200304 1

Form No. S16-I
表格第 S16-I 號

APPLICATION FOR PERMISSION UNDER SECTION 16 OF THE TOWN PLANNING ORDINANCE (CAP.131)

根據《城市規劃條例》(第131章)第16條遞交的許可申請

此文件在 2021年 1月 7日 收到。城市規劃委員會只會在收到所有必要的資料及文件後才正式確認收到申請的日期。
This document is received on - 7 JAN 2021. The Town Planning Board will formally acknowledge the date of receipt of the application only upon receipt of all the required information and documents.

Applicable to proposals not involving or not only involving:
適用於建議不涉及或不祇涉及:

(i) Construction of "New Territories Exempted House(s)";
興建「新界豁免管制屋宇」;

(ii) Temporary use/development of land and/or building not exceeding 3 years in rural areas; and
位於鄉郊地區土地上及/或建築物內進行為期不超過三年的臨時用途/發展;及

(iii) Renewal of permission for temporary use or development in rural areas
位於鄉郊地區的臨時用途或發展的許可續期

Applicant who would like to publish the notice of application in local newspapers to meet one of the Town Planning Board's requirements of taking reasonable steps to obtain consent of or give notification to the current land owner, please refer to the following link regarding publishing the notice in the designated newspapers: https://www.info.gov.hk/tpb/en/plan_application/apply.html

申請人如欲在本地報章刊登申請通知,以採取城市規劃委員會就取得現行土地擁有人的同意或通知現行土地擁有人所指定的其中一項合理步驟,請瀏覽以下網址有關在指定的報章刊登通知:
https://www.info.gov.hk/tpb/tc/plan_application/apply.html

General Note and Annotation for the Form
填寫表格的一般指引及註解

\# "Current land owner" means any person whose name is registered in the Land Registry as that of an owner of the land to which the application relates, as at 6 weeks before the application is made
「現行土地擁有人」指在提出申請前六星期,其姓名或名稱已在土地註冊處註冊為該申請所關乎的土地的擁有人的人

& Please attach documentary proof 請夾附證明文件

^ Please insert number where appropriate 請在適當地方註明編號

Please fill "NA" for inapplicable item 請在不適用的項目填寫「不適用」

Please use separate sheets if the space provided is insufficient 如所提供的空間不足,請另頁說明

Please insert a「✓」at the appropriate box 請在適當的方格內上加上「✓」號

For Official Use Only 請勿填寫此欄	Application No. 申請編號	A/KC/473
	Date Received 收到日期	17 JAN 2021

1. The completed form and supporting documents (if any) should be sent to the Secretary, Town Planning Board (the Board), 15/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong.
申請人須把填妥的申請表格及其他支持申請的文件 (倘有)，送交香港北角渣華道 333 號北角政府合署 15 樓城市規劃委員會(下稱「委員會」)秘書收。

2. Please read the "Guidance Notes" carefully before you fill in this form. The document can be downloaded from the Board's website at http://www.info.gov.hk/tpb/. It can also be obtained from the Secretariat of the Board at 15/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong (Tel: 2231 4810 or 2231 4835), and the Planning Enquiry Counters of the Planning Department (Hotline: 2231 5000) (17/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong and 14/F, Sha Tin Government Offices, 1 Sheung Wo Che Road, Sha Tin, New Territories).
請先細閱《申請須知》的資料單張，然後填寫此表格。該份文件可從委員會的網頁下載 (網址：http://www.info.gov.hk/tpb/)，亦可向委員會秘書處 (香港北角渣華道 333 號北角政府合署 15 樓 – 電話：2231 4810 或 2231 4835)及規劃署的規劃資料查詢處(熱線：2231 5000) (香港北角渣華道 333 號北角政府合署 17 樓及新界沙田上禾輋路 1 號沙田政府合署 14 樓)索取。

3. This form can be downloaded from the Board's website, and obtained from the Secretariat of the Board and the Planning Enquiry Counters of the Planning Department. The form should be typed or completed in block letters. The processing of the application may be refused if the required information or the required copies are incomplete.
此表格可從委員會的網頁下載，亦可向委員會秘書處及規劃署的規劃資料查詢處索取。申請人須以打印方式或以正楷填寫表格。如果申請人所提交的資料或文件副本不齊全，委員會可拒絕處理有關申請。

1. Name of Applicant 申請人姓名/名稱

(☐ Mr. 先生 / ☐ Mrs. 夫人 / ☐ Miss 小姐 / ☐ Ms. 女士 / ☑ Company 公司 / ☐ Organisation 機構)

EDJ II (HK) Limited

2. Name of Authorised Agent (if applicable) 獲授權代理人姓名/名稱（如適用）

(☐ Mr. 先生 / ☐ Mrs. 夫人 / ☐ Miss 小姐 / ☐ Ms. 女士 / ☑ Company 公司 / ☐ Organisation 機構)

Ove Arup & Partners Hong Kong Limited 奧雅納工程顧問有限公司

3. Application Site 申請地點

(a) Full address / location / demarcation district and lot number (if applicable) 詳細地址／地點／丈量約份及地段號碼（如適用）	Kwai Chung Town Lot No.161 Nos. 2-10 Tai Yuen Street, Kwai Chung
(b) Site area and/or gross floor area involved 涉及的地盤面積及／或總樓面面積	☑Site area 地盤面積 1,865 sq.m 平方米 ☑About 約 ☑Gross floor area 總樓面面積 21,820.5 sq.m 平方米 ☑About 約
(c) Area of Government land included (if any) 所包括的政府土地面積（倘有）	N/A sq.m 平方米 ☐About 約

(d)	Name and number of the related statutory plan(s) 有關法定圖則的名稱及編號	Draft Kwai Chung Outline Zoning Plan No. S/KC/29
(e)	Land use zone(s) involved 涉及的土地用途地帶	"Other Specified Uses" annotated "Business"
(f)	Current use(s) 現時用途	Vacated industrial building (If there are any Government, institution or community facilities, please illustrate on plan and specify the use and gross floor area) (如有任何政府、機構或社區設施，請在圖則上顯示，並註明用途及總樓面面積)

4. "Current Land Owner" of Application Site 申請地點的「現行土地擁有人」

The applicant 申請人 –

☑ is the sole "current land owner"#& (please proceed to Part 6 and attach documentary proof of ownership).
是唯一的「現行土地擁有人」#& (請繼續填寫第 6 部分，並夾附業權證明文件)。

☐ is one of the "current land owners"#& (please attach documentary proof of ownership).
是其中一名「現行土地擁有人」#& (請夾附業權證明文件)。

☐ is not a "current land owner"#.
並不是「現行土地擁有人」#。

☐ The application site is entirely on Government land (please proceed to Part 6).
申請地點完全位於政府土地上（請繼續填寫第 6 部分）。

5. Statement on Owner's Consent/Notification
就土地擁有人的同意/通知土地擁有人的陳述

(a) According to the record(s) of the Land Registry as at ..... (DD/MM/YYYY), this application involves a total of ..... "current land owner(s)"#.
根據土地註冊處截至 ..... 年 ..... 月 ..... 日的記錄，這宗申請共牽涉 ..... 名「現行土地擁有人」#。

(b) The applicant 申請人 –

☐ has obtained consent(s) of ..... "current land owner(s)"#.
已取得 ..... 名「現行土地擁有人」#的同意。

Details of consent of "current land owner(s)"# obtained 取得「現行土地擁有人」#同意的詳情		
No. of 'Current Land Owner(s)' 「現行土地擁有人」數目	Lot number/address of premises as shown in the record of the Land Registry where consent(s) has/have been obtained 根據土地註冊處記錄已獲得同意的地段號碼／處所地址	Date of consent obtained (DD/MM/YYYY) 取得同意的日期 (日/月/年)

(Please use separate sheets if the space of any box above is insufficient. 如上列任何方格的空間不足，請另頁說明)

☐ has notified ..... "current land owner(s)"#
已通知 ..... 名「現行土地擁有人」#。

Details of the "current land owner(s)"# notified 已獲通知「現行土地擁有人」#的詳細資料		
No. of 'Current Land Owner(s)' 「現行土地擁有人」數目	Lot number/address of premises as shown in the record of the Land Registry where notification(s) has/have been given 根據土地註冊處記錄已發出通知的地段號碼／處所地址	Date of notification given (DD/MM/YYYY) 通知日期(日/月/年)

(Please use separate sheets if the space of any box above is insufficient. 如上列任何方格的空間不足，請另頁說明)

☐ has taken reasonable steps to obtain consent of or give notification to owner(s):
已採取合理步驟以取得土地擁有人的同意或向該人發給通知，詳情如下：

Reasonable Steps to Obtain Consent of Owner(s) 取得土地擁有人的同意所採取的合理步驟

☐ sent request for consent to the "current land owner(s)" on _____ (DD/MM/YYYY)#&
於_____(日/月/年)向每一名「現行土地擁有人」#郵遞要求同意書&

Reasonable Steps to Give Notification to Owner(s) 向土地擁有人發出通知所採取的合理步驟

☐ published notices in local newspapers on _____ (DD/MM/YYYY)&
於_____(日/月/年)在指定報章就申請刊登一次通知&

☐ posted notice in a prominent position on or near application site/premises on _____ (DD/MM/YYYY)&
於_____(日/月/年)在申請地點／申請處所或附近的顯明位置貼出關於該申請的通知&

☐ sent notice to relevant owners' corporation(s)/owners' committee(s)/mutual aid committee(s)/management office(s) or rural committee on _____ (DD/MM/YYYY)&
於_____(日/月/年)把通知寄往相關的業主立案法團/業主委員會/互助委員會或管理處，或有關的鄉事委員會&

Others 其他

☐ others (please specify)
其他（請指明）

_____

_____

_____

_____

Note: May insert more than one「✓」.
Information should be provided on the basis of each and every lot (if applicable) and premises (if any) in respect of the application.
註: 可在多於一個方格內加上「✓」號
申請人須就申請涉及的每一地段（倘適用）及處所（倘有）分別提供資料

6. Type(s) of Application 申請類別

☐ Type (i) 第(i)類 Change of use within existing building or part thereof 更改現有建築物或其部分內的用途

☐ Type (ii) 第(ii)類 Diversion of stream / excavation of land / filling of land / filling of pond as required under Notes of Statutory Plan(s) 根據法定圖則《註釋》內所要求的河道改道／挖土／填土／填塘工程

☐ Type (iii) 第(iii)類 Public utility installation / Utility installation for private project 公用事業設施裝置/私人發展計劃的公用設施裝置

☑ Type (iv) 第(iv)類 Minor relaxation of stated development restriction(s) as provided under Notes of Statutory Plan(s) 略為放寬於法定圖則《註釋》內列明的發展限制

☐ Type (v) 第(v)類 Use / development other than (i) to (iii) above 上述的(i)至(iii)項以外的用途／發展

Note 1: May insert more than one「✓」.
註 1： 可在多於一個方格內加上「✓」號
Note 2: For Development involving columbarium use, please complete the table in the Appendix.
註 2： 如發展涉及靈灰安置所用途，請填妥於附件的表格。

(@) For Type (@) application 供第(@)類用途

(a) Total floor area involved 涉及的總樓面面積	sq.m 平方米		
(b) Proposed use(s)/development 擬議用途/發展	(If there are any Government, institution or community facilities, please illustrate on plan and specify the use and gross floor area) (如有任何政府、機構或社區設施，請在圖則上顯示，並註明用途及總樓面面積)		
(c) Number of storeys involved 涉及層數		Number of units involved 涉及單位數目	
(d) Proposed floor area 擬議樓面面積	Domestic part 住用部分 ..... sq.m 平方米 ☐About 約		
	Non-domestic part 非住用部分..... sq.m 平方米 ☐About 約		
	Total 總計 ..... sq.m 平方米 ☐About 約		

(e) Proposed uses of different floors (if applicable) 不同樓層的擬議用途(如適用)
(Please use separate sheets if the space provided is insufficient)
(如所提供的空間不足，請另頁說明)

Floor(s) 樓層	Current use(s) 現時用途	Proposed use(s) 擬議用途

(ii) For Type (ii) application 供第(ii)類用途

(a) Operation involved 涉及工程	☐ Diversion of stream 河道改道 ☐ Filling of pond 填塘 Area of filling 填塘面積 ..... sq.m 平方米 ☐About 約 Depth of filling 填塘深度 ..... m 米 ☐About 約 ☐ Filling of land 填土 Area of filling 填土面積 ..... sq.m 平方米 ☐About 約 Depth of filling 填土厚度 ..... m 米 ☐About 約 ☐ Excavation of land 挖土 Area of excavation 挖土面積 ..... sq.m 平方米 ☐About 約 Depth of excavation 挖土深度 ..... m 米 ☐About 約 (Please indicate on site plan the boundary of concerned land/pond(s), and particulars of stream diversion, the extent of filling of land/pond(s) and/or excavation of land) (請用圖則顯示有關土地／池塘界線，以及河道改道、填塘、填土及／或挖土的細節及/或範圍))
(b) Intended use/development 有意進行的用途／發展	

(a) Nature and scale 性質及規模	☐ Public utility installation 公用事業設施裝置 ☐ Utility installation for private project 私人發展計劃的公用設施裝置 Please specify the type and number of utility to be provided as well as the dimensions of each building/structure, where appropriate 請註明有關裝置的性質及數量，包括每座建築物/構築物(倘有)的長度、高度和闊度

Name/type of installation 裝置名稱／種類	Number of provision 數量	Dimension of each installation /building/structure (m) (LxWxH) 每個裝置／建築物／構築物的尺寸 (米) (長 x 闊 x 高)

(Please illustrate on plan the layout of the installation 請用圖則顯示裝置的布局)

(iv) For Type (iv) application 供第(iv)類用

(a) Please specify the proposed minor relaxation of stated development restriction(s) and **also fill in the proposed use/development and development particulars in part (v) below** –
請列明擬議略為放寬的發展限制**並填妥於第(v)部分的擬議用途/發展及發展細節** –

☑	Plot ratio restriction 地積比率限制	From 由 9.75 to 至 11.7
☐	Gross floor area restriction 總樓面面積限制	From 由 .....sq. m 平方米 to 至 .....sq. m 平方米
☐	Site coverage restriction 上蓋面積限制	From 由 .....% to 至 ..... %
☐	Building height restriction 建築物高度限制	From 由 .....m 米 to 至 ..... m 米 From 由 ..... mPD 米 (主水平基準上) to 至 .....mPD 米 (主水平基準上) From 由 ..... storeys 層 to 至 ..... storeys 層
☐	Non-building area restriction 非建築用地限制	From 由 .....m to 至 ..... m
☐	Others (please specify) 其他（請註明）	.....

(v) For Type (iv) application 供第(iv)類用

(a) Proposed use(s)/development 擬議用途/發展	"Information Technology and Telecommunications Industries" (Proposed Data Centre Development) (Please illustrate the details of the proposal on a layout plan 請用平面圖說明建議詳情)

(b) Development Schedule 發展細節表

Proposed gross floor area (GFA) 擬議總樓面面積	21,820.5 sq.m 平方米	☑About 約
Proposed plot ratio 擬議地積比率	11.7	☑About 約
Proposed site coverage 擬議上蓋面積	G/F-2/F (up to 15m from street level): not more than 90.0% 3/F-UR/F(above 15m from street level): not more than 62.5%	☐About 約
Proposed no. of blocks 擬議座數	1	
Proposed no. of storeys of each block 每座建築物的擬議層數	22 storeys 層 ☑ include 包括 2 storeys of basements 層地庫 ☐ exclude 不包括 ..... storeys of basements 層地庫	
Proposed building height of each block 每座建築物的擬議高度	129.5 mPD 米(主水平基準上) 111.15 m 米	☑About 約 ☑About 約

☐ Domestic part 住用部分

GFA 總樓面面積 ..... sq. m 平方米 ☐About 約

number of Units 單位數目 .....

average unit size 單位平均面積 .....sq. m 平方米 ☐About 約

estimated number of residents 估計住客數目 .....

☑ Non-domestic part 非住用部分 GFA 總樓面面積

☐ eating place 食肆 ..... sq. m 平方米 ☐About 約

☐ hotel 酒店 ..... sq. m 平方米 ☐About 約
(please specify the number of rooms 請註明房間數目) .....

☐ office 辦公室 ..... sq. m 平方米 ☐About 約

☐ shop and services 商店及服務行業 ..... sq. m 平方米 ☐About 約

☐ Government, institution or community facilities 政府、機構或社區設施 (please specify the use(s) and concerned land area(s)/GFA(s) 請註明用途及有關的地面面積／總樓面面積)
.....
.....
.....

☑ other(s) 其他 (please specify the use(s) and concerned land area(s)/GFA(s) 請註明用途及有關的地面面積／總樓面面積)
data centre with GFA of about 21,820.5 sq.m.
.....
.....
.....

☐ Open space 休憩用地 (please specify land area(s) 請註明地面面積)

☐ private open space 私人休憩用地 ..... sq. m 平方米 ☐ Not less than 不少於

☐ public open space 公眾休憩用地 ..... sq. m 平方米 ☐ Not less than 不少於

(c) Use(s) of different floors (if applicable) 各樓層的用途 (如適用)

[Block number] [座數]	[Floor(s)] [層數]	[Proposed use(s)] [擬議用途]
1	B2/F - B1/F	Carpark, loading/unloading and E&M
.....	G/F	Lobby, ancillary security office, car park, loading/unloading, electricity substation and E&M
.....	1/F	Electricity substation and E&M
.....	2/F	Ancillary uses including protection control, security control and telecom, electricity substation and E&M
.....	3/F, 5/F-7/F, 9/F-12/F, 14/F-16/F	Data hall
.....	4/F, 8/F, 13/F, 17/F-19/F	E&M
.....	R/F-UR/F	E&M and cooling towers

(d) Proposed use(s) of uncovered area (if any) 露天地方（倘有）的擬議用途
Greenery
.....
.....
.....
.....
.....

7. Anticipated Completion Time of the Development Proposal
擬議發展計劃的預計完成時間

Anticipated completion time (in month and year) of the development proposal (by phase (if any)) (e.g. June 2023)
擬議發展計劃預期完成的年份及月份 (分期 (倘有)) (例：2023 年 6 月)
(Separate anticipated completion times (in month and year) should be provided for the proposed public open space and Government, institution or community facilities (if any))
(申請人須就擬議的公眾休憩用地及政府、機構或社區設施 (倘有) 提供個別擬議完成的年份及月份)

2024.

8. Vehicular Access Arrangement of the Development Proposal
擬議發展計劃的行車通道安排

Any vehicular access to the site/subject building? 是否有車路通往地盤／有關建築物？	Yes 是	☑ There is an existing access. (please indicate the street name, where appropriate) 有一條現有車路。(請註明車路名稱(如適用)) Tai Yuen Street ☐ There is a proposed access. (please illustrate on plan and specify the width) 有一條擬議車路。（請在圖則顯示，並註明車路的闊度）
	No 否	☐
Any provision of parking space for the proposed use(s)? 是否有為擬議用途提供停車位？	Yes 是	☑ (Please specify type(s) and number(s) and illustrate on plan) 請註明種類及數目並於圖則上顯示) Private Car Parking Spaces 私家車車位: 37 Motorcycle Parking Spaces 電單車車位: 4 Light Goods Vehicle Parking Spaces 輕型貨車泊車位: 2 Medium Goods Vehicle Parking Spaces 中型貨車泊車位: N/A Heavy Goods Vehicle Parking Spaces 重型貨車泊車位: 2 Others (Please Specify) 其他 (請列明): N/A
	No 否	☐
Any provision of loading/unloading space for the proposed use(s)? 是否有為擬議用途提供上落客貨車位？	Yes 是	☑ (Please specify type(s) and number(s) and illustrate on plan) 請註明種類及數目並於圖則上顯示) Taxi Spaces 的士車位: N/A Coach Spaces 旅遊巴車位: N/A Light Goods Vehicle Spaces 輕型貨車車位: 2 Medium Goods Vehicle Spaces 中型貨車車位: N/A Heavy Goods Vehicle Spaces 重型貨車車位: 1 Others (Please Specify) 其他 (請列明): N/A
	No 否	☐

9. Impacts of Development Proposal 擬議發展計劃的影響

If necessary, please use separate sheets to indicate the proposed measures to minimise possible adverse impacts or give justifications/reasons for not providing such measures.
如需要的話，請另頁表示可盡量減少可能出現不良影響的措施，否則請提供理據/理由。

Does the development proposal involve alteration of existing building? 擬議發展計劃是否包括現有建築物的改動?	Yes 是	☐ Please provide details 請提供詳情 ....
	No 否	☑
Does the development proposal involve the operation on the right? 擬議發展是否涉及右列的工程? (Note: where Type (ii) application is the subject of application, please skip this section. 註：如申請涉及第(ii)類申請，請跳至下一條問題。)	Yes 是	☑ (Please indicate on site plan the boundary of concerned land/pond(s), and particulars of stream diversion, the extent of filling of land/pond(s) and/or excavation of land) (請用地盤平面圖顯示有關土地／池塘界線，以及河道改道、填塘、填土及／或挖土的細節及/或範圍) ☐ Diversion of stream 河道改道 ☐ Filling of pond 填塘 Area of filling 填塘面積 ..... sq.m 平方米 ☐About 約 Depth of filling 填塘深度 ..... m 米 ☐About 約 ☐ Filling of land 填土 Area of filling 填土面積 ..... sq.m 平方米 ☐About 約 Depth of filling 填土厚度 ..... m 米 ☐About 約 ☑ Excavation of land 挖土 Area of excavation 挖土面積.....1,865... sq.m 平方米 ☑About 約 Depth of excavation 挖土深度 .....13.....m 米 ☑About 約
	No 否	☐
Would the development proposal cause any adverse impacts? 擬議發展計劃會否造成不良影響？	On environment 對環境	Yes 會 ☐ No 不會 ☑
	On traffic 對交通	Yes 會 ☐ No 不會 ☑
	On water supply 對供水	Yes 會 ☐ No 不會 ☑
	On drainage 對排水	Yes 會 ☐ No 不會 ☑
	On slopes 對斜坡	Yes 會 ☐ No 不會 ☑
	Affected by slopes 受斜坡影響	Yes 會 ☐ No 不會 ☑
	Landscape Impact 構成景觀影響	Yes 會 ☐ No 不會 ☑
	Tree Felling 砍伐樹木	Yes 會 ☐ No 不會 ☑
	Visual Impact 構成視覺影響	Yes 會 ☐ No 不會 ☑
	Others (Please Specify) 其他 (請列明)	Yes 會 ☐ No 不會 ☑
	_____	
	_____	
	Please state measure(s) to minimise the impact(s). For tree felling, please state the number, diameter at breast height and species of the affected trees (if possible) 請註明盡量減少影響的措施。如涉及砍伐樹木，請說明受影響樹木的數目、及胸高度的樹幹直徑及品種(倘可) Please refer to the Supporting Planning Statement for details.	

10. Justifications 理由

The applicant is invited to provide justifications in support of the application. Use separate sheets if necessary.
現請申請人提供申請理由及支持其申請的資料。如有需要，請另頁說明。

Please refer to the Supporting Planning Statement for details.

11. Declaration 聲明

I hereby declare that the particulars given in this application are correct and true to the best of my knowledge and belief.
本人謹此聲明，本人就這宗申請提交的資料，據本人所知及所信，均屬真實無誤。

I hereby grant a permission to the Board to copy all the materials submitted in an application to the Board and/or to upload such materials to the Board's website for browsing and downloading by the public free-of-charge at the Board's discretion.
本人現准許委員會酌情將本人就此申請所提交的所有資料複製及/或上載至委員會網站，供公眾免費瀏覽或下載。

Signature 簽署 ..... ☐ Applicant 申請人 / ☑ Authorised Agent 獲授權代理人

Yeung Wing Shan, Theresa
Name in Block Letters 姓名（請以正楷填寫）

Director of Planning
Position (if applicable) 職位 （如適用）

Professional Qualification(s) 專業資格
☐ Member 會員 / ☑ Fellow of 資深會員
☑ HKIP 香港規劃師學會 / ☐ HKIA 香港建築師學會
☐ HKIS 香港測量師學會 / ☐ HKIE 香港工程師學會 /
☐ HKILA 香港園境師學會/ ☐ HKIUD 香港城市設計學會
Others 其他 MRTPI, RPP

on behalf of 代表 Ove Arup & Partners Hong Kong Limited

☑ Company 公司 / ☐ Organisation Name and Chop (if applicable) 機構名稱及蓋章（如適用）

Date 日期 23/12/2020 (DD/MM/YYYY 日/月/年)

Remark 備註

The materials submitted in an application to the Board and the Board's decision on the application would be disclosed to the public. Such materials would also be uploaded to the Board's website for browsing and free downloading by the public where the Board considers appropriate.
委員會會向公眾披露申請人所遞交的申請資料和委員會對申請所作的決定。在委員會認為合適的情況下，有關申請資料亦會上載至委員會網頁供公眾免費瀏覽及下載。

Warning 警告

Any person who knowingly or wilfully makes any statement or furnish any information in connection with this application, which is false in any material particular, shall be liable to an offence under the Crimes Ordinance.
任何人在明知或故意的情況下，就這宗申請提出在任何要項上是虛假的陳述或資料，即屬違反《刑事罪行條例》。

Statement on Personal Data 個人資料的聲明

1. The personal data submitted to the Board in this application will be used by the Secretary of the Board and Government departments for the following purposes:
委員會就這宗申請所收到的個人資料會交給委員會秘書及政府部門，以根據《城市規劃條例》及相關的城市規劃委員會規劃指引的規定作以下用途：
   (a) the processing of this application which includes making available the name of the applicant for public inspection when making available this application for public inspection; and
E&M rooms and CLP substations
處理這宗申請，包括公布這宗申請供公眾查閱，同時公布申請人的姓名供公眾查閱；以及
   (b) facilitating communication between the applicant and the Secretary of the Board/Government departments.
方便申請人與委員會秘書及政府部門之間進行聯絡。

2. The personal data provided by the applicant in this application may also be disclosed to other persons for the purposes mentioned in paragraph 1 above.
申請人就這宗申請提供的個人資料，或亦會向其他人士披露，以作上述第 1 段提及的用途。

3. An applicant has a right of access and correction with respect to his/her personal data as provided under the Personal Data (Privacy) Ordinance (Cap. 486). Request for personal data access and correction should be addressed to the Secretary of the Board at 15/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong.
根據《個人資料(私隱)條例》(第 486 章)的規定，申請人有權查閱及更正其個人資料。如欲查閱及更正個人資料，應向委員會秘書提出有關要求，其地址為香港北角渣華道 333 號北角政府合署 15 樓。

For Developments involving Columbarium Use, please also complete the following:
如發展涉及靈灰安置所用途，請另外填妥以下資料:

Ash interment capacity 骨灰安放容量[@]

Maximum number of sets of ashes that may be interred in the niches
在龕位內最多可安放骨灰的數量 _____

Maximum number of sets of ashes that may be interred other than in niches
在非龕位的範圍內最多可安放骨灰的數量 _____

Total number of niches 龕位總數 _____

Total number of single niches
單人龕位總數 _____

Number of single niches (sold and occupied)
單人龕位數目 (已售並佔用) _____

Number of single niches (sold but unoccupied)
單人龕位數目 (已售但未佔用) _____

Number of single niches (residual for sale)
單人龕位數目 (待售) _____

Total number of double niches
雙人龕位總數 _____

Number of double niches (sold and fully occupied)
雙人龕位數目 (已售並全部佔用) _____

Number of double niches (sold and partially occupied)
雙人龕位數目 (已售並部分佔用) _____

Number of double niches (sold but unoccupied)
雙人龕位數目 (已售但未佔用) _____

Number of double niches (residual for sale)
雙人龕位數目 (待售) _____

Total no. of niches other than single or double niches (please specify type)
除單人及雙人龕位外的其他龕位總數 (請列明類別) _____

Number. of niches (sold and fully occupied)
龕位數目 (已售並全部佔用) _____

Number of niches (sold and partially occupied)
龕位數目 (已售並部分佔用) _____

Number of niches (sold but unoccupied)
龕位數目 (已售但未佔用) _____

Number of niches (residual for sale)
龕位數目 (待售) _____

Proposed operating hours 擬議營運時間 _____

_____

@ Ash interment capacity in relation to a columbarium means --
就靈灰安置所而言，骨灰安放容量指：
- the maximum number of containers of ashes that may be interred in each niche in the columbarium;
每個龕位內可安放的骨灰容器的最高數目;
- the maximum number of sets of ashes that may be interred other than in niches in any area in the columbarium; and
在該靈灰安置所並非龕位的範圍內，總共最多可安放多少份骨灰；以及
- the total number of sets of ashes that may be interred in the columbarium.
在該骨灰安置所內，總共最多可安放多少份骨灰。

Gist of Application 申請摘要

(Please provide details in both English and Chinese as far as possible. This part will be circulated to relevant consultees, uploaded to the Town Planning Board's Website for browsing and free downloading by the public and deposited at the Planning Enquiry Counters of the Planning Department for general information.)
(請盡量以英文及中文填寫。此部分將會發送予相關諮詢人士、上載至城市規劃委員會網頁供公眾免費瀏覽及下載及存放於規劃署規劃資料查詢處以供一般參閱。)

Application No. 申請編號	(For Official Use Only) (請勿填寫此欄)
Location/address 位置／地址	**葵涌大圓街2-10號 (葵涌市地段第161號)** Nos. 2-10 Tai Yuen Street, Kwai Chung (Kwai Chung Town Lot No.161)
Site area 地盤面積	1,865 sq. m 平方米 ☑ About 約 (includes Government land of 包括政府土地 0 sq. m 平方米 ☐ About 約)
Plan 圖則	**葵涌分區計劃大綱草圖編號S／KC／29** Draft Kwai Chung Outline Zoning Plan No. S/KC/29
Zoning 地帶	**「其他指定用途」註明「商貿」** "Other Specified Uses" annotated "Business"
Applied use/ development 申請用途/發展	**擬議略為放寬地積比率限制，以作准許的資訊科技及電訊業(擬議數據中心發展項目)用途** Proposed Minor Relaxation of Plot Ratio Restriction for Permitted Information Technology and Telecommunications Industries (Proposed Data Centre Development)

		sq.m 平方米	Plot Ratio 地積比率
(i) Gross floor area and/or plot ratio 總樓面面積及／或地積比率	Domestic 住用	☐ About 約 ☐ Not more than 不多於	☐About 約 ☐Not more than 不多於
	Non-domestic 非住用	21,820.5 ☑ About 約 ☐ Not more than 不多於	11.7 ☑About 約 ☐Not more than 不多於
(ii) No. of block 幢數	Domestic 住用		
	Non-domestic 非住用	1	
	Composite 綜合用途		

(iii)	Building height/No. of storeys 建築物高度／層數	Domestic 住用		m 米 ☐ (Not more than 不多於)
				mPD 米(主水平基準上) ☐ (Not more than 不多於)
				Storeys(s) 層 ☐ (Not more than 不多於) (☐*Include 包括*/☐ *Exclude 不包括* ☐ *Carport 停車間* ☐ *Basement 地庫* ☐ *Refuge Floor 防火層* ☐ *Podium 平台*)
		Non-domestic 非住用		m 米 ☐ (Not more than 不多於)
			129.5	mPD 米(主水平基準上) ☐ (Not more than 不多於)
			22	Storeys(s) 層 ☑ (Not more than 不多於) (☑*Include 包括*/☐ *Exclude 不包括* ☐ *Carport 停車間* ☑ *Basement 地庫* ☐ *Refuge Floor 防火層* ☐ *Podium 平台*)
		Composite 綜合用途		m 米 ☐ (Not more than 不多於)
				mPD 米(主水平基準上) ☐ (Not more than 不多於)
				Storeys(s) 層 ☐ (Not more than 不多於) (☐*Include 包括*/☐ *Exclude 不包括* ☐ *Carport 停車間* ☐ *Basement 地庫* ☐ *Refuge Floor 防火層* ☐ *Podium 平台*)
(iv)	Site coverage 上蓋面積			G/F-2/F: Not more than 90.0% 3/F-UR/F: Not more than 62.5% ☑ About 約
(v)	No. of units 單位數目			
(vi)	Open space 休憩用地	Private 私人		sq.m 平方米 ☐ Not less than 不少於
		Public 公眾		sq.m 平方米 ☐ Not less than 不少於

(vii) No. of parking spaces and loading / unloading spaces 停車位及上落客貨車位數目	Total no. of vehicle parking spaces 停車位總數	
	Private Car Parking Spaces 私家車車位	37
	Motorcycle Parking Spaces 電單車車位	4
	Light Goods Vehicle Parking Spaces 輕型貨車泊車位	2
	Medium Goods Vehicle Parking Spaces 中型貨車泊車位	N/A
	Heavy Goods Vehicle Parking Spaces 重型貨車泊車位	2
	Others (Please Specify) 其他 (請列明)	N/A
	Total no. of vehicle loading/unloading bays/lay-bys 上落客貨車位／停車處總數	
	Taxi Spaces 的士車位	N/A
	Coach Spaces 旅遊巴車位	N/A
	Light Goods Vehicle Spaces 輕型貨車車位	2
	Medium Goods Vehicle Spaces 中型貨車位	N/A
	Heavy Goods Vehicle Spaces 重型貨車車位	1
	Others (Please Specify) 其他 (請列明)	N/A

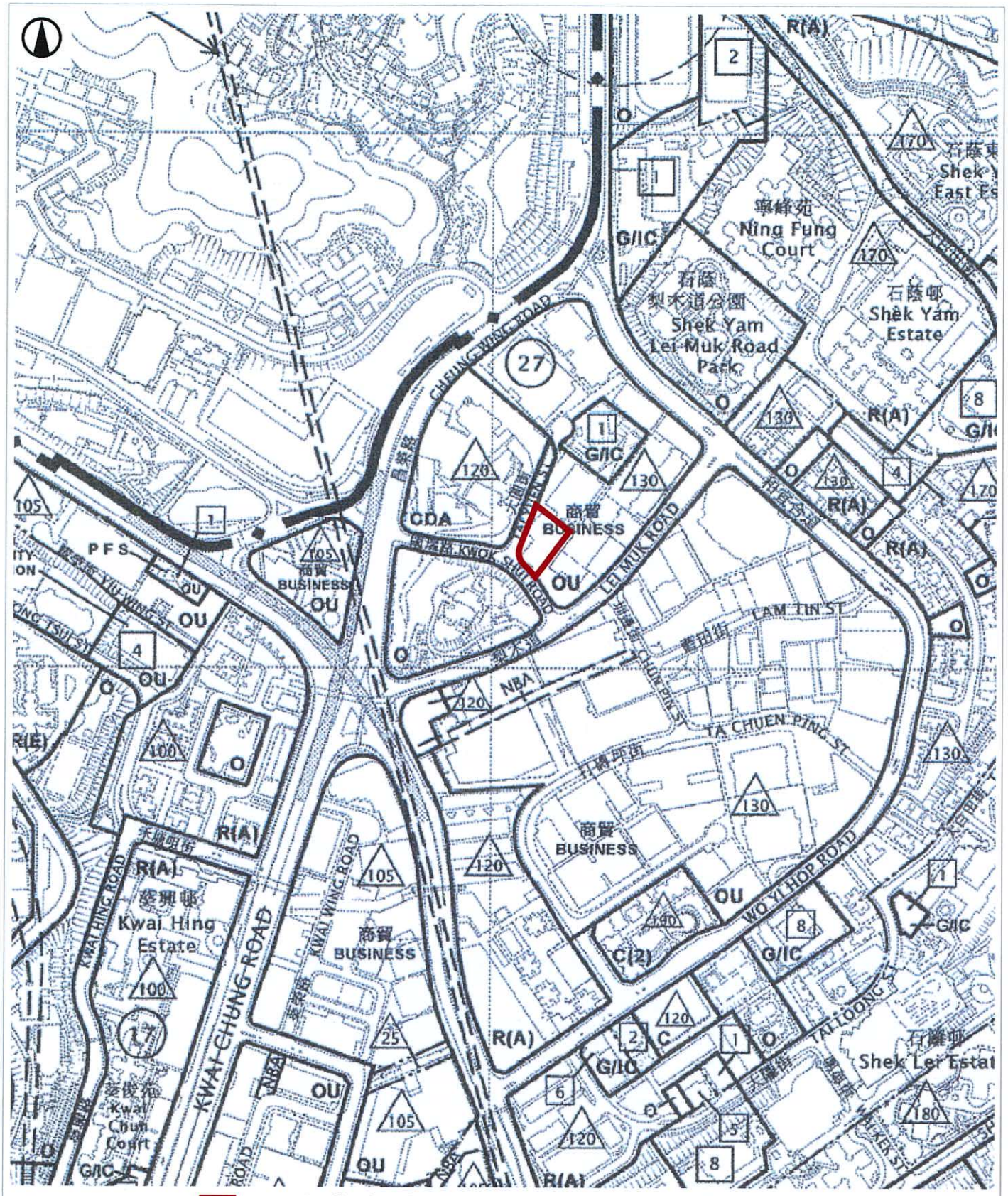
Submitted Plans, Drawings and Documents 提交的圖則、繪圖及文件

	Chinese 中文	English 英文
Plans and Drawings 圖則及繪圖		
Master layout plan(s)/Layout plan(s) 總綱發展藍圖／布局設計圖	☐	☑
Block plan(s) 樓宇位置圖	☐	☑
Floor plan(s) 樓宇平面圖	☐	☑
Sectional plan(s) 截視圖	☐	☑
Elevation(s) 立視圖	☐	☐
Photomontage(s) showing the proposed development 顯示擬議發展的合成照片	☐	☑
Master landscape plan(s)/Landscape plan(s) 園境設計總圖／園境設計圖	☐	☐
Others (please specify) 其他（請註明） Greenery Calculations	☐	☐
Reports 報告書		
Planning Statement/Justifications 規劃綱領/理據	☐	☑
Environmental assessment (noise, air and/or water pollutions) 環境評估（噪音、空氣及／或水的污染）	☐	☐
Traffic impact assessment (on vehicles) 就車輛的交通影響評估	☐	☑
Traffic impact assessment (on pedestrians) 就行人的交通影響評估	☐	☑
Visual impact assessment 視覺影響評估	☐	☐
Landscape impact assessment 景觀影響評估	☐	☐
Tree Survey 樹木調查	☐	☐
Geotechnical impact assessment 土力影響評估	☐	☐
Drainage impact assessment 排水影響評估	☐	☐
Sewerage impact assessment 排污影響評估	☐	☑
Risk Assessment 風險評估	☐	☐
Others (please specify) 其他（請註明）	☐	☐

Note: May insert more than one「✓」. 註：可在多於一個方格內加上「✓」號

Note: The information in the Gist of Application above is provided by the applicant for easy reference of the general public. Under no circumstances will the Town Planning Board accept any liabilities for the use of the information nor any inaccuracies or discrepancies of the information provided. In case of doubt, reference should always be made to the submission of the applicant.

註： 上述申請摘要的資料是由申請人提供以方便市民大眾參考。對於所載資料在使用上的問題及文義上的歧異，城市規劃委員會概不負責。若有任何疑問，應查閱申請人提交的文件。

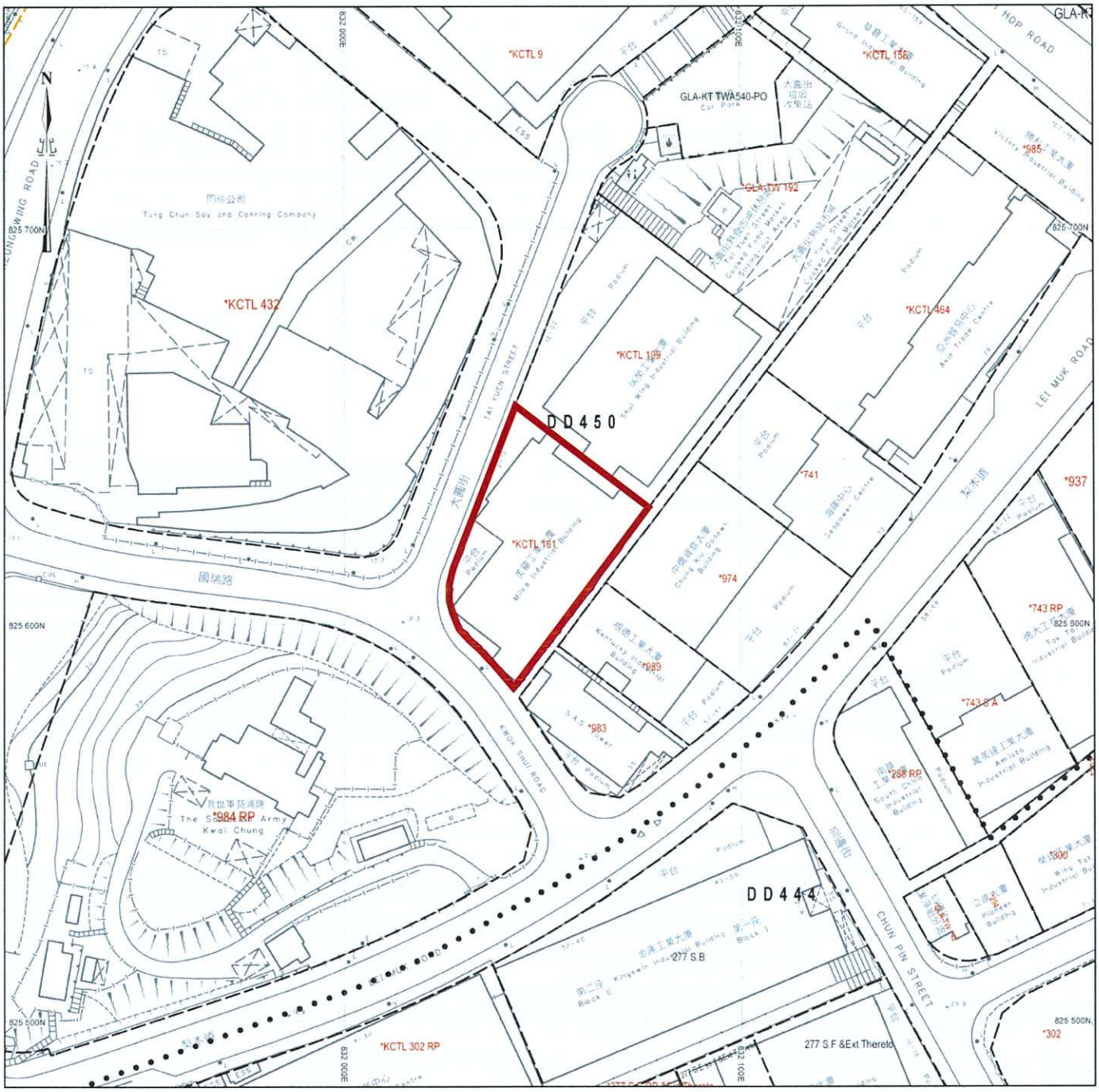


LEGEND Application Site

ZONING

R(A)	Residential (Group A)
C	Commercial
C(2)	Commercial (2)
G/IC	Government, Institution or Community
O	Open Space
GB	Green Belt
OU(B)	Other Specified Uses (Business)
I	Industrial

Figure No.	*Scale*	*Figure Title*
2.1	-	**Location Plan**
ARUP	*Date* December 2020	*Source* Extracted from the Draft Kwai Chung Outline Zoning Plan No. S/KC/29



Application Site

Figure No.	*Scale*	*Figure Title*	**Lot Index Plan**
2.2	-		
ARUP	*Date* December 2020	*Source*	Survey and Mapping Office, Lands Department

EXECUTIVE SUMMARY

Pursuant to section 16 (s.16) of the Town Planning Ordinance (TPO), this Supporting Planning Statement is prepared and submitted to seek approval from the Town Planning Board (TPB) for the proposed minor relaxation of plot ratio (PR) restriction from 9.75 to 11.7 (+20%) for redeveloping the existing industrial building at Nos. 2-10 Tai Yuen Street, Kwai Chung (the Application Site), which is constructed before 1987, for proposed data centre use. The concerned redevelopment echoes with the reactivated revitalization scheme for industrial buildings (IBs), which was announced in the Chief Executive's 2018 Policy Address to encourage the redevelopment of pre-1987 industrial buildings (IBs).

The Application Site falls within an area zoned "Other Specified Uses" annotated "Business" ("OU(B)") zone on the Draft Kwai Chung Outline Zoning Plan No. S/KC/29 (the OZP). According to the Notes of the Draft OZP, the proposed data centre use is under 'Information Technology and Telecommunications Industries' use, which is a Column 1 use of the "OU(B)" zone and is always permitted. Any proposed development at the Application Site is subject to maximum PR of 9.5 or the PR of the existing building, and maximum building height (BH) of 130mPD or the height of the existing building, whichever is the greater.

The Proposed Development at the Application Site is justified through the following planning merits:

- Echoing the Government's intention to encourage redevelopment of IBs constructed before 1987 as announced in the Chief Executive's 2018 Policy Address;
- Providing proactive response to the prevailing policy on high-tier data centre development for promotion of innovation and technology (I&T) development;
- Realising the planning intention of the "OU(B)" zone;
- Providing multiple planning and design benefits for the public;
- Adopting optimal street-level design to enhance pedestrian accessibility, connectivity and comfort;
- Compliance with the Sustainable Building Design Guidelines (SBDG) to foster quality and sustainable built environment;
- Consideration of green building design to promote energy efficiency;
- Providing additional data centre floor space while achieving planning and design merits without the need to apply for minor relaxation of BH;
- Resulting in no adverse impacts to the surroundings; and
- Creating a desirable precedent in encouraging the transformation along Kwok Shui Road and Tai Yuen Street while furnishing the critical technology infrastructure to support I&T development in Hong Kong.

The Applicant has demonstrated their genuine effort and commitment in taking forward the Proposed Development at the Application Site. In light of the planning merits and justifications put forward in this Supporting Planning Statement, we sincerely seek the favourable consideration from the TPB to give its support to this Planning Application.

Your ref
Our ref 276306/01/WSTY/MYNL/KYAC/04202

ARUP

By Email (ffhung@pland.gov.hk) and By Fax (2877 0245)

Level 5, Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong
t +852 2528 3031
f +852 2779 8428
d +852 2268 3721
thersea.yeung@arup.com
www.arup.com

The Secretary
Town Planning Board
15/F, North Point Government Offices
333 Java Road
North Point
Hong Kong

30 December 2020

Dear Madam,

S16 Planning Application for
Proposed Minor Relaxation of Plot Ratio Restriction
for Permitted Information Technology and Telecommunications Industries (Proposed Data Centre Development) at "Other Specified Uses" annotated "Business" Zone
at Nos. 2-10 Tai Yuen Street, Kwai Chung

Technical Clarifications

As requested by the Town Planning Board, we hereby submit the updated Chinese Executive Summary of the Supporting Planning Statement for the captioned Planning Application for your consideration (**Appendix A** refers).

We sincerely seek for the favourable consideration from the Town Planning Board to approve the captioned S16 Planning Application.

Should you have any queries, please contact the undersigned or our Ms. Aileen CHENG at 2908 4011.

Yours faithfully

Theresa YEUNG
Director of Planning

Encl. - Appendix A: Updated Chinese Executive Summary of the Supporting Planning Statement

cc - Client

Appendix A

Updated Chinese Executive Summary of the Supporting Planning Statement

行政摘要

（內容如與英文版本有任何差異，應以英文版本為準）

本規劃申請旨在獲得城市規劃委員會（下稱「城規會」）批准申請地點（大圓街2-10 號）（下稱「申請地點」）擬議略為放寬地積比率百分之二十的限制，以重建現時在申請地點的一座於一九八七年前所興建的工業大廈作數據中心用途，藉此回應二零一八年《施政報告》中所提及的活化工廈政策，鼓勵業主重建以加快取締一九八七年前興建的現有工業大廈。

申請地點位於葵涌分區計劃大綱草圖編號 S/KC/29（下稱「分區計劃大綱草圖」）的「其他指定用途」註明「商貿」地帶內。根據「其他指定用途」註明「商貿」地帶的註釋，「資訊科技及電訊業」用途為有關地帶土地用途表的第一欄用途，屬經常准許使用的土地用途。申請地點內的發展計劃亦受限於最高地積比率 9.5 倍或現有建築物的地積比率，以及主水平基準上130米的最高建築物高度限制或現有建築物的高度，兩者中皆以數目較大者為準。

擬議發展方案將帶來以下公眾規劃增益：

- 呼應政府於二零一八年施政報告宣佈的政策意向，鼓勵重建於一九八七年前興建的工業大廈；
- 積極回應高端數據中心發展政策以促進創新及科技發展；
- 實現「其他指定用途」註明「商貿」地帶的規劃意向；
- 提供多方面的規劃及設計增益；
- 採用優化街道設計以提升步行環境的可達度、連接度及舒適度；
- 符合《可持續建築設計指引》以構建優質和可持續建築環境；
- 體現「綠色建築」環保特色以提高能源效益；
- 在不需放寬建築物高度限制的前提下，提供額外數據中心樓面面積，並提供多種規劃及設計增益；
- 不會帶來負面影響；及
- 為國瑞路/大圓街工業/商貿區一帶轉型升級創立良好的先例，同時提供可促進創新及科技行業發展的重要基礎建設。

申請人對推進此項目持有誠懇和積極的態度。基於本規劃綱領所闡述的規劃增益和理據，我們誠懇希望是次規劃許可申請能獲得城規會的支持。

Proposed Minor Relaxation of Plot Ratio Restriction for Permitted Information Technology and Telecommunications Industries (Proposed Data Centre Development) at "Other Specified Uses" annotated "Business" Zone at Nos. 2-10 Tai Yuen Street, Kwai Chung

Supporting Planning Statement

Revised Draft | December 2020

This report takes into account the particular instructions and requirements of our client.
It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Ove Arup & Partners Hong Kong Ltd
Level 5 Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong
www.arup.com

ARUP

CONTENTS

Page

EXECUTIVE SUMMARY **1**

行政摘要 **3**

1 INTRODUCTION **4**

2 SITE CONTEXT **6**

2.1 Location 6
2.2 Land Status 6
2.3 Existing Uses 6
2.4 Surrounding Uses 6
2.5 Accessibility 7

3 PLANNING CONTEXT **8**

3.1 Land Use Zoning 8
3.2 Departmental Plan Setback Requirements 8
3.3 New Policy Direction for Revitalisation of Industrial Buildings 8
3.4 Policy Initiatives on Development of High-Tier Data Centres in Support of I&T Development 9

4 PROPOSED DEVELOPMENT **10**

4.1 General Planning and Design Principles 10
4.2 Proposed Development Parameters 11
4.3 Building Design of the Proposed Development 12

5 PLANNING JUSTIFICATIONS **14**

5.1 Echoing the Government's Intention to Encourage Redevelopment of Industrial Buildings Constructed before 1987 as Announced in the Chief Executive's 2018 Policy Address 14
5.2 Providing Proactive Response to the Prevailing Policy on High-Tier Data Centre Development for Promotion of Innovation and Technology Development 14
5.3 Realising the Planning Intention of the "OU(B)" Zone 14
5.4 Providing Multiple Planning and Design Benefits for the Public 15
5.5 Adopting Optimal Street-Level Design to Enhance Pedestrian Accessibility, Connectivity and Comfort 16
5.6 Compliance with the Sustainable Building Design Guidelines to Foster Quality and Sustainable Built Environment 17
5.7 Consideration of Green Building Design to Promote Energy Efficiency 18

5.8 Providing Additional Data Centre Floor Space while Achieving Planning and Design Merits without the Need to Apply for Minor Relaxation of BH 18

5.9 Resulting in No Adverse Impacts to the Surroundings 19

5.10 Creating a Desirable Precedent in Encouraging the Transformation along Kwok Shui Road and Tai Yuen Street while Furnishing the Critical Technology Infrastructure to Support I&T Development in Hong Kong 19

6 CONCLUSION 20

Figures

Figure 2.1 Location Plan
Figure 2.2 Lot Index Plan
Figure 2.3 Existing Use and Surrounding Use of the Application Site
Figure 3.1 Extracted Notes of the "OU(B)" Zone of the Draft Kwai Chung Outline Zoning Plan No. S/KC/29
Figure 3.2 Extracted Explanatory Statement of the "OU(B)" Zone of the Draft Kwai Chung Outline Zoning Plan No. S/KC/29
Figure 3.3 Extract of Kwai Chung Outline Development Plan No. D/KC/D
Figure 4.1 Typical Section of Data Hall and Dimension of Data Rack
Figure 4.2 Details of Enclosed Structures on R/F
Figure 4.3 Key Technical and Mechanical Requirements on G/F
Figure 5.1 Illustration of the Planning and Design Merits of the Proposed Development
Figure 5.2 Details of Implementation of Vertical Greening
Figure 5.3 Artist's Impressions of Street-Level Design

Table

Table 4.1 Comparison of Key Development Parameters of the Proposed Development and as Allowed under the OZP

Appendices

Appendix A Architectural Drawings
Appendix B Greenery Calculations
Appendix C Traffic Impact Assessment
Appendix D Sewerage Impact Assessment

EXECUTIVE SUMMARY

Pursuant to section 16 (s.16) of the Town Planning Ordinance (TPO), this Supporting Planning Statement is prepared and submitted to seek approval from the Town Planning Board (TPB) for the proposed minor relaxation of plot ratio (PR) restriction from 9.75 to 11.7 (+20%) for redeveloping the existing industrial building at Nos. 2-10 Tai Yuen Street, Kwai Chung (the Application Site), which is constructed before 1987, for proposed data centre use. The concerned redevelopment echoes with the reactivated revitalization scheme for industrial buildings (IBs), which was announced in the Chief Executive's 2018 Policy Address to encourage the redevelopment of pre-1987 industrial buildings (IBs).

The Application Site falls within an area zoned "Other Specified Uses" annotated "Business" ("OU(B)") zone on the Draft Kwai Chung Outline Zoning Plan No. S/KC/29 (the OZP). According to the Notes of the Draft OZP, the proposed data centre use is under 'Information Technology and Telecommunications Industries' use, which is a Column 1 use of the "OU(B)" zone and is always permitted. Any proposed development at the Application Site is subject to maximum PR of 9.5 or the PR of the existing building, and maximum building height (BH) of 130mPD or the height of the existing building, whichever is the greater.

The Proposed Development at the Application Site is justified through the following planning merits:

- Echoing the Government's intention to encourage redevelopment of IBs constructed before 1987 as announced in the Chief Executive's 2018 Policy Address;
- Providing proactive response to the prevailing policy on high-tier data centre development for promotion of innovation and technology (I&T) development;
- Realising the planning intention of the "OU(B)" zone;
- Providing multiple planning and design benefits for the public;
- Adopting optimal street-level design to enhance pedestrian accessibility, connectivity and comfort;
- Compliance with the Sustainable Building Design Guidelines (SBDG) to foster quality and sustainable built environment;
- Consideration of green building design to promote energy efficiency;
- Providing additional data centre floor space while achieving planning and design merits without the need to apply for minor relaxation of BH;
- Resulting in no adverse impacts to the surroundings; and
- Creating a desirable precedent in encouraging the transformation along Kwok Shui Road and Tai Yuen Street while furnishing the critical technology infrastructure to support I&T development in Hong Kong.

The Applicant has demonstrated their genuine effort and commitment in taking forward the Proposed Development at the Application Site. In light of the planning merits and justifications put forward in this Supporting Planning Statement, we sincerely seek the favourable consideration from the TPB to give its support to this Planning Application.

行政摘要

（內容如與英文版本有任何差異，應以英文版本為準）

本規劃申請旨在獲得城市規劃委員會（下稱「城規會」）批准申請地點（大圓街 2-10 號）（下稱「申請地點」）擬議略為放寬地積比率百分之二十的限制，以重建現時在申請地點的一座於一九八七年前所興建的工業大廈作數據中心用途，藉此回應二零一八年《施政報告》中所提及的活化工廈政策，鼓勵業主重建以加快取締一九八七年前興建的現有工業大廈。

申請地點位於葵涌分區計劃大綱草圖編號 S/KC/29（下稱「分區計劃大綱草圖」）的「其他指定用途」註明「商貿」地帶內。根據「其他指定用途」註明「商貿」地帶的註釋，「資訊科技及電訊業」用途為有關地帶土地用途表的第一欄用途，屬經常准許使用的土地用途。申請地點內的發展計劃亦受限於最高地積比率 9.5 倍或現有建築物的地積比率，以及主水平基準上 105 米的最高建築物高度限制或現有建築物的高度，兩者中皆以數目較大者為準。

擬議發展方案將帶來以下公眾規劃增益：

- 呼應政府於二零一八年施政報告宣佈的政策意向，鼓勵重建於一九八七年前興建的工業大廈；
- 積極回應高端數據中心發展政策以促進創新及科技發展；
- 實現「其他指定用途」註明「商貿」地帶的規劃意向；
- 提供多方面的規劃及設計增益；
- 採用優化街道設計以提升步行環境的可達度、連接度及舒適度；
- 符合《可持續建築設計指引》以構建優質和可持續建築環境；
- 體現「綠色建築」環保特色以提高能源效益；
- 在不需放寬建築物高度限制的前提下，提供額外數據中心樓面面積，並提供多種規劃及設計增益；
- 不會帶來負面影響；及
- 為國瑞路/大圓街工業/商貿區一帶轉型升級創立良好的先例，同時提供可促進創新及科技行業發展的重要基礎建設。

申請人對推進此項目持有誠懇和積極的態度。基於本規劃綱領所闡述的規劃增益和理據，我們誠懇希望是次規劃許可申請能獲得城規會的支持。

1 INTRODUCTION

1.1.1 Pursuant to section 16 (s.16) of the Town Planning Ordinance (TPO), this Supporting Planning Statement is prepared and submitted to seek approval from the Town Planning Board (TPB) for the proposed minor relaxation of plot ratio (PR) restriction for 20% to redevelop the existing industrial building at Nos. 2-10, Tai Yuen Street, Kwai Chung (the Application Site), which is constructed before 1987.

1.1.2 The Application Site is currently designated as "Other Specified Uses" annotated "Business" ("OU(B)") zone on the Draft Kwai Chung Outline Zoning Plan No. S/KC/29 (the OZP). According to Schedule II of the Notes of the OZP for "OU(B)" zone, the proposed data centre development falls under Column 1 use of 'Information Technology and Telecommunications Industries' and is always permitted. The Application Site is subject to maximum PR of 9.5 or the PR of the existing building, and maximum building height (BH) of 130mPD or the height of the existing building, whichever is the greater. As specified in Remark (7) of the Notes for "OU(B)" zone, based on the individual merits of a development or redevelopment proposal, minor relaxation of plot ratio (PR) restriction may be considered by the Board on application under s.16 of the TPO.

1.1.3 According to the Chief Executive's 2018 Policy Address, the Government intends to expedite the transformation of traditional industrial areas by reactivating the revitalization scheme for industrial buildings (IBs). One of the key measures is to encourage owners to redevelop IBs constructed before 1987 by allowing relaxation of the maximum permissible non-domestic PR by up to 20% for sites located outside "Residential" zones in Main Urban Areas and New Towns. Individual applications have to be made to the TPB within three years starting from 10 October 2018, and the lease modification letter should be executed no later than three years form the date of the TPB's approval letter.

1.1.4 In response to the policy, this Planning Application is hereby submitted for the proposed minor relaxation of PR restriction from 9.75 (i.e. PR of the existing building) to 11.7, to facilitate the redevelopment at the Application Site for the always permitted data centre use.

1.1.5 In view of the growing demand for high-tier data centres in Hong Kong, the Proposed Development is designed for a Tier-III+ Data Centre according to the 4-tier classification system established by Uptime Institute[1]. According to the classification system, a Tier-III+ Data Centre is required to fulfil N+1 (i.e. the amount required for operation plus a backup) redundancy to ensure fault tolerance. The additional PR sought under this Planning Application is expected to provide the necessary floor area for the accommodation of the supporting facilities in fulfilment of N+1 redundancy. By replacing the existing dilapidated

[1] https://journal.uptimeinstitute.com/explaining-uptime-institutes-tier-classification-system/

IB with a notable data centre development with desirable architectural and street-level design, the Proposed Development will also realise the planning intention for "OU(B)" zone at a corner site, and contribute to the phasing out of polluting industrial uses along Kwok Shui Road and Tai Yuen Street. Taking into account the need to maintain visual compatibility with the surrounding area, efforts have been spent to optimise the efficiency of all floor areas in the Proposed Development so as to house the additional PR without any increase in the maximum permissible BH of 130mPD under the OZP. Despite various technical and mechanical considerations pertaining to high-tier data centre might pose limited opportunities on street-level design, the Proposed Development has strived to enhance pedestrian environment surrounding the Application Site by introducing visual amenity and pedestrian comfort. The technical assessments conducted also confirms that the Proposed Development is technically feasible and will generate no adverse impact to the surroundings on traffic and sewerage aspects.

1.1.6 This Supporting Planning Statement is to provide members of the TPB with the relevant information in considering this s.16 Planning Application. ***Section 2*** provides a brief description of the Application Site and its surrounding environment. ***Section 3*** explains the planning context of the Application Site. ***Section 4*** details the features of Proposed Development. ***Section 5*** presents the planning justifications in support of the Planning Application. ***Section 6*** concludes the highlights and justifications of this Supporting Planning Statement.

1.1.7 We sincerely seek a favourable consideration from the TPB to grant approval to this well justified s.16 Planning Application.

2 SITE CONTEXT

2.1 Location

2.1.1 The Application Site, with a site area of about 1,865m^2, is located at Nos. 2-10 Tai Yuen Street, Kwai Chung. It is a corner site bounded by Tai Yuen Street to the west and Kwok Shui Road to the south. Please refer to **Figure 2.1** for the location of the Application Site.

2.2 Land Status

2.2.1 The Application Site is held under Kwai Chung Town Lot No. 161, which is under single ownership by the Applicant. Please refer to **Figure 2.2** for the Lot Index Plan of the Application Site.

2.3 Existing Uses

2.3.1 The Application Site is currently occupied by Milo's Industrial Building, a 12-storey IB with Phase I completed in 1972 and Phase II completed in 1976. The building is currently vacated.

2.4 Surrounding Uses

2.4.1 The Application Site is located at the junction of Kwok Shui Road and Tai Yuen Street, and is predominantly surrounded by a mix of industrial, industrial-office (I-O) and commercial developments.

2.4.2 To the immediate north of the Application Site is a group of medium-rise IBs including Shui Wing Industrial Building and Tung Chun Industrial Building situated within the same "OU(B)" zone. Amidst the group of IBs stands a vehicle park co-located with Tai Yuen Street Refuse Collection Point and Tai Yuen Street Public Toilet.

2.4.3 To the immediate east of the Application Site is a row of medium-rise IBs (e.g.: Kentucky Industrial Building) and high-rise I-O and commercial developments (i.e. S.A.S. Tower and Asia Trade Center). To the further east and southeast across Lei Muk Road is the core of the Castle Peak Road/Wo Yip Hop Road business/industrial area[2] where clusters of IBs and I-O developments, including South China Industrial Building and Edwick Industrial Centre, are found. Hotel Ease Tsuen Wan, a resultant redevelopment of wholesale conversion of IB for non-industrial use is also identified. It should be noted that Planning Application No. A/KC/466, a similar planning application for minor relaxation of PR restriction from 9.5 to 11.4 as well as relaxation of BH restriction from 130mPD to 146.5mPD for permitted data centre development at Nos. 2-16 Lam Tin Street is located in this area and was

[2] Site B11 – Castle Peak Road/ Wo Yi Hop Road, Appendix 5.6 Detailed Assessments of Individual "OU(B)" Areas of Report on 2014 Area Assessments of Industrial Land in the Territory, https://www.pland.gov.hk/pland_en/p_study/comp_s/industrial_report_2014/appendices/b11.pdf

approved with conditions by the Metro Planning Committee of the TPB on 29 May 2020.

2.4.4 To the immediate south of the Application Site are the vacant buildings of the ex-Salvation Army Kwai Chung Girls' Home, where a rezoning proposal from "Open Space" to "Other Specified Uses" annotated "Buildings with Historical and Architectural Interests Preserved for Social Welfare Facility Use" to preserve the existing three Graded Buildings for social welfare uses was partially agreed under Planning Application No. Y/KC/15 by the TPB on 23 October 2020.

2.4.5 To the immediate west of the Application Site are the low-rise IBs operated by Tung Chun Soy and Canning Company, where a proposed comprehensive development for 'Flat', 'Eating Place', 'Shop and Services' and 'Office' uses and minor relaxation of BH restriction from 120mPD to 145mPD was approved under Planning Application No. A/KC/444 on 22 March 2019.

2.4.6 Please refer to **Figure 2.3** for the surrounding uses of the Application Site.

2.5 Accessibility

2.5.1 The Application Site is served by a comprehensive public transport network comprising franchised bus and green minibus services running along Cheung Wing Road and Wo Yi Hop Road. It is also connected to MTR Kwai Hing and Kwai Fong Station by bus and minibus, conveniently connected to different parts of Hong Kong. At present, vehicular and pedestrian access to the Application Site is available via Tai Yuen Street.

3 PLANNING CONTEXT

3.1 Land Use Zoning

3.1.1 The Application Site is designated as "OU(B)" zone on the Draft Kwai Chung Outline Zoning Plan No. S/KC/29. The Notes of the Draft OZP states that the "OU(B)" zone is *"intended primarily for general* business *uses. A mix of information technology and telecommunications industries, non-polluting industrial, office and other commercial uses are always permitted in new "business" buildings. Less fire hazard-prone office use that would not involve direct provision of customer services or goods to the general public is always permitted in existing industrial and industrial-office buildings"*.

3.1.2 According to Schedule II of the Notes of "OU(B)" zone for industrial or I-O building, 'Information Technology and Telecommunications Industries' is a Column 1 use which is always permitted. According to Remark (1) of the Notes for "OU(B)" zone, *"no new development, or addition, alternation and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of a maximum plot ratio of 9.5 or the plot ratio of the existing building, whichever is the greater"*. As stipulated on the plan of the OZP, the Application Site is subject to a maximum BH of 130mPD, or the height of the existing building, whichever is the greater.

3.1.3 Please refer to **Figures 3.1** and **3.2** for the respective extracts of the Notes and ES of the Draft OZP.

3.2 Departmental Plan Setback Requirements

3.2.1 According to the Kwai Chung Outline Development Plan (ODP) No. D/KC/D, no building setback nor non-building area is required from Tai Yuen Street and Kwok Shui Road abutting the Application Site.

3.2.2 The relevant extract of the ODP is provided at **Figure 3.3**.

3.3 New Policy Direction for Revitalisation of Industrial Buildings

3.3.1 According to the Chief Executive's 2018 Policy Address, the IB Revitalisation Scheme is reactivated in order to facilitate the market to optimise the use of the existing industrial stock and the valuable land resources to meet the changing social and economic needs. As stated in the Chief Executive's 2018 Policy Address under III. Housing and Land Supply Item 72(ii), the new scheme "*...will allow relaxation of the maximum permissible non-domestic PR by up to 20% for redevelopment projects of these pre-1987 IBs located outside "R" zones in Main Urban Areas and New Towns*".

3.3.2 The scheme is… "*subject to approval of the TPB on a case-by-case basis and the maximum non-domestic PR allowed under the Buildings*

(Planning) Regulations. Individual applications have to be made to the TPB within three years starting from 10 October 2018, and the lease modification letter shall be executed no later than three years and the modified lease should be executed within a specified period after the town planning approval."

3.3.3 In view of the above, the Applicant is keen to respond to the Government's latest policy direction and to better optimise land resources through redeveloping the existing pre-1987 IB at the Application Site for the proposed data centre use. The Proposed Development will help to expedite the transformation of the Castle Peak Road/Wo Yip Hop Road business/industrial area while realising multiple planning gains with the provision of the necessary data centre floor space to contribute to the changing economic development needs of Hong Kong.

3.4 Policy Initiatives on Development of High-Tier Data Centres in Support of I&T Development

3.4.1 In view of the growth of high-frequency securities trading, cloud computing services and e-commerce, as well as the emergence of financial technologies and mobile application services in recent years, the market demand for safe and reliable data centre services in Hong Kong and the Asia Pacific Region has surged.

3.4.2 Capitalising on this opportunity, the Government is committed to promote the development of high-tier data centres in support of I&T development in Hong Kong. According to LegCo Paper No. CB(4)25/17-18(02), apart from supplying land for data centre development, the Government will also continue with the two concessionary measures to encourage the conversion of industrial buildings into data centres and developing high-tier data centres on industrial lots. The Office of the Government Chief Information Officer (OGCIO), through its Data Centre Facilitation Unit, will also provide support and cross-departmental coordination service to companies that are interested in setting up data centres in Hong Kong.

3.4.3 Designed to meet the Uptime Institute Tier-III+ Standard for Data Centre, the Proposed Development will provide a timely provision of high-tier data centre floor space to respond to the strong industry demand and contribute to the I&T development in Hong Kong. It will contribute to the development of Hong Kong into an International Innovation and Technology Hub as promulgated in the Chief Executive's 2020 Policy Address.

4 PROPOSED DEVELOPMENT

4.1 General Planning and Design Principles

4.1.1 To align with the planning intention as specified in the OZP, information technology and telecommunication industries (data centre), one of the much-needed digital infrastructure to sustain the continued economic development of Hong Kong, is proposed at the Application Site. General planning and design principles of the Proposed Development are as follows:

4.1.2 ***Catalysing the Transformation of Castle Peak Road/Wo Yip Hop Road Business/Industrial Area:*** With a central location in the Castle Peak Road/Wo Yip Hop Road business/industrial area, the Application Site, with a sizeable site area, is of considerable potential to be developed into a distinguished data centre development to facilitate the phasing out of polluting industrial uses and catalyse the transformation of the surrounding area for business uses. By increasing the provision of the always permitted 'Information Technology and Telecommunication Industries' use for data centre development, the Proposed Development also provides a timely response to the Government's call for supply of high-tier data centre floor space to promote the economic transformation and I&T development in Hong Kong.

4.1.3 ***Adopting Optimal Design to Accommodate the Additional PR Efficiently within the Maximum BH specified under the OZP:*** The proposed minor relaxation of PR restriction is solely intended for the accommodation of the 20% PR increase promulgated under the provisions of the Chief Executive's 2018 Policy Address. Efforts are made as far as possible to optimise the efficiency of all floor areas while not compromising the operational needs of the high-tier data centre, such that the additional PR could be accommodated without exceedance of the maximum permissible BH of 130mPD under the OZP. The adoption of optimal design will also ensure the visual compatibility of the Proposed Development with its surroundings to maintain a harmonious townscape.

4.1.4 ***Maximising the Opportunities for Street-Level Greening and Enhancement of Pedestrian Environment:*** As a Tier-III+ data centre, the Proposed Development must meet the N+1 redundancy requirement which implies the need for extra mechanical space to house the additional redundant equipment. Despite that most of the spaces at pedestrian level will be occupied by mechanical equipment, opportunities to maximise the provision of street-level greening and enhancement of pedestrian environment have be explored as far as possible so as to foster a positive public realm along Kwok Shui Road and Tai Yuen Street, to benefit members of the public.

4.2 Proposed Development Parameters

4.2.1 The Proposed Development proposes for minor relaxation of PR restriction of 20% from PR 9.75 (i.e. PR of the existing building) to 11.7. A comparison between the key development parameters of the Proposed Development and as allowed under the OZP is provided in **Table 4.1** below.

Table 4.1 Comparison of Key Development Parameters of the Proposed Development and as Allowed under the OZP

Key Development Parameters	Proposed Development (a)	Development Parameters Allowed by the OZP (b)	Difference/ Compliance (a) - (b)
Site Area	1,865m^2	1,865m^2	-
PR	Not exceeding 11.7	Not exceeding 9.75[1]	+ 20%
GFA	Not exceeding 21,820.5m^2	Not exceeding 18,183.75m^2	+ 20%
Site Coverage (SC)	Up to 15m above mean level of the lowest street: Not more than 90.0% More than 15m above mean level of the lowest street: Not more than 62.5%	N/A	-
No. of Block	1	N/A	-
Building Height (at main roof level)	129.5 mPD	130 mPD	Complied
No. of Storeys	22 (including 2 basement levels)	N/A	-
Typical Floor-to-Floor Height (FTFH)	5.5m (excluding B2, B1 and G/F)	N/A	-
Proposed Use	'Information Technology and Telecommunication Industries' (Proposed Data Centre Development)	'Information Technology and Telecommunication Industries' (Proposed Data Centre Development)	Column 1 Use
Parking Spaces	• 37 nos. private car parking spaces (including 1 no. accessible car parking space) • 4 nos. motorcycle parking spaces • 2 nos. LGV parking spaces • 2 nos. HGV parking spaces	N/A	-
Loading/Unloading (L/UL) Bays	• 2 nos. LGV L/UL bays • 1 no. HGV L/UL bays	N/A	-
Voluntary Building Setbacks	Full-height setback of 2m from the lot boundary along Tai Yuen Street and Kwok Shui Road	N/A	-
Greenery Provision (% of Gross Site Area)	About 20.3% (including about 14.0% at primary zone)	N/A	-

Key Development Parameters	Proposed Development (a)	Development Parameters Allowed by the OZP (b)	Difference/ Compliance (a) - (b)
Anticipated Year of Completion	2024	N/A	-

Notes:

[1] Refers to the PR of the existing building. According to the Remarks (1) in the Notes of the "OU(B)" zone under the OZP, "*no new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of a maximum total plot ratio of 9.5, or the plot ratio of the existing building, whichever is the greater*".

4.3 Building Design of the Proposed Development

4.3.1 The building design of the Proposed Development has followed the general planning and design principles put forward in **Section 4.1** and the planning intention specified under the "OU(B)" zone on the OZP. With reference to the Architectural Drawings (**Appendix A** refers), the Proposed Development consists of a 22-storey data centre development including 2 storeys of basement carparks. The proposed BH is about 129.5mPD, which is within the BH restriction of 130mPD as stipulated on the OZP. Intended for a Tier-III+ Standard Data Centre, a typical FTFH of 5.5m[3] is introduced in the Proposed Development to reserve adequate floor space to accommodate required E&M zone, data racks and raised floors for additional pipe ducts and power cables as alternate power distribution path for stability (**Figure 4.1** refers).

4.3.2 In addition to the aforementioned headroom requirement, a 132kV CLP substation with dual-source configuration will be incorporated in the Proposed Development to support the highly redundant and reliable MEP system required for high-tier data centre development. The associated transformer bay and Ring Main Units (RMUs) are placed side-by-side on G/F in accordance with CLP's latest code of practice, so as to allow for cable lead-in for the substation and easy maintenance. To fulfil the redundancy requirement, electrical equipment for emergency power backup including generator, UPS, battery and transformer etc. are also furnished at 3/F, 8/F, 13/F and 17/F. Thermal storage tanks are housed at 18/F to provide emergency cooling supply. Chillers and cooling towers are respectively provided at 19/F and R/F to furnish the adequate cooling capacity for data centre with N+1 arrangement. It should be noted that the cooling towers on R/F are an equipment plant which is nether covered plant room nor enclosed structure. Taking into account that the roof ancillary structure including the cooling towers are less than 10% in height from main roof (i.e. 12.135m) and the total area of enclosed structure at roof floor is less than 50% (i.e. 571.5m^2), the cooling towers should not constitute as one floor nor be counted towards the height of the Proposed Development

[3] The proposed FTFH of 5.5m in the Proposed Development is identical to that proposed in on the approved Planning Application No. A/KC/466. With reference to the comments provided by OGCIO as stated in MPC Paper No. A/KC/466A, high FTFH is genuinely required for high-tier data centre development and a FTFH of 5.5m is considered reasonable.

according to Joint Practice Note (JPN) No.5 (Please refer to **Figure 4.2** for details of the enclosed structures on R/F).

4.3.3 As demonstrated in **Figure 4.3**, the size and the relevant mechanical and technical requirements of underground fuel tank, 132kV CLP substation and parking arrangement of heavy good vehicles have substantially limited further provision of setback and greenery area at G/F. In order to enhance pedestrian environment and connectivity surrounding the Application Site, extra efforts have been provided in the Proposed Development, to maximise the efficiency of G/F layout for the provision of ground-level greenery and a continuous 2m full-height voluntary setback from the lot boundary abutting Kwok Shui Road and Tai Yuen Street. In addition, glass canopies have been incorporated at the main entrance facing Tai Yuen Street to serve as weather protection for pedestrians.

4.3.4 To further enhance streetscape and soften the building edges, opportunities to provide street-level greenery, in the form of both horizontal and vertical greening, at the Proposed Development. With ample greenery provision and vertical green walls on G/F to 2/F, the Proposed Development will achieve a greenery coverage of about 14.0% at primary zone. Including the greening on R/F, the Proposed development will provide an overall greenery coverage of about 20.3% (Please refer to **Appendix B** for the Greenery Calculations).

4.3.5 Considering that no operable windows are required within data halls for lighting and ventilation, the Proposed Development will be equipped with central air-conditioning system. Internal transport facilities have also been provided in accordance to the high-end standard set out in the Hong Kong Planning Standards and Guidelines (HKPSG).

5 PLANNING JUSTIFICATIONS

5.1 Echoing the Government's Intention to Encourage Redevelopment of Industrial Buildings Constructed before 1987 as Announced in the Chief Executive's 2018 Policy Address

5.1.1 This Planning Application provides a timely response to the Chief Executive's 2018 Policy Address to encourage owners to redevelop IBs constructed before 1 March 1987. The Applicant therefore seeks for a minor relaxation of PR restriction for 20% for the pre-1987 IB at the Application Site, from the currently permissible PR 9.75 (i.e. PR of the existing building) to PR 11.7 for redevelopment. This Planning Application echoes with the Government's intention to provide more floor area to meet Hong Kong's changing social and economic needs and optimise the use of the valuable land resources.

5.2 Providing Proactive Response to the Prevailing Policy on High-Tier Data Centre Development for Promotion of Innovation and Technology Development

5.2.1 According to the Chief Executive's 2020 Policy Address, the Government is committed to developing Hong Kong into an International I&T Hub. Data centres are considered the critical technology infrastructure for sustaining I&T development. In response to the strong industry demand for safe and reliable data centre services in Hong Kong and the Asia Pacific Region, the Government has been encouraging the development of high-tier data centres on industrial lots. Designed to meet the Uptime Institute Tier-III+ Standard for Data Centre, the Proposed Development, with the applied minor relaxation of PR, will optimise land resources at the Application Site and provide a timely provision of high-tier data centre floor space, providing proactive response to the Government's prevailing policy on data centre development and contributing to the I&T development of Hong Kong.

5.3 Realising the Planning Intention of the "OU(B)" Zone

5.3.1 Situated within "OU(B)" zone, the Application Site is planned primarily for general business uses. The proposed data centre development falls under the Column 1 use of 'Information Technology and Telecommunications Industries' use under the "OU(B)" zone and is always permitted. Realisation of the Proposed Development will in turn actualise the planning intention of the "OU(B)" zone.

5.4 Providing Multiple Planning and Design Benefits for the Public

The Proposed Development will not only satisfy the growing demand for high-tier data centre in the territory, but also provide multiple planning and design merits for the public as follows (Please also refer to **Figure 5.1-5.3** for illustrations):

5.4.1 ***Provision of Voluntary Full-Height Setback*** – Under the Proposed Development, a 2m voluntary full-height building setback[4] will be provided from the lot boundary abutting Kwok Shui Road and Tai Yuen Street with featured paving to create wider footpaths for better pedestrian environment. With the proposed setbacks, the pedestrian footpaths along Kwok Shui Road and Tai Yuen Street will be widened to no less than about 3.7m and about 5.1m respectively.

5.4.2 ***Provision of Canopy along Main Entrance*** – To provide rain shelter for pedestrians and visitors, canopy is furnished along the main entrance at Tai Yuen Street.

5.4.3 ***Incorporation of Street-Level Greenery*** – In addition to the 2m setback area on G/F, landscape treatments comprising groundcovers, shrubs and a tree are introduced along the building façade of the Proposed Development to create a more pleasant public realm[5]. Extensive vertical greening (with primary zone of not less than about 112m^2) is also proposed on the facades of G/F-2/F fronting Tai Yuen Street to enhance walking experience and enrich the streetscape (Please refer to **Figure 5.2** for the details of implementation of vertical greening).

5.4.4 ***Incorporation of Flat Roofs with Greenery*** – To further soften the building bulk and improve the environment of the immediate surroundings, greenery have been introduced on the flat roof located on 1/F, 2/F and R/F. The incorporation of flat roofs with greenery will effectively reduce solar heat gain and contribute to the reduction of cooling load, energy consumption and greenhouse gas emission in the Proposed Development in the long run.

5.4.5 ***Introduction of Natural Ventilation on Mechanical Floors*** – The open-sided areas of some mechanical floors of the Proposed Development will allow maximised natural ventilation and reduce the use of mechanical ventilation.

Minimisation of Building Heat Gain

5.4.6 In order to enhance energy efficiency within the typical floors of data halls, window/louver openings are minimised on facade to maintain better thermal/humidity control within building. Light colour materials

[4] Due to constraints posed by the building structure upon accommodating the essential facilities in support of the proposed data centre use (e.g. underground fuel tank, CLP substation and associated plant rooms), as well as the space occupied by the turntable and L/UL bays, it is not feasible to provide further expansion of setback and ground-level greenery within the Application Site.
[5] Ditto.

will also be adopted, in particular on flat roof and outdoor equipment, to further minimise building height gain.

Consideration of Public Health and Safety

5.4.7 As a facility that houses computer systems and associated components, the proposed data centre development is not expected to create any public health and safety concerns. The proposed CLP power supply equipment will be provided in full compliance with the guidelines issued by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The whole 132kV CLP substation will also be built in accordance with the CLP's code of practice to achieve the latest health and safety standard. It should be noted that the Proposed Development will not release any radioactive substances to the environment nor create any radioactive waste from its activities. Hence, no adverse radioactive impact to the surroundings is anticipated.

5.4.8 Taking into account that the existing IB residing at the Application Site was built before the mid-1980s and may potentially contain asbestos containing materials, asbestos investigation prior to the demolition of the existing building structure has been conducted to identify the presence, quantity and location of all asbestos containing materials. All identified asbestos containing materials will be removed by a registered asbestos contractor before the demolition works. The associated handling, storage and disposal of asbestos waste will be carried out in accordance with the EPD's Code of Practice on the Handling, Transportation and Disposal of Asbestos Waste to ensure that no adverse environmental impacts due to building demolition will be generated in the process.

5.4.9 Based on preliminary review, potential fixed plant noise may be generated from the water pumps, cooling towers, emergency generators and CLP transformer of the Proposed Development. Considering that most of these fixed plants will be fully enclosed inside a concrete building structure or plant room, adverse noise impact to the surroundings due to the operation of these fixed plant noise sources are not anticipated. As regards the potential noise nuisance caused by the cooling tower located on the roof, noise control measure with reference to EPD's Good Practices on Ventilation System Noise Control will be adequately provided to ensure that no adverse noise impact to the surroundings will be resulted.

5.5 Adopting Optimal Street-Level Design to Enhance Pedestrian Accessibility, Connectivity and Comfort

5.5.1 Despite being located at a corner site, the current pedestrian environment at the Application Site is rather unpleasant. The existing pre-1987 IB residing at the Application Site is in deteriorating condition. With a width of about 2m, the narrow footpath abutting Tai Yuen Street

also poses safety hazard to pedestrians. The overall streetscape and urban quality at the Application Site are unappealing.

5.5.2 On the other hand, the Proposed Development will bring about considerable improvement to the pedestrian environment and visual ambience of the Application Site through its well-designed data centre development (**Figure 5.3** refers). By providing a 2m full-height voluntary setback from the lot boundary abutting Kwok Shui Road and Tai Yuen Street in a continuous manner, the Proposed Development will effectively enhance pedestrian circulation and safety surrounding the Application Site. The canopy provided above the main entrance at Tai Yuen Street will also offer protection from inclement weather, therefore improving pedestrian comfort. Coupling with the proposed soft landscape provision at pedestrian level and vertical greening on G/F-2/F building frontage, the quality of visual amenities at the Application Site will be enhanced and break down the monotonous building façade along Tai Yuen Street and Kwok Shui Road. Additional visual relief will be furnished through the proposed greenery at 1/F and 2/F flat roof, which will be visually connected to the pedestrians walking along Kwok Shui Road and Tai Yuen Street.

5.5.3 In view of the above, the street-level design of the Proposed Development is considered favourable in fostering a positive public realm with enhancement in pedestrian accessibility, connectivity and comfort.

5.6 Compliance with the Sustainable Building Design Guidelines to Foster Quality and Sustainable Built Environment

5.6.1 To achieve a quality and sustainable built environment in the industrial/business area, due considerations have been made to the relevant provisions of PNAP APP-152 Sustainable Building Design Guidelines (SBDG) in formulating the Proposed Development. The considerations of the three key building design elements of building length, building setback and site coverage of greenery under the SBDG are summarised as follows:

Building Length

5.6.2 The Application Site is with a site area less than 20,000m^2. The continuous projected façade length is below 60m. Hence, this requirement is considered not applicable.

Building Setback

5.6.3 Under the Proposed Development, 2m full-height voluntary setback are provided from the lot boundary abutting Kwok Shui Road and Tai Yuen Street. As such, no part of the Proposed Development up to a level of 15m above the street level are within 7.5m from the centreline of Kwok Shui Road and Tai Yuen Street. The building setback requirement is duly complied.

Site Coverage of Greenery

5.6.4 According to the SBDG, the Application Site, with a site area of about 1,865m^2, is required to reach minimum site coverage of greenery of 10% in primary zones and 20% in overall development respectively. As illustrated in **Appendix B**, the Proposed Development will achieve about 20.3% overall site coverage of greenery, of which about 14.0% will be provided within the primary zone. The requirement on site coverage of greenery is duly complied.

5.7 Consideration of Green Building Design to Promote Energy Efficiency

5.7.1 To promote energy efficiency, the following green building design elements have been taken into account in formulating the Proposed Development:

5.7.2 ***Green Roof and Vertical Greening, Light Colour Materials on Flat Roof and Outdoor Equipment and Open-Sided Areas of Some Mechanical Floors*** – The green roof on 1/F, 2/F and R/F, together with the multiple vertical greening introduced on the building facades, as well as the adoption of light colour materials on flat roof and outdoor equipment and the open-sided areas of some mechanical floors, can effectively reduce solar heat gain and hence reduces the cooling load, electricity consumption and greenhouse emission of the Proposed Development in the long run.

5.7.3 ***Building Energy Efficiency*** – The building services installations in the Proposed Development would be designed, installed and maintained up to the design standard in accordance with the Building Energy Code to promote energy efficiency.

5.7.4 ***BEAM Plus and LEED Certification*** – The Proposed Development is intended to adopt BEAM Plus and LEED certification, with rating to be determined at detailed design stage.

5.8 Providing Additional Data Centre Floor Space while Achieving Planning and Design Merits without the Need to Apply for Minor Relaxation of BH

5.8.1 As demonstrated in the Architectural Drawings (**Appendix A** refers), the Proposed Development has strived to achieve an optimal design to accommodate the 20% increase in PR while providing multiple planning and design merits, including voluntary setback and multi-level greeneries, to the public and users, without exceeding the BH restriction of the Application Site on the OZP. The Proposed Development has also maximised the floor area for high-tier data centre, which is in line with the Chief Executive's 2018 Policy Address on revitalizing of IBs and the Chief Executive's 2020 Policy Address on developing Hong Kong into an International I&T Hub. Without compromising the

operational needs of the high-tier data centre, the efficiency of all floor areas have been optimised to accommodate the additional PR without exceedance of the maximum permissible BH of 130mPD under the OZP. It has ensured compatibility with the surrounding BH profile and harmonious townscape in future redevelopment of the Application Site.

5.9 Resulting in No Adverse Impacts to the Surroundings

5.9.1 Traffic Impact Assessment (TIA) and Sewerage Impact Assessment (SIA) have been conducted to demonstrate the feasibility of the Proposed Development. It is confirmed that the Proposed Development. is technically feasible and will generate no adverse impacts on the surroundings. Please refer to **Appendix C** and **D** for details of TIA and SIA.

5.10 Creating a Desirable Precedent in Encouraging the Transformation along Kwok Shui Road and Tai Yuen Street while Furnishing the Critical Technology Infrastructure to Support I&T Development in Hong Kong

5.10.1 As a proactive response to the policy to encourage owners to redevelop IBs completed before 1987, this planning application is to seek approval for proposed minor relaxation of PR restriction by 20% (from PR 9.75 to 11.7), to facilitate the Proposed Development at the Application Site which comply with all eligible criteria for relaxing the maximum permissible PR for IBs up to 20% set out in LC Paper No. CB(1)323/18-19(03)[6].

5.10.2 With its corner site location, the Proposed Development will set a desirable precedent in encouraging the ongoing transformation along Kwok Shu Road and Tai Yuen Street as a well-designed high-tier data centre development, providing the critical technology infrastructure in support of I&T development of Hong Kong, while realising the planning intention of the "OU(B)" zone, providing various planning and design merits for the public within the permissible building height restriction on the OZP, as well as adopting enhanced street-level design to improve pedestrian accessibility, connectivity and comfort, compliance with SBDG requirements and consideration of green building design. Approval of this Application for the intended data centre use will also optimise the valuable land resources in urban areas, and provide the much-needed high-tier data centre floor space to contribute to the changing economic development needs of Hong Kong.

[6] According to LC Paper No. CB(1)323/18-19(03), TPB may approve a higher non-domestic PR for individual sites for redevelopment of pre-1987 IBs into industrial/commercial uses, subject to technical assessments confirming the feasibility of allowing such in terms of infrastructure capacity, technical constraints, as well as relevant planning principles and considerations.

6 CONCLUSION

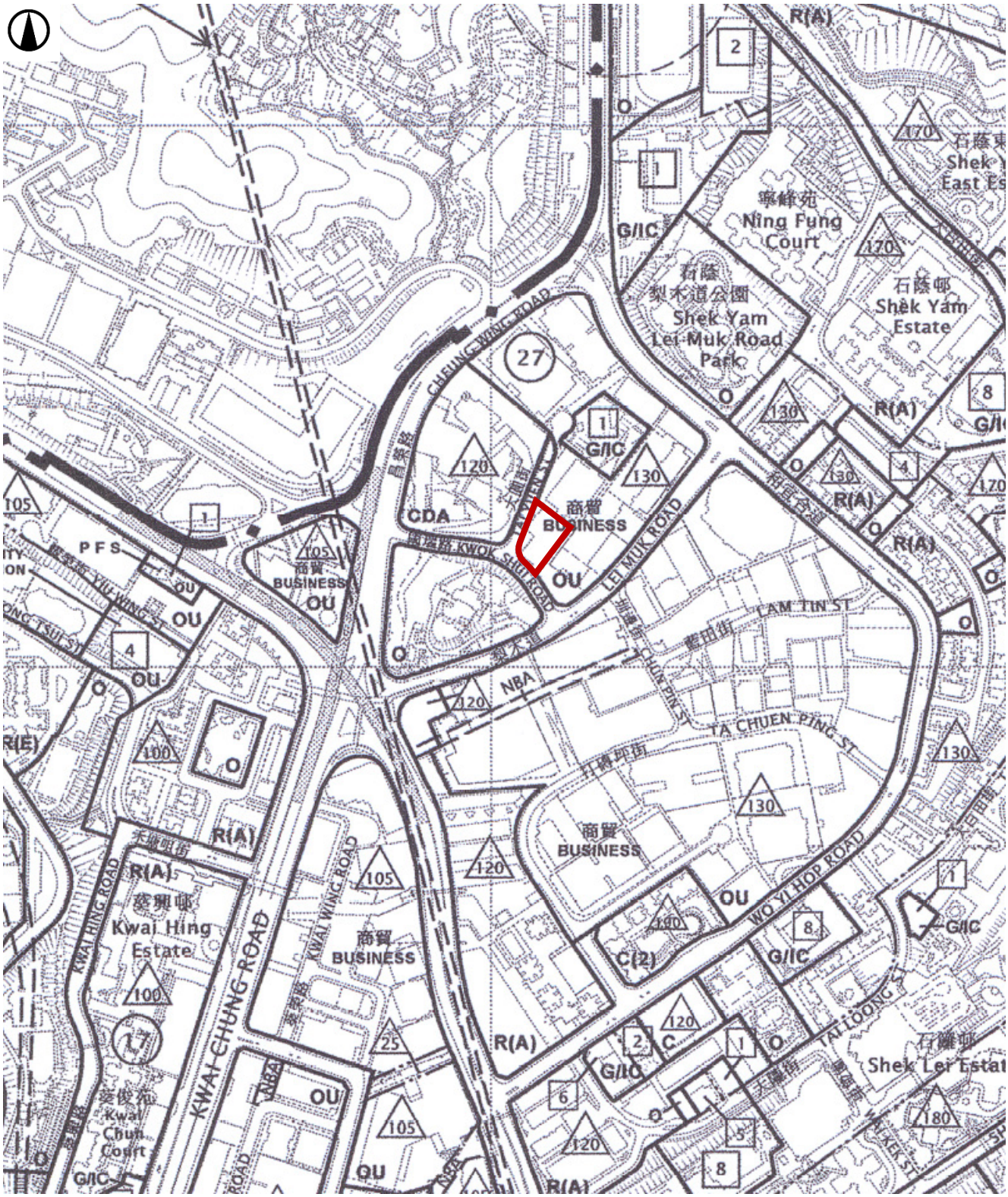
6.1.1 This Supporting Planning Statement is submitted under Section 16 of the TPB to seek approval for the proposed minor relaxation of PR restriction for 20% for redevelopment of Milo's Industrial Building built before 1987 for the permitted 'Information Technology and Telecommunications Industries' use (proposed data centre development) at the Application Site.

6.1.2 The Application echoes with the Government's intention to encourage redevelopment of IBs constructed before 1987 as announced in the Chief Executive's 2018 Policy Address. It is also a timely response to the prevailing policy on high-tier data centre development for promotion of I&T development in Hong Kong. The intended 'Information Technology and Telecommunications Industries' use (proposed data centre development) is a Column 1 use in the OZP and fully respects the planning intention of the "OU(B)".

6.1.3 The Proposed Development is expected to encourage the transformation of the business/industrial area along Tai Yuen Steret and Kwok Shui Road, while respecting the planning intention of the "OU(B)" zone. Efforts are made as far as possible to optimise the efficiency of all floor areas while not compromising the operational needs of the high-tier data centre, such that the additional PR could be accommodated without exceedance of the maximum permissible BH of 130mPD under the OZP. The adoption of optimal design will also ensure the visual compatibility of the Proposed Development with its surroundings to maintain a harmonious townscape. Realisation of the Proposed Development will actualise various planning and design merits at the corner site, comprising 2m voluntary full-height setback from lot boundary abutting Kwok Shui Road and Tai Yuen Street with featured paving, canopy along main entrance, street-level greenery in the form of horizontal and vertical green, greenery on flat roof, natural ventilation on mechanical floors, minimization of building heat gain, and consideration of public health and safety etc. The Proposed Development will also achieve street-level design on pedestrian accessibility, connectivity and comfort and full compliance with the SBDG requirements, with consideration of green building design, to enhance the urban quality of the Application Site. It is also demonstrated that there will be no adverse impacts to the surroundings from traffic and sewerage perspectives. This Application therefore sets a desirable precedent in encouraging the ongoing transformation along Kwok Shui Road and Tai Yuen Street, while providing the critical technology infrastructure to promote I&T development in Hong Kong.

6.1.4 In light of the planning merits and justifications put forward in this Supporting Planning Statement, we sincerely seek for the favourable consideration from the TPB to give support to this well-justified Planning Application.

Figures



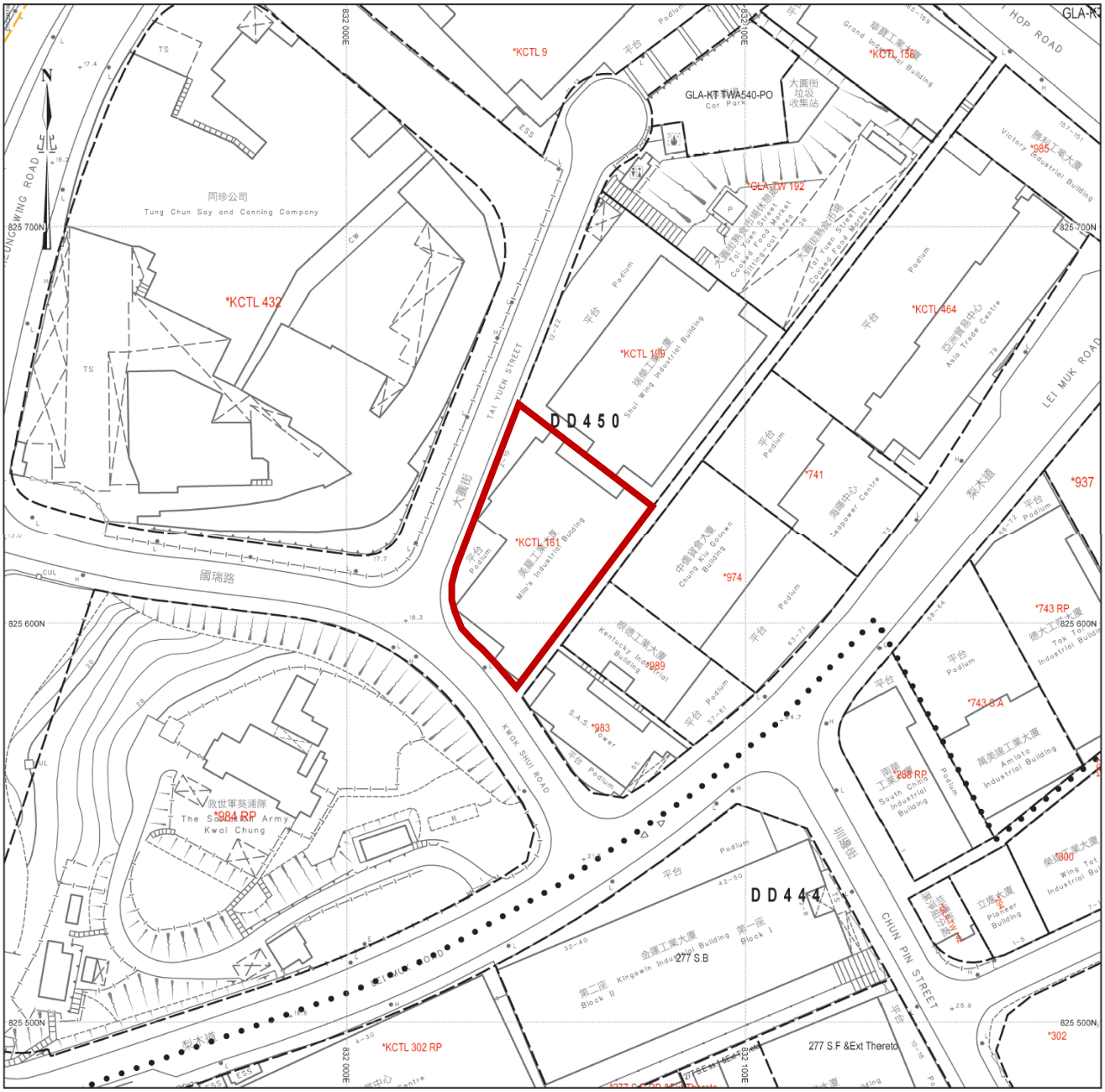
LEGEND

Application Site

ZONING

R(A)	Residential (Group A)
C	Commercial
C(2)	Commercial (2)
G/IC	Government, Institution or Community
O	Open Space
GB	Green Belt
OU(B)	Other Specified Uses (Business)
I	Industrial

Figure No.	*Scale*	*Figure Title*
2.1	-	**Location Plan**
ARUP	*Date* December 2020	*Source* Extracted from the Draft Kwai Chung Outline Zoning Plan No. S/KC/29

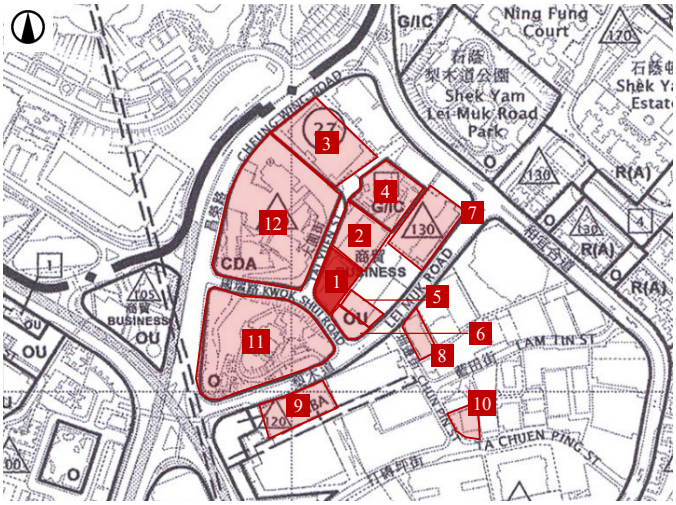


Application Site

Figure No.	Scale	Figure Title	Lot Index Plan
2.2	-		
ARUP	Date: December 2020	Source: Survey and Mapping Office, Lands Department	

1 Milo's Industrial Building (Application Site)





2 Shun Wing Industrial Building



3 Tung Chun Industrial Building



4 Public Vehicle Park, Tai Yuen Street Public Toilet and Tai Yuen Street Refuse Collection Point



5 Kentucky Industrial Building



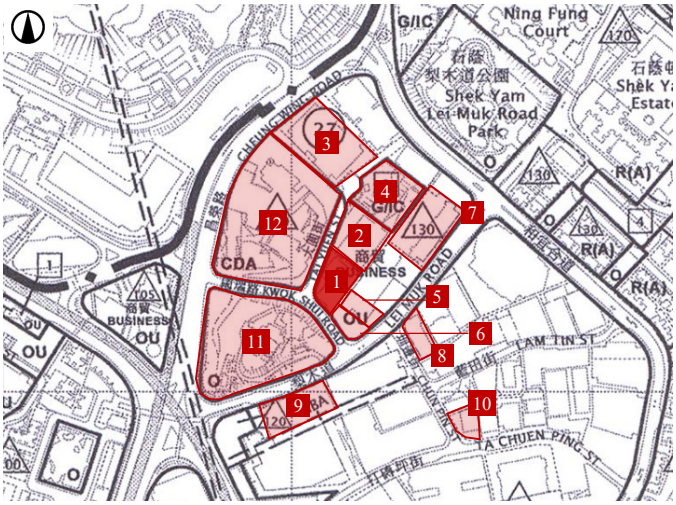
6 S.A.S. Tower



7 Asia Trade Center



Figure No.	Scale	Figure Title
2.3	-	**Existing Use and Surrounding Use of the Application Site (1 of 2)**
ARUP	Date: December 2020	Source:



8 South China Industrial Building

9 Edwick Industrial Centre

10 Hotel Ease Tsuen Wan (with Application Site of Planning Application No. A/KC/466 at the front)







11 Ex-Salvation Army Kwai Chung Girls' Home



12 Tung Chun Soy and Canning Company



Figure No.	*Scale*	*Figure Title*	**Existing Use and Surrounding Use of the Application Site (2 of 2)**
2.3	-		
ARUP	*Date* December 2020	*Source*	

OTHER SPECIFIED USES (Cont'd)

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board

For "Business" Only

Schedule I: for open-air development or for building other than industrial or industrial-office building@

Ambulance Depot
Commercial Bathhouse/Massage Establishment
Eating Place
Educational Institution
Exhibition or Convention Hall
Government Use (Police Reporting Centre, Post Office only)
Information Technology and Telecommunications Industries
Institutional Use (not elsewhere specified)
Library
Non-polluting Industrial Use (excluding industrial undertakings involving the use/storage of Dangerous Goods Δ)
Off-course Betting Centre
Office
Place of Entertainment
Place of Recreation, Sports or Culture
Private Club
Public Clinic
Public Convenience
Public Transport Terminus or Station
Public Utility Installation
Public Vehicle Park (excluding container vehicle)
Radar, Telecommunications Electronic Microwave Repeater, Television and/or Radio Transmitter Installation
Recyclable Collection Centre
Religious Institution
Research, Design and Development Centre
School (excluding free-standing purpose-designed building and kindergarten)
Shop and Services
Training Centre
Utility Installation for Private Project
Broadcasting, Television and/or Film Studio
Cargo Handling and Forwarding Facility
Government Refuse Collection Point
Government Use (not elsewhere specified)
Hotel
Mass Transit Railway Vent Shaft and/or Other Structure above ground level other than Entrances
Non-polluting Industrial Use (not elsewhere specified)
Petrol Filling Station
School (not elsewhere specified)
Social Welfare Facility (excluding those involving residential care)
Warehouse (excluding Dangerous Goods Godown)
Wholesale Trade

(Please see next page)

Figure No.	*Scale*	*Figure Title* **Extracted Notes of the "OU(B)" Zone of the Draft Kwai Chung Outline Zoning Plan No. S/KC/29 (1 of 4)**
3.1	-	
ARUP	*Date* December 2020	*Source* Extracted from the Draft Kwai Chung Outline Zoning Plan No. S/KC/29

OTHER SPECIFIED USES (Cont'd)

For "Business" Only (Cont'd)

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
Schedule II: for industrial or industrial-office building[@]	
Ambulance Depot Art Studio (excluding those involving direct provision of services or goods) Bus Depot Cargo Handling and Forwarding Facility (not elsewhere specified) Eating Place (Canteen only) Government Refuse Collection Point Government Use (not elsewhere specified) Information Technology and Telecommunications Industries Non-polluting Industrial Use (excluding industrial undertakings involving the use/storage of Dangerous Goods[Δ]) Office (excluding those involving direct provision of customer services or goods) Public Convenience Public Transport Terminus or Station Public Utility Installation Public Vehicle Park (excluding container vehicle) Radar, Telecommunications Electronic Microwave Repeater, Television and/or Radio Transmitter Installation Recyclable Collection Centre Research, Design and Development Centre Shop and Services (Motor-vehicle Showroom on ground floor, Service Trades only) Utility Installation for Private Project Warehouse (excluding Dangerous Goods Godown)	Broadcasting, Television and/or Film Studio Cargo Handling and Forwarding Facility (Container Freight Station, free-standing purpose-designed Logistics Centre only) Industrial Use (not elsewhere specified) Mass Transit Railway Vent Shaft and/or Other Structure above Ground Level other than Entrances Off-course Betting Centre Office (not elsewhere specified) Petrol Filling Station Place of Recreation, Sports or Culture (not elsewhere specified) Private Club Shop and Services (not elsewhere specified) (ground floor only except Ancillary Showroom[#] which may be permitted on any floor) Vehicle Repair Workshop Wholesale Trade
In addition, for building without industrial undertakings involving offensive trades or the use/storage of Dangerous Goods[Δ], the following use is always permitted :	
Office	

(Please see next page)

Figure No.	*Scale*	*Figure Title* **Extracted Notes of the "OU(B)" Zone of the Draft Kwai Chung Outline Zoning Plan No. S/KC/29 (2 of 4)**
3.1	-	
ARUP	*Date* December 2020	*Source* Extracted from the Draft Kwai Chung Outline Zoning Plan No. S/KC/29

OTHER SPECIFIED USES (Cont'd)

For "Business" Only (Cont'd)

In addition, the following uses are always permitted in the purpose-designed non-industrial portion on the lower floors (except basements and floors containing wholly or mainly car parking, loading/unloading bays and/or plant room) of an existing building, provided that the uses are separated from the industrial uses located above by a buffer floor or floors and no industrial uses are located within the non-industrial portion :	In addition, the following use may be permitted with or without conditions on application to the Town Planning Board in the purpose-designed non-industrial portion on the lower floors (except basements and floors containing wholly or mainly car parking, loading/unloading bays and/or plant room) of an existing building provided that the use is separated from the industrial uses located above by a buffer floor or floors and no industrial uses are located within the non-industrial portion :
Commercial Bathhouse/Massage Establishment Eating Place Educational Institution Exhibition or Convention Hall Institutional Use (not elsewhere specified) Library Off-course Betting Centre Office Place of Entertainment Place of Recreation, Sports or Culture Private Club Public Clinic Religious Institution School (excluding kindergarten) Shop and Services Training Centre	Social Welfare Facility (excluding those involving residential care)

@ An industrial or industrial-office building means a building which is constructed for or intended to be occupied by industrial or industrial-office purpose respectively as approved by the Building Authority.

Δ Dangerous Goods refer to substances classified as Dangerous Goods and requiring a licence for their use/storage under the Dangerous Goods Ordinance (Cap.295).

Ancillary Showroom requiring planning permission refers to showroom use of greater than 20% of the total usable floor area of an industrial firm in the same premises or building.

Planning Intention

This zone is intended primarily for general business uses. A mix of information technology and telecommunications industries, non-polluting industrial, office and other commercial uses are always permitted in new "business" buildings. Less fire hazard-prone office use that would not involve direct provision of customer services or goods to the general public is always permitted in existing industrial or industrial-office buildings.

(Please see next page)

Figure No.	*Scale*	*Figure Title* **Extracted Notes of the "OU(B)" Zone of the Draft Kwai Chung Outline Zoning Plan No. S/KC/29 (3 of 4)**
3.1	-	
ARUP	*Date* December 2020	*Source* Extracted from the Draft Kwai Chung Outline Zoning Plan No. S/KC/29

OTHER SPECIFIED USES (Cont'd)

For "Business" Only (Cont'd)

Remarks

(1) No new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of a maximum total plot ratio of 9.5, or the plot ratio of the existing building, whichever is the greater.

(2) No new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of the maximum building heights in terms of metres above Principal Datum (mPD) as stipulated on the Plan, or the height of the existing building, whichever is the greater.

(3) On land demarcated for a 15m-wide building gap from Castle Peak Road to the east-west aligned section of Tai Lin Pai Road as shown on the Plan, no new development (except minor addition, alteration and/or modification not affecting the building height of the existing building) or redevelopment of an existing building shall exceed the maximum building height restriction of 25mPD.

(4) A minimum 4m-wide non-building area from the lot boundary abutting Lam Tin Street and a minimum 3.5m-wide non-building area from the lot boundary abutting Chun Pin Street (except 1 Chun Pin Street) and Ta Chuen Ping Street (except 26-38, 68, 70, 85-89 and 93 Ta Chuen Ping Street) shall be provided.

(5) In determining the maximum plot ratio for the purpose of paragraph (1) above, any floor space that is constructed or intended for use solely as car park, loading/unloading bay, plant room and caretaker's office, provided such uses and facilities are ancillary and directly related to the development or redevelopment, may be disregarded.

(6) Where the permitted plot ratio as defined in Building (Planning) Regulations is permitted to be exceeded in circumstances as set out in Regulation 22(1) or (2) of the said Regulations, the plot ratio for the building on land to which paragraph (1) applies may be increased by the additional plot ratio by which the permitted plot ratio is permitted to be exceeded under and in accordance with the said Regulation 22(1) or (2), notwithstanding that the relevant maximum plot ratio specified in paragraph (1) above may thereby be exceeded.

(7) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the plot ratio/building height/building gap restrictions stated in paragraphs (1) to (3) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

(8) Under exceptional circumstances, for a development or redevelopment proposal, minor relaxation of the non-building area restrictions as shown on the Plan or stated in paragraph (4) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

(Please see next page)

Figure No.	*Scale*	*Figure Title* **Extracted Notes of the "OU(B)" Zone of the Draft Kwai Chung Outline Zoning Plan No. S/KC/29 (4 of 4)**
3.1	-	
ARUP	*Date* December 2020	*Source* Extracted from the Draft Kwai Chung Outline Zoning Plan No. S/KC/29

in terms of number of storeys except that the relatively high-rise GIC uses, such as Kwai Chung Police Station in Planning Area 10, Lai King Disciplined Services Quarters in Planning Area 42, and Kwai Chung Hospital, Princess Margaret Hospital and Princess Margaret Hospital School of Nursing and Quarters in Planning Area 43, are stipulated in terms of mPD so as to provide a clearer control over the building height profile. The "G/IC(2)" sub-zone covering Lai King Fire Station is subject to a maximum building height of 3 storeys as stipulated on the Plan, and a drill tower up to 9 storeys is allowed as specified in the Notes.

8.8.7 Minor relaxation of the building height restrictions may be considered by the Board on application under section 16 of the Ordinance. The criteria given in paragraph 7.9 above would be relevant for the assessment of minor relaxation of building height restrictions. Each application will be considered on its own merits.

8.8.8 However, for any existing building with building height already exceeding the relevant restrictions as stipulated on the Plan or in the Notes of the Plan, there is a general presumption against such application for minor relaxation unless under exceptional circumstances.

8.9 Open Space ("O") : Total Area 114.88 ha

8.9.1 This zoning is intended primarily for the provision of outdoor open-air public space for active and/or passive recreational uses serving the needs of local residents as well as the general public. While passive recreational facilities are provided in the existing Central Kwai Chung Park in Planning Area 42, active recreational facilities are provided in the existing Kwai Chung Sports Ground and Kwai Chung San Kui Park in Planning Area 10 and the future Kwai Chung Park with land reserved in Planning Area 37.

8.9.2 Local open spaces at various locations are also provided to meet local demands.

8.10 Other Specified Uses ("OU") : Total Area 174.91 ha

8.10.1 This zoning covers land allocated for specific uses which include the following:-

(a) the container terminals in Planning Area 30 and 37 and container-related uses in Planning Areas 10 and 30;

(b) the cargo handling areas in Planning Areas 26 and 37;

(c) the petrol filling stations in Planning Areas 10, 28, 29 and 44;

(d) the slaughter house in Planning Area 26;

(e) the cemetery, crematorium and funeral facilities in Planning Area 26;

Figure No.	*Scale*	*Figure Title* **Extracted Explanatory Statement of the "OU(B)" Zone of the Draft Kwai Chung Outline Zoning Plan No. S/KC/29 (1 of 5)**
3.2	-	
ARUP	*Date* December 2020	*Source* Extracted from the Draft Kwai Chung Outline Zoning Plan No. S/KC/29

(f) the sewage treatment works in Planning Area 37 and sewage screening plant in Planning Area 30;

(g) the electricity substation at the junction of Yiu Wing Street and Wo Tong Tsui Street in Planning Area 28;

(h) the Lai King Ventilation Building for the MTR Tsuen Wan Line in Planning Area 11;

(i) the two emergency access points for MTR West Rail Line at Kwai Fong and at a site sandwiched between Tsuen Wan Road and Wing Kei Road;

(j) areas bounded by Cheung Wing Road, Tai Yuen Street, Lei Muk Road and Wo Yi Hop Road and the area at the junction of Cheung Wing Road and Castle Peak Road in Planning Area 27; the areas bounded by Castle Peak Road, Yiu Wing Street, Wo Tong Tsui Street and Kin Chuen Street in Planning Area 28; and the areas bounded by Tai Lin Pai Road, Kwai Chung Road and Castle Peak Road in Planning Area 29 are zoned "OU(B)". Development within this zone is subject to a maximum total plot ratio of 9.5, or the plot ratio of the existing building, whichever is the greater, as stipulated in the Notes; and

(k) two proposed columbarium sites at Tsing Tsuen Road and No. 2-6 Wing Lap Street in Planning Area 26.

8.10.2 Developments and redevelopments within this zone are subject to building height restrictions in terms of number of storeys (excluding basement floors(s)) or mPD as stipulated on the Plan, or the height of the existing building, whichever is the greater. Building height restrictions for most of the sites within this zone are stipulated in terms of number of storeys except the "OU(B)" zone, "OU(Columbarium)", "OU(Columbarium)(1)" and the relatively high-rise buildings within the "OU" annotated "Container Terminal" zone.

8.10.3 The "OU(Columbarium)" zone is intended for a public columbarium and garden of remembrance uses. A traffic impact assessment (TIA) for 3 proposed public columbarium sites in Kwai Chung including the site at Tsing Tsuen Road and two sites near Kwai Tai Road was completed in July 2012. The TIA confirmed that the proposed columbarium development at Tsing Tsuen Road with recommended appropriate traffic and transport improvement measures could accommodate the anticipated increase in traffic and pedestrian flows. Development within the zone is restricted to a maximum number of niches of 20 000, 2 000 memorial plaques and a maximum building height of 45mPD. As the Tsing Tsuen Road site covers more than 3 hectares of land, there may be scope for future expansion in order to provide more public niches to meet the market demand. However, any development proposal for more than 20 000 niches and 2 000 memorial plaques at the site would require a new TIA to be conducted to confirm there will be no

Figure No.	*Scale*	*Figure Title* **Extracted Explanatory Statement of the "OU(B)" Zone of the Draft Kwai Chung Outline Zoning Plan No. S/KC/29 (2 of 5)**
3.2	-	
ARUP	*Date* December 2020	*Source* Extracted from the Draft Kwai Chung Outline Zoning Plan No. S/KC/29

adverse traffic impact arising from the expansion proposal. Minor relaxation of the restrictions on maximum number of niches, memorial plaques and building height may be considered by the Board under section 16 of the Ordinance.

8.10.4 A proposed private columbarium development at Wing Lap Street is zoned "OU(Columbarium)(1)". Development within the zone is restricted to a maximum number of niches of 23 000 and a maximum building height of 50mPD. In order to ensure proper control and monitoring of the proposed columbarium development, 'Columbarium' use requires planning permission from the Board so that the applicant can be requested to fulfil relevant departments' requirement such as the proposed transport/traffic/crowd management measures, building design and landscaping through the imposition of approval conditions. To allow design flexibility for proposed columbarium development, e.g. higher floor to floor height, wider circulation corridor and greening on upper floors to enhance the ventilation, circulation and outlook of the building, minor relaxation of the building height restriction may be considered by the Board under section 16 of the Ordinance.

8.10.5 The development of container terminal (CT) is facing the fast-changing requirements of the logistics industry. As the CT is located at the gateway of breezeway and the visual corridor of Rambler Channel, the building height restrictions on the CT seek to maintain the quality environment through preserving the Rambler Channel and provide flexibility for the trade. To this end, maximum building heights of 70mPD and 110mPD are imposed to accommodate relatively taller buildings to cater for the operational requirements, taking into account air ventilation and visual considerations. To improve wind flow and visual relief, there are low-rise bands including a 50m-wide height band of maximum 25mPD along the quayside to accommodate minor structures, a height band of maximum 30mPD to the north of Tsing Yi Bridge, and the southern half of the CT No. 4 Crosswharf featuring a 55m-wide NBA and a height band of maximum 30mPD (110m-wide). Due to the waterfront location and potential long building frontage of the CT, three 40m-wide intervening NBAs are designated to enhance air permeability and break up the building mass. While link bridges within the NBAs are allowed to facilitate connection between buildings, air permeability of at least 50% within the NBAs should be provided to allow air penetration. The building height restrictions do not apply to crane structures and container stacks. Under the lease, any development within the CT is required to submit general layout plan to the Land Authority. The proponent may also undertake relevant assessments, including traffic impact assessment, visual impact assessment, quantitative AVA(s) and provide any other information as may be required by the Government departments during the layout plan submission under lease. Quantitative AVAs should identify other enhancement measures and to ascertain their effectiveness. Due to the waterfront location, the proponent of future developments should provide more building gaps to enhance permeability, particularly for

Figure No.	*Scale*	*Figure Title* **Extracted Explanatory Statement of the "OU(B)" Zone of the Draft Kwai Chung Outline Zoning Plan No. S/KC/29 (3 of 5)**
3.2	-	
ARUP	*Date* December 2020	*Source* Extracted from the Draft Kwai Chung Outline Zoning Plan No. S/KC/29

buildings with long frontage facing the channel so as to improve air ventilation of the sensitive areas identified in the AVA (CFD) 2015.

8.10.6 The planning intention of the "OU(B)" zone is primarily for general business uses. A mix of information technology and telecommunications industries, non-polluting industrial, office and other commercial uses are always permitted in new "business" buildings. Less fire hazard-prone office use that would not involve direct provision of customer services or goods to the general public is always permitted in existing industrial or industrial-office (I-O) buildings. As it is not possible to phase out existing polluting and hazardous industrial uses all at once, it is necessary to ensure compatibility of the uses within the same industrial building, I-O building or industrial area in Kwai Chung until the whole area is transformed to cater for the new non-polluting business uses. Upon redevelopment of the existing electricity substation site bounded by Castle Peak Road and Yiu Wing Street in Planning Area 28, adequate provision should be made within the site for the construction of a new primary electricity substation, if required. Development within this zone should make reference to the relevant Town Planning Board Guidelines.

8.10.7 In the circumstances set out in Regulation 22 of the Building (Planning) Regulations, the above specified maximum plot ratio for the "OU(B)" zone may be increased by what is permitted to be exceeded under Regulation 22. This is to maintain flexibility for unique circumstances such as dedication of part of a site for road widening or public uses.

8.10.8 Developments and redevelopments within the "OU(B)" zone are subject to maximum building heights of 105mPD along Tai Lin Pai Road, 105/130mPD along Wo Tong Tsui Street/Yiu Wing Street, 130mPD along Wo Yi Hop Road and 150mPD at Kowloon Commerce Centre, or the height of the existing building, whichever is the greater.

8.10.9 A 15m-wide building gap above 25mPD between Castle Peak Road and the east-west aligned section of Tai Lin Pai Road under the "OU(B)" zone shall be provided to facilitate northeasterly wind reaching Tai Lin Pai Road.

8.10.10 Minor relaxation of the plot ratio/building height/building gap restrictions may be considered by the Board on application under section 16 of the Ordinance. The criteria given in paragraph 7.9 above would be relevant for the assessment of minor relaxation of building height restrictions. Each application will be considered on its own merits.

8.10.11 However, for any existing building with plot ratio/building height already exceeding the relevant restrictions as stipulated on the Plan or in the Notes of the Plan, there is a general presumption against such application for minor relaxation unless under exceptional circumstances.

Figure No.	*Scale*	*Figure Title* **Extracted Explanatory Statement of the "OU(B)" Zone of the Draft Kwai Chung Outline Zoning Plan No. S/KC/29 (4 of 5)**
3.2	-	
ARUP	*Date* December 2020	*Source* Extracted from the Draft Kwai Chung Outline Zoning Plan No. S/KC/29

8.10.12 To cater for the long-term road widening proposal and to improve air ventilation of the "OU(B)" zone bounded by Castle Peak Road and Wo Yi Hop Road, a minimum 4m-wide NBA from the lot boundary abutting Lam Tin Street, and a minimum 3.5m-wide NBA from the lot boundary abutting Chun Pin Street (except 1 Chun Pin Street) and Ta Chuen Ping Street (except 26-38, 68, 70, 85-89 and 93 Ta Chuen Ping Street) shall be provided. A 9m-wide NBA aligning with Lam Tin Street between Chun Pin Street and Castle Peak Road is also imposed (see **Plan 1**).

8.10.13 To improve air ventilation of the "OU(B)" zone along Tai Lin Pai Road, the following six NBAs are designated on the Plan:

(a) the existing public footpath which straddles "OU(B)" and "I" zones between Wo Yi Hop Road and Wah Sing Street and portion of 21-33 Tai Lin Pai Road abutting this footpath is designated as an NBA;

(b) a 15m-wide north-south NBA aligning with Kwai Wing Road and Kwai Cheong Road;

(c) two 15m-wide east-west aligned NBAs between Kwai Chung Road and Tai Lin Pai Road;

(d) a 15m-wide east-west aligned NBA connecting Kwai Chung Road with Kwai Cheong Road; and

(e) a 15m-wide east-west aligned NBA between Kwai Chung Road and Kwai Ting Road.

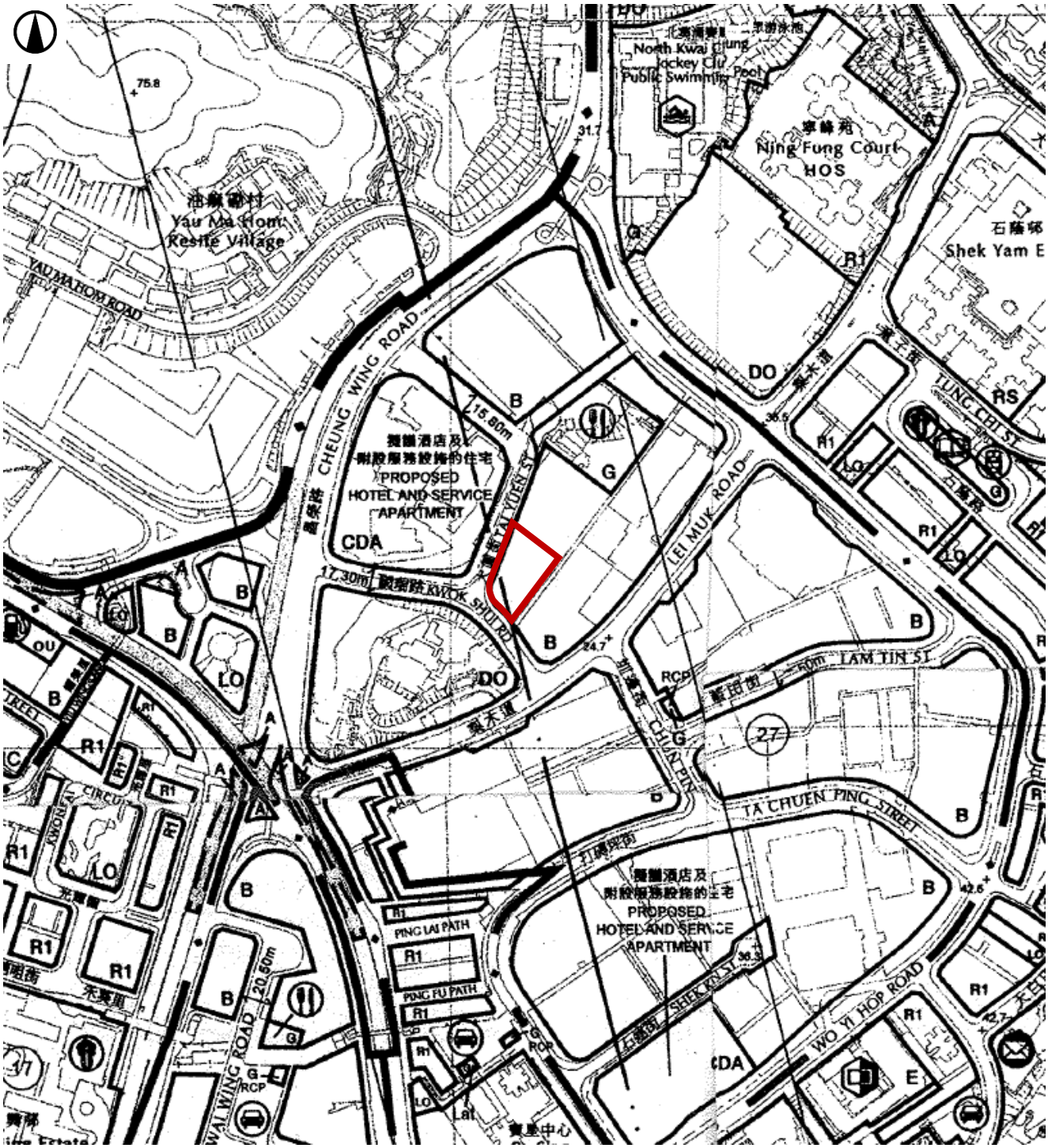
8.10.14 The NBAs are required for air ventilation purpose above ground and such restriction will not apply to underground development. Under exceptional circumstances, minor relaxation of the NBAs restrictions may be considered by the Board on application under section 16 of the Ordinance.

8.11 Green Belt ("GB") : Total Area 263.34 ha

8.11.1 This zoning covers mainly steep hill-slopes in the eastern part of the Area, and is intended to define the outer limits of Tsuen Wan New Town and for the conservation of areas with prominent, high scenic and high value landscape features, e.g. the Kau Wa Keng San Tsuen area. This zoning also provides additional outlets for passive recreational uses. Generally, there is a presumption against development in this zone and development proposals will be assessed on individual merits taking into account relevant Town Planning Board Guidelines.

8.11.2 The "GB" zone in the Kau Wa Keng valley is intended to keep the existing character of the area. In particular, the relationship between the existing buildings of the Kau Wa Keng San Tsuen, the land-forms and the vegetation should be retained. The area of high landscape value in

Figure No.	*Scale*	*Figure Title* **Extracted Explanatory Statement of the "OU(B)" Zone of the Draft Kwai Chung Outline Zoning Plan No. S/KC/29 (5 of 5)**
3.2	-	
ARUP	*Date* December 2020	*Source* Extracted from the Draft Kwai Chung Outline Zoning Plan No. S/KC/29

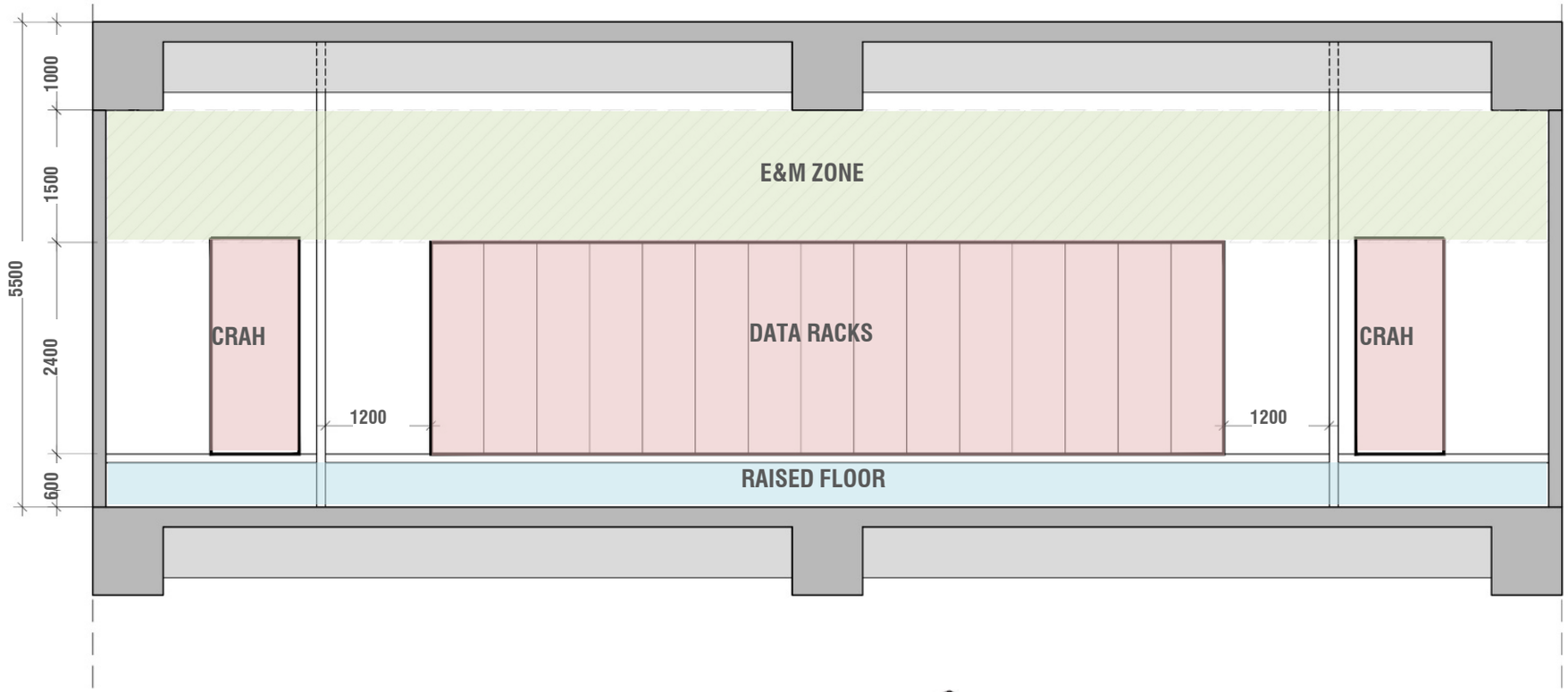


LEGEND Application Site

ZONING

R1	Residential – Zone 1
G	Government
B	Business
C	Commercial
CDA	Comprehensive Development Area
E	Education
DO	District Open Space
I	Industrial

Figure No.	*Scale*	*Figure Title*
3.3	-	**Extract of Draft Kwai Chung Outline Development Plan No. D/KC/D**
ARUP	*Date* December 2020	*Source* Draft Kwai Chung Outline Development Plan No. D/KC/D



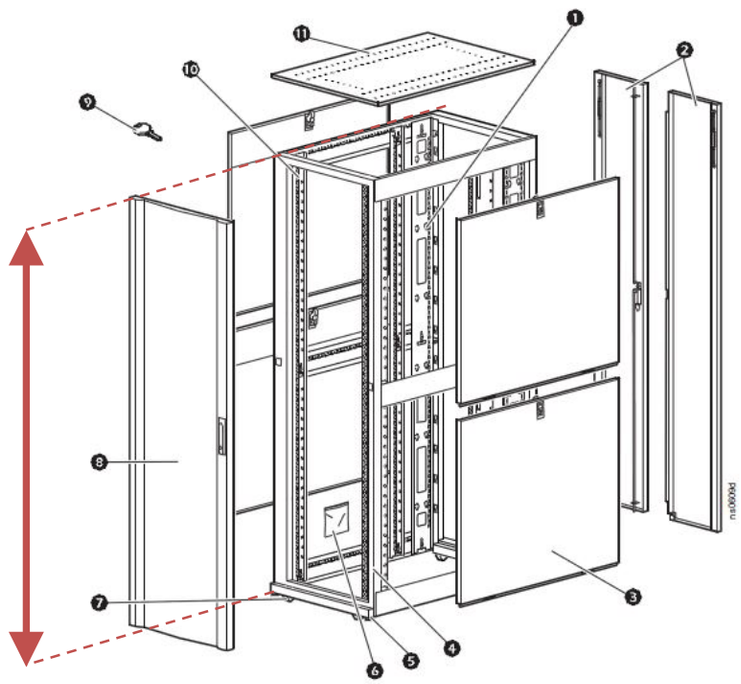
E&M Zone (min. 1500mm):

- Cable Trays for Power Distribution Unit;
- Trunkings for CCTV, IT, Electricity, Building Management System, Public Access, Lighting, Fire Sprinkler and Normal Power;
- Chilled Water Supply and Return Pipes;
- Smoke Detectors;
- Gas Suppression Nozzle and Pipes;
- Primary Air Ducts

Raised Floor (min. 600mm):

- Trunking for IT Racks;
- Chilled Water Supply and Return

OVERALL HEIGHT OF DATA RACK ~2.4m



1. Adjustable vertical 0 U accessory channel*
2. Removable rear split doors
3. Removable side panel with lock
4. Cabinet frame
5. Adjustable leveling feet
6. Hardware bag (see page 5)
7. Casters
8. Removable and reversible front door
9. Key for doors and side panels
10. Vertical mounting flanges
11. Roof

Not shown: Cable Cutouts, 750 mm (29.5 in.) and 800 mm (31.5 in.) wide models only. See "Remove the Cable Cutout Covers" on page 20.

* 1200 mm (47.24 in.) deep cabinets include four vertical 0U Accessory Channels.

Figure Title	*Source*	*Date*	*Figure No.*
Typical Section of Data Hall and Dimension of Data Rack		December 2020	4.1
		Scale	

E&M

GREENERY

Total Roof Area:	**1108sqm**
A. BUILDING CORE & CIRCULATION :	**~170 sqm**
B. STEEL FRAME FOR COOLING TOWERS :	**~138 sqm**
C. OTHER E&M PLANT AND EQUIPMENT:	**~246 sqm**

A+B+C = ~554 sqm i.e. ~50 % of roof area

Sample Photos of Steel Frame for Cooling Tower



The cooling tower on R/F is an equipment plant which is neither covered plant room nor enclosed structure. The roof ancillary structure (including cooling towers) is less than 10% in height from main roof and the total area of enclosed structure at roof floor is less than 50%. According to JPN No.5. the cooling tower should not constitute one floor of GFA nor be counted towards the height of the Proposed Development.



Figure Title	Source	Date	Figure No.
Details of Enclosed Structures on R/F		December 2020	4.2
		Scale	

Site Constraints

1. Underground Fuel Tank

Fuel tanks are essential to the operation of data centre. However, no part of the underground fuel tanks shall be covered up by the building according to the statutory requirement. In this case, ground floor area shall be reserved to facilitate future operation.

2. Cable Lead-In for CLP Sub-station

Cable lead-in for the CLP substation will be running along Kwok Shui Road. Therefore, R.C. covers for cable trenches leading into the ring main units (RMU) are required on the pavement and in turn reduces site coverage of greenery.

3. CLP Plant Room Arrangement

According to CLP's latest code of practice, minimum size requirement of 132kV transformer bays and RMU are 10 x 11m and 10 x 8m respectively. Those transformer bays and RMUs shall be placed on G/F for ease of maintenance.

4. HGV on Ground Floor

According to HKPSG, at least 3 nos. of HGV shall be provided for the development which a turntable with minimum 12 x 12m clear space shall be reserved for the operation of the parking of HGVs and in turn taking up more G/F area.

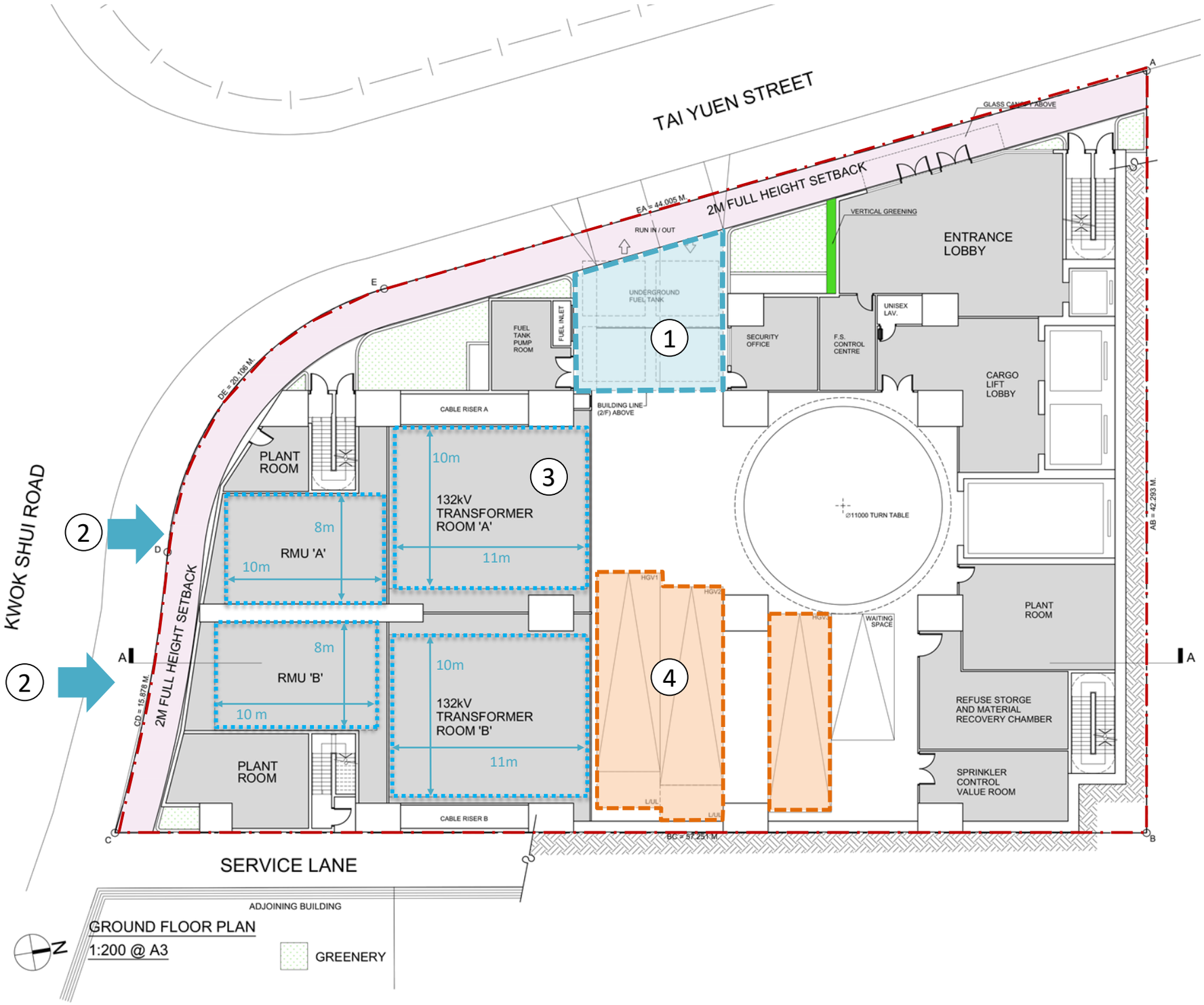


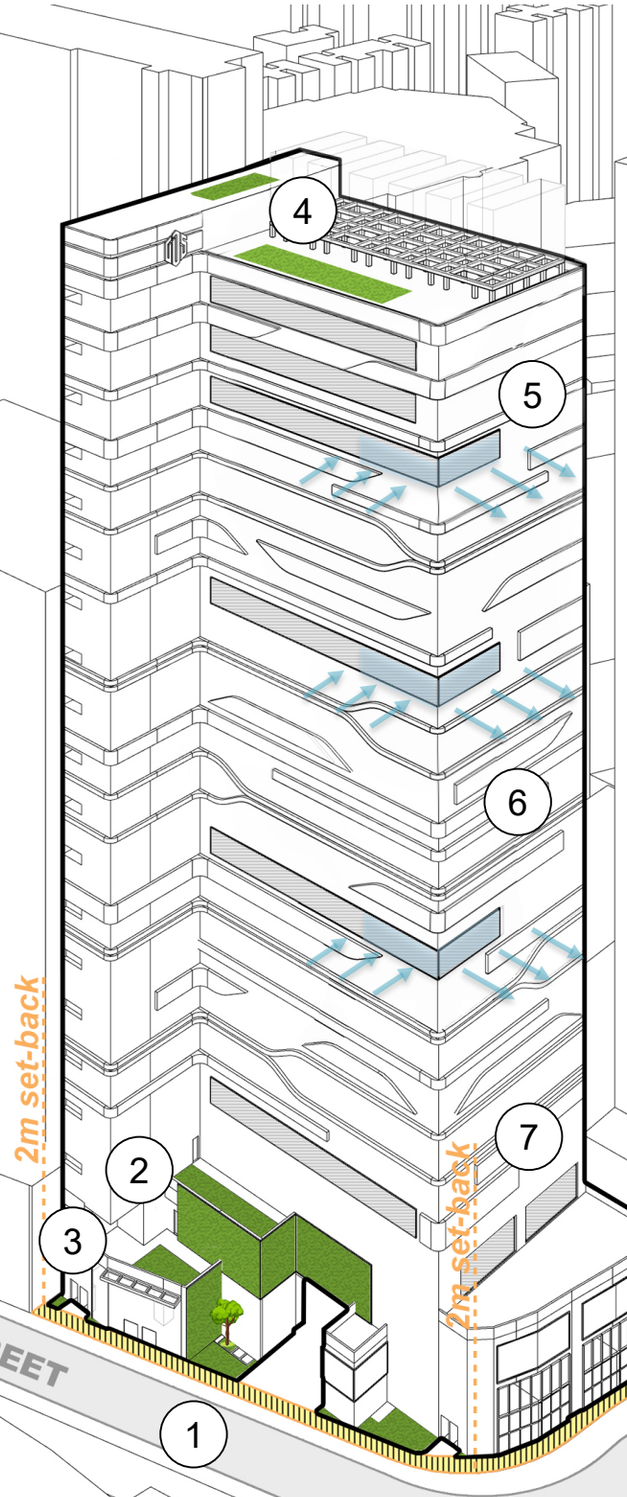
Figure Title	Source	Date	Figure No.
Key Technical and Mechanical Requirements on G/F		December 2020	4.3
		Scale	

1. Voluntary Building Setback
2m full-height setback from site boundary along Tai Yuen Street and Kwok Shui Road to further widen the existing pedestrian pavement.

2. Vertical and Horizontal Greening
Providing street level greenery for pedestrians, especially along main façade of the building, so as to soften edges of the building and enhance streetscape.

3. Canopy along Main Entrance
Canopy to provide rain shelter for pedestrian.

4. Greenery on Flat Roof
Greenery on flat roof to increase green coverage for building and reduce heat island effect within the site, which is surrounded by other upcoming redevelopments in close proximity.



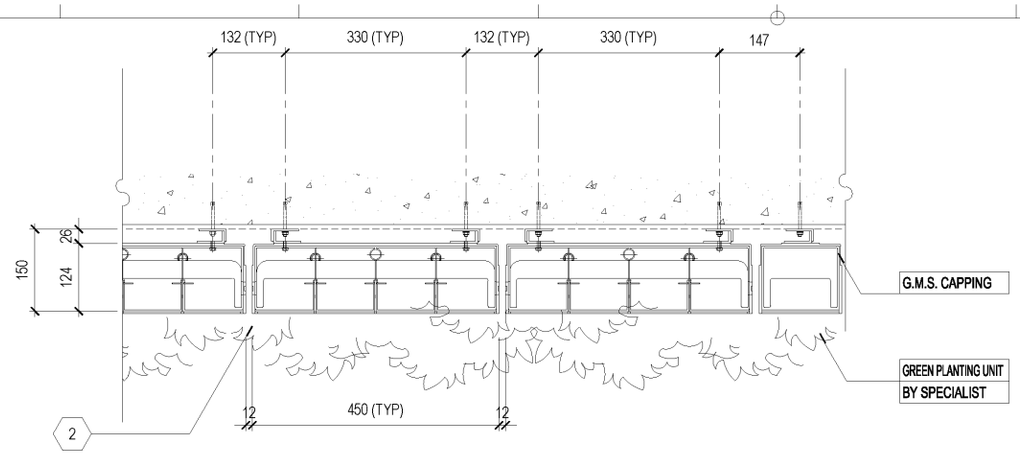
5. Natural Ventilation on Mechanical Floors
Minimization of mechanical ventilation for E&M floors by maximizing natural ventilation on those floors. Nuisance mitigation measures will be reviewed and provided accordingly.

6. Minimization of Building Heat Gain
In order to increase energy efficiency within the typical floors of data halls, window/louver openings are minimized on façade to maintain better temperature and humidity control within building. Light colour material will also be adopted especially on flat roof and outdoor equipment in order to reduce heat gain

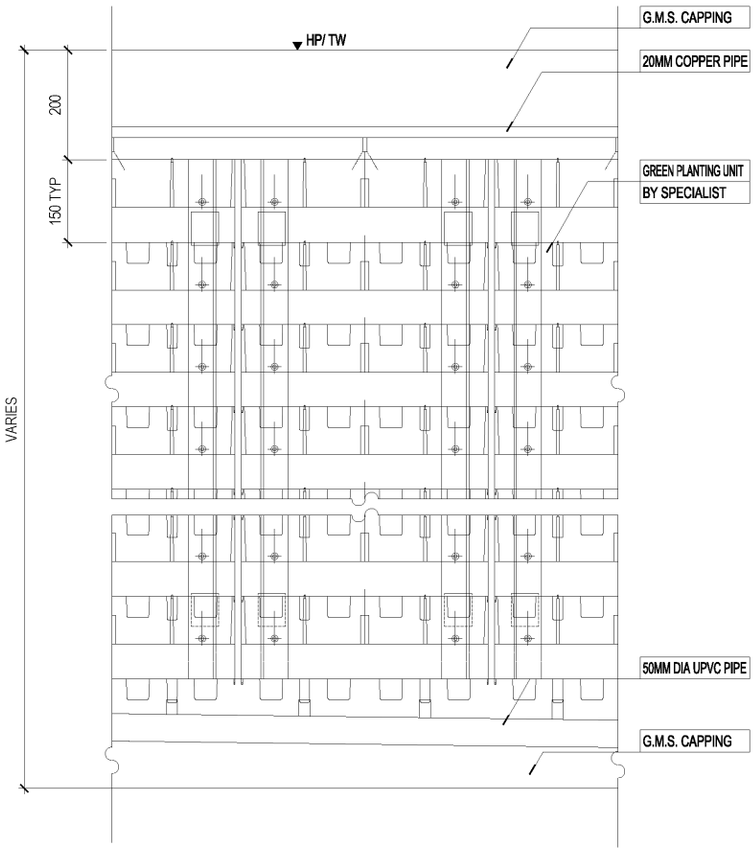
7. Public Health and Safety
CLP power supply equipment fully complies with the guidelines issued by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The whole CLP 132kV substation would be built according to CLP code of practice to achieve the same health and safety standard.

8. BEAM Plus and LEED Certification
The proposed development is intended to adopt BEAM Plus and LEED certification of which the rating will be considered at detailed design stage.

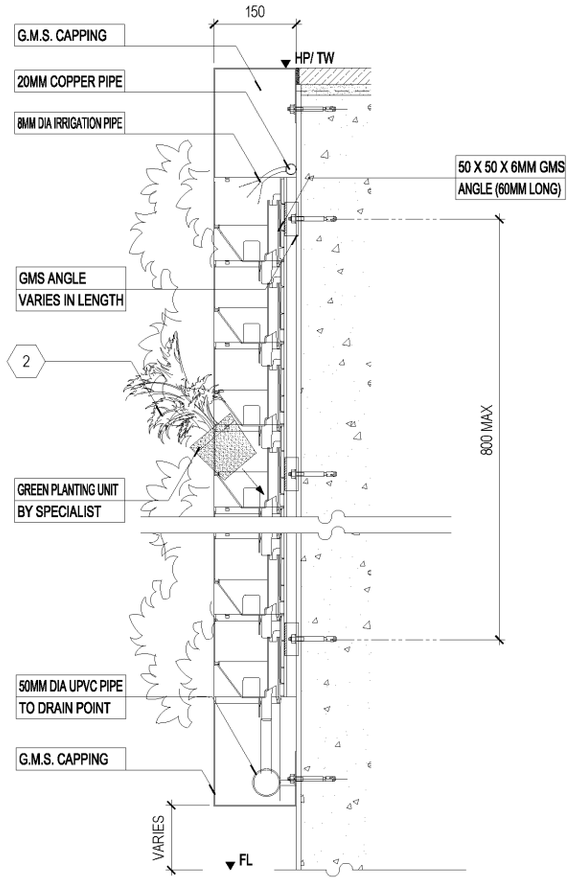
Figure Title	Source	Date	Figure No.
Illustration of the Planning and Design Merits of the Proposed Development		December 2020	5.1
		Scale	



1 PLAN SCALE 1 :10



2 ELEVATION SCALE 1 :10



3 SECTION SCALE 1 :10

LEGEND

CODE	DESCRIPTION
2	PLANTING AS SPECIFIED (REFER TO PLANTING PLAN)
HP	HIGH POINT
TW	TOP OF WALL
FL	FINISH LEVEL; FINISHED FLOOR LEVEL

eddg 泛亞國際
earthasia limited
香港銅鑼灣告士打道262號中糧大廈11樓
11/F, COFCO Tower, 262 Gloucester Road
Causeway Bay, Hong Kong
Tel: (852) 2559 9439 Fax: (852) 2559 9841

CLIENT

NOTES

GENERAL NOTES:

THIS DRAWING IS NOT VALID FOR CONSTRUCTION OR OTHER PURPOSES UNLESS SEPARATELY CERTIFIED.

THIS DRAWING AND DESIGN ARE COPYRIGHTED AND NO PORTION MAY BE REPRODUCED WITHOUT THE PRIOR PERMISSION OF THE LANDSCAPE ARCHITECTS.

DO NOT SCALE. USE THE WRITTEN DIMENSIONS OR GRID LINES ONLY. MEASUREMENT TO EXISTING WORK TO BE CHECKED ON SITE.

REPORT ALL OMISSIONS & ANY DISCREPANCIES TO THE LANDSCAPE ARCHITECTS.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SPECIFICATION AND CONDITION OF CONTRACT.

DRAWING NOT SHOWING THE LAST REVISION ARE TO BE CANCELLED.

REVISION

ISSUE	DESCRIPTION	DATE

DESIGN:
DRAWN: EW
CHECKED:
STAGE:
PROJECT:

GDS, DATA CENTRE
2-10 TAI YUEN ST

TITLE:

TYPICAL VERTICAL
GREEN WALL DETAIL

SCALE: AS SHOWN
DRAWING NO.: APP-I-01
REVISION:
DATE: NOV 2020
REFERENCE:

earthasia design group

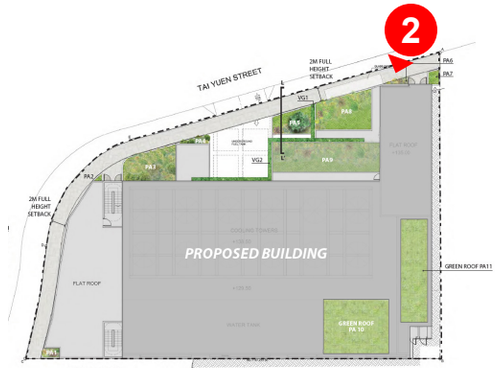
Figure Title	Source	Date	Figure No.
Details of Implementation of Vertical Greening		December 2020	5.2
		Scale	





1. VIEW FROM JUNCTION OF TAI YUEN STREET & KWOK SHUI ROAD

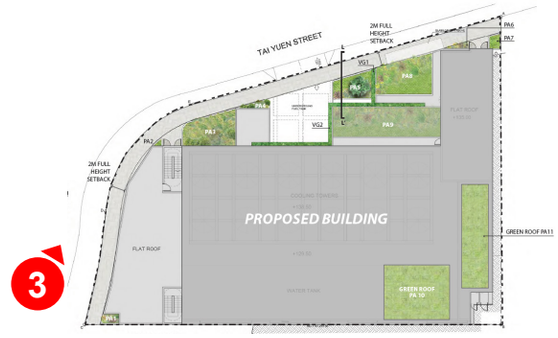
Figure Title	Source	Date	Figure No.
Artist's Impressions of Street-Level Design (1 of 3)		December 2020	5.3
		Scale	





2. VIEW FROM JUNCTION OF TAI YUEN STREET

Figure Title	Source	Date	Figure No.
Artist's Impressions of Street-Level Design (2 of 3)		December 2020	5.3
		Scale	



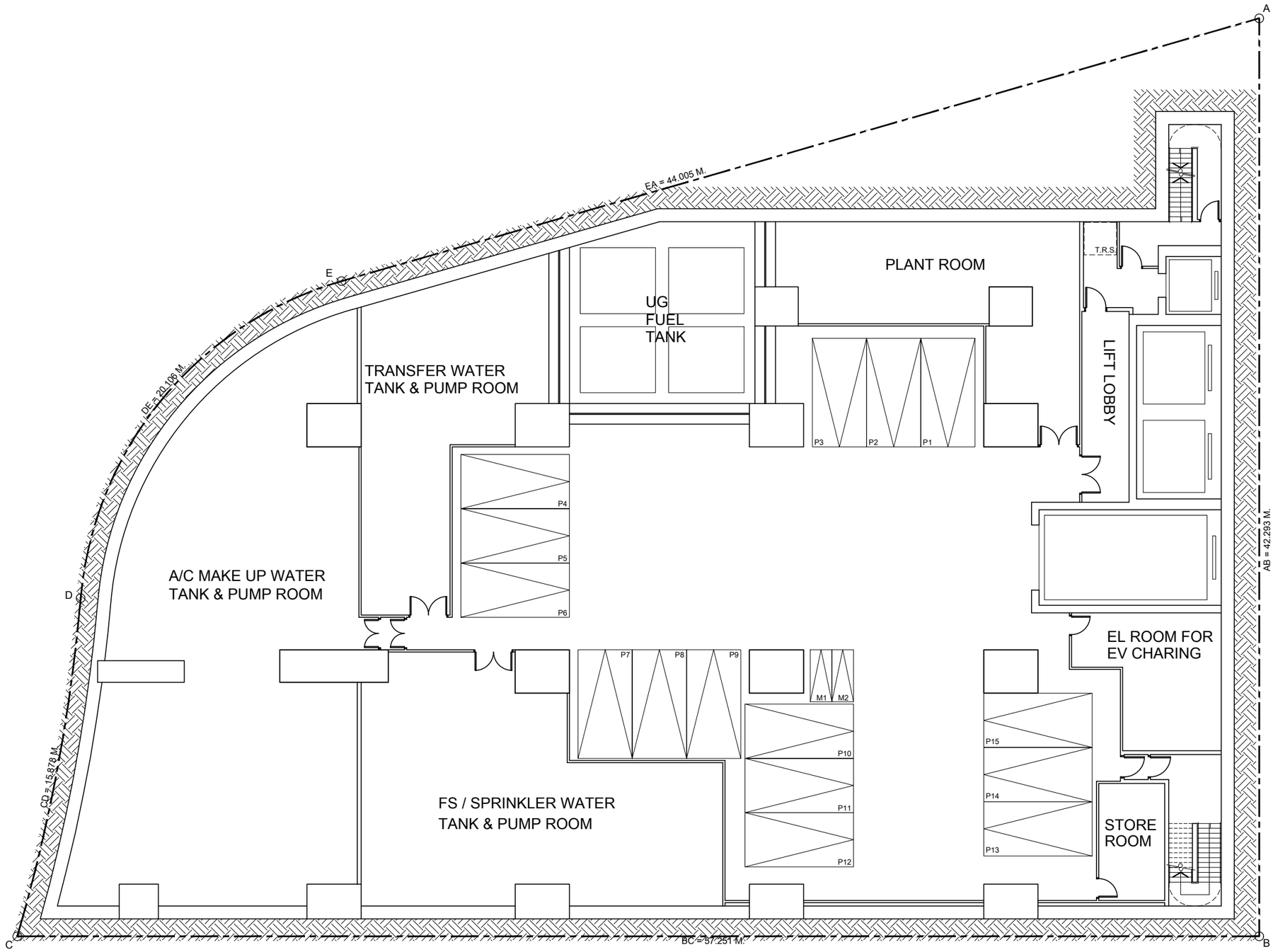


3. VIEW FROM JUNCTION OF KWOK SHUI ROAD

Figure Title	Source	Date	Figure No.
Artist's Impressions of Street-Level Design (3 of 3)		December 2020	5.3
		Scale	

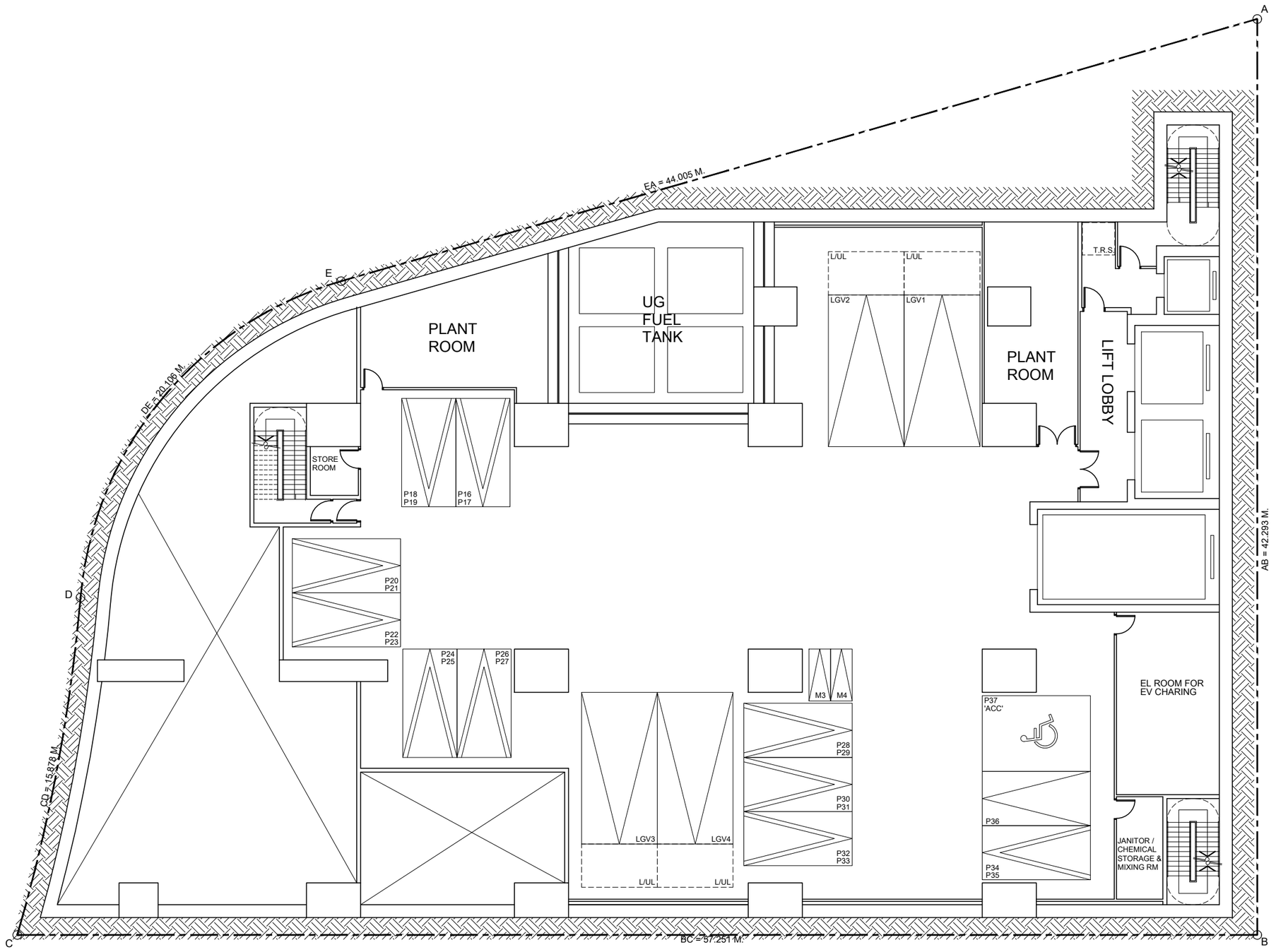
Appendix A

Architectural Drawings



BASEMENT '2' FLOOR PLAN

1:200 @ A3



BASEMENT '1' FLOOR PLAN

1:200 @ A3

TAI YUEN STREET

KWOK SHUI ROAD

2M FULL HEIGHT SETBACK

GLASS CANOPY ABOVE

VERTICAL GREENING

EA = 44.005 M.

RUN IN / OUT

ENTRANCE LOBBY

UNDERGROUND FUEL TANK

FUEL TANK PUMP ROOM

FUEL INLET

SECURITY OFFICE

F.S. CONTROL CENTRE

UNISEX LAV.

CARGO LIFT LOBBY

DE = 20.106 M.

CABLE RISER A

BUILDING LINE (2/F) ABOVE

PLANT ROOM

132kV TRANSFORMER ROOM 'A'

RMU 'A'

Ø11000 TURN TABLE

AB = 42.293 M.

HGV1

HGV2

HGV3

WAITING SPACE

PLANT ROOM

RMU 'B'

132kV TRANSFORMER ROOM 'B'

CD = 15.878 M.

REFUSE STORGE AND MATERIAL RECOVERY CHAMBER

SPRINKLER CONTROL VALUE ROOM

L/UL

L/UL

CABLE RISER B

BC = 57.251 M

SERVICE LANE

ADJOINING BUILDING

A

B

C

D

E

N

GREENERY

GROUND FLOOR PLAN

1:200 @ A3

KWOK SHUI ROAD

2M FULL HEIGHT SETBACK

CD = 15.878 M.

DE = 20.106 M.

EA = 44.005 M.

2M FULL HEIGHT SETBACK

GLASS CANOPY

VERTICAL GREENING

BUILDING LINE
(2/F) ABOVE

T.R.S.

MMR 'A'

LIFT
LOBBY

CUSTOMER 11kV
SWITCHGEAR
ROOM 'A'

LIFT
MACHINE
ROOM '1'

P.D.

CUSTOMER 11kV
SWITCHGEAR
ROOM 'B'

CUSTOMER
SWITCH ROOM

TRANSFORMER
ROOM FOR BUILDING

T.B.E. ROOM '1'

BUILDING LINE
(2/F) ABOVE

AB = 42.293 M.

ADJOINING BUILDING

BC = 57.251 M.

A

B

C

D

E

SERVICE LANE

ADJOINING BUILDING

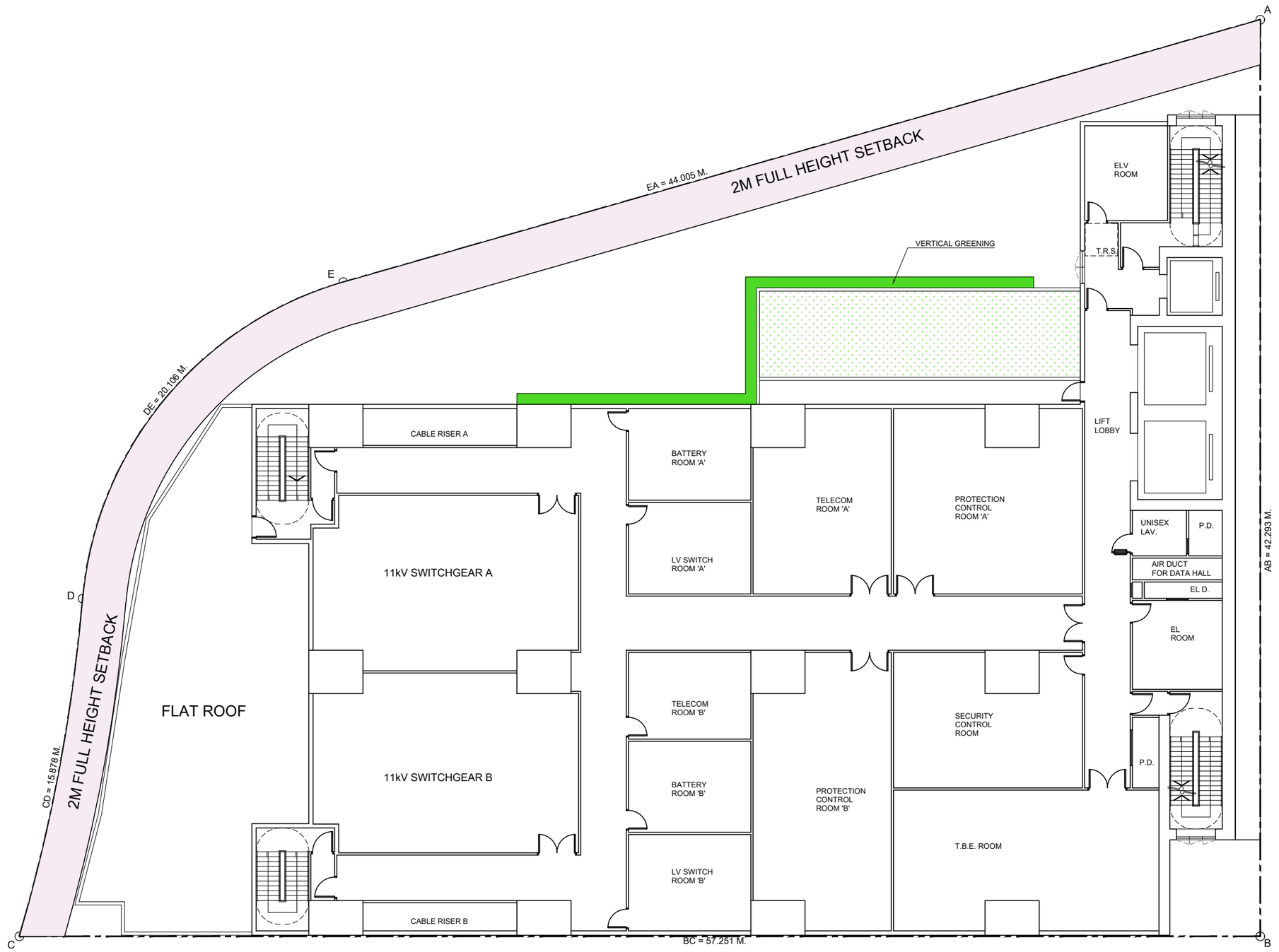
ADJOINING BUILDING

N

FIRST FLOOR PLAN

1:200 @ A3

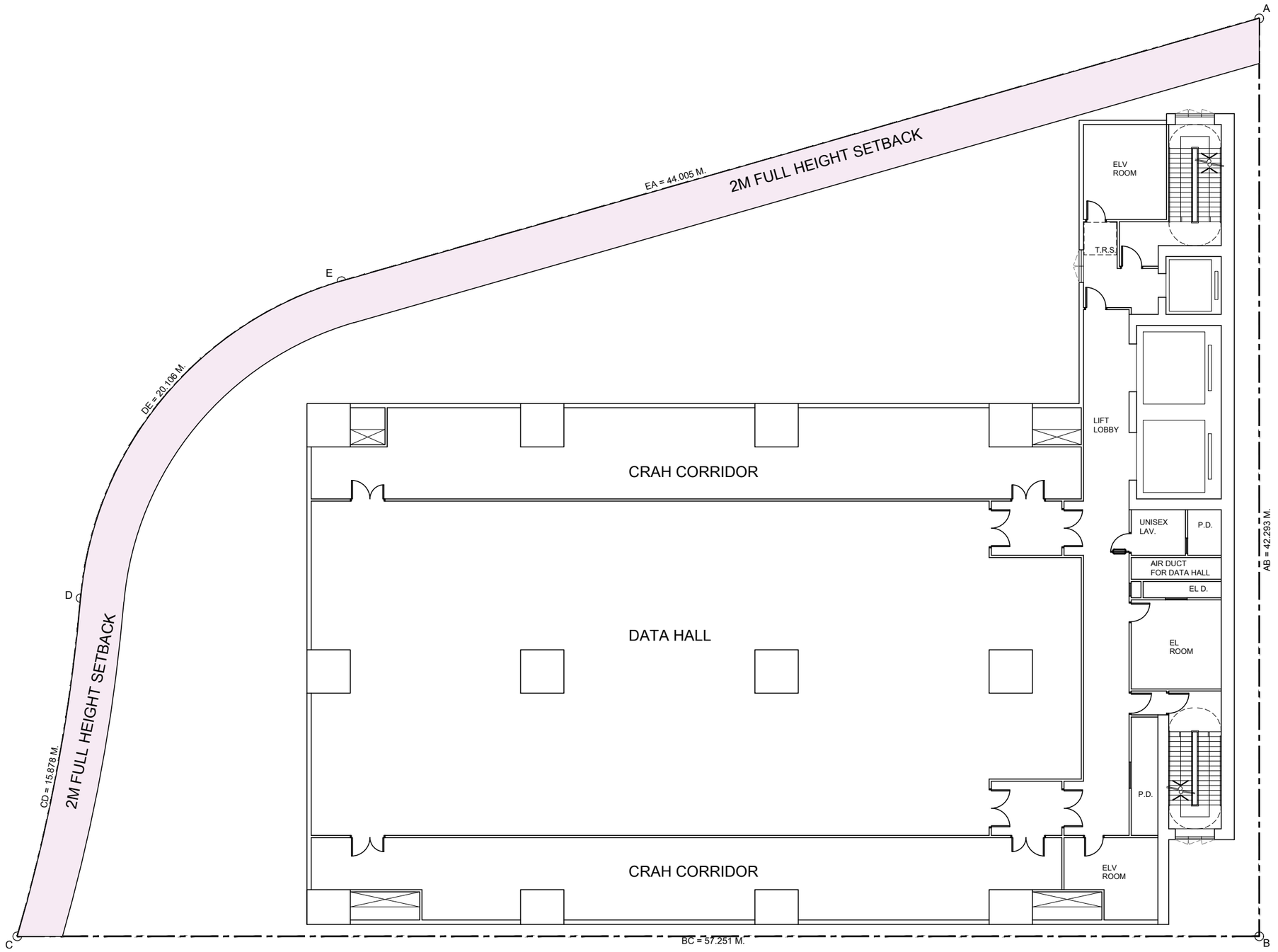
GREENERY



SECOND FLOOR PLAN

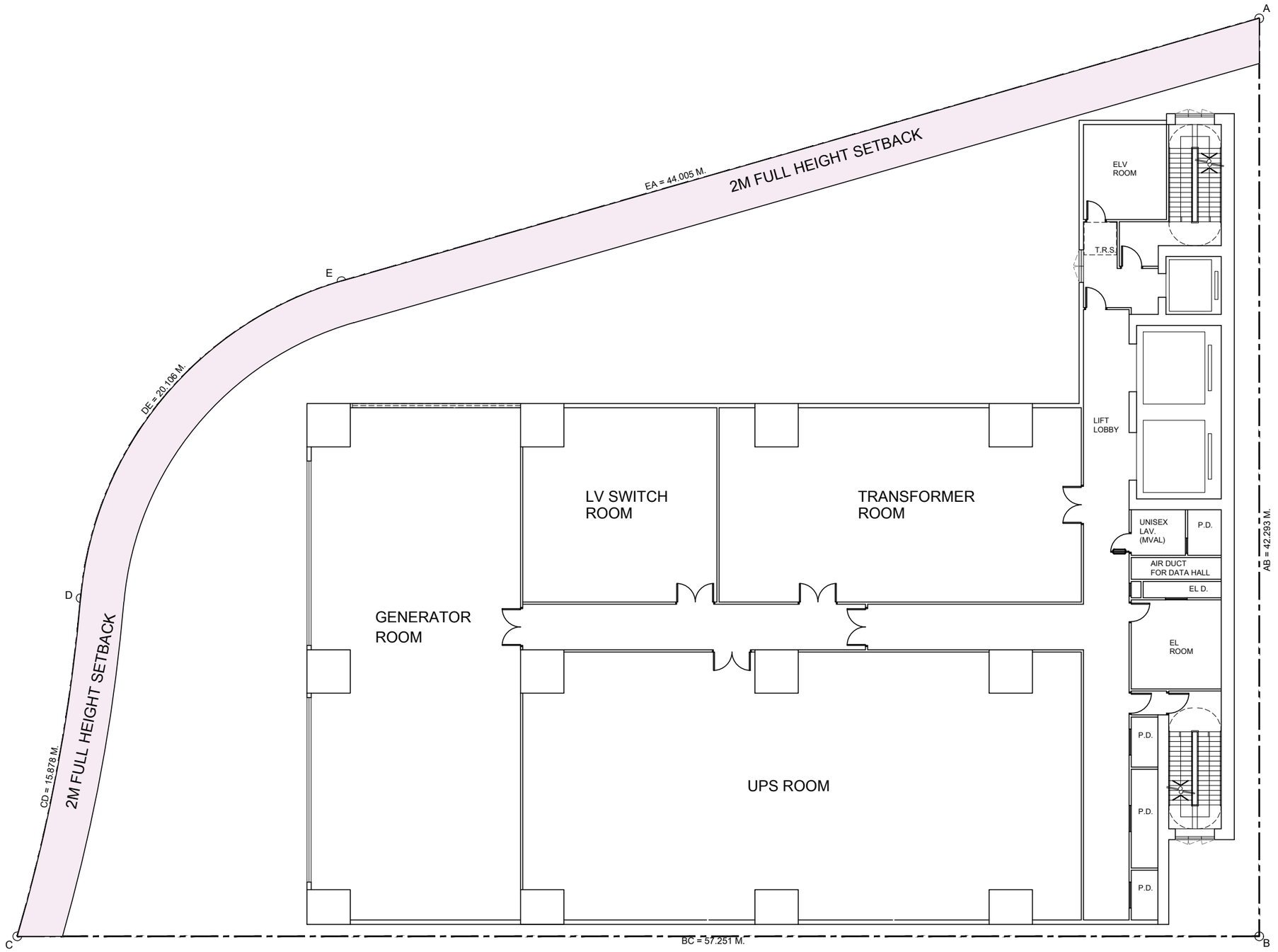
1:200 @ A3

GREENERY



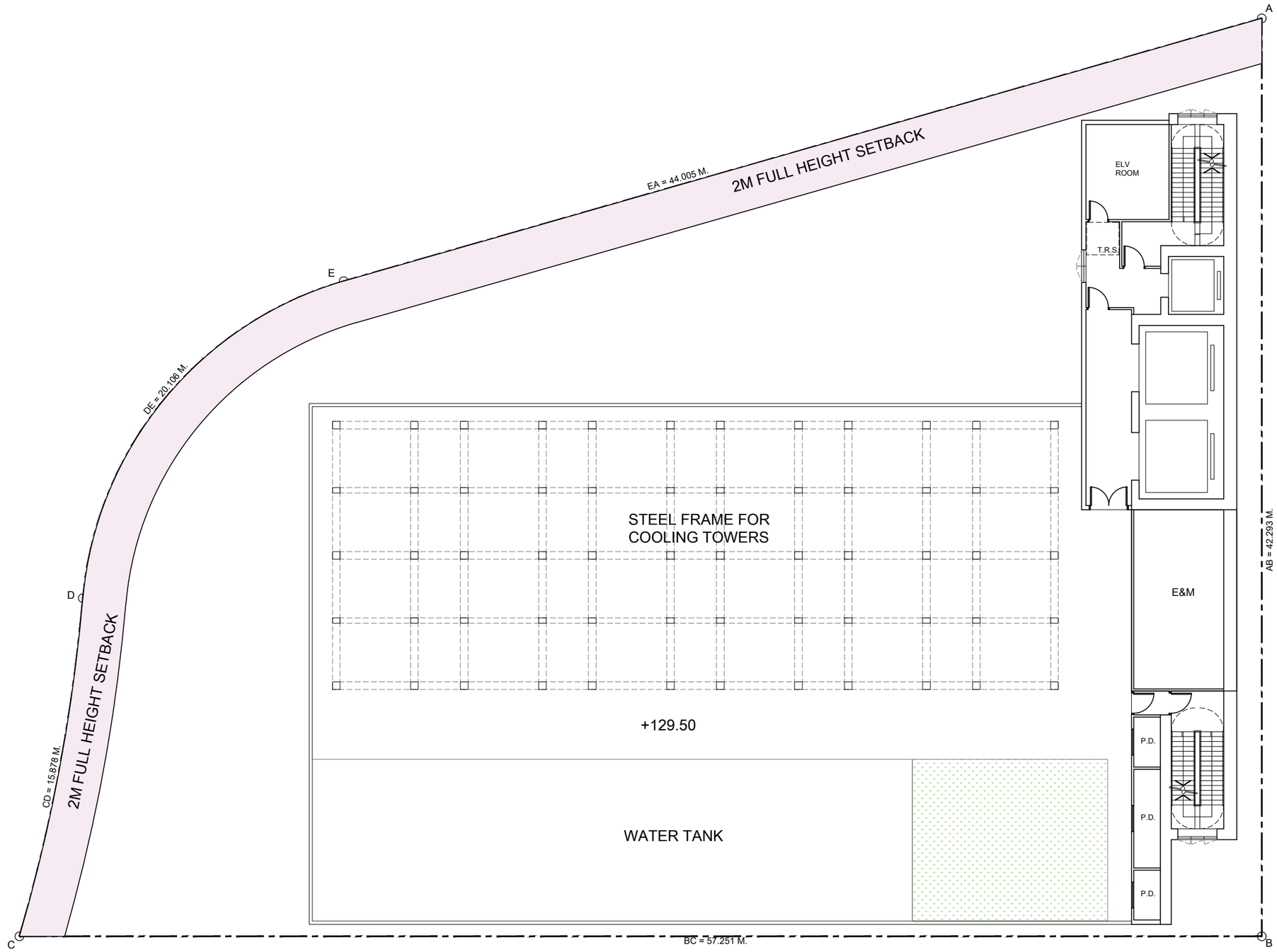
TYPICAL DATA HALL FLOOR PLAN

1:200 @ A3



TYPICAL MECHANICAL FLOOR PLAN

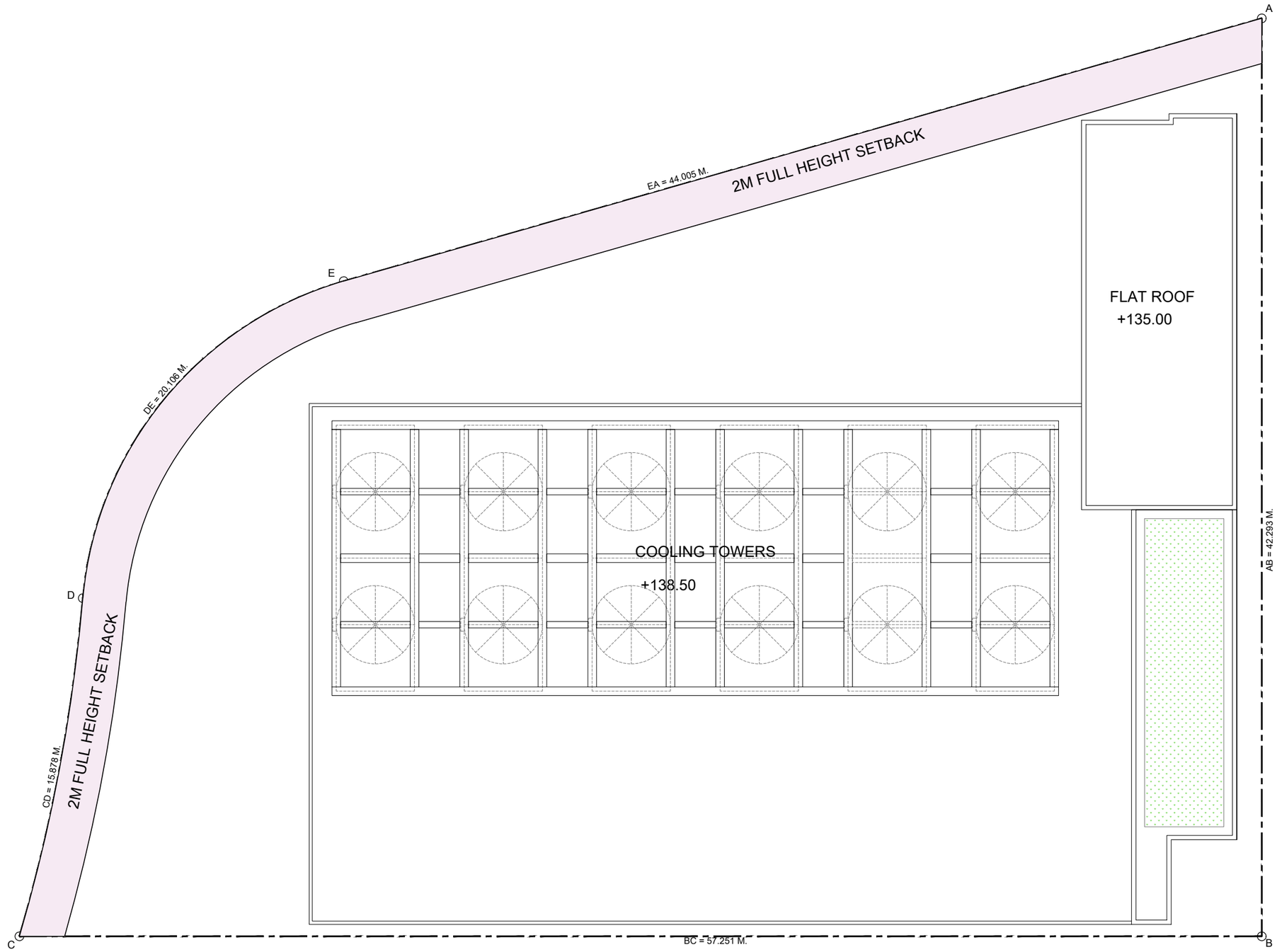
1:200 @ A3



ROOF FLOOR PLAN

1:200 @ A3

GREENERY

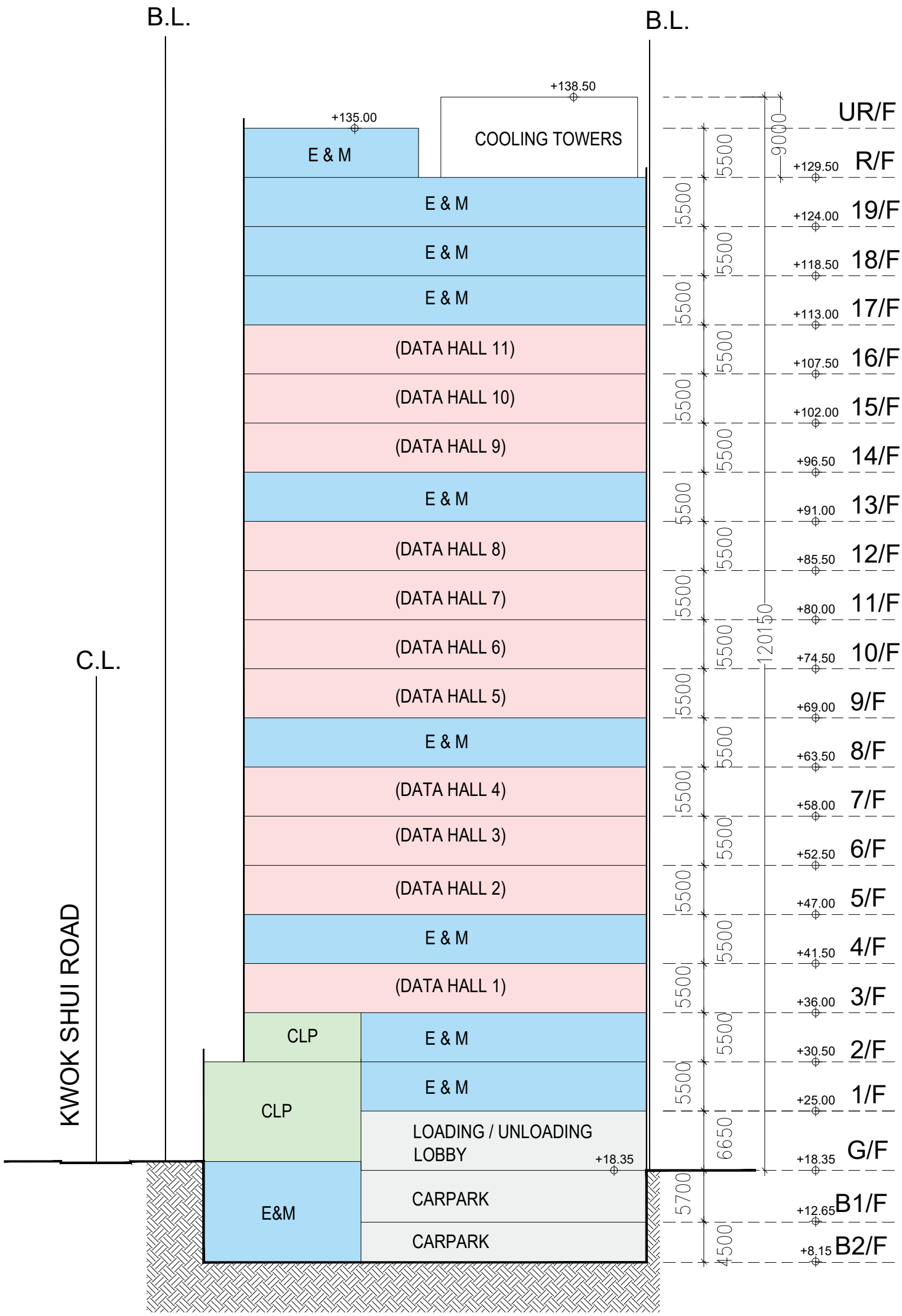


UR FLOOR PLAN

1:200 @ A3

N

GREENERY

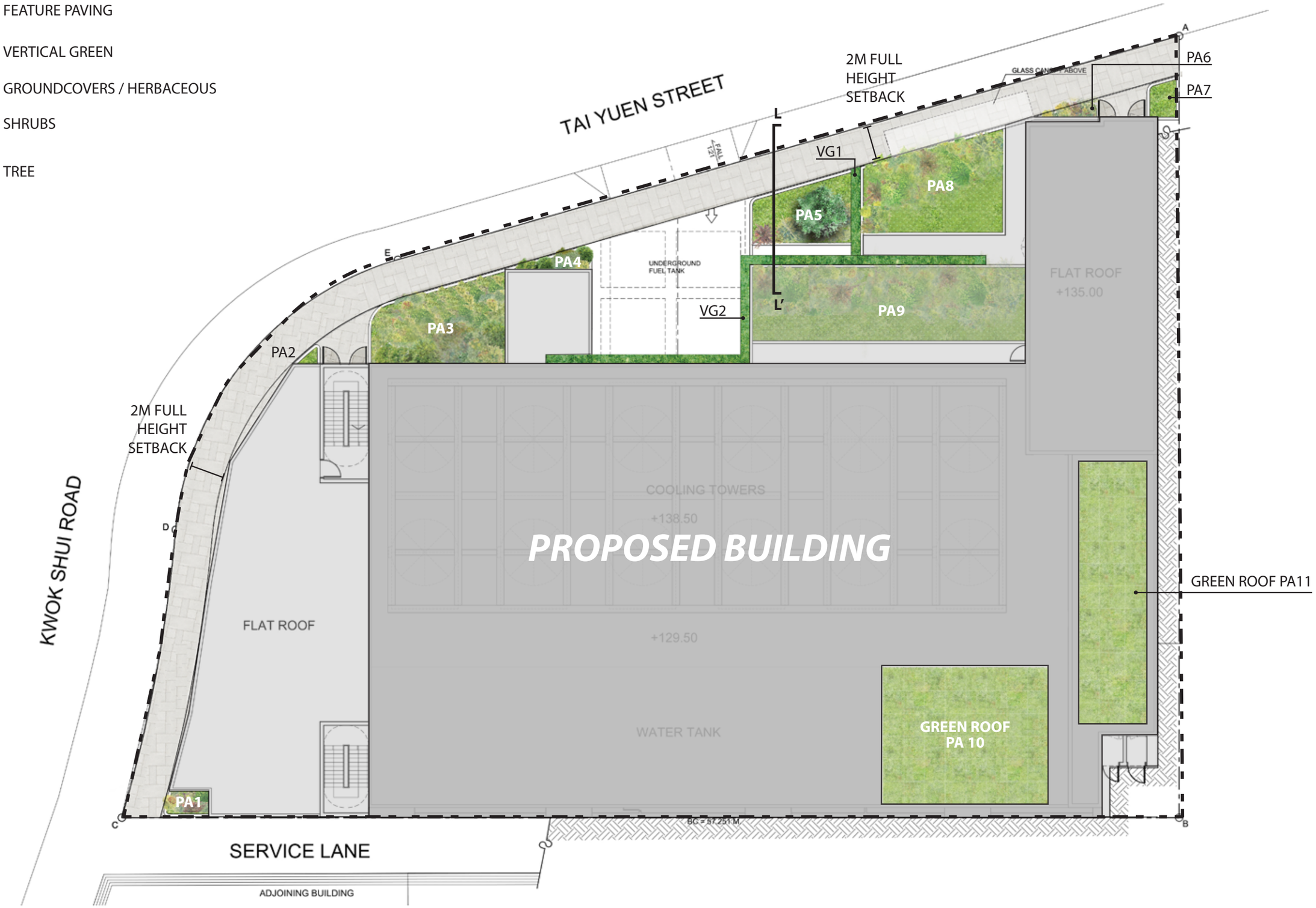

B.L.
B.L.
C.L.
KWOK SHUI ROAD
+138.50
+135.00
E & M
COOLING TOWERS
E & M
E & M
E & M
(DATA HALL 11)
(DATA HALL 10)
(DATA HALL 9)
E & M
(DATA HALL 8)
(DATA HALL 7)
(DATA HALL 6)
(DATA HALL 5)
E & M
(DATA HALL 4)
(DATA HALL 3)
(DATA HALL 2)
E & M
(DATA HALL 1)
CLP
E & M
CLP
E & M
LOADING / UNLOADING
LOBBY
+18.35
E&M
CARPARK
CARPARK
UR/F
R/F
+129.50
19/F
+124.00
18/F
+118.50
17/F
+113.00
16/F
+107.50
15/F
+102.00
14/F
+96.50
13/F
+91.00
12/F
+85.50
11/F
+80.00
10/F
+74.50
9/F
+69.00
8/F
+63.50
7/F
+58.00
6/F
+52.50
5/F
+47.00
4/F
+41.50
3/F
+36.00
2/F
+30.50
1/F
+25.00
G/F
+18.35
B1/F
+12.65
B2/F
+8.15
9000
5500
5500
5500

Appendix B

Greenery Calculations

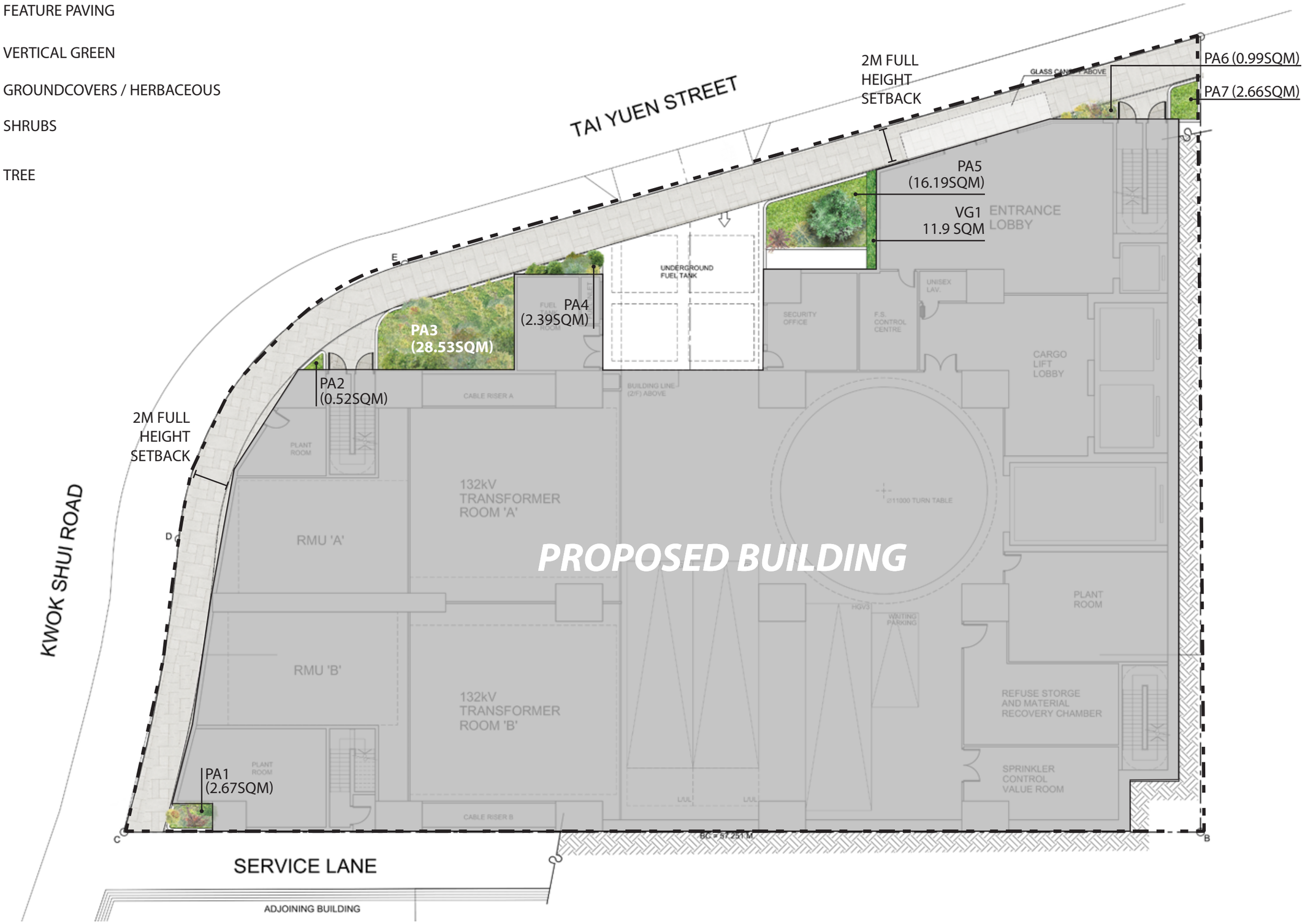
OVERVIEW OF LANDSCAPE PROVISIONS

- APPLICATION SITE BOUNDARY
- FEATURE PAVING
- VERTICAL GREEN
- GROUNDCOVERS / HERBACEOUS
- SHRUBS
- TREE



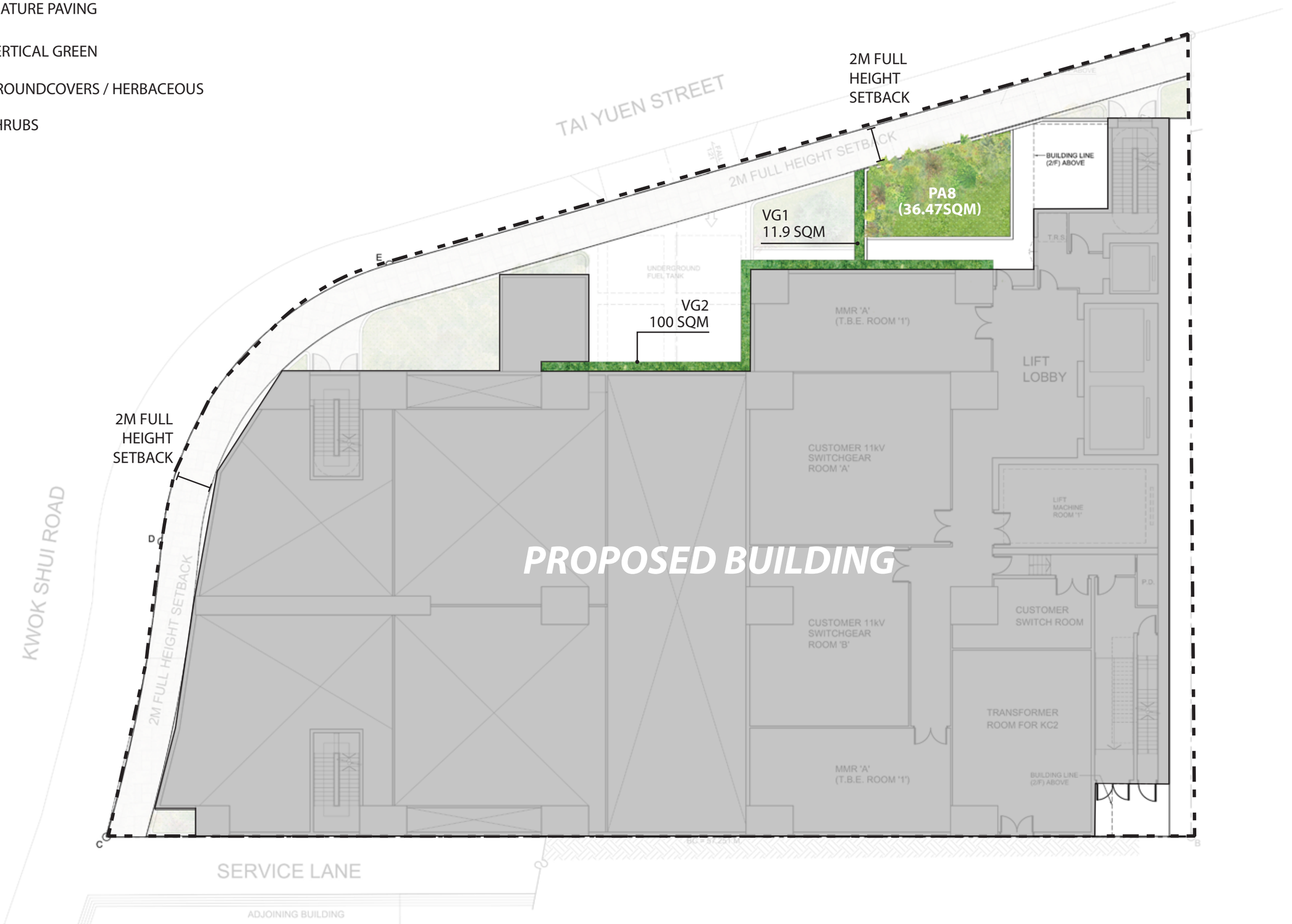
G/F LANDSCAPE PLAN

- APPLICATION SITE BOUNDARY
- FEATURE PAVING
- VERTICAL GREEN
- GROUNDCOVERS / HERBACEOUS
- SHRUBS
- TREE



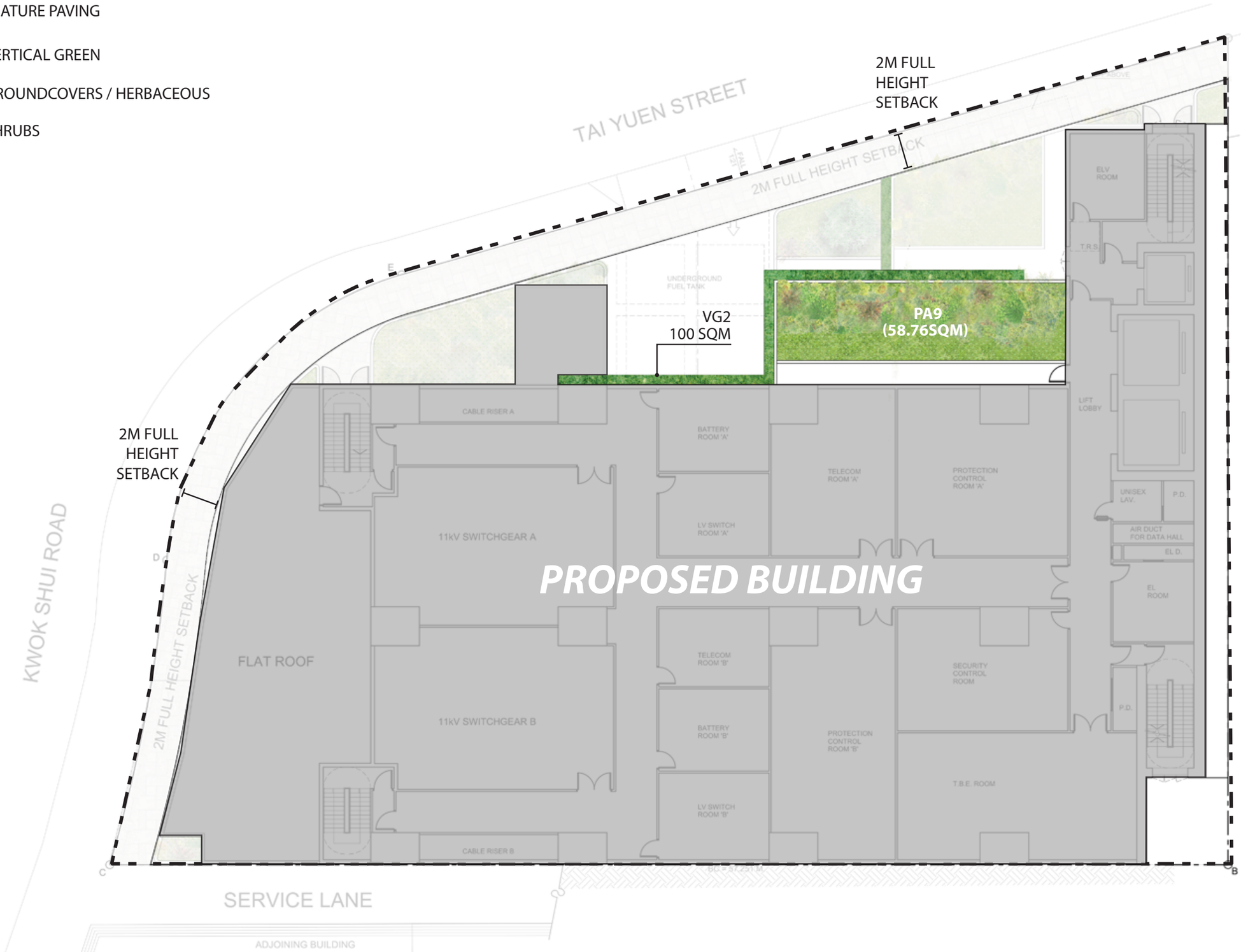
1/F LANDSCAPE PLAN

- APPLICATION SITE BOUNDARY
- FEATURE PAVING
- VERTICAL GREEN
- GROUNDCOVERS / HERBACEOUS
- SHRUBS



2/F LANDSCAPE PLAN

- APPLICATION SITE BOUNDARY
- FEATURE PAVING
- VERTICAL GREEN
- GROUNDCOVERS / HERBACEOUS
- SHRUBS

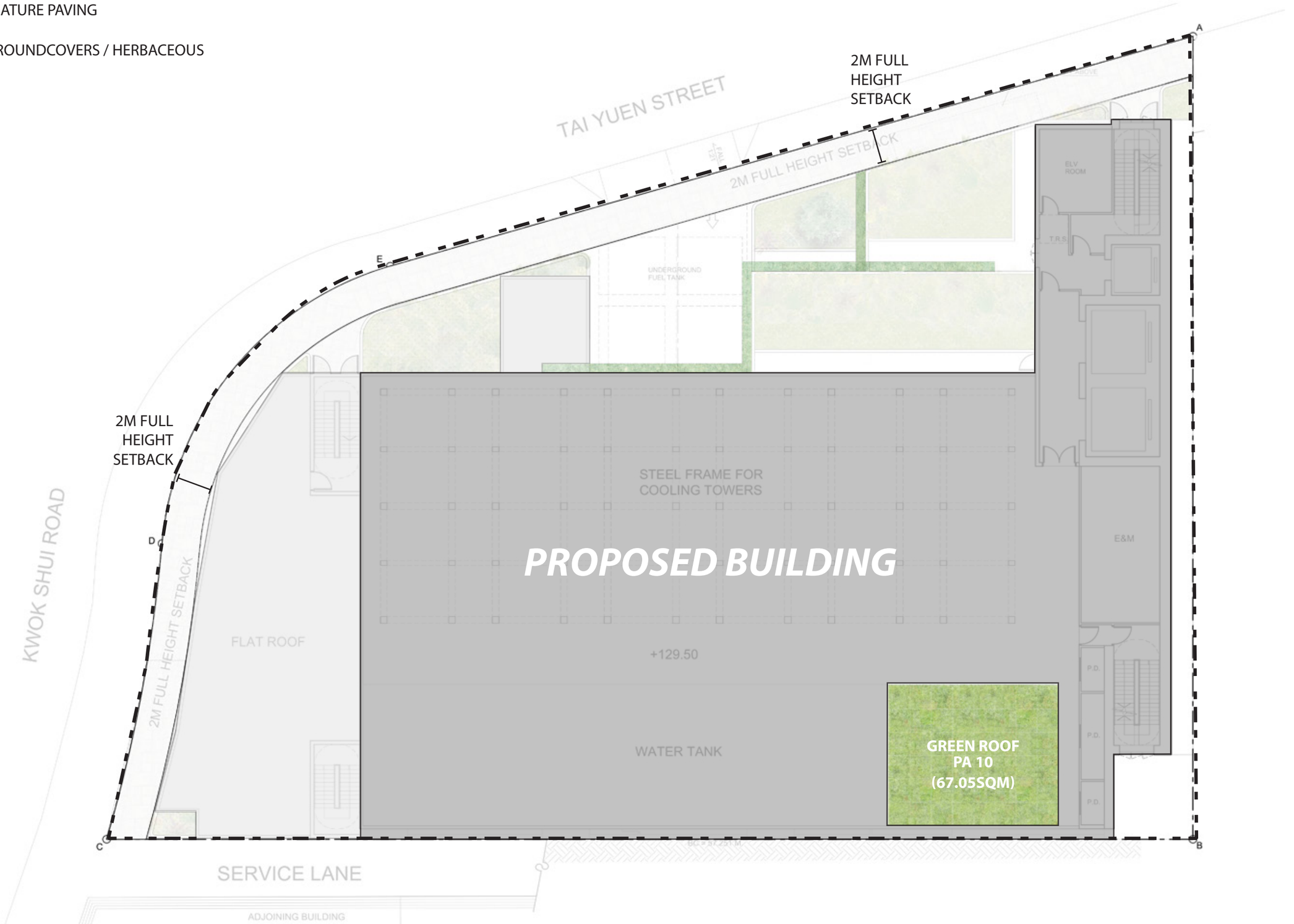


ROOF LANDSCAPE PLAN

APPLICATION SITE BOUNDARY

FEATURE PAVING

GROUNDCOVERS / HERBACEOUS



UPPER ROOF LANDSCAPE PLAN

APPLICATION SITE BOUNDARY

FEATURE PAVING

GROUNDCOVERS / HERBACEOUS

N

TAI YUEN STREET

KWOK SHUI ROAD

SERVICE LANE

ADJOINING BUILDING

2M FULL HEIGHT SETBACK

2M FULL HEIGHT SETBACK

2M FULL HEIGHT SETBACK

A

B

C

D

E

FLAT ROOF
+135.00

UNDERGROUND FUEL TANK

COOLING TOWERS
+138.50

FLAT ROOF

+129.50

WATER TANK

PROPOSED BUILDING

(51.83SQM)
GREEN ROOF PA11

GREENERY CALCULATIONS

EQUIRED SITE COVERAGE OF GREENERY:
1865SQM X 20% = ABOUT 374 SQM

A. HORIZONTAL GREEN (SHRUBS AND GROUNDCOVERS) (G/F)
PA1+PA2+PA3+PA4+PA5+PA6+PA7 = ~53.97 SQM

B. HORIZONTAL GREEN (SHRUBS AND GROUNDCOVERS) (1/F)
PA8 =~36.47 SQM

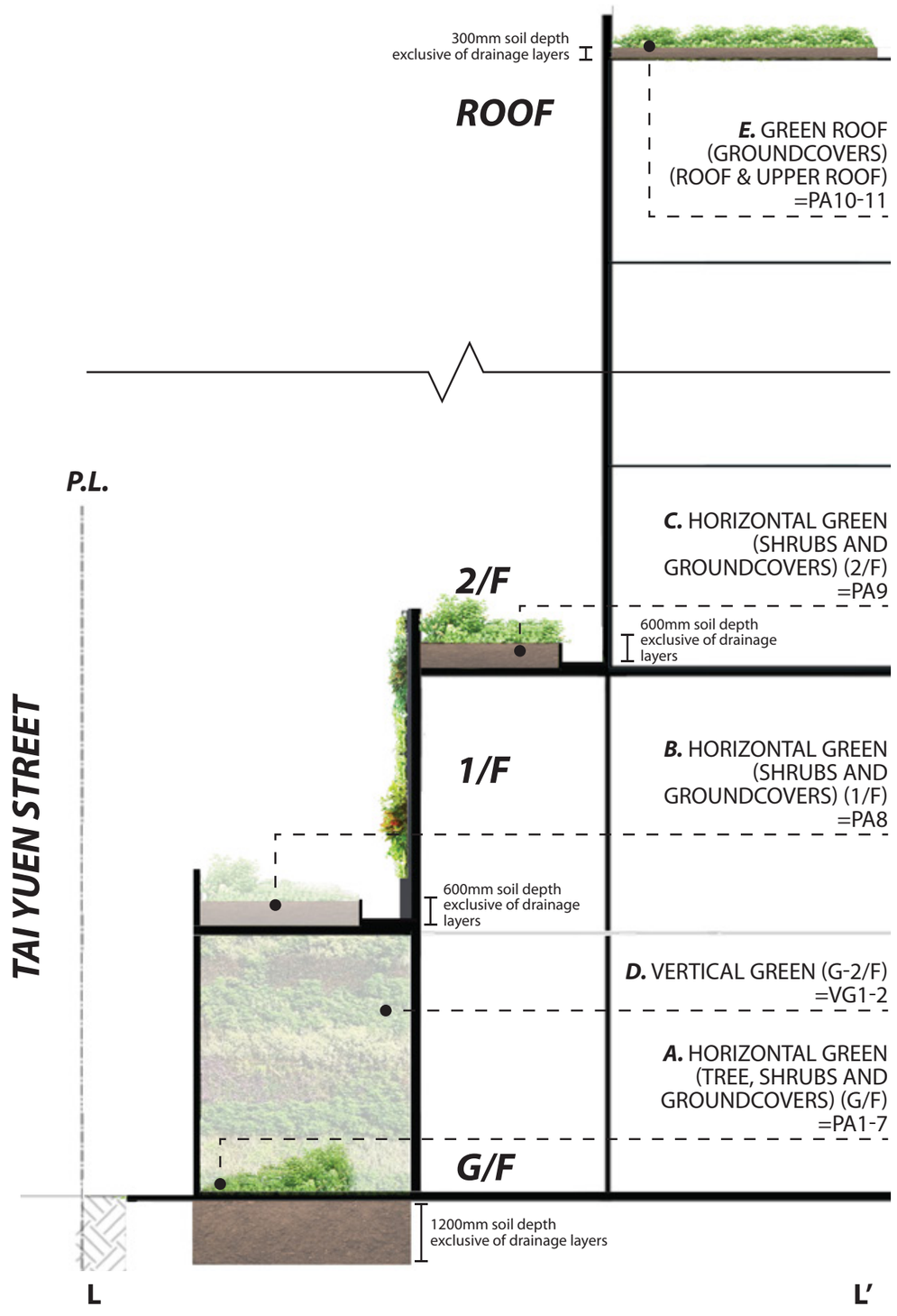
C. HORIZONTAL GREEN (SHRUBS AND GROUNDCOVERS) (2/F)
PA9 =~58.76 SQM

D. VERTICAL GREEN (G/F-2/F)
VG1+2 =~111.9 SQM

GREENERY AT PRIMARY ZONE
A+B+C+D
=~ 261.1 SQM (14%)
>186.5 SQM (10%) i.e. the required greenery at primary zone

E. GREEN ROOF (ROOD AND UPPER ROOF)
PA10+PA11 = ~118.88 SQM

TOTAL GREENERY
A+B+C+D+E
=~379.98 SQM (20.3%)
> 374 SQM (20%) i.e. the required total greenery



Appendix C

Traffic Impact Assessment

Proposed Minor Relaxation of Plot Ratio Restriction for Permitted Information Technology and Telecommunications Industries (Proposed Data Centre Development) at "Other Specified Uses" annotated "Business" Zone at Nos. 2-10, Tai Yuen Street, Kwai Chung

Traffic Impact Assessment Report

1st submission | Dec 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 276306-24

Ove Arup & Partners Hong Kong Ltd
Level 5 Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong
www.arup.com

ARUP

Contents

			Page
1	**INTRODUCTION**		**1**
	1.1	Background	1
	1.2	Objectives of this Report	1
	1.3	Scope of Study	1
	1.4	Structure of the Report	2
2	**EXISTING TRAFFIC CONDITION**		**3**
	2.1	Site Characteristics	3
	2.2	Existing Road Network	3
	2.3	Existing Junction Performance	4
	2.4	Existing Pedestrian Condition	5
3	**THE SUBJECT DEVELOPMENT**		**7**
	3.1	Development Schedule	7
	3.2	Vehicular Access Arrangement	7
	3.3	Internal Transport Facilities Provision	7
	3.4	Swept Path Assessment	9
	3.5	Car Lift Assessment	9
	3.6	Mechanical Parking System Assessment	10
4	**TRAFFIC IMPACT ASSESSMENT**		**14**
	4.1	Trip Generation and Attraction of Proposed Development	14
	4.2	Adjacent Developments	15
	4.3	Future Traffic Growth	15
	4.4	Assessment Scenarios	17
	4.5	Junction Capacity Assessment	18
	4.6	Pedestrian Impact Assessment	20
5	**CONCLUSION**		**24**
	5.1	Summary	24
	5.2	Conclusion	25

Figures

Figure 1.1 Location of Application Site
Figure 2.1 Location of Surveyed Junctions in the vicinity of Proposed Development
Figure 2.2 Year 2020 Existing Traffic Flow
Figure 2.3 Major Pedestrian Routes in the Vicinity of Proposed Development
Figure 3.1 Proposed Vehicular Access of Proposed Development
Figure 3.2 Ingress Vehicular Routes of Proposed Development
Figure 3.3 Egress Vehicular Routes of Proposed Development
Figure 3.4 Proposed Layout at G/F
Figure 3.5 Proposed Layout at B1/F
Figure 3.6 Proposed Layout at B2/F
Figure 3.7 Swept Path Analysis for 11m Long Heavy Goods Vehicle at G/F (Approaching/ Leaving)
Figure 4.1 Location of Planned Developments in the vicinity of Proposed Development
Figure 4.2 Year 2027 Reference Traffic Flow
Figure 4.3 Year 2027 Design Traffic Flow

1 INTRODUCTION

1.1 Background

1.1.1 According to The Chief Executive's 2018 Policy Address, the Government plans to encourage owners to redevelop industrial buildings constructed before 1987 and will allow relaxation of the maximum permissible non-domestic plot ratio (PR) by up to 20% for redevelopment projects of these pre-1987 industrial buildings located outside residential zones in main urban areas and new towns.

1.1.2 As an immediate response to this new policy, the Applicant intends to redevelop the existing industrial building at No. 2-10 Tai Yuen Street, which was occupied before 1987, to information technology and telecommunications industries use (Data Centre), in consideration of the proposed 20% increase in PR restriction (from the existing PR 9.75 to the proposed PR 11.7). The location of application site is shown in **Figure 1.1**.

1.1.3 Ove Arup & Partners Hong Kong Limited (Arup) was commissioned to carry out a Traffic Impact Assessment (TIA) report in support of the Section 16 application for enabling the proposal at the application site.

1.2 Objectives of this Report

1.2.1 The purpose of this report is to evaluate the potential traffic impact associated with the proposed development for the scenarios with and without the proposed 20% increase in PR.

1.3 Scope of Study

1.3.1 The tasks for this TIA study are outlined as follows:

- Carry out traffic surveys at critical junctions to appreciate current traffic condition;
- Update the inventory regarding traffic circulation patterns, traffic conditions, as well as the constraints of the existing road network in the vicinity;
- Carry out pedestrian surveys at pedestrian facilities in the vicinity to appreciate current walking condition;
- Review the access arrangement for the proposed development and to make recommendation;
- Recommend car parking provisions and goods vehicle loading/unloading arrangements and provide justifications to the proposed internal transport facilities including car lift assessment, if applicable;

- Set up the reference scenario should the application site be developed into data centre development with the existing PR 9.75, i.e. reference scenario with the proposed development but without the proposed 20% increase in PR;
- Identify the likely change in traffic generation should the application site be developed into data centre development with the proposed PR 11.7, i.e. design scenario with the proposed development and the proposed 20% increase in PR;
- Compare the above two traffic scenarios for evaluation of the likely traffic impact, if any, associated with the proposed development;
- Assess future traffic condition, taking into account any future traffic growth, as well as the traffic generated by the proposed development and other planned/committed development, if any, to be built in the vicinity; and
- Assess future pedestrian walking condition, taking into account any future population and employment growth generated by the proposed development and other planned/committed development, if any, to be built in the vicinity.

1.4 Structure of the Report

1.4.1 The structure of this TIA report is as follows:

Chapter	Title	Aims
1	Introduction	Provide project background and scope of the Study
2	Existing Traffic Condition	Review and appreciate the existing traffic condition
3	The Subject Development	Provide information of the Proposed Development
4	Traffic Impact Assessment	Illustrate the results of Traffic Impact Assessment
5	Conclusion	Summarize the findings of this Study

2 EXISTING TRAFFIC CONDITION

2.1 Site Characteristics

2.1.1 The application site is located at No. 2-10 Tai Yuen Street, Kwai Chung, with a site area of about 1,865m^2. It is bounded by Tai Yuen Street to the north, Kwok Shui Road to the west, and existing buildings to the east and south. **Figure 1.1** shows the location and the environs of the application site.

2.2 Existing Road Network

2.2.1 The application site is served by a comprehensive road network to and from all districts. Some major roads in the vicinity of the application site are listed as follows:

- Castle Peak Road – Kwai Chung Section is a primary distributor road, dual two-lane carriageway running in north-south direction. It connects Castle Peak Road – Tsuen Wan Section to the north and Tsing Sha Highway and Ching Cheung Road to the south. Castle Peak Road – Kwai Chung Section serves traffic between Kwai Chung, New Territories West and Kowloon.
- Kwai Chung Road is a primary distributor road, dual three-lane carriageway running in north-south direction. It connects Cheung Wing Road to the north and Tsuen Wan Road to the south. Kwai Chung Road is a major public transport corridor with comprehensive public transport services including franchised buses and GMB being provided along this road.
- Cheung Wing Road is a district distributor road, dual three-lane carriageway running in the north-south direction. It connects Wo Yi Hop Road to the north and Kwai Chung Road and Castle Peak Road – Kwai Chung Section to the south.
- Wo Yi Hop Road is a district distributor road, single two-lane carriageway running in the north-south direction. It connects Wo Yi Hop Interchange to the north and Castle Peak Road – Kwai Chung Section to the south.
- Lei Muk Road is a district distributor road, it is a single carriageway with two traffic lanes in eastbound direction and one traffic lane westbound direction for the section between Castle Peak Road – Kwai Chung Section and Wo Yip Hop Road.
- Chun Pin Street is a local distributor road, it is a single carriageway with two traffic lanes in northbound direction between Lei Muk Road and Lam Tin Street, and in single two-lane configuration between Lam Tin Street and Ta Cheun Ping Street.
- Tai Yuen Street is a local distributor road, single two-lane carriageway running in the north-south direction, connecting to Kwok Shui Road.

- Kwok Shui Road is a local distributor road, it is a single carriageway with two traffic lanes in westbound direction between Cheung Wing Road and Tai Yuen Street, and in single two-lane configuration between Tai Yuen Street and Lei Muk Road.

2.3 Existing Junction Performance

2.3.1 To appreciate the existing traffic conditions, comprehensive classified traffic counts were conducted at the following identified key junctions in the vicinity of the application site. Locations of these surveyed junctions are listed below and shown in **Figure 2.1**.

J1	-	Castle Peak Road - Kwai Chung Interchange	Priority Junction
J2	-	Cheung Wing Road / Kwok Shui Road	Signalized Junction
J3	-	Castle Peak Road - Kwai Chung / Kwai Chung Road	Signalized Junction
J4	-	Lei Muk Road / Castle Peak Road	Priority Junction
J5	-	Tai Yuen Street / Kwok Shui Road	Priority Junction
J6	-	Kwok Shui Road / Lei Muk Road	Signalized Junction
J7	-	Chun Pin Street / Lei Muk Road	Priority Junction
J8	-	Lei Muk Road / Wo Yi Hop Road	Signalized Junction
J9	-	Wo Yi Hop Road / Cheung Wing Road	Signalized Junction

2.3.2 The counts were undertaken on a typical weekday during the AM and PM peak periods in October 2020. The AM and PM peak hours were found to be 08:45-09:45 and 17:15-18:15 respectively. The observed traffic flows during these peak hours are presented in **Figure 2.2**.

2.3.3 Junction capacity analysis was carried out at the identified key junctions in the vicinity of the application site. Results of the capacity assessment are shown in **Table 2.3.1** below.

Table 2.3.1 Year 2020 Junction Performance

Junction		Type	Performance (1)	
			AM	PM
J1	Castle Peak Road - Kwai Chung Interchange	Priority	1.07	1.01
J2	Cheung Wing Road / Kwok Shui Road	Signalized	42%	46%
J3	Castle Peak Road - Kwai Chung / Kwai Chung Road (2)	Signalized	65%	50%
J4	Lei Muk Road / Castle Peak Road (2)	Priority	0.14	0.18
J5	Tai Yuen Street / Kwok Shui Road (3)	Priority	0.13	0.15
J6	Kwok Shui Road / Lei Muk Road (4)	Signalized	35%	54%
J7	Chun Pin Street / Lei Muk Road (4)	Priority	0.59	0.63
J8	Lei Muk Road / Wo Yi Hop Road (2)	Signalized	70%	68%
J9	Wo Yi Hop Road / Cheung Wing Road (2)	Signalized	51%	72%

Notes:
(1) Figures shown represent "Reserve Capacity" (RC) in % for signalized junctions and "Design Flow Capacity" (DFC) ratio for priority junctions.
(2) Junction parameter assumptions are taken into account to reflect the actual traffic conditions.
(3) Taken into account the existing kerbside activities at Tai Yuen Street in the calculations.
(4) Taken into account the existing kerbside activities at Lei Muk Road in the calculations.

2.3.4 Results of the analysis indicate that the identified key junctions in the vicinity of the application site are currently operating satisfactorily during both AM and PM peak hours, expect for J1.

2.4 Existing Pedestrian Condition

2.4.1 To appreciate the existing conditions, comprehensive pedestrian count surveys were conducted at the critical footpath in the vicinity, as shown in **Figure 2.3**. The pedestrian counts were undertaken on typical weekdays during the AM and PM peak periods in October 2020.

2.4.2 In order to address the performance of the critical footpath, Level of Service (LOS) assessment of the critical footpath has been conducted.

2.4.3 LOS assessment is carried out based on the definitions presented in the Highways Capacity Manual 2000. **Table 2.4.1** shows the various LOS 'quantified' in terms of pedestrian flow rates.

Table 2.4.1 Level of Service (LOS) for Walkway*

LOS	Flow rate for Walkway (ped/min/m)	Description
A	≤16	Pedestrians basically 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	Sufficient space is provided for pedestrians to freely select their walking speeds, to bypass other pedestrians and to avoid crossing conflicts with others. At this level, pedestrians begin to be aware of other pedestrians and to respond to their presence in the selection of walking paths.

C	23 – 33	Sufficient space is available to select normal walking speeds and to bypass other pedestrians primarily in unidirectional stream. Where reverse direction or crossing movement exist, minor conflicts will occur, and speed and volume will be somewhat lower.
D	33 – 49	Freedom to select individual walking speeds and bypass other pedestrians is restricted. Where crossing or reverse-flow movements exist, the probability of conflicts is high and its avoidance requires changes of speeds and position. The LOS provides reasonable fluid flow; however considerable friction and interactions between pedestrians are likely to occur.
E	49 - 75	Virtually, all pedestrians would have their normal walking speeds restricted. At the lower range of this LOS, forward movement is possible only by shuffling. Space is insufficient to pass over slower pedestrians. Cross- and reverse-movement are possible only with extreme difficulties. Design volumes approach the limit of walking capacity with resulting stoppages and interruptions to flow.
F	> 75	Walking speeds are severely restricted. Forward progress is made only by shuffling. There are frequent and unavoidable conflicts with other pedestrians. Cross- and reverse-movements are virtually impossible. Flow is sporadic and unstable. Space is more characteristics of queued pedestrians than of moving pedestrian streams.

*Source: Extracted from Exhibit 18-3 of Highway Capacity Manual (HCM) 2000

2.4.4 Footpaths with LOS A to C are considered as desirable with sufficient space for pedestrian to select normal walking speeds to bypass. For footpaths with LOS D represent freedom to select individual walking speeds and bypass other pedestrian is restricted. Unless there are any site constraints, improved measures should be sought for footpath with LOS D or poorer.

2.4.5 **Table 2.4.2** summarized the observed AM and PM peak pedestrian flow and LOS in surveyed footpath.

Table 2.4.2: Year 2020 Level of Service in AM and PM Peaks at Key Footpath

Footpath		Actual Width (m)	Effective Clear Width (1) (m)	Two-way Peak 15-minute Flow (ped/15-min)		Flow Rate(2) (ped/min/m)		LOS (Level)	
				AM	PM	AM	PM	AM	PM
F1	Tai Yuen Street Footpath	1.7	0.7	225	195	26	23	C	B
F2	Kwok Shui Road Footpath	2.7	1.7	190	175	9	9	A	A

Notes:
(1) Effective clear width = Actual width (on-site measurement) minus 0.5m dead width on both sides.
(2) Pedestrian flow rates are computed based on effective clear width, with 1.2 peak factor applied for the peak minute flow rate.

2.4.6 The results presented in **Table 2.4.2** revealed that the walking condition on the critical footpath in the vicinity of the application site is undesirable during both AM and PM peaks hours in Year 2020.

3 THE SUBJECT DEVELOPMENT

3.1 Development Schedule

3.1.1 The Applicant intends to redevelop the site for the proposed information technology and telecommunications industries (data centre) use. The proposed development is envisaged to be completed by Year 2024.

3.1.2 The proposed development schedule is summarized in **Table 3.1.1**.

Table 3.1.1 Proposed Development Schedule

Development Schedule		
Site Area	About 1,865m^2	
Use	Industrial	
Plot Ratio	9.75	11.7 (1)
No. of Storeys	N/A	20 storeys above ground, plus 2 storeys of basement carpark
Gross Floor Area	18,183.75m²	21,820.50m²

Notes:
(1) Including the proposed 20% increase in PR to PR 11.7.

3.2 Vehicular Access Arrangement

3.2.1 The vehicular access of proposed development will be situated at Tai Yuen Street, as shown in **Figure 3.1**.

3.2.2 The major ingress and egress routes for vehicular traffic approaching and leaving the application site are illustrated in **Figures 3.2** and **3.3** respectively.

3.3 Internal Transport Facilities Provision

3.3.1 The required internal transport facilities provision in accordance with the Hong Kong Planning Standards and Guidelines (HKPSG) are summarized **Table 3.3.1** below.

Table 3.3.1 HKPSG Required Internal Transport Provision for the Proposed Development

Facilities (L x W x H)	Type of Development	Proposed Provision Rate	Provision under Proposed Rate		Proposed Provision
			Low-end	High-end	
Car Parking Space (5m x 2.5m x 2.4m)	Information Technology and Telecommunications Industries (21,820.50m²)	1 car space per 600-750m² GFA (1)	30 (30 nos. incl. Accessible Car Parking Space)	37 (37 nos. incl. Accessible Car Parking Space)	**37 (incl. Accessible Car Parking Space)**
Accessible Car Parking Space (5m x 3.5m x 2.4m)		1 car space for total provision of 1-50 nos. car parking spaces in lot (1)	1	1	**1**
Motorcycle Parking Spaces (1m x 2.4m x 2.4m)		5-10% of the total provision of private cars (1)	2	4	**4**
Loading / Unloading Bay for Goods Vehicles LGV: (7m x 3.5m x 3.6m) HGV: (11m x 3.5m x 4.7m)		For the first 20,000 m² GFA: 1 no. per 3,400-3,800 m² GFA (2)	5.26	5.88	**7**
		For the floor space above 20,000 m² GFA: 1 no. per 5,500-6,100 m² GFA (2)	0.48	0.54	
		Total	5.74 (6 nos.)	6.42 (7 nos.)	
		Loading / Unloading bays are to be provided as such: 60% for loading / unloading and 40% for parking (2); 65% are for LGV and 35% are for HGV (2)	Of the 6 nos.: LGV (Parking): 2 LGV (L/UL): 2 HGV (Parking): 1 HGV (L/UL): 1	Of the 7 nos.: LGV (Parking): 2 LGV (L/UL): 3 HGV (Parking): 1 HGV (L/UL): 1	**Of the 7 nos.:** **LGV (Parking): 2** **LGV (L/UL): 2** **HGV (Parking): 2** **HGV (L/UL): 1**

Notes:
(1) In accordance with HKPSG requirements.
(2) In accordance with TD's Departmental Circular No. 6/2012 – Standards for Goods Vehicle Parking and Loading/Unloading for Data Centres.

3.3.2 The proposed internal transport facilities will be provided on ground floor and basement parking floors of the subject development. Detailed allocations of the internal transport facilities are described as follows:

Car Parking Space Provision

3.3.3 A total of 37 nos. car parking spaces as per HKPSG high-end requirements will be provided. 10 sets of Mechanical Car Parking spaces (10×2=20 nos. car parking spaces) plus 2 nos. of conventional car parking spaces (including 1 no. accessible car parking space) will be provided on B1/F, and 15 nos. of conventional car parking spaces will be provided on B2/F, which will be accessed via LGV-lift system.

Motorcycle Parking Space Provision

3.3.4 A total of 4 nos. motorcycle parking spaces as per HKPSG requirements will be provided on B1/F and B2/F, which will be accessed via LGV-lift system.

Loading / Unloading Bay Provision

3.3.5 A total of 7 nos. loading/unloading bays (4 nos. for LGV on B1/F and 3 nos. for HGV on G/F) as per requirements under TD's Departmental Circular No. 6/2012 will be provided on G/F. The LGV loading/unloading bays on B1/F will be accessed via LGV lift-system.

3.3.6 The corresponding preliminary layout plans for ground floor and basement parking floors are demonstrated in **Figures 3.4** to **3.6**.

3.4 Swept Path Assessment

3.4.1 Swept path assessment for the critical movements of vehicles entering/leaving the application site and manoeuvring for loading/ unloading bays was carried out as demonstrated in **Figure 3.7**.

3.5 Car Lift Assessment

3.5.1 As mentioned in the **Section 3.3** earlier, LGVs, private cars and motorcycles accessing B1/F and B2/F will use the LGV lift from G/F.

3.5.2 Assessment and relevant queuing analysis have been conducted for vehicles waiting at G/F before entering the LGV lift, and the results are shown in **Table 3.5.1**.

Table 3.5.1 Assessment of LGV Lift Operation and Queuing Analysis

Assumptions	Parameters
Average Rate Estimation	
Total No. of Parking Stalls (on B1/F & B2/F)	45 nos.
No. of LGV lift	1 no.
Travelling speed of LGV lift	0.5 m/sec.
Maximum arrival rate in peak 15 minutes	3 vehicles

Estimated of Round Trip Time of LGV Lift (in sec)	
Door opening time at G/F	4.0
Manoeuvring time	21.0
Safety margin before door closes	2.0
Door closing time at G/F	4.0
Travelling time from G/F to B2/F	20.0
Door opening time at B2/F	4.0
Manoeuvring time	24.0
Safety margin before door closes	2.0
Door closing time at B2/F	4.0
Travelling time from B2/F to G/F	20.0
Total (Cycle Time)	105.0
Average Servicing Time and Rate	
Average Servicing Time (1/μ)	105.0
Average Servicing Rate (μ)	0.57
Average Servicing Rate (μ) per 15 Minutes	8.57
No. of Vehicles Arrived at Peak 15 Minutes (r)	3
Analysis Results	
Probability of the LGV lift available, P(0)	65.0%
Probability of the LGV lift in use, P(1)	22.8%
Probability of the LGV lift in use and 1 waiting space occupied, P(2)	8.0%
Probability of the LGV lift in use and more than 1 waiting space occupied, P(2+)	4.3%

3.5.3 The assessment shows that at 95% confidence interval, the probability of more than two vehicles in the proposed LGV-lift system only 4.3%. With provision of one waiting space for the LGV lift system, it is anticipated that the vehicles could be served by the proposed LGV-lift system without inducing any queue onto the public road.

3.5.4 Based on the assessment results, it is not likely that queuing of vehicles will extend onto the public road during AM and PM peak hours. In conclusion, the provision of one LGV lift and one waiting space for the proposed development will not generate any negative traffic impact onto the public road.

3.6 Mechanical Parking System Assessment

3.6.1 Mechanical parking system is proposed on B1/F in order to meet the high end of the required HKPSG car parking provision. For Mechanical Parking System Assessment, in order to fully demonstrate the worst-case scenario, it is assumed that all conventional parking spaces are

occupied, and vehicles are arriving for the mechanical parking spaces consecutively.

3.6.2 To demonstrate the critical scenario, the operation time of the mechanical parking system and the round-trip time for the LGV lift to travel between G/F and B1/F are summarised and presented in **Table 3.6.1** and **Table 3.6.2** below.

Table 3.6.1 Operation Time for Mechanical Parking System

Estimated Time for Using the Mechanical Parking System (1) (2)	**(sec)**
Manoeuvring time for **Vehicle 1** to leave LGV lift to the temporary waiting space (3)	10.0
Manoeuvring time for **Vehicle A** leaving the lower parking deck to internal driveway without blocking other internal traffic (3)	12.0
Lifting down the platforms of upper deck	15.0
Safety buffer	4.0
Manoeuvring time for **Vehicle 1** parking into upper deck (3)	25.0
Lifting up the platforms	17.0
Safety buffer	4.0
Manoeuvring time for **Vehicle A** parking into lower deck (3)	15.0
Total Cycle Time	**102.0**

Notes:
(1) Vehicle 1 is the arriving vehicle from GF to B1/F
(2) Vehicle A is the vehicle originally parking at the lower deck of the mechanical parking space.
(3) Manoeuvring time for vehicles are calculated with assumption of vehiclar speed at 5km/hr.

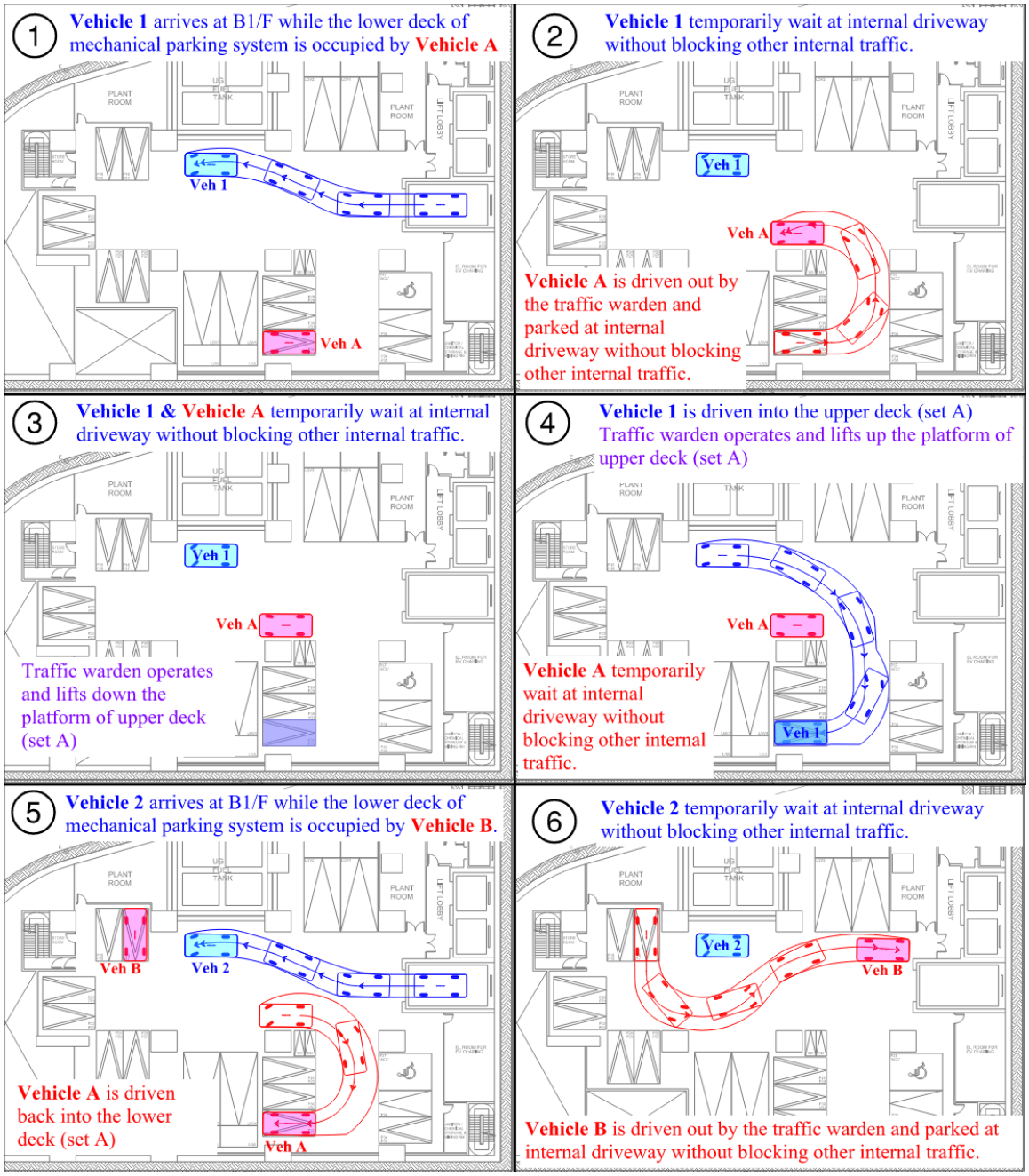
Table 3.6.2 Operation Time for LGV Lift system (G/F to B1/F)

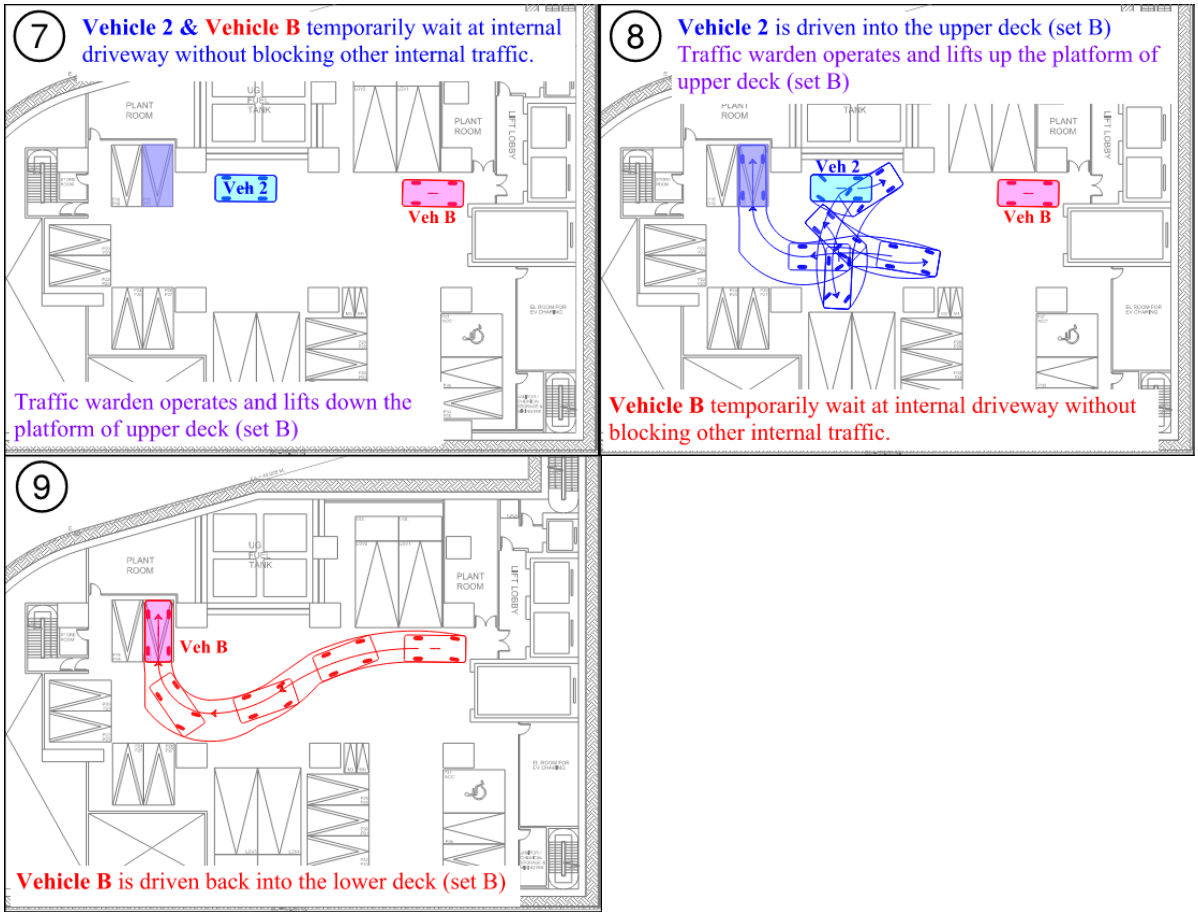
Estimated of Round-Trip Time of LGV Lift	**(sec)**
Door opening time at G/F	4.0
Manoeuvring time	21.0
Safety margin before door closes	2.0
Door closing time at G/F	4.0
Travelling time from G/F to B1/F	11.0
Door opening time at B1/F	4.0
Manoeuvring time	9.0
Safety margin before door closes	2.0
Door closing time at B1/F	4.0
Travelling time from B1/F to G/F	11.0
Total Cycle Time	**72.0**

3.6.3 Presented in **Table 3.6.1** and **Table 3.6.2** above, the overall process of the Mechanical Parking System and the LGV lift system round-trip time **(G/F to B1/F)** after all conventional parking spaces are occupied are 102

seconds and 72 seconds respectively. It is anticipated that in the most critical scenario, the 2nd vehicle will be arriving B1/F during the operation of the 1st set of mechanical parking space.

3.6.4 The above-mentioned critical scenario for the operation of mechanical parking system is illustrated below:





3.6.5 As shown the above illustration, there will be adequate space the operation of two sets of mechanical parking system simultaneously on B1/F without interlocking the internal traffic circulation. Therefore, the operation of the LGV Lift System is the critical path of the overall parking system (operation of Mechanical Parking System and the LGV Lift System).

3.6.6 As presented in **Chapter 3.5** above, with provision of one waiting space for the LGV lift system, it is anticipated that vehicles could be served by the proposed LGV-lift system without inducing any queue onto the public road. The proposed parking system will not generate any negative traffic impact onto the public road.

4 TRAFFIC IMPACT ASSESSMENT

4.1 Trip Generation and Attraction of Proposed Development

4.1.1 To establish appropriate trip generation and attraction rates for the proposed development, trip generation survey has been conducted on typical weekdays, 12th September 2019 and 19th December 2019 at the existing data centre developments in the vicinity. The trip generation and attraction of the surveyed data centre developments during peak hour is shown in **Table 4.1.1** below.

Table 4.1.1 Peak Hour Trip Generation and Attraction at the Surveyed Data Centres (pcu/hr)

Development		AM Peak		PM Peak	
		Generation	Attraction	Generation	Attraction
iTech Tower 1 at 28 Pak Tin Par Street, Tsuen Wan (17,652m^2 GFA)	Observed Trips (pcu/hr)	2.1	1	2	1
	Trip Rate (in pcu/hr/100m^2 GFA)	0.012	0.006	0.011	0.006
iTech Tower 2 at 54-56 Ta Chuen Ping Street, Kwai Chung (9,125m^2 GFA)	Observed Trips (pcu/hr)	2.5	3.5	2	0
	Trip Rate (in pcu/hr/100m^2 GFA)	0.027	0.038	0.022	0.000
NTT Communications Hong Kong Tai Po Data Center at 2 Dai Hei Street, Tai Po (19,700 m^2 GFA)	Observed Trips (pcu/hr)	9	6.1	7.1	13
	Trip Rate (in pcu/hr/100m^2 GFA)	0.046	0.031	0.036	0.066

4.1.2 For conservative assessment, the highest of the rates above were adopted for applying to the proposed development. The adopted trip generation and attraction rates and the associated trips of the proposed development are shown in **Table 4.1.2** below.

Table 4.1.2 Estimated Trip Generation and Attraction of the Proposed Development (pcu/hr)

Development		AM Peak		PM Peak	
		Generation	Attraction	Generation	Attraction
Adopted Trip Rate (in pcu/hr/100m^2 GFA)		0.046	0.038	0.036	0.066
Proposed Development with PR of 9.75 (18,183.75m^{2}GFA)	Estimated Trips (pcu/hr)	8	7	7	12
Proposed Development with PR of 11.7 (21,820.50m^2 GFA)	Estimated Trips (pcu/hr)	10	8	8	14

4.1.3 As indicated in table above, the proposed development would generate a total of about 15 pcu/hr and 19 pcu/hr (two-way) during AM and PM peaks respectively for PR 9.75, and about 18 pcu/hr and 22 pcu/hr (two-way) during AM and PM peaks respectively for PR 11.7.

4.2 Adjacent Developments

4.2.1 In addition to the development flow, the traffic generated and attracted by adjacent major planned/committed developments in the vicinity of the proposed development were taken into account for the traffic forecast. Details of these adjacent planned developments are summarized in **Table 4.2.1** below. The location of the planned developments are indicated in **Figure 4.1**.

Table 4.2.1 Adjacent Planned Developments in the Vicinity

Adjacent Developments	Type	Parameters
Proposed Comprehensive Development for Flat, Eating Place, Shop and Services and Office at Kwai Chung Town Lot 432 and Adjoining Government Land, No. 1-7 Cheung Wing Road, Kwai Chung	Private Housing	1,336 flats
	Office + Retail	23,248 m^2 GFA
Proposed Industrial Redevelopment at No. 45-51 Kwok Shui Road, Kwai Chung	Industrial	13,472 m^2 GFA
Proposed Industrial-Office Redevelopment at No. 57-61 Ta Chuen Ping Street, Kwai Chung	Industrial - Office	26,336 m^2 GFA
Proposed Industrial Redevelopment at No. 20-24 Kwai Wing Road, Kwai Chung	Industrial	18,004 m^2 GFA
Proposed Industrial Redevelopment at No.2-16 Lam Tin Street, Kwai Chung	Industrial	21,181 m^2 GFA
Proposed Hotel Redevelopment at No. 4-30 Lei Muk Road, Kwai Chung	Hotel	780 rooms
Proposed Hotel Redevelopment on 2/F, Hotel Ease Tsuen Wan, 15-19 Chun Pin Street, Kwai Chung	Hotel	14 rooms
Proposed Residential Care Home for the Elderly at 1 Lei Muk Road DD450 Lot. 984RP	Residential	8,766 m^2 GFA

4.3 Future Traffic Growth

4.3.1 The proposed development is targeted for completion in Year 2024. In order to assess the traffic impact of the development-related traffic on the adjacent road network, Year 2027 (i.e. 3 years after completion) is adopted as the design year of the study.

Annual Traffic Census

4.3.2 Reference was made to Annual Traffic Census (ATC) on annual average daily traffic (AADT) at counting stations in the vicinity of the proposed development and the corresponding traffic flows are summarized in **Table 4.3.1** below.

Table 4.3.1 Annual Average Growth Rate by ATC

Stn No.	Location	2014 AADT	2015 AADT	2016 AADT	2017 AADT	2018 AADT	2019 AADT	Average Annual Growth from 2014 to 2019
5221	Cheung Wing Rd (between Wo Yi Hop Rd and Kwai Chung Rd)	39,780	40,530	41,650	42,420	40,980	43,680	+1.89% p.a.
5225	Wo Yi Hop Rd (between Tai Loong St and Lei Muk Rd)	14,690	14,970	15,380	15,660	14,090	14,040	-0.90% p.a.
5226	Lei Muk Rd (between Wo Yi Hop Rd and Chun Pin St)	6,700	6,830	7,020	7,140	5,220	7,280	+1.67% p.a.
5431	Wo Yi Hop Rd (between Lei Muk Rd and Cheung Wing Rd)	27,720	21,630	22,230	22,640	22,970	28,020	+0.22% p.a.
6024	Lei Muk Rd (Castle Peak Rd – Kwai Chung and Chun Pin St)	3,820	3,890	4,000	4,060	4,010	4,000	+0.93% p.a.
6046	Lei Muk Rd (between Wo Yi Hop Rd and Tung Chi St)	11,530	11,740	12,070	10,980	10,980	10,940	-1.05% p.a.
6639	Chun Pin St (between Ta Chuen Ping St and Lei Muk Rd)	5,200	5,560	5,330	5,980	6,460	6,330	+4.01% p.a.
5025	Castle Peak Rd - Kwai Chung (between Kwai Chung Rd RA and Wo Yi Hop Road)	17,360	17,860	17,840	17,910	23,020	19,880	+2.75% p.a.
6005	Kwai Chung Rd (between Tai Lin Pai Rd and Castle Peak Rd - Kwai Chung INT)	57,810	59,460	59,380	60,970	45,480	44,080	-5.28% p.a.
Overall flow		**184,610**	**182,470**	**184,900**	**187,760**	**173,210**	**178,250**	**-0.70% p.a.**

4.3.3 The ATC historic data indicates a negative growth of traffic in recent years in the region with around **-0.70% p.a.**

Territorial Population and Employment Data Matrix (TPEDM)

4.3.4 Reference was also made to 2016-based TPEDM published by Planning Department. **Table 4.3.2** below summarizes the estimated and projected population and employment data as well as their respective annual average growth rate of Kwai Chung District in 2016, 2021 and 2026.

Table 4.3.2 Annual Average Growth Rate of Kwai Chung District by TPEDM

Year	2016	2021	2026
Population	327,000	325,550	319,950
Employment	202,700	198,250	192,850
TOTAL	529,700	523,800	512,800
Annual Average Growth Rate	-	**-0.32%** (from 2016 to 2026)	**-0.42%** (from 2021 to 2026)

4.3.5 From the table above, the annual average growth rate of population and employment in Kwai Chung District from 2016 to 2026 is -0.32%p.a. and that from 2021 to 2026 is -0.42% p.a.

4.3.6 The average annual growth rate determined from ATC is -0.70% p.a., and that of TPEDM ranges from -0.32% to -0.42% p.a. For conservative purpose, growth rate of **+1% p.a.** is adopted to produce the traffic forecast for 2020–2027.

4.4 Assessment Scenarios

4.4.1 To evaluate the associated traffic impact likely to be induced by the proposed 20% increase in PR for the proposed development, two scenarios were analysed and compared.

4.4.2 The first scenario (i.e. Year 2027 Reference Scenario) assumed that the proposed development with the permitted PR 9.75 (i.e. **without** 20% increase in PR) is in place, whereas the second scenario (i.e. Year 2027 Design Scenario) assumed that the proposed development with the proposed PR 11.7 (i.e. **with** 20% increase in PR) is in place.

Year 2027 Reference Scenario (Scenario 1)

= Year 2020 observed traffic flows × growth factor during the period of year 2020-2027

Plus traffic generations of other major planned/committed developments in the vicinity

Plus trips generated and attracted by the proposed development with PR 9.75 (i.e. **without** 20% increase in PR)

Year 2027 Design Scenario (Scenario 2)

= Year 2020 observed traffic flows × growth factor during the period of year 2020-2027

Plus traffic generations of other major planned/committed developments in the vicinity

Plus trips generated and attracted by the proposed development with PR 11.7 (i.e. **with** 20% increase in PR)

4.4.3 The forecasted traffic flows for the above two scenarios are presented in **Figures 4.2** and **4.3** respectively.

4.5 Junction Capacity Assessment

4.5.1 Junction capacity assessment was carried out at the identified key junctions for Year 2027 Reference and Design Scenarios. Assessment results are summarized in **Table 4.5.1** below.

Table 4.5.1 Year 2027 Future Junction Performance

Junction		Type	Performance (1)			
			2027 Reference		2027 Design	
			AM	PM	AM	PM
J1	Castle Peak Road - Kwai Chung Interchange	Priority	1.19	1.12	1.19	1.12
J2	Cheung Wing Road / Kwok Shui Road	Signalized	28%	29%	28%	29%
J3	Castle Peak Road - Kwai Chung / Kwai Chung Road (2)	Signalized	37%	27%	37%	26%
J4	Lei Muk Road / Castle Peak Road (2)	Priority	0.20	0.22	0.20	0.22
J5	Tai Yuen Street / Kwok Shui Road (3)	Priority	0.35	0.31	0.36	0.31
J6	Kwok Shui Road / Lei Muk Road (4)	Signalized	10%	22%	10%	22%
J7	Chun Pin Street / Lei Muk Road (4)	Priority	0.73	0.76	0.73	0.76
J8	Lei Muk Road / Wo Yi Hop Road (2)	Signalized	51%	46%	51%	45%
J9	Wo Yi Hop Road / Cheung Wing Road (2)	Signalized	33%	52%	33%	52%

Notes:
(1) Figures shown represent "Reserve Capacity" (RC) in % for signalized junctions and "Design Flow Capacity" (DFC) ratio for priority junctions.
(2) Junction parameter assumptions are taken into account to reflect the actual traffic conditions.
(3) Taken into account the existing kerbside activities at Tai Yuen Street in the calculations.
(4) Taken into account the existing kerbside activities at Lei Muk Road in the calculations.

4.5.2 The above results revealed that the identified key junctions would operate within capacity with the proposed development in Year 2027, except J1 and J6.

4.5.3 The results also reveal that the junction performances at **J1** and **J6** are the same under the Reference Scenario (i.e. **without** 20% increase in PR) and the Design Scenario (i.e. **with** 20% increase in PR) during both AM and PM peak hours.

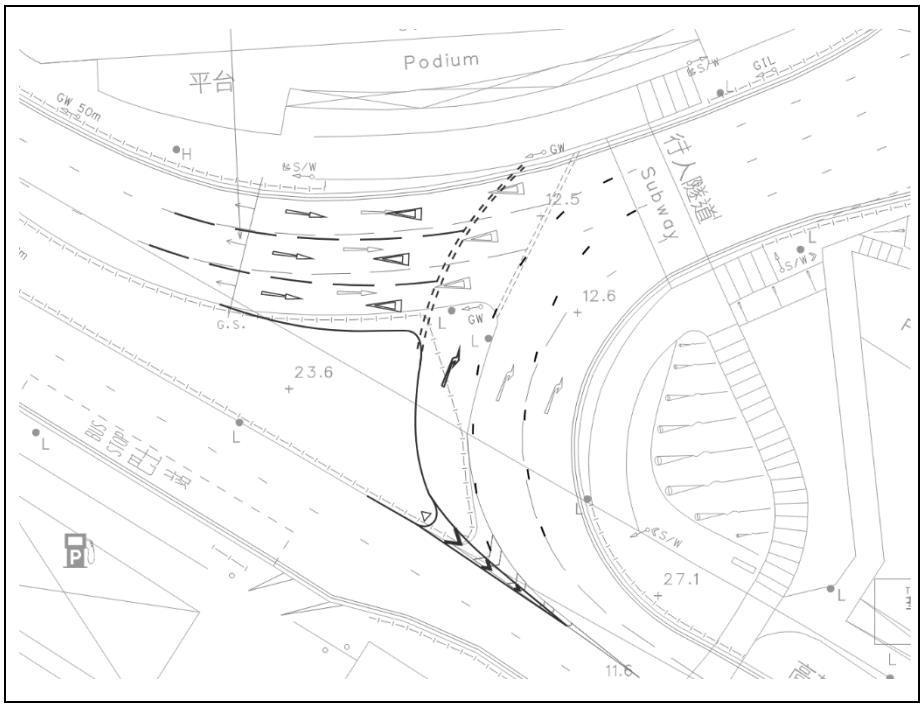
4.5.4 The traffic loading due to the proposed increase in PR onto J1 and J6 is considered minimal due to insignificant decrease in junction performance.

4.5.5 It is anticipated that the implication to the identified key junctions associated with the proposed 20% increase in PR for the proposed development in Year 2027 would be minimal. In other words, the proposed development would not generate significant impact onto the identified key junctions due to minimal traffic contribution to those junctions from such small-scale site.

4.5.6 Considered the junction capacity for junction J1 – Castle Peak Road - Kwai Chung Interchange and junction J6 – Kwok Shui Road / Lei Muk Road are overloaded even in the Reference Scenario, junction improvement proposals have been explored in order to improve the performance of these junctions.

J1 – Castle Peak Road - Kwai Chung Interchange

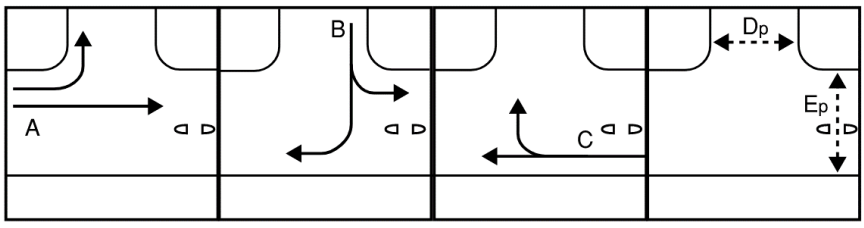
4.5.7 For junction J1 – Castle Peak Road - Kwai Chung Interchange, possible improvement proposal is suggested by provision of additional traffic lane underneath the at the Castle Peak Road - Kwai Chung Flyover, as shown below.



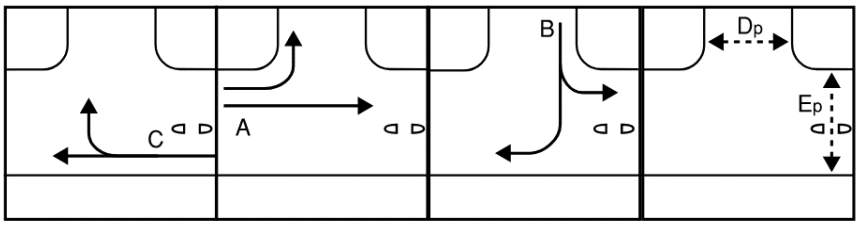
J6 – Kwok Shui Road / Lei Muk Road

4.5.8 For junction J6 – Kwok Shui Road / Lei Muk Road, possible improvement proposal is suggested modifying the method-of-control (MOC) plan (i.e. re-arrangement of the existing MOC) to reduce loss time at the junction, as shown below.

Current MOC Plan Sequence



Proposed MOC Plan Sequence



4.5.9 Taking into consideration that the junction performances at **J1** and **J6** are the same under the Reference Scenario (i.e. **without** 20% increase in PR) and the Design Scenario (i.e. **with** 20% increase in PR) during both AM and PM peak hours.

4.5.10 The traffic loading due to the proposed increase in PR onto J1 and J6 is considered minimal due to insignificant decrease in junction performance. The proposed improvement of **J1** and **J6** should be carried out and initiated by the Government from a district-wide and strategic level.

4.5.11 With these improvements, junctions J1 and J6 have been assessed and the junction performance are summarized in **Table 4.5.2** below.

Table 4.5.2 Year 2027 Future Junction Performance - with Junction Improvement

Junction		Type	Performance (1) 2027 Design	
			AM	PM
J1	Castle Peak Road - Kwai Chung Interchange	Priority	0.99	0.97
J6	Kwok Shui Road / Lei Muk Road (2)	Signalized	18%	31%

Notes:
(1) Figures shown represent "Reserve Capacity" (RC) in % for signalized junctions and "Design Flow Capacity" (DFC) ratio for priority junctions.
(2) Taken into account the existing kerbside activities at Lei Muk Road in the calculations.

4.5.12 The above results revealed that under the Design Scenario in Year 2027, the DFC of J1 would be improved from 1.19 and 1.12 to 0.99 and 0.97 for AM peak and PM peak hour respectively. And the reserve capacity of J6 would be improved from 10% and 22% to 18% and 31% for AM peak and PM peak hour respectively. under the Design Scenario in Year 2027.

4.5.13 With the above improvement proposals, it is anticipated that the performance of junctions J1 and J6 would be enhanced and operate within capacity with the proposed development in Year 2027.

4.6 Pedestrian Impact Assessment

Pedestrian Generation

4.6.1 To establish appropriate pedestrian generation and attraction rates for the proposed development, pedestrian count survey has been conducted on typical weekdays at the existing data centres in the vicinity. The surveyed pedestrian generation and attraction flow during peak hours are summarized in **Table 4.6.1** below.

Table 4.6.1 Peak Hour Pedestrian Generated and Attracted at the Surveyed Data Centres

Development Schedule GFA (m^2)		AM		PM	
		Gen	Att	Gen	Att
iTech Tower 1 at 28 Pak Tin Par Street, Tsuen Wan (17,652m^2 GFA)	Observed Trips (ped/hr)	7	25	38	13
	Trip Rate (in ped/hr/100m^2 GFA)	0.040	0.142	0.215	0.074
iTech Tower 2 at 54-56 Ta Chuen Ping Street, Kwai Chung (9,125m^2 GFA)	Observed Trips (ped/hr)	5	33	26	8
	Trip Rate (in ped/hr/100m^2 GFA)	0.055	0.362	0.285	0.088
Adopted Trip Rate (ped/ hr/100m^2 GFA)		**0.055**	**0.362**	**0.285**	**0.088**

4.6.2 For conservative assessment, the highest of the rates above were adopted and applied in order to estimate the pedestrian generation for the proposed development. The additional pedestrians generated and attracted due to the 20% increase in PR in is summarized in **Table 4.6.2** below.

Table 4.6.2 Pedestrians Generated and Attracted by Proposed Development

Development Schedule GFA (m^2)		Pedestrian Flow (ped/ hr)			
		AM		PM	
		Gen	Att	Gen	Att
Proposed Development with PR 9.75	18,183.75	10	66	52	16
Proposed Development with PR 11.7	21,820.50	12	79	63	20

4.6.3 As indicated in **Table 4.6.2** above, the proposed development would generate a total of 76 and 68 ped/hr (two-way) during AM and PM peaks for PR 9.75, and a total of 91 and 83 ped/hr (two-way) during AM and PM peaks for PR 11.7.

Assessment Scenarios

4.6.4 Similar to the traffic impact assessment, year 2027 is adopted as the design year of pedestrian assessment. Annual growth rate of +**1% p.a.** is adopted to produce the pedestrian forecasts for 2020–2027 to derive year 2027 peak hour background pedestrian flows. Additionally, the future pedestrian volumes generated by the proposed development are taken into account for year 2027 pedestrian flows.

4.6.5 Similarly, to evaluate the associated pedestrian impact likely to be induced by the proposed 20% increase in PR for the proposed development, two scenarios were analysed and compared.

4.6.6 The first scenario (i.e. Year 2027 Reference Scenario) assumed that the proposed development with the existing PR 9.75 (i.e. **without** 20% increase in PR) is in place.

4.6.7 The second scenario (i.e. Year 2027 Design Scenario) assumed that the proposed development with the proposed PR 11.7 (i.e. **with** 20% increase in PR) is in place.

Year 2027 Reference Scenario (Scenario 1)

= Year 2020 observed pedestrian flows × growth factor during the period of year 2020-2027

Plus pedestrian trips generated and attracted by the proposed development with PR 9.75 (i.e. **without** 20% increase in PR)

Year 2027 Design Scenario (Scenario 2)

= Year 2020 observed pedestrian flows × growth factor during the period of year 2020-2027

Plus pedestrian trips generated and attracted by the proposed development with PR 11.7 (i.e. **with** 20% increase in PR)

Performance of Pedestrian Facilities in Year 2027

4.6.8 In order to address the performance of the concerned pedestrian facilities, Level of Service (LOS) assessment of the critical footpaths have been conducted for Year 2027 Reference and Design Scenarios.

4.6.9 **Table 4.6.3** and **Table 4.6.4** summarized the peak pedestrian flow and the pedestrian assessment results at the critical footpaths under the Year 2027 Reference and Design Scenarios.

Table 4.6.3 Design Year 2027 Level of Service in AM and PM Peaks along Key Footpath under Reference Scenario (i.e. with permitted PR 9.75)

Footpath		Actual Width (m)	Effective Clear Width (1) (m)	Two-way Peak 15-minute Flow (ped/15-min)		Flow Rate(2) (ped/min/m)		LOS (Level)	
				AM	PM	AM	PM	AM	PM
F1	Tai Yuen Street Footpath (Without 2m setback)	1.7	0.7	260	225	30	26	C	C
F2	Kwok Shui Road Footpath (Without 2m setback)	2.7	1.7	210	195	10	10	A	A

Notes:
(1) Effective clear width = Actual width (on-site measurement) minus 0.5m dead width on both sides.
(2) Pedestrian flow rates are computed based on effective clear width, with 1.2 peak factor applied for the peak minute flow rate.

Table 4.6.4 Design Year 2027 Level of Service in AM and PM Peaks along Key Footpath under Design Scenario (i.e. with proposed PR 11.7)

Footpath		Actual Width (m)	Effective Clear Width (1) (m)	Two-way Peak 15-minute Flow (ped/15-min)		Flow Rate(2) (ped/min/m)		LOS (Level)	
				AM	PM	AM	PM	AM	PM
F1	Tai Yuen Street Footpath (With 2m setback)	3.7	2.7	260	230	8	7	A	A
F2	Kwok Shui Road Footpath (With 2m setback)	4.7	3.7	210	195	5	5	A	A

Notes:
(1) Effective clear width = Actual width (on-site measurement) minus 0.5m dead width on both sides.
(2) Pedestrian flow rates are computed based on effective clear width, with 1.2 peak factor applied for the peak minute flow rate.

4.6.10 As shown in **Table 4.6.4** above, with the proposed setback at Tai Yuen Street and Kwok Shui Road by the proposed development, the walking condition on the critical footpath in the vicinity of the application site is desirable during both AM and PM peaks in Year 2027. No adverse pedestrian impact will be generated by the proposed development.

5 CONCLUSION

5.1 Summary

5.1.1 The Applicant intends to redevelop the existing industrial building at No. 2-10 Tai Yuen Street, which was occupied before 1987, to information technology and telecommunications industries use (Data Centre), in consideration of the proposed 20% increase in PR restriction (from the existing PR 9.75 to the proposed PR 11.7).

5.1.2 This is in echo of the 2018 Policy Address to encourage owners to redevelop industrial buildings constructed before 1987 by allowing relaxation of the maximum permissible non-domestic PR by up to 20% for redevelopment projects of these pre-1987 industrial buildings.

5.1.3 A Traffic Impact Assessment (TIA) study was carried out to evaluate the likely traffic impact associated with the proposed development in support of the Section 16 application for enabling the proposal at the application site.

5.1.4 The proposed provision of internal parking and servicing facilities for the proposed development is in full compliance with the HKPSG high-end requirements and the requirement under the Departmental Circular No. 6/2012. The goods vehicle loading/unloading area will be located on G/F for HGVs and B1/F for LGVs, the car park will be located on B1/F and B2/F. Vehicles will access to/from the subject development through the vehicular access located at Tai Yuen Street. LGV, private cars and motorcycles will access to/from the basement car parking floors via LGV-lift system.

5.1.5 Car lift assessment has been conducted and the assessment results revealed that it is not likely that queuing of vehicles will extend onto the public road during AM and PM peak hours. The provision of one LGV lift and one waiting space for the proposed development will not generate any negative traffic impact onto the public road.

5.1.6 The identified key junctions in the vicinity were assessed with respect to traffic generation of the proposed development upon Year 2027 (3 years after the target Completion Year 2024), taking into account the traffic generation by the major planned/committed developments in the vicinity.

5.1.7 Traffic impact assessment scenarios were set up for the proposed development, namely Year 2027 Reference Scenario (the site occupied by the proposed development without 20% increase in PR, i.e. with PR 9.75) and Year 2027 Design Scenario (the site occupied by the proposed development with 20% increase in PR, i.e. with PR 11.7).

5.1.8 Assessment results show revealed that the identified key junctions would operate within capacity with the proposed development in Year 2027, except J1 and J6. Nevertheless, the junction performances at J1 and J6 are the same under the Reference Scenario (i.e. without 20% increase in PR) and the Design Scenario (i.e. with 20% increase in PR) during both AM and PM peak hours.

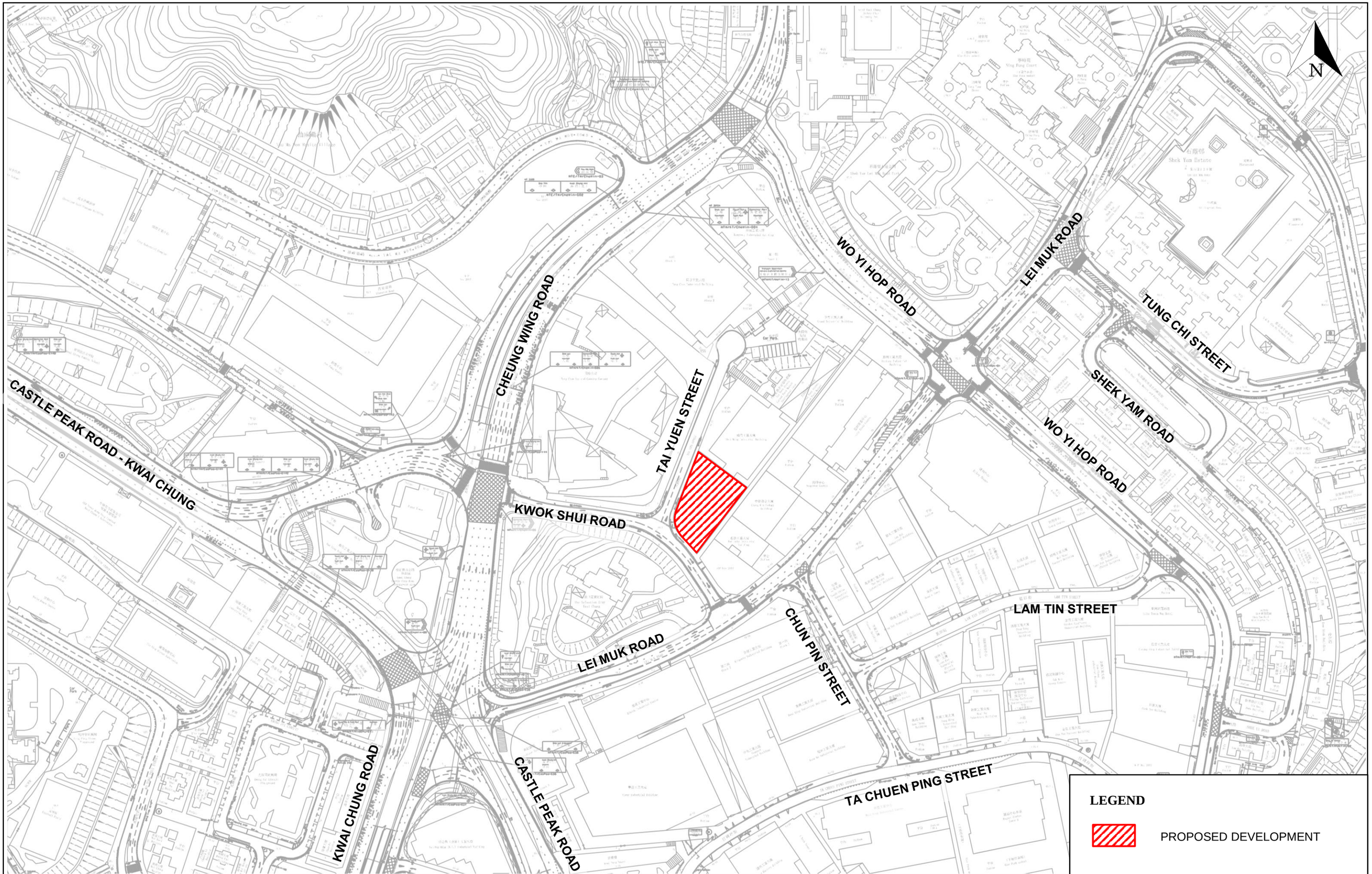
5.1.9 Possible improvement proposals were also suggested for J1 and J6. With the above-mentioned, it is considered that the traffic impact due to the proposed development is insignificant and could be accommodated by the surrounding road network.

5.1.10 Pedestrian impact assessment has been conducted and the results indicated that with the proposed setback at Tai Yuen Street and Kwok Shui Road by the proposed development, the walking condition on the critical footpath in vicinity of the application site is desirable during both AM and PM peaks in Year 2027. No adverse pedestrian impact will be generated by the proposed development.

5.2 Conclusion

5.2.1 It could be concluded that the proposed development will not impose any adverse traffic impact on the surrounding road network and pedestrian walking condition, and thus is feasible from the traffic engineering point of view.

Figures

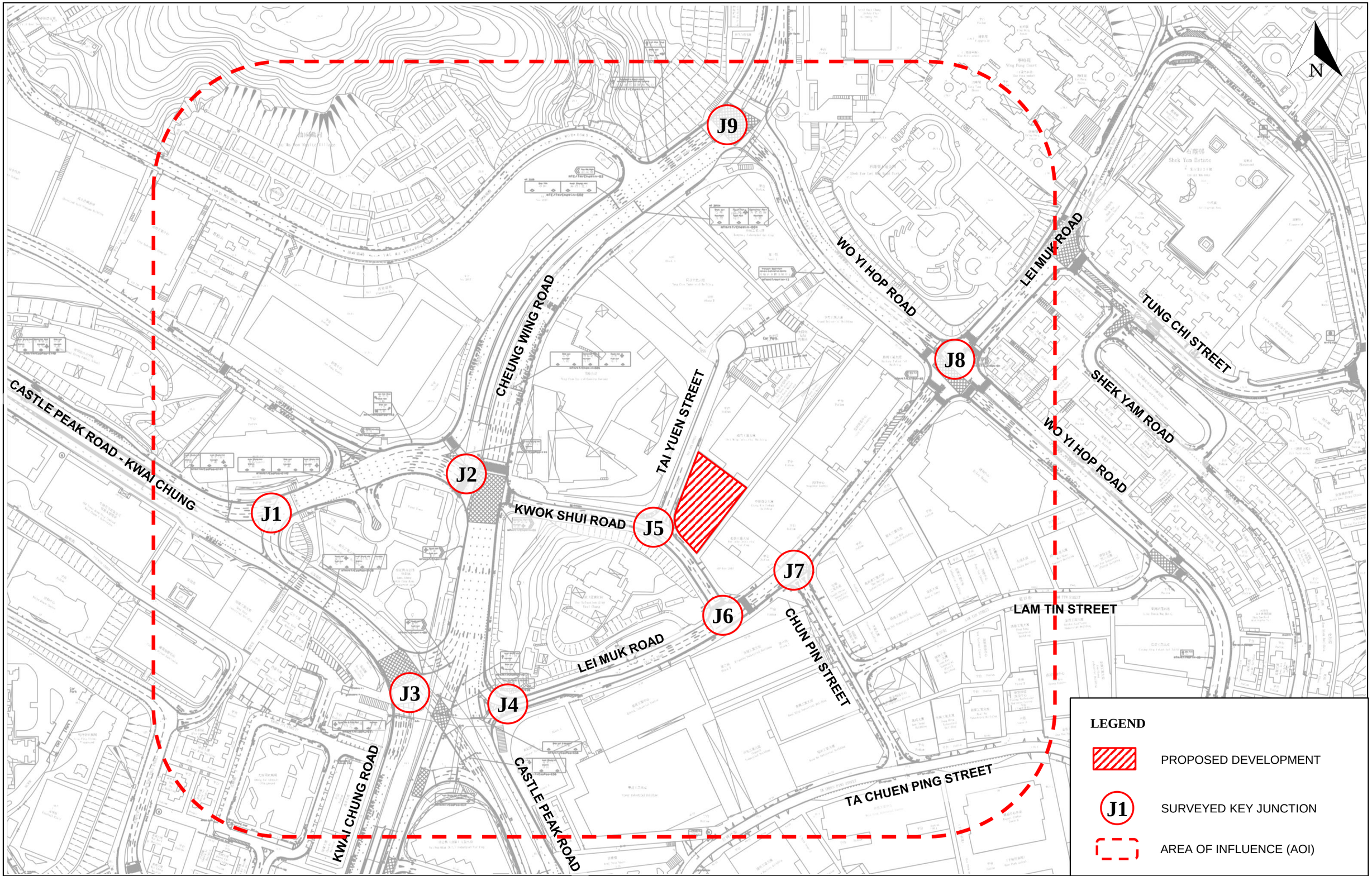


Job Title **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

FIGURE 1.1

Date	Scale	Drawing Title
12/2020	N.T.S	LOCATION OF APPLICATION SITE
Drawn	Job No.	
KSIY	276306-24	

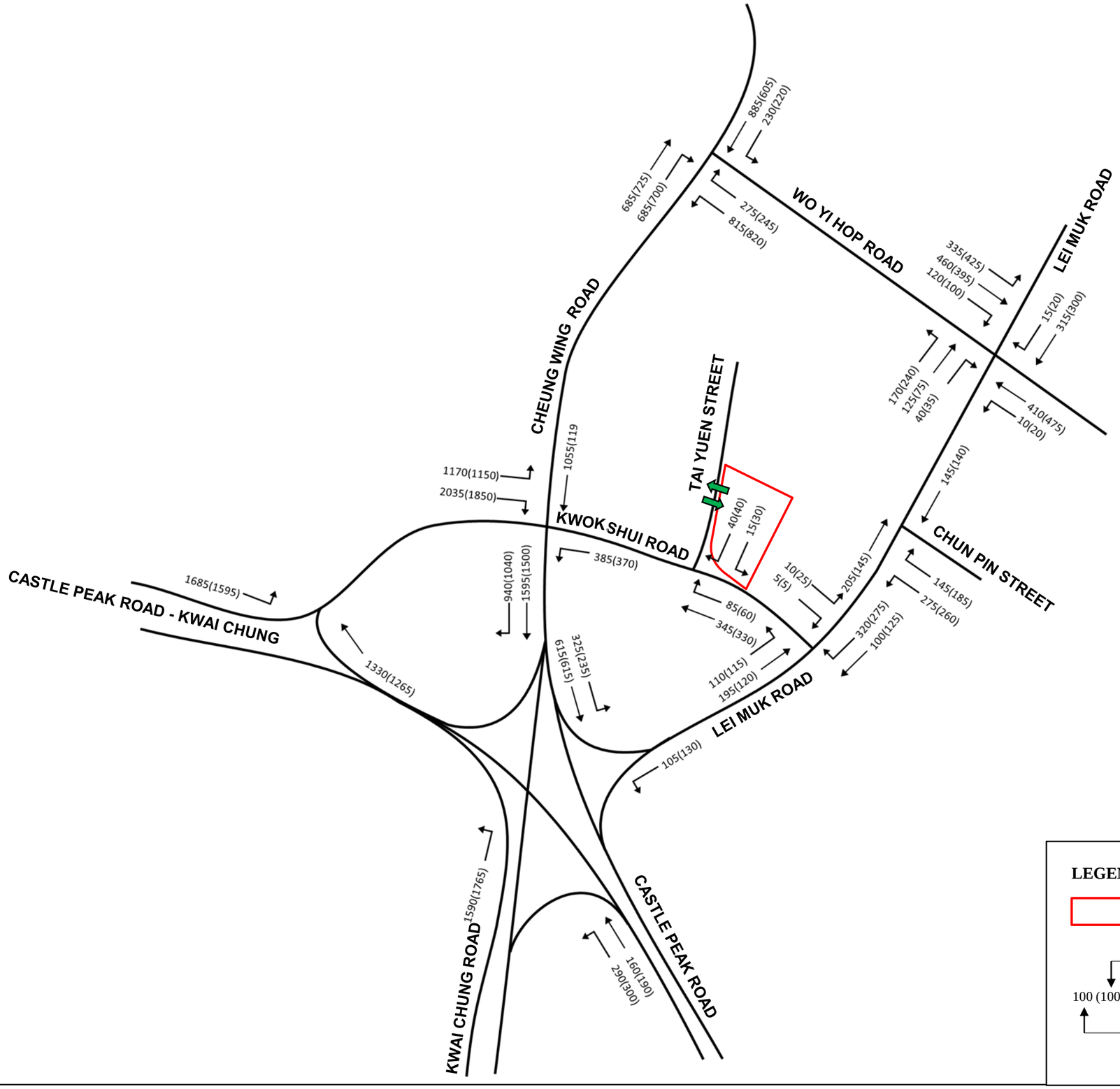
ARUP



Job Title	**PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**
Date	12/2020
Scale	N.T.S
Drawn	KSIY
Job No.	276306-24
Drawing Title	LOCATION OF SURVEYED JUNCTIONS IN THE VICINITY OF PROPOSED DEVELOPMENT

FIGURE 2.1

ARUP



LEGEND

PROPOSED DEVELOPMENT

PM PEAK TRAFFIC FLOW (PCU/HOUR)

100 (100)

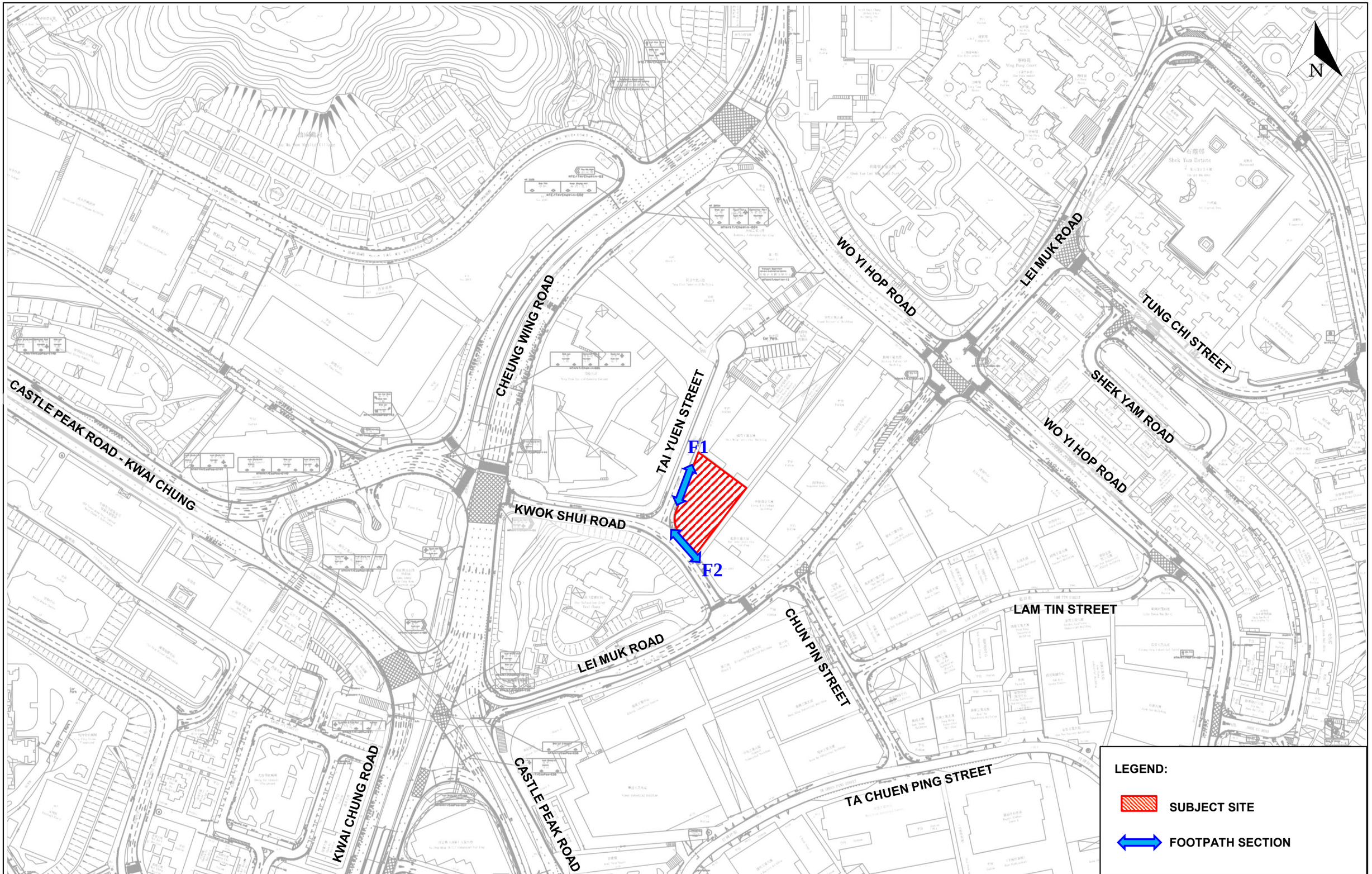
AM PEAK TRAFFIC FLOW (PCU/HOUR)

Job Title **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

FIGURE 2.2

Date	Scale	Drawing Title
12/2020	N.T.S	YEAR 2020 EXISTING TRAFFIC FLOW
Drawn	Job No.	
KSIY	276306-24	

ARUP



Job Title **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

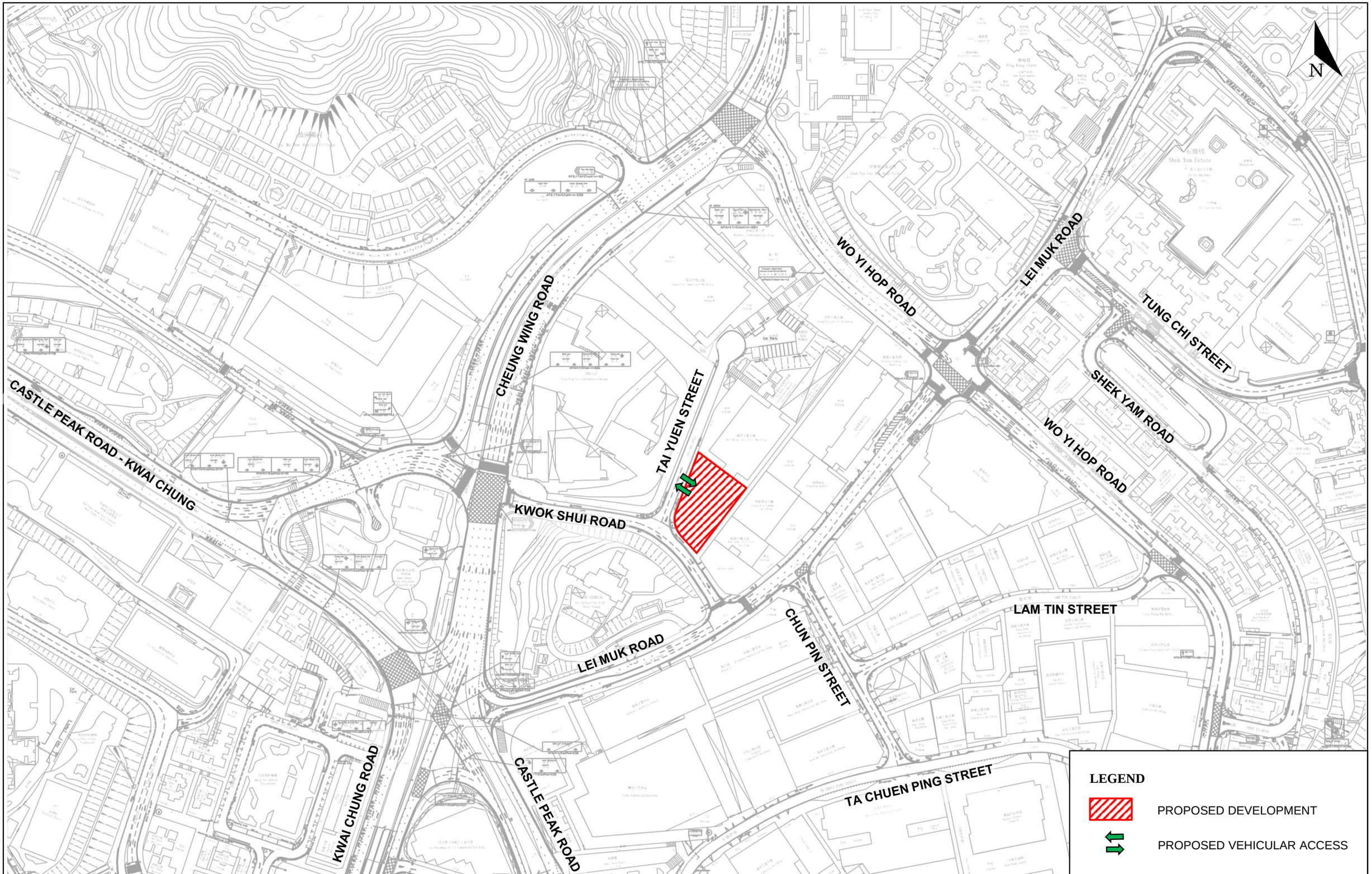
FIGURE 2.3

Date	Scale
12/2020	N.T.S
Drawn	Job No.
KSIY	276306-24

Drawing Title

PEDESTRIAN FACILITIES ALONG MAJOR PEDESTRIAN ROUTES JUNCTIONS IN THE VICINITY OF PROPOSED DEVELOPMENT

ARUP



Job Title **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

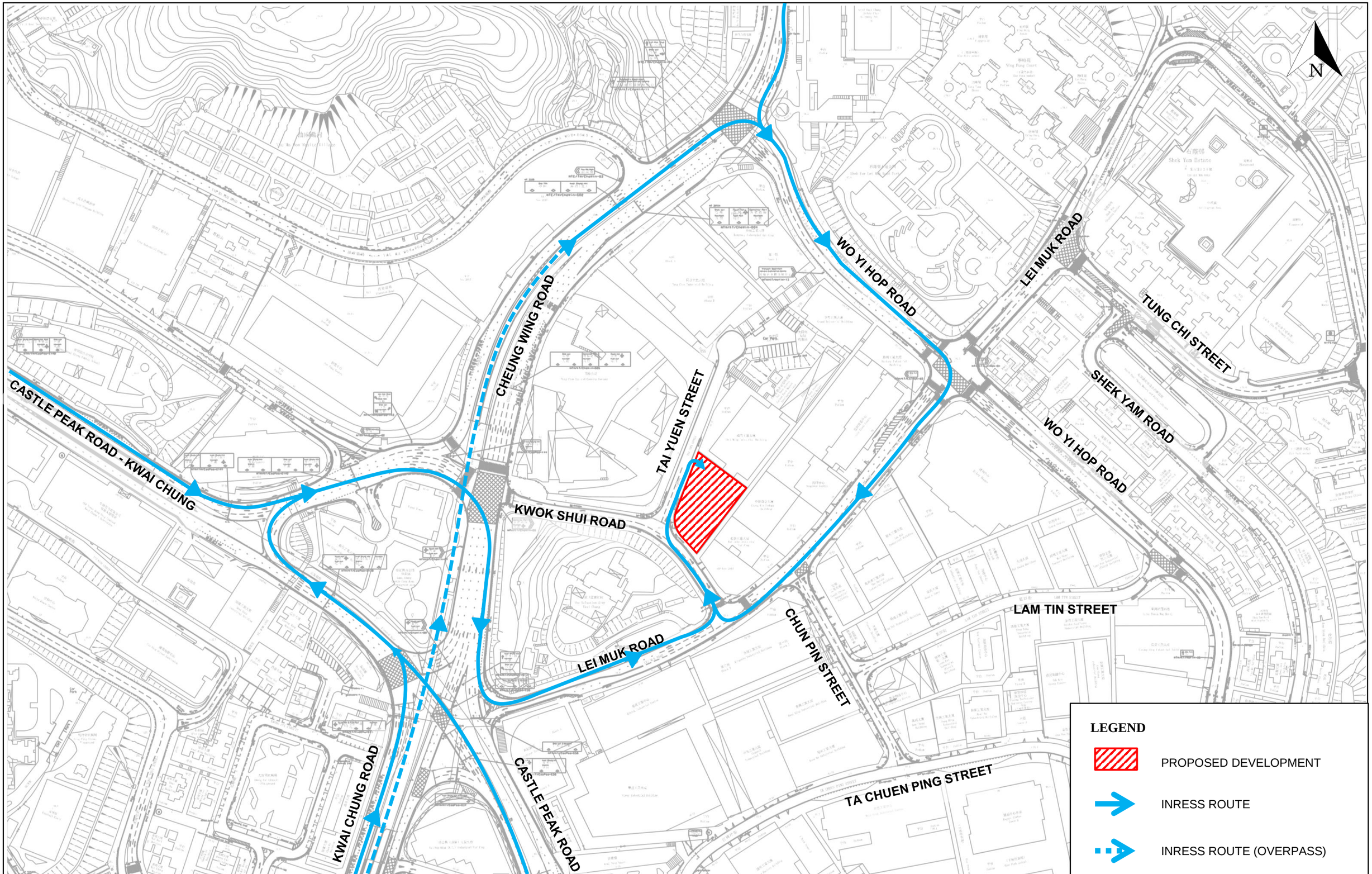
FIGURE 3.1

Date	Scale
12/2020	N.T.S
Drawn	Job No.
KSIY	276306-24

Drawing Title

PROPOSED VEHICULAR ACCESS OF PROPOSED DEVELOPMENT

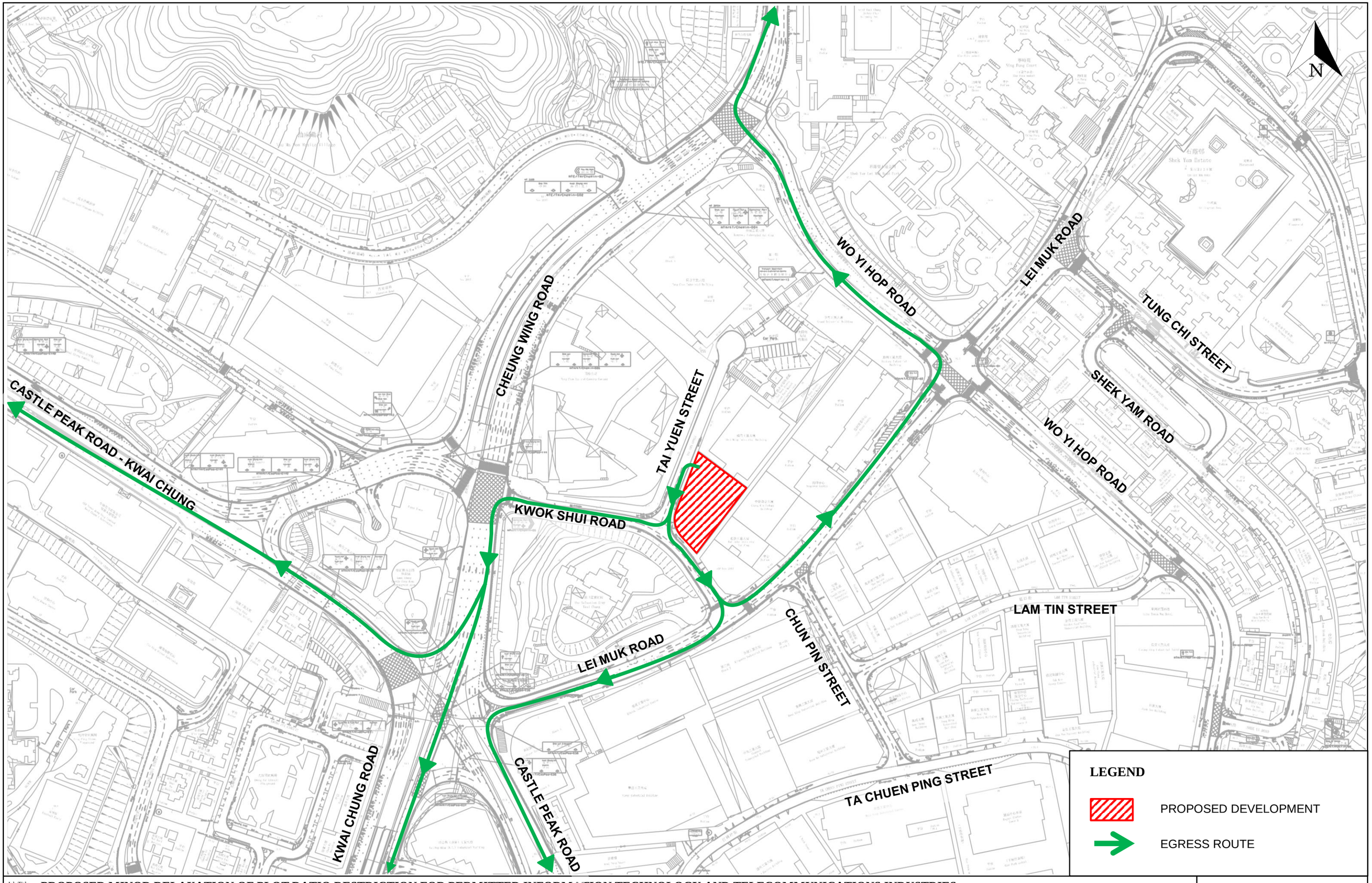
ARUP



Job Title	**PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**
Date	12/2020
Scale	N.T.S
Drawn	KSIY
Job No.	276306-24
Drawing Title	INGRESS VEHICULAR ROUTES OF PROPOSED DEVELOPMENT

FIGURE 3.2

ARUP

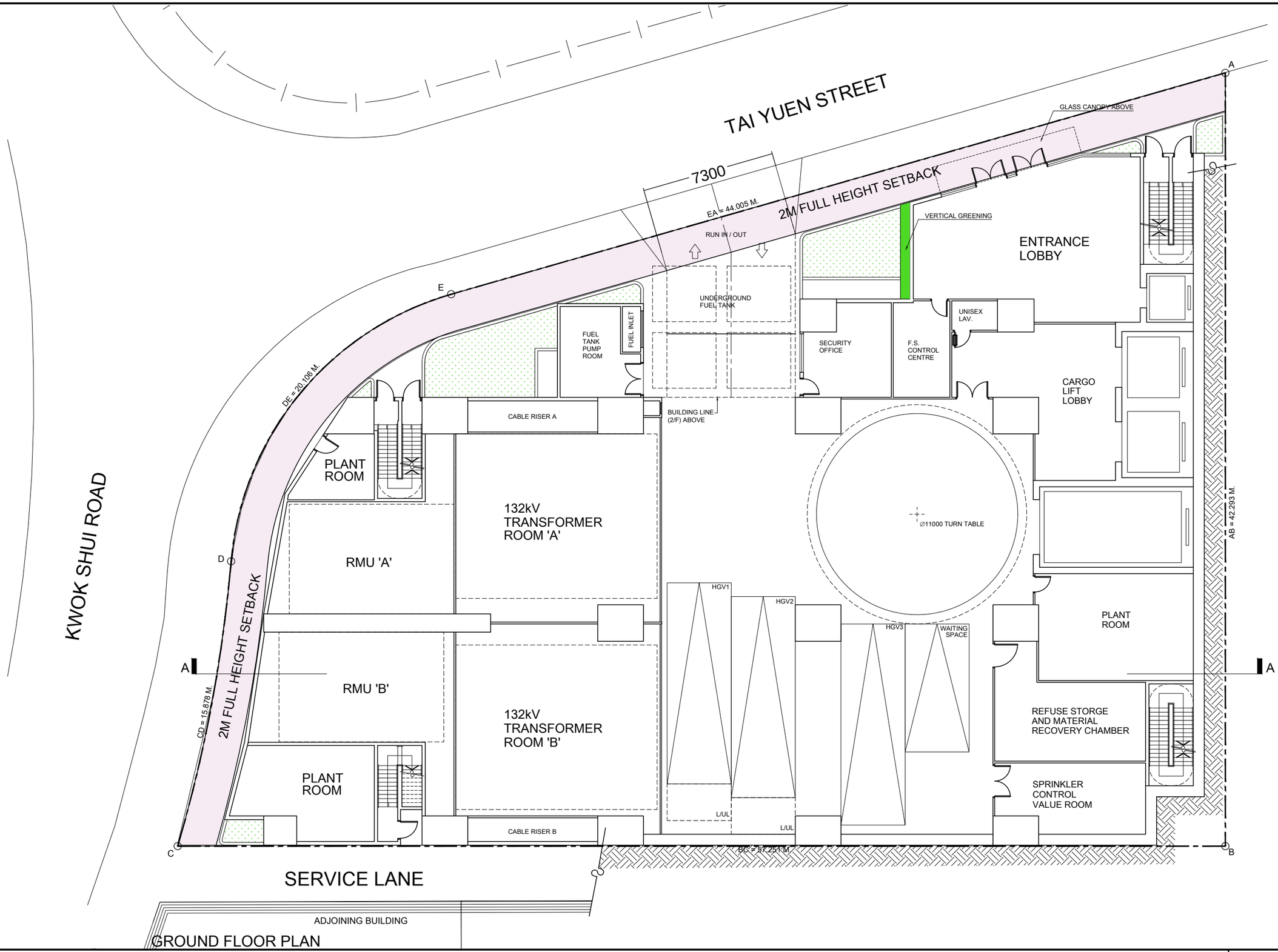


Job Title **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

FIGURE 3.3

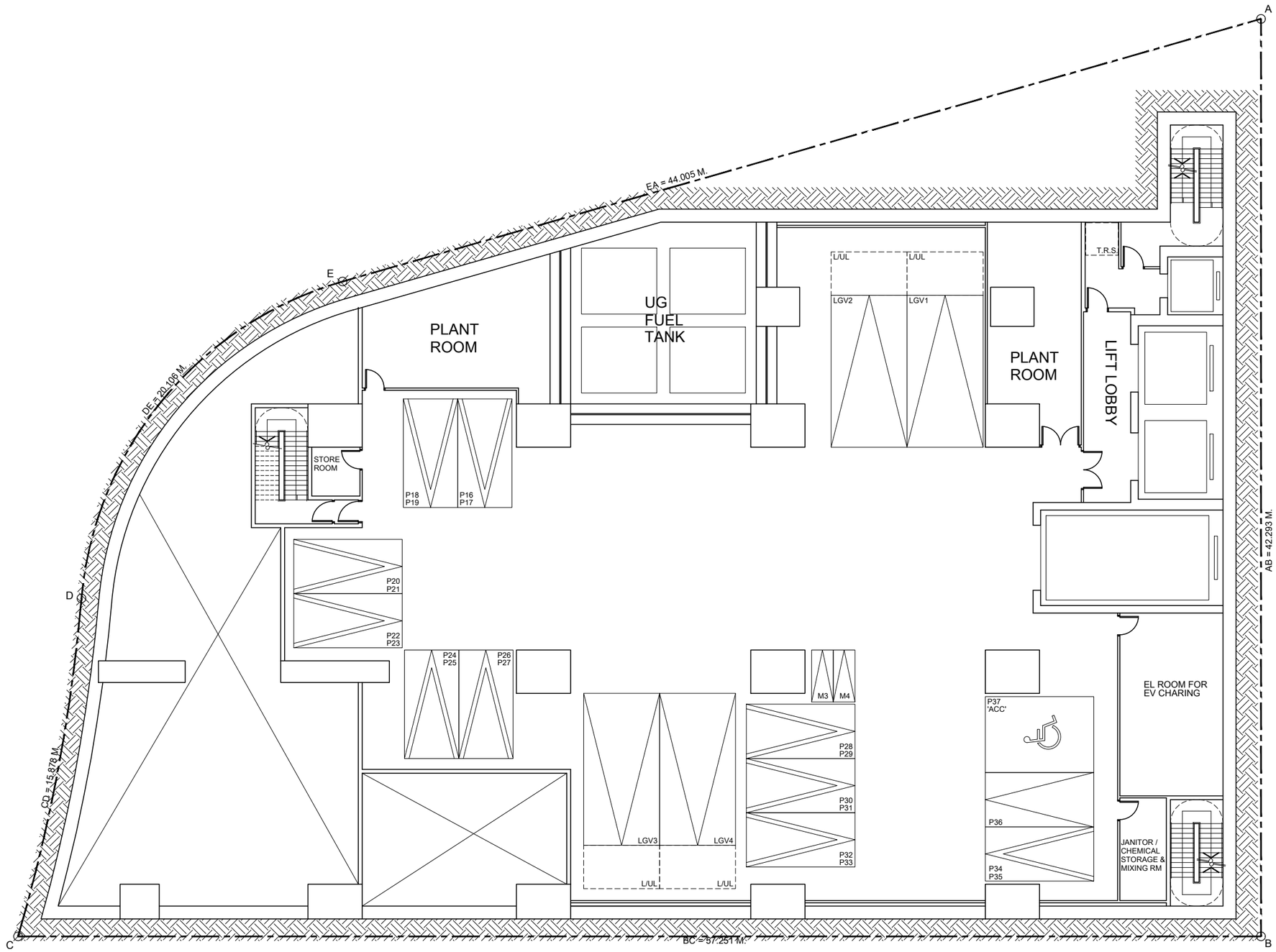
Date	Scale	Drawing Title
12/2020	N.T.S	EGRESS VEHICULAR ROUTES OF PROPOSED DEVELOPMENT
Drawn	Job No.	
KSIY	276306-24	

ARUP



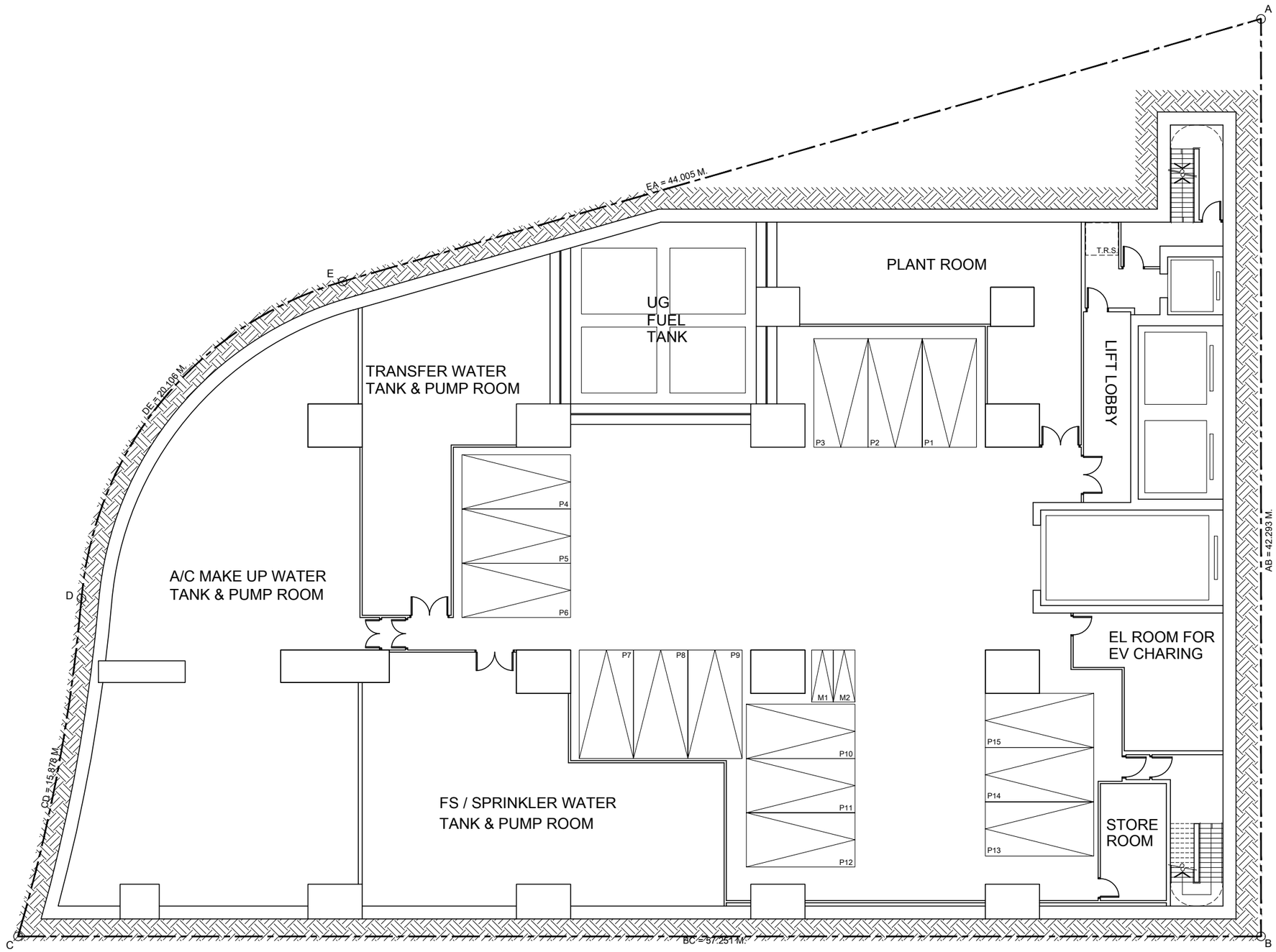
GROUND FLOOR PLAN

Job Title	**PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**		FIGURE 3.4
Date: 12/2020	Scale: N.T.S	Drawing Title: PROPOSED LAYOUT AT G/F	ARUP
Drawn: KSIY	Job No.: 276306-24		



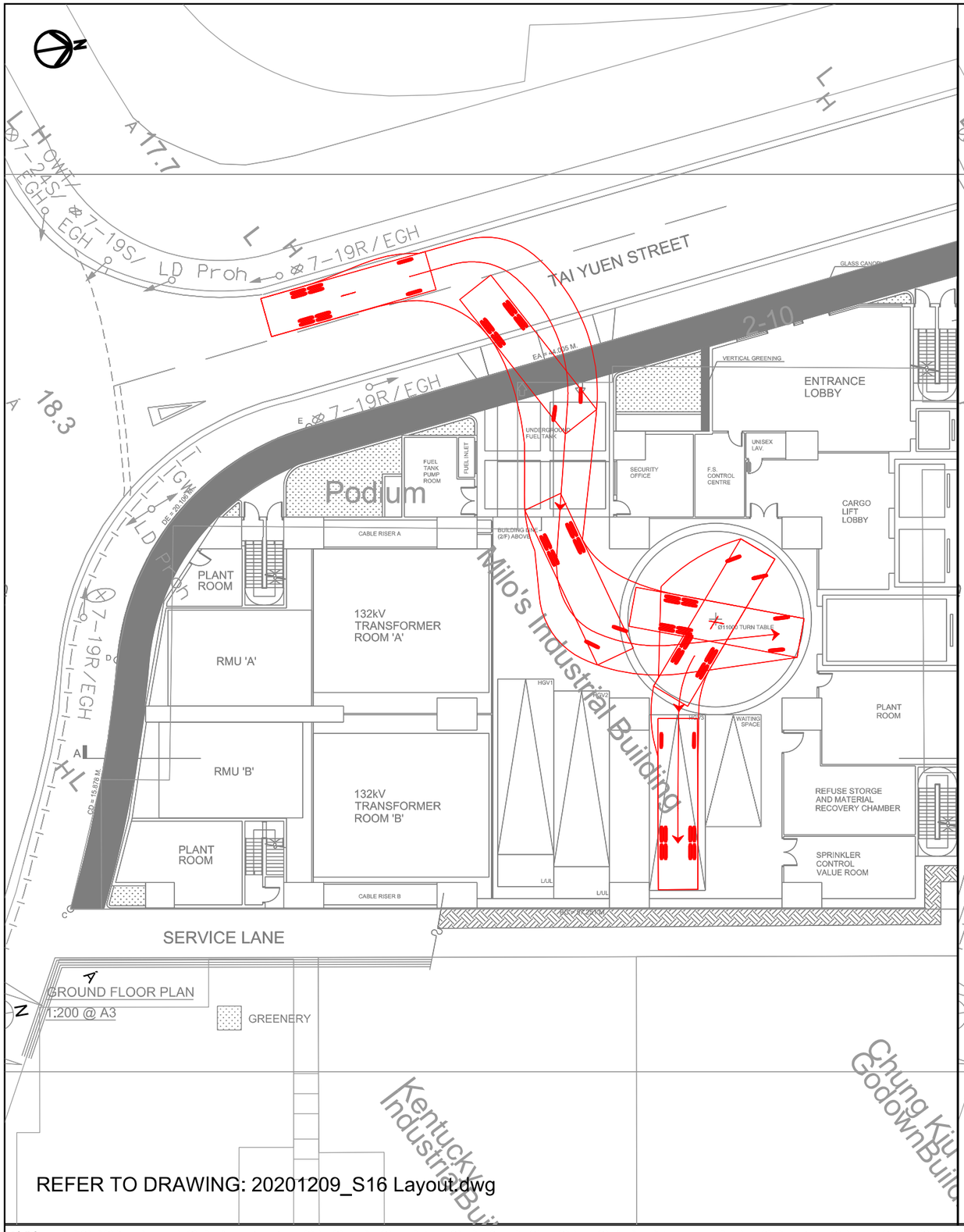
BASEMENT '1' FLOOR PLAN

Job Title	**PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**	FIGURE 3.5
Date: 12/2020 / Scale: N.T.S	Drawing Title: PROPOSED LAYOUT AT B1/F	ARUP
Drawn: KSIY / Job No.: 276306-24		

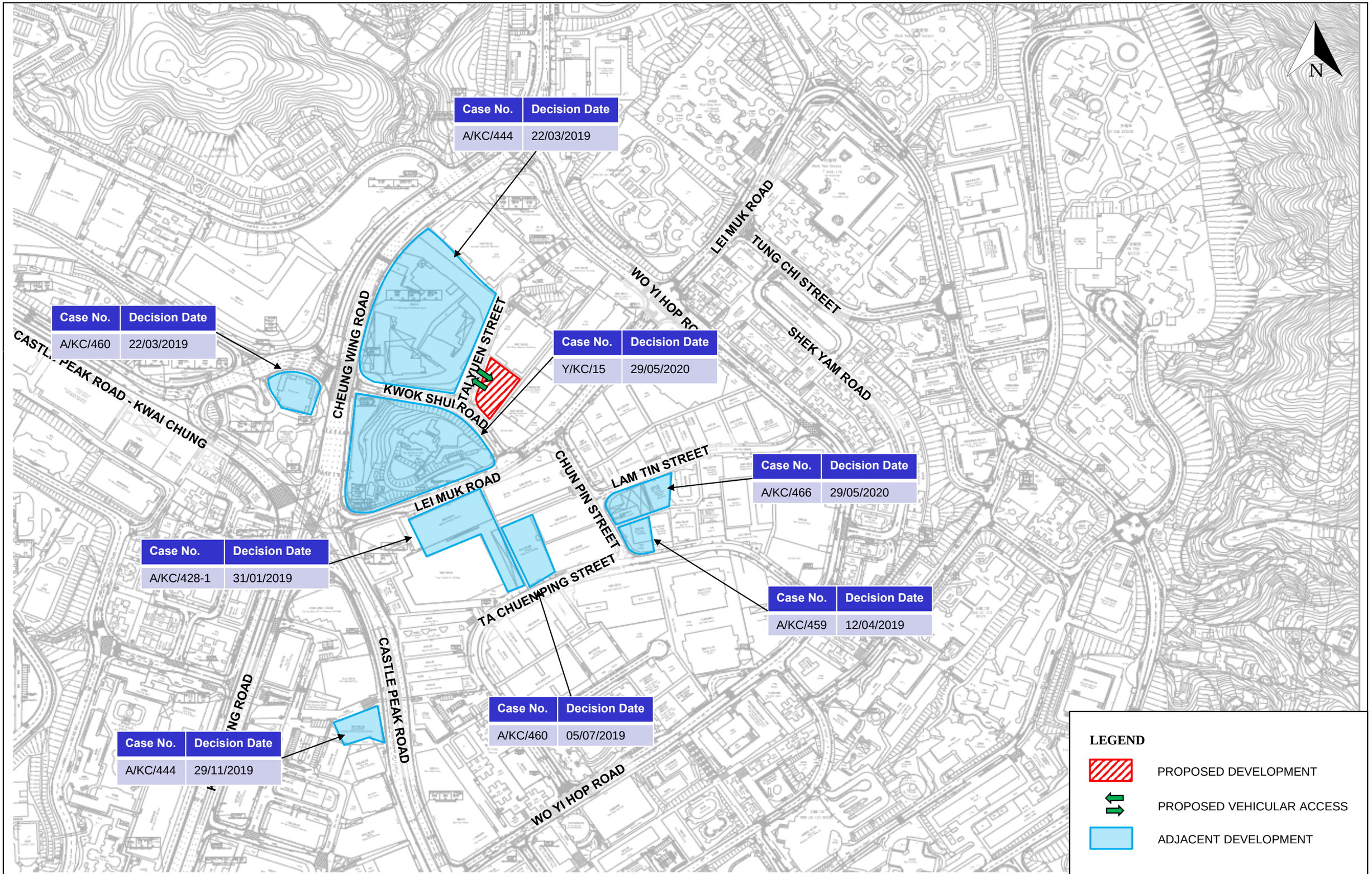


BASEMENT '2' FLOOR PLAN

Job Title: **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**		FIGURE 3.6
Date: 12/2020	Scale: N.T.S	Drawing Title: PROPOSED LAYOUT AT B2/F
Drawn: KSIY	Job No.: 276306-24	ARUP



Job Title	**PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**
Date	12/2020
Scale	N.T.S
Drawn	KSIY
Job No.	276306-24
Drawing Title	SWEPT PATH ANALYSIS FOR 11M LONG HEAVY GOODS VEHICLE AT G/F (APPROACHING/LEAVING)
	FIGURE 3.7
	ARUP



Job Title: **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

FIGURE 4.1

Date	Scale
12/2020	N.T.S
Drawn	**Job No.**
KSIY	276306-24

Drawing Title: LOCATION OF PLANNED DEVELOPMENTS IN THE VICINITY OF PROPOSED DEVELOPMENT

ARUP



LEGEND

PROPOSED DEVELOPMENT

PM PEAK TRAFFIC FLOW (PCU/HOUR)

100 (100)

AM PEAK TRAFFIC FLOW (PCU/HOUR)

PROPOSED VEHICULAR ACCESS

Job Title **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

FIGURE 4.2

Date	Scale	Drawing Title
12/2020	N.T.S	YEAR 2027 REFERENCE TRAFFIC FLOW
Drawn	Job No.	
KSIY	276306-24	

ARUP



LEGEND

PROPOSED DEVELOPMENT

PM PEAK TRAFFIC FLOW (PCU/HOUR)

100 (100)

AM PEAK TRAFFIC FLOW (PCU/HOUR)

PROPOSED VEHICULAR ACCESS

Job Title	**PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**
Date	12/2020
Scale	N.T.S
Drawn	KSIY
Job No.	276306-24
Drawing Title	YEAR 2027 DESIGN TRAFFIC FLOW

FIGURE 4.3

ARUP

Appendix D

Sewerage Impact Assessment

Proposed Minor Relaxation of Plot Ratio Restriction for Permitted Information Technology and Telecommunications Industries (Proposed Data Centre Development) at "Other Specified Uses" annotated "Business" Zone at Nos. 2-10, Tai Yuen Street, Kwai Chung

Sewerage Impact Assessment

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 276306

Ove Arup & Partners Hong Kong Ltd
Level 5 Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong
www.arup.com

ARUP

Contents

			Page
1	**Introduction**		**1**
	1.1	Background	1
	1.2	Objective	1
	1.3	Reference Materials	1
2	**The Development**		**1**
3	**Description of Existing Environment and Baseline Conditions**		**2**
	3.1	Site Location and Topography	2
	3.2	Existing Baseline Condition	2
	3.3	Approach and Methodology	3
	3.4	Evaluation of Sewerage Impact	3
	3.5	Sewage Generation from the Proposed Development	4
	3.6	Impact of the Proposed Development	4
4	**Conclusion**		**5**

Appendices

Appendix A

Figures

Appendix B

Calculation

1 Introduction

1.1 Background

Ove Arup & Partners HK Ltd. was commissioned to undertake a Sewerage Impact Assessment to support a planning application for the Proposed Data Centre Development at junction of Kwok Shui Road and Tai Yuen Street with Uptime Institute Tier-III+ standard.

1.2 Objective

The objective of this report is to provide an assessment of the impact of the Proposed Data Centre Development at 2-10 Tai Yuen Street on the existing public sewerage system and to propose mitigation measures (if any).

1.3 Reference Materials

In evaluating the sewerage impact arising from the proposed development, the following sources of information have been specifically referred to:

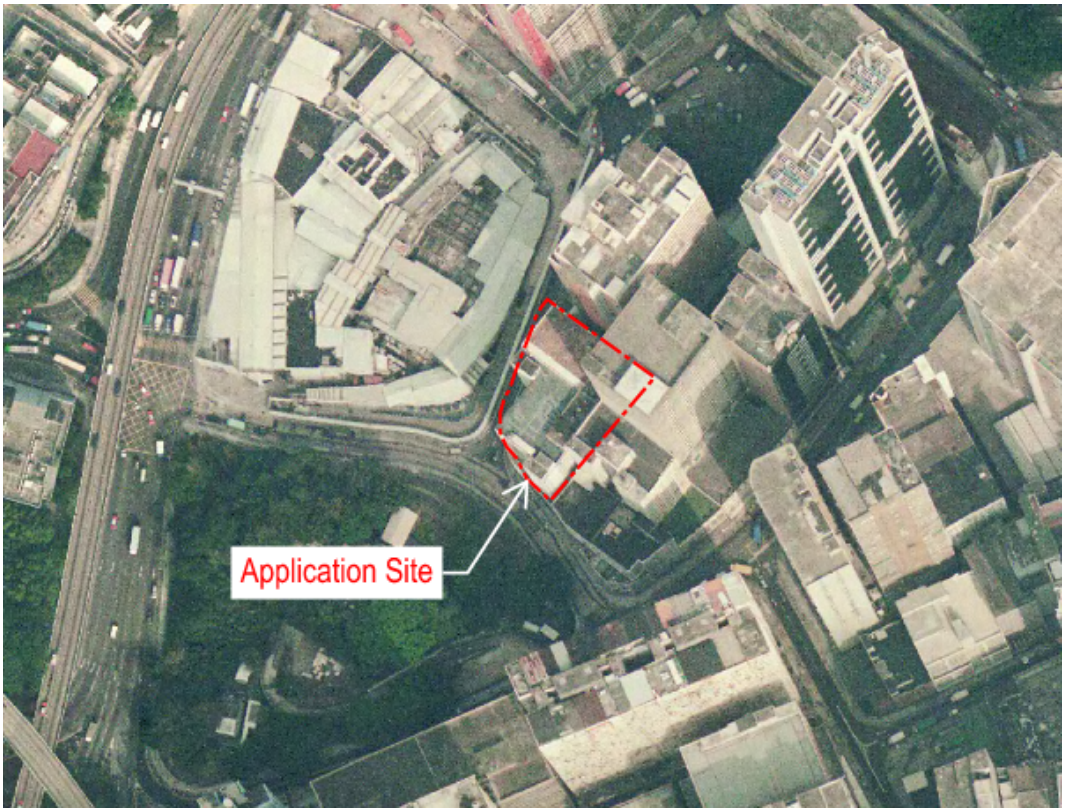
- Environmental Protection Department (EPD) Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning No. : EPD/TP 1/05;
- DSD Sewerage Manual – Key Planning Issues and Gravity Collection System; and
- Drainage Record Plans obtained from DSD.

2 The Development

A table showing the proposed development parameters is shown in table below:

Proposed Development	**Site Particulars**
Project Title	Sewerage Impact Assessment for Proposed Development at 2-10 Tai Yuen Street, Kwai Chung
Description	A 22-storey date centre will consist of 2500-3000 data racks and other functional areas, and shall include infrastructure components covering electrical, mechanical, fire safety, security and structured cabling.
Location	The site is located at Nos. 2-10 Tai Yuen Street, Kwai Chung, New Territories (see **Figure 1**).
Land Use Zoning	"Other Specified Uses" annotated "Business" Zone.
Site Area	1865 m^2
Proposed GFA	Approx. 21820.50 m^2

Below is an aerial photograph of the Application Site.



3 Description of Existing Environment and Baseline Conditions

3.1 Site Location and Topography

The Application Site is at the junction of Kwok Shui Road and Tai Yuen Street, Kwai Chung. The Application Site covers approximately 1,865m^2 of area and currently been occupied by Milo's industrial building, which is a 12-storey building composed by two contiguous buildings.

3.2 Existing Baseline Condition

The relevant drainage record plans were reviewed to gather the background information on the existing sewerage infrastructure in the areas. The relevant drainage data were extracted from the drainage record plans and re-produced in part in **Figure 2** for ease of references.

As shown in **Figure 2**, the sewage from the existing Milo's Industrial Building is discharges via manhole no. FMH4020817 with a 300⌀ connected to the existing public sewer of 450⌀ along Tai Yuen Street at manhole no. FMH4020670.

3.3 Approach and Methodology

The sewage generated from the proposed data centre will be collected and conveyed to the existing sewerage system via the existing manhole FMH4020817 currently been used by the Milo's Industrial Building. In order to assess the associated sewerage impact, the capacities of the existing public sewers along Tai Yuen Street were checked.

The adequacy of sewerage capacity along Tai Yuen Street was determined by using the estimate of future sewage generation from the proposed data centre.

The global unit flow factors recommended in the EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning No.: EPD/TP 1/05 have been adopted in the estimation.

3.4 Evaluation of Sewerage Impact

The sewage flow estimation from the proposed development, the ceiling unit flow factors as stated in EPD/TP 1/05 have been adopted.

The capacities of sewers have been calculated based on Colebrook-White equation, assuming full bore flow as below:

(a) Pipe capacity is calculated based on the continuity equation

$Q = AV$

Where Q = pipe full flow capacity in m^3/s

A = pipe cross-sectional area in m^2

V = velocity at full bore flow in m/s

(b) Velocity at full bore flow is based on the Colebrook-White equation

$V= -(32gRS)^{0.5} \log \{(ks/14800R) + (1.255v/ R (32gRS)^{0.5})\}$

Where g = acceleration due to gravity in m/s^2

R = hydraulic radius in m

S = pipe gradient

ks = pipe roughness in mm = 1.5mm (sewer)

v = kinematic viscosity of water in m^2/s

(c) The sewerage impact due to the proposed data centre on the existing public sewer of 450⌀ along Tai Yuen Street and the downstream existing public sewer of 600Ø running along Kwok Shui Road have been evaluated by comparing the estimated peak flow against the capacity of the existing public sewer.

(d) The detailed calculations are provided in **Appendix B** for reference.

3.5 Sewage Generation from the Proposed Development

The prediction for the proposed development sewage generation has been based on the information extracted from the development schedule (refer to Section 2). The quantity of sewage generated by the proposed is estimated from expected total population and Average Dry Weather Flow.

The table showing the sewage generation of the proposed development is calculated based on the guideline set in EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning and is shown on **Table B1** in **Appendix B** and summarized in the table below.

Accommodation Type	**Proposed Scheme**
Average Dry Weather Flow, m^3/day	
Proposed Data Centre	
Catchment Inflow Factor	1.10
ADWF (m^3/day)	403
Contributing Population	1493
Global Peaking Factor	6
Peak Discharge, l/s	27.99

3.6 Impact of the Proposed Development

In order to assess the impact on the existing public sewer associated with the proposed development, the capacities of the existing public sewers have been checked and shown on **Tables B2** in **Appendix B**.

The estimation of sewage generation in the vicinity of the Application Site is based on the assumptions as below:

1) Existing public sewer information based on DSD drainage record plans and shown in **Figure 2**;

2) Existing development parameters in the vicinity of the proposed development are obtained from public domain and sewerage catchment plan shown in **Figure 2**;

3) Residential population for the proposed development at the Application Site based on development schedule in Section 2 above;

4) Flow factors as per EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning; and

5) Global peaking factor with stormwater allowance is adopted as per EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning.

The capacities checking of the existing public sewers is shown in **Table B2**. Sewage flow from the proposed development is calculated to be 27.99 L/s and it is observed

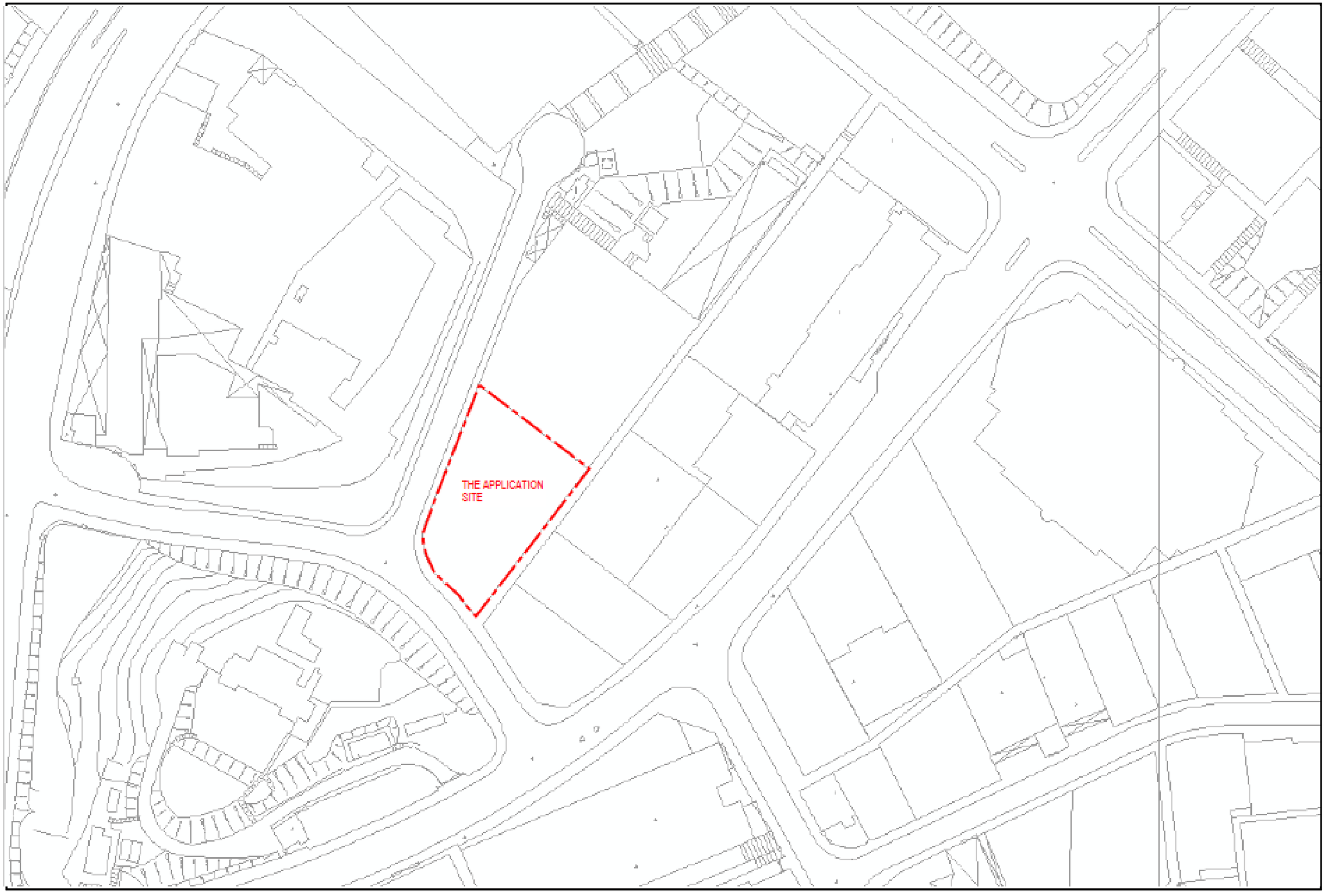
that the existing public sewerage serving the Application Site comprising an existing 450 Ø public gravity sewer running along Tai Yuen Street and the downstream existing public sewer of 600Ø running along Kwok Shui Road have sufficient capacity to carry the estimated sewage from the Application Site. It is concluded that the proposed development would not result in any adverse sewerage impact to the existing public sewerage system.

4 Conclusion

The peak sewage flow from the proposed development is calculated to be 27.99 L/s. It is observed that the existing public sewerage serving the Application Site comprising an existing 450 Ø public gravity sewer running along Tai Yuen Street and the downstream existing public sewer of 600Ø running along Kwok Shui Road have sufficient capacity to carry the estimated sewage from the Application Site. It is concluded that the proposed development would not result in any adverse sewerage impact to the existing public sewerage system.

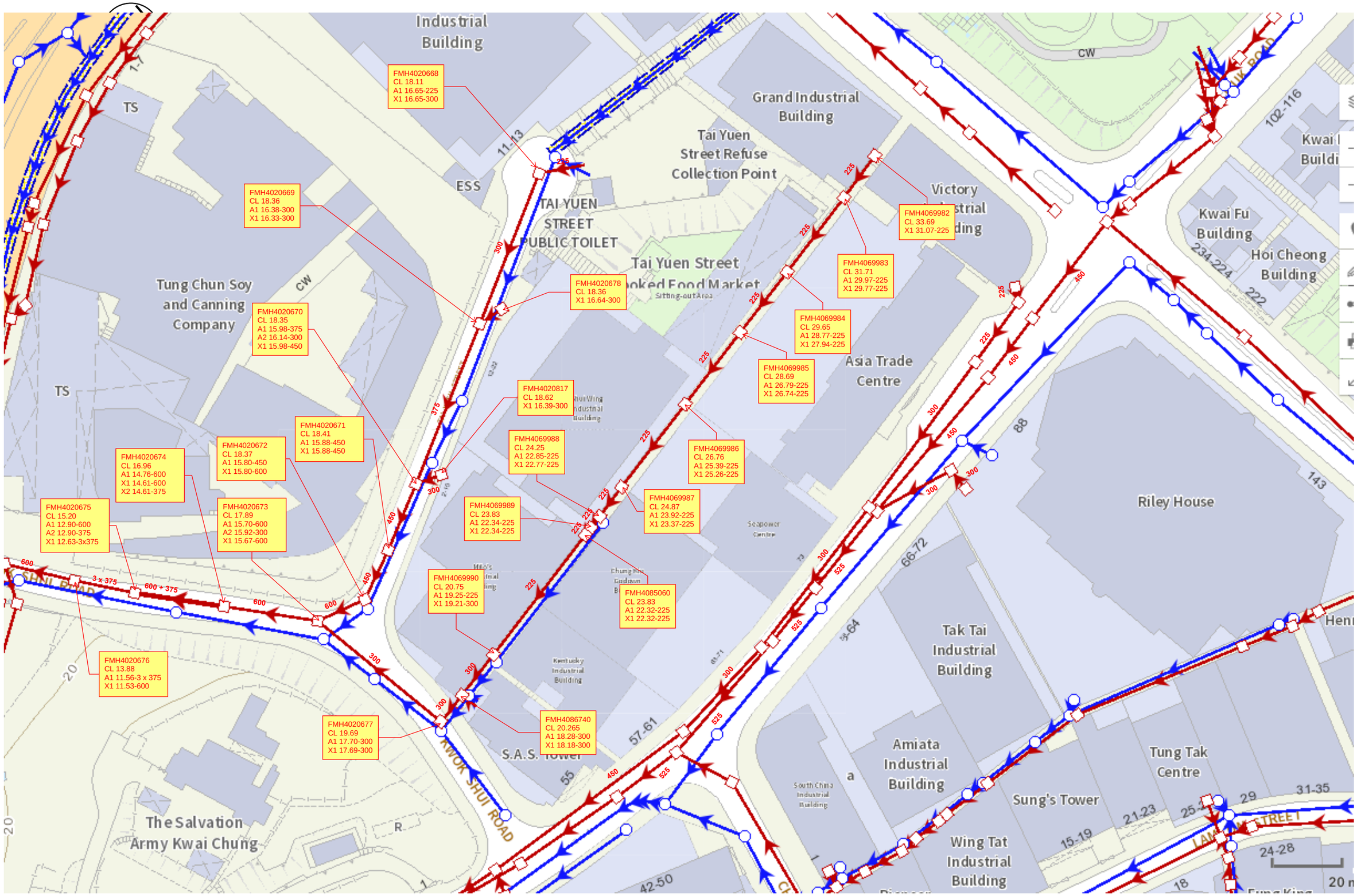
Appendix A

Figures



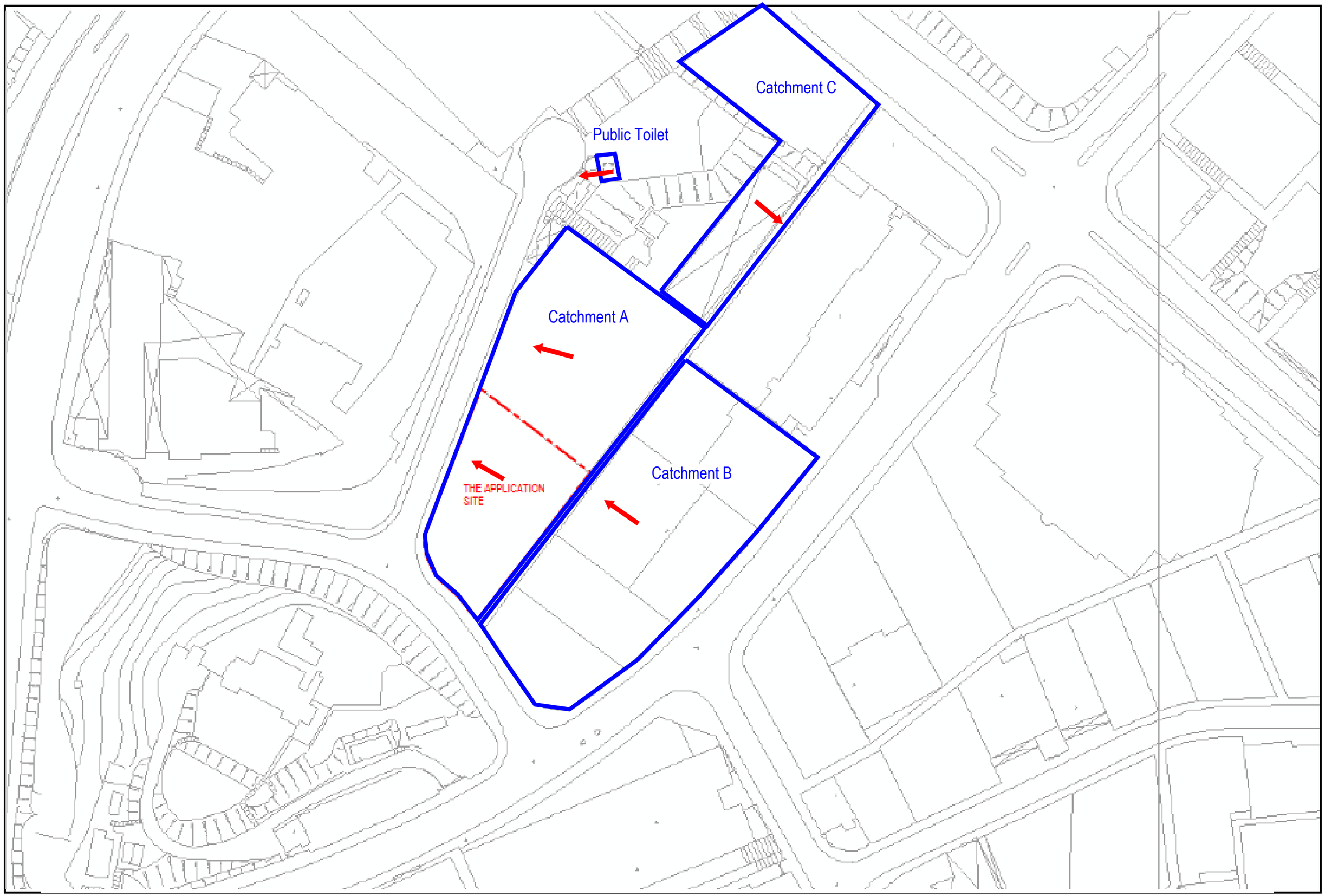
LOCATION PLAN

Figure 1



DSD Drainage Record Plan (A3 1:1000)

Figure 2



SEWAGE CATCHMENT PLAN

Figure 3

Appendix B

Calculation

TABLE B1
Estimation of Sewage Flows Estimation for Proposed and Existing Developments

(Based on EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning)

Design Assumption:
Global Peaking Factor, P (Including Stormwater Allowance) as per Table T-5
Global Unit Flow Factors as per Tables T-2 and T-3
Catchment Inflow Factor for East Kowloon (P_{CIF} = 1.10) as per Table T-4

Development Schedule		
Sewage Flow Estimates	**Estimation**	**Remark**
Proposed Data Centre		
Proposed Data Centre		**Connected to Manhole FMH4020817**
GFA (m^2)	21821	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	502	
Unit flow factor (m^3/person/day) - Commercial activities type J2 Electricity Gas & Water	0.33	
ADWF, (m^3/day)	182	**P_{CIF} = 1.10 included**
Catchment A		
Milo's Industrial Building		**Connected to Manhole FMH4020817**
GFA (m^2)	18184	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	418	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	336	**P_{CIF} = 1.10 included**
Shui Wing Industrial Building		**Connected to Manhole FMH4020678**
GFA (m^2)	44454	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	1022	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	821	**P_{CIF} = 1.10 included**
Catchment B		
CHUNG KIU GODOWN BUILDING		**Connected to Manhole FMH4085060**
GFA (m^2)	16044	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	369	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	296	**P_{CIF} = 1.10 included**
KENTUCKY INDUSTRIAL BUILDING		**Connected to Manhole FMH4069990**
GFA (m^2)	8954	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	206	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	165	**P_{CIF} = 1.10 included**
S.A.S. TOWER		**Connected to Manhole FMH4086740**
GFA (m^2)	14868	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	342	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	275	**P_{CIF} = 1.10 included**
Catchment C		
Grand Industrial Building		**Connected to Manhole FMH4069982**
GFA (m^2)	17004	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	391	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	314	**P_{CIF} = 1.10 included**
Tai Yuen Street Cooked Food Market Sitting-Out Area		**Connected to Manhole FMH4069985**
GFA (m^2)	724	
Worker Density (No. of Worker per 100m^2)	5.1	
No. of Employee	37	
Unit flow factor (m^3/person/day) - Commercial activities type J10 Restaurants & Hotels	1.58	
ADWF, (m^3/day)	64	**P_{CIF} = 1.10 included**
Existing Scenario		
Total ADWF, (m^3/day)	2986	
Contributing Population	11060	
Global Peaking Factor	4.00	
Total Peak Flow (L/s) + Peak Flow from Tai Tuen Street Public Toilet	147	
Proposed Scenario		
Total ADWF, (m^3/day)	2833	
Contributing Population	10491	
Global Peaking Factor	4.00	
Total Peak Flow (L/s) + Peak Flow from Tai Tuen Street Public Toilet	139	

Notes:
Employment density shall refer to Commercial and Industrial Floor Space Utilization Survey published by PlanD.
Industrial = 2.3 employee per 100m^2 of GFA
Restaurant = 5.1 employee per 100m^2 of GFA

Sewage Flows Estimation for Existing Public Toilet at Tai Yuen Street

From	**To**	**No. of Sanitary Appliance**		
		Urinal Bowl	**WC**	**Wash Basin**
TAI TUEN STREET PUBLIC TOILET	FMH4020668	6	12	8
Discharge Units [3]		-	24	6
Flow (L/s, per appliance)		0.005	0.543	0.216
Sub Peak Flow (L/s)		0.030	6.519	1.726
Total Peak Flow (L/s)			8.275	

Notes:
Flow estimation based on Discharge Unit Method from Plumbing Engineering Services Design Guide.
i.e. Approximate flow in L/s = $(DU / 60)^{0.666}$ where DU = Discharge Units

Table B2 - Capacity Performance of Existing and Proposed Sewer

Notes:

(1) Calculate by Colebrook-White Equation

$$\overline{V} = -\sqrt{32gRS_f}\log\left[\frac{k_s}{14.8R} + \frac{1.255\nu}{R\sqrt{32gRS_f}}\right]$$

where ks is roughness value equals 1.5mm.

ν is kinematic viscosity of fluid = 1.14 x 10-6 m2/s and g is the gravity = 9.81m/s2

V is the velocity, D is the diameter of the sewer and S is the gradient of the sewer.

Abbreviation:

UP_MAN	Upstream Manhole	CON_POP	Contributing Population	DN_GL	Downstream Ground Level	CAP	Peak Pipe Capacity
DN_MAN	Downstream Manhole	DIA	Diameter	UP_INV	Upstream Invert Level	F/C	Peak Flow/Capacity
ADWF	Average Dry Weather Flow	LEN	Length	DN_INV	Downstream Invert Level		
ACC_ADWF	Accumulated Average Dry Weather Flow	UP_GL	Upstream Ground Level	VEL	Peak Pipe Velocity		

Existing Development

Manhole		FROM SITE	CON_POP	PEAKING FACTOR	ACC_ADWF	Peak Flow	Existing / Proposed Pipe Parameter										
UP_MAN No.	DN_MAN No.				(L/s)	(L/s)	DIA (D) (mm)	LEN (m)	UP_GL (mPD)	DN_GL (mPD)	UP_INV (mPD)	DN_INV (mPD)	Gradient (S)	VEL (m/s)	CAP (L/s)	F/C (%)	Adequate Capacity?
Catchment A																	
FMH4020668	FMH4020669	Tai Yuen Street Public Toilet	2,648	6	8.28	49.65	300	42.0	18.11	18.36	16.65	16.38	156	1.11	78.44	63.3%	YES
FMH4020669	FMH4020670	Tai Yuen Street Public Toilet + Shui Wing Industrial Building	5,689	5	17.78	88.89	375	45.1	18.36	18.35	16.33	15.98	129	1.41	155.82	57.0%	YES
FMH4020670	FMH4020671	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Milo's Industrial Building	6,933	5	21.66	108.32	450	18.0	18.35	18.41	15.98	15.88	180	1.34	213.35	50.8%	YES
FMH4020671	FMH4020672	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Milo's Industrial Building	6,933	5	21.66	108.32	450	12.5	18.41	18.37	15.88	15.80	156	1.44	229.28	47.2%	YES
FMH4020672	FMH4020673	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Milo's Industrial Building	6,933	5	21.66	108.32	600	12.4	18.37	17.89	15.80	15.70	124	1.95	550.60	19.7%	YES
Catchment B & Catchment C																	
FMH4069982	FMH4069983	Grand Industrial Building	1,163	6	3.63	21.81	225	13.1	33.69	31.71	31.07	29.97	12	3.33	132.36	16.5%	YES
FMH4069983	FMH4069984	Grand Industrial Building	1,163	6	3.63	21.81	225	23.6	31.71	29.65	29.77	28.77	24	2.37	94.13	23.2%	YES
FMH4069984	FMH4069985	Grand Industrial Building	1,163	6	3.63	21.81	225	18.8	29.65	28.69	27.94	26.79	16	2.85	113.16	19.3%	YES
FMH4069985	FMH4069986	Grand Industrial Building	1,163	6	3.63	21.81	225	22.6	28.69	26.76	26.74	25.39	17	2.81	111.84	19.5%	YES
FMH4069986	FMH4069987	Grand Industrial Building + Tai Yuen Street Cooked Food Market Sitting-Out Area	1,401	6	4.38	21.81	225	26.8	26.76	24.87	25.26	23.92	20	2.57	102.33	21.3%	YES
FMH4069987	FMH4069988	Grand Industrial Building + Tai Yuen Street Cooked Food Market Sitting-Out Area	1,401	6	4.38	21.81	225	8.5	24.87	24.25	23.37	22.85	16	2.85	113.44	19.2%	YES
FMH4069988	FMH4069989	Grand Industrial Building + Tai Yuen Street Cooked Food Market Sitting-Out Area	1,401	6	4.38	21.81	225	3.7	24.25	23.83	22.77	22.34	9	3.92	155.78	14.0%	YES
FMH4069989	FMH4085060	Catchment C + Chung Kiu Godown Building	2,498	6	7.81	46.84	225	1.4	23.83	23.83	22.34	22.32	69	1.38	54.93	85.3%	YES
FMH4085060	FMH4069990	Catchment C + Chung Kiu Godown Building + Kentucky Industrial Building	3,111	6	9.72	58.33	225	38.8	23.83	20.75	22.32	19.25	13	3.24	128.74	45.3%	YES
FMH4069990	FMH4086740	Catchment C + Chung Kiu Godown Building + Kentucky Industrial Building + S.A.S. Tower	4,128	6	12.90	77.40	300	12.0	20.75	20.27	19.21	18.28	13	3.87	273.28	28.3%	YES
FMH4086740	FMH4020677	Catchment C + Chung Kiu Godown Building + Kentucky Industrial Building + S.A.S. Tower	4,128	6	12.90	77.40	300	7.3	20.27	19.69	18.18	17.70	15	3.57	252.48	30.7%	YES
FMH4020677	FMH4020673	Catchment C + Chung Kiu Godown Building + Kentucky Industrial Building + S.A.S. Tower	4,128	6	12.90	77.40	300	41.2	19.69	17.89	17.69	15.92	23	2.88	203.39	38.1%	YES
FMH4020673	FMH4020674	Catchment A + Catchment B + Catchment C	11,060	4	34.56	138.26	600	24.2	17.89	16.96	15.67	14.76	27	4.21	1190.44	11.6%	YES
FMH4020674	FMH4020675	Catchment A + Catchment B + Catchment C	11,060	4	34.56	138.26	375	22.7	16.96	15.20	14.61	12.90	13	4.41	486.86	5.8%	YES
FMH4020674	FMH4020675	Catchment A + Catchment B + Catchment C	11,060	4	34.56	138.26	600	22.7	16.96	15.20	14.61	12.90	13	5.31	1876.84	5.8%	YES

Propsoed Development

Manhole		FROM SITE	CON_POP	PEAKING FACTOR	ACC_ADWF	Peak Flow	Existing / Proposed Pipe Parameter										
UP_MAN No.	DN_MAN No.				(L/s)	(L/s)	DIA (D) (mm)	LEN (m)	UP_GL (mPD)	DN_GL (mPD)	UP_INV (mPD)	DN_INV (mPD)	Gradient (S)	VEL (m/s)	CAP (L/s)	F/C (%)	Adequate Capacity?
Catchment A																	
FMH4020668	FMH4020669	Tai Yuen Street Public Toilet	2,648	6	8.28	49.65	300	42.0	18.11	18.36	16.65	16.38	156	1.11	78.44	63.3%	YES
FMH4020669	FMH4020670	Tai Yuen Street Public Toilet + Shui Wing Industrial Building	5,689	5	17.78	88.89	375	45.1	18.36	18.35	16.33	15.98	129	1.41	155.82	57.0%	YES
FMH4020670	FMH4020671	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Proposed Development	6,364	5	19.89	99.43	450	18.0	18.35	18.41	15.98	15.88	180	1.34	213.35	46.6%	YES
FMH4020671	FMH4020672	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Proposed Development	6,364	5	19.89	99.43	450	12.5	18.41	18.37	15.88	15.80	156	1.44	229.28	43.4%	YES
FMH4020672	FMH4020673	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Proposed Development	6,364	5	19.89	99.43	600	12.4	18.37	17.89	15.80	15.70	124	1.95	550.60	18.1%	YES
Catchment B & Catchment C																	
FMH4069982	FMH4069983	Grand Industrial Building	1,163	6	3.63	21.81	225	13.1	33.69	31.71	31.07	29.97	12	3.33	132.36	16.5%	YES
FMH4069983	FMH4069984	Grand Industrial Building	1,163	6	3.63	21.81	225	23.6	31.71	29.65	29.77	28.77	24	2.37	94.13	23.2%	YES
FMH4069984	FMH4069985	Grand Industrial Building	1,163	6	3.63	21.81	225	18.8	29.65	28.69	27.94	26.79	16	2.85	113.16	19.3%	YES
FMH4069985	FMH4069986	Grand Industrial Building	1,163	6	3.63	21.81	225	22.6	28.69	26.76	26.74	25.39	17	2.81	111.84	19.5%	YES
FMH4069986	FMH4069987	Grand Industrial Building + Tai Yuen Street Cooked Food Market Sitting-Out Area	1,163	6	4.38	21.81	225	26.8	26.76	24.87	25.26	23.92	20	2.57	102.33	21.3%	YES
FMH4069987	FMH4069988	Grand Industrial Building + Tai Yuen Street Cooked Food Market Sitting-Out Area	1,163	6	4.38	21.81	225	8.5	24.87	24.25	23.37	22.85	16	2.85	113.44	19.2%	YES
FMH4069988	FMH4069989	Grand Industrial Building + Tai Yuen Street Cooked Food Market Sitting-Out Area	1,163	6	4.38	21.81	225	3.7	24.25	23.83	22.77	22.34	9	3.92	155.78	14.0%	YES
FMH4069989	FMH4085060	Catchment C + Chung Kiu Godown Building	2,498	6	7.81	46.84	225	1.4	23.83	23.83	22.34	22.32	69	1.38	54.93	85.3%	YES
FMH4085060	FMH4069990	Catchment C + Chung Kiu Godown Building + Kentucky Industrial Building	3,111	6	9.72	58.33	225	38.8	23.83	20.75	22.32	19.25	13	3.24	128.74	45.3%	YES
FMH4069990	FMH4086740	Catchment C + Chung Kiu Godown Building + Kentucky Industrial Building + S.A.S. Tower	4,128	6	12.90	77.40	300	12.0	20.75	20.27	19.21	18.28	13	3.87	273.28	28.3%	YES
FMH4086740	FMH4020677	Catchment C + Chung Kiu Godown Building + Kentucky Industrial Building + S.A.S. Tower	4,128	6	12.90	77.40	300	7.3	20.27	19.69	18.18	17.70	15	3.57	252.48	30.7%	YES
FMH4020677	FMH4020673	Catchment C + Chung Kiu Godown Building + Kentucky Industrial Building + S.A.S. Tower	4,128	6	12.90	77.40	300	41.2	19.69	17.89	17.69	15.92	23	2.88	203.39	38.1%	YES
FMH4020673	FMH4020674	Catchment A + Catchment B + Catchment C	10,491	4	32.79	131.14	600	24.2	17.89	16.96	15.67	14.76	27	4.21	1190.44	11.0%	YES
FMH4020674	FMH4020675	Catchment A + Catchment B + Catchment C	10,491	4	32.79	131.14	375	22.7	16.96	15.20	14.61	12.90	13	4.41	486.86	5.5%	YES
FMH4020674	FMH4020675	Catchment A + Catchment B + Catchment C	10,491	4	32.79	131.14	600	22.7	16.96	15.20	14.61	12.90	13	5.31	1876.84	5.5%	YES

Your ref TPB/A/KC/473
Our ref 276306/01/WSTY/MYNL/KYAC/04254

ARUP

By Email (tpbpd@pland.gov.hk) and By Hand

Level 5, Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong
t +852 2528 3031
f +852 2779 8428
d +852 2268 3721
thersea.yeung@arup.com
www.arup.com

The Secretary
Town Planning Board
15/F, North Point Government Offices
333 Java Road, North Point, Hong Kong

18 February 2021

Dear Sir/Madam,

S16 Planning Application for
Proposed Minor Relaxation of Plot Ratio Restriction
for Permitted Information Technology and Telecommunications Industries (Proposed Data Centre Development) at "Other Specified Uses" annotated "Business" Zone
at Nos. 2-10 Tai Yuen Street, Kwai Chung
(Planning Application No. A/KC/473)

Technical Clarifications

We refer to the comments from various Government Departments received on 26 January, 28 January, 1 February, 2 February, 3 February and 8 February 2021 on the captioned Planning Application.

We are pleased to submit our responses in the form of a Response-to-Comments Table (**Attachment A**) and relevant supplementary information (**Attachment B** to **C**) for your consideration.

This submission only serves as technical clarifications without changing the scheme or the technical assessments, and thus should be exempted from recounting requirement.

We sincerely seek for the favourable consideration from the Town Planning Board to approve the captioned S16 Planning Application.

Should you have any queries, please contact the undersigned or our Ms. Aileen CHENG at 2908 4011.

Yours faithfully

Natalie LEUNG
Chief Town Planner

Encl. - Attachment A-C
cc - Mr Stephen Chan (STP/Kwai Tsing, PlanD) (email: scychan@pland.gov.hk)
- Mr Robert Tsang (TP/Kwai Tsing, PlanD) (email: rhctsang@pland.gov.hk)

Attachment A

Response-to-Comments Table

Comments from Related Departments — Page No.

COMMENTS FROM RELATED DEPARTMENTS 2
1. Architectural Services Department, Central Management Division 2, dated 28 January 2021 2
2. Buildings Department, New Territories West Section, dated 8 February 2021 2
3. Drainage Services Department, dated 1 February 2021 3
4. Highways Department, dated 26 January 2021 4
5. Lands Department, dated 2 February 2021 5
6. Planning Department, Urban Design and Landscape Section, dated 3 February 2021 6

COMMENTS FROM RELATED DEPARTMENTS

No.	Comments	Responses
1.	**Architectural Services Department, Central Management Division 2, dated 28 January 2021** Based on the information provided, we have the following comments from architectural and visual point of view	
	(a) It is noted that the proposed development consists of one 22-storey building with a height of 129.5 mPD, which complies with the Building Height Restriction (BHR) permitted in the Outline Zoning Plan. It may not be incompatible with adjacent developments with BHR of 130mPD.	Noted with thanks.
	(b) In order to enable us to comment on the visual impact of the development to the surrounding neighbourhood, it would be useful to have some perspective images/photomontages of the proposed development in its surrounding context from different vantage points.	Please refer to Figure 5.3 of the submitted Supporting Planning Statement for your consideration. Please note that the building height (BH) of the Proposed Development is about 129.5mPD, which is within the BH restriction of 130mPD as stipulated in the OZP. Hence, the Proposed Development is completely compatible with the surrounding BH profile. In addition, various design merits (e.g.: landscape treatment comprising groundcovers, shrubs and a tree at G/F, green roof on 1/F, 2/F and R/F, vertical greening at G/F-2/F building frontage) have been incorporated in the Proposed Development to enhance streetscape and visual amenities at both street level and building level.
2.	**Buildings Department, New Territories West Section, dated 8 February 2021**	
	(a) The proposed development parameter should not exceed the limitation under the First Schedule of Building (Planning) Regulations.	Noted with thanks.
	(b) The site shall be provided with means of obtaining access thereto from a street and emergency vehicular access in accordance with Regulations 5 and 41D of the Building (Planning) Regulations respectively.	Noted with thanks.

No.	Comments	Responses
	(c) Disregarding carparking spaces from GFA calculation under the BO will be considered on the basic of the criteria set out in PNAP APP-2 during building plan submission stage.	Noted with thanks.
	(d) For features to be excluded from the calculation of the total gross floor area, it shall be subject to compliance with the requirements laid down in the relevant JPNs and PNAPs including APP-151 as appropriate. If the applicant applies for the GFA concession, Building Set Back, Building Separation and Site Coverage of Greenery as required under PNAP APP-152 also apply.	Noted with thanks.
	(e) Detailed comments will be given during the building plan submission stage	Noted with thanks.
3.	**Drainage Services Department, dated 1 February 2021** Please note the following comments on the captioned SIA report (Appendix D):	
	(i) Please note that the sewerage part of the Drainage and Sewerage Impact Assessment shall meet the full satisfaction of the Environmental Protection Department (EPD) as the planning authority of sewerage infrastructure. Comments of this department on the sewerage part of the Drainage and Sewerage Impact Assessment are subject to views and agreement of EPD.	Noted with thanks.
	(ii) <u>Figure 2</u> Please indicate the site location and discharge manhole of the proposed development.	Figure 2 is revised for your consideration (**Attachment B** refers).
	(iii) <u>Appendix B, Table B1</u> Please clarify if Milo's Industrial Building shall be the existing development and not in Catchment A.	Please be clarified that Milo's Industrial Building shall be the existing development. The sewage catchment plan and Table B1 are revised accordingly (**Attachment B** refers).
	(iv) <u>Appendix B, Table B2</u>	

No.	Comments	Responses
	– Please review the Peak Flow for "Grand Industrial Building + Tai Yuen Street Cooked Food Market Sitting-Out Area".	The Peak Flow for ""Grand Industrial Building + Tai Yuen Street Cooked Food Market Sitting-Out Area" has been reviewed and revised to 26.27L/s. Table B2 is revised accordingly. (**Attachment B** refers).
	– The Peak Flow for "Catchment A + Catchment B + Catchment C" for existing and proposed scenario does not tally with that in Table B1. Please review.	Table B2 is revised accordingly. (**Attachment B** refers).
	– According to the records of this department, the pipe material for sewer pipes 600mm dia. or above shall be concrete and 450mm dia. or below shall be vitrified clay in this assessment. Please review the roughness coefficients accordingly, and state the assumption on the condition of pipes.	Roughness coefficients adopted in the SIA has made reference to the DSD SM Table 5 - Recommended Roughness Values ks, which stated that the roughness of concrete and clayware are respectively 3mm and 0.6mm. To be conservative, the classification of the material is assumed to be poor in the assessment. Table B2 is revised to specify the assumption on the condition of pipes (**Attachment B** refers).
4.	**Highways Department, dated 26 January 2021** Please note the following comments from highway maintenance point of view:-	
	1. It is noted that a 7.3m long vehicular access is proposed along Tai Yuen Street in vicinity of the priority junction. Please seek TD's comment from traffic perspective on the proposed arrangement.	Please be advised that the proposed vehicular access is located approx. 30m away from the adjoining priority junction, which is in compliance with TPDM requirement. The planning application has also been circulated to TD for comment.
	2. Para. 4.5.7 of TIA - Please provide the enlarged layout plan of the proposed road improvement works for review and comment. Please be reminded that all proposed road improvement works for the planning application should be designed and constructed by the Applicant according to HyD's standard.	Enlarged layout plans showing the road improvement works will be provided in later detailed design stage after obtaining TD's approval on the schematic design at the current planning stage. The proposed road improvement works for the planning application will be designed according to HyD's standard.
	3. Para. 4.3.2 of Supporting Planning Statement - It is noted that a 132kV CLP substation would be incorporated in the proposed development to support high-tier data centre development. Please clarify the extent of electric cabling works involved in Kwai Chung area and	Please be clarified that the subject cabling works will involve Lam Tin Street, Kwok Shui Road and Tai Yuen Street in Kwai Chung area. Liaison with CLP will be conducted at detailed design stage, who will undertake the electric cabling works.

No.	Comments	Responses
	clarify if the associated impacts have been duly considered	
	4. It is noted that full-height setback of 2m from the lot boundary along Tai Yuen Street and Kwok Shui Road is proposed by the Applicant. Please clarify if there would be any proposed measures to deter the potential illegal parking along the footpath.	To deter the potential illegal parking along the footpath, bollards are proposed on footpath along the site frontage to prevent illegal parking and enhance pedestrian safety. The proposed bollards will be designed and constructed according to HyD's standard.
	5. It is noted from LandsD that the proposed data centre development at the Lot is not acceptable from lease point of view because of the use restriction. Please be reminded to seek LandsD's comment and conditions to be imposed for the application.	Noted. Comments from LandsD have already been sought (Please refer to response-to-comment item 5. below).
5.	**Lands Department, dated 2 February 2021**	
	1. I have the following comments on land related matters from the perspective of measures announced in 2018 Policy Address on revitalisation of industrial buildings (IBs):-	
	To be qualified for the measure on relaxation of the maximum permissible non-domestic plot ratio (PR) by 20% for redevelopment project, the building has to be pre-1987 IBs located outside "Residential" zones in Main Urban Areas and New Towns and subject to the maximum non-domestic PR allowed under the Building (Planning) Regulations (B(P)R). Pre-1987 IB refers to those wholly or partly constructed on or before 1.3.1987 or those constructed with building plans first submitted to Building Authority for approval on or before 1.3.1987. You may approach BD on confirmation of Pre-1987 status and no excess of non-domestic PR under B(P)R.	With reference to the General Building Plan (GBP) (**Attachment C** refers), the existing building at the Application Site was constructed with building plans approved by the Buildings Authority on 20 Jun 1975, before 1987. The Proposed Development is therefore qualified for the stated measure on relaxation of maximum permissible non-domestic plot ratio (PR) by 20%.
	2. It is noted from Table 4.1 of the Supporting Planning Statement that the subject application involves minor relaxation of PR by not more than 20% from PR of existing building (i.e. 9.75 as claimed by the Applicant) to a PR of	With reference to the GBP (**Attachment C** refers), the PR of the existing building approved by the Buildings Authority is 9.75.

No.	Comments	Responses
	11.7. As such, you may approach BD on confirmation of the GFA or PR of the existing building.	
	3. The technical assessments such as traffic impact, sewerage impact, building design, landscaping and setback requirements etc., should be considered by the relevant Bureaux/Departments.	Noted with thanks. Comments from relevant B/Ds have been sought.
	4. The proposed development does not comply with the existing lease conditions. If the Town Planning Board (TPB) approves the subject application, the owner of the subject lot is required to apply a lease modification / land exchange from LandsD to implement the proposal. When processing the lease modification application, LandsD will impose such appropriate terms and conditions including user restriction for non-residential purposes, the 5-year time limit for completion of the development, payment of full premium and administrative fee, other conditions applicable to the 2018 IB Revitalisation Measures etc.. There is no guarantee that the application will be approved by LandsD. Under the 2018 IB Revitalisation Measures for redevelopment, the modification letter / conditions of exchange shall be executed within 3 years from the date of TPB's approval letter.	Noted. The Applicant will apply for a lease modification to give effect to the Proposed Development upon obtaining approval of the s.16 planning application by the TPB.
	5. As the proposed development under the s.16 application is for high-tier data centre development, the Applicant is requested to advise if he intends to apply for a lease modification for high-tier data centre use under LandsD (LAO) Practice Note Issue No. 3/2012 and its supplements ("PNs 3/2012"). Subject to the Applicant's advice, comments from ITB/OGCIO should be sought.	The application for the lease modification as mentioned above is not intended to be applied under PNs 3/2012.
6.	**Planning Department, Urban Design and Landscape Section, dated 3 February 2021**	
	With reference to the aerial photo of 2019, the site is situated in an area of industrial urban landscape character, dominated by	Noted with thanks.

No.	Comments	Responses
	industrial buildings. The site is currently occupied by an industrial building without any existing landscape resource. The proposed development is considered not incompatible with the surrounding environment. In view that significant adverse landscape impact arising from the development is not anticipated, we have no objection to the application from landscape planning perspective. Please note below comments on the submission from landscape planning perspective:	
	(a) The applicant should explore the opportunity on additional tree planting on G/F.	Opportunity with additional tree planting on G/F has been explored in the design process. However, with consideration of the site constraints on G/F in terms of essential plant room arrangement for operation of CLP's substation, underground fuel tanks and loading/unloading requirement for HGVs (Figure 4.3 of the submitted Supporting Planning Statement refers), the G/F layout is relatively congested in the current design. Moreover, the retaining structure for basement and enclosure of underground fuel tanks have limited the space to provide adequate soil depth for tree planting, thus only one tree pit with minimum size of 1m (W) x 1m (L) x 1.2m (D) could be fitted on G/F in the current design.
	(b) The applicant should clarify whether the green roofs on 1/F and 2/F would be opened for enjoyment of the tenants and visitors. If affirmative, provisions of sitting-out areas/benches on the green roofs are recommended.	Please be clarified that the green roofs on 1/F and 2/F facing Tai Yuen Street will be accessible at reasonable hours (e.g. during office hours), for future tenants and visitors' enjoyment. Opportunities to integrate the provision of sitting-out areas with the landscape design of these green roofs will be explored at detailed design stage.
	(c) The applicant is reminded of the long-term commitment in providing proper maintenance to the vertical green wall for healthy and sustainable plant growth. Observations/comments from urban design and visual perspectives are as follows for your consideration:	Noted with thanks.

No.	Comments	Responses
	1. The applicant seeks planning permission for minor relaxation of plot ratio (PR) restriction from 9.5 to 11.7 for the development of a data centre of 22-storeys (about 129.5mPD) including a 2-storey basement carpark at the subject site, which is zoned as "Other Specified Uses" annotated "Business" ("OU(B)"). According to the applicant, the relatively high floor-to-floor height of 5.5m adopted in the proposal is to cater for the headroom requirement for the data centre.	Noted with thanks.
	2. The subject corner site with an area of about 1,865m2 is located at the junction of Kwok Shui Road and Tai Yuen Street forming part of an area zoned "OU(B)" with an intended building height (BH) of 130mPD. The proposed minor relaxation of PR does not involve additional BH beyond that is permitted in the OZP. Given the context, it is unlikely that the proposed development will induce any significant adverse effects on the visual character of the surrounding townscape.	Noted with thanks.
	3. As gathered from the submission, the proposed development has incorporated a 2m full-height voluntary setback along Kwok Shui Road and Tai Yuen Street. Landscape treatments in the form of greenery are provided at G/F, 1/F, 2/F and R/F, and vertical greening is provided along the western facade at the building's low zone. A section of weather protection canopy is incorporated above the main entrance of the building. These design measures may promote visual interest and improve the pedestrian environment.	Noted with thanks.
	<u>Advisory comments</u>	
	4. To enhance pedestrian experience at street level, the applicant may consider extending the weather protection measures along the building edges, incorporating façade articulation at the building corner, and providing landscape treatments at the flat roof facing Kwok Shui Road at 2/F.	The captioned design merits to enhance pedestrian experience have been reviewed and considered in the design process, please refer to our response as follows: i) Weather protection measures along the building edges: Taking into account that the run-in/out of the Proposed Development is located at the centre of

No.	Comments	Responses
		the elevation facing Tai Yuen Street, the proposed canopy is only provided over main entrance area to correspond with the overall façade design and to facilitate the design of both vertical and horizontal greenery at Primary Zone holistically. The benefits of canopy may also be defeated when it is constructed over tree pit and planters. In addition, the elevation facing Kwok Shui Road is currently occupied by full height roller shutter and louvers for operation of the two ring main units of CLP substation. Thus, provision of continuous weather protection is technically infeasible. ii) Façade articulation at the building corner: Noted with thanks. The façade design will be further reviewed at detailed design stage. iii) Provision of landscape treatments at the flat roof facing Kwok Shui Road at 2/F: Provision of landscape treatment with soil system on the captioned flat roof is technically infeasible since it is situated above the ring main units of CLP substation. However, façade treatment such as decorative screens or removable pot plants etc. could be further explored to embellish the environment of the captioned flat roof at detailed design stage.
	5. Please clarify whether the setback area at G/F would be open for public use and if so its opening hour.	Please be clarified that 2m full-height setback from site boundary along Tai Yuen Street and Kwok Shui Road will be open for public use on a 24-hour basis to effectively enhance pedestrian circulation and safety surrounding the Application Site.

(Updated on 11 February 2021)

Attachment B

Replacement Pages of

Sewerage Impact Assessment

3.5 Sewage Generation from the Proposed Development

The prediction for the proposed development sewage generation has been based on the information extracted from the development schedule (refer to Section 2). The quantity of sewage generated by the proposed is estimated from expected total population and Average Dry Weather Flow.

The table showing the sewage generation of the proposed development is calculated based on the guideline set in EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning and is shown on **Table B1** in **Appendix B** and summarized in the table below.

Accommodation Type	**Proposed Scheme**
Average Dry Weather Flow, m^3/day	
Proposed Data Centre	
Catchment Inflow Factor	1.10
ADWF (m^3/day)	182
Contributing Population	675
Global Peaking Factor	8
Peak Discharge, l/s	16.87

3.6 Impact of the Proposed Development

In order to assess the impact on the existing public sewer associated with the proposed development, the capacities of the existing public sewers have been checked and shown on **Tables B2** in **Appendix B**.

The estimation of sewage generation in the vicinity of the Application Site is based on the assumptions as below:

1) Existing public sewer information based on DSD drainage record plans and shown in **Figure 2**;

2) Existing development parameters in the vicinity of the proposed development are obtained from public domain and sewerage catchment plan shown in **Figure 2**;

3) Residential population for the proposed development at the Application Site based on development schedule in Section 2 above;

4) Flow factors as per EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning; and

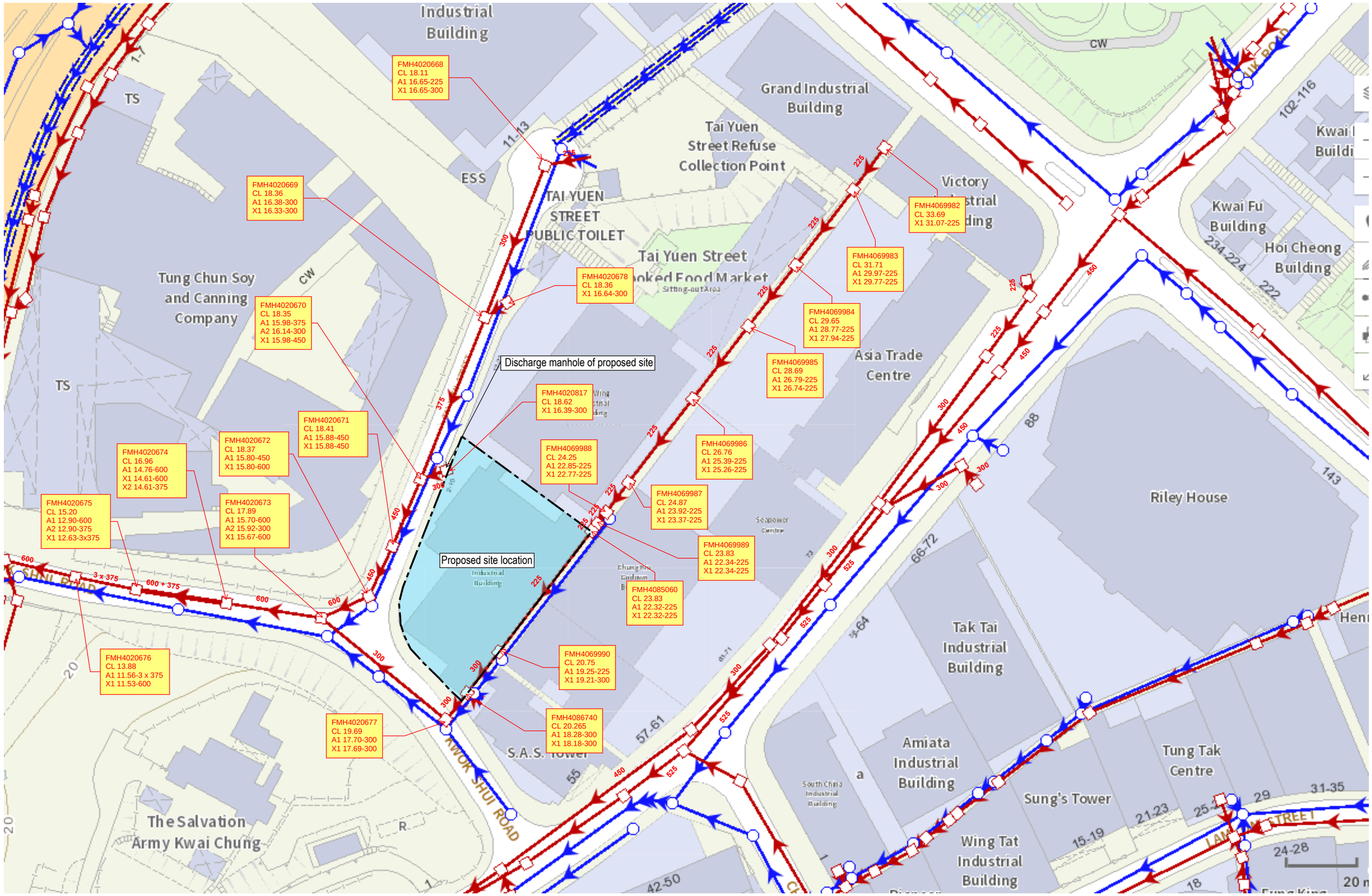
5) Global peaking factor with stormwater allowance is adopted as per EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning.

The capacities checking of the existing public sewers is shown in **Table B2**. Sewage flow from the proposed development is calculated to be 16.87 L/s and it is observed

that the existing public sewerage serving the Application Site comprising an existing 450Ø public gravity sewer running along Tai Yuen Street and the downstream existing public sewer of 600Ø running along Kwok Shui Road have sufficient capacity to carry the estimated sewage from the Application Site. It is concluded that the proposed development would not result in any adverse sewerage impact to the existing public sewerage system.

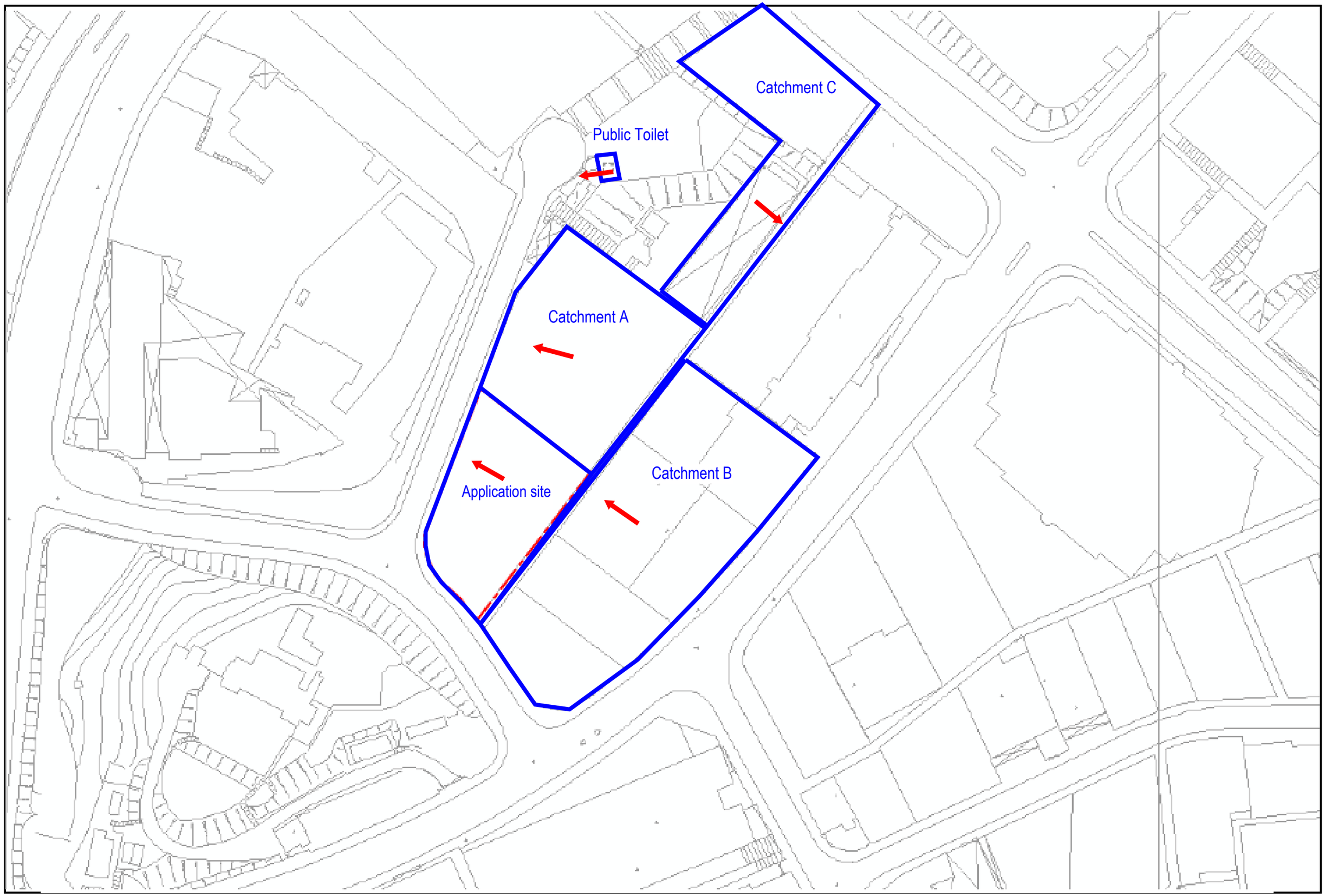
4 Conclusion

The peak sewage flow from the proposed development is calculated to be 16.87 L/s. It is observed that the existing public sewerage serving the Application Site comprising an existing 450Ø public gravity sewer running along Tai Yuen Street and the downstream existing public sewer of 600Ø running along Kwok Shui Road have sufficient capacity to carry the estimated sewage from the Application Site. It is concluded that the proposed development would not result in any adverse sewerage impact to the existing public sewerage system.



DSD Drainage Record Plan (A3 1:1000)

Figure 2



SEWAGE CATCHMENT PLAN

Figure 3

TABLE B1
Estimation of Sewage Flows Estimation for Proposed and Existing Developments

(Based on EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning)

Design Assumption:
Global Peaking Factor, P (Including Stormwater Allowance) as per Table T-5
Global Unit Flow Factors as per Tables T-2 and T-3
Catchment Inflow Factor for Kwai Chung (P_{CIF} = 1.10) as per Table T-4

Development Schedule		
Sewage Flow Estimates	**Estimation**	**Remark**
Proposed Data Centre		
Proposed Data Centre		**Connected to Manhole FMH4020817**
GFA (m^2)	21821	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	502	
Unit flow factor (m^3/person/day) - Commercial activities type J2 Electricity Gas & Water	0.33	
ADWF, (m^3/day)	182	**P_{CIF} = 1.10 included**
Existing Development		
Milo's Industrial Building		**Connected to Manhole FMH4020817**
GFA (m^2)	18184	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	418	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	336	**P_{CIF} = 1.10 included**
Catchment A		
Shui Wing Industrial Building		**Connected to Manhole FMH4020678**
GFA (m^2)	44454	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	1022	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	821	**P_{CIF} = 1.10 included**
Catchment B		
CHUNG KIU GODOWN BUILDING		**Connected to Manhole FMH4085060**
GFA (m^2)	16044	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	369	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	296	**P_{CIF} = 1.10 included**
KENTUCKY INDUSTRIAL BUILDING		**Connected to Manhole FMH4069990**
GFA (m^2)	8954	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	206	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	165	**P_{CIF} = 1.10 included**
S.A.S. TOWER		**Connected to Manhole FMH4086740**
GFA (m^2)	14868	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	342	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	275	**P_{CIF} = 1.10 included**
Catchment C		
Grand Industrial Building		**Connected to Manhole FMH4069982**
GFA (m^2)	17004	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	391	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	314	**P_{CIF} = 1.10 included**
Tai Yuen Street Cooked Food Market Sitting-Out Area		**Connected to Manhole FMH4069985**
GFA (m^2)	724	
Worker Density (No. of Worker per 100m^2)	5.1	
No. of Employee	37	
Unit flow factor (m^3/person/day) - Commercial activities type J10 Restaurants & Hotels	1.58	
ADWF, (m^3/day)	64	**P_{CIF} = 1.10 included**
Existing Scenario		
Total ADWF, (m^3/day)	2361	
Contributing Population	8743	
Global Peaking Factor	5.00	
Total Peak Flow (L/s) + Peak Flow from Tai Tuen Street Public Toilet	136.62	
Proposed Scenario		
Total ADWF, (m^3/day)	2207	
Contributing Population	8174	
Global Peaking Factor	5.00	
Total Peak Flow (L/s) + Peak Flow from Tai Tuen Street Public Toilet	127.72	

Notes:
Employment density shall refer to Commercial and Industrial Floor Space Utilization Survey published by PlanD.
Industrial = 2.3 employee per 100m^2 of GFA
Restaurant = 5.1 employee per 100m^2 of GFA

Sewage Flows Estimation for Existing Public Toilet at Tai Yuen Street

From	**To**	**No. of Sanitary Appliance**		
		Urinal Bowl	**WC**	**Wash Basin**
TAI TUEN STREET PUBLIC TOILET	FMH4020668	6	12	8
Discharge Units [3]		-	24	6
Flow (L/s, per appliance)		0.005	0.543	0.216
Sub Peak Flow (L/s)		0.030	6.519	1.726
Total Peak Flow (L/s)		8.275		

Notes:
Flow estimation based on Discharge Unit Method from Plumbing Engineering Services Design Guide.
i.e. Approximate flow in L/s = (DU / 60) $^{0.666}$ where DU = Discharge Units

Table B2 - Capacity Performance of Existing and Proposed Sewer

Notes:
(1) Calculate by Colebrook-White Equation

$$\overline{V} = -\sqrt{32gRS_f}\,\log\left[\frac{k_s}{14.8R} + \frac{1.255\nu}{R\sqrt{32gRS_f}}\right]$$

where ks is roughness value
for concrete slimed sewers, ks equals 3mm
for clayware slimed sewers, ks equals 0.6mm
v is kinematic viscosity of fluid = 1.14 x 10-6 m2/s and g is the gravity = 9.81m/s2
V is the velocity, D is the diameter of the sewer and S is the gradient of the sewer.

Abbreviation:

UP_MAN	Upstream Manhole	CON_POP	Contributing Population	DN_GL	Downstream Ground Level	CAP	Peak Pipe Capacity
DN_MAN	Downstream Manhole	DIA	Diameter	UP_INV	Upstream Invert Level	F/C	Peak Flow/Capacity
ADWF	Average Dry Weather Flow	LEN	Length	DN_INV	Downstream Invert Level		
ACC_ADWF	Accumulated Average Dry Weather Flow	UP_GL	Upstream Ground Level	VEL	Peak Pipe Velocity		

Existing Development

Manhole							Existing / Proposed Pipe Parameter										
UP_MAN No.	DN_MAN No.	FROM SITE	CON_POP	PEAKING FACTOR	ACC_ADWF (L/s)	Peak Flow (L/s)	DIA (D) (mm)	LEN (m)	UP_GL (mPD)	DN_GL (mPD)	UP_INV (mPD)	DN_INV (mPD)	Gradient (S)	VEL (m/s)	CAP (L/s)	F/C (%)	Adequate Capacity?
Catchment A & Existing Development																	
FMH4020668	FMH4020669	Tai Yuen Street Public Toilet	331	8	1.03	8.28	300	42.0	18.11	18.36	16.65	16.38	156	1.26	88.76	9.3%	YES
FMH4020669	FMH4020670	Tai Yuen Street Public Toilet + Shui Wing Industrial Building	3,372	6	10.54	63.22	375	45.1	18.36	18.35	16.33	15.98	129	1.59	175.84	36.0%	YES
FMH4020670	FMH4020671	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Milo's Industrial Building	4,616	6	14.42	86.54	450	18.0	18.35	18.41	15.98	15.88	180	1.51	239.97	36.1%	YES
FMH4020671	FMH4020672	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Milo's Industrial Building	4,616	6	14.42	86.54	450	12.5	18.41	18.37	15.88	15.80	156	1.62	257.97	33.5%	YES
FMH4020672	FMH4020673	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Milo's Industrial Building	4,616	6	14.42	86.54	600	12.4	18.37	17.89	15.80	15.70	124	1.77	499.01	17.3%	YES
Catchment B & Catchment C																	
FMH4069982	FMH4069983	Grand Industrial Building	1,163	6	3.63	21.81	225	13.1	33.69	31.71	31.07	29.97	12	3.81	151.22	14.4%	YES
FMH4069983	FMH4069984	Grand Industrial Building	1,163	6	3.63	21.81	225	23.6	31.71	29.65	29.77	28.77	24	2.70	107.46	20.3%	YES
FMH4069984	FMH4069985	Grand Industrial Building	1,163	6	3.63	21.81	225	18.8	29.65	28.69	27.94	26.79	16	3.25	129.25	16.9%	YES
FMH4069985	FMH4069986	Grand Industrial Building	1,163	6	3.63	21.81	225	22.6	28.69	26.76	26.74	25.39	17	3.21	127.74	17.1%	YES
FMH4069986	FMH4069987	Grand Industrial Building + Tai Yuen Street Cooked Food Market Sitting-Out Area	1,401	6	4.38	26.27	225	26.8	26.76	24.87	25.26	23.92	20	2.94	116.85	22.5%	YES
FMH4069987	FMH4069988	Grand Industrial Building + Tai Yuen Street Cooked Food Market Sitting-Out Area	1,401	6	4.38	26.27	225	8.5	24.87	24.25	23.37	22.85	16	3.26	129.57	20.3%	YES
FMH4069988	FMH4069989	Grand Industrial Building + Tai Yuen Street Cooked Food Market Sitting-Out Area	1,401	6	4.38	26.27	225	3.7	24.25	23.83	22.77	22.34	9	4.48	178.04	14.8%	YES
FMH4069989	FMH4085060	Catchment C + Chung Kiu Godown Building	2,498	6	7.81	46.84	225	1.4	23.83	23.83	22.34	22.32	69	1.57	62.58	74.8%	YES
FMH4085060	FMH4069990	Catchment C + Chung Kiu Godown Building + Kentucky Industrial Building	3,111	6	9.72	58.33	225	38.8	23.83	20.75	22.32	19.25	13	3.70	147.08	39.7%	YES
FMH4069990	FMH4086740	Catchment C + Chung Kiu Godown Building + Kentucky Industrial Building + S.A.S. Tower	4,128	6	12.90	77.40	300	12.0	20.75	20.27	19.21	18.28	13	4.40	310.60	24.9%	YES
FMH4086740	FMH4020677	Catchment C + Chung Kiu Godown Building + Kentucky Industrial Building + S.A.S. Tower	4,128	6	12.90	77.40	300	7.3	20.27	19.69	18.18	17.70	15	4.06	286.92	27.0%	YES
FMH4020677	FMH4020673	Catchment C + Chung Kiu Godown Building + Kentucky Industrial Building + S.A.S. Tower	4,128	6	12.90	77.40	300	41.2	19.69	17.89	17.69	15.92	23	3.27	231.03	33.5%	YES
FMH4020673	FMH4020674	Catchment A + Catchment B + Catchment C	8,743	5	27.32	136.62	600	24.2	17.89	16.96	15.67	14.76	27	3.81	1078.10	12.7%	YES
FMH4020674	FMH4020675	Catchment A + Catchment B + Catchment C	8,743	5	27.32	136.62	375	22.7	16.96	15.20	14.61	12.90	13	4.99	551.27	6.1%	YES
FMH4020674	FMH4020675	Catchment A + Catchment B + Catchment C	8,743	5	27.32	136.62	600	22.7	16.96	15.20	14.61	12.90	13	4.80	1694.92	6.1%	YES

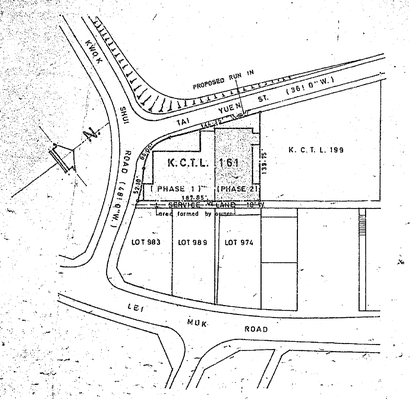
Propsoed Development

Manhole							Existing / Proposed Pipe Parameter										
UP_MAN No.	DN_MAN No.	FROM SITE	CON_POP	PEAKING FACTOR	ACC_ADWF (L/s)	Peak Flow (L/s)	DIA (D) (mm)	LEN (m)	UP_GL (mPD)	DN_GL (mPD)	UP_INV (mPD)	DN_INV (mPD)	Gradient (S)	VEL (m/s)	CAP (L/s)	F/C (%)	Adequate Capacity?
Catchment A & Proposed Development																	
FMH4020668	FMH4020669	Tai Yuen Street Public Toilet	331	8	1.03	8.28	300	42.0	18.11	18.36	16.65	16.38	156	1.26	88.76	9.3%	YES
FMH4020669	FMH4020670	Tai Yuen Street Public Toilet + Shui Wing Industrial Building	3,372	6	10.54	63.22	375	45.1	18.36	18.35	16.33	15.98	129	1.59	175.84	36.0%	YES
FMH4020670	FMH4020671	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Proposed Development	4,047	6	12.65	75.87	450	18.0	18.35	18.41	15.98	15.88	180	1.51	239.97	31.6%	YES
FMH4020671	FMH4020672	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Proposed Development	4,047	6	12.65	75.87	450	12.5	18.41	18.37	15.88	15.80	156	1.62	257.97	29.4%	YES
FMH4020672	FMH4020673	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Proposed Development	4,047	6	12.65	75.87	600	12.4	18.37	17.89	15.80	15.70	124	1.77	499.01	15.2%	YES
Catchment B & Catchment C																	
FMH4069982	FMH4069983	Grand Industrial Building	1,163	6	3.63	21.81	225	13.1	33.69	31.71	31.07	29.97	12	3.81	151.22	14.4%	YES
FMH4069983	FMH4069984	Grand Industrial Building	1,163	6	3.63	21.81	225	23.6	31.71	29.65	29.77	28.77	24	2.70	107.46	20.3%	YES
FMH4069984	FMH4069985	Grand Industrial Building	1,163	6	3.63	21.81	225	18.8	29.65	28.69	27.94	26.79	16	3.25	129.25	16.9%	YES
FMH4069985	FMH4069986	Grand Industrial Building	1,163	6	3.63	21.81	225	22.6	28.69	26.76	26.74	25.39	17	3.21	127.74	17.1%	YES
FMH4069986	FMH4069987	Grand Industrial Building + Tai Yuen Street Cooked Food Market Sitting-Out Area	1,163	6	4.38	26.27	225	26.8	26.76	24.87	25.26	23.92	20	2.94	116.85	22.5%	YES
FMH4069987	FMH4069988	Grand Industrial Building + Tai Yuen Street Cooked Food Market Sitting-Out Area	1,163	6	4.38	26.27	225	8.5	24.87	24.25	23.37	22.85	16	3.26	129.57	20.3%	YES
FMH4069988	FMH4069989	Grand Industrial Building + Tai Yuen Street Cooked Food Market Sitting-Out Area	1,163	6	4.38	26.27	225	3.7	24.25	23.83	22.77	22.34	9	4.48	178.04	14.8%	YES
FMH4069989	FMH4085060	Catchment C + Chung Kiu Godown Building	2,498	6	7.81	46.84	225	1.4	23.83	23.83	22.34	22.32	69	1.57	62.58	74.8%	YES
FMH4085060	FMH4069990	Catchment C + Chung Kiu Godown Building + Kentucky Industrial Building	3,111	6	9.72	58.33	225	38.8	23.83	20.75	22.32	19.25	13	3.70	147.08	39.7%	YES
FMH4069990	FMH4086740	Catchment C + Chung Kiu Godown Building + Kentucky Industrial Building + S.A.S. Tower	4,128	6	12.90	77.40	300	12.0	20.75	20.27	19.21	18.28	13	4.40	310.60	24.9%	YES
FMH4086740	FMH4020677	Catchment C + Chung Kiu Godown Building + Kentucky Industrial Building + S.A.S. Tower	4,128	6	12.90	77.40	300	7.3	20.27	19.69	18.18	17.70	15	4.06	286.92	27.0%	YES
FMH4020677	FMH4020673	Catchment C + Chung Kiu Godown Building + Kentucky Industrial Building + S.A.S. Tower	4,128	6	12.90	77.40	300	41.2	19.69	17.89	17.69	15.92	23	3.27	231.03	33.5%	YES
FMH4020673	FMH4020674	Catchment A + Catchment B + Catchment C	8,174	5	25.54	127.72	600	24.2	17.89	16.96	15.67	14.76	27	3.81	1078.10	11.8%	YES
FMH4020674	FMH4020675	Catchment A + Catchment B + Catchment C	8,174	5	25.54	127.72	375	22.7	16.96	15.20	14.61	12.90	13	4.99	551.27	5.7%	YES
FMH4020674	FMH4020675	Catchment A + Catchment B + Catchment C	8,174	5	25.54	127.72	600	22.7	16.96	15.20	14.61	12.90	13	4.80	1694.92	5.7%	YES

Attachment C

Extract of Approved GBP of

Existing Building at Application Site



BLOCK PLAN (SCALE: 100 FT. = 1 INCH)

COLOUR SCHEDULE

BRICK WORKS		CANTON TILES	
R. C. C. WORKS		MOSAIC TILES	
WOOD WORKS		HARD CORE	
GLASS WORKS		SANITARY FITMENTS	
IRON WORKS		EXISTING WORKS	
VICON BLOCK		CEMENT RENDERING	

GENERAL NOTES :

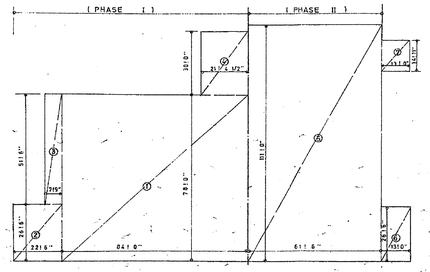
1. ALL BRICK WORKS TO BE BUILT IN 1:3 CEMENT - MORTAR.
2. ALL R.C.C. WORKS TO BE 1:2:4 MIXTURE UNLESS OTHERWISE STATE ON THE DRAWING.
3. PLANS OF PLUMBING, DRAINAGE & WELL TO BE SUBMITTED LATER.
4. MIN. DIMENSIONS UNDERSIDE TO ALL R.C.C. BEAMS TO BE 7'6" UNDERSIDE TO FLOOR SLAB TO BE 10'0" O.A.
5. RISERS OF ALL STAIRCASES TO BE NOT MORE THAN 7" & TREADS TO BE NOT LESS THAN 9"
6. HAND RAILINGS TO BE PROVIDED AT BOTHSIDE OF ALL STAIRCASES.
7. ALL LAVATORIES TO HAVE MIN. 4'0" HIGH GLAZED TILES DADO AROUND THE INTERNAL WALL.
8. R.C.C. CALCULATIONS & DETAILS TO BE SUBMITTED LATER.
9. ALL SOLID CONC. BLOCK PARTITION WALLS REQUIRED TO HAVE 2 NRS. F.R.P. ARE TO BE FINISH WITH 1/2" PLASTER ON BOTH SIDE.
10. NO WORKS TO COMMENCE UNTIL R.C.C. DETAILS AND CALCULATIONS HAVE BEEN APPROVED BY BUILDING AUTHORITY.
11. ALL FIRE SERVICE REQUIREMENTS TO BE FULLY COMPLIED WITH.

FIRE SERVICE NOTES :

1. FIRE SERVICE INSTALLATION TO BE INSTALLED AT POSITIONS INDICATED ON PLANS.
2. A FIRE ALARM SYSTEM TO BE PROVIDED THROUGHOUT THE BUILDING, TO BE INCORPORATED IN THE FH/HR INSTALLATION.
3. LIFTS MARKED A TO BE ARRANGED AS FIREMAN'S LIFTS WHICH SHOULD NOT BE SMALLER THAN THAT DEEMED BY LIFT MANUFACTURERS AS AN 8 PERSON LIFT. SUCH LIFTS TO BE PROVIDED WITH SUITABLE SWITCHES TO BE CLEARLY INDICATED ON THE OUTSIDE.
4. NO STORAGE OF DANGEROUS GOODS WITHOUT THE AUTHORITY OF THE DIRECTOR OF FIRE SERVICES.
5. ALL EXITS TO BE CLEARLY INDICATED BY ILLUMINED EXIT SIGNS IN 7" ENGLISH AND CHINESE CHARACTERS.
6. WALL LININGS, IT IS RECOMMENDED THAT ALL INTERNAL LININGS FOR ACOUSTIC, THERMAL, INSULATION OR DECORATIVE PURPOSED BE OF CLASS 1 OR 2 RATE OF SURFACE FLAME SPREAD AS LAID DOWN BY B.S.S. NO. 476 OF 1953 (PART 11).
7. A WATER TANK TO BE PROVIDED TO SUPPLY FH/HR SYSTEM ONLY AND TO HAVE A CAPACITY OF NOT LESS THAN 8,000 GALLONS.
8. A SPRINKLER SYSTEM TO BE PROVIDED AND INSTALLED IN ACCORDANCE WITH F.O.C. RULES, TO COVER THE ENTIRE BUILDING OF PHASE II.
9. THE WATER SUPPLY FOR SPRINKLERS ARE TO CONFORM TO 29th EDITION FIRE OFFICES' COMMITTEE RULES FOR AUTOMATIC SPRINKLER INSTALLATIONS, AND IS TO BE CONNECTED TO THE PUMP AND SUCTION TANK SYSTEM AND A 16,500 GALS. WATER TANK IS TO BE PROVIDED FOR THIS PURPOSE.
10. THE GROUND FLOOR CARPARK TO BE PROVIDED WITH ADEQUATE SMOKE VENTS, AND SUCH VENTS ARE TO BE COMPLETELY SEPARATE AT EACH LEVEL, GIVING DIRECT TO OPEN AIR.
11. ALL FIRE HYDRANTS TO BE SITUATED AT HALF LANDING LEVELS ON STAIRCASES.
12. ALL WINDOW OPENING ON ALL FLOORS, FACING THE 10 FEET LANE TO BE PROTECTED BY AN EXTERNAL DRENCHER SYSTEM IN ACCORDANCE WITH F.O.C. RULES. A MANUAL OPERATED VALVE TO BE PROVIDED NEAR THE DRENCHER INLET AND TO BE CLEARLY INDICATED IN ENGLISH AND CHINESE CHARACTERS.
13. STEEL SLIDING DOORS HAVING 2 HOURS F.R.P. TO BE PROVIDED AS INDICATED ON PLANS. IT SHOULD BE CONSTRUCTED IN ACCORDANCE WITH F.O.C. RULES AND SET TO OPERATE BY FUSIBLE LINK AT A TEMPERATURE OF 155° F.
14. EACH OPENING PROTECTED MUST NOT EXCEED 56 SUPERFICIAL FEET OR BE MORE THAN 7 FEET IN WIDTH OR 9 FEET IN HEIGHT.
15. ..... STANDARD REQUIREMENTS FOR FIREMAN'S LIFT TO BE FULLY COMPLIED WITH.
16. FIREMAN'S LIFTS TO DISCHARGE INTO A PROTECTED AREA AT ALL LEVELS, AS INDICATED ON PLANS.
17. ..... STANDARD REQUIREMENTS FOR PRIVATE GARAGES TO BE COMPLIED WITH AS APPLICABLE.
18. ..... STANDARD REQUIREMENT FOR TRANSFORMER AND AND SWITCH ROOMS TO BE COMPLIED WITH WHERE APPLIABLE.

RECEIVED BY
Mar 12 10 1975

FLOOR AREA CALCULATIONS :



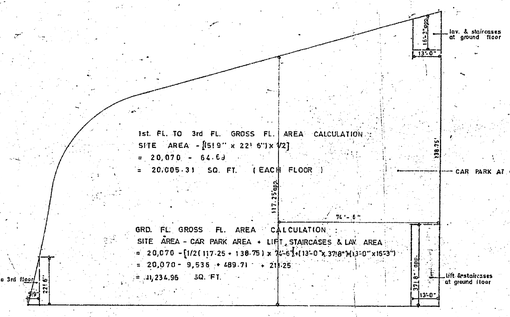
ROOF COVERED AREA DIAGRAM (SCALE: 30'0" = 1")

ROOF COVERED AREA CALCULATION :

CONDITION OF SITE :
SITE AREA : 20,070 SQ. FT. (FROM LEASE PLAN)
CLASS 'B' SITE.
HEIGHT OF BUILDING : NOT OVER 140 FEET.
PERMISSIBLE ROOF COVERED AREA :
20,070 x 0.775 = 15,554.25 SQ FT.
PROPOSED ROOF COVERED AREA :

(PHASE 1)		(PHASE 2)	
①	84'10" x 78'10" = 6,552.00 S.F.	④	51'6" x 11'0" = 683.42 S.F.
②	22'6" x 26'6" = 596.25 S.F.	⑤	13'0" x 26'6" = 344.50 S.F.
③	7'9" x 51'6" = 399.13 S.F.	⑦	13'0" x 14'11" = 193.96 S.F.
⑥	21'4 1/2" x 30'0" = 641.25 S.F.		
	TOTAL = 8,188.63 S.F.		TOTAL = 7,364.96 S.F.

PHASE 1 + PHASE 2
8,188.63 S.F. + 7,364.96 S.F. = 15,553.59 SQ FT. < 15,554.25 SQ. FT.



1st FL. TO 3rd FL. GROSS AREA DIAGRAM (SCALE 30'0" 1")

GROSS FL. AREA CALCULATION :

11th TO 4th FL.	(roof covered area) 15,553.59 x 8	=	124,428.72 SQ. FT.
3rd TO 1st FL.	20,005.31 x 3	=	60,015.93 SQ. FT.
GROUND FLOOR		=	11,234.96 SQ. FT.
	TOTAL	=	195,679.61 SQ. FT.

PLOT RATIO CALCULATION :

PERMISSIBLE PLOT RATIO = 10.8

PROPOSED PLOT RATIO = TOTAL GROSS FL. AREA OF THE BUILDING / SITE AREA

= 195,679.61 SQ. FT. / 20,070 SQ. FT.

= 9.75 < 10.8

SANITARY FITMENT SCHEDULE

FLOOR	USE	NO. OF PERSON	NUMBER OF FITMENTS REQUIRED			NUMBER OF FITMENTS PROVIDED		
			W. C.	BASIN	URINAL	W. C.	BASIN	URINAL
FL TO 11th FL.	FACTORY	MALE = 192		6		6	6	4
		FEM. = 191	9	6		9	6	
GRD. FL.	1st FL. TO 7th FL (PHASE II) GODOWN	TOTAL MALE WORKERS = 26	3	2	2	3	3	2

EXIT ROUTE SCHEDULE

FLOOR	EXIT FROM STOREY OR FLAT	CAPACITY	REQUIRED				PROVIDED			
			MIN. WIDTH OF EACH EXIT DOORS	MIN. TOTAL WIDTH OF EXIT ROUTES	MIN. WIDTH OF EACH EXIT DOORS	MIN. TOTAL WIDTH OF EXIT ROUTES	MIN. WIDTH OF EACH EXIT DOORS	MIN. WIDTH OF EXIT ROUTES	MIN. TOTAL WIDTH OF EXIT DOORS	MIN. TOTAL WIDTH OF EXIT ROUTES
8TH FL. TO 11TH FL.	FROM FLT/HSE	383	2-3'-6"	3'-6"	10'-0"	10'-0"	3 -3'6" 2 -4'0"	3 -4'0" 2 -5'0"	15'-0"	18'-0"
1ST FL. TO 7TH FL	FROM FLAT (PHASE 2) GODOWN	under 0	1 - 2'6"	1'-6"			1 - 4'6" 2 - 3'6" 2 - 4'0" (1st fl only)	1 - 5'0" 2 - 4'0" 1 - 5'0"		
NOTE : ALL WIDTH OF EXIT DOORS PROVIDED TO BE EXCLUDING DOOR FRAME							1 - 3'6"(at 1st fl. only)			

FIRE RESISTANCE REQUIREMENT FOR ELEMENT OF CONSTRUCTION

FLOOR	USE	CLASS	COMPARTMENT OF BUILDING		F.R.P. (HRS)	DIMENSIONS OF ELEMENT OF CONSTRUCTION				
			FLOOR AREA SQ. FT.	VOLUME CU. FT.		R. C. C. SLAB		R.C.C. BEAM	R.C.C. COLUMN	
						OVER TO STEEL	THICKNESS	COVER TO STEEL	COVER TO STEEL	THICKNESS
8TH FL. TO 11TH FL.	FACTORY	2	15,553.59	171,089.49	2 HRS.	2"	5"	2"	2"	12"
1ST FL. TO 7TH FL	GODOWN	1	under 9536.00	under 104,896.00	1 HRS.	1/2"	5"	2"	2"	12"
GROUND FLOOR	CAR PARK	7	8536.00	153,744.00	1 HRS.	1/2"	5"	2"	2"	12"

DISCHARGE VALUE CALCULATION :

NO.S OF STOREYS ABOVE GROUND FL. = 11 STOREYS

1 NO. 6'0" STAIRCASE DISCHARGE VALUE = 0.75 x (195 + 80) = 956.25 PERSONS
1 NO. 5'0" STAIRCASE DISCHARGE VALUE : (955 + 60) = 815 PERSONS
2 NOS. 4'0" STAIRCASE DISCHARGE VALUE : (720 + 45) x 2 = 1530 PERSONS
TOTAL = 3301.25 PERSONS

ACTUAL DISCHARGE VALUE :

1ST. FL. TO 3RD. FL.	228 x 3	= 684	PERSONS
4TH. FL. TO 7TH. FL.	166 x 4	= 664	PERSONS
8TH. FL. TO 11TH. FL.	~~383~~ 383 x 4	= ~~1532~~ 1532	PERSONS
	TOTAL	= 2880	PERSONS < 3301.25 PERSONS

CAR PARK CALCULATION

NUMBERS OF CAR PARK REQUIRED :

TOTAL GROSS FLOOR AREA OF THE BUILDING / 10,000 SQ. FT.
195,679.61 / 10,000 = 20 NOS.

NUMBERS OF CAR PARK PROVIDED = 21 NOS.

NOTE: As these plans have been examined only as to particulars stated in Circular Letter No. 64, your attention is drawn to Section 4 (3) (b) of the Buildings Ordinance regarding your duty to Architect and to Section 13 (2) (c) regarding your duty to give notice of any deviation of the Building Contract.

Approved
FOR BUILDING AUTHORITY
20 JUN 1975

REFERENCES:
File 70/1
B.O.O. 2/9260/70
F.S.D. F.P.B. 8/6163

NOTES:

AMENDMENT NOTES
1. BLUE DOTTED LINES INDICATED APPRO. BUILDING WORKS TO BE OMITTED.
2. THE WORKS IN COLOUR INDICATED NEW BUILDING WORKS.

AMENDED PLAN

AMENDMENTS	SIGNATURE	DATE
1. REVISED SANITARY FITMENT SCHEDULE, EXIT ROUTE SCHEDULE, FIRE RESISTANCE REQUIREMENT, DISCHARGE VALUE & CAR PARK CALCULATION		
2. REVISED GROUND AREA CALCULATION, 1ST TO 3RD FL. AREA CALCULATION, ROOF AREA CALCULATION, CAR PARK CALCULATION & FIRE RESISTANCE REQUIREMENT		
4. AMENDED CAR PARK CALCULATION		DEC 1975
5. AMENDED GROSS FL. AREA CALCULATION		3 DEC 1975
6. AMENDED PLOT RATIO CALCULATION		3 DEC 1975
VIDE I-11 NO. 12		

REVISIONS	SIGNATURE	DATE

DESIGNED
DRAWN
CHECKED
ARCHITECT IN CHARGE

LO YUK SUM REG. NO. A.R.B.
CHARTERED & AUTHORIZED ARCHITECT

Y. S. LO & ASSOCIATE
ARCHITECTS & ENGINEERS

JOB TITLE: PROPOSED FLATTED FACTORY & GODOWN BLDG. ON K. C. T. L. 161 (PHASE II) KWAI CHUNG N. T.

GENERAL NOTES:
1. Do not scale drawings ; Figured dimensions to be followed.
2. All dimensions are to be checked and verified on site.
3. All prints, notes, specifications and the[illegible] are the property of the Architects/Engineers unless certified by the Architects/Engineers.
4. This Drawing is not valid for construction.

DRG. TITLE: BLOCK PLAN
SCALES: As shown
JOB NO

Your ref TPB/A/KC/473
Our ref 276306/01/WSTY/MYNL/KYAC/04274

ARUP

By Email (tpbpd@pland.gov.hk) and By Hand

Level 5, Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong
t +852 2528 3031
f +852 2779 8428
d +852 2268 3721
theresa.yeung@arup.com
www.arup.com

The Secretary
Town Planning Board
15/F, North Point Government Offices
333 Java Road, North Point, Hong Kong

26 February 2021

Dear Sir/Madam,

S16 Planning Application for
Proposed Minor Relaxation of Plot Ratio Restriction
for Permitted Information Technology and Telecommunications Industries (Proposed Data Centre Development) at "Other Specified Uses" annotated "Business" Zone
at Nos. 2-10 Tai Yuen Street, Kwai Chung
(Planning Application No. A/KC/473)

Submission of Further Information

We refer to the comments from various Government Departments received on 8 February and 10 February 2021 as well as public comments on the captioned Planning Application.

We are pleased to submit our responses in the form of a Response-to-Comments Table (**Attachment A**) and relevant supplementary information (**Attachment B**) for your consideration.

We sincerely seek for the favourable consideration from the Town Planning Board to approve the captioned S16 Planning Application.

Should you have any queries, please contact the undersigned or our Ms. Aileen CHENG at 2908 4011.

Yours faithfully

Theresa YEUNG
Director of Planning

Encl. - Attachment A-B
cc - Mr Stephen Chan (STP/Kwai Tsing, PlanD) (email: scychan@pland.gov.hk)
- Mr Robert Tsang (TP/Kwai Tsing, PlanD) (email: rhctsang@pland.gov.hk)

RE: A/KC/473 - Submission of Further Information03/03/2021 14:38
From: Aileen Cheng <aileen.cheng@arup.com>
To: "tpbpd@pland.gov.hk" <tpbpd@pland.gov.hk>
Cc: "scychan@pland.gov.hk" <scychan@pland.gov.hk>, "rhctsang@pland.gov.hk" <rhctsang@pland.gov.hk>, "ncywong@pland.gov.hk" <ncywong@pland.gov.hk>, Theresa Yeung <theresa.yeung@arup.com>, Natalie Leung <natalie.leung@arup.com>
Sent by: prvs=689259553=aileen.cheng@arup.com
File Ref:

Dear TPB Secretariat,

I refer to our submission of further information for Planning Application No. A/KC/473 dated 26 February (email below refers).

With regard to our response-to-comment item no. 6c. from Transport Department, we would like to clarify that the response should be amended as follows:
"The existing traffic aids and street furniture adjacent to the application site are shown in figures in the TIA report. Bollards are proposed on footpath along the site frontage to prevent illegal parking and enhance pedestrian safety after the 2m fullheight setback to deter the potential illegal parking along the footpath, presented in ***Chapter 4.7*** ~~***Chapter 4.6***~~ *of the revised TIA report. (****Attachment B*** *refers)."*

Thank you for your consideration.

Best Regards,
--
Aileen Cheng
Assistant Town Planner | Planning

Arup
Level 5 Festival Walk 80 Tat Chee Avenue Kowloon Tong Kowloon Hong Kong
t: +852 2528 3031 f: +852 2779 8428
d: +852 2908 4011
www.arup.com

From: Aileen Cheng
Sent: Friday, February 26, 2021 1:51 PM
To: 'tpbpd@pland.gov.hk' <tpbpd@pland.gov.hk>
Cc: 'scychan@pland.gov.hk' <scychan@pland.gov.hk>; 'rhctsang@pland.gov.hk' <rhctsang@pland.gov.hk>; Theresa Yeung <theresa.yeung@arup.com>; Natalie Leung <natalie.leung@arup.com>
Subject: A/KC/473 - Submission of Further Information [Filed 26 Feb 2021 13:51]

Dear TPB Secretariat,

S16 Planning Application for
Proposed Minor Relaxation of Plot Ratio Restriction
for Permitted Information Technology and Telecommunications Industries (Proposed Data Centre Development) at "Other Specified Uses" annotated "Business" Zone
at Nos. 2-10 Tai Yuen Street, Kwai Chung
(Planning Application No. A/KC/473)

Submission of Further Information

We refer to the comments from various Government Departments received on 8 February and 10

Attachment A

Response-to-Comments Table

Comments from Related Departments — Page No.

COMMENTS FROM RELATED DEPARTMENTS 2
1. Environmental Protection Department, dated 10 February 2021 2
2. Transport Department, dated 8 February 2021 2
SUMMARY OF PUBLIC COMMENTS 5
3. Environment 5
4. Electricity Supply 11
5. Fire Safety 12
6. Traffic 12
7. Feng Shui 12

COMMENTS FROM RELATED DEPARTMENTS

No.	Comments	Responses
1.	**Environmental Protection Department, dated 10 February 2021**	
	1. Since the subject case involves redevelopment of industrial building, the applicant should address the potential land contamination issue. If the applicant chooses to address this issue at a later stage, an approval condition on land contamination assessment shall be imposed, should the case be approved by TPB.	Noted. Land contamination assessment will be addressed at the approval condition stage should planning approval for the Proposed Development is obtained.
	2. We are still reviewing the SIA provided by the applicant. The comment on the SIA will be sent to you once received.	Noted.
2.	**Transport Department, dated 8 February 2021**	
	I refer to the S.16 application No. A/KC/473 received by the Town Planning Board on 7.1.2021 and attached the comments from the Commissioner for Transport:	
	She has reservation on the captioned application due to the following comments from traffic point of view.	Noted. Please find below our response-to-comments for your consideration.
	2. Paragraph 2.3 — Existing traffic flows refers. Date of survey for traffic should be specified in the TIA. Necessary adjustment factor on the surveyed traffic flows should be adopted so that the peak traffic situation is reflected in the TIA. Link flow capacity should be duly considered in the TIA.	As referred to the submitted TIA report, the comprehensive classified traffic counts at the identified key junctions were undertaken on a typical weekday during the AM and PM peaks periods in October 2020. In view of the current COVID-2019 situation, the obtained traffic flows have been reviewed and compared with in-house year 2019 traffic flow data in vicinity, and the year 2020 traffic flow adopted in the TIA report is considered appropriate for assessment purpose. Link flow capacity assessment for the identified road links are supplemented in the revised report. The assessment result revealed that there is sufficient capacity in existing, reference and design scenario. The conclusion from the previously submitted TIA is still valid.

No.	Comments	Responses
	3. Paragraph 3.3 and Appendix B — Provision of internal transport facilities and swept path analysis refer. In accordance with the HKPSG, the high end provision of 5 nos. LGV and 2 nos. HGV for loading/unloading facilities should be provided. However, 4 nos. LGV and 3 nos. HGV for loading/unloading facilities would be provided within the subject lot. Please substantiate the changes.	Please be advised that the proposed internal transport provision fully complies with HKPSG and TD's Departmental Circular No. 6/2012 – Standards for Goods Vehicle Parking and Loading/Unloading for Data Centre. For total of 7 nos. loading/unloading facilities to be provided within site, 2.45 nos. for HGV should be provided (7 x 35% = 2.45). Rounding-up of HGV loading /unloading facilities (3 nos.) is proposed to ensure self-contained transport facilities including parking spaces and loading/ unloading facilities to be provided within the application site, without spill-over onto the public roads and external parking or loading/unloading facilities.
	4. Section 4.1 and Figure 3.2-3.3 — Trip generation and attraction of proposed development refer. Please state clearly the numbers of trips to/from the subject lot in Figure 3.2-3.3.	Noted, the trip generation and attraction of proposed development are indicated on **Figure 3.2-3.3** for reference (**Attachment B** refers).
	5. Section 4.2 — Adjacent Developments refers. Trips generation and attraction of the planned and committed developments within AOI should be assessed and please demonstrate the proposed trip generation considered in the forecast assessment. Separate figures showing the trip generation / attraction for planned and committed developments as well as subject development should be included in the report.	Please be advised the trips generated from the planned and committed developments within AOI were assessed and included in the forecast assessment, and the location plan was given in **Figure 4.1**. The trip generation and attraction of these adjacent developments are indicated on **Figure 4.1** for reference. (**Attachment B** refers).
	6. Other than the above, the following shortcomings on TIA report as follow.	
	a. Calculation spreadsheet should be included in the TIA report.	Calculation spreadsheets supplemented in **Appendix A** for reference. (**Attachment B** refers).
	b. The traffic conditions near the subject site should be checked, and any relevant problems to be arisen out of the development should be duly addressed.	Noted. Please be advised that traffic assessment and pedestrian assessment have been conducted and the assessment results revealed that no adverse vehicular and pedestrian traffic impact will be induced by the relaxation of Plot Ratio of the proposed redevelopment.

No.	Comments	Responses
	c. The existing traffic aids (both traffic signs and road markings) and street furniture (e.g. railings / bollards, etc.) should be indicated. Any necessary changes to the existing traffic aids and street furniture should be discussed and proposed.	The existing traffic aids and street furniture adjacent to the application site are shown in figures in the TIA report. Bollards are proposed on footpath along the site frontage to prevent illegal parking and enhance pedestrian safety after the 2m full-height setback to deter the potential illegal parking along the footpath, presented in **Chapter 4.6** of the revised TIA report. (**Attachment B** refers).
	7. A full TIA report should be provided in the next FI submission.	Noted. (**Attachment B** refers).

SUMMARY OF PUBLIC COMMENTS

No.	Comments	Responses
3.	**Environment** **<u>Air Quality</u>** Taking into account the high population density and average air quality of Kwai Chung District, it is worried that the emissions from the cooling system of the proposed data centre development will bring about adverse impacts on air quality. **<u>Radiation</u>** It is concerned that the operation of machineries and servers at the proposed data centre development will generate radiation and bring about adverse impacts on the health of surrounding users. **<u>Noise</u>** The 24-hour round-the-clock operation of data centre development will cause continuous noise pollution to surrounding area. Please clarify if there are any mitigation measures in place to alleviate the noise produced.	Please be clarified that adverse air quality impacts due to the operation of the cooling system are not anticipated. Design of the exhaust outlets will be located and oriented away from nearby air sensitive receivers as far as practicable during detailed design stage. Please note that data centres in general do not emit more electromagnetic radiation than a normal building. Data centres are used to store servers and hard drives, with data being transmitted via fiber-optic cables and transferred at the facility via Ethernet. In general, no radiation would be produced in the data transfer process. Please be clarified that the equipment noise transmission of the Proposed Development to the adjacent exterior buildings (NSRs) will comply with the relevant requirements under the Hong Kong Planning Standards and Guidelines (HKPSG) (e.g. 5dBA below the appropriate Acceptable Noise Level shown in the Technical Memorandum for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites (i.e. 65 dBA (day time) and 55 dBA (night time) or below)). Preliminarily, cooling towers with low noise model and silencers for intake and discharge are proposed to minimise potential noise disturbance. Ventilation openings of other equipment such as chiller plant, generator rooms etc. will also be treated by silencer or acoustic louver in order to meet the EPD's requirement. Subject to manufacturer noise data and equipment layout/location, the actual acoustic treatment will be further reviewed in detail design stage when equipment information is available.

No.	Comments	Responses
	<u>Pollution Caused by Cooling Towers</u>	
	The Proposed Data Centre Development will bring substantial impacts on the surrounding area. In particular, the cooling towers will bring about water, air and noise pollution etc. which have adverse impacts on the safety and health of nearby residents and workers.	Please refer to our response-to-comment on air quality and noise aspect above. To further minimise the potential construction dust impacts to workers and nearby air sensitive receivers (ASRs), the Recommended Pollution Control Clauses for Construction Contracts by EPD will be incorporated into the relevant works contracts to ensure good site practice. With the implementation of the recommended mitigation measures, no adverse construction dust impacts due to the Proposed Development are anticipated. Please also note that the cooling towers will utilise the fresh water from municipal main pipe to provide cooling by water evaporation, which is a physical process and will not produce hazardous contaminant to air and water. The design, installation and commissioning of cooling tower would follow the Code of Practice for Fresh Water Cooling Towers from Electrical and Mechanical Services Department to avoid generating any adverse impact to the public.
	<u>Adverse Environmental Impact upon the Immediately Adjacent Residential Towers Approved under the "CDA" Development at Nos.1-7 Cheung Wing Road (Planning Application No. A/KC/444)</u>	
	The Site at Nos. 1-7 Cheung Wing Road, Kwai Chung (zoned "Comprehensive Development Area" ("CDA") and partly shown as 'Road' on the draft Kwai Chung Outline Zoning Plan No. S/KC/29) which is owned by the Objector, was the subject of a number of Planning Approvals for Comprehensive Development.	Noted with thanks.
	The latest approval (Planning Application No. A/KC/444) for 'Flat', 'Eating Place', 'Shop and Services' and 'Office' uses with minor relaxation of building height restriction from 120mPD to 145mPD was obtained from the TPB at its meeting on 22 March 2019. The development is under implementation by the Objector with occupation year in 2024 to 2025.	Noted with thanks.

No.	Comments	Responses
	The Approved CDA development consists of 4 residential towers and one office tower, with retail space and central landscape area below. This is intended as part of the revitalization of the old industrial area into a vibrant residential and recreational environment. Creation of new and noisy industrial uses (such as the Proposed Data Centre Development) immediately adjacent to the Approved CDA development would cause significant environmental impacts (primarily noise) disturbance and inconvenience to future residents and users of the retail and recreational spaces in the ***immediately adjacent*** Approved CDA development.	According to the Notes of the Draft Kwai Chung Outline Zoning Plan No. S/KC/29 (the OZP), on the "OU(B)" zone that the Application Site is located, the proposed data centre is subsumed under 'Information Technology and Telecommunications Industries' use, which is a Column 1 use, i.e. always permitted. As a Column 1 use, the proposed data centre use is fully in-line with the planning intention "for general business uses. A mix of information technology and telecommunications industries, non-polluting industrial, office and other commercial uses are always permitted in new business buildings". We would also take this opportunity to clarify the sole intention of the subject application is to seek for minor relaxation of Plot Ratio in response to the Government's new policy initiative for revitalisation of pre-1987 industrial buildings, to facilitate the phasing out of polluting industrial uses and expedite the transformation of the surrounding area for business uses. Moreover, as part of the Proposed Scheme, by providing voluntary full-height setback along Kwok Shui Road and Tai Yuen Street, as well as multiple design merits such as soft landscape provision at pedestrian level, vertical greening on G/F-2/F building frontage, the proposed data centre development will also contribute to the enhancement of pedestrian environment and streetscape along Kwok Shui Road and Tai Yuen Street, thereby fostering a positive public realm to benefit members of the public.
	The reasons for the objection are outlined in further detail below: ***Adverse Fixed Noise Impact Associated with the Proposed Data Centre Development***	
	According to the information included in the Supporting Planning Statement submitted by the Applicant, there will be sizable cooling towers (12 nos.) located at the roof of the proposed development. It is understood that	Please note that the equipment noise transmission of the Proposed Development to the adjacent exterior buildings (NSRs) is designed to comply with the relevant requirements under the HKPSG (e.g. 5dBA below the appropriate Acceptable Noise Level shown in the Technical Memorandum

No.	Comments	Responses
	operation of the Data Centre will be 24 hours. Hence, the noise generated from the cooling towers will incur significant noise impact onto the surrounding area during its round-the-clock operation. This will cause very significant disturbance and inconvenience to future residents and users of the retail and recreational spaces in the approved CDA development. In this regard, ***the shortest distance from the proposed data center to the Approved CDA Development at Nos. 1 - 7 Cheung Wing Road is about 20m only.*** A typical cooling tower with such large size may attain a noise level of 105 dB(A) and the **total noise level generated from those 12 nos. of large cooling towers may even reach 116 dB(A).** Based on the shortest distance from the Proposed Data Centre to the Approved CDA Development at Nos. 1 - 7 Cheung Wing Road is about 20m only, the predicted **night-time noise level** at the residential towers due to the operation of these cooling towers may reach around 91 dB(A) with tonal effect, which **exceeds the night-time noise standard of 60 dB(A) under the Noise Control Ordinance by 31 dB(A).** ***No Information on Fixed Noise Impact Submitted*** As there is no information such as a Fixed Noise Impact Assessment included in the Supporting Planning Statement submitted by the Applicant, the potential noise impact associated with the cooling towers at roof-top cannot be ascertained. **The Planning Application fails to demonstrate there would not be any adverse fixed noise impact to the nearby Noise Sensitive Receivers ("NSRs").** To the extent there is any identified adverse noise impact, the proposed mitigation measures put forward by the Applicant are inadequate, as elaborated below.	for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites (i.e. 65 dBA (day time) and 55 dBA (night time) or below)). Careful considerations have been made to the site context and operation conditions including operation mode/period, operation loading, distance between cooling towers and the nearest NSR, and manufacturer noise data in designing the cooling towers. Safety factor and necessary contribution factor have also been considered. With proper acoustic treatment, noise generated from the cooling towers will unlikely cause disturbance to nearby residents/other users. Preliminarily, cooling towers with low noise model and silencers for intake and discharge have been proposed. Subject to manufacturer noise data and equipment layout/location, the actual acoustic treatment will be further reviewed in detail design stage when equipment information is available. It is understood that fixed noise sources other than the cooling towers should also be reviewed in order to ensure the combined level of the intruding noise at the nearest NSR is at least 5 dBA below the appropriate Acceptable Noise Level shown in the Technical Memorandum for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites. Preliminarily, cooling towers with low noise model and silencers for intake and discharge have been proposed to minimise potential noise disturbance. The ventilation openings of chiller plants, generator rooms etc. will also be treated by silencer or acoustic louver. Moreover, the noise level of outdoor units will be reviewed for further suggestion.

No.	Comments	Responses
		Subject to manufacturer noise data and equipment layout/location, the actual acoustic treatment will be further reviewed in detail design stage when equipment information is available.
	We strongly urge the TPB to require the Applicant to carry out a Fixed Noise Impact Assessment to the satisfaction of Environmental Protection Department at the planning stage for identifying the fixed noise sources and assessing whether the fixed noise impact of the Proposed Data Centre Development to the nearby NSRs would comply with the Noise Control Ordinance. The TPB will be aware of recent guidance that fundamental issues of this nature must be considered on their merits by the TPB as part of the Section 16 planning process rather than being left over to be dealt with under planning approval conditions.	According to the Notes of the Draft Kwai Chung Outline Zoning Plan No. S/KC/29 (the OZP), on the "OU(B)" zone that the Application Site is located, the proposed data centre is subsumed under 'Information Technology and Telecommunications Industries' use, which is a Column 1 use, i.e. always permitted. As a Column 1 use, the proposed data centre use is fully in-line with the planning intention "for general business uses. A mix of information technology and telecommunications industries, non-polluting industrial, office and other commercial uses are always permitted in new business buildings". We would like to reiterate that the sole intention of the subject application is to seek for minor relaxation of Plot Ratio by 20% in response to the Government's new policy initiative for revitalisation of pre-1987 industrial buildings, to facilitate the phasing out of polluting industrial uses and expedite the transformation of the surrounding area for business uses. Reference could also made with our responses above to address your concern on noise impact to surrounding NSRs.
	The Need to Implement At-Source Noise Mitigation Measures It is stated in the Supporting Planning Statement submitted by the Applicant that ***"the cooling towers at roof floor are an equipment plant which is neither covered plant room nor enclosed structure".*** This demonstrates that no at-source mitigation measures have been considered by the Applicant in mitigating the potential fixed noise impact incurred by the cooling towers. Based on other similar project experience, tailor-made at-source noise mitigation measures in terms of a combination of acoustic louvre at four sides and silencer at top would be required to completely enclose	As discussed above, cooling towers with low noise model and silencers for intake and discharge have been preliminarily proposed. Therefore, at-source noise mitigation measures will be adopted in the proposed data centre development. Subject to manufacturer noise data and equipment layout/location, the actual acoustic treatment will be further reviewed in detail design stage when equipment information is available.

No.	Comments	Responses
	these cooling towers in order to minimize any adverse fixed noise impact onto the nearby NSRs including future residents at the Approved CDA Development at Nos. 1-7 Cheung Wing Road. ***Benefits of Implementation of At-Source Noise Mitigation Measure*** Provision of the acoustic louvre and silencer is a typical and common mitigation measures in Hong Kong for effectively mitigating cooling towers and chiller noise source. These measures have been commonly adopted in many commercial buildings (e.g. City Plaza Phase One Office Building, etc.) or hospitals (such as Prince of Wales Hospital, etc). With careful planning of having at-source noise mitigation measures at early stage, it is believed that the Proposed Data Centre would not have any adverse noise impact to the surroundings even during its night-time operation. Also, the Proposed Data Centre would achieve the sustainable green building design under both BEAM Plus and LEED certification. Some typical examples are attached. Last but not least, the TPB is urged to also take into account that, while an increase in plot ratio is not in principle objectionable where the planning circumstances justify such an increase, this must not be at the expense of and serious inconvenience to neighbours, in particular future residents of the approved CDA development ***immediately adjacent*** to the Application Site and users of the retail and recreational areas in the Approved CDA development. The Applicant should revise the captioned Planning Application No. A/KC/473 to ensure that any and all noise and other environmental impacts on the Approved CDA development immediately adjacent to the Application Site are ***fully mitigated beyond any doubt.***	With reference to our responses above, please be clarified that at-source noise mitigation measures will be adopted in the proposed data centre development. According to the Notes of the Draft Kwai Chung Outline Zoning Plan No. S/KC/29 (the OZP), on the "OU(B)" zone that the Application Site is located, the proposed data centre is subsumed under 'Information Technology and Telecommunications Industries' use, which is a Column 1 use, i.e. always permitted. As a Column 1 use, the proposed data centre use is fully in-line with the planning intention "for general business uses. A mix of information technology and telecommunications industries, non-polluting industrial, office and other commercial uses are always permitted in new business buildings". We would also take this opportunity to clarify the sole intention of the subject application is to seek for minor relaxation of Plot Ratio in response to the Government's new policy initiative for revitalisation of pre-1987 industrial buildings, to facilitate the phasing out of polluting industrial uses and expedite the transformation of the surrounding area for business uses.

No.	Comments	Responses
		We would also like to supplement that the proposed data centre development echoes with the Government's new policy direction for revitalisation of industrial buildings and will help to facilitate the phasing out of polluting industrial uses and expedite the transformation of the surrounding area for business uses. By providing voluntary full-height setback along Kwok Shui Road and Tai Yuen Street, as well as incorporating street-level greenery, the proposed data centre development will also contribute to the enhancement of pedestrian environment and streetscape along Kwok Shui Road and Tai Yuen Street, thereby fostering a positive public realm to benefit members of the public, including the future users of the approved CDA development.
	In view of the objection grounds above, we consider that the Applicant has failed to submit adequate information in demonstrating the feasibility of the Proposed Data Centre Development. Unless there is unequivocal evidence submitted by the Applicant to your reasonable satisfaction that inter alia, the aforesaid concerns are properly addressed or dealt with, the Proposed Development will be detrimental to the living quality and well-being of the residents in the surrounding developments, including in particular future residents of the Approved CDA development ***immediately adjacent*** to the Application Site and users of the retail and recreational areas in the approved CDA development. We respectfully request the TPB to reject the Planning Application.	Please refer to our response to above that the Proposed Data Centre development is fully in line with the planning intention of the OU(B) zone to facilitate the upgrading of the industrial area for general business use. As illustrated above, the proposed data centre development will be equipped with measures to minimize impacts to surrounding users. In addition, numerous planning and design merits will be realized at the public realm (in particular at pedestrian level), benefiting the well-being and pedestrian experience for users of the retail and recreational areas of the approved CDA development. In view of the above, we considered the Proposed Development is fully justified and sincerely seek for the favourable consideration from the TPB to approve the captioned S16 Planning Application.
4.	**Electricity Supply** Taking into account that the proposed data centre development is surrounded by large-scale industrial buildings with high electricity consumption, and the proposed data centre development itself will also consume substantial amount of electricity, it is concerned that whether there will be issues causing instability in electricity supply, electricity leakage or even district-scale electricity blackout.	Please note that the proposed data centre development is provided with dedicated and individual power substations from CLP for power consumption of the development itself and will not cause adverse impact on the power supply reliability to the surrounding buildings. It should also be noted that CLP provides one of the most reliable electricity services in the world, achieving 99.999% supply reliability. With CLP acting as a

No.	Comments	Responses
		coordinator for data centre operations, highly reliable energy system shall be furnished.
5.	**Fire Safety** The temperature may become extremely high at the proposed data centre development, leading to a much higher fire risk than industrial buildings in general. It is concerned that whether sufficient fire services installations are available to support the proposed data centre development and to mitigate the fire risk.	Please note that the proposed data centre development is not anticipated to provide a high-temperature environment as the equipment is designed to operate under an air-conditioned environment at around 24°C. It should be noted that high temperature will cause damage to the equipments and will be avoided. We would also like to supplement that the proposed data centre development is protected by advanced fire extinguishing systems including fire hydrant system, sprinkler system, gas suppression system, detection system etc., which will comply with latest code of practice for minimum fire service installations and equipment from Fire Services Department.
6.	**Traffic** The Application Site is located in high-density old urban area with heavy traffic. Redeveloping the existing industrial building into data centre will aggravate pedestrian-vehicle conflicts and bring about serious road safety concerns.	Please be advised that traffic assessment and pedestrian assessment have been conducted and the assessment results revealed that no adverse vehicular and pedestrian traffic impact will be induced by redeveloping the existing industrial building into a data centre.
7.	**Feng Shui** It is understood that data centre in general will be equipped with bulky cooling towers. The design of such cooling towers often looks like graves and may affect the feng shui of Kwai Chung District.	By replacing a pre-1987 industrial building with a well-designed and well-managed data centre with soft landscape provision at pedestrian level and vertical greening on G/F-2/F building facade, the proposed development will definitely bring about enhancement in the visual qualities at the Application Site.

(Updated on 25 February 2021)

Attachment B

Updated Traffic Impact Assessment

Proposed Minor Relaxation of Plot Ratio Restriction for Permitted Information Technology and Telecommunications Industries (Proposed Data Centre Development) at "Other Specified Uses" annotated "Business" Zone at Nos. 2-10, Tai Yuen Street, Kwai Chung

Traffic Impact Assessment Report

Rev. A | Feb 2021

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 276306-24

Ove Arup & Partners Hong Kong Ltd
Level 5 Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong
www.arup.com

ARUP

Contents

			Page
1	**INTRODUCTION**		**1**
	1.1	Background	1
	1.2	Objectives of this Report	1
	1.3	Scope of Study	1
	1.4	Structure of the Report	2
2	**EXISTING TRAFFIC CONDITION**		**3**
	2.1	Site Characteristics	3
	2.2	Existing Road Network	3
	2.3	Existing Junction Performance	4
	2.4	Existing Link Capacity Assessment	5
	2.5	Existing Pedestrian Condition	6
3	**THE SUBJECT DEVELOPMENT**		**8**
	3.1	Development Schedule	8
	3.2	Vehicular Access Arrangement	8
	3.3	Internal Transport Facilities Provision	8
	3.4	Swept Path Assessment	10
	3.5	Car Lift Assessment	10
	3.6	Mechanical Parking System Assessment	11
4	**TRAFFIC IMPACT ASSESSMENT**		**15**
	4.1	Trip Generation and Attraction of Proposed Development	15
	4.2	Adjacent Developments	16
	4.3	Future Traffic Growth	16
	4.4	Assessment Scenarios	18
	4.5	Junction Capacity Assessment	19
	4.6	Link Capacity Assessment	21
	4.7	Pedestrian Impact Assessment	22
5	**CONCLUSION**		**25**
	5.1	Summary	25
	5.2	Conclusion	26

Figures

Figure 1.1 Location of Application Site
Figure 2.1 Location of Surveyed Junctions in the vicinity of Proposed Development
Figure 2.2 Year 2020 Existing Traffic Flow
Figure 2.3 Major Pedestrian Routes in the Vicinity of Proposed Development
Figure 3.1 Proposed Vehicular Access of Proposed Development
Figure 3.2 Ingress Vehicular Routes of Proposed Development
Figure 3.3 Egress Vehicular Routes of Proposed Development
Figure 3.4 Proposed Layout at G/F
Figure 3.5 Proposed Layout at B1/F
Figure 3.6 Proposed Layout at B2/F
Figure 3.7 Swept Path Analysis for 11m Long Heavy Goods Vehicle at G/F (Approaching/ Leaving)
Figure 4.1 Location of Planned Developments in the vicinity of Proposed Development
Figure 4.2 Year 2027 Reference Traffic Flow
Figure 4.3 Year 2027 Design Traffic Flow

Appendices

Appendix A Junction Calculation Sheets
Appendix B Junction Calculation Sheets for Proposed Junction Improvement

1 INTRODUCTION

1.1 Background

1.1.1 According to The Chief Executive's 2018 Policy Address, the Government plans to encourage owners to redevelop industrial buildings constructed before 1987 and will allow relaxation of the maximum permissible non-domestic plot ratio (PR) by up to 20% for redevelopment projects of these pre-1987 industrial buildings located outside residential zones in main urban areas and new towns.

1.1.2 As an immediate response to this new policy, the Applicant intends to redevelop the existing industrial building at No. 2-10 Tai Yuen Street, which was occupied before 1987, to information technology and telecommunications industries use (Data Centre), in consideration of the proposed 20% increase in PR restriction (from the existing PR 9.75 to the proposed PR 11.7). The location of application site is shown in **Figure 1.1**.

1.1.3 Ove Arup & Partners Hong Kong Limited (Arup) was commissioned to carry out a Traffic Impact Assessment (TIA) report in support of the Section 16 application for enabling the proposal at the application site.

1.2 Objectives of this Report

1.2.1 The purpose of this report is to evaluate the potential traffic impact associated with the proposed development for the scenarios with and without the proposed 20% increase in PR.

1.3 Scope of Study

1.3.1 The tasks for this TIA study are outlined as follows:

- Carry out traffic surveys at critical junctions to appreciate current traffic condition;
- Update the inventory regarding traffic circulation patterns, traffic conditions, as well as the constraints of the existing road network in the vicinity;
- Carry out pedestrian surveys at pedestrian facilities in the vicinity to appreciate current walking condition;
- Review the access arrangement for the proposed development and to make recommendation;
- Recommend car parking provisions and goods vehicle loading/unloading arrangements and provide justifications to the proposed internal transport facilities including car lift assessment, if applicable;

- Set up the reference scenario should the application site be developed into data centre development with the existing PR 9.75, i.e. reference scenario with the proposed development but without the proposed 20% increase in PR;
- Identify the likely change in traffic generation should the application site be developed into data centre development with the proposed PR 11.7, i.e. design scenario with the proposed development and the proposed 20% increase in PR;
- Compare the above two traffic scenarios for evaluation of the likely traffic impact, if any, associated with the proposed development;
- Assess future traffic condition, taking into account any future traffic growth, as well as the traffic generated by the proposed development and other planned/committed development, if any, to be built in the vicinity; and
- Assess future pedestrian walking condition, taking into account any future population and employment growth generated by the proposed development and other planned/committed development, if any, to be built in the vicinity.

1.4 Structure of the Report

1.4.1 The structure of this TIA report is as follows:

Chapter	Title	Aims
1	Introduction	Provide project background and scope of the Study
2	Existing Traffic Condition	Review and appreciate the existing traffic condition
3	The Subject Development	Provide information of the Proposed Development
4	Traffic Impact Assessment	Illustrate the results of Traffic Impact Assessment
5	Conclusion	Summarize the findings of this Study

2 EXISTING TRAFFIC CONDITION

2.1 Site Characteristics

2.1.1 The application site is located at No. 2-10 Tai Yuen Street, Kwai Chung, with a site area of about 1,865m^2. It is bounded by Tai Yuen Street to the north, Kwok Shui Road to the west, and existing buildings to the east and south. **Figure 1.1** shows the location and the environs of the application site.

2.2 Existing Road Network

2.2.1 The application site is served by a comprehensive road network to and from all districts. Some major roads in the vicinity of the application site are listed as follows:

- Castle Peak Road – Kwai Chung Section is a primary distributor road, dual two-lane carriageway running in north-south direction. It connects Castle Peak Road – Tsuen Wan Section to the north and Tsing Sha Highway and Ching Cheung Road to the south. Castle Peak Road – Kwai Chung Section serves traffic between Kwai Chung, New Territories West and Kowloon.
- Kwai Chung Road is a primary distributor road, dual three-lane carriageway running in north-south direction. It connects Cheung Wing Road to the north and Tsuen Wan Road to the south. Kwai Chung Road is a major public transport corridor with comprehensive public transport services including franchised buses and GMB being provided along this road.
- Cheung Wing Road is a district distributor road, dual three-lane carriageway running in the north-south direction. It connects Wo Yi Hop Road to the north and Kwai Chung Road and Castle Peak Road – Kwai Chung Section to the south.
- Wo Yi Hop Road is a district distributor road, single two-lane carriageway running in the north-south direction. It connects Wo Yi Hop Interchange to the north and Castle Peak Road – Kwai Chung Section to the south.
- Lei Muk Road is a district distributor road, it is a single carriageway with two traffic lanes in eastbound direction and one traffic lane westbound direction for the section between Castle Peak Road – Kwai Chung Section and Wo Yip Hop Road.
- Chun Pin Street is a local distributor road, it is a single carriageway with two traffic lanes in northbound direction between Lei Muk Road and Lam Tin Street, and in single two-lane configuration between Lam Tin Street and Ta Cheun Ping Street.
- Tai Yuen Street is a local distributor road, single two-lane carriageway running in the north-south direction, connecting to Kwok Shui Road.

- Kwok Shui Road is a local distributor road, it is a single carriageway with two traffic lanes in westbound direction between Cheung Wing Road and Tai Yuen Street, and in single two-lane configuration between Tai Yuen Street and Lei Muk Road.

2.3 Existing Junction Performance

2.3.1 To appreciate the existing traffic conditions, comprehensive classified traffic counts were conducted at the following identified key junctions in the vicinity of the application site. Locations of these surveyed junctions are listed below and shown in **Figure 2.1**.

J1	-	Castle Peak Road - Kwai Chung Interchange	Priority Junction
J2	-	Cheung Wing Road / Kwok Shui Road	Signalized Junction
J3	-	Castle Peak Road - Kwai Chung / Kwai Chung Road	Signalized Junction
J4	-	Lei Muk Road / Castle Peak Road	Priority Junction
J5	-	Tai Yuen Street / Kwok Shui Road	Priority Junction
J6	-	Kwok Shui Road / Lei Muk Road	Signalized Junction
J7	-	Chun Pin Street / Lei Muk Road	Priority Junction
J8	-	Lei Muk Road / Wo Yi Hop Road	Signalized Junction
J9	-	Wo Yi Hop Road / Cheung Wing Road	Signalized Junction

2.3.2 The counts were undertaken on a typical weekday during the AM and PM peak periods in October 2020. The AM and PM peak hours were found to be 08:45-09:45 and 17:15-18:15 respectively. The observed traffic flows during these peak hours are presented in **Figure 2.2**.

2.3.3 Junction capacity analysis was carried out at the identified key junctions in the vicinity of the application site. Results of the capacity assessment are shown in **Table 2.3.1** below.

Table 2.3.1 Year 2020 Junction Performance

Junction		Type	Performance (1)	
			AM	PM
J1	Castle Peak Road - Kwai Chung Interchange	Priority	1.07	1.01
J2	Cheung Wing Road / Kwok Shui Road	Signalized	42%	46%
J3	Castle Peak Road - Kwai Chung / Kwai Chung Road (2)	Signalized	65%	50%
J4	Lei Muk Road / Castle Peak Road (2)	Priority	0.14	0.18
J5	Tai Yuen Street / Kwok Shui Road (3)	Priority	0.13	0.15
J6	Kwok Shui Road / Lei Muk Road (4)	Signalized	35%	54%
J7	Chun Pin Street / Lei Muk Road (4)	Priority	0.59	0.63
J8	Lei Muk Road / Wo Yi Hop Road (2)	Signalized	70%	68%
J9	Wo Yi Hop Road / Cheung Wing Road (2)	Signalized	51%	72%

Notes:
(1) Figures shown represent "Reserve Capacity" (RC) in % for signalized junctions and "Design Flow Capacity" (DFC) ratio for priority junctions.
(2) Junction parameter assumptions are taken into account to reflect the actual traffic conditions.
(3) Taken into account the existing kerbside activities at Tai Yuen Street in the calculations.
(4) Taken into account the existing kerbside activities at Lei Muk Road in the calculations.

2.3.4 Results of the analysis indicate that the identified key junctions in the vicinity of the application site are currently operating satisfactorily during both AM and PM peak hours, expect for J1.

2.4 Existing Link Capacity Assessment

2.4.1 With the peak hours traffic flow obtained from the comprehensive classified traffic counts mentioned in **Section 2.3**, link capacity assessment for Kwok Shui Road and Lei Muk Road has been carried out. Assessment results are summarized in **Table 2.4.1** below.

Table 2.4.1 Year 2020 Existing Link Performance

Road Link	Link Capacity (pcu/hr)	Traffic Flows (pcu/hr)		Volume/Capacity (V/C) Ratio	
		Existing		Existing	
		AM	PM	AM	PM
Kwok Shui Road	900 (1)	445	420	0.49	0.47
Lei Muk Road	900 (1),(2)	410	365	0.46	0.41

Notes:
(1) Link capacity in pcu/hr was derived from link capacity of 800veh/hr for 2-lane single carriageway with the presence of loading activities, standing vehicles and pedestrian crossings in TPDM Vol.2 Ch.2.4.
Veh/hr converted to pcu/hr according to survey pcu factor & reduced 10% capacity due to high % of HV.
(2) Taking into account the illegal on-street parking along the kerbside.

2.4.2 Results of the analysis indicate that both Kwok Shui Road and Lei Muk Road are currently operating with ample capacity during both morning and evening peak hours.

2.5 Existing Pedestrian Condition

2.5.1 To appreciate the existing conditions, comprehensive pedestrian count surveys were conducted at the critical footpath in the vicinity, as shown in **Figure 2.3**. The pedestrian counts were undertaken on typical weekdays during the AM and PM peak periods in October 2020.

2.5.2 In order to address the performance of the critical footpath, Level of Service (LOS) assessment of the critical footpath has been conducted.

2.5.3 LOS assessment is carried out based on the definitions presented in the Highways Capacity Manual 2000. **Table 2.5.1** shows the various LOS 'quantified' in terms of pedestrian flow rates.

Table 2.5.1 Level of Service (LOS) for Walkway*

LOS	Flow rate for Walkway (ped/min/m)	Description
A	≤16	Pedestrians basically 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	Sufficient space is provided for pedestrians to freely select their walking speeds, to bypass other pedestrians and to avoid crossing conflicts with others. At this level, pedestrians begin to be aware of other pedestrians and to respond to their presence in the selection of walking paths.
C	23 – 33	Sufficient space is available to select normal walking speeds and to bypass other pedestrians primarily in unidirectional stream. Where reverse direction or crossing movement exist, minor conflicts will occur, and speed and volume will be somewhat lower.
D	33 – 49	Freedom to select individual walking speeds and bypass other pedestrians is restricted. Where crossing or reverse-flow movements exist, the probability of conflicts is high and its avoidance requires changes of speeds and position. The LOS provides reasonable fluid flow; however considerable friction and interactions between pedestrians are likely to occur.
E	49 - 75	Virtually, all pedestrians would have their normal walking speeds restricted. At the lower range of this LOS, forward movement is possible only by shuffling. Space is insufficient to pass over slower pedestrians. Cross- and reverse-movement are possible only with extreme difficulties. Design volumes approach the limit of walking capacity with resulting stoppages and interruptions to flow.
F	> 75	Walking speeds are severely restricted. Forward progress is made only by shuffling. There are frequent and unavoidable conflicts with other pedestrians. Cross- and reverse-movements are virtually impossible. Flow is sporadic and unstable. Space is more characteristics of queued pedestrians than of moving pedestrian streams.

*Source: Extracted from Exhibit 18-3 of Highway Capacity Manual (HCM) 2000

2.5.4 Footpaths with LOS A to C are considered as desirable with sufficient space for pedestrian to select normal walking speeds to bypass. For footpaths with LOS D represent freedom to select individual walking speeds and bypass other pedestrian is restricted. Unless there are any

site constraints, improved measures should be sought for footpath with LOS D or poorer.

2.5.5 **Table 2.5.2** summarized the observed AM and PM peak pedestrian flow and LOS in surveyed footpath.

Table 2.5.2: Year 2020 Level of Service in AM and PM Peaks at Key Footpath

Footpath		Actual Width (m)	Effective Clear Width (1) (m)	Two-way Peak 15-minute Flow (ped/15-min)		Flow Rate(2) (ped/min/m)		LOS (Level)	
				AM	PM	AM	PM	AM	PM
F1	Tai Yuen Street Footpath	1.7	0.7	225	195	26	23	C	B
F2	Kwok Shui Road Footpath	2.7	1.7	190	175	9	9	A	A

Notes:
(1) Effective clear width = Actual width (on-site measurement) minus 0.5m dead width on both sides.
(2) Pedestrian flow rates are computed based on effective clear width, with 1.2 peak factor applied for the peak minute flow rate.

2.5.6 The results presented in **Table 2.5.2** revealed that the walking condition on the critical footpath in the vicinity of the application site is undesirable during both AM and PM peaks hours in Year 2020.

3 THE SUBJECT DEVELOPMENT

3.1 Development Schedule

3.1.1 The Applicant intends to redevelop the site for the proposed information technology and telecommunications industries (data centre) use. The proposed development is envisaged to be completed by Year 2024.

3.1.2 The proposed development schedule is summarized in **Table 3.1.1**.

Table 3.1.1 Proposed Development Schedule

Development Schedule		
Site Area	About 1,865m^2	
Use	Industrial	
Plot Ratio	9.75	11.7 (1)
No. of Storeys	N/A	20 storeys above ground, plus 2 storeys of basement carpark
Gross Floor Area	18,183.75m²	21,820.50m²

Notes:
(1) Including the proposed 20% increase in PR to PR 11.7.

3.2 Vehicular Access Arrangement

3.2.1 The vehicular access of proposed development will be situated at Tai Yuen Street, as shown in **Figure 3.1**.

3.2.2 The major ingress and egress routes for vehicular traffic approaching and leaving the application site are illustrated in **Figures 3.2** and **3.3** respectively.

3.3 Internal Transport Facilities Provision

3.3.1 The required internal transport facilities provision in accordance with the Hong Kong Planning Standards and Guidelines (HKPSG) are summarized **Table 3.3.1** below.

Table 3.3.1 HKPSG Required Internal Transport Provision for the Proposed Development

Facilities (L x W x H)	Type of Development	Proposed Provision Rate	Provision under Proposed Rate		Proposed Provision
			Low-end	High-end	
Car Parking Space (5m x 2.5m x 2.4m)	Information Technology and Telecommunications Industries (21,820.50m²)	1 car space per 600-750m² GFA (1)	30 (30 nos. incl. Accessible Car Parking Space)	37 (37 nos. incl. Accessible Car Parking Space)	**37 (incl. Accessible Car Parking Space)**
Accessible Car Parking Space (5m x 3.5m x 2.4m)		1 car space for total provision of 1-50 nos. car parking spaces in lot (1)	1	1	**1**
Motorcycle Parking Spaces (1m x 2.4m x 2.4m)		5-10% of the total provision of private cars (1)	2	4	**4**
Loading / Unloading Bay for Goods Vehicles LGV: (7m x 3.5m x 3.6m) HGV: (11m x 3.5m x 4.7m)		For the first 20,000 m² GFA: 1 no. per 3,400-3,800 m² GFA (2)	5.26	5.88	**7**
		For the floor space above 20,000 m² GFA: 1 no. per 5,500-6,100 m² GFA (2)	0.48	0.54	
		Total	5.74 (6 nos.)	6.42 (7 nos.)	
		Loading / Unloading bays are to be provided as such: 60% for loading / unloading and 40% for parking (2); 65% are for LGV and 35% are for HGV (2)	Of the 6 nos.: LGV (Parking): 2 LGV (L/UL): 2 HGV (Parking): 1 HGV (L/UL): 1	Of the 7 nos.: LGV (Parking): 2 LGV (L/UL): 3 HGV (Parking): 1 HGV (L/UL): 1	**Of the 7 nos.:** **LGV (Parking): 2** **LGV (L/UL): 2** **HGV (Parking): 2** **HGV (L/UL): 1**

Notes:
(1) In accordance with HKPSG requirements.
(2) In accordance with TD's Departmental Circular No. 6/2012 – Standards for Goods Vehicle Parking and Loading/Unloading for Data Centres.

3.3.2 The proposed internal transport facilities will be provided on ground floor and basement parking floors of the subject development. Detailed allocations of the internal transport facilities are described as follows:

Car Parking Space Provision

3.3.3 A total of 37 nos. car parking spaces as per HKPSG high-end requirements will be provided. 10 sets of Mechanical Car Parking spaces (10×2=20 nos. car parking spaces) plus 2 nos. of conventional car parking spaces (including 1 no. accessible car parking space) will be provided on B1/F, and 15 nos. of conventional car parking spaces will be provided on B2/F, which will be accessed via LGV-lift system.

Motorcycle Parking Space Provision

3.3.4 A total of 4 nos. motorcycle parking spaces as per HKPSG requirements will be provided on B1/F and B2/F, which will be accessed via LGV-lift system.

Loading / Unloading Bay Provision

3.3.5 A total of 7 nos. loading/unloading bays (4 nos. for LGV on B1/F and 3 nos. for HGV on G/F) as per requirements under TD's Departmental Circular No. 6/2012 will be provided on G/F. The LGV loading/unloading bays on B1/F will be accessed via LGV lift-system.

3.3.6 The corresponding preliminary layout plans for ground floor and basement parking floors are demonstrated in **Figures 3.4** to **3.6**.

3.4 Swept Path Assessment

3.4.1 Swept path assessment for the critical movements of vehicles entering/leaving the application site and manoeuvring for loading/ unloading bays was carried out as demonstrated in **Figure 3.7**.

3.5 Car Lift Assessment

3.5.1 As mentioned in the **Section 3.3** earlier, LGVs, private cars and motorcycles accessing B1/F and B2/F will use the LGV lift from G/F.

3.5.2 Assessment and relevant queuing analysis have been conducted for vehicles waiting at G/F before entering the LGV lift, and the results are shown in **Table 3.5.1**.

Table 3.5.1 Assessment of LGV Lift Operation and Queuing Analysis

Assumptions	Parameters
Average Rate Estimation	
Total No. of Parking Stalls (on B1/F & B2/F)	45 nos.
No. of LGV lift	1 no.
Travelling speed of LGV lift	0.5 m/sec.
Maximum arrival rate in peak 15 minutes	3 vehicles

Estimated of Round Trip Time of LGV Lift (in sec)	
Door opening time at G/F	4.0
Manoeuvring time	21.0
Safety margin before door closes	2.0
Door closing time at G/F	4.0
Travelling time from G/F to B2/F	20.0
Door opening time at B2/F	4.0
Manoeuvring time	24.0
Safety margin before door closes	2.0
Door closing time at B2/F	4.0
Travelling time from B2/F to G/F	20.0
Total (Cycle Time)	105.0
Average Servicing Time and Rate	
Average Servicing Time (1/μ)	105.0
Average Servicing Rate (μ)	0.57
Average Servicing Rate (μ) per 15 Minutes	8.57
No. of Vehicles Arrived at Peak 15 Minutes (r)	3
Analysis Results	
Probability of the LGV lift available, P(0)	65.0%
Probability of the LGV lift in use, P(1)	22.8%
Probability of the LGV lift in use and 1 waiting space occupied, P(2)	8.0%
Probability of the LGV lift in use and more than 1 waiting space occupied, P(2+)	4.3%

3.5.3 The assessment shows that at 95% confidence interval, the probability of more than two vehicles in the proposed LGV-lift system only 4.3%. With provision of one waiting space for the LGV lift system, it is anticipated that the vehicles could be served by the proposed LGV-lift system without inducing any queue onto the public road.

3.5.4 Based on the assessment results, it is not likely that queuing of vehicles will extend onto the public road during AM and PM peak hours. In conclusion, the provision of one LGV lift and one waiting space for the proposed development will not generate any negative traffic impact onto the public road.

3.6 Mechanical Parking System Assessment

3.6.1 Mechanical parking system is proposed on B1/F in order to meet the high end of the required HKPSG car parking provision. For Mechanical Parking System Assessment, in order to fully demonstrate the worst-case scenario, it is assumed that all conventional parking spaces are

occupied, and vehicles are arriving for the mechanical parking spaces consecutively.

3.6.2 To demonstrate the critical scenario, the operation time of the mechanical parking system and the round-trip time for the LGV lift to travel between G/F and B1/F are summarised and presented in **Table 3.6.1** and **Table 3.6.2** below.

Table 3.6.1 Operation Time for Mechanical Parking System

Estimated Time for Using the Mechanical Parking System (1) (2)	**(sec)**
Manoeuvring time for **Vehicle 1** to leave LGV lift to the temporary waiting space (3)	10.0
Manoeuvring time for **Vehicle A** leaving the lower parking deck to internal driveway without blocking other internal traffic (3)	12.0
Lifting down the platforms of upper deck	15.0
Safety buffer	4.0
Manoeuvring time for **Vehicle 1** parking into upper deck (3)	25.0
Lifting up the platforms	17.0
Safety buffer	4.0
Manoeuvring time for **Vehicle A** parking into lower deck (3)	15.0
Total Cycle Time	**102.0**

Notes:
(1) Vehicle 1 is the arriving vehicle from GF to B1/F
(2) Vehicle A is the vehicle originally parking at the lower deck of the mechanical parking space.
(3) Manoeuvring time for vehicles are calculated with assumption of vehiclar speed at 5km/hr.

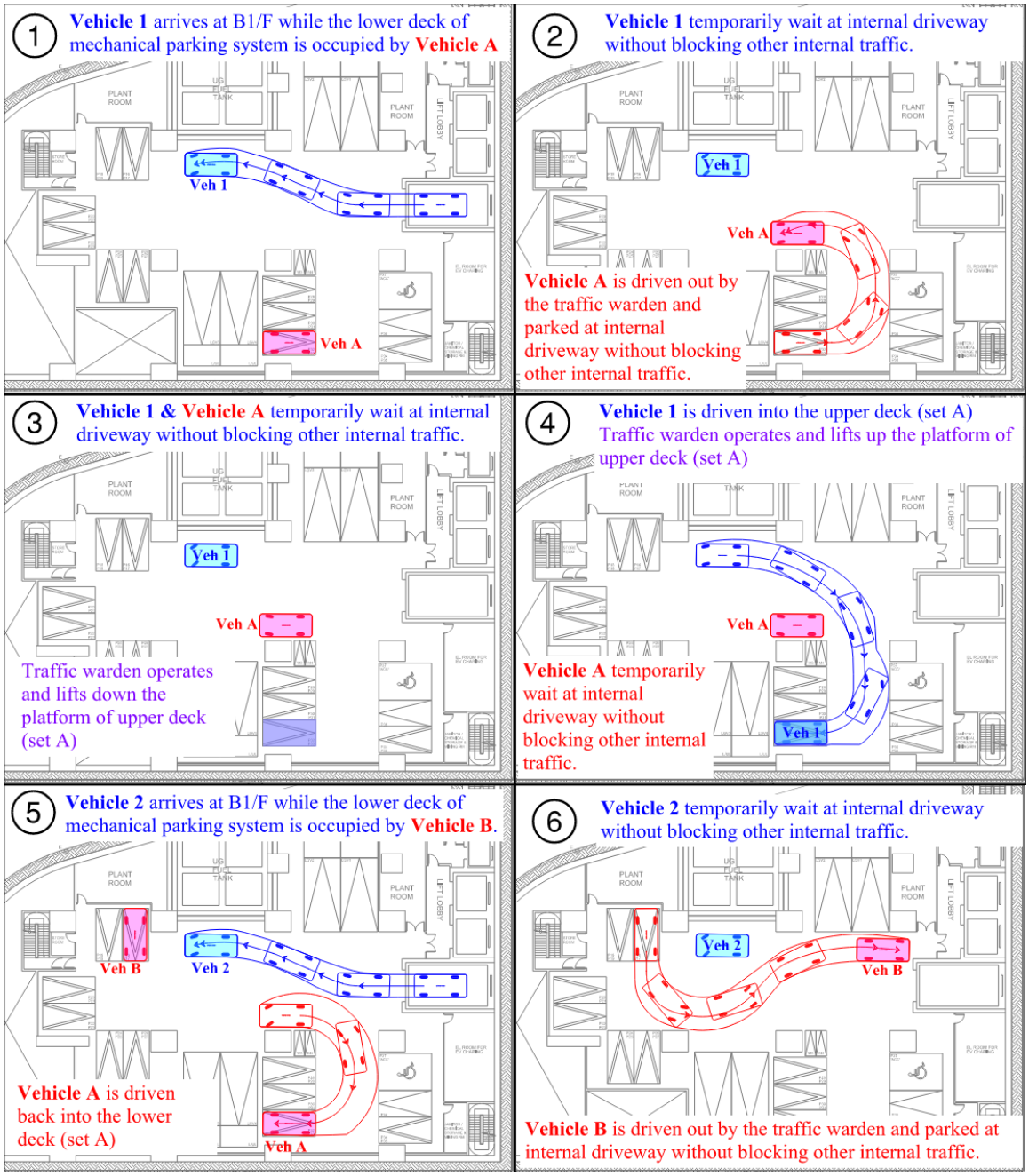
Table 3.6.2 Operation Time for LGV Lift system (G/F to B1/F)

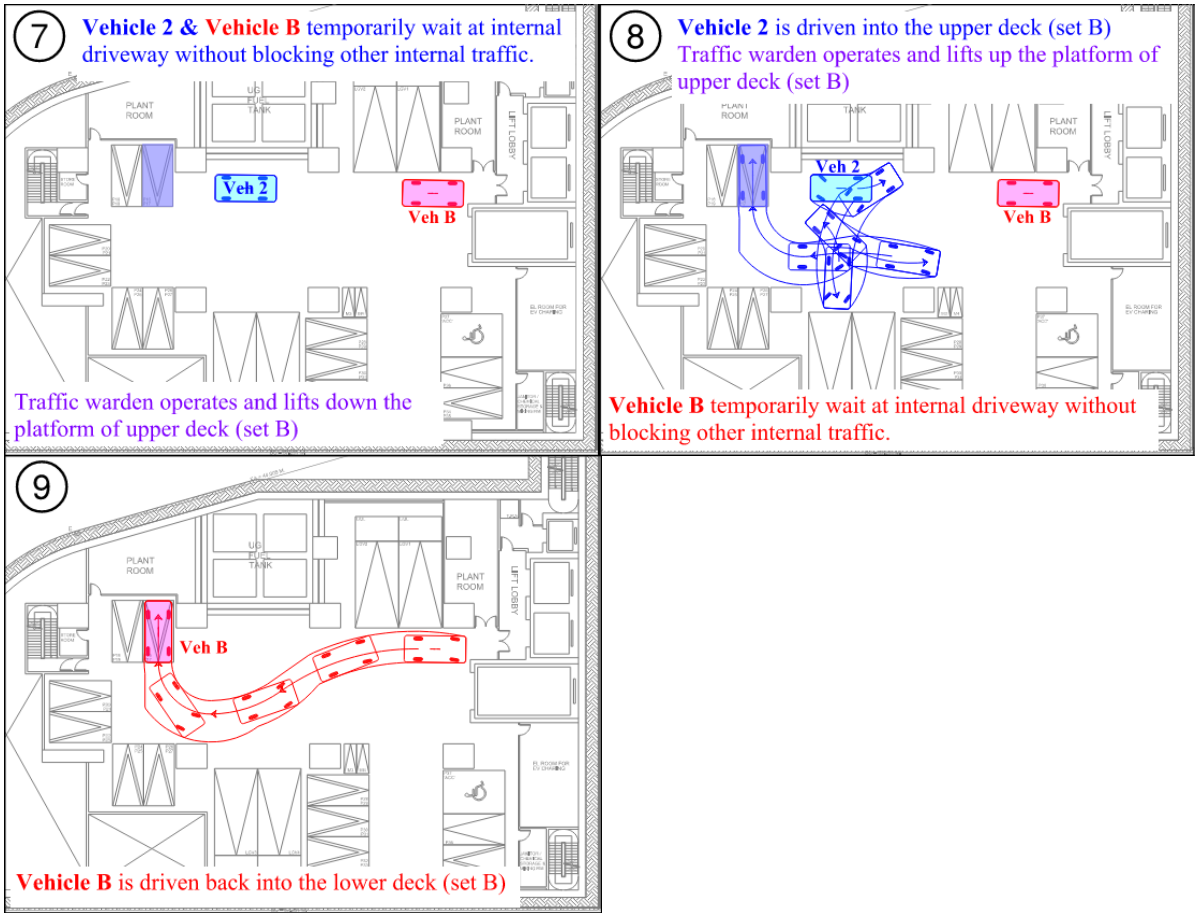
Estimated of Round-Trip Time of LGV Lift	**(sec)**
Door opening time at G/F	4.0
Manoeuvring time	21.0
Safety margin before door closes	2.0
Door closing time at G/F	4.0
Travelling time from G/F to B1/F	11.0
Door opening time at B1/F	4.0
Manoeuvring time	9.0
Safety margin before door closes	2.0
Door closing time at B1/F	4.0
Travelling time from B1/F to G/F	11.0
Total Cycle Time	**72.0**

3.6.3 Presented in **Table 3.6.1** and **Table 3.6.2** above, the overall process of the Mechanical Parking System and the LGV lift system round-trip time **(G/F to B1/F)** after all conventional parking spaces are occupied are 102

seconds and 72 seconds respectively. It is anticipated that in the most critical scenario, the 2nd vehicle will be arriving B1/F during the operation of the 1st set of mechanical parking space.

3.6.4 The above-mentioned critical scenario for the operation of mechanical parking system is illustrated below:





3.6.5 As shown the above illustration, there will be adequate space the operation of two sets of mechanical parking system simultaneously on B1/F without interlocking the internal traffic circulation. Therefore, the operation of the LGV Lift System is the critical path of the overall parking system (operation of Mechanical Parking System and the LGV Lift System).

3.6.6 As presented in **Chapter 3.5** above, with provision of one waiting space for the LGV lift system, it is anticipated that vehicles could be served by the proposed LGV-lift system without inducing any queue onto the public road. The proposed parking system will not generate any negative traffic impact onto the public road.

4 TRAFFIC IMPACT ASSESSMENT

4.1 Trip Generation and Attraction of Proposed Development

4.1.1 To establish appropriate trip generation and attraction rates for the proposed development, trip generation survey has been conducted on typical weekdays, 12th September 2019 and 19th December 2019 at the existing data centre developments in the vicinity. The trip generation and attraction of the surveyed data centre developments during peak hour is shown in **Table 4.1.1** below.

Table 4.1.1 Peak Hour Trip Generation and Attraction at the Surveyed Data Centres (pcu/hr)

Development		AM Peak		PM Peak	
		Generation	Attraction	Generation	Attraction
iTech Tower 1 at 28 Pak Tin Par Street, Tsuen Wan (17,652m^2 GFA)	Observed Trips (pcu/hr)	2.1	1	2	1
	Trip Rate (in pcu/hr/100m^2 GFA)	0.012	0.006	0.011	0.006
iTech Tower 2 at 54-56 Ta Chuen Ping Street, Kwai Chung (9,125m^2 GFA)	Observed Trips (pcu/hr)	2.5	3.5	2	0
	Trip Rate (in pcu/hr/100m^2 GFA)	0.027	0.038	0.022	0.000
NTT Communications Hong Kong Tai Po Data Center at 2 Dai Hei Street, Tai Po (19,700 m^2 GFA)	Observed Trips (pcu/hr)	9	6.1	7.1	13
	Trip Rate (in pcu/hr/100m^2 GFA)	0.046	0.031	0.036	0.066

4.1.2 For conservative assessment, the highest of the rates above were adopted for applying to the proposed development. The adopted trip generation and attraction rates and the associated trips of the proposed development are shown in **Table 4.1.2** below.

Table 4.1.2 Estimated Trip Generation and Attraction of the Proposed Development (pcu/hr)

Development		AM Peak		PM Peak	
		Generation	Attraction	Generation	Attraction
Adopted Trip Rate (in pcu/hr/100m^2 GFA)		0.046	0.038	0.036	0.066
Proposed Development with PR of 9.75 (18,183.75m²GFA)	Estimated Trips (pcu/hr)	8	7	7	12
Proposed Development with PR of 11.7 (21,820.50m² GFA)	Estimated Trips (pcu/hr)	10	8	8	14

4.1.3 As indicated in table above, the proposed development would generate a total of about 15 pcu/hr and 19 pcu/hr (two-way) during AM and PM peaks respectively for PR 9.75, and about 18 pcu/hr and 22 pcu/hr (two-way) during AM and PM peaks respectively for PR 11.7.

4.2 Adjacent Developments

4.2.1 In addition to the development flow, the traffic generated and attracted by adjacent major planned/committed developments in the vicinity of the proposed development were taken into account for the traffic forecast. Details of these adjacent planned developments are summarized in **Table 4.2.1** below. The location of the planned developments are indicated in **Figure 4.1**.

Table 4.2.1 Adjacent Planned Developments in the Vicinity

Adjacent Developments	Type	Parameters
Proposed Comprehensive Development for Flat, Eating Place, Shop and Services and Office at Kwai Chung Town Lot 432 and Adjoining Government Land, No. 1-7 Cheung Wing Road, Kwai Chung	Private Housing	1,336 flats
	Office + Retail	23,248 m^2 GFA
Proposed Industrial Redevelopment at No. 45-51 Kwok Shui Road, Kwai Chung	Industrial	13,472 m^2 GFA
Proposed Industrial-Office Redevelopment at No. 57-61 Ta Chuen Ping Street, Kwai Chung	Industrial - Office	26,336 m^2 GFA
Proposed Industrial Redevelopment at No. 20-24 Kwai Wing Road, Kwai Chung	Industrial	18,004 m^2 GFA
Proposed Industrial Redevelopment at No.2-16 Lam Tin Street, Kwai Chung	Industrial	21,181 m^2 GFA
Proposed Hotel Redevelopment at No. 4-30 Lei Muk Road, Kwai Chung	Hotel	780 rooms
Proposed Hotel Redevelopment on 2/F, Hotel Ease Tsuen Wan, 15-19 Chun Pin Street, Kwai Chung	Hotel	14 rooms
Proposed Residential Care Home for the Elderly at 1 Lei Muk Road DD450 Lot. 984RP	Residential	8,766 m^2 GFA

4.3 Future Traffic Growth

4.3.1 The proposed development is targeted for completion in Year 2024. In order to assess the traffic impact of the development-related traffic on the adjacent road network, Year 2027 (i.e. 3 years after completion) is adopted as the design year of the study.

Annual Traffic Census

4.3.2 Reference was made to Annual Traffic Census (ATC) on annual average daily traffic (AADT) at counting stations in the vicinity of the proposed development and the corresponding traffic flows are summarized in **Table 4.3.1** below.

Table 4.3.1 Annual Average Growth Rate by ATC

Stn No.	Location	2014 AADT	2015 AADT	2016 AADT	2017 AADT	2018 AADT	2019 AADT	Average Annual Growth from 2014 to 2019
5221	Cheung Wing Rd (between Wo Yi Hop Rd and Kwai Chung Rd)	39,780	40,530	41,650	42,420	40,980	43,680	+1.89% p.a.
5225	Wo Yi Hop Rd (between Tai Loong St and Lei Muk Rd)	14,690	14,970	15,380	15,660	14,090	14,040	-0.90% p.a.
5226	Lei Muk Rd (between Wo Yi Hop Rd and Chun Pin St)	6,700	6,830	7,020	7,140	5,220	7,280	+1.67% p.a.
5431	Wo Yi Hop Rd (between Lei Muk Rd and Cheung Wing Rd)	27,720	21,630	22,230	22,640	22,970	28,020	+0.22% p.a.
6024	Lei Muk Rd (Castle Peak Rd – Kwai Chung and Chun Pin St)	3,820	3,890	4,000	4,060	4,010	4,000	+0.93% p.a.
6046	Lei Muk Rd (between Wo Yi Hop Rd and Tung Chi St)	11,530	11,740	12,070	10,980	10,980	10,940	-1.05% p.a.
6639	Chun Pin St (between Ta Chuen Ping St and Lei Muk Rd)	5,200	5,560	5,330	5,980	6,460	6,330	+4.01% p.a.
5025	Castle Peak Rd - Kwai Chung (between Kwai Chung Rd RA and Wo Yi Hop Road)	17,360	17,860	17,840	17,910	23,020	19,880	+2.75% p.a.
6005	Kwai Chung Rd (between Tai Lin Pai Rd and Castle Peak Rd - Kwai Chung INT)	57,810	59,460	59,380	60,970	45,480	44,080	-5.28% p.a.
Overall flow		**184,610**	**182,470**	**184,900**	**187,760**	**173,210**	**178,250**	**-0.70% p.a.**

4.3.3 The ATC historic data indicates a negative growth of traffic in recent years in the region with around **-0.70% p.a.**

Territorial Population and Employment Data Matrix (TPEDM)

4.3.4 Reference was also made to 2016-based TPEDM published by Planning Department. **Table 4.3.2** below summarizes the estimated and projected population and employment data as well as their respective annual average growth rate of Kwai Chung District in 2016, 2021 and 2026.

Table 4.3.2 Annual Average Growth Rate of Kwai Chung District by TPEDM

Year	2016	2021	2026
Population	327,000	325,550	319,950
Employment	202,700	198,250	192,850
TOTAL	529,700	523,800	512,800
Annual Average Growth Rate	-	**-0.32%** (from 2016 to 2026)	**-0.42%** (from 2021 to 2026)

4.3.5 From the table above, the annual average growth rate of population and employment in Kwai Chung District from 2016 to 2026 is -0.32%p.a. and that from 2021 to 2026 is -0.42% p.a.

4.3.6 The average annual growth rate determined from ATC is -0.70% p.a., and that of TPEDM ranges from -0.32% to -0.42% p.a. For conservative purpose, growth rate of **+1% p.a.** is adopted to produce the traffic forecast for 2020–2027.

4.4 Assessment Scenarios

4.4.1 To evaluate the associated traffic impact likely to be induced by the proposed 20% increase in PR for the proposed development, two scenarios were analysed and compared.

4.4.2 The first scenario (i.e. Year 2027 Reference Scenario) assumed that the proposed development with the permitted PR 9.75 (i.e. **without** 20% increase in PR) is in place, whereas the second scenario (i.e. Year 2027 Design Scenario) assumed that the proposed development with the proposed PR 11.7 (i.e. **with** 20% increase in PR) is in place.

Year 2027 Reference Scenario (Scenario 1)

= Year 2020 observed traffic flows × growth factor during the period of year 2020-2027

Plus traffic generations of other major planned/committed developments in the vicinity

Plus trips generated and attracted by the proposed development with PR 9.75 (i.e. **without** 20% increase in PR)

Year 2027 Design Scenario (Scenario 2)

= Year 2020 observed traffic flows × growth factor during the period of year 2020-2027

Plus traffic generations of other major planned/committed developments in the vicinity

Plus trips generated and attracted by the proposed development with PR 11.7 (i.e. **with** 20% increase in PR)

4.4.3 The forecasted traffic flows for the above two scenarios are presented in **Figures 4.2** and **4.3** respectively.

4.5 Junction Capacity Assessment

4.5.1 Junction capacity assessment was carried out at the identified key junctions for Year 2027 Reference and Design Scenarios. Assessment results are summarized in **Table 4.5.1** below.

Table 4.5.1 Year 2027 Future Junction Performance

Junction		Type	Performance (1)			
			2027 Reference		2027 Design	
			AM	PM	AM	PM
J1	Castle Peak Road - Kwai Chung Interchange	Priority	1.19	1.12	1.19	1.12
J2	Cheung Wing Road / Kwok Shui Road	Signalized	28%	29%	28%	29%
J3	Castle Peak Road - Kwai Chung / Kwai Chung Road (2)	Signalized	37%	27%	37%	26%
J4	Lei Muk Road / Castle Peak Road (2)	Priority	0.20	0.22	0.20	0.22
J5	Tai Yuen Street / Kwok Shui Road (3)	Priority	0.35	0.31	0.36	0.31
J6	Kwok Shui Road / Lei Muk Road (4)	Signalized	10%	22%	10%	22%
J7	Chun Pin Street / Lei Muk Road (4)	Priority	0.73	0.76	0.73	0.76
J8	Lei Muk Road / Wo Yi Hop Road (2)	Signalized	51%	46%	51%	45%
J9	Wo Yi Hop Road / Cheung Wing Road (2)	Signalized	33%	52%	33%	52%

Notes:
(1) Figures shown represent "Reserve Capacity" (RC) in % for signalized junctions and "Design Flow Capacity" (DFC) ratio for priority junctions.
(2) Junction parameter assumptions are taken into account to reflect the actual traffic conditions.
(3) Taken into account the existing kerbside activities at Tai Yuen Street in the calculations.
(4) Taken into account the existing kerbside activities at Lei Muk Road in the calculations.

4.5.2 The above results revealed that the identified key junctions would operate within capacity with the proposed development in Year 2027, except J1 and J6.

4.5.3 The results also reveal that the junction performances at **J1** and **J6** are the same under the Reference Scenario (i.e. **without** 20% increase in PR) and the Design Scenario (i.e. **with** 20% increase in PR) during both AM and PM peak hours.

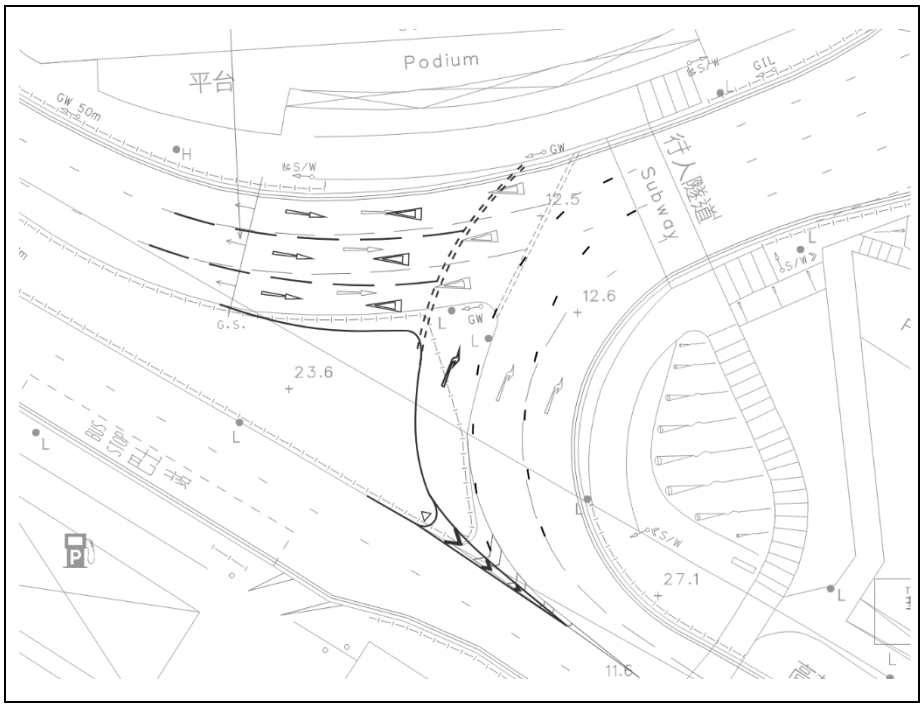
4.5.4 The traffic loading due to the proposed increase in PR onto J1 and J6 is considered minimal due to insignificant decrease in junction performance.

4.5.5 It is anticipated that the implication to the identified key junctions associated with the proposed 20% increase in PR for the proposed development in Year 2027 would be minimal. In other words, the proposed development would not generate significant impact onto the identified key junctions due to minimal traffic contribution to those junctions from such small-scale site.

4.5.6 Considered the junction capacity for junction J1 – Castle Peak Road - Kwai Chung Interchange and junction J6 – Kwok Shui Road / Lei Muk Road are overloaded even in the Reference Scenario, junction improvement proposals have been explored in order to improve the performance of these junctions.

J1 – Castle Peak Road - Kwai Chung Interchange

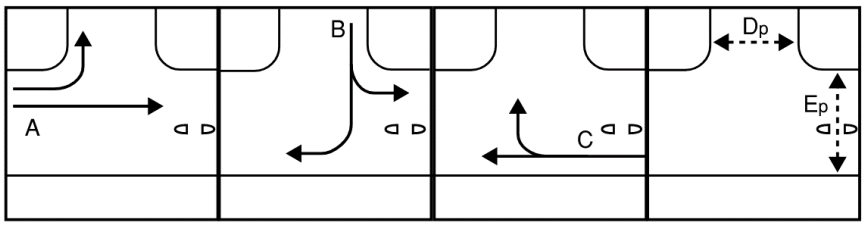
4.5.7 For junction J1 – Castle Peak Road - Kwai Chung Interchange, possible improvement proposal is suggested by provision of additional traffic lane underneath the at the Castle Peak Road - Kwai Chung Flyover, as shown below.



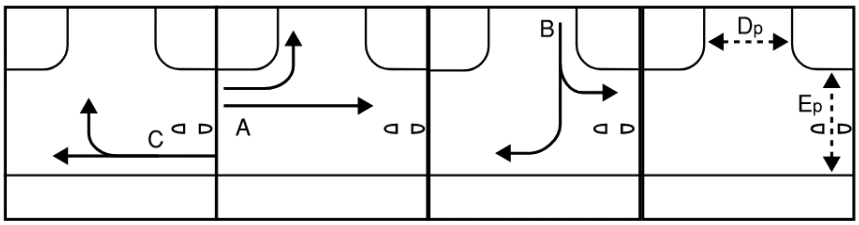
J6 – Kwok Shui Road / Lei Muk Road

4.5.8 For junction J6 – Kwok Shui Road / Lei Muk Road, possible improvement proposal is suggested modifying the method-of-control (MOC) plan (i.e. re-arrangement of the existing MOC) to reduce loss time at the junction, as shown below.

Current MOC Plan Sequence



Proposed MOC Plan Sequence



4.5.9 Taking into consideration that the junction performances at **J1** and **J6** are the same under the Reference Scenario (i.e. **without** 20% increase in PR) and the Design Scenario (i.e. **with** 20% increase in PR) during both AM and PM peak hours.

4.5.10 The traffic loading due to the proposed increase in PR onto J1 and J6 is considered minimal due to insignificant decrease in junction performance. The proposed improvement of **J1** and **J6** should be carried out and initiated by the Government from a district-wide and strategic level.

4.5.11 With these improvements, junctions J1 and J6 have been assessed and the junction performance are summarized in **Table 4.5.2** below.

Table 4.5.2 Year 2027 Future Junction Performance - with Junction Improvement

Junction		Type	Performance (1) 2027 Design	
			AM	PM
J1	Castle Peak Road - Kwai Chung Interchange	Priority	0.99	0.96
J6	Kwok Shui Road / Lei Muk Road (2)	Signalized	18%	31%

Notes:
(1) Figures shown represent "Reserve Capacity" (RC) in % for signalized junctions and "Design Flow Capacity" (DFC) ratio for priority junctions.
(2) Taken into account the existing kerbside activities at Lei Muk Road in the calculations.

4.5.12 The above results revealed that under the Design Scenario in Year 2027, the DFC of J1 would be improved from 1.19 and 1.12 to 0.99 and 0.97 for AM peak and PM peak hour respectively. And the reserve capacity of J6 would be improved from 10% and 22% to 18% and 31% for AM peak and PM peak hour respectively. under the Design Scenario in Year 2027.

4.5.13 With the above improvement proposals, it is anticipated that the performance of junctions J1 and J6 would be enhanced and operate within capacity with the proposed development in Year 2027.

4.6 Link Capacity Assessment

4.6.1 The link capacity assessment of Kwok Shui Road and Lei Muk Road has been carried out for Year 2027 Reference and Design scenarios and the results are summarized in **Table 4.6.1** below.

Table 4.6.1 Year 2027 Future Link Performance

Road Link	Link Capacity (pcu/hr)	Traffic Flows (pcu/hr)				Volume/Capacity (V/C) Ratio			
		2027 Reference		2027 Design		2027 Reference		2027 Design	
		AM	PM	AM	PM	AM	PM	AM	PM
Kwok Shui Road	900 (1)	600	565	605	565	0.67	0.63	0.67	0.63
Lei Muk Road	900 (1),(2)	505	445	505	445	0.56	0.49	0.56	0.49

Notes:
(1) Link capacity in pcu/hr was derived from link capacity of 800veh/hr for 2-lane single carriageway with the presence of loading activities, standing vehicles and pedestrian crossings in TPDM Vol.2 Ch.2.4.
(2) Taking into account the illegal on-street parking along the kerbside.

4.6.2 The results reveal that the road link performance of Kwok Shui Road and Lei Muk Road will be operating with ample capacity during both morning and evening peak hours in design year 2027 under both Reference and Design Scenario. The road link performance are the same under both Reference Scenario and Design Scenario. It is anticipated that the implication to the road links of Kwok Shui Road and Lei Muk Road associated with the proposed development would be minimal.

4.7 Pedestrian Impact Assessment

Pedestrian Generation

4.7.1 To establish appropriate pedestrian generation and attraction rates for the proposed development, pedestrian count survey has been conducted on typical weekdays at the existing data centres in the vicinity. The surveyed pedestrian generation and attraction flow during peak hours are summarized in **Table 4.7.1** below.

Table 4.7.1 Peak Hour Pedestrian Generated and Attracted at the Surveyed Data Centres

Development Schedule GFA (m^2)		AM		PM	
		Gen	Att	Gen	Att
iTech Tower 1 at 28 Pak Tin Par Street, Tsuen Wan (17,652m^2 GFA)	Observed Trips (ped/hr)	7	25	38	13
	Trip Rate (in ped/hr/100m^2 GFA)	0.040	0.142	0.215	0.074
iTech Tower 2 at 54-56 Ta Chuen Ping Street, Kwai Chung (9,125m^2 GFA)	Observed Trips (ped/hr)	5	33	26	8
	Trip Rate (in ped/hr/100m^2 GFA)	0.055	0.362	0.285	0.088
Adopted Trip Rate (ped/ hr/100m^2 GFA)		**0.055**	**0.362**	**0.285**	**0.088**

4.7.2 For conservative assessment, the highest of the rates above were adopted and applied in order to estimate the pedestrian generation for the proposed development. The additional pedestrians generated and attracted due to the 20% increase in PR in is summarized in **Table 4.7.2** below.

Table 4.7.2 Pedestrians Generated and Attracted by Proposed Development

Development Schedule GFA (m^2)		Pedestrian Flow (ped/ hr)			
		AM		PM	
		Gen	Att	Gen	Att
Proposed Development with PR 9.75	18,183.75	10	66	52	16
Proposed Development with PR 11.7	21,820.50	12	79	63	20

4.7.3 As indicated in **Table 4.7.2** above, the proposed development would generate a total of 76 and 68 ped/hr (two-way) during AM and PM peaks for PR 9.75, and a total of 91 and 83 ped/hr (two-way) during AM and PM peaks for PR 11.7.

Assessment Scenarios

4.7.4 Similar to the traffic impact assessment, year 2027 is adopted as the design year of pedestrian assessment. Annual growth rate of +**1% p.a.** is adopted to produce the pedestrian forecasts for 2020–2027 to derive year 2027 peak hour background pedestrian flows. Additionally, the future pedestrian volumes generated by the proposed development are taken into account for year 2027 pedestrian flows.

4.7.5 Similarly, to evaluate the associated pedestrian impact likely to be induced by the proposed 20% increase in PR for the proposed development, two scenarios were analysed and compared.

4.7.6 The first scenario (i.e. Year 2027 Reference Scenario) assumed that the proposed development with the existing PR 9.75 (i.e. **without** 20% increase in PR) is in place.

4.7.7 The second scenario (i.e. Year 2027 Design Scenario) assumed that the proposed development with the proposed PR 11.7 (i.e. **with** 20% increase in PR) is in place.

Year 2027 Reference Scenario (Scenario 1)

= Year 2020 observed pedestrian flows × growth factor during the period of year 2020-2027

Plus pedestrian trips generated and attracted by the proposed development with PR 9.75 (i.e. **without** 20% increase in PR)

Year 2027 Design Scenario (Scenario 2)

= Year 2020 observed pedestrian flows × growth factor during the period of year 2020-2027

Plus pedestrian trips generated and attracted by the proposed development with PR 11.7 (i.e. **with** 20% increase in PR)

Performance of Pedestrian Facilities in Year 2027

4.7.8 In order to address the performance of the concerned pedestrian facilities, Level of Service (LOS) assessment of the critical footpaths have been conducted for Year 2027 Reference and Design Scenarios.

4.7.9 **Table 4.7.3** and **Table 4.7.4** summarized the peak pedestrian flow and the pedestrian assessment results at the critical footpaths under the Year 2027 Reference and Design Scenarios.

Table 4.7.3 Design Year 2027 Level of Service in AM and PM Peaks along Key Footpath under Reference Scenario (i.e. with permitted PR 9.75)

Footpath		Actual Width (m)	Effective Clear Width (1) (m)	Two-way Peak 15-minute Flow (ped/15-min)		Flow Rate(2) (ped/min/m)		LOS (Level)	
				AM	PM	AM	PM	AM	PM
F1	Tai Yuen Street Footpath (Without 2m setback)	1.7	0.7	260	225	30	26	C	C
F2	Kwok Shui Road Footpath (Without 2m setback)	2.7	1.7	210	195	10	10	A	A

Notes:
(1) Effective clear width = Actual width (on-site measurement) minus 0.5m dead width on both sides.
(2) Pedestrian flow rates are computed based on effective clear width, with 1.2 peak factor applied for the peak minute flow rate.

Table 4.7.4 Design Year 2027 Level of Service in AM and PM Peaks along Key Footpath under Design Scenario (i.e. with proposed PR 11.7)

Footpath		Actual Width (m)	Effective Clear Width (1) (m)	Two-way Peak 15-minute Flow (ped/15-min)		Flow Rate(2) (ped/min/m)		LOS (Level)	
				AM	PM	AM	PM	AM	PM
F1	Tai Yuen Street Footpath (With 2m setback)	3.7	2.7	260	230	8	7	A	A
F2	Kwok Shui Road Footpath (With 2m setback)	4.7	3.7	210	195	5	5	A	A

Notes:
(1) Effective clear width = Actual width (on-site measurement) minus 0.5m dead width on both sides.
(2) Pedestrian flow rates are computed based on effective clear width, with 1.2 peak factor applied for the peak minute flow rate.

4.7.10 As shown in **Table 4.7.4** above, with the proposed setback at Tai Yuen Street and Kwok Shui Road by the proposed development, the walking condition on the critical footpath in the vicinity of the application site is desirable during both AM and PM peaks in Year 2027. No adverse pedestrian impact will be generated by the proposed development.

4.7.11 In the view the footpath on Tai Yuen Street and Kwok Shui Road are widened to 3.7m and 4.7m respectively with the 2m full-height setback by the Applicant, it is proposed to install bollards along the site frontage of Tai Yuen Street to deter the potential illegal parking on footpath to enhance pedestrian safety. The proposed bollards are shown on **Figure 3.4**.

5 CONCLUSION

5.1 Summary

5.1.1 The Applicant intends to redevelop the existing industrial building at No. 2-10 Tai Yuen Street, which was occupied before 1987, to information technology and telecommunications industries use (Data Centre), in consideration of the proposed 20% increase in PR restriction (from the existing PR 9.75 to the proposed PR 11.7).

5.1.2 This is in echo of the 2018 Policy Address to encourage owners to redevelop industrial buildings constructed before 1987 by allowing relaxation of the maximum permissible non-domestic PR by up to 20% for redevelopment projects of these pre-1987 industrial buildings.

5.1.3 A Traffic Impact Assessment (TIA) study was carried out to evaluate the likely traffic impact associated with the proposed development in support of the Section 16 application for enabling the proposal at the application site.

5.1.4 The proposed provision of internal parking and servicing facilities for the proposed development is in full compliance with the HKPSG high-end requirements and the requirement under the Departmental Circular No. 6/2012. The goods vehicle loading/unloading area will be located on G/F for HGVs and B1/F for LGVs, the car park will be located on B1/F and B2/F. Vehicles will access to/from the subject development through the vehicular access located at Tai Yuen Street. LGV, private cars and motorcycles will access to/from the basement car parking floors via LGV-lift system.

5.1.5 Car lift assessment has been conducted and the assessment results revealed that it is not likely that queuing of vehicles will extend onto the public road during AM and PM peak hours. The provision of one LGV lift and one waiting space for the proposed development will not generate any negative traffic impact onto the public road.

5.1.6 The identified key junctions in the vicinity were assessed with respect to traffic generation of the proposed development upon Year 2027 (3 years after the target Completion Year 2024), taking into account the traffic generation by the major planned/committed developments in the vicinity.

5.1.7 Traffic impact assessment scenarios were set up for the proposed development, namely Year 2027 Reference Scenario (the site occupied by the proposed development without 20% increase in PR, i.e. with PR 9.75) and Year 2027 Design Scenario (the site occupied by the proposed development with 20% increase in PR, i.e. with PR 11.7).

5.1.8 Assessment results show revealed that the identified key junctions would operate within capacity with the proposed development in Year 2027, except J1 and J6. Nevertheless, the junction performances at J1 and J6 are the same under the Reference Scenario (i.e. without 20% increase in PR) and the Design Scenario (i.e. with 20% increase in PR) during both AM and PM peak hours.

5.1.9 Possible improvement proposals were also suggested for J1 and J6. With the above-mentioned, it is considered that the traffic impact due to the proposed development is insignificant and could be accommodated by the surrounding road network.

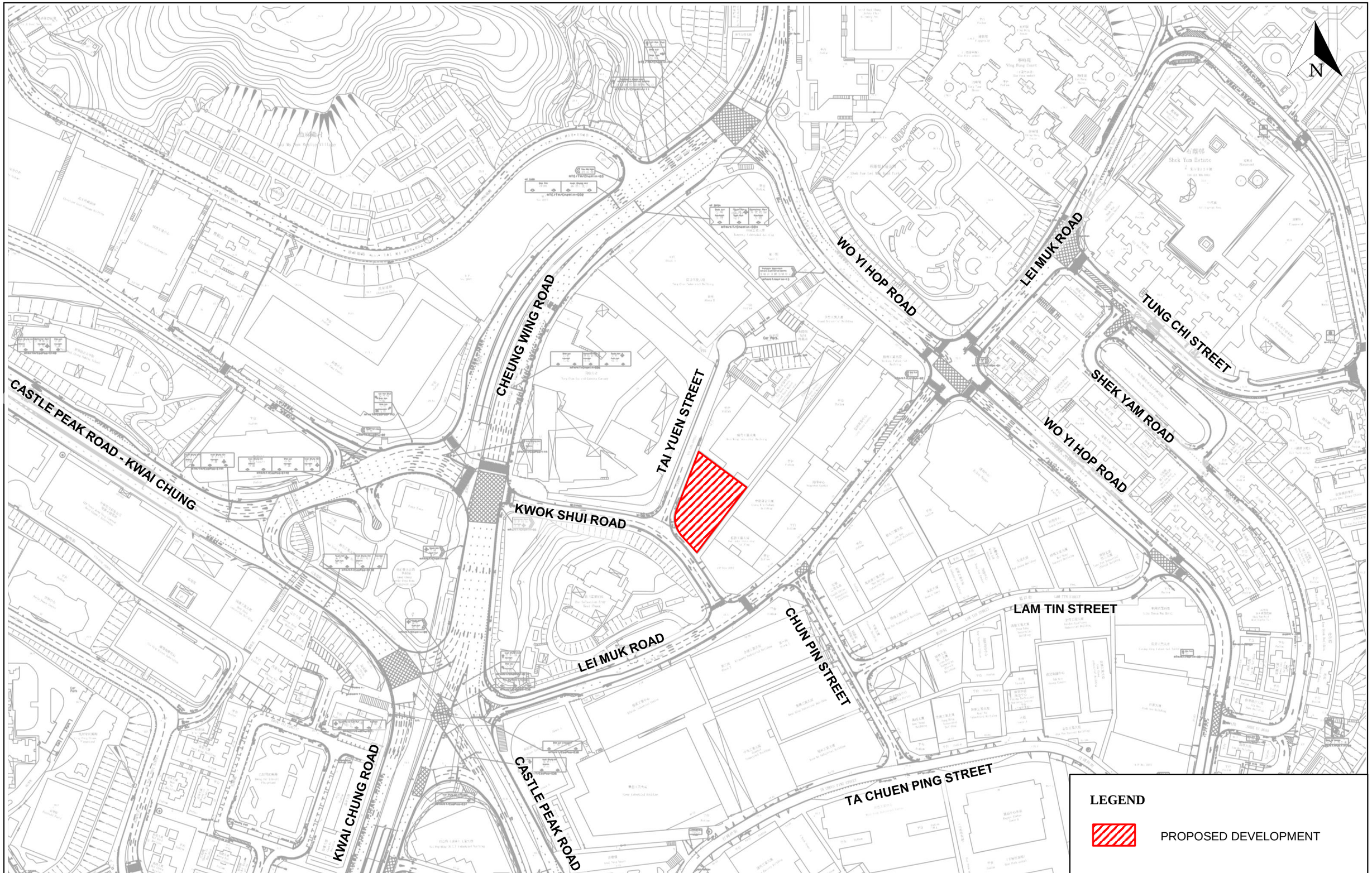
5.1.10 The link capacity assessment results reveal that the road link performance of Kwok Shui Road and Lei Muk Road will be operating with ample capacity during both morning and evening peak hours in design year 2027 under both Reference and Design Scenario. It is anticipated that the implication to the road links of Kwok Shui Road and Lei Muk Road associated with the proposed development would be minimal.

5.1.11 Pedestrian impact assessment has been conducted and the results indicated that with the proposed setback at Tai Yuen Street and Kwok Shui Road by the proposed development, the walking condition on the critical footpath in vicinity of the application site is desirable during both AM and PM peaks in Year 2027. No adverse pedestrian impact will be generated by the proposed development.

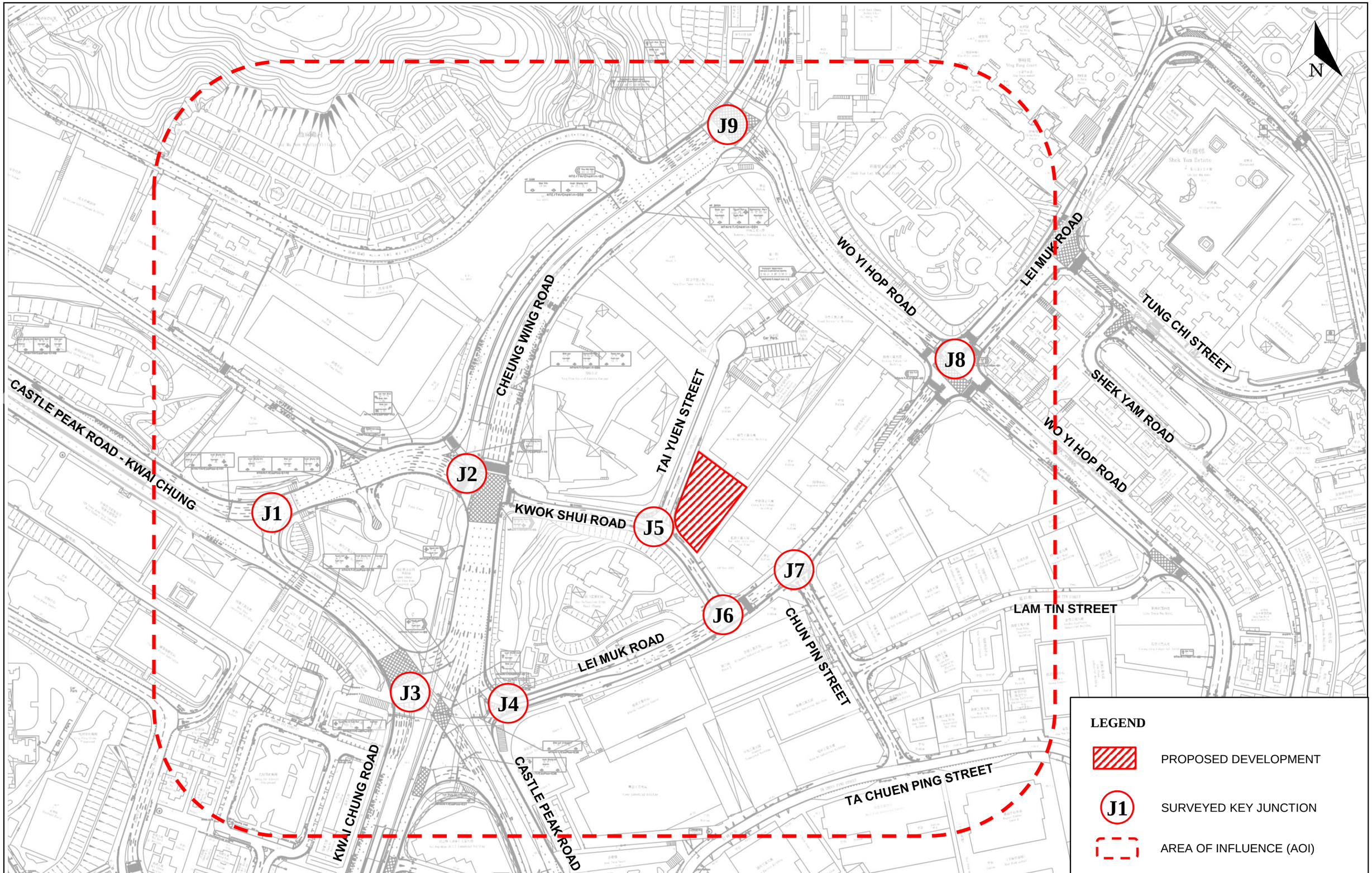
5.2 Conclusion

5.2.1 It could be concluded that the proposed development will not impose any adverse traffic impact on the surrounding road network and pedestrian walking condition, and thus is feasible from the traffic engineering point of view.

Figures



Job Title	**PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**
	FIGURE 1.1
Date: 11/2020	Scale: N.T.S
Drawn: KSIY	Job No.: 276306-24
Drawing Title	LOCATION OF APPLICATION SITE
	ARUP



Job Title	**PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**
Date	11/2020
Scale	N.T.S
Drawn	KSIY
Job No.	276306-24
Drawing Title	LOCATION OF SURVEYED JUNCTIONS IN THE VICINITY OF PROPOSED DEVELOPMENT

FIGURE 2.1

ARUP



LEGEND

PROPOSED DEVELOPMENT

PM PEAK TRAFFIC FLOW (PCU/HOUR)

100 (100)

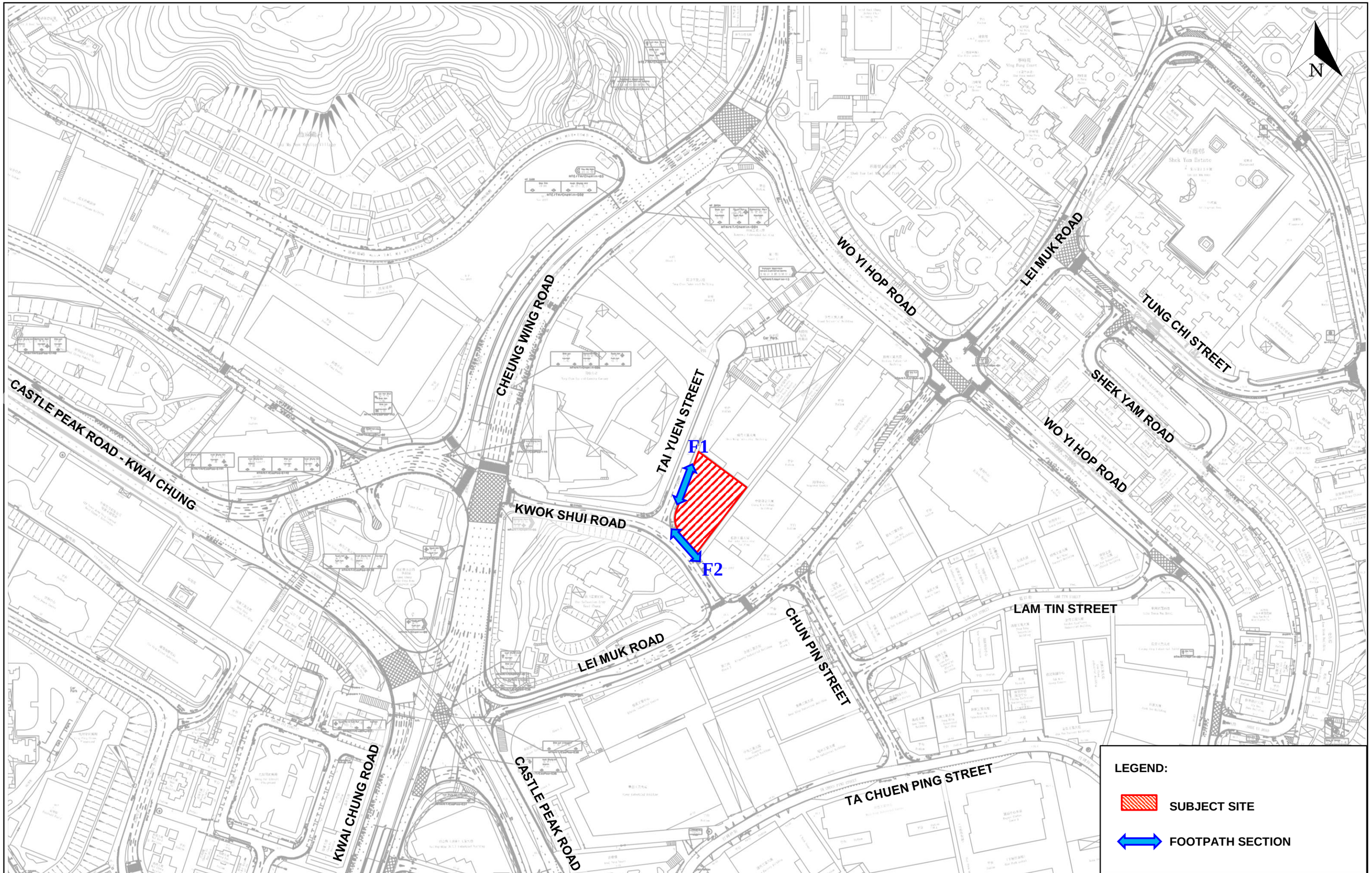
AM PEAK TRAFFIC FLOW (PCU/HOUR)

Job Title **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

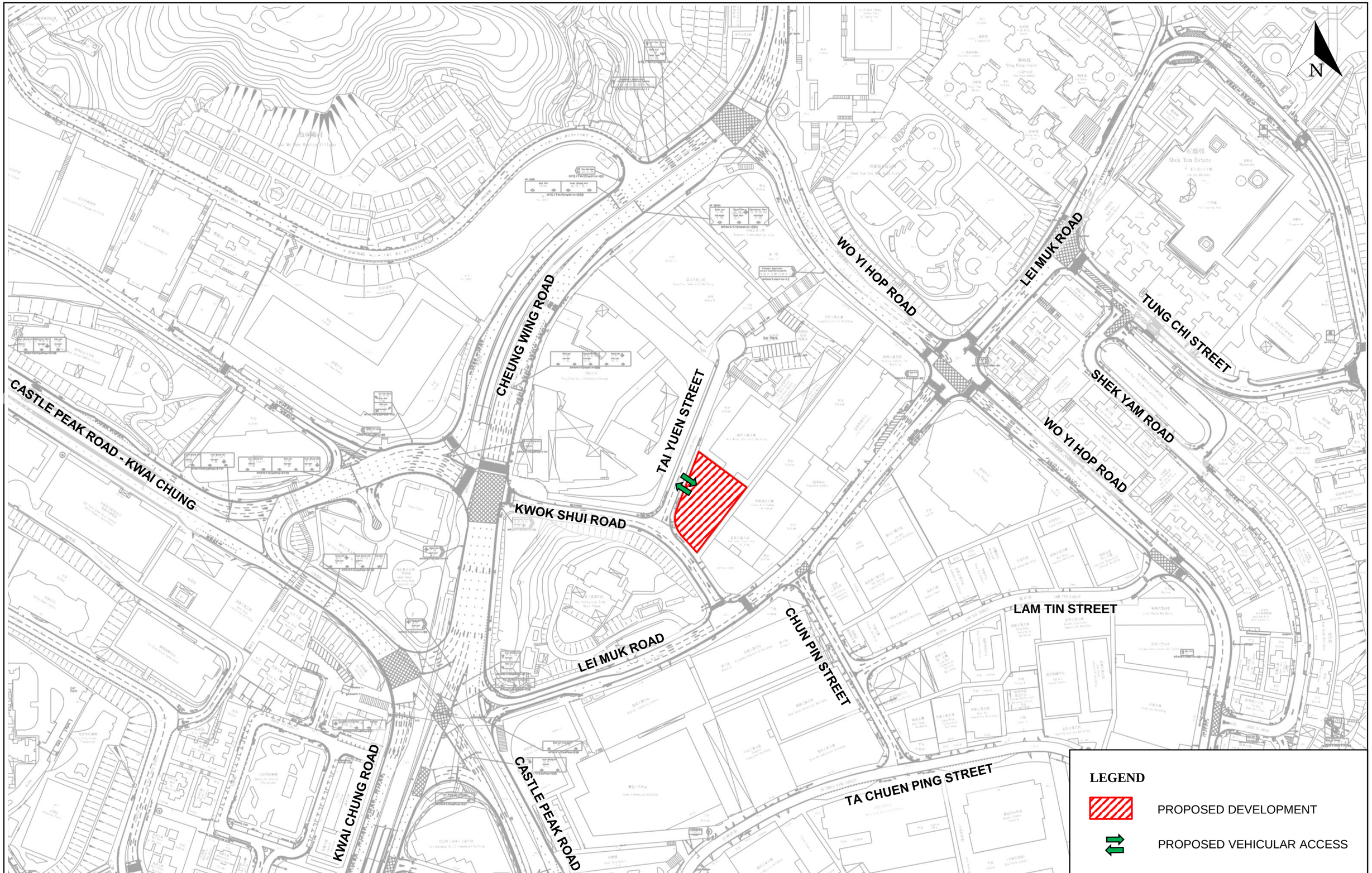
FIGURE 2.2

Date	Scale	Drawing Title
11/2020	N.T.S	YEAR 2020 EXISTING TRAFFIC FLOW
Drawn	Job No.	
KSIY	276306-24	

ARUP



Job Title	**PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**
	FIGURE 2.3
Date: 11/2020	Scale: N.T.S
Drawn: KSIY	Job No.: 276306-24
Drawing Title	PEDESTRIAN FACILITIES ALONG MAJOR PEDESTRIAN ROUTES JUNCTIONS IN THE VICINITY OF PROPOSED DEVELOPMENT
	ARUP



Job Title **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

FIGURE 3.1

Date	Scale
11/2020	N.T.S
Drawn	Job No.
KSIY	276306-24

Drawing Title

PROPOSED VEHICULAR ACCESS OF PROPOSED DEVELOPMENT

ARUP

Development Flow (pcu/hr)	AM	PM
Proposed Development	8	14

From Castle Peak Road - Kwai Chung and Kwai Chung Road		
Development Flow (pcu/hr)	AM	PM
Proposed Development	5	9

From Wo Yi Hop Road and Kwai Chung Road overpass		
Development Flow (pcu/hr)	AM	PM
Proposed Development	3	5

CASTLE PEAK ROAD - KWAI CHUNG
CHEUNG WING ROAD
KWOK SHUI ROAD
TAI YUEN STREET
WO YI HOP ROAD
LEI MUK ROAD
TUNG CHI STREET
SHEK YAM ROAD
WO YI HOP ROAD
CHUN PIN STREET
LAM TIN STREET
KWAI CHUNG ROAD
CASTLE PEAK ROAD
TA CHUEN PING STREET
N

LEGEND

- PROPOSED DEVELOPMENT
- INGRESS ROUTE
- INGRESS ROUTE (OVERPASS)

Job Title **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

FIGURE 3.2

Date	Scale
11/2020	N.T.S
Drawn	Job No.
KSIY	276306-24

Drawing Title

INGRESS VEHICULAR ROUTES OF PROPOSED DEVELOPMENT

ARUP

Development Flow (pcu/hr)	AM	PM
Proposed Development	10	8

To Kwai Chung Road and Castle Peak Road – Kwai Chung		
Development Flow (pcu/hr)	AM	PM
Proposed Development	4	3

To Wo Yi Hop Road		
Development Flow (pcu/hr)	AM	PM
Proposed Development	3	3

To Castle Peak Road		
Development Flow (pcu/hr)	AM	PM
Proposed Development	3	2

LEGEND

PROPOSED DEVELOPMENT

EGRESS ROUTE

CASTLE PEAK ROAD - KWAI CHUNG

CHEUNG WING ROAD

TAI YUEN STREET

KWOK SHUI ROAD

WO YI HOP ROAD

LEI MUK ROAD

TUNG CHI STREET

SHEK YAM ROAD

WO YI HOP ROAD

LAM TIN STREET

CHUN PIN STREET

LEI MUK ROAD

KWAI CHUNG ROAD

CASTLE PEAK ROAD

Job Title **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

FIGURE 3.3

Date	Scale
11/2020	N.T.S
Drawn	Job No.
KSIY	276306-24

Drawing Title

EGRESS VEHICULAR ROUTES OF PROPOSED DEVELOPMENT

ARUP

TAI YUEN STREET

KWOK SHUI ROAD

SERVICE LANE

PROPOSED BOLLARDS ARRANGEMENT

PROPOSED BOLLARDS ARRANGEMENT

GLASS CANOPY ABOVE

2M FULL HEIGHT SETBACK

2M FULL HEIGHT SETBACK

7300

EA = 44.005 M.

RUN IN / OUT

VERTICAL GREENING

ENTRANCE LOBBY

UNDERGROUND FUEL TANK

FUEL TANK PUMP ROOM

FUEL INLET

SECURITY OFFICE

F.S. CONTROL CENTRE

UNISEX LAV.

CARGO LIFT LOBBY

CABLE RISER A

BUILDING LINE (2/F) ABOVE

PLANT ROOM

132kV TRANSFORMER ROOM 'A'

RMU 'A'

Ø11000 TURN TABLE

HGV1

HGV2

HGV3

WAITING SPACE

PLANT ROOM

RMU 'B'

132kV TRANSFORMER ROOM 'B'

REFUSE STORGE AND MATERIAL RECOVERY CHAMBER

SPRINKLER CONTROL VALUE ROOM

PLANT ROOM

CABLE RISER B

L/UL

L/UL

DE = 20.106 M.

DD = 15.878 M.

AB = 42.293 M.

BC = 57.251 M.

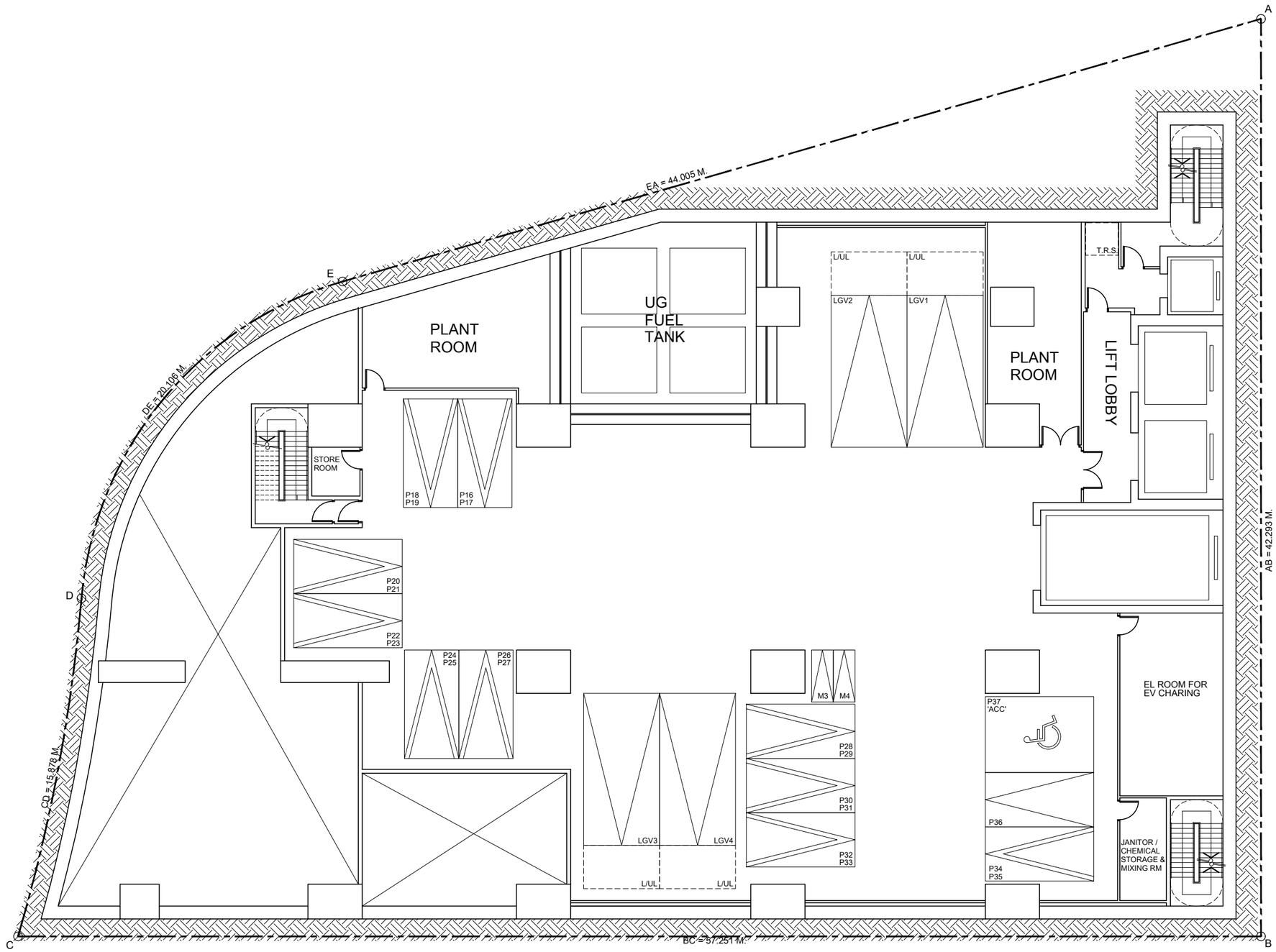
ADJOINING BUILDING

GROUND FLOOR PLAN

LEGEND:

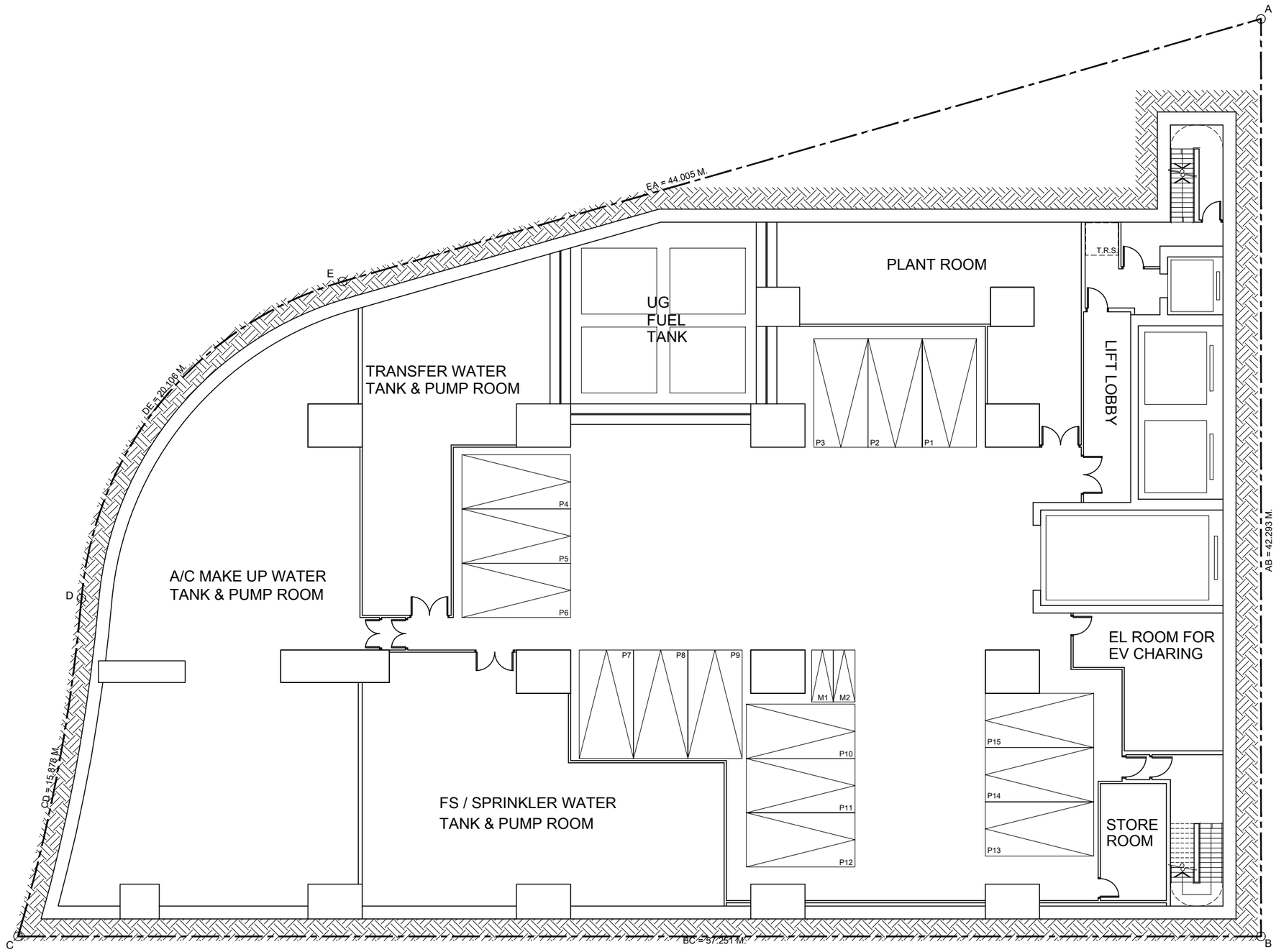
PROPOSED TYPE 1 BOLLARD WITHOUT CHAINS

Job Title	**PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**	FIGURE 3.4
Date: 12/2020	Scale: N.T.S	
Drawn: KSIY	Job No.: 276306-24	
Drawing Title	PROPOSED LAYOUT AT G/F	ARUP



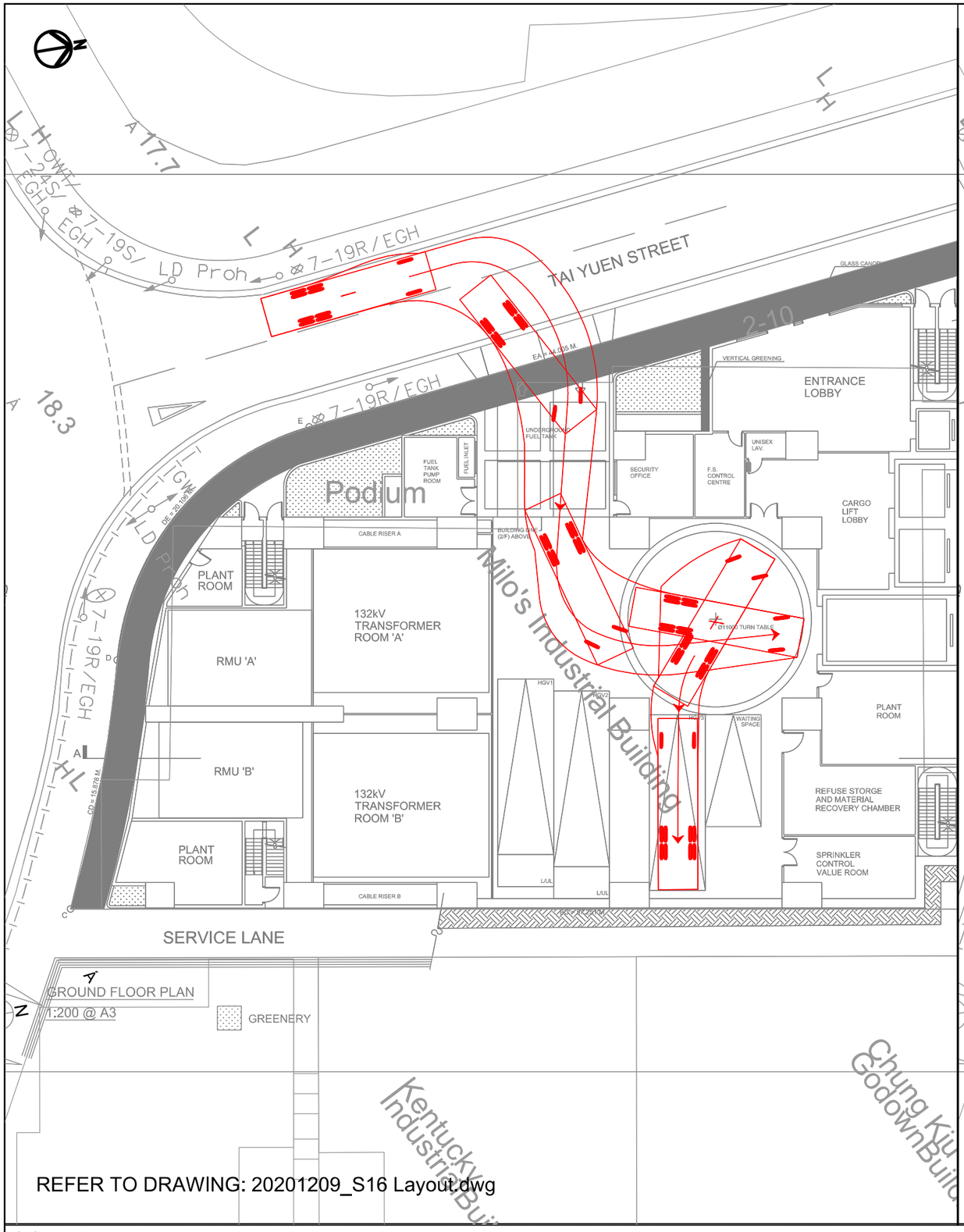
BASEMENT '1' FLOOR PLAN

Job Title	**PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**	FIGURE 3.5
Date: 12/2020 / Scale: N.T.S	Drawing Title: PROPOSED LAYOUT AT B1/F	ARUP
Drawn: KSIY / Job No.: 276306-24		



BASEMENT '2' FLOOR PLAN

Job Title: **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**		FIGURE 3.6
Date: 12/2020	Scale: N.T.S	Drawing Title: PROPOSED LAYOUT AT B2/F
Drawn: KSIY	Job No.: 276306-24	ARUP



Job Title	**PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**
Date	12/2020
Scale	N.T.S
Drawn	KSIY
Job No.	276306-24
Drawing Title	SWEPT PATH ANALYSIS FOR 11M LONG HEAVY GOODS VEHICLE AT G/F (APPROACHING/LEAVING)
	FIGURE 3.7
	ARUP

Development Flow (pcu/hr)	Decision Date	AM		PM	
		Generation	Attraction	Generation	Attraction
A/KC/463	22/03/2019	16	23	22	17

Development Flow (pcu/hr)	Decision Date	AM		PM	
		Generation	Attraction	Generation	Attraction
A/KC/444	22/03/2019	213	173	144	167

Development Flow (pcu/hr)	Decision Date	AM		PM	
		Generation	Attraction	Generation	Attraction
Y/KC/15	29/05/2020	3	3	2	3

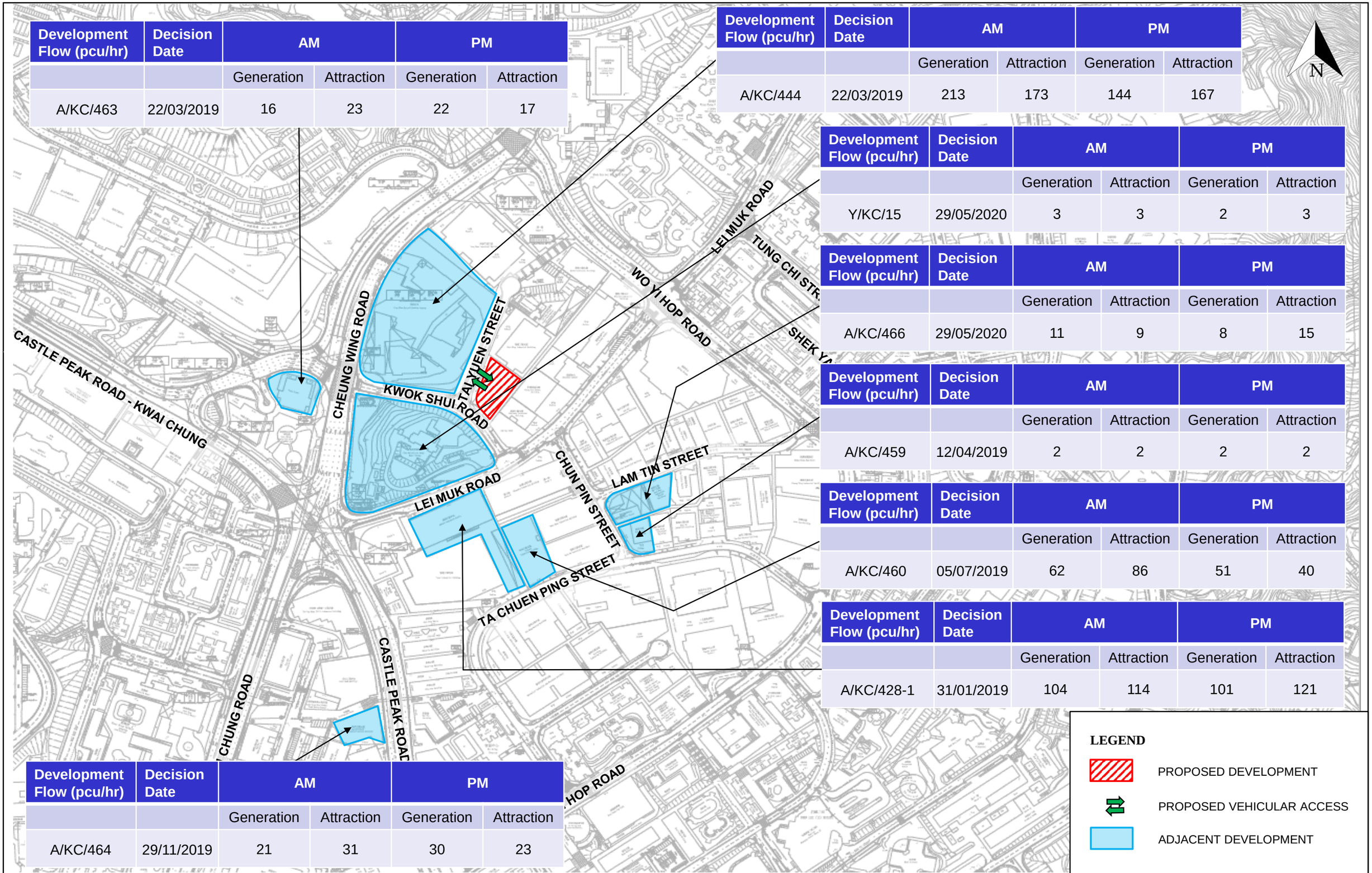
Development Flow (pcu/hr)	Decision Date	AM		PM	
		Generation	Attraction	Generation	Attraction
A/KC/466	29/05/2020	11	9	8	15

Development Flow (pcu/hr)	Decision Date	AM		PM	
		Generation	Attraction	Generation	Attraction
A/KC/459	12/04/2019	2	2	2	2

Development Flow (pcu/hr)	Decision Date	AM		PM	
		Generation	Attraction	Generation	Attraction
A/KC/460	05/07/2019	62	86	51	40

Development Flow (pcu/hr)	Decision Date	AM		PM	
		Generation	Attraction	Generation	Attraction
A/KC/428-1	31/01/2019	104	114	101	121

Development Flow (pcu/hr)	Decision Date	AM		PM	
		Generation	Attraction	Generation	Attraction
A/KC/464	29/11/2019	21	31	30	23



LEGEND

- PROPOSED DEVELOPMENT
- PROPOSED VEHICULAR ACCESS
- ADJACENT DEVELOPMENT

Job Title: **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

FIGURE 4.1

Date: 11/2020 | Scale: N.T.S | Drawn: KSIY | Job No.: 276306-24

Drawing Title: LOCATION OF PLANNED DEVELOPMENTS IN THE VICINITY OF PROPOSED DEVELOPMENT

ARUP



Job Title **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

FIGURE 4.2

Date	Scale	Drawing Title
11/2020	N.T.S	YEAR 2027 REFERENCE TRAFFIC FLOW
Drawn	Job No.	
KSIY	276306-24	

ARUP



LEGEND

PROPOSED DEVELOPMENT

PM PEAK TRAFFIC FLOW (PCU/HOUR)

100 (100)

AM PEAK TRAFFIC FLOW (PCU/HOUR)

PROPOSED VEHICULAR ACCESS

Job Title: **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

FIGURE 4.3

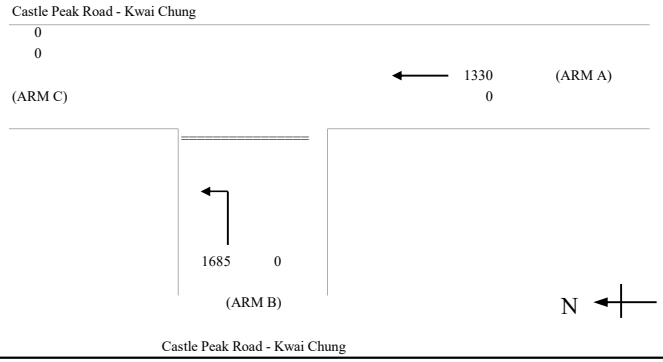
Date	Scale	Drawing Title
11/2020	N.T.S	YEAR 2027 DESIGN TRAFFIC FLOW
Drawn	Job No.	
KSIY	276306-24	

ARUP

Appendix A

Junction Calculation Sheets

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J1 Castle Peak Road at Kwai Cung Road Roundabout	Year 2020 Existing AM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	25.60	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	1330	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	14.75	(metres)
Vl b-a	=		(metres)
Vr b-a	=		(metres)
Vr b-c	=	250	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	1685	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.53321887
E	=	2.28205781
F	=	0.5859548
Y	=	0.1168

THE CAPACITY OF MOVEMENT :

Q b-a	=	304
Q b-c	=	1571
Q c-b	=	403
Q b-ac	=	1571

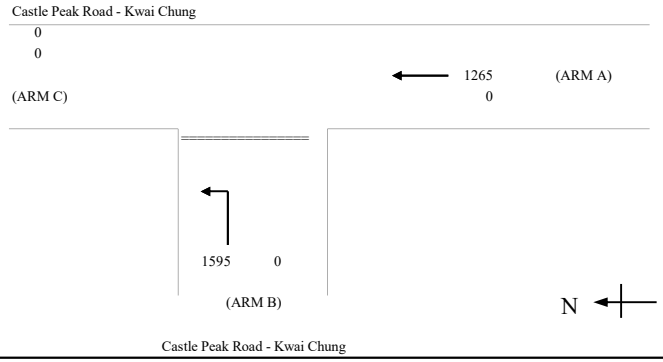
TOTAL FLOW = 3015 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	1.0726
DFC c-b	=	0.0000
DFC b-ac	=	1.0726

CRITICAL DFC = 1.07

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J1 Castle Peak Road at Kwai Cung Road Roundabout	Year 2020 Existing PM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	25.60	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	1265	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	14.75	(metres)
Vl b-a	=	0	(metres)
Vr b-a	=	0	(metres)
Vr b-c	=	250	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	1595	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.53321887
E	=	2.28205781
F	=	0.5859548
Y	=	0.1168

THE CAPACITY OF MOVEMENT :

Q b-a	=	306
Q b-c	=	1577
Q c-b	=	405
Q b-ac	=	1577

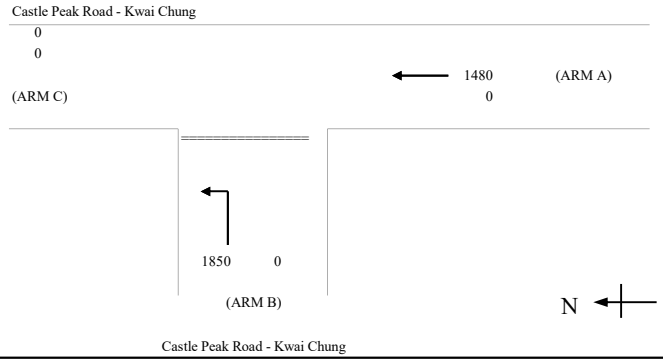
TOTAL FLOW = 2860 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	1.0114
DFC c-b	=	0.0000
DFC b-ac	=	1.0114

CRITICAL DFC = 1.01

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J1 Castle Peak Road at Kwai Cung Road Roundabout	Year 2027 Reference AM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	25.60	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	1480	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	14.75	(metres)
Vl b-a	=	0	(metres)
Vr b-a	=	0	(metres)
Vr b-c	=	250	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	1850	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.53321887
E	=	2.28205781
F	=	0.5859548
Y	=	0.1168

THE CAPACITY OF MOVEMENT :

Q b-a	=	301
Q b-c	=	1557
Q c-b	=	400
Q b-ac	=	1557

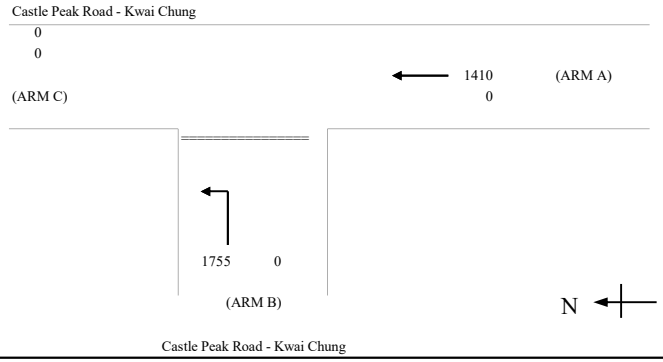
TOTAL FLOW = 3330 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	1.1882
DFC c-b	=	0.0000
DFC b-ac	=	1.1882

CRITICAL DFC = 1.19

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J1 Castle Peak Road at Kwai Cung Road Roundabout	Year 2027 Reference PM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	25.60	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	1410	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	14.75	(metres)
Vl b-a	=	0	(metres)
Vr b-a	=	0	(metres)
Vr b-c	=	250	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	1755	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.53321887
E	=	2.28205781
F	=	0.5859548
Y	=	0.1168

THE CAPACITY OF MOVEMENT :

Q b-a	=	302
Q b-c	=	1563
Q c-b	=	401
Q b-ac	=	1563

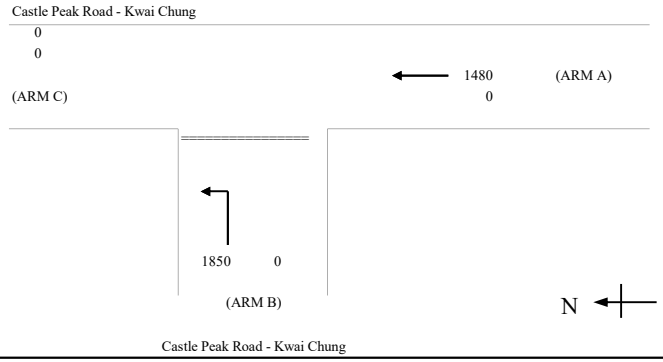
TOTAL FLOW = 3165 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	1.1228
DFC c-b	=	0.0000
DFC b-ac	=	1.1228

CRITICAL DFC = 1.12

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J1 Castle Peak Road at Kwai Cung Road Roundabout	Year 2027 Design AM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	25.60	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	1480	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	14.75	(metres)
Vl b-a	=	0	(metres)
Vr b-a	=	0	(metres)
Vr b-c	=	250	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	1850	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.53321887
E	=	2.28205781
F	=	0.5859548
Y	=	0.1168

THE CAPACITY OF MOVEMENT :

Q b-a	=	301
Q b-c	=	1557
Q c-b	=	400
Q b-ac	=	1557

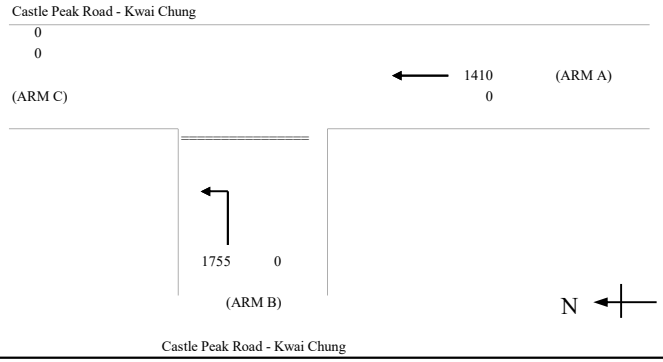
TOTAL FLOW = 3330 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	1.1882
DFC c-b	=	0.0000
DFC b-ac	=	1.1882

CRITICAL DFC = 1.19

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J1 Castle Peak Road at Kwai Cung Road Roundabout	Year 2027 Design PM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	25.60	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	1410	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	14.75	(metres)
Vl b-a	=	0	(metres)
Vr b-a	=	0	(metres)
Vr b-c	=	250	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	1755	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.53321887
E	=	2.28205781
F	=	0.5859548
Y	=	0.1168

THE CAPACITY OF MOVEMENT :

Q b-a	=	302
Q b-c	=	1563
Q c-b	=	401
Q b-ac	=	1563

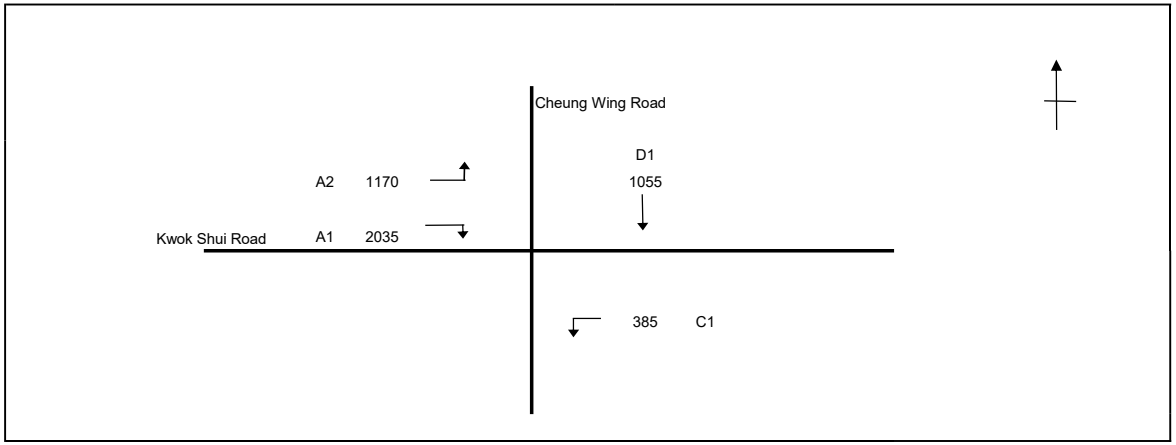
TOTAL FLOW = 3165 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

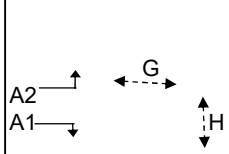
DFC b-a	=	0.0000
DFC b-c	=	1.1228
DFC c-b	=	0.0000
DFC b-ac	=	1.1228

CRITICAL DFC = 1.12

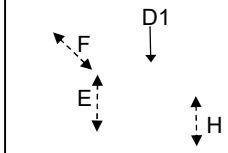
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J2
J2 Cheung Wing Road / Kwok Shui Road	Year 2020 Existing AM Peak	DATE : 19-Feb-21	FILENAME :



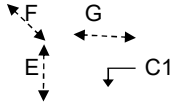
No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.522
Loss time		L =	16 sec
Total Flow		=	3409 pcu
Co	= (1.5*L+5)/(1-Y)	=	60.7 sec
Cm	= L/(1-Y)	=	33.5 sec
Yult		=	0.780
R.C.ult	= (Yult-Y)/Y*100%	=	49.3 %
Cp	= 0.9*L/(0.9-Y)	=	38.1 sec
Ymax	= 1-L/C	=	0.822
R.C.(P)	= (0.9/Xmax-1)*100%	=	38.5 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	41.7 %



STAGE 1 INT= 5



STAGE 2 INT= 7



STAGE 3 INT= 7

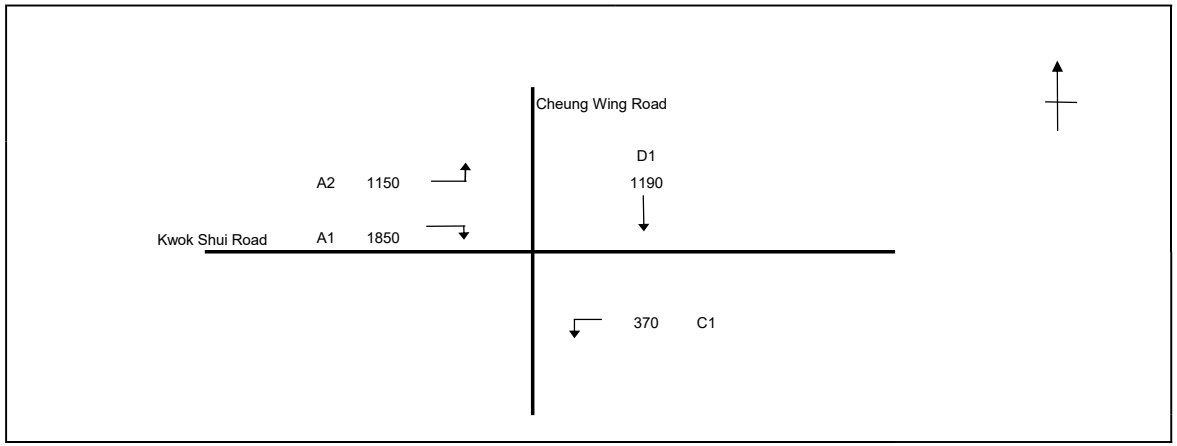
STAGE 4 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	20	11	3	22	15	3	22	OK
F	10.3	6	3	11	26	3	11	OK
G	19	11	3	21	45	3	21	OK
H	13.4	7	0	15	54	0	15	OK

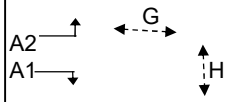
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
A2	1	3.70	A	1	20		N	1985	591			591	1.00	1847			1847	0.320	0.320		45	45	0.640	44
A2,A1	1	5.00	A	1	30		N	2115	**579**		**66**	645	1.00	2014			2014	0.320			45	45	0.640	48
A1	1	4.20	A	3	40		N	6385			1969	1969	1.00	6154			6154	0.320			45	45	0.640	49
D1	2	3.60	D	5	25		N	10435		1055		1055	0.00	10435			10435	0.101	0.101		14	14	0.650	27
C1	3	4.00	C	2	16		N	4170	385			385	1.00	3813			3813	0.101	0.101		14	14	0.649	24

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

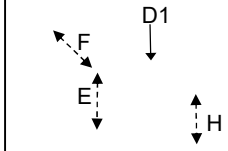
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J2
J2 Cheung Wing Road / Kwok Shui Road	Year 2020 Existing PM Peak	DATE : 19-Feb-21	FILENAME :



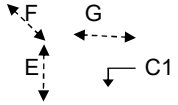
No. of stages per cycle		N =	3	
No. of stage using for calculation		N =	3	
Cycle time		C =	90	sec
Sum(y)		Y =	0.507	
Loss time		L =	16	sec
Total Flow		=	3410	pcu
Co	= (1.5*L+5)/(1-Y)	=	58.8	sec
Cm	= L/(1-Y)	=	32.4	sec
Yult		=	0.780	
R.C.ult	= (Yult-Y)/Y*100%	=	53.9	%
Cp	= 0.9*L/(0.9-Y)	=	36.6	sec
Ymax	= 1-L/C	=	0.822	
R.C.(P)	= (0.9/Xmax-1)*100%	=	47.7	% (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	46.0	%



STAGE 1 INT= 5



STAGE 2 INT= 7



STAGE 3 INT= 7

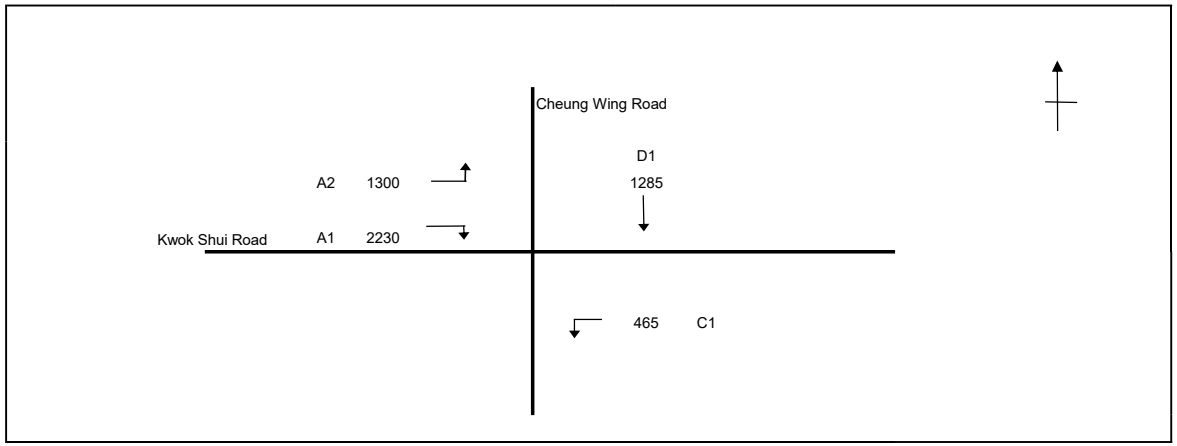
STAGE 4 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	20	11	3	22	18	3	22	OK
F	10.3	6	3	11	29	3	11	OK
G	19	11	3	21	44	3	21	OK
H	13.4	7	0	15	56	0	15	OK

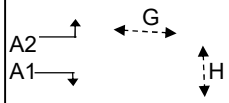
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
A2	1	3.70	A	1	20		N	1985	550			550	1.00	1847			1847	0.298	0.298		44	44	0.609	42
A2,A1	1	5.00	A	1	30		N	2115	600		0	600	1.00	2014			2014	0.298			44	44	0.609	46
A1	1	4.20	A	4	40		N	8560			1850	1850	1.00	8251			8251	0.224			33	44	0.459	35
D1	2	3.60	D	5	25		N	10435		1190		1190	0.00	10435			10435	0.114	0.114		17	17	0.604	29
C1	3	4.50	C	2	16		N	4270	370			370	1.00	3904			3904	0.095	0.095		14	14	0.609	23

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

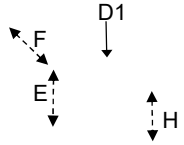
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J2
J2 Cheung Wing Road / Kwok Shui Road	Year 2027 Reference AM Peak	DATE : 19-Feb-21	FILENAME :



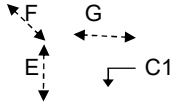
No. of stages per cycle		N =	3	
No. of stage using for calculation		N =	3	
Cycle time		C =	90	sec
Sum(y)		Y =	0.579	
Loss time		L =	16	sec
Total Flow		=	3980	pcu
Co	= (1.5*L+5)/(1-Y)	=	68.9	sec
Cm	= L/(1-Y)	=	38.0	sec
Yult		=	0.780	
R.C.ult	= (Yult-Y)/Y*100%	=	34.7	%
Cp	= 0.9*L/(0.9-Y)	=	44.9	sec
Ymax	= 1-L/C	=	0.822	
R.C.(P)	= (0.9/Xmax-1)*100%	=	25.9	% (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	27.8	%



STAGE 1	INT= 5



STAGE 2	INT= 7



STAGE 3	INT= 7

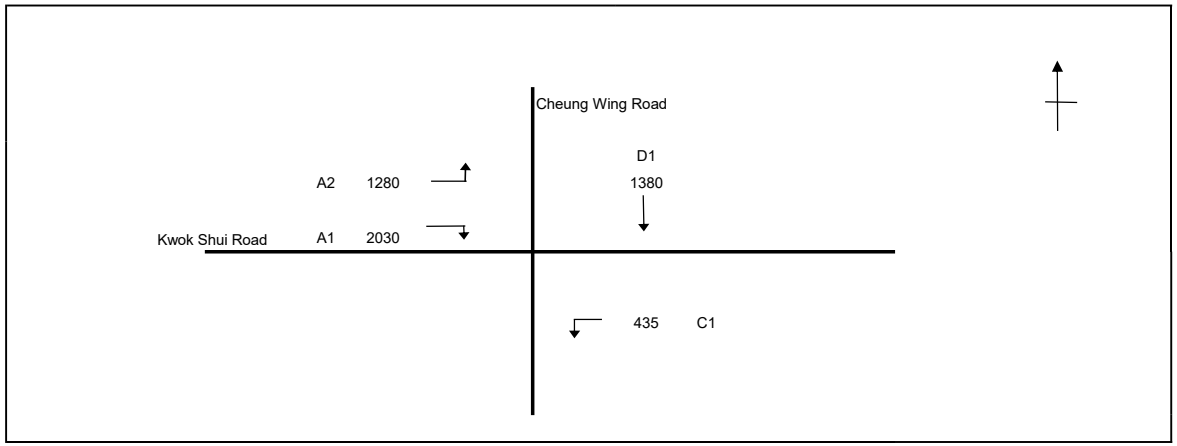
STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	20	11	3	22	18	3	22	OK
F	10.3	6	3	11	29	3	11	OK
G	19	11	3	21	44	3	21	OK
H	13.4	7	0	15	54	0	15	OK

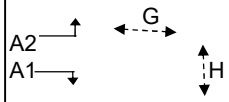
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
A2	1	3.70	A	1	20		N	1985	622			622	1.00	1847			1847	0.337	0.337		43	43	0.705	49
A2,A1	1	5.00	A	1	30		N	2115	678		0	678	1.00	2014			2014	0.337			43	43	0.705	53
A1	1	4.20	A	4	40		N	8560			2230	2230	1.00	8251			8251	0.270			35	43	0.566	44
D1	2	3.60	D	5	25		N	10435		1285		1285	0.00	10435			10435	0.123	0.123		16	16	0.693	32
C1	3	4.50	C	2	16		N	4270	465			465	1.00	3904			3904	0.119	0.119		15	15	0.715	29

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

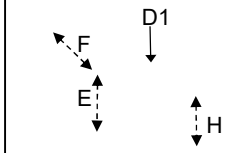
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J2
J2 Cheung Wing Road / Kwok Shui Road	Year 2027 Reference PM Peak	DATE : 19-Feb-21	FILENAME :



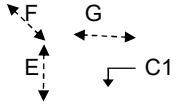
No. of stages per cycle		N =	3	
No. of stage using for calculation		N =	3	
Cycle time		C =	90	sec
Sum(y)		Y =	0.575	
Loss time		L =	16	sec
Total Flow		=	3845	pcu
Co	= (1.5*L+5)/(1-Y)	=	68.3	sec
Cm	= L/(1-Y)	=	37.7	sec
Yult		=	0.780	
R.C.ult	= (Yult-Y)/Y*100%	=	35.6	%
Cp	= 0.9*L/(0.9-Y)	=	44.3	sec
Ymax	= 1-L/C	=	0.822	
R.C.(P)	= (0.9/Xmax-1)*100%	=	25.6	% (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	28.6	%



STAGE 1 INT= 5



STAGE 2 INT= 7



STAGE 3 INT= 7

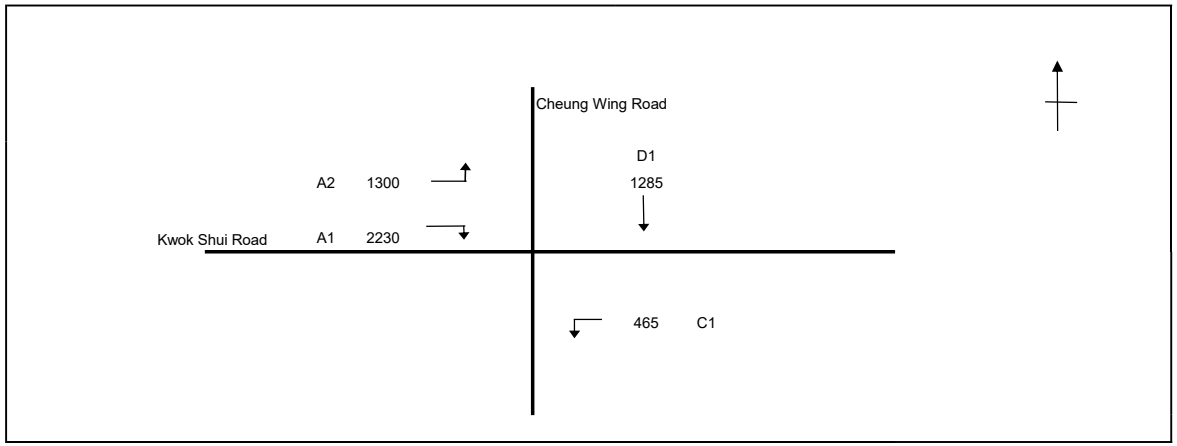
STAGE 4 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	20	11	3	22	18	3	22	OK
F	10.3	6	3	11	29	3	11	OK
G	19	11	3	21	43	3	21	OK
H	13.4	7	0	15	55	0	15	OK

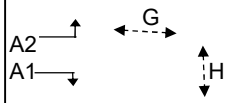
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
A2	1	3.70	A	1	20		N	1985	612			612	1.00	1847			1847	0.332	0.332		43	43	0.694	48
A2,A1	1	5.00	A	1	30		N	2115	668		0	668	1.00	2014			2014	0.332			43	43	0.694	52
A1	1	4.20	A	4	40		N	8560			2030	2030	1.00	8251			8251	0.246			32	43	0.515	40
D1	2	3.60	D	5	25		N	10435		1380		1380	0.00	10435			10435	0.132	0.132		17	17	0.700	34
C1	3	4.50	C	2	16		N	4270	435			435	1.00	3904			3904	0.111	0.111		14	14	0.716	28

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

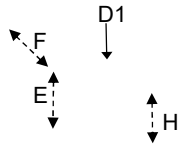
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J2
J2 Cheung Wing Road / Kwok Shui Road	Year 2027 Design AM Peak	DATE : 19-Feb-21	FILENAME :



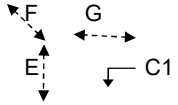
No. of stages per cycle		N =	3	
No. of stage using for calculation		N =	3	
Cycle time		C =	90	sec
Sum(y)		Y =	0.579	
Loss time		L =	16	sec
Total Flow		=	3980	pcu
Co	= (1.5*L+5)/(1-Y)	=	68.9	sec
Cm	= L/(1-Y)	=	38.0	sec
Yult		=	0.780	
R.C.ult	= (Yult-Y)/Y*100%	=	34.7	%
Cp	= 0.9*L/(0.9-Y)	=	44.9	sec
Ymax	= 1-L/C	=	0.822	
R.C.(P)	= (0.9/Xmax-1)*100%	=	25.9	% (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	27.8	%



STAGE 1	INT= 5



STAGE 2	INT= 7



STAGE 3	INT= 7

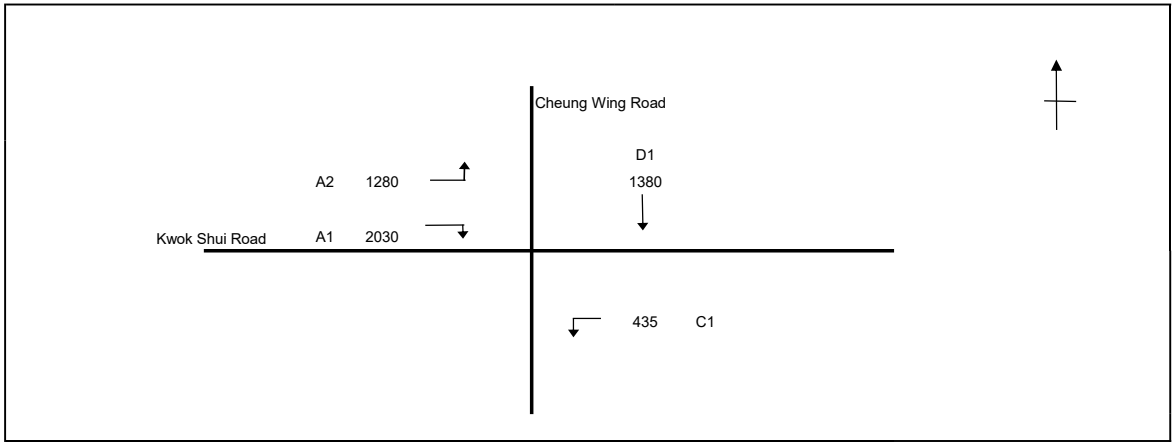
STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	20	11	3	22	18	3	22	OK
F	10.3	6	3	11	29	3	11	OK
G	19	11	3	21	44	3	21	OK
H	13.4	7	0	15	54	0	15	OK

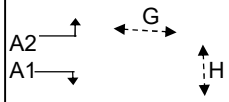
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
A2	1	3.70	A	1	20		N	1985	622			622	1.00	1847			1847	0.337	0.337		43	43	0.705	49
A2,A1	1	5.00	A	1	30		N	2115	678		0	678	1.00	2014			2014	0.337			43	43	0.705	53
A1	1	4.20	A	4	40		N	8560			2230	2230	1.00	8251			8251	0.270			35	43	0.566	44
D1	2	3.60	D	5	25		N	10435		1285		1285	0.00	10435			10435	0.123	0.123		16	16	0.693	32
C1	3	4.50	C	2	16		N	4270	465			465	1.00	3904			3904	0.119	0.119		15	15	0.715	29

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

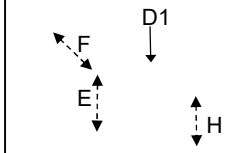
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J2
J2 Cheung Wing Road / Kwok Shui Road	Year 2027 Design PM Peak	DATE : 19-Feb-21	FILENAME :



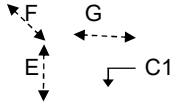
No. of stages per cycle	N =	3	
No. of stage using for calculation	N =	3	
Cycle time	C =	90	sec
Sum(y)	Y =	0.575	
Loss time	L =	16	sec
Total Flow	=	3845	pcu
Co = (1.5*L+5)/(1-Y)	=	68.3	sec
Cm = L/(1-Y)	=	37.7	sec
Yult	=	0.780	
R.C.ult = (Yult-Y)/Y*100%	=	35.6	%
Cp = 0.9*L/(0.9-Y)	=	44.3	sec
Ymax = 1-L/C	=	0.822	
R.C.(P) = (0.9/Xmax-1)*100%	=	25.6	% (Actual)
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	28.6	%



STAGE 1 INT= 5



STAGE 2 INT= 7



STAGE 3 INT= 7

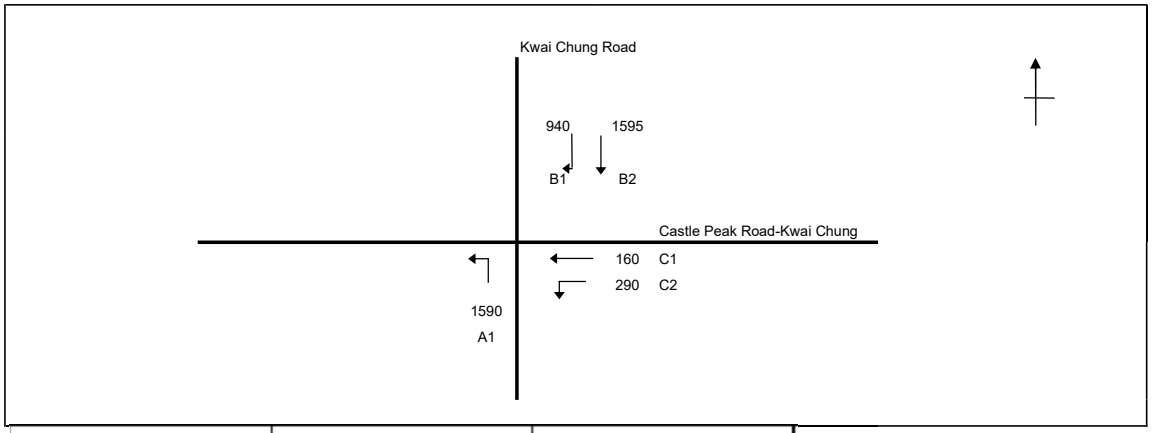
STAGE 4 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	20	11	3	22	18	3	22	OK
F	10.3	6	3	11	29	3	11	OK
G	19	11	3	21	43	3	21	OK
H	13.4	7	0	15	55	0	15	OK

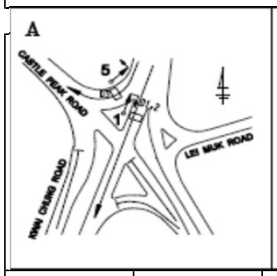
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
A2	1	3.70	A	1	20		N	1985	612			612	1.00	1847			1847	0.332	0.332		43	43	0.694	48
A2,A1	1	5.00	A	1	30		N	2115	668		0	668	1.00	2014			2014	0.332			43	43	0.694	52
A1	1	4.20	A	4	40		N	8560			2030	2030	1.00	8251			8251	0.246			32	43	0.515	40
D1	2	3.60	D	5	25		N	10435		1380		1380	0.00	10435			10435	0.132	0.132		17	17	0.700	34
C1	3	4.50	C	2	16		N	4270	435			435	1.00	3904			3904	0.111	0.111		14	14	0.716	28

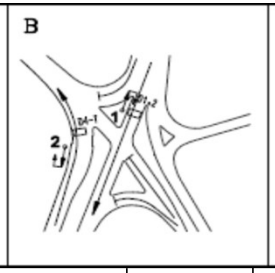
NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

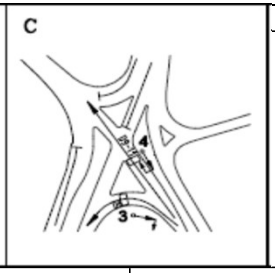
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J3
J3 Castle Peak Road - Kwai Chung / Kwai Chung Road	Year 2020 Existing AM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.395
Loss time		L =	25 sec
Total Flow		=	2855 pcu
Co	= (1.5*L+5)/(1-Y)	=	70.2 sec
Cm	= L/(1-Y)	=	41.3 sec
Yult		=	0.713
R.C.ult	= (Yult-Y)/Y*100%	=	80.4 %
Cp	= 0.9*L/(0.9-Y)	=	44.6 sec
Ymax	= 1-L/C	=	0.722
R.C.(P)	= (0.9/Xmax-1)*100%	=	64.6 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	64.6 % (Optimized)







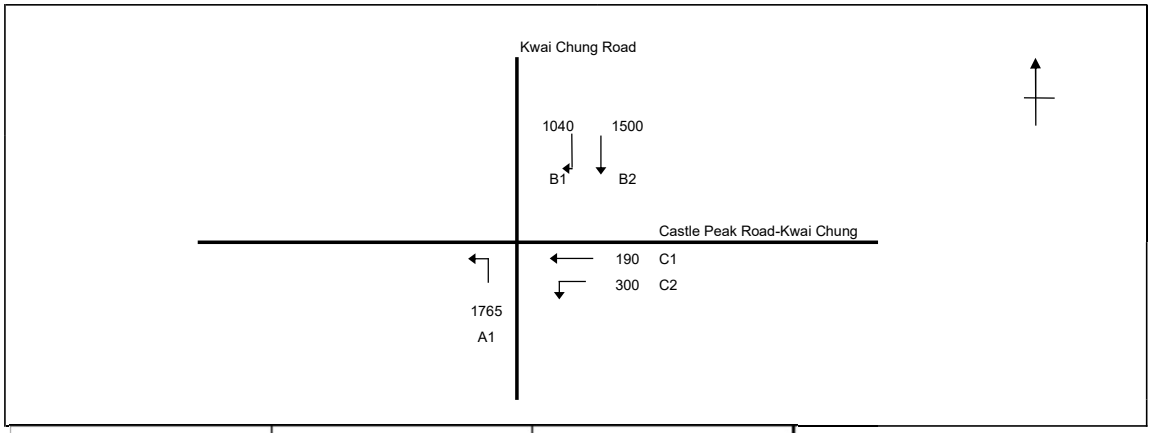
STAGE 1	INT= 5	STAGE 2	INT= 11	STAGE 3	INT= 11	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

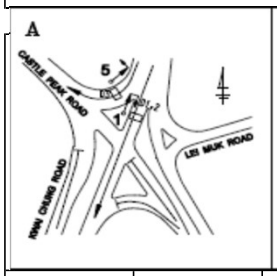
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				24				
A1	2	3.50	A	1	80		N	1965	**284**			284	1.00	1929			1350	0.211	0.211		35	35	0.547	26
A1	2	3.50	A	3	80			6315	1306			1306	1.00	6199			6199	0.211			35	35	0.547	40
B1	1	5.00	B1	3	50		N	6625	940			940	1.00	6432			6432	0.146	0.146		24	24	0.547	34
B2	1,2	3.30	B2	3				6255		1595		1595	0.00	6255		1564	7819	0.204			34	63	0.293	24
C1	3	3.60	C	3				6345		160		160	0.00	6345			6345	0.025	0.038	1	4	7	0.311	7
C2	3	4.70	C	2	50		N	4310	160			160	1.00	4184			4184	0.038			6	7	0.472	11

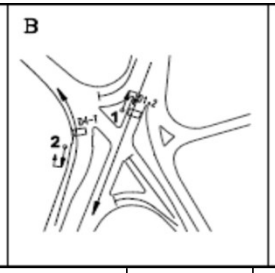
NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

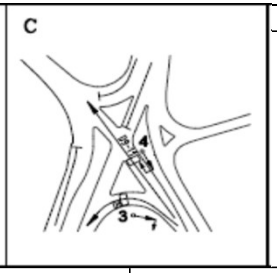
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J3
J3 Castle Peak Road - Kwai Chung / Kwai Chung Road	Year 2020 Existing PM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.441
Loss time		L =	24 sec
Total Flow		=	2920 pcu
Co	= (1.5*L+5)/(1-Y)	=	73.3 sec
Cm	= L/(1-Y)	=	42.9 sec
Yult		=	0.720
R.C.ult	= (Yult-Y)/Y*100%	=	63.3 %
Cp	= 0.9*L/(0.9-Y)	=	47.0 sec
Ymax	= 1-L/C	=	0.733
R.C.(P)	= (0.9/Xmax-1)*100%	=	49.7 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	49.7 % (Optimized)







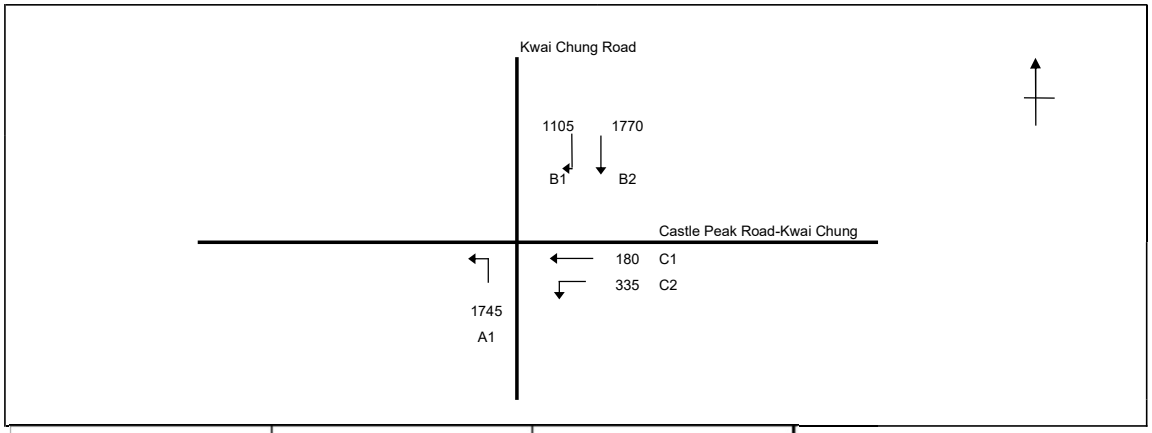
STAGE 1	INT= 5	STAGE 2	INT= 11	STAGE 3	INT= 11	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

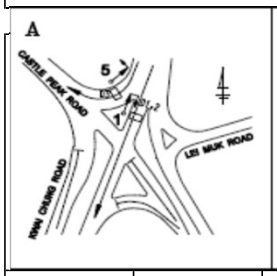
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				24				
A1	2	3.50	A	1	80		N	1965	**316**			316	1.00	1929			1350	0.234	0.234		35	35	0.601	29
A1	2	3.50	A	3	80			6315	1449			1449	1.00	6199			6199	0.234			35	35	0.601	44
B1	1	5.00	B1	3	50		N	6625	1040			1040	1.00	6432			6432	0.162	0.162		24	24	0.601	38
B2	1,2	3.30	B2	3				6255		1500		1500	0.00	6255		1564	7819	0.192			29	63	0.273	22
C1	3	3.60	C	3				6345		190		190	0.00	6345			6345	0.030	0.045		4	7	0.397	9
C2	3	4.70	C	2	50		N	4310	190			190	1.00	4184			4184	0.045			7	7	0.601	13

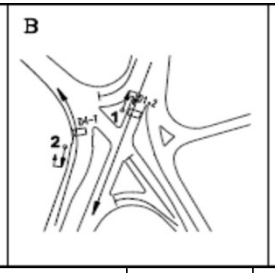
NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

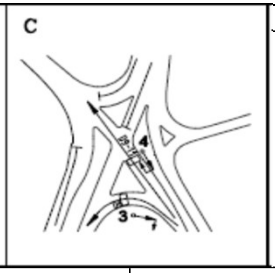
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J3
J3 Castle Peak Road - Kwai Chung / Kwai Chung Road	Year 2027 Reference AM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.483
Loss time		L =	24 sec
Total Flow		=	3390 pcu
Co	= (1.5*L+5)/(1-Y)	=	79.3 sec
Cm	= L/(1-Y)	=	46.4 sec
Yult		=	0.720
R.C.ult	= (Yult-Y)/Y*100%	=	49.1 %
Cp	= 0.9*L/(0.9-Y)	=	51.8 sec
Ymax	= 1-L/C	=	0.733
R.C.(P)	= (0.9/Xmax-1)*100%	=	36.6 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	36.6 % (Optimized)







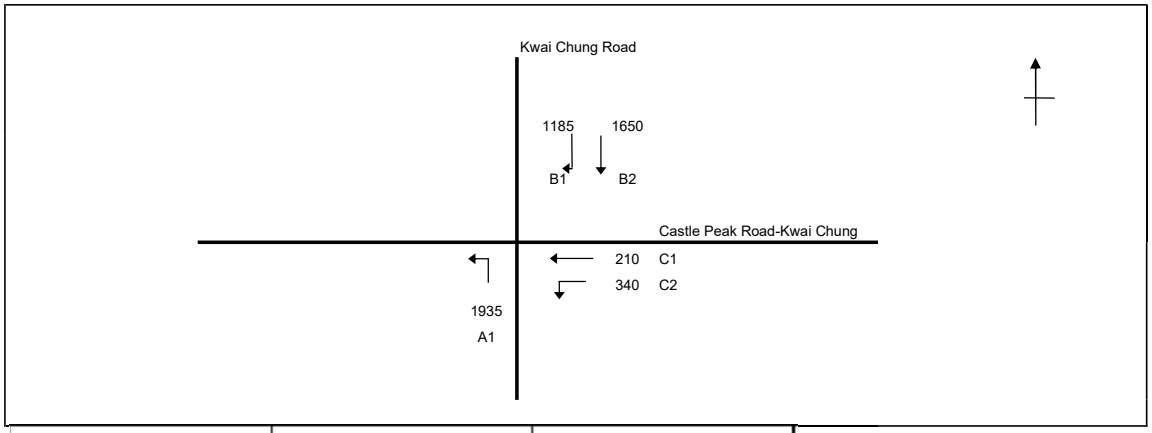
STAGE 1	INT= 5	STAGE 2	INT= 11	STAGE 3	INT= 11	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

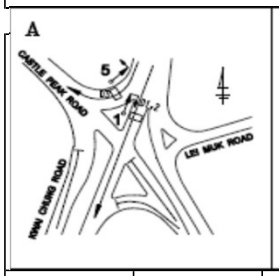
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				24				
A1	2	3.50	A	1	80		N	1965	**312**			312	1.00	1929			1350	0.231	0.231		32	32	0.659	30
A1	2	3.50	A	3	80			6315	1433			1433	1.00	6199			6199	0.231			32	32	0.659	47
B1	1	5.00	B1	3	50		N	6625	1105			1105	1.00	6432			6432	0.172	0.172		23	23	0.659	41
B2	1,2	3.30	B2	3				6255		1770		1770	0.00	6255		1564	7819	0.226			31	59	0.345	30
C1	3	3.60	C	3				6345		180		180	0.00	6345			6345	0.028	0.080		4	11	0.233	8
C2	3	4.70	C	2	50		N	4310	335			335	1.00	4184			4184	0.080			11	11	0.659	22

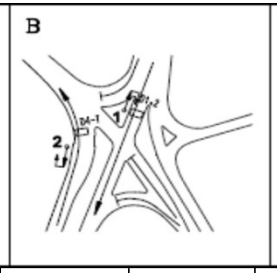
NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

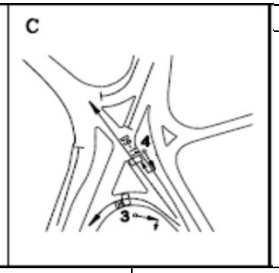
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J3
J3 Castle Peak Road - Kwai Chung / Kwai Chung Road	Year 2027 Reference PM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.522
Loss time		L =	24 sec
Total Flow		=	3385 pcu
Co	= (1.5*L+5)/(1-Y)	=	85.7 sec
Cm	= L/(1-Y)	=	50.2 sec
Yult		=	0.720
R.C.ult	= (Yult-Y)/Y*100%	=	38.0 %
Cp	= 0.9*L/(0.9-Y)	=	57.1 sec
Ymax	= 1-L/C	=	0.733
R.C.(P)	= (0.9/Xmax-1)*100%	=	26.5 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	26.5 % (Optimized)







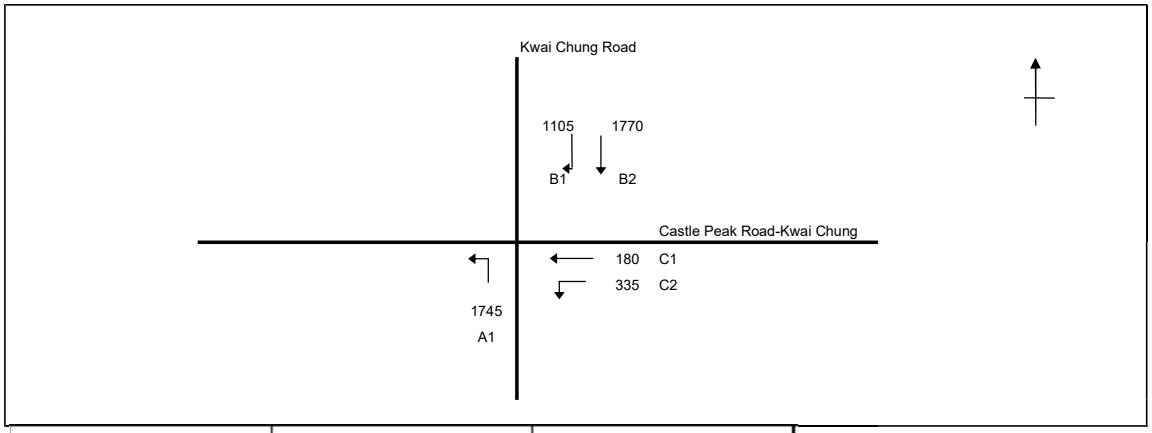
STAGE 1	INT= 5	STAGE 2	INT= 11	STAGE 3	INT= 11	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

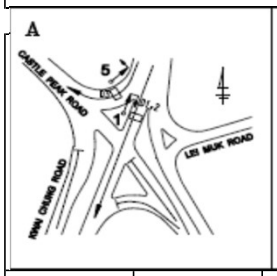
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				24				
A1	2	3.50	A	1	80		N	1965	**346**			346	1.00	1929			1350	0.256	0.256		32	32	0.711	33
A1	2	3.50	A	3	80			6315	1589			1589	1.00	6199			6199	0.256			32	32	0.711	51
B1	1	5.00	B1	3	50		N	6625	1185			1185	1.00	6432			6432	0.184	0.184		23	23	0.711	44
B2	1,2	3.30	B2	3				6255		1650		1650	0.00	6255		1564	7819	0.211			27	60	0.318	28
C1	3	3.60	C	3				6345		210		210	0.00	6345			6345	0.033	0.081		4	10	0.290	9
C2	3	4.70	C	2	50		N	4310	340			340	1.00	4184			4184	0.081			10	10	0.711	23

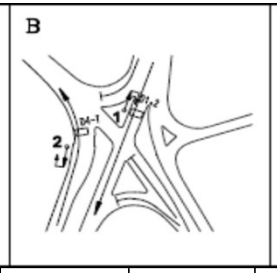
NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

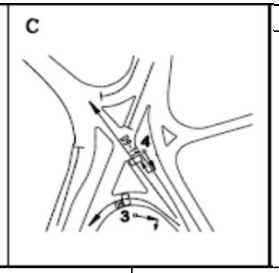
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J3
J3 Castle Peak Road - Kwai Chung / Kwai Chung Road	Year 2027 Design AM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.483
Loss time		L =	24 sec
Total Flow		=	3390 pcu
Co	= (1.5*L+5)/(1-Y)	=	79.3 sec
Cm	= L/(1-Y)	=	46.4 sec
Yult		=	0.720
R.C.ult	= (Yult-Y)/Y*100%	=	49.0 %
Cp	= 0.9*L/(0.9-Y)	=	51.8 sec
Ymax	= 1-L/C	=	0.733
R.C.(P)	= (0.9/Xmax-1)*100%	=	36.6 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	36.6 % (Optimized)







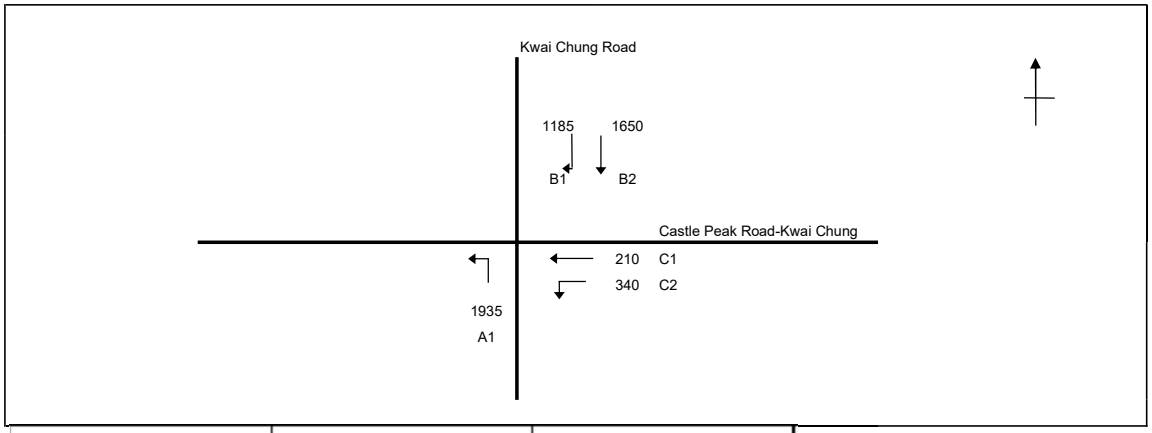
STAGE 1	INT= 5	STAGE 2	INT= 11	STAGE 3	INT= 11	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

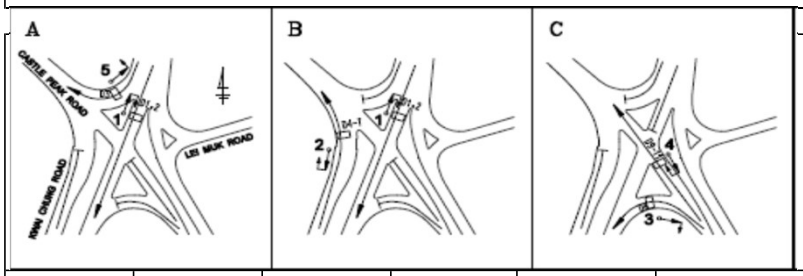
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				24				
A1	2	3.50	A	1	80		N	1965	**312**			312	1.00	1929			1350	0.231	0.231		32	32	0.659	30
A1	2	3.50	A	3	80			6315	1433			1433	1.00	6199			6199	0.231			32	32	0.659	47
B1	1	5.00	B1	3	50		N	6625	1105			1105	1.00	6432			6432	0.172	0.172		23	23	0.659	41
B2	1,2	3.30	B2	3				6255		1770		1770	0.00	6255		1564	7819	0.226			31	59	0.345	30
C1	3	3.60	C	3				6345		180		180	0.00	6345			6345	0.028	0.080		4	11	0.234	8
C2	3	4.70	C	2	50		N	4310	335			335	1.00	4184			4184	0.080			11	11	0.659	22

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J3
J3 Castle Peak Road - Kwai Chung / Kwai Chung Road	Year 2027 Design PM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.522
Loss time		L =	24 sec
Total Flow		=	3385 pcu
Co	= (1.5*L+5)/(1-Y)	=	85.7 sec
Cm	= L/(1-Y)	=	50.2 sec
Yult		=	0.720
R.C.ult	= (Yult-Y)/Y*100%	=	38.0 %
Cp	= 0.9*L/(0.9-Y)	=	57.1 sec
Ymax	= 1-L/C	=	0.733
R.C.(P)	= (0.9/Xmax-1)*100%	=	26.5 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	26.5 % (Optimized)



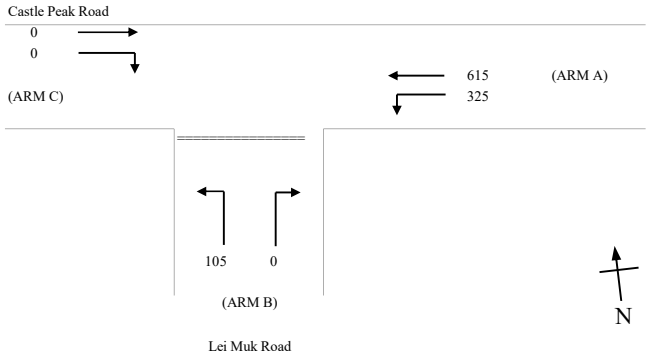
STAGE 1	INT= 5	STAGE 2	INT= 11	STAGE 3	INT= 11	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				24				
A1	2	3.50	A	1	80		N	1965	**346**			346	1.00	1929			1350	0.256	0.256		32	32	0.712	33
A1	2	3.50	A	3	80			6315	1589			1589	1.00	6199			6199	0.256			32	32	0.712	51
B1	1	5.00	B1	3	50		N	6625	1185			1185	1.00	6432			6432	0.184	0.184		23	23	0.712	44
B2	1,2	3.30	B2	2				4170		1650		1650	0.00	4170		1043	5213	0.317			40	60	0.477	42
C1	3	3.60	C	3				6345		210		210	0.00	6345			6345	0.033	0.081		4	10	0.290	9
C2	3	4.70	C	2	50		N	4310	340			340	1.00	4184			4184	0.081			10	10	0.712	23

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J4 Lei Muk Road / Castle Peak Road	Year 2020 Existing AM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	16.30	(metres)
W cr	=	0	(metres)
q a-b	=	325	(pcu/hr)
q a-c	=	615	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	5.14	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	105	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.6746363
E	=	1.17084162
F	=	0.5859548
Y	=	0.43765

THE CAPACITY OF MOVEMENT :

Q b-a	=	343
Q b-c	=	734
Q c-b	=	349
Q b-ac	=	734

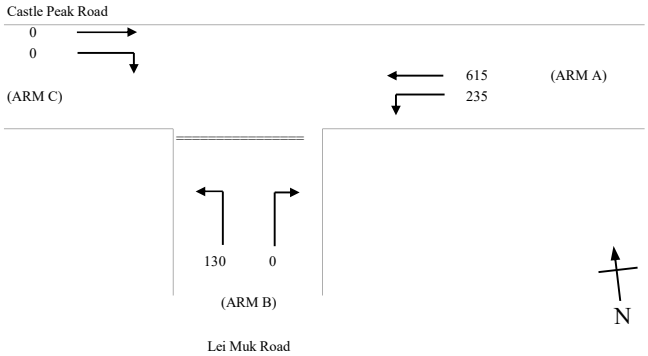
TOTAL FLOW = 1045 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.1431
DFC c-b	=	0.0000
DFC b-ac	=	0.1431

CRITICAL DFC = 0.143

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J4 Lei Muk Road / Castle Peak Road	Year 2020 Existing PM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	16.30	(metres)
W cr	=	0	(metres)
q a-b	=	235	(pcu/hr)
q a-c	=	615	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	5.14	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	130	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.6746363
E	=	1.17084162
F	=	0.5859548
Y	=	0.43765

THE CAPACITY OF MOVEMENT :

Q b-a	=	347
Q b-c	=	740
Q c-b	=	357
Q b-ac	=	740

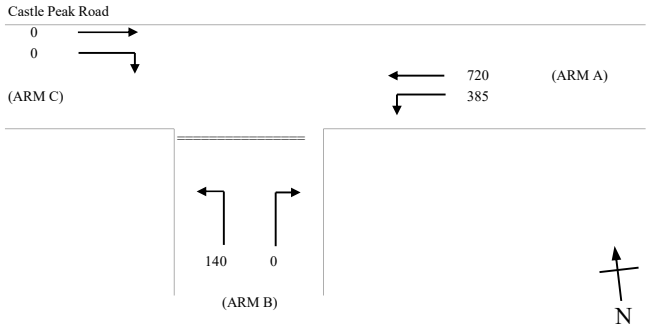
TOTAL FLOW = 980 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.1757
DFC c-b	=	0.0000
DFC b-ac	=	0.1757

CRITICAL DFC = 0.176

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J4 Lei Muk Road / Castle Peak Road	Year 2027 Reference AM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	16.30	(metres)
W cr	=	0	(metres)
q a-b	=	385	(pcu/hr)
q a-c	=	720	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	5.14	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	140	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.6746363
E	=	1.17084162
F	=	0.5859548
Y	=	0.43765

THE CAPACITY OF MOVEMENT :

Q b-a	=	329
Q b-c	=	710
Q c-b	=	333
Q b-ac	=	710

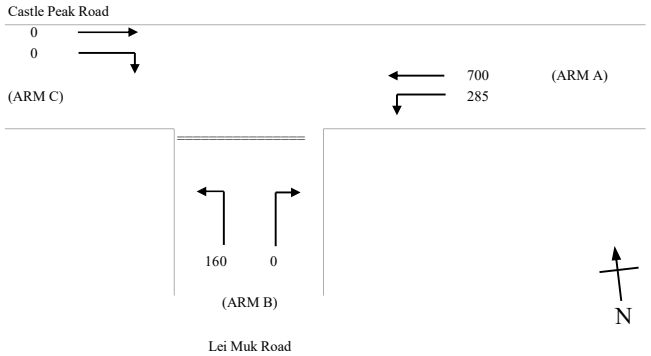
TOTAL FLOW = 1245 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.1972
DFC c-b	=	0.0000
DFC b-ac	=	0.1972

CRITICAL DFC = 0.197

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J4 Lei Muk Road / Castle Peak Road	Year 2027 Reference PM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	16.30	(metres)
W cr	=	0	(metres)
q a-b	=	285	(pcu/hr)
q a-c	=	700	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	5.14	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	160	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.6746363
E	=	1.17084162
F	=	0.5859548
Y	=	0.43765

THE CAPACITY OF MOVEMENT :

Q b-a	=	336
Q b-c	=	721
Q c-b	=	345
Q b-ac	=	721

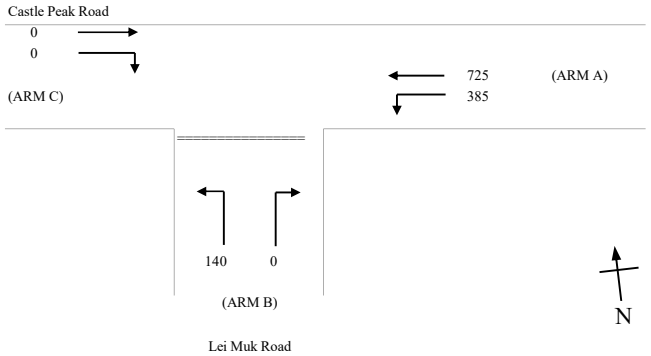
TOTAL FLOW = 1145 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.2219
DFC c-b	=	0.0000
DFC b-ac	=	0.2219

CRITICAL DFC = 0.222

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J4 Lei Muk Road / Castle Peak Road	Year 2027 Design AM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	16.30	(metres)
W cr	=	0	(metres)
q a-b	=	385	(pcu/hr)
q a-c	=	725	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	5.14	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	140	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.6746363
E	=	1.17084162
F	=	0.5859548
Y	=	0.43765

THE CAPACITY OF MOVEMENT :

Q b-a	=	329
Q b-c	=	709
Q c-b	=	333
Q b-ac	=	709

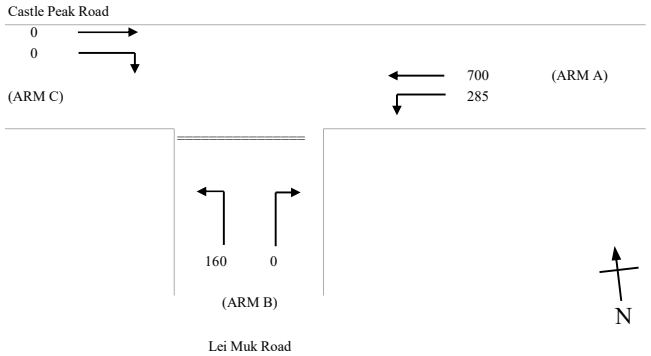
TOTAL FLOW = 1250 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.1975
DFC c-b	=	0.0000
DFC b-ac	=	0.1975

CRITICAL DFC = 0.197

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J4 Lei Muk Road / Castle Peak Road	Year 2027 Design PM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	16.30	(metres)
W cr	=	0	(metres)
q a-b	=	285	(pcu/hr)
q a-c	=	700	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	5.14	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	160	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.6746363
E	=	1.17084162
F	=	0.5859548
Y	=	0.43765

THE CAPACITY OF MOVEMENT :

Q b-a	=	336
Q b-c	=	721
Q c-b	=	345
Q b-ac	=	721

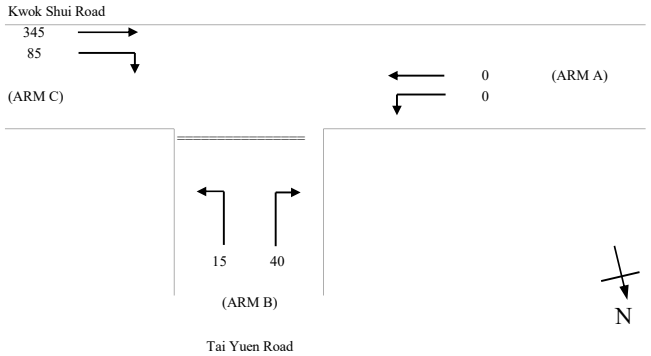
TOTAL FLOW = 1145 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.2219
DFC c-b	=	0.0000
DFC b-ac	=	0.2219

CRITICAL DFC = 0.222

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J5 Tai Yuen Street / Kwok Shui Road	Year 2020 Existing AM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.10	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	0	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.50	(metres)
Vr c-b	=	0	(metres)
q c-a	=	345	(pcu/hr)
q c-b	=	85	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.20	(metres)
W b-c	=	2.20	(metres)
Vl b-a	=	34	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	40	(pcu/hr)
q b-c	=	15	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.73487984
E	=	0.78985365
F	=	0.8794228
Y	=	0.75505

THE CAPACITY OF MOVEMENT :

Q b-a	=	392
Q b-c	=	588
Q c-b	=	655
Q b-ac	=	431.2

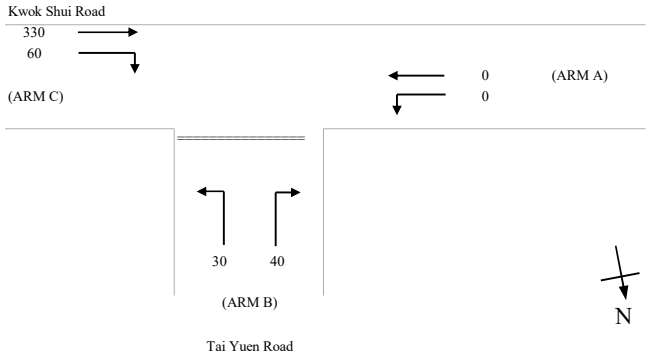
TOTAL FLOW = 485 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.1020
DFC b-c	=	0.0255
DFC c-b	=	0.1298
DFC b-ac	=	0.1276

CRITICAL DFC = 0.130

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J5 Tai Yuen Street / Kwok Shui Road	Year 2020 Existing PM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.10	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	0	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.50	(metres)
Vr c-b	=	0	(metres)
q c-a	=	330	(pcu/hr)
q c-b	=	60	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.20	(metres)
W b-c	=	2.20	(metres)
Vl b-a	=	34	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	40	(pcu/hr)
q b-c	=	30	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.73487984
E	=	0.78985365
F	=	0.8794228
Y	=	0.75505

THE CAPACITY OF MOVEMENT :

Q b-a	=	402
Q b-c	=	588
Q c-b	=	655
Q b-ac	=	465.05

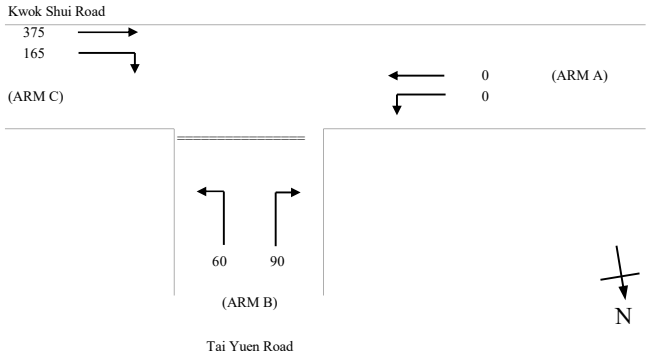
TOTAL FLOW = 460 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0995
DFC b-c	=	0.0510
DFC c-b	=	0.0916
DFC b-ac	=	0.1505

CRITICAL DFC = 0.151

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J5 Tai Yuen Street / Kwok Shui Road	Year 2027 Reference AM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.10	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	0	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.50	(metres)
Vr c-b	=	0	(metres)
q c-a	=	375	(pcu/hr)
q c-b	=	165	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.20	(metres)
W b-c	=	2.20	(metres)
Vl b-a	=	34	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	90	(pcu/hr)
q b-c	=	60	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.73487984
E	=	0.78985365
F	=	0.8794228
Y	=	0.75505

THE CAPACITY OF MOVEMENT :

Q b-a	=	366
Q b-c	=	588
Q c-b	=	655
Q b-ac	=	431.11

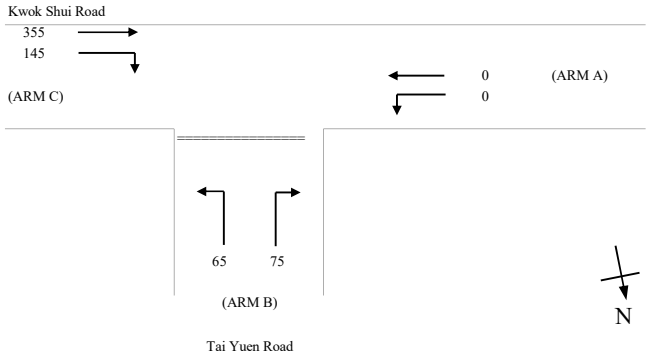
TOTAL FLOW = 690 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.2459
DFC b-c	=	0.1020
DFC c-b	=	0.2519
DFC b-ac	=	0.3479

CRITICAL DFC = 0.348

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J5 Tai Yuen Street / Kwok Shui Road	Year 2027 Reference PM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.10	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	0	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.50	(metres)
Vr c-b	=	0	(metres)
q c-a	=	355	(pcu/hr)
q c-b	=	145	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.20	(metres)
W b-c	=	2.20	(metres)
Vl b-a	=	34	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	75	(pcu/hr)
q b-c	=	65	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.73487984
E	=	0.78985365
F	=	0.8794228
Y	=	0.75505

THE CAPACITY OF MOVEMENT :

Q b-a	=	374
Q b-c	=	588
Q c-b	=	655
Q b-ac	=	450.05

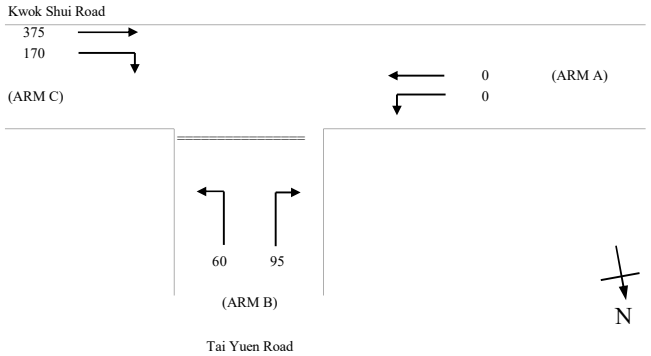
TOTAL FLOW = 640 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.2005
DFC b-c	=	0.1105
DFC c-b	=	0.2214
DFC b-ac	=	0.3111

CRITICAL DFC = 0.311

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J5 Tai Yuen Street / Kwok Shui Road	Year 2027 Design AM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.10	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	0	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.50	(metres)
Vr c-b	=	0	(metres)
q c-a	=	375	(pcu/hr)
q c-b	=	170	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.20	(metres)
W b-c	=	2.20	(metres)
Vl b-a	=	34	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	95	(pcu/hr)
q b-c	=	60	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.73487984
E	=	0.78985365
F	=	0.8794228
Y	=	0.75505

THE CAPACITY OF MOVEMENT :

Q b-a	=	364
Q b-c	=	588
Q c-b	=	655
Q b-ac	=	426.96

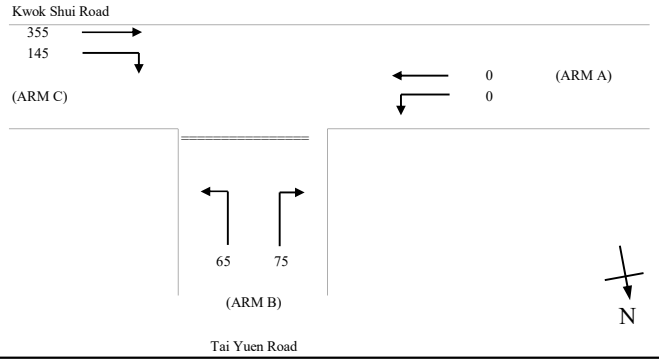
TOTAL FLOW = 700 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.2610
DFC b-c	=	0.1020
DFC c-b	=	0.2595
DFC b-ac	=	0.3630

CRITICAL DFC = 0.363

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J5 Tai Yuen Street / Kwok Shui Road	Year 2027 Design PM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.10	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	0	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.50	(metres)
Vr c-b	=	0	(metres)
q c-a	=	355	(pcu/hr)
q c-b	=	145	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.20	(metres)
W b-c	=	2.20	(metres)
Vl b-a	=	34	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	75	(pcu/hr)
q b-c	=	65	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.73487984
E	=	0.78985365
F	=	0.8794228
Y	=	0.75505

THE CAPACITY OF MOVEMENT :

Q b-a	=	374
Q b-c	=	588
Q c-b	=	655
Q b-ac	=	450.05

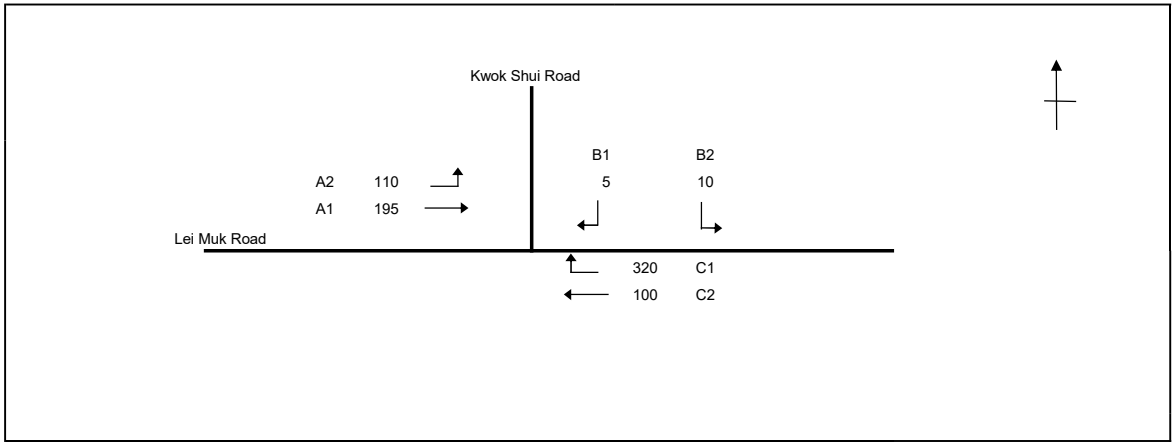
TOTAL FLOW = 640 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

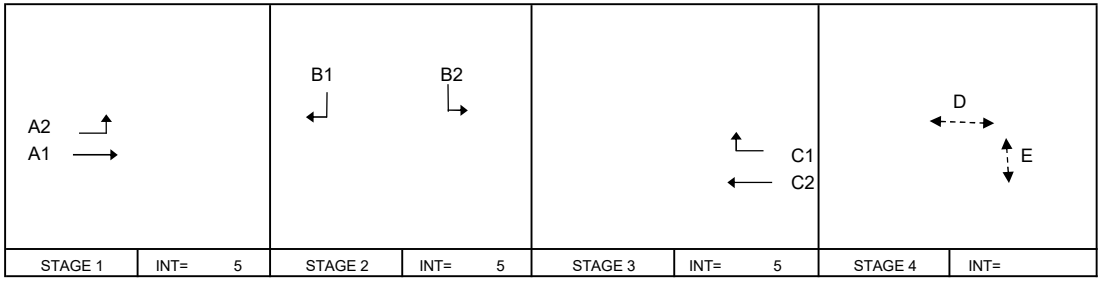
DFC b-a	=	0.2005
DFC b-c	=	0.1105
DFC c-b	=	0.2214
DFC b-ac	=	0.3111

CRITICAL DFC = 0.311

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J6
J6 - Kwok Shui Road / Lei Muk Road	Year 2020 Existing AM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle	N =	4
No. of stage using for calculation	N =	3
Cycle time	C =	90 sec
Sum(y)	Y =	0.386
Loss time	L =	38 sec
Total Flow	=	740 pcu
Co = (1.5*L+5)/(1-Y)	=	101.0 sec
Cm = L/(1-Y)	=	61.9 sec
Yult	=	0.615
R.C.ult = (Yult-Y)/Y*100%	=	59.2 %
Cp = 0.9*L/(0.9-Y)	=	66.6 sec
Ymax = 1-L/C	=	0.578
R.C.(P) = (0.9/Xmax-1)*100%	=	33.9 % (Actual)
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	35 %



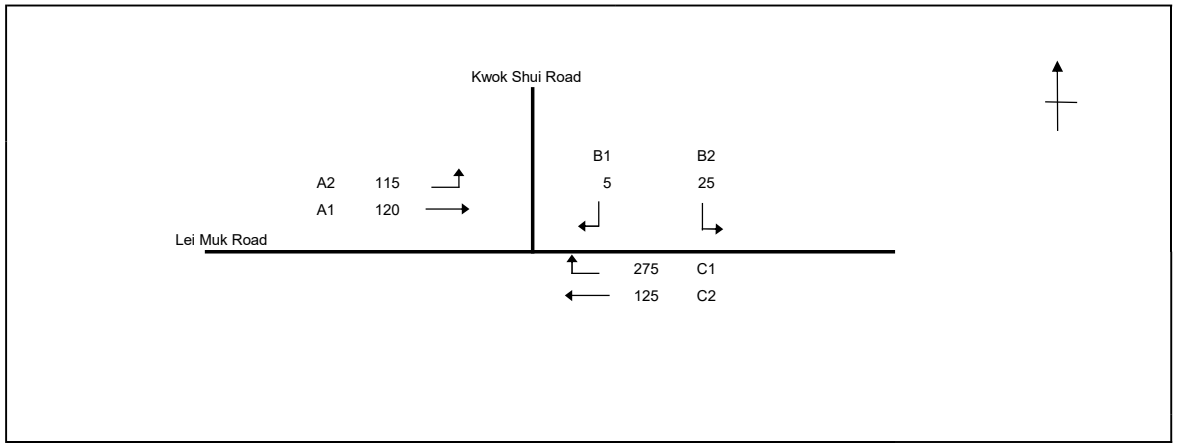
STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT= 5	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
D	10.3	5	7	9	5	7	9	OK
E	7.5	6	1	5	15	1	5	OK

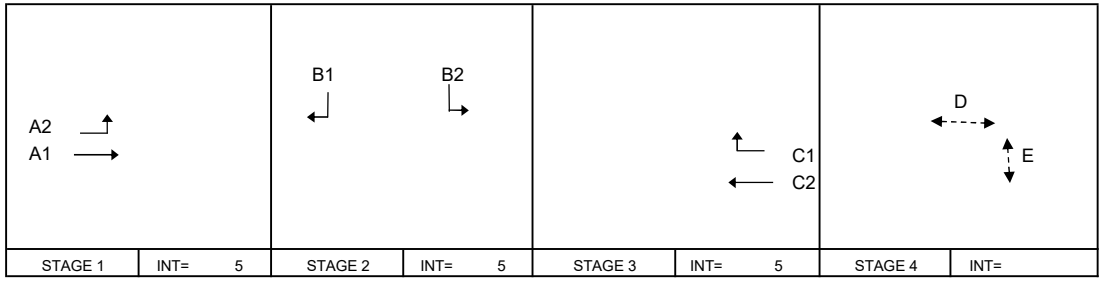
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
A1,A2	1	3.60	A	1	15			2115	110	195		305	0.36	2041			2041	0.149	0.149		20	20	0.672	36
B1,B2	2	4.00	B	1	10		N	2015	10		5	15	1.00	1752			1752	0.009	0.009	5	1	6	0.128	2
C1,C2	3	3.30	C	1	20		N	1945		100	320	420	0.76	1840			1840	0.228	0.228		31	31	0.663	41
ped																				21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS		TRAFFIC SIGNAL CALCULATION		
			PROJECT NO: 276306-24	Junction No. J6
J6- Kwok Shui Road / Lei Muk Road		Year 2020 Existing PM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.350
Loss time		L =	36 sec
Total Flow		=	665 pcu
Co	= (1.5*L+5)/(1-Y)	=	90.8 sec
Cm	= L/(1-Y)	=	55.4 sec
Yult		=	0.630
R.C.ult	= (Yult-Y)/Y*100%	=	80.0 %
Cp	= 0.9*L/(0.9-Y)	=	58.9 sec
Ymax	= 1-L/C	=	0.600
R.C.(P)	= (0.9/Xmax-1)*100%	=	52.6 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	54 %



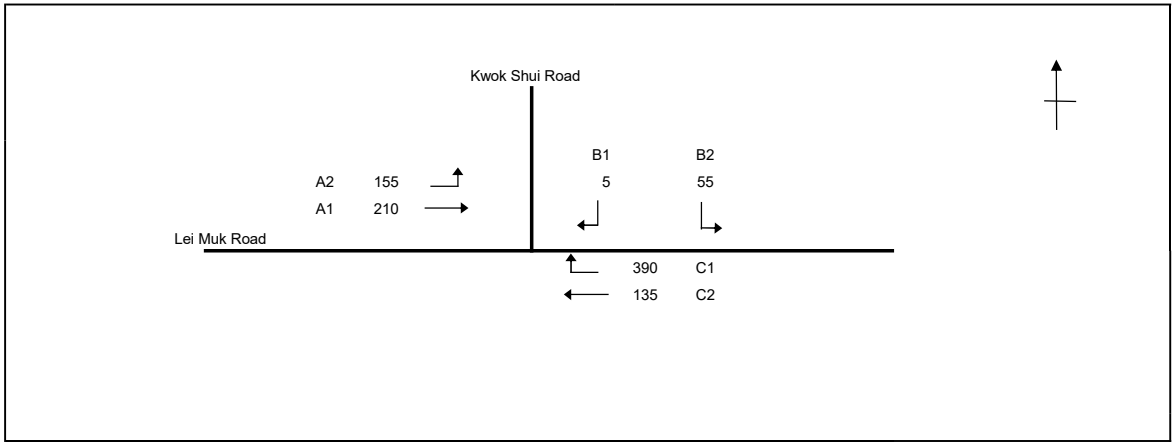
STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT= 5	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
D	10.3	5	7	9	5	7	9	OK
E	7.5	6	1	5	15	1	5	OK

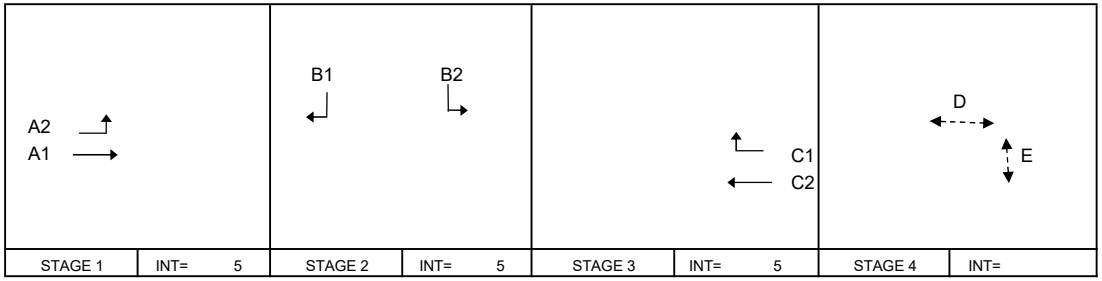
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
A1,A2	1	3.60	A	1	15			2115	115	120		235	0.49	2016			2016	0.117	0.117		18	18	0.583	28
B1,B2	2	4.00	B	1	10		N	2015	25		5	30	1.00	1752			1752	0.017	0.017	3	3	6	0.257	4
C1,C2	3	3.30	C	1	20		N	1945		125	275	400	0.69	1850			1850	0.216	0.216		33	33	0.590	38
ped																				21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J6
J6- Kwok Shui Road / Lei Muk Road	Year 2027 Reference AM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.499
Loss time		L =	35 sec
Total Flow		=	950 pcu
Co	= (1.5*L+5)/(1-Y)	=	114.8 sec
Cm	= L/(1-Y)	=	69.9 sec
Yult		=	0.638
R.C.ult	= (Yult-Y)/Y*100%	=	27.7 %
Cp	= 0.9*L/(0.9-Y)	=	78.6 sec
Ymax	= 1-L/C	=	0.611
R.C.(P)	= (0.9/Xmax-1)*100%	=	8.8 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	10 %



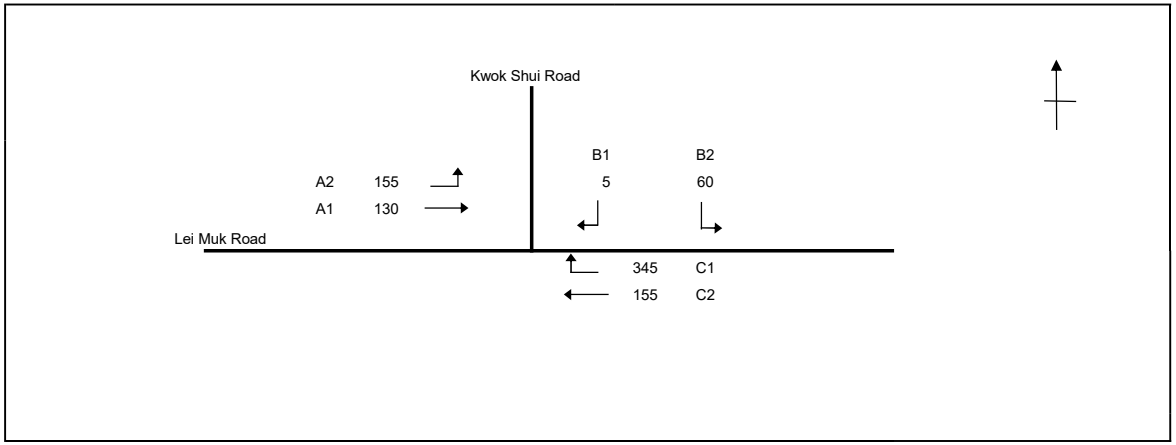
STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT= 5	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
D	10.3	5	7	9	5	7	9	OK
E	7.5	6	1	5	15	1	5	OK

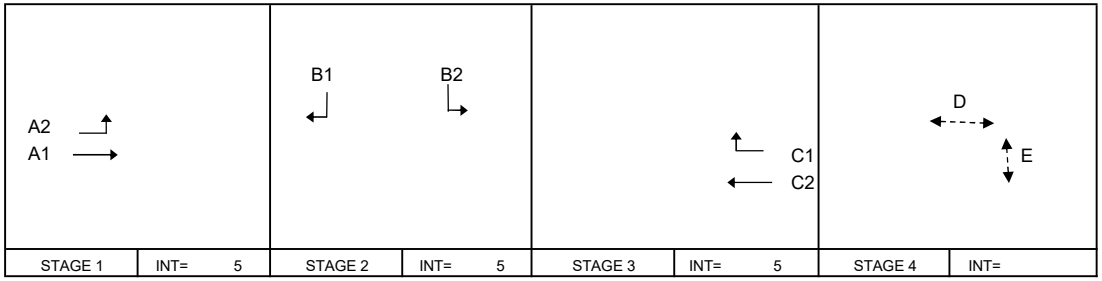
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
A1,A2	1	3.60	A	1	15			2115	155	210		365	0.42	2029			2029	0.180	0.180		20	20	0.810	43
B1,B2	2	4.00	B	1	10		N	2015	55		5	60	1.00	1752			1752	0.034	0.034	2	4	6	0.514	8
C1,C2	3	3.30	C	1	20		N	1945		135	390	525	0.74	1842			1842	0.285	0.285		31	31	0.827	52
ped																				21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J6
J6- Kwok Shui Road / Lei Muk Road	Year 2027 Reference PM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.450
Loss time		L =	35 sec
Total Flow		=	850 pcu
Co	= (1.5*L+5)/(1-Y)	=	104.5 sec
Cm	= L/(1-Y)	=	63.6 sec
Yult		=	0.638
R.C.ult	= (Yult-Y)/Y*100%	=	41.8 %
Cp	= 0.9*L/(0.9-Y)	=	69.9 sec
Ymax	= 1-L/C	=	0.611
R.C.(P)	= (0.9/Xmax-1)*100%	=	19.7 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	22 %



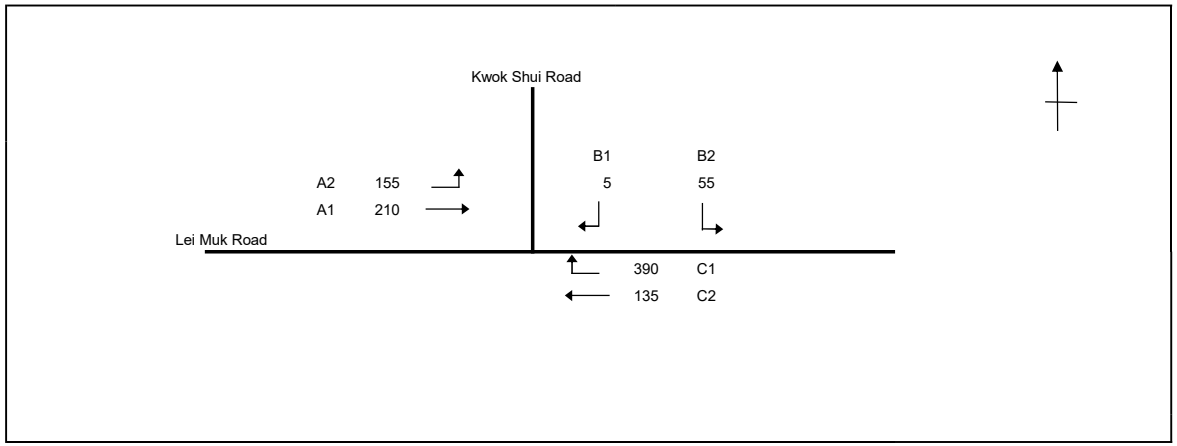
STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT= 5	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
D	10.3	5	7	9	5	7	9	OK
E	7.5	6	1	5	15	1	5	OK

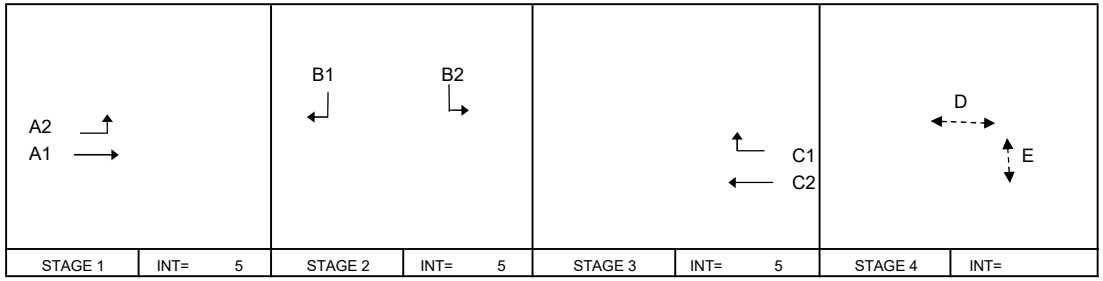
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
A1,A2	1	3.60	A	1	15			2115	155	130		285	0.54	2006			2006	0.142	0.142		17	17	0.752	35
B1,B2	2	4.00	B	1	10		N	2015	60		5	65	1.00	1752			1752	0.037	0.037	2	5	7	0.477	9
C1,C2	3	3.30	C	1	20		N	1945		155	345	500	0.69	1849			1849	0.270	0.270		33	33	0.737	48
ped																				21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS		TRAFFIC SIGNAL CALCULATION		
			PROJECT NO: 276306-24	Junction No. J6
J6- Kwok Shui Road / Lei Muk Road		Year 2027 Design AM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.499
Loss time		L =	35 sec
Total Flow		=	950 pcu
Co	= (1.5*L+5)/(1-Y)	=	114.8 sec
Cm	= L/(1-Y)	=	69.9 sec
Yult		=	0.638
R.C.ult	= (Yult-Y)/Y*100%	=	27.7 %
Cp	= 0.9*L/(0.9-Y)	=	78.6 sec
Ymax	= 1-L/C	=	0.611
R.C.(P)	= (0.9/Xmax-1)*100%	=	8.8 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	10 %



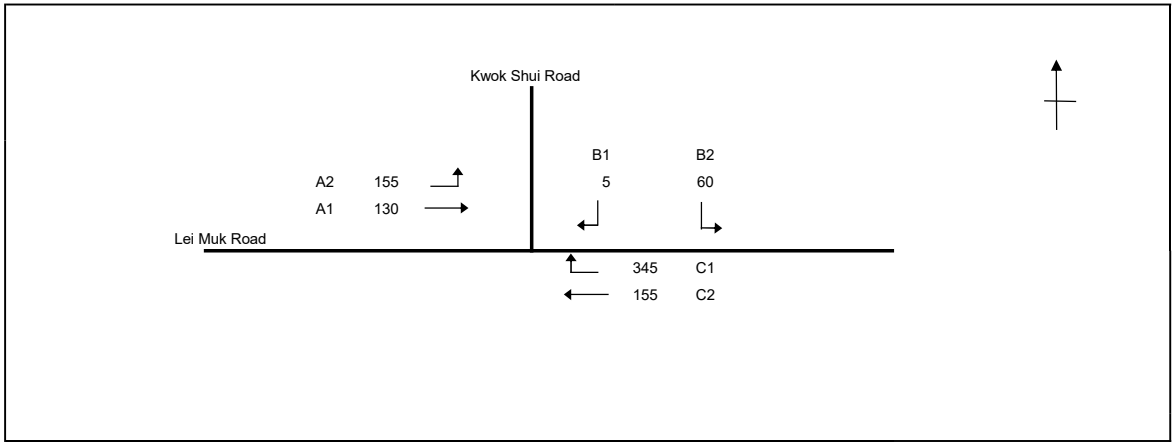
STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT= 5	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
D	10.3	5	7	9	5	7	9	OK
E	7.5	6	1	5	15	1	5	OK

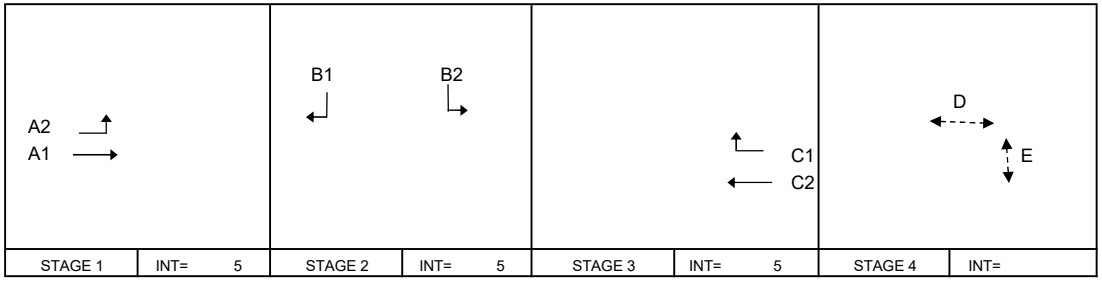
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
A1,A2	1	3.60	A	1	15			2115	155	210		365	0.42	2029			2029	0.180	0.180		20	20	0.810	43
B1,B2	2	4.00	B	1	10		N	2015	55		5	60	1.00	1752			1752	0.034	0.034	2	4	6	0.514	8
C1,C2	3	3.30	C	1	20		N	1945		135	390	525	0.74	1842			1842	0.285	0.285		31	31	0.827	52
ped																				21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS		TRAFFIC SIGNAL CALCULATION		
			PROJECT NO: 276306-24	Junction No. J6
J6- Kwok Shui Road / Lei Muk Road		Year 2027 Design PM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle	N =	4
No. of stage using for calculation	N =	3
Cycle time	C =	90 sec
Sum(y)	Y =	0.450
Loss time	L =	35 sec
Total Flow	=	850 pcu
Co = (1.5*L+5)/(1-Y)	=	104.5 sec
Cm = L/(1-Y)	=	63.6 sec
Yult	=	0.638
R.C.ult = (Yult-Y)/Y*100%	=	41.8 %
Cp = 0.9*L/(0.9-Y)	=	69.9 sec
Ymax = 1-L/C	=	0.611
R.C.(P) = (0.9/Xmax-1)*100%	=	19.7 % (Actual)
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	22 %



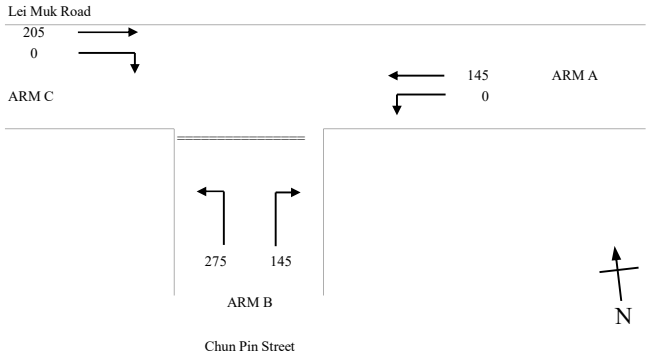
STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT= 5	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
D	10.3	5	7	9	5	7	9	OK
E	7.5	6	1	5	15	1	5	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
A1,A2	1	3.60	A	1	15			2115	155	130		285	0.54	2006			2006	0.142	0.142		17	17	0.752	35
B1,B2	2	4.00	B	1	10		N	2015	60		5	65	1.00	1752			1752	0.037	0.037	2	5	7	0.477	9
C1,C2	3	3.30	C	1	20		N	1945		155	345	500	0.69	1849			1849	0.270	0.270		33	33	0.737	48
ped																				21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J7 Lei Muk Road / Chun Pin Street	Year 2020 Existing AM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	145	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	205	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.90	(metres)
W b-c	=	4.20	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	145	(pcu/hr)
q b-c	=	275	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.1476725
E	=	1.0800959
F	=	0.5859548
Y	=	0.793

THE CAPACITY OF MOVEMENT :

Q b-a	=	629
Q b-c	=	759
Q c-b	=	412
Q b-ac	=	708.45

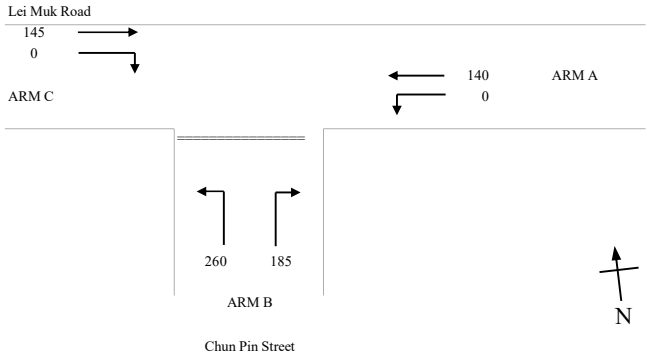
TOTAL FLOW = 770 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.2305
DFC b-c	=	0.3623
DFC c-b	=	0.0000
DFC b-ac	=	0.5928

CRITICAL DFC = 0.593

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J7 Lei Muk Road / Chun Pin Street	Year 2020 Existing PM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	140	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	145	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.90	(metres)
W b-c	=	4.20	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	185	(pcu/hr)
q b-c	=	260	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.1476725
E	=	1.0800959
F	=	0.5859548
Y	=	0.793

THE CAPACITY OF MOVEMENT :

Q b-a	=	643
Q b-c	=	761
Q c-b	=	413
Q b-ac	=	707.06

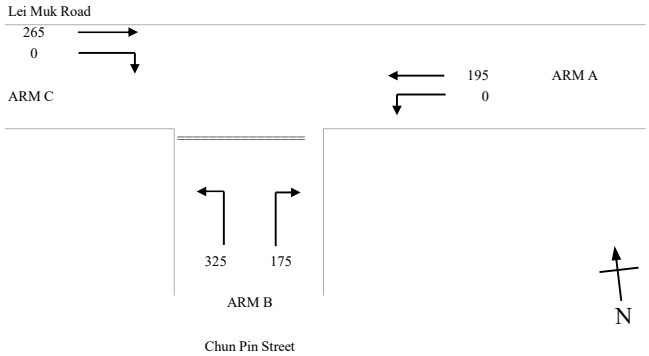
TOTAL FLOW = 730 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.2877
DFC b-c	=	0.3417
DFC c-b	=	0.0000
DFC b-ac	=	0.6294

CRITICAL DFC = 0.629

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J7 Lei Muk Road / Chun Pin Street	Year 2027 Reference AM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	195	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	265	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.90	(metres)
W b-c	=	4.20	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	175	(pcu/hr)
q b-c	=	325	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.1476725
E	=	1.0800959
F	=	0.5859548
Y	=	0.793

THE CAPACITY OF MOVEMENT :

Q b-a	=	600
Q b-c	=	744
Q c-b	=	404
Q b-ac	=	686.35

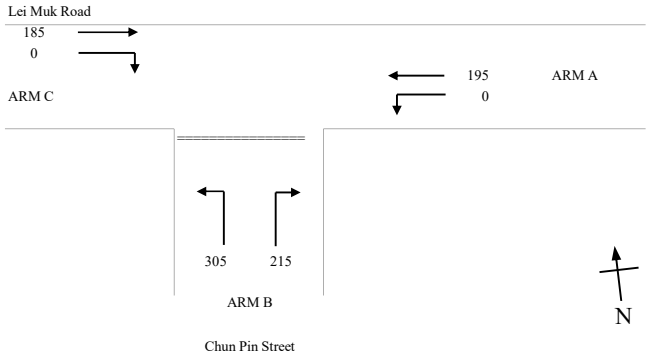
TOTAL FLOW = 960 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.2917
DFC b-c	=	0.4368
DFC c-b	=	0.0000
DFC b-ac	=	0.7285

CRITICAL DFC = 0.728

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J7 Lei Muk Road / Chun Pin Street	Year 2027 Reference PM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	195	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	185	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.90	(metres)
W b-c	=	4.20	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	215	(pcu/hr)
q b-c	=	305	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.1476725
E	=	1.0800959
F	=	0.5859548
Y	=	0.793

THE CAPACITY OF MOVEMENT :

Q b-a	=	616
Q b-c	=	744
Q c-b	=	404
Q b-ac	=	685.14

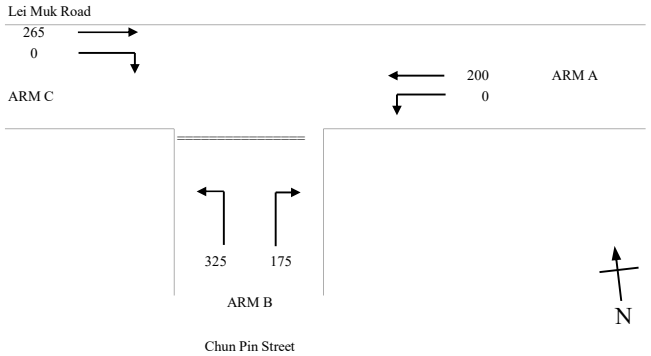
TOTAL FLOW = 900 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.3490
DFC b-c	=	0.4099
DFC c-b	=	0.0000
DFC b-ac	=	0.7590

CRITICAL DFC = 0.759

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J7 Lei Muk Road / Chun Pin Street	Year 2027 Design AM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	200	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	265	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.90	(metres)
W b-c	=	4.20	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	175	(pcu/hr)
q b-c	=	325	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.1476725
E	=	1.0800959
F	=	0.5859548
Y	=	0.793

THE CAPACITY OF MOVEMENT :

Q b-a	=	598
Q b-c	=	742
Q c-b	=	403
Q b-ac	=	684.32

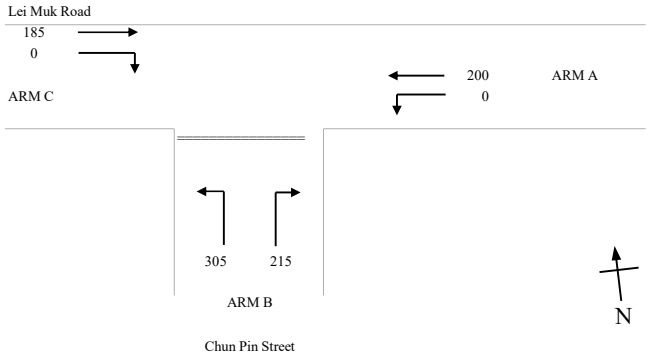
TOTAL FLOW = 965 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.2926
DFC b-c	=	0.4380
DFC c-b	=	0.0000
DFC b-ac	=	0.7306

CRITICAL DFC = 0.731

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J7 Lei Muk Road / Chun Pin Street	Year 2027 Design PM Peak	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	200	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	185	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.90	(metres)
W b-c	=	4.20	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	215	(pcu/hr)
q b-c	=	305	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.1476725
E	=	1.0800959
F	=	0.5859548
Y	=	0.793

THE CAPACITY OF MOVEMENT :

Q b-a	=	615
Q b-c	=	742
Q c-b	=	403
Q b-ac	=	683.63

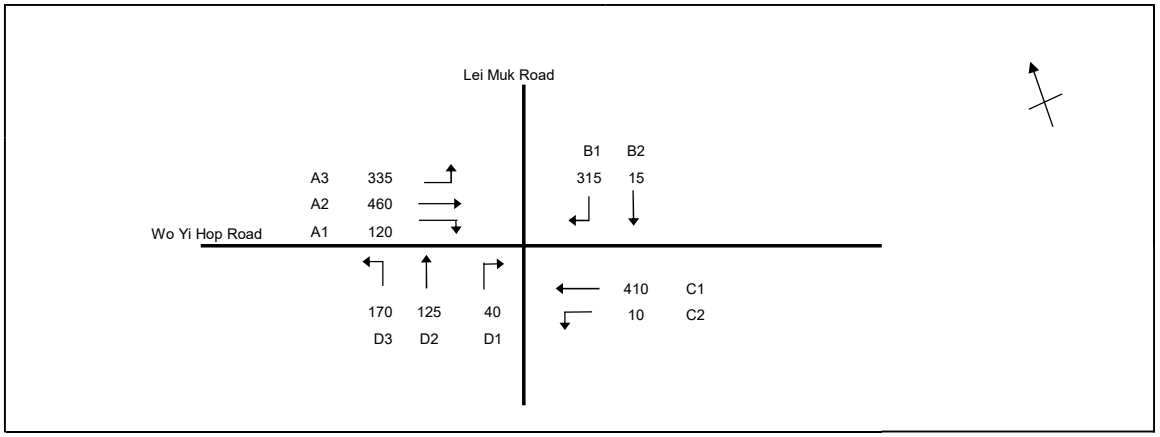
TOTAL FLOW = 905 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

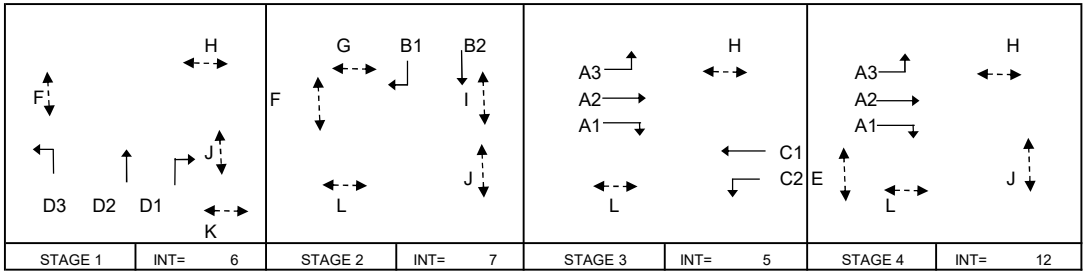
DFC b-a	=	0.3496
DFC b-c	=	0.4111
DFC c-b	=	0.0000
DFC b-ac	=	0.7606

CRITICAL DFC = 0.761

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J8
J8 Lei Muk Road / Wo Yi Hop Road	Year 2020 Existing AM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	110 sec
Sum(y)		Y =	0.424
Loss time		L =	22 sec
Total Flow		=	1726 pcu
Co	= (1.5*L+5)/(1-Y)	=	66.0 sec
Cm	= L/(1-Y)	=	38.2 sec
Yult		=	0.735
R.C.ult	= (Yult-Y)/Y*100%	=	73.3 %
Cp	= 0.9*L/(0.9-Y)	=	41.6 sec
Ymax	= 1-L/C	=	0.800
R.C.(P)	= (0.9/Xmax-1)*100%	=	65.8 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	69.8 %

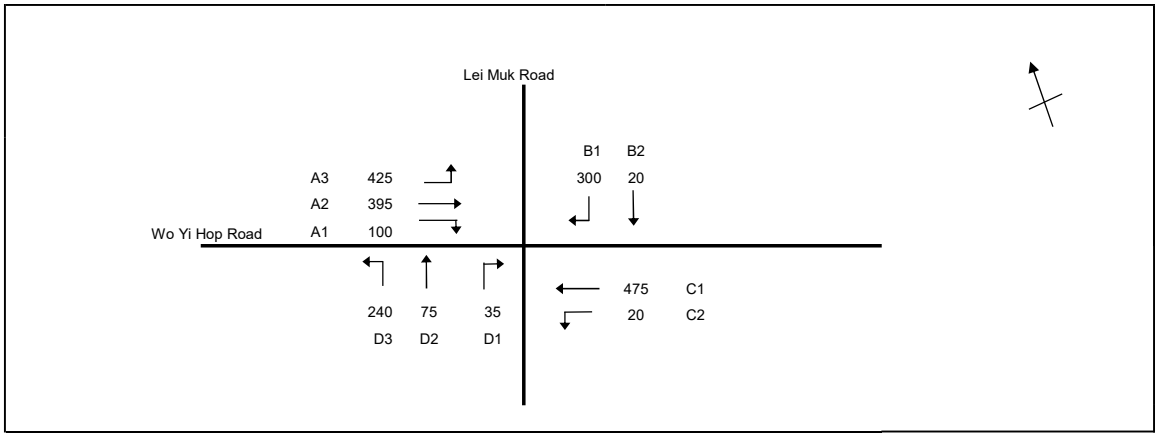


Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	7	5	4	8	5	4	8	OK
F	11	6	2	12	32	2	12	OK
G	7	5	8	8	8	8	8	OK
H	9	5	3	10	73	3	10	OK
I	8	5	8	9	7	8	9	OK
J	10	6	1	11	51	1	11	OK
K	7.5	5	2	8	12	2	8	OK
L	11	6	2	12	74	2	12	OK

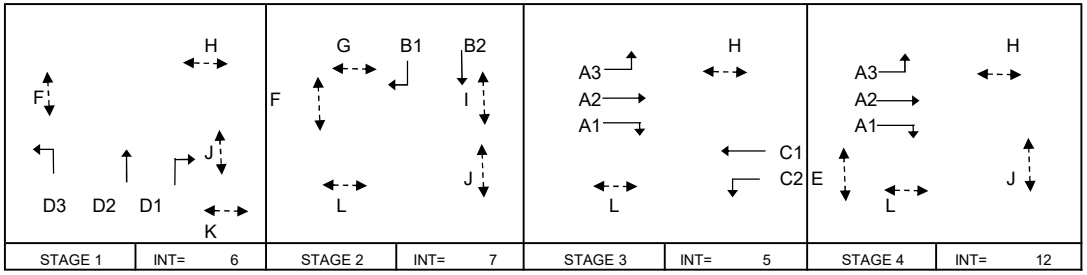
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
D1,D2	1	3.10	D	1	15			2065		125	40	165	0.24	2016			2016	0.082	0.082		17	17	0.530	26
D3	1	3.10	D	1	10			2065	109			109	1.00	1796			1796	0.061			13	17	0.393	17
D3	1	3.10	D	1	10		N	1925	61			61	1.00	1674			1004	0.061			13	17	0.393	9
B1,B2	2	3.40	B	1	15		N	1955		15	144	159	0.91	1793			1793	0.089	0.089		18	18	0.543	24
B1	2	3.60	B	1	15			2115			171	171	1.00	1923			1923	0.089			18	18	0.543	26
C1	3	2.90	C	2	20			4090		410		410	0.00	4090			4090	0.100			21	43	0.256	23
C2	3	2.70	C	1	10		N	1885	10			10	1.00	1639			1639	0.006			1	43	0.016	1
A2,A3	3,4	3.80	A	1	10		N	1995	335	120		455	0.74	1797			1797	0.253	0.253		53	53	0.526	43
A1,A2	3,4	3.60	A	1	10	Y		2115		340	120	460	0.26	1814			1814	0.253			53	53	0.526	44

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J8
J8 Lei Muk Road / Wo Yi Hop Road	Year 2020 Existing PM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	110 sec
Sum(y)		Y =	0.429
Loss time		L =	22 sec
Total Flow		=	1821 pcu
Co	= (1.5*L+5)/(1-Y)	=	66.6 sec
Cm	= L/(1-Y)	=	38.5 sec
Yult		=	0.735
R.C.ult	= (Yult-Y)/Y*100%	=	71.3 %
Cp	= 0.9*L/(0.9-Y)	=	42.0 sec
Ymax	= 1-L/C	=	0.800
R.C.(P)	= (0.9/Xmax-1)*100%	=	68.5 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	67.8 %



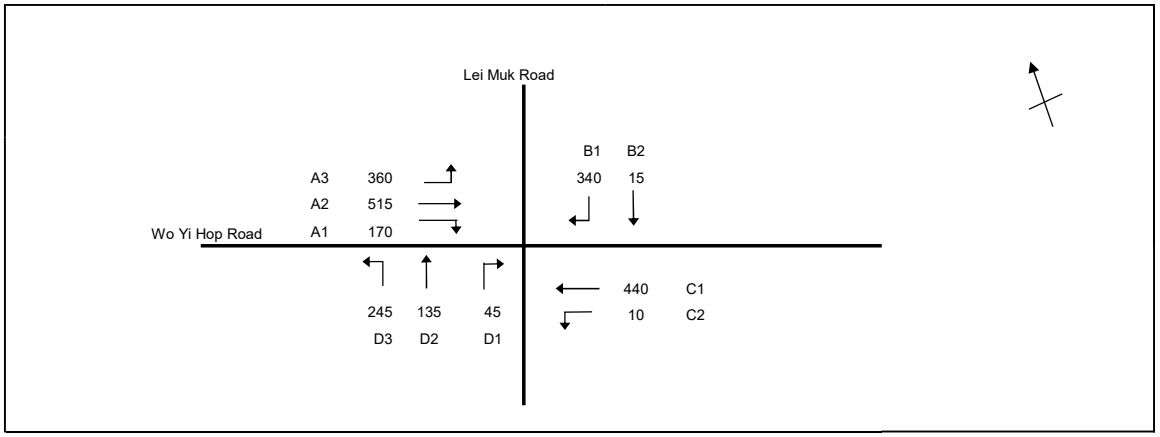
STAGE 1	INT= 6	STAGE 2	INT= 7	STAGE 3	INT= 5	STAGE 4	INT= 12

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	7	5	4	8	5	4	8	OK
F	11	6	2	12	33	2	12	OK
G	7	5	8	8	8	8	8	OK
H	9	5	3	10	74	3	10	OK
I	8	5	8	9	7	8	9	OK
J	10	6	1	11	52	1	11	OK
K	7.5	5	2	8	13	2	8	OK
L	11	6	2	12	74	2	12	OK

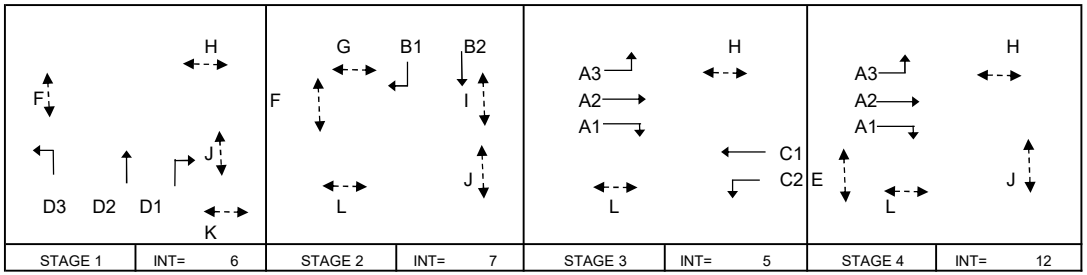
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
D1,D2	1	3.10	D	1	15			2065		75	35	110	0.32	2001			2001	0.055	0.086		11	18	0.336	17
D3	1	3.10	D	1	10			2065	154			154	1.00	1796			1796	0.086			18	18	0.524	24
D3	1	3.10	D	1	10		N	1925	86			86	1.00	1674			1004	0.086			18	18	0.524	13
B1,B2	2	3.40	B	1	15		N	1955		20	135	155	0.87	1798			1798	0.086	0.086		18	18	0.526	24
B1	2	3.60	B	1	15			2115			165	165	1.00	1923			1923	0.086			18	18	0.526	25
C1	3	2.90	C	2	20			4090		475		475	0.00	4090			4090	0.116			24	48	0.266	25
C2	3	2.70	C	1	10		N	1885	20			20	1.00	1639			1639	0.012			3	48	0.028	2
A2,A3	3,4	3.80	A	1	10		N	1995	425	25		450	0.94	1747			1747	0.257	0.257		53	53	0.534	43
A1,A2	3,4	3.60	A	1	10	Y		2115		370	100	470	0.21	1827			1827	0.257			53	53	0.534	45

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J8
J8 Lei Muk Road / Wo Yi Hop Road	Year 2027 Reference AM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	110 sec
Sum(y)		Y =	0.475
Loss time		L =	22 sec
Total Flow		=	1938 pcu
Co	= (1.5*L+5)/(1-Y)	=	72.4 sec
Cm	= L/(1-Y)	=	41.9 sec
Yult		=	0.735
R.C.ult	= (Yult-Y)/Y*100%	=	54.6 %
Cp	= 0.9*L/(0.9-Y)	=	46.6 sec
Ymax	= 1-L/C	=	0.800
R.C.(P)	= (0.9/Xmax-1)*100%	=	52.3 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	51.5 %



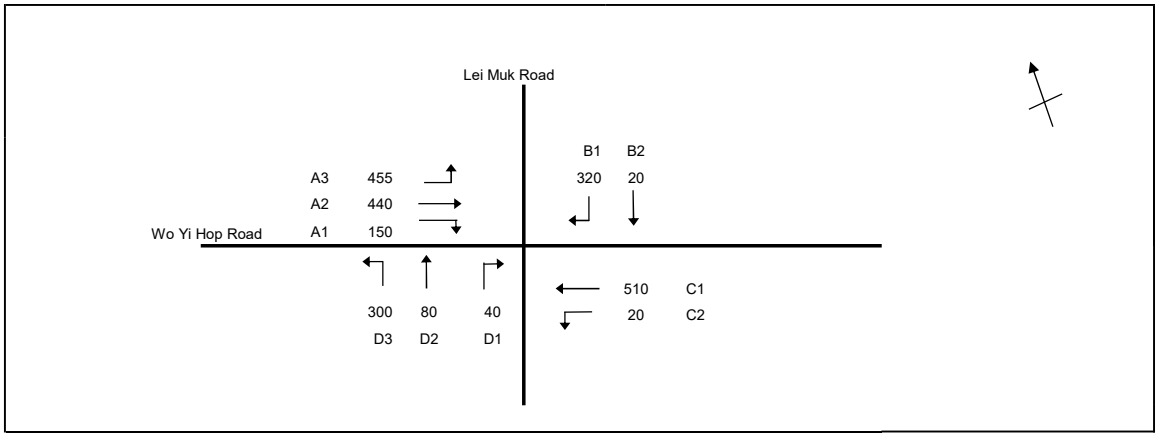
STAGE 1	INT= 6	STAGE 2	INT= 7	STAGE 3	INT= 5	STAGE 4	INT= 12

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	7	5	4	8	5	4	8	OK
F	11	6	2	12	32	2	12	OK
G	7	5	8	8	8	8	8	OK
H	9	5	3	10	74	3	10	OK
I	8	5	8	9	7	8	9	OK
J	10	6	1	11	51	1	11	OK
K	7.5	5	2	8	12	2	8	OK
L	11	6	2	12	75	2	12	OK

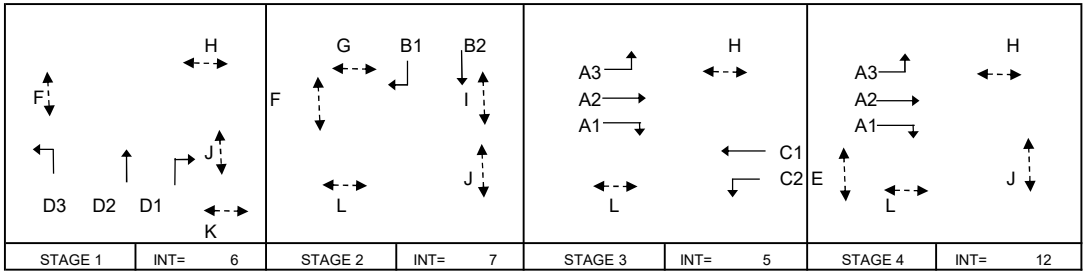
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
D1,D2	1	3.10	D	1	15			2065		135	45	180	0.25	2015			2015	0.089	0.089		17	17	0.578	28
D3	1	3.10	D	1	10			2065	157			157	1.00	1796			1796	0.087			16	17	0.566	24
D3	1	3.10	D	1	10		N	1925	88			88	1.00	1674			1004	0.088			16	17	0.566	14
B1,B2	2	3.40	B	1	15		N	1955		15	157	172	0.91	1791			1791	0.096	0.096		18	18	0.586	26
B1	2	3.60	B	1	15			2115			183	183	1.00	1923			1923	0.095			18	18	0.582	28
C1	3	2.90	C	2	20			4090		440		440	0.00	4090			4090	0.108			20	49	0.242	22
C2	3	2.70	C	1	10		N	1885	10			10	1.00	1639			1639	0.006			1	49	0.014	1
A2,A3	3,4	3.80	A	1	10		N	1995	360	165		525	0.69	1809			1809	0.290	0.290		54	54	0.591	49
A1,A2	3,4	3.60	A	1	10	Y		2115		350	170	520	0.33	1797			1797	0.290			54	54	0.590	49

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J8
J8 Lei Muk Road / Wo Yi Hop Road	Year 2027 Reference PM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	110 sec
Sum(y)		Y =	0.492
Loss time		L =	22 sec
Total Flow		=	2023 pcu
Co	= (1.5*L+5)/(1-Y)	=	74.7 sec
Cm	= L/(1-Y)	=	43.3 sec
Yult		=	0.735
R.C.ult	= (Yult-Y)/Y*100%	=	49.5 %
Cp	= 0.9*L/(0.9-Y)	=	48.5 sec
Ymax	= 1-L/C	=	0.800
R.C.(P)	= (0.9/Xmax-1)*100%	=	42.8 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	46 %



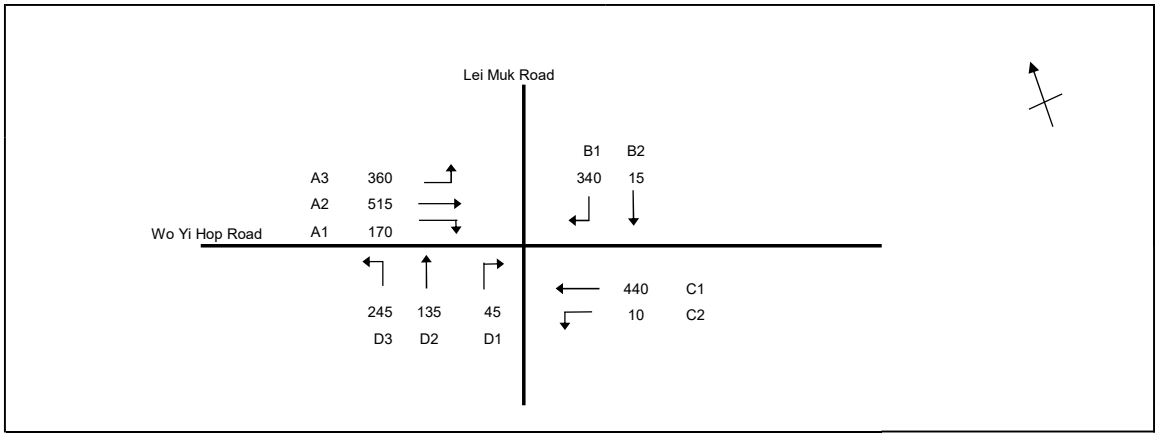
STAGE 1	INT= 6	STAGE 2	INT= 7	STAGE 3	INT= 5	STAGE 4	INT= 12

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	7	5	4	8	5	4	8	OK
F	11	6	2	12	32	2	12	OK
G	7	5	8	8	6	8	8	OK
H	9	5	3	10	74	3	10	OK
I	8	5	8	9	5	8	9	OK
J	10	6	1	11	51	1	11	OK
K	7.5	5	2	8	14	2	8	OK
L	11	6	2	12	71	2	12	OK

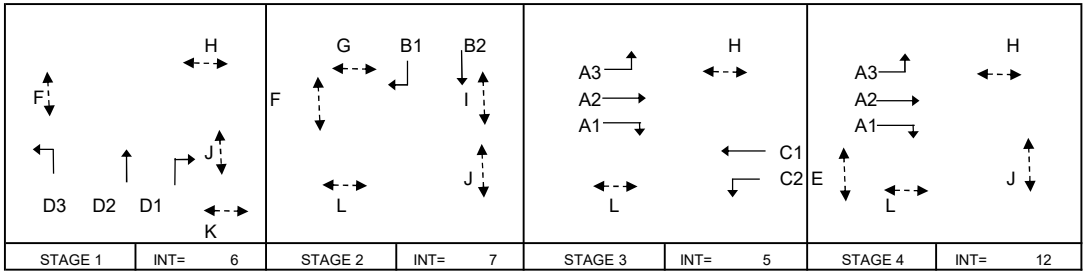
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
D1,D2	1	3.10	D	1	15			2065		80	40	120	0.33	1998			1998	0.060	0.107		11	19	0.348	18
D3	1	3.10	D	1	10			2065	192			192	1.00	1796			1796	0.107			19	19	0.620	29
D3	1	3.10	D	1	10		N	1925	108			108	1.00	1674			1004	0.107			19	19	0.620	16
B1,B2	2	3.40	B	1	15		N	1955		20	144	164	0.88	1797			1797	0.091	0.092		16	16	0.627	26
B1	2	3.60	B	1	15			2115			176	176	1.00	1923			1923	0.092			16	16	0.630	28
C1	3	2.90	C	2	20			4090		510		510	0.00	4090			4090	0.125			22	47	0.292	27
C2	3	2.70	C	1	10		N	1885	20			20	1.00	1639			1639	0.012			2	47	0.029	2
A2,A3	3,4	3.80	A	1	10		N	1995	455	61		516	0.88	1762			1762	0.293	0.293		52	52	0.619	50
A1,A2	3,4	3.60	A	1	10	Y		2115		379	150	529	0.28	1808			1808	0.293			52	52	0.619	51

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J8
J8 Lei Muk Road / Wo Yi Hop Road	Year 2027 Design AM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	110 sec
Sum(y)		Y =	0.476
Loss time		L =	22 sec
Total Flow		=	1937 pcu
Co	= (1.5*L+5)/(1-Y)	=	72.5 sec
Cm	= L/(1-Y)	=	42.0 sec
Yult		=	0.735
R.C.ult	= (Yult-Y)/Y*100%	=	54.5 %
Cp	= 0.9*L/(0.9-Y)	=	46.7 sec
Ymax	= 1-L/C	=	0.800
R.C.(P)	= (0.9/Xmax-1)*100%	=	52.1 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	51.4 %



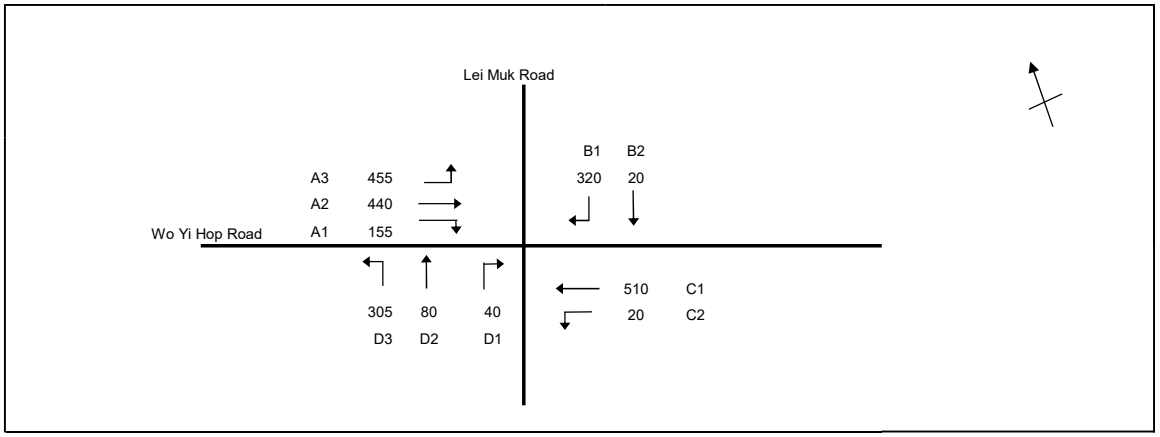
STAGE 1	INT= 6	STAGE 2	INT= 7	STAGE 3	INT= 5	STAGE 4	INT= 12

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	7	5	4	8	5	4	8	OK
F	11	6	2	12	32	2	12	OK
G	7	5	8	8	8	8	8	OK
H	9	5	3	10	74	3	10	OK
I	8	5	8	9	7	8	9	OK
J	10	6	1	11	51	1	11	OK
K	7.5	5	2	8	12	2	8	OK
L	11	6	2	12	75	2	12	OK

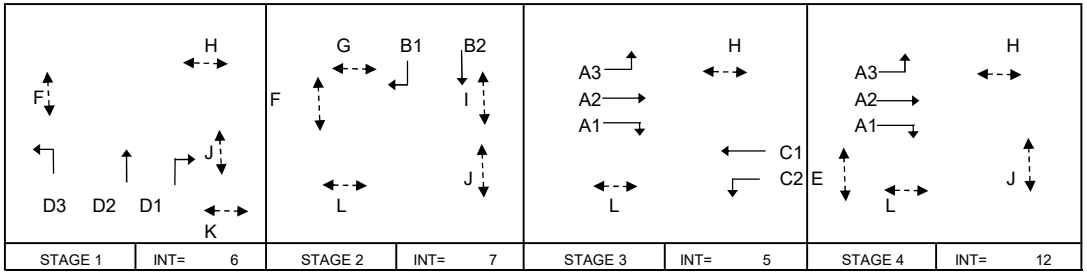
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
D1,D2	1	3.10	D	1	15			2065		135	45	180	0.25	2015			2015	0.089	0.089		17	17	0.578	28
D3	1	3.10	D	1	10			2065	158			158	1.00	1796			1796	0.088			16	17	0.568	24
D3	1	3.10	D	1	10		N	1925	87			87	1.00	1674			1004	0.087			16	17	0.562	14
B1,B2	2	3.40	B	1	15		N	1955		15	157	172	0.91	1791			1791	0.096	0.096		18	18	0.586	26
B1	2	3.60	B	1	15			2115			183	183	1.00	1923			1923	0.095			18	18	0.582	28
C1	3	2.90	C	2	20			4090		440		440	0.00	4090			4090	0.108			20	49	0.242	22
C2	3	2.70	C	1	10		N	1885	10			10	1.00	1639			1639	0.006			1	49	0.014	1
A2,A3	3,4	3.80	A	1	10		N	1995	360	165		525	0.69	1809			1809	0.290	0.290		54	54	0.592	49
A1,A2	3,4	3.60	A	1	10	Y		2115		350	170	520	0.33	1797			1797	0.289			54	54	0.589	49

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J8
J8 Lei Muk Road / Wo Yi Hop Road	Year 2027 Design PM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	110 sec
Sum(y)		Y =	0.495
Loss time		L =	22 sec
Total Flow		=	2029 pcu
Co	= (1.5*L+5)/(1-Y)	=	75.3 sec
Cm	= L/(1-Y)	=	43.6 sec
Yult		=	0.735
R.C.ult	= (Yult-Y)/Y*100%	=	48.4 %
Cp	= 0.9*L/(0.9-Y)	=	48.9 sec
Ymax	= 1-L/C	=	0.800
R.C.(P)	= (0.9/Xmax-1)*100%	=	42.4 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	45.4 %



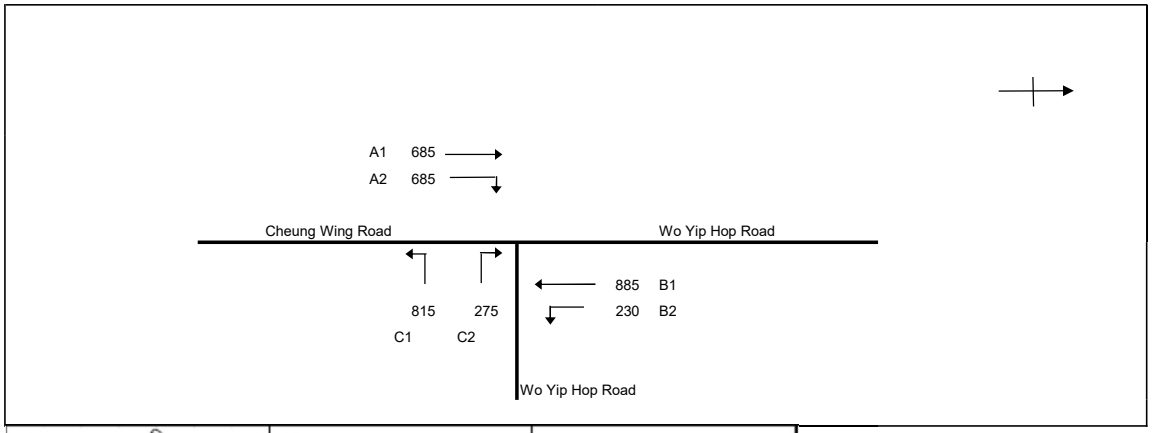
STAGE 1	INT= 6	STAGE 2	INT= 7	STAGE 3	INT= 5	STAGE 4	INT= 12

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	7	5	4	8	5	4	8	OK
F	11	6	2	12	32	2	12	OK
G	7	5	8	8	6	8	8	OK
H	9	5	3	10	74	3	10	OK
I	8	5	8	9	5	8	9	OK
J	10	6	1	11	51	1	11	OK
K	7.5	5	2	8	14	2	8	OK
L	11	6	2	12	71	2	12	OK

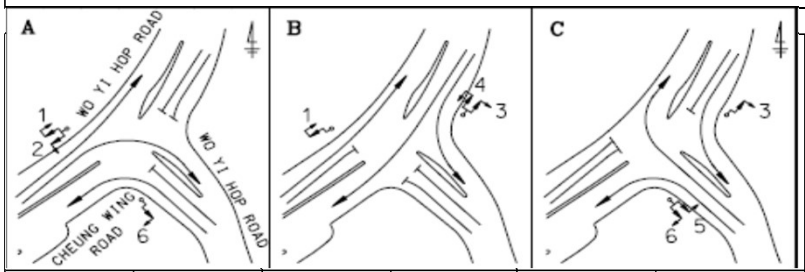
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
D1,D2	1	3.10	D	1	15			2065		80	40	120	0.33	1998			1998	0.060	0.109		11	19	0.348	18
D3	1	3.10	D	1	10			2065	196			196	1.00	1796			1796	0.109			19	19	0.632	30
D3	1	3.10	D	1	10		N	1925	109			109	1.00	1674			1004	0.109			19	19	0.628	17
B1,B2	2	3.40	B	1	15		N	1955		20	145	165	0.88	1797			1797	0.092	0.092		16	16	0.631	26
B1	2	3.60	B	1	15			2115			175	175	1.00	1923			1923	0.091			16	16	0.626	27
C1	3	2.90	C	2	20			4090		510		510	0.00	4090			4090	0.125			22	47	0.292	27
C2	3	2.70	C	1	10		N	1885	20			20	1.00	1639			1639	0.012			2	47	0.029	2
A2,A3	3,4	3.80	A	1	10		N	1995	455	64		519	0.88	1763			1763	0.294	0.294		52	52	0.623	50
A1,A2	3,4	3.60	A	1	10	Y		2115		376	155	531	0.29	1806			1806	0.294			52	52	0.622	51

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J9
J9 Wo Yi Hop Road / Cheung Wing Road	Year 2020 Existing AM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	112 sec
Sum(y)		Y =	0.516
Loss time		L =	15 sec
Total Flow		=	2890 pcu
Co	= (1.5*L+5)/(1-Y)	=	56.8 sec
Cm	= L/(1-Y)	=	31.0 sec
Yult		=	0.788
R.C.ult	= (Yult-Y)/Y*100%	=	52.6 %
Cp	= 0.9*L/(0.9-Y)	=	35.2 sec
Ymax	= 1-L/C	=	0.866
R.C.(P)	= (0.9/Xmax-1)*100%	=	51.0 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	51.0 % (Optimized)



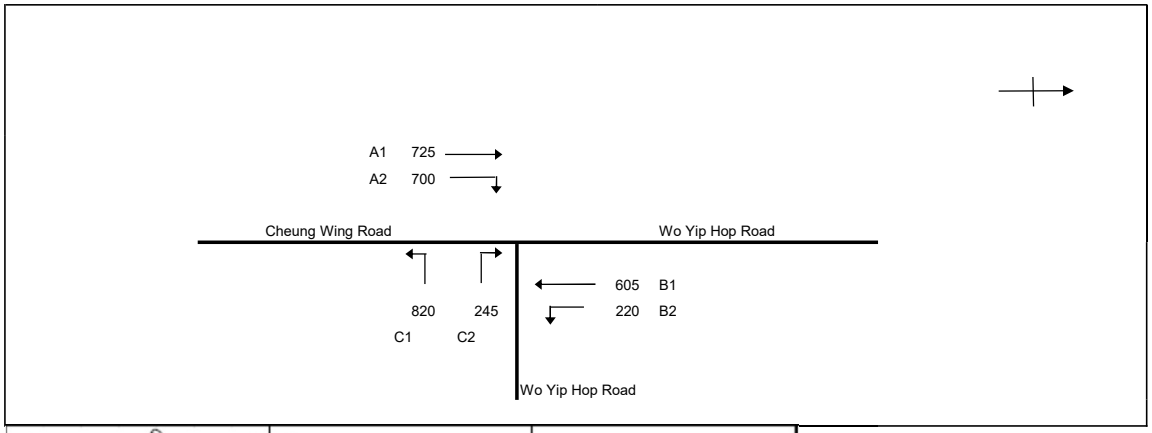
STAGE 1	INT= 9	STAGE 2	INT= 8	STAGE 3	INT= 6	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

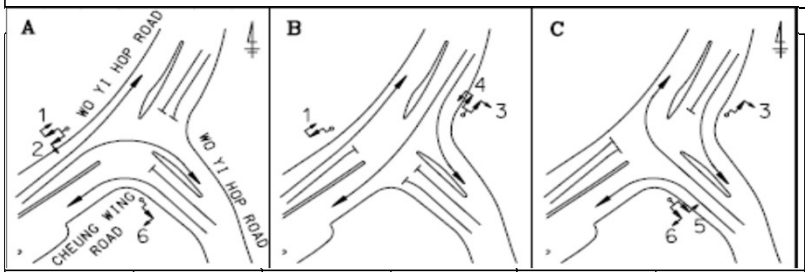
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				15				
A1	1,2	3.10	A1	2			N	3990		685		685	0.00	3990			2993	0.229			43	79	0.323	0
A2	1	3.10	A2	2	30			4130			685	685	1.00	3933			3933	0.174			33	33	0.596	45
B1	2	3.40	B1	3			N	6145		885		885	0.00	6145			4302	0.206	0.206		39	39	0.596	36
B2	2,3	3.40	B2	1	15			2095	230			230	1.00	1905			1905	0.121			23	63	0.214	19
C1	1,3	3.10	C1	1	15		N	1925	815			815	1.00	1750		875	2625	0.310	0.310		58	102	0.341	14
C2	3	3.10	C2	1	30			2065			275	275	1.00	1967		983	2950	0.093			18	18	0.596	0

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J9
J9 Wo Yi Hop Road / Cheung Wing Road	Year 2020 Existing PM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	112 sec
Sum(y)		Y =	0.453
Loss time		L =	15 sec
Total Flow		=	2590 pcu
Co	= (1.5*L+5)/(1-Y)	=	50.3 sec
Cm	= L/(1-Y)	=	27.4 sec
Yult		=	0.788
R.C.ult	= (Yult-Y)/Y*100%	=	73.8 %
Cp	= 0.9*L/(0.9-Y)	=	30.2 sec
Ymax	= 1-L/C	=	0.866
R.C.(P)	= (0.9/Xmax-1)*100%	=	72.1 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	72.1 % (Optimized)



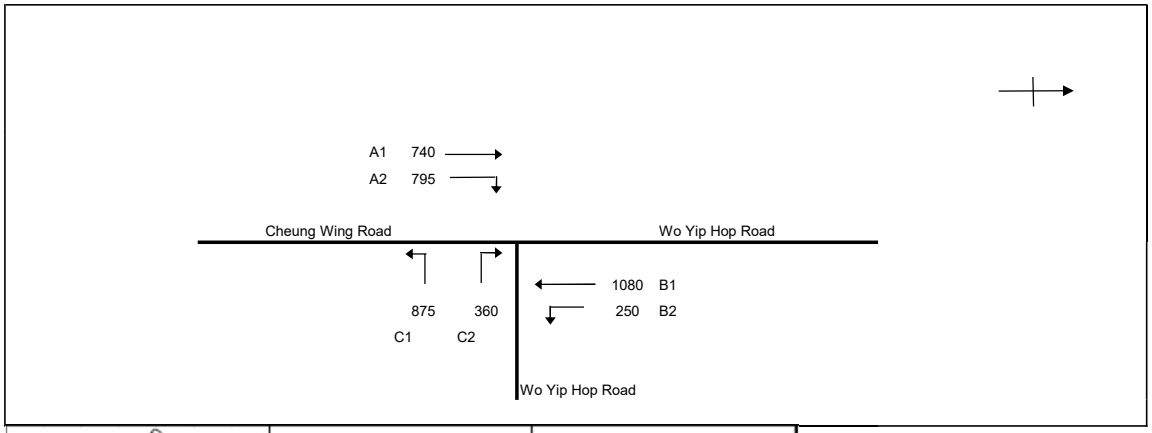
STAGE 1	INT= 9	STAGE 2	INT= 8	STAGE 3	INT= 6	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

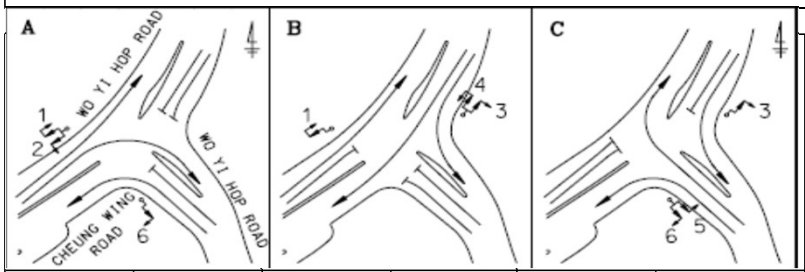
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				15				
A1	1,2	3.10	A1	2			N	3990		725		725	0.00	3990			2993	0.242			52	76	0.356	0
A2	1	3.10	A2	2	30			4130			700	700	1.00	3933			3933	0.178			38	38	0.523	43
B1	2	3.40	B1	3			N	6145		605		605	0.00	6145			4302	0.141	0.141		30	30	0.523	28
B2	2,3	3.40	B2	1	15			2095	220			220	1.00	1905			1905	0.116			25	55	0.236	21
C1	1,3	3.10	C1	1	15		N	1925	820			820	1.00	1750		875	2625	0.312	0.312		67	99	0.353	18
C2	3	3.10	C2	1	30			2065			245	245	1.00	1967		983	2950	0.083			18	18	0.523	0

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J9
J9 Wo Yi Hop Road / Cheung Wing Road	Year 2027 Reference AM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	112 sec
Sum(y)		Y =	0.584
Loss time		L =	15 sec
Total Flow		=	3360 pcu
Co	= (1.5*L+5)/(1-Y)	=	66.2 sec
Cm	= L/(1-Y)	=	36.1 sec
Yult		=	0.788
R.C.ult	= (Yult-Y)/Y*100%	=	34.8 %
Cp	= 0.9*L/(0.9-Y)	=	42.8 sec
Ymax	= 1-L/C	=	0.866
R.C.(P)	= (0.9/Xmax-1)*100%	=	33.4 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	33.4 % (Optimized)



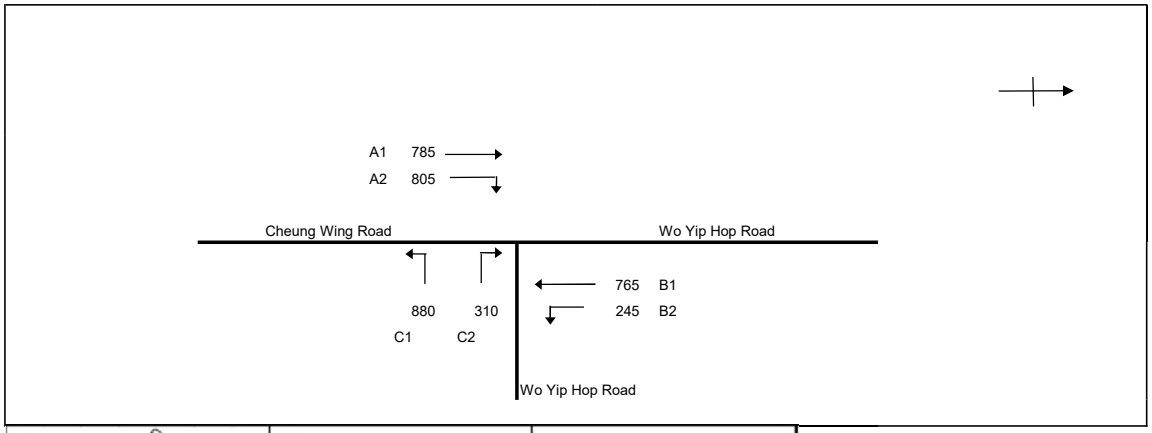
STAGE 1	INT= 9	STAGE 2	INT= 8	STAGE 3	INT= 6	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

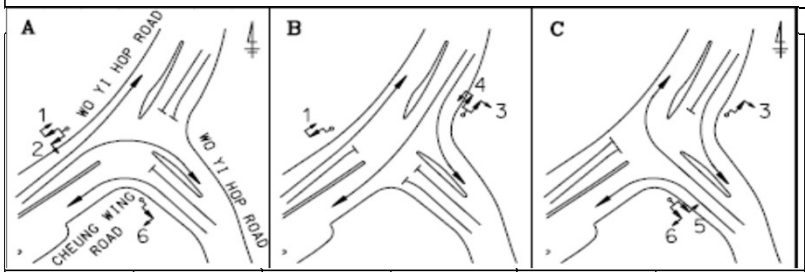
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				15				
A1	1,2	3.10	A1	2			N	3990		740		740	0.00	3990			2993	0.247			41	83	0.333	0
A2	1	3.10	A2	2	30			4130			795	795	1.00	3933			3933	0.202			34	34	0.675	52
B1	2	3.40	B1	3			N	6145		1080		1080	0.00	6145			4302	0.251	0.251		42	42	0.675	42
B2	2,3	3.40	B2	1	15			2095	250			250	1.00	1905			1905	0.131			22	69	0.213	18
C1	1,3	3.10	C1	1	15		N	1925	875			875	1.00	1750		875	2625	0.333	0.333		55	108	0.344	5
C2	3	3.10	C2	1	30			2065			360	360	1.00	1967		983	2950	0.122			20	20	0.675	0

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J9
J9 Wo Yi Hop Road / Cheung Wing Road	Year 2027 Reference PM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	3	
No. of stage using for calculation		N =	3	
Cycle time		C =	112	sec
Sum(y)		Y =	0.513	
Loss time		L =	15	sec
Total Flow		=	3005	pcu
Co	= (1.5*L+5)/(1-Y)	=	56.5	sec
Cm	= L/(1-Y)	=	30.8	sec
Yult		=	0.788	
R.C.ult	= (Yult-Y)/Y*100%	=	53.5	%
Cp	= 0.9*L/(0.9-Y)	=	34.9	sec
Ymax	= 1-L/C	=	0.866	
R.C.(P)	= (0.9/Xmax-1)*100%	=	51.9	% (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	51.9	% (Optimized)



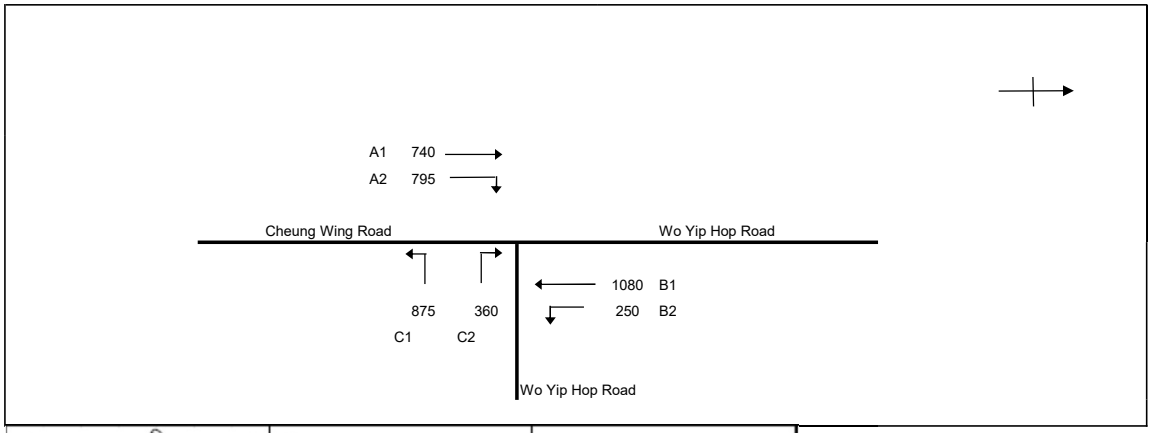
STAGE 1	INT= 9	STAGE 2	INT= 8	STAGE 3	INT= 6	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

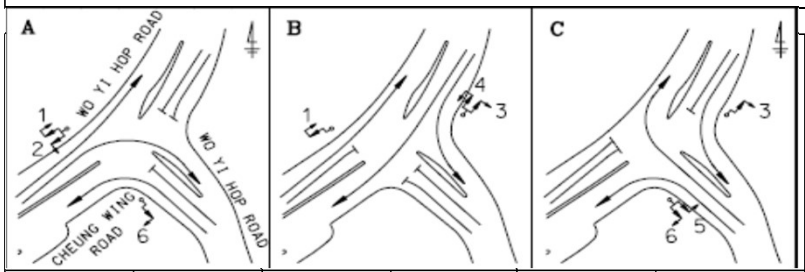
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				15				
A1	1,2	3.10	A1	2			N	3990		785		785	0.00	3990			2993	0.262			50	80	0.366	0
A2	1	3.10	A2	2	30			4130			805	805	1.00	3933			3933	0.205			39	39	0.592	49
B1	2	3.40	B1	3			N	6145		765		765	0.00	6145			4302	0.178	0.178		34	34	0.592	33
B2	2,3	3.40	B2	1	15			2095	245			245	1.00	1905			1905	0.129			24	60	0.238	21
C1	1,3	3.10	C1	1	15		N	1925	880			880	1.00	1750		875	2625	0.335	0.335		63	105	0.357	10
C2	3	3.10	C2	1	30			2065			310	310	1.00	1967		983	2950	0.105			20	20	0.592	0

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J9
J9 Wo Yi Hop Road / Cheung Wing Road	Year 2027 Design AM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	112 sec
Sum(y)		Y =	0.584
Loss time		L =	15 sec
Total Flow		=	3360 pcu
Co	= (1.5*L+5)/(1-Y)	=	66.2 sec
Cm	= L/(1-Y)	=	36.1 sec
Yult		=	0.788
R.C.ult	= (Yult-Y)/Y*100%	=	34.8 %
Cp	= 0.9*L/(0.9-Y)	=	42.8 sec
Ymax	= 1-L/C	=	0.866
R.C.(P)	= (0.9/Xmax-1)*100%	=	33.4 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	33.4 % (Optimized)



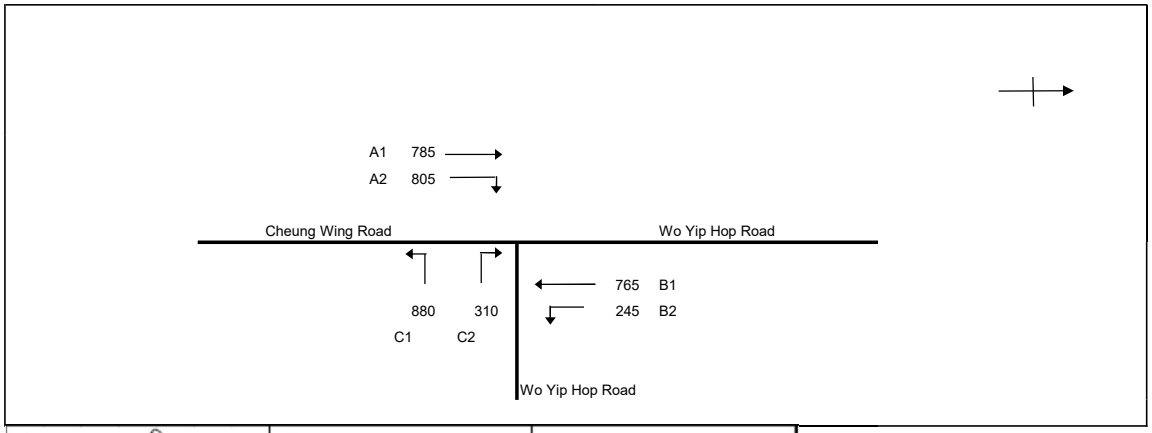
STAGE 1	INT= 9	STAGE 2	INT= 8	STAGE 3	INT= 6	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

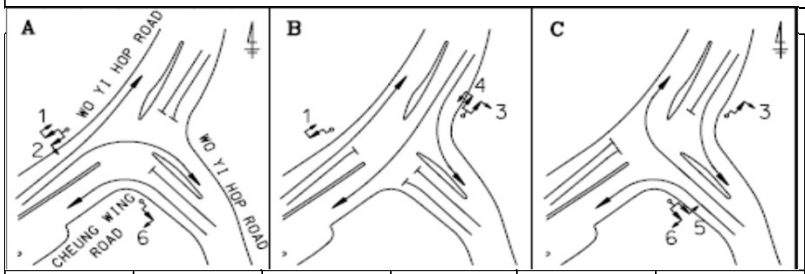
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				15				
A1	1,2	3.10	A1	2			N	3990		740		740	0.00	3990			2993	0.247			41	83	0.333	0
A2	1	3.10	A2	2	30			4130			795	795	1.00	3933			3933	0.202			34	34	0.675	52
B1	2	3.40	B1	3			N	6145		1080		1080	0.00	6145			4302	0.251	0.251		42	42	0.675	42
B2	2,3	3.40	B2	1	15			2095	250			250	1.00	1905			1905	0.131			22	69	0.213	18
C1	1,3	3.10	C1	1	15		N	1925	875			875	1.00	1750		875	2625	0.333	0.333		55	108	0.344	5
C2	3	3.10	C2	1	30			2065			360	360	1.00	1967		983	2950	0.122			20	20	0.675	0

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J9
J9 Wo Yi Hop Road / Cheung Wing Road	Year 2027 Design PM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	112 sec
Sum(y)		Y =	0.513
Loss time		L =	15 sec
Total Flow		=	3005 pcu
Co	= (1.5*L+5)/(1-Y)	=	56.5 sec
Cm	= L/(1-Y)	=	30.8 sec
Yult		=	0.788
R.C.ult	= (Yult-Y)/Y*100%	=	53.5 %
Cp	= 0.9*L/(0.9-Y)	=	34.9 sec
Ymax	= 1-L/C	=	0.866
R.C.(P)	= (0.9/Xmax-1)*100%	=	51.9 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	51.9 % (Optimized)



STAGE 1	INT= 9	STAGE 2	INT= 8	STAGE 3	INT= 6	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

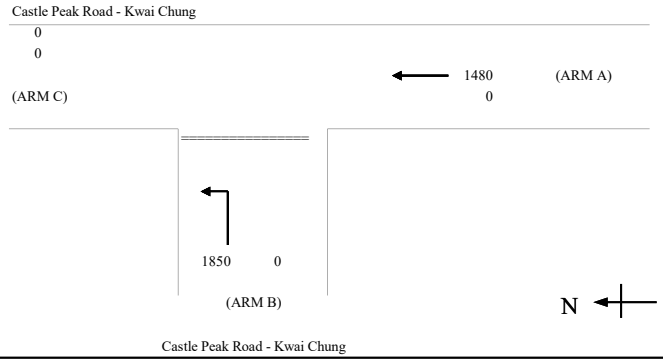
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				15				
A1	1,2	3.10	A1	2			N	3990		785		785	0.00	3990			2993	0.262			50	80	0.366	0
A2	1	3.10	A2	2	30			4130			805	805	1.00	3933			3933	0.205			39	39	0.592	49
B1	2	3.40	B1	3			N	6145		765		765	0.00	6145			4302	0.178	0.178		34	34	0.592	33
B2	2,3	3.40	B2	1	15			2095	245			245	1.00	1905			1905	0.129			24	60	0.238	21
C1	1,3	3.10	C1	1	15		N	1925	880			880	1.00	1750		875	2625	0.335	0.335		63	105	0.357	10
C2	3	3.10	C2	1	30			2065			310	310	1.00	1967		983	2950	0.105			20	20	0.592	0

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

Appendix B

Junction Calculation Sheets for Proposed Junction Improvement

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J1 Castle Peak Road at Kwai Cung Road Roundabout	Year 2027 Design AM Peak (Improvement)	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	31.60	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	1480	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	15.50	(metres)
Vl b-a	=	0	(metres)
Vr b-a	=	0	(metres)
Vr b-c	=	250	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	1850	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.53321887
E	=	2.3612263
F	=	0.5859548
Y	=	-0.0902

THE CAPACITY OF MOVEMENT :

Q b-a	=	360
Q b-c	=	1874
Q c-b	=	465
Q b-ac	=	1874

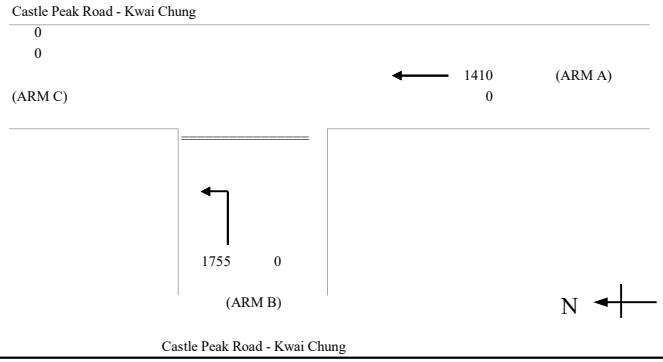
TOTAL FLOW = 3330 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.9872
DFC c-b	=	0.0000
DFC b-ac	=	0.9872

CRITICAL DFC = 0.99

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J1 Castle Peak Road at Kwai Cung Road Roundabout	Year 2027 Design PM Peak (Improvement)	DATE : 19-02-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	31.60	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	1410	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	15.03	(metres)
Vl b-a	=	0	(metres)
Vr b-a	=	0	(metres)
Vr b-c	=	250	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	1755	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.53321887
E	=	2.31145725
F	=	0.5859548
Y	=	-0.0902

THE CAPACITY OF MOVEMENT :

Q b-a	=	359
Q b-c	=	1829
Q c-b	=	464
Q b-ac	=	1829

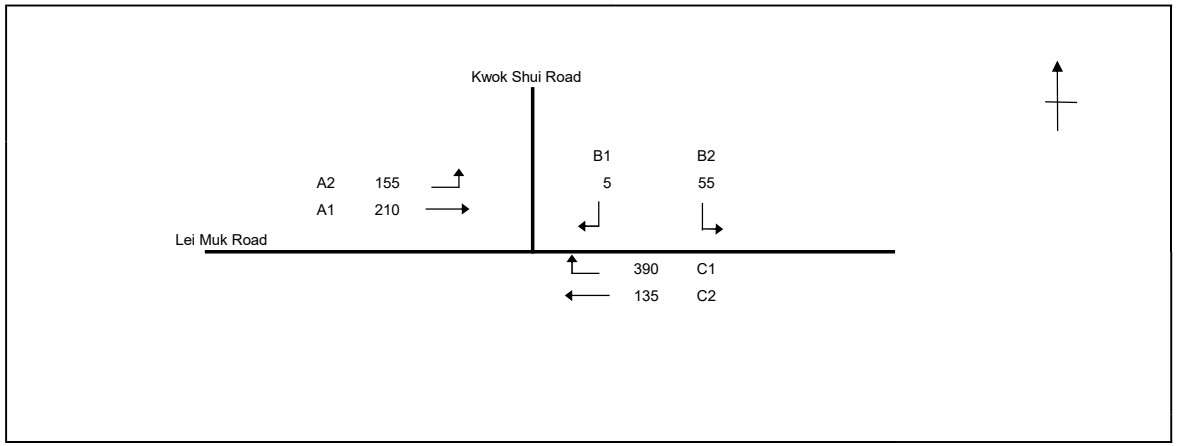
TOTAL FLOW = 3165 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

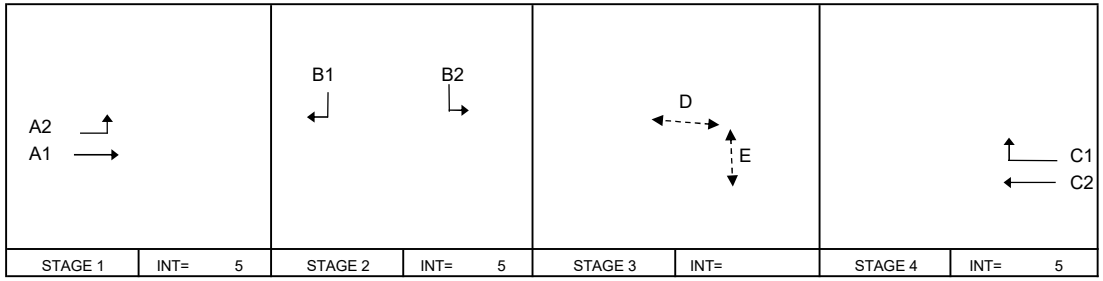
DFC b-a	=	0.0000
DFC b-c	=	0.9595
DFC c-b	=	0.0000
DFC b-ac	=	0.9595

CRITICAL DFC = 0.96

OVE ARUP & PARTNERS		TRAFFIC SIGNAL CALCULATION		
			PROJECT NO: 276306-24	Junction No. J6
J6- Kwok Shui Road / Lei Muk Road		Year 2027 Design AM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.499
Loss time		L =	31 sec
Total Flow		=	950 pcu
Co	= (1.5*L+5)/(1-Y)	=	102.8 sec
Cm	= L/(1-Y)	=	61.9 sec
Yult		=	0.668
R.C.ult	= (Yult-Y)/Y*100%	=	33.7 %
Cp	= 0.9*L/(0.9-Y)	=	69.6 sec
Ymax	= 1-L/C	=	0.656
R.C.(P)	= (0.9/Xmax-1)*100%	=	16.7 % (Actual)
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	18 %



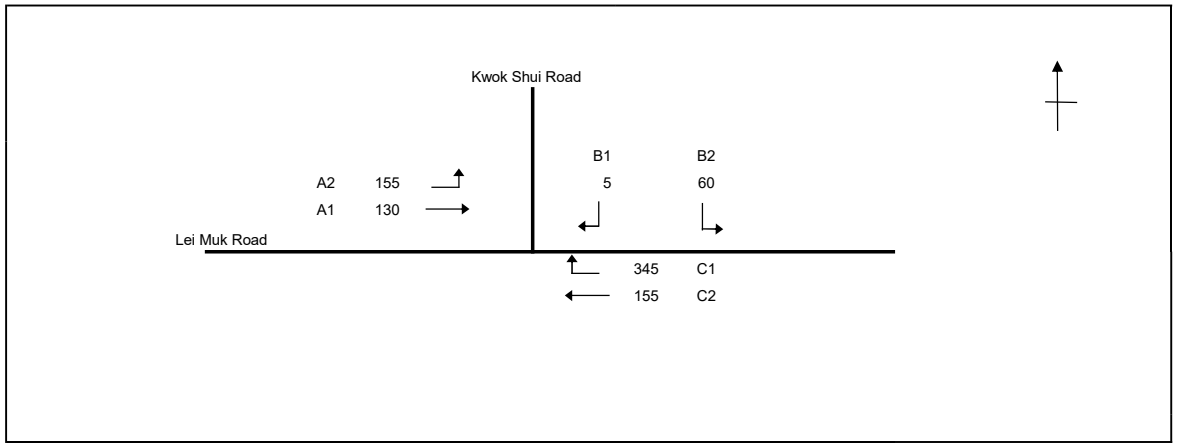
STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT=	STAGE 4	INT= 5

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
D	10.3	5	1	9	7	1	9	OK
E	7.5	6	6	5	6	6	5	OK

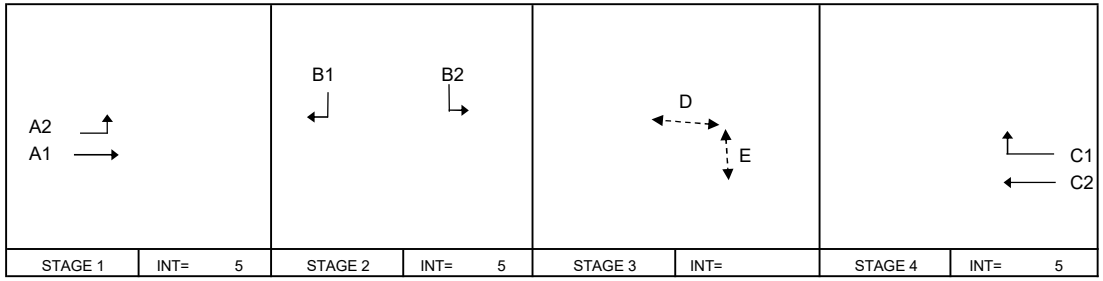
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
A1,A2	1	3.60	A	1	15			2115	155	210		365	0.42	2029			2029	0.180	0.180		21	21	0.771	42
B1,B2	2	4.00	B	1	10		N	2015	55		5	60	1.00	1752			1752	0.034	0.034	2	4	6	0.514	8
C1,C2	4	3.30	C	1	20		N	1945		135	390	525	0.74	1842			1842	0.285	0.285		34	34	0.754	49
ped																				17				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS		TRAFFIC SIGNAL CALCULATION		
			PROJECT NO: 276306-24	Junction No. J6
J6- Kwok Shui Road / Lei Muk Road		Year 2027 Design PM Peak	DATE : 19-Feb-21	FILENAME :



No. of stages per cycle	N =	4
No. of stage using for calculation	N =	3
Cycle time	C =	90 sec
Sum(y)	Y =	0.450
Loss time	L =	31 sec
Total Flow	=	850 pcu
Co = (1.5*L+5)/(1-Y)	=	93.6 sec
Cm = L/(1-Y)	=	56.3 sec
Yult	=	0.668
R.C.ult = (Yult-Y)/Y*100%	=	48.5 %
Cp = 0.9*L/(0.9-Y)	=	61.9 sec
Ymax = 1-L/C	=	0.656
R.C.(P) = (0.9/Xmax-1)*100%	=	29.5 % (Actual)
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	31 %



STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT=	STAGE 4	INT= 5

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
D	10.3	5	1	9	7	1	9	OK
E	7.5	6	6	5	6	6	5	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
A1,A2	1	3.60	A	1	15			2115	155	130		285	0.54	2006			2006	0.142	0.142		19	19	0.673	34
B1,B2	2	4.00	B	1	10		N	2015	60		5	65	1.00	1752			1752	0.037	0.037	2	5	7	0.477	9
C1,C2	4	3.30	C	1	20		N	1945		155	345	500	0.69	1849			1849	0.270	0.270		35	35	0.695	46
ped																				17				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

Your ref TPB/A/KC/473
Our ref 276306/01/WSTY/MYNL/KYAC/04303

ARUP
Level 5, Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong
t +852 2528 3031
f +852 2779 8428
d +852 2268 3721
theresa.yeung@arup.com
www.arup.com

By Email (tpbpd@pland.gov.hk) and By Hand

The Secretary
Town Planning Board
15/F, North Point Government Offices
333 Java Road, North Point, Hong Kong

1 April 2021

Dear Sir/Madam,

S16 Planning Application for
Proposed Minor Relaxation of Plot Ratio Restriction
for Permitted Information Technology and Telecommunications Industries (Proposed Data Centre Development) at "Other Specified Uses" annotated "Business" Zone
at Nos. 2-10 Tai Yuen Street, Kwai Chung
(Planning Application No. A/KC/473)

Technical Clarifications

We refer to the comments from various Government Departments received on 2 March, 6 March, 10 March and 15 March 2021 on the captioned Planning Application.

We are pleased to submit our responses in the form of a Response-to-Comments Table (**Attachment A**) and relevant supplementary information (**Attachment B**) for your consideration.

As requested by Tsuen Wan and West Kowloon District Planning Office, Planning Department, we would like to take this opportunity to clarify that the Applicant has no intention to apply for bonus plot ratio under Building (Planning) Regulations at this stage. Subject to detailed design development, irrigation system of the proposed vertical greening is supplemented at **Attachment C** for your consideration.

This submission only serves as technical clarifications without changing the scheme or the technical assessments, and thus should be exempted from recounting requirement.

We sincerely seek for the favourable consideration from the Town Planning Board to approve the captioned S16 Planning Application.

Should you have any queries, please contact the undersigned or our Ms. Natalie LEUNG at 2268 3612 or Ms. Aileen CHENG at 2908 4011.

Yours faithfully

Theresa YEUNG
Director of Planning

Encl. - Attachment A-C
cc - Mr Stephen Chan (STP/Kwai Tsing, PlanD) (email: scychan@pland.gov.hk)
- Mr Robert Tsang (TP/Kwai Tsing, PlanD) (email: rhctsang@pland.gov.hk)

Attachment A

Response-to-Comments Table

Comments from Related Departments — Page No.

COMMENTS FROM RELATED DEPARTMENTS 2
1. Environmental Protection Department, dated 2 March 2021 2
2. Environmental Protection Department, dated 15 March 2021 4
3. Highways Department, dated 8 March 2021 5
4. Planning Department, Urban Design and Landscape Section, dated 10 March 2021 5

COMMENTS FROM RELATED DEPARTMENTS

No.	Comments	Responses
1.	**Environmental Protection Department, dated 2 March 2021**	
	2. Please find below our comments on the SIA for the applicant's follow up please.	Noted. Please find our responses-to-comments below for your consideration.
	Appendix B, Table B1	
	(i) The applicant should have knowledge of the number of staff to be hired for the proposed data centre, estimation of employee population using GFA should be avoided.	The project proponent has confirmed 28 employees will be hired for the proposed data centre. Among the 28 employees to be hired for the proposed data centre, 2 of them shall be security staff and 26 of them shall be administrative staff.
	(ii) Please advise whether there is discharge of bleed-off water from cooling tower(s) into sewerage system. If yes, such discharge rate should be included in the SIA.	Please be advised that the estimated discharge of bleed-off water from cooling tower is 132m^3/day. The discharge rate has been included in the SIA (**Attachment B** refers).
	(iii) The applicant is reminded that the discharge of the cooling tower bleed-off water may require a licence under the Water Pollution Control Ordinance.	Noted. Discharge licence under Water Pollution Control Ordinance will be applied once the cooling tower discharge scheme is confirmed.
	(iv) Please clarify if Seapower Centre should be include in Catchment B as indicated in Figure 3.	Please be clarified that Seapower Centre has been included in Catchment D (**Attachment B** refers).
	(v) Please check and advise with supporting information on whether Asia Trade Centre and Victory Industrial Building should be included in the concerned catchment.	Please be clarified that Asia Trade Centre and Victory Industrial Building have been included in Catchment D (**Attachment B** refers).
	(vi) Please elaborate on the assumption of discharge rate for sanitary appliances at Tai Yuen Street public toilet.	Please note that the flow estimation of Tai Yuen Street public toilet is based on Discharge Unit Method from Plumbing Engineering Services Design Guide, with the application of the following equation: $Qww = K \sqrt{\sum DU}$ - Qww is Wastewater flow rate (L/s). - K is Frequency of use, for congested use, e.g toilets and/or showers open to the public, K = 1.0. - DU is discharge units: for Single urinal with cistern, DU=0.4 (L/s). - for WC with 9l cistern, DU=2.0 (L/s).

No.	Comments	Responses
		- for Wash basin or bidet, DU=0.3 (L/s) The number of urinal bowls, WC and wash basins have been counted in site visit.
	<u>Appendix B, Table B2</u>	
	(vii) Please review the peak flow of Tai Yuen Street Public Toilet and hydraulic analysis of downstream sewer.	The peak flow of Tai Yuen Street Public Toilet and hydraulic analysis of downstream sewer is revised accordingly.
	(viii) Please review pipe parameters adopted in the analysis, some of the information (e.g. invert level) do not tally with DSD's drainage record.	Noted. The pipe parameters are revised according to DSD's drainage record (**Figure 2** of **Attachment B** refers).
	(ix) Please clearly define Catchment A which should include different sewage flow for existing and proposed development scenario.	Catchment A is defined as the area of Shui Wing Building that contributes sewage flow to the outlet connecting to the concerned sewage branch.
	(x) Please review the peak flow for "Grand Industrial Building + Tai Yuen Street Cooked Food Market Sitting-out Area".	The peak flow for "Grand Industrial Building + Tai Yuen Street Cooked Food Market Sitting-out Area" is revised.
	(xi) Please elaborate the calculation of sewage flow for "Catchment A + Catchment B+ Catchment C" for both existing and proposed development scenario.	There are two branches starting from FMH4020668 to FMH4020673 (Catchment A + Proposed Development at Application Site + Tai Yuen Street Public Toilet) and FMH4069982 to FMH4020673 (Catchment B + Catchment C + Catchment D). Our aim is to check whether the downstream of FM4020673 is sufficient or not to cater for the Proposed Development. Thus, the pipe capacity of the downstream (from FMH4020673 to FMH4020675) is checked against the total sewage flow from Catchment A, Catchment B, Catchment C, Catchment D, Tai Yuen Street Public Toilet and the Proposed Development.
	(xii) The implementation of local sewer connection should meet the satisfaction of DSD.	Noted with thanks.

No.	Comments	Responses
2.	**Environmental Protection Department, dated 15 March 2021**	
	2. Based on the information provided in the application document and FI 2, we note that: • the site is in close proximity to the adjacent CDA development (the approved Application No. A/KC/444) which include residential use (i.e. noise sensitive use); • most of the fixed plant at the proposed data centre will be enclosed except the cooling tower on the roof top; • the Applicant committed that noise control measure with reference to EPD's Good Practices on Ventilation System Noise Control will be adequately provided to ensure no adverse noise impact to the surroundings; • public comments (PC) have been received raising concern regarding the potential fixed noise issue from the proposed data centre development to the adjacent CDA development; and • the Applicant further committed in FI 2 that the equipment noise will comply with the relevant requirements of the HKPSG, acoustic treatment to the fixed plants will be implemented to minimise the noise impact and the actual treatment will be further reviewed in detail design stage.	Noted.
	3. In view of the close proximity to noise sensitive uses and the nature of the proposed data centre development, the Applicant should conduct a noise impact assessment (NIA) to demonstrate that no adverse noise impact would be anticipated from the proposed development and propose necessary mitigation measures.	Noted.
	4. If the Applicant chooses to address the noise issue at a later stage, an approval condition on NIA shall be imposed, should the case be approved by TPB.	Noted. Fixed noise impact assessment will be addressed at the approval condition stage should planning approval for the Proposed Development be obtained.

No.	Comments	Responses
3.	**Highways Department, dated 8 March 2021**	
	1. To facilitate Transport Department's (TD) consideration, please specify the exact distance between the vehicular access and junction and check with TD if it should be located as far as possible according to TPDM Cl. 3.6.2.5.	Please be advised that the proposed vehicular access is located approx. 30m away from the adjoining priority junction, which is in compliance with TPDM requirement. TD's view on the vehicular access arrangement will be sought.
	2. Please provide the requested information as it will affect the road inventory under HyD's maintenance.	Please be clarified that the proposed bollards arrangement has been provided in the submitted TIA report (**Figure 3.4** refers). Enlarged plans of the road inventory for HyD's maintenance will be advised, provided that TD's preliminary no adverse comment on the proposed junction improvement scheme.
	3. Our comments were not duly addressed and the requested information should be provided for consideration. While there are some local objections / concerns on the electricity issue, the Applicant should have an early liaison with CLP to resolve the objection from this perspective and to obtain the proposed routing for review and comment. Subject to TD's comment on the TIA report, the Applicant should consider adopting a holistic approach to demonstrate that there would be no adverse impact due to the development and its associated works (i.e. electric cabling work).	Please note that the Applicant is in close liaison with CLP on the arrangement of electricity supply for the Proposed Development. CLP will take lead and closely coordinate with relevant government bodies at different development stages and propose the cable routing per the underground utility information and coordination results among stakeholders so as to avoid any adverse impact. Please also note that comments from TD on the TIA report have already been sought in parallel.
	4. The proposed bollards and other road improvement measures should be submitted to TD for review and comment, and designed and constructed as part of the development by the Applicant according to HyD's standard.	Noted. Please be advised that the proposed bollards and other road improvement measures have been circulated to TD for review and comment. The proposed works on public road will be designed and constructed according to HyD's standard.
4.	**Planning Department, Urban Design and Landscape Section, dated 10 March 2021**	
	1. Urban Design	
	As gathered from the current submission, the applicant would further review the possibility to incorporate facade articulation at the building corner, and facade treatment or removable pot plant to embellish the environment of the flat roof facing Kwok	Noted with thanks.

No.	Comments	Responses
	Shui Road at 2/F at the detailed design stage. The applicant has also clarified that the voluntary setback along Kwok Shui Road and Tai Yuen Street will be opened for public use. 2. Landscape <u>Advisory Comments to the Applicant:</u> The applicant is recommended to provide appropriate amenity facilities such as sitting benches on the green roofs on 1/F and 2/F for enjoyment of the tenants and visitors.	Noted with thanks. Opportunities to integrate the provision of sitting-out areas with the landscape design of these green roofs will be explored at detailed design stage.

(Updated on 28 March 2021)

Attachment B

Replacement Pages of

Sewerage Impact Assessment

3.5 Sewage Generation from the Proposed Development

The prediction for the proposed development sewage generation has been based on the information extracted from the development schedule (refer to Section 2). The quantity of sewage generated by the proposed development is estimated from expected total population and the estimated cooling tower bleed-off rate.

The table showing the sewage generation of the proposed development is calculated based on the guideline set in EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning and is shown on **Table B1** in **Appendix B** and summarized in the table below.

Accommodation Type	**Proposed Scheme**
Average Dry Weather Flow, m^3/day	
Proposed Data Centre	
Catchment Inflow Factor	1.10
ADWF (m^3/day)	155
Contributing Population	575
Global Peaking Factor	8
Peak Discharge, l/s	14.39

3.6 Impact of the Proposed Development

In order to assess the impact on the existing public sewer associated with the proposed development, the capacities of the existing public sewers have been checked and shown on **Tables B2** in **Appendix B**.

The estimation of sewage generation in the vicinity of the Application Site is based on the assumptions as below:

1) Existing public sewer information based on DSD drainage record plans and shown in **Figure 2**;

2) Existing development parameters in the vicinity of the proposed development are obtained from public domain and sewerage catchment plan shown in **Figure 2**;

3) Residential population for the proposed development at the Application Site based on development schedule in Section 2 above;

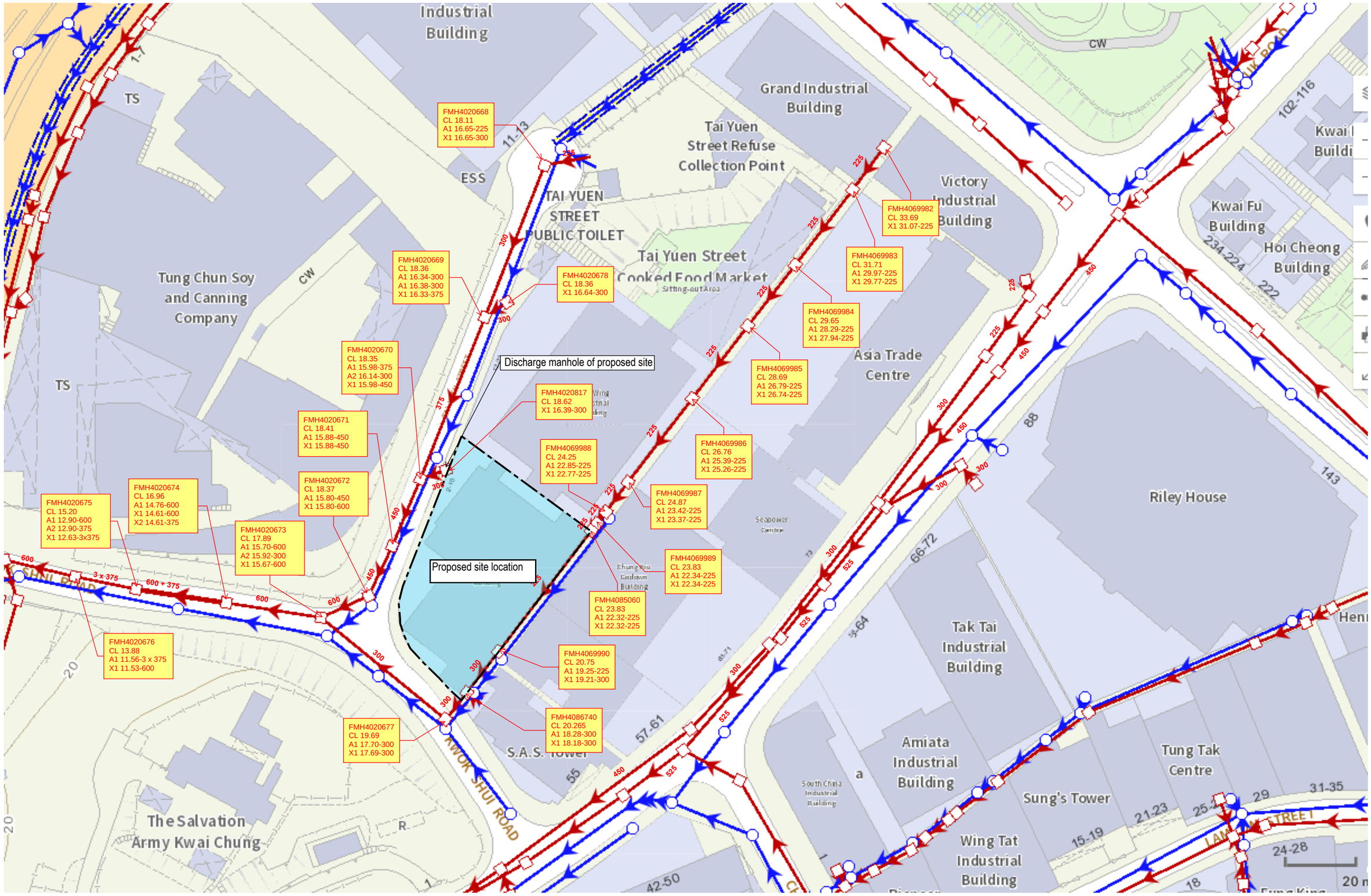
4) Flow factors as per EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning; and

5) Global peaking factor with stormwater allowance is adopted as per EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning.

The capacities checking of the existing public sewers is shown in **Table B2**. Sewage flow from the proposed development is calculated to be 14.39 L/s and it is observed that the existing public sewerage serving the Application Site comprising an existing 450Ø public gravity sewer running along Tai Yuen Street and the downstream existing public sewer of 600Ø running along Kwok Shui Road have sufficient capacity to carry the estimated sewage from the Application Site. It is concluded that the proposed development would not result in any adverse sewerage impact to the existing public sewerage system.

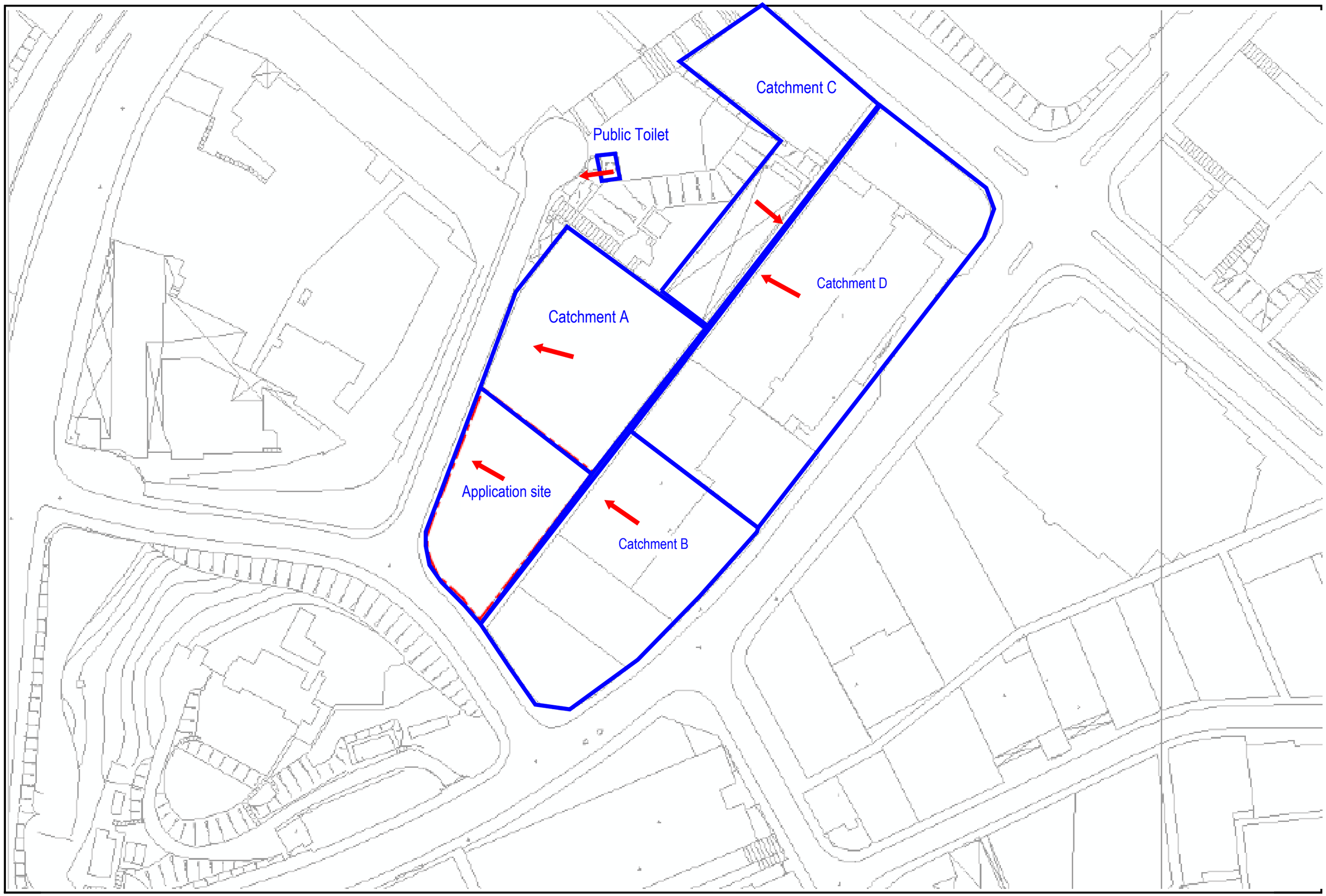
4 Conclusion

The peak sewage flow from the proposed development is calculated to be 14.39 L/s. It is observed that the existing public sewerage serving the Application Site comprising an existing 450Ø public gravity sewer running along Tai Yuen Street and the downstream existing public sewer of 600Ø running along Kwok Shui Road have sufficient capacity to carry the estimated sewage from the Application Site. It is concluded that the proposed development would not result in any adverse sewerage impact to the existing public sewerage system.



DSD Drainage Record Plan (A3 1:1000)

Figure 2



SEWAGE CATCHMENT PLAN

Figure 3

TABLE B1
Estimation of Sewage Flows Estimation for Proposed and Existing Developments

(Based on EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning)

Design Assumption:
Global Peaking Factor, P (Including Stormwater Allowance) as per Table T-5
Global Unit Flow Factors as per Tables T-2 and T-3
Catchment Inflow Factor for Kwai Chung (P_{CIF} = 1.10) as per Table T-4

Development Schedule		
Sewage Flow Estimates	**Estimation**	**Remark**
Proposed Data Centre		
Proposed Data Centre		**Connected to Manhole FMH4020817**
No. of Employee	28	
Unit flow factor (m^3/person/day) - Commercial activities type J2 Electricity Gas & Water	0.33	
Estimated Cooling Tower Bleed-off Rate (m^3/day)	132	
ADWF, (m^3/day)	155	**P_{CIF} = 1.10 included**
Existing Development		
Milo's Industrial Building		**Connected to Manhole FMH4020817**
GFA (m^2)	18184	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	418	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	336	**P_{CIF} = 1.10 included**
Catchment A		
Shui Wing Industrial Building		**Connected to Manhole FMH4020678**
GFA (m^2)	44454	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	1022	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	821	**P_{CIF} = 1.10 included**
Catchment B		
CHUNG KIU GODOWN BUILDING		**Connected to Manhole FMH4085060**
GFA (m^2)	16044	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	369	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	296	**P_{CIF} = 1.10 included**
KENTUCKY INDUSTRIAL BUILDING		**Connected to Manhole FMH4069990**
GFA (m^2)	8954	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	206	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	165	**P_{CIF} = 1.10 included**
S.A.S. TOWER		**Connected to Manhole FMH4086740**
GFA (m^2)	14868	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	342	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	275	**P_{CIF} = 1.10 included**
Catchment C		
Grand Industrial Building		**Connected to Manhole FMH4069982**
GFA (m^2)	17004	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	391	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	314	**P_{CIF} = 1.10 included**
Tai Yuen Street Cooked Food Market Sitting-Out Area		**Connected to Manhole FMH4069985**
GFA (m^2)	724	
Worker Density (No. of Worker per 100m^2)	5.1	
No. of Employee	37	
Unit flow factor (m^3/person/day) - Commercial activities type J10 Restaurants & Hotels	1.58	
ADWF, (m^3/day)	64	**P_{CIF} = 1.10 included**
Catchment D		
Seapower Centre		**Connected to Manhole FMH4069986**
GFA (m^2)	17004	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	391	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	314	**P_{CIF} = 1.10 included**
Asia Trade Centre		**Connected to Manhole FMH4069985**
GFA (m^2)	30770	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	708	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	568	**P_{CIF} = 1.10 included**
Victory Industrial Building		**Connected to Manhole FMH4069982**
GFA (m^2)	5611	
Worker Density (No. of Worker per 100m^2)	2.3	
No. of Employee	129	
Unit flow factor (m^3/person/day) - Industrial Activities (Kwai Chung)	0.73	
ADWF, (m^3/day)	104	**P_{CIF} = 1.10 included**
Existing Scenario		
Total ADWF + Peak Flow from Tai Tuen Street Public Toilet , (m^3/day)	3340	
Contributing Population	12371	
Global Peaking Factor	4.00	
Total Peak Flow (L/s)	154.64	
Proposed Scenario		
Total ADWF + Peak Flow from Tai Tuen Street Public Toilet , (m^3/day)	3160	
Contributing Population	11703	
Global Peaking Factor	4.00	
Total Peak Flow (L/s)	146.28	

Notes:
Employment density shall refer to Commercial and Industrial Floor Space Utilization Survey published by PlanD.
Commercial activities type J2 Electricity Gas & Water = 0.33 employee per 100m^2 of GFA
Industrial = 2.3 employee per 100m^2 of GFA
Restaurant = 5.1 employee per 100m^2 of GFA

Sewage Flows Estimation for Existing Public Toilet at Tai Yuen Street

From	**To**	**No. of Sanitary Appliance**		
		Urinal Bowl	**WC**	**Wash Basin**
TAI TUEN STREET PUBLIC TOILET	FMH4020668	3	6	5
Discharge Units (L/s)		0.4	2.0	0.3
Peak Flow (L/s)		3.83		

Notes:
Flow estimation based on Discharge Unit Method from Plumbing Engineering Services Design Guide.
(1) The total peak flow is calculated by the following equation

$$Qww = K\sqrt{\sum DU}$$

Qww is Wastewater flow rate (L/s)
K is Frequency of use, for congested use, e.g toilets and/or showers open to the public, K = 1.0
DU is Discharge units, for Single urinal with cistern, DU=0.4 (L/s)
for WC with 9l cistern, DU=2.0 (L/s)
for Wash basin or bidet, DU=0.3 (L/s)

Table B2 - Capacity Performance of Existing and Proposed Sewer

Notes:

(1) Calculate by Colebrook-White Equation

$$\bar{V} = -\sqrt{32gRS_f}\log\left[\frac{k_s}{14.8R} + \frac{1.255\nu}{R\sqrt{32gRS_f}}\right]$$

where ks is roughness value

for concrete slimed sewers, ks equals 3mm

for clayware slimed sewers, ks equals 0.6mm

ν is kinematic viscosity of fluid = 1.14 x 10-6 m2/s and g is the gravity = 9.81m/s2

V is the velocity, D is the diameter of the sewer and S is the gradient of the sewer.

Abbreviation:

UP_MAN	Upstream Manhole	CON_POP	Contributing Population	DN_GL	Downstream Ground Level	CAP	Peak Pipe Capacity
DN_MAN	Downstream Manhole	DIA	Diameter	UP_INV	Upstream Invert Level	F/C	Peak Flow/Capacity
ADWF	Average Dry Weather Flow	LEN	Length	DN_INV	Downstream Invert Level		
ACC_ADWF	Accumulated Average Dry Weather Flow	UP_GL	Upstream Ground Level	VEL	Peak Pipe Velocity		

Existing Development

Manhole		FROM SITE	CON_POP	PEAKING FACTOR	ACC_ADWF	Peak Flow	Existing / Proposed Pipe Parameter										
UP_MAN No.	DN_MAN No.				(L/s)	(L/s)	DIA (D) (mm)	LEN (m)	UP_GL (mPD)	DN_GL (mPD)	UP_INV (mPD)	DN_INV (mPD)	Gradient (S)	VEL (m/s)	CAP (L/s)	F/C (%)	Adequate Capacity?
Tai Yuen Street Public Toilet, Catchment A & Existing Development																	
FMH4020668	FMH4020669	Tai Yuen Street Public Toilet	153	8	0.48	3.83	300	42.0	18.11	18.36	16.65	16.34	135	1.35	95.18	4.0%	YES
FMH4020669	FMH4020670	Tai Yuen Street Public Toilet + Shui Wing Industrial Building	3,245	6	10.14	60.85	375	45.1	18.36	18.35	16.33	15.98	129	1.59	175.84	34.6%	YES
FMH4020670	FMH4020671	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Milo's Industrial Building	4,489	6	14.03	84.17	450	18.0	18.35	18.41	15.98	15.88	180	1.51	239.97	35.1%	YES
FMH4020671	FMH4020672	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Milo's Industrial Building	4,489	6	14.03	84.17	450	12.5	18.41	18.37	15.88	15.80	156	1.62	257.97	32.6%	YES
FMH4020672	FMH4020673	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Milo's Industrial Building	4,489	6	14.03	84.17	600	12.4	18.37	17.89	15.80	15.70	124	1.77	499.01	16.9%	YES
Tai Yuen Street Public Toilet + Catchment A + Catchment B + Catchment C + Catchment D + Existing Development																	
FMH4020673	FMH4020674	Tai Yuen Street Public Toilet + Catchment A + Catchment B + Catchment C + Catchment D + Existing Development	12,269	4	38.66	154.64	600	24.2	17.89	16.96	15.67	14.76	27	3.81	1078.10	14.3%	YES
FMH4020674	FMH4020675		12,269	4	38.66	154.64	375	22.7	16.96	15.20	14.61	12.90	13	4.99	551.27	6.9%	YES
		Tai Yuen Street Public Toilet + Catchment A + Catchment B + Catchment C + Catchment D + Existing Development					600	22.7	16.96	15.20	14.61	12.90	13	4.80	1694.92		

Propsoed Development

Manhole		FROM SITE	CON_POP	PEAKING FACTOR	ACC_ADWF	Peak Flow	Existing / Proposed Pipe Parameter										
UP_MAN No.	DN_MAN No.				(L/s)	(L/s)	DIA (D) (mm)	LEN (m)	UP_GL (mPD)	DN_GL (mPD)	UP_INV (mPD)	DN_INV (mPD)	Gradient (S)	VEL (m/s)	CAP (L/s)	F/C (%)	Adequate Capacity?
Tai Yuen Street Public Toilet, Catchment A & Proposed Development																	
FMH4020668	FMH4020669	Tai Yuen Street Public Toilet	153	8	0.48	3.83	300	42.0	18.11	18.36	16.65	16.34	135	1.35	95.18	4.0%	YES
FMH4020669	FMH4020670	Tai Yuen Street Public Toilet + Shui Wing Industrial Building	3,245	6	10.14	60.85	375	45.1	18.36	18.35	16.33	15.98	129	1.59	175.84	34.6%	YES
FMH4020670	FMH4020671	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Proposed Development	3,821	6	11.94	71.64	450	18.0	18.35	18.41	15.98	15.88	180	1.51	239.97	29.9%	YES
FMH4020671	FMH4020672	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Proposed Development	3,821	6	11.94	71.64	450	12.5	18.41	18.37	15.88	15.80	156	1.62	257.97	27.8%	YES
FMH4020672	FMH4020673	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Proposed Development	3,821	6	11.94	71.64	600	12.4	18.37	17.89	15.80	15.70	124	1.77	499.01	14.4%	YES
Tai Yuen Street Public Toilet + Catchment A + Catchment B + Catchment C + Catchment D + Proposed Development																	
FMH4020673	FMH4020674	Tai Yuen Street Public Toilet + Catchment A + Catchment B + Catchment C + Catchment D + Proposed Development	11,600	4	36.57	146.28	600	24.2	17.89	16.96	15.67	14.76	27	3.81	1078.10	13.6%	YES
FMH4020674	FMH4020675	Tai Yuen Street Public Toilet + Catchment A + Catchment B + Catchment C + Catchment D + Proposed Development	11,600	4	36.57	146.28	375	22.7	16.96	15.20	14.61	12.90	13	4.99	551.27	6.5%	YES
							600	22.7	16.96	15.20	14.61	12.90	13	4.80	1694.92		

Attachment C

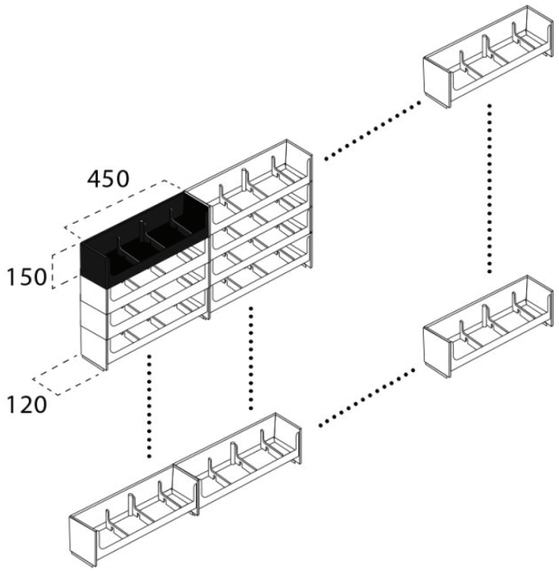
Irrigation System of

Proposed Vertical Greening

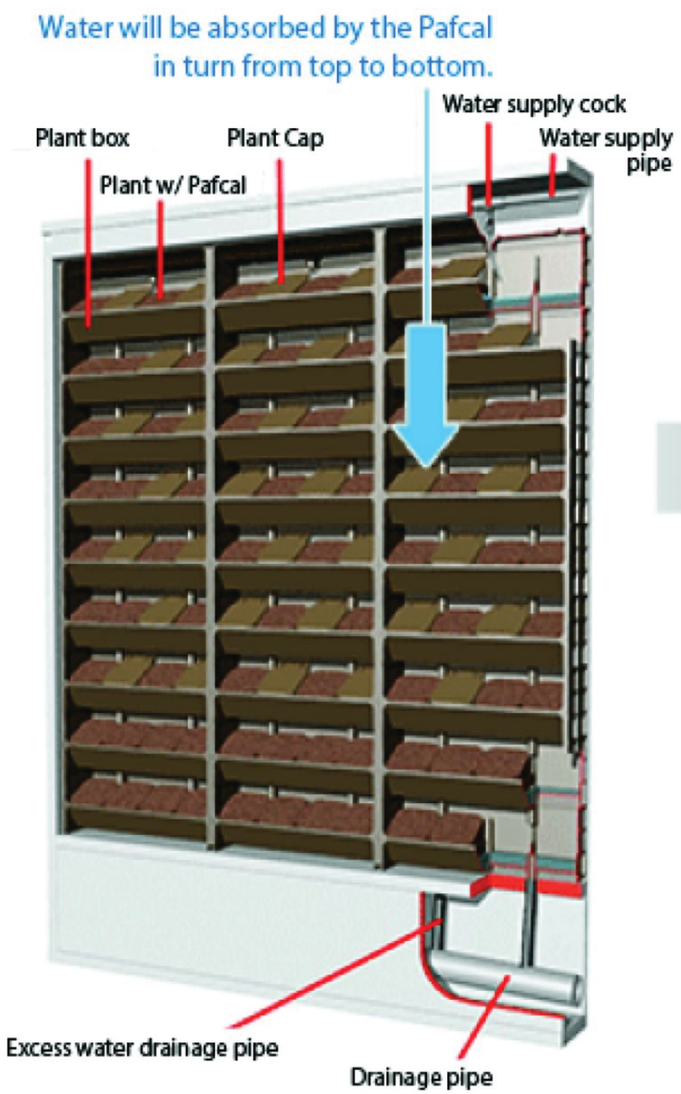
IRRIGATION SYSTEM OF PROPOSED VERTICAL GREENING

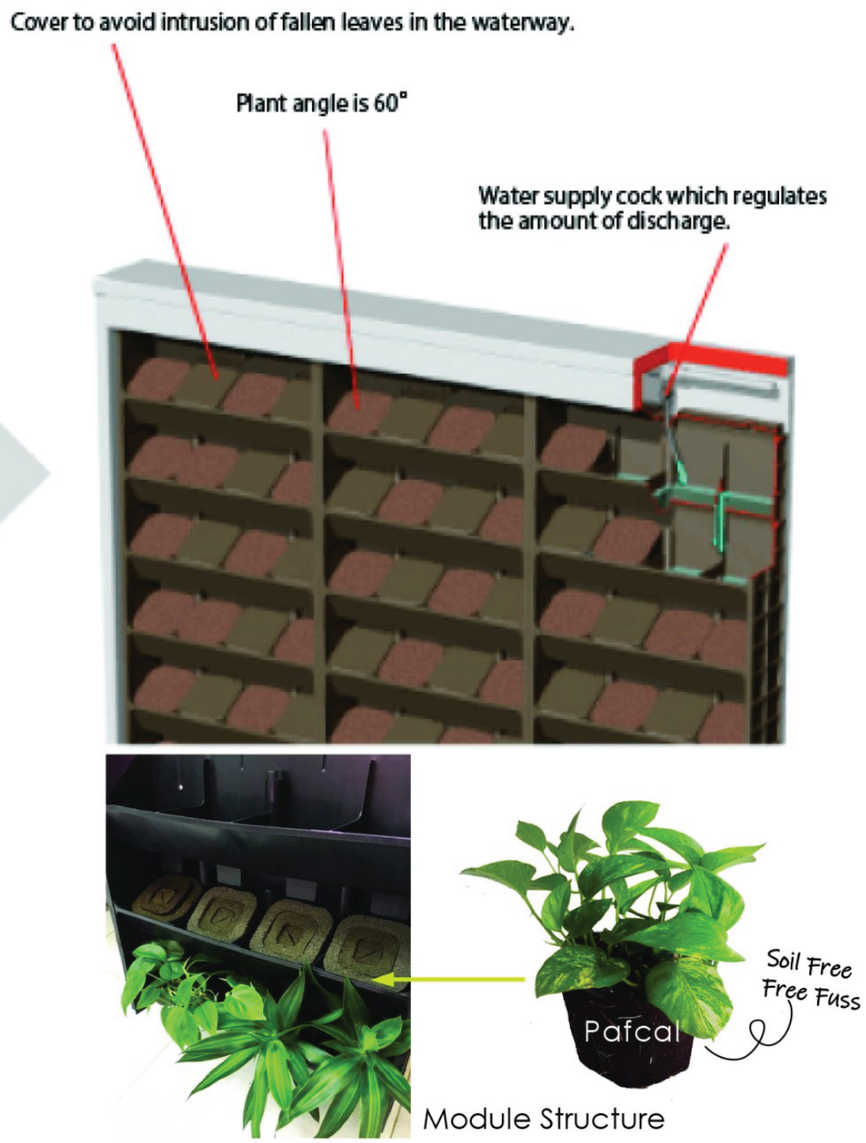
Module Structure

- Manageable size according to varying module combinations.
- Modules that corresponds with curves & corners are available.



System View





Module Structure

NOTE:

- The proposed systematic plant box system will be connected to an irrigation pipe with direct water feed.
- Controlled by auto-timer, water is supplied to each planting unit row by row from the top to botttom.
- To prevent water from clogging up, which could lead to breeding of bugs and mosquitoes, built-in drainage pipe and excess water drainage pipe connecting to the drainage system will be included.
-

Your ref TPB/A/KC/473
Our ref 276306/01/WSTY/MYNL/KYAC/04314

ARUP

Level 5, Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong
t +852 2528 3031
f +852 2779 8428
d +852 2268 3721
theresa.yeung@arup.com
www.arup.com

By Email (tpbpd@pland.gov.hk) and By Hand

The Secretary
Town Planning Board
15/F, North Point Government Offices
333 Java Road, North Point
Hong Kong

19 April 2021

Dear Sir/Madam,

S16 Planning Application for
Proposed Minor Relaxation of Plot Ratio Restriction
for Permitted Information Technology and Telecommunications Industries (Proposed Data Centre Development) at "Other Specified Uses" annotated "Business" Zone
at Nos. 2-10 Tai Yuen Street, Kwai Chung
(Planning Application No. A/KC/473)

Technical Clarifications

We refer to the comments from Transport Department received on 25 March 2021 on the captioned Planning Application.

We are pleased to submit our responses in the form of a Response-to-Comments Table (**Attachment A**) and relevant supplementary information (**Attachment B**) for your consideration.

This submission only serves as technical clarifications without changing the scheme or the technical assessments, and thus should be exempted from recounting requirement.

We sincerely seek for the favourable consideration from the Town Planning Board to approve the captioned S16 Planning Application.

Should you have any queries, please contact the undersigned or our Ms. Natalie LEUNG at 2268 3612 or Ms. Aileen CHENG at 2908 4011.

Yours faithfully

Theresa YEUNG
Director of Planning

Encl. - Attachment A-B
cc - Mr Stephen Chan (STP/Kwai Tsing, PlanD) (email: scychan@pland.gov.hk)
- Mr Robert Tsang (TP/Kwai Tsing, PlanD) (email: rhctsang@pland.gov.hk)

Attachment A

Response-to-Comments Table

Comments from Related Departments — Page No.

COMMENTS FROM RELATED DEPARTMENTS 2
1. Transport Department, dated 25 March 2021 2

COMMENTS FROM RELATED DEPARTMENTS

No.	Comments	Responses
1.	**Transport Department, dated 25 March 2021**	
	He has the following comments on the supplementary information of TIA from traffic point of view.	Noted. Please refer to our responses-to-comments below and revised TIA report appended at **Attachment B** for your consideration.
	2. Paragraph 2.3 – Existing traffic flows refers. Observed traffic flow is still not reflecting the prevailing traffic conditions, in particular Junctions J3 and J8 comparing with other recent TIA submissions. Date of survey for traffic should be specified in the TIA. Necessary adjustment factor on the surveyed traffic flow should be adopted so that the peak traffic situation is reflected in the traffic impact assessment.	Please be clarified that the vehicular count surveys were undertaken during the periods 07:30-10:30 and 16:30-19:30 on a typical weekday in October 2020 (29th October 2020). To reflect the prevailing traffic condition, traffic flow is reviewed and compared with the in-house traffic data surveyed in 2018. Adjustment factor on the surveyed traffic flow is applied to reflect conservative peak traffic situation in the revised TIA report. Junction assessments have been reviewed and the assessment results revealed that the identified key junctions will be operating with ample capacity during both AM and PM peak hours in design year 2027 under both Reference and Design Scenarios, except for J1 and J6. The conclusion from the previously submitted TIA is still valid. Please refer to **Table 4.5.1** of the revised TIA report.
	3. Paragraph 2.4 and 4.6 – Link capacity assessment refers. The assessment should cover the major roads with additional trip generation and attraction due to the proposed development.	Link capacity assessment for major roads with additional trip generation and attraction due to the proposed development is incorporated. The assessment results revealed that the identified critical road links will be operating with ample capacity during both AM and PM peak hours in design year 2027 under both Reference and Design Scenarios. The conclusion from the previously submitted TIA is still valid. Please refer to **Table 4.6.1** of the revised TIA report.
	4. Paragraph 4.2 – Adjacent development refers. No. 57-61 Tai Chuen Ping Street was proposed as hotel use under Planning Application No. A/KC/469.	It is noted that No. 57-61 Tai Chuen Ping Street was proposed as hotel use under Planning Application No. A/KC/469, and office use under Planning Application No.

No.	Comments	Responses
	Please update the traffic generated and attracted by adjacent developments accordingly.	A/KC/460. For conservative assessment purpose, traffic generation by hotel use is adopted in the revised TIA report. Please refer to **Table 4.2.1** and **Figure 4.1** in the revised TIA report.
	5. Paragraph 4.4 – Assessment scenarios refers. Figures 4.2 and 4.3 could not reflect the additional trip generation and attraction due to the proposed development specified in Table 4.1.2. Please add a figure showing the net difference between Scenario 1 (Figure 4.2) and Scenario 2 (Figure 4.3), that should tally with Table 4.1.2.	Please be advised that the traffic flow in **Figure 4.2** and **Figure 4.3** are rounded to 5 pcu/hr. As the overall increase in trip generation induced by the relaxation in plot ratio of the proposed development is very minimal, therefore the net change may not be reflected in the traffic flow diagram. The additional trip generation induced by the proposed development distributed to the surrounding road network is indicated on the ingress and egress vehicular route for easy reference. Please refer to the updated **Figure 3.2** and **Figure 3.3**, the trip generation and attraction indicated tally with **Table 4.1.2**.
	6. Paragraph 4.5 – Junction capacity assessment refers. Any traffic improvement scheme should aim to restore DFC ratio of the affected junction ≤0.85. However, with the proposed junction improvement scheme of Junction J1, DFC ratio in 2027 is assessed to be 0.99 (AM) and 0.96 (PM), which are still larger than 0.85. Furthermore, the existing traffic queue at this junction should be on east bound of Castle Peak Road – Kwai Chung and therefore the proposed improvement scheme may even worsen the situation. Please review.	For J1, alternative proposed junction improvement scheme is proposed in the revised TIA report, with the resulting DFC ratio in design year 2027 being less than 0.85. Taking into consideration that the junction performances at J1 and J6 are the same under the Reference Scenario (i.e. without 20% increase in PR) and the Design Scenario (i.e. with 20% increase in PR) during both AM and PM peak hours, the traffic loading due to the proposed increase in PR onto J1 and J6 is considered minimal due to insignificant decrease in junction performance. The proposed improvement of J1 and J6 should therefore be carried out and initiated by the Government from a district-wide and strategic level.
	7. Paragraph 4.7.4 refers. Maximum 2m clear width between bollards should be provided.	Noted. 2m clear width between bollards according to HyD Drawing No. H2278 will be provided accordingly.

(Updated on 15 April 2021)

Attachment B

Replacement Pages of

Traffic Impact Assessment

Figures

Figure 1.1 Location of Application Site
Figure 2.1 Location of Surveyed Junctions in the vicinity of Proposed Development
Figure 2.2 Year 2020 Existing Traffic Flow
Figure 2.3 Location of Identified Road Links in the Vicinity of Proposed Development
Figure 2.4 Major Pedestrian Routes in the Vicinity of Proposed Development
Figure 3.1 Proposed Vehicular Access of Proposed Development
Figure 3.2 Ingress Vehicular Routes of Proposed Development
Figure 3.3 Egress Vehicular Routes of Proposed Development
Figure 3.4 Proposed Layout at G/F
Figure 3.5 Proposed Layout at B1/F
Figure 3.6 Proposed Layout at B2/F
Figure 3.7 Swept Path Analysis for 11m Long Heavy Goods Vehicle at G/F (Approaching/ Leaving)
Figure 4.1 Location of Planned Developments in the vicinity of Proposed Development
Figure 4.2 Year 2027 Reference Traffic Flow
Figure 4.3 Year 2027 Design Traffic Flow

Appendices

Appendix A Junction Calculation Sheets
Appendix B Junction Calculation Sheets for Proposed Junction Improvement

- Kwok Shui Road is a local distributor road, it is a single carriageway with two traffic lanes in westbound direction between Cheung Wing Road and Tai Yuen Street, and in single two-lane configuration between Tai Yuen Street and Lei Muk Road.

2.3 Existing Junction Performance

2.3.1 To appreciate the existing traffic conditions, comprehensive classified traffic counts were conducted at the following identified key junctions in the vicinity of the application site. Locations of these surveyed junctions are listed below and shown in **Figure 2.1**.

J1	-	Castle Peak Road - Kwai Chung Interchange	Priority Junction
J2	-	Cheung Wing Road / Kwok Shui Road	Signalized Junction
J3	-	Castle Peak Road - Kwai Chung / Kwai Chung Road	Signalized Junction
J4	-	Lei Muk Road / Castle Peak Road	Priority Junction
J5	-	Tai Yuen Street / Kwok Shui Road	Priority Junction
J6	-	Kwok Shui Road / Lei Muk Road	Signalized Junction
J7	-	Chun Pin Street / Lei Muk Road	Priority Junction
J8	-	Lei Muk Road / Wo Yi Hop Road	Signalized Junction
J9	-	Wo Yi Hop Road / Cheung Wing Road	Signalized Junction

2.3.2 The counts were undertaken on a typical weekday during the periods 07:30-10:30 and 16:30-19:30 on 29th October 2020. The AM and PM peak hours were found to be 08:45-09:45 and 17:15-18:15 respectively.

2.3.3 Due to current COVID-2019 situation, the surveyed traffic data is reviewed and compared with the in-house traffic data surveyed in 2018. Adjustment factor is applied to reflect a conservative peak traffic condition for assessment purpose. The adopted 2020 prevailing traffic flows during AM and PM peak hours are presented in **Figure 2.2**.

2.3.4 Junction capacity analysis was carried out at the identified key junctions in the vicinity of the application site. Results of the capacity assessment are shown in **Table 2.3.1** below.

Table 2.3.1 Year 2020 Junction Performance

Junction		Type	Performance (1)	
			AM	PM
J1	Castle Peak Road - Kwai Chung Interchange	Priority	1.07	1.01
J2	Cheung Wing Road / Kwok Shui Road	Signalized	30%	39%
J3	Castle Peak Road - Kwai Chung / Kwai Chung Road (2)	Signalized	40%	41%
J4	Lei Muk Road / Castle Peak Road (2)	Priority	0.16	0.16
J5	Tai Yuen Street / Kwok Shui Road (3)	Priority	0.14	0.15
J6	Kwok Shui Road / Lei Muk Road (4)	Signalized	35%	38%
J7	Chun Pin Street / Lei Muk Road (4)	Priority	0.48	0.64
J8	Lei Muk Road / Wo Yi Hop Road (2)	Signalized	32%	39%
J9	Wo Yi Hop Road / Cheung Wing Road (2)	Signalized	42%	59%

Notes:
(1) Figures shown represent "Reserve Capacity" (RC) in % for signalized junctions and "Design Flow Capacity" (DFC) ratio for priority junctions.
(2) Junction parameter assumptions are taken into account to reflect the actual traffic conditions.
(3) Taken into account the existing kerbside activities at Tai Yuen Street in the calculations.
(4) Taken into account the existing kerbside activities at Lei Muk Road in the calculations.

2.3.5 Results of the analysis indicate that the identified key junctions in the vicinity of the application site are currently operating satisfactorily during both AM and PM peak hours, expect for J1.

2.4 Existing Link Capacity Assessment

2.4.1 With the peak hours traffic flow obtained from the comprehensive classified traffic counts mentioned in **Section 2.3**, link capacity assessment for major road links in the vicinity of the Proposed Development has been carried out. Location of the identified road links are indicated on **Figure 2.3**. Assessment results are summarized in **Table 2.4.1** below.

Table 2.4.1 Year 2020 Existing Link Performance

Road Link		Link Capacity (pcu/hr)	Traffic Flows (pcu/hr)		Volume/Capacity (V/C) Ratio	
			Existing		Existing	
			AM	PM	AM	PM
L1	Kwok Shui Road	900 (1)	455	510	0.51	0.57
L2	Lei Muk Road (South of Kwok Shui Road)	900 (1),(2)	445	395	0.49	0.44
L3	Lei Muk Road (North of Kwok Shui Road)	900 (1),(2)	540	535	0.60	0.59
L4	Wo Yi Hop Road	3400(3)	2385	2305	0.70	0.68

Notes:
(1) Link capacity in pcu/hr was derived from link capacity of 800veh/hr for 2-lane single carriageway with the presence of loading activities, standing vehicles and pedestrian crossings in TPDM Vol.2 Ch.2.4. Veh/hr converted to pcu/hr according to survey pcu factor & reduced 10% capacity due to high % of HV.
(2) Taking into account the illegal on-street parking along the kerbside.
(3) Link capacity in pcu/hr was derived Table 2.4.1.1 in TPDM Vol.2 Ch.2.4. Veh/hr converted to pcu/hr according to survey pcu factor & reduced 10% capacity due to high % of HV.

4.2 Adjacent Developments

4.2.1 In addition to the development flow, the traffic generated and attracted by adjacent major planned/committed developments in the vicinity of the proposed development were taken into account for the traffic forecast. Details of these adjacent planned developments are summarized in **Table 4.2.1** below. The location of the planned developments are indicated in **Figure 4.1**.

Table 4.2.1 Adjacent Planned Developments in the Vicinity

Adjacent Developments	Type	Parameters
Proposed Comprehensive Development for Flat, Eating Place, Shop and Services and Office at Kwai Chung Town Lot 432 and Adjoining Government Land, No. 1-7 Cheung Wing Road, Kwai Chung	Private Housing	1,336 flats
	Office + Retail	23,248 m^2 GFA
Proposed Industrial Redevelopment at No. 45-51 Kwok Shui Road, Kwai Chung	Industrial	13,472 m^2 GFA
Proposed Industrial-Office Redevelopment at No. 57-61 Ta Chuen Ping Street, Kwai Chung	Hotel	1,196 rooms
Proposed Industrial Redevelopment at No. 20-24 Kwai Wing Road, Kwai Chung	Industrial	18,004 m^2 GFA
Proposed Industrial Redevelopment at No.2-16 Lam Tin Street, Kwai Chung	Industrial	21,181 m^2 GFA
Proposed Hotel Redevelopment at No. 4-30 Lei Muk Road, Kwai Chung	Hotel	780 rooms
Proposed Hotel Redevelopment on 2/F, Hotel Ease Tsuen Wan, 15-19 Chun Pin Street, Kwai Chung	Hotel	14 rooms
Proposed Residential Care Home for the Elderly at 1 Lei Muk Road DD450 Lot. 984RP	Residential	8,766 m^2 GFA

4.3 Future Traffic Growth

4.3.1 The proposed development is targeted for completion in Year 2024. In order to assess the traffic impact of the development-related traffic on the adjacent road network, Year 2027 (i.e. 3 years after completion) is adopted as the design year of the study.

Annual Traffic Census

4.3.2 Reference was made to Annual Traffic Census (ATC) on annual average daily traffic (AADT) at counting stations in the vicinity of the proposed development and the corresponding traffic flows are summarized in **Table 4.3.1** below.

4.5 Junction Capacity Assessment

4.5.1 Junction capacity assessment was carried out at the identified key junctions for Year 2027 Reference and Design Scenarios. Assessment results are summarized in **Table 4.5.1** below.

Table 4.5.1 Year 2027 Future Junction Performance

Junction		Type	Performance (1)			
			2027 Reference		2027 Design	
			AM	PM	AM	PM
J1	Castle Peak Road - Kwai Chung Interchange	Priority	1.19	1.12	1.19	1.12
J2	Cheung Wing Road / Kwok Shui Road	Signalized	17%	23%	17%	23%
J3	Castle Peak Road - Kwai Chung / Kwai Chung Road (2)	Signalized	26%	26%	26%	26%
J4	Lei Muk Road / Castle Peak Road (2)	Priority	0.25	0.24	0.25	0.24
J5	Tai Yuen Street / Kwok Shui Road (3)	Priority	0.36	0.31	0.37	0.31
J6	Kwok Shui Road / Lei Muk Road (4)	Signalized	9%	9%	9%	9%
J7	Chun Pin Street / Lei Muk Road (4)	Priority	0.65	0.81	0.65	0.81
J8	Lei Muk Road / Wo Yi Hop Road (2)	Signalized	17%	20%	17%	20%
J9	Wo Yi Hop Road / Cheung Wing Road (2)	Signalized	25%	40%	25%	40%

Notes:
(1) Figures shown represent "Reserve Capacity" (RC) in % for signalized junctions and "Design Flow Capacity" (DFC) ratio for priority junctions.
(2) Junction parameter assumptions are taken into account to reflect the actual traffic conditions.
(3) Taken into account the existing kerbside activities at Tai Yuen Street in the calculations.
(4) Taken into account the existing kerbside activities at Lei Muk Road in the calculations.

4.5.2 The above results revealed that the identified key junctions would operate within capacity with the proposed development in Year 2027, except J1 and J6.

4.5.3 The results also reveal that the junction performances at **J1** and **J6** are the same under the Reference Scenario (i.e. **without** 20% increase in PR) and the Design Scenario (i.e. **with** 20% increase in PR) during both AM and PM peak hours.

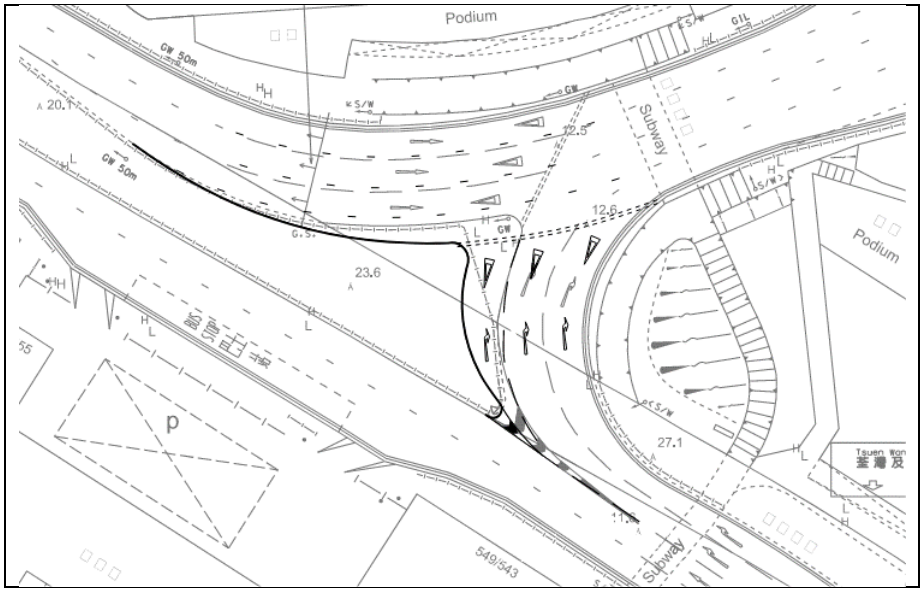
4.5.4 The traffic loading due to the proposed increase in PR onto J1 and J6 is considered minimal due to insignificant decrease in junction performance.

4.5.5 It is anticipated that the implication to the identified key junctions associated with the proposed 20% increase in PR for the proposed development in Year 2027 would be minimal. In other words, the proposed development would not generate significant impact onto the identified key junctions due to minimal traffic contribution to those junctions from such small-scale site.

4.5.6 Considered the junction capacity for junction J1 – Castle Peak Road - Kwai Chung Interchange and junction J6 – Kwok Shui Road / Lei Muk Road are overloaded even in the Reference Scenario, junction improvement proposals have been explored in order to improve the performance of these junctions.

J1 – Castle Peak Road - Kwai Chung Interchange

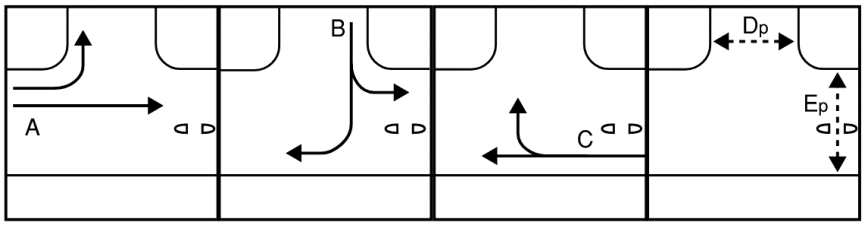
4.5.7 For junction J1 – Castle Peak Road - Kwai Chung Interchange, possible improvement proposal is suggested by local widening Castle Peak Road - Kwai Chung (Eastbound) and provision of additional traffic lane underneath the at the Castle Peak Road - Kwai Chung Flyover, as shown below. It is proposed to give priority to the Castle Peak Road - Kwai Chung (Eastbound) which contribute the major flow at this junction by modifying the junction road markings.



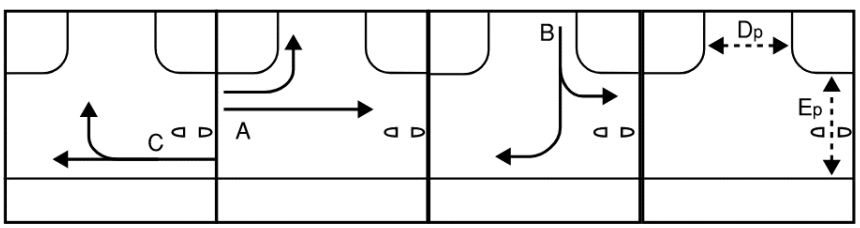
J6 – Kwok Shui Road / Lei Muk Road

4.5.8 For junction J6 – Kwok Shui Road / Lei Muk Road, possible improvement proposal is suggested modifying the method-of-control (MOC) plan (i.e. re-arrangement of the existing MOC) to reduce loss time at the junction, as shown below.

Current MOC Plan Sequence



Proposed MOC Plan Sequence



4.5.9 Taking into consideration that the junction performances at **J1** and **J6** are the same under the Reference Scenario (i.e. **without** 20% increase in PR) and the Design Scenario (i.e. **with** 20% increase in PR) during both AM and PM peak hours.

4.5.10 The traffic loading due to the proposed increase in PR onto J1 and J6 is considered minimal due to insignificant decrease in junction performance. The proposed improvement of **J1** and **J6** should be carried out and initiated by the Government from a district-wide and strategic level.

4.5.11 With these improvements, junctions J1 and J6 have been assessed and the junction performance are summarized in **Table 4.5.2** below.

Table 4.5.2 Year 2027 Future Junction Performance - with Junction Improvement

Junction		Type	Performance (1) 2027 Design	
			AM	PM
J1	Castle Peak Road - Kwai Chung Interchange	Priority	0.83	0.79
J6	Kwok Shui Road / Lei Muk Road (2)	Signalized	17%	17%

Notes:
(1) Figures shown represent "Reserve Capacity" (RC) in % for signalized junctions and "Design Flow Capacity" (DFC) ratio for priority junctions.
(2) Taken into account the existing kerbside activities at Lei Muk Road in the calculations.

4.5.12 The above results revealed that under the Design Scenario in Year 2027, the DFC of J1 would be improved from 1.19 and 1.12 to 0.83 and 0.79 for AM peak and PM peak hour respectively. And the reserve capacity of J6 would be improved from 9% and 9% to 17% and 17% for AM peak and PM peak hour respectively. under the Design Scenario in Year 2027.

4.5.13 With the above improvement proposals, it is anticipated that the performance of junctions J1 and J6 would be enhanced and operate within capacity with the proposed development in Year 2027.

4.6 Link Capacity Assessment

4.6.1 The link capacity assessment of the identified road links has been carried out for Year 2027 Reference and Design scenarios and the results are summarized in **Table 4.6.1** below.

Table 4.6.1 Year 2027 Future Link Performance

Road Link		Link Capacity (pcu/hr)	Traffic Flows (pcu/hr)				Volume/Capacity (V/C) Ratio			
			2027 Reference		2027 Design		2027 Reference		2027 Design	
			AM	PM	AM	PM	AM	PM	AM	PM
L1	Kwok Shui Road	900 (1)	610	665	615	665	0.68	0.74	0.68	0.74
L2	Lei Muk Road (South of Kwok Shui Road)	900 (1),(2)	555	505	555	505	0.62	0.56	0.62	0.56
L3	Lei Muk Road (North of Kwok Shui Road)	900 (1),(2)	710	685	710	685	0.79	0.76	0.79	0.76
L4	Wo Yi Hop Road	3400	2710	2625	2710	2625	0.80	0.77	0.80	0.77

Notes:
(1) Link capacity in pcu/hr was derived from link capacity of 800veh/hr for 2-lane single carriageway with the presence of loading activities, standing vehicles and pedestrian crossings in TPDM Vol.2 Ch.2.4.
(2) Taking into account the illegal on-street parking along the kerbside.
(3) Link capacity in pcu/hr was derived Table 2.4.1.1 in TPDM Vol.2 Ch.2.4. Veh/hr converted to pcu/hr according to survey pcu factor & reduced 10% capacity due to high % of HV.

4.6.2 The results reveal that the road link performance of all identified key road links will be operating with ample capacity during both AM and PM peak hours in design year 2027 under both Reference and Design Scenario. The road link performances are the same under both Reference Scenario and Design Scenario. It is anticipated that the implication to the identified key road links associated with the proposed development would be minimal.

4.7 Pedestrian Impact Assessment

Pedestrian Generation

4.7.1 To establish appropriate pedestrian generation and attraction rates for the proposed development, pedestrian count survey has been conducted on typical weekdays at the existing data centres in the vicinity. The surveyed pedestrian generation and attraction flow during peak hours are summarized in **Table 4.7.1** below.

Table 4.7.1 Peak Hour Pedestrian Generated and Attracted at the Surveyed Data Centres

Development Schedule GFA (m^2)		AM		PM	
		Gen	Att	Gen	Att
iTech Tower 1 at 28 Pak Tin Par Street, Tsuen Wan (17,652m^2 GFA)	Observed Trips (ped/hr)	7	25	38	13
	Trip Rate (in ped/hr/100m^2 GFA)	0.040	0.142	0.215	0.074
iTech Tower 2 at 54-56 Ta Chuen Ping Street, Kwai Chung (9,125m^2 GFA)	Observed Trips (ped/hr)	5	33	26	8
	Trip Rate (in ped/hr/100m^2 GFA)	0.055	0.362	0.285	0.088
Adopted Trip Rate (ped/ hr/100m^2 GFA)		**0.055**	**0.362**	**0.285**	**0.088**



LEGEND

PROPOSED DEVELOPMENT

PM PEAK TRAFFIC FLOW (PCU/HOUR)

100 (100)

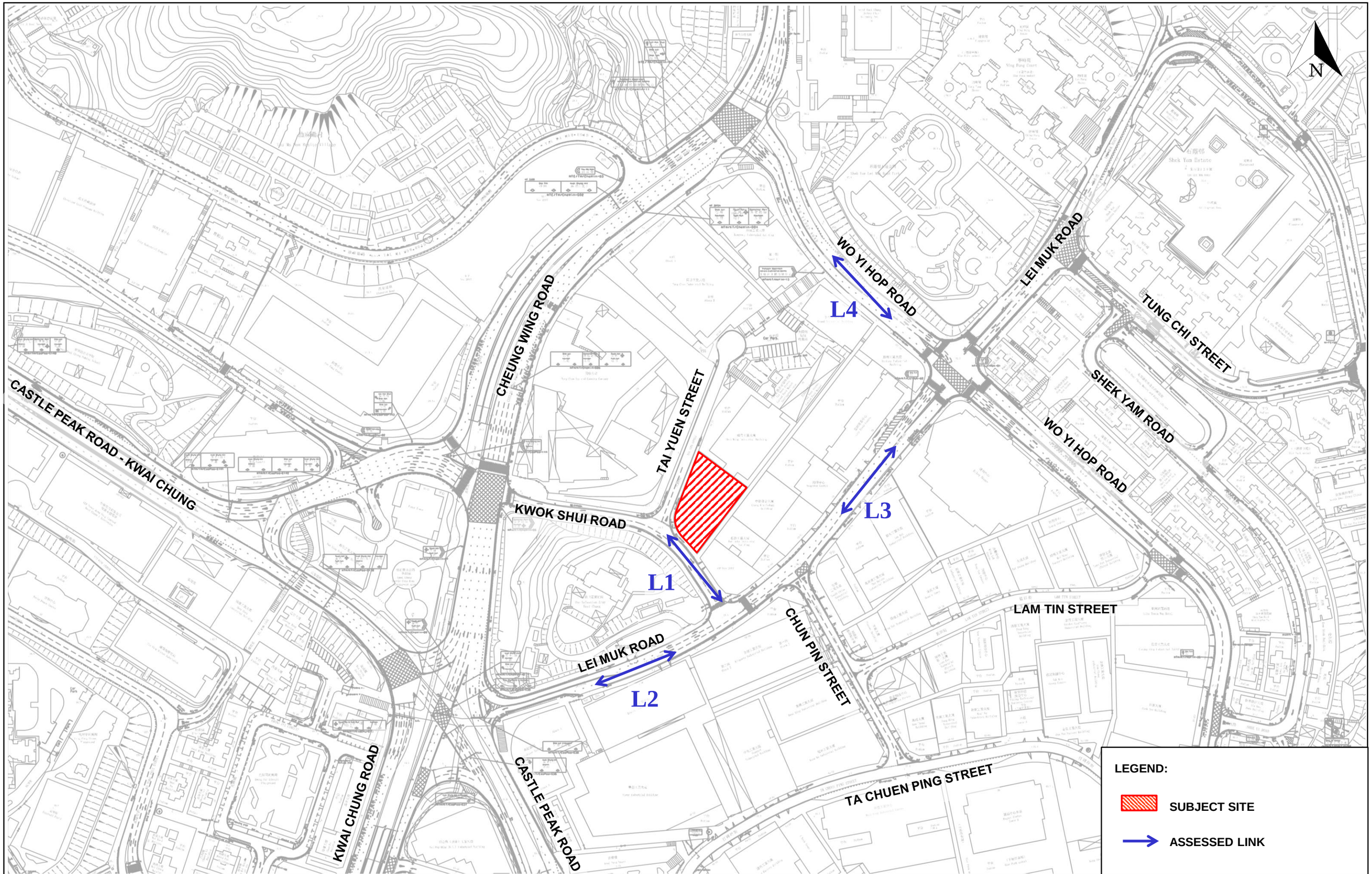
AM PEAK TRAFFIC FLOW (PCU/HOUR)

Job Title **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

FIGURE 2.2

Date	Scale	Drawing Title
11/2020	N.T.S	
Drawn	Job No.	
KSIY	276306-24	

ARUP

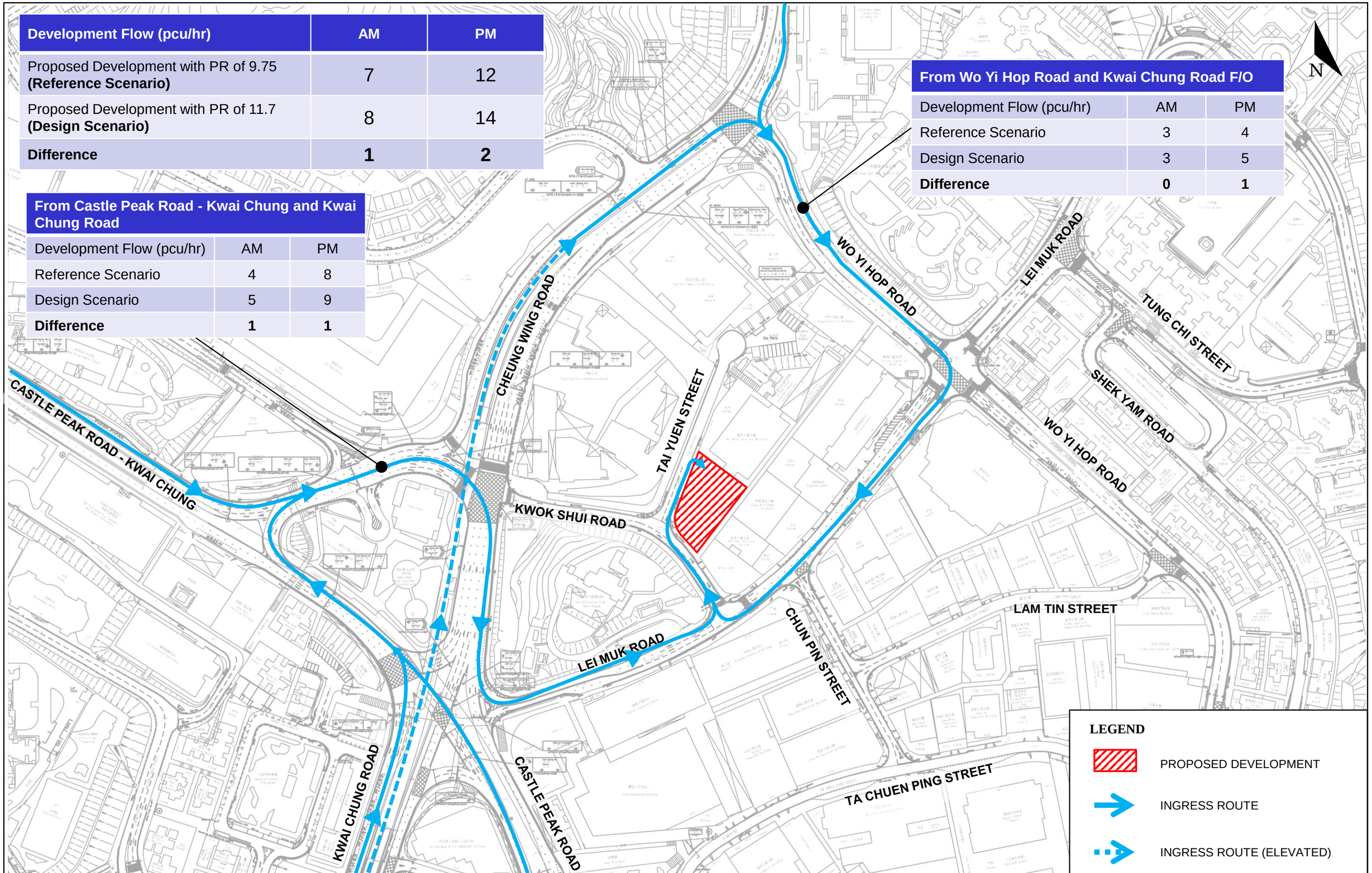


Job Title	**PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**	FIGURE 2.3
Date: 11/2020 / Scale: N.T.S	Drawing Title: LOCATION OF IDENTIFIED ROAD LINKS IN THE VICINITY OF PROPOSED DEVELOPMENT	ARUP
Drawn: KSIY / Job No.: 276306-24		

Development Flow (pcu/hr)	AM	PM
Proposed Development with PR of 9.75 **(Reference Scenario)**	7	12
Proposed Development with PR of 11.7 **(Design Scenario)**	8	14
Difference	**1**	**2**

From Castle Peak Road - Kwai Chung and Kwai Chung Road		
Development Flow (pcu/hr)	AM	PM
Reference Scenario	4	8
Design Scenario	5	9
Difference	**1**	**1**

From Wo Yi Hop Road and Kwai Chung Road F/O		
Development Flow (pcu/hr)	AM	PM
Reference Scenario	3	4
Design Scenario	3	5
Difference	**0**	**1**



Job Title **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

FIGURE 3.2

Date	Scale
11/2020	N.T.S
Drawn	**Job No.**
KSIY	276306-24

Drawing Title

INGRESS VEHICULAR ROUTES OF PROPOSED DEVELOPMENT

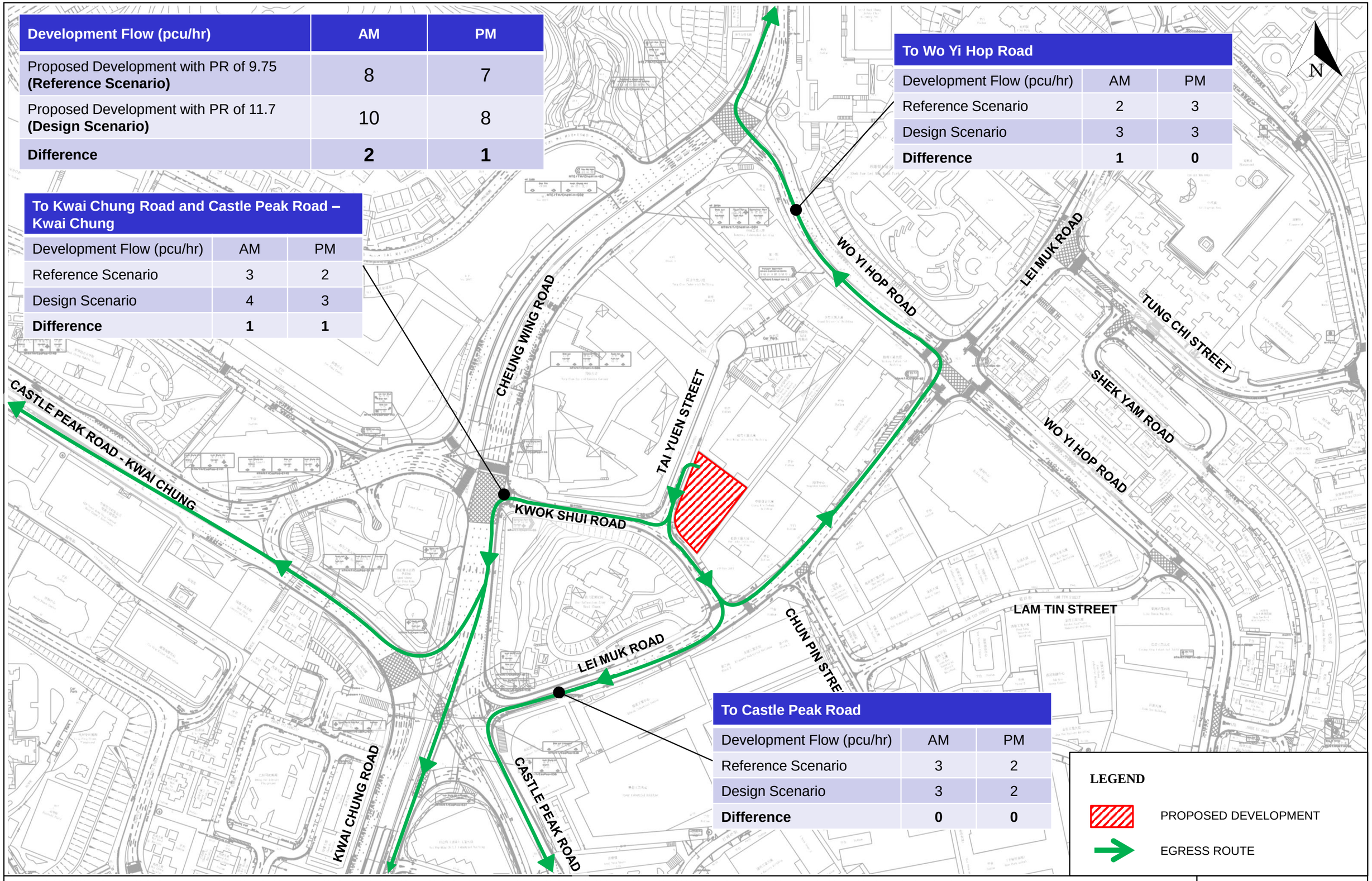
ARUP

Development Flow (pcu/hr)	AM	PM
Proposed Development with PR of 9.75 **(Reference Scenario)**	8	7
Proposed Development with PR of 11.7 **(Design Scenario)**	10	8
Difference	**2**	**1**

To Kwai Chung Road and Castle Peak Road – Kwai Chung		
Development Flow (pcu/hr)	AM	PM
Reference Scenario	3	2
Design Scenario	4	3
Difference	**1**	**1**

To Wo Yi Hop Road		
Development Flow (pcu/hr)	AM	PM
Reference Scenario	2	3
Design Scenario	3	3
Difference	**1**	**0**

To Castle Peak Road		
Development Flow (pcu/hr)	AM	PM
Reference Scenario	3	2
Design Scenario	3	2
Difference	**0**	**0**



LEGEND

PROPOSED DEVELOPMENT

EGRESS ROUTE

Job Title **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

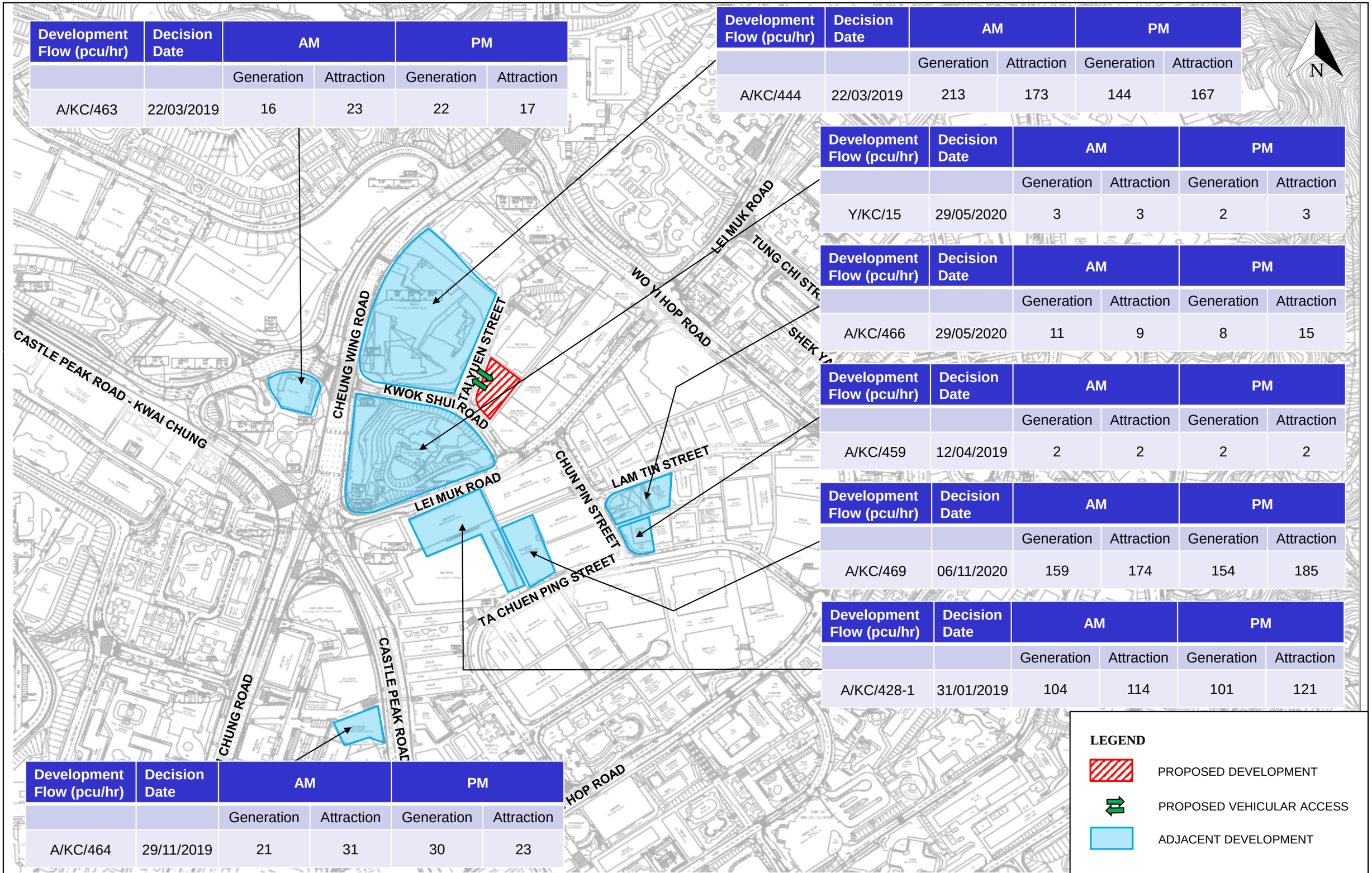
FIGURE 3.3

Date 11/2020 | Scale N.T.S | Drawn KSIY | Job No. 276306-24

Drawing Title

EGRESS VEHICULAR ROUTES OF PROPOSED DEVELOPMENT

ARUP



Development Flow (pcu/hr)	Decision Date	AM		PM	
		Generation	Attraction	Generation	Attraction
A/KC/463	22/03/2019	16	23	22	17

Development Flow (pcu/hr)	Decision Date	AM		PM	
		Generation	Attraction	Generation	Attraction
A/KC/444	22/03/2019	213	173	144	167

Development Flow (pcu/hr)	Decision Date	AM		PM	
		Generation	Attraction	Generation	Attraction
Y/KC/15	29/05/2020	3	3	2	3

Development Flow (pcu/hr)	Decision Date	AM		PM	
		Generation	Attraction	Generation	Attraction
A/KC/466	29/05/2020	11	9	8	15

Development Flow (pcu/hr)	Decision Date	AM		PM	
		Generation	Attraction	Generation	Attraction
A/KC/459	12/04/2019	2	2	2	2

Development Flow (pcu/hr)	Decision Date	AM		PM	
		Generation	Attraction	Generation	Attraction
A/KC/469	06/11/2020	159	174	154	185

Development Flow (pcu/hr)	Decision Date	AM		PM	
		Generation	Attraction	Generation	Attraction
A/KC/428-1	31/01/2019	104	114	101	121

Development Flow (pcu/hr)	Decision Date	AM		PM	
		Generation	Attraction	Generation	Attraction
A/KC/464	29/11/2019	21	31	30	23

LEGEND

- PROPOSED DEVELOPMENT
- PROPOSED VEHICULAR ACCESS
- ADJACENT DEVELOPMENT

Job Title: **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

FIGURE 4.1

Date: 11/2020 | Scale: N.T.S | Drawn: KSIY | Job No.: 276306-24

Drawing Title: LOCATION OF PLANNED DEVELOPMENTS IN THE VICINITY OF PROPOSED DEVELOPMENT

ARUP



LEGEND

PROPOSED DEVELOPMENT

PM PEAK TRAFFIC FLOW (PCU/HOUR)

100 (100)

AM PEAK TRAFFIC FLOW (PCU/HOUR)

PROPOSED VEHICULAR ACCESS

Job Title: **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

FIGURE 4.2

Date	Scale	Drawing Title
11/2020	N.T.S	YEAR 2027 REFERENCE TRAFFIC FLOW
Drawn	Job No.	
KSIY	276306-24	

ARUP



LEGEND

PROPOSED DEVELOPMENT

PM PEAK TRAFFIC FLOW (PCU/HOUR)

100 (100)

AM PEAK TRAFFIC FLOW (PCU/HOUR)

PROPOSED VEHICULAR ACCESS

Job Title: **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

FIGURE 4.3

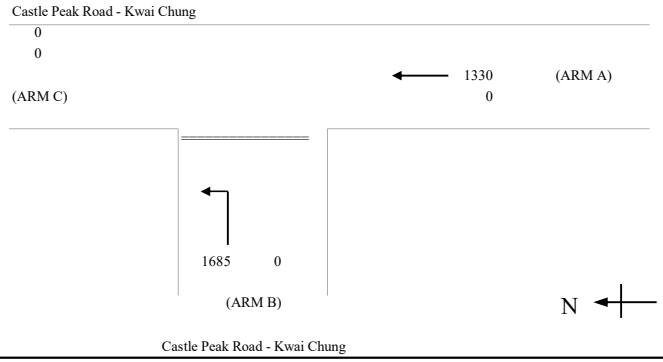
Date	Scale	Drawing Title
11/2020	N.T.S	YEAR 2027 DESIGN TRAFFIC FLOW
Drawn	Job No.	
KSIY	276306-24	

ARUP

Appendix A

Junction Calculation Sheets

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J1 Castle Peak Road at Kwai Cung Road Roundabout	Year 2020 Existing AM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	25.60	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	1330	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	14.75	(metres)
Vl b-a	=		(metres)
Vr b-a	=		(metres)
Vr b-c	=	250	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	1685	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.53321887
E	=	2.28205781
F	=	0.5859548
Y	=	0.1168

THE CAPACITY OF MOVEMENT :

Q b-a	=	304
Q b-c	=	1571
Q c-b	=	403
Q b-ac	=	1571

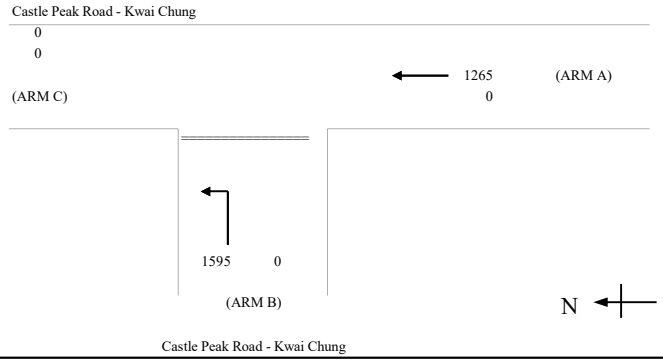
TOTAL FLOW = 3015 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	1.0726
DFC c-b	=	0.0000
DFC b-ac	=	1.0726

CRITICAL DFC = 1.07

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J1 Castle Peak Road at Kwai Cung Road Roundabout	Year 2020 Existing PM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	25.60	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	1265	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	14.75	(metres)
Vl b-a	=	0	(metres)
Vr b-a	=	0	(metres)
Vr b-c	=	250	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	1595	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.53321887
E	=	2.28205781
F	=	0.5859548
Y	=	0.1168

THE CAPACITY OF MOVEMENT :

Q b-a	=	306
Q b-c	=	1577
Q c-b	=	405
Q b-ac	=	1577

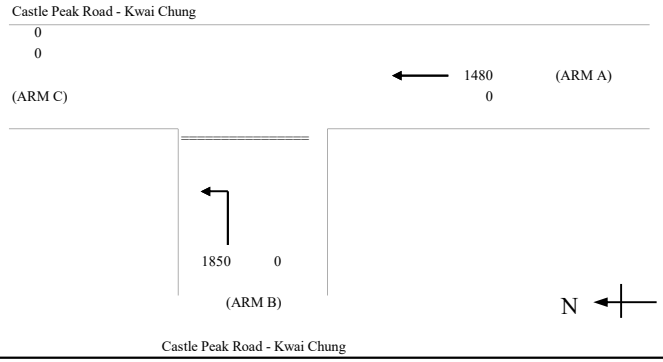
TOTAL FLOW = 2860 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	1.0114
DFC c-b	=	0.0000
DFC b-ac	=	1.0114

CRITICAL DFC = 1.01

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J1 Castle Peak Road at Kwai Cung Road Roundabout	Year 2027 Reference AM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	25.60	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	1480	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	14.75	(metres)
Vl b-a	=	0	(metres)
Vr b-a	=	0	(metres)
Vr b-c	=	250	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	1850	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.53321887
E	=	2.28205781
F	=	0.5859548
Y	=	0.1168

THE CAPACITY OF MOVEMENT :

Q b-a	=	301
Q b-c	=	1557
Q c-b	=	400
Q b-ac	=	1557

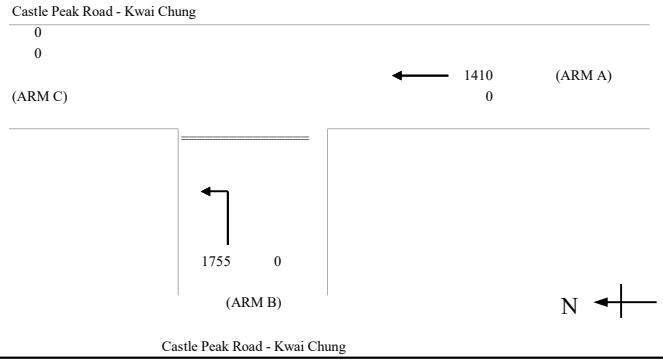
TOTAL FLOW = 3330 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	1.1882
DFC c-b	=	0.0000
DFC b-ac	=	1.1882

CRITICAL DFC = 1.19

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J1 Castle Peak Road at Kwai Cung Road Roundabout	Year 2027 Reference PM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	25.60	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	1410	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	14.75	(metres)
Vl b-a	=	0	(metres)
Vr b-a	=	0	(metres)
Vr b-c	=	250	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	1755	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.53321887
E	=	2.28205781
F	=	0.5859548
Y	=	0.1168

THE CAPACITY OF MOVEMENT :

Q b-a	=	302
Q b-c	=	1563
Q c-b	=	401
Q b-ac	=	1563

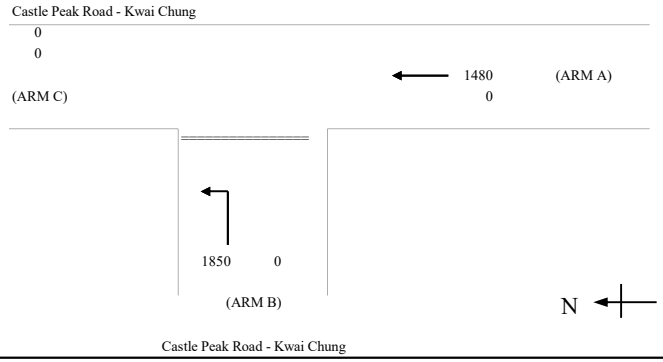
TOTAL FLOW = 3165 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	1.1228
DFC c-b	=	0.0000
DFC b-ac	=	1.1228

CRITICAL DFC = 1.12

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J1 Castle Peak Road at Kwai Cung Road Roundabout	Year 2027 Design AM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	25.60	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	1480	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	14.75	(metres)
Vl b-a	=	0	(metres)
Vr b-a	=	0	(metres)
Vr b-c	=	250	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	1850	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.53321887
E	=	2.28205781
F	=	0.5859548
Y	=	0.1168

THE CAPACITY OF MOVEMENT :

Q b-a	=	301
Q b-c	=	1557
Q c-b	=	400
Q b-ac	=	1557

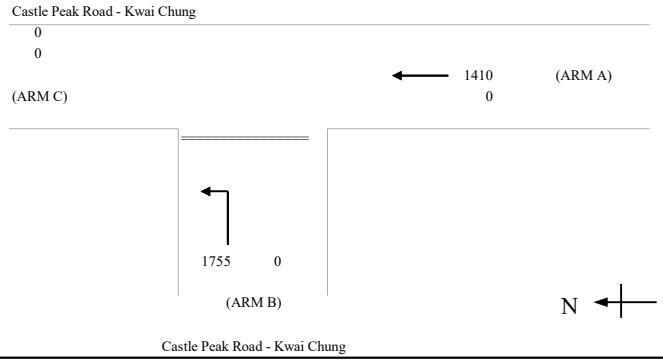
TOTAL FLOW = 3330 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	1.1882
DFC c-b	=	0.0000
DFC b-ac	=	1.1882

CRITICAL DFC = 1.19

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J1 Castle Peak Road at Kwai Cung Road Roundabout	Year 2027 Design PM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	25.60	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	1410	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	14.75	(metres)
Vl b-a	=	0	(metres)
Vr b-a	=	0	(metres)
Vr b-c	=	250	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	1755	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.53321887
E	=	2.28205781
F	=	0.5859548
Y	=	0.1168

THE CAPACITY OF MOVEMENT :

Q b-a	=	302
Q b-c	=	1563
Q c-b	=	401
Q b-ac	=	1563

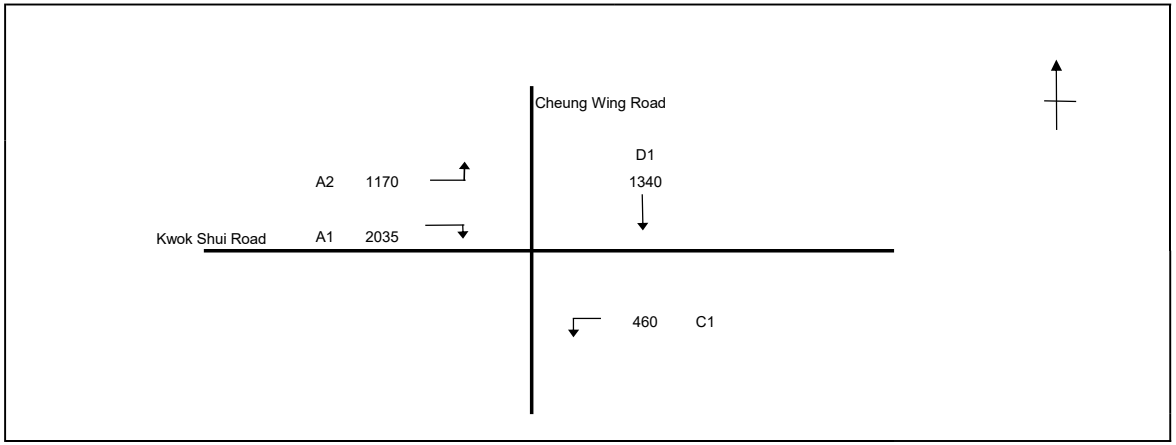
TOTAL FLOW = 3165 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

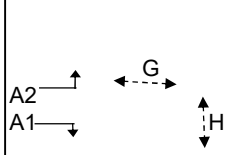
DFC b-a	=	0.0000
DFC b-c	=	1.1228
DFC c-b	=	0.0000
DFC b-ac	=	1.1228

CRITICAL DFC = 1.12

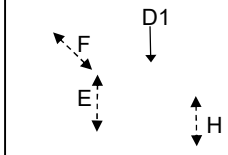
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J2
J2 Cheung Wing Road / Kwok Shui Road	Year 2020 Existing AM Peak	DATE : 14-Apr-21	FILENAME :



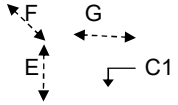
No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.569
Loss time		L =	16 sec
Total Flow		=	3769 pcu
Co	= (1.5*L+5)/(1-Y)	=	67.3 sec
Cm	= L/(1-Y)	=	37.1 sec
Yult		=	0.780
R.C.ult	= (Yult-Y)/Y*100%	=	37.0 %
Cp	= 0.9*L/(0.9-Y)	=	43.5 sec
Ymax	= 1-L/C	=	0.822
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	30 %



STAGE 1 INT= 5



STAGE 2 INT= 7



STAGE 3 INT= 7

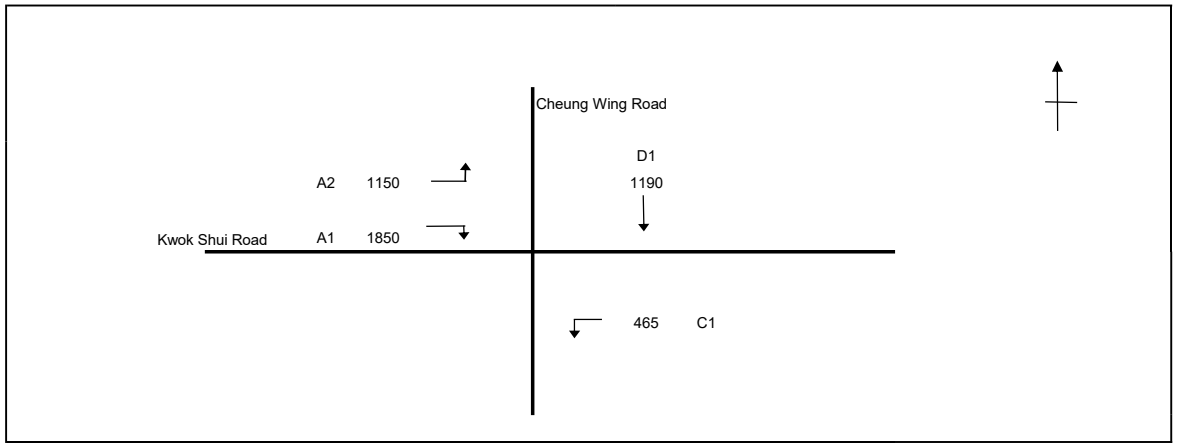
STAGE 4 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	20	11	3	22	20	3	22	OK
F	10.3	6	3	11	31	3	11	OK
G	19	11	3	21	44	3	21	OK
H	13.4	7	0	15	54	0	15	OK

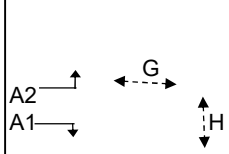
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
A2	1	3.70	A	1	20		N	1985	591			591	1.00	1847			1847	0.320	0.320		42	42	0.686	47
A2,A1	1	5.00	A	1	30		N	2115	**579**		**66**	645	1.00	2014			2014	0.320			42	42	0.686	52
A1	1	4.20	A	3	40		N	6385			1969	1969	1.00	6154			6154	0.320			42	42	0.686	53
D1	2	3.60	D	5	25		N	10435		1340		1340	0.00	10435			10435	0.128	0.128		17	17	0.680	33
C1	3	4.00	C	2	16		N	4170	460			460	1.00	3813			3813	0.121	0.121		16	16	0.679	28

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

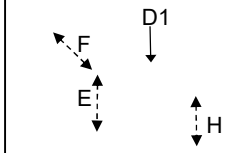
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J2
J2 Cheung Wing Road / Kwok Shui Road	Year 2020 Existing PM Peak	DATE : 14-Apr-21	FILENAME :



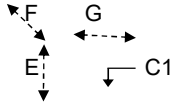
No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.531
Loss time		L =	16 sec
Total Flow		=	3505 pcu
Co	= (1.5*L+5)/(1-Y)	=	61.8 sec
Cm	= L/(1-Y)	=	34.1 sec
Yult		=	0.780
R.C.ult	= (Yult-Y)/Y*100%	=	46.9 %
Cp	= 0.9*L/(0.9-Y)	=	39.0 sec
Ymax	= 1-L/C	=	0.822
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	39 %



STAGE 1 INT= 5



STAGE 2 INT= 7



STAGE 3 INT= 7

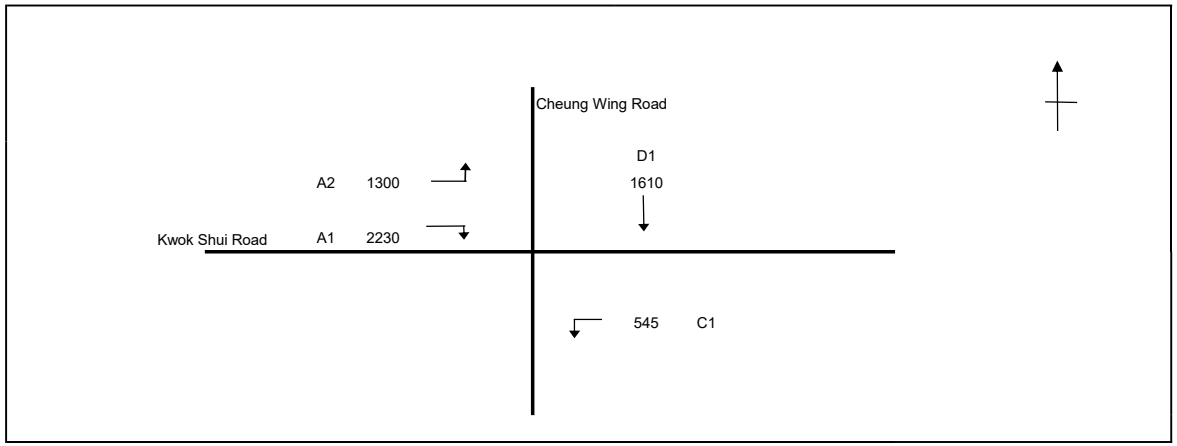
STAGE 4 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	20	11	3	22	20	3	22	OK
F	10.3	6	3	11	31	3	11	OK
G	19	11	3	21	45	3	21	OK
H	13.4	7	0	15	53	0	15	OK

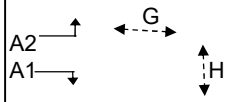
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
A2	1	3.70	A	1	20		N	1985	550			550	1.00	1847			1847	0.298	0.298		42	42	0.638	44
A2,A1	1	5.00	A	1	30		N	2115	600		0	600	1.00	2014			2014	0.298			42	42	0.638	48
A1	1	4.20	A	4	40		N	8560			1850	1850	1.00	8251			8251	0.224			31	42	0.480	37
D1	2	3.60	D	5	25		N	10435		1190		1190	0.00	10435			10435	0.114	0.114		16	16	0.641	29
C1	3	4.50	C	2	16		N	4270	465			465	1.00	3904			3904	0.119	0.119		17	17	0.631	28

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

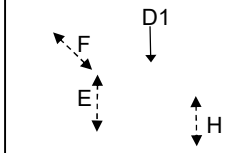
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J2
J2 Cheung Wing Road / Kwok Shui Road	Year 2027 Reference AM Peak	DATE : 14-Apr-21	FILENAME :



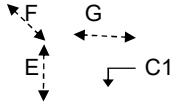
No. of stages per cycle		N =	3	
No. of stage using for calculation		N =	3	
Cycle time		C =	90	sec
Sum(y)		Y =	0.631	
Loss time		L =	16	sec
Total Flow		=	4385	pcu
Co	= (1.5*L+5)/(1-Y)	=	78.5	sec
Cm	= L/(1-Y)	=	43.3	sec
Yult		=	0.780	
R.C.ult	= (Yult-Y)/Y*100%	=	23.7	%
Cp	= 0.9*L/(0.9-Y)	=	53.5	sec
Ymax	= 1-L/C	=	0.822	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	17	%



STAGE 1 INT= 5



STAGE 2 INT= 7



STAGE 3 INT= 7

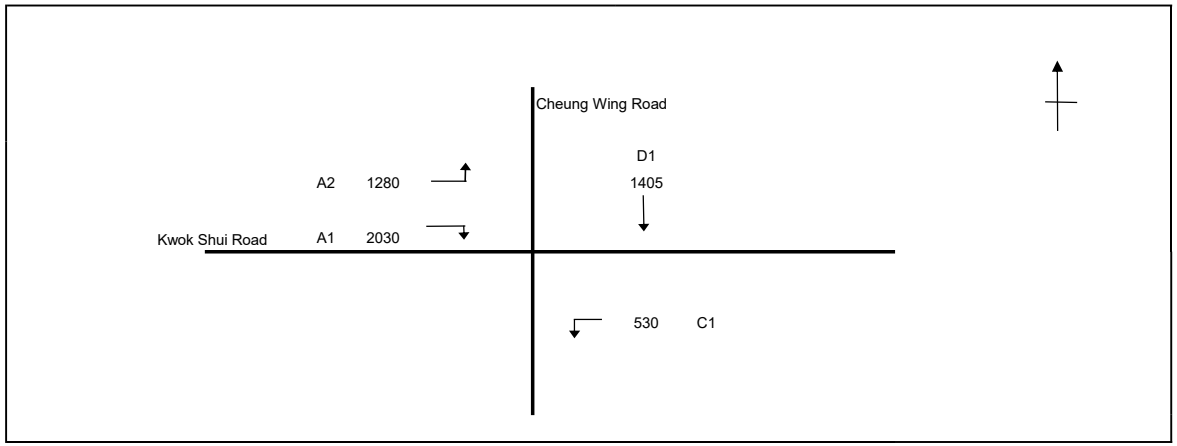
STAGE 4 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	20	11	3	22	21	3	22	OK
F	10.3	6	3	11	32	3	11	OK
G	19	11	3	21	42	3	21	OK
H	13.4	7	0	15	53	0	15	OK

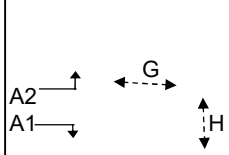
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
A2	1	3.70	A	1	20		N	1985	622			622	1.00	1847			1847	0.337	0.337		40	40	0.758	52
A2,A1	1	5.00	A	1	30		N	2115	678		0	678	1.00	2014			2014	0.337			40	40	0.758	57
A1	1	4.20	A	4	40		N	8560			2230	2230	1.00	8251			8251	0.270			32	40	0.608	46
D1	2	3.60	D	5	25		N	10435		1610		1610	0.00	10435			10435	0.154	0.154		18	18	0.771	39
C1	3	4.50	C	2	16		N	4270	545			545	1.00	3904			3904	0.140	0.140		16	16	0.785	34

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

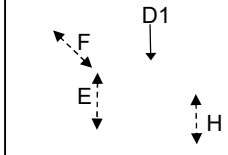
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J2
J2 Cheung Wing Road / Kwok Shui Road	Year 2027 Reference PM Peak	DATE : 14-Apr-21	FILENAME :



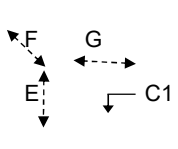
No. of stages per cycle		N =	3	
No. of stage using for calculation		N =	3	
Cycle time		C =	90	sec
Sum(y)		Y =	0.602	
Loss time		L =	16	sec
Total Flow		=	3965	pcu
Co	= (1.5*L+5)/(1-Y)	=	72.9	sec
Cm	= L/(1-Y)	=	40.2	sec
Yult		=	0.780	
R.C.ult	= (Yult-Y)/Y*100%	=	29.6	%
Cp	= 0.9*L/(0.9-Y)	=	48.3	sec
Ymax	= 1-L/C	=	0.822	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	23	%



STAGE 1 INT= 5



STAGE 2 INT= 7



STAGE 3 INT= 7

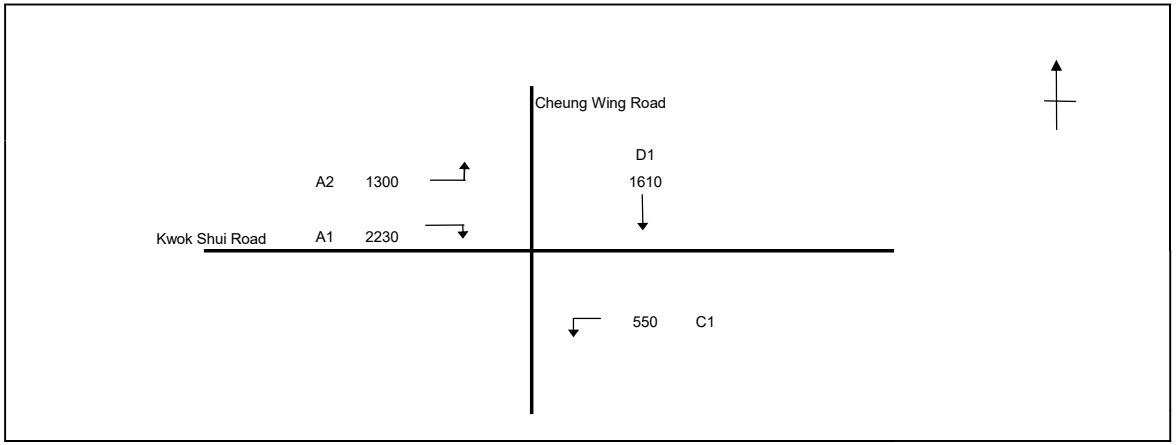
STAGE 4 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	20	11	3	22	21	3	22	OK
F	10.3	6	3	11	32	3	11	OK
G	19	11	3	21	44	3	21	OK
H	13.4	7	0	15	53	0	15	OK

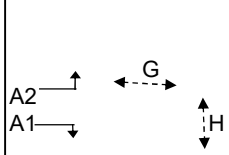
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
A2	1	3.70	A	1	20		N	1985	612			612	1.00	1847			1847	0.332	0.332		41	41	0.728	50
A2,A1	1	5.00	A	1	30		N	2115	668		0	668	1.00	2014			2014	0.332			41	41	0.728	55
A1	1	4.20	A	4	40		N	8560			2030	2030	1.00	8251			8251	0.246			30	41	0.540	41
D1	2	3.60	D	5	25		N	10435		1405		1405	0.00	10435			10435	0.135	0.135		17	17	0.713	34
C1	3	4.50	C	2	16		N	4270	530			530	1.00	3904			3904	0.136	0.136		17	17	0.719	32

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

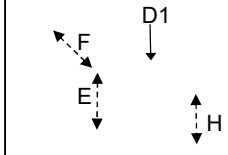
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J2
J2 Cheung Wing Road / Kwok Shui Road	Year 2027 Design AM Peak	DATE : 14-Apr-21	FILENAME :



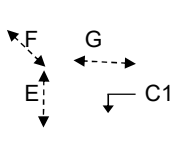
No. of stages per cycle		N =	3	
No. of stage using for calculation		N =	3	
Cycle time		C =	90	sec
Sum(y)		Y =	0.632	
Loss time		L =	16	sec
Total Flow		=	4390	pcu
Co	= (1.5*L+5)/(1-Y)	=	78.8	sec
Cm	= L/(1-Y)	=	43.5	sec
Yult		=	0.780	
R.C.ult	= (Yult-Y)/Y*100%	=	23.4	%
Cp	= 0.9*L/(0.9-Y)	=	53.7	sec
Ymax	= 1-L/C	=	0.822	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	17	%



STAGE 1	INT= 5



STAGE 2	INT= 7



STAGE 3	INT= 7

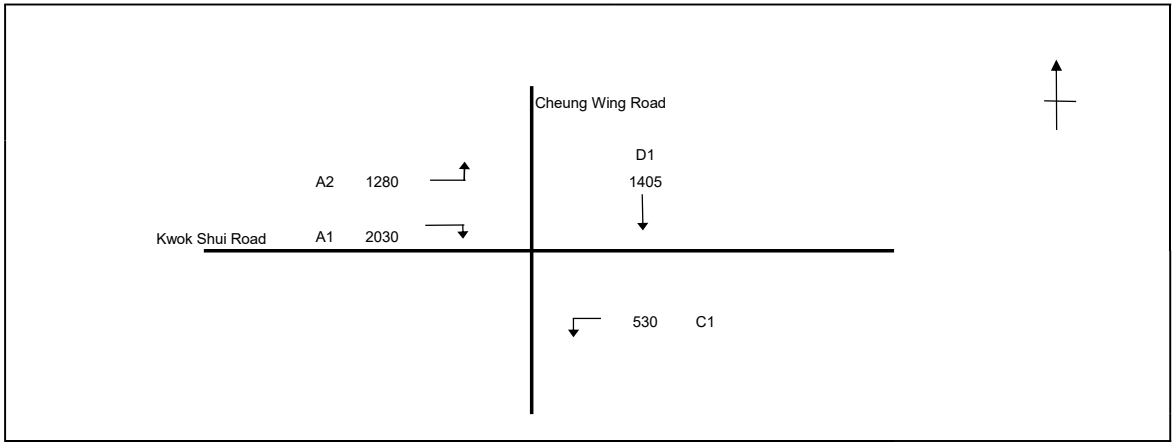
STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	20	11	3	22	21	3	22	OK
F	10.3	6	3	11	32	3	11	OK
G	19	11	3	21	41	3	21	OK
H	13.4	7	0	15	52	0	15	OK

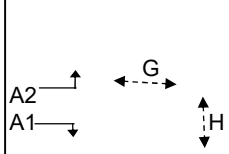
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
A2	1	3.70	A	1	20		N	1985	622			622	1.00	1847			1847	0.337	0.337		39	39	0.777	53
A2,A1	1	5.00	A	1	30		N	2115	678		0	678	1.00	2014			2014	0.337			39	39	0.777	58
A1	1	4.20	A	4	40		N	8560			2230	2230	1.00	8251			8251	0.270			32	39	0.624	47
D1	2	3.60	D	5	25		N	10435		1610		1610	0.00	10435			10435	0.154	0.154		18	18	0.771	39
C1	3	4.50	C	2	16		N	4270	550			550	1.00	3904			3904	0.141	0.141		16	16	0.792	34

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

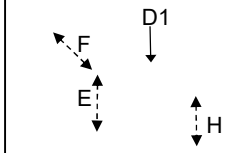
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J2
J2 Cheung Wing Road / Kwok Shui Road	Year 2027 Design PM Peak	DATE : 14-Apr-21	FILENAME :



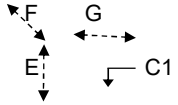
No. of stages per cycle	N =	3	
No. of stage using for calculation	N =	3	
Cycle time	C =	90	sec
Sum(y)	Y =	0.602	
Loss time	L =	16	sec
Total Flow	=	3965	pcu
Co = (1.5*L+5)/(1-Y)	=	72.9	sec
Cm = L/(1-Y)	=	40.2	sec
Yult	=	0.780	
R.C.ult = (Yult-Y)/Y*100%	=	29.6	%
Cp = 0.9*L/(0.9-Y)	=	48.3	sec
Ymax = 1-L/C	=	0.822	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	23	%



STAGE 1 INT= 5



STAGE 2 INT= 7



STAGE 3 INT= 7

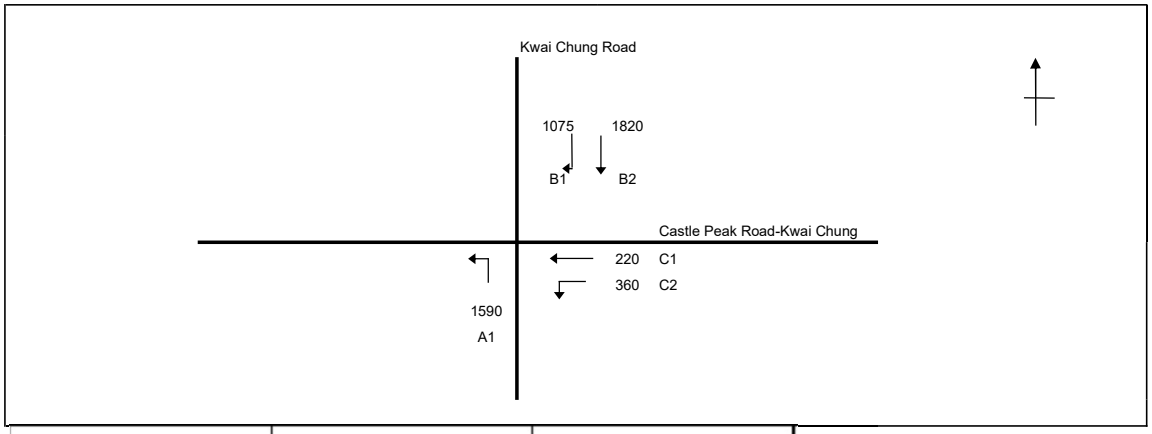
STAGE 4 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	20	11	3	22	21	3	22	OK
F	10.3	6	3	11	32	3	11	OK
G	19	11	3	21	44	3	21	OK
H	13.4	7	0	15	53	0	15	OK

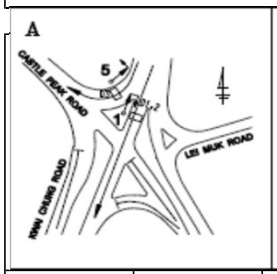
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
A2	1	3.70	A	1	20		N	1985	612			612	1.00	1847			1847	0.332	0.332		41	41	0.728	50
A2,A1	1	5.00	A	1	30		N	2115	668		0	668	1.00	2014			2014	0.332			41	41	0.728	55
A1	1	4.20	A	4	40		N	8560			2030	2030	1.00	8251			8251	0.246			30	41	0.540	41
D1	2	3.60	D	5	25		N	10435		1405		1405	0.00	10435			10435	0.135	0.135		17	17	0.713	34
C1	3	4.50	C	2	16		N	4270	530			530	1.00	3904			3904	0.136	0.136		17	17	0.719	32

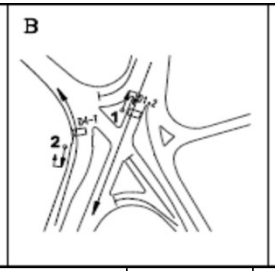
NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

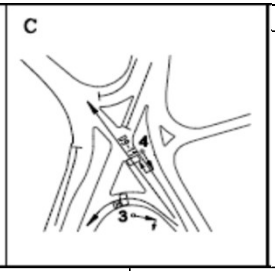
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J3
J3 Castle Peak Road - Kwai Chung / Kwai Chung Road	Year 2020 Existing AM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.464
Loss time		L =	25 sec
Total Flow		=	3475 pcu
Co	= (1.5*L+5)/(1-Y)	=	79.3 sec
Cm	= L/(1-Y)	=	46.6 sec
Yult		=	0.713
R.C.ult	= (Yult-Y)/Y*100%	=	53.6 %
Cp	= 0.9*L/(0.9-Y)	=	51.6 sec
Ymax	= 1-L/C	=	0.722
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	40 % (Optimized)







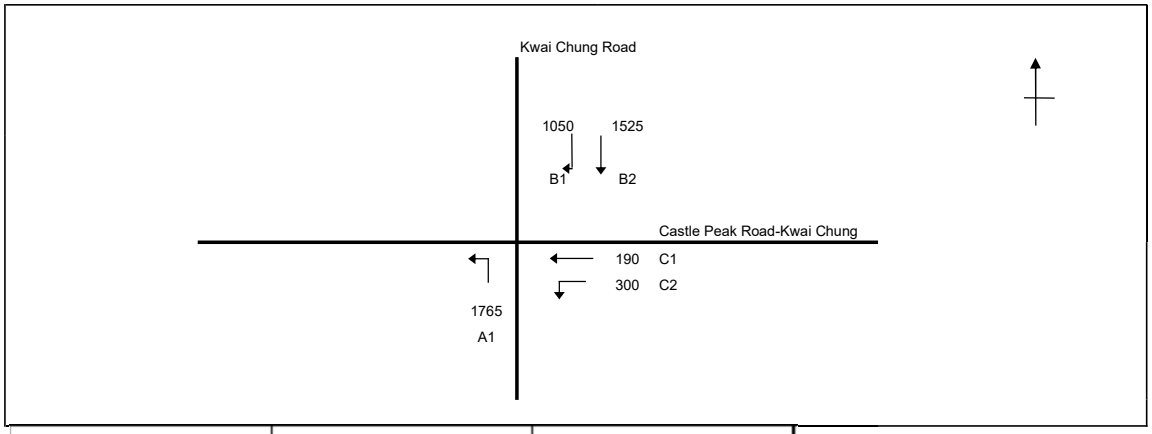
STAGE 1	INT= 5	STAGE 2	INT= 11	STAGE 3	INT= 11	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

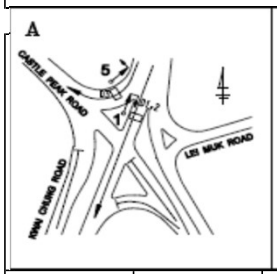
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				24				
A1	2	3.50	A	1	80		N	1965	**284**			284	1.00	1929			1350	0.211	0.211		30	30	0.642	29
A1	2	3.50	A	3	80			6315	1306			1306	1.00	6199			6199	0.211			30	30	0.642	44
B1	1	5.00	B1	3	50		N	6625	1075			1075	1.00	6432			6432	0.167	0.167		23	23	0.642	40
B2	1,2	3.30	B2	3				6255		1820		1820	0.00	6255		1564	7819	0.233			33	57	0.368	33
C1	3	3.60	C	3				6345		220		220	0.00	6345			6345	0.035	0.086	1	5	13	0.239	9
C2	3	4.70	C	2	50		N	4310	360			360	1.00	4184			4184	0.086			12	13	0.593	23

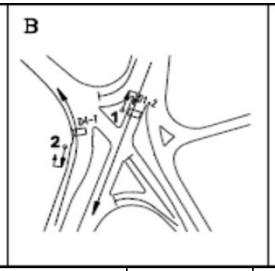
NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

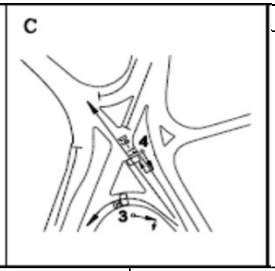
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J3
J3 Castle Peak Road - Kwai Chung / Kwai Chung Road	Year 2020 Existing PM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.469
Loss time		L =	24 sec
Total Flow		=	3065 pcu
Co	= (1.5*L+5)/(1-Y)	=	77.2 sec
Cm	= L/(1-Y)	=	45.2 sec
Yult		=	0.720
R.C.ult	= (Yult-Y)/Y*100%	=	53.6 %
Cp	= 0.9*L/(0.9-Y)	=	50.1 sec
Ymax	= 1-L/C	=	0.733
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	41 % (Optimized)







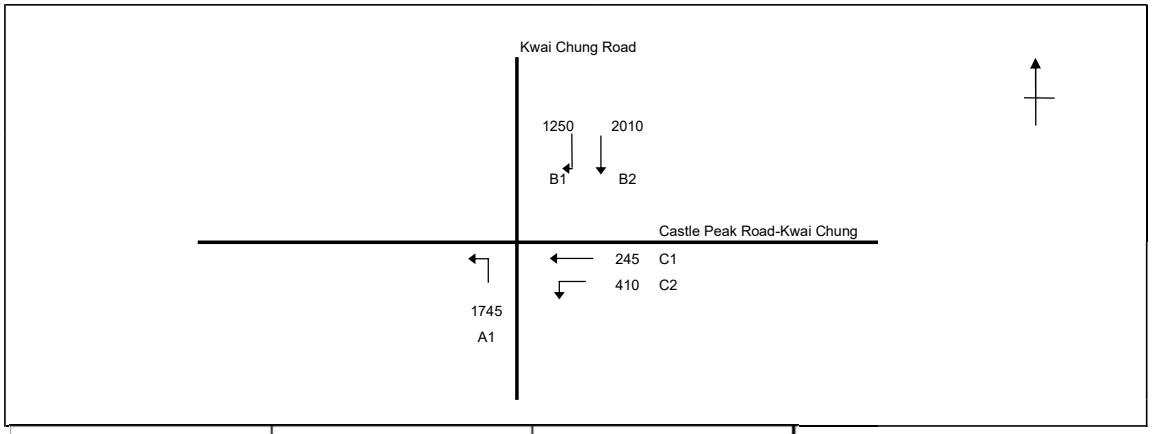
STAGE 1	INT= 5	STAGE 2	INT= 11	STAGE 3	INT= 11	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

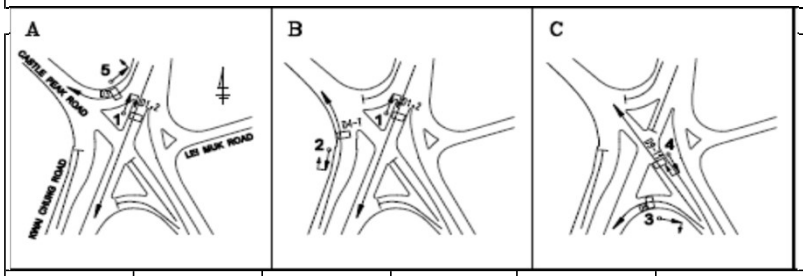
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				24				
A1	2	3.50	A	1	80		N	1965	**316**			316	1.00	1929			1350	0.234	0.234		33	33	0.639	30
A1	2	3.50	A	3	80			6315	1449			1449	1.00	6199			6199	0.234			33	33	0.639	46
B1	1	5.00	B1	3	50		N	6625	1050			1050	1.00	6432			6432	0.163	0.163		23	23	0.639	39
B2	1,2	3.30	B2	3				6255		1525		1525	0.00	6255		1564	7819	0.195			27	60	0.293	25
C1	3	3.60	C	3				6345		190		190	0.00	6345			6345	0.030	0.072		4	10	0.267	8
C2	3	4.70	C	2	50		N	4310	300			300	1.00	4184			4184	0.072			10	10	0.639	20

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J3
J3 Castle Peak Road - Kwai Chung / Kwai Chung Road	Year 2027 Reference AM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.523
Loss time		L =	24 sec
Total Flow		=	3915 pcu
Co	= (1.5*L+5)/(1-Y)	=	86.0 sec
Cm	= L/(1-Y)	=	50.4 sec
Yult		=	0.720
R.C.ult	= (Yult-Y)/Y*100%	=	37.5 %
Cp	= 0.9*L/(0.9-Y)	=	57.4 sec
Ymax	= 1-L/C	=	0.733
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	26 % (Optimized)



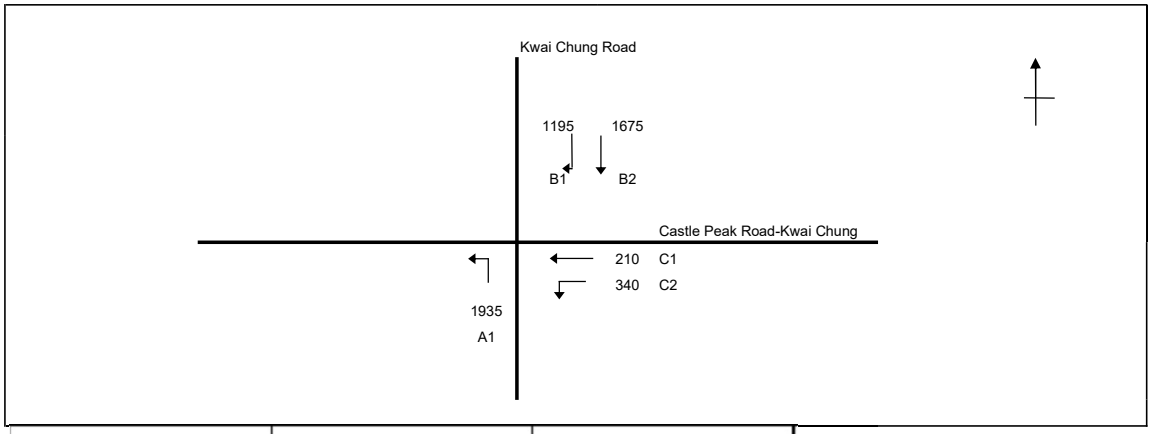
STAGE 1	INT= 5	STAGE 2	INT= 11	STAGE 3	INT= 11	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

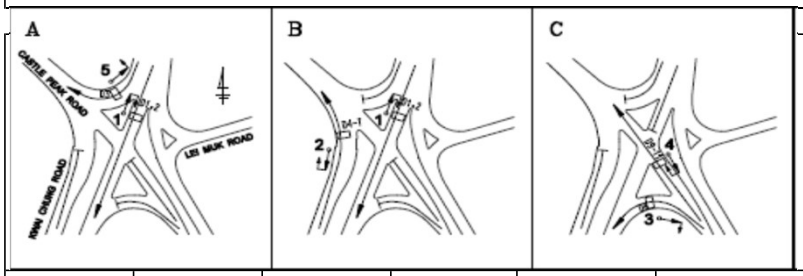
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				24				
A1	2	3.50	A	1	80		N	1965	**312**			312	1.00	1929			1350	0.231	0.231		29	29	0.714	32
A1	2	3.50	A	3	80			6315	1433			1433	1.00	6199			6199	0.231			29	29	0.714	48
B1	1	5.00	B1	3	50		N	6625	1250			1250	1.00	6432			6432	0.194	0.194		25	25	0.714	45
B2	1,2	3.30	B2	3				6255		2010		2010	0.00	6255		1564	7819	0.257			32	58	0.401	36
C1	3	3.60	C	3				6345		245		245	0.00	6345			6345	0.039	0.098		5	12	0.281	11
C2	3	4.70	C	2	50		N	4310	410			410	1.00	4184			4184	0.098			12	12	0.714	27

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J3
J3 Castle Peak Road - Kwai Chung / Kwai Chung Road	Year 2027 Reference PM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.523
Loss time		L =	24 sec
Total Flow		=	3420 pcu
Co	= (1.5*L+5)/(1-Y)	=	86.0 sec
Cm	= L/(1-Y)	=	50.4 sec
Yult		=	0.720
R.C.ult	= (Yult-Y)/Y*100%	=	37.6 %
Cp	= 0.9*L/(0.9-Y)	=	57.4 sec
Ymax	= 1-L/C	=	0.733
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	26 % (Optimized)



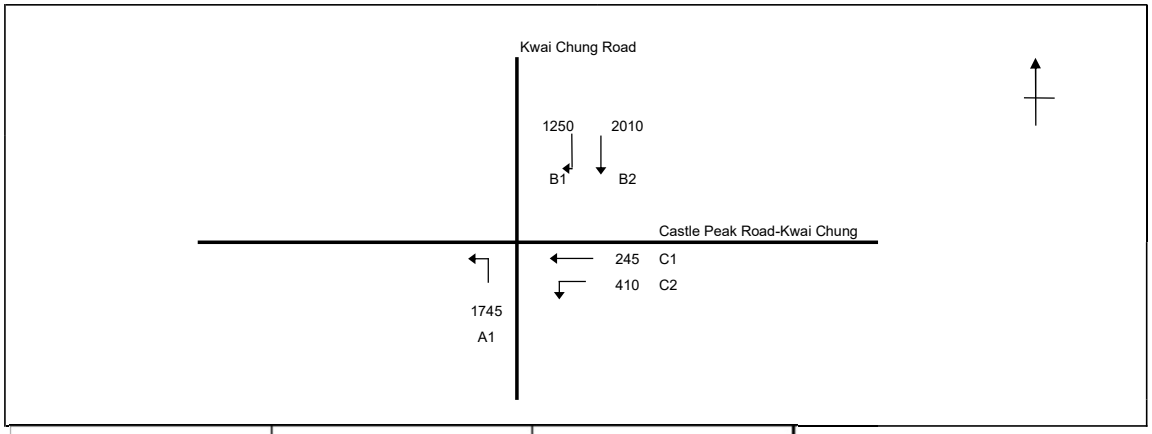
STAGE 1	INT= 5	STAGE 2	INT= 11	STAGE 3	INT= 11	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

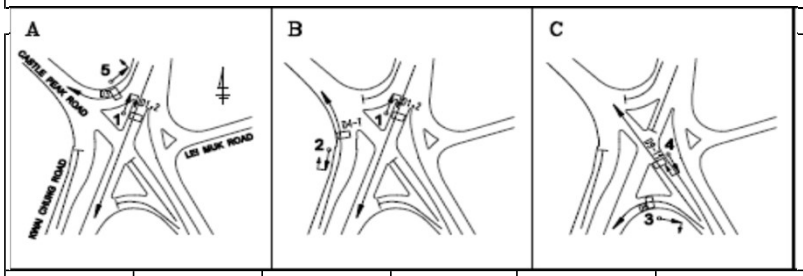
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				24				
A1	2	3.50	A	1	80		N	1965	**346**			346	1.00	1929			1350	0.256	0.256		32	32	0.714	33
A1	2	3.50	A	3	80			6315	1589			1589	1.00	6199			6199	0.256			32	32	0.714	51
B1	1	5.00	B1	3	50		N	6625	1195			1195	1.00	6432			6432	0.186	0.186		23	23	0.714	44
B2	1,2	3.30	B2	3				6255		1675		1675	0.00	6255		1564	7819	0.214			27	60	0.323	28
C1	3	3.60	C	3				6345		210		210	0.00	6345			6345	0.033	0.081		4	10	0.291	9
C2	3	4.70	C	2	50		N	4310	340			340	1.00	4184			4184	0.081			10	10	0.714	23

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J3
J3 Castle Peak Road - Kwai Chung / Kwai Chung Road	Year 2027 Design AM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.523
Loss time		L =	24 sec
Total Flow		=	3915 pcu
Co	= (1.5*L+5)/(1-Y)	=	86.0 sec
Cm	= L/(1-Y)	=	50.4 sec
Yult		=	0.720
R.C.ult	= (Yult-Y)/Y*100%	=	37.5 %
Cp	= 0.9*L/(0.9-Y)	=	57.4 sec
Ymax	= 1-L/C	=	0.733
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	26 % (Optimized)



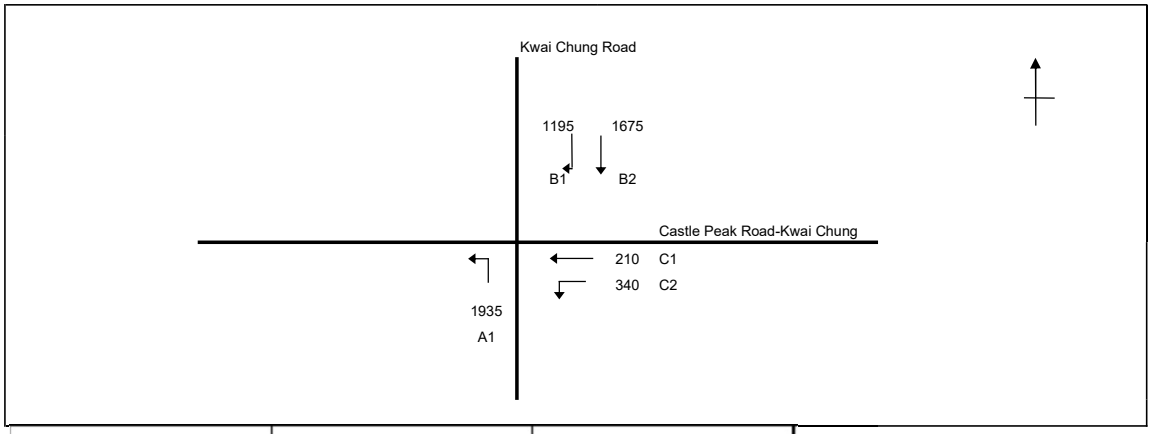
STAGE 1	INT= 5	STAGE 2	INT= 11	STAGE 3	INT= 11	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

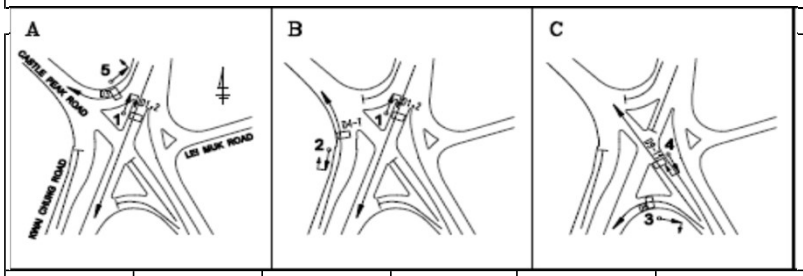
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				24				
A1	2	3.50	A	1	80		N	1965	**312**			312	1.00	1929			1350	0.231	0.231		29	29	0.714	32
A1	2	3.50	A	3	80			6315	1433			1433	1.00	6199			6199	0.231			29	29	0.714	48
B1	1	5.00	B1	3	50		N	6625	1250			1250	1.00	6432			6432	0.194	0.194		25	25	0.714	45
B2	1,2	3.30	B2	3				6255		2010		2010	0.00	6255		1564	7819	0.257			32	58	0.401	36
C1	3	3.60	C	3				6345		245		245	0.00	6345			6345	0.039	0.098		5	12	0.281	11
C2	3	4.70	C	2	50		N	4310	410			410	1.00	4184			4184	0.098			12	12	0.714	27

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J3
J3 Castle Peak Road - Kwai Chung / Kwai Chung Road	Year 2027 Design PM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.523
Loss time		L =	24 sec
Total Flow		=	3420 pcu
Co	= (1.5*L+5)/(1-Y)	=	86.0 sec
Cm	= L/(1-Y)	=	50.4 sec
Yult		=	0.720
R.C.ult	= (Yult-Y)/Y*100%	=	37.6 %
Cp	= 0.9*L/(0.9-Y)	=	57.4 sec
Ymax	= 1-L/C	=	0.733
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	26 % (Optimized)



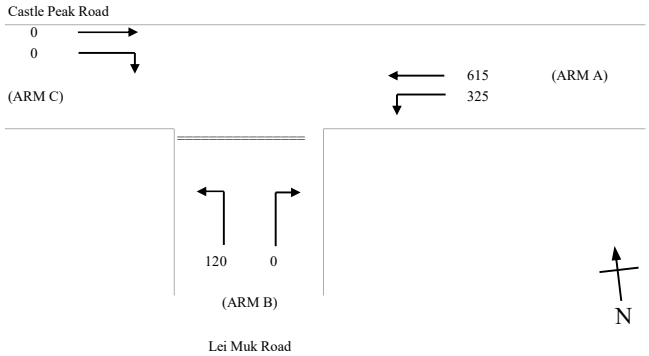
STAGE 1	INT= 5	STAGE 2	INT= 11	STAGE 3	INT= 11	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				24				
A1	2	3.50	A	1	80		N	1965	**346**			346	1.00	1929			1350	0.256	0.256		32	32	0.714	33
A1	2	3.50	A	3	80			6315	1589			1589	1.00	6199			6199	0.256			32	32	0.714	51
B1	1	5.00	B1	3	50		N	6625	1195			1195	1.00	6432			6432	0.186	0.186		23	23	0.714	44
B2	1,2	3.30	B2	2				4170		1675		1675	0.00	4170		1043	5213	0.321			41	60	0.484	42
C1	3	3.60	C	3				6345		210		210	0.00	6345			6345	0.033	0.081		4	10	0.291	9
C2	3	4.70	C	2	50		N	4310	340			340	1.00	4184			4184	0.081			10	10	0.714	23

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J4 Lei Muk Road / Castle Peak Road	Year 2020 Existing AM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	16.30	(metres)
W cr	=	0	(metres)
q a-b	=	325	(pcu/hr)
q a-c	=	615	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	5.14	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	120	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.6746363
E	=	1.17084162
F	=	0.5859548
Y	=	0.43765

THE CAPACITY OF MOVEMENT :

Q b-a	=	343
Q b-c	=	734
Q c-b	=	349
Q b-ac	=	734

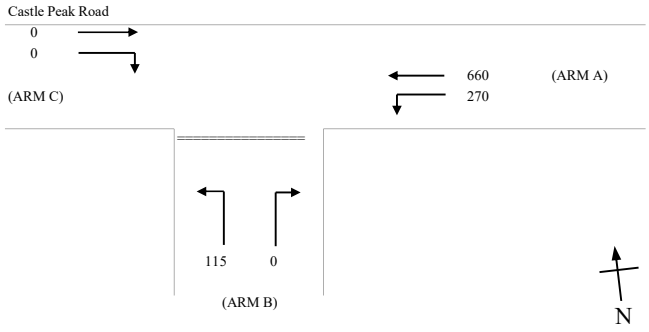
TOTAL FLOW = 1060 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.1635
DFC c-b	=	0.0000
DFC b-ac	=	0.1635

CRITICAL DFC = 0.16

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J4 Lei Muk Road / Castle Peak Road	Year 2020 Existing PM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	16.30	(metres)
W cr	=	0	(metres)
q a-b	=	270	(pcu/hr)
q a-c	=	660	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	5.14	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	115	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.6746363
E	=	1.17084162
F	=	0.5859548
Y	=	0.43765

THE CAPACITY OF MOVEMENT :

Q b-a	=	341
Q b-c	=	729
Q c-b	=	350
Q b-ac	=	729

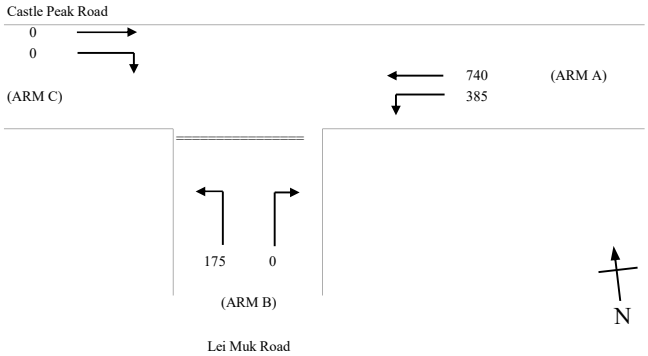
TOTAL FLOW = 1045 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.1578
DFC c-b	=	0.0000
DFC b-ac	=	0.1578

CRITICAL DFC = 0.16

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J4 Lei Muk Road / Castle Peak Road	Year 2027 Reference AM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	16.30	(metres)
W cr	=	0	(metres)
q a-b	=	385	(pcu/hr)
q a-c	=	740	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	5.14	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	175	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.6746363
E	=	1.17084162
F	=	0.5859548
Y	=	0.43765

THE CAPACITY OF MOVEMENT :

Q b-a	=	327
Q b-c	=	706
Q c-b	=	332
Q b-ac	=	706

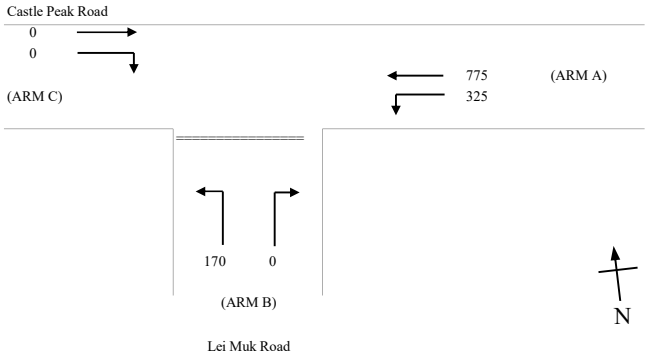
TOTAL FLOW = 1300 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.2479
DFC c-b	=	0.0000
DFC b-ac	=	0.2479

CRITICAL DFC = 0.25

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J4 Lei Muk Road / Castle Peak Road	Year 2027 Reference PM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	16.30	(metres)
W cr	=	0	(metres)
q a-b	=	325	(pcu/hr)
q a-c	=	775	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	5.14	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	170	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.6746363
E	=	1.17084162
F	=	0.5859548
Y	=	0.43765

THE CAPACITY OF MOVEMENT :

Q b-a	=	326
Q b-c	=	704
Q c-b	=	334
Q b-ac	=	704

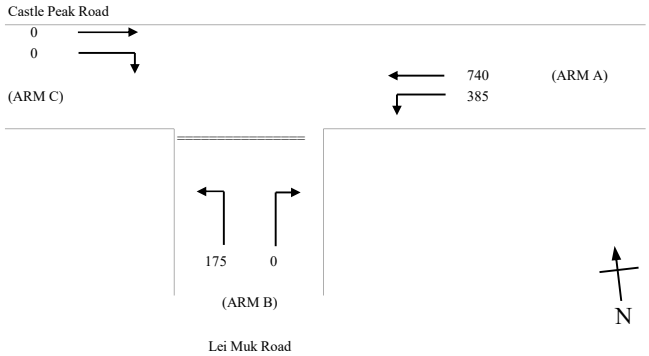
TOTAL FLOW = 1270 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.2415
DFC c-b	=	0.0000
DFC b-ac	=	0.2415

CRITICAL DFC = 0.24

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J4 Lei Muk Road / Castle Peak Road	Year 2027 Design AM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	16.30	(metres)
W cr	=	0	(metres)
q a-b	=	385	(pcu/hr)
q a-c	=	740	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	5.14	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	175	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.6746363
E	=	1.17084162
F	=	0.5859548
Y	=	0.43765

THE CAPACITY OF MOVEMENT :

Q b-a	=	327
Q b-c	=	706
Q c-b	=	332
Q b-ac	=	706

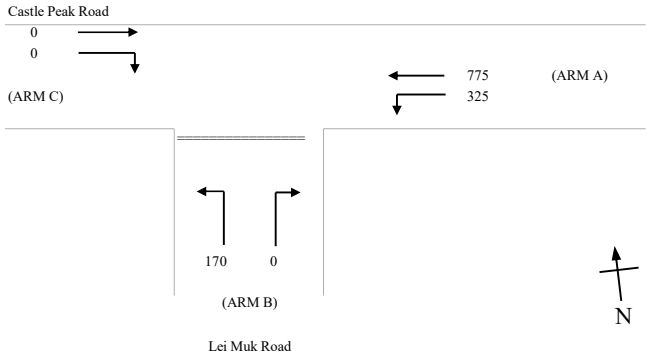
TOTAL FLOW = 1300 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.2479
DFC c-b	=	0.0000
DFC b-ac	=	0.2479

CRITICAL DFC = 0.25

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J4 Lei Muk Road / Castle Peak Road	Year 2027 Design PM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	16.30	(metres)
W cr	=	0	(metres)
q a-b	=	325	(pcu/hr)
q a-c	=	775	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	5.14	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	170	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.6746363
E	=	1.17084162
F	=	0.5859548
Y	=	0.43765

THE CAPACITY OF MOVEMENT :

Q b-a	=	326
Q b-c	=	704
Q c-b	=	334
Q b-ac	=	704

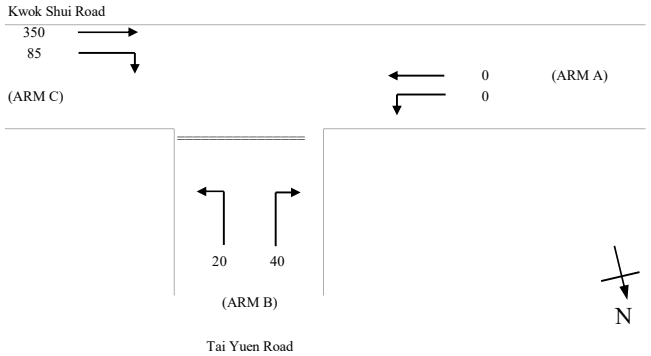
TOTAL FLOW = 1270 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.2415
DFC c-b	=	0.0000
DFC b-ac	=	0.2415

CRITICAL DFC = 0.24

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J5 Tai Yuen Street / Kwok Shui Road	Year 2020 Existing AM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.10	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	0	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.50	(metres)
Vr c-b	=	0	(metres)
q c-a	=	350	(pcu/hr)
q c-b	=	85	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.20	(metres)
W b-c	=	2.20	(metres)
Vl b-a	=	34	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	40	(pcu/hr)
q b-c	=	20	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.73487984
E	=	0.78985365
F	=	0.8794228
Y	=	0.75505

THE CAPACITY OF MOVEMENT :

Q b-a	=	392
Q b-c	=	588
Q c-b	=	655
Q b-ac	=	441

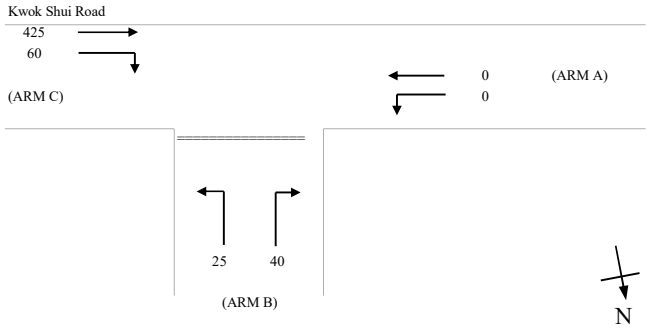
TOTAL FLOW = 495 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.1020
DFC b-c	=	0.0340
DFC c-b	=	0.1298
DFC b-ac	=	0.1361

CRITICAL DFC = 0.14

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J5 Tai Yuen Street / Kwok Shui Road	Year 2020 Existing PM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.10	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	0	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.50	(metres)
Vr c-b	=	0	(metres)
q c-a	=	425	(pcu/hr)
q c-b	=	60	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.20	(metres)
W b-c	=	2.20	(metres)
Vl b-a	=	34	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	40	(pcu/hr)
q b-c	=	25	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.73487984
E	=	0.78985365
F	=	0.8794228
Y	=	0.75505

THE CAPACITY OF MOVEMENT :

Q b-a	=	389
Q b-c	=	588
Q c-b	=	655
Q b-ac	=	447.21

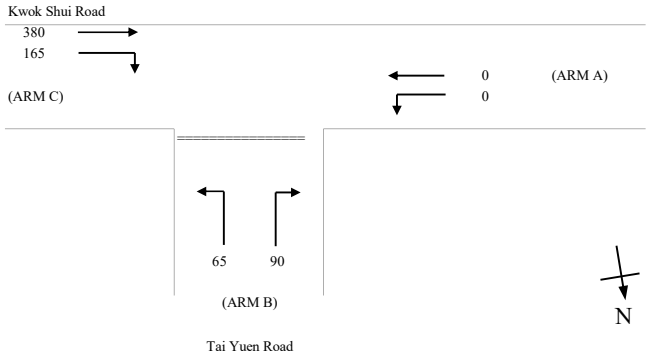
TOTAL FLOW = 550 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.1028
DFC b-c	=	0.0425
DFC c-b	=	0.0916
DFC b-ac	=	0.1453

CRITICAL DFC = 0.15

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J5 Tai Yuen Street / Kwok Shui Road	Year 2027 Reference AM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.10	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	0	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.50	(metres)
Vr c-b	=	0	(metres)
q c-a	=	380	(pcu/hr)
q c-b	=	165	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.20	(metres)
W b-c	=	2.20	(metres)
Vl b-a	=	34	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	90	(pcu/hr)
q b-c	=	65	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.73487984
E	=	0.78985365
F	=	0.8794228
Y	=	0.75505

THE CAPACITY OF MOVEMENT :

Q b-a	=	365
Q b-c	=	588
Q c-b	=	655
Q b-ac	=	434.03

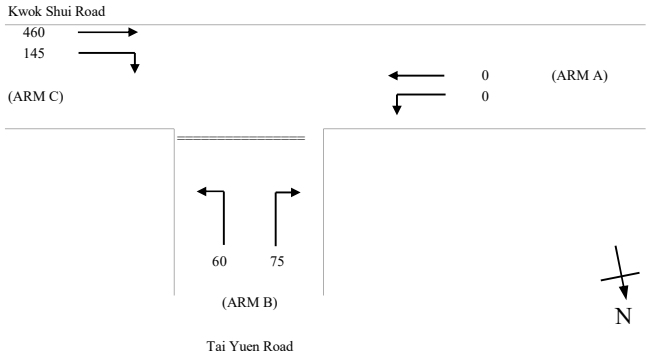
TOTAL FLOW = 700 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.2466
DFC b-c	=	0.1105
DFC c-b	=	0.2519
DFC b-ac	=	0.3571

CRITICAL DFC = 0.36

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J5 Tai Yuen Street / Kwok Shui Road	Year 2027 Reference PM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.10	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	0	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.50	(metres)
Vr c-b	=	0	(metres)
q c-a	=	460	(pcu/hr)
q c-b	=	145	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.20	(metres)
W b-c	=	2.20	(metres)
Vl b-a	=	34	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	75	(pcu/hr)
q b-c	=	60	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.73487984
E	=	0.78985365
F	=	0.8794228
Y	=	0.75505

THE CAPACITY OF MOVEMENT :

Q b-a	=	360
Q b-c	=	588
Q c-b	=	655
Q b-ac	=	434.96

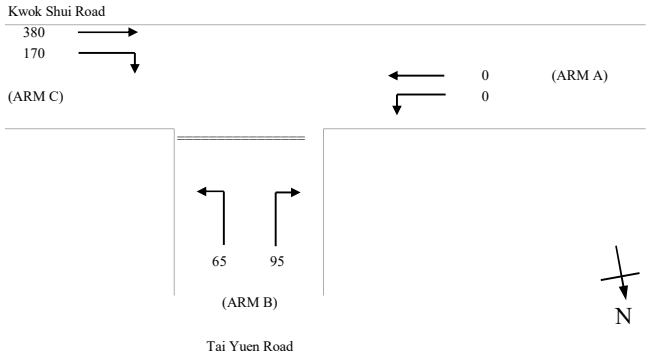
TOTAL FLOW = 740 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.2083
DFC b-c	=	0.1020
DFC c-b	=	0.2214
DFC b-ac	=	0.3104

CRITICAL DFC = 0.31

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J5 Tai Yuen Street / Kwok Shui Road	Year 2027 Design AM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.10	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	0	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.50	(metres)
Vr c-b	=	0	(metres)
q c-a	=	380	(pcu/hr)
q c-b	=	170	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.20	(metres)
W b-c	=	2.20	(metres)
Vl b-a	=	34	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	95	(pcu/hr)
q b-c	=	65	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.73487984
E	=	0.78985365
F	=	0.8794228
Y	=	0.75505

THE CAPACITY OF MOVEMENT :

Q b-a	=	363
Q b-c	=	588
Q c-b	=	655
Q b-ac	=	429.82

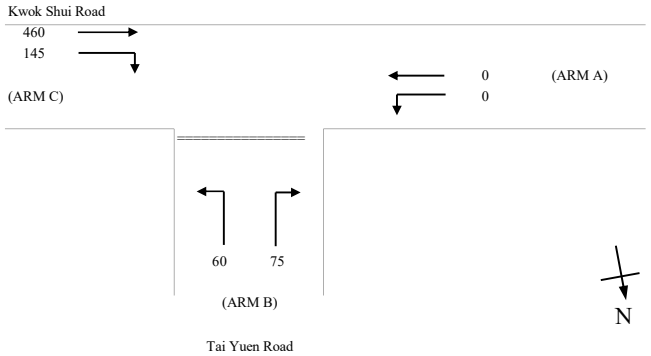
TOTAL FLOW = 710 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.2617
DFC b-c	=	0.1105
DFC c-b	=	0.2595
DFC b-ac	=	0.3723

CRITICAL DFC = 0.37

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J5 Tai Yuen Street / Kwok Shui Road	Year 2027 Design PM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.10	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	0	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.50	(metres)
Vr c-b	=	0	(metres)
q c-a	=	460	(pcu/hr)
q c-b	=	145	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.20	(metres)
W b-c	=	2.20	(metres)
Vl b-a	=	34	(metres)
Vr b-a	=	25	(metres)
Vr b-c	=	25	(metres)
q b-a	=	75	(pcu/hr)
q b-c	=	60	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.73487984
E	=	0.78985365
F	=	0.8794228
Y	=	0.75505

THE CAPACITY OF MOVEMENT :

Q b-a	=	360
Q b-c	=	588
Q c-b	=	655
Q b-ac	=	434.96

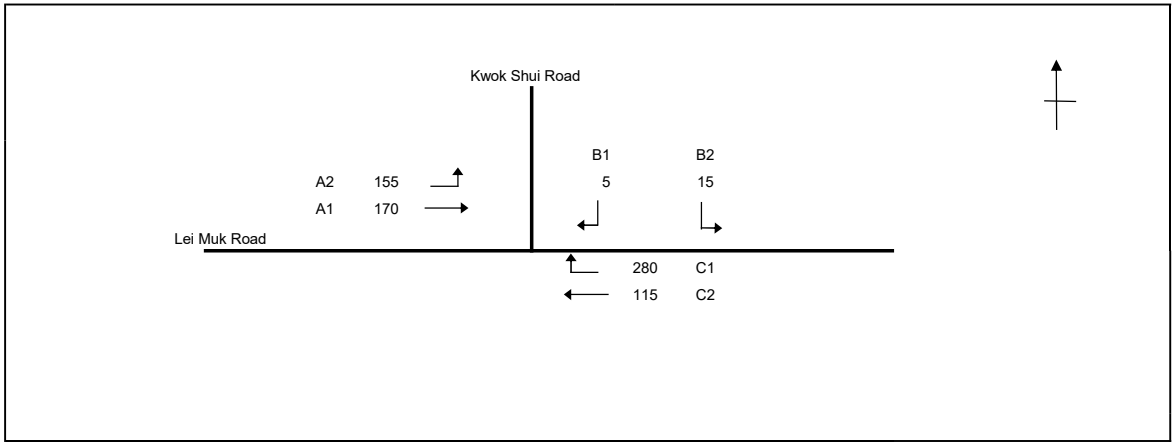
TOTAL FLOW = 740 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

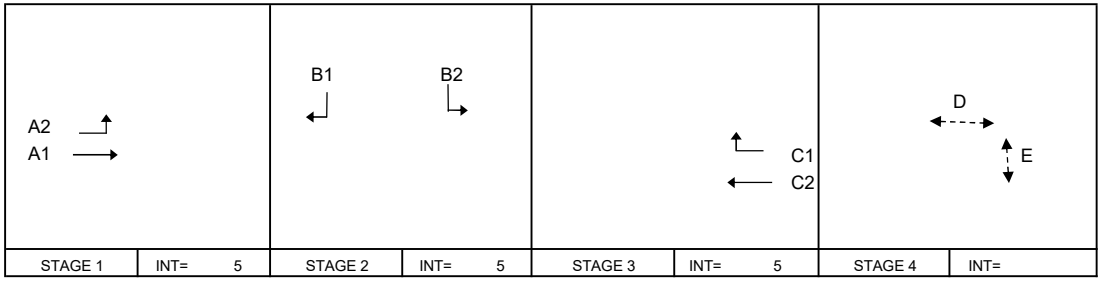
DFC b-a	=	0.2083
DFC b-c	=	0.1020
DFC c-b	=	0.2214
DFC b-ac	=	0.3104

CRITICAL DFC = 0.31

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J6
J6 - Kwok Shui Road / Lei Muk Road	Year 2020 Existing AM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.386
Loss time		L =	38 sec
Total Flow		=	740 pcu
Co	= (1.5*L+5)/(1-Y)	=	101.0 sec
Cm	= L/(1-Y)	=	61.9 sec
Yult		=	0.615
R.C.ult	= (Yult-Y)/Y*100%	=	59.2 %
Cp	= 0.9*L/(0.9-Y)	=	66.6 sec
Ymax	= 1-L/C	=	0.578
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	35 %



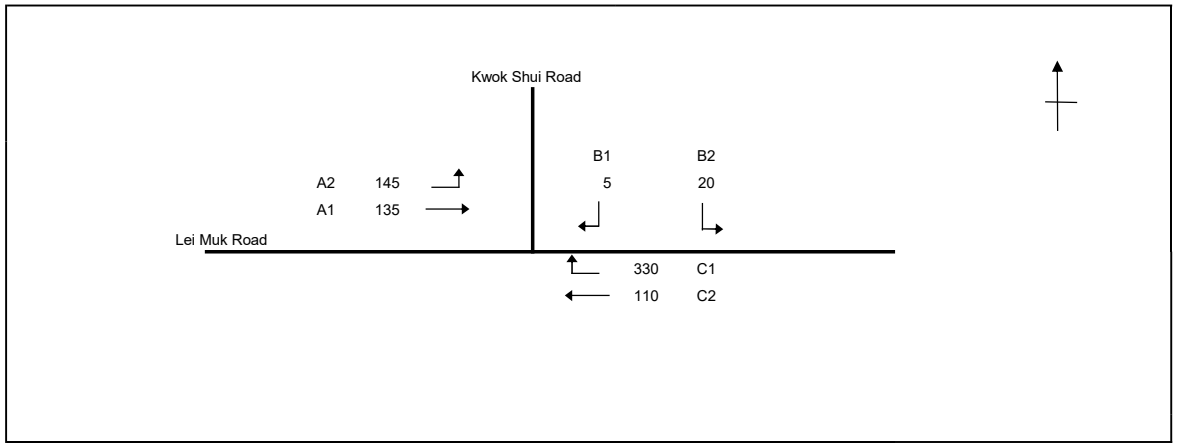
STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT= 5	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
D	10.3	5	7	9	5	7	9	OK
E	7.5	6	1	5	15	1	5	OK

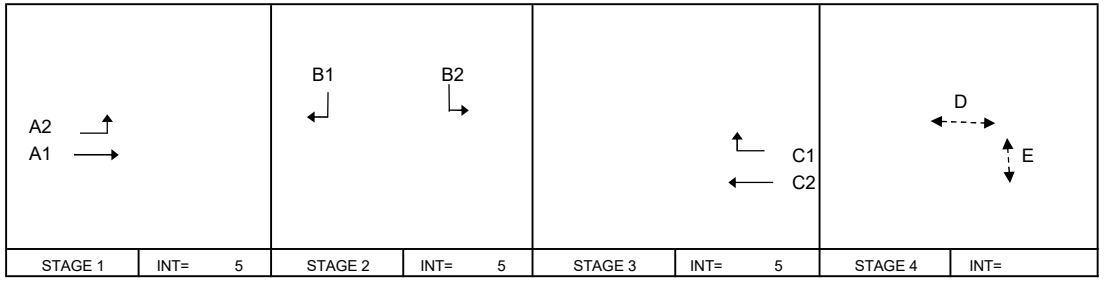
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
A1,A2	1	3.60	A	1	15			2115	155	170		325	0.48	2019			2019	0.161	0.161		22	22	0.659	37
B1,B2	2	4.00	B	1	10		N	2015	15		5	20	1.00	1752			1752	0.011	0.011	5	2	7	0.147	3
C1,C2	3	3.30	C	1	20		N	1945		115	280	395	0.71	1847			1847	0.214	0.214		29	29	0.664	40
ped																				21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS		TRAFFIC SIGNAL CALCULATION		
			PROJECT NO: 276306-24	Junction No. J6
J6- Kwok Shui Road / Lei Muk Road		Year 2020 Existing PM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle	N =	4
No. of stage using for calculation	N =	3
Cycle time	C =	90 sec
Sum(y)	Y =	0.392
Loss time	L =	36 sec
Total Flow	=	745 pcu
Co = (1.5*L+5)/(1-Y)	=	97.1 sec
Cm = L/(1-Y)	=	59.3 sec
Yult	=	0.630
R.C.ult = (Yult-Y)/Y*100%	=	60.5 %
Cp = 0.9*L/(0.9-Y)	=	63.8 sec
Ymax = 1-L/C	=	0.600
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	38 %



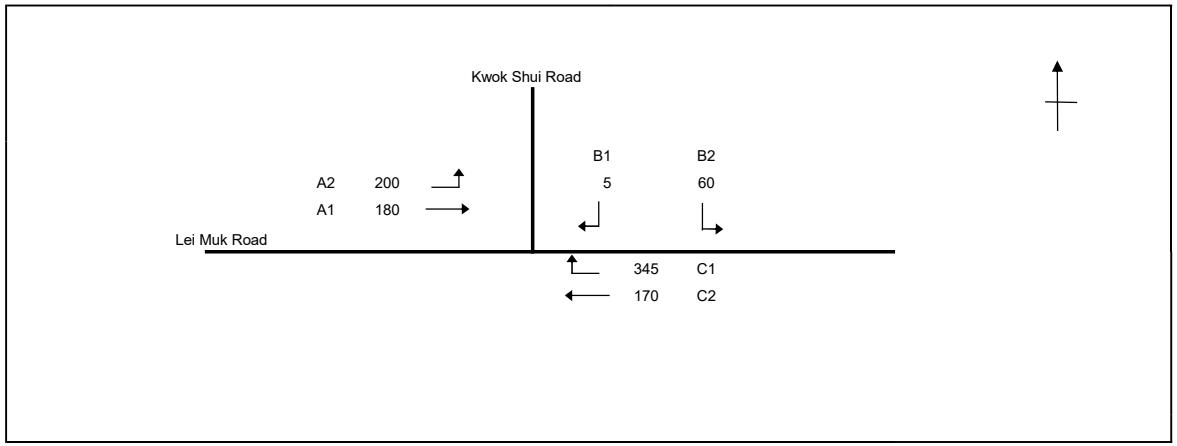
STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT= 5	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
D	10.3	5	7	9	5	7	9	OK
E	7.5	6	1	5	15	1	5	OK

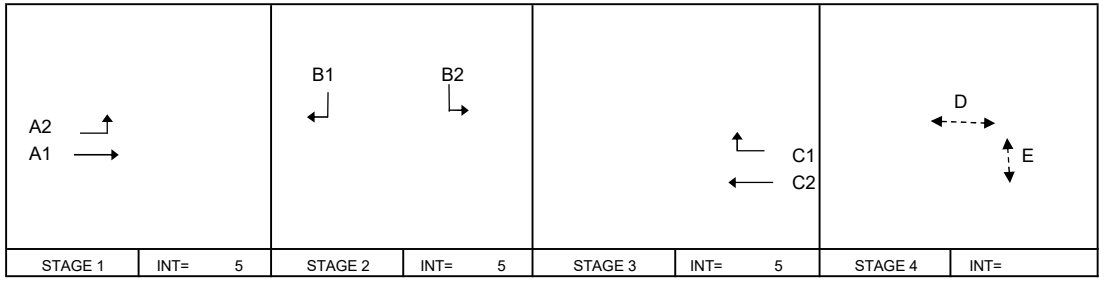
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
A1,A2	1	3.60	A	1	15			2115	145	135		280	0.52	2011			2011	0.139	0.139		19	19	0.660	33
B1,B2	2	4.00	B	1	10		N	2015	20		5	25	1.00	1752			1752	0.014	0.014	3	2	5	0.257	4
C1,C2	3	3.30	C	1	20		N	1945		110	330	440	0.75	1841			1841	0.239	0.239		33	33	0.652	42
ped																				21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J6
J6- Kwok Shui Road / Lei Muk Road	Year 2027 Reference AM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.504
Loss time		L =	35 sec
Total Flow		=	960 pcu
Co	= (1.5*L+5)/(1-Y)	=	116.0 sec
Cm	= L/(1-Y)	=	70.6 sec
Yult		=	0.638
R.C.ult	= (Yult-Y)/Y*100%	=	26.4 %
Cp	= 0.9*L/(0.9-Y)	=	79.6 sec
Ymax	= 1-L/C	=	0.611
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	9 %



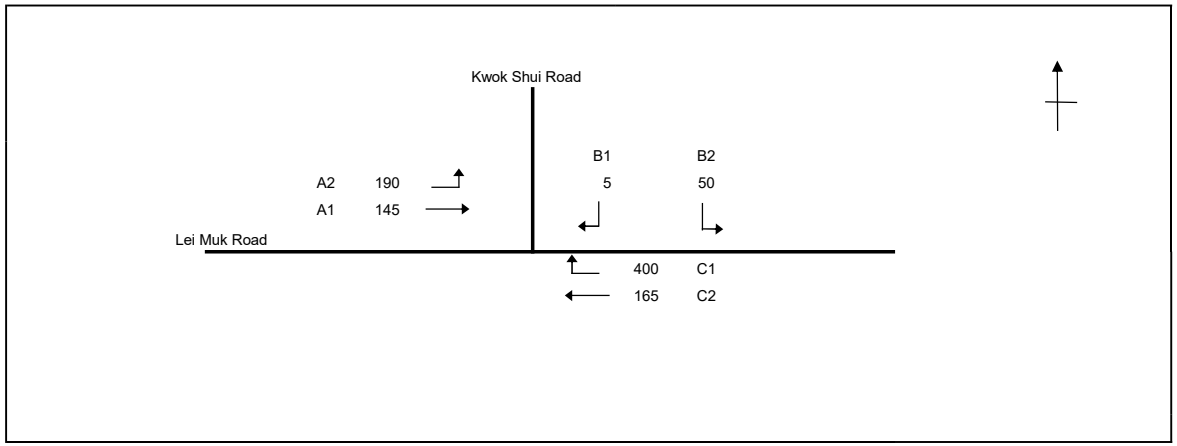
STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT= 5	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
D	10.3	5	7	9	5	7	9	OK
E	7.5	6	1	5	15	1	5	OK

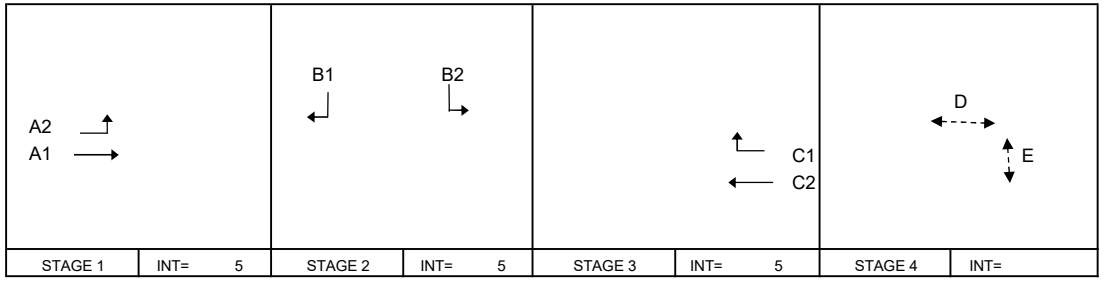
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
A1,A2	1	3.60	A	1	15			2115	200	180		380	0.53	2009			2009	0.189	0.189		21	21	0.811	44
B1,B2	2	4.00	B	1	10		N	2015	60		5	65	1.00	1752			1752	0.037	0.037	2	4	6	0.556	9
C1,C2	3	3.30	C	1	20		N	1945		170	345	515	0.67	1852			1852	0.278	0.278		30	30	0.834	52
ped																				21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS		TRAFFIC SIGNAL CALCULATION		
			PROJECT NO: 276306-24	Junction No. J6
J6- Kwok Shui Road / Lei Muk Road		Year 2027 Reference PM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.505
Loss time		L =	35 sec
Total Flow		=	955 pcu
Co	= (1.5*L+5)/(1-Y)	=	116.1 sec
Cm	= L/(1-Y)	=	70.7 sec
Yult		=	0.638
R.C.ult	= (Yult-Y)/Y*100%	=	26.3 %
Cp	= 0.9*L/(0.9-Y)	=	79.7 sec
Ymax	= 1-L/C	=	0.611
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	9 %



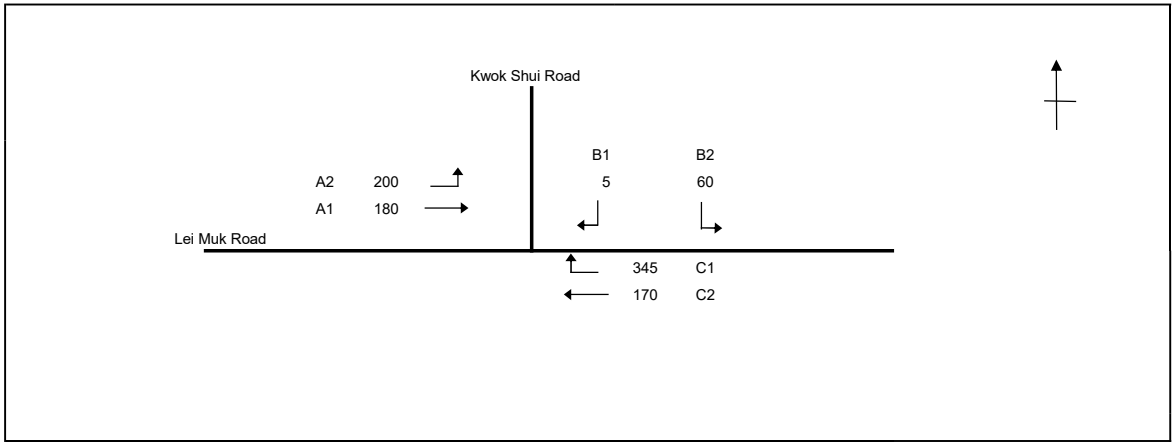
STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT= 5	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
D	10.3	5	7	9	5	7	9	OK
E	7.5	6	1	5	15	1	5	OK

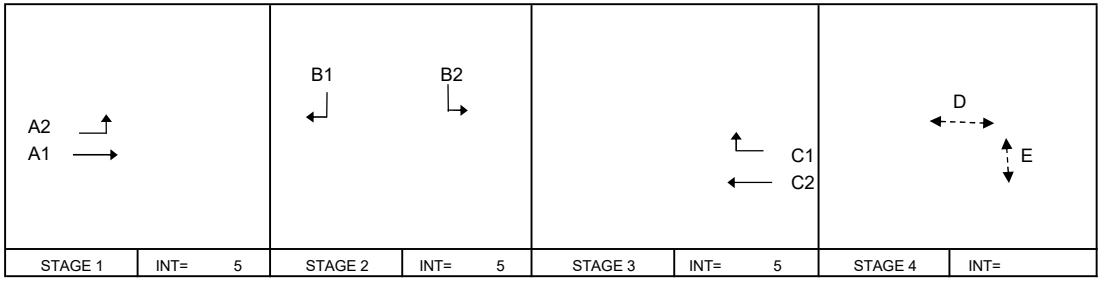
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
A1,A2	1	3.60	A	1	15			2115	190	145		335	0.57	2001			2001	0.167	0.167		18	18	0.837	40
B1,B2	2	4.00	B	1	10		N	2015	50		5	55	1.00	1752			1752	0.031	0.031	2	3	5	0.565	8
C1,C2	3	3.30	C	1	20		N	1945		165	400	565	0.71	1847			1847	0.306	0.306		33	33	0.834	54
ped																				21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J6
J6- Kwok Shui Road / Lei Muk Road	Year 2027 Design AM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.504
Loss time		L =	35 sec
Total Flow		=	960 pcu
Co	= (1.5*L+5)/(1-Y)	=	116.0 sec
Cm	= L/(1-Y)	=	70.6 sec
Yult		=	0.638
R.C.ult	= (Yult-Y)/Y*100%	=	26.4 %
Cp	= 0.9*L/(0.9-Y)	=	79.6 sec
Ymax	= 1-L/C	=	0.611
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	9 %



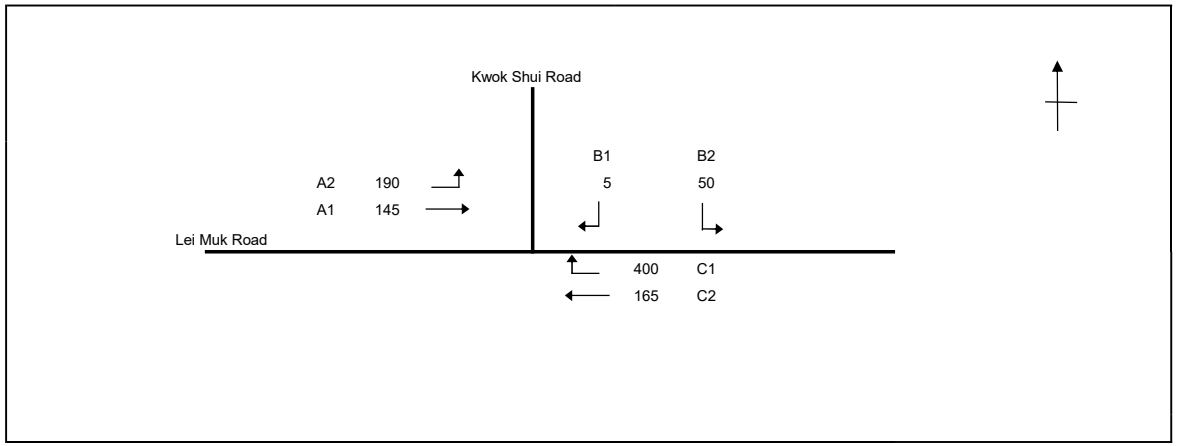
STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT= 5	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
D	10.3	5	7	9	5	7	9	OK
E	7.5	6	1	5	15	1	5	OK

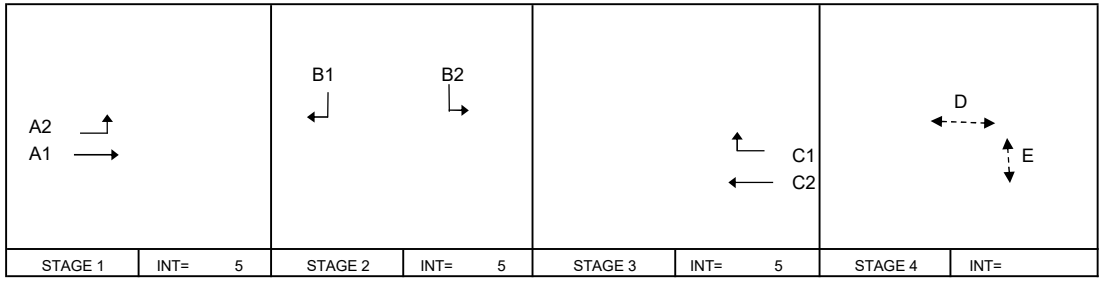
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
A1,A2	1	3.60	A	1	15			2115	200	180		380	0.53	2009			2009	0.189	0.189		21	21	0.811	44
B1,B2	2	4.00	B	1	10		N	2015	60		5	65	1.00	1752			1752	0.037	0.037	2	4	6	0.556	9
C1,C2	3	3.30	C	1	20		N	1945		170	345	515	0.67	1852			1852	0.278	0.278		30	30	0.834	52
ped																				21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS		TRAFFIC SIGNAL CALCULATION		
			PROJECT NO: 276306-24	Junction No. J6
J6- Kwok Shui Road / Lei Muk Road		Year 2027 Design PM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.505
Loss time		L =	35 sec
Total Flow		=	955 pcu
Co	= (1.5*L+5)/(1-Y)	=	116.1 sec
Cm	= L/(1-Y)	=	70.7 sec
Yult		=	0.638
R.C.ult	= (Yult-Y)/Y*100%	=	26.3 %
Cp	= 0.9*L/(0.9-Y)	=	79.7 sec
Ymax	= 1-L/C	=	0.611
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	9 %



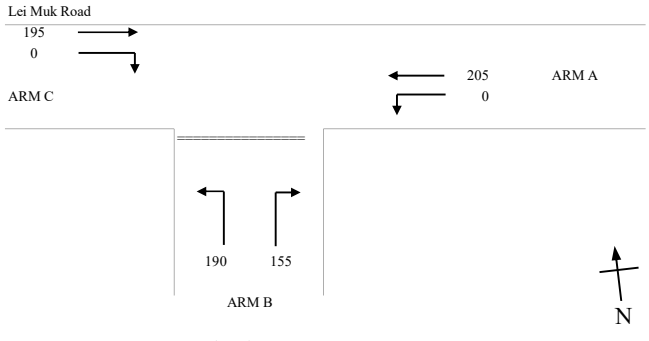
STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT= 5	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
D	10.3	5	7	9	5	7	9	OK
E	7.5	6	1	5	15	1	5	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
A1,A2	1	3.60	A	1	15			2115	190	145		335	0.57	2001			2001	0.167	0.167		18	18	0.837	40
B1,B2	2	4.00	B	1	10		N	2015	50		5	55	1.00	1752			1752	0.031	0.031	2	3	5	0.565	8
C1,C2	3	3.30	C	1	20		N	1945		165	400	565	0.71	1847			1847	0.306	0.306		33	33	0.834	54
ped																				21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J7 Lei Muk Road / Chun Pin Street	Year 2020 Existing AM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	205	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	195	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	5.84	(metres)
W b-c	=	4.76	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	155	(pcu/hr)
q b-c	=	190	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.23841822
E	=	1.13435026
F	=	0.5859548
Y	=	0.793

THE CAPACITY OF MOVEMENT :

Q b-a	=	659
Q b-c	=	778
Q c-b	=	402
Q b-ac	=	719.62

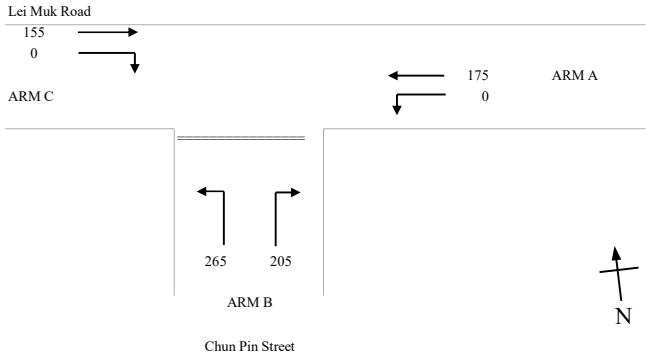
TOTAL FLOW = 745 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.2352
DFC b-c	=	0.2442
DFC c-b	=	0.0000
DFC b-ac	=	0.4794

CRITICAL DFC = 0.48

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J7 Lei Muk Road / Chun Pin Street	Year 2020 Existing PM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	175	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	155	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	5.84	(metres)
W b-c	=	4.76	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	205	(pcu/hr)
q b-c	=	265	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.23841822
E	=	1.13435026
F	=	0.5859548
Y	=	0.793

THE CAPACITY OF MOVEMENT :

Q b-a	=	679
Q b-c	=	788
Q c-b	=	407
Q b-ac	=	736.44

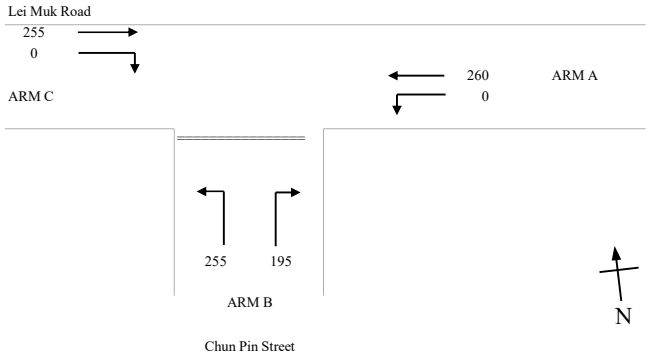
TOTAL FLOW = 800 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.3019
DFC b-c	=	0.3363
DFC c-b	=	0.0000
DFC b-ac	=	0.6382

CRITICAL DFC = 0.64

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J7 Lei Muk Road / Chun Pin Street	Year 2027 Reference AM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	260	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	255	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	5.84	(metres)
W b-c	=	4.76	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	195	(pcu/hr)
q b-c	=	255	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.23841822
E	=	1.13435026
F	=	0.5859548
Y	=	0.793

THE CAPACITY OF MOVEMENT :

Q b-a	=	626
Q b-c	=	760
Q c-b	=	393
Q b-ac	=	695.49

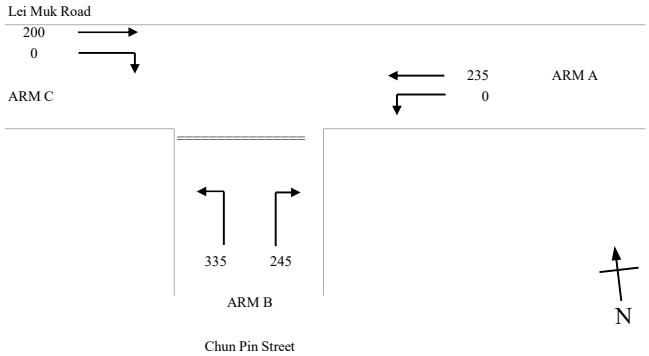
TOTAL FLOW = 965 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.3115
DFC b-c	=	0.3355
DFC c-b	=	0.0000
DFC b-ac	=	0.6470

CRITICAL DFC = 0.65

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J7 Lei Muk Road / Chun Pin Street	Year 2027 Reference PM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	235	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	200	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	5.84	(metres)
W b-c	=	4.76	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	245	(pcu/hr)
q b-c	=	335	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.23841822
E	=	1.13435026
F	=	0.5859548
Y	=	0.793

THE CAPACITY OF MOVEMENT :

Q b-a	=	648
Q b-c	=	768
Q c-b	=	397
Q b-ac	=	712.28

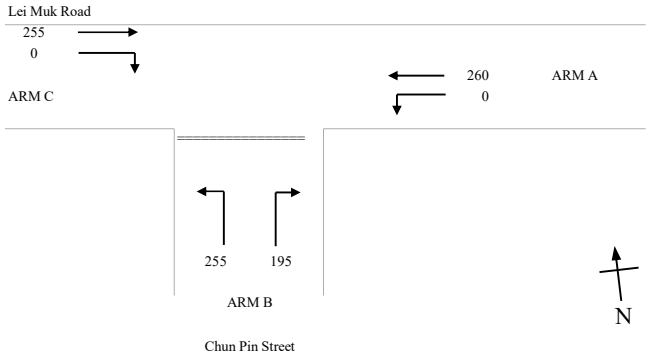
TOTAL FLOW = 1015 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.3781
DFC b-c	=	0.4362
DFC c-b	=	0.0000
DFC b-ac	=	0.8143

CRITICAL DFC = 0.81

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J7 Lei Muk Road / Chun Pin Street	Year 2027 Design AM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	260	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	255	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	5.84	(metres)
W b-c	=	4.76	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	195	(pcu/hr)
q b-c	=	255	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.23841822
E	=	1.13435026
F	=	0.5859548
Y	=	0.793

THE CAPACITY OF MOVEMENT :

Q b-a	=	626
Q b-c	=	760
Q c-b	=	393
Q b-ac	=	695.49

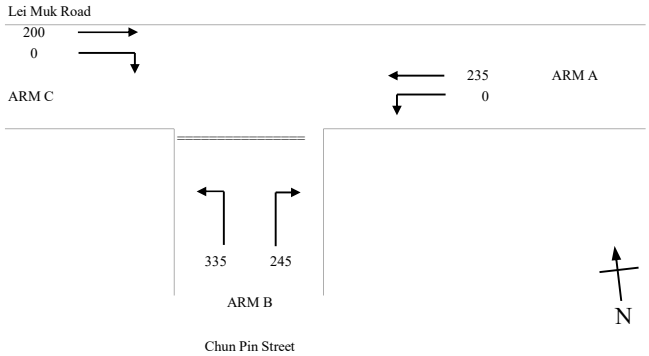
TOTAL FLOW = 965 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.3115
DFC b-c	=	0.3355
DFC c-b	=	0.0000
DFC b-ac	=	0.6470

CRITICAL DFC = 0.65

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J7 Lei Muk Road / Chun Pin Street	Year 2027 Design PM Peak	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.00	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	235	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	200	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	5.84	(metres)
W b-c	=	4.76	(metres)
Vl b-a	=	150	(metres)
Vr b-a	=	150	(metres)
Vr b-c	=	150	(metres)
q b-a	=	245	(pcu/hr)
q b-c	=	335	(pcu/hr)

GEOMETRIC FACTORS :

D	=	1.23841822
E	=	1.13435026
F	=	0.5859548
Y	=	0.793

THE CAPACITY OF MOVEMENT :

Q b-a	=	648
Q b-c	=	768
Q c-b	=	397
Q b-ac	=	712.28

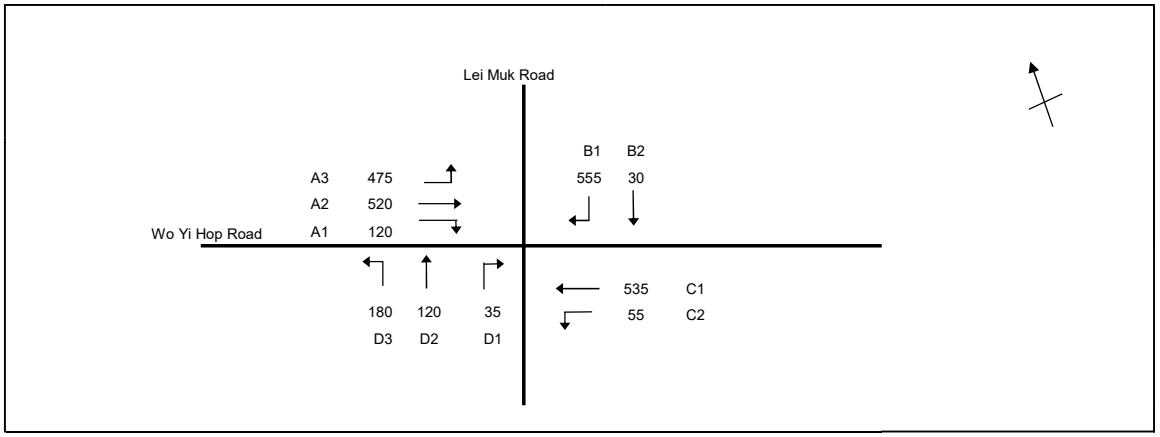
TOTAL FLOW = 1015 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

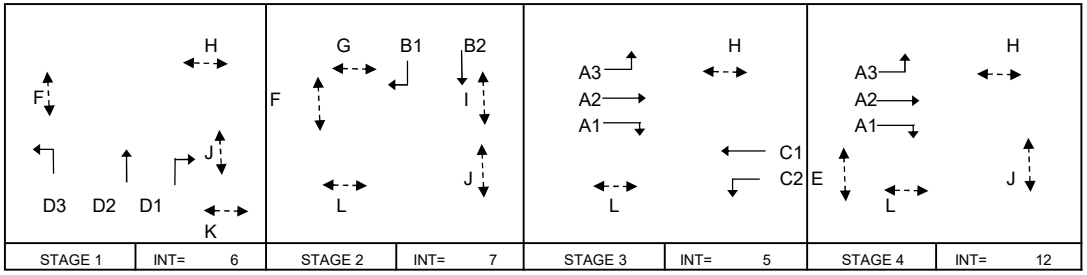
DFC b-a	=	0.3781
DFC b-c	=	0.4362
DFC c-b	=	0.0000
DFC b-ac	=	0.8143

CRITICAL DFC = 0.81

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J8
J8 Lei Muk Road / Wo Yi Hop Road	Year 2020 Existing AM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	110 sec
Sum(y)		Y =	0.545
Loss time		L =	22 sec
Total Flow		=	2625 pcu
Co	= (1.5*L+5)/(1-Y)	=	83.4 sec
Cm	= L/(1-Y)	=	48.3 sec
Yult		=	0.735
R.C.ult	= (Yult-Y)/Y*100%	=	35.0 %
Cp	= 0.9*L/(0.9-Y)	=	55.7 sec
Ymax	= 1-L/C	=	0.800
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	32 %



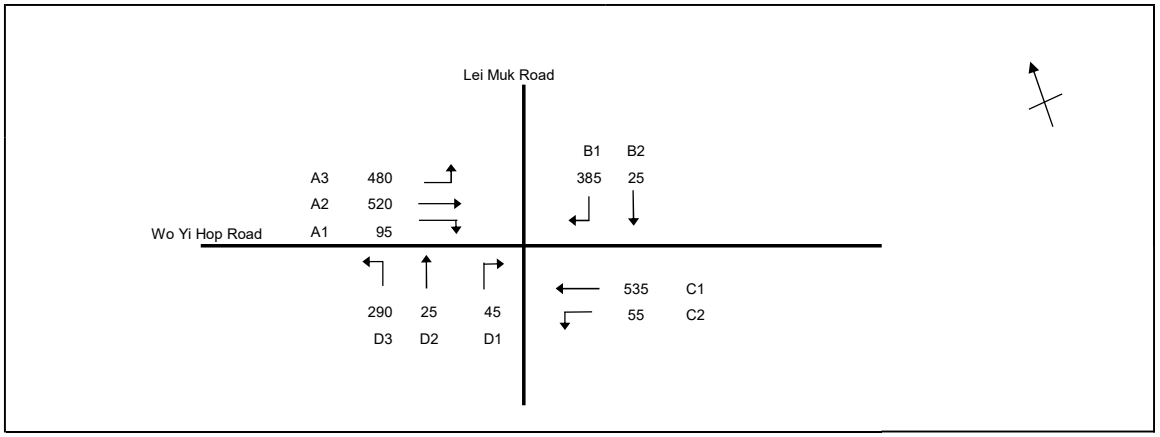
STAGE 1	INT= 6	STAGE 2	INT= 7	STAGE 3	INT= 5	STAGE 4	INT= 12

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	7	5	4	8	5	4	8	OK
F	11	6	2	12	34	2	12	OK
G	7	5	8	8	15	8	8	OK
H	9	5	3	10	65	3	10	OK
I	8	5	8	9	14	8	9	OK
J	10	6	1	11	53	1	11	OK
K	7.5	5	2	8	7	2	8	OK
L	11	6	2	12	78	2	12	OK

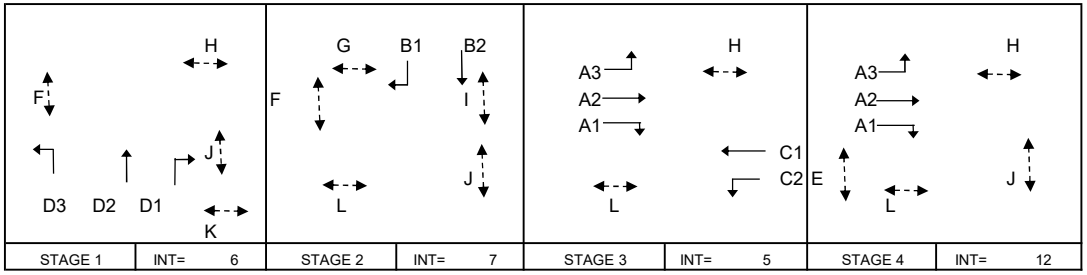
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
D1,D2	1	3.10	D	1	15			2065		120	35	155	0.23	2019			2019	0.077	0.077		12	12	0.704	25
D3	1	3.10	D	1	10			2065	115			115	1.00	1796			1796	0.064			10	12	0.589	19
D3	1	3.10	D	1	10		N	1925	65			65	1.00	1674			1004	0.064			10	12	0.589	11
B1,B2	2	3.40	B	1	15		N	1955		30	252	282	0.89	1795			1795	0.157	0.157		25	25	0.692	40
B1	2	3.60	B	1	15			2115			303	303	1.00	1923			1923	0.157			25	25	0.692	43
C1	3	2.90	C	2	20			4090		535		535	0.00	4090			4090	0.131			21	40	0.360	31
C2	3	2.70	C	1	10		N	1885	55			55	1.00	1639			1639	0.034			5	40	0.092	6
A2,A3	3,4	3.80	A	1	10		N	1995	475	73		548	0.87	1765			1765	0.310	0.310		50	50	0.683	55
A1,A2	3,4	3.60	A	1	10	Y		2115		447	120	567	0.21	1827			1827	0.310			50	50	0.683	57

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J8
J8 Lei Muk Road / Wo Yi Hop Road	Year 2020 Existing PM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	110 sec
Sum(y)		Y =	0.518
Loss time		L =	22 sec
Total Flow		=	2455 pcu
Co	= (1.5*L+5)/(1-Y)	=	78.9 sec
Cm	= L/(1-Y)	=	45.7 sec
Yult		=	0.735
R.C.ult	= (Yult-Y)/Y*100%	=	41.8 %
Cp	= 0.9*L/(0.9-Y)	=	51.9 sec
Ymax	= 1-L/C	=	0.800
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	39 %



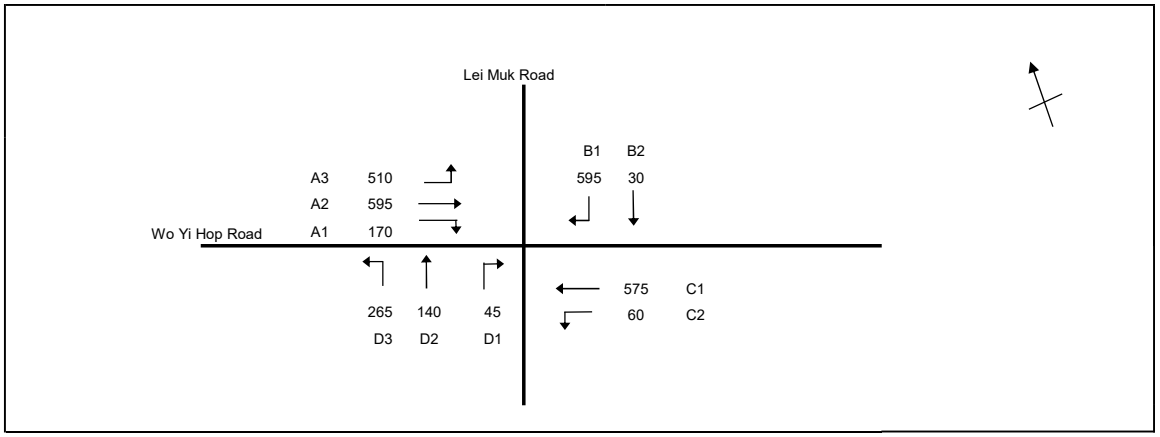
STAGE 1	INT= 6	STAGE 2	INT= 7	STAGE 3	INT= 5	STAGE 4	INT= 12

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	7	5	4	8	5	4	8	OK
F	11	6	2	12	34	2	12	OK
G	7	5	8	8	9	8	8	OK
H	9	5	3	10	73	3	10	OK
I	8	5	8	9	8	8	9	OK
J	10	6	1	11	53	1	11	OK
K	7.5	5	2	8	13	2	8	OK
L	11	6	2	12	74	2	12	OK

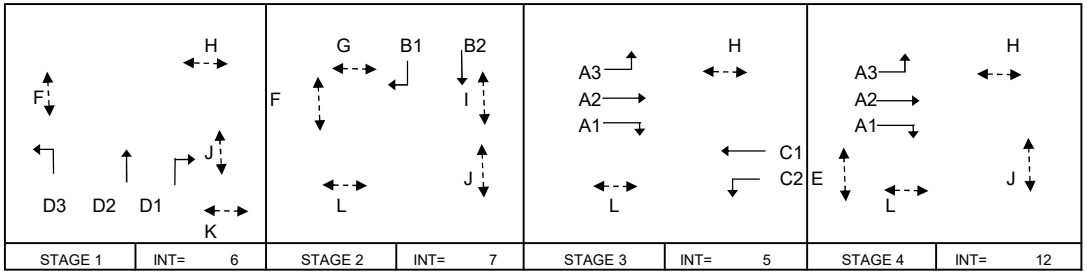
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
D1,D2	1	3.10	D	1	15			2065		25	45	70	0.64	1940			1940	0.036	0.104		6	18	0.220	11
D3	1	3.10	D	1	10			2065	186			186	1.00	1796			1796	0.104			18	18	0.633	29
D3	1	3.10	D	1	10		N	1925	104			104	1.00	1674			1004	0.104			18	18	0.633	16
B1,B2	2	3.40	B	1	15		N	1955		25	173	198	0.87	1798			1798	0.110	0.110		19	19	0.638	30
B1	2	3.60	B	1	15			2115			212	212	1.00	1923			1923	0.110			19	19	0.638	32
C1	3	2.90	C	2	20			4090		535		535	0.00	4090			4090	0.131			22	47	0.306	28
C2	3	2.70	C	1	10		N	1885	55			55	1.00	1639			1639	0.034			6	47	0.079	6
A2,A3	3,4	3.80	A	1	10		N	1995	480	55		535	0.90	1759			1759	0.304	0.304		52	52	0.644	52
A1,A2	3,4	3.60	A	1	10	Y		2115		465	95	560	0.17	1838			1838	0.304			52	52	0.644	54

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J8
J8 Lei Muk Road / Wo Yi Hop Road	Year 2027 Reference AM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	110 sec
Sum(y)		Y =	0.618
Loss time		L =	22 sec
Total Flow		=	2985 pcu
Co	= (1.5*L+5)/(1-Y)	=	99.4 sec
Cm	= L/(1-Y)	=	57.5 sec
Yult		=	0.735
R.C.ult	= (Yult-Y)/Y*100%	=	19.0 %
Cp	= 0.9*L/(0.9-Y)	=	70.1 sec
Ymax	= 1-L/C	=	0.800
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	17 %



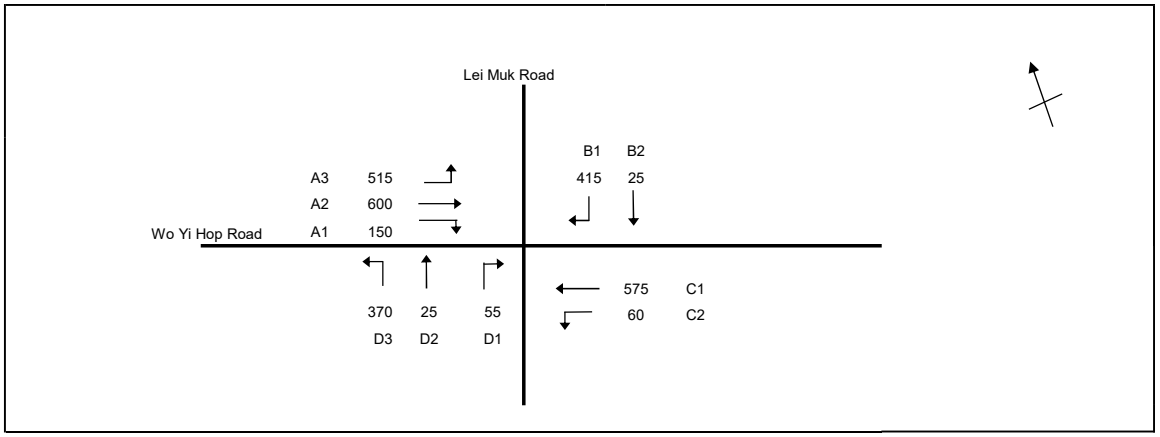
STAGE 1	INT= 6	STAGE 2	INT= 7	STAGE 3	INT= 5	STAGE 4	INT= 12

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	7	5	4	8	5	4	8	OK
F	11	6	2	12	34	2	12	OK
G	7	5	8	8	14	8	8	OK
H	9	5	3	10	67	3	10	OK
I	8	5	8	9	13	8	9	OK
J	10	6	1	11	53	1	11	OK
K	7.5	5	2	8	8	2	8	OK
L	11	6	2	12	78	2	12	OK

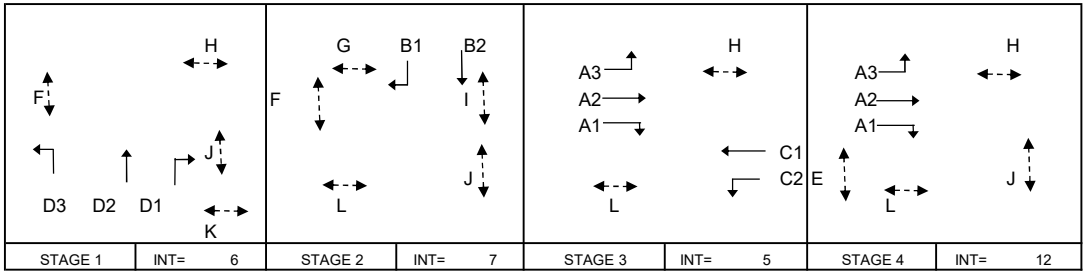
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
D1,D2	1	3.10	D	1	15			2065		140	45	185	0.24	2016			2016	0.092	0.095		13	13	0.776	30
D3	1	3.10	D	1	10			2065	170			170	1.00	1796			1796	0.095			13	13	0.801	27
D3	1	3.10	D	1	10		N	1925	95			95	1.00	1674			1004	0.095			13	13	0.801	15
B1,B2	2	3.40	B	1	15		N	1955		30	272	302	0.90	1793			1793	0.168	0.168		24	24	0.771	43
B1	2	3.60	B	1	15			2115			323	323	1.00	1923			1923	0.168			24	24	0.771	46
C1	3	2.90	C	2	20			4090		575		575	0.00	4090			4090	0.141			20	46	0.336	31
C2	3	2.70	C	1	10		N	1885	60			60	1.00	1639			1639	0.037			5	46	0.088	6
A2,A3	3,4	3.80	A	1	10		N	1995	510	122		632	0.81	1779			1779	0.355	0.355		51	51	0.765	62
A1,A2	3,4	3.60	A	1	10	Y		2115		473	170	643	0.26	1813			1813	0.355			51	51	0.765	63

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J8
J8 Lei Muk Road / Wo Yi Hop Road	Year 2027 Reference PM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	110 sec
Sum(y)		Y =	0.602
Loss time		L =	22 sec
Total Flow		=	2790 pcu
Co	= (1.5*L+5)/(1-Y)	=	95.5 sec
Cm	= L/(1-Y)	=	55.3 sec
Yult		=	0.735
R.C.ult	= (Yult-Y)/Y*100%	=	22.1 %
Cp	= 0.9*L/(0.9-Y)	=	66.4 sec
Ymax	= 1-L/C	=	0.800
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	20 %



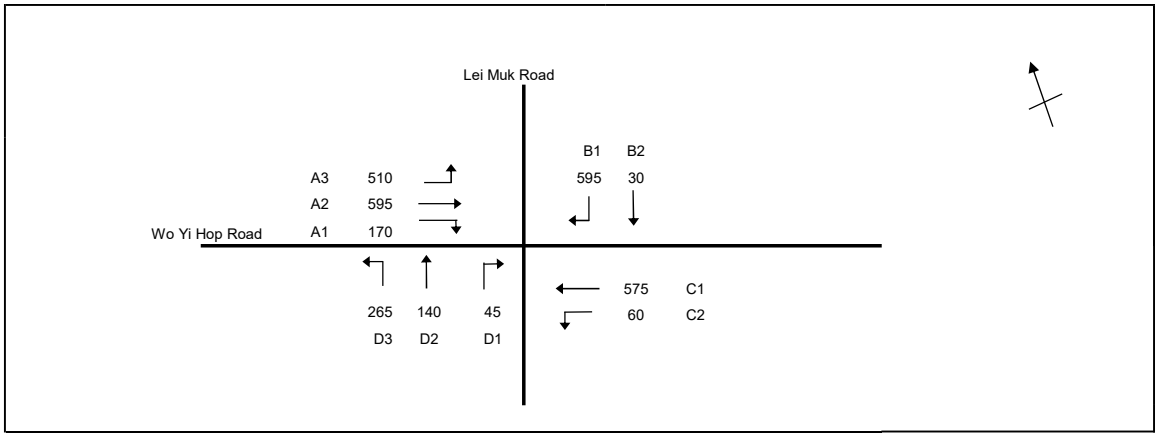
STAGE 1	INT= 6	STAGE 2	INT= 7	STAGE 3	INT= 5	STAGE 4	INT= 12

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	7	5	4	8	5	4	8	OK
F	11	6	2	12	33	2	12	OK
G	7	5	8	8	7	8	8	OK
H	9	5	3	10	73	3	10	OK
I	8	5	8	9	6	8	9	OK
J	10	6	1	11	52	1	11	OK
K	7.5	5	2	8	14	2	8	OK
L	11	6	2	12	71	2	12	OK

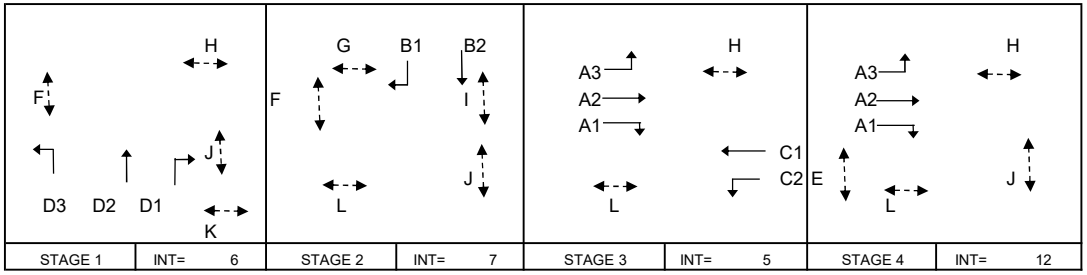
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
D1,D2	1	3.10	D	1	15			2065		25	55	80	0.69	1932			1932	0.041	0.132		6	19	0.240	12
D3	1	3.10	D	1	10			2065	237			237	1.00	1796			1796	0.132			19	19	0.765	36
D3	1	3.10	D	1	10		N	1925	133			133	1.00	1674			1004	0.132			19	19	0.765	20
B1,B2	2	3.40	B	1	15		N	1955		25	188	213	0.88	1796			1796	0.118	0.118		17	17	0.766	33
B1	2	3.60	B	1	15			2115			227	227	1.00	1923			1923	0.118			17	17	0.766	35
C1	3	2.90	C	2	20			4090		575		575	0.00	4090			4090	0.141			21	46	0.336	31
C2	3	2.70	C	1	10		N	1885	60			60	1.00	1639			1639	0.037			5	46	0.088	6
A2,A3	3,4	3.80	A	1	10		N	1995	515	109		624	0.82	1775			1775	0.352	0.352		51	51	0.759	61
A1,A2	3,4	3.60	A	1	10	Y		2115		491	150	641	0.23	1821			1821	0.352			51	51	0.759	63

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J8
J8 Lei Muk Road / Wo Yi Hop Road	Year 2027 Design AM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	110 sec
Sum(y)		Y =	0.618
Loss time		L =	22 sec
Total Flow		=	2985 pcu
Co	= (1.5*L+5)/(1-Y)	=	99.4 sec
Cm	= L/(1-Y)	=	57.5 sec
Yult		=	0.735
R.C.ult	= (Yult-Y)/Y*100%	=	19.0 %
Cp	= 0.9*L/(0.9-Y)	=	70.1 sec
Ymax	= 1-L/C	=	0.800
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	17 %



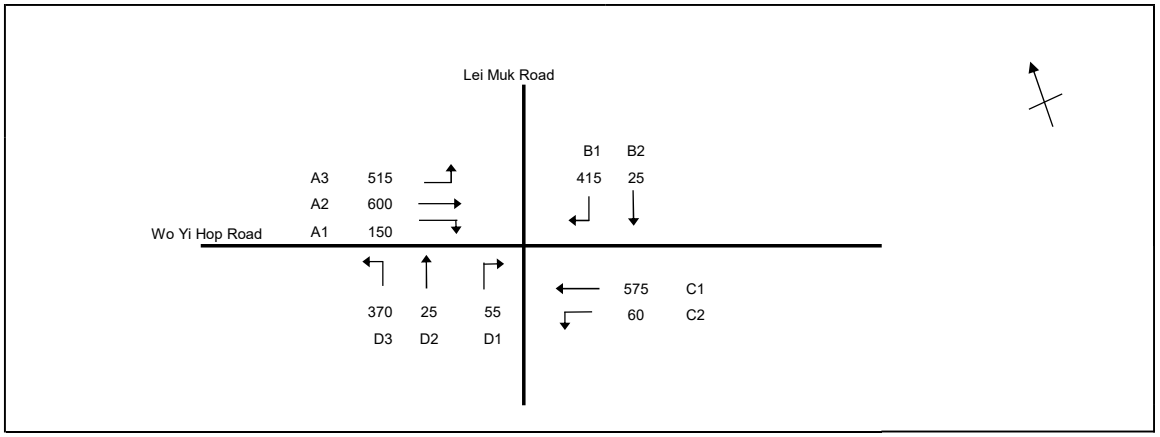
STAGE 1	INT= 6	STAGE 2	INT= 7	STAGE 3	INT= 5	STAGE 4	INT= 12

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	7	5	4	8	5	4	8	OK
F	11	6	2	12	34	2	12	OK
G	7	5	8	8	14	8	8	OK
H	9	5	3	10	67	3	10	OK
I	8	5	8	9	13	8	9	OK
J	10	6	1	11	53	1	11	OK
K	7.5	5	2	8	8	2	8	OK
L	11	6	2	12	78	2	12	OK

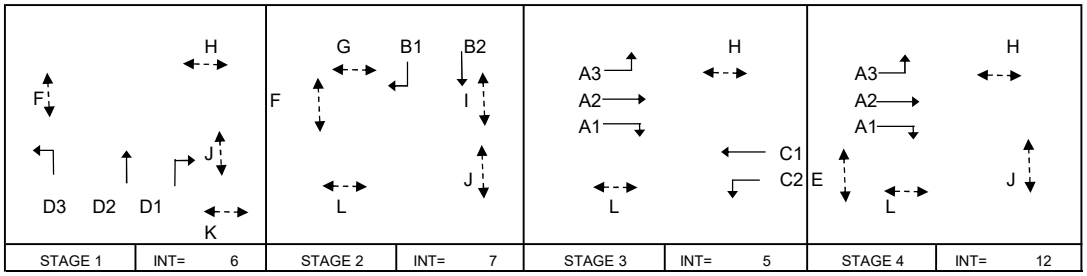
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
D1,D2	1	3.10	D	1	15			2065		140	45	185	0.24	2016			2016	0.092	0.095		13	13	0.776	30
D3	1	3.10	D	1	10			2065	170			170	1.00	1796			1796	0.095			13	13	0.801	27
D3	1	3.10	D	1	10		N	1925	95			95	1.00	1674			1004	0.095			13	13	0.801	15
B1,B2	2	3.40	B	1	15		N	1955		30	272	302	0.90	1793			1793	0.168	0.168		24	24	0.771	43
B1	2	3.60	B	1	15			2115			323	323	1.00	1923			1923	0.168			24	24	0.771	46
C1	3	2.90	C	2	20			4090		575		575	0.00	4090			4090	0.141			20	46	0.336	31
C2	3	2.70	C	1	10		N	1885	60			60	1.00	1639			1639	0.037			5	46	0.088	6
A2,A3	3,4	3.80	A	1	10		N	1995	510	122		632	0.81	1779			1779	0.355	0.355		51	51	0.765	62
A1,A2	3,4	3.60	A	1	10	Y		2115		473	170	643	0.26	1813			1813	0.355			51	51	0.765	63

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J8
J8 Lei Muk Road / Wo Yi Hop Road	Year 2027 Design PM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle	N =	4
No. of stage using for calculation	N =	3
Cycle time	C =	110 sec
Sum(y)	Y =	0.602
Loss time	L =	22 sec
Total Flow	=	2790 pcu
Co = (1.5*L+5)/(1-Y)	=	95.5 sec
Cm = L/(1-Y)	=	55.3 sec
Yult	=	0.735
R.C.ult = (Yult-Y)/Y*100%	=	22.1 %
Cp = 0.9*L/(0.9-Y)	=	66.4 sec
Ymax = 1-L/C	=	0.800
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	20 %



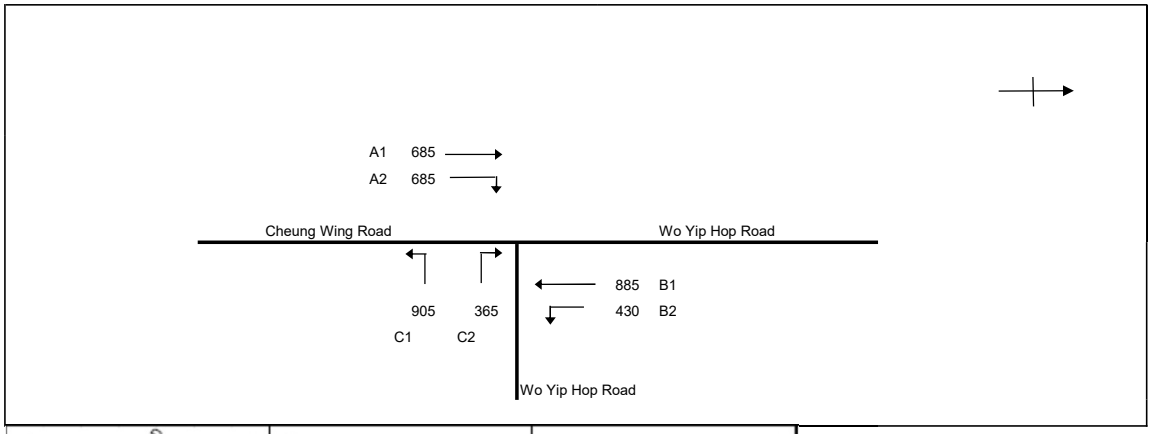
STAGE 1	INT= 6	STAGE 2	INT= 7	STAGE 3	INT= 5	STAGE 4	INT= 12

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
E	7	5	4	8	5	4	8	OK
F	11	6	2	12	33	2	12	OK
G	7	5	8	8	7	8	8	OK
H	9	5	3	10	73	3	10	OK
I	8	5	8	9	6	8	9	OK
J	10	6	1	11	52	1	11	OK
K	7.5	5	2	8	14	2	8	OK
L	11	6	2	12	71	2	12	OK

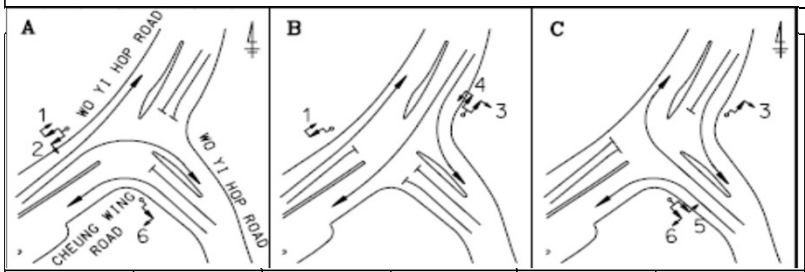
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
D1,D2	1	3.10	D	1	15			2065		25	55	80	0.69	1932			1932	0.041	0.132		6	19	0.240	12
D3	1	3.10	D	1	10			2065	237			237	1.00	1796			1796	0.132			19	19	0.764	36
D3	1	3.10	D	1	10		N	1925	133			133	1.00	1674			1004	0.132			19	19	0.767	20
B1,B2	2	3.40	B	1	15		N	1955		25	188	213	0.88	1796			1796	0.119	0.119		17	17	0.767	33
B1	2	3.60	B	1	15			2115			227	227	1.00	1923			1923	0.118			17	17	0.764	35
C1	3	2.90	C	2	20			4090		575		575	0.00	4090			4090	0.141			21	46	0.336	31
C2	3	2.70	C	1	10		N	1885	60			60	1.00	1639			1639	0.037			5	46	0.088	6
A2,A3	3,4	3.80	A	1	10		N	1995	515	109		624	0.83	1775			1775	0.352	0.352		51	51	0.758	61
A1,A2	3,4	3.60	A	1	10	Y		2115		491	150	641	0.23	1821			1821	0.352			51	51	0.759	63

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J9
J9 Wo Yi Hop Road / Cheung Wing Road	Year 2020 Existing AM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	112 sec
Sum(y)		Y =	0.551
Loss time		L =	15 sec
Total Flow		=	3270 pcu
Co	= (1.5*L+5)/(1-Y)	=	61.2 sec
Cm	= L/(1-Y)	=	33.4 sec
Yult		=	0.788
R.C.ult	= (Yult-Y)/Y*100%	=	43.1 %
Cp	= 0.9*L/(0.9-Y)	=	38.6 sec
Ymax	= 1-L/C	=	0.866
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	42 % (Optimized)



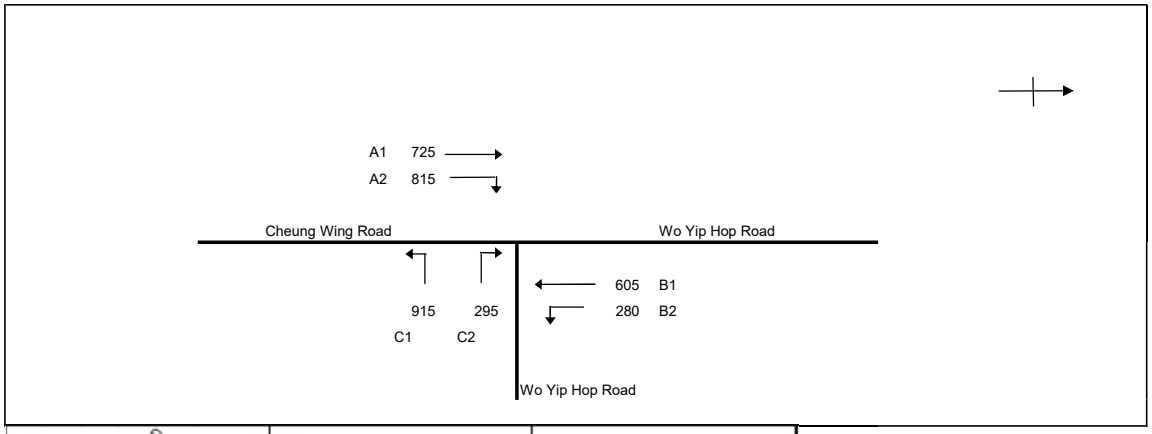
STAGE 1	INT= 9	STAGE 2	INT= 8	STAGE 3	INT= 6	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

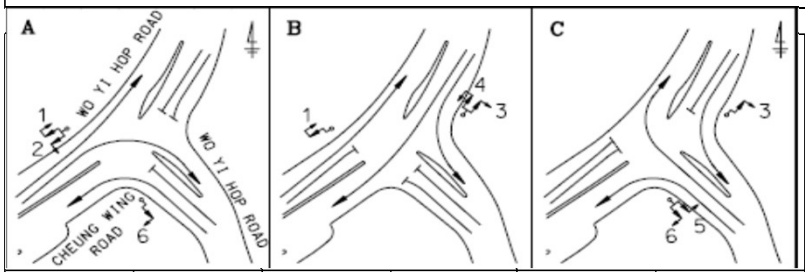
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				15				
A1	1,2	3.10	A1	2			N	3990		685		685	0.00	3990			2993	0.229			40	75	0.342	0
A2	1	3.10	A2	2	30			4130			685	685	1.00	3933			3933	0.174			31	31	0.636	46
B1	2	3.40	B1	3			N	6145		885		885	0.00	6145			4302	0.206	0.206		36	36	0.636	37
B2	2,3	3.40	B2	1	15			2095	430			430	1.00	1905			1905	0.226			40	65	0.389	34
C1	1,3	3.10	C1	1	15		N	1925	905			905	1.00	1750		875	2625	0.345	0.345		61	102	0.380	15
C2	3	3.10	C2	1	30			2065			365	365	1.00	1967		983	2950	0.124			22	22	0.636	0

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J9
J9 Wo Yi Hop Road / Cheung Wing Road	Year 2020 Existing PM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	112 sec
Sum(y)		Y =	0.489
Loss time		L =	15 sec
Total Flow		=	2910 pcu
Co	= (1.5*L+5)/(1-Y)	=	53.8 sec
Cm	= L/(1-Y)	=	29.4 sec
Yult		=	0.788
R.C.ult	= (Yult-Y)/Y*100%	=	61.0 %
Cp	= 0.9*L/(0.9-Y)	=	32.9 sec
Ymax	= 1-L/C	=	0.866
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	59 % (Optimized)



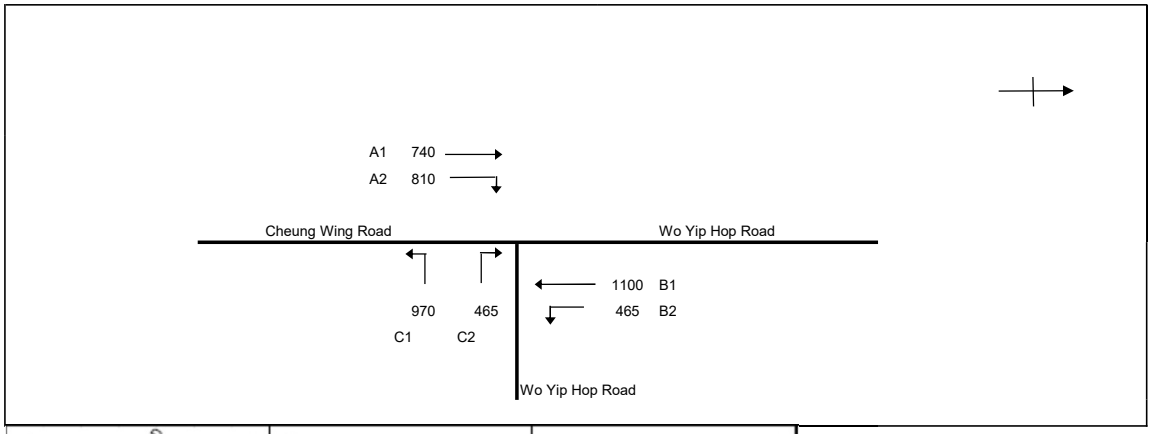
STAGE 1	INT= 9	STAGE 2	INT= 8	STAGE 3	INT= 6	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

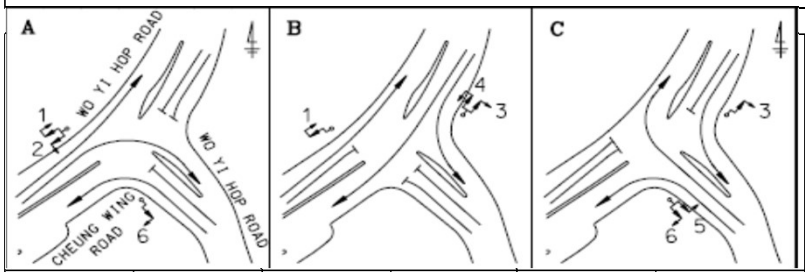
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				15				
A1	1,2	3.10	A1	2			N	3990		725		725	0.00	3990			2993	0.242			48	77	0.353	0
A2	1	3.10	A2	2	30			4130			815	815	1.00	3933			3933	0.207			41	41	0.565	48
B1	2	3.40	B1	3			N	6145		605		605	0.00	6145			4302	0.141	0.141		28	28	0.565	28
B2	2,3	3.40	B2	1	15			2095	280			280	1.00	1905			1905	0.147			29	55	0.301	27
C1	1,3	3.10	C1	1	15		N	1925	915			915	1.00	1750		875	2625	0.349	0.349		69	102	0.384	16
C2	3	3.10	C2	1	30			2065			295	295	1.00	1967		983	2950	0.100			20	20	0.565	0

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J9
J9 Wo Yi Hop Road / Cheung Wing Road	Year 2027 Reference AM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	112 sec
Sum(y)		Y =	0.625
Loss time		L =	15 sec
Total Flow		=	3810 pcu
Co	= (1.5*L+5)/(1-Y)	=	73.4 sec
Cm	= L/(1-Y)	=	40.0 sec
Yult		=	0.788
R.C.ult	= (Yult-Y)/Y*100%	=	25.9 %
Cp	= 0.9*L/(0.9-Y)	=	49.1 sec
Ymax	= 1-L/C	=	0.866
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	25 % (Optimized)



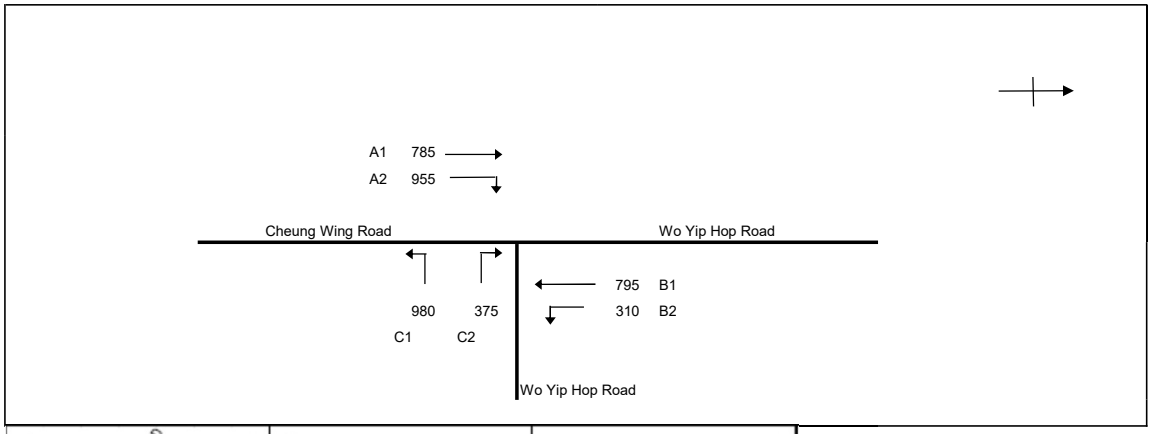
STAGE 1	INT= 9	STAGE 2	INT= 8	STAGE 3	INT= 6	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

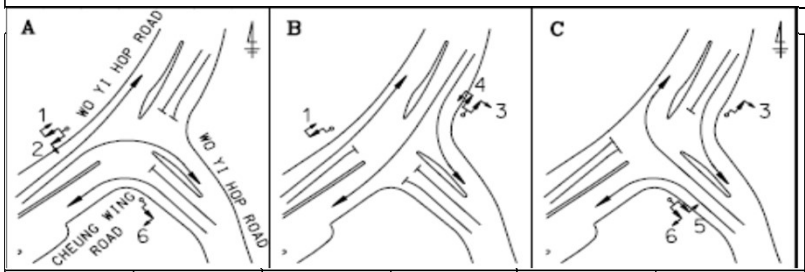
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				15				
A1	1,2	3.10	A1	2			N	3990		740		740	0.00	3990			2993	0.247			38	80	0.348	0
A2	1	3.10	A2	2	30			4130			810	810	1.00	3933			3933	0.206			32	32	0.722	54
B1	2	3.40	B1	3			N	6145		1100		1100	0.00	6145			4302	0.256	0.256		40	40	0.722	44
B2	2,3	3.40	B2	1	15			2095	465			465	1.00	1905			1905	0.244			38	71	0.384	32
C1	1,3	3.10	C1	1	15		N	1925	970			970	1.00	1750		875	2625	0.370	0.370		57	109	0.379	5
C2	3	3.10	C2	1	30			2065			465	465	1.00	1967		983	2950	0.158			24	24	0.722	0

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J9
J9 Wo Yi Hop Road / Cheung Wing Road	Year 2027 Reference PM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	112 sec
Sum(y)		Y =	0.558
Loss time		L =	15 sec
Total Flow		=	3415 pcu
Co	= (1.5*L+5)/(1-Y)	=	62.2 sec
Cm	= L/(1-Y)	=	33.9 sec
Yult		=	0.788
R.C.ult	= (Yult-Y)/Y*100%	=	41.1 %
Cp	= 0.9*L/(0.9-Y)	=	39.5 sec
Ymax	= 1-L/C	=	0.866
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	40 % (Optimized)



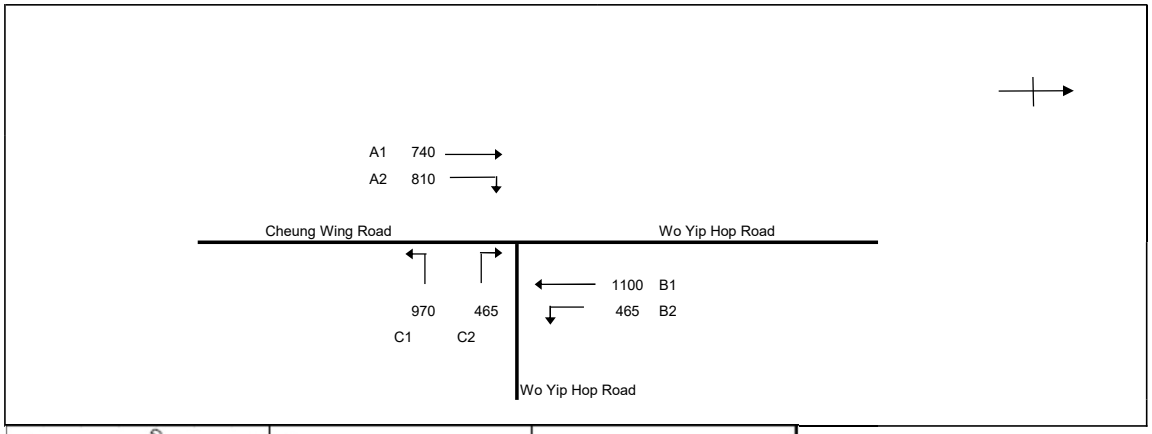
STAGE 1	INT= 9	STAGE 2	INT= 8	STAGE 3	INT= 6	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

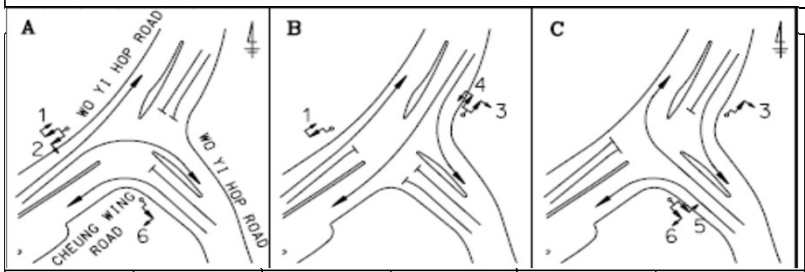
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				15				
A1	1,2	3.10	A1	2			N	3990		785		785	0.00	3990			2993	0.262			46	82	0.357	0
A2	1	3.10	A2	2	30			4130			955	955	1.00	3933			3933	0.243			42	42	0.644	56
B1	2	3.40	B1	3			N	6145		795		795	0.00	6145			4302	0.185	0.185		32	32	0.644	35
B2	2,3	3.40	B2	1	15			2095	310			310	1.00	1905			1905	0.163			28	61	0.298	26
C1	1,3	3.10	C1	1	15		N	1925	980			980	1.00	1750		875	2625	0.373	0.373		65	109	0.382	4
C2	3	3.10	C2	1	30			2065			375	375	1.00	1967		983	2950	0.127			22	22	0.644	0

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J9
J9 Wo Yi Hop Road / Cheung Wing Road	Year 2027 Design AM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	3
Cycle time		C =	112 sec
Sum(y)		Y =	0.625
Loss time		L =	15 sec
Total Flow		=	3810 pcu
Co	= (1.5*L+5)/(1-Y)	=	73.4 sec
Cm	= L/(1-Y)	=	40.0 sec
Yult		=	0.788
R.C.ult	= (Yult-Y)/Y*100%	=	25.9 %
Cp	= 0.9*L/(0.9-Y)	=	49.1 sec
Ymax	= 1-L/C	=	0.866
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	25 % (Optimized)



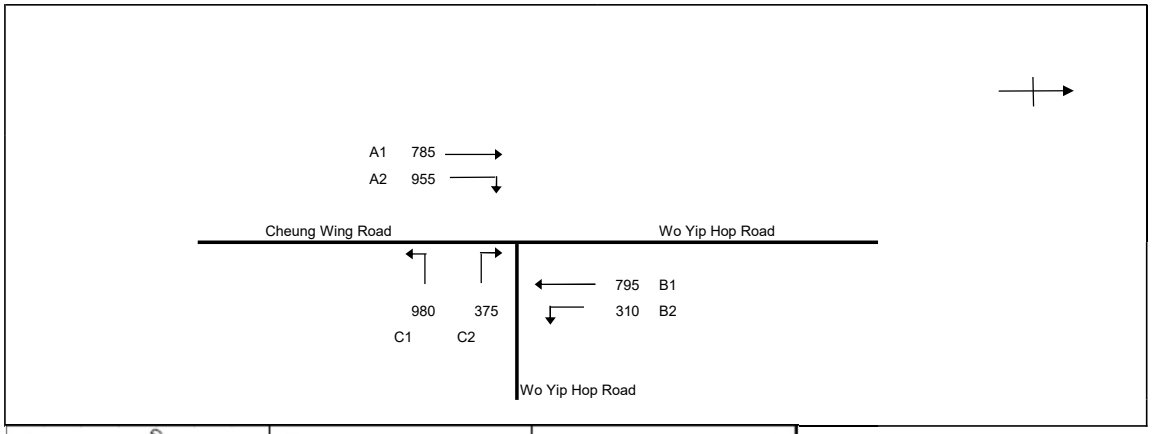
STAGE 1	INT= 9	STAGE 2	INT= 8	STAGE 3	INT= 6	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

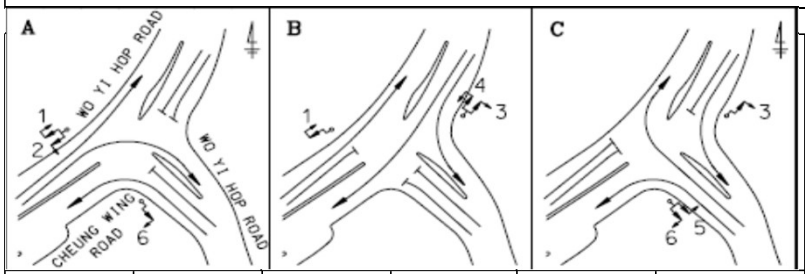
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				15				
A1	1,2	3.10	A1	2			N	3990		740		740	0.00	3990			2993	0.247			38	80	0.348	0
A2	1	3.10	A2	2	30			4130			810	810	1.00	3933			3933	0.206			32	32	0.722	54
B1	2	3.40	B1	3			N	6145		1100		1100	0.00	6145			4302	0.256	0.256		40	40	0.722	44
B2	2,3	3.40	B2	1	15			2095	465			465	1.00	1905			1905	0.244			38	71	0.384	32
C1	1,3	3.10	C1	1	15		N	1925	970			970	1.00	1750		875	2625	0.370	0.370		57	109	0.379	5
C2	3	3.10	C2	1	30			2065			465	465	1.00	1967		983	2950	0.158			24	24	0.722	0

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J9
J9 Wo Yi Hop Road / Cheung Wing Road	Year 2027 Design PM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle	N =	3
No. of stage using for calculation	N =	3
Cycle time	C =	112 sec
Sum(y)	Y =	0.558
Loss time	L =	15 sec
Total Flow	=	3415 pcu
Co = (1.5*L+5)/(1-Y)	=	62.2 sec
Cm = L/(1-Y)	=	33.9 sec
Yult	=	0.788
R.C.ult = (Yult-Y)/Y*100%	=	41.1 %
Cp = 0.9*L/(0.9-Y)	=	39.5 sec
Ymax = 1-L/C	=	0.866
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	40 % (Optimized)



STAGE 1	INT= 9	STAGE 2	INT= 8	STAGE 3	INT= 6	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

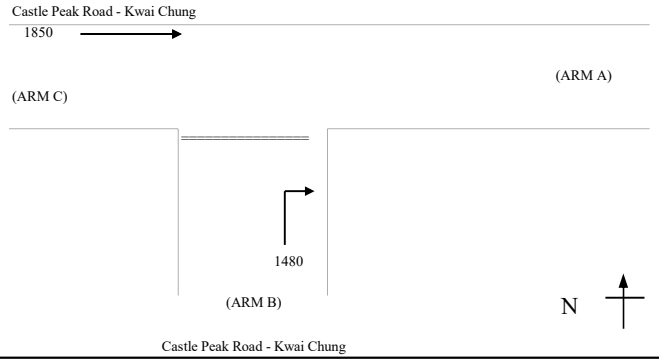
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				15				
A1	1,2	3.10	A1	2			N	3990		785		785	0.00	3990			2993	0.262			46	82	0.357	0
A2	1	3.10	A2	2	30			4130			955	955	1.00	3933			3933	0.243			42	42	0.644	56
B1	2	3.40	B1	3			N	6145		795		795	0.00	6145			4302	0.185	0.185		32	32	0.644	35
B2	2,3	3.40	B2	1	15			2095	310			310	1.00	1905			1905	0.163			28	61	0.298	26
C1	1,3	3.10	C1	1	15		N	1925	980			980	1.00	1750		875	2625	0.373	0.373		65	109	0.382	4
C2	3	3.10	C2	1	30			2065			375	375	1.00	1967		983	2950	0.127			22	22	0.644	0

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

Appendix B

Junction Calculation Sheets for Proposed Junction Improvement

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J1 Castle Peak Road at Kwai Cung Road Roundabout	Year 2027 Design AM Peak (Improvement)	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	29.60	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	0	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	1850	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	18.22	(metres)
W b-c	=		(metres)
Vl b-a	=	250	(metres)
Vr b-a	=	250	(metres)
Vr b-c	=	250	(metres)
q b-a	=	1480	(pcu/hr)
q b-c	=	0	(pcu/hr)

GEOMETRIC FACTORS :

D	=	2.80563011
E	=	0.7337573
F	=	0.5859548
Y	=	-0.0212

THE CAPACITY OF MOVEMENT :

Q b-a	=	1784
Q b-c	=	547
Q c-b	=	437
Q b-ac	=	1784

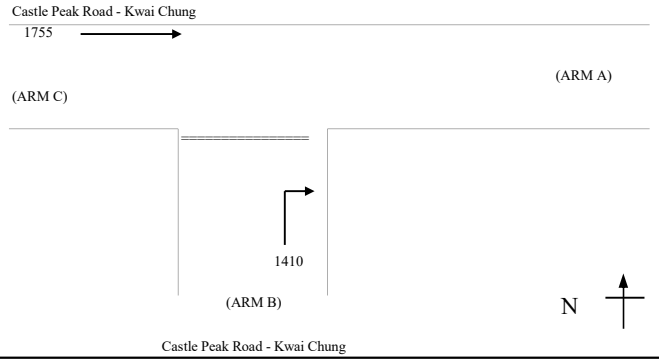
TOTAL FLOW = 3330 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.8296
DFC b-c	=	0.0000
DFC c-b	=	0.0000
DFC b-ac	=	0.8296

CRITICAL DFC = 0.83

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		PROJECT NO: 276306-24	DESIGNED BY:
J1 Castle Peak Road at Kwai Cung Road Roundabout	Year 2027 Design PM Peak (Improvement)	DATE : 14-04-21	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH (6-20m) (minor road turn left only, 2W)
W cr	=	CENTRAL RESERVE WIDTH (0m, 1.2-9m)
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a (0m, 2.2-5m)
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c (2.2-5m)
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b (0m, 2.2-5m)
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a (0-250m)
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a (0-250)
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c (0-250)
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b (0-250)
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	29.60	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	0	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	1755	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	18.22	(metres)
W b-c	=		(metres)
Vl b-a	=	250	(metres)
Vr b-a	=	250	(metres)
Vr b-c	=	250	(metres)
q b-a	=	1410	(pcu/hr)
q b-c	=	0	(pcu/hr)

GEOMETRIC FACTORS :

D	=	2.80563011
E	=	0.7337573
F	=	0.5859548
Y	=	-0.0212

THE CAPACITY OF MOVEMENT :

Q b-a	=	1783
Q b-c	=	547
Q c-b	=	437
Q b-ac	=	1783

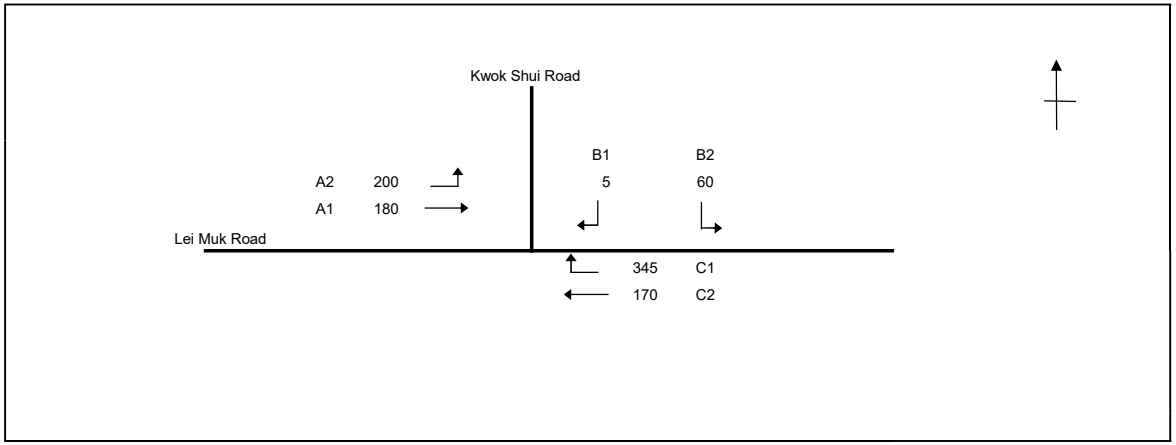
TOTAL FLOW = 3165 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

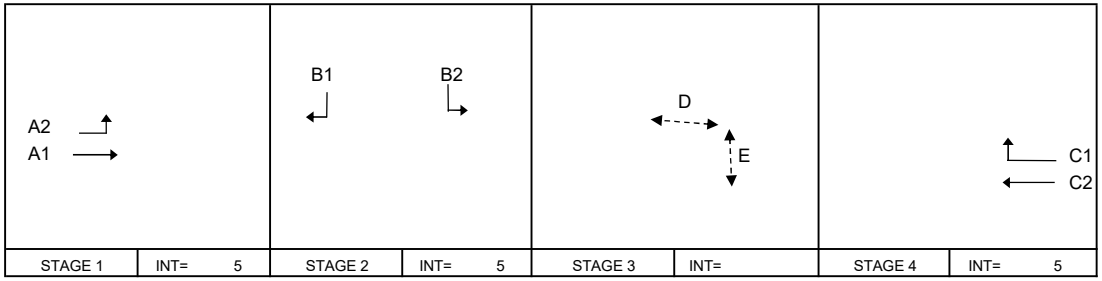
DFC b-a	=	0.7908
DFC b-c	=	0.0000
DFC c-b	=	0.0000
DFC b-ac	=	0.7908

CRITICAL DFC = 0.79

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J6
J6- Kwok Shui Road / Lei Muk Road	Year 2027 Design AM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.504
Loss time		L =	31 sec
Total Flow		=	960 pcu
Co	= (1.5*L+5)/(1-Y)	=	103.9 sec
Cm	= L/(1-Y)	=	62.5 sec
Yult		=	0.668
R.C.ult	= (Yult-Y)/Y*100%	=	32.4 %
Cp	= 0.9*L/(0.9-Y)	=	70.5 sec
Ymax	= 1-L/C	=	0.656
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	17 %



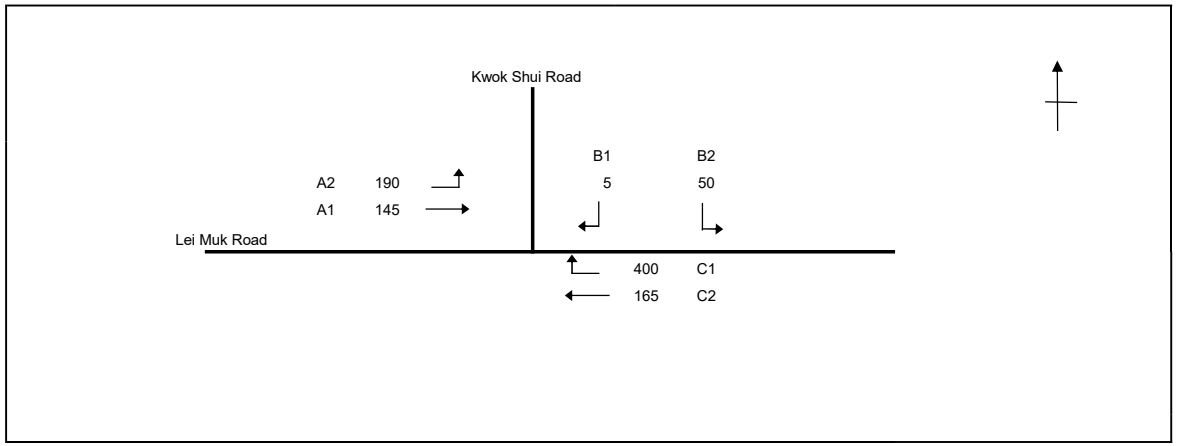
STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT=	STAGE 4	INT= 5

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
D	10.3	5	1	9	7	1	9	OK
E	7.5	6	6	5	6	6	5	OK

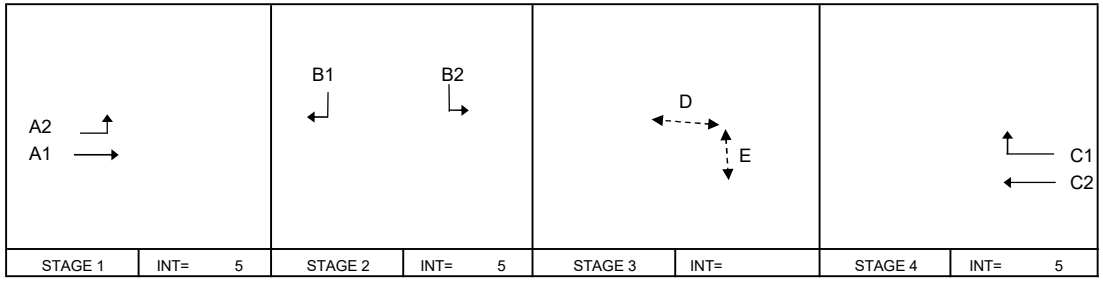
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
A1,A2	1	3.60	A	1	15			2115	200	180		380	0.53	2009			2009	0.189	0.189		22	22	0.774	43
B1,B2	2	4.00	B	1	10		N	2015	60		5	65	1.00	1752			1752	0.037	0.037	2	4	6	0.556	9
C1,C2	4	3.30	C	1	20		N	1945		170	345	515	0.67	1852			1852	0.278	0.278		33	33	0.758	49
ped																				17				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS		TRAFFIC SIGNAL CALCULATION		
			PROJECT NO: 276306-24	Junction No. J6
J6- Kwok Shui Road / Lei Muk Road		Year 2027 Design PM Peak	DATE : 14-Apr-21	FILENAME :



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	90 sec
Sum(y)		Y =	0.505
Loss time		L =	31 sec
Total Flow		=	955 pcu
Co	= (1.5*L+5)/(1-Y)	=	104.0 sec
Cm	= L/(1-Y)	=	62.6 sec
Yult		=	0.668
R.C.ult	= (Yult-Y)/Y*100%	=	32.3 %
Cp	= 0.9*L/(0.9-Y)	=	70.6 sec
Ymax	= 1-L/C	=	0.656
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	17 %



STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT=	STAGE 4	INT= 5

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
D	10.3	5	1	9	7	1	9	OK
E	7.5	6	6	5	6	6	5	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Flow Left pcu/h	Flow Straight pcu/h	Flow Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
A1,A2	1	3.60	A	1	15			2115	190	145		335	0.57	2001			2001	0.167	0.167		20	20	0.753	39
B1,B2	2	4.00	B	1	10		N	2015	50		5	55	1.00	1752			1752	0.031	0.031	2	4	6	0.471	8
C1,C2	4	3.30	C	1	20		N	1945		165	400	565	0.71	1847			1847	0.306	0.306		36	36	0.765	51
ped																				17				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

Your ref TPB/A/KC/473
Our ref 276306/01/WSTY/MYNL/04364

ARUP

Level 5, Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong
t +852 2528 3031
f +852 2779 8428
d +852 2268 3721
theresa.yeung@arup.com
www.arup.com

By Email (tpbpd@pland.gov.hk) and By Hand

The Secretary
Town Planning Board
15/F, North Point Government Offices
333 Java Road, North Point
Hong Kong

26 May 2021

Dear Sir/Madam,

S16 Planning Application for
Proposed Minor Relaxation of Plot Ratio Restriction
for Permitted Information Technology and Telecommunications Industries (Proposed Data Centre Development) at "Other Specified Uses" annotated "Business" Zone
at Nos. 2-10 Tai Yuen Street, Kwai Chung
(Planning Application No. A/KC/473)

Technical Clarifications

We refer to the Government departmental comments and public comments received on the captioned Planning Application.

We are pleased to submit our responses in the form of a Response-to-Comments Table (**Attachment A**) and relevant supplementary information (**Attachment B-D**) for your consideration.

As requested by District Planning Office, Planning Department, we are pleased to provide, in **Attachment E**, the proposed plant species that could be incorporated at the Proposed Development, subject to detailed design in future design stage. The Applicant is also willing to explore the feasibility of using recycled water for the vertical greening irrigation system at the Proposed Development in detailed design stage.

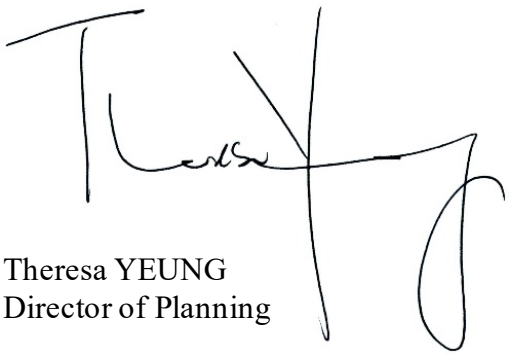
Due to the operational requirements for data centre development, we would like to take this opportunity to clarify that the proposed glass canopy is proposed over the main entrance protruding around 1.5m from the building façade. According to PNAP APP-19, no site coverage and GFA will be counted for canopies projecting not more than 2m over entrance to a building. Please be clarified that there are 4 key operational considerations: (1) Clear opening for Ring Main Unit (RMU) A & B shall be kept along Kwok Shui Road to meet CLP's operational requirement; (2) Louvers area facing Tai Yuen Street shall remain uncovered for fuel pump room and CLP's major plant rooms on G/F; (3) All parts of underground fuel tanks shall remain uncovered to fulfil statutory requirement; and (4) Openings for firefighting and rescue stairway (F.R.S.) at G/F facing Tai Yuen Street shall remain uncovered to fulfil requirement to provide natural ventilation for the said F.R.S.

This submission only serves as technical clarifications without changing the scheme or the technical assessments, and thus should be exempted from recounting requirement.

We sincerely seek for the favourable consideration from the Town Planning Board to approve the captioned S16 Planning Application.

Should you have any queries, please contact the undersigned or our Ms. Natalie LEUNG at 2268 3612 at 2908 4011.

Yours faithfully



Theresa YEUNG
Director of Planning

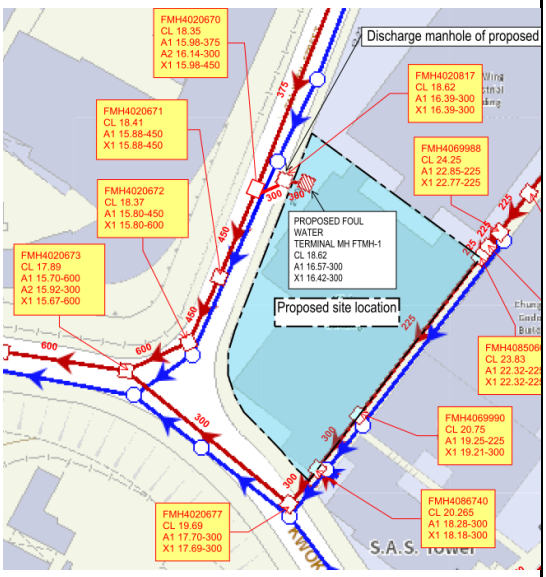
Encl. - Attachments A-E
cc - Mr Stephen Chan (STP/Kwai Tsing, PlanD) (email: scychan@pland.gov.hk)
- Mr Robert Tsang (TP/Kwai Tsing, PlanD) (email: rhctsang@pland.gov.hk)

Ove Arup & Partners Hong Kong Ltd | Registered in England & Wales
Registered Number: 1359968 | Registered Address: 13 Fitzroy Street London W1T 4B

Page No.

COMMENTS FROM RELATED DEPARTMENTS 2
1. Environmental Protection Department, dated 3 May 2021 2
2. Highways Department, dated 3 May 2021 3
3. Transport Department, dated 25 May 2021 4
PUBLIC COMMENTS 6
1. Noise 6
2. 立法會議員, 陳恒鑌, dated 11 May 2021 8
3. Kenneth To & Associates Ltd, dated 18 May 2021 9

COMMENTS FROM RELATED DEPARTMENTS

No.	Comments	Responses
1.	**Environmental Protection Department, dated 3 May 2021** Please be advised that the Applicant is required to address our further comments on the SIA as given below before we could form a view on the subject case: • Please clarify if any terminal manhole will be constructed and which public manhole (FMH4020670 or FMH4020817?) will it be connected to. In addition, hydraulic assessment for sewer between the terminal manhole and public sewer should be conducted.	FMH4020817 will be connected for the sewage discharge for the Proposed Development and a proposed terminal manhole FTMH-1 will be constructed as shown below (see **Appendix A2** in **Attachment B**).  Hydraulic assessment for the proposed sewer between the proposed terminal manhole and the existing public manhole has been provided in **Appendix B2** in **Attachment B**. The calculation is highlighted as below. Proposed Development Manhole UP_MAN No. / DN_MAN No. / FROM SITE / CON_POP / PEAKING FACTOR / ACC_AD (L/s) Catchment A & Proposed Development FMH4020669 / FMH4020669 / Tai Yuen Street Public Toilet / 38 / 8 / 0.56 FMH4020669 / FMH4020670 / Tai Yuen Street Public Toilet + Shui Wing Industrial Building / 3,348 / 6 / 10.46 FMH4020670 / FMH4020671 / Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Proposed Development / 3,923 / 6 / 12.26 FMH4020671 / FMH4020672 / Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Proposed Development / 3,923 / 6 / 12.26 FMH4020672 / FMH4020673 / Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Proposed Development / 3,923 / 6 / 12.26 FTMH-1 / FMH4020817 / Proposed Development / 575 / 6 / 1.80 FMH4020817 / FMH4020670 / Proposed Development / 575 / 6 / 1.80 Catchment A, Catchment B, Catchment C & Catchment D + Proposed Development FMH4020673 / FMH4020674 / Catchment A + Catchment B + Catchment C + Catchment D + Proposed Development / 11,703 / 4 / 36.57 FMH4020674 / FMH4020675 / Catchment A + Catchment B + Catchment C + Catchment D + Proposed Development / 11,703 / 4 / 36.57 FMH4020674 / FMH4020675 / Catchment A + Catchment B + Catchment C + Catchment D + Proposed Development / 11,703 / 4 / 36.57 Existing / Proposed Pipe Parameter DIA (D) (mm) / LEN (m) / UP_GL (mPD) / DN_GL (mPD) / UP_INV (mPD) / DN_INV (mPD) / Gradient (S) / VEL (m/s) / CAP (L/s) / F/C (%) / Adequate Capacity? 300 / 42.0 / 18.11 / 18.36 / 16.65 / 16.34 / 135 / 1.35 / 95.18 / 8.1% / YES 375 / 45.1 / 18.36 / 18.35 / 16.33 / 15.98 / 129 / 1.59 / 175.84 / 35.7% / YES 450 / 18.0 / 18.35 / 18.41 / 15.98 / 15.88 / 180 / 1.51 / 239.97 / 30.7% / YES 450 / 12.5 / 18.41 / 18.37 / 15.88 / 15.80 / 156 / 1.62 / 257.97 / 28.5% / YES 600 / 12.4 / 18.37 / 17.89 / 15.80 / 15.70 / 124 / 1.77 / 499.01 / 14.7% / YES 300 / 4.8 / 18.62 / 18.62 / 16.42 / 16.39 / 150 / 1.28 / 90.41 / 11.9% / YES 300 / 6.1 / 18.62 / 18.35 / 16.39 / 16.14 / 24 / 3.20 / 226.42 / 4.8% / YES 600 / 24.2 / 17.89 / 16.96 / 15.67 / 14.76 / 27 / 3.81 / 1078.10 / 13.6% / YES 375 / 22.7 / 16.96 / 15.20 / 14.61 / 12.90 / 13 / 4.99 / 551.27 / 6.5% / YES 600 / 22.7 / 16.96 / 15.20 / 14.61 / 12.90 / 13 / 4.80 / 1694.92 / 6.5% / YES

No.	Comments	Responses
2.	**Highways Department, dated 3 May 2021** • The Applicant's R-to-C is noted but our comments dated 8.3.2021 are still valid. Please request the Applicant to provide the requested information for review and comment.	Please be clarified that two locations of works involving road inventories have been proposed under this planning application as shown in previous submissions, and summarised below. 1) <u>Footpath along Site Frontage at Tai Yuen Street</u> • A new run-in/out has been proposed and the original run-in/out of the existing building will be suspended and reinstated to footpath. • Bollards have been proposed along the footpath at the site frontage to deter the potential illegal parking on footpath. • Modification of other street furniture except the above is not involved in the proposed works. 2) <u>Proposed Junction Improvement at Castle Peak Road – Kwai Chung Interchange</u> • Modification of existing road kerb and road markings. • Relocation of existing traffic signs, light pole and railing according to the proposed re-arrangement of traffic lanes. • Reconstruction of footpath and modification of other street furniture except the above is not involved in the proposed junction improvement. Please be advised that all proposed works are designed and will be constructed in accordance with HyD's standard. Enlarged plans showing the proposed works at the abovementioned two locations are attached in **Attachment C** for information. In response to local concern on electricity issue, the Applicant will continue to maintain close liaison with CLP to facilitate the Proposed Data Centre development while avoid adverse impact to the local community.

No.	Comments	Responses
3.	**Transport Department, dated 25 May 2021** I refer to the S.16 application No. A/KC/473 and Further Information 4, and attach the comments from the Commissioner for Transport. He has the following comments on the revised TIA: 2. Para 4.5 – Junction capacity assessment refers. Please provide queue length assessment for the proposed improvement scheme for junction J1 to substantiate that the tailback will not affect the upstream junction. Furthermore, please explore other improvement options (eg. Signalized) for junction J1.	Queue analysis has been carried out based on definitions in the Highway Capacity Manual (HCM,2000) Chapter 17 - Unsignalised Intersections. Theoretical studies and empirical observations have demonstrated that the probability distribution of queue lengths for any minor movement at an unsignalized intersection is a function of the capacity of the movement and the volume of traffic being served during the analysis period. $$Q_{95} \approx 900T\left[\frac{v_x}{c_{m,x}} - 1 + \sqrt{\left(\frac{v_x}{c_{m,x}} - 1\right)^2 + \frac{\left(\frac{3600}{c_{m,x}}\right)\left(\frac{v_x}{c_{m,x}}\right)}{150T}}\right]\left(\frac{c_{m,x}}{3600}\right)$$ is used to calculate the 95th percentile queue. Where AM Peak / PM Peak v_x = flow rate for movement x (veh/h): 1480 / 1410 c_{mx} = capacity of movement x (veh/h): 1784 / 1783 T = analysis time period (h): T=0.25 for 15-min period Q_{95} = the 95th percentile queue (veh): 12 / 10 Please be advised that the 15 min interval Q_{95} is 12 and 10 vehicles in the AM and PM peak hour. The junction have adequate capacity to cater for the traffic queue, and upstream junctions will not be affected.

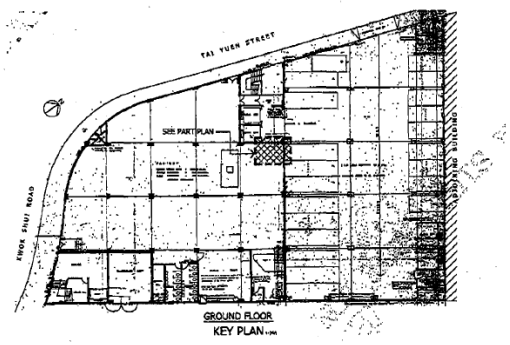
No.	Comments	Responses
		Furthermore, signalized junction arrangement has been explored. The proposed layout and junction calculation sheets are attached in **Attachment D** for reference. The traffic loading due to the proposed increase in PR of the proposed development is considered minimal due to insignificant change in junction performance in the reference and design scenario. The proposed improvement should be carried out and initiated by the Government from a district-wide and strategic level.

PUBLIC COMMENTS

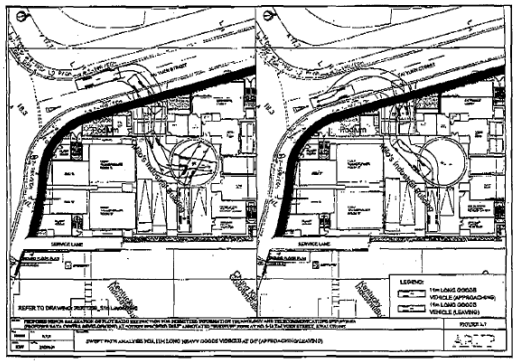
No.	Comments	Responses
1.	**Noise** The round-the-clock operation of the proposed data centre development including E&M facilities and cooling towers, will cause serious noise pollution and affect the residents living nearby. Noise impact assessment should be conducted to ensure that no adverse noise impact will be resulted due to the Proposed Development. **Adverse Environmental Impact upon the Immediately Adjacent Residential Towers Approved under the "CDA" Development at Nos.1-7 Cheung Wing Road (Planning Application No. A/KC/444)** With reference to the Environmental Assessment ("EA") prepared in support of the S16 Planning Application for the "CDA" development at Nos. 1-7 Cheung Wing Road, Kwai Chung in September 2017, there were 5 nos. of cooling towers at the roof of existing Milo's Industrial Building (extracts of the Approved EA report and comparison of roof-top cooling towers in **Annex A** refers). With the redevelopment of Milo's Industrial Building for Data Centre, there will be 12 nos. of cooling towers which will incur significant fixed noise impact onto the Approved "CDA" development. Since there is no information such as a Fixed Noise Impact Assessment included in the Supporting Planning Statement or elsewhere in the Further Information submitted by the Applicant, the potential noise impact associated with the proposed cooling towers at roof-top cannot be ascertained. The Planning Application fails to demonstrate there would not be any adverse fixed noise impact to the nearby Noise Sensitive Receivers ("NSRs"). According to the Technical Memorandum ("TM") for the assessment of noise from places other than domestic premises, public places or construction sites, the area sensitive rating of the Approved "CDA" Development at Nos. 1-7 Cheung Wing Road, Kwai Chung is "C". According to Table 4.1: Summary of	Referring to our response-to-comments from EPD submitted on 1 April 2021, please note that fixed noise impact assessment will be addressed at the approval condition stage should planning approval for the Proposed Development be obtained. In addition, we would like to supplement that the combined level of intruding noise of the Proposed Development at the nearest Noise Sensitive Receivers ("NSRs") shall be at least 5 dBA below the appropriate Acceptable Noise Levels ("ANL") as stated in the Technical Memorandum for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites. The equipment noise transmission to adjacent buildings (NSRs) shall also comply with the requirement of the Hong Kong Planning Standards and Guidelines (HKPSG), which shall be 5dBA below the requirement indicated by EPD, i.e. 65 dBA (day time) and 55 dBA (night time) or below. Please note that ventilation openings for chiller plants, generator rooms, etc. will be treated by silencers or acoustic louvers preliminarily. Noise level of outdoor units will also be reviewed during detailed design stage, which cooling towers with low noise model and intake / discharge silencers have been proposed in current design. For other equipment such as chiller plants, generator rooms etc., ventilation openings shall be treated by silencer or acoustic louver to comply with relevant requirements by EPD. To conclude, acoustic treatment will be reviewed in detail throughout the detailed design stage, based on the manufacturer

No.	Comments	Responses
	Noise Standards of Chapter 9 Environment of Hong Kong Planning Standards and Guidelines ("HKPSG"), the design criteria of fixed noise source has to fulfil (a) 5 dB(A) below the Acceptable Noise Levels ("ANL") of the corresponding area sensitive rating or (b) the prevailing background noise level. With the criteria set above and the shortest distance from the Approved "CDA" Development to the Proposed Data Centre being about 20m only, the total maximum allowable noise level generated from all the noise sources of the future Data Centre has to be not more than 80 dB(A) or even lower if the prevailing background is lower than 55 dB(A), which is the ANL-5 dB(A) criteria set in the HKPSG. This maximum allowable noise level has considered the facade correction of 3 dB(A) and the possible tonal effect of 6 dB(A) as requested in the above-mentioned TM. Our understanding is that planning applications of similar nature were requested to submit a Noise Impact Assessment to demonstrate that the proposed non-polluting industrial developments would not incur any adverse fixed noise impact onto the surrounding NSRs. The Objector urges the TPB to require the Applicant to submit a Noise Impact Assessment with proposed mitigation measures to the satisfaction of relevant Authorities such that the Proposed Data Centre (with night-time operation) would not generate any adverse noise impact to the nearby Noise Sensitive Receivers of the surrounding existing and approved residential developments. Provision of the acoustic louvre and silencer is a typical and common mitigation measures in Hong Kong for effectively mitigating cooling towers and chiller noise source. These measures are **affordable and reasonable** and have been commonly adopted in many commercial buildings (e.g. City Plaza Phase One Office Building, etc.) or) hospitals (such as Prince of Wales Hospital, etc). With careful planning of having at-source noise mitigation measures at an early stage, it is possible to design the	noise data available and the proposed equipment layout/location. By providing proper acoustic treatment for the cooling towers and other noise generating equipment inside the building, we believe that it is unlikely to cause disturbance nor adverse noise impact to the nearby residents/ occupants. In addition to the above, as per agreed with EPD, a fixed noise impact assessment will be submitted at approval conditions stage.

No.	Comments	Responses
	Proposed Data Centre so that it would not have any adverse noise impact to the surroundings even during its night-time operation. The Proposed Data Centre Development would also contribute to achieving sustainable green building design under both BEAM Plus and LEED certification and the TPB should ensure that this requirement has been met **before** deciding to approve the Planning Application. In view of the above, our previous objection and comments vide letter dated 5 February 2021 remain valid (letter at **Annex B** refers), including drawing the TPB's attention to recent guidance that fundamental issues of this nature must be considered on their merits by the TPB as part of the Section 16 planning process rather than being left over to be dealt with under planning approval conditions.  Annex A & B.pdf	
2	**立法會議員, 陳恒鑌, dated 11 May 2021**	
	有市民向本辦事處表達關注，指新界葵涌大圓街 2-10 號擬興建為數據中心（申請編號：A/KC/473)，擔心運作後對附近一帶構成潛在噪音問題。 據了解，計劃中的數據中心未來將會24小時運作，因應需要大廈天台的冷卻系統亦將由目前的5台倍增至12台，相信將對附近環境造成一定的影響。惟目前未見申請人向有關當局提交任何正式運作時，對社區構成的噪音污染評估報告。 本人理解有關市民的憂慮，懇請 貴署考慮要求申請人盡早提交噪音評估報告，以釋除公眾疑慮；倘若一旦評估後發現新機組有機會對環境構成噪音滋擾，亦有利申請人在規劃時加入改善措施，如增建適當的隔音屏障等，以減低對社區的影響。	

No.	Comments	Responses
4.	**Kenneth To & Associates Ltd, dated 18 May 2021**	
	We are instructed by Tung Chun Company Limited ("the Objector") to submit this comment on the Further Information pertaining to Traffic Impact Assessment ("TIA") submitted by the Applicant to the Town Planning Board ("TPB") in relation to Planning Application No. A/KC/473 on 26 February and 19 April 2021. The Objector, also the owner of Kwai Chung Town Lot ("KCTL") No. 432 at Nos. 1-7 Cheung Wing Road, Kwai Chung, wishes, with respect to raise their objection to the Planning Application in its current format (including the Further Information), on the basis of adverse traffic impact associated with the Proposed Data Centre Development at the Subject Site upon the ***immediately adjacent residential towers*** approved under the "CDA" development referred to below. **<u>Adverse Traffic Issue along Tai Yuen Street</u>** With reference to the past ground floor layout plan record of the Subject Site (Please see the figure below), it is identified that its vehicular access was provided at the northern corner of the Subject Site which is far from the junction of Kwok Shui Road/Tai Yuen Street. In addition, sufficient manoeuvring spaces could be provided within the site for goods vehicle manoeuvring without affect the road traffic on Tai Yuen Street.  *(Past Record Ground Floor Layout Plan of the Subject Site)*	

No.	Comments	Responses
	Referring to Figure 3.7 of TIA report attached with the Applicant's letter dated 26 February 2021 regarding swept path analysis for 11m heavy goods vehicle ("HGV"), it is noted that the vehicular access of 7.3m wide only is shifted southward which is very close to the junction of Kwok Shui Road/Tai Yuen Street. HGV would turn into the Subject Site via the vehicle access marginally. When HGV is leaving from the Subject Site, it will encroach onto opposite traffic lane at Tai Yuen Street and traffic maneuvering has to be conducted outside of its own premises which is highly undesirable because of its proximity to the junction and the vehicular access is as narrow as what the older building was.	Please be advised that the proposed vehicular access is located approximate 30m away from the adjoining priority junction, which is in compliance with TPDM requirement. In addition, according to TPDM Vol. 2 Ch. 3.6, the width of vehicular access should be kept to the minimum compatible with satisfactory operation of vehicles using the vehicular access. It is considered not practical nor safe to pedestrians to provide a vehicular access wide enough for 11m long goods vehicle to turn out from the proposed development entering only the nearside lane. 7.3m-wide vehicular access is considered an adequate width to be provided. Moreover, with the proposed site setback for a wider footpath along Tai Yuen Street, motorists from the proposed development would have unobstructed visibility to both direction along Tai Yuen Street to enable them to judge safely when they turn out from the proposed development. Also, there is only 3 nos. of HGV parking spaces within the proposed development, the chance of HGV operation in the proposed development is deemed to be low. Nonetheless, for the sake of road safety, traffic wardens will be deployed to regulate the 11m long HGV egressing to minimize the potential traffic problem attributed from vehicles encroaching onto opposite lane. Therefore, it is envisaged that the proposed vehicular access arrangement is desirable in terms of access width and proposed location, and traffic manoeuvring would not be conducted outside premise.
	Manoeuvring of goods vehicles has to rely on turn table on ground floor of Subject Site. If there is goods vehicle using the tum table on ground floor of the Subject Site while another vehicle arrives and wants to enter the Subject site, that vehicle has to wait and queue on Tai Yuen Street outside the Subject Site until the ground floor area is cleared. Traffic queue thus occurs along Tai Yuen Street which would not only affect the traffic	Please be advised that as shown in the proposed layout, the turntable on ground floor is approximate 20m from the vehicular access. Adequate temporary waiting space is provided within site, therefore, when another vehicle approaches during the turntable operation, it will temporarily wait inside the proposed development and will not spill-over onto the public road nor affect traffic along Tai Yuen Street.

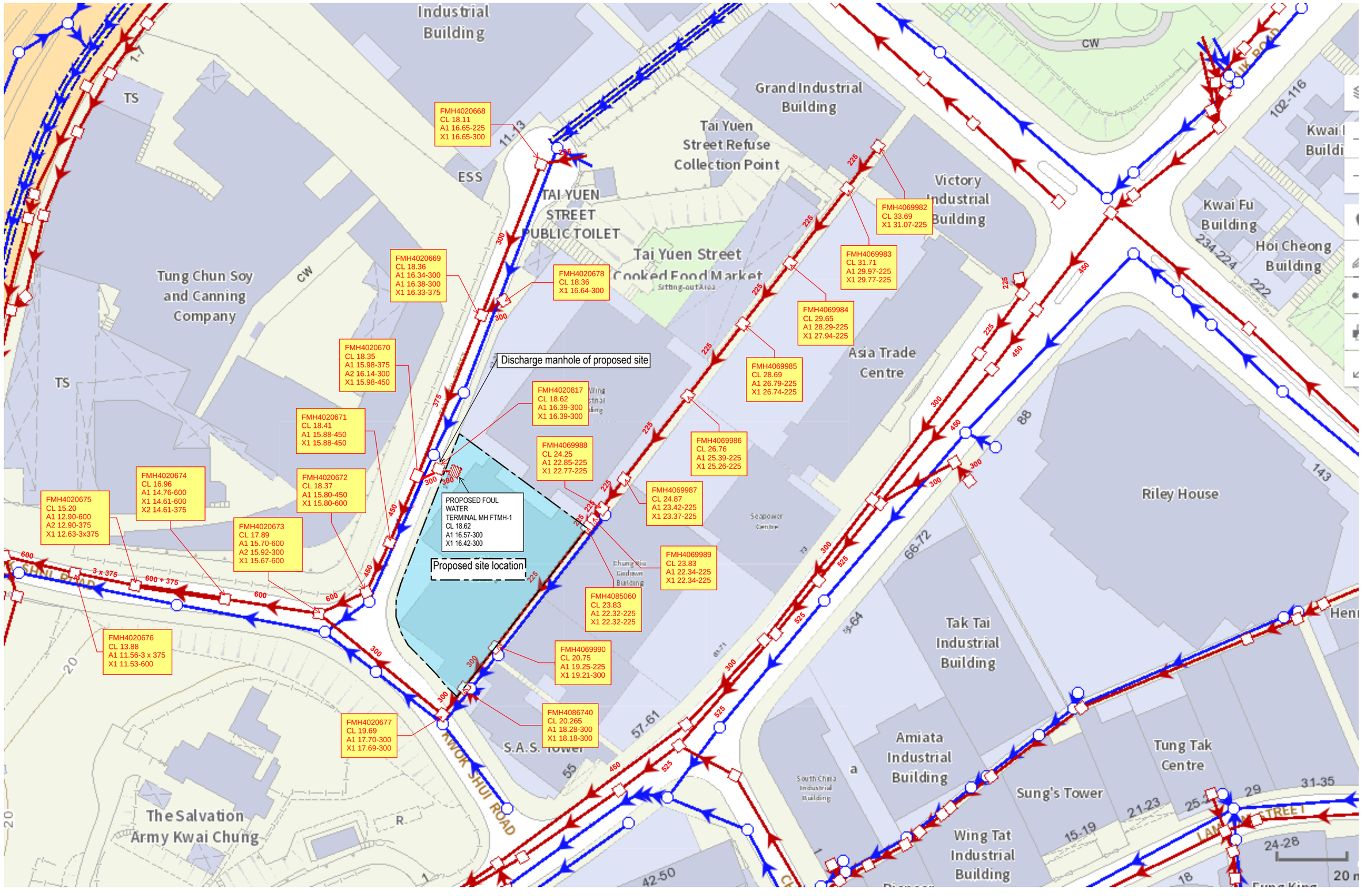
No.	Comments	Responses
	along Tai Yuen Street but also the junction of Kwok Shui Road/Tai Yuen Street. Therefore, the Applicant shall consider to provide more maneuvering space on the ground level (e.g. any consideration of relocation of E&M plant room to 1st floor or basement; widen the vehicle access with the consent of TD) so as to reduce the traffic queue on public road.  *(Figure 3.7 extracted from TIA report attached with the Applicant's letter dated 26 February 2021)*	
	In addition, it is noted that only one vehicle lift has been provided for the Subject Site. If the vehicle lift is out-of-order / under maintenance, the basement car park cannot be functioned and vehicles would be jammed at the vehicle access. It will block the vehicular access of the "CDA" development and affect traffic not only Tai Yuen Street but also the adjacent road network. The Applicant shall provide mitigation measure to avoid the concerned situation.	Please be advised that the proposed LGV lift will be under regular maintenance programme and hence the mechanical failure / breakdown is unlikely. Nevertheless, contingency operation will still be implemented in case mechanical failure of the LGV lift occurred. It is proposed to deploy traffic warden to guide the vehicles away during maintenance / mechanical failure of the LGV lift. In addition, the adequate manoevuring area on the proposed GF layout can provide limited loading / unloading service on ground floor as contingency purpose. Therefore, vehicles will not be jammed at the vehicular access.
	Furthermore, under the latest approved S16 Planning Application for the "CDA" development, Transport Department ("TD") raised concern on the illegal parking at Tai Yuen Street since "7-19 Non-stopping Restriction ("NSR")" had been imposed	Noted.

No.	Comments	Responses
	along Tai Yuen Street but illegal parking was still observed. Hence, the Objector has proposed mitigation measures including proposing additional traffic lane for the Tai Yuen Street northbound and widening of western footpath at Tai Yuen Street outside their "CDA" development in the Planning Application (Application No. A/KC/444) approved on 12 April 2019.	
	The situation (i.e. illegal parking) will be worsened if the Subject Site affects/ blocks the vehicle access of the Subject Site/adjacent developments in the commissioning year. The illegal parking will block the vehicles from the Subject Site leaving and has to make use of the traffic lane in opposite direction which will endanger the traffic situation along Tai Yuen Street. (*Please find below the site record photos at 10:00am May 2021 showing the illegal parking conditions along Tai Yuen Street despite the NSR is being in forced*).	Please be advised that the proposed internal transport provision fully complies with HKPSG high-end parking requirement and TD's Departmental Circular No. 6/2012 – Standards for Goods Vehicle Parking and Loading/Unloading for Data Centres. Self-contained transport facilitates including parking spaces and loading/unloading facilities will be provided within the application site. It is anticipated that the development-related parking demand and loading/unloading demand will not spill-over onto the public roads and external parking & loading/unloading facilities, therefore not affecting the adjacent sites.
	 	
	The Applicant should provide effective precaution measure prior to alleviate illegal parking and loading / unloading activities at Tai Yuen Street such as providing lay-by or setting back the carriageway along Tai Yuen Street outside the Subject Site.	Please refer to our responses above.
	<u>No Consideration on Future/ Planned Adjacent Road Network</u>	
	Vehicular access of adjacent planned/future developments (e.g. adjacent "CDA" Development) and proposed junction improvements have not been taken into consideration in the future traffic situation nor shown on the drawings in the TIA report. It is very unclear how the adjust of the	As presented in the submitted TIA report, in addition to the development flow, the traffic generated and attracted by adjacent major planned/committed developments in the vicinity of the proposed development were taken into account for the traffic forecast, including A/KC/444.

No.	Comments	Responses
	observed traffic flow based on surveyed traffic data in response to TD's comment and discrepancy of traffic flows were found in the junction assessments. Since there is **no queue length analysis for the proposed junction improvement scheme, it is doubtful whether the traffic situation would not be worsened with the proposed junction improvement scheme.**	Road widening at Tai Yuen Street, proposed new road and proposed junction improvements, including at the junction of Castle Peak Road -Kwai Chung to be carried out by the applicant of A/KC/444 is noted. The proposed road widening at Tai Yuen Street, new road and development flow of A/KC/444 have been considered in the traffic forecast and TIA calculation. To reflect the prevailing traffic condition, traffic flow has been reviewed and compared with the in-house traffic data surveyed in 2018. Adjustment factor on the surveyed traffic flow has been applied to reflect conservative peak traffic situation in the revised TIA report. Queue analysis has been carried out based on definitions in the Highway Capacity Manual (HCM,2000) Chapter 17 - Unsignalised Intersections. Theoretical studies and empirical observations have demonstrated that the probability distribution of queue lengths for any minor movement at an unsignalized intersection is a function of the capacity of the movement and the volume of traffic being served during the analysis period. $$Q_{95} \approx 900T\left[\frac{v_x}{c_{m,x}} - 1 + \sqrt{\left(\frac{v_x}{c_{m,x}} - 1\right)^2 + \frac{\left(\frac{3600}{c_{m,x}}\right)\left(\frac{v_x}{c_{m,x}}\right)}{150T}}\right]\left(\frac{c_{m,x}}{3600}\right)$$ is used to calculate the 95th percentile queue. Where v_x = flow rate for movement x (veh/h), AM Peak 1480, PM Peak 1410 c_{mx} = capacity of movement x (veh/h) AM Peak 1784, PM Peak 1783 T = analysis time period (h) T=0.25 for 15-min period Q_{95} = the 95th percentile queue (veh) AM Peak 12, PM Peak 10 Please be advised that the 15 min interval Q95 is 12 and 10 vehicles in AM and PM peak hour. The junction has adequate

No.	Comments	Responses
		capacity to cater for the traffic queue, and upstream junctions will not be affected.
	In view of the objection grounds above, we consider that the Applicant has failed to submit adequate information in demonstrating the feasibility of the Proposed Data Centre Development. Unless there is unequivocal evidence submitted by the Applicant to your reasonable satisfaction that inter alia, the aforesaid concerns are properly addressed or dealt with, the Proposed Development will be detrimental to the traffic situation along Tai Yuen Street and the surrounding road network. Unless mitigation measures e.g. widening of exit and provision of more manoeuvring spaces within the premise and other effective precaution measure for tackling illegal lay-by parking are being taken; the TPB is urged to also take into account of the planning gain to be received by the Applicant in the event of a favorable decision to approve the captioned Planning Application No. A/KC/473, we respectfully request the TPB to reject the Planning Application.	Please kindly refer to our responses above that demonstrate that the Proposed Development is fully justifiable and acceptable from traffic engineering point of view.

(Updated on 26 May 2021)



DSD Drainage Record Plan (A3 1:1000)

Figure 2

ARUP

Ove Arup & Partners Calculation Sheet

Job Title **Proposed Development at 2-10 Tai Yuen Street, Kwai Chung**

Job No. 276306 Sheet No. Rev. A

Made by IP Date 04/05/21 Checked CC

Table B2 - Capacity Performance of Existing and Proposed Sewer

Notes:

(1) Calculate by Colebrook-White Equation

$$\bar{V} = -\sqrt{32gRS_f}\,\log\left[\frac{k_s}{14.8R} + \frac{1.255\nu}{R\sqrt{32gRS_f}}\right]$$

where ks is roughness value

for concrete slimed sewers, ks equals 3mm

for clayware slimed sewers, ks equals 0.6mm

ν is kinematic viscosity of fluid = 1.14 x 10-6 m2/s and g is the gravity = 9.81m/s2

V is the velocity, D is the diameter of the sewer and S is the gradient of the sewer.

Abbreviation:

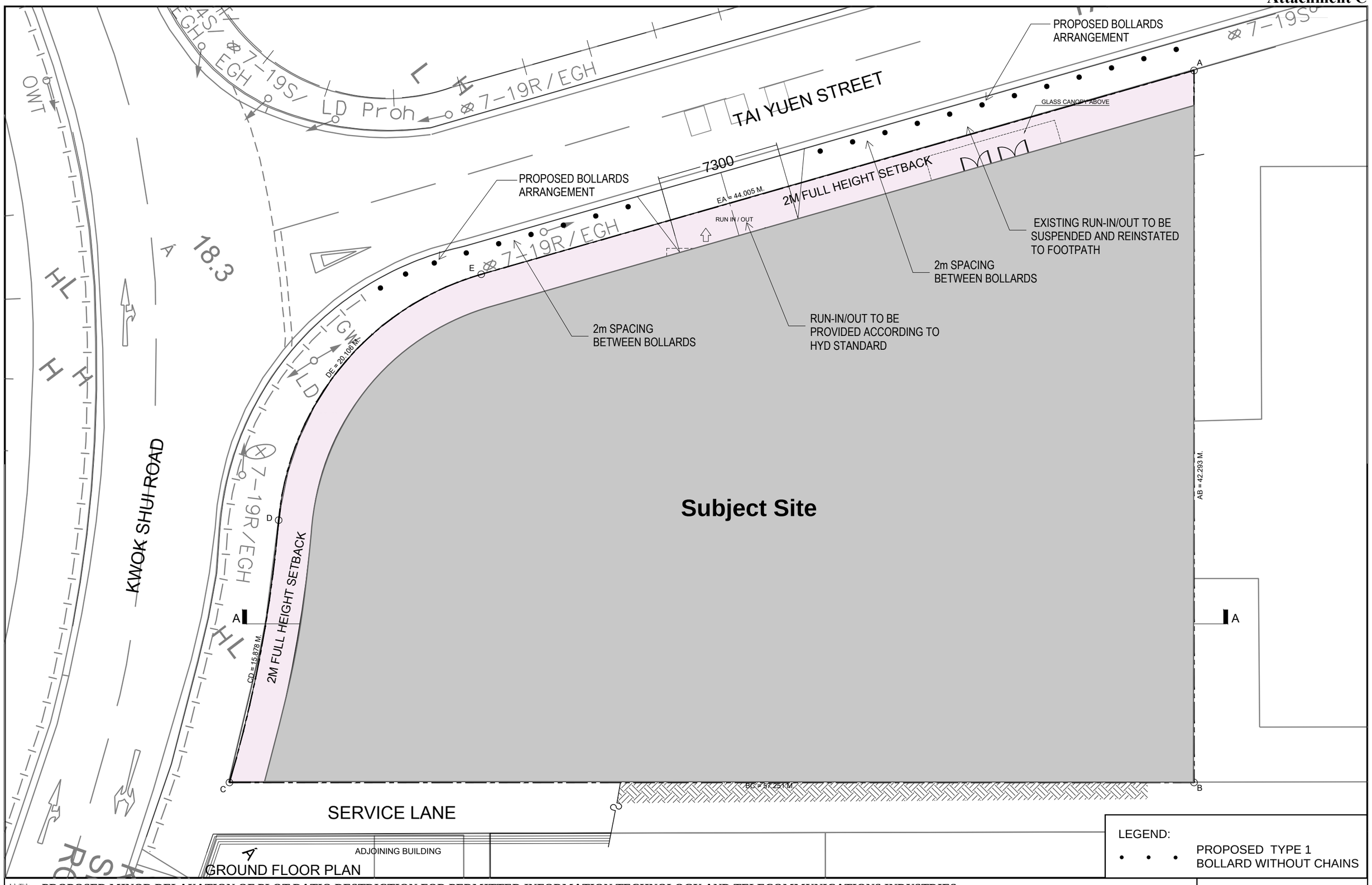
UP_MAN	Upstream Manhole	CON_POP	Contributing Population	DN_GL	Downstream Ground Level	CAP	Peak Pipe Capacity
DN_MAN	Downstream Manhole	DIA	Diameter	UP_INV	Upstream Invert Level	F/C	Peak Flow/Capacity
ADWF	Average Dry Weather Flow	LEN	Length	DN_INV	Downstream Invert Level		
ACC_ADWF	Accumulated Average Dry Weather Flow	UP_GL	Upstream Ground Level	VEL	Peak Pipe Velocity		

Existing Development

Manhole		FROM SITE	CON_POP	PEAKING FACTOR	ACC_ADWF (L/s)	Peak Flow (L/s)	Existing Pipe Parameter										
UP_MAN No.	DN_MAN No.						DIA (D) (mm)	LEN (m)	UP_GL (mPD)	DN_GL (mPD)	UP_INV (mPD)	DN_INV (mPD)	Gradient (S)	VEL (m/s)	CAP (L/s)	F/C (%)	Adequate Capacity?
Catchment A & Existing Development																	
FMH4020668	FMH4020669	Tai Yuen Street Public Toilet	38	8	0.96	7.67	300	42.0	18.11	18.36	16.65	16.34	135	1.35	95.18	8.1%	YES
FMH4020669	FMH4020670	Tai Yuen Street Public Toilet + Shui Wing Industrial Building	3,348	6	10.46	62.77	375	45.1	18.36	18.35	16.33	15.98	129	1.59	175.84	35.7%	YES
FMH4020670	FMH4020671	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Milo's Industrial Building	4,591	6	14.35	86.09	450	18.0	18.35	18.41	15.98	15.88	180	1.51	239.97	35.9%	YES
FMH4020671	FMH4020672	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Milo's Industrial Building	4,591	6	14.35	86.09	450	12.5	18.41	18.37	15.88	15.80	156	1.62	257.97	33.4%	YES
FMH4020672	FMH4020673	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Milo's Industrial Building	4,591	6	14.35	86.09	600	12.4	18.37	17.89	15.80	15.70	124	1.77	499.01	17.3%	YES
Existing Terminal MH	FMH4020817	Milo's Industrial Building	1,244	6	3.89	23.32	300	4.5	18.62	18.62	16.42	16.39	150	1.28	90.36	25.8%	YES
FMH4020817	FMH4020670	Milo's Industrial Building	1,244	6	3.89	23.32	300	6.1	18.62	18.35	16.39	16.14	24	3.20	226.42	10.3%	YES
Catchment A, Catchment B, Catchment C & Catchment D + Existing Development																	
FMH4020673	FMH4020674	Catchment A + Catchment B + Catchment C + Catchment D + Existing Development	12,371	4	38.66	154.64	600	24.2	17.89	16.96	15.67	14.76	27	3.81	1078.10	14.3%	YES
FMH4020674	FMH4020675	Catchment A + Catchment B + Catchment C + Catchment D + Existing Development	12,371	4	38.66	154.64	375	22.7	16.96	15.20	14.61	12.90	13	4.99	551.27	6.9%	YES
FMH4020674	FMH4020675	Catchment A + Catchment B + Catchment C + Catchment D + Existing Development	12,371	4	38.66	154.64	600	22.7	16.96	15.20	14.61	12.90	13	4.80	1694.92	6.9%	YES

Propsoed Development

Manhole		FROM SITE	CON_POP	PEAKING FACTOR	ACC_ADWF (L/s)	Peak Flow (L/s)	Existing / Proposed Pipe Parameter										
UP_MAN No.	DN_MAN No.						DIA (D) (mm)	LEN (m)	UP_GL (mPD)	DN_GL (mPD)	UP_INV (mPD)	DN_INV (mPD)	Gradient (S)	VEL (m/s)	CAP (L/s)	F/C (%)	Adequate Capacity?
Catchment A & Proposed Development																	
FMH4020668	FMH4020669	Tai Yuen Street Public Toilet	38	8	0.96	7.67	300	42.0	18.11	18.36	16.65	16.34	135	1.35	95.18	8.1%	YES
FMH4020669	FMH4020670	Tai Yuen Street Public Toilet + Shui Wing Industrial Building	3,348	6	10.46	62.77	375	45.1	18.36	18.35	16.33	15.98	129	1.59	175.84	35.7%	YES
FMH4020670	FMH4020671	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Proposed Development	3,923	6	12.26	73.56	450	18.0	18.35	18.41	15.98	15.88	180	1.51	239.97	30.7%	YES
FMH4020671	FMH4020672	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Proposed Development	3,923	6	12.26	73.56	450	12.5	18.41	18.37	15.88	15.80	156	1.62	257.97	28.5%	YES
FMH4020672	FMH4020673	Tai Yuen Street Public Toilet + Shui Wing Industrial Building + Proposed Development	3,923	6	12.26	73.56	600	12.4	18.37	17.89	15.80	15.70	124	1.77	499.01	14.7%	YES
FTMH-1	FMH4020817	Proposed Development	575	6	1.80	10.79	300	4.8	18.62	18.62	16.42	16.39	150	1.28	90.41	11.9%	YES
FMH4020817	FMH4020670	Proposed Development	575	6	1.80	10.79	300	6.1	18.62	18.35	16.39	16.14	24	3.20	226.42	4.8%	YES
Catchment A, Catchment B, Catchment C & Catchment D + Proposed Development																	
FMH4020673	FMH4020674	Catchment A + Catchment B + Catchment C + Catchment D + Proposed Development	11,703	4	36.57	146.28	600	24.2	17.89	16.96	15.67	14.76	27	3.81	1078.10	13.6%	YES
FMH4020674	FMH4020675	Catchment A + Catchment B + Catchment C + Catchment D + Proposed Development	11,703	4	36.57	146.28	375	22.7	16.96	15.20	14.61	12.90	13	4.99	551.27	6.5%	YES
FMH4020674	FMH4020675	Catchment A + Catchment B + Catchment C + Catchment D + Proposed Development	11,703	4	36.57	146.28	600	22.7	16.96	15.20	14.61	12.90	13	4.80	1694.92	6.5%	YES



Job Title	**PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**
	FIGURE 3.4_A
Date: 05/2021	Scale: N.T.S
Drawn: KSIY	Job No.: 276306-24
Drawing Title	PROPOSED PUBLIC FOOTPATH ARRANGEMENT AT SITE FRONTAGE
	ARUP

Proposed Modification of Road Kerb and Road Markings

Proposed Relocation of Existing Railings

Proposed Relocation of Existing Light Pole

Proposed Relocation of Existing Traffic Sign

Proposed Modification of Road Kerb and Road Markings

Kwai Chung (N) 葵涌（北） Shatin 沙田

Kwai Chung (S) 葵涌（南） Kowloon 九龍

NTW/TW/CasPea-G141

Mita Centre

Shek Lei 石梨

NTW/KT/CasPea-G142

Podium

Subway

Road

Tsuen Wan & Tuen Mun 荃灣及屯門

NTW/KT/CasPea-G1

LOT 46

59-57

555

549/F

566-552

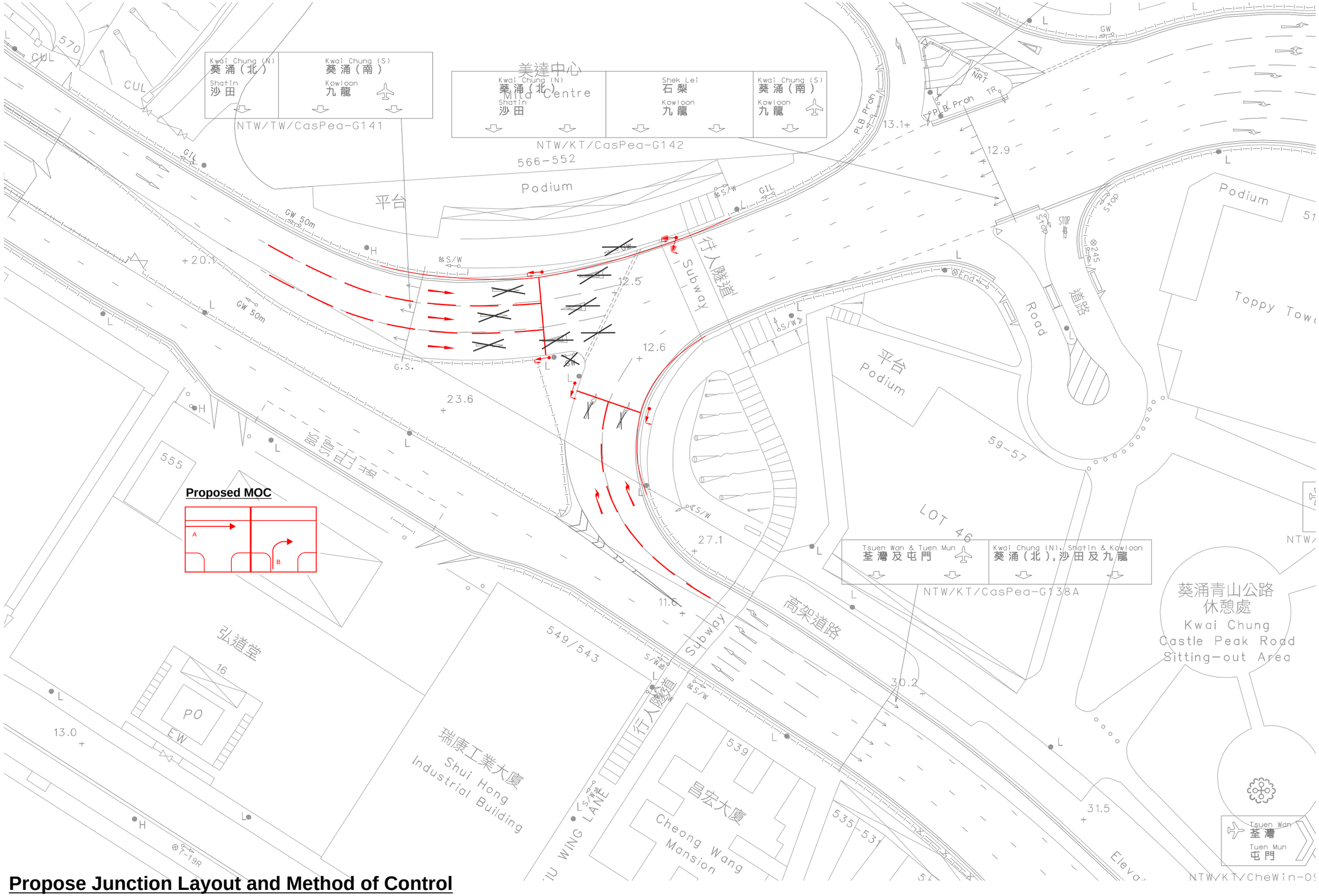
LEGEND:

- PROPOSED ROAD MARKING
- PROPOSED ROAD KERB
- GW — PROPOSED RELOCATION OF TRAFFIC SIGNS
- PROPOSED RELOCATION OF RAILING
- L — PROPOSED RELOCATION OF LIGHT POLE

Job Title **PROPOSED MINOR RELAXATION OF PLOT RATIO RESTRICTION FOR PERMITTED INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS INDUSTRIES (PROPOSED DATA CENTRE DEVELOPMENT) AT "OTHER SPECIFIED USES" ANNOTATED "BUSINESS" ZONE AT NO. 2-10 TAI YUEN STREET, KWAI CHUNG**

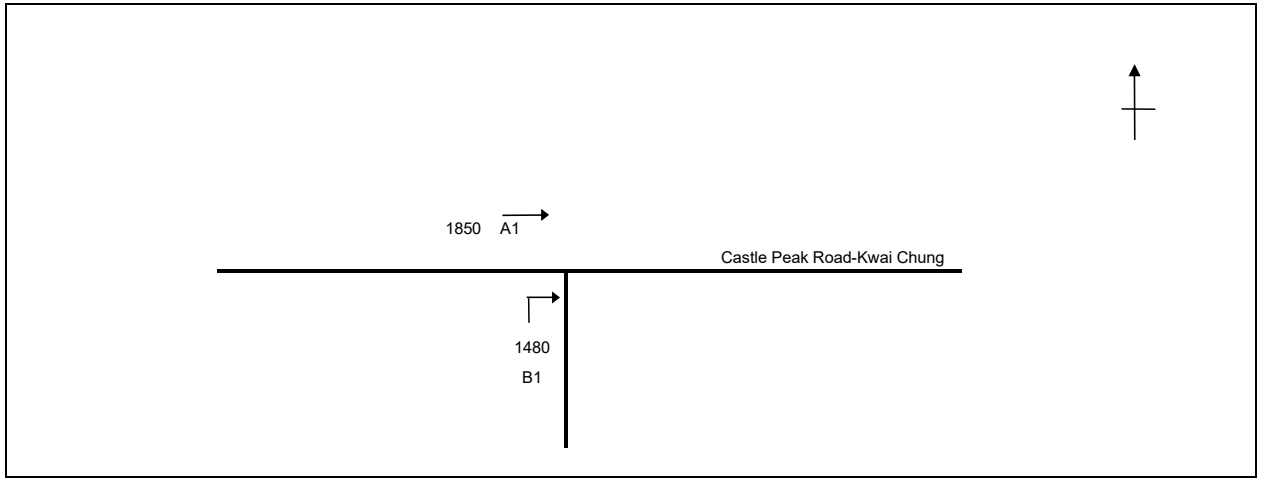
Date	Scale	Drawing Title
05/2021	1: 400	PROPOSED JUNCTION IMPROVEMENT SCHEME AT CASTLE PEAK ROAD - KWAI CHUNG INTERCHANGE (J1)
Drawn	Job No.	
KSIY	276306-24	

ARUP

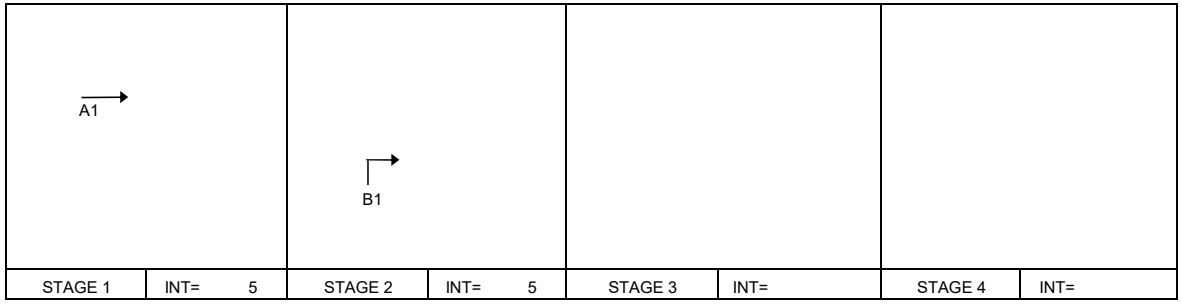


Propose Junction Layout and Method of Control

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J3
Castle Peak Road - Kwai Chung / Kwai Chung Road	Year 2027 Design AM Peak	DATE : 25-May-21	FILENAME :



No. of stages per cycle		N =	2
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.648
Loss time		L =	8 sec
Total Flow		=	3330 pcu
Co	= (1.5*L+5)/(1-Y)	=	48.4 sec
Cm	= L/(1-Y)	=	22.8 sec
Yult		=	0.840
R.C.ult	= (Yult-Y)/Y*100%	=	29.5 %
Cp	= 0.9*L/(0.9-Y)	=	28.6 sec
Ymax	= 1-L/C	=	0.933
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	30 % (Optimized)



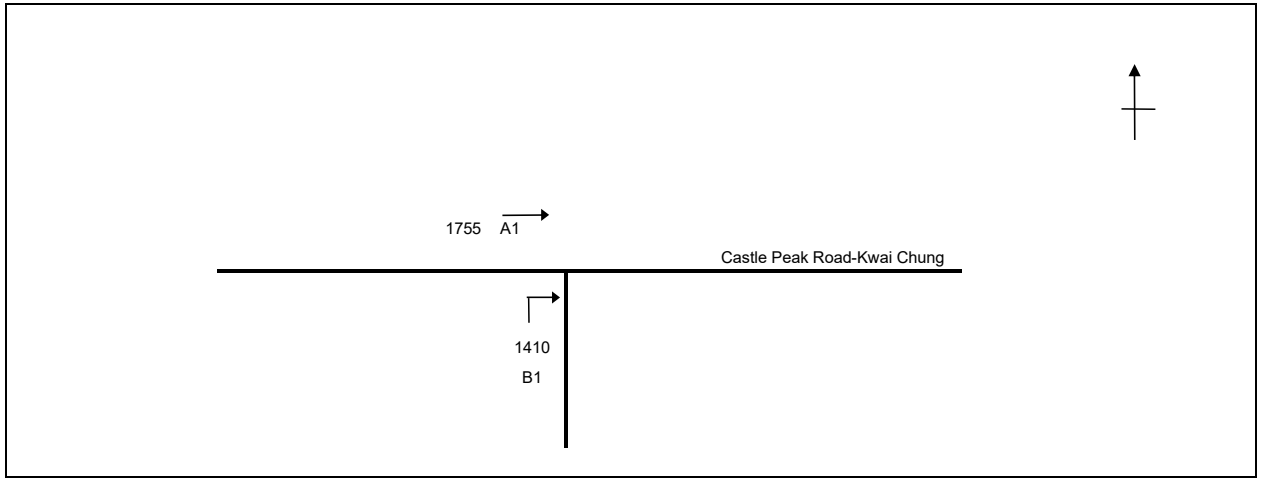
STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT=	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

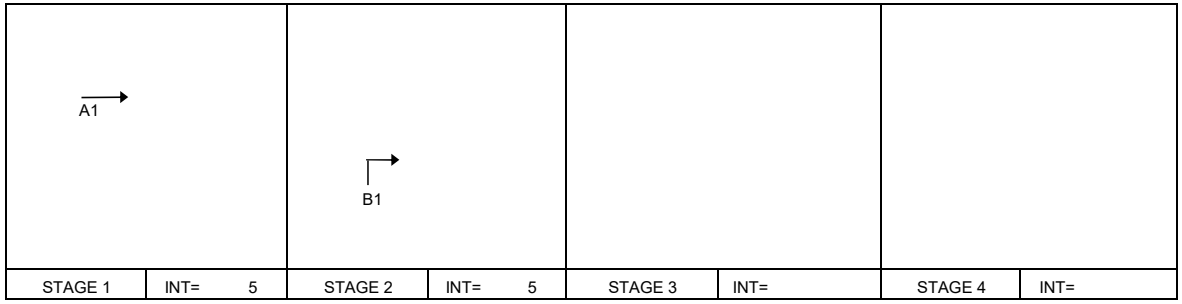
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				8				
A1	1	3.50	A	3			N	6175		**1850**		1850	0.00	6175			6175	0.300	0.300		52	52	0.695	70
B1	1	5.00	B1	2	50		N	4370	0		1480	1480	1.00	4243			4243	0.349	0.349		60	60	0.695	74

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 276306-24	Junction No. J3
Castle Peak Road - Kwai Chung / Kwai Chung Road	Year 2027 Design AM Peak	DATE : 25-May-21	FILENAME :



No. of stages per cycle		N =	2
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.617
Loss time		L =	8 sec
Total Flow		=	3165 pcu
Co	= (1.5*L+5)/(1-Y)	=	44.3 sec
Cm	= L/(1-Y)	=	20.9 sec
Yult		=	0.840
R.C.ult	= (Yult-Y)/Y*100%	=	36.2 %
Cp	= 0.9*L/(0.9-Y)	=	25.4 sec
Ymax	= 1-L/C	=	0.933
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	36 % (Optimized)



STAGE 1	INT= 5	STAGE 2	INT= 5	STAGE 3	INT=	STAGE 4	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total Flow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				8				
A1	1	3.50	A	3			N	6175		**1755**		1755	0.00	6175			6175	0.284	0.284		52	52	0.661	67
B1	1	5.00	B1	2	50		N	4370	0		1410	1410	1.00	4243			4243	0.332	0.332		60	60	0.661	70

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 0.9m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

2.1 ARCHITECTURAL ASPECTS

2.1.8 Landscape Design

Proposed Plant Species (Groundcover and Vertical greening)



Arachis pintoi
多年生花生



Ophiopogon japonicus 'Nana'
玉龍草



Ophiopogon intermedius 'Argenteo-marginatus'
斑葉沿階草



Lantana montevidensis
小葉馬纓丹



Asparagus densiflorus 'Sprengeri'
非洲天門冬



Phyllanthus myrtfolius
瘤腺葉下珠



Chlorophytum comosum 'Variegatum'
花葉吊蘭



Peperomia obtusifolia
圓葉椒草

2.1.8 Landscape Design

Proposed Plant Species (Shrub and Herbaceous)



Casuarina nana
千頭木麻黃



Ligustrum sinense 'Variegatum'
山指甲



Salvia officinalis
鼠尾草



Pennisetum alopecuroides
狼尾草



Nephralepis exaltata cv. Bastaniensis
波士頓蕨



Aglaonema 'Silver Queen'
銀皇后



Sapathiphyllum floribundum
白鶴芋

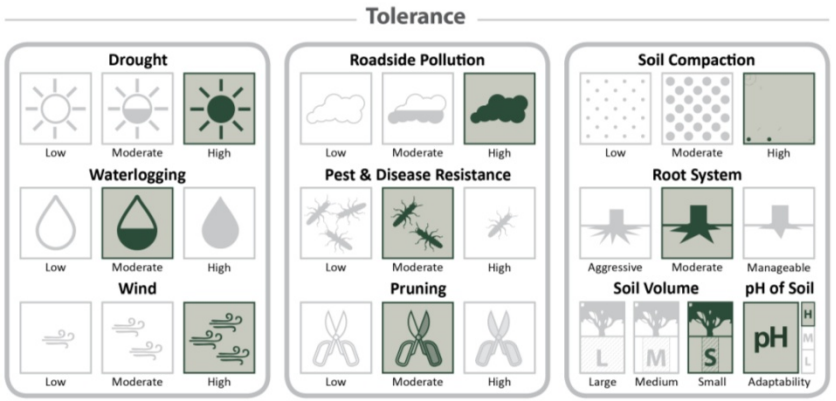


Monstera deliciosa
龜背竹

2.1.8 Landscape Design

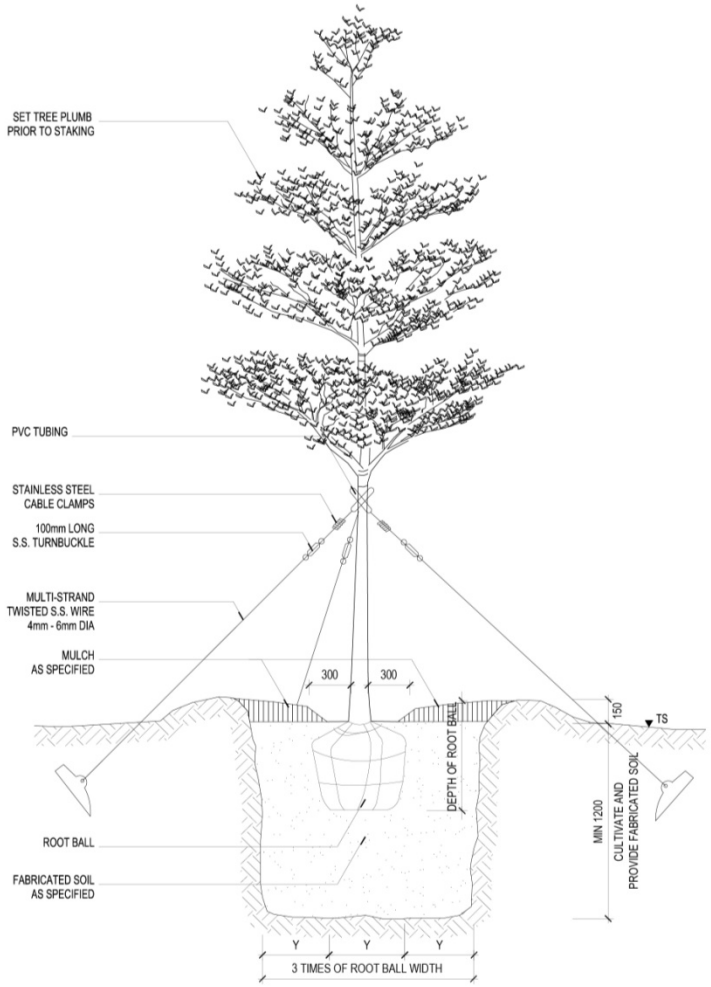
Proposed Plant Species (Tree)





2.1.8 Landscape Design

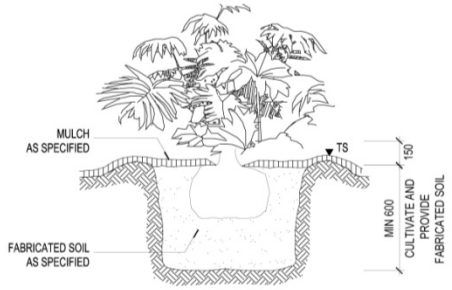
Typical Planting Details (Tree, shrub and groundcover)



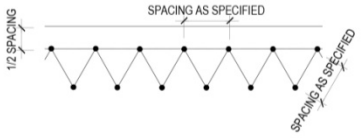
1 PLANTING DETAIL : TREE SCALE N.T.S.



2 PLANTING PLAN : TREE SCALE N.T.S.
STAKING ARRANGEMENT



3 PLANTING DETAIL : GROUND COVER & SHRUB SCALE N.T.S.



4 PLANTING DETAIL : GROUND COVER & SHRUB SCALE N.T.S.
TRIANGULAR SPACING DIAGRAM

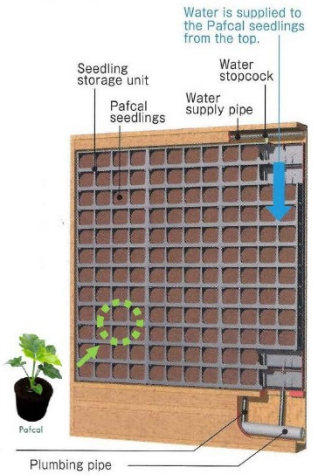
2.1.8 Landscape Design

Vertical Greening System

Vertical Greening Wall

The system is simple, easy to maintain, sustainable.
We solved all the problems that typical greening wall systems can have.

	Midorie	Typical soil vertical green wall
Simple irrigation system	• Water supply system is simple, since Pafcal automatically keep the ideal balance of water and air from bottom to top of each pafcal. • Each unit keep 1 cm of water and drain to next level.	• Each pot needs a water supply pipe and water supply system.
No drain blocking	• Since Pafcal is a chunk, it doesn't block the drain hole. • Only inspect at top.	• Soil can blocks the drain holes. • Inspect @150mmc/c drip hole in every line
Clean water	• The water passed through the pafcal is still clear water.	• The water passed through the soil is usually muddy and dirty.



2. Water pipe irrigation with automatic timer
(From bottom to top, or from top to bottom)

*Custom-made, primary direct water feed/direct drainage.
Tank cycle arrangements are also possible.



Pafcal

This Midorie system does not use soil.
The system use 'Pafcal', the soil substitute invented by a Japanese company Suntory Midorie.
Pafcal can keep the optimal balance of water and air almost equally from bottom to top of it.
Also, it is light, clean, easy to handle, and good for plants.


Pafcal

Comparison between Pafcal and Soil

	Pafcal	Soil
Light	Water retained Pafcal is about a half weight of soil.	Soil is about 2 times heavier than Pafcal.
Clean	No bacteria and No bugs are inside when manufactured.	Soil usually contains bacteria and often contains small bugs.
Easy to handle	Pafcal is a chunk. It doesn't mess around. Easy to replace.	Soil scatters around.
Ideal for plants	Pafcal keeps the balance of water and air, from bottom to top. Pafcal is soft. Those feature helps to grow roots of the plants.	Soil gets harder and it makes difficult to keep the ideal condition for plant's root.

2.1.8 Landscape Design

Proposed Plant Species (Groundcover and Vertical greening)



Arachis pintoi
多年生花生



Ophiopogon japonicus 'Nana'
玉龍草



Ophiopogon intermedius 'Argenteo-marginatus'
斑葉沿階草



Lantana montevidensis
小葉馬纓丹



Asparagus densiflorus 'Sprengeri'
非洲天門冬



Phyllanthus myrtfolius
瘤腺葉下珠



Chlorophytum comosum 'Variegatum'
花葉吊蘭



Peperomia obtusifolia
圓葉椒草

2.1.8 Landscape Design

Proposed Plant Species (Shrub and Herbaceous)



Casuarina nana
千頭木麻黃



Ligustrum sinense 'Variegatum'
山指甲



Salvia officinalis
鼠尾草



Pennisetum alopecuroides
狼尾草



Nephralepis exaltata cv. Bastaniensis
波士頓蕨



Aglaonema 'Silver Queen'
銀皇后



Sapathiphyllum floribundum
白鶴芋

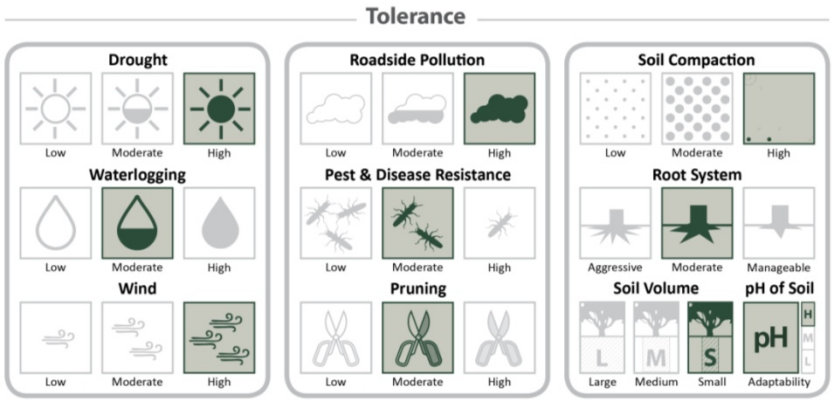


Monstera deliciosa
龜背竹

2.1.8 Landscape Design

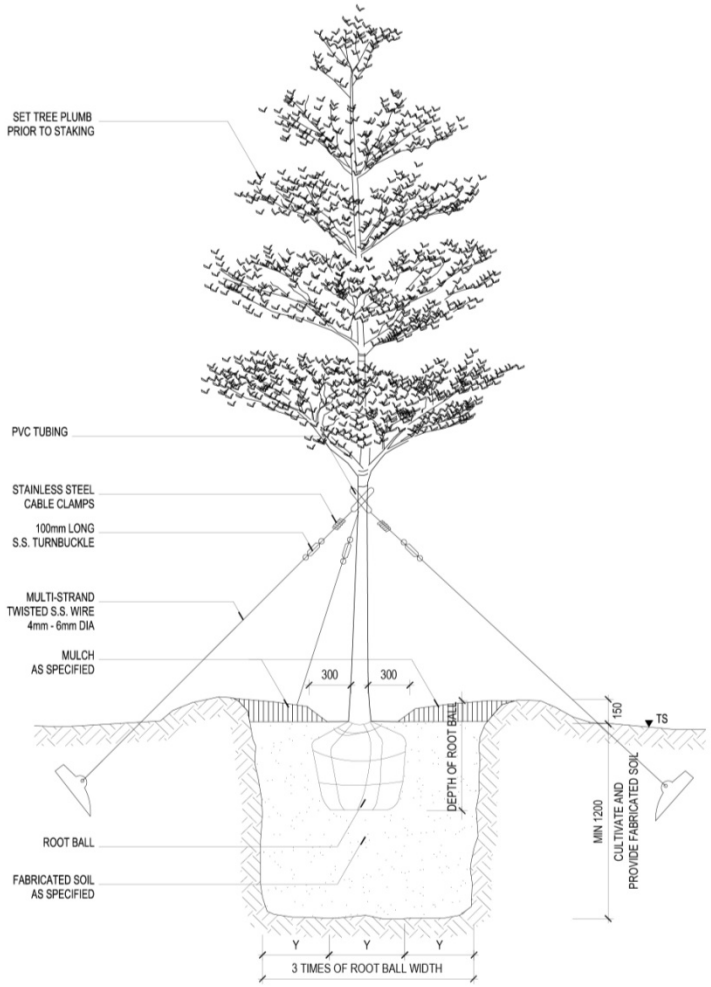
Proposed Plant Species (Tree)





2.1.8 Landscape Design

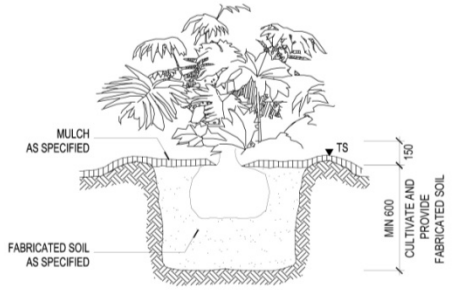
Typical Planting Details (Tree, shrub and groundcover)



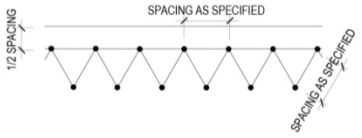
1 PLANTING DETAIL : TREE SCALE N.T.S.



2 PLANTING PLAN : TREE SCALE N.T.S.
STAKING ARRANGEMENT



3 PLANTING DETAIL : GROUND COVER & SHRUB SCALE N.T.S.



4 PLANTING DETAIL : GROUND COVER & SHRUB SCALE N.T.S.
TRIANGULAR SPACING DIAGRAM

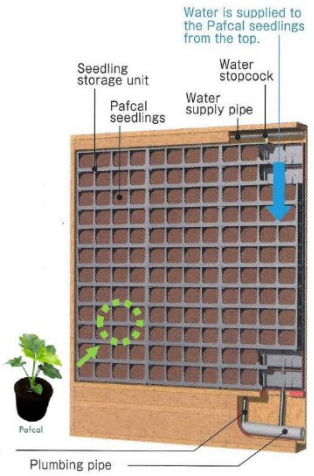
2.1.8 Landscape Design

Vertical Greening System

Vertical Greening Wall

The system is simple, easy to maintain, sustainable.
We solved all the problems that typical greening wall systems can have.

	Midorie	Typical soil vertical green wall
Simple irrigation system	• Water supply system is simple, since Pafcal automatically keep the ideal balance of water and air from bottom to top of each pafcal. • Each unit keep 1 cm of water and drain to next level.	• Each pot needs a water supply pipe and water supply system.
No drain blocking	• Since Pafcal is a chunk, it doesn't block the drain hole. • Only inspect at top.	• Soil can blocks the drain holes. • Inspect @150mmc/c drip hole in every line
Clean water	• The water passed through the pafcal is still clear water.	• The water passed through the soil is usually muddy and dirty.



2. Water pipe irrigation with automatic timer
(From bottom to top, or from top to bottom)

*Custom-made, primary direct water feed/direct drainage.
Tank cycle arrangements are also possible.



Pafcal

This Midorie system does not use soil.
The system use 'Pafcal', the soil substitute invented by a Japanese company Suntory Midorie.
Pafcal can keep the optimal balance of water and air almost equally from bottom to top of it.
Also, it is light, clean, easy to handle, and good for plants.

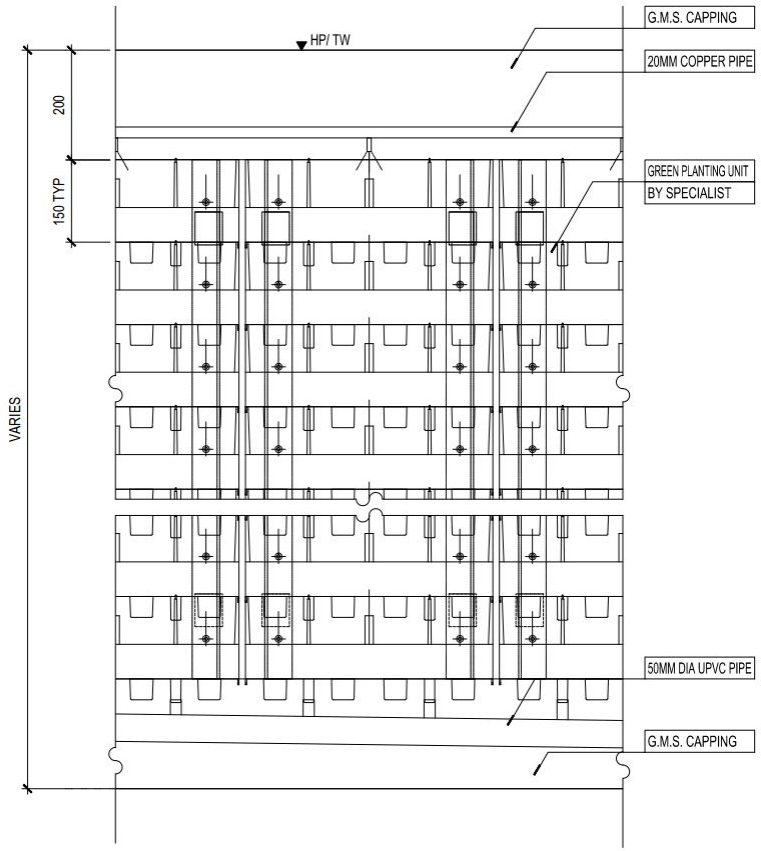

Pafcal

Comparison between Pafcal and Soil

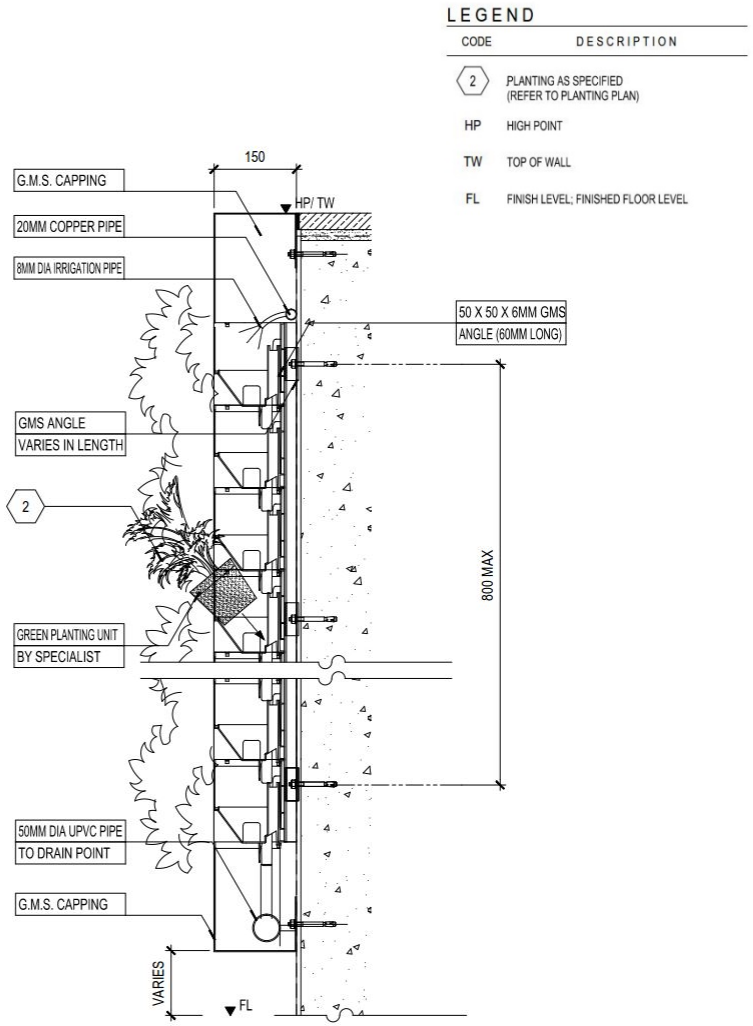
	Pafcal	Soil
Light	Water retained Pafcal is about a half weight of soil.	Soil is about 2 times heavier than Pafcal.
Clean	No bacteria and No bugs are inside when manufactured.	Soil usually contains bacteria and often contains small bugs.
Easy to handle	Pafcal is a chunk. It doesn't mess around. Easy to replace.	Soil scatters around.
Ideal for plants	Pafcal keeps the balance of water and air, from bottom to top. Pafcal is soft. Those feature helps to grow roots of the plants.	Soil gets harder and it makes difficult to keep the ideal condition for plant's root.

2.1.8 Landscape Design

Vertical Greening System - Typical Planting Details



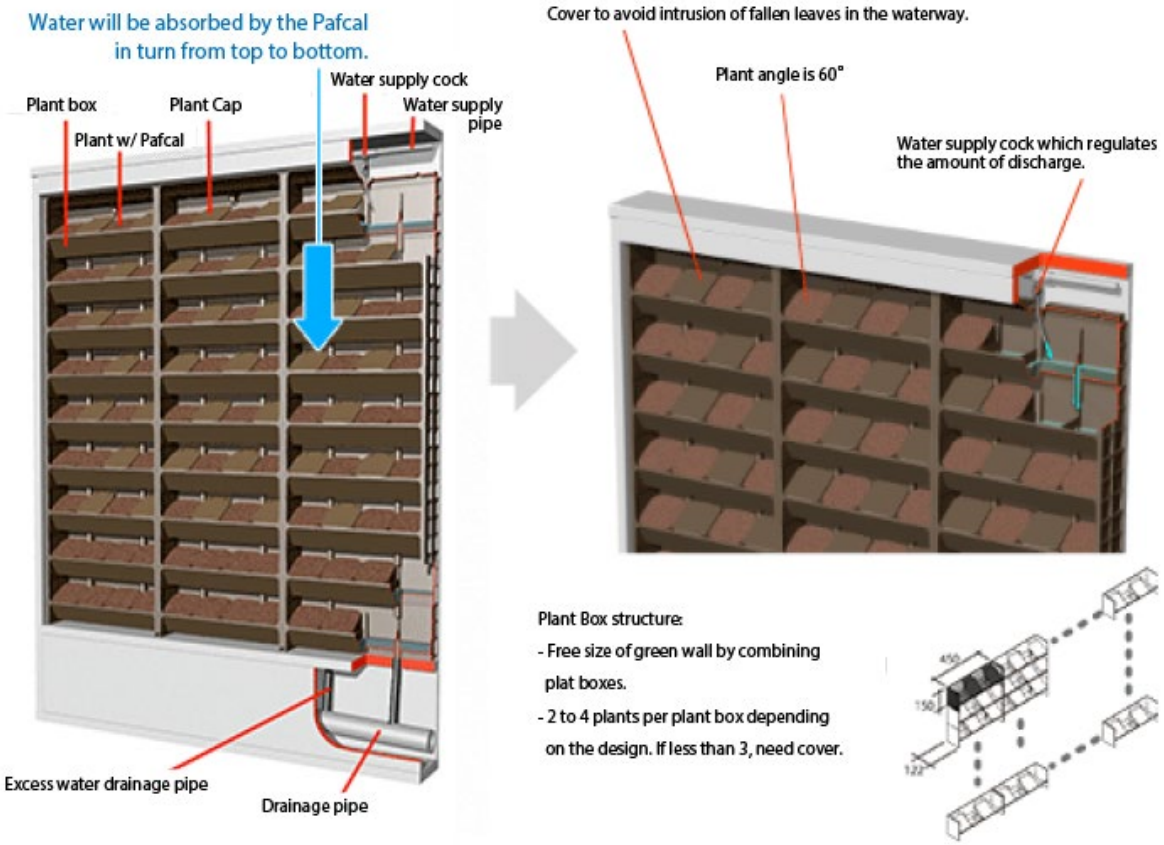
ELEVATION



SECTION

2.1.8 Landscape Design

Vertical Greening System - Maintenance



By replacing the Pafcal with plant, you can seasonally change your green wall design.



2.1.8 Landscape Design

Vertical Greening System - Maintenance

Annual Work Content	A : Inspection Check the growth situation of the plants and irrigation system We check the growth of the plant together with the greening system.	B : Pruning Pruning of plants Pruning not only improves the appearance, but also encourages the development of sprouts and helps plant development, such as prevention of pests.	C : Inspection Use fertilizer (liquid/solid) Give nutrition with liquid fertilizer/granular fertilizer, etc. according to plant type and growth.	D : Disinfection Spraying medicine for pest prevention It prevents it before the occurrence of pests, but it is also important to minimize the damage corresponding to the early stages of occurrence. we use medicine according to the situation.	E : Leaves Maintenance Removal of dead leaves In addition to arranging the shape, in order to prevent shortage of sunshine which causes pests and deterioration of ventilation, remove unnecessary dead leaves and overcrowded leaves.
JANUARY	●	▲	▲	▲	▲
FEBRUARY	●	▲	▲	▲	▲
MARCH	●	▲	▲	▲	▲
APRIL	●	▲	▲	▲	▲
MAY	●	▲	▲	▲	▲
JUNE	●	▲	▲	▲	▲
JULY	●	▲	▲	▲	▲
AUGUST	●	▲	▲	▲	▲
SEPTEMBER	●	▲	▲	▲	▲
OCTOBER	●	▲	▲	▲	▲
NOVEMBER	●	▲	▲	▲	▲
DECEMBER	●	▲	▲	▲	▲
TOTAL	12times/year	Arbitrarily	Arbitrarily	Arbitrarily	Arbitrarily

*Replacement of dead plants may require additional expenses depending on the contract and/or cause.
●Perform ▲Arbitraly (perform if necessary)

An automatic watering system: no hassle about watering the green wall.

2.1.8 Landscape Design

Typical Planting Details (Cable Type Vertical Greening)





















February April June August October

2.1.8 Landscape Design

Proposed Plant Species (Cable Type Vertical Greening)





Quisqualis indica
使君子

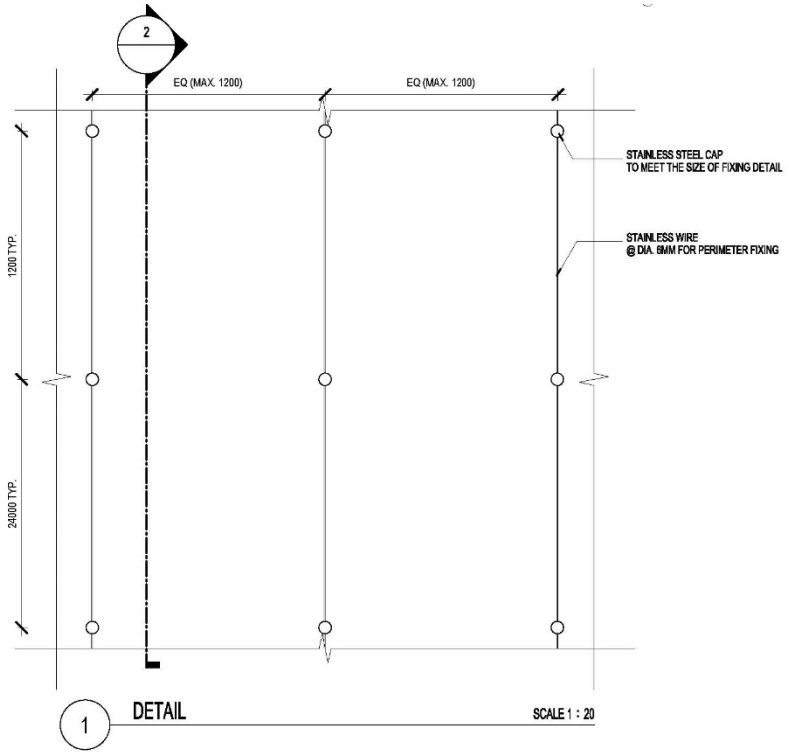


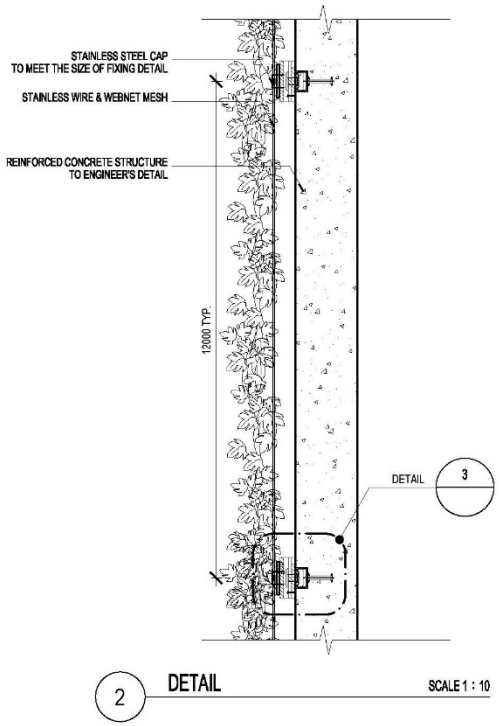


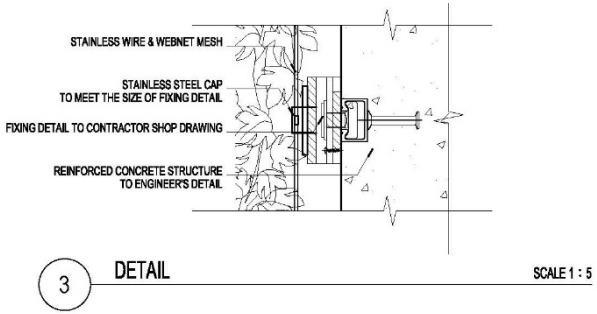
Trachelospermum jasminoides
絡石

2.1.8 Landscape Design

Proposed Plant Species (Cable Type Vertical Greening)

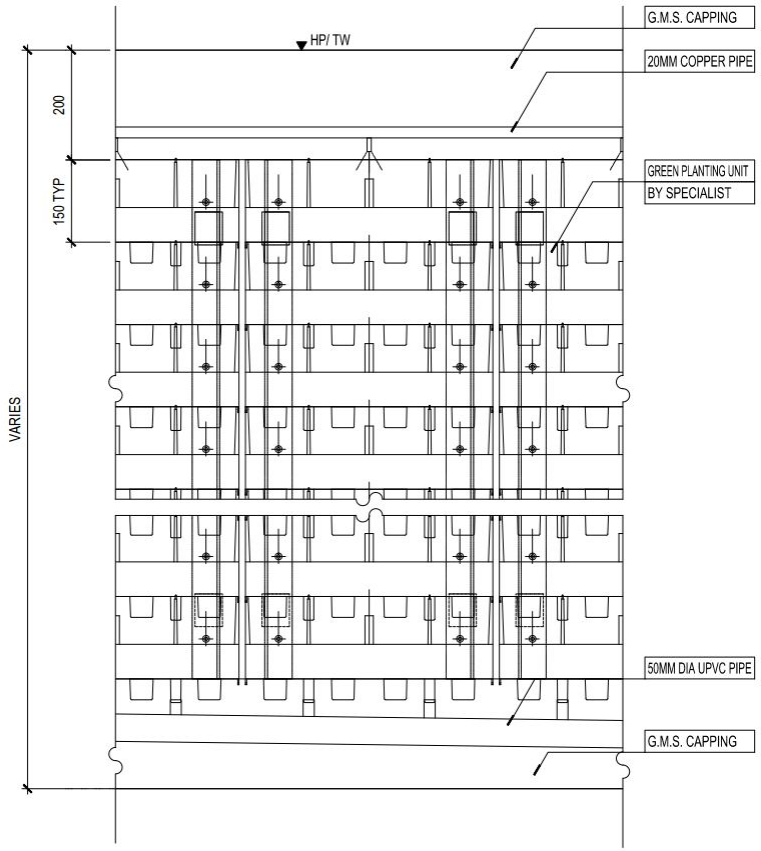




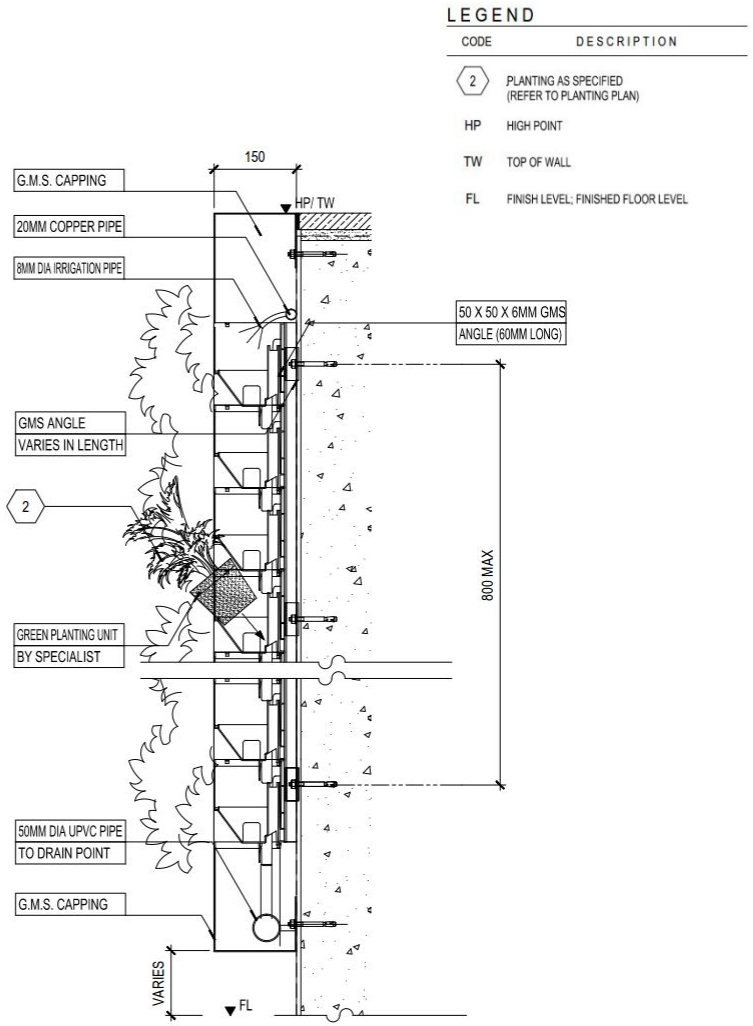


2.1.8 Landscape Design

Vertical Greening System - Typical Planting Details



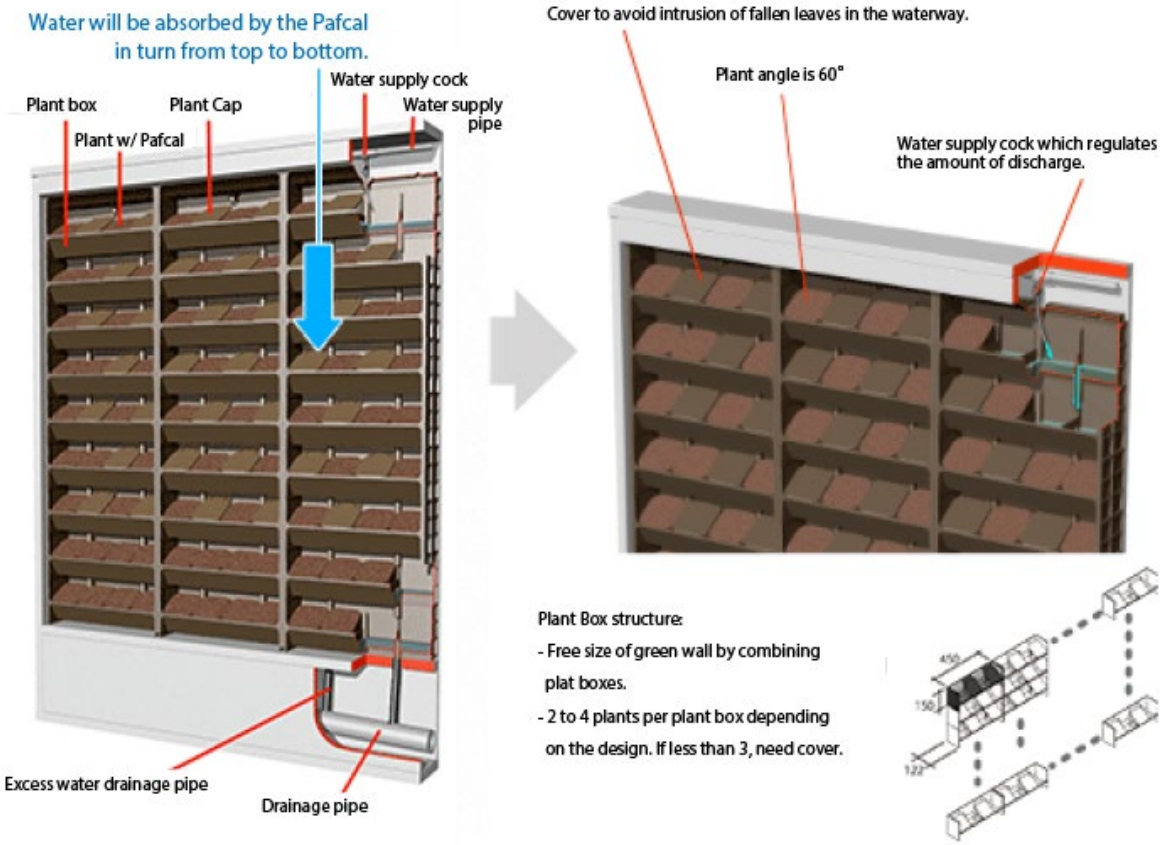
ELEVATION



SECTION

2.1.8 Landscape Design

Vertical Greening System - Maintenance



By replacing the Pafcal with plant, you can seasonally change your green wall design.



2.1.8 Landscape Design

Vertical Greening System - Maintenance

Annual Work Content	A : Inspection Check the growth situation of the plants and irrigation system We check the growth of the plant together with the greening system.	B : Pruning Pruning of plants Pruning not only improves the appearance, but also encourages the development of sprouts and helps plant development, such as prevention of pests.	C : Inspection Use fertilizer (liquid/solid) Give nutrition with liquid fertilizer/granular fertilizer, etc. according to plant type and growth.	D : Disinfection Spraying medicine for pest prevention It prevents it before the occurrence of pests, but it is also important to minimize the damage corresponding to the early stages of occurrence. we use medicine according to the situation.	E : Leaves Maintenance Removal of dead leaves In addition to arranging the shape, in order to prevent shortage of sunshine which causes pests and deterioration of ventilation, remove unnecessary dead leaves and overcrowded leaves.
JANUARY	●	▲	▲	▲	▲
FEBRUARY	●	▲	▲	▲	▲
MARCH	●	▲	▲	▲	▲
APRIL	●	▲	▲	▲	▲
MAY	●	▲	▲	▲	▲
JUNE	●	▲	▲	▲	▲
JULY	●	▲	▲	▲	▲
AUGUST	●	▲	▲	▲	▲
SEPTEMBER	●	▲	▲	▲	▲
OCTOBER	●	▲	▲	▲	▲
NOVEMBER	●	▲	▲	▲	▲
DECEMBER	●	▲	▲	▲	▲
TOTAL	12times/year	Arbitrarily	Arbitrarily	Arbitrarily	Arbitrarily

*Replacement of dead plants may require additional expenses depending on the contract and/or cause.
●Perform ▲Arbitraly (perform if necessary)

An automatic watering system: no hassle about watering the green wall.

2.1.8 Landscape Design

Typical Planting Details (Cable Type Vertical Greening)





















February April June August October

2.1.8 Landscape Design

Proposed Plant Species (Cable Type Vertical Greening)





Quisqualis indica
使君子

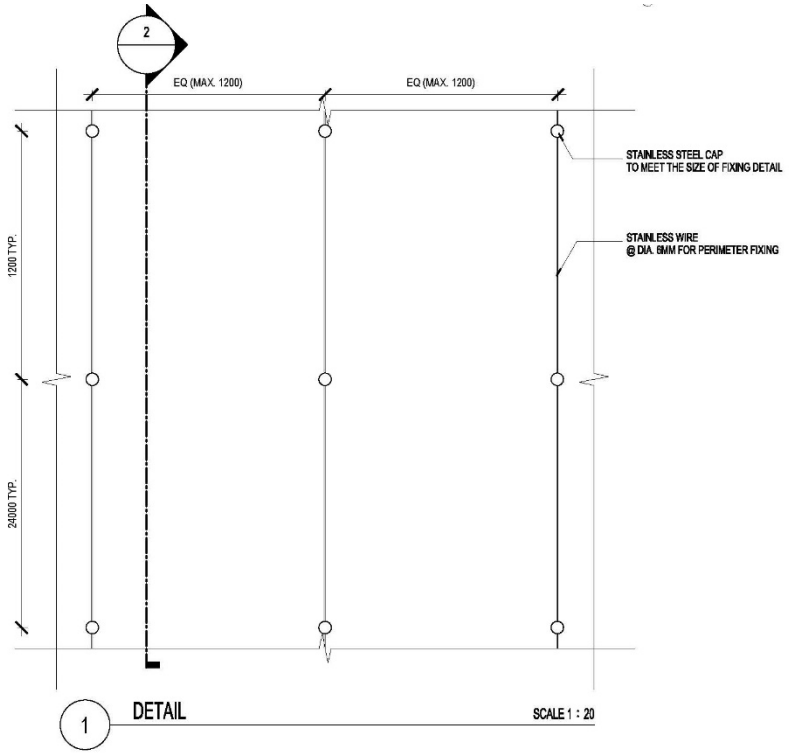


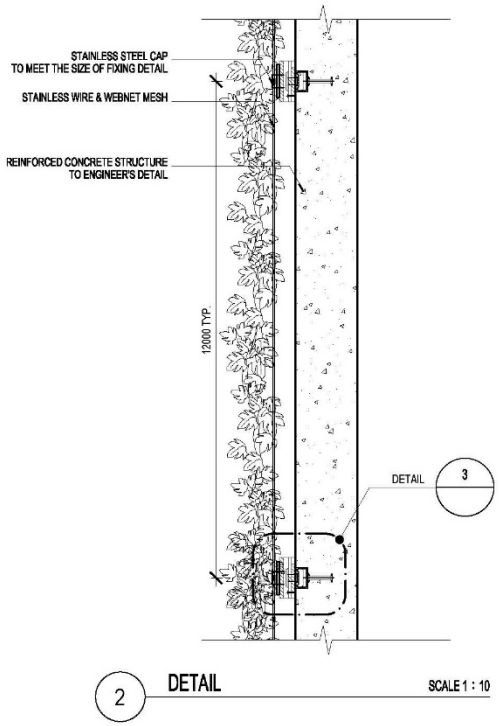


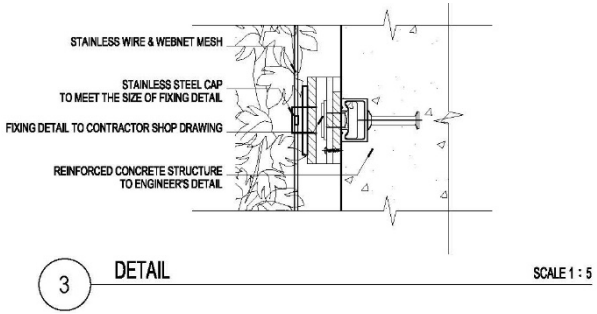
Trachelospermum jasminoides
絡石

2.1.8 Landscape Design

Proposed Plant Species (Cable Type Vertical Greening)







Your ref TPB/A/KC/473
Our ref 276306/01/WSTY/MYNL/04367

By Email (tpbpd@pland.gov.hk) and By Fax (2877 0245)

The Secretary
Town Planning Board
15/F, North Point Government Offices
333 Java Road, North Point
Hong Kong

ARUP
Level 5, Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong
t +852 2528 3031
f +852 2779 8428
d +852 2268 3721
theresa.yeung@arup.com
www.arup.com

31 May 2021

Dear Sir/Madam,

S16 Planning Application for
Proposed Minor Relaxation of Plot Ratio Restriction
for Permitted Information Technology and Telecommunications Industries (Proposed Data Centre Development) at "Other Specified Uses" annotated "Business" Zone
at Nos. 2-10 Tai Yuen Street, Kwai Chung
(Planning Application No. A/KC/473)

Technical Clarifications

We refer to the comments received from Highways Department on the captioned application.

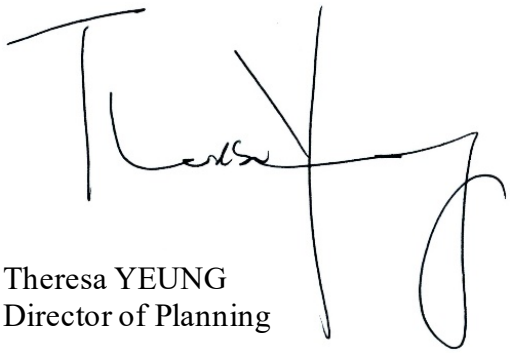
We are pleased to submit our responses in the form of a Response-to-Comments Table (**Attachment A**) for your consideration.

This submission only serves as technical clarifications without changing the scheme or the technical assessments, and thus should be exempted from recounting requirement.

We sincerely seek for the favourable consideration from the Town Planning Board to approve the captioned S16 Planning Application.

Should you have any queries, please contact the undersigned or our Ms Natalie LEUNG at 2268 3612.

Yours faithfully



Theresa YEUNG
Director of Planning

Encl. - Attachments A – Response-to-Comments Table
cc - Mr Stephen Chan (STP/Kwai Tsing, PlanD) (email: scychan@pland.gov.hk)
- Mr Robert Tsang (TP/Kwai Tsing, PlanD) (email: rhctsang@pland.gov.hk)

COMMENTS FROM RELATED DEPARTMENTS

No.	Comments	Responses
1.	**Highways Department, dated 27 May 2021**	
	1. The feasibility of proposed junction improvement at Castle Peak Road - Kwai Chung Interchange should be critically reviewed. The existing flyover and its foundation should be overlaid and the vertical and horizontal clearance should be checked accordingly.	With to TD's comment received on 25th May, 2021, alternative junction improvement scheme which will be undertaken by others had been submitted via Technical Clarification Submission dated 26th May, 2021, as referred to the Attachment D of the said submission. As presented in the submitted plan, traffic lane widening is not required for the proposed conversion of the junction into signalized control arrangement. Only minor adjustment of kerb is proposed for the installation of the traffic signal light poles. It is deemed that the no significant implication of the existing Highway Structures, including, the existing flyover, its foundation and the existing sign gantry.
	2. Please clarify if the existing sign gantry would be modified and affected by the proposed junction improvement works. The relevant details should be provided.	Ditto response as above.
	3. The Applicant should have an early liaison with CLP to resolve the objection from this perspective and to obtain the proposed routing for review and comment. HyD has repeatedly requested you to seek early liaison with CLP and furnish HyD with the documentation after the liaison.	Please note the Applicant has already engage early liaison with CLP with regard of the Proposed Development. According to CLP, their works proposal including cable routing has been submitted to the relevant Government B/Ds for review which is a standard approval process to safeguard public interest. Prior to commencement of cable laying works, CLP will submit the application for excavation permit along with other supporting documents i.e. layout plan, programme, approved works proposal, etc. to HyD for approval. We trust these governing system/procedures will well address the public concern, subject to the B/Ds' detail consideration at detailed design stage.

(Updated on 31 May 2021)

Your ref TPB/A/KC/473
Our ref 276306/01/WSTY/MYNL/04372

ARUP

Level 5, Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong
t +852 2528 3031
f +852 2779 8428
d +852 2268 3721
theresa.yeung@arup.com
www.arup.com

By Email (tpbpd@pland.gov.hk) and By Hand

The Secretary
Town Planning Board
15/F, North Point Government Offices
333 Java Road, North Point
Hong Kong

2 June 2021

Dear Sir/Madam,

S16 Planning Application for
Proposed Minor Relaxation of Plot Ratio Restriction
for Permitted Information Technology and Telecommunications Industries (Proposed Data Centre Development) at "Other Specified Uses" annotated "Business" Zone
at Nos. 2-10 Tai Yuen Street, Kwai Chung
(Planning Application No. A/KC/473)

Technical Clarifications

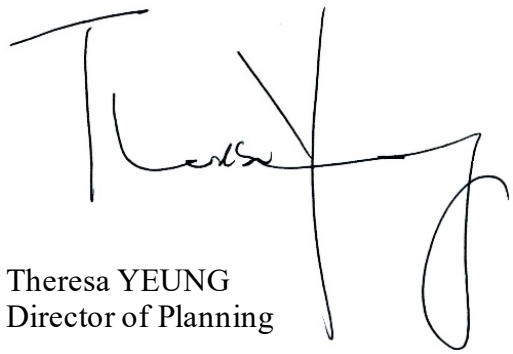
As per requested by District Planning Office, Planning Department, we are pleased to submit our updated architectural plans (G/F and 1/F) and updated landscape plans (overview and G/F) in **Attachment A** for your consideration.

This submission only serves as technical clarifications without changing the scheme or the technical assessments, and thus should be exempted from recounting requirement.

We sincerely seek for the favourable consideration from the Town Planning Board to approve the captioned S16 Planning Application.

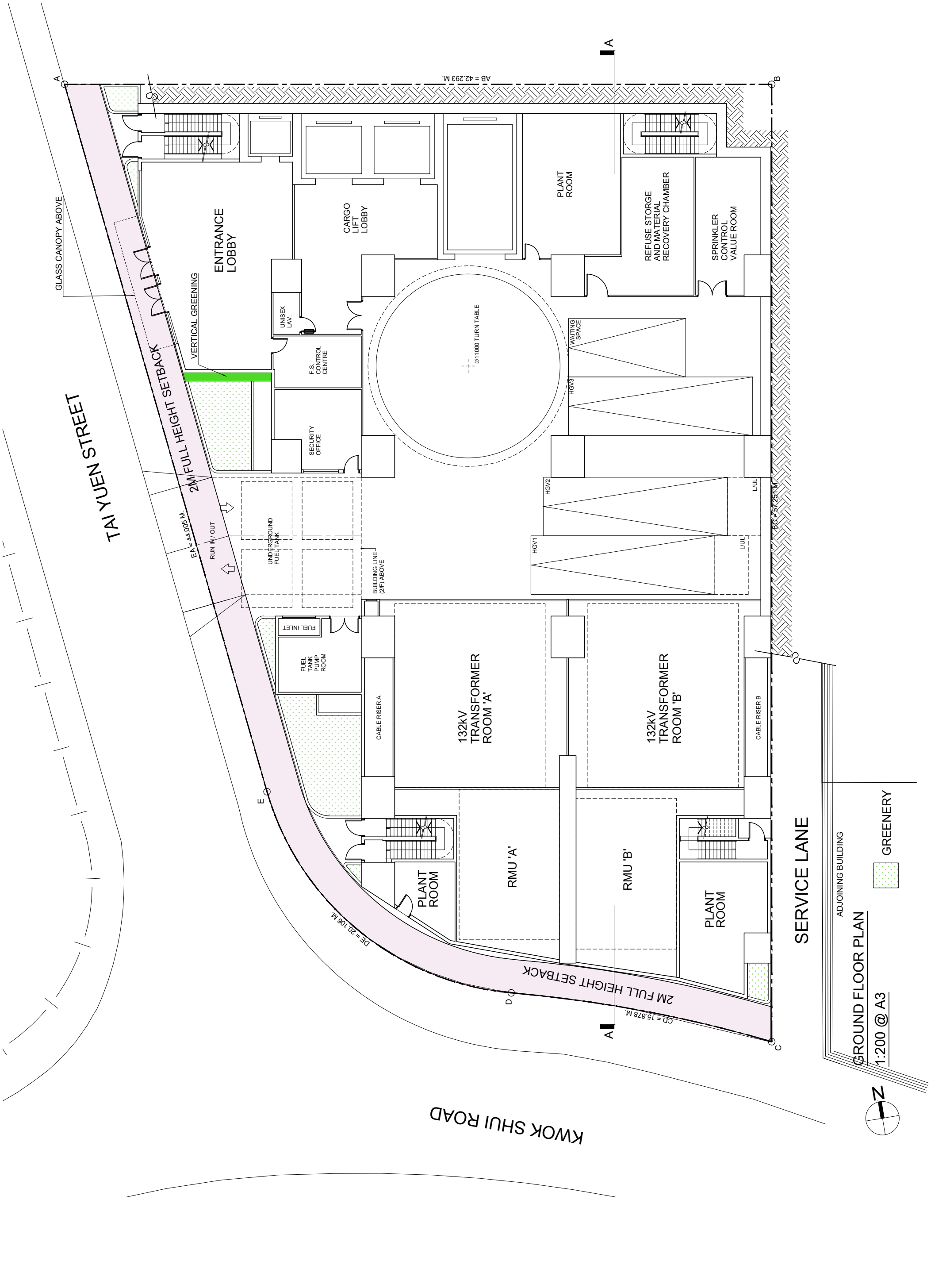
Should you have any queries, please contact the undersigned or our Ms. Natalie LEUNG at 2268 3612.

Yours faithfully



Theresa YEUNG
Director of Planning

Encl. - Attachments A
cc - Mr Stephen Chan (STP/Kwai Tsing, PlanD) (email: scychan@pland.gov.hk)
- Mr Robert Tsang (TP/Kwai Tsing, PlanD) (email: rhctsang@pland.gov.hk)


TAI YUEN STREET
KWOK SHUI ROAD
SERVICE LANE
ADJOINING BUILDING
GREENERY
GLASS CANOPY ABOVE
VERTICAL GREENING
ENTRANCE LOBBY
CARGO LIFT LOBBY
PLANT ROOM
REFUSE STORGE AND MATERIAL RECOVERY CHAMBER
SPRINKLER CONTROL VALUE ROOM
UNISEX LAV.
F.S. CONTROL CENTRE
SECURITY OFFICE
Ø11000 TURN TABLE
WAITING SPACE
HGV3
HGV2
HGV1
L/UL
BC = 31.251 M.
2M FULL HEIGHT SETBACK
EA = 44.005 M.
RUN IN / OUT
UNDERGROUND FUEL TANK
BUILDING LINE (2/F) ABOVE
FUEL INLET
FUEL TANK PUMP ROOM
CABLE RISER A
132kV TRANSFORMER ROOM 'A'
132kV TRANSFORMER ROOM 'B'
CABLE RISER B
PLANT ROOM
RMU 'A'
RMU 'B'
PLANT ROOM
DE = 20.106 M.
2M FULL HEIGHT SETBACK
CD = 15.878 M.
AB = 42.293 M.
A
B
C
D
E
GROUND FLOOR PLAN
1:200 @ A3
N

KWOK SHUI ROAD

2M FULL HEIGHT SETBACK

CD = 15.878 M.

DE = 20.106 M.

EA = 44.005 M.

2M FULL HEIGHT SETBACK

GLASS CANOPY

A

E

D

C

B

BC = 57.251 M.

AB = 42.283 M.

ADJOINING BUILDING

VERTICAL GREENING

MMR 'A'

LIFT LOBBY

BUILDING LINE (2/F) ABOVE

T.R.S.

CUSTOMER 11kV SWITCHGEAR ROOM 'A'

LIFT MACHINE ROOM '1'

P.D.

CUSTOMER 11kV SWITCHGEAR ROOM 'B'

CUSTOMER SWITCH ROOM

TRANSFORMER ROOM FOR BUILDING

T.B.E. ROOM '1'

BUILDING LINE (2/F) ABOVE

SERVICE LANE

ADJOINING BUILDING

ADJOINING BUILDING

N

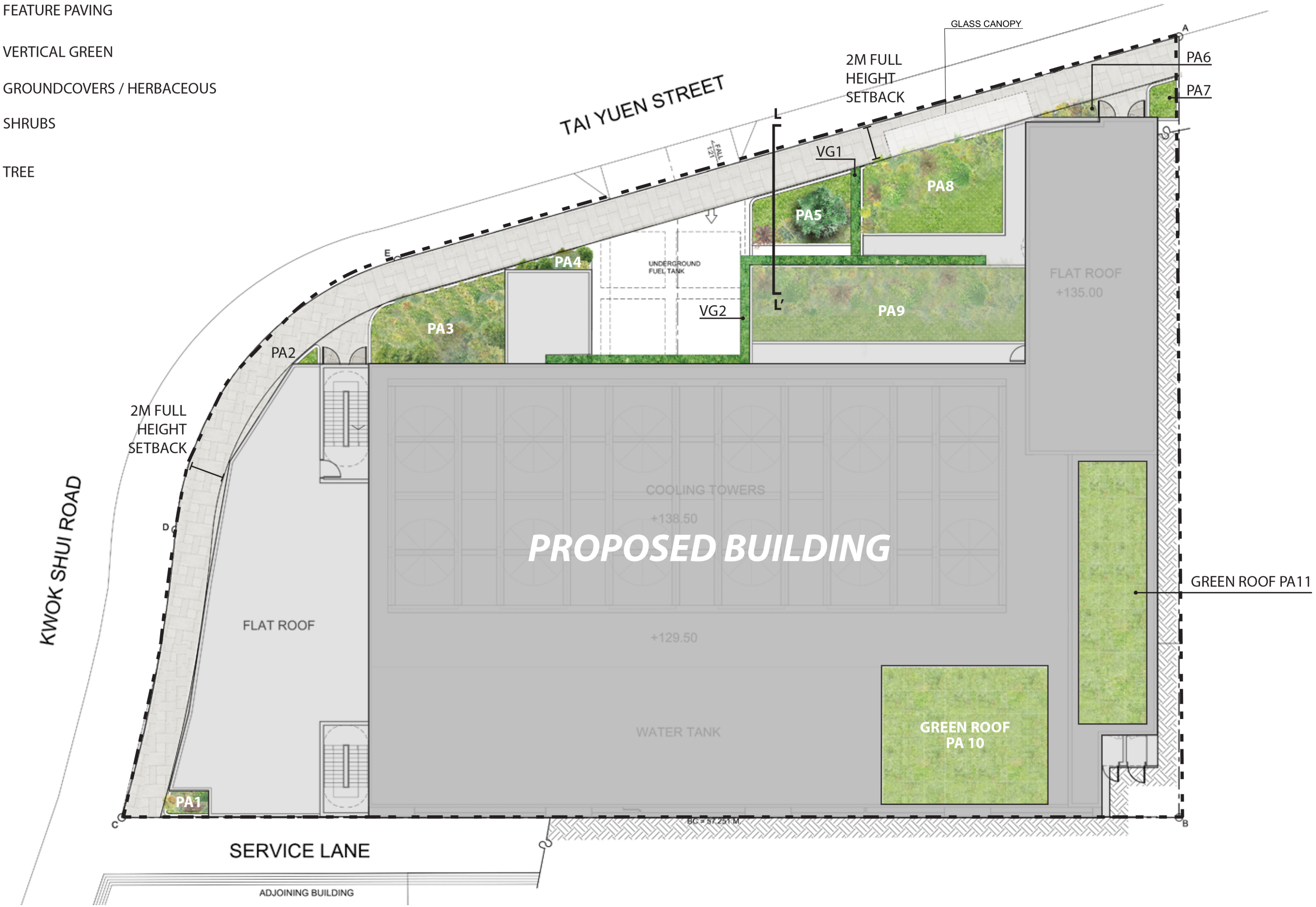
FIRST FLOOR PLAN

1:200 @ A3

GREENERY

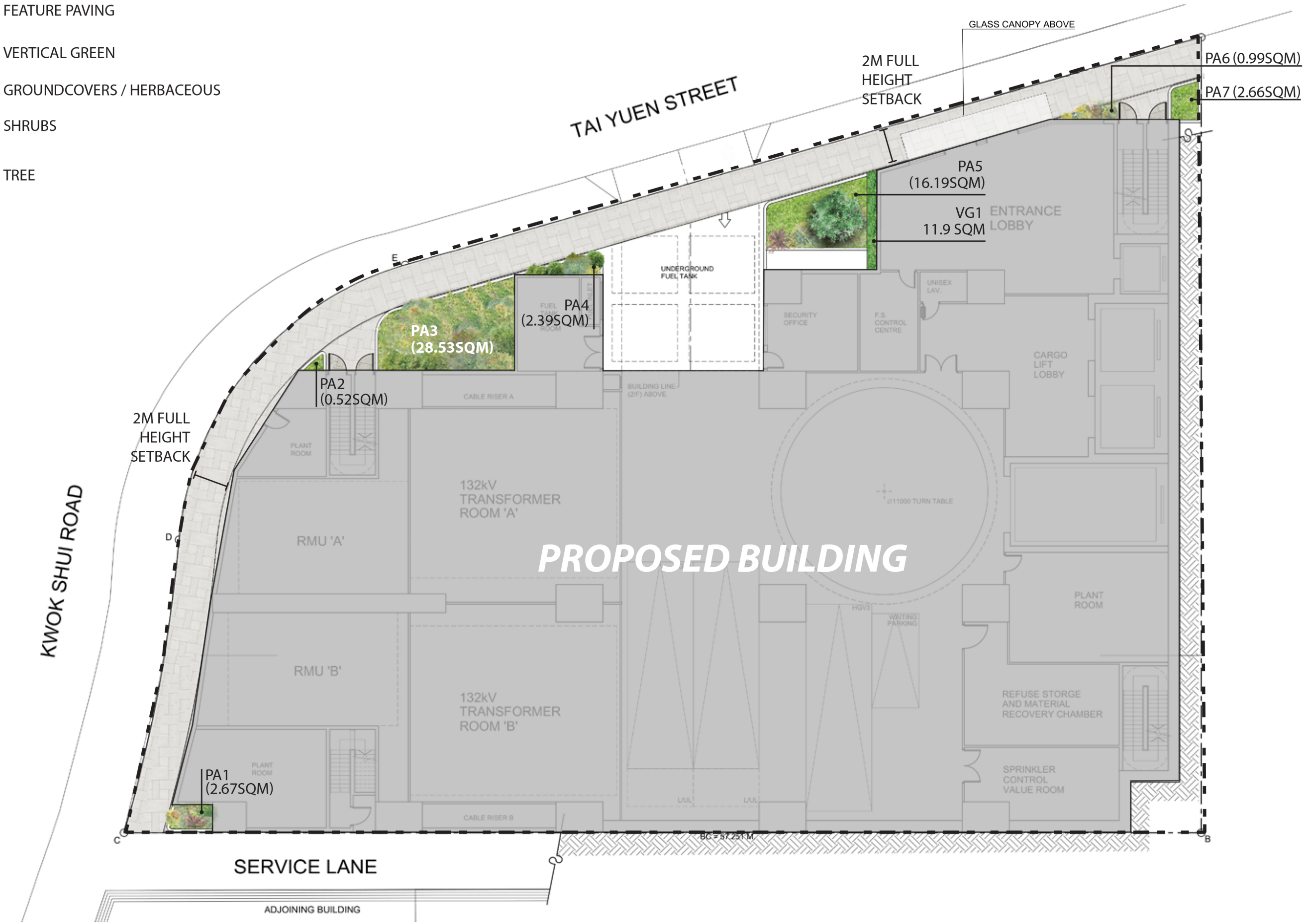
OVERVIEW OF LANDSCAPE PROVISIONS

- APPLICATION SITE BOUNDARY
- FEATURE PAVING
- VERTICAL GREEN
- GROUNDCOVERS / HERBACEOUS
- SHRUBS
- TREE



G/F LANDSCAPE PLAN

- APPLICATION SITE BOUNDARY
- FEATURE PAVING
- VERTICAL GREEN
- GROUNDCOVERS / HERBACEOUS
- SHRUBS
- TREE



Similar Applications

No.	OZP Zoning Application No.	Address (Site Area)	Proposed Uses[1]	Proposed Minor Relaxation	Date of Consideration	Typical Floor Height (Uses)	Major Planning & Design Merits
Yau Tsim Mong Area							
1.	S/K3/31 "OU(B)" A/K3/582 BHR: 110mPD	107-111 (Odd Numbers Only) Tung Chau Street, Tai Kok Tsui, Kowloon (386.5m^2)	I	PR 12 to 14.4 (+20%) BH Nil	**Approved** with conditions on 17.3.2020	4.025m (Workshop)	● Setback above 15m measured from the mean street level along Maple Street in accordance with OZP requirement ● Full-height setback along Tung Chau Street ● Greening ratio of about 33.4% (about 129m^2) with greening on G/F (about 11m^2) and 3/F (about 48m^2) as well as vertical greening (about 70m^2) ● Incorporation of landscaped area at the setback on G/F ● Incorporation of a sky garden with edge planters on 3/F ● Provision of vertical greening features on the podium façade along Tung Chau Street ● Compliance with SBDG and incorporation of green building design measures
2.	S/K3/32 "OU(B)" A/K3/588 BHR: 110mPD	100-114 Bedford Road, Kowloon (932.925m^2)	C/O	PR 12 to 14.4 (+20%) BH Nil	**Approved** with conditions on 29.5.2020	3.73m (Office)	● Voluntary Full-height setback from the south-eastern part of the lot boundary abutting Bedford Road ● Greening ratio of about 25.87% (about 241.39m^2) with greening on 3/F (about 116m^2) and R/F (about 80m^2) as well as green wall on lower floors (about 45.39m^2) ● Incorporation of a sky garden on 3/F ● Compliance with SBDG and incorporation of green building design measures
Cheung Sha Wan							
3.	S/K5/37 "OU(B)" A/K5/813 BHR: 120mPD	822 Lai Chi Kok Road, Cheung Sha Wan (1318.3m^2)	C/O	PR 12 to 14.4 (+20%) BH 120mPD to 125.7mPD (+4.75%)	**Approved** with conditions on 6.3.2020	4.375m (Office)	● Full-height setbacks along Lai Chi Kok Road and Cheung Lai Street in accordance with ODP requirement for street widening and streetscape improvement ● Voluntary setback at G/F and 1/F along Cheung Yee Street to provide shading and to enhance pedestrian connectivity and comfort ● Incorporation of refuge floor cum communal sky garden ● Incorporation of flat roofs/recessed terraces with greenery ● Greenery coverage of 263.891m^2 (about 20% of Site Area) with an additional 50m^2 vertical greening ● Compliance with SBDG and incorporation of green building design measures
4.	S/K5/37 "OU(B)" A/K5/816 BHR: 130mPD	121 King Lam Street, Cheung Sha Wan (509.4m^2)	I	PR 12 to 14.4 (+20%) BH Nil	**Approved** with conditions on 21.8.2020	4.5m (Workshop)	● Voluntary full-height setback along King Lam Street in addition to setback in accordance with ODP requirement for improving pedestrian circulation ● Voluntary full-height setback along eastern boundary to facilitate manoeuvring of vehicles ● Incorporation of podium garden for cross ventilation and visual permeability ● Greenery provision at G/F, 3/F and roof, with greenery coverage of 76.75m^2 (about 15.07% of Site Area) ● Compliance with SBDG

No.	OZP Zoning Application No.	Address (Site Area)	Proposed Uses[1]	Proposed Minor Relaxation	Date of Consideration	Typical Floor Height (Uses)	Major Planning & Design Merits
5.	S/K5/37 "OU(B)" A/K5/820 BHR: 130mPD	1016-1018 Tai Nan West Street, Cheung Sha Wan (1,374m^2)	I	PR 12 to 14.4 (+20%) BH Nil	**Approved** with conditions on 5.2.2021	4.7m (Workshop)	● Full-height setbacks along Wing Hong Street, Tai Nan West Street and King Lam Street in accordance with ODP requirement for street widening and streetscape improvement ● Weather protection canopy along Wing Hong Street, Tai Nan West Street and King Lam Street ● Corner splays ● Tree planting along Tai Nan West Street and King Lam Street ● Incorporation of vertical greening at G/F and 1/F facades, podium garden at 2/F and recessed platform with greenery ● Greenery provision of 313.64m^2 (about 22.83% of Site Area) with additional vertical greening ● Compliance with SBDG and incorporation of green building design measures
6.	S/K5/37 "OU(B)2" A/K5/825 BHR: 130mPD	916-922 Cheung Sha Wan Road, Cheung Sha Wan (892m^2)	I	PR 12 to 13.455 (+12.1%) BH Nil	**Approved** with conditions on 20.11.2020	4.55m (Workshop)	● Full-height setback along Cheung Sha Wan Road in accordance with ODP requirement for street widening and streetscape improvement ● Weather protection canopy and tree planting along Cheung Sha Wan Road ● Incorporation of podium garden and recessed platform with greenery ● Greenery provision at 1/F (including vertical greening of 53.512m^2) and 2/F, with greenery coverage of 222.733m^2 (about 20% of Site Area) ● Compliance with SBDG and incorporation of green building design measures
7.	S/K5/37 "OU(B)2" A/K5/826 BHR: 130mPD	924-926 Cheung Sha Wan Road, Cheung Sha Wan (1,115m^2)	I	PR 12 to 14.352 (+19.6%) BH Nil	**Approved** with conditions on 20.11.2020	4.55m (Workshop)	● Full-height setback along Cheung Sha Wan Road in accordance with ODP requirement for street widening and streetscape improvement ● Weather protection canopy and tree planting along Cheung Sha Wan Road ● Incorporation of podium garden and recessed platform with greenery ● Greenery provision at 1/F (including vertical greening of 66.89m^2) and 2/F, with greenery coverage of 241.58m^2 (about 20% of Site Area) ● Compliance with SBDG and incorporation of green building design measures
8.	S/K5/37 "OU(B)1" A/K5/829 BHR: 130mPD	550-556 Castle Peak Road, Cheung Sha Wan (1,471m^2)	I	PR 12 to 14.4 (+20%) BH Nil	**Deferred** on 30.4.2021	4.75m/4.9m (Workshop)	● Full-height setback along Castle Peak Road, Wing Hong Street and Yu Chau West Street in accordance with OZP/ODP requirements for street widening and streetscape improvement ● 3m additional voluntary setback from Castle Peak Road from 3/F upwards ● Incorporation of vertical greening at G/F and 1/F facades, planters on G/F, landscaped sky-garden at 13/F and green-roofs at 1/F, 2/F, 3/F and R/F ● Greenery coverage of 356.28m^2 (about 24.22% of Site Area), of which about 13.54% (199.28m^2) is within the pedestrian zone ● Compliance with SBDG and incorporation of green building design measures

No.	OZP Zoning Application No.	Address (Site Area)	Proposed Uses[1]	Proposed Minor Relaxation	Date of Consideration	Typical Floor Height (Uses)	Major Planning & Design Merits
Kwai Chung							
9.	S/KC/29 "OU(B)" A/KC/460 BHR: 130mPD	57 – 61 Ta Chuen Ping Street, Kwai Chung (2,261m^2)	I-O	PR 9.5 to 11.4 (+20%) BH Nil	**Approved** with conditions on 5.7.2019	N/A	● Full-height setback along Ta Chuen Ping Street wider than OZP requirement for long-term road widening and improving air ventilation
10.	S/KC/29 "OU(B)" A/KC/464 BHR: 105mPD	20-24 Kwai Wing Road, Kwai Chung (1,579m^2)	I	PR 9.5 to 11.4 (+20%) BH Nil	**Approved** with conditions on 29.11.2019	4.2m (Workshop)	● Voluntary full-height setbacks at the northern portion of site and along Castle Peak Road - Kwai Chung for improving pedestrian environment, air ventilation and visual permeability ● Greening provision of 316m^2 (about 20% of Site Area) ● Provision of communal escalator with universal accessible lift and staircase open to the public for improving pedestrian connectivity, accessibility and comfort ● Compliance with SBDG and incorporation of green building design measures
11.	S/KC/29 "OU(B)" A/KC/463 BHR: 105mPD	Kwai Chung Town Lot (KCTL) 49 and Ext. RP, 45-51 Kwok Shui Road, Kwai Chung, New Territories (Gross Site Area: 1,324.3m^2 Net Site Area[2]: 1,181.727m^2)	I	PR 9.5 to 11.4 (+20%) BH Nil	**Approved** with conditions on 17.3.2020	4.20m (Workshop)	● 2m Voluntary full-height setback along Kwok Shui Road for proposed pedestrian footpath and landscaped area ● Weather protection canopy along the northern and western facades ● Greening ratio of about 28.37% (335m^2) ● Incorporation of landscaped area at G/F, 1/F, 3/F and the rooftop ● Compliance with SBDG and incorporation of green building design measures

No.	OZP Zoning Application No.	Address (Site Area)	Proposed Uses[1]	Proposed Minor Relaxation	Date of Consideration	Typical Floor Height (Uses)	Major Planning & Design Merits
12.	S/KC/29 "OU(B)" A/KC/466 BHR: 130mPD	2-16 Lam Tin Street (1,858m^2)	Information Technology and Telecommu-nications Industries	PR 9.5 to 11.4 (+20%) BH 130mPD to 146.5mPD (+12.7%)	**Approved** with conditions on 29.5.2020	5.5m (Data Centre)	● Full-height NBAs along Lam Tin Street and Chun Pin Street in accordance with OZP requirement to cater for the long-term road widening proposal and enhance the air permeability of the area ● Incorporation of landscape area at B1/F, G/F, 1/F, 3/F and R/F and vertical greening at the low zone of the building along the western and eastern façades ● Greening ratio of about 22.69% (421.501m^2) ● Compliance with SBDG and incorporation of green building design measures
13.	S/KC/29 "OU(B)" A/KC/469 BHR: 130mPD	57-61 Ta Chuen Ping Street (2,248m^2)	Hotel	PR 9.5 to 11.4 (+20%)	**Approved** with conditions on 6.11.2020	3.3m (hotel rooms)	● Full-height NBAs abutting Ta Chuen Ping Street in accordance with OZP requirement and voluntary full-height setback to further improve permeability and streetscape ● Incorporation of landscaped area at G/F, 1/F and 2/F and vertical greening at 1/F façades ● Greening ratio of about 26.09% (586.5m^2) ● Compliance with SBDG and incorporation of green building design measures
14.	S/KC/29 "OU(B)" A/KC/471 BHR: 105mPD	10-16 Kwai Ting Road (1,381.457m^2)	I	PR 11.75 to 14.1 (+20%) BH 105mPD to 121.2mPD (+15.43%)	**Approved** with conditions on 14.5.2021	4.1m (Workshop)	● 7m full-height NBA (without underground structures) from the northern lot boundary abutting Kwai On Road ● Voluntary 1m full-height setback and a further 2.685m up to 15m in height above the abutted street level ● Canopy along the building edge facing Kwai On Road ● Bollards on pavement along the frontage of the Site to prevent illegal parking of vehicles and enhance pedestrian safety ● Plantings on street level within the Site along Kwai On Road and the western footpath ● Vertical greening features alongside the building facade facing Kwai On Road, a sky garden cum refuge floor on 13/F, communal landscape garden on 3/F, and green roof
Tsuen Wan							
15.	S/TW/33 "Industrial" A/TW/505 BHR: 100mPD	14-18 Ma Kok Street, Tsuen Wan (1,858.1m^2)	I	PR 9.5 to 11.4 (+20%) BH Nil	**Approved** with conditions on 1.11.2019	3.5m (Workshop)	● Voluntary full-height setback along Ma Kok Street for improving pedestrian environment ● Greening at G/F (with 0.6m setback) along Tsuen Yip Street ● Greening provision of 389 m^2 (about 20% of Site Area) ● Compliance with SBDG and incorporation of green building design measures

No.	OZP Zoning Application No.	Address (Site Area)	Proposed Uses[1]	Proposed Minor Relaxation	Date of Consideration	Typical Floor Height (Uses)	Major Planning & Design Merits
16.	S/TW/33 "Industrial" A/TW/509 BHR: 100mPD	8-14 Sha Tsui Road, Tsuen Wan (4,645.16m^2)	I	PR 9.5 to 11.4 (+20%) BH Nil	**Approved** with conditions on 13.12.2019	4.95m (Workshop)	● Full-height setback along Sha Tsui Road, Pun Shan Street and back alley ● Building setback above 1/F ● Landscape and seating provided in setback area along Sha Tsui Road and Pun Shan Street ● Substantial vertical greenery in front facade and total greenery coverage of not less than 20% ● Compliance with SBDG and incorporation of green building design measures
17.	S/TW/33 "OU(B)" A/TW/508 BHR: 100mPD	18-20 Pun Shan Street, Tsuen Wan (2,322.557m^2)	I	PR 9.5 to 11.4 (+20%) BH Nil	**Approved** with conditions on 17.1.2020	3.85m (Workshop)	● Full-height setback along Pun Shan Street in accordance with ODP requirement for improving pedestrian environment ● Setback from G/F to 3/F along the service lane at the west of the application site ● Landscape area provided at 1/F, 2/F and roof floor ● Greenery provided at entrance foyer and run-in/out, and total greenery coverage of not less than 20% ● Compliance with SBDG and incorporation of green building design measures
18.	S/TW/33 "Industrial" A/TW/514 BHR: 100mPD	Tsuen Wan Town Lot 85 and Lot 486 in D.D. 443, Fui Yiu Kok Street, Tsuen Wan (593 m^2)	I	PR 9.5 to 11.4 (+20%) BH Nil	**Approved** with conditions on 29.5.2020	3.5m (Workshop)	● Full-height setback along Fui Yiu Kok Street ● Upgrading works at G/F setback area and adjoining public footpath ● Provision of a continuous glass canopy structure facing Fui Yiu Kok Street above the pavement ● Incorporation of a communal podium garden at 1/F ● Total greenery provision of about 119.378m^2 (not less than 20% of site area) ● Compliance with SBDG and incorporation of green building design measures
19.	S/TW/33 "Industrial" A/TW/516 BHR: 100mPD	24-32 Fui Yiu Kok Street, Tsuen Wan (973.6 m^2)	I	PR 9.5 to 11.4 (+20%) BH Nil	**Approved** with conditions on 12.6.2020	4.08m (Workshop)	● Full-height setback along Fui Yiu Kok Street ● Incorporation of landscape area at the flat roof at 1/F ● Total greenery provision of about 201.8m^2 (about 20.7% of site area) ● Compliance with SBDG and incorporation of green building design measures
20.	S/TW/33 "OU(B)" A/TW/517 BHR: 100mPD	46-48 Pak Tin Par Street, Tsuen Wan (721.59 m^2)	I	PR 9.832 to 11.4 (+16%)	**Approved** with conditions on 9.10.2020	3.85m (Workshop)	● Voluntary full-height setback of 2m along Pak Tin Par Street with trees, and canopy above for rain protection and sun shading ● Provision of vertical greening at the building façade along Pak Tin Par Street, peripheral greening at 3/F and a sky garden with vegetated edge at 12/F ● Total greenery provision of about 177.8m^2 (24.634% of site area)

No.	OZP Zoning Application No.	Address (Site Area)	Proposed Uses[1]	Proposed Minor Relaxation	Date of Consideration	Typical Floor Height (Uses)	Major Planning & Design Merits
				BH Nil			
21.	S/TW/33 "OU(B)" A/TW/518 BHR: 100mPD	Lot 301 RP in D.D. 355, Pun Shan Street, Tsuen Wan (903.5 m2)	I	PR 9.5 to 11.4 (+20%) BH Nil	**Approved** with conditions on 22.1.2021	4.95m (Workshop)	● Full-height setback in form of non-building area (NBA) of 3.5m along Pun Shan Street for widening the existing footpath with provision of sunken planters to enhance pedestrian circulation and comfort ● 4.5m full-height setback in form of NBA along the south-western lot boundary for creating an extended pedestrian network from Sha Tsui Road into inner part of the street block bounded by Sha Tsui Road, Pun Shan Stret and Chai Wan Kok Street; and provision of canopy along this facade subject to GFA exemption ● Provision of vertical greening at G/F building facade along Pun Shan Street and roof greenery with total greenery provision of about 183.7m^2 (20.3% of the total site area)
22.	S/TW/34 "Industrial" A/TW/521 BHR: 100mPD	18-32 Fui Yiu Kok Street, Tsuen Wan (1,540 m^2)	I	PR 9.5 to 11.4 (+20%) BH Nil	**Approved** with conditions on 14.5.2021	4.15m (Workshop)	● Voluntary 1m full-height setback on G/F and 6.3m full-height setback at 1/F and above fronting Fui Yiu Kok Street ● 1m wide canopy above the main entrance will be provided within the 1m setback area on G/F ● Vertical greening on G/F and 1/F building façade/edge facing Fui Yiu Kok Street ● Incorporation of landscape area at the flat roof on 1/F for tenants' and visitors' use only ● Total greenery provision of about 324m^2 (about 21% of site area) ● Compliance with SBDG and incorporation of green building design measures

Notes

[1] Proposed Uses: Industrial (I), Commercial/ Office (C/O), Office (O) and Industrial-Office (I-O)

[2] The Site comprises parent lot KCTL No.49 (about 1,181.727m^2) and Ext. RP (about 142.6m^2). The extension area was granted after the building plans for the existing Toppy Tower were approved in 1974. Under the lease, no structure other than boundary walls and fences is permitted to be erected within the extension area except with prior approval of the Director of Lands, and the extension area shall not be PR/site coverage accountable. Hence, only the area of KCTL 49, i.e. about 1,181.727m^2 should be accountable for PR/GFA calculation.

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-1

致城規會秘書:

有關 A/KC/473 的申請

我是住在美羅大廈附近的居民，得知美羅大廈這項申請，我十分擔憂，數據中心對周邊的影響很大，尤其是其冷卻塔的水污染、空氣污染、噪音污染等，對附近居民的安全和健康都有重大影響，所以本人反對這項申請。

姓 名: 林小姐

簽 名: 林小姐

日 期: 2021-02-05



電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-2

敬啟者：

有關申請編號：A/KC/473

本人理解香港要發展 Data Center 的需求，但本人認為並不適合在人口密集的舊區發展，第一，數據中心 24 小時運作，年中無休，大量機器同冷卻塔的運作，噪音持續不斷，對附近居民的精神和健康都造成影響；第二，舊區的電力負荷和消防配套設施是否足夠。

姓　名：葉曉妮

簽　名：

日　期：05/FEB/2021

冒

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-3

秘書處先生/小姐:

有關申請: A/KC/473

就美羅工業大廈要重建成為數據中心的申請，本人極力反對。美羅工業大廈為處人口密集的老區，平日車來攘往、人車繁忙，美羅工業大廈正正林立在道路旁，改建成為數據中心後必定出現人車爭路的情況，使道路安全危機重重。而且數據中心所產生的噪音對我們都有非常有影響。

姓名：YIP KIM KWAN　　日期：5-2-2021

簽名：

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-4

敬啟者:

計劃申請編號 A/KC/473

經過詳細考慮和仔細看過該申請書，我明白數據中心是大勢，社會亦需要數據中心支持，但貿然在該位置興建數據中心，是否有些不合適？我知道附近都是大型工業大廈，每天人來人往，而且隔壁又是工廠，電力等等是否足夠。數據中心所產生的熱能非常高，是否有足夠配套措施配合？數據中心全年無休的噪音影響是否有解決方案？

姓名: 謝福芝

簽名: 謝福芝

日期: 04/02/2021

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-5

致城市規劃委員會秘書處:

得知美羅工業大廈申請改建為數據中心(A/KC/473)，本人表示反對。本人擔心改建後該數據中心會大量用電，引致供電不穩，發生全區停電的情況。也擔心數據中心的大量機器，廿四小時運作，噪音不斷，影響周邊。

姓名: 赵拐弘忍

簽名: 赵拐弘忍

日期: 05/02/21

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk

傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號

北角政府合署 15 樓

城市規劃委員會秘書處

5-6

秘書處:

本人為葵涌居民多年，葵涌是一個老區，得悉美羅中心會有新發展，本人對數據中心並不熟悉，知道數據中心會造成噪音滋擾，對附近居民造成影響；同時亦知道數據中心需要大量用電，擔心我們區電力不足以應付，倘若做成停電等，對我們葵涌區市民帶來不便。

姓名: 梁[illegible]

簽名:

日期: 05-02-2021

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-7

致城規會秘書:

有關的規劃申請編號 A/KC/473 的發展計劃，我是反對的。該位置的交通平常都較為繁忙，車路擠塞情況，若改建數據中心，我擔心交通擠塞問題。另外，我平時工作時間長，夜晚在家需要靜心工作，我十分擔心數據中心發出不間斷噪音，影響我的工作和休息。

姓名: 黃[illegible]

簽名: 黃

日期: 5-2-2021

[illegible]

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-8

致城規會秘書:

有關的規劃申請編號: A/KC/473

意見詳情:

一、電腦產生高溫，擔心引致火警，比起一般工廈更危險，本身已經多工廈。

二、美羅大廈非常貼近居民、附近工作人士，擔心噪音會影響四週，影響工作及健康。

姓名: 吳金妹

簽名: 吳金妹

日期: 2021/02/05

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-9

致秘書:

有關的規劃申請編號: A/KC/473

我對於數據中心並不了解，我擔心相關輻射問題、噪音問題，有見及此，本人特意來信表達對於此憂慮！

姓名: 何慧仁

簽名:

日期: 21/02/05

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-10

敬啟者:

有關的規劃申請編號: A/KC/473

申請地方是老區，附近又多工廠及工業大廈，而數據中心大量用電，我十分擔心會導致供電不穩定，以致全區停電；另外數據中心的噪音也是一大問題，對附近工作的人士和居民都造成嚴重影響。

姓名: 北少俊年

簽名: 北少俊年

日期: 05/02/2021

電

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-11

秘書處先生/小姐:

有關申請: A/KC/473

就美羅工業大廈要重建成為數據中心的申請，本人極力反對。美羅工業大廈為處人口密集的老區，平日車來攘往、人車繁忙，美羅工業大廈正正林立在道路旁，改建成為數據中心後必定出現人車爭路的情況，使道路安全危機重重。

姓名：王建仁　　日期：5-2-2021

簽名：

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-12

敬啟者:

申請編號 A/KC/473

葵涌人口相當密集，空氣質素不算差但不算好，但 Data Center 的冷卻系統排放，我十分擔心所排放的廢氣影響。而且噪音不停，也讓我十分擔憂的噪音會影響我的睡眠。

姓名: 安其保

簽名: 安其保

日期: 03-02-2021

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-13

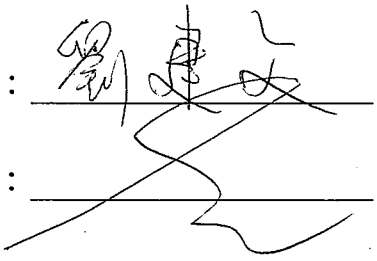
秘書處先生/小姐:

有關美羅工業大廈的申請: A/KC/473

美羅工業大廈要重建成為數據中心，本人對此持反對態度。數據中心設立在人口密集的老區非常不合理，老區日常人車繁忙，數據中心又接近道路，屆時人車爭路必定發生危險。而且我們每天經過美羅，不想受到噪音的影響。

姓名：劉康文　　日期：5-2-2021

簽名：





電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-14

致城規會秘書:

有關的規劃申請編號 A/KC/473 的發展計劃，本人深表反對。我知道一般數據中心會興建大型散熱塔為電腦散熱，萬一美羅工業大廈真的改建為數據中心，我擔心外型如死人墓的散熱塔會影響本區風水，而所產生的噪音更影響本區居民身心健康。

姓名: 林素金

簽名: 金

日期: 01-02-2021



電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-15

城市規劃委員會秘書先生/小姐:

申請編號: A/KC/473

有關規劃申請（A/KC/473），發展地方是舊區，多居民，多工廠，又多工業大廈，比較密集，本人是附近的居民，這裡要發展數據中心，本人十分擔心大量的機器和電腦會產生輻射，而且有噪音，對附近的人士的健康造成影響。

姓　名：郭[illegible]　　日　期：08-02-2021

簽　名：[illegible]　　電

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-16

敬啟者:

計劃申請編號 A/KC/473

得知本區美羅工業大廈有意申請改建成為數據中心，本人特意翻查有關資訊，並得出以下疑惑：

1. 附近都是大型工業大廈，區內供電配套是否足夠應付? 會否造成漏電或停電的情況發生?
2. 數據中心所產生的熱能非常高，是否有足夠消防配套措施配合？
3. 數據中心 24 小時日以繼夜 365 日全年無休，冷卻和機器運作不停所造成的噪音長期保持同一高頻，本區噪音問題如何解決?

因以上疑慮，本人認為該地址不是成為數據中心的理想選址。

姓名: 張毅湛

簽名:

日期: 4-2-2021

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-17

城市規劃委員會秘書先生/小姐:

有關規劃申請（A/KC/473），我十分擔心長期運作的數據中心會產生大量輻射，影響附近居民的健康。除此之外，我亦很憂慮中心會產生無間斷的噪音，滋擾居民生活。

姓　名：蔡美爽

簽　名：

日　期：5-2-2021

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-18

致城市規劃委員會秘書處:

葵涌申請編號 A/KC/473

我是美羅工業大廈鄰近居民，我十分反對這個申請，因為數據中心的機器長期運作，發出無盡的噪音，會影響我的睡眠及健康，希望貴處能為附近居民設想，審慎考慮此申請。

姓名: 葉美娜

簽名: 娜

日期: 5-2-2021

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-19

致城規會秘書:

有關的規劃申請編號: A/KC/473

意見詳情 – 本人聽街坊討論始知美羅工業大廈遞交申請，本人亦特別到訪大廈四周看看是否有通知，但本人並沒有發現任何通知。本人深覺奇怪。

對於相關申請，本人並沒有見到任何噪音改善的措施，到底這樣是否合適？雖然現在只是放寬地積比率，但如此沒有相關措施的申請，貴會應慎重考慮。

姓名: 李毛霞

簽名: 霞

日期: 5、2、21

電郵或電話: 霞

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-20

敬啟者:

本人從街坊口中得知，我們附近的美羅工業大廈申請轉為數據中心，本人感到愕然，因為本人每天都會經過大廈，並沒有見到任何告示。本人對於這項申請感到憂慮，擔心噪音問題。

姓名: [redacted] 簽名: [redacted]

日期: 5.2.21

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-21

秘書處:

針對美羅工業大廈的申請：A/KC/473，我個人是反對的，美羅大廈非常貼近居民、附近工作人士，擔心噪音會影響四週，影響工作及健康。
。

姓名: 陳日華

簽名: 華

日期: 5、2、21

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵：tpbpd@pland.gov.hk
傳真：2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-22

敬啟者：

有關美羅工業大廈的申請(A/KC/473)

本人是葵涌區老街坊，最近知道有關美羅大廈申請轉為數據中心的消息，十分擔心噪音影響。數據中心的設備發出的噪音會讓人分心，人們無法集中精力來處理工作，長期處於噪音嚴重的環境中，聽力會下降，人容易產生煩躁情緒，這些都不利於人們理智地去正常工作，數據中心噪音對鄰近居民和工作人士影響最大，希望政府慎重考慮。

姓　名：叶丽金

簽　名：金

日　期：5、2、21

RECEIVED
- 5 FEB 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-23

秘書先生/小姐:

有關的規劃申請編號: A/KC/473

申請地方是鄰近工業區、工業大廈、工廠等等，我也是在附近工作的，所以對於這個計劃我是非常擔心的。因為數據中心的冷卻系統，是 24 小時不停運作，本人擔心系統產生的噪音會影響我們日常工作。

姓名: 叶巧珍

簽名: 珍

日期: 5、2、21



電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-24

致城市規劃委員會秘書處:

葵涌申請編號 A/KC/473

我在美羅工業大廈附近住，我本人不支持這個申請，因為數據中心了無生氣，在樓頂放大量散熱塔，我怕影響風水，更會噪音不停，影響我睡眠。所以希望貴會慎重考慮此申請。

姓名: 李雲璟

簽名: 璟

日期: 5、2、21



電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-25

秘書處先生/小姐：

有關：申請編號 A/KC/473

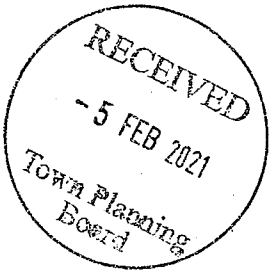
數據中心的電力供應須十分充足，也需要具備冷卻系統以助散熱，如此大量的用電，供電安全問題需要謹慎考慮。因此本人認為在此葵涌舊區發展不合適，供電需求太大，恐會造成周邊供電不穩定，亦可能會有漏電危險。

而且舊區附近工廈所產生音量已經不少，而現在更是全日無休的噪音不停。我作為附近的居民感到擔心。

姓　名：琪珊

簽　名：Shan

日　期：5/2/2021



致城市規劃委員會秘書：
專人送遞或郵遞：香港北角渣華道 333 號北角政府合署 15 樓
傳真：2877 0245 或 2522 8426
電郵：tpbpd@pland.gov.hk

5-26

To: Secretary, Town Planning Board
By hand or post: 15/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong
By Fax: 2877 0245 or 2522 8426
By e-mail: tpbpd@pland.gov.hk

有關的規劃申請編號 The application no. to which the comment relates A/KC/473

意見詳情（如有需要，請另頁說明）
Details of the Comment (use separate sheet if necessary)

Please refer to attached letter

「提意見人」姓名／名稱 Name of person/company making this comment Kenneth To & Associates Limited on behalf of Tung Chun Company Limited

簽署 Signature _____ 日期 Date 5 February 2021

RECEIVED
- 5 FEB 2021
Town Planning Board

KTA
Kenneth To & Associates Ltd
杜立基規劃顧問有限公司
TOWN PLANNING
AND DEVELOPMENT
CONSULTANTS

RECEIVED
2021 FEB -5 P 4:38
TOWN PLANNING BOARD

Our Ref: S1395/A_KC_473/21/001Lg

5 February 2021

Secretary, Town Planning Board
15/F North Point Government Offices
333 Java Road
North Point
Hong Kong

5-26

By Hand

Dear Sir / Madam,

Comment on Planning Application No. A/KC/473
Proposed Minor Relaxation of Plot Ratio Restriction for
Permitted Information Technology and Telecommunications Industries
(Proposed Data Centre Development)
at "Other Specified Uses" annotated "Business" Zone
Nos. 2-10 Tai Yuen Street, Kwai Chung

We are instructed by Tung Chun Company Limited ("the Objector") to submit this comment on Planning Application No. A/KC/473 received by the Town Planning Board ("TPB") on 7 January 2021 for the Proposed Information Technology and Telecommunications Industries (Proposed Data Centre Development) at Nos. 2-10 Tai Yuen Street, Kwai Chung.

The Objector, also the owner of Kwai Chung Town Lot ("KCTL") No. 432 at Nos. 1-7 Cheung Wing Road, Kwai Chung, wishes to lodge their **Strong Objection** to the Planning Application on the basis of adverse environmental impact, primarily in relation to the potential fixed noise impact associated with the Proposed Data Centre Development upon the ***immediately adjacent residential towers*** approved under the "CDA" development referred to below.

Approved Comprehensive Development at Nos. 1-7 Cheung Wing Road

The Site at Nos. 1-7 Cheung Wing Road, Kwai Chung (zoned "Comprehensive Development Area" ("CDA") and partly shown as 'Road' on the draft Kwai Chung Outline Zoning Plan No. S/KC/29) which is owned by the Objector, was the subject of a number of Planning Approvals for Comprehensive Development.

The latest approval (Planning Application No. A/KC/444) for ' Flat', 'Eating Place', 'Shop and Services' and 'Office' uses with minor relaxation of building height restriction from 120mPD to 145mPD was obtained from the TPB at its meeting on 22 March 2019. The development is under implementation by the Objector with occupation year in 2024 to 2025.

The Approved CDA development consists of 4 residential towers and one office tower, with retail space and central landscape area below. This is intended as part of the revitalisation of the old industrial area into a vibrant residential and recreational environment. Creation of new and noisy industrial uses (such as the Proposed Data Centre Development) immediately adjacent to the Approved CDA development would cause significant environmental impacts

九龍觀塘海濱道133號萬兆豐中心16樓K室 Unit K, 16/F, MG Tower, 133 Hoi Bun Road, Kwun Tong, Kowloon
電話 Tel：(852) 3426 8451 傳真 Fax：(852) 3426 9737 電子郵件 Email：kta@ktaplanning.com
bsi. ISO 9001 Quality Management
FS 579819

(primarily noise) disturbance and inconvenience to future residents and users of the retail and recreational spaces in the ***immediately adjacent*** Approved CDA development.

The reasons for the objection are outlined in further detail below:

Reasons for the Objection

Adverse Fixed Noise Impact Associated with the Proposed Data Centre Development
According to the information included in the Supporting Planning Statement submitted by the Applicant, there will be sizable cooling towers (12 nos.) located at the roof of the proposed development. It is understood that operation of the Data Centre will be 24 hours.

Hence, the noise generated from the cooling towers will incur significant noise impact onto the surrounding area during its round-the-clock operation. This will cause very significant disturbance and inconvenience to future residents and users of the retail and recreational spaces in the approved CDA development. In this regard, ***the shortest distance from the proposed data center to the Approved CDA Development at Nos. 1 - 7 Cheung Wing Road is about 20m only.***

A typical cooling tower with such large size may attain a noise level of 105 dB(A) and the **total noise level generated from those 12 nos. of large cooling towers may even reach 116 dB(A)**. Based on the shortest distance from the Proposed Data Centre to the Approved CDA Development at Nos. 1 - 7 Cheung Wing Road is about 20m only, the predicted **night-time noise level** at the residential towers due to the operation of these cooling towers may reach around 91 dB(A) with tonal effect, which **exceeds the night-time noise standard of 60 dB(A) under the Noise Control Ordinance by 31 dB(A)**.

No Information on Fixed Noise Impact Submitted
As there is no information such as a Fixed Noise Impact Assessment included in the Supporting Planning Statement submitted by the Applicant, the potential noise impact associated with the cooling towers at roof-top cannot be ascertained. **The Planning Application fails to demonstrate there would not be any adverse fixed noise impact to the nearby Noise Sensitive Receivers ("NSRs")**. To the extent there is any identified adverse noise impact, the proposed mitigation measures put forward by the Applicant are inadequate, as elaborated below.

We strongly urge the TPB to require the Applicant to carry out a Fixed Noise Impact Assessment to the satisfaction of Environmental Protection Department at the planning stage for identifying the fixed noise sources and assessing whether the fixed noise impact of the Proposed Data Centre Development to the nearby NSRs would comply with the Noise Control Ordinance. The TPB will be aware of recent guidance that fundamental issues of this nature must be considered on their merits by the TPB as part of the Section 16 planning process rather than being left over to be dealt with under planning approval conditions.

The Need to Implement At-Source Noise Mitigation Measures
It is stated in the Supporting Planning Statement submitted by the Applicant that "***the cooling towers at roof floor are an equipment plant which is neither covered plant room nor enclosed structure***". This demonstrates that no at-source mitigation measures have been considered by the Applicant in mitigating the potential fixed noise impact incurred by the cooling towers. Based on other similar project experience, tailor-made at-source noise mitigation measures in terms of a combination of acoustic louvre at four sides and

silencer at top would be required to completely enclose these cooling towers in order to minimize any adverse fixed noise impact onto the nearby NSRs including future residents at the Approved CDA Development at Nos. 1- 7 Cheung Wing Road.

Benefits of Implementation of At-Source Noise Mitigation Measure
Provision of the acoustic louvre and silencer is a typical and common mitigation measures in Hong Kong for effectively mitigating cooling towers and chiller noise source. These measures have been commonly adopted in many commercial buildings (e.g. City Plaza Phase One Office Building, etc.) or hospitals (such as Prince of Wales Hospital, etc). With careful planning of having at-source noise mitigation measures at early stage, it is believed that the Proposed Data Centre would not have any adverse noise impact to the surroundings even during its night-time operation. Also, the Proposed Data Centre would achieve the sustainable green building design under both BEAM Plus and LEED certification. Some typical examples are attached.

Last but not least, the TPB is urged to also take into account that, while an increase in plot ratio is not in principle objectionable where the planning circumstances justify such an increase, this must not be at the expense of and serious inconvenience to neighbours, in particular future residents of the approved CDA development ***immediately adjacent*** to the Application Site and users of the retail and recreational areas in the Approved CDA development. The Applicant should revise the captioned Planning Application No. A/KC/473 to ensure that any and all noise and other environmental impacts on the Approved CDA development immediately adjacent to the Application Site are ***fully mitigated beyond any doubt***.

In view of the objection grounds above, we consider that the Applicant has failed to submit adequate information in demonstrating the feasibility of the Proposed Data Centre Development. Unless there is unequivocal evidence submitted by the Applicant to your reasonable satisfaction that inter alia, the aforesaid concerns are properly addressed or dealt with, the Proposed Development will be detrimental to the living quality and well-being of the residents in the surrounding developments, including in particular future residents of the Approved CDA development ***immediately adjacent*** to the Application Site and users of the retail and recreational areas in the approved CDA development. We respectfully request the TPB to reject the Planning Application.

Meanwhile, should you have any queries in relation to the above and attached, please do not hesitate to contact the undersigned or Mr Kenneth To at 3426 8451.

Thank you for your kind attention.

Yours faithfully
For and on behalf of
KENNETH TO & ASSOCIATES LTD

Kitty Wong

KT/KW/vy
cc. Applicant and Team

Supreme Acoustics

NAP Acoustics

5-26

NAP ACOUSTICS JOB REFERENCE LIST

Acoustic Enclosure & Panel System

(This list indicates only part of our major projects.)















NAP ACOUSTICS (FAR EAST) LTD.

Tel : (852) 2866 2886
Fax : (852) 2866 3777
Email : acoustics@napafe.com.hk
Website : www.napacoustics.com.hk

Address:
Room 1811, 18/F., Hong Kong Plaza,
188 Connaught Road West, Hong Kong
香港干諾道西 188 號香港商業中心 1811 室

ISO 9001 : 2015
Certification No. HK03/02008

5-26

NAP SILENTFLO



A tranquil life in the country park. Route 3, Hong Kong
Dual three lane 3.7km long tunnel, Tai Lam

DUCT SILENCERS

QUALITY ASSURED FIRM ISO 9001 SGS

UKAS QUALITY MANAGEMENT 005

NAP SILENTFLO

Established in Australia in 1978, NAP SILENTFLO is now the leading designer and manufacturer of noise control equipment in the Asia Pacific region. Whatever the noise problem experienced in architectural, commercial or industrial situations, NAP has a proven engineered and technically advanced solution. The company's standard range of products are as follows:

- ▲ acoustic enclosures
- ▲ duct silencers
- ▲ vent silencers
- ▲ in-line silencers
- ▲ gas turbine silencers
- ▲ exhaust mufflers
- ▲ acoustic louvres
- ▲ acoustic doors
- ▲ audiometric rooms
- ▲ acoustic linings
- ▲ floating floors
- ▲ acoustic air handling units
- ▲ acoustic screens and barriers
- ▲ acoustic windows
- ▲ acoustic panels for architectural purposes

In this catalogue, we are pleased to introduce our standard range of duct silencers. These consist of:-

Section 1: Rectangular Duct Silencers
Section 2: Circular Silencers
Section 3: Air Relief Silencers
Section 4: Resonator Silencers

Information contained in this catalogue covers general applications, detailed technical data and selection procedures making it suitable for use by experienced acoustic engineers as well as mechanical consultants, designers, project engineers and architects.

PROJECT REFERENCE

AUSTRALIA
Hawker de Havilland - Jet Engine Test Cell
Hazelwood Power Station - Forced Draft Fans
Katherine Power Station - 5 x 8MW Turbines
Loy Yang Power Station - Resonator Silencers
National Tennis Centre - D-Series Silencers
North West Shelf - LNG In-Line Silencers

SOUTH EAST ASIA

Brunei
DPD (Suttan) Private Office
Jerudong Park Hotel

Cambodia
Intercontinental Hotel

Indonesia
Indosiar Television Studios
Stock Exchange Building

Malaysia
British High Commission
Oriental Hotel

Singapore
MRT
Suntec City - Sheraton Towers

Thailand
All Seasons Place
Siam Commercial Bank

Vietnam
63 Lai Tai Toh, Hanoi

Yangon
Marina Residential

FAR EAST REGIONS

Hong Kong
Bank of China Headquarters
Chek Lap Kok Air Traffic Control Tower
Eastern Harbour Crossing
Festival Walk, Yau Yat Chuen
Gateway II, Harbour City
MTR Headquarters Building
PRC Ministry of Foreign Affairs Building
Tai Po C & I Hospital
Tsz On Estate
Yuen Long Civic Centre

Shanghai
Pudong Shangrila Hotel
Pudong Times Square

Taiwan
Grand 50 Tower, Kaohsiung
Nan Pu Power Station

Macau
CTM Macau
CTT Building

SECTION 1 - RECTANGULAR DUCT SILENCERS

Introduction

D-Series (formerly named as Dingo) and H-Series Duct Silencers are used wherever it is necessary to control the passage of noise along an airpath. They control the noise of ventilating and air-conditioning systems in office buildings, lecture and conference rooms, hotels, hospitals and wherever air-conditioning and ventilating systems are installed.

In Industrial applications, D-Series Duct Silencers control noise from fans and blowers, cooling towers, dust extraction systems and generators. Excellent low frequency performance combined with minimal aerodynamic pressure drop make H-Series Duct Silencers the ideal choice for noise control in applications such as air-cooled chillers, industrial fans, power station ducting, cooling towers, steam vents, diesel and gas turbine driven equipment.

D-Series and H-Series Duct Silencers have a sheet metal outer casing resembling a conventional piece of ductwork. Inside the case is a number of splitters which divide the silencer into separate longitudinal airways. As the air or gas passes through these airways, sound is attenuated by the absorbent infill in the splitters.

The NAP Silentflo design features a specially formed splitter nose section, parallel airways and a truncated tapered tail to provide lower aerodynamic resistance. The specially formed nose section incorporates a non cylindrical profile providing a longer absorptive section of splitter whilst retaining a low pressure loss entry.

Whilst D-Series Duct Silencers have peak performance at mid frequency bands, H-Series Silencers incorporates extra thick acoustic splitters which enhance the low frequency performance significantly.

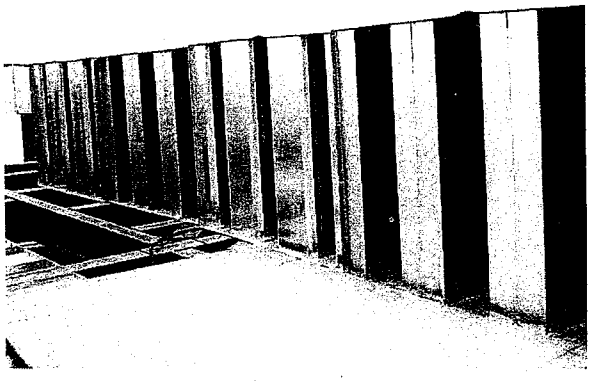


Figure 1.1: NAP Silentflo Duct Silencers

Construction

NAP Silentflo Duct Silencers consist of a galvanised sheetmetal case containing side splitters and one or more full splitters. The casing shall be rigidly constructed in accordance with the HVCA Ductwork Specification DW142 or the ASHRAE guide recommendation with a minimum sheet thickness of 0.8mm. For system pressures up to 2500Pa, Pittsburgh seams shall be used with duct sealant to ensure that the silencer case is airtight.

Splitters shall have a specially formed solid nose of non-cylindrical profile made from not less than 0.8mm galvanised sheetmetal, followed by a perforated galvanised sheetmetal facing of not less than 0.55mm thickness. A truncated tapered tail shall be incorporated to further reduce resistance to airflow.

To ensure a long service life, the solid nose shall be made from continuous sheet and jointed to the perforated facing by 'C' cleated cross joints without any welding. NAP research has shown that the service life of silencer depends very much on the integrity of the splitter nose and the construction detail of the nose to perforated facing. It is logical to conclude that the lesser the weldings the longer the service life. (Figure 1.1)

The sound absorptive infill in the splitters shall be glass fibre or mineral fibre and shall be retained by a perforated galvanised steel sheet, so as to be free from erosion for channel velocities up to 25m/s. The standard acoustic infill is suitable for continuous exposure up to 350°C. Alternative acoustic infills and stainless steel construction is available for temperatures up to 950°C.

In some special applications, polyester membrane is placed behind the perforated facing to prevent the ingress of dust, water and/or grease into the absorptive infill. Examples are cooling tower exhaust, kitchen extraction, clean room and hospital ventilation.

For passage velocities in excess of 25m/s, special facings such as fibreglass cloth and stainless steel wire meshes are required in addition to the perforated facing to prevent erosion of the absorptive infill.

NAP Silentflo Duct Silencers have been used on cooling towers continuously exposed to the weather without any sign of rust or reduction in acoustic performance, after many years in service.

For many industrial applications, heavier construction and enhanced corrosion resistance are required. NAP Silentflo's engineers will be pleased to discuss your specific project needs regarding structural and acoustic requirements and design for corrosion protections.

Heat Test

Heat test has been conducted by an independent laboratory to prove that NAP Silentflo Duct Silencers of galvanised steel construction are able to withstand 250°C for one hour with no change in the physical dimensions.

Silencer Types

D-Series and H-Series Duct Silencers are available in standard lengths of 600, 900, 1200, 1500, 1800, 2100, 2400, 2700 and 3000mm. Intermediate lengths are also available upon request.

Increasing the silencer length increases the sound attenuation with a corresponding increase in pressure drop.

A total of seven models and four models are available for the D-Series and H-Series Duct Silencers respectively. All have different airway spacings between the splitters and hence different percentage open areas. The explanatory notes on model numbers are as follows:

e.g. D27/90 - **D**-Series with peak performance at mid frequency bands
- **27%** open areas
- **90**cm splitter length

H33/90 - **H** series with superior performance at low frequency bands
- **33%** open areas
- **90**cm splitter length

If necessary, non module widths can be supplied by varying the configuration of the side splitters or by small variations in the airway.

Acoustic Performance

The longer the sound absorptive portion of the splitter, the better the acoustic performance of the silencer.

To maximize the acoustic performance, NAP Silentflo Splitter nose is characterized by a specially formed non-cylindrical profile.

The sound insertion loss for the range of silencers has been determined from measurements in an independent NATA registered Australian Laboratory. The diffuse field method from BS4718 : 1971 "Methods of Test for Silencers for Air Distribution Systems" was selected as basis of the testing procedures.

Tables 1.1 and 1.2 indicate the insertion loss figures associated with different series and models.

Table 1.1: H-Series Rectangular Silencers - Insertion Loss Performance

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
H33/60	7	11	12	17	22	16	13	11
H33/90	8	13	17	26	27	21	16	14
H33/120	9	15	22	34	32	26	20	16
H33/150	10	17	27	38	37	31	24	19
H33/180	12	20	32	41	43	36	28	21
H33/210	13	22	37	43	48	41	32	23
H33/240	14	24	42	48	53	46	36	26
H33/270	16	26	47	53	56	51	40	28
H33/300	18	29	52	59	60	56	44	31

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
H45/60	3	7	9	15	16	12	10	9
H45/90	3	9	13	20	20	14	14	9
H45/120	4	11	17	25	24	17	15	10
H45/150	6	13	21	30	29	20	16	12
H45/180	8	15	25	35	34	23	17	14
H45/210	9	17	29	40	38	26	18	15
H45/240	11	19	33	45	45	29	20	17
H45/270	12	21	37	47	47	32	21	18
H45/300	14	23	41	50	52	35	22	20

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
H40/60	5	9	10	16	19	14	12	10
H40/90	7	11	14	25	28	17	15	14
H40/120	8	13	19	30	32	21	17	15
H40/150	9	15	23	35	36	25	19	16
H40/180	10	17	28	42	40	29	21	17
H40/210	11	19	32	43	44	33	23	18
H40/240	12	21	37	50	48	37	26	20
H40/270	13	23	42	51	52	41	28	21
H40/300	14	25	47	55	56	45	30	22

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
H50/60	2	5	8	13	13	10	9	8
H50/90	3	7	12	17	14	12	11	10
H50/120	4	11	16	22	18	14	12	11
H50/150	5	12	19	26	24	16	14	12
H50/180	6	13	22	30	30	19	15	13
H50/210	7	15	25	34	35	22	16	13
H50/240	9	16	29	39	41	25	17	14
H50/270	10	17	32	41	44	26	17	15
H50/300	12	19	36	43	47	28	18	16

Table 1.2: D-Series Rectangular Silencers - Insertion Loss Performance

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
D27/60	6	10	19	32	35	30	27	24
D27/90	7	12	23	37	39	34	32	28
D27/120	8	14	27	42	43	38	37	32
D27/150	9	16	31	46	47	40	42	35
D27/180	10	18	35	50	51	47	46	38
D27/210	11	19	39	54	55	53	51	40
D27/240	12	21	43	59	60	59	56	42
D27/270	13	23	47	59	60	59	58	44
D27/300	14	25	51	60	60	60	60	47

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
D33/60	5	8	16	31	31	23	20	19
D33/90	6	10	20	35	35	28	25	22
D33/120	7	12	23	39	39	33	30	25
D33/150	8	14	27	43	44	38	35	28
D33/180	9	16	31	47	48	45	39	31
D33/210	9	17	34	51	53	51	43	33
D33/240	10	19	38	56	58	57	48	36
D33/270	11	21	42	58	59	58	52	38
D33/300	12	23	46	60	60	60	56	41

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
D38/60	4	6	12	28	25	18	14	13
D38/90	5	8	16	32	30	24	18	16
D38/120	5	10	19	36	35	29	23	19
D38/150	7	12	23	40	40	35	27	22
D38/180	8	14	27	45	45	42	31	24
D38/210	8	15	30	48	50	48	35	26
D38/240	9	17	33	54	56	54	39	29
D38/270	10	19	36	57	58	57	43	31
D38/300	11	21	40	60	60	60	47	34

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
D43/60	4	5	11	23	24	17	12	11
D43/90	5	7	15	28	29	22	16	13
D43/120	6	9	17	33	33	27	20	16
D43/150	7	11	21	38	38	32	24	18
D43/180	8	12	25	43	43	37	28	21
D43/210	8	14	28	47	47	42	30	23
D43/240	9	16	31	52	52	47	33	25
D43/270	9	17	33	56	56	52	35	27
D43/300	10	19	36	60	60	57	38	29

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
D47/60	4	5	10	20	23	16	11	9
D47/90	5	7	13	25	27	20	14	11
D47/120	7	8	16	30	31	25	17	13
D47/150	7	10	19	35	35	29	20	15
D47/180	8	11	23	41	40	33	22	17
D47/210	8	12	26	46	44	36	24	18
D47/240	8	14	29	51	48	40	27	20
D47/270	8	15	32	55	52	44	29	22
D47/300	9	17	35	60	56	48	32	24

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
D50/60	3	5	8	17	21	14	10	6
D50/90	4	6	11	22	25	17	12	8
D50/120	5	7	14	27	29	22	15	10
D50/150	5	9	17	32	33	26	18	11
D50/180	7	10	21	37	37	29	19	13
D50/210	7	11	24	42	41	32	21	15
D50/240	7	13	27	48	45	35	23	17
D50/270	7	14	30	53	49	38	25	19
D50/300	8	16	33	59	53	42	27	21

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
D60/60	2	4	7	12	14	8	5	3
D60/90	3	6	9	15	18	11	7	4
D60/120	4	7	11	18	22	14	9	5
D60/150	5	8	13	21	26	17	11	6
D60/180	5	9	15	24	30	20	13	7
D60/210	6	9	17	27	34	23	15	8
D60/240	6	10	18	29	38	25	16	10
D60/270	7	11	19	31	40	27	18	12
D60/300	7	12	20	34	42	29	20	14

Dynamic Insertion Loss

The testing standard BS4718:1971 describes the testing procedures for insertion loss of a silencer without air flowing through. The acoustic performance determined is static insertion loss.

As the acoustic performance is influenced by the flow of air through the silencer and is termed the dynamic insertion loss. NAP has carried out laboratory testing of the dynamic insertion loss for channel velocities up to 36m/s.

The data obtained have been interpolated, with the empirical input from some well known literatures to give the following results:

- The influence depends on the direction of air flow relative to the direction of sound propagation and the velocity of the air in the silencer channels.
- For silencer face velocity up to 7m/s, the dynamic insertion loss is within 10% of the static insertion loss.
- In commercial applications, such as HVAC systems in office buildings, the critical low frequencies 63Hz to 250Hz have negligible change between the dynamic and static insertion loss.
- For high velocity system, please refer to our Technical Bulletin for dynamic insertion loss.

Aerodynamic Performance

Studies on the subject of fluid mechanics prove that a truncated tapered tail on the splitter will provide pressure recovery which minimizes the pressure loss of NAP Silentflo Duct Silencers.

The pressure drop of D-Series and H-Series Duct Silencers is based on the results of tests performed in a NATA registered laboratory.

The steps for determining the pressure drop are as follows:-

1. Select silencer model and check the associated loss coefficient, K in Table 1.3.
2. Determine face velocity by dividing air flow (m^3/s) with silencer face area, W x H (m^2).
3. Determine pressure drop by multiplying loss coefficient, K by the square of face velocity, V (m/s).

$$\Delta p\ (Pa) = KV^2$$

where Δp = pressure drop (Pa)
K = Loss Coefficient
V = Face Velocity (m/s)

Table 1.3: Loss Coefficient, K

	Silencer Length (mm)								
Model	600	900	1200	1500	1800	2100	2400	2700	3000
H33	2.89	2.91	2.94	2.97	3.00	3.02	3.04	3.08	3.11
H40	1.69	1.71	1.73	1.74	1.76	1.77	1.79	1.80	1.81
H45	1.16	1.17	1.18	1.19	1.20	1.21	1.22	1.22	1.23
H50	0.82	0.83	0.84	0.84	0.85	0.85	0.86	0.87	0.87
D27	2.85	3.29	3.73	4.17	4.61	5.05	5.48	5.92	6.36
D33	1.60	1.85	2.10	2.35	2.60	2.85	3.09	3.34	3.59
D38	1.04	1.20	1.36	1.52	1.68	1.84	2.00	2.16	2.32
D43	0.68	0.79	0.90	1.00	1.11	1.22	1.32	1.43	1.53
D47	0.49	0.57	0.65	0.72	0.80	0.88	0.95	1.03	1.11
D50	0.39	0.45	0.51	0.57	0.63	0.69	0.75	0.81	0.87
D60	0.35	0.38	0.42	0.45	0.46	0.47	0.48	0.50	0.52

Airflow Generated Noise

NAP splitter silencers have been tested for regenerated noise. Although it is best at all times to refer to actual test data listed in our Technical Bulletin, a simplified formula is provided for prediction of regenerated sound power level of silencers. The steps are as follows:-

1. Select silencer model and determine the associated correction factor, C from Table 1.4,

2. Determine face velocity, V (m/s) by dividing air flow (m^3/s) with silencer face area, W x H (m^2).

3. Determine silencer open area percentage, %OA, for example, D27 model silencer has an open area percentage of 27%.

4. Determine A-weighted sound power level, Lw(A) from the following formula:-

   $Lw(A) = 50\log V + 10\log A - 45\log(\%OA/100) + C$
   where A = silencer cross section area (m^2)

5. To calculate the unweighted octave band sound power, apply the spectrum correction factors listed in Table 1.5 to the A-weighted sound power level.

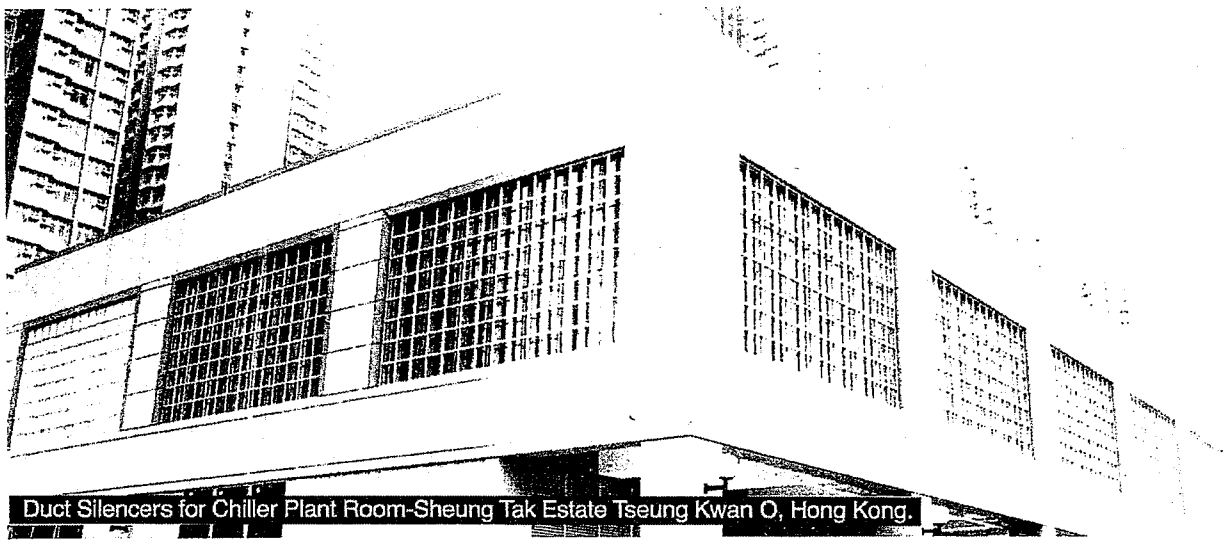
6. The regenerated noise should always be considered, particularly at passage velocities in excess of 10m/s and especially where NR values of 40 or below are required.

Table 1.4: Correction Factor, C for different models

	Silencer Length (mm)								
Model	600	900	1200	1500	1800	2100	2400	2700	3000
H-Series	1	0	-1	-2	-4	-5	-6	-7	-7
D-Series	3	3	2	1	0	0	-1	-1	-2

Table 1.5: Spectrum Correction Factors

	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
H-Series	14	1	-3	-5	-5	-6	-8	-17
D-Series	11	3	-1	-5	-6	-8	-16	-20
Standard Deviation	±5	±5	±5	±2	±3	±3	±3	±4



Duct Silencers for Chiller Plant Room-Sheung Tak Estate Tseung Kwan O, Hong Kong.

Material Standard

To produce high quality products, NAP has selected first class materials according to quality control requirements.

Steel sheet is galvanized by hot-dip process to ASTM A653-94 (formerly as ASTM A526) or AS1397 or JIS3302 and have minimum zinc coating to G60 or Z180.

The sound absorptive infill shall be inert, vermin proof, non-hygroscopic, non-capillary and moisture proof. Combusion ratings for the infill material shall be non-combustible and comply with BS476 Part 4:1970 or AS1530 Part 3:1976 or other national standards where applicable.

Installation

When used in mechanical services and air conditioning systems silencers are best installed where the ductwork passes through plant room, studio or other building walls, and where the ductwork upstream of the silencer is free of bends so that airflow into the silencer will be uniform. Should a silencer be installed after a bend, there is a right and wrong way of orienting the silencer.

Splitters should be installed in same plane as the radius of the bend. (Figure 1.2)

Silencers should not be installed close to the inlet of fans. This prevents noise generated by the fan blades as they cross the wake from the splitter airways. This phenomenon can increase the fan noise by up to 15dB. Silencers should therefore be placed approximately two rotor diameters from the fan itself. (Figure 1.3)

Where the adjoining ductwork is thermally insulated, allowance should be made for thermally insulating the silencer as they are not externally insulated in standard form.

Flexible couplings should be used between the silencer and adjoining ductwork where there is a risk of vibration transmission or flanking. The material of the flexible coupling should be non-sound transparent (metal impregnated fibreglass reinforced vinyl cloth being an excellent material) which permits vibration isolation whilst minimizing the sound leakage into or out of the ductwork.

NAP engineers are pleased to provide assistance in selecting the proper silencers and the proper installation procedures.

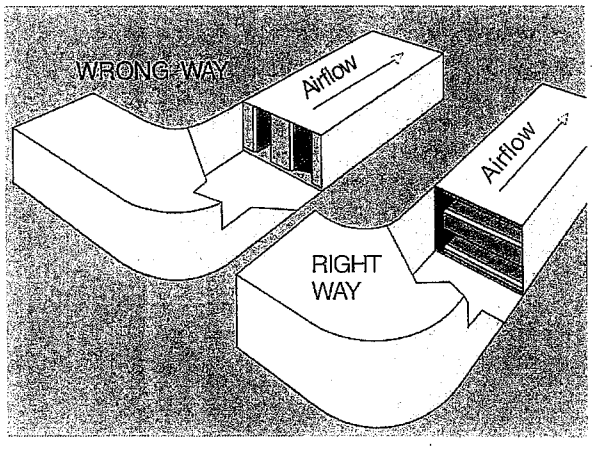


Figure 1.2: Silencer Installation - Bends preceding silencer

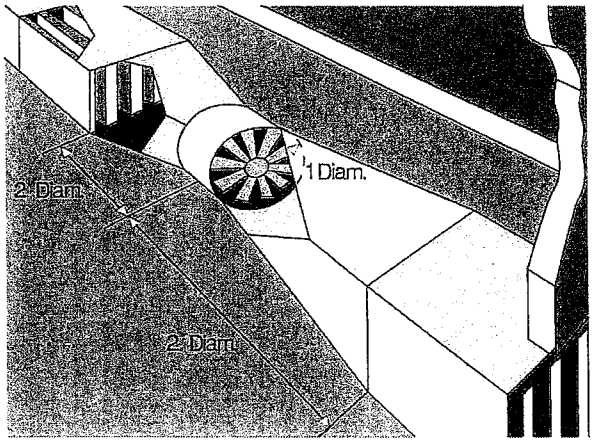


Figure 1.3: Fans located near silencers

SECTION 2 - CIRCULAR SILENCERS

Introduction

NAP Circular Silencers are used to reduce noise in an airpath of ventilating and air-conditioning systems in office buildings, lecture and conference rooms, hotels, hospitals, radio and television studios.

In industrial applications, specially designed and constructed circular silencers control noise from fans and blowers, cooling towers, dust extraction systems and gas turbines.

Construction

NAP Circular Silencers are available in a wide range of sizes from 305mm diameter upwards.

The case is fabricated from a minimum of 0.8mm galvanised steel. The inner pod and outside lining use fibreglass or mineral fibre as acoustic infill, protected by perforated galvanised steel facing. The silencers are supplied in natural galvanised finish, with the weld affected areas protected by cold galvanised paint. Angle flanges protected by a corrosion resistant paint finish are recommended to be provided by the manufacturer and fixed to the silencers at workshop before delivery (Figure 2.1). The silencers can also be supplied with drilled and tapped holes on both ends as options.



Figure 2.1: Circular Silencers with angle flanges

Model Range

A standard range comprising Types CS (without pod) and CSP (with pod) is offered from 305mm to 2415mm diameter, and each range is available in two lengths. For models CS-1D and CSP-1D the length of silencer is equal to one diameter, and for models CS-2D and CSP-2D, the length is equal to two diameters. 1D and 2D are standard lengths, but non-standard lengths are available on request, or to meet special performance requirements.

The silencer model prefix represents the internal diameter of the silencer.

Standard Silencer Dimensions

Silencer Diameter (I.D.)	Case Diameter (O.D.)	Length 1D*	Length 2D*
305	455	305	610
380	530	380	760
480	630	480	960
530	680	530	1060
610	760	610	1220
760	910	760	1520
915	1115	915	1830
965	1175	965	1930
1065	1275	1065	2130
1220	1430	1220	2440
1370	1580	1370	2740
1525	1740	1525	3050
1905	2220	1905	3810
2415	2730	2415	4830

* length equals length overall including flanges.

Installation

NAP Circular Silencers can be fitted directly to the inlet or discharge of axial fans or in circular sections of the ductwork.

Consideration should be given to the pressure drop and noise regenerations when mounting podded circular silencers to the discharge of axial flow fans.

Acoustic Performance

The sound insertion loss for the range of silencers has been determined from measurements in an independent NATA registered Australian Laboratory. The diffuse field method from AS1277 : 1983 "Acoustics - Measurement Procedures For Duct Silencers" was selected as basis of the testing procedures.

Table 2.1: Circular Silencers type CS (without Pod) - Insertion Loss Performance

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
305 CS-1D	1	3	3	8	7	6	6	5
380 CS-1D	1	3	4	8	7	7	7	5
480 CS-1D	1	3	4	9	7	7	7	5
530 CS-1D	1	3	5	9	7	7	7	5
610 CS-1D	1	3	5	9	7	7	6	5
760 CS-1D	1	3	6	9	7	6	5	4
915 CS-1D	2	3	6	9	7	6	5	4
965 CS-1D	2	3	6	9	7	6	5	4
1065 CS-1D	2	3	7	9	7	6	5	4
1220 CS-1D	2	4	7	9	7	6	4	4
1370 CS-1D	3	4	7	8	6	6	4	4
1525 CS-1D	3	4	8	8	6	5	4	3
1905 CS-1D	4	5	8	8	6	5	4	3
2415 CS-1D	4	6	8	8	6	5	4	3

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
305 CS-2D	2	5	6	14	14	13	9	8
380 CS-2D	2	5	7	14	14	13	10	8
480 CS-2D	2	5	7	15	14	13	10	8
530 CS-2D	2	5	8	15	14	13	10	8
610 CS-2D	3	6	8	15	14	12	10	8
760 CS-2D	3	6	10	16	14	11	9	7
915 CS-2D	4	6	11	16	15	11	9	7
965 CS-2D	4	6	11	16	15	11	8	7
1065 CS-2D	4	7	12	17	15	10	8	7
1220 CS-2D	5	8	14	18	14	10	8	7
1370 CS-2D	6	8	15	18	13	9	7	7
1525 CS-2D	6	9	15	18	11	9	7	6
1905 CS-2D	7	9	16	16	10	8	7	6
2415 CS-2D	8	10	17	14	10	7	6	6

Table 2.2: Circular Silencers type CSP (with Pod) - Insertion Loss Performance

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
305 CSP-1D	2	4	6	12	14	17	17	14
380 CSP-1D	2	4	7	13	14	18	18	14
480 CSP-1D	2	4	7	13	14	18	18	14
530 CSP-1D	2	4	8	13	15	20	17	13
610 CSP-1D	3	4	8	13	16	21	16	12
760 CSP-1D	3	5	10	13	17	23	15	11
915 CSP-1D	4	6	11	13	18	21	14	10
965 CSP-1D	4	6	11	14	19	20	13	10
1065 CSP-1D	4	6	11	14	21	19	13	10
1220 CSP-1D	5	6	11	14	24	18	12	9
1370 CSP-1D	5	7	11	15	23	17	12	9
1525 CSP-1D	6	8	11	15	22	15	11	9
1905 CSP-1D	7	9	12	19	20	13	10	8
2415 CSP-1D	8	10	13	23	17	11	9	7

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
305 CSP-2D	4	7	13	23	29	36	29	21
380 CSP-2D	4	8	14	24	30	38	30	21
480 CSP-2D	5	8	14	24	30	38	31	21
530 CSP-2D	5	8	16	25	32	37	30	19
610 CSP-2D	5	8	18	26	33	37	30	18
760 CSP-2D	6	9	21	27	34	35	26	16
915 CSP-2D	8	10	22	28	36	35	23	15
965 CSP-2D	9	10	23	29	37	34	20	14
1065 CSP-2D	9	11	23	29	37	33	19	14
1220 CSP-2D	10	13	24	30	37	33	19	13
1370 CSP-2D	10	16	25	32	36	30	18	13
1525 CSP-2D	11	18	25	33	36	26	17	13
1905 CSP-2D	12	20	26	35	33	21	15	12
2415 CSP-2D	14	22	27	36	30	17	12	11

Aerodynamic Performance

The pressure drop graph (Figure 2.2) applies to the types CSP-1D, CSP-2D.

The type CS (without concentric pod) has a negligible pressure drop. It is equal to the equivalent length of straight duct plus a roughness factor of 60% for duct velocities up to 15m/s.

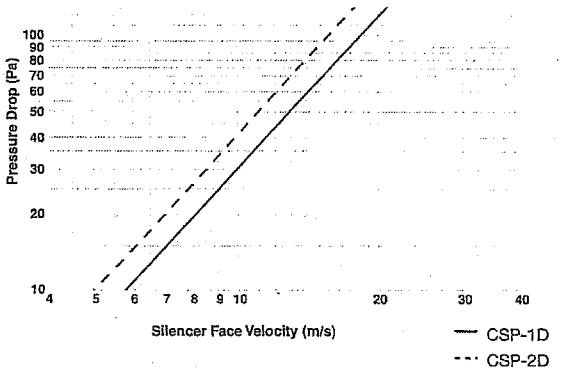


Figure 2.2: Graph of pressure drop vs. face velocity applies to the types CSP-1D & CSP-2D

SECTION 3 - NAP 'AIRVENT' CROSS-TALK SILENCERS

Introduction

The NAP Silentflo 'AIRVENT' range of cross-talk silencers has been specially designed to solve the common problem of transferring air from adjacent areas without transferring unwanted noise. These silencers allow two way airflow whilst efficiently reducing the transfer of sound in either direction. They are particularly effective in the all important speech frequency range which often causes speech privacy problems in the work environment.

A comprehensive range of models of various configurations allows great flexibility in the choice of silencer location. Versatility and ease of installation result in economical noise control.

As with all NAP Silentflo products attention to detail and quality of construction are evident throughout the 'AIRVENT' range. Product reliability has established NAP Silentflo's reputation, proven performance and market leadership.

Applications

NAP 'AIRVENT' silencers are designed to be used in locations where air must be transferred or relieved from one area to another without the transfer of noise.

They are ideally suited to applications where it is desirable to keep out music or conversational noise from adjacent areas. The versatility of the 'AIRVENT' range allows them to be installed in ceilings, walls, partitions and ventilation shafts. They may be either inbuilt or surface mounted depending on specific project requirements.

Typical Applications:
Offices; Schools; Laboratories; Hospitals; Conference Rooms; Hotels; Factories; Libraries; Music Rooms; Studios; Sporting Complexes; Kitchens; Apartments; Rest Rooms; Return Air Shafts.

Construction

Standard 'AIRVENT' units (ST-type) are constructed using a minimum 0.8mm galvanised steel case, which can be prime painted in preparation for finish painting by others where exposed installation is required.

Sound absorption is provided by a fibreglass or mineral fibre lining faced with perforated galvanised steel sheet. Melinex lining is available as options for special applications.

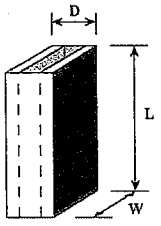
In those applications where higher performance (HP-type) than catalogued is required, minimum 1.2mm case, special mass barriers and higher density acoustic infill are used. This will ensure superior acoustic performance, particularly in the reduction of flanking noise.

For further information regarding the extensive range of non standard sizes and constructions for specialized applications please contact NAP Silentflo.

Silencer Types

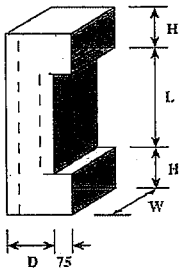
I Configuration

Unit Designation
I - ST - W/H
Model - Type -
Grille Width/Grille Height
Overall length = L



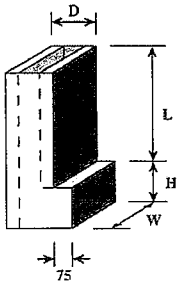
U Configuration

Unit Designation
U - ST - W/H
Model - Type -
Grille Width/Grille Height
Overall length = L + 2H



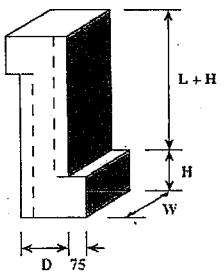
L Configuration

Unit Designation
L - ST - W/H
Model - Type -
Grille Width/Grille Height
Overall length = L + H



Z Configuration

Unit Designation
Z - ST - W/H
Model - Type -
Grille Width/Grille Height
Overall length = L + 2H



Acoustic Performance

The published performance data is based on results obtained from laboratory tests carried out at an independent NATA registered laboratory and tested to BS 2750 : 1980 "Field and Laboratory Measurement of Airborne and Impact Sound Transmission in Buildings". Table 3.1 indicates the Noise Reduction figures associated with different types and models.

As there can be other paths of sound transmission between the source and the listener such as walls, ceilings and doors it should be noted that the actual installed acoustic performance will depend on the transmission losses of these adjacent structures. As a general guide the STC rating of any wall less than STC48, with an area of less than 12-14m², will not be derated by the installation of NAP 'AIRVENT' U & Z silencers. For L configuration silencers, the maximum wall rating would be STC45 and for I configuration silencers, the maximum wall rating would be STC42. Area limits of 12-14m² still apply.

For information regarding the effect of surrounding structures on the acoustic performance, consult NAP engineers.

Table 3.1: 'AIRVENT' Cross-Talk Silencers - Noise Reduction Performance

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
I-ST	23	25	24	25	24	32	40	35
I-HP	22	28	31	33	34	34	39	39

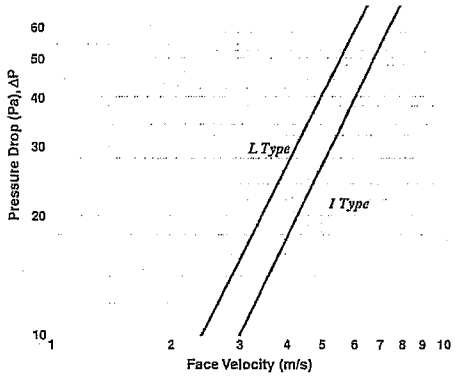
	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
Z-ST	23	25	24	31	40	42	46	41
Z-HP	22	28	31	39	44	44	45	45

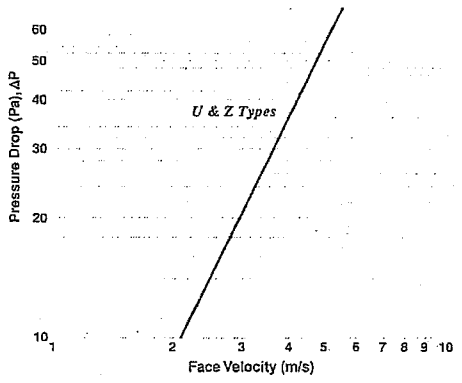
	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
L-ST	23	25	24	28	32	37	43	38
L-HP	22	28	31	36	37	38	42	42

	Octave Band Centre Frequency (Hz)							
Model	63	125	250	500	1k	2k	4k	8k
U-ST	23	25	24	31	40	42	46	41
U-HP	22	28	31	39	44	44	45	45

* For ST-Type, L = 900mm. For HP-Type, L = 1500mm

Pressure Drop





Pressure drop curve applies to standard grille height of 200mm

Specification

Supply and install cross-talk silencers as shown on the drawings and schedules. Cross-talk silencers shall be NAP Silentflo 'AIRVENT'.

The dimensions and capacities shall be as indicated on the schedules.

The outer casing shall be of galvanised steel sheet not less than 0.8mm thick and constructed in accordance with the HVCA Ductwork Specification DW142 or the ASHRAE guide recommendation.

The sound absorptive linings shall be glass fibre or mineral fibre, faced with perforated galvanised steel sheet.

Suppliers shall submit independent test results indicating Noise Reduction and Pressure Drop performance of the units.

Sizing and Selection

Airflow capacity of 'AIRVENT' silencers for different grille sizes is as follows:

Grille Size (W x H)	Air Quantity (l/s) Face Velocity (m/s) 1.0	1.5	2.0	2.5	3.0
300 x 200	60	90	120	150	180
300 x 300	90	135	180	225	270
400 x 200	80	120	160	200	240
500 x 300	150	225	300	375	450
600 x 300	180	270	360	450	540
600 x 400	240	360	480	600	720

Note: Face velocities greater than 3m/s are not recommended.
1.5-2.0m/s is commonly used.
Grilles are not supplied with 'AIRVENT'units.

For higher air quantities than given (above), the following steps are recommended:

1. Increase grille (and silencer) width
2. Increase the number of silencers
3. Increase the silencer depth (max. 400mm) allowing maximum grille height of 800mm. (Refer below)

When using grille heights other than 200mm the following correction should be made to the standard pressure drop:

$$\Delta P \text{ Adjusted} = \Delta P \times (H/D)^2$$

where H = Grille Height (mm)
D = Silencer Depth (normally 200mm)

Note: Values of (H/D) greater than 2 are not recommended.
Quoted pressure drop values apply to units only and do not include grilles.

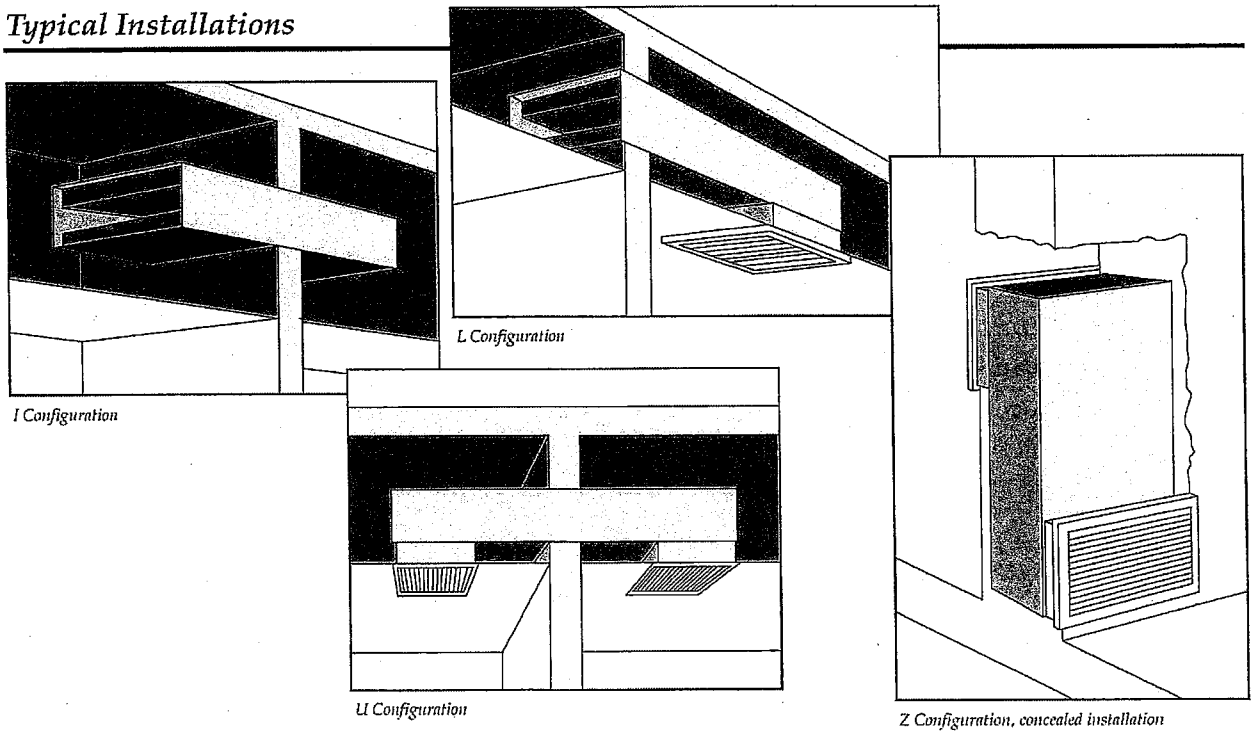
Installation

NAP 'AIRVENT' silencers may be installed in ceilings, walls and shafts in a fully concealed, flush or exposed configuration suitable for standard partitioning systems or ceiling grids.

In order to ensure 'AIRVENT' silencers achieve their maximum performance potential, careful attention should be given to the location and installation details. Typical installations are shown below.

All penetrations through walls and ceilings should be properly sealed once the unit has been installed to prevent flanking noise and breakout.

Typical Installations



I Configuration

L Configuration

U Configuration

Z Configuration, concealed installation

SECTION 4 - RESONATOR SILENCERS

Introduction

NAP Silentflo Resonator Silencers are ideal for control of noise from large industrial process plants, manufacturing and mining installations, food processing and electrical power generation plants, where control of broadband fan noise with tonal components is critical.

Resonator Silencer, sometimes called Tuned-Dissipative Silencers or "Christmas Tree" Silencers, are suitable for fan silencing when such equipment becomes a source of community noise problems for residents living adjacent to industrial plants. (Figure 4.1)

Resonator Silencer construction consists of Quarter Wave and Helmholtz chambers which generally contain a number of cavities tuned to the fundamental frequency and its first harmonic. Other chambers are tuned to provide attenuation across the full frequency band.

Resonator Silencer are used in dusty or grease laden environments, where conventional absorptive type silencers clog up and become ineffective.

The Resonator Silencer can readily be cleaned in situ, or the splitter elements can be designed to be removable from the casing for external cleaning.

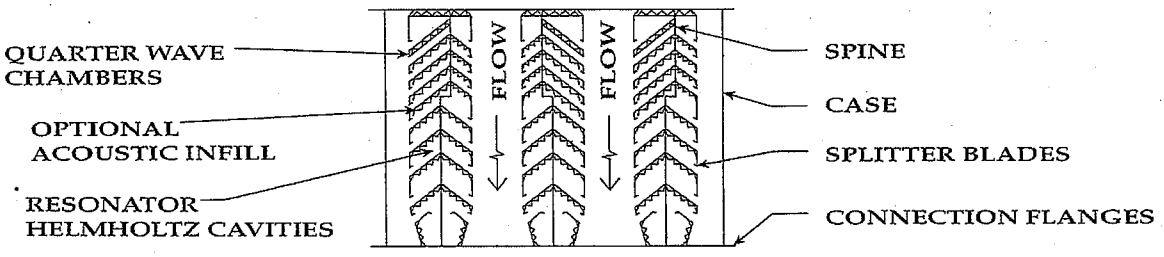


Figure 4.1: NAP Silentflo Resonator Silencers

Applications

In commercial applications such as kitchen exhausts, clean air rooms, electronic component manufacture, laboratories and medical facilities where extremely high air quality or low particulate contamination is required, the silencers can be supplied without fibrous infill and with special non-contaminating absorptive, or flow resistive linings. Thus, depending on the technical and environmental requirements, these silencers can be supplied with optional linings as follows:

- ◆Mineral wool or glass fibre
- ◆Acoustic foams or polyester fibre
- ◆Flow resistive facings (no infill at all)

Construction

The silencers shall comprise a galvanized sheetmetal case of minimum thickness 0.8mm in accordance with the code of practice DW142 or the ASHRAE guide recommendation. Longitudinal joints shall be of Pittsburgh seams sealed with duct sealant.

Splitters shall have a specially formed bull nose of non-cylindrical profile made from not less than 0.8mm galvanized sheet metal, followed by a steel spine with steel blades. The splitters shall consist of repeating modules of cavities and chambers which, acting on the wave cancellation and Helmholtz principle, provides the necessary attenuation. Each splitter shall normally be faced with a wire mesh along its length to provide strength and uniform flow through the airways, thereby minimising turbulence.

Angle flanges protected by a corrosion resistant paint finish are recommended to be provided by the manufacturer and fitted to the silencers at workshop before delivery.

In cases where silencers are installed in corrosive environments, construction of the silencers shall be in stainless steel or other appropriate material as specified.

Acoustic Performance

Table 4.1 indicates the insertion loss figures associated with different series and models.

Table 4.1: Resonator Silencers - Insertion Loss Performance

		Octave Band Centre Frequency (Hz)							
Model	Length	63	125	250	500	1k	2k	4k	8k
PE90	900	5	10	15	18	21	20	14	10
PE120	1200	6	12	17	20	24	23	16	11
PE150	1500	8	14	19	23	26	25	18	13
PE180	1800	9	15	21	25	28	27	20	14
PE240	2400	10	17	23	28	31	29	22	16
PL90	900	4	9	11	15	17	16	12	10
PL120	1200	5	11	14	18	20	19	14	11
PL150	1500	7	13	17	21	23	22	16	12
PL180	1800	8	14	19	23	26	25	18	13
PL240	2400	9	15	21	25	28	27	20	14
PX90	900	3	7	11	12	14	13	10	8
PX120	1200	5	9	13	15	17	16	12	9
PX150	1500	6	11	15	18	20	19	14	10
PX180	1800	7	12	16	20	22	21	15	11
PX240	2400	8	13	17	22	24	23	17	12

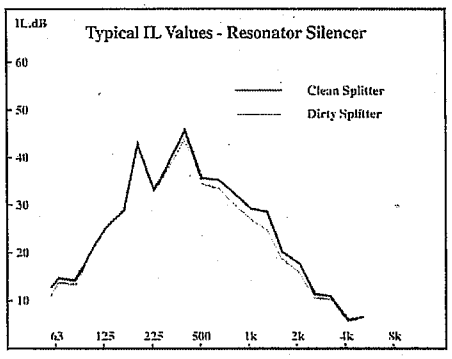


Figure 4.2: Effect on contamination of Resonator Silencer

Aerodynamic Performance

The following formula can be used to determine the pressure loss at normal room condition.

$$\Delta p\ (Pa) = KV^2$$

where Δp = pressure drop (Pa)
K = loss coefficient
V = face velocity (m/s)

Table 4.2: Loss coefficient, K

	Silencer Length (mm)				
Model	900	1200	1500	1800	2400
PE	3.12	3.15	3.17	3.20	3.25
PL	1.87	1.88	1.89	1.90	1.92
PX	1.27	1.28	1.29	1.30	1.32

The graphs shown in Figure 4.2 and 4.3 demonstrate the rapid deterioration in performance, which can occur with conventional silencers in dirty airstreams. Resonator silencers will continue to perform in aggressive environments over many years without degradation.

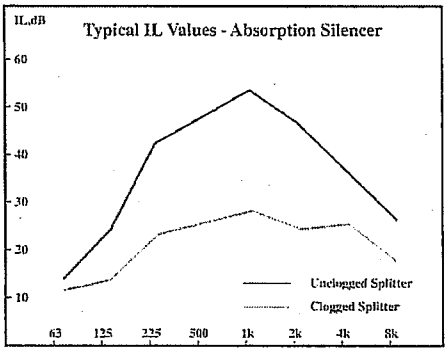
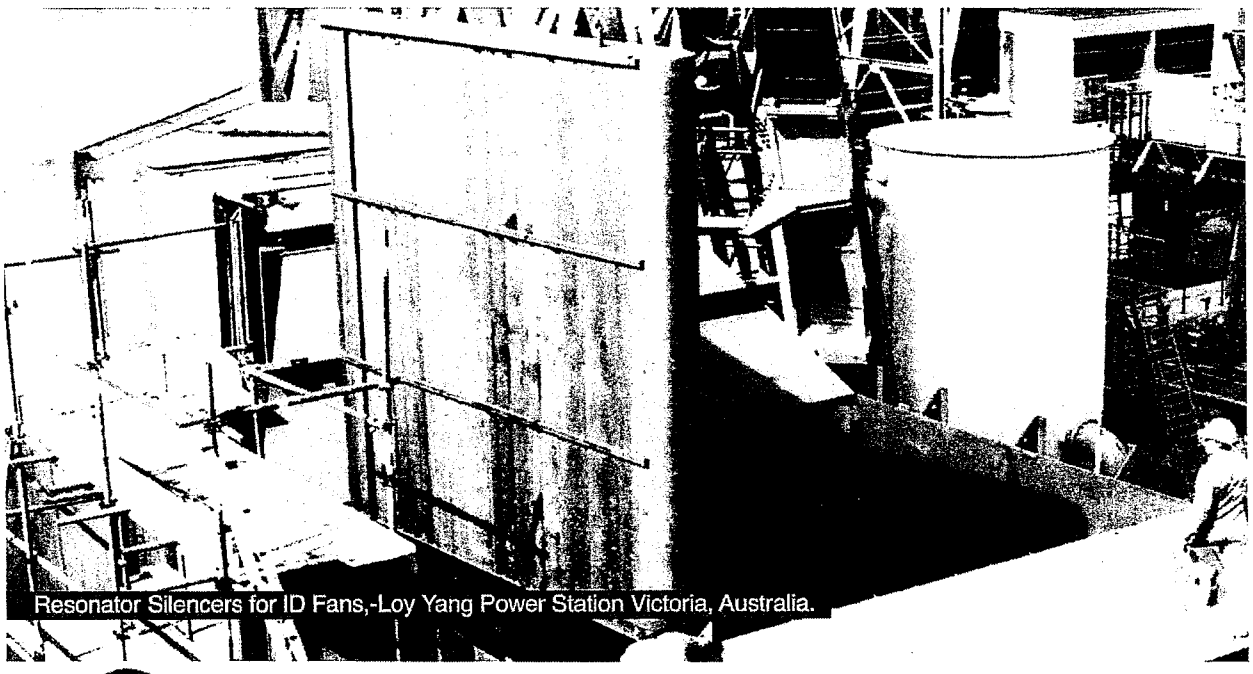


Figure 4.3: Performance of clogged and unclogged silencer for Absorption Splitter Type



Resonator Silencers for ID Fans,-Loy Yang Power Station Victoria, Australia.

SECTION 5 - TECHNICAL INFORMATION

Attenuation Requirements

The amount of attenuation that is required should be determined in order to select a silencer. For ventilating and air conditioning systems, detailed procedures for calculating the required attenuation can be found in the ASHRAE guide and SMACNA manual. Other references will also provide guidelines, but should any difficulty be encountered, then discuss the problems with NAP engineers.

Silencer selection for ventilation systems is dependent on the sound power level of the fan and the final noise level required. The sound power level quantifies the total acoustical energy of a source. This acoustical power emanates from the source and spreads over an ever increasing area as the sound travels away from the source. This reduces the intensity of the acoustical energy and a corresponding reduction in sound pressure level occurs.

The first piece of information required in an air conditioning system calculation, for example, is the fan sound power level. Knowing the type of fan, the air quantity delivered by the fan, and the fan pressure, the manufacturer can determine the sound power level. For air conditioning system noise calculations, octave bands from 125Hz to 4000Hz or 63Hz to 8000Hz are normally used.

Secondly, the design criteria should be determined. In addition to this, all the attenuation due to other fittings should be evaluated with a final summation to determine the performance, in each octave band, that is required of the silencer.

Detail Analysis

As part of our research works, NAP Silentflo has created its own computer softwares for both roomside and outdoors acoustic calculations. Having extensive experience in solving a wide variety of complex acoustic problems and with the support from the proprietary softwares, NAP Silentflo offers a professional service, aimed at providing cost effective and practical solutions to individual problems, built and designed with pride and quality in mind.

The Short Attenuation Calculation Procedure - Airconditioning Systems

Most calculations of the attenuation required in a ventilating system show that the selection of silencers is governed by the attenuation requirement at 125Hz. To provide a quick check, the attenuation requirement on roomside calculation can be simplified to:

Attenuation required at 125Hz Octave Band		
=10 Log (room air quantity l/s)		.....
+20 Log (fan pressure Pa)	+	.....
-duct length m	-	.....
-20 Log (distance from register m)	-	.....
-Noise Rating (NR Number)	-	.....
-16 dB	-	.....
Silencer Requirement, dB		_____

Final Selection

A correct silencer selection provides the required sound attenuation and at the same time accommodates the required air quantity at an acceptable pressure drop. The selection should bear in mind limitations of airflow generated noise.

After the determination of the attenuation requirement, make a selection of the silencers models which will provide the required attenuation. Then, determine the duct face velocity at the point in the system where it is proposed to insert the silencer and, referring to the pressure loss graphs, make a selection of models which will accommodate the aerodynamic requirements.

A final check should then be performed on the silencers to ensure that the level of regenerated noise is not too high. The shortest attenuator is usually the most economical solution.

Acoustic Submission

To maintain a guaranteed standard on acoustic submissions and noise control measures, NAP recommends that all acoustic submissions shall be checked and endorsed by a competent person, such as a corporate member of the local acoustics institution, e.g. MHKIOA, MIOA, MASS,etc.


NO. 2
13
08.12.2006 13:16

tpbpd@pland.gov.hk

寄件者: [redacted]
寄件日期: 2021年03月25日星期四 3:51
收件者: tpbpd
主旨: A/KC/473 2-10 Tai Yuen Street, Kwai Chung

Sog 2

5-27

A/KC/473
2-10 Tai Yuen Street, Kwai Chung
Site area : About 1,865m²
Zoning : "Industrial"
Applied Development : Proposed **Minor Relaxation of Plot Ratio** for 22f Data Centre / 44 Vehicle Parking

Dear TPB Members,

That every development applies for MINOR relaxations and that PD, responsible for drafting the OZP in the first place, supports the applications makes a mockery of the OZP process. How can a district wide increase in height and bulk of 20% be justified? Where is the data with regard to overall impact on the district?

I would refer to the minutes of 31 May 2019 re a similar application: strong justification and planning merits for the proposed minor relaxation of BH restriction. Approving such applications without strong justification and planning merits would set an undesirable precedent.

(a) the planning and design merits of the proposed scheme, taking into account the site specific characteristics and local context;
(b) design of street level on pedestrian accessibility, connectivity and comfort;
(c) compliance with relevant provisions of Sustainable Building Design Guidelines; and
(d) consideration of green building design

Green Wall = Green Wash. This is an data centre, it will emit lots of heat, the chances of any plants surviving are remote. In addition the location of the GW would make it clearly very difficult and expensive to maintain.
One a few shrubs and on tree on the pavement.
Sky Garden on roof delivers no public benefit, ditto the small pockets of potted plants on 1st and 2nd floors
Canopy along Main Entrance Canopy to provide rain shelter for pedestrian. Seriously? This is very short and merely protects the entrance to the building.

Members must ensure that relaxations come with community benefits and green measures that are sustainable and permanent, not merely ornaments trotted out to secure approval.

Mary Mulvihill

致城規會：

Sg 2

反對規劃申請編號 A/KC/473
（地址：葵涌大圓街 2-10 號）

5-28

近日，本會收到會員反映葵涌大圓街 2-10 號興建 24 小時運作數據中心的查詢，表示憂慮數據中心散熱機房會帶來噪音污染，望貴署可以認真審示有關規劃詳情，並要求發展商提供合格的環評報告，確保項目的營運符合環保署的噪音法例規定，如聲浪過大，建議發展商加強隔音設備，讓居民在家不受噪音滋擾。有勞之處，先行致謝。



石蔭朋友仔

2021 年 3 月 29 日



致城規會：

5-29

反對規劃申請編號 A/KC/473
（地址：葵涌大圓街 2-10 號）

本會得知葵涌大圓街 2-10 號將興建 24 小時運作的數據中心，在此表示歡迎創科技業帶動區內經濟發展，惟居民擔心數據中心散熱機房及頂樓冷卻水塔的產生噪音滋擾，希望有關企業注意問題的嚴重性，並做好環境評估報告，積極考慮興建足以應付噪音的隔音設備，讓居民免受噪音影響。

另外，本會冀望政府有關部門可以做好把關的職能，嚴謹要求發展商遵守《香港規劃標準與準則》“第九章環境”的“表 4.1：噪音標準摘要” 中的固定噪音源要求。

葵涌居民協會

2021 年 3 月 29 日

RECEIVED
30 MAR 2021
Town Planning Board

致城規會：

5-30

反對規劃申請編號 A/KC/473
（地址：葵涌大圓街 2-10 號）

擬議的數據中心 24 小時運作，事實上，數據中心運營的聲音非常嘈雜。例如數據中心的聲音來自服務器本身產生的噪音，其次來自高速運轉的風扇，而更多的噪音可能來自冷凝器、壓縮機、蒸發器的機房空調設備。噪音過大往往令人感到煩躁不安。

居民長期受噪音騷擾，精神健康堪憂。有精神科專科醫生表示，長期生活在噪音之下，會令人產生巨大精神壓力，繼而產生負面情緒，處理不慎更會有抑鬱及焦慮徵狀，繼而惡化成情緒病。

有鑒於市民對噪音污染日益關注， 政府於 1989 年制定《噪音管制 條例》("《條例》")，限制各種 源頭產生的噪音於法定水平。因此，政府一直致力將大部份環境噪音納入法律規管內。此外，政府亦透過公眾諮詢進行規劃及政策制訂工作，令受不必要噪音滋擾的市民人數盡量減少。

有見及此，懇請貴會/署審批數據中心事宜時，向申請人瞭解數據中心有否作出詳細全面的環境噪音評估及研究？對當區居民會否造成不可接受的影響？及如何落實相應的噪音緩解措施，務求盡量紓減有關發展可能帶來的影響。避免影響大眾市民的生活質素。

艷紅梅曲藝社

2021 年 3 月 29 日

RECEIVED
30 MAR 2021
Town Planning Board

致城規會:

5-31

反對規劃申請編號 A/KC/473
（地址：葵涌大圓街 2-10 號）

擬議的數據中心將會是全日 24 小時運作，數據中心服務需求日增，高密度伺服器亦愈趨普及，由於這類伺服器耗電量高，並產生大量熱力，故需要更多電力供冷卻之用。與此同時，數據中心有否符合機電工程署有兩項措施，即實施《建築物能源效益條例》(第 610 章)及推出「淡水冷卻塔計劃」，有助提升數據中心的能源效益，同時關注對附近居民的影響。

數據中心有大量的電腦儀器在不停運作，儀器始終需要釋放能量，散熱導體或是使用冷水塔形式去處理，同樣會為附近帶來基本噪音問題，當噪音日積月累時，為居民帶來嚴重的困擾。該地段與民居十分接近，因此，區內的生活質素相當重要，在室外的冷卻水塔的噪音將會為周邊環境帶來嚴重的噪音影響。而就議上述事宜亦未見申請人有提交足夠項目研究及數據分析以證明數據中心並不會為周邊環境帶來嚴重的噪音影響。居民擔心數據中心運作後，冷卻水塔發出的噪音不能解決，杜絕噪音的問題也解決不了，鄰近民居只能默默忍受。

城規會及環保署有責任確保新的發展項目如擬議的數據中心不會為公眾帶來噪音的滋擾。城規會、環保署及有關政府部門有責任要求申請人提交噪音評估報告及提出噪音緩解措施給城規會、環保署及有關部門考慮及審批。

懇請 貴會切實執行把關的責任，並確保擬議的數據中心在運作時務必附合香港現有之法規，保障一切廣大市民的利益，避免將不必要的矛盾帶給居民，影響大眾市民的生活質素。

荃藝曲社

荃藝曲社 TSUEN NGAI MUSIC ASSOCIATION

RECEIVED
30 MAR 2021
Town Planning Board

2021 年 3 月 29 日

致城規會：

5-32

反對規劃申請編號 A/KC/473
（地址：葵涌大圓街 2-10 號）

本會特撰函 貴會反映大圓街 2-10 號發展 24 小時運作數據中心事宜。本會基本歡迎創科企業於區內發展，但大前提必須不影響居民正常生活。據網上資料提供，數據中心每日消耗大量電力，令機器經常處於過熱狀態，需要使用大型冷卻系統或大型散熱風扇降溫，惟此類降低溫度的大型設備往往產生嚴重噪音問題。本會冀望 貴會在批准項目發展前，確保發展商提出防止噪音滋擾的方案，並貫徹落實，以避免居民生活環境受到破壞。如規劃時未能滿足居民訴求，將會為居民帶來不堪設想的後果，祈求 貴會體恤居民的困難予以幫助。

CLUB BEAUTIFUL
靚靚會
*

靚靚會

2021 年 3 月 29 日

RECEIVED
30 MAR 2021
Town Planning Board

致城規會：

5-33

反對規劃申請編號 A/KC/473
（地址：葵涌大圓街 2-10 號）

本會乃東北葵涌居民團體，關注工商業處所發出的噪音問題，據了解現時正在興建的大圓街發展項目為創科項目，擬規劃為 24 小時數據中心，本會建議發展商必須徹底解決工業裝置所帶來的噪音滋擾，根據法例工商業處所發出的噪音同樣受《噪音管制條例》監管。工廠及商用處所會在日常業務運作中產生噪音，更可況 24 小時營運設備，這些噪音的來源包括：空調及通風系統。其他與業務有關的機械或工業裝置，例如冷凍系統。這些噪音均受《管制非住用處所、非公眾地方或非建築地盤噪音技術備忘錄》規管。本會望貴會正視該發展項目的環評噪音報告，保障東北葵涌居民免受噪音滋擾。

寧峰苑居民協會

NING FUNG COURT RESIDENTS ASSOCIATION
寧峰苑
居民協會

2021 年 3 月 29 日

RECEIVED
30 MAR 2021
Town Planning Board

致城規會：

5-34

反對規劃申請編號 A/KC/473
（地址：葵涌大圓街 2-10 號）

擬議的數據中心將會是 24 小時運作，因此在屋頂上的冷卻水塔的噪音將會為周邊環境帶來嚴重的噪音影響。申請人並沒有提交足夠資料以證明數據中心並不會為周邊環境帶來嚴重的噪音影響。申請地點附近有不少現有及已獲城規會批准的住宅發展，受噪音影響的住戶將會不計其數，嚴重影響區內的生活質素。

根據申請人提交的資料，申請人並沒有就冷卻水塔發出的噪音做評估及提出任何緩解措施。坊間現時有不少的隔音措施/方法可供選擇，申請人理應詳細考慮相關緩解措施，以減低對鄰近民居的影響。

城規會及環保署有責任確保新的發展項目如擬議的數據中心不會為公眾帶來噪音的滋擾。城規會、環保署及有關政府部門有責任要求申請人提交噪音評估報告及提出噪音緩解措施給城規會、環保署及有關部門考慮及審批。

懇請貴會/署確保擬議的數據中心在運作時將會產生的噪音是在「可接受噪音聲級」以下，及其"聲級"要求可參照《香港規劃標準與準則》"第九章環境"的"表 4.1：噪音標準摘要"中的固定噪音源要求，以確保申請人及貴會/署在此申請事宜中符合香港法例的要求。

社區發展聯盟

ALLIANCE OF DISTRICTS 社區發展聯盟

2021 年 3 月 29 日

RECEIVED
30 MAR 2021
Town Planning Board

致城規會：

5-35

反對規劃申請編號 A/KC/473

（地址：葵涌大圓街 2-10 號）

本人居住於區內私人樓宇，發現大圓街正在興建創科數據中心，得知中心將會以 24 小時運作模式不停工作，恐防其機房會產生大量噪音破壞小區的安寧，本人相信任何發展計劃都必須廣泛咨詢附近居民，得到大家的認同先可以落實。望 發展商主動與附近居民多接觸，了解他們的顧慮及意願，令發展計劃做到不影響居民居住環境下順利運作。另外，希望 貴會按照環保條例的規定審批發展商的申請，以避受人垢病。

2021 年 3 月 29 日

RECEIVED
30 MAR 2021
Town Planning Board

致城規會

5-36

反對規劃申請編號 A/KC/473
（地址：葵涌大圓街 2-10 號）

本人在此希望發展商提交更完善的環境評估資料，該發展商未有就散熱機房及冷卻水塔發出的聲量做出評估，在發展商補交噪音環評報告前，本人並不百份百放心項目發展。如報告屬噪音管制類別，應該積極提出可以解決的措施。效仿其他符合噪音標準的工業大廈，採取適當的隔音措施或降低噪音的方法，發展商理應盡企業責任考慮相關降低噪音的措施，以減低對鄰近生活民居的影響。

Tina

2021 年 3 月 29 日



致城規會：

5-37

反對規劃申請編號 A/KC/473
（地址：葵涌大圓街 2-10 號）

本人是石蔭區居民，希望反映有關大圓街新樓盤興建 24 小時營運數據中心事宜，首先本人歡迎及非常支持創科企業在當區發展，但本人及部分街坊擔心數據中心長期運行電腦，其散熱風扇及冷卻系統在 24 小時運作的模式中，好大機會造成噪音滋擾，望 政府有關部門批示數據中心申請時，必須要求發展商提供環評研究報告及興建足夠的隔音屏障以阻隔機器產生的聲音降低聲浪及符合環保署的法例規定。讓居民可以與往常一樣在舒適的環境生活。

2021 年 3 月 29 日

RECEIVED
30 MAR 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-38

敬啟者：

關於美羅工業大廈的申請

美羅工業大廈申請編號為 A/KC/473，數據中心的機房，是一個成百上千台電腦運行的複雜環境，我擔心數據中心建在居民區周邊，運作時會產生大量的輻射風險，亦會產生無間斷的噪音問題，對居民的生活造成滋擾。

姓名: 郭嘉窕

簽名: 郭

日期: 27-3-2021

電郵或電話:



香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

5-39

執事先生/小姐：

有關 A/KC/473 申請的意見

近日得知美羅工業大廈將會重建成為數據中心，此前我並不了解數據中心，但與街坊交流後，隨即我上網查閱資料，並且詢問朋友，得知數據中心需要安置大量的電腦系統及相關部件的設施，例如電信和儲存系統，環境控制裝置（例如空調），另外還要設置冷卻塔裝置。而這些裝置，都將會是長期不間斷的工作，意味着噪音也是長期不間斷，這對我們附近居民造成很大困擾。

姓　名：顏 [illegible]

簽　名：顏 [illegible]

日　期：27 - 3 - 21

電郵/電話：



日期：26/3/2021

北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會
秘書處收

5-40

申請編號 A/KC/473

本人是葵涌多年居民，對數據中心也比較有了解，本人知道數據中心若落成，因為要長期運作，維修等工作相對很難開展，但美羅改建直至這刻我都無見到任何詳細對於噪音的控制，而政府部門也無就噪音對申請有要求或限制。如果他日，中心落成，到時候噪音影響到各街坊，而街坊才去投訴，已經太遲。數據中心帶來的噪音大家都知道有多噪，大家都不能忽視這個問題。所以希望委員能防範於未然，若不是，到時間各街坊能力薄弱，可以做到的真的不多。

此致　城市規劃委員會

姓名: 黃民友
簽名: 黃民友
日期: 27-3-21

RECEIVED
30 MAR 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-41

致城規會秘書:

有關 A/KC/473 的申請

我是美羅工廈附近的居民，得知美羅大廈這項申請，我們附近街坊都十分擔憂，因數據中心冷卻塔的各種污染，包括噪音污染、空氣污染、水污染等等，對我們附近街坊的安全和健康都有重大影響，所以本人十分反對這項申請，希望能重新考慮將數據中心的設立遠離這密集居民的舊區。

姓名: 郭錦明

簽名: [signature]

日期: 26-3-2021

RECEIVED
30 MAR 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-42

致城規會秘書先生/小姐：

有關的規劃申請編號: A/KC/473

意見詳情:

1. 本人在上個月聽街坊討論始知美羅工業大廈遞交申請轉做數據中心，本人亦特別到訪大廈四周看看是否有通知，但本人並沒有發現任何通知。本人深覺奇怪。故上月曾去信貴會，但至今未有任何回覆及措施。

2. 本人就數據中心的噪音問題曾提出疑慮，但此申請仍沒有見到任何改善噪音的措施，懇請貴會再次慎重考慮。

姓名: 楊雪玉

簽名: _____

日期: 2020-3-25



電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-43

敬啟者:

有關美羅工業大廈的申請(編號: A/KC/473)

葵涌區的人口相當密集，空氣質素已經不算很好，而美羅工業大廈要改做數據中心，空調及通風、冷卻系統、及其他有關的機械或工業裝置會 24 小時運作，我擔心所排放的廢氣會對附近居民造成影響，而且 24 小時噪音不停，白天影響工作，夜晚會影響睡眠，讓我十分擔憂。

姓名: 許淑卿

簽名: 許

日期: 25-3-2021

RECEIVED
30 MAR 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-44

致城規會秘書處：

申請編號 A/KC/473

我是葵涌區居民，住處鄰近美羅工業大廈，我自從得知此項申請，一直十分憂慮，我擔心全日無休的數據中心設備有很大的輻射問題、噪音問題，也未見此項申請提出相關的改善措施。

姓名: 葉金堯

簽名: 堯

日期: 26-3-2021

RECEIVED
30 MAR 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-45

致秘書處

有關規劃申請-A/KC/473

位於葵涌大圓街的美羅大廈申請發展數據中心，附近已經不少工業大廈，也有密集的住宅大廈，數據中心的大量電腦長期運作，全年無休，未知在這舊區的電力是否能負荷，會否導致全區供電不穩定，而無間斷的噪音，對附近的居民造成的嚴重影響如何解決。

姓 名: 蔡美娜

簽 名: 美

日 期: 27-3-2021



電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

5-46

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

致秘書先生/小姐：

有關規劃申請編號: A/KC/473

本人為葵涌區的老街坊，從街坊口中得知美羅工業大廈要重建做數據中心，不明白為何如此大的工程，從未貼出告示正式通知過區內居民，也從沒有公示收集意見。本人對此申請有很多疑慮，不知道有否慎重考慮過數據中心對周邊帶來的電力、消防、噪音滋擾等影響？

姓名: 鍾珊

簽名: _____

日期: _____

1

致北角渣華道北角政府合署 15 樓
城市規劃委員會秘書處收

5-47

日期：二零二一年三月二十日

就申請編號 A/KC/473，意見如下：

從街坊口中得知，我們附近的美羅位置會變成數據中心。起初我都沒有為意，但近早上網一查，了解一下數據中心是甚麼來的，看到資料後，我對這個申請有些顧慮。

從很多資料見到：資料中心運營的聲音非常嘈雜。資料中心的噪音範圍通常為 75 分分貝到 95 分貝。相比之下，根據美國國家職業安全與健康研究所(NIOSH) 的資料，人類正常交談的聲音約為 60 分貝，割草機約為 90 分貝，飛機起飛時的發動機噪音為 140 分貝。所以其實對資料中心是很嘈的，而最令人顧慮的是資料中心是不會停止運作，即是長期都是陪隨著這個分貝。這是一個很大的問題，十分需要被正視。希望委員會可以充份考慮。

姓名: 錢建

日期: 29-3-2021

RECEIVED
30 MAR 2021
Town Planning Board

香港北角渣華道 333 號北角政府合署 15 樓
城市規劃委員會秘書處

5-48

敬啟者：

有關編號 A/KC/473

有關美羅工業大廈重建成為數據中心的申請，本人持反對意見，本人是葵涌區老街坊，葵涌區人口密集，美羅大廈的位置平日已經交通繁忙，人多車多，數據中心的建立會增加交通擠塞的情況，並且本身附近已經多工廠、工廈，再改建數據中心，會使噪音污染的問題變得更加嚴重。

姓　名：林美華

簽　名：

日　期：26-3-2021

RECEIVED
30 MAR 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

5-49

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

致城規會秘書處:

有關規劃申請編號: A/KC/473

有關美羅工業大廈申請重建成為 Datacenter，本人了解過 Datacenter 的一些設備會持續發出低頻噪音，在其他區甚至其他國家也有相同的情況，如果設立在住宅區附近 低頻噪音會持續對居民造成健康影響, 例如頭痛、耳鳴等，而且噪音問題是難以解決。有見及此，本人認為對於 Datacenter 的選址問題應重新進行慎重考慮。

姓　名: 許書輝

簽　名: 許書輝

日　期: 27-3-2021



日期：26/3/2021

北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會
秘書處收

5-50

城市規劃委員會主席及各位委員：

A/KC/473 申請

我有朋友住在日出康城，剛好對面便是數據中心，由於晚上傳來不斷低頻的聲音，以致朋友睡眠一直睡不好，投訴過幾次，但情況一直無好轉。我作為美羅大廈附近居民，見到這個申請，我真的好擔心。我有跟我的朋友提過附近大廈改建數據中心，他讓我好快點就申請未獲批前，快些提交意見，因為一但數據中心建成，那麼就會重蹈覆轍，像他一樣會長期受到影響。我只是很擔心這些不斷的聲音對我生活造成影響。

姓名:

簽名:

日期:

電郵或電話:



5-51

北角渣華道 333 號北角政府合署 15 樓
城市規劃委員會秘書處

電郵: tpbpd@pland.gov.hk_
傳真: 2877 0245 or 2522 8426

致城市規劃委員會:

有關編號 A/KC/473，知道有關申請再次交資料，但資料中沒有顯示任何確實的減少嘈音方案，本人並不能接受。本人並非無理取鬧，而是地點會改為興建數據中心，一個並非朝九晚六的工作地方，而是全天候無間斷運作的地方。那麼數據中心的嘈音就是全天候無間斷，試想想往後日子都是受著那些嘈音的影響，所以本人只希望能見到有確實方案，確保嘈音在晚上，特別是睡眠時間能夠有效保障我們。

姓名: 黎建新

簽名:

日期:

RECEIVED
30 MAR 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-52

敬啟者：

關於申請編號 A/KC/473

關於美羅工業大廈改建數據中心，本人未見此申請對數據中心將會產生的噪音影響有任何有效措施，本人感到十分擔心。

姓名：Judy Tsim　　簽名：

日期：26/Mar/2021

RECEIVED
30 MAR 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-53

城市規劃委員會秘書處:

有關的規劃申請編號: A/KC/473

本人不懂數據中心，但也知道數據中心會產生大量輻射及噪音，對附近工作和生活的人都造成滋擾。希望政府慎重考慮。

姓 名: 許美蓮　　日 期: 26-3-2021

簽 名: 許

RECEIVED
30 MAR 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-54

致城市規劃委員會秘書處

有關美羅大廈的申請(A/KC/473)

本人對此申請此反對態度：

- 數據中心設立在密集工廈、密集居民的舊區，該位置附近的交通平常已經較為繁忙，再建數據中心，屆時交通擠塞、人車爭路，十分危險。
- 數據中心廿四小時工作，噪音也廿四小時不間斷，鄰近居民和工作人士，將長期處於噪音環境中，對身心健康造成嚴重影響。

姓　名: 吳貴雄

簽　名:

日　期:

RECEIVED
30 MAR 2021
Town Planning Board

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

5-55

秘書處：

有關申請編號: A/KC/473

本人得知美羅工業大廈要改建成為數據中心，本人對此持反對態度，本人認為在此葵涌舊區發展不合適，附近工廈所產生噪音已經不少，而數據中心更是 24 小時無休的噪音不停。據我了解附近的居民都感到十分擔心。

姓名: 侯穎淩

簽名:

日期: 26-3-2021

RECEIVED
30 MAR 2021
Town Planning Board

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

5-56

致城規委員會：

有關 A/KC/473 的意見

本人理解政府推行活化工廈的初衷，也同意將舊工廈重建，但在此舊區的工廈重建成為數據中心則需要慎重再慎重考慮. 數據中心會有持續的低頻噪音，而附近又多住宅，即使日間能忍受，夜間也會對睡眠造成影響，對人的精神狀態也會造成影響，睡眠不好，翌日學生上課、居民工作也難以集中精神，對生活、工作都造成嚴重影響。

姓　名: 蔡文杰

簽　名:

日　期: 27 - 3 - 2021

RECEIVED
30 MAR 2021
Town Planning Board

5-57

香港北角渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

電郵: tpbpd@pland.gov.hk
傳真: 2877 0245 or 2522 8426

關於美羅工業大廈的申請(A/KC/473)

數據中心噪音擾民的情況在各區各地都有見，所以本人衷心希望委員會能重新考慮此項申請對附近的影響，避免在落成之後，才發現噪音污染難以解決。

姓名: 楊達琳　　日期: 27-03-2021

簽名: _____

RECEIVED
30 MAR 2021
Town Planning Board

致城市規劃委員會秘書：
專人送遞或郵遞：香港北角渣華道 333 號北角政府合署 15 樓
傳真：2877 0245 或 2522 8426
電郵：tpbpd@pland.gov.hk

5-58

To: Secretary, Town Planning Board
By hand or post: 15/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong
By Fax: 2877 0245 or 2522 8426
By e-mail: tpbpd@pland.gov.hk

有關的規劃申請編號 **The application no. to which the comment relates** A/KC/473

意見詳情（如有需要，請另頁說明）
Details of the Comment (use separate sheet if necessary)

Please refer to attached letter

「提意見人」姓名／名稱 ~~Name of person/company~~ making this comment Kenneth To & Associates Limited on behalf of Tung Chun Company Limited

簽署 Signature _____ 日期 Date 30/3/2021

RECEIVED
30 MAR 2021
Town Planning Board

KTA
Kenneth To & Associates Ltd
杜立基規劃顧問有限公司
TOWN PLANNING
AND DEVELOPMENT
CONSULTANTS

5-58

Our Ref: S1395/A_KC_473/21/002Lg

30 March 2021

Secretary, Town Planning Board
15/F North Point Government Offices
333 Java Road
North Point
Hong Kong

By Hand

Dear Sir / Madam,

Comment on Planning Application No. A/KC/473
Proposed Minor Relaxation of Plot Ratio Restriction for
Permitted Information Technology and Telecommunications Industries
(Proposed Data Centre Development)
at "Other Specified Uses" annotated "Business" Zone
Nos. 2-10 Tai Yuen Street, Kwai Chung

RECEIVED
30 MAR 2021
Town Planning Board

We are instructed by Tung Chun Company Limited ("the Objector") to submit this comment on the Further Information submitted by the Applicant to the Town Planning Board ("TPB") in relation to Planning Application No. A/KC/473 on 18, 26 February and 3 March 2021.

The Objector, also the owner of Kwai Chung Town Lot ("KCTL") No. 432 at Nos. 1-7 Cheung Wing Road, Kwai Chung, wishes, with respect to repeat their strong objection to the Planning Application in its current format (including the Further Information), on the basis of adverse environmental impact, primarily in relation to the potential fixed noise impact associated with the Proposed Data Centre Development upon the ***immediately adjacent residential towers*** approved under the "CDA" development referred to below.

With reference to the Environmental Assessment ("EA") prepared in support of the S16 Planning Application for the "CDA" development at Nos. 1-7 Cheung Wing Road, Kwai Chung in September 2017, there were 5 nos. of cooling towers at the roof of existing Milo's Industrial Building (extracts of the Approved EA report and comparison of roof-top cooling towers in **Annex A** refers). With the redevelopment of Milo's Industrial Building for Data Centre, there will be 12 nos. of cooling towers which will incur significant fixed noise impact onto the Approved "CDA" development.

Since there is no information such as a Fixed Noise Impact Assessment included in the Supporting Planning Statement or elsewhere in the Further Information submitted by the Applicant, the potential noise impact associated with the proposed cooling towers at roof-top cannot be ascertained. The Planning Application fails to demonstrate there would not be any adverse fixed noise impact to the nearby Noise Sensitive Receivers ("NSRs").

According to the Technical Memorandum ("TM") for the assessment of noise from places other than domestic premises, public places or construction sites, the area sensitive rating of the Approved "CDA" Development at Nos. 1-7 Cheung Wing Road, Kwai Chung is "C". According to Table 4.1: Summary of Noise Standards of Chapter 9 Environment of Hong

九龍觀塘海濱道133號萬兆豐中心16樓K室 Unit K, 16/F, MG Tower, 133 Hoi Bun Road, Kwun Tong, Kowloon
電話 Tel：(852) 3426 8451 傳真 Fax：(852) 3426 9737 電子郵件 Email：kta@ktaplanning.com
FS 579819

5-58

Our Ref : S1395/A_KC_473/21/002Lg
Date : 30 March 2021

Kong Planning Standards and Guidelines ("HKPSG"), the design criteria of fixed noise source has to fulfil (a) 5 dB(A) below the Acceptable Noise Levels ("ANL") of the corresponding area sensitive rating or (b) the prevailing background noise level.

With the criteria set above and the shortest distance from the Approved "CDA" Development to the Proposed Data Centre being about 20m only, the total maximum allowable noise level generated from all the noise sources of the future Data Centre has to be not more than 80 dB(A) or even lower if the prevailing background is lower than 55 dB(A), which is the ANL-5 dB(A) criteria set in the HKPSG. This maximum allowable noise level has considered the façade correction of 3 dB(A) and the possible tonal effect of 6 dB(A) as requested in the above-mentioned TM.

Our understanding is that planning applications of similar nature were requested to submit a Noise Impact Assessment to demonstrate that the proposed non-polluting industrial developments would not incur any adverse fixed noise impact onto the surrounding NSRs. The Objector urges the TPB to require the Applicant to submit a Noise Impact Assessment with proposed mitigation measures to the satisfaction of relevant Authorities such that the Proposed Data Centre (with night-time operation) would not generate any adverse noise impact to the nearby Noise Sensitive Receivers of the surrounding existing and approved residential developments.

Provision of the acoustic louvre and silencer is a typical and common mitigation measures in Hong Kong for effectively mitigating cooling towers and chiller noise source. These measures are **affordable and reasonable** and have been commonly adopted in many commercial buildings (e.g. City Plaza Phase One Office Building, etc.) or hospitals (such as Prince of Wales Hospital, etc). With careful planning of having at-source noise mitigation measures at an early stage, it is possible to design the Proposed Data Centre so that it would not have any adverse noise impact to the surroundings even during its night-time operation. The Proposed Data Centre Development would also contribute to achieving sustainable green building design under both BEAM Plus and LEED certification and the TPB should ensure that this requirement has been met **before** deciding to approve the Planning Application.

In view of the above, our previous objection and comments vide letter dated 5 February 2021 remain valid (letter at **Annex B** refers), including drawing the TPB's attention to recent guidance that fundamental issues of this nature must be considered on their merits by the TPB as part of the Section 16 planning process rather than being left over to be dealt with under planning approval conditions.

Should you have any queries in relation to the above, please do not hesitate to contact the undersigned or Mr Kenneth To at 3426 8451. Thank you for your kind attention.

Yours faithfully
For and on behalf of
KENNETH TO & ASSOCIATES LTD

Kitty Wong
KT/KW/vy
cc. Applicant and Team

5-58

Annex A



TUNG CHUN SOY SAUCE AND CANNED FOOD FACTORY REDEVELOPMENT FOR RESIDENTIAL/COMMERCIAL USES AT NO. 1 TO 7 CHEUNG WING ROAD, KWAI CHUNG

ENVIRONMENTAL ASSESSMENT

Prepared for:

Tung Chun Company Limited

Prepared by:
Ramboll Environ Hong Kong Limited

Date:
September 2017

Report Number:
R4823_V2.5

Identified Noise Source	Description and Observation
5 Cooling Towers at the roof of Milo's Industrial Building (C9 to C12, C15)	As advised by the management officer of the industrial building, there is no night-time operation of the cooling towers. During the site visits in July and October 2016, the roof of the building is not accessible for taking noise measurements, hence the measurement data for the previous S16 planning application was adopted. * Sound Pressure Level of 70.3 dB(A) was measured, which was 2.5 m from the centre of the cooling towers (C9 – C10). ** Sound Pressure Level of 73.9 dB(A) was measured, which was 4 m from the centre of the cooling towers (C11 – C12). Since the size of C15 is similar to C11 and C12, it is assumed that its measured sound pressure level is the same as C11 and C12. (i.e. 73.9dB(A).
1 Cooling Tower at the roof of Kentucky Industrial Building (C13)	This cooling tower has been removed.
1 Cooling Tower at the roof of Luen Fat Industrial (No. 2) Building (C14)	Luen Fat Industrial (No.2) Building has been demolished and this cooling tower has been removed.

Note:

* During the site visits, the cooling towers are either not operating or access restricted; therefore measured noise level from similar type found at Tsuen Wan Area is used. The noise is measured form the Cooling Tower at Young Ya Industrial Building at Tsuen Wan during 2 pm to 4 p.m. on November 2010.

** During the site visits, the cooling towers are either not operating or access restricted; therefore measured noise level from similar type found at Tsuen Wan Area is used. The noise is measured form the Cooling Tower at Symphone Industrial Building at Tsuen Wan during the 2:00 to 4:00 p.m. on November 2010.

3.4 Identification Of Noise Impact From Existing Industrial Establishments

The Application Site is surrounded by the existing industrial establishments (Tung Chun Industrial Building, Shui Wing Industrial Building and Milo's Industrial Building), the activities inside the industrial buildings and the air-conditioners distributed on the building walls may have direct noise impact to the future residents. In order to verify their noise impact, on-site noise measurements were conducted on night time of 16 March 2017 and day time of 17 March 2017 by a truck mounted platform with 28m working height to raise the noise measurement equipment to a level up to 45.5mPD in front of the site, which is about equivalent to the level of 5th residential floor. Given the existing subject site is congested (occupied by existing Tung Chun soy sauce and canned food factory) and the required minimum outrigger width of this kind of truck is 3.95m, the only possible location inside the site available to accommodate the truck mounted platform for measurement is the narrow road path to the north and northeast of the site with the width of about 4m to 9m.

Since there are other noises, mainly the traffic noise from Cheung Wing Road would also be included in the measurement and this noise is expected to be the dominant noise of the area. In order to gather the noise level due to the operation of the fixed noise sources only, a separate measurement to

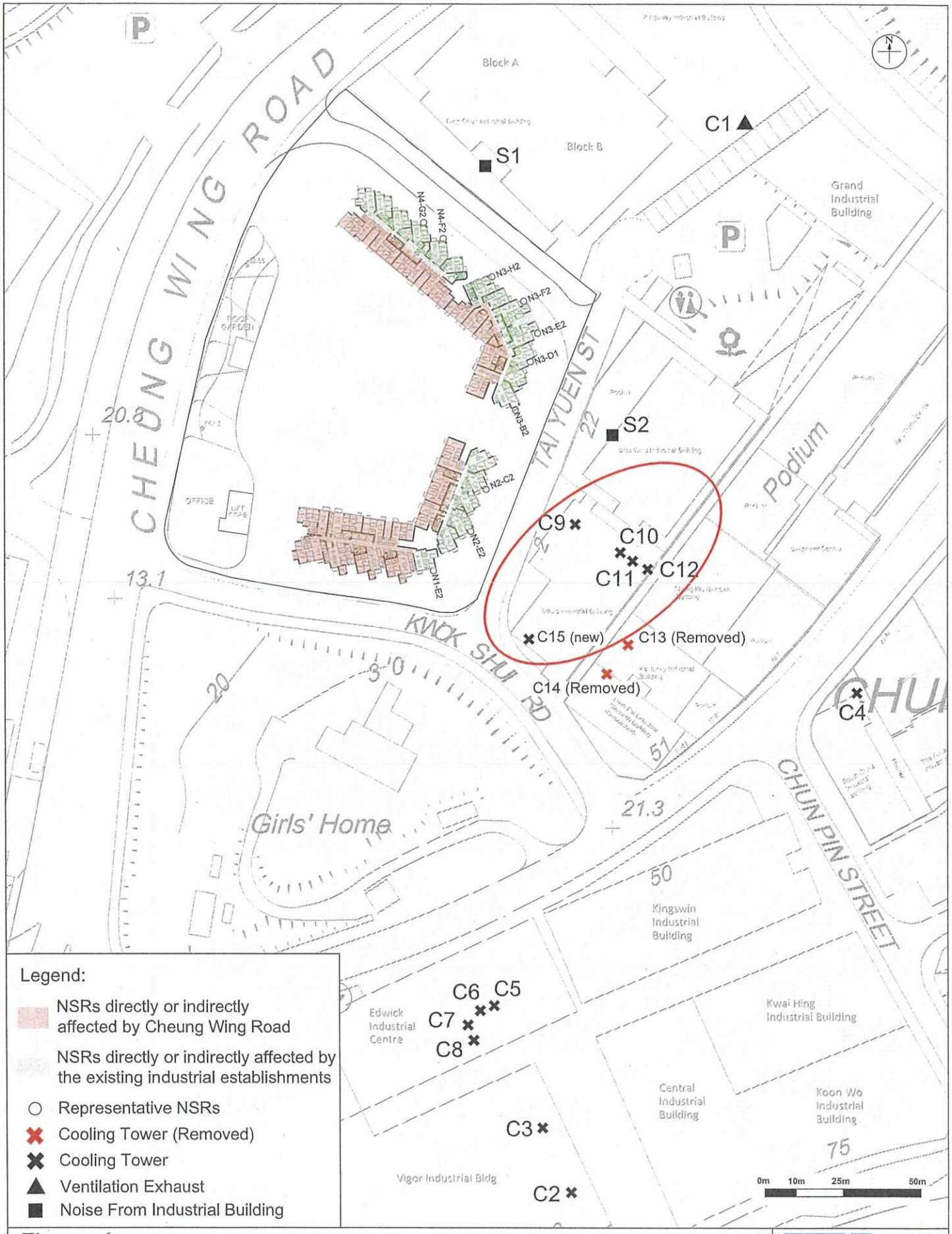
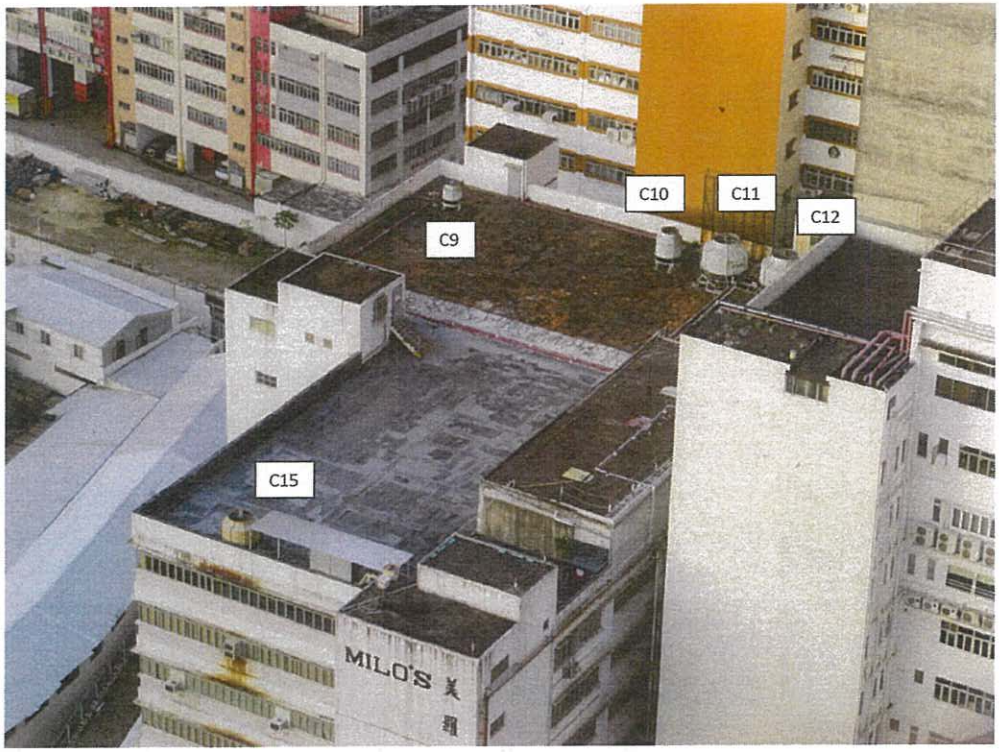
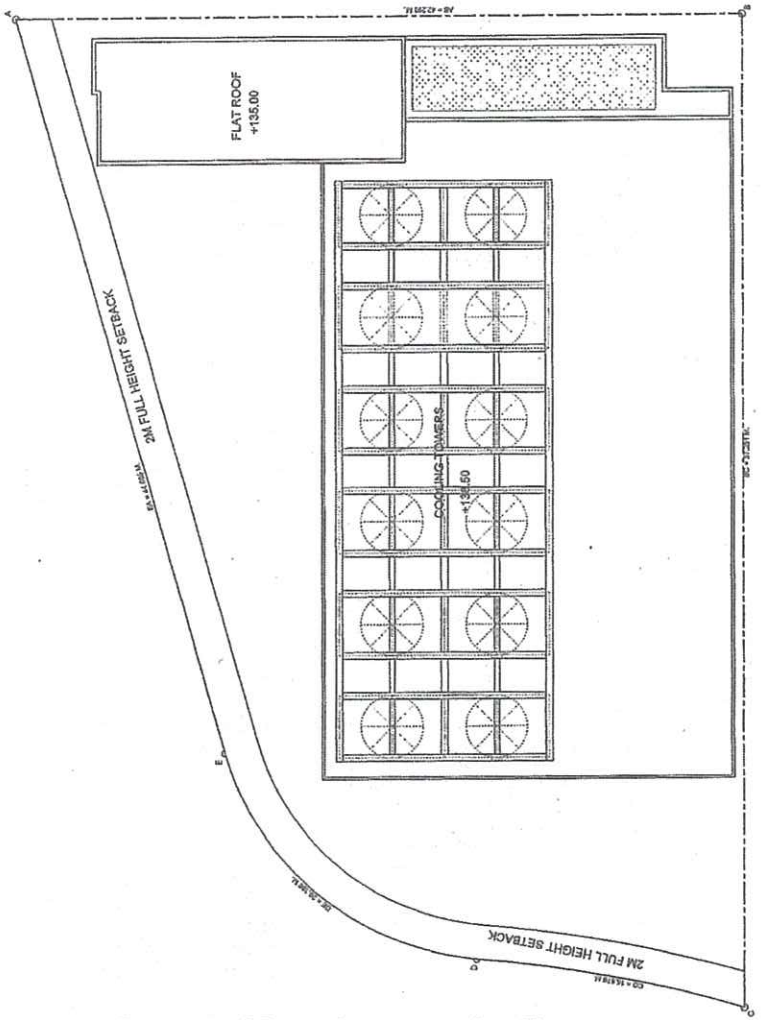


Figure: 6		RAMBOLL ENVIRON
Title:	Locations of Identified Fixed Noise Sources and Representative Noise Sensitive Receivers for Fixed Source Noise Impact Assessment	Drawn by: KW Checked by: TC
Project:	Tung Chun Soy Sauce and Canned Food Factory Redevelopment For Residential/Commercial Uses at No. 1 to 7 Cheung Wing Road, Kwai Chung	Rev.: 2.2 Date: Apr 2017



Existing Milo's Industrial Building at the Site
(with 5 nos. of Cooling Towers)



Proposed Data Centre at the Site
(with 12 nos. of Cooling Towers)

Annex B

Refer to public comment No. 5-26

KTA
Kenneth To & Associates Ltd
杜立基規劃顧問有限公司
TOWN PLANNING AND DEVELOPMENT CONSULTANTS

Our Ref: S1395/A_KC_473/21/001Lg

5 February 2021

Secretary, Town Planning Board
15/F North Point Government Offices
333 Java Road
North Point
Hong Kong

By Hand

Dear Sir / Madam,

Comment on Planning Application No. A/KC/473
Proposed Minor Relaxation of Plot Ratio Restriction for
Permitted Information Technology and Telecommunications Industries
(Proposed Data Centre Development)
at "Other Specified Uses" annotated "Business" Zone
Nos. 2-10 Tai Yuen Street, Kwai Chung

We are instructed by Tung Chun Company Limited ("the Objector") to submit this comment on Planning Application No. A/KC/473 received by the Town Planning Board ("TPB") on 7 January 2021 for the Proposed Information Technology and Telecommunications Industries (Proposed Data Centre Development) at Nos. 2-10 Tai Yuen Street, Kwai Chung.

The Objector, also the owner of Kwai Chung Town Lot ("KCTL") No. 432 at Nos. 1-7 Cheung Wing Road, Kwai Chung, wishes to lodge their **Strong Objection** to the Planning Application on the basis of adverse environmental impact, primarily in relation to the potential fixed noise impact associated with the Proposed Data Centre Development upon the ***immediately adjacent residential towers*** approved under the "CDA" development referred to below.

Approved Comprehensive Development at Nos. 1-7 Cheung Wing Road
The Site at Nos. 1-7 Cheung Wing Road, Kwai Chung (zoned "Comprehensive Development Area" ("CDA") and partly shown as 'Road' on the draft Kwai Chung Outline Zoning Plan No. S/KC/29) which is owned by the Objector, was the subject of a number of Planning Approvals for Comprehensive Development.

The latest approval (Planning Application No. A/KC/444) for ' Flat', 'Eating Place', 'Shop and Services' and 'Office' uses with minor relaxation of building height restriction from 120mPD to 145mPD was obtained from the TPB at its meeting on 22 March 2019. The development is under implementation by the Objector with occupation year in 2024 to 2025.

The Approved CDA development consists of 4 residential towers and one office tower, with retail space and central landscape area below. This is intended as part of the revitalisation of the old industrial area into a vibrant residential and recreational environment. Creation of new and noisy industrial uses (such as the Proposed Data Centre Development) immediately adjacent to the Approved CDA development would cause significant environmental impacts

九龍觀塘海濱道133號萬兆豐中心16樓K室 Unit K, 16/F, MG Tower, 133 Hoi Bun Road, Kwun Tong, Kowloon
電話 Tel : (852) 3426 8451 傳真 Fax : (852) 3426 9737 電子郵件 Email : kta@ktaplanning.com
FS 579819

silencer at top would be required to completely enclose these cooling towers in order to minimize any adverse fixed noise impact onto the nearby NSRs including future residents at the Approved CDA Development at Nos. 1- 7 Cheung Wing Road.

Benefits of Implementation of At-Source Noise Mitigation Measure
Provision of the acoustic louvre and silencer is a typical and common mitigation measures in Hong Kong for effectively mitigating cooling towers and chiller noise source. These measures have been commonly adopted in many commercial buildings (e.g. City Plaza Phase One Office Building, etc.) or hospitals (such as Prince of Wales Hospital, etc). With careful planning of having at-source noise mitigation measures at early stage, it is believed that the Proposed Data Centre would not have any adverse noise impact to the surroundings even during its night-time operation. Also, the Proposed Data Centre would achieve the sustainable green building design under both BEAM Plus and LEED certification. Some typical examples are attached.

Last but not least, the TPB is urged to also take into account that, while an increase in plot ratio is not in principle objectionable where the planning circumstances justify such an increase, this must not be at the expense of and serious inconvenience to neighbours, in particular future residents of the approved CDA development ***immediately adjacent*** to the Application Site and users of the retail and recreational areas in the Approved CDA development. The Applicant should revise the captioned Planning Application No. A/KC/473 to ensure that any and all noise and other environmental impacts on the Approved CDA development immediately adjacent to the Application Site are ***fully mitigated beyond any doubt.***

In view of the objection grounds above, we consider that the Applicant has failed to submit adequate information in demonstrating the feasibility of the Proposed Data Centre Development. Unless there is unequivocal evidence submitted by the Applicant to your reasonable satisfaction that inter alia, the aforesaid concerns are properly addressed or dealt with, the Proposed Development will be detrimental to the living quality and well-being of the residents in the surrounding developments, including in particular future residents of the Approved CDA development ***immediately adjacent*** to the Application Site and users of the retail and recreational areas in the approved CDA development. We respectfully request the TPB to reject the Planning Application.

Meanwhile, should you have any queries in relation to the above and attached, please do not hesitate to contact the undersigned or Mr Kenneth To at 3426 8451.

Thank you for your kind attention.

Yours faithfully
For and on behalf of
KENNETH TO & ASSOCIATES LTD

Kitty Wong

KT/KW/vy
cc. Applicant and Team

Sg 4

5 - 59

致城市規劃委員會秘書：
專人送遞或郵遞:香港北角渣華道 333 號北角政府合署 15 樓
傳真 : 2877 0245 或 2522 8426
電郵: tpbpd@pland.gov.hk

To : Secretary, Town Planning Board
By hand or post : 15/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong
By Fax : 2877 0245 or 2522 8426
By e-mail : tpbpd@pland.gov.hk

有關的規劃申請編號 **The application no. to which the comment relates**
A/KC/473 Received on 20/04/2021

意見詳情 (如有需要，請另頁說明)
Details of the Comment (use separate sheet if necessary)

土地資源寶貴，應為放寬地積比率限制是
釋放土地資源的最佳方法，應該支持。

「提意見人」姓名/名稱 Name of person/company making this comment 徐錦全

簽署 Signature [signature] 日期 Date 30/4/2021

RECEIVED
- 3 MAY 2021
Town Planning Board

tpbpd@pland.gov.hk

寄件者: [redacted]
寄件日期: 2021年05月11日星期二 16:16
收件者: tpbpd@pland.gov.hk
主旨: 關注新界葵涌大圓街 2-10號發展項目潛在噪音問題

S09 4

5-60

規劃署署長
鍾文傑先生, JP

鍾署長：

關注新界葵涌大圓街 2-10 號發展項目潛在噪音問題

有市民向本辦事處表達關注，指新界葵涌大圓街 2-10 號擬興建為數據中心(申請編號：A/KC/473)，擔心運作後對附近一帶構成潛在噪音問題。

據了解，計劃中的數據中心未來將會 24 小時運作，因應需要大廈天台的冷卻系統亦將由目前的 5 台倍增至 12 台，相信將對附近環境造成一定的影響。惟目前未見申請人向有關當局提交任何正式運作時，對社區構成的噪音污染評估報告。

本人理解有關市民的憂慮，懇請 貴署考慮要求申請人盡早提交噪音評估報告，以釋除公眾疑慮；倘若一旦評估後發現新機組有機會對環境構成噪音滋擾，亦有利申請人在規劃時加入改善措施，如增建適當的隔音屏障等，以減低對社區的影響。

祝

諸事順遂！

立法會議員 陳恒鑌 謹啓

2021 年 5 月 11 日

如有任何查詢，請與本處聯絡！想知更多社區資訊，請 Like 及 Share
陳恒鑌 Facebook：[redacted]

陳恒鑌立法會議員辦事處(金鐘)
Office of Legislative Councillor, Hon. Chan Han Pan, JP
電 話 Tel: 2522 2202
傳 真 Fax: 2522 1116

KTA
Kenneth To & Associates Ltd
杜立基規劃顧問有限公司
TOWN PLANNING AND DEVELOPMENT CONSULTANTS

RECEIVED
2021 MAY 18 P 5:17
TOWN PLANNING BOARD

Our Ref: S1395/A_KC_473/21/003Lg

18 May 2021

Secretary, Town Planning Board
15/F North Point Government Offices
333 Java Road
North Point
Hong Kong

5-61

By Hand

Dear Sir / Madam,

Comment on Planning Application No. A/KC/473
Proposed Minor Relaxation of Plot Ratio Restriction for
Permitted Information Technology and Telecommunications Industries
(Proposed Data Centre Development)
at "Other Specified Uses" annotated "Business" Zone
Nos. 2-10 Tai Yuen Street, Kwai Chung

We are instructed by Tung Chun Company Limited ("the Objector") to submit this comment on the Further Information pertaining to Traffic Impact Assessment ("TIA") submitted by the Applicant to the Town Planning Board ("TPB") in relation to Planning Application No. A/KC/473 on 26 February and 19 April 2021.

The Objector, also the owner of Kwai Chung Town Lot ("KCTL") No. 432 at Nos. 1-7 Cheung Wing Road, Kwai Chung, wishes, with respect to raise their objection to the Planning Application in its current format (including the Further Information), on the basis of adverse traffic impact associated with the Proposed Data Centre Development at the Subject Site upon the ***immediately adjacent residential towers*** approved under the "CDA" development referred to below.

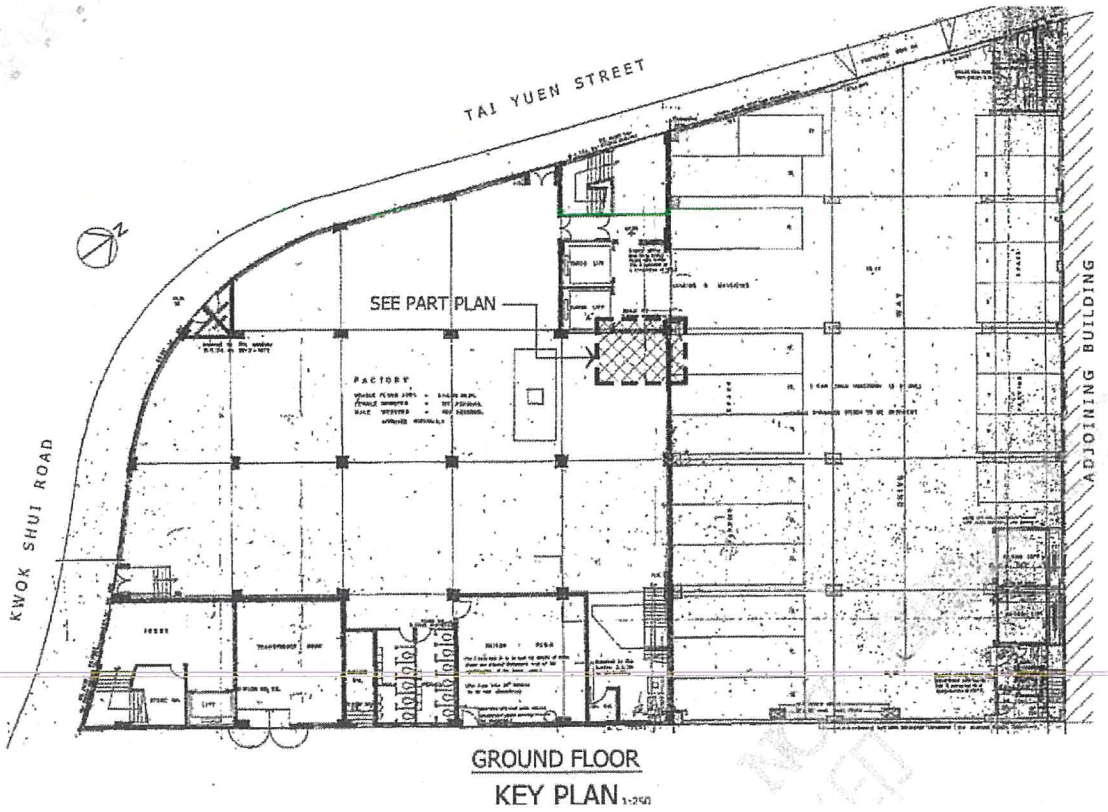
Adverse Traffic Issue along Tai Yuen Street

With reference to the past ground floor layout plan record of the Subject Site (Please see the figure below), it is identified that its vehicular access was provided at the northern corner of the Subject Site which is far from the junction of Kwok Shui Road/Tai Yuen Street. In addition, sufficient manoeuvring spaces could be provided within the site for goods vehicle manoeuvring without affect the road traffic on Tai Yuen Street.

九龍觀塘海濱道133號萬兆豐中心16樓K室 Unit K, 16/F, MG Tower, 133 Hoi Bun Road, Kwun Tong, Kowloon
電話 Tel：(852) 3426 8451 傳真 Fax：(852) 3426 9737 電子郵件 Email：kta@ktaplanning.com

bsi. ISO 9001 Quality Management
FS 579819

Our Ref : S1395/A_KC_473/21/003Lg
Date : 18 May 2021

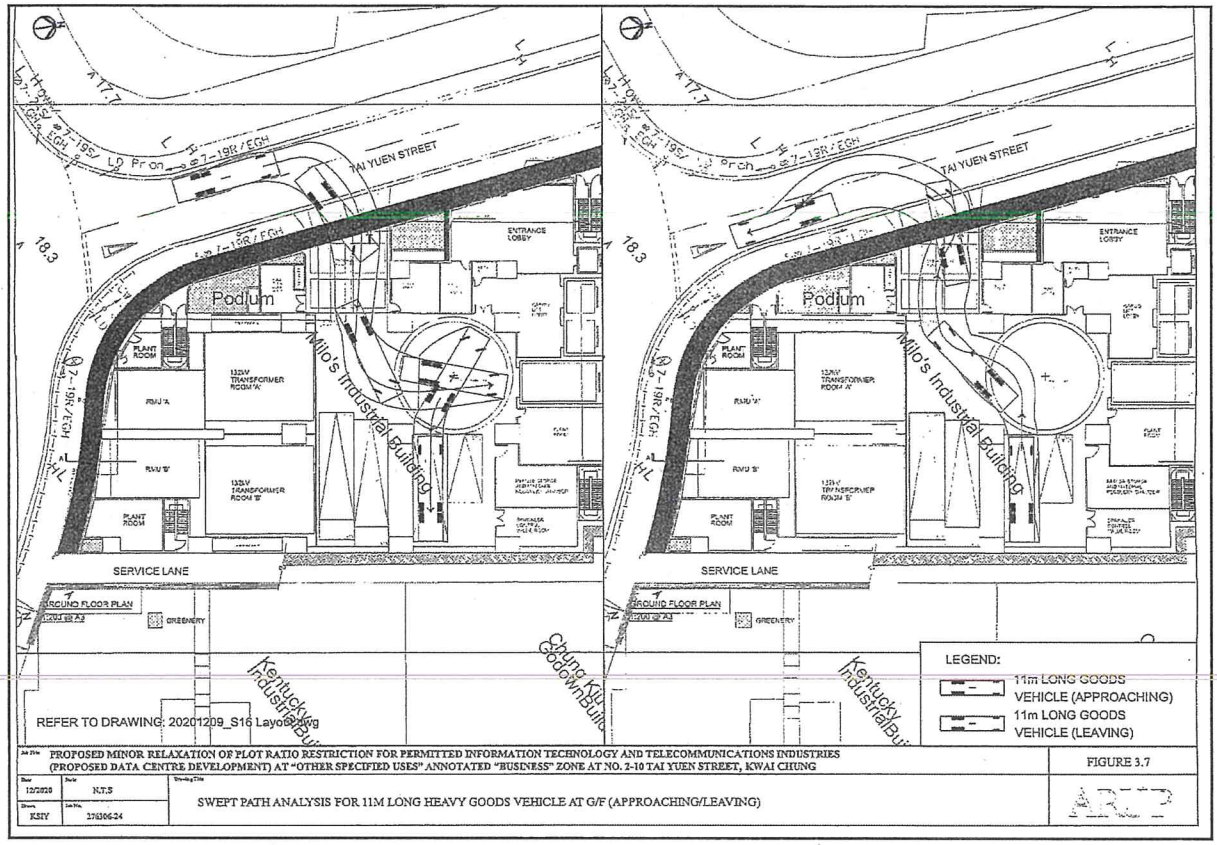


(Past Record Ground Floor Layout Plan of the Subject Site)

Referring to **Figure 3.7** of TIA report attached with the Applicant's letter dated 26 February 2021 regarding swept path analysis for 11m heavy goods vehicle ("HGV"), it is noted that the vehicular access of 7.3m wide only is shifted southward which is very close to the junction of Kwok Shui Road/Tai Yuen Street. HGV would turn into the Subject Site via the vehicle access marginally. When HGV is leaving from the Subject Site, it will encroach onto opposite traffic lane at Tai Yuen Street and traffic maneuvering has to be conducted outside of its own premises which is highly undesirable because of its proximity to the junction and the vehicular access is as narrow as what the older building was.

Manoeuvring of goods vehicles has to rely on turn table on ground floor of Subject Site. If there is goods vehicle using the turn table on ground floor of the Subject Site while another vehicle arrives and wants to enter the Subject site, that vehicle has to wait and queue on Tai Yuen Street outside the Subject Site until the ground floor area is cleared. Traffic queue thus occurs along Tai Yuen Street which would not only affect the traffic along Tai Yuen Street but also the junction of Kwok Shui Road/Tai Yuen Street. Therefore, the Applicant shall consider to provide more maneuvering space on the ground level (e.g. any consideration of relocation of E&M plant room to 1st floor or basement; widen the vehicle access with the consent of TD) so as to reduce the traffic queue on public road.

Our Ref : S1395/A_KC_473/21/003Lg
Date : 18 May 2021



(Figure 3.7 extracted from TIA report attached with the Applicant's letter dated 26 February 2021)

In addition, it is noted that only one vehicle lift has been provided for the Subject Site. If the vehicle lift is out-of-order / under maintenance, the basement car park cannot be functioned and vehicles would be jammed at the vehicle access. It will block the vehicular access of the "CDA" development and affect traffic not only Tai Yuen Street but also the adjacent road network. The Applicant shall provide mitigation measure to avoid the concerned situation.

Furthermore, under the latest approved S16 Planning Application for the "CDA" development, Transport Department ("TD") raised concern on the illegal parking at Tai Yuen Street since "7-19 Non-stopping Restriction ("NSR")" had been imposed along Tai Yuen Street but illegal parking was still observed. Hence, the Objector has proposed mitigation measures including proposing additional traffic lane for the Tai Yuen Street northbound and widening of western footpath at Tai Yuen Street outside their "CDA" development in the Planning Application (Application No. A/KC/444) approved on 12 April 2019.

The situation (i.e. illegal parking) will be worsened if the Subject Site affects/ blocks the vehicle access of the Subject Site/adjacent developments in the commissioning year. The illegal parking will block the vehicles from the Subject Site leaving and has to make use of the traffic lane in opposite direction which will endanger the traffic situation along Tai Yuen Street. *(Please find below the site record photos at 10:00am May 2021 showing the illegal parking conditions along Tai Yuen Street despite the NSR is being in forced).*

Our Ref : S1395/A_KC_473/21/003Lg
Date : 18 May 2021





The Applicant should provide effective precaution measure prior to alleviate illegal parking and loading / unloading activities at Tai Yuen Street such as providing lay-by or setting back the carriageway along Tai Yuen Street outside the Subject Site.

No Consideration on Future/ Planned Adjacent Road Network

Vehicular access of adjacent planned/future developments (e.g. adjacent "CDA" Development) and proposed junction improvements have not been taken into consideration in the future traffic situation nor shown on the drawings in the TIA report. It is very unclear how the adjust of the observed traffic flow based on surveyed traffic data in response to TD's comment and discrepancy of traffic flows were found in the junction assessments. Since there is **no queue length analysis** for **the proposed junction improvement scheme, it is doubtful whether the traffic situation would not be worsened with the proposed junction improvement scheme.**

In view of the objection grounds above, we consider that the Applicant has failed to submit adequate information in demonstrating the feasibility of the Proposed Data Centre Development. Unless there is unequivocal evidence submitted by the Applicant to your reasonable satisfaction that inter alia, the aforesaid concerns are properly addressed or dealt with, the Proposed Development will be detrimental to the traffic situation along Tai Yuen Street and the surrounding road network. Unless mitigation measures e.g. widening of exit and provision of more manoeuvring spaces within the premise and other effective precaution measure for tackling illegal lay-by parking are being taken; the TPB is urged to also take into account of the planning gain to be received by the Applicant in the event of a favorable decision to approve the captioned Planning Application No. A/KC/473, we respectfully request the TPB to reject the Planning Application.

Should you have any queries in relation to the above, please do not hesitate to contact the undersigned or Mr Kenneth To at 3426 8451.

Thank you for your kind attention.

Our Ref : S1395/A_KC_473/21/003Lg
Date : 18 May 2021

Yours faithfully
For and on behalf of
KENNETH TO & ASSOCIATES LTD

Kitty Wong
KT/KW/vy

cc. Applicant and Team

Recommended Advisory Clauses

(a) the approval of the application does not imply that any proposal on building design elements to fulfil the requirements under the Sustainable Building Design Guidelines and any gross floor area (GFA) concession of the proposed development will be granted by the Building Authority (BA). The applicant should approach the Buildings Department (BD) direct to obtain the necessary approval. If the proposed building design elements and GFA concession are not approved/granted by the BA and major changes to the current scheme are required, a fresh planning application to the Town Planning Board (TPB) may be required.

(b) to note the comments of the District Lands Officer/Tsuen Wan & Kwai Tsing (DLO/TW&KT) and the Chief Estate Surveyor/Development Control (CES/DC) of Lands Department (LandsD) that:

(i) the proposed data centre development would contravene primarily the user restriction under the New Grant. If planning approval is given, the lot owner is required to seek a lease modification from LandsD to implement the proposed development. Upon receipt of a lease modification, it will be considered by LandsD acting in the capacity as landlord at its sole discretion. There is no guarantee that any application will be approved. In the event that an application is approved, it will be subject to such terms and conditions as the Government shall see fit, including, among others, payment of premium and administrative fee; and

(ii) when processing the lease modification application, LandsD will impose such appropriate terms and conditions including user restriction for non-residential purposes, the 5-year time limit for completion of the development, payment of full premium and administrative fee, other conditions applicable to the 2018 Industrial Building (IB) Revitalisation Measures etc. There is no guarantee that the application will be approved by LandsD. Under the 2018 IB Revitalisation Measures for redevelopment, the modification letter/conditions of exchange shall be executed within 3 years from the date of TPB's approval letter.

(c) to note the comments of the Chief Town Planner/Urban Design and Landscape (CTP/UD&L) of Planning Department (PlanD) that:

(i) the applicant is advised to review the possibility to incorporate façade articulation at the building corner, and façade treatment or removable pot plant to embellish the environment of the flat roof facing Kwok Shui Road at 2/F at the detailed design stage ;

(ii) the applicant is recommended to provide appropriate amenity facilities such as sitting benches on the green roofs on 1/F and 2/F for enjoyment of the tenants and visitors; and

(iii) the applicant is reminded of the long-term commitment in providing proper maintenance to the vertical green wall for healthy and sustainable plant growth.

(d) to note the comments of the Chief Building Surveyor/New Territories West (CBS/NTW) of BD that:

(i) the proposed development parameter should not exceed the limitation under the First Schedule of Building (Planning) Regulations (B(P)R);

(ii) the Site shall be provided with means of obtaining access thereto from a street and emergency vehicular access in accordance with Regulations 5 and 41D of the B(P)R respectively;

(iii) disregarding carparking spaces from GFA calculation under the Building Ordinance will be considered on the basic of the criteria set out in Practice Notes for Authorized Persons (PNAP) APP-2 during building plan submission stage;

(iv) for features to be excluded from the calculation of the total GFA, it shall be subject to compliance with the requirements laid down in the relevant Joint Practice Notes and PNAPs including APP-151 as appropriate. If the applicant applies for the GFA concession, Building Set Back, Building Separation and Site Coverage of Greenery as required under PNAP APP-152 also apply; and

(v) detailed comments will be given during the building plan submission stage.

(e) to note the comments of the Director of Environmental Protection (DEP) that:

as the proposed development would involve demolition of the existing structures and excavation works, the applicant is advised to minimise the generation of Construction and Demolition (C&D) materials; reuse and recycle the C&D materials on-site as far as possible; and observe and comply with the legislative requirements and prevailing guidelines on proper waste management for the proposed development.

(f) to note the comments of the Chief Highway Engineer/NT West (CHE/NTW) of Highways Department (HyD) that:

the applicant is strongly advised to have an early consultation with the relevant Government bureau/departments when formulating the China Light & Power (CLP) cable works/routing proposal affecting public road.