Recommended Advisory Clauses

(a) to resolve any land issues relating to the development with the concerned land owners of the application site (the Site);

(b) to note the comments of the Chief Highway Engineer/New Territories West, Highways Department (CHE/NTW, HyD) that:

(i) if the proposed access on Fuk Wang Street and Wang Lee Street is approved by Transport Department (TD), they should be designed and constructed to the satisfaction of TD and HyD in accordance with the latest Transport Planning and Design Manual and HyD's standard; and

(ii) adequate drainage measures shall be provided to prevent surface water running from the Site to the nearby public roads and drains;

(c) to note the comments of the Director of Fire Services (D of FS) that:

detailed fire services requirements will be formulated upon receipt of formal submission of general building plans;

(d) to note the comments of the Chief Engineer/Construction, Water Supplies Department (CE/C, WSD) that:

(i) there are existing water mains within the Site. The cost of any necessary diversion shall be borne by the project proponent;

(ii) in case it is not feasible to divert the affected water mains, a waterworks reserve within 1.5 metres from the center line of the water main shall be provided to WSD. No structure shall be built or materials stored within this waterworks reserve. Free access shall be made available at all times for staff of the Director of Water Supplies or their contractor to carry out construction, inspection, operation, maintenance and repair works;

(iii) no trees or shrubs with penetrating roots may be planted within the Waterworks; and

(iv) Government shall not be liable to any damage whatsoever and howsoever caused arising from burst or leakage of the public water mains within and in close vicinity of the Site;

(e) to note the comments of the Chief Building Surveyor/New Territories West, Buildings Department (CBS/NTW, BD) that:

(i) the development intensity of Site A, Site B and Site C shall not exceed the permissible figures under the 1st schedule of the Building (Planning) Regulations (B(P)R);

(ii) the Site shall be provided with means of obtaining access thereto from a street under the B(P)R 5 and Emergency Vehicular Access shall be provided for all the buildings to be erected on the Site in accordance with the requirements under the Regulation 41(D) of the B(P)R;

(iii) justification of the proposed high headroom from G/F to 9/F of the buildings (ranged from 6.5 m to 8 m) should be provide during plan submission stage;

(iv) car parking spaces may be excluded from gross floor area (GFA) calculation under the BO, and will be considered on the basis of criteria set out in Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers (PNAP) No. APP-2 during plan submission stage;

(v) the number of parking spaces for vehicles and disabled persons should be provided in according to the requirement set out in Division 3 of Chapter 4 in Design Manual Barrier Free Access 2008;

(vi) if the proposed plot ratio is based on the assumption that GFA concession will be granted, the pre-requisite for GFA concession in PNAP APP-151 and Sustainable Building Design guideline stipulated in PNAP APP-152 should be complied with; and

(vii) detailed checking of plans will be carried out during building plan submission stage;

(f) to note the comments of the Head of Geotechnical Engineering Office, Civil Engineering and Development Department (H(GEO), CEDD) that:

(i) the applicant is reminded to submit the proposed building works plans to BD for approval as required under the provisions of the Buildings Ordinance; and

(ii) the Site is located within Scheduled Area No. 2 and may be underlain by cavernous marble. Depending on the nature of foundation of the new development proposed at the Site, extensive geotechnical investigation may be required as necessary. This would require a high-level involvement of experienced geotechnical engineer(s), both in the design and supervision of geotechnical aspects of the works to be carried out on the Site;

(g) to note the comments of the Chief Town Planner/Urban Design and Landscape, Planning Department (CTP/UD&L, PlanD) that:

(i) as set out in the Air Ventilation Assessment Initial Study report, mitigation measures including (i) various building setbacks from Fuk Wang Street and Wang Lee Street; (ii) building separations between Site A & Site B and Site B & Site C; and (iii) three ground floor empty bays, have been incorporated in the proposed scheme to address the potential adverse air ventilation impact induced by the proposal on the surrounding areas;

(ii) approval of the s.16 application by the Town Planning Board (the Board) does not imply approval of the tree works such as pruning, transplanting and/or felling under lease. Applicant is reminded to approach relevant authority/government department(s) direct to obtain the necessary approval on tree works; and

(iii) approval of the s.16 application by the Board does not imply approval of site coverage of greenery requirements under PNAP No. APP-152 and/or under the lease. The site coverage of greening calculation should be submitted separately to BD for approval.

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/YL/312

意見詳情 (如有需要，請另頁說明)
Details of the Comment (use separate sheet if necessary)

關於申請地點在新界元朗積洲創科園設有多個車位停泊車位
設意事項，在水樂街及福秀街往來車輛流量出入問題！
建議加設行人安全島及設高線，可及村民過馬路，確保安全！
希望貴署接納村民的意見！有勞之處，不勝感激！

「提意見人」姓名/名稱 Name of person/company making this comment 楊京遠

簽署 Signature 楊京遠 日期 Date 25/10/2023

☐ Urgent ☐ Return Receipt Requested ☐ Sign ☐ Encrypt ☐ Mark Subject Restricted ☐ Expand personal&publi

Application No. A/YL/312
28/10/2023 19:47

From:
To: <tpbpd@pland.gov.hk>
Cc:
File Ref:

To: Secretary, Town Planning Board,

就A/YL/312 申請咨詢

基於基本法第40條，本人要求新增「新界傳統權益影響評估報告」。有關報告之委員會成員必須包括附近300米的村代表及熟悉新界傳統權益的專家，並就影響(如有的話)提供補償性建議。

建議報告內容基本包括但不限於:

1. 對新界傳統權益行使建屋權的影響 (例如:潛在土地會否可能會適合更改為V-ZONE土地/當地原居民未行使建屋權人口/V-Zone 未建私人及政府土地面積)以及真正足夠建屋的V-Zone 空間位置);
2. 對新界傳統權益行使土葬權或墓穴的影響; 及
3. 對影響所提議的補償方案。

任何法例必須符合香港最高法律基本法，因此<<城市規劃條例>>必須符合基本法第40條的保障。 故 現時欠缺此報告，明顯不足以符合基本法，過程中有違反基本法的可能，故要求新增「新界傳統權益影響報告」的要求，有助令整個過程更符合基本法。

本建議並非單針對本次申請，建議日後所有與鄉村村界或葬區300米範圍內的申請或政府收地計劃都必須加入新界傳統權益評估」。

本人保留日後向任何部門及法庭提供本電郵的權利。

如有任何查詢，可致電 與林偉業 村代表 聯絡。

祝
工作順利!

林偉業
元朗屏山鄉橫洲林屋村村代表
中國香港林氏宗親總會秘書長

此文件在2023年 10月 1 0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 10 OCT 2023. The Town Planning Board will formally acknowledge the date of receipt of the application only upon receipt of all the required information and documents.

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

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 or Regulated Areas; and
位於鄉郊地區或受規管地區土地上及/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 or Regulated Areas
位於鄉郊地區或受規管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.tpb.gov.hk/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.tpb.gov.hk/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

2302657 9/10 by hand

For Official Use Only 請勿填寫此欄	Application No. 申請編號	A/YL/312
	Date Received 收到日期	10 OCT 2023

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.tpb.gov.hk/. 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.tpb.gov.hk/)，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。

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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)

West Development Office, Civil Engineering and Development Department, HKSARG

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)

Mott Macdonald Hong Kong Ltd.

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）	Yuen Long InnoPark, Yuen Long, New Territories
(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 863,298 (Application Site) 32,300 (Development Site) sq.m 平方米 ☑ About 約 ☐ Gross floor area 總樓面面積 ..... 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）	190,665 (Application Site) 28,400 (Development Site) 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 Yuen Long Outline Zoning Plan No. S/YL/26
(e)	Land use zone(s) involved 涉及的土地用途地帶	"Other Specified Uses" annotated "Industrial Estate"
(f)	Current use(s) 現時用途	Yuen Long InnoPark, Temporary Workshops, Temporary Bus Depot, Public Vehicle Parking, etc. (Application Site) Temporary Workshops, Temporary Bus Depot, Public Vehicle Parking, Yuen Long InnoPark Estate Centre (Development Site) (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 5 & 6/10/2023 (DD/MM/YYYY), this application involves a total of 26 "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 9/10/2023 (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。

(i) For Type (i) application 供第(i)類申請

(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)類申請

(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	

(iii) For Type (iii) application 供第(iii)類申請

(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)類申請

(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 ..... to 至 .....
☑	Gross floor area restriction 總樓面面積限制	From 由 1,687,625 sq. m 平方米 to 至 1,849,125 sq. m 平方米 (for Application Site)
☐	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 8 storeys 層 to 至 10 storeys 層 (for part of Area (a) of the Application Site; in the Development Site as defined in the Supporting Planning Statement)
☐	Non-building area restriction 非建築用地限制	From 由 .....
☐	Others (please specify) 其他（請註明）	.....

(v) For Type (v) application 供第(v)類申請

(a) Proposed use(s)/development 擬議用途/發展	Proposed Minor Relaxation of Maximum Gross Floor Area and Building Height Restrictions for Multi-Storey Buildings Development (including Permitted Industrial Uses and Public Vehicle Park) (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	161,500 (Development Site) 1,849,125 (Application Site) ..... sq.m 平方米	☑About 約
Proposed plot ratio 擬議地積比率	5 (Development Site) and 2.14 (Application Site)	☑About 約
Proposed site coverage 擬議上蓋面積	.....60..... % (Development Site)	☐About 約
Proposed no. of blocks 擬議座數	3	
Proposed no. of storeys of each block 每座建築物的擬議層數	Not more than 10 ..... storeys 層 ☐ include 包括.....storeys of basements 層地庫 ☑ exclude 不包括 1 storeys of basements 層地庫	
Proposed building height of each block 每座建築物的擬議高度	..... mPD 米(主水平基準上) ..... 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)
About 161,500 sq.m GFA in 3 buildings for Permitted Industrial Uses and Public Vehicle Park
.....

☐ 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]
.....	.....	Please refer to the Supporting Planning Statement
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

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

Please refer to the Supporting Planning Statement
.....
.....
.....
.....
.....

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)

December 2029 Tentatively

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)) Wang Lee Street, Fuk Wang 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: 240 Motorcycle Parking Spaces 電單車車位: 38 Light Goods Vehicle Parking Spaces 輕型貨車泊車位: 23 Medium Goods Vehicle Parking Spaces 中型貨車泊車位: - Heavy Goods Vehicle Parking Spaces 重型貨車泊車位: 25 Others (Please Specify) 其他 (請列明) Parking Space for Coach: 15
	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: - Coach Spaces 旅遊巴車位: - Light Goods Vehicle Spaces 輕型貨車車位: 72 Medium Goods Vehicle Spaces 中型貨車車位: - Heavy Goods Vehicle Spaces 重型貨車車位: 30 Others (Please Specify) 其他 (請列明) L/UL for Container Vehicle: 6
	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，請另頁註明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 Please refer to the Supporting Planning Statement
	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 7,500 sq.m 平方米 ☑About 約 Depth of excavation 挖土深度 6 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 ☑
	No adverse impacts on air ventilation and sewerage, please refer to the Supporting Planning Statement		
	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		

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

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 this application 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

K S Li ..... Technical Director .....

Name in Block Letters 姓名（請以正楷填寫） 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
☐ RPP 註冊專業規劃師
Others 其他 .....

on behalf of 代表 Mott MacDonald Hong Kong Ltd. .....

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

Date 日期 9/10/2023 ..... (DD/MM/YYYY 日/月/年)

Remark 備註

The materials submitted in this application 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
   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。

MOTT MACDONALD

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

Our Reference
SHC/KS/sl/369397/L0568

Mott MacDonald
3/F Manulife Place
348 Kwun Tong Road
Kwun Tong
Kowloon
Hong Kong

T +852 2828 5757
mottmac.hk

Application for Permission under Section 16 of the Town Planning Ordinance (CAP.131) for the Proposed Minor Relaxation of Maximum Gross Floor Area and Building Height Restriction for Proposed Multi-Storey Buildings Development (Including Permitted Industrial Uses and Public Vehicle Park) in "Other Specified Uses" Annotated "Industrial Estate" Zone, Yuen Long INNOPARK, Yuen Long (Application No. A/YL/312)

15 November 2023

Dear Sirs / Madams,

We refer to the captioned S16 Planning Application scheduled for consideration by the Town Planning Board in its meeting dated 8 December 2023 and our submission of further information on 1 November 2023 and 9 November 2023, respectively.

Upon further review, we write to update that the total area of Government land involved in the Application Site should be about 185,965 sqm instead of about 190,665 sqm stated in the application form. The 4,700 sqm reduction is to account for the following two lots that were allocated to the CLP Power Hong Kong Limited:

1) YLTL 360 (about 983 sqm)
2) YLTL 537 (about 3,717 sqm)

In this connection, pages 2 and 14 of the application form are to be revised. We enclose herewith **four sets** of the further information (i.e. the two replacement pages) for the above application.

Please note that the further information merely includes correction of discrepancy in application form without any revision of the Planning Statement and technical assessments. Should you have any queries, please do not hesitate to contact the undersigned at [redacted].

We confirm that we would proceed with the original application (i.e. without the further information) in case the Secretary of the Town Planning Board decides that the further information is not accepted, or such information is accepted but not exempted from the requirements in respect of publication for public comments and recounting of the statutory time limit for consideration of the application.

Yours faithfully,

For MOTT MACDONALD HONG KONG LIMITED

KS Li
Project Manager
[redacted]

Encl.

RECEIVED
15 NOV 2023
Town Planning Board

cc Mr. YEUNG Chin Ho, Daniel (w/e) WDO, CEDD

For Official Use Only 請勿填寫此欄	Application No. 申請編號	
	Date Received 收到日期	

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.tpb.gov.hk/. 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.tpb.gov.hk/)，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)

West Development Office, Civil Engineering and Development Department, HKSARG

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)

Mott Macdonald Hong Kong Ltd.

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）	Yuen Long InnoPark, Yuen Long, New Territories
(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 863,298 (Application Site) 32,300 (Development Site) sq.m 平方米 ☑ About 約 ☐ Gross floor area 總樓面面積 ..... 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）	185,965 (Application Site) 28,400 (Development Site) sq.m 平方米 ☑ About 約

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 available 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於規劃署規劃資料查詢處供一般參閱。)

Application No. 申請編號	(For Official Use Only) (請勿填寫此欄)
Location/address 位置／地址	Yuen Long InnoPark, Yuen Long, New Territories
Site area 地盤面積	863,298 sq.m (Application Site) 32,300 sq.m (Development Site) sq. m 平方米 ☑ About 約 (includes Government land of 包括政府土地 185,965 sq.m (Application Site) 28,400 sq.m (Development Site) 方米 ☑ About 約)
Plan 圖則	Draft Yuen Long Outline Zoning Plan No. S/YL/26
Zoning 地帶	"Other Specified Uses" annotated "Industrial Estate"
Applied use/ development 申請用途/發展	Proposed Minor Relaxation of Gross Floor Area and Building Height Restrictions for Multi-Storey Buildings Development (including Permitted Industrial Uses and Public Vehicle Park)

(i) Gross floor area and/or plot ratio 總樓面面積及／或地積比率			sq.m 平方米	Plot Ratio 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	161,500 (Development Site) 1,849,125 (Application Site)	☑ About 約 ☐ Not more than 不多於	5 (Development Site) 2.14 (Application Site)	☑About 約 ☐Not more than 不多於
(ii) No. of blocks 幢數	Domestic 住用				
	Non-domestic 非住用	3			
	Composite 綜合用途				

S.16 PLANNING APPLICATION
DRAFT YUEN LONG OUTLINE ZONING PLAN NO. S/YL/26

Proposed Minor Relaxation of Maximum Gross Floor Area and Building Height Restrictions for Multi-Storey Buildings Development (Including Permitted Industrial Uses and Public Vehicle Park) in "Other Specified Uses" annotated "Industrial Estate" zone

SUPPORTING PLANNING STATEMENT

October 2023

Applicant:
West Development Office, Civil Engineering and Development Department, HKSARG

Consultancy Team:
Mott MacDonald Hong Kong Ltd.
KTA Planning Ltd
Ho Wang SPB Limited
Urban Green Consultants Limited

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Executive Summary

This Planning Application is prepared and submitted on behalf of the West Development Office, Civil Engineering and Development Department, HKSARG ("the Applicant") to seek approval from the Town Planning Board ("TPB") under section 16 of the Town Planning Ordinance for (1) proposed minor relaxation of maximum Gross Floor Area restriction ("GFA") from 1,687,625m^2 to 1,849,125m^2 (with an increase of 161,500m^2) in the area zoned "Other Specified Uses" annotated "Industrial Estate" ("OU(IE)") ("Application Site"), and (2) proposed minor relaxation of building height ("BH") restriction from 8 storeys to 10 storeys (excluding basement(s)) for part of Area (a) in the "OU(IE)" zone in the Draft Yuen Long Outline Zoning Plan No. S/YL/26 ("Draft OZP"), to enable the proposed Multi-Storey Buildings ("MSBs") at No. 32 Wang Lee Street and adjoining Government Land, Yuen Long, New Territories ("Development Site").

It Is proposed to provide three sub-sites within the Development Site with an area of about 1 ha each to accommodate MSBs developments of not more than 10 storeys above ground with the plot ratio of 5. With the proposed total GFA of about 161,500m^2, the proposed MSBs development will provide industrial uses mainly for private vehicle servicing and maintenance and/or logistics uses while not less than 30% of the total GFA will be built in each MSB for accommodating eligible brownfield operations displaced by the government-led development projects; and public vehicle park.

The proposed MSBs developments ("Proposed Development") is fully justified due to the following reasons:

- It is in line with the 2022 Policy Address to make available land in Yuen Long for the development of multi-storey industrial buildings with a certain portion of floor area for leasing to the affected brownfield operators

- It is in line with the Government's Policies in Northern Metropolis Development Strategy on accommodating displaced brownfield operations in the MSBs to facilitate government's clearance programme in the NDAs.

- It echoes to the Government's multi-pronged land supply strategy on releasing brownfield sites for housing development, so as to meet the imminent housing demand while meeting the demand for the industrial development.

- It is in line with the Planning Intention of "OU(IE)" and compatible to the land use in the Yuen Long INNOPARK.

- It enhances the land utilization and enables the better use of land in Yuen Long by replacing the existing temporary uses in the Development Site. The existing public transport uses and the estate centre of YL INNOPARK will be reprovisioned to minimize the impact on the existing uses. Other temporary uses within the Development Site will cease timely to match with the implementation programme of

the Proposed Development.

- The proposed minor relaxation of maximum GFA and building height restrictions in the "OU(IE)" zone enable the Proposed Development to unleash the development potential of the Site while not affecting the development potential of the YL INNOPARK.

- The proposed MSBs development will adopt various planning and design merits:

    - Minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Streets to enhance streetscapes.

    - Tree planting and/or vertical greening at the Development Site boundary and at the building façade for diversity of the visual experience at the pedestrian level and for providing shading and micro-climate control for street level environment.

    - Preserving some existing trees within the Development Site.

    - Compliance with Sustainable Building Design Guidelines by providing greenery of not less than 20% of the site coverage of each MSB area, 10% of which would be within the primary zone.

- The Proposed Development is technically feasible with no adverse impact to the surrounding environment.

In light of the above, TPB is recommended to support the Planning Application from planning and technical points of view.

行政摘要
（內文如有差異，應以英文版本為準）

此規劃申請是代表申請人香港特別行政區政府土木工程拓展署西拓展處（下稱「申請人」）根據城市規劃條例第 16 條向城市規劃委員會（下稱「城規會」）提出規劃申請，於元朗分區計劃大綱草圖編號 S/YL/26（下稱「大綱草圖」）的「其他指定用途」註明「工業邨」地帶（下稱「申請地點」）內，申請 (1) 略為放寬最高總樓面面積限制，由 1,687,625 平方米放寬至 1,849,125 平方米（增加 161,500 平方米）；以及 (2) 於申請地點中的部分「地區（a) 」（於元朗宏利街 32 號及毗連政府土地（下稱「發展地點」）中的部分）略為放寬建築物高度限制，由不得超過八層放寬至不得超過十層（不包括地庫），以容許於發展地點作多層式大廈發展。

擬議發展計劃包括於發展地點內提供三塊面積各約一公頃的分地段，以發展不高於十層、地積比率為 5 的多層式大廈。擬議發展將會提供約 161,500 平方米的總樓面面積，主要作車輛維修及保養及/或物流等工業用途。當中多層式大廈中不少於百分之三十的樓面面積會用作安置受政府發展項目而影響的棕地營運商。

申請人提出是次規劃申請是基於以下理據：

- 擬議發展符合行政長官 2022 年施政報告的政策，於元朗提供土地作多層式大廈發展，並向受影響的棕地營運商出租部分樓面面積。

- 擬議發展符合政府北部都會區發展策略的政策，透過提供多層式大廈，以安置新發展區內受影響的棕地營運商。

- 擬議發展配合透過騰出棕地作房屋發展的策略，有效回應政府以多管齊下的方式增加土地供應，同時應付迫切的房屋需求和滿足工業發展的需要。

- 擬議發展符合大綱核准圖「其他指定用途」註明「工業邨」地帶的規劃意向，並與元朗創新園的土地用途相融。

- 擬議發展透過取代現有位於發展地點內的臨時用途，以善用元朗現時的土地資源。現有的公共交通設施將會於現址重置，以減少擬議發展對現時用途所產生的影響。發展地點內其他臨時用途會適時停止營運以配合擬議發展的實施計劃。

- 於大綱草圖中「其他指定用途」註明「工業邨」地帶內略為放寬最大總樓面面積和建築物高度限制作擬議發展，以釋放發展地點的潛力，同時不會影響元朗創新園的發展潛力。

- 擬議發展方案的規劃及設計優點包括:

    - 建築物將於面向宏利街和福宏街後移最少 6 米，以改善街道環境。

    - 於發展地點的邊界和擬議建築物外牆提供綠化包括種植樹木和垂直綠化，以改善周圍環境和街道景觀的景觀質素，並為街道提供遮蔽作用，以及對微氣候的控制。

- 發展地點部份現有的樹木將會被保留。

- 遵守「可持續建築設計指引」中綠化覆蓋率的準則，於各分地段提供不少於百分之二十的綠化覆蓋率，當中主要區(Primary Zone)內提供百分之十的綠化覆蓋率。

- 申請人已進行了各種技術評估，結果均證明該發展方案將不會帶來不良的影響。

根據以上各點，申請人希望是次的規劃申請能獲得城規會支持。

S.16 Planning Application
Draft Yuen Long Outline Zoning Plan No. S/YL/26

Proposed Minor Relaxation of Maximum GFA and Building Height Restrictions for Multi-Storey Buildings Development (Including Permitted Industrial Uses and Public Vehicle Park) in "Other Specified Uses" annotated "Industrial Estate" zone

Supporting Planning Statement

1. INTRODUCTION

1.1 Purpose

1.1.1 This Planning Application is prepared and submitted on behalf of the West Development Office, Civil Engineering and Development Department, HKSARG ("the Applicant") to seek approval from the Town Planning Board ("TPB") under section 16 of the Town Planning Ordinance for (1) proposed minor relaxation of Gross Floor Area restriction ("GFA") from 1,687,625m^2 to 1,849,125m^2 (with an increase of 161,500m^2) in the area zoned "Other Specified Uses" annotated "Industrial Estate" ("OU(IE)") ("Application Site"), and (2) proposed minor relaxation of building height ("BH") restriction from 8 storeys to 10 storeys (excluding basement(s)) for part of Area (a) in the "OU(IE)" zone in the Draft Yuen Long Outline Zoning Plan No. S/YL/26 ("Draft OZP"), to enable the proposed Multi-Storey Buildings ("MSBs") at 32 Wang Lee Street, Yuen Long ("Development Site") (**Figure 2.1** refers).

1.1.2 Having regard to the commercial viability of the MSBs, it is recommended to divide the Development Site into three sub-sites with the area of about 1 ha each for the MSBs. With the building height of not more than 10 storeys above ground level, the industrial spaces in the MSBs will mainly serve as private vehicle servicing and maintenance and/or logistics use, with not less than 30% of total GFA built in each MSB to accommodate eligible brownfield operations displaced by the government-led development projects ("the displaced brownfield operations").

1.1.3 This Supporting Planning Statement is to provide the TPB with the necessary information to facilitate consideration for the proposed minor relaxation of the maximum GFA restriction for the Application Site and minor relaxation of the building height restriction for part of the Development Site in the "OU(IE)" zone in the Draft Yuen Long OZP No. S/YL/26, to enhance the development potential of the Development Site and to provide operating floor space in the MSB for the Permitted Industrial Uses, mainly vehicle servicing and maintenance and/or logistics uses and the displaced brownfield operations, and public vehicle park.

1.2 Background

1.2.1 The Government has identified a site in Yuen Long area suitable for MSBs development with the provision of floor space to accommodate the displaced brownfield operations. As brownfield operations are business undertaking and sensitive to market changes, leveraging market forces through land sale for the development and operation of MSBs is considered a preferred option.

1.2.2 With reference to the findings and recommendations of a market sounding exercise, it is recommended to provide three sub-sites with an area of about 1 ha each in the Development Site for MSBs development to accommodate brownfield operations. The market sounding exercise also suggested that the private vehicle servicing and maintenance sector and the relevant brand operators showed interest on the Development Site due to its proximity to existing population centres. Private vehicle servicing and maintenance and/or logistics uses are also considered compatible with the displaced brownfield operations and could enhance the financial viability of the MSBs.

1.3 Report Structure

1.3.1 This Supporting Planning Statement comprises 7 sections. Following this introductory section, the background of the Development Site and surrounding area will be set out in Section 2. The relevant planning context will be elaborated in Section 3. The Development Proposal will be described in Section 4. Summaries of technical assessments will be presented in Section 5 while planning merits and justifications will be discussed in Section 6. Section 7 concludes and summarizes this Supporting Planning Statement.

2. THE DEVELOPMENT SITE AND ITS SURROUNDING AREA

2.1 Site Location and Existing Condition

2.1.1 The Application Site[1] is situated to the north of Yuen Long Town with an area of about 863,298m^2. Bounded by Shan Pui River to the east, Yuen Long INNOPARK ("YL INNOPARK") is situated within the Application Site which can be connected via Fuk Hi Street, Wang Lee Street and Fuk Shun Street.

2.1.2 The Development Site is a piece of L-shaped land at No. 32 Wang Lee Street and adjoining Government Land, Yuen Long where the YL INNOPARK is located in the vicinity. The Development Site is bounded by industrial buildings in YL INNOPARK at the west, east and north respectively. A local knoll namely Chu Wong Ling with a height of about +52.6mPD is situated to the immediate south of the Development Site. (**Figure 2.1** refers)

2.1.3 Various uses are identified within the Development Site. A bus depot operated by Kowloon Motor Bus is situated at the western portion of the Development Site. To the immediate east of the depot is a storage compound by Water Supplies Department. A public car park and a bus terminus for bus route no. K68 are at the northern portion of the Development Site. The estate management office of YL INNOPARK operated by Hong Kong Science and Technology Parks Corporation ("HKSTPC") is located at the immediate southeast of the public car park, where a piece of vacant land is at the southeast of the YL INNOPARK Estate Centre site. **Figures 2.2** and **2.3** illustrate the existing site context and the surrounding context respectively.

[1] As the stated total GFA (i.e. 1,687,625 m^2) on the OZP for the whole "OU(IE)" zone "already been sold to the lessee or sub-lessees of the YLIE" (i.e. HKSTPC), the land portion of MSB sites (except the Estate Centre portion) is not entitled for any GFA currently. Therefore, planning approval of the proposed minor relaxation of maximum GFA restriction should be sought in order to allow additional GFA for the MSB development.

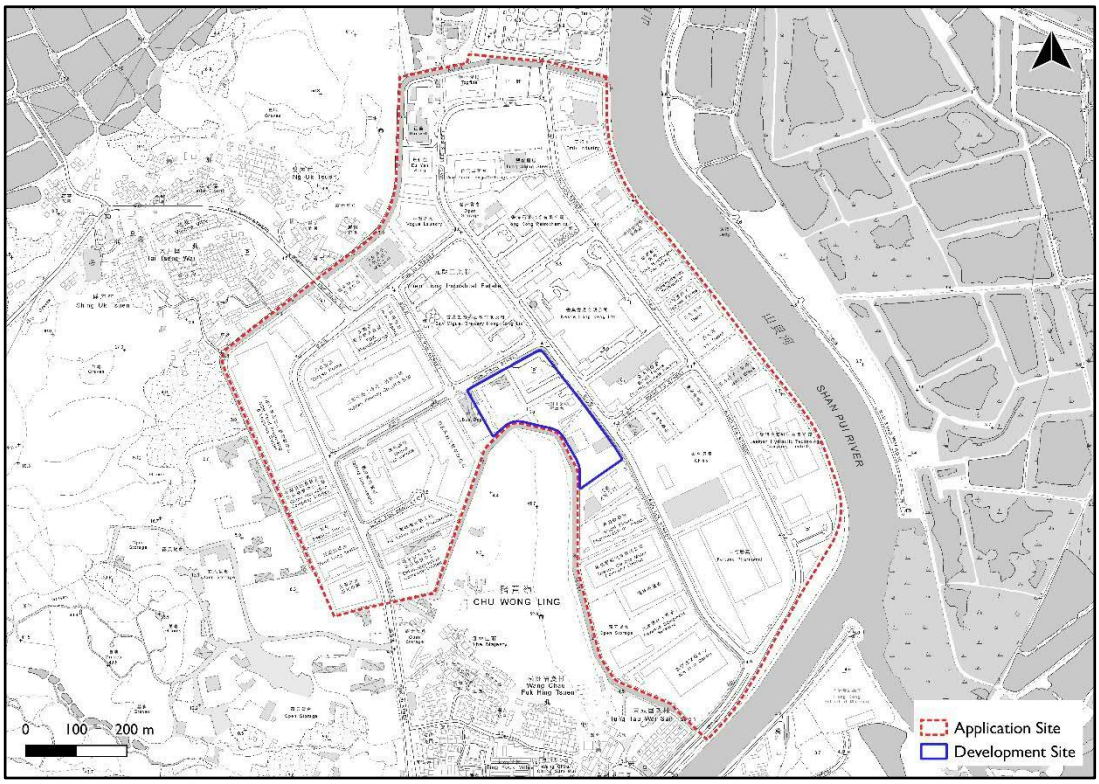

Figure 2.1 Site Location Plan

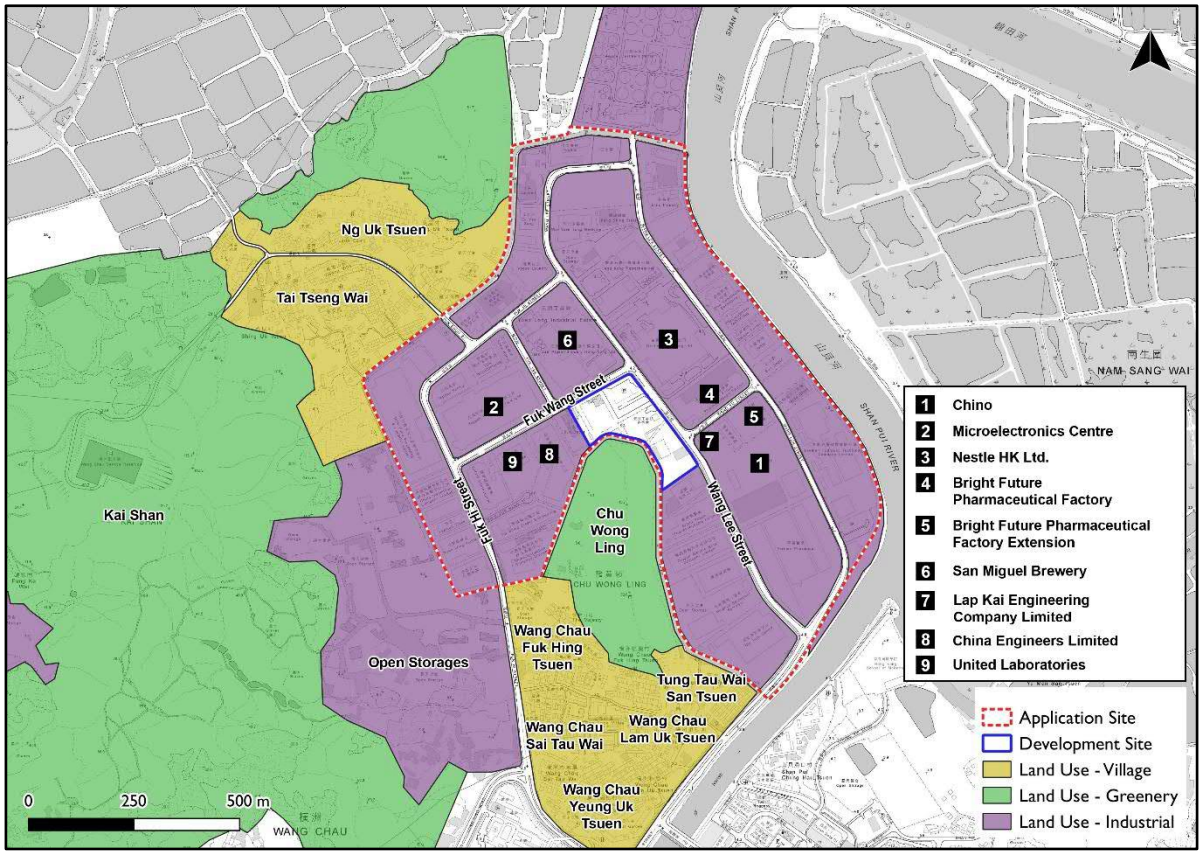

Figure 2.3 Surrounding Context

2.2 Surrounding Land Use Pattern

2.2.1 As shown in **Figures 2.2** and **2.3**, the Development Site is located in an area dominated by a mix of low-rise industrial developments and open storage sites, while a vegetated knoll and some villages located to the south. Details of the surrounding land uses are as follows:

- The Development Site is surrounded by multiple factories and industrial buildings in the YL INNOPARK to the north, east and west respectively. Large factories or industrial sites including San Miguel Brewery, Nestle Hong Kong Ltd and Bright Future Pharmaceutical Factory are located to the north, northeast and east across Fuk Wang Street and Wang Lee Street respectively. The China Engineers Limited is located to the immediate west of the Development Site.

- To the south of the Development Site is a knoll namely Chu Wong Ling. With the height level of about +52.6mPD, it is a major green belt in the surrounding area with trees and greenery. Various village settlements of Wang Chau are located to the further south across Chu Wong Ling. Some temporary open storage sites and workshops are at the western hillside of Chu Wong Ling across Fuk Hi Street.















N

Legend

- Application Site
- Development Site

1 - View from Wang Lee Street

2 - Temporary open storage of abandoned vehicles by LandsD

3 - Estate centre of YLIE

4 - Bus terminal of Route K68 and public carpark

5 - WSD's storage compound

6 - Temporary KMB bus depot

7 - Vacant land behind WSD's storage compound

PLANNING LIMITED
規劃顧問有限公司

Site Context

Proposed Minor Relaxation of Maximum GFA Restriction and Minor Relaxation of Maximum BH Restriction for part of Area (a) in "OU(IE)" zone for Proposed MSBs Development near Yuen Long Industrial Estate, Yuen Long

Supporting Planning Statement

Figure 2.2

Scale: 1:5,000 (A3)

Date: 16 June 2023

2.3 Accessibility of the Development Site

2.3.1 The Development Site has street frontage on Fuk Wang Street to the north and Wang Lee Street to the east. Ingress/egress point(s) of the Site are provided on these two streets. Vehicles to and from the Development Site could reach major roads in the surrounding areas such as Wang Lok Street and Fuk Hi Street via Fuk Wang Street and Wang Lee Street to connect other parts of the territory. Traffic to and from the Site can access Route 9 via Shui Pin Wai Interchange and Long Tin Road, and Route 3 via Pok Oi Interchange and Castle Peak Road – Yuen Long.

2.3.2 The Development Site is accessible by public transport such as bus and minibus. Bus route no. K68 and minibus route no. 74 connects YL INNOPARK to Yuen Long Town Centre and MTR Long Ping Station. The bus terminus of no. K68 locates within the Development Site which will be reprovisioned at Wang Lee Street.

2.4 Current Uses of the Development Site

2.4.1 **Table 2.1** and **Figure 2.4** lists the current uses of the Site and **Figure 2.5** shows the land status of the Development Site and adjacent areas**.**

Table 2.1: Current Uses of the Development Site

Lot / GLA / STT No.	Current Status	Area (m^2) (about)
Yuen Long Town Lot (YLTL) 313 & the Exts Thereto S.N	Granted by Private Treaty to the Hong Kong Industrial Estates Corporation (HKIEC) (in 2001, the HKIEC was replaced by the Hong Kong Science and Technology Parks Corporation (HKSTPC)) for the development of an Estate Centre. There are a single-storey Estate Centre and an Electric Transformer Room in the eastern portion of the lot and the western portion is vacant	3,900
GLA-TYL 164	Storage compound of Water Supplies Department (WSD) allocated to WSD's Term Contract or as storage yard.	4,440
STT 2575 (part)	A bus depot for parking and maintenance, refuelling and bus washing of buses operated by the Tenant (KMB). (5 years certain commencing on 19 Feb 2013 and thereafter quarterly subject to 3 months' notice of termination)	1,500
Unallocated Government Land: Public carpark, bus terminus, temporary open storage and miscellaneous public uses	(i) Public carpark managed by Transport Department (TD) • 27 public parking spaces for coaches/heavy vehicles • 58 public parking spaces for cars (including 56 nos. of metered-parking spaces and 2 nos. of disabled car parking spaces) and 19 parking slots for motorcycles (ii) K68 Bus terminus with regulator's kiosk (iii) Temporary open storage of abandoned vehicles managed by Lands Department (LandsD) (iv) Miscellaneous public uses such as roads, footpath and public areas, etc	22,460
	Total:	**32,300**

2.4.2 The majority of the Development Site (i.e. about 88%) falls within government land while a minor portion of land (i.e. about 12%) registered as Yuen Long Town Lot ("YLTL") No. 313 & Exts Thereto S.N in the land registry.

2.4.3 To facilitate the Proposed Development, the lot designated for use by YL INNOPARK as an Estate Centre (i.e. YLTL 313 & the Exts Thereto S.N) will be relocated outside the Development Site. A portion of STT 2575 adjoining the Development Site with an area of 3,900m^2 which similar to the area of existing Estate Centre Site has been considered as a potential relocation site, however, detailed arrangement is being discussed between the Government and the HKSTPC.

2.4.4 Prior to the Proposed Development, the function of the current bus depot in the Development Site will be taken up by KMB's current depots in Tin Shui Wai and Tuen Mun before the commissioning of a new depot.

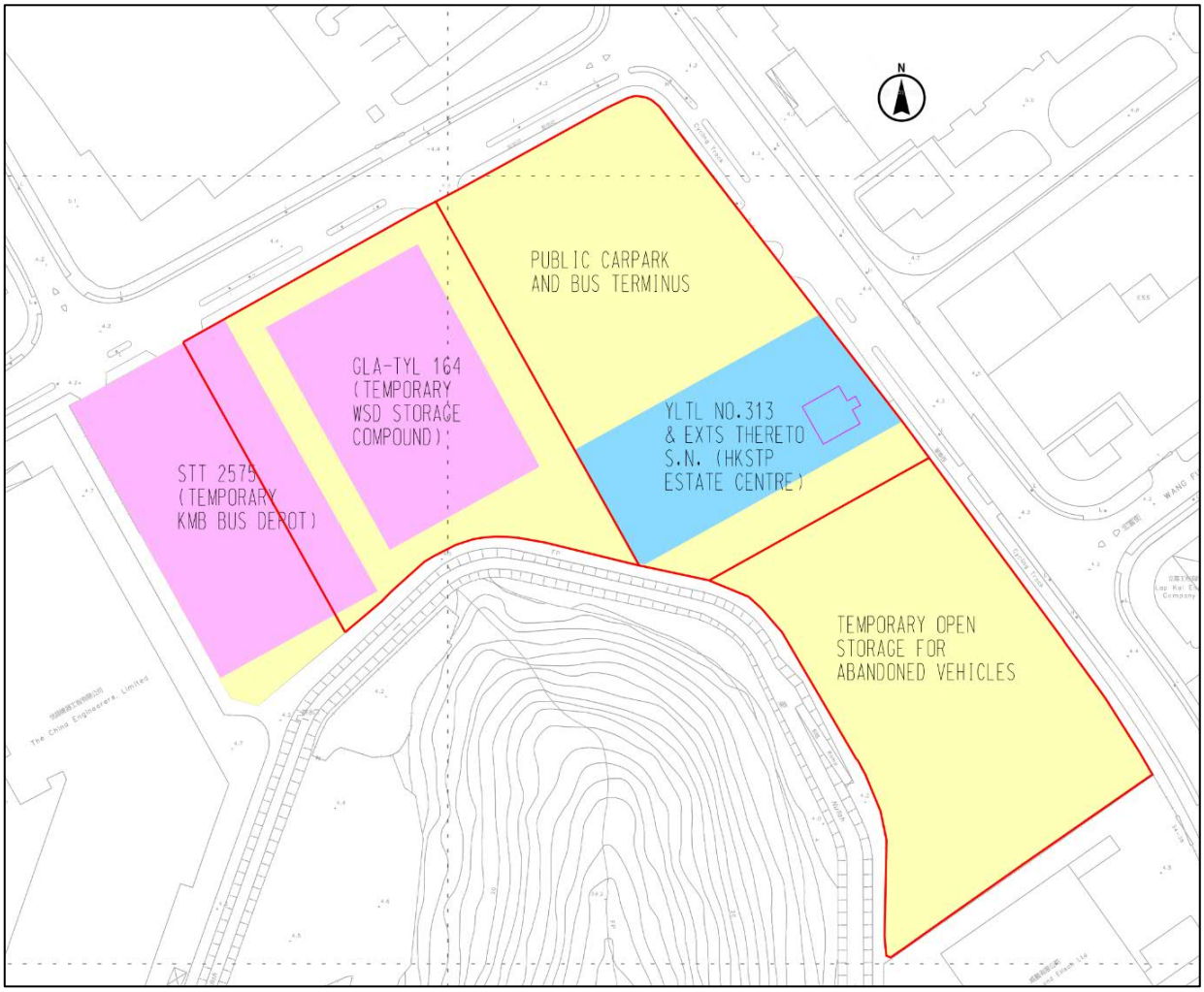

Figure 2.4 Land Uses and Status of the Development Site

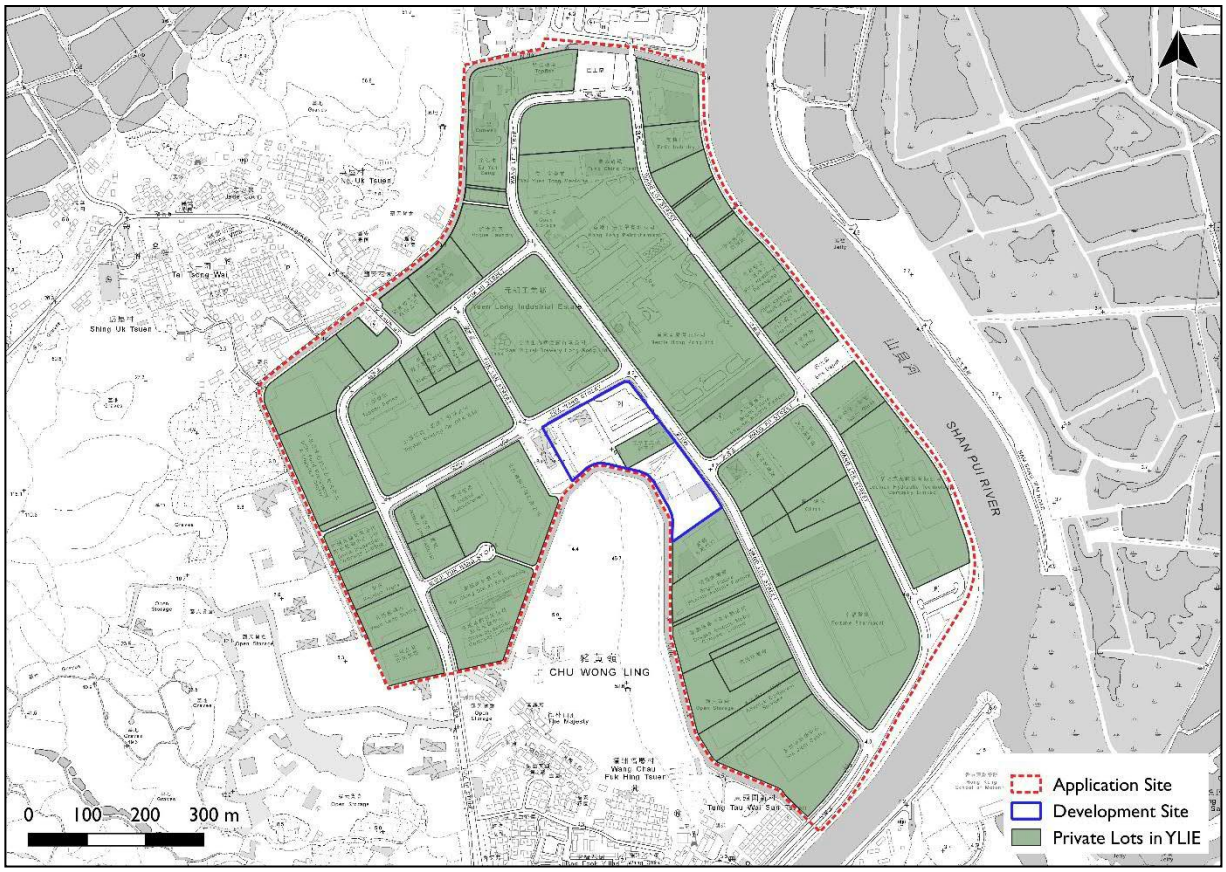

Figure 2.5 Land Status of the Development Site and Adjacent Areas

3. PLANNING CONTEXT

3.1 Statutory Planning Context

3.1.1 Under the prevailing Draft Yuen Long Outline Zoning Plan No. S/YL/26 ("the Draft OZP") gazetted on 6 January 2023, the Application Site is zoned "Other Specified Uses" annotated "Industrial Estate" ("OU(IE)") where the Development Site falls within (**Figure 3.1** refers). According to the Statutory Notes of the Draft OZP, the planning intention of "OU(IE)" zone is as follows:

"This zone is intended to provide/reserve land for the development of an industrial estate for industries to be admitted by the Hong Kong Science and Technology Parks Corporation according to the criteria set by the Corporation. Industries to be included would normally not be accommodated in conventional industrial buildings because of their specific requirements."

3.1.2 On the other hand, according to the Remarks of the "OU(IE)" zone in the Statutory Notes of the Draft OZP, it is stipulated that "*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 gross floor area of 1,687,625m^2 and a maximum building height of 8 and 10 storeys excluding basement(s) for areas annotated Area (a) and Area (b) respectively*". The Site mainly falls within Area (a) with a small portion of area falling within Area (b) in the prevailing "OU(IE)" zone.

3.1.3 Under the prevailing zoning, 'Industrial Use', 'Warehouse (excluding Dangerous Goods Godown)', 'Cargo Handling and Forwarding Facility' and 'Public Vehicle Park' are column 1 uses which are always permitted. Besides, according to the Remarks, "*based on the individual merits of a development or redevelopment proposal, minor relaxation of the gross floor area and building height restrictions may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance*".

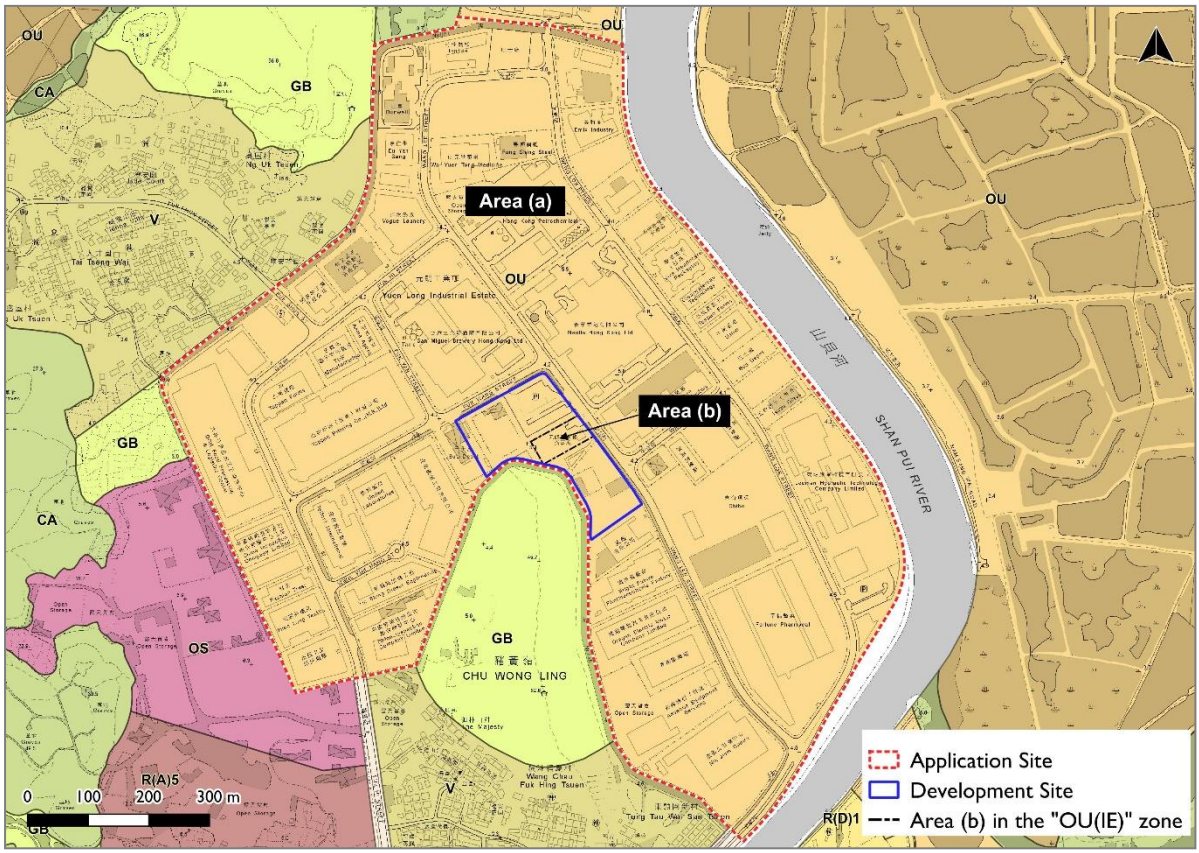

Figure 3.1 Zoning Context Plan

3.2 Non-Statutory Planning Context

Government Policy on Brownfield Operations

3.2.1 As brownfield operations are business initiatives, their search for working space is essentially a market behaviour. As applicable to similar situations affecting other business operators, the Government's policy is to make monetary compensation (i.e. statutory compensation as prescribed in the law, or ex-gratia allowances as an alternative) for eligible business operators to assist them in planning their own arrangements upon clearance.

3.2.2 In view of the scarcity of land, it is impracticable for the Government to resume and redevelop brownfield sites for public housing or other uses, and to offer land at the same time for "one-on-one" re-provisioning for the affected brownfield operators. In addition, the current large-scale open-air operations on brownfield sites may not be the most optimal use of land for sustainable development. Developing MSBs to provide planned and concentrated accommodation to consolidate brownfield operations in a manner could achieve better land use efficiency.

3.2.3 As brownfield operations are sensitive to market changes, leveraging market forces through land sale for the development and operation of MSBs is considered a preferred option.

3.2.4 For commercial viability, the proposed MSBs are recommended mainly for private vehicle servicing and maintenance and/or logistics use with specific land sale restrictions to set aside at least 30% of total GFA built in each MSB to accommodate eligible brownfield operations. Subjected to the possible changes on the relevant policies, future adjustments on the ratio of GFA distribution may be anticipated to meet the current needs.

Northern Metropolis Development Strategy

3.2.5 Under the Policy Address 2021 by the Chief Executive, the Government has proposed as a Key Action Direction adopting an innovative approach on land grant for multi-storey industrial buildings first in the HSK/HT NDA, with a view to facilitating the development of modern logistics centres to accommodate some brownfield operations, with the intention to promote upgrading of the logistics industry and create relevant employment opportunities, as well as to release more land resources for development.

3.2.6 Similarly, the proposed MSBs in YL INNOPARK area will enhance the land-use efficiency through accommodating brownfield operations in a multi-storey setting, promote higher operation efficiency, create new jobs, etc., which are in line with the development intentions of multi-storey industrial buildings in the HSK/HT NDA.

Policy Address 2022

3.2.7 In the Policy Address 2022, it was further announced that the Government will make available land in Yuen Long and Hung Shui Kiu for development of multi-storey industrial building from 2023, with lease conditions requiring a certain portion of floor area to be set aside for leasing to the affected brownfield operators at below market rent.

3.3 Land Use Compatibility with Approved Zoning

3.3.1 A major portion of the GFA of the proposed MSBs development is for private vehicle servicing and maintenance, and/or logistics uses, and public vehicle park.

3.3.2 According to the definition of terms of TPB, 'Industrial use' refers to "*the use of any place, premises or structure for the manufacture, alteration, cleansing, repairing, ornamenting, finishing, adaptation for sale, breaking up, or demolishing or transformation of goods and materials; for the storage, loading, unloading or handling of goods and cargo; or for the training, research, design and development, quality control and packaging in relation to the above processes*".

3.3.3 On the other hand, 'Vehicle Servicing and Maintenance' is considered being similar with "*alteration, repairing, ornamenting*" on vehicles, which is assumed to be similar in nature with 'Industrial Use'.

3.3.4 Logistics use is also considered being similar in nature with 'Cargo Handling and Forwarding Facility' use under Column 1 uses, which is always permitted.

3.3.5 Therefore, it is considered that both private vehicle servicing and maintenance and/or logistics uses are always permitted under the "OU(IE)" zone.

3.3.6 It is noted that 'Public Vehicle Park (excluding container vehicle)' is under the Column 1 uses, which is always permitted in the "OU(IE)" zone.

3.3.7 Furthermore, subject to the potential adjustments on the ratio of GFA distribution based on the possible changes on the relevant policies, eligible brownfield operations may take up not less than 30% of the total GFA of the proposed MSBs, which comprise the major following industries identified from a study of the Planning Department (PlanD) in 2017[2]:

a) General Warehouse/ Storage
b) Construction
c) Logistics
d) Vehicle Repairing and Related
e) Vehicle Parking
f) Waste Recycling
g) Rural industries
h) General Workshops
i) Vehicle Scrapping

3.3.8 The identified eligible brownfield operations and their relevant land uses area in general subsumed in Column 1 uses in the "OU(IE)" zone, such as 'Industrial Use', 'Warehouse (excluding Dangerous Goods Godown)', and 'Cargo Handling and Forwarding Facility', uses, which are considered as "Column 1 uses" and always permitted under the Draft OZP (**Figure 3.2** refers). According to the "Remarks" of the draft OZP, in determining the maximum gross floor area: (i) 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; and (ii) any floor space that is constructed or intended for use solely as public utility installations, public car/lorry parks, public transportation facilities or Government,

[2] https://www.legco.gov.hk/yr19-20/english/panels/dev/papers/dev20191126cb1-160-6-e.pdf

institution or community facilities, as may be required by Government, may be disregarded.



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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 "Industrial Estate" only

Ambulance Depot
Broadcasting, Television and/or Film Studio
Cargo Handling and Forwarding Facility
Dangerous Goods Godown
Eating Place
Gas Works
Government Refuse Collection Point
Government Use (not elsewhere specified)
Industrial Use
Information Technology and Telecommunications Industries
Office
Petrol Filling Station
Private Club
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 Installations
Refuse Disposal Installation
Research, Design and Development Centre
Shop and Services
Social Welfare Facility (excluding those involving residential care)
Training Centre
Utility Installation for Private Project
Warehouse (excluding Dangerous Goods Godown)
Wholesale Trade
Asphalt Plant/Concrete Batching Plant
Electric Power Station
Library
Off-course Betting Centre
Offensive Trades
Oil Depot, Oil Refinery and Petro-chemical Plant
Place of Recreation, Sports or Culture
Service Industries (not elsewhere specified)

Planning Intention

This zone is intended to provide/reserve land for the development of an industrial estate for industries to be admitted by the Hong Kong Science and Technology Parks Corporation according to the criteria set by the Corporation. Industries to be included would normally not be accommodated in conventional industrial buildings because of their specific requirements.

Figure 3.2 Extract of the Schedule of Uses of the "OU(IE)" Zone in the Draft OZP

3.4 The Need for Applying Minor Relaxation of Maximum GFA Restriction of the Prevailing "OU(IE)" Zone and Minor Relaxation of BH Restriction for part of Area (a) of "OU(IE)" Zone

3.4.1 The need for applying minor relaxation of maximum GFA restriction for the Application Site (i.e. the "OU(IE)" zone) is that there was no planned GFA for the proposed MSBs at the Site. According to the Draft OZP, the "OU(IE)" zone is subject to a maximum GFA of 1,687,625m^2 with the planning intention "*to provide/reserve land for the development of an industrial estate for industries to be admitted by the Hong Kong Science and Technology Parks Corporation according to the criteria set by the Corporation"* and *"[i]ndustries to be included would normally not be accommodated in conventional industrial buildings because of their specific requirements*".

3.4.2 The Explanatory Statement of the Draft OZP further points out that the calculation of the maximum GFA is *"equivalent to a plot ratio of 2.5 for the area designated for industrial development and a plot ratio of 5 for a site designated for estate centre as set out in the lease for the Yuen Long INNOPARK*". However, referring to the **Figure 2.5**, the lease for Yuen Long INNOPARK does not cover the Government land falling within the "OU(IE)" zone while the maximum GFA permitted under the "OU(IE)" zone is mainly granted to the lease for Yuen Long INNOPARK[3]. Therefore, minor relaxation of GFA restriction of the "OU(IE)" zone for the proposed MSBs development would be required.

3.4.3 The Draft OZP also stipulates that a maximum building height of 8 and 10 storeys excluding basement(s) for areas annotated Area (a) and Area (b) of the "OU(IE)" zone, respectively. While the Development Site falls within both Area (a) and Area (b), the proposed MSBs are recommended for development at a plot ratio of 5 for commercial viability and enhanced land use efficiency. Taking into account the site coverage stipulated in the Building (Planning) Regulations, 10 storeys above ground would be required for whole Development Site to provide adequate operating floor space for the intended uses. Therefore, minor relaxation of the building height restriction for part of Area (a) (that the Development Site falls within) from 8 storeys to 10 storeys (excluding basement(s)) is required to enable the proposed MSBs development at the Development Site.

[3] As the stated total GFA (i.e. 1,687,625 m^2) on the OZP for the whole "OU(IE)" zone "already been sold to the lessee or sub-lessees of the YLIE" (i.e. HKSTPC), the land portion of MSB sites (except the Estate Centre portion) is not entitled for any GFA currently. Therefore, planning approval of the proposed minor relaxation of maximum GFA restriction should be sought in order to allow additional GFA for the MSB development.

4. DEVELOPMENT PROPOSAL

4.1 Indicative Development Layout

4.1.1 Having regard to the commercial viability, three sub-sites (i.e. Site A, Site B and Site C) of each of about 1 ha are proposed in the Development Site to accommodate MSBs development. A plot ratio of 5 is proposed for each MSBs and the proposed building height of each MSBs will be not more than 10 storeys above ground level. With the proposed height level of about +71.5mPD, higher floor to floor headroom is adopted to facilitate the operation of vehicle servicing and maintenance and/or logistics in the MSBs development. The proposed MSBs development at the Development Site is anticipated to achieve a total GFA of about 161,500m^2. **Figure 4.1** illustrates an indicative scheme for the proposed MSBs development.

4.1.2 The proposed uses could be summarized as Permitted Industrial Uses and Public Vehicle Park that are always permitted as "Column 1 uses" in the OZP.

4.1.3 It is anticipated that the land for the proposed MSBs will be disposed by tender and the proposed MSBs are assumed to start operation in 2028/2029 for the purpose of technical assessments, with a construction period of 4 to 5 years. Demolition works of existing Estate Centre will be required for the proposed MSB at Site C. Major development parameters and proposed floor uses of the proposed MSBs are summarised in **Table 4.1** and **Table 4.2** respectively. The schematic layout plans of the proposed MSBs are presented at **Appendix A**.

4.1.4 The scheme as submitted in this Planning Statement is indicative only and solely for technical assessment purpose. It is used to demonstrate that the proposed increase of maximum GFA and building height would have no significant adverse impacts on the environment, air ventilation, visual quality, etc. This is to allow flexibility to the future disposal of the land parcels in the Site. The actual development layout is subject to change in the implementation stage. In case of combining the development of two or three of the sites into a scheme different from the indicative scheme, further air ventilation assessment should be conducted to the satisfaction of PlanD.

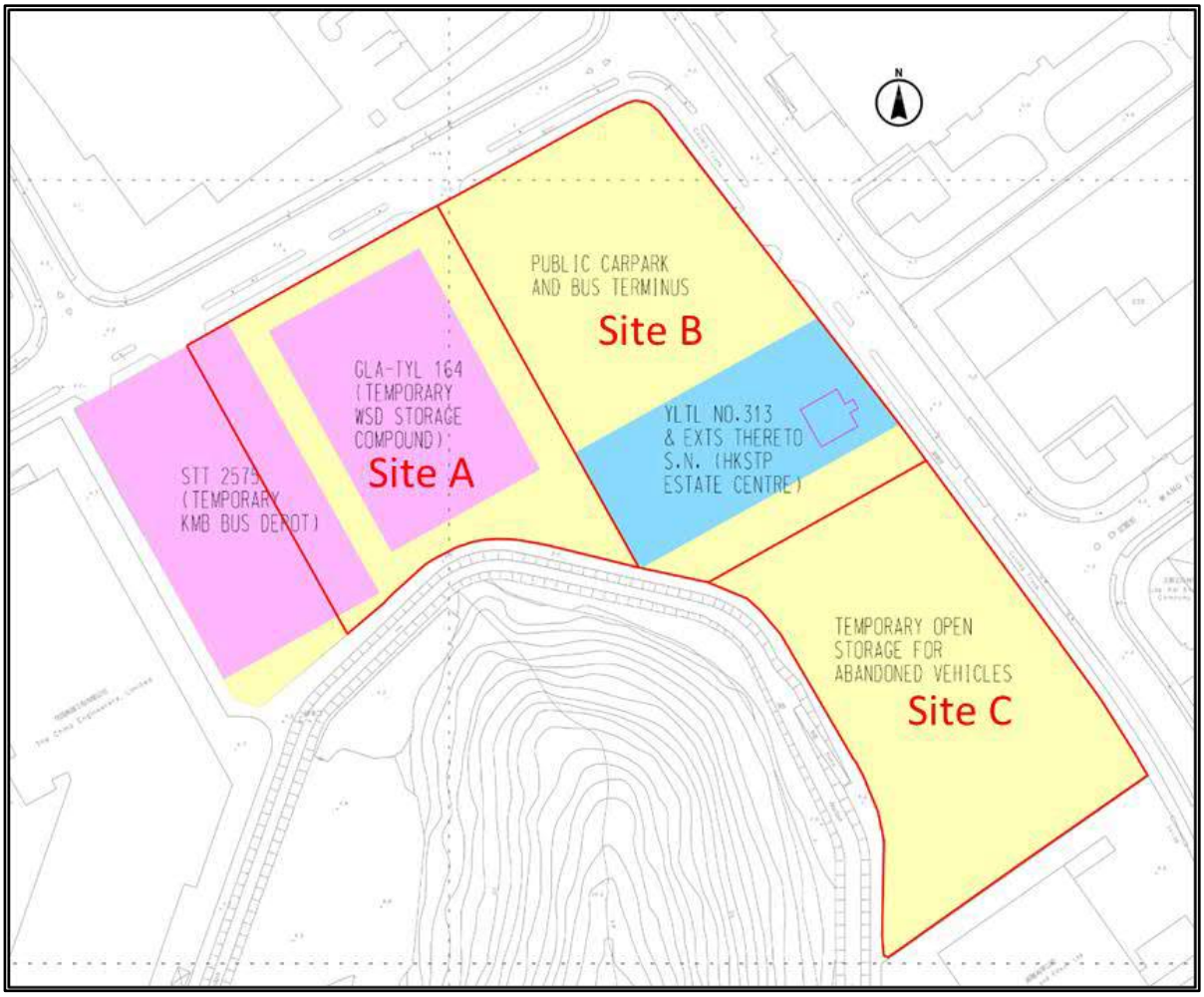

Figure 4.1 Indicative Land Parcel for MSBs Development within the Development Site

Table 4.1 Major Development Parameters of the Proposed MSBs

Parameters	MSB in Site A	MSB in Site B	MSB in Site C	Total
Total Site Area	0.98ha	1.25ha	1ha	3.23ha
Max. Plot Ratio	5			
Total GFA (m^2)	49,000	62,500	50,000	161,500
Site Coverage	Not Specified			
Class of Site	Class A	Class B	Class A	
Land Uses	Private vehicle servicing and maintenance and/or logistics uses + Not less than 30% of total GFA for accommodating eligible brownfield operators displaced by the government-led development projects (industrial uses)[4][5]			
Maximum Building Height	Not more than 10 storeys above ground			

Table 4.2 Proposed Floor Uses of MSBs Development in Sites A to C based on the Indicative Scheme

Floor	Proposed Uses
G/F-9/F	Vehicle Servicing and Maintenance and/or Logistics Use + Industrial Use (Brownfield Operation)[6]
Basement [7]	Vehicle Parking (Site B only)[8]

4.2 Provision of Internal Transport Facilities

4.2.1 The proposed transport facilities provision is in accordance with the requirements under Hong Kong Planning Standards and Guidelines ("HKPSG").

4.2.2 As indicated in **Table 2.1**, the proposed development in Site B will affect 27 public parking spaces for coaches/heavy vehicles; 58 public parking spaces for cars (including 56 nos. of metered-parking spaces and 2 nos. of disabled car parking spaces); and 19 parking slots for motorcycles. It is therefore proposed that the affected parking facilities be mainly reprovisioned and incorporated in the proposed MSBs in Site B except for the cycle parking spaces which will be allocated at the roadside.

[4] The 30% of total GFA would be subject to relevant Government policy on brownfield operations which may be adjusted in the future.
[5] The 30% of total GFA may exclude any structures and partitions, car parking spaces, circulation areas, staircases, staircase halls, lift landings, space occupied by toilet facilities, mechanical and electrical services such as lifts and air-conditioning systems subject to further discussion among Government departments.
[6] Including ancillary parking spaces, loading and unloading bays.
[7] Subject to the detailed design, basement(s) may be constructed within Site A, Site B and Site C to accommodate ancillary parking and loading/unloading spaces and E&M rooms underground .
[8] The vehicle parking at Site B includes public vehicle parking as referred in paragraph 4.2.2 and in Drawing No. MMH/369397/IDS/202A

4.2.3 The proposed parking and loading/unloading provisions of the proposed MSBs in each of the three sub-sites are shown in **Table 4.3** below. For illustrative purposes, the provisions are derived on the assumption that vehicle servicing and maintenance facilities would take up the remaining 70% of the GFA built of the proposed MSBs (i.e. excluding the provision for brownfield operation). If some GFA of the MSBs are to be taken up for logistics use, the parking and loading/unloading provisions would be adjusted according to prevailing practices.

Table 4.3 Proposed Parking and Loading/Unloading Provision

Type		Site A		Site B			Site C	
		Required Provision from HKPSG	Proposed Provision	Reprovision of Affected Facilities [a]	Required Provision from HKPSG [b]	Total [c] = [a] + [b]	Required Provision from HKPSG	Proposed Provision
Private Car	Parking	54	54	56	68	124	54	54
Private Car (Disabled)	Parking	2	2	2	2	4	2	2
Motorcycle	Parking	6	6	19	7	26	6	6
Light Goods Vehicle	Parking	7	7	-	9	9	7	7
	L/UL	22	22	-	28	28	22	22
Heavy Goods Vehicle	L/UL	9	9	-	12	12	9	9
	Parking	4	4	12	5	17	4	4
Coach	Parking	-	-	15	-	15	-	-
Container Vehicle	L/UL	2	2	-	2	2	2	2

4.3 Planning and Design Merits

4.3.1 The proposed MSBs would be designed with the following planning and design merits:

- Providing not less than 6m-wide building setback along the site boundaries fronting Wang Lee Street and Fuk Wang Street, so as to allow space for peripheral tree planting strip(s) for providing shading and micro-climate control for street level environment as well as enhancing streetscape.

- Providing tree planting and/or vertical greening at the Development Site boundaries and at the building façade for diversity of the visual experience at the pedestrian level and for providing shading and micro-climate control for street level environment.

- Preserving the existing large trees within the Development Site.
- Providing greenery of not less than 20% of the site coverage of each MSB site, 10% of which should be within primary zone.

5. TECHNICAL ASSESSMENT

5.1 Traffic and Transport Impact Assessment (Appendix C refers)

5.1.1 A Traffic and Transport Impact Assessment has been conducted for the Proposed Development[9] to assess the potential traffic impact onto the surrounding road network and the potential impact on the road and public transportation. Traffic count survey was conducted at the concerned junctions / road links located in the vicinity of the Proposed Development in order to establish the traffic flow in the peak periods. Most of the junctions and road links are operated with capacities during the AM and PM peak hours. For the design year 2032, the junctions analysed are expected to operate with capacities during the peak hour for the case with and without the Proposed Development. It is anticipated that the Proposed Development will not result in insurmountable traffic impact to the key junctions and road links in the Area of Influence with the proposed improvement works by other projects. The implementation arrangement of the road improvement works will be further identified with nearby interfacing projects with a view to achieve a holistic design and implementation approach.

5.1.2 The road link assessment results show that the concerned road links in the AOI would be operating within capacity (i.e. V/C ratios below 1.0) except L8 - Yuen Long Highway eastbound which will operate with V/C ratio between 1.0 and 1.1[10]. However, it should be noted that the contribution of the development traffic from the proposed MSBs to that road link is expected to be insignificant. Furthermore, the Northern Metropolis Highway in the New Territories North proposed under strategic studies on Railways and Major Roads beyond 2030 connecting Tin Shui Wai in the west and Kwu Tung North in the east may also provide convenient traffic connection and alleviate the impact to the local traffic network e.g. Yuen Long Highway, Long Tin Road and Castle Peak Road arising from the proposed development.

5.1.3 For the public transport demand, the assessment shows that additional 6 and 4 departures in the AM peak plus additional 6 and 3 departures in the PM peak would be required for MTR bus route no. K68 and GMB route no. 74, respectively, to meet the increased demand in the YL INNOPARK area.

5.1.4 The affected MTR Bus Route No. K68 terminus in Site B would be reprovisioned at Wang Lee Street; and the affected public parking space would be reprovisioned and incorporated together with ancillary parking and loading/unloading bays in the proposed MSBs development as shown in **Table 4.3**. During the interim period, setting up a temporary bus terminus at Fuk Wang Street is proposed to maintain

[9] Please note that there is about 60% of the GFA allocated to the Yuen Long Industrial Area (now known as Yuen Long Innopark) had yet to be expended. The impact assessments supporting the s16 application would be based on an "existing GFA" scenario (i.e. covering the impact of all existing developments and projects under planning only).

[10] V/C ratio between 1.0 and 1.1 means that the road section would be slightly overloaded, but heavy congestions and long traffic queues are not expected. The road section will experience some delay with reduced traffic speed at peak period, which is commonly seen at strategic roads in urban areas.

the services of K68 bus, subject to further discussion with the relevant authorities.

5.1.5 The existing public vehicle park would be affected during the construction stage. It is expected that the existing public vehicle park at Wang Lok Street can accommodate the demand for private car parking. For the affected parking spaces for motorcycles, coaches, buses, and goods vehicles, some existing nighttime roadside parking spaces at Wang Lee Street, Fuk Wang Street, Fuk Hi Street, and Fuk Yan Street will gradually be converted to roadside parking spaces.

5.2 Environmental Assessment (Appendix D refers)

Air Quality Impact

5.2.1 According to the Air Quality Impact Assessment, the construction activities for the Proposed Development are limited with no large scale demolition works and minor construction works. Therefore, no adverse construction dust impacts to nearby ASRs is anticipated subject to the implementation of good site management and the recommended dust control measures.

5.2.2 Given that the proposed MSBs are located within Yuen Long INNOPARK, which is designated for various industrial operation, the proposed MSBs are considered compatible with the prevailing uses and the intention uses of the area when in operation, as the proposed MSBs are also designated for industrial operations.

5.2.3 For vehicle servicing and maintenance uses in operation, control measures as Environmental Guidelines for the Vehicle Repair Trade should be implemented to treat the exhaust gas from the activities with potential air pollutant emission sources including engine testing, paint spraying and welding works, etc. Special emission sources are not expected within the proposed MSBs. Should there be any, an assessment shall be conducted.

5.2.4 There would be additional traffic arising from the proposed development. As the buffer distance would be not less than 5m from the road, thus satisfying the buffer distance requirement for Local Distributor as stated in Chapter 9 of HKPSG. Therefore, adverse air quality impact to ASRs due to traffic induced by the development is not expected.

Noise Impact

5.2.5 Given that there is no NSRs identified within the 300m study area, no adverse construction noise impact is anticipated. Hence, no specific construction noise mitigation measures are required. It is recommended that the noise reduction measures should be considered as far as practicable to further minimise the construction noise impact.

5.2.6 There are exceedances of road traffic noise criteria predicted under with Project scenarios at some existing and planned NSRs. Nevertheless, the differences in the predicted noise levels between with and without Project scenarios are found to within 1.0 dB(A). Thus, the induced traffic noise impact due to the operation of the proposed MSB is insignificant. Furthermore, as NSRs were identified within the 300m study area, fixed noise impact is not anticipated.

Tree Preservation

5.2.7 According to the tree survey, a total of 102 individual trees were identified in the Development Site. Among the surveyed trees in the Site, no trees of particular interests, including registered, potential OVT or tree species of conservation importance, was identified. In overall, 15 trees are proposed to be retained and approximately 87 trees are proposed to be felled for the implementation of the Development.

5.2.8 For the compensatory planting, compensatory tree planting should be as far as possible of a ratio not less than 1:1 in terms of number. In addition, it is recommended that the site coverage of greening area should be not less than 20% for each MSB site. The detailed compensatory planting proposal shall be submitted with the tree removal application for approval in accordance with LAO Practice Note No. 2/2020.

Ecological Impact

5.2.9 The Development Site mainly comprises the Developed Area habitat which is characterised by paved surfaces and low-rise structures with constant human disturbance. Loss of the Developed Area is temporary during construction with minor impact significance.

5.2.10 Direct and indirect impacts on flora and fauna species of conservation interest are not anticipated. Offsite disturbance and indirect impact on environmental quality is considered as minor. Potential impacts on reduction of ecological carrying capacity and habitat fragmentation are not anticipated, while risk of bird collision to new building structures can be mitigated by minimising the use of vertical glass surface on new building structures.

5.2.11 Given that the habitat affected is artificial with limited ecological value and minor indirect impacts anticipated, the potential ecological impact due to construction and operation of the Project is considered as minor and acceptable.

Land Contamination

5.2.12 A Contamination Assessment Plan (CAP) which details the findings of desktop study and site reconnaissance survey and the proposed SI works, was endorsed by EPD.

5.2.13 The proposed contamination SI works in the endorsed CAP is for general reference only, and the exact extent, number of sampling locations etc. will have to be further reviewed and updated when the land in question is available.

5.2.14 It is recommended that site re-appraisal will be conducted by existing occupants or the developer taking up the site to ascertain initial contamination evaluation and review the site investigation works proposed in the endorsed CAP. The findings of the re-appraisal will then be documented appropriately, such as by Supplementary CAP to EPD for agreement prior to the commencement of SI works. After the site investigation, the soil sampling and testing results will be presented in the CAR and submitted to EPD for agreement. If land contamination is confirmed, RAP and RR will also be prepared and submitted to EPD for agreement prior to commencement of the site works for the proposed MSBs development.

Water Quality Impact

5.2.15 The identified water quality impacts of the Development include construction site runoff and drainage, groundwater ingress, potentially contaminated soil, sewage from the construction workforce, accidental spillage of fuels, oils and chemicals, and general refuse and debris generated during construction phase, and sewage from the MSBs, wastewater from the MSBs canteen (if any) and tenant operations, and surface runoff from paved areas during operation phase.

5.2.16 Based on the identified water quality impacts, mitigation measures are recommended for both construction and operation phases of the project. With implementation of the mitigation measures, no adverse impact during construction and operation phases is anticipated.

Waste Management

5.2.17 The major waste types generated by the construction activities will include C&D materials from site clearance works, site formation works, foundation works and multi-storey buildings construction works; chemical waste from maintenance and servicing of construction plant and equipment and general refuse from the construction workforce. Provided that all these identified wastes are handled, transported and disposed of in accordance with the relevant legislative and recommended requirements and the recommended good site practices and mitigation measures are properly implemented, no adverse environmental impact is expected during the construction phase.

5.2.18 During the operation phase, the waste types generated will be general refuse from staff and chemical waste from the vehicle servicing and maintenance, logistics use and the brownfield operations. Provided that all these wastes are handled, transported and disposed of in accordance with the relevant legislative requirements and the recommended mitigation measures are properly implemented, no adverse environmental impact is expected during the operation phase.

Hazard to Life

5.2.19 The Site is identified outside any 1-km consultation zone of PHIs. No construction and operation hazard-to-life impact is anticipated for the Proposed Development.

5.3 Infrastructure Capacity (Appendices E, F and G refers)

5.3.1 The adequacy of the water supply system, the sewerage system, the drainage system and the power supply to cope with the Proposed Development has been assessed. It is concluded that the existing systems would have adequate capacity to accommodate the estimated demand.

5.3.2 The reports on the Water Supply and Utilities Impact Assessment, Sewerage Impact Assessment and Drainage Impact Assessment are enclosed in **Appendices F, G and H**.

5.4 Air Ventilation Assessment (Appendix H refers)

5.4.1 An Air Ventilation Study has been conducted to investigate the pedestrian wind environment, identify and assess the ventilation corridors and the wind availability for the Proposed Development.

5.4.2 The Site is located in YL INNOPARK, north-west Hong Kong and is bounded by Fuk Wang Street to the northwest, Wang Lee Street to the east, and a wooded hill (i.e. Chu Wong Ling) to the south. The immediate surrounding mainly consists of low-rise industrial buildings and warehouses.

5.4.3 The air ventilation performance of two schemes have been reviewed and assessed, being the Baseline Scheme[11] and the Proposed Scheme[12].

5.4.4 A series of CFD simulations have been performed based on the AVA methodology as stipulated in the Technical Circular and Technical Guide. Ten wind directions in total, which cover 84.4% and 77.1% of annual and summer wind conditions of the areas, have been considered. The annual prevailing winds for the Site and its surrounding area are coming from E, NE, ESE directions while the summer prevailing wind are coming from SSW, S, SW directions. The ventilation performance for the Proposed Development at the site boundary and within the assessment area was assessed.

5.4.5 A total of 36 perimeter test points and 193 overall test points are selected to assess the ventilation performance of the Proposed Development.

[11] The Baseline Scheme comprises a major MSB block of 8-storey high for accommodating brownfield operation, with a total GFA of 100,282 m^2 above ground at a plot ratio of 3.1.
[12] Refer to the information in Table 4.1, the Proposed Scheme comprises three MSB blocks each of 10-storey high with a total GFA of 161,500 m^2 at a plot ratio of 5.0.

5.4.6 The assessment results have demonstrated that the general wind environments of both schemes are comparable and similar. The annual LVR for the Baseline Scheme and the Indicative Development Scheme are 0.14 and 0.13 respectively, whilst their LVRs range from 0.10 to 0.15 and 0.10 to 0.14 respectively. In terms of the summer LVR, the Baseline Scheme and the Indicative Development Scheme are 0.13 and 0.12, whilst the respective LVRs both are ranging from 0.10 to 0.15.

5.4.7 The annual SVRs for the Baseline Scheme and the Indicative Development Scheme are 0.18 and 0.16, while the SVRs of the two schemes are ranging from 0.14 to 0.20 and 0.11 to 0.21 respectively. The summer SVRs for Baseline and Indicative Development Scheme both are 0.16, while their SVRs are ranging from 0.14 to 0.16 and 0.14 to 0.20 respectively.

5.4.8 The wind ventilation performance of the Indicative Development Scheme is assessed to be slighter weaker than that of the Baseline Scheme. This is expected because the Indicative Development Scheme, with significantly higher GFA than the Baseline Scheme, would involve three multi-storey building blocks which together would be more massive than the Baseline Scheme.

5.4.9 From detailed examination of the wind availability from different directions, it is assessed that the adopted design feature of the Indicative Development Scheme, including building minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Streets, will enhance the wind ventilation. This is evident from the better ventilation of the Indicative Development Scheme than the Baseline Scheme under the NNE prevailing wind and the easterly wind. The design features also benefit the wind availability of pedestrian footpath along Fuk Wang Street and Wang Lee Street.

5.4.10 To conclude, the Indicative Development Scheme will provide sufficient wind environment in the vicinity of the Site as well as in the assessment area within YL INNOPARK. The Indicative Development Scheme will not cause significant air ventilation impact on the pedestrian wind environment when compared with the Baseline Scheme, which justifies the proposed development of the Site at a plot ratio of 5.0, resulting in a higher land use efficiency.

5.4.11 In case Site A, Site B and/or Site C are combined for development into a scheme different from the Indicative Development Scheme, further air ventilation assessment should be conducted to the satisfaction of PlanD.

5.5 Visual Impact Assessment (Appendix B refers)

5.5.1 The Proposed Development comprised of three building blocks with a maximum building height of 10 storeys above ground at a maximum height level of +71.5mPD. It will transform the surrounding area from being an open albeit disturbed landscape currently occupied with various temporary and public transport uses.

5.5.2 The Site is currently covered with concrete hard standing with some existing trees located largely around the periphery along Fuk Wang Street and Wang Lee Street. The existing built environment including the YL INNOPARK and nearby village developments are generally low-rise in nature. Although there are a few of taller developments in the YL INNOPARK, those buildings are not exceeding 8-storey at stipulated in the Draft OZP.

5.5.3 The significance of the visual impacts of the Development is assessed to be ranging from slight to moderate adverse. Moderate impacts are mainly assessed for the local viewpoints within YL INNOPARK in the vicinity with high visibility of the Development. Slight impacts are assessed for distant viewpoints such as areas along the eastern bank of the Shan Pui River, Chu Wong Ling wooded knoll at the south and from elevated locations on the Kai Shan ridge to the west. The Chu Wong Ling wooded knoll and the YL INNOPARK intervening industrial development serves to largely obscure views of the Development.

5.5.4 Various design measures have been adopted in the preparation of the indicative scheme to mitigate the potential visual impact from the Proposed Development. These design measures are stated as follows:

- Provide a minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Streets to enhance streetscapes. This will provide a wider view corridor at these two streets abutting the Development.

- Tree planting and/or vertical greening at the Development Site boundary and at the building façade is recommended for diversity of the visual experience at the pedestrian level.

- Provide greenery of not less than 20% of the site coverage of each MSB area, 10% of which would be within the primary zone to enhance the visual appearance.

5.5.5 In overall terms, with proper design measures on the building façade and the adopted colour scheme to be harmonised with the environment, the visual impact of the Development can be further mitigated.

5.6 Geotechnical Aspect (Appendix I refers)

Scheduled Area No. 2

5.6.1 The Development Site is located within the Schedule Area No. 2 and may be underlain by cavernous marble. The developers shall submit the proposed building and excavation works to BD for approval as required under the provisions of BO. Depending on the foundation design of the new developments, extensive ground investigation may be required. Such investigation may require a high level of

involvement of an experienced geotechnical engineer both in the design and in the supervision of geotechnical aspects of the works required to be carried out on the Site.

Construction Vibration Impact On Sensitive Structures and Services

5.6.2 It is noted that there are vibration sensitive structures and services in the vicinity of the Site, including the Microelectronic Centre under construction at Fuk Wang Street, near to the Site A.

5.6.3 The construction methodology to be adopted for the foundation of the Project shall not cause any adverse impact on the vibration sensitive structures and services. The requirements of the relevant PNAPs shall be observed and complied with, including, but not limited to, the following:

- PNAP APP18: Foundation Works
- PNAP APP137: Ground-borne Vibrations and Ground Settlements Arising from Pile Driving and Similar Operations

5.6.4 To minimise the construction noise/vibration impact, quieter construction method for foundation works such as bored piling is recommended when working in the vicinity of the vibration sensitive structures and services.

6. PLANNING MERITS AND JUSTIFICATIONS

6.1 In Line with the Government's Policies and Studies

6.1.1 The Proposed Development in the three sub-sites of the Development Site presented in this supporting Planning Statement is in line with the Government policies and studies such as Northern Metropolis Development Strategy, where brownfield operators may re-establish their business in the MSBs at enhanced land-use efficiency in comparison with conventional open-air sites. Furthermore, moving displaced brownfield operators to the proposed MSBs would facilitate the development of brownfield sites.

6.1.2 Co-locating compatible brownfield uses in the proposed MSBs would promote efficient use of land and building resources, which is in line with the similar MSBs initiative of the Government in the HSK/HT NDA.

6.1.3 With reference to findings and recommendations of the market sounding exercise conducted by the Government, for commercial viability, the proposed MSBs will be mainly for private vehicle servicing and maintenance, and/or logistics uses (about 70% of the GFA) with not less than 30% of the total GFA built for accommodating the displaced brownfield operators.

6.2 Providing Land for Sustainable Development of Hong Kong

6.2.1 In the 2020 Policy Address, the Government announced that 330 hectares of land had been identified for providing 316,000 public housing units to meet the demand for about 301,000 public housing units in the coming 10 years. In the Long Term Housing Strategy Annual Project Report 2020 released in December 2020, the Government further affirmed that its 10-year housing supply target remained unchanged at 430,000.

6.2.2 It was further announced in the 2022 Policy Address that Government will make available land in Yuen Long and Hung Shui Kiu for development of multi-storey industrial buildings from 2023, with lease conditions requiring a certain portion of floor area to be set aside for leasing to the affected brownfield operators at below market rent.

6.2.3 Apart from the housing need, land supply for industrial development is also in strong demand, in supporting the sustainable development of Hong Kong and creating job opportunities. This s.16 application is to facilitate and enable the subject government land in the Development Site in Yuen Long for industrial development.

6.2.4 Redeveloping brownfield sites into housing or other uses is an important component of Government's multi-pronged land supply strategy. Resumption of brownfield sites will cause displacement of operations at these sites that are part in our economy's production chain across different industries, of which private car

servicing and maintenance is one of the components. To mitigate the impact from the land resumption, it is recommended that the proposed MSBs should provide space for the following industrial uses:

- Private vehicle servicing and maintenance and/or logistics uses for about 70% of the MSB GFA. There has been a high demand for operation space for vehicle servicing and maintenance as well as the related uses.

- Industrial spaces for accommodating eligible brownfield operators displaced by the government-led development projects (not less than 30% of the MSB GFA).

6.3 Compatible with Planning Intention of "OU(IE)" and Surrounding Land Uses

6.3.1 The Development Site falls within an area zoned "OU(IE)" on the prevailing Draft Yuen Long Outline Zoning Plan No. S/YL/26 ("Draft OZP"). The proposed uses will all be Column 1 uses, including vehicle servicing and maintenance and/or logistics uses subsumed in 'industrial use', logistics use subsumed in 'cargo handling and forwarding facility', 'warehouse (excluding Dangerous Goods Godown)', and 'public vehicle park (excluding container vehicle)' uses, etc, which are always permitted in the prevailing "OU(IE)" zone. The proposed uses will all be compatible with the planning intention of the "OU(IE)" zone and the surrounding YL INNOPARK land uses.

6.4 Enhancing Land Utilisation in Yuen Long District

6.4.1 The major portions in the Development Site are government land with various temporary uses, car parking and public transport uses. Although the Proposed MSBs Development will affect the existing temporary uses, there would be planned reprovisioning of the affected uses as outlined in **Section 2.4**.

6.4.2 It is recommended that the Development Site shall be made available for the Proposed MSBs Development to enhance the land utilisation and to enable the better use of land in Yuen Long.

6.5 Timely Available Land to Meet the Implementation Programme

6.5.1 As the Development Site is mainly government land with temporary uses, most of the land will be available timely by ceasing the temporary uses without requiring any land resumption. The target is to make available land for development of multi-storey industrial buildings from late 2023, aiming to accommodate the brownfield operations affected by Hung Shui Kiu/Ha Tsuen NDA and other government-led development projects in the New Territories.

6.6 Unleashing the Development Potential of YL INNOPARK Under the Existing Framework

6.6.1 Under the prevailing Draft OZP, the maximum GFA of 1,687,625m^2 has been stipulated. There is no GFA reserved for the government land in the Application Site within the prevailing "OU(IE)" zone. To enable the proposed MSBs development, planning permission from the Town Planning Board for minor relaxation of maximum GFA restriction from 1,687,625m^2 to 1,849,125m^2 (an increase of 161,500m^2) in the prevailing "OU(IE)" zone is required.

6.6.2 The proposed minor relaxation of maximum GFA restriction of the "OU(IE)" zone is to enable the Proposed Development to unleash the development potential of the Development Site without affecting the development potential of the YL INNOPARK.

6.7 Providing Planning and Design Merits

6.7.1 The Proposed Development will adopt various design considerations in create pleasant street environment and provide adequate air paths at the Development Site, as well as to comply with the requirement of PNAP APP-152 – Sustainable Building Design Guidelines ("APP-152 SBDG"), including:

A) Setbacks for Enhancing Streetscapes

6.7.2 To create a pleasant streetscape facing Wang Lee Street and Fuk Wang Street, a minimum of 6m wide building setback will be provided along the site boundaries fronting Wang Lee Street and Fuk Wang Street.

6.7.3 The setback will provide spaces for peripheral tree planting strip(s) and/or vertical greening at the site boundaries which would provide shading and micro-climate control for street level environment.

B) Measures On Providing Air Paths to Maintain Permeability for Ventilation

6.7.4 Unenclosed ramp drums and opening facades are recommended in three MSBs as far as practicable to provide good air flows into/through the MSBs.

C) Provision of Visible Greenery to Pedestrian Level

6.7.5 Tree planting and/or vertical greening at the Development Site boundary and at the building façade for diversity of the visual experience at the pedestrian level and for providing shading and micro-climate control for street level environment.

6.7.6 Some existing trees within the Development Site are recommended to be preserved as part of the greenery to be provided for the Proposed Development.

D) Compliance with APP-152 SBDG on Site Coverage of Greenery

6.7.7 With reference to the greenery provision requirement under APP-152 SBDG, the provision of greenery of not less than 20% of the Development Site area is proposed to improve the environmental quality of the urban space, in which 10% of the greenery will be provided within primary zone to provide visual access of

greenery at street level.

6.8 Proposed Development being Technically Feasible

6.8.1 Technical assessments on traffic, environmental, infrastructure capacity, air ventilation and visual impact have been conducted. Results of the technical assessments have confirmed the technical feasibility of the Proposed Development. With the adoption of various good practice in the design, construction and operation, the impacts on the aspects of environment, water supply, sewerage, drainage, air ventilation and visual, etc. due to the Proposed Development would be minimal and acceptable.

7. CONCLUSION AND SUMMARY

7.1.1 In conclusion, this Planning Statement together with the supporting technical assessments has demonstrated that the Development Site is considered suitable for the proposed MSBs development, through proposed minor relaxation of maximum GFA restriction from 1,687,625m^2 to 1,849,125m^2 (with an increase of 161,500 m^2) in the area zoned "OU(IE)" ("Application Site") and the proposed minor relaxation of building height restriction from 8 storeys to 10 storeys (exceeding basement(s)) for part of Area (a) in the "OU(IE)" zone in the Draft OZP No. S/YL/26.

7.1.2 The Planning Statement has considered the location of the Site; the existing conditions and the surrounding context of the Site; the existing land uses; accessibility; the planning context including the compatibility with approved zoning; and the relevant technical assessments.

7.1.3 This proposed minor relaxation of maximum GFA and building height restrictions for the Proposed Development are well justified on the grounds of:

- Being in line with the Government's Policies in Northern Metropolis Development Strategy on accommodating displaced brownfield operators in the MSBs to facilitate government's clearance programme in the NDAs.

- Echoing to the Government's multi-pronged land supply strategy on releasing brownfield sites for housing development so as to meet the imminent housing demand while also meeting the demand for the industrial development.

- Being in line with the Planning Intention of "OU(IE)" and compatible to the land use in the Yuen Long INNOPARK.

- Enhancing the land utilization and enabling the better use of land in Yuen Long by replacing the existing temporary uses in the Development Site. The existing public transport uses and the estate centre of YL INNOPARK will be reprovisioned to minimize the impact on the existing uses. Cessation of other temporary uses within the Development Site will cease timely to match with the implementation programme of the Proposed Development.

- Unleashing the development potential of the Development Site while not affecting the development potential of the YL INNOPARK.

- The Proposed Development will adopt various planning and design merits:

    - Minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Streets to enhance streetscapes.

    - Tree planting and/or vertical greening at the Development Site boundary and at the building façade for diversity of the visual

experience at the pedestrian level and for providing shading and micro-climate control for street level environment.

- Preserving some existing trees within the Development Site.

- Compliance with Sustainable Building Design Guidelines by providing greenery of not less than 20% of the site coverage of each MSB area, 10% of which would be within the primary zone.

- The Proposed Development is technically feasible with no adverse impact to the surrounding environment.

7.1.4 In light of the above, TPB is recommended to support the Planning Application from planning and technical points of view.

APPENDICES

Appendix A Indicative Development Scheme
Appendix B Visual Impact Assessment (VIA)
Appendix C Traffic and Transport Impact Assessment (TTIA)
Appendix D Environmental Assessment (EA)
Appendix E Water Supply and Utilities Impact Assessment (WSUIA)
Appendix F Sewerage Impact Assessment (SIA)
Appendix G Drainage Impact Assessment (DIA)
Appendix H Air Ventilation Assessment (AVA)
Appendix I Geotechnical Assessment (GA)

MOTT MACDONALD

RECEIVED
1 NOV 2023
Town Planning Board

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Application for Permission under Section 16 of the Town Planning Ordinance (CAP.131) for the Proposed Minor Relaxation of Maximum Gross Floor Area and Building Height Restriction for Proposed Multi-Storey Buildings Development (Including Permitted Industrial Uses and Public Vehicle Park) in "Other Specified Uses" Annotated "Industrial Estate" Zone, Yuen Long INNOPARK, Yuen Long (Application No. A/YL/312)

01 November 2023

Dear Sirs / Madams,

We refer to the captioned S16 Planning Application scheduled for consideration by the Town Planning Board in its meeting dated 8 December 2023.

Having reviewed the departmental comments on the submitted documents, we enclose herewith a table showing our responses to the received departmental comments. In responses to the comments, we will provide further information by revising the planning statement and Appendices B, C and H of the technical assessments. **Four sets** of the further information (replacement pages only) are enclosed with this letter.

Softcopies of the revised documents will be submitted via the link sent to us previously by the Town Planning Board, followed by notification to the Board of the submission by email (tpbsubmission@pland.gov.hk).

Please note that the further information merely includes correction of typos and clarification/responses to the comments of the Government departments without any substantial revision of the technical assessments. Should you have any queries, please do not hesitate to contact the undersigned at 2[redacted].

We confirm that we would proceed with the original application (i.e. without the further information) in case the Secretary of the Town Planning Board decides that the further information is not accepted, or such information is accepted but not exempted from the requirements in respect of publication for public comments and recounting of the statutory time limit for consideration of the application.

Yours faithfully,

For MOTT MACDONALD HONG KONG LIMITED

[redacted]
Project Manager
[redacted]

Encl.

cc Mr. YEUNG Chin Ho, Daniel (w/e) WDO, CEDD

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Item Reference	Comments	Response
1.	**From: Ms. Belinda Chan, Asst Dist Engr/YL(W), New Territories West District and Maintenance Division, New Territories Region, Highways Department** **Dated: 16 October 2023**	
1.1.	I refer to your email and the attachments, and have the following comments from the highways maintenance point of view: (a) The proposed access arrangement on Fuk Wang Street and Wang Lee Street should be commented and approved by TD;	The proposed access arrangement on Fuk Wang Street and Wang Lee Street has been circulated to TD. No adverse comments have been received.
1.2.	(b) Should the proposed access arrangement on Fuk Wang Street and Wang Lee Street be agreed by TD, they should be designed and constructed to the satisfaction of TD and HyD in accordance with the latest TPDM and HyD standard;	Noted.
1.3.	(c) Appendix C - The TTIA report and the conclusion made therein should be commented and agreed by TD; and	Same the responses to Item 1.1 above.
1.4.	(d) Adequate drainage measures shall be provided to prevent surface water running from the application site to the nearby public roads and drains.	Noted. The developer(s) shall be responsible for providing adequate drainage measures during detailed design and general building submission stage.
2.	**From: Mr. KONG Cheuk Wing, Env Protection Offr(Terrority N)31, Territory North Group, Environmental Assessment Division, Environmental Protection Department** **Dated: 19 October 2023**	
2.1.	According to the information provided, we note that the application is to seek planning permission for the proposed minor relaxation of GFA and building height restrictions for multi-storey industrial building (MSB) development at the site. We also note that the site falls within area zoned "Other Specified Uses" annotated "Industrial Estate" ("OU(IE)") and the applied uses are always permitted in the "OU(IE)" zone.	Noted.
2.2.	Based on the Environmental Assessment (EA) and Sewerage Impact Assessment (SIA) in the submission, it is considered that there will be no adverse environmental impact due to the proposed development. As such, please note that we have **no objection** to the application from the environmental planning perspective.	Noted.

Item Reference	Comments	Response
2.3.	With respect to the recommendations in the EA and SIA reports, such as further review of land contamination and sewerage upgrading works to be carried out by further developer(s), we note that the applicant, CEDD, would liaise with LandsD to ensure suitable conditions would be incorporated into the relevant lands title documents to cater for the recommendations.	Noted.
3.	**From: Mr. Mr. LAM Ding, Brian, Landscape Architect 3, Urban Design & Landscape Section, District Planning Branch, Planning Department** **Dated: 19 October 2023**	
3.1.	Landscape Observations and Comments 1. According to Section 5.2 of the planning statement and Section 5.2 of Appendix D, the applicant stated: • "*a total 102 individual trees were identified in the Development Site. Among the surveyed in the Site, no trees of particular interests, including registered, potential OVT or tree species of conservation importance was identified. In overall, 15 trees are proposed to be retained and approximately 87 trees are proposed to be felled for the implementation of the Development*". • "*an individual tree survey was conducted within accessible areas in the Development Site on 6th, 18th January and 18th April 2017, while a tree group survey was conducted within inaccessible area in the Site from August to October 2016. Site verification of the previous tree survey was performed in September 2022. During the site verification, no major change of individual tree / tree groups was identified. Photo records of existing tree conditions are shown in Annex 5.5 of Appendix D*."	N/A
3.2.	2. Noting the applicant stated that "*compensatory tree planting should be as far as possible of a ratio not less than 1:1 in terms of number*" and the proposed landscape treatment shown in "Indicative Master Layout Plan - proposed scheme", we therefore have no comment on the planning application from the landscape planning perspective.	Noted.
3.3.	Advisory Remarks to the Applicant 3. Please revise the following editorial remarks to facilitate TPB's review: (a) According to the Table 5.2.1, Table 5.2.2 and para. 5.3.5 of Appendix D, the nos. of individual trees and tree nos. in tree group are 102 and 26 respectively (i.e. total 128 trees), and the total 113 trees (including 87 individually surveyed trees and 26 from tree group TG00) are proposed to be felled. The applicant shall review the untallied figures reported in Section 5.2 of the planning statement.	Section 5.2 of the planning statement provides the proposed treatment of "individual trees" identified in the survey. The assessment in Appendix D reports the proposed treatment to "individual trees" as well as tree groups identified in the survey (which were in areas not accessible at the time of the survey). For consistency, it is proposed to revise Section 5.2 of the planning statement to add the proposed treatment to the tree groups. Paragraph 5.2.7 has been revised to clarify.

Item Reference	Comments	Response
3.4.	(b) The applicant proposed the peripheral tree planting strips(s) along the site boundaries fronting Wang Lee Street and Fuk Wang Street, tree planting at the Development Site boundaries (para. 4.3.1), presumably "Greening" in Legend of the "Indicative Master Layout Plan – Proposed Scheme" was conceptually reflected the mentioned landscape proposal/treatment. The applicant please confirm.	Confirmed that "Greening" in Legend of the "Indicative Master Layout Plan – Proposed Scheme" reflects the landscape proposal/treatment in paragraph 4.3.1 of the planning statement.
3.5.	4. The applicant should note that approval of the s.16 application by the TPB does not imply approval of the tree works such as pruning, transplanting and/or felling under lease. Applicant is reminded to approach relevant authority / government department(s) direct to obtain the necessary approval on tree works.	Noted.
4.	**From: Ms Celia YANG, GEO, CEDD** **Dated: 26 October 2023**	
4.1.	(a) It is noted that the Geotechnical Assessment Report (GAR) solely covers the proposed "Development Site" which constitutes only a part of the application site. This office has **no** adverse comment on the captioned planning application and the GAR submitted by the applicant.	Noted.
4.2.	(b) Section 4.2 of the GAR refers. Please be advised that GEO is not the authority for the control of vibration impact of foundation works on sensitive building structures and services nearby. You may wish to seek comments from other relevant Government departments on the pertinent issues.	Noted.
4.3.	(c) Please remind the applicant that they should submit the proposed building works to the Building Department for approval as required under the provisions of the Buildings Ordinance.	Noted.
4.4.	(d) Please remind the applicant that the subject site is located within Scheduled Area No. 2 and may be underlain by cavernous marble. Depending on the nature of foundation, if necessary, of the new development at the proposed area, extensive geotechnical investigation may be required. This would require a high-level involvement of experienced geotechnical engineer(s) both in the design and in the supervision of geotechnical aspects of the works required to be carried out on the site.	Noted.

Item Reference	Comments	Response
5.	**From: Commissioner of Police** **Dated: 26 October 2023** No comments/ objection	Noted.
6.	**From: Agriculture, Fisheries and Conservation Department** **Dated: 26 October 2023** No comments/ objection	Noted.
7.	**From: Ms Loreen CHUI, Urban Design Unit, Urban Design & Landscape Section, District Planning Branch, Planning Department** **Dated: 27 October 2023**	
7.1.	*Comments from Urban Design and Visual perspective:* <u>Observations/Comments</u> (a) Being located at the Yuen Long INNOPARK, the development site is surrounded by some 1 to 6-storey industrial buildings/factories (with BHs ranging from 7.3mPD to 44.3mPD which are subject to BH restriction of 8 storeys excluding basement(s) in the OZP) to the immediate north, west and east, and flanking Chu Wong Ling to the immediate south. The proposed development (with maximum BH of 10 storeys above ground/ 71.5mPD) is considered not incompatible with the surrounding and planned context of industrial developments in terms of building footprint and height.	Noted
7.2.	(b) According to the submitted visual impact assessment (VIA), as compared to the Baseline Scheme (i.e. OZP compliance scheme), the proposed development would result in negligible to slightly adverse visual impacts on the selected public viewing points. Besides, various design measures are incorporated into the proposed development including the provision of minimum 6m wide building setback along Wang Lee Street and Fuk Wang Street, and tree planting and /or vertical greening at the building façade as well as the development site boundary, etc.	Noted
7.3.	<u>Detailed Comments/Advisory Comments on Appendix B – VIA</u> The applicant may wish to provide a plan indicating the boundary of the assessment area and all selected VPs for ease of reference.	Noted. The new plan is appended as the last page to Appendix B.

Item Reference	Comments	Response
7.4.	*Comments from air ventilation perspective:* <u>Supporting Planning Statement</u> (a) Paragraph 5.4.3 – The consultant should refer to the consistent scheme name (either Indicative Development Scheme or Proposed Scheme) in the Planning Statement and the AVA IS report.	Noted. Paragraph 5.4.3 and the footnote 12 on the same page have been amended.
7.5.	(b) Paragraph 5.4.7 – Referring to Table 4.2 of Appendix H, the summer SVRs of Baseline and Indicative Development Schemes should be 0.16 and 0.14 respectively. The consultant should clarify and revise it where appropriate.	The typos in paragraph 5.4.7 have been rectified. The summer SVRs of Baseline and Indicative Development Schemes are 0.16 and 0.14, respectively
7.6.	(c) Paragraph 5.4.9 – The consultant should report all good design features, including (i) building setback; (ii) building separations and (iii) ground floor empty bays, with their exact dimensions.	Paragraphs 5.4.9 to 5.4.11 have been revised.
7.7.	(d) Paragraphs 4.1.4 and 5.4.11 – Irrespective of whether the three sites are combined or not, the AVA to support the application is based on the block layout and mitigation measures of the Indicative Development Scheme to compare with the Baseline Scheme. Further AVA is considered not necessary. It is suggest to delete the further AVA requirement.	Noted. Paragraph 4.1.4 has been revised. Previous paragraph 5.4.11 has been removed.
7.8.	<u>Appendix H (AVA IS Report)</u> (e) Paragraph 4.4.4 – The consultant should note that AVA is aimed to assess the air ventilation performance (but not air quality) at pedestrian wind environment under different development schemes. The consultant should revise the arguments where appropriate.	Paragraph 4.4.4 has been revised
7.9.	(f) Para. 4.5.31 (last sentence), para. 4.7.5 (1st sentence) and para. 5.1.10 (1st sentence) – Considering there is no benchmarking criteria for AVA, we would not ascertain whether the Indicative Development Scheme would achieve “adequate” flow and “sufficient” for the pedestrian wind environment. The consultant should rewrite the sentences and focus on the comparison of the performance between the Baseline Scheme and the Indicative Development Scheme to avoid confusion.	Paragraph 4.5.31, 4.7.5 and 5.1.10 have been revised
7.10.	(g) Building setbacks under Indicative Development Scheme (paragraph 4.8.1 and Figure 4.25) – The consultant should report the exact dimensions of the building setbacks from each site boundary in text in accordance with those information presented in Annex A.	Section 4.8 has been revised.

Item Reference	Comments	Response
7.11.	(h) Building separations among Sites A, B and C (paragraphs 4.8.4 to 4.8.5) – The consultant should report the exact dimensions of the building separations with its split in different sites in text in accordance with those information presented in Annex A.	Section 4.8 has been revised.
7.12.	(i) Empty bays at Sites A, B and C (section 4.8) – The consultant should report the empty bays with exact dimensions in text in accordance with those information presented in Annex A.	Section 4.8 has been revised.
8.	**From: Ms Libby LI, Transport Department** **Dated: 27 October 2023**	
8.1.	Please be advised that we have no objection in principle for the subject planning application from traffic perspective subject to the addressing of the below minor comments on the inconsistency:	Noted.
8.2.	Planning Statement: Para. 5.1.2, Please rectify the typo error of *" V/C ratio between 1.0 and **1.1 10**."*	Typo error in para. 5.1.2 has been rectified. Actually, the last two digits (10) is a footnote number, which is reformatted as superscript (as shown below). between 1.0 and 1.1[10].
8.3.	TTIA Report: (i) Para. 2.2.2, Drawing no. MMH369397/TTIA/003-SP1 mentioned in the paragraph is not found in the report.	The missing drawing is added to the report.
8.4.	(ii) Para. 2.2.3, "Would be re-provided as soon as possible within one year after land sale." should be updated according to draft special condition being prepared by LandsD.	Paragraph 2.2.3 has been revised to two years for reprovisioning of the affected bus terminus.
8.5.	(iii) 2022 Observed Case- Annex A contains wrong enclosure of 2032 reference case.	The 2022 Observed Case- Annex A has been updated (starting from page 74 of the PDF file).
8.6.	(iv) Para. 5.1.7, Please rectify typo error of "Table 5.13" and "Table 5.3B" which are not found in the report.	Paragraph 5.1.7 has been revised.
8.7.	(v) Table 5.6, RC ratios for PM peak for Junction J7 in Table 20%[21%] are inconsistent with that in the junction analysis in Annex A which shows 12%[13%].	Typos in Table 5.6 has been amended.

Item Reference	Comments	Response
8.8.	(vi) Footnote to Table 5.12, the footnote is inconsistent with the Table. Please rectify as "Demand for PM ~~generation~~ attraction is anticipated to lower than demand for PM generation ~~attraction~~.	Footnote to Table 5.12 has been revised.
8.9.	(vii) Drawing no. MMH369397/TTIA/001, the drawing shows that "the existing bicycle parking spaces are to be relocated." which is inconsistent with the current arrangement to retain the bicycle parking at the original location.	The drawing has been amended.
9.	**From Mr Jeffery HO, Water Supplies Department, Construction Division** **Dated: 27 October 2023**	
9.1.	(a) No objection the application.	Noted.
9.2.	(b) There are existing water mains within the proposed site area as shown on the attached plan (Appendix I). The applicant shall update their Water Supply and Utility Impact Assessment accordingly taking into account the following requirements:	The comment will be included as advisory clauses to the main paper for TPB.
9.3.	(i) The cost of any necessary diversion shall be borne by the proposed development.	Ditto
9.4.	(ii) In case it is not feasible to divert the affected water mains, a waterworks reserve within 1.5 metres from the center line of the water main shall be provided to WSD. No structure shall be built or materials stored within this waterworks reserve. Free access shall be made available at all times for staff of the Director of Water Supplies or their contractor to carry out construction, inspection, operation, maintenance and repair works.	Ditto
9.5.	(iii) No trees or shrubs with penetrating roots may be planted within the Waterworks Reserve or in the vicinity of the water main shown on the plan.	Ditto
9.6.	(iv) Government shall not be liable to any damage whatsoever and howsoever caused arising from burst or leakage of the public water mains within and in close vicinity of the site.	Ditto
10.	**From Director of Fire Services Department** **Dated: 27 October 2023** No comments/ objection	 Noted

Item Reference	Comments	Response
11.	**From: Ms YU In Sin, Ingrid, Prin AS (Planning & Lands)7, Planning Division, Planning and Lands Branch, Development Bureau** **Dated: 30 October 2023**	
11.1.	(a) Sufficient land supply is key to enhancing Hong Kong's capacity for economic and industrial development. In pursuing large-scale developments in the New Territories (NT), we aspire to make available sufficient land for the long-term development of industries, through comprehensive planning with due regard to the benefits of cluster development. Of the about 1 600 brownfield sites in the NT, over 1 000 ha will be resumed for high density housing and other land uses. Given that brownfield sites are accommodating operations supporting different industries of our economy at present, the Government must resume these sites for development in a controlled manner, provide assistance for affected brownfield operators to minimise the impact of clearance and development works on related economic activities, and take this opportunity to facilitate brownfield operations to consolidate and operate in a more land-efficient manner.	N/A
11.2.	(b) In the light of the above, the Development Bureau (DEVB) seeks to leverage market forces in the development of multi-storey buildings (MSBs) through land sale, with a view to achieving the dual policy objectives of promoting development of relevant industries and consolidating brownfield operations. Specifically, when these MSB sites are disposed through open cash tender, land sale conditions would be imposed to request the developer-owner of the MSB to set aside no less than 30% of the floor space to be taken up by the Government as Government Accommodation (GA), and the Government will appoint an agent to manage the GA and lease the space to brownfield operators displaced by government projects. The first batch of MSB sites to be rolled out include the three sites near Yuen Long INNOPARK involved in the subject planning application.	N/A
11.3.	(c) A consultancy study earlier has confirmed the viability of the above proposal. Legislative Council Panel on Development was briefed and indicated support. Subsequently, DEVB conducted an invitation of expression of interest from June to August 2023 and ascertained market interest.	N/A

Item Reference	Comments	Response
11.4.	(d) The subject application seeks a minor relaxation of the maximum gross floor area (GFA) and building height restrictions to facilitate the development of MSBs near Yuen Long INNOPARK, which is in line with DEVB's policy intent as mentioned above. With the proposed increase of GFA by 161 500 m^2 and relaxation of building height restriction from 8 storeys to 10 storeys, the development potential of the sites under application could be unleashed for the MSBs thereon to support the logistics and/or vehicle maintenance industries and provide more spaces to accommodate brownfield operations displaced by government projects. This application is also compatible with the planning intention of the "OU(IE)" zone and the land use in Yuen Long INNOPARK, and its proposed planning and design merits (including building setback, design features at the street level, green building design, etc.), if materialised, can provide better streetscape and bring about amenity of the locality. We also note that although the development layout is indicative and subject to change in the implementation stage, no technical problem in relation to traffic, environment, infrastructure capacity, air ventilation, or other constraints has been identified by the Applicant so far thus agreeable.	Noted.
12.	**From Ms. Catherine WONG, Architect/ASC/8, Advisory & Statutory Compliance Division, Architectural Branch, Architectural Services Department** **Dated: 30 October, 2023**	
12.1.	Based on the information provided, it is noted that the proposed Multi-Storey Buildings for industrial uses with a public vehicle park and ancillary facilities mainly consists of 10-storey buildings among other medium and low-rise buildings in the surrounding area and the building are planned to set back from the existing streets and neighboring sites. We have no particular comment from architectural and visual impact point of view, subject to PlanD's view.	Noted.
13.	**From CE/MN, Drainage Services Department** **Dated: 30 October 2023** No comment/objection.	Noted.
14.	**From Electrical and Mechanical Services Department** **Dated: 30 October 2023** No comment/objection.	Noted.

Item Reference	Comments	Response
15.	**From CES/Land Supply, Lands Department** **Dated: 30 October 2023** No comment/objection.	Noted.

Summary of Further Information for Planning Statement

1. Replacement Page 22: Paragraph 4.1.4
2. Replacement Page 27: Paragraph 5.1.2
3. Replacement Page 29: Paragraph 5.2.7
4. Replacement Page 31: Paragraph 5.4.3, Footnote 12
5. Replacement Page 32: Paragraphs 5.4.7, 5.4.9 to 5.4.11

4. DEVELOPMENT PROPOSAL

4.1 Indicative Development Layout

4.1.1 Having regard to the commercial viability, three sub-sites (i.e. Site A, Site B and Site C) of each of about 1 ha are proposed in the Development Site to accommodate MSBs development. A plot ratio of 5 is proposed for each MSBs and the proposed building height of each MSBs will be not more than 10 storeys above ground level. With the proposed height level of about +71.5mPD, higher floor to floor headroom is adopted to facilitate the operation of vehicle servicing and maintenance and/or logistics in the MSBs development. The proposed MSBs development at the Development Site is anticipated to achieve a total GFA of about 161,500m^2. **Figure 4.1** illustrates an indicative scheme for the proposed MSBs development.

4.1.2 The proposed uses could be summarized as Permitted Industrial Uses and Public Vehicle Park that are always permitted as "Column 1 uses" in the OZP.

4.1.3 It is anticipated that the land for the proposed MSBs will be disposed by tender and the proposed MSBs are assumed to start operation in 2028/2029 for the purpose of technical assessments, with a construction period of 4 to 5 years. Demolition works of existing Estate Centre will be required for the proposed MSB at Site C. Major development parameters and proposed floor uses of the proposed MSBs are summarised in **Table 4.1** and **Table 4.2** respectively. The schematic layout plans of the proposed MSBs are presented at **Appendix A**.

4.1.4 The scheme as submitted in this Planning Statement is indicative only and solely for technical assessment purpose. It is used to demonstrate that the proposed increase of maximum GFA and building height would have no significant adverse impacts on the environment, air ventilation, visual quality, etc. This is to allow flexibility to the future disposal of the land parcels in the Site. The actual development layout is subject to change in the implementation stage.

5. TECHNICAL ASSESSMENT

5.1 Traffic and Transport Impact Assessment (Appendix C refers)

5.1.1 A Traffic and Transport Impact Assessment has been conducted for the Proposed Development[9] to assess the potential traffic impact onto the surrounding road network and the potential impact on the road and public transportation. Traffic count survey was conducted at the concerned junctions / road links located in the vicinity of the Proposed Development in order to establish the traffic flow in the peak periods. Most of the junctions and road links are operated with capacities during the AM and PM peak hours. For the design year 2032, the junctions analysed are expected to operate with capacities during the peak hour for the case with and without the Proposed Development. It is anticipated that the Proposed Development will not result in insurmountable traffic impact to the key junctions and road links in the Area of Influence with the proposed improvement works by other projects. The implementation arrangement of the road improvement works will be further identified with nearby interfacing projects with a view to achieve a holistic design and implementation approach.

5.1.2 The road link assessment results show that the concerned road links in the AOI would be operating within capacity (i.e. V/C ratios below 1.0) except L8 - Yuen Long Highway eastbound which will operate with V/C ratio between 1.0 and 1.1[10]. However, it should be noted that the contribution of the development traffic from the proposed MSBs to that road link is expected to be insignificant. Furthermore, the Northern Metropolis Highway in the New Territories North proposed under strategic studies on Railways and Major Roads beyond 2030 connecting Tin Shui Wai in the west and Kwu Tung North in the east may also provide convenient traffic connection and alleviate the impact to the local traffic network e.g. Yuen Long Highway, Long Tin Road and Castle Peak Road arising from the proposed development.

5.1.3 For the public transport demand, the assessment shows that additional 6 and 4 departures in the AM peak plus additional 6 and 3 departures in the PM peak would be required for MTR bus route no. K68 and GMB route no. 74, respectively, to meet the increased demand in the YL INNOPARK area.

5.1.4 The affected MTR Bus Route No. K68 terminus in Site B would be reprovisioned at Wang Lee Street; and the affected public parking space would be reprovisioned and incorporated together with ancillary parking and loading/unloading bays in the proposed MSBs development as shown in **Table 4.3**. During the interim period, setting up a temporary bus terminus at Fuk Wang Street is proposed to maintain

[9] Please note that there is about 60% of the GFA allocated to the Yuen Long Industrial Area (now known as Yuen Long Innopark) had yet to be expended. The impact assessments supporting the s16 application would be based on an "existing GFA" scenario (i.e. covering the impact of all existing developments and projects under planning only).

[10] V/C ratio between 1.0 and 1.1 means that the road section would be slightly overloaded, but heavy congestions and long traffic queues are not expected. The road section will experience some delay with reduced traffic speed at peak period, which is commonly seen at strategic roads in urban areas.

5.2.6 There are exceedances of road traffic noise criteria predicted under with Project scenarios at some existing and planned NSRs. Nevertheless, the differences in the predicted noise levels between with and without Project scenarios are found to within 1.0 dB(A). Thus, the induced traffic noise impact due to the operation of the proposed MSB is insignificant. Furthermore, as NSRs were identified within the 300m study area, fixed noise impact is not anticipated.

Tree Preservation

5.2.7 According to the tree survey, a total of 102 individual trees were identified in the Development Site. Also, 26 trees were identified in a tree group. Among the surveyed trees in the Site, no trees of particular interests, including registered, potential OVT or tree species of conservation importance, was identified. In overall, 15 trees are proposed to be retained and approximately 113 trees (including 87 individually identified trees and 26 from the tree group) are proposed to be felled for the implementation of the Development.

5.2.8 For the compensatory planting, compensatory tree planting should be as far as possible of a ratio not less than 1:1 in terms of number. In addition, it is recommended that the site coverage of greening area should be not less than 20% for each MSB site. The detailed compensatory planting proposal shall be submitted with the tree removal application for approval in accordance with LAO Practice Note No. 2/2020.

Ecological Impact

5.2.9 The Development Site mainly comprises the Developed Area habitat which is characterised by paved surfaces and low-rise structures with constant human disturbance. Loss of the Developed Area is temporary during construction with minor impact significance.

5.2.10 Direct and indirect impacts on flora and fauna species of conservation interest are not anticipated. Offsite disturbance and indirect impact on environmental quality is considered as minor. Potential impacts on reduction of ecological carrying capacity and habitat fragmentation are not anticipated, while risk of bird collision to new building structures can be mitigated by minimising the use of vertical glass surface on new building structures.

5.2.11 Given that the habitat affected is artificial with limited ecological value and minor indirect impacts anticipated, the potential ecological impact due to construction and operation of the Project is considered as minor and acceptable.

Land Contamination

5.2.12 A Contamination Assessment Plan (CAP) which details the findings of desktop study and site reconnaissance survey and the proposed SI works, was endorsed by EPD.

Hazard to Life

5.2.19 The Site is identified outside any 1-km consultation zone of PHIs. No construction and operation hazard-to-life impact is anticipated for the Proposed Development.

5.3 Infrastructure Capacity (Appendices E, F and G refers)

5.3.1 The adequacy of the water supply system, the sewerage system, the drainage system and the power supply to cope with the Proposed Development has been assessed. It is concluded that the existing systems would have adequate capacity to accommodate the estimated demand.

5.3.2 The reports on the Water Supply and Utilities Impact Assessment, Sewerage Impact Assessment and Drainage Impact Assessment are enclosed in **Appendices F, G and H**.

5.4 Air Ventilation Assessment (Appendix H refers)

5.4.1 An Air Ventilation Study has been conducted to investigate the pedestrian wind environment, identify and assess the ventilation corridors and the wind availability for the Proposed Development.

5.4.2 The Site is located in YL INNOPARK, north-west Hong Kong and is bounded by Fuk Wang Street to the northwest, Wang Lee Street to the east, and a wooded hill (i.e. Chu Wong Ling) to the south. The immediate surrounding mainly consists of low-rise industrial buildings and warehouses.

5.4.3 The air ventilation performance of two schemes have been reviewed and assessed, being the Baseline Scheme[11] and the Indicative Development Scheme[12].

5.4.4 A series of CFD simulations have been performed based on the AVA methodology as stipulated in the Technical Circular and Technical Guide. Ten wind directions in total, which cover 84.4% and 77.1% of annual and summer wind conditions of the areas, have been considered. The annual prevailing winds for the Site and its surrounding area are coming from E, NE, ESE directions while the summer prevailing wind are coming from SSW, S, SW directions. The ventilation performance for the Proposed Development at the site boundary and within the assessment area was assessed.

5.4.5 A total of 36 perimeter test points and 193 overall test points are selected to assess the ventilation performance of the Proposed Development.

[11] The Baseline Scheme comprises a major MSB block of 8-storey high for accommodating brownfield operation, with a total GFA of 100,282 m^2 above ground at a plot ratio of 3.1.
[12] Refer to Table 4.1, the Indicative Development Scheme comprises three MSB blocks each of 10-storey high with a total GFA of 161,500 m^2 at a plot ratio of 5.0.

5.4.6 The assessment results have demonstrated that the general wind environments of both schemes are comparable and similar. The annual LVR for the Baseline Scheme and the Indicative Development Scheme are 0.14 and 0.13 respectively, whilst their LVRs range from 0.10 to 0.15 and 0.10 to 0.14 respectively. In terms of the summer LVR, the Baseline Scheme and the Indicative Development Scheme are 0.13 and 0.12, whilst the respective LVRs both are ranging from 0.10 to 0.15.

5.4.7 The annual SVRs for the Baseline Scheme and the Indicative Development Scheme are 0.18 and 0.16, while the SVRs of the two schemes are ranging from 0.14 to 0.20 and 0.11 to 0.21 respectively. The summer SVRs for Baseline and Indicative Development Scheme are 0.16 and 0.14, respectively, while their SVRs are ranging from 0.14 to 0.16 and 0.14 to 0.20 respectively.

5.4.8 The wind ventilation performance of the Indicative Development Scheme is assessed to be slighter weaker than that of the Baseline Scheme. This is expected because the Indicative Development Scheme, with significantly higher GFA than the Baseline Scheme, would involve three multi-storey building blocks which together would be more massive than the Baseline Scheme.

5.4.9 Good design features adopted in the Indicative Development Scheme for improving air ventilation performance include:

- Building gaps of 16.5m and 26m between Sites A and B, and Sites B and C, respectively.
- Provision of 14m-wide building setback from site boundary along Fuk Wang Street for Site A; 12m and 14m-wide setback from boundaries along Fuk Wang Street and Wang Lee Street, respectively, for Site B; and 10m and 20m-wide setback from boundaries along Wang Lee Street and the adjacent lot, respectively, for Site C.
- Provision of empty bays of about 8m high and about 14m wide on Site A, Site B and Site C ground floor to maximize penetration of various prevailing winds.

5.4.10 From detailed examination of the wind availability from different directions, it is assessed that the adopted design feature of the Indicative Development Scheme will enhance the wind ventilation. This is evident from the better ventilation of the Indicative Development Scheme than the Baseline Scheme under the NNE prevailing wind and the easterly wind. The design features also benefit the wind availability of pedestrian footpath along Fuk Wang Street and Wang Lee Street.

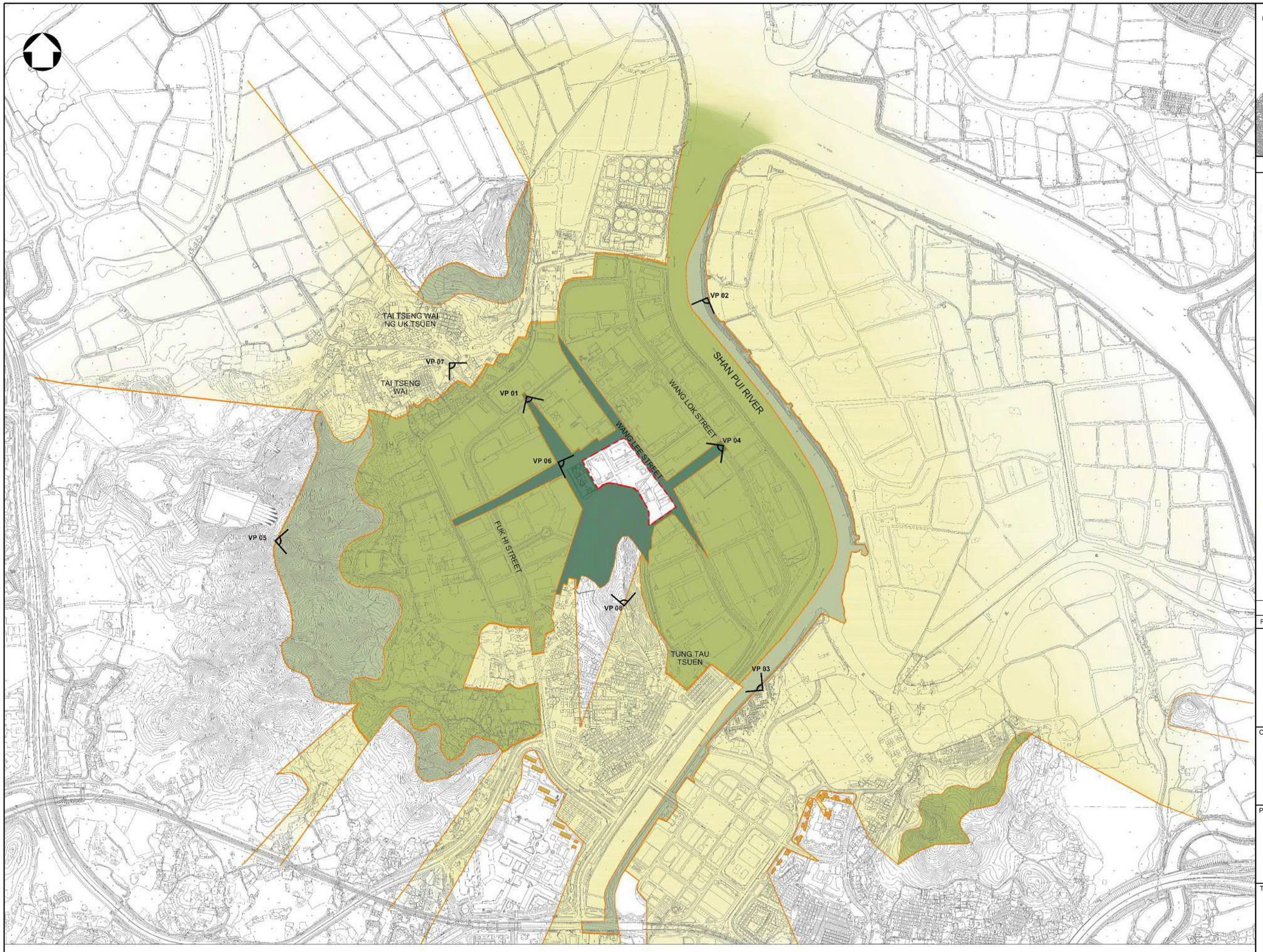
5.4.11 To conclude, the Indicative Development Scheme will not cause significant air ventilation impact on the pedestrian wind environment when compared with the Baseline Scheme, which justifies the proposed development of the Site at a plot ratio of 5.0, resulting in a higher land use efficiency.

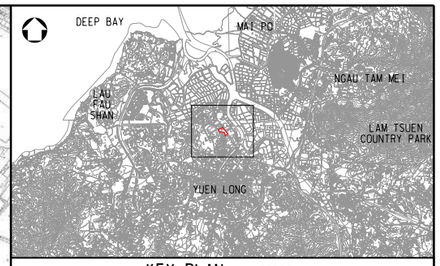
5.5 Visual Impact Assessment (Appendix B refers)

5.5.1 The Proposed Development comprised of three building blocks with a maximum building height of 10 storeys above ground at a maximum height level of +71.5mPD. It will transform the surrounding area from being an open albeit disturbed landscape currently occupied with various temporary and public transport uses.

Summary of Further Information for Appendix B -VIA

1. Additional Figure: MMH/369397/VIA/002





KEY PLAN (1:100000)

LEGEND

DEVELOPMENT SITE

BOUNDARY OF THE ASSESSMENT AREA (PREMINARY VISUAL ENVELOPE - THE AREA FROM WHICH THE DEVELOPMENT CAN BE SEEN)

REPRESENTATIVE VANTAGE POINTS (VP) AND ANGLE OF MAIN VIEW

ZONE OF VISUAL INFLUENCE (ZVIs)

PRIMARY ZONE OF VISUAL INFLUENCE

AREA OF GREATEST VISIBILITY OF THE PROPOSED SCHEME LARGELY RESTRICTED TO THE AREA IMMEDILATELY ADJACENT TO THE PROPOSED DEVELOPMENT AREA, SURROUNDING ROADS AND THE SMALL WOODED KNOLL TO THE SOUTH OF THE PROPOSED PROJECT DEVELOPMENT AREA.

SECONDARY ZONE OF VISUAL INFLUENCE

AREA WITH MORE LIMITED VISIBILITY OF THE PROPOSED SCHEME DUE TO INTERVENING OBSTACLES INCLUDING A COMBINATION OF EXISTING INDUSTRIAL BUILDINGS, THE EXISTING VEGETATION, AND, TO A LESSER EXTENT, THE EXISTING LANDFORM. THE VISIBLE PART OF THE PROPOSED SCHEME IS LIKELY TO BE LARGELY LIMITED TO THE UPPER PORTION OF THE PROPOSED BUILDING.

TERTIARY ZONE OF VISUAL INFLUENCE

FOR THE MOST PART VIEWS OF THE PROPOSED SCHEME ARE SCRETTERED BY A COMBINATION OF THE INTERVENING DEVELOPMENT LANDFORM AND VEGETATION. ZVI LARGELY LOCATED ALONG THE SHAN PUI RIVER CORRIDOR AND AT EDGE OF THE HIGH RISE DEVELOPMENT TO THE NORTH OF YUEN LONG. GLIMPSED VIEWS OF THE PARTS OF THE UPPER PORTION OF THE STRUCTURES.

QUATERNARY ZONE OF VISUAL INFLUENCE

THIS IS THE AREA FROM WHICH THERE ARE LONG DISTANCE OCCASIONAL PARTIAL AND GLIMPSED VIEWS OF THE PROPOSED SCHEME. THE VIEWS ARE LARGELY FROM THE NORTH EAST AND EAST. VISIBLE PART OF THE PROPOSED SCHEME IS LIKELY TO BE DRACMENTARY.

VANTAGE POINTS

VP 01: VIEW LOOKING SOUTHEAST ALONG FUK YAN STREET

VP 02: VIEW LOOKING SOUTHWEST FROM NAM SANG WAI ROAD

VP 03: VIEW LOOKING NORTHWEST FROM SHAN PUI HO EAST ROAD

VP 04: VIEW LOOKING WEST FROM WANG FU STREET

VP 05: VIEW LOOKING SOUTHEAST FROM THE SUMMIT OF KAI SHAN

VP 06: VIEW LOOKING SOUTHEAST FROM THE JUNCTION OF FUK WANG STREET AND FUK YAN STREET

VP 07: VIEW LOOKING SOUTHEAST ALONG FUK SHUN STREET IN TAI TSEUNG WAI

VP 08: VIEW FOR TRAIL WALKERS LOOKING NORTH FROM CHU WONG LING SUMMIT PAVILION

0 60 120 180 240 300m
1 : 6 000 SCALE BAR

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	OCT 2022	HL	FIRST ISSUE	JC	SHC

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

BOUNDARY OF THE ASSESSMENT AREA AND VANTAGE POINT

Designed	JC		Eng check	LW	
Drawn	HL		Coordination	JC	
Dwg check	JC		Approved	SHC	

Scale at A1: 1:6000
Status: PRE
Rev: P1

Drawing Number: MMH/369397/VIA/002 FI_A

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Summary of Further Information for Appendix C – TTIA

1. Replacement Page 6: Paragraph 2.2.3
2. Replacement Page 28: Paragraph 5.1.7
3. Replacement Page 31: Table 5.6
4. Replacement Page 37: footnote to Table 5.12
5. Replacement Figure: Figure MMH/369397/TTIA/001
6. Additional drawing: MMH/369397/TTIA/003-SP1
7. Replacement Pages (Annex A of the Report): 16 pages

2.2 Reprovision of Affected Facilitates

2.2.1 A bus terminus for MTR bus route no. K68 is currently located within the Site. To maintain the operation of MTR bus route no. K68, a 42m long double width on-street bus layby to accommodate 6 nos. of 12.8m long bus is proposed at Wang Lee Street for K68 bus terminus during operational hours and for bus overnight parking purpose. The layout of the proposed bus layby at Wang Lee Street is shown in **Drawing no. MMH/369397/TTIA/001**. The swept paths of vehicles entering / leaving the proposed vehicular access is shown in **Drawing no. MMH/369397/TTIA/001-SP1** and the swept path of 12.8m bus is shown in **Drawing no. MMH/369397/TTIA/001-SP2**. Supporting facilities such as shelter and bus regulator's kiosk are to be reprovided upon relocation of bus terminus.

2.2.2 It is anticipated that the K68 bus terminus at YLIP may be required to be closed for a short period when the proposed MSB at Site B commences construction and before the new bus layby at Wang Lee Street is completed. During the interim period, setting up a temporary bus terminus at Fuk Wang Street is proposed to maintain the services of K68 bus. The diversion route of K68 and the temporary bus stop at Fuk Wang Street is shown in **Drawing no. MMH/369397/TTIA/003**. The swept path of 12.8m bus at the proposed diversion route is shown in **Drawing no. MMH/369397/TTIA/003-SP1.**

2.2.3 Since the reprovided bus terminus cannot provide turnaround facilities for buses of K68 making return trip to Wang Fu Street, the bus routing of K68 will be diverted to Wang Lee Street northbound, Fuk Hi Street westbound, Fuk Yan Street southbound, Fuk Wang Street eastbound and Wang Lee Street southbound with a detour of 900m. The catchment of bus route no. K68 will not be affected by the proposed local re-routing. The bus routing is shown in **Drawing no. MMH/369397/TTIA/003**. The pedestrian route between the development sites and the public transport services is shown in **Drawing no. MMH/369397/TTIA/004**. In view of the impact to bus services due to bus route detour and limited on-street operation space during the interim period, the reprovisioned bus terminus at Wang Lee Street would be provided as soon as possible within two years after the land sale.

2.2.4 The existing cycle track along Wang Lee Street will be realigned to provide a 3.5m wide footpath for passenger waiting and pedestrian passage at Wang Lee Street western footpath near the proposed bus layby shown in **Drawing no. MMH/369397/TTIA/001**. The realigned cycle track will be maintained at 3.5m wide and two pedestrian crossings across the cycle track will be provided for pedestrian to access the reprovisioned bus terminus.

2.2.5 There are a total of 19 motorcycle parking spaces, 15 coach parking spaces, 12 heavy goods vehicle parking spaces, 56 no. private car metered parking spaces and 2 nos. for disabled parking spaces in the area occupied by the Site B. It is proposed that the proposed MSB in Site B will reprovide all the affected public parking spaces in addition to those required for the proposed MSB under the HKPSG.

2.2.6 In case that if the proposed three sites are not to be disposed of at the same time, it is considered that part of the sites may be used for interim parking to meet the high demand for both private cars and goods vehicles parking spaces in the YLIP area.

Table 5.2: Referenced Trip Generation Rates for Brownfield / Logistics Uses

Reference Site	GFA (m^2)	AM (pcu/hr/100 m^2 GFA)		PM (pcu/hr/100 m^2 GFA)	
		GEN	ATT	GEN	ATT
Mapletree Logistics Centre (Tsing Yi Tsing Yi Road)	120,550	**0.1080**	**0.1796**	0.1146	**0.1230**
TPDM Industrial Building Land Use*	/	0.0926	0.1386	**0.1350**	0.1049
Adopted	/	**0.1080**	**0.1796**	**0.1350**	**0.1230**

* Mean Trip Rate is considered

A conservative approach has been adopted in estimating the traffic generation from the proposed MSBs by adopting the higher trip rate between the Mapletree logistics centre and TPDM Industrial building land use

5.1.6 The trip generation rates to be adopted for estimating traffic generations from the proposed MSBs are highlighted in **Table 5.1** and **Table 5.2** above.

5.1.7 The number of trips to/from proposed MSBs for each development sites is summarised in **Table 5.3** (with vehicle servicing and maintenance as the major land use occupying about 70% of the MSB GFA) and in **Table 5.3A** (with logistics as the major land use). The number of trips to/from proposed MSBs for each development sites due to transport needs is summarised in **Table 5.12.**

Table 5.3: Trips for Proposed MSBs with Vehicle Servicing and Maintenance as Major Land Use

Development Site	Usage	GFA (m^2)	AM (pcu/hr)		PM (pcu/hr)	
			GEN	ATT	GEN	ATT
Site A	30% Brownfield	14,700	16	26	20	18
	70 % Vehicle servicing and maintenance	34,300	16	49	49	33
Site B	30% Brownfield	18,750	20	34	25	23
	70 % Vehicle servicing and maintenance	43,750	22	64	64	42
Site C	30% Brownfield	15,000	16	27	20	18
	70 % Vehicle servicing and maintenance	35,000	17	51	51	34
Total of 30% Brownfield and 70% Vehicle servicing and maintenance		161,500	107	251	229	168
Proposed Additional Public Transport Trips		-	21	21	19.5	19.5

Table 5.6: 2032 Design Junction Performance (with proposed MSBs)

No.	Type	2032 Design (With Proposed MSBs) RC/DFC	
		AM	PM
J1	Priority	0.48[0.53]	0.40[0.38]
J2	Priority	0.20[0.20]	0.16[0.14]
J3	Priority	0.53[0.55]	0.30[0.31]
J4	Signal	15%[12%]	27%[31%]
J5	Signal	16%[14%]	18%[17%]
J6	Signal	14%[10%]	14%[14%]
J7	Signal	3%[1%]	12%[13%]
J8	Signal	19%[18%]	20%[23%]
J9	Signal	47%[42%]	71%[70%]
J10	Priority	0.48[0.53]	0.54[0.53]
J11	Signal	18%[17%]	20%[20%]
J13	Roundabout	0.86[0.86]	0.84[0.85]
J16	Signal	31%[30%]	43%[43%]

Remark: junction performance for logistics as major land use is shown in brackets in the above table

5.2.3 From Table 5.6, it is noted that the proposed MSBs would have slight to adverse traffic impact for the 2032 Design Year on junctions J6 and J7 if vehicle servicing and maintenance is the major land use; and on junctions J4, J5, J6 and J7 if logistics is the major land use in the MSBs.

5.2.4 Since there will be planned road improvement works for junctions J4, J5, J6 and J7 under nearby interfacing projects, such as Remaining phases of Public Housing Development at Wang Chau and another planned project in vicinity, of which the population intake of these projects would be by around 2033/2034, it is envisaged that with the planned road improvement shortly after the commissioning of the proposed MSBs, the design RC ratio of the four junctions in question will be restored to the desirable level of not less than the 15% requirement. The implementation arrangement of the above-mentioned road improvement works at J4, J5, J6 and J7 will be further identified with nearby interfacing projects with a view to achieve a holistic design and implementation approach. For J7, with the proposed minor road marking improvement works as shown in Annex C, the performance could be brought back to 17% [15%] for AM and 20% [21%] for PM, respectively.

5.2.5 Although J13 will have DFC of 0.86 under 2032 reference case and design case which is slightly above the desirable level of 0.85, the traffic impact contributed by the proposed MSB is minimal. The Government will implement traffic management improvement measures at Pok Oi Interchange and the tentative completion year will be in 2025 which is before the completion year of the proposed MSB. It is expected the performance of J13 will be improved.

5.2.6 In summary, it is anticipated that the Proposed Development will not result in insurmountable traffic impact to the key junctions and road links in the Area of Influence with the proposed improvement works by other projects.

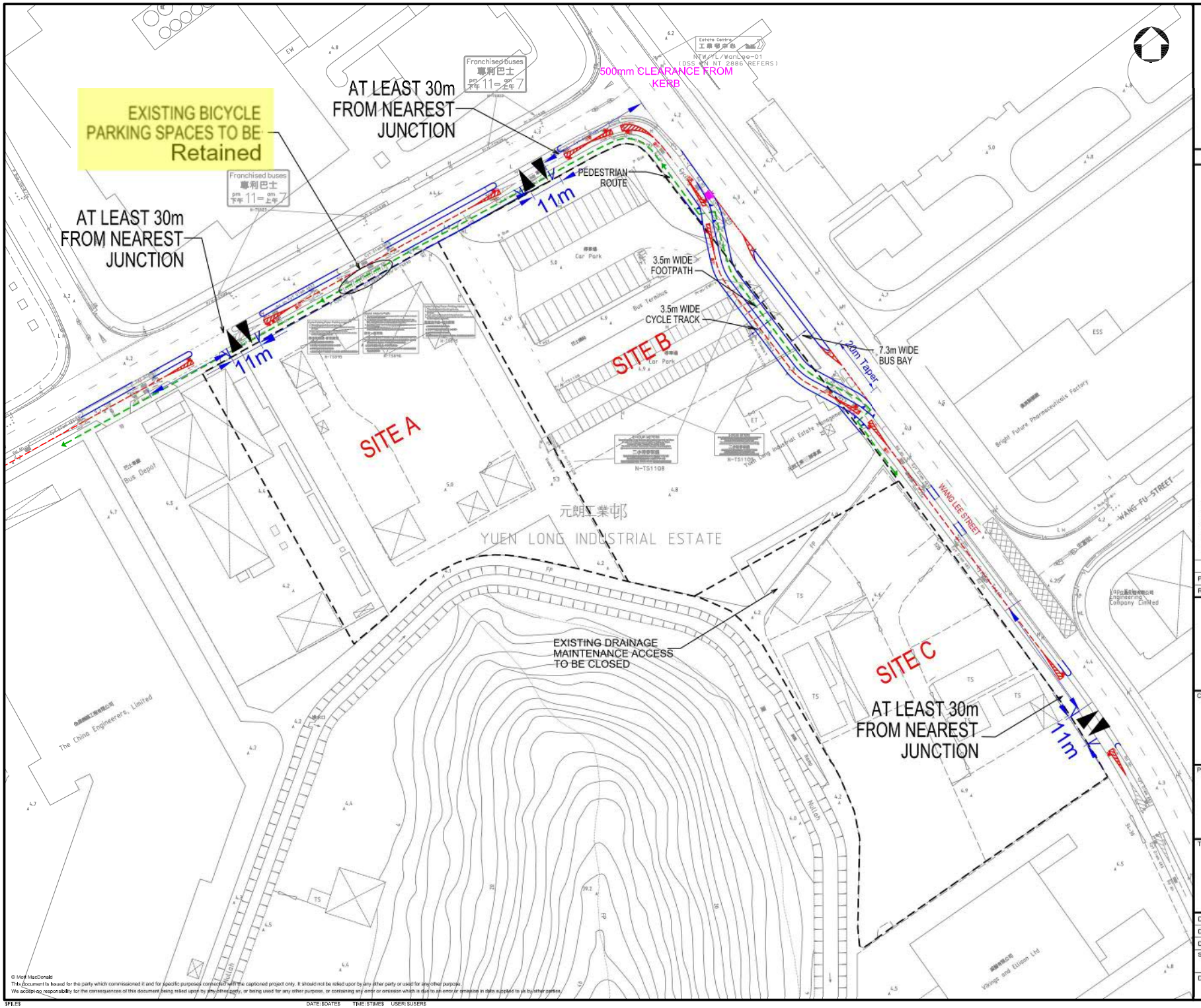
5.2.7 The road link assessment for the critical sections is summarised in **Table 5.7** and **Table 5.8**.

Table 5.12: Public Transport Demand Assessment

	AM Peak Hour Attraction		PM Peak Hour Generation	
	Bus Route No. K68	GMB Route No. 74	Bus Route No. K68	GMB Route No. 74
	Existing Condition During Peak Hour			
Observed No. of Departures in Peak Hour [a]	10	10	9	9
Assumed Capacity per Vehicle [b]	90	16	90	16
Capacity per Hour [c] = [a] x [b]	900	160	810	144
Passenger Demand without Proposed MSBs during Peak Hour [d]	643	160	550	117
	With Proposed MSBs During Peak Hour			
Passenger Demand of Proposed MSBs during Peak Hour [e]	732 [721]	100 [98]	784 [298]	107 [41]
Assumed Capacity per Vehicle [b1]	90	19	90	19
Passenger Demand with Proposed MSBs during Peak Hour [f] = [d] + [e]	1,375 [1,364]	260 [258]	1,334 [848]	224 [158]
Proposed No. of Departures in Peak Hour [a1]	16 [16]	14 [14]	15 [10]	12 [9]
New capacity per Hour [c1] = [a1] x [b1]	1,440 [1,440]	266 [266]	1,350 [900]	228 [171]
Additional Departure Required during Peak Hour [a1] – [a]	6 [6]	4 [4]	6 [1]	3 [0]

Remark:

- Public transport demand for logistics as major land use is shown in brackets in the above table
- Demand for AM generation is anticipated to be lower than demand for AM attraction, and demand for PM attraction is anticipated to be lower than demand for PM generation. Due to the fact that both public transport are loop services, the additional departures for AM attraction and PM generation are representing two-way traffic.



KEY PLAN

- DEVELOPMENT SITE
- PROPOSED RUN-IN/OUT (SUBJECT TO INITIAL DESIGN OPTIONS ; MINIMUM 30m DISTANCE BETWEEN RUN-IN/OUT AND JUNCTION)
- ROAD KERB
- ROAD MARKING
- PEDESTRIAN ROUTE
- 1.6m(W) X 2.4m(L) REGULATOR'S KIOSK

THE RE-PROVISION OF THE BUS TERMINUS AND THE REALIGNMENT OF CYCLE TRACK SHOULD BE ENFORCED UNDER LEASE TO BE COMPLETED BY THE GRANTEE TO THE SATISFACTION OF TD/HyD AND OTHER RELEVANT PARTIES / DEPARTMENTS

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 22	EW	FIRST ISSUE	KS	SHC

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Project
AGREEMENT NO. CE3/2016(CE) SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVLOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title
PROPOSED ACCESS LOCATION AND BUS LAYBY

Designed	WS		Eng check	TE
Drawn	BC		Coordination	--
Dwg check	EW		Approved	EC
Scale at A1 1:600		Status PRE		Rev P3

Drawing Number
MMH/369397/TIA/001

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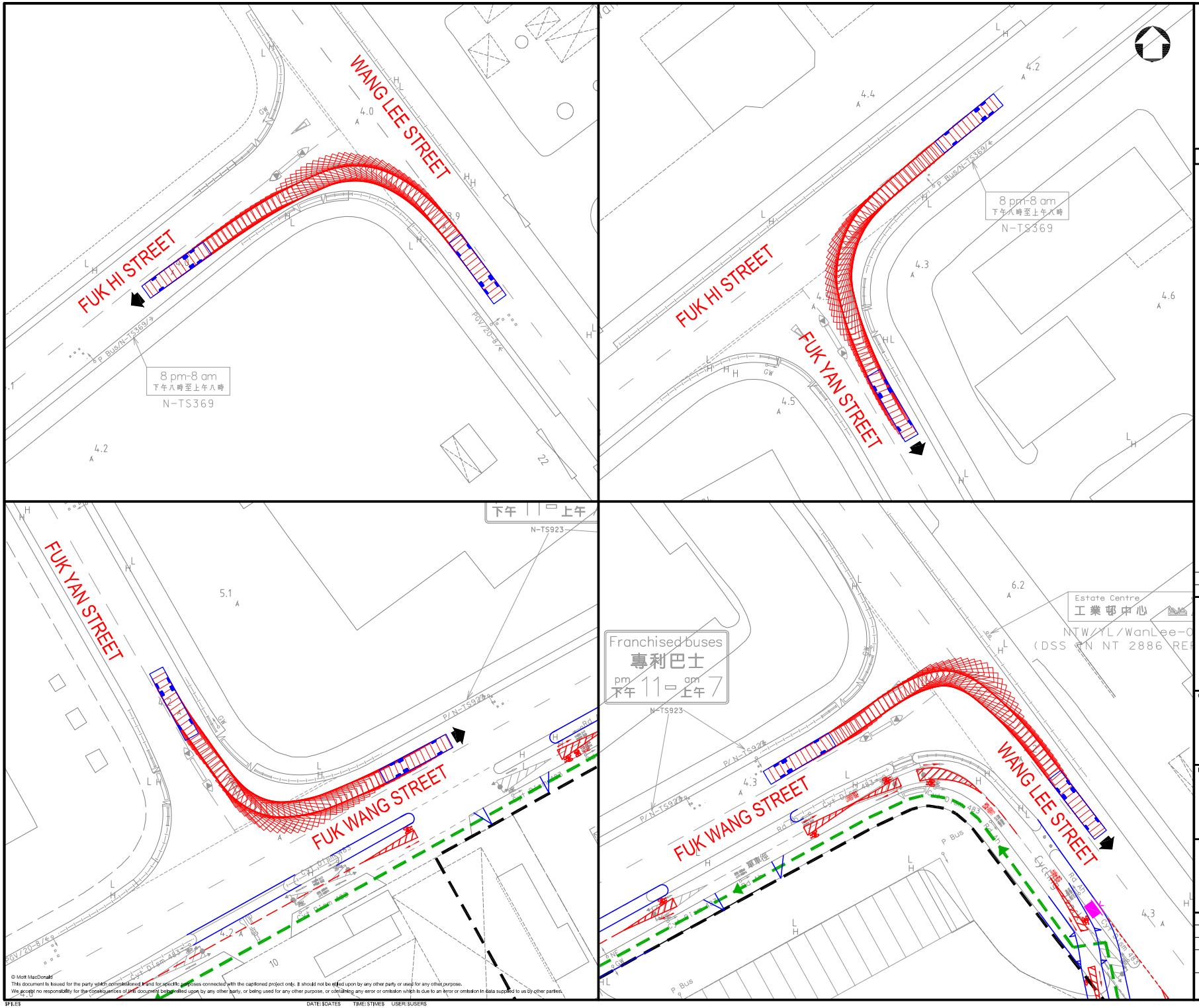

KEY PLAN

- STUDY SITE
- PROPOSED RUN-IN/OUT (SUBJECT TO INITIAL DESIGN OPTIONS ; MINIMUM 30m DISTANCE BETWEEN RUN-IN/OUT AND JUNCTION)
- ROAD KERB
- ROAD MARKING
- PEDESTRIAN ROUTE

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	AUG 17	EW	FIRST ISSUE	KS	SHC

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Client

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

Title

SWEPT PATHS OF 12.8m BUS AT THE PROPOSED DIVERSION ROUTE

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	–	
Dwg check	EW		Approved	EC	
Scale at A1 1:600		Status PRE		Rev P3	

Drawing Number MMH/369397/TIA/003-SP1

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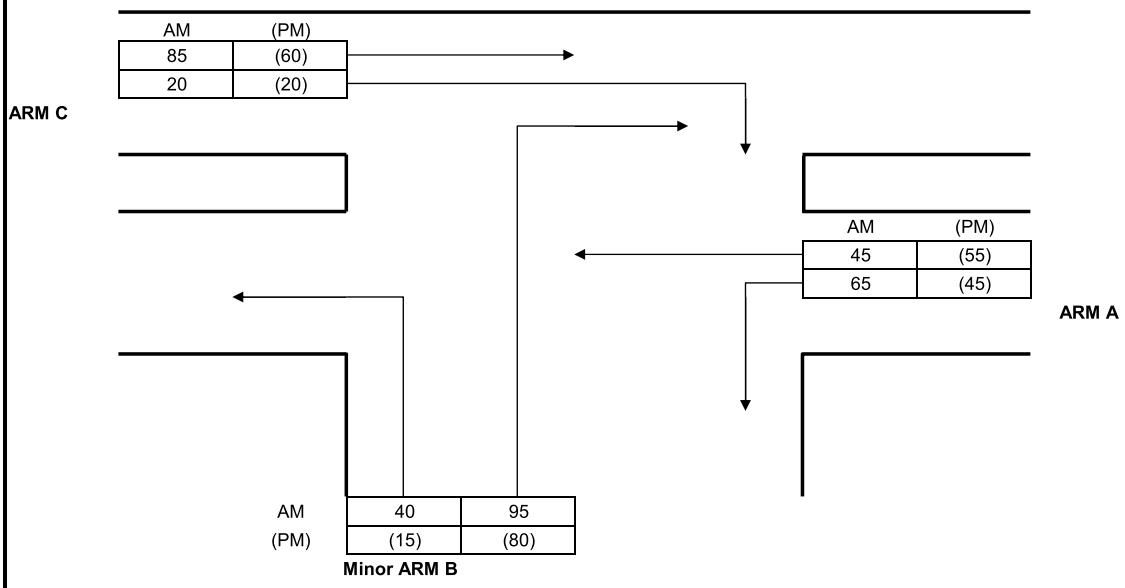
Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Wang Lee St / Fuk Wang St			Ref. No.:	J01P
Scheme:	2022 Observed Flow			Ref. No.:	
Year:	2022	Job No.:	J1358.1	Rev.:	-
ARM A:	Wang Lee Street NB				
ARM B:	Fuk Wang Street EB				
ARM C:	Wang Lee Street SB				



GEOMETRY

Major road width	W	10.00	Lane widths	w(b-a)	4.50
Central Reserve width	Wcr	0.00		w(b-c)	4.50
2 Lane Minor Arm (Y/N)		N		w(c-b)	5.00
Visibilities	Vr(b-a)	150	Calculated	D	1.11
	Vl(b-a)	150		E	1.11
	Vr(b-c)	150		F	1.16
	Vr(c-b)	150		Y	0.66

ANALYSIS

		Factor	AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		85	60
	q(c-b)		20	20
	q(a-b)		65	45
	q(a-c)		45	55
	q(b-a)		95	80
	q(b-c)		40	15
	f		0.30	0.16
CAPACITIES	Q(b-a)	1	655	659
	Q(b-c)	1	808	807
	Q(c-b)	1	832	835
	Q(b-ac)	1	694	679
RFC's	b-a		0.145	0.121
	b-c		0.050	0.019
	c-b		0.024	0.024
	b-ac		0.195	0.140
Worst RFC			**0.195**	**0.140**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

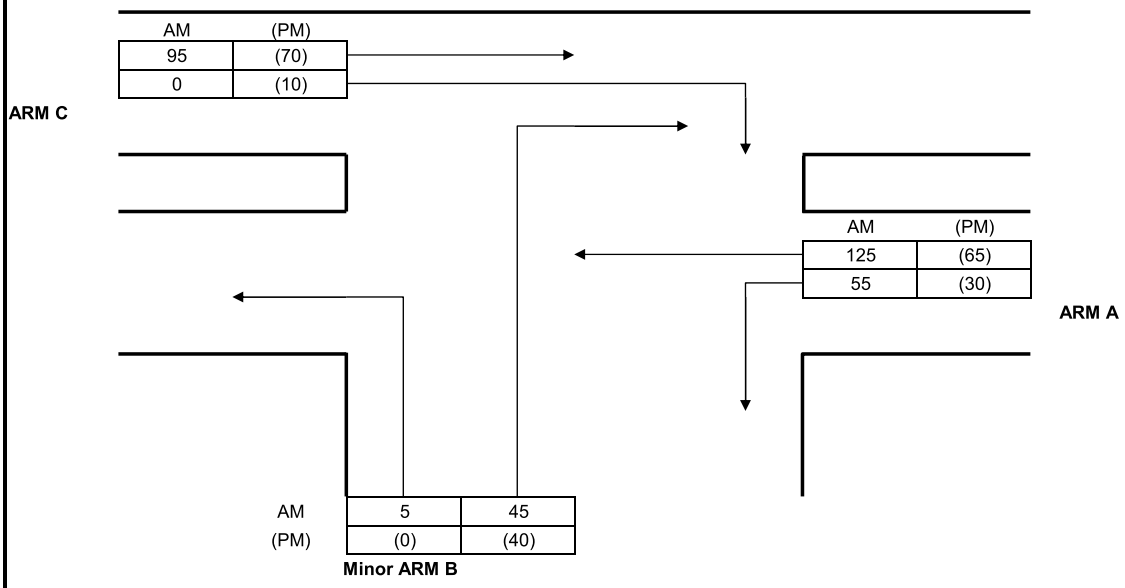
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Aug-23	Checked by:

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Fuk Yan St / Fuk Wang St			Ref. No.:	J02P
Scheme:	2022 Observed Flow			Ref. No.:	
Year:	2022	Job No.:	J1358.1	Rev.:	-
ARM A:	Fuk Wang Street EB				
ARM B:	Fuk Yan Street SB				
ARM C:	Fuk Wang Street WB				



GEOMETRY

Major road width	W	10.50	Lane widths	w(b-a)	4.08
Central Reserve width	Wcr	0.00		w(b-c)	4.08
2 Lane Minor Arm (Y/N)		N		w(c-b)	5.00
Visibilities	Vr(b-a)	150	Calculated	D	1.07
	Vl(b-a)	150		E	1.07
	Vr(b-c)	150		F	1.16
	Vr(c-b)	150		Y	0.64

ANALYSIS

		Factor	AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		95	70
	q(c-b)		0	10
	q(a-b)		55	30
	q(a-c)		125	65
	q(b-a)		45	40
	q(b-c)		5	0
	f		0.10	0.00
CAPACITIES	Q(b-a)	1	619	637
	Q(b-c)	1	760	777
	Q(c-b)	1	814	837
	Q(b-ac)	1	631	637
RFC's	b-a		0.073	0.063
	b-c		0.007	0.000
	c-b		0.000	0.012
	b-ac		0.079	0.063
Worst RFC			**0.079**	**0.063**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

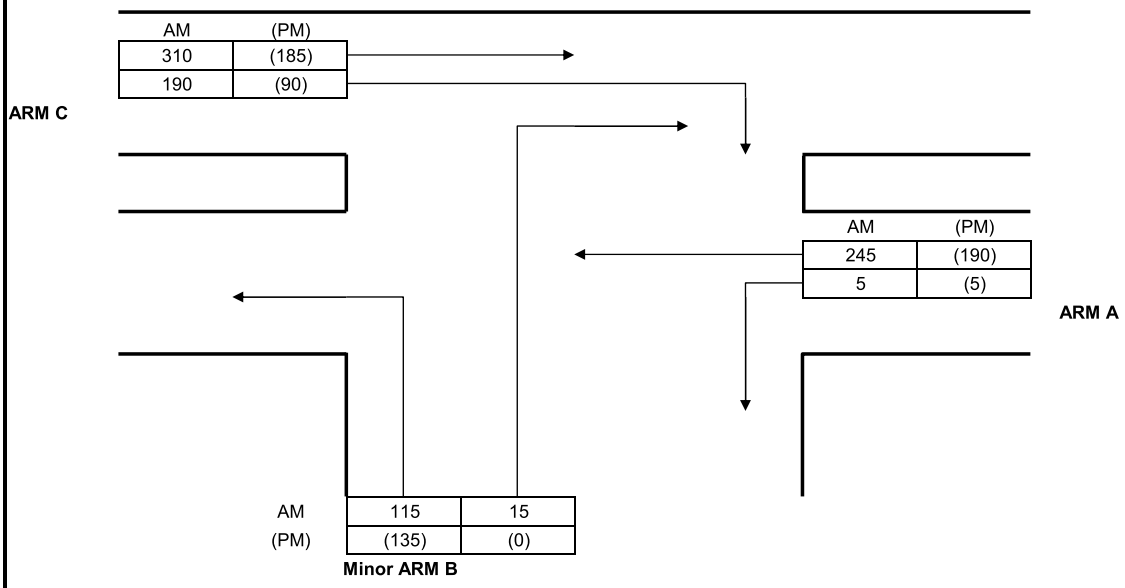
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Aug-23	Checked by:

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Fuk Wang St / Fuk Hi St			Ref. No.:	J03P
Scheme:	2022 Observed Flow			Ref. No.:	
Year:	2022	Job No.:	J1358.1	Rev.:	-
ARM A:	Fuk Hi Street NB				
ARM B:	Fuk Wang Street WB				
ARM C:	Fuk Hi Street SB				



GEOMETRY

Major road width	W	10.50	Lane widths	w(b-a)	7.80
Central Reserve width	Wcr	0.00		w(b-c)	7.80
2 Lane Minor Arm (Y/N)		N		w(c-b)	5.00
Visibilities	Vr(b-a)	150	Calculated	D	1.43
	Vl(b-a)	150		E	1.43
	Vr(b-c)	150		F	1.16
	Vr(c-b)	150		Y	0.64

ANALYSIS

		Factor	AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		310	185
	q(c-b)		190	90
	q(a-b)		5	5
	q(a-c)		245	190
	q(b-a)		15	0
	q(b-c)		115	135
	f		0.88	1.00
CAPACITIES	Q(b-a)	1	659	750
	Q(b-c)	1	982	1000
	Q(c-b)	1	795	810
	Q(b-ac)	1	929	1000
RFC's	b-a		0.023	0.000
	b-c		0.117	0.135
	c-b		0.239	0.111
	b-ac		0.140	0.135
Worst RFC			**0.239**	**0.135**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

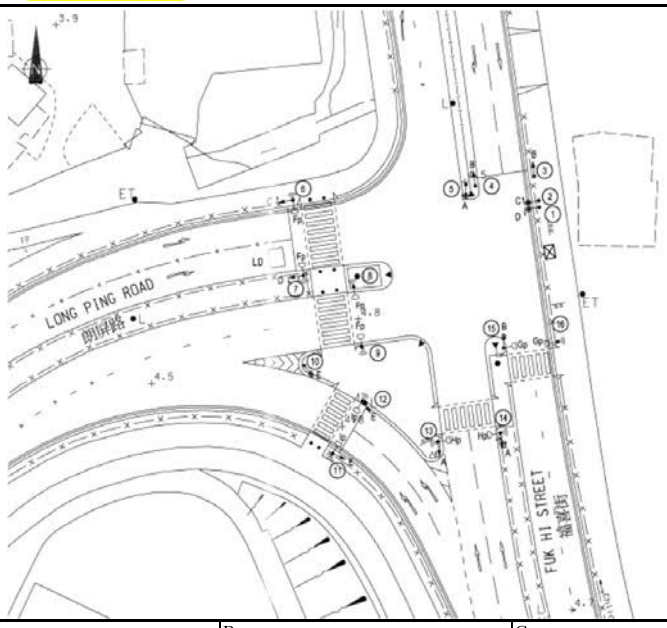
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Aug-23	Checked by:

Traffic Signal Junction Calculation Sheet

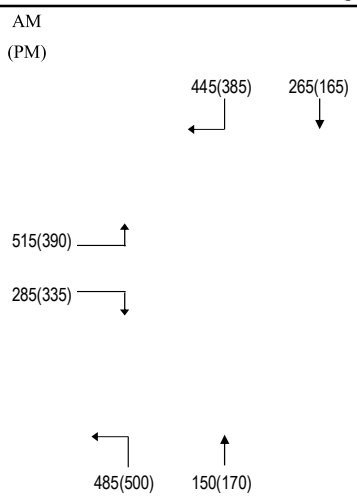
Ho Wang SPB Limited
Traffic & Transportation Consultants

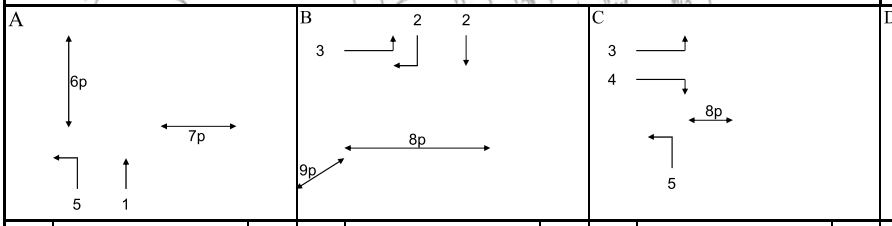
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Fuk Hi St / Long Ping Rd	Ref. No.:	J04S
Scheme:	2022 Observed Flow	Ref. No.:	



Year: 2022 | Job No.: J1358.1 | Rev.: -

Peak Hour Traffic Flows (pcu/hr)





3		5	2		3	2		8		
		3	2		3	6				

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↑	A	2	4.00								4310	150	0.035		170	0.039	
2 ↓	B	1	3.70	1							1985	265	0.134		165	0.083	
2 ↲	B	1	3.70				20			100	1975	445	0.225	1	385	0.195	1
3 ↑	BC	1	4.30	1		15				100	1860	515	0.277		390	0.210	
4 ↳	C	1	4.70				20			100	2070	285	0.138		335	0.162	
5 ↰	AC	1	3.80						0.75	100	1600	485	0.303	1	500	0.313	1

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
6p	A									
7p	A									
8p	BC									
9p	B									

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

	AM Peak			PM Peak		
Check Critical Phase	1,2,4	5,2		1,2,4	5,2	
Sum of y values, Y	0.398	0.528		0.396	0.507	
Lost time, L	20	12		20	12	
Cycle Time, C	100	100		90	90	
Practical Y, Y_{pr}	0.720	0.792		0.700	0.780	
Reserve Capacity, R.C. (%)	81%	50%		77%	54%	

Calculated by:	Date: Aug-2023	Checked by:

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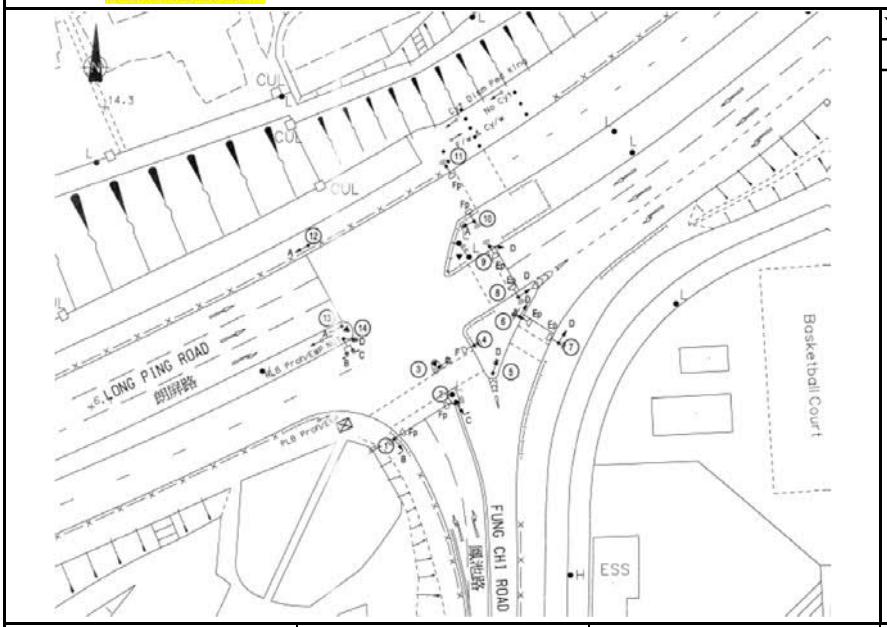
Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Long Ping Rd / Fung Chi Rd	Ref. No.:	J05S
Scheme:	2022 Observed Flow	Ref. No.:	

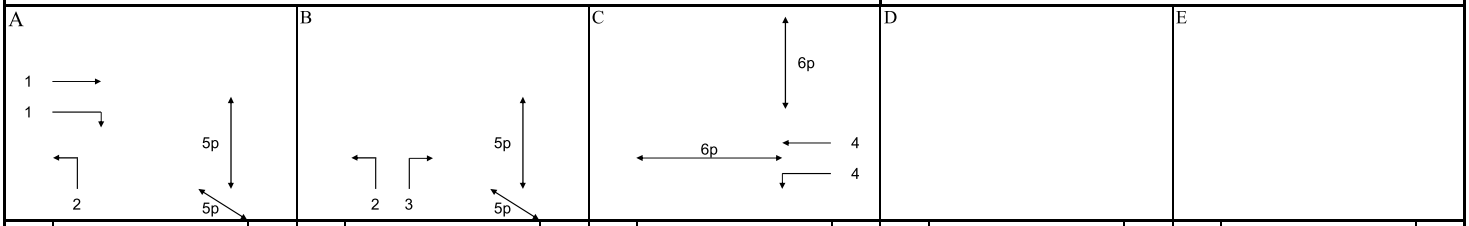


Year:	2022	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

AM
(PM)

670(640)
140(225)
635(650)
260(240)
185(185)
170(135)



3		3	3			3	6		3										
3						3	6		3										

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 →	A	2	3.60	1							4090	670	0.164	1	640	0.156	1
1 ↓	A	1	3.60				20			100	1965	140	0.071		225	0.115	
2 ↰	AB	1	3.00						0.8	100	1645	185	0.112		185	0.112	
3 ↱	B	1	3.00						0.8	100	1645	170	0.103	1	135	0.082	1
4 ←	C	2	3.70								4250	635	0.149		650	0.153	1
4 ↓	C	1	4.00						0.8	100	1725	260	0.151	1	240	0.139	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
5p	AB		8		8	16				
6p	C		8		8	16				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

	AM Peak			PM Peak		
Check Critical Phase	1,3,4	2,4		1,3,4	2,4	
Sum of y values, Y	0.418	0.263		0.391	0.265	
Lost time, L	18	13		18	13	
Cycle Time, C	108	108		108	108	
Practical Y, Y_{pr}	0.750	0.792		0.750	0.792	
Reserve Capacity, R.C. (%)	79%	201%		92%	198%	

Calculated by:	Date: Aug-2023	Checked by:

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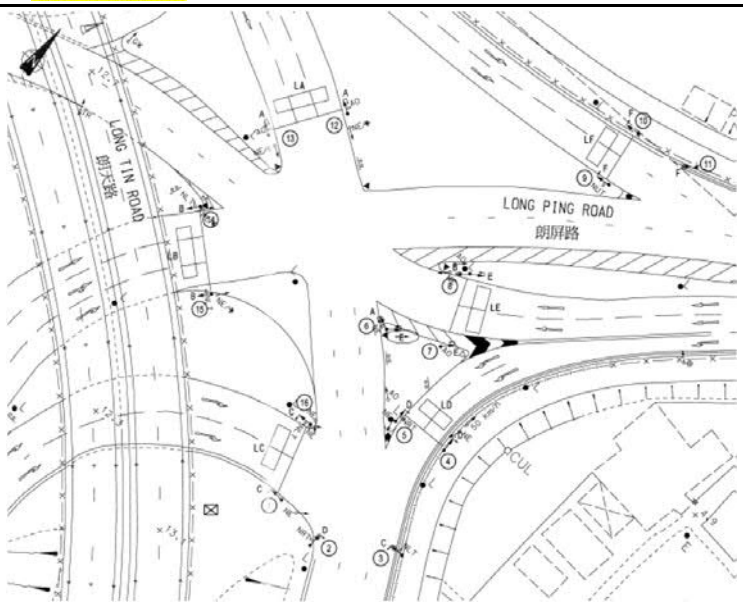
FI_R

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

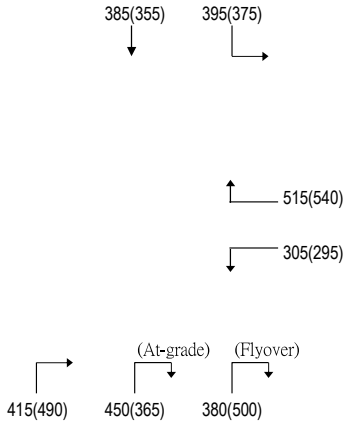
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Long Ping Rd / Shui Pin Wai Interchange	Ref. No.:	J06S
Scheme:	2022 Observed Flow	Ref. No.:	

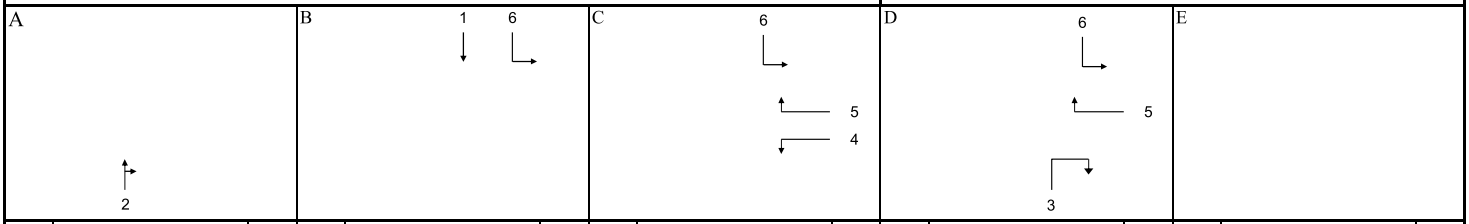


Year:	2022	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

AM
(PM)





2		3	4		3	9		3	3		3						
5		3	4		3	3					3						

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↓	B	3	3.3	1							6115	385	0.063	1	355	0.058	1
2 →	A	1	3.8	1							1990	290	0.146		285	0.143	
2 ↓→	A	1	3.9				18			58 / 31	2045/2090	298	0.146	1	299	0.143	1
2 ↓	A	1	3.3				15				1895	276	0.146		271	0.143	
3 ↓	D	2	5.1	1			20			100	4085	380	0.093	1	500	0.122	1
4 ↓	C	1	3.5	1		20				100	1920	305	0.159	1	295	0.154	1
5 ←	CD	2	3.5	1						100	4070	515	0.127		540	0.133	
6 →	BCD	2	3.6	1						100	4090	395	0.097		375	0.092	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.

Note: Saturation flow of 90 pcu/hr is added for approach 4 is for the additional 15 meters traffic lane at junction

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

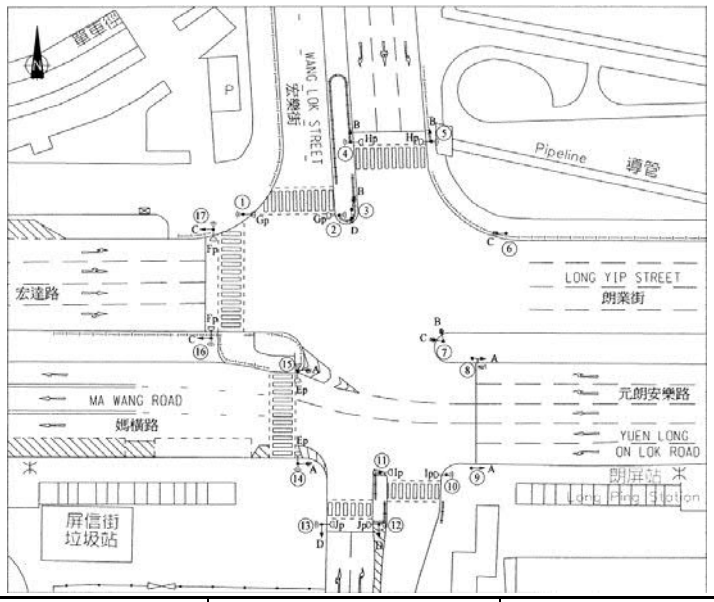
	AM Peak			PM Peak		
Check Critical Phase	2,1,4,3	2,1,5		2,1,4,3	2,1,5	
Sum of y values, Y	0.461	0.335		0.477	0.334	
Lost time, L	26	18		26	18	
Cycle Time, C	120	120		120	120	
Practical Y, Y_{pr}	0.705	0.765		0.705	0.765	
Reserve Capacity, R.C. (%)	53%	128%		48%	129%	

Calculated by:	Date: Aug-2023	Checked by:

Traffic Signal Junction Calculation Sheet

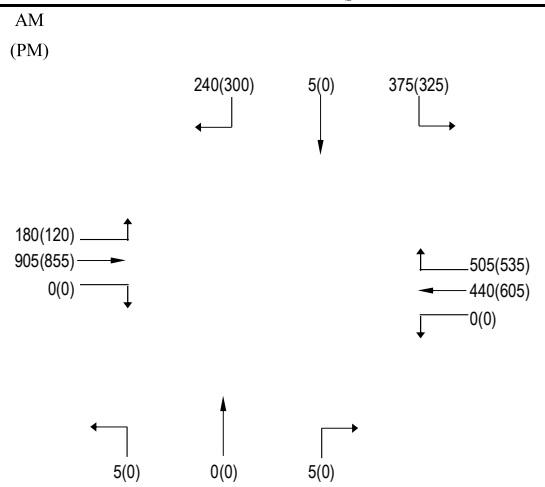
Ho Wang SPB Limited
Traffic & Transportation Consultants

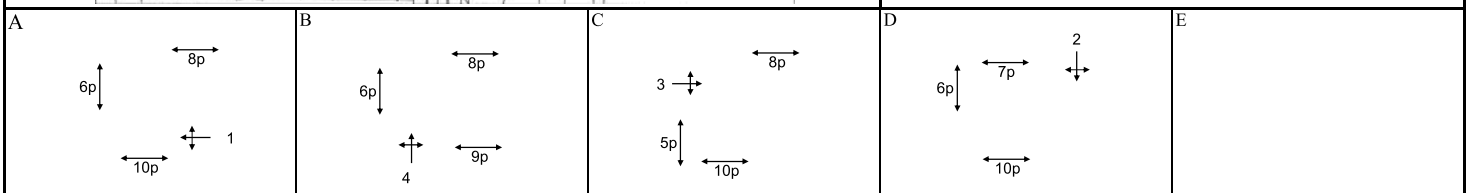
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Wang Lok St / Wang Tat Rd / Ma Wang Rd / Long Yip St / Yuen Long On Lok Rd	Ref. No.:	J07S
Scheme:	2022 Observed Flow	Ref. No.:	



Year: 2022 | Job No.: J1358.1 | Rev.: -

Peak Hour Traffic Flows (pcu/hr)





2		3	4	5		7	2		3	5		7			

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1A	A	2	3.00				30		0.75	100	2940	505	0.172	1	535	0.182	1
1B	A	2	3.00								4110	440	0.107		605	0.147	
1C	A	1	3.00			15				100	1870	0	0.000		0	0.000	
2A	D	1	3.5	1			25				1855	240	0.129		242	0.131	1
2B	D	1	3.5			20	30			98 / 100	1960/1970	255	0.130	1	257	0.131	
2C	D	1	3.5			15			0.5		960	125	0.130		125	0.131	1
3A	C	1	3.5	1		15				100	1785	180	0.101		120	0.067	
3B	C	1	3.5			20				0	2105	302	0.143	1	285	0.135	1
3C	C	1	3.5								2105	302	0.143	1	285	0.135	1
3D	C	1	3.5				15				2105	302	0.143	1	285	0.135	1
4A	B	1	3.50	1		15				100 / 100	1785	5	0.003		0	0.000	
4B	B	1	3.50				30			100	2005	5	0.002		0	0.000	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
5p	C		6		12	18				
6p	ABD		10		15	25				
7p	D		7		11	18				
8p	ABC		8		10	18				
9p	B		7		7	14				
10p	ACD		5		6	11				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

	AM Peak			PM Peak		
Check Critical Phase	1,9p,3,2			1,9p,3,2		
Sum of y values, Y	0.445			0.448		
Lost time, L	35			35		
Cycle Time, C	120			120		
Practical Y, Y_{pr}	0.638			0.638		
Reserve Capacity, R.C. (%)	43%			42%		

Calculated by:	Date: Sep-2023	Checked by:

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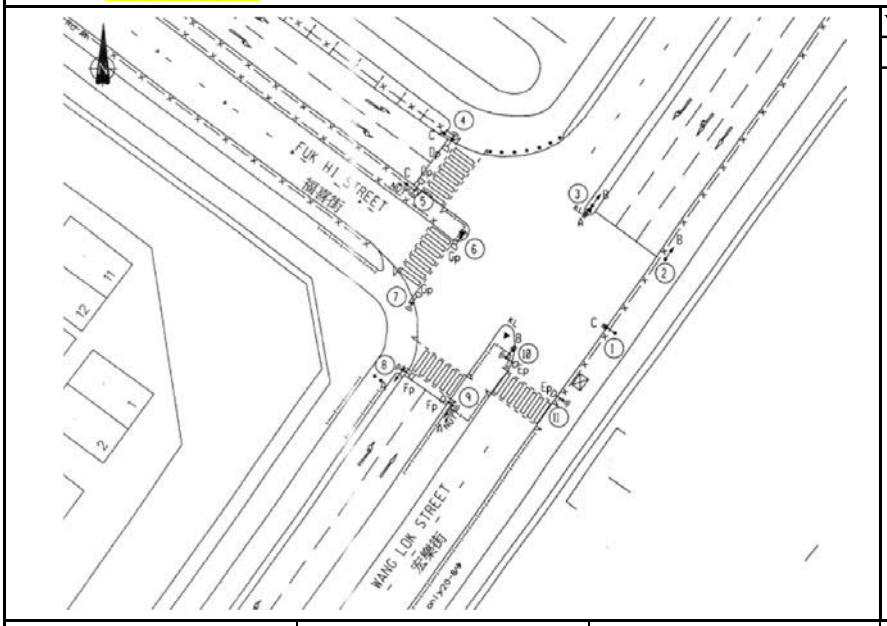
Traffic Signal Junction Calculation Sheet

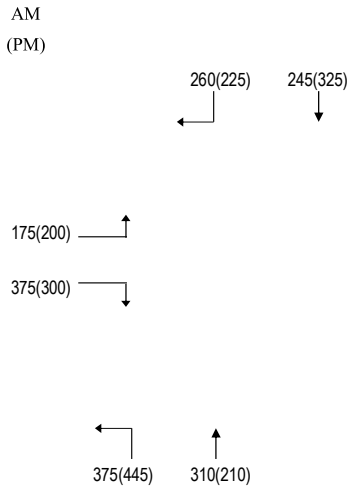
Ho Wang SPB Limited
Traffic & Transportation Consultants

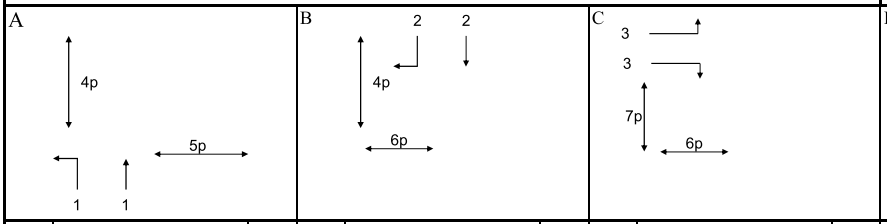
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study	
Junction:	Fuk Hi St / Wang Lok St	Ref. No.: J08S
Scheme:	2022 Observed Flow	Ref. No.:



Year: 2022 | Job No.: J1358.1 | Rev.: -

Peak Hour Traffic Flows (pcu/hr)





3		3	4			3	4		3										

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1	A	1	3.7	1		10				100	1725	375	0.217	1	445	0.258	1
1	A	1	3.7								2125	310	0.146		210	0.099	
2	B	1	3.5				15				1915	164	0.086		177	0.093	
2	B	1	3.5				18			56 / 25	2010/2060	172	0.086	1	191	0.093	1
2	B	1	3.5	1							1965	168	0.086		182	0.093	
3	C	1	4.00	1		15				100	1830	175	0.096		200	0.109	
3	C	1	4.00				20			100	2005	375	0.187	1	300	0.150	1

Critical Ped. Phase	Stage	Width Across	Min. GM	Min. FGM	Lost Time	Note	Crit.	Note	Crit.
4p	AB		7	7	14				
5p	A		7	7	14				
6p	BC		7	7	14				
7p	C		7	7	14				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%

In accordance with TPDM - Volume 4.2.4

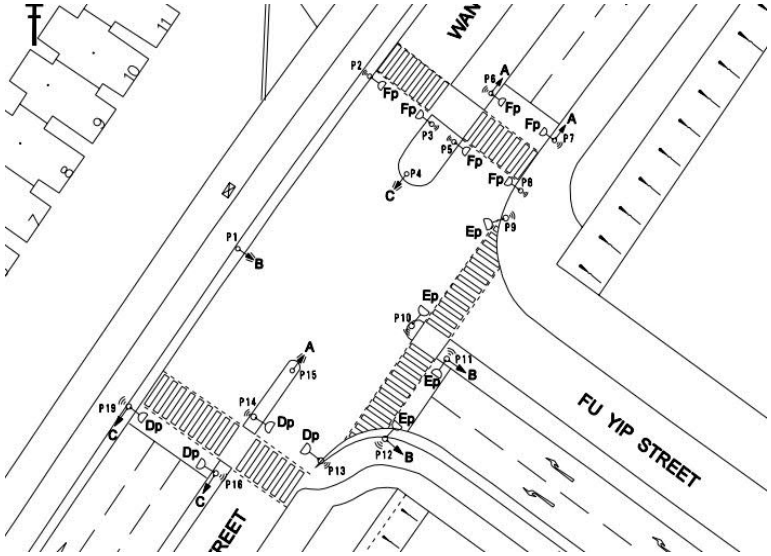
Check Critical Phase	1,2,3			1,2,3	
Sum of y values, Y	0.490			0.500	
Lost time, L	17			17	
Cycle Time, C	108			108	
Practical Y, Y_{pr}	0.758			0.758	
Reserve Capacity, R.C. (%)	55%			52%	

Calculated by:	Date: Aug-2023	Checked by:

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

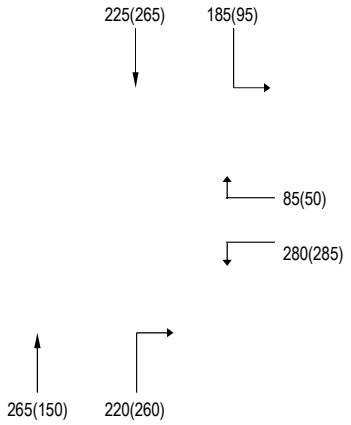
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Wang Lok St / Fu Yip St	Ref. No.:	J09S
Scheme:	2022 Observed Flow	Ref. No.:	



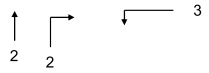
Year:	2022	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

AM
(PM)



A



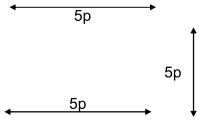
B



C



D



E

3		3	4		3	2		3	5	13	11						
3					3	2		3	5	13	11						

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↓	C	1	3.5								2105	225	0.107		194	0.092	
1 ↓→	C	1	3.5	1		10				100 / 57	1710/1810	185	0.108	1	166	0.092	1
2 ↑→	A	1	3.5	1			20		1.11	92 / 100	2040/2030	239	0.117		260	0.128	1
2 ↑	A	1	3.5								2105	246	0.117	1	150	0.071	
3 ↓←	AB	1	3.50	1		10				100	1710	280	0.164		285	0.167	
4 ←↓	B	1	3.50	1			20			100	1830	85	0.046	1	50	0.027	1

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
5p	D		5		8	13		1		1
6p	D		5		8	13		1		1
7p	D		5		8	13				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%

In accordance with TPDM - Volume 4.2.4

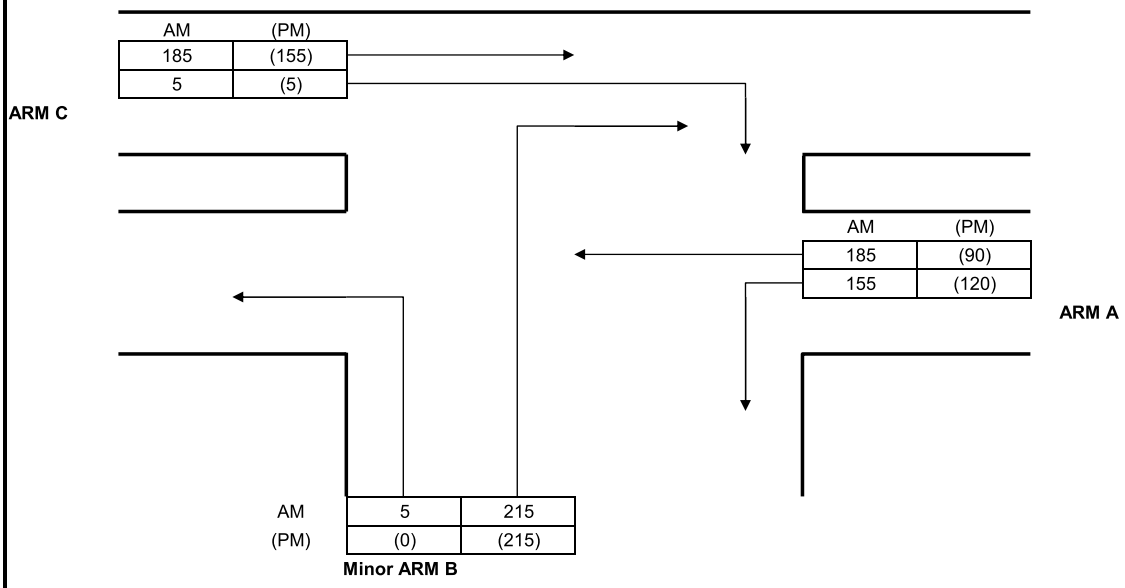
Check Critical Phase	2,4,1,5p	3,1,5p		2,4,1,5p	3,1,5p	
Sum of y values, Y	0.272	0.272		0.247	0.259	
Lost time, L	44	38		44	38	
Cycle Time, C	115	115		115	115	
Practical Y, Y_{pr}	0.556	0.603		0.556	0.603	
Reserve Capacity, R.C. (%)	105%	122%		125%	133%	

Calculated by:	Date: Aug-2023	Checked by:

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Wang Lee St / Wang Lok St			Ref. No.:	J10P
Scheme:	2022 Observed Flow			Ref. No.:	
Year:	2022	Job No.:	J1358.1	Rev.:	-
ARM A:	Wang Lok Street				
ARM B:	Wang Lee Street				
ARM C:	Wang Lok Street				



GEOMETRY

Major road width	W	13.65	Lane widths	w(b-a)	5.30
Central Reserve width	Wcr	4.75		w(b-c)	5.30
2 Lane Minor Arm (Y/N)		Y		w(c-b)	4.36
Visibilities	Vr(b-a)	110	Calculated	D	1.14
	Vl(b-a)	150		E	1.14
	Vr(b-c)	110		F	1.10
	Vr(c-b)	150		Y	0.53

ANALYSIS

		Factor	AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		185	155
	q(c-b)		5	5
	q(a-b)		155	120
	q(a-c)		185	90
	q(b-a)		215	215
	q(b-c)		5	0
	f		0.02	0.00
CAPACITIES	Q(b-a)	1	712	740
	Q(b-c)	1	799	822
	Q(c-b)	1	744	772
	Q(b-ac)	1	713	740
RFC's	b-a		0.302	0.291
	b-c		0.006	0.000
	c-b		0.007	0.006
	b-ac		0.000	0.000
Worst RFC			**0.302**	**0.291**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

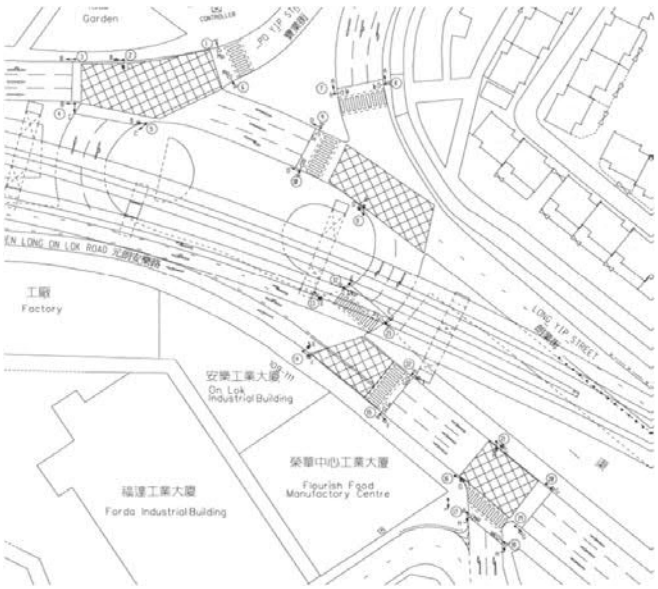
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Aug-23	Checked by:

Traffic Signal Junction Calculation Sheet

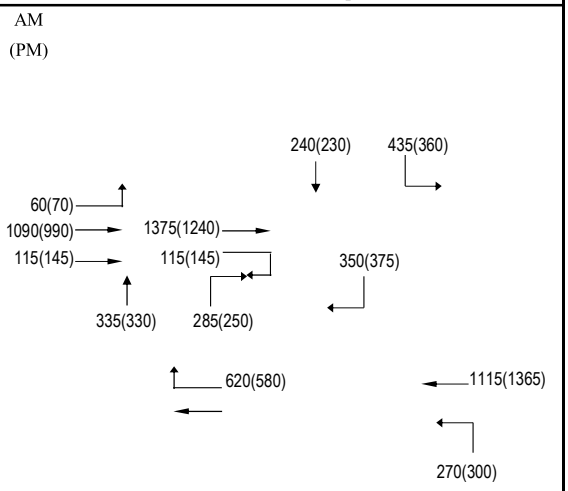
Ho Wang SPB Limited
Traffic & Transportation Consultants

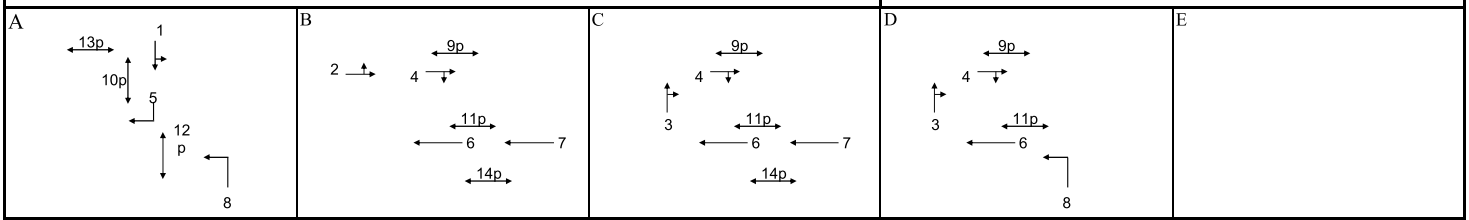
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Long Yip St / Yuen Long On Lok Rd / Po Yip St	Ref. No.:	J11S
Scheme:	2022 Observed Flow	Ref. No.:	



Year:	2022	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)





4		3	4		3	4					6								

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↓	A	1	3.5								2105	240	0.114		212	0.101	
1 ↓→	A	1	3.5			18				100 / 91	1945/1955	227	0.117		197	0.101	1
1 ↓←	A	1	3.5	1		15					1785	208	0.117	1	180	0.101	
2 ↑→	B	1	3.0	1		10				29 / 38	1885/1880	597	0.317		565	0.300	
2 →	B	1	3.0								2055	668	0.325	1	640	0.312	1
3 ↑	CD	1	3.5								2105	335	0.159		319	0.152	1
3 ↑→	CD	1	3.5	1			10			100 / 96	1710/1720	285	0.167	1	261	0.152	
4 →	BCD	2	3.3	1							4030	1375	0.341		1240	0.308	
4 ↓	BCD	1	3.3				10			100	1815	115	0.063		145	0.080	
5 ↓←	A	2	5.0				10			100	3920	350	0.089		375	0.096	
6 ←	BCD	3	3.3								6255	620	0.099		580	0.093	
7 ←	BCD	3	3.5							100	6315	1115	0.177		1365	0.216	
8 ↑←	AD	2	3.5			15				100	3825	270	0.071		300	0.078	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
9p	BCD		9		10	19				
10p	A		8		9	17				
11p	BCD		10		12	22				
12p	A		8		9	17				
13p	A		8		9	17				
14p	BC		10		12	22				

Practical Y (Ypr):	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

	AM Peak			PM Peak		
Check Critical Phase	1,2,3			1,2,3		
Sum of y values, Y	0.609			0.564		
Lost time, L	21			21		
Cycle Time, C	120			120		
Practical Y, Y_{pr}	0.743			0.743		
Reserve Capacity, R.C. (%)	22%			32%		

Calculated by:	Date: Aug-2023	Checked by:

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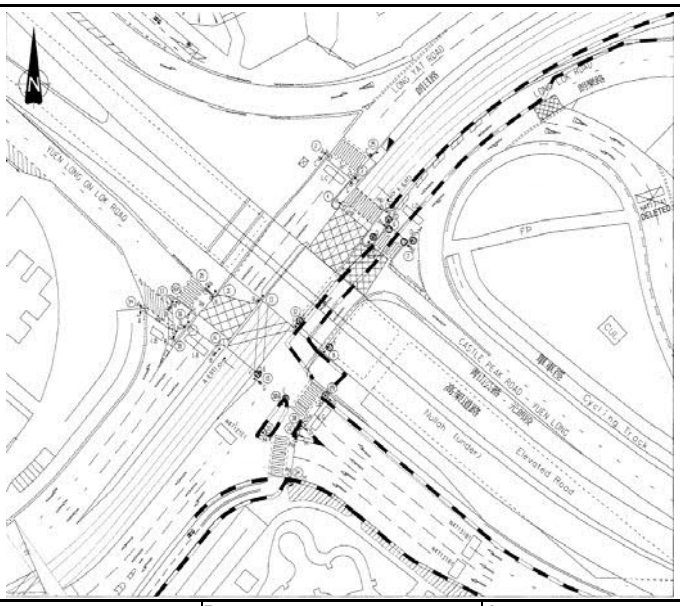
Traffic Signal Junction Calculation Sheet

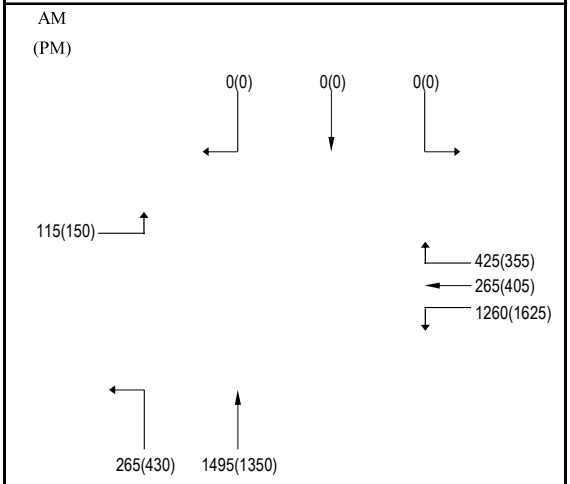
Ho Wang SPB Limited
Traffic & Transportation Consultants

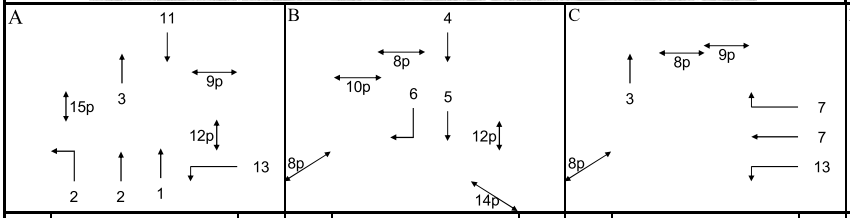
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Castle Peak Road – Yuen Long/Long Yip Street/Yuen Long On Lok Road/Long Yat Road	Ref. No.:	J12S
Scheme:	2022 Observed Flow	Ref. No.:	J47131



Year:	2022	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)





6		7	1	16			3		3								
		3	1	16			3										

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
2A ←	A	1	3.50	1		15				100	1785	265	0.148		430	0.241	
2B ↑	A	2	3.80								4270	1495	0.350	1	1350	0.316	1
3 ↑	AC	2	3.80	1							4130	1920	0.465		1705	0.413	
7A ←	C	1	3.30				20			100	1940	425	0.219	1	355	0.183	
7B ←	C	1	3.30								2085	265	0.127		405	0.194	1
13 ↰	CA	2	3.20	1		15				100	3645	1260	0.346		1625	0.446	
4 ↓	B	2	3.50	1							4070	0	0.000		0	0.000	
6 ←	B	1	3.70				20			0	0	0	0.000		0	0.000	
5 ↓	B	1	3.70	1							1985	0	0.000		0	0.000	

Critical Ped. Phase	Stage	Width Across	Min. GM	Min. FGM	Lost Time	Note	Crit.	Note	Crit.
8p	BC		10	8	18				
9p	AB		5	6	11				
10p	B		5	6	11				
11p	A		5	4	9				
12p	AB		8	8	16		1		1
14p	B		8	8	16		1		1
15p	A		5	6	11				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

	AM Peak			PM Peak		
Check Critical Phase	2,12p,7	3,12p		2,12p,7	3,12p	
Sum of y values, Y	0.569	0.465		0.510	0.413	
Lost time, L	34	22		34	22	
Cycle Time, C	134	134		134	134	
Practical Y, Y_{pr}	0.672	0.752		0.672	0.752	
Reserve Capacity, R.C. (%)	18%	62%		32%	82%	

Calculated by:	Date: Aug-2023	Checked by:

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FI_R

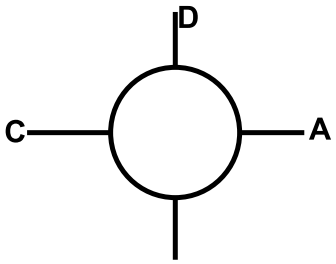
Simplified Roundabout Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Pok Oi Interchange		Ref. No.: J13R
Scheme:	2022 Observed Flow		Ref. No.:
Year:	2022	Job No.: J1358.1	Rev.: -

AM PM

ARM A: Castle Peak Road Westbound Approach
ARM B: Yuen Long Highway
ARM C: Castle Peak Road Eastbound Approach
ARM D: Route 3



GEOMETRY

ARM	v	e	L	r	D	Phi	S
A	7.00	17.00	5	25	90	60	3.20
B	12.00	23.00	5	25	90	30	3.52
C	3.50	6.50	4	25	90	40	1.20
D	7.00	9.00	5	25	90	30	0.64

AM FLOWS

from \ to	A	B	C	D	Circ	Entry
A					1215	1185
B					1385	1200
C					1335	645
D					1870	795

PM FLOWS

from \ to	A	B	C	D	Circ	Entry
A					1505	1115
B					1475	1005
C					900	715
D					1520	1015

CALCULATIONS

ARM	K	X_2	M	F	t_D	f_c	Q_E AM	Q_E PM	RFC AM	RFC PM
A	0.91	8.35	20.09	2530	1.02	0.57	1660	1509	0.71	0.74
B	1.01	13.37	20.09	4051	1.02	0.79	2986	2914	0.40	0.34
C	0.98	4.38	20.09	1328	1.02	0.40	770	941	0.84	0.76
D	1.01	7.88	20.09	2387	1.02	0.55	1365	1560	0.58	0.65

Crtical Arm:	**C**	**C**
RFC:	**0.84**	**0.76**
	AM	**PM**

- In accordance with TPDM V2.4

Calculated by:	PY	Date:	Aug-23	Checked by:	TE

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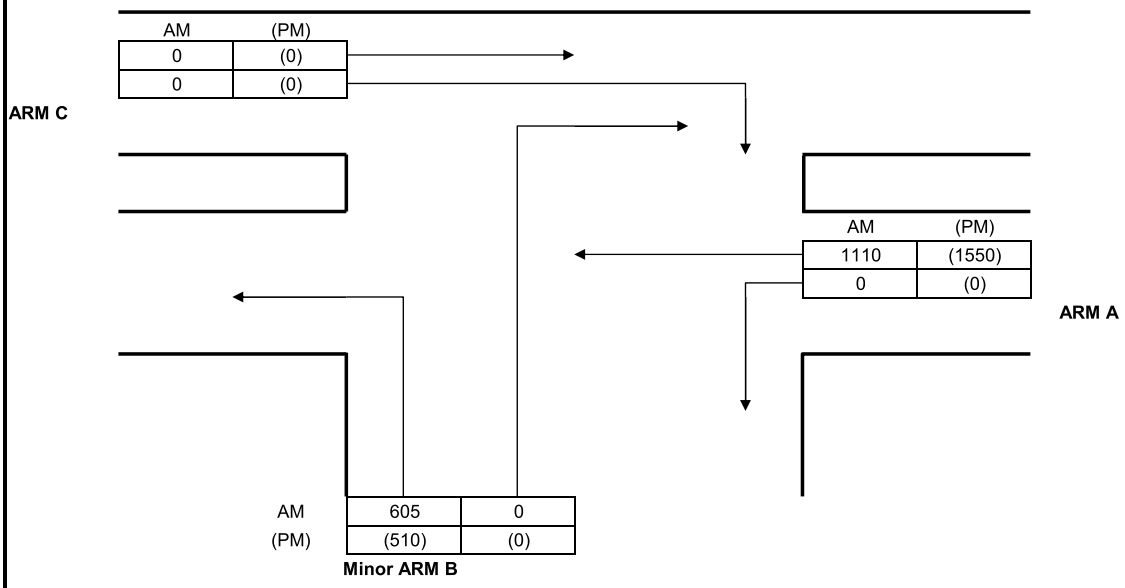
Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Tong Yan San Tsuen Interchange			Ref. No.:	J14P
Scheme:	2022 Observed Flow			Ref. No.:	
Year:	2022	Job No.:	J1358.1	Rev.:	-
ARM A:	Slip Road from Yuen Long Highway				
ARM B:	Slip Road from Long Tin Road				
ARM C:	Slip Road to Long Tin Road				



GEOMETRY					
Major road width	W	7.00	Lane widths	w(b-a)	0.00
Central Reserve width	Wcr	0.00		w(b-c)	5.50
2 Lane Minor Arm (Y/N)		Y		w(c-b)	0.00
Visibilities	Vr(b-a)	80	Calculated	D	0.61
	Vl(b-a)	100		E	1.13
	Vr(b-c)	80		F	0.63
	Vr(c-b)	80		Y	0.76

ANALYSIS			AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		0	0
	q(c-b)		0	0
	q(a-b)		0	0
	q(a-c)		1110	1550
	q(b-a)		0	0
	q(b-c)		605	510
	f		1.00	1.00
		Factor		
CAPACITIES	Q(b-a)	1	197	122
	Q(b-c)	1	496	359
	Q(c-b)	1	278	201
	Q(b-ac)	1	496	359
RFC's	b-a		0.000	0.000
	b-c		1.220	1.421
	c-b		0.000	0.000
	b-ac		0.000	0.000
Worst RFC			**1.220**	**1.421**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

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

Calculated by:	Date: Aug-23	Checked by:

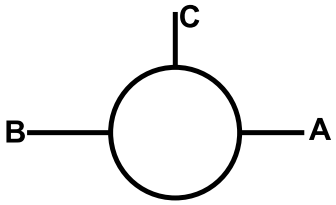
Simplified Roundabout Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Shap Pat Heung Interchange		Ref. No.: J15R
Scheme:	2022 Observed Flow		Ref. No.:
Year:	2022	Job No.: J1358.1	Rev.: -

AM PM

ARM A: Yuen Long Highway WB
ARM B: Yuen Long Highway EB
ARM C: Shap Pat Heung



GEOMETRY

ARM	v	e	L	r	D	Phi	S
A	12.00	12.50	5	25	110	60	0.16
B	8.00	9.00	5	25	110	60	0.32
C	10.00	13.00	4	25	110	60	1.20
D							

AM FLOWS

from \ to	A	B	C	D	Circ	Entry
A					555	1285
B					540	1580
C					965	1670
D						

PM FLOWS

from \ to	A	B	C	D	Circ	Entry
A					800	1705
B					975	1335
C					735	1620
D						

CALCULATIONS

							Q_E		RFC	
ARM	K	X_2	M	F	t_D	f_c	AM	PM	AM	PM
A	0.91	12.38	148.41	3751	1.00	0.73	3029	2866	0.42	0.59
B	0.91	8.61	148.41	2609	1.00	0.57	2082	1856	0.76	0.72
C	0.91	10.88	148.41	3297	1.00	0.67	2401	2541	0.70	0.64

Crtical Arm: **B** **B**
RFC: **0.76** **0.72**
AM **PM**

- In accordance with TPDM V2.4

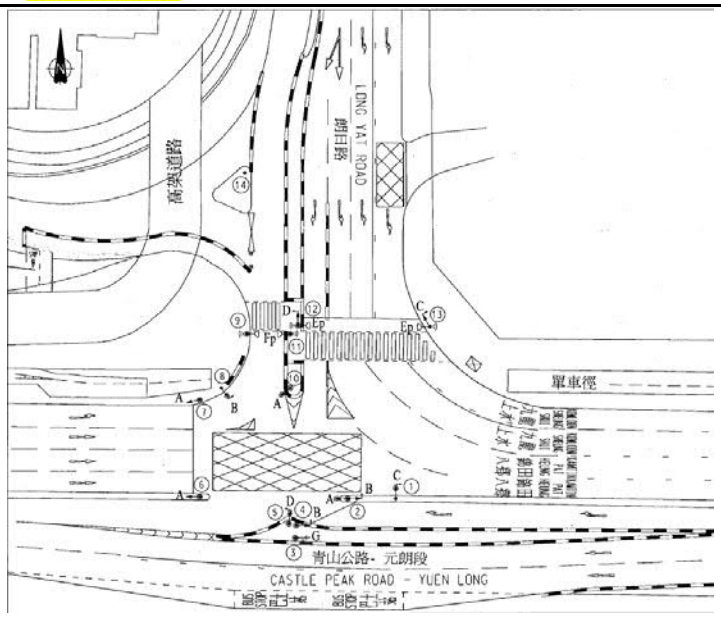
Calculated by:	PY	Date:	Aug-23	Checked by:	TE

:\Job\J1358.1 MSB in Yuen Long\04-Working\04G_Calculations\[J1358.1-2022_Observed_Calculation_1A_20230828.xlsm]J15R

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Castle Peak Road - Yuen Long / Long Yat Road	Ref. No.:	J16S
Scheme:	2022 Observed Flow	Ref. No.:	J47151



Year:	2022	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

AM
(PM)

345(360)
1900(1505)
25(20)
1420(1230)
265(220)
2190(2835)

A	B	C	D	E
5p 1 1	3 2	6p 4 3		

2		3	5		3	4		6									
2		3	5					5									

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1A →	A	3	3.30								6255	1420	0.227	1	1230	0.197	1
1B ↑	A	1	3.50	1		15				100	1785	25	0.014		20	0.011	
2 ←	B	1	3.20				25			100	1960	265	0.135		220	0.112	1
3 ↓	BC	3	4.50	1		20			0.9	100	5425	1900	0.350	1	1505	0.277	
4 ↵	C	1	3.50				30			100	2005	345	0.172		360	0.180	1

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
6p	C		7		5	12				
5p	A		7		17	24				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

Check Critical Phase	1,2,4	1,3		1,2,4	1,3	
Sum of y values, Y	0.534	0.577		0.488	0.474	
Lost time, L	20	13		20	13	
Cycle Time, C	108	108		108	108	
Practical Y, Y_{pr}	0.733	0.792		0.733	0.792	
Reserve Capacity, R.C. (%)	37%	37%		50%	67%	

Calculated by:	Date: Aug-2023	Checked by:

Y:\Job\J1358.1 MSB in Yuen Long\04-Working\04G_Calculations\[J1358.1-2022_Observed_Calculation_1A_20230828.xlsm]J16S

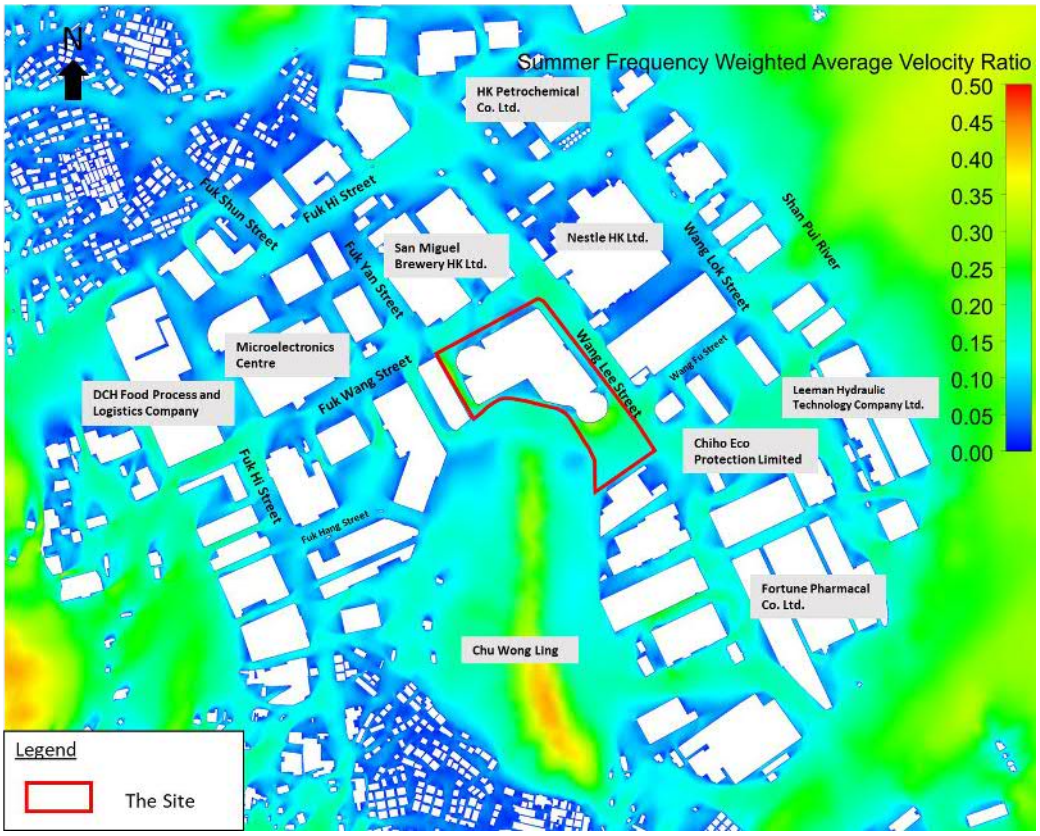
Summary of Further Information for Appendix H – AVA

1. Replacement Page 26: Paragraph 4.4.4
2. Replacement Page 43: Paragraph 4.5.31
3. Replacement Page 51: Paragraph 4.7.5, Paragraph 4.8.1
4. Replacement Page 52: Paragraph 4.8.3 to 4.8.8
5. Additional Page 52A: Figure 4.25
6. Replacement Page 54: Paragraph 5.1.10

prevailing winds from diverse directions to traverse the site. Consequently, the Indicative Development Scheme exhibits better air ventilation compared to the Baseline Scheme.

4.4.4 The summer LVRs and SVRs of the Baseline Scheme are noted to marginally outperform those of the Indicative Development Scheme. However, it is assessed that the Indicative Development Scheme will not engender any significant adverse effects on air ventilation in contrast to the Baseline Scheme. The permeable design of the Indicative Development Scheme will facilitate enhanced wind penetration, ensuring a favourable wind environment during the summer months.

Figure 4.3: Summer Weighted Average VR Contour Plot of Baseline Scheme



SSW Wind Analysis

4.5.28 The SSW wind contributes 8.5% and 17.8% of prevailing wind in the annual and summer condition respectively. The contour plots of VR value for Baseline Scheme and Indicative Development Scheme are shown in **Figure 4.21** and **Figure 4.22** respectively.

4.5.29 The SSW wind is the most prevailing wind during the summer, the wind environment is strong in the assessment area, especially near the Site boundary. The SSW wind mainly enters the assessment area through Fuk Wang Street near DCH Food Process and Logistics Company. The wind is then facilitating across the assessment area via Fuk Hi Street. The SSW wind also provides wind ventilation to southeast of the assessment area, where the wind environment at there is commonly clam in other prevailing wind (i.e. Fortune Pharmacal Co. Limited).

4.5.30 A few zones with high ventilation performance have been identified for both Baseline and Indicative Development Scheme. Under Baseline Scheme, one zone is located at the intersection of Fuk Yan Street and Fuk Wang Street; and another zone is located in the southeast of the Site. The SSW wind continues to flow to the downstream area and provides significant air ventilation at the pedestrian level.

4.5.31 Under Indicative Development Scheme, the location of zones with high ventilation performance are similar, being at the Fuk Yan Street and southeast of the Site. There is also an additional zone in the centre of the Site. The SSW wind would penetrate through the building setback and provide air ventilation at the pedestrian level at Fuk Wang Street. The building setback of Site C facilitates the SSW wind to provide air permeation at pedestrian level for Chiho Eco Protection Limited, Bright Future Pharmaceutical Lab. Limited, and Leeman Hydraulic Technology Company Limited. However, a decrease in VR is evident in the northern section of Wang Lok Street and the downstream wake zone. Due to the Indicative Development Scheme, the wind environment in the vicinity between Nestle HK Ltd. and Bright Future Pharmaceutical Lab. Limited experiences reduced turbulence, which slightly restricts the extent of wind dispersion into these areas. Nevertheless, it is assessed that there would not be significant impact on the wind environment for supporting the pedestrian access within the specified area.

4.5.32 Most locations along Fuk Hi Street and Fuk Yan Street have relatively high VRs, thus having higher ventilation performance. The VR at northeast of the assessment area (i.e. Hong Kong Petrochemical Co. Limited and Nestle Hong Kong Limited) is relatively low but it is sufficient for the limited pedestrian access in the area.

4.5.33 In conclusion, due to different MSB layout for the Baseline Scheme and the Indicative Development Scheme, the corresponding flow pattern and VR distribution along the Site boundary are therefore different. However, zones with relatively high VR are similar for both schemes. The permeability of Indicative Development Scheme will result in higher VR within the Site at the pedestrian level. As the most prevailing wind during the summertime, it is expected that there would not be any adverse air ventilation under both Baseline Scheme and Indicative Development Scheme.

VR for the Ground Level Footpath of Site A and Site B are 0.09 and 0.10, respectively. It appears that the VR for Site A is comparable under both annual and summer wind condition. Therefore, the ventilation performance of Site A at pedestrian level is consistent throughout the year and the ventilation performance of Site B in annual condition is better than summer. In addition, the building setback between Site A and Site B (ID#S26 - S28 in **Figure 3.5**) the VRs of the building gap 0.10, 0.09 and 0.16 under annual condition, and the summer VRs are 0.11, 0.11 and 0.24. The ventilation performance of the building gap under summer condition is slightly better than annual.

4.7.4 On the other hand, the annual VR for the footpath of Site B is larger than the summer VR. The building setback between Site B and Site C (ID# S16 – S18 in **Figure 3.5**) aligns with the annual prevailing wind. The annual VRs of the building gap are 0.24, 0.27 and 0.22, and the summer VRs are 0.18, 0.23 and 0.22, respectively. The building setback between Sites is acting as an effective wind corridor. The setback promotes the incoming wind to penetrate through the Site during the annual period. The results show that the permeability of the Indicative Development Scheme effectively increases the wind availability of the Site.

4.7.5 In conclusion, the VRs for footpath of Site A and Site B is comparable under the annual and the summer condition. The footpath of Site C is benefited by the building setback, which promote wind ventilation especially under annual wind condition.

Table 4.4: Summary of Average Velocity Ratios of Special Test Points under Annual Wind Condition

			Annual VR	
			Indicative Development Scheme	Range
6	Ground Level Footpath of Site A	S01 – S03, S20 – S33	0.09	0.06 – 0.18
7	Ground Level Footpath of Site B	S04 – S09, S19, S34 – S36	0.15	0.07 – 0.21
8	Ground Level Footpath of Site C	S10 – S18, S37 – S39	0.18	0.12 – 0.23

Table 4.5: Summary of Average Velocity Ratios of Special Test Points under Summer Wind Condition

			Summer VR	
			Indicative Development Scheme	Range
6	Ground Level Footpath of Site A	S01 – S03, S20 – S33	0.09	0.06 – 0.12
7	Ground Level Footpath of Site B	S04 – S09, S19, S34 – S36	0.10	0.07 – 0.16
8	Ground Level Footpath of Site C	S10 – S18, S37 – S39	0.17	0.12 – 0.23

4.8 Good Design Features

4.8.1 Good design features in the Proposed Scheme for improving air ventilation performance include, as shown in **Figure 4.25**, with more elaboration given below:

- Building gaps of 16.5m and 26m between Sites A and B, and Sites B and C, respectively.
- Provision of 14m-wide building setback from site boundary along Fuk Wang Street for Site A; 12m and 14m-wide setback from boundaries along Fuk Wang Street and Wang Lee Street, respectively, for Site B; and 10m and 20m-wide setback from boundaries along Wang Lee Street and the adjacent lot, respectively, for Site C.
- Provision of empty bays of about 8m high and about 14m wide on Site A, Site B and Site C ground floor to maximize penetration of various prevailing winds.

4.8.2 The layout plan of the Indicative Development Scheme and model assumption are enclosed in the **Annex A.**

Building Gaps between Sites

4.8.3 Building separation between the three sites is adopted in the Proposed Scheme. The building gap between Sites A and B is 16.5m wide, while that between Sites B and C is 26m wide.

4.8.4 Compared with the Baseline Scheme, which is a single-block design, the building gaps in the Proposed Scheme minimizes the impediment effect of the building under prevailing winds particularly from the north-northeast and southwest directions.

Building Setback

4.8.5 The proposed building setbacks from the site boundaries and the adjoining lot as mentioned above will provide ventilation corridors between proposed buildings and the roads in front.

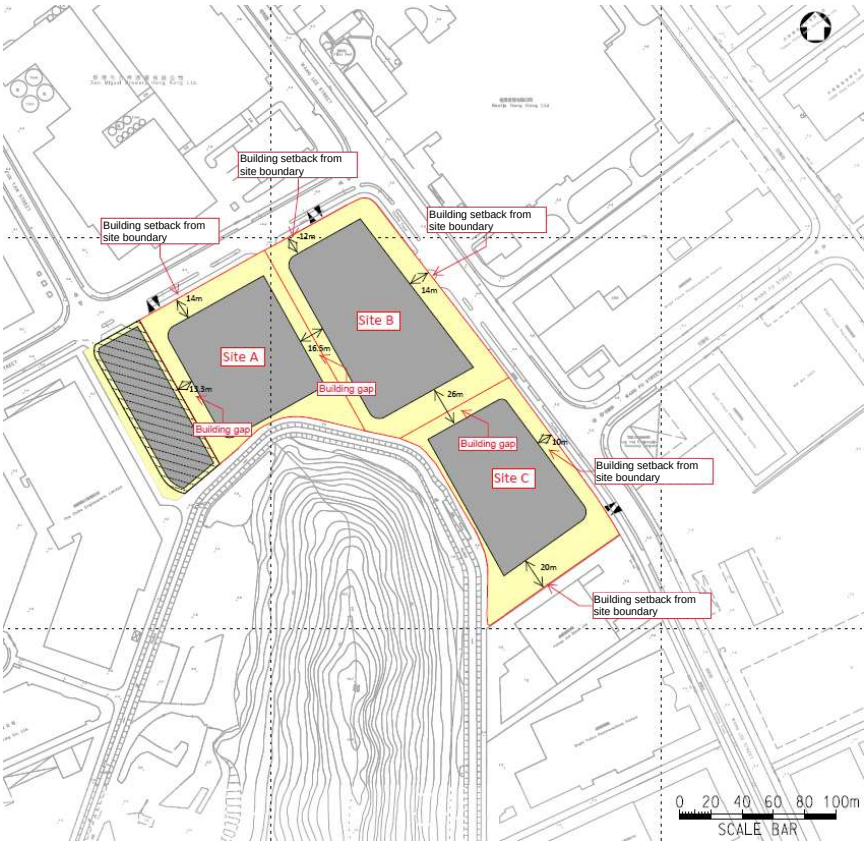
4.8.6 The ventilation corridors will enable air ventilation through the Site and enhance the overall wind permeability. The spacing act as a corridor for the wind to penetration through the Site and provide air flow to the downstream area. The ventilation corridors also align with some of the prevailing wind from annual and summer wind conditions. The southerly wind can penetration via the ventilation corridor between the building block of Site A and Site B and reach Fuk Wan Street. The wind continues to travel the YL INNOPARK area along Fuk Yan Street. On the other hand, the ventilation corridor between the building block of Site B and Site C also align with the prevailing wind from the southerly direction.

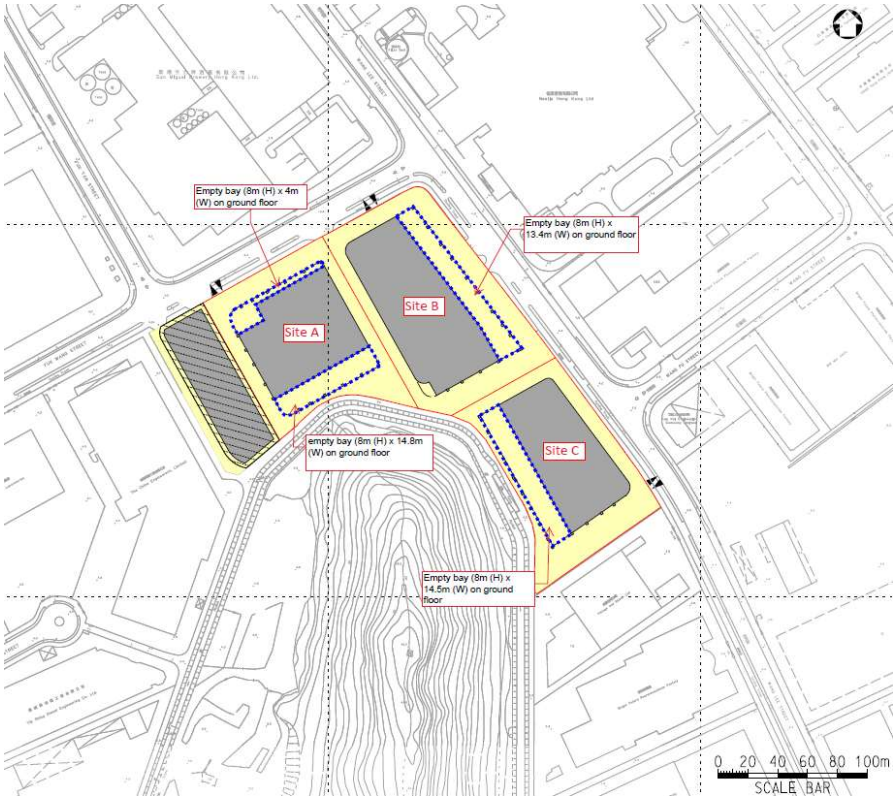
Empty Bays on ground floor of Sites A, Site B and Site C

4.8.7 Empty bays on ground floor are present at the south and northwest of Site A (8m(H) x 14.8m (W), 8m(H) x 4m (W)), the northeast of Site B (8m(H) x 13.4m (W)), and southwest of Site C (8m(H) x 14.5m (W)).

4.8.8 This feature enhances ventilation performance at the northeast of the Proposed Scheme under prevailing wind from the northeast, east-southeast and east-northeast directions under annual condition and improve the ground wind to reach Fuk Wang Street at low elevation. It also facilitates south, southwest ground wind to reach the Site.

Figure 4.25: Layout Plan of Proposed Scheme with indications of good design features





easterly wind. The design features also benefit the wind availability of pedestrian footpath along Fuk Wang Street and Wang Lee Street.

5.1.10 To conclude, the Indicative Development Scheme will not cause significant air ventilation impact on the pedestrian wind environment when compared with the Baseline Scheme, which justifies the proposed development of the Site at a plot ratio of 5.0, resulting in a higher land use efficiency.

MOTT MACDONALD

RECEIVED
- 9 NOV 2023
Town Planning Board

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

Our Reference
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Application for Permission under Section 16 of the Town Planning Ordinance (CAP.131) for the Proposed Minor Relaxation of Maximum Gross Floor Area and Building Height Restriction for Proposed Multi-Storey Buildings Development (Including Permitted Industrial Uses and Public Vehicle Park) in "Other Specified Uses" Annotated "Industrial Estate" Zone, Yuen Long INNOPARK, Yuen Long (Application No. A/YL/312)

09 November 2023

Dear Sirs / Madams,

We refer to the captioned S16 Planning Application scheduled for consideration by the Town Planning Board in its meeting dated 8 December 2023 and our submission of further information on 1 November 2023.

Having reviewed the departmental comments received since 1 November 2023, we enclose our responses to the further departmental comments received.

We enclose herewith further information (**four sets**) for the above application in consideration of the further departmental comments received. Please note that clarification has been added to Table 4.2 of the Planning Statement that floor areas relating to ancillary parking spaces and loading and unloading spaces as required by Transport Department may be disregarded under OZP Notes.

Please note that the further information merely includes correction of typos and clarification/responses to the comments of the Government departments without any substantial revision of the technical assessments. Should you have any queries, please do not hesitate to contact the undersigned at [redacted].

We confirm that we would proceed with the original application (i.e. without the further information) in case the Secretary of the Town Planning Board decides that the further information is not accepted, or such information is accepted but not exempted from the requirements in respect of publication for public comments and recounting of the statutory time limit for consideration of the application.

Yours faithfully,

For MOTT MACDONALD HONG KONG LIMITED

KS LI
Project Manager
[redacted]

Encl.

cc Mr. YEUNG Chin Ho, Daniel (w/e) WDO, CEDD

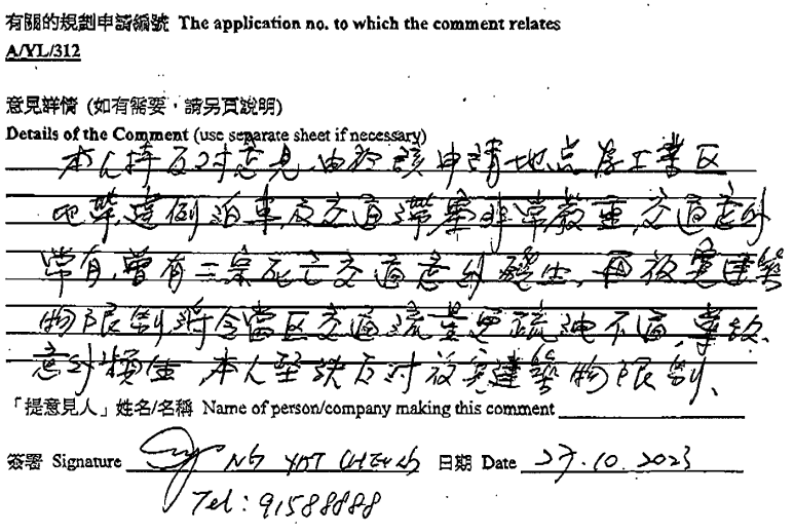
Table of Contents (Responses to Departmental Comments Received Since 1 November 2023)

1. **Innovation and Technology Commission** 2
2. **Building Department** 2
3. **Transport Department** 3
4. **Home Affair Department** 4
5. **Planning Department** 6

Item Reference	Comments	Response
1.	**From Ms. SHEK Wai Man, Emily, Mgr (Capital Works), Capital Works Section, Infrastructure Division, Innovation and Technology Commission** **Dated: 31 October 2023**	
1.1.	We refer to your email below and circulation memo of 13 October 2023 regarding the s.16 planning application for the MSBs in Yuen Long INNOPARK.	N/A
1.2.	The Explanatory Notes of the Outline Zoning Plan stipulate that the maximum total gross floor area (GFA) within the OU(IE) zone is 1,687,625m2 which is equivalent to a plot ratio of 2.5 for industrial development and a plot ratio of 5 for estate centre and developments in the area annotated Area (a) are restricted to a maximum of 8 storeys and developments in the area annotated Area (b), i.e. the estate centre site, are restricted to a maximum of 10 storeys.	N/A
1.3.	We note from Note 1 to Paragraph 2.1.1 of the supporting planning statement that on top of the stated total GFA (i.e. 1,687,625 m2) on the OZP for the whole “OU(IE)” “already been sold to the lessee or sub-lessees of the YLIE” (i.e. HKSTPC), the proposed minor relaxation of maximum GFA restriction is to allow additional GFA for the MSB development. We also note from paragraph 2.4.3 of the statement that the existing estate centre site will be relocated outside the Development Site to an adjacent potential site, however, detailed arrangement is being discussed between the Government and the HKSTPC.	N/A
1.4.	The application should clearly show the proposed location of the relocated estate centre site which is outside the planned location of the estate centre shown in the approved OZP.	The potential location of the estate centre, which detail detailed arrangement is being discussed between the Government and the HKSTPC, had been clearly stated in paragraph 2.4.3.
1.5.	ITC has no comment on the proposed relaxation of the GFA restriction of the “OU(IE)” mentioned in paragraph 3 of PlanD’s memo of 13 October 2023.	Noted.
2.	**From Mr. TAM Wing-chau, Bldg Surveyor/New Territories West 5, New Territories West Section, New Buildings Division 1, Buildings Department** **Dated: 1 November 2023**	
2.1.	1. Based on the limited information in the s.16 application, I have the following comments under the Building Ordinance (BO):	N/A

Item Reference	Comments	Response
2.2.	(i) according to the indicative master layout plan of the proposed scheme, the site is proposed to provide into three sub-sites (i.e. Site A, Site B and Site C). Site A abuts on Fuk Wang Street and Site C abuts on Wang Lee Street. Site B is a corner site that abuts on Fuk Wang Street and Wang Lee Street. The development intensity of Site A, Site B and Site C shall not exceed the permissible figures under the 1st schedule of Building (Planning) Regulations [B(P)R];	Noted. In the formulation of the Indicative Development Scheme, the B(P)R permissible development intensity have been taken into account.
2.3.	(ii) the site shall be provided with means of obtaining access thereto from a street under the B(P)R 5 and emergency vehicular access shall be provided for all the building to be erected on the site in accordance with the requirements under the regulation 41(D) of the B(P)R;	In the formulation of the Indicative Development Scheme, the B(P)R EVA requirements have been taken into account.
2.4.	(iii) justification of the proposed high headroom from G/F to 9/F of the buildings (ranged from 6.5m to 8.0m) should be provided during plan submission stage;	Noted.
2.5.	(iv) carparkng spaces may be excluded from Gross Floor Area calculation under the BO, it will be considered on the basis of the criteria set out in Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers (PNAP) APP-2 during plan submission stage;	Noted.
2.6.	(v) the number parking spaces for vehicles of disabled persons should be provided in according to the requirement set out in division 3 of chapter 4 in Design Manual Barrier Free Access 2008; and	Noted.
2.7.	(vi) if the proposed plot ratio is based on the assumption that GFA concession will be granted, the pre-requisites for GFA concession in PNAP APP-151 and the Sustainable Building Design guideline stipulated in in PNAP APP-152 should be complied with.	Noted. In the formulation of the Indicative Development Scheme, considerations of Sustainable Building Design Guidelines have been taken into account.
2.8.	2. Please be advised that detailed checking of plans will be carried out during building plan submissions stage.	Noted.
3.	**From Ms. Ping LI, Transport Department** **Dated: 1 November 2023**	
3.1.	Please be advised that we have no objection in principle for the subject planning application from traffic perspective subject to the addressing of the below minor comments:	Noted

Item Reference	Comments	Response
3.2.	1. RtoC item 8.2 (textual) Please consider to delete the below sentence in footnote 10 to Para. 5.1.2 of planning statement and Para.5.2.8 in TTIA report. • ~~", which is commonly seen at strategic roads in urban areas~~"	Para 5.1.2 of Planning Statement and Para. 5.2.8 of the TTIA have been revised.
3.3.	2. RtoC item 8.5 (inconsistency) a) The RC ratios for Junction J9 in replacement page of Annex A- 2022 Observed Case (105%/125%) are inconsistent with the RC ratios (75%/95%) in Table 3.3. b) Junction J15 Shap Pat Heung Interchange is deleted from the AOI but the junction analysis for 2022 Observed case is still enclosed in the replacement pages. Please rectify .	The typos in Table 3.3 have been revised. The junction analysis for J15 is to be removed from the set of further information submitted on 1 November 2023.
4.	**From Ms. Iris NGAN, Liaison Offr (R2)1, Liaison (Rural) Section (YLDO), Yuen Long District Office, Home Affairs Department** **Dated: 6 November 2023**	
4.1.	Consultation letters have been sent to relevant Village Representatives. 2 replies were received as attached. 有關的規劃申請編號 The application no. to which the comment relates A/YL/312 意見詳情 (如有需要，請另頁說明) Details of the Comment (use separate sheet if necessary) 本人持反对意見，由於該申請地点為工業区地帶，建例泊車及交通滯塞非常嚴重，交通意外常有，曾有二宗死亡交通意外發生，再放寬建築物限制，將令當区交通流量更疏通不通，事故意外頻生，本人堅決反对放寬建築物限制。 「提意見人」姓名/名稱 Name of person/company making this comment _____ 簽署 Signature [signature] NG YAT CHEUNG 日期 Date 27.10.2023 Tel: 91588888	Traffic & Transport Impact Assessment for the proposed development site has been conducted. It is concluded that the minor relaxation of gross floor area and building height restrictions for the proposed development will not result in insurmountable traffic impact to the key junctions and road links in the Area of Influence with the proposed improvement works by other projects.



Item Reference	Comments	Response
4.2.	**就A/YL/312 申請咨詢** 基於基本法第40條，本人要求新增「新界傳統權益影響評估報告」。有關報告之委員會成員必須包括附近300米的村代表及熟悉新界傳統權益的專家，並就影響(如有的話)提供補償性建議。 建議報告內容基本包括但不限於: 1. 對新界傳統權益行使建屋權的影響 (例如:潛在土地會否可能會適合更改為V-ZONE土地/當地原居民未行使建屋權人口/V-Zone 未建私人及政府土地面積)以及真正足夠建屋的V-Zone 空間位置); 2. 對新界傳統權益行使土葬權或墓穴的影響; 及 3. 對影響所提議的補償方案。 任何法例必須符合香港最高法律基本法，因此<<城市規劃條例>>必須符合基本法第40條的保障。 故 現時欠缺此報告，明顯不足以符合基本法，過程中有違反基本法的可能，故要求新增「新界傳統權益影響報告」的要求，有助令整個過程更符合基本法。 **本建議並非單針對本次申請，建議日後所有與鄉村村界或葬區300米範圍內的申請或政府收地計劃都必須加入新界傳統權益評估」。** 本人保留日後向任何部門及法庭提供本電郵的權利。 如有任何查詢，可致電 6227 9412 與林偉業 村代表 聯絡。 祝 工作順利! 林偉業 元朗屏山鄉橫洲林屋村村代表 中國香港林氏宗親總會秘書長	Noted. This comment will be conveyed to the relevant government departments for consideration.

Item Reference	Comments	Response
5.	**From Ms. Loreen CHUI, Town Plnr/Urban Design 6, Urban Design Unit, Special Duties Division, District Planning Branch, Planning Department** **Dated: 7 November 2023**	
5.1.	Comments from Urban Design and Visual Perspective Having reviewed the FI (1), we have no further comment on the application.	Noted.
5.2.	Comments from air ventilation perspective Supporting Planning Statement 1. Proposed Building setbacks (paragraph 5.4.9, 2nd bullet) – Referring to Figure 4.25 of the AVA IS report, the consultant should report the proposed 13.3m-wide building setback from the south-western site boundary of Site A in text.	Paragraph 5.4.9, 2nd bullet has been revised.
5.3.	2. Paragraph 5.4.9, 3rd bullet – For complete information, the consultant please refer to the correct figure (i.e. Figure 4.25 of AVA IS report) for the exact dimension of the proposed ground floor empty bays.	Paragraph 5.4.9, 3rd bullet has been revised.
5.4.	Appendix H (AVA IS Report) 3. Proposed Building setbacks (paragraph 4.8.1, 2nd bullet) – Referring to Figure 4.25, the consultant should report the proposed 13.3m-wide building setback from the south-western site boundary of Site A in text.	Paragraph 4.8.1, 2nd bullet has been revised.
5.5.	4. Proposed Empty bays (paragraph 4.8.1, 3rd bullet) – For complete information, the consultant please refer to Figure 4.25 for the exact dimension of the proposed ground floor empty bays.	Paragraph 4.8.1, 3rd bullet has been revised.

Table 4.1 Major Development Parameters of the Proposed MSBs

Parameters	MSB in Site A	MSB in Site B	MSB in Site C	Total
Total Site Area	0.98ha	1.25ha	1ha	3.23ha
Max. Plot Ratio	5			
Total GFA (m^2)	49,000	62,500	50,000	161,500
Site Coverage	Not Specified			
Class of Site	Class A	Class B	Class A	
Land Uses	Private vehicle servicing and maintenance and/or logistics uses + Not less than 30% of total GFA for accommodating eligible brownfield operators displaced by the government-led development projects (industrial uses)[4][5]			
Maximum Building Height	Not more than 10 storeys above ground			

Table 4.2 Proposed Floor Uses of MSBs Development in Sites A to C based on the Indicative Scheme

Floor	Proposed Uses
G/F-9/F	Vehicle Servicing and Maintenance and/or Logistics Use + Industrial Use (Brownfield Operation)[6, 6a]
Basement [7]	Vehicle Parking (Site B only)[8]

4.2 Provision of Internal Transport Facilities

4.2.1 The proposed transport facilities provision is in accordance with the requirements under Hong Kong Planning Standards and Guidelines ("HKPSG").

4.2.2 As indicated in **Table 2.1**, the proposed development in Site B will affect 27 public parking spaces for coaches/heavy vehicles; 58 public parking spaces for cars (including 56 nos. of metered-parking spaces and 2 nos. of disabled car parking spaces); and 19 parking slots for motorcycles. It is therefore proposed that the affected parking facilities be mainly reprovisioned and incorporated in the proposed MSBs in Site B except for the cycle parking spaces which will be allocated at the roadside.

[4] The 30% of total GFA would be subject to relevant Government policy on brownfield operations which may be adjusted in the future.
[5] The 30% of total GFA may exclude any structures and partitions, car parking spaces, circulation areas, staircases, staircase halls, lift landings, space occupied by toilet facilities, mechanical and electrical services such as lifts and air-conditioning systems subject to further discussion among Government departments.
[6] Including ancillary parking spaces, loading and unloading bays.
[6a] Ancillary parking spaces, loading and unloading spaces including manoeuvring spaces, queuing spaces and lay-bys as requested by Transport Department; and such floor areas may be disregarded under OZP Notes.
[7] Subject to the detailed design, basement(s) may be constructed within Site A, Site B and Site C to accommodate ancillary parking and loading/unloading spaces and E&M rooms underground .
[8] The vehicle parking at Site B includes public vehicle parking as referred in paragraph 4.2.2 and in Drawing No. MMH/369397/IDS/202A

5. TECHNICAL ASSESSMENT

5.1 Traffic and Transport Impact Assessment (Appendix C refers)

5.1.1 A Traffic and Transport Impact Assessment has been conducted for the Proposed Development[9] to assess the potential traffic impact onto the surrounding road network and the potential impact on the road and public transportation. Traffic count survey was conducted at the concerned junctions / road links located in the vicinity of the Proposed Development in order to establish the traffic flow in the peak periods. Most of the junctions and road links are operated with capacities during the AM and PM peak hours. For the design year 2032, the junctions analysed are expected to operate with capacities during the peak hour for the case with and without the Proposed Development. It is anticipated that the Proposed Development will not result in insurmountable traffic impact to the key junctions and road links in the Area of Influence with the proposed improvement works by other projects. The implementation arrangement of the road improvement works will be further identified with nearby interfacing projects with a view to achieve a holistic design and implementation approach.

5.1.2 The road link assessment results show that the concerned road links in the AOI would be operating within capacity (i.e. V/C ratios below 1.0) except L8 - Yuen Long Highway eastbound which will operate with V/C ratio between 1.0 and 1.1 [10]. However, it should be noted that the contribution of the development traffic from the proposed MSBs to that road link is expected to be insignificant. Furthermore, the Northern Metropolis Highway in the New Territories North proposed under strategic studies on Railways and Major Roads beyond 2030 connecting Tin Shui Wai in the west and Kwu Tung North in the east may also provide convenient traffic connection and alleviate the impact to the local traffic network e.g. Yuen Long Highway, Long Tin Road and Castle Peak Road arising from the proposed development.

5.1.3 For the public transport demand, the assessment shows that additional 6 and 4 departures in the AM peak plus additional 6 and 3 departures in the PM peak would be required for MTR bus route no. K68 and GMB route no. 74, respectively, to meet the increased demand in the YL INNOPARK area.

5.1.4 The affected MTR Bus Route No. K68 terminus in Site B would be reprovisioned at Wang Lee Street; and the affected public parking space would be reprovisioned and incorporated together with ancillary parking and loading/unloading bays in the proposed MSBs development as shown in **Table 4.3**. During the interim period, setting up a temporary bus terminus at Fuk Wang Street is proposed to maintain

[9] Please note that there is about 60% of the GFA allocated to the Yuen Long Industrial Area (now known as Yuen Long Innopark) had yet to be expended. The impact assessments supporting the s16 application would be based on an "existing GFA" scenario (i.e. covering the impact of all existing developments and projects under planning only).

[10] V/C ratio between 1.0 and 1.1 means that the road section would be slightly overloaded, but heavy congestions and long traffic queues are not expected. The road section will experience some delay with reduced traffic speed at peak period.

5.4.6 The assessment results have demonstrated that the general wind environments of both schemes are comparable and similar. The annual LVR for the Baseline Scheme and the Indicative Development Scheme are 0.14 and 0.13 respectively, whilst their LVRs range from 0.10 to 0.15 and 0.10 to 0.14 respectively. In terms of the summer LVR, the Baseline Scheme and the Indicative Development Scheme are 0.13 and 0.12, whilst the respective LVRs both are ranging from 0.10 to 0.15.

5.4.7 The annual SVRs for the Baseline Scheme and the Indicative Development Scheme are 0.18 and 0.16, while the SVRs of the two schemes are ranging from 0.14 to 0.20 and 0.11 to 0.21 respectively. The summer SVRs for Baseline and Indicative Development Scheme are 0.16 and 0.14, respectively, while their SVRs are ranging from 0.14 to 0.16 and 0.14 to 0.20 respectively.

5.4.8 The wind ventilation performance of the Indicative Development Scheme is assessed to be slighter weaker than that of the Baseline Scheme. This is expected because the Indicative Development Scheme, with significantly higher GFA than the Baseline Scheme, would involve three multi-storey building blocks which together would be more massive than the Baseline Scheme.

5.4.9 Good design features in the Indicative Development Scheme for improving air-ventilation performance include:

- Building gaps of 16.5m and 26m between Sites A and B, and Site B and C, respectively.
- Provision of 14m-wide and 13.3m-wide building setbacks from the site boundary along Fuk Wang Street and the south-western site boundary of Site A, respectively; 12m and 14m-wide setback from boundaries along Fuk Wang Street and Wang Lee Street, respectively, for Site B; and 10m and 20m-wide setback from boundaries along Wang Lee Street and the adjacent lot, respectively, for Site C.
- Empty bays on ground floor at the southeast and northwest of Site A (8m(H) x 14.8m (W), 8m(H) x 4m (W)), the northeast of Site B (8m(H) x 13.4m (W)), and southwest of Site C (8m(H) x 14.5m (W)).

5.4.10 From detailed examination of the wind availability from different directions, it is assessed that the adopted design feature of the Indicative Development Scheme will enhance the wind ventilation. This is evident from the better ventilation of the Indicative Development Scheme than the Baseline Scheme under the NNE prevailing wind and the easterly wind. The design features also benefit the wind availability of pedestrian footpath along Fuk Wang Street and Wang Lee Street.

5.4.11 To conclude, the Indicative Development Scheme will not cause significant air ventilation impact on the pedestrian wind environment when compared with the Baseline Scheme, which justifies the proposed development of the Site at a plot ratio of 5.0, resulting in a higher land use efficiency.

5.5 Visual Impact Assessment (Appendix B refers)

5.5.1 The Proposed Development comprised of three building blocks with a maximum building height of 10 storeys above ground at a maximum height level of +71.5mPD. It will transform the surrounding area from being an open albeit disturbed landscape currently occupied with various temporary and public transport uses.

3.4 Base Year Junction and Link Performance

3.4.1 The existing junction capacity for the critical junctions during the AM and PM peak hour periods have been assessed and the results of the junction performance are summarised in **Table 3.3**. The existing junction layouts are enclosed in **Annex B**.

Table 3.3: Summary of 2022 Junction Performance

No.	Junction	Junction Type	2022 RC/DFC/VC	
			AM	PM
J1	Wang Lee St / Fuk Wang St	Priority	0.19	0.14
J2	Fuk Yan St / Fuk Wang St	Priority	0.08	0.06
J3	Fuk Wang St / Fuk Hi St	Priority	0.24	0.14
J4	Fuk Hi St / Long Ping Rd	Signal	50%	54%
J5	Long Ping Rd / Fung Chi Rd	Signal	79%	92%
J6	Shui Pin Wai Interchange	Signal	53%	48%
J7	Wang Lok St / Wang Tat Rd / Ma Wang Rd / Long Yip St / Yuen Long On Lok Rd	Signal	43%	42%
J8	Fuk Hi St / Wang Lok St	Signal	55%	52%
J9	Wang Lok St / Fu Yip St	Signal	105%	125%
J10	Wang Lee St / Wang Lok St	Priority	0.30	0.29
J11	Long Yip St / Yuen Long On Lok Rd / Po Yip St	Signal	22%	32%
J12	Castle Peak Road – Yuen Long/Long Yip Street/Yuen Long On Lok Road/Long Yat Road	Signal	18%	32%
J13	Pok Oi Interchange	Roundabout	0.84	0.76
J14	Tong Yan San Tsuen Interchange[7]	Priority	1.22	1.42
J16	Castle Peak Road - Yuen Long / Long Yat Road	Signal	37%	50%

Note: DFC – Design Flow to Capacity for priority junction and roundabout. DFC of 0.85 indicates that the junction is operating satisfactorily while DFC over 1.0 indicates the junction is overloaded.
RC – Reserve Capacity for signalised junction. A signal-controlled junction with a RC of 15% implies that it is operating satisfactorily while a negative RC implies it is overloaded.

3.4.2 The results of junction capacity analysis show that the concerned junctions are operating satisfactorily except J14 – Tong Yan San Tsuen Interchange during both AM and PM peak hours and with no capacity problems. The junction capacity calculation sheets are enclosed in **Annex A**.

3.4.3 The existing road link capacity analysis for the concerned links is summarised in **Table 3.4**.

[7] J14 at Tong Yan San Tsuen will be modified by Yuen Long South Development into free flow slip roads in the design year, hence it will not be calculated in 2032 Reference and Design case.

Table 5.8: 2032 Design Road Link Performance (with the Proposed MSBs)

No.	Bound	2032 Design (with Proposed MSBs)			
		Flow (pcu/hr)		VC	
		AM	PM	AM	PM
L1	SB	886[919]	771[754]	0.71[0.74]	0.62[0.60]
	NB	925[944]	911[915]	0.74[0.76]	0.73[0.73]
L2	SB	545[579]	539[529]	0.19[0.21]	0.19[0.19]
	NB	595[615]	430[440]	0.21[0.22]	0.15[0.16]
L3	SB	1,201[1,234]	1,061[1,044]	0.43[0.44]	0.38[0.37]
	NB	1,120[1,139]	1,116[1,120]	0.40[0.41]	0.40[0.40]
L4	SB	1,091[1,124]	1,111[1,106]	0.39[0.40]	0.40[0.40]
	NB	1,195[1,214]	1,286[1,302]	0.43[0.43]	0.46[0.47]
L5	SB	4,021[4,054]	3,576[3,571]	0.71[0.71]	0.63[0.63]
	NB	3,885[3,904]	4,166[4,182]	0.68[0.68]	0.73[0.73]
L6	EB	1,451[1,478]	1,523[1,519]	0.48[0.48]	0.50[0.50]
	WB	1,315[1,331]	1,411[1,406]	0.27[0.27]	0.29[0.29]
L7	EB	3,636[3,663]	3,338[3,334]	0.64[0.64]	0.59[0.58]
	WB	2,919[2,935]	3,496[3,508]	0.51[0.51]	0.61[0.62]
L8	EB	6,290[6,290]	5,285[5,285]	1.03[1.03]	0.87[0.87]
	WB	5,860[5,860]	5,665[5,665]	0.96[0.96]	0.93[0.93]
L9	-	1,715[1,715]	1,180[1,180]	0.95[0.95]	0.66[0.66]
L10	-	1,706[1,739]	1,806[1,801]	0.47[0.48]	0.50[0.50]
L11	-	1,505[1,524]	1,781[1,797]	0.42[0.42]	0.49[0.50]
L12	-	1,620[1,620]	1,655[1,655]	0.90[0.90]	0.92[0.92]

Remark: link performance for logistics as major land use is shown in brackets in the above table

5.2.8 The road link assessment results show that the concerned road links in the AOI would be operating within capacity (i.e. V/C ratios below 1.0) except L8 - Yuen Long Highway eastbound which will operate with V/C ratio between 1.0 and 1.1[10]. However, it should be noted that the contribution of the development traffic from the proposed MSBs to that road link is expected to be insignificant. Furthermore, the Northern Metropolis Highway in the New Territories North proposed under strategic studies on Railways and Major Roads beyond 2030 connecting Tin Shui Wai in the west and Kwu Tung North in the east may also provide convenient traffic connection and alleviate the impact to the local traffic network e.g. Yuen Long Highway, Long Tin Road and Castle Peak Road arising from the proposed development.

[10] V/C ratio between 1.0 and 1.1 means that the road section would be slightly overloaded, but heavy congestions and long traffic queues are not expected. The road section will experience some delay with reduced traffic speed at peak period.

VR for the Ground Level Footpath of Site A and Site B are 0.09 and 0.10, respectively. It appears that the VR for Site A is comparable under both annual and summer wind condition. Therefore, the ventilation performance of Site A at pedestrian level is consistent throughout the year and the ventilation performance of Site B in annual condition is better than summer. In addition, the building setback between Site A and Site B (ID#S26 - S28 in **Figure 3.5**) the VRs of the building gap 0.10, 0.09 and 0.16 under annual condition, and the summer VRs are 0.11, 0.11 and 0.24. The ventilation performance of the building gap under summer condition is slightly better than annual.

4.7.4 On the other hand, the annual VR for the footpath of Site B is larger than the summer VR. The building setback between Site B and Site C (ID# S16 – S18 in **Figure 3.5**) aligns with the annual prevailing wind. The annual VRs of the building gap are 0.24, 0.27 and 0.22, and the summer VRs are 0.18, 0.23 and 0.22, respectively. The building setback between Sites is acting as an effective wind corridor. The setback promotes the incoming wind to penetrate through the Site during the annual period. The results show that the permeability of the Indicative Development Scheme effectively increases the wind availability of the Site.

4.7.5 In conclusion, the VRs for footpath of Site A and Site B is comparable under the annual and the summer condition. The footpath of Site C is benefited by the building setback, which promote wind ventilation especially under annual wind condition.

Table 4.4: Summary of Average Velocity Ratios of Special Test Points under Annual Wind Condition

			Annual VR	
			Indicative Development Scheme	Range
6	Ground Level Footpath of Site A	S01 – S03, S20 – S33	0.09	0.06 – 0.18
7	Ground Level Footpath of Site B	S04 – S09, S19, S34 – S36	0.15	0.07 – 0.21
8	Ground Level Footpath of Site C	S10 – S18, S37 – S39	0.18	0.12 – 0.23

Table 4.5: Summary of Average Velocity Ratios of Special Test Points under Summer Wind Condition

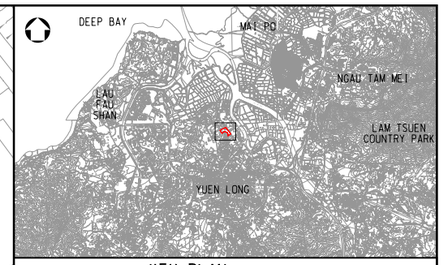
			Summer VR	
			Indicative Development Scheme	Range
6	Ground Level Footpath of Site A	S01 – S03, S20 – S33	0.09	0.06 – 0.12
7	Ground Level Footpath of Site B	S04 – S09, S19, S34 – S36	0.10	0.07 – 0.16
8	Ground Level Footpath of Site C	S10 – S18, S37 – S39	0.17	0.12 – 0.23

4.8 Good Design Features

4.8.1 Good design features in the Proposed Scheme for improving air- ventilation performance include, as shown in **Figure 4.25**, with more elaboration given below:

- Building gaps of 16.5m and 26m between Sites A and B, and Site B and C, respectively.
- Provision of 14m and 13.3m-wide building setback from the site boundary along Fuk Wang Street and the south-western site boundary of Site A, respectively; 12m and 14m-wide setback from boundaries along Fuk Wang Street and Wang Lee Street, respectively, for Site B; and 10m and 20m-wide setback from boundaries along Wang Lee Street and the adjacent lot, respectively, for Site C.
- Empty bays on ground floor at the southeast and northwest of Site A (8m(H) x 14.8m(W), 8m(H) x 4m (W)), the northeast of Site B (8m(H) x 13.4m (W)), and southwest of Site C (8m(H) x 14.5m (W)).

820500 E
820750 E
821000 E
835750 N
835500 N
Fuk Wang Street
Wang Lee Street
WANG LEE STREET
FUK YAN STREET
FUK WANG STREET
WANG FU STREET
FUK HANG STREET
香港生力啤酒廠有限公司
San Miguel Brewery Hong Kong Ltd.
雀巢香港有限公司
Nestle Hong Kong Ltd
Site A
Site B
Site C
GREEN ROOF
DRIVEWAY
0 10 20 30 40 50m
1 : 1 000 SCALE BAR



KEY PLAN (1:100000)

LEGEND:

- SITE BOUNDARY
- RETAINED TREE
- GREENING
- GREEN ROOF
- INDICATIVE LOCATION OF ROAD-SIDE TERMINUS, FOOTPATH AND CYCLE TRACK SUBJECT TO DETAILED DESIGN BY FUTURE PROJECT PROPONENT

Note:
1. The affected cycle track will be realigned at the ingress/egress points of the proposed development, together with updating of road marking and traffic signs at those locations.) Providing not less than 6m-wide building setback along the site boundaries fronting Wang Lee Street.

2. Providing not less than 6m-wide building setback along the site boundaries fronting Wang Lee Street and Fuk Wang Street

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	JUL 2023	AL	SECOND ISSUE	KS	SHC
P1	NOV 2022	AL	FIRST ISSUE	KS	SHC

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CEDD
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING AT NO. 32 WANG LEE STREET AND ADJOINING GOVERNMENT LAND, YUEN LONG

Title

INDICATIVE MASTER LAYOUT PLAN - PROPOSED SCHEME

Designed	PK		Eng check	JC	
Drawn	MING		Coordination	JC	
Dwg check	PK		Approved	EC	
Scale at A1	1:1000	Status	PRE	Rev	P2

Drawing Number
MMH/369397/IDS/101

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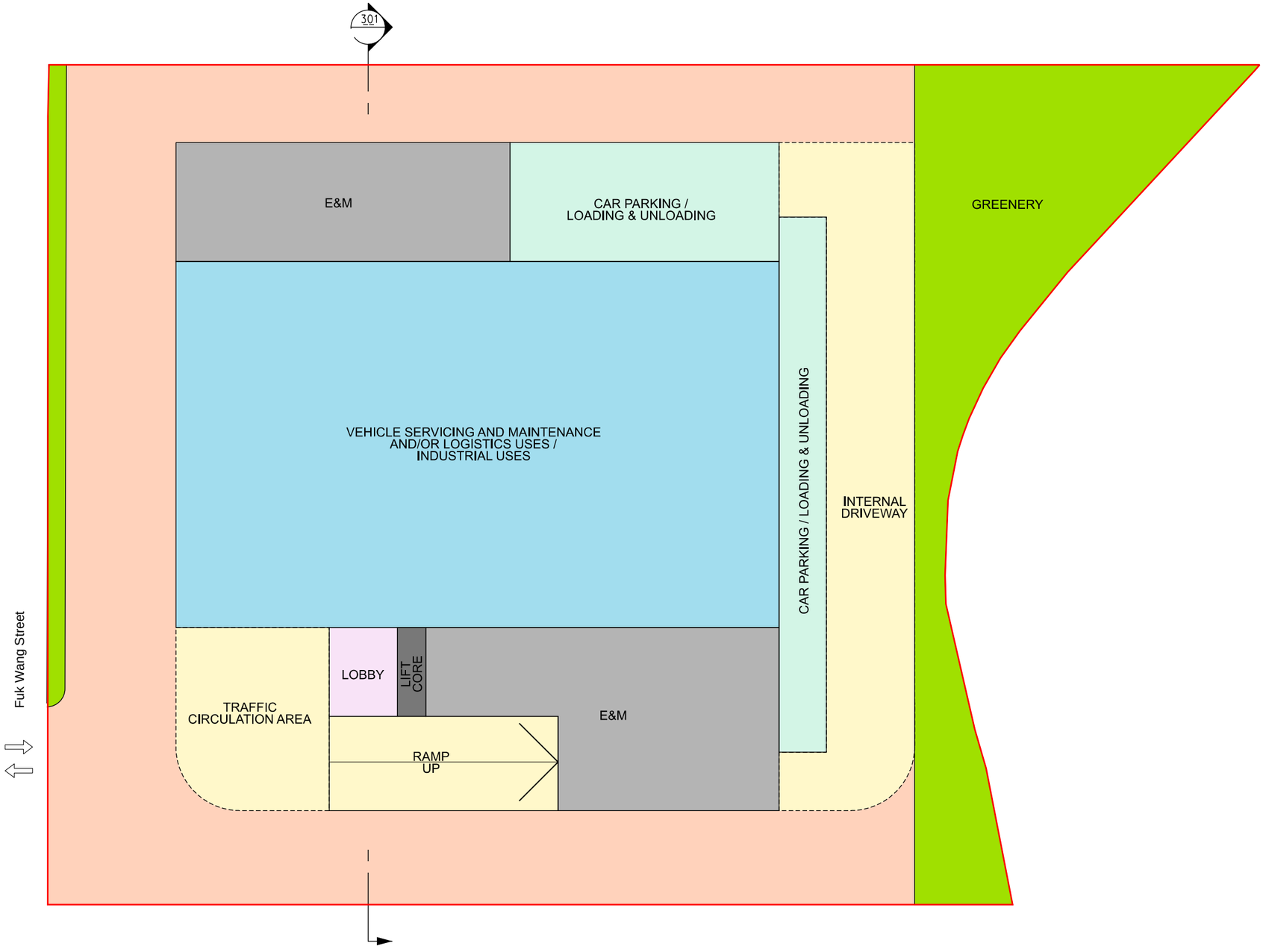

LEGEND:

- SITE BOUNDARY
- PROJECTION LINE OF UPPER FLOOR
- LIFT CORE
- E&M
- CAR PARKING/ LOADING & UNLOADING
- LOBBY
- INTERNAL DRIVEWAY/ RAMP
- DRIVEWAY
- VEHICLE SERVICING AND MAINTENANCE AND/OR LOGISTICS USES / INDUSTRIAL USES
- GREENERY

Note:
Providing not less than 6m-wide building setback along the site boundaries fronting Fuk Wang Street

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P1	JUL 2023	AL	FIRST ISSUE	KS	SHC

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CEDD
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION
FOR MULTI-STOREY BUILDING AT NO. 32 WANG LEE STREET AND ADJOINING GOVERNMENT LAND, YUEN LONG

Title

INDICATIVE GROUND FLOOR PLAN FOR SITE A

Designed	VARIOUS		Eng check	KS	
Drawn	AL		Coordination	KS	
Dwg check	KS		Approved	SHC	
Scale at A1	1:250	Status	PRE	Rev	P1

Drawing Number

MMH/369397/IDS/201A

0 6.25 12.5m
1 : 250 SCALE BAR

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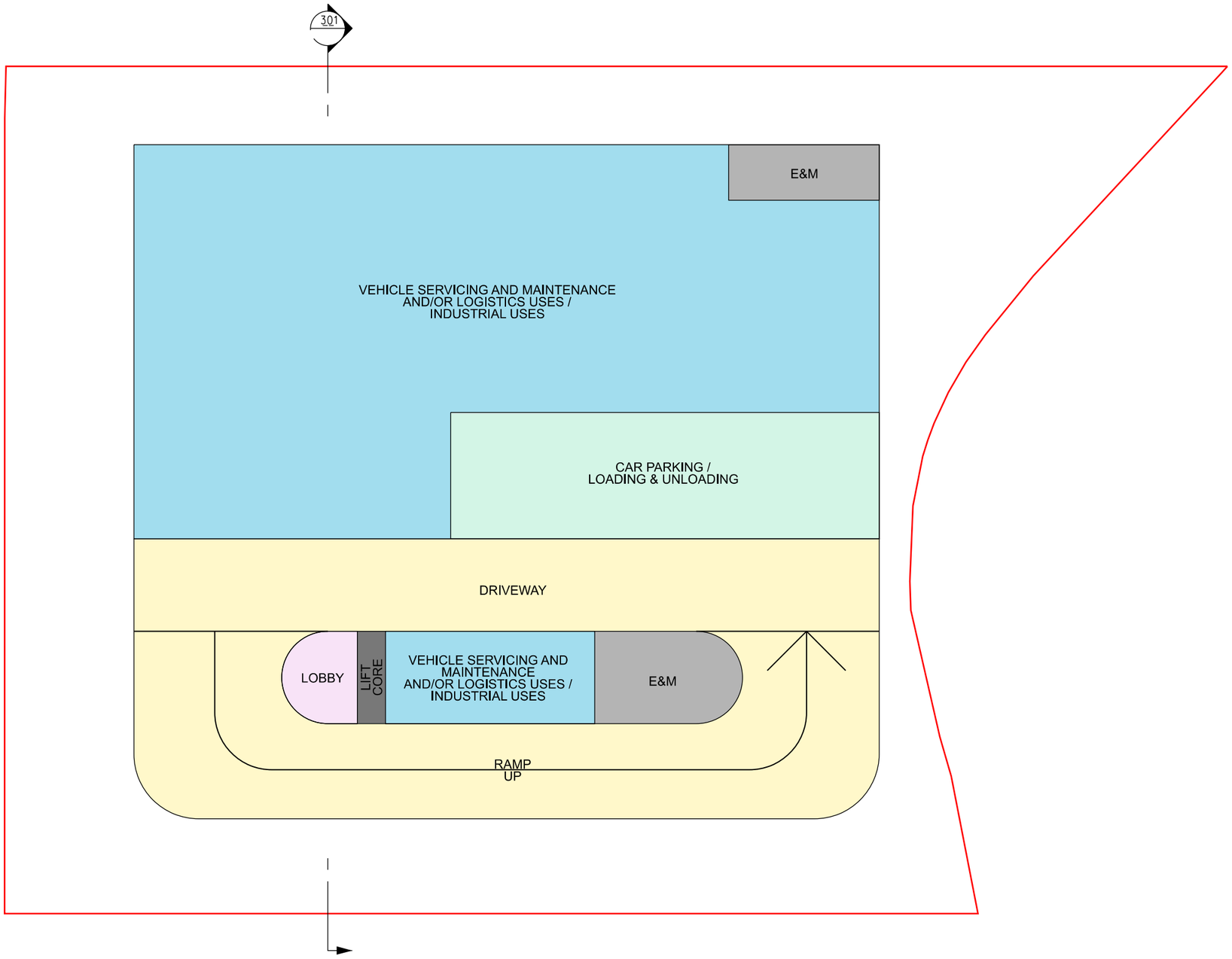

LEGEND:

- SITE BOUNDARY
- LIFT CORE
- E&M
- CAR PARKING/ LOADING & UNLOADING
- LOBBY
- INTERNAL DRIVEWAY/ RAMP
- VEHICLE SERVICING AND MAINTENANCE AND/OR LOGISTICS USES / INDUSTRIAL USES

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	JUL 2023	AL	FIRST ISSUE	KS	SHC

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SECTION 16 PLANNING APPLICATION
FOR MULTI-STOREY BUILDING AT NO. 32
WANG LEE STREET AND ADJOINING
GOVERNMENT LAND, YUEN LONG

Title

INDICATIVE TYPICAL FLOOR PLAN FOR SITE A (1/F - 9/F)

Designed	AL		Eng check	KS	
Drawn	AL		Coordination	KS	
Dwg check	KS		Approved	SHC	

Scale at A1	Status	Rev
1:250	PRE	P1

Drawing Number

MMH/369397/IDS/201B

0 6.25 12.5m
1 : 250 SCALE BAR

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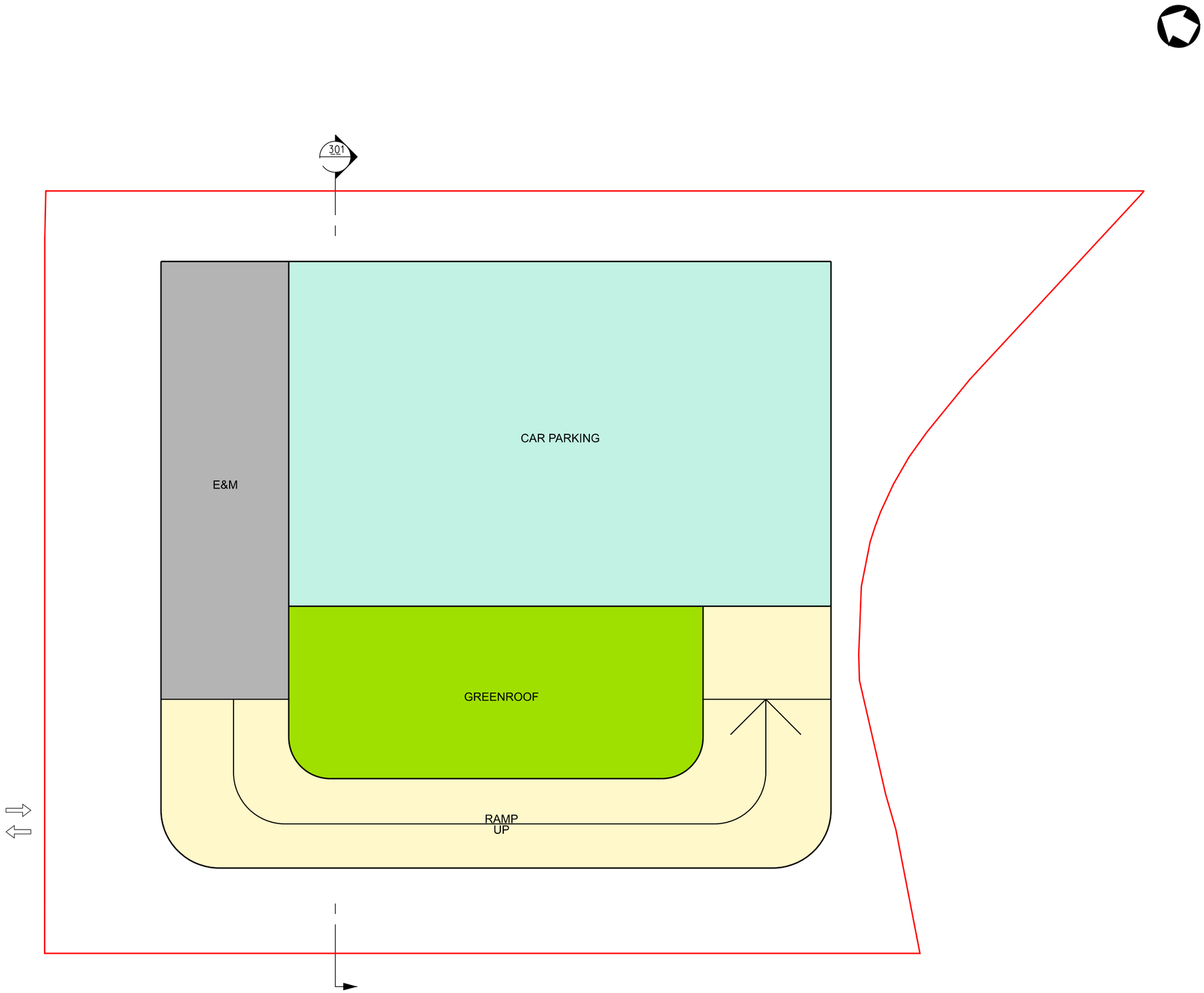

LEGEND:

- SITE BOUNDARY
- E&M
- CAR PARKING
- INTERNAL DRIVEWAY / RAMP
- GREEN ROOF

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	JUL 2023	AL	FIRST ISSUE	KS	SHC

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SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING AT NO. 32 WANG LEE STREET AND ADJOINING GOVERNMENT LAND, YUEN LONG

Title

INDICATIVE ROOF FLOOR PLAN FOR SITE A

Designed	VARIOUS		Eng check	KS	
Drawn	AL		Coordination	KS	
Dwg check	KS		Approved	SHC	

Scale at A1	Status	Rev
1:250	PRE	P1

Drawing Number

MMH/369397/IDS/201C

0 6.25 12.5m
1 : 250 SCALE BAR

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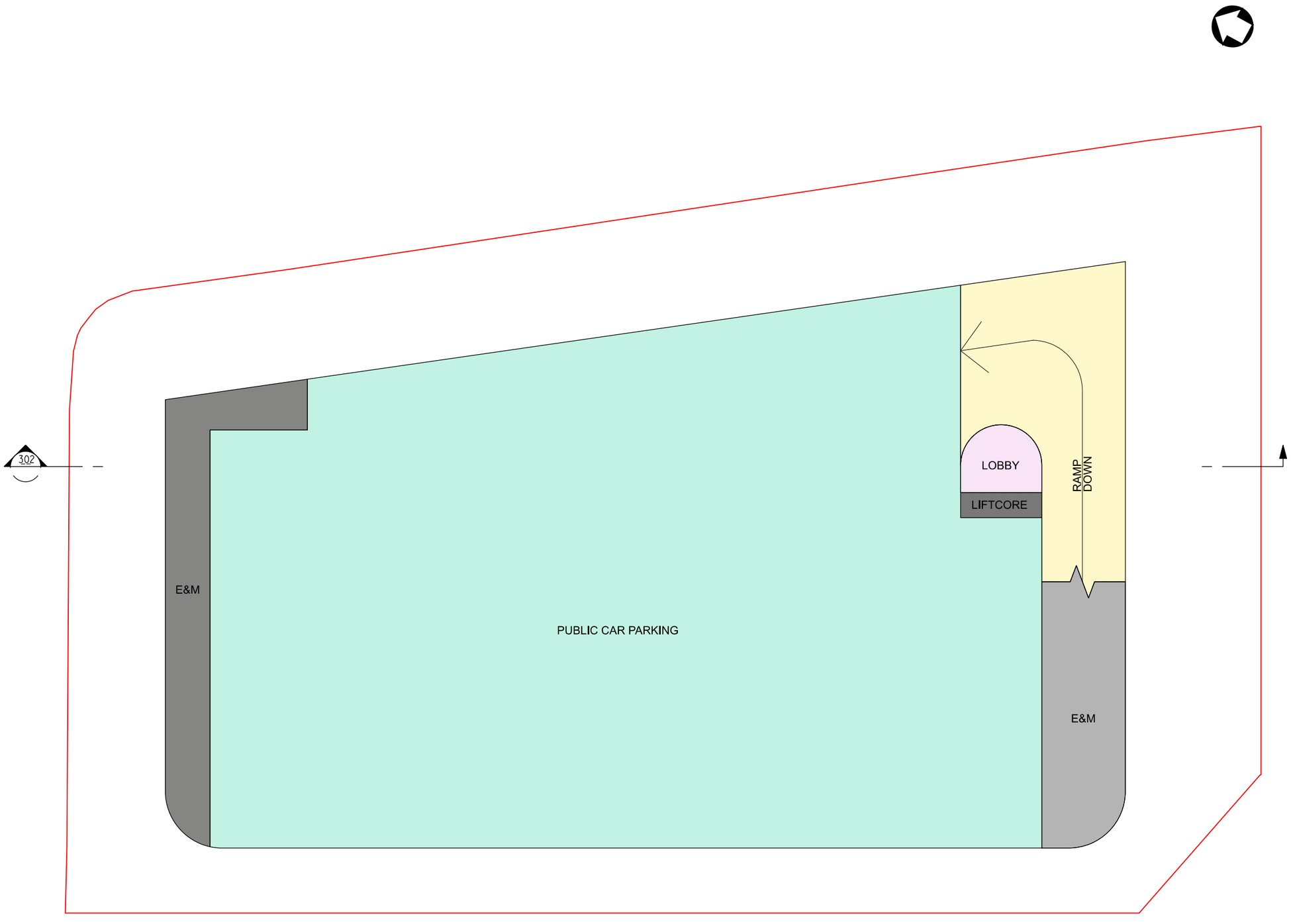

LEGEND:

- SITE BOUNDARY
- LIFT CORE
- E&M
- PUBLIC CAR PARKING
- LOBBY
- INTERNAL DRIVEWAY/ RAMP

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	JUL 2023	AL	FIRST ISSUE	KS	SHC

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SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING AT NO. 32 WANG LEE STREET AND ADJOINING GOVERNMENT LAND, YUEN LONG

Title

INDICATIVE BASEMENT FLOOR PLAN FOR SITE B

Designed	AL		Eng check	KS	
Drawn	AL		Coordination	KS	
Dwg check	KS		Approved	EC	

Scale at A1	Status	Rev
1:250	PRE	P1

Drawing Number

MMH/369397/IDS/202A

0 6.25 12.5m
1 : 250 SCALE BAR

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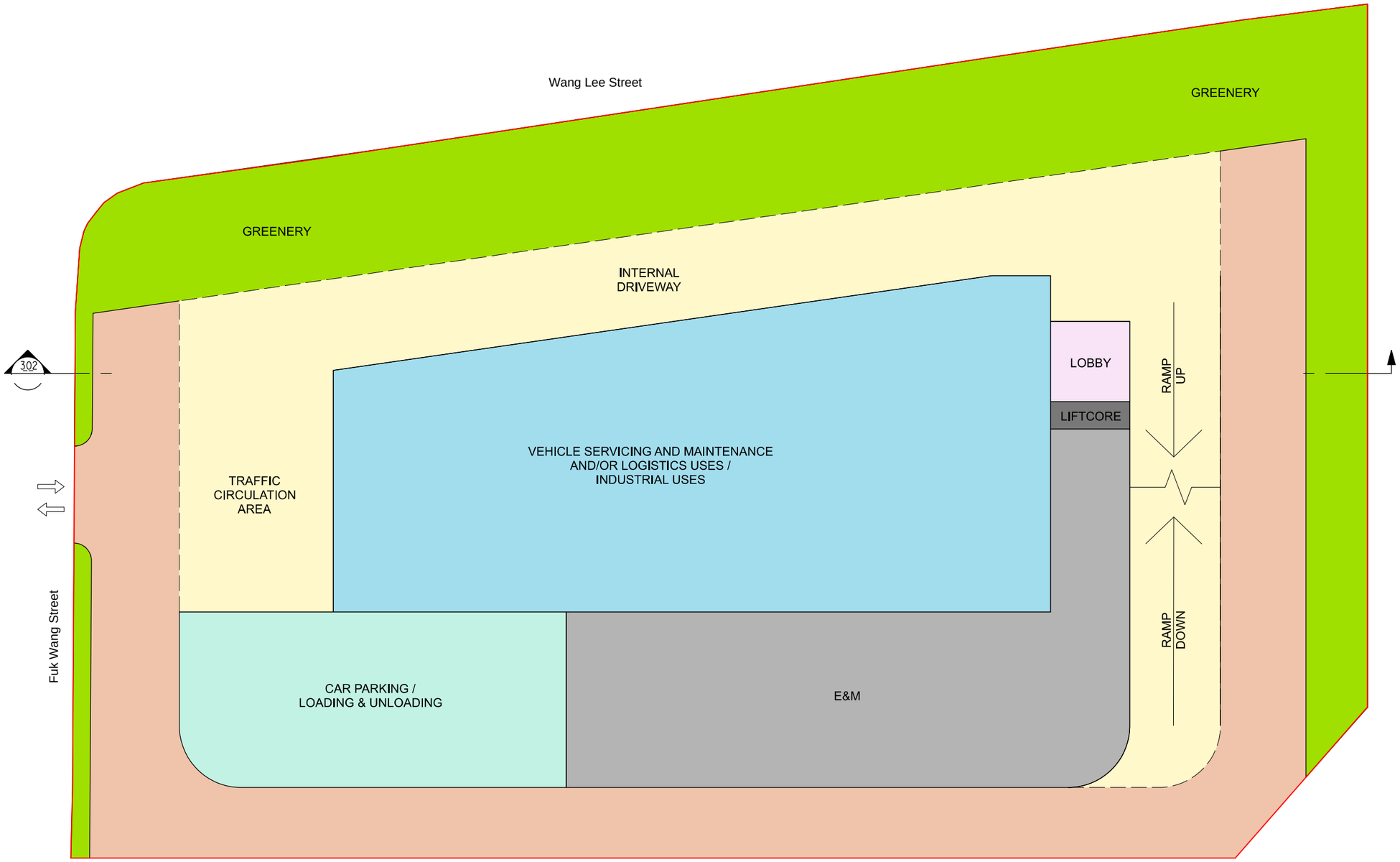

LEGEND:

- SITE BOUNDARY
- PROJECTION LINE OF UPPER FLOOR
- LIFT CORE
- E&M
- CAR PARKING/ LOADING & UNLOADING
- LOBBY
- INTERNAL DRIVEWAY/ RAMP
- DRIVEWAY
- VEHICLE SERVICING AND MAINTENANCE AND/OR LOGISTICS USES / INDUSTRIAL USES
- GREENERY
- FOOT PATH

Note:
Providing not less than 6m-wide building setback along the site boundaries fronting Wang Lee Street and Fuk Wang Street

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Title

INDICATIVE GROUND FLOOR PLAN FOR SITE B

Designed	AL		Eng check	KS	
Drawn	AL		Coordination	KS	
Dwg check	KS		Approved	EC	

Scale at A1	Status	Rev
1:250	PRE	P1

Drawing Number
MMH/369397/IDS/202B

0 6.25 12.5m
1 : 250 SCALE BAR

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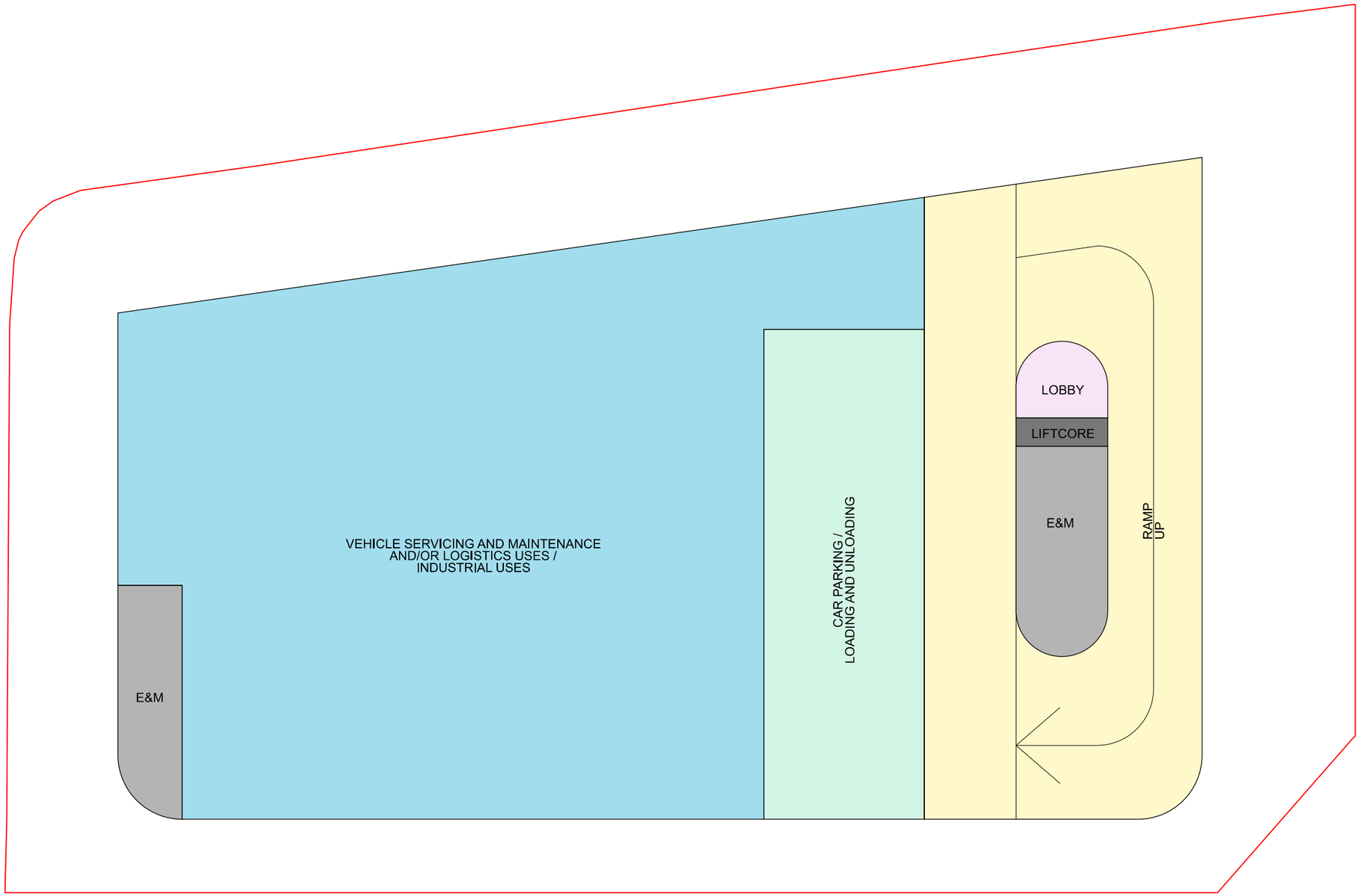

LEGEND:

- SITE BOUNDARY
- LIFT CORE
- E&M
- CAR PARKING/ LOADING & UNLOADING
- LOBBY
- INTERNAL DRIVEWAY/ RAMP
- VEHICLE SERVICING AND MAINTENANCE AND/OR LOGISTICS USES / INDUSTRIAL USES

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	FEB 2023	AL	FIRST ISSUE	KS	SHC

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Title

INDICATIVE FLOOR PLAN FOR SITE B (1/F - 9/F)

Designed	AL		Eng check	KS	
Drawn	AL		Coordination	KS	
Dwg check	KS		Approved	EC	
Scale at A1	1:250	Status	PRE	Rev	P1

Drawing Number

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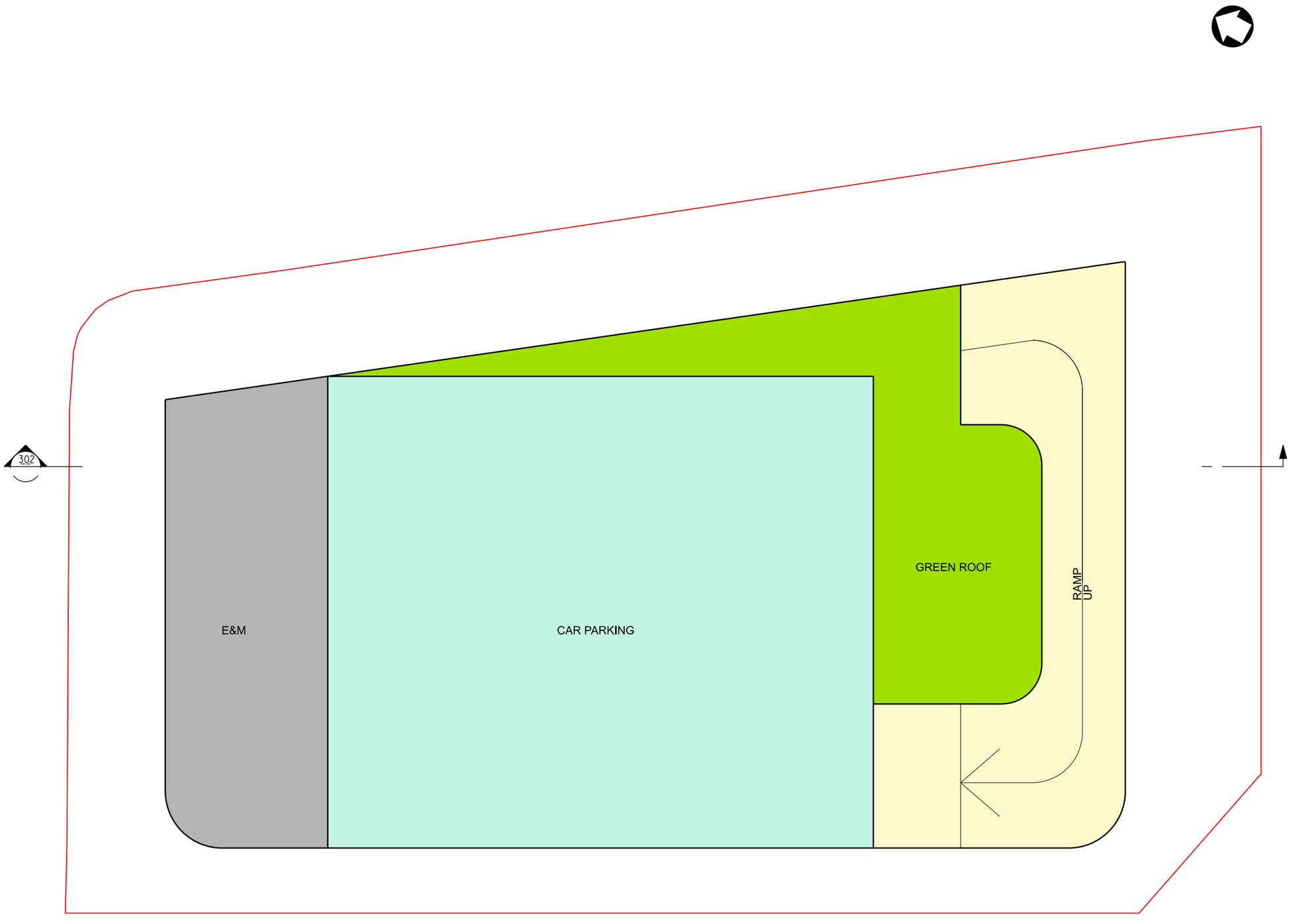
0 6.25 12.5m
1 : 250 SCALE BAR



LEGEND:

- SITE BOUNDARY
- E&M
- CAR PARKING
- INTERNAL DRIVEWAY / RAMP
- GREEN ROOF

Rev	Date	Drawn	Description	Ch'k'd	App'd
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SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING AT NO. 32 WANG LEE STREET AND ADJOINING GOVERNMENT LAND, YUEN LONG

Title

INDICATIVE ROOF FLOOR PLAN FOR SITE B

Designed	AL		Eng check	KS	
Drawn	AL		Coordination	KS	
Dwg check	KS		Approved	EC	

Scale at A1	Status	Rev
1:250	PRE	P1

Drawing Number

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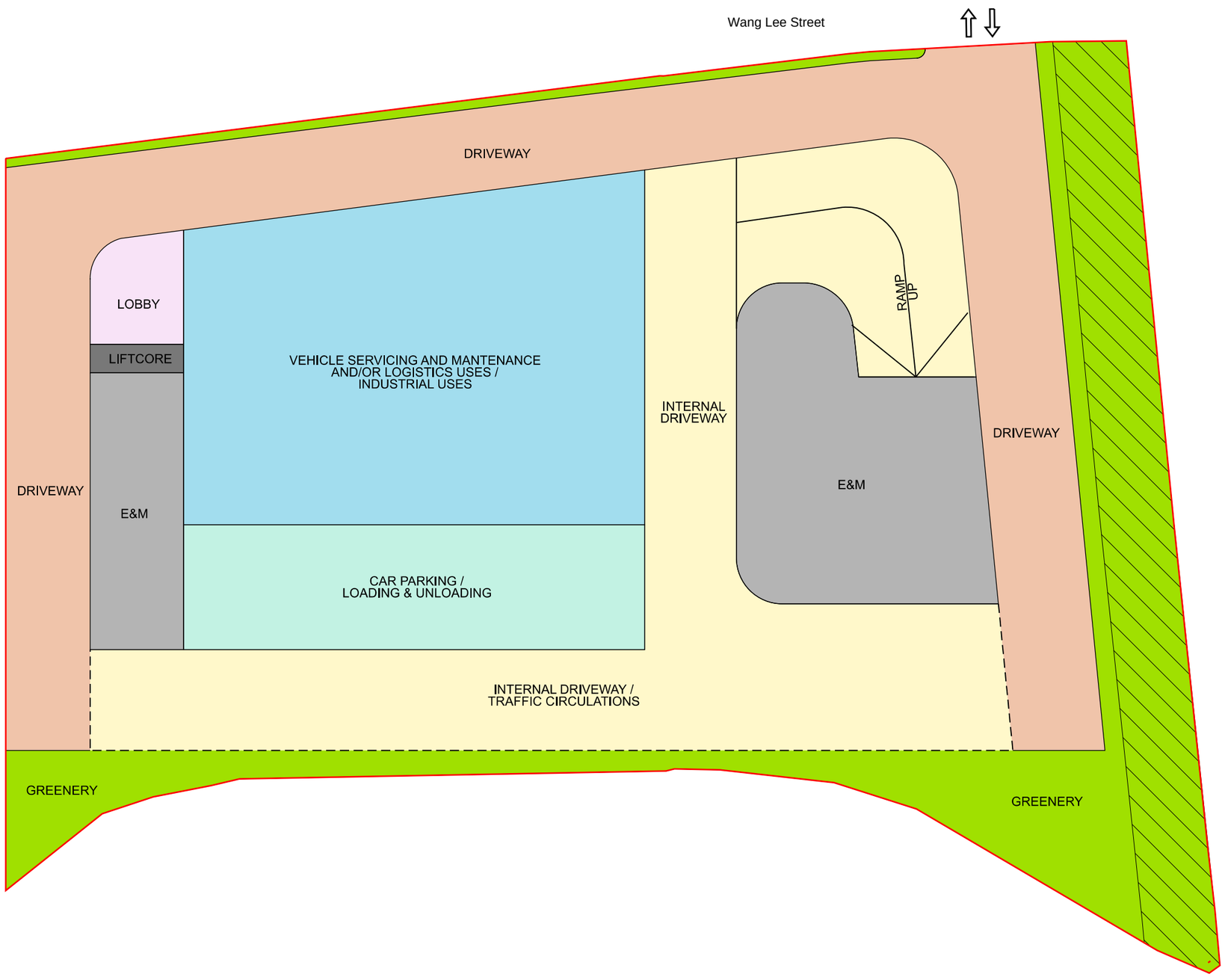

LEGEND:

- SITE BOUNDARY
- PROJECTION LINE OF UPPER FLOOR
- LIFT CORE
- E&M
- CAR PARKING/ LOADING & UNLOADING
- LOBBY
- INTERNAL DRIVEWAY/ RAMP
- DRIVEWAY
- VEHICLE SERVICING AND MAINTENANCE AND/OR LOGISTICS USES / INDUSTRIAL USES
- GREENERY
- DRAINAGE RESERVE

Note:
Providing not less than 6m-wide building setback along the site boundaries fronting Wang Lee Street.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	JUL 2023	AL	FIRST ISSUE	KS	SHC

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SECTION 16 PLANNING APPLICATION
FOR MULTI-STOREY BUILDING AT NO. 32 WANG LEE STREET AND ADJOINING GOVERNMENT LAND, YUEN LONG

Title

INDICATIVE GROUND FLOOR PLAN FOR SITE C

Designed	AL		Eng check	KS	
Drawn	AL		Coordination	KS	
Dwg check	KS		Approved	SHC	

Scale at A1	Status	Rev
1:250	PRE	P1

Drawing Number

MMH/369397/IDS/203A

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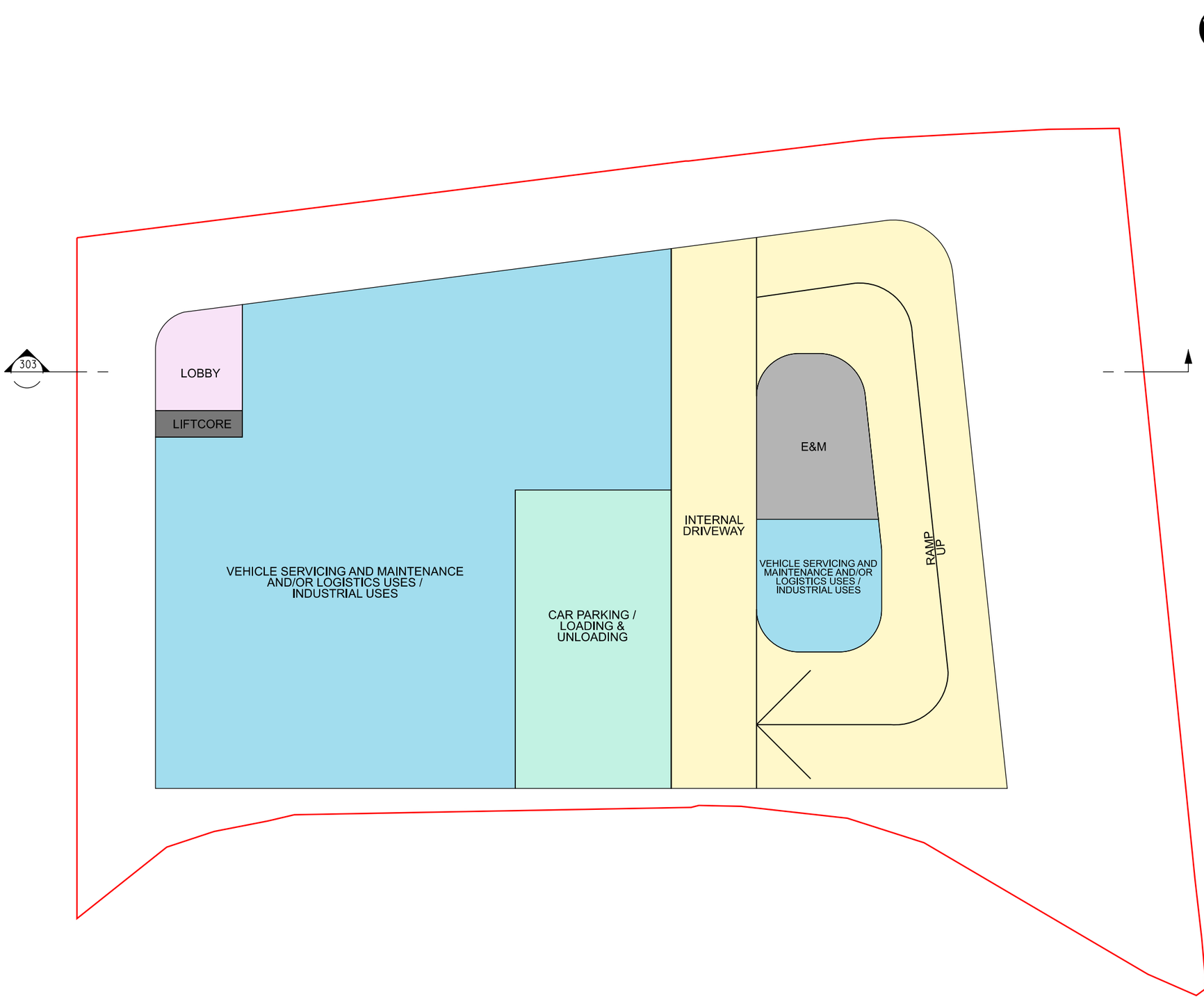

LEGEND:

- SITE BOUNDARY
- PROJECTION LINE OF UPPER FLOOR
- LIFT CORE
- E&M
- CAR PARKING/ LOADING & UNLOADING
- LOBBY
- INTERNAL DRIVEWAY/ RAMP
- VEHICLE SERVICING AND MAINTENANCE AND/OR LOGISTICS USES / INDUSTRIAL USES

Rev	Date	Drawn	Description	Ch'k'd	App'd
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SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING AT NO. 32 WANG LEE STREET AND ADJOINING GOVERNMENT LAND, YUEN LONG

Title

INDICATIVE TYPICAL FLOOR PLAN FOR SITE C (1/F - 9/F)

Designed	AL		Eng check	KS	
Drawn	AL		Coordination	KS	
Dwg check	KS		Approved	SHC	
Scale at A1	1:250	Status	PRE	Rev	P1

Drawing Number

MMH/369397/IDS/203B

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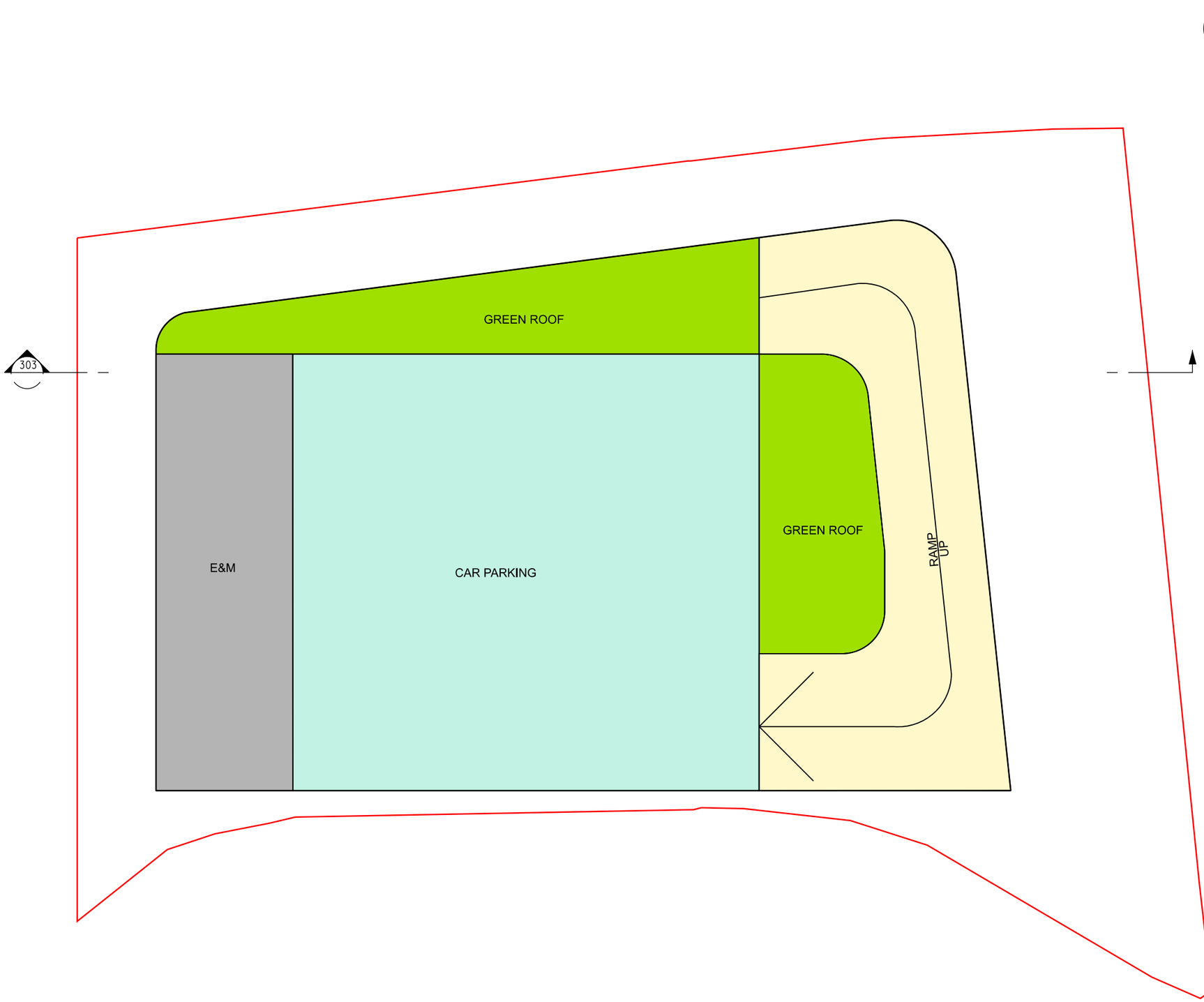
0 6.25 12.5m
1 : 250 SCALE BAR

P:\Hong Kong\INF\Projects\369397 MSBs in YLIE FS\09_Additional Services\s16 Application (Scenario C)_RevA\Technical Assessment\DWG\Indicative Typical Floor Plan for Site C (1F - 9F)_MMH369397IDS203B.dgn



LEGEND:

- SITE BOUNDARY
- E&M
- CAR PARKING
- INTERNAL DRIVEWAY / RAMP
- GREEN ROOF

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	Jul 2023	AL	FIRST ISSUE	KS	SHC

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Title

INDICATIVE ROOF FLOOR PLAN FOR SITE C

Designed	AL		Eng check	KS	
Drawn	AL		Coordination	KS	
Dwg check	KS		Approved	SHC	

Scale at A1	Status	Rev
1:250	PRE	P1

Drawing Number

MMH/369397/IDS/203B

0 6.25 12.5m
1 : 250 SCALE BAR

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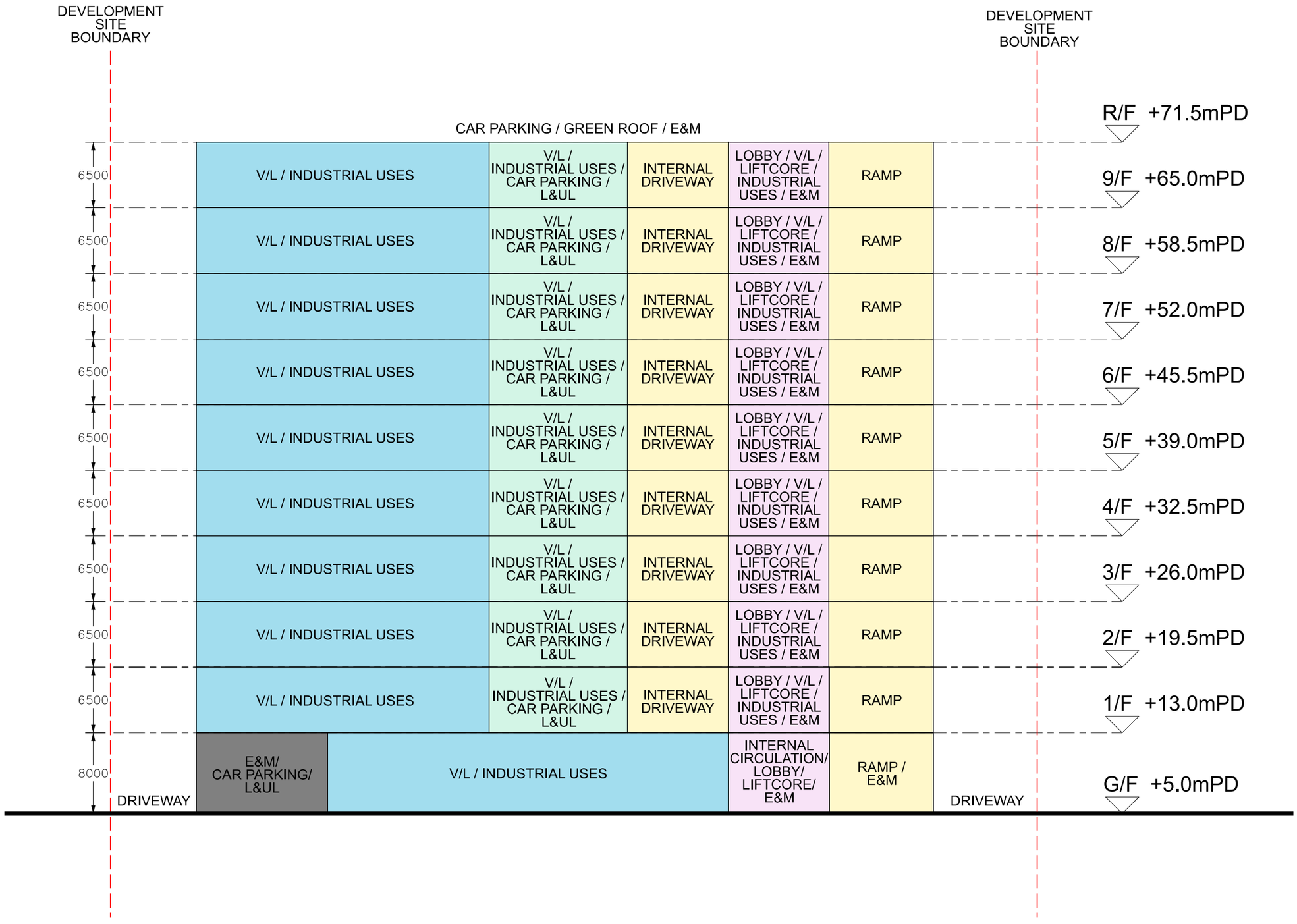

NOTES:

1. ALL DIMENSION IN MILLIMETER.

LEGEND:

- SITE BOUNDARY
- E&M
- CAR PARKING/ LOADING & UNLOADING
- LOBBY
- INTERNAL DRIVEWAY/ RAMP
- VEHICLE SERVICING AND MAINTENANCE AND/OR LOGISTICS USES AND/OR INDUSTRIAL USES (FOR ACCOMMODATING ELIGIBLE BROWNFIELD OPERATORS) (V/L/INDUSTRIAL USES)

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	JUL 2023	AL	FIRST ISSUE	KS	SHC

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FOR MULTI-STOREY BUILDING AT NO. 32 WANG LEE STREET AND ADJOINING GOVERNMENT LAND, YUEN LONG

Title

INDICATIVE SECTION FOR SITE A

Designed	VARIOUS		Eng check	KS	
Drawn	AL		Coordination	KS	
Dwg check	HL		Approved	EC	
Scale at A1	1:200	Status	PRE	Rev	P1

Drawing Number

MMH/369397/IDS/301

0 5 10m
1 : 200 SCALE BAR

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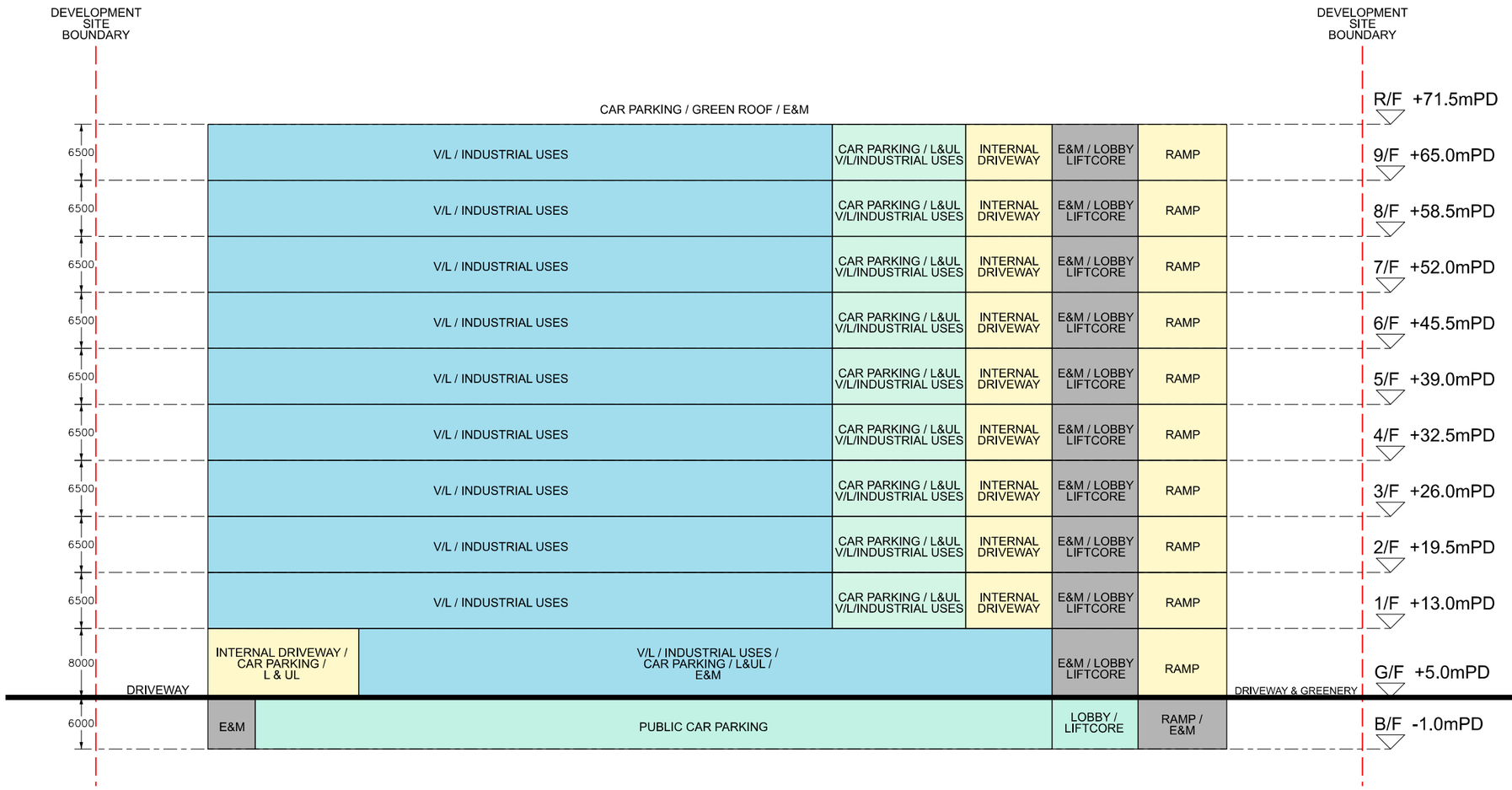

NOTES:

1. ALL DIMENSION IN MILLIMETER.

LEGEND:

- SITE BOUNDARY
- E&M
- CAR PARKING/ LOADING & UNLOADING
- LOBBY
- INTERNAL DRIVEWAY/ RAMP
- VEHICLE SERVICING AND MAINTENANCE AND/OR LOGISTICS USES AND/OR INDUSTRIAL USES (FOR ACCOMMODATING ELIGIBLE BROWNFIELD OPERATORS) (V/L/INDUSTRIAL USES)

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	JUL 2023	AL	FIRST ISSUE	KS	SHC

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING AT NO. 32 WANG LEE STREET AND ADJOINING GOVERNMENT LAND, YUEN LONG

Title

INDICATIVE SECTION FOR SITE B

Designed	VARIOUS		Eng check	KS	
Drawn	AL		Coordination	KS	
Dwg check	KS		Approved	SHC	
Scale at A1 1:300		Status PRE		Rev P1	

Drawing Number

MMH/369397/IDS/302

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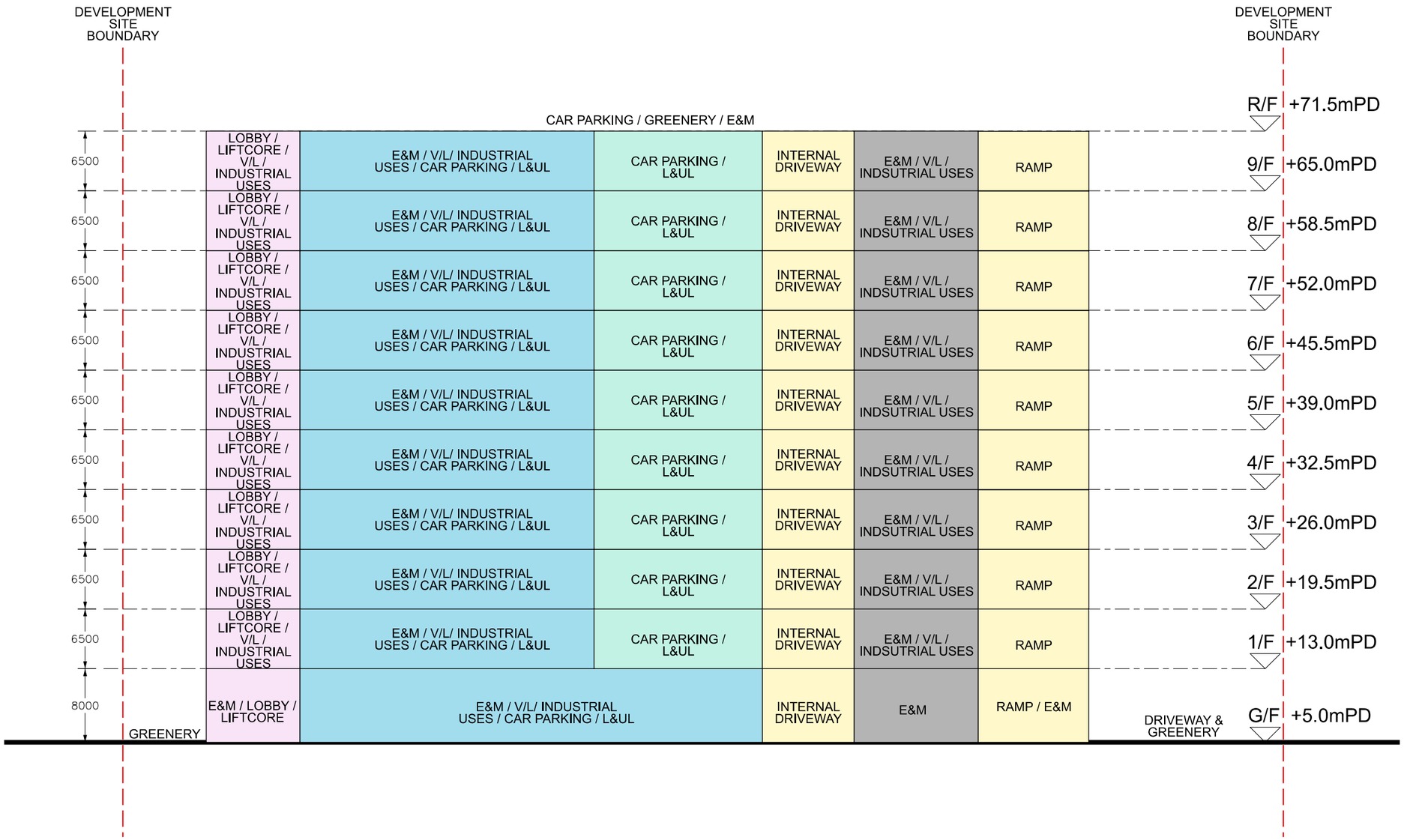

LEGEND:

1. ALL DIMENSION IN MILLIMETER.

LEGEND:

- SITE BOUNDARY
- E&M
- CAR PARKING/ LOADING & UNLOADING
- LOBBY
- INTERNAL DRIVEWAY/ RAMP
- VEHICLE SERVICING AND MAINTENANCE AND/OR LOGISTICS USES AND/OR INDUSTRIAL USES (FOR ACCOMMODATING ELIGIBLE BROWNFIELD OPERATORS) (V/L/INDUSTRIAL USES)

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INDICATIVE SECTION FOR SITE C

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Dwg check	HL		Approved	EC	
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MOTT MACDONALD

Section 16 Planning Application for Multi-storey Building Developments at No. 32 Wang Lee Street and Adjoining Government Land, Yuen Long

Visual Impact Assessment

Sep 2023

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Section 16 Planning Application for Multi-storey Building Developments at No. 32 Wang Lee Street and Adjoining Government Land, Yuen Long

Visual Impact Assessment

Sep 2023

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MMH/369397/VIA/002C	Photomontages (VP03)
MMH/369397/VIA/002D	Photomontages (VP04)
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MMH/369397/VIA/002H	Photomontages (VP08)
MMH/369397/VIA/003	Indicative Master Layout Plan – Proposed Scheme

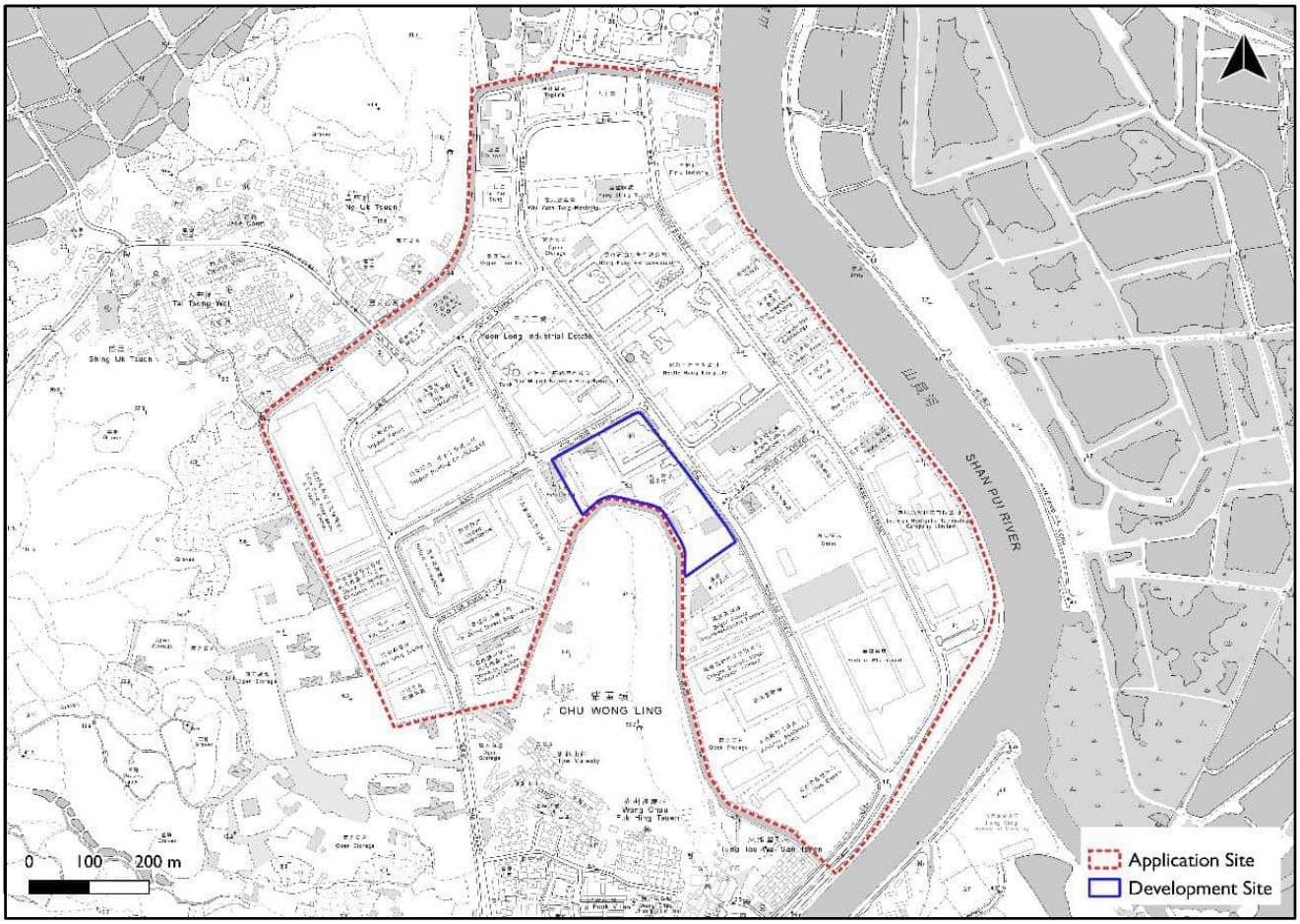
1 Introduction

1.1 Background

1.1.1 This Visual Impact Assessment Report is prepared to support a Section 16 planning application for the proposed multi-storey buildings (MSBs) development (Proposed Development) near Yuen Long INNOPARK (YL INNOPARK), Yuen Long.

1.1.2 A Site Location Plan of the Development Site (the Site) is shown in **Figure 1.1**.

Figure 1.1: Site Location Plan



1.2 Structure of this Report

1.2.1 This report contains the following sections in addition to this introduction (**Section 1**):

Section 2 – Development Proposal

Section 3 – Visual Impact Assessment

1.3 Abbreviations

1.3.1 The following abbreviations shall have the meaning hereby assigned to them except when the context of this Report otherwise requires:

Abbreviation for Bureaux/Departments/ organisations	**Full title**
BH	Building Height
CEDD	Civil Engineering and Development Department
DEVB	Development Bureau
GFA	Gross Floor Area
GN	Guidance Note
HK	Hong Kong
HKSTPC	Hong Kong Science and Technology Parks Corporation
LandsD	Lands Department
MSB	Multistorey Building
OU(IE)	Other Specified Uses (Industrial Estate)
OZP	Outline Zoning Plan
PlanD	Planning Department
PR	Plot Ratio
TN	Technical Note
VE	Visual Envelope
WBA	Wetland Buffer Area
WCA	Wetland Conservation Area
YL INNOPARK	Yuen Long INNOPARK
YLTL	Yuen Long Town Lot
ZVI	Zone of Visual Influence

2 Development Proposal

2.1 Indicative Layout of Proposed MSBs Development

2.1.1 The Site is proposed to provide three sites (**Sites A, B and C**) each about 1 ha to accommodate MSBs developments for industrial uses, totalling 3.23 ha in area.

2.1.2 **Figure 2.1** illustrates the indicative division of land parcels in the Site. It should be noted that the land parcels for proposed MSBs shown in the Site is indicative and solely for technical assessments purpose.

2.1.3 The proposed MSBs at Sites A, B and C are to be developed at a plot ratio of 5 with not more than 10 storeys excluding basement level above ground level.

2.1.4 It is anticipated that the land will be disposed by tender and the MSBs are targeted to start the operation in 2028/2029, with a construction period of 4 to 5 years. Major development parameters and proposed floor uses of the proposed MSBs are summarised in **Table 2.1** and **Table 2.2,** respectively.

Figure 2.1: Indicative Land Parcel for MSBs Development within the Development Site

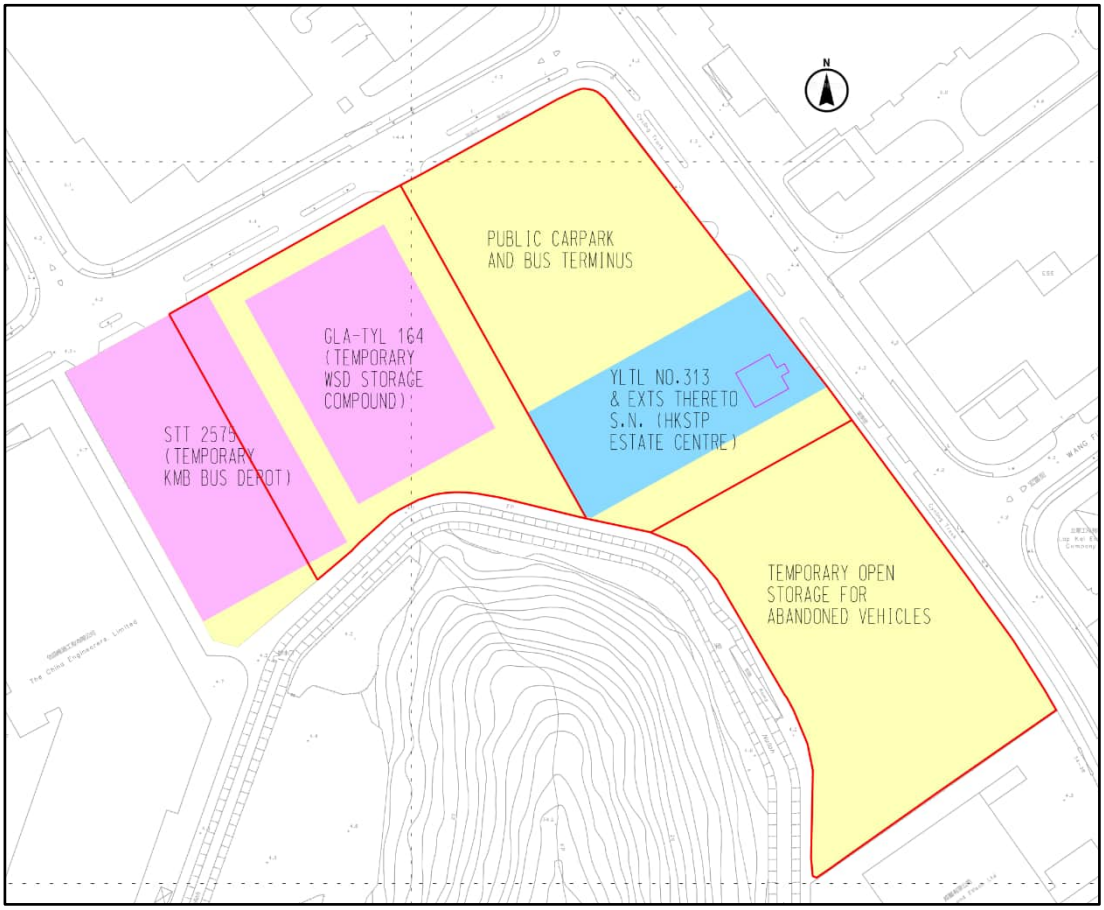


Table 2.1: Development Parameters for Indicative Scheme

Parameters	MSB in Site A	MSB in Site B	MSB in Site C	Total
Site Area	0.98 ha	1.25 ha	1.00 ha	3.23 ha
Maximum Plot Ratio	5			
GFA (m2)	49,000	62,500	50,000	161,500
Site Coverage	Not Specified			
Class of Site	Class A	Class B	Class A	
Land Uses	Vehicle Servicing and Maintenance and/or Logistics Uses + Not less than 30% for accommodating eligible brownfield operators displaced by the government-led development projects (industrial uses)			
No. of Storeys	No more than 10 storeys above ground level			

Table 2.2: Indicative Floor Uses of MSBs Development in Sites A, B and C

Floor	Proposed Uses
G/F-9/F	• Vehicle Servicing and Maintenance; • Logistics Uses; and/or • Industrial Uses (for accommodating eligible brownfield operators)
Basement (1 Level)	Public Vehicle Parking (in Site B)[1]

[1] Subject to the detailed design, a basement may be constructed in Site A and Site C to take up some underground space for ancillary parking, plant room, etc.

2.1.5 The building form and general layout of the proposed MSBs would remain largely the same for the above-mentioned major land uses. In consideration of the prevailing design of similar buildings in Hong Kong, a maximum building height of 66.5m (or 71.5 m PD) of the proposed MSBs is adopted for the visual impact assessment in this report, comprising a floor-to-floor height of 8m for the ground floor and 6.5m for each of the nine storeys above the ground level.

3 Visual Impact Assessment

3.1 Methodology for Assessment of Visual Impacts

Introduction

3.1.1 This Visual Impact Assessment (VIA) is prepared following the requirements in TPB PG-No. 41, which comprises the following components:

- Identification of Baseline Conditions
- Identification of Potential Sources of Impacts
- Appraisal of Visual Changes
- Evaluation of Overall Visual Impact
- Identification of Mitigation Measures

3.1.2 These components are described in more details below.

Identification of Baseline Conditions

3.1.3 The existing baseline visual conditions of the Development will be assessed, comprising the following key components:

Assessment Area

3.1.4 The Assessment Area is the visual envelope within which the Development will be clearly visible from the key sensitive viewers. The visual envelope (zone of visual influence) is generally the view shed formed by natural or manmade features such as vegetation, landform and/or built development.

Visual Elements

3.1.5 Visual envelope (zone of visual influence) is generally the view shed formed by natural or manmade features such as vegetation, landform and/or built development. It contains areas which are fully, partially visible, glimpsed or unseen from this Project and its associated works.

3.1.6 Visual elements and resources and key public viewers within the Visual Envelope which would be affected by the proposed development have been identified. Minimum viewing distance of each key public viewer is also determined. the visual envelope (zone of visual influence) is generally the view shed formed by natural or manmade features such

as vegetation, landform and/or built development. It contains areas which are fully, partially visible, glimpsed or unseen from this Project and its associated works.

Viewing Points / Vantage Points

3.1.7 Typical viewing points of public viewers, i.e. Vantage Points (VPs), within the Visual Envelope have been identified. Minimum viewing distance of each VP is also determined.

3.1.8 Visual sensitivity considers the impact on views to the Development from potential public viewers. A number of factors affecting the sensitivity of the public viewers from the viewing points for evaluation of visual impacts are as follows:

- Value and quality of existing views;
- Availability and amenity of alternative views;
- Type and estimated number of receiver population (many, medium and few);
- Duration (long, medium and short) and frequency of view (frequent, occasional and rare);
- Degree of visibility (no view, glimpse, partial view, vista, open view, and panoramic view);
- The sensitivity rating for the public viewers from the identified VPs are determined as follows:
  - **High:** The key public viewer is highly sensitive to any changes in their viewing experience.
  - **Medium:** The key public viewer is moderately sensitive to any changes in their viewing experience.
  - **Low:** The key public viewer is only slightly sensitive to any changes in their viewing experience.

Identification of Sources of Impacts

3.1.9 The key sources of visual impacts generated within the Development Site will be identified.

3.1.10 Various elements located within the Development Site that would generate visual impacts will be identified.

Appraisal of Visual Changes

3.1.11 The effects of visual changes on the assessment area and sensitive public viewers should be appraised. Visual changes may be positive or negative and they are not necessarily mutually exclusive. The appraisal is expected to consider the following aspects:

3.1.12 **(a) Visual Composition** – Visual composition is the total visual effects of all the visual elements due to their variation in locations, massing, heights, dispositions, scales, forms, proportions and characters vis-a-viz the overall visual backdrop. Visual composition may result in visual balance, compatibility, harmony, unity or contrast. The appraisal should have due regard to the overall visual context and character within the wider and local contexts. A building of an inappropriate scale can dominate the setting and create visual incompatibility with the surroundings. However, in some areas, a well-designed building creating contrast in an appropriate setting may punctuate the space,

add visual interest and break the visual monotony, provided other urban design principles applicable to the site are not negated.

3.1.13 **(b) Visual Obstruction** – A development may cause views in its foreground or background to be intercepted or blocked. The appraisal should assess the degree of visual obstruction and loss of views or visual openness due to the proposed development from all key public viewing points within the assessment area. Blockage or partial blockage of views which substantially reduce visual permeability, existing panorama, vistas, visual resources or visual amenities should be avoided or minimized, in particular with regard to impact on prominent ridgelines, the harbour, natural coastlines, open sea horizon, skyline, scenic areas, valued landscape, special landmark, heritage features to be preserved, etc. The degree of visual obstruction can sometimes be reduced by repositioning of building blocks or scaling down building mass.

3.1.14 **(c) Effect on Public Viewers** – The effects of visual changes from key public viewing points with direct sightlines to the proposed development should be assessed and demonstrated in VIA. The changes in views to the existing and future public viewers should be compared before and after the proposed development. The cumulative impact with any known planned developments as permitted by the statutory plans should be taken into account where possible. The appraisal should take into account the public perception of value attached to the views currently enjoyed, and any likely visual concerns from the general public, e.g. concerns on sore thumb development, visual impermeability, wall effect, neighbourhood identity and character, etc. In the likelihood of such public concerns, the appraisal should explain how to avoid or address the negative visual impact. The effects of the visual changes can be graded qualitatively in terms of magnitude as negligible, slight, moderate or substantial.

Negligible	The key public viewers are likely to suffer no discernible change in their viewing experience
Slight	The key public viewers are likely to suffer a slight change in their viewing experience
Moderate	The key public viewers are likely to suffer a moderate change in their viewing experience
Substantial	The key public viewers are likely to suffer a significant change in their viewing experience

3.1.15 **(d) Effect on Visual Resources** – The condition, quality and character of the assessment area may change positively or negatively as a result of a development. The appraisal should assess if the proposed development may improve or degrade the condition, quality and character of the assessment area and any on-site and off-site visual impact such as that on the visual resources, visual amenities, area of special character, natural and built heritage, sky view, streetscape, townscape and public realm related to the development. Any proposal to enhance or mitigate the impact through design measures, such as design to improve visual permeability, greening, streetscape improvement, landscape screening for visually intrusive elements e.g. carparks, plant rooms, retaining walls, etc. should be included and presented.

Evaluation of Overall Visual Impact

3.1.16 The assessment of visual impacts would be considering the factors including the sensitivity of the key public viewers, visual resources and visual amenities likely to be affected, the magnitude, extent and duration of impact and any resultant improvement or degradation in the visual quality and character of the surrounding area, and the

planning intention and known planned developments of the area. Impacts are assessed upon completion of the projects. Impacts are also assessed on the assumption that mitigation measures are in place.

3.1.17 The resultant overall impact shall be concluded and classified within a range of threshold:

Enhanced – if the proposed development in overall term will improve the visual quality and complement the visual character of its setting from most of the identified key public viewing points;

Partly enhanced/partly adverse – if the proposed development will exhibit enhanced visual effects to some of the identified key public viewing points and at the same time, with or without mitigation measures, exhibit adverse visual effects to some other key public viewing points;

Negligible – if the proposed development will, with or without mitigation measures, in overall term have insignificant visual effects to most of the identified key public viewing points, or the visual effects would be screened or filtered by other distracting visual elements in the assessment area;

Slightly adverse – if the proposed development will, with or without mitigation measures, result in overall term some negative visual effects to most of the identified key public viewing points;

Moderately adverse – if the proposed development will, with or without mitigation measures, result in overall term negative visual effects to most of the key identified key public viewing points; and

Significantly adverse – if the proposed development will in overall term cause serious and detrimental visual effects to most of the identified key public viewing points even with mitigation measures

Identification of Mitigation Measures

3.1.18 Mitigation proposal would be developed to reduce the overall visual impacts derived from the Development where possible. Mitigation measures can be part of the project design (e.g. tree planting for visual screening, colour treatment of building facades, etc.).

3.2 Identification of Baseline Conditions

Existing Site Conditions

3.2.1 The Development Site is currently mainly zoned as "OU (Industrial Estate)" ("OU(IE)") under the prevailing draft Yuen Long Outline Zoning Plan ("Approved OZP") No. S/YL/26.

3.2.2 Under "OU(IE)" zoning, there are a number of Statutory Development Restrictions. Of these the key ones potentially impacting landscape and visual amenity are the following: (i) Building height (BH) restriction, and (ii) Maximum permissible gross floor area (GFA). Whilst BH is expressed in number of storeys rather than mPD, the currently proposed MSBs are significantly higher than other developments within the YL INNOPARK. Similarly, given that minor relaxation of the maximum permissible GFA may be involved for the proposed MSBs, the bulk of the buildings may be larger than originally envisaged in the OZP. However, there are no restriction of the "OU(IE)" zone in terms of the building bulk or building mass, thus, the minor relaxation of the currently proposed MSBs will not pose any significant impact to the landscape and visual amenity. Additionally, the vast remainder of the "OU(IE)" zone is also subject to an extended BHR of 8 storeys (excluding basements).

3.2.3 The visual impact arising from the proposed minor relaxation of BH for the site from 8 storeys to 10 storeys and the minor relaxation of the maximum permissible GFA are assessed and presented in this report.

3.2.4 In addition, the Development Site is currently utilised for a number of temporary uses including the KMB Bus Depot to the northwest, parking facilities in the central portion of the site including 40 nos. of cycle parking spaces to the north and to the south the Fuk Wang Street public parking where there are around 27 public parking spaces for coaches/heavy vehicles and 60 public parking spaces for cars (including 32 metered-parking spaces) and 19 parking slots for motorcycles. To the south of the parking is located two land parcels being using by government works departments.

3.2.5 Although not physically affected by the Development there will be indirect impacts on the existing Chu Wong Ling wooded knoll which is currently zoned "GB". This is due to the weakening of its role as a green backdrop to views from within the YL INNOPARK due the physical bulk of the proposed MSBs.

Assessment Area

3.2.6 The assessment area is the visual envelope (VE), the area from which the proposed works would be seen, is shaped by a combination of the existing residential and infrastructural development; the surrounding landform and its associated vegetation.

3.2.7 The VE for the proposed scheme extends from the Kai Shan range south and east towards the YL INNOPARK, the Shan Pui River and beyond to Nam Sang Wai, south towards Tung Tau Wai San Tsuen and the periphery of Yuen Long, south west towards the development either side of Fuk Hi Street, and north towards Fung Lok Wai. Within the VE there are a number of Zones of Visual Influence (ZVIs) which are as follows:

- **Primary Zone of Visual Influence**
  - This is the area of greatest visibility of the Proposed Scheme largely restricted to the area immediately adjacent to the proposed development area / road alignment; and the Chu Wong Ling wooded knoll to the south

of the proposed Study Site. The Primary ZVI extends north along Fuk Yan Street, north and south along Wang Lee Street, east along Wang Fu Street, and west along Fuk Wang Street. Owing to a combination of the existing industrial development, existing street trees and the landform, this zone is largely restricted to the area immediately adjacent to the proposed Study Site.

- **Secondary Zone of Visual Influence**
  - This is the area with more limited visibility of the proposed works due to intervening obstacles including a combination of existing industrial development and vegetation so that the visible part of the proposed works is largely limited to the central and upper portions of the proposed building. This zone includes occasional filtered and framed views from the upland areas to the north, west and southeast of the VE. This includes views from the Kai Shan range. The secondary ZVI also includes the eastern bank of the Shan Pui River.

- **Tertiary Zone of Visual Influence**
  - For the most part views of the proposed works are screened by a combination of the intervening industrial development, landform and vegetation. This zone is limited to areas within the YL INNOPARK, the Shan Pui River corridor to the east and the light industrial and storage areas to the west of Fuk Hi Street. From these locations visual access is likely to be limited to glimpsed views of the parts of the upper portion of the proposed works.

- **Quaternary Zone of Visual Influence**
  - This is the area from which there are long distance, occasional partial and glimpsed views of the proposed works. The views are largely from the flat valley floor of Nam Sang Wai to the east, Yuen Long urban area to the south and the Fung Lok Wai fishpond area to the north. From these locations the visible part of the proposed works is likely to be occasional, fragmentary and form a small part of the overall view.

Visual Elements

3.2.8 Key visual elements and resources will be identified, which may include major physical structures, visual resources or attractions and/or visual eye scores that are existing or are being planned within the Assessment Area.

Viewing Points / Vantage Points

3.2.9 Vantage points (VPs) have been identified where typical views of public viewers within the visual envelope can be demonstrated. Photomontages have been prepared for these identified VPs to conceptually illustrate the visual impacts of the Development. The identified VPs and the photomontages are presented in **Drawing nos. MMH/369397/VIA/002A** to **MMH/369397/VIA/002H**. The sensitivity of public viewers from these VPs are explained in **Table 3.**, which are assessed to have low to medium sensitivity. The identified VPs are as follows:

- *Vantage Point 01*: View looking southeast along Fuk Yan Street (Refer to **Drawing no. MMH/369397/VIA/002A**)

- *Vantage Point 02*: View looking southwest from Nam Sang Wai Road (Refer to **Drawing no. MMH/369397/VIA/002B**)

- *Vantage Point 03*: View looking northwest from Shan Pui Ho East Road (Refer to **Drawing no. MMH/369397/VIA/002C**)

- *Vantage Point 04*: View looking southwest from Wang Fu Street (Refer to **Drawing no. MMH/369397/VIA/002D**)

- *Vantage Point 05*: View looking southeast from the summit of Kai Shan (Refer to **Drawing no. MMH/369397/VIA/002E**)

- *Vantage Point 06*: View looking southeast from the junction of Fuk Wang Street and Fuk Yan Street (Refer to **Drawing no. MMH/369397/VIA/002F**).

- *Vantage Point 07*: View looking southeast along Fuk Shun Street in Tai Tseng Wai (Refer to **Drawing nos. Drawing no. MMH/369397/VIA/002G**).

- *Vantage Point 08*: View for trail walkers looking north from Chu Wong Ling summit pavilion (Refer to **Drawing no. MMH/369397/VIA/002H**).

Table 3.1 Sensitivity of Public Viewers from identified Vantage Points

VP ID	Vantage Point (VP)	Type of Viewers and Number (Very Few, Few, Many, Very Many)	Quality of Existing Views (Good, Fair, Poor)	Duration of View (Transient / Permanent Receiver)	Alternate Views and Amenity (Poor, Fair, Good)	Frequency of View (Very Frequent, Frequent, Occasional, Rare)	Degree of Visibility (Full, Partial, Glimpsed, No View)	Sensitivity (Low, Medium, High)
VP 01	View looking southeast along Fuk Yan Street	Vehicle travellers and pedestrians Many	Fair	Transient receiver	Yes (Fair)	Frequent	Partial	Low
VP 02	View looking southwest from Nam Sang Wai Road	Vehicle travellers, pedestrians, and recreation users along Shan Pui River Few	Good	Transient receiver	Yes (Fair)	Frequent	Partial	Medium
VP 03	View looking northwest from Shan Pui Ho East Road	Vehicle travellers and pedestrians Few	Fair	Transient receiver	Yes (Good)	Occasional	Partial	Medium
VP 04	View looking west from Wang Fu Street	Vehicle travellers and pedestrians Many	Fair	Transient receiver	Yes (Fair)	Frequent	Partial	Low
VP 05	View looking southeast from the summit of Kai Shan	Pedestrians Few	Good	Transient receiver	Yes (Good)	Occasional	Full	Medium
VP 06	View looking southeast from the junction of Fuk Wang Street and Fuk Yan Street	Vehicle travellers and pedestrians Many	Fair	Transient receiver	Yes (Fair)	Frequent	Full	Low
VP 07	View looking southeast along Fuk Shun Street in Tai Tseng Wai	Vehicle travellers and pedestrians Many	Fair	Transient receiver	Yes (Fair)	Very Frequent	Glimpsed	Medium
VP 08	View for trail walkers looking north from Chu Wong Ling summit pavilion	Trail walkers Few	Fair	Transient receiver	Yes (Fair)	Occasional	Partial	Low

3.3 Identification of Potential Sources of Impact

3.3.1 The identified key positive visual elements for the VIA are:

- Chi Wong Ling
- Kai Shan

3.3.2 The identified key negative visual elements for the VIA are:

- Vehicle Traffic
- Introduction of new built structures due to the Development which are larger in scale than many of the existing developments within the YL INNOPARK
- Minor reduction in vegetated surface due to areas used for the Development; and
- Night-time building and street lighting

3.4 Appraisal of Visual Changes

3.4.1 As mentioned in **Section 3.2**, the majority of the Development Site mainly zoned as "OU(IE)" is subject to an extended BHR of 8 storeys (excluding basement). Visual appearance of the proposed development is considered not so pronounced if other developments in the YL INNOPARK are also fully (re)developed to their extended BHR. The layout of the Baseline Scheme, which would be adopted as OZP compliance scheme for the VIA is shown in **Drawing No. MMH-369397-VIA-001**.

3.4.2 The magnitude of change for the identified Vantage Points of public viewers is described in **Table 3..**

3.4.3 **Drawing No. MMH-369397-VIA-002A to H** compare the building height of the proposed development under the OZP with the building height of the proposed increase in development density within the overall Yuen Long INNOPARK building height profile. Although the proposed increase would slightly affect the overall building height profile of Yuen Long INNOPARK, this could create building height variations while the overall stepped height profile would still be generally maintained.

3.4.4 The magnitude of change in views for public viewers from the identified VPs are assessed to be small in general. Views from these VPs towards the Development will be obscured for a small part of the proposed MSBs by the existing industrial developments, the existing landform and vegetation.

VP 01: View looking southeast along Fuk Yan Street

3.4.5 The view looking southeast along Fuk Yan Street will be dominated by views of the existing industrial buildings within the YL INNOPARK in the foreground which will block views beyond the YL INNOPARK showing partial view of the proposed development.

3.4.6 Effects on Visual Composition: The proposed development will result in taller buildings to southeast of the YL INNOPARK, however this will have a negligible effect form this viewpoint.

3.4.7 Effects on Visual Obstruction and Visual Permeability: The general background is dense with the built environment and the viewpoint of the proposed development has been obstructed by the foreground building (i.e., San Miguel Brewery Hong Kong Limited). Therefore, the change in building height caused by the proposed development

will cause a slight increase in the visual obstruction but in no change to the visual permeability to access the open sky view.

3.4.8 Effects on Visual Elements/Resources: There will be a negligible impact on the view towards southeast of the YL INNOPARK, as the outlook will remain largely the same.

3.4.9 Effects on Public Viewers: The public's perception of the view towards southeast along Fuk Yan Street will be of medium value, as the existing industrial buildings in the foreground are unpolished for some. The Public Viewers will have transient and partial views towards the proposed development, which when combined with the low sensitivity of the public viewers will result in a visual impact considered to be Slight.

VP 02: View looking southwest from Nam Sang Wai Road

3.4.10 The view looking southwest from Nam Sang Wai Road offers a riverside view of Shan Pui River in the foreground and existing industrial buildings within YL INNOPARK across the river in the background.

3.4.11 Effects on Visual Composition: The proposed development result in a new building profile that is higher, resulting a slightly more imposing effect on the viewer.

3.4.12 Effects on Visual Obstruction and Visual Permeability: The change in building height caused by the proposed development will cause a slight increase in the visual obstruction but will result in no change to the visual permeability from this viewpoint, as the proposed development will not significantly reduce the visual openness and visual access to open sky view and the Shan Pui River.

3.4.13 Effects on Visual Elements/Resources: There will be a sightly adverse impact on the view towards southeast of the YL INNOPARK, as the outlook will remain largely the same except a small part of the open sky view is obstructed.

3.4.14 Effects on Public Viewers: The public's perception of the view towards southwest from Nam Sang Wai Road will be of high value, with the existing open riverside view remaining unaffected/unobstructed. The Public Viewers will have transient and partial views towards the proposed development, which when combined with the medium sensitivity of the public viewers will result in a visual impact considered to be Slight.

VP 03: View looking northwest from Shan Pui Ho East Road

3.4.15 The view looking northwest from Shan Pui Ho East Road offers a wider panoramic view of Shan Pui River with roadside planting and the YL INNOPARK as the backdrop.

3.4.16 Effects on Visual Composition: Blocked by the existing industrial buildings closer to the river front, despite the proposed relaxation in building height, the upper portion of the proposed development will be visible from this viewpoint; therefore, this will have a slight effect form this viewpoint.

3.4.17 Effects on Visual Obstruction and Visual Permeability: The proposed site has been largely obstructed by the existing development (i.e., Bright Future building). Therefore, the proposed site would not increase the change of visual obstruction or impact on the visual permeability on the view across the river and the towards the YL INNOPARK from

Shan Pui Ho East Road, as the proposed development will not significantly reduce the visual openness and visual access to open sky view and the Shan Pui River.

3.4.18 Effects on Visual Elements/Resources: There will be a negligible impact on the view to northwest from Shan Pui Ho East Road, as the outlook will remain largely the same.

3.4.19 Effects on Public Viewers: The public's perception of the view towards northwest from Shan Pui Ho East Road will be of high value, with the existing open riverside view remaining unaffected/unobstructed. The Public Viewers will have transient and partial views towards the proposed development, which when combined with the medium sensitivity of the public viewers will result in a visual impact considered to be Slight.

VP 04: View looking west from Wang Fu Street

3.4.20 The view looking southwest from Wang Fu Street will be dominated by views of the existing industrial buildings within YL INNOPARK in the foreground and partial view of the proposed development in the background.

3.4.21 Effects on Visual Composition: The proposed development will result in taller buildings, causing greater shading on Wang Fu Street and a more imposing effect on viewers.

3.4.22 Effects on Visual Obstruction and Visual Permeability: The change in building height caused by the proposed development will cause a slight increase in the visual obstruction and a reduction in the visual permeability of the open sky view.

3.4.23 Effects on Visual Elements/Resources: There will be a slight impact on the view looking southwest from Wang Fu Street, with an obstruction of the sky view caused by the building mass.

3.4.24 Effects on Public Viewers: The public's perception of the view looking southwest from Wang Fu Street will be of medium value, as the existing industrial buildings in the foreground are unpolished for same. The Public Viewers will have transient and glimpsed views towards the proposed development, which when combined with the low sensitivity of the public viewers will result in a visual impact considered to be Slight.

VP 05: View looking southeast from the summit of Kai Shan

3.4.25 The view looking southeast from the summit of Kai Shan offers a panoramic view of the YL INNOPARK and the proposed development in the mid-ground, and Nam San Wai and Kai Kung Ling in the background.

3.4.26 Effects on Visual Composition: The proposed relaxation in building height will result in taller buildings to southeast of the YL INNOPARK, causing only a slight imposing effect on viewers as compared to the scale of the overall view. When comparing with the baseline scheme, the impact caused by the change in building height is negligible due to the vast scale of the overall view.

3.4.27 Effects on Visual Obstruction and Visual Permeability: The change in building height caused by the proposed development will cause a slight increase in the visual obstruction and slightly reduce the visual permeability of Nam Sang Wai at the back. When comparing with the baseline scheme, change in visual obstruction and visual permeability is negligible.

3.4.28 Effects on Visual Elements/Resources: There will be an slight impact on the view towards southeast from the summit of Kai Shan, as the visual connection of the rural-urban fringe slightly altered by the proposed development.

3.4.29 Effects on Public Viewers: The public's perception of the view looking southeast from the summit of Kai Shan will be of high value with the existing panoramic view. The Public Viewers will have transient and partial views towards the proposed development, which when combined with the medium sensitivity of the public viewers will result in a visual impact considered to be Slight.

VP 06: View looking southeast from the junction of Fuk Wang Street and Fuk Yan Street

3.4.30 The view looking southeast from the junction of Fuk Wang Street and Fuk Yan Street will be dominated by views of the proposed development at a close distance.

3.4.31 Effects on Visual Composition: The proposed development will result in taller buildings, causing a greater shading at Fuk Wan Street, and a more imposing effect on viewers. However, when comparing with the baseline scheme, there will be nearly no change in building mass at this viewpoint, so the effect will be negligible.

3.4.32 Effects on Visual Obstruction and Visual Permeability: The change in building height caused by the proposed development will cause an increase in the visual obstruction and reduction in the visual permeability of the sky view.

3.4.33 Effects on Visual Elements/Resources: When comparing with the baseline scheme, there will be no additional impact on reduction of openness of the existing view in terms of building mass or building bulk. The effect on visual elements/resources will be negligible.

3.4.34 Effects on Public Viewers: The public's perception of the view looking southeast from the junction of Fuk Wang Street and Fuk Yan Street will be of medium value. The Public Viewers will have transient and full views towards the proposed development, which when combined with the low sensitivity of the public viewers will result in a visual impact is considered to be Negligible.

VP 07: View looking southeast along Fuk Shun Street in Tai Tseng Wai

3.4.35 The view looking southeast along Fuk Shun Street in Tai Tseng Wai will be dominated by views of the existing low-rise buildings with unseen of the proposed development in the background.

3.4.36 Effects on Visual Composition: The proposed development will result in taller buildings on the view looking southeast along Fuk Shun Street in Tai Tseng Wai, however this will have a negligible effect form this viewpoint.

3.4.37 Effects on Visual Obstruction and Visual Permeability: The general background is dense with the built environment and the viewpoint of the proposed development has been largely obstructed by the village houses. Hence, the change in building height caused by the proposed development will be a negligible visual obstruction and no change to the visual permeability to access the open sky view.

3.4.38 Effects on Visual Elements/Resources: There will be a negligible impact on the view towards southeast of the YL INNOPARK, as the outlook will remain largely the same.

3.4.39 Effects on Public Viewers: The public's perception of the view looking southeast along Fuk Shun Street in Tai Tseng Wai will be of medium value. The Public Viewers will have transient and glimpsed views towards the proposed development, which when combined with the medium sensitivity of the public viewers will result in a visual impact considered to be Negligible.

VP 08: View for trail walkers looking north from Chu Wong Ling summit pavilion

3.4.40 The view for trail walkers looking north from Chu Wong Ling summit pavilion offers an enclosed view of the outdoor recreational area at the summit surrounded by vegetation.

3.4.41 Effects on Visual Composition: The proposed relaxation in building height will result in a partial view of building structure through the vegetation layer, causing a slight imposing effect on the viewer.

3.4.42 Effects on Visual Obstruction and Visual Permeability: The viewpoint of the proposed development has been obstructed by a dense vegetation layer. The change in building height caused by the proposed development will cause a slight increase in the visual obstruction but in no change to the visual permeability to access the open sky view.

3.4.43 Effects on Visual Elements/Resources: There will be a slight adverse impact on the view for trail walkers looking north from Chu Wong Ling summit pavilion, as some of the open view will be blocked by the proposed building.

3.4.44 Effects on Public Viewers: The public's perception of the view for trail walkers looking north from Chu Wong Ling summit pavilion will be of medium value. The Public Viewers will have transient and partial views towards the proposed development, which when combined with the low sensitivity of the public viewers will result in a visual impact considered to be Slight.

3.5 Evaluation of Overall Visual Impact

3.5.1 The predicted visual impacts for the following Vantage Points, locating to the north and northwest of the Site, are assessed to be slightly adverse to negligible due to low to medium sensitivity and the small magnitude of visual change because of limited visibility of the Development:

- VP 01 View looking southeast along Fuk Yan Street
- VP 07 View looking southeast along Fuk Shun Street in Tai Tseng Wai

3.5.2 The predicted visual impacts for the following Vantage Points, locating to the east and northeast the Site, are assessed to be slightly adverse due to low to medium sensitivity and the small visual change:

- VP 02 View looking southwest from Nam Sang Wai Road
- VP 04 View looking west from Wang Fu Street

3.5.3 The predicted visual impacts for the following Vantage Points, locating to the south of the Site, are also assessed to be slightly adverse due to low to medium sensitivity and small visual change, with substantial screening by Chu Wong Ling and/or the existing landscape:

- VP 03 View looking northwest from Shan Pui Ho East Road
- VP 08 View for trail walkers looking north from Chu Wong Ling summit pavilion

3.5.4 The predicted visual impact for the following Vantage Point, locating to the west of the Site, is assessed to be slightly adverse due to medium sensitivity and small visual change, because of limited visibility of the Development with the views being obscured by existing industrial developments and the vast overview at the vantage point:

- VP 05 View looking southeast from the summit of Kai Shan

3.5.5 For VP 06 in respect of pedestrians and vehicle travellers looking southeast from the junction of Fuk Wang Street and Fuk Yan Street, the magnitude of change will be large due to the proximity and scale of the Development. However, when comparing to the baseline scheme, there will be no additional impact caused by the change in building height. considering that the key public viewer is within the YL INNOPARK occupied by industrial developments and the Development will be compatible with the surrounding land uses, the overall visual impact is also assessed to be negligible.

3.5.6 A summary of visual impacts to key public viewing points is provided in **Table 3.3**.

3.6 Identification of Mitigation Measures

3.6.1 The following measures have been identified, which have been adopted in the preparation of the indicate scheme, to mitigate the potential visual impact of the Development. These measures have been incorporated as the design and planning merits of the Development in the S16 Planning Application.

- **MM1** - Provide a minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Streets to enhance streetscapes. This will provide a wider view corridor at these two streets abutting the Development (Refer to **Drawing no. MMH/369397/VIA/003**).

- **MM2** - Tree planting and/or green roof at the Development Site boundary and at the building is recommended for diversity of the visual experience at the pedestrian level.

- **MM3** - Provide greenery of not less than 20% of the site coverage of each MSB area, 10% of which would be within the primary zone to enhance the visual appearance.

3.6.2 In addition, with proper design of the building façade and the adopted colour scheme to be in harmony with the environment (**MM5**), the visual impact of the Development can be further mitigated.

3.7 Summary

3.7.1 The Development, comprising three building blocks with a maximum of 10 storeys above ground with a maximum building height of 66.5m, or at a maximum elevation of +71.5 m PD, will transform an area in the vicinity of the YL INNOPARK from being an open albeit disturbed landscape currently occupied with various temporary and public transport uses. The Site is largely covered with concrete hard standing with some existing trees located largely around the periphery along Fuk Wang Street and Wang Lee Street.

3.7.2 The existing built environment, including the YL INNOPARK and nearby village developments, are generally low-rise, with the exception of a few taller developments within the YL INNOPARK that do not exceed the maximum 8-story height limit according to the prevailing darft OZP. However, the vast remainder of the "OU(IE)" zone is also subject to an extended BHR of 8 storeys (excluding basements). If other developments in the YL INNOPARK are also fully (re)developed to their extended BHR, the visual impact of the will be much less pronounced.

3.7.3 The overall visual impacts of the Development are assessed to be negligible to slightly adverse.

3.7.4 Slight impacts are assessed for vantage points at more distant locations such as areas along the eastern bank of the Shan Pui River, behind the Chu Wong Ling wooded knoll in the south and from elevated locations on the Kai Shan ridge to the west. The Chu Wong Ling wooded knoll and the YL INNOPARK intervening industrial development serves to largely obscure views of the Development.

3.7.5 Negligible impacts are assessed for vantage points at the streets in close vicinity to the Development. When comparing with the baseline scheme, the change in building height will not cause any additional impact to the vantage points, and no positive visual elements will be obscured by the Development.

3.7.6 The following measures have been identified, which have been adopted in the preparation of the indicative scheme, to mitigate the potential visual impact of the Development. These measures have been incorporated as the design and planning merits of the Development in the S16 Planning Application.

- Provide a minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Streets to enhance streetscapes. This will provide a wider view corridor at these two streets abutting the Development.

- Tree planting and/or green roof at the Development Site boundary and at the building is recommended for diversity of the visual experience at the pedestrian level.

- Provide greenery of not less than 20% of the site coverage of each MSB area, 10% of which would be within the primary zone to enhance the visual appearance.

3.7.7 In addition, with proper design of the building façade and the adopted colour scheme to be in harmony with the environment, the visual impact of the Development can be further mitigated.

Table 3.2 Magnitude of Change in Views for Public Viewers from identified Vantage Points

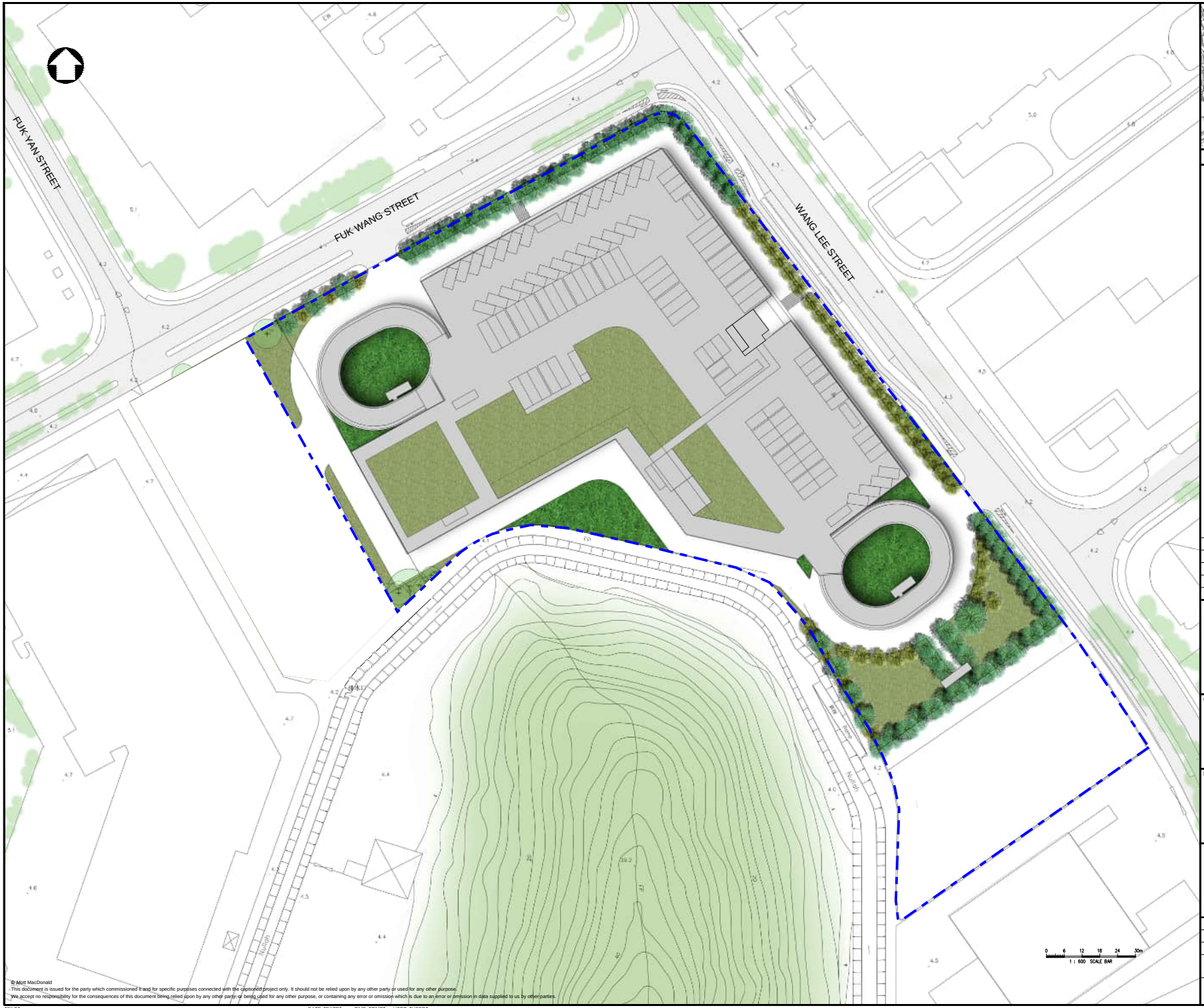
VP ID	Vantage Point (VP)	Compatibility of Project with Surroundings (High, Medium, Low, Negligible)	Scale of Development (Large, Medium, Small, Negligible)	Reversibility of Change (Yes, No)	Minimum Viewing Distance (Metres)	Degree of Visibility (Full, Partial, Glimpsed, No View)	Duration of Impacts (Short, Long)	Magnitude of Change (Small, Intermediate, Large)
VP 01	View looking southeast along Fuk Yan Street	High	Large	No	262	Partial	Long	Small
VP 02	View looking southwest from Nam Sang Wai Road	Medium	Large	No	725	Partial	Long	Small
VP 03	View looking northwest from Shan Pui Ho East Road	Medium	Large	No	828	Partial	Long	Small
VP 04	View looking west from Wang Fu Street	High	Large	No	291	Partial	Long	Small
VP 05	View looking southeast from the summit of Kai Shan	Medium	Large	No	946	Full	Long	Small
VP 06	View looking southeast from the junction of Fuk Wang Street and Fuk Yan Street	High	Large	No	54	Full	Long	Small
VP 07	View looking southeast along Fuk Shun Street in Tai Tseng Wai	Medium	Large	No	561	Glimpsed	Long	Small
VP 08	View for trail walkers looking north from Chu Wong Ling summit pavilion	Low	Large	No	392	Partial	Long	Small

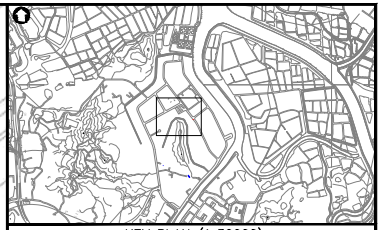
Table 3.3 Visual Impact of the Development

VP ID	Vantage Point (VP)	Sensitivity (Low, Medium, High) and Number of Public Viewers (Very Few, Few, Many, Very Many)	Degree of Visibility of Source(s) of Visual Impact (Full, Partial, Glimpsed, No View) and Min. Distance between VP and nearest Source(s) of Impact	Magnitude of Change (Negligible, Small, Intermediate, Large)	Visual Impact during Operation Phase (Substantial, Moderate, Slight, Negligible)
VP 01	View looking southeast along Fuk Yan Street	Low; Many	Partial; 262	Small	Slightly adverse
VP 02	View looking southwest from Nam Sang Wai Road	Medium; Few	Partial; 725	Small	Slightly adverse
VP 03	View looking northwest from Shan Pui Ho East Road	Medium; Few	Partial; 828	Small	Slightly adverse
VP 04	View looking west from Wang Fu Street	Low; Many	Partial; 291	Small	Slightly adverse
VP 05	View looking southeast from the summit of Kai Shan	Medium; Few	Full; 946	Small	Slightly adverse
VP 06	View looking southeast from the junction of Fuk Wang Street and Fuk Yan Street	Low; Many	Full; 54	Small	Negligible
VP 07	View looking southeast along Fuk Shun Street in Tai Tseng Wai	Medium; Many	Glimpsed; 561	Small	Negligible
VP 08	View for trail walkers looking north from Chu Wong Ling summit pavilion	Low; Few	Partial; 392	Small	Slightly adverse

Drawings

MMH/369397/VIA/001	Baseline Scheme – Master Plan
MMH/369397/VIA/002A	Photomontages (VP01)
MMH/369397/VIA/002B	Photomontages (VP02)
MMH/369397/VIA/002C	Photomontages (VP03)
MMH/369397/VIA/002D	Photomontages (VP04)
MMH/369397/VIA/002E	Photomontages (VP05)
MMH/369397/VIA/002F	Photomontages (VP06)
MMH/369397/VIA/002G	Photomontages (VP07)
MMH/369397/VIA/002H	Photomontages (VP08)
MMH/369397/VIA/003	Indicative Master Layout Plan – Proposed Scheme





KEY PLAN (1: 30000)

LEGEND

DEVELOPMENT SITE

Rev	Date	Drawn	Description	Ch'k'd	App'd
P4	MAY18	CL	RESPOND TO COMMENTS	CJF	SHC
P3	JAN 18	CL	BOUNDARY UPDATE	CJF	SHC
P2	AUG 17	CL	RESPOND TO COMMENTS	CJF	SHC
P1	MAY 17	CL	FIRST ISSUE	CJF	SHC

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CEDD

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE3/2016(CE) STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

Title

BASELINE SCHEME -MASTER PLAN

Designed			Eng check		
Drawn			Coordination		
Dwg check			Approved		
Scale at A1		Status		Rev	

Drawing Number MMH/369397/VIA/001

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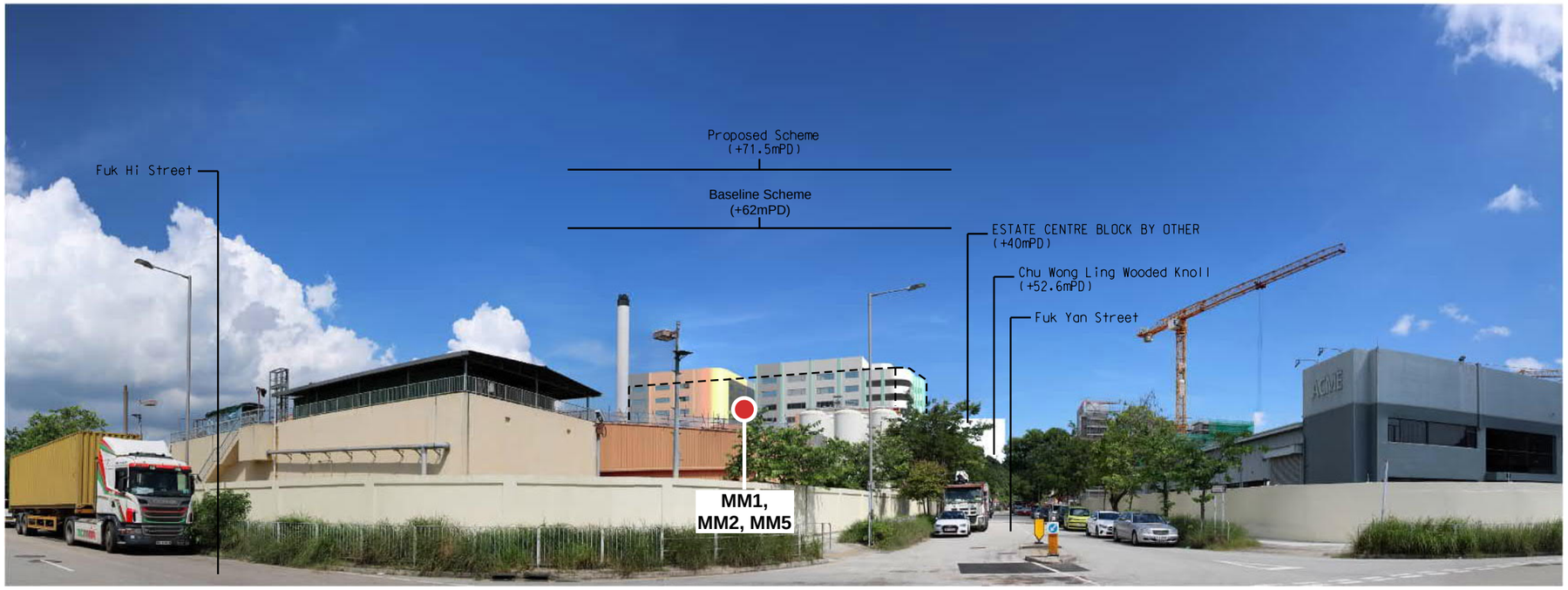
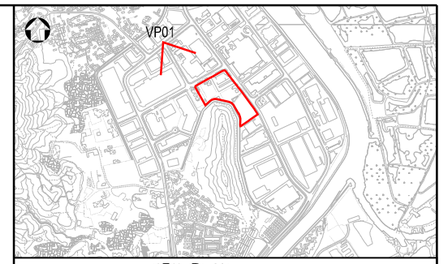
$FILE$ DATE: $DATE$ TIME: $TIME$ USER: $USER$



Vantage Point 01: View looking southeast along Fuk Yan Street (Existing Situation)



Vantage Point 01: View looking southeast along Fuk Yan Street
Baseline Scheme: Building height profile of maximum building height restriction under OZP (S/YL/26)



KEY PLAN (1:15000)

LEGEND:

DEVELOPMENT SITE

BASELINE SCHEME

VANTAGE POINT 01 (VP01)
VANTAGE POINT ELEVATED +4.5mPD
VIEWING DISTANCE 262m
MAXIMUM HEIGHT AT PROPOSED SCHEME +71.5mPD

Mitigation Measures

MM1 - Provide a minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Streets to enhance streetscapes. This will provide a wider view corridor at these two streets abutting the Development.

MM2 - Tree planting and/or green roof at the Development Site boundary and at the building is recommended for diversity of the visual experience at the pedestrian level.

MM3 - Provide greenery of not less than 20% of the site coverage of each MSB area, 10% of which would be within the primary zone to enhance the visual appearance.

MM4 - Proper design of the building façade and the adopted colour scheme to be in harmony with the environment

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	OCT 2022	HL	FIRST ISSUE	LW	SHC

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Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

PHOTOMONTAGES
(VANTAGE POINT 01)

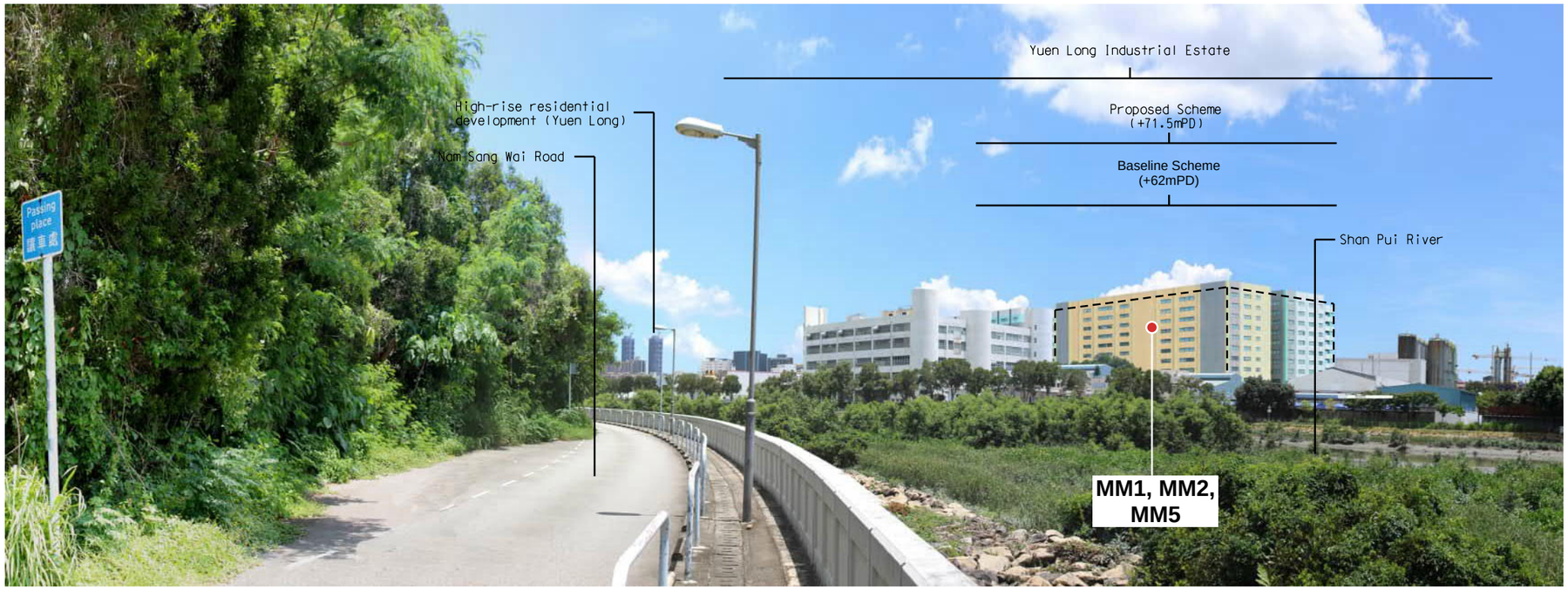
Designed	JC		Eng check	LW	
Drawn	HL		Coordination	JC	
Dwg check	JC		Approved	SHC	

Scale at A1	Status	Rev
N.T.S.	PRE	P1

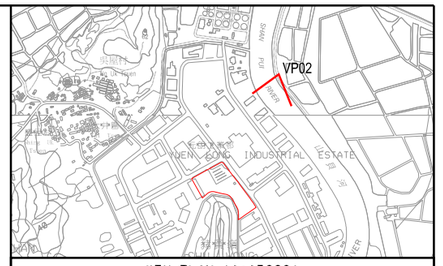
Drawing Number
MMH/369397/VIA/002A



Vantage Point 02: View looking southwest from Nam Sang Wai Road (Existing Situation)



Vantage Point 02: View looking southwest from Nam Sang Wai Road
Baseline Scheme: Building height profile of maximum building height restriction under OZP (S/YL/26)



KEY PLAN (1:15000)

LEGEND:

DEVELOPMENT SITE

BASELINE SCHEME

VANTAGE POINT 02 (VP02)
VANTAGE POINT ELEVATED +4.7mPD
VIEWING DISTANCE 725m
MAXIMUM HEIGHT AT PROPOSED SCHEME +71.5mPD

Mitigation Measures

MM1 - Provide a minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Streets to enhance streetscapes. This will provide a wider view corridor at these two streets abutting the Development.

MM2 - Tree planting and/or green roof at the Development Site boundary and at the building is recommended for diversity of the visual experience at the pedestrian level.

MM3 - Provide greenery of not less than 20% of the site coverage of each MSB area, 10% of which would be within the primary zone to enhance the visual appearance.

MM4 - Proper design of the building façade and the adopted colour scheme to be in harmony with the environment

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	OCT 2022	HL	FIRST ISSUE	LW	SHC

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SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

PHOTOMONTAGES
(VANTAGE POINT 02)

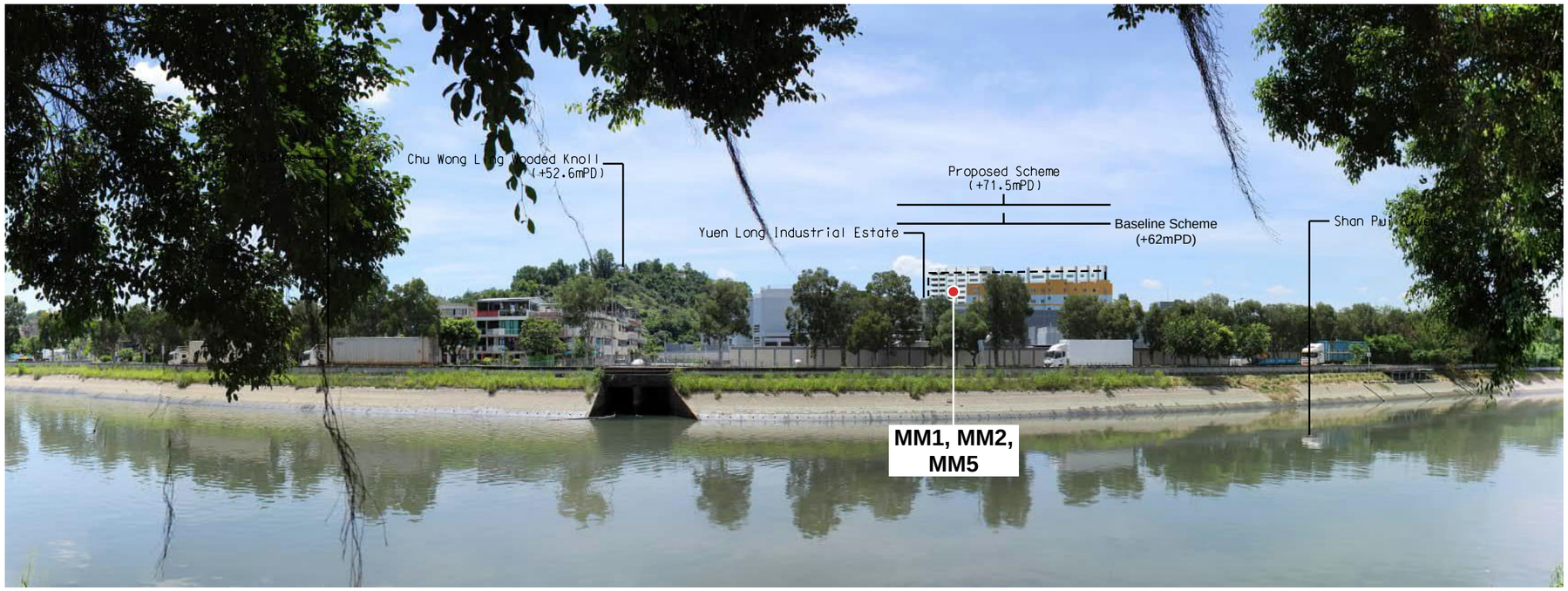
Designed	JC		Eng check	LW	
Drawn	HL		Coordination	JC	
Dwg check	JC		Approved	SHC	

Scale at A1	Status	Rev
N.T.S.	PRE	P1

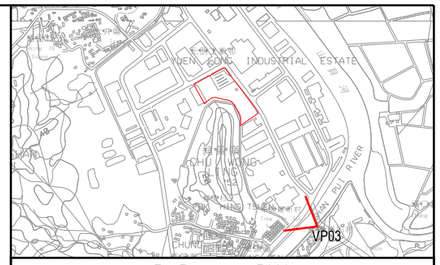
Drawing Number
MMH/369397/VIA/002B



Vantage Point 03: View looking northwest from Shan Pui Ho East Road (Existing Situation)



Vantage Point 03: View looking northwest from Shan Pui Ho East Road
Baseline Scheme: Building height profile of maximum building height restriction under OZP (S/YL/26)



KEY PLAN (1:15000)

LEGEND:

DEVELOPMENT SITE

BASELINE SCHEME

VANTAGE POINT 03 (VP03)
VANTAGE POINT ELEVATED +4.7mPD
VIEWING DISTANCE 828m
MAXIMUM HEIGHT AT PROPOSED SCHEME +71.5mPD

Mitigation Measures

MM1 - Provide a minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Streets to enhance streetscapes. This will provide a wider view corridor at these two streets abutting the Development.

MM2 - Tree planting and/or green roof at the Development Site boundary and at the building is recommended for diversity of the visual experience at the pedestrian level.

MM3 - Provide greenery of not less than 20% of the site coverage of each MSB area, 10% of which would be within the primary zone to enhance the visual appearance.

MM4 - Proper design of the building façade and the adopted colour scheme to be in harmony with the environment

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	OCT 2022	HL	FIRST ISSUE	LW	SHC

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AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

(VANTAGE POINT 03)

Designed	JC		Eng check	LW	
Drawn	HL		Coordination	JC	
Dwg check	JC		Approved	SHC	
Scale at A1 N.T.S.		Status PRE		Rev P1	

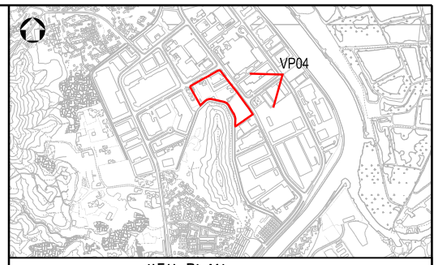
Drawing Number
MMH/369397/VIA/002C



Vantage Point 04: View looking west from Wang Fu Street (Existing Situation)



Vantage Point 04: View looking west from Wang Fu Street
Baseline Scheme: Building height profile of maximum building height restriction under OZP (S/YL/26)



KEY PLAN (1:15000)

LEGEND:

DEVELOPMENT SITE

BASELINE SCHEME

VANTAGE POINT 04 (VP04)
VANTAGE POINT ELEVATED +6.2mPD
VIEWING DISTANCE 291m
MAXIMUM HEIGHT AT PROPOSED SCHEME +71.5mPD

Mitigation Measures

MM1 - Provide a minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Streets to enhance streetscapes. This will provide a wider view corridor at these two streets abutting the Development.

MM2 - Tree planting and/or green roof at the Development Site boundary and at the building is recommended for diversity of the visual experience at the pedestrian level.

MM3 - Provide greenery of not less than 20% of the site coverage of each MSB area, 10% of which would be within the primary zone to enhance the visual appearance.

MM4 - Proper design of the building façade and the adopted colour scheme to be in harmony with the environment

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SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

PHOTOMONTAGES
(VANTAGE POINT 04)

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Dwg check	JC		Approved	SHC	

Scale at A1	Status	Rev
N.T.S.	PRE	P1

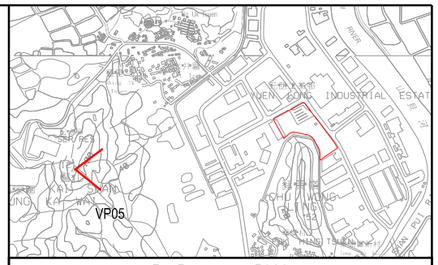
Drawing Number
MMH/369397/VIA/002D



Vantage Point 05: View looking southeast from the summit of Kai Shan (Existing Situation)



Vantage Point 05: View looking southeast from the summit of Kai Shan
Baseline Scheme: Building height profile of maximum building height restriction under OZP (S/YL/26)



KEY PLAN (1:15000)

LEGEND:

DEVELOPMENT SITE

BASELINE SCHEME

VANTAGE POINT 05 (VP05)
VANTAGE POINT ELEVATED +120.7mPD
VIEWING DISTANCE 946m
MAXIMUM HEIGHT AT PROPOSED SCHEME +71.5mPD

Mitigation Measures

MM1 - Provide a minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Streets to enhance streetscapes. This will provide a wider view corridor at these two streets abutting the Development.

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Title

PHOTOMONTAGES
(VANTAGE POINT 05)

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Drawn	HL		Coordination	JC	
Dwg check	JC		Approved	SHC	
Scale at A1	N.T.S.	Status	PRE	Rev	P1

Drawing Number
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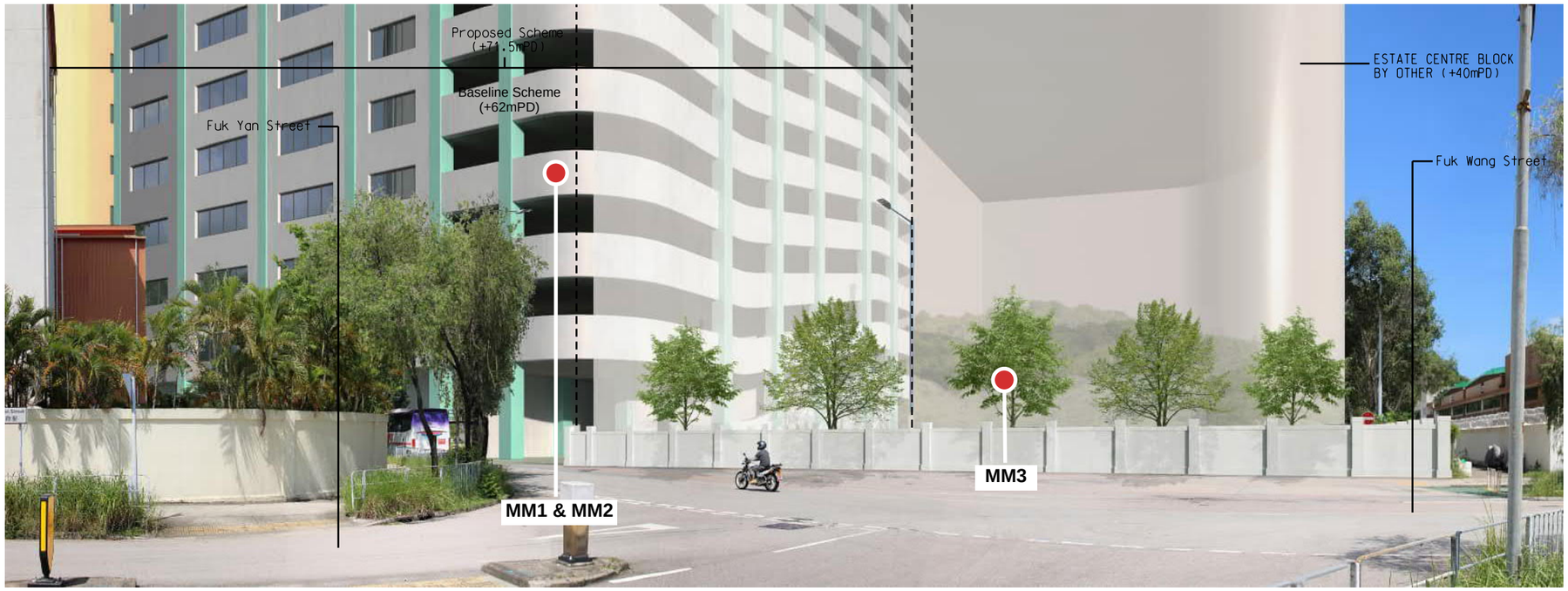
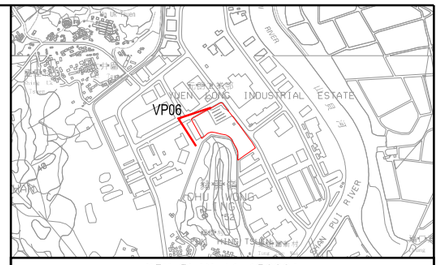
Vantage Point 06: View looking southeast from the junction of Fuk Wang Street and Fuk Yan Street (Existing Situation)



Vantage Point 06: View looking southeast from the junction of Fuk Wang Street and Fuk Yan Street
Baseline Scheme: Building height profile of maximum building height restriction under OZP (S/YL/26)



KEY PLAN (1:15000)

LEGEND:

DEVELOPMENT SITE

BASELINE SCHEME

VANTAGE POINT 06 (VP06)
VANTAGE POINT ELEVATED +4.1mPD
VIEWING DISTANCE 54m
MAXIMUM HEIGHT AT PROPOSED SCHEME +71.5mPD

Mitigation Measures

MM1 - Provide a minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Streets to enhance streetscapes. This will provide a wider view corridor at these two streets abutting the Development.

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Title
PHOTOMONTAGES
(VANTAGE POINT 06)

Designed	JC		Eng check	LW	
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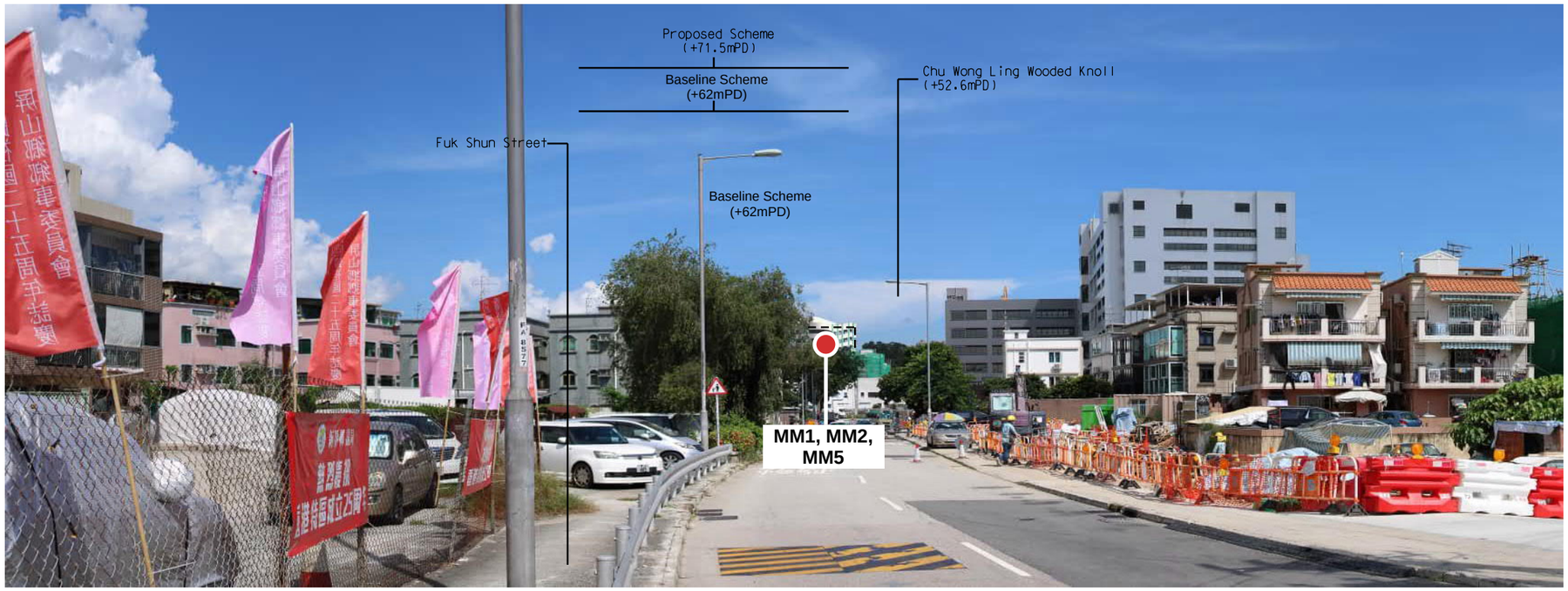
Scale at A1	N.T.S.	Status	PRE	Rev	P1

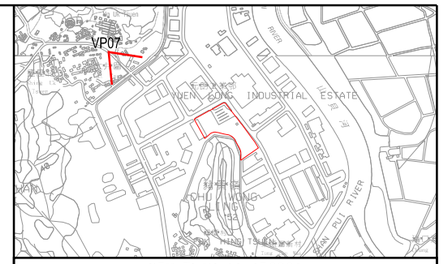
Drawing Number
MMH/369397/VIA/002F



Vantage Point 07: View looking southeast along Fuk Shun Street in Tai Tseng Wai (Existing Situation)



Vantage Point 07: View looking southeast along Fuk Shun Street in Tai Tseng Wai
Baseline Scheme: Building height profile of maximum building height restriction under OZP (S/YL/26)



KEY PLAN (1:15000)

LEGEND:

DEVELOPMENT SITE

BASELINE SCHEME

VANTAGE POINT 07 (VP07)
VANTAGE POINT ELEVATED +4.8mPD
VIEWING DISTANCE 561m
MAXIMUM HEIGHT AT PROPOSED SCHEME +71.5mPD

Mitigation Measures

MM1 - Provide a minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Streets to enhance streetscapes. This will provide a wider view corridor at these two streets abutting the Development.

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Title
PHOTOMONTAGES
(VANTAGE POINT 07)

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Dwg check	JC		Approved	SHC	
Scale at A1 N.T.S.		Status PRE		Rev P1	

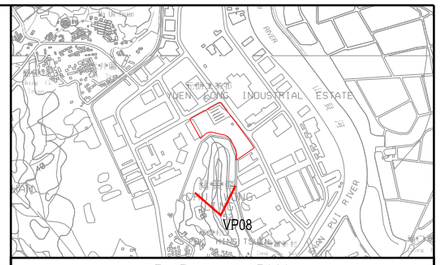
Drawing Number
MMH/369397/VIA/002G



Vantage Point 08: View for trail walker looking north from Chu Wong Ling summit pavilion (Existing Situation)



Vantage Point 08: View for trail walker looking north from Chu Wong Ling summit pavilion
Baseline Scheme: Building height profile of maximum building height restriction under OZP (S/YL/26)



KEY PLAN (1:15000)

LEGEND:

DEVELOPMENT SITE

BASELINE SCHEME

VANTAGE POINT 08 (VP08)
VANTAGE POINT ELEVATED +52.6mPD
VIEWING DISTANCE 392m
MAXIMUM HEIGHT AT PROPOSED SCHEME +71.5mPD

Mitigation Measures

MM1 - Provide a minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Streets to enhance streetscapes. This will provide a wider view corridor at these two streets abutting the Development.

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Title
PHOTOMONTAGES
(VANTAGE POINT 08)

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Dwg check	JC		Approved	SHC	

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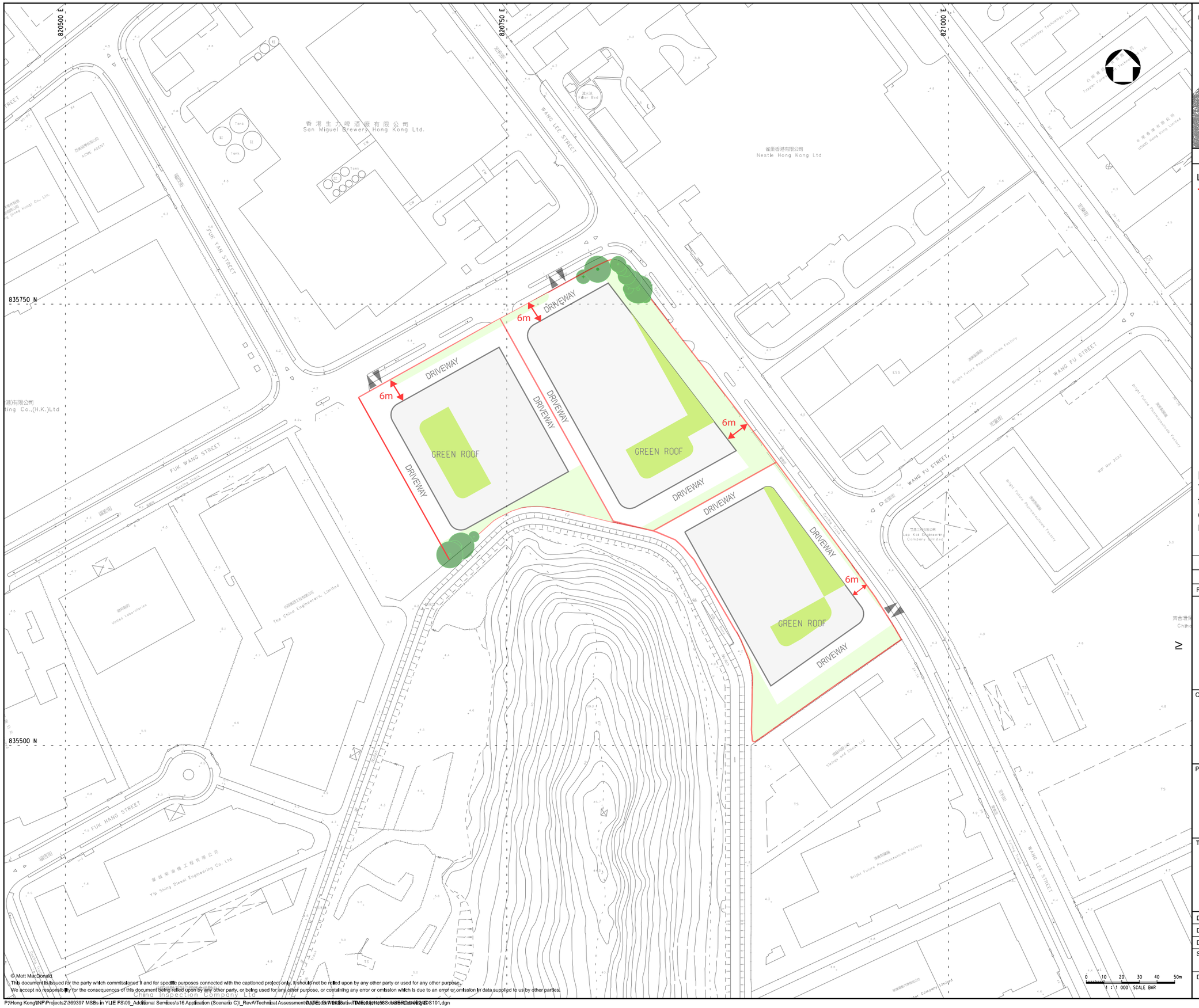



KEY PLAN (1:100000)

LEGEND:

- SITE BOUNDARY
- RETAINED TREE
- GREENING
- GREEN ROOF

INDICATIVE LOCATION OF ROAD-SIDE TERMINUS, FOOTPATH AND CYCLE TRACK SUBJECT TO DETAILED DESIGN BY FUTURE PROPONENT

Note:
The affected cycle track will be realigned at the ingress/egress points of the proposed development, together with updating of road marking and traffic signs at those locations.)

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Title
INDICATIVE MASTER LAYOUT PLAN - PROPOSED SCHEME

Designed	PK		Eng check	JC	
Drawn	MING		Coordination	JC	
Dwg check	PK		Approved	EC	

Scale at A1	Status	Rev
1:1000	PRE	P2

Drawing Number
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0 10 20 30 40 50m
1:1 000 SCALE BAR

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MOTT MACDONALD

Section 16 Planning Application for Multi-storey Building Developments at No. 32 Wang Lee Street and Adjoining Government Land, Yuen Long

Traffic and Transport Impact Assessment

Sep 2023

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Section 16 Planning Application for Multi-storey Building Developments at No. 32 Wang Lee Street and Adjoining Government Land, Yuen Long

Traffic and Transport Impact Assessment

September 2023

Mott MacDonald Hong Kong Limited
registered in Hong Kong no. 236497

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Document reference: 369397 | 01B | C |

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MMH/369397/TTIA/001	Proposed Access Location and Bus Layby
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MMH/369397/TTIA/001-SP2	Swept Path of 12.8m Bus at the Proposed Bus Bay
MMH/369397/TTIA/002	Not Used
MMH/369397/TTIA/003	Proposed Diversion Route for Route No. K68
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MMH/369397/TTIA/011	2032 Reference Flow
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MMH/369397/TTIA/012B	Development Flow for Logistics Use
MMH/369397/TTIA/013A	Public Transport Flow for Vehicle Servicing and Maintenance
MMH/369397/TTIA/013B	Public Transport Flow for Logistics Use
MMH/369397/TTIA/014A	2032 Design Flow for Vehicle Servicing and Maintenance
MMH/369397/TTIA/014B	2032 Design Flow for Logistics Use

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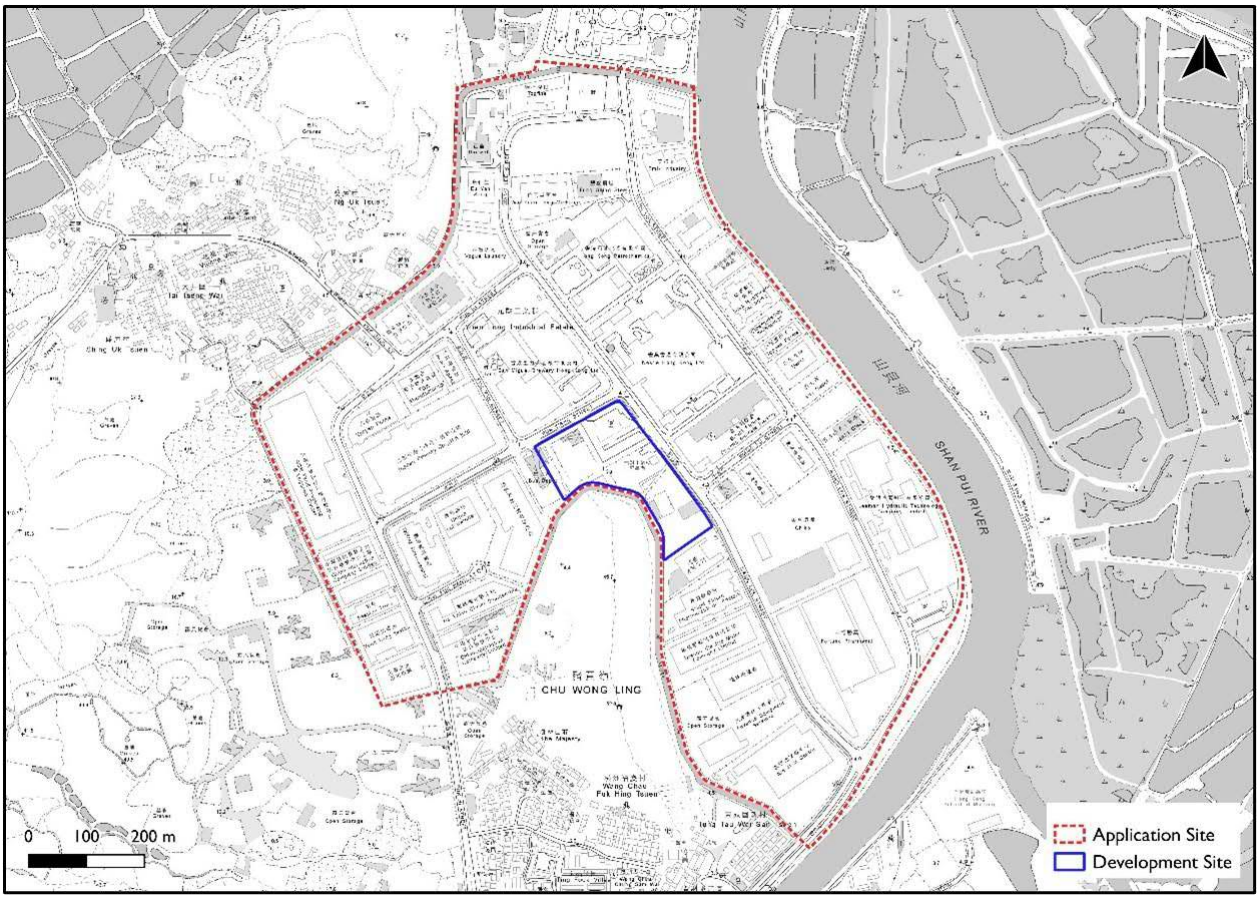
1 Introduction

1.1 Background

1.1.1 This Traffic and Transport Impact Assessment Report is prepared to support a Section 16 planning application for the proposed multi-storey buildings (MSBs) development (Proposed Development) at No. 32 Wang Lee Street and Adjoining Government Land, Yuen Long.

1.1.2 A Site Location Plan of the Development Site (the Site) is shown in **Figure 1.1**.

Figure 1.1: Site Location Plan



1.2 Structure of this Report

1.2.1 This report contains the following sections in addition to this introduction (Section 1):

1.2.2 **Section 2** – Development Proposal

1.2.3 **Section 3** – Existing Traffic Conditions

1.2.4 **Section 4** – Future Traffic Modelling

1.2.5 **Section 5** – Traffic and Transport Impact Assessment

1.2.6 **Section 6** – Summary and Conclusion

1.3 Abbreviations

1.3.1 The following abbreviations shall have the meaning hereby assigned to them except when the context of this Report otherwise requires:

Abbreviation for Bureaux/Departments/ organisations	**Full title**
AM	Morning Peak
AOI	Area of Influence
ATC	Annual Traffic Census
ATT	Attraction
BDTM	Base District Traffic Model
CEDD	Civil Engineering and Development Department
CTS	Comprehensive Transport Study
DEVB	Development Bureau
DFC	Design Flow-to-Capacity
EB	Eastbound
G/F	Ground Floor
GDP	Gross Domestic Product
GEH	Geoffrey E. Havers
GEN	Generation
GEO	Geotechnical Engineering Office of the Civil Engineering and Development Department
GFA	Gross Floor Area
GIU	General Industrial Use
GLA	Government Land Allocation
GMB	Green Minibus
GV	Goods Vehicle
GVTCS	Survey on Goods Vehicle Trip Characteristics
HGV	Heavy Goods Vehicle
HKPSG	Hong Kong Planning Standards and Guidelines

Abbreviation for Bureaux/Departments/ organisations	Full title
HSK	Hung Shui Kiu
HWSPB	Ho Wang SPB Limited
J/O	Junction of
L/UL	Loading/unloading
LATM	Local Area Traffic Model
LGV	Light Goods Vehicle
LOS	Level-of-Service
LRT	Light Rail Transit
MSB	Multi-storey Building
MTR	Mass Transit Railway
NB	Northbound
NDA	New Development Area
NT	New Territories
OU	Other Use
OZP	Outline Zoning Plan
PCU	Passenger Car Unit
PDZ	Planning Data Zone
PLB	Public Light Bus
PM	Evening Peak
PT	Public Transport
RC	Reserve Capacity
RDS	Railway Development Strategy
SB	Southbound
STM	Strategic Transport Model
STT	Short Term Tenancy
TCS	Travel Characteristics Survey
TD	Transport Department
TPDM	Transport Planning and Design Manual
TPEDM	Territorial Population and Employment Data Matrices
TTIA	Traffic and Transport Impact Assessment
V/C	Volume-to-Capacity Ratio
WB	Westbound
YLIP	Yuen Long InnoPark

2 Development Proposal

2.1 Indicative Layout of Proposed MSBs Development

2.1.1 The Site is proposed to provide three sites (**Sites A, B and C**) each about 1 ha to accommodate MSBs developments for industrial uses, totalling 3.23 ha in area.

2.1.2 **Figure 2.1** illustrates the indicative division of land parcels in the Site. It should be noted that the land parcels for proposed MSBs shown in the Site is indicative and solely for technical assessments purpose.

2.1.3 The proposed MSBs at Sites A, B and C are to be developed at a plot ratio of 5 with not more than 10 storeys above ground level excluding basement level.

2.1.4 It is anticipated that the land will be disposed by tender and the MSBs are targeted to start the operation in 2028/2029, with a construction period of 4 to 5 years. Major development parameters and proposed floor uses of the proposed MSBs are summarised in **Table 2.1** and **Table 2.2,** respectively.

Figure 2.1: Indicative Land Parcel for MSBs Development within the Development Site

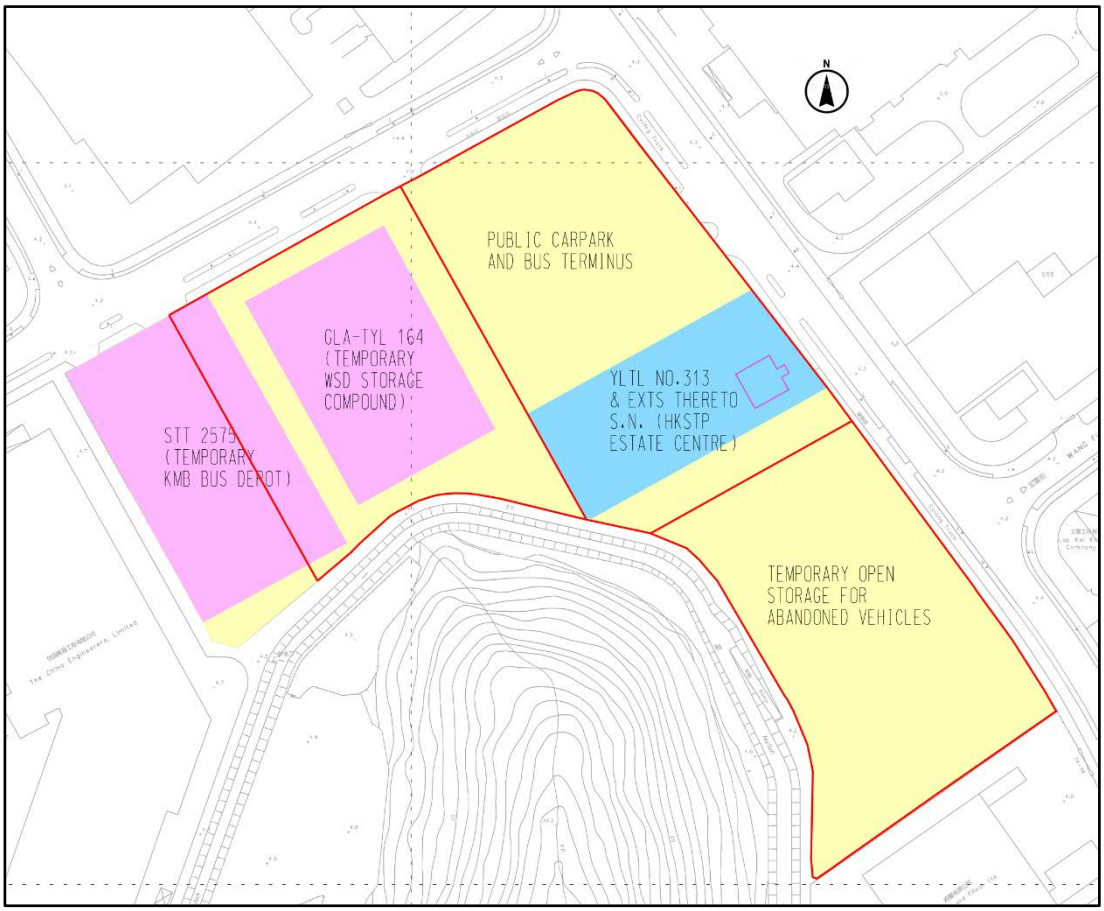


Table 2.1: Development Parameters for Indicative Scheme

Parameters	MSB in Site A	MSB in Site B	MSB in Site C	Total
Site Area	0.98 ha	1.25 ha	1.00 ha	3.23 ha
Maximum Plot Ratio	5			
GFA (m2)	49,000	62,500	50,000	161,500
Site Coverage	Not Specified			
Class of Site	Class A	Class B	Class A	
Land Uses	Vehicle Servicing and Maintenance and/or Logistics Uses + Not less than 30% for accommodating eligible brownfield operators displaced by the government-led development projects (industrial uses)			
No. of Storeys	No more than 10 storeys above ground level			

Table 2.2: Indicative Floor Uses of MSBs Development in Sites A, B and C

Floor	Proposed Uses
G/F-9/F	• Vehicle Servicing and Maintenance; • Logistics Uses; and/or • Industrial Uses (for accommodating eligible brownfield operators)
Basement (1 Level)	Public Vehicle Parking (in Site B)[1]

[1] Subject to the detailed design, a basement may be constructed in Site A and Site C to take up some underground space for ancillary parking, plant room, etc.

2.2 Reprovision of Affected Facilitates

2.2.1 A bus terminus for MTR bus route no. K68 is currently located within the Site. To maintain the operation of MTR bus route no. K68, a 42m long double width on-street bus layby to accommodate 6 nos. of 12.8m long bus is proposed at Wang Lee Street for K68 bus terminus during operational hours and for bus overnight parking purpose. The layout of the proposed bus layby at Wang Lee Street is shown in **Drawing no. MMH/369397/TTIA/001**. The swept paths of vehicles entering / leaving the proposed vehicular access is shown in **Drawing no. MMH/369397/TTIA/001-SP1** and the swept path of 12.8m bus is shown in **Drawing no. MMH/369397/TTIA/001-SP2**. Supporting facilities such as shelter and bus regulator's kiosk are to be reprovided upon relocation of bus terminus.

2.2.2 It is anticipated that the K68 bus terminus at YLIP may be required to be closed for a short period when the proposed MSB at Site B commences construction and before the new bus layby at Wang Lee Street is completed. During the interim period, setting up a temporary bus terminus at Fuk Wang Street is proposed to maintain the services of K68 bus. The diversion route of K68 and the temporary bus stop at Fuk Wang Street is shown in **Drawing no. MMH/369397/TTIA/003**. The swept path of 12.8m bus at the proposed diversion route is shown in **Drawing no. MMH/369397/TTIA/003-SP1.**

2.2.3 Since the reprovided bus terminus cannot provide turnaround facilities for buses of K68 making return trip to Wang Fu Street, the bus routing of K68 will be diverted to Wang Lee Street northbound, Fuk Hi Street westbound, Fuk Yan Street southbound, Fuk Wang Street eastbound and Wang Lee Street southbound with a detour of 900m. The catchment of bus route no. K68 will not be affected by the proposed local re-routing. The bus routing is shown in **Drawing no. MMH/369397/TTIA/003**. The pedestrian route between the development sites and the public transport services is shown in **Drawing no. MMH/369397/TTIA/004**. In view of the impact to bus services due to bus route detour and limited on-street operation space during the interim period, the reprovisioned bus terminus at Wang Lee Street would be provided as soon as possible within one year after the land sale.

2.2.4 The existing cycle track along Wang Lee Street will be realigned to provide a 3.5m wide footpath for passenger waiting and pedestrian passage at Wang Lee Street western footpath near the proposed bus layby shown in **Drawing no. MMH/369397/TTIA/001**. The realigned cycle track will be maintained at 3.5m wide and two pedestrian crossings across the cycle track will be provided for pedestrian to access the reprovisioned bus terminus.

2.2.5 There are a total of 19 motorcycle parking spaces, 15 coach parking spaces, 12 heavy goods vehicle parking spaces, 56 no. private car metered parking spaces and 2 nos. for disabled parking spaces in the area occupied by the Site B. It is proposed that the proposed MSB in Site B will reprovide all the affected public parking spaces in addition to those required for the proposed MSB under the HKPSG.

2.2.6 In case that if the proposed three sites are not to be disposed of at the same time, it is considered that part of the sites may be used for interim parking to meet the high demand for both private cars and goods vehicles parking spaces in the YLIP area.

2.3 Parking and Loading/Unloading Provision

2.3.1 The parking and loading/unloading provision of the MSBs for the proposed land uses are:

- Logistics uses: as per the functional needs; reference may be made to the requirements specified in a recent land lease document for similar logistics development.
- Vehicle servicing and maintenance: as per Rural Based Industrial Use specified in HKPSG for parking; and as per the functional needs for loading and unloading provision with reference to existing vehicle servicing and maintenance workshop; and
- Brownfield operations: there are no specific parking provision standards for the brownfield operations in the HKPSG. In view of the nature of their industrial operations (mainly involving warehouse related and minor industrial processes), it is proposed to refer to the General Industrial Use of the HKPSG.

2.3.2 The requirements are summarised in **Table 2.3** and the recommended parking and loading/unloading provisions for Site A, B and C are shown in **Table 2.4.** For the possible different mixes of major land uses, two cases have been presented in the table – **Case 1** for 70% of the MSB GFA being for vehicle servicing and maintenance; and **Case 2** for 70% of the MSB GFA being for logistics use.

2.3.3 **Table 2.5** gives details of the affected public parking spaces in Site B, which are to be re-provided in the basement of the MSB in Site B. If the 70% of the site would be used for logistics, the internal access road should be designed with adequate queuing/waiting spaces within the site to ensure that the smooth circulation and no waiting vehicles will queue back to the public road.

2.3.4 **Table 2.6** and **Table 2.7** consolidate the total provisions from **Table 2.4** and **Table 2.5** for the above-mentioned **Case 1** and **Case 2**, respectively.

Table 2.3: HKPSG Requirements on Parking and Loading/Unloading for General industrial Use, Rural Based Industrial Use and Other Industrial Uses with Special Requirements (SI)

Type of Development	Parking Requirements	Loading/Unloading Requirements
General Industrial Use (GIU)	◆ Private car: 1 per 1 000 -1 200m² GFA. Remarks: see Notes (1) – (3)	◆ 1 goods vehicle bay per 700-900m² GFA, 50% of which should be for parking of goods vehicles. Remarks: see Notes (4) – (7) ◆ One container vehicle loading/unloading bay with turning circle of 11.6m outer radius should be provided for a site with dimensions not less than 45m x 40m. Remarks: see Notes (4) – (7)
Rural Based Industrial Use (RIU)	◆ 1 parking space per establishment or 1 parking space for every 900m² GFA of the establishment, whichever is the greater, for lorry/visitor parking. Remarks: see Notes (1), (9), (10) & (11)	◆ As per functional needs[3]
Other Industrial Uses with Special Requirements (SI)	◆ As per functional needs[4]	As per functional needs[5]

Notes:

1. *The relevant standards of the HKPSG Chapter 8 for Internal Transport Facilities will apply where other supporting facilities are provided.*
2. *Provision referring to gross floor area (GFA) includes part thereof of the specified m^2 GFA.*
3. *The following design standards apply:*
   - *i) For private cars: Turning circle - 7.5m outer radius.*
   - *ii) For goods vehicles: turning circle - 11.5m outer radius.*
4. *Goods vehicle provision is divided into 65 % Light Goods Vehicles (LGV) and 35 % Heavy Goods Vehicles (HGV).*
5. *The space provided for loading/unloading is required to abut a goods handling platform or area which must be provided and so laid out that the goods loading/unloading from/to such platform or area may be transported within the lot to all parts of the building both horizontally and vertically. It does not apply to those goods vehicle bays being used for parking of goods vehicles.*
6. *The goods handling platform or area must give access to the building in accordance with the Code of Practice for Provision of Means of Escape in Case of Fire and allied requirements made under the Buildings Ordinance.*
7. *All parking and loading/unloading bays shall be laid out in such a way to avoid the need for vehicles to reverse onto roads abutting the lot.*
8. *The provision of container vehicle loading/unloading bay on sites with dimensions less than 45m x 40m should be considered on a case-by-case basis and in consultation with the Transport Department.*
9. *50% of all the above required goods vehicle bays shall be for parking of goods vehicles.*

[3] With reference to an existing vehicle servicing and maintenance workshop at Kowloon Bay which is in a similar nature with the Case 1: 70% of MSB GFA for Vehicle Servicing and Maintenance. Adopting similar provisions, it is recommended to provide (a) 1 loading/unloading bay for CV per 50,000 m^2 GFA; (b) 1 loading/unloading bay for lorries per 1,800 m^2 GFA (assume 25% for HGV).

[4] Adopted requirements from recent leases comprise: one private car parking per 1,400 sq m GFA; one goods vehicle parking per 1,400 sq m GFA, of which 25% are for container vehicles and 75% are for heavy goods vehicles.

[5] Adopted requirements from recent leases comprise: one goods vehicle loading/unloading bay per 1,400 sq m GFA, of which 25% are for container vehicles and 75% are for heavy goods vehicles.

10. *Goods vehicle provision is divided into 65 % Light Goods Vehicles (LGV) and 35 % Heavy Goods Vehicles (HGV).*
11. *Provision referring to gross floor area (GFA) includes part thereof the specified m2 GFA.*

Table 2.4: Parking and Loading / Unloading Provision for Proposed MSBs^

Brownfield Operation Portion (30% of MSB GFA)						
Type		**HKPSG Standard (GIU)**	**Required Provision**			
			Site A	**Site B**	**Site C**	**Total**
Private Car	Parking	1 per 1,000-1,200 m^2 GFA	15	19	15	49
Private Car (Disabled)	Parking	1 for total 1~50 Car Parking Space in Lot	1	1	1	3
Motorcycle	Parking	5% to 10% of total provision for private cars	2	2	2	6
Light Goods Vehicle	Parking	1 goods vehicle bay per 700-900 m^2 GFA [50% for parking] [65% LGV; 35% HGV]	7	9	7	23
	L/UL		7	9	7	23
Heavy Goods Vehicle	L/UL		4	5	4	13
	Parking		4	5	4	13
Container Vehicle	L/UL	One container vehicle loading/unloading bay with turning circle of 11.6m outer radius should be provided for a site with dimensions not less than 45m x 40m.	1	1	1	3
Case 1: 70% of MSB GFA for Vehicle Servicing and Maintenance						
Type		**HKPSG Standard (RIU) / Existing vehicle servicing and maintenance workshop**	**Site A**	**Site B**	**Site C**	**Total**
Private Car	Parking	1 parking space for every 900m^2 [6]	39	49	39	127
Private Car (Disabled)	Parking	1 for total 1~50 Car Parking Space in Lot	1	1	1	3
Motorcycle	Parking	5% to 10% of total provision for private cars	4	5	4	13
Light Goods Vehicle	L/UL	1 goods vehicle bay per 1,800 m^2 GFA [75% LGV; 25% HGV]	15	19	15	49
Heavy Goods Vehicle	L/UL		5	7	5	17
Container Vehicle	L/UL	1 loading/unloading bay for CV per 50,000 m^2 GFA	1	1	1	3

[6] As the loading/unloading provision for goods vehicles is referenced to an existing vehicle servicing and maintenance workshop and deemed sufficient for lorry/visitor use, the HKPSG requirement of "*1 parking space per establishment or 1 parking space for every 900m2 GFA of the establishment, whichever is greater, for lorry/visitor parking*" is assumed to be all private car parking.

Case 2: 70% of MSB GFA for Logistics Uses						
Type		**HKPSG Standard (Other Industrial Uses with Special Requirements (SI))**	**Site A**	**Site B**	**Site C**	**Total**
Private Car	Parking	As per functional needs	25	32	25	82
Private Car (Disabled)	Parking	1 for total 1~50 Car Parking Space in Lot	1	1	1	3
Motorcycle	Parking	As per functional needs	4	5	4	13
Light Goods Vehicle	Parking	As per functional needs	Nil	Nil	Nil	Nil
	L/UL	As per functional needs	Nil	Nil	Nil	Nil
Heavy Goods Vehicle	L/UL	As per functional needs	19	24	19	62
	Parking	As per functional needs	19	24	19	62
Container Vehicle	L/UL	As per functional needs	7	8	7	22
	Parking	As per functional needs	7	8	7	22

^: High end of the HKPSG requirement is adopted in preparing the table.

*: figures may not add up to total due to rounding

#: 1. 50% of all the above required goods vehicle bays shall be for parking of goods vehicles.

2. Goods vehicle provision is divided into 65 % LGV and 35 % HGV.

3. Provision referring to gross floor area (GFA) includes part thereof the specified m2 GFA.

4. For Industrial Estates, the parking requirement is the minimum provision. The Hong Kong Science and technology Parks Corporation will assess the actual parking provision on an individual site basis.

~: the calculation of the parking spaces under Case 1 is based on GFA and the required number of parking spaces might be subject to further review when the number of the establishment is known.

Table 2.5: Parking Facilities to be Reprovided in the Proposed MSBs

Parking Facilities to be Affected	**Required Reprovision**			
	Site A	**Site B**	**Site C**	**Total**
Coach	-	15	-	15
Heavy Goods Vehicle	-	12	-	12
Private Car	-	56	-	56
Disabled Parking	-	2	-	2
Motorcycle	-	19	-	19

Table 2.6: Overall Required Parking and L/UL Provision with Vehicle Servicing and Maintenance as Major Land Use

Type		Site A			Site B			Site C		
		Reprovision of Affected Facilities [a]	Required Provision from RIU/ existing workshop [b]	Total [c] = [a] + [b]	Reprovision of Affected Facilities [a]	Required Provision from RIU/ existing workshop [b]	Total [c] = [a] + [b]	Reprovision of Affected Facilities [a]	Required Provision from RIU/ existing workshop [b]	Total [c] = [a] + [b]
Private Car	Parking	-	54	54	56	68	124	-	54	54
Private Car (Disabled)	Parking	-	2	2	2	2	4	-	2	2
Motorcycle	Parking	-	6	6	19	7	26	-	6	6
Light Goods Vehicle	Parking	-	7	7	-	9	9	-	7	7
	L/UL	-	22	22	-	28	28	-	22	22
Heavy Goods Vehicle	L/UL	-	9	9	-	12	12	-	9	9
	Parking	-	4	4	12	5	17	-	4	4
Coach	Parking	-	-	-	15	-	15	-	-	-
Container Vehicle	L/UL	-	2	2	-	2	2	-	2	2
	Parking	-	-	-	-	-	0	-	-	-

^: High end of the HKPSG requirement is adopted in preparing the table.

Table 2.7: Overall Required Parking and L/UL Provision with Logistics as Major Land Use

Type		Site A			Site B			Site C		
		Reprovision of Affected Facilities [a]	Required Provision from HKPSG [b]	Total [c] = [a] + [b]	Reprovision of Affected Facilities [a]	Required Provision from HKPSG [b]	Total [c] = [a] + [b]	Reprovision of Affected Facilities [a]	Required Provision from HKPSG [b]	Total [c] = [a] + [b]
Private Car	Parking	-	40	40	56	51	107	-	40	40
Private Car (Disabled)	Parking	-	2	2	2	2	4	-	2	2
Motorcycle	Parking	-	6	6	19	7	26	-	6	6
Light Goods Vehicle	Parking	-	7	7	-	9	9	-	7	7
	L/UL	-	7	7	-	9	9	-	7	7
Heavy Goods Vehicle	L/UL	-	23	23	-	29	29	-	23	23
	Parking	-	23	23	12	29	41	-	23	23
Coach	Parking	-	-	-	15	-	15	-	-	-
Container Vehicle	L/UL	-	8	8	-	9	9	-	8	8
	Parking	-	7	7	-	8	8	-	7	7

^: High end of the HKPSG requirement is adopted in preparing the table.

2.4 Access Arrangement and Traffic Management

2.4.1 The Site is adjacent to the existing Wang Lee Street and Fuk Wang Street. There are several vehicular accesses surrounding the Site. It is assessed that the width of the existing accesses would permit entry of heavy good vehicles and container vehicles up to 16m long from the near side into three MSB sites without encroachment onto an adjacent lane.

2.4.2 The access points to each MSB sites will be maintained at a minimum distance of 30m from the nearby road junctions to comply with TPDM Vol. 2. para. 3.6.2.5 (**Drawing no. MMH/369397/TTIA/001**)**.** Visibility of the access road will also be maintained at 60m to comply with TPDM Vol.2 Table 3.6.3.1.

3 Existing Conditions of Development Site

3.1 Existing Road Network

3.1.1 The Site is bounded by Wang Lee Street and Fuk Wang Street to the north of Chu Wong Ling. Future traffic from the proposed MSBs is expected to make use of Fuk Hi Street, Long Ping Road, Long Tin Road and NT circular Road to the west; Wang Lee Street, Wang Lok Street, Yuen Long On Lok Road immediate to the south; and Castle Peak Road – Yuen Long Section and Yuen Long Highway / Route 3 to the east.

3.2 Concerned Junctions and Links for TTIA Study

3.2.1 **Drawing no. MMH/369397/TTIA/005** shows the location of the key junctions and road links to be included for the assessment of the traffic impact of the proposed MSBs. The key junctions and links are listed in **Table 3.1** and **Table 3.2** for ease of reference.

Table 3.1: Concerned Junctions for TTIA Study

No.	Location	Type
J1	Wang Lee St / Fuk Wang St	Priority
J2	Fuk Yan St / Fuk Wang St	Priority
J3	Fuk Wang St / Fuk Hi St	Priority
J4	Fuk Hi St / Long Ping Rd	Signal
J5	Long Ping Rd / Fung Chi Rd	Signal
J6	Shui Pin Wai Interchange	Signal
J7	Wang Lok St / Wang Tat Rd / Ma Wang Rd / Long Yip St / Yuen Long On Lok Rd	Signal
J8	Fuk Hi St / Wang Lok St	Signal
J9	Wang Lok St / Fu Yip St	Signal
J10	Wang Lee St / Wang Lok St	Priority
J11	Long Yip St / Yuen Long On Lok Rd / Po Yip St	Signal
J13	Pok Oi Interchange	Roundabout
J14	Tong Yan San Tsuen Interchange	Priority
J16	Castle Peak Road - Yuen Long / Long Yat Road	Signal

Table 3.2: Concerned Road Links for TTIA Study

No.	Location
L1	Fuk Hi St (section between Fuk Wang St and Long Ping Rd)
L2	Wang Lok St (section between Wang Lee St and Fu Yip St)
L3	Long Ping Rd (section between Fuk Hi St and Fung Chi Rd)
L4	Long Ping Rd (section between Fung Chi Rd and Long Tin Rd)
L5	Long Tin Rd (section between Castle Peak Road – Ping Shan and Yuen Long Highway)
L6	Long Yip St / Yuen Long On Lok Rd (section between Po Yip St and Wang Lok St)
L7	Castle Peak Rd – Yuen Long (section between Long Yat Rd and Pok Oi Interchange)
L8	Yuen Long Highway section between Tong Yan San Tsuen Interchange and Shap Pat Heung Interchange
L9	Slip Rd from Long Tin Rd to Yuen Long Highway Eastbound
L10	Slip Rd from Long Tin Rd to Yuen Long Highway Westbound
L11	Slip Rd from Yuen Long Highway Eastbound to Long Tin Rd
L12	Slip Rd from Yuen Long Highway Westbound to Long Tin Rd

3.3 Traffic Count Survey

3.3.1 A traffic count survey was conducted on 5 May 2022 to obtain updated traffic condition in the area. At that time, the pandemic was under control. The results are therefore considered as representative of the normal traffic.

3.3.2 The survey was conducted on a normal weekday in the peak periods of AM from 07:30 to 09:30 and PM from 17:00 to 19:00. The worst external traffic impact duration is expected to occur at normal AM and PM peak hours, whereas the operation traffic of the proposed MSBs is considered site / land use specific.

3.3.3 The observed 2022 traffic flows for the concerned junctions / links within the AOI are shown in **Drawing no. MMH/369397/TTIA/006**.

3.4 Base Year Junction and Link Performance

3.4.1 The existing junction capacity for the critical junctions during the AM and PM peak hour periods have been assessed and the results of the junction performance are summarised in **Table 3.3**. The existing junction layouts are enclosed in **Annex B**.

Table 3.3: Summary of 2022 Junction Performance

No.	Junction	Junction Type	2022 RC/DFC/VC	
			AM	PM
J1	Wang Lee St / Fuk Wang St	Priority	0.19	0.14
J2	Fuk Yan St / Fuk Wang St	Priority	0.08	0.06
J3	Fuk Wang St / Fuk Hi St	Priority	0.24	0.14
J4	Fuk Hi St / Long Ping Rd	Signal	50%	54%
J5	Long Ping Rd / Fung Chi Rd	Signal	79%	92%
J6	Shui Pin Wai Interchange	Signal	53%	48%
J7	Wang Lok St / Wang Tat Rd / Ma Wang Rd / Long Yip St / Yuen Long On Lok Rd	Signal	43%	42%
J8	Fuk Hi St / Wang Lok St	Signal	55%	52%
J9	Wang Lok St / Fu Yip St	Signal	75%	95%
J10	Wang Lee St / Wang Lok St	Priority	0.30	0.29
J11	Long Yip St / Yuen Long On Lok Rd / Po Yip St	Signal	22%	32%
J12	Castle Peak Road – Yuen Long/Long Yip Street/Yuen Long On Lok Road/Long Yat Road	Signal	18%	32%
J13	Pok Oi Interchange	Roundabout	0.84	0.76
J14	Tong Yan San Tsuen Interchange[7]	Priority	1.22	1.42
J16	Castle Peak Road - Yuen Long / Long Yat Road	Signal	36%	50%

Note: DFC – Design Flow to Capacity for priority junction and roundabout. DFC of 0.85 indicates that the junction is operating satisfactorily while DFC over 1.0 indicates the junction is overloaded.
RC – Reserve Capacity for signalised junction. A signal-controlled junction with a RC of 15% implies that it is operating satisfactorily while a negative RC implies it is overloaded.

3.4.2 The results of junction capacity analysis show that the concerned junctions are operating satisfactorily except J14 – Tong Yan San Tsuen Interchange during both AM and PM peak hours and with no capacity problems. The junction capacity calculation sheets are enclosed in **Annex A**.

3.4.3 The existing road link capacity analysis for the concerned links is summarised in **Table 3.4**.

[7] J14 at Tong Yan San Tsuen will be modified by Yuen Long South Development into free flow slip roads in the design year, hence it will not be calculated in 2032 Reference and Design case.

Table 3.4: Summary of 2022 Road Link Performance

No.	Road Section	Bound	Con-fig	Capacity (pcu/hr) (1)	Flow (pcu/hr)		VC Ratio (2)	
					AM	PM	AM	PM
L1	Fuk Hi St (section between Fuk Wang St and Long Ping Rd)	SB	S1	1,250	700	575	0.56	0.46
		NB	S1	1,250	695	570	0.56	0.46
L2	Wang Lok St (section between Wang Lee St and Fu Yip St)	SB	S2	2,800	410	360	0.15	0.13
		NB	S2	2,800	360	250	0.13	0.09
L3	Long Ping Rd (section between Fuk Hi St and Fung Chi Rd)	SB	S2	2,800	920	905	0.33	0.32
		NB	S2	2,800	740	675	0.26	0.24
L4	Long Ping Rd (section between Fung Chi Rd and Long Tin Rd)	SB	S2	2,800	820	875	0.29	0.31
		NB	S2	2,800	810	865	0.29	0.31
L5	Long Tin Rd (section between Castle Peak Road – Ping Shan and Yuen Long Highway)	SB	D3	5,600	3,545	3,235	0.63	0.58
		NB	D2	3,600	3,025	3,795	0.84	1.05
L6	Long Yip St / Yuen Long On Lok Rd (section between Po Yip St and Wang Lok St)	EB	S2	3,050	1,285	1,180	0.42	0.39
		WB	S3	4,850	945	1,140	0.19	0.24
L7	Castle Peak Rd – Yuen Long (section between Long Yat Rd and Pok Oi Interchange)	EB	D3	5,700	3,320	2,735	0.58	0.48
		WB	D3	5,700	2,455	3,055	0.43	0.54
L8	Yuen Long Highway section between Tong Yan San Tsuen Interchange and Shap Pat Heung Interchange	EB	D3	6,100	5,805	3,820	0.95	0.63
		WB	D3	6,100	3,830	4,590	0.63	0.75
L9	Slip Road from Long Tin Road (SB) to Yuen Long Highway (EB)	-	-	1,800	1,460	950	0.81	0.53
L10	Slip Road from Long Tin Road (SB) to Yuen Long Highway (WB)	-	-	1,800	1,230	1,285	0.68	0.71
L11	Slip Road from Yuen Long Highway (EB) to Long Tin Road (NB)	-	-	1,800	1,310	1,735	0.73	0.96
L12	Slip Road from Yuen Long Highway (WB) to Long Tin Road (NB)	-	-	1,800	1,110	1,550	0.62	0.86

Notes: (1) Link capacity refers to CTS-3 Report
(2) VC means Volume to capacity ratio. V/C ratio of 1.0 indicates that the capacity has been reached; a V/C ratio between 1.0 and 1.2 would indicate a manageable degree of congestion. A V/C ratio above 1.2 means the onset of more serious congestion.

No.	Road Section	Bound	Con-fig	Capacity (pcu/hr) (1)	Flow (pcu/hr)		VC Ratio (2)	
					AM	PM	AM	PM

(3) It is considered that the 2022 observed traffic flows of slip road L9 from Long Tin Road SB to Yuen Long Highway EB may be on the low side. In view of the contribution of the traffic flows due to the development to the road link L9 is minimal, the traffic impact on the slip road L9 under 2032 design case is insignificant.

3.4.4 It is assessed that all the concerned road links are operating with adequate capacities except for L5 – Long Tin Road northbound during PM peak hours.

3.5 Existing Pedestrian and Cycle Track Network

3.5.1 Pedestrian movements to/from the proposed MSBs are adequately served by at-grade footpaths and at-grade cautionary pedestrian crossings. The pedestrian footpaths along Wang Lee Street and Fuk Wang Street in the vicinity of the proposed MSBs are about 2.5m to 3.2m clear width. The existing pedestrian facilities in the vicinity are shown in **Drawing no. MMH/369397/TTIA/007**.

3.5.2 As the walking distance between the J/O Fuk Wang Street and Wang Lee Street to Long Ping MTR Station is approximately 2km, commuters travel on foot between the nearest MTR Station and YLIP is not expected. Majority of the commuters will use feeder mode such as buses and GMB to reach their destination.

3.5.3 The existing pedestrian footpaths in the YLIP is therefore mainly to provide convenient pedestrian connection to the nearby bus and GMB stops and from the bus and GMB stops to the various industrial undertaking in the YLIP and the village housing areas in the vicinity.

3.5.4 The existing cycle track and cycle parking facilities in the vicinity of the proposed MSBs are indicated in **Drawing no. MMH/369397/TTIA/008**. Cyclists can reach the proposed MSBs from Yuen Long through the cycle tracks at Long Ping Estate, Tung Tau Industrial Area, Wang Lok Street and Wang Lee Street.

3.5.5 The proposed MSBs will affect the existing 40 nos. of cycle parking spaces (to the north of the current site of GLA-TYT 164). It is the only public cycle parking facility in Wang Chau and it serves cyclists reaching the YLIP from the adjacent area.

3.5.6 Although cycling facilities are provided in the vicinity of the proposed MSBs, site observation suggests that the use of cycling as a means of direct access to work at YLIP is expected to be minimal.

3.6 Existing Public Transport Facilities

3.6.1 There are two feeder routes (one bus route and one GMB route) servicing between YLIP and Yuen Long:

- Circular MTR Feeder Bus Route No. K68 serving between YLIP and Yuen Long Park with the terminus at YLIP (with the Site B)
- GMB Route No. 74 serving between Yuen Long (Fook Hong Street) and Shing Uk Tsuen

3.6.2 During the AM peak hour, it is observed that the demand for GMB service is close to their capacities. The public transport facilities in the vicinity are shown in **Drawing no. MMH/369397/TTIA/009**.

3.6.3 The proposed MSBs will generate employment opportunities for workers, drivers and operators. Taken into consideration of the high accessibility of the Site to public transport facilities and pedestrian walkway system in Yuen Long and Long Ping, it is anticipated that the employees and workers would likely use public transport to reach the proposed MSBs.

3.6.4 The transport impact and the proposed measures to address the shortfall in public transport are further discussed in **Section 5**.

3.7 Interim Arrangement of the Affected Public Vehicle Park and Bus Terminus

3.7.1 The existing public vehicle park would be affected during the construction stage. It is expected that the existing public vehicle park at Wang Lok Street can accommodate the demand for private car parking. For the affected parking spaces for motorcycles, coaches, buses, and goods vehicles, some existing night-time roadside parking spaces at Wang Lee Street, Fuk Wang Street, Fuk Hi Street, and Fuk Yan Street will gradually be converted to roadside parking spaces.

3.7.2 The existing bus terminus at Yuen Long InnoPark would be temporarily relocated to Fuk Wang Street.

4 Future Traffic Modelling

4.1 Design Years and Modelling Approach

4.1.1 A two-tier transport modelling approach is adopted for the traffic and transport assessment. The upper tier STM using the HWSPB in-house model would support the strategic transport planning analysis which provide the boundary conditions and zonal traffic growth information for the lower tier LATM using the BDTM. The LATM would evaluate the traffic and transport implication and assist for formulating traffic and transport improvement proposals to meet local transport demands.

4.1.2 The proposed MSBs are targeted to start operation in year 2029. The design year is taken as 3 years after the completion year (i.e. 2032) for the assessment of the traffic impact for the operation of all the three MSBs at the same time as the worst case approach.

4.2 Planning and Model Assumptions

Population and Employment

4.2.1 The following sections outline the key points on assumptions on the modelling methodology and nearby new developments.

4.2.2 Since the design year of the latest 2015-based BDTM is up to the year 2026, annual zonal growth factors are applied to project the 2026 traffic flows onto the 2032 traffic flows.

4.2.3 The annual growth factors are determined by referring to the growth of population and employment, GDP growth and cross-boundary traffic forecast of the relevant zones.

4.2.4 According to the current PDZ system of the 2019-based TPEDM, the proposed MSBs are bounded within PDZ Zone 232.

4.2.5 The design year model matrices have been developed based on the updated matrices taking into account of the future population and employment data.+

Developments in the Vicinity

4.2.6 Several new developments in Yuen Long area are under construction / planned to be built. These developments are shown in **Table 4.1**.

Table 4.1: New Developments in Yuen Long

No.	Developments	Case No.	Development Parameter	Tentative Completion Year
1	Proposed Comprehensive Residential and Commercial (Eating Place and Shop and Services) Development	A/TSW/63-1	1,777 Flats, 1,858 m2 Commercial GFA	Before 2032
2	Proposed Comprehensive Residential Development with Wetland Nature Reserve, Filling of Pond and Excavation of Bund Resulting in No Net Loss of Wetland	A/YL-LFS/224	1,958 Flats	Before 2032
3	No. 21 Wang Yip Street West, Yuen Long, New Territories (Yuen Long Town Lot No. 461)	A/YL/257-1	335 Flats	Before 2032
4	Wang Chau Public Housing Development (Phase 1)*	-	4,000 Flats	2026
5	Yuen Long Station Property Development	A/YL/209	1,876 Flats	2023
6	Various Lots in D.D. 115 and Adjoining Government Land, Yuen Long, New Territories	A/YL/172	640 m^2	Before 2032
8	Sha Po North Development*	A/YL-KTN/118-2	4,282 Flats	2031
9	Sha Po South Development*	A/YL-KTN/319-2	830 Flats, 17,860 m^2 Commercial GFA	2031
10	Proposed Office cum Public Car Park with Ground Floor Retail Shops	A/YL/253	17,860 m^2 Commercial GFA, 418 Parking Spaces	Before 2032
11	Proposed Underground Public Vehicle Park (excluding Container Vehicle) and Re-provisioning of Permitted Sports Facilities	A/YL/290	180 car parking spaces	2026
12	Public Housing Development at Long Bin, Yuen Long*	A/YL-TYST-1074	11,700 Flats	2029

*: Developments already included in 2019-based TPEDM

4.2.7 According to the available information, the target population intake for the remaining phases of public housing developments at Wang Chau will be 2033 the earliest. Hence, the Wang Chau remaining phases developments are not considered in the traffic impact assessment.

Highway and Railway Network Assumptions Relevant to this Study

4.2.8 **Table 4.2** and **Table 4.3** summarise the adopted major highway networks and the new railway line assumptions in this Study respectively.

Table 4.2: Adopted Major Highway Network Assumptions

Highway Network Assumptions by Year 2021	Configuration
Tuen Mun – Chek Lap Kok Link	D2
Highway Network Assumptions by Year 2026 (In addition to Year 2021)	**Configuration**
Widening of Castle Peak Road – Castle Peak Bay	D2
Widening of Fuk Hang Tsuen Road	S2
Improvement to Fan Kam Road	S2
Highway Network Assumptions by Year 2031 (In addition to Year 2026)	**Configuration**
Road Improvement Works in Hung Shui Kiu New Development Area	S2/D2

^ The configuration of these proposed highways varies at different sections of the road.
District or local improvement projects have not been included in the above lists in general.

Table 4.3: Adopted New Railway Assumptions

Railway Network Assumptions by Year 2021
Express Rail Link (1)
Shatin to Central Link - (Hung Hom – Tai Wai Section) (2)
Railway Network Assumptions by Year 2026 (In addition to Year 2021)
Shatin to Central Link – (Hung Hom – Admiralty Section) (3)
East Kowloon Line
North Island Line
South Island Line (West)
Railway Network Assumptions by Year 2031 (In addition to Year 2026)
Hung Shui Kiu Station (4)
Northern Link Phase 1 - Kwu Tung Station (5)
Tung Chung West Extension (6)
Tung Chung East Station (6)
Tuen Mun South Extension (7)
Siu Ho Wan Station (8)

Source: Railway Development Strategy 2014 (RDS-2014) except:

(1) Completed on 29 September 2018
(2) Completed on 27 June 2021
(3) Completed on 15 May 2022
(4) Government Press Release published on 27 May 2021
(5) Government Press Release published on 16 December 2020
(6) Government Press Release published on 7 April 2020
(7) Government Press Release published on 29 May 2020
(8) Government Press Release published on 11 June 2021

4.3 Base Year Model Development

STM Model Validation Results

4.3.1 The STM was validated to the ATC screenlines across the major NWNT screenlines (screenline SS and screenline YY) in both, morning and afternoon peak periods. **Table 4.4** to **Table 4.7** summarised the validation results of the road-based traffic volumes for morning and afternoon peak periods.

Table 4.4: 2019 AM Peak 2-way Screenline Validation (PCU/hr)

Car			Taxi			Goods Vehicle			Public Transport+ Special Purpose Bus			Total		
Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs
Screenline S-S														
12,500	11,900	0.95	1,700	1,800	1.06	13,700	13,500	0.99	5,300	4,900	0.92	33,200	32,100	0.97
Screenline Y-Y														
4,500	4,200	0.93	1,100	1,100	1.00	6,600	6,300	0.95	1,500	1,600	1.07	13,700	13,200	0.96
											Total	**46,900**	**45,300**	**0.97**

Table 4.5: 2019 PM Peak 2-way Screenline Validation (PCU/hr)

Car			Taxi			Goods Vehicle			Public Transport+ Special Purpose Bus			Total		
Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs
Screenline S-S														
14,200	13,400	0.94	1,500	1,300	0.87	9,000	9,700	1.08	4,800	5,100	1.06	29,500	29,500	1.00
Screenline Y-Y														
4,600	4,200	0.91	1,100	1,000	0.91	5,500	5,300	0.96	1,600	1,700	1.06	12,800	12,200	0.95
											Total	**42,300**	**41,700**	**0.99**

Table 4.6: 2019 AM Peak 1-way Screenline Validation (PCU/hr)

Car			Taxi			GV			Public Transport+ Special Purpose Bus			Total		
Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs
Screenline S-S EB														
7,500	7,200	0.96	1,000	1,100	1.10	8,200	7,900	0.96	3,100	3,100	1.00	19,800	19,300	0.97
Screenline S-S WB														
5,000	4,800	0.96	700	700	1.00	5,500	5,600	1.02	2,200	2,500	1.14	13,400	13,600	1.01
Screenline Y-Y EB														
2,400	2,300	0.96	500	500	1.00	3,100	2,900	0.94	600	600	1.00	6,600	6,300	0.95
Screenline Y-Y WB														
2,100	2,000	0.95	600	600	1.00	3,500	3,400	0.97	900	900	1.00	7,100	6,900	0.97
											EB Total	**26,400**	**25,600**	**0.97**
											WB Total	**20,500**	**20,500**	**1.00**

Table 4.7: 2019 PM Peak 1-way Screenline Validation (PCU/hr)

Car			Taxi			GV			Public Transport+ Special Purpose Bus			Total		
Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs
Screenline S-S EB														
6,200	6,000	0.97	600	600	1.00	3,900	4,400	1.13	2,100	2,200	1.05	12,800	13,200	1.03
Screenline S-S WB														
8,000	7,400	0.93	800	700	0.88	5,100	5,400	1.06	2,800	2,900	1.04	16,700	16,400	0.98
Screenline Y-Y EB														
2,000	1,900	0.95	600	600	1.00	3,400	3,200	0.94	1,000	1,000	1.00	7,000	6,700	0.96
Screenline Y-Y WB														
2,600	2,400	0.92	500	500	1.00	2,100	2,100	1.00	700	600	0.86	5,900	5,600	0.95
											EB Total	**19,800**	**19,900**	**1.01**
											WB Total	**22,600**	**22,000**	**0.97**

Note: Obs: Observed traffic figures based on ATC 2019
Mod: Modelled traffic figures based on 2019 STM Model Results
The observed and modelled traffic flows are rounded to the nearest hundred.

4.3.2 The validation results indicate that the percentage differences of the modelled and observed screenline totals in 2-way flows are within 10% and all of the percentage differences of the modelled and observed screenline totals are within 15%.

LATM Screenline Validation Results

4.3.3 The base year model validations for the AM and PM peaks at the screenlines shown in **Figure 4.1** are summarised in **Table 4.8**. The results show that the total screenline flows well satisfy the validation criteria with 100% of total screenline flows within 10% difference.

Table 4.8: Total Screenline Flows Validation Summary for Peak Period

Screenline	Direction	Total (Passenger Vehicle + Goods Vehicle + Public Transport)					
		AM			PM		
		Obs	Mod	Mod/Obs	Obs	Mod	Mod/Obs
A-A	NB	1,005	970	0.97	770	735	0.95
	SB	1,110	1,070	0.96	920	875	0.95
B-B	NB	6,405	6,030	0.94	5,705	5,895	1.03
	SB	5,985	5,570	0.93	5,680	5,680	1.00
C-C	EB	6,615	6,500	0.98	4,685	4,855	1.04
	WB	4,650	4,660	1.00	5,425	5,400	1.00
D-D	EB	1,855	1,820	0.98	1,690	1,670	0.99
	WB	1,480	1,355	0.92	1,700	1,610	0.95

4.3.4 The validation summary for total 4 screenline link flows are presented in **Table 4.9** and it shows that the model validation results out-perform all the target requirements. The Geoffrey E. Havers (GEH) statistic criteria for all screenline link flows were well satisfied with 85% of links having GEH error of 5 or less. The results also fulfilled the criteria of 100% link flows within 20% difference and 85% of links within 10% difference from the observed flows.

Table 4.9: Screenline and Key Link Flows Validation Summary

Validation Criteria	Target Values	Percentage of Screenline Link Flows within the Criteria	
		AM Peak	PM Peak
		Total (Passenger Vehicle + Goods Vehicle + Public Transport)	Total (Passenger Vehicle + Goods Vehicle + Public Transport)
Percentage Difference between Observed and Modelled Flows			
% of links within ±10%	85%	100%	100%
% of links within ±20%	100%	100%	100%
GEH Statistics			
% of links with GEH 5 or less	85%	88%	100%
% of links with GEH 10 or less	100%	100%	100%

LATM Junction Validation Results

4.3.5 The validation of key junction flows was undertaken for entry/exit flows on each arm of the junctions separately. **Table 4.10** were summarised the validation results for key junction flows.

Table 4.10: Key Junction Flows Validation Summary

Validation Criteria	Target Values	Percentage of Key Junction In/Out Flows	
		AM Peak	PM Peak
		Total (Passenger Vehicle + Goods Vehicle + Public Transport)	Total (Passenger Vehicle + Goods Vehicle + Public Transport)
% within GEH 5	85%	94%	93%
% within GEH 10	100%	100%	100%

4.3.6 The above results shown that entry/exit traffic flows at key junctions were satisfactorily validated as the validation criteria for GEH 5 and 10 for both AM and PM peak hours. As demonstrated in the above table, both key link and junction flows synthesised by the base year 2022 LATM compared well with the observed flows.

Validation Summary

4.3.7 The validation results illustrate that the STM and LATM satisfactorily replicate the existing 2022 traffic flow pattern and the modelled flows agree very well with the observed traffic count data within the AOI. The accuracy achieved for the base year 2022 model results demonstrate that STM and LATM can provide reliable platforms for carrying out traffic projections, which would provide the basis for the development of design year traffic models for the traffic forecasting and TTIA purposes.

4.4 Design Year Model Development

4.4.1 To update the BDTM in 2026, the adjustment factors derived in the validation process have been applied to the 2015-based BDTM matrices to obtain the revised matrices. Traffic zonal growth factors and cordon points traffic demand derived from the STM have been applied to BDTM for the future planning horizon years.

4.4.2 To develop the LATM for the TTIA design year of 2032, 2032 BDTM trip ends and network have been developed for the reference traffic model. Since the TTIA design of 2032 is not the planning horizon year, the 2032 BDTM trip ends have been derived based on the interpolation of the 2031 and 2036 matrices to form the reference traffic models. Since the design year of the latest 2015-based BDTM is up to the year 2026, annual zonal growth factors are needed to be applied to project the 2026 traffic flows onto the 2032 traffic flows.

4.4.3 Planning parameters and relevant network infrastructure / improvements for major developments nearby the Study Area have been incorporated in the future year (i.e. 2032) reference traffic models.

4.4.4 Layouts of junctions J5, J13 and J16 were improved in 2023. The improved layouts are enclosed in **Annex C** and included the Design Year Model.

4.4.5 Having formed the reference traffic models, the planning parameters of proposed MSBs and network infrastructure / improvements have been incorporated to form a forecast model for the Development. The 2032 forecast traffic model was used as an analysis tool for investigating traffic and transport implications due to the Development and to assist formulating traffic and transport remedial measures for the proposed MSBs.

5 Traffic and Transport Impact Assessment

5.1 Trip Generation and Attraction

5.1.1 The proposed MSBs are planned for accommodating vehicle servicing and maintenance and/or logistics uses[8] and brownfield operations[9]. The trip generation of the proposed MSBs are estimated from referring to the traffic demand of similar usage in Hong Kong, with the traffic distribution pattern updated to reflect the local network characteristics.

5.1.2 The trip distribution of the proposed MSBs is determined from the following sources:

Vehicle servicing and maintenance uses

5.1.3 Two traffic surveys were conducted in 2 June 2022 during peak periods of AM from 07:30 to 09:30 and PM from 17:00 to 19:00: one at Dah Chong Hong in Kowloon Bay and the other at Volkswagen in Yuen Long to obtain traffic generation rates for typical vehicle servicing and maintenance MSBs, which will account for about 70% of the total GFA of the developments. The trip generation rates for vehicle repair usage are summarised in **Table 5.1** below.

Table 5.1: Trip Generation Rates for Vehicle Servicing and Maintenance

Reference Site	Site Area (m^2)	AM (pcu/hr/100 m^2 GFA)		PM (pcu/hr/100 m^2 GFA)	
		GEN	ATT	GEN	ATT
Dah Chong Hong (Kowloon Bay Kai Cheung Road)	80,938	0.0469	0.0815	0.0852	0.0544
Volkswagen (Yuen Long Castle Peak Road – Ping Shan)	4,159	**0.0481**	**0.1443**	**0.1443**	**0.0962**
Adopted	/	**0.0481**	**0.1443**	**0.1443**	**0.0962**

A conservative approach has been adopted in estimating the traffic generation from the proposed MSBs by adopting the higher trip rate between Dah Chong Hong and Volkswagan.

Brownfield operation / Logistics uses

5.1.4 Brownfield operations comprises a wide range of industrial uses. Apart from vehicle servicing and maintenance, brownfield uses may include different kinds of warehouse storage, logistics operation, recycling operations, etc.

5.1.5 The traffic generation rates given in TPDM for industrial buildings as well as the observed trip rates from a traffic count survey in 16 November 2017 during peak periods of AM from 07:30 to 09:30 and PM from 17:00 to 19:00 on the Mapletree Logistics Centre in Tsing Yi are considered relevant and shown in **Table 5.2**:

[8] For about 70% GFA of the proposed MSBs

[9] For not less than 30% GFA of the proposed MSBs

Table 5.2: Referenced Trip Generation Rates for Brownfield / Logistics Uses

Reference Site	GFA (m^2)	AM (pcu/hr/100 m^2 GFA)		PM (pcu/hr/100 m^2 GFA)	
		GEN	ATT	GEN	ATT
Mapletree Logistics Centre (Tsing Yi Tsing Yi Road)	120,550	**0.1080**	**0.1796**	0.1146	**0.1230**
TPDM Industrial Building Land Use*	/	0.0926	0.1386	**0.1350**	0.1049
Adopted	/	**0.1080**	**0.1796**	**0.1350**	**0.1230**

* Mean Trip Rate is considered

A conservative approach has been adopted in estimating the traffic generation from the proposed MSBs by adopting the higher trip rate between the Mapletree logistics centre and TPDM Industrial building land use

5.1.6 The trip generation rates to be adopted for estimating traffic generations from the proposed MSBs are highlighted in **Table 5.1** and **Table 5.2** above.

5.1.7 The number of trips to/from proposed MSBs for each development sites is summarised in **Table 5.3** (with vehicle servicing and maintenance as the major land use occupying about 70% of the MSB GFA) and in **Table 5.3A** (with logistics as the major land use). The number of trips to/from proposed MSBs for each development sites due to transport needs is summarised in **Table 5.13** and the corresponding trips for public transport demand is shown in **Table 5.3B.**

Table 5.3: Trips for Proposed MSBs with Vehicle Servicing and Maintenance as Major Land Use

Development Site	Usage	GFA (m^2)	AM (pcu/hr)		PM (pcu/hr)	
			GEN	ATT	GEN	ATT
Site A	30% Brownfield	14,700	16	26	20	18
	70 % Vehicle servicing and maintenance	34,300	16	49	49	33
Site B	30% Brownfield	18,750	20	34	25	23
	70 % Vehicle servicing and maintenance	43,750	22	64	64	42
Site C	30% Brownfield	15,000	16	27	20	18
	70 % Vehicle servicing and maintenance	35,000	17	51	51	34
Total of 30% Brownfield and 70% Vehicle servicing and maintenance		161,500	107	251	229	168
Proposed Additional Public Transport Trips		-	21	21	19.5	19.5

Table 5.3 A: Trips for Proposed MSBs with Logistics as Major Land Use

Development Site	Usage	GFA (m^2)	AM (pcu/hr)		PM (pcu/hr)	
			GEN	ATT	GEN	ATT
Site A	30% Brownfield + 70% Logistics	49,000	53	88	66	60
Site B	30% Brownfield + 70% Logistics	62,500	68	112	84	77
Site C	30% Brownfield + 70% Logistics	50,000	54	90	68	62
Total of 30% Brownfield and 70% Logistics		161,500	174	290	219	199
Proposed Additional Public Transport Trips		-	21	21	2.5	2.5

5.1.8 For the proposed development traffic, it is assessed that the destinations, and vice versa, will be mainly from the YLIP area to the east (i.e. towards Route 3); to the south (i.e. towards Tuen Mun); and a small share to Yuen Long Town/ Tung Tau.

5.1.9 An on-site traffic survey was conducted on 13 June 2022 during peak periods of AM from 07:30 to 09:30 and PM from 17:00 to 19:00 at the YLIP and the Wang Chau area. The observed directional split of the traffic to the destinations is shown in **Table 5.4**. It is assumed that the future development traffic from the proposed MSBs would have similar direction split, and is adopted for the traffic impact assessment.

Table 5.4: Observed Trip Distribution in YLIP and Wang Chau area

Destination	Directional Split
Yuen Long Town / Tung Tau Industrial Estate	10%
East (Route 3)	40%
West (Tuen Mun)	50%

Source: On-site Traffic survey **in 13 June 2022**

5.2 Junction and Link Capacity Assessment

5.2.1 A junction and link capacity assessment has been carried out to examine the performance for all concerned junctions and link sections within the AOI for the design year of 2032 (with and without the proposed MSBs). The results are presented in **Table 5.5** and **Table 5.6**. Apart from the traffic generation and attraction of the proposed land uses in the MSBs, the assessments have also considered the traffic flows arising from the pedestrian demand generation of the MSBs. The pedestrian demand assessments are presented in **Section 5.4**. The assessments predict that in respective of the major

land uses, the public transportation need would be substantially higher for vehicle servicing and maintenance than for logistics uses.

5.2.2 The 2032 reference traffic flows (without proposed MSBs), the development traffic flows, the proposed additional public transport services flow and the 2032 design traffic flows (with proposed MSBs) are shown in **Drawing nos. MMH/369397/TTIA/011, MMH/369397/TTIA/012, MMH/369397/TTIA/013** and **MMH/369397/TTIA/014** respectively.

Table 5.5: 2032 Reference Junction Performance (without proposed MSBs)

No.	Junction	Junction Type	2032 Reference (Without Proposed MSBs) RC/DFC	
			AM	PM
J1	Wang Lee St / Fuk Wang St	Priority	0.31	0.20
J2	Fuk Yan St / Fuk Wang St	Priority	0.13	0.10
J3	Fuk Wang St / Fuk Hi St	Priority	0.36	0.18
J4	Fuk Hi St / Long Ping Rd	Signal	23%	45%
J5	Long Ping Rd / Fung Chi Rd / Wang Chau Phase 1 Access Road	Signal	24%	27%
J6	Shui Pin Wai Interchange	Signal	23%	29%
J7	Wang Lok St / Wang Tat Rd / Ma Wang Rd / Long Yip St / Yuen Long On Lok Rd	Signal	13%	23%
J8	Fuk Hi St / Wang Lok St	Signal	23%	26%
J9	Wang Lok St / Fu Yip St	Signal	68%	87%
J10	Wang Lee St / Wang Lok St	Priority	0.38	0.37
J11	Long Yip St / Yuen Long On Lok Rd / Po Yip St	Signal	20%	25%
J13	Pok Oi Interchange	Roundabout	0.86	0.82
J16	Castle Peak Road - Yuen Long / Long Yat Road	Signal	32%	46%

Note:
- DFC – Design Flow to Capacity for priority junction and roundabout. DFC of 0.85 indicates that the junction is operating satisfactorily while DFC over 1.0 indicates the junction is overloaded.
- RC – Reserve Capacity for signalised junction. A signal-controlled junction with a RC of 15% implies that it is operating satisfactorily while a negative RC% implies it is overloaded.
- J14 at Tong Yan San Tsuen will be modified by Yuen Long South Development into free flow slip roads in the design year, hence it will not be calculated in 2032 Reference and Design case.
- A reduction factor has been applied in the assessment of J7 to reflect the predicted queue length at the junction.

Table 5.6: 2032 Design Junction Performance (with proposed MSBs)

No.	Type	2032 Design (With Proposed MSBs) RC/DFC	
		AM	PM
J1	Priority	0.48[0.53]	0.40[0.38]
J2	Priority	0.20[0.20]	0.16[0.14]
J3	Priority	0.53[0.55]	0.30[0.31]
J4	Signal	15%[12%]	27%[31%]
J5	Signal	16%[14%]	18%[17%]
J6	Signal	14%[10%]	14%[14%]
J7	Signal	3%[1%]	20%[21%]
J8	Signal	19%[18%]	20%[23%]
J9	Signal	47%[42%]	71%[70%]
J10	Priority	0.48[0.53]	0.54[0.53]
J11	Signal	18%[17%]	20%[20%]
J13	Roundabout	0.86[0.86]	0.84[0.85]
J16	Signal	31%[30%]	43%[43%]

Remark: junction performance for logistics as major land use is shown in brackets in the above table

5.2.3 From Table 5.6, it is noted that the proposed MSBs would have slight to adverse traffic impact for the 2032 Design Year on junctions J6 and J7 if vehicle servicing and maintenance is the major land use; and on junctions J4, J5, J6 and J7 if logistics is the major land use in the MSBs.

5.2.4 Since there will be planned road improvement works for junctions J4, J5, J6 and J7 under nearby interfacing projects, such as Remaining phases of Public Housing Development at Wang Chau and another planned project in vicinity, of which the population intake of these projects would be by around 2033/2034, it is envisaged that with the planned road improvement shortly after the commissioning of the proposed MSBs, the design RC ratio of the four junctions in question will be restored to the desirable level of not less than the 15% requirement. The implementation arrangement of the above-mentioned road improvement works at J4, J5, J6 and J7 will be further identified with nearby interfacing projects with a view to achieve a holistic design and implementation approach. For J7, with the proposed minor road marking improvement works as shown in Annex C, the performance could be brought back to 17% [15%] for AM and 20% [21%] for PM, respectively.

5.2.5 Although J13 will have DFC of 0.86 under 2032 reference case and design case which is slightly above the desirable level of 0.85, the traffic impact contributed by the proposed MSB is minimal. The Government will implement traffic management improvement measures at Pok Oi Interchange and the tentative completion year will be in 2025 which is before the completion year of the proposed MSB. It is expected the performance of J13 will be improved.

5.2.6 In summary, it is anticipated that the Proposed Development will not result in insurmountable traffic impact to the key junctions and road links in the Area of Influence with the proposed improvement works by other projects.

5.2.7 The road link assessment for the critical sections is summarised in **Table 5.7** and **Table 5.8**.

Table 5.7: 2032 Reference Road Link Performance (without the Proposed MSBs)

No.	Road Section	Bound	Con-fig	Capacity (pcu/hr)	2032 Reference (without the Proposed MSBs)			
					Flow (pcu/hr)		VC	
					AM	PM	AM	PM
L1	Fuk Hi St (section between Fuk Wang St and Long Ping Rd)	SB	S1	1,250	817	641	0.65	0.51
		NB	S1	1,250	784	812	0.63	0.65
L2	Wang Lok St (section between Wang Lee St and Fu Yip St)	SB	S2	2,800	486	420	0.17	0.15
		NB	S2	2,800	464	341	0.17	0.12
L3	Long Ping Rd (section between Fuk Hi St and Fung Chi Rd)	SB	S2	2,800	1,132	931	0.40	0.33
		NB	S2	2,800	979	1,017	0.35	0.36
L4	Long Ping Rd (section between Fung Chi Rd and Long Tin Rd)	SB	S2	2,800	1,037	996	0.37	0.36
		NB	S2	2,800	1,069	1,202	0.38	0.43
L5[3]	Long Tin Rd (section between Castle Peak Road – Ping Shan and Yuen Long Highway)	SB	D3	5,700	3,967	3,461	0.70	0.61
		NB	D3	5,700	3,759	4,082	0.66	0.72
L6	Long Yip St / Yuen Long On Lok Rd (section between Po Yip St and Wang Lok St)	EB	S2	3,050	1,408	1,432	0.46	0.47
		WB	S3	4,850	1,194	1,325	0.25	0.27
L7	Castle Peak Rd – Yuen Long (section between Long Yat Rd and Pok Oi Interchange)	EB	D3	5,700	3,593	3,247	0.63	0.57
		WB	D3	5,700	2,819	3,430	0.49	0.60
L8	Yuen Long Highway section between Tong Yan San Tsuen Interchange and Shap Pat Heung Interchange	EB	D3	6,100	6,290	5,285	1.03	0.87
		WB	D3	6,100	5,860	5,665	0.96	0.93
L9	Slip Road from Long Tin Road (SB) to Yuen Long Highway (EB)	-	-	1,800	1,715	1,180	0.95	0.66
L10[4]	Slip Road from Long Tin Road (SB) to Yuen Long Highway (WB)	-	-	3,600	1,652	1,691	0.46	0.47
L11[4]	Slip Road from Yuen Long Highway (EB) to Long Tin Road (NB)	-	-	3,600	1,379	1,697	0.38	0.47
L12	Slip Road from Yuen Long Highway (WB) to Long Tin Road (NB)	-	-	1,800	1,620	1,655	0.90	0.92

Notes: (1) Link capacity refers to CTS-3 Report
(2) VC means Volume to capacity ratio. V/C ratio of 1.0 indicates that the capacity has been reached; a V/C ratio between 1.0 and 1.2 would indicate a manageable degree of congestion. A V/C ratio above 1.2 means the onset of more serious congestion.
(3) Proposed widening at L5 from D2 to D3 by Long Bin Public Housing Development (Target Completion year: 2027)
(4) Proposed widening works at L10 & L11 from 1 lane to 2 lane by Yuen Long South Development (Target Completion year: 2028)

Table 5.8: 2032 Design Road Link Performance (with the Proposed MSBs)

No.	Bound	2032 Design (with Proposed MSBs)			
		Flow (pcu/hr)		VC	
		AM	PM	AM	PM
L1	SB	886[919]	771[754]	0.71[0.74]	0.62[0.60]
	NB	925[944]	911[915]	0.74[0.76]	0.73[0.73]
L2	SB	545[579]	539[529]	0.19[0.21]	0.19[0.19]
	NB	595[615]	430[440]	0.21[0.22]	0.15[0.16]
L3	SB	1,201[1,234]	1,061[1,044]	0.43[0.44]	0.38[0.37]
	NB	1,120[1,139]	1,116[1,120]	0.40[0.41]	0.40[0.40]
L4	SB	1,091[1,124]	1,111[1,106]	0.39[0.40]	0.40[0.40]
	NB	1,195[1,214]	1,286[1,302]	0.43[0.43]	0.46[0.47]
L5	SB	4,021[4,054]	3,576[3,571]	0.71[0.71]	0.63[0.63]
	NB	3,885[3,904]	4,166[4,182]	0.68[0.68]	0.73[0.73]
L6	EB	1,451[1,478]	1,523[1,519]	0.48[0.48]	0.50[0.50]
	WB	1,315[1,331]	1,411[1,406]	0.27[0.27]	0.29[0.29]
L7	EB	3,636[3,663]	3,338[3,334]	0.64[0.64]	0.59[0.58]
	WB	2,919[2,935]	3,496[3,508]	0.51[0.51]	0.61[0.62]
L8	EB	6,290[6,290]	5,285[5,285]	1.03[1.03]	0.87[0.87]
	WB	5,860[5,860]	5,665[5,665]	0.96[0.96]	0.93[0.93]
L9	-	1,715[1,715]	1,180[1,180]	0.95[0.95]	0.66[0.66]
L10	-	1,706[1,739]	1,806[1,801]	0.47[0.48]	0.50[0.50]
L11	-	1,505[1,524]	1,781[1,797]	0.42[0.42]	0.49[0.50]
L12	-	1,620[1,620]	1,655[1,655]	0.90[0.90]	0.92[0.92]

Remark: link performance for logistics as major land use is shown in brackets in the above table

5.2.8 The road link assessment results show that the concerned road links in the AOI would be operating within capacity (i.e. V/C ratios below 1.0) except L8 - Yuen Long Highway eastbound which will operate with V/C ratio between 1.0 and 1.1[10]. However, it should be noted that the contribution of the development traffic from the proposed MSBs to that road link is expected to be insignificant. Furthermore, the Northern Metropolis Highway in the New Territories North proposed under strategic studies on Railways and Major Roads beyond 2030 connecting Tin Shui Wai in the west and Kwu Tung North in the east may also provide convenient traffic connection and alleviate the impact to the local traffic network e.g. Yuen Long Highway, Long Tin Road and Castle Peak Road arising from the proposed development.

[10] V/C ratio between 1.0 and 1.1 means that the road section would be slightly overloaded, but heavy congestions and long traffic queues are not expected. The road section will experience some delay with reduced traffic speed at peak period, which is commonly seen at strategic roads in urban areas.

5.3 Pedestrian Demand Assessment

5.3.1 The estimated pedestrian trip generation rate is referenced from the following, which are summarised below:

- Trip generation survey conducted at typical vehicle servicing and maintenance and/or logistics uses which account for about 70% of the total GFA of the proposed MSBs

5.3.2 The estimated pedestrian generation of the proposed MSBs is applied to evaluate the future public transport facilities and recommend future PT operation plan, if necessary.

5.3.3 In addition, the modal split of the pedestrian demand of the proposed MSBs is estimated based on:

- Travel Characteristics Survey 2011 (TCS 2011)
- Goods Vehicle Travel Characteristics Survey 2011 (GVTCS 2011)
- 2021 Population Census
- On-site Observation

5.3.4 It is anticipated that the pedestrian generation and attraction during peak hours would be mainly workers and staff arriving the proposed MSBs to work during AM peak and leaving the MSBs during the PM peak. The pedestrian traffic generation rate is summarised in **Table 5.9** based on the functional uses for brownfield and the on-site pedestrian survey conducted in 19 September 2022 during peak periods of AM from 07:30 to 09:30 and PM from 17:00 to 19:00 at Volkswagen in Yuen Long for Vehicle Repair uses.

Table 5.9: Pedestrian Rate for Proposed MSBs

	Peak Hour Pedestrian Flow (ped/hr/100m^2 GFA)			
	Attraction Rate (AM)	**Generation Rate (AM)[11]**	**Attraction Rate (PM)**	**Generation Rate (PM)**
Brownfield[12]	0.1428	0.0143	0.0095	0.0952
Vehicle Servicing and Maintenance	0.6732	0.0673	0.0745	0.7454
Logistics	0.6627	0.0623	0.0258	0.2581

[11] The pedestrian flow opposite to the main pedestrian flow of workers return to work in the AM and going to home in PM is assumed to be 10% of the corresponding peak hour main pedestrian flow.

[12] According to HKPSG, the worker density for warehouses (which is the most common type of brownfield operations) under General Industrial uses is about 700m^2/worker. Assuming conservatively all workers return to work within 1 hour and go home within 1.5 hours during the AM and PM peak periods, the equivalent peak hour pedestrian flow is assessed to be 0.1428 and 0.0952 ped/hr/100m^2 GFA, respectively.

5.3.5 The number of pedestrians to/from proposed MSBs in peak hour is summarised in **Table 5.10 and Table 5.10A**.

Table 5.10: Pedestrian Flows for Proposed MSBs

Usage	GFA(m^2)	AM (ATT)	AM (Gen)	PM (ATT)	PM (Gen)
30% Brownfield	48,450	70	7	5	47
Vehicle Servicing and Maintenance	113.050	761	76	84	843
Total	161,500	831	83	89	890

Table 5.10A: Pedestrian Flows for Proposed MSBs

Usage	GFA(m^2)	AM (ATT)	AM (Gen)	PM (ATT)	PM (Gen)
30% Brownfield	48,450	70	7	5	47
70% Logistics	113,050	749	75	29	292
Total	161,500	819	82	34	339

5.3.6 In view of the 2km walking distance between YLIP and Long Ping MTR Station, it is anticipated that commuters will use feeder transport to reach Yuen Long Town and walking along Wang Lok Street and Fuk Hi Street is not expected.

5.3.7 A survey of pedestrian flows was conducted on 19 September 2022 during peak periods of AM from 07:30 to 09:30 and PM from 17:00 to 19:00 at Fuk Wang Street. Based on the estimated pedestrian flows, the provision of 2m clear width (1m effective width) footpath would be able to cope with the pedestrian demand. **Table 5.10B** shows the assessment of level-of-service at Fuk Wang Street Southern Footpath.

Table 5.10B: Level-of-Service for Fuk Wang Street Southern Footpath (P1)

Fuk Wang Street Southern Footpath (P1)	Clear Width	Peak 15-min 2-way Pedestrian Flows		Pedestrian Flow Rate (ped/min/m)		LOS	
-	-	AM	PM	AM	PM	AM	PM
2022 Base Year	2.0m	14	14	0.9	0.9	A	A
2032 Reference		16	16	1.1	1.1	A	A
Pedestrian Flows from Proposed MSB*		274^ [270]^	294^ [130]^	3-			
2032 Design		290 [286]	310 [128]	19.3 [19.1]	20.7 [8.5]	B [B]	B [A]

Remark: Public transport demand for logistics as major land use is shown in brackets in the above table
An annual growth rate of 1% is assumed based on TPEDM growth
* A surge factor of 1.2 is adopted for the proposed MSB
^Assume a nominal 10% of AM generation and PM attraction trips to / from the proposed MSBs

5.4 Public Transport Demand Assessment

5.4.1 Based on the estimated pedestrian generation and attraction from the proposed MSBs, the critical peak hour public transport demand has been established. Since the proposed MSBs is not located within walking distance from railway stations, it is assumed that workers and staff would take MTR bus route no. K68 at the reprovided bus terminus at Wang Lee Street outside the proposed MSBs and GMB route no. 74. This is a conservative assumption as other modes of transport such as employer-arranged coach/bus services are discounted.

5.4.2 A preliminary estimation of the feeder service requirements has been conducted to assess the requirement of public transport service. The modal split of the YLIP area obtained from 2021 Population Census is summarised in **Table 5.11**. The table shows that there would be about 34% and 29% passengers to ride on heavy rail and light rail during peak hour as the main mode of transport respectively which the proposed MSBs would generate insignificant public transport impact to the heavy rail and light rail. Since there has interchange discount between MTR bus route no. K68 and MTR, most of passengers interchanging heavy rail, light rail would be assumed to take bus route no. K68 as feeder service.

Table 5.11: 2021 Population Census Modal Split

Main Transport Mode by Passenger	Rail	LRT	PLB	Bus	Total
	34%	29%	12%	25%	100%

5.4.3 A passenger demand survey for MTR Bus route no. K68 and GMB route no. 74 has been conducted on 13 September 2022 during peak periods of AM from 07:30 to 09:30 and PM from 17:00 to 19:00. The passenger demand with proposed MSBs during peak hour is summarised in **Table 5.12** which shows additional departures of MTR bus route no. K68 and GMB route no. 74 are required for the proposed MSBs – being 6 and 4 departures respectively for the AM peak; and 6 and 3 departures respectively in PM peak if vehicle servicing and maintenance is the major land use.

5.4.4 If logistics use is the major land use, additional departures of MTR bus route no. K68 and GMB route no. 74 will be 6 and 4 departures respectively for the AM peak; and 1 and 0 departures respectively in PM peak.

Table 5.12: Public Transport Demand Assessment

	AM Peak Hour Attraction		PM Peak Hour Generation	
	Bus Route No. K68	**GMB Route No. 74**	**Bus Route No. K68**	**GMB Route No. 74**
	Existing Condition During Peak Hour			
Observed No. of Departures in Peak Hour [a]	10	10	9	9
Assumed Capacity per Vehicle [b]	90	16	90	16
Capacity per Hour [c] = [a] x [b]	900	160	810	144
Passenger Demand without Proposed MSBs during Peak Hour [d]	643	160	550	117
	With Proposed MSBs During Peak Hour			
Passenger Demand of Proposed MSBs during Peak Hour [e]	732 [721]	100 [98]	784 [298]	107 [41]
Assumed Capacity per Vehicle [b1]	90	19	90	19
Passenger Demand with Proposed MSBs during Peak Hour [f] = [d] + [e]	1,375 [1,364]	260 [258]	1,334 [848]	224 [158]
Proposed No. of Departures in Peak Hour [a1]	16 [16]	14 [14]	15 [10]	12 [9]
New capacity per Hour [c1] = [a1] x [b1]	1,440 [1,440]	266 [266]	1,350 [900]	228 [171]
Additional Departure Required during Peak Hour [a1] – [a]	6 [6]	4 [4]	6 [1]	3 [0]

Remark:

- Public transport demand for logistics as major land use is shown in brackets in the above table
- Demand for AM generation is anticipated to be lower than demand for AM attraction, and demand for PM generation is anticipated to be lower than demand for PM attraction. Due to the fact that both public transport are loop services, the additional departures for AM attraction and PM generation are representing two-way traffic.

5.5 Supplementary Sensitivity Analysis for the Residential Development at Nam Sang Wai and Lut Chau (A/YL-NSW/242)

5.5.1 It is noted that the proposed residential development at Nam Sang Wai and Lut Chau was allowed by Town Planning Appeal Board (TPAB) in end 2021, subject to a revised traffic and transport impact assessment to be conducted by the developer as per the approval conditions of the TPAB. However, there is no confirmed development programme for the proposed residential development. In view of the various approval conditions imposed by TPAB, e.g. wetland enhancement works and management plan, and other arrangements, etc., it is noted that the developer is now conducting various assessments to fulfil TPBA conditions. As the proposed residential development would comprise a number of designated projects under the EIAO, it is therefore assessed that the population intake year for the proposed residential development would likely be after the design year of MSBs development, that is 2032.

5.5.2 Based on the “Comprehensive Development with Wetland Enhancement at Nam Sang Wai and Lut Chau Traffic Impact Assessment Study” Report prepared by the developer of the residential development issued in Aug 2016, in which the residential development proposal, the proposed road network of the proposed residential development with a newly constructed bridge over Shan Pui River directing the traffic from the proposed residential development to Wang Lok Street, and the assumptions on traffic generation from the proposed residential development were described, it is anticipated that the junctions J7 and J9 might likely be overloaded, subject to a review under the revised traffic and transport impact assessment to be conducted by the developer of the residential development.

5.5.3 It is expected that the cumulative traffic impact on the road network in the Yuen Long INNOPARK due to the proposed residential development on top of the proposed MSBs as well as any necessary proposed road improvement schemes, if required, should be carried out and devised under the revised traffic and transport impact assessment to be conducted by the developer of the proposed residential development as per the approval conditions of the TPAB.

6 Summary and Conclusion

6.1 Summary

6.1.1 The traffic and transport impacts arising from proposed MSBs have been assessed for the design year of 2032, being 3 years after the forecast completion in 2029, with a total GFA of 161,500 m^2.

6.1.2 Some existing traffic and transport facilities would be affected by the proposed MSBs, including public parking space, bus terminus, etc., are to be reprovided in the proposed MSBs development. A temporary bus terminus is proposed at Fuk Wang Street for MTR Bus Route No. K68 in the interim period before the new bus bay at Wang Lee Street is constructed.

6.1.3 The proposed MSBs would accommodate vehicle servicing and maintenance and/or logistics uses for about 70% of the GFA and brownfield uses for not less than 30% of the GFA. A conservative approach has been adopted by comparing the site survey trip rate and the mean trip rate of TPDM and adopting the higher trip rate in estimating the traffic generation from the proposed MSBs.

6.1.4 The affected public vehicle parking will be re-provided in addition to those required for the proposed MSB under the HKPSG.

6.1.5 The traffic impact assessments for the two proposed major land uses of the MSBs (taking up about 70% of the GFA) have been assessed. The results show that there would be slight to adverse traffic impact for the 2032 Design Year on junctions J6 and J7 if vehicle servicing and maintenance is the major land use; and on junctions J4, J5, J6 and J7 if logistics is the major land use in the MSBs.

6.1.6 Since there will be planned road improvement works for junctions J4, J5, J6 and J7 under nearby interfacing projects, such as Remaining phases of Public Housing Development at Wang Chau and another planned project in vicinity, of which the population intake of these projects would be by around 2033/2034, it is envisaged that with the planned road improvement shortly after the commissioning of the proposed MSBs, the design RC ratio of the four junctions in question will be restored to the desirable level of not less than the 15% requirement. The implementation arrangement of the above-mentioned road improvement works at J4, J5, J6 and J7 will be further identified with nearby interfacing projects with a view to achieve a holistic design and implementation approach. For J7, with the proposed minor road marking improvement works as shown in Annex C, the performance could be brought back to 17% [15%] for AM and 20% [21%] for PM, respectively.

6.1.7 The Northern Metropolis Highway in the New Territories North connecting Tin Shui Wai in the west and Kwu Tung North in the east proposed under strategic studies on Railways and Major Roads beyond 2030 may also provide convenient traffic connection and alleviate the impact to the local traffic network e.g. Yuen Long Highway, Long Tin Road and Castle Peak Road arising from the proposed development.

6.1.8 For the pedestrian circulation, the provision of 2m clear width (1m effective width) footpath will be able to cope with the pedestrian demand during peak hours.

6.1.9 For the peak hour public transport demand, the assessment shows that additional departures to cater for the additional passenger demand from the proposed MSBs:

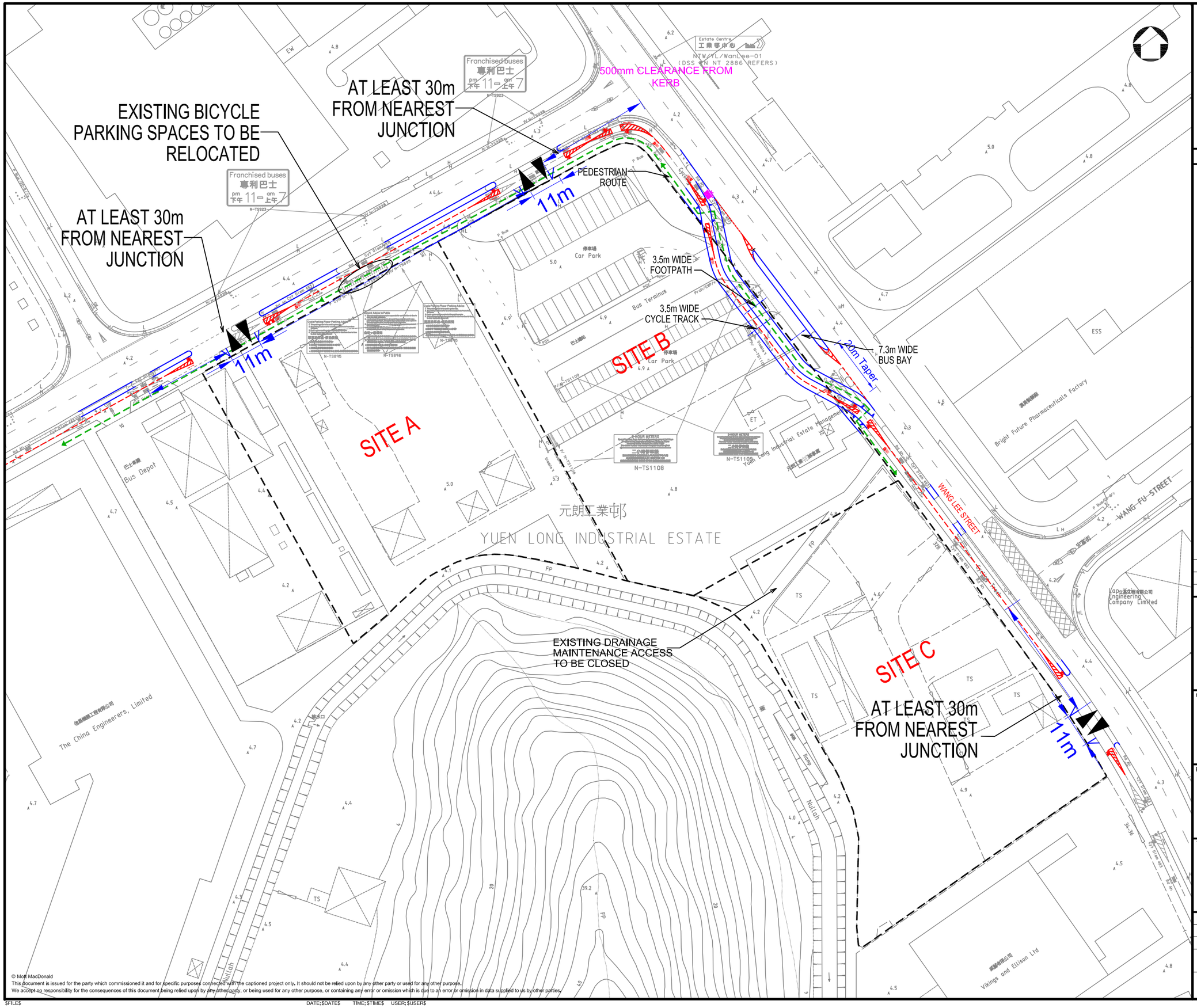
a) Vehicle servicing and maintenance: additional departures of 6 and 4 of MTR bus route no. K68 and GMB route no. 74, respectively for the AM peak; and additional departure of 6 and 3 of MTR bus route no. K68 and GMB route no. 74, respectively for the PM peak.

b) Logistics uses: additional departures of 6 and 4 of MTR bus route no. K68 and GMB route no. 74, respectively for the AM peak; and additional department of 1 MTR bus route no. K68 for the PM peak.

6.1.10 In summary, it is anticipated that the Proposed Development will not result in insurmountable traffic impact to the key junctions and road links in the Area of Influence with the proposed improvement works by other projects.

Drawings

MMH/369397/TTIA/001	Proposed Access Location and Bus Layby
MMH/369397/TTIA/001-SP1	Swept Paths of 16.5m Container at Proposed Vehicular Access
MMH/369397/TTIA/001-SP2	Swept Path of 12.8m Bus at the Proposed Bus Bay
MMH/369397/TTIA/002	Not used
MMH/369397/TTIA/003	Proposed Diversion Route for Route No. K68
MMH/369397/TTIA/003-SP1	Swept Paths of 12.8m Bus at the Proposed Diversion Route
MMH/369397/TTIA/004	Proposed Pedestrian Route to Nearby Public Transport Services
MMH/369397/TTIA/005	Area of Influence for Traffic Impact Assessment
MMH/369397/TTIA/006	2022 Observed Flow
MMH/369397/TTIA/007	Existing Pedestrian Facilities in the Vicinity
MMH/369397/TTIA/008	Existing Cycle Track and Bicycle Parking Space in the Vicinity
MMH/369397/TTIA/009	Existing Public Transport Facilities in the Vicinity
MMH/369397/TTIA/0010	Screenlines for Local Area Traffic Model Validation
MMH/369397/TTIA/011	2032 Reference Flow
MMH/369397/TTIA/012A	Development Flow for Vehicle Servicing and Maintenance
MMH/369397/TTIA/012B	Development Flow for Logistics Use
MMH/369397/TTIA/013A	Public Transport Flow for Vehicle Servicing and Maintenance
MMH/369397/TTIA/013B	Public Transport Flow for Logistics Use
MMH/369397/TTIA/014A	2032 Design Flow for Vehicle Servicing and Maintenance
MMH/369397/TTIA/014B	2032 Design Flow for Logistics Use



KEY PLAN

- DEVELOPMENT SITE
- PROPOSED RUN-IN/OUT (SUBJECT TO INITIAL DESIGN OPTIONS ; MINIMUM 30m DISTANCE BETWEEN RUN-IN/OUT AND JUNCTION)
- ROAD KERB
- ROAD MARKING
- PEDESTRIAN ROUTE
- 1.6m(W) X 2.4m(L) REGULATOR'S KIOSK

THE RE-PROVISION OF THE BUS TERMINUS AND THE REALIGNMENT OF CYCLE TRACK SHOULD BE ENFORCED UNDER LEASE TO BE COMPLETED BY THE GRANTEE TO THE SATISFACTION OF TD/HyD AND OTHER RELEVANT PARTIES / DEPARTMENTS

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 22	EW	FIRST ISSUE	KS	SHC

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION
FOR MULTI-STOREY BUILDING
DEVLOPMENTS NEAR YUEN LONG
INDUSTRIAL ESTATE

Title

PROPOSED ACCESS LOCATION AND BUS LAYBY

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	
Scale at A1 1:600		Status PRE		Rev P3	

Drawing Number

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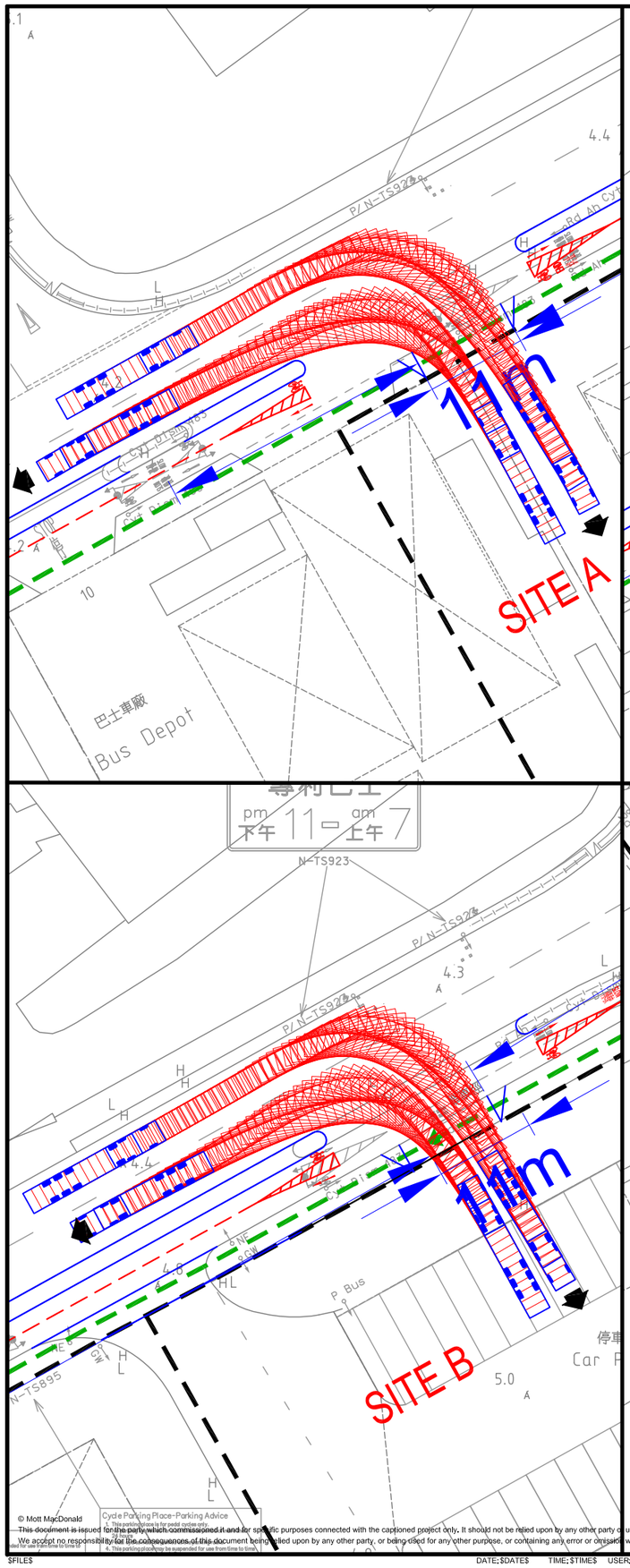

KEY PLAN

- STUDY SITE
- PROPOSED RUN-IN/OUT (SUBJECT TO INITIAL DESIGN OPTIONS ; MINIMUM 30m DISTANCE BETWEEN RUN-IN/OUT AND JUNCTION)
- ROAD KERB
- ROAD MARKING
- PEDESTRIAN ROUTE

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CEDD

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

Title

SWEPT PATHS OF 16.5m CONTAINER AT PROPOSED VEHICULAR ACCESS

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	
Scale at A1 1:600		Status PRE		Rev P3	

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Cycle Parking Place-Parking Advice
1. This parking place is for pedal cycles only.
4. This parking place may be suspended for use from time to time to...

Y:\Job\113358.1 MSB in Yuen Long\05-Figures\113358.1-Tex001-TI-F23 P3.dwg, A3 1:200, 1:1

$FILE$ DATE:$DATE$ TIME:$TIME$ USER:$USER$

Franchised buses
專利巴士
pm 下午 11 – am 上午 7
N-TS923

Estate Centre
工業邨中心
NTW/YL/WanLee-01
(DSS 至 N NT 2886 REFERS)

SITE B

停車場
Car Park

巴士總站
Bus Terminus

P Bus
PGV
Pcrch/EWP/
PMC
Disable V
Cyclist Dismount
Rd Ab
Cyclist Dismount 483
N-TS1108
N-TS1109
2-HOUR METERS
Operating from 8 am to 8 pm daily except general hol days
On general hol days operating from 10 am to 10 pm
In case of meter defects tel. 2332 3700
The meter number inclined on the post must be given
二小時停車位
除全日假期外每日營業時間上午八時至下午八時
全日假期營業時間由上午十時至下午十時
如機件有問題請致電 2332 3700 並須提供該計時器號碼
ET
Yuen Long Industrial Estate Management Office
元朗工業邨辦事處
Bright Future Pharmaceutical Factory
滙美製藥廠
Estate Centre
工業邨中心
4.2 4.3 4.7 5.0 4.9 5.3 4.8 4.4 4.5 6.2

KEY PLAN

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Project
AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

Title
SWEPT PATH OF
12.8m BUS
AT THE PROPOSED BUS BAY

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	
Scale at A1 1:600		Status PRE		Rev P3	

Drawing Number
MMH/369397/TIA/001-SP2

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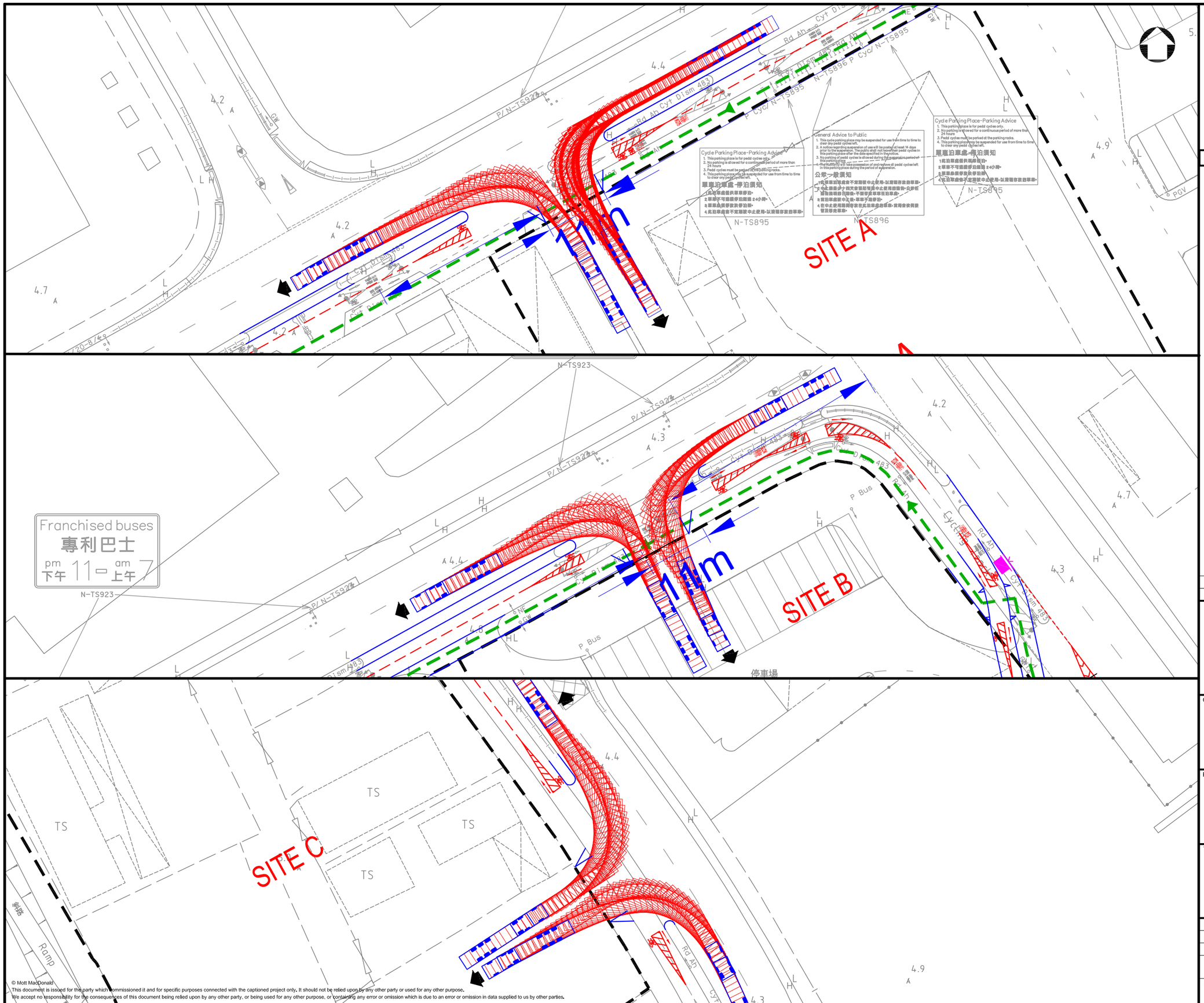

KEY PLAN

- STUDY SITE
- PROPOSED RUN-IN/OUT (SUBJECT TO INITIAL DESIGN OPTIONS ; MINIMUM 30m DISTANCE BETWEEN RUN-IN/OUT AND JUNCTION)
- ROAD KERB
- ROAD MARKING
- PEDESTRIAN ROUTE

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	AUG 17	EW	FIRST ISSUE	KS	SHC

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

Title

SWEPT PATHS OF 16.5m CONTAINER AT PROPOSED VEHICULAR ACCESS

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	
Scale at A1	1:600	Status	PRE	Rev	P3

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專利巴士
pm 下午 11 – am 上午 7
N-TS923

Estate Centre
工業邨中心
NTW/YL/WanLee-01
(DSS 至 N NT 2886 REFERS)

SITE B

停車場
Car Park

巴士總站
Bus Terminus

N-TS1108
N-TS1109

2-HOUR METERS
Operating from 8 am to 8 pm daily except general holidays
On general holidays operating from 10 am to 10 pm
In case of meter defects tel. 2332 3700
The meter number marked on the post must be given
二小時停車錶
除全早假期外每日星期一上午八時至下午八時
全早假期星期日上午十時至下午十時
如錶失靈請致電電話 2332 3700 並需報明錶柱號碼

Yuen Long Industrial Estate Management
元朗工業邨辦事處

Bright Future Pharm
澳美製藥廠

Rd Abt 8 Cyt 01sm 483
Cycle Track
P Bus
Disable v
PMC
PGV
Prom/EWP
ET

KEY PLAN

- STUDY SITE
- PROPOSED RUN-IN/OUT (SUBJECT TO INITIAL DESIGN OPTIONS ; MINIMUM 30m DISTANCE BETWEEN RUN-IN/OUT AND JUNCTION)
- ROAD KERB
- ROAD MARKING
- PEDESTRIAN ROUTE
- 1.6m(W) X 2.4m(L) REGULATOR'S KIOSK

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	AUG 17	EW	FIRST ISSUE	KS	SHC

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project
AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

Title
SWEPT PATH OF
12.8m BUS
AT THE PROPOSED BUS BAY

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	
Scale at A1	1:600	Status	PRE	Rev	P3

Drawing Number
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FUK HI STREET

FUK YAN STREET

FUK WANG STREET

WANG LEE STREET

WANG FU STREET

YUEN LONG INDUSTRIAL ESTATE

元朗工業邨

Hong Kong Petrochemical Co., Ltd

San Miguel Brewery Hong Kong Ltd.

Nestle Hong Kong Ltd

Bright Future Pharmaceuticals Factory

Vive Healthcare Packaging (HK) Limited

Clearcastway Technology, Ltd.

Tapper Power Card Technologies Ltd.

UCMD Hong Kong Limited

ACME AGENT

United Laboratories

The China Engineers, Limited

Chiho

Franchised buses
專營巴士
11 7

Car Park

Bus Terminus

Bus Depot

Filter Bed

Tank

Toilet

Refuse Collection Point

Footbridge

Subway

Underpass

Pedestrian Crossing

Bus Stop

Traffic Signal

Lamp Post

Manhole

Gully

Kerb Line

Road Marking

Fence

Wall

Building

Open Area

Trees

Contour

Spot Level

Survey Control Point

Existing Bus Routing to be Maintained

Proposed Bus Routing

Proposed Temporary Bus Stop before Completion of Bus Layby

Development Site

WP Jul 2015

WP Oct 2021

KEY PLAN

- DEVELOPMENT SITE
- ROAD KERB
- ROAD MARKING
- PROPOSED BUS ROUTING
- EXISTING BUS ROUTING TO BE MAINTAINED
- PROPOSED TEMPORARY BUS STOP BEFORE COMPLETION OF BUS LAYBY

REMARK: THE LOCATION OF TEMPORARY BUS STOP TO BE CONFIRMED

Rev	Date	Drawn	Description	Ch'k'd	App'd
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AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

PROPOSED DIVERSION ROUTE FOR ROUTE NO.K68 (TEMPORARY)

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	

Scale at A1	Status	Rev
1 : 1000	PRE	P4

Drawing Number

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KEY PLAN

- DEVELOPMENT SITE
- ROAD KERB
- ROAD MARKING
- PEDESTRIAN ROUTE TO NEARBY PUBLIC TRANSPORT SERVICES
- PROPOSED BUS TERMINUS
- SURVEYED FOOTPATH SECTION

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 22	EW	FIRST ISSUE	KS	SHC

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AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION
FOR MULTI-STOREY BUILDING
DEVELOPMENTS NEAR YUEN LONG
INDUSTRIAL ESTATE

Title

PROPOSED PEDESTRIAN ROUTE TO NEARBY PUBLIC TRANSPORT SERVICES

Designed	WS		Eng check	TE	
Drawn	BC		CoordInation	--	
Dwg check	EW		Approved	EC	
Scale at A1	1 : 1200	Status	PRE	Rev	P1

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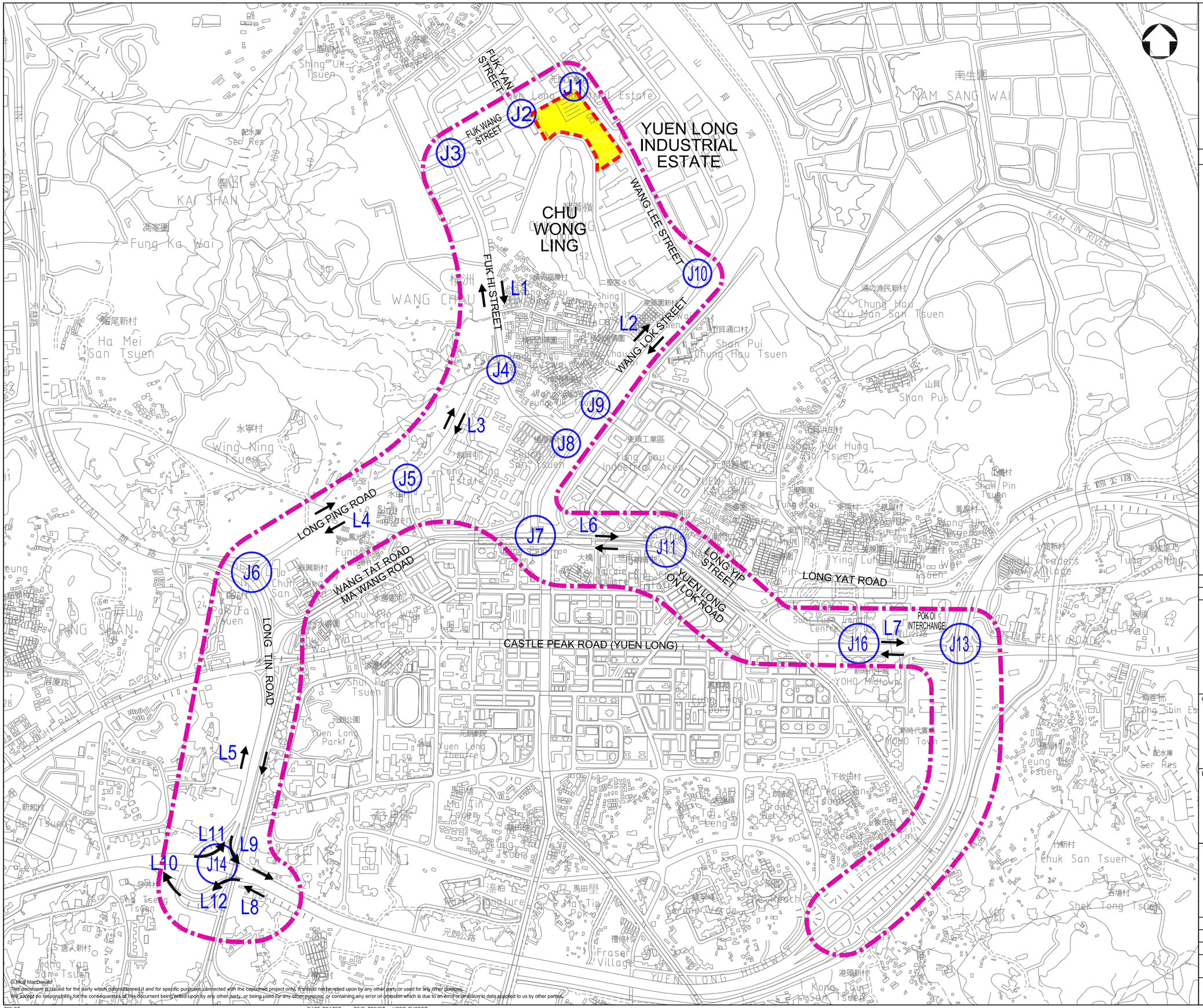

KEY PLAN

- DEVELOPMENT SITE
- AREA OF INFLUENCE (AOI) FOR TRAFFIC IMPACT ASSESSMENT
- J1 KEY JUNCTION
- L1 KEY ROAD LINK

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 22	EW	FIRST ISSUE	CY	SHC

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SECTION 16 PLANNING APPLICATION FOR MUTLI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

AREA OF INFLUENCE FOR TRAFFIC IMPACT ASSESSMENT

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	

Scale at A1	Status	Rev
1:6000	PRE	P3

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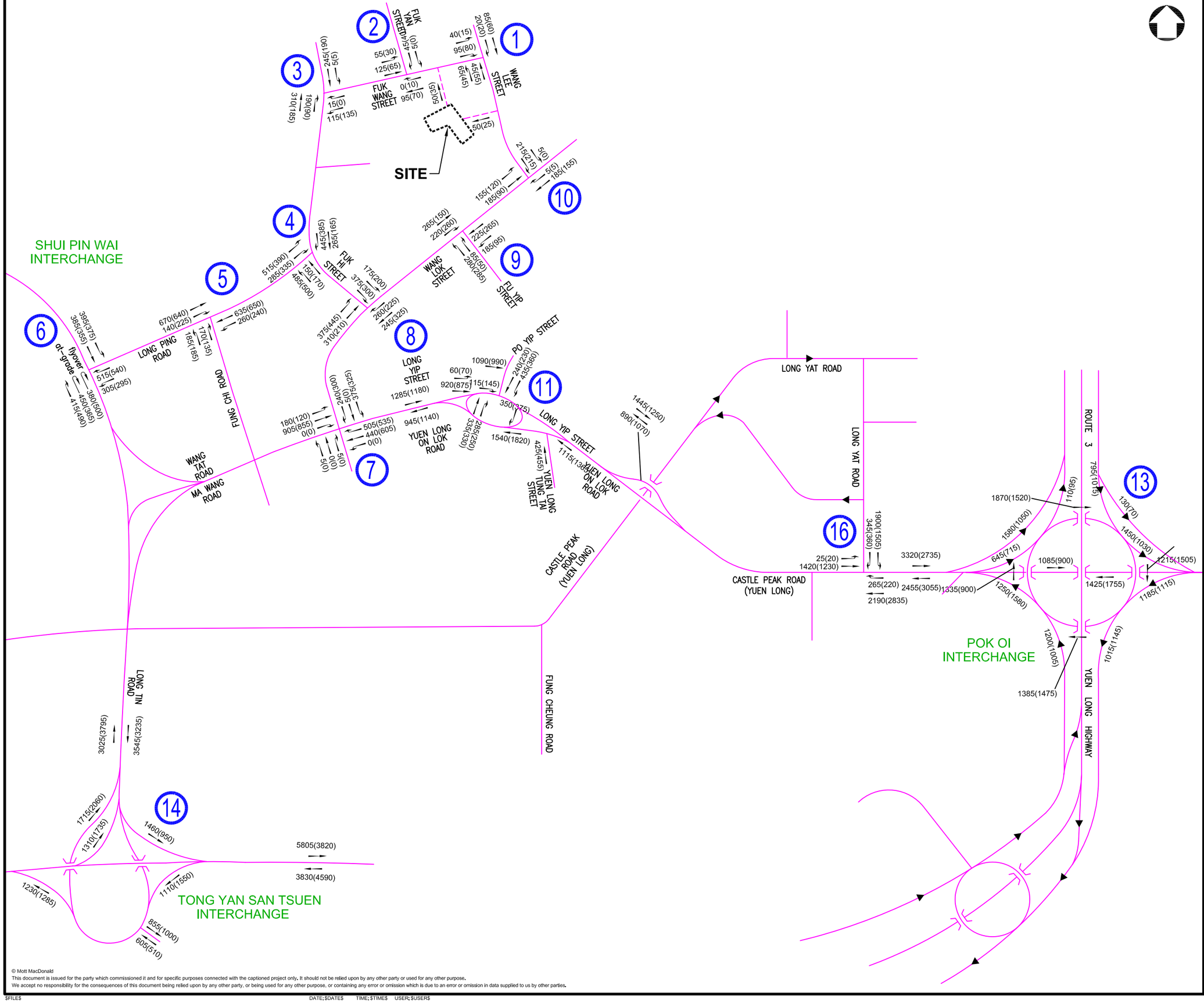

KEY PLAN

102	AM PEAK HOUR TRAFFIC FLOWS (PCU/HR)
(102)	PM PEAK HOUR TRAFFIC FLOWS (PCU/HR)
(10)	JUNCTION NO.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 22	EW	FRIST ISSUE	KS	SHC

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SECTION 16 PLANNING APPLICATION FOR MUTLI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

2022 OBSERVED FLOW

Designed	–		Eng check	--	
Drawn	–		Coordination	--	
Dwg check	–		Approved	EC	
Scale at A1	N. T. S.	Status	PRE	Rev	P2

Drawing Number

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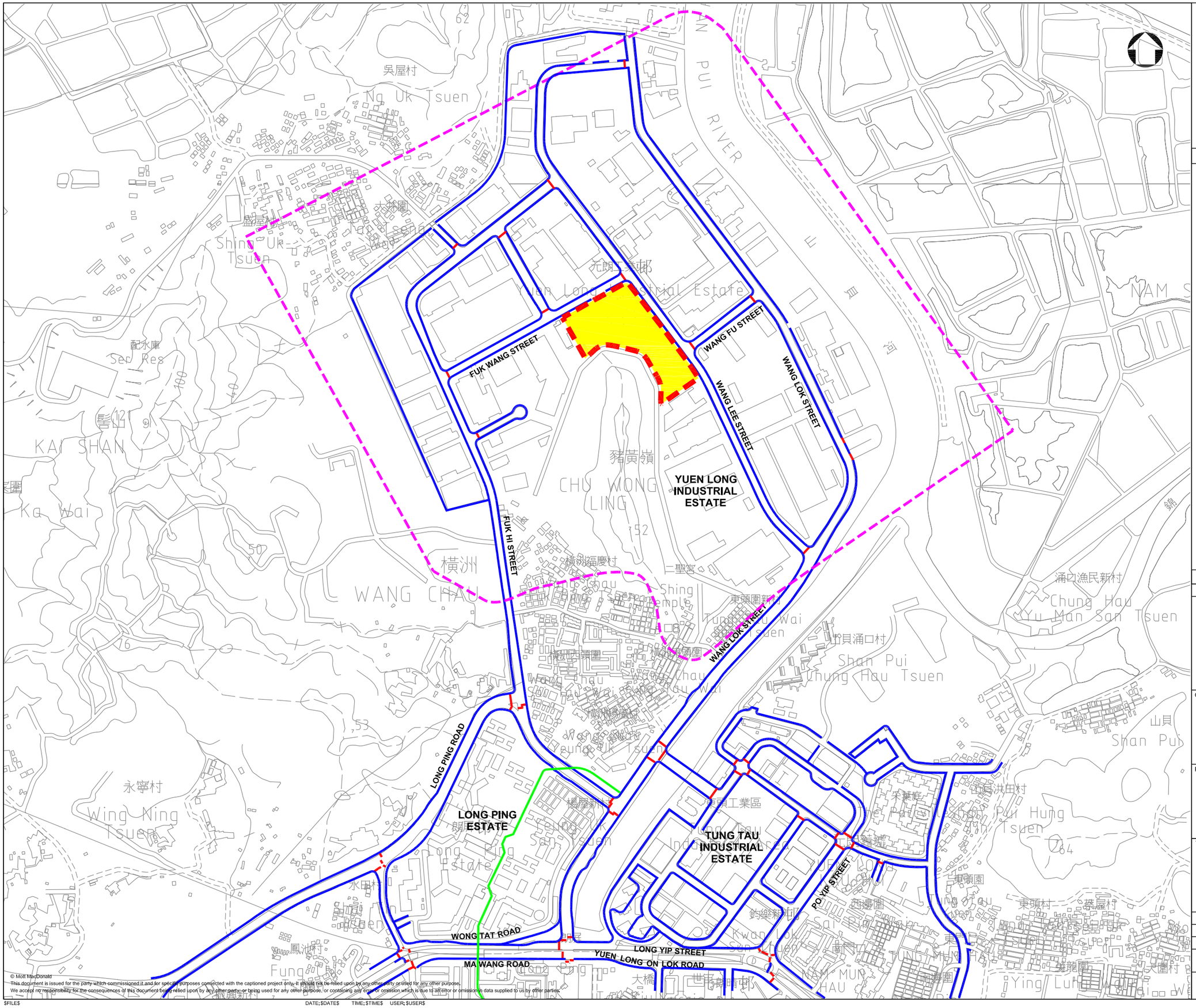

KEY PLAN

- DEVELOPMENT SITE
- TENTATIVE ASSESSMENT AREA
- AT-GRADE FOOTPATH
- PEDESTRIAN CROSSING
- ELEVATED WALKWAY

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 22	EW	FIRST ISSUE	KS	SHC

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Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION
FOR MUTLI-STOREY BUILDING
DEVELOPMENTS NEAR YUEN LONG
INDUSTRIAL ESTATE

Title

EXISTING PEDESTRIAN FACILITIES IN THE VICINITY

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	

Scale at A1	Status	Rev
N. T. S.	PRE	P2

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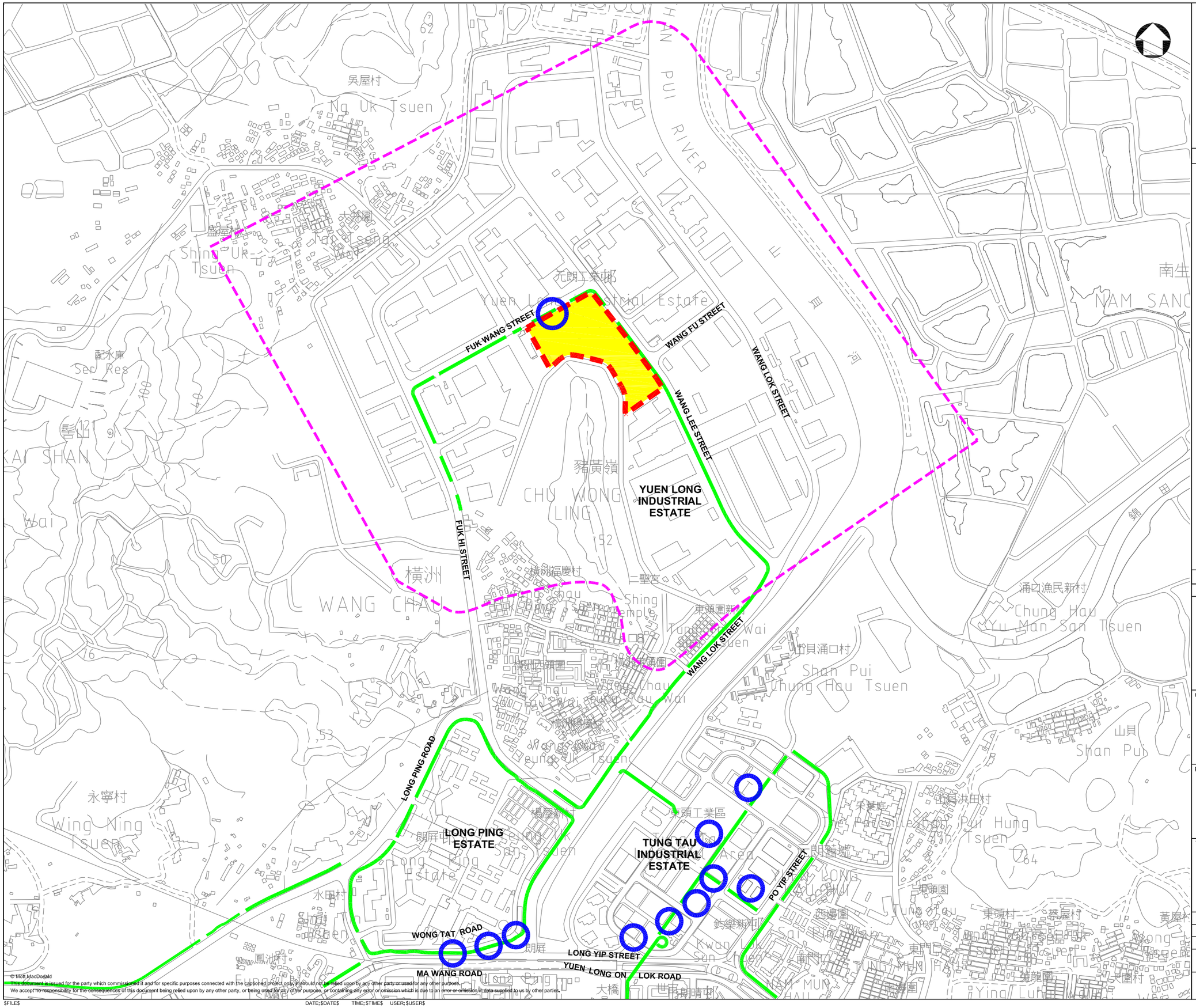
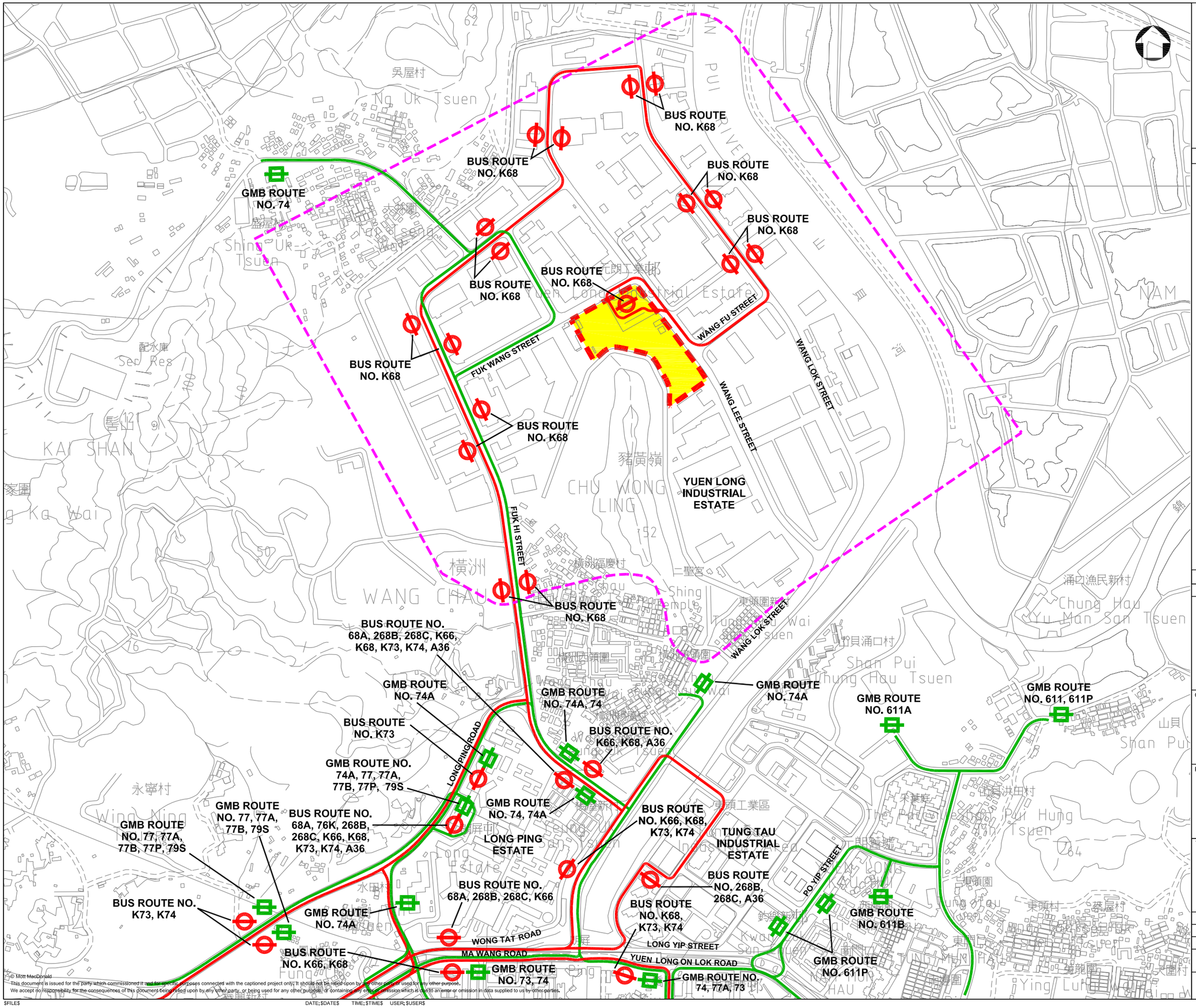

FUK WANG STREET
WANG FU STREET
WANG LOK STREET
WANG LEE STREET
FUK HI STREET
YUEN LONG INDUSTRIAL ESTATE
LONG PING ROAD
LONG PING ESTATE
TUNG TAU INDUSTRIAL ESTATE
PO YIP STREET
WONG TAT ROAD
LONG YIP STREET
YUEN LONG ON LOK ROAD
MA WANG ROAD
Ng Uk Tsuen
Shing Uk Tsuen
Kai Siu Wai
Yuen Long Industrial Estate
CHU WONG LING
WANG CHAU
Wang Chau Wai
Shan Pui
Chung Hau Tsuen
Yu Man San Tsuen
NAM SANG
Wing Ning Tsuen
Pui Hung
KAI SHAN
Sec Res
Wai
Tung Tau Wai
Tung Tau Area
Kwan Lok Sun Chuen
Yung Ping Estate
Yung Ping Sun Tsuen
Fung Ping Tsuen
Shan Pui Tsuen
Tung Tau Tsuen
Tung Tau Hsin Tsuen
Tung Tau Tsuen Wai
Tung Tau Sun Chuen
Yung Ping Shan Tsuen
Yung Ping Estate
Yung Ping Sun Tsuen
Fung Ping Tsuen
Shan Pui



KEY PLAN

- DEVELOPMENT SITE
- TENTATIVE ASSESSMENT AREA
- BUS STOP
- GMB STOP
- BUS ROUTE
- GMB ROUTE

Rev	Date	Drawn	Description	Ch'k'd	App'd
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AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MUTLI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

EXISTING PUBLIC TRANSPORT FACILITIES IN THE VICINITY

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	

Scale at A1: N. T. S.
Status: PRE
Rev: P2

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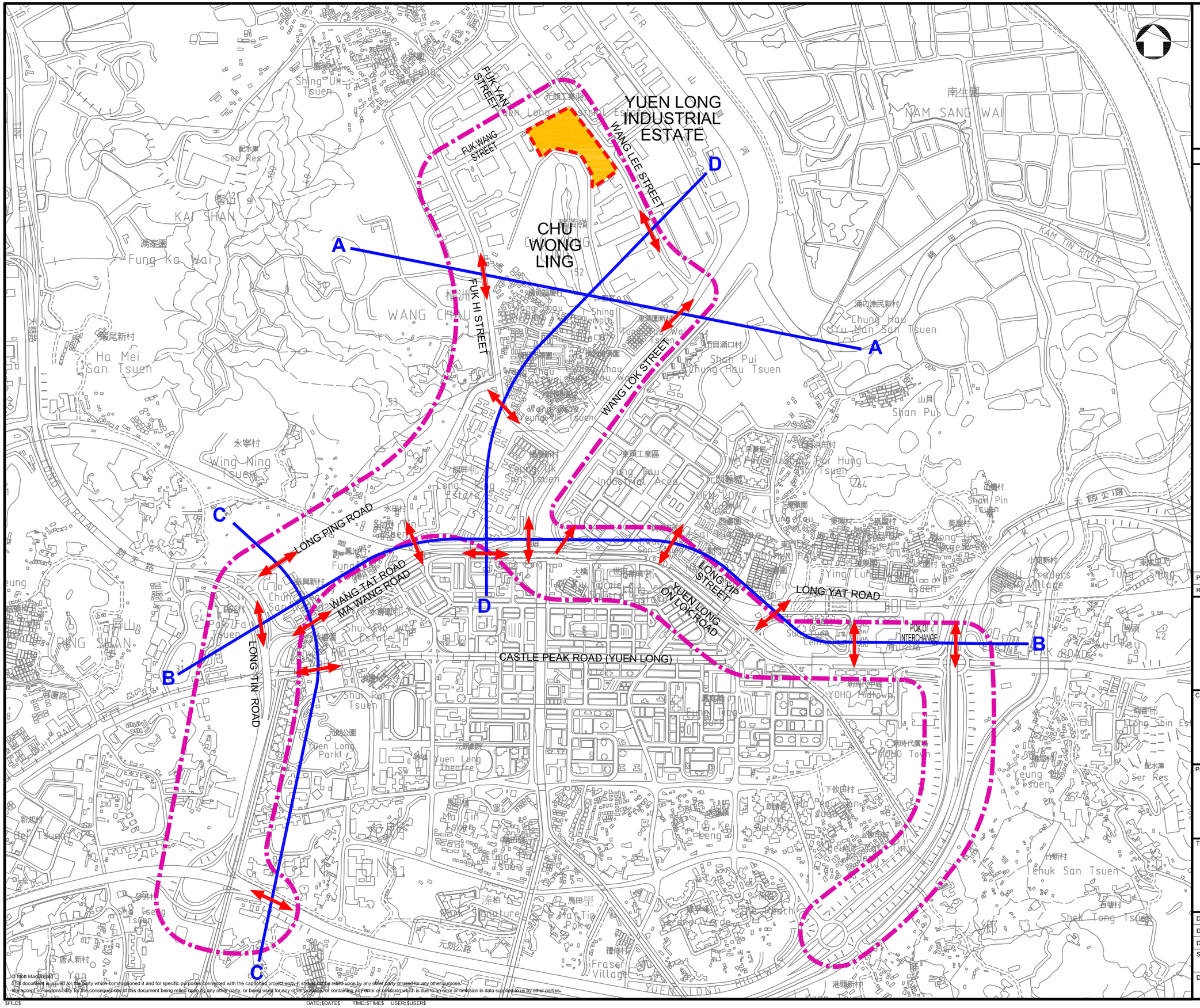

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SECTION 16 PLANNING APPLICATION FOR MUTLI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

SCREENLINES FOR LOCAL AREA TRAFFIC MODEL VALIDATION

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
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Scale at A1	Status	Rev
1:6000	PRE	P2

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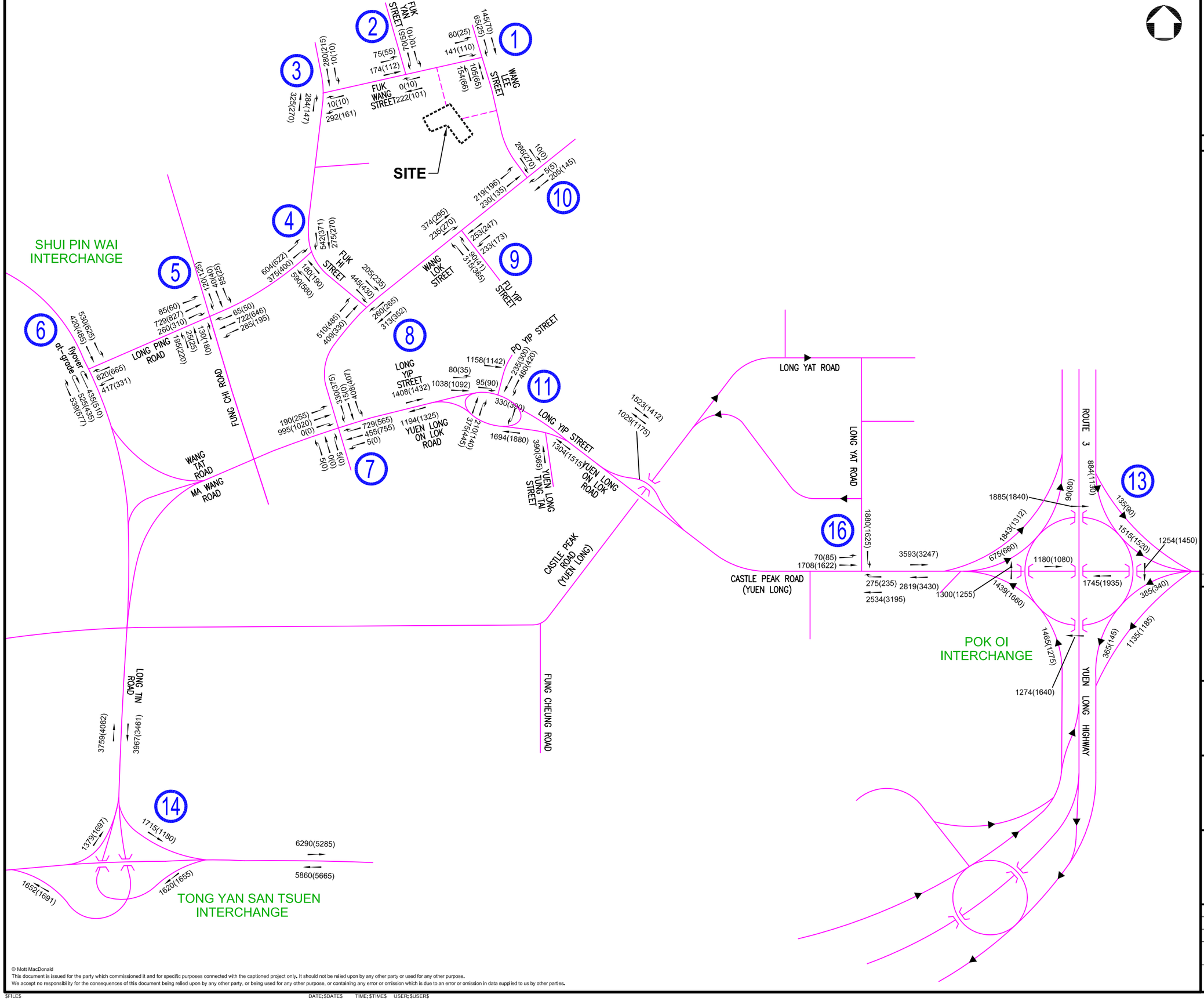

KEY PLAN

102	AM PEAK HOUR TRAFFIC FLOWS (PCU/HR)
(102)	PM PEAK HOUR TRAFFIC FLOWS (PCU/HR)
(10)	JUNCTION NO.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 22	EW	FRIST ISSUE	KS	SHC

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SECTION 16 PLANNING APPLICATION FOR MUTLI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

2032 REFERENCE FLOW

Designed	–		Eng check	--	
Drawn	–		Coordination	--	
Dwg check	–		Approved	EC	
Scale at A1	N. T. S.	Status	PRE	Rev	P4

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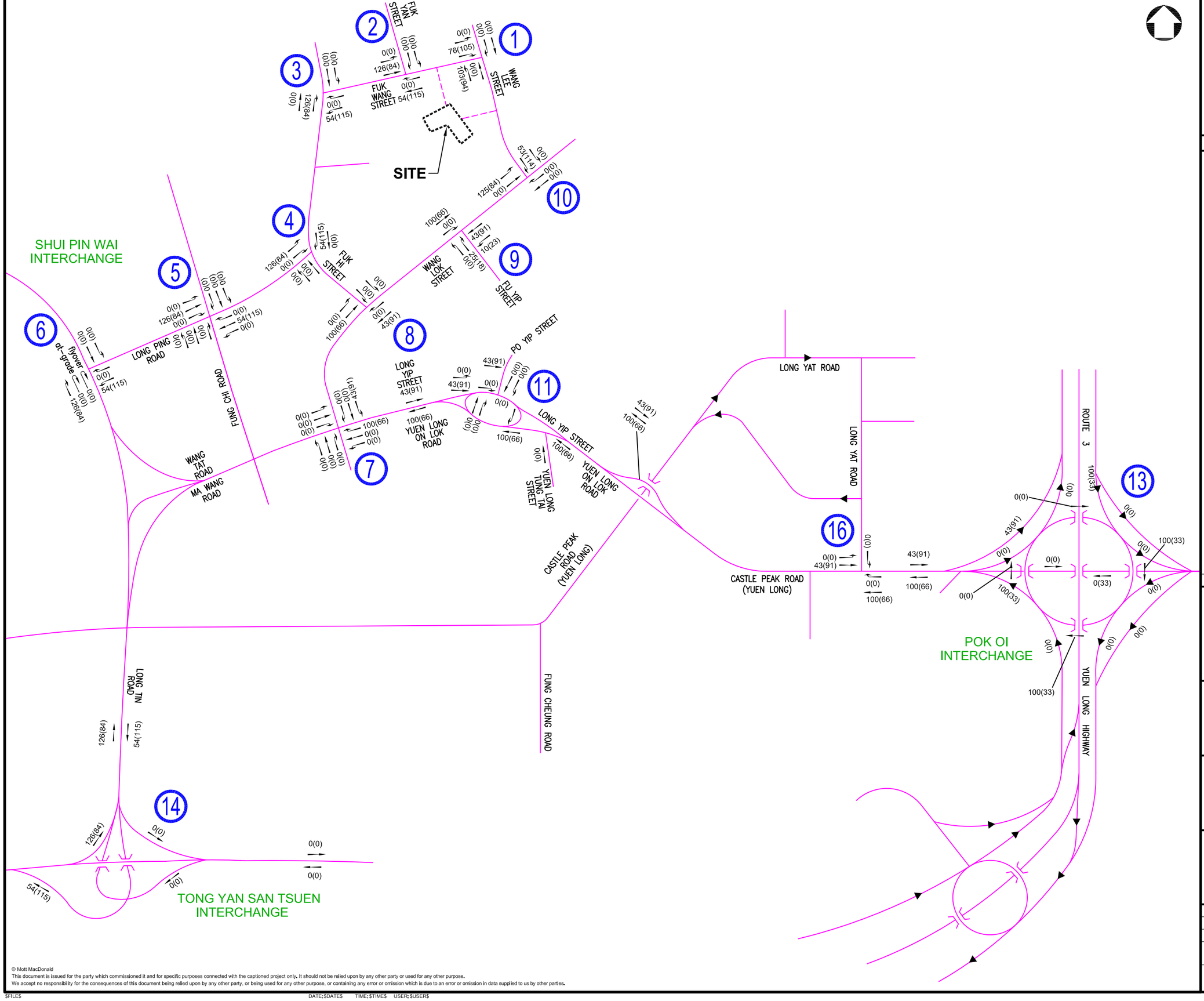

KEY PLAN

102	AM PEAK HOUR TRAFFIC FLOWS (PCU/HR)
(102)	PM PEAK HOUR TRAFFIC FLOWS (PCU/HR)
(10)	JUNCTION NO.

Rev	Date	Drawn	Description	Ch'k'd	App'd
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SECTION 16 PLANNING APPLICATION FOR MUTLI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

DEVELOPMENT FLOW FOR VEHICLE SERVICING AND MAINTENANCE

Designed	–		Eng check	--	
Drawn	–		Coordination	--	
Dwg check	–		Approved	EC	
Scale at A1	N. T. S.	Status	PRE	Rev	P4

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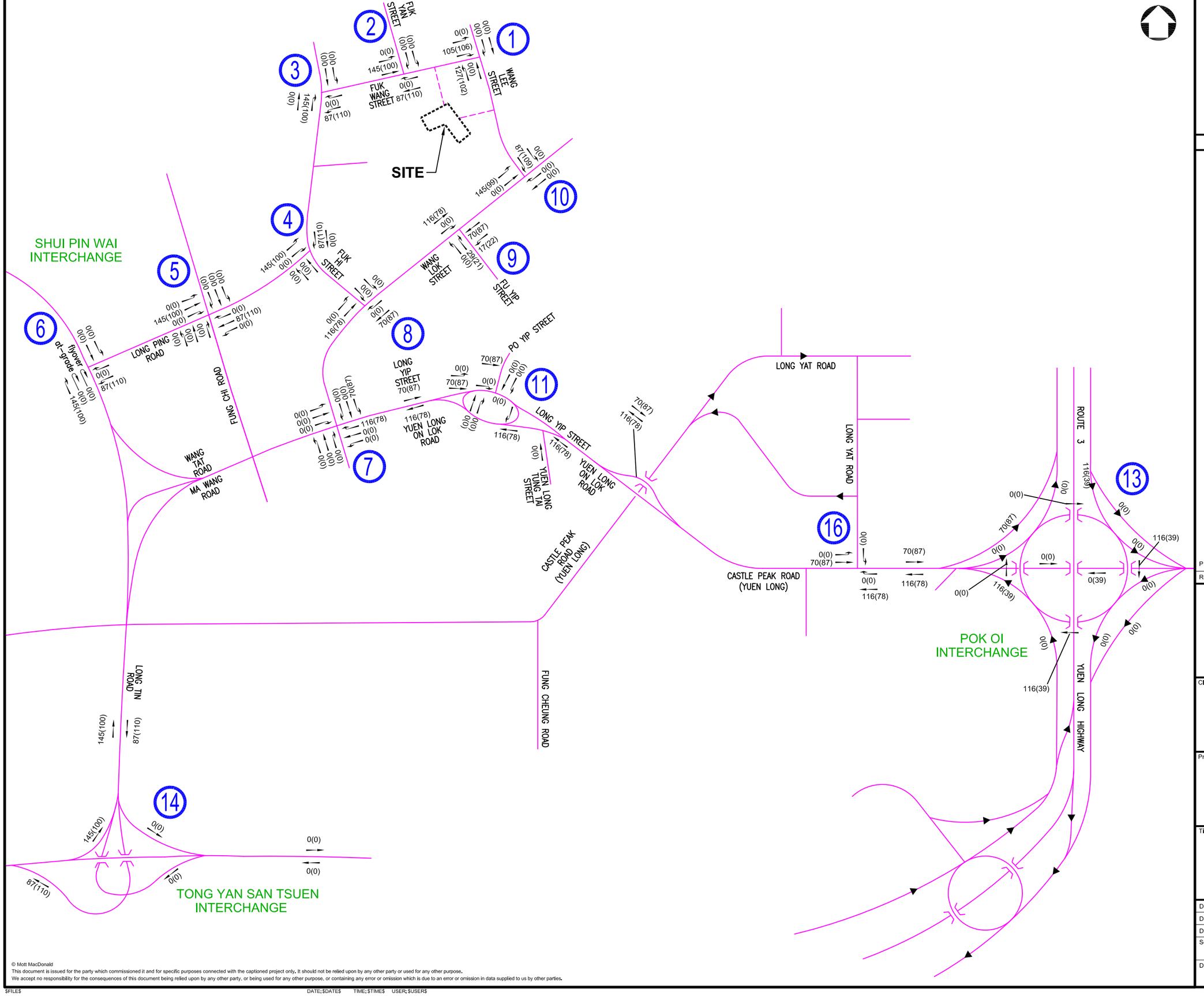

KEY PLAN

102	AM PEAK HOUR TRAFFIC FLOWS (PCU/HR)
(102)	PM PEAK HOUR TRAFFIC FLOWS (PCU/HR)
(10)	JUNCTION NO.

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CEDD
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MUTLI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

DEVELOPMENT FLOW FOR LOGISTICS USE

Designed	–		Eng check	--	
Drawn	–		Coordination	--	
Dwg check	–		Approved	EC	
Scale at A1	N. T. S.	Status	PRE	Rev	P4

Drawing Number

MMH/369397/TIA/012B

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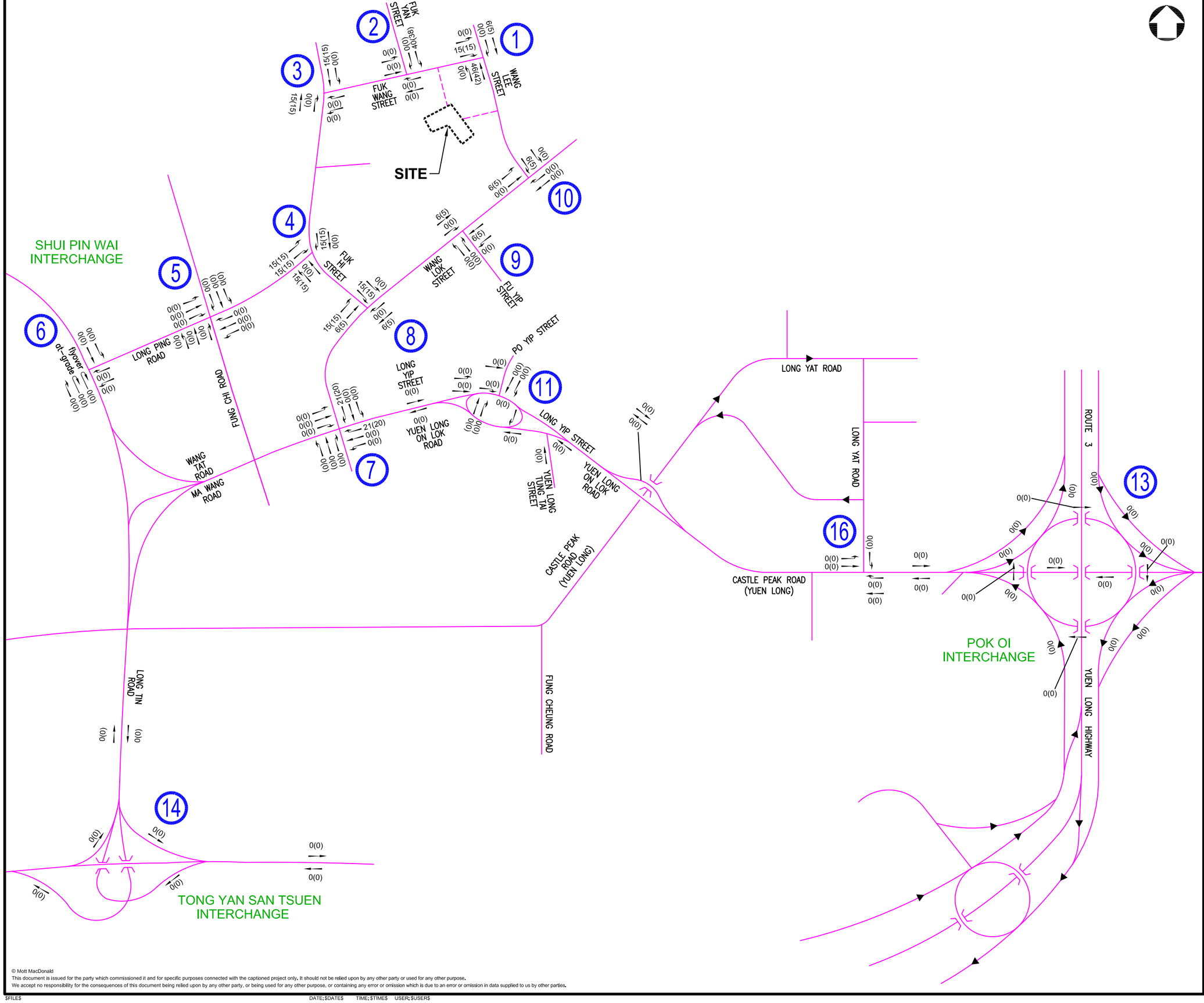

KEY PLAN

102	AM PEAK HOUR TRAFFIC FLOWS (PCU/HR)
(102)	PM PEAK HOUR TRAFFIC FLOWS (PCU/HR)
(10)	JUNCTION NO.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 22	EW	FRIST ISSUE	KS	SHC

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AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MUTLI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

PUBLIC TRANSPORT FLOW FOR VEHICLE SERVICING AND MAINTENANCE

Designed	–		Eng check	--	
Drawn	–		Coordination	--	
Dwg check	–		Approved	EC	
Scale at A1	N. T. S.	Status	PRE	Rev	P4

Drawing Number

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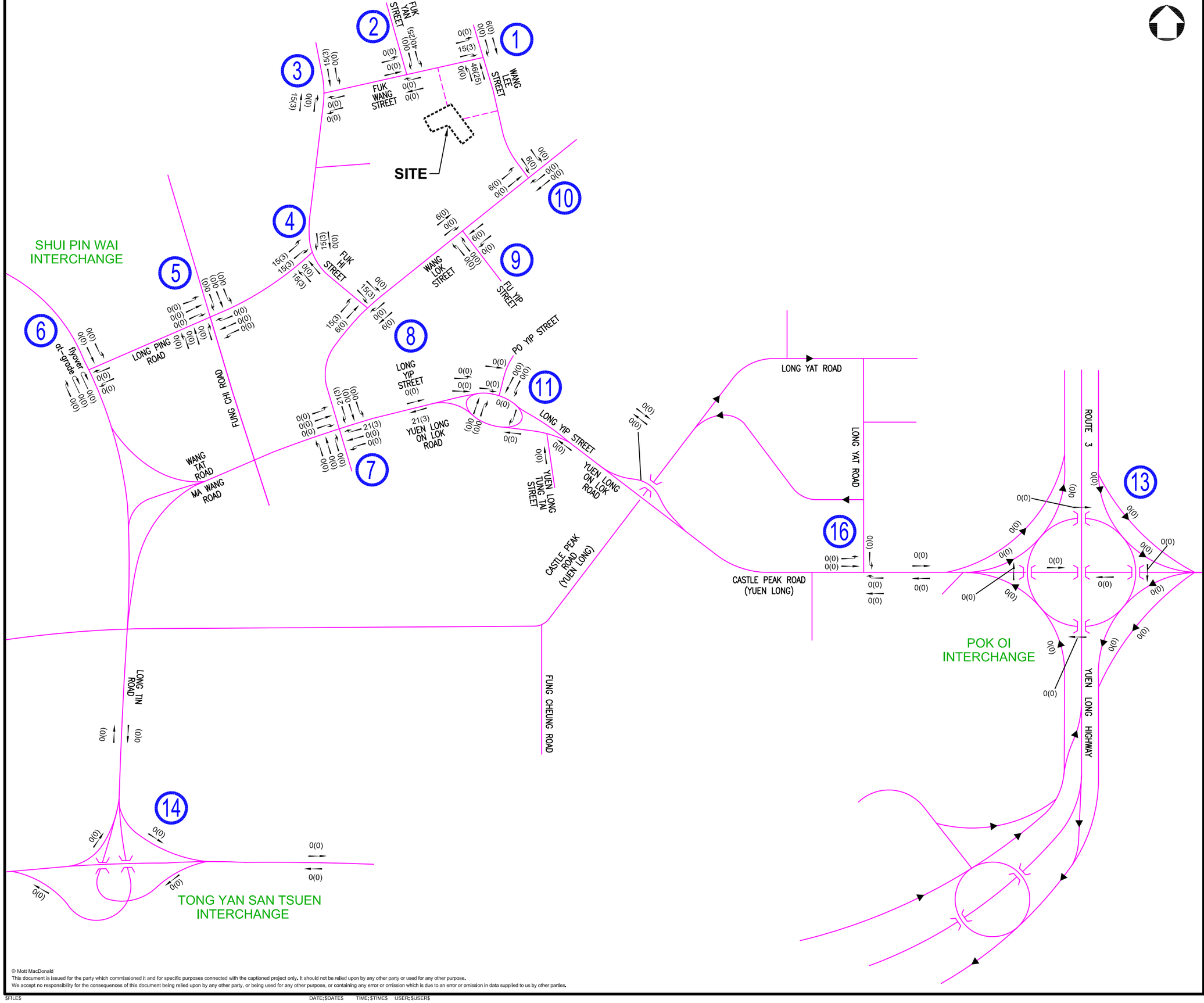

KEY PLAN

102	AM PEAK HOUR TRAFFIC FLOWS (PCU/HR)
(102)	PM PEAK HOUR TRAFFIC FLOWS (PCU/HR)
(10)	JUNCTION NO.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 22	EW	FRIST ISSUE	KS	SHC

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Title

PUBLIC TRANSPORT FLOW FOR LOGISTICS USE

Designed	--		Eng check	--	
Drawn	--		Coordination	--	
Dwg check	--		Approved	EC	
Scale at A1	N. T. S.	Status	PRE	Rev	P3

Drawing Number

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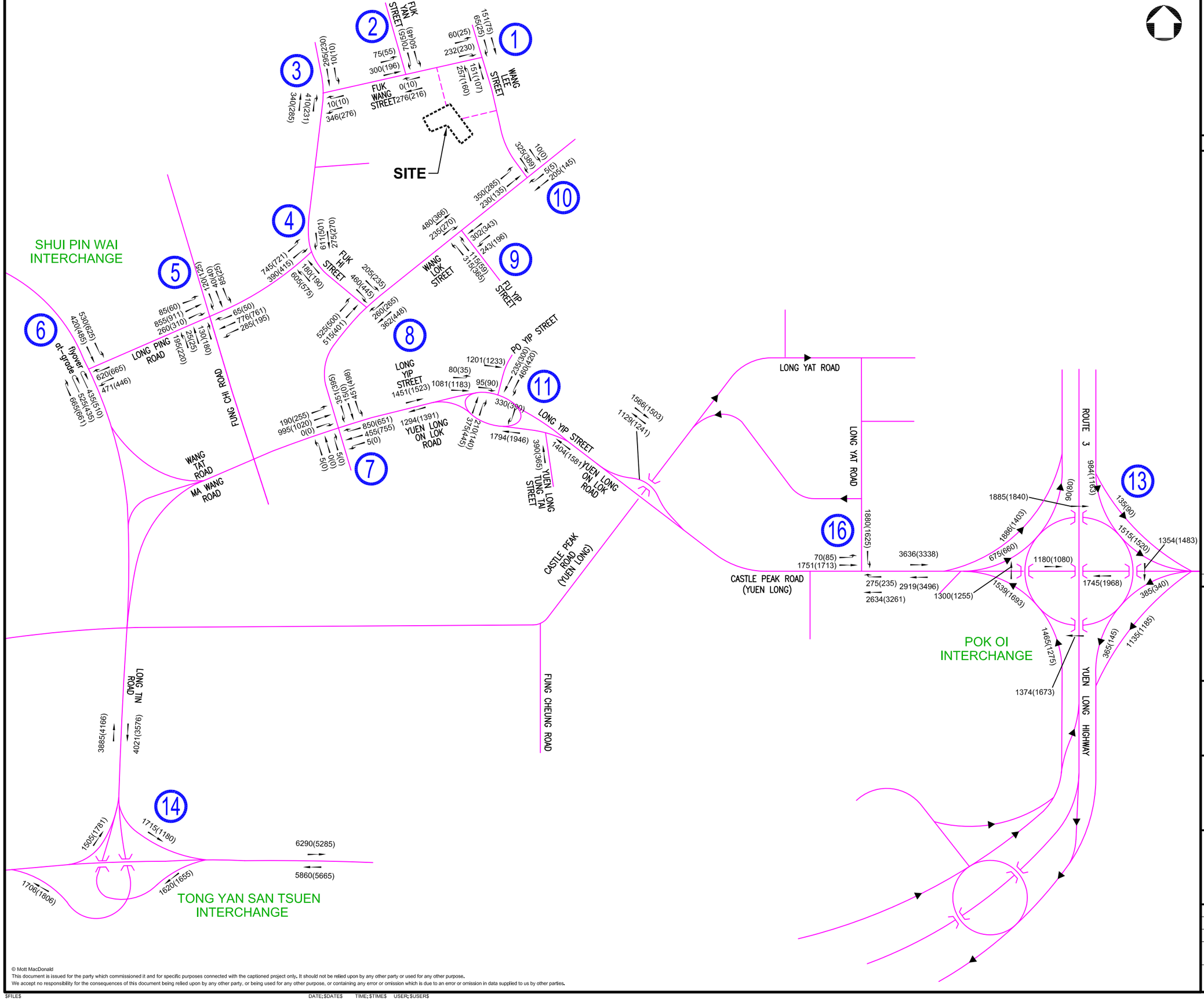

KEY PLAN

102 AM PEAK HOUR TRAFFIC FLOWS (PCU/HR)

(102) PM PEAK HOUR TRAFFIC FLOWS (PCU/HR)

(10) JUNCTION NO.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 22	EW	FRIST ISSUE	KS	SHC

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AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MUTLI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

2032 DESIGN FLOW FOR VEHICLE SERVICING AND MAINTENANCE

Designed	–		Eng check	--	
Drawn	–		Coordination	--	
Dwg check	–		Approved	EC	
Scale at A1	N. T. S.	Status	PRE	Rev	P4

Drawing Number

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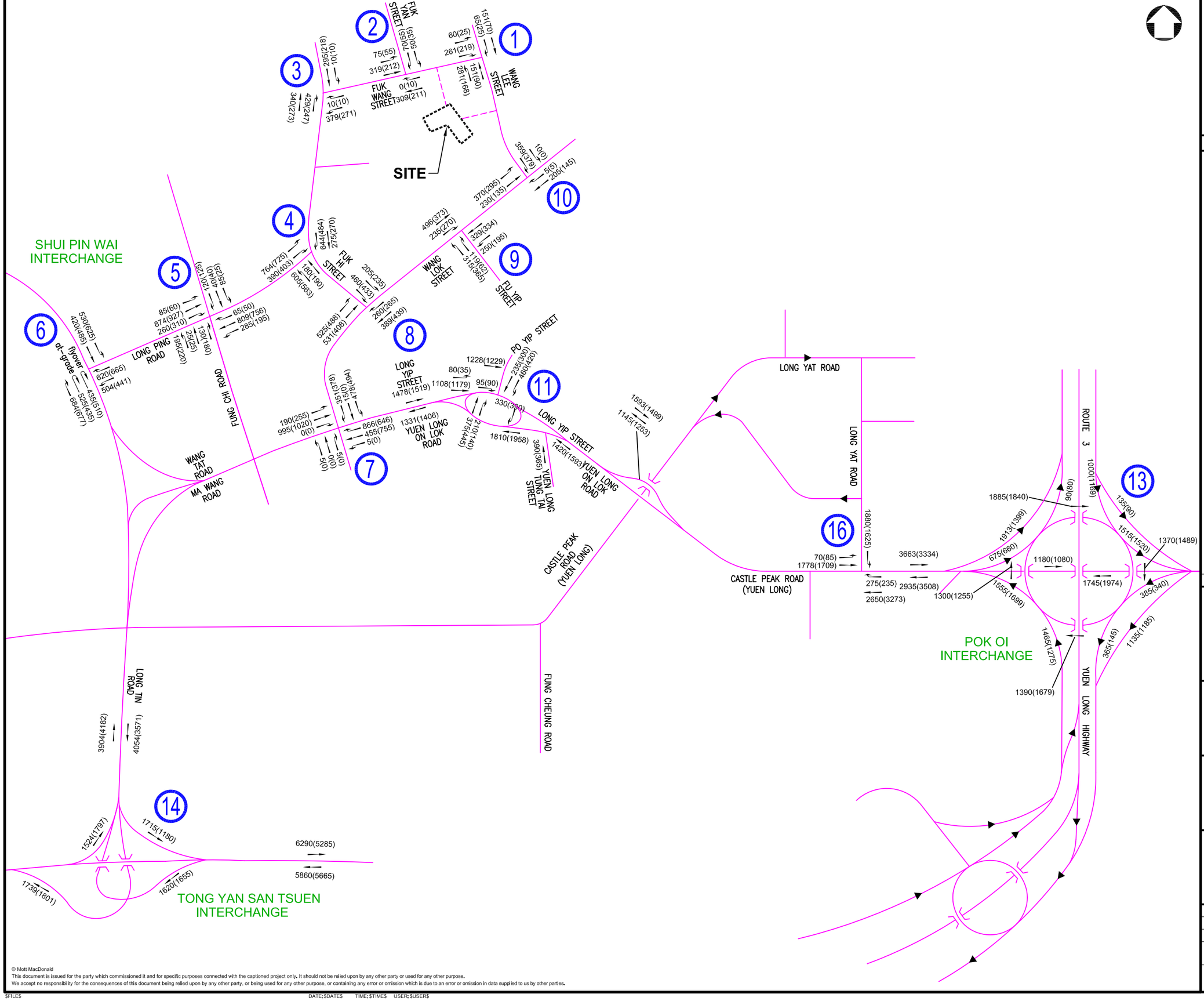

KEY PLAN

102 AM PEAK HOUR TRAFFIC FLOWS (PCU/HR)

(102) PM PEAK HOUR TRAFFIC FLOWS (PCU/HR)

(10) JUNCTION NO.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 22	EW	FRIST ISSUE	KS	SHC

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Title

2032 DESIGN FLOW FOR LOGISTICS USE

Designed	--		Eng check	--	
Drawn	--		Coordination	--	
Dwg check	--		Approved	EC	
Scale at A1	N. T. S.	Status	PRE	Rev	P4

Drawing Number

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Annex

Annex A	Junction Calculation Sheets
Annex B	Existing Junction Layout Plan
Annex C	Planned / Improved Junction Layout Plan
Annex D	Location of the Planned / Committed Developments

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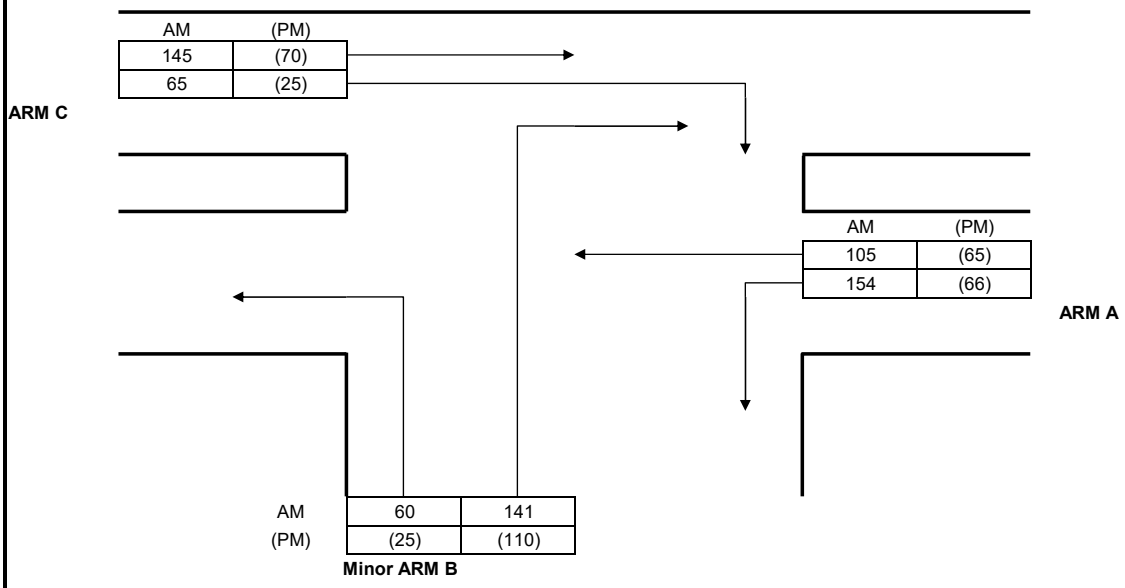
Annex A

2022 Observed Traffic Flows

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Wang Lee St / Fuk Wang St			Ref. No.:	J01P
Scheme:	2032 Reference Flow			Ref. No.:	
Year:	2032	Job No.:	J1358.1	Rev.:	-
ARM A:	Wang Lee Street NB				
ARM B:	Fuk Wang Street EB				
ARM C:	Wang Lee Street SB				



GEOMETRY					
Major road width	W	10.00	Lane widths	w(b-a)	4.50
Central Reserve width	Wcr	0.00		w(b-c)	4.50
2 Lane Minor Arm (Y/N)		N		w(c-b)	5.00
Visibilities	Vr(b-a)	150	Calculated	D	1.11
	Vl(b-a)	150		E	1.11
	Vr(b-c)	150		F	1.16
	Vr(c-b)	150		Y	0.66

ANALYSIS			AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		145	70
	q(c-b)		65	25
	q(a-b)		154	66
	q(a-c)		105	65
	q(b-a)		141	110
	q(b-c)		60	25
	f		0.30	0.19
		Factor		
CAPACITIES	Q(b-a)	1	603	650
	Q(b-c)	1	782	802
	Q(c-b)	1	791	826
	Q(b-ac)	1	648	674
RFC's	b-a		0.234	0.169
	b-c		0.077	0.031
	c-b		0.082	0.030
	b-ac		0.310	0.200
Worst RFC			**0.310**	**0.200**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

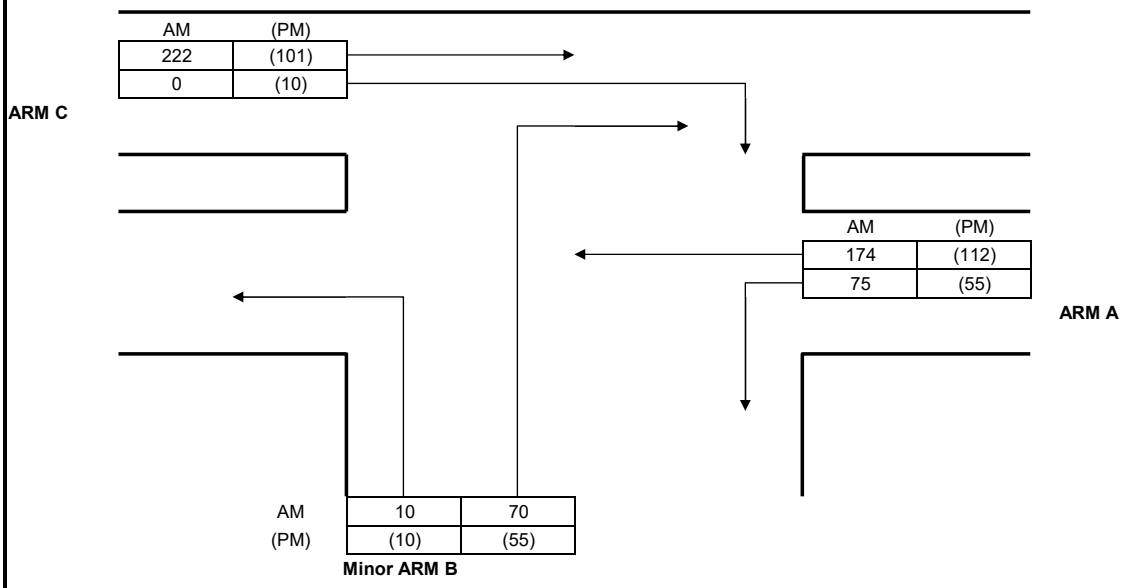
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Sep-23	Checked by:

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Fuk Yan St / Fuk Wang St			Ref. No.:	J02P
Scheme:	2032 Reference Flow			Ref. No.:	
Year:	2032	Job No.:	J1358.1	Rev.:	-
ARM A:	Fuk Wang Street EB				
ARM B:	Fuk Yan Street SB				
ARM C:	Fuk Wang Street WB				



GEOMETRY

Major road width	W	10.50	Lane widths	w(b-a)	4.08
Central Reserve width	Wcr	0.00		w(b-c)	4.08
2 Lane Minor Arm (Y/N)		N		w(c-b)	5.00
Visibilities	Vr(b-a)	150	Calculated	D	1.07
	Vl(b-a)	150		E	1.07
	Vr(b-c)	150		F	1.16
	Vr(c-b)	150		Y	0.64

ANALYSIS

		Factor	AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		222	101
	q(c-b)		0	10
	q(a-b)		75	55
	q(a-c)		174	112
	q(b-a)		70	55
	q(b-c)		10	10
	f		0.13	0.15
CAPACITIES	Q(b-a)	1	585	618
	Q(b-c)	1	746	763
	Q(c-b)	1	795	817
	Q(b-ac)	1	601	637
RFC's	b-a		0.120	0.089
	b-c		0.013	0.013
	c-b		0.000	0.012
	b-ac		0.133	0.102
Worst RFC			**0.133**	**0.102**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

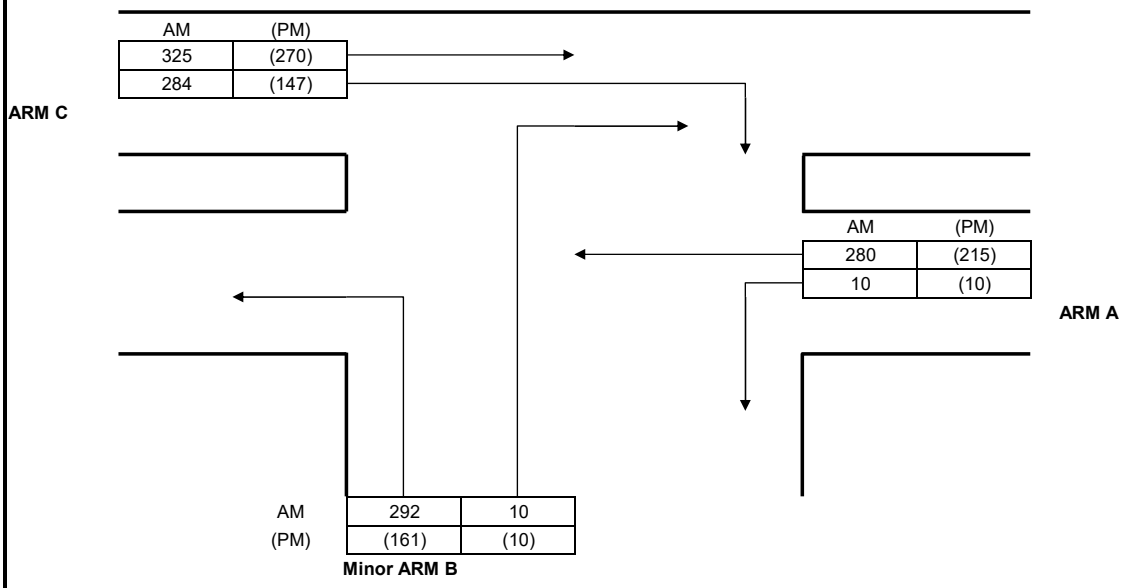
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Sep-23	Checked by:

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Fuk Wang St / Fuk Hi St			Ref. No.:	J03P
Scheme:	2032 Reference Flow			Ref. No.:	
Year:	2032	Job No.:	J1358.1	Rev.:	-
ARM A:	Fuk Hi Street NB				
ARM B:	Fuk Wang Street WB				
ARM C:	Fuk Hi Street SB				



GEOMETRY

Major road width	W	10.50	Lane widths	w(b-a)	7.80
Central Reserve width	Wcr	0.00		w(b-c)	7.80
2 Lane Minor Arm (Y/N)		N		w(c-b)	5.00
Visibilities	Vr(b-a)	150	Calculated	D	1.43
	Vl(b-a)	150		E	1.43
	Vr(b-c)	150		F	1.16
	Vr(c-b)	150		Y	0.64

ANALYSIS

		Factor	AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		325	270
	q(c-b)		284	147
	q(a-b)		10	10
	q(a-c)		280	215
	q(b-a)		10	10
	q(b-c)		292	161
	f		0.97	0.94
CAPACITIES	Q(b-a)	1	599	697
	Q(b-c)	1	969	991
	Q(c-b)	1	784	802
	Q(b-ac)	1	950	967
RFC's	b-a		0.017	0.014
	b-c		0.301	0.162
	c-b		0.362	0.183
	b-ac		0.318	0.177
Worst RFC			**0.362**	**0.183**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

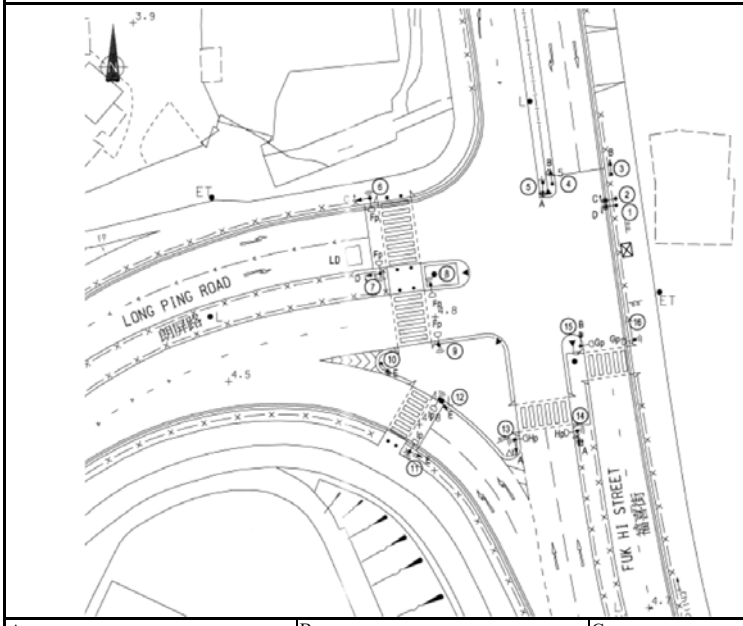
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Sep-23	Checked by:

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Fuk Hi St / Long Ping Rd	Ref. No.:	J04S
Scheme:	2032 Reference Flow	Ref. No.:	



Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

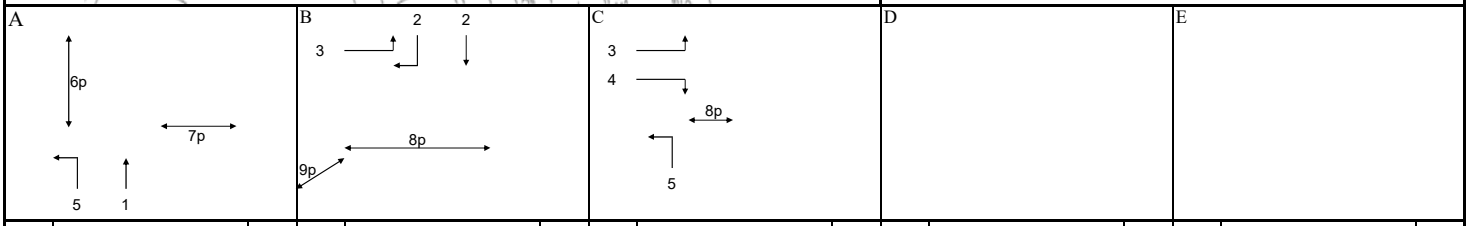
AM
(PM)

542(371) 275(270)

604(622)

375(400)

590(560) 180(190)



3		5	2		3	2		8											
		3	2		3	6													

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↑	A	2	4.00								4310	180	0.042		190	0.044	
2 ↓	B	1	3.70	1							1985	275	0.139		270	0.136	
2 ↓	B	1	3.70				20			100	1975	542	0.274	1	371	0.188	1
3 →	BC	1	4.30	1		15				100	1860	604	0.325		622	0.334	
4 ↓	C	1	4.70				20			100	2070	375	0.181		400	0.193	
5 ←	AC	1	3.80						0.75	100	1600	590	0.369	1	560	0.350	1

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
6p	A									
7p	A									
8p	BC									
9p	B									

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

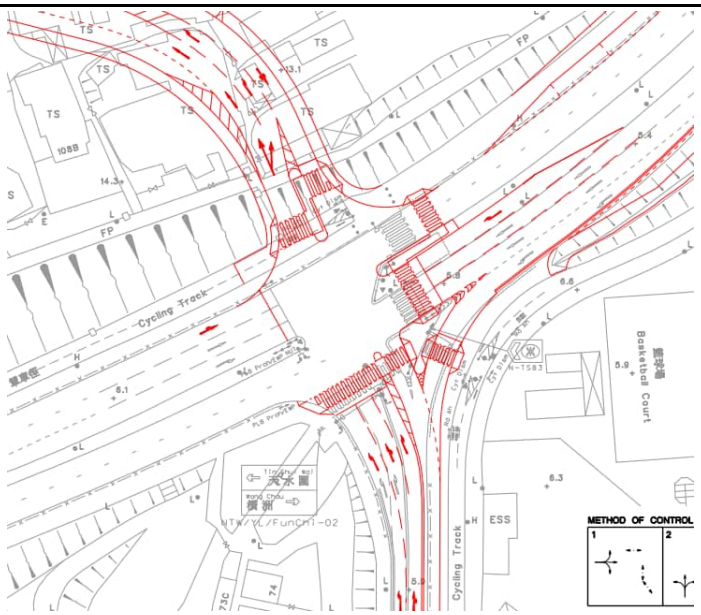
	AM Peak			PM Peak		
Check Critical Phase	1,2,4	5,2		1,2,4	5,2	
Sum of y values, Y	0.497	0.643		0.425	0.538	
Lost time, L	20	12		20	12	
Cycle Time, C	100	100		90	90	
Practical Y, Y_{pr}	0.720	0.792		0.700	0.780	
Reserve Capacity, R.C. (%)	45%	23%		65%	45%	

Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Long Ping Rd / Fung Chi Rd / Wang Chau Phase 1 Access Road	Ref. No.:	J05S
Scheme:	2032 Reference Flow	Ref. No.:	



Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

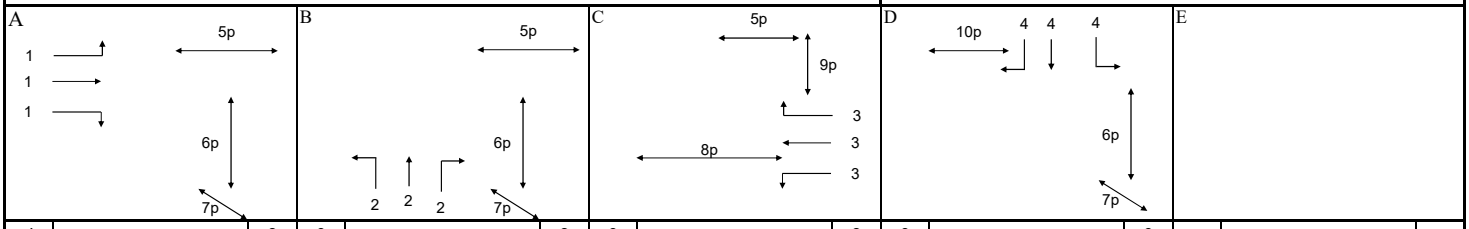
AM
(PM)

120(125) 40(40) 85(25)

85(60)
729(827)
260(310)

65(50)
722(646)
285(195)

195(220) 25(25) 130(180)



4		2	3		2	3		2	3		3			

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1	A	1	3.60	1		15				22 / 14	1935/1950	389	0.201		425	0.218	
1	A	1	3.60								2115	425	0.201	1	462	0.218	1
1	A	1	3.60				10			100	1840	260	0.141		310	0.168	
4	D	1	4.00	1		15	20			84 / 79	1880/1895	245	0.130	1	190	0.100	1
2	B	1	3.60	1		10				100	1715	195	0.114	1	220	0.128	1
2	B	1	3.50				20			84 / 88	1980/1975	155	0.078		205	0.104	
3	C	1	3.90				15		0.8	100	1560	65	0.042		50	0.032	
3	C	2	3.40								4190	722	0.172	1	646	0.154	1
3	C	1	3.60	1		40				100	1905	285	0.150		195	0.102	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
5p			8		8	16				
6p			8		8	16				

Note: Saturation flow of 90 pcu/hr is added for approach 4 is for the additional 15 meters traffic lane at junction

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

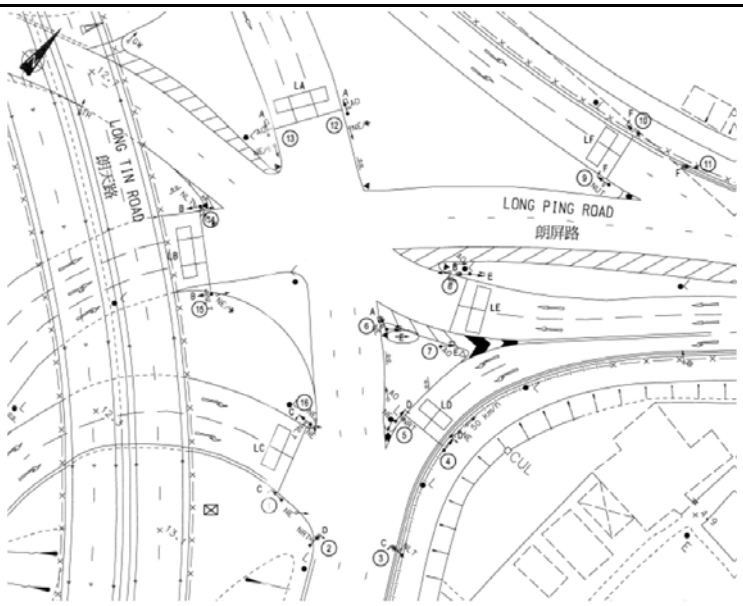
	AM Peak			PM Peak		
Check Critical Phase	1,2,3,4			1,2,3,4		
Sum of y values, Y	0.617			0.601		
Lost time, L	18			18		
Cycle Time, C	120			120		
Practical Y, Y_{pr}	0.765			0.765		
Reserve Capacity, R.C. (%)	24%			27%		

Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

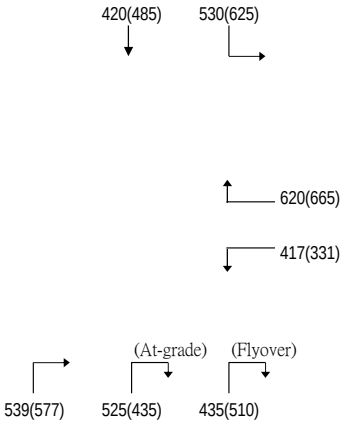
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Long Ping Rd / Shui Pin Wai Interchange	Ref. No.:	J06S
Scheme:	2032 Reference Flow	Ref. No.:	

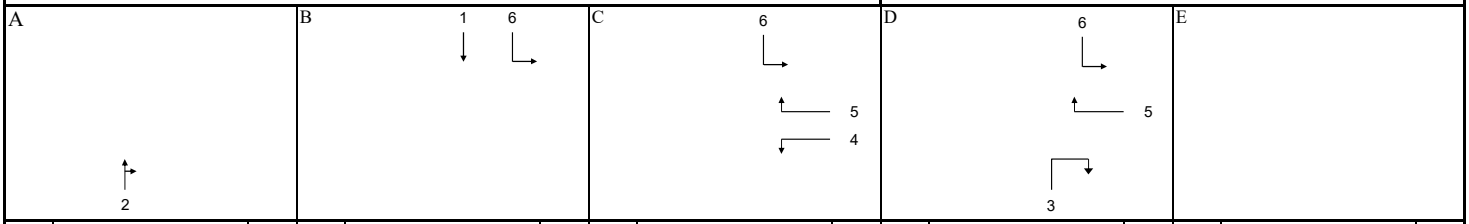


Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

AM
(PM)





2		3	4		3	9		3	3		3						
5		3	4		3	3					3						

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↓	B	3	3.3	1							6115	420	0.069	1	485	0.079	1
2 →	A	1	3.8	1							1990	356	0.179	1	337	0.169	1
2 ↘	A	1	3.9				18			50 / 32	2060/2090	369	0.179		354	0.169	
2 ↘	A	1	3.3				15				1895	339	0.179	1	321	0.169	1
3 ↘	D	2	5.1	1			20			100	4085	435	0.106	1	510	0.125	1
4 ↙	C	1	3.5	1		20				100	1920	417	0.217	1	331	0.172	1
5 ←	CD	2	3.5	1						100	4070	620	0.152		665	0.163	
6 →	BCD	2	3.6	1						100	4090	530	0.130		625	0.153	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.

Note: Saturation flow of 90 pcu/hr is added for approach 4 is for the additional 15 meters traffic lane at junction

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

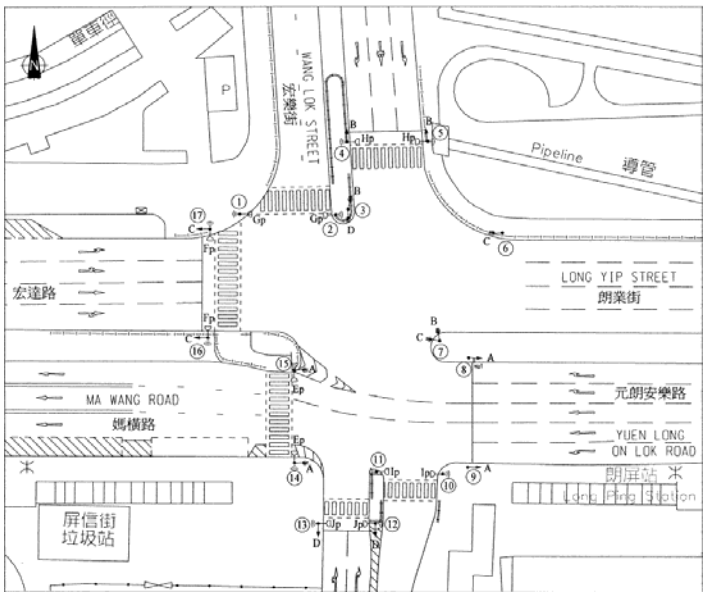
	AM Peak			PM Peak		
Check Critical Phase	2,1,4,3	2,1,5		2,1,4,3	2,1,5	
Sum of y values, Y	0.571	0.400		0.546	0.412	
Lost time, L	26	18		26	18	
Cycle Time, C	120	120		120	120	
Practical Y, Y_{pr}	0.705	0.765		0.705	0.765	
Reserve Capacity, R.C. (%)	23%	91%		29%	86%	

Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

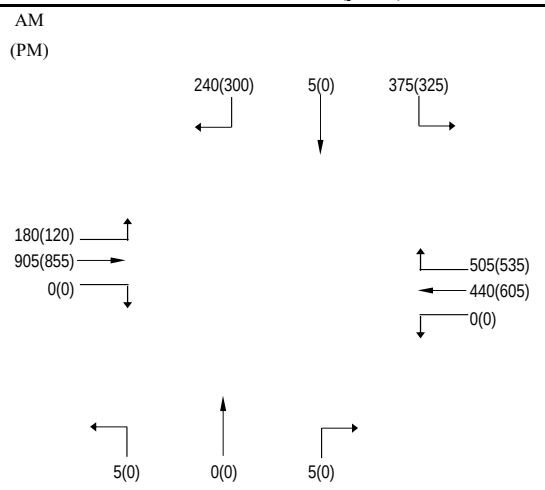
Ho Wang SPB Limited
Traffic & Transportation Consultants

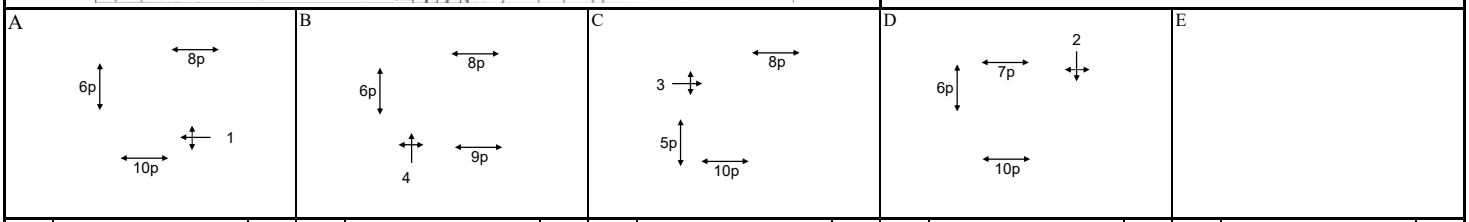
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Wang Lok St / Wang Tat Rd / Ma Wang Rd / Long Yip St / Yuen Long On Lok Rd	Ref. No.:	J07S
Scheme:	2022 Observed Flow	Ref. No.:	



Year:	2022	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)





2		3	4	5	7	2		3	5		7			

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1A	A	2	3.00				30		0.75	100	2940	505	0.172	1	535	0.182	1
1B	A	2	3.00								4110	440	0.107		605	0.147	
1C	A	1	3.00			15				100	1870	0	0.000		0	0.000	
2A	D	1	3.5	1			25				1855	240	0.129		242	0.131	1
2B	D	1	3.5			20	30			98 / 100	1960/1970	255	0.130	1	257	0.131	
2C	D	1	3.5			15			0.5		960	125	0.130		125	0.131	1
3A	C	1	3.5	1		15				100	1785	180	0.101		120	0.067	
3B	C	1	3.5			20				0	2105	302	0.143	1	285	0.135	1
3C	C	1	3.5								2105	302	0.143	1	285	0.135	1
3D	C	1	3.5				15				2105	302	0.143	1	285	0.135	1
4A	B	1	3.50	1		15				100 / 100	1785	5	0.003		0	0.000	
4B	B	1	3.50				30			100	2005	5	0.002		0	0.000	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
5p	C		6		12	18				
6p	ABD		10		15	25				
7p	D		7		11	18				
8p	ABC		8		10	18				
9p	B		7		7	14				
10p	ACD		5		6	11				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

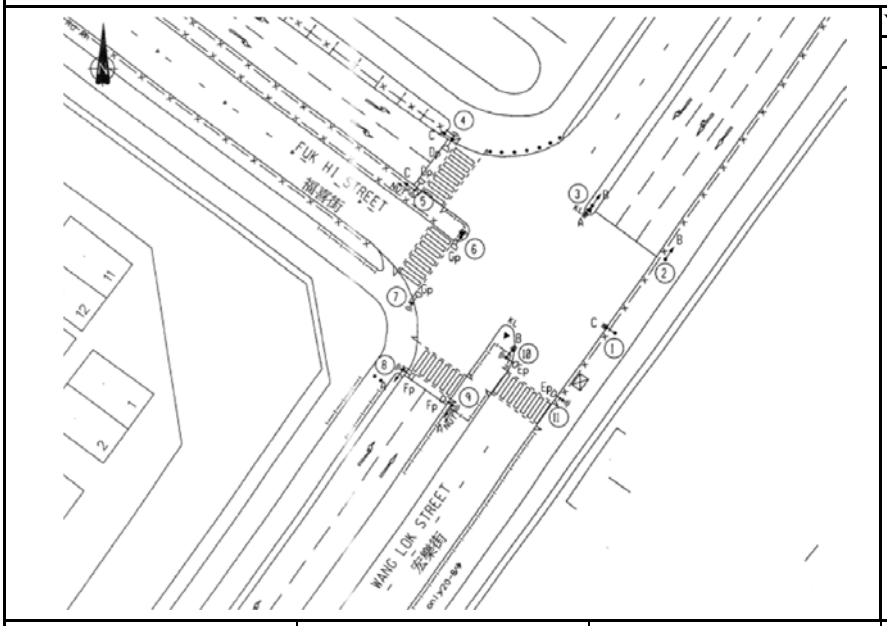
	AM Peak			PM Peak		
Check Critical Phase	1,9p,3,2			1,9p,3,2		
Sum of y values, Y	0.445			0.448		
Lost time, L	35			35		
Cycle Time, C	120			120		
Practical Y, Y_{pr}	0.638			0.638		
Reserve Capacity, R.C. (%)	43%			42%		

Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

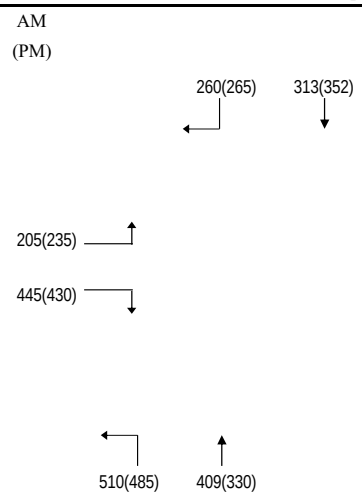
Ho Wang SPB Limited
Traffic & Transportation Consultants

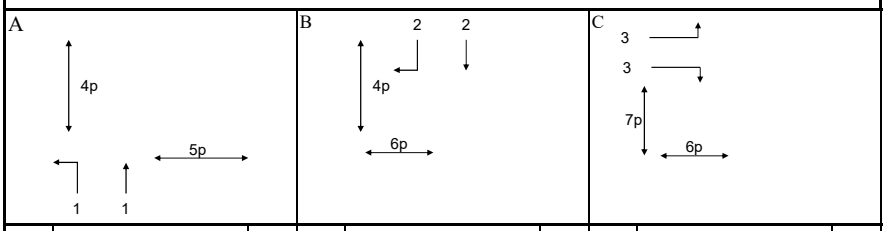
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Fuk Hi St / Wang Lok St	Ref. No.:	J08S
Scheme:	2032 Reference Flow	Ref. No.:	



Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)





D

E

3		3	4		3	4		3									

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1	A	1	3.7	1		10				100	1725	510	0.296	1	485	0.281	1
1	A	1	3.7								2125	409	0.192		330	0.155	
2	B	1	3.5				15				1915	185	0.097		199	0.104	
2	B	1	3.5				18			38 / 31	2040/2050	197	0.097	1	213	0.104	1
2	B	1	3.5	1							1965	190	0.097		204	0.104	
3	C	1	4.00	1		15				100	1830	205	0.112		235	0.128	
3	C	1	4.00				20			100	2005	445	0.222	1	430	0.214	1

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
4p	AB		7		7	14				
5p	A		7		7	14				
6p	BC		7		7	14				
7p	C		7		7	14				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

Check Critical Phase	1,2,3			1,2,3		
Sum of y values, Y	0.614			0.600		
Lost time, L	17			17		
Cycle Time, C	108			108		
Practical Y, Y_{pr}	0.758			0.758		
Reserve Capacity, R.C. (%)	23%			26%		

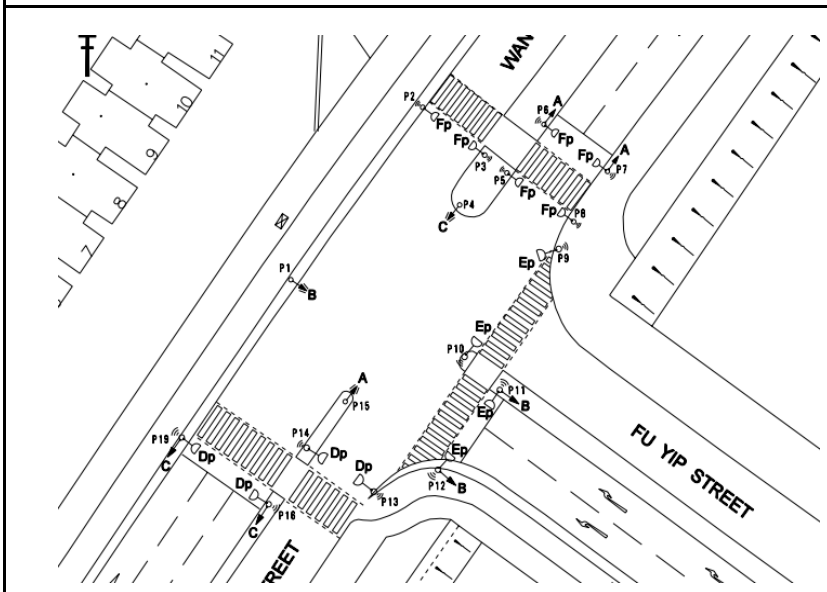
Calculated by:	Date:	Sep-2023	Checked by:

Y:\Job\J1358.1 MSB in Yuen Long\04-Working\04G_Calculations\[J1358.1-2032_Reference_Calculation_With_Relocation_Site_1A_20230828.xlsm]J08S

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

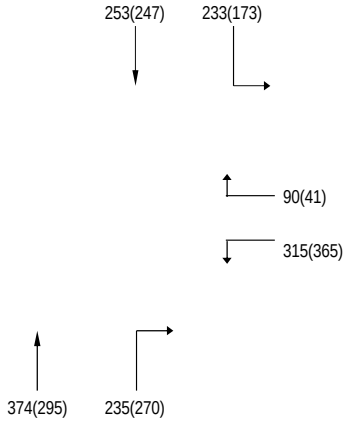
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Wang Lok St / Fu Yip St	Ref. No.:	J09S
Scheme:	2032 Reference Flow	Ref. No.:	



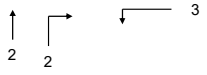
Year: 2032	Job No.: J1358.1	Rev.: -

Peak Hour Traffic Flows (pcu/hr)

AM
(PM)



A



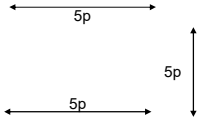
B



C



D



E

3		3	4		3	2		3	5	13	11			
3					3	2		3	5	13	11			

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↓	C	1	3.5								2105	253	0.120		231	0.110	1
1 ↓→	C	1	3.5	1		10				100 / 91	1710/1730	233	0.136	1	189	0.109	
2 →↑	A	1	3.5	1			20		1.11	78 / 97	2060/2030	301	0.146		277	0.137	1
2 ↑	A	1	3.5								2105	308	0.146	1	288	0.137	
3 ↓←	AB	1	3.50	1		10				100	1710	315	0.184		365	0.213	1
4 ←↑	B	1	3.50	1			20			100	1830	90	0.049	1	41	0.022	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
5p	D		5		8	13		1		1
6p	D		5		8	13		1		1
7p	D		5		8	13				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

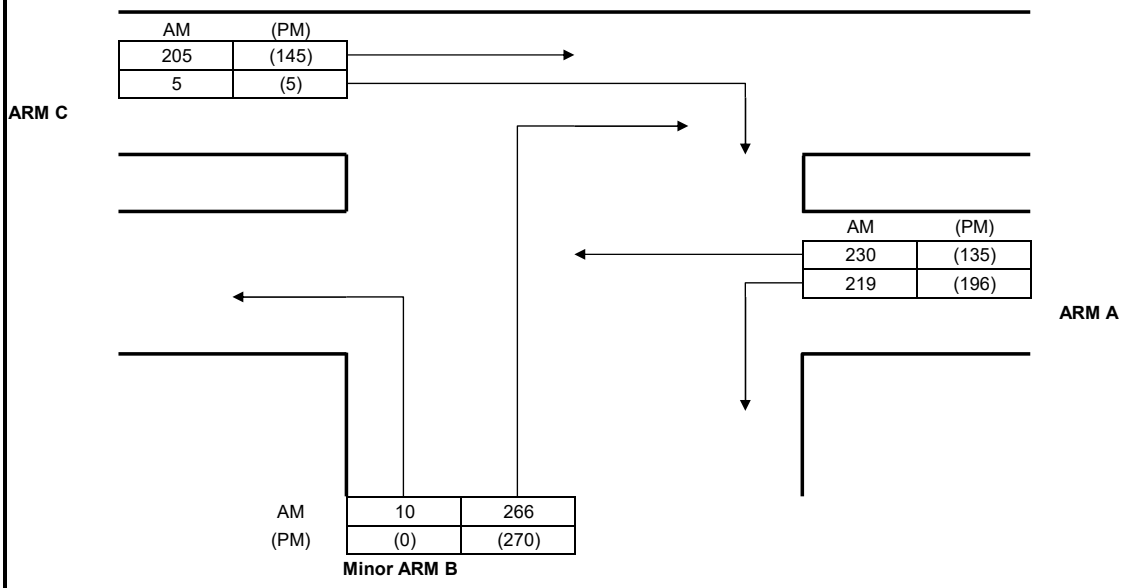
Check Critical Phase	2,4,1,5p	3,1,5p		2,4,1,5p	3,1,5p	
Sum of y values, Y	0.332	0.320		0.269	0.323	
Lost time, L	44	38		44	38	
Cycle Time, C	115	115		115	115	
Practical Y, Y_{pr}	0.556	0.603		0.556	0.603	
Reserve Capacity, R.C. (%)	68%	88%		107%	87%	

Calculated by:	Date: Sep-2023	Checked by:

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Wang Lee St / Wang Lok St			Ref. No.:	J10P
Scheme:	2032 Reference Flow			Ref. No.:	
Year:	2032	Job No.:	J1358.1	Rev.:	-
ARM A:	Wang Lok Street				
ARM B:	Wang Lee Street				
ARM C:	Wang Lok Street				



GEOMETRY

Major road width	W	13.65	Lane widths	w(b-a)	5.30
Central Reserve width	Wcr	4.75		w(b-c)	5.30
2 Lane Minor Arm (Y/N)		Y		w(c-b)	4.36
Visibilities	Vr(b-a)	110	Calculated	D	1.14
	Vl(b-a)	150		E	1.14
	Vr(b-c)	110		F	1.10
	Vr(c-b)	150		Y	0.53

ANALYSIS

		Factor	AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		205	145
	q(c-b)		5	5
	q(a-b)		219	196
	q(a-c)		230	135
	q(b-a)		266	270
	q(b-c)		10	0
	f		0.04	0.00
CAPACITIES	Q(b-a)	1	694	725
	Q(b-c)	1	783	806
	Q(c-b)	1	721	746
	Q(b-ac)	1	697	725
RFC's	b-a		0.383	0.372
	b-c		0.013	0.000
	c-b		0.007	0.007
	b-ac		0.000	0.000
Worst RFC			**0.383**	**0.372**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

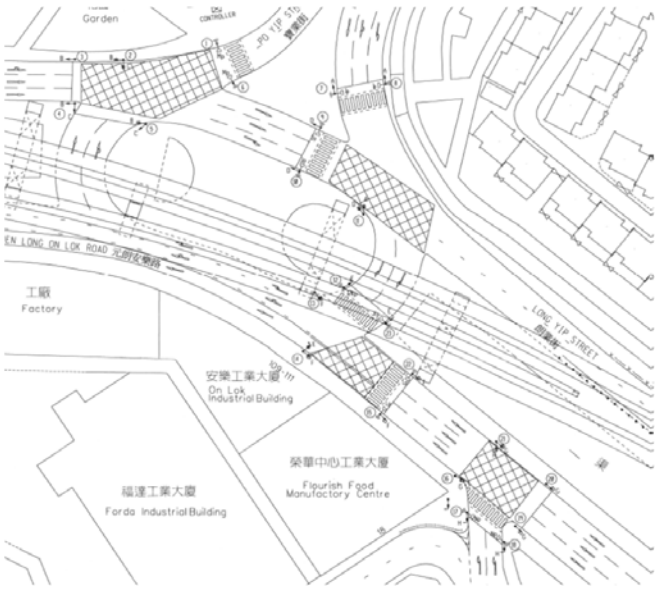
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Sep-23	Checked by:

Traffic Signal Junction Calculation Sheet

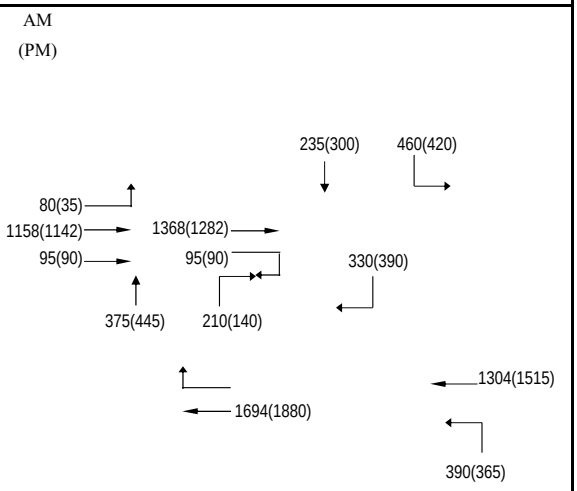
Ho Wang SPB Limited
Traffic & Transportation Consultants

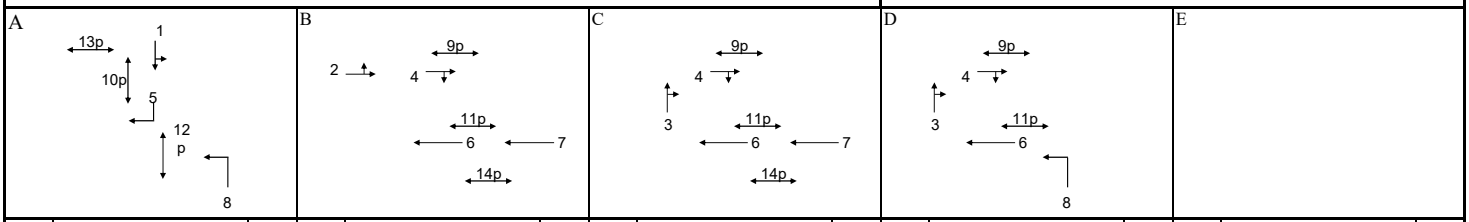
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Long Yip St / Yuen Long On Lok Rd / Po Yip St	Ref. No.:	J11S
Scheme:	2032 Reference Flow	Ref. No.:	



Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)





4		3	4		3	4				6			

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↓	A	1	3.5								2105	235	0.112		259	0.123	1
1 ↓→	A	1	3.5			18				100 / 83	1945/1970	240	0.123		242	0.123	
1 ↓←	A	1	3.5	1		15					1785	220	0.123	1	219	0.123	1
2 ↑→	B	1	3.0	1		10				28 / 21	1880/1900	629	0.335		601	0.317	
2 →	B	1	3.0								2055	704	0.342	1	666	0.324	1
3 ↑	CD	1	3.5								2105	319	0.151		313	0.149	1
3 ↑→	CD	1	3.5	1			10			79 / 52	1755/1825	266	0.152	1	272	0.149	
4 →	BCD	2	3.3	1							4030	1368	0.339		1282	0.318	
4 ↓	BCD	1	3.3				10			100	1815	95	0.052		90	0.050	
5 ↓	A	2	5.0				10			100	3920	330	0.084		390	0.099	
6 ←	BCD	3	3.3								6255	1694	0.271		1880	0.301	
7 ←	BCD	3	3.5							100	6315	1304	0.206		1515	0.240	
8 ↑	AD	2	3.5			15				100	3825	390	0.102		365	0.095	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
9p	BCD		9		10	19				
10p	A		8		9	17				
11p	BCD		10		12	22				
12p	A		8		9	17				
13p	A		8		9	17				
14p	BC		10		12	22				

Practical Y (Ypr):	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

	AM Peak			PM Peak		
Check Critical Phase	1,2,3			1,2,3		
Sum of y values, Y	0.617			0.596		
Lost time, L	21			21		
Cycle Time, C	120			120		
Practical Y, Y_{pr}	0.743			0.743		
Reserve Capacity, R.C. (%)	20%			25%		

Calculated by:	Date: Sep-2023	Checked by:

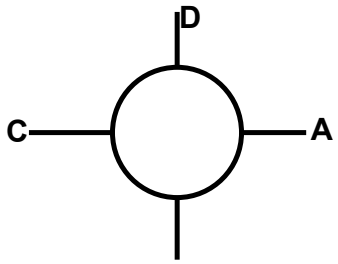
Simplified Roundabout Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Pok Oi Interchange		Ref. No.: J13R
Scheme:	2032 Reference Flow		Ref. No.:
Year:	2032	Job No.: J1358.1	Rev.: -

AM PM

ARM A: Castle Peak Road Westbound Approach
ARM B: Yuen Long Highway
ARM C: Castle Peak Road Eastbound Approach
ARM D: Route 3



GEOMETRY

ARM	v	e	L	r	D	Phi	S
A	4.00	7.00	18	25	90	65	0.27
B	12.00	23.00	5	25	90	30	3.52
C	3.50	6.50	4	25	90	40	1.20
D	7.00	9.00	5	25	90	30	0.64

AM FLOWS

from \ to	A	B	C	D	Circ	Entry
A					1254	385
B					1274	1465
C					1300	675
D					1885	884

PM FLOWS

from \ to	A	B	C	D	Circ	Entry
A					1450	340
B					1640	1275
C					1255	660
D					1840	1130

CALCULATIONS

ARM	K	X_2	M	F	t_D	f_c	Q_E AM	Q_E PM	RFC AM	RFC PM
A	0.89	5.96	20.09	1805	1.02	0.47	1079	996	0.36	0.34
B	1.01	13.37	20.09	4051	1.02	0.79	3074	2782	0.48	0.46
C	0.98	4.38	20.09	1328	1.02	0.40	783	801	0.86	0.82
D	1.01	7.88	20.09	2387	1.02	0.55	1356	1381	0.65	0.82

Crtical Arm:	**C**	**C**
RFC:	**0.86**	**0.82**
	AM	**PM**

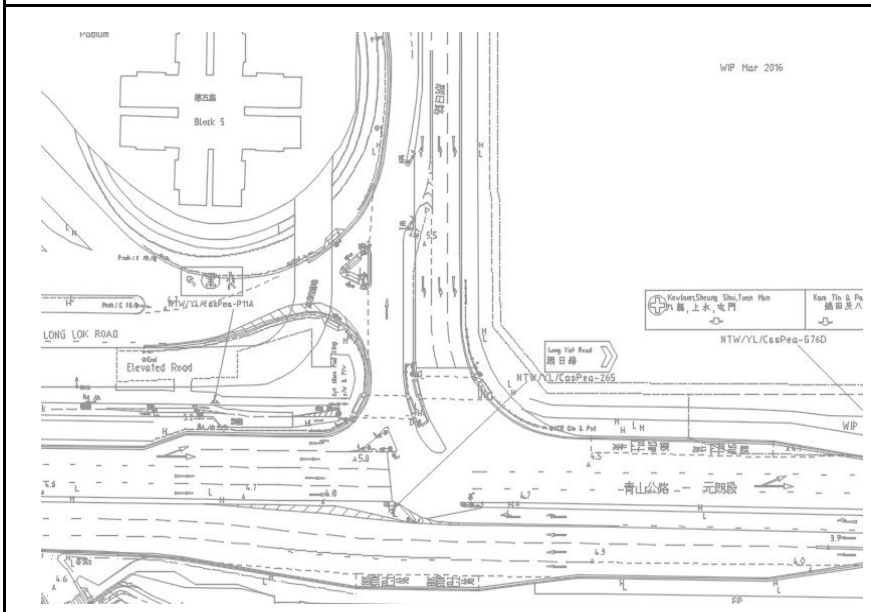
- In accordance with TPDM V2.4

Calculated by:	PY	Date:	Sep-23	Checked by:	TE

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Castle Peak Road - Yuen Long / Long Yat Road	Ref. No.:	J16S
Scheme:	2032 Reference Flow	Ref. No.:	J47151



Year:	2032	Job No.:	J1358	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

AM
(PM)

1880(1625)
70(85)
1708(1622)
275(235)
2534(3195)

A	B	C	D	E
7p, 6p, 1	7p, 2, 1	5, 4	5, 6p	

2					3	3					3						
2	22					3					3						

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 →	AB	3	3.30								6255	1708	0.273	1	1622	0.259	1
2 ↱	B	1	3.50	1		15				100	1785	70	0.039		85	0.048	
4 ↰	C	1	3.20				25			100	1960	275	0.140		235	0.120	
5 ↳	CD	3	4.20	1		20			0.9	100	5345	1880	0.352	1	1625	0.304	1

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
6p	AD		5		10	15				
7p	AB		5		17	22				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

Check Critical Phase	1,5	7p,5		1,5	7p,5	
Sum of y values, Y	0.625	0.352		0.563	0.304	
Lost time, L	9	29		9	29	
Cycle Time, C	108	108		108	108	
Practical Y, Y_{pr}	0.825	0.658		0.825	0.658	
Reserve Capacity, R.C. (%)	32%	87%		46%	117%	

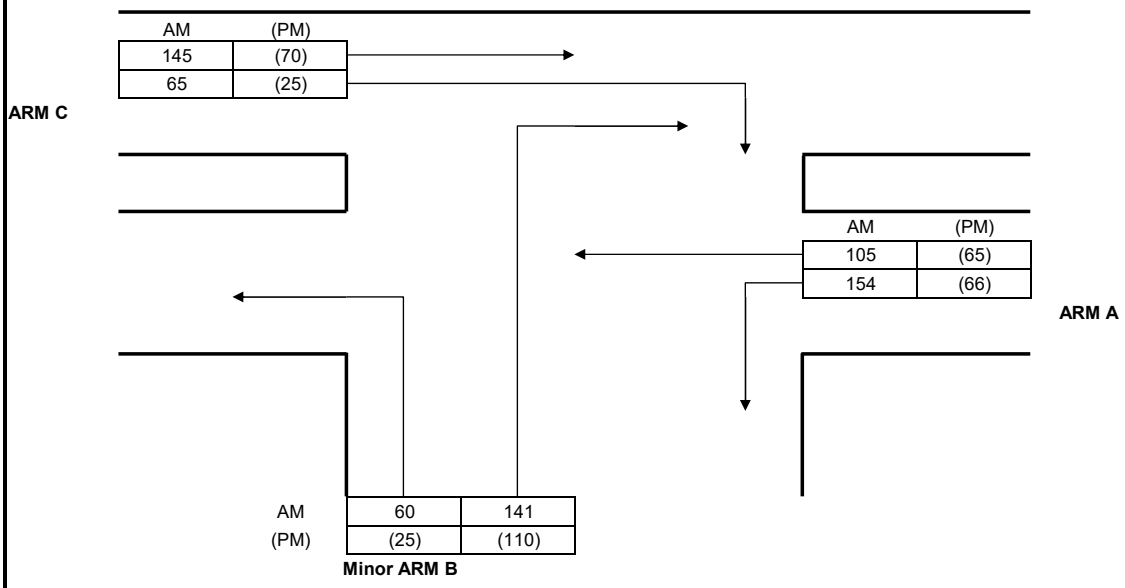
Calculated by:	Date: Sep-2023	Checked by:

2032 Reference

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Wang Lee St / Fuk Wang St			Ref. No.:	J01P
Scheme:	2032 Reference Flow			Ref. No.:	
Year:	2032	Job No.:	J1358.1	Rev.:	-
ARM A:	Wang Lee Street NB				
ARM B:	Fuk Wang Street EB				
ARM C:	Wang Lee Street SB				



GEOMETRY					
Major road width	W	10.00	Lane widths	w(b-a)	4.50
Central Reserve width	Wcr	0.00		w(b-c)	4.50
2 Lane Minor Arm (Y/N)		N		w(c-b)	5.00
Visibilities	Vr(b-a)	150	Calculated	D	1.11
	Vl(b-a)	150		E	1.11
	Vr(b-c)	150		F	1.16
	Vr(c-b)	150		Y	0.66

ANALYSIS			AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		145	70
	q(c-b)		65	25
	q(a-b)		154	66
	q(a-c)		105	65
	q(b-a)		141	110
	q(b-c)		60	25
	f		0.30	0.19
		Factor		
CAPACITIES	Q(b-a)	1	603	650
	Q(b-c)	1	782	802
	Q(c-b)	1	791	826
	Q(b-ac)	1	648	674
RFC's	b-a		0.234	0.169
	b-c		0.077	0.031
	c-b		0.082	0.030
	b-ac		0.310	0.200
Worst RFC			**0.310**	**0.200**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

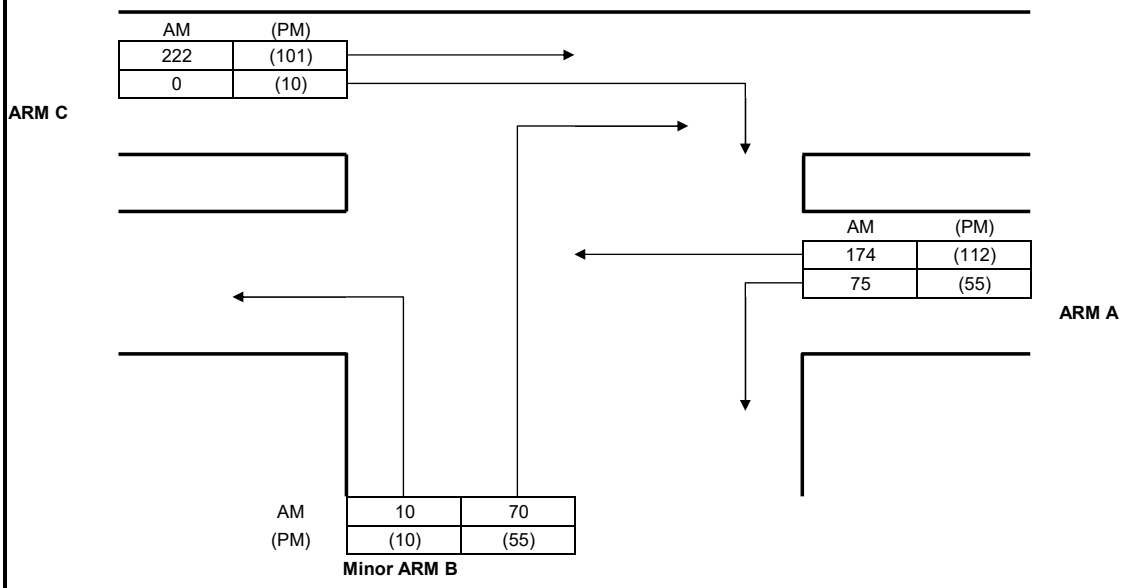
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Sep-23	Checked by:

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Fuk Yan St / Fuk Wang St			Ref. No.:	J02P
Scheme:	2032 Reference Flow			Ref. No.:	
Year:	2032	Job No.:	J1358.1	Rev.:	-
ARM A:	Fuk Wang Street EB				
ARM B:	Fuk Yan Street SB				
ARM C:	Fuk Wang Street WB				



GEOMETRY

Major road width	W	10.50	Lane widths	w(b-a)	4.08
Central Reserve width	Wcr	0.00		w(b-c)	4.08
2 Lane Minor Arm (Y/N)		N		w(c-b)	5.00
Visibilities	Vr(b-a)	150	Calculated	D	1.07
	Vl(b-a)	150		E	1.07
	Vr(b-c)	150		F	1.16
	Vr(c-b)	150		Y	0.64

ANALYSIS

		Factor	AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		222	101
	q(c-b)		0	10
	q(a-b)		75	55
	q(a-c)		174	112
	q(b-a)		70	55
	q(b-c)		10	10
	f		0.13	0.15
CAPACITIES	Q(b-a)	1	585	618
	Q(b-c)	1	746	763
	Q(c-b)	1	795	817
	Q(b-ac)	1	601	637
RFC's	b-a		0.120	0.089
	b-c		0.013	0.013
	c-b		0.000	0.012
	b-ac		0.133	0.102
Worst RFC			**0.133**	**0.102**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

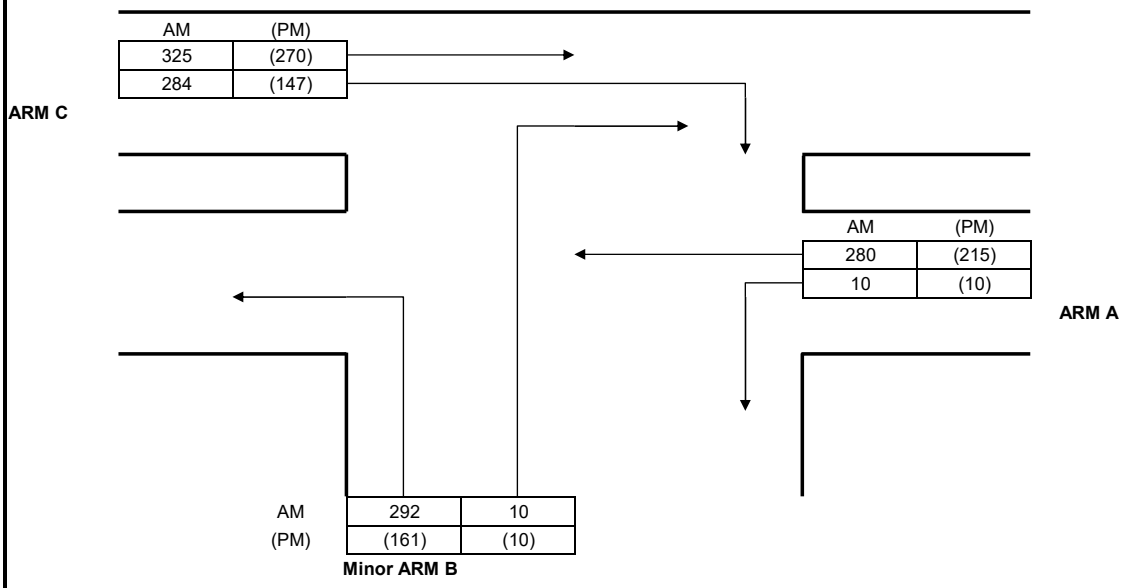
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Sep-23	Checked by:

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Fuk Wang St / Fuk Hi St			Ref. No.:	J03P
Scheme:	2032 Reference Flow			Ref. No.:	
Year:	2032	Job No.:	J1358.1	Rev.:	-
ARM A:	Fuk Hi Street NB				
ARM B:	Fuk Wang Street WB				
ARM C:	Fuk Hi Street SB				



GEOMETRY

Major road width	W	10.50	Lane widths	w(b-a)	7.80
Central Reserve width	Wcr	0.00		w(b-c)	7.80
2 Lane Minor Arm (Y/N)		N		w(c-b)	5.00
Visibilities	Vr(b-a)	150	Calculated	D	1.43
	Vl(b-a)	150		E	1.43
	Vr(b-c)	150		F	1.16
	Vr(c-b)	150		Y	0.64

ANALYSIS

		Factor	AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		325	270
	q(c-b)		284	147
	q(a-b)		10	10
	q(a-c)		280	215
	q(b-a)		10	10
	q(b-c)		292	161
	f		0.97	0.94
CAPACITIES	Q(b-a)	1	599	697
	Q(b-c)	1	969	991
	Q(c-b)	1	784	802
	Q(b-ac)	1	950	967
RFC's	b-a		0.017	0.014
	b-c		0.301	0.162
	c-b		0.362	0.183
	b-ac		0.318	0.177
Worst RFC			**0.362**	**0.183**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

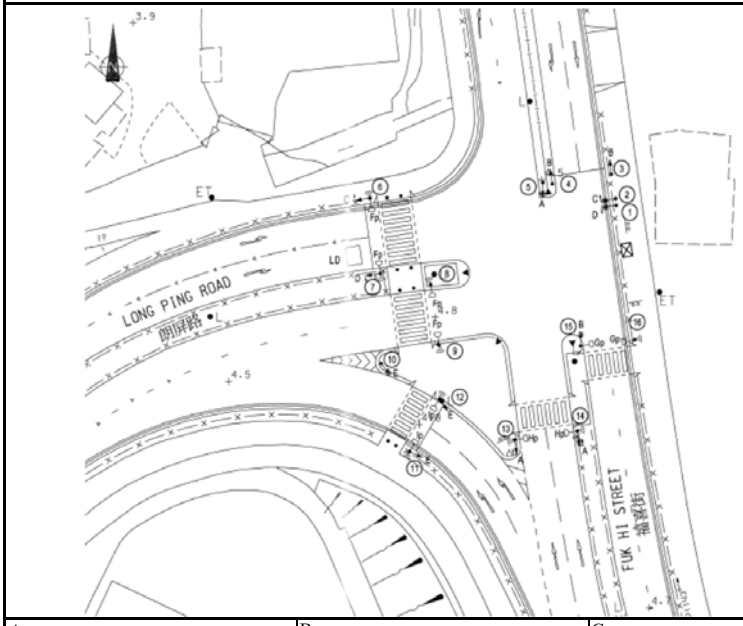
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Sep-23	Checked by:

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Fuk Hi St / Long Ping Rd	Ref. No.:	J04S
Scheme:	2032 Reference Flow	Ref. No.:	



Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

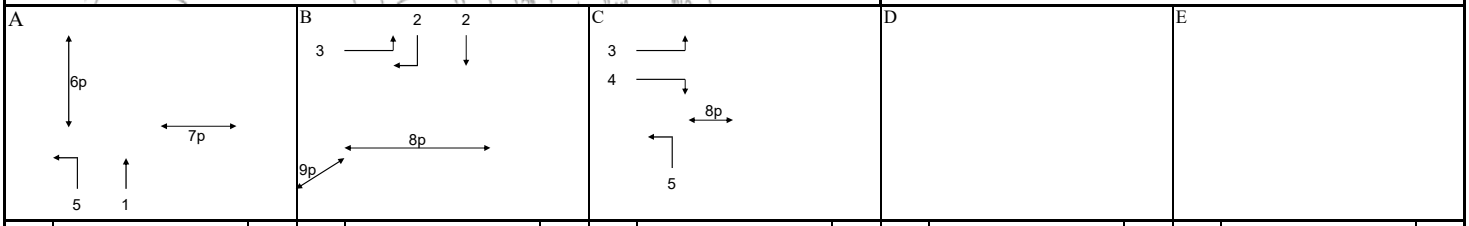
AM
(PM)

542(371) 275(270)

604(622)

375(400)

590(560) 180(190)



3		5	2		3	2		8											
		3	2		3	6													

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↑	A	2	4.00								4310	180	0.042		190	0.044	
2 ↓	B	1	3.70	1							1985	275	0.139		270	0.136	
2 ↓	B	1	3.70				20			100	1975	542	0.274	1	371	0.188	1
3 →	BC	1	4.30	1		15				100	1860	604	0.325		622	0.334	
4 ↓	C	1	4.70				20			100	2070	375	0.181		400	0.193	
5 ←	AC	1	3.80						0.75	100	1600	590	0.369	1	560	0.350	1

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
6p	A									
7p	A									
8p	BC									
9p	B									

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

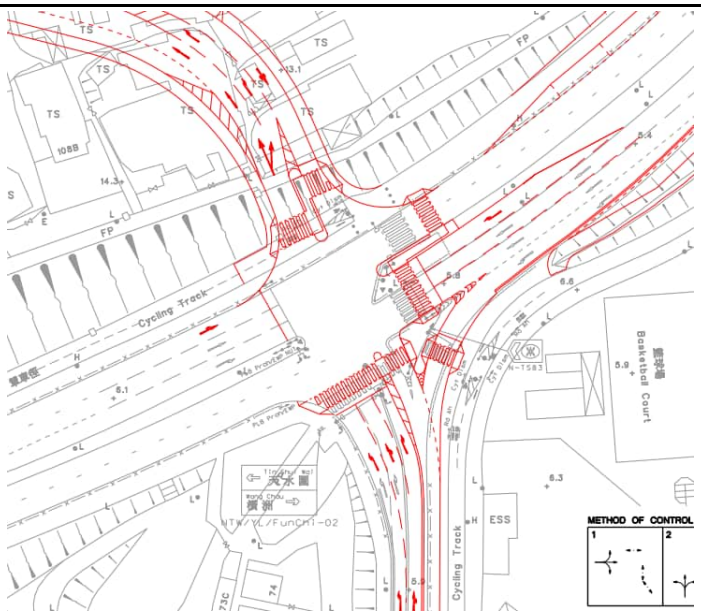
	AM Peak			PM Peak		
Check Critical Phase	1,2,4	5,2		1,2,4	5,2	
Sum of y values, Y	0.497	0.643		0.425	0.538	
Lost time, L	20	12		20	12	
Cycle Time, C	100	100		90	90	
Practical Y, Y_{pr}	0.720	0.792		0.700	0.780	
Reserve Capacity, R.C. (%)	45%	23%		65%	45%	

Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Long Ping Rd / Fung Chi Rd / Wang Chau Phase 1 Access Road	Ref. No.:	J05S
Scheme:	2032 Reference Flow	Ref. No.:	



Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

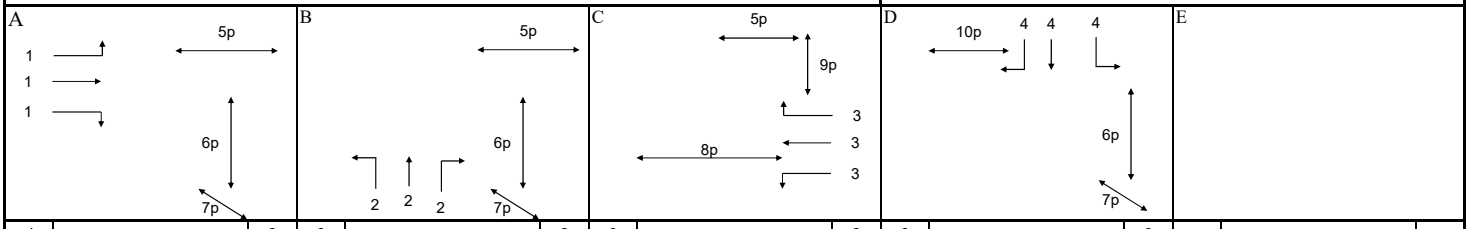
AM
(PM)

120(125) 40(40) 85(25)

85(60)
729(827)
260(310)

65(50)
722(646)
285(195)

195(220) 25(25) 130(180)



4		2	3		2	3		2	3		3			

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1	A	1	3.60	1		15				22 / 14	1935/1950	389	0.201		425	0.218	
1	A	1	3.60								2115	425	0.201	1	462	0.218	1
1	A	1	3.60				10			100	1840	260	0.141		310	0.168	
4	D	1	4.00	1		15	20			84 / 79	1880/1895	245	0.130	1	190	0.100	1
2	B	1	3.60	1		10				100	1715	195	0.114	1	220	0.128	1
2	B	1	3.50				20			84 / 88	1980/1975	155	0.078		205	0.104	
3	C	1	3.90				15		0.8	100	1560	65	0.042		50	0.032	
3	C	2	3.40								4190	722	0.172	1	646	0.154	1
3	C	1	3.60	1		40				100	1905	285	0.150		195	0.102	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
5p			8		8	16				
6p			8		8	16				

Note: Saturation flow of 90 pcu/hr is added for approach 4 is for the additional 15 meters traffic lane at junction

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

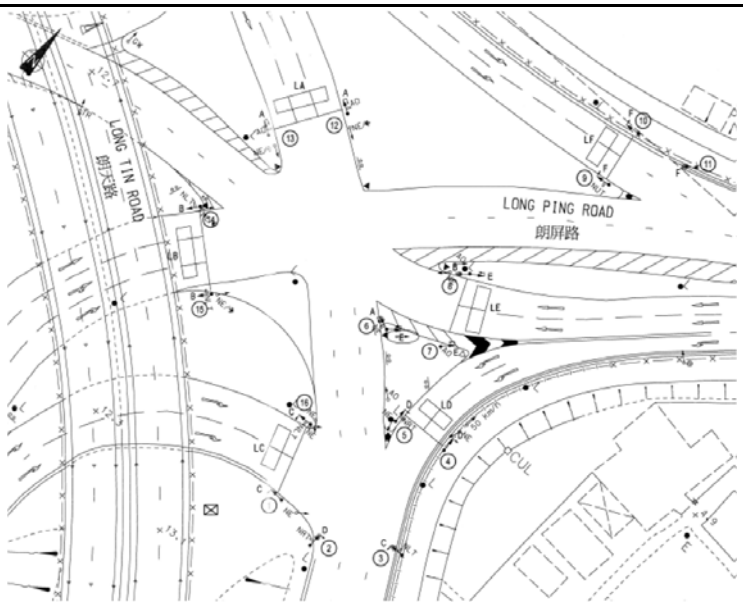
	AM Peak			PM Peak		
Check Critical Phase	1,2,3,4			1,2,3,4		
Sum of y values, Y	0.617			0.601		
Lost time, L	18			18		
Cycle Time, C	120			120		
Practical Y, Y_{pr}	0.765			0.765		
Reserve Capacity, R.C. (%)	24%			27%		

Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

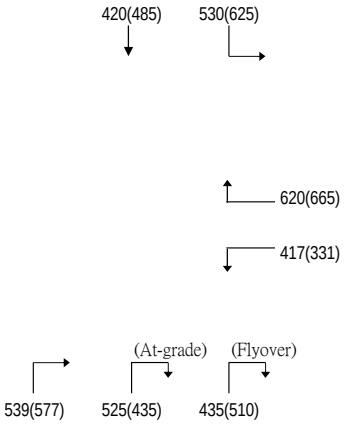
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Long Ping Rd / Shui Pin Wai Interchange	Ref. No.:	J06S
Scheme:	2032 Reference Flow	Ref. No.:	

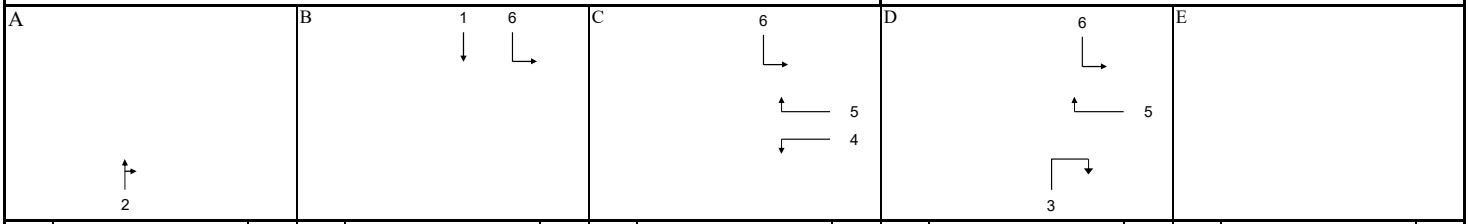


Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

AM
(PM)





2		3	4		3	9		3	3		3						
5		3	4		3	3					3						

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↓	B	3	3.3	1							6115	420	0.069	1	485	0.079	1
2 →	A	1	3.8	1							1990	356	0.179	1	337	0.169	1
2 ↘	A	1	3.9				18			50 / 32	2060/2090	369	0.179		354	0.169	
2 ↘	A	1	3.3				15				1895	339	0.179	1	321	0.169	1
3 ↘	D	2	5.1	1			20			100	4085	435	0.106	1	510	0.125	1
4 ↙	C	1	3.5	1		20				100	1920	417	0.217	1	331	0.172	1
5 ←	CD	2	3.5	1						100	4070	620	0.152		665	0.163	
6 →	BCD	2	3.6	1						100	4090	530	0.130		625	0.153	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.

Note: Saturation flow of 90 pcu/hr is added for approach 4 is for the additional 15 meters traffic lane at junction

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

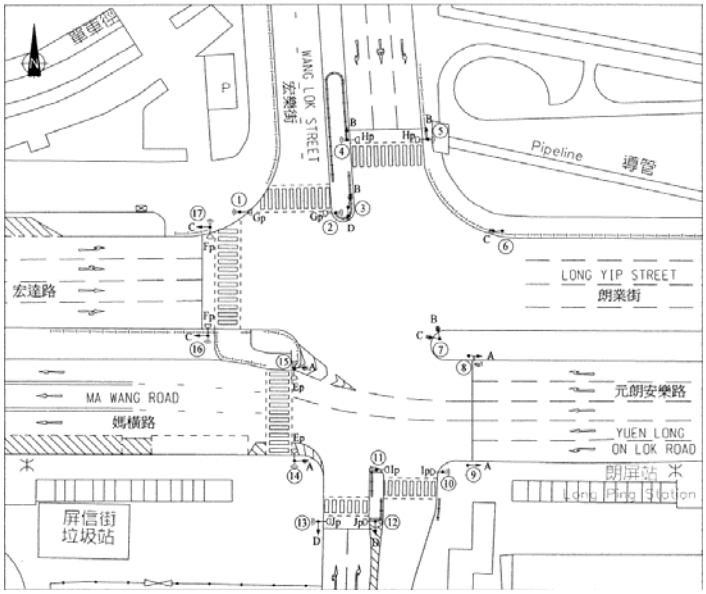
	AM Peak			PM Peak		
Check Critical Phase	2,1,4,3	2,1,5		2,1,4,3	2,1,5	
Sum of y values, Y	0.571	0.400		0.546	0.412	
Lost time, L	26	18		26	18	
Cycle Time, C	120	120		120	120	
Practical Y, Y_{pr}	0.705	0.765		0.705	0.765	
Reserve Capacity, R.C. (%)	23%	91%		29%	86%	

Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

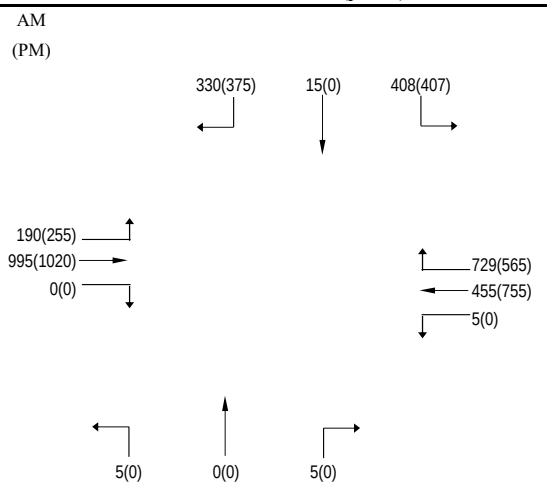
Ho Wang SPB Limited
Traffic & Transportation Consultants

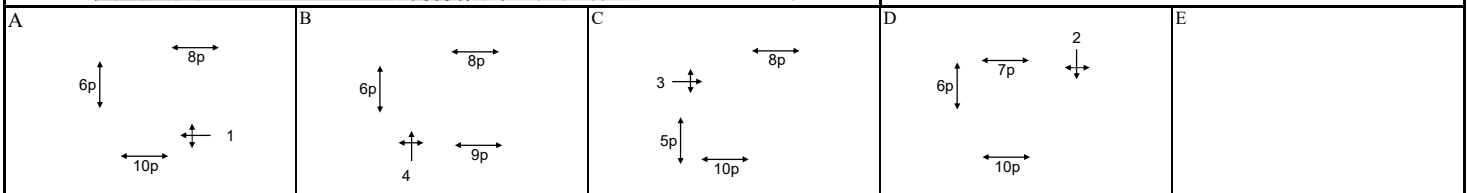
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Wang Lok St / Wang Tat Rd / Ma Wang Rd / Long Yip St / Yuen Long On Lok Rd	Ref. No.:	J07S
Scheme:	2032 Reference Flow	Ref. No.:	



Year: 2032 | Job No.: J1358.1 | Rev.: -

Peak Hour Traffic Flows (pcu/hr)





2		3	4	5	7	2		3	5		7			

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1A	A	2	3.00				30		0.75	100	2940	729	0.248	1	565	0.192	1
1B	A	2	3.00								4110	455	0.111		755	0.184	
1C	A	1	3.00			15				100	1870	5	0.003		0	0.000	
2A	D	1	3.5	1			25				1855	292	0.157		303	0.163	1
2B	D	1	3.5			20	30			95 / 100	1970	310	0.157	1	322	0.163	
2C	D	1	3.5			15			0.5		960	151	0.157		157	0.163	1
3A	C	1	3.5	1		15				100	1785	190	0.106		255	0.143	
3B	C	1	3.5			20				0	2105	332	0.158	1	340	0.162	1
3C	C	1	3.5								2105	332	0.158	1	340	0.162	1
3D	C	1	3.5				15				2105	332	0.158	1	340	0.162	1
4A	B	1	3.50	1		15				100 / 100	1785	5	0.003		0	0.000	
4B	B	1	3.50				30			100	2005	5	0.002		0	0.000	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
5p	C		6		12	18				
6p	ABD		10		15	25				
7p	D		7		11	18				
8p	ABC		8		10	18				
9p	B		7		7	14				
10p	ACD		5		6	11				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

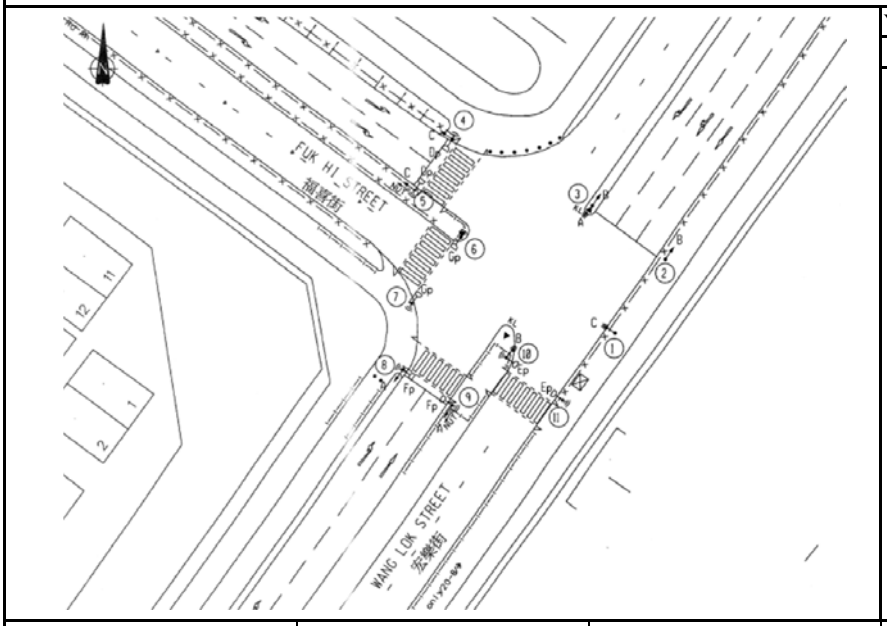
	AM Peak			PM Peak		
Check Critical Phase	1,9p,3,2			1,9p,3,2		
Sum of y values, Y	0.563			0.517		
Lost time, L	35			35		
Cycle Time, C	120			120		
Practical Y, Y_{pr}	0.638			0.638		
Reserve Capacity, R.C. (%)	13%			23%		

Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

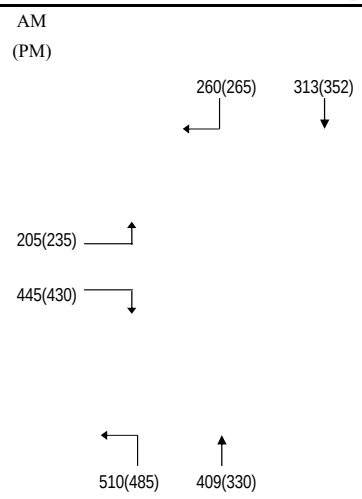
Ho Wang SPB Limited
Traffic & Transportation Consultants

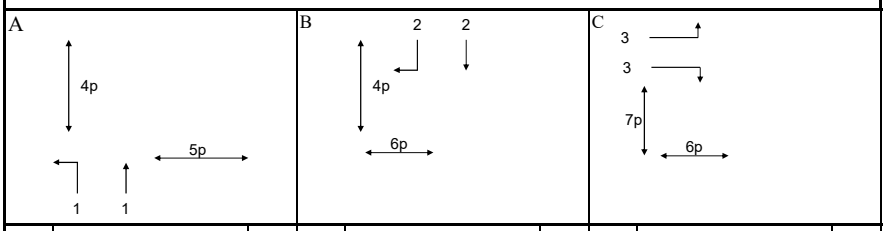
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Fuk Hi St / Wang Lok St	Ref. No.:	J08S
Scheme:	2032 Reference Flow	Ref. No.:	



Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)





D

E

3		3	4		3	4		3									

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1	A	1	3.7	1		10				100	1725	510	0.296	1	485	0.281	1
1	A	1	3.7								2125	409	0.192		330	0.155	
2	B	1	3.5				15				1915	185	0.097		199	0.104	
2	B	1	3.5				18			38 / 31	2040/2050	197	0.097	1	213	0.104	1
2	B	1	3.5	1							1965	190	0.097		204	0.104	
3	C	1	4.00	1		15				100	1830	205	0.112		235	0.128	
3	C	1	4.00				20			100	2005	445	0.222	1	430	0.214	1

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
4p	AB		7		7	14				
5p	A		7		7	14				
6p	BC		7		7	14				
7p	C		7		7	14				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

Check Critical Phase	1,2,3			1,2,3		
Sum of y values, Y	0.614			0.600		
Lost time, L	17			17		
Cycle Time, C	108			108		
Practical Y, Y_{pr}	0.758			0.758		
Reserve Capacity, R.C. (%)	23%			26%		

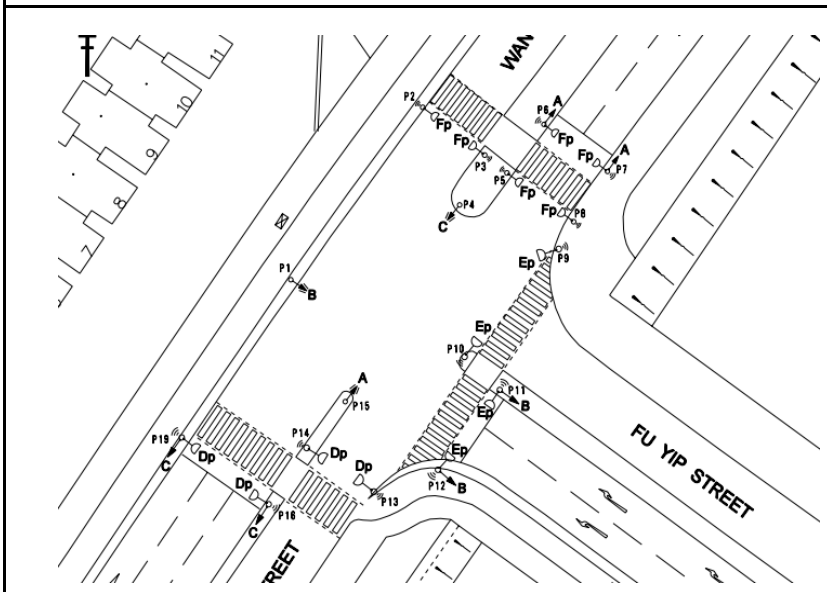
Calculated by:	Date:	Sep-2023	Checked by:

Y:\Job\J1358.1 MSB in Yuen Long\04-Working\04G_Calculations\[J1358.1-2032_Reference_Calculation_With_Relocation_Site_1A_20230828.xlsm]J08S

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

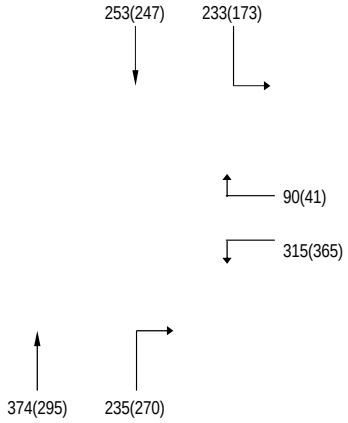
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Wang Lok St / Fu Yip St	Ref. No.:	J09S
Scheme:	2032 Reference Flow	Ref. No.:	



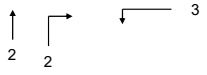
Year: 2032	Job No.: J1358.1	Rev.: -

Peak Hour Traffic Flows (pcu/hr)

AM
(PM)



A



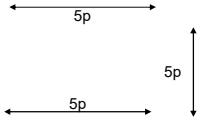
B



C



D



E

3		3	4		3	2		3	5	13	11			
3					3	2		3	5	13	11			

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↓	C	1	3.5								2105	253	0.120		231	0.110	1
1 ↓→	C	1	3.5	1		10				100 / 91	1710/1730	233	0.136	1	189	0.109	
2 →↑	A	1	3.5	1			20		1.11	78 / 97	2060/2030	301	0.146		277	0.137	1
2 ↑	A	1	3.5								2105	308	0.146	1	288	0.137	
3 ↓←	AB	1	3.50	1		10				100	1710	315	0.184		365	0.213	1
4 ←↑	B	1	3.50	1			20			100	1830	90	0.049	1	41	0.022	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
5p	D		5		8	13		1		1
6p	D		5		8	13		1		1
7p	D		5		8	13				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

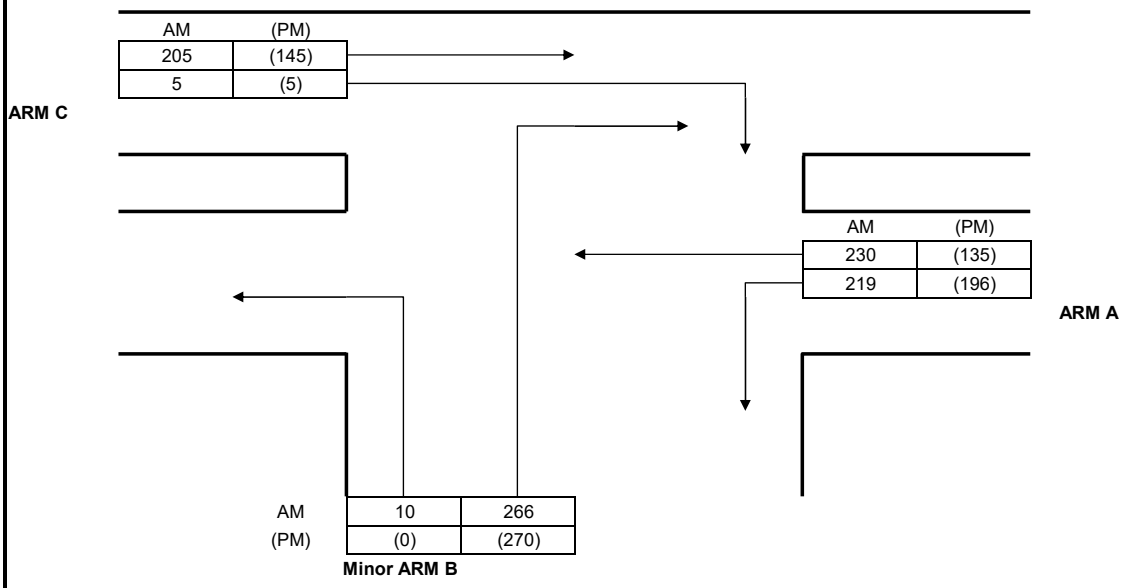
Check Critical Phase	2,4,1,5p	3,1,5p		2,4,1,5p	3,1,5p	
Sum of y values, Y	0.332	0.320		0.269	0.323	
Lost time, L	44	38		44	38	
Cycle Time, C	115	115		115	115	
Practical Y, Y_{pr}	0.556	0.603		0.556	0.603	
Reserve Capacity, R.C. (%)	68%	88%		107%	87%	

Calculated by:	Date: Sep-2023	Checked by:

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Wang Lee St / Wang Lok St			Ref. No.:	J10P
Scheme:	2032 Reference Flow			Ref. No.:	
Year:	2032	Job No.:	J1358.1	Rev.:	-
ARM A:	Wang Lok Street				
ARM B:	Wang Lee Street				
ARM C:	Wang Lok Street				



GEOMETRY

Major road width	W	13.65	Lane widths	w(b-a)	5.30
Central Reserve width	Wcr	4.75		w(b-c)	5.30
2 Lane Minor Arm (Y/N)		Y		w(c-b)	4.36
Visibilities	Vr(b-a)	110	Calculated	D	1.14
	Vl(b-a)	150		E	1.14
	Vr(b-c)	110		F	1.10
	Vr(c-b)	150		Y	0.53

ANALYSIS

		Factor	AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		205	145
	q(c-b)		5	5
	q(a-b)		219	196
	q(a-c)		230	135
	q(b-a)		266	270
	q(b-c)		10	0
	f		0.04	0.00
CAPACITIES	Q(b-a)	1	694	725
	Q(b-c)	1	783	806
	Q(c-b)	1	721	746
	Q(b-ac)	1	697	725
RFC's	b-a		0.383	0.372
	b-c		0.013	0.000
	c-b		0.007	0.007
	b-ac		0.000	0.000
Worst RFC			**0.383**	**0.372**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

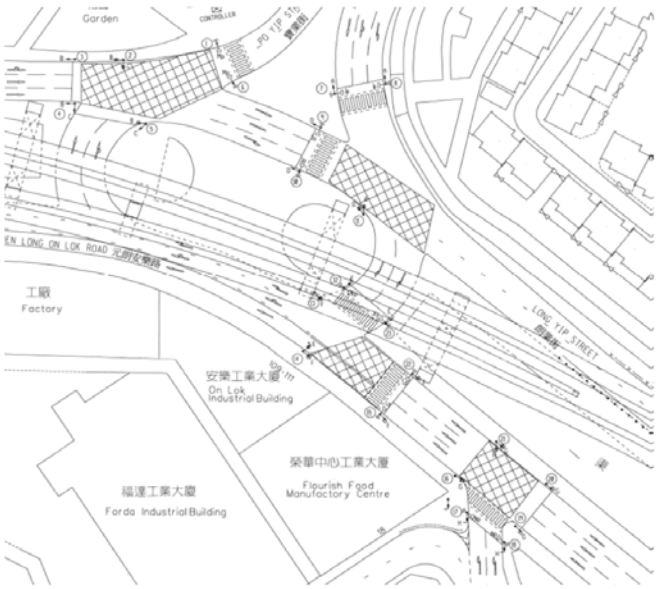
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Sep-23	Checked by:

Traffic Signal Junction Calculation Sheet

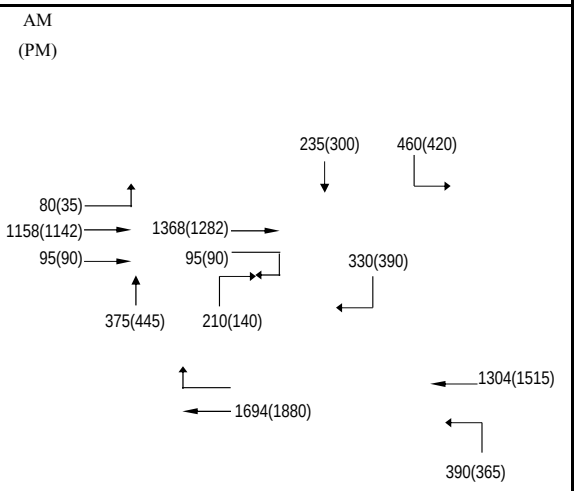
Ho Wang SPB Limited
Traffic & Transportation Consultants

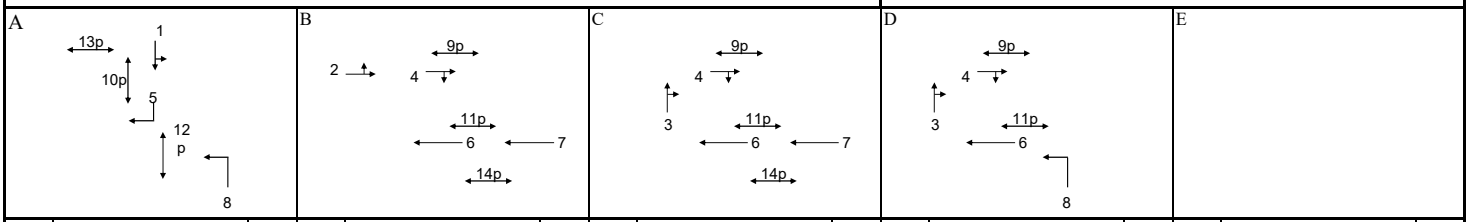
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Long Yip St / Yuen Long On Lok Rd / Po Yip St	Ref. No.:	J11S
Scheme:	2032 Reference Flow	Ref. No.:	



Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)





4		3	4		3	4				6			

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↓	A	1	3.5								2105	235	0.112		259	0.123	1
1 ↓→	A	1	3.5			18				100 / 83	1945/1970	240	0.123		242	0.123	
1 ↓←	A	1	3.5	1		15					1785	220	0.123	1	219	0.123	1
2 ↑→	B	1	3.0	1		10				28 / 21	1880/1900	629	0.335		601	0.317	
2 →	B	1	3.0								2055	704	0.342	1	666	0.324	1
3 ↑	CD	1	3.5								2105	319	0.151		313	0.149	1
3 ↑→	CD	1	3.5	1			10			79 / 52	1755/1825	266	0.152	1	272	0.149	
4 →	BCD	2	3.3	1							4030	1368	0.339		1282	0.318	
4 ↓	BCD	1	3.3				10			100	1815	95	0.052		90	0.050	
5 ↓	A	2	5.0				10			100	3920	330	0.084		390	0.099	
6 ←	BCD	3	3.3								6255	1694	0.271		1880	0.301	
7 ←	BCD	3	3.5							100	6315	1304	0.206		1515	0.240	
8 ↑	AD	2	3.5			15				100	3825	390	0.102		365	0.095	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
9p	BCD		9		10	19				
10p	A		8		9	17				
11p	BCD		10		12	22				
12p	A		8		9	17				
13p	A		8		9	17				
14p	BC		10		12	22				

Practical Y (Ypr):	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

	AM Peak			PM Peak		
Check Critical Phase	1,2,3			1,2,3		
Sum of y values, Y	0.617			0.596		
Lost time, L	21			21		
Cycle Time, C	120			120		
Practical Y, Y_{pr}	0.743			0.743		
Reserve Capacity, R.C. (%)	20%			25%		

Calculated by:	Date: Sep-2023	Checked by:

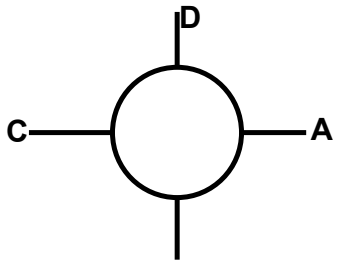
Simplified Roundabout Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Pok Oi Interchange		Ref. No.: J13R
Scheme:	2032 Reference Flow		Ref. No.:
Year:	2032	Job No.: J1358.1	Rev.: -

AM PM

ARM A: Castle Peak Road Westbound Approach
ARM B: Yuen Long Highway
ARM C: Castle Peak Road Eastbound Approach
ARM D: Route 3



GEOMETRY

ARM	v	e	L	r	D	Phi	S
A	4.00	7.00	18	25	90	65	0.27
B	12.00	23.00	5	25	90	30	3.52
C	3.50	6.50	4	25	90	40	1.20
D	7.00	9.00	5	25	90	30	0.64

AM FLOWS

from \ to	A	B	C	D	Circ	Entry
A					1254	385
B					1274	1465
C					1300	675
D					1885	884

PM FLOWS

from \ to	A	B	C	D	Circ	Entry
A					1450	340
B					1640	1275
C					1255	660
D					1840	1130

CALCULATIONS

ARM	K	X_2	M	F	t_D	f_c	Q_E AM	Q_E PM	RFC AM	RFC PM
A	0.89	5.96	20.09	1805	1.02	0.47	1079	996	0.36	0.34
B	1.01	13.37	20.09	4051	1.02	0.79	3074	2782	0.48	0.46
C	0.98	4.38	20.09	1328	1.02	0.40	783	801	0.86	0.82
D	1.01	7.88	20.09	2387	1.02	0.55	1356	1381	0.65	0.82

Crtical Arm:	**C**	**C**
RFC:	**0.86**	**0.82**
	AM	**PM**

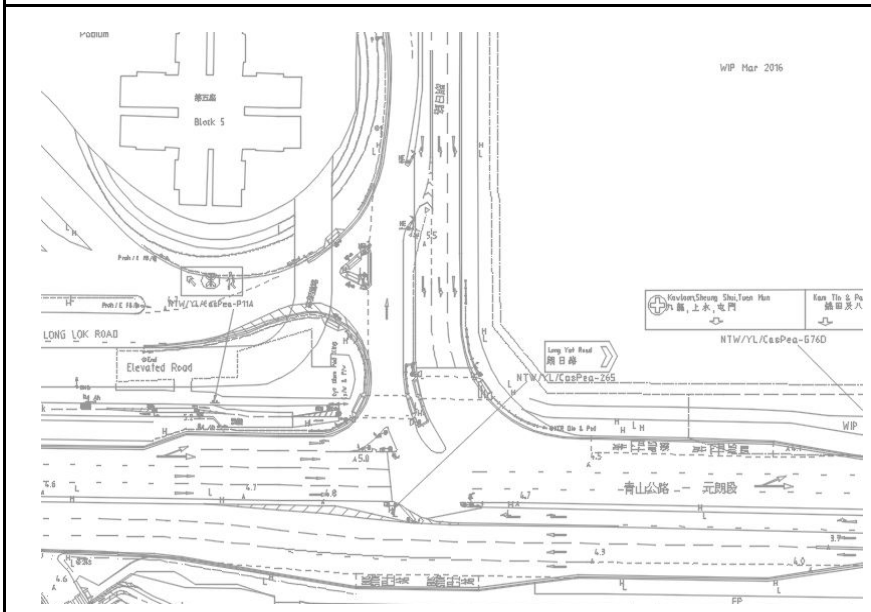
- In accordance with TPDM V2.4

Calculated by:	PY	Date:	Sep-23	Checked by:	TE

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Castle Peak Road - Yuen Long / Long Yat Road	Ref. No.:	J16S
Scheme:	2032 Reference Flow	Ref. No.:	J47151



Year:	2032	Job No.:	J1358	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

AM
(PM)

1880(1625)
70(85)
1708(1622)
275(235)
2534(3195)

A	B	C	D	E
7p, 6p, 1	7p, 2, 1	5, 4	5, 6p	

2					3	3					3						
2	22					3					3						

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 →	AB	3	3.30								6255	1708	0.273	1	1622	0.259	1
2 ↱	B	1	3.50	1		15				100	1785	70	0.039		85	0.048	
4 ↰	C	1	3.20				25			100	1960	275	0.140		235	0.120	
5 ↳	CD	3	4.20	1		20			0.9	100	5345	1880	0.352	1	1625	0.304	1

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
6p	AD		5		10	15				
7p	AB		5		17	22				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

Check Critical Phase	1,5	7p,5		1,5	7p,5	
Sum of y values, Y	0.625	0.352		0.563	0.304	
Lost time, L	9	29		9	29	
Cycle Time, C	108	108		108	108	
Practical Y, Y_{pr}	0.825	0.658		0.825	0.658	
Reserve Capacity, R.C. (%)	32%	87%		46%	117%	

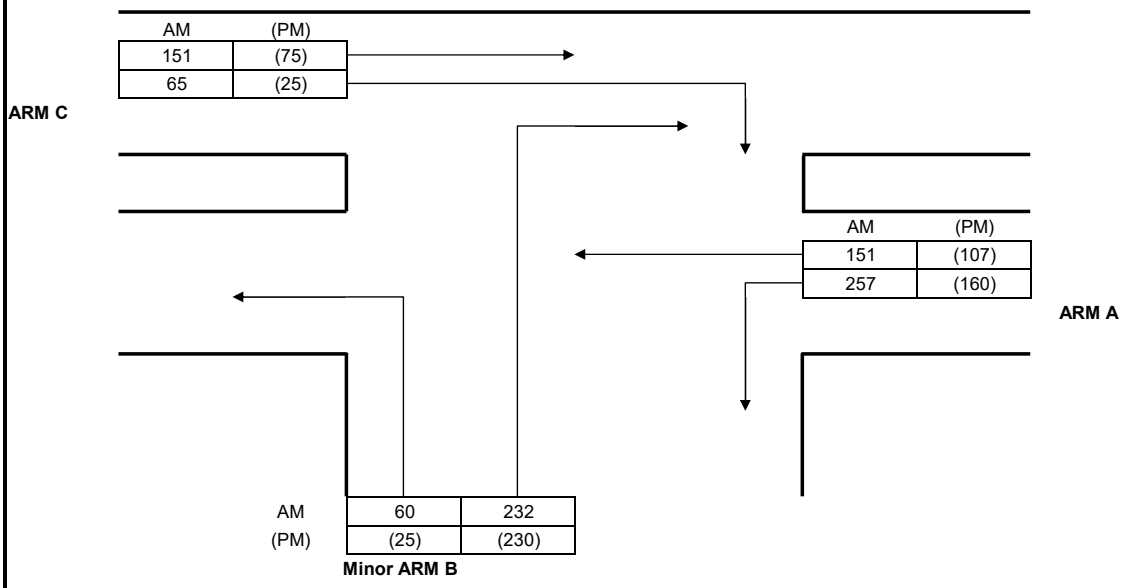
Calculated by:	Date: Sep-2023	Checked by:

2032 Design Scenario of
30% Brownfield and
70% Vehicle Servicing and Maintenance

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Wang Lee St / Fuk Wang St			Ref. No.:	J01P
Scheme:	2032 Design Flow (Vehicle Servcing and Maintenance)			Ref. No.:	
Year:	2032	Job No.:	J1358.1	Rev.:	-
ARM A:	Wang Lee Street NB				
ARM B:	Fuk Wang Street EB				
ARM C:	Wang Lee Street SB				



GEOMETRY

Major road width	W	10.00	Lane widths	w(b-a)	4.50
Central Reserve width	Wcr	0.00		w(b-c)	4.50
2 Lane Minor Arm (Y/N)		N		w(c-b)	5.00
Visibilities	Vr(b-a)	150	Calculated	D	1.11
	Vl(b-a)	150		E	1.11
	Vr(b-c)	150		F	1.16
	Vr(c-b)	150		Y	0.66

ANALYSIS

			AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		151	75
	q(c-b)		65	25
	q(a-b)		257	160
	q(a-c)		151	107
	q(b-a)		232	230
	q(b-c)		60	25
	f		0.21	0.10
		Factor		
CAPACITIES	Q(b-a)	1	579	629
	Q(b-c)	1	759	781
	Q(c-b)	1	750	789
	Q(b-ac)	1	609	641
RFC's	b-a		0.401	0.366
	b-c		0.079	0.032
	c-b		0.087	0.032
	b-ac		0.479	0.398
Worst RFC			**0.479**	**0.398**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

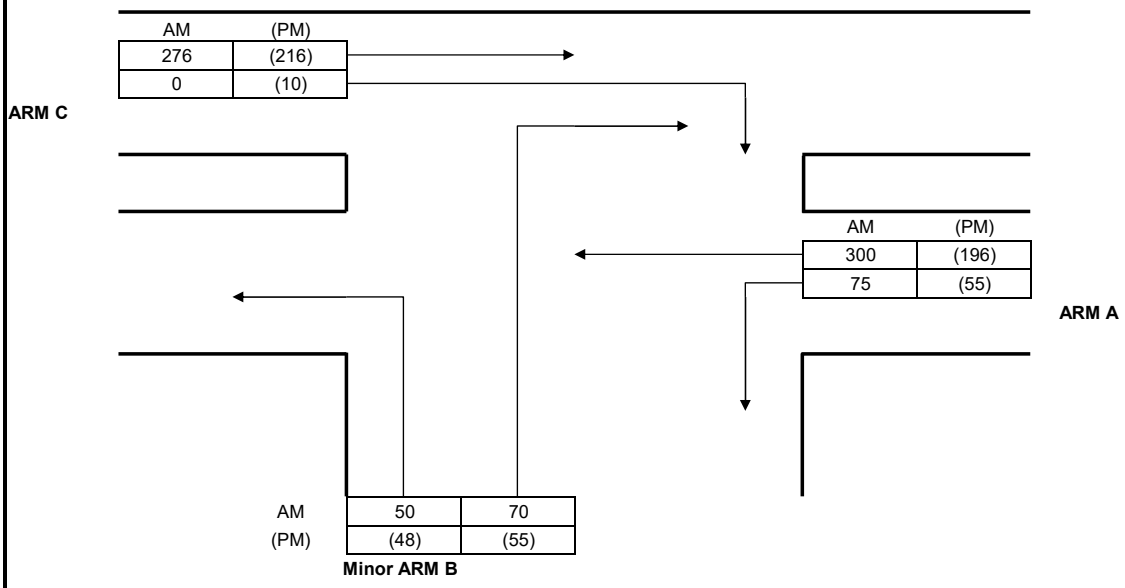
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Sep-23	Checked by:

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Fuk Yan St / Fuk Wang St			Ref. No.:	J02P
Scheme:	2032 Design Flow (Vehicle Servcing and Maintenance)			Ref. No.:	
Year:	2032	Job No.:	J1358.1	Rev.:	-
ARM A:	Fuk Wang Street EB				
ARM B:	Fuk Yan Street SB				
ARM C:	Fuk Wang Street WB				



GEOMETRY

Major road width	W	10.50	Lane widths	w(b-a)	4.08
Central Reserve width	Wcr	0.00		w(b-c)	4.08
2 Lane Minor Arm (Y/N)		N		w(c-b)	5.00
Visibilities	Vr(b-a)	150	Calculated	D	1.07
	Vl(b-a)	150		E	1.07
	Vr(b-c)	150		F	1.16
	Vr(c-b)	150		Y	0.64

ANALYSIS

		Factor	AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		276	216
	q(c-b)		0	10
	q(a-b)		75	55
	q(a-c)		300	196
	q(b-a)		70	55
	q(b-c)		50	48
	f		0.42	0.46
CAPACITIES	Q(b-a)	1	545	579
	Q(b-c)	1	714	742
	Q(c-b)	1	761	795
	Q(b-ac)	1	605	645
RFC's	b-a		0.128	0.095
	b-c		0.070	0.064
	c-b		0.000	0.013
	b-ac		0.198	0.159
Worst RFC			**0.198**	**0.159**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

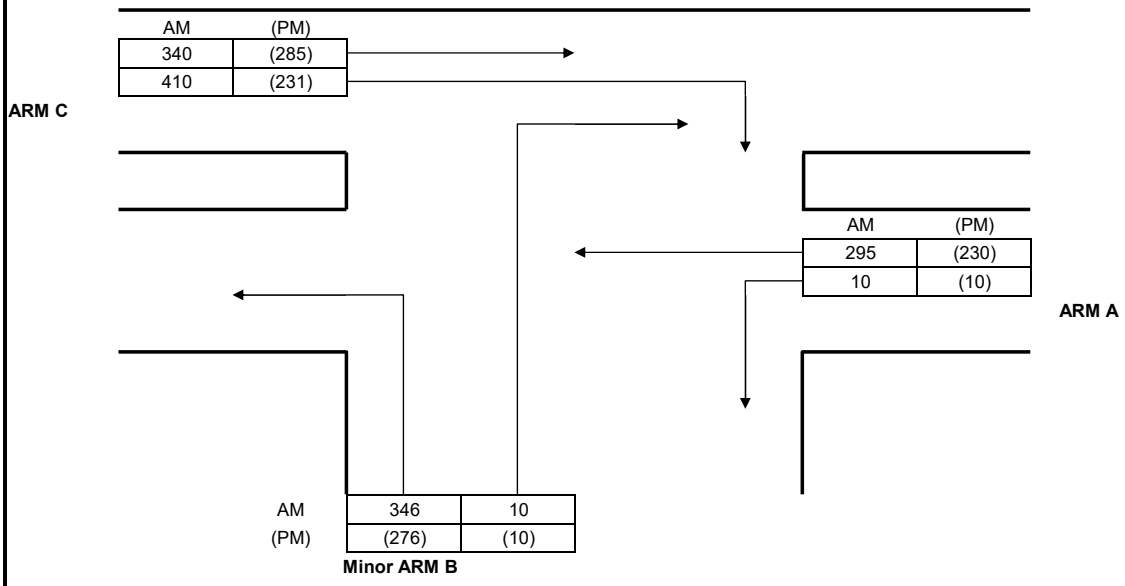
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Sep-23	Checked by:

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Fuk Wang St / Fuk Hi St			Ref. No.:	J03P
Scheme:	2032 Design Flow (Vehicle Servcing and Maintenance)			Ref. No.:	
Year:	2032	Job No.:	J1358.1	Rev.:	-
ARM A:	Fuk Hi Street NB				
ARM B:	Fuk Wang Street WB				
ARM C:	Fuk Hi Street SB				



GEOMETRY

Major road width	W	10.50	Lane widths	w(b-a)	7.80
Central Reserve width	Wcr	0.00		w(b-c)	7.80
2 Lane Minor Arm (Y/N)		N		w(c-b)	5.00
Visibilities	Vr(b-a)	150	Calculated	D	1.43
	Vl(b-a)	150		E	1.43
	Vr(b-c)	150		F	1.16
	Vr(c-b)	150		Y	0.64

ANALYSIS

		Factor	AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		340	285
	q(c-b)		410	231
	q(a-b)		10	10
	q(a-c)		295	230
	q(b-a)		10	10
	q(b-c)		346	276
	f		0.97	0.97
CAPACITIES	Q(b-a)	1	531	649
	Q(b-c)	1	965	986
	Q(c-b)	1	780	798
	Q(b-ac)	1	943	968
RFC's	b-a		0.019	0.015
	b-c		0.359	0.280
	c-b		0.526	0.289
	b-ac		0.378	0.295
Worst RFC			**0.526**	**0.295**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

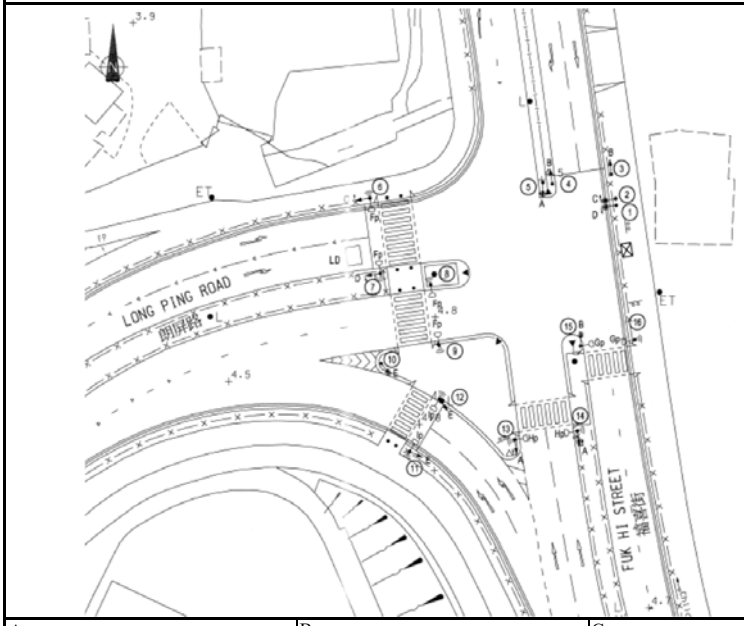
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Sep-23	Checked by:

Traffic Signal Junction Calculation Sheet

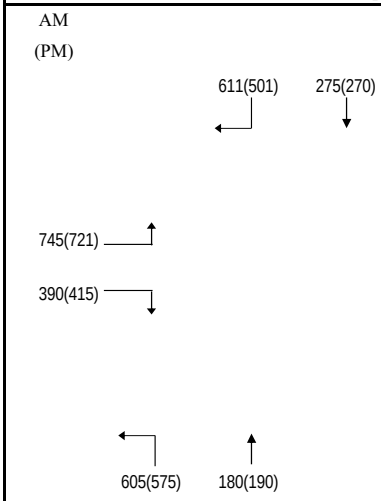
Ho Wang SPB Limited
Traffic & Transportation Consultants

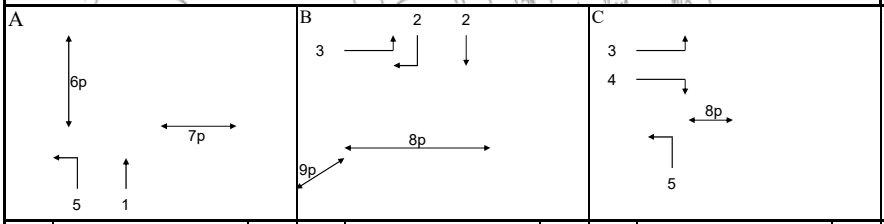
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Fuk Hi St / Long Ping Rd	Ref. No.:	J04S
Scheme:	2032 Design Flow (Vehicle Servcing ai	Ref. No.:	



Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)





3		5	2		3	2		8			
		3	2		3	6					

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↑	A	2	4.00								4310	180	0.042		190	0.044	
2 ↓	B	1	3.70	1							1985	275	0.139		270	0.136	
2 ↲	B	1	3.70				20			100	1975	611	0.309	1	501	0.254	1
3 →	BC	1	4.30	1		15				100	1860	745	0.401		721	0.388	
4 ↳	C	1	4.70				20			100	2070	390	0.188		415	0.200	
5 ←	AC	1	3.80						0.75	100	1600	605	0.378	1	575	0.359	1

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
6p	A									
7p	A									
8p	BC									
9p	B									

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

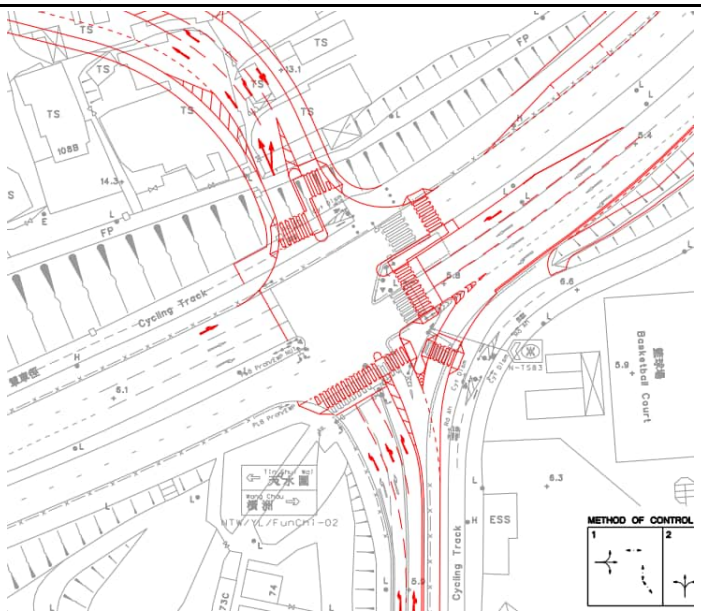
	AM Peak			PM Peak		
Check Critical Phase	1,2,4	5,2		1,2,4	5,2	
Sum of y values, Y	0.540	0.687		0.498	0.613	
Lost time, L	20	12		20	12	
Cycle Time, C	100	100		90	90	
Practical Y, Y_{pr}	0.720	0.792		0.700	0.780	
Reserve Capacity, R.C. (%)	33%	15%		40%	27%	

Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Long Ping Rd / Fung Chi Rd / Wang Chau Phase 1 Access Road	Ref. No.:	J05S
Scheme:	2032 Design Flow (Vehicle Servcing ai	Ref. No.:	



Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

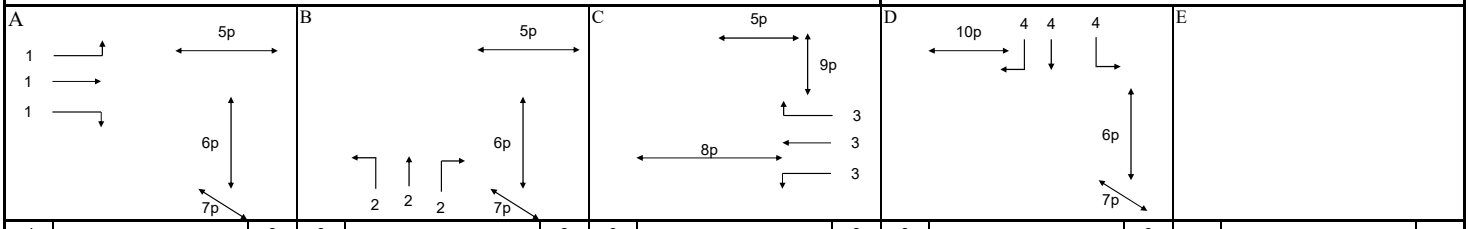
AM
(PM)

120(125) 40(40) 85(25)

85(60)
855(911)
260(310)

65(50)
776(761)
285(195)

195(220) 25(25) 130(180)



4		2	3		2	3		2	3		3			

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1	A	1	3.60	1		15				19 / 13	1940/1950	450	0.232		466	0.239	
1	A	1	3.60								2115	490	0.232	1	505	0.239	1
1	A	1	3.60				10			100	1840	260	0.141		310	0.168	
4	D	1	4.00	1		15	20			84 / 79	1880/1895	245	0.130	1	190	0.100	1
2	B	1	3.60	1		10				100	1715	195	0.114	1	220	0.128	1
2	B	1	3.50				20			84 / 88	1980/1975	155	0.078		205	0.104	
3	C	1	3.90				15		0.8	100	1560	65	0.042		50	0.032	
3	C	2	3.40								4190	776	0.185	1	761	0.182	1
3	C	1	3.60	1		40				100	1905	285	0.150		195	0.102	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
6p			8		8	16				
8p			8		8	16				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

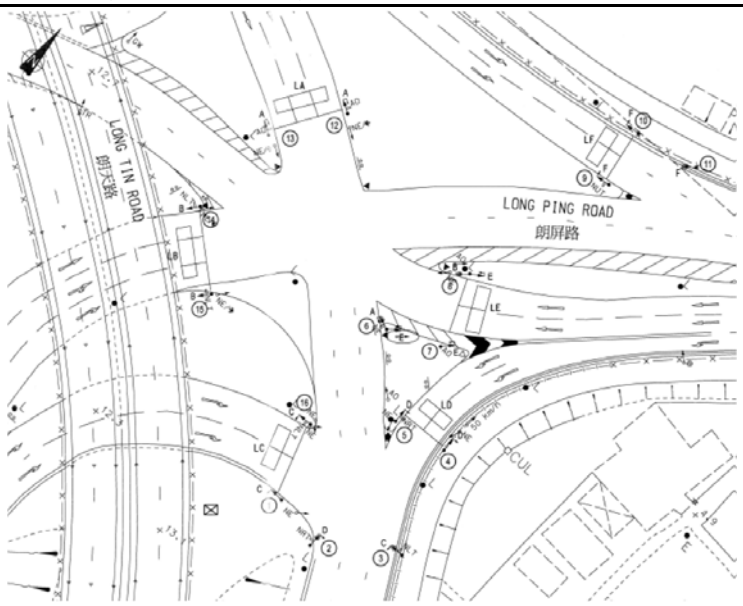
	AM Peak			PM Peak		
Check Critical Phase	1,2,3,4			1,2,3,4		
Sum of y values, Y	0.661			0.649		
Lost time, L	18			18		
Cycle Time, C	120			120		
Practical Y, Y_{pr}	0.765			0.765		
Reserve Capacity, R.C. (%)	16%			18%		

Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

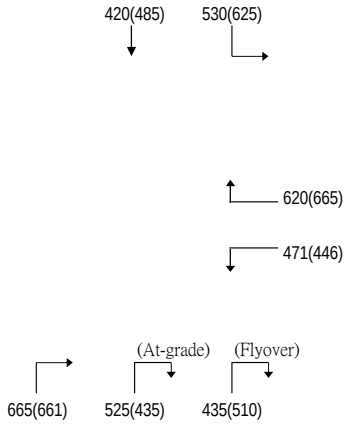
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Long Ping Rd / Shui Pin Wai Interchange	Ref. No.:	J06S
Scheme:	2032 Design Flow (Vehicle Servcing ai	Ref. No.:	

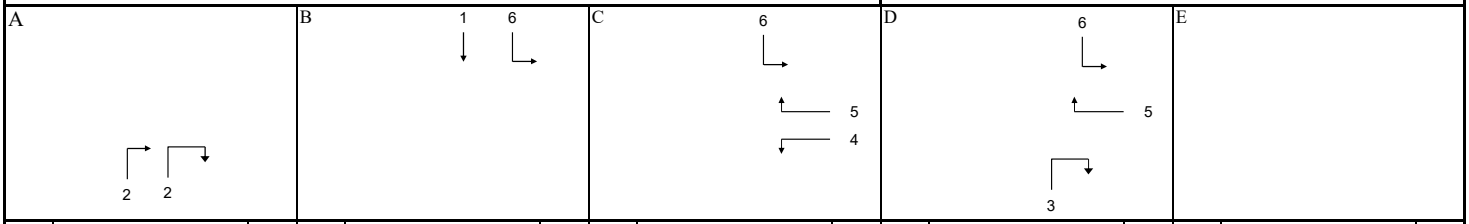


Year: 2032 | Job No.: J1358.1 | Rev.: -

Peak Hour Traffic Flows (pcu/hr)

AM
(PM)





2		3	4		3	9		3	3		3						
5		3	4		3	3					3						

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↓	B	3	3.3	1							6115	420	0.069	1	485	0.079	1
2 →	A	1	3.8	1							1990	397	0.199	1	364	0.183	1
2 ↓→	A	1	3.9				18			35 / 23	2085/2105	415	0.199		385	0.183	
2 ↓	A	1	3.3				15				1895	378	0.199	1	347	0.183	1
3 ↓	D	2	5.1	1			20			100	4085	435	0.106	1	510	0.125	1
4 ↓	C	1	3.5	1		20				100	1920	471	0.245	1	446	0.232	1
5 ←	CD	2	3.5	1						100	4070	620	0.152		665	0.163	
6 →	BCD	2	3.6	1						100	4090	530	0.130		625	0.153	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.

Note: Saturation flow of 90 pcu/hr is added for approach 4 is for the additional 15 meters traffic lane at junction

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

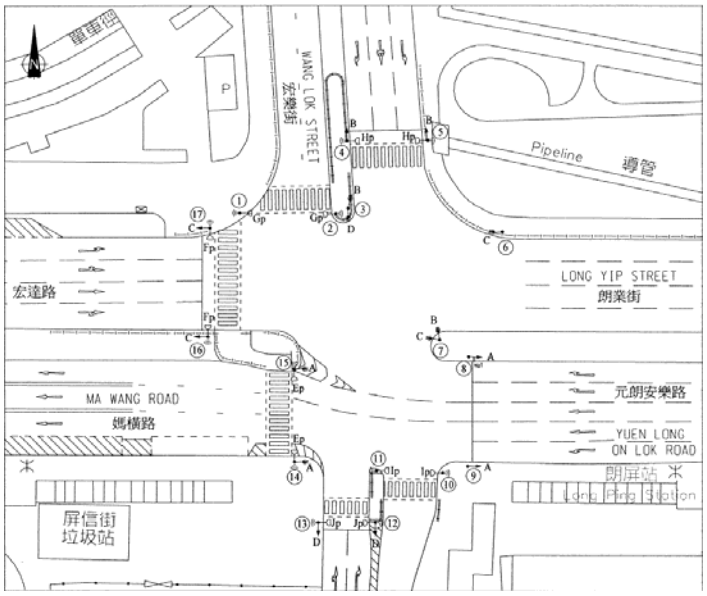
	AM Peak			PM Peak		
Check Critical Phase	2,1,4,3	2,1,5		2,1,4,3	2,1,5	
Sum of y values, Y	0.620	0.420		0.619	0.426	
Lost time, L	26	18		26	18	
Cycle Time, C	120	120		120	120	
Practical Y, Y_{pr}	0.705	0.765		0.705	0.765	
Reserve Capacity, R.C. (%)	14%	82%		14%	80%	

Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

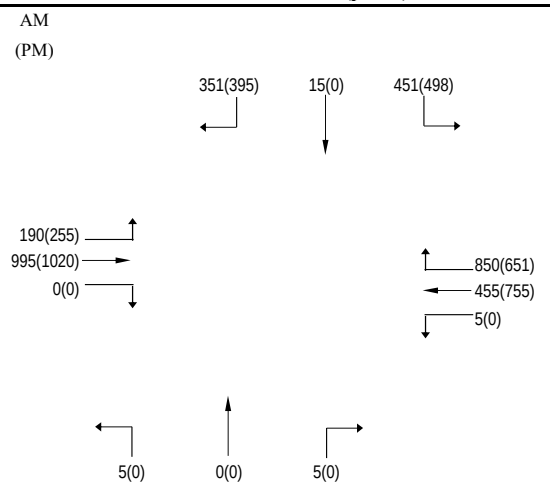
Ho Wang SPB Limited
Traffic & Transportation Consultants

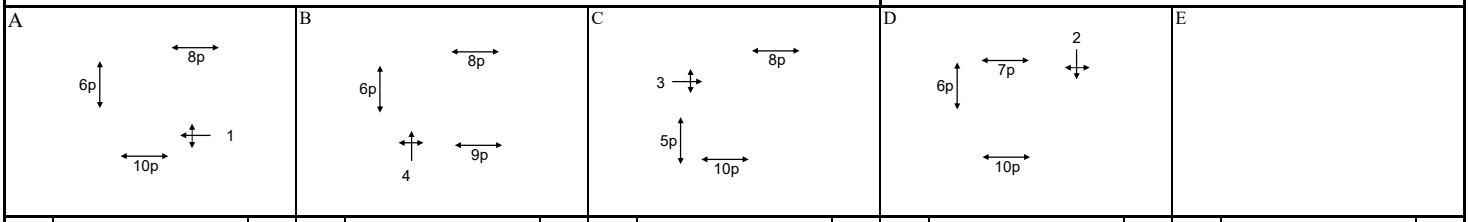
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Wang Lok St / Wang Tat Rd / Ma Wang Rd / Long Yip St / Yuen Long On Lok Rd	Ref. No.:	J07S
Scheme:	2032 Design Flow (Vehicle Servcing an	Ref. No.:	



Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)





2		3	4	5	7	2		3	5		7			

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1A	A	2	3.00				30		0.75	100	2940	850	0.289	1	651	0.221	1
1B	A	2	3.00								4110	455	0.111		755	0.184	
1C	A	1	3.00			15				100	1870	5	0.003		0	0.000	
2A	D	1	3.5	1			25				1855	317	0.171	1	347	0.187	1
2B	D	1	3.5			20	30			96 / 100	1970/1965	336	0.171		367	0.187	
2C	D	1	3.5			15			0.5		960	164	0.171	1	179	0.187	1
3A	C	1	3.5	1		15				100	1785	190	0.106		255	0.143	
3B	C	1	3.5			20				0	2105	332	0.158	1	340	0.162	1
3C	C	1	3.5								2105	332	0.158	1	340	0.162	1
3D	C	1	3.5				15				2105	332	0.158	1	340	0.162	1
4A	B	1	3.50	1		15				100 / 100	1785	5	0.003		0	0.000	
4B	B	1	3.50				30			100	2005	5	0.002		0	0.000	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
5p	C		6		12	18				
6p	ABD		10		15	25				
7p	D		7		11	18				
8p	ABC		8		10	18				
9p	B		7		7	14				
10p	ACD		5		6	11				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

	AM Peak			PM Peak		
Check Critical Phase	1,9p,3,2			1,9p,3,2		
Sum of y values, Y	0.617			0.570		
Lost time, L	35			35		
Cycle Time, C	120			120		
Practical Y, Y_{pr}	0.638			0.638		
Reserve Capacity, R.C. (%)	3%			12%		

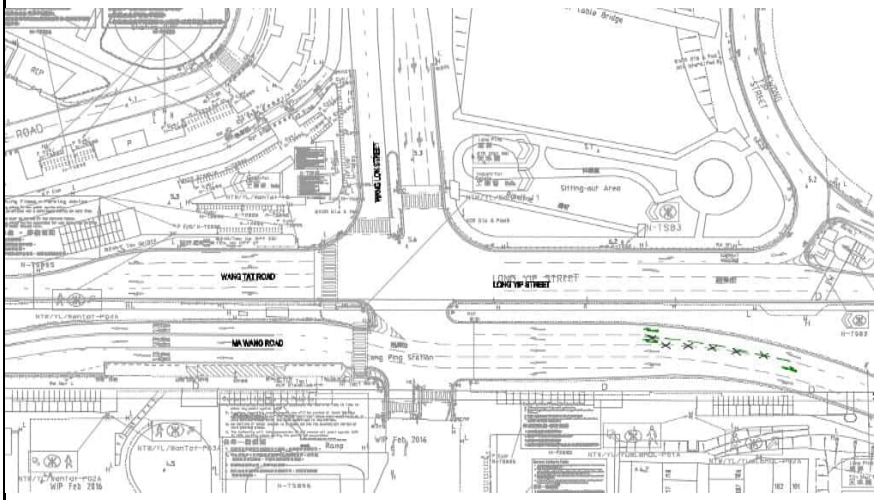
Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

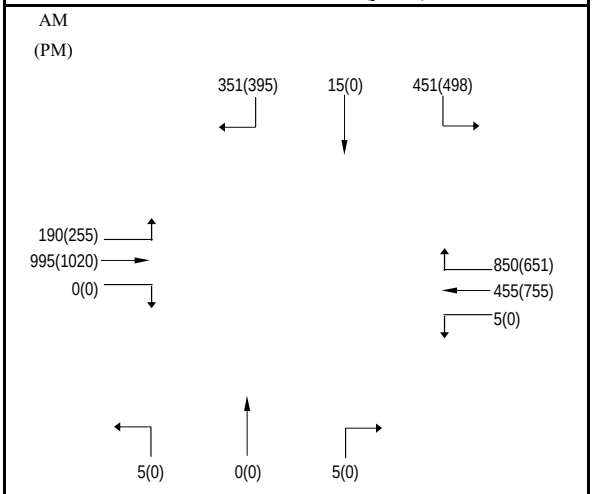
Ho Wang SPB Limited
Traffic & Transportation Consultants

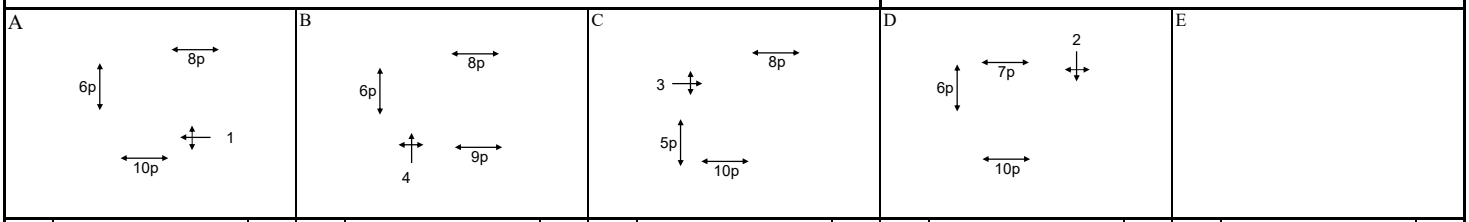
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Wang Lok St / Wang Tat Rd / Ma Wang Rd / Long Yip St / Yuen Long On Lok Rd	Ref. No.:	J07S (with ir
Scheme:	2032 Design Flow (Vehicle Servcing an With Improvement Works	Ref. No.:	

Year:	2032	Job No.:	J1358.1	Rev.:	-



Peak Hour Traffic Flows (pcu/hr)





2		3	4	5	7	2		3	5		7			

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1A	A	2	3.00				30			100	3915	850	0.217	1	651	0.166	
1B	A	2	3.00								4110	455	0.111		755	0.184	1
1C	A	1	3.00			15				100	1870	5	0.003		0	0.000	
2A	D	1	3.5	1			25				1855	317	0.171	1	347	0.187	1
2B	D	1	3.5			20	30			96 / 100	1970/1965	336	0.171		367	0.187	
2C	D	1	3.5			15			0.5		960	164	0.171	1	179	0.187	1
3A	C	1	3.5	1		15				100	1785	190	0.106		255	0.143	
3B	C	1	3.5			20				0	2105	332	0.158	1	340	0.162	1
3C	C	1	3.5								2105	332	0.158	1	340	0.162	1
3D	C	1	3.5				15				2105	332	0.158	1	340	0.162	1
4A	B	1	3.50	1		15				100 / 100	1785	5	0.003		0	0.000	
4B	B	1	3.50				30			100	2005	5	0.002		0	0.000	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
5p	C		6		12	18				
6p	ABD		10		15	25				
7p	D		7		11	18				
8p	ABC		8		10	18				
9p	B		7		7	14				
10p	ACD		5		6	11				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

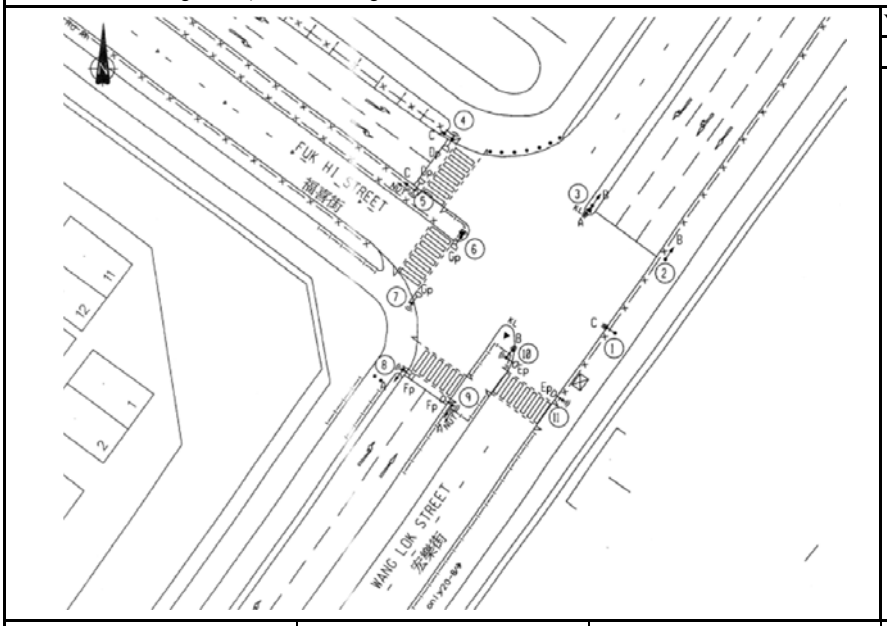
	AM Peak			PM Peak		
Check Critical Phase	1,9p,3,2			1,9p,3,2		
Sum of y values, Y	0.545			0.532		
Lost time, L	35			35		
Cycle Time, C	120			120		
Practical Y, Y_{pr}	0.638			0.638		
Reserve Capacity, R.C. (%)	17%			20%		

Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

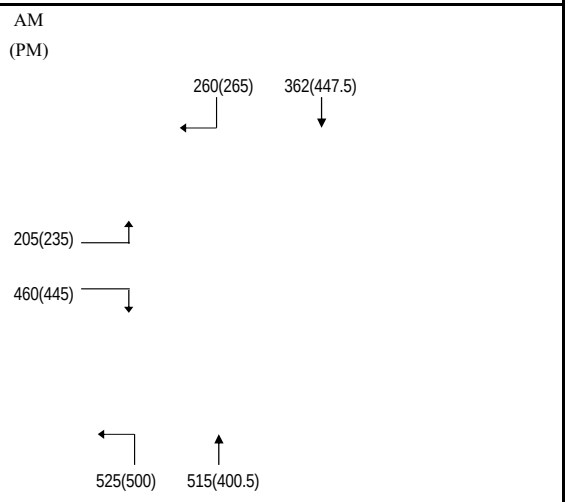
Ho Wang SPB Limited
Traffic & Transportation Consultants

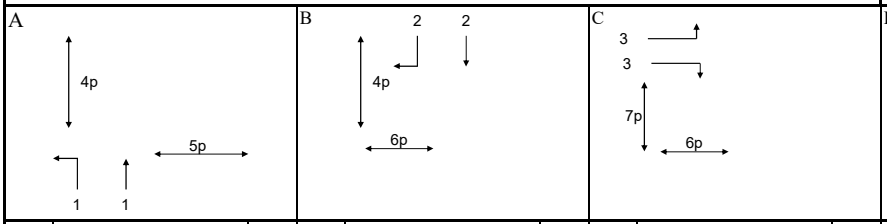
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Fuk Hi St / Wang Lok St	Ref. No.:	J08S
Scheme:	2032 Design Flow (Vehicle Servcing ai	Ref. No.:	



Year: 2032 | Job No.: J1358.1 | Rev.: -

Peak Hour Traffic Flows (pcu/hr)





3		3	4		3	4		3											

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↰↑	A	1	3.7	1		10				100	1725	525	0.304	1	500	0.290	1
1 ↑	A	1	3.7								2125	515	0.242		401	0.188	
2 ↱	B	1	3.5				15				1915	201	0.105	1	229	0.120	1
2 ↰↓	B	1	3.5				18			28 / 15	2060/2080	216	0.105		249	0.120	
2 ↓	B	1	3.5	1							1965	206	0.105	1	235	0.120	1
3 →↑	C	1	4.00	1		15				100	1830	205	0.112		235	0.128	
3 →	C	1	4.00				20			100	2005	460	0.229	1	445	0.222	1

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
4p	AB		7		7	14				
5p	A		7		7	14				
6p	BC		7		7	14				
7p	C		7		7	14				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%

In accordance with TPDM - Volume 4.2.4

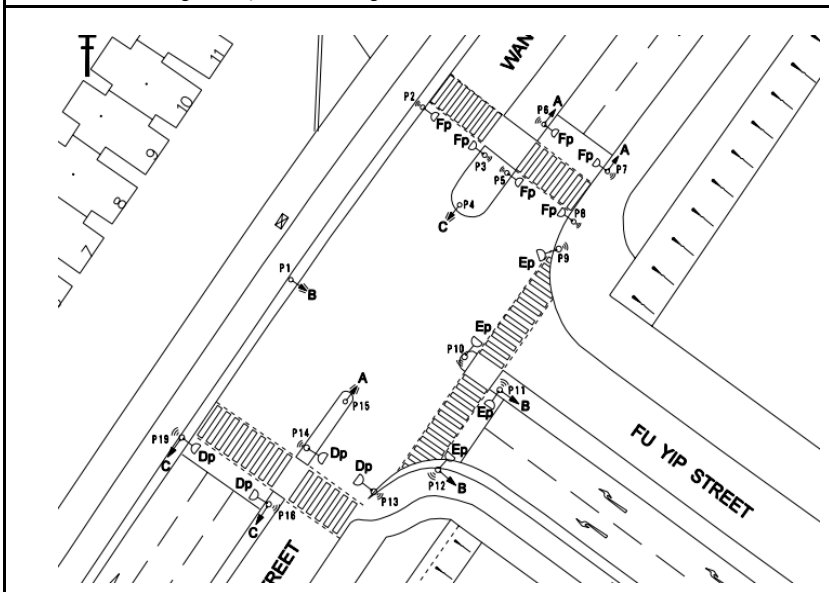
Check Critical Phase	1,2,3			1,2,3		
Sum of y values, Y	0.639			0.631		
Lost time, L	17			17		
Cycle Time, C	108			108		
Practical Y, Y_{pr}	0.758			0.758		
Reserve Capacity, R.C. (%)	19%			20%		

Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

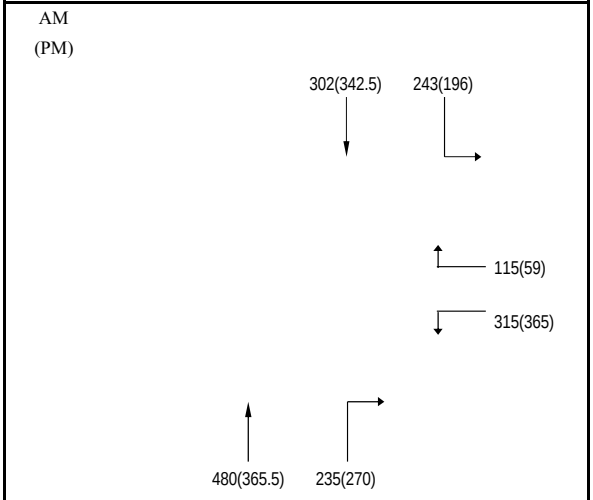
Ho Wang SPB Limited
Traffic & Transportation Consultants

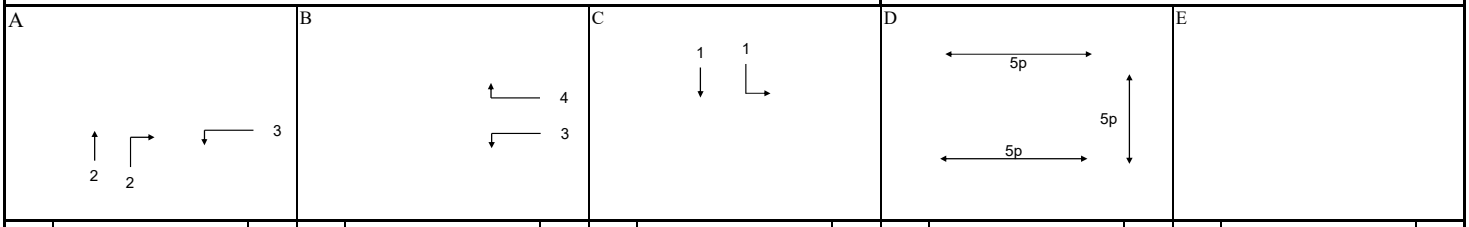
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Wang Lok St / Fu Yip St	Ref. No.:	J09S
Scheme:	2032 Design Flow (Vehicle Servcing a	Ref. No.:	



Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)





3		3	4			3	2		3	5	13	11					
3						3	2		3	5	13	11					

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↓	C	1	3.5								2105	301	0.143	1	294	0.140	1
1 ↓→	C	1	3.5	1		10				99 / 80	1710/1755	244	0.143		245	0.139	
2 →↑	A	1	3.5	1			20		1.11	66 / 86	2075/2050	355	0.171	1	313	0.153	
2 ↑	A	1	3.5								2105	360	0.171		322	0.153	1
3 ↓←	AB	1	3.50	1		10				100	1710	315	0.184		365	0.213	1
4 ←↑	B	1	3.50	1			20			100	1830	115	0.063	1	59	0.032	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
5p	CD		5		8	13		1		1
6p	D		5		8	13		1		1
7p	D		5		8	13				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

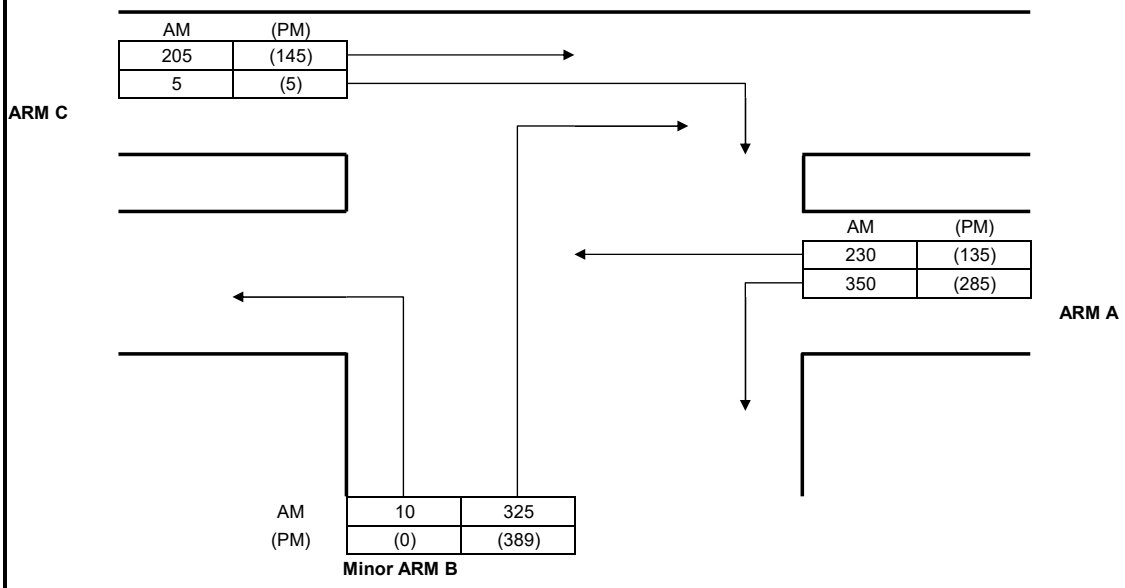
	AM Peak			PM Peak		
Check Critical Phase	2,4,1,5p	3,1,5p		2,4,1,5p	3,1,5p	
Sum of y values, Y	0.377	0.327		0.325	0.353	
Lost time, L	44	38		44	38	
Cycle Time, C	115	115		115	115	
Practical Y, Y_{pr}	0.556	0.603		0.556	0.603	
Reserve Capacity, R.C. (%)	47%	84%		71%	71%	

Calculated by:	Date: Sep-2023	Checked by:

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Wang Lee St / Wang Lok St			Ref. No.:	J10P
Scheme:	2032 Design Flow (Vehicle Servcing and Maintenance)			Ref. No.:	
Year:	2032	Job No.:	J1358.1	Rev.:	-
ARM A:	Wang Lok Street				
ARM B:	Wang Lee Street				
ARM C:	Wang Lok Street				



GEOMETRY

Major road width	W	13.65	Lane widths	w(b-a)	5.30
Central Reserve width	Wcr	4.75		w(b-c)	5.30
2 Lane Minor Arm (Y/N)		Y		w(c-b)	4.36
Visibilities	Vr(b-a)	110	Calculated	D	1.14
	Vl(b-a)	150		E	1.14
	Vr(b-c)	110		F	1.10
	Vr(c-b)	150		Y	0.53

ANALYSIS

		Factor	AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		205	145
	q(c-b)		5	5
	q(a-b)		350	285
	q(a-c)		230	135
	q(b-a)		325	389
	q(b-c)		10	0
	f		0.03	0.00
CAPACITIES	Q(b-a)	1	683	718
	Q(b-c)	1	772	798
	Q(c-b)	1	694	728
	Q(b-ac)	1	685	718
RFC's	b-a		0.476	0.541
	b-c		0.013	0.000
	c-b		0.007	0.007
	b-ac		0.000	0.000
Worst RFC			**0.476**	**0.541**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

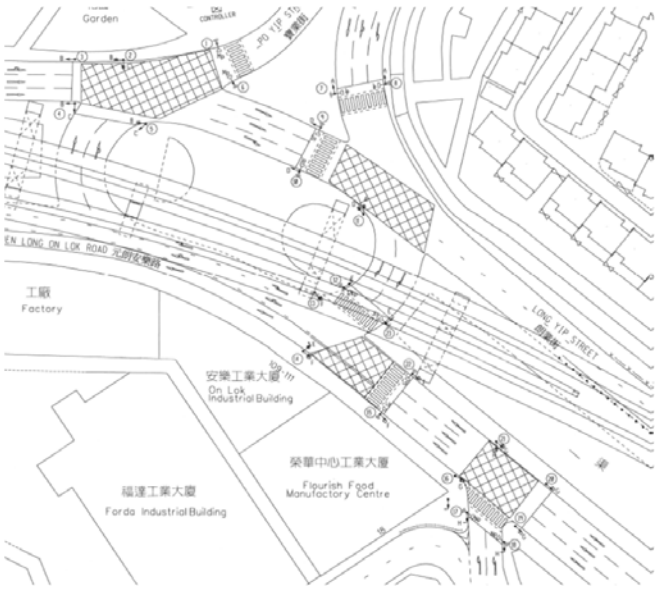
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Sep-23	Checked by:

Traffic Signal Junction Calculation Sheet

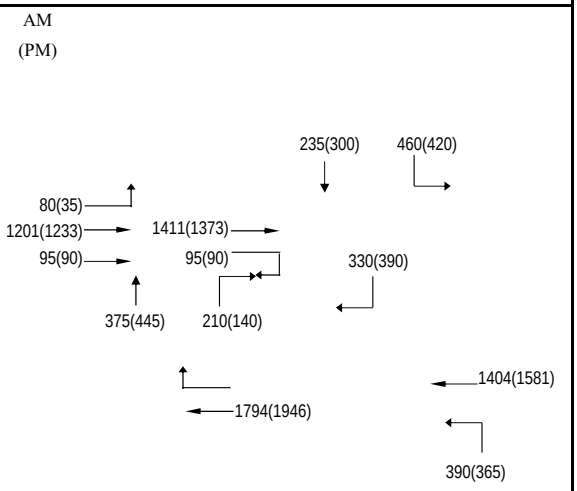
Ho Wang SPB Limited
Traffic & Transportation Consultants

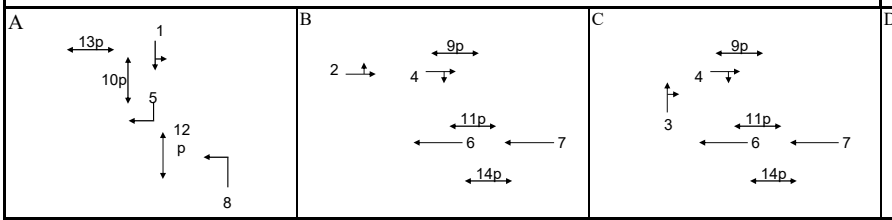
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Long Yip St / Yuen Long On Lok Rd / Po Yip St	Ref. No.:	J11S
Scheme:	2032 Design Flow (Vehicle Servcing an	Ref. No.:	



Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)





4		3	4		3	4					6			

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↓	A	1	3.5								2105	235	0.112		259	0.123	1
1 ↓→	A	1	3.5			18				100 / 83	1945/1970	240	0.123		242	0.123	
1 ↓←	A	1	3.5	1		15					1785	220	0.123	1	219	0.123	1
2 ↑→	B	1	3.0	1		10				27 / 19	1880/1900	650	0.346		645	0.340	
2 →	B	1	3.0								2055	726	0.353	1	713	0.347	1
3 ↑	CD	1	3.5								2105	319	0.151		313	0.149	1
3 ↑→	CD	1	3.5	1			10			79 / 52	1755/1825	266	0.152	1	272	0.149	
4 →	BCD	2	3.3	1							4030	1411	0.350		1373	0.341	
4 ↓	BCD	1	3.3				10			100	1815	95	0.052		90	0.050	
5 ↓	A	2	5.0				10			100	3920	330	0.084		390	0.099	
6 ←	BCD	3	3.3								6255	1794	0.287		1946	0.311	
7 ←	BCD	3	3.5							100	6315	1404	0.222		1581	0.250	
8 ↑	AD	2	3.5			15				100	3825	390	0.102		365	0.095	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
9p	BCD		9		10	19				
10p	A		8		9	17				
11p	BCD		10		12	22				
12p	A		8		9	17				
13p	A		8		9	17				
14p	BC		10		12	22				

Practical Y (Ypr):	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

	AM Peak			PM Peak		
Check Critical Phase	1,2,3			1,2,3		
Sum of y values, Y	0.628			0.619		
Lost time, L	21			21		
Cycle Time, C	120			120		
Practical Y, Y_{pr}	0.743			0.743		
Reserve Capacity, R.C. (%)	18%			20%		

Calculated by:	Date: Sep-2023	Checked by:

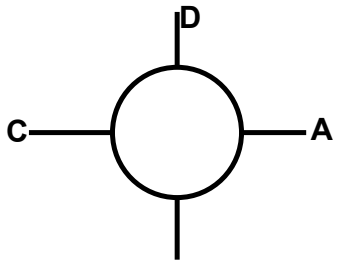
Simplified Roundabout Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Pok Oi Interchange		Ref. No.: J13R
Scheme:	2032 Design Flow (Vehicle Servcing and Maintenance)		Ref. No.:
Year:	2032	Job No.: J1358.1	Rev.: -

AM PM

ARM A: Castle Peak Road Westbound Approach
ARM B: Yuen Long Highway
ARM C: Castle Peak Road Eastbound Approach
ARM D: Route 3



GEOMETRY

ARM	v	e	L	r	D	Phi	S
A	4.00	7.00	18	25	90	65	0.27
B	12.00	23.00	5	25	90	30	3.52
C	3.50	6.50	4	25	90	40	1.20
D	7.00	9.00	5	25	90	30	0.64

AM FLOWS

from \ to	A	B	C	D	Circ	Entry
A					1354	385
B					1374	1465
C					1300	675
D					1885	984

PM FLOWS

from \ to	A	B	C	D	Circ	Entry
A					1483	340
B					1673	1275
C					1255	660
D					1840	1163

CALCULATIONS

ARM	K	X_2	M	F	t_D	f_c	Q_E AM	Q_E PM	RFC AM	RFC PM
A	0.89	5.96	20.09	1805	1.02	0.47	1037	983	0.37	0.35
B	1.01	13.37	20.09	4051	1.02	0.79	2994	2756	0.49	0.46
C	0.98	4.38	20.09	1328	1.02	0.40	783	801	0.86	0.82
D	1.01	7.88	20.09	2387	1.02	0.55	1356	1381	0.73	0.84

Crtical Arm:	**C**	**D**
RFC:	**0.86**	**0.84**
	AM	**PM**

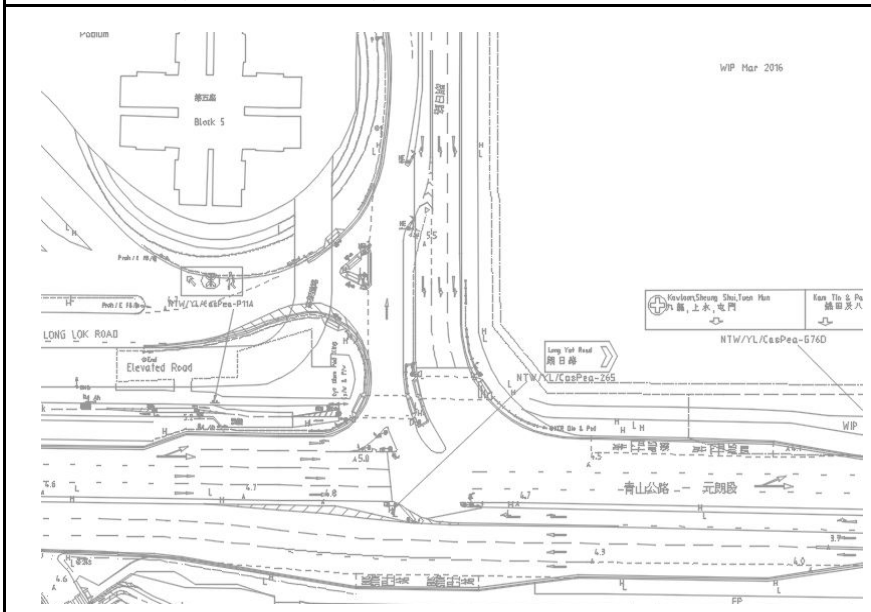
- In accordance with TPDM V2.4

Calculated by:	PY	Date:	Sep-23	Checked by:	TE

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Castle Peak Road - Yuen Long / Long Yat Road	Ref. No.:	J16S
Scheme:	2032 Design Flow (Vehicle Servcing ai	Ref. No.:	J47151



Year:	2032	Job No.:	J1358	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

AM
(PM)

1880(1625)
70(85)
1751(1713)
275(235)
2634(3261)

A	B	C	D	E
7p, 6p, 1	7p, 2, 1	5, 4	5, 6p	

2					3	3				3							
2	22					3				3							

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 →	AB	3	3.30								6255	1751	0.280	1	1713	0.274	1
2 ↱	B	1	3.50	1		15				100	1785	70	0.039		85	0.048	
4 ↰	C	1	3.20				25			100	1960	275	0.140		235	0.120	
5 ↳	CD	3	4.20	1		20			0.9	100	5345	1880	0.352	1	1625	0.304	1

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
6p	AD		5		10	15				
7p	AB		5		17	22				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

Check Critical Phase	1,5	7p,5		1,5	7p,5	
Sum of y values, Y	0.632	0.352		0.578	0.304	
Lost time, L	9	29		9	29	
Cycle Time, C	108	108		108	108	
Practical Y, Y_{pr}	0.825	0.658		0.825	0.658	
Reserve Capacity, R.C. (%)	31%	87%		43%	117%	

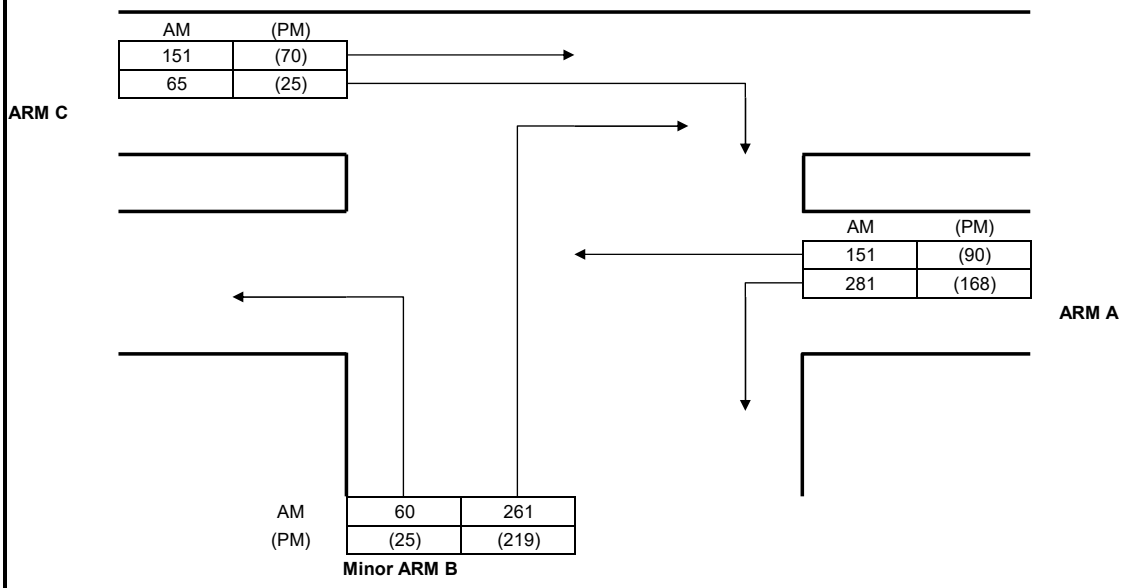
Calculated by:	Date: Sep-2023	Checked by:

2032 Design Scenario of
30% Brownfield and
70% Logistics use

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Wang Lee St / Fuk Wang St			Ref. No.:	J01P
Scheme:	2032 Design Flow (Logistics Use)			Ref. No.:	
Year:	2032	Job No.:	J1358.1	Rev.:	-
ARM A:	Wang Lee Street NB				
ARM B:	Fuk Wang Street EB				
ARM C:	Wang Lee Street SB				



GEOMETRY

Major road width	W	10.00	Lane widths	w(b-a)	4.50
Central Reserve width	Wcr	0.00		w(b-c)	4.50
2 Lane Minor Arm (Y/N)		N		w(c-b)	5.00
Visibilities	Vr(b-a)	150	Calculated	D	1.11
	Vl(b-a)	150		E	1.11
	Vr(b-c)	150		F	1.16
	Vr(c-b)	150		Y	0.66

ANALYSIS

			AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		151	70
	q(c-b)		65	25
	q(a-b)		281	168
	q(a-c)		151	90
	q(b-a)		261	219
	q(b-c)		60	25
	f		0.19	0.10
		Factor		
CAPACITIES	Q(b-a)	1	576	633
	Q(b-c)	1	757	785
	Q(c-b)	1	743	791
	Q(b-ac)	1	603	646
RFC's	b-a		0.453	0.345
	b-c		0.079	0.032
	c-b		0.087	0.032
	b-ac		0.532	0.377
Worst RFC			**0.532**	**0.377**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

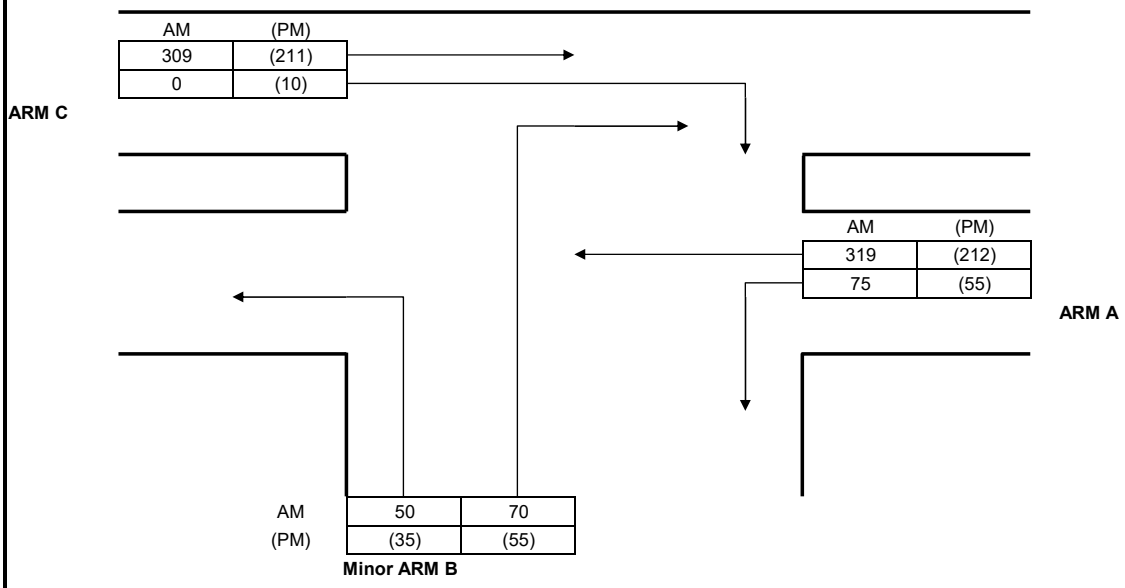
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Sep-23	Checked by:

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Fuk Yan St / Fuk Wang St			Ref. No.:	J02P
Scheme:	2032 Design Flow (Logistics Use)			Ref. No.:	
Year:	2032	Job No.:	J1358.1	Rev.:	-
ARM A:	Fuk Wang Street EB				
ARM B:	Fuk Yan Street SB				
ARM C:	Fuk Wang Street WB				



GEOMETRY

Major road width	W	10.50	Lane widths	w(b-a)	4.08
Central Reserve width	Wcr	0.00		w(b-c)	4.08
2 Lane Minor Arm (Y/N)		N		w(c-b)	5.00
Visibilities	Vr(b-a)	150	Calculated	D	1.07
	Vl(b-a)	150		E	1.07
	Vr(b-c)	150		F	1.16
	Vr(c-b)	150		Y	0.64

ANALYSIS

			AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		309	211
	q(c-b)		0	10
	q(a-b)		75	55
	q(a-c)		319	212
	q(b-a)		70	55
	q(b-c)		50	35
	f		0.42	0.39
		Factor		
CAPACITIES	Q(b-a)	1	535	576
	Q(b-c)	1	710	738
	Q(c-b)	1	756	790
	Q(b-ac)	1	596	630
RFC's	b-a		0.131	0.095
	b-c		0.070	0.047
	c-b		0.000	0.013
	b-ac		0.201	0.143
Worst RFC			**0.201**	**0.143**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

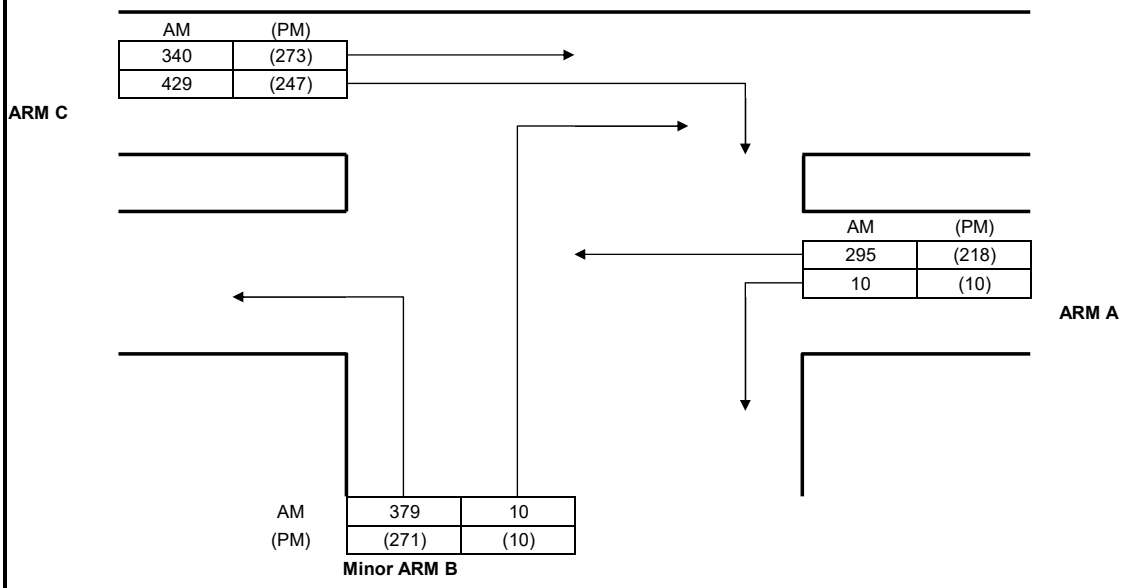
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Sep-23	Checked by:

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Fuk Wang St / Fuk Hi St			Ref. No.:	J03P
Scheme:	2032 Design Flow (Logistics Use)			Ref. No.:	
Year:	2032	Job No.:	J1358.1	Rev.:	-
ARM A:	Fuk Hi Street NB				
ARM B:	Fuk Wang Street WB				
ARM C:	Fuk Hi Street SB				



GEOMETRY

Major road width	W	10.50	Lane widths	w(b-a)	7.80
Central Reserve width	Wcr	0.00		w(b-c)	7.80
2 Lane Minor Arm (Y/N)		N		w(c-b)	5.00
Visibilities	Vr(b-a)	150	Calculated	D	1.43
	Vl(b-a)	150		E	1.43
	Vr(b-c)	150		F	1.16
	Vr(c-b)	150		Y	0.64

ANALYSIS

		Factor	AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		340	273
	q(c-b)		429	247
	q(a-b)		10	10
	q(a-c)		295	218
	q(b-a)		10	10
	q(b-c)		379	271
	f		0.97	0.96
CAPACITIES	Q(b-a)	1	522	648
	Q(b-c)	1	965	990
	Q(c-b)	1	780	801
	Q(b-ac)	1	944	972
RFC's	b-a		0.019	0.015
	b-c		0.393	0.274
	c-b		0.550	0.308
	b-ac		0.412	0.289
Worst RFC			**0.550**	**0.308**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

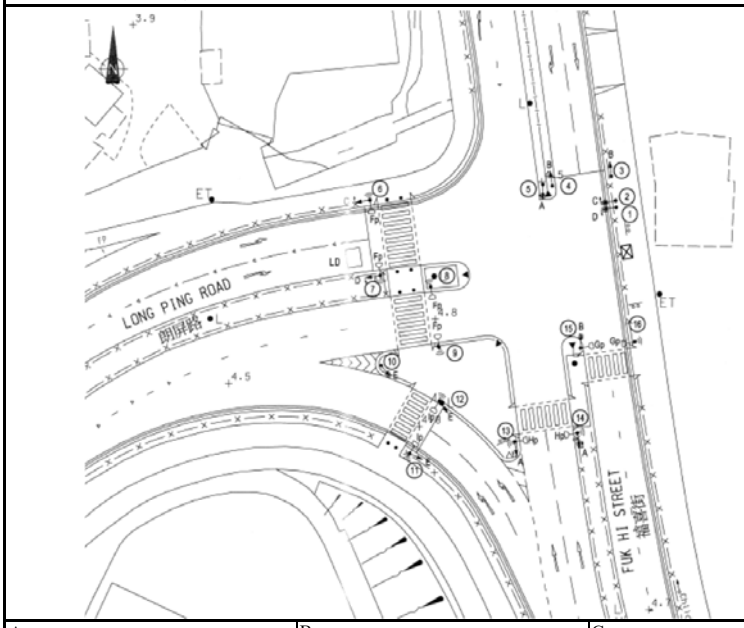
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Sep-23	Checked by:

Traffic Signal Junction Calculation Sheet

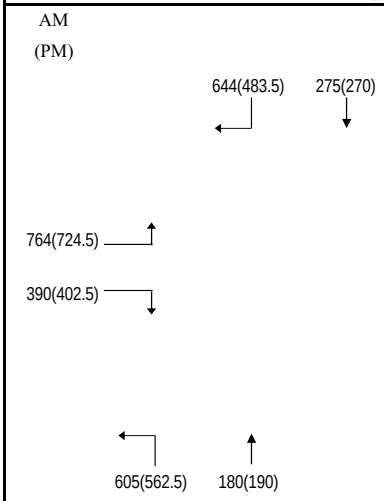
Ho Wang SPB Limited
Traffic & Transportation Consultants

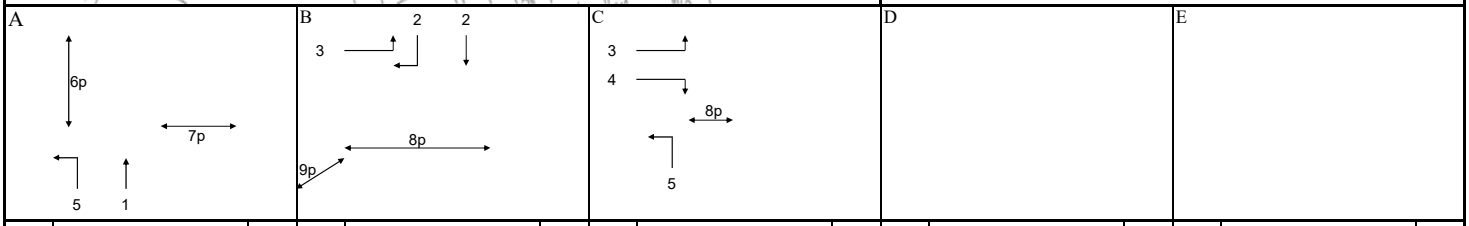
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Fuk Hi St / Long Ping Rd	Ref. No.:	J04S
Scheme:	2032 Design Flow (Scenario B)	Ref. No.:	



Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)





3		5	2		3	2		8											
		3	2		3	6													

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↑	A	2	4.00								4310	180	0.042		190	0.044	
2 ↓	B	1	3.70	1							1985	275	0.139		270	0.136	
2 ↓	B	1	3.70				20			100	1975	644	0.326	1	484	0.245	1
3 →	BC	1	4.30	1		15				100	1860	764	0.411		725	0.390	
4 ↓	C	1	4.70				20			100	2070	390	0.188		403	0.194	
5 ↑	AC	1	3.80						0.75	100	1600	605	0.378	1	563	0.352	1

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
6p	A									
7p	A									
8p	BC									
9p	B									

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

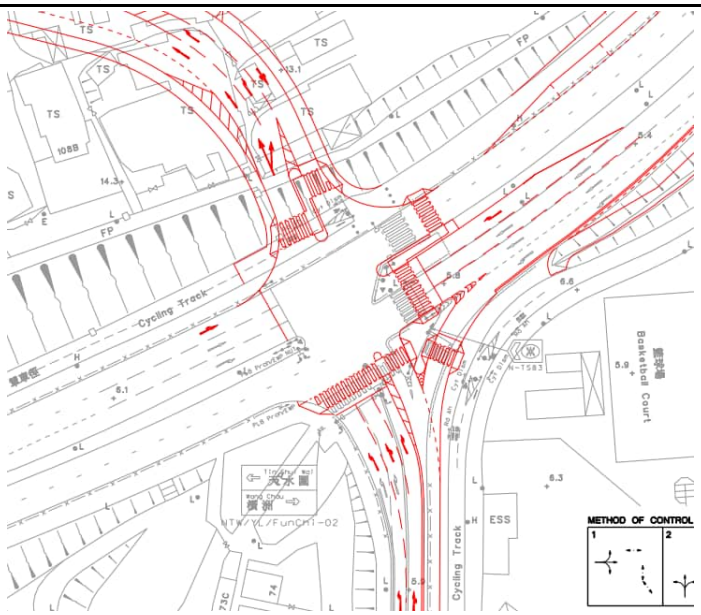
	AM Peak			PM Peak		
Check Critical Phase	1,2,4	5,2		1,2,4	5,2	
Sum of y values, Y	0.556	0.704		0.483	0.596	
Lost time, L	20	12		20	12	
Cycle Time, C	100	100		90	90	
Practical Y, Y_{pr}	0.720	0.792		0.700	0.780	
Reserve Capacity, R.C. (%)	29%	12%		45%	31%	

Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Long Ping Rd / Fung Chi Rd / Wang Chau Phase 1 Access Road	Ref. No.:	J05S
Scheme:	2032 Design Flow (Scenario B)	Ref. No.:	



Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

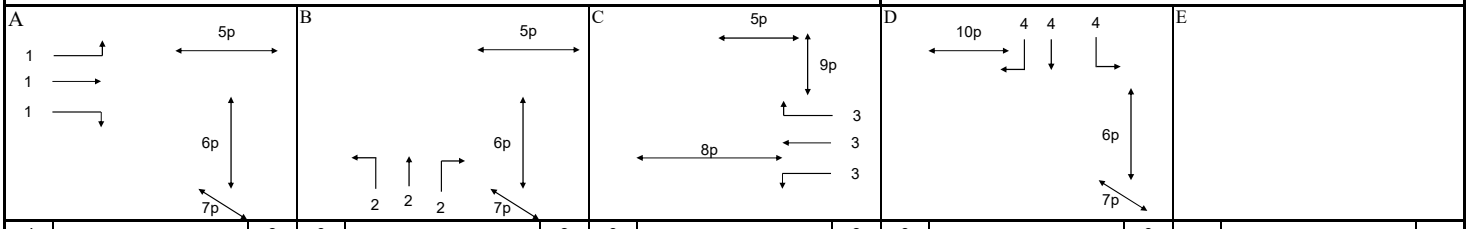
AM
(PM)

120(125) 40(40) 85(25)

85(60)
874(927)
260(310)

65(50)
809(756)
285(195)

195(220) 25(25) 130(180)



4		2	3		2	3		2	3		3								

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1	A	1	3.60	1		15				19 / 13	1940/1950	459	0.236		474	0.243	1
1	A	1	3.60								2115	500	0.237	1	513	0.243	
1	A	1	3.60				10			100	1840	260	0.141		310	0.168	
4	D	1	4.00	1		15	20			84 / 79	1880/1895	245	0.130	1	190	0.100	1
2	B	1	3.60	1		10				100	1715	195	0.114	1	220	0.128	1
2	B	1	3.50				20			84 / 88	1980/1975	155	0.078		205	0.104	
3	C	1	3.90				15		0.8	100	1560	65	0.042		50	0.032	
3	C	2	3.40								4190	809	0.193	1	756	0.180	1
3	C	1	3.60	1		40				100	1905	285	0.150		195	0.102	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
6p			8		8	16				
8p			8		8	16				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

	AM Peak			PM Peak		
Check Critical Phase	1,2,3,4			1,2,3,4		
Sum of y values, Y	0.674			0.652		
Lost time, L	18			18		
Cycle Time, C	120			120		
Practical Y, Y_{pr}	0.765			0.765		
Reserve Capacity, R.C. (%)	14%			17%		

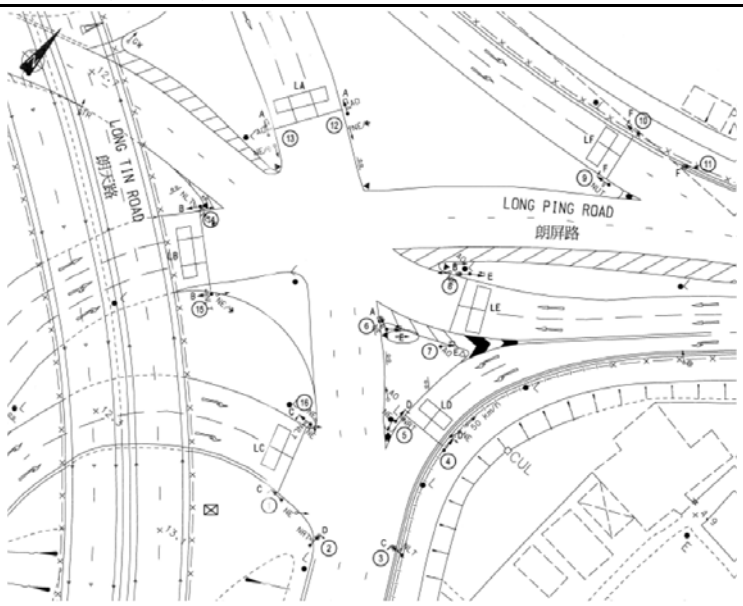
Calculated by:	Date: Sep-2023	Checked by:

Y:\Job\J1358.1 MSB in Yuen Long\04-Working\04G_Calculations\[J1358.1-2032_Design_Scenario_C1_Calculation_1A_20230808.xlsm]J05S

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

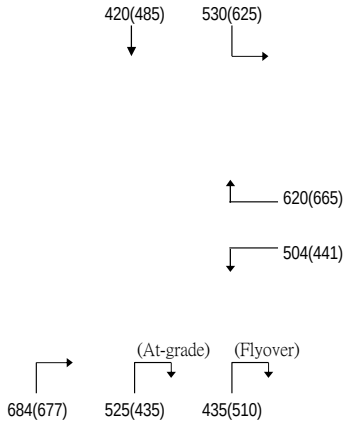
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Long Ping Rd / Shui Pin Wai Interchange	Ref. No.:	J06S
Scheme:	2032 Design Flow (Logistics Use)	Ref. No.:	

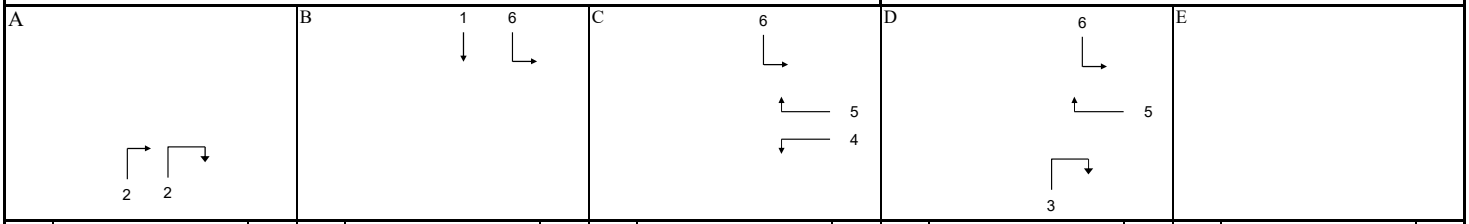


Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

AM
(PM)





2		3	4		3	9		3	3		3						
5		3	4		3	3					3						

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↓	B	3	3.3	1							6115	420	0.069	1	485	0.079	1
2 →	A	1	3.8	1							1990	403	0.202		369	0.186	1
2 ↓→	A	1	3.9				18			33 / 21	2085/2110	422	0.203	1	391	0.185	
2 ↓	A	1	3.3				15				1895	384	0.202		352	0.186	1
3 ↓	D	2	5.1	1			20			100	4085	435	0.106	1	510	0.125	1
4 ↓	C	1	3.5	1		20				100	1920	504	0.263	1	441	0.230	1
5 ←	CD	2	3.5	1						100	4070	620	0.152		665	0.163	
6 →	BCD	2	3.6	1						100	4090	530	0.130		625	0.153	

Critical Ped. Phase	Stage	Width Across	Min. GM	Min. FGM	Lost Time	Note	Crit.	Note	Crit.

Note: Saturation flow of 90 pcu/hr is added for approach 4 is for the additional 15 meters traffic lane at junction

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

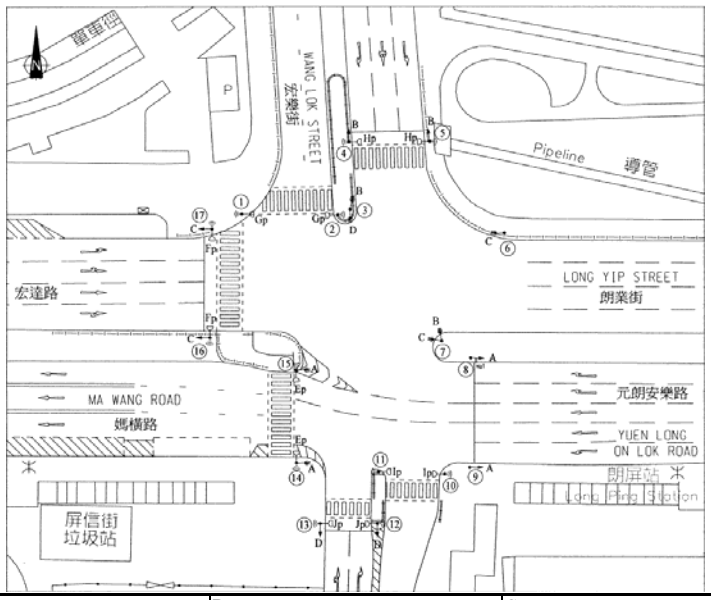
	AM Peak			PM Peak		
Check Critical Phase	2,1,4,3	2,1,5		2,1,4,3	2,1,5	
Sum of y values, Y	0.640	0.424		0.619	0.428	
Lost time, L	26	18		26	18	
Cycle Time, C	120	120		120	120	
Practical Y, Y_{pr}	0.705	0.765		0.705	0.765	
Reserve Capacity, R.C. (%)	10%	81%		14%	79%	

Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

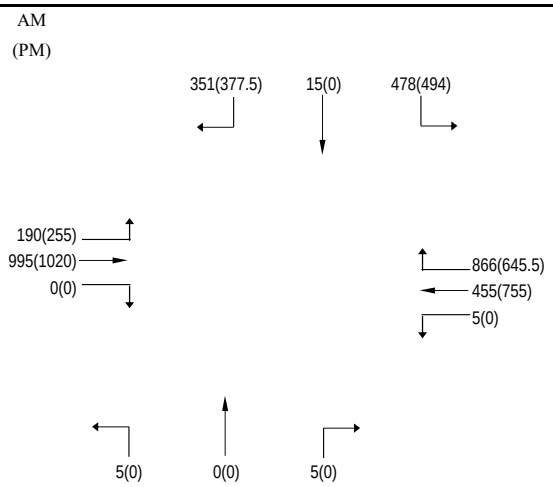
Ho Wang SPB Limited
Traffic & Transportation Consultants

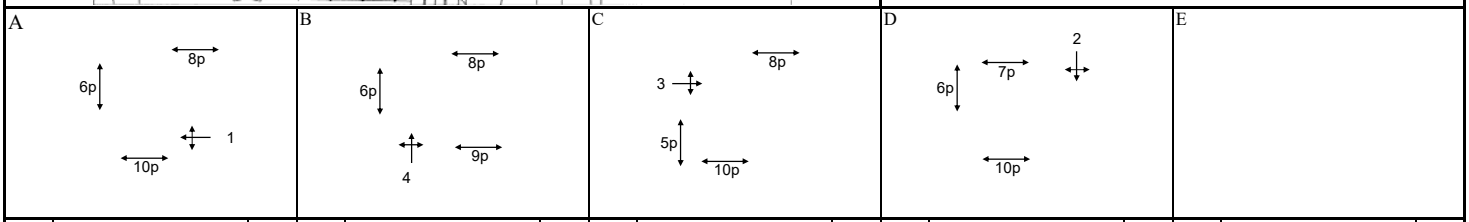
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study	
Junction:	Wang Lok St / Wang Tat Rd / Ma Wang Rd / Long Yip St / Yuen Long On Lok Rd	Ref. No.: J07S
Scheme:	2032 Design Flow (Logistics Use)	Ref. No.:



Year: 2032	Job No.: J1358.1	Rev.: -

Peak Hour Traffic Flows (pcu/hr)





2		3	4	5		7	2		3	5		7			

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1A	A	2	3.00				30		0.75	100	2940	866	0.295	1	646	0.220	1
1B	A	2	3.00								4110	455	0.111		755	0.184	
1C	A	1	3.00			15				100	1870	5	0.003		0	0.000	
2A	D	1	3.5	1			25				1855	327	0.176		338	0.182	1
2B	D	1	3.5			20	30			96 / 100	1965	347	0.177	1	358	0.182	
2C	D	1	3.5			15			0.5		960	169	0.176		175	0.182	1
3A	C	1	3.5	1		15				100	1785	190	0.106		255	0.143	
3B	C	1	3.5			20				0	2105	332	0.158	1	340	0.162	1
3C	C	1	3.5								2105	332	0.158	1	340	0.162	1
3D	C	1	3.5				15				2105	332	0.158	1	340	0.162	1
4A	B	1	3.50	1		15				100 / 100	1785	5	0.003		0	0.000	
4B	B	1	3.50				30			100	2005	5	0.002		0	0.000	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
5p	C		6		12	18				
6p	ABD		10		15	25				
7p	D		7		11	18				
8p	ABC		8		10	18				
9p	B		7		7	14				
10p	ACD		5		6	11				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

	AM Peak			PM Peak		
Check Critical Phase	1,9p,3,2			1,9p,3,2		
Sum of y values, Y	0.629			0.563		
Lost time, L	35			35		
Cycle Time, C	120			120		
Practical Y, Y_{pr}	0.638			0.638		
Reserve Capacity, R.C. (%)	1%			13%		

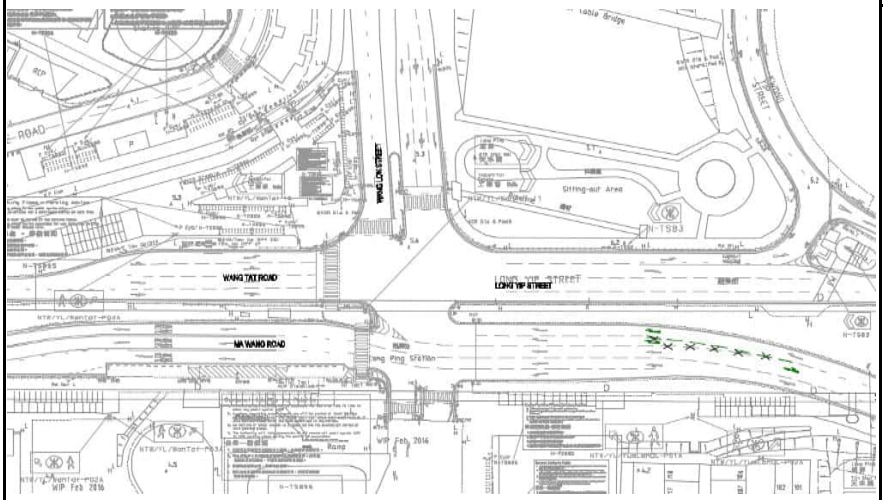
Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

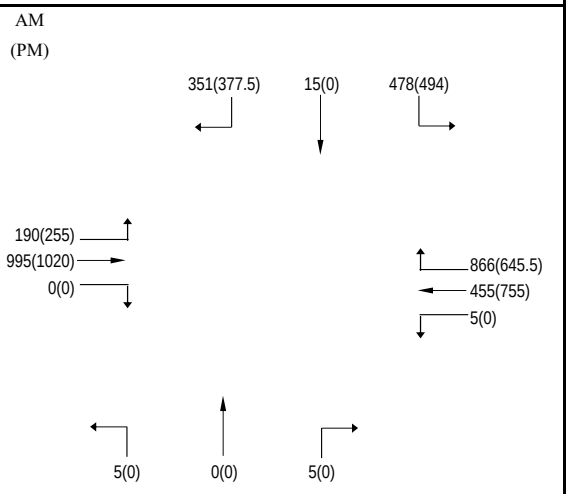
Ho Wang SPB Limited
Traffic & Transportation Consultants

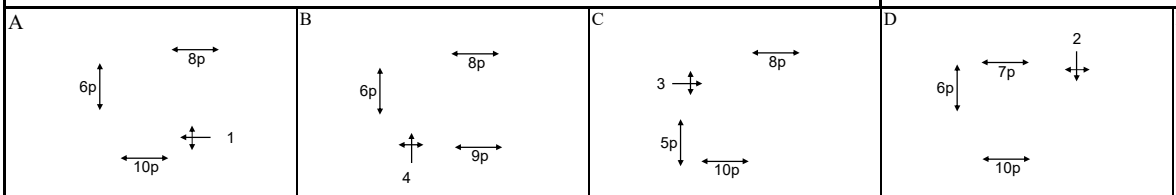
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study	
Junction:	Wang Lok St / Wang Tat Rd / Ma Wang Rd / Long Yip St / Yuen Long On Lok Rd	Ref. No.: J07S (with ir
Scheme:	2032 Design Flow (Logistics Use) With Improvement	Ref. No.:

Year: 2032 | Job No.: J1358.1 | Rev.: -



Peak Hour Traffic Flows (pcu/hr)





2		3	4	5		7	2		3	5		7							

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1A	A	2	3.00				30			100	3915	866	0.221	1	646	0.165	
1B	A	2	3.00								4110	455	0.111		755	0.184	1
1C	A	1	3.00			15				100	1870	5	0.003		0	0.000	
2A	D	1	3.5	1			25				1855	327	0.176		338	0.182	1
2B	D	1	3.5			20	30			96 / 100	1965	347	0.177	1	358	0.182	
2C	D	1	3.5			15			0.5		960	169	0.176		175	0.182	1
3A	C	1	3.5	1		15				100	1785	190	0.106		255	0.143	
3B	C	1	3.5			20				0	2105	332	0.158	1	340	0.162	1
3C	C	1	3.5								2105	332	0.158	1	340	0.162	1
3D	C	1	3.5				15				2105	332	0.158	1	340	0.162	1
4A	B	1	3.50	1		15				100 / 100	1785	5	0.003		0	0.000	
4B	B	1	3.50				30			100	2005	5	0.002		0	0.000	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
5p	C		6		12	18				
6p	ABD		10		15	25				
7p	D		7		11	18				
8p	ABC		8		10	18				
9p	B		7		7	14				
10p	ACD		5		6	11				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

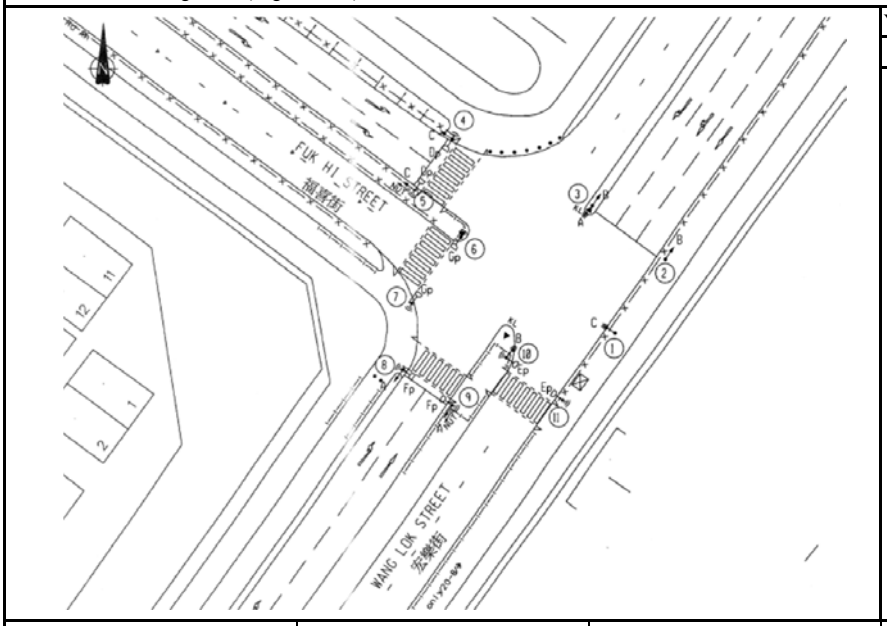
	AM Peak			PM Peak		
Check Critical Phase	1,9p,3,2			1,9p,3,2		
Sum of y values, Y	0.555			0.528		
Lost time, L	35			35		
Cycle Time, C	120			120		
Practical Y, Y_{pr}	0.638			0.638		
Reserve Capacity, R.C. (%)	15%			21%		

Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

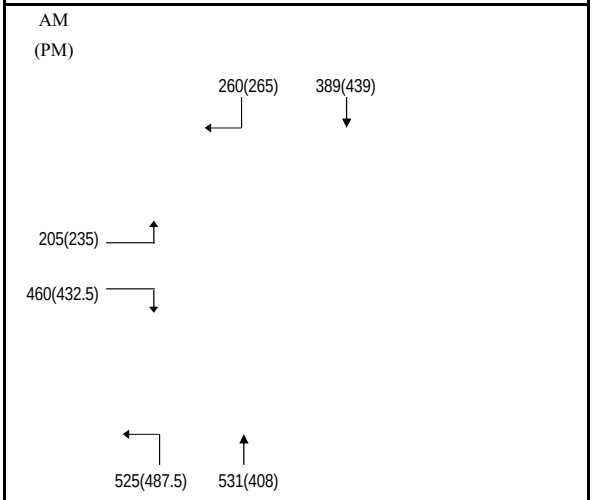
Ho Wang SPB Limited
Traffic & Transportation Consultants

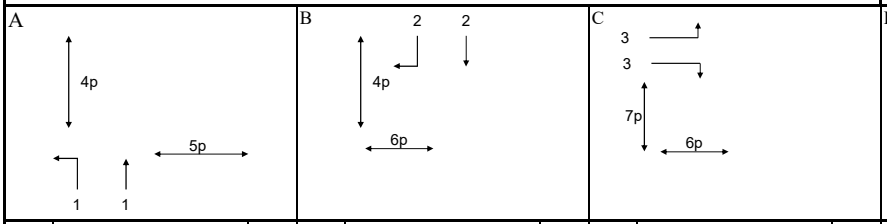
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Fuk Hi St / Wang Lok St	Ref. No.:	J08S
Scheme:	2032 Design Flow (Logistics Use)	Ref. No.:	



Year: 2032 | Job No.: J1358.1 | Rev.: -

Peak Hour Traffic Flows (pcu/hr)





3		3	4			3	4		3										

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1	A	1	3.7	1		10				100	1725	525	0.304	1	488	0.283	1
1	A	1	3.7								2125	531	0.250		408	0.192	
2	B	1	3.5				15				1915	209	0.109		226	0.118	1
2	B	1	3.5				18			23 / 16	2065/2080	226	0.109	1	246	0.118	
2	B	1	3.5	1							1965	214	0.109		232	0.118	1
3	C	1	4.00	1		15				100	1830	205	0.112		235	0.128	
3	C	1	4.00				20			100	2005	460	0.229	1	433	0.216	1

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
4p	AB		7		7	14				
5p	A		7		7	14				
6p	BC		7		7	14				
7p	C		7		7	14				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

Check Critical Phase	1,2,3			1,2,3		
Sum of y values, Y	0.643			0.616		
Lost time, L	17			17		
Cycle Time, C	108			108		
Practical Y, Y_{pr}	0.758			0.758		
Reserve Capacity, R.C. (%)	18%			23%		

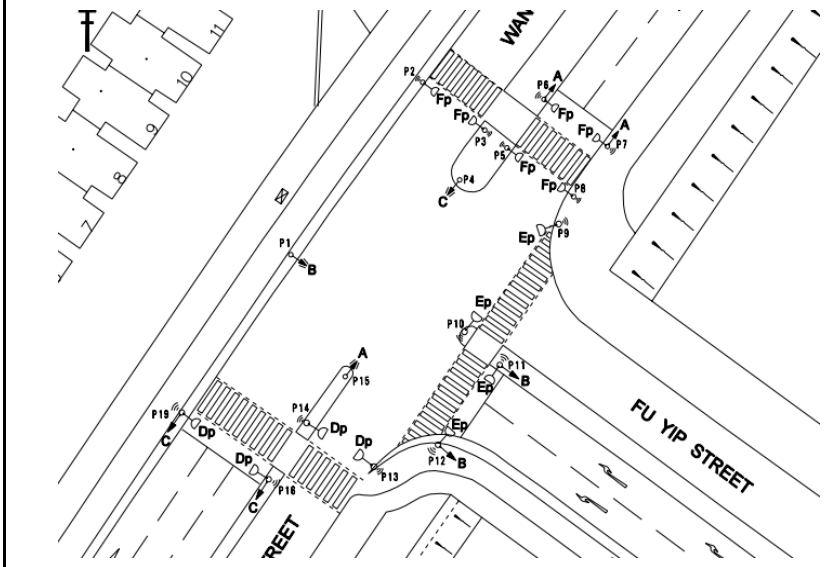
Calculated by:	Date: Sep-2023	Checked by:

Traffic Signal Junction Calculation Sheet

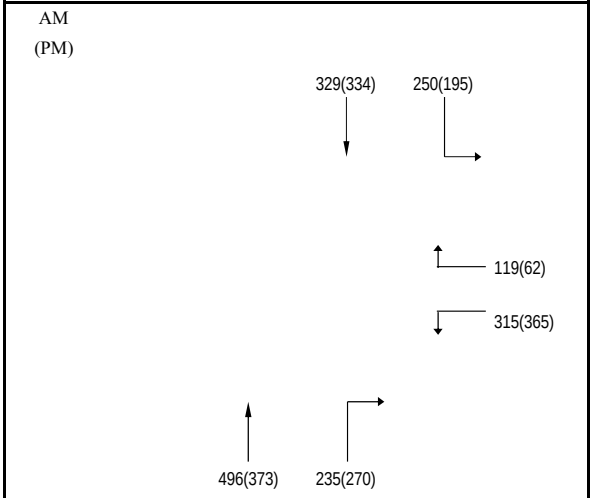
Ho Wang SPB Limited
Traffic & Transportation Consultants

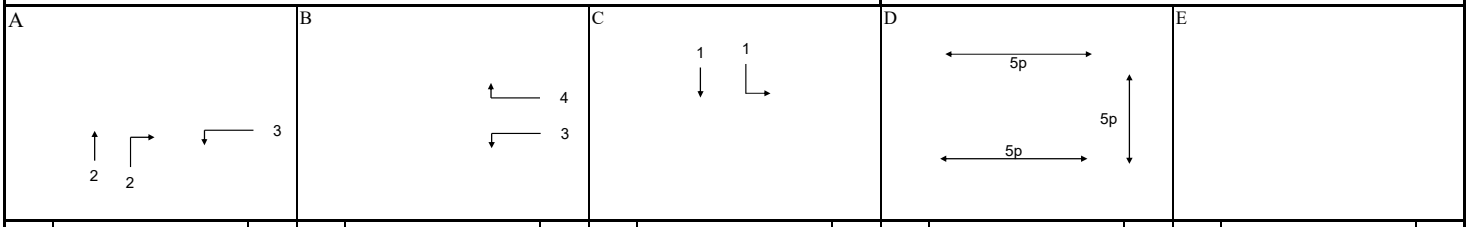
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study	
Junction:	Wang Lok St / Fu Yip St	Ref. No.: J09S
Scheme:	2032 Design Flow (Logistics Use)	Ref. No.:

Year: 2032 | Job No.: J1358.1 | Rev.: -



Peak Hour Traffic Flows (pcu/hr)





3		3	4		3	2		3	5	13	11			
3					3	2		3	5	13	11			

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↓	C	1	3.5								2105	319	0.151		289	0.137	
1 ↓→	C	1	3.5	1		10				96 / 81	1715/1750	260	0.152	1	240	0.137	1
2 →↑	A	1	3.5	1			20		1.11	65 / 85	2080/2050	363	0.175		317	0.155	
2 ↑	A	1	3.5								2105	368	0.175	1	326	0.155	1
3 ↓←	AB	1	3.50	1		10				100	1710	315	0.184		365	0.213	
4 ←↑	B	1	3.50	1			20			100	1830	119	0.065	1	62	0.034	1

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
5p	CD		5		8	13		1		1
6p	D		5		8	13		1		1
7p	D		5		8	13				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr} /Y - 1) x 100%

In accordance with TPDM - Volume 4.2.4

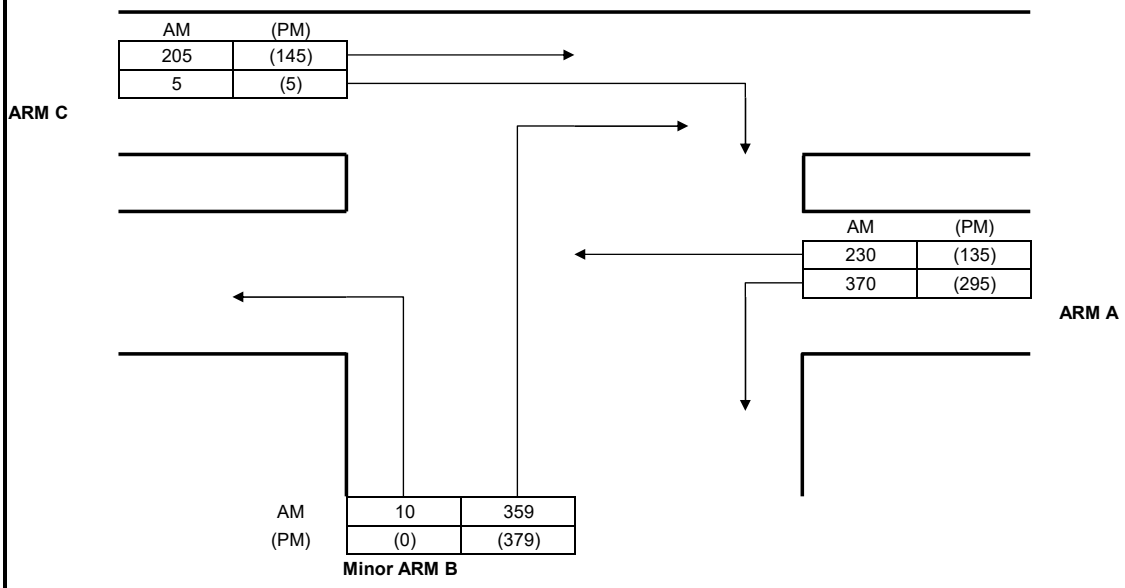
	AM Peak			PM Peak		
Check Critical Phase	2,4,1,5p	3,1,5p		2,4,1,5p	3,1,5p	
Sum of y values, Y	0.391	0.336		0.326	0.351	
Lost time, L	44	38		44	38	
Cycle Time, C	115	115		115	115	
Practical Y, Y_{pr}	0.556	0.603		0.556	0.603	
Reserve Capacity, R.C. (%)	42%	79%		70%	72%	

Calculated by:	Date: Sep-2023	Checked by:

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study				
Junction:	Wang Lee St / Wang Lok St			Ref. No.:	J10P
Scheme:	2032 Design Flow (Logistics Use)			Ref. No.:	
Year:	2032	Job No.:	J1358.1	Rev.:	-
ARM A:	Wang Lok Street				
ARM B:	Wang Lee Street				
ARM C:	Wang Lok Street				



GEOMETRY

Major road width	W	13.65	Lane widths	w(b-a)	5.30
Central Reserve width	Wcr	4.75		w(b-c)	5.30
2 Lane Minor Arm (Y/N)		Y		w(c-b)	4.36
Visibilities	Vr(b-a)	110	Calculated	D	1.14
	Vl(b-a)	150		E	1.14
	Vr(b-c)	110		F	1.10
	Vr(c-b)	150		Y	0.53

ANALYSIS

		Factor	AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		205	145
	q(c-b)		5	5
	q(a-b)		370	295
	q(a-c)		230	135
	q(b-a)		359	379
	q(b-c)		10	0
	f		0.03	0.00
CAPACITIES	Q(b-a)	1	681	717
	Q(b-c)	1	770	797
	Q(c-b)	1	690	725
	Q(b-ac)	1	683	717
RFC's	b-a		0.527	0.529
	b-c		0.013	0.000
	c-b		0.007	0.007
	b-ac		0.000	0.000
Worst RFC			**0.527**	**0.529**

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

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

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

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

Y = 1-0.0345W

f = proportion of minor traffic turning left

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

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

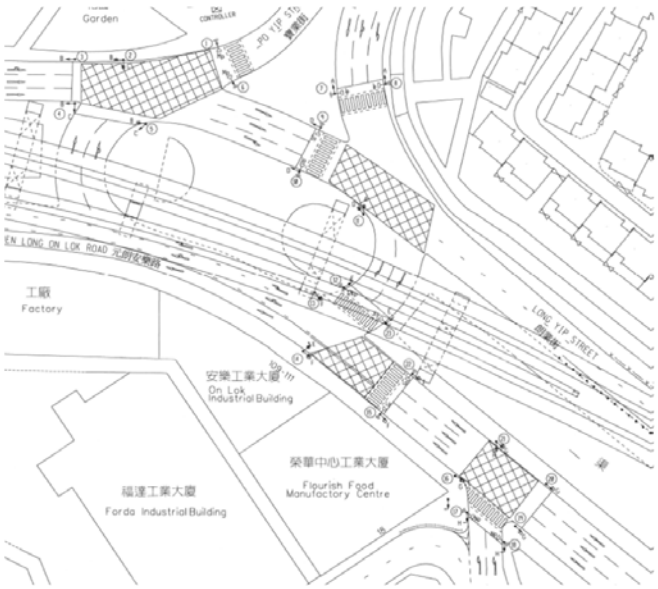
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	Date: Sep-23	Checked by:

Traffic Signal Junction Calculation Sheet

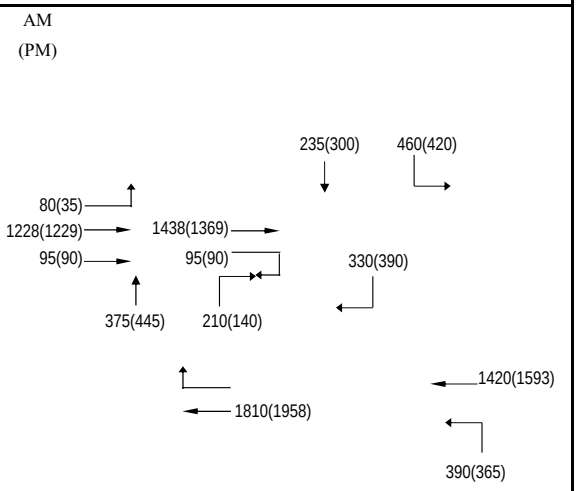
Ho Wang SPB Limited
Traffic & Transportation Consultants

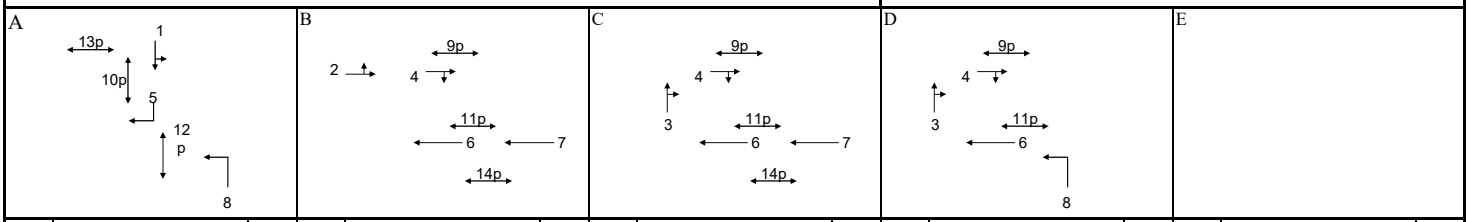
Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Long Yip St / Yuen Long On Lok Rd / Po Yip St	Ref. No.:	J11S
Scheme:	2032 Design Flow (Logistics Use)	Ref. No.:	



Year:	2032	Job No.:	J1358.1	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)





4		3	4		3	4					6						

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 ↓	A	1	3.5								2105	235	0.112		259	0.123	1
1 ↓→	A	1	3.5			18				100 / 83	1945/1970	240	0.123		242	0.123	
1 ↓←	A	1	3.5	1		15					1785	220	0.123	1	219	0.123	1
2 ↑→	B	1	3.0	1		10				26 / 19	1880/1900	663	0.353		643	0.339	
2 →	B	1	3.0								2055	740	0.360	1	711	0.346	1
3 ↑	CD	1	3.5								2105	319	0.151		313	0.149	1
3 ↑→	CD	1	3.5	1			10			79 / 52	1755/1825	266	0.152	1	272	0.149	
4 →	BCD	2	3.3	1							4030	1438	0.357		1369	0.340	
4 ↓←	BCD	1	3.3				10			100	1815	95	0.052		90	0.050	
5 ↓←	A	2	5.0				10			100	3920	330	0.084		390	0.099	
6 ←	BCD	3	3.3								6255	1810	0.289		1958	0.313	
7 ←	BCD	3	3.5							100	6315	1420	0.225		1593	0.252	
8 ↑←	AD	2	3.5			15				100	3825	390	0.102		365	0.095	

Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
9p	BCD		9		10	19				
10p	A		8		9	17				
11p	BCD		10		12	22				
12p	A		8		9	17				
13p	A		8		9	17				
14p	BC		10		12	22				

Practical Y (Ypr):	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

	AM Peak			PM Peak		
Check Critical Phase	1,2,3			1,2,3		
Sum of y values, Y	0.635			0.618		
Lost time, L	21			21		
Cycle Time, C	120	120		120	120	
Practical Y, Y_{pr}	0.743			0.743		
Reserve Capacity, R.C. (%)	17%			20%		

Calculated by:	Date: Sep-2023	Checked by:

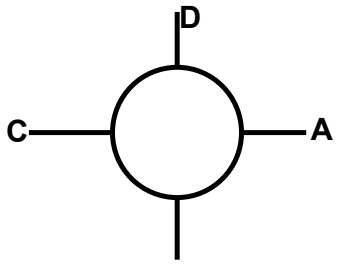
Simplified Roundabout Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Pok Oi Interchange		Ref. No.: J13R
Scheme:	2032 Design Flow (Logistics Use)		Ref. No.:
Year:	2032	Job No.: J1358.1	Rev.: -

AM PM

ARM A: Castle Peak Road Westbound Approach
ARM B: Yuen Long Highway
ARM C: Castle Peak Road Eastbound Approach
ARM D: Route 3



GEOMETRY

ARM	v	e	L	r	D	Phi	S
A	4.00	7.00	18	25	90	65	0.27
B	12.00	23.00	5	25	90	30	3.52
C	3.50	6.50	4	25	90	40	1.20
D	7.00	9.00	5	25	90	30	0.64

AM FLOWS

from \ to	A	B	C	D	Circ	Entry
A					1370	385
B					1390	1465
C					1300	675
D					1885	1000

PM FLOWS

from \ to	A	B	C	D	Circ	Entry
A					1489	340
B					1679	1275
C					1255	660
D					1840	1169

CALCULATIONS

ARM	K	X_2	M	F	t_D	f_c	Q_E AM	Q_E PM	RFC AM	RFC PM
A	0.89	5.96	20.09	1805	1.02	0.47	1030	980	0.37	0.35
B	1.01	13.37	20.09	4051	1.02	0.79	2982	2751	0.49	0.46
C	0.98	4.38	20.09	1328	1.02	0.40	783	801	0.86	0.82
D	1.01	7.88	20.09	2387	1.02	0.55	1356	1381	0.74	0.85

Crtical Arm:	**C**	**D**
RFC:	**0.86**	**0.85**
	AM	**PM**

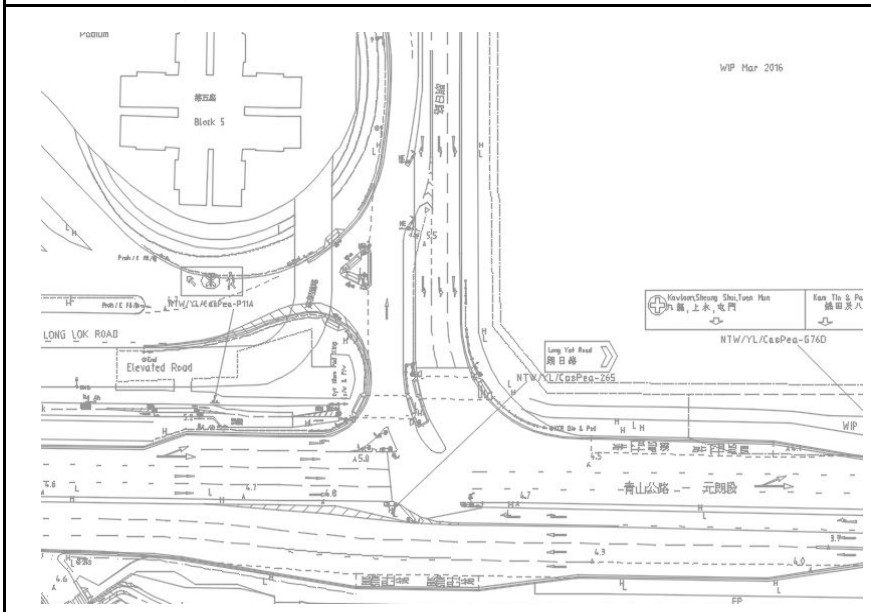
- In accordance with TPDM V2.4

Calculated by:	PY	Date:	Sep-23	Checked by:	TE

Traffic Signal Junction Calculation Sheet

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Agreement No. CE3/2016 (CE) Study on Proposed Multi-storey Building in Yuen Long Area for Brownfield Operations - Feasibility Study		
Junction:	Castle Peak Road - Yuen Long / Long Yat Road	Ref. No.:	J16S
Scheme:	2032 Design Flow (Logistics Use)	Ref. No.:	J47151



Year:	2032	Job No.:	J1358	Rev.:	-

Peak Hour Traffic Flows (pcu/hr)

AM
(PM)

1880(1625)
70(85)
1778(1709)
275(235)
2650(3273)

A	B	C	D	E
7p 6p 1	7p 2 1	5 4	5 6p	

2					3	3					3						
2	22					3					3						

Approach / Phase	Stage	Lane No.	Wide (m)	No. Near	No. Oppo	Rad. L(m)	Rad. R(m)	Grad. (%)	Site Fact.	Turning Pro. (f)	Saturation Flow (pcu/hr)	AM Peak Flow	AM Peak y	AM Peak Crit.	PM Peak Flow	PM Peak y	PM Peak Crit.
1 →	AB	3	3.30								6255	1778	0.284	1	1709	0.273	1
2 ↱	B	1	3.50	1		15				100	1785	70	0.039		85	0.048	
4 ↰	C	1	3.20				25			100	1960	275	0.140		235	0.120	
5 ↳	CD	3	4.20	1		20			0.9	100	5345	1880	0.352	1	1625	0.304	1

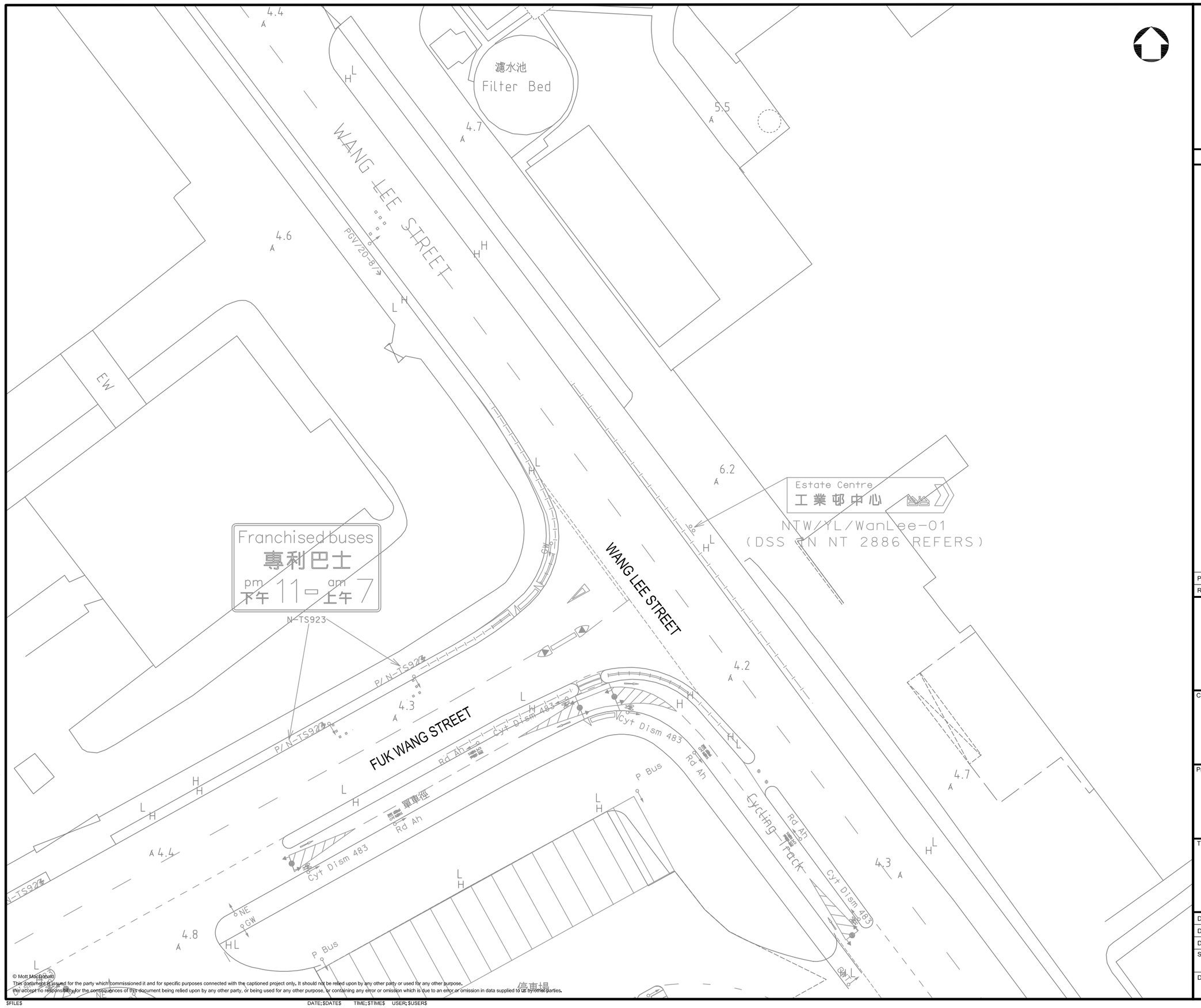
Critical Ped. Phase	Stage	Width Across	Min. GM		Min. FGM	Lost Time	Note	Crit.	Note	Crit.
6p	AD		5		10	15				
7p	AB		5		17	22				

Nearside Lane:	1940 + 100 x (W - 3.25)
Other Lanes:	2080 + 100 x (W - 3.25)
Gradient & Radius:	-42 x (gradient in %)
Opposed Traffic	-230
Turning Proportion:	x 1 / (1 + 1.5 f /R)
Practical Y (Y_{pr}):	0.9 x (1 - L/C)
Reserve Capacity (RC):	(Y_{pr}/Y - 1) x 100%
In accordance with TPDM - Volume 4.2.4	

Check Critical Phase	1,5	7p,5		1,5	7p,5	
Sum of y values, Y	0.636	0.352		0.577	0.304	
Lost time, L	9	29		9	29	
Cycle Time, C	108	108		108	108	
Practical Y, Y_{pr}	0.825	0.658		0.825	0.658	
Reserve Capacity, R.C. (%)	30%	87%		43%	117%	

Calculated by:	Date: Sep-2023	Checked by:

Annex B



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SECTION 16 PLANNING APPLICATION FOR MUTLI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

EXISTING JUNCTION LAYOUT AT FUK WANG STREET / WANG LEE STREET (J1)

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	

Scale at A1	Status	Rev
1 : 500	PRE	P1

Drawing Number

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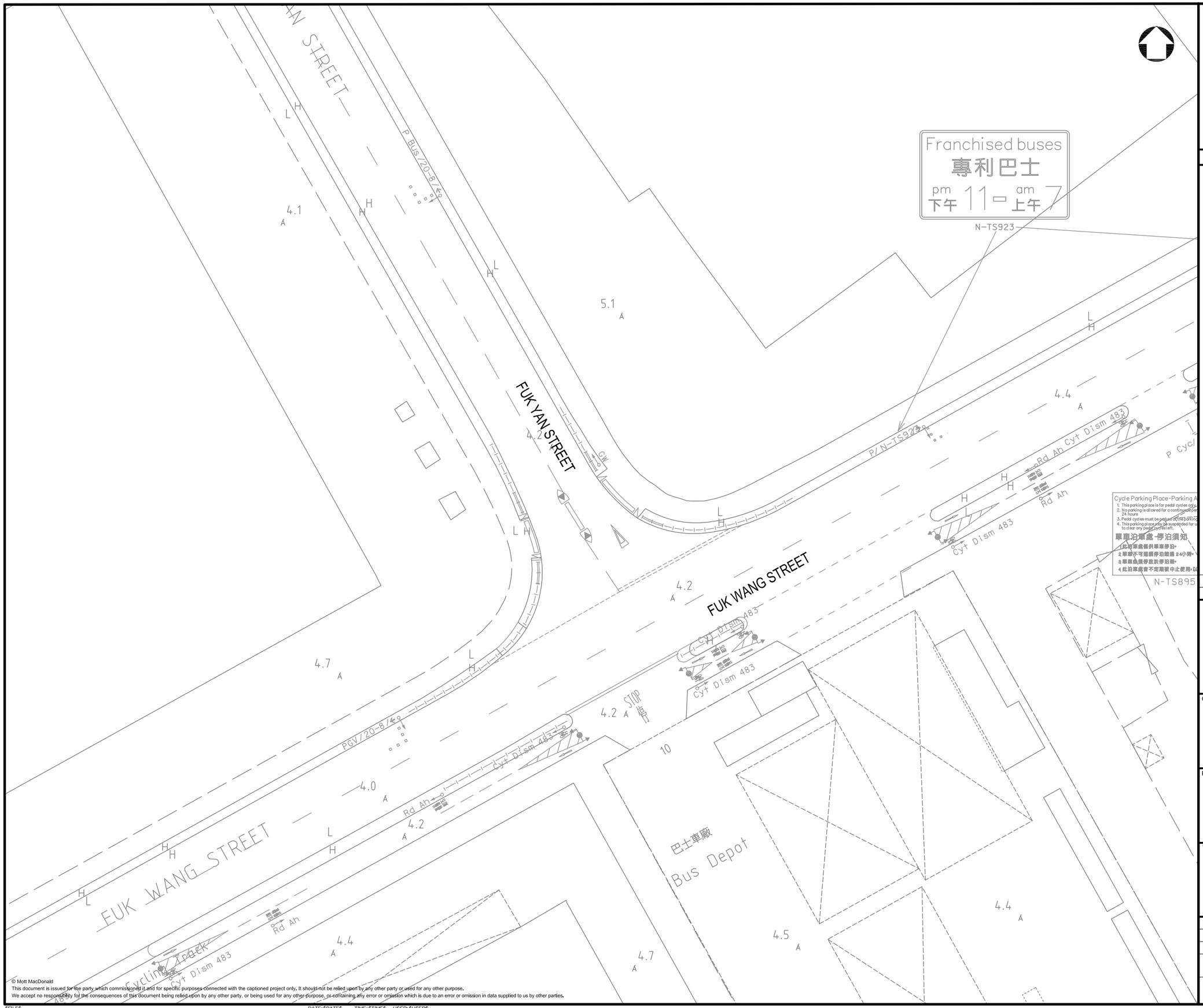

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Title

EXISTING JUNCTION LAYOUT AT FUK WANG STREET / FUK YAN STREET (J2)

Designed	WS		Eng check	TE	
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Dwg check	EW		Approved	EC	
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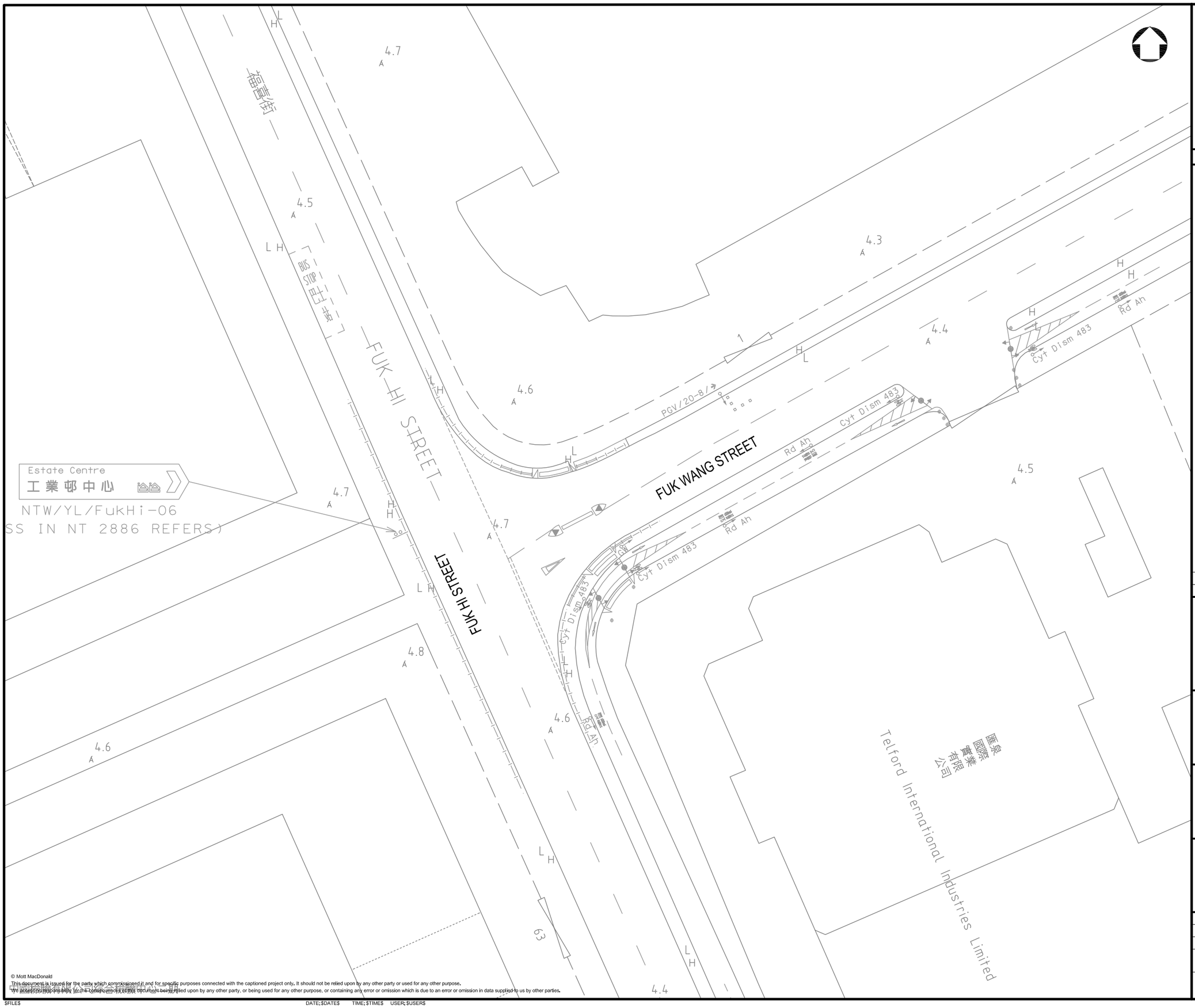

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Title

EXISTING JUNCTION LAYOUT AT FUK WANG STREET / FUK HI STREET (J3)

Designed	WS		Eng check	TE	
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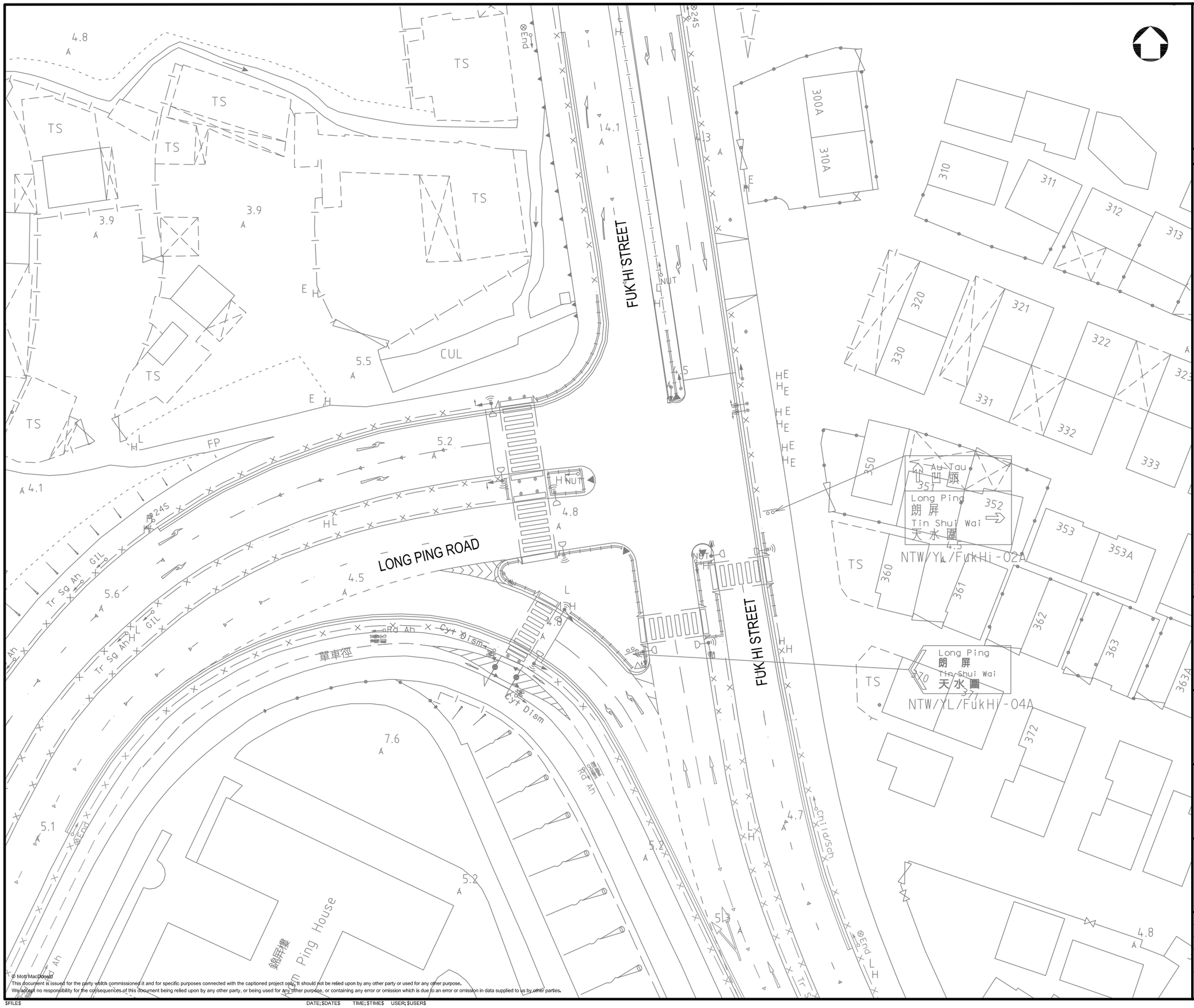

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SECTION 16 PLANNING APPLICATION FOR MUTLI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

EXISTING JUNCTION LAYOUT AT FUK HI STREET / LONG PING ROAD (J4)

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	
Scale at A1	1 : 500	Status	PRE	Rev	P1

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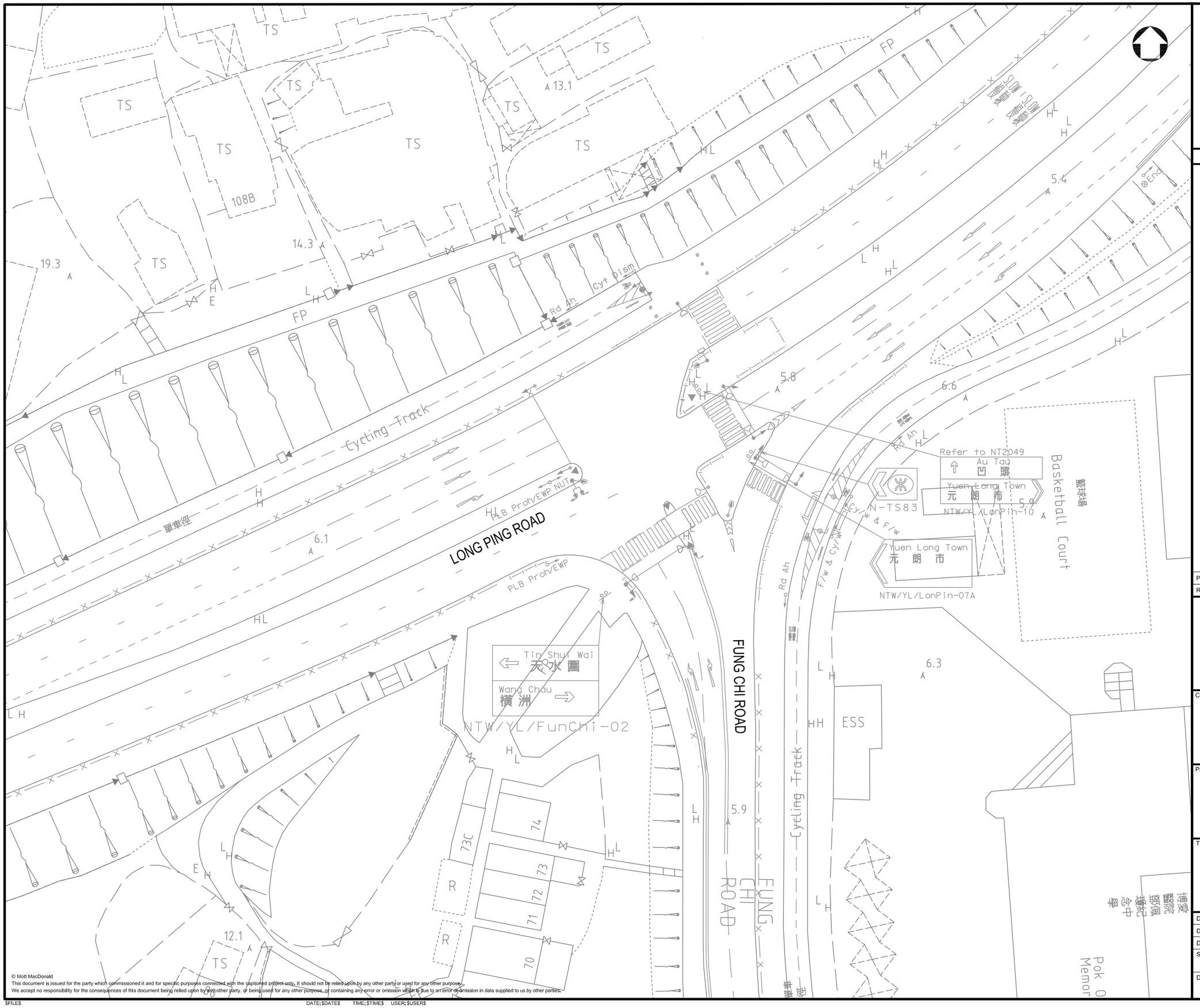

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FOR MUTLI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

EXISTING JUNCTION LAYOUT AT LONG PING ROAD / FUNG CHI ROAD (J5)

Designed	WS		Eng check	TE	
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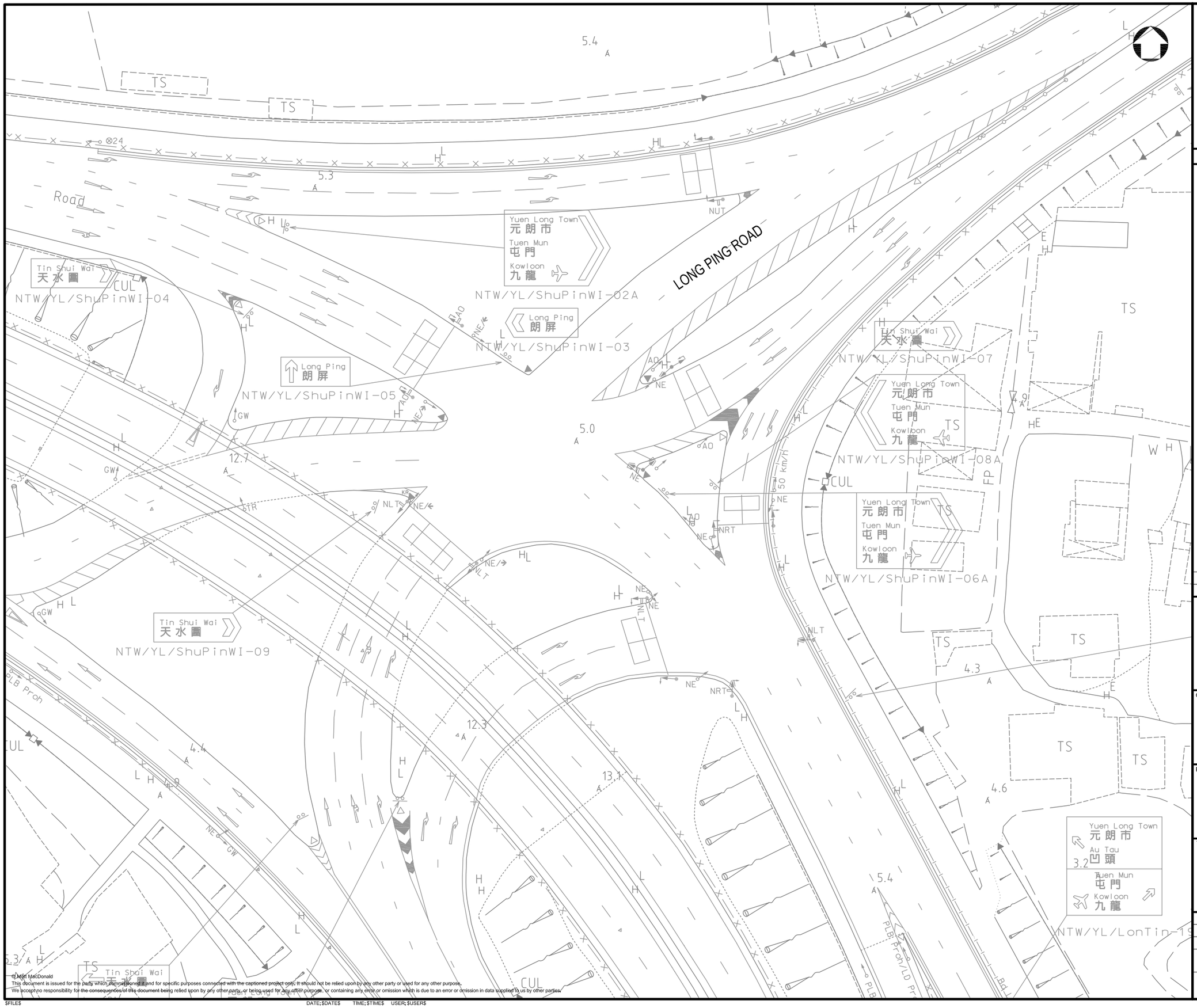

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Title

EXISTING JUNCTION LAYOUT AT SHUI PIN WAI INTERCHANGE (J6)

Designed	WS		Eng check	TE	
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Dwg check	EW		Approved	EC	
Scale at A1	1 : 500	Status	PRE	Rev	P1

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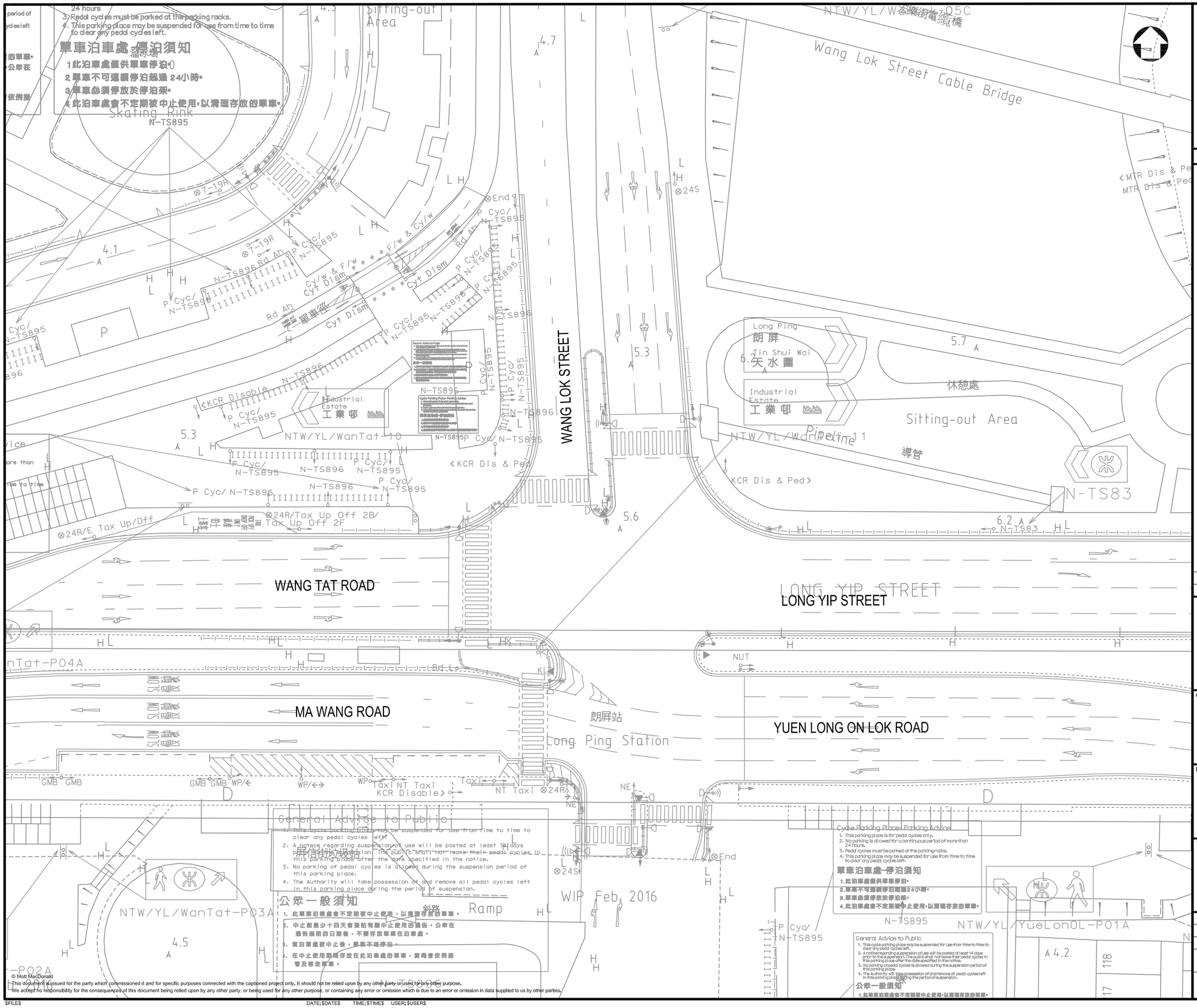

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Title

EXISTING JUNCTION LAYOUT AT YUEN LONG ON LOK ROAD / LONG YIP STREET / WANG LOK STREET / MA WANG ROAD / WANG TAT ROAD (J7)

Designed	WS		Eng check	TE	
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Dwg check	EW		Approved	EC	

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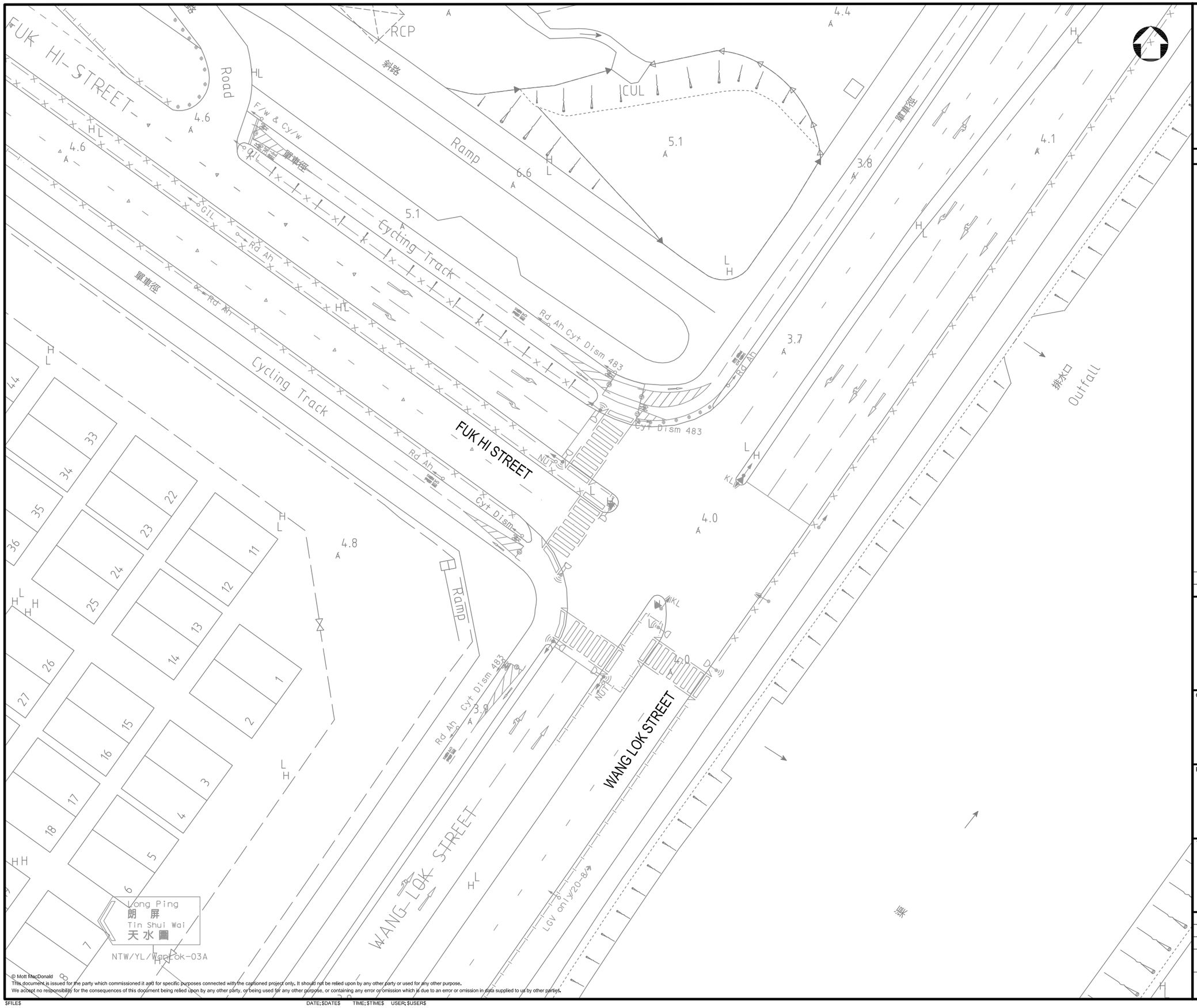

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KEY PLAN

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SECTION 16 PLANNING APPLICATION FOR MUTLI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

EXISTING JUNCTION LAYOUT AT FUK HI STREET / WANG LOK STREET (J8)

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	

Scale at A1	Status	Rev
1 : 500	PRE	P1

Drawing Number

ANNEX B - J8

WANG LOK STREET

FU YIP STREET

KEY PLAN

Rev	Date	Drawn	Description	Ch'k'd	App'd
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Title

EXISTING JUNCTION LAYOUT AT FU YIP STREET / WANG LOK STREET (J9)

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	
Scale at A1	1 : 500	Status	PRE	Rev	P1

Drawing Number

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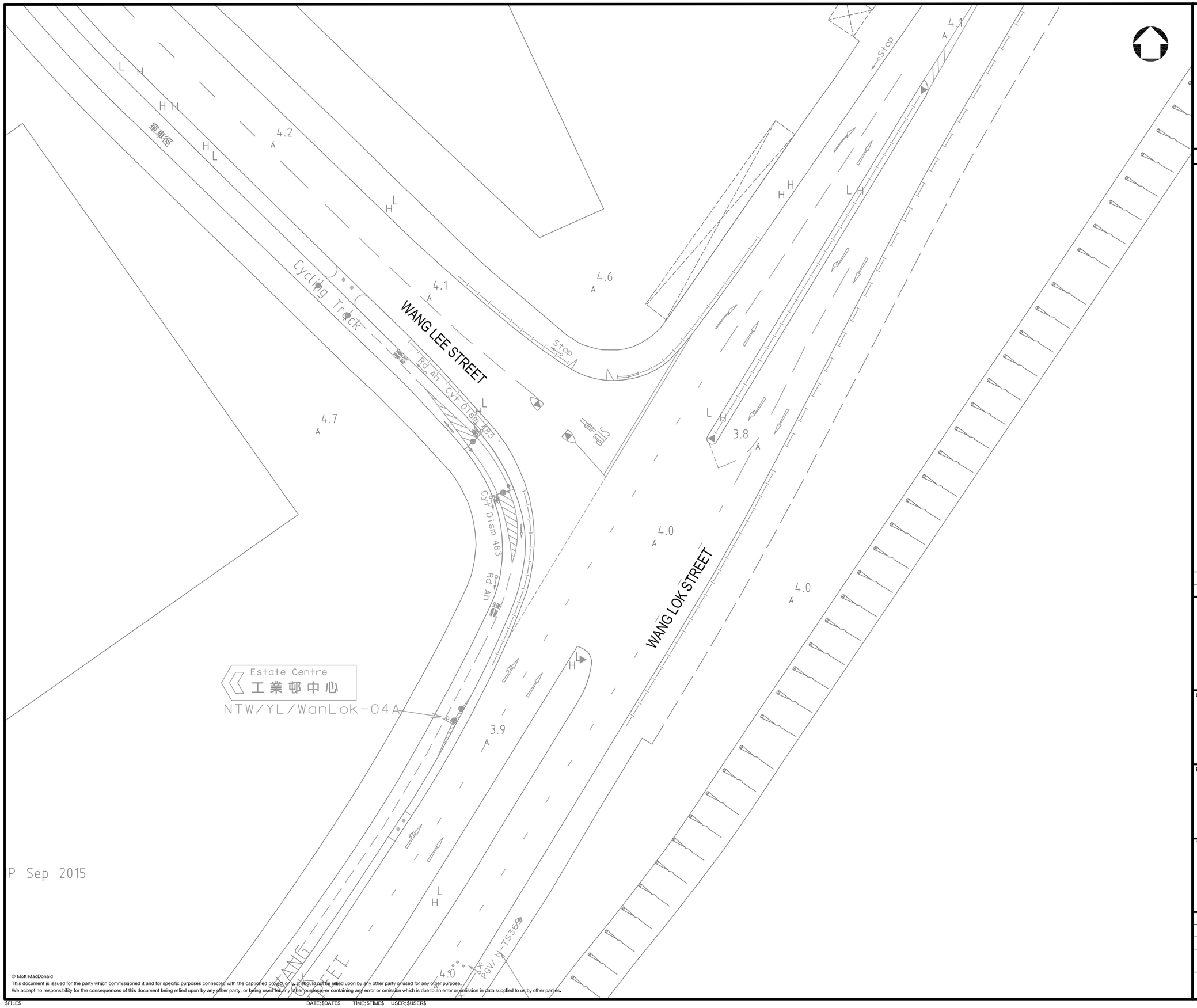

KEY PLAN

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Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MUTLI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

EXISTING JUNCTION LAYOUT AT WANG LOK STREET / WANG LEE STREET (J10)

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
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1 : 500	PRE	P1

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DEVELOPMENTS NEAR YUEN LONG
INDUSTRIAL ESTATE

Title

EXISTING JUNCTION LAYOUT AT ON LOK YIP STREET / YUEN LONG ON LOK ROAD / PO YIP STREET (J11)

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	

Scale at A1	Status	Rev
1 : 500	PRE	P1

Drawing Number

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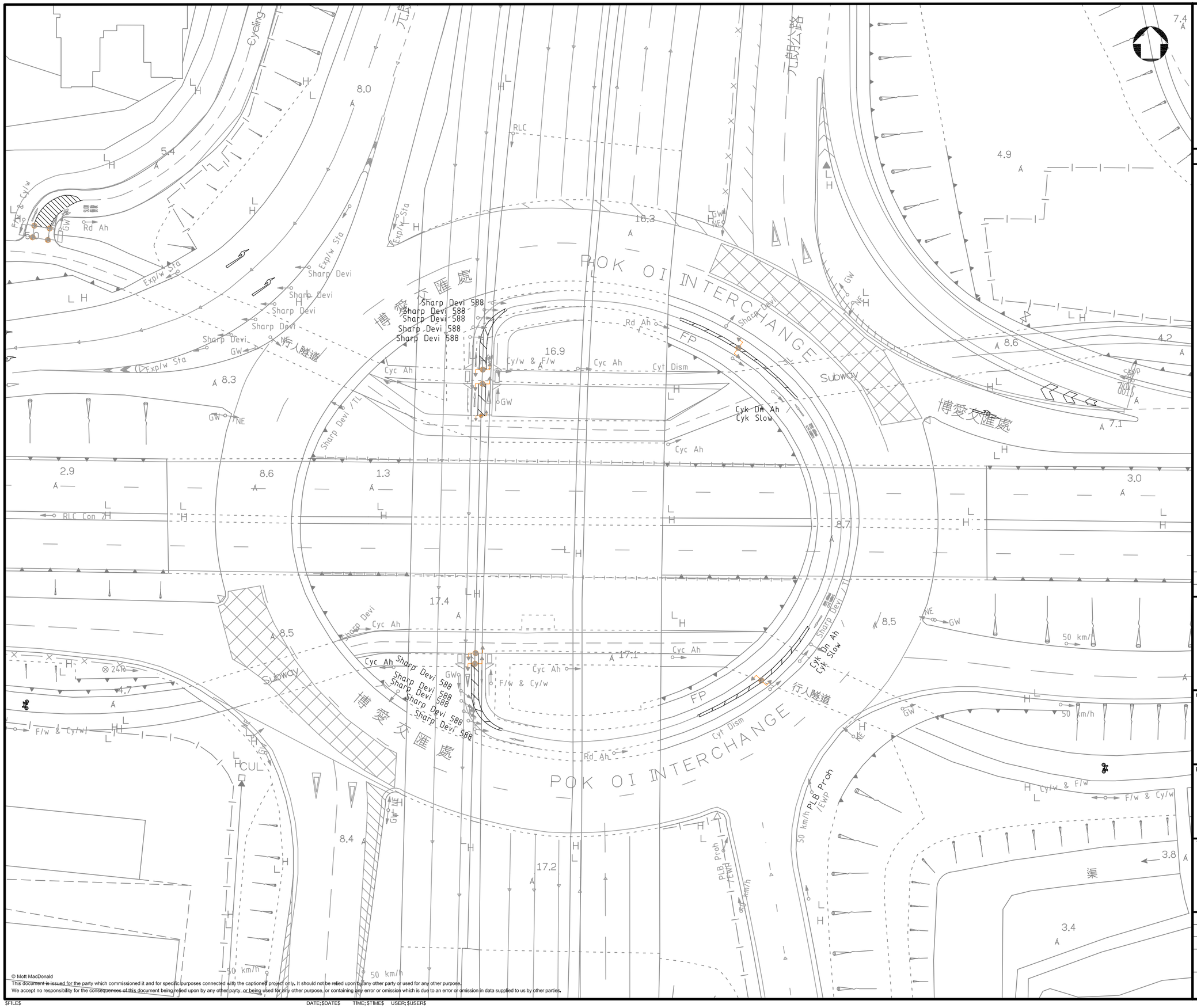

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FOR MUTLI-STOREY BUILDING
DEVELOPMENTS NEAR YUEN LONG
INDUSTRIAL ESTATE

Title

EXISTING JUNCTION LAYOUT AT POK OI INTERCHANGE (J13)

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	

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1 : 500	PRE	P1

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ANNEX B - J13

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唐人新村交匯處

TONG YAN SAN TSUEN INTERCHANGE

Cycling Track

Wetland Park
濕地公園

Yuen Long(W)
Tin Shui Wai(E)
元朗(西)
天水圍(東)
14

Yuen Long(S),Kowloon&Sheung Shui
元朗(南),九龍及上水
9

½km
Tin Shui Wai(W)
Hung Shui Kiu
天水圍(西) 及洪水橋
15

NTW/YL/LonTin-X25B

NTW/YL/LonTin-40A

NTW/YL/LonTin-08A

NTW/YL/Tsuel onH-XG06E

NTW/YL/YuenLongH-XG11E

Yuen Long Town
元朗市
Tin Shui Wai
天水圍

Shum Ha Tsuen
山下村

Bamboo Grove
翠竹園
Yuen Mun
屯門

Nullah

Open Storage
露天貨倉

Length over 12m
長貨車
N-TS26O

Ferry N-TS26EFA

Rd A Reduce Sp

Rd R Reduce Sp

Rd R/S-Rd L

Rd Ah

Rd Ak

Exp Merging Ah 3603

Exp Merging Ah 3604

ExpA43.4R9

ExpB43.4R9

ExpA43.3R9

ExpB43.3R9

ExpA43.2R9

ExpB43.2R9

Sharp Devi 589

50 km/h

60 km/h

No Ped/Cyl/s

PLB Prah

PLB Prah/No Ped/Cyl/s

Exp S/s

Exp End

Entry Slipping Rd

Exit Slipping Rd

Footbridge

FB

PO

FP

TS

CUL

ET

DW/824

DW/824A

DW/824B

DW/824C

DW/824D

DW/824E

DW/824F

DW/824G

DW/824H

DW/824J

DW/824K

DW/824L

DW/824M

DW/824N

DW/824P

DW/824Q

DW/824R

DW/824S

DW/824T

DW/824U

DW/824V

DW/824W

DW/824X

DW/824Y

DW/824Z

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SECTION 16 PLANNING APPLICATION FOR MUTLI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

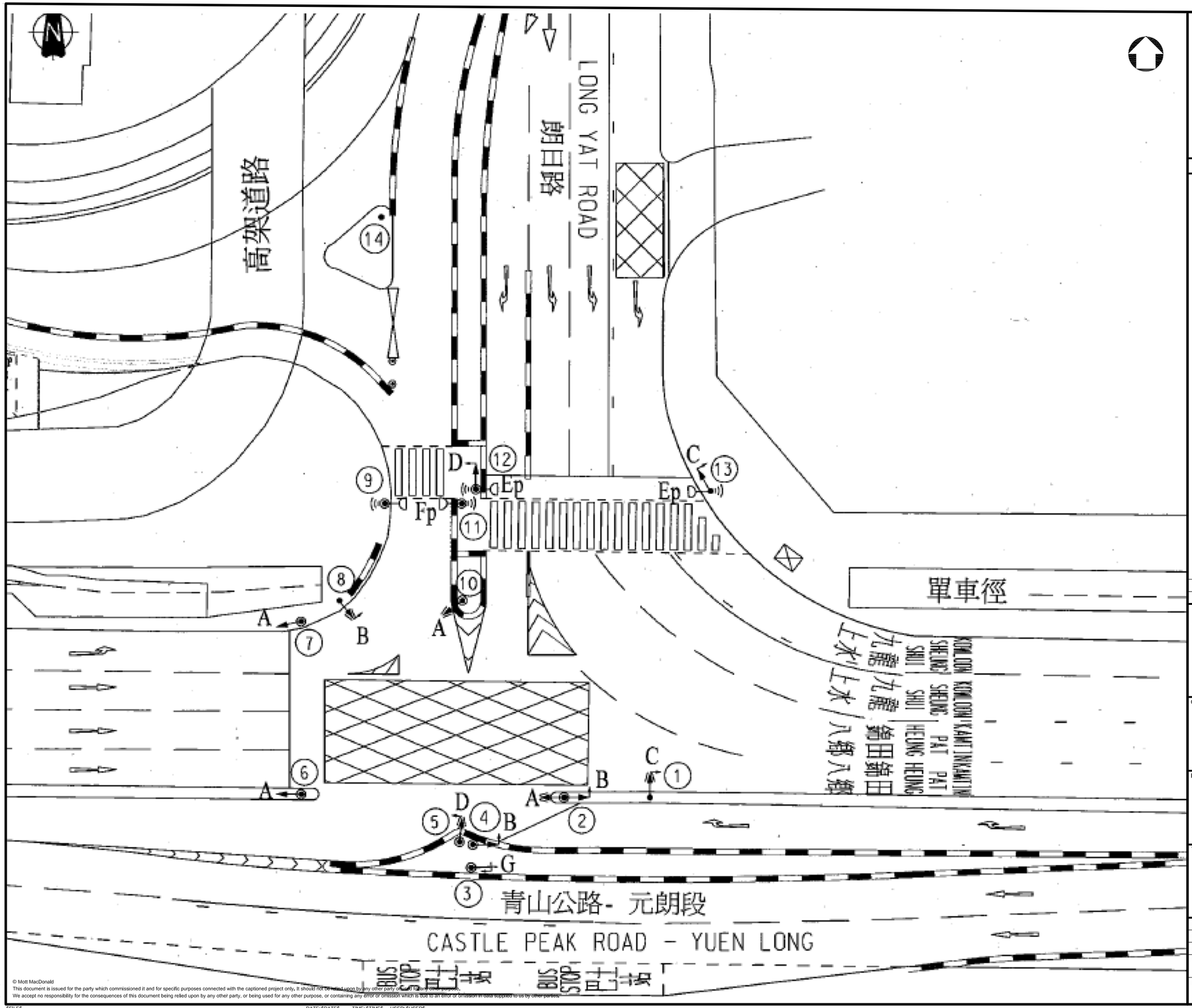
Title

EXISTING JUNCTION LAYOUT AT TONG YAN SAN TSUEN INTERCHANGE (J14)

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	
Scale at A1	1 : 1000	Status	PRE	Rev	P1

Drawing Number

ANNEX B - J14



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Title

EXISTING JUNCTION LAYOUT AT CASTLE PEAK ROAD / LONG YAT ROAD (J16)

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
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Scale at A1	Status	Rev
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Drawing Number

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Annex C

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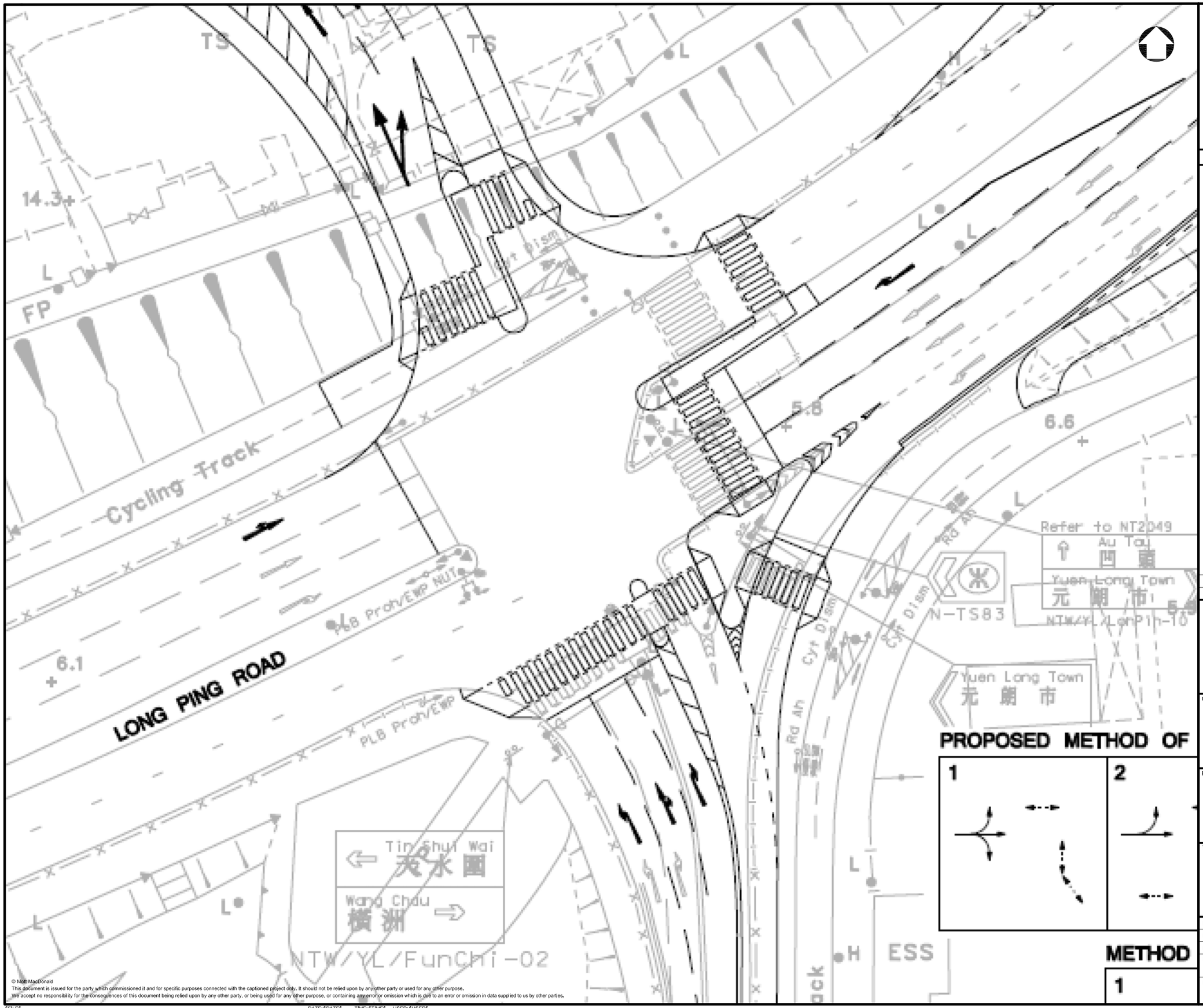

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Title
IMPROVED JUNCTION LAYOUT AT LONG PING ROAD / FUNG CHI ROAD (J5)

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	

Scale at A1	Status	Rev
1 : 500	PRE	P1

Drawing Number
ANNEX C - J5

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Title

IMPROVED JUNCTION LAYOUT AT POK OI INTERCHANGE (J13)

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	

Scale at A1	Status	Rev
1 : 500	PRE	P1

Drawing Number

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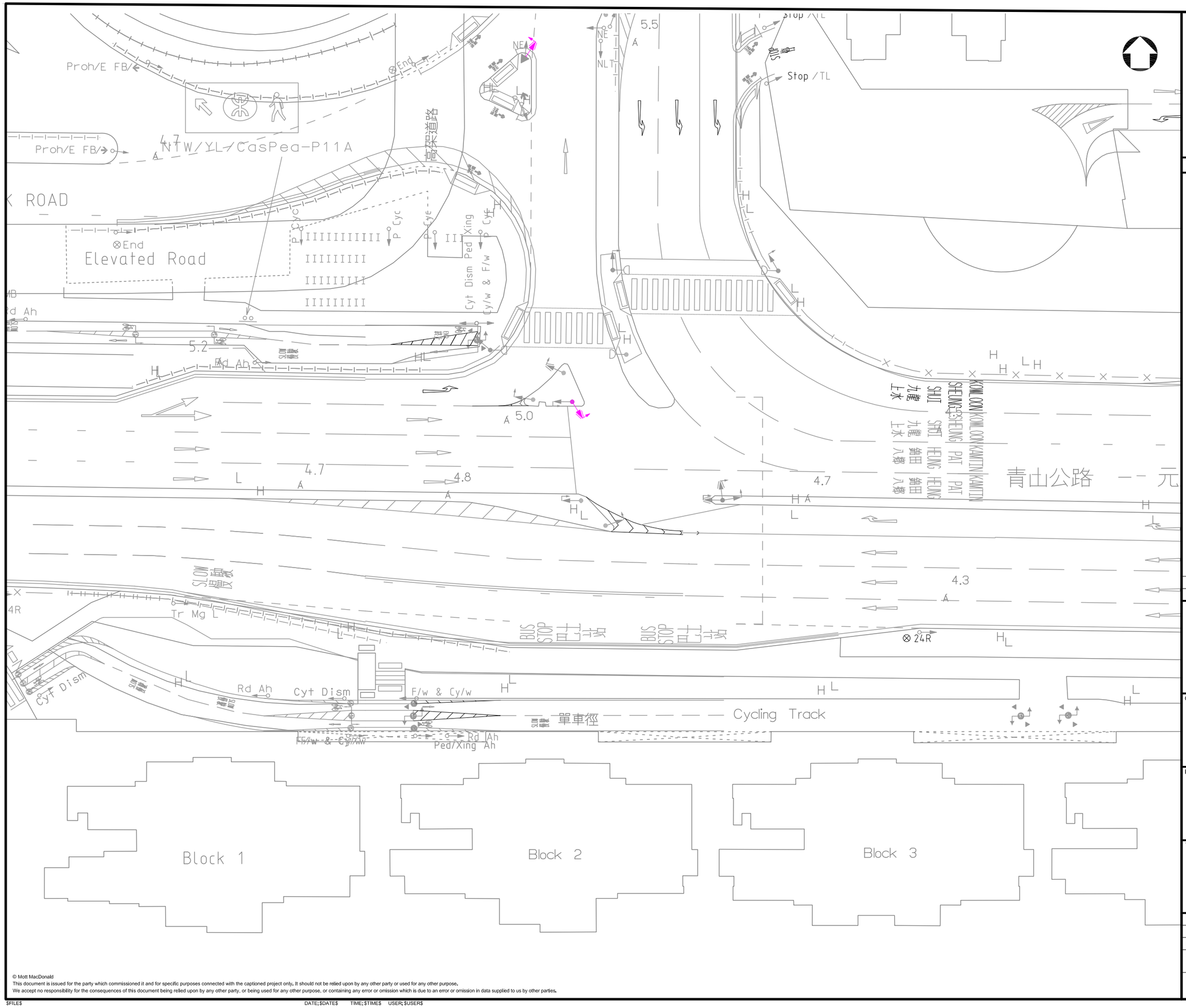

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Title

PLANNED JUNCTION LAYOUT AT CASTLE PEAK ROAD / LONG YAT ROAD (J16)

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	
Scale at A1	1 : 500	Status	PRE	Rev	P1

Drawing Number

ANNEX C - J16

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Proposed Improvements
Schemes from Others

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圖例:
LEGEND:

施工區界限
LIMIT OF WORKS AREA

擬建行車道
PROPOSED CARRIAGEWAY

擬建行人路
PROPOSED FOOTPATH

擬建中央分隔帶 / 安全島
PROPOSED CENTRAL MEDIAN / TRAFFIC ISLAND

擬建行車進出口
PROPOSED VEHICULAR INGRESS AND EGRESS

擬建行人天橋
PROPOSED FOOTBRIDGE

擬建升降機塔連附連樓梯
PROPOSED LIFT TOWER WITH ASSOCIATED STAIRCASE

擬建美化市容地帶
PROPOSED AMENITY AREA

擬建單車徑
PROPOSED CYCLE TRACK

擬建行人過路處
PROPOSED PEDESTRIAN CROSSING

擬建停車灣
PROPOSED LAY-BY

現有斜坡將拆卸並改建為行車道
EXISTING SLOPE TO BE DEMOLISHED AND CONVERTED INTO CARRIAGEWAY

現有斜坡將拆卸並改建為行人路
EXISTING SLOPE TO BE DEMOLISHED AND CONVERTED INTO FOOTPATH

現有斜坡將拆卸並改建為升降機塔連附連樓梯
EXISTING SLOPE TO BE DEMOLISHED AND CONVERTED INTO LIFT TOWER WITH ASSOCIATED STAIRCASE

現有斜坡將拆卸並改建為美化市容地帶
EXISTING SLOPE TO BE DEMOLISHED AND CONVERTED INTO AMENITY AREA

現有斜坡將拆卸並改建為單車徑
EXISTING SLOPE TO BE DEMOLISHED AND CONVERTED INTO CYCLE TRACK

現有行車道將永久封閉並改建為
中央分隔帶/安全島
EXISTING CARRIAGEWAY TO BE PERMANENTLY CLOSED AND CONVERTED INTO CENTRAL MEDIAN / TRAFFIC ISLAND

現有行車道將永久封閉並改建為行人過路處
EXISTING CARRIAGEWAY TO BE PERMANENTLY CLOSED AND CONVERTED INTO PEDESTRIAN CROSSING

現有行人路將永久封閉並改建為行車道
EXISTING FOOTPATH TO BE PERMANENTLY CLOSED AND CONVERTED INTO CARRIAGEWAY

現有行人路將永久封閉並改建為
中央分隔帶/安全島
EXISTING FOOTPATH TO BE PERMANENTLY CLOSED AND CONVERTED INTO CENTRAL MEDIAN / TRAFFIC ISLAND

現有行人路將永久封閉並改建為
升降機塔連附連樓梯
EXISTING FOOTPATH TO BE PERMANENTLY CLOSED AND CONVERTED INTO LIFT TOWER WITH ASSOCIATED STAIRCASE

現有行人路將永久封閉並改建為美化市容地帶
EXISTING FOOTPATH TO BE PERMANENTLY CLOSED AND CONVERTED INTO AMENITY AREA

現有行人路將永久封閉並改建為單車徑
EXISTING FOOTPATH TO BE PERMANENTLY CLOSED AND CONVERTED INTO CYCLE TRACK

現有行人路將永久封閉並改建為行人過路處
EXISTING FOOTPATH TO BE PERMANENTLY CLOSED AND CONVERTED INTO PEDESTRIAN CROSSING

現有行人路將永久封閉並改建為停車灣
EXISTING FOOTPATH TO BE PERMANENTLY CLOSED AND CONVERTED INTO LAY-BY

現有美化市容地帶將永久封閉並改建為行車道
EXISTING AMENITY AREA TO BE PERMANENTLY CLOSED AND CONVERTED INTO CARRIAGEWAY

現有美化市容地帶將永久封閉並改建為行人路
EXISTING AMENITY AREA TO BE PERMANENTLY CLOSED AND CONVERTED INTO FOOTPATH

現有美化市容地帶將永久封閉並改建為單車徑
EXISTING AMENITY AREA TO BE PERMANENTLY CLOSED AND CONVERTED INTO CYCLE TRACK

現有單車徑將永久封閉並改建為行車道
EXISTING CYCLE TRACK TO BE PERMANENTLY CLOSED AND CONVERTED INTO CARRIAGEWAY

現有單車徑將永久封閉並改建為美化市容地帶
EXISTING CYCLE TRACK TO BE PERMANENTLY CLOSED AND CONVERTED INTO AMENITY AREA

現有行車道將暫時封閉及重建
EXISTING CARRIAGEWAY TO BE TEMPORARILY CLOSED AND RECONSTRUCTED

現有行人路將暫時封閉及重建
EXISTING FOOTPATH TO BE TEMPORARILY CLOSED AND RECONSTRUCTED

現有單車徑將暫時封閉及重建
EXISTING CYCLE TRACK TO BE TEMPORARILY CLOSED AND RECONSTRUCTED

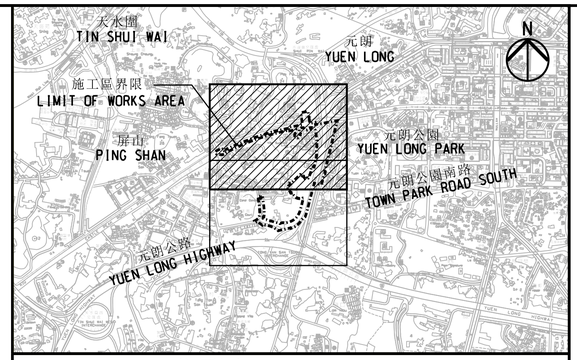
現有斜坡將被重建
EXISTING SLOPE TO BE RECONSTRUCTED

擬建護土牆
PROPOSED RETAINING WALL

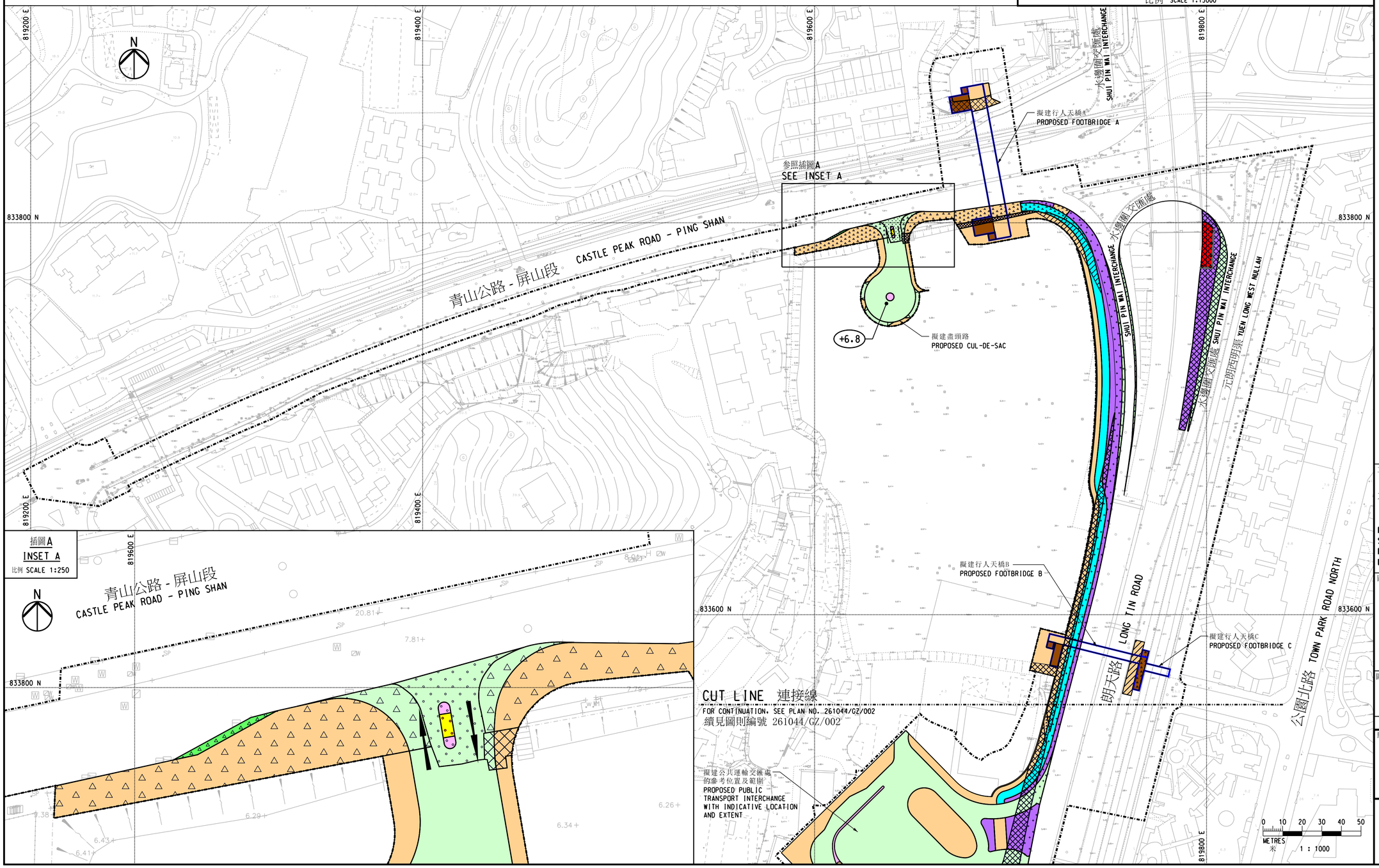
擬建隔音屏障
PROPOSED NOISE BARRIER

建議水平(約數)
PROPOSED LEVEL (APPROXIMATELY)

行車線
(每一箭咀代表一條行車線)
TRAFFIC LANE
(ONE ARROW REPRESENTS ONE LANE)



位置圖 LOCATION PLAN
比例 SCALE 1:15000



插圖A
INSET A
比例 SCALE 1:250

註釋:
NOTES:

1. 除在其他方面指定外,所有量度以米為單位。
ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. 所有水平均為約數,以米為單位,並在香港主水平基準上。
ALL LEVELS ARE APPROXIMATE VALUES AND IN METRES ABOVE HONG KONG PRINCIPAL DATUM.
3. 如有需要,施工區界限內部分現有行車道,行人路,中央分隔帶/安全島,美化市容地帶和單車徑或會分階段暫時封閉。
SECTIONS OF THE EXISTING CARRIAGEWAYS, FOOTPATHS, CENTRAL MEDIANS/TRAFFIC ISLANDS, AMENITY AREAS AND CYCLE TRACKS WITHIN THE LIMIT OF WORKS AREA MAY BE TEMPORARILY CLOSED IN PHASES AS AND WHEN REQUIRED.

工程名稱 PROJECT TITLE
工務計劃項目第B810CL號
元朗朗邊公營房屋發展之工地平整及基礎設施工程
道路工程
ROAD WORKS UNDER PWP ITEM NO.B810CL
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENTS AT LONG BIN, YUEN LONG

圖則名稱 PLAN TITLE
根據《道路(工程、使用及補償)條例》(第370章)而在憲報公布的圖則
(二張之第一張)
PLAN FOR GAZETTING UNDER ROADS (WORKS, USE AND COMPENSATION) ORDINANCE (CHAPTER 370)
(SHEET 1 OF 2)

圖則編號 PLAN NO. 261044/GZ/001
比例 SCALE 1:1000

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HOUSING PROJECTS 2 DIVISION
土木工程處
CIVIL ENGINEERING OFFICE

CEDD 土木工程拓展署
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

圖例:
LEGEND:

- 施工區界限 LIMIT OF WORKS AREA
- 擬建行車道 PROPOSED CARRIAGEWAY
- 擬建行人路 PROPOSED FOOTPATH
- 擬建中央分隔帶 / 安全島 PROPOSED CENTRAL MEDIAN / TRAFFIC ISLAND
- 擬建行車進出口 PROPOSED VEHICULAR INGRESS AND EGRESS
- 擬建行人天橋 PROPOSED FOOTBRIDGE
- 擬建升降機塔連附連樓梯 PROPOSED LIFT TOWER WITH ASSOCIATED STAIRCASE
- 擬建美化市容地帶 PROPOSED AMENITY AREA
- 擬建單車徑 PROPOSED CYCLE TRACK
- 擬建行人過路處 PROPOSED PEDESTRIAN CROSSING
- 擬建停車灣 PROPOSED LAY-BY
- 現有斜坡將拆卸並改建為行車道 EXISTING SLOPE TO BE DEMOLISHED AND CONVERTED INTO CARRIAGEWAY
- 現有斜坡將拆卸並改建為行人路 EXISTING SLOPE TO BE DEMOLISHED AND CONVERTED INTO FOOTPATH
- 現有斜坡將拆卸並改建為升降機塔連附連樓梯 EXISTING SLOPE TO BE DEMOLISHED AND CONVERTED INTO LIFT TOWER WITH ASSOCIATED STAIRCASE
- 現有斜坡將拆卸並改建為美化市容地帶 EXISTING SLOPE TO BE DEMOLISHED AND CONVERTED INTO AMENITY AREA
- 現有斜坡將拆卸並改建為單車徑 EXISTING SLOPE TO BE DEMOLISHED AND CONVERTED INTO CYCLE TRACK
- 現有行車道將永久封閉並改建為中央分隔帶/安全島 EXISTING CARRIAGEWAY TO BE PERMANENTLY CLOSED AND CONVERTED INTO CENTRAL MEDIAN / TRAFFIC ISLAND
- 現有行車道將永久封閉並改建為行人過路處 EXISTING CARRIAGEWAY TO BE PERMANENTLY CLOSED AND CONVERTED INTO PEDESTRIAN CROSSING
- 現有行人路將永久封閉並改建為行車道 EXISTING FOOTPATH TO BE PERMANENTLY CLOSED AND CONVERTED INTO CARRIAGEWAY
- 現有行人路將永久封閉並改建為中央分隔帶/安全島 EXISTING FOOTPATH TO BE PERMANENTLY CLOSED AND CONVERTED INTO CENTRAL MEDIAN / TRAFFIC ISLAND
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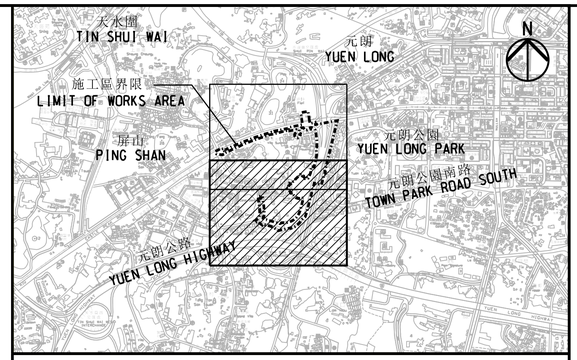
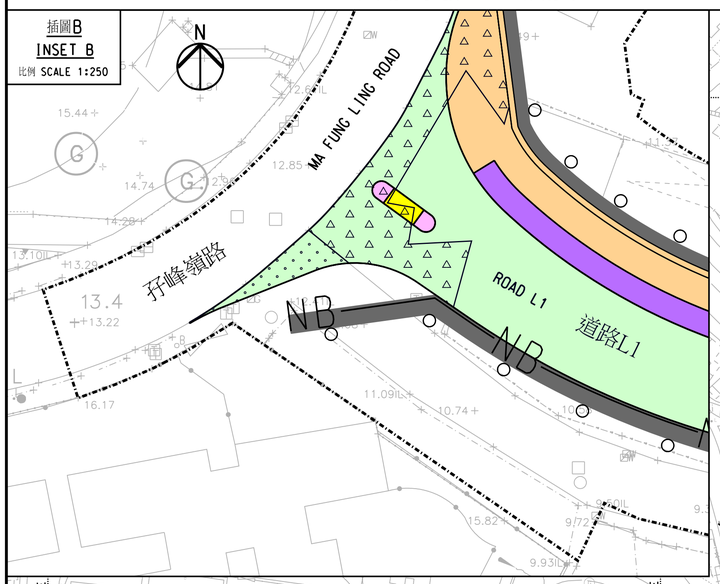
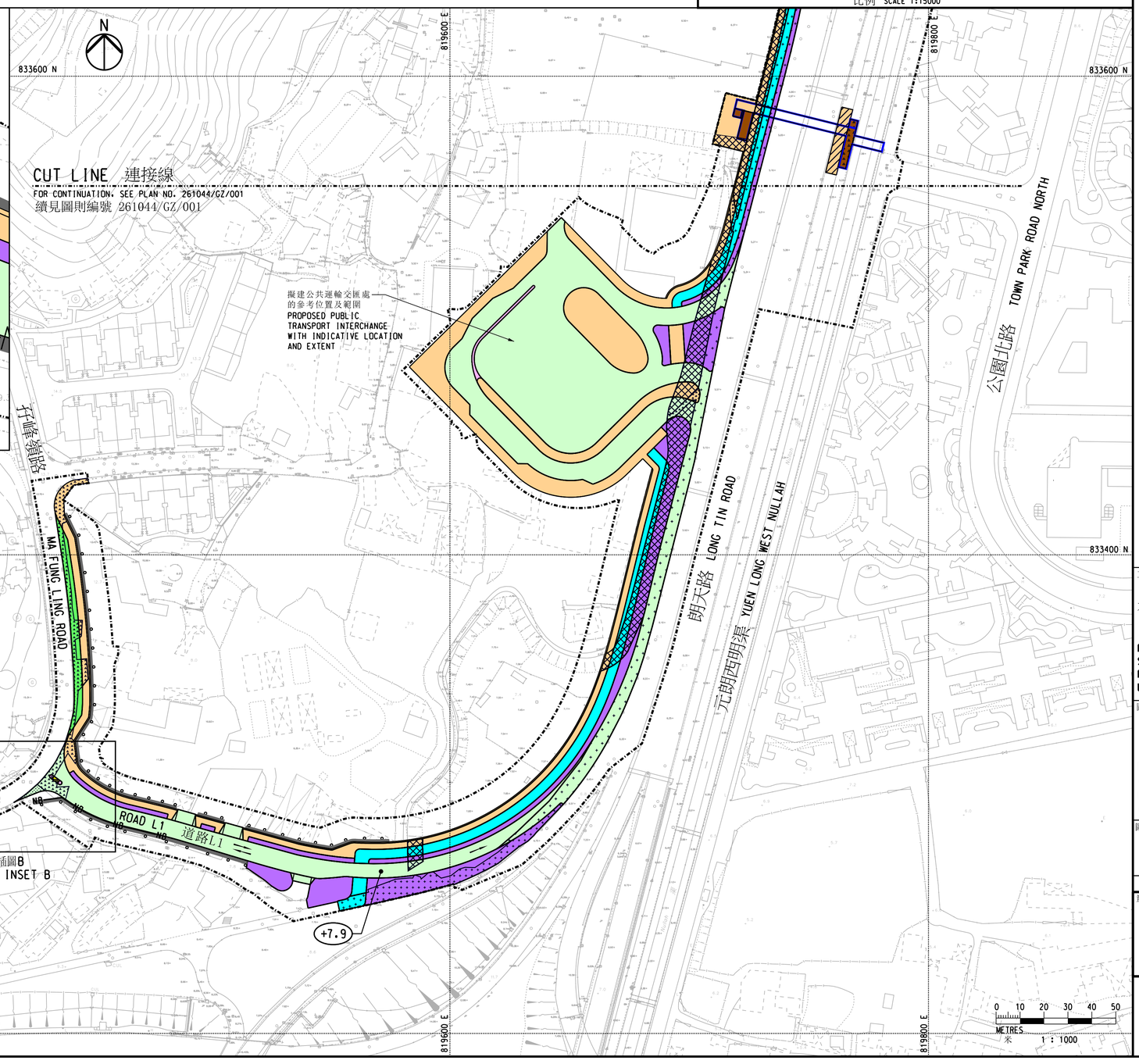
- 現有行人路將永久封閉並改建為行人過路處 EXISTING FOOTPATH TO BE PERMANENTLY CLOSED AND CONVERTED INTO PEDESTRIAN CROSSING
- 現有行人路將永久封閉並改建為停車灣 EXISTING FOOTPATH TO BE PERMANENTLY CLOSED AND CONVERTED INTO LAY-BY
- 現有美化市容地帶將永久封閉並改建為行車道 EXISTING AMENITY AREA TO BE PERMANENTLY CLOSED AND CONVERTED INTO CARRIAGEWAY
- 現有美化市容地帶將永久封閉並改建為行人路 EXISTING AMENITY AREA TO BE PERMANENTLY CLOSED AND CONVERTED INTO FOOTPATH
- 現有美化市容地帶將永久封閉並改建為單車徑 EXISTING AMENITY AREA TO BE PERMANENTLY CLOSED AND CONVERTED INTO CYCLE TRACK
- 現有單車徑將永久封閉並改建為行車道 EXISTING CYCLE TRACK TO BE PERMANENTLY CLOSED AND CONVERTED INTO CARRIAGEWAY
- 現有單車徑將永久封閉並改建為美化市容地帶 EXISTING CYCLE TRACK TO BE PERMANENTLY CLOSED AND CONVERTED INTO AMENITY AREA
- 現有行車道將暫時封閉及重建 EXISTING CARRIAGEWAY TO BE TEMPORARILY CLOSED AND RECONSTRUCTED
- 現有行人路將暫時封閉及重建 EXISTING FOOTPATH TO BE TEMPORARILY CLOSED AND RECONSTRUCTED
- 現有單車徑將暫時封閉及重建 EXISTING CYCLE TRACK TO BE TEMPORARILY CLOSED AND RECONSTRUCTED
- 現有斜坡將被重建 EXISTING SLOPE TO BE RECONSTRUCTED
- 擬建護土牆 PROPOSED RETAINING WALL
- NB 擬建隔音屏障 PROPOSED NOISE BARRIER
- +6.5 建議水平(約數) PROPOSED LEVEL (APPROXIMATELY)
- 行車線 (每一箭咀代表一條行車線) TRAFFIC LANE (ONE ARROW REPRESENTS ONE LANE)



位置圖 LOCATION PLAN
比例 SCALE 1:15000

插圖B
INSET B
比例 SCALE 1:250





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工程名稱 PROJECT TITLE
工務計劃項目第B810CL號
元朗朗邊公營房屋發展之工地平整及基礎設施工程
道路工程
ROAD WORKS UNDER PWP ITEM NO.B810CL SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENTS AT LONG BIN, YUEN LONG

圖則名稱 PLAN TITLE
根據《道路(工程、使用及補償)條例》(第370章)而在憲報公布的圖則
(二張之第二張)
PLAN FOR GAZETTING UNDER ROADS (WORKS, USE AND COMPENSATION) ORDINANCE (CHAPTER 370) (SHEET 2 OF 2)

圖則編號 PLAN NO. 261044/GZ/002
比例 SCALE 1:1000

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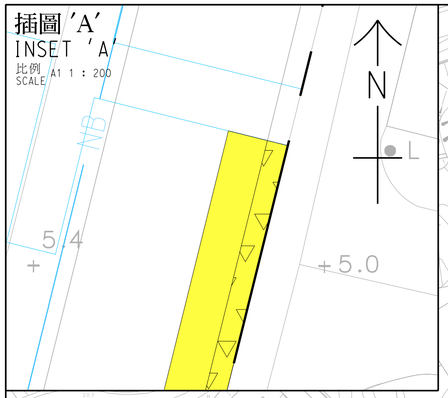
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

插圖 'A'
INSET 'A'
比例 SCALE A1 1 : 200



819600 E

819800 E

833600 N

833400 N

由工務計劃項目第6832TH號-朗天路加建
隔音屏障工程興建中的直立式隔音屏障
(只供提示用途)
VERTICAL NOISE BARRIER UNDER CONSTRUCTION BY PWP ITEM NO. 6832TH - RETROFITTING OF NOISE BARRIERS ON LONG TIN ROAD (FOR INDICATIVE PURPOSE ONLY)

由工務計劃項目第B810CL號-元朗朗邊工
營房屋發展之工地平整及基礎設施工程
將會興建的行人天橋
(只供提示用途)
FOOTBRIDGE TO BE CONSTRUCTED UNDER PWP ITEM NO. B810CL-SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT AT LONG BIN, YUEN LONG (FOR INDICATIVE PURPOSE ONLY)

朗天路 LONG TIN ROAD

公園北路 TOWN PARK ROAD NORTH

參看插圖 'A'
SEE INSET 'A'

朗天路
LONG TIN ROAD

由工務計劃項目第B810CL號-元朗朗邊工
營房屋發展之工地平整及基礎設施工程
將會興建的公共運輸交匯處
(只供提示用途)
PUBLIC TRANSPORT INTERCHANGE TO BE CONSTRUCTED UNDER PWP ITEM NO. B810CL-SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT AT LONG BIN, YUEN LONG (FOR INDICATIVE PURPOSE ONLY)

由工務計劃項目第6832TH號-朗天路加建
隔音屏障工程興建中的懸臂式隔音屏障
(只供提示用途)
CANTILEVER NOISE BARRIER UNDER CONSTRUCTION BY PWP ITEM NO. 6832TH - RETROFITTING OF NOISE BARRIERS ON LONG TIN ROAD (FOR INDICATIVE PURPOSE ONLY)

由工務計劃項目第B810CL號-元朗朗邊工
營房屋發展之工地平整及基礎設施工程
將會興建的行車道、單車徑及行人路
(只供提示用途)
CARRIAGEWAY, CYCLE TRACK AND FOOTPATH TO BE CONSTRUCTED UNDER PWP ITEM NO. B810CL-SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENT AT LONG BIN, YUEN LONG (FOR INDICATIVE PURPOSE ONLY)

山下路 SHAN HA ROAD

由工務計劃項目第6832TH號-朗天路加建隔音屏障
工程興建中的懸臂式隔音屏障將予取代
CANTILEVER NOISE BARRIER BEING CONSTRUCTED UNDER PWP ITEM NO. 6832TH - RETROFITTING OF NOISE BARRIERS ON LONG TIN ROAD TO BE REPLACED

孖峰嶺路
MA FUNG LING ROAD

現有橫跨元朗西明渠的行人天橋
EXISTING FOOTBRIDGE ACROSS YUEN LONG WEST NULLAH

CUT LINE B - B 連接線 B - B
PLAN NO. 60566218/GAZ/103
圖則編號 60566218/GAZ/103

註釋:
NOTES:

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4. 如有需要，斜坡穩固工程或會在施工區界限之內進行。
   SLOPE STABILIZATION WORKS MAY BE CARRIED OUT WITHIN THE LIMIT OF WORKS AREA AS AND WHEN REQUIRED.

工程名稱 PROJECT TITLE
工務計劃項目第 7817CL 號及
第 7827CL 號（部分）
元朗南發展第一階段工程
及第二階段工程第一期的道路工程

PWP ITEM NOS. 7817CL AND 7827CL (PART)
ROAD WORKS UNDER
YUEN LONG SOUTH DEVELOPMENT STAGE 1
WORKS AND STAGE 2 WORKS, PHASE 1

圖則名稱 PLAN TITLE
根據<<道路(工程、使用及補償)條例>>
(第370章)而在憲報公布之圖則
PLANS FOR GAZETTING UNDER ROADS (WORKS, USE AND COMPENSATION) ORDINANCE (CHAPTER 370)
十二張之第二張 SHEET 2 OF 12

圖則編號 PLAN NO. 60566218/GAZ/102
比例 SCALE A1 1 : 1000

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WEST DEVELOPMENT OFFICE

CEDD 土木工程拓展署
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

註釋:
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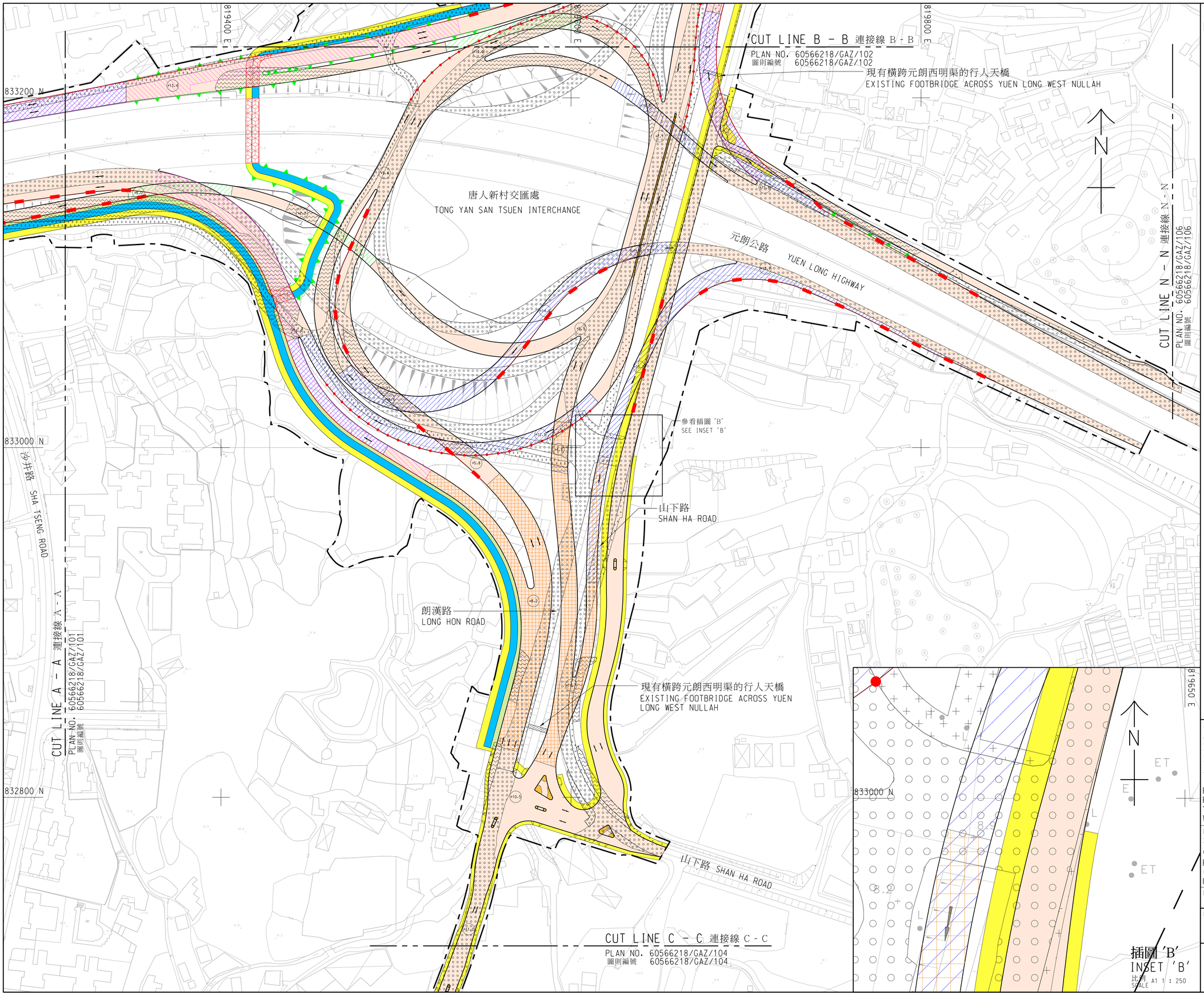

工程名稱 PROJECT TITLE

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(WORKS, USE AND COMPENSATION)
ORDINANCE (CHAPTER 370)

十二張之第三張
SHEET 3 OF 12

圖則編號 PLAN NO.	比例 SCALE
60566218/GAZ/103	A1 1 : 1000

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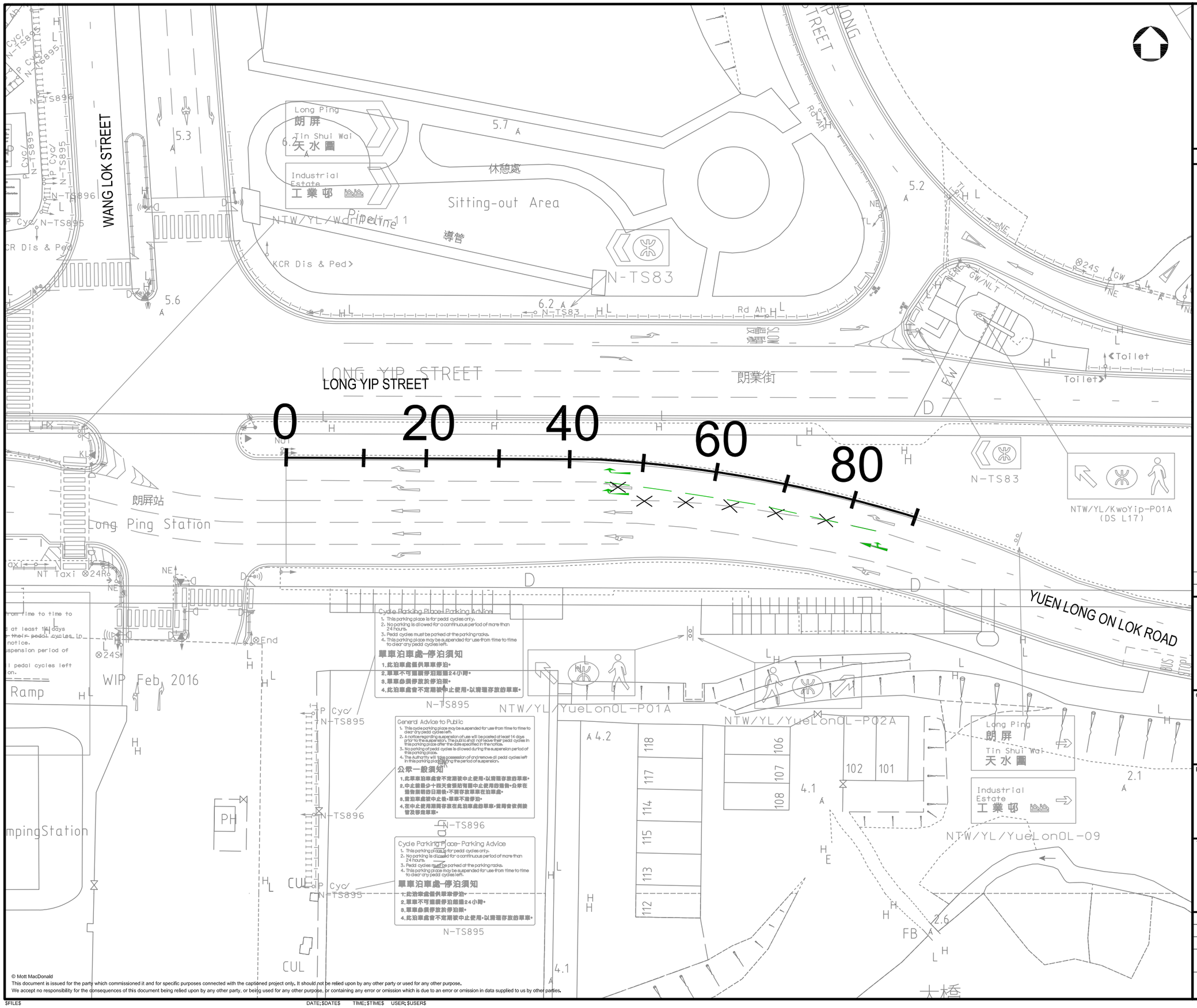

KEY PLAN

PROPOSED ROAD MARKING

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 22	EW	FIRST ISSUE	KS	SHC

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Client

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Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MUTLI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

PROPOSED MODIFICATION AT YUEN LONG ON LOK ROAD / LONG YIP STREET / WANG LOK STREET / MA WANG ROAD / WANG TAT ROAD (J7)

Designed	WS		Eng check	TE	
Drawn	BC		Coordination	--	
Dwg check	EW		Approved	EC	
Scale at A1	1 : 500	Status	PRE	Rev	P2

Drawing Number

R TO C - J7 (IMP)

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Y:\Job\J1358.1 MSB in Yuen Long\05-Figures\J1358.1-Tex002-I1-Annex-C3.dwg, A3 2000, 1:1

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Annex D

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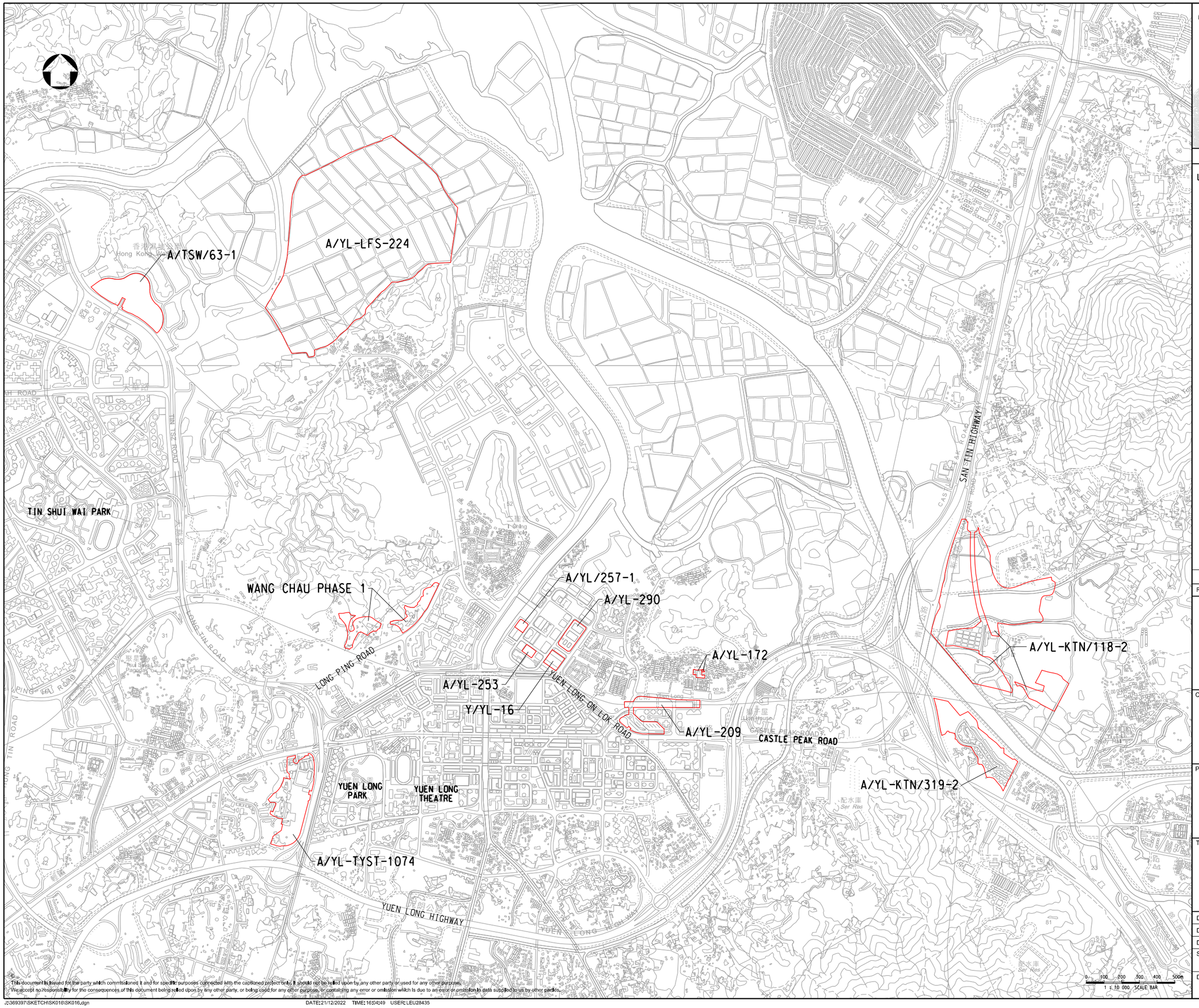

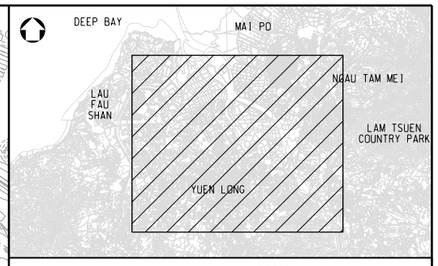

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LEGEND:

NEW DEVELOPMENT

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	DEC 2022	HK	FIRST ISSUE	ET	SHC

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AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

Title

NEW DEVELOPMENTS IN YUEN LONG

Designed	AL		Eng check	KS	
Drawn	HL		Coordination	KS	
Dwg check	EL		Approved	SHC	
Scale at A1	1:10000	Status	PRE	Rev	P1
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Section 16 Planning Application for Multi-storey Building Developments at No. 32 Wang Lee Street and Adjoining Government Land, Yuen Long

Environmental Assessment

September 2023

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Section 16 Planning Application for Multi-storey Building Developments at No. 32 Wang Lee Street and Adjoining Government Land, Yuen Long

Environmental Assessment

September 2023

Mott MacDonald Hong Kong Limited
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Issue and Revision Record

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B	Feb 2023	Various	KS Li	S H Ching	Final Submission
C	Sep 2023	Various	KS Li	S H Ching	Revised Final Submission

Document reference: 369397 | 01B | C |

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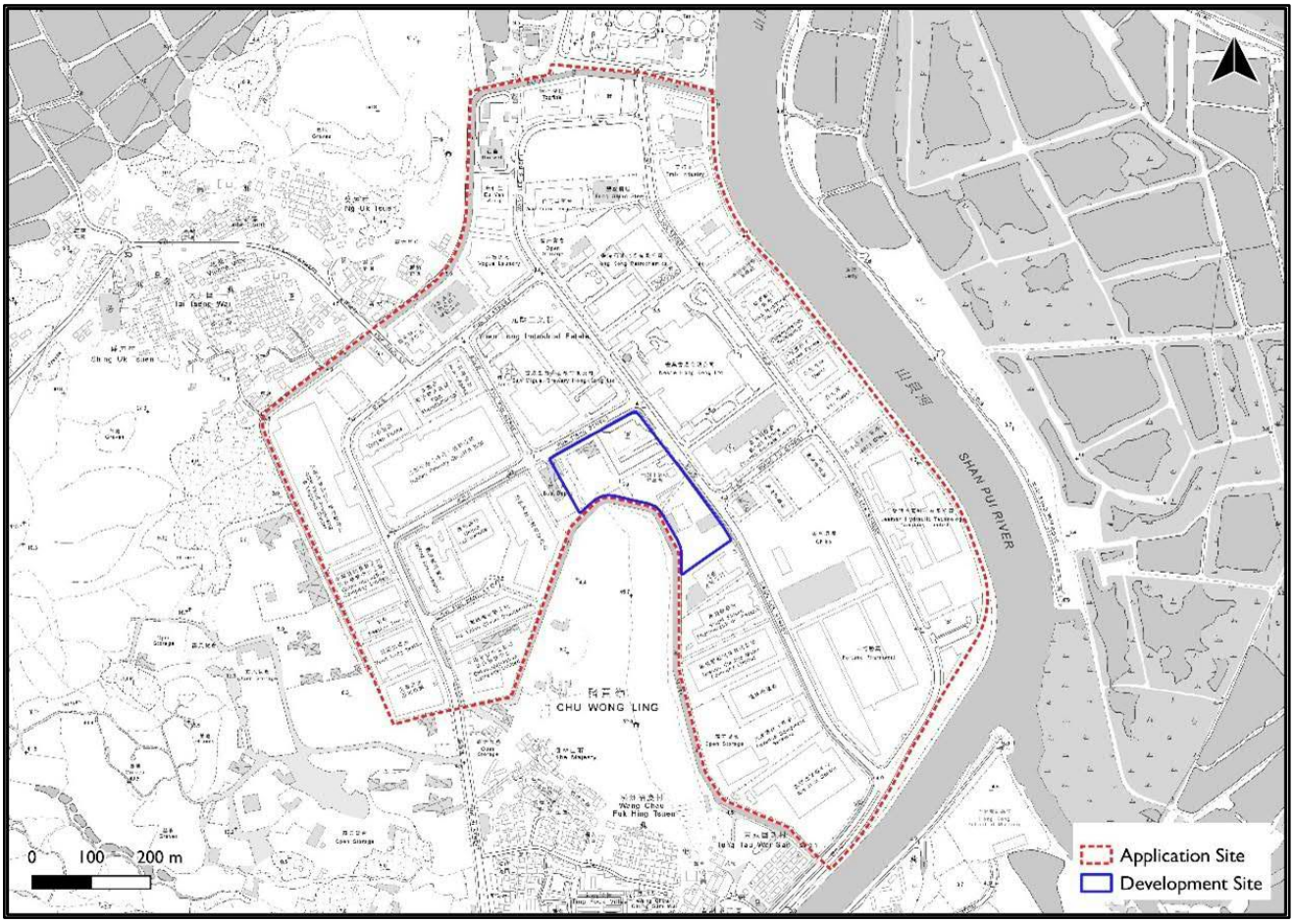
1 Introduction

1.1 Background

1.1.1 This Environmental Assessment Report is prepared to support a Section 16 planning application for the proposed multi-storey buildings (MSBs) development (Proposed Development) near Yuen Long INNOPARK (YL INNOPARK), Yuen Long.

1.1.2 A Site Location Plan of the Development Site (the Site) is shown in **Figure 1.1**.

Figure 1.1: Site Location Plan



1.2 Structure of this Report

1.2.1 This report contains the following sections in addition to this introduction (Section 1):

Section 2 – Development Proposal

Section 3 – Air Quality Impact

Section 4 – Noise Impact

Section 5 – Tree Preservation

Section 6 – Ecological Impact

Section 7 – Land Contamination

Section 8 – Water Quality Impact

Section 9 – Waste Management

Section 10 – Hazard to Life

1.3 Abbreviations

1.3.1 The following abbreviations shall have the meaning hereby assigned to them except when the context of this Report otherwise requires:

Abbreviation for Bureaux/Departments/ organisations	**Full title**
CEDD	Civil Engineering and Development Department
DEVB	Development Bureau
GEO	Geotechnical Engineering Office of the Civil Engineering and Development Department
MSB	Multistorey Building

2 Development Proposal

2.1 Indicative Layout of Proposed MSBs Development

2.1.1 The Site is proposed to provide three sites (**Sites A, B and C**) each about 1 ha to accommodate MSBs developments for industrial uses, totalling 3.23 ha in area.

2.1.2 **Figure 2.1** illustrates the indicative division of land parcels in the Site. It should be noted that the land parcels for proposed MSBs shown in the Site is indicative and solely for technical assessments purpose.

2.1.3 The proposed MSBs at Sites A, B and C are to be developed at a plot ratio of 5 with not more than 10 storeys above ground level excluding basement level.

2.1.4 It is anticipated that the land will be disposed by tender and the MSBs are targeted to start the operation in 2028/2029, with a construction period of 4 to 5 years. Major development parameters and proposed floor uses of the proposed MSBs are summarised in **Table 2.1** and **Table 2.2,** respectively.

Figure 2.1: Indicative Land Parcel for MSBs Development within the Development Site

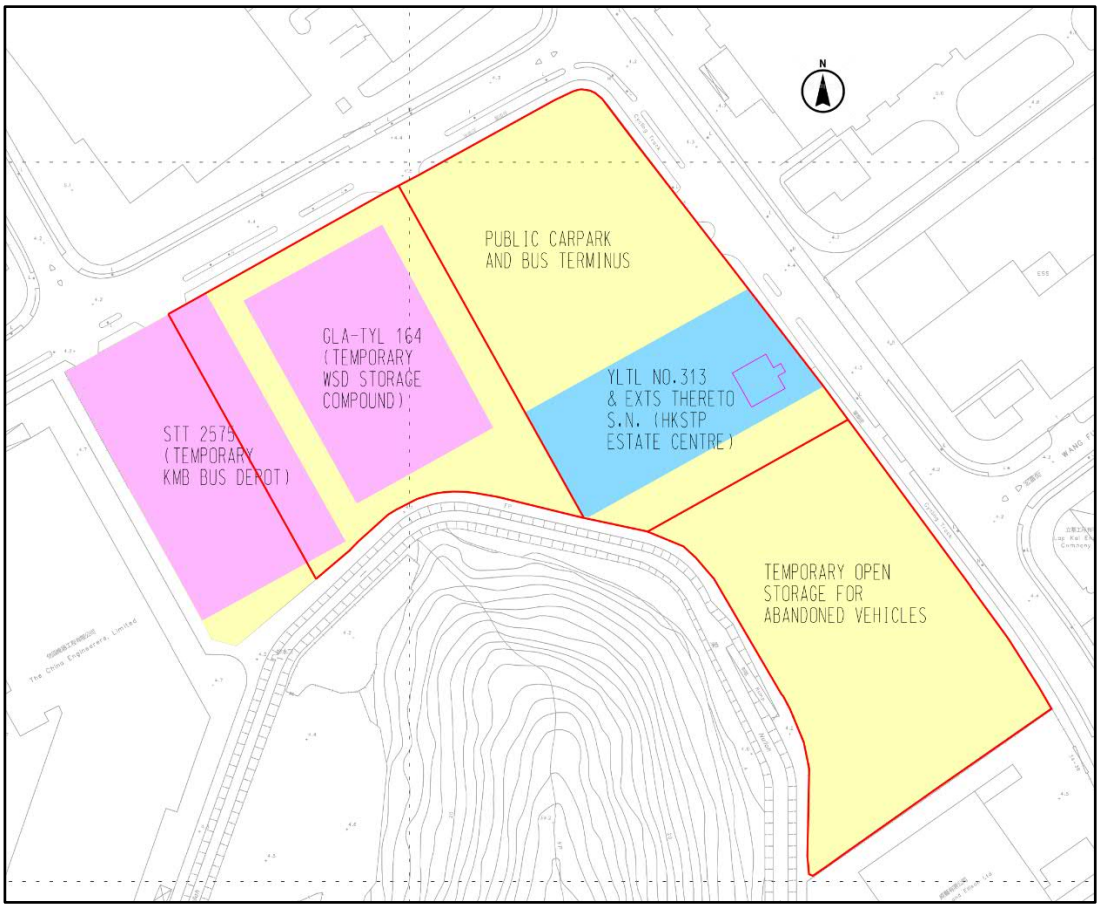


Table 2.1: Development Parameters for Indicative Scheme

Parameters	MSB in Site A	MSB in Site B	MSB in Site C	Total
Total Site Area	0.98ha	1.25ha	1ha	3.23ha
Max. Plot Ratio	5			
Total GFA (m^2)	49,000	62,500	50,000	161,500
Site Coverage	Not Specified			
Class of Site	Class A	Class B	Class A	
Land Uses	Private vehicle servicing and maintenance and/or logistics uses + Not less than 30% of total GFA for accommodating eligible brownfield operators displaced by the government-led development projects (industrial uses)[1][2]			
Maximum Building Height	Not more than 10 storeys above ground			

Table 2.2: Indicative Floor Uses of MSBs Development in Sites A, B and C

Floor	Proposed Uses
G/F-9/F	• Vehicle Servicing and Maintenance; • Logistics Uses; and/or • Industrial Uses (for accommodating eligible brownfield operators
Basement (1 Level)	Public Vehicle Parking (in Site B)[3]

[1] The 30% of total GFA would be subject to relevant Government policy on brownfield operations which may be adjusted in the future.

[2] The 30% of total GFA may exclude any structures and partitions, car parking spaces, circulation areas, staircases, staircase halls, lift landings, space occupied by toilet facilities, mechanical and electrical services such as lifts and air-conditioning systems subject to further discussion among Government departments.

[3] Subject to the detailed design, a basement may be constructed in Site A and Site C to take up some underground space for ancillary parking, plant room, etc.

3 Air Quality Impact

3.1 Introduction

3.1.1 This section presents the assessment of potential air quality impacts associated with the construction and operation phases of the proposed Development. Dust generated from construction activities and vehicular emission from proposed Development induced road traffic is the primary concern during construction phase and operation phase respectively.

3.1.2 Representative ASRs within the tentative assessment area have been identified and the worst-case impacts on these receivers have been assessed. Suitable mitigation measures, where necessary, have been recommended to protect nearby sensitive receivers and to achieve compliance with relevant criteria.

3.2 Assessment Criteria

3.2.1 Air quality impact assessment has been carried out in accordance with the relevant criteria and standards as specified in the following legislation and guidelines:

- Environmental Impact Assessment Ordinance (EIAO) (Cap. 499), EIAO-TM, Annexes 4 and 12;
- Air Pollution Control Ordinance (APCO) (Cap. 311);
- Air Pollution Control (Construction Dust) Regulation;
- Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation; and
- Hong Kong Planning Standards and Guidelines (Chapter 9).

Air Pollution Control Ordinance

Air Quality Objectives

3.2.2 The principal legislation for the management of air quality is the APCO. The APCO specifies Air Quality Objectives (AQOs) which stipulate the statutory limits of air pollutants and the maximum allowable numbers of exceedances over specific periods. The prevailing AQOs which have been effective since 1st January 2022 are listed in **Table 3.2.1** below.

Table 3.2.1: Air Quality Objectives

Pollutant	Averaging time	Concentration[i] (µg/m³)	Number of exceedances allowed
Sulphur Dioxide (SO_2)	10-minute	500	3
	24-hour	50	3
Respirable Suspended Particulates (PM_{10}) [ii]	24-hour	100	9
	Annual	50	Not applicable
	24-hour	50	18 [iv]

Pollutant	Averaging time	Concentration[i] (µg/m³)	Number of exceedances allowed
Fine Suspended Particulates ($PM_{2.5}$) [iii]	Annual	25	Not applicable
Nitrogen Dioxide (NO_2)	1-hour	200	18
	Annual	40	Not applicable
Ozone (O_3)	8-hour	160	9
Carbon Monoxide (CO)	1-hour	30,000	0
	8-hour	10,000	0
Lead (Pb)	Annual	0.5	Not applicable

Notes:
[i]. All measurements of the concentration of gaseous air pollutants, i.e., sulphur dioxide, nitrogen dioxide, ozone and carbon monoxide, are to be adjusted to a reference temperature of 293 Kelvin and a reference pressure of 101.325 kilopascal.
[ii]. Respirable suspended particulates mean suspended particles in air with a nominal aerodynamic diameter of 10 µm or less.
[iii]. Fine suspended particulates mean suspended particles in air with a nominal aerodynamic diameter of 2.5 µm or less.
[iv]. The allowable exceedance is for new government project

Air Pollution Control (Construction Dust) Regulation

3.2.3 The Air Pollution Control (Construction Dust) Regulation enacted under the APCO defines notifiable and regulatory works activities that are subject to construction dust control. Notifiable works are site formation, reclamation, demolition of a building, construction of foundation and superstructure for a building, and road construction work. Regulatory works are renovation of building, road opening or resurfacing work, slope stabilisation work, and any work involving stockpiling, loading and unloading of dusty material, transfer of dusty material using belt conveyor system, etc.

3.2.4 Notifiable works require that advance notice of activities shall be given to EPD. The Air Pollution Control (Construction Dust) Regulation also requires the works contractor to ensure that both notifiable works and regulatory works are conducted in accordance with the Schedule of Regulation, which provides dust control and suppression measures.

Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation

3.2.5 The Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation controls the emissions from non-road vehicle and regulated machines to be used in construction sites. The regulated machines must comply with the emission standards of Stage IIIA of the European Union (EU) or equivalent, while non-road vehicles must comply with the prevailing emission standards for newly registered road vehicles, which is Euro VI. Upon confirmation of their compliance with the emission requirement, EPD will issue them with an approval label.

3.2.6 According to the regulation, mobile machine and equipment (regulated machines) means any mobile machine or transportable industrial equipment that is powered by an internal combustion engine with a rated engine power output that is greater than 19 kW but less than or equal to 560 kW. Non-road vehicles are intended to be used in a private road that is within an area wholly or mainly used for the carrying on of construction work/industry. The regulated machines include crawler cranes, excavators, etc., while

non-road vehicles means a private car, goods vehicles, etc. Therefore, this regulation is applicable to the regulated machines and non-road vehicles (if any) to be deployed for construction activities of the proposed Development.

3.3 Description of the Environment

Assessment Area and Local Environment

3.3.1 **MMH/369397/EA/301** shows the study areas for the air quality impact assessment. The Study Site is situated within the Yuen Long INNOPARK (YL INNOPARK), on the corner of Fuk Wang Street and Wang Lee Street. The site is currently a piece of developed land which is largely concrete paved. There exists an open storage area to the south-east of the Study Site, which is temporarily being used by abandoned vehicles. The YL INNOPARK Management Office (Estate Centre) is located to the north-east of this open storage area. There is a bus depot, temporary WSD storage compound and public car park currently occupying the north-western part of the Study Site. (See **Figure 2.1**)

Baseline Condition

3.3.2 Historical background air quality has been referenced from EPD's general air quality monitoring station (AQMS) located in Yuen Long, which is closest to the Study Site. The recent five years' monitoring data (Year 2017 - 2021) recorded at the AQMS in Yuen Long is presented in **Table 3.3.1**.

Table 3.3.1: Historical Air Quality from EPD's general monitoring station at Yuen Long

Pollutant	Averaging Period	Concentration (µg/m³)						Corresponding AQOs (µg/m³)
		2017	2018	2019	2020	2021	5-year annual average	
Sulphur Dioxide (SO_2)	10-minute - 4th highest	80	52	42	26	24	45	500
	24-hour - 4th highest	20	16	11	10	14	14	50
Respirable Suspended Particulates (RSP/ PM_{10})	24-hour - 10th highest	87	75	83	77	73	79	100
	Annual	40	37	37	30	30	35	50
Fine Suspended Particulates (FSP/ $PM_{2.5}$)	24-hour - 19th highest	47	41	38	33	37	39	50
	Annual	22	20	20	16	17	19	25
Nitrogen Dioxide (NO_2)	1-hour - 19th highest	156	150	161	135	148	150	200
	Annual	**41**	**43**	**44**	32	40	40	40
Carbon Monoxide (CO)	1-hour	1,450	1,720	2,150	1,530	2,090	1,788	30,000
	8-hour	1,324	1,574	1,903	1,279	1,591	1,534	10,000

Pollutant	Averaging Period	Concentration (µg/m³)						Corresponding AQOs (µg/m³)
		2017	2018	2019	2020	2021	5-year annual average	
Ozone (O_3)	8-hour - 10th highest	**175**	**162**	**200**	154	**178**	**174**	160

Notes:
[i]. All Data extracted from EPD's Air Quality in Hong Kong Reports for Annual Air Quality Monitoring Result (2017-2021) for Yuen Long monitoring station.
[ii]. Monitoring results that exceeded prevailing AQO criteria are shown in bold characters.
[iii]. Lead is not measured at Yuen Long AQMS.

3.3.3 The predicted future background air pollutant concentrations within the Assessment Area are extracted from the relevant grids of the Pollutants in the Atmosphere and their Transport over Hong Kong (PATH) v.2.1 model for Year 2025 and are summarised in **Table 3.3.2** below.

Table 3.3.2: Future Background Air Quality from PATH for Year 2025

Pollutant	Averaging Period	Concentration (µg/m³)		Corresponding AQOs (µg/m³)
		25, 48	25, 49	
RSP/ PM_{10}	24-hour – 10th Highest	68	69	100
	Annual	28	27	50
FSP/ $PM_{2.5}$	24-hour – 19th Highest	39	39	50
	Annual	16	16	25
NO_2	1-hour – 19th Highest	108	113	200
	Annual	20	19	40
SO_2	10-minute – 4th Highest	54	55	500
	24-hour – 4th Highest	13	14	50

Notes:
[i]. 10th highest daily and annual RSP concentrations are adjusted by adding 11.0µg/m³ and 10.3µg/m³, respectively, as referenced from EPD's 'Guidelines on Choice of Models and Model Parameters'.
[ii]. Annual FSP concentrations are adjusted by adding 3.5µg/m³, as indicated in EPD's 'Guidelines on Choice of Models and Model Parameters'. No adjustment is required for daily FSP concentration.
[iii]. Conversion factors for stability classes are multiplied by the 1-hr average concentrations of SO_2 as per EPD's Guideline Estimation of 10-min average SO_2 Concentration for Air Quality Assessment.

3.3.4 As shown in **Table 3.3.2**, the future background levels of hourly and annual NO_2, 10-min and daily SO_2 as well as daily RSP and FSP would be below with their corresponding AQOs by 2025. The improvement in future ambient air quality can be

attributed to the government's commitment to implement various planned emission reduction measures, as published on EPD's website[4].

3.4 Identification of Air Sensitive Receivers

3.4.1 Referring to Annex 12 of the EIAO-TM, any domestic premises, hotel, hostel, hospital, clinic, nursery, temporary housing accommodation, school, educational institution, office, factory, shop, shopping centre, place of public worship, library, court of law, sports stadium or performing arts centre should be classified as Air Sensitive Receivers (ASRs). Any other premises or place with similar duration or number of people to be affected as above premises and places should also be considered as ASRs.

3.4.2 The representative ASRs (both existing or planned) that may be affected by the proposed Development within the 500m assessment area are shown in **MMH/369397/EA/302**. Summary and details of representative ASRs are presented in **Table 3.4.1**.

Table 3.4.1: Representative ASRs in the Vicinity of the Development Site

ASR ID	**Description**	**Type of Use**	**Approximate Horizontal Distance from Development Site (m)**
A01	Nestle Hong Kong Ltd	Industrial	44
A02	Bright Future Pharmaceutical Factory (3)	Industrial	32
A03	Vikings and Ellison Ltd	Industrial	8
A04	Chiho-Tiande Group Limited	Industrial	133
A05	Bright Future Pharmaceutical Factory (6)	Industrial	96
A06	China Engineers	Industrial	15
A07	United Laboratories	Industrial	101
A08	Microelectronics Centre (MEC)	Industrial	40
A09	San Miguel Brewery Hong Kong Ltd.	Industrial	42
A10	Leon Court, Block 10	Residential	360
A11	Village House, near Fuk Hi Street	Residential	329
P01 to P25	Planned MSB development	Industrial	-

3.5 Identification of Pollution Sources

Construction Phase

3.5.1 As mentioned in **Chapter 2**, the land will be disposed by tender and the proposed MSBs are targeted to start operation in 2029 with a construction period of about 4 to 5 years.

3.5.2 Key activities anticipated during the construction phase that could potentially give rise to fugitive dust emissions include site clearance, demolition, foundation works,

[4] Environmental Protection Department, Air Pollution Control Strategies, June 2022 < http://www.epd.gov.hk/epd/english/environmentinhk/air/prob_solutions/strategies_apc.html>.

excavation and earth moving, transfer and temporary storage of dusty materials. Other potential sources of air quality impacts may include exhaust emissions from construction vehicles.

3.5.3 The air pollutants of concerns during the construction phase of the proposed Developments are TSP, RSP and FSP from the potential dust emitting activities.

3.5.4 There also exist a number of concurrent projects within the assessment area which may have cumulative impacts:

Yuen Long Barrage Scheme

3.5.5 According to the tentative construction programme of the Barrage Scheme, the main construction works (i.e., excavation and pilling works) for the section of the Yuen Long Barrage Scheme within the assessment area will be completed by Q4 2023. E&M installation and superstructure works will be started from Q4 2023 and finished at Q4 2025. The distance between the Development Site and the Barrage Scheme is approximately 300m. Hence, the concurrent impact is anticipated to be minimal. The location of the concurrent projects is shown in Drawing MMH/369397/EA/301.

Proposed Private Residential Development in D.D.115 at Chung Yip Road, Nam Sang Wai, Yuen Long

3.5.6 The site is more than 600m from the Development Site . As there is no publicly available information on this development's construction and occupation programme, the project is not included in the assessment.

Operation Phase

3.5.7 Refer to **Table 2.2**, part of the proposed development will be used for industrial uses such as vehicle servicing and maintenance related uses, logistics uses as well as other minor industrial brownfield operations.

3.5.8 For vehicle servicing and maintenance, tailpipe emission (NO_2, RSP, FSP), odour, VOCs and toxic air pollutants may be generated from the activities of the workshop, such as vehicle emission test and car painting. SO_2 emission from the proposed development is not expected. The scale and types of the activities of the workshops are unknown at this stage. Control measures would be required for the potential pollutant emission activities before release to ambient air, e.g. emissions from vehicle engine testing and paint spraying booth should be treated with activated carbon and other controls through central ventilation system before discharge. Operators of proposed vehicle servicing and maintenance use shall provide the possible control measures as presented in EPD's Environmental Guidelines for the Vehicle Repair Trade as far as practicable. With implementation of proper mitigation measures, the pollutants and odour emission impact from vehicle servicing and maintenance would be minimal.

3.5.9 For the part of the proposed development for logistics uses or other minor brownfield operations, the nature of the operation will be mostly related to the warehouse related operations and minor industrial processes relating to recycling. Hence, some tailpipe emission will be generated from the activities of the brownfield operators due to goods delivery or transportation by vehicles. Emission, if any, from forklift trucks or other equipment for goods movement within the premises will be insignificant. Electric forklifts and other electric equipment will be used as far as practicable. The same also applies

to the minor industrial processes relating to recycling. Air emission sources of fuel burning machinery are not expected in the MSB development. Should there be any, separate assessment shall be conducted.

3.5.10 Yuen Long Sewage Treatment Work (STW) is more than 700m from the proposed development which the odour impact from STW is considered to be limited. Based on Site visits during February and June 2022, there is no odour detected at Development Site from Yuen Long nullah.

3.6 Construction Phase Air Quality Assessment

3.6.1 The Development Site currently does not contain any permanent structure that would require large scale demolition works and would generate significant dust impact. Given that the construction activities for setting up MSBs are limited and the scale of construction works would be minor, it is anticipated that with the implementation of the recommended dust control measures below, the construction of the proposed Developments would not give rise to adverse construction dust impacts to nearby ASRs. Therefore, a qualitative approach was adopted for the assessment of fugitive dust emissions from the construction phase.

Fugitive Dust Emissions

3.6.2 As mentioned in **Section 3.6**, this proposed Development will not require large scale demolition and excavation works. The extent of the construction activities for the three MSBs will be limited and confined at different locations within the Study Site, which about 3.23 ha in area (see **Section 2.1.1**). Activities that may generate dust comprise:

a) Demolition of existing structures (not significant as only minor existing structures on site)
b) Excavation for basement or pile cap construction: not all MSBs may have basement; excavation works for the three sites may not commence at the same time; and the associated workfronts[5] will be at scattered locations as the total area of the three sites is about 3.23 ha. The size of works area for each of the site is estimated to be approximately 600m^2. With good site management as described in **Section 3.9**[6], the dust impact is considered acceptable.
c) The estimated total amount of construction and demolition (C&D) materials to be excavated is about 102,120m^3. The average number of dump trucks would be around 12 vehicles per day.
d) Superstructure works, including formwork, fixing rebars, concreting, and other internal furnishing works, etc.: these construction activities would not generate significant amount of dust. Nevertheless, the good site management as described in **Section 3.9** will help limit the dust impact to an acceptable level.

3.6.3 As detailed in **Section 3.5**, the concurrent projects identified within the 500m Assessment Area are Yuen Long Barrage Scheme and the Proposed Private Residential Development in Nam Sang Wai. Whilst the heavy construction works of the Barrage Scheme are likely to be completed before the land disposal of the Development Site; there is no information publicly available on the implementation programme for the

[5] There will be approximately 2-3 excavators/backhoe at each workfront, serving dump trucks at a maximum rate of 5 min per truck.

[6] Including water spraying, provision of wheel washing facilities, proper cover of excavated materials (on site and on truck), use of low emission plant, etc.

Nam Sang Wai development. Hence, it is anticipated that the cumulative construction dust impacts due to the proposed Development would not be significant at the identified ASRs.

Construction vehicles and machineries emissions

3.6.4 With the enforcement of the *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation*, the regulated machines and non-road vehicles must comply with the relevant emission standards. *Air pollution Control (Fuel Restriction) Regulation* controls the types of fuel allowed for use and their sulphur contents in commercial and industrial processes to reduce SO_2 emissions. Therefore, the particulates, SO_2 and NO_2 emissions from these machines and vehicles should be limited and will not be significant. Hence, it is anticipated that these emissions would not result in the exceedance of the relevant AQOs at the identified ASRs.

3.7 Operation Phase Air Quality Assessment

Impact to Proposed MSBs

3.7.1 Given that the proposed MSBs are located within Yuen Long INNOPARK, which is designated for various industrial operation and the proposed MSBs are also designated for industrial operations as described in **Table 2.2** above. Therefore, the proposed MSBs are considered compatible with the prevailing uses and the intention uses of the area.

3.7.2 As presented in **Section**s **3.5.8** and **3.5.9**, most of the premises of the proposed MSBs are for industrial uses, which are not sensitive to air quality. Although there could be some minor offices within the proposed MSBs, these offices are typically with their air ventilation systems to separate from the industrial activities.

3.7.3 According to the background pollutant concentrations as shown in **Table 3.3.2**, the pollutant concentrations are far below the relevant AQOs. With proper air-ventilation system, adverse air-quality impacts to the proposed MSBs are not expected.

Impact to Surrounding Areas

3.7.4 As there would be no major emissions from the proposed MSBs, adverse air quality impacts to industrial premises within the Yuen Long INNOPARK due to the operations of the development are not expected.

3.7.5 There would be additional traffic arising from the proposed development. The surrounding roads including Fuk Shun Street, Fuk Hi Street, Fuk Yan Street, Fuk Wang Street and Wang Lee Street in the vicinity of the proposed MSBs are local distributors according to the Annual Traffic Census 2021 of Transport Department. It is noted that the sensitive receivers identified in Table 3.4.1 would have a buffer distance not less than 5m from the road, thus satisfying the buffer distance requirement for Local Distributor as stated in Chapter 9 of HKPSG. Therefore adverse air quality impacts are not expected.

3.8 Air Quality Mitigation Measures

Construction Phase

3.8.1 Provide electric power supply for on-site machinery as far as practicable to minimize any gaseous and PM emissions. In addition to implementing:

Good Site Management

3.8.2 Good site management is important to help reduce potential air quality impact down to an acceptable level. As a general guide, the Contractor should maintain high standards of housekeeping to prevent emissions of fugitive dust. Loading, unloading, handling and storage of raw materials, wastes or by-products should be carried out in a manner so as to minimise the release of visible dust emission. Any piles of materials accumulated on or around the work areas should be cleaned up regularly. Cleaning, repair and maintenance of all plant facilities within the work areas should be carried out in a manner minimising generation of fugitive dust emissions. The material should be handled properly to prevent fugitive dust emission before cleaning.

Disturbed Parts of the Roads

3.8.3 Main temporary access points should be paved with concrete, bituminous hardcore materials or metal plates and be kept clear of dusty materials; or

3.8.4 Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet.

Exposed Earth

3.8.5 Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seating with latex, vinyl, bitumen within six months after the last construction activity on the site or part of the site where the exposed earth lies.

3.8.6 Covering stockpiling area by impervious sheets and spraying all dusty material with water immediately prior to any loading transfer operations to keep the dusty materials wet during material handling at the stockpile areas.

Loading, Unloading or Transfer of Dusty Materials

3.8.7 All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet.

Debris Handling

3.8.8 Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides.

3.8.9 Before debris is dumped into a chute, water should be sprayed onto the debris so that it remains wet when it is dumped.

Transport of Dusty Materials

3.8.10 Vehicles used for transporting dusty materials/ spoils should be covered with tarpaulin or similar material. The cover should extend over the edges of the sides and tailboards.

Wheel washing

3.8.11 Vehicle wheel washing facilities should be provided at the construction site exit. Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.

Use of vehicles

3.8.12 The speed of trucks within the Development Site area should be controlled to about 10 km/hour in order to reduce adverse dust impacts and secure safe movement around the Development Site area.

3.8.13 Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.

3.8.14 Where a vehicle leaving the construction site is carrying a load of dusty materials, the load should be covered entirely by clean impervious sheeting to ensure dusty materials do not leak from the vehicle.

Operation Phase

3.8.15 Control measures as Environmental Guidelines for the Vehicle Repair Trade should be implemented to treat the exhaust gas from the activities with potential air pollutant emission sources including engine testing, paint spraying and welding works, etc.

3.8.16 Special emission sources are not expected within the proposed MSBs. Should there be any, an assessment shall be conducted.

4 Noise Impact

4.1 Introduction

4.1.1 This section presents the assessment of potential noise impacts associated with the construction and operation phases of the proposed Development. Noise generated from various construction activities will be the primary concern during construction phase. Road traffic noise and fixed noise sources will be the major noise impacts during the operation phase.

4.1.2 Representative NSRs within the tentative assessment area as shown in **MMH/369397/EA/401** have been identified and the worst-case impacts on these receivers have been assessed. Suitable mitigation measures, where necessary, have been recommended to protect the NSRs and to ensure that the legislative criteria and guidelines can be satisfied.

4.2 Assessment Criteria

Construction Phase

4.2.1 Legislation, Standards, Guidelines and Criteria relevant to the consideration of construction noise impacts under this assessment include the following:

- Noise control Ordinance (NCO)
- ProPECC PN 2/93 Environmental Protection Department Practice Note for Professional Persons: Noise from Construction Activities – Non-statutory Controls

General Construction Activities during Non-Restricted Hours

4.2.2 ProPECC PN 2/93 provides assessment criteria as well as requirements relating to construction noise not currently controlled under the NCO. The Practice Note also provides information on noise abatement measures. Noise impacts arising from general construction activities other than percussive piling during the daytime period (07:00-19:00 hours on any day not being a Sunday or general holiday) would be assessed against the noise standards tabulated in **Table 4.2.1** below. Practicable direct mitigation measures will be evaluated and exhausted to maximise the protection of NSRs.

Table 4.2.1: Noise Standards for Daytime Construction Activities

Noise Sensitive Uses	*0700 to 1900 hours on any day not being a Sunday or general holiday, $L_{eq(30\ min)}$, dB(A)*
Dwellings	*75*
School	*70*
	65 during examination

Source: ProPECC PN 2/93 "Noise from Construction Activities – Non-Statutory Controls" issued by EPD in 1993.
Notes: The above noise standards apply to uses, which rely on opened windows for ventilation.
The above standards shall be viewed as the maximum permissible noise levels assessed at 1 m from the external facade.

General Construction Activities during Restricted Hours

4.2.3 Noise impacts arising from general construction activities (excluding percussive piling) conducted during the restricted hours (19:00-07:00 hours on any day and anytime on Sunday or general holiday) and percussive piling during anytime are governed by the NCO.

4.2.4 For carrying out of any general construction activities involving the use of any PME within the restricted hours, a CNP issued by the Authority must be obtained under the NCO. The noise criteria and the assessment procedures for issuing a CNP are specified in the GW-TM published under the NCO. CNP are also required for percussive piling involving the use of diesel, pneumatic and / or steam hammer.

4.2.5 Regardless of the assessment made in this section, the Authority will consider all relevant factors when assessing a CNP application, following the guidelines of the relevant Technical Memoranda. The assessment in this report shall not pre-empt the Authority in making their decisions. The Authority may include any conditions they consider appropriate and such conditions are to be followed while the works covered by the CNP are being carried out. Failing to do so may lead to cancellation of the CNP and prosecution action under the NCO.

4.2.6 It is expected that majority of the construction works would be carried out during non-restricted hours. In case of any activities during restricted hours, it would be the Contractor's responsibility to submit CNP applications when so required and ensure compliance with the NCO, any conditions stated in the CNP and the relevant Technical Memoranda.

Operation Phase

Road Traffic Noise

4.2.7 Legislation, Standards, Guidelines and Criteria relevant to the consideration of planning against possible road traffic noise impact under this assessment include the following:

- Chapter 9 of the HKPSG
- EIAO Guidance Note (GN) No. 12/2010

Chapter 9 of the HKPSG

The noise criteria for evaluating noise impact of planning development with respect to road traffic noise are based on the HKPSG. The summary of noise criteria is given in **Table 4.2.2** below.

Table 4.2.2: Relevant Road Traffic Noise Standards for Planning Purposes

Uses	Road Traffic Noise Peak Hour Traffic L_{10}(1 Hour), dB(A)
All domestic premises including temporary housing accommodation, hotels and hostels, offices	70
Educational institutions including kindergarten, child care centres and all other where unaided voice communication is required	65
Places of public worship and courts of law	65

Uses	Road Traffic Noise Peak Hour Traffic L_{10}(1 Hour), dB(A)
Hospitals, clinics, convalescences and residential care homes for the elderly **- diagnostic rooms** **- wards**	55

Source: Chapter 9 of HKPSG, Table 4.1– Summary of Noise Standards
Notes: The above standards apply to uses which rely on opened windows for ventilation.
The above standards should be viewed as the maximum permissible noise levels at the external facade.

EIAO Guidance Note (GN) No. 12/2010

4.2.8 The captioned GN provides general reference for practitioners to prepare Road Traffic Noise Impact Assessment (RTNIA) for Designated Projects (DPs) under the Environmental Impact Assessment Ordinance (EIAO). Nevertheless, the perspective regarding "significant" impact in the GN is referenced.

4.2.9 As stipulated in the GN, traffic noise impact would be considered significant if the traffic noise level with the road project would be greater than that without the road project at the design year by 1.0 dB(A) or more.

4.2.10 By the same token, traffic noise impact would be considered significant if the traffic noise level with the proposed development would be greater than that without the proposed development at the design year by 1.0 dB(A) or more.

Fixed Noise Sources

4.2.11 Legislation, Standards, Guidelines and Criteria relevant to the consideration of planning against possible fixed noise impact under this assessment include the following:

- NCO (Cap. 400)
- Chapter 9 of the HKPSG
- IND-TM

4.2.12 For fixed noise sources impact assessment, the assessment criteria are determined with reference to the Section 4.2.13 in Chapter 9 of HKPSG. The ANLs for the NSRs are based on the Area Sensitivity Rating, which is defined in the IND-TM issued under the NCO. The Area Sensitivity Rating depends on the type of area and the degree of impact that Influencing Factors (IFs) have on the NSRs and as illustrated in **Table 4.2.3** below. Industrial area, major road or the area within the boundary of Hong Kong International Airport shall be considered to be an IF.

Table 4.2.3: Area Sensitivity Rating

	Degree to which NSR is affected by IF		
Type of Area Containing NSR	**Not Affected[(c)]**	**Indirectly Affected[(d)]**	**Directly Affected[(e)]**
(i) Rural area, including country parks[(a)] or village type developments	A	B	B
(ii) Low density residential area	A	B	C

	Degree to which NSR is affected by IF		
consisting of low-rise or isolated high-rise developments			
(iii) Urban area[(b)]	B	C	C
(iv) Area other than those above	B	B	C

Definitions:
a) "Country park" means an area that is designated as a country park pursuant to section 14 of the Country Parks Ordinance.
b) "Urban area" means an area of high density, diverse development including a mixture of such elements as industrial activities, major trade or commercial activities and residential premises.
c) "Not Affected" means that the NSR is at such a location that noise generated by the IF is not noticeable at the NSR.
d) "Indirectly Affected" means that the NSR is at such a location that noise generated by the IF, whilst noticeable at the NSR, is not a dominant feature of the noise climate of the NSR.
e) "Directly Affected" means that the NSR is at such a location that noise generated by the IF is readily noticeable at the NSR and is a dominant feature of the noise climate of the NSR.

4.2.13 Fixed noise impact arising from the existing fixed noise source is controlled under the NCO and shall comply with the ANLs laid down in the Table 2 of the IND-TM. For a given Area Sensitivity Rating, the ANL, in dB(A), is given by **Table 4.2.4** below.

Table 4.2.4: Acceptable Noise Level for Fixed Noise Sources

	Area Sensitivity Rating, (ANL $L_{eq\ (30\ min)}$, dB(A))		
Time Period	**A**	**B**	**C**
Day-time (0700 to 1900 hours)	60	65	70
Evening (1900 to 2300 hours)	60	65	70
Night-time (2300 to 0700 hours)	50	55	60

Source: IND-TM, Table 2– Acceptable Noise Levels

4.2.14 According to the Outline Zoning Plan, the Development Site is located in the zoning of "Industrial Estate". In accordance with IND-TM, any NSR shall be assigned an ASR of "C" if it is within 100m of a zone designated as "Industrial Estate", or an ASR of "B" if it is between 100m and 250m from such a zone.

Noise Criteria for Planned Fixed Plant Noise Sources

4.2.15 As stipulated in Chapter 9 "Environment" of the HKPSG, the noise standards for planning purposes fixed noise source are (a) 5 dB(A) below the appropriate ANL as stipulated in the IND-TM, or (b) the prevailing background noise levels (for quiet areas with level 5 dB(A) below the ANL).

4.3 Surrounding Environment

4.3.1 The Site is located at the central part of the YL INNOPARK. The existing site is bounded by Fuk Wang Street to the northwest, Wang Lee Street to the northeast and the footpath

along the nullah and the vegetated knoll known as Chu Wong Ling to the south, with industrial buildings in the surroundings.

4.3.2 The existing noise environment is dominant by fixed noise from nearby existing industrial facilities and road traffic noise from Wang Lee Street, Fuk Wang Street,etc. **Figure 1.1** shows the location of the Site and its surrounding area.

4.4 Construction Noise Impact Assessment

4.4.1 No NSRs were identified within the 300m study area as shown in **MMH/369397/EA/401**.

4.4.2 As the representative NSRs are located more than 300 m from the Site (see **MMH/369397/EA/401**). Hence, no adverse construction noise impact is anticipated.

4.4.3 The Contractor(s) shall prepare detailed construction method statements with number and types of construction plants to be used; and predict the construction noise level with appropriate noise mitigation measures, where necessary, for different stages of works.

Mitigation Measures

4.4.4 As no adverse construction noise impact is anticipated, no specific construction noise mitigation measures are required. It is recommended that the following noise reduction measures should be considered as far as practicable to minimise the construction noise impact, e.g. “Recommended Pollution Control Clauses for Construction Contracts” available on EPD’s website[7]. A noise control plan should be set up to ensure regular maintenance of all plant and equipment, reduction of noise generation at source, and that appropriate silencing applications are in use based upon the best reasonable practice.

4.4.5 Typical noise mitigation measures include:

- scheduling activities to ensure that only minimal noise activities are in progress at any one time;
- use of silenced equipment;
- use of movable noise barrier;
- reduction in the number of items of PME operation at any given time; and
- avoidance of works in restricted hours etc.

4.5 Road Traffic Noise Impact Assessment

4.5.1 As no NSR is identified within 300m study area, no adverse traffic noise impact is anticipated.

[7] http://www.epd.gov.hk/epd/english/environmentinhk/eia_planning/guide_ref/rpc_3.html

4.6 Fixed Noise Sources Impact Assessment

4.6.1 The proposed MSBs are in the middle of the YL INNOPARK area and surrounded by different industrial buildings. No NSRs were identified within the 300m study area as shown in **MMH/369397/EA/401**.

Evaluation of Potential Noise Sources

Vehicle Servicing and Maintenance Activities and/or Logistics and Brownfield Activities inside Proposed MSBs

4.6.2 All vehicle servicing and maintenance activities would only be conducted inside the proposed MSBs. Given that these activities would be enclosed inside the building structure of the MSBs, the potential noise impact is considered as minimal. Considering the large buffer distance (i.e. at least 300 m away from the NSRs), no adverse noise impact from the vehicle servicing and maintenance actives is anticipated.

4.6.3 Typical brownfield activities may include warehousing, logistics operation and some minor industrial processes. Again, no adverse noise impact is anticipated because the activities would be conducted inside the building structure of the MSBs and the buffer distance from the nearby NSRs is more than 300m.

E&M Equipment of the MSBs

4.6.4 Most of E&M equipment (e.g. ventilation and pumping system) would be installed inside the plant rooms. The potential noise impact is therefore considered as minimal. Considering the large buffer distance (i.e. at least 300 m away from the NSRs), no adverse noise impact from the enclosed E&M equipment is anticipated.

Mitigation Measures

4.6.5 With the planned fixed noise sources properly designed (i.e. enclosed inside the plant room / building structure), no adverse fixed noise impact is predicted. However, it is recommended that the following noise mitigation measures shall be considered as far as practicable during the detailed design stage:

- Choose quieter plant such as those which have been effectively silenced;
- Include noise levels specification when ordering new plant (including chillier and E/M equipment);
- Locate fixed plant / louver away from any NSRs as far as practicable;
- Locate fixed plant in walled plant rooms or in specially designed enclosures;
- Locate noisy machines in a completely separate building;
- Install direct noise mitigation measures including silencers, acoustic louvres and acoustic enclosure where necessary; and
- Develop and implement a regularly scheduled plant maintenance programme so that equipment is properly operated and serviced in order to maintain a controlled level of noise.

5 Tree Preservation

5.1 Tree Survey Methodology

General Approach

5.1.1 A tree survey was carried out at the Development Site and its adjacent areas to identify trees likely to be affected by the proposed MSBs development. Individual tree survey was carried out for all identified trees within accessible areas. For inaccessible areas within the survey boundary, tree group survey was undertaken.

Standards and Guidelines

5.1.2 In accordance with Development Bureau (DEVB) Technical Circular (Works) TC(W) No. 4/2020 – *Tree Preservation*, a plant is considered as a "tree" to be surveyed if its trunk diameter measures 95 mm or more at a height of 1.3 m (i.e. Diameter at Breast Height, DBH) above the ground level.

5.1.3 Measurement of DBH follows the guidance in the Agriculture, Fisheries and Conservation Department's Nature Conservation Practice Note No. 2 – *Measurement of Diameter at Breast Height (DBH)*.

5.1.4 The identification of registered Old and Valuable Tree (OVT) and potentially registrable OVT refers to DEVB TC(W) No. 5/2020 – *Registration and Preservation of Old and Valuable Trees*.

5.1.5 Highways Department (HyD) Technical Circular (TC) No. 3/2008 – *Independent Vetting of Tree Works under the Maintenance of Highways Department* is referenced for trees under maintenance of HyD.

5.1.6 Maintenance responsibilities of existing and proposed trees are demarcated following DEVB TCW No. 6/2015 – *Maintenance of Vegetation and Hard Landscape Features*.

5.1.7 Reference was also made to the following technical circulars, practice notes and publications:

- AFCD Nature Conservation Practice Note No. 3 – The Use of Plant Names.
- Forests and Countryside Ordinance (Cap. 96) and its subsidiary legislations.
- General Specification for Civil Engineering Works Volume 2, 2020 Edition, Section 26 "Preservation and Protection of Trees".
- General Standards and Maintenance Requirements for Landscape Works to be Handed Over to LCSD for Horticultural Maintenance.
- Guidance Notes on Tree Preservation and Removal Proposal for Building Development in Private Projects – Compliance of Tree Preservation Clause under Lease
- Guidelines on Tree Preservation during Development by DEVB (April 2015).
- Guidelines on Tree Transplanting by DEVB (September 2014).
- Protection of Endangered Species of Animals and Plants Ordinance (Cap 586).

Individual Tree Survey

5.1.8 Individual tree survey was conducted within the Site and its adjacent areas where trees are likely to be affected where accessible to collect detailed information of trees which will likely be affected by the proposed MSBs development, including dead trees. All the surveyed trees were recorded with the following information, with photographic record:

- tree number
- species (scientific names and Chinese common name)
- height
- DBH
- crown spread
- amenity value
- form
- health
- structural conditions
- suitability for transplanting
- conservation status
- special features (if any, recorded in remarks)

5.1.9 In the individual tree survey, all the trees were assessed and evaluated in accordance with the following criteria for health, tree form, amenity value and suitability for transplanting:

• **Health Condition**:	Estimated according to the foliage, branches, trunk and exposed roots.
Good	Without any visible disease or defect, sound and healthy tree
Average	With few visible defects or health problem
Poor	With many visible defects or health problem such as rot, cavities in the main trunk, insect or fungi attack, lack of vigour and crown die back, etc.
• **Tree Form**:	Estimated according to the canopy, branch and trunk.
Good	Well-balanced canopy and straight strong trunk(s) without major branch failure
Average	Slightly unbalanced canopy and non-straight trunk(s)
Poor	Heavily leaning, unbalanced canopy, poor branching
• **Amenity Value**:	Estimated according to the species, age, size, health condition and form.
High	Mature trees with good health condition and form that have good functional attributes and create large positive visual effect

Medium	Trees which individually or collectively make a useful but not vital contribution to the local environment
Low	Unhealthy trees and trees of generally poor form and shape, trees of undesirable species (such as *Leucaena leucocephala*)

- **Suitability for Transplanting**:

	The anticipated suitability for transplanting of each individual tree was assessed. The following criteria were taken into account.
Condition of the Tree	trees with balanced form, in fair / good health and with medium / high amenity value are considered for transplanting
Size and Maturity	small and younger trees have a better chance of surviving transplanting while larger, mature trees are difficult to transplant both logistically and in terms of survival rate
Species	different tree species have better chances of survival or are better suited to transplanting than others
Conservation Status	tree species of high conservation importance should be considered for transplantation as far as practicable if on-site preservation is impracticable
Permanent Receptor Site	availability and suitability of permanent receptor site, both within and outside the project site, will be considered
Preparation Time	adequacy of time for preparation of transplanting operation, such as root pruning and crown pruning, needs to be considered
Maintenance Party	long-term maintenance party for the transplanted tree(s) needs to be identified
Access	large machinery is required to lift the trees, steep slopes and rocky terrain therefore make it difficult to access trees
Topography	for those trees located on sloping ground, they may not survive transplanting even if they are accessible as it is difficult for their inclined root systems to adapt to the normally more gentle ground at receptor sites
Cost-effectiveness	cost-effectiveness of the transplantation operation needs to be carefully justified

Tree Group Survey

5.1.10 For the inaccessible areas, tree group survey was conducted. The species of trees present were recorded by direct observation. The following information of each tree species within each tree group was recorded:

- Estimated Percentage and / or Quantity
- Diameter at Breast Height (DBH) Range
- Height Range
- Crown Spread Range
- Health
- Tree Form
- Amenity Value
- Remarks

5.1.11 In areas where individual trees were easily observable, such as roadside trees, the quantity of each tree species within a tree group was counted individually. For inaccessible areas or for dense tree groups where individual trees were not easily distinguishable, the percentage of each tree species out of all trees present in the area was first estimated by direct observation. The total number of trees present in the area was estimated by both direct counting of observable tree trunks and / or individual tree canopies and estimation of average spacing between trees. The abundance of each tree species was calculated by multiplying the estimated percentage by the total number of trees present.

5.1.12 Heath conditions, tree form and amenity value of each species were determined using the same criteria as those used in individual tree survey.

5.2 Findings of Tree Survey

Existing Trees within Development Site

5.2.1 An individual tree survey was conducted within accessible areas in the Development Site on 6th, 18th January and 18th April 2017, while a tree group survey was conducted within inaccessible area in the Site from August to October 2016. Site verification of the previous tree survey was performed in September 2022. During the site verification, no major change of individual tree / tree groups was identified. Photo records of existing tree conditions are shown in **Annex 5.5**.

5.2.2 For individual tree survey, a total of 102 surveyed trees of 20 species, including living trees and five dead trees were recorded within the Site. The recorded species and their abundances are summarized in **Table 5.2.1**. The locations of all individually surveyed trees are shown in the Tree Survey Plan in **MMH/369397/EA/501**, **MMH/369397/EA/501A** to **MMH/369397/EA/501C**. Tree assessment schedule and tree photographs of individually surveyed trees are shown in **Annex 5.1** and **Annex 5.2** respectively.

Table 5.2.1: Tree Species and Abundances of Individually Surveyed Trees

Scientific Name	Chinese Name	Abundance
Acacia auriculiformis	耳果相思	7
Acacia confusa	台灣相思	5
Albizia lebbeck	大葉合歡	7
Aleurites moluccana	石栗	1
***Bauhinia* sp.**	羊蹄甲屬	1
Bombax ceiba	木棉	7
Bridelia tomentosa	土蜜樹	1
Celtis sinensis	朴樹	3
Delonix regia	鳳凰木	6
Ficus benjamina	垂葉榕	3
Ficus microcarpa	細葉榕	3
Khaya senegalensis	非洲楝	1
Leucaena leucocephala	銀合歡	31
Livistona chinensis	蒲葵	7
Macaranga tanarius* var. *tomentosa	血桐	4
Mangifera indica	杧果	1
Melia azedarach	苦楝	2
Sapium sebiferum	烏桕	2

Scientific Name	Chinese Name	Abundance
Spathodea campanulata	火焰木	3
Sterculia lanceolata	假蘋婆	5
Dead tree	枯樹	2
	TOTAL	**102**

5.2.3 For tree group survey, an approximate of 26 surveyed trees of 12 species in one tree group (i.e. TG00) were estimated within the Development Site. The recorded species and their abundances are summarized in **Table 5.2.2**. The location of the tree group is shown in **MMH/369397/EA/501**. Tree assessment schedule and tree photographs of the tree group are shown in **Annex 5.3** and **Annex 5.4** respectively.

Table 5.2.2: Tree Species and Abundances in Tree Group in the Inaccessible Area

Scientific Name	Chinese Name	Abundance
Acacia auriculiformis	耳果相思	4
Acacia confusa	台灣相思	6
Albizia lebbeck	大葉合歡	2
Aleurites moluccana	石栗	4
Bombax ceiba	木棉	1
Carica papaya	番木瓜	1
Ficus microcarpa	細葉榕	1
Leucaena leucocephala	銀合歡	1
Macaranga tanarius* var. *tomentosa	血桐	3
Melia azedarach	苦楝	1
Psidium guajava	番石榴	1
Syzygium jambos	蒲桃	1
	TOTAL	**26**

Trees of Particular Interest (TPI)

5.2.4 During the tree survey, no registered OVT nor potential OVT as defined in DEVB TC(W) No. 05/2020 was identified. In addition, no tree species identified are of conservation importance. Tree species with conservation status i.e. *Khaya senegalensis* (IUCN: Vulnerable) was recorded, however, this tree species is exotic and is cultivated for amenity purpose, thus are not considered as tree species of conservation importance.

5.3 Tree Treatment Proposal

Trees to be Retained

5.3.1 One tree (T004) identified within the Site is proposed to be retained on site due to its large size.

5.3.2 Other 15 trees along the indicative site boundaries are also recommended to be retained as far as practicable as part of the greenery area to be provided within the Site.

5.3.3 In order to minimize the adverse effect to the existing tree during the construction period, tree protection fences shall be provided for all retaining trees. Preservation and protection of trees to be retained on site shall follow Clauses 26.08 to 26.15 of Section 26 Preservation and Protection of Trees in General Specification for Civil Engineering Works (GS) (2020 edition) issued by CEDD, DEVB TC(W) No. 5/2020, DEVB's "Guidelines on Tree Preservation during Development (April 2015)" and relevant guidelines such as Proper Planting Practices issued by Greening, Landscape and Tree Management Section of Development Bureau, in particular "Proper Planting Practice - Design for Tree Protection Zone", "Pictorial Guide for Tree Maintenance" and "Tree Care During Construction".

Trees to be Transplanted

5.3.4 No tree is recommended for transplanting due to poor tree form or structure, being a weedy tree species, or other limitations such as inability to extract a decent-sized rootball, etc.

Trees to be Felled

5.3.5 A total of 113 trees (including 87 individually surveyed trees and 26 from tree group TG00) are proposed to be felled due to their likely conflict with the proposed development. These trees are mainly in poor structure/ health condition and have low suitability for transplanting. The situation should be reviewed in the detailed design stage when implementing the proposed MSBs. Consideration should be made to retain the trees to be felled as far as practicable.

5.3.6 Tree removal application shall be submitted for approval in accordance with LAO Practice Note No. 2/2020 prior to any tree removal works under the proposed Development. All tree removal shall follow Clause 26.05 of Section 26 Preservation and Protection of Trees in CEDD's GS (2020 edition), and be carried out in accordance with paragraph 8 and 9 in "DEVB TC(W) No. 4/2020" only when tree preservation or transplanting is unsuitable or impracticable with the following conditions for the affected trees:

- low amenity value;
- poor health, structure or form;
- irrecoverable form after transplanting (e.g. transplanting requires substantial crown and root pruning);
- low chance of survival upon transplanting;
- undesirable species (e.g. *Leucaena leucocephala* which is an invasive, exotic and self-seeding tree);

- trees grown under poor conditions which have limited the formation of proper root ball necessary for transplanting

Summary of Proposed Tree Treatment

5.3.7 The proposed treatment of the individually surveyed trees and surveyed tree group are shown in **MMH/369397/EA/501, MMH/369397/EA/501A** to **MMH/369397/EA/501C**. **Table 5.3.1** summarises the recommended treatment of all identified individual trees and tree group.

Table 5.3.1: Summary of Proposed Tree Treatment

	Retain	Transplant	Fell	TOTAL
Site A	4(0)	0(0)	12(0)	16
Site B	11(0)	0(0)	24(8)	43
Site C	0(0)	0(0)	51(18)	69
TOTAL	**15**	**0**	**87**	**128**

Notes:
1. Number in parentheses indicate that the number of trees identified in tree group survey

Compensatory Planting Proposal

5.3.8 For existing trees within the Site that will inevitably be affected by the proposed Development, the implementation of compensatory tree planting should be of a ratio not less than 1:1 in terms of number as far as possible.

5.3.9 Sufficient spaces shall be provided for the planting of compensatory tree taking into account the adequate space required to cater the establishment and healthy growth of the trees up to maturity.

5.3.10 In addition to compensatory tree planting, the requirement of adequate greening area not less than 20% shall be adopted for each MSB site in accordance with Building Department Practices Notes no. APP-152 Sustainable Building Design Guidelines.

5.3.11 The detailed compensatory planting proposal shall be submitted with the tree removal application for approval in accordance with LAO Practice Note No. 2/2020.

5.4 Summary

5.4.1 A tree survey was conducted for the proposed development and the site verification, no major change of individual tree / tree groups was identified in September 2022.

5.4.2 During the tree surveys, 87 individual trees were identified within the Development Site and in areas where trees are likely to be affected; while one tree group with approximately 26 trees was identified within the Development Site. No trees of particular interests, including registered, potential OVT or tree species of conservation importance, was identified. Overall, 15 trees are proposed to be retained and approximately 87 trees are proposed to be felled for the implementation of the Development. Detailed tree removal application shall be submitted for approval in accordance with LAO Practice Note No. 2/2020 prior to any tree removal works under the proposed Development.

5.4.3 For the compensatory planting, compensatory tree planting should be as far as possible of a ratio not less than 1:1 in terms of number. In addition, it is recommended that the site coverage of greening area should be not less than 20% for each MSB site. The detailed compensatory planting proposal shall be submitted with the tree removal application for approval in accordance with LAO Practice Note No. 2/2020.

6 Ecological Impact

6.1 Introduction

6.1.1 This section presents an assessment of the potential ecological impacts associated with the construction and operation phases of the proposed Development. Potential impacts on the ecological resources and ecological sensitive receivers within the Study Site and tentative assessment area were assessed in accordance with the criteria and guidelines identified in Annexes 8 and 16 of the EIAO-TM. Suitable mitigation measures were proposed to mitigate adverse ecological impacts to an environmentally acceptable level.

6.2 Environmental Legislation, Standards and Guidelines

6.2.1 Numerous international conventions, local legislation and guidelines provide the framework for the protection of species and habitats of ecological importance. Those related to this proposed Development are:

- Forests and Countryside Ordinance (Cap. 96), which protects the rare plant species from selling, offering for sale, or possession illegally;
- Forestry Regulations (Cap. 96 sub. leg.) are subsidiary legislation of the Forests and Countryside Ordinance (Cap. 96). Under these regulations, no person shall without lawful excuse sell, offer for sale, or have in his possession or under his custody or control any portion of any of the plants scheduled under the Forestry Regulations. These regulations do not apply to plants grown outside Hong Kong or on any land held from the Government under a lease, licence or permit or by virtue of an Ordinance;
- Wild Animals Protection Ordinance (Cap. 170), which protects wild animals listed under the second schedule from being hunted, possession, sale or export, disturbance of their nest or egg without permission by authorised officer;
- Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586), which regulates the import, introduction from the sea, export, re-export, and possession of specimens of a scheduled species, including live, dead, parts or derivatives. The Ordinance applies to all activities involving endangered species which include the parties of traders, tourists and individuals;
- EIAO (Cap. 499), which specifies designated projects under Schedule 2 of the Ordinance, unless exempted, must follow the statutory EIA process and require environmental permits for their construction and operation;
- EIAO Guidance Notes No. 6/2010, 7/2010 and 10/2010. These guidance notes provide the observations on Ecological Assessment from the EIAO perspective, providing the general guidelines for conducting an ecological baseline survey for ecological assessment, introducing some methodologies in conducting terrestrial and freshwater ecological baseline surveys, and methodologies for marine ecological baseline surveys respectively;
- Annexes 8 and 16 of the EIAO-TM: Annex 8 recommends the criteria for evaluating ecological impacts. Annex 16 sets out the general approach and methodology for assessment of ecological impacts arising from a project or proposal, to allow a

complete and objective identification, prediction and evaluation of the potential ecological impacts;

- Town Planning Ordinance (Cap. 131) which gives designation to country parks, conservation area, green belts, sites of special scientific interest, coastal protection area and other specified uses to promote conservation, protection and education of the valuable environment;
- Chapter 10 of the HKPSG provides the guidelines on landscape and conservation to achieve a balance between the need for development and the need to minimise disruption of the landscape and natural resources.
- The IUCN Red List of Threatened Species is widely recognised as the most comprehensive, objective global approach for evaluating the conservation status of plant and animal species. The goal of the IUCN Red List is to provide information and analyses on the status, trends and threats to species in order to inform and catalyse action for biodiversity conservation;
- The CITES is an international agreement between Governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival;
- The Convention on the Conservation of Migratory Species of Wild Animals (the Bonn Convention) is an intergovernmental treaty concluded under the aegis of the United Nations Environment Programme concerned with the conservation of wildlife and habitats on a global scale. Its aim is to conserve terrestrial, marine and avian migratory species throughout their range;
- United Nations Convention on Biological Diversity (CBD) (1992) is an international legally binding treaty. Its aim is to develop national strategies for the conservation and sustainable use of biological diversity; and
- Wild Animal Protection Law of the Peoples' Republic of China is formulated for the purpose of protecting and saving the species of wildlife which are rare or near extinction, protecting, developing and rationally utilising wildlife resources and maintaining ecological balances.

6.3 Assessment Methodology

Study Site

6.3.1 The Study Site, i.e. the site for the proposed MSBs development), is shown in **MMH/369397/EA/601**.

Literature Review

6.3.2 A preliminary desktop study and literature review have been conducted to investigate the existing conditions within the Study Site and the Tentative Assessment Area (approximately 500m from the Study Site), and to identify habitats or species having conservation interest. The available information relevant to this proposed Development including approved EIA reports, Government and private sector reports, published literature, academic study reports and unpublished data requested were covered in the literature review. Examples for these are as follows:

- Approved EIA Report for the Yuen Long Barrage Scheme (Binnies, 2021)

- Ecological survey findings in the exhibited EIA Report for the Construction of Cycle Tracks and the associated Supporting Facilities at Nam Sang Wai, Yuen Long (Mott MacDonald, 2012)
- Field Guides to flora and fauna groups (individual books)
- Hong Kong Biodiversity Information Hub (AFCD, 2022)
- Hong Kong Biodiversity Newsletter published by Agriculture, Fisheries and Conservation Department (AFCD)
- Hong Kong Bird Report and other survey reports by HKBWS
- HKBWS Breeding Bird Survey (Carey et al., 2001)

6.3.3 Site specific ecological information were collected through daytime and night-time ecological field surveys from July 2016 to January 2017 under an assignment studying the feasibility of proposed MSB at the Site, covering both wet and dry seasons, to fill the information gaps identified in literature review. Methodology of the field surveys are presented in the following **Section 6.4**, while survey findings are presented in **Section 6.5**.

6.3.4 Updated ecological information has been obtained from the literature review of EIA Report for the Yuen Long Barrage Scheme (Binnies, 2021).

6.3.5 With reference to the ecological information presented in this report, no species of conservation interest was found within the Study Site.

Ecological Resources and Sensitive Receivers

Wetland Conservation Area and Wetland Buffer Area

6.3.6 The Study Site is within the YL INNOPARK area, adjacent to the Wetland Buffer Area. The Study Site does not fall into the Wetland Conservation Area or Wetland Buffer Area. The Study Site, Wetland Conservation Area and Wetland Buffer Area are shown in **MMH/369397/EA/601**.

6.4 Ecological Field Survey Schedule and Methodology

Ecological Field Survey Schedule

6.4.1 The conducted ecological field surveys covered the Study Site and the Tentative Assessment Area. The ecological field surveys covered a 7-month period including both wet and dry seasons from July 2016 to January 2017.

6.4.2 Special attention was paid to the ecologically sensitive wildlife groups and habitats. The field survey schedule is presented in **Table 6.4.1** below.

Table 6.4.1: Schedule of Ecological Field Surveys

Survey Type	Jul* 2016	Aug* 2016	Sep* 2016	Oct* 2016	Nov# 2016	Dec# 2016	Jan# 2016
Habitat Mapping and Vegetation Survey	✓		✓				✓
Fauna Surveys (Mammal, Avifauna, Herpetofauna, Butterflies & Odonates, Freshwater Aquatic Assemblages)	✓		✓				✓

Notes: *=wet season, # = dry season

Ecological Field Survey Methodology

6.4.3 Ecological field surveys were conducted following the guidelines stated in the "Ecological Baseline Survey for Ecological Assessment (EIAO Guidance Note No. 7/2010)" and "Methodologies for Terrestrial and Freshwater Ecological Baseline Surveys (EIAO Guidance Note No. 10/2010)".

Habitat Mapping and Vegetation Survey

6.4.4 Field surveys focusing on terrestrial habitat and vegetation (including trees, woodlands and plantations, etc.) were performed during the dry and wet seasons to establish the general terrestrial ecological profile of the Study Site and the Tentative Assessment Area. Habitats were mapped based on government latest aerial photos and field ground-truthing. Representative areas of each habitat type and the Study Site were surveyed on foot. Plant species of each habitat type encountered, and their relative abundance were recorded with special attention to rare or protected species. Nomenclature and conservation status of plant species followed Xing et al. (2000) and Wu and Lee (2000). Nomenclature also made reference to HKH & SCBC (2007, 2008, 2009 and 2011).

Terrestrial Mammal Survey

6.4.5 Terrestrial mammal surveys (including daytime and night-time surveys) were carried out. Night-time surveys were conducted to survey nocturnal mammal species. As most mammals often occur at low densities, all sightings, tracks, and signs of mammals (including droppings) were actively searched during the surveys. Nomenclature for mammals followed Shek (2006).

Avifauna Survey

6.4.6 The presence and abundance of avifauna species at various habitats were recorded visually aided with aural. Daytime avifauna surveys were carried out in the early morning at the period of peak bird activity. Night-time surveys were conducted near evening to record nocturnal avifauna. The location(s) of any avifauna species of conservation interest encountered were recorded, along with notable behaviour (e.g. breeding behaviour such as nesting and presence of recently fledged juveniles, roosting, and feeding activities). Signs of breeding (e.g. nests, recently fledged juveniles) were also recorded, if any. Observations were made using binoculars (at least 8X) and photographic records were taken, if possible. Ornithological nomenclature in this study followed HKBWS (2021).

Herpetofauna Survey

6.4.7 Herpetofauna surveys (including daytime and night-time surveys) were carried out. Herpetofauna surveys were conducted through direct observation and active searching in all habitat types and in potential hiding places such as among leaf litter, inside holes, under stones and logs. Particular attention was given to streams and watercourses. Auditory detection of species-specific calls was also used to survey frogs and toads. During the surveys, all reptiles and amphibians sighted and heard were recorded. Active search of species of conservation interest was also conducted during the survey to confirm the current status. Nomenclature and status used for reptiles followed Karsen et al. (1998) and Chan et al. (2006) while that of amphibians followed Chan et al. (2005).

Butterfly and Odonate Survey

6.4.8 Butterfly and odonate surveys (including daytime survey only) were carried out by direct observation. Relative abundance of butterflies and odonates in each type of habitat was estimated. All butterflies and odonates encountered were recorded in order to produce a complete species list. Nomenclature for butterflies followed Walthew (1997) and Yiu (2004), and odonate nomenclature followed Wilson (2004).

6.5 Ecological Field Survey Findings

Habitat and Vegetation

6.5.1 The habitat of the Study Site and the area within the Tentative Assessment Area mainly comprises the Developed Area (characterised by largely paved area with low vegetation coverage).

6.5.2 Representative photo of the Developed Area habitat is illustrated in **Annex 6.1**. Flora species recorded in the Study Site and the Tentative Assessment Area are tabulated in **Annex 6.2**.

6.5.3 Most of the vegetated areas in the Developed Area are purposely planted and regularly maintained. Various landscape planting species were found in this habitat. Tree species observed with low abundance include *Albizia lebbeck*, *Aleurites moluccana*, *Bombax ceiba*, *Delonix regia*, *Ficus microcarpa*, *Khaya senegalensis*, *Melaleuca cajuputi* subsp. *cumingiana*, *Melia azedarach*, *Spathodea campanulata* and *Sterculia lanceolata*. Shrub and herb species were also recorded with low abundance. No flora species of conservation interest is recorded in this habitat.

Species of Conservation Interest

6.5.4 No flora and fauna of conservation interest was recorded within the Study Site. The approximate locations of flora and fauna species of conservation interest recorded in the Tentative Assessment Area are shown in **MMH/369397/EA/601**.

Terrestrial Mammals

6.5.5 A total of three species of mammals were recorded in the Developed Area during the surveys. No species of conservation interest was recorded in the Study Site.

6.5.6 Details of the survey result of terrestrial mammal surveys are presented in **Annex 6.2** while the approximate location of unidentified insectivorous bat species (protected under Cap. 170) recorded during the ecological surveys is shown in **MMH/369397/EA/601**.

Avifauna

6.5.7 A total of 17 species of avifauna were recorded in the Developed Area during the surveys. No species of conservation interest was recorded in the Study Site . Black Kite and Eastern Buzzard, both being species protected under Cap. 586, were recorded flying over the Developed Area distant from the Study Site .

6.5.8 Details of the survey result of avifauna surveys are presented in **Annex 6.2** while the approximate locations of avifauna species of conservation interest recorded during the ecological surveys is shown in **MMH/369397/EA/601**.

Herpetofauna

6.5.9 Two very common herpetofauna species were recorded in the Development Area during the surveys. No species of conservation interest was recorded in the Study Site .

6.5.10 Details of the survey result of herpetofauna surveys are presented in **Annex 6.2**.

Butterflies and Odonates

6.5.11 A total of seven butterfly species were recorded in the Developed Area during the surveys. All of them are common or very common species. No butterfly species of conservation interest was recorded in the Study Site .

6.5.12 A total of three odonate species were recorded in the Developed Area during the surveys. All of them are common or abundant species. No odonate species of conservation interest was recorded in the Study Site.

6.5.13 Details of the survey result of butterfly and odonate surveys are presented in **Annex 6.2** while the approximate locations of butterfly and odonate species of conservation interest recorded during the surveys are shown in **MMH/369397/EA/601**.

Freshwater Aquatic Assemblages

6.5.14 There was no freshwater habitat identified in the Developed Area, thus no freshwater fauna survey was conducted in the Study Site.

6.6 Evaluation of Ecological Importance

Habitat Evaluation

6.6.1 Ecological evaluation of the habitat type identified in the Study Site is presented in **Table 6.6.1** below.

Table 6.6.1: Ecological Evaluation of Developed Area

Criteria	Developed Area
Naturalness	Man-made habitat with intensive human activities
Size	Small in size (approx. 3.22 ha in the Study Site)
Diversity	Low in terms of floral diversity (18 species recorded)
Rarity	This habitat type is common in Hong Kong No flora and fauna species of conservation interest is recorded;
Re-creatability	Readily re-creatable
Fragmentation	Generally not fragmented
Ecological linkage	No ecological linkage to other habitats
Potential value	Low potential value with respect to the existing and planned specific land-uses
Nursery / Breeding ground	No record of significant nursery or breeding ground
Age	Probably >30 years of urbanisation for most areas of this man-made habitat
Abundance / Richness of wildlife	Moderate-low species richness with 32 fauna species recorded (including species recorded in Study Site and the Tentative Assessment Area) during the field surveys
Ecological value	Low

Evaluation of Species of Conservation Interest

6.6.2 No species of conservation interest was recorded in the Study Site.

6.7 Identification and Evaluation of Potential Ecological Impact

Evaluation Criteria

6.7.1 The potential impacts described below have been assessed and evaluated in accordance with the criteria stipulated in the EIAO-TM. Levels of ecological impacts were ranked as follows:

- Severe
- Severe-moderate
- Moderate
- Moderate-minor
- Minor
- Negligible

Sources of Potential Ecological Impact

6.7.2 Works of the proposed Development will comprise site clearance, foundation works, construction of buildings and associated structural works. The potential ecological impacts during construction and operation phases include direct habitat loss, and secondary impacts on fauna species of ecological significance including disturbance of foraging, breeding and roosting sites. Details of the potential impacts are identified and assessed as below.

Habitat Loss

6.7.3 The Developed Area of approximately 3.23 ha will be cleared for the proposed MSBs development. Since the Developed Area is largely paved with various existing land uses under constant human disturbance, clearance of such a developed area during construction will cause temporary loss of a habitat of low ecological value. In view of its nature of highly disturbed urban habitat, the potential ecological impact of habitat loss is anticipated to be minor during construction.

6.7.4 Upon completion of the proposed MSBs, the Developed Area will be converted into a site mainly covered with above-ground hard structures. The habitat type will remain largely unchanged as it is now. The ecological impact during operation is therefore considered as negligible.

Impact on Species of Conservation Interest

6.7.5 There was no flora species of conservation interest recorded in the Study Site. The nearest flora species of conservation interest *Aquilaria sinensis* within the Tentative Assessment Area is found on the hill slope of Chu Wong Ling at a location more than 300m from the Study Site, therefore, no direct impact or any indirect offsite disturbance to this flora species of conservation interest due to the proposed Development is anticipated.

6.7.6 None of the fauna species of conservation interest identified was observed in or associated with the Study Site. Hence, no direct impact or any indirect offsite disturbance to these fauna species of conservation interest due to the proposed Development is anticipated.

Offsite Disturbance and Impact on Environmental Quality

6.7.7 During construction, dust, noise and waste generated by site clearance, buildings construction and associated structure works might affect the adjoining habitats. Site runoff, sewage effluent or accidental spillage of any chemical could also pollute the drainage channels if uncontrolled. For the proposed Development, since the construction noise, air emission, site runoff, waste handling and disposal, sewage effluent disposal and handling of chemicals will be closely monitored according to respective regulations and ordinances on air, noise, waste and water, any potential impact on the offsite habitats and environmental quality of the surrounding areas are expected to be within acceptable levels. Significance of potential offsite disturbance and indirect impact on environmental quality is considered as minor during the construction phase.

6.7.8 During operation, surface runoff, uncontrolled effluent discharges, unmanaged general refuse and chemical waste may pose indirect impact on the adjoining habitats by

deteriorating the environmental quality. Nevertheless, discharge and waste disposal will be controlled according to respective ordinances on water quality and waste handling. Potential offsite disturbance and indirect impact on the environmental quality during operation phase are therefore considered as minor.

Reduction of Ecological Carrying Capacity

6.7.9 Ecological carrying capacity refers to the ecological resource that a habitat or an area can sustain. The whole area of the Study Site is an artificially modified habitat and considered as of generally insignificant ecological value with limited ecological carrying capacity. The flora and fauna resources are generally not of significant ecological importance in the area. Also, the proposed works of the proposed Development will not alter the habitat type of the Study Site. Hence, the potential impact on the ecological carrying capacity is considered as negligible.

Habitat Fragmentation

6.7.10 Habitat fragmentation is considered significant if a high-value ecological habitat is divided into disconnected patches, thus affecting the ecological linkages. For the proposed Development, no habitat of high ecological value will be lost, and no habitat type will be altered. Hence, potential ecological impact due to habitat fragmentation is not anticipated for the proposed Development in both construction and operation phases.

Bird Collision to New Building Structures

6.7.11 During operation, glazed window and glass curtain of the proposed buildings, if any, may pose a risk of bird collision. Glazing in building structures causes deception to birds, either by reflection of an outdoor scene (e.g. the sky, clouds, trees and vegetation) that reproduces habitats familiar and attractive to birds, or by transparency view that appears to birds as a potential flight path. For instance, birds strike glazed curtain-wall as they attempt to access potential perches, potted plants, water sources and other lures inside and beyond the glass. Since extensive of glazed window and glass curtain wall are not expected for the proposed MSBs which are intended for industrial uses, the risk of bird collision is expected to be minor.

6.8 Recommended Mitigation Measures

Basic Principle

6.8.1 According to Annex 16 in EIAO-TM, mitigation measures were proposed to avoid, minimise and/or compensate for the adverse ecological impacts identified, with an aim to protect, maintain or rehabilitate the natural environment if considered necessary.

Impact on Species of Conservation Interest

6.8.2 No specific mitigation measure is proposed for the flora and fauna species of conservation interest since no direct impact and no indirect offsite disturbance is anticipated.

Offsite Disturbance and Impact on Environmental Quality

6.8.3 With proper implementation of control measures for noise, air quality, water and waste, residual ecological disturbance and deterioration of environmental quality is anticipated to be minor. Hence, no specific mitigation measure is proposed to minimise offsite

ecological disturbance.

Reduction of Ecological Carrying Capacity

6.8.4 Since the significant of impact on reduction of ecological carrying capacity is considered negligible, no specific mitigation measure is proposed to minimise reduction of ecological carrying capacity.

Habitat Fragmentation

6.8.5 Since potential ecological impact due to habitat fragmentation is not anticipated for the proposed Development in both construction and operation phases, no specific measure is proposed to minimise habitat fragmentation.

Bird Collision to New Building Structures

6.8.6 To minimise the risk of bird collision, the use of glazed window, glass curtain wall and any other form of vertical glass surface is not recommended for the proposed MSBs.

Post-mitigation Acceptability of the Development Site

6.8.7 **Table 6.8.1** summarises the potential impacts of the proposed Development without mitigation, the proposed mitigation measures and significance of impact after mitigation. With implementation of the recommended mitigation measures, residual ecological impact is anticipated to range from minor to negligible.

Table 6.8.1: Summary of Potential Ecological Impacts before and after Adoption of Mitigation Measures

Potential Impact	Significance without Mitigation	Proposed Mitigation Measure	Significance after Mitigation
Habitat loss	Minor during construction; negligible during operation	Further review the extent of works limit during detailed design	Minor during construction; negligible during operation
Impact on flora species of conservation interest	Negligible	No mitigation required	Negligible
Impact on fauna species of conservation interest	Negligible; no significant impact to the flight path of the waterbirds and ardeids is anticipated	No mitigation required	Negligible
Offsite disturbance and impact on environmental quality	Minor	Proper implementation of control measures for noise, air quality, water and waste	Minor
Reduction of ecological carrying capacity	Negligible	No mitigation required	Negligible
Habitat fragmentation	Negligible	No mitigation required	Negligible
Bird Collision to New Building Structures	Minor	Avoid or minimise the use of glazed window, glass curtain and any other form of vertical glass surface of the proposed buildings during detailed design as far as practicable	Negligible

6.9 Cumulative Impact

6.9.1 The proposed Development is expected to overlap with the implementation programme of other projects under planning and/or construction in the vicinity, and the potential cumulative ecological impact is assessed below.

Agreement No. CE 93/2017 (DS) Yuen Long Barrage Scheme – Investigation, Design and Construction

6.9.2 Part of the Development site of the proposed barrage scheme at the Yuen Long Nullah (YLN) is about 400m of the Study Site, and is within the Wetland Buffer Area. The construction works of the pumping stations and tidal barrier is anticipated to commence in Q4 of 2022 and complete by Q3 of 2027. Revitalisation works along YLN would take place until Q3 of 2029.

6.9.3 The proposed barrage scheme involves permanent loss of plantation (low in ecological value) and temporary loss of channelised watercourse (low to middle in ecological value) in Yuen Long Nullah Section 4. The direct impact of habitat loss in plantation is considered minor, and that for the temporary loss of channelised watercourse is considered minor to moderate.

6.9.4 Since only temporary loss of Developed Area of low ecological value is expected in the Study Site, and there is no habitat of watercourse and plantation identified, cumulative impact of habitat loss during construction and operation of the proposed Development is not anticipated. The channelised watercourse of YLN is also expected to be ecologically enhanced after revitalisation. With mitigation measures proposed to minimise any offsite disturbance and indirect impact on environmental quality during construction and operation, cumulative impacts are considered minimal

6.10 Conclusion

6.10.1 The Study Site mainly comprises the Developed Area habitat which is characterised by paved surfaces and low-rise structures with constant human disturbance. Loss of the Developed Area is temporary during construction with minor impact significance. Direct and indirect impacts on flora and fauna species of conservation interest are not anticipated. Offsite disturbance and indirect impact on environmental quality is considered as minor. Potential impacts on reduction of ecological carrying capacity and habitat fragmentation are not anticipated, while risk of bird collision to new building structures can be mitigated by minimising the use of vertical glass surface on new building structures. Given that the habitat affected is artificial with limited ecological value and minor indirect impacts anticipated, the potential ecological impact due to construction and operation of the proposed Development is considered as minor and acceptable.

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7 Land Contamination

7.1 Introduction

7.1.1 This section presents an assessment of the potential land contamination impacts associated with the Development Site. Recommendations for mitigation measures have been made where necessary to minimise potential water quality impacts.

7.2 Assessment Criteria

7.2.1 EPD issued two guidelines for utilising Risk-based Remediation Goals (RBRGs) developed for Hong Kong, namely, “Guidance Note for Contaminated Land Assessment and Remediation” (Guidance Note) and “Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management” (Guidance Manual). The land contamination assessment was carried out in accordance with the Guidance Manual and Guidance Note. In addition, reference was also made to the “Practice Guide for Investigation and Remediation of Contaminated Land” (Practice Guide).

7.2.2 Based on the initial design, the proposed Development is not considered as a Designated Project (DP) under Schedule 2, Part I or Schedule 3. Therefore, the guidelines for evaluating and assessing potential land contamination issues as stated in Section 3.1 of Annex 19 of Technical Memorandum on Environmental Impact Assessment (EIA) Process were not applicable to this report. Nevertheless, subject to detailed design at later stage, if the recommended design option is classified as a DP under Schedule 2, Part I or Schedule 3, the relevant guidelines will be adopted when conducting land contamination assessment.

7.3 Approach and Methodology

7.3.1 The assessment includes desktop review and site visit of the Development site as listed below:

- Desktop review to investigate the current and past land uses in the Development Sites and surrounding area with the aid with historical aerial photographs, maps and previous endorsed Contamination Assessment Plan (CAP);
- Site visit to identify the current land uses in the Project Sites as well as the potential contamination areas and hotspots; and
- Records of accidents that involved spillage / leakage of chemical waste or DG from EPD and FSD

7.4 Identification and Evaluation of Environmental Impacts

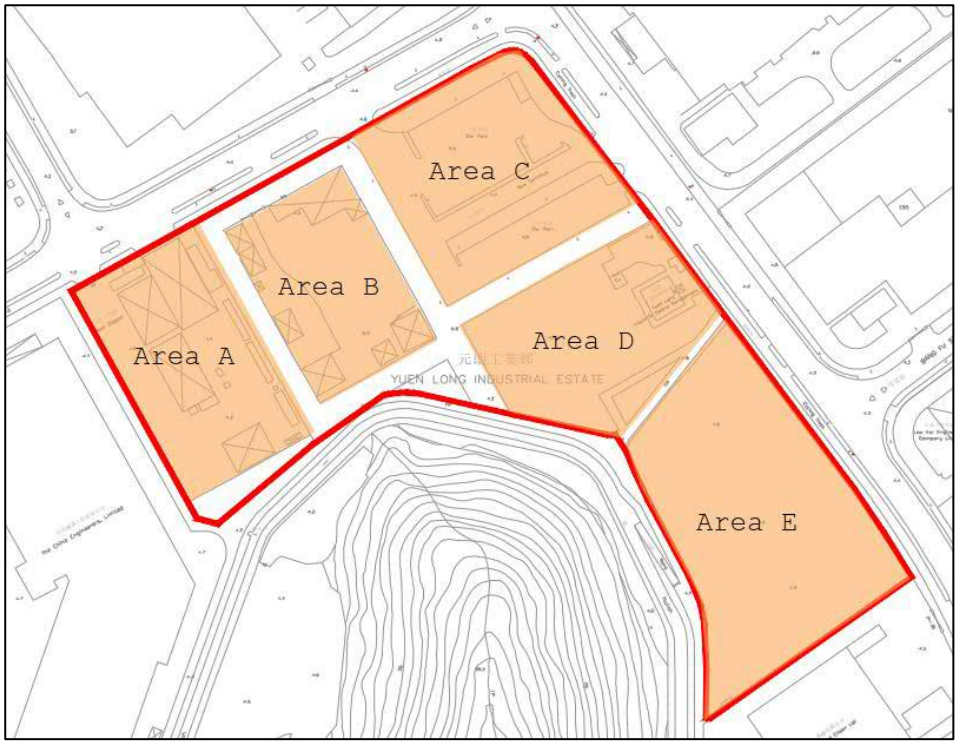
Desktop Review

7.4.1 Prior to conducting the land contamination assessment, a CAP, which details the findings of desktop study and site reconnaissance survey and the proposed SI works,

was endorsed by EPD on 6 March 2017. The endorsed CAP is provided in **Annex 7.1** for reference.

7.4.2 A review of the historical aerial photos of the Development site for different timelines has been conducted. With reference to the historical and the existing land uses, the Site has been divided into five areas (i.e. Area A to Area E) (**Figure 7.1**) for reporting the review results.

Figure 7.1: Locations of Areas A to E



7.4.3 The observed land uses for the above five areas for 2014, 2015, 2018 and 2020 are listed in **Table 7.4.1**. A further site reconnaissance survey was carried out on 11 February 2022. It was confirmed that there has been no changes in the land uses when compared with the review of the aerial photos taken in 2020.

Table 7.4.1: Details of Areas A to E as Site Survey in 2018, 2020 and 2022

Year	Area A	Area B	Area C	Area D	Area E
2014	KMB Maintenance Depot was built in progress	WSD area for the purpose of storage compound (Ming Hing Waterworks)	Open Carpark & Bus Stop	A minor portion of Area D is occupied by Estate Management Office – Yuen Long Industrial Estate and the remaining is	DSD works area (DSD Contract DC/2011/07 and DC/2012/05)

Year	Area A	Area B	Area C	Area D	Area E
				unoccupied area with bushes	
2015	KMB Maintenance Depot	No change	No change	No change	No change
2018	No change	No change	No change	No change	No change
2020	No change	No change	No change	No change to the portion for Estate Management Office – Yuen Long Industrial Estate and the remaining is paved open area with some car parking	Most of land is vacant but one temporary warehouse is identified in the middle of the land
2022	No change	No change	No change	No change	No change

7.4.4 Two registered Chemical Waste Producers (CWPs) were identified on the Study Site. The CWPs record is summarised in **Table 7.4.2** below.

Table 7.4.2: Summary of CWPs (as of 9 September 2022)

Name of CWP	Premises Address	Nature of Business	Register Status
Ming Hing Waterworks Engineering Co. Ltd.	DD123, Lot GLA-TYL, WSD Maintenance Yard, Fuk Wang Street (Contract No. 1/WSD/12CW) (**partly within Site A and partly within Site B of the Study Site**)	Engineering and Construction	Valid
The Kowloon Motor Bus Company (1933) Limited	Fuk Wang Street (**within Site A of the Study Site**)	Passenger Transportation Corporation	Valid

Identification of Potentially Contaminated Areas

7.4.5 Based on the findings of endorsed CAP and site reconnaissance survey, Areas A, B, D (Transformers Room) and E were identified as potentially contaminated at the Study Site.

7.5 Conclusion

7.5.1 A CAP which details the findings of desktop study and site reconnaissance survey and the proposed SI works, was endorsed by EPD on 6 March 2017.

7.5.2 It was noted majority of the MSB Development Site is currently occupied and managed by various operators and is still in operation, therefore undertaking the SI works at this stage is not possible. Besides, it is also not worthy to conduct SI when the site is still in operation as the on-going operation of the site will make the assessment result obsolete. Therefore, it is recommended to commence the SI only after the operation is terminated and the land is available for the proposed development.

7.5.3 The proposed contamination SI works in the endorsed CAP is for general reference only, and the exact extent, number of sampling locations etc. will have to be further reviewed and updated when the land in question is available.

7.5.4 It is recommended that site re-appraisal be conducted after taking up the site to ascertain initial contamination evaluation of all areas and review the site investigation works proposed in the endorsed CAP. The findings of the re-appraisal will then be documented appropriately, such as by Supplementary CAP to EPD for agreement prior to the commencement of SI works. After the site investigation, the soil sampling and testing results will be presented in the CAR and submitted to EPD for agreement. If land contamination is confirmed, RAP and RR will also be prepared and submitted to EPD for agreement prior to commencement of the site works for the proposed MSBs development.

8 Water Quality Impact

8.1 Introduction

8.1.1 This section presents an assessment of the potential water quality impacts associated with the construction and operation phases of the proposed Development. Recommendations for mitigation measures have been made where necessary to minimise potential water quality impacts.

8.2 Water Quality Legislations, Standards and Guidelines

8.2.1 The following legislation and associated guidance are applicable for the evaluation of water quality impacts associated with the Development Site Area.

- WPCO (Cap. 358);
- Technical Memorandum for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (WPCO, Cap. 358, S.21);
- EIAO (Cap. 499., S.16), EIAO-TM, Annexes 6 and 14;
- "No Net Increase in Pollution Load" Requirement in Deep Bay; and
- ProPECC Note PN 1/94.
- ProPECC PN 5/93

8.3 Water Pollution Control Ordinance (Cap. 358)

8.3.1 Under the WPCO (Chapter 358), Hong Kong waters are divided into ten WCZs and four supplementary water control zones. Each WCZ has a designated set of statutory WQOs designed to protect the inland and/or marine environment and its users. The tentative assessment area of the proposed Developmentis within the Deep Bay Water Control Zone and the corresponding WQOs are listed in **Table 8.3.1** below.

Table 8.3.1: Water Quality Objectives for Deep Bay Water Control Zone

Parameters	Objectives	Sub-Zone
Aesthetic appearance	Waste discharges shall cause no objectionable odours or discolouration of the water.	Whole zone
	Tarry residues, floating wood, articles made of glass, plastic, rubber or of any other substances should be absent.	
	Mineral oil should not be visible on the surface. Surfactants should not give rise to a lasting foam.	
	There should be no recognisable sewage-derived debris.	

Parameters	Objectives	Sub-Zone
	Floating, submerged and semi-submerged objects of a size likely to interfere with the free movement of vessels, or cause damage to vessels, should be absent.	
	Waste discharges shall not cause the water to contain substances which settle to form objectionable deposits.	
Bacteria (*E. coli*)	Not exceed 610 per 100ml, calculated as the geometric mean of all samples collected in a calendar year.	Secondary Contact Recreation Subzone and Mariculture Subzone (L.N. 455 of 1991)
	Should be zero per 100ml, calculated as the running median of the most recent 5 consecutive samples taken at intervals of between 7 and 21 days.	Yuen Long & Kam Tin (Upper) Subzone, Beas Subzone, Indus Subzone, Ganges Subzone and Water Gathering Ground Subzones
	Not exceed 1000 per 100ml, calculated as the running median of the most recent 5 consecutive samples taken at intervals of between 7 and 21 days.	Yuen Long & Kam Tin (Lower) Subzone and other inland waters
	Not exceed 180 per 100ml, calculated as the geometric mean of all samples collected from March to October inclusive in one calendar year. Samples should be taken at least 3 times a calendar month at intervals of between 3 and 14 days.	Yung Long Bathing Beach Subzone (L.N. 455 of 1991)
Depth-averaged DO	Not cause the level of dissolved oxygen to fall below 4mg L^{-1} for 90% of the sampling occasions during the year; values should be taken at 1 metre below surface.	Inner Marine Subzone excepting Mariculture Subzone
	Not cause the level of dissolved oxygen to fall below 4mg L^{-1} for 90% of the sampling occasions during the year; values should be calculated as water column average (arithmetic mean of at least 2 measurements at 1 metre below surface and 1 metre above seabed).	Outer Marine Subzone excepting Mariculture Subzone
	Not be less than 5 mg L^{-1} for 90% of the sampling occasions during the year; values should	Mariculture Subzone

Parameters	Objectives	Sub-Zone
	be taken at 1 metre below surface.	
	Not cause the level of dissolved oxygen to be less than 4 mg L^{-1}.	Yuen Long & Kam Tin (Upper and Lower) Subzones, Beas Subzone, Indus Subzone, Ganges Subzone, Water Gathering Ground Subzones and other inland waters of the Zone
DO within 2m of the seabed	Not be less than 2 mg L^{-1} within 2m of the seabed for 90% of the sampling occasions during the whole year.	Outer Marine Subzone excepting Mariculture Subzone
Turbidity	Waste discharges shall not reduce light transmission substantially from the normal level	Yung Long Bathing Beach Subzone
Colour	Human activity should not cause the colour of water to exceed 30 Hazen units.	Yuen Long & Kam Tin (Upper) Subzone, Beas Subzone, Indus Subzone, Ganges Subzone and Water Gathering Ground Subzones
	Human activity should not cause the colour of water to exceed 50 Hazen units.	Yuen Long & Kam Tin (Lower) Subzone and other inland waters
pH	To be in the range of 6.5 – 8.5, change due to human activity not to exceed 0.2 units	Marine waters excepting Yung Long Bathing Beach Subzone
	To be in the range of 6.5 – 8.5	Yuen Long & Kam Tin (Upper and Lower) Subzones, Beas Subzone, Indus Subzone, ganges Subzone and Water Gathering Ground Subzones Other inland waters
	To be in the range of 6.0 - 9.0	Other inland waters
	To be in the range of 6.0-9.0 for 95% of samples, change due to human activity not to exceed 0.5 units.	Yung Long Bathing Beach Subzone
Salinity	Change due to human activity not to exceed 10% of ambient level.	Whole zone
Temperature	Not to exceed 2°C change due to human activity.	Whole zone
SS	Not to be raised by more than 30% nor give rise to accumulation of suspended solids which may adversely affect aquatic communities.	Marine waters

Parameters	Objectives	Sub-Zone
	Human activities shall not cause the annual median of suspended solids to exceed 20 mg L^{-1}.	Yuen Long & Kam Tin (Upper and Lower) Subzones, Beas Subzone, Ganges Subzone, Indus Subzone, Water Gathering Ground Subzones and other inland waters
UIA	Not to exceed 0.021 mg L^{-1}, calculated as the annual average (arithmetic mean).	Whole zone
Phenol	Phenols shall not be present in such quantities as to produce a specific odour, or in concentration greater than 0.05 milligrams per litre as C_6H_5OH.	Yung Long Bathing Beach Subzone
BOD_5	Waste discharges shall not cause the 5-day biochemical oxygen demand to exceed 3 mg L^{-1}	Yuen Long & Kam Tin (Upper) Subzone, Beas Subzone, Indus Subzone, Ganges Subzone and Water Gathering Ground Subzones
	Waste discharge shall not cause the 5-day biochemical oxygen demand to exceed 5 mg L^{-1}	Yuen Long & Kam Tin (Lower) Subzone and other inland waters
COD_5	Waste discharges shall not cause the chemical oxygen demand to exceed 15 mg L_{-1}	Yuen Long & Kam Tin (Upper) Subzone, Beas Subzone, Indus Subzone, Ganges Subzone and Water Gathering Ground Subzones
	Waste discharges shall not cause the chemical oxygen demand to exceed 30 mg L^{-1}	Yuen Long & Kam Tin (Lower) Subzone and other inland waters
Nutrients	Not present in quantities sufficient to cause excessive algal growth or other aquatic plants	Inner and Outer Marine Subzones
	Annual mean depth-averaged inorganic nitrogen not to exceed 0.7 mg L^{-1}	Inner Marine Subzone
	Level of inorganic nitrogen should not exceed 0.5 mg L^{-1}, expressed as annual water column average (arithmetic mean of at least 2 measurements at 1 metre below surface and 1 metre above seabed).	Outer Marine Subzone
Toxic substances	Not to attain such levels as to produce significant toxic, carcinogenic, mutagenic or teratogenic effects in humans, fish or any other aquatic organisms.	Whole zone

Parameters	Objectives	Sub-Zone
	Not to cause a risk to any beneficial use of the aquatic environment due to human activity.	Whole zone

Source: Statement of Water Quality Objectives (Deep Bay Water Control Zone)

8.3.2 The WQOs are applicable as evaluation criteria for assessing compliance of any water quality impacts associated with the construction and operation of the proposed Development.

Technical Memorandum for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (WPCO, Cap. 358, S.21)

8.3.3 Discharges of effluents are subject to control under the WPCO. The TM-DSS sets the limits for effluent discharges. Specific limits apply for different areas and are different between surface waters and sewers. The limits vary with the rate of effluent flow. Effluent from the proposed construction and operation phase activities should comply with the standards for effluent discharged into Group D (general amenity and secondary contact recreation use); coastal waters of the Deep Bay WCZ; and the standards for effluents discharged into foul sewers leading into Government sewage treatment plants as stated in TM-DSS and reproduced in **Table 8.3.2, Table 8.3.3 and Table 8.3.4** respectively.

Table 8.3.2: Standards for Effluents Discharged into Group D Inland Waters

Flow rate (m^3/day) Determinant	≤200	>200 and ≤400	>400 and ≤600	>600 and ≤800	>800 and ≤1000	>1000 and ≤1500	>1500 and ≤2000	>2000 and ≤3000
pH (pH units)	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10
Temperature (°C)	30	30	30	30	30	30	30	30
Colour (lovibond units) (25mm cell length)	1	1	1	1	1	1	1	1
SS	30	30	30	30	30	30	30	30
BOD	20	20	20	20	20	20	20	20
COD	80	80	80	80	80	80	80	80
Oil & Grease	10	10	10	10	10	10	10	10
Iron	10	8	7	5	4	2.7	2	1.3
Boron	5	4	3.5	2.5	2	1.5	1	0.7
Barium	5	4	3.5	2.5	2	1.5	1	0.7
Mercury	0.1	0.05	0.001	0.001	0.001	0.001	0.001	0.001

Flow rate (m^3/day) Determinant	≤200	>200 and ≤400	>400 and ≤600	>600 and ≤800	>800 and ≤1000	>1000 and ≤1500	>1500 and ≤2000	>2000 and ≤3000
Cadmium	0.1	0.05	0.001	0.001	0.001	0.001	0.001	0.001
Other toxic metals individually	1	1	0.8	0.8	0.5	0.5	0.2	0.2
Total toxic metals	2	2	1.6	1.6	1	1	0.5	0.4
Cyanide	0.4	0.4	0.3	0.3	0.2	0.1	0.1	0.05
Phenols	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1
Sulphide	1	1	1	1	1	1	1	1
Sulphate	800	600	600	600	600	400	400	400
Chloride	1000	800	800	800	600	600	400	400
Fluoride	10	8	8	8	5	5	3	3
Total phosphorus	10	10	10	8	8	8	5	5
Ammonia nitrogen	20	20	20	20	20	20	20	10
Nitrate + nitrite nitrogen	50	50	50	30	30	30	30	20
Surfactants (total)	15	15	15	15	15	15	15	15
***E.coli* (count/100ml)**	1000	1000	1000	1000	1000	1000	1000	1000

Source: Table 6, Cap 358AK – Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters

Note: all units in mg/L unless otherwise stated; all figures are upper limits unless otherwise indicated.

Table 8.3.3: Standards for Effluents Discharged into the Coastal Waters of Deep Bay WCZ

Flow rate (m^3/day) Determinant	≤ 10	> 10 and ≤ 200	> 200 and ≤ 400	> 400 and ≤ 600	> 600 and ≤ 800	> 800 and ≤ 1000	> 1000 and ≤ 1500	> 1500 and ≤ 2000	> 2000 and ≤ 3000	> 3000 and ≤ 4000	> 4000 and ≤ 5000	> 5000 and ≤ 6000
pH (pH units)	6-9	6-9	6-9	6-9	6-9	6-9	6-9	6-9	6-9	6-9	6-9	6-9
Temperature	45	45	45	45	45	45	45	45	45	45	45	45

Flow rate (m^3/day) Determinant	≤ 10	> 10 and ≤ 200	> 200 and ≤ 400	> 400 and ≤ 600	> 600 and ≤ 800	> 800 and ≤ 1000	> 1000 and ≤ 1500	> 1500 and ≤ 2000	> 2000 and ≤ 3000	> 3000 and ≤ 4000	> 4000 and ≤ 5000	> 5000 and ≤ 6000
Colour (lovibond units) (25mm cell length)	1	1	1	1	1	1	1	1	1	1	1	1
Suspended solids	50	50	50	50	50	50	25	25	25	25	25	25
BOD	20	20	20	20	20	20	10	10	10	10	10	10
COD	80	80	80	80	80	80	50	50	50	50	50	50
Oil & Grease	20	20	20	20	20	20	10	10	10	10	10	10
Iron	10	10	10	7	5	4	3	2	1	1	1	1
Boron	5	4	3	2.5	2	1.6	1.1	0.8	0.5	0.4	0.3	0.2
Barium	5	4	3	2.5	2	1.6	1.1	0.8	0.5	0.4	0.3	0.2
Mercury	0.1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cadmium	0.1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Other toxic metals individually	1	0.5	0.5	0.5	0.4	0.4	0.25	0.2	0.15	0.1	0.1	0.1
Total Toxic metals	2	1	1	1	0.8	0.8	0.5	0.4	0.3	0.2	0.14	0.1
Cyanide	0.1	0.1	0.1	0.1	0.1	0.08	0.06	0.04	0.03	0.02	0.01	0.01
Phenols	0.5	0.5	0.4	0.3	0.25	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Sulphide	5	5	5	5	5	5	2.5	2.5	1.5	1	1	0.5
Total residual chlorine	1	1	1	1	1	1	1	1	1	1	1	1
Total nitrogen	100	100	100	100	100	100	80	80	50	50	50	50
Total phosphorus	10	10	10	10	10	10	8	8	5	5	5	5
Surfactants (total)	15	15	15	15	15	15	10	10	10	10	10	7
***E.coli* (count/100ml)**	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	5000	1000

Source: Table 8, Cap 358AK – Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters

Note: all units in mg/L unless otherwise stated; all figures are upper limits unless otherwise indicated.

Table 8.3.4: Standards for Effluents Discharged into Foul Sewers leading into Government Sewage Treatment Plants

Flow rate (m^3/day) Determinant	≤ 10	>10 and ≤100	> 10 and ≤ 200	> 200 and ≤ 400	> 400 and ≤ 600	> 600 and ≤ 800	> 800 and ≤ 1000	> 1000 and ≤ 1500	> 1500 and ≤ 2000	> 2000 and ≤ 3000	> 3000 and ≤ 4000	> 4000 and ≤ 5000	> 5000 and ≤ 6000
pH (pH units)	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10
Temperature (°C)	43	43	43	43	43	43	43	43	43	43	43	43	43
Suspended solids	1200	1000	900	800	800	800	800	800	800	800	800	800	800
Settleable solids	100	100	100	100	100	100	100	100	100	100	100	100	100
BOD	1200	1000	900	800	800	800	800	800	800	800	800	800	800
COD	3000	2500	2200	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Oil & Grease	100	100	50	50	50	40	30	20	20	20	20	20	20
Iron	30	25	25	25	15	12.5	10	7.5	5	3.5	2.5	2	1.5
Boron	8	7	6	5	4	3	2.4	1.6	1.2	0.8	0.6	0.5	0.4
Barium	8	7	6	5	4	3	2.4	1.6	1.2	0.8	0.6	0.5	0.4
Mercury	0.2	0.15	0.1	0.1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cadmium	0.2	0.15	0.1	0.1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Copper	4	4	4	3	1.5	1.5	1	1	1	1	1	1	1
Nickel	4	3	3	2	1.5	1.5	1	0.8	0.7	0.7	0.6	0.6	0.6
Chromium	2	2	2	2	1	0.7	0.6	0.4	0.3	0.2	0.1	0.1	0.1
Zinc	5	5	4	3	1.5	1.5	1	0.8	0.7	0.7	0.6	0.6	0.6
Silver	4	3	3	2	1.5	1.5	1	0.8	0.7	0.7	0.6	0.6	0.6
Other toxic metals individually	2.5	2.2	2	1.5	1	0.7	0.6	0.4	0.3	0.2	0.15	0.12	0.1
Total toxic metals	10	10	8	7	3	2	2	1.6	1.4	1.2	1.2	1.2	1
Cyanide	2	2	2	1	0.7	0.5	0.4	0.27	0.2	0.13	0.1	0.08	0.06
Phenols	1	1	1	1	0.7	0.5	0.4	0.27	0.2	0.13	0.1	0.1	0.1
Sulphide	10	10	10	10	5	5	4	2	2	2	1	1	1
Sulphate	1000	1000	1000	1000	1000	1000	1000	900	800	600	600	600	600
Total nitrogen	200	200	200	200	200	200	200	100	100	100	100	100	100
Total phosphorus	50	50	50	50	50	50	50	25	25	25	25	25	25
Surfactants (total)	200	150	50	40	30	25	25	25	25	25	25	25	25

Source: Table 1, Cap 358AK – Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters

Note: All units in mg/L unless otherwise stated; all figures are upper limits unless otherwise indicated

Technical Memorandum on Environmental Impact Assessment Process Annexes 6 and 14

8.3.4 Under Section 16 of the EIAO, EPD issued the *Technical Memorandum on Environmental Impact Assessment Process* (EIAO-TM) which specifies the assessment methods and criteria for environmental impact assessment. While this proposed Development does not require a statutory EIA under the EIAO, the criteria and guidelines from Annex 6 – Criteria for Evaluating Water Pollution and Annex 14 – Guidelines for Assessment of Water Pollution under the EIAO-TM have nevertheless been adopted as references for assessing the potential water quality impacts that may arise during construction and operational phases of the proposed Development.

Practice Note for Professional Persons on Construction Site Drainage (ProPECC Note PN 1/94)

8.3.5 A practice note for professionals was issued by the EPD to provide guidelines for handling and disposal of construction site discharges. The ProPECC Note PN 1/94 provides good practice guidelines for dealing with various types of discharge from a construction site. Practices outlined in ProPECC Note PN 1/94 should be followed as far as possible during construction to minimise the water quality impact due to construction site drainage.

Practice Note for Professional Persons on Construction Site Drainage (ProPECC Note PN 5/93)

8.3.6 The ProPECC PN 5/93 "Drainage Plans subject to Comments by Environmental Protection Department" provides guidelines and practices for handling, treatment and disposal of various effluent discharges to stormwater drains and foul sewers. The design of site drainage and disposal of various site effluents generated within the new development area should follow the relevant guidelines and practices as given in the ProPECC PN 5/93.

8.4 Assessment Methodology

8.4.1 To assess the potential water quality impacts associated with the proposed Development, pollutants from point discharges and non-point sources such as sewage, storm water and surface water runoff generated from the proposed Development that could affect the quality of surface water runoff and marine waters were identified. All the identified sources of potential water quality impact were then evaluated and their impacts were assessed. The need for mitigation measures to reduce any identified adverse impacts on water quality to acceptable levels was determined.

8.5 Baseline Conditions and Sensitive Receivers

8.5.1 Baseline Water Quality

Marine Water Quality

8.5.2 The Deep Bay WCZ is influenced by the discharges from Pearl River during wet season, and receives discharges from Shenzhen river all year around. According to the latest

annual marine water quality published by EPD[8], the overall WQO compliance rate for Deep Bay WCZ was 60%, as compared with a ten-year average of 47% in 2009-2018.

8.5.3 EPD conducts regular marine water quality monitoring at 5 locations throughout the Deep Bay WCZ, of which DM1 and DM2 are nearest to the Development area. Data associated with these two monitoring stations are summarised in **Table 8.5.1**.

Table 8.5.1: Summary of Water Quality for Deep Bay WCZ at Selected Stations in 2021

Parameter	DM1	DM2
Temperature (°C)	26.4 (17.6 – 32.6)	26.7 (18.2 – 32.9)
Salinity	16.2 (9.4 – 22.2)	18.8 (9.8 – 26.5)
Dissolved Oxygen (mg/L)	5.5 (4.0 – 7.7)	6.0 (4.4 – 10.1)
Bottom	N/A	N/A
Dissolved Oxygen (% Saturation)	74 (56 – 101)	83 (65 – 125)
Bottom	N/A	N/A
pH	7.3 (6.9 – 7.8)	7.4 (6.9 – 7.9)
Secchi Dis Depth (m)	1.0 (0.9 – 1.3)	1.1 (0.7 – 1.5)
Turbidity (NTU)	23.6 (9.8 – 38.0)	33.6 (10.7 – 146.0)
Suspended Solids (mg/L)	29.5 (13.0 – 57.0)	29.0 (6.4 – 70.0)
5-day Biochemical Oxygen Demand (mg/L)	2.5 (1.1 – 12.0)	2.4 (0.4 – 9.0)
Ammonia Nitrogen (mg/L)	0.417 (0.150 – 0.950)	0.267 (0.041 – 1.000)
UIA (mg/L)	0.005 (0.002 – 0.009)	0.004 (<0.001 – 0.011)
Nitrite Nitrogen (mg/L)	0.152 (0.060 – 0.260)	0.102 (0.026 – 0.180)
Nitrate Nitrogen (mg/L)	1.260 (0.490 – 2.700)	0.965 (0.350 – 2.400)
Total Inorganic Nitrogen (mg/L)	1.83 (0.82 – 3.41)	1.33 (0.50 – 2.81)
Total Kjeldahl Nitrogen (mg/L)	0.75 (0.51 – 0.86)	0.63 (0.40 – 0.94)
Total Nitrogen (mg/L)	1.95 (1.55 – 2.23)	1.48 (1.19 – 2.33)
Orthophosphate Phosphorus (mg/L)	0.159 (0.110 – 0.220)	0.110 (0.056 – 0.170)
Total Phosphorus (mg/L)	0.20 (0.14 – 0.26)	0.18 (0.11 – 0.28)
Silica (as SiO_2) ((mg/L)	6.18 (1.40 – 11.00)	4.68 (0.70 – 8.50)
Chlorophyll-a (µg/L)	8.3 (1.7 – 15.0)	11.0 (2.1 – 43.0)
***E.coli* (count/100ml)**	160 (23 – 1600)	56 (9 – 3200)
Faecal Coliforms (count/100ml)	400 (86 – 3000)	120 (11 – 6000)

Source: Environmental Protection Department, Marine Water Quality in Hong Kong in 2020, Appendix B, pg B-14.
Notes:

[8] Environmental Protection Department, Marine Water Quality in Hong Kong in 2021 <https://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/water/hkwqrc/files/waterquality/annual-report/marinereport2021.pdf>

1. Unless otherwise specified, data presented are depth-averaged (A) values calculated by taking the means of three depths: Surface (S), Mid-depth (M), Bottom (B).
2. Data presented are annual arithmetic means of the depth-averaged results except for E. coli and faecal coliforms which are annual geometric means.
3. Data in brackets indicate the ranges.
4. N/A (Not Applicable) indicates the measurement was not made due to shallow water.
5. During the periods of the special work arrangement under the COVID-19 pandemic in 2020, marine water quality monitoring frequency was adjusted and sampling at representative monitoring stations were maintained. Full scale monitoring was conducted in the periods of January, May to June and September to November 2020.

River Water Quality

8.5.4 The Shan Pui river is in the east of the Study Site, and is a downstream section of the Yuen Long Creek with a total length of 60km and a catchment area of about 26.7km^2. Shan Pui River collects stormwater drainage discharge from catchment within the southwestern part of the Study Site. The closest river water quality monition stations include YL3 and YL4 along the Yuen Long Creek, are located approximately 1.3km and 1.2km south of the Study Site.

8.5.5 In 2021, the overall WQO compliance rate for Yuen Long Creek was 41%, as compared with 23% in 1991[9]. The monitoring data are summarised in **Table 8.5.2**.

Table 8.5.2: Annual Summary of Water Quality Data for YL3 and YL4 in 2021

Parameter	WQOs	YL3	YL4
Dissolved oxygen (mg/L)	≥4.0	3.2 (2.3 – 4.5)	2.6 (1.6 – 3.7)
pH	6.5 – 8.5	7.3 (7.0 – 7.9)	7.3 (7.0 – 7.8)
Suspended solids (mg/L)	≤20	32.5 (11.0 – 140.0)	27.0 (13.0 – 57.0)
BOD_5 (mg/L)	≤5	56.5 (27.0 – 130.0)	110.0 (25.0 – 230.0)
COD (mg/L)	≤30	61 (13 – 270)	110 (51 – 180)
Oil & grease (mg/L)	N/A	1.4 (<0.5 – 15.0)	3.7 (0.6 – 6.9)
***E.coli* (counts/100mL)**	N/A	1,200,000 (700,000 – 2,500,000)	1,600,000 (660,000 – 3,000,000)
Faecal coliforms (counts/100mL)	N/A	2,100,000 (900,000 – 3,000,000)	3,500,000 (1,800,000 – 6,400,000)
Ammonia-nitrogen (mg/L)	N/A	8.500 (3.600 – 11.000)	6.500 (2.700 – 7.300)
Nitrate-nitrogen (mg/L)	N/A	0.004 (<0.002 – 0.450)	0.002 (<0.002 – 0.014)
Total Kjeldahl nitrogen (mg/L)	N/A	18.50 (15.00 – 20.00)	13.00 (12.00 – 19.00)
Ortho-phosphate (mg/L)	N/A	0.550 (0.310 – 1.400)	0.380 (0.053 – 0.590)
Total phosphorus (mg/L)	N/A	1.60 (1.30 – 2.60)	1.20 (1.00 – 1.70)
Total sulphide (mg/L)	N/A	0.07 (0.04 – 0.31)	0.18 (0.05 – 0.36)

[9] Environmental Protection Department, River Water Quality in Hong Kong in 2020 <https://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/water/hkwqrc/files/waterquality/annual-report/riverreport2021.pdf>.

Parameter	WQOs	YL3	YL4
Aluminium (µg/L)	N/A	<50 (<50 – <50)	<50 (<50 – <50)
Cadmium (µg/L)	N/A	<0.1 (<0.1 – <0.1)	<0.1 (<0.1 – <0.1)
Chromium (µg/L)	N/A	<1 (<1 – <1)	<1 (<1 – 2)
Copper (µg/L)	N/A	2 (1 – 5)	3 (2 – 6)
Lead (µg/L)	N/A	<1 (<1 – <1)	<1 (<1 – <1)
Zinc (µg/L)	N/A	12 (<10 – 18)	10 (<10 – 24)
Flow (m^3/s)	N/A	0.703 (0.506 – 1.422)	0.217 (0.141 – 0.429)

Source: Environmental Protection Department, River Water Quality in Hong Kong in 2021, Appendix E, pg E-16.
Notes:
1. Data presented are in annual medians of monthly samples; except those for faecal coliforms and E. coli which are in annual geometric means.
2. Figures in brackets are annual ranges.
3. Values at or below laboratory reporting limits are presented as laboratory reporting limits.
4. Equal values for annual medians (or geometric means) and ranges indicate that all data are the same as or below laboratory reporting limits.

Water Sensitive Receivers

8.5.6 The Development Site is located within the YL INNOPARK area, adjacent to the Shan Pui River and adjacent to (but outside of) the Wetland Buffer Area as defined by the Town Planning Board Guidelines No.12C. The Study Site is situated in the Yuen Long Shan Pui River catchment.

8.5.7 Within the assessment area, the identified water sensitive receivers (WSRs) are shown in **MMH/369397/EA/801** and include the **Table 8.5.3** below.

Table 8.5.3: WSRs in the Vicinity of the Development Site Area

WSR ID	Description	Type	Status	Approximate Horizontal Distance from Project (m)
W1	Ponds	Pond	Active	450
W2	Shan Pui River	Modified watercourse	Active	310
W3	Nullah	Channel	Active	10
W4	Nullah	Channel	Active	330

8.6 Identification and Evaluation of Water Quality Impacts

Construction Phase

8.6.1 During construction phase, potential water quality impacts associated with the Development Site include the following:

- Construction site runoff and drainage
- Groundwater ingress to excavations
- Contaminated groundwater, site runoff and wastewater from land decontamination, if any
- Sewage from the construction workforce
- Accidental spillage / leakage of fuels, oils and chemicals

- General refuse and debris

8.6.2 Construction activities such as site formation, excavation, concreting and drilling can release pollutants which can runoff into nearby surface waters. Such surface water runoff and site drainage from construction works areas may contain suspended solids, sediments and contaminants which can clog and pollute watercourses if uncontrolled. To prevent adverse impacts to nearby watercourses, good site practices with respect to construction site drainage should be applied. Such good site practices are outlined in ProPECC Note PN1/94.

8.6.3 Excavation activities may cause groundwater ingress, which would generate wastewater laden with sediment and affect the local groundwater table. The potential for such groundwater ingress should also be minimised as far as practicable using appropriate construction techniques such as grouting or installation of cofferdam to reduce the quantities of wastewater requiring treatment and discharge. In the event that wastewater is generated by the excavation activities, this would need to be pumped out and treated before discharge to avoid adversely impacting the surrounding watercourses.

8.6.4 Contaminated soil and groundwater from past or current land uses (e.g. the bus depot) may be present within the construction works area. If present, such contaminated groundwater and site runoff must be confined to avoid contaminating other parts of the site and nearby watercourses. Measures should be taken to minimise the quantity of contaminated water generated during construction phase, and any wastewater generated from the contaminated area including decontamination activities must be diverted to appropriate treatment facilities. With proper confinement and treatment of any contaminated water before discharge, adverse impacts to nearby watercourses will be prevented.

8.6.5 Sewage generated by the workforce during the construction phase, if uncontrolled, may impact nearby watercourses causing foul odour, eutrophication, depletion of dissolved oxygen levels, and fish kills. All construction site sewage should be controlled by providing adequate on-site portable toilets. Regular maintenance and off-site disposal of such sewage by licensed contractor would prevent release of sewage to nearby watercourses and avoid adverse impacts due to such sewage discharges.

8.6.6 Chemicals stored on-site during construction such as petroleum, oil and grease, lubricants and solvents have the potential to enter the surface water drainage system through accidental spillage on the construction site and subsequent runoff to stormwater drains. To mitigate the impacts of these contaminants, appropriate site storage and bunding of chemicals should be implemented as part of good site practice.

8.6.7 General refuse and construction site debris, if not properly stored and disposed, may get washed into nearby watercourses due to wind or during rainfall events. Implementation of good housekeeping and site management practices can prevent the impacts of general construction activities on water quality.

Operation Phase

8.6.8 During operation phase, potential water quality impacts associated with the Development Site include the following:

- Sewage from the MSBs
- Wastewater from tenant operations
- Surface runoff from paved areas

8.6.9 Workers of the future operators in the MSBs would generate domestic sewage. This sewage needs to be disposed properly to avoid release to the surrounding environment. According to the sewerage impact assessment, sewage generated from the operation of the proposed MSBs would be conveyed by the sewerage network to the public sewerage system for treatment at YLSTW. There would be no direct discharge of sewage effluents to the surrounding watercourses, and no adverse water quality impacts due to sewage generated from the proposed MSBs.

8.6.10 Tenant operations may involve generation of some contaminated wastewater which may not comply with the quality requirements of the TM-DSS 'Standards for Effluents Discharged into Foul Sewers leading into Government Sewage Treatment Plants'. The quality of the wastewater depends on the type of tenant operations. Examples of potential sources of wastewater include the following:

- Vehicle washing / cleaning activities
- Process-generated water from other brownfield operations[10]

8.6.11 To prevent contaminated wastewater from entering the existing public sewerage systems, all such wastewater generated from tenant operations will need to be properly treated prior to the discharge into the sewerage system. As the wastewater quality (and the associated treatment required) would vary depending on individual tenant operations, a centralised onsite treatment system is considered to be impractical.

8.6.12 Based on a 'treat your own waste' or 'polluter pays' principle, the responsibility for treating operations-related wastewater, if any, to meet the TM-DSS standards should rest with the individual tenants. The requirement for provision, operation, maintenance, and decommissioning of wastewater treatment systems to meet TM-DSS standards would form part of the tenancy agreements for the future tenants. The individual tenant's wastewater treatment facilities should be designed to comply with the effluent discharge standards, and a WPCO discharge licence should be obtained from EPD.

8.6.13 Surface runoff from the roof and paved areas of the site will be generated during rainstorm events. Such runoff would be diverted to stormwater drains. To minimise debris and silt from entering nearby watercourses via the stormwater drains, silt traps and debris shields / screens should be installed and regularly maintained. For drainage areas covering the car parks, goods loading and unloading areas and the spiral ramp, petrol interceptors should be installed and maintained to prevent fuel / oil from entering the nearby watercourses.

8.7 Mitigation Measures

8.7.1 Based on the water quality impacts identified in **Section 8.6**, mitigation measures are recommended for both construction and operation phases of the proposed Development:

Construction Phase

8.7.2 During construction phase, the following mitigation measures are recommended to protect water quality for all three MSB sites:

- Install perimeter cut-off drains to direct off-site water around site.

[10] Typical brownfield activities may include warehousing, logistics operation and some minor industrial processes. The amount of process-generated water is expected to be minimal.

- Channels, earth bunds or sand bag barriers should be provided to divert the stormwater to silt removal facilities.
- The construction works should be programmed to minimise surface excavation works during rainy seasons (April to September).
- All exposed earth areas should be covered or vegetated as soon as possible after the earthworks have been completed.
- All site drainage facilities should be regularly inspected and maintained to ensure their proper and efficient operation at all times particularly following rainstorms.
- Measures should be taken to minimise the ingress of site drainage into excavations.
- Groundwater ingress into excavations should also be minimised as far as practicable using appropriate construction techniques such as grouting or installation of cofferdam where applicable.
- The water pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.
- Open stockpiles should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.
- Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and storm runoff being directed into foul sewers.
- All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads.
- Adequate on-site portable toilets should be provided onsite and maintained regularly. A licensed contractor should be employed to maintain and dispose of the sewage to appropriate treatment facilities off-site.
- All fuel containers and chemical storage areas should be provided with locks and sited on sealed and bunded areas, with a bunded capacity equal to 110% of the storage capacity of the largest container to prevent spilled fuel, oils and chemicals from reaching nearby WSRs.
- Construction solid waste, debris and rubbish on-site should be collected, handled and disposed of properly to avoid causing any water quality impacts.

8.7.3 In case any contaminated soil is identified, the following mitigation measures should be implemented for all three MSB sites:

- Any contaminated materials and exposed contaminated surfaces should be properly covered to prevent generation of contaminated runoff.
- Open stockpiling of contaminated materials should be avoided.
- The contaminated soils should be properly isolated to minimise groundwater ingress and groundwater contamination as far as practicable using appropriate construction techniques such as grouting or installation of cofferdam where applicable.
- Contaminated groundwater, runoff and wastewater should be properly collected and diverted to wastewater treatment facilities with suitable treatment processes to reduce the pollution to acceptable levels.
- All treated effluent from the wastewater treatment system shall meet the TM-DSS requirements before discharge to foul sewer or tanked away for proper disposal.
- No direct discharge of contaminated groundwater, runoff or wastewater is permitted.

8.7.4 For any discharges from the construction site, the contractor shall apply to EPD for a discharge licence under the WPCO. The discharge quality must meet the requirements

specified in the discharge licence. All the runoff and wastewater generated from the construction works areas should be treated to meet the standards specified in the TM-DSS.

Operation Phase

8.7.5 During operation phase, no adverse water quality impact is anticipated due to sewage generated from the MSB being conveyed to the YLSTW for treatment via the existing sewerage system.

8.7.6 If canteen facilities are provided, grease trap(s) shall be installed to separate grease and oil from the wastewater before discharge to the domestic sewerage system. The grease trap(s) shall be designed to hold all canteen wastewater for a period of at least 20 minutes during peak flow. Reference should be made to EPD's 'Grease Traps for Restaurants and Food Processors' for the design and maintenance of the grease trap facilities. All grease traps shall be regularly maintained and grease trap waste shall be emptied and disposed properly. For large grease traps, a registered grease trap waste collector should be employed to regularly collect and dispose of the grease trap waste. Provided that such grease traps are properly designed, installed and maintained, no adverse impacts to the sewerage system are anticipated due to wastewater.

8.7.7 For tenants whose operations involve generating contaminated wastewater, the tenant shall be responsible for provision, operation, maintenance, and decommissioning of wastewater treatment systems to meet TM-DSS standards for discharge to Government sewage treatment plants. Such requirements are to be clearly defined in the future tenancy agreements. Subject to the tenant operating in accordance with the requirements of their discharge licence, there would be no adverse impacts to the sewage treatment plants due to the tenant operations.

8.7.8 Surface runoff from the roof and paved areas of the site should be diverted to stormwater drains equipped with silt traps and debris shields / screens. Drainage areas covering the car parks, goods loading and unloading areas and the spiral ramp should also be equipped with petrol interceptors. Provided the drains and associated traps / interceptors are regularly cleared and maintained, there would be no adverse water quality impacts.

9 Waste Management

9.1 Introduction

9.1.1 This section identifies the potential waste arising from the construction and operation activities of the proposed Development and evaluates the potential environmental impacts that may result from waste generated. Mitigation measures and good site practices, including waste handling, storage and disposal, are recommended with reference to applicable waste legislation and management guidelines to minimise potential waste management impacts.

9.2 Environmental Legislation, Standards and Guidelines

9.2.1 The following legislation relates to the handling, treatment and disposal of wastes in Hong Kong and should be referenced in assessing potential impacts:

- Waste Disposal Ordinance (Cap. 354)
- Waste Disposal (Chemical Waste) (General) Regulation (Cap.354C)
- Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)
- Public Health and Municipal services Ordinance (Cap. 132) – Public Cleansing and Prevention of Nuisances Regulation
- Land (Miscellaneous Provisions) Ordinance (Cap. 28)
- Dumping at Sea Ordinance (Cap. 466)

Waste Disposal Ordinance

9.2.2 The WDO prohibits the unauthorised disposal of wastes. Construction waste is defined as any substance, matter or thing that is generated from construction work and abandoned, whether or not it has been processed or stockpiled before being abandoned, but does not include any sludge, screenings or matter removed in or generated from any desludging, desilting or dredging works. Under the WDO, wastes can be disposed of only at designated waste disposal facilities.

Waste Disposal (Chemical Waste) (General) Regulation

9.2.3 Under the WDO, the Chemical Waste (General) Regulation provides regulations for chemical waste control, and administers the possession, storage, collection, transport and disposal of chemical wastes.

9.2.4 According to the Waste Disposal (Chemical Waste) (General) Regulation, all producers of chemical waste must register with the EPD and treat their waste, either utilising on-site plant licensed by EPD, or arranging for a licensed collector to transport the waste to a licensed facility. The Regulation also prescribes the storage facilities to be provided on site, including labelling and warning signs, and requires the preparation of written

procedures and training to deal with emergencies such as spillages, leakages or accidents arising from the storage of chemical wastes.

9.2.5 EPD has also issued a 'guideline' document, the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes, which details how to comply with the regulations on chemical wastes.

Waste Disposal (Charges for Disposal of Construction Waste) Regulation

9.2.6 Under the Waste Disposal (Charges for Disposal of Construction Waste) Regulation, updated in 2022, construction waste delivered to a landfill for disposal must not contain more than 50% by weight of inert material. Construction waste delivered to a sorting facility for disposal must contain more than 50% by weight of inert material, and construction waste delivered to a PFRF for disposal must consist entirely of inert material.

Public Health and Municipal Services Ordinance (Cap. 132)

9.2.7 The Public Cleansing and Prevention of Nuisances Regulation provides control on illegal tipping of waste on unauthorised (unlicensed) sites.

Land (Miscellaneous Provisions) Ordinance (Cap. 28)

9.2.8 The Land (Miscellaneous Provisions) Ordinance requires that dumpling licenses be obtained by individuals or companies who deliver public fill to public filling areas. The CEDD issues the licences under delegated powers from the Director of Lands. The current policy related to dumping of C&D material is documented in the Works Branch Technical Circular no. 2/93 – Public Dumps. C&D materials that are wholly inert, namely public fill, should not be disposed to landfill, but taken to fill banks or public filling areas.

9.2.9 Individual licences and windscreen stickers are issued for each vehicle involved. Under the licence conditions, public fill reception facilities will only accept soil, sand, rubble, brick, tile, rock, boulder, concrete, asphalt, masonry or used bentonite. In addition, in accordance with paragraph 12 of DEVB Technical Circular (Works) TC(W) No.6/2010, PFC will advise on the acceptance criteria. The material will, however, be free from marine mud, household refuse, plastic, metal, industrial and chemical wastes, animal and vegetable matter and any other materials considered unsuitable by the public fill reception facility supervisor.

Dumping at Sea Ordinance (Cap. 466)

9.2.10 In accordance with the DASO, application for dumping permits from EPD is required for marine disposal of dredged materials.

9.2.11 The Practice Notes for Authorised Persons, Registered Structural Engineers and Registered Geotechnical Engineers ADV-21 (PNAP ADV-21) – Management Framework for Disposal of Dredged/ Excavated Sediment, set out the procedures for seeking approval to dredge/ excavate sediment and the management framework for marine disposal of such sediment. Applications for approval of dredging proposal and allocation of marine disposal shall be made to the Secretary of Marine Fill Committee. The aforementioned documents outline the requirements to be followed for assessing

and classifying the sediment and explain the marine disposal arrangement for the classified material.

9.3 Assessment Methodology

9.3.1 The methods for assessing potential waste management impacts during construction and operation phases include the following:

- Identify the types and quantity of waste arising as a result of the construction and operation activities of the proposed Development;
- Assess the potential environmental impacts associated with the waste generation, handling, storage, transport and disposal;
- Identify the opportunities for reducing waste generation, on-site or off-site reuse and recycling prior to considering the disposal options for each type of waste; and
- Identify the disposal options for each type of waste.

9.3.2 The assessment of potential waste management impacts during construction and operation phases in **Section 9.4** will be applicable to the proposed Development**.**

9.4 Identification, Prediction and Evaluation of Environmental Impacts

Construction Phase

9.4.1 The activities to be carried out for construction of the proposed Development would generate a variety of wastes that can be divided into different key categories based on their composition and ultimate method of disposal. The identified waste types include:

- C&D materials;
- Excavated sediment;
- Chemical waste; and
- General refuse.

9.4.2 Each type of the above waste arising is described below, together with an evaluation of the potential environmental impacts associated with the waste generation, handling, storage, transport and disposal.

Construction and Demolition materials

9.4.3 It is anticipated that the majority of C&D materials will be generated from the following key construction activities:

- Site clearance works;
- Site formation works;
- Foundation works, including basement construction if applicable; and
- Multi-storey buildings construction works.

9.4.4 The excavation, foundation, site clearance and site formation works will be the major source of C&D materials generated by the Project. It is estimated that the total amount of C&D materials to be generated would be approximately 102,120m^3, with approximately 97,000m^3 being inert C&D materials and the remaining 5,120m^3 being

non-inert C&D materials. An indicative breakdown of the estimated quantities for the three MSB sites as **Figure 2.1** is given in **Table 9.4.1**:

Table 9.4.1: Estimated Amount of Construction C&D Material to be Generated

Site	Inert C&D Materials (m3)	Non Inert C&D Materials (m3)
Site A	10,000	600
Site B	75,000	3,800
Site C	12,000	720
Total	97,000	5,120

9.4.5 The inert materials should be segregated from the C&D materials on-site for reuse as far as practicable. In order to minimise the impact resulting from collection and transportation of C&D material for off-site disposal, the C&D material could be reused on-site as fill materials as far as practicable. The surplus inert C&D materials could be disposed of at the nearest Government's PFRFs, that is Tuen Mun Area 38 public fill bank for beneficial use by any other projects in Hong Kong.

9.4.6 The Contractor(s) should separate the non-inert C&D materials from the inert C&D materials on-site. Any recyclable materials (e.g. metal) should be segregated from the non-inert C&D materials for collection by reputable licensed recyclers. Only the remaining non-recyclable portion will be disposed of at designated landfill sites.

9.4.7 With proper implementation of good construction site practice and mitigation measures recommended, potential dust, noise and water quality impacts associated with on-site handling and transportation of C&D materials are not anticipated.

Excavated Sediment

9.4.8 It is anticipated that a small amount of land-based sediment (say less than 1,000 m^3) may be generated from the excavation works of the Project, mainly arising from the basement excavation for Site B. The land-based sediment will be reused on-site as much as possible. If not all the sediment could be reused on-site, reusing the sediment as fill materials in other concurrent projects will be explored.

9.4.9 For on-site reuse of excavated sediment, it is proposed to mix sand/soil and cement with the excavated sediment generated from this proposed Development to provide the treated sediment as construction material, which will be used as backfilling materials for the proposed Development. The mixing ratio of cement and excavated sediment is to be determined on-site. Also, it is proposed to reuse the sediment with higher contaminant levels (i.e. Category M and Category H sediment), if any, on-site as much as possible to minimise the environmental impact during the transportation of sediment. In order to identify the appropriate marine disposal options of the excavated sediment, sediment sampling and testing will be required to classify the sediment into various categories (i.e. Category L, Category M or Category H) according to PNAP ADV-21. The sampling and testing methodology should be detailed in the Sediment Sampling and Testing Plan which is to be submitted to EPD for approval prior to any sediment sampling work. After the completion of sediment sampling and testing, the results should be detailed in the Sediment Quality Report (SQR) which is to be submitted to EPD for approval. Once the SQR is approved, allocation of sediment disposal site should also be sought from Marine Fill Committee (MFC) before applying to EPD for the marine dumping permit. No excavation work would be permitted to proceed until all matters on

management of excavated sediment have been resolved with all relevant authorities including EPD and MFC.

9.4.10 For on-site reuse of excavated sediment from the Development, it is proposed to treat it through cement mixing or other method acceptable to EPD. The mixing ratio of cement and excavated sediment or other treatment method is to be determined on-site based on the categories of excavated sediment. Also, it is proposed to reuse the sediments with higher contaminant levels (i.e. Category M and Category H sediments), if any, on-site as much as possible, at higher priority to those with lower contaminant levels (i.e. Category L sediments) to minimise the environmental impacts in the course of transportation and disposal of sediments (due to leakage, volatility, etc) under the marine disposal option.

9.4.11 The treated sediment should comply with the UTS and UCS Standard according to the Practice Guide for Investigation and Remediation of Contaminated Land.

9.4.12 To minimise any potential adverse impacts arising from the excavated sediment, the sediment will be excavated and transported in a manner that will minimise the loss of contaminants. Mitigation measures to minimise the associated potential environmental impacts are described in **Section 9.5.8 and 9.5.9**. With the implementation of mitigation measures, no environmental impacts would be anticipated from the excavation and transportation of the sediment.

Chemical Waste

9.4.13 Chemical wastes arising during the construction phase may pose environmental, health and safety hazards if not stored and disposed of in an appropriate manner as stipulated in the Waste Disposal (Chemical Waste) (General) Regulations. The potential hazards include:

- Toxic effects to workers;
- Adverse impacts on water quality from spills and associated adverse impacts on marine biota; and
- Fire hazards.

9.4.14 The maintenance and servicing of construction plant and equipment may generate some chemical wastes such as used solvents, contaminated rags and waste lubricating oil. It is difficult to quantify the amount of chemical waste that will arise from the construction activities since it will be dependent on the Contractor's on-site maintenance requirements and the amount of plant utilised. However, it is anticipated that the quantity of chemical waste, such as waste lubricating oil and solvents produced from plant maintenance, will be small and estimated to be less than a few hundred litres per month. The amount of chemical waste to be generated will be quantified in the WMP to be prepared by the Contractor for the site.

9.4.15 Materials classified as chemical wastes will require special handling and storage arrangements before removal for off-site disposal at the approved The Chemical Waste Treatment Facilities (CWTF) or recycling by licensed facilities. Mitigation and control requirements for chemical wastes are detailed in **Section 9.5.10 and 9.5.11**. Provided

that the handling, storage and disposal of chemical wastes are in accordance with these requirements, adverse environmental impacts are not expected.

General Refuse

9.4.16 The construction workforce will generate refuse comprising food scraps, waste paper and empty containers etc. The daily general refuse arising from the construction workforce can be estimated based on a generation rate of 0.65 kg per worker per day. It is estimated that about 800 construction workers would be employed during the construction phase. Therefore, approximately 520 kg/day of general refuse will be generated.

9.4.17 Such refuse will be properly managed so that intentional or accidental release to the surrounding environment will be avoided. Disposal of refuse at sites other than approved waste transfer or disposal facilities will be prohibited. Effective collection of site wastes will be required to prevent waste materials being blown around by wind, flushed or leached into the aquatic environment, or creating an odour nuisance or pest/ vermin problem. Waste storage areas will be well maintained and cleaned regularly.

9.4.18 With the implementation of good waste management practices at the site, adverse environmental impacts are not expected to arise from the storage, handling and transportation of general refuse generated from the construction workforce.

Operation Phase

9.4.19 The following types of wastes would be generated during operation of the proposed Development:

- General refuse; and
- Chemical waste.

9.4.20 Each type of the above waste arising is described below, together with an evaluation of the potential environmental impacts associated with the waste generation, handling, storage, transport and disposal.

General Refuse

9.4.21 General refuse (such as food scraps, waste paper, empty containers and packaging, etc.) from operation of the proposed Development will mainly be generated from staff working within the Development Site. Such refuse will be properly managed by suitable waste collectors so that intentional or accidental release to the surrounding environment will not occur. The amounts of general refuse generation during the operation phase have been preliminarily estimated and are summarised in **Table 9.4.2**.

Table 9.4.2: Estimation of General Refuse Generation during Operation Phase

Number of Staff	Waste Classification (1)	Per capita disposal rate (2)	Estimated Waste Generation
Approximately 1,350	Commercial waste	0.53 kg/person/day*	716 kg/day

Source: (1) Appendix 1: Classification of Solid Waste and Monitoring Methodology, in *Monitoring of Solid Waste in Hong Kong – Waste Statistic for 2020*
(2) Plate 2.1 and Plate 2.7, *Monitoring of Solid Waste in Hong Kong – Waste Statistic for 2020*
Note: *Calculated from percentage of commercial waste over total municipal solid waste, based on municipal solid waste disposal rate

9.4.22 Effective collection of general wastes will be implemented to prevent waste materials from creating odour nuisance or pest/ vermin problem. Waste storage areas will be well maintained and cleaned regularly. To reduce waste and improve recycling, it is expected that waste such as waste paper, plastics and aluminium can be segregated for off-site recycling.

Chemical Waste

9.4.23 Chemical waste will be generated during the operation of the proposed Development because the multi-storey building will be used for vehicle servicing and maintenance and/or logistics and brownfield operations which may involve various routine maintenance and servicing activities for electrical and mechanical equipment. Chemical waste such as waste lubricating oil, contaminated rags, waste paint, used solvents and spent chemicals are expected to be generated from these activities.

9.4.24 Chemical wastes may pose environmental, health and safety hazards if not stored and disposed of in an appropriate manner as stipulated in the Waste Disposal (Chemical Waste) (General) Regulation. Chemical wastes will require special handling and storage arrangements in accordance with the relevant regulations before removal for off-site disposal at the approved CWTF or recycling by licensed facilities. Provided that the handling, storage and disposal of chemical wastes will be in accordance with these requirements, adverse environmental impacts will not be expected.

9.5 Recommendation of Mitigation Measures

Construction Phase

Good Site Practices

9.5.1 Adverse impacts related to waste management such as dust, odour, noise and wastewater discharge due to the proposed Development are not expected, provided that good site practices will be strictly followed. Recommendations for good site practices during the construction phase include:

- Nomination of a competent person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site;
- Training of site personnel in proper waste management and chemical handling procedures;
- Provision of sufficient waste disposal points and regular collection of waste;
- Appropriate measures to minimise windblown litter and dust/odour during transportation of waste by either covering trucks or by transporting wastes in enclosed containers;
- Stockpiles of C&D materials should be kept covered by impervious sheets to avoid wind-blown dust;
- All dusty materials including C&D materials should be sprayed with water immediately prior to any loading transfer operation so as to keep the dusty material wet during material handling at the stockpile areas;
- Provision of wheel washing facilities before the trucks leaving the works area so as to minimise dust introduction to public roads;
- Well planned delivery programme for offsite disposal such that adverse environmental impact from transporting the inert or non-inert C&D materials is not anticipated.

Waste Reduction Measures

9.5.2 Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:

- Sort non-inert C&D materials to recover any recyclable portions;
- Segregation and storage of different types of waste in different containers or skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;
- Encourage collection of recyclable waste such as waste paper and aluminium cans by providing separate labelled bins to enable such waste to be segregated from other general refuse generated by the work force;
- Proper site practices to minimise the potential for damage or contamination of inert C&D materials;
- Plan the use of construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.

9.5.3 In addition to the above measures, specific mitigation measures are recommended below for the identified waste arising to minimise environmental impacts during handling, transportation and disposal of these wastes.

Inert and Non-inert C&D materials

9.5.4 In order to minimise impacts resulting from collection and transportation of inert C&D materials for off-site disposal, the inert C&D materials should be reused on-site as fill material as far as practicable. In addition, inert C&D materials generated from excavation works could be reused as fill materials in local projects that require public fill for reclamation.

9.5.5 The surplus inert C&D materials will be disposed of at the nearest Government's PFRFs, that is Tuen Mun Area 38 public fill bank for beneficial use by other projects in Hong Kong.

9.5.6 The C&D materials generated from general site clearance should be sorted on site to segregate any inert materials for reuse or disposal of at PFRFs whereas the non-inert materials will be disposed of at the designated landfill site.

9.5.7 In order to monitor the disposal of inert and non-inert C&D materials at respective PFRFs and the designated landfill site, and to control fly-tipping, it is recommended that the Contractor should follow the DEVB Technical Circular (Works) No. 6/2010 for Trip Ticket System for Disposal of Construction & Demolition Materials issued by DEVB. In addition, it is also recommended that the Contractor should prepare and implement a Waste Management Plan detailing their various waste arising and waste management practices in accordance with the relevant requirements of the ETWB Technical Circular (Works) No. 19/2005 Environmental Management on Construction Site.

Excavated Sediment

9.5.8 The following mitigation measures shall be implemented for excavation of sediment:

- The loading, unloading, handling, transfer or storage of treated and untreated sediment should be carried out in such a manner to prevent or minimise dust emissions;

- Temporary stockpiling shall be avoided as far as possible. In case temporary storage is needed, the untreated sediment should be placed at a designated area paved with either concrete or liner and covered properly with tarpaulins;
- Speed control shall be implemented for vehicles carrying untreated sediment within the site to minimise dust emission; and
- All necessary measures should be employed to prevent cross-contamination of untreated sediment with other excavated / fill materials.

9.5.9 General health and safety precautions shall also be employed for all personnel working on site, including:

- No food and drink allowed on site;
- Direct skin contact with excavated sediment should be avoided;
- Provide all necessary PPE to site workers;
- Bulk earth moving equipment shall be used for handling the sediment as much as possible;
- Minimise dust generation; and
- Provision of personal cleaning facilities.

Chemical Waste

9.5.10 If chemical wastes are produced at the construction site, the Contractor will be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the “Code of Practice on the Packaging Labelling and Storage of Chemical Wastes”. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidising, irritant, toxic, harmful, corrosive, etc. The Contractor should use a licensed collector to transport and dispose of the chemical wastes at the approved Chemical Waste Treatment Centre or other licensed recycling facilities, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.

9.5.11 Potential environmental impacts arising from the handling activities (including storage, collection, transportation and disposal of chemical waste) are expected to be minimal with the implementation of appropriate mitigation measures as recommended.

General Refuse

9.5.12 General refuse should be stored in enclosed bins or compaction units separated from inert C&D materials. A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from inert C&D materials. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' light material.

Operation Phase

General Refuse

9.5.13 General refuse should be collected on daily basis and delivered to the refuse collection point accordingly. A reputable waste collector should be employed to remove general refuse regularly to avoid odour nuisance or pest/vermin problem. Sufficient recycling

containers are recommended to be provided at suitable locations of the Development Site to encourage recycling of such waste as aluminium cans, plastics and waste paper.

Chemical Waste

9.5.14 If chemical wastes are expected to be produced during the operation phase, the Project Proponent should register with the EPD as a chemical waste producer and follow the guidelines stated in the “Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes”. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidising, irritant, toxic, harmful, corrosive, etc. Licensed collector should be deployed to transport and dispose of the chemical wastes at the approved Chemical Waste Treatment Centre or other licensed recycling facilities, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.

10 Hazard to Life

10.1 Introduction

10.1.1 This section presents an assessment of any potential hazard to life impact of the proposed Development in accordance with the relevant criteria and guidelines.

10.2 Assessment Criteria

10.2.1 The hazard-to-life impact assessment is made reference to the following ordinance, criteria and guidelines:

- Environmental Impact Assessment Ordinance (Cap. 499);
- Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM), particularly, Section 12 (Hazard Assessment) and Annex 4 (Criteria for Evaluating Air Quality Impact and Hazard to Life); and
- HKPSG Chapter 12.

10.3 Evaluation of Impact

10.3.1 The Development Site is identified outside any 1-km consultation zone of Potentially Hazardous Installation (PHIs).

10.4 Construction Phase Impact

10.4.1 No explosives would be used for the construction of the Development Site. Hazard-to-life impact due to the construction of the proposed Development is not anticipated.

10.5 Operation Phase Impact

10.5.1 During the operation phase, storage, use or transport of hazardous materials would be less than the threshold quantities constituting a PHI as specified in HKPSG. Therefore, hazard-to-life impact due to the operation of the proposed Development is not anticipated.

11 Conclusion

11.1 Air Quality Impact

11.1.1 Given that the construction activities for setting up MSBs are limited and the scale of construction works would be minor, it is anticipated that with the implementation of good site management and the recommended dust control measures, the construction of the Development would not give rise to adverse construction dust impacts to nearby ASRs. An EM&A programme shall be implemented to monitor the dust impact during construction stage to ensure that no nearby ASRs will be subject to adverse constructional air quality impact if necessary.

11.1.2 Given that the proposed MSBs are located within Yuen Long INNOPARK, which is designated for various industrial operation. As the proposed MSBs are also designated for industrial operations, the proposed MSBs are considered compatible with the prevailing uses and the intention uses of the area when in operation.

11.1.3 For vehicle servicing and maintenance uses in operation, control measures as Environmental Guidelines for the Vehicle Repair Trade should be implemented to treat the exhaust gas from the activities with potential air pollutant emission sources including engine testing, paint spraying and welding works, etc. Special emission sources are not expected within the proposed MSBs. Should there be any, an assessment shall be conducted.

11.1.4 There would be additional traffic arising from the proposed development. As the buffer distance would be not less than 5m from the road, thus satisfying the buffer distance requirement for Local Distributor as stated in Chapter 9 of HKPSG. Therefore, adverse air quality impact to ASRs due to traffic induced by the development is not expected.

11.2 Noise Impact

11.2.1 No NSRs were identified within the 300m study area. No adverse construction noise impact is anticipated, no specific construction noise mitigation measures are required. It is recommended that the noise reduction measures should be considered as far as practicable to further minimise the construction noise impact.

11.2.2 No NSRs were identified within 300m study area. Therefore, adverse traffic noise impact during operation phase is not anticipated.

11.2.3 As no NSRs were identified within the 300m study area, fixed noise impact is not anticipated.

11.3 Tree Preservation

11.3.1 102 individual trees were identified in the Development Site and in areas where trees are likely to be affected; while one tree group with approximately 26 trees was identified in the Development Site. No trees of particular interests, including registered, potential OVT or tree species of conservation importance, was identified. Overall, 15 trees are proposed to be retained and approximately 87 trees are proposed to be felled for the implementation of the Development.

11.3.2 For the compensatory planting, compensatory tree planting should be as far as possible of a ratio not less than 1:1 in terms of number. In addition, it is recommended that the site coverage of greening area should be not less than 20% for each MSB site. The detailed compensatory planting proposal shall be submitted with the tree removal application for approval in accordance with LAO Practice Note No. 2/2020.

11.4 Ecological Impact

11.4.1 The Development Site mainly comprises the Developed Area habitat which is characterised by paved surfaces and low-rise structures with constant human disturbance. Loss of the Developed Area is temporary during construction with minor impact significance.

11.4.2 Direct and indirect impacts on flora and fauna species of conservation interest are not anticipated. Offsite disturbance and indirect impact on environmental quality is considered as minor.

11.4.3 Potential impacts on reduction of ecological carrying capacity and habitat fragmentation are not anticipated, while risk of bird collision to new building structures can be mitigated by minimising the use of vertical glass surface on new building structures.

11.4.4 Given that the habitat affected is artificial with limited ecological value and minor indirect impacts anticipated, the potential ecological impact due to construction and operation of the proposed Development is considered as minor and acceptable.

11.5 Land Contamination

11.5.1 A CAP which details the findings of desktop study and site reconnaissance survey and the proposed SI works, was endorsed by EPD on 6 March 2017.

11.5.2 The proposed contamination SI works in the endorsed CAP is for general reference only, and the exact extent, number of sampling locations etc. will have to be further reviewed and updated when the land in question is available.

11.5.3 It is recommended that site re-appraisal be conducted after taking up the site to ascertain initial contamination evaluation of all areas and review the site investigation works proposed in the endorsed CAP. The findings of the re-appraisal will then be documented appropriately, such as by Supplementary CAP to EPD for agreement prior to the commencement of SI works. After the site investigation, the soil sampling and testing results will be presented in the CAR and submitted to EPD for agreement. If land contamination is confirmed, RAP and RR will also be prepared and submitted to EPD for agreement prior to commencement of the site works for the proposed MSBs development.

11.6 Water Quality Impact

11.6.1 The identified water quality impacts of the Development include construction site runoff and drainage, groundwater ingress, potentially contaminated soil, sewage from the construction workforce, accidental spillage of fuels, oils and chemicals, and general refuse and debris generated during construction phase, and sewage from the MSBs,

wastewater from the MSBs canteen (if any) and tenant operations, and surface runoff from paved areas during operation phase.

11.6.2 Based on the identified water quality impacts, mitigation measures are recommended for both construction and operation phases of the proposed Development. With implementation of the mitigation measures, no adverse impact during construction and operation phases is anticipated.

11.7 Waste Management

11.7.1 The major waste types generated by the construction activities will include C&D materials from site clearance works, site formation works, foundation works and multi-storey buildings construction works; excavated sediment; chemical waste from maintenance and servicing of construction plant and equipment and general refuse from the construction workforce. Provided that all these identified wastes are handled, transported and disposed of in accordance with the relevant legislative and recommended requirements and the recommended good site practices and mitigation measures are properly implemented, no adverse environmental impact is expected during the construction phase.

11.7.2 During the operation phase, the waste types generated will be general refuse from staff and chemical waste from the vehicle servicing and maintenance and the brownfield operations. Provided that all these wastes are handled, transported and disposed of in accordance with the relevant legislative requirements and the recommended mitigation measures are properly implemented, no adverse environmental impact is expected during the operation phase.

11.8 Hazard to Life

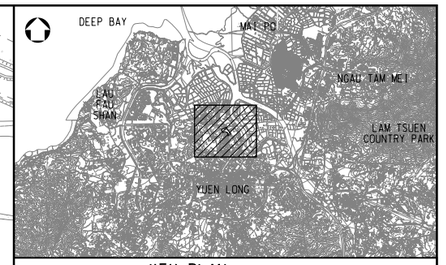
11.8.1 The Site is identified outside any 1-km consultation zone of PHIs.

11.8.2 No construction and operation hazard-to-life impact is anticipated for the proposed development.

Drawings

MMH/369397/EA/301	Study Areas for air quality Impact Assessment
MMH/369397/EA/302	Location of representative air sensitive receivers
MMH/369397/EA/401	Study area for construction/fixed noise impact assessment
MMH/369397/EA/501	Tree survey plan – key plan
MMH/369397/EA/501A	Tree survey plan (sheet 1 of 3)
MMH/369397/EA/501B	Tree survey plan (sheet 2 of 3)
MMH/369397/EA/501C	Tree survey plan (sheet 3 of 3)
MMH/369397/EA/601	Habitat Map
MMH/369397/EA/801	Study area for water quality impact assessment

820000 E
820500 E
821000 E
821500 E
836000 N
835500 N
835000 N
YUEN LONG INDUSTRIAL ESTATE
SHAN PUI RIVER
0 30 60 90 120 150m
1 : 5 000 SCALE-BAR



KEY PLAN (1:100000)

LEGEND:

- PROJECT BOUNDARY
- 500m ASSESSMENT AREA
- POTENTIAL CONCURRENT PROJECT

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 2022	HL	FIRST ISSUE	KS	SHC

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

STUDY AREAS FOR AIR QUALITY IMPACT ASSESSMENT

Designed	AL		Eng check	KS	
Drawn	HL		Coordination	KS	
Dwg check	AL		Approved	SHC	
Scale at A1	1:3000	Status	PRE	Rev	P1

Drawing Number

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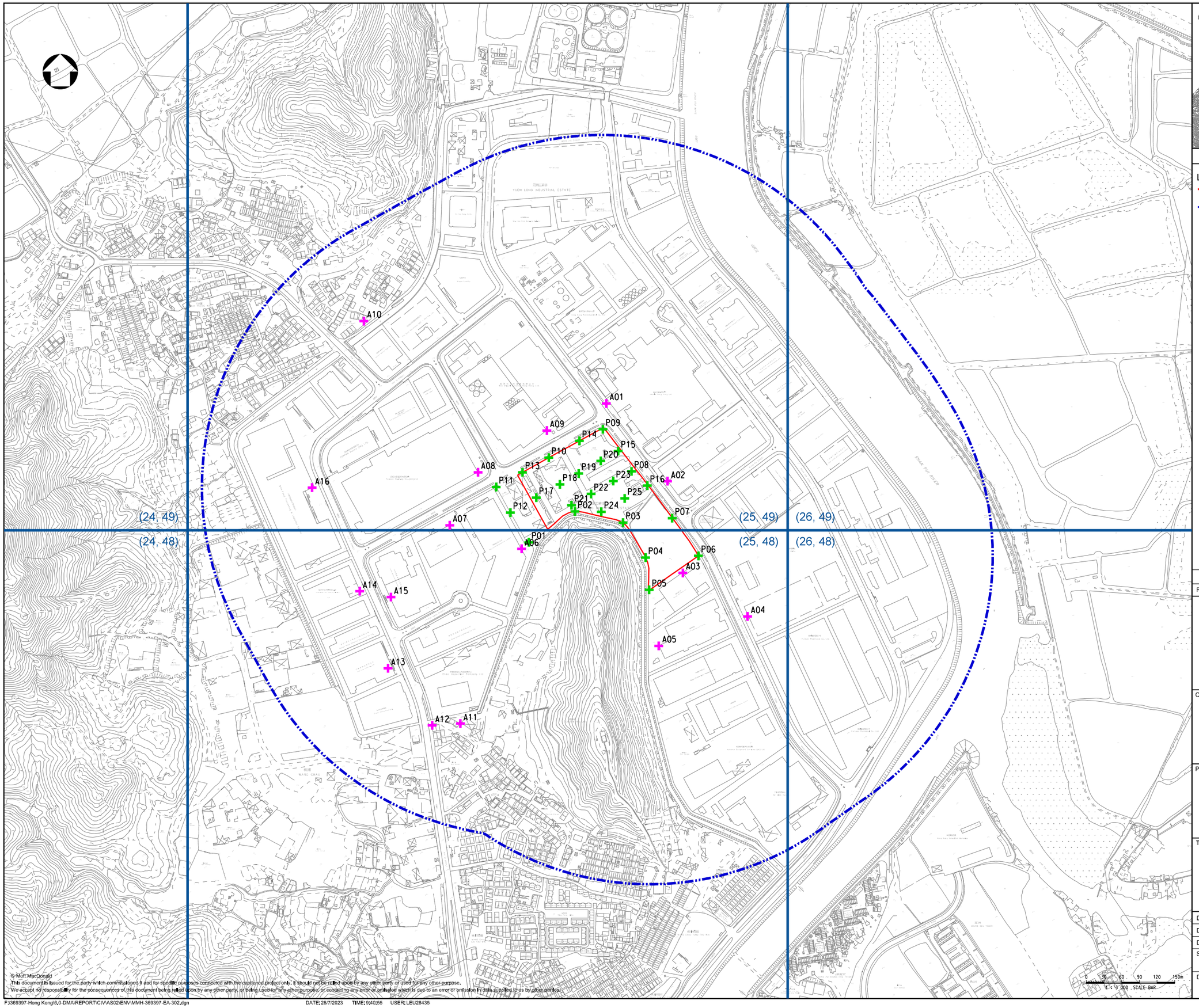



KEY PLAN (1:100000)

LEGEND:

- PROJECT BOUNDARY
- 500m ASSESSMENT AREA
- (24, 49) REPRESENTATIVE PATH GRIDS
- AIR SENSITIVE RECEIVER (EXISTING)
- AIR SENSITIVE RECEIVER (PLANNED)

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 2022	HL	FIRST ISSUE	KS	SHC

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SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

LOCATION OF REPRESENTATIVE AIR SENSITIVE RECEIVERS

Designed	AL		Eng check	KS	
Drawn	HL		Coordination	KS	
Dwg check	AL		Approved	SHC	
Scale at A1	1:3000	Status	PRE	Rev	P1

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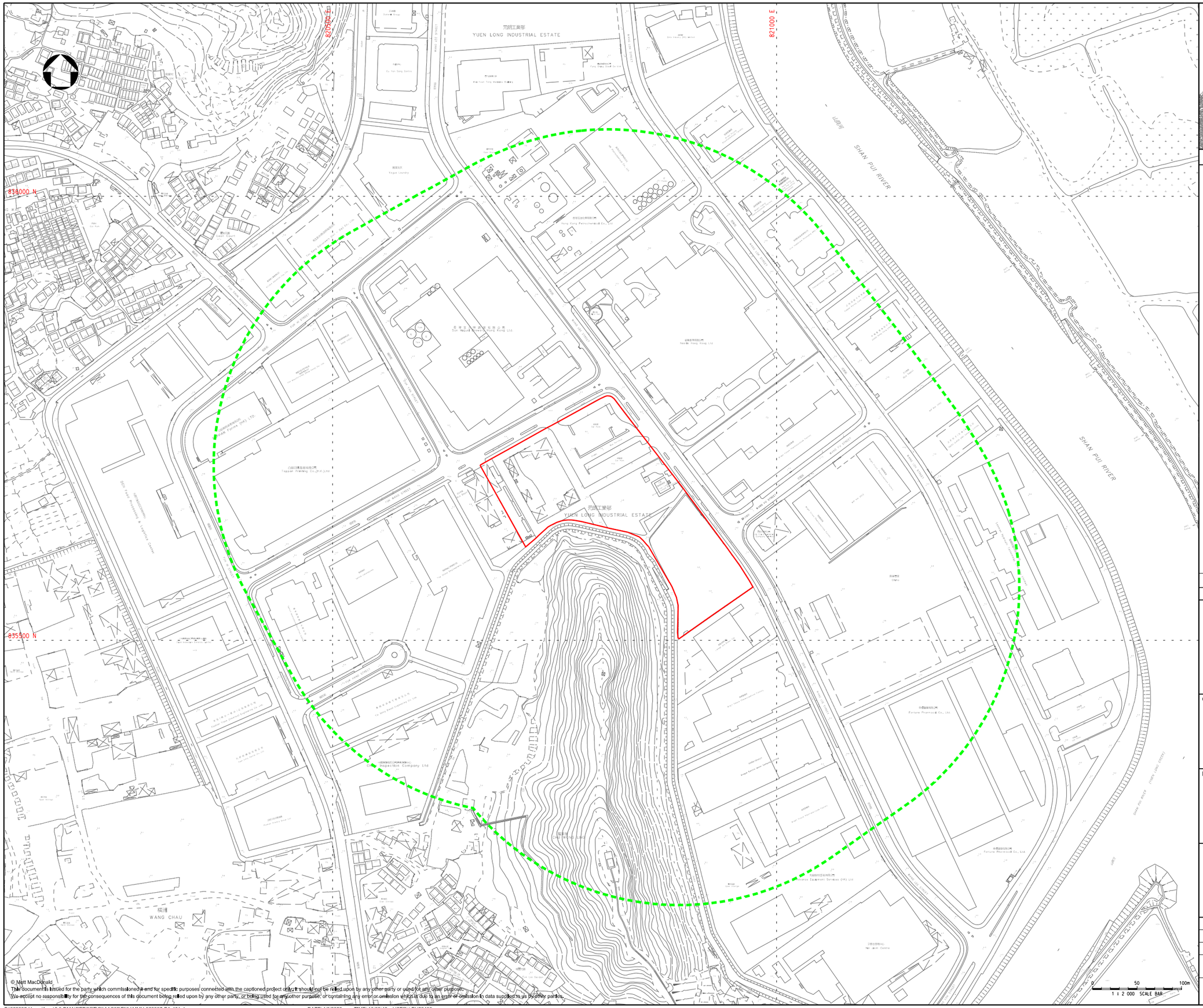



KEY PLAN (1:100000)

LEGEND:

- 300m STUDY AREA
- STUDY SITE

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 2022	HL	FIRST ISSUE	JC	SHC

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SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

STUDY AREA FOR CONSTRUCTION / FIXED NOISE IMPACT ASSESSMENT

Designed	NN		Eng check	JC	
Drawn	HL		Coordination	JC	
Dwg check	NN		Approved	EC	
Scale at A1	1:2000	Status	PRE	Rev	P1

Drawing Number

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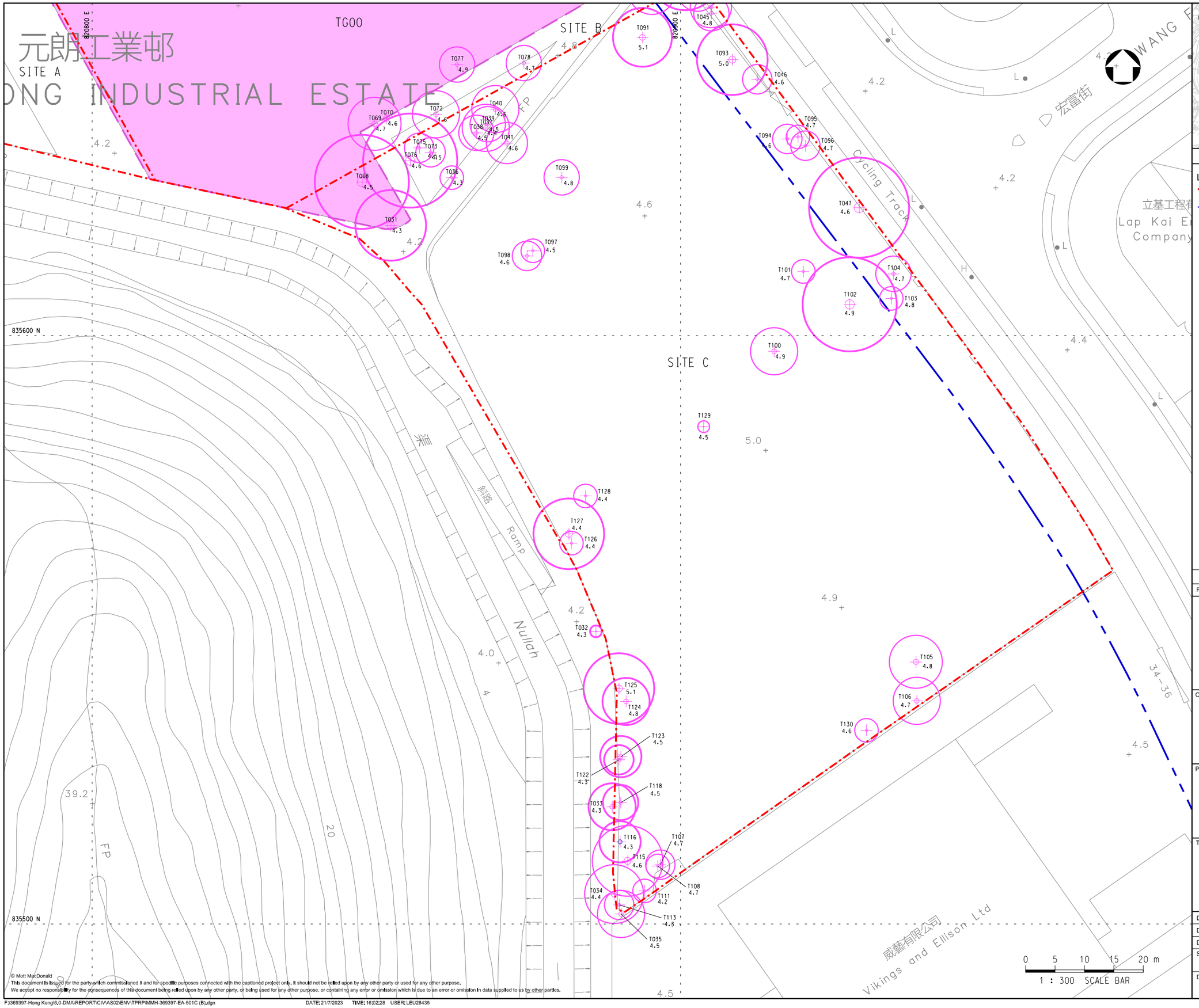

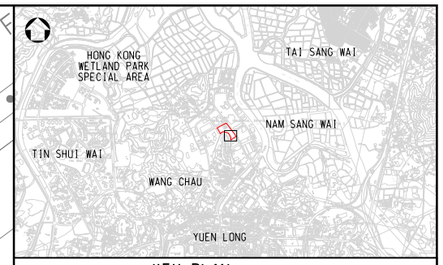

KEY PLAN (1:50000)

LEGEND:
- DEVELOPMENT SITE
- 10m FROM ROAD KERB
- TREE TO BE FELLED
- TREE GROUP TO BE FELLED

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 2022	MING	FIRST ISSUE	PK	EC

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Project
AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title
TREE SURVEY PLAN (SHEET 3 OF 3)

Designed	PK		Eng check	JC	
Drawn	MING		Coordination	JC	
Dwg check	PK		Approved	EC	

Scale at A1	Status	Rev
1:300	PRE	P1

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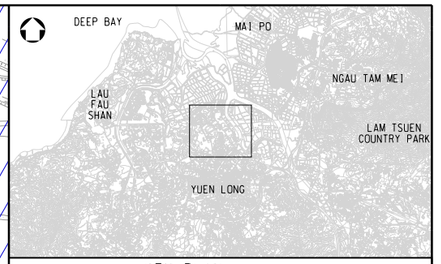

KEY PLAN (1:100000)

LEGEND:

- TENTATIVE ASSESSMENT AREA
- STUDY SITE
- TRANSECT ROUTES FOR ECOLOGICAL FIELD SURVEYS (VEGETATION, MAMMAL, AVIFAUNA, HERPETOFAUNA, BUTTERFLY AND ODONATE, FRESHWATER AQUATIC ASSEMBLAGE)
- WETLAND CONSERVATION AREA
- WETLAND BUFFER AREA
- WL — WOODLAND
- SL — SHRUBLAND
- P — PLANTATION
- M — MARSH
- AL — DRY AGRICULTURAL LAND
- AAL — ABANDONED AGRICULTURAL LAND
- PD — POND
- DC — DRAINAGE CHANNEL
- OF — OPEN FIELD
- DA — DEVELOPED AREA

SECIES OF CONSERVATION INTEREST

	COMMON NAME	SCIENTIFIC NAME
P1		*Aquilaria sinensis*
B1	BLACK KITE	*Milvus migrans*
B2	BLACK-CROWNED NIGHT HERON	*Nycticorax nycticorax*
B3	BLACK-WINGED STILT	*Himantopus himantopus*
B4	CHINESE POND HERON	*Ardeola bacchus*
B5	COLLARED CROW	*Corvus torquatus*
B6	EASTERN BUZZARD	*Buteo japonicus*
B7	GREAT CORMORANT	*Phalacrocorax carbo*
B8	GREAT EGRET	*Ardea alba*
B9	GREY HERON	*Ardea cinerea*
B10	LITTLE EGRET	*Egretta garzetta*
B11	NORTHERN SHOVELER	*Anas clypeata*
B12	WHITE-THROATED KINGFISHER	*Halcyon smyrnensis*
BF1	SWALLOWTAIL	*Papilio xuthus xuthus*
D1	SCARLET BASKER	*Urothemis signata signata*
M1	INSECTIVOROUS BAT	-

0 50 100 150 200 m
1 : 3 000 SCALE BAR

Rev	Date	Drawn	Description	Ch'k'd	App'd
P3	JUN 23	MING	GENERAL REVISION	KI	EC
P2	DEC 17	MING	GENERAL REVISION	KI	EC
P1	APR 17	MING	FIRST ISSUE	RH	EC

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Project
AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

Title
HABITAT MAP

Designed	KI		Eng check	GC	
Drawn	MING		Coordination	JC	
Dwg check	KI		Approved	EC	
Scale at A1	1:3000	Status	PRE	Rev	P3

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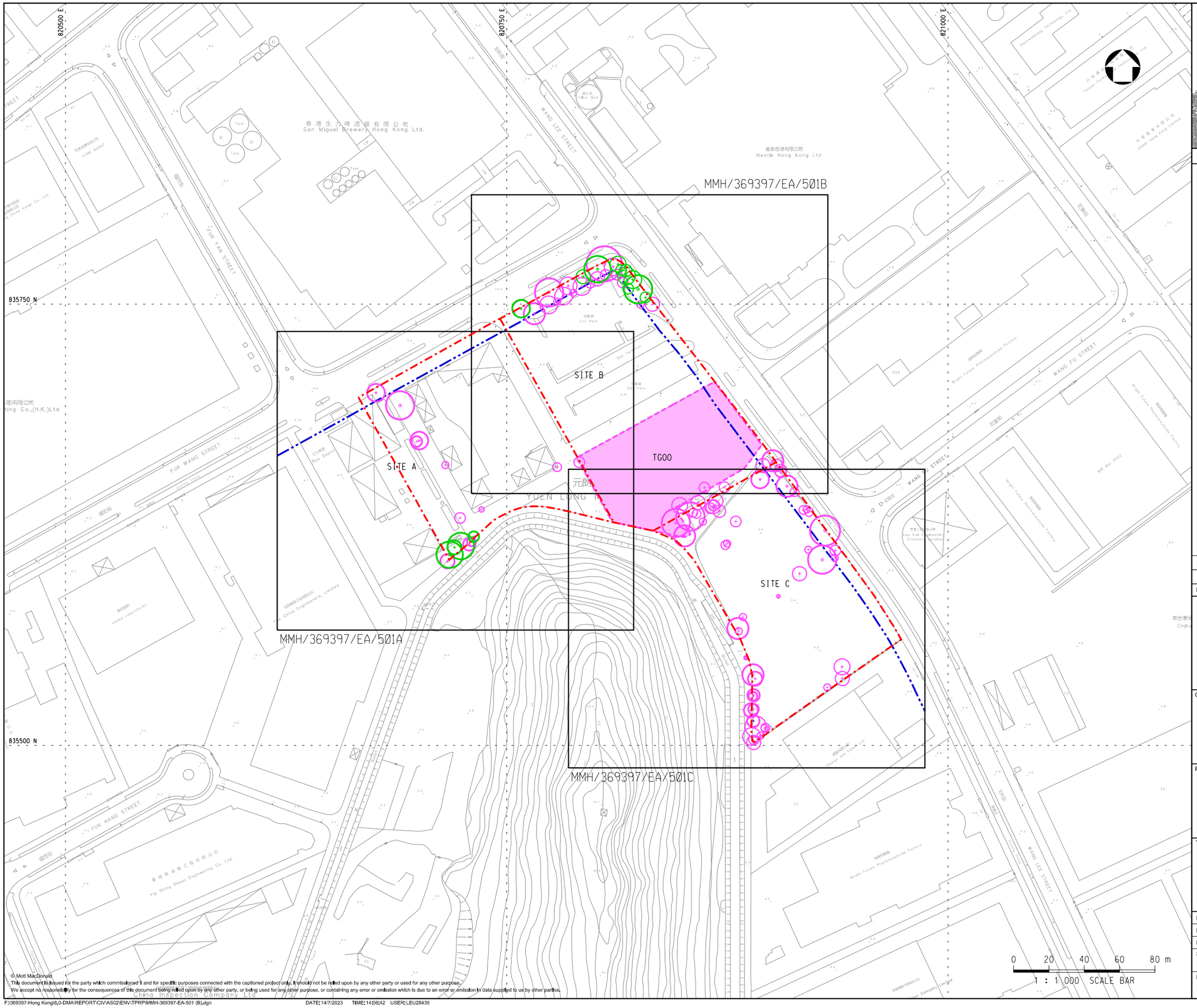

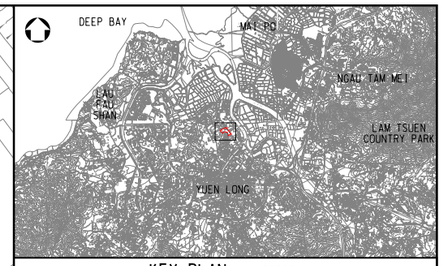

KEY PLAN (1:100000)

LEGEND:

- DEVELOPMENT SITE
- 10m FROM ROAD KERB
- TREE TO BE RETAINED
- TREE TO BE FELLED
- TREE GROUP TO BE FELLED

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	JUL 2023	MING	SECOND ISSUE	PK	EC
P1	SEP 2022	MING	FIRST ISSUE	PK	EC

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Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

TREE SURVEY PLAN - KEY PLAN

Designed	PK		Eng check	JC	
Drawn	MING		Coordination	JC	
Dwg check	PK		Approved	EC	

Scale at A1	Status	Rev
1:1000	PRE	P3

Drawing Number

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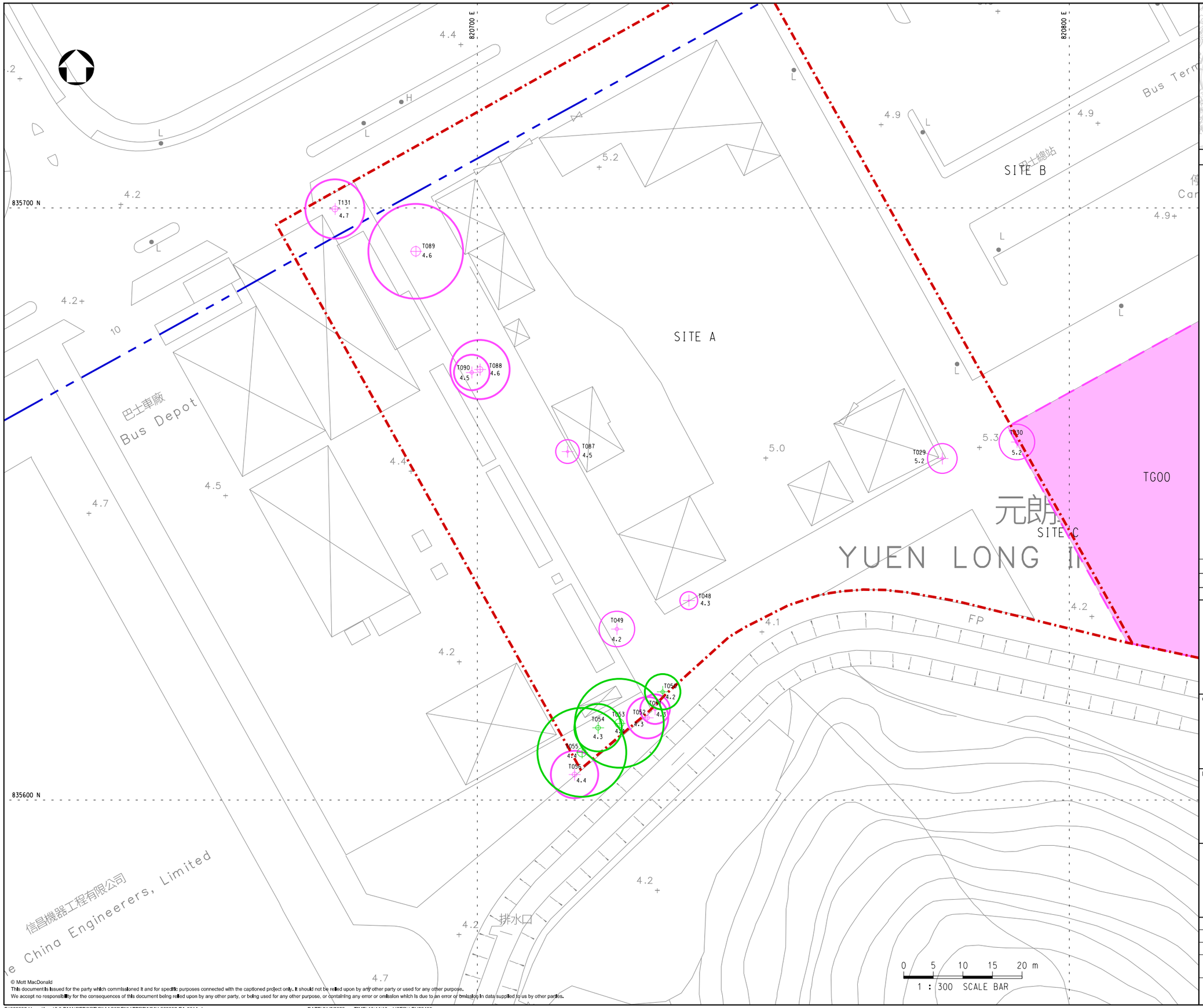

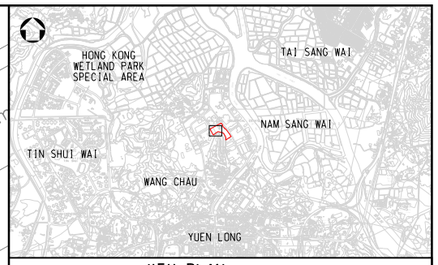

KEY PLAN (1:50000)

LEGEND:

- DEVELOPMENT SITE
- 10m FROM ROAD KERB
- TREE TO BE RETAINED
- TREE TO BE FELLED
- TREE GROUP TO BE FELLED

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	JUL 2023	MING	SECOND ISSUE	PK	EC
P1	SEP 2022	MING	FIRST ISSUE	PK	EC

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SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

TREE SURVEY PLAN (SHEET 1 OF 3)

Designed	PK		Eng check	JC	
Drawn	MING		Coordination	JC	
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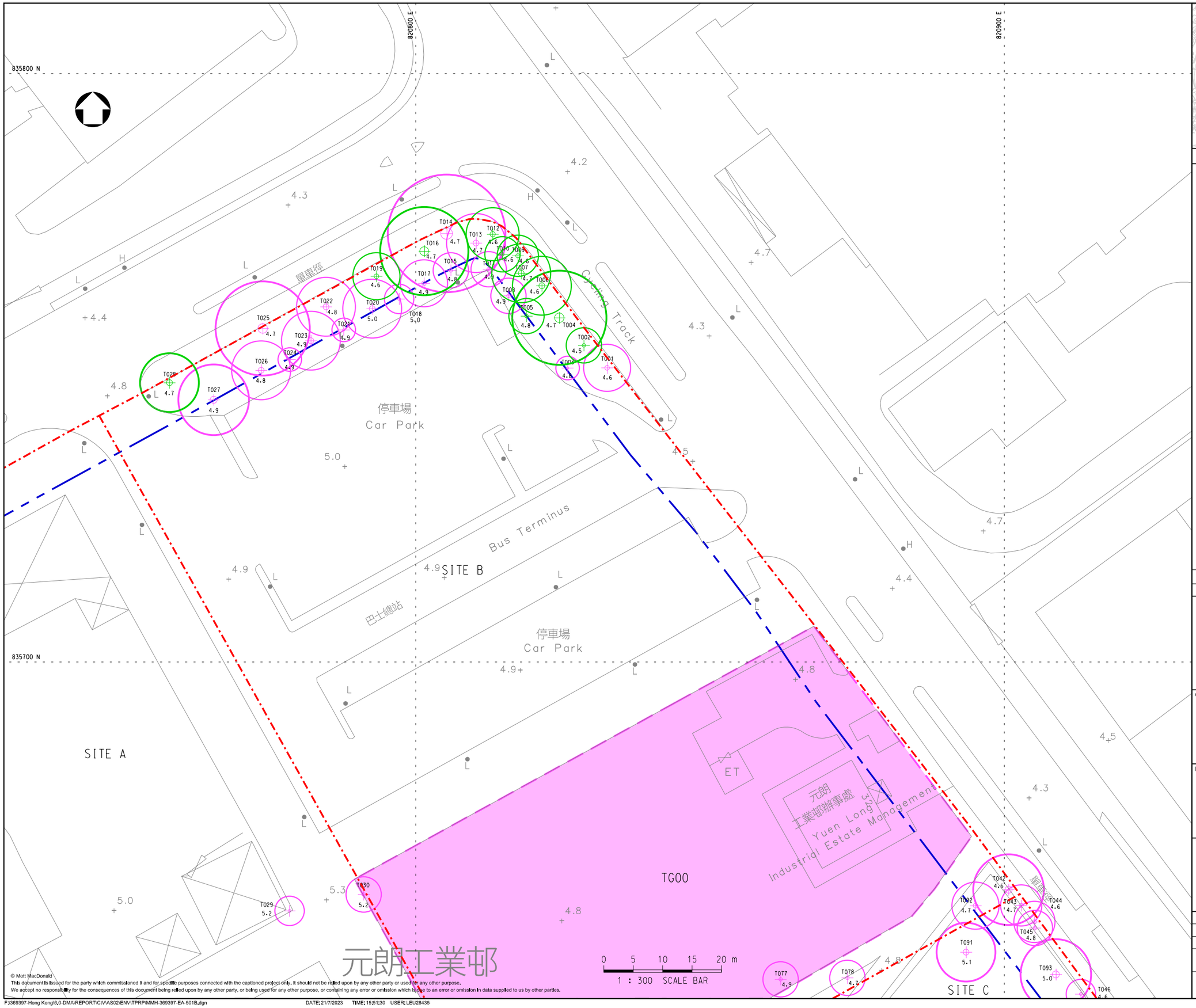

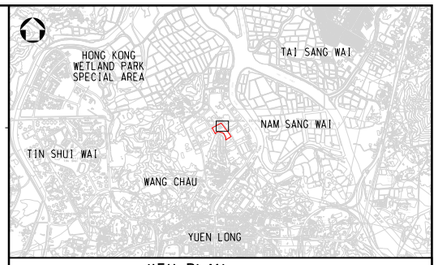

KEY PLAN (1:50000)

LEGEND:

- DEVELOPMENT SITE
- 10m FROM ROAD KERB
- TREE TO BE RETAINED
- TREE TO BE FELLED
- TREE GROUP TO BE FELLED

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 2022	MING	FIRST ISSUE	PK	EC

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CEDD

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

TREE SURVEY PLAN (SHEET 2 OF 3)

Designed	PK		Eng check	JC	
Drawn	MING		Coordination	JC	
Dwg check	PK		Approved	EC	

Scale at A1: 1:300 | Status: PRE | Rev: P1

Drawing Number: MMH/369397/EA/501B

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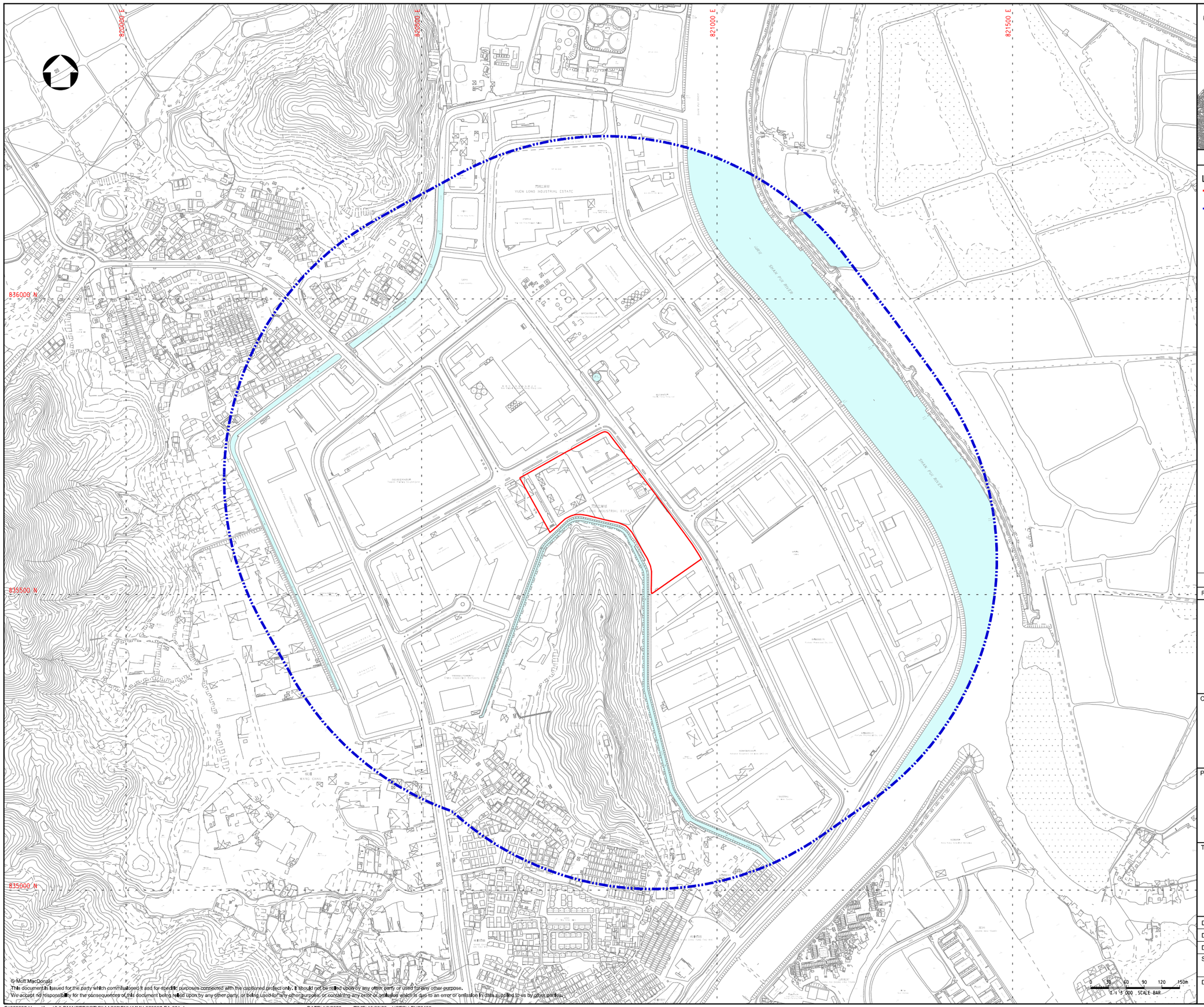



KEY PLAN (1:100000)

LEGEND:

- PROJECT BOUNDARY
- 500m ASSESSMENT AREA
- WATER SENSITIVE RECEIVER

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 2022	HL	FIRST ISSUE	JC	SHC

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Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

STUDY AREA FOR WATER QUALITY IMPACT ASSESSMENT

Designed	NN		Eng check	JC	
Drawn	HL		Coordination	JC	
Dwg check	NN		Approved	SHC	
Scale at A1	1:3000	Status	PRE	Rev	P1

Drawing Number

MMH/369397/EA/801

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Annexes

Annex 5.1	Individual Tree Assessment Schedule
Annex 5.2	Photographic Record (Individual Tree)
Annex 5.3	Tree Group Assessment Schedule
Annex 5.4	Photographic Record (Tree Group)
Annex 5.5	Photo Record of Existing Tree Conditions
Annex 6.1	Representative photos of habitat identified
Annex 6.2	List of Species Record
Annex 7.1	Endorsed CAP

Annex 5.1

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Annex 5.1: Individual Tree Assessment Schedule

Project Title: Agreement No. CE 3/2016 (CE) Study on Proposed Multi-storey Buildings in Yuen Long Area for Brownfield Operations - Feasibility Study

Date of Tree Survey: 6th January, 18th January & 18th April 2017 Surveyed by: Mr. Pak Kin CHAN & Mr. Kelvin IP

Tree No.	Species		Measurements			Amenity value	Form	Health condition	Structural condition	Suitability for transplanting		Conservation Status[3]	Recommendation	Location of tree	Department to provide expert advice to LandsD	Additional Remarks
	Scientific name	Chinese name	height (m)	DBH[1] (mm)	crown spread (m)	(high / medium / low)	(good / average / poor)			(high / medium / low)	Remarks[2]		(retain / transplant / fell)			
T001	*Ficus microcarpa*	細葉榕	8	519	7	low	poor	poor	fair	low	A,B,F,	-	fell	UUGL <10m from kerb	LCSD	Co-dominant trunks; imbalanced form; climbers
T002	*Bauhinia sp.*	羊蹄甲屬	7	186	9	low	poor	fair	poor	low	A,B,F,	-	retain	UUGL <10m from kerb	LCSD	Leaning; crooked trunk; imbalanced form; co-dominant branches; crossing branches; open wound; 5% dieback; 1% foliage damaged by herbivory
T003	*Livistona chinensis*	蒲葵	5	192	4	low	fair	fair	fair	low	A,	-	fell	UUGL <10m from kerb	LCSD	Imbalanced form
T004	*Ficus microcarpa*	細葉榕	9	800	12	medium	fair	fair	fair	medium		-	retain	UUGL <10m from kerb	LCSD	Over-extended branch; crossing branches; open wound
T005	*Livistona chinensis*	蒲葵	7	185	5	low	poor	fair	fair	low	A,F,	-	retain	UUGL <10m from kerb	LCSD	Leaning; imbalanced form; nails on trunk
T006	*Sterculia lanceolata*	假蘋婆	7	210	7	low	poor	fair	fair	low	A,F,O	-	retain	UUGL <10m from kerb	LCSD	Leaning; imbalanced form; co-dominant branches; open wound; girdling roots; 5% dieback
T007	*Sterculia lanceolata*	假蘋婆	9	239	10	low	poor	fair	poor	low	A,B,F,	-	retain	UUGL <10m from kerb	LCSD	Leaning; forked; included bark; dead branches
T008	*Ficus microcarpa*	細葉榕	8	300	6	low	poor	fair	fair	low	A,F,	-	fell	UUGL <10m from kerb	LCSD	Imbalanced form
T009	*Sterculia lanceolata*	假蘋婆	7	150	4	low	poor	fair	poor	low	A,B,F,	-	retain	UUGL <10m from kerb	LCSD	Crooked trunk; imbalanced form; included bark
T010	*Sterculia lanceolata*	假蘋婆	6	169	7	low	poor	fair	fair	low	A,F,O	-	retain	UUGL <10m from kerb	LCSD	Leaning; imbalanced form; co-dominant branches; dead branches; girdling roots; 3% foliage damaged by herbivory
T011	*Livistona chinensis*	蒲葵	6	181	5	low	poor	fair	fair	low	A,F,	-	fell	UUGL <10m from kerb	LCSD	Imbalance form; cavity at base
T012	*Aleurites moluccana*	石栗	8	243	6	low	poor	fair	poor	low	A,B,F,	-	retain	UUGL <10m from kerb	LCSD	Top-pruned; imbalanced form; included bark
T013	*Sterculia lanceolata*	假蘋婆	6	192	8	low	poor	fair	fair	low	A,B,F,	-	fell	UUGL <10m from kerb	LCSD	Co-dominant trunks; imbalanced form; co-dominant branches; open wound; 5% foliage damaged by herbivory
T014	*Albizia lebbeck*	大葉合歡	14	515	16	low	poor	fair	fair	low	A,F,O	-	fell	UUGL <10m from kerb	LCSD	Leaning; exposed roots; girdling roots; parasitic plants
T015	*Livistona chinensis*	蒲葵	6	185	5	low	poor	fair	fair	low	A,F,	-	fell	UUGL <10m from kerb	LCSD	Imbalanced form
T016	*Delonix regia*	鳳凰木	6	297	15	low	poor	fair	fair	low	A,B,F,	IUCN: Least Concern	retain	UUGL <10m from kerb	LCSD	Co-dominant trunks; imbalanced form; crossing branches; dead branches
T017	*Delonix regia*	鳳凰木	6	199	7	low	poor	fair	poor	low	A,B,F,	IUCN: Least Concern	fell	UUGL <10m from kerb	LCSD	Co-dominant trunks; imbalanced form; broken branches; crossing branches; dead branches; open wound
T018	*Livistona chinensis*	蒲葵	4	196	5	low	fair	fair	fair	low	A,	-	fell	UUGL <10m from kerb	LCSD	-
T019	*Bombax ceiba*	木棉	10	231	9	low	poor	fair	fair	low	A,F,	-	retain	UUGL <10m from kerb	LCSD	Imbalanced form; dead branches
T020	*Delonix regia*	鳳凰木	7	254	8	low	poor	fair	fair	low	A,F,	IUCN: Least Concern	fell	UUGL <10m from kerb	LCSD	Imbalanced form; crossing branches; dead branches; hangers; epiphytic *Ficus microcarpa*
T021	*Livistona chinensis*	蒲葵	4	183	4	low	fair	fair	fair	low	A,	-	fell	UUGL <10m from kerb	LCSD	-
T022	*Delonix regia*	鳳凰木	6	378	8	low	poor	fair	poor	low	A,F,	IUCN: Least Concern	fell	UUGL <10m from kerb	LCSD	Imbalanced form; broken branches; crossing branches; dead branches; canker
T023	*Delonix regia*	鳳凰木	7	295	9	low	poor	fair	poor	low	A,B,F,	IUCN: Least Concern	fell	UUGL <10m from kerb	LCSD	Co-dominant trunks; broken trunk; imbalanced form; crossing branches; included bark

Appendix B: Individual Tree Assessment Schedule

Project Title: Agreement No. CE 3/2016 (CE) Study on Proposed Multi-storey Buildings in Yuen Long Area for Brownfield Operations - Feasibility Study

Date of Tree Survey: 6th January, 18th January & 18th April 2017 Surveyed by: Mr. Pak Kin CHAN & Mr. Kelvin IP

Tree No.	Species		Measurements			Amenity value	Form	Health condition	Structural condition	Suitability for transplanting		Conservation Status[3]	Recommendation	Location of tree	Department to provide expert advice to LandsD	Additional Remarks
	Scientific name	Chinese name	height (m)	DBH[1] (mm)	crown spread (m)	(high / medium / low)	(good / average / poor)			(high / medium / low)	Remarks[2]		(retain / transplant / fell)			
T024	*Livistona chinensis*	蒲葵	4	180	4	low	fair	fair	fair	low	A,	-	fell	UUGL <10m from kerb	LCSD	Epiphytic *Macaranga tanarius* var. *tomentosa*
T025	*Albizia lebbeck*	大葉合歡	11	352	12	low	fair	fair	fair	low	A,	-	fell	UUGL <10m from kerb	LCSD	Crossing branches; dead branches; parasitic plant
T026	*Delonix regia*	鳳凰木	6	235	8	low	poor	fair	fair	low	A,F,	IUCN: Least Concern	fell	UUGL <10m from kerb	LCSD	Imbalanced form; crossing branches
T027	*Khaya senegalensis*	非洲楝	12	436	12	low	poor	fair	poor	low	A,B,C,F,	IUCN: Vulnerable	fell	UUGL <10m from kerb	LCSD	Co-dominant trunks; dead branches; included bark; hangers
T028	*Melia azedarach*	苦楝	9	487.4	10	low	poor	fair	poor	low	A,B,C,F,	-	retain	UUGL <10m from kerb	LCSD	Co-dominant trunks; imbalanced form; broken branches; dead branches; included bark; open wound; hangers
T029	*Leucaena leucocephala*	銀合歡	6	139	4	low	poor	fair	fair	low	A,B,F,G,	-	fell	GLA-TYL 164	Tree Unit of LandsD	Crooked trunk; imbalanced form; broken branch; climbers
T030	*Melia azedarach*	苦楝	5	150	5	low	poor	fair	fair	low	A,B,F,	-	fell	YLTL 313 & Exts Thereto S.N	Tree Unit of LandsD	Forked; climbers
T031	*Leucaena leucocephala*	銀合歡	9	177	8	low	poor	fair	poor	low	A,B,F,G,	-	fell	UUGL >10m from kerb	LandsD	Leaning; co-dominant trunks; imbalanced form; climbers
T032	*Leucaena leucocephala*	銀合歡	3	117	2	low	poor	poor	fair	low	A,B,F,G,H,	-	fell	UUGL >10m from kerb	LandsD	Broken trunk; water sprouts
T033	*Sapium sebiferum*	烏桕	10	213	7	low	poor	fair	fair	low	A,B,F,H,	-	fell	UUGL >10m from kerb	LandsD	Crooked trunk; imbalanced form; broken branch; crossing branches; open wound; hangers
T034	*Leucaena leucocephala*	銀合歡	12	162	8	low	poor	fair	fair	low	A,B,F,G,H,M,	-	fell	UUGL >10m from kerb	LandsD	Leaning; forked; included bark; climbers
T035	*Leucaena leucocephala*	銀合歡	10	117	6	low	poor	fair	poor	low	A,F,G,H,M,	-	fell	UUGL >10m from kerb	LandsD	Leaning; imbalanced form; climbers
T036	*Leucaena leucocephala*	銀合歡	8	97	5	low	poor	fair	fair	low	A,F,G,	-	fell	UUGL >10m from kerb	LandsD	Leaning; imbalanced form; broken branch
T037	*Leucaena leucocephala*	銀合歡	9	220.5	15	low	poor	fair	poor	low	A,B,F,G,H,M,	-	fell	UUGL >10m from kerb	LandsD	Toppled; co-dominant trunks; imbalanced form; dead branches; climbers
T038	*Leucaena leucocephala*	銀合歡	8	105	6	low	poor	fair	fair	low	A,F,G,H,	-	fell	UUGL >10m from kerb	LandsD	Imbalanced form; dead branches; climbers
T039	*Leucaena leucocephala*	銀合歡	9	95	6	low	poor	fair	poor	low	A,F,G,H,M,	-	fell	UUGL >10m from kerb	LandsD	Leaning; imbalanced form; hangers; climbers
T040	*Leucaena leucocephala*	銀合歡	10	109	6	low	poor	fair	fair	low	A,F,G,	-	fell	UUGL >10m from kerb	LandsD	Imbalanced form
T041	*Leucaena leucocephala*	銀合歡	8	156	9	low	poor	fair	poor	low	A,B,F,G,	-	fell	UUGL >10m from kerb	LandsD	Co-dominant trunks; imbalanced form; dead branches; climbers
T042	*Albizia lebbeck*	大葉合歡	10	244.4	11	low	poor	fair	fair	low	A,B,F,H,	-	fell	UUGL <10m from kerb	LCSD	Co-dominant trunks; imbalanced form
T043	*Bridelia tomentosa*	土蜜樹	5	182.3	6	low	poor	fair	fair	low	A,B,F,H,	-	fell	UUGL <10m from kerb	LCSD	Multiple trunks
T044	*Macaranga tanarius* var. *tomentosa*	血桐	6	159.2	6	low	poor	fair	fair	low	A,B,F,H,M,	-	fell	UUGL <10m from kerb	LCSD	Co-dominant trunks; crossing trunks; imbalanced form; broken branch; water sprouts; climbers

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Project Title: Agreement No. CE 3/2016 (CE) Study on Proposed Multi-storey Buildings in Yuen Long Area for Brownfield Operations - Feasibility Study

Date of Tree Survey: 6th January, 18th January & 18th April 2017 Surveyed by: Mr. Pak Kin CHAN & Mr. Kelvin IP

Tree No.	Species		Measurements			Amenity value	Form	Health condition	Structural condition	Suitability for transplanting		Conservation Status[3]	Recommendation	Location of tree	Department to provide expert advice to LandsD	Additional Remarks
	Scientific name	Chinese name	height (m)	DBH[1] (mm)	crown spread (m)	(high / medium / low)	(good / average / poor)			(high / medium / low)	Remarks[2]		(retain / transplant / fell)			
T045	*Celtis sinensis*	朴樹	6	107	5	low	poor	fair	fair	low	A,B,F,H,M,	-	fell	UUGL <10m from kerb	LCSD	Crooked trunk; imbalanced form; climbers
T046	*Macaranga tanarius* var. *tomentosa*	血桐	6	118	4	low	poor	fair	fair	low	A,F,H,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Imbalanced form; broken branches; water sprouts; climbers
T047	*Acacia auriculiformis*	耳果相思	15	511	16	low	poor	fair	fair	low	A,B,C,F,H,	IUCN: Least Concern	fell	UUGL <10m from kerb	LCSD	Forked; dead branches; decaying stump; hangers; climbers
T048	*Bombax ceiba*	木棉	3	104	2	low	poor	average	average	low	A,F,	-	fell	GLA-TYL 164	Tree Unit of LandsD	Climbers
T049	*Ficus benjamina*	垂葉榕	7	184	5	low	poor	average	average	low	A,F,	-	fell	UUGL >10m from kerb	LandsD	Leaning; crossing branches; climbers
T050	*Celtis sinensis*	朴樹	6	219	7	low	poor	average	average	low	A,F,	-	retain	UUGL >10m from kerb	LandsD	Imbalanced form; broken branch; parasitic plant; climbers
T051	*Macaranga tanarius* var. *tomentosa*	血桐	5	118	5	low	poor	average	average	low	A,F,H,	-	fell	UUGL >10m from kerb	LandsD	Leaning; imbalanced form; open wound; climbers
T052	*Celtis sinensis*	朴樹	8	192	9	low	poor	average	poor	low	A,B,F,H,	-	fell	UUGL >10m from kerb	LandsD	Crooked trunk; imbalanced form; open wound; decay; parasitic plant
T053	*Acacia confusa*	台灣相思	10	401.4	15	low	poor	average	poor	low	A,B,C,F,	-	retain	UUGL >10m from kerb	LandsD	Multiple trunks; imbalanced form; decaying dead branch; included bark; open wound; water sprouts; climbers
T054	*Acacia confusa*	台灣相思	12	390	13	low	poor	average	poor	low	A,C,F,H,	-	retain	UUGL >10m from kerb	LandsD	Imbalanced form; included bark; decaying stump; water sprouts; 5% dieback
T055	*Acacia confusa*	台灣相思	10	437.2	15	low	poor	average	poor	low	A,B,C,F,	-	retain	UUGL >10m from kerb	LandsD	Multiple trunks; crossing trunks; dead decaying trunk; included bark;
T056	*Acacia confusa*	台灣相思	7	198.2	8	low	poor	average	poor	low	A,B,C,F,H,	-	fell	UUGL >10m from kerb	LandsD	Leaning; crossing trunks; broken trunk; imbalanced form; water sprouts; climbers
T068	*Albizia lebbeck*	大葉合歡	10	369.2	14	low	poor	fair	poor	low	A,B,F,	-	fell	UUGL >10m from kerb	LandsD	Co-dominant trunks; crossing trunks; included bark; climbers; parasitic plant
T069	*Leucaena leucocephala*	銀合歡	10	112	9	low	poor	fair	fair	low	A,B,F,G,	-	fell	UUGL >10m from kerb	LandsD	Co-dominant trunks; imbalanced form; included bark
T070	*Leucaena leucocephala*	銀合歡	3	118	1	low	poor	poor	fair	low	A,B,F,G,	-	fell	UUGL >10m from kerb	LandsD	Broken trunk
T072	*Leucaena leucocephala*	銀合歡	10	200.1	8	low	poor	fair	poor	low	A,B,F,G,	-	fell	UUGL >10m from kerb	LandsD	Toppled; multiple trunks; imbalanced form
T073	*Leucaena leucocephala*	銀合歡	10	105	5	low	poor	fair	poor	low	A,B,F,G,H,	-	fell	UUGL >10m from kerb	LandsD	Leaning; co-dominant trunks; imbalanced form; included bark; climbers
T075	*Leucaena leucocephala*	銀合歡	12	117	6	low	poor	fair	poor	low	A,B,F,G,H,	-	fell	UUGL >10m from kerb	LandsD	Co-dominant trunks; included bark; climbers
T076	*Leucaena leucocephala*	銀合歡	13	198	8	low	poor	fair	poor	low	A,F,G,	-	fell	UUGL >10m from kerb	LandsD	Imbalanced form; co-dominant branches; included bark; exposed roots; climbers
T077	*Acacia auriculiformis*	耳果相思	10	125	7	low	poor	fair	fair	low	A,C,F,	IUCN: Least Concern	fell	UUGL >10m from kerb	LandsD	Co-dominant branches
T078	*Leucaena leucocephala*	銀合歡	3	208	10	low	poor	poor	poor	low	A,B,F,G,	-	fell	UUGL >10m from kerb	LandsD	Toppled; crooked trunk; dead branches; climbers
T087	*Leucaena leucocephala*	銀合歡	6	105	3	low	poor	average	poor	low	A,F,G,N,	-	fell	UUGL >10m from kerb	LandsD	Imbalanced form; climbers; fused with chain-link fence
T088	*Ficus benjamina*	垂葉榕	6	308.2	8	low	poor	average	poor	low	A,B,F,M,	-	fell	UUGL >10m from kerb	LandsD	Leaning; co-dominant trunks; decaying trunk; imbalanced form; 20% dieback
T089	*Ficus benjamina*	垂葉榕	12	581	14	low	poor	average	average	low	A,B,F,	-	fell	UUGL >10m from kerb	LandsD	Leaning; co-dominant trunks; imbalanced form; decay; hangers
T090	*Bombax ceiba*	木棉	6	130	5	low	poor	average	average	low	A,B,F,M,	-	fell	UUGL >10m from kerb	LandsD	Crooked trunk

Appendix B: Individual Tree Assessment Schedule

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Date of Tree Survey: 6th January, 18th January & 18th April 2017 Surveyed by: Mr. Pak Kin CHAN & Mr. Kelvin IP

Tree No.	Species		Measurements			Amenity value	Form	Health condition	Structural condition	Suitability for transplanting		Conservation Status[3]	Recommendation	Location of tree	Department to provide expert advice to LandsD	Additional Remarks
	Scientific name	Chinese name	height (m)	DBH[1] (mm)	crown spread (m)	(high / medium / low)	(good / average / poor)			(high / medium / low)	Remarks[2]		(retain / transplant / fell)			
T091	*Albizia lebbeck*	大葉合歡	8	462.2	9	low	poor	fair	fair	low	A,B,F,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Multiple trunks; imbalanced form; broken branch; decaying stump; open wound; climbers; parasitic plant
T092	*Albizia lebbeck*	大葉合歡	7	197	7	low	poor	fair	poor	low	A,F,H,	-	fell	GLA-TYL 575	LandsD	Imbalanced form; included bark; open wound; decay with fungal fruiting bodies; climbers
T093	*Albizia lebbeck*	大葉合歡	10	336.2	11	low	poor	fair	poor	low	A,B,F,H,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Multiple trunks; included bark; open wound; hangers; climbers
T094	*Sapium sebiferum*	烏桕	5	247	4	low	poor	poor	fair	low	A,B,F,H,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Crooked trunk; imbalanced form; crossing branches; decaying stump; open wound; water sprouts; climbers
T095	*Macaranga tanarius* var. *tomentosa*	血桐	4	120	3	low	poor	poor	fair	low	A,F,H,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Imbalanced form; open wound; decay; pest infestation; water sprouts; climbers
T096	*Bombax ceiba*	木棉	6	145	4	low	poor	fair	fair	low	A,B,F,H,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Bent trunk; imbalanced form
T097	*Bombax ceiba*	木棉	6	162	3	low	poor	fair	poor	low	A,F,N,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Imbalanced form; broken branch; climbers; very close to hard structure
T098	*Bombax ceiba*	木棉	6	234	4	low	poor	fair	poor	low	A,F,N,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Imbalanced form; very close to hard structure
T099	*Acacia auriculiformis*	耳果相思	8	283	5	low	poor	fair	fair	low	A,B,C,F,	IUCN: Least Concern	fell	GLA-TYL 575	Tree Unit of LandsD	Crooked trunk; imbalanced form; dead branches; hard pruned; open wound; crack; climbers
T100	*Acacia auriculiformis*	耳果相思	9	264	7	low	poor	fair	fair	low	A,B,C,F,	IUCN: Least Concern	fell	GLA-TYL 575	Tree Unit of LandsD	Co-dominant trunks; imbalanced form; included bark; open wound; water sprouts; epiphytic *Ficus microcarpa*
T101	*Spathodea campanulata*	火焰木	6	112	3	low	poor	fair	fair	low	A,F,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Imbalanced form; decay
T102	*Acacia auriculiformis*	耳果相思	14	415	15	low	poor	fair	poor	low	A,B,C,F,	IUCN: Least Concern	fell	GLA-TYL 575	Tree Unit of LandsD	Leaning; forked; imbalanced form; crack; hangers; epiphytic *Ficus microcarpa*
T103	*Spathodea campanulata*	火焰木	6	196	3	low	poor	fair	fair	low	A,B,F,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Forked; imbalanced form; water sprouts
T104	*Spathodea campanulata*	火焰木	6	153	5	low	poor	fair	fair	low	A,F,H,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Imbalanced form
T105	*Leucaena leucocephala*	銀合歡	8	233	8	low	poor	fair	fair	low	A,B,F,G,H,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Forked; imbalanced form
T106	*Acacia auriculiformis*	耳果相思	6	180	7	low	poor	fair	poor	low	A,B,C,F,H,	IUCN: Least Concern	fell	GLA-TYL 575	Tree Unit of LandsD	Leaning; co-dominant trunks; included bark; dead branches; climbers
T107	*Leucaena leucocephala*	銀合歡	6	146.2	4	low	poor	fair	fair	low	A,B,F,G,H,M,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Leaning; multiple trunks; broken trunk; hangers; climbers
T108	*Leucaena leucocephala*	銀合歡	7	110	3	low	poor	fair	fair	low	A,B,F,G,H,M,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Forked; co-dominant trunk; climbers
T111	*Leucaena leucocephala*	銀合歡	3	106.9	3	low	poor	fair	fair	low	A,B,F,G,H,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Leaning; co-dominant trunks; imbalanced form; climbers

Appendix B: Individual Tree Assessment Schedule

Project Title: Agreement No. CE 3/2016 (CE) Study on Proposed Multi-storey Buildings in Yuen Long Area for Brownfield Operations - Feasibility Study

Date of Tree Survey: 6th January, 18th January & 18th April 2017 Surveyed by: Mr. Pak Kin CHAN & Mr. Kelvin IP

Tree No.	Species		Measurements			Amenity value	Form	Health condition	Structural condition	Suitability for transplanting		Conservation Status[3]	Recommendation	Location of tree	Department to provide expert advice to LandsD	Additional Remarks
	Scientific name	Chinese name	height (m)	DBH[1] (mm)	crown spread (m)	(high / medium / low)	(good / average / poor)			(high / medium / low)	Remarks[2]		(retain / transplant / fell)			
T113	*Leucaena leucocephala*	銀合歡	9	126	4	low	poor	fair	fair	low	A,F,G,H,M,N,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Climbers; fused with hard structure
T115	*Leucaena leucocephala*	銀合歡	10	240	11	low	poor	fair	fair	low	A,F,G,H,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Leaning; imbalanced form; climbers
T116	*Leucaena leucocephala*	銀合歡	8	118	6	low	poor	fair	fair	low	A,B,F,G,H,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Forked; imbalanced form; climbers
T118	*Leucaena leucocephala*	銀合歡	10	116	5	low	poor	fair	fair	low	A,F,G,H,N,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Leaning; imbalanced form; climbers; fused with hard structure
T122	*Leucaena leucocephala*	銀合歡	7	108	4	low	poor	fair	fair	low	A,F,G,H,M,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Leaning; imbalanced form; climbers
T123	*Leucaena leucocephala*	銀合歡	7	142	6	low	poor	fair	fair	low	A,B,F,G,H,M,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Multiple trunks; imbalanced form; climbers
T124	*Leucaena leucocephala*	銀合歡	9	161	7	low	poor	fair	fair	low	A,F,G,H,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Imbalanced form; dead branches; open wound
T125	*Leucaena leucocephala*	銀合歡	10	199	11	low	poor	fair	fair	low	A,F,G,H,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Imbalanced form; open wound; climbers
T126	dead tree	枯樹	5	142	4	-	-	-	-	-	-	-	fell	GLA-TYL 575	Tree Unit of LandsD	Leaning; climbers
T127	*Acacia confusa*	台灣相思	8	226	11	low	poor	fair	poor	low	A,B,C,F,H,M,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Leaning; co-dominant trunks; broken trunk; imbalanced form; dead branches; open wound; decay; climbers
T128	*Mangifera indica*	杧果	3	139	3	low	poor	fair	poor	low	A,B,F,N,	IUCN: Data Deficient	fell	GLA-TYL 575	Tree Unit of LandsD	Imbalanced form; forked; included bark; very close to hard structure
T129	*Bombax ceiba*	木棉	3	100	2	low	poor	fair	fair	low	A,B,F,N,	-	fell	GLA-TYL 575	Tree Unit of LandsD	Crooked trunk; climbers; very close to hard structure; fused with chain-link fence
T130	*Acacia auriculiformis*	耳果相思	4	98	3	low	poor	fair	fair	low	A,C,F,H,	IUCN: Least Concern	fell	GLA-TYL 575	Tree Unit of LandsD	Leaning; imbalanced form; dead branches
T131	dead tree	枯樹	12	550	9	-	-	-	-	-	-	-	fell	STT 2575	Tree Unit of LandsD	Cavity; epiphytic *Ficus microcarpa*

[1] DBH of a tree refers to its diameter at breast height (i.e. measured at 1.3 m above ground level). Measurement of DBH followed AFCD PN No. 2 - *Measurement of Diameter at Breast Height (DBH)*

[2] A = low amenity value; B = irrecoverable form after transplanting; C = low survival rate after transplanting; D = very large size; E = with evidence of over-maturity and onset of senescence; F = with poor health, structure or form; G = undesirable species; H = change in exposure; I = no sufficient available space for Tree Protection Zone; J = limited access by necessary equipment; K = low cost-effectiveness; L = on sloping ground; M = very close to another tree; N = very close to hard structures; O = girdling roots

[3] The IUCN species status were extracted from The IUCN Red List of Threatened Species. Version 2022. <www.iucnredlist.org>. Downloaded on 16 August 2

Remark: Tree nos. T071, T074, T079, T109, T110, T112, T114, T117, T119-T121 and T147-T150 are not used. The total no. of trees individually surveyed is 142.

Annex 5.2

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Annex 5.2: Photographic Record of Individually Surveyed Trees



T001_01



T001_02



T002_01



T002_02



T002_03



T002_04



T003_01



T004_01



T004_02



T004_03



T004_04



T005_01



T005_02



T006_01



T006_02



T006_03



T006_04



T006_05



T007_01



T007_02



T007_03



T007_04



T008_01



T008_02



T009_01



T009_02



T009_03



T010_01



T010_02



T010_03



T010_04



T011_01



T011_02



T011_03



T012_01



T012_02



T012_03



T013_01



T013_02



T013_03



T013_04



T014_01



T014_02



T014_03



T014_04



T014_05



T015_01



T015_02



T016_01



T016_02



T016_03



T016_04



T017_01



T017_02



T017_03



T017_04



T017_05



T017_06



T018_01



T019_01



T019_02



T020_01



T020_02



T020_03



T021_01



T022_01



T022_02



T022_03



T022_04



T022_05



T022_06



T022_07



T023_01



T023_02



T023_03



T023_04



T023_05



T023_06



T024_01



T024_02



T025_01



T025_02



T025_03



T026_01



T026_02



T026_03



T027_01



T027_02



T027_03



T028_01



T028_02



T028_03



T028_04



T029_01



T029_02



T029_03



T029_04



T029_05



T029_06



T030_01



T030_02



T031_01



T031_02



T031_03



T032_01



T032_02



T033_01



T033_02



T033_03



T033_04



T033_05



T033_06



T033_07



T033_08



T034_01



T034_02



T034_03



T035_01



T035_02



T036_01



T037_01



T037_02



T038_01



T038_02



T038_03



T039_01



T039_02



T039_03



T040_01



T040_02



T041_01



T041_02



T041_03



T042_01



T042_02



T043_01



T043_02



T044_01



T044_02



T044_03



T044_04



T044_05



T045_01



T045_02



T045_03



T046_01



T046_02



T046_03



T046_04



T047_01



T047_02



T047_03



T047_04



T047_05



T048_01



T049_01



T049_02



T049_03



T049_04



T050_01



T050_02



T050_03



T050_04



T050_05



T051_01



T051_02



T051_03



T052_01



T052_02



T052_03



T052_04



T052_05



T053_01



T053_02



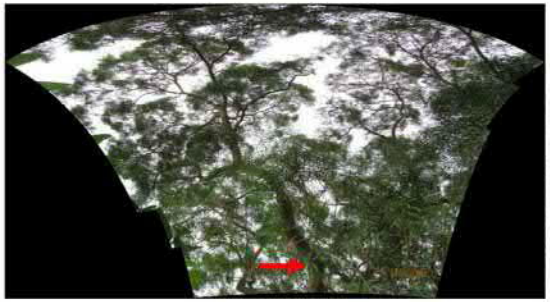
T053_03



T053_04



T053_05



T054_01



T054_02



T054_03



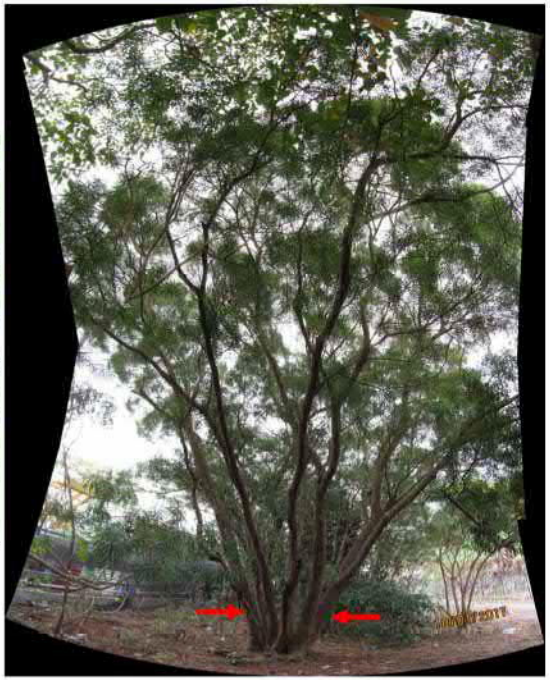
T054_04



T054_05



T054_06



T055_01



T055_02



T055_03



T055_04



T055_05



T056_01



T056_02



T057_01



T057_02



T057_03



T057_04



T058_01



T058_02



T058_03



T058_04



T058_05



T058_06



T058_07



T058_08



T059_01



T059_02



T059_03



T059_04



T059_05



T059_06



T060_01



T060_02



T060_03



T061_01



T061_02



T061_03



T061_04



T062_01



T062_02



T062_03



T063_01



T063_02



T063_03



T063_04



T064_01



T064_02



T065_01



T065_02



T065_03



T065_04



T065_05



T066_01



T066_02



T066_03



T066_04



T067_01



T067_02



T067_03



T068_01



T066_02



T069_01



T069_02



T069_03



T070_01



T070_02



T072_01



T072_02



T072_03



T073_01



T073_02



T075_01



T076_01



T076_02



T076_03



T076_04



T077_01



T078_01



T078_02



T080_01



T080_02



T080_03



T081_01



T081_02



T082_01



T082_02



T082_03



T082_04



T083_01



T083_02



T083_03



T083_04



T084_01



T084_02



T084_03



T085_01



T085_02



T085_03



T086_01



T086_02



T086_03



T087_01



T087_02



T087_03



T088_01



T088_02



T088_03



T089_01



T089_02



T089_03



T089_04

Annex 5.2: Photographic Record of Individually Surveyed Trees



T089_05



T090_01



T090_02



T090_03



T091_01



T091_02



T091_03



T091_04



T091_05



T091_06



T091_07



T091_08



T091_09



T091_10



T091_11



T092_01

Annex 5.2: Photographic Record of Individually Surveyed Trees



T092_02



T092_03



T092_04



T092_05



T092_06



T092_07



T092_08



T093_01

Annex 5.2: Photographic Record of Individually Surveyed Trees



T093_02



T093_03



T093_04



T093_05



T094_01



T094_02



T094_03



T094_04



T094_05



T094_06



T094_07



T094_08



T095_01



T095_02



T095_03



T095_04



T096_01



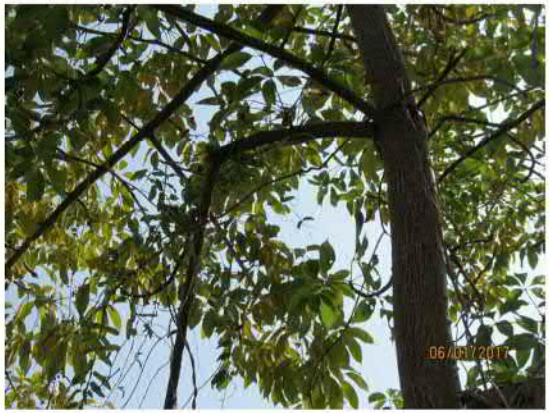
T096_02



T097_01



T097_02



T097_03



T098_01



T098_02



T099_01

Annex 5.2: Photographic Record of Individually Surveyed Trees



T099_02



T099_03



T099_04



T099_05



T099_06



T099_07



T100_01



T100_02

Annex 5.2: Photographic Record of Individually Surveyed Trees



T100_03



T100_04



T100_05



T101_01



T101_02



T101_03



T101_04



T102_01



T102_02



T102_03



T102_04



T102_05



T103_01



T103_02



T103_03



T104_01



T104_02



T104_03



T105_01



T105_02



T105_03



T106_01



T106_02



T106_03



T106_04



T106_05



T106_06



T107_01



T107_02



T107_03



T108_01



T108_02



T108_03



T111_01



T111_02



T113_01



T113_02



T113_03



T115_01



T115_02



T115_03



T116_01



T116_02



T118_01



T118_02



T118_03



T122_01



T122_02



T123_01



T123_02



T123_03



T123_04



T124_01



T124_02



T124_03



T125_01



T125_02_



T125_03



T125_04



T126_01



T126_02



T126_03



T127_01



T127_02



T127_03



T127_04



T128_01



T128_02



T128_03



T129_01



T129_02



T129_03

Annex 5.2: Photographic Record of Individually Surveyed Trees



T129_04



T130_01



T130_02



T130_03



T131_01



T131_02



T131_03



T131_04



T131_05



T132_01



T132_02



T132_03



T132_04



T133_01



T133_02



T133_03



T134_01_



T134_02



T134_03



T134_04



T134_05



T135_01



T135_02



T136_01



T136_02



T136_03



T137_01



T137_02



T137_03



T137_04



T138_01



T138_02



T138_03



T138_04



T138_05



T138_06



T139_01



T139_02



T139_03



T139_04



T140_01



T140_02



T140_03



T140_04



T141_01



T141_02



T141_03



T141_04



T142_01



T142_02



T142_03



T142_04



T142_05



T142_06



T143_01



T143_02



T143_03



T143_04



T144_01



T144_02



T145_01



T145_02



T145_03



T145_04



T146_01



T146_02



T146_03



T146_04



T146_05



T151_01



T151_02



T151_03_fe



T151_04



T151_05



T151_06



T152_01


T152_02



T152_03



T152_04



T152_05



T152_06



T152_07



T153_01



T153_02



T153_03



T153_04



T153_05



T153_06



T153_07



T153_08



T153_09



T153_10



T153_11



T154_01



T154_02



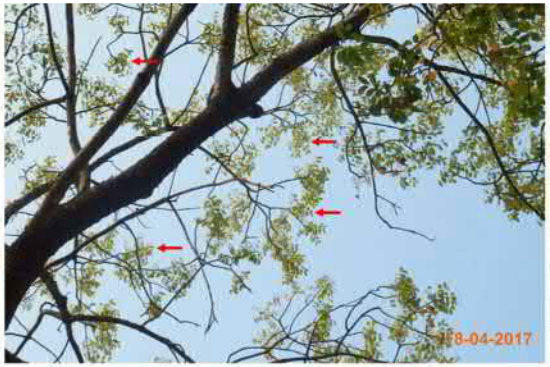
T154_03



T154_04



T154_05



T154_06



T154_07



T154_08



T154_09



T155_01



T155_02



T155_03



T155_04



T155_05



T155_06



T155_07



T155_08



T155_09



T155_10



T156_01



T156_02



T156_03



T156_04



T156_05



T156_06



T157_01



T157_02

Annex 5.2: Photographic Record of Individually Surveyed Trees



T157_03



T157_04

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Annex 5.3

Annex 5.3: Tree Group Assessment Schedule

Project Title: Agreement No. CE 3/2016 (CE) Study on Proposed Multi-storey Buildings in Yuen Long Area for Brownfield Operations - Feasibility Study

Date of Tree Survey: 8th August to 13th October 2016 Surveyed by: Mr. Pak Kin CHAN

Species				No. with Diameter at Breast Height [mm]				Height	Crown	Health	Form	Amenity
Botanical Name		**%**	**Quantity**	**95-149**	**150-499**	**500-999**	**>1000**	**[m]**	**[m]**	**(P/A/G)***	**(P/A/G)***	**(L/M/H)****
TG00 (Within Proposed Development Area)												
Acacia auriculiformis	耳果相思	15%	4	3	1	0	0	6 to 8	5 to 9	A	P to A	L
Acacia confusa	台灣相思	23%	6	0	6	0	0	10 to 15	4 to 12	A	P to A	L
Albizia lebbeck	大葉合歡	8%	2	0	2	0	0	9 to 12	12 to 13	A	F	L
Aleurites moluccana	石栗	15%	4	0	4	0	0	4 to 8	4 to 8	P to A	P to A	L
Bombax ceiba	木棉	4%	1	0	1	0	0	14	13	A	A	L
Carica papaya	番木瓜	4%	1	1	0	0	0	2	2	A	A	L
Ficus microcarpa	細葉榕	4%	1	0	1	0	0	8	10	A	A	L
Leucaena leucocephala	銀合歡	4%	1	1	0	0	0	7	8	A	P	L
Macaranga tanarius var. *tomentosa*	血桐	12%	3	1	2	0	0	4 to 6	2 to 7	A	P to A	L
Melia azedarach	苦楝	4%	1	1	0	0	0	6	7	A	P	L
Psidium guajava	番石榴	4%	1	0	1	0	0	5	6	A	P	L
Syzygium jambos	蒲桃	4%	1	0	1	0	0	7	6	A	P	L
	Total:	**100%**	**26**	7	19	0	0	-	-	-	-	-

***** P = Poor; A = Average; G = Good

****** L = Low; M = Medium; H = High

Annex 5.4

[BLANK]

Annex 5.4: Photographic Record of Surveyed Tree Groups



TG00_fell



TG01_retain



TG02_retain



TG03_retain



TG04_retain



TG05_retain



TG06_retain



TG07_retain

Annex 5.4: Photographic Record of Surveyed Tree Groups



TG08_retain



TG09_retain



TG10_retain



TG11_retain



TG12_retain



TG13_retain



TG14_retain



TG15_retain

Annex 5.4: Photographic Record of Surveyed Tree Groups



TG16_retain



TG17_retain



TG18_retain



TG19_retain



TG20_retain



TG21_retain



TG22_retain



TG23_retain

Annex 5.4: Photographic Record of Surveyed Tree Groups



TG24_retain



TG25_retain



TG26_retain



TG27_retain



TG28_retain



TG29_retain



TG30_retain



TG31_retain

Annex 5.4: Photographic Record of Surveyed Tree Groups



TG32_retain



TG33_retain



TG34_retain



TG35_retain



TG36_retain



TG37_retain



TG38_retain



TG39_retain

Annex 5.4: Photographic Record of Surveyed Tree Groups



TG40_retain



TG41_retain



TG42_retain



TG43_retain



TG44_retain



TG45_retain



TG46_retain



TG47_retain

Annex 5.4: Photographic Record of Surveyed Tree Groups



TG48_retain



TG49_retain



TG50_retain



TG51_retain



TG52_retain



TG53_retain



TG54_retain



TG55_retain

Annex 5.4: Photographic Record of Surveyed Tree Groups



TG56_retain



TG57_retain



TG58_retain



TG59_retain



TG60_retain



TG61_retain



TG62_retain



TG63_retain

Annex 5.4: Photographic Record of Surveyed Tree Groups



TG64_retain



TG65_retain



TG66_retain



TG67_retain



TG68_retain



TG69_retain



TG70_retain



TG71_retain

Annex 5.4: Photographic Record of Surveyed Tree Groups



TG72_retain



TG73_retain



TG74_retain



TG75_retain



TG76_retain



TG77_retain



TG78_retain



TG79_retain

Annex 5.4: Photographic Record of Surveyed Tree Groups



TG80_retain



TG81_retain



TG82_retain

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Annex 5.5

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DSC05392



DSC05397



DSC05400



DSC05401



DSC05406



DSC05409



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DSC05414



DSC05424



DSC05425



DSC05430



DSC05440



DSC05448



DSC05451



DSC05467



DSC05470



DSC05477



DSC05480



DSC05490



DSC05493



DSC05494



DSC05499



DSC05500



DSC05504



DSC05510



DSC05515



DSC05521



DSC05529



DSC05534



DSC05541



DSC05550



DSC05551



DSC05556



DSC05566



DSC05567



DSC05575



DSC05577



DSC05596



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DSC05814



DSC05822



DSC05832



DSC05841



DSC05842



DSC05845



DSC05847

Annex 6.1

Annex 6.1 Representative Photos of Habitat Identified



Developed Area
(The Study Site)



Developed Area
(Tentative Assessment Area)

Annex 6.2

Table 6.2A: List of Flora Species Recorded in Developed Area (Study Site and Tentative Assessment Area)

Botanical Name	Chinese Name	Growth Form	Relative Abundance*	
			Tentative Assessment Area	Study Site
Acacia auriculiformis	耳果相思	Tree	+	
Acacia confusa	台灣相思	Tree	+	
Ageratum conyzoides	勝紅薊	Herb	+	
Aglaia odorata var. *microphyllina*	小葉米仔蘭	Shrub	+	
Albizia lebbeck	大葉合歡	Tree	+	+
Aleurites moluccana	石栗	Tree	+	+
Allamanda schottii	硬枝黃蟬	Shrub	+	
Alocasia macrorrhizos	海芋	Herb	+	
Aloe vera	蘆薈	Herb	+	
Alstonia scholaris	糖膠樹	Tree	+	
Alternanthera philoxeroides	空心莧	Herb	+	
Alysicarpus vaginalis	練莢豆	Herb	+	
Amaranthus viridis	野莧	Herb	+	
Annona squamosa	番荔枝	Tree	+	
Araucaria heterophylla	異葉南洋杉	Tree	+	
Archontophoenix alexandrae	假檳榔	Tree	+	
Artemisia indica	五月艾	Herb	+	
Artocarpus heterophyllus	菠蘿蜜	Tree	+	
Asparagus sprengeri	武竹	Herb	+	
Bambusa sp.	簕竹屬	Bamboo	+	
Bauhinia sp.	羊蹄甲屬	Tree	+	
Bidens alba	白花鬼針草	Herb	+	
Bischofia javanica	秋楓	Tree	+	
Bombax ceiba	木棉	Tree	+	+
Bougainvillea spectabilis	葉子花	Climber	+	
Bridelia tomentosa	土蜜樹	Shrub / Tree	+	
Broussonetia papyrifera	構樹	Tree	+	
Calliandra haematocephala	紅絨球	Shrub	+	
Callistemon viminalis	串錢柳	Tree	+	
Camellia sp.	山茶屬	Shrub	+	
Canna indica	美人蕉	Herb	+	
Canna x *generalis*	大花美人蕉	Herb	+	
Carica papaya	番木瓜	Tree	+	
Carmona microphylla	基及樹	Shrub	+	
Catharanthus roseus	長春花	Shrub	+	
Cayratia corniculata	角花烏蘞莓	Climber	+	
Celosia argentea	青葙	Herb	+	
Celtis sinensis	朴樹	Tree	+	
Cenchrus echinatus	蒺藜草	Herb	+	

Botanical Name	Chinese Name	Growth Form	Relative Abundance*	
			Tentative Assessment Area	Study Site
Centella asiatica	崩大碗	Herb		+
Chloris barbata	孟仁草	Herb	+	
Cinnamomum camphora	樟	Tree	+	
Citrus maxima	柚	Tree	+	
Clausena lansium	黃皮	Tree	+	
Clerodendrum thomsonae	龍吐珠	Shrub	+	
Commelina diffusa	節節草	Herb	+	
Cordyline fruticosa	朱蕉	Shrub	+	
Crateva trifoliata	鈍葉魚木	Tree	+	
Crateva unilocularis	樹頭菜	Tree	+	
Cuphea hyssopifolia	細葉萼距花	Shrub	+	
Cyperus involucratus	風車草	Herb	+	
Cyperus surinamensis	蘇里南莎草	Herb	+	
Delonix regia	鳳凰木	Tree	+	+
Desmodium heterocarpon	假地豆	Shrub	+	
Desmodium triflorum	三點金	Herb	+	
Dianella ensifolia	山菅蘭	Herb	+	
Dichanthium annulatum	雙花草	Herb	+	
Digitaria longiflora	長花馬唐	Herb	+	
Dimocarpus longan	龍眼	Tree	+	
Dracaena fragrans	巴西鐵樹	Shrub	+	
Dracaena sanderiana	富貴竹	Shrub	+	
Duranta erecta	假連翹	Shrub	++	+
Dypsis lutescens	散尾葵	Shrub	+	
Elephantopus scaber	地膽草	Herb		+
Eleusine indica	牛筋草	Herb	+	
Emilia sonchifolia	一點紅	Herb	+	
Eriobotrya japonica	枇杷	Tree	+	
Eucalyptus sp.	桉屬	Tree	+	
Euphorbia hirta	飛揚草	Herb	+	+
Euphorbia pulcherrima	一品紅	Shrub	+	
Euphorbia thymifolia	小飛揚	Herb	+	
Excoecaria cochinchinensis	紅背桂	Shrub	+	
Ficus altissima	高山榕	Tree	+	
Ficus benjamina	垂葉榕	Tree	+	
Ficus hispida	對葉榕	Tree	+	
Ficus longifolia	長葉榕	Tree	+	
Ficus microcarpa	細葉榕	Tree	++	+
Ficus pumila	薜荔	Climber	+	
Ficus religiosa	菩提樹	Tree	+	
Ficus subpisocarpa	筆管榕	Tree	+	

Botanical Name	Chinese Name	Growth Form	Relative Abundance*	
			Tentative Assessment Area	Study Site
Ficus variegata	青果榕	Tree	+	
Ficus virens	黃葛樹	Tree	+	
Fimbristylis dichotoma	兩歧飄拂草	Herb	+	
Hedyotis corymbosa	繖房花耳草	Herb	+	+
Hibiscus rosa-sinensis	大紅花	Shrub	+	
Hibiscus tiliaceus	黃槿	Tree	+	
Imperata cylindrica var. *major*	大白茅	Herb	+	
Ipomoea aquatica	蕹菜	Herb	+	
Ipomoea batatas	番薯	Climber	+	
Ipomoea cairica	五爪金龍	Climber	+	
Ipomoea nil	牽牛	Climber	+	
Ixora chinensis	龍船花	Shrub	+	
Ixora stricta	細葉龍船花	Shrub	+	
Juniperus chinensis	圓柏	Tree	+	
Kalanchoe pinnata	落地生根	Herb	+	
Khaya senegalensis	非洲楝	Tree	+	+
Koelreuteria bipinnata	複羽葉欒樹	Tree	+	
Lagerstroemia speciosa	大花紫薇	Tree	+	
Lantana camara	馬纓丹	Shrub	+	
Leucaena leucocephala	銀合歡	Tree	+	
Ligustrum sinense	山指甲	Shrub	++	
Liquidambar formosana	楓香	Tree	+	
Litchi chinensis	荔枝	Tree	+	
Livistona chinensis	蒲葵	Shrub / Tree	+	+
Loropetalum chinense	紅花繼木	Shrub	+	
Ludwigia octovalvis	毛草龍	Herb	+	
Macaranga tanarius var. *tomentosa*	血桐	Tree	+	
Malvastrum coromandelianum	賽葵	Shrub	+	
Malvaviscus arboreus var. *penduliflorus*	垂花懸鈴花	Shrub	+	
Mangifera indica	杧果	Tree	+	
Melaleuca cajuputi subsp. *cumingiana*	白千層	Tree	+++	+
Melia azedarach	苦楝	Tree	+	+
Melinis repens	紅毛草	Herb	+	
Michelia x alba	白蘭	Tree	+	
Mikania micrantha	薇甘菊	Climber	+	
Mimosa pudica	含羞草	Herb	+	
Morus alba	桑	Tree	+	
Murraya paniculata	九里香	Shrub	+	
Musa x *paradisiaca*	大蕉	Tree	+	

Botanical Name	Chinese Name	Growth Form	Relative Abundance*	
			Tentative Assessment Area	Study Site
Neomarica northiana	新瑪麗雅	Herb	+	
Neyraudia reynaudiana	類蘆	Herb	+	
Opuntia stricta	仙人掌	Herb	+	
Osmanthus fragrans	桂花	Shrub / Tree	+	
Oxalis corniculata	酢漿草	Herb	+	
Paederia scandens	雞矢藤	Climber	++	
Panicum maximum	大黍	Herb	+	
Paspalum conjugatum	兩耳草	Herb	+	
Passiflora foetida	龍珠果	Climber	+	
Peltophorum pterocarpum	盾柱木	Tree	+	
Peperomia pellucida	草胡椒	Herb	+	
Perilla frutescens	紫蘇	Herb	+	
Persicaria chinensis	火炭母	Herb	+	
Phyllanthus niruri	珠子草	Herb	+	
Pilea microphylla	小葉冷水花	Herb	+	
Plantago major	車前草	Herb	+	
Platycladus orientalis	扁柏	Tree	+	
Plumeria rubra	雞蛋花	Tree	+	
Podocarpus macrophyllus	羅漢松	Tree	+	
Portulaca oleracea	馬齒莧	Herb	+	
Portulaca pilosa	毛馬齒莧	Herb	+	
Psidium guajava	番石榴	Tree	+	
Pteris vittata	蜈蚣草	Herb	+	
Roystonea regia	王棕	Tree	+	
Ruellia coerulea	蘭花草	Herb	+	
Salix babylonica	垂柳	Tree	+	
Sansevieria trifasciata	虎尾蘭	Herb	+	
Sapium sebiferum	烏桕	Tree	+	
Sauropus spatulifolius	龍脷葉	Shrub	+	
Schefflera actinophylla	傘樹	Shrub / Tree	+	
Schefflera heptaphylla	鴨腳木	Tree	+	
Scindapsus aureus	黃金葛	Climber	+	
Scoparia dulcis	野甘草	Herb	+	
Senna siamea	鐵刀木	Tree	+	
Senna surattensis	黃槐決明	Tree	+	
Sesbania cannabina	田菁	Herb	+	
Solanum nigrum	龍葵	Herb	+	
Sonneratia apetala	無瓣海桑	Shrub / Tree	+	
Spathodea campanulata	火焰木	Tree	+	+
Spermacoce stricta	豐花草	Herb	+	
Sporobolus fertilis	鼠尾粟	Herb	+	

Botanical Name	Chinese Name	Growth Form	Relative Abundance*	
			Tentative Assessment Area	Study Site
Sterculia lanceolata	假蘋婆	Tree	+	+
Sterculia nobilis	蘋婆	Tree	+	
Syzygium jambos	蒲桃	Tree	+	
Tabebuia chrysantha	黃鐘木	Tree	+	
Thevetia peruviana	黃花夾竹桃	Shrub	+	
Torenia fournieri	藍豬耳	Herb	+	
Tradescantia spathacea	蚌花	Herb	+	
Tradescantia zebrina	吊竹梅	Herb	+	
Tridax procumbens	羽芒菊	Herb	+	+
Vernonia cinerea	夜香牛	Herb	+	
Wedelia trilobata	三裂葉蟛蜞菊	Herb	+	+
Wikstroemia indica	了哥王	Shrub	+	
Youngia japonica	黃鵪菜	Herb	+	
	Total no. of species recorded:		**171**	**18**

*Key for Relative Abundance: + scarce; ++ occasional; +++ abundant

Table 6.2B: List of Terrestrial Mammal Species Recorded in Developed Area (Study Site and Tentative Assessment Area)

Common Name	Scientific Name	Protection / Conservation Status	Abundance
Domestic Cat	*Felis catus*	-	1
Domestic Dog	*Canis lupus familiaris*	-	1
Unidentified Insectivorous Bat	-	Cap. 170*	4
		Total no. of species recorded:	**3**
		Total abundance recorded:	**6**

*Note: All bats are protected under the Wild Animals Protection Ordinance. (Cap. 170) in Hong Kong.

Table 6.2C: List of Avifauna Species Recorded in Developed Area (Study Site and Tentative Assessment Area)

Common Name	Scientific Name	Protection / Conservation Status*	Abundance
Black Kite	*Milvus migrans*	RC, Cap. 586	4
Black-collared Starling	*Gracupica nigricollis*	-	14
Chinese Bulbul	*Pycnonotus sinensis*	-	9
Cinereous Tit	*Parus cinereus*	-	1
Common Tailorbird	*Orthotomus sutorius*	-	1
Crested Myna	*Acridotheres cristatellus*	-	8
Daurian Redstart	*Phoenicurus auroreus*	-	1
Eastern Buzzard	*Buteo japonicus*	Cap. 586	1
Eurasian Tree Sparrow	*Passer montanus*	-	88
Grey Wagtail	*Motacilla cinerea*	-	1
House Swift	*Apus nipalensis*	-	6
Japanese White-eye	*Zosterops japonicus*	-	44
Oriental Magpie Robin	*Copsychus saularis*	-	7
Pallas's Leaf Warbler	*Phylloscopus proregulus*	-	1
Red-whiskered Bulbul	*Pycnonotus jocosus*	-	25
Scaly-breasted Munia	*Lonchura punctulata*	-	1
Spotted Dove	*Spilopelia chinensis*	-	15
		Total no. of species recorded:	**17**
		Total abundance recorded:	**227**

*Key for Protection / Conservation Status:

RC = Regional Concern (Reference: Fellowes, J.R, Lau, M.W.N., Dudgeon, D., Reels, G.T., Ades, G.W.J., Carey, G.J., Chan, B.P.L., Kendrick, R.C., Lee, K.S., Leven, M.R., Wilson, K.D.P. and Yu, Y.T. (2002) Wild animals to watch: terrestrial and freshwater fauna of conservation concern in Hong Kong. *Memoirs of the Hong Kong Natural History Society 25*: 123 – 160.)

Cap. 586: Species protected under Protection of Endangered Species of Animals and Plants Ordinance

Table 6.2D: List of Herpetofauna Species Recorded in Developed Area (Study Site and Tentative Assessment Area)

Common Name	Scientific Name	Commonness	Protection/ Conservation Status	Abundance
Bowring's Gecko	*Hemidactylus bowringii*	Very Common	-	1
Gunther's Frog	*Sylvirana guentheri*	Very Common	-	1
			Total no. of species recorded:	**2**
			Total abundance recorded:	**2**

Table 6.2E: List of Butterfly Species Recorded in Developed Area (Study Site and Tentative Assessment Area)

Common Name	Scientific Name	Commonness	Level of Concern	Abundance
Common Grass Yellow	*Eurema hecabe hecabe*	Very Common	-	1
Common Mormon	*Papilio polytes polytes*	Very Common	-	1
Indian Cabbage White	*Pieris canidia canidia*	Very Common	-	1
Lemon Emigrant	*Catopsilia pomona pomona*	Common	-	1
Pale Grass Blue	*Zizeeria maha serica*	Very Common	-	3
Peacock Pansy	*Junonia almana almana*	Common	-	1
Spangle	*Papilio protenor protenor*	Very Common	-	4
			Total no. of species recorded:	**7**
			Total abundance recorded:	**12**

Table 6.2F: List of Odonate Species Recorded in Developed Area (Study Site and Tentative Assessment Area)

Common Name	Scientific Name	Commonness	Level of Concern	Abundance
Common Red Skimmer	*Orthetrum pruinosum neglectum*	Abundant	-	1
Green Skimmer	*Orthetrum sabina sabina*	Common	-	1
Wandering Glider	*Pantala flavescens*	Abundant	-	5
			Total no. of species recorded:	**3**
			Total abundance recorded:	**7**

Annex 7.1

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本署檔號
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6 March 2017

Mott MacDonald Hong Kong Ltd.
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Kowloon Tong, Kowloon.

Attn: Mr. S.H. CHING

Dear Mr. Ching,

Agreement No. CE3/2016 (CE)
Study on Proposed Multi-storey Buildings in Yuen Long Area for
Brownfield Operations – Feasibility Study
Submission of Contamination Assessment Report (CAP) (Revision B)

We refer to your letter of 14 February 2017 regarding the above Report.

2. As the revised CAP (Revision B) has addressed our previous comments provided in November 2016 and January 2017, we have no further comment to the CAP. Please note that our comments/ views are provided on advisory basis without prejudice to any future decision by the Director of Environmental Protection under the EIAO.

Yours sincerely,

(HO Man-wu)
Environmental Protection Officer
for Director of Environmental Protection

c.c.
CEDD (Attn: Mr. YIP Wai Lun Fax: 2693 2918)

(Internal)
S(RA)4

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MOTT MACDONALD

Agreement No. CE3/2016 (CE) Study on Proposed Multi-Storey Buildings in Yuen Long Area for Brownfield Operations – Feasibility Study

Contamination Assessment Plan (Rev. B)

February 2017

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Contamination Assessment Plan (Rev. B)

February 2017

New Territories West Development Office, Civil Engineering and Development Department

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1 Introduction

1.1 General

1.1.1 On 30 June 2016, Mott MacDonald Hong Kong Limited (MMHK) was commissioned by the Civil Engineering and Development Department (CEDD) under Agreement No. CE3/2016 (CE) to provide consultancy services for the Study on Proposed Multi-storey Buildings in Yuen Long Area for Brownfield Operations – Feasibility Study (the Assignment).

1.2 Project Background

1.2.1 In the 2014-15 Budget Speech, it was announced that the Government would explore feasible improvement measures, including accommodating some of the brownfield operations in suitable multi-storey buildings (MSBs). In the 2015 Policy Address, it was further announced that brownfield sites inside the Hung Shui Kiu New Development Area (HSK NDA) would be taken as a pilot case for accommodating the brownfield operations in MSBs, with a view to taking forward the development of NDAs. The 2016 Policy Address has reiterated that the Government would earnestly study the possibility of moving some of the brownfield operations into MSBs, and announced that 24ha of land in the HSK NDA has been set aside and suitable land in adjoining area is being identified for use as a pilot site to consolidate different types of brownfield operation.

1.2.2 The current proposal for HSK NDA may not be sufficient to accommodate the majority of the operations, and relocation through more land-efficient means such as MSBs should be pursued through joint actions or relevant bureaux on both policy and implementation.

1.2.3 Under the auspices of the Steering Committee on Land Supply chaired by the Financial Secretary, a Task Force on Brownfield Operations chaired by the Under Secretary for Development has been established to formulate and propose strategies and action plans to facilitate the conversion of brownfield sites to more efficient uses. In the first meeting held on 5 August 2014, EMSD briefed the Task Force on the findings of the Pre-feasibility Study for a Multi-level Storage Compound for Containers, Vehicles and Other Materials in the New Territories that MSB is a possible solution for accommodating the various operations on brownfield sites. In the second Task Force Meeting held on 9 March 2015, it was agreed, amongst others, that a more detailed feasibility study shall be conducted on technical and building design as well as on the operation model of the proposed MSBs in the areas adjacent to Fuk Wang Street and Wang Lee Street in Yuen Long area (the Project), subject to the findings of the detailed questionnaire survey on the brownfield operations in the HSK NDA.

1.2.4 The Project is to conduct a feasibility study on technical assessments and building design as well as operation model and financial/economic viability of the proposed MSBs in the Yuen Long area to house some of the brownfield operations to be affected by the HSK NDA project.

1.3 Objectives of the Assignment

1.3.1 The overall objective of the Assignment is to investigate, evaluate and establish the feasibility of developing the proposed MSBs in the Study Site of about 3.8ha in total adjacent to Fuk Wang Street and Wang Lee Street in Yuen Long, to house some of the brownfield operations to be affected by the HSK NDA project. The Study Site is shown in **Figure 1.1**.

1.4 Structure of this Report

1.4.1 A Contamination Assessment Plan (CAP) has been prepared in accordance with Clause 6.7.91 of the Brief. The report contains the following sections:

- Section 1 – Introduction
- Section 2 – presents the assessment objectives, criteria and methodology;
- Section 3 – provides findings of the site appraisal, which include a desktop study and a site reconnaissance survey;
- Section 4 – presents the identification of potentially contaminated areas;
- Section 5 – presents the site investigation (SI) plan for the potentially contaminated areas;
- Section 6 – presents the laboratory analysis;
- Section 7 – presents the possible remediation measures;
- Section 8 – presents the assessment conclusion

2 Assessment Objective, Criteria and Methodology

2.1 Objective

2.1.1 The objectives of this CAP are to:

- Review the present and historical land uses in relation to possible land contamination within or in the proximity of the Study Site;
- Present the findings of desktop studies and site appraisals;
- Identify any potential contamination and associated impacts, risks or hazards;
- Evaluate the environmental impacts associated with the potential contamination identified from implementation of the Project; and
- Propose, where necessary, sampling and laboratory chemical analysis required to determine the nature and extent of any potential land contamination identified.

2.2 Relevant Standards, Guidelines and Requirements

2.2.1 In 2007, Environmental Protection Department (EPD) issued two guidelines for utilising Risk-based Remediation Goals (RBRGs) developed for Hong Kong, namely, “Guidance Note for Contaminated Land Assessment and Remediation” (Guidance Note) and “Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management” (Guidance Manual). The land contamination assessment was carried out in accordance with the Guidance Manual and Guidance Note. In addition, reference was also made to the “Practice Guide for Investigation and Remediation of Contaminated Land” (Practice Guide).

2.3 Assessment Methodology

2.3.1 Desktop appraisal and site reconnaissance were undertaken to identify the presence of any potentially contaminative land within the Study Site.

2.3.2 Relevant information were collected and reviewed as part of the desktop study, including:

- Historical aerial photographs of the Study Site;
- Records of active (current) and inactive (past) registered chemical waste producers in the areas of interest from the EPD;
- Records of current and past dangerous goods (DG) licences in the areas of interest from the Fire Service Department (FSD);
- Records of accidents that involved spillage / leakage of chemical waste or DG from EPD and FSD.

2.3.3 Site reconnaissance surveys were also undertaken to identify current land uses in the Study Site and to verify the findings of the desktop appraisal.

3 Appraisal of Land Contamination Potential

3.1 Desktop Study

3.1.1 Site Geology

3.1.1.1 The Study Site is located at Yuen Long Industrial Estate, south of the junction of Fuk Wang Street and Wang Lee Street, and at the toe of Chu Wong Ling natural hillside **(Figure 1.1)**. The Study Site and immediate surroundings are situated on reclamation constructed in the early 1980s to approximately +4.5mPD by filling of pond and agricultural areas.

3.1.1.2 The general geological sequence in the Study Site is as follows:

- Reclamation fill, about 5m thick, mainly sand and decomposed rock, with some boulders;
- Mud, sandy mud and muddy sand, up to 4.5m to 6m thick Holocene deposit, variously logged as Marine Deposit, Pond Deposit and lacustrine Deposit; likely to be thin or absent near the toe of the hillside;
- Alluvium, 7.5m to 10m thick Pleistocene deposit, consisting of thickly interbedded or interlensed sand, silty sand and silt/clay;
- Colluvium, shown on the geological map as a fringe around the lower slopes and toe of Chu Wong Ling hillside;
- Decomposed rock (completely and highly decomposed granodiorite and metasedimatary rock), frequently with corestones of moderately decomposed rock;
- Bedrock of granodiorite, metasiltstone/metasandstone and marble.

3.1.2 Review of Relevant Information from Government Departments

3.1.2.1 The Environmental Protection Department (EPD) and Fire Service Department (FSD) have been contacted for the following information:

- Records on any active (present) and inactive (past) registered chemical waste procedure(s) and any reported accidents of chemical waste spillage / leakage within the Study Site; and
- Records of any licensed Dangerous Goods (DG) Store(s) and any reported accidents of spillage leakage of DG within the Study Area.

3.1.2.2 Relevant documentation from EPD and FSD is provided in **Appendix A**. Information provided is summarized below.

Environmental Protection Department

3.1.2.3 A review of the chemical waste producers (CWPs) records had been conducted at the EPD Territory Control Office. Four registered CWPs were identified in the Study Site. The record of the registered CWP in the Study Site obtained from EPD is presented in **Table 1**.

Table 1: Summary of Registered Chemical Waste Producers

Name of Chemical Waste Producer	Business Nature	Premises Address (Area ID)[1]
The Kowloon Motor Bus Company (1933) Limited	Passenger Transportation Corporation	Fuk Wang Street, Yuen Long, N.T. (Area A)
Ming Hing Waterworks Engineering Co. Ltd	Engineering & Construction	DD123, Lot GLA-TYL164, WSD Maintenance Yard, Fuk Wang Street, Yuen Long Industrial Estate, Yuen Long, N.T.

Name of Chemical Waste Producer	Business Nature	Premises Address (Area ID)[1]
		(Contract: 1/WSD/12(W)) (Area B)
Kwan On Construction Company Limited	Construction Industry	32B Wang Lee Street, Yuen Long, N.T. (Area E2)
Choi Nam Kee Construction Company Limited	Construction	32B Wang Lee Street, Wang Chau, Yuen Long, New Territories (No record as this company is no longer existed in the Study Site)

Remarks:

[1] Please refer to Table 4 for the details of Area ID

3.1.2.4 Based on the information given by EPD, there was no record of chemical spillage / leakage within the Study Site as shown in **Appendix A**.

Fire Service Department

3.1.2.5 According to the reply from FSD, there is one record of dangerous goods (DG) in the Study Site which consists of 4 above-ground diesel storage tanks with of storage quantity of 22,500 litres per each storage tank. The subsequent site reconnaissance survey concluded that the 4 diesel storage tanks are located within Kowloon Motor Bus (KMB) Maintenance Depot (i.e. refer to **Section 3.2** for details). However, no incident of spillage / leakage of DG were found within the Study Site. The reply from FSD is shown in **Appendix A**.

3.1.3 Review of Aerial Photographs

3.1.3.1 Relevant historical aerial photographs taken between 1978 and 2013, where available, were collected and reviewed. The reviewed aerial photos had covered the Study Area. The aim of this review is to evaluate potential contamination implication associated with any land use changes within the Study Area. The development history of Study Site is summarized in **Table 2** and a list of aerial photographs reviewed has been provided in the **Table 3**. Selected aerial photographs are provided in **Appendix B** for reference. In order to facilitate the description of aerial photos review findings and subsequent site reconnaissance survey findings, the Study Site was divided into 5 separate areas namely **Areas A, B, C, D** and **E** as shown in **Figure 3.1**.

Table 2: Summary of Aerial Photos Review

Year	Area A	Area B	Area C	Area D	Area E
1978	Fish pond with few village houses	Fish pond	Fish pond	Fish pond	Fish pond
1982	Pond had been filled, and vacant land was formed	Pond had been filled, and vacant land was formed	Pond had been filled, and vacant land was formed	Pond had been filled, and vacant land was formed	Pond had been filled, and vacant land was formed
1987	The land use was changed to Open car park	Still a vacant land	The land use was changed to bus terminus	Still a vacant land	Still a vacant land
1995	Parking area was changed to mainly serve the heavy vehicle	The land use changed to open storage area with a temporary structure / shelter	No significant change (Bus terminus)	Mainly vacant land with a small building & few carparks	Half of the area was used for open storage. Other remains vacant
1999	No significant change (Parking area for heavy vehicle)	Open storage area with a temporary structure / shelter	No significant change (Bus terminus)	The vacant land became grass land. The small building & carparks were still presented.	Entire area became vacant land again

Year	Area A	Area B	Area C	Area D	Area E
2004	No significant change (Parking area for heavy vehicle)	Open storage area, but few more temporary structures / shelters were built.	No significant change (Bus terminus)	No significant change. (Mainly grass land with a small building & few carparks)	No significant change. (Vacant land)
2009	Parking area was changed to mainly served for private vehicle	No significant change. (Open storage area with few temporary structures /shelters)	No significant change (Bus terminus)	The grass land became vacant but the small building & few carparks were still presented	The land use was changed to open storage area with few temporary structure/ shelters
2013	No significant change (Open car park for private vehicle)	No significant change. (Open storage area with few temporary structures /shelters)	The land use was changed to open carpark for heavy & private vehicles with 1 bus stop in the middle	No significant change. (Mainly vacant land with a small building & few carparks)	No significant change. (Open storage area with few temporary structure shelters)

Table 3: Summary of Aerial Photographs

Year	Height (feet)	Photograph Reference Number
1978	2000	22049
1982	4000	42897
1987	4000	A09452
1995	3200	CN10141
1999	3500	CN22458
2004	2500	CW58270
2009	2000	CW85163
2013	6000	CS43602

Source: Survey and Mapping Office, Lands Department

3.2 Site Reconnaissance Survey

3.2.1 A site reconnaissance survey was carried out on 25 August 2016 and 30 August 2016 to identify current land uses within the Study Site and to verify the findings of desktop appraisal.

3.2.2 In order to facilitate the assessment, the Study Site is divided into 5 separate areas namely **Areas A, B, C, D** and **E** as shown in **Figure 3.1.** The photos showing the details of Area A to Area D are given in **Figure 3.2** to **Figure 3.5**. **Area E** is further divided into 8 sub-areas namely **Area E1** to **Area E8**. The photos showing the details of Area E1 to Area E8 are given in **Figure 3.6** to **Figure 3.14**. The site survey findings of each sub-area and their respective potentially contamination sources/areas are summarized in **Table 4**. The site walkover checklists of respective sub-area are given in **Appendix C**.

3.3 Future Land Use

3.3.1 The RBRGs have developed four different post-restoration land uses, namely “Urban Residential”, “Rural Residential”, “Industrial” and “Public Parks”, to reflect the actual settings which people could be exposed to contaminated soil or groundwater. Definition of post-restoration land uses are given in EPD’s *Guidance Note for Contaminated Land Assessment and Remediation and Guidance Manual for RBRGs*.

3.3.2 As this Project is to conduct a feasibility study for the proposed multi-storey buildings at Study Site to house some of the brownfield operations to be affected by the HSK NDA project, the RBRGs of **“Industrial”** should be adopted in assessing the land contamination level of the Study Site. The RBRGs for soil and soil saturation limits, and RBRGs for groundwater and groundwater solubility limits are given in **Appendix D**.

Table 4: Site Survey Findings and Potentially Contamination Sources

Area ID	Company	Figure No.	Site Observation	Potentially Contamination Sources	Photo No.	Potentially Contaminated
Area A	Kowloon Motor Bus (KMB) Maintenance Depot	Figures 3.1 and 3.2	• A new KMB maintenance deport stated operation in 2014; • Entire depot area was well paved and intact, • 6 diesel filling stations was located close to the entrance (**Photo PA-01**) with four (4) 22,500 litres aboveground diesel tanks located at eastern region of this area (**Photo PA-02**); • As informed by the operators, there are 2 underground diesel pipelines connecting the aboveground diesel tanks to the diesel filling station; • A large maintenance bay (i.e. can serve up to 8 buses) was located at western region of this area (**Photo PA-03** and **Photo PA-04**); • Another maintenance bay (i.e. can serve up to 3 buses) was located at southern region of this area (**Photo PA-05**); • An emergency generator room was located at eastern-south side of the site (**Photo PA-06**). • A chemical waste storage cabinet was located western-south side of the site (**Photo PA-07**).	• Diesel filling station • Diesel storage tank • Underground diesel pipeline • Bus maintenance bay • Emergency generator • Chemical waste storage cabinet	• PA-01 • PA-02 -- • PA-03 to PA-05 • PA-06 • PA-07	**Yes**
Area B	Ming Hing Waterworks	Figures 3.1 and 3.3	• Site access was denied by Ming Hing Waterworks, the contractor of Water Suppliers Department (WSD) Contract 1WSD15W; • Observation from outside of the site revealed that the site was mainly used for storage of various water piping materials (**Photo PB-01** to **Photo PB-02**); • Container offices (**Photo PB-03** and **Photo PB-04**) was located at the main entrance of the site; • Few shelter structures were also located inside the site (**Photo PB-05**), but no repairing or maintenance activities were observed. • Registered as Chemical Waste Producer (CWP) but cannot identify the chemical waste storage facility from outside of the site	• Open storage of construction materials • Chemical waste storage (i.e. registered as CWP)	• PB-01 to PB-05	**Yes**
Area C	Open Carpark & Bus Stop	Figures 3.1 and 3.4	• The area was used for heavy vehicle parking (**Photo PC-01**) and private vehicle parking (**Photo PC-02**). The whole area was concrete paved and intact; • One bus stop is located in the middle of the area (**Photo PC-03**);	Nil	Nil	No

Area ID	Company	Figure No.	Site Observation	Potentially Contamination Sources	Photo No.	Potentially Contaminated
			• No industrial activities and oil stain was observed in this area.			
Area D	Estate Management Office – Yuen Long Industrial Estate	Figures 3.1 and 3.5	• A single storey office building of Yuen Long Industrial Estate (**Photo PD-01**) with few parking spaces (**Photo PD-02**); • A CLP electric sub-station (transformer) was located behind the office building (**Photo PD-03**); • Other remaining area is shrub land (**Photo PD-04**) and a small piece of government land (**Photo PD-05**)	• Electric Sub-station	• PD-03	**Yes**
Area E1	Drainage Services Department (DSD) Contract DC/2012/05 Engineer Site Offices	Figures 3.1, 3.6 and 3.7	• DSD Contract DC/2012/05 Engineer site office (2-storey) with car parking area. (**Photo PE1-01** and **Photo PE1-02**); • Entire site office area was paved and intact. No repairing or maintenance workshop was observed.	• No contamination source was identified during site reconnaissance survey. • Entire site was used as open storage area as retrieved in aerial photo 1995 (**Appendix B**)	Nil	**Yes** (i.e. mainly due to historical land use as open storage area)
Area E2	DSD Contract DC/2012/05 Contractor Site Offices	Figures 3.1, 3.6 and 3.8	• DSD Contract DC/2012/05 Contractor single storey site office (Kwan On Construction Limited) (**Photo PE2-01**); • A chemical waste storage container was observed (**Photo PE2-02**); • A temporary open storage area with two (2) 200-litres oil drums was observed (**Photo PE2-03**); • Entire area was semi-paved/unpaved.	• Chemical waste storage container • Open storage area • Entire site was used as open storage area as retrieved in aerial photo 2009 (**Appendix B**)	• PE2-02 • PE2-03	**Yes**
Area E3	DSD Contract DC/2012/05 Contractor Temporary Storage Area	Figures 3.1, 3.6 and 3.9	• DSD Contract DC/2012/05 Contractor temporary storage area (**Photo PE3-01**); • Storage of construction materials was observed (**Photo PE3-02** and **Photo PE3-03**); • Five (5) 200-litres oil drums with oil stain on ground were observed (**Photo PE3-04**). • Entire area was semi-paved/unpaved.	• Open storage of construction materials • Suspected maintenance activities (i.e. oil stain on ground) • Entire site was used as open storage area as retrieved in aerial photo 2009	• PE3-02 and PE3-03 • PE3-04	**Yes**

Area ID	Company	Figure No.	Site Observation	Potentially Contamination Sources	Photo No.	Potentially Contaminated
				(**Appendix B**)		
Area E4	DSD Contract DC/2012/05 Contractor Temporary Storage Area and Maintenance Workshop	Figures 3.1, 3.6 and 3.10	• DSD Contract DC/2012/05 Contractor temporary storage area (**Photo PE4-01**); • A maintenance workshop was located inside this area (**Photo PE4-02**); • Two (2) opened 200-litres oil drums were located beside the maintenance workshop (**Photo PE4-03**); • Open storage of construction materials was observed along the boundary of this area (**Photo PE4-04** and **Photo PE4-05**); • Two (2) half-fill 200-litres oil drums were observed within the open storage area (**Photo PE4-06**) • Entire area was semi-paved but with cracks	• Maintenance workshop • Open storage area • Oil drums on semi-paved ground surface • Entire site was used as open storage area as retrieved in aerial photo 2009 (**Appendix B**)	• PE4-02 • PE4-04 and PE4-05 • PE4-03 and PE4-06	**Yes**
Area E5	DSD Contract DC/2012/05 Contractor Temporary Storage Area	Figures 3.1, 3.6 and 3.11	• The original paving of this area was seriously cracked. Soil ground surface and grassland was also observed in this area (**Photo PE5-01**); • 1 heavy vehicle (**Photo PE5-02**) and 2 heavy construction equipment (i.e. excavator and compactor) (**Photo PE5-03**) were observed within this area. • It is suspected that maintenance activities were carried out within this area as 2 large shelters were observed from the aerial photo of year 2013 which is suspected as maintenance workshop.	• Suspected maintenance activities	• PE5-02 and PE5-03 • Aerial photo of year 2013	**Yes**
Area E6	DSD Contract DC/2012/05 Contractor Temporary Storage Area	Figures 3.1 3.6 and 3.12	• DSD Contract DC/2012/05 Contractor temporary storage area (**Photo PE6-01**); • Open storage of sheet-pile (**Photo PE6-02** and **Photo PE-03**), wooden material (**Photo PE6-04**), fill/rock material (**Photo PE6-05**) and other construction materials (**Photo PE6-06**); • Entire area was semi-paved but with cracks	• Open storage of various type of construction materials	• PE6-02 to PE6-06	**Yes**
Area E7	DSD Contract DC/2011/07 Engineer Site Offices	Figures 3.1, 3.6 and 3.13	• DSD Contract DC/2011/07 site office (2-storey) with car parking area. (**Photo PE7-01** and **Photo PE7-02**); • Entire site office area was semi-paved with crack. However, no repairing or maintenance workshop was observed.	• No contamination source was identified during site reconnaissance survey. • Entire site was used as open storage area	Nil	**Yes** (i.e. mainly due to historical land use as open storage area))

Area ID	Company	Figure No.	Site Observation	Potentially Contamination Sources	Photo No.	Potentially Contaminated
				as retrieved in aerial photo 2009 (**Appendix B**)		
Area E8	DSD Contract DC/2011/07 Temporary Storage Area	Figures 3.1, 3.6 and 3.14	• DSD Contract DC/2011/07 temporary storage area (**Photo PE8-01**); • Storage of construction materials such as concrete water pipe (**Photo PE8-02)**, steel bar (**Photo PE8-03**) and sheet-pile (**Photo PE8-04**); • As oil drum was observed on unpaved ground surface (**Photo PE8-05**). • The area was partial paved, but most area was unpaved with grass and shrub.	• Open storage of various type of construction materials • Oil drum on unpaved ground surface	• PE8-02 to PE8-04 • PE8-05	**Yes**

4 Potentially Contaminated Area

4.1 Identification of Potentially Contaminated Area

4.1.1 Potentially contaminated area within the Study Site have been identified based on selected aerial photos, and the information collected during site survey (refer to **Section 3.2** for details). The areas with those activities, posing the highest potential for contamination, have been identified in accordance with the criteria in EPD's *Practice Guide for Investigation and Remediation of Contaminated Land.*

4.1.2 Desktop review of available historical records e.g. historical aerial photos have been used to assist the identification of potentially contaminated areas.

4.1.3 After reviewing of the aforesaid information, total 11 areas were identified as potentially contaminated in the Study Site (refer to **Table 4** for details) as summarized in **Table 5**.

Table 5: Identified Potentially Contaminated Areas

Area ID	Company	Potentially Contamination Sources
Area A	Kowloon Motor Bus (KMB) Maintenance Depot	• Diesel filling station • Diesel storage tank • Underground diesel pipeline • Bus maintenance bay • Emergency generator • Chemical waste storage cabinet
Area B	Ming Hing Waterworks	• Open storage of construction materials
Area D	Estate Management Office – Yuen Long Industrial Estate	• Electric Sub-station
Area E1	DSD Contract DC/2012/05 Engineer Site Offices	• Historical land use (i.e. open storage area)
Area E2	DSD Contract DC/2012/05 Contractor Site Offices	• Chemical waste storage container • Open storage area • Historical land use (i.e. open storage area)
Area E3	DSD Contract DC/2012/05 Contractor Temporary Storage Area	• Open storage of construction materials • Suspected maintenance activities (i.e. oil stain on ground) • Historical land use (i.e. open storage area)
Area E4	DSD Contract DC/2012/05 Contractor Temporary Storage Area and Maintenance Workshop	• Maintenance workshop • Open storage area • Oil drums on semi-paved ground surface • Historical land use (i.e. open storage area)
Area E5	DSD Contract DC/2012/05 Contractor Temporary Storage Area	• Suspected maintenance activities
Area E6	DSD Contract DC/2012/05 Contractor Temporary Storage Area	• Open storage of various type of construction materials
Area E7	DSD Contract DC/2011/07 Engineer Site Offices	• Historical land use (i.e. open storage area)
Area E8	DSD Contract DC/2011/07 Temporary Storage Area	• Open storage of various type of construction materials • Oil drum on unpaved ground surface

5 Site Investigation

5.1 Proposed Site Investigation for Potentially Contaminated Areas

5.1.1 Site investigation (SI) is recommended to be carried out in 11 potentially contaminated areas to determine the types and quantities of contaminants (refer to **Section 4.1** for details).

5.1.2 Total **103** trial pits are proposed for soil and groundwater sampling and testing as summarized in **Table 6**. The locations of proposed trial pits are shown in **Figure 5.1** to **Figure 5.11**.

5.1.3 It should be noted the Study Site is currently occupied and managed by various operators and is still in operation, therefore undertaking the SI works at this feasibility study stage is not possible. Besides, it is also not worthy to conduct SI when the site is still in operation as the continuously operation of the Study Site will make the assessment result obsolete. Therefore, the SI is recommended to commence only after the operation is terminated and the land is resumed. Hence the proposed contamination SI works in this report is for general reference only, and the exact extent, number of sampling locations etc. will have to be further reviewed and updated when the land in question is made available and handed over for the proposed development.

5.1.4 Besides, site re-appraisal will also be conducted after the site resumption to ascertain initial contamination evaluation of all areas and the site investigation works proposed in this CAP will be reviewed accordingly. The findings of the re-appraisal will be documented appropriately, such as by supplementary CAP to EPD for agreement prior to the commencement of SI works. Contamination Assessment Report (CAR), Remediation Action Plan (RAP) and Remediation Report (RR) will also be prepared and submitted to EPD for agreement prior to commencement of the development works on the sites.

5.2 Scope of Site Investigation

5.2.1 The sampling and testing plan, with sampling locations and depths are recommended and have made reference to the guidelines on sampling and analysis recommended in the EPD's Practice Guide for Investigation and Remediation of Contaminated Land. A summary of the sampling locations is shown in **Table 6**. During site reconnaissance survey, no underground structures or tanks are observed at the proposed sampling locations. Therefore, trial pits are proposed for site investigation.

5.2.2 Appropriate safety precaution measures such as shoring support, steeping/sloping of sides etc. will be implemented for the excavation of trail pit exceed 1.2m, with reference to the relevant guidance note e.g. "Guide to Trench Excavations (Shoring Support and Drainage Measures)" prepared by Utilities Technical Liaison Committee of Highway Department and Geotechnical Engineering Office of Civil Engineering Department.

5.3 Soil Sampling Method and Depth of Sampling

5.3.1 All soil excavation and sampling should be supervised by a Land Contamination Specialist.

5.3.2 Trial pits digging will be undertaken by separate hand digging tools to geotechnical investigations. Collect soil samples with a clean knife or spatula and placed within relevant containers and groundwater sample (if encountered) from each trial pit.

5.3.3 Soil samples will be taken to identify the potential contamination vertical profile taking into consideration the proposed excavation levels. Sub-samples will be taken from recovered

disturbed samples at nominally 0.5, 1.5 & 3.0 m below ground level (or below concrete pavement) with depth variations made to suit proposed excavation depths.

5.3.4 Field testing will encompass head space tests by use of a Photo Ionizing Detector (PID) (where applicable) to identify the presence of any potential Volatile Organic Chemicals (VOCs), and identification of any significant free-product thickness lying above the groundwater table by use of an interface meter.

5.3.5 The disturbed samples collected from the trial pits should be placed in the pre-cleaned glass sample jar. The jar lib should be covered with laboratory solvent washed aluminium foils and lids. Each sample jar should be labelled. Records should be made of the details of the sampling location and other pertinent data. Samples would be stored between 0-4°C but never frozen, and delivered to the laboratory within 24 hours. All samples would be collected under chain-of-custody protocols.

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Table 6: Summary of Proposed Site Investigation of Potentially Contaminated Area

Area ID	Company	Potentially Contamination Sources	Approximate Potentially Contaminated Area (m^2)	Square Grid Size (m)	No. of Trial Pits (TP) Recommended	Figure No.	Trial Pit No.
Area A	Kowloon Motor Bus (KMB) Maintenance Depot	• 6 Diesel filling stations	• 250	--	6 (1 TP per station)	Figure 5.1	TP(A)1-TP(A)6
		• 4 Diesel storage tanks	• 100	--	4 (1 TP per tank)		TP(A)7-TP(A)10
		• 2 UG diesel pipelines (approx. 18m & 40m)	• --	--	6 (1 TP per 10m)		TP(A)11-TP(A)16
		• Bus maintenance bay (3 buses)	• 240	10	3		TP(A)17-TP(A)19
		• Bus maintenance bay (8 buses)	• 860	13	6		TP(A)20-TP(A)25
		• Emergency generator	• 50	--	1		TP(A)26
		• Chemical waste storage cabinet	• <10	--	1		TP(A)27
Area B	Ming Hing Waterworks	• Open storage of construction materials	• 4,400	17	16	Figure 5.2	TP(B)1-TP(B)16
Area D	Estate Management Office – Yuen Long Industrial Estate	• Electric Sub-station	• 30	--	1	Figure 5.3	TP(D)1
Area E1	DSD Contract DC/2012/05 Engineer Site Offices	• Historical land use (i.e. open storage area)	• 1,390	13	9	Figure 5.4	TP(E1)1-TP(E1)9
Area E2	DSD Contract DC/2012/05 Contractor Site Offices	• Open storage area (i.e. historical & existing) + Chemical waste storage container	• 850	13	6 + 1	Figure 5.5	TP(E2)1-TP(E2)7
Area E3	DSD Contract DC/2012/05 Contractor Temporary Storage Area	• Open storage area (i.e. historical & existing) of construction materials + Suspected maintenance activities (i.e. oil stain on ground)	• 550	13	4	Figure 5.6	TP(E3)1-TP(E3)4
Area E4	DSD Contract DC/2012/05 Contractor Temporary Storage Area and Maintenance Workshop	• Maintenance workshop	• 270	10	3	Figure 5.7	TP(E4)1-TP(E4)3
		• Open storage area (i.e. historical & existing) + Oil drums on semi-paved ground surface (i.e. hotspot)	• 550	13	4 + 1		TP(E4)4-TP(E4)8
Area E5	DSD Contract DC/2012/05 Contractor Temporary Storage Area	• Suspected maintenance activities	• 510	13	3	Figure 5.8	TP(E5)1-TP(E5)3
Area E6	DSD Contract DC/2012/05 Contractor Temporary Storage	• Open storage of various type of construction materials	• 2,450	14	13	Figure 5.9	TP(E6)1-TP(E6)13

Area ID	Company	Potentially Contamination Sources	Approximate Potentially Contaminated Area (m^2)	Square Grid Size (m)	No. of Trial Pits (TP) Recommended	Figure No.	Trial Pit No.
	Area						
Area E7	DSD Contract DC/2011/07 Engineer Site Offices	• Historical land use (i.e. open storage area)	• 770	13	6	Figure 5.10	TP(E7)1 – TP(E7)6
Area E8	DSD Contract DC/2011/07 Temporary Storage Area	• Open storage of various type of construction materials + Oil drum on unpaved ground surface (i.e. hotspot)	• 1,270	13	8 + 1	Figure 5.11	TP(E8)1 - TP(E8)9

5.4 Strata Logging

5.4.1 Strata logging for trial pits will be conducted by a qualified geologist during the drilling and sampling. The logs will include general stratigraphic description, soil sampling depth, sample notation and level of groundwater. The presence of rocks/boulders/cobbles and foreign objects (e.g. wood, metals and plastics) will also be recorded.

5.5 Free Product and Groundwater Level Measurement

5.5.1 The thickness of any free product and ground water level (if present) at sampling locations should be measured with an interface probe. The free product (if encountered in sufficient amounts) should be collected for laboratory analysis to determine the composition.

5.6 Groundwater Sampling

5.6.1 It is proposed to collect groundwater samples if groundwater is encountered at the sampling locations. An additional inspection pit (i.e. 500mm x 500mm) will be excavated beside the groundwater-encountered trail pit to the depth of 3 meter below ground and a groundwater well would be installed for groundwater sampling.

5.6.2 Upon completion of installation of monitoring wells, approximately five times volume of well would be flushed to remove silt and drilling fluid residue from the wells. The wells would then be allowed to stand for a day to permit groundwater conditions to equilibrate. Prior to groundwater sampling, the sampling wells would be purged (at least three times volume of well) to remove fine-grained materials and to collect freshly refilled groundwater samples. After purging, one groundwater sample would then be collected at each sampling well by a decontaminated bailer. Field measurement of temperature and pH would also be taken for each of the samples. Typical details of proposed groundwater monitoring well is shown in **Appendix D**.

5.6.3 If the permeability of the surrounding strata and storage is low, dewatering by purging may dry up the hole, in which case the on-site Land Contamination Specialist would decide whether the requirement to purge three times the liquid volume is to be waived.

5.6.4 The collected groundwater samples should be immediately transferred to new, clean, laboratory-supplied “darken” type glass jars for sample storage/transport after collection. Groundwater samples should be placed in the glass jars with zero headspace and promptly sealed with a septum-lined cap. The samples should be placed in ice chests, cooled and maintained at a temperature of about 4°C until delivered to the analytical laboratory immediately after collection.

5.6.5 The floating layer, if any, will be removed/recovered and analysed separately from the main aqueous phase of the groundwater (as far as is reasonably practicable). All samples will be uniquely labelled.

5.6.6 Between samples, all equipment used for sample handling and storage will be thoroughly decontaminated with laboratory-grade detergent. Samples will be stored in appropriate pre-washed containers (provided by the laboratory) and immediately put in an insulated cool box. It will be ensured that the sample containers and the box are tightly closed and that sufficient chilling packs or ice are provided to maintain a temperature of 0-4°C inside the box but never frozen.

5.6.7 Chilled groundwater samples will be transferred to the custody of the HKOLAS accredited laboratory or one of its Mutual Recognition Arrangement Partners on the same day as sampling. A chain-of-custody system will be operated in triplicate as part of the QA/QC procedure. The accredited laboratory QA/QC procedures will be precisely followed.

5.7 Sample Size and Decontamination Procedures

5.7.1 All equipment in contact with the ground should be thoroughly decontaminated between each excavation, and sampling event to minimise the potential for cross contamination. The equipment (including digging tools and soil/groundwater samplers) should be decontaminated by steam cleaning or high-pressure hot water jet, then washed by phosphate-free detergent and finally rinsed by distilled / deionised water.

5.7.2 Prior to sampling, the laboratory responsible for analysis should be consulted on the particular sample size and preservation procedures that are necessary for each chemical analysis.

5.7.3 The sample containers should be laboratory cleaned, sealable, water-tight, made of glass or other suitable materials with aluminium or Teflon-lined lids, so that the container surface will not react with the sample or adsorb contaminants. No headspace should be allowed in the containers which contain samples to be analysed for VOCs, Petroleum Hydrocarbon Ranges or other volatile chemicals.

5.7.4 The containers should be marked with the sampling location codes and the depths at which the samples were taken. If the contents are hazardous, this should be clearly marked on the container and precautions taken during transport. Samples should be stored at between 0-4 ºC but never frozen. Samples should be delivered to laboratory within 24 hours of the samples being collected and analysed within the respective retention period but should not be more than 10 days.

5.8 Quality Assurance / Quality Control Procedures

5.8.1 Soil samples will be labelled uniquely and unambiguously. The nature of soil material sampled will be recorded at different depths. Information such as depth, sampling location and other information such as any non-standard sampling events will be recorded as well. The description of soil samples will include but not limited to:

- Test site where the sample is collected;
- Sample identification number;
- Soil sampling depth (with respect to the lowest level of concert pavement/cover, if any);
- Estimated physical characteristics; and
- Colour photographs.

5.8.2 At each sampling location/depth, sufficient quantity of soil sample (as specified by the laboratory) should be taken. All soil samples should be uniquely labelled. Backup samples should be retained and stored at 0-4 ºC in laboratory.

5.8.3 Quality Assurance / Quality Control (QA/QC) samples should be collected with the following frequency during the SI. Chain of Custody protocol should be adopted.

- 1 equipment blank per 20 samples for full suite analysis;
- 1 field blank per 20 samples for full suite analysis;
- 1 duplicate sample per 20 samples for full suite analysis; and
- 1 trip blank per trip for the analysis of volatile parameters.

5.9 Health and Safety

5.9.1 The specific safety measures to be taken depend on the nature and content of contamination, the site conditions and the regulations related to site safety requirements. Workers Compensation Insurance and third party insurance must be provided for the SI.

5.9.2 Extreme care should be exercised when toxic gases or other hazardous materials are encountered. Any abnormal conditions found shall be reported immediately to the safety officer and the land contamination specialist.

5.9.3 The SI contractor shall establish and maintain a Health and Safety Plan before commencement of the SI that will include the following:

1. Instruction of works on work procedures, safe practices, emergency duties, and applicable regulations;
2. Regularly scheduled meetings of the workers in which the possible hazards, problems of the job, and related safe practices are emphasized and discussed;
3. Good housekeeping practices; and
4. Availability of and instruction in the location, use and maintenance of personal protective equipment.

5.9.4 The SI Contractor shall maintain equipment and supplies reasonably required in an emergency, including lifesaving, evacuation, rescue and medical equipment in good working order and condition at all times. The SI Contractor shall use all reasonable means to control and prevent fires and explosions, injury to personnel and damage to equipment of property. Without limiting the foregoing, the SI Contractor shall:

1. Maintain proper safety devices and barriers to minimize hazards during performance of the work;
2. Prohibit smoking and open flames and the carrying of matches and lighters;
3. Develop and maintain a written emergency plan applicable to the work site;
4. Maintain equipment in good operating condition and have emergency and first aid equipment ready for immediate use, where applicable;
5. Conduct equipment tests to ensure that equipment is properly placed and in good operating condition, and that workers are able to respond to emergency situations;
6. Require all workers employed or retained by the Contractor, or a subcontractor, to at all time wear clothing suitable for existing work, weather and environmental conditions; and
7. Require the site personnel to wear respirator and gloves for vapour exposure protection, if necessary.
8. Ensure all site staff members wear safety helmet and protective boots.

6 Laboratory Analysis

6.1 Analytical Parameters

6.1.1 The collected soil and groundwater samples would be analyzed for the parameters which have been selected with reference to the EPD's *Practice Guide for Investigation and Remediation of Contamination Land* and based on the potentially contaminated sources.

6.1.2 All samples should be analyzed by a Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited laboratory. In addition, all laboratory test methods should be, as far as practical, accredited by HOKLAS or one of its Mutual Recognition Arrangement partners. The proposed sampling and testing schedule is given in **Table 7** and the analytical methods are shown in **Table 8**.

Table 7: Proposed Soil and Groundwater Testing Schedule

Proposed Sampling Locations[1]	Sample Matrix[2]		Metals	PCRs[3]	VOCs[3]	SVOCs[3]	PCBs[3]	Rationale of Sampling
Area A (Kowloon Motor Bus (KMB) Maintenance Depot)								
TP(A)1 – TP(A)6	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	-	Assess potential land contamination impact from diesel filling stations
	GW	If present^	Mercury only	✓	✓	✓	-	
TP(A)7 – TP(A)10	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	-	Assess potential land contamination impact from aboveground diesel storage tanks
	GW	If present^	Mercury only	✓	✓	✓	-	
TP(A)11 – TP(A)16	Soil	0.5 m, 1.5 m, 3.0 m bpb	Full list	✓	✓	✓	-	Assess potential land contamination impact from underground diesel pipelines
	GW	If present^	Mercury only	✓	✓	✓	-	
TP(A)17 – TP(A)19	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	-	Assess potential land contamination impact from bus maintenance bays
	GW	If present^	Mercury only	✓	✓	✓	-	
TP(A)20 – TP(A)25	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	-	Assess potential land contamination impact from bus maintenance bays
	GW	If present^	Mercury only	✓	✓	✓	-	
TP(A)26	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	✓	Assess potential land contamination impact from emergency power generation units
	GW	If present^	Mercury only	✓	✓	✓	✓	
TP(A)27	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	-	Assess potential land contamination impact from chemical waste storage cabinet
	GW	If present^	Mercury only	✓	✓	✓	-	
Area B (Ming Hing Waterworks)								
TP(B)1 – TP(B)16	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	-	Assess potential land contamination impact from open storage area
	GW	If present^	Mercury only	✓	✓	✓	-	
Area D (Estate Management Office – Yuen Long Industrial Estate)								
TP(D)1	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	✓	Assess potential land contamination impact from transformer
	GW	If present^	Mercury only	✓	✓	✓	✓	

Proposed Sampling Locations [1]	Sample Matrix[2]		Metals	PCRs[3]	VOCs[3]	SVOCs[3]	PCBs[3]	Rationale of Sampling
Area E1 (DSD Contract DC/2012/05 Engineer Site Offices)								
TP(E1)1-TP(E1)9	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	-	Assess potential land contamination impact from historical land use as open storage area
	GW	If present^	Mercury only	✓	✓	✓	-	
Area E2 (DSD Contract DC/2012/05 Contractor Site Offices)								
TP(E2)1	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	-	Assess potential land contamination impact from chemical waste storage
	GW	If present^	Mercury only	✓	✓	✓	-	
TP(E2)2 – TP(E2)7	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	-	Assess potential land contamination impact from open storage area (i.e. historical and existing)
	GW	If present^	Mercury only	✓	✓	✓	-	
Area E3 (DSD Contract DC/2012/05 Contractor Temporary Storage Area)								
TP(E3)1 – TP(E3)4	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	-	Assess potential land contamination impact from open storage area (i.e. historical and existing) and suspected maintenance activities
	GW	If present^	Mercury only	✓	✓	✓	-	
Area E4 (DSD Contract DC/2012/05 Contractor Temporary Storage Area and Maintenance Workshop)								
TP(E4)1 – TP(E4)3	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	-	Assess potential land contamination impact from maintenance activities
	GW	If present^	Mercury only	✓	✓	✓	-	
TP(E4)4 – TP(E4)8	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	-	Assess potential land contamination impact from open storage area (i.e. historical and existing)
	GW	If present^	Mercury only	✓	✓	✓	-	
Area E5 (DSD Contract DC/2012/05 Contractor Temporary Storage Area)								
TP(E5)1 – TP(E5)3	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	-	Assess potential land contamination impact from suspected maintenance activities
	GW	If present^	Mercury only	✓	✓	✓	-	
Area E6 (DSD Contract DC/2012/05 Contractor Temporary Storage Area)								
TP(E6)1 – TP(E6)13	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	-	Assess potential land contamination impact from open storage area
	GW	If present^	Mercury only	✓	✓	✓	-	
Area E7 (DSD Contract DC/2011/07 Engineer Site Offices)								
TP(E7)1 – TP(E7)6	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	-	Assess potential land contamination impact from historical land use as open storage area
	GW	If present^	Mercury only	✓	✓	✓	-	
Area E8 (DSD Contract DC/2011/07 Temporary Storage Area)								
TP(E8)1 – TP(E8)9	Soil	0.5 m, 1.5 m, 3.0 m bgs	Full list	✓	✓	✓	-	Assess potential land contamination impact from open storage area
	GW	If present^	Mercury only	✓	✓	✓	-	

Remarks:

[1] Please refer to Figure 5.1 to Figure 5.11 for locations.

[2] bgs = Below Ground Surface; bpb = below pipeline bottom; GW = groundwater.

[3] ✓ = testing proposed.

^ Samples will only be collected if groundwater is encountered during SI works.

Table 8: Parameters, Detection Limits and Reference Methods for Laboratory Analysis

Parameter	Soil		Groundwater	
	Detection Limit (mg/kg) or other stated	Reference Method	Detection Limit (µg/L) or other stated	Reference Method
VOCs				
Acetone	5	USEPA 8260 or similar method*	50	USEPA 8260 or similar method*
Benzene	0.2		5	
Bromodichloromethane	0.1		5	
2-Butanone	5		50	
Chloroform	0.05		5	
Ethylbenzene	0.5		5	
Methyl tert-Butyl Ether	0.1		5	
Methylene Chloride	0.5		50	
Styrene	0.5		5	
Tetrachloroethene	0.04		5	
Toluene	0.5		5	
Trichloroethene	0.1		5	
Xylenes (Total)	1.5		15	
sVOCs				
Acenaphthene	0.5	USEPA 8270D or similar method*	2	USEPA 8270D or similar method*
Acenaphthylene	0.5		2	
Anthracene	0.5		2	
Benzo(a)anthracene	0.5		N/A	
Benzo(a)pyrene	0.5		N/A	
Benzo(b)fluoranthene	1.0		1	
Benzo(g,h,i)perylene	0.5		N/A	
Benzo(k)fluoranthene	1		N/A	
Bis-(2-Ethylhexyl)phthalate	5.0		N/A	
Chrysene	0.5		1	
Dibenzo(a,h)anthracene	0.5		N/A	
Fluoranthene	0.5		2	
Fluorene	0.5		2	
Hexachlorobenzene	0.2		4	
Indeno(1,2,3-cd)pyrene	0.5		N/A	
Naphthalene	0.5		2	
Phenanthrene	0.5		2	
Phenol	0.5		N/A	
Pyrene	0.5		2	
Metals				
Antimony	1	USEPA 6020 or similar method*	N/A	USEPA 6020 or similar method*
Arsenic	1		N/A	
Barium	0.5		N/A	
Cadmium	0.2		N/A	
Chromium III	0.5		N/A	
Chromium VI	0.5		N/A	
Cobalt	0.5		N/A	
Copper	1		N/A	
Lead	1		N/A	
Manganese	0.5		N/A	
Mercury	0.05		1	

Parameter	Soil		Groundwater	
Molybdenum	1		N/A	
Nickel	1		N/A	
Tin	0.5		N/A	
Zinc	1		N/A	
Petroleum Carbon Ranges				
C6 - C8	5	USEPA 8260B / 8015 or similar method*	20	USEPA 8260B / 8015 or similar method*
C9 - C16	200		500	
C17 - C35	500		500	
PCBs				
PCBs	0.1	USEPA 8070 or similar method*	0.1	USEPA 8070 or similar method*

Remark:

* Alternative testing methods with accreditation by HOKLAS or its Mutual Recognition Arrangement partner are also acceptable.

N/A - Not Available.

6.2 Interpretation of Results

6.2.1 As mentioned in **Section 3.3**, the most relevant RBRGs corresponding to the future land use is **"Industrial"** which should be adopted in assessing the land contamination level of the Study Site. Laboratory testing results from site investigation should be compared with correspondent RBRGs for the testing parameters in **Table 8** in accordance with the EPD's *Guidance Manual for Use of RBRGs for Contaminated Land Management*. The RBRGs for soil and soil saturation limits as well as groundwater and groundwater solubility limits are shown in **Appendix E**.

7 Remediation Measures

7.1 General

7.1.1 Following the submission of the supplementary CAP after the land resumption and completion of SI and lab testing works, a Contamination Assessment Report (CAR) would be prepared. The CAR would present the findings of the site investigation and evaluate the level and extent of potential contamination. The CAR would evaluate the potential environmental and human health impact based on the extent of potential contamination identified. If remediation is required, a Remediation Action Plan (RAP) will be prepared. The objectives of RAP are:

(1) To undertake further site investigation where required;

(2) To evaluate and recommend appropriate remedial measures for the contaminated materials identified in the assessment;

(3) To recommend good handling practices for the contaminated materials during the remediation works;

(4) To recommend approximate handling and disposal measures; and

(5) To formulate optimal and cost-effective mitigation and remedial measures for EPD's agreement.

7.1.2 A Remediation Report (RR) would also be prepared to demonstrate that the clean-up works are adequate. No construction/development works would be carried out within the potentially contaminated areas in the Study Site prior to the agreement of the RR.

7.2 Possible Remediation Methods

7.2.1 The possible contaminants that might be found in the Study Site include, as previously mentioned, metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), petroleum carbon ranges (PCRs) and polychlorinated biphenyls (PCBs).

7.2.2 The criteria listed below would be used as basis on which to address soil remediation options applicable to the subject contaminants in the Study Area:

(1) Nature and level of contamination;

(2) Extent of contamination;

(3) Site characteristic, e.g. soil type and site hydrology;

(4) Site constraints, e.g. available space;

(5) Technical and cost effectiveness;

(6) Technology development status;

(7) Environmental benefits and disbenefits;

(8) Commercial availability;

(9) Time allowable;

(10) Experience; and

(11) Expertise requirement.

7.2.1 Remediation Methods for Contaminated Soil

7.2.1.1 Common *in-situ* and *ex-situ* treatment technologies that were screened for the targeted soil contaminants are presented in **Table 9** below. The technologies are classified into biological treatment, physical / chemical treatment and removal, and grouped under in-situ and ex-situ methods.

Table 9: Treatment Technologies for Contaminated Soil with VOCs / SVOCs / Metals / PCRs/ PCBs

Technology	In-situ Treatment	Ex-situ Treatment
Biological Treatment	• Natural Attenuation • Soil Venting	• Biopiling • Landfarming
Physical / Chemical Treatment	• Electrokinetic Separation • Thermal Desorption • Permeable Reactive Barrier	• Solidification/Stabilization • Soil Washing • Incineration
Removal	• NA	• Excavation and Landfill Disposal

7.2.1.2 The applicability, limitations and environmental benefits and disbenefits of the above remediation techniques for contaminated soil are described in **Table 10**.

7.2.2 Remediation Methods for Contaminated Groundwater

7.2.2.1 The applicability, limitations and environmental benefits and disbenefits of different remediation techniques for contaminated groundwater are described in **Table 11**.

7.3 Surmountability of Potentially Contaminated Areas

7.3.1 The contamination issues in the Study Site that are identified as potentially contaminated would not be considered insurmountable in the supportive view that these areas are relatively small in size, the individual operation involving contaminating activities are likely to be small in scale, the extent of potential contamination are relatively localised, likely contaminants are generic and easily remediated, remediation methods available in the market are well established and nature of the possible contaminants can be dealt with by sufficient local remediation experience.

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Table 10: Treatment Technologies for Contaminated Soil

Remediation Option	Remediation Effectiveness	Descriptions	Applicability / Environmental Benefits	Limitations / Environmental Disadvantages
Biopiling	VOCs, SVOCs and PCRs	An Ex-situ bioremediation method that facilitates bacterial growth in contaminated soil and degradation of waste into harmless products.	• Effective to PCRs and other wide range of organic contaminants with some successful local case studies, e.g. decontamination works at the Cheoy Lee Shipyard at Penny's Bay, reclamation works at North Tsing Yi Shipyard site, decommissioning of Kwan Chung Incinerator. • Most cost-effective for large volumes of contaminated soil • All materials and equipment commercially available • Can be designed to be a closed system; vapour emissions can be controlled	• Labour-intensive; considerable maintenance required • Time-consuming (~12 months period) and not cost-effective for treating small soil samples. • Space required for biopile construction
Soil Venting	VOCs, SVOCs and PCRs	An In-situ bioremediation method using indigenous bacterial degradation of contaminants. Bacterial activity enhanced by air flow inducement (using extraction or injection wells) and, if required, by adding nutrients.	• Very effective to PCRs • Suitable for remediation in built up areas as wells can be placed between and/or below buildings • Applicable to extensive contamination in large sites • Uses readily available equipment; easy to install • Vapour emissions can be controlled but not to the extent of biopiling depending on underground soil in-situ properties	• Effectiveness hindered by underground soil features e.g. soil moisture content, permeability, etc. • Potential air emission to the sensitive receivers • Large area requirement for system development
Solidification / Stabilization	Metals	Ex-situ immobilization technique treating contaminated soil by mixing soil with binding agents, e.g. cement so as to physically bind contaminants into stable mass.	• Applicable to clean-up inorganic contaminants such as heavy metals. • Solidification/stabilization are used on certain contaminated sites in Hong Kong and successfully demonstrated treatment method for inorganic contaminated soil, e.g. decontamination works at the Cheoy Lee Shipyard at Penny's Bay, reclamation works at North Tsing Yi Shipyard site, decommissioning of Kwan Chung Incinerator, & few isolated sites identified in Deep Bay Link project.	• Effective in reducing presence of organic contaminants • Possible hindrance of large boulders in mixing process. Soil sorting necessary prior to treatment.
Soil Washing	Metals, SVOCs, PCRs and PCBs	An Ex-situ soil separation method primarily based on mineral processing techniques. A water-based process for scrubbing soils ex-situ to remove contaminants.	• Applicable to clean inorganic contaminants such as heavy metals from coarse-grained soils.	• Effectiveness of treatment dependent on soil coarseness. Fine soil particles may require addition of polymer for removal of contaminant by the washing fluid. • Complex waste mixtures make formulating washing fluid difficult. • Further treatment and disposal for residuals required.
Electrokinetic Separation	Metals	This In-situ method uses electrochemical and electrokinetic	• Applicable to treat soil with low permeability and heavily contaminated with metals.	• Effectiveness dependent on moisture content of soil and decreases with moisture

Remediation Option	Remediation Effectiveness	Descriptions	Applicability / Environmental Benefits	Limitations / Environmental Disadvantages
		processes to desorb and remove metals and polar organics from soil. Low intensity direct current is applied to the soil to mobilize the charged species.		content less than 10%. • Require further treatment for removal of desorbed contaminants and thus increase cost of remediation. • Variability of electrical conductivity in soil may be induced by presence of anomalies such as large gravels and insulating material. This may reduce treatment effectiveness.
Excavation and Landfill Disposal	Metals, VOCs, SVOCs, PCRs and PCBs	Ex-situ method whereby contaminants are removed by excavation of the contaminated soil and direct disposal to landfill	• Most simple and quickest way to dispose of large volume of contaminated soil. • Contamination is removed definitely. • Higher certainty of success. • Wide experience in Hong Kong. • Applicable to all waste or mixture that meet land disposal restriction treatment standards. • Common practice for shallow, highly-contaminated soils.	• Pre-treatment may be required for contaminated soil to meet landfill disposal criteria • Landfill space limited and valuable. • Indirect costs to the landfill management on monitoring and maintenance. • Potential long-term liabilities to landfill • Need large volume of clean backfill materials • No access to the working site until completion of backfilling • Least desirable management option.
Thermal Desorption	VOCs, SVOCs, PCRs and PCBs	A method to increase the volatility of contaminants by applying heat to the contaminated soil so that the contaminants can be removed / separated from the soil matrix.	• Low temperature thermal desorption systems are targeted for soils contaminated with VOCs, SVOCs and fuel components. • PAHs, PCBs, and pesticides can be treated with high temperature thermal desorption. • Less polluting method when compared with incineration.	• Have varying degrees of effectiveness against the full spectrum of organic contaminants • Processor unit can potentially be venerable to highly abrasive feed • Reaction time can vary with feed content as a result of binding of contaminants
Incineration	VOCs, SVOCs, PCRs and PCBs	Ex-situ or in-situ treatment of contaminated soils and hazardous materials by incinerating in order to break down contaminants.	• Applicable to soil contaminated with hazardous wastes such as dioxins, PCBs, and chlorinated hydrocarbons. • Wide experience in Hong Kong. • Common practice for highly-contaminated soils.	• Process produces ash residues which contains volatile heavy metals • Ash residues leaving the combustion unit requires gas treatment prior to release • Contaminants can react to each other forming more volatile and toxic compounds which may require breaking down in a caustic quench

Table 11: Treatment Technologies for Contaminated Groundwater

Remediation Option	Remediation Effectiveness	Descriptions	Applicability and Environmental Benefits	Limitations and Environmental Disadvantages
Vapour extraction / Groundwater extraction	PCRs	Vacuum is applied to well(s) above water table to recover vapour phase and residual hydrocarbons and to help maintain high water table. Free product and / or groundwater is recovered from wells by pumps.	• Low to moderately permeable materials (silts and silty sands). Often used to enhance recovery of hydrocarbons.	• Water and vapour treatment is typically required • Phase separation is required • Initial startup times are longer than other conventional methods • Moderate to large capital investment, medium to high operation and maintenance costs
Dual phase (liquid and vapour) recovery	VOCs, SVOCs and PCRs	Both liquids and vapours are recovered from same well. Groundwater production is minimized, and water table is stabilized.	• Generally low permeability materials (clay, clayey silts, silts, silty / clayey sands). Requires surface seal (either naturally occurring clay or man-made) to prevent short-circuiting of vacuum. • High vacuum increases groundwater and product recovery. • Minimizes drawdown and “smearing” of product. • Expedites site cleanup by recovering all hydrocarbon phases.	• Usually requires vapour and groundwater treatment • Phase separation is required • Longer initial startup time • Higher capital costs
Skimming systems	PCRs	Free product is recovered from a pit or trench without recovering groundwater	• Applicable to settings in which the amount of free product is small and exists in permeable conduits such as utility bedding or buried underground open structures. • Low cost and simple operation and maintenance. • Ideal for shallow groundwater level and soil excavation works.	• Recovery rates depend on pit/trench size • Frequent media replacement • Requires manual adjustment
Free product recovery with water table depression	PCRs	Free product is recovered from a well or trench along with groundwater. Groundwater is pumped to create cone of depression in water table to expand area of influence.	• Requires moderately permeable to permeable subsurface materials (silts, sands, and gravels). Can be used in setting with deep water tables. Often used in long term (>1year) remedial actions. Produced groundwater can be expensive to treat. • Recovered groundwater can be oxygenated and re-injected for bioremediation.	• Recovered fluids usually require treatment • Product can be “smeared” across area of depression resulting in greater formation storage • Higher permeability formations may require high pumping rates • Well network design requires capture zone analysis
Permeable Reactive Barriers	Metals, VOCs, SVOCs, PCRs and PCBs	In-situ treatment of contaminated water by means of engineering and use of reactive materials.	• Applicable to groundwater contaminated with volatile organic compounds, metals, and radioactive contaminants. • Common method for reducing chlorinated contaminants such as TCE and PCE.	• Method only applies to relatively shallow aquifers • Treatment effectiveness is highly dependent on groundwater chemistry / flow rate, ground geochemistry, site topography, seasonal

Remediation Option	Remediation Effectiveness	Descriptions	Applicability and Environmental Benefits	Limitations and Environmental Disadvantages
			• Effective method for immobilizing metals such as uranium, chromium and arsenic.	changes in hydrogeological conditions.

8 Conclusion

8.1 An investigation into the present and past land uses in respect to the potential land contamination has been undertaken, including a desktop review of available information and the reconnaissance site surveys. Based on the findings of the site appraisal on the present and past land uses in the Study Site, a number of areas have been identified with potential to be contaminated land and SI sampling is proposed in these areas.

8.2 It should be noted the Study Site is currently occupied and managed by various operators and is still in operation, therefore undertaking the SI works at this feasibility study stage is not possible. Besides, it is also not worthy to conduct SI when the site is still in operation as the continuously operation of the Study Site will make the assessment result obsolete. Therefore, the SI is recommended to commence only after the operation is terminated and the land is resumed. Hence the proposed contamination SI works in this report is for general reference only, and the exact extent, number of sampling locations etc. will have to be further reviewed and updated when the land in question is made available and handed over for the proposed development.

8.3 Besides, site re-appraisal will also be conducted after the site resumption to ascertain initial contamination evaluation of all areas and the site investigation works proposed in this CAP will be reviewed accordingly. The findings of the re-appraisal will be documented appropriately, such as by supplementary CAP to EPD for agreement prior to the commencement of SI works. Contamination Assessment Report (CAR), Remediation Action Plan (RAP) and Remediation Report (RR) will also be prepared and submitted to EPD for agreement prior to commencement of the development works on the sites.

8.4 There were no records of chemical waste spillage or leakage in the Study Site, according to the information obtained from EPD. As a result, no land contamination due to spillage or leakage of chemical waste within the Study Site would be anticipated. According to the information obtained from FSD, there were no recorded spillage / leakage incidents within the Study Site. Therefore, no land contamination due to spillage or leakage of DG would be anticipated.

8.5 Despite the SI could not be conducted at this stage, the contamination issues in the Study Site that are identified as potentially contaminated would not be considered insurmountable in the supportive view that these areas are relatively small in size, the individual operation involving contaminating activities are likely to be small in scale, the extent of potential contamination are relatively localised, likely contaminants are generic and easily remediated, remediation methods available in the market are well established and nature of the possible contaminants can be dealt with by sufficient local remediation experience.

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Appendices

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A. Documentation from EPD and FSD

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本署檔案
OUR REF : EP/RN/380044
來函檔案
YOUR REF : SHC/JS/sa/369397/4.2/L0029
電 話
TEL NO : 2158 5852
圖文傳真
FAX NO : 2650 6033
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10/F., Shatin Government Offices,
1 Sheung Wo Che Road,
Sha Tin, New Territories,
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環境保護署
環保法規管理科
區域辦事處 (北)
香港新界沙田
上禾輋路一號
沙田政府合署 10 樓

By Fax & Post (2827 1823)

29 July 2016

Mott MacDonald Hong Kong Limited
20/F AIA Kowloon Tower Landmark East
100 How Ming Street Kwun Tong Kowloon Hong kong
(Attn.: K S Li, Project Manager)

Dear Sir/Madam,

Request for Information about Chemical Waste Producer and Chemical Spillage/Leakage Incidents

I refer to your letter dated 18 July 2016 requesting records of Chemical Waste Producers Registration, and chemical spillage / leakage records within the site boundary shown in the enclosed location plan.

A register of chemical waste producers under Waste Disposal (Chemical Waste) (General) Regulation is open for inspection by the public during normal office hours in the department. The register contains prescribed particulars such as registered name, location, etc. If you would like to inspect, please contact Mr. HO Shui-lun, Aaron at 2835 1017.

There is no chemical spillage / leakage record within the site boundary illustrated in the provided location plan in the past three years.

For further enquiry, please contact our Senior Environmental Protection Inspector Mr SO Kwai-hong at tel. no.: 2158 5751.

Yours faithfully,

(Ashley M.H. PUN)
for Director of Environmental Protection

1C0085

消 防 處
香港九龍尖沙咀東部康莊道 1 號
消防總部大廈

FIRE SERVICES DEPARTMENT
FIRE SERVICES HEADQUARTERS BUILDING,
No.1 Hong Chong Road,
Tsim Sha Tsui East, Kowloon,
Hong Kong.

本處檔號 OUR REF. : (227) in FSD GR 6-5/4 R Pt. 12
來函檔號 YOUR REF. : SHC/KS/sa/369397/4.2/L0027
電子郵件 E-mail : hkfsdenq@hkfsd.gov.hk
圖文傳真 FAX NO. : 2739 5879
電 話 TEL NO. : 2733 5848

19 August 2016

Mott MacDonald
20/F AIA Kowloon Tower,
Landmark East,
100 How Ming Street,
Kwun Tong, Kowloon, Hong Kong
(Attn: Mr. K. S. LI)

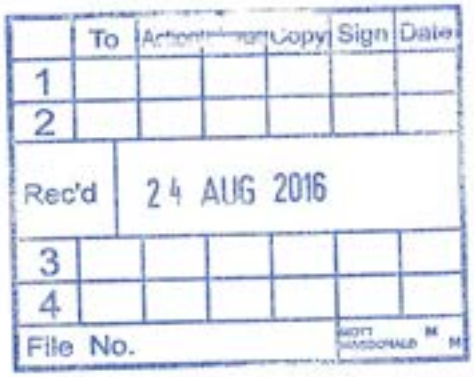
Dear Mr. LI,

Study on Proposed Multi-Storey Buildings in Yuen Long Area
Request for Information of Dangerous Goods & Incident Records

I refer to your letter of 18.7.2016 regarding the captioned request and reply below in response to your questions.

According to our record, dangerous goods licenses have been issued by this department to the subject address, with details as shown in **Appendix**. No incident record was found at the aforesaid location with your given conditions.

If you have further questions, please feel free to contact the undersigned.



Yours sincerely,

(CHAN Kwok-ming)
for Director of Fire Services

Appendix

Study on Proposed Multi-Storey Buildings in Yuen Long Area
Request for Information of Dangerous Goods & Incident Records

Item	Type of DG	Quantity	Storage Method
1.	Diesel	22,500 Litres	A/G Tank
2.	Diesel	22,500 Litres	A/G Tank
3.	Diesel	22,500 Litres	A/G Tank
4.	Diesel	22,500 Litres	A/G Tank

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B. Aerial Photographs

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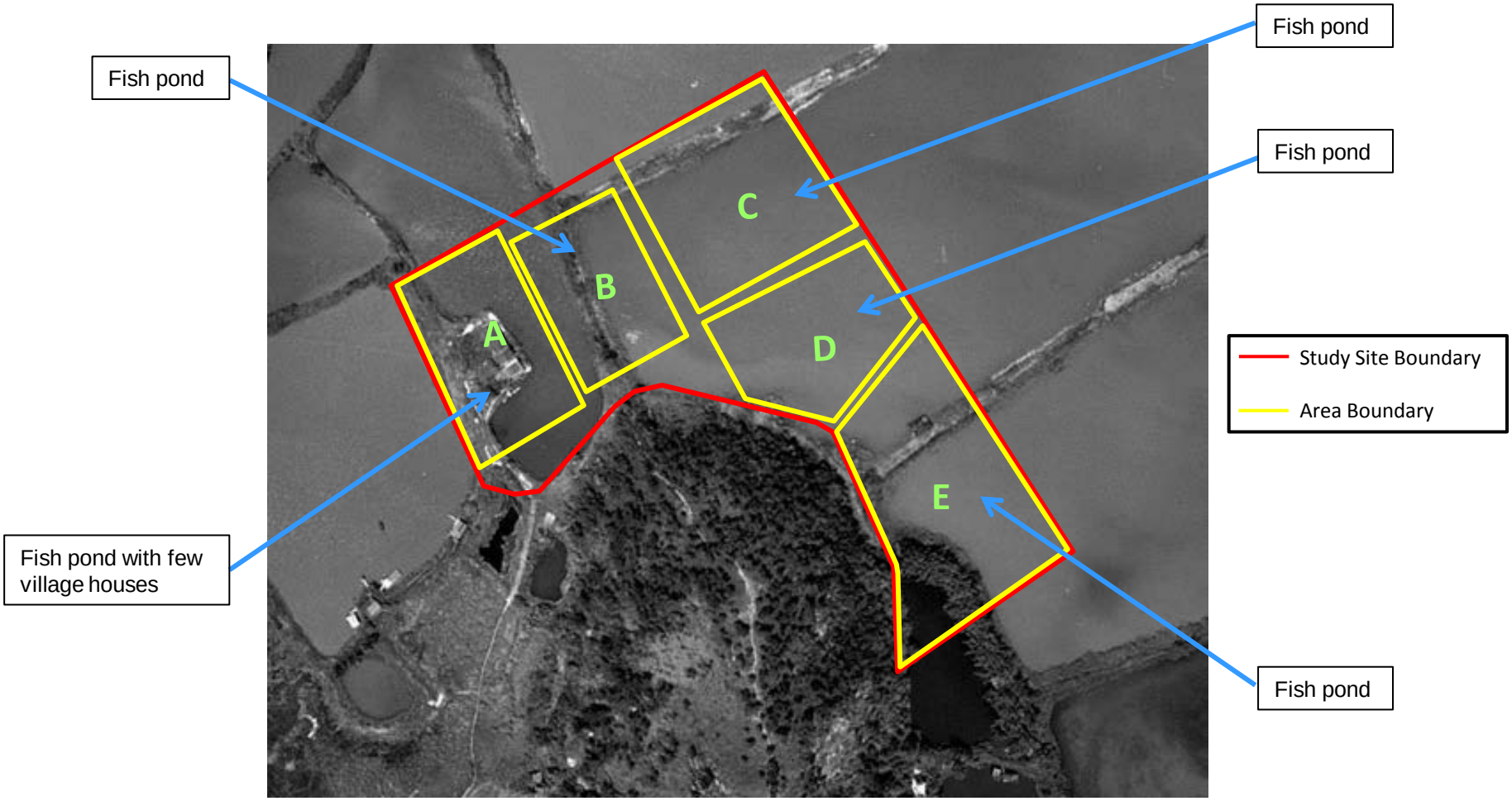
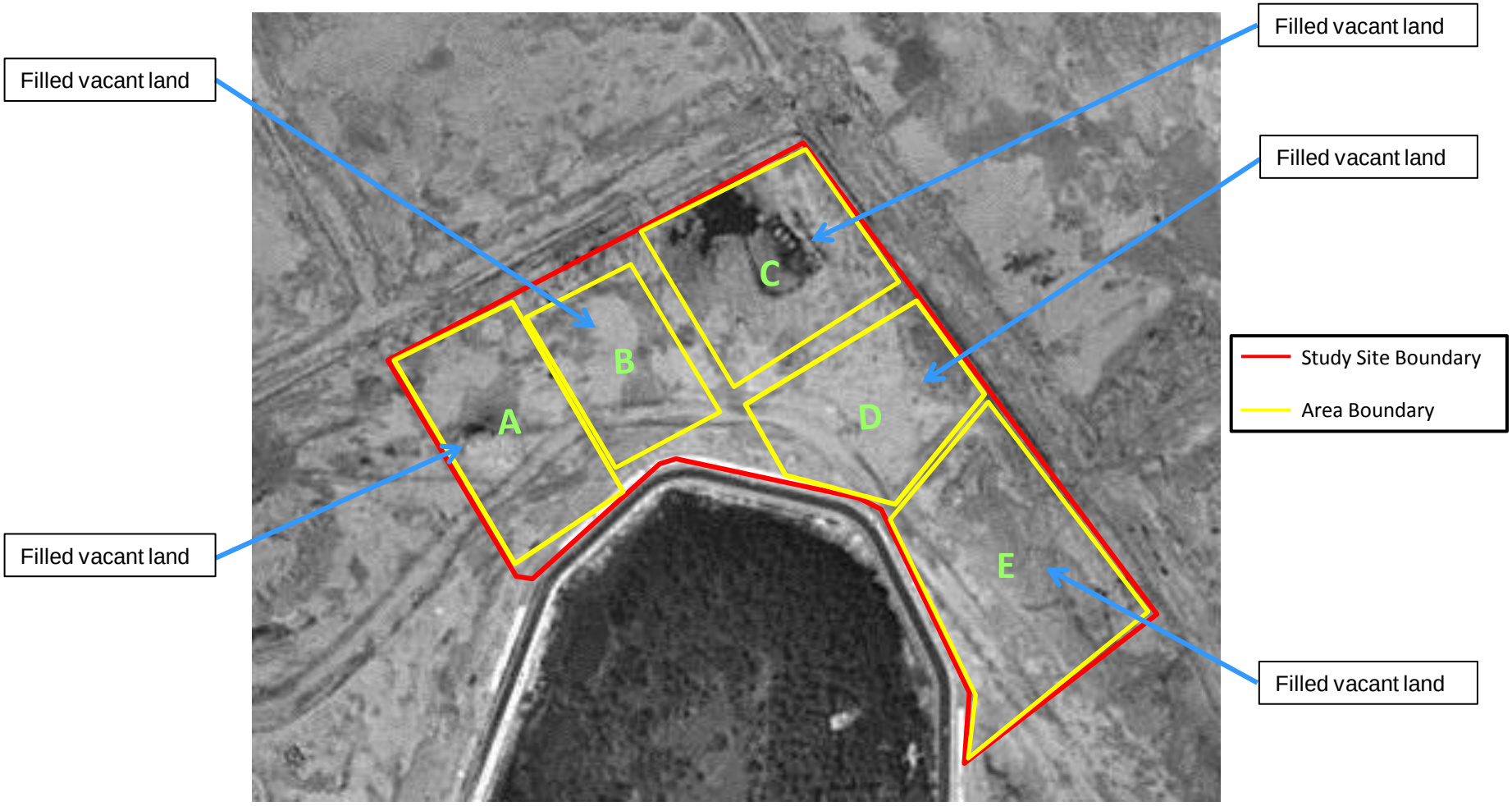
Appendix B Representative Historical Aerial Photographs



Year: 1978
Ref: 22049

Appendix B Representative Historical Aerial Photographs



Year: 1982
Ref: 42897

Appendix B Representative Historical Aerial Photographs



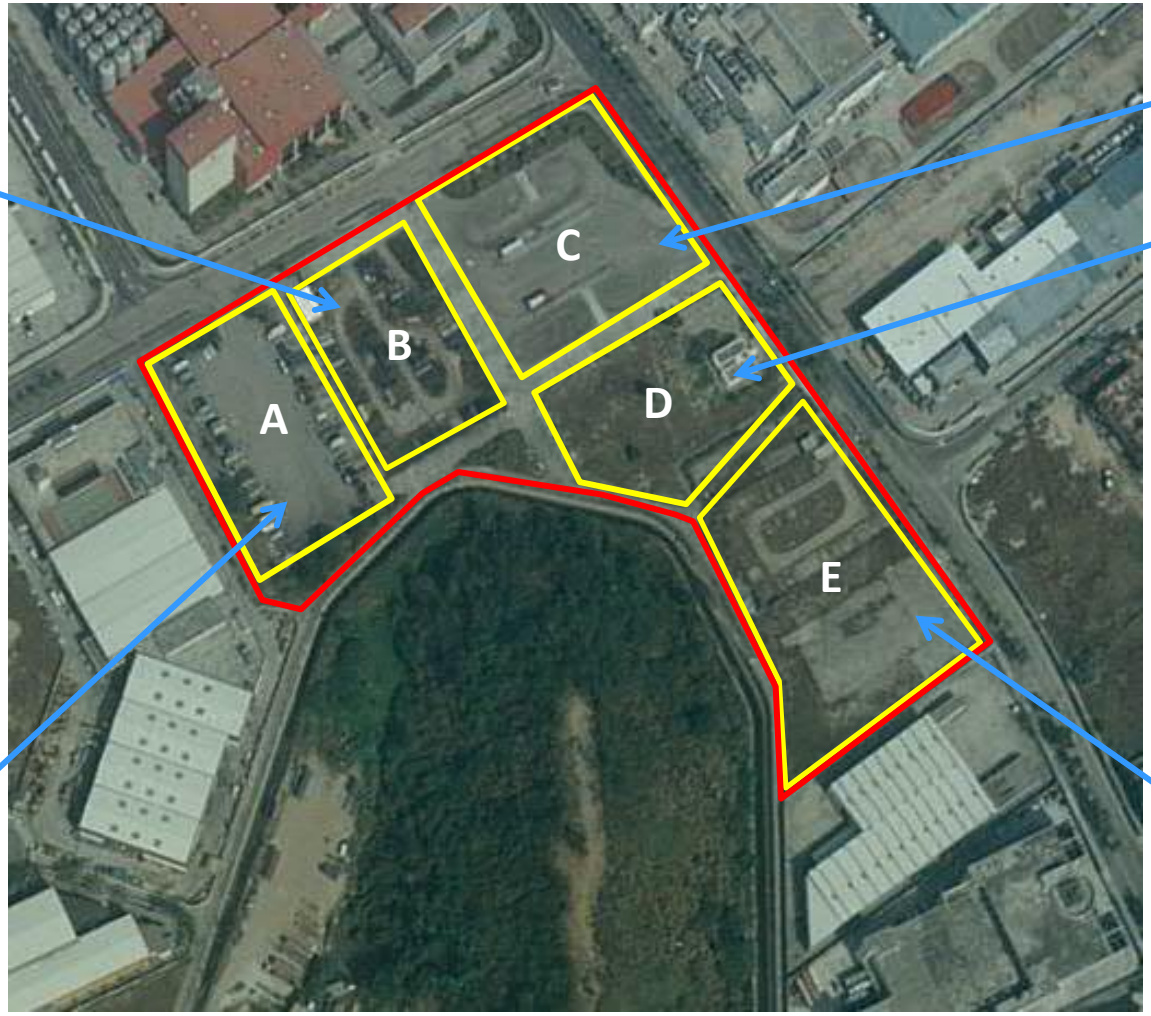
Year: 1987
Ref: A09452

Appendix B Representative Historical Aerial Photographs



Year: 1995
Ref: CN10141

Appendix B Representative Historical Aerial Photographs



Open storage area with a temporary structure/shelter

Bus terminus

Grassland with a small building and few car parks

Study Site Boundary

Area Boundary

Open car park for heavy vehicle

Vacant land again

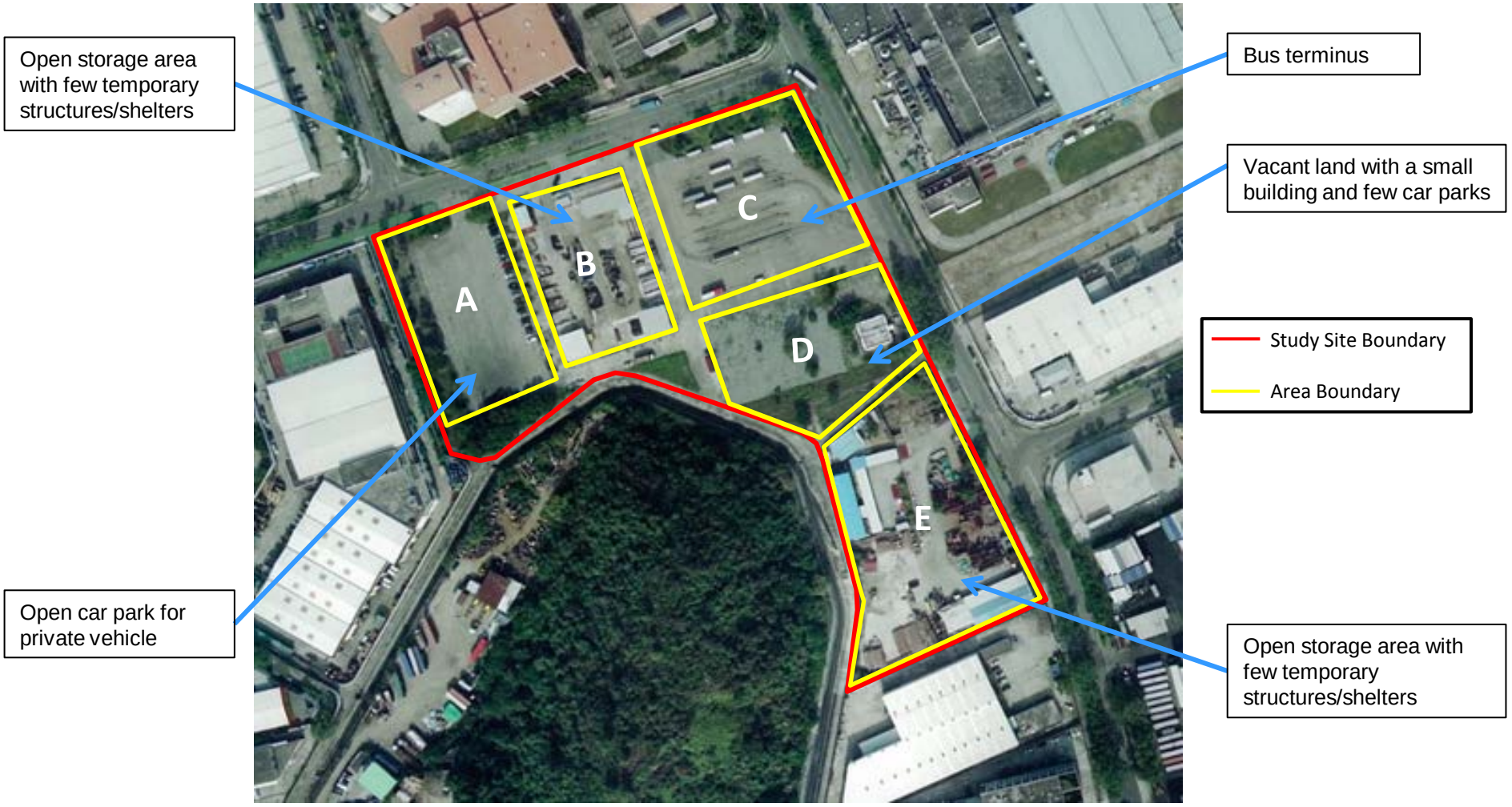
Year: 1999
Ref: CN22458

Appendix B Representative Historical Aerial Photographs



Year: 2004
Ref: CW58270

Appendix B Representative Historical Aerial Photographs



Year: 2009
Ref: CW85163

Appendix B Representative Historical Aerial Photographs



Open storage area with few temporary structures/shelters

Open car park for heavy and private vehicle with bus stop in the middle

Vacant land with a small building and few car parks

Open car park for private vehicle

Open storage area with few temporary structures/shelters

Year: 2013
Ref: CS43602

C. Site Walkover Checklists

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Area A

1. General Site Details

Site Owner / Client: Mr. Ma

Property Address: Fuk Wang Street No. 10 (Refer to Area A in Figure 3.1)

Person Conducting the Questionnaire

Name: Mott MacDonald HK Ltd

Position: N/A

Authorized Owner / Client Representative (if applicable)

Name: N/A

Position: N/A

Telephone: 2477 6586

2. Site Activities

Briefly describe activities carried out on site, including types of products / chemicals / materials handled.

Number of employees:	Full-time:	N/A
	Part-time:	N/A
	Temporary / Seasonal:	N/A
Maximum no. of people on site at any time:		N/A

Typical hours of operation: N/A

Number of shifts: N/A

Days per week: N/A

Weeks per year: N/A

Scheduled plant shut-down: N/A

Detail the main sources of energy at the site:

Gas	No
Electricity	Yes
Coal	No
Oil	No
Other	No

3. Site Description

This section is intended to gather information on site setting and environmental receptors on, adjacent or close to the site.

What is the total site area: 5,600m^2

What area of the site is covered by buildings (%): ~10%

Please list all current and previous owners / occupiers of possible.

N/A

Is a site plan available? If yes, please attach. No

Are there any other parties on site as tenants or sub-tenants? No

If yes, identify those parties: N/A

Describe surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.

North: Beer brewing company

South: Open storage and vegetated area

East: Open storage

West: Mechanical equipment company

Describe the topography of the area (flat terrain, rolling hills, mountains, by a large body of water, vegetation, etc.)

Flat concrete-paved ground

State the size and location of the nearest residential communities.

N/A

Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or site of special scientific interest?

No

4. Questionnaire with Existing / Previous Site Owner or Occupier (Area A)

	Yes / No	Notes
1. What are the main activities / operations at the above address?	--	Kowloon Motor Bus (KMB) Maintenance Depot
2. How long have you been occupying the site?	--	Since 2014
3. Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	No	--
4. Prior to your occupancy, who occupied the site?	--	--
5. What were the main activities / operations during their occupancy?	--	--
6. Have there been any major changes in operations carried out at the site in the last 10 years?	--	--
7. Have any polluting activities been carried out in the vicinity of the site in the past?	No	--
8. To the best of your knowledge, has the site ever been used as a petrol filling station / car service garage?	Yes	Currently as a bus maintenance depot
9. Are there any boreholes / wells or natural springs either on the site or in the surrounding area?	No	--
10. Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	Yes	4 x 22,500L diesel tanks
11. Are any chemicals used in your daily operations? (If yes, please provide details.)	Yes	N/A
• Where do you store these chemicals?	--	--
12. Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	No	--
13. Has the facility produced a separate hazardous substance inventory?	No	--
14. Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details)	No	--
15. How are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?	--	4 x 22,500L diesel tanks
16. Do you have any underground storage tanks? (If yes, please provide details.)	No	--
• How many underground storage tanks do you have on site?	--	--
• What are the tanks constructed of?	--	--
• What are the contents of these tanks?	--	--
• Are the pipelines above or below ground?	Underground	--
• If the pipelines are below ground, has any leak and integrity testing \g been performed?	No	--
• Have there been any spills associated with these tanks?	--	--
17. Are there any disused underground storage tanks?	No	--
18. Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)	Yes	N/A
19. How are the wastes disposed of?	--	--
20. Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	No	--
21. Have any spills occurred on site? (If yes, please provide details.)	No	--
• When did the spill occur?	--	--
• What were the substances spilled?	--	--
• What was the quantity of material spilled?	--	--
• Did you notify the relevant departments of the spill?	--	--
• What were the actions taken to clean up the spill?	--	--

	Yes / No	Notes
• What were the areas affected?	--	--
22. Do you have any records of major renovation of your site or re-arrangement of underground utilities, pipe work / underground tanks (If yes, please provide details.)	No	--
23. Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	No	--
24. Are there any known contaminations on site? (If yes, please provide details.)	No	--
25. Has the site ever been remediated? (If yes, please provide details.)	No	--

5. Observations

	Yes / No	Notes
1. Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	Yes	--
2. What are the conditions of the bund walls and floors?	--	Good
3. Are there any surface water drains located near to drum storage and unloading areas?	No	
4. Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	No	--
5. Is there a storage site for the wastes?	No	--
6. Is there an on-site landfill?	No	--
7. Were any stressed vegetation noted on site during the site reconnaissance? (if yes, please indicate location and approximate size.)	No	--
8. Were any stained surfaces noted on-site during the site reconnaissance? (if yes, please provide details.)	No	--
9. Are there any potential off-site sources of contamination?	No	--
10. Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	No	--
11. Are there any sumps, effluent pits, interceptors or lagoons on site?	No	--
12. Any noticeable odours during site walkover?	No	--
13. Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ask, oil tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?	Yes	Lubricating oils

Area B

1. General Site Details

Site Owner / Client: Miss Chan

Property Address: Fuk Wang Street (Refer to Area B in Figure 3.1)

Person Conducting the Questionnaire

Name: Mott MacDonald HK Ltd

Position: N/A

Authorized Owner / Client Representative (if applicable)

Name: N/A

Position: N/A

Telephone: 2478 2263

2. Site Activities

Briefly describe activities carried out on site, including types of products / chemicals / materials handled.

Number of employees:	Full-time:	N/A
	Part-time:	N/A
	Temporary / Seasonal:	N/A
Maximum no. of people on site at any time:		N/A

Typical hours of operation: N/A

Number of shifts: N/A

Days per week: N/A

Weeks per year: N/A

Scheduled plant shut-down: N/A

Detail the main sources of energy at the site:

Gas	No
Electricity	Yes
Coal	No
Oil	No
Other	No

3. Site Description

This section is intended to gather information on site setting and environmental receptors on, adjacent or close to the site.

What is the total site area: 4,400m^2

What area of the site is covered by buildings (%): 0%

Please list all current and previous owners / occupiers of possible.

N/A

Is a site plan available? If yes, please attach. No

Are there any other parties on site as tenants or sub-tenants? No

If yes, identify those parties: N/A

Describe surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.

North: Beer brewing company

South: Vegetated area

East: Car park and bus terminus

West: Bus maintenance depot

Describe the topography of the area (flat terrain, rolling hills, mountains, by a large body of water, vegetation, etc.)

Flat concrete-paved ground

State the size and location of the nearest residential communities.

N/A

Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or site of special scientific interest?

No

4. Questionnaire with Existing / Previous Site Owner or Occupier (Area B)

	Yes / No	Notes
1. What are the main activities / operations at the above address?	--	Open storage
2. How long have you been occupying the site?	--	--
3. Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	--	--
4. Prior to your occupancy, who occupied the site?	--	--
5. What were the main activities / operations during their occupancy?	--	--
6. Have there been any major changes in operations carried out at the site in the last 10 years?	--	--
7. Have any polluting activities been carried out in the vicinity of the site in the past?	--	--
8. To the best of your knowledge, has the site ever been used as a petrol filling station / car service garage?	--	--
9. Are there any boreholes / wells or natural springs either on the site or in the surrounding area?	--	--
10. Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	--	--
11. Are any chemicals used in your daily operations? (If yes, please provide details.)	--	--
• Where do you store these chemicals?	--	--
12. Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	--	--
13. Has the facility produced a separate hazardous substance inventory?	--	--
14. Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details)	--	--
15. How are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?	--	--
16. Do you have any underground storage tanks? (If yes, please provide details.)	--	--
• How many underground storage tanks do you have on site?	--	--
• What are the tanks constructed of?	--	--
• What are the contents of these tanks?	--	--
• Are the pipelines above or below ground?	--	--
• If the pipelines are below ground, has any leak and integrity testing \g been performed?	--	--
• Have there been any spills associated with these tanks?	--	--
17. Are there any disused underground storage tanks?	--	--
18. Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)	--	--
19. How are the wastes disposed of?	--	--
20. Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	--	--
21. Have any spills occurred on site? (If yes, please provide details.)	--	--
• When did the spill occur?	--	--
• What were the substances spilled?	--	--
• What was the quantity of material spilled?	--	--
• Did you notify the relevant departments of the spill?	--	--
• What were the actions taken to clean up the spill?	--	--
• What were the areas affected?	--	--
22. Do you have any records of major renovation of your site or re-arrangement of	--	--

	Yes / No	Notes
underground utilities, pipe work / underground tanks (If yes, please provide details.)		
23. Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	--	--
24. Are there any known contaminations on site? (If yes, please provide details.)	--	--
25. Has the site ever been remediated? (If yes, please provide details.)	--	--

5. Observations

	Yes / No	Notes
1. Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	--	--
2. What are the conditions of the bund walls and floors?	--	--
3. Are there any surface water drains located near to drum storage and unloading areas?	--	--
4. Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	--	--
5. Is there a storage site for the wastes?	--	--
6. Is there an on-site landfill?	--	--
7. Were any stressed vegetation noted on site during the site reconnaissance? (if yes, please indicate location and approximate size.)	--	--
8. Were any stained surfaces noted on-site during the site reconnaissance? (if yes, please provide details.)	--	--
9. Are there any potential off-site sources of contamination?	--	--
10. Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	--	--
11. Are there any sumps, effluent pits, interceptors or lagoons on site?	--	--
12. Any noticeable odours during site walkover?	--	--
13. Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ask, oil tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?	--	--

Area C

1. General Site Details

Site Owner / Client: N/A

Property Address: Fuk Wang Street (Refer to Area C in Figure 3.1)

Person Conducting the Questionnaire

Name: Mott MacDonald HK Ltd

Position: N/A

Authorized Owner / Client Representative (if applicable)

Name: N/A

Position: N/A

Telephone: N/A

2. Site Activities

Briefly describe activities carried out on site, including types of products / chemicals / materials handled.

Number of employees:	Full-time:	N/A
	Part-time:	N/A
	Temporary / Seasonal:	N/A
Maximum no. of people on site at any time:		N/A

Typical hours of operation: N/A

Number of shifts: N/A

Days per week: N/A

Weeks per year: N/A

Scheduled plant shut-down: N/A

Detail the main sources of energy at the site:

Gas	N/A
Electricity	N/A
Coal	N/A
Oil	N/A
Other	N/A

3. Site Description

This section is intended to gather information on site setting and environmental receptors on, adjacent or close to the site.

What is the total site area: 6,200m^2

What area of the site is covered by buildings (%): 0%

Please list all current and previous owners / occupiers of possible.

N/A

Is a site plan available? If yes, please attach. No

Are there any other parties on site as tenants or sub-tenants? No

If yes, identify those parties: N/A

Describe surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.

North: Beer brewing company

South: Estate Management Office – Yuen Long Industrial Estate

East: Food production company

West: Open storage

Describe the topography of the area (flat terrain, rolling hills, mountains, by a large body of water, vegetation, etc.)

Flat concrete-paved ground

State the size and location of the nearest residential communities.

N/A

Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or site of special scientific interest?

No

4. Questionnaire with Existing / Previous Site Owner or Occupier (Area C)

	Yes / No	Notes
1. What are the main activities / operations at the above address?	--	--
2. How long have you been occupying the site?	--	--
3. Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	--	--
4. Prior to your occupancy, who occupied the site?	--	--
5. What were the main activities / operations during their occupancy?	--	--
6. Have there been any major changes in operations carried out at the site in the last 10 years?	--	--
7. Have any polluting activities been carried out in the vicinity of the site in the past?	--	--
8. To the best of your knowledge, has the site ever been used as a petrol filling station / car service garage?	--	--
9. Are there any boreholes / wells or natural springs either on the site or in the surrounding area?	--	--
10. Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	--	--
11. Are any chemicals used in your daily operations? (If yes, please provide details.)	--	--
• Where do you store these chemicals?	--	--
12. Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	--	--
13. Has the facility produced a separate hazardous substance inventory?	--	--
14. Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details)	--	--
15. How are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?	--	--
16. Do you have any underground storage tanks? (If yes, please provide details.)	--	--
• How many underground storage tanks do you have on site?	--	--
• What are the tanks constructed of?	--	--
• What are the contents of these tanks?	--	--
• Are the pipelines above or below ground?	--	--
• If the pipelines are below ground, has any leak and integrity testing \g been performed?	--	--
• Have there been any spills associated with these tanks?	--	--
17. Are there any disused underground storage tanks?	--	--
18. Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)	--	--
19. How are the wastes disposed of?	--	--
20. Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	--	--
21. Have any spills occurred on site? (If yes, please provide details.)	--	--
• When did the spill occur?	--	--
• What were the substances spilled?	--	--
• What was the quantity of material spilled?	--	--
• Did you notify the relevant departments of the spill?	--	--
• What were the actions taken to clean up the spill?	--	--
• What were the areas affected?	--	--
22. Do you have any records of major renovation of your site or re-arrangement of	--	--

	Yes / No	Notes
underground utilities, pipe work / underground tanks (If yes, please provide details.)		
23. Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	--	--
24. Are there any known contaminations on site? (If yes, please provide details.)	--	--
25. Has the site ever been remediated? (If yes, please provide details.)	--	--

5. Observations

	Yes / No	Notes
1. Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	--	--
2. What are the conditions of the bund walls and floors?	--	--
3. Are there any surface water drains located near to drum storage and unloading areas?	--	--
4. Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	--	--
5. Is there a storage site for the wastes?	--	--
6. Is there an on-site landfill?	--	--
7. Were any stressed vegetation noted on site during the site reconnaissance? (if yes, please indicate location and approximate size.)	--	--
8. Were any stained surfaces noted on-site during the site reconnaissance? (if yes, please provide details.)	--	--
9. Are there any potential off-site sources of contamination?	--	--
10. Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	--	--
11. Are there any sumps, effluent pits, interceptors or lagoons on site?	--	--
12. Any noticeable odours during site walkover?	--	--
13. Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ask, oil tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?	--	--

Area D

1. General Site Details

Site Owner / Client: N/A

Property Address: Wang Lee Street No. 32 (Refer to Area D in Figure 3.1)

Person Conducting the Questionnaire

Name: Mott MacDonald HK Ltd

Position: N/A

Authorized Owner / Client Representative (if applicable)

Name: N/A

Position: N/A

Telephone: N/A

2. Site Activities

Briefly describe activities carried out on site, including types of products / chemicals / materials handled.

Number of employees:	Full-time:	N/A
	Part-time:	N/A
	Temporary / Seasonal:	N/A
Maximum no. of people on site at any time:		N/A

Typical hours of operation: N/A

Number of shifts: N/A

Days per week: N/A

Weeks per year: N/A

Scheduled plant shut-down: N/A

Detail the main sources of energy at the site:

Gas	No
Electricity	Yes
Coal	No
Oil	No
Other	No

3. Site Description

This section is intended to gather information on site setting and environmental receptors on, adjacent or close to the site.

What is the total site area: 5,200m^2

What area of the site is covered by buildings (%): ~10%

Please list all current and previous owners / occupiers of possible.

N/A

Is a site plan available? If yes, please attach. No

Are there any other parties on site as tenants or sub-tenants? No

If yes, identify those parties: N/A

Describe surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.

North: Car park and bus terminus

South: Vegetated land and open storage

East: Pharmaceutical company

West: Vegetated land

Describe the topography of the area (flat terrain, rolling hills, mountains, by a large body of water, vegetation, etc.)

Mostly vegetation with a small building

State the size and location of the nearest residential communities.

N/A

Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or site of special scientific interest?

No

4. Questionnaire with Existing / Previous Site Owner or Occupier (Area D)

	Yes / No	Notes
1. What are the main activities / operations at the above address?	--	--
2. How long have you been occupying the site?	--	--
3. Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	--	--
4. Prior to your occupancy, who occupied the site?	--	--
5. What were the main activities / operations during their occupancy?	--	--
6. Have there been any major changes in operations carried out at the site in the last 10 years?	--	--
7. Have any polluting activities been carried out in the vicinity of the site in the past?	--	--
8. To the best of your knowledge, has the site ever been used as a petrol filling station / car service garage?	--	--
9. Are there any boreholes / wells or natural springs either on the site or in the surrounding area?	--	--
10. Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	--	--
11. Are any chemicals used in your daily operations? (If yes, please provide details.)	--	--
• Where do you store these chemicals?	--	--
12. Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	--	--
13. Has the facility produced a separate hazardous substance inventory?	--	--
14. Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details)	--	--
15. How are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?	--	--
16. Do you have any underground storage tanks? (If yes, please provide details.)	--	--
• How many underground storage tanks do you have on site?	--	--
• What are the tanks constructed of?	--	--
• What are the contents of these tanks?	--	--
• Are the pipelines above or below ground?	--	--
• If the pipelines are below ground, has any leak and integrity testing \g been performed?	--	--
• Have there been any spills associated with these tanks?	--	--
17. Are there any disused underground storage tanks?	--	--
18. Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)	--	--
19. How are the wastes disposed of?	--	--
20. Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	--	--
21. Have any spills occurred on site? (If yes, please provide details.)	--	--
• When did the spill occur?	--	--
• What were the substances spilled?	--	--
• What was the quantity of material spilled?	--	--
• Did you notify the relevant departments of the spill?	--	--
• What were the actions taken to clean up the spill?	--	--
• What were the areas affected?	--	--
22. Do you have any records of major renovation of your site or re-arrangement of	--	--

	Yes / No	Notes
underground utilities, pipe work / underground tanks (If yes, please provide details.)		
23. Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	--	--
24. Are there any known contaminations on site? (If yes, please provide details.)	--	--
25. Has the site ever been remediated? (If yes, please provide details.)	--	--

5. Observations

	Yes / No	Notes
1. Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	--	--
2. What are the conditions of the bund walls and floors?	--	--
3. Are there any surface water drains located near to drum storage and unloading areas?	--	--
4. Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	--	--
5. Is there a storage site for the wastes?	--	--
6. Is there an on-site landfill?	--	--
7. Were any stressed vegetation noted on site during the site reconnaissance? (if yes, please indicate location and approximate size.)	--	--
8. Were any stained surfaces noted on-site during the site reconnaissance? (if yes, please provide details.)	--	--
9. Are there any potential off-site sources of contamination?	--	--
10. Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	--	--
11. Are there any sumps, effluent pits, interceptors or lagoons on site?	--	--
12. Any noticeable odours during site walkover?	--	--
13. Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ask, oil tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?	--	--

Area E1

1. General Site Details

Site Owner / Client: Mr. To

Property Address: Wan Lee Street (Refer to Area E1 in Figure 3.6)

Person Conducting the Questionnaire

Name: Mott MacDonald HK Ltd

Position: N/A

Authorized Owner / Client Representative (if applicable)

Name: N/A

Position: N/A

Telephone: 2640 8020

2. Site Activities

Briefly describe activities carried out on site, including types of products / chemicals / materials handled.

Number of employees:	Full-time:	N/A
	Part-time:	N/A
	Temporary / Seasonal:	N/A
Maximum no. of people on site at any time:		N/A

Typical hours of operation: N/A

Number of shifts: N/A

Days per week: N/A

Weeks per year: N/A

Scheduled plant shut-down: N/A

Detail the main sources of energy at the site:

Gas	No
Electricity	Yes
Coal	No
Oil	No
Other	No

3. Site Description

This section is intended to gather information on site setting and environmental receptors on, adjacent or close to the site.

What is the total site area: 1,400m^2

What area of the site is covered by buildings (%): 0%

Please list all current and previous owners / occupiers of possible.

N/A

Is a site plan available? If yes, please attach. No

Are there any other parties on site as tenants or sub-tenants? No

If yes, identify those parties: N/A

Describe surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.

North: Vegetated land

South: Open storage

East: Pharmaceutical company

West: Vegetated land

Describe the topography of the area (flat terrain, rolling hills, mountains, by a large body of water, vegetation, etc.)

Flat concrete-paved ground

State the size and location of the nearest residential communities.

N/A

Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or site of special scientific interest?

No

4. Questionnaire with Existing / Previous Site Owner or Occupier (Area E1)

	Yes / No	Notes
1. What are the main activities / operations at the above address?	--	Site office
2. How long have you been occupying the site?	--	Since 2012
3. Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	No	--
4. Prior to your occupancy, who occupied the site?	--	--
5. What were the main activities / operations during their occupancy?	--	--
6. Have there been any major changes in operations carried out at the site in the last 10 years?	No	--
7. Have any polluting activities been carried out in the vicinity of the site in the past?	No	--
8. To the best of your knowledge, has the site ever been used as a petrol filling station / car service garage?	No	--
9. Are there any boreholes / wells or natural springs either on the site or in the surrounding area?	No	--
10. Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	No	--
11. Are any chemicals used in your daily operations? (If yes, please provide details.)	No	--
• Where do you store these chemicals?	--	--
12. Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	No	--
13. Has the facility produced a separate hazardous substance inventory?	No	--
14. Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details)	No	--
15. How are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?	--	--
16. Do you have any underground storage tanks? (If yes, please provide details.)	No	--
• How many underground storage tanks do you have on site?	--	--
• What are the tanks constructed of?	--	--
• What are the contents of these tanks?	--	--
• Are the pipelines above or below ground?	--	--
• If the pipelines are below ground, has any leak and integrity testing \g been performed?	--	--
• Have there been any spills associated with these tanks?	--	--
17. Are there any disused underground storage tanks?	No	--
18. Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)	No	--
19. How are the wastes disposed of?	--	--
20. Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	No	--
21. Have any spills occurred on site? (If yes, please provide details.)	No	--
• When did the spill occur?	--	--
• What were the substances spilled?	--	--
• What was the quantity of material spilled?	--	--
• Did you notify the relevant departments of the spill?	--	--
• What were the actions taken to clean up the spill?	--	--
• What were the areas affected?	--	--
22. Do you have any records of major renovation of your site or re-arrangement of	No	--

	Yes / No	Notes
underground utilities, pipe work / underground tanks (If yes, please provide details.)		
23. Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	No	--
24. Are there any known contaminations on site? (If yes, please provide details.)	No	--
25. Has the site ever been remediated? (If yes, please provide details.)	No	--

5. Observations

	Yes / No	Notes
1. Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	--	--
2. What are the conditions of the bund walls and floors?	--	--
3. Are there any surface water drains located near to drum storage and unloading areas?	No	--
4. Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	No	--
5. Is there a storage site for the wastes?	No	--
6. Is there an on-site landfill?	No	--
7. Were any stressed vegetation noted on site during the site reconnaissance? (if yes, please indicate location and approximate size.)	No	--
8. Were any stained surfaces noted on-site during the site reconnaissance? (if yes, please provide details.)	No	--
9. Are there any potential off-site sources of contamination?	No	--
10. Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	No	--
11. Are there any sumps, effluent pits, interceptors or lagoons on site?	No	--
12. Any noticeable odours during site walkover?	No	--
13. Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ask, oil tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?	No	--

Area E2 - E6

1. General Site Details

Site Owner / Client: Mr. Lee

Property Address: Wang Lee Street (Refer to Area E2 - E6 in Figure 3.6)

Person Conducting the Questionnaire

Name: Mott MacDonald HK Ltd

Position: N/A

Authorized Owner / Client Representative (if applicable)

Name: N/A

Position: N/A

Telephone: 6018 7900

2. Site Activities

Briefly describe activities carried out on site, including types of products / chemicals / materials handled.

Number of employees:	Full-time:	N/A
	Part-time:	N/A
	Temporary / Seasonal:	N/A
Maximum no. of people on site at any time:		N/A

Typical hours of operation: N/A

Number of shifts: N/A

Days per week: N/A

Weeks per year: N/A

Scheduled plant shut-down: N/A

Detail the main sources of energy at the site:

Gas	No
Electricity	Yes
Coal	No
Oil	No
Other	No

3. Site Description

This section is intended to gather information on site setting and environmental receptors on, adjacent or close to the site.

What is the total site area: 5,600m^2

What area of the site is covered by buildings (%): 0%

Please list all current and previous owners / occupiers of possible.

N/A

Is a site plan available? If yes, please attach. No

Are there any other parties on site as tenants or sub-tenants? No

If yes, identify those parties: N/A

Describe surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.

North: Estate Management Office – Yuen Long Industrial Estate

South: Switchboard company

East: Pharmaceutical company

West: Vegetated land

Describe the topography of the area (flat terrain, rolling hills, mountains, by a large body of water, vegetation, etc.)

Semi-paved ground

State the size and location of the nearest residential communities.

N/A

Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or site of special scientific interest?

No

4. Questionnaire with Existing / Previous Site Owner or Occupier (Area E2 – E6)

	Yes / No	Notes
1. What are the main activities / operations at the above address?	--	Open Storage and maintenance workshop
2. How long have you been occupying the site?	--	Since 2012
3. Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	No	--
4. Prior to your occupancy, who occupied the site?	--	--
5. What were the main activities / operations during their occupancy?	--	--
6. Have there been any major changes in operations carried out at the site in the last 10 years?	--	--
7. Have any polluting activities been carried out in the vicinity of the site in the past?	No	--
8. To the best of your knowledge, has the site ever been used as a petrol filling station / car service garage?	No	--
9. Are there any boreholes / wells or natural springs either on the site or in the surrounding area?	No	--
10. Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	No	--
11. Are any chemicals used in your daily operations? (If yes, please provide details.)	Yes	N/A
• Where do you store these chemicals?	--	--
12. Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	No	--
13. Has the facility produced a separate hazardous substance inventory?	No	--
14. Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details)	No	--
15. How are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?	--	--
16. Do you have any underground storage tanks? (If yes, please provide details.)	No	--
• How many underground storage tanks do you have on site?	--	--
• What are the tanks constructed of?	--	--
• What are the contents of these tanks?	--	--
• Are the pipelines above or below ground?	--	--
• If the pipelines are below ground, has any leak and integrity testing \g been performed?	--	--
• Have there been any spills associated with these tanks?	--	--
17. Are there any disused underground storage tanks?	No	--
18. Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)	Yes	N/A
19. How are the wastes disposed of?	--	--
20. Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	No	--
21. Have any spills occurred on site? (If yes, please provide details.)	No	--
• When did the spill occur?	--	--
• What were the substances spilled?	--	--
• What was the quantity of material spilled?	--	--
• Did you notify the relevant departments of the spill?	--	--
• What were the actions taken to clean up the spill?	--	--

	Yes / No	Notes
• What were the areas affected?	--	--
22. Do you have any records of major renovation of your site or re-arrangement of underground utilities, pipe work / underground tanks (If yes, please provide details.)	No	--
23. Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	No	--
24. Are there any known contaminations on site? (If yes, please provide details.)	No	--
25. Has the site ever been remediated? (If yes, please provide details.)	No	--

5. Observations

	Yes / No	Notes
1. Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	No	--
2. What are the conditions of the bund walls and floors?	--	--
3. Are there any surface water drains located near to drum storage and unloading areas?	No	--
4. Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	No	--
5. Is there a storage site for the wastes?	No	--
6. Is there an on-site landfill?	No	--
7. Were any stressed vegetation noted on site during the site reconnaissance? (if yes, please indicate location and approximate size.)	No	--
8. Were any stained surfaces noted on-site during the site reconnaissance? (if yes, please provide details.)	No	--
9. Are there any potential off-site sources of contamination?	No	--
10. Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	No	--
11. Are there any sumps, effluent pits, interceptors or lagoons on site?	No	--
12. Any noticeable odours during site walkover?	No	--
13. Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ask, oil tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?	Yes	Lubricating oils

Area E7 – E8

1. General Site Details

Site Owner / Client: Mr. Yeung

Property Address: Wang Lee Street (Refer to Area E7 – E8 in Figure 3.6)

Person Conducting the Questionnaire

Name: Mott MacDonald HK Ltd

Position: N/A

Authorized Owner / Client Representative (if applicable)

Name: N/A

Position: N/A

Telephone: 6922 7114

2. Site Activities

Briefly describe activities carried out on site, including types of products / chemicals / materials handled.

Number of employees:	Full-time:	N/A
	Part-time:	N/A
	Temporary / Seasonal:	N/A
Maximum no. of people on site at any time:		N/A

Typical hours of operation: N/A

Number of shifts: N/A

Days per week: N/A

Weeks per year: N/A

Scheduled plant shut-down: N/A

Detail the main sources of energy at the site:

Gas	No
Electricity	Yes
Coal	No
Oil	No
Other	No

3. Site Description

This section is intended to gather information on site setting and environmental receptors on, adjacent or close to the site.

What is the total site area: 2,200m^2

What area of the site is covered by buildings (%): 0%

Please list all current and previous owners / occupiers of possible.

N/A

Is a site plan available? If yes, please attach. No

Are there any other parties on site as tenants or sub-tenants? No

If yes, identify those parties: N/A

Describe surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.

North: Estate Management Office – Yuen Long Industrial Estate

South: Switchboard company

East: Pharmaceutical company

West: Vegetated land

Describe the topography of the area (flat terrain, rolling hills, mountains, by a large body of water, vegetation, etc.)

Unpaved ground

State the size and location of the nearest residential communities.

N/A

Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or site of special scientific interest?

No

4. Questionnaire with Existing / Previous Site Owner or Occupier (Area E7 – E8)

	Yes / No	Notes
1. What are the main activities / operations at the above address?	--	Open Storage
2. How long have you been occupying the site?	--	Since 2011
3. Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	No	--
4. Prior to your occupancy, who occupied the site?	--	--
5. What were the main activities / operations during their occupancy?	--	--
6. Have there been any major changes in operations carried out at the site in the last 10 years?	--	--
7. Have any polluting activities been carried out in the vicinity of the site in the past?	No	--
8. To the best of your knowledge, has the site ever been used as a petrol filling station / car service garage?	No	--
9. Are there any boreholes / wells or natural springs either on the site or in the surrounding area?	No	--
10. Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	No	--
11. Are any chemicals used in your daily operations? (If yes, please provide details.)	No	--
• Where do you store these chemicals?	--	--
12. Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	No	--
13. Has the facility produced a separate hazardous substance inventory?	No	--
14. Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details)	No	--
15. How are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?	--	--
16. Do you have any underground storage tanks? (If yes, please provide details.)	No	--
• How many underground storage tanks do you have on site?	--	--
• What are the tanks constructed of?	--	--
• What are the contents of these tanks?	--	--
• Are the pipelines above or below ground?	--	--
• If the pipelines are below ground, has any leak and integrity testing \g been performed?	--	--
• Have there been any spills associated with these tanks?	--	--
17. Are there any disused underground storage tanks?	No	--
18. Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)	No	--
19. How are the wastes disposed of?	--	--
20. Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	No	--
21. Have any spills occurred on site? (If yes, please provide details.)	No	--
• When did the spill occur?	--	--
• What were the substances spilled?	--	--
• What was the quantity of material spilled?	--	--
• Did you notify the relevant departments of the spill?	--	--
• What were the actions taken to clean up the spill?	--	--
• What were the areas affected?	--	--
22. Do you have any records of major renovation of your site or re-arrangement of	No	--

	Yes / No	Notes
underground utilities, pipe work / underground tanks (If yes, please provide details.)		
23. Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	No	--
24. Are there any known contaminations on site? (If yes, please provide details.)	No	--
25. Has the site ever been remediated? (If yes, please provide details.)	No	--

5. Observations

	Yes / No	Notes
1. Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	No	--
2. What are the conditions of the bund walls and floors?	--	--
3. Are there any surface water drains located near to drum storage and unloading areas?	No	--
4. Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	No	--
5. Is there a storage site for the wastes?	No	--
6. Is there an on-site landfill?	No	--
7. Were any stressed vegetation noted on site during the site reconnaissance? (if yes, please indicate location and approximate size.)	No	--
8. Were any stained surfaces noted on-site during the site reconnaissance? (if yes, please provide details.)	No	--
9. Are there any potential off-site sources of contamination?	No	--
10. Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	No	--
11. Are there any sumps, effluent pits, interceptors or lagoons on site?	No	--
12. Any noticeable odours during site walkover?	No	--
13. Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ask, oil tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?	Yes	Lubricating oils

D. Groundwater Monitoring Well

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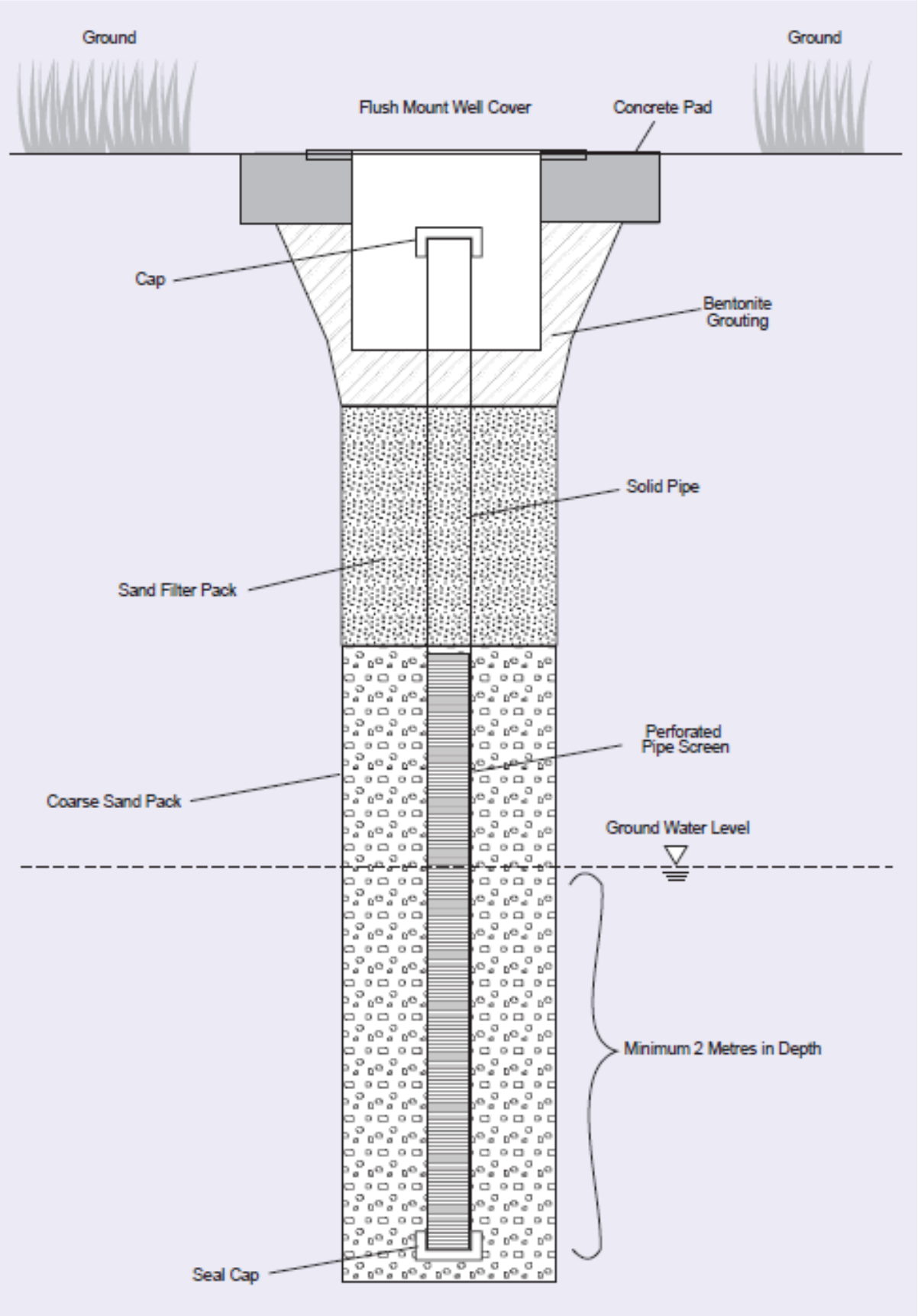

Remarks: Reference from Practice Guide for Investigation and Remediation of Contaminated Land, Annex E, EPD

E. RBRGs for Soil and Groundwater

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	Soil		Groundwater	
Parameter	**RBRGs for Industrial (mg/kg)**	**Soil Saturation Limit (C_{sat}) (mg/kg)**	**RBRGs for Industrial (mg/L)**	**Groundwater Solubility Limit (mg/L)**
VOCs				
Acetone	10000*	***	10000*	N/A
Benzene	9.21	336	54	1750
Bromodichloromethane	2.85	1030	26.2	6740
2-Butanone	10000*	***	10000*	N/A
Chloroform	1.54	1100	11.3	7920
Ethylbenzene	8240	138	10000*	169
Methyl tert-Butyl Ether	70.1	2380	1810	N/A
Methylene Chloride	13.9	921	224	N/A
Styrene	10000*	497	10000*	310
Tetrachloroethene	0.777	97.1	2.95	200
Toluene	10000*	235	10000*	526
Trichloroethene	5.68	488	14.2	1100
Xylenes (Total)	1230	150	1570	175
SVOCs				
Acenaphthene	10000*	60.2	10000*	4.24
Acenaphthylene	10000*	19.8	10000*	3.93
Anthracene	10000*	2.56	10000*	0.0434
Benzo(a)anthracene	91.8	N/A	N/A	N/A
Benzo(a)pyrene	9.18	N/A	N/A	N/A
Benzo(b)fluoranthene	17.8	N/A	7.53	0.0015
Benzo(g,h,i)perylene	10000*	N/A	N/A	N/A
Benzo(k)fluoranthene	918	N/A	N/A	N/A
Bis-(2-Ethylhexyl)phthalate	91.8	N/A	N/A	N/A
Chrysene	1140	N/A	812	0.00160
Dibenzo(a,h)anthracene	9.18	N/A	N/A	N/A
Fluoranthene	10000*	N/A	10000*	0.206
Fluorene	10000*	N/A	10000*	1.98
Hexachlorobenzene	0.582	54.7	0.695	6.2
Indeno(1,2,3-cd)pyrene	91.8	N/A	N/A	N/A
Naphthalene	453	125	862	31
Phenanthrene	10000*	28.0	10000*	1
Phenol	10000*	7260	N/A	N/A
Pyrene	10000*	N/A	10000*	0.135
Metals				
Antimony	261	N/A	N/A	N/A
Arsenic	196	N/A	N/A	N/A
Barium	10000*	N/A	N/A	N/A
Cadmium	653	N/A	N/A	N/A
Chromium III	10000*	N/A	N/A	N/A
Chromium VI	1960	N/A	N/A	N/A
Cobalt	10000*	N/A	N/A	N/A
Copper	10000*	N/A	N/A	N/A
Lead	2290	N/A	N/A	N/A
Manganese	10000*	N/A	N/A	N/A
Mercury	38.4	N/A	6.79	N/A
Molybdenum	3260	N/A	N/A	N/A
Nickel	10000*	N/A	N/A	N/A

		Soil	Groundwater	
Tin	10000*	N/A	N/A	N/A
Zinc	10000*	N/A	N/A	N/A
Petroleum Carbon Ranges				
C6 - C8	10000*	1,000	1150	5.23
C9 - C16	10000*	3,000	9980	2.8
C17 - C35	10000*	5,000	178	2.8
PCBs				
PCBs	0.748	N/A	5.11	0.031

Remark:

*Indicates a 'ceiling limit' concentration.

N/A - Not Available.



KEY PLAN

LEGEND:

STUDY SITE

MOTT MACDONALD

CEDD

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STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

STUDY SITE LOCATION

Scale at A1	Status	Rev
1:1000	PRE	P1

Figure 1.1

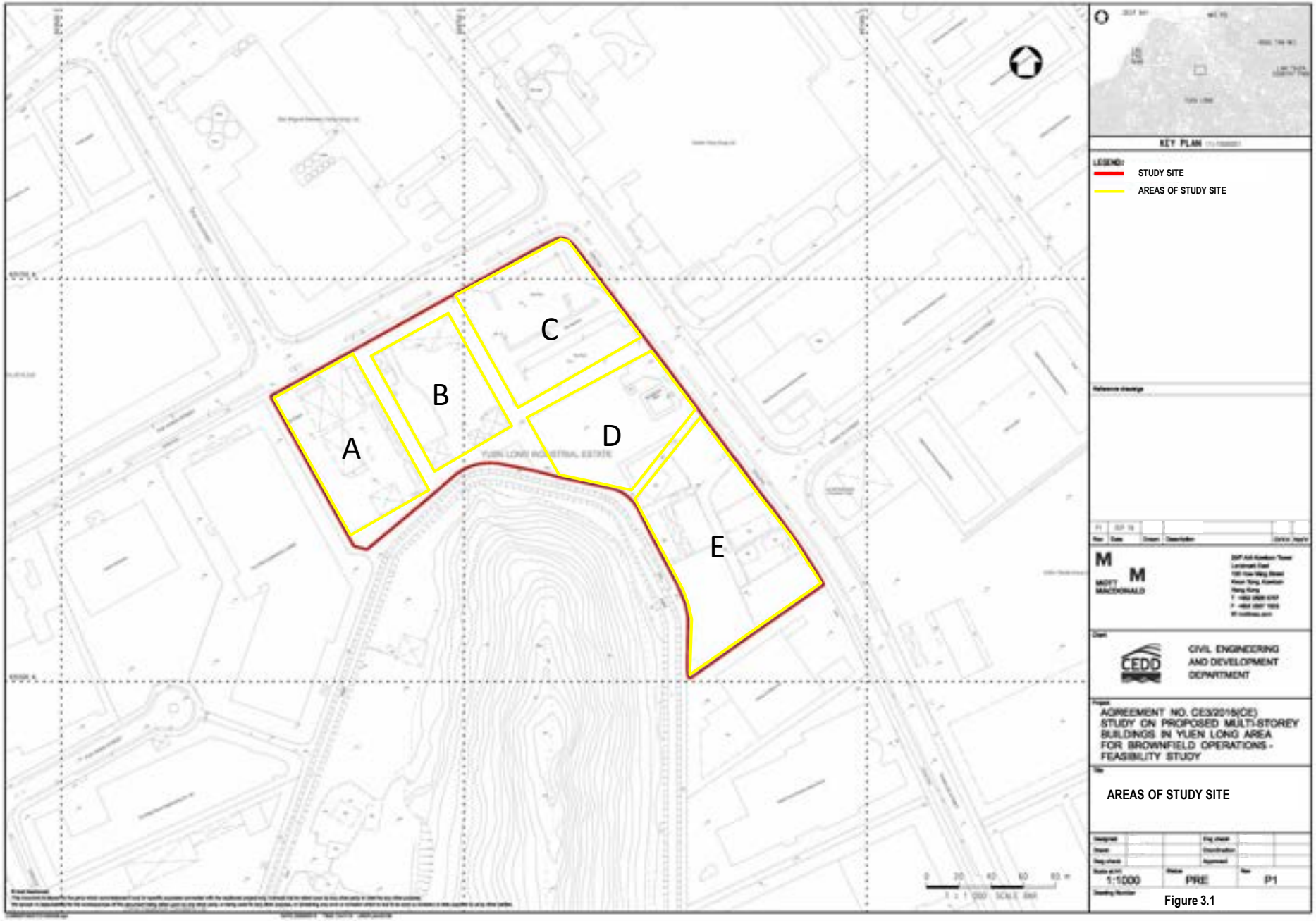

A
B
C
D
E
KEY PLAN
LEGEND:
STUDY SITE
AREAS OF STUDY SITE
MOTT MACDONALD
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY
AREAS OF STUDY SITE
1:1000
PRE
P1

Figure 3.1



Photo PA-04



Photo PA-03



Photo PA-05



Photo PA-07



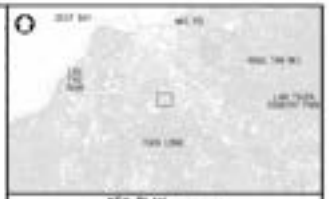
Photo PA-01



Photo PA-02



Photo PA-06



KEY PLAN

LEGEND:

AREA A OF STUDY SITE

UNDERGROUND DIESEL PIPELINES

M MOTT MACDONALD

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STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

DETAILS OF AREA A

PRE

P1

Figure 3.2



Photo PB-03



Photo PB-04



Photo PB-05

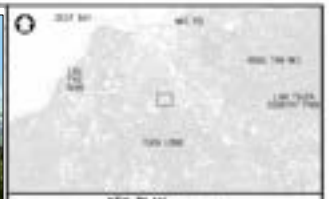




Photo PB-01



Photo PB-02



LEGEND:

AREA B OF STUDY SITE

MOTT MACDONALD

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

DETAILS OF AREA B

PRE

P1

Figure 3.3



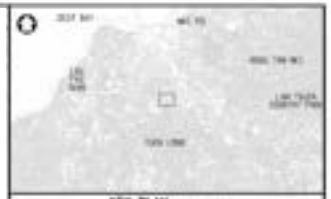
Photo PC-01





Photo PC-03

Photo PC-02



KEY PLAN

LEGEND:

AREA C OF STUDY SITE

MOTT MACDONALD

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

DETAILS OF AREA C

PRE

P1

Figure 3.4



Photo PD-03



Photo PD-02



Photo PD-05

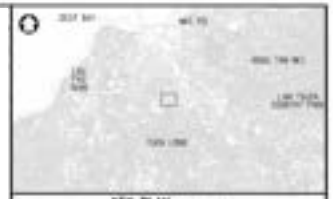


Photo PD-04



Photo PD-01





KEY PLAN

LEGEND:

AREA D OF STUDY SITE

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STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

DETAILS OF AREA D

PRE P1

Figure 3.5



KEY PLAN

LEGEND:

AREA E OF STUDY SITE

SUB-AREAS OF AREA E
(i.e. AREAS E1 TO E8)

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STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

DETAILS OF AREA E

PRE

P1

Figure 3.6

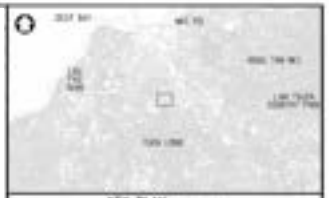




Photo PE1-01



Photo PE1-02



KEY PLAN

LEGEND:

AREA E1 OF STUDY SITE

M MOTT MACDONALD

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AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

DETAILS OF AREA E1

PRE P1

Figure 3.7



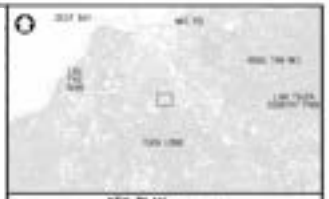
Photo PE2-02



Photo PE2-03



Photo PE2-01



KEY PLAN

LEGEND:

AREA E2 OF STUDY SITE

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AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

DETAILS OF AREA E2

PRE P1

Figure 3.8



Photo PE3-01



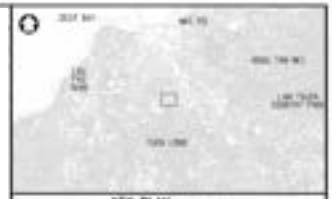
Photo PE3-02



Photo PE3-03



Photo PE3-04



KEY PLAN

LEGEND:

AREA E3 OF STUDY SITE

M MOTT MACDONALD

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AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

DETAILS OF AREA E3

PRE P1

Figure 3.9



Photo PE4-04



Photo PE4-02



Photo PE4-06



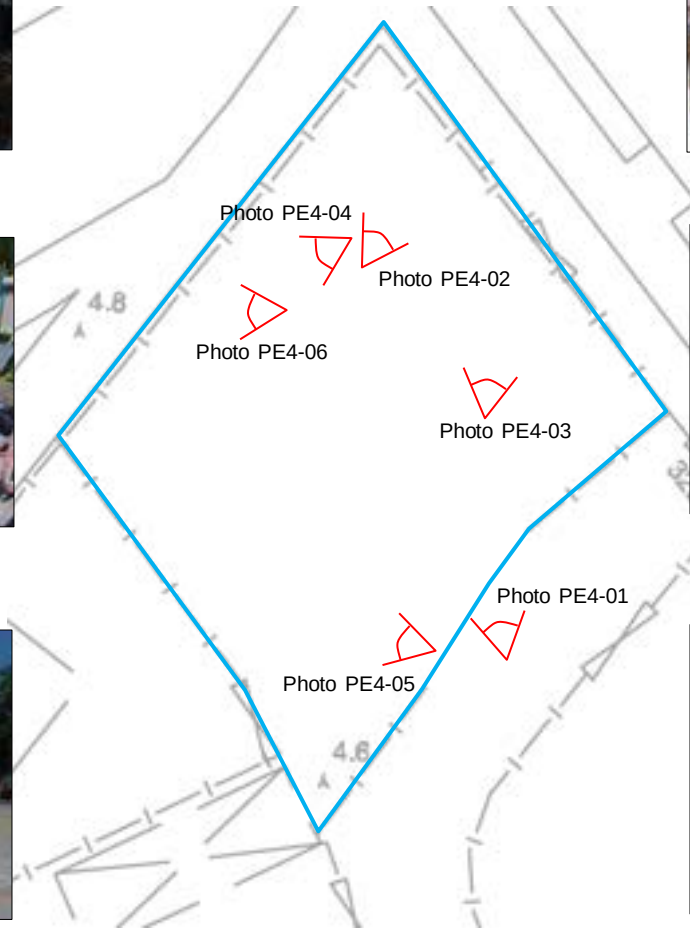
Photo PE4-03

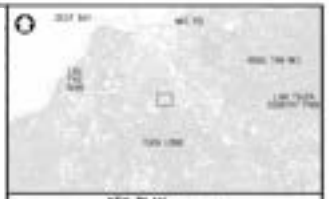


Photo PE4-05



Photo PE4-01





KEY PLAN

LEGEND:

AREA E4 OF STUDY SITE

M MOTT MACDONALD

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AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

DETAILS OF AREA E4

PRE P1

Figure 3.10

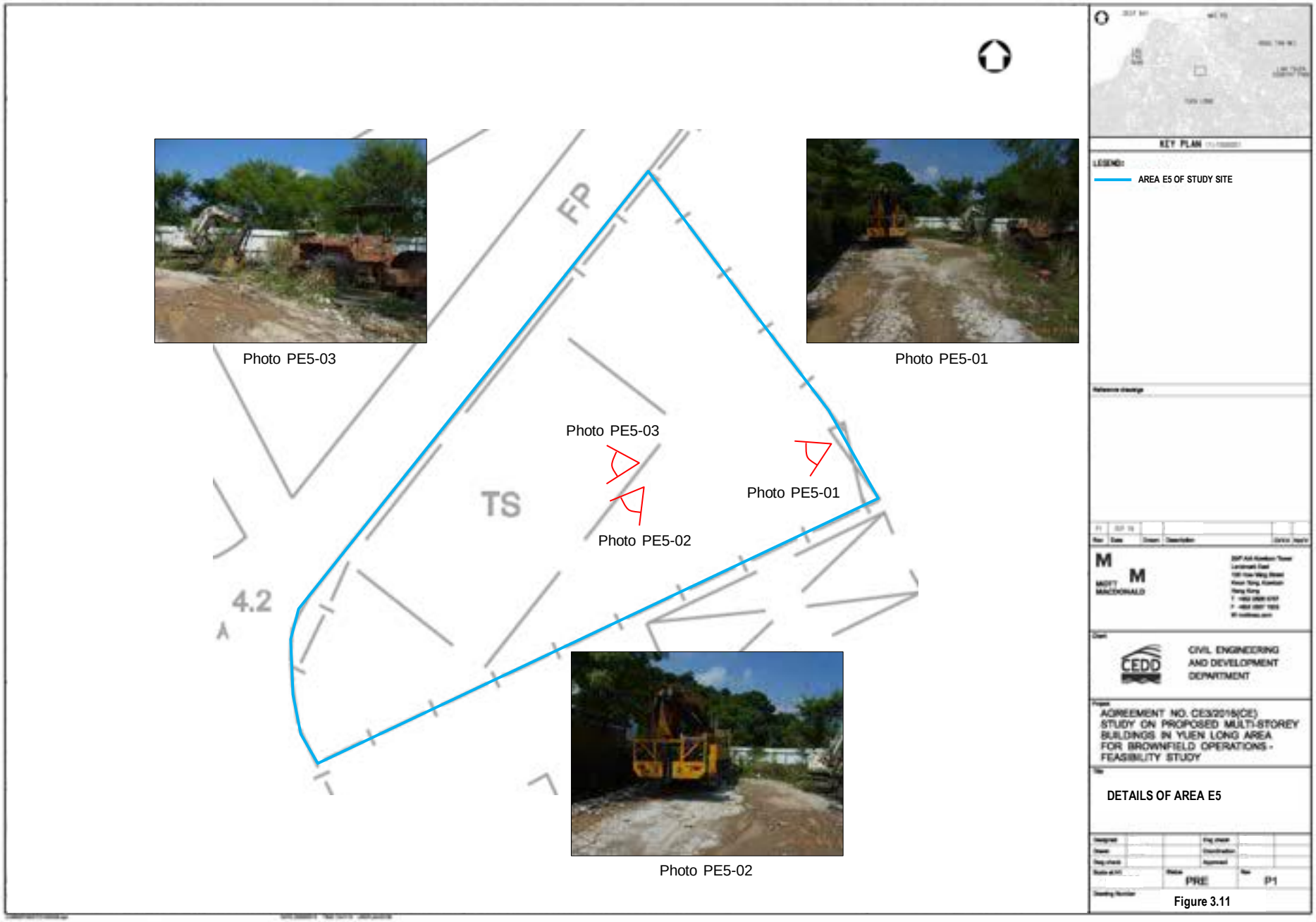


Photo PE5-03
Photo PE5-01
Photo PE5-03
Photo PE5-01
Photo PE5-02
Photo PE5-02
FP
TS
4.2
KEY PLAN
LEGEND:
AREA E5 OF STUDY SITE
MOTT MACDONALD
CEDD
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
AGREEMENT NO. CE3/2016(CE) STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY
DETAILS OF AREA E5
PRE
P1

Figure 3.11



Photo PE6-05



Photo PE6-01



Photo PE6-04



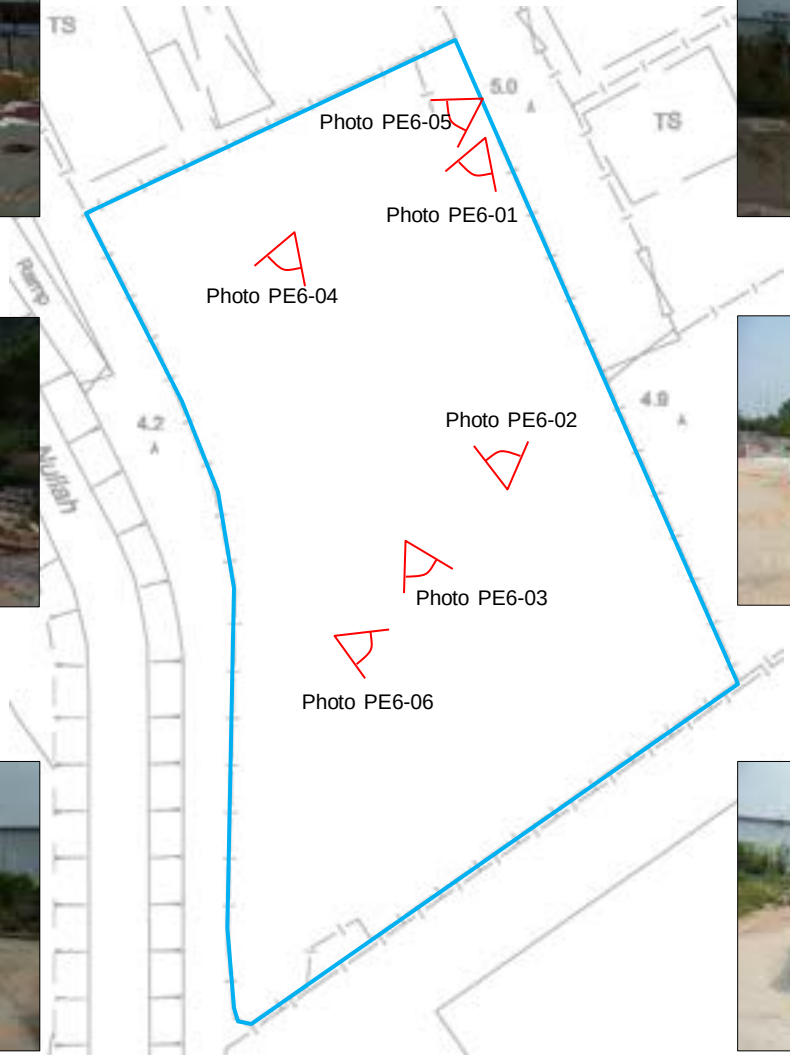
Photo PE6-02

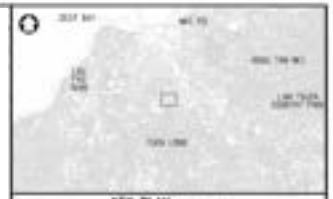


Photo PE6-06



Photo PE6-03





KEY PLAN

LEGEND:

AREA E6 OF STUDY SITE

MOTT MACDONALD

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

DETAILS OF AREA E6

PRE

P1

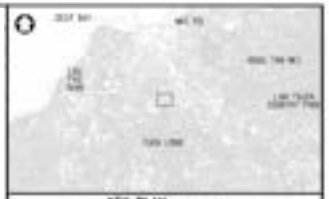
Figure 3.12





Photo PE7-01

Photo PE7-02



KEY PLAN

LEGEND:

AREA E7 OF STUDY SITE

MOTT MACDONALD

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

DETAILS OF AREA E7

PRE

P1

Figure 3.13



Photo PE8-02



Photo PE8-03



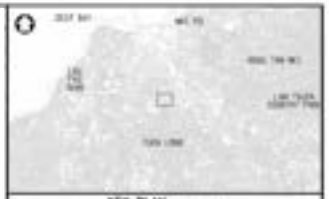
Photo PE8-01



Photo PE8-04



Photo PE8-05



KEY PLAN

LEGEND:

AREA E8 OF STUDY SITE

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AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

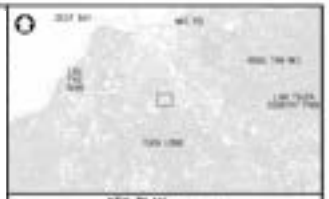
DETAILS OF AREA E8

PRE

P1

Figure 3.14





KEY PLAN

LEGEND:

- AREA A OF STUDY SITE
- PROPOSED TRIAL PIT LOCATIONS
- POTENTIALLY CONTAMINATED AREAS
- UNDERGROUND DIESEL PIPELINES
- SAMPLING GRID

Reference drawings

Rev	Date	Drawn	Description	Checked / Approved
P1	SEP 19			

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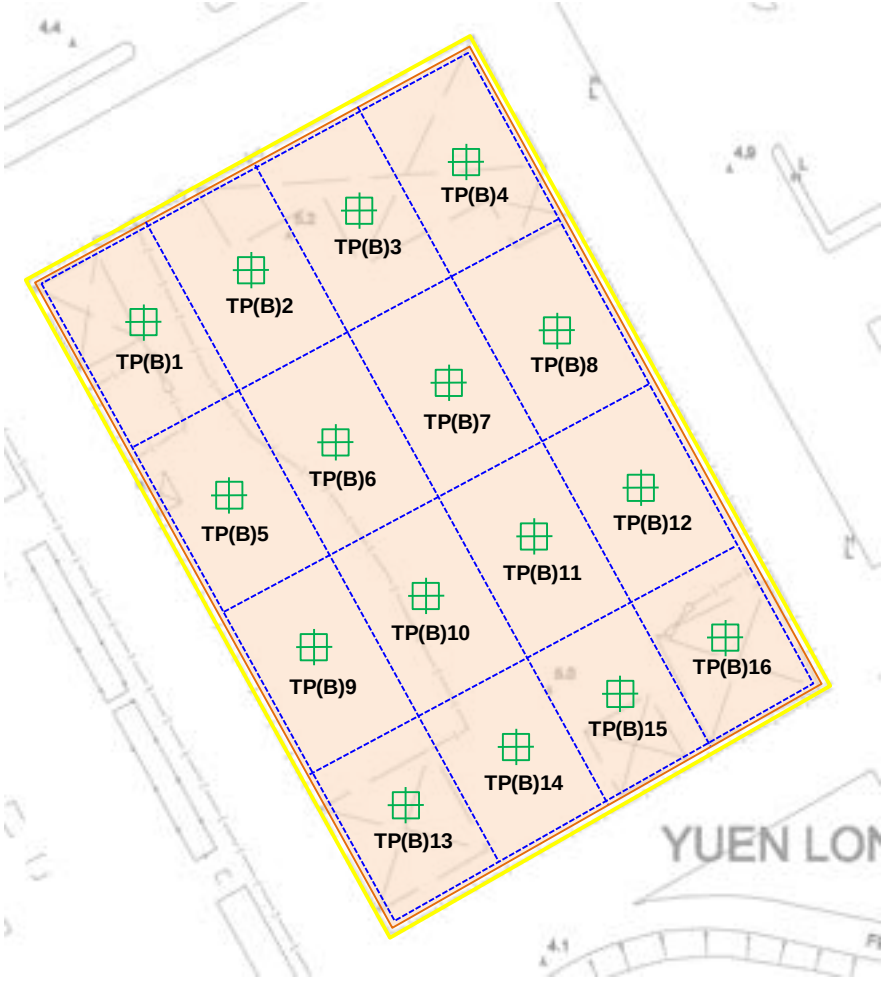
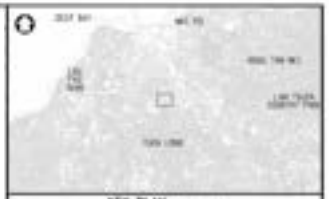
AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

PROPOSED TRIAL PIT LOCATIONS AT AREA A

Designed		Engineering check	
Drawn		Coordination	
Engineering check		Approved	
Scale at A1		Status	Title
Drawing Number		PRE	P1

Figure 5.1





KEY PLAN

LEGEND:

- AREA B OF STUDY SITE
- PROPOSED TRIAL PIT LOCATIONS
- POTENTIALLY CONTAMINATED AREAS
- SAMPLING GRID

Reference drawings

Rev	Date	Drawn	Description	Checked	Approved
P1	SEP 16				

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AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

PROPOSED TRIAL PIT LOCATIONS AT AREA B

Designed			Eng check		
Drawn			Coordination		
Eng check			Approved		
Scale at A1		Status		Rev	
		PRE		P1	
Drawing Number					

Figure 5.2



KEY PLAN

LEGEND:

AREA D OF STUDY SITE

PROPOSED TRIAL PIT LOCATIONS

POTENTIALLY CONTAMINATED AREAS

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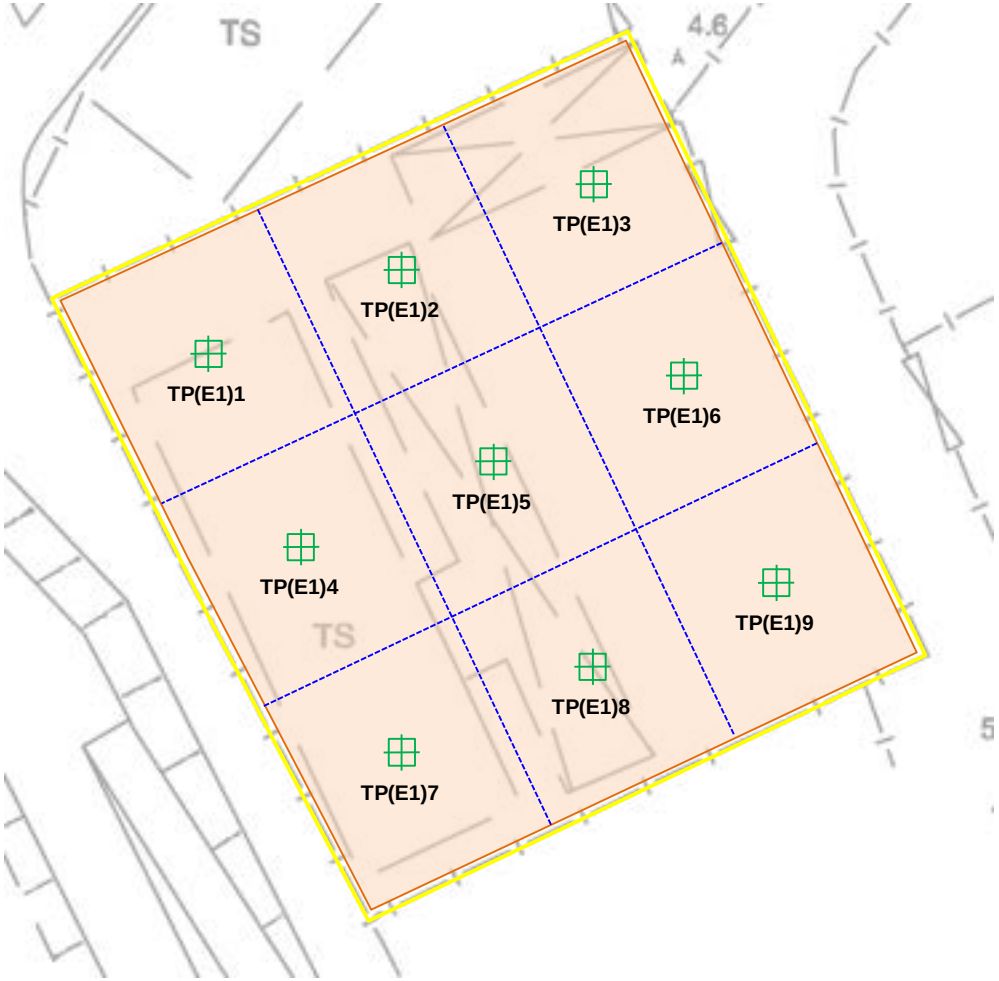
AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

PROPOSED TRIAL PIT LOCATIONS AT AREA D

PRE

P1

Figure 5.3



KEY PLAN

LEGEND:

- AREA E1 OF STUDY SITE
- PROPOSED TRIAL PIT LOCATIONS
- POTENTIALLY CONTAMINATED AREAS
- SAMPLING GRID

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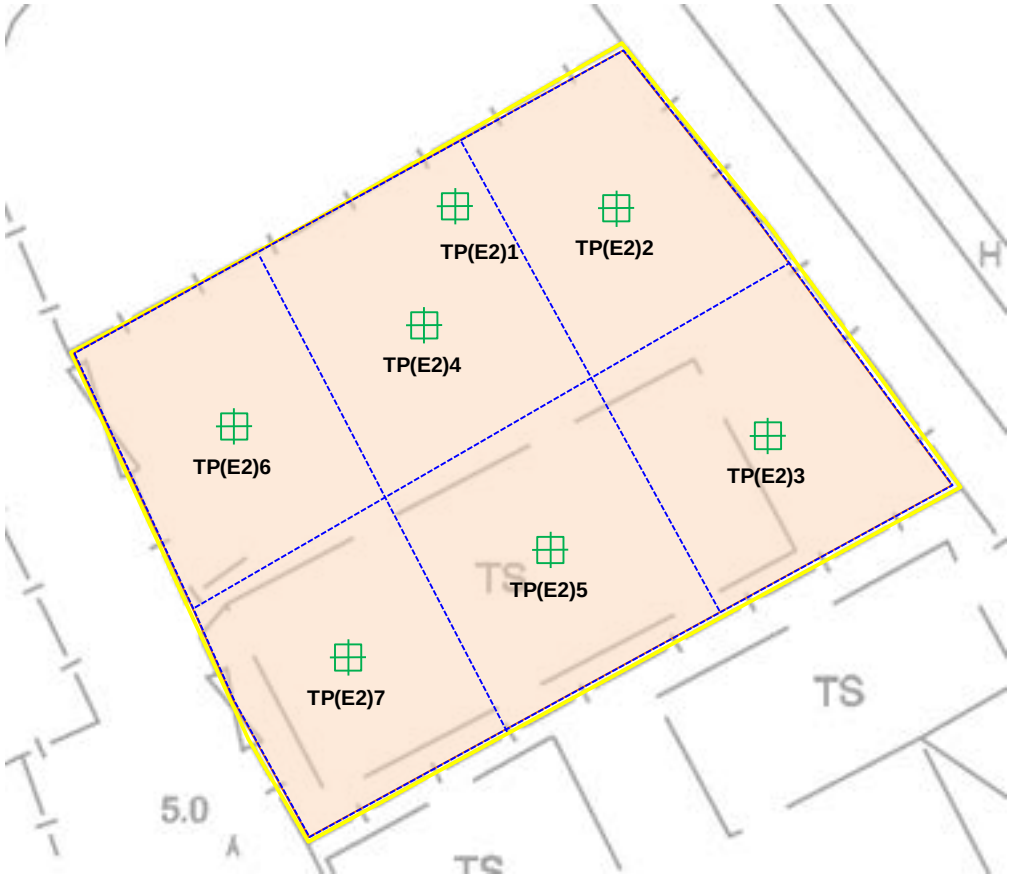
AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

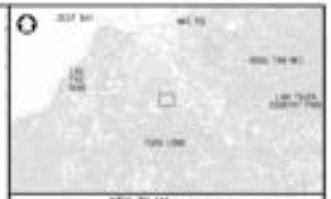
PROPOSED TRIAL PIT LOCATIONS AT AREA E1

PRE

P1

Figure 5.4





KEY PLAN

LEGEND:

- AREA E2 OF STUDY SITE
- PROPOSED TRIAL PIT LOCATIONS
- POTENTIALLY CONTAMINATED AREAS
- SAMPLING GRID

MOTT MACDONALD

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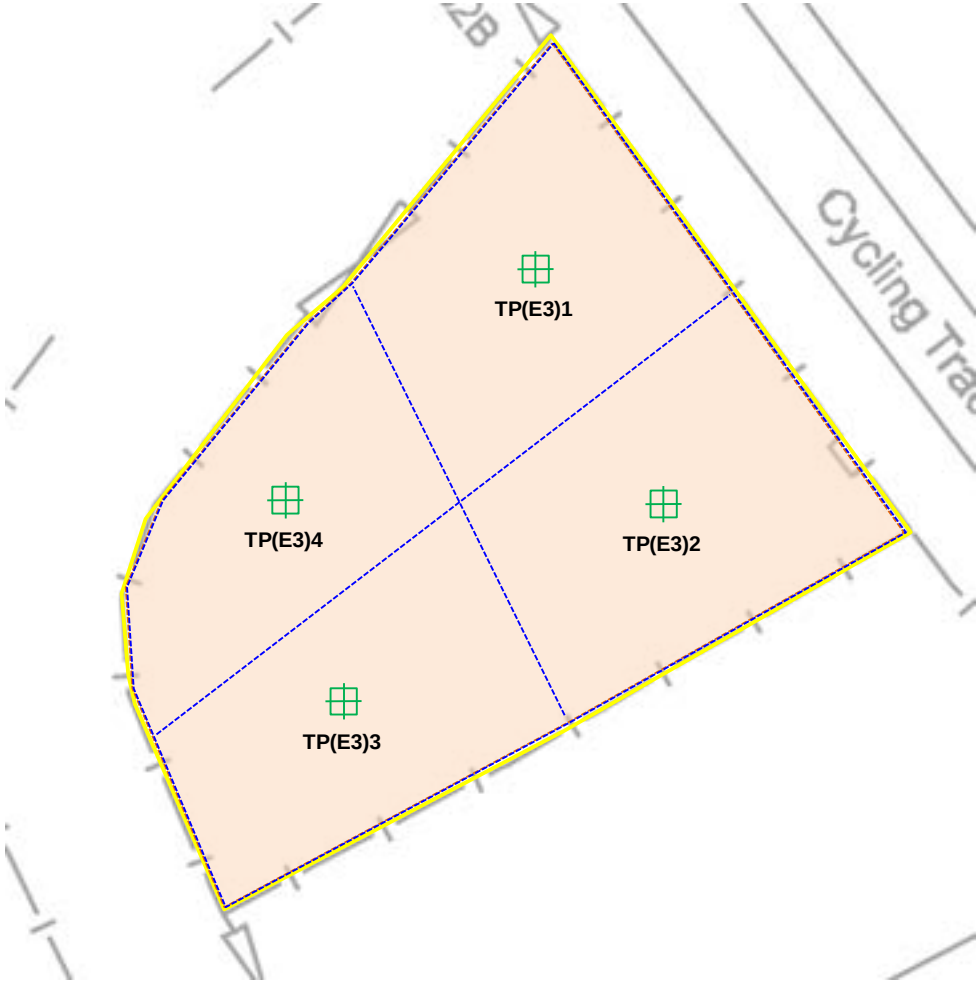
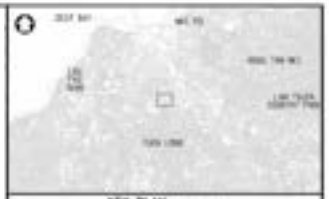
AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

PROPOSED TRIAL PIT LOCATIONS AT AREA E2

PRE P1

Figure 5.5





KEY PLAN

LEGEND:

- AREA E3 OF STUDY SITE
- PROPOSED TRIAL PIT LOCATIONS
- POTENTIALLY CONTAMINATED AREAS
- SAMPLING GRID

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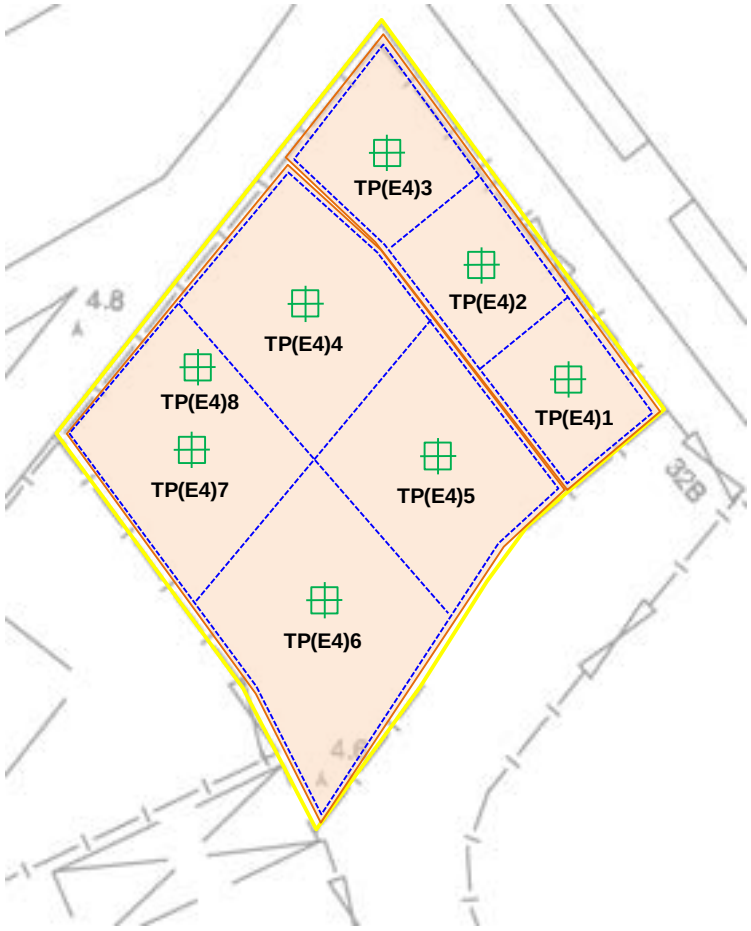
AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

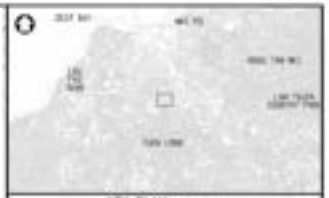
PROPOSED TRIAL PIT LOCATIONS AT AREA E3

PRE

P1

Figure 5.6





KEY PLAN

LEGEND:

- AREA E4 OF STUDY SITE
- PROPOSED TRIAL PIT LOCATIONS
- POTENTIALLY CONTAMINATED AREAS
- SAMPLING GRID

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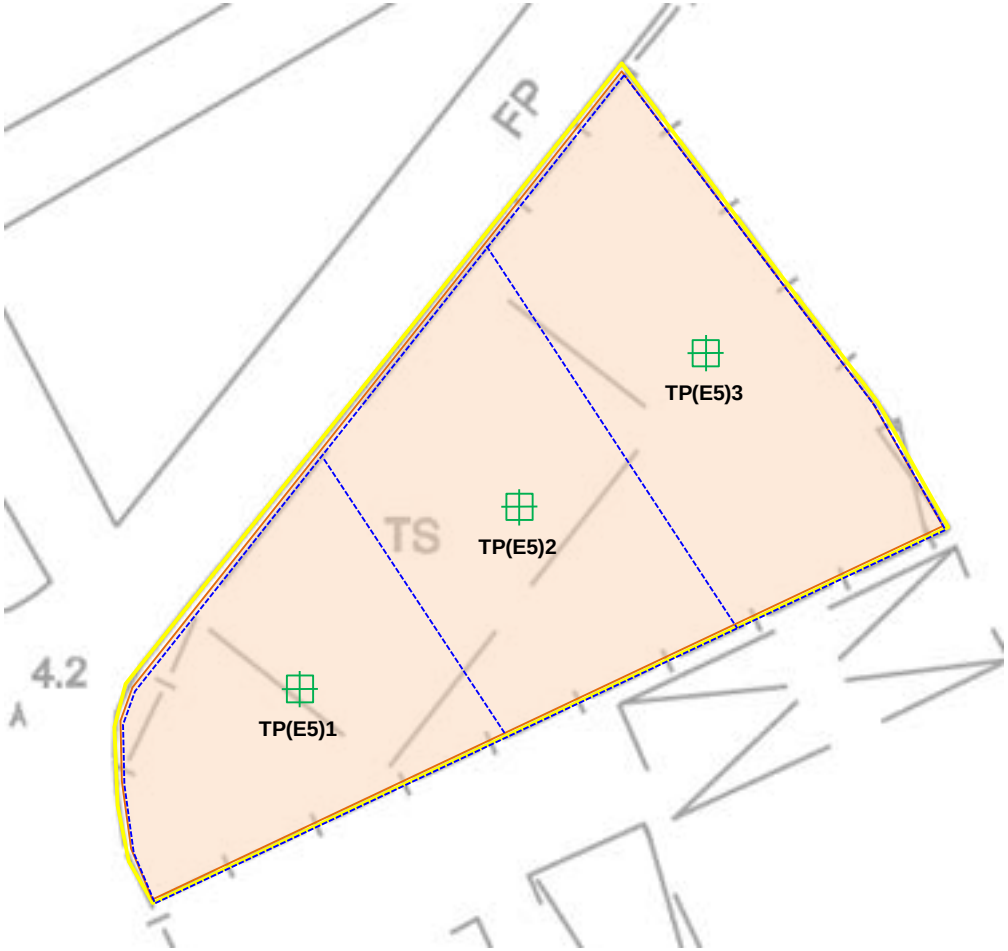
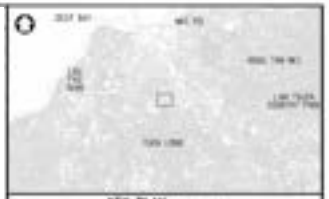
AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

PROPOSED TRIAL PIT LOCATIONS AT AREA E4

PRE P1

Figure 5.7





KEY PLAN

LEGEND:

- AREA E5 OF STUDY SITE
- PROPOSED TRIAL PIT LOCATIONS
- POTENTIALLY CONTAMINATED AREAS
- SAMPLING GRID

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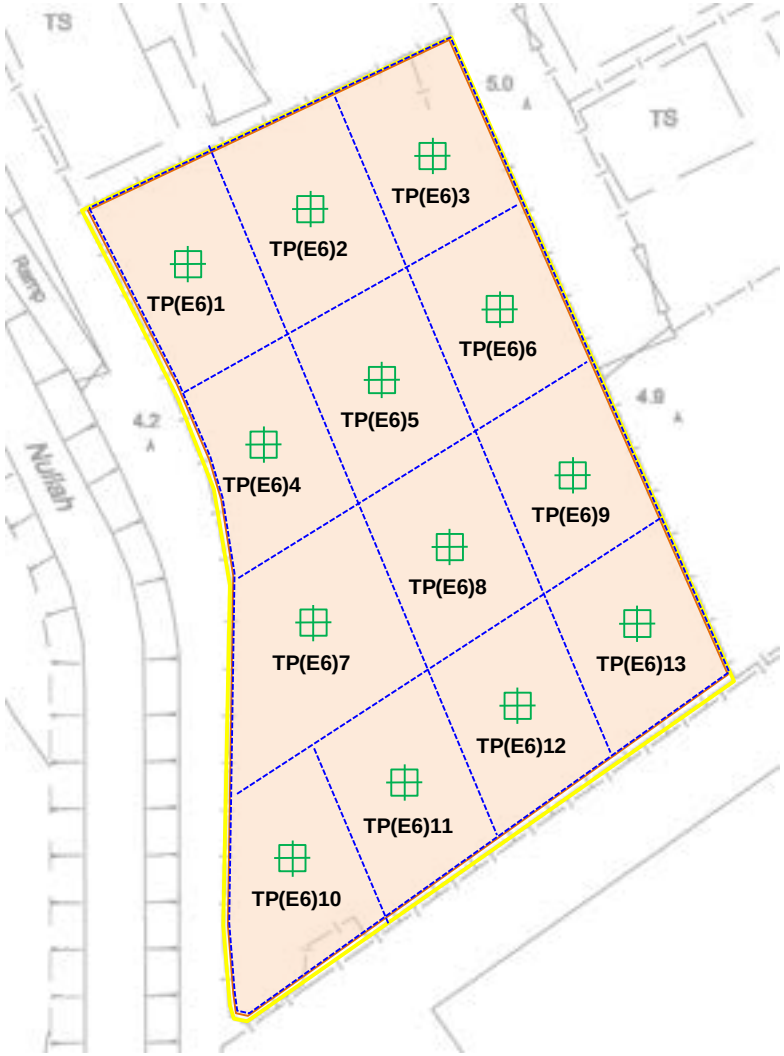
AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

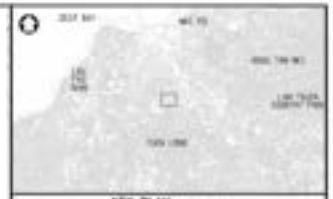
PROPOSED TRIAL PIT LOCATIONS AT AREA E5

PRE

P1

Figure 5.8





KEY PLAN

LEGEND:

- AREA E6 OF STUDY SITE
- PROPOSED TRIAL PIT LOCATIONS
- POTENTIALLY CONTAMINATED AREAS
- SAMPLING GRID

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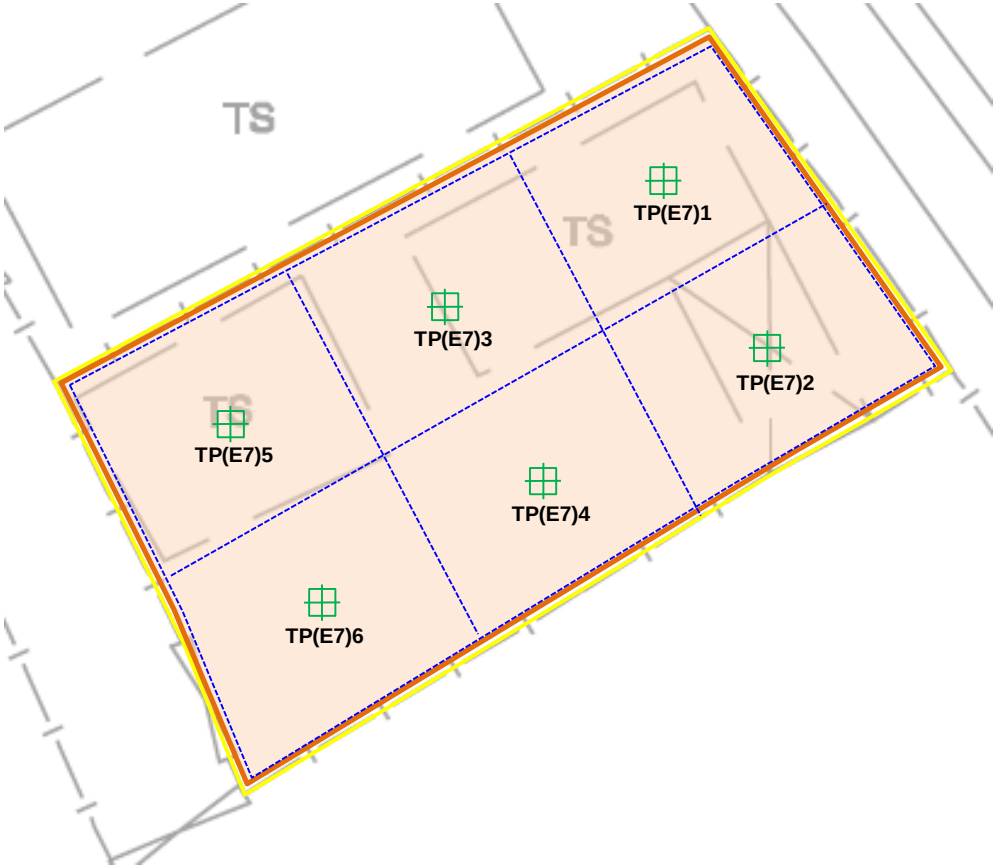
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

PROPOSED TRIAL PIT LOCATIONS AT AREA E6

PRE P1

Figure 5.9



KEY PLAN

LEGEND:

- AREA E7 OF STUDY SITE
- PROPOSED TRIAL PIT LOCATIONS
- POTENTIALLY CONTAMINATED AREAS
- SAMPLING GRID

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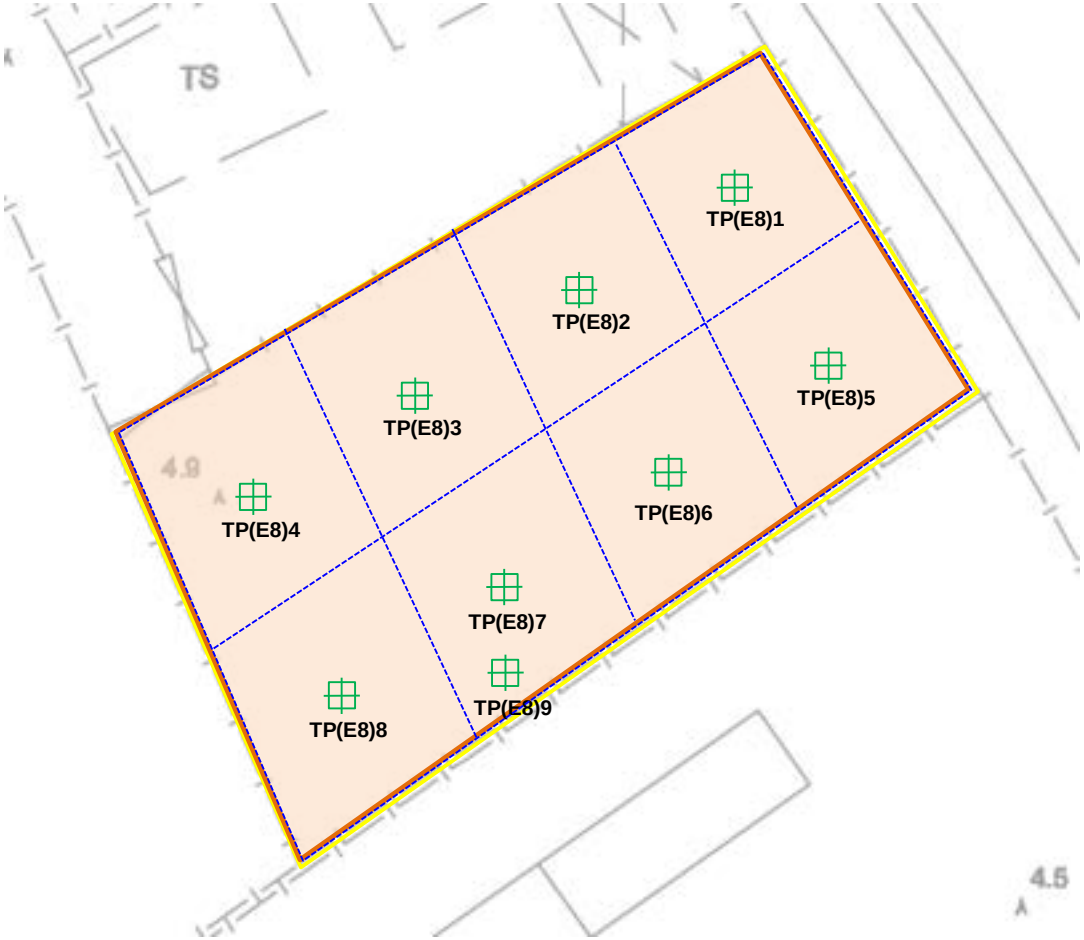
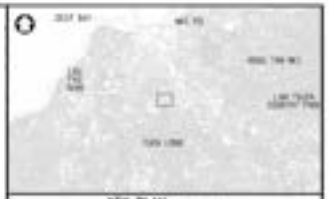
AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

PROPOSED TRIAL PIT LOCATIONS AT AREA E7

PRE P1

Figure 5.10





KEY PLAN

LEGEND:

- AREA E8 OF STUDY SITE
- PROPOSED TRIAL PIT LOCATIONS
- POTENTIALLY CONTAMINATED AREAS
- SAMPLING GRID

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AGREEMENT NO. CE3/2016(CE)
STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

PROPOSED TRIAL PIT LOCATIONS AT AREA E8

PRE

P1

Figure 5.11



MOTT MACDONALD

Section 16 Planning Application for Multi-storey Building Developments at No. 32 Wang Lee Street and Adjoining Government Land, Yuen Long

Water Supply and Utilities Impact Assessment

September 2023

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Section 16 Planning Application for Multi-storey Building Developments at No. 32 Wang Lee Street and Adjoining Government Land, Yuen Long

Water Supply and Utilities Impact Assessment

September 2023

Mott MacDonald Hong Kong Limited
registered in Hong Kong no. 236497

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MMH/369397/WSUIA/002	Existing Fresh Water Supply Scheme (Sheet 2 of 2)
MMH/369397/WSUIA/003	Existing Flushing Water Supply Scheme (Sheet 1 of 4)
MMH/369397/WSUIA/004	Existing Flushing Water Supply Scheme (Sheet 2 of 4)
MMH/369397/WSUIA/005	Existing Flushing Water Supply Scheme (Sheet 3 of 4)
MMH/369397/WSUIA/006	Existing Flushing Water Supply Scheme (Sheet 4 of 4)

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Annex F	Hydraulic Analysis of Proposed Salt Water Supply System
Annex G	Hydraulic Analysis of Proposed Reclaimed Water Supply System

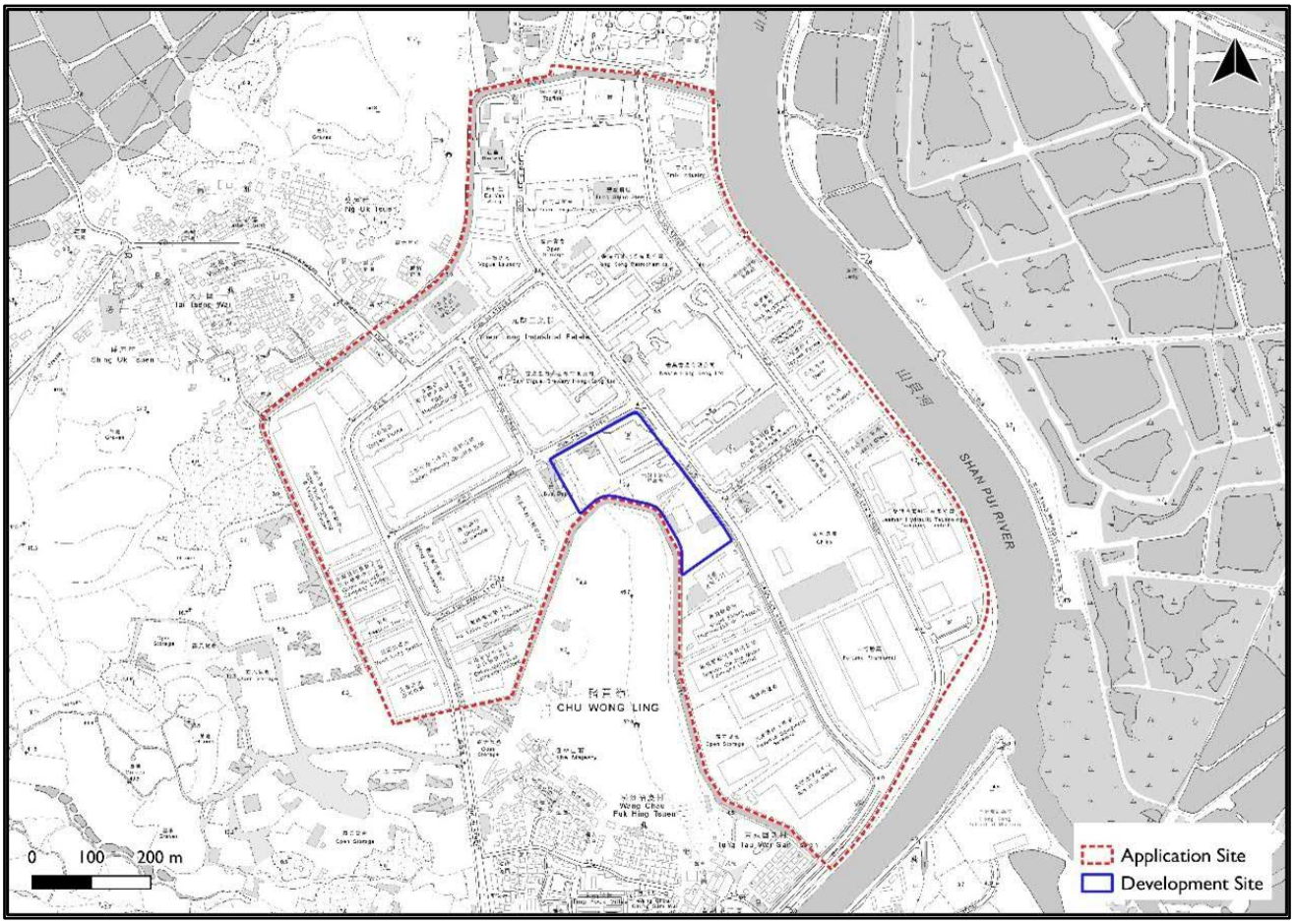
1 Introduction

1.1 Background

1.1.1 This Water Supply and Utilities Impact Assessment Report is prepared to support a Section 16 planning application for the proposed multi-storey buildings (MSBs) development (Proposed Development) at No. 32 Wang Lee Street and Adjoining Government Land, Yuen Long.

1.1.2 A Site Location Plan of the Development Site (the Site) is shown in **Figure 1.1**.

Figure 1.1: Site Location Plan



1.2 Structure of this Report

1.2.1 This report contains the following sections in addition to this introduction (Section 1):

Section 2 – Development Proposal

Section 3 – Water Supply Impact Assessment

Section 4 – Utilities Impact Assessment

Section 5 – Summary

1.3 Abbreviations

1.3.1 The following abbreviations shall have the meaning hereby assigned to them except when the context of this Report otherwise requires:

Abbreviation for Bureaux/Departments / organisations	Full title
AT WTW	Au Tau Water Treatment Works
CableTV	Hong Kong Cable TV Limited
CEDD	Civil Engineering and Development Department
CLP	China Light and Power Company Limited
DSD	Drainage Services Department
DN	Diameter Nominal
ELV	Electrical Low Voltage Room
FKT FWT	Fung Kong Tsuen Fresh Water Tanks
FSD	Fire Services Department
FW	Fresh Water
FWSR	Fresh Water Service Reservoir
GFA	Gross Floor Area
HGC	Hutchison Global Communications Limited
HKCG	Hong Kong and China Gas Company Limited (Towngas)
HKBN	Hong Kong Broadband Network Limited
HSK/HT NDA	Hung Shui Kiu/Ha Tsuen New Development Area
HV	High Voltage
HyD	Highways Department
KTN NDA	Kwu Tung North New Development Area
LB D	Long Bin Development
LOP SWPS	Lok On Pai Salt Water Pumping Station
LV	Low Voltage
MDD	Mean Daily Demand
MLD	Million Litres/Day
MSB(s)	Multi-storey Building(s)

Abbreviation for Bureaux/Departments / organisations	Full title
NTM WTW	Ngau Tam Mei Water Treatment Works
NWNT	Northwest New Territories
NWT	New World Telecommunications Limited
PCCW	Hong Kong Telecommunications Limited
PR	Plot Ratio
RWSR	Reclaimed Water Service Reservoir
SWPS	Salt Water Pumping Station
SWSR	Salt Water Service Reservoir
TBE	Telecommunication and Broadcast Equipment Room
TKT SWSR	Tan Kwai Tsuen Salt Water Service Reservoir
TKTN FWSR	Tan Kwai Tsuen North Fresh Water Service Reservoir
TKTS FWSR	Tan Kwai Tsuen South Fresh Water Service Reservoir
TMF	Temporary Mains for Flushing
WC FWSR	Wang Chau Fresh Water Service Reservoir
WTW	Water Treatment Works
WSD	Water Supplies Department
WSD DI	Water Supplies Department Departmental Instruction
WSIA	Water Supply Impact Assessment
WSUIA	Water Supply and Utilities Impact Assessment
YLEPP	Yuen Long Effluent Polishing Plant
YL FWSR	Yuen Long Fresh Water Service Reservoir
YLS D	Yuen Long South Development
YLIE	Yuen Long Industrial Estate
YLIEEE	Yuen Long Industrial Estate Extension
YL STW	Yuen Long Sewage Treatment Works

2 Development Proposal

2.1 Indicative Layout of Proposed MSBs Development

2.1.1 The Site is proposed to provide three sites (**Sites A, B and C**) each about 1 ha to accommodate MSBs developments for industrial uses, totalling 3.23 ha in area.

2.1.2 **Figure 2.1** illustrates the indicative division of land parcels in the Site. It should be noted that the land parcels for proposed MSBs shown in the Site is indicative and solely for technical assessments purpose.

2.1.3 The proposed MSBs at Sites A, B and C are to be developed at a plot ratio of 5 with not more than 10 storeys excluding basement level above ground level .

2.1.4 It is anticipated that the land will be disposed by tender and the MSBs are targeted to start the operation in 2028/2029, with a construction period of 4 to 5 years. Major development parameters and proposed floor uses of the proposed MSBs are summarised in **Table 2.1** and **Table 2.2,** respectively.

Figure 2.1: Indicative Land Parcel for MSBs Development within the Development Site

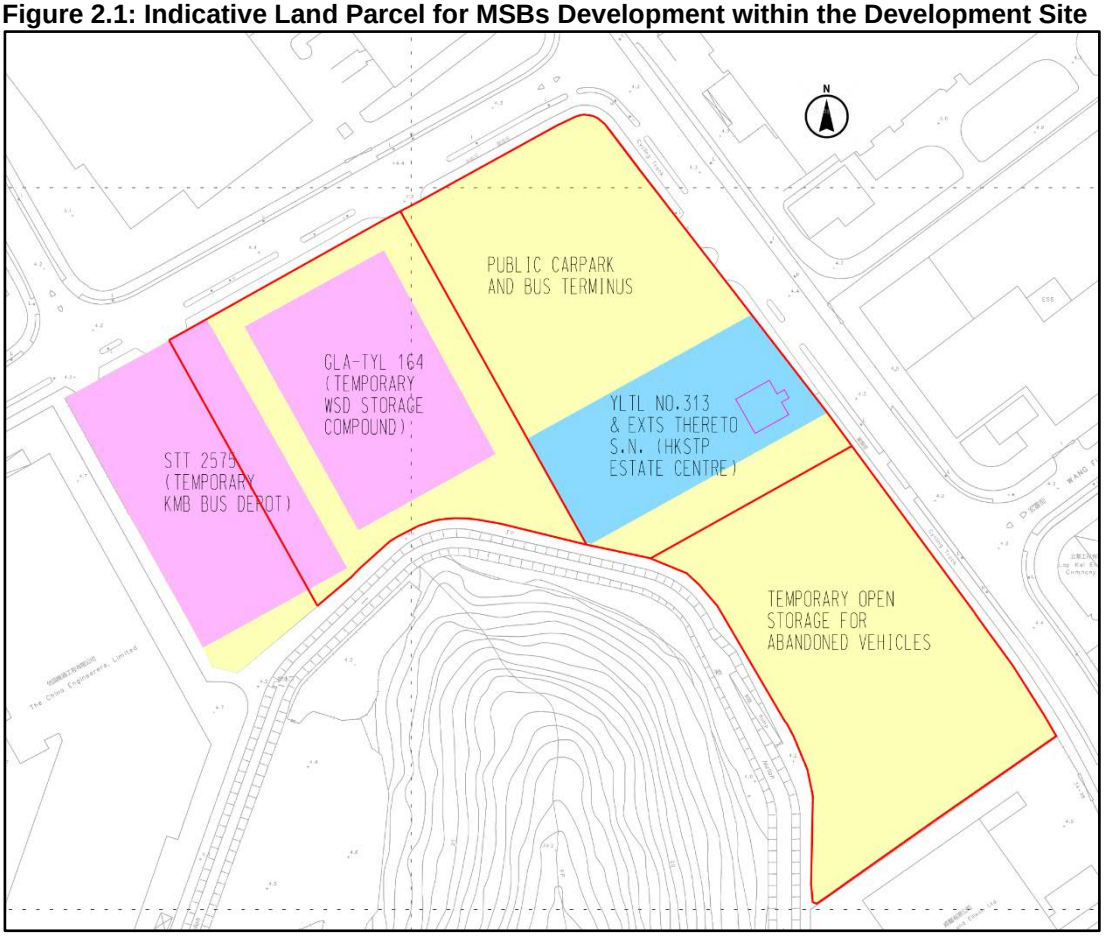


Table 2.1: Development Parameters for Indicative Scheme

Parameters	MSB in Site A	MSB in Site B	MSB in Site C	Total
Site Area	0.98 ha	1.25 ha	1.00 ha	3.23 ha
Maximum Plot Ratio	5			
GFA (m2)	49,000	62,500	50,000	161,150
Site Coverage	Not Specified			
Class of Site	Class A	Class B	Class A	
Land Uses	Vehicle Servicing and Maintenance and/or Logistics Uses + Not less than 30% for accommodating eligible brownfield operators displaced by the government-led development projects (industrial uses)			
No. of Storeys	No more than 10 storeys above ground level			

Table 2.2: Indicative Floor Uses of MSBs Development in Sites A, B and C

Floor	Proposed Uses
G/F-9/F	• Vehicle Servicing and Maintenance; • Logistics Uses; and/or • Industrial Uses (for accommodating eligible brownfield operators)
Basement (1 Level)	Public Vehicle Parking (in Site B)[1]

[1] Subject to the detailed design, a basement may be constructed in Site A and Site C to take up some underground space for ancillary parking, plant room, etc.

3 Water Supply Impact Assessment

3.1 Methodology and Design Criteria

Methodology

3.1.1 The following approach is adopted in carrying out the Water Supply Impact Assessment (WSIA) :

- identify the scale and scope of the proposed development (the Development) and identify the area where the WSIA should cover (i.e. the “Study Area”);
- estimate the water demand of the Development;
- identify the existing and planned water supply system within the Study Area and Yuen Long area; and
- examine the impact on the water supply system arising from the Development and the system capacity.

3.1.2 The completion year of the proposed MSBs will be around 2029. The design year of 2029 has been adopted for the assessment.

3.2 Design Parameters

3.2.1 In accordance with the WSD's DI 1309 and FSD Codes of Practice for Minimum Fire Service Installations and Equipment and Inspection, Testing and Maintenance of Installations and Equipment (September 2022 revision), the following design parameters and peak demand factors are adopted for the WSIA:

Considered Cases

3.2.2 Two cases (cases 1 and 2) are considered in the hydraulic analysis as shown in **Table 3.2.1** to cater for the effect of potential water consumption for firefighting for fresh water and flushing water supply, where appropriate.

Table 3.2.1: Cases to be considered in Hydraulic Analysis

Case	Water Demand	Description
1	Existing + Development	Daily Operation (Without firefighting)
2	Existing + Development	With firefighting

Without Firefighting

3.2.3 The design peak flow rate of the distribution system for Case 1 should be sufficient for meeting the following peak demands:

1. Fresh Water System – 3 times MDD
2. Flushing Water Supply – 2 times MDD

Firefighting

3.2.4 Under firefighting scenario, the hydraulic analysis has taken account of additional withdrawal at the extremity of the system with adjustment on the demand as below:

Demand for fresh water = 1 x MDD

Demand for flushing water = 1 x MDD

3.2.5 The firefighting requirement for industrial zones in Case 2 is 11,000 m^3/d with a discharge pressure of 17m head. The assumed draw-off rate through any single pedestal hydrant is 3,000 m^3/d.

Minimum Capacity of Service Reservoir

3.2.6 The service reservoir capacity required as a minimum percentage of the MDDs are as follows:-

1. Isolated supply zones with critical consumers - 90% of MDD
2. Interconnected supply zones with critical consumers - 75% of MDD
3. Salt Water / Temporary Main for Flushing - 25% of MDD

Properties of Water Mains

3.2.7 Internal diameter of the water mains is used for hydraulic analysis. The nominal diameter and corresponding internal diameter adopted for the common pipe sizes are shown in **Table 3.2.2**.

Table 3.2.2: Internal Diameter for Pipes

Nominal Diameter (mm)	Internal Diameter (mm)	
	Fresh Water Mains	Salt Water Mains
600	586	567
550	536	536
525	510	510
500	485	485
450	424	424
400	382	382
375	358	358
350	334	334
300	282	282
250	233	233
200	189	189
150	138	138

3.2.8 The pipeline head loss is calculated based on Hazen-Williams equation. The adopted roughness coefficients are shown in **Table 3.2.3** below.

Table 3.2.3: Hazen-Williams Roughness Coefficients

Water Main	Pipe Diameter (mm)	Roughness Coefficient, C
Fresh Water	< DN600	110
	≥ DN600	120
Salt Water	All	90

3.2.9 The adopted design criteria for Fresh Water Main and Salt Water Main follow the design criteria under WSD DI 1309 and Handbook on Plumbing Installation for Building. The systems should meet the criteria as shown in **Table 3.2.4** below.

Table 3.2.4: Design Criteria

Description	Minimum Residual Head (m)			Maximum Velocity (m/s)
	Fresh Water Main (1)	Salt Water Main	Discharge pressure	
Daily Operation (Without Fire-Fighting)	20	15	N/A	3
Daily Operation (With Fire-Fighting)	20	15	17	3

Note:

(1) In accordance with WSD's instruction of 26 June 2017, fresh water supply infrastructure for new developments should be planned for a minimum residual head of 20m with immediate effect, except for village supplies and situations where such reduction would adversely affect the supply to the adjacent existing buildings / developments which have been designed for a residual head of 30m.

Fresh and Flushing Water Unit Demand

3.2.10 The following unit demands are adopted when checking the existing water supply and designing new water supply system:

Table 3.2.5: Fresh and Flushing Water Unit Demand for Public Housing

Development Type	Unit	Fresh water Demand	Flushing water Demand
Residential			
R1 – All areas	litre/head/day (l/h/d)	270(1)	70

Note:

(1) The demands for the Public Housing classes area based on domestic use only (which is 230 l/h/d according to WI 1309). An allowance of 40 l/h/d for Yuen Long is added for service trade use according to Table 2 of WSD DI 1309. Hence, the total unit demand is 270 l/h/d.

Table 3.2.6: Fresh and Flushing Water Unit Demand for Industrial

Development Type	Unit	Fresh water Demand	Flushing water Demand
Industries			
Type I(A) – New Towns Yuen Long PR = less than 7	m^3/ha/d (net area)	450 (2) (3)	210 (2)

Note:

(2) from Table 1, WSD DI 1309.

(3) An additional allowance of 40 l/h/d for Yuen Long is to be added on top of the unit demand for service trade use according to Table 2 of WSD DI 1309.

3.3 Existing and Planned Water Supply System

Fresh Water Supply System

3.3.1 According to WSD, the NTM WTW and the AT WTW are now jointly supplying fresh water and flushing water to Yuen Long Town, Kam Tin, San Tin, Tin Shui Wai and part of Yuen Long - Tuen Mun Corridor. The proposed MSBs are located within the distribution zone of the NTM WTW.

3.3.2 The capacity of the NTM WTW is shown in **Table 3.3.1**.

Table 3.3.1: Capacity of Existing Water Treatment Works

Water Treatment Works	Capacity (MLD)
NTM WTW	230

3.3.3 The NTM WTW provides treated water to the WC FWSR for distribution to the YLIE area including the Study Area. The key waterworks installations including fresh water supply zones for NTM WTW and WC FWSR are shown in ***Annex A***.

3.3.4 The capacity of WC FWSR is shown in **Table 3.3.2** below:

Table 3.3.2: Capacity of WC FWSR

Service Reservoir	Capacity (MLD)	Top Water Level (mPD)	Invert Level (mPD)
WC FWSR	58.79	67	60.81

3.3.5 The alignments of the existing water mains extracted from WSD record plans are shown in **Drawing nos. MMH/369397/WSUIA/001** and **MMH/369397/WSUIA/002**. The existing fresh water network from the WC FWSR to the Development is described in **Table 3.3.3**.

Table 3.3.3: Existing Fresh Water Network

Existing Fresh Water Mains	System	Location
DN900 pipe	Trunk water main delivery from NTM FWPSR to WC FWSR	Along Fuk Hi Street and Fuk Shun Street
DN600 and DN450 pipes	Distribution mains from WC FWSR towards YLIE	Along Fuk Shun Street and Fuk Hi Street
DN450 and DN300 pipes	Distribution mains serving YLIE and adjoining areas	Branching off from Fuk Hi Street to run along Wang Lee Street and Wang Lok Street
DN250 pipe	Distribution mains serving YLIE and adjoining areas	Another branching off from Fuk Hi Street to run along Fuk Yan Street and Fuk Wang Street

3.3.6 The existing water mains along Fuk Wang Street and Wang Lee Street are to serve the three MSB sites described in **Section 2**. The adequacy is assessed in **Section 3.4**.

Salt Water Supply System

3.3.7 As advised by WSD, salt water is provided from LOP SWPS together with the TKT SWSR for flushing purposes to YLIE.

3.3.8 The capacities and the demand of LOP SWPS and the TKT SWSR are shown in **Table 3.3.4** below.

Table 3.3.4: Existing Flushing Water Supply in the Area

Flushing Water Supply	Capacity (as at mid 2022)	Total Existing Demand within supply zone (MLD)
TKT SWSR	18,100 m^3	91.0
LOP SWPS	124.42 MLD	

3.3.9 The alignments of the existing water mains extracted from WSD record plans are shown in **Drawing nos. MMH/369397/WSUIA/003** to **MMH/369397/WSUIA/006**. The existing salt water network in the vicinity of the Development is briefly described in **Table 3.3.5**.

Table 3.3.5: Existing Salt Water Network

Existing Fresh Water Mains	Location
Existing DN1000 pipe	From TKT SWSR to Yuen Long Highway
Existing DN1000 pipe	From Yuen Long Highway to Hung Tin Road
Existing DN1000 and DN800 pipe	Along Hung Tin Road
Existing DN700 pipe	Branch off from Hung Tin Road to run along Castle Peak Road towards Ping Shan
Existing DN600 pipe	From Castle Peak Road – Ping Shan to Ma Wang Road
Existing DN450 pipe	From Ma Wang Road to Fung Chi Road
Existing DN400 pipe	From Fung Chi Road to Long Ping Road
Existing DN300 and DN200 pipes	Branch off from Long Ping Road to run along Fuk Hi Street
Existing DN200 pipe	From Fuk Hi Street via Fuk Wang Street to Wang Lee Street

3.3.10 The flushing water mains along Fuk Wang Street and Wang Lee Street are to serve the three MSB sites described in **Section 2**. The adequacy is assessed in **Section 3.5**.

Planned Water Supply Facilities

3.3.11 With the launching of planned developments in Yuen Long area, it was assessed that the NTM WTW would not be able to cope with the increase in water demand by 2028. WSD has planned to expand NTM WTW from 230 MLD to 440 MLD to cater for additional water demand arising from new developments in Tuen Mun and Yuen Long. WSD has commenced the investigation study, design and associated site investigation works for the Project in the second quarter of 2021.

3.3.12 Upon liaison with WSD, it is noted that WSD is planning to supply reclaimed water from YLEPP to Tin Shui Wai and Yuen Long Town including the YLIE area for flushing use after 2030 tentatively. In this connection, a new RWSR of 40,000m^3 with tentative top water level and invert level of 67mPD and 57mPD respectively is being planned adjacent to the existing WC FWSR.

3.4 Fresh Water Demand Estimation and Projection

3.4.1 Population projections for existing and planned developments within the WC FWSR supply zone to year 2029 are based on the Population Distribution Projections (2019-2029) - by District Council District, New Town and Tertiary Planning Unit (September 2020).

3.4.2 The fresh water demands of existing developments within WC FWSR supply zone up to 2029 are derived based on WSD DI 1309. The results, including the projected existing demands for fresh water and the projected demand of using fresh water for flushing are shown in **Table 3.4.1**.

3.4.3 In addition to considering the growth of the existing developments, the assessment has also considered the following planned developments:

I. Planned Developments in NWNT

II. Phase 1 of Wang Chau Public Housing Development

III. Yuen Long Effluent Polishing Plant (fresh water consumption of the plant)

IV. Planning Applications No. A/YL/257-1

V. Planning Applications No. A/YL/259

VI. Planning Applications No. A/YL-LFS/224-1

VII. Planning Applications No. Y/YL/16

3.4.4 The implications of the above planned developments are assessed as follows:

Planned Developments in NWNT

3.4.5 According to WSIA for HSK/HT NDA, KTN NDA, LB D, and YLS D, the developments are located within the fresh water supply zones of TKTN FWSR, TKTS FWSR, YL FWSR and FKT FWT, which will not be sourced from WC FWSR. As such, they are independent of WC FWSR supply zone.

Phase 1 of Wang Chau Public Housing Development

3.4.6 According to the Waterworks Impact Assessment for Site Formation and Infrastructure Works for Development at Wang Chau, Yuen Long, the water demand upon completion of works (anticipated commission in 2025) is summarised in **Table 3.4.1**.

Yuen Long Effluent Polishing Plant

3.4.7 According to the Waterworks Impact Assessment for YLEPP, the estimated water demand for YLEPP would be around 3% of the storage capacity of WC FWSR. The fresh water demand upon completion of YLEPP are summarized in **Table 3.4.1**.

Other Planned Developments

3.4.8 The four planned developments are within the supply zone of WC FWSR. Their impact is shown in **Table 3.4.1**.

Table 3.4.1: Estimated Water Demand from Existing and Planned Developments

Existing and Planned Developments	Estimated Fresh Water Demand in Year 2029 (m^3/d)	Estimated Flushing Water Demand in Year 2029 (m^3/d)[2]
Existing Developments	24,720	448
Phase 1 of Wang Chau Public Housing Development	3,226	1,832
Yuen Long Effluent Polishing Plant	1,800	N/A
Application No. A/Y/257-1	271	N/A
Application no. A/YL/259	327	N/A
Application no. A/YL-LFS/224-1	1,586	411
Application no. Y/YL/16	671	N/A
New Estate Centre	215	N/A
Sub-Total	**32,816**	**2,692**
Total	**35,508**	

3.4.9 From the above, the total fresh water demand is estimated to be 35,508m^3/d in year 2029. A breakdown of the water demands is enclosed in ***Annex C***.

With MSBs scenarios

3.4.10 The first MSBs of the Development is anticipated to be commissioned in Year 2029. Details of the water demand have been assessed. The total fresh water demand for the proposed MSBs is estimated to 1,569 m^3/d (or about 1.6 MLD). A breakdown of the assessment is also enclosed in ***Annex C***.

3.4.11 It is assessed that with the proposed MSBs, the total fresh water demand from WC FWSR will be increased from 35,508m^3/d to 37,077m^3/d for design year of 2029.

[2] Fresh water from WC FWSR is assumed to be used for the flushing purposes

3.5 Salt Water Demand Estimation and Projection

3.5.1 As mentioned in **Section 3.3.8**, the existing MDD is 91MLD. Adopting the same population growth for Yuen Long area up to 2029, the projected salt water demand for the supply zone of LOP SWPS and TKT SWSR is estimated to be 105MLD.

3.5.2 The estimated flushing demand for the Development is 760.1m^3/d (or about 0.8MLD) for the design year 2029. A breakdown of the assessment is enclosed in ***Annex C***.

3.6 Potential Impact to Fresh Water Supply

3.6.1 As mentioned in **Section 3.3.11**, WSD has planned to expand the capacity of the NTM WTW from 230 MLD to 440 MLD. The planned capacity would be sufficient to accommodate the additional demand from the Development.

3.6.2 Currently WC FWSR is the major source of the fresh water to the YLIE area. The updated water supply record and latest development parameters for fresh have been reviewed.

3.6.3 Based on WSD DI 1309, the required capacity of service reservoir is to be 75% of the MDD. The capacity assessment is presented in **Table 3.6.1**.

Table 3.6.1: Summary of Capacity Assessment of Existing Fresh Water Facilities in Year 2029

	Total Estimated Fresh Water Demand (m^3/d)	Required Capacity of Service Reservoirs (m^3/d)	Existing Capacity of Service Reservoirs (m^3/d)	Percentage of usage
Without MSBs	35,508	26,631	58,790	45.3%
With MSBs	37,077	27,808	58,790	47.3%

3.6.4 From the table, WC FWSR can cater for both the existing supply zone and the Development. There would be a slight rise in the percentage usage of the WC FWSR from 45.3% to 47.3%, which is considered acceptable.

3.7 Potential Impact to Flushing Water Supply

3.7.1 Based on WSD DI 1309, the required capacity of service reservoir is to be 25% of the MDD. As mentioned in **Section 3.5.1**, the projected MDD for year 2029 is 105MLD. Therefore, the existing capacity of the TKT SWSR (i.e. 18,100m^3 or 17.3% of the projected MDD) is less than the required 25%.

3.7.2 However, as mentioned in **Section 3.3.12**, there will be a planned RWSR of 40,000m^3 capacity to be commissioned around year 2030 near to the WC FWSR to supply reclaimed water to Yuen Long Town and Tin Shui Wai area, including the YLIE area, for

flushing. With the planned RWSR, the total capacity of the service reservoirs will be adequate to meet the 25% requirement.

3.7.3 With the planned RWSR, there will be adequate flushing water supply to the Development. Prior to the completion of the RWSR around 2030, there would be a slight increase in the demand of flushing water from the TKT SWSR, which is already under strong demand. The buffer provided by the TKT SWSR would be slightly reduced from 17.24% to 17.05% of the MDD in the interim period, which is considered acceptable.

3.8 Proposed Water Supply Scheme and Hydraulic Analysis

Proposed Fresh Water Supply System

3.8.1 In view of the proximity of WC FWSR, it is proposed to source water from WC FWSR and corresponding distribution mains.

3.8.2 As mentioned in **Section 3.3**, there are two FW distribution mains for existing Wang Chau Supply Zone, size DN600 and DN450. Under the existing condition, the DN250 ductile iron pipe connecting the DN600 FW distribution main can serve Site A and the DN450 ductile iron pipe can serve Site B and Site C.

3.8.3 **Drawing nos. MMH/369397/WSUIA/001** and **MMH/369397/WSUIA/002** show the existing fresh water supply system.

3.8.4 ***Annex D*** and ***Annex E*** give the assessment for the cases in **Table 3.2.1**. For the planned scenario, it is assumed that the fresh water supply will be from the WC FWSR. In summary, the existing Fresh Water supply system in the area is assessed to be capable of serving the proposed MSBs.

Proposed Flushing Water Supply System

3.8.5 Flushing water is planned to be supplied initially around 2029 by LOP SWPS with TKT SWSR, having a reserved capacity less than the desirable 25%. When the reclaimed water from the new WC RWSR of 40,000m^3 will be available after its commissioning around 2030, there will be adequate flushing water supply to the proposed MSBs.

3.8.6 **Drawing nos. MMH/369397/WSUIA/003** to **MMH/369397/WSUIA/006** show the existing salt water supply system.

3.8.7 ***Annex F*** gives the assessment for the cases in **Table 3.2.1**. For the planned scenario, it is assumed that the salt water supply will be from the TKT SWSR. In summary, the existing Salt Water supply system in the area is assessed to be capable of serving the proposed MSBs.

3.8.8 If the WC RWSR can be completed in time to serve the proposed MSBs, the flushing water supply system to the YLIE area will be enhanced substantially. As the new flushing water supply system from WC RWSR is yet subject to detailed design, some broad assumptions have been made and an indicative hydraulic performance is presented in ***Annex G***.

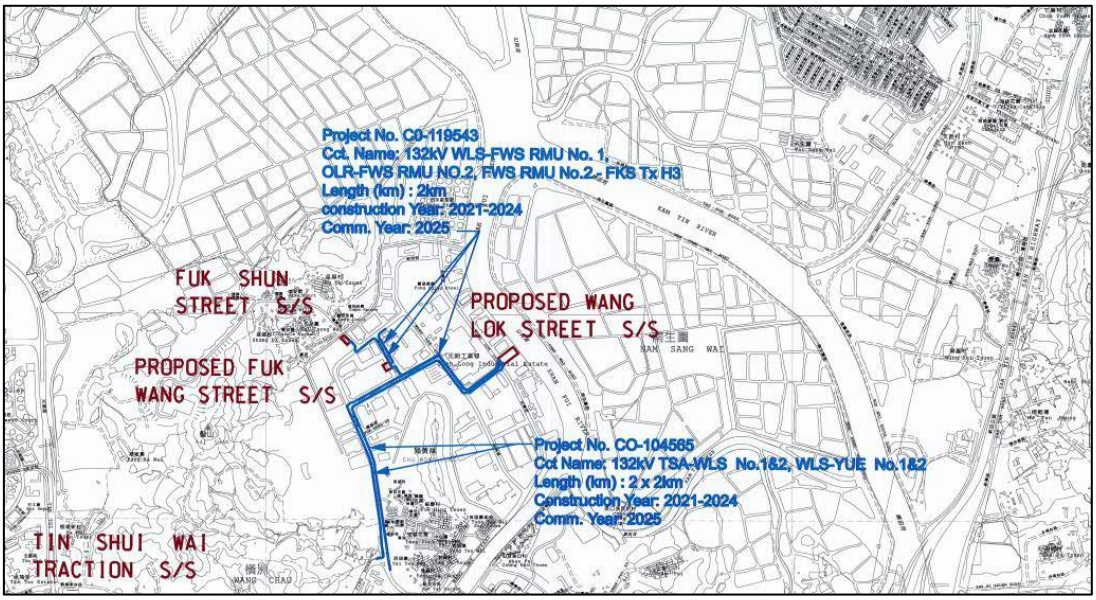
4 Utilities Impact Assessment

4.1.1 There is currently a 11kV CLP substation (designated CTR S/S 120922) located within the Study Area behind the existing Estate Centre. Based on the information provided by CLP, the substation mainly serves the Estate Centre, bus kiosk, public lighting, payphone booth and temporary supply of construction site.

4.1.2 CLP has advised that the existing substation would not have spare capacity to provide the required power supply to the Development. Power supply will be provided from a new sub-station to be constructed in the YLIE area which is expected to commission around 2027 (**Figure 4.1**).

4.1.3 It is suggested that close coordination with CLP should be maintained on the power supply issue.

Figure 4.1: Location of new power sub-station



4.2 Telecommunications

4.2.1 According to the collected information on the existing telecommunication services. There are some existing and planned telecommunication cables identified within the Study Area.

4.2.2 The existing PCCW cable within the Site would be affected by the proposed MSBs development. Further liaisons with the PCCW would be required to determine whether cable diversion would be necessary.

4.2.3 As telecommunications would provide essential IT support to operators within the proposed MSBs as well as the management office of the facility, continuous liaison with the telecom services undertakers is recommended in the course of the MSBs development.

4.3 Gas Supplies

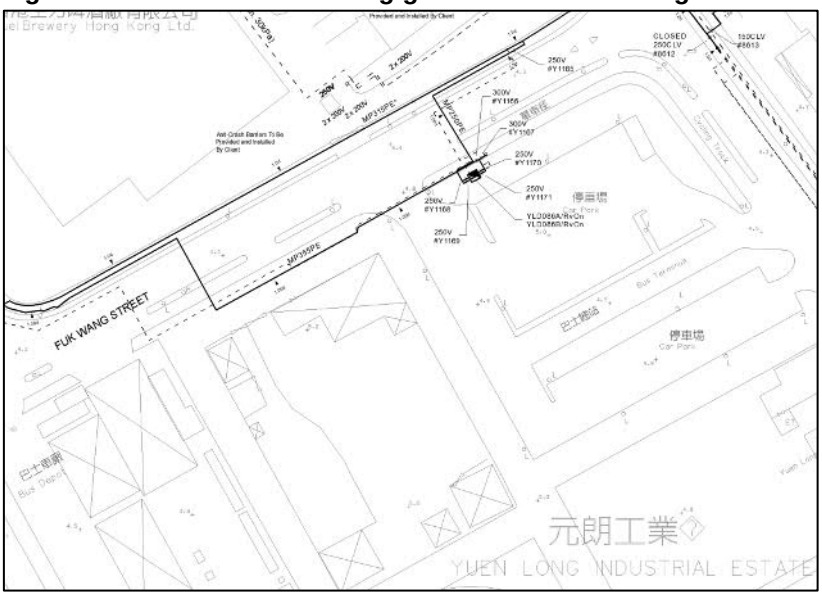
4.3.1 According to the information provided by the HKCG, there are some existing medium pressure gas mains running along Fuk Wang Street and Wang Lee Street.

4.3.2 There is an existing governor kiosk within Site B, as shown in **Figure 4.2** which is supplying gas to a few industrial customers in Yuen Long Industrial area.

4.3.3 Liaison with Town Gas is in progress regarding the diversion of the kiosk / gas pipes. Tentatively, the new gas kiosk is proposed to be relocated to the greening area in the public car park near Wang Lok Street.

4.3.4 Continuous liaison with HKCG is required during the implementation of the proposed MSBs in case any diversion of gas main or relocation of governor kiosk is required.

Figure 4.2: Location of existing gas kiosk at Fuk Wang Street



5 Summary

5.1 Water Supply Impact Assessment

5.1.1 The proposed MSBs are assessed to cause additional fresh water demand of 1.8 MLD and flushing water demand of 0.8 MLD from the water supply system in the YLIE area for the Design Year 2029.

5.1.2 The existing WC FWSR and the water main network in the area are assessed to be capable of meeting the additional fresh water and flushing water demand due to the Development without adverse impact from the hydraulic point of view.

5.1.3 It is proposed to provide fresh water supply to the Development via the existing DN250 water main along Fuk Wang Street for Site A; and the existing DN450 water main along Wang Lee Street for Site B and Site C.

5.1.4 It is proposed to provide salt water (or reclaimed water) supply to the Development via the existing DN200 water main along Fuk Wang Street for Site A; and the existing DN200 water main along Wang Lee Street for Site B and Site C.

5.1.5 It is noted that the major land uses of the MSBs would be vehicle servicing and maintenance and/or logistics uses. As the vehicle servicing and maintenance and logistics uses are identified as industrial uses in WSD DI 1309, it is assessed that the different combination of land uses will not cause any adverse water supply impact.

5.2 Utilities Impact Assessment

5.2.1 CLP has advised that the existing substation would not have spare capacity to provide the required power supply to the Development. Power supply will be provided from a new sub-station to be constructed in the YLIE area which is expected to commission around 2027. It is suggested that close coordination with CLP should be maintained on the power supply issue.

5.2.2 There is an existing governor gas kiosk within site B. Liaison with HKCG is in progress regarding the diversion of the kiosk / gas pipes. Tentatively, the new gas kiosk is proposed to be relocated to the greening area in the public car park near Wang Lok Street.

5.2.3 No significant impacts on existing and planned utilities are expected due to the Development.

Drawings

MMH/369397/WSUIA/001	Existing Fresh Water Supply Scheme (Sheet 1 of 2)
MMH/369397/WSUIA/002	Existing Fresh Water Supply Scheme (Sheet 2 of 2)
MMH/369397/WSUIA/003	Existing Flushing Water Supply Scheme (Sheet 1 of 4)
MMH/369397/WSUIA/004	Existing Flushing Water Supply Scheme (Sheet 2 of 4)
MMH/369397/WSUIA/005	Existing Flushing Water Supply Scheme (Sheet 3 of 4)
MMH/369397/WSUIA/006	Existing Flushing Water Supply Scheme (Sheet 4 of 4)

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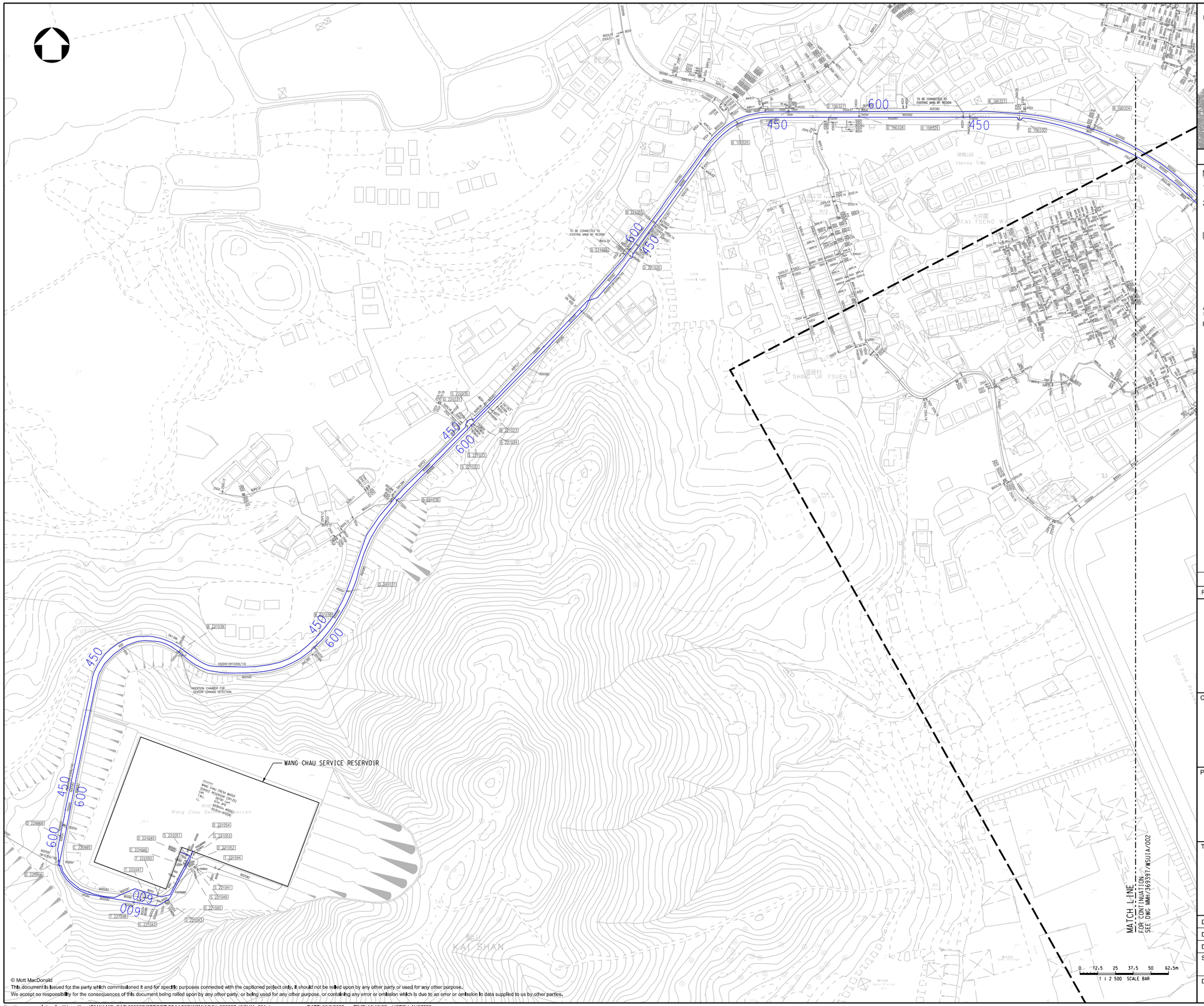

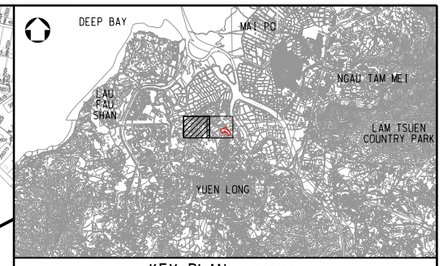

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LEGEND:

- TENTATIVE ASSESSMENT AREA
- DEVELOPMENT SITE
- EXISTING FRESH WATER MAIN TO SERVE THE DEVELOPMENT SITE

SOURCE:

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Title

EXISTING FRESH WATER SUPPLY SCHEME (SHEET 1 OF 2)

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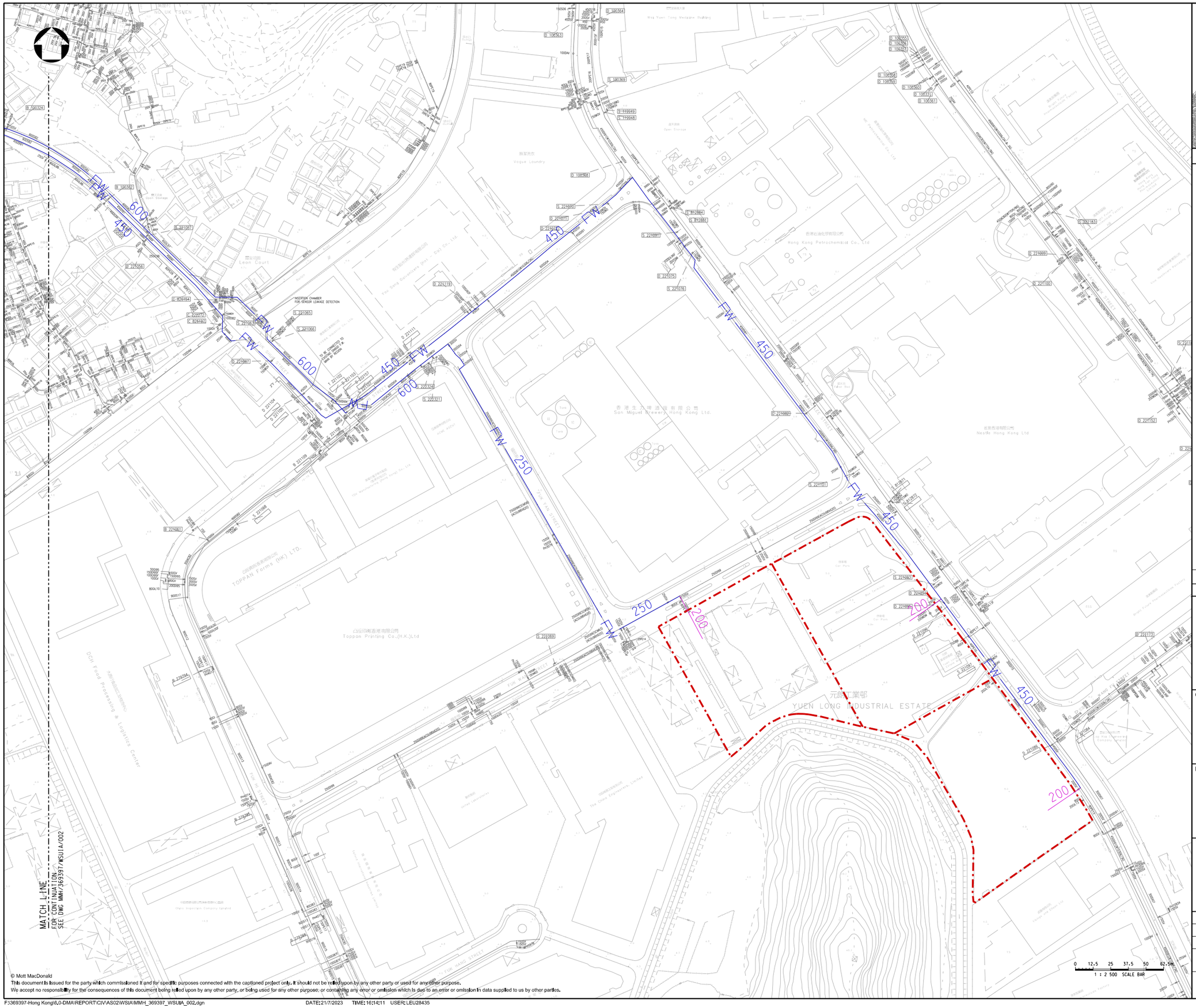

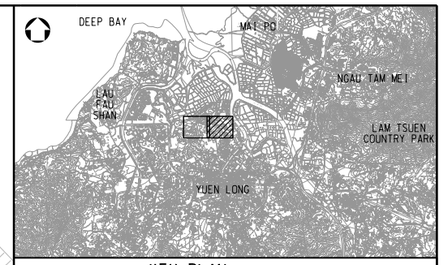

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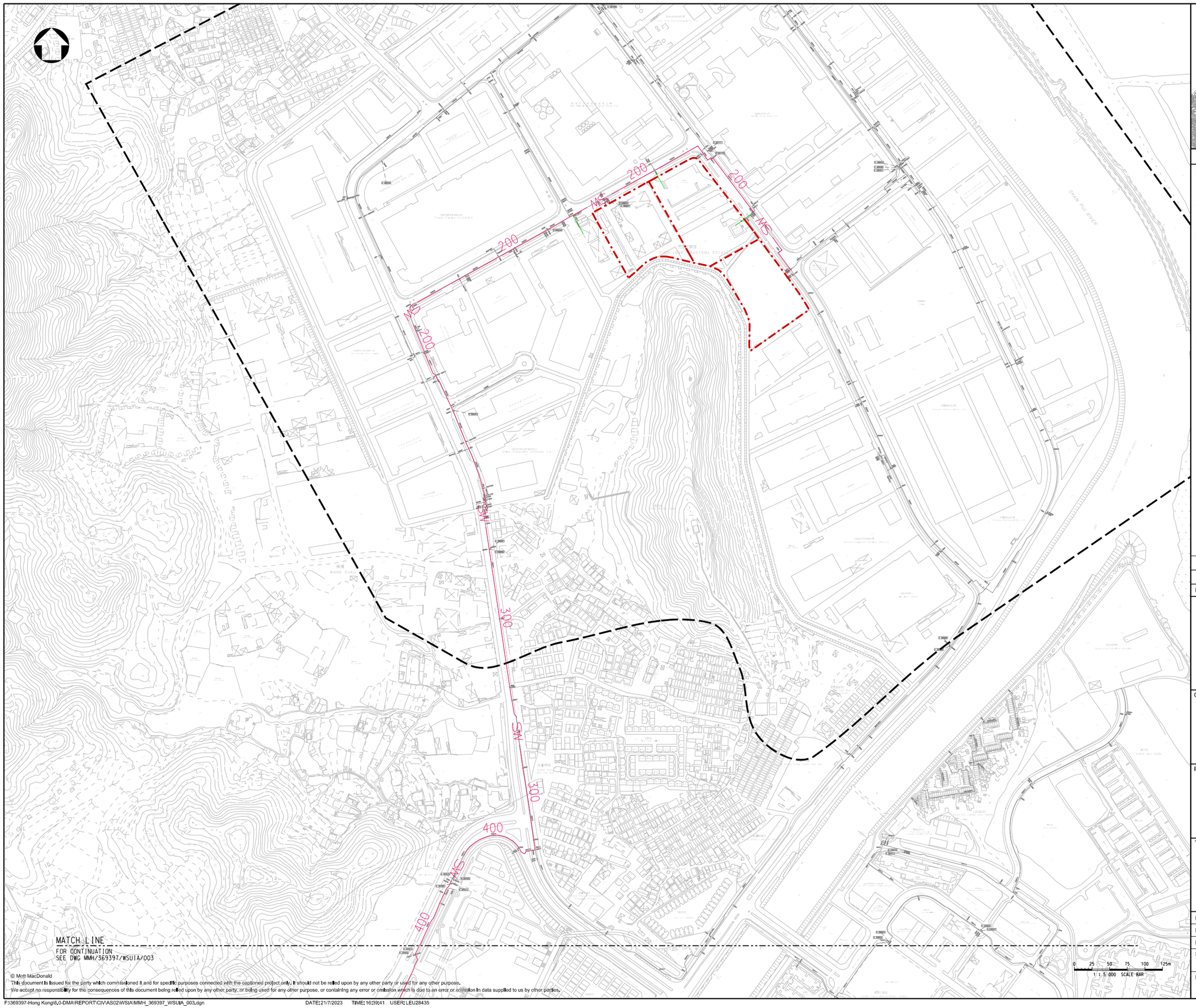

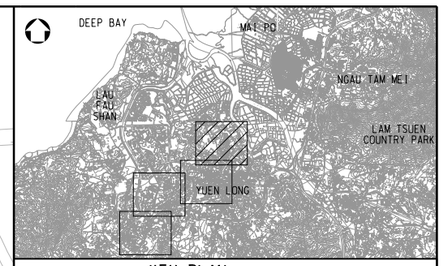

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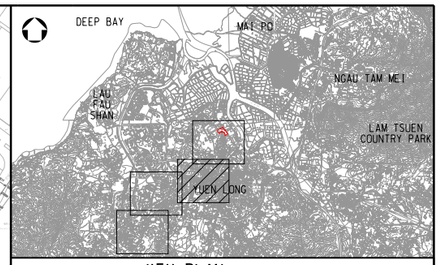

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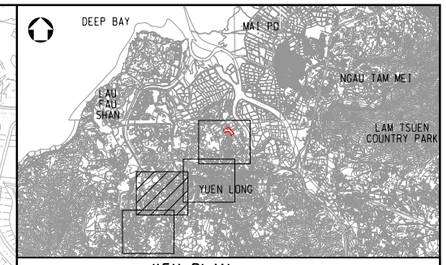

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TAN KWAI TSUEN SALT
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MMH/369397/WSUIA/006

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Annexes

Annex A	Fresh Water Supply Zones for New Territories West
Annex B	Flushing Supply Zone of Tan Kwai Tsuen SWSR and Lok On Pai SWPS
Annex C	Water Demand Estimation
Annex D	Hydraulic Analysis of Proposed Fresh Water Supply System (Case 1)
Annex E	Hydraulic Analysis of Proposed Fresh Water Supply System (Case 2)
Annex F	Hydraulic Analysis of Proposed Salt Water Supply System
Annex G	Hydraulic Analysis of Proposed Reclaimed Water Supply System

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Annex A

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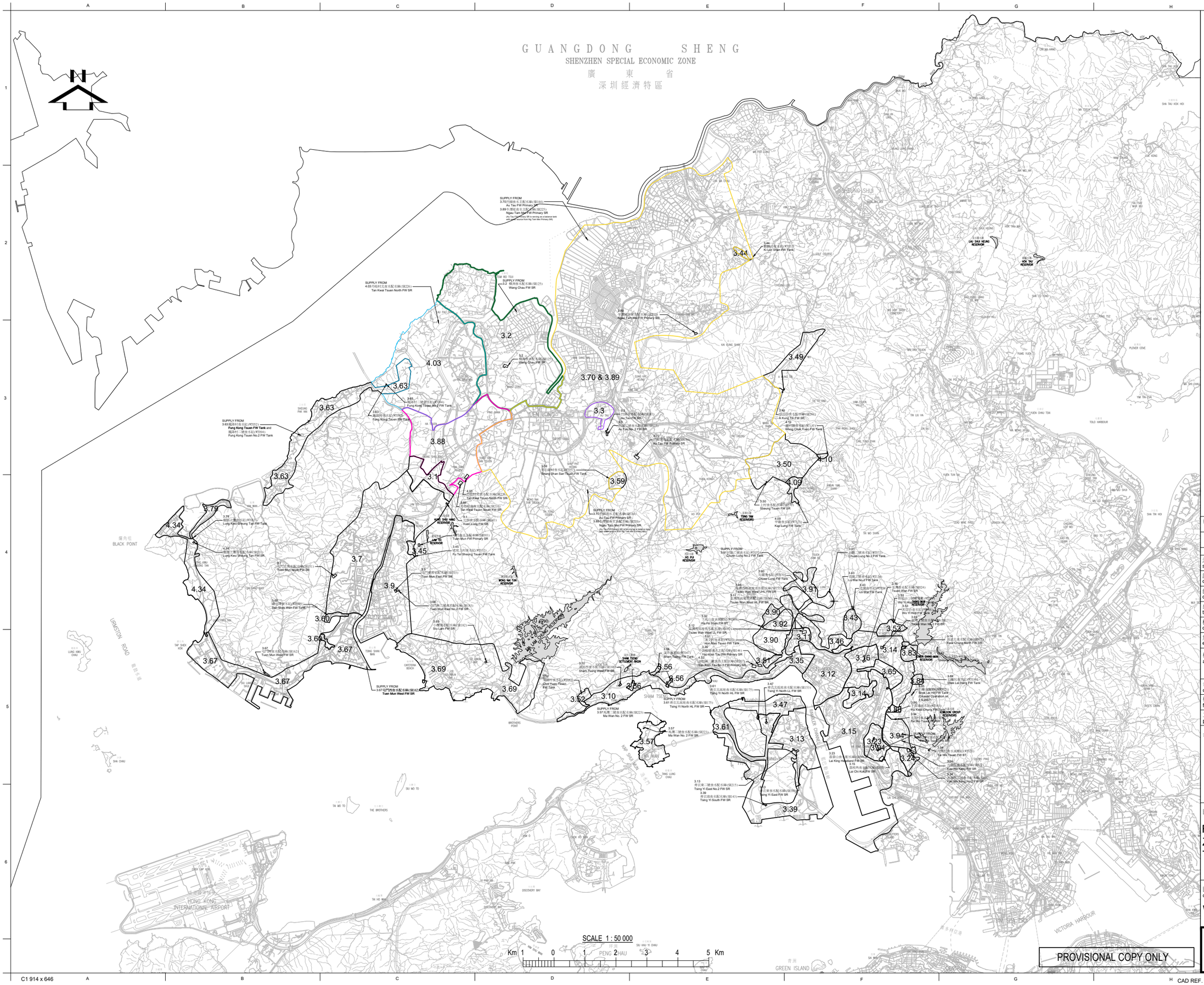

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LEGEND :

TMN — FRESH WATER MAJOR SUPPLY ZONE

3.2 — SERVICE RESERVOIR SUPPLY AREAS SUPPLY CODE

ABBREVIATIONS :

SSF	SHEUNG SHUI / FANLING
YLG	YUEN LONG
STN	SHA TIN
TPO	TAI PO
MOS	MA ON SHAN
SKG	SAI KUNG
KLE	KOWLOON EAST
KLW	KOWLOON WEST
TWN	TSUEN WAN
TMN	TUEN MUN
NLT	NORTH LANTAU

編號 no.	日期 date	摘 要 description	簽署 initial
修 訂 REVISION			

	姓名 name	簽署 initial	日期 date
測 量 surveyed			
設 計 designed			
繪 製 drawn			
摹 印 traced			
核 對 checked			
加 簽 endorsed			
核 准 approved	CE/HK		

合約編號 contract no.

檔案編號 file no.

工務編號 project no.

合約 contract

圖則名稱 drawing title

FRESH WATER SUPPLY ZONES FOR NEW TERRITORIES WEST

(AS AT 01-09-2021)

圖則編號 drawing no. W 10156.4.4

比例 scale 1 : 50 000

水務署 Water Supplies Department

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Annex B

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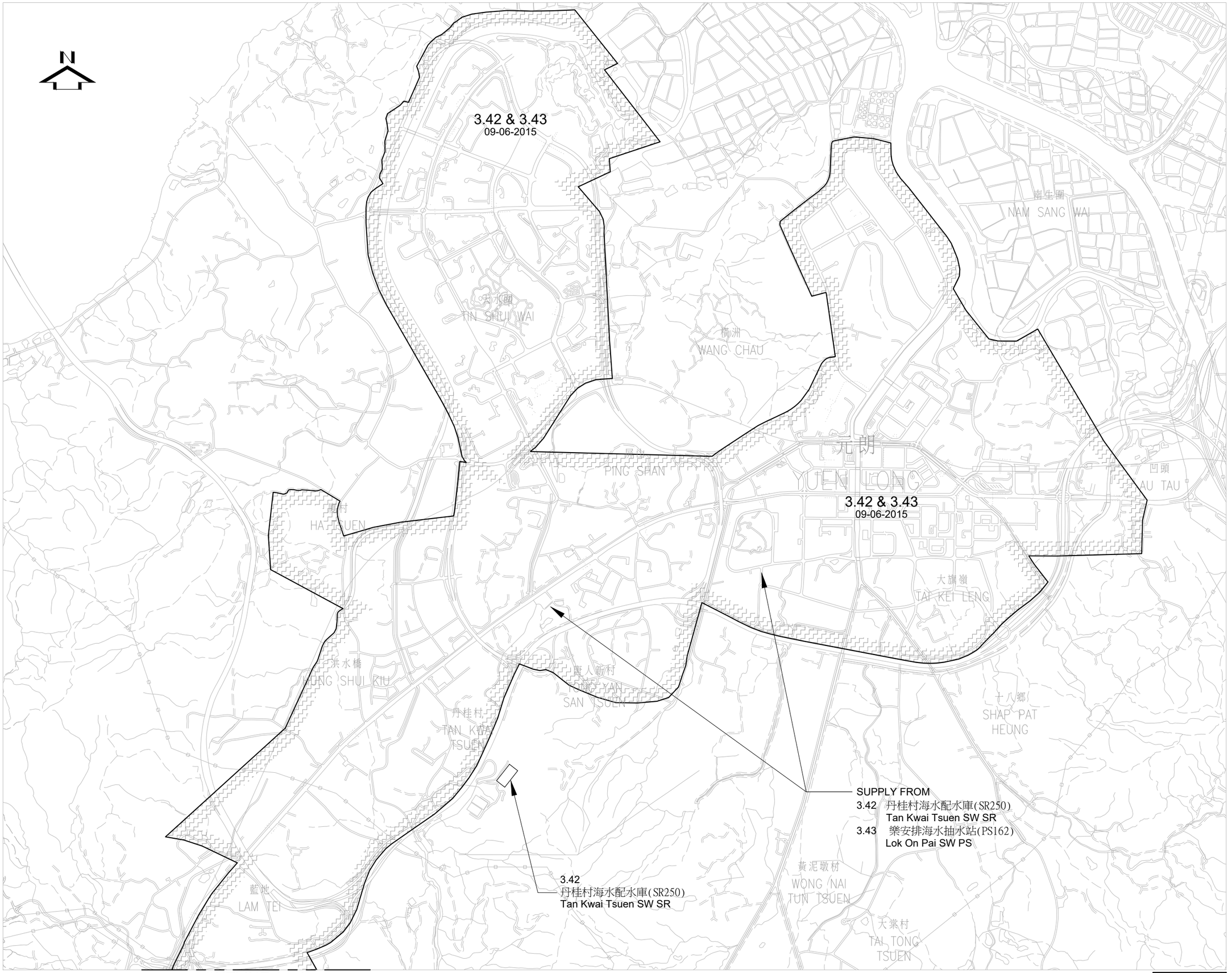

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LEGEND :

3.1 TUEN MUN NORTH SW SR
3.1 SERVICE RESERVOIR SUPPLY AREAS SUPPLY CODE

編號 no.	日期 date	摘要 description	簽署 initial
修訂 REVISION			

	姓名 name	簽署 initial	日期 date
設計 designed			
繪製 drawn			
核對 checked			
加簽 endorsed			
核准 approved			

合約編號 contract no.
檔案編號 file no.
工務編號 PWP no.
合約 contract

圖則名稱 drawing title

FLUSHING SUPPLY ZONE OF TAN KWAI TSUEN SW SR AND LOK ON PAI SW PS (SHEET 1 OF 2)

圖則編號 drawing no. R 2021/2

比例 scale 1 : 10000

水務署 Water Supplies Department

B1 1000 x 707 | PC REV. NO. | CAD REF. R2021_002-003.DWG | PLOTTING SCALE 1 : 1

CUTLINE A - A

N

3.42 & 3.43
09-06-2015

SUPPLY FROM
3.42 丹桂村海水配水庫(SR250)
Tan Kwai Tsuen SW SR
3.43 樂安排海水抽水站(PS162)
Lok On Pai SW PS

虎地中村
FU TEI CHUNG TSUEN

屯門
TUEN MUN

青山灣
TSING SHAN WAN

咖啡灣
CAFETERIA BEACH

掃管笏
SO KWUN WAT

掃管籮
SO KWUN TAN

小欖
SIU LAM

大欖涌
TAI LAM CHUNG

大欖角

3.42 & 3.43
09-06-2015

3.43
樂安排海水抽水站(PS162)
Lok On Pai SW PS

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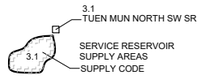
LEGEND :



編號 no.	日期 date	摘要 description	簽署 initial
修訂 REVISION			

	姓名 name	簽署 initial	日期 date
設計 designed			
繪製 drawn			
核對 checked			
加簽 endorsed			
核准 approved			

合約編號 contract no.

檔案編號 file no.

工務編號 PWP no.

合約 contract

圖則名稱 drawing title

FLUSHING SUPPLY ZONE OF TAN KWAI TSUEN SW SR AND LOK ON PAI SW PS (SHEET 2 OF 2)

圖則編號 drawing no.

R 2021/3

比例 scale

1 : 10000

水務署
Water Supplies Department

B1 1000 x 707 A

PC REV. NO.

CAD REF. R2021_002-003.DWG

PLOTTING SCALE 1 : 1

Annex C - Water Demand Estimation

Water Treatment Works	Water Service Reservoir	Supply Zone TPU [1]	Location	Projection Population [2]							Average Yearly-Based Projections [3]
				2019	2020	2021	2022	2023	2024	2025	2029
		0.2*514	YL	840	860	920	940	960	960	980	1,016
		516	YL	3,200	3,200	3,400	3,500	3,600	3,600	3,600	3,731
		517	YL	1,500	1,500	1,600	1,600	1,600	1,600	1,600	1,658
		0.1*524	YL	7,730	7,630	7,600	7,620	7,700	7,840	7,830	8,116
		0.2*525	YL	280	300	300	300	300	300	320	332
		0.15*527	YL	9,870	9,885	9,960	9,945	9,855	9,810	9,705	10,059
		0.05*510[4]	TSW	13,995	13,910	13,940	14,120	14,335	14,355	14,270	14,791
		Sub-total		37,415	37,285	37,720	38,025	38,350	38,465	38,305	39,703

Notes:
(1) Existing supply zone of reservoirs as of Sep 2021, refers to WSD drawing no. W 10156.4.4
(2) Population from Planning Department WGPD Report, Table 15: Projected Population by TPU, 2019-2025.
(3) Average annual % change from Planning Department WGPD Report, Table 5: Projected Population by TPU, 2019-2029 is 0.9%.
(4) The supply zone includes Hong Kong Wetland Park and part of Tin Shui Wai (i.e. Tin Tsz Estate).

Water Demand from the Development

Unit Water Demand arising from Public Housing

Supply Zone	Unit Demand Factor (m3/h/d)		Remarks
	Fresh Water (FW)	Flushing Water (FLW)	
Yuen Long	0.27	0.07	WSD DI 1309; Assume R1

Unit Water Demand arising from Industrial Use

Supply Zone	Unit Demand Factor (m3/ha/d)		Remark
	Fresh Water (FW)	Flushing Water (FLW)	
Yuen Long	450	210	WSD DI 1309; Assume Type I(A) - New Towns: Yuen Long PR = less than 7

Estimation of Fresh Water Demand for YLMSB

Site	Target Intake year	Land Use	Site	Site Area for Industrial Use [ha]	Employee	Fresh Water Unit Demand		Fresh Water Demand [m3/d]
						Industries [m3/ha/d]	Services Trades [l/h/d]	
MSBs in Yuen Long Area for Brownfield Operations	2029	Vehicle servicing and maintenance and/or logistics and Brownfield Operation	Site A	0.98	868	450	40	475.72
			Site B	1.25	1110	450	40	608.25
			Site C	1.00	887	450	40	485.48
							Total	1569.45

Estimation of Fresh Water Demand for Relocated Estate Centre

Site	Target Intake year	Land Use	Site	Site Area for Industrial Use [ha]	Employee	Fresh Water Unit Demand		Fresh Water Demand [m3/d]
						Industries [m3/ha/d]	Services Trades [l/h/d]	
New Estate Centre (Next to Site A)	2029	Office Use	New Estate Centre	0.39	975	450	40	214.5

Estimation of Flushing Water Demand for YLMSB

Site	Target Intake year	Land Use	Site	Site Area for Industrial Use [ha]	Employee	Flushing Water Unit Deamnd		Flushing Water Demand [m3/d]
						Industries [m3/ha/d]	Services Trades [l/h/d]	
MSBs in Yuen Long Area for Brownfield Operations	2029	Vehicle servicing and maintenance and/or logistics and Brownfield Operation	Site A	0.98	868	210	-	205.8
			Site B	1.25	1110	210	-	263.13
			Site C	1.00	887	210	-	210
							Total	678.93

Estimation of Flushing Water Demand for Relocated Estate Centre

Site	Target Intake year	Land Use	Site	Site Area for Industrial Use [ha]	Employee	Flushing Water Unit Deamnd		Flushing Water Demand [m3/d]
						Industries [m3/ha/d]	Services Trades [l/h/d]	
New Estate Centre (Next to Site A)	2029	Office Use	New Estate Centre	0.39	975	210	-	81.9

Summary of Contributing developments for WC FWSR

Water Treatment Works	Water Service Reservoir	Supply Zone TPU	Location	Projected Population 2021 Population	FW Demand (m^3/d)[5]	FLW Demand (m^3/d)[6]	Total Demand (m^3/d)	Average Yearly-Based Projections 2029 Population / Site area (ha)	FW Demand (m^3/d)[5]	FLW Demand (m^3/d)[6]	Total Demand (m^3/d)
Ngau Tam Mei WTW	Wang Chau FWSR	0.2*514	YL	920	248	64	313	1,016	274	71	345
		516	YL	3,400	918	238	1,156	3,731	1,007	261	1,269
		517	YL	1,600	432	112	544	1,658	448	116	564
		0.1*524	YL	7,600	2,052	-	2,052	8,116	2,191	-	2,191
		0.2*525	YL	300	81	-	81	332	90	-	90
		0.15*527	YL	9,960	2,689	-	2,689	10,059	2,716	-	2,716
		528	YL IE[7]	-	4,000	-	4,000	-	14,000	-	14,000
		0.05*510	TSW[4]	13,940	3,764	-	3,764	14,791	3,993	-	3,993
		Sub-total		37,720	14,184	414	14,599	39,703	24,720	448	25,168
		Proposed Wang Chau Development (Phase 1)[8]		-	-	-	-	13,508	3,226	1,832	5,058
		Proposed Yuen Long Effluent Polishing Plant Development[9]		-	-	-	-	-	1,800	-	1,800
		Planning application no. A/Y/257-1 (Domestic)[10]		-	-	-	-	1,005	271	-	271
		Planning application no. A/Y/259 (Industial) (0.7271ha)[11]		-	-	-	-	-	327	-	327
		Planning application no. A/YL-LFS/224-1 (Domestic)[12]		-	-	-	-	5,874	1,586	411	1,997
		Planning application no. Y/YL/16 (Domestic)[13]		-	-	-	-	2,484	671	-	671
		New Estate Centre		-	-	-	-	-	215	-	215
		Proposed Brownfield Development		-	-	-	-	-	1,569	-	1,569
		Total		37,720	14,184	414	14,599	62,574	34,385	2,692	37,076

Required Capacity of FWSR (75% of total water demand) = 27,807

Notes

(5) The Unit Demand Factor for Fresh Water in the supply zones in Yuen Long and Tin Shui Wai is 0.27 m3/h/d.

(6) The Unit Demand Factor for Flushing Water in supply zones in Yuen Long and Tin Shui Wai is 0.07 m3/h/d.

(7) According to the pervious report (WSIA for public housing development at Wang Chau), the water consumption in 2014 per day is 4,000 m^3 at YLIE (with a developed GFA of 0.63M m^3). The ultimate total water consumption was estimated by HKSTPC to be 14,000 m^3/day. Alternatively, with the permissible GFA for YLIE being 1.69M m^3, the scaled up water consumption to the max GFA is 11,000 m^3/day. For this WUSIA, the ultimate consumption of 14,000 m^3/day is adopted as a conservative apporach.

(8) Source from Agreement No. 64/2014 (CE) - Final Waterworks Impact Assessment Report (Wang Chau).

(9) Source from Agreement No. 3/2015 (DS) - Yuen Long Effluent Polishing Plant - Investigation, Design and Construction

(10) Source from Application No. A/YL/257-1, Yuen Long, assumed to be completed before 2029. As the application site is within the supply zone of LOP SWPS, the salt water are assumed to be used for flushing.

(11) Source from Application No. A/YL/259, Tung Tau Industrial Area, assumed to be completed before 2029. As the application site is within the supply zone of LOP SWPS, the salt water are assumed to be used for flushing.

(12) Source from Application No. A/YL-LFS/224-1 - Lot 1457 RP in D.D. 123 and Adjoining Government Land, Fung Lok Wai, Lau Fau Shan, Yuen Long, assumed to be completed before 2029

(13) Source from Application No. Y/YL/16, Tung Tau Industrial Area, assumed to be completed before 2029. As the application site is within the supply zone of LOP SWPS, the salt water are assumed to be used for flushing.

Annex D - Hydraulic Analysis of Proposed Fresh Water Supply System (Case 1)

Case 1: Daily Operation (Without Fire-Fighting)

Summary of Water Demand in 2029, which Fresh Water is supplied by DN600 and DN450 outlet pipes of Wang Chau FWSR

Supply Zone	Type	MDD (m^3/d)	Daily Operation	
			Peak Factor	Peak Demand (m^3/d)
WC FWSR Supply Zone (DN600 Distribution Main) (1)(2)	FW	20,504	3	61,513
WC FWSR Supply Zone (DN450 Distribution Main) (1)(3)	FW	8,103	3	24,310
WC FWSR Supply Zone (DN600 Distribution Main) (1)(2)	FLW	1,767	2	3,533
WC FWSR Supply Zone (DN450 Distribution Main) (1)(3)	FLW	925	2	1,850
New Estate Centre	FW	215	3	644
Proposed development site A	FW	476	3	1,427
Proposed development site B	FW	608	3	1,825
Proposed development site C	FW	485	3	1,456

Notes:
(1) There are two FW distribution mains for existing Wang Chau Supply Zone (Sizes DN600 and DN450), the estimated flow in DN600 and DN450 mains are prorata by pipe area.
(2) The mean water demands = (Total FW/FLW Demand - Demand from proposed MSBs and TSW) * Ratio of internal area of main + Demand from YLEPP, WC Phase 1.
(3) The mean water demands = (Total FW/FLW Demand - Demand from proposed MSBs and TSW) * Ratio of internal area of main.

Hydraulic Assessment on Pipe Size

Location	Pipe ID	Type	Nominal Pipe Size (mm)	Internal Pipe Size (mm)	Calculated Peak Flow (m^3/d)	Peak Demand (m3/d)
From WC FWSR to Fuk Shun Street	EX600	FW	600	586	69907	67,117
From WC FWSR to Fuk Shun Street	EX450	FW	450	424	36598	29,441
Fuk Shun Street to Fuk Hi Street	EX600A	FW	600	586	69907	52,689
Fuk Shun Street to Fuk Hi Street	EX450A	FW	450	424	36598	24,173
Fuk Hi Street to Fuk Yan Street	EX250	FW	250	233	11052	6,271
Fuk Hi Street to Wang Lee Street	EX450B	FW	450	424	36598	13,727
Along Wang Lee Street	EX450C	FW	450	424	36598	12,815
Proposed development site A	P200A	FW	200	189	7272	1,427
Proposed development site B	P200B	FW	200	189	7272	1,825
Proposed development site C	P200C	FW	200	189	7272	1,456

Headloss Analysis

Top Water Level at WC FWSR	=	67	mPD
Invert Level at WC FWSR	=	60.81	mPD
Mean Water Level at WC FWSR	=	63.91	mPD

Hydraulic Assessment on Residual Head

Location	Pipe ID	Type	Nominal Pipe Size (mm)	Internal Pipe Size (mm)	Length (m)	C Value	Peak Flow (m3/d)	Assumed Velocity under peak flow (m/s)	Friction Loss, H1 (m), Note 1	Minor Loss H2 (m), Note 2	Total Head Loss, H1+H2 (m)	Elevation (mPD)	Residual Head (m)
From WC FWSR to Fuk Shun Street	EX600	FW	600	586	1490	120	67,117	2.88	18.97	3.79	22.76	4.6	36.54
From WC FWSR to Fuk Shun Street	EX450	FW	450	424	1490	110	29,441	2.41	23.42	4.68	28.11	4.6	31.20
Fuk Shun Street to Fuk Hi Street	EX600A	FW	600	586	90	120	52,689	2.26	0.73	0.15	0.88	4.5	35.77
Fuk Shun Street to Fuk Hi Street	EX450A	FW	450	424	280	110	24,173	1.98	3.06	0.61	3.67	4.0	28.13
Fuk Hi Street to Fuk Yan Street	EX250	FW	250	233	295	110	6,271	1.70	4.88	0.98	5.86	4.2	30.21
Fuk Hi Street to Wang Lee Street	EX450B	FW	450	424	380	110	13,727	1.13	1.45	0.29	1.74	4.4	25.99
Along Wang Lee Street	EX450C	FW	450	424	160	110	12,815	1.05	0.54	0.11	0.65	4.4	25.34
Proposed development site A	P200A	FW	200	189	10	110	1,427	0.59	0.03	0.01	0.04	5.0	29.37
Proposed development site B	P200B	FW	200	189	10	110	1,825	0.75	0.05	0.01	0.06	5.0	25.33
Proposed development site C	P200C	FW	200	189	10	110	1,456	0.60	0.03	0.01	0.04	5.0	24.70

Notes:
Friction loss of Pipe (H1) = $[(10.67L)(Q^{1.852})]/[(C^{1.852})(d^{4.8704})]$ [Hazen Williams Formula: L = length of pipeline in metres, Q = Peak flow rate (m^3/s), C = pipe roughness coefficient, d = internal diameter of pipe (m)]
Assume Minor Loss (H2) to be = 20 % of friction loss (H1)

Annex E - Hydraulic Analysis of Proposed Fresh Water Supply System (Case 2)

Case 2: Fire-Fighting

Summary of Water Demand in 2029, which Fresh Water is supplied by DN600 and DN450 outlet pipes of Wang Chau FWSR

Supply Zone	Type	MDD (m^3/d)	Daily Operation	
			Peak Factor	Peak Demand (m^3/d)
WC FWSR Supply Zone (DN600 Distribution Main) (1)(2)	FW	31,504	1	31,504
WC FWSR Supply Zone (DN450 Distribution Main) (1)(3)	FW	19,318	1	19,318
WC FWSR Supply Zone (DN600 Distribution Main) (1)(2)	FLW	1,767	1	1,767
WC FWSR Supply Zone (DN450 Distribution Main) (1)(3)	FLW	925	1	925
New Estate Centre	FW	215	1	215
Proposed development site A	FW	476	1	476
Proposed development site B	FW	608	1	608
Proposed development site C	FW	485	1	485

Notes:
(1) There are two FW distribution mains for existing Wang Chau Supply Zone (Sizes DN600 and DN450), the estimated flow in DN600 and DN450 mains are prorata by pipe area.
(2) The mean water demands = (Total FW/FLW Demand - Demand from proposed MSBs and TSW) * Ratio of internal area of main + Demand from YLEPP, WC Phase 1 + Fire-fighting Requirements for Industrial Zones of 11,000m3/day.
(3) The mean water demands = (Total FW/FLW Demand - Demand from proposed MSBs and TSW) * Ratio of internal area of main + Fire-fighting Requirements for Industrial Zones of 11,000m3/day.

Hydraulic Assessment on Pipe Size

Location	Pipe ID	Type	Nominal Pipe Size (mm)	Internal Pipe Size (mm)	Calculated Peak Flow (m^3/d)	Peak Demand (m3/d)
From WC FWSR to Fuk Shun Street	EX600	FW	600	586	69907	33,961
From WC FWSR to Fuk Shun Street	EX450	FW	450	424	36598	21,336
Fuk Shun Street to Fuk Hi Street	EX600A	FW	600	586	69907	17,588
Fuk Shun Street to Fuk Hi Street	EX450A	FW	450	424	36598	8,058
Fuk Hi Street to Fuk Yan Street	EX250	FW	250	233	11052	2,090
Fuk Hi Street to Wang Lee Street	EX450B	FW	450	424	36598	5,669
Along Wang Lee Street	EX450C	FW	450	424	36598	4,514
Proposed development site A	P200A	FW	200	189	7272	476
Proposed development site B	P200B	FW	200	189	7272	608
Proposed development site C	P200C	FW	200	189	7272	485

Headloss Analysis

Top Water Level at WC FWSR	=	67	mPD
Invert Level at WC FWSR	=	60.81	mPD
Mean Water Level at WC FWSR	=	63.91	mPD

Hydraulic Assessment on Residual Head

Location	Pipe ID	Type	Nominal Pipe Size (mm)	Internal Pipe Size (mm)	Length (m)	C Value	Peak Flow (m3/d)	Assumed Velocity under peak flow (m/s)	Friction Loss, H1 (m), Note 1	Minor Loss H2 (m), Note 2	Total Head Loss, H1+H2 (m)	Elevation (mPD)	Residual Head (m)
From WC FWSR to Fuk Shun Street	EX600	FW	600	586	1490	120	33,961	1.46	5.37	1.07	6.45	4.6	52.86
From WC FWSR to Fuk Shun Street	EX450	FW	450	424	1490	110	21,336	1.75	12.90	2.58	15.48	4.6	43.82
Fuk Shun Street to Fuk Hi Street	EX600A	FW	600	586	90	120	17,588	0.75	0.10	0.02	0.12	4.5	52.84
Fuk Shun Street to Fuk Hi Street	EX450A	FW	450	424	280	110	8,058	0.66	0.40	0.08	0.48	4.0	43.94
Fuk Hi Street to Fuk Yan Street	EX250	FW	250	233	295	110	2,090	0.57	0.64	0.13	0.77	4.2	52.38
Fuk Hi Street to Wang Lee Street	EX450B	FW	450	424	380	110	5,669	0.46	0.28	0.06	0.34	4.4	43.20
Along Wang Lee Street	EX450C	FW	450	424	160	110	4,514	0.37	0.08	0.02	0.09	4.4	43.11
Proposed development site A	P200A	FW	200	189	10	110	476	0.20	0.00	0.00	0.00	5.0	51.57
Proposed development site B	P200B	FW	200	189	10	110	608	0.25	0.01	0.00	0.01	5.0	42.60
Proposed development site C	P200C	FW	200	189	10	110	485	0.20	0.00	0.00	0.00	5.0	42.50

Notes:
Friction loss of Pipe (H1) = $[(10.67L)(Q^{1.852})]/[(C^{1.852})(d^{4.8704})]$ [Hazen Williams Formula: L = length of pipeline in metres, Q = Peak flow rate (m^3/s), C = pipe roughness coefficient, d = internal diameter of pipe (m)]
Assume Minor Loss (H2) to be = 20 % of friction loss (H1)

Agreement No. CE3/2016 (CE) - Study on Proposed Multi-storey Buildings in Yuen Long Area for Brownfield Operations - Feasibility Study

Annex F - Hydraulic Analysis of Proposed Salt Water Supply System

Case 1: Daily Operation (Without Fire-Fighting)

Existing pressure head of Pedestal Fire Hydrant PH3067	=	50	m	
Existing elevation of Pedestal Fire Hydrant PH3067	=	4.4	mPD	
Flushing Water Demand for the Development and the remaining YLIE area	=	2,260.8	m^3/day	(= 760.83 + 1500) (Assuming flushing water serving the remaining YLIE area is 1500 m3/day)
Flushing Water Demand (2 x MDD)	=	4,521.7	m^3/day	

Hydraulic Assessment of Existing and Proposed Pipeline System (Flushing Water)

Location	Pipe ID	Type	Nominal Pipe Size (mm)	Internal Pipe Size (mm)	Length (m)	C Value	Peak Flow (m3/d)	Assumed Velocity under peak flow (m/s)	Friction Loss, H1 (m), Note 1	Minor Loss H2 (m), Note 2	Total Head Loss, H1+H2 (m)	Elevation (mPD)	Residual Head (m)
Along Fuk Wang Street	EX200A	FLW	200	189	100	90	4,521.7	1.87	3.63	0.726	4.36	4.4	45.6
Fuk Wang Street to Wang Lee Street	EX200B	FLW	200	189	290	90	3,721.7	1.54	7.34	1.468	8.81	4.3	36.9
Along Wang Lee Street	EX200C	FLW	200	189	120	90	2,921.7	1.21	1.94	0.388	2.33	4.2	34.7
Proposed development site A	P150A	FLW	150	138	10	90	411.6	0.32	0.02	0.004	0.02	5.0	45.0
Proposed development site B	P150B	FLW	150	138	10	90	526.3	0.41	0.03	0.006	0.04	5.0	36.2
Proposed development site C	P150C	FLW	150	138	10	90	420	0.33	0.02	0.004	0.02	5.0	33.9

Note (1)

Friction loss of Pipe (H1) = $[(10.67L)(Q^{1.852})]/[(C^{1.852})(d^{4.8704})]$ [Hazen Williams Formula: L = length of pipeline in metres, Q = Peak flow rate (m^3/s), C = pipe roughness coefficient, d = internal diameter of pipe (m)]

Assume Minor Loss (H2) to be = 20 % of friction loss (H1)

Annex G - Hydraulic Analysis of Proposed Reclaimed Water Supply System

Headloss Analysis

Top Water Level at WC RWSR	=	67	mPD
Invert Level at WC RWSR	=	57	mPD
Mean Water Level at WC RWSR	=	62.00	mPD
Capacity of WC RWSR	=	40,000	m3

Hydraulic Assessment on Residual Head

Location	Pipe ID	Type	Nominal Pipe Size (mm)	Internal Pipe Size (mm)	Length (m)	C Value	Peak Flow (m3/d) (Assumed)	Assumed Velocity under peak flow (m/s)	Friction Loss, H1 (m), Note 1	Minor Loss H2 (m), Note 2	Total Head Loss, H1+H2 (m)	Elevation (mPD)	Residual Head (m)
From WC RWSR to Fuk Shun Street	P800	SW	800	784	1490	90	20,000	0.86	0.83	0.17	1.00	4.6	56.40
Fuk Shun Street to Fuk Hi Street	P700	SW	700	682	350	90	15,000	0.64	0.23	0.05	0.27	4.5	56.23
Fuk Hi Street to Fuk Wang Street (Pedestal Fire Hydrant PH3067) (with MSBs)	EX200	SW	250	233	380	90	3,273	0.89	2.74	0.55	3.28	4.2	53.25

Notes:

Friction loss of Pipe (H1) = $[(10.67L)(Q^{1.852})]/[(C^{1.852})(d^{4.8704})]$ [Hazen Williams Formula: L = length of pipeline in metres, Q = Peak flow rate (m^3/s), C = pipe roughness coefficient, d = internal diameter of pipe (m)]

Assume Minor Loss (H2) to be = 20 % of friction loss (H1)

Assume flushing water serving the whole YLIE area is 5000 m3/day, and demand drag from Fuk Wang Street is half of it.

Conclusion: with the WC RWSR, there would be more flushing water supply to the YLIE area. The residue head of the pedestal fire hydrant PH3067 will be higher than the alternative supply from the TKTSWSR.



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Section 16 Planning Application for Multi-storey Building Developments at No. 32 Wang Lee Street and Adjoining Government Land, Yuen Long

Sewerage Impact Assessment

September 2023

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Mott MacDonald Hong Kong Limited
registered in Hong Kong no. 236497

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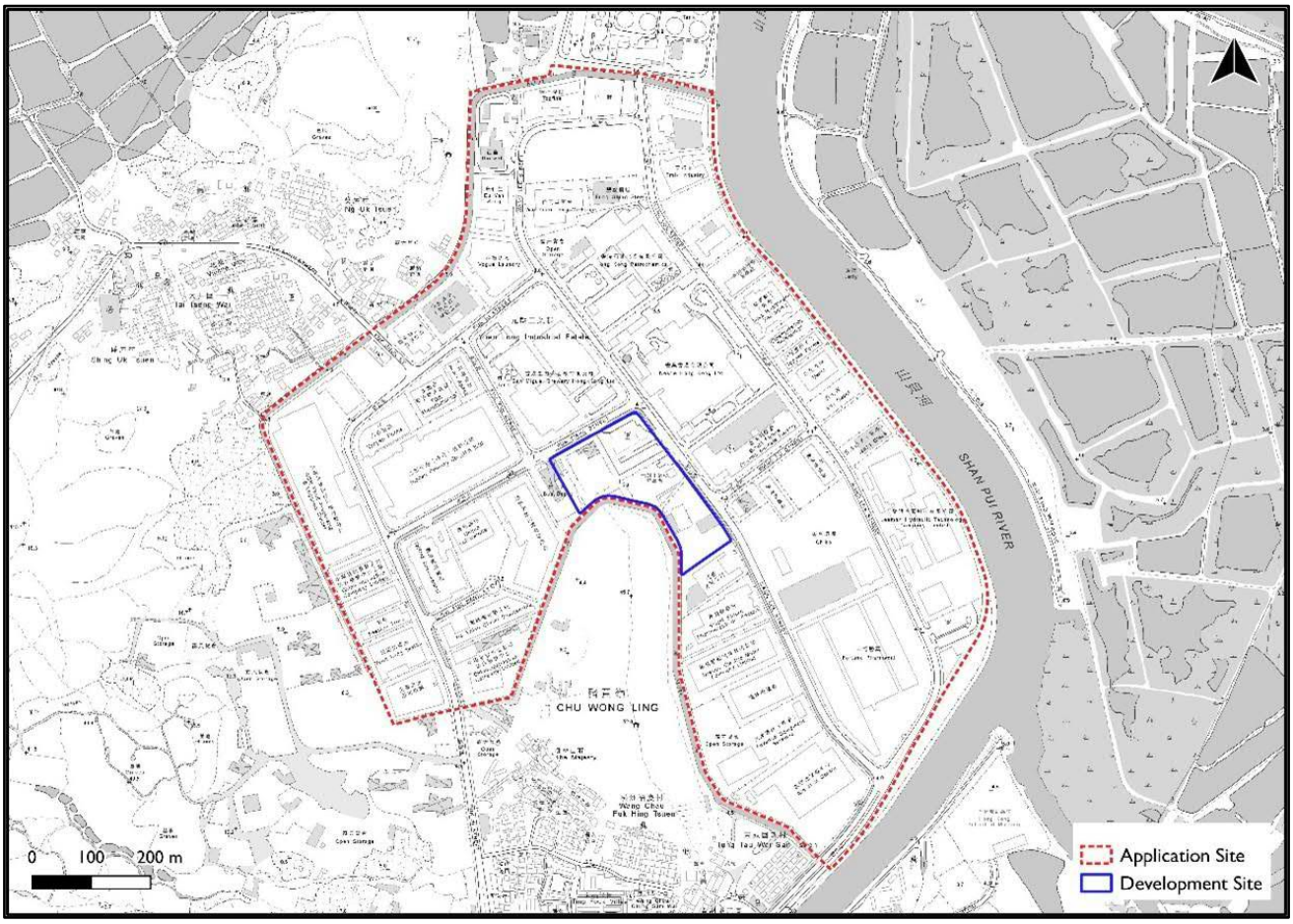
1 Introduction

1.1 Background

1.1.1 This Sewerage Impact Assessment Report is prepared to support a Section 16 planning application for the proposed multi-storey buildings (MSBs) development (Proposed Development) near Yuen Long Industrial Estate (YLIE), Yuen Long.

1.1.2 A Site Location Plan of the Development Site (the Site) is shown in **Figure 1.1**.

Figure 1.1: Site Location Plan



1.2 Structure of this Report

1.2.1 This report contains the following sections in addition to this introduction (Section 1):

Section 2 – Development Proposal

Section 3 – Methodology and Design Parameters for Sewerage Impact Assessment

Section 4 – Estimation of Sewage Flow under the Existing Conditions

Section 5 – Sewerage Impact Assessment and Sewage Discharge Arrangement

Section 6 – Conclusion

1.3 Abbreviations

1.3.1 The following abbreviations shall have the meaning hereby assigned to them except when the context of this Report otherwise requires:

Abbreviation for Bureaux/Departments/ organisations	**Full title**
ADWF	Average Dry Weather Flow
BRAVO	Building Records Access and Viewing On-line
CEDD	Civil Engineering and Development Department
DSD	Drainage Services Department
EMSD	Electrical and Mechanical Services Department
EPD	Environmental Protection Department
GESF	Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning
GFA	Gross Floor Area
GUFF	Global Unit Flow Factor
HKPSG	Hong Kong Planning Standards and Guidelines
KMB	The Kowloon Motor Bus Company (1933) Limited
L/UL	Loading/Unloading
MMHK	Mott MacDonald Hong Kong Limited
MSB(s)	Multi-storey Building(s)
Pcif	Catchment Inflow Factors
PlanD	Planning Department
PR	Plot Ratio
NDA(s)	New Development Area(s)
TP	Technical Paper
TPEDM	Territorial Population and Employment Data Matrix
UFF(s)	Unit Flow Factor(s)
YLIE	Yuen Long Industrial Estate
YLSTW	Yuen Long Sewage Treatment Works

2 Development Proposal

2.1 Indicative Layout of Proposed MSBs Development

2.1.1 The Site is proposed to provide three sites (**Sites A, B and C**) each about 1 ha to accommodate MSBs developments for industrial uses, totalling 3.23 ha in area.

2.1.2 **Figure 2.1** illustrates the indicative division of land parcels in the Site. It should be noted that the land parcels for proposed MSBs shown in the Site is indicative and solely for technical assessments purpose.

2.1.3 The proposed MSBs at Sites A, B and C are to be developed at a plot ratio of 5 with not more than 10 storeys excluding basement level above ground level.

2.1.4 It is anticipated that the land will be disposed by tender and the MSBs are targeted to start the operation in 2028/2029, with a construction period of 4 to 5 years. Major development parameters and proposed floor uses of the proposed MSBs are summarised in **Table 2.1** and **Table 2.2,** respectively.

Figure 2.1: Indicative Land Parcel for MSBs Development within the Development Site

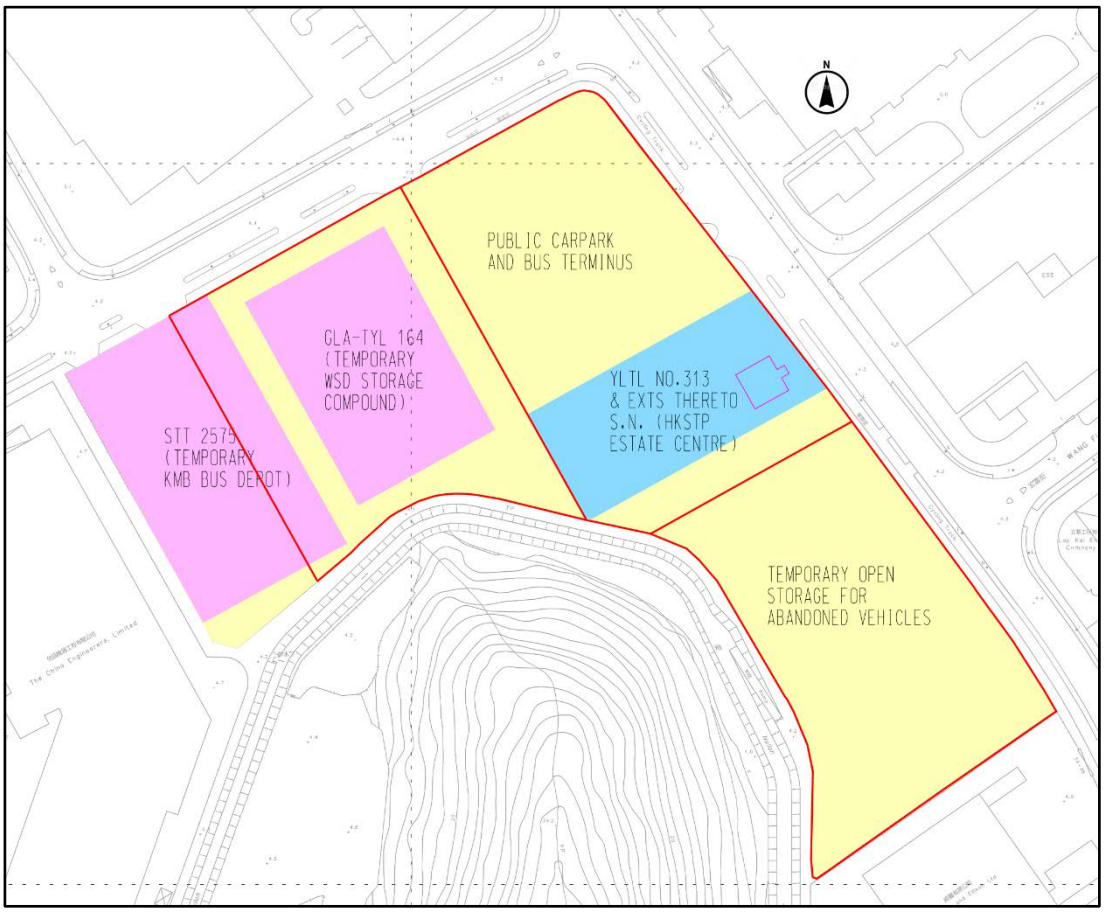


Table 2.1: Development Parameters for Indicative Scheme

Parameters	MSB in Site A	MSB in Site B	MSB in Site C	Total
Site Area	0.98 ha	1.25 ha	1.00 ha	3.23 ha
Maximum Plot Ratio	5			
GFA (m2)	49,000	62,500	50,000	161,500
Site Coverage	Not Specified			
Class of Site	Class A	Class B	Class A	
Land Uses	Vehicle Servicing and Maintenance and/or Logistics Uses + Not less than 30% for accommodating eligible brownfield operators displaced by the government-led development projects (industrial uses)			
No. of Storeys	No more than 10 storeys above ground level			

Table 2.2: Indicative Floor Uses of MSBs Development in Sites A, B and C

Floor	Proposed Uses
G/F-9/F	• Vehicle Servicing and Maintenance; • Logistics Uses; and/or • Industrial Uses (for accommodating eligible brownfield operators)
Basement (1 Level)	Public Vehicle Parking (in Site B)[1]

[1] Subject to the detailed design, a basement may be constructed in Site A and Site C to take up some underground space for ancillary parking, plant room, etc.

3 Methodology and Design Parameters for Sewerage Impact Assessment

3.1 General Approach

3.1.1 The sewerage impact assessment is carried out to identify, assess and mitigate any potential adverse sewerage impacts which may arise from the proposed MSBs (the Development).

3.2 Methodology

Assessment Approach

3.2.1 The following approach and methodology have been adopted in this sewerage impact assessment:-

- Conduct desktop study and site visit to collect relevant information for the assessment;
- Investigate and review the existing / planned sewerage networks and sewage treatment facilities in the vicinity of the development and determine the sewage flow and pollutant loading generated from the existing development;
- Determine the potential sewage arising from the Development;
- Study and assess the impacts of discharging sewage from the Development to the existing / planned sewerage systems in YLIE area; and
- Formulate options to mitigate the sewerage impacts identified and recommend the required sewage disposal system, if found necessary.

3.2.2 For the proposed sewerage and associated works, Colebrook-White equation has been used to assess the hydraulic conditions of the proposed sewers.

Collected Information

3.2.3 Desktop study and site visit have been undertaken to collect the relevant information for the assessment. The relevant information collected or reviewed is summarised below:-

- Drainage record plans from the Drainage Services Department (DSD);
- The details of Drainage pipes and Manholes from the GeoInfo Map contributed by the DSD;
- Environmental Impact Assessment Report of “Agreement No. CE3/2015 (DS) Yuen Long Effluent Polishing Plant – Investigation, Design and Construction”;
- 2019-based TPEDM;

- Related plan(s) / documents(s) of building record from Building Records Access and Viewing On-line (BRAVO) System;

Design Standards, Guidelines and Reference

3.2.4 The sewage flow generated from the Development is based on the following standards, guidelines and reference:-

- Sewerage Manual published by DSD;
- Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) (Version 1.0) published by Environmental Protection Department (EPD); and
- HKPSG.

3.3 Design Parameters and Assumptions

Design Population

3.3.1 It is envisaged that the sewage from the Development, comprising Sites A, B and C, will be discharged to the sewer manholes and pipes along Wang Lee Street and Fuk Wang Street. The adequacy of the existing sewer system at the two streets to take up the additional sewage is examined in this report.

3.3.2 The design population of the existing developments along the two streets for Design Year 2029 is determined using the following approach:

- Obtain the gross floor areas (GFAs) of the existing developments by referring to the general building plans (GBPs) recorded in the BRAVO System
- Determine the design population for the design year with reference to the 2019-based TPEDM.
- Assess the sewage flow generated from the design population.
- For large developments with sewer connections to more than one street, the relevant GBPs are examined and the sharing of sewage discharge to Fuk Wang Street/Wang Lee Street is assessed.

3.3.3 The estimated populations for Design Year 2029 of the existing developments along Fuk Wang Street and Wang Lee Street are shown in **Table 3.3.1 and Table 3.3.2**, respectively. Locations of these existing developments are shown in **Annex B**.

Table 3.3.1: Estimated Population for Existing Development Along Fuk Wang Street for Design Year 2029

Land Parcel ID	Current Use	GFA in Building Plans (m^2)	Population (Remark)
12	Bus Depot	5,330	72
14	San Miguel Brewery	45,105	602
Total			674

Remark:-

Population estimation is based on the following: -

- According to the 2019-based TPEDM, the MSB sites falls within Yuen Long Zone, Planning Data Zone 232.
- Based on 2019-based TPEDM, the numbers of employees for relevant Planning Data Zone 232 of YLIE are 8500 for 2019 and 7400 for 2031 respectively. The corresponding employment densities are 76.47m^2/worker and 85.37m^2/worker for 2019 and 2031, assuming the total GFA remains the same. According to HKPSG, the employment density for the industrial estate shown in Table 2 is 75m^2/worker, which is greater than the corresponding employment densities of 76.47m^2/worker and 85.37m^2/worker. Therefore, the employment density of 75m^2/worker is adopted conservatively.

Table 3.3.2: Estimated Population for Existing Development Along Wang Lee Street for Design Year 2029

Land Parcel ID	Current Use	GFA in Building Plans (m^2)	Population (Remark)
1	Advance Equipment	3,133	42
2	Bright Future (5)	21,857	292
3	Fortune Pharmacel	30,082	402
4	Dragon Electric Motor	9,886	132
5	Chiho-Tiande	14,797	198
6	Bright Future (4)	14,326	192
7	Viking's	3,875	52
8	Lap Kai	1,795	24
9	Bright Future (2)	7,495	100
10	Bright Future (1)	13,319	178
11	Estate Centre	191	10
13	Nestle Hong Kong	30,479	407
15	HK Petrochemical	16,505	221
Total			2,250

Remark:-

- Population estimation is based on the same assumptions as for Table 3.3.1.
- The population of the estate centre is based on Table 2 of HKPSG, the density of the worker for business use is 20m^2/worker.

3.3.4 For the Development, the estimated population for Design Year 2029 is shown in **Table 3.3.3**. Derivation of the employment densities for estimation of the populations for the Development is described in **Annex A**.

Table 3.3.3: Estimated Population for Proposed MSBs

Use	GFA in Building Plans (m^2)	Population (Remark)		
		Vehicle Servicing and Maintenance	Brownfield Operation	Total
Proposed MSB in Site A	49,000	693	175	868
Proposed MSB in Site B	62,500	884	224	1,108
Proposed MSB in Site C	50,000	708	179	887
New Estate Centre (next to Site A)	19,500[2]	-	-	975

Remark:-

Population for proposed MSBs is calculated based on the following uses of GFA in the MSBs:-

a. 70% of MSB GFA is assumed serving vehicle servicing and maintenance with an employment density of 49.5 m^2/worker (**Annex A**); in case logistics is adopted as the major land use, the corresponding employment density of 84 m^2/worker (**Annex A**), the sewerage impact will be less.

b. 30% of GFA serving brownfield operation with an employment density of 84m^2/worker.

Population for the proposed Estate Centre with a land take of 3,900 m^2 is calculated based on the conservative assumption that the Estate Centre is developed to the maximum plot ratio of 5.0:-

a. The Estate Centre will be served as office with an employment density of 20 m^2/worker according to HKPSG.

Unit Flow Factors (UFFs)

3.3.5 The adopted UFFs are in accordance with Table T-3 of the GESF. The category of the components and the UFFs adopted in the assessment are indicated in **Table 3.3.4**.

[2] Assume conservatively to develop the site to a plot ratio of 5.0.

Table 3.3.4 Unit Flow Factors

Component	Category Use	Unit Flow Factors (m^3/d/p)
Industrial	Existing Industrial Activities in Yuen Long	2.08 [3]
Industrial	Vehicle Servicing and Maintenance in Proposed MSBs (assumed)[4]	0.73 [5]
Commercial	Brownfield Operation in Proposed MSBs	0.23 [6]
Commercial	Estate Centre	0.08 [7]

3.3.6 Catchment Inflow Factors (P_{cif}) caters for the net overall ingress of water or wastewater to the sewerage system. They are catchment-dependent and applicable to major sewerage facilities of a catchment.

3.3.7 For the existing sewerage system in Yuen Long, P_{cif} of 1.00 is adopted in accordance with Table T-4 of the GESF.

Peaking Factors

3.3.8 Peaking factors cater for seasonal / diurnal fluctuation and normal amount of infiltration and inflow. The peaking factors shall be in accordance with Table T-5 of GESF and are shown in the **Table 3.3.5**. For this assessment, though separate drainage system and sewerage system are provided in the YLIE area, it is considered that stormwater may be collected through the sewerage system in the YLIE area, Peaking factor (including stormwater allowance) should be used.

[3] The adopted unit flow factor (2.08m^3/day) is the sum of "Industrial Employee" (0.08m^3/day) and "Industrial Activities in Yuen Long" (2.00m^3/day) according to Table T-3 of GESF.

[4] If logistics is adopted as the major land use, the sewerage impact will be less critical. See footnote 5 below for the assessment of the corresponding unit flow factor.

[5] It is considered that the activities UFF of 2.0m^3/employee/day for the industrial flow of Yuen Long (Table V1(b) of GESF) is not applicable to the vehicle servicing and maintenance in the proposed MSBs because the operations in vehicle servicing and maintenance do not consume a significant amount of water. As such, the UFF for other industrial areas in Hong Kong such as Tsuen Wan and Kwai Chung where there are many vehicle servicing and maintenance. The UFF for industrial flows in Tsuen Wan is 0.65 m^3/employee/day according to the same table, which is also higher than the territorial average of 0.56 m^3/employee/day. Therefore, 0.65 m^3/employee/day is adopted for this assessment, which is likely on the conservative side, and the unit flow factor is 0.73m^3/employee/day, being the sum of "Industrial Employee" (0.08m^3/day) and 0.65m^3/employee/day.

[6] For brownfield operations the relevant commercial activities are "J3 Transport, Storage & Communication" which are typical of the logistics industry; or "J9 construction" which may represent the warehouse storage and handling of construction-related materials and plants on brownfield sites. According to Table T-2 of GESF, J9 has a higher unit flow factor of 0.15 m^3/day than that of J3 (0.1 m3/day). Therefore, the adopted unit flow factor is 0.23m^3/day, being the sum of "Commercial Employee" (0.08m^3/day) and "Commercial activities J9 - Construction" (0.15m^3/day).

[7] The unit flow factor for commercial activity "J6 Finance, Insurance, Real Estate & Business Services" adopted for the Estate Centre is 0.08m3/day which only takes account of the "commercial employee" (0.08m3/day) based on Table T-2 of GESF.

Table 3.3.5: Peaking Factors for Various Population Ranges

Population Range	Peaking Factor (including stormwater allowance) for facility with existing upstream sewerage	Peaking Factor (excluding stormwater allowance) for facility with new upstream sewerage
Sewers		
< 1,000	8	6
1,000 – 5,000	6	5
5,000 – 10,000	5	4
10,000 – 50,000	4	3
> 50,000	Max ($7.3/N^{0.15}$, 2.4)	Max ($6/N^{0.175}$, 1.6)
Sewage Treatment Works, Preliminary Treatment Works and Pumping Stations		
< 10,000	4	3
10,000 – 25,000	3.5	2.5
25,000 – 50,000	3	2
> 50,000	Max ($3.9/N^{0.065}$, 2.4)	Max ($2.6/N^{0.065}$, 1.6)

Note:-

N = Contributing population in thousands.

$$Contributing\ Population = \frac{Calculated\ total\ average\ flow\ (m^3/day)}{0.27\ (m^3/day)}$$

4 Estimation of Sewage Flow under the Existing Conditions

4.1 Existing Sewerage and Sewage Treatment Facilities

Existing Sewerage System

4.1.1 The Development sites and the site for relocated Estate Centre fall within the sewage catchment boundary of YLSTW. According to DSD drainage record, the existing sewerage system relevant to the Development comprises:

Sewer along Fuk Wang Street

a) 300 mm dia. to 375 mm dia. sewer pipes running along Fuk Wang Street to the east and connected to manhole (FMH1008636) which conveys sewage along Wang Lee Street via a 750 mm dia. sewer pipe.

Sewer along Wang Lee Street

b) Start with a 300 mm dia. sewer pipe upstream; the sewer pipeline increases to 600 mm dia. when reaching the junction with Wang Fu Street, where a 300 mm sewer pipe discharges the collected sewage from Wang Fu Street to manhole (FMH1008666);

c) Between Wang Fu Street and Fuk Wang Street, the sewer pipeline increases from 600 mm dia. to 750 mm dia.;

d) The sewer pipeline keeps constant in size of 750 mm dia. before reaching the junction with Fuk Hi Street;

e) Beyond Fuk Hi Street, the sewer pipeline further increases in carrying capacity with larger pipes, from 750 mm dia. to 1200 mm dia. up to the junction with Wang Lok Street;

4.1.2 Eventually, the collected sewage is delivered to the YLSTW via a 1,800 mm dia. sewer pipe and a 1,800 mm x 1,800 mm single cell box culvert along the Wang Lok Street. The layout of the existing sewerage system is shown in **Drawings no. MMH/369397/SIA/001A** to **MMH/369397/SIA/001G**.

Further Expansion of YLSTW

4.1.3 DSD commissioned a feasibility study under Agreement No. SP 06/2013 “Effluent Polishing Scheme at Yuen Long Sewage Treatment Works (YLSTW) – Treatment Process Study” to review the sewage flow projection and treatment process for YLSTW upgrading. The findings of the feasibility study identified that the existing capacity of YLSTW of 70,000 m^3/d would be fully committed in 2025. The design capacity is recommended to be further upgraded in two phases.

4.1.4 In order to meet EPD's requirement of "No net increase in pollution load to Deep Bay", YLSTW will be upgraded to an effluent polishing plant with tertiary treatment level to reduce the residual pollution loading of the treated effluent. Phase 1 of the upgrading works is in progress for commissioning around year 2027. The upgrading works would be up to tertiary treatment level and would have a capacity of 100,000 m^3/d to cater for new developments in the area.

4.2 Estimated Sewage Flow from the Existing Sites

Existing Sewerage System

4.2.1 Average Dry Weather Flows (ADWF) for existing sites are calculated based on estimation of the projected population for Design Year 2029 presented in **Table. 3.3.1** and **Table. 3.3.2** and the UFFs with reference to the EPD's GESF. The adopted UFF of 2.08 m^3/d/p is referred to "Industrial Activities in Yuen Long" in Table T-3 of GESF. For estate centre, the UFF of 0.08 m^3/d/p is adopted which is referred to "commercial activity J6 - Finance, Insurance, Real Estate & Business Services" in Table T-2 of GESF.

4.2.2 It is noted that some existing sites between Fuk Wang Street and Wang Lee Street; or between Wang Lee Street and Wang Lok Street, have more than one discharge point. The distributions of the ADWF to different discharge points for those sites are described in **Annex B**.

4.2.3 The estimated sewage flows generated from the existing sites and discharged to Fuk Wang Street and Wang Lee Street are summarized in **Table 4.2.1** and **Table 4.2.2**. The total sewage flow is estimated to be 3,538.88 m^3/d (40.96 l/s).

Table 4.2.1: Estimated Sewage Flow for Existing Sites at Fuk Wang Street for Design Year 2029

Land Parcel ID	Current Uses	Connecting Manhole	Population	ADWF (m^3/d)	ADWF (l/s)
12	**Bus Depot**	FMH1008652	72	149.76	1.73
14	**San Miguel Brewery**	FMH1008658	81 (13.3% of 602)	168.48	1.95
Total					3.68

Table 4.2.2: Estimated Sewage Flow for Existing Sites at Wang Lee Street for Design Year 2029

Land Parcel ID	Current Uses	Connecting Manhole	Population[8]	ADWF (m3/d)	ADWF (l/s)
1	**Advance Equipment**	FMH1008682	42	87.36	1.01
2	**Bright Future (5)**	FMH1008682	292	607.36	7.03
3	**Fortune Pharmacel**	FMH1008682	134 (33.3% of 402)	278.72	3.23
4	**Dragon Electric Motor**	FMH1008682	132	274.56	3.18
5	**Chiho-Tiande**	FMH1008682	99 (50% of 198)	205.92	2.38
6	**Bright Future (4)**	FMH1008682	192	399.36	4.62
7	**Viking's**	FMH1008682	52	108.16	1.25
8	**Lap Kai**	FMH1008667	24	49.92	0.58
9	**Bright Future (2)**	FMH1008666	100	208.00	2.41
10	**Bright Future (1)**	FMH1008666	89 (50% of 178)	185.12	2.14
11	**Estate Centre**	FMH1008664	10	0.80	0.01
12	**Bus Depot (from Fuk Wang Street)**	FMH1008636	72	149.76	1.73
13	**Nestle Hong Kong**	FMH1008635	204 (50% of 407)	424.32	4.91
14	**San Miguel Brewery (from Fuk Wang Street)**	FMH1008636	81 (13.3% of 602)	168.48	1.95
	San Miguel Brewery (directly to Wang Lee Street)	FMH1008633	161 (26.7% of 602)	334.88	3.88
15	**HK Petrochemical**	FMH1009476	27 (12% of 221)	56.16	0.65
Total				3,538.88	40.96

4.2.4 For the estimated ADWF shown in **Table 4.2.1** and **Table 4.2.2**, the peak flow is assessed by multiplying the cumulative ADWF with a peaking factor calculated according to the **Table 3.3.5**.

[8] For the share contributing sewage flow in Wang Lee Street

4.2.5 The hydraulic capacities of the existing sewers assuming flowing full are assessed using the Colebrook-White equation. The results for the sewer pipes fronting the MSBs sites at Fuk Wang Street and Wang Lee Street are shown in **Table 4.2.3** and **Table 4.2.4**.

Table 4.2.3: Existing Sewer Pipes Check at Fuk Wang Street

From	To	Pipe Dia. (mm)	Cumulative ADWF (l/s)	Peak Flow (l/s)	Full Flow Capacity (l/s)	Utilization
FMH1008652	FMH1008658	300	1.73	13.87	44	31%
FMH1008658	FMH1008659	375	3.68	22.10	70	32%
FMH1008659	FMH1008660	375	3.68	22.10	72	31%
FMH1008660	FMH1008692	375	3.68	22.10	73	30%
FMH1008692	FMH1008636	375	3.68	22.10	76	29%

Table 4.2.4: Existing Sewer Pipes Check at Wang Lee Street

From	To	Pipe Dia. (mm)	Cumulative ADWF (l/s)	Peak Flow (l/s)	Full Flow Capacity (l/s)	Utilization
FMH1008664	FMH1008663	600	27.84	139.19	251	55%
FMH1008663	FMH1008662	600	27.84	139.19	253	55%
FMH1008662	FMH1008661	750	27.84	139.19	455	31%
FMH1008661	FMH1008694	750	27.84	139.19	491	28%
FMH1008694	FMH1008636	750	27.84	139.19	444	31%
FMH1008636	FMH1008635	750	31.52	126.09	566	22%
FMH1008635	FMH1008634	750	36.43	145.73	229	64%
FMH1008634	FMH1008633	750	36.43	145.73	449	32%
FMH1008633	FMH1008632	750	40.31	161.24	442	37%
FMH1008632	FMH1009476	750	40.31	161.24	723	22%
FMH1009476	FMH1008631	750	40.96	163.84	723	23%

5 Sewerage Impact Assessment and Sewage Discharge Arrangement

5.1 Estimated Sewage Flow from Proposed MSBs

5.1.1 The Development is to accommodate vehicle servicing and maintenance occupying about 70% of the GFA and brownfield operations occupying the remaining about 30% of the GFA.

5.1.2 Based on the design population for the Development concluded in **Table 3.3.3** and sewage unit flow factors summarized in **Table 3.3.4**, the ADWF from the MSBs development is estimated to be 1,802.45 m^3/d (23.77 l/s) as shown in **Table 5.1.1**. The total ADWF from the Development and New Estate Centre is estimated to be around 1,880 m^3/d (24.80 l/s).

Table 5.1.1: Estimated Sewage Flow for Proposed MSBs for Design Year 2029

Proposed Use	Population		UFF m^3/d/p		ADWF (m^3/d)
	Vehicle Servicing and Maintenance	Brownfield Operation	Vehicle Servicing and Maintenance	Brownfield Operation	
Proposed MSB in Site A	693	175	0.73	0.23	546.14
Proposed MSB in Site B	884	224	0.73	0.23	696.84
Proposed MSB in Site C	708	179	0.73	0.23	558.01
Total					1,802.45
New Estate Centre (next to Site A)	Office: 19,500		0.08		78
Total					1,878.99

5.2 Planned Increase in Sewage Treatment Capacity

5.2.1 In order to meet EPD's requirement of "No net increase in pollution load to Deep Bay", YLSTW will be upgraded to an effluent polishing plant with tertiary level to reduce the residual pollution loading of the treated effluent. Phase 1 of the upgrading works would have a capacity of 100,000 m^3/d to cater for the new developments, which is expected to be commissioned around year 2027.

5.2.2 The estimated sewage of 1,880 m^3/d generated from the proposed Development and New Estate Centre for Design Year 2029 is to be conveyed via the existing sewer pipes along Fuk Wang Street and Wang Lee Street, eventually to the YLSTW.

5.2.3 The estimated sewage generated from the MSBs and the New Estate Centre will take up only about 1.88% capacity of the Phase 1 of the upgrading works of YLSTW.

5.3 Impact to Existing Sewers at Fuk Wang Street and Wang Lee Street for Design Year 2029

5.3.1 It is proposed that sewage from the proposed MSB in Site A and the New Estate Centre would be discharged to the existing sewer pipes at Fuk Wang Street, to manholes FMH1008658 and FMH1008652 respectively. The collected sewage will then be conveyed to sewer pipes at Wang Lee Street via manhole FMH1008636.

5.3.2 Sewage from Sites B and C would be discharged to the sewer pipes at Wang Lee Street, to manholes FMH1008662 and FMH1008665 respectively.

5.3.3 The hydraulic capacities of the existing and proposed sewers assuming flowing full are assessed using the Colebrook-White equation. The results are enclosed in **Annex B**. Considering the amount of sewage from the three sites, sewer pipes of 225mm diameter may be used for discharge of sewage from the sites to the connecting manholes. The proposed connections are shown in **Drawing no. MMH/369397/SIA/002**.

5.3.4 **Table 5.3.1** and **Table 5.3.2** below compare the hydraulic capacities of the existing sewers fronting the Development and New Estate Centre.

Table 5.3.1: Hydraulic Capacities for Existing and Proposed Condition at Fuk Wang Street for Design Year 2029[9]

From	To	Pipe Diameter (mm)	Existing Condition (Capacity Utilisation)	Proposed Condition (Capacity Utilisation)
FMH1008652 (receive sewage from New Estate Centre)	FMH1008658	300	31%	16%
FMH1008658 (receive sewage from Site A and)	FMH1008659	375	32%	78%
FMH1008659	FMH1008660	375	31%	77%
FMH1008660	FMH1008692	375	30%	76%
FMH1008692	FMH1008636	375	29%	73%

[9] Only manholes and sewers receiving sewage from the proposed MSBs are included.

Table 5.3.2: Hydraulic Capacities for Existing and Proposed Condition at Wang Lee Street for Design Year 2029

From	To	Pipe Diameter (mm)	Existing Condition (Capacity Utilisation)	Proposed Condition (Capacity Utilisation)[10]
FMH1008665 (receive sewage from Site C)	FMH1008664	600	55%	55%
FMH1008664	FMH1008663	600	55%	55%
FMH1008663	FMH1008662	600	55%	54%
FMH1008662 (receive sewage from Site B)	FMH1008661	750	31%	37%
FMH1008661	FMH1008694	750	28%	34%
FMH1008694	FMH1008636	750	31%	38%
FMH1008636 (receive sewage from Site A and New Estate Centre via Fuk Wang Street)	FMH1008635	750	22%	36%
FMH1008635	FMH1008634	750	64%	98%
FMH1008634	FMH1008633	750	32%	50%
FMH1008633	FMH1008632	750	37%	55%
FMH1008632	FMH1009476	750	22%	33%
FMH1009476	FMH1008631	750	23%	34%

5.3.5 From the results shown in the **Table 5.3.1**, it is concluded that the existing sewers along Fuk Wang Street would have adequate capacity in handling the estimated sewage from the Site A for the Design Year 2029.

5.3.6 Along Wang Lee Street (**Table 5.3.2**), there would be sufficient capacity to deal with the estimated sewage from the Development for the Design Year 2029 except the existing sewer pipe from manhole FMH1008635 to FMH1008634 at proposed condition.

5.3.7 Compared with other sewer pipes along Wang Lee Street, the sewer pipe from manholes FMH1008635 to FMH1008634 has a smaller gradient, which leads to a lower full flow velocity and capacity and a high utilization of the sewer pipe.

[10] The decrease in capacity utilization for the existing condition compared with the proposed condition is due to a change of the peaking factor from 5 to 4 for the existing condition and the proposed condition, respectively.

5.4 Recommended Relining Work for Existing Sewers at Wang Lee Street

5.4.1 According to Table 5.3.2, utilisation of the sewer pipeline from Manhole FMH1008635 to Manhole FMH1008634 is assessed to be close to the limit of the pipeline capacity.

5.4.2 To mitigate the potential impact, relining of the section of sewer pipeline in question with Glass Reinforced Plastic (GRP) by future developer is recommended to enhance the hydraulic performance of the pipeline.

5.4.3 The GRP layer will provide a smooth surface to the pipe and reduce the pipe roughness, which can increase the full flow velocity. Although relining layer will slightly reduce the internal diameter of the pipe, there would still be an increase in the pipe full flow capacity.

5.4.4 The pipeline discharge check according to the reduced pipe roughness and diameter is enclosed in **Annex B**. The relevant results are summarized in **Table 5.4.1**.

Table 5.4.1: Hydraulic Capacities for pipelines after Relining for Design Year 2029

From	To	Relining Condition	Pipe Roughness (mm)	Pipe Diameter (mm)	Existing Condition (Capacity Utilisation)	Proposed Condition (Capacity Utilisation)
FMH1008635	FMH1008634	without Relining	3	750	64%	98%
		with Relining	0.06 (Note 1)	700 (Note 2)	54%	83%
		Long-term	0.6(Note 3)	700	63%	97%

Note 1: The reduced pipe roughness of 0.06mm is referred to the normal suitable value of roughness k_s for GRP in Table 5 of Sewerage Manual Part 1.
Note 2: The reduction of pipe diameter due to the liner is conservatively assumed to be 50mm.
Note 3: The reduced pipe roughness of 0.6mm is referred to the normal suitable value of roughness k_s under slimed sewer type (i.e. uPVC) to reflect the long-term condition.

5.5 Impact to Sewer Pipelines with Increasing Invert Level at Wang Lee Street

5.5.1 It is found that a section of the sewer pipeline between manhole FMH1008631 and FMH1008582 at Wang Lee Street has a negative gradient (i.e. an increase in the invert level from FMH1008631 to FMH1008582). This section of sewer pipeline locates at the junction of Wang Lee Street and Fuk Hi Street, which is about 300 m downstream of the proposed sewage discharge point from Site B.

5.5.2 InfoWorks ICM (version 10.08) has been utilized to create a hydraulic model for more detailed assessment of such section for both existing and proposed conditions for design year 2029. The design parameters and the outcomes of the ICM hydraulic model are enclosed in **Annex B1**.

5.5.3 It is concluded from the assessment that for both conditions, at least 2m freeboard

would still be achieved at the two manholes in question at the intersection of Wang Lee Street and Fuk Hi Street, which is considered acceptable.

5.5.4 In conclusion, the increasing invert level for the section of sewer pipeline in question will not cause any adverse hydraulic impact under the existing and planned conditions.

6 Conclusion

6.1.1 The sewage generated and discharged from the Development is assessed to be about 1,880 m^3/d.

6.1.2 From the hydraulic analysis, it is concluded that the existing sewers along Fuk Wang Street would have adequate capacity in handling the estimated sewage from the Site A for the Design Year 2029.

6.1.3 Along Wang Lee Street, relining work is recommended for the sewer pipeline between manholes FMH1008635 and FMH1008634 to enhance the hydraulic performance. The other sewer pipelines along Wang Lee Street would have sufficient capacity to handle the estimated sewage from the Development for the Design Year 2029.

6.1.4 More detailed assessment has been made to the sewer pipeline with increasing invert level from manhole FMH1008631 to FMH1008582 at the intersection of Wang Lee Street and Fuk Hi Street. The results show that at least 2m freeboard would still be achieved for both existing and proposed conditions for MSBs Development for the Design Year 2029.

6.1.5 The sewage will be discharged eventually to the YLSTW, which Phase 1 of upgrading works is in progress. It is assessed that the sewage generated from the MSBs will take up only about 1.88% of the capacity of Phase 1 of the upgrading works of YLSTW, which is considered acceptable.

6.1.6 To conclude, with the recommended relining to a section of the sewer pipeline at Wang Lee Street, the proposed MSBs development would not cause any adverse impact to the existing sewerage system in the YLIE area.

Drawings

MMH/369397/SIA/001	Key Plan for Existing Major Sewerage System within the Tentative Assessment Area of Yuen Long Area
MMH/369397/SIA/001A	Existing Major Sewerage System within the Tentative Assessment Area of Yuen Long Area (Sheet 1 of 7)
MMH/369397/SIA/001B	Existing Major Sewerage System within the Tentative Assessment Area of Yuen Long Area (Sheet 2 of 7)
MMH/369397/SIA/001C	Existing Major Sewerage System within the Tentative Assessment Area of Yuen Long Area (Sheet 3 of 7)
MMH/369397/SIA/001D	Existing Major Sewerage System within the Tentative Assessment Area of Yuen Long Area (Sheet 4 of 7)
MMH/369397/SIA/001E	Existing Major Sewerage System within the Tentative Assessment Area of Yuen Long Area (Sheet 5 of 7)
MMH/369397/SIA/001F	Existing Major Sewerage System within the Tentative Assessment Area of Yuen Long Area (Sheet 6 of 7)
MMH/369397/SIA/001G	Existing Major Sewerage System within the Tentative Assessment Area of Yuen Long Area (Sheet 7 of 7)
MMH/369397/SIA/002	Proposed Sewerage Network

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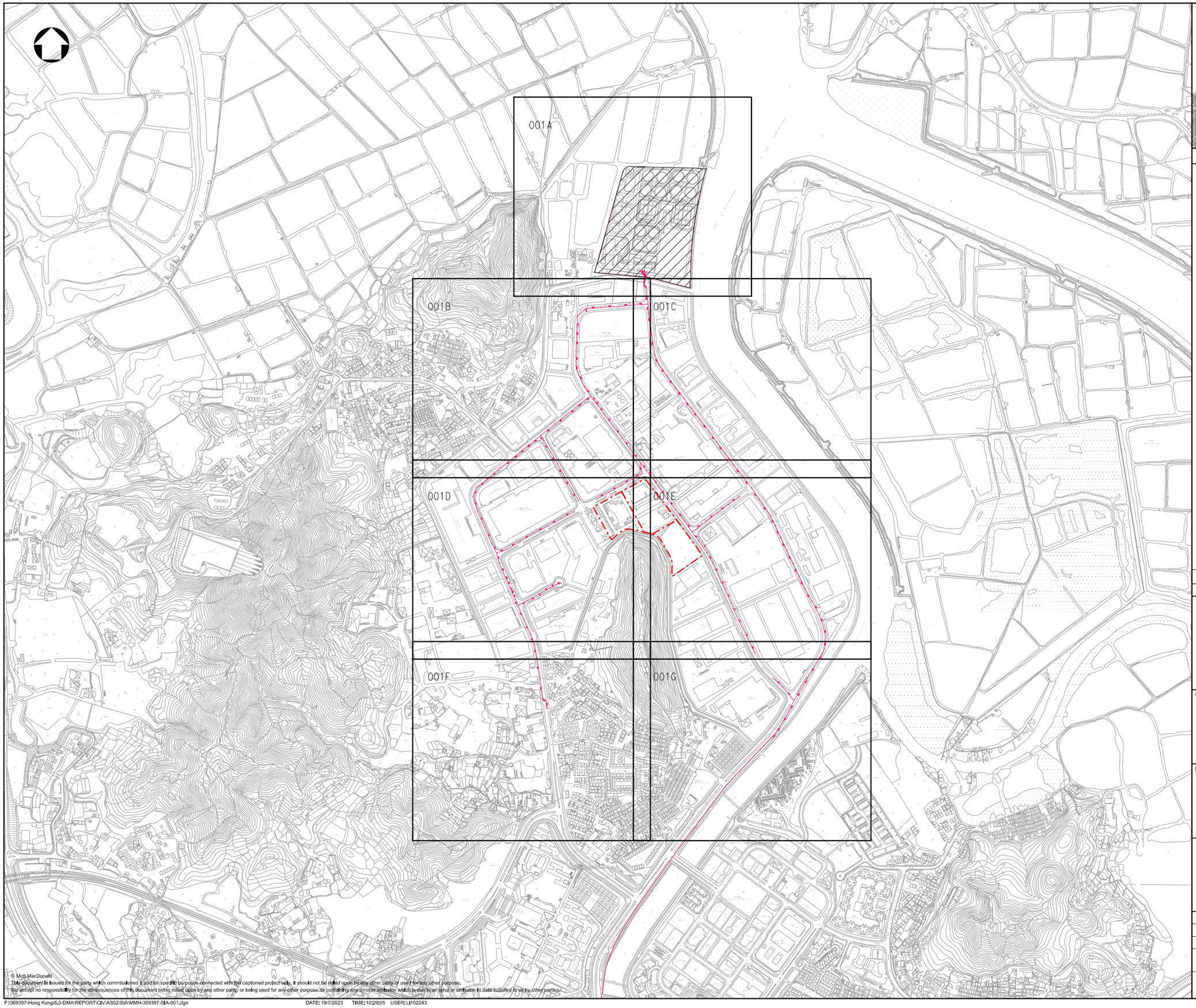

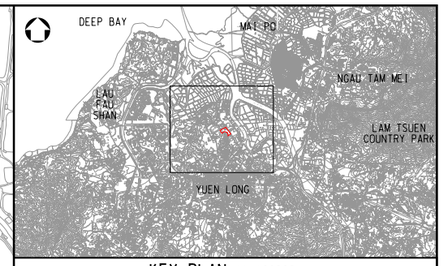

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LEGEND:

- DEVELOPMENT SITE
- EXISTING FOUL SEWER PIPE
- EXISTING RISING MAIN (SEWER)
- TUNNEL / BOX CULVERT (SEWER)

SOURCE:

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

KEY PLAN FOR EXISTING MAJOR SEWERAGE SYSTEM WITHIN THE OU (INDUSTRIAL ESTATE) ZONE OF YUEN LONG AREA

Designed	VARIOUS		Eng check	KS	
Drawn	EL		Coordination	KS	
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Title

EXISTING MAJOR SEWERAGE SYSTEM WITHIN THE TENTATIVE ASSESSMENT AREA OF YUEN LONG AREA (SHEET 1 OF 7)

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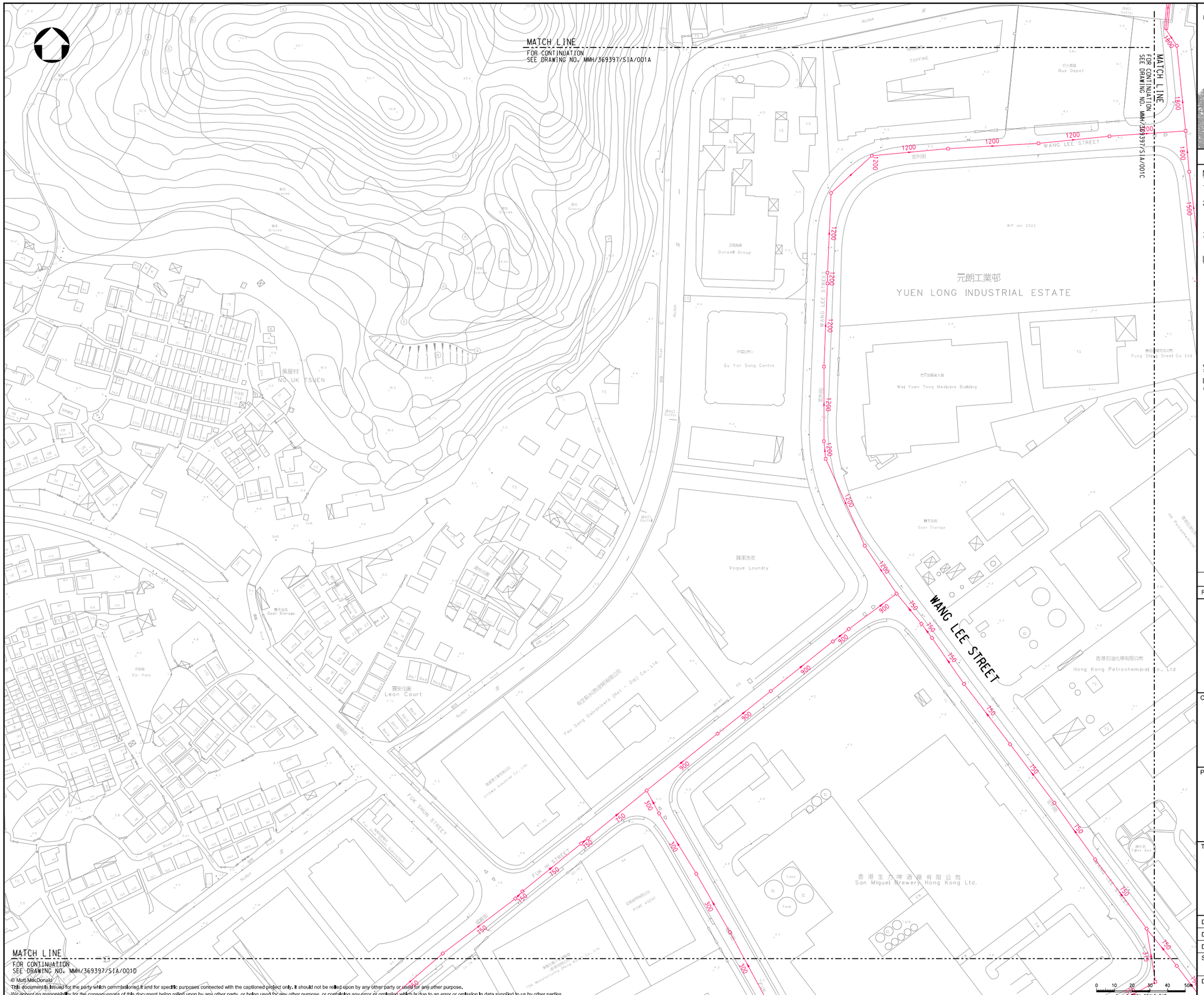

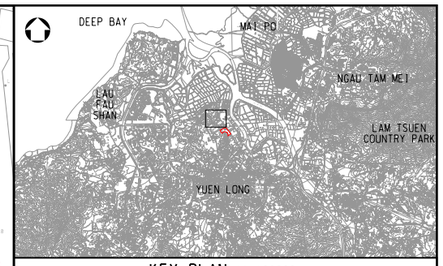

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EXISTING MAJOR SEWERAGE SYSTEM WITHIN THE OU (INDUSTRIAL ESTATE) ZONE OF YUEN LONG AREA (SHEET 2 OF 7)

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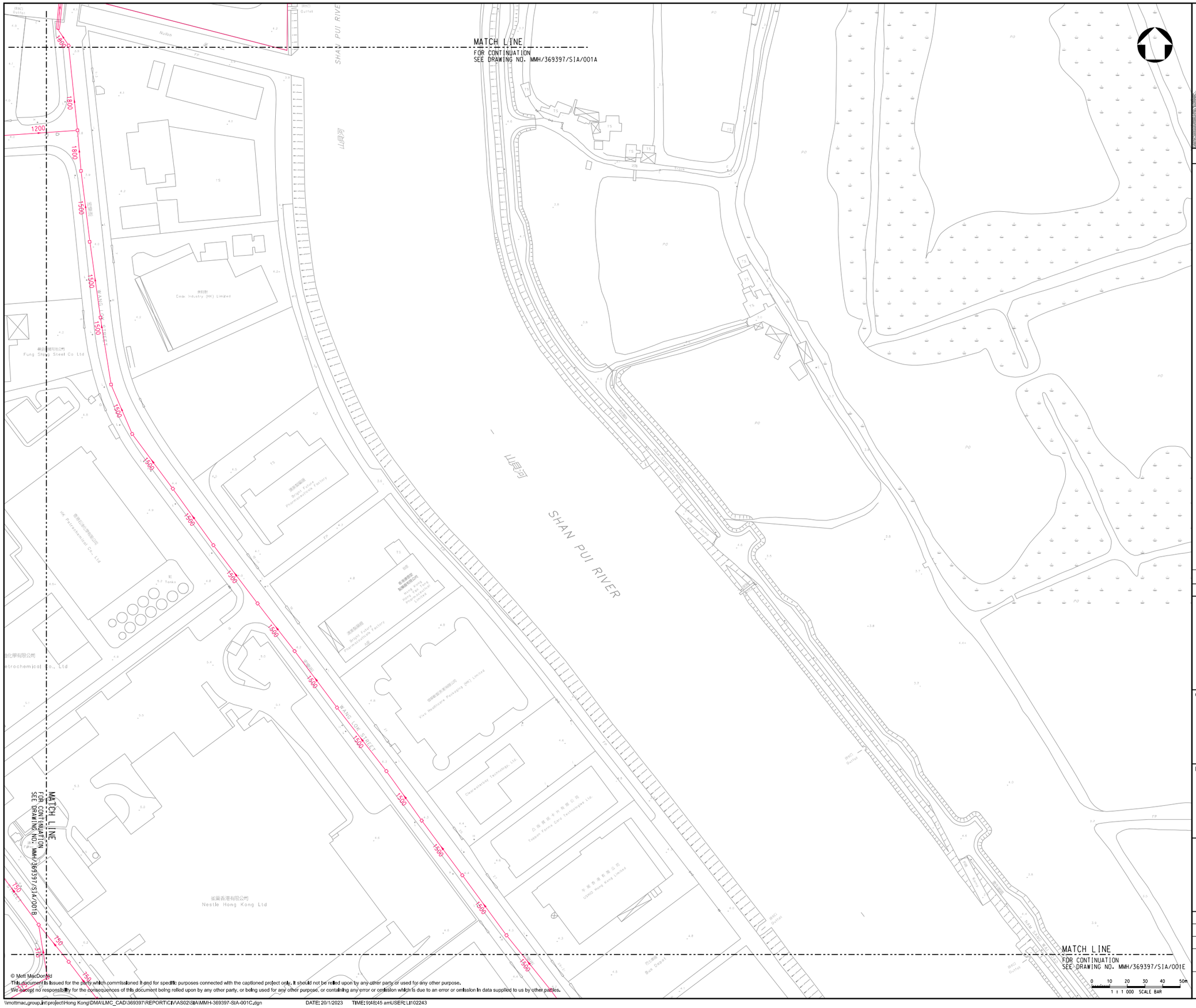



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EXISTING MAJOR SEWERAGE SYSTEM WITHIN THE OU (INDUSTRIAL ESTATE) ZONE OF YUEN LONG AREA (SHEET 3 OF 7)

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FUK WANG STREET

CHU WONG LING

MATCH LINE
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SEE DRAWING NO. MMH/369397/S1A/001F



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EXISTING MAJOR SEWERAGE SYSTEM WITHIN THE OU (INDUSTRIAL ESTATE) ZONE OF YUEN LONG AREA (SHEET 4 OF 7)

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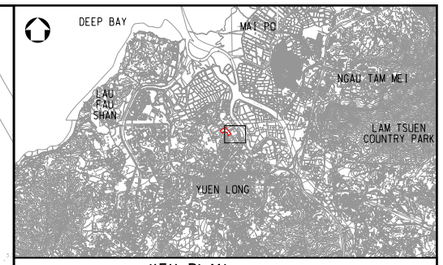

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LEGEND:

- DEVELOPMENT SITE
- EXISTING FOUL SEWER PIPE
- EXISTING RISING MAIN (SEWER)
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SOURCE:

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

EXISTING MAJOR SEWERAGE SYSTEM WITHIN THE OU (INDUSTRIAL ESTATE) ZONE OF YUEN LONG AREA (SHEET 5 OF 7)

Designed	VARIOUS		Eng check	KS	
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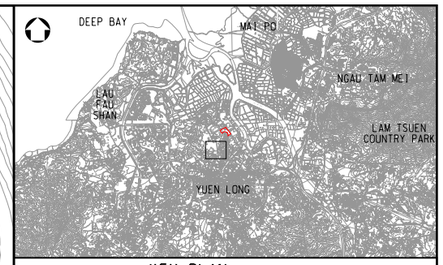

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SECTION 16 PLANNING APPLICATION
FOR MULTI-STOREY BUILDING
DEVELOPMENTS NEAR YUEN LONG
INDUSTRIAL ESTATE

Title

EXISTING MAJOR SEWERAGE SYSTEM WITHIN THE OU (INDUSTRIAL ESTATE) ZONE OF YUEN LONG AREA (SHEET 6 OF 7)

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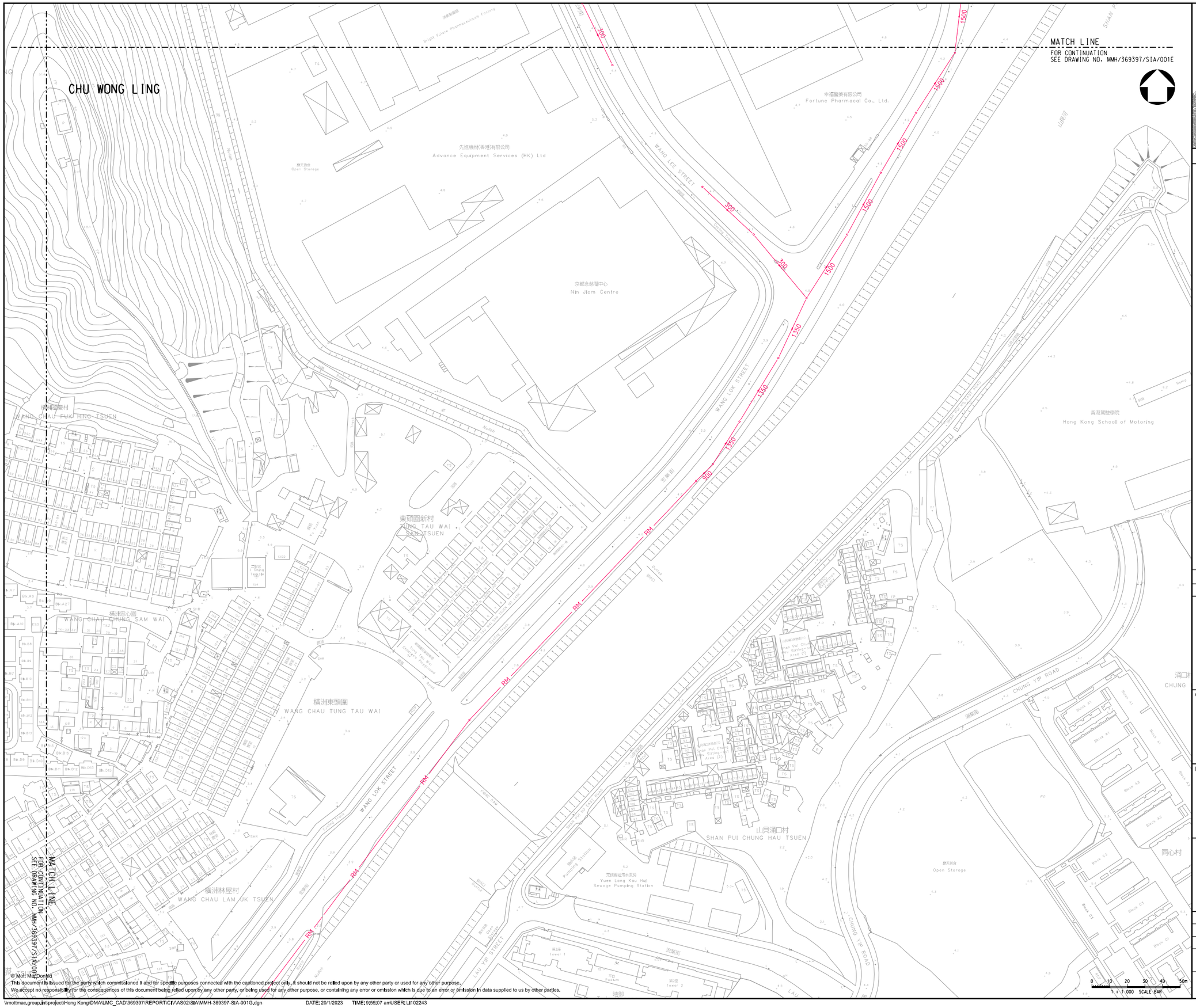



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EXISTING MAJOR SEWERAGE SYSTEM WITHIN THE OU (INDUSTRIAL ESTATE) ZONE OF YUEN LONG AREA (SHEET 7 OF 7)

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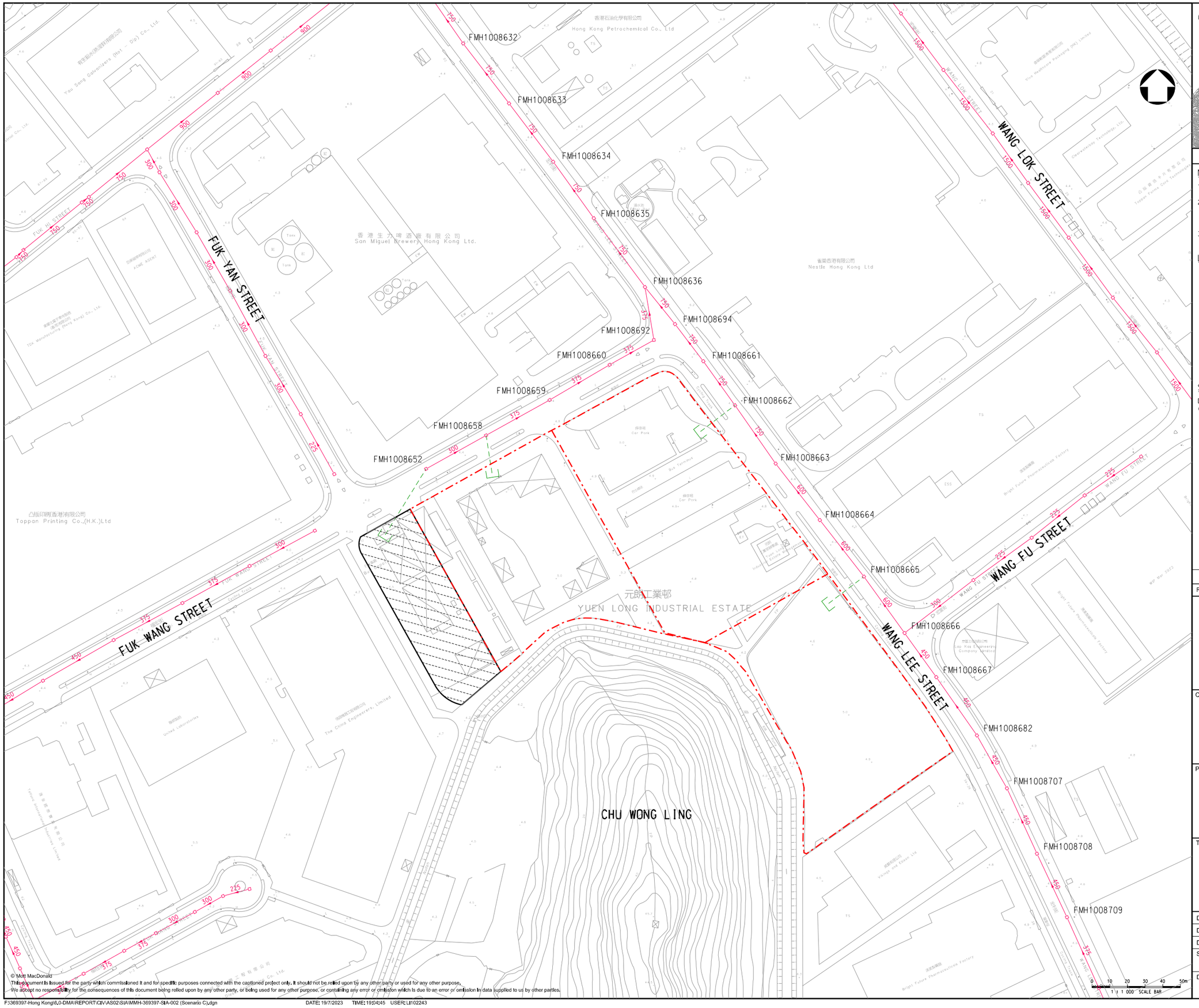



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LEGEND:

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- PROPOSED CONNECTION
- PROPOSED RE-PROVISIONING SITE FOR ESTATE CENTRE

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SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

PROPOSED SEWERAGE NETWORK

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Annexes

Annex A	Estimation of Employment for Proposed MSBs
Annex B	Estimation of Sewage Flow at Existing and Proposed Condition
Annex B1	Sewer Pipeline Check for the Section from FMH1008631 to FMH1008582

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Annex A

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Annex A Estimation of Employment for the Proposed MSBs

1. The proposed MSBs would be in operation in year 2029 to 2032 tentatively.
2. The proposed MSBs would be developed on the assumption of accommodating primarily vehicle servicing and maintenance (about 70% of the GFA) and brownfield operation including logistics (about 30% of GFA).
3. For vehicle servicing and maintenance and brownfield uses, there were five references for worker density from referencing the GBP records in the BRAVO system:

Table A.1: Worker Density from GBP records

Name of the Industrial Building	Type of uses	GFA in Building Plan (m^2)	Numbers of Workers	Worker Density (m^2/worker)
Dah Chong Hong Motor Service Building (Aberdeen)	Vehicle Servicing and Maintenance Related	52459.201	748	70.13
Dah Chong Hong Building (Kowloon)		80938.433	1635	49.50
Goodman Yuen Long Logistics Centre	Logistics	28783.629	136	211.64
Tsing Yi Mapletree Logistics Hub		84951.46	496	171.27
Tsing Yi Goodman Interlink		141682.703	1687	83.99

Table A.2: Worker density from other references

References	Type of Uses	Worker Density (m^2/worker)
HKPSG	Business Use	20
HKPSG	General Industrial use	25
	• Existing industrial areas	35
	• New industrial areas	700
	• Warehouses	20
	• Industrial/office use	
	Special industrial use	
	• Industrial Estate	75

4. It is proposed to adopt the following employee density in estimating the population of vehicle servicing and maintenance in the proposed MSBs:

    - 49.50m^2/worker for Dah Chong Hong Building in Kowloon
      which is the higher density of the two available references.

5. For the brownfield operations, it is noted that their nature is mainly of warehouse storage and/or provision of varying goods handling services on the stored items. From the available references, the worker density could vary greatly, from 700m^2 per worker for bulk warehouse storage to 84m^2 to 212m^2 per worker for logistics related operations. For the brownfield portions of the proposed MSBs, a worker density of 84m^2 per worker is adopted as a conservative approach.

6. For the New Estate Centre (NEC) next to Site A, an employment density of 20m^2 per worker is adopted, which is same as "Business Use" and "Industrial/Office Use" in HKPSG.

7. From the above worker densities, the estimated employment (population) for the proposed MSBs of Site A, B, and C are shown in Table A.3.

Table A.3: Estimated Employment for the Proposed MSBs

Site	GFA (m^2)		Population		
	Vehicle Servicing and Maintenance (70%)	Brownfield Operation (30%)	Vehicle Servicing and Maintenance	Brownfield Operation	Total
A	34300	14700	693	175	868
B	43855	18795	886	224	1110
C	35000	15000	708	179	887
NEC	Office: 19500		975		

Note: The numbers are rounded up to the nearest integer.

Annex B

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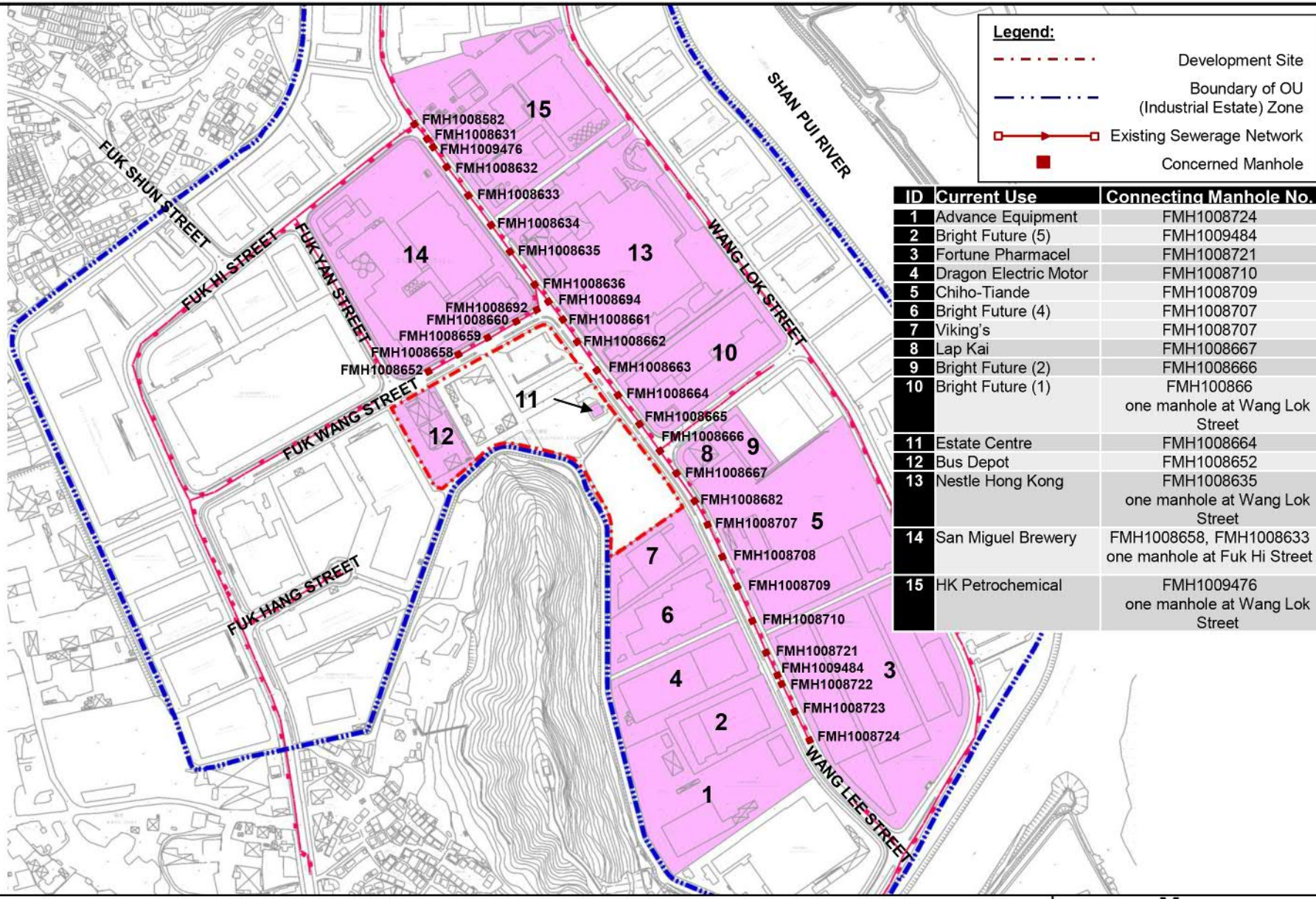

ID	Current Use	Connecting Manhole No.
1	Advance Equipment	FMH1008724
2	Bright Future (5)	FMH1009484
3	Fortune Pharmacel	FMH1008721
4	Dragon Electric Motor	FMH1008710
5	Chiho-Tiande	FMH1008709
6	Bright Future (4)	FMH1008707
7	Viking's	FMH1008707
8	Lap Kai	FMH1008667
9	Bright Future (2)	FMH1008666
10	Bright Future (1)	FMH100866 one manhole at Wang Lok Street
11	Estate Centre	FMH1008664
12	Bus Depot	FMH1008652
13	Nestle Hong Kong	FMH1008635 one manhole at Wang Lok Street
14	San Miguel Brewery	FMH1008658, FMH1008633 one manhole at Fuk Hi Street
15	HK Petrochemical	FMH1009476 one manhole at Wang Lok Street

Project Section 16 Planning Application for Multi-storey Building Developments near Yuen Long Industrial Estate

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Title Sewerage Catchment Plan for Existing Condition

Annex B

Date: Dec 2022 | Scale: N.T.S. | File

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Annex B - Estimation of Sewage Flow at Existing and Proposed Condition

Existing Population and Sewage Flow

References:
- Sewerage Manual Part 1
- EPD's Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning Version 1.0 (GESF)
- Building Plans of BRAVO System
- 2019-based TPEDM
- GeoInfo Map
- HKPSG

Remark:
- Land Parcel ID and land use refer to Sewerage Catchment Plan for Existing Condition
- GFA is based on building plans from BRAVO System (total GFA in YLIE is about 650,000m^2)
- Population estimation is based on the following: -
  1) According to the 2019-based TPEDM, the MSB sites fall within Yuen Long Zone, Planning Data Zone 232.
  2) Based on 2019-based TPEDM, the numbers of employees for relevant Planning Data Zone 232 of YLIE are 8500 for 2019 and 7400 for 2031 respectively. The corresponding employment densities are 76.47m^2/worker and 85.37m^2/worker for 2019 and 2031, assuming the total GFA remains the same. According to HKPSG, the employment density for the industrial estate shown in Table 2 is 75m^2/worker, which is greater than the corresponding employment densities of 76.47m^2/worker and 85.37m^2/worker. Therefore, the employment density of 75m^2/worker is adopted conservatively.
  3) The population of the estate centre is based on Table 2 of HKPSG, the density of the worker for business use is 20m^2/worker.
- Global unit flow factor (GUFF) for Industrial in Yuen Long is based on Table T-3 of GESF. The unit flow factor (2.08m^3/day) is the sum of “Industrial employee” (0.08m^3/day) and “Industrial activities in Yuen Long” (2.00m^3/day).
- The unit flow factor for commercial activity "J6 Finance, Insurance, Real Estate & Business Services" adopted for the Estate Centre is 0.08m^3/day which only takes account of the "commercial employee" (0.08m^3/day) based on Table T-2 of GESF.

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Existing Population and Average Dry weather Flow (ADWF)

ID	Site/ Building	Type	GFA	Population	GUFF (m^3/d/p)	ADWF (m^3/d)
1	Advance Equipment	Industrial in Yuen Long	**3133**	**42**	2.08	87.36
2	Bright Future (5)	Industrial in Yuen Long	**21857**	**292**	2.08	607.36
3	Fortune Pharmacel	Industrial in Yuen Long	**30082**	**134 (33.3% of 402)**	2.08	278.72
4	Dragon Electric Motor	Industrial in Yuen Long	**9886**	**132**	2.08	274.56
5	Chiho-Tiande	Industrial in Yuen Long	**14797**	**99 (50% of 198)**	2.08	205.92
6	Bright Future (4)	Industrial in Yuen Long	**14326**	**192**	2.08	399.36
7	Viking's	Industrial in Yuen Long	**3875**	**52**	2.08	108.16
8	Lap Kai	Industrial in Yuen Long	**1795**	**24**	2.08	49.92
9	Bright Future (2)	Industrial in Yuen Long	**7495**	**100**	2.08	208.00
10	Bright Future (1)	Industrial in Yuen Long	**13319**	**89 (50% of 178)**	2.08	185.12
11	Estate Centre	Commercial	**191**	**10**	0.08	0.80
12	Bus Depot	Industrial in Yuen Long	**5330**	**72**	2.08	149.76
13	Nestle Hong Kong	Industrial in Yuen Long	**30479**	**204 (50% of 407)**	2.08	424.32
14	San Miguel Brewery	Industrial in Yuen Long	**45105**	**81 (13.3% of 602) (via Fuk Wang St.)**	2.08	168.48
				161 (26.7% of 602)(via Wang Lee St.)	2.08	334.88
15	HK Petrochemical	Industrial in Yuen Long	**16505**	**27 (12% of 221)**	2.08	56.16

Estimated total Average Dry Weather Flow (ADWF) = 3538.88 m^3/d

= 40.96 l/s

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Existing Population and Average Dry weather Flow (ADWF)(Con't)

3) Fortune Pharmacel

Type:		Industrial	
GFA	=	30082	m^2
The density of the worker	=	75	m^2/person
Population	=	402	Persons
Contributing Poputaion for Flow to Wang Lee St.	=	33.33	%
		134	Persons

According to the BRAVO system, Fortune Pharmacel has three connection points. One sewage pipe with a maximum flow rate of about 36l/s connects to the manhole FMH1008721 at Wang Lee Street and the other two sewage pipes with a maximum flow rate of about 41l/s connect to the manhole FMH1008720 at Wang Lok Street. Assuming the contributing populations are the same for three connection points because the full flow capacities of the pipes are similar.

5) Chiho-Tiande

Type:		Industrial	
GFA	=	14797	m^2
The density of the worker	=	75	m^2/person
Population	=	198	Persons
Contributing Poputaion for Flow to Wang Lee St.	=	50.00	%
		99	Persons

According to the BRAVO system, Chiho-Tiande has two connection points. One sewage pipe with a maximum flow rate of about 39l/s connects to the manhole FMH1008709 at Wang Lee Street and other sewage pipes with a maximum flow rate of about 43l/s connect to the manhole FMH1008714 at Wang Lok Street. Assuming the contributing populations are the same between the two connection points because the full flow capacities of the pipes are similar.

10) Bright Future (1)

Type:		Industrial	
GFA	=	13319	m^2
The density of the worker	=	75	m^2/person
Population	=	178	Persons
Contributing Poputaion for Flow to Wang Lee St.	=	50.00	%
		89	Persons

According to the GeoInfo Map, Bright Future (3) has two connection points of the same pipe size of 225 dia. The sewage pipes connect to the manhole FMH1008666 at Wang Lee Street and the manhole FMH1057114 at Wang Lok Street respectively. Assuming the sewage flows in the connection points are the same as half of the total ADWF generated from Bright Future (3) because of the same pipe size, thus the contributing populations are the same between the two connection points.

13) Nestle Hong Kong

Type:		Industrial	
GFA	=	30479	m^2
The density of the worker	=	75	m^2/person
Population	=	407	Persons
Contributing Poputaion for Flow to Wang Lee St.	=	50.00	%
		204	Persons

According to the GeoInfo Map, Nestle Hong Kong has two connection points of the same pipe size of 225 dia. The sewage pipes connect to the manhole FMH1008635 at Wang Lee Street and the manhole FMH1008625 at Wang Lok Street respectively. Assuming the sewage flows in the connection points are the same as half of the total ADWF generated from Nestle Hong Kong because of the same pipe size, thus, the contributing populations are the same between the two connection points.

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Existing Population and Average Dry weather Flow (ADWF)(Con't)

14) San Miguel Brewery

Type:		Industrial	
GFA	=	45105	m^2
The density of the worker	=	75	m^2/person
Population	=	602	Persons
Contributing Poputaion for Flow to Fuk Wang St.	=	13.33	%
		81	Persons
Contributing Poputaion for Flow Directly to Wang Lee St.	=	26.67	%
		161	Persons
Combined Contributing Population for above two points	=	40.00	%
		241	Persons

According to the BRAVO system, San Miguel Brewery has three connection points. One sump pit with a maximum flow rate of about 8l/s connects to the manhole at Fuk Wang Street and discharges the sewage to manhole FMH1008636. Another sump pit with a maximum flow rate of about 16l/s discharges the sewage to manhole FMH1008633. The last connection point with a maximum flow rate of about 36l/s connects to the manhole at Fuk Hi Street and discharges the sewage to manhole FMH1008582. Assuming the distribution of contributing populations is proportional to the full flow capacity of the pipes.

15) HK Petrochemical

Type:		Industrial	
GFA	=	16505	m^2
The density of the worker	=	75	m^2/person
Population	=	221	Persons
Contributing Poputaion for Flow to Manhole 1009476 at Wang Lee St.	=	12.00	%
		27	Persons

According to the GeoInfo Map, HK Petrochemical has three connection points. In Wang Lee Street, a 225mm dia. sewage pipe with a maximum flow rate of about 41l/s discharges the sewage to the manhole FMH1009476 while another 600dia. pipe with a maximum flow rate of about 277 l/s discharges the sewage to the manhole FMH1008581. The last pipe with a size of 225mm dia. and a maximum flow rate of about 41l/s discharges the sewage to the manhole FMH1008600 at Wang Lok Street. Assuming the distribution of contributing populations is likely proportional to the full flow capacity of pipes. About 12% of contributing population is adopted for flow to manhole 1009476 at Wang Lee St.

Existing Sewer Pipeline Design Check

Agreement No. CE3/2016(CE)

Foulwater Drains Capacity Design Check (By Colebrook White Equation)

Section 16 Planning Application for Multi-storey Building Developments near Yuen Long Industrial Estate

where V = velocity (m/s)
g = 9.81 (ms^{-2})
R = hydraulic radius (m)
S = Slope of pipe
v = kinematic viscosity (m^2/s)
Ks = pipe roughness (mm)

$$V = -\sqrt{(8gDs)}\log\left(\frac{Ks}{3.7D} + \frac{2.51v}{D\sqrt{(2gDs)}}\right)$$

Assumptions:
1. Pipe roughness = 3 mm (refer to Sewerage Manual Part 1 - Table 5)
2. Transitional flow and water at 15 degree celcius, i.e. kinematic viscosity is 1.14 x 10^{-6} m^2/s

Pipe Information										Capacity and Velocity Check								
Sewage from existing sites	From	To	Pipe Diameter mm	Pipe Length m	Ground Level (US) mPD	Invert Level (US) mPD	Ground Level (DS) mPD	Invert Level (DS) mPD	Gradient 1 in	Cumulative Sewage Flow m^3/day	Cumulative Sewage Flow l/s	Contributing Population	Peak Factor	Peak Factored Cumulative Sewage Flow l/s	Pipe Full Flow Capacity l/s	Pipe Full Flow Velocity m/s	Utilization %	Flow Capacity Check
Along Wang Lee Street																		
	FMH1008665	FMH1008664	600	39.1	4.27	1.650	4.390	1.570	489	2404.48	27.83	8905	5	139.15	251	0.89	55%	OK
	FMH1008664	FMH1008663	600	39.0	4.39	1.570	4.440	1.490	487	2405.28	27.84	8908	5	139.19	251	0.89	55%	OK
	FMH1008663	FMH1008662	600	38.6	4.44	1.490	4.340	1.410	483	2405.28	27.84	8908	5	139.19	253	0.89	55%	OK
	FMH1008662	FMH1008661	750	29.2	4.34	1.410	4.370	1.350	486	2405.28	27.84	8908	5	139.19	455	1.03	31%	OK
	FMH1008661	FMH1008694	750	25.0	4.37	1.350	4.220	1.290	417	2405.28	27.84	8908	5	139.19	491	1.11	28%	OK
	FMH1008694	FMH1008636	750	25.5	4.22	1.290	4.290	1.240	510	2405.28	27.84	8908	5	139.19	444	1.00	31%	OK
	FMH1008636	FMH1008635	750	47.1	4.29	1.240	4.430	1.090	314	2723.52	31.52	10087	4	126.09	566	1.28	22%	OK
	FMH1008635[1]	FMH1008634	750	38.0	4.43	1.080	4.490	1.060	1899	3147.84	36.43	11659	4	145.73	229	0.52	64%	OK
	FMH1008634	FMH1008633	750	39.9	4.49	1.060	4.370	0.980	499	3147.84	36.43	11659	4	145.73	449	1.02	32%	OK
	FMH1008633	FMH1008632	750	41.2	4.37	0.980	4.210	0.900	515	3482.72	40.31	12899	4	161.24	442	1.00	37%	OK
	FMH1008632	FMH1009476[2]	750	30.1	4.21	0.900	-	0.744	193	3482.72	40.31	12899	4	161.24	723	1.64	22%	OK
	FMH1009476[2]	FMH1008631	750	8.5	-	0.744	4.03	0.700	193	3538.88	40.96	13107	4	163.84	723	1.64	23%	OK
	FMH1008631[3]	FMH1008582	750	20.4	4.03	0.730	3.97	0.770	-511	3538.88	40.96	13107	4	163.84	-	-	-	-
Along Fuk Wang Street																		
	FMH1008652	FMH1008658	300	39.0	4.33	3.190	4.45	3.090	390	149.76	1.73	555	8	13.87	44	0.63	31%	OK
	FMH1008658	FMH1008659	375	41.1	4.45	3.090	4.44	3.010	514	318.24	3.68	1179	6	22.10	70	0.63	32%	OK
	FMH1008659	FMH1008660	375	39.4	4.44	3.010	4.32	2.930	493	318.24	3.68	1179	6	22.10	72	0.65	31%	OK
	FMH1008660	FMH1008692	375	28.7	4.32	2.930	4.25	2.870	478	318.24	3.68	1179	6	22.10	73	0.66	30%	OK
	FMH1008692	FMH1008636	375	30.7	4.25	2.790	4.39	2.720	439	318.24	3.68	1179	6	22.10	76	0.69	29%	OK

Remark:-

1) The pipes utilization between manhole FMH1008635 and FMH1008634 would be close to 100% at proposed conditions, the relining is adopted.
2) According to DSD's drainage record plan, no invert level for manhole FMH1009476 is provided. Assume the gradient of pipe between manhole FMH1008632 and FMH1009476 is same as manhole FMH1009476 and 1008631.
3) The pipe between manhole FMH1008631 and FMH1008582 has negative gradient. The hydraulic conditions of this pipe in both existing and proposed conditions are assessed in **Annex B1.**

Existing Sewer Pipeline Design Check (with Relining)

Agreement No. CE3/2016(CE)

Section 16 Planning Application for Multi-storey Building Developments near Yuen Long Industrial Estate

Foulwater Drains Capacity Design Check (By Colebrook White Equation)

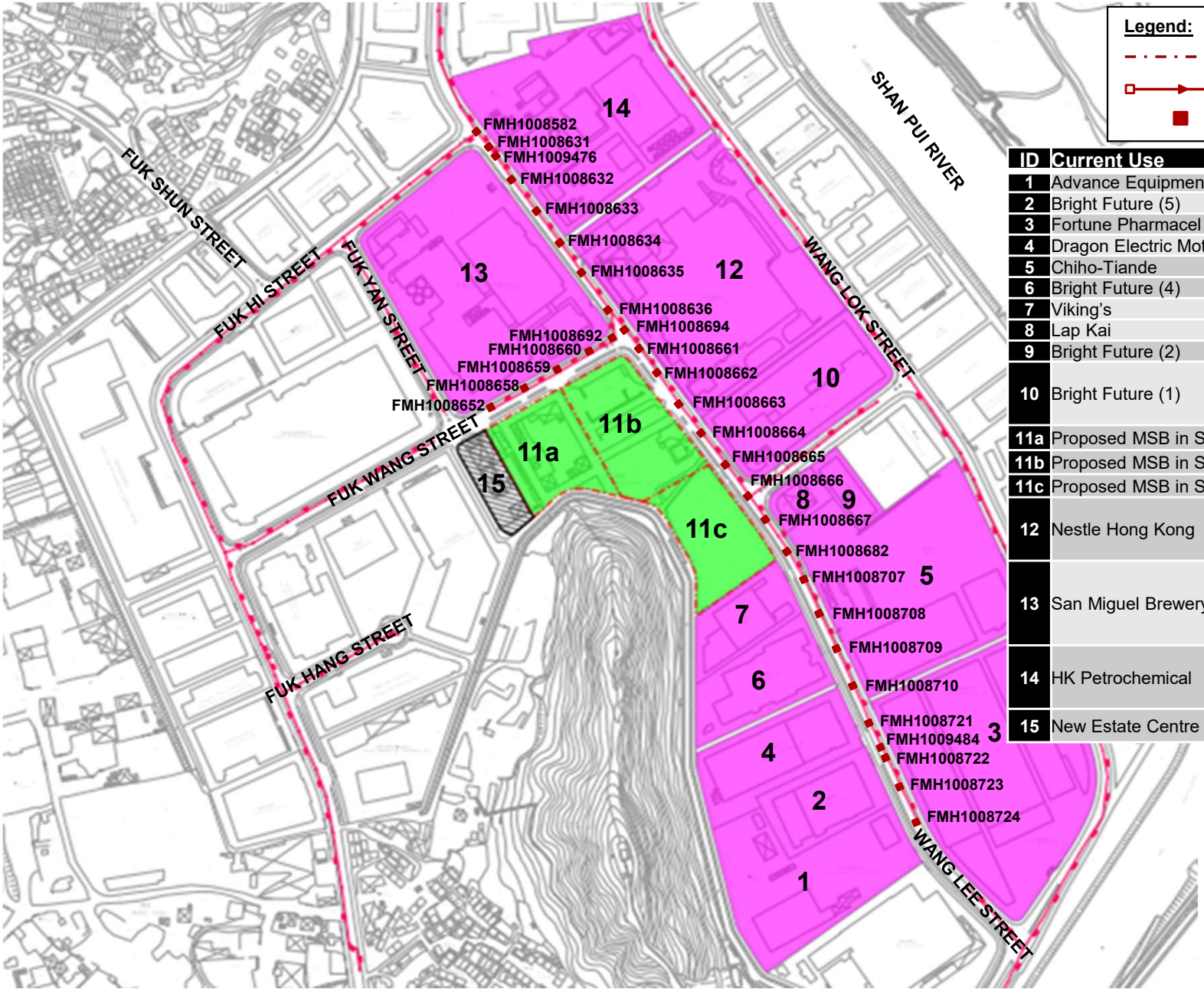
where V = velocity (m/s)
g = 9.81 (ms^{-2})
R = hydraulic radius (m)
S = Slope of pipe
v = kinematic viscosity (m^2/s)
Ks = pipe roughness (mm)

$$V = -\sqrt{(8gDs)}\log\left(\frac{Ks}{3.7D} + \frac{2.51v}{D\sqrt{(2gDs)}}\right)$$

Assumptions:
1. Pipe roughness = 3 mm (refer to Sewerage Manual Part 1 - Table 5)
2. Pipe roughness with relining = 0.06 mm (refer to Sewerage Manual Part 1 - Table 5, Glass Reinforced Plastic, Normal roughness)
3. The reduction of diamter due to liner = 50 mm
4. Transitional flow and water at 15 degree celcius, i.e. kinematic viscosity is 1.14 x 10^{-6} m^2/s

Pipe Information										Capacity and Velocity Check								
Sewage from existing sites	From	To	Pipe Diameter mm	Pipe Length m	Ground Level (US) mPD	Invert Level (US) mPD	Ground Level (DS) mPD	Invert Level (DS) mPD	Gradient 1 in	Cumulative Sewage Flow m^3/day	Cumulative Sewage Flow l/s	Contributing Population	Peak Factor	Peak Factored Cumulative Sewage Flow l/s	Pipe Full Flow Capacity l/s	Pipe Full Flow Velocity m/s	Utilization %	Flow Capacity Check
Along Wang Lee Street																		
	FMH1008635(1)	FMH1008634	700	38.0	4.43	1.080	4.490	1.060	1899	3147.84	36.43	11659	4	145.73	272	0.71	54%	OK

Remark:-
1) The pipes utilization between manhole FMH1008635 and FMH1008634 would be close to 100% at proposed conditions, the relining is adopted.



ID	Current Use	Connecting Manhole No.
1	Advance Equipment	FMH1008724
2	Bright Future (5)	FMH1009484
3	Fortune Pharmacel	FMH1008721
4	Dragon Electric Motor	FMH1008710
5	Chiho-Tiande	FMH1008709
6	Bright Future (4)	FMH1008707
7	Viking's	FMH1008707
8	Lap Kai	FMH1008667
9	Bright Future (2)	FMH1008666
10	Bright Future (1)	FMH100866 one manhole at Wang Lok Street
11a	Proposed MSB in Site A	FMH1008658
11b	Proposed MSB in Site B	FMH1008662
11c	Proposed MSB in Site C	FMH1008665
12	Nestle Hong Kong	FMH1008635 one manhole at Wang Lok Street
13	San Miguel Brewery	FMH1008658, FMH1008633 one manhole at Fuk Hi Street
14	HK Petrochemical	FMH1009476 one manhole at Wang Lok Street
15	New Estate Centre	FMH1008652

Project Section 16 Planning Application for Multi-storey Building Developments near Yuen Long Industrial Estate

MOTT MACDONALD

Title Sewerage Catchment Plan for MSBs Development (Scenario B)

Annex B

Date: July 2023 | Scale: N.T.S. | File

Mott MacDonald HK

Consulting Engineers

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Contract:			Job Ref: 369397
Subject: Agreement No. CE3/2016(CE) Section 16 Planning Application for Multi-storey Building Developments near Yuen Long Industrial Estate			
Drawing Ref. -	Calculations by EL	Checked by KS	Date: Jul 2023

Ref.

Annex B - Estimation of Sewage Flow at Existing and Proposed Condition

Proposed Population and Sewage Flow

References:

- Sewerage Manual Part 1
- EPD's Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning Version 1.0 (GESF)
- Building Plans of BRAVO System
- 2019-based TPEDM
- GeoInfo Map

Remark:

- Land Parcel ID and land use refer to Sewerage Catchment Plan for MSBs Development
- GFA is based on building plans from BRAVO System (total GFA in YLIE is about 650,000m^2)
- Population estimation is based on the following: -
  1) According to the 2019-based TPEDM, the MSB sites fall within Yuen Long Zone, Planning Data Zone 232.
  2) Based on 2019-based TPEDM, the numbers of employees for relevant Planning Data Zone 232 of YLIE are 8500 for 2019 and 7400 for 2031 respectively. The corresponding employment densities are 76.47m^2/worker and 85.37m^2/worker for 2019 and 2031, assuming the total GFA remains the same. According to HKPSG, the employment density for the industrial estate shown in Table 2 is 75m^2/worker, which is greater than the corresponding employment densities of 76.47m^2/worker and 85.37m^2/worker. Therefore, the employment density of 75m^2/worker is adopted conservatively.
  3) The population of the new estate centre next to Site A is based on Table 2 of HKPSG, the density of the worker for business use is 20m^2/worker.
- Global unit flow factor (GUFF) for Industrial in Yuen Long is based on Table T-3 of GESF the unit flow factor (2.08m^3/day) is the sum of “Industrial employee” (0.08m^3/day) and “Industrial activities in Yuen Long” (2.00m^3/day).
- It is considered that the activities UFF of 2.0m^3/employee/day for the industrial flow of Yuen Long (Table V1(b) of GESF) is not applicable to the vehicle servicing and maintenance in the proposed MSBs because the operations in vehicle servicing and maintenance do not consume a significant amount of water. As such, the UFF for other industrial areas in Hong Kong such as Tsuen Wan and Kwai Chung where there are many vehicle repair workshops. The UFF for industrial flows in Tsuen Wan is 0.65 m^3/employee/day according to the same table, which is also higher than the territorial average of 0.56 m^3/employee/day. Therefore, 0.65 m^3/employee/day is adopted for this assessment, which is likely on the conservative side, and the unit flow factor is 0.73m^3/employee/day, being the sum of “Industrial Employee” (0.08m^3/day) and 0.65m^3/employee/day.
- For brownfield operations, the relevant commercial activities are “J3 Transport, Storage & Communication” which are typical of the logistics industry; or “J9 construction” which may represent the warehouse storage and handling of construction-related materials and plants on brownfield sites. According to Table T-2 of GESF, J9 has a higher unit flow factor of 0.15 m^3/day than that of J3 (0.1 m^3/day). Therefore, the adopted unit flow factor is 0.23m^3/day, being the sum of “Commercial Employee” (0.08m^3/day) and “Commercial activities J9 - Construction” (0.15m^3/day).
- The unit flow factor for commercial activity "J6 Finance, Insurance, Real Estate & Business Services" adopted for the New Estate Centre is 0.08m^3/day which only takes account of the "commercial employee" (0.08m^3/day) based on Table T-2 of GESF.

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Contract:	Job Ref: 369397
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Drawing Ref.	Calculations by	Checked by	Date:
-	EL	KS	Jul 2023

Ref.

Proposed Population and Average Dry Weather Flow (ADWF)

ID	Site/ Building	Type	GFA	Population	GUFF ($m^3/d/p$)	ADWF (m^3/d)
1	Advance Equipment	Industrial in Yuen Long	**3133**	**42**	2.08	87.36
2	Bright Future (5)	Industrial in Yuen Long	**21857**	**292**	2.08	607.36
3	Fortune Pharmacel	Industrial in Yuen Long	**30082**	**134 (33.3% of 402)**	2.08	278.72
4	Dragon Electric Motor	Industrial in Yuen Long	**9886**	**132**	2.08	274.56
5	Chiho-Tiande	Industrial in Yuen Long	**14797**	**99 (50% of 198)**	2.08	205.92
6	Bright Future (4)	Industrial in Yuen Long	**14326**	**192**	2.08	399.36
7	Viking's	Industrial in Yuen Long	**3875**	**52**	2.08	108.16
8	Lap Kai	Industrial in Yuen Long	**1795**	**24**	2.08	49.92
9	Bright Future (2)	Industrial in Yuen Long	**7495**	**100**	2.08	208.00
10	Bright Future (1)	Industrial in Yuen Long	**13319**	**89 (50% of 178)**	2.08	185.12
11a	Proposed MSB in Site A	Vehicle Servicing and Maintenance	**34300**	**693**	0.73	505.89
		Brownfield	**14700**	**175**	0.23	40.25
11b	Proposed MSB in Site B	Vehicle Servicing and Maintenance	**43750**	**884**	0.73	645.32
		Brownfield	**18750**	**224**	0.23	51.52
11c	Proposed MSB in Site C	Vehicle Servicing and Maintenance	**35000**	**708**	0.73	516.84
		Brownfield	**15000**	**179**	0.23	41.17
12	Nestle Hong Kong	Industrial in Yuen Long	**30479**	**204 (50% of 407)**	2.08	424.32
13	San Miguel Brewery	Industrial in Yuen Long	**45105**	**81 (13.3% of 602) (via Fuk Wang St.)**	2.08	168.48
				161 (26.7% of 602) (via Wang Lee St.)	2.08	334.88
14	HK Petrochemical	Industrial in Yuen Long	**16505**	**27 (12% of 221)**	2.08	56.16
15	New Estate Centre (NEC)	Commercial in Yuen Long	**19500**	**975**	0.08	78.00

Estimated Total ADWF = 5267.31 m^3/d

= 60.96 l/s

Proposed Sewer Pipeline Design Check

Agreement No. CE3/2016(CE)

Foulwater Drains Capacity Design Check (By Colebrook White Equation)

Section 16 Planning Application for Multi-storey Building Developments near Yuen Long Industrial Estate

where V = velocity (m/s)

g = 9.81 (ms^{-2})
R = hydraulic radius (m)
S = Slope of pipe

v = kinematic viscosity (m^2/s)
Ks = pipe roughness (mm)

$$V = -\sqrt{(8gDs)}\log\left(\frac{Ks}{3.7D} + \frac{2.51v}{D\sqrt{(2gDs)}}\right)$$

Assumptions:
1. Pipe roughness = 3 mm (refer to Sewerage Manual Part 1 - Table 5)
2. Transitional flow and water at 15 degree celcius, i.e. kinematic viscosity is 1.14 x 10^{-6} m^2/s

Pipe Information										Capacity and Velocity Check								
Pipe no.	From	To	Pipe Diameter mm	Pipe Length m	Ground Level (US) mPD	Invert Level (US) mPD	Ground Level (DS) mPD	Invert Level (DS) mPD	Gradient 1 in	Cumulative Sewage Flow m^3/day	Cumulative Sewage Flow l/s	Contributing Population	Peak Factor	Peak Factored Cumulative Sewage Flow l/s	Pipe Full Flow Capacity l/s	Pipe Full Flow Velocity m/s	Utilization %	Flow Capacity Check
Along Wang Lee Street																		
Site C	FMH1008665	FMH1008664	600	39.1	4.27	1.650	4.390	1.570	489	2962.49	34.29	10972	4	137.15	251	0.89	55%	OK
	FMH1008664	FMH1008663	600	39.0	4.39	1.570	4.440	1.490	487	2962.49	34.29	10972	4	137.15	251	0.89	55%	OK
	FMH1008663	FMH1008662	600	38.6	4.44	1.490	4.340	1.410	483	2962.49	34.29	10972	4	137.15	253	0.89	54%	OK
Site B	FMH1008662	FMH1008661	750	29.2	4.34	1.410	4.370	1.350	486	3659.33	42.35	13553	4	169.41	455	1.03	37%	OK
	FMH1008661	FMH1008694	750	25.0	4.37	1.350	4.220	1.290	417	3659.33	42.35	13553	4	169.41	491	1.11	34%	OK
	FMH1008694	FMH1008636	750	25.5	4.22	1.290	4.290	1.240	510	3659.33	42.35	13553	4	169.41	444	1.00	38%	OK
Site A & NEC via Fuk Wang Street	FMH1008636	FMH1008635	750	47.1	4.29	1.240	4.430	1.090	314	4451.95	51.53	16489	4	206.11	566	1.28	36%	OK
	FMH1008635[2]	FMH1008634	750	38.0	4.43	1.080	4.490	1.060	1900	4876.27	56.44	18060	4	225.75	229	0.52	98%	OK
	FMH1008634	FMH1008633	750	39.9	4.49	1.060	4.370	0.980	499	4876.27	56.44	18060	4	225.75	449	1.02	50%	OK
	FMH1008633	FMH1008632	750	41.2	4.37	0.980	4.210	0.900	515	5211.15	60.31	19301	4	241.26	442	1.00	55%	OK
	FMH1008632	FMH1009476[3]	750	30.1	4.21	0.900	-	0.744	193	5211.15	60.31	19301	4	241.26	723	1.64	33%	OK
	FMH1009476[3]	FMH1008631	750	8.5	-	0.744	4.03	0.700	193	5267.31	60.96	19509	4	243.86	723	1.64	34%	OK
	FMH1008631[4]	FMH1008582	750	20.4	4.03	0.730	3.97	0.770	-511	5267.31	60.96	19509	4	243.86	-	-	-	-
Along Fuk Wang Street																		
NEC	FMH1008652	FMH1008658	300	39.0	4.33	3.190	4.45	3.090	390	78.00	0.90	289	8	7.22	44	0.63	16%	OK
Site A	FMH1008658	FMH1008659	375	41.1	4.45	3.090	4.44	3.010	514	792.62	9.17	2936	6	55.04	70	0.63	78%	OK
	FMH1008659	FMH1008660	375	39.4	4.44	3.010	4.32	2.930	493	792.62	9.17	2936	6	55.04	72	0.65	77%	OK
	FMH1008660	FMH1008692	375	28.7	4.32	2.930	4.25	2.870	478	792.62	9.17	2936	6	55.04	73	0.66	76%	OK
	FMH1008692	FMH1008636	375	30.7	4.25	2.790	4.29	2.720	439	792.62	9.17	2936	6	55.04	76	0.69	73%	OK

Remark:-

1) The pipes utilization between manhole FMH1008635 and FMH1008634 would be close to 100% at proposed conditions, the relining is adopted.
2) According to DSD's drainage record plan, no invert level for manhole FMH1009476 is provided. Assuming the gradient of pipe between manhole FMH1008632 and FMH1009476 is same as the pipe between manhole FMH1009476 and 1008631.

3) The pipe between manhole FMH1008631 and FMH1008582 has negative gradient. The hydraulic conditions of this pipe in both existing and proposed conditions are assessed in **Annex B1.**

Proposed Sewer Pipeline Design Check (with Relining)

Agreement No. CE3/2016(CE)

Section 16 Planning Application for Multi-storey Building Developments near Yuen Long Industrial Estate

Foulwater Drains Capacity Design Check (By Colebrook White Equation)

$$V = -\sqrt{(8gDs)}\log\left(\frac{Ks}{3.7D} + \frac{2.51v}{D\sqrt{(2gDs)}}\right)$$

where V = velocity (m/s)
g = 9.81 (ms^{-2})
R = hydraulic radius (m)
S = Slope of pipe
v = kinematic viscosity (m^2/s)
Ks = pipe roughness (mm)

Assumptions:
1. Pipe roughness = 3 mm (refer to Sewerage Manual Part 1 - Table 5)
2. Pipe roughness with relining = 0.06 mm (refer to Sewerage Manual Part 1 - Table 5, Glass Reinforced Plastic, Normal roughness)
3. The reduction of diamter due to liner = 50 mm
4. Transitional flow and water at 15 degree celcius, i.e. kinematic viscosity is 1.14 x 10^{-6} m^2/s

Pipe Information										Capacity and Velocity Check								
Pipe no.	From	To	Pipe Diameter mm	Pipe Length m	Ground Level (US) mPD	Invert Level (US) mPD	Ground Level (DS) mPD	Invert Level (DS) mPD	Gradient 1 in	Cumulative Sewage Flow m^3/day	Cumulative Sewage Flow l/s	Contributing Population	Peak Factor	Peak Factored Cumulative Sewage Flow l/s	Pipe Full Flow Capacity l/s	Pipe Full Flow Velocity m/s	Utilization %	Flow Capacity Check
Along Wang Lee Street																		
	FMH1008635[(1)]	FMH1008634	700	38.0	4.43	1.080	4.490	1.060	1900	4876.27	56.44	18060	4	225.75	271	0.71	83%	OK

Remark:-
1) The pipes utilization between manhole FMH1008635 and FMH1008634 would be close to 100% at proposed conditions, the relining is adopted.

Annex B1

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Annex B1 Sewer Pipeline Check for the Section from FMH1008631 to FMH1008582

1.1 This annex is prepared to check whether the sewer pipeline with increasing invert level from manhole FMH1008631 to FMH1008582 along Wang Lee Street would be free from overflowing under both existing and proposed flow conditions.

1.2 InfoWorks ICM (version 10.08) has been utilized for more detailed assessment of the hydraulic conditions of such section.

1.3 A hydraulic model for the section of sewer in question has been created for the assessment.

2 Design Parameters

Nodes and Links

2.1 The following manholes and sewer pipelines are simulated in the hydraulic model:

Table B1.1: Summary of Nodes

Manhole No.	Remark
Along Wang Lee Street	
FHM1008633	With discharge from upstream of Wang Lee Steet
FHM1008632	-
FHM1009476	With discharge from existing development via 225 mm dia. sewer pipe
FMH1008631	-
FMH1008582	Junction of Wang Lee Street and Fuk Hi Street
FMH1008581	Outflow node
Branch from Fuk Hi Street	
FMH1008630	With discharge from upstream of Fuk Hi Steet (to connect to manhole FMH1008582)

Table B1.2: Summary of Links

From	To	Pipeline Size (mm)
Along Wang Lee Street		
FHM1008633	FHM1008632	750
FHM1008632	FHM1009476	750
FHM1009476	FMH1008631	750
FMH1008631	FMH1008582	750#
FMH1008582	FMH1008581	1200
Branch from Fuk Hi Street into Manhole FMH1008582		
FMH1008630	FMH1008582	900

#: link with increasing invert level

2.2 Flooding would be predicted if the assessed flow level is higher than the ground level at any manhole.

Inflow

Along Wang Lee Street

2.3 Based on Annex B, Manhole FMH1008633 receives total peak factored inflows of about 0.161m^3/s (161.24l/s) and 0.24m^3/s (241.26l/s) from the upstream of Wang Lee Street in existing condition and proposed condition, respectively.

2.4 For both conditions, Manhole FMH1009476 receives an inflow of 0.0026 m^3/s (2.6l/s) (Annex B) via a 225mm dia. sewer pipe from an existing development i.e., Hong Kong Petrochemical Co., Ltd.

From Fuk Hi Street

2.5 It is conservatively assumed that the sewer pipeline running along Fuk Hi Street (i.e. from manhole FMH1008630 to FMH1008582) would be at full flow capacity (0.487m^3/s) in both existing and planned conditions.

2.6 The hydraulic property of that sewer pipe is shown in **Table B1.3**.

Table B1.3: Existing Sewer Pipeline Design Check

From	To	Pipe Diameter mm	Pipe Length m	Ground Level (US) mPD	Invert Level (US) mPD	Ground Level (DS) mPD	Invert Level (DS) mPD	Gradient 1 in	Pipe Full Flow Velocity m/s[1]	Pipe Full Flow Capacity m^3/s
FMH1008630	FMH1008582	900	33.3	4.08	1.200	3.970	1.170	1111	0.76	**0.487**

Water Level

2.7 In the InfoWorks ICM Model, manhole FMH1008581 (with a 1200mm diameter sewer downstream) is assigned as the outflow and the water level of the outflow for the assessment period is assumed under full flow condition, being 1.93mPD, which is the sum of downstream invert level 0.73mPD and 1.2m diameter of the pipe.

[1] The pipe full flow velocity (m/s) is calculated by Colebrook White Equation with same assumptions adopted in **Annex B** i.e., the pipe roughness is 3mm and kinematic viscosity is 1.14 x 10 -6 m2/s.

User Defined Head-Loss Factor

2.8 The flow simulation has considered the head loss along the sewer pipelines.

2.9 The user defined headloss factor (Ku) represent the headloss due to the change of flow direction at a manhole. The user defined headloss factors shall be in accordance with Table 1 of Technical Note for Headloss published by Innovyze and are shown in **Table B1.4.**

Table B1.4: Suggested Values of Ku for Various Angles of Approach

Angle of Approach	Ku
30	3.3
60	6.0
90	6.6
>90	8.0

Roughness

2.10 For the existing drainage network, Colebrook-White k_s value of 3.0mm has been adopted for the sewer pipes with low velocity flows.

Sedimentation

2.11 For design of new proposed drains, if any, sediment for the pipeline system follows the recommendation given in Section 9.3 of SDM, which suggests allowing 5% reduction in flow area if the gradient is greater than 1 in 25 or 10% reduction in flow area in other areas.

3 Results of Model Simulation

3.1 The hydraulic results from manhole FHM1008633 to FMH1008581 for existing condition and proposed condition for MSBs development are shown in **Figure B1.1** and **Figure B1.2** respectively.

3.2 Both conditions achieve at least 2m freeboard at the assessed manholes along Wang Lee Street, which is more than the minimum acceptable 1m freeboard.

3.3 To conclude, the increasing invert level for the section of sewer pipeline in question will not cause any adverse hydraulic impact under both the existing and planned conditions.

Figure B1.1: Hydraulic Results for Existing Condition

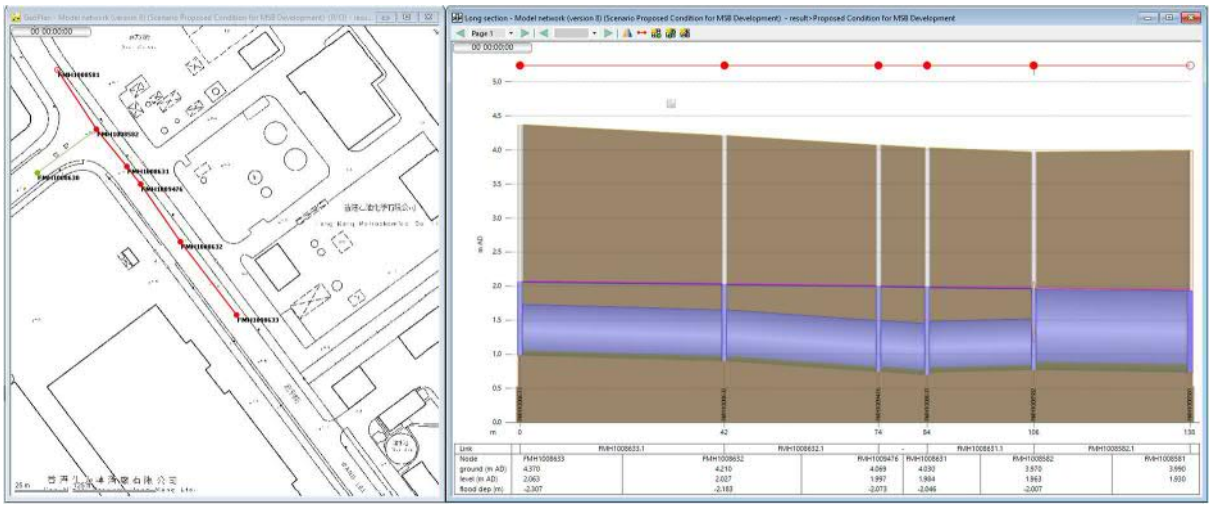
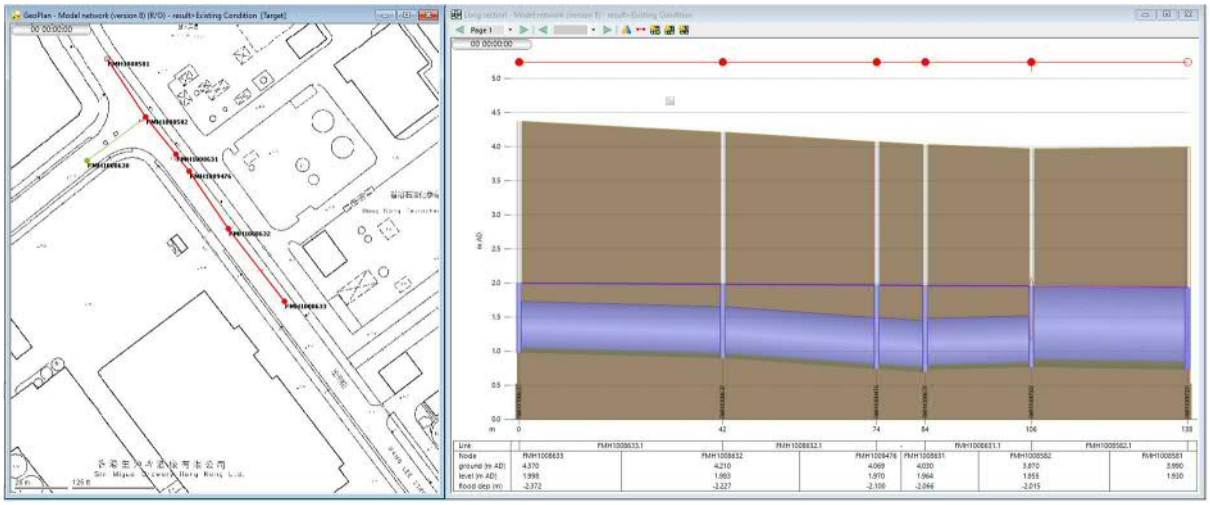


Figure B1.2: Hydraulic Results for Proposed Condition for MSBs Development



Manhole Outcome - Existing Condition

Node ID	Level (m AD)	Flood depth (m)	Flood volume (m3)	Volume lost (m3)	Max Level (m AD)	Max Flood depth (m)	Max Flood volume (m3)	Max Volume lost (m3)	Max Infiltration loss (m3/s)	Max Inflow (m3/s)	Max Direct runoff (m3/s)	Max Volume (m3)	Cumulative inflow (m3)	Infiltration loss (m3/s)	Inflow (m3/s)	Direct runoff (m3/s)	Volume at flood level (m3)	Volume at ground level (m3)	Volume (m3)	Volume balance (m3)	Volume balance (%)
FMH1008633	1.998	-2.372	-4.3	0	1.998	-2.372	-4.3	0	0	0.16124	0	1.8	580.5	0	0.16124	0	6.087	6.087	1.8	0	0
FMH1008632	1.983	-2.227	-4	0	1.983	-2.227	-4	0	0	0	0	1.9	0	0	0	0	5.943	5.943	1.9	0	0
FMH1009476	1.97	-2.1	-3.8	0	1.97	-2.1	-3.8	0	0	0.0026	0	2.2	9.4	0	0.0026	0	5.971	5.971	2.2	0	0
FMH1008631	1.964	-2.066	-3.7	0	1.964	-2.066	-3.7	0	0	0	0	2.3	0	0	0	0	5.979	5.979	2.3	0	0
FMH1008582	1.955	-2.015	-6.1	0	1.955	-2.015	-6.1	0	0	0	0	3.6	0	0	0	0	9.675	9.675	3.6	0	0
FMH1008630	2	-2.08	-4.5	0	2	-2.08	-4.5	0	0	0.48667	0	1.7	1752	0	0.48667	0	6.248	6.248	1.7	0	0
FMH1008581	1.93				1.93																

Manhole Outcome - Proposed Condition for MSBs Development

Node ID	Level (m AD)	Flood depth (m)	Flood volume (m3)	Volume lost (m3)	Max Level (m AD)	Max Flood depth (m)	Max Flood volume (m3)	Max Volume lost (m3)	Max Infiltration loss (m3/s)	Max Inflow (m3/s)	Max Direct runoff (m3/s)	Max Volume (m3)	Cumulative inflow (m3)	Infiltration loss (m3/s)	Inflow (m3/s)	Direct runoff (m3/s)	Volume at flood level (m3)	Volume at ground level (m3)	Volume (m3)	Volume balance (m3)	Volume balance (%)
FMH1008633	2.063	-2.307	-4.1	0	2.063	-2.307	-4.1	0	0	0.24936	0	1.9	897.7	0	0.24936	0	6.087	6.087	1.9	0	0
FMH1008632	2.027	-2.183	-3.9	0	2.027	-2.183	-3.9	0	0	0	0	2	0	0	0	0	5.943	5.943	2	0	0
FMH1009476	1.997	-2.073	-3.7	0	1.997	-2.073	-3.7	0	0	0.0026	0	2.2	9.4	0	0.0026	0	5.971	5.971	2.2	0	0
FMH1008631	1.984	-2.046	-3.7	0	1.984	-2.046	-3.7	0	0	0	0	2.3	0	0	0	0	5.979	5.979	2.3	0	0
FMH1008582	1.963	-2.007	-6.1	0	1.963	-2.007	-6.1	0	0	0	0	3.6	0	0	0	0	9.675	9.675	3.6	0	0
FMH1008630	2	-2.08	-4.5	0	2	-2.08	-4.5	0	0	0.48667	0	1.7	1752	0	0.48667	0	6.248	6.248	1.7	0	0
FMH1008581	1.93				1.93																

Pipeline Outcome - Existing Condition

US node ID	Link suffix	Max US Froude number	Cumulative inflow (m3)	Lateral inflow (m3/s)	Surcharge state	US depth (m)	Hydraulic gradient	US flow (m3/s)	US Froude number	US cumulative flow (m3)	US total head (m AD)	US velocity (m/s)	Max Infiltration loss (m3/s)	Max Lateral inflow (m3/s)
FMH1008633	1	0.021	0	0	1	1.016		0.16124	0.021	580.46	2.003	0.368	0	0
FMH1008632	1	0.021	0	0	1	1.08		0.16124	0.021	580.46	1.987	0.367	0	0
FMH1009476	1	0.022	0	0	1	1.224		0.16384	0.022	589.82	1.975	0.371	0	0
FMH1008631	1	0.022	0	0	1	1.232		0.16384	0.022	589.82	1.969	0.371	0	0
FMH1008630	1	0.286	0	0	0.88	0.79		0.4867	0.286	1752.12	2.029	0.871	0	0
FMH1008582	1	0.131	0	0	1	1.173		0.65054	0.131	2341.94	1.962	0.609	0	0

Pipeline Outcome - Existing Condition (Con't)

Max Surcharge state	Max US depth (m)	Max US flow (m3/s)	Volume (m3)	Max US total head (m AD)	Max US velocity (m/s)	Infiltration loss (m3/s)	DS flow (m3/s)	DS Froude number	DS cumulative flow (m3)	DS total head (m AD)	DS velocity (m/s)	Max DS depth (m)	Max DS flow (m3/s)	Max DS Froude number	Max DS total head (m AD)	Max DS velocity (m/s)	DS depth (m)
1	1.016	0.16124		2.003	0.368	0	0.16124	0.021	580.46	1.99	0.367	1.083	0.16124	0.021	1.99	0.367	1.083
1	1.08	0.16124		1.987	0.367	0	0.16124	0.021	580.46	1.977	0.365	1.226	0.16124	0.021	1.977	0.365	1.226
1	1.224	0.16384		1.975	0.371	0	0.16384	0.022	589.82	1.971	0.371	1.264	0.16384	0.022	1.971	0.371	1.264
1	1.232	0.16384		1.969	0.371	0	0.16384	0.022	589.82	1.962	0.372	1.185	0.16384	0.022	1.962	0.372	1.185
0.88	0.79	0.4867		2.029	0.871	0	0.4867	0.289	1752.12	1.996	0.874	0.787	0.4867	0.289	1.996	0.874	0.787
1	1.173	0.65054		1.962	0.609	0	0.65054	0.119	2341.94	1.949	0.602	1.2	0.65054	0.119	1.949	0.602	1.2

Pipeline Outcome - Proposed Condition for MSBs Development

US node ID	Link suffix	Max US Froude number	Cumulative inflow (m3)	Lateral inflow (m3/s)	Surcharge state	US depth (m)	Hydraulic gradient	US flow (m3/s)	US Froude number	US cumulative flow (m3)	US total head (m AD)	US velocity (m/s)	Max Infiltration loss (m3/s)	Max Lateral inflow (m3/s)
FMH1008633	1	0.033	0	0	1	1.079		0.24936	0.033	897.7	2.075	0.568	0	0
FMH1008632	1	0.033	0	0	1	1.122		0.24936	0.033	897.7	2.038	0.567	0	0
FMH1009476	1	0.033	0	0	1	1.248		0.25196	0.033	907.06	2.009	0.571	0	0
FMH1008631	1	0.033	0	0	1	1.249		0.25196	0.033	907.06	1.996	0.571	0	0
FMH1008630	1	0.278	0	0	0.89	0.797		0.48667	0.278	1752.01	2.036	0.864	0	0
FMH1008582	1	0.147	0	0	1	1.177		0.73863	0.147	2659.07	1.971	0.69	0	0

Pipeline Outcome - Proposed Condition for MSBs Development (Con't)

Max Surcharge state	Max US depth (m)	Max US flow (m3/s)	Volume (m3)	Max US total head (m AD)	Max US velocity (m/s)	Infiltration loss (m3/s)	DS flow (m3/s)	DS Froude number	DS cumulative flow (m3)	DS total head (m AD)	DS velocity (m/s)	Max DS depth (m)	Max DS flow (m3/s)	Max DS Froude number	Max DS total head (m AD)	Max DS velocity (m/s)	DS depth (m)
1	1.079	0.24936		2.075	0.568	0	0.24936	0.033	897.7	2.044	0.567	1.127	0.24936	0.033	2.044	0.567	1.127
1	1.122	0.24936		2.038	0.567	0	0.24936	0.033	897.7	2.013	0.565	1.253	0.24936	0.033	2.013	0.565	1.253
1	1.248	0.25196		2.009	0.571	0	0.25196	0.033	907.06	2.001	0.57	1.284	0.25196	0.033	2.001	0.57	1.284
1	1.249	0.25196		1.996	0.571	0	0.25196	0.033	907.06	1.98	0.572	1.193	0.25196	0.033	1.98	0.572	1.193
0.89	0.797	0.48667		2.036	0.864	0	0.48667	0.281	1752.01	2.003	0.867	0.795	0.48667	0.281	2.003	0.867	0.795
1	1.177	0.73863		1.971	0.69	0	0.73863	0.135	2659.07	1.954	0.683	1.2	0.73863	0.135	1.954	0.683	1.2



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Section 16 Planning Application for Multi-storey Building Developments at No. 32 Wang Lee Street and Adjoining Government Land, Yuen Long

Drainage Impact Assessment

September 2023

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Drainage Impact Assessment

September 2023

Mott MacDonald Hong Kong Limited
registered in Hong Kong no. 236497

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MMH/369397/DIA/001	Location Plan of Development
MMH/369397/DIA/002	Location Plan of Development with the Surrounding Drainage System
MMH/369397/DIA/003	Model Extent and Sub-Catchment Plan (Existing Condition)
MMH/369397/DIA/004	Location Plan of Control Points
MMH/369397/DIA/005	Model Extent and Sub-Catchment Plan (Planned Condition)
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Annex A	Location of DSD Flooding Blackspots as at March 2021
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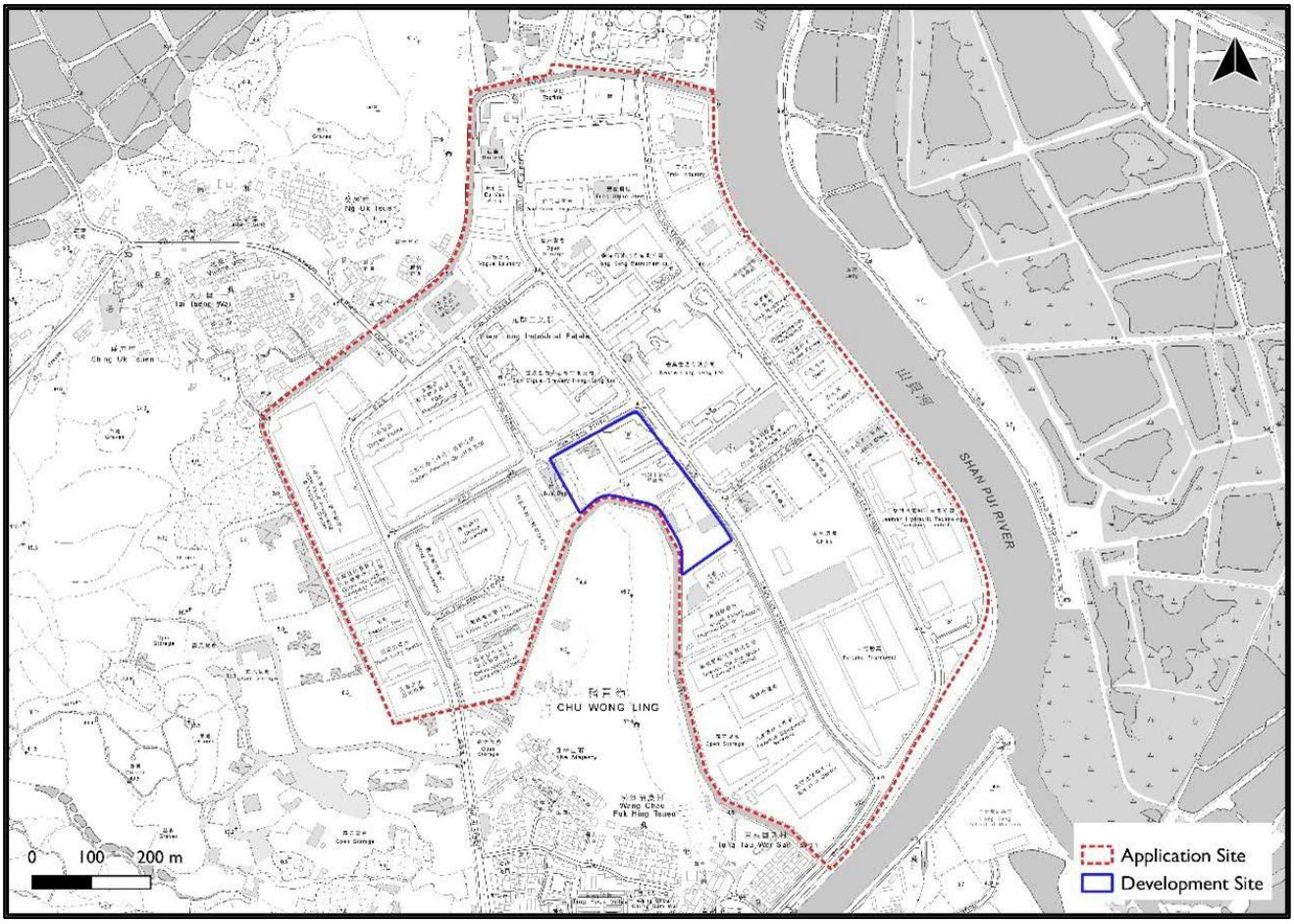
1 Introduction

1.1 Background

1.1.1 This Drainage Impact Assessment Report is prepared to support a Section 16 planning application for the proposed multi-storey buildings (MSBs) development (Proposed Development) at No. 32 Wang Lee Street and Adjoining Government Land, Yuen Long.

1.1.2 A Site Location Plan of the Development Site (the Site) is shown in **Figure 1.1**.

Figure 1.1: Site Location Plan



1.2 Structure of this Report

1.2.1 This report contains the following sections in addition to this introduction (Section 1):

Section 2 – Methodology and Design Parameters for Drainage Impact Assessment

Section 3 – Existing Drainage System

Section 4 – Drainage Impact Assessment and Planned Drainage Condition

Section 5 – Summary

1.3 Abbreviations

1.3.1 The following abbreviations shall have the meaning hereby assigned to them except when the context of this Report otherwise requires:

CEDD	Civil Engineering and Development Department
CN	Curve Numbers
CS	Collection Systems
DIA	Drainage Impact Assessment
DRP	Drainage Record Plan
DSD	Drainage Services Department
E&M	Electrical and Mechanical
EE	Existing Network, Existing Land Use
EMSD	Electrical and Mechanical Services Department
ETWB	Environment, Transport and Works Bureau
GEO	Geotechnical Engineering Office
GFA	Gross Floor Area
HSK NDA	Hung Shui Kiu New Development Area
ICM	Integrated Catchment Modelling
MMHK	Mott MacDonald Hong Kong Limited
MSB(s)	Multi-storey Building(s)
NDA(s)	New Development Area(s)
PP	Planned Network, Planned Land Use
PR	Plot Ratio
SCS	Soil Conservation Services
SDM	Stormwater Drainage Manual (Fifth Edition, January 2018)
TC(W)	Technical Circular (Works)
TGN	Technical Guidance Note
WL	Water Level
YLIE	Yuen Long Industrial Estate

2 Development Proposal

2.1 Indicative Layout of Proposed MSBs Development

2.1.1 The Site is proposed to provide three sites (**Sites A, B and C**) each about 1 ha to accommodate MSBs developments for industrial uses, totalling 3.23 ha in area.

2.1.2 **Figure 2.1** illustrates the indicative division of land parcels in the Site. It should be noted that the land parcels for proposed MSBs shown in the Site is indicative and solely for technical assessments purpose.

2.1.3 The proposed MSBs at Sites A, B and C are to be developed at a plot ratio of 5 with not more than 10 storeys excluding basement level above ground level.

2.1.4 It is anticipated that the land will be disposed by tender and the MSBs are targeted to start the operation in 2028/2029, with a construction period of 4 to 5 years. Major development parameters and proposed floor uses of the proposed MSBs are summarised in **Table 2.1** and **Table 2.2,** respectively.

Figure 2.1: Indicative Land Parcel for MSBs Development within the Development Site

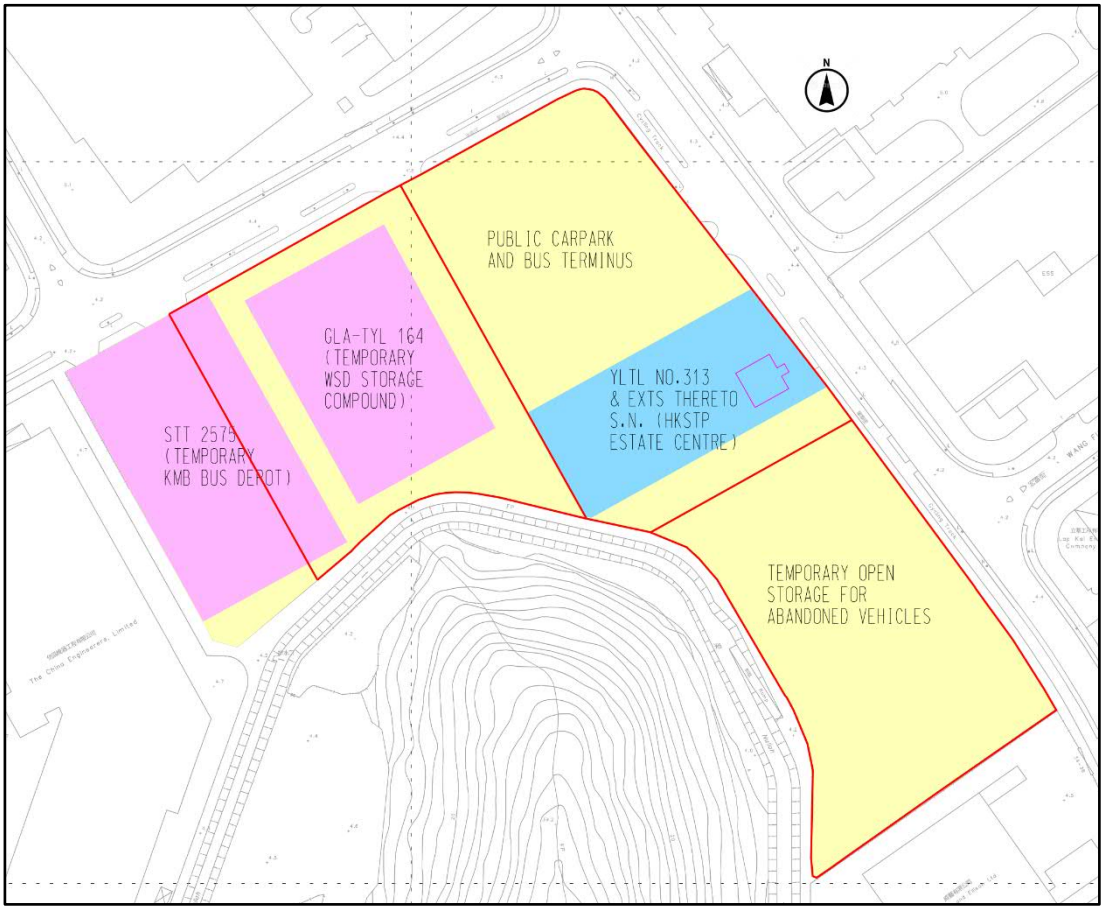


Table 2.1: Development Parameters for Indicative Scheme

Parameters	MSB in Site A	MSB in Site B	MSB in Site C	Total
Site Area	0.98 ha	1.25 ha	1.00 ha	3.23 ha
Maximum Plot Ratio	5			
GFA (m2)	49,000	62,500	50,000	161,500
Site Coverage	Not Specified			
Class of Site	Class A	Class B	Class A	
Land Uses	Vehicle Servicing and Maintenance and/or Logistics Uses + Not less than 30% for accommodating eligible brownfield operators displaced by the government-led development projects (industrial uses)			
No. of Storeys	No more than 10 storeys above ground level			

Tablele 2.2: Indicative Floor Uses of MSBs Development in Sites A, B and C

Floor	Proposed Uses
G/F-9/F	• Vehicle Servicing and Maintenance; • Logistics Uses; and/or • Industrial Uses (for accommodating eligible brownfield operators)
Basement (1 Level)	Public Vehicle Parking (in Site B)[1]

[1] Subject to the detailed design, a basement may be constructed in Site A and Site C to take up some underground space for ancillary parking, plant room, etc.

3 Methodology and Design Parameters for Drainage Impact Assessment

3.1 General Approach

3.1.1 The DIA is conducted by comparing the existing drainage condition against the drainage condition after the implementation of the proposed MSBs development ("the Development"); and appropriate mitigation measures are proposed to reduce the potential adverse impact identified, if found necessary.

3.1.2 Relevant information from the updated hydraulic models ("the Updated Hydraulic Models") under Agreement No. LD 02/2017 Upkeeping of Hydraulic Models in Yuen Long – Feasibility Study has been used to establish the existing drainage conditions ("the Baseline"). This Baseline is then updated to reflect the drainage conditions after the Development ("the Planned Condition").

3.1.3 The potential drainage impacts have been identified by comparing the Baseline against the Planned Condition in terms of catchment area, paving condition, and water levels.

3.2 Design Methodology

Assessment Method

3.2.1 **Drawing nos. MMH/369397/DIA/002** and **MMH/369397/DIA/003** illustrates the existing catchment and the drainage systems in close vicinity to the Development.

3.2.2 The runoff from the existing catchments at the Development are currently collected by stormwater pipelines along Fuk Wang Street and Wang Lee Street which deliver to the existing Chu Wong Ling Channel (approximately 6~ 10 m wide) and then discharge to Shan Pui River and Deep Bay, as shown in **Drawing no. MMH/369397/DIA/002**.

3.2.3 To analyse the drainage implications arising from the Development, ICM hydraulic models (Version 10.0) have been developed based on the drainage record from DSD and from the Updated Hydraulic Models, covering the Chu Wong Ling Channel and the drainage pipeline network in the area.

3.3 Design Parameters

Assessment Criteria

3.3.1 The assessment criteria are based on the recommendations set out in Stormwater Drainage Manual (SDM) issued by DSD and its subsequent corrigendum no. 1/2022 as well as the GEO TGN No. 39 – Guidelines for Estimation of Surface Runoff from Natural Terrain Catchments for Drainage Design Purposes. Flood events of return periods 10, 50 and 200 years have been assessed in accordance with the requirements of ETWB TC(W) No. 2/2006 "Drainage Impact Assessment Process for Public Sector Projects".

3.3.2 The drainage system for the Development will be designed to cater for a 1 in 50 years' flood event according to the recommendations of Section 6 of SDM. Furthermore, a 200-

year design return period is adopted for checking the adequacy of the urban drainage trunk system.

3.3.3 The following flood combinations (**Table 3.1**) in accordance with Section 6.4 and Table 11 of the SDM are adopted to assess the existing and proposed drainage systems.

Table 3.1 Flood Combinations

Flood Level Return Period (Years)	Rainfall Return Period (Years)	Sea Level Return Period (Years)	Case Label[2]
50	50	10	50A
	10	50	50B
200	200	10	200A
	10	200	200B

Design Rainfall

3.3.4 The rainfall profiles used in the hydraulic models for this assessment follow the synthetic rainstorms used in the Updated Hydraulic Models, which is in line with the recommendation in Section 4.3.4(b) of SDM. A 4-hour duration design rainfall for various return periods (50 and 200 years) is adopted, while the rainfall profiles are derived based on the following equation.

$$F(t) = \begin{cases} \dfrac{a[b+2(1-c)t]}{(2t+b)^{c+1}} & , \quad 0 \le t \le \dfrac{t_d}{2} \\ F(-t) & , \quad -\dfrac{t_d}{2} \le t \le 0 \end{cases}$$

Where F(t) = rate of rainfall or instantaneous intensity in mm/ hr at time t (in minutes)

t_d = rainstorm duration (in minutes) (td <= 240)

a, b, c = storm constants given in **Table 3-2** below

3.3.5 The design rainstorm profiles are assumed to be synthetic, peaked and symmetrically distributed. Based on the 5th edition of SDM, the Development is located within the area adopting rainfall statistics of Hong Kong Observatory (HKO) Headquarters and the associated storm constants are shown in **Table 3.2**.

Table 3.2 Storm Constants of the Design Rainstorm Profiles

Return Period T (years)	2	10	50	200
a	499.8	471.9	451.3	429.5
b	4.26	3.02	2.46	2.05
c	0.494	0.397	0.337	0.295

[2] For easy reference, the same case labels as those in the Updated Hydraulic Models are adopted.

3.3.6 The Hydraulic Model under this submission has been updated in accordance with DSD latest SDM Corrigendum No. 1/2022 to incorporate climate change allowance (16% increase in rainfall) plus design allowance (12.1% increase in rainfall) by the End of the 21st Century.

Design Sea Level and Boundary Conditions

3.3.7 It is noted that DSD is going to implement the proposed Yuen Long Barrage Scheme (YLBS) (PWP No. 4178CD) to enhance the flood protection to the Yuen Long area, with a target commissioning for 2027.

3.3.8 For this report, the situation of without the YLBS is assessed. Qualitative assessment will be added on the potential improvement to the drainage condition of Development area due to the YLBS.

3.3.9 The peak water levels in the Updated Hydraulic Models at the boundary points for the corresponding return period are summarised in **Table 3.3**[3].

Table 3.3 Peak Level of Water Level Profile Boundary Conditions for Scenario 1 (extracted from Updated Hydraulic Models)

Case Label	Peak Water Level (mPD)
50A	**3.74**
50B	**4.32**
200A	**3.74**
200B	**5.00**

3.3.10 The Hydraulic Model under this submission has been updated in accordance with DSD latest SDM Corrigendum No. 1/2022 Table 30b and 31 to incorporate climate change allowance, storm surge increase and design allowance by the End of the 21st Century. The overall extreme sea levels adopted are presented in **Table 3.4**

3.3.11 To cater the changes under Corrigendum No. 1/2022, the differences between the SDM and the Corrigendum No. 1/2022 of SDM have been considered in the Updated Hydraulic Model by directly incorporating the difference into the simulated water level of its respective case of simulation at the outfall of the drainage network.

[3] Refer to Table 3.1 for the flood combination for each case label

3.3.12

Table 3.4 Change in Extreme Sea Level under Corrigendum No. 1/2022

Tide Station	Return Period	Extreme Sea Level under SDM 5th Edition (mPD)	Extreme Sea Level under Corrigendum No. 1/2022 (mPD)	Difference (m)
Tsim Bei Tsui	10	4.00	4.37	**0.37**
	50	4.58	5.01	**0.43**
	200	5.26	5.78	**0.52**

Note 1: The extreme sea level under SDM 5th Edition is the sum of design extreme sea level and the mean sea level rise due to climate change for end of 21st century (0.49m) at Tsim Bei Tsui

Note 2: The extreme sea level under Corrigendum No. 1/2022 is the sum of design extreme sea level, the mean sea level rise due to climate change for end of 21st century (0.47m), storm surge increase due to climate change and design allowance at Tsim Bei Tsui

Land Uses and Runoff Parameters

Rural Catchment

3.3.13 For the purpose of assessing the change in the runoff characteristics of the catchments, the runoff parameters will be presented and analysed as CN used in the SCS method. The base CN value for the rural catchment in this report is presented in **Table 3.5**. This CN value is in line with the values adopted in the Updated Hydraulic Models.

Table 3.5 CN Adopted for Each Land Use

Land Use	SCS CN
UPLAND	
Woodland	25-55
STORAGE AND RURAL INDUSTRY	
Open Space	90

Urban Catchment

3.3.14 In the InfoWorks CS/ICM model, urban runoff is accounted for by three concurrent processes: - (i) initial losses (depression storage); (ii) continuing losses (infiltration) and (iii) overland flow routing. The losses account for the processes which rainfall will not contribute in runoff while the routing accounts for the time delay between peak rainfall and peak runoff.

3.3.15 Initial loss includes the initial soil moisture deficit (dryness), depression storage and evaporation. The value of initial loss depends on surface type and slope. The initial loss is estimated by a regression equation.

$$D = \frac{K}{\sqrt{S}}$$

Where,

D = Depression Storage

K = Coefficient
S = Ground slope

3.3.16 The values of K for calculating the initial loss as recommended in the InfoWorks to be adopted are as follows:

- impervious surfaces: 0.000071m

3.3.17 The rainfall runoff parameters suggested to be adopted in this DIA are as below:

- Paved Condition, Runoff coefficient = 0.95
- Unpaved Condition, Runoff coefficient =0.35

Roughness

3.3.18 For new proposed drains, if any, a value of 1.5mm for Colebrook-White ks, roughness will be used.

3.3.19 For the existing drainage network: -

- Manning's n value of 0.016 has been adopted for Chu Wong Ling channel; and
- Colebrook-White k_s value of 3.0mm has been adopted for slimy concrete pipes with low velocity flows.

Sedimentation

3.3.20 For design of new proposed drains, if any, sediment for the pipeline system follows the recommendation given in Section 9.3 of SDM, which suggests allowing 5% reduction in flow area if the gradient is greater than 1 in 25 or 10% reduction in flow area in other areas.

4 Existing Drainage System

4.1 Existing Catchment

4.1.1 The Development falls within the Yuen Long, Kam Tin & Ngau Tam Mei Drainage Basin, and the drainage system is served by Shan Pui River to the East.

4.1.2 The existing condition of the Development area contains approximately 84.5% paved area. The existing ground level of the Development Area is relatively high comparing with the road nearby, typically range is approximate +4.2mPD to +5.3mPD.

4.1.3 In accordance with the "Location of DSD Flooding Blackspots as at March 2021" provided in the website of DSD as enclosed in **Annex A**, there is no flooding blackspot reported near the Development.

4.1.4 The existing catchments near the Development are shown in **Drawing no. MMH/369397/DIA/003**, the surface properties of the affected catchments and percentage of paved and unpaved areas are also summarised in **Table 4.1**.

Table 4.1: Properties of the Affected Existing Catchments

Catchment ID with the Development Area	Area (ha)	Paved area (%)	Unpaved area (%)
YL_013	0.174	50	50
YL_071	0.106	100	0
YL_072	0.128	100	0
YL_073	0.043	100	0
YL_074	0.122	100	0
YL_075	0.155	100	0
YL_076	0.041	100	0
YL_077	0.159	100	0
YL_078	0.671	100	0
YL_080	0.072	100	0
YL_088	0.925	100	0
YL_093	0.550	100	0
YL_117	0.086	48	52
Total	3.232	~95.9% of total area)	~4.1% of total area)

4.2 Existing Drainage System

4.2.1 Runoff from the Development area is collected via the stormwater drains along Fuk Wang Street and Wang Lee Street, which are then discharged to the existing Chu Wong Ling Channel (approximately 6 to 10 m wide) and further discharges to Shan Pui River and Deep Bay, as shown in **Drawing no. MMH/369397/DIA/002**.

4.2.2 At Fuk Wang Street, the drainage pipes are 750mm to 1,350mm diameter running southwest, then to the southeast with a 1,800mm diameter pipeline along a footpath next to Site A for discharge into the Chu Wong Ling Channel.

4.2.3 At Wang Lee Street, there is a drainage pipe of 1,350mm diameter serving the northern portion, which is connected to a 1,800mm diameter pipeline in an existing drainage reserve (about 4.5m wide) within Site C before discharging to the Chu Wong Ling Channel.

4.2.4 For the southern portion of Wang Lee Street, there are drainage pipes of 1,200mm to 1,350mm diameter serving the lots on both side, which is also connected to the 1,800mm diameter pipeline in the existing drainage reserve within Site C before discharging to the Chu Wong Ling Channel.

4.3 Predicted Water Level for Existing Condition

4.3.1 From the Updated Hydraulic Models, the existing drainage condition of the Development and the areas in the vicinity has been assessed.

4.3.2 Stormwater from the proposed Site A and the proposed site for relocation of the YLIE Estate Centre, which comprises about 5 sub-catchments, are collected and discharged to manholes at Fuk Wang Street and the existing manhole SMH1010839 at the access road next to Site A.

4.3.3 Stormwater from the proposed Site B, which comprises about 7 sub-catchments, are collected and discharged to manhole SMH1010863 at Wang Lee Street.

4.3.4 Stormwater from the proposed Site C comprises about 2 sub-catchments, are collected and discharged to manholes SMH1010863 and SMH1010871 at Wang Lee Street.

4.3.5 The predicted maximum water levels at selected control points for Existing Condition are presented in **Table 4.2**. The location of the control points refers to **Drawing no. MMH/369397/DIA/004**.

Table 4.2: Predicted Maximum Water Level at Control Points (Existing Condition)

Control Point	Return Period	Existing Condition		Free-board (Note) (m)
		Ground Level (mPD)	Max WL (mPD)	
A: (node: SMH1010863)	50A	4.460	4.042	0.418
	50B	4.460	4.173	0.287
	200A	4.460	4.129	0.331

Control Point	Return Period	Existing Condition		
		Ground Level (mPD)	Max WL (mPD)	Free-board (Note) (m)
	200B	4.460	5.155	-0.695
B: (node: SMH1010840)	50A	4.190	3.685	0.505
	50B	4.190	4.315	-0.125
	200A	4.190	3.822	0.368
	200B	4.190	5.250	-1.060
C: (node: SMH1010839)	50A	4.500	3.113	1.387
	50B	4.500	4.254	0.246
	200A	4.500	3.598	0.902
	200B	4.500	5.111	-0.611
D (break: 820844835604)	50A	4.130	2.696	1.434
	50B	4.130	4.103	0.027
	200A	4.130	3.502	0.628
	200B	4.130	5.005	-0.875
E (break: 820880835499)	50A	4.130	2.695	1.435
	50B	4.130	3.846	0.284
	200A	4.130	3.503	0.627
	200B	4.130	5.002	-0.872
F (break :820880835337)	50A	4.130	2.688	1.442
	50B	4.130	3.435	0.695
	200A	4.130	3.501	0.629
	200B	4.130	4.993	-0.863
H: (node: SMH1010860)	50A	4.310	4.358	-0.048
	50B	4.310	4.278	0.032
	200A	4.310	4.386	-0.076
	200B	4.310	5.039	-0.729

Note: -ve freeboard means maximum water level is above ground level/ channel bank level, i.e. potential predicted flooding depth; while +ve freeboard means maximum water level is below bank level.

4.3.6 With reference to the result in **Table 4.2**, flooding is predicted for all control points for Case 200B, ranging from 0.048m to 1.060m. This is expected because according to Table 8 in the 5th edition of SDM, the design extreme sea level in Tsim Bei Tsui is 4.77 mPD for a return period of 200 years. As the Development Area is located in low-lying areas in Yuen Long, with ground level of the control points ranging from 4.13 mPD to 4.60 mPD.

4.3.7 For other cases, flooding is not anticipated except for control point H, where minor flooding of 0.048m for Case 50A and 0.076m for Case 200A is predicted.

4.3.8 Flood maps for the four cases for the existing conditions are enclosed in **Annex B** for easy reference.

4.3.9 Based on the factor of rainfall increase (mentioned in **Section 3.3.8**) and change in extreme sea level added on the outfall water level (mentioned in **Table 3.4**), the predicted maximum water levels at selected control points for Existing Condition under Corrigendum No. 1/2022 are presented in **Table 4.3**, which are used for Drainage Impact assessment comparing with proposed condition of the Development area.

Table 4.3: Predicted Maximum Water Level at Control Points (Existing Condition under Corrigendum No. 1/2022)

Control Point	Return Period	Existing Condition w/o Corrigendum			Planned Condition w/ Corrigendum			Change
		Ground Level (mPD)	Max WL (mPD)	Free-board (Note 1) (m)	Ground Level (mPD)	Max WL (mPD)	Free-board (Note 1) (m)	Free-board (m)
A: (node: SMH1010863)	50A	4.460	4.042	0.418	4.460	4.188	0.272	-0.146
	50B	4.460	4.173	0.287	4.460	4.173	0.287	0.000
	200A	4.460	4.129	0.331	4.460	4.248	0.212	-0.119
	200B	4.460	5.155	-0.695	4.460	5.352	-0.892	-0.197
B: (node: SMH1010840)	50A	4.190	3.583	0.607	4.190	3.854	0.336	-0.271
	50B	4.190	4.315	-0.125	4.190	4.315	-0.125	0.000
	200A	4.190	3.739	0.451	4.190	4.104	0.086	-0.365
	200B	4.190	5.25	-1.060	4.190	5.422	-1.232	-0.172
C: (node: SMH1010839)	50A	4.500	2.986	1.514	4.500	3.303	1.197	-0.317
	50B	4.500	4.254	0.246	4.500	4.254	0.246	0.000
	200A	4.500	3.584	0.916	4.500	3.975	0.525	-0.391
	200B	4.500	5.111	-0.611	4.500	5.375	-0.875	-0.264
D (break:	50A	4.130	2.696	1.434	4.130	3.06	1.070	-0.364
	50B	4.130	4.103	0.027	4.130	4.103	0.027	0.000

Control Point	Return Period	Existing Condition w/o Corrigendum			Planned Condition w/ Corrigendum			Change
		Ground Level (mPD)	Max WL (mPD)	Free-board (Note 1) (m)	Ground Level (mPD)	Max WL (mPD)	Free-board (Note 1) (m)	Free-board (m)
820844835604)	200A	4.130	3.502	0.628	4.130	3.872	0.258	-0.370
	200B	4.130	5.005	-0.875	4.130	5.436	-1.306	-0.431
E (break: 820880835499)	50A	4.130	2.695	1.435	4.130	3.063	1.067	-0.368
	50B	4.130	3.846	0.284	4.130	3.846	0.284	0.000
	200A	4.130	3.502	0.628	4.130	3.873	0.257	-0.371
	200B	4.130	5.002	-0.872	4.130	5.347	-1.217	-0.345
F (break :820880835337)	50A	4.130	2.688	1.442	4.130	3.057	1.073	-0.369
	50B	4.130	3.435	0.695	4.130	3.435	0.695	0.000
	200A	4.130	3.501	0.629	4.130	3.872	0.258	-0.371
	200B	4.130	4.993	-0.863	4.130	5.764	-1.634	-0.771
H: (node: SMH1010860)	50A	4.310	4.357	-0.047	4.310	4.411	-0.101	-0.054
	50B	4.310	4.277	0.033	4.310	4.378	-0.068	-0.101
	200A	4.310	4.386	-0.076	4.310	4.437	-0.127	-0.051
	200B	4.310	5.039	-0.729	4.310	5.039	-0.729	0.000

Note: -ve freeboard means maximum water level is above ground level/ channel bank level, i.e. potential predicted flooding depth; while +ve freeboard means maximum water level is below bank level.

5 Drainage Impact Assessment and Planned Drainage Condition

5.1 Proposed Development

5.1.1 The Development comprises three sites for the proposed MSBs development and the site for relocation of the Estate Centre. For this report, it is assumed that all the sub-sites in the Development will be paved for the planned scenario.

5.1.2 The existing ground level of the Development ranges from +4.2mPD to +5.3mPD and the proposed site formation level is assumed to be +5.0mPD. No extensive filling nor cutting works are expected.

5.1.3 It is assumed that there will be a drainage connection from each site, including the site for relocation of the YLIE Estate Centre to convey stormwater collected within the site to the existing drainage system.

5.1.4 In order not to constrain the development potential of Site C, it is proposed that the existing drainage reserve (about 4.5m wide) be diverted to next to the site boundary of Site C (about 8.3m wide according to previous discussion with DSD).

5.1.5 The proposed drainage connection points and the new drainage reserve are shown in **Drawing no. MMH/369397/DIA/006.**

5.1.6 As a result of the Development, the sub-catchments of the sites have been revised and the Updated Hydraulic Models under the Planned Condition have been amended accordingly. The details are shown in **Drawing no. MMH/369397/DIA/006**.

5.2 Proposed Catchment

5.2.1 The paved and unpaved conditions for the sub-catchments under Planned Condition are presented in the **Table 5.1**. As shown in **Table 5.1**, there is an minor increase of the paved catchment area (about 0.132 ha) due to the Development.

Table 5.1: Summary of Catchment Properties of the Planned Condition

Catchment ID with the Development Area	Paved area (ha)	Unpaved area (ha)	Area (ha)
Planned Catchments			
MSB_PP_A	0.982	0	0.982
MSB_PP_B	1.252	0	1.252
MSB_PP_C	1.000	0	1.000
Total	**3.232**	**0**	**3.232**

5.3 Proposed Upgrading of Drainage System

5.3.1 The following drainage works are proposed for the Development, apart from the drainage connections from each site:

- Diversion of the existing drainage reserve at Wang Lee Street to the southern site boundary of the Site B;
- A new 2,100 m diameter stormwater drainage pipeline is to be constructed in the new drainage reserve (about 8.3m wide), together with an intermediate manhole and an outfall at the Chu Wong Ling Channel;
- Upgrading of a section (about 68.6 m long) of the existing 1,350mm diameter pipeline and a section (about 63.1m long) of the existing 1,200mm diameter pipeline to 1,800mm diameter pipeline at Wang Lee Street with one additional manhole for the diversion of the drainage reserve.

5.3.2 The proposed drainage works are shown in **Drawing no. MMH/369397/DIA/006**.

5.4 Hydraulic Performance of the Planned Condition

5.4.1 For the Planned Condition, a local hydraulic model (**Annex C**) has been created by modifying the baseline model of existing condition to incorporate the effect of changes in paving conditions, redistribution of catchment area, site formation and proposed drainage to assess the hydraulic performance of the upgraded drainage system. The predicted maximum water levels at the control points for the Planned Condition are shown in **Table 5.2**, with the water levels for the Existing Condition shown for easy reference. Flood maps for the four cases are enclosed in **Annex B** for easy reference.

Table 5.2: Comparison of Maximum Water Level at Control Points[5] (Drawing No. MMH/369397/DIA/004 refers)

Control Point	Return Period	Existing Condition			Planned Condition			Change
		Ground Level (mPD)	Max WL (mPD)	Free-board (Note 1) (m)	Ground Level (mPD)	Max WL (mPD)	Free-board (Note 1) (m)	Free-board (Note 2) (m)
A: (node: SMH1010863)	50A	4.460	4.188	0.272	4.460	4.200	0.260	-0.012
	50B	4.460	4.173	0.287	4.460	4.098	0.362	0.075
	200A	4.460	4.248	0.212	4.460	4.291	0.169	-0.043
	200B	4.460	5.352	-0.892	4.460	5.301	-0.841	0.051
B: (node: SMH1010840)	50A	4.190	3.854	0.336	4.190	3.930	0.260	-0.076
	50B	4.190	4.315	-0.125	4.190	4.315	-0.125	0.000
	200A	4.190	4.104	0.086	4.190	4.132	0.058	-0.028

Control Point	Return Period	Existing Condition			Planned Condition			Change
		Ground Level (mPD)	Max WL (mPD)	Free-board (Note 1) (m)	Ground Level (mPD)	Max WL (mPD)	Free-board (Note 1) (m)	Free-board (Note 2) (m)
	200B	4.190	5.422	-1.232	4.190	5.444	-1.254	-0.022
C: (node: SMH1010839)	50A	4.500	3.303	1.197	4.500	3.345	1.155	-0.042
	50B	4.500	4.254	0.246	4.500	4.255	0.245	-0.001
	200A	4.500	3.975	0.525	4.500	3.987	0.513	-0.012
	200B	4.500	5.375	-0.875	4.500	5.347	-0.847	0.028
D (break: 820844835604)	50A	4.130	3.06	1.070	4.130	3.063	1.067	-0.003
	50B	4.130	4.103	0.027	4.130	4.104	0.026	-0.001
	200A	4.130	3.872	0.258	4.130	3.873	0.257	-0.001
	200B	4.130	5.436	-1.306	4.130	5.436	-1.306	0.000
E (break: 820880835499)	50A	4.130	3.063	1.067	4.130	3.064	1.066	-0.001
	50B	4.130	3.846	0.284	4.130	3.858	0.272	-0.012
	200A	4.130	3.873	0.257	4.130	3.873	0.257	0.000
	200B	4.130	5.347	-1.217	4.130	5.330	-1.200	0.017
F (break :820880835337)	50A	4.130	3.057	1.073	4.130	3.058	1.072	-0.001
	50B	4.130	3.435	0.695	4.130	3.446	0.684	-0.011
	200A	4.130	3.872	0.258	4.130	3.872	0.258	0.000
	200B	4.130	5.764	-1.634	4.130	5.753	-1.623	0.011
G: (node: SMH1010859!)	50A	N.A.	N.A.	N.A.	4.600	3.267	1.333	N.A.
	50B	N.A.	N.A.	N.A.	4.600	3.952	0.648	N.A.
	200A	N.A.	N.A.	N.A.	4.600	3.960	0.640	N.A.
	200B	N.A.	N.A.	N.A.	4.600	5.215	-0.615	N.A.
H: (node: SMH1010860)	50A	4.310	4.411	-0.101	4.310	4.416	-0.106	-0.005
	50B	4.310	4.378	-0.068	4.310	4.376	-0.066	0.002
	200A	4.310	4.437	-0.127	4.310	4.447	-0.137	-0.010
	200B	4.310	5.039	-0.729	4.310	5.039	-0.729	0.000

Control Point	Return Period	Existing Condition			Planned Condition			Change
		Ground Level (mPD)	Max WL (mPD)	Free-board (Note 1) (m)	Ground Level (mPD)	Max WL (mPD)	Free-board (Note 1) (m)	Free-board (Note 2) (m)
I: (break: 820981835570)	50A	N.A.	N.A.	N.A.	4.280	3.357	0.923	N.A.
	50B	N.A.	N.A.	N.A.	4.280	4.015	0.265	N.A.
	200A	N.A.	N.A.	N.A.	4.280	4.004	0.276	N.A.
	200B	N.A.	N.A.	N.A.	4.280	5.225	-0.945	N.A.

Note 1: -ve freeboard means maximum water level is above ground level/ channel bank level, i.e. potential predicted flooding depth; while +ve freeboard means maximum water level is below bank level. **N.A.** denotes the new control point in relation to the proposed drainage works.

Note 2: cases with decrease in +ve freeboard are marked in Green; and cases with increase in -ve freeboard are marked in Red.

5.4.2 With reference to the result in **Table 5.2**, the following observations are noted regarding the Planned Condition:

- Similar to the Existing Condition, flooding is predicted for all control points for Case 200B, due to the fact that the Development Area is located in low-lying areas in Yuen Long, with ground level of the control points ranging from 4.13 mPD to 4.60 mPD.
- For other cases, flooding is not anticipated except for control point H, where flooding ranging from 0.066m to 0.729m for four cases.
- Flood maps for the four cases for the Planned Condition are enclosed in **Annex B** for easy reference.

5.4.3 Comparing with the Existing Condition, the following observations are noted with the proposed drainage upgrading works for the Development:

- Very minor increase in flooding is observed for control points A, C, E, F for Case 200B and control point H for case 200A, up to a maximum of 0.051m at control point A
- Minor relieve in flooding by 0.022m for control point B for Case 200B
- Very minor decrease in freeboard is observed for control points A, B, C for Case 200A, up to a maximum of 0.043m at control point A

5.4.4 Flood maps of proposed condition for the four cases are enclosed in **Annex B** for easy reference.

5.5 Implication of Yuen Long Barrage Scheme

5.5.1 According to DSD, a drainage project "Yuen Long Barrage Scheme" is under construction for enhancing the resilience to flooding of the Yuen Long area. The scope of this project mainly comprises the following: -

- *Construction of a barrage, and ancillary pumping and E&M facilities at Yuen Long Nullah;*
- *Drainage improvement works at the intersection of Yuen Long Nullah and Yuen Long Bypass Floodway;*
- *Construction and modification of parapet walls along Yuen Long Nullah, Kam Tin River and Sam Chung River; and*
- *Enhancement of the local environment quality of existing nullah between Long Ping West Rail Station and the proposed Barrage.*

5.5.2 The Yuen Long Barrage Scheme (YLBS) will significantly improve the drainage performance of Shan Pui River as well as Chu Wong Ling channel. When the barrage scheme is in operation, the water level of Chu Wong Ling channel will be drawn down. Subject to the detailed design of the YLBS, the estimated water levels at the Yuen Long Nullah before and after the implementation of YLBS are shown in **Table 5.3**:

Table 5.3: Comparison of Maximum Water Level of Implementation of YLBS[6] (provided by DSD without considering Corrigendum)

Location	Return Period	Maximum Water Levels (mPD) before implementation of YLBS	Estimated Water Levels (mPD) after implementation of YLBS
Yuen Long Nullah (break: 820825834549)	50A	3.389	2.827
	50B	3.133	2.561
	200A	3.874	3.652
	200B	4.859	3.070

5.5.3 It is noted that the maximum water level at the Yuen Long Nullah for the four cases will be lowered significantly due to the implementation of the YLBS, more than 0.5m for Case 50A and Case 50B; and more than 0.2m for Case 200A and more than 1.7m for Case 200B.

[6] The maximum water levels before implementation of YLBS are extracted from Updated Hydraulic Models. The estimated water levels after implementation of YLBS are from the Final Preliminary Drainage Impact Assessment Report under Agreement No. CE 13/2017(CE) Site Formation and Infrastructural Works for Remaining Phases of Public Housing Developments at Wang Chau.

5.5.4 In contrast to the minimal decrease in freeboard by only 0.043m at control point A for Case 200A mentioned in **Section 5.4.3**, the implementation of the YLBS has significantly lowered the maximum water level by 0.2m. This substantial reduction in water level for Case 200A will positively impact the assessed hydraulic performance of the drainage system serving the Planned Condition of the Development in the vicinity.

5.5.5 Comparing it to the flooding situation at control point F for Case 200B under Planned Condition stated in **Table 5.2**, where significant issue arose, the YLBS has remarkably lowered the maximum water level by 1.7m for Case 200B. This substantial reduction in water level due to the YLBS will have a consequential positive impact on the assessed hydraulic performance of the drainage system serving the Planned Condition of the Development in the vicinity.

5.5.6 By assessing the hydraulic performance of the drainage system serving the Planned Condition of the Development, while taking into account the insignificantly increase in the paved catchment area (merely 4.1% of the total area) and considering the lowered maximum water level at the Yuen Long Nullah due to YLBS, the occurrence of overbank flow at the Yuen Long Nullah is not expected in all Cases.

5.5.7 Consequentially, the predicted flooding for the Planned Condition of the Development is not expected upon commissioning of the Development in 2029.

6 Summary

6.1.1 The Development falls within the Yuen Long urban catchments which are currently mainly paved area. The Development will insignificantly increase the percentage of the paved area by 4.1%, from 95.9% to 100% for the area to be occupied by the proposed MSBs. Runoff from the Development area discharges to existing Chu Wong Ling Channel (approximately 6 ~ 10 m wide) and further discharges to Shan Pui River and Deep Bay.

6.1.2 According to the hydraulic modelling results for various flood design cases, flooding is predicted for all control points near the Development for Case 200B for the Existing Condition, ranging from 0.729m to 1.634m. For other cases, flooding is not anticipated except at the junction of Fuk Wang Street and Wang Lee Street (control point H), where minor flooding ranging from 0.068m to 0.127m for Case 50A, 50B, 200A is predicted.

6.1.3 In order not to constrain the Development, diversion of an existing drainage reserve abutting Wang Lee Street and the associated drainage upgrading works would be required, including the upgrading of the 1,800mm drain pipe in the drainage reserve to 2,100mm drain pipe in the new drainage reserve.

6.1.4 For the Planned Condition, minor increase in flooding is predicted for most control points for Case 200B due to the Development, up to a maximum of 0.051m at control point A. There will also be minor increase in flooding at control point H for Case 50A, 50B, 200A ranging from 0.002m to 0.01m.

6.1.5 In summary, the drainage impact due to the Development is assessed to be insignficant, with very minor increase in the peak runoff due to increased paved area and the associated diversion of an existing drainage reserve.

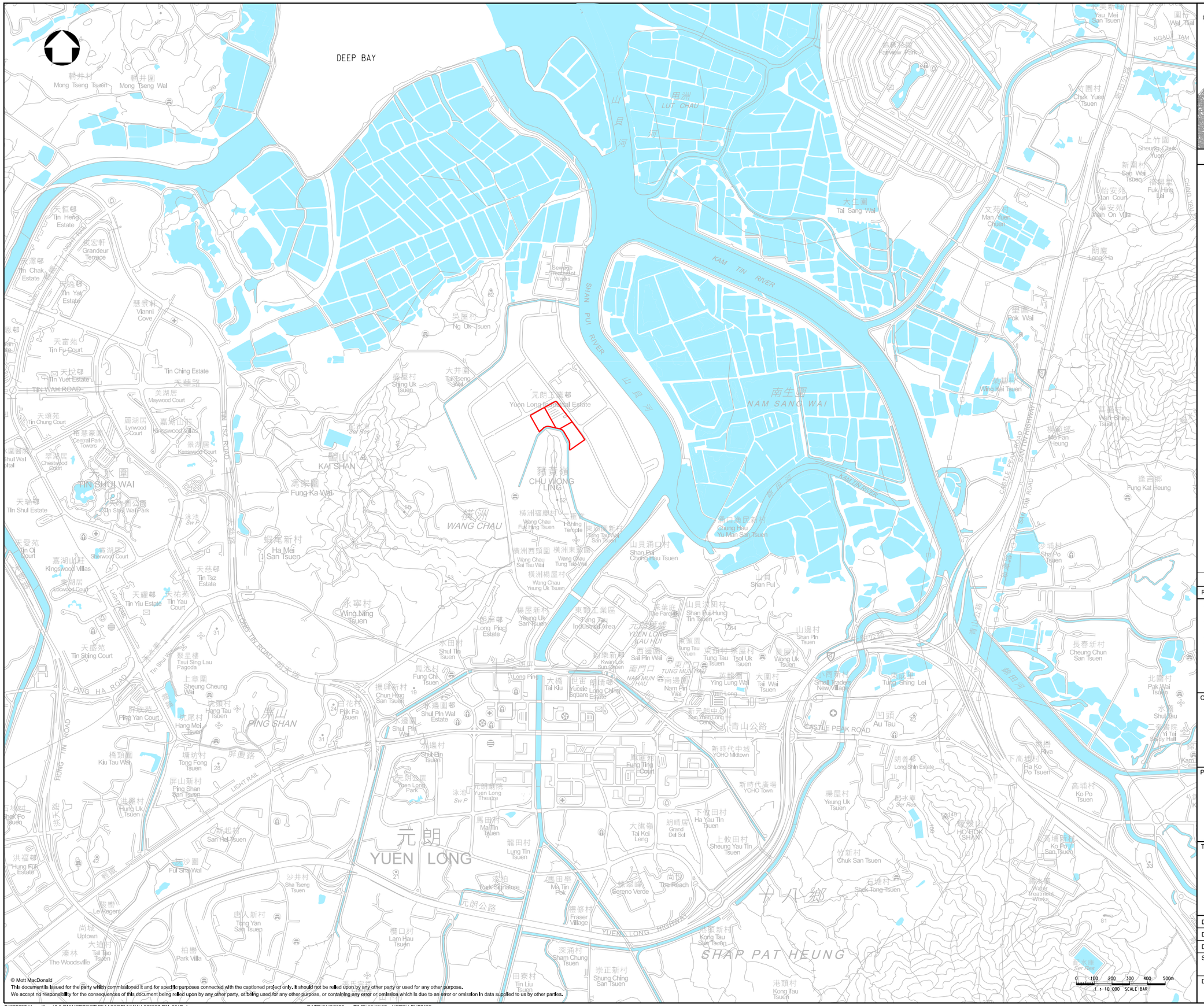
6.1.6 The above drainage impact assessment is conducted without considering the YLBS project, which is in the planning stage to improve the resilience to flooding of the Yuen Long area for completion by 2027.

6.1.7 Upon completion of the YLBS, it is expected that the maximum water level at the Shan Pui River will be lowered substantially for the flood design cases. Consequentially, the above predicted flooding and the occurrence of overbank flow at Yuen Long Nullah under the Planned Condition of the Development is not expected upon commissioning of the Development in 2029.

6.1.8 It is noted that the major land uses of the MSBs would be vehicle servicing and maintenance and/or logistics uses. As the drainage impact would be insensitive to different major land uses, it is assessed that the different combination of land uses will not cause any adverse drainage impact.

Drawings

MMH/369397/DIA/001	Location Plan of Development
MMH/369397/DIA/002	Location Plan of Development with the Surrounding Drainage System
MMH/369397/DIA/003	Model Extent and Sub-Catchment Plan (Existing Condition)
MMH/369397/DIA/004	Location Plan of Control Points
MMH/369397/DIA/005	Model Extent and Sub-Catchment Plan (Planned Condition)
MMH/369397/DIA/006	Proposed Drainage Works



KEY PLAN (1:100000)

LEGEND:

STUDY SITE

RIVER

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	SEP 22	KY	FIRST ISSUE	KS	SHC

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Title

LOCATION PLAN OF STUDY SITE

Designed	VARIOUS		Eng check	KS	
Drawn	KY		Coordination	KS	
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PART PLAN A



KEY PLAN (1:100000)

LEGEND:

- EXISITING DRAWAGE RESERVE ZONE
- DRAINAGE RECORD PLAN
- STUDY SITE

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Title

EXISTING DRAINAGE PLAN

Designed	VARIOUS		Eng check	KS	
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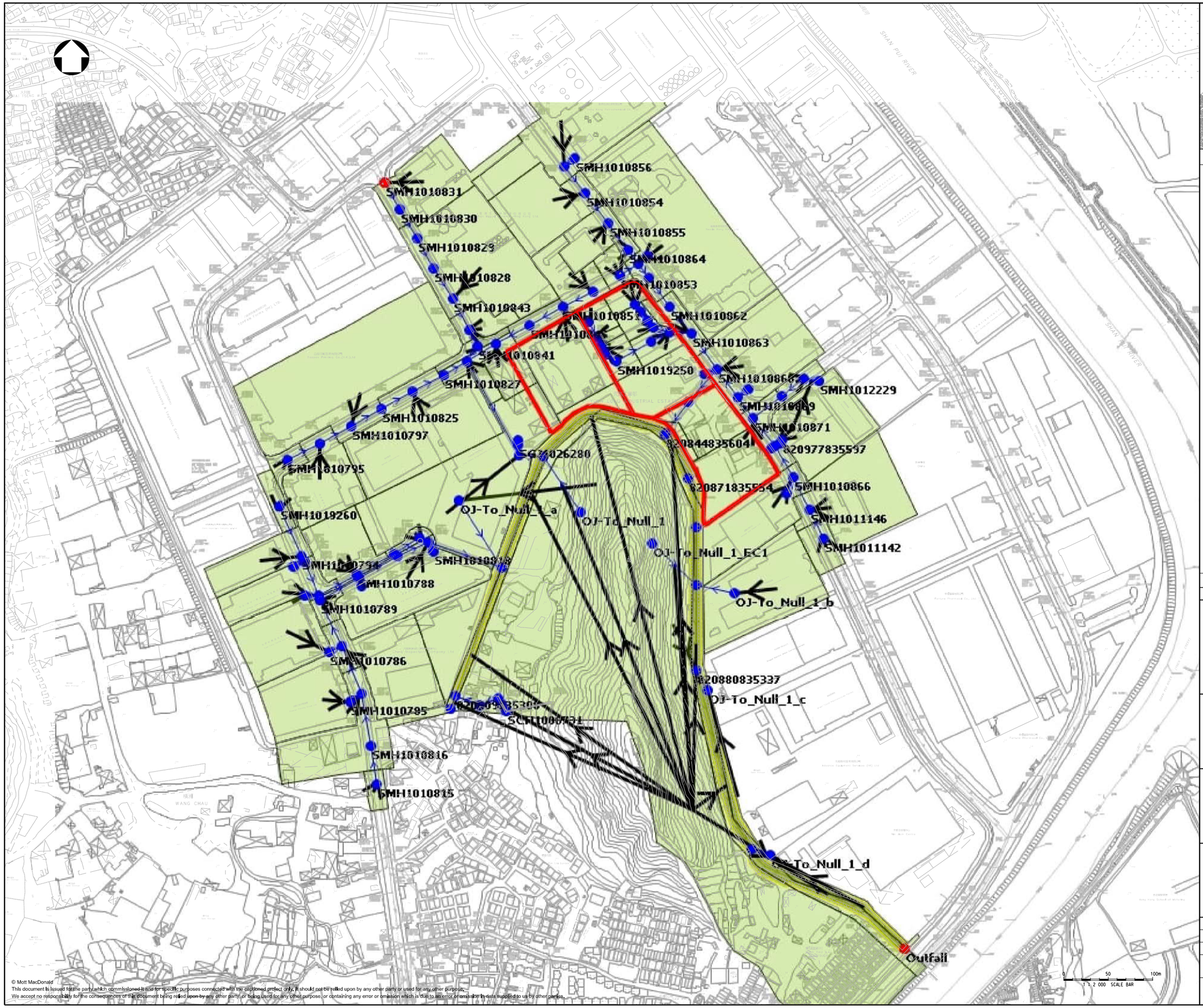



KEY PLAN (1:100000)

LEGEND:

EXISTING SUB-CATCHMENT

STUDY SITE

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Title

SUB-CATCHMENT PLAN
(EXISTING CONDITION)

Designed	VARIOUS		Eng check	KS	
Drawn	KY		Coordination	KS	
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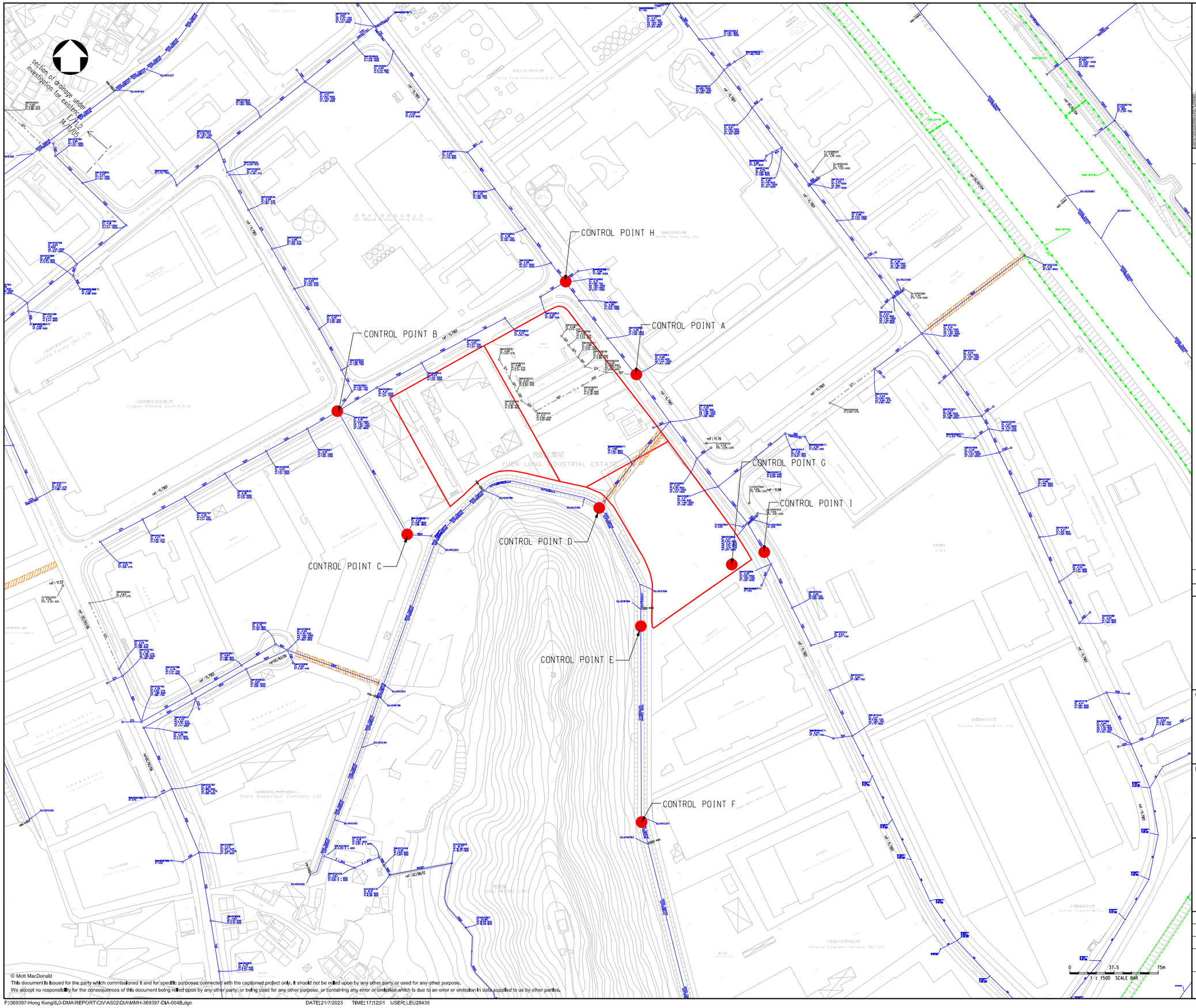



KEY PLAN (1:100000)

LEGEND:

- EXISITING DRAWAGE RESERVE ZONE
- STUDY SITE
- CONTROL POINT

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Title

LOCATION PLAN OF CONTROL POINTS

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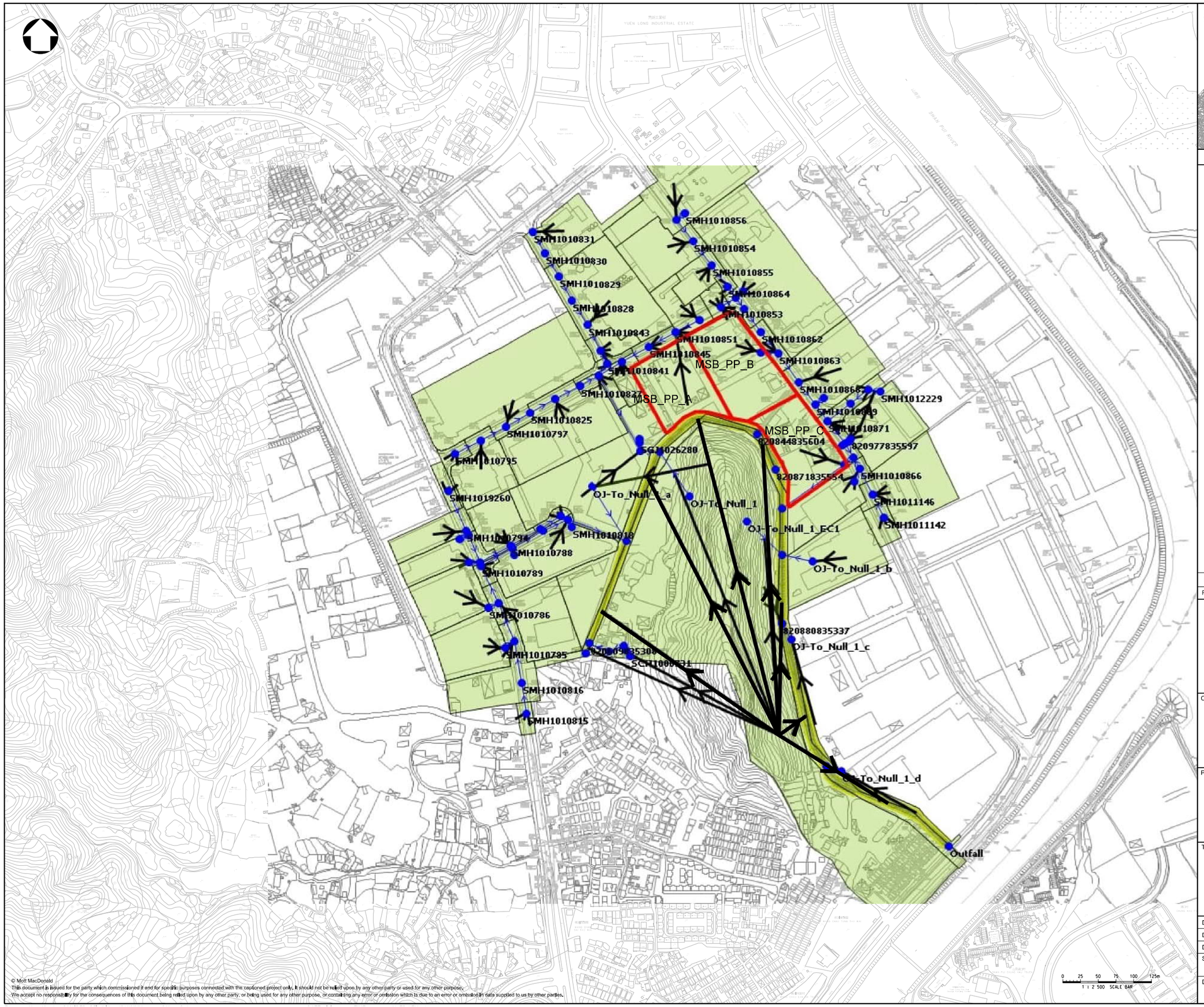



KEY PLAN (1:100000)

LEGEND:

- EXISTING SUB-CATCHMENT
- STUDY SITE
- FLOW DIRECTION OF THE SURFACE RUNOFF
- MANHOLE

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Title

UPDATED SUB-CATCHEMNT PLAN (PLANNED CONDITION)

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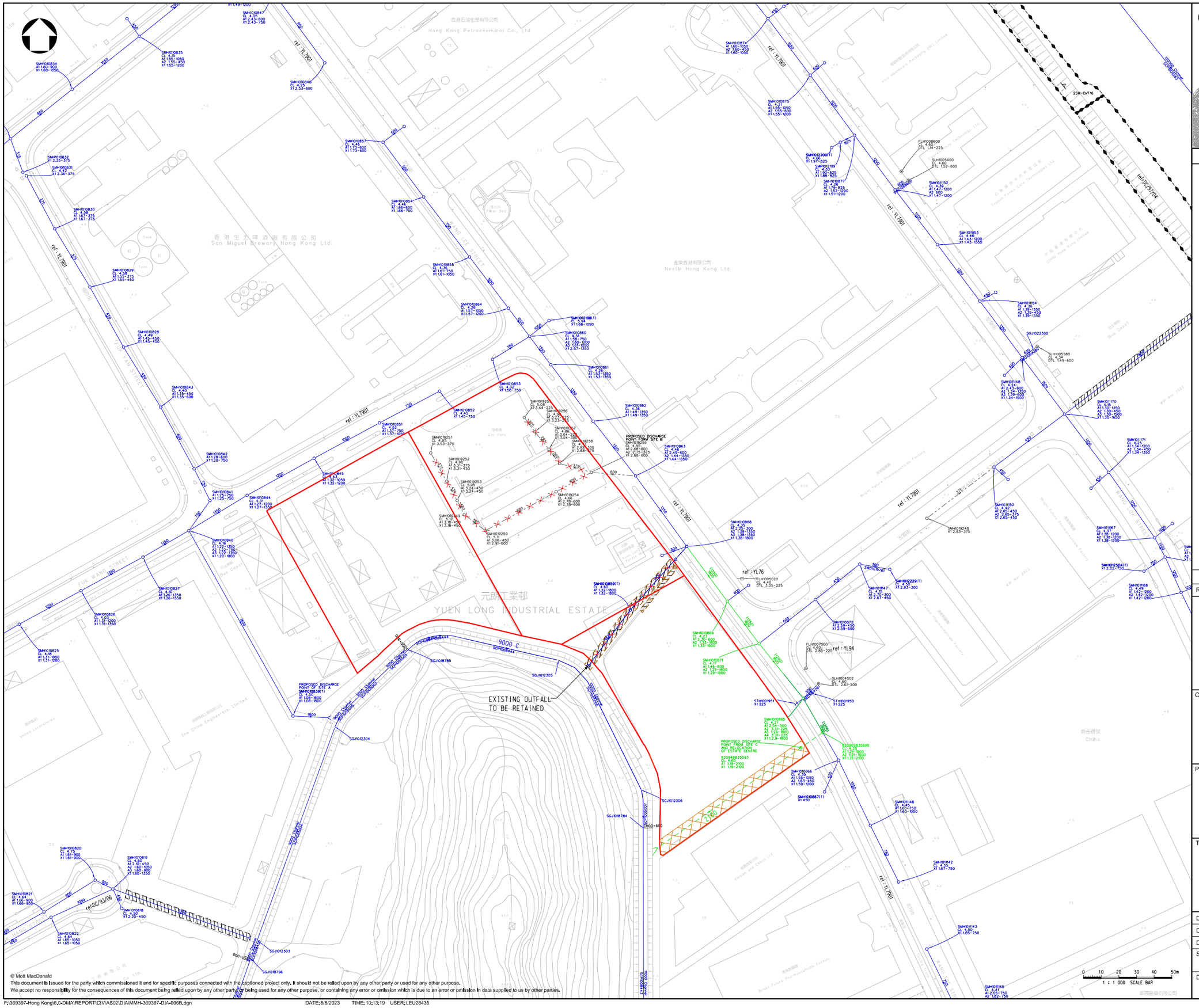

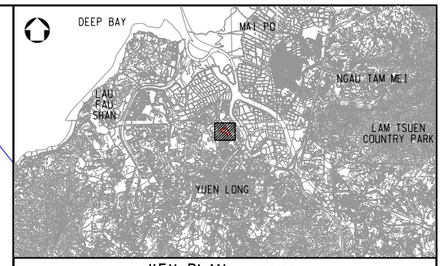

KEY PLAN (1:100000)

LEGEND:

- STUDY SITE
- 1800 / (1350) — EXISTING 1350mm DIAMETER STORMWATER DRAIN TO BE UPGRADED TO 1800mm DIAMETER DRAIN
- PROPOSED DRAINAGE RESERVE ZONE
- × × × EXISTING PIPES TO BE REMOVED

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Title
PROPOSED DRAINAGE WORKS

Designed	VARIOUS		Eng check	KS	
Drawn	KY		Coordination	KS	
Dwg check	TT		Approved	SHC	
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Drawing Number
MMH/369397/DIA/006

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1 : 1 000 SCALE BAR

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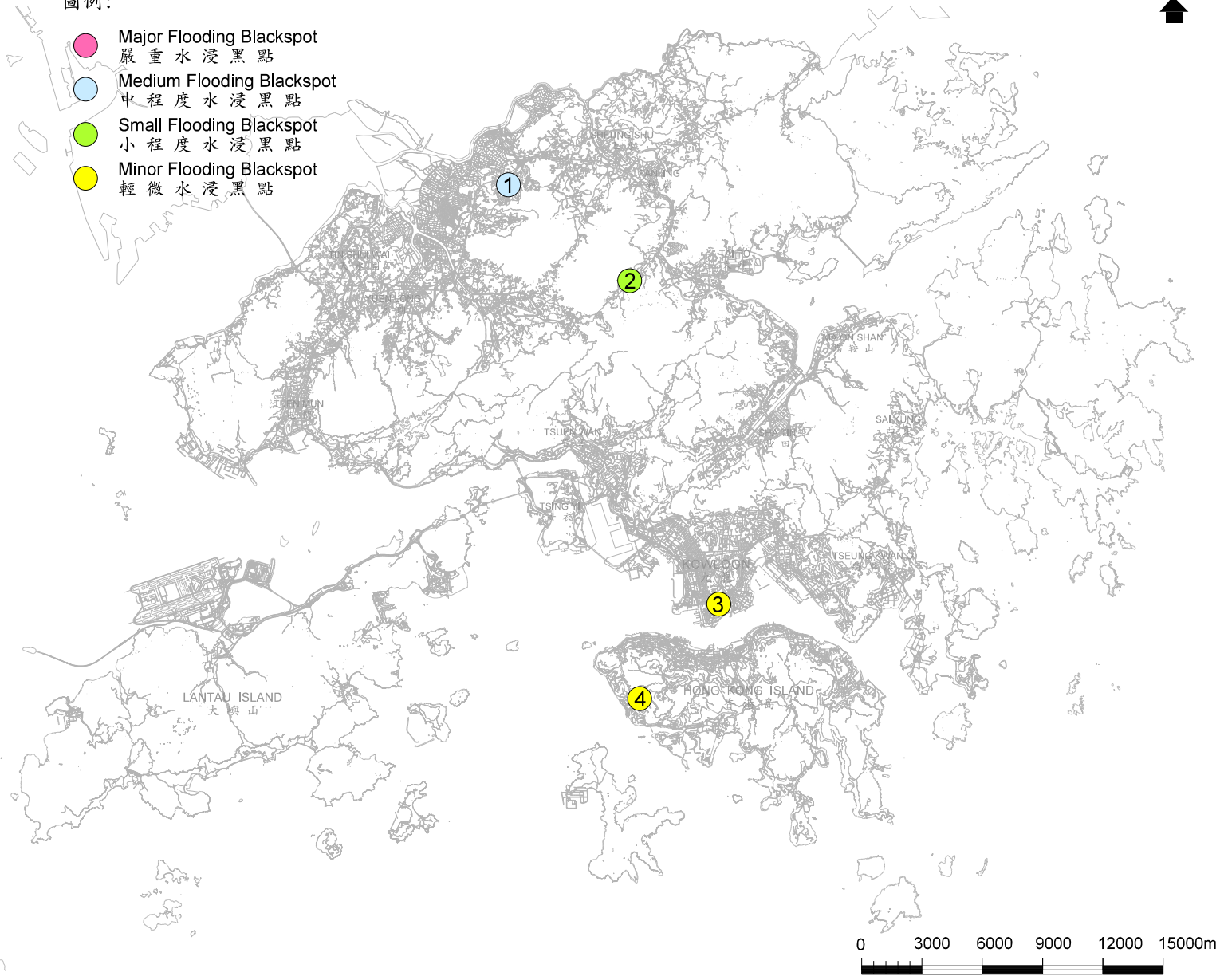
Annexes

Annex A	Location of DSD Flooding Blackspots as at March 2021
Annex B	Flood Risk Maps
Annex C	Verification of ICM model
Annex D	ICM Models (Version 10.0) (CD) (Only Submit to CEDD and DSD)

Annex A



Flooding Blackspots
水浸黑點

No. 編號	Location 地點
1	Shek Wu Wai, San Tin 新田石湖圍
2	Lam Tsuen Valley Basin 林村谷盆地
3	Chatham Road South (Granville Road to Austin Avenue) 漆咸道南 (加連威老道和柯士甸路之間)
4	Pok Fu Lam Village 薄扶林村

Remarks :

The DSD blackspots list and location map are produced based on previous flooding records and complaints received by DSD for monitoring the maintenance and mitigation measures to alleviate flooding at the blackspots. Locations susceptible to flooding problems dominated by tidal influence were not included. The blackspots list and maps should not be used as an indication of the actual or hidden flood risk at any particular location in Hong Kong.

備註：

渠務署水浸黑點名單及位置圖是根據我們以往的水浸記錄及收到的水浸投訴編制而成，用以監察該地點維修及防洪措施的進展，一些純粹因潮漲引發水浸的地點並未包括在內。水浸黑點名單及位置圖並不適用於顯示本港任何地方的實際或隱藏水浸風險。

Drawing title

Flooding Blackspots as at March 2021
水浸黑點(2021年3月情況)

Drawing no.	Scale	Date
DLD 4012A	A4 (1:300000)	Mar 2021

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DRAINAGE SERVICES DEPARTMENT
HONG KONG

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Annex B

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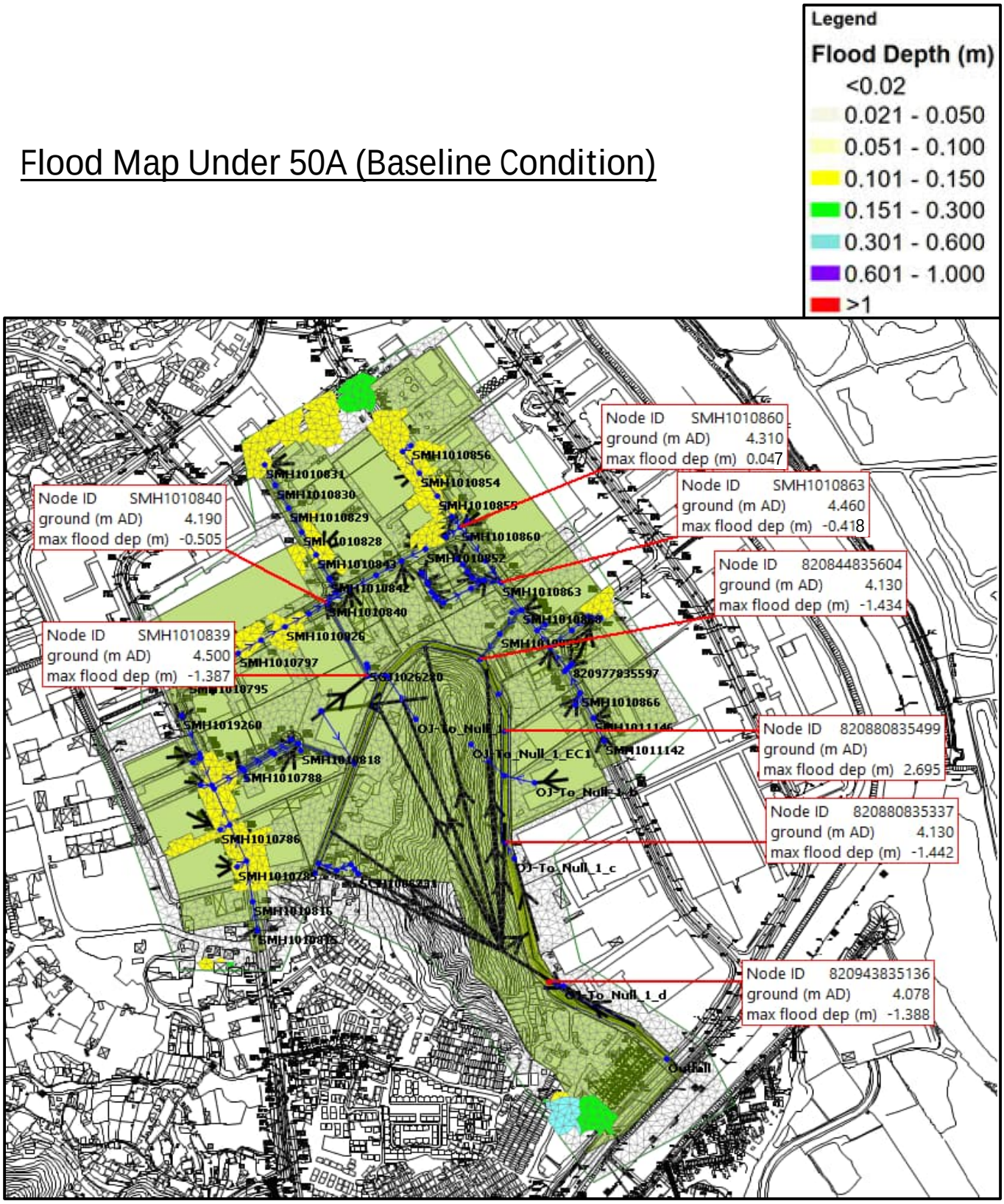
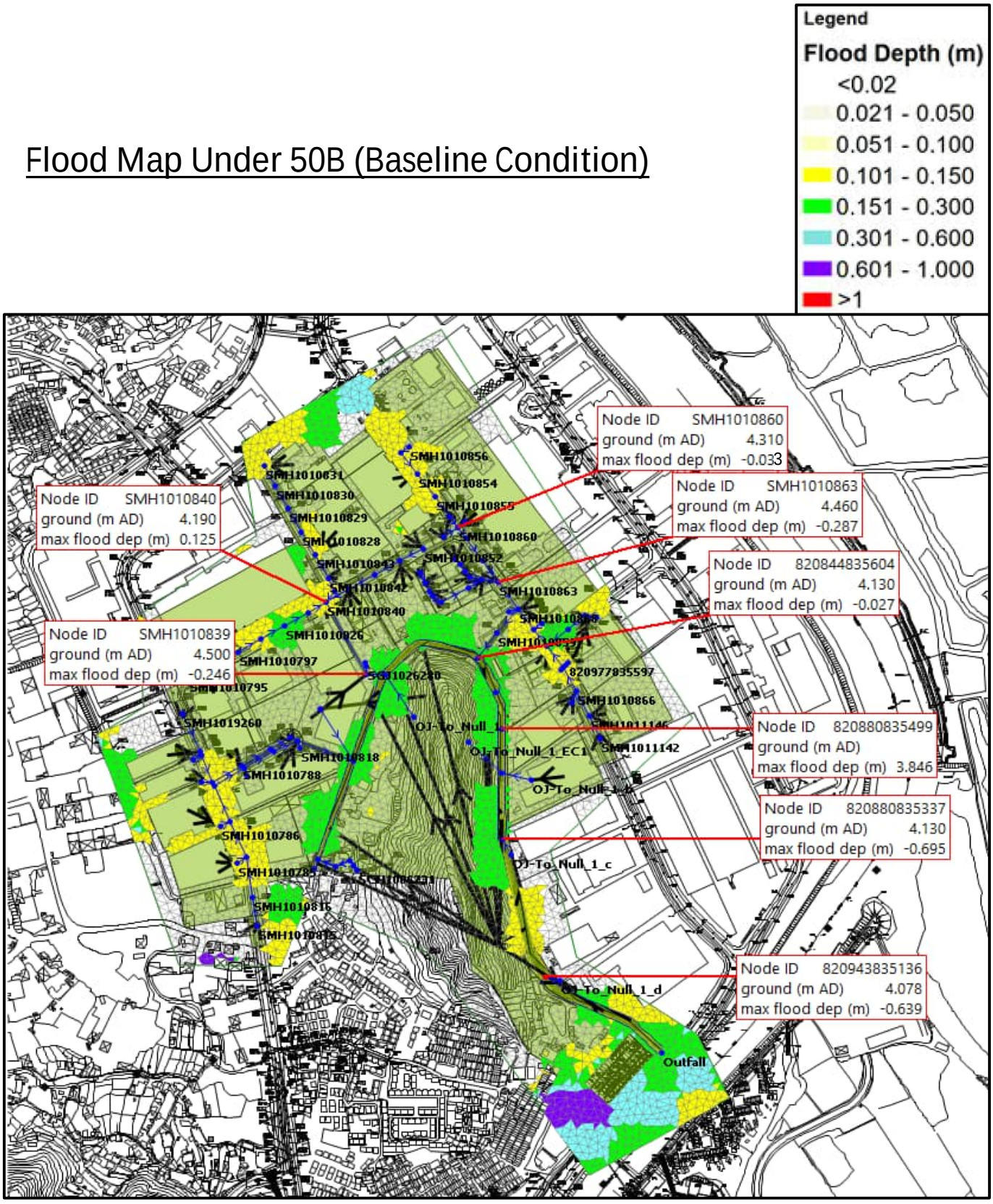
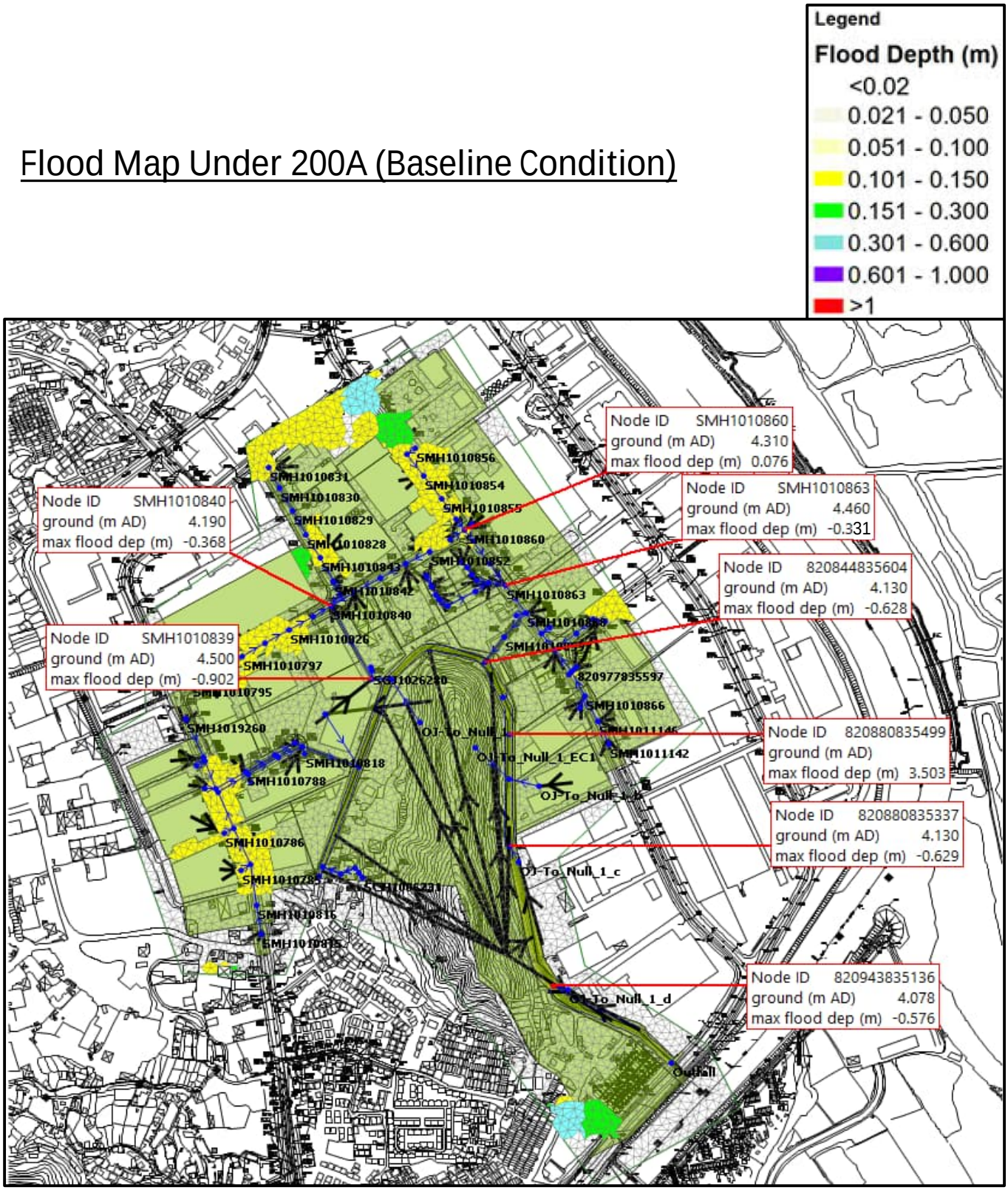
Flood Map Under 50A (Baseline Condition)



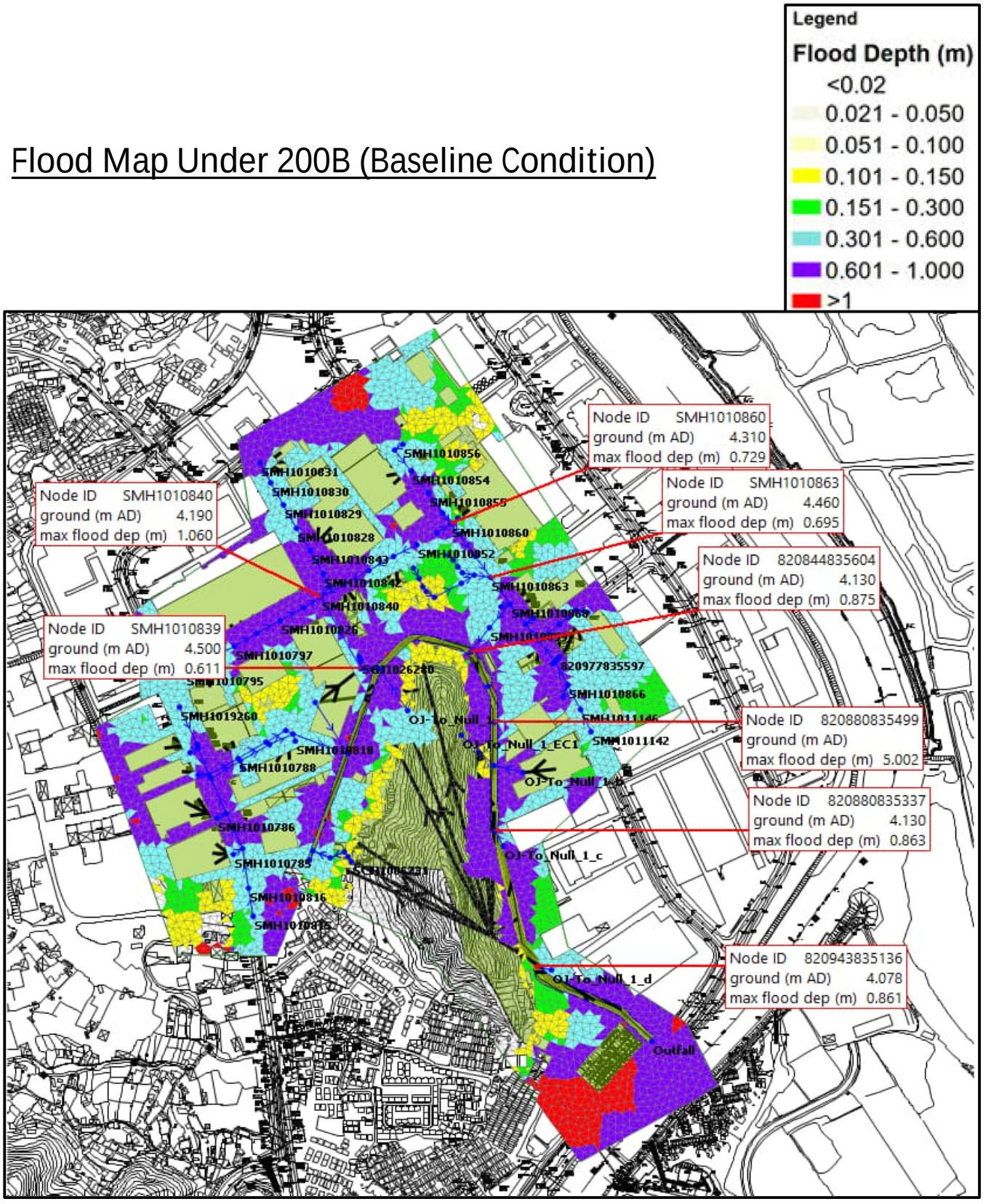
Flood Map Under 50B (Baseline Condition)



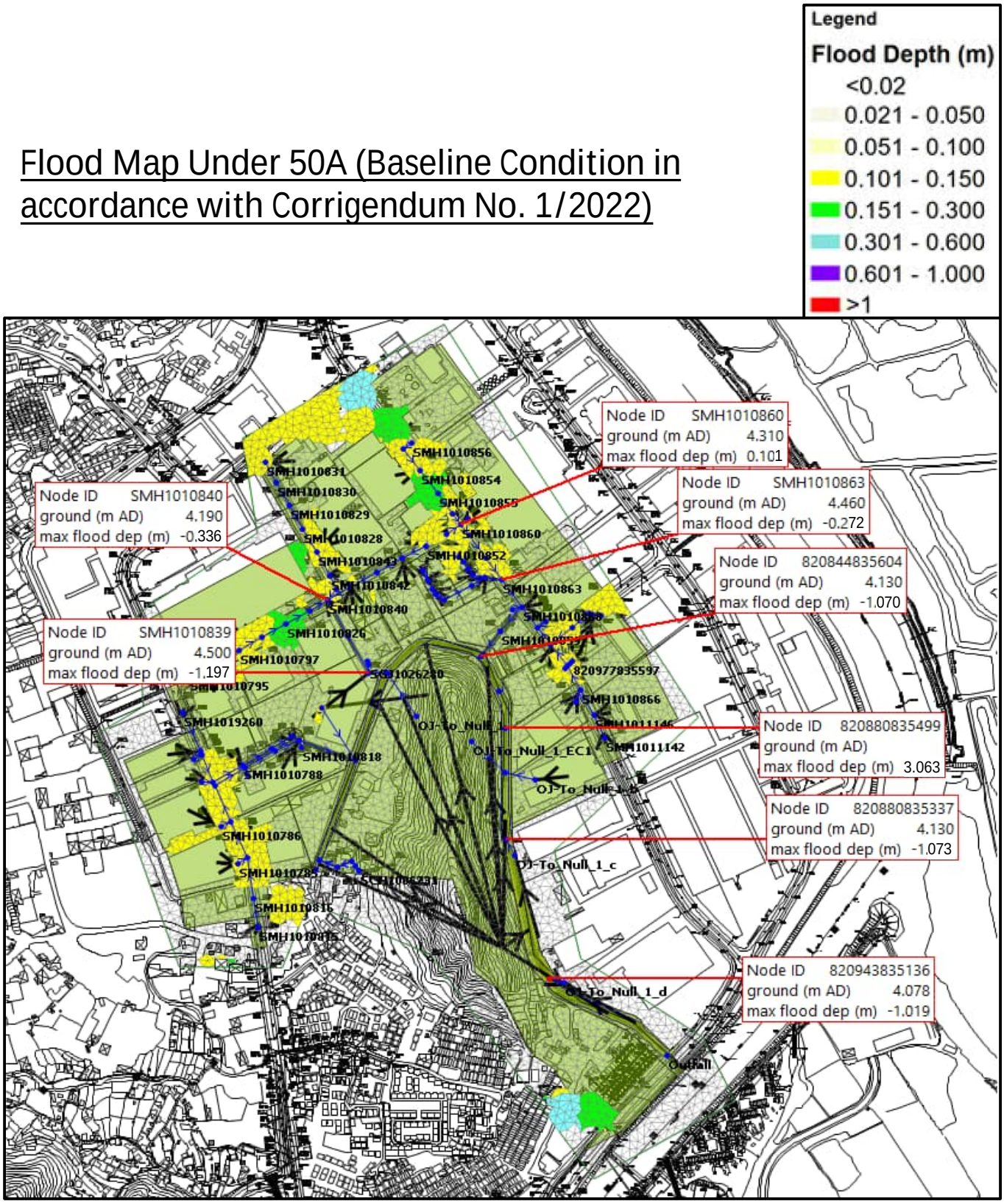
Flood Map Under 200A (Baseline Condition)



Flood Map Under 200B (Baseline Condition)



Flood Map Under 50A (Baseline Condition in accordance with Corrigendum No. 1/2022)



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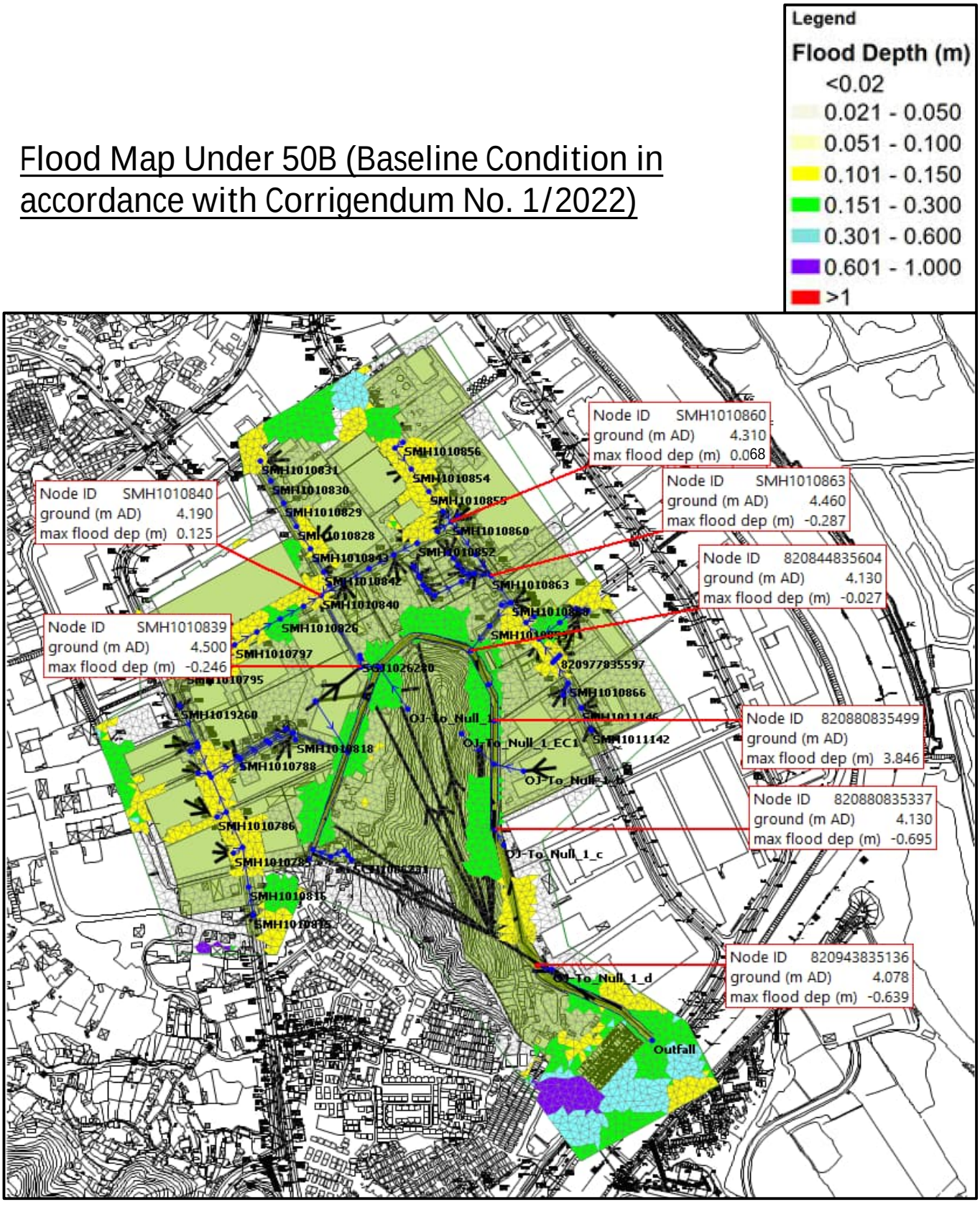
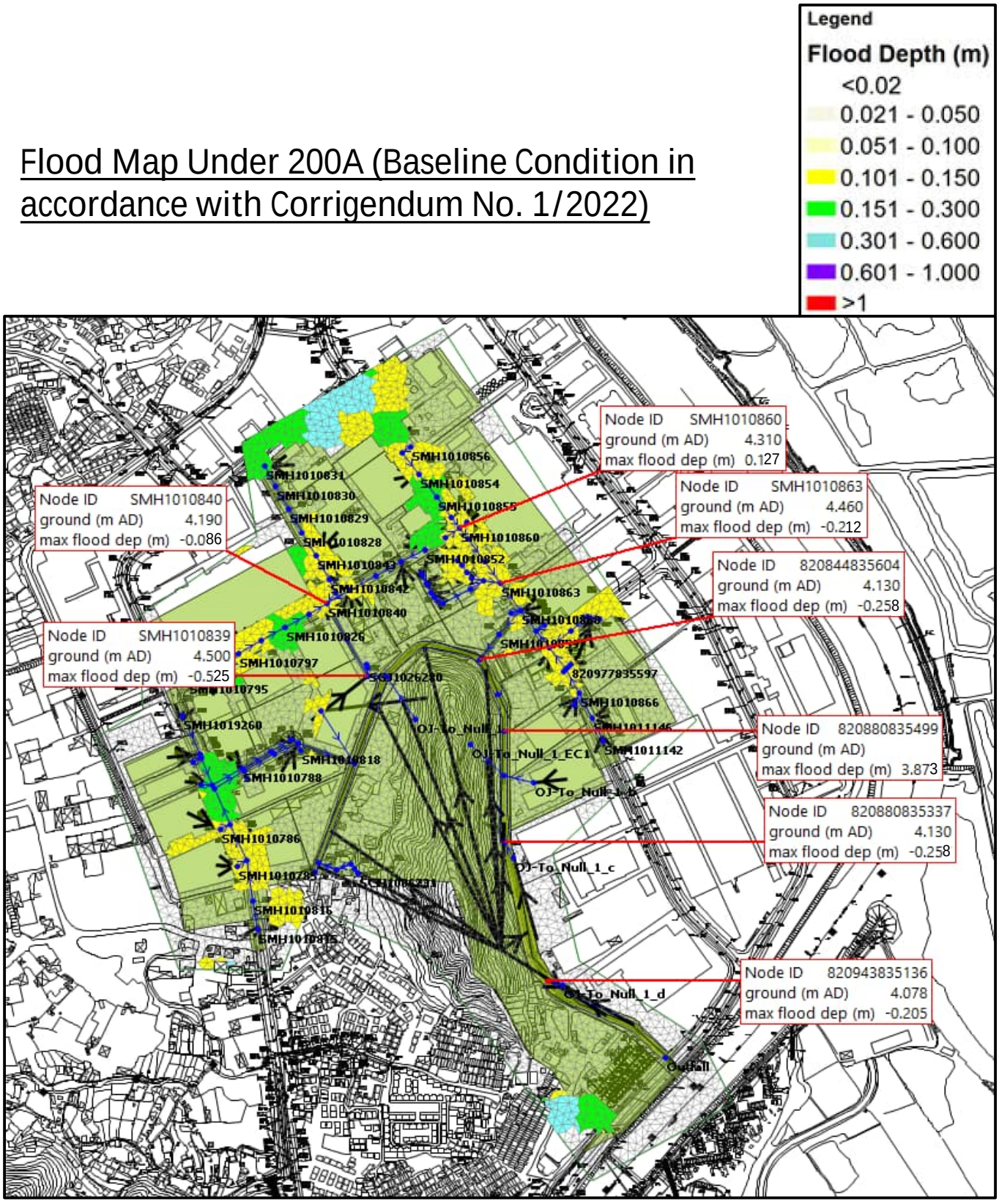
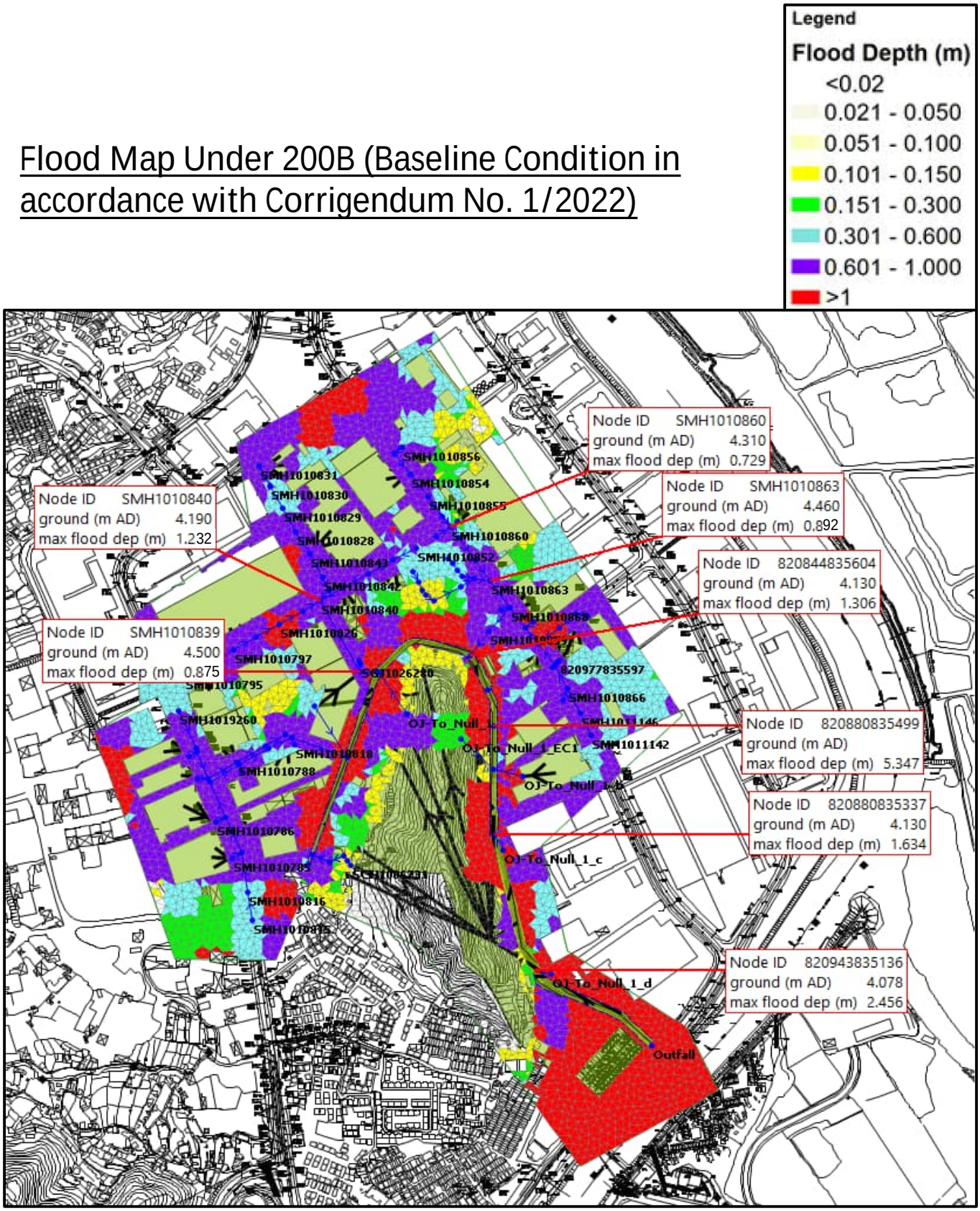


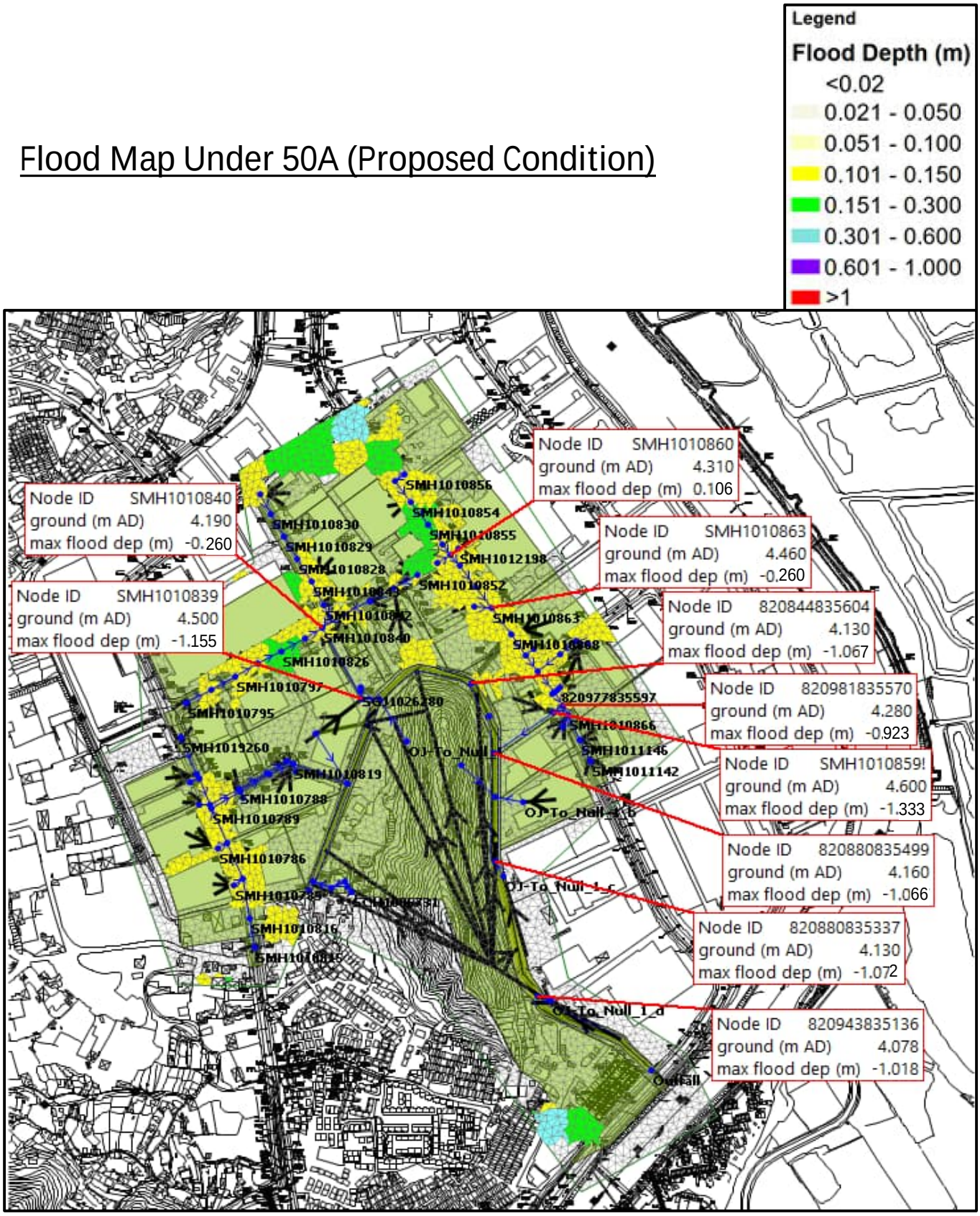
Flood Map Under 200A (Baseline Condition in accordance with Corrigendum No. 1/2022)



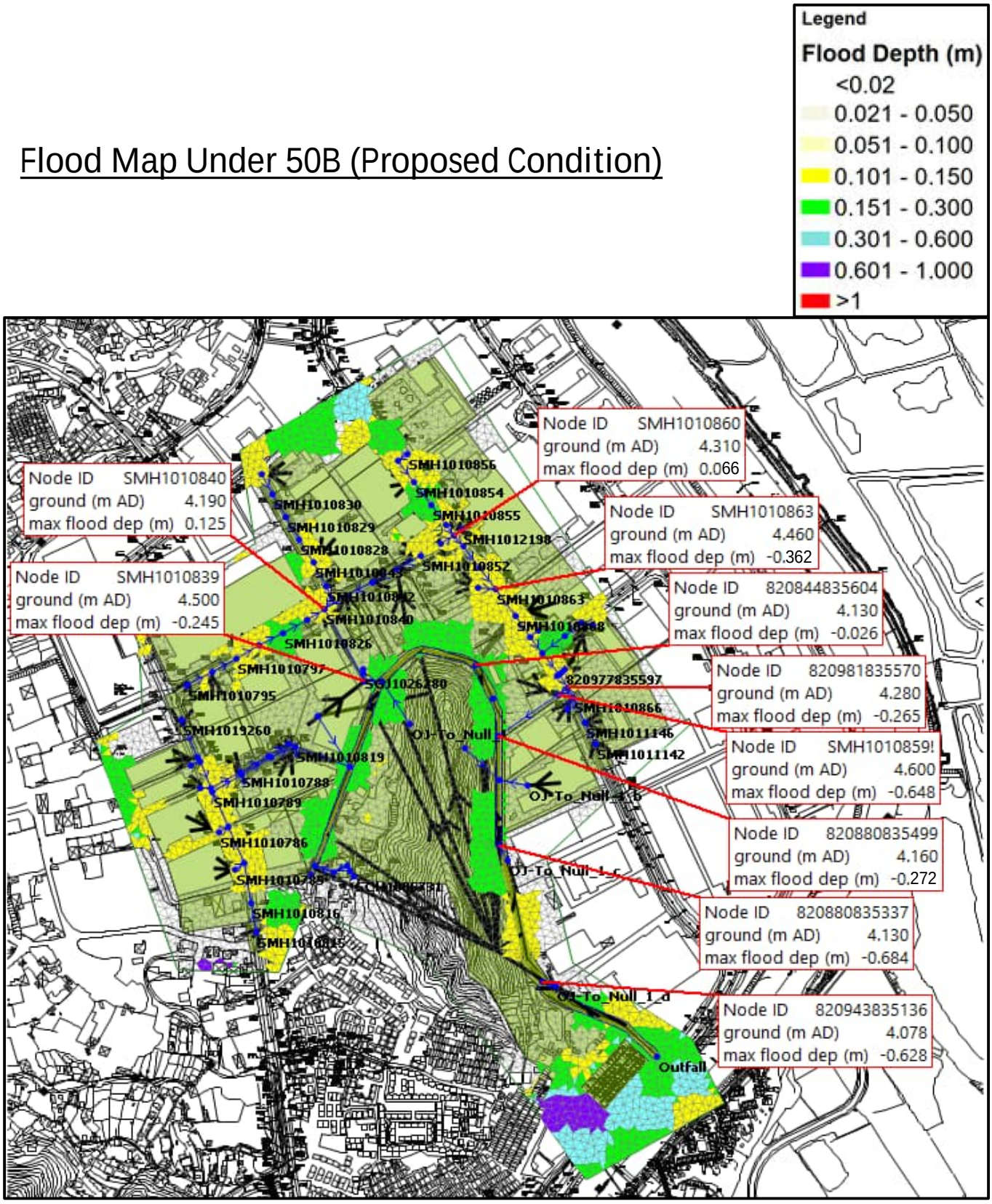
Flood Map Under 200B (Baseline Condition in accordance with Corrigendum No. 1/2022)



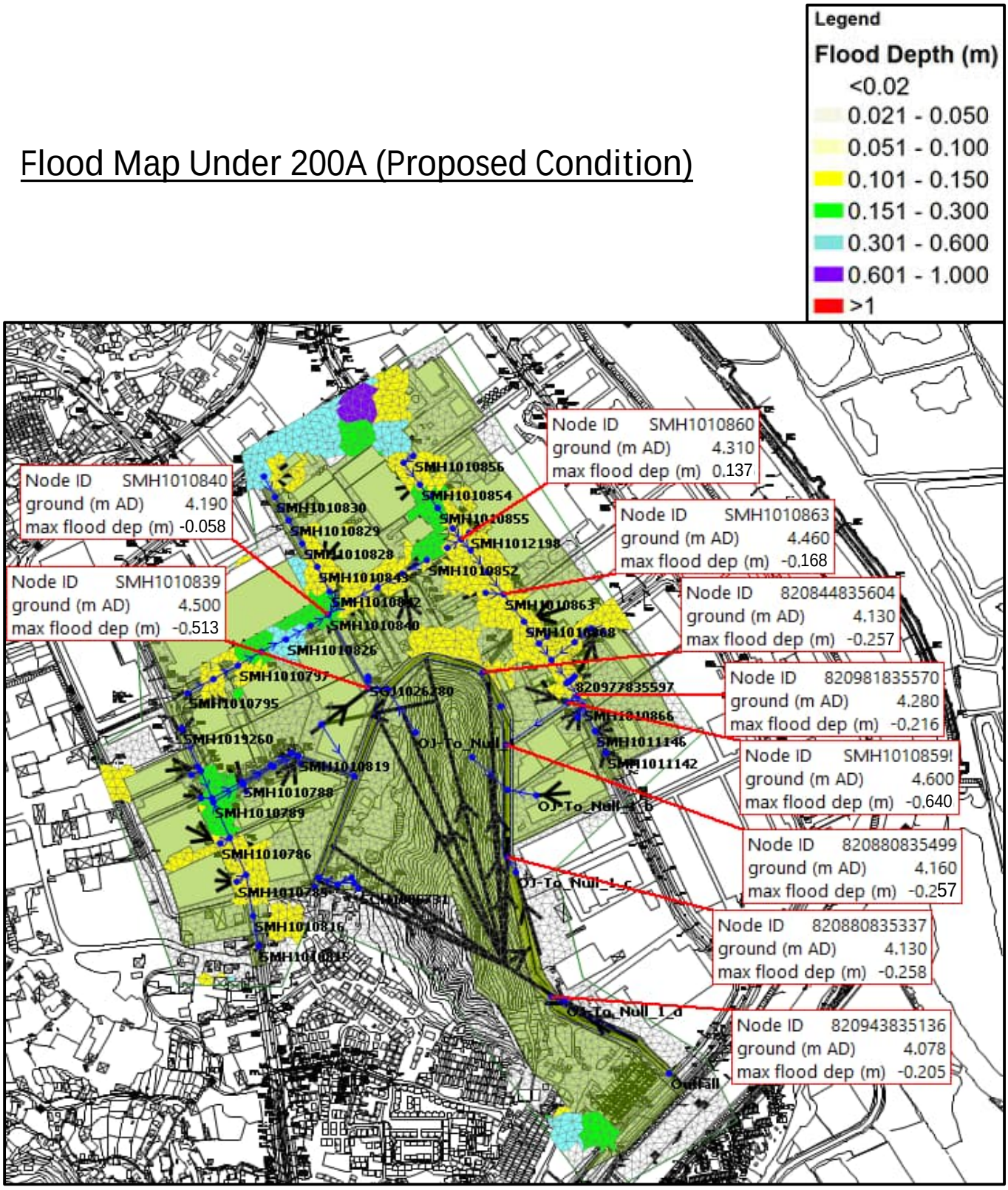
Flood Map Under 50A (Proposed Condition)



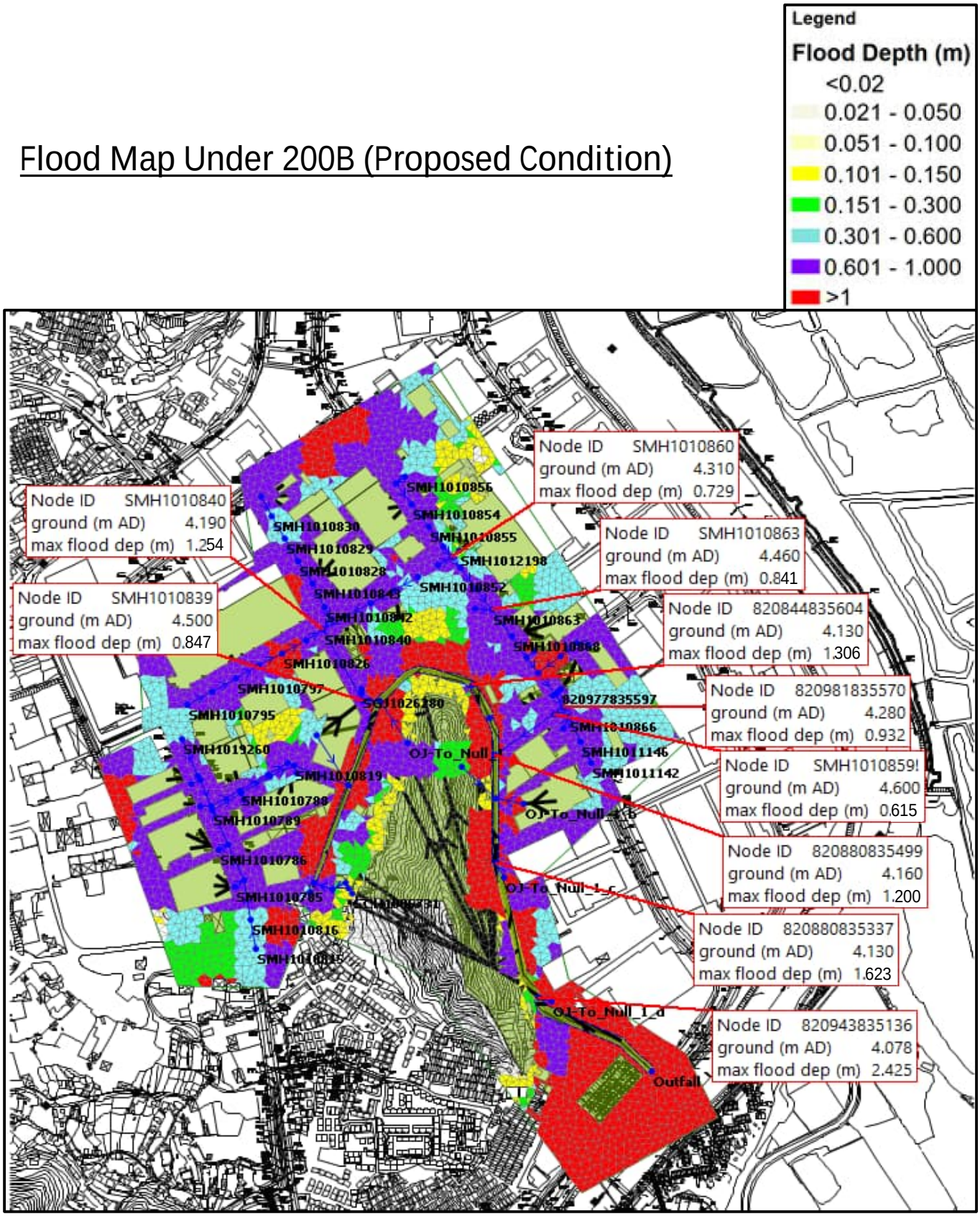
Flood Map Under 50B (Proposed Condition)



Flood Map Under 200A (Proposed Condition)



Flood Map Under 200B (Proposed Condition)



Annex C

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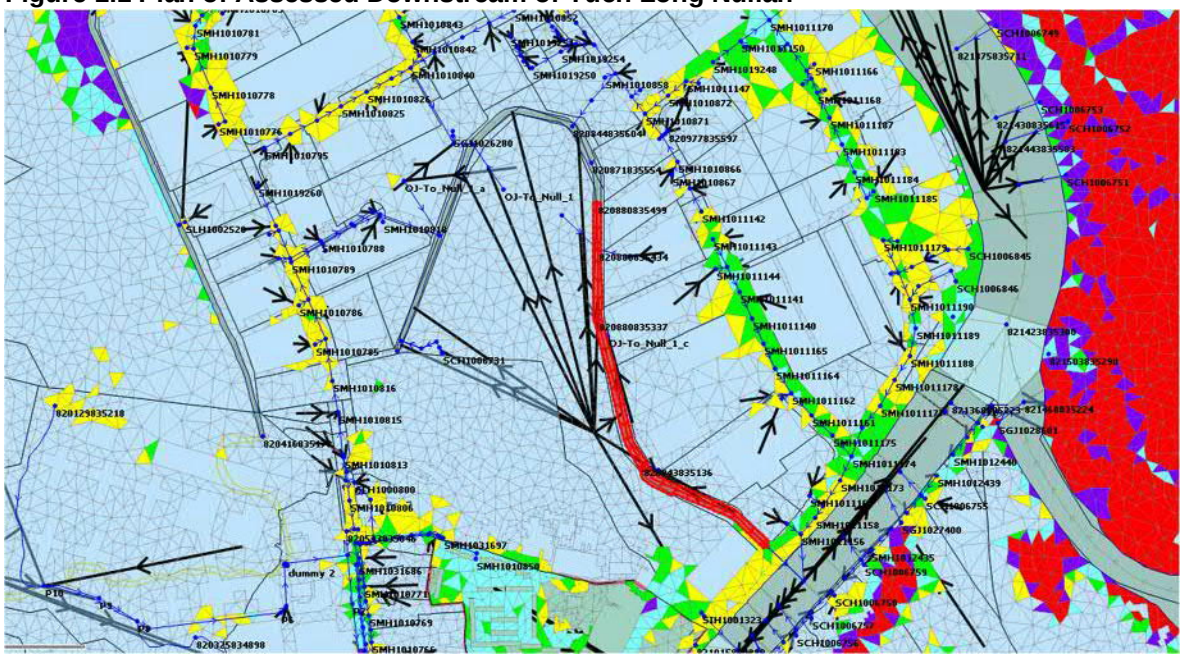
Annex C Verification of ICM model

1.1 To verifying the Updated Hydraulic Model split from DMP model, this annex is prepared to compare its maximum water levels at the downstream of Yuen Long Nullah to that of the original DMP Model obtained from DSD under the existing condition.

1.2 The result revealed that the maximum water levels at the downstream of Yuen Long Nullah between two versions of model are similar under 200 return period, the Updated Hydraulic Model is considered acceptable. The Plan of Downstream of Yuen Long Nullah are showed below. The long sections of the Downstream Nullah under two versions of model for the Cases are showed in next sections.

Figure 1.1 Plan of Assessed Downstream of Yuen Long Nullah



2 Case 200A

Figure 2.1 long section for Case 200A from DPM Model

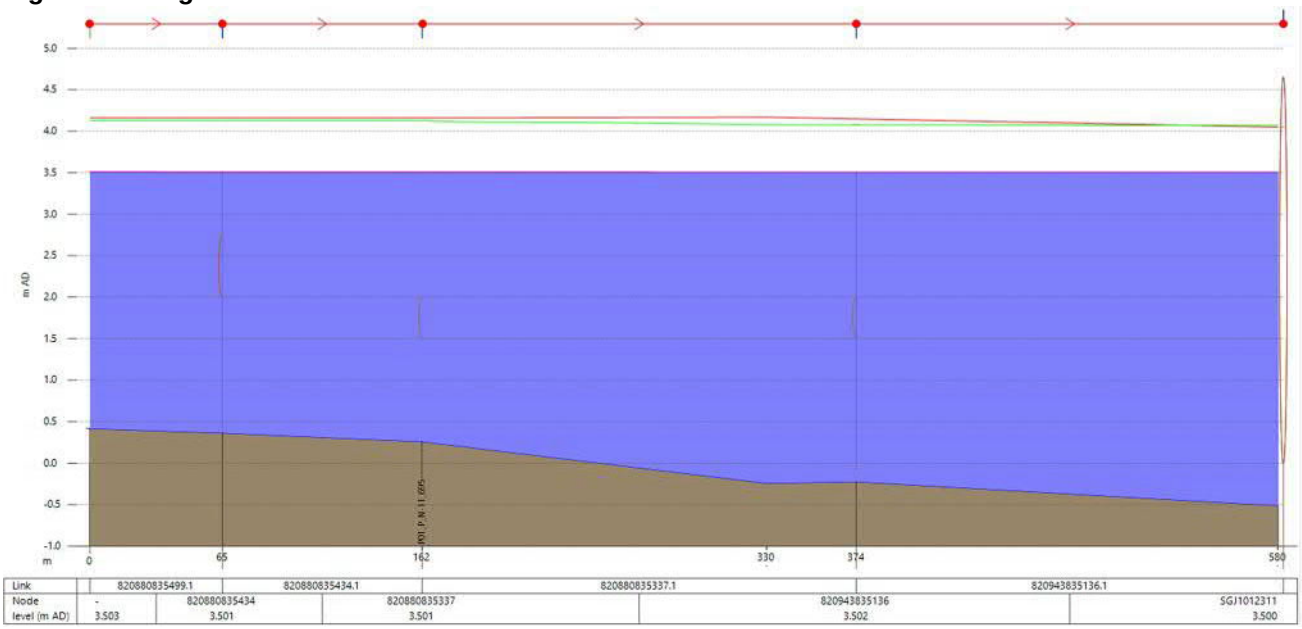
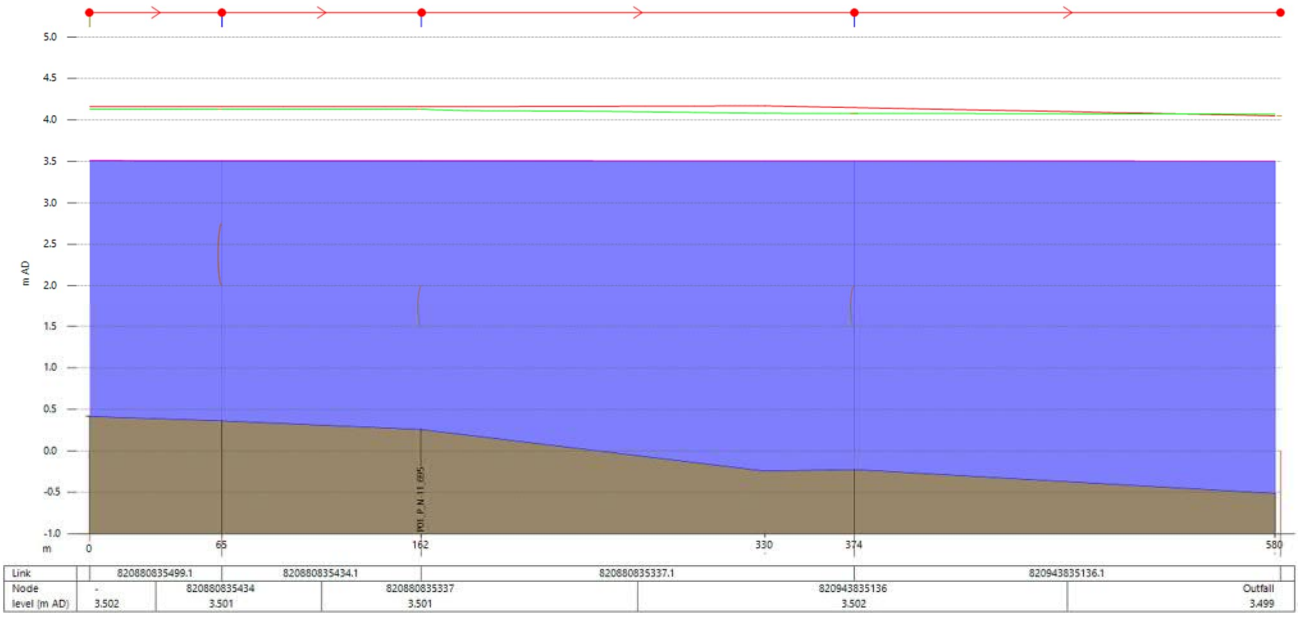


Figure 2.2 long section for Case 200A from Updated Hydraulic Model



3 Case 200B

Figure 3.1 long section for Case 200B from DPM Model

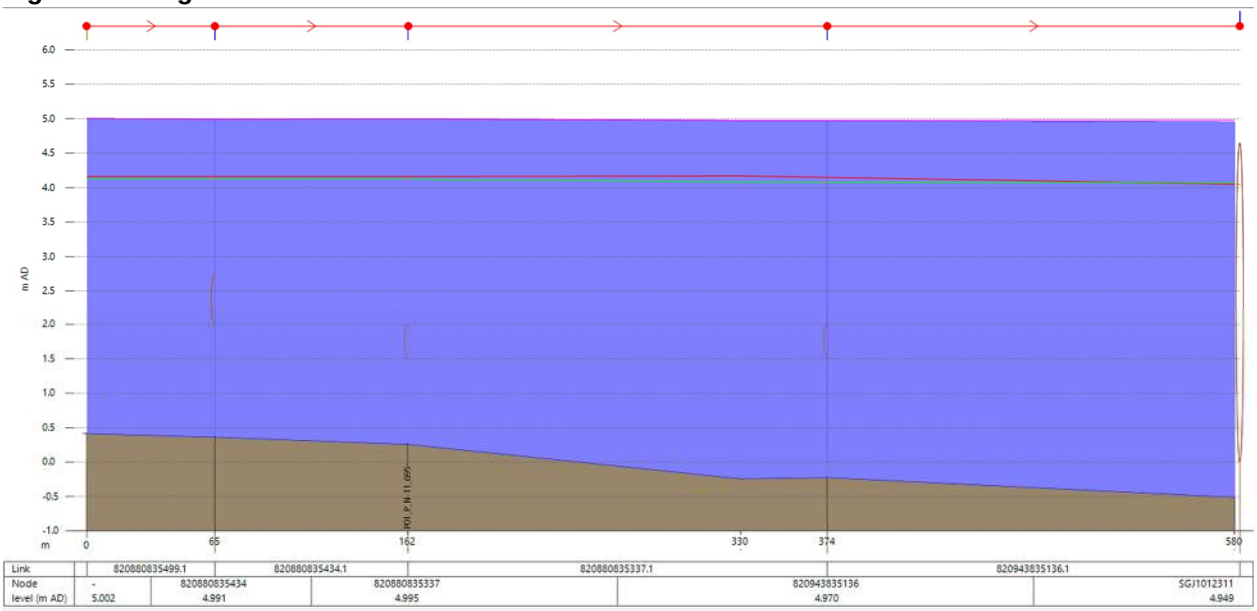
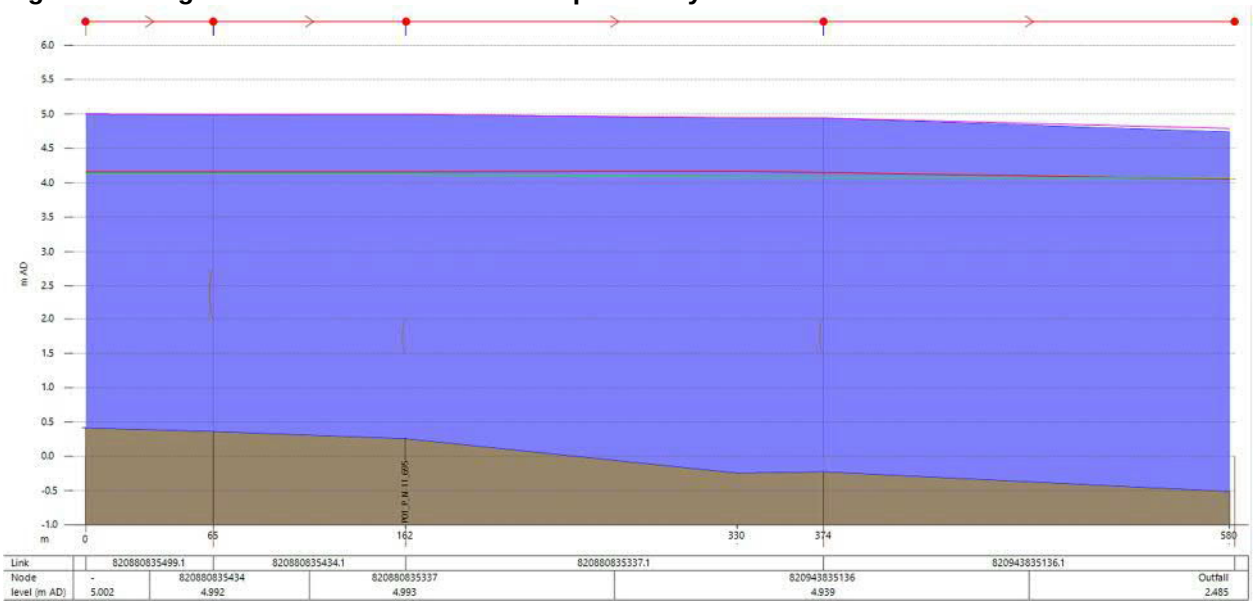


Figure 3.2 long section for Case 200B from Updated Hydraulic Model



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Section 16 Planning Application for Multi-storey Building Developments at No. 32 Wang Lee Street And Adjoining Government Land, Yuen Long

Air Ventilation Assessment

September 2023

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Section 16 Planning Application for Multi-storey Building Developments at No. 32 Wang Lee Street And Adjoining Government Land, Yuen Long

Air Ventilation Assessment

September 2023

Mott MacDonald Hong Kong Limited
registered in Hong Kong no. 236497

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	Oct 2022	Various	KS Li	S H Ching	Draft Submission
B	Feb 2023	Various	KS Li	S H Ching	Final Submission
C	Sep 2023	Various	KS Li	S H Ching	Revised Final Submission

Document reference: 369397 | 01B | C |

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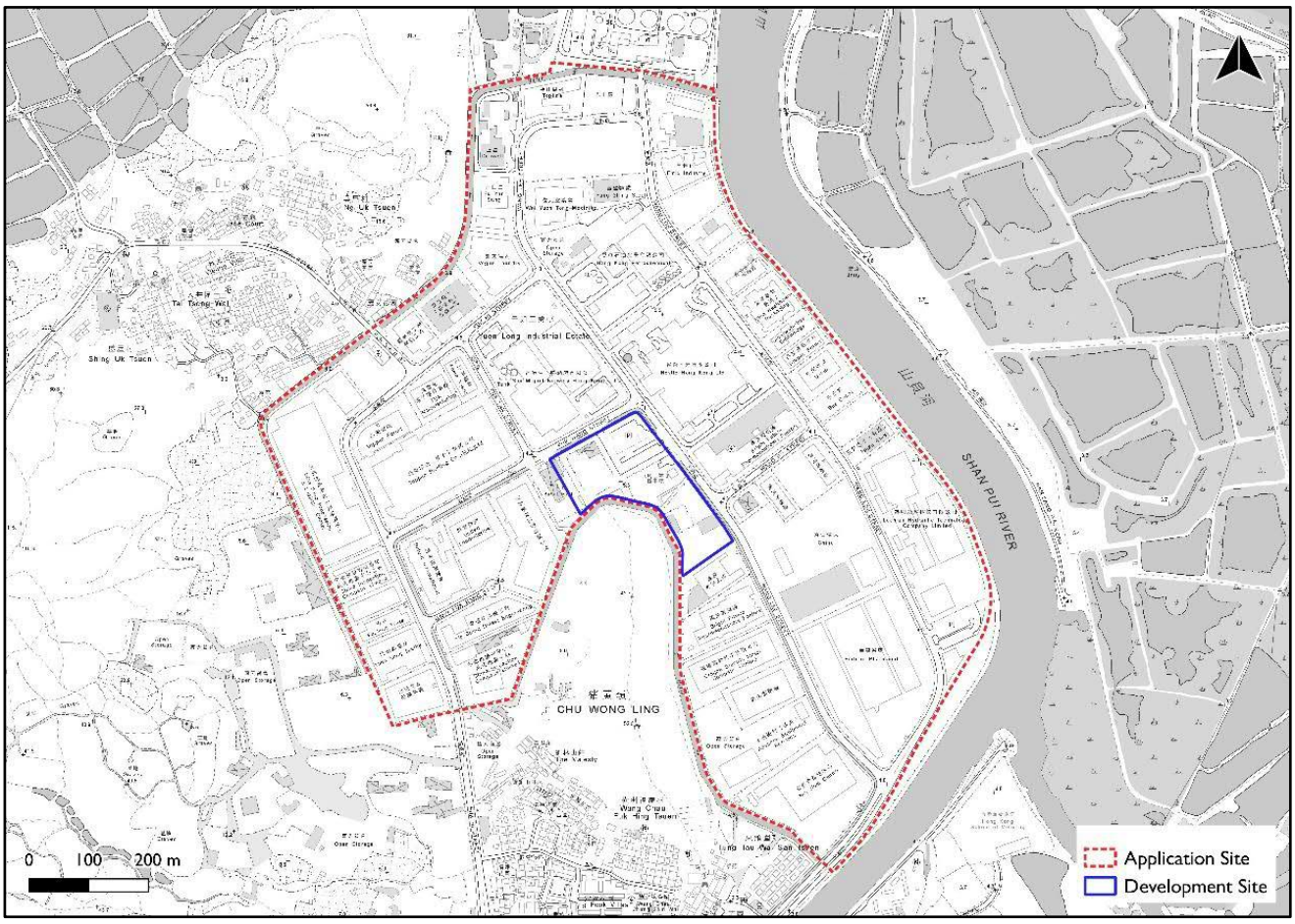
1 Introduction

1.1 Background

1.1.1 This Air Ventilation Assessment (AVA) Initial Study is prepared to support a Section 16 planning application for the proposed multi-storey buildings (MSBs) development (Proposed Development) near Yuen Long INNOPARK (YL INNOPARK), Yuen Long.

1.1.2 A Site Location Plan of the Development Site (the Site) is shown in **Figure 1.1**.

Figure 1.1: Site Location Plan



1.2 Structure of this Report

1.2.1 This report contains the following sections in addition to this introduction (Section 1):

Section 2 – Development Proposal

Section 3 – Methodology of Air Ventilation Assessment

Section 4 – Result and Key Findings

Section 5 – Conclusion

1.3 Abbreviations

1.3.1 The following abbreviations shall have the meaning hereby assigned to them except when the context of this Report otherwise requires:

Abbreviation for Bureaux/Departments/ organisations	**Full title**
CEDD	Civil Engineering and Development Department
DEVB	Development Bureau
GEO	Geotechnical Engineering Office of the Civil Engineering and Development Department
MSB	Multistorey Building
YL INNOPARK	Yuen Long Industrial Estate
HKO	Hong Kong Observatory
RAMS	Regional Atmospheric Modelling System
AVA	Air Ventilation Assessment
CFD	Computational Fluid Dynamics
VR	Velocity Ratio
LVR	Local Spatial Average Velocity Ratio
SVR	Site Spatial Average Velocity Ratio

2 Development Proposal

2.1 Indicative Layout of Proposed MSBs Development

2.1.1 The Site is proposed to provide three sites (**Sites A, B and C**) each about 1 ha to accommodate MSBs developments for industrial uses, totalling 3.23 ha in area.

2.1.2 **Figure 2.1** illustrates the indicative division of land parcels in the Site. It should be noted that the land parcels for proposed MSBs shown in the Site is indicative and solely for technical assessments purpose.

2.1.3 The proposed MSBs at Sites A, B and C are to be developed at a plot ratio of 5 with not more than 10 storeys above ground level excluding basement level.

2.1.4 It is anticipated that the land will be disposed by tender and the MSBs are targeted to start the operation in 2028/2029, with a construction period of 4 to 5 years. Major development parameters and proposed floor uses of the proposed MSBs are summarised in **Table 2.1** and **Table 2.2,** respectively.

Figure 2.1: Indicative Land Parcel for MSBs Development within the Development Site

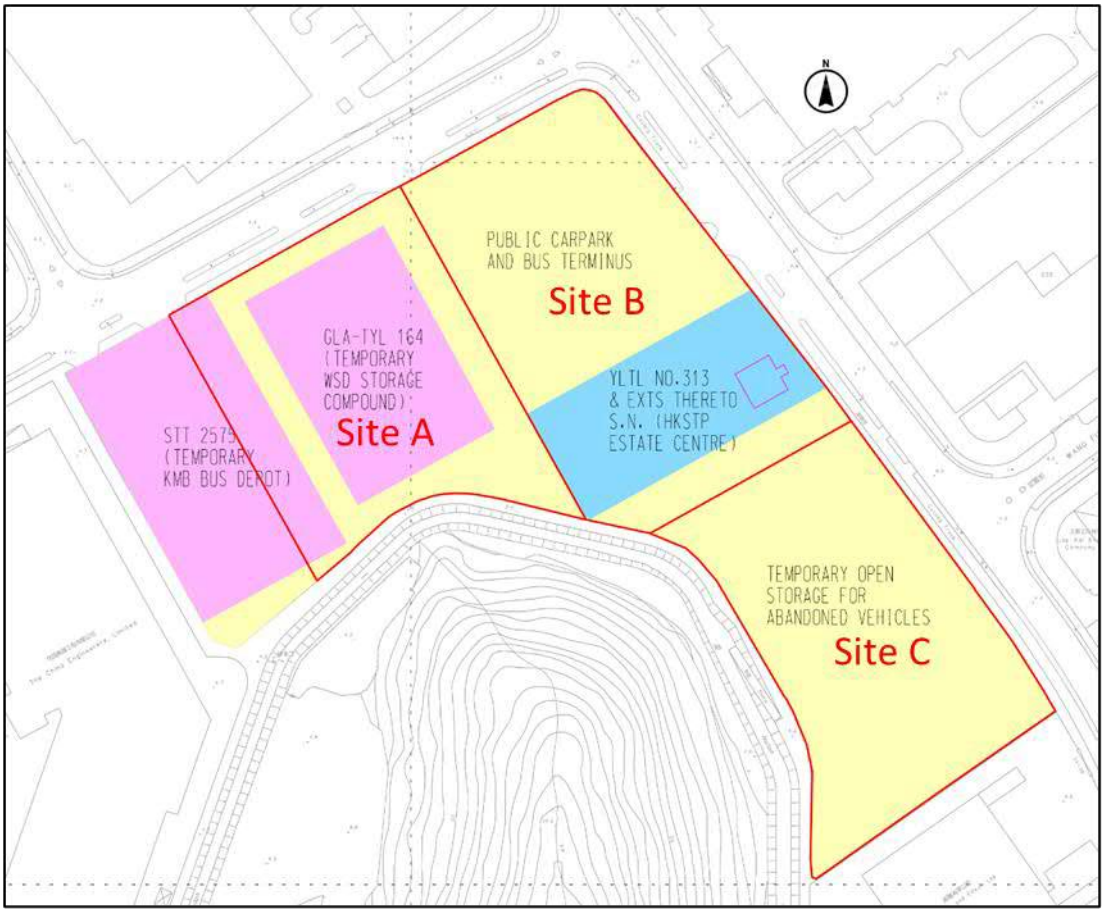


Table 2.1: Development Parameters for Indicative Scheme

Parameters	MSB in Site A	MSB in Site B	MSB in Site C	Total
Site Area	0.98 ha	1.25 ha	1.00 ha	3.23 ha
Maximum Plot Ratio	5			
GFA (m2)	49,000	62,500	50,000	161,500
Site Coverage	Not Specified			
Class of Site	Class A	Class B	Class A	
Land Uses	Vehicle Servicing and Maintenance and/or Logistics Uses + Not less than 30% for accommodating eligible brownfield operators displaced by the government-led development projects (industrial uses)			
No. of Storeys	No more than 10 storeys above ground level			

Table 2.2: Indicative Floor Uses of MSBs Development in Sites A, B and C

Floor	Proposed Uses
G/F-9/F	• Vehicle Servicing and Maintenance; • Logistics Uses; and/or • Industrial Uses (for accommodating eligible brownfield operators)
Basement (1 Level)	Public Vehicle Parking (in Site B)[1]

[1] Subject to the detailed design, a basement may be constructed in Site A and Site C to take up some underground space for ancillary parking, plant room, etc.

2.2 Site and Surrounding Area Characteristics

2.2.1 The proposed development is located in Yuen Long INNOPARK (YL INNOPARK), north-west Hong Kong and is bounded by Fuk Wang Street to the northwest, Wang Lee Street to the east, and a wooded hill (i.e. Chu Wong Ling) to the south. The immediate surrounding mainly consists of low-rise industrial buildings and warehouses. Further afield, the surrounding area comprises paddy fields to the north and east, the city of Yuen Long to the south, and Shenzhen Bay to the northwest.

2.2.2 Most of the Site is surrounded by low-rise industrial buildings and warehouses, with some up to 37mPD to the northwest and the west, and no noise barriers and elevated structures are found in its vicinity. Chu Wong Ling (approximately 52.6mPD) is located immediately south of the Site. Shan Pui River is located within close vicinity of the eastern and southern perimeters of the Site. Nam Sang Wai is situated from the north to eastern portion of the Site. Outside of the YL INNOPARK area, there are dense clusters of village houses, which are 1-3 storeys high, located south of Chu Wong Ling (e.g. Wang Chau Village, 5.9mPD up to 19.5mPD) and further north-west of the Site (e.g. Tai Tseng Wai, Shing Uk Tsuen, etc. at 8.2mPD to 21.2mPD). The area immediately west of the YL INNOPARK are mainly characterised by land zoned as Open Storage at Wang Chau, Conservation Area such as Kai Shan (approximately 121mPD) and Green Belt area. **Figure 2.2** shows the location of the Site and its environs, with the height of the major buildings in the vicinity shown. The building height for the existing developments in the vicinity of the Site are summarized in **Table 2.3**.

Figure 2.2: Site Location and its Environs

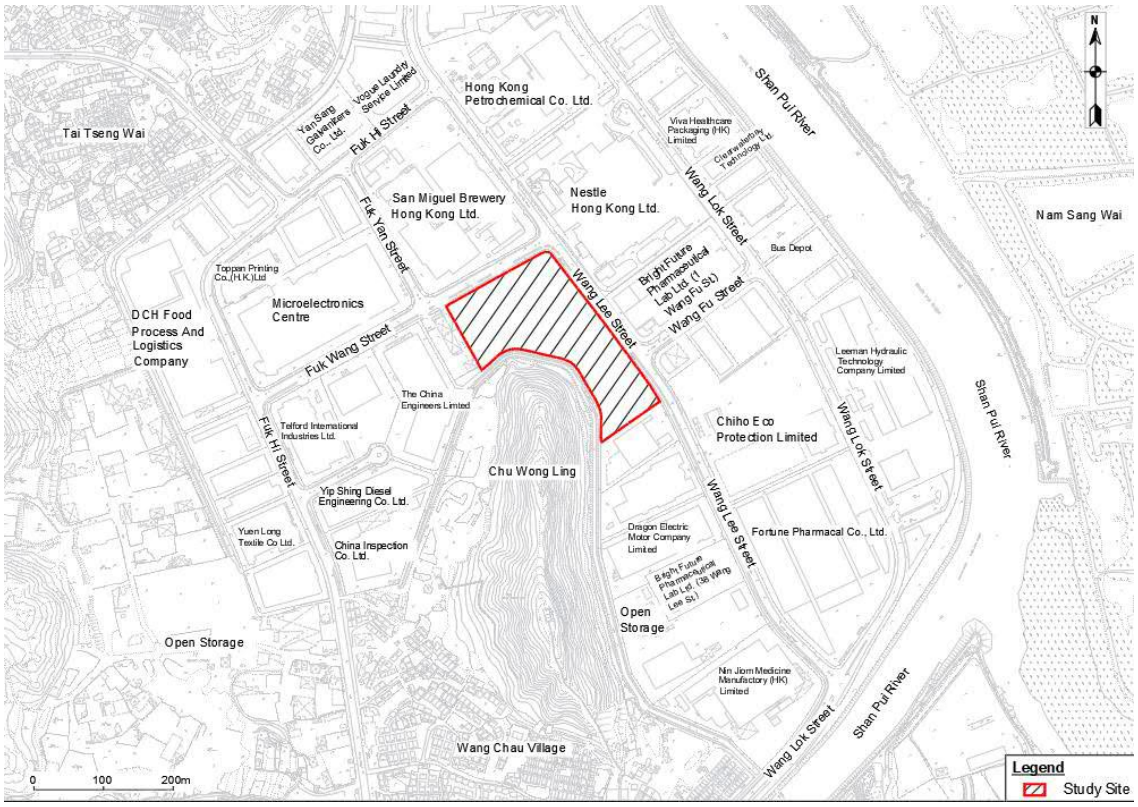


Table 2.3: Existing Development around the Subject Site

Existing Development	Maximum Building Height (+mPD)
DCH Food Process and Logistics Company	23.9
Toppan Printing CO., (H.K.) Ltd.	18.6
Microelectronics Centre	25.7
Yan Sang Galvanizers Co., Ltd.	17.0
San Miguel Brewery Hong Kong Ltd.	39.1
Hong Kong Petrochemical Co., Ltd.	15.6
Vogue Laundry Service Limited	41.4
Nestle Hong Kong Ltd.	11.9
Viva Healthcare Packaging (HK) Limited	31.0
Clearwaterbay Technology Limited	20.4
Telford International Industries Ltd.	29.5
The China Engineers Limited	13.6
Bright Future Pharmaceutical Lab Ltd. (1 Wang Fu Street)	27.0
Yuen Long Textile Co., Ltd.	15.0
Yip Shing Diesel Engineering Co., Ltd.	17.0
China Inspection Co., Ltd.	15.7
Chiho Eco Protection Limited	22.0
Leeman Hydraulic Technology Company Limited	21.0
Dragon Electric Motor Company Limited	17.2
Bright Future Pharmaceutical Lab Ltd. (38 Wang Lee Street)	37.8
Fortune Pharmacal Co., Ltd.	18.0
Nin Jiom Medicine Manufactory (HK) Limited	20.4

2.2.3 As the area about 3,900 m^2 to the west of the Site A may be used for reprovisioning of the lot designated for the Estate Centre within the OU(IE) zoning, an indicative building block with a GFA of 19,000 m^2 and a building height of 35m above ground has been included in the baseline of air ventilation simulation for assessment of the potential impact. It is noted that there is yet no programme for this planned development.

2.3 Baseline Scheme

2.3.1 The Baseline Scheme consists of one 8-storey building block with 3 levels of basement[2], which was developed based on adopting a large building block for accommodating brownfield operations. The main building block is designed with two one-way ramp drums. The building height of the main block and ancillary facilities are 62 m and 8 m respectively.

2.3.2 The detail design parameters of the Baseline Scheme are summarized in **Table 2.4** below. For a like-with-like comparison with the Indicative Development Scheme , only the GFA for the 8 storeys above ground are shown in the table, with potential GFA concession discounted with reference to similar industrial buildings. As a result, the Baseline Scheme was to develop the subject site at a plot ratio of about 3.1. The three-dimensional model of the Baseline Scheme is shown in **Figure 2.3** to **Figure 2.5** from different angles of view.

Table 2.4: Design Parameters of the Baseline Scheme

Parameters	Baseline Scheme
Configuration	One block with two 1-way ramp drums (8-storey) And Basement (3-storey)
Development Site Area	3.23 ha
Total GFA (m^2)[3]	100,282 m^2
Maximum Plot Ratio (PR)	3.1
Actual Building Height (Above Ground) • **MSB Block**	62 m
Site Coverage	0.48

[2] The basement levels are intended for vehicle parking and other non-industrial uses

[3] For the 8 storeys above ground

Figure 2.3: 3-D Model of the Baseline Scheme (South View)

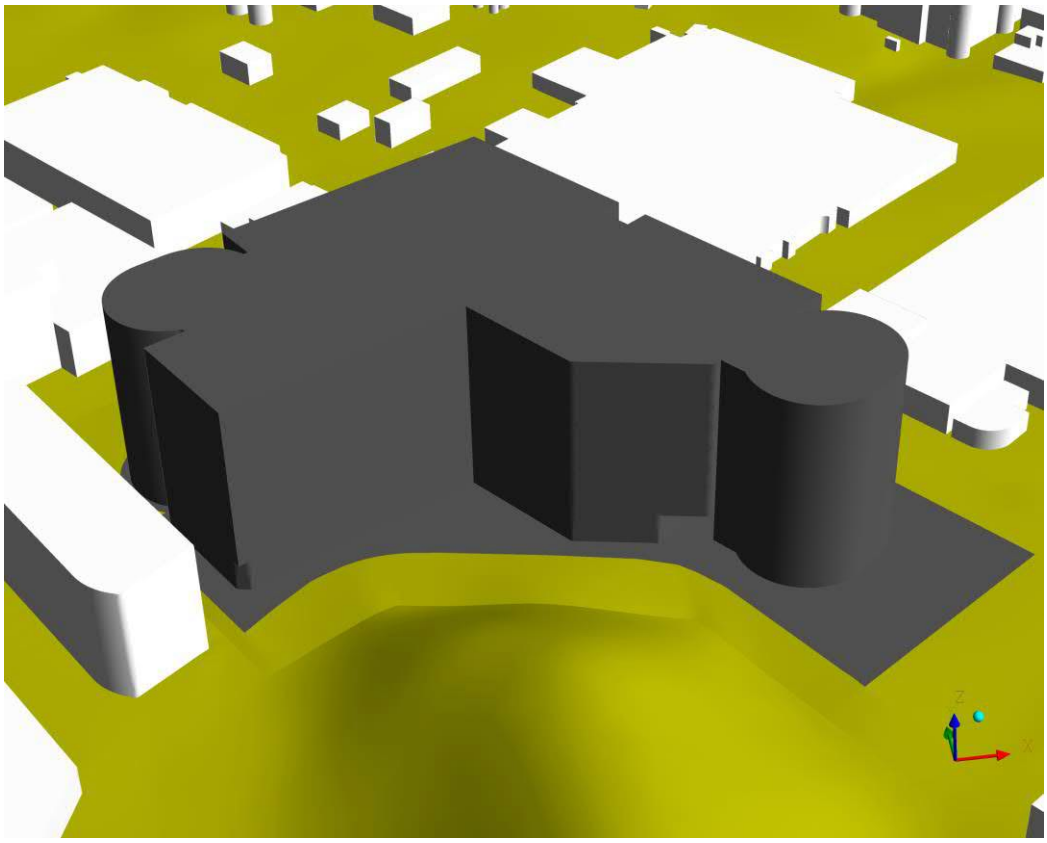


Figure 2.4: 3-D Model of the Baseline Scheme (North View)

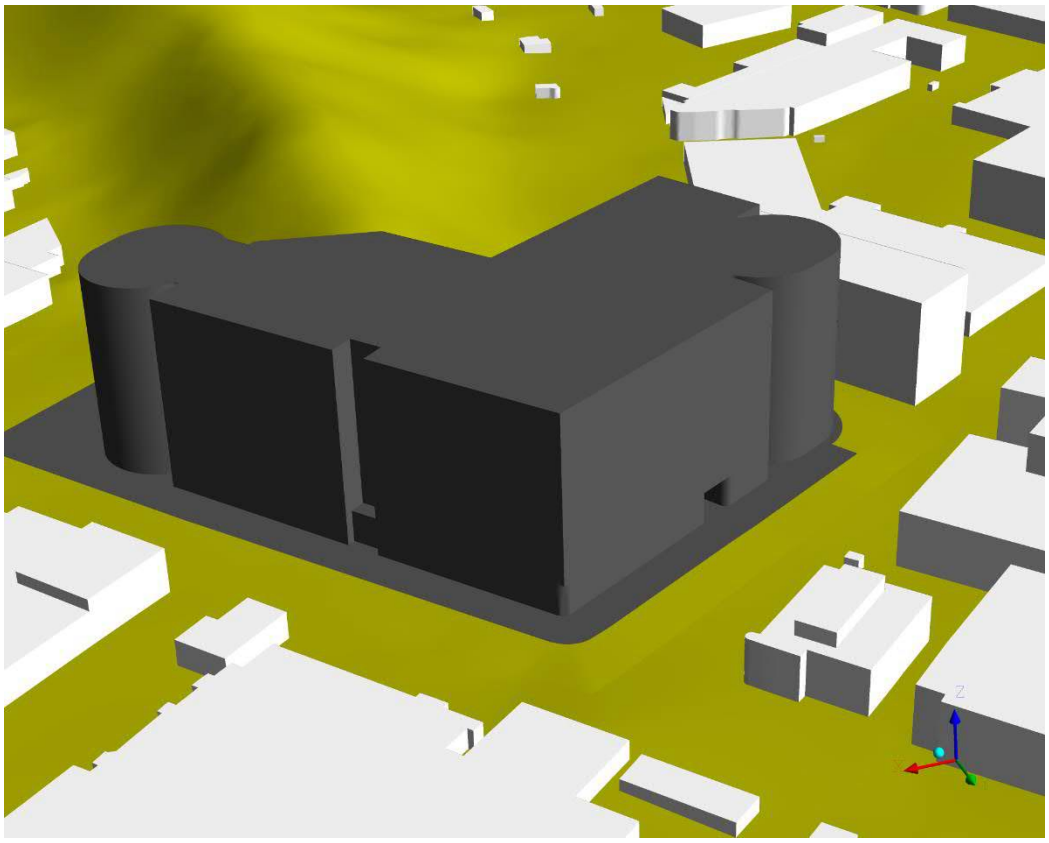
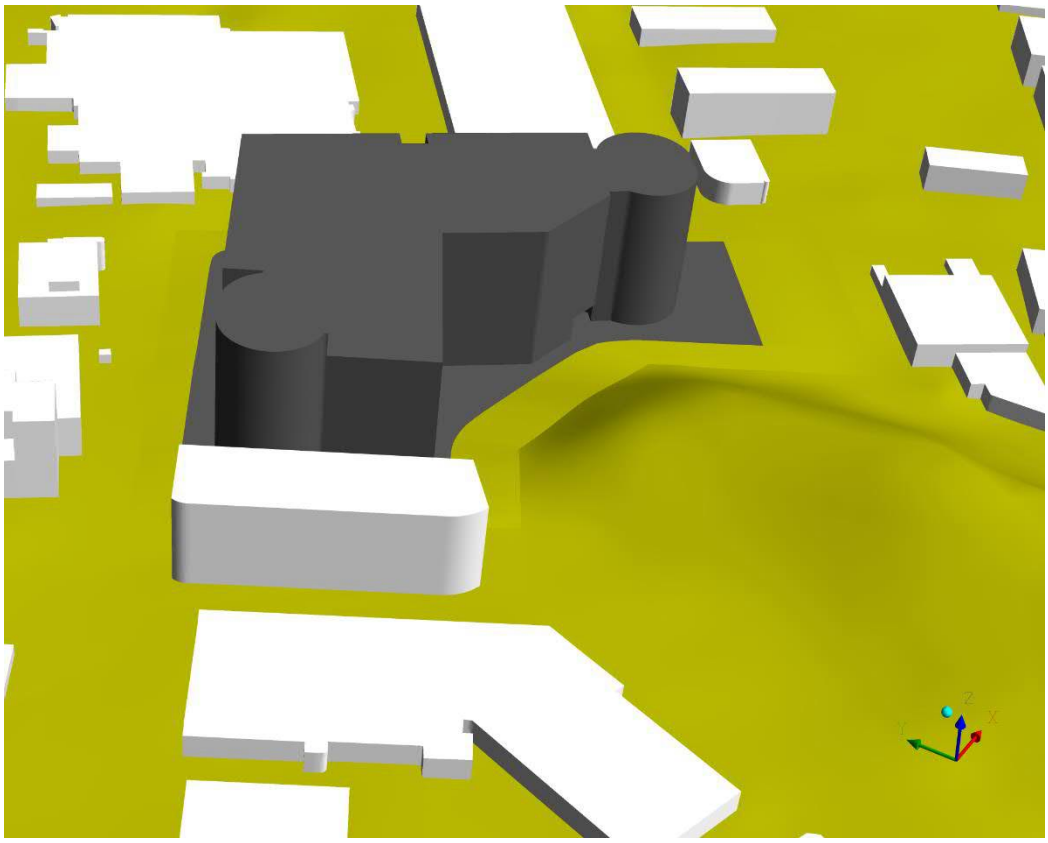


Figure 2.5: 3-D Model of the Baseline Scheme (Southwest View)



2.4 Indicative Development Scheme

2.4.1 The Indicative Development Scheme consists of an indicative development layout of three building blocks with 10 storeys excluding basement level. Each building block is provided with a two-way ramp to all floors in the Indicative Development Scheme. The maximum building height for each building block is about 66.5 m. The actual development layout is subject to change in the implementation stage.

2.4.2 The detailed design parameters of the Indicative Development Scheme are summarized in **Table 2.5** below. The three-dimensional model of the Indicative Development Scheme is shown in **Figure 2.6** to **Figure 2.8** from different angles of view.

Table 2.5: Design Parameters of the Indicative Development Scheme

Parameters	Indicative Development Scheme
Configuration	
- Site A	- One block with a two-way ramp (10-storey)
- Site B	- One block with a two-way ramp (10-storey) and Basement (1-storey)
- Site C	- One block with a two-way ramp (10-storey)

Parameters	Indicative Development Scheme
Development Site Area	3.23 ha
Total GFA	**161,500 m^2**
- **Site A**	49,000 m^2
- **Site B**	62,500 m^2
- **Site C**	50,000 m^2
Maximum Plot Ratio (PR)	5
Actual Building Height (Above Ground)	66.5 m
Site Coverage[5]	
- **Site A**	0.6
- **Site B**	0.6
- **Site C**	0.6

[5] Approximate, subject to the detailed design

Figure 2.6: 3-D Model of the Indicative Development Scheme (South View)

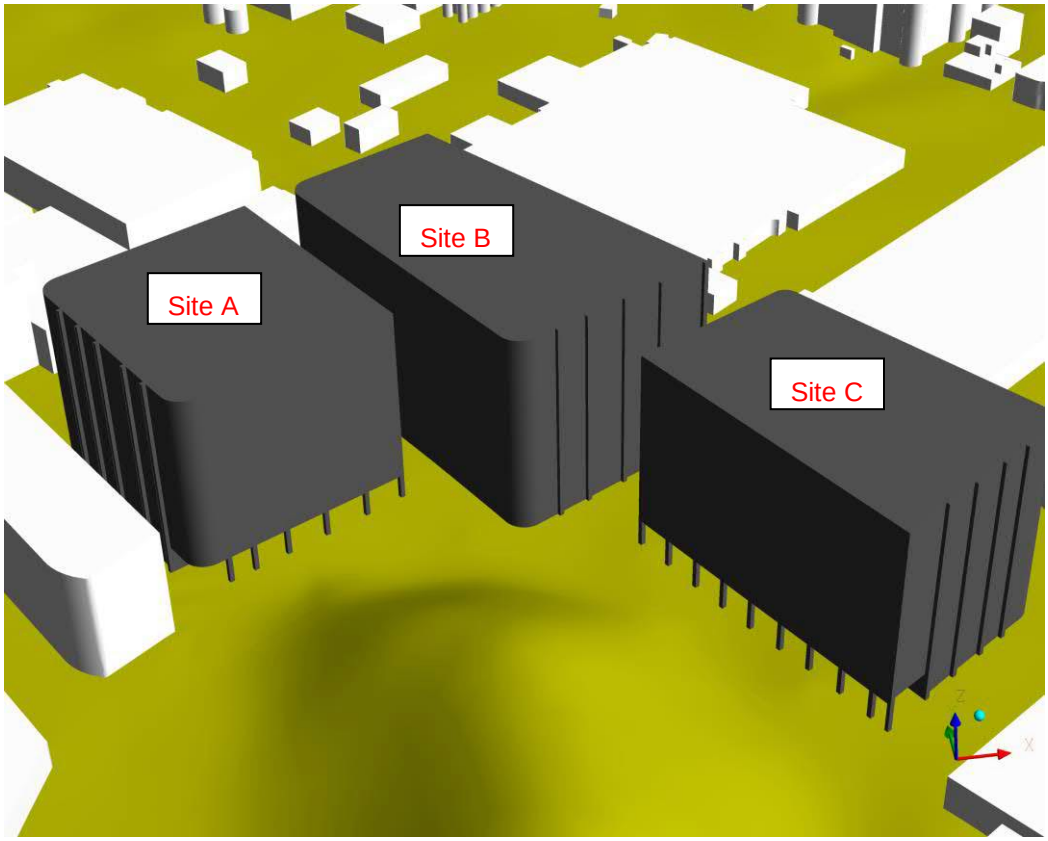


Figure 2.7: 3-D Model of the Indicative Development Scheme (North View)

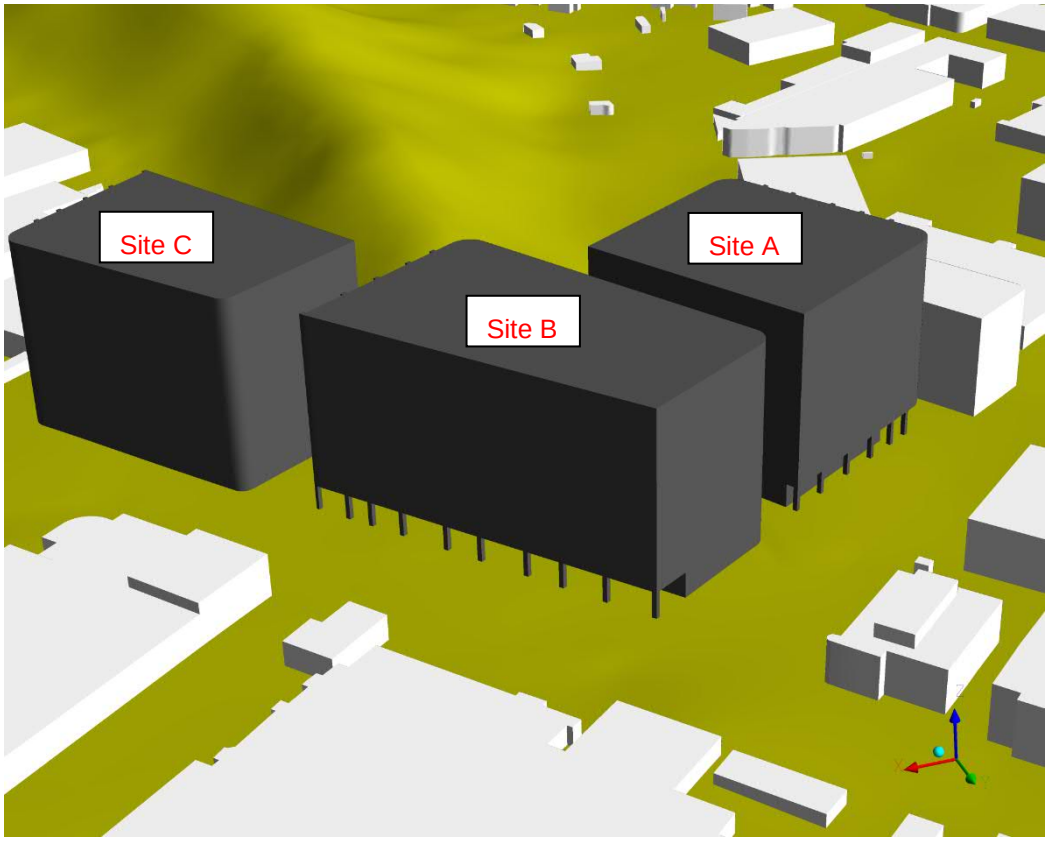
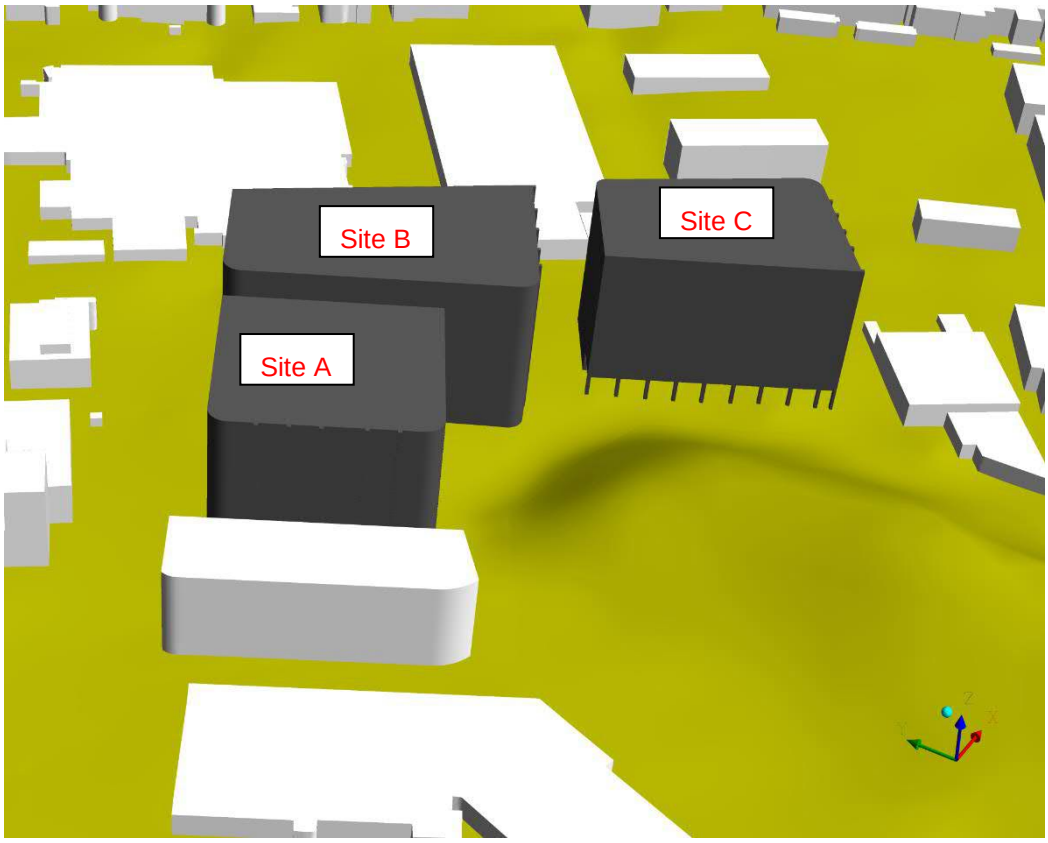


Figure 2.8: 3-D Model of the Indicative Development Scheme (Southwest View)



2.4.3 By conducting CFD modelling on both the Baseline Scheme and the Indicative Development Scheme, it is anticipated that air ventilation impacts due to the proposed MSBs development would be comprehensively simulated and compared for different block configurations.

2.4.4 **Figure 2.9** and **Figure 2.10** shows the overview of the model for Baseline Scheme and Indicative Development Scheme respectively.

Figure 2.9: 3-D Model of the Baseline Scheme (Overview)

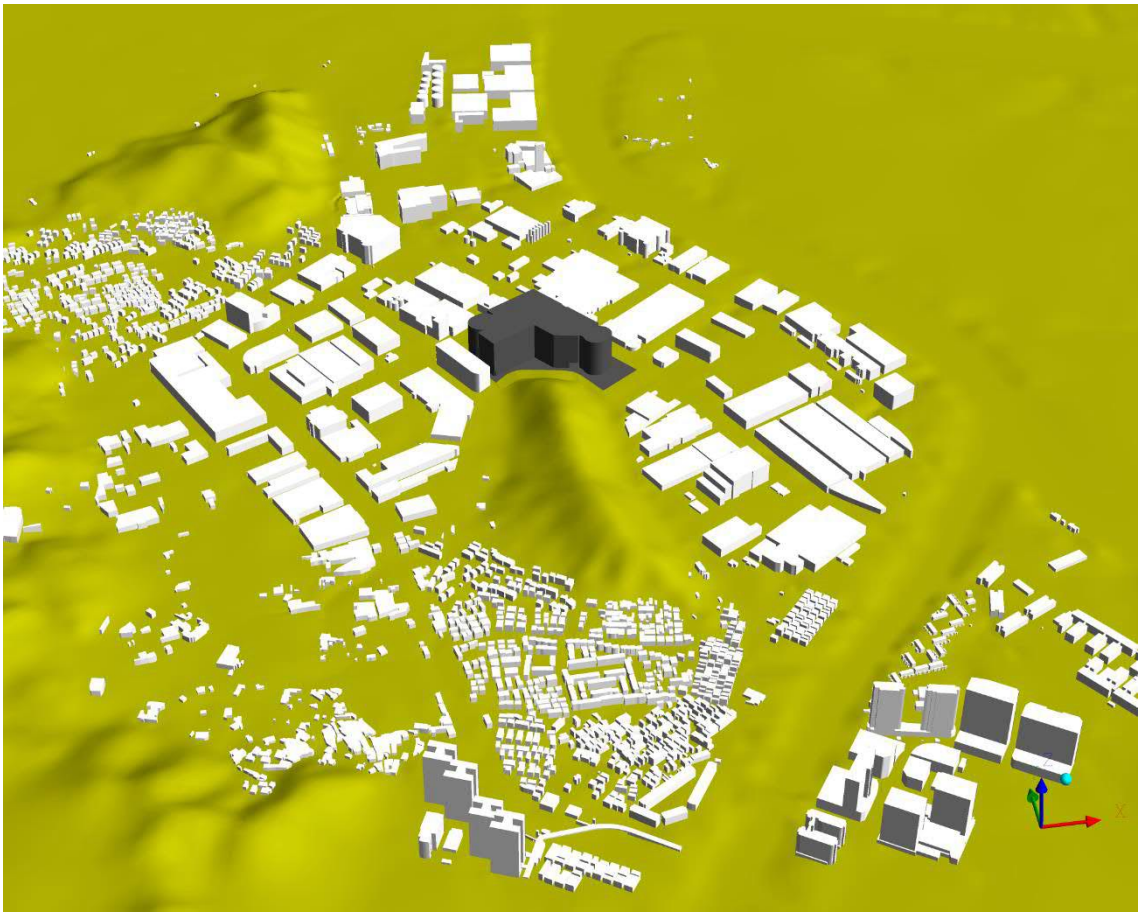
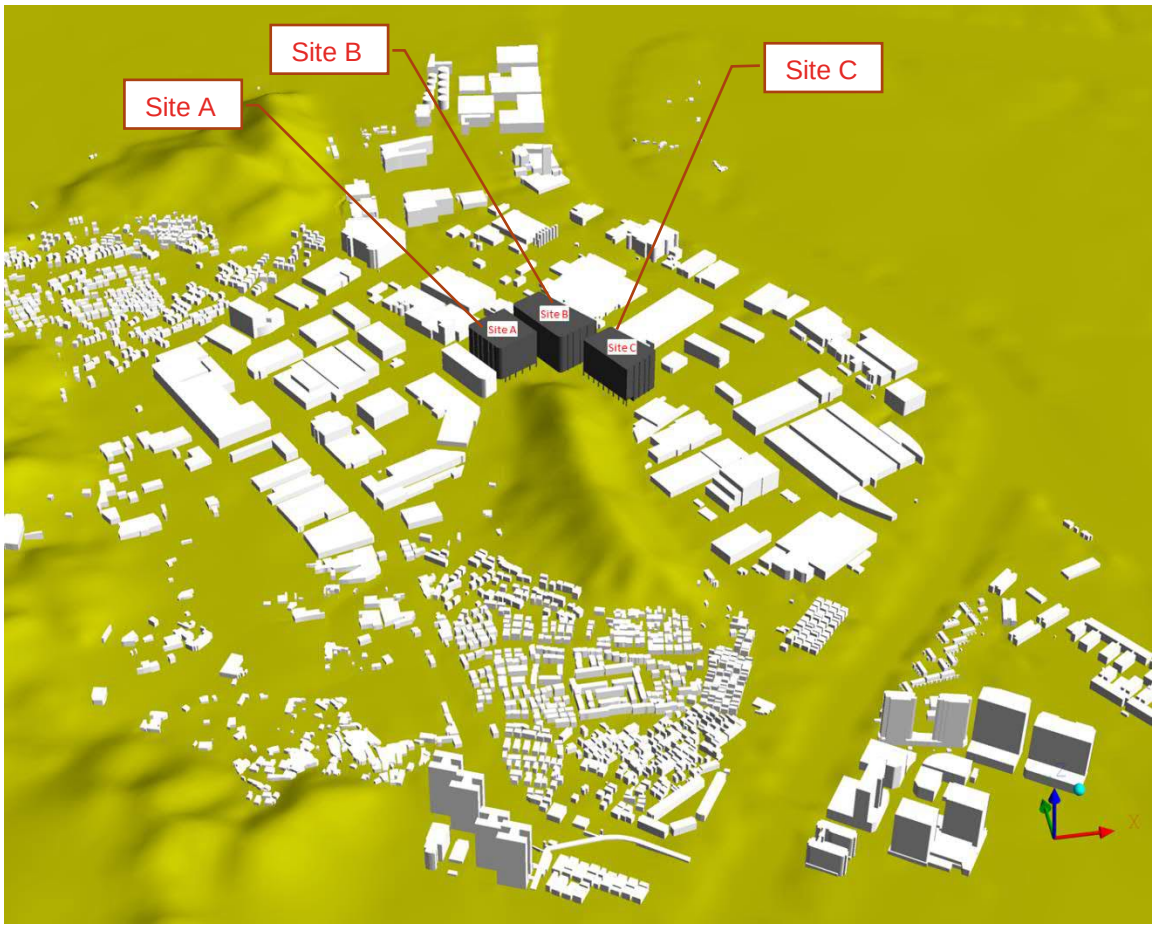


Figure 2.10: 3-D Model of the Indicative Development Scheme (Overview)



3 Methodology of Air Ventilation Assessment

3.1 Introduction

3.1.1 This adopted methodology for the AVA is in accordance with the requirements of the Annex A of the Technical Circular on "Technical Guide for Air Ventilation Assessment for Developments in Hong Kong" (Technical Guide) [1]. The weather data is provided by Hong Kong Observatory (HKO) and the simulated site wind availability data (i.e. Regional Atmospheric Modelling System (RAMS) [2]) is published on the website of Planning Department.

3.2 Wind Availability

3.2.1 Based on the methodology and the simulated site wind availability data (i.e. RAMS) for Hong Kong published by Planning Department, the Site is located in the square grid cell (050,074). The annual and summer wind rose at 500mPD demonstrating the frequency of occurrence of different wind directions are shown in **Figure 3.1** and **Figure 3.2** respectively.

Figure 3.1: Wind Rose for the Development under Annual Wind Condition at 500m

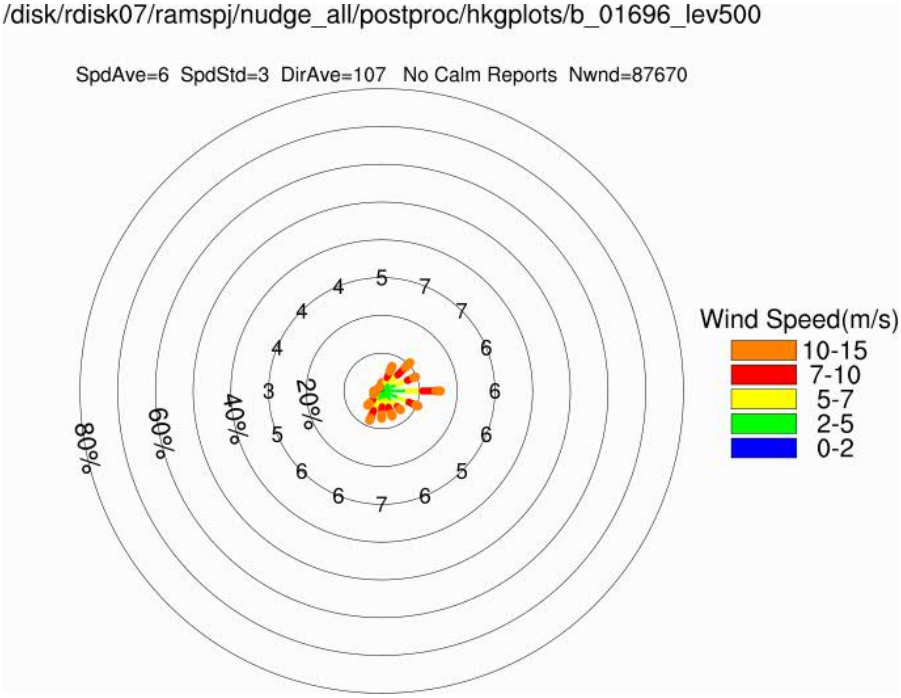
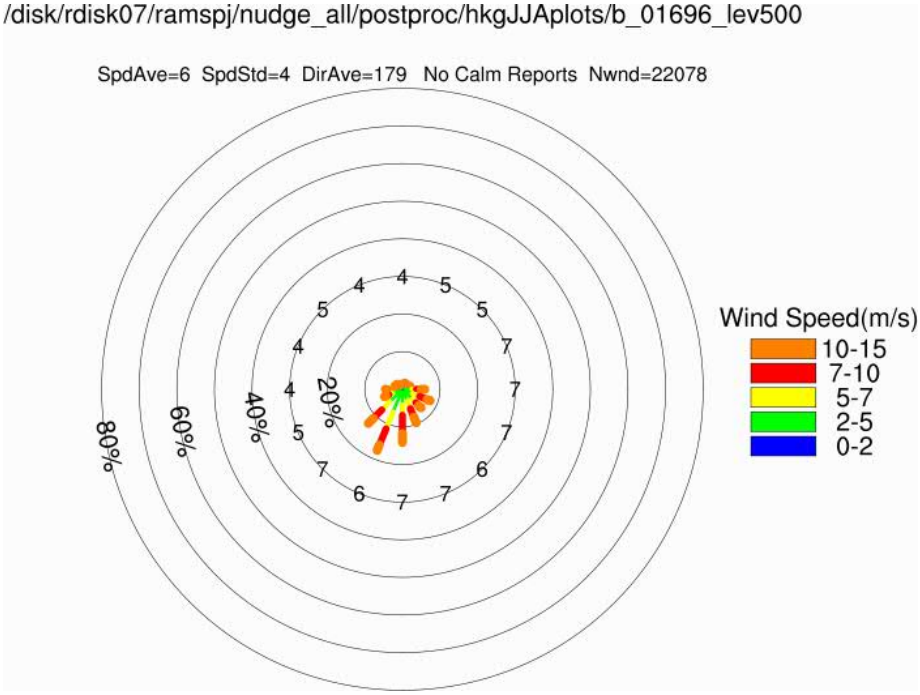


Figure 3.2: Wind Rose for the Development under Summer Wind Condition at 500m



3.2.2 RAMS Data in grid cell (050,074) at 500m height was adopted as wind boundary condition for the AVA. In order to comply with the Technical Circular for Air Ventilation Assessment [1], not less than 75% of the annual probable winds will be accounted for which includes the following eight wind directions (i.e. E, NE, ESE, ENE, SSW, S, SSE, NNE and SE) covering 84.4% of the total availability of the Site. Meanwhile, not less than 75% of summer probable winds will be accounted for which includes the following seven wind directions (i.e. SSW, S, SW, SSE, ESE, SE and E) covering 77.1% of the total wind availability of the Site. The considered wind directions and their annual and summer probabilities are shown in **Table 3.1**.

Table 3.1: Wind Boundary Conditions Applied in the AVA

No.	Annual		Summer	
	Wind Boundary Condition	Annual Probability	Wind Boundary Condition	Annual Probability
1	E, 90º	15.7%	SSW, 202.5º	17.8%
2	NE, 45º	10.8%	S, 180º	14.6%
3	ESE, 112.5º	10.5%	SW, 225º	13.2%
4	ENE, 67.5º	9.8%	SSE, 157.5º	9.8%
5	SSW, 202.5º	8.5%	ESE, 112.5º	8.2%
6	S, 180º	7.4%	SE, 135º	7.3%
7	SSE, 157.5º	7.3%	E, 90º	6.2%
8	NNE, 22.5º	7.2%	--	--
9	SE, 135º	7.2%	--	--
	Total	84.4%	Total	77.1%

3.2.3 In regard of the assessing approaching wind directions, three categories (i.e. Category 0, 1, 2) of profile for wind speed and turbulent intensity are applied to determine the wind and turbulence profile for the wind from those approaching wind directions. The approach profiles for wind speed and turbulent intensity extracted from RAMS Data are presented in **Figures A5** and **Figures A6** of **Annex A**.

3.3 Computational Fluid Dynamics (CFD) Approach

3.3.1 With reference to the Technical Circular for Air Ventilation Assessment [1], CFD method is used as “fit for the purpose”.

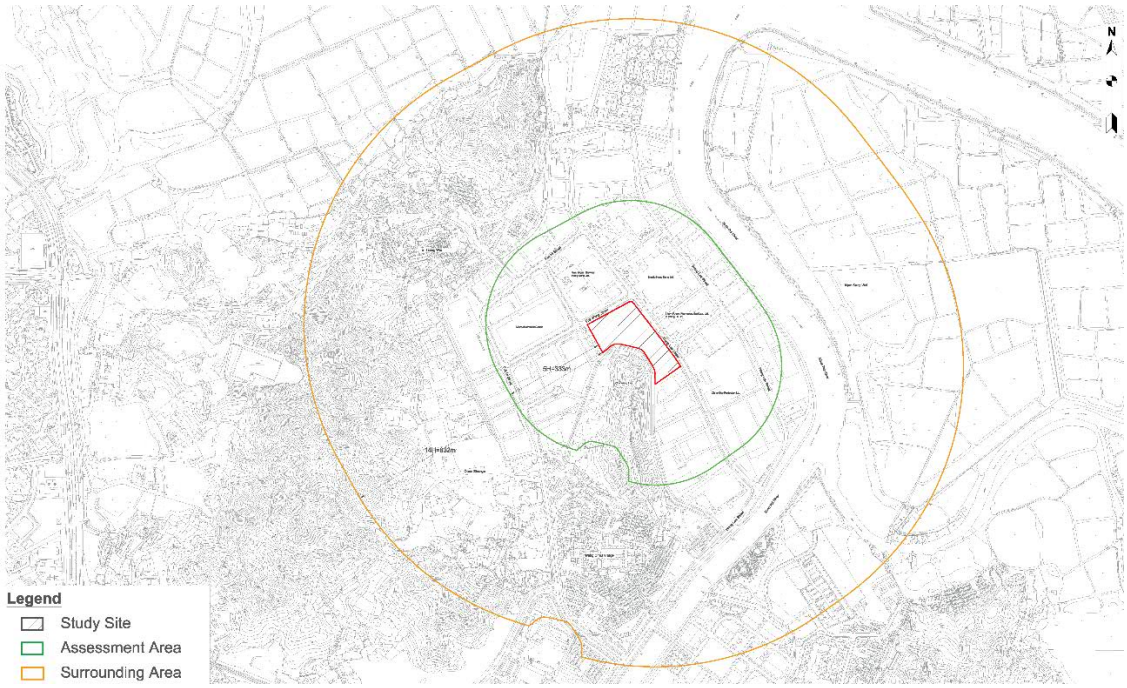
3.3.2 The optimum CFD Model is created based on “the Quality Assurance Manual on Environment Wind Studies (AWES-QAM-1-2001)” [3] and the “Guide for the Verification and Validation of Computational Fluid Dynamics Simulations (American Institute of Aeronautics and Astronautics 1998) [4]”. The details of CFD modelling verification are described in the following sections.

3.4 Domain of CFD Model

3.4.1 Both the width and length of the domain of the computational model is 3,000m, while the height of the model is 1,000m. The whole CFD domain covers the entire development and the surrounding buildings. According to the Technical Guide, the areas of the Assessment and Surrounding area are measured from the site boundary as well as a belt up to 1H, where H is the height of the tallest building of the proposed development, around the site boundary.

3.4.2 Based on the updated layout design, the maximum building height of the proposed MSBs is +66.5 mPD while the ground level is approximately +5 mPD. The extent of the assessment area is thus identified to be at least 66.5 m from the Site boundary. In this study, the assessment area is extended to 333 m (5H) to cover the most immediate surrounding area, including all existing and planned buildings, and topographical features, for a more comprehensive assessment. **Annex A** presents the views for the CFD model of bounding surfaces for the Baseline Scheme and the Indicative Development Scheme . **Figure 3.3** shows the extent of the assessment and surrounding areas.

Figure 3.3: Extent of Assessment Area and Surrounding Area



3.5 Validity of CFD Model

3.5.1 "The Biography of Fluent User Guide [5]" recommends benchmark tests of the partial differential equations and their finite volume representation to investigate any CFD coding errors. However, for this project, one of the most reliable and fully verified commercial 3D CFD tools in Fluent v21.1, which is widely used in Hong Kong & Asia Pacific, has been adopted. Therefore, verification of the code is not required for the present analysis. For an extensive description of the Fluent code verification and benchmark tests, details are referred to reference [5].

3.6 General Settings of CFD Model

3.6.1 The CFD model was generated with the combination of tetrahedral and prism cells. Four layers of equally spaced prism cells are generated from the ground level up to 2 m above the ground level for the entire computational model. This was intended to predict the steep velocity gradient close to the ground level. The rest of the computational volume was filled with high quality un-skewed tetrahedral cells. The grid size on the proposed MSBs was the smallest with a minimum size of 0.5 m. The mesh size was expanded out from the proposed MSBs with an expansion ratio of approximately 1.05. For this study, about 9.8 million-cells hybrid CFD models were created.

3.6.2 CFD modelling is a three-dimensional turbulent air flow modelling based on steady state RANS equation. The Realizable k-ε turbulence model and a 2nd-order discretization scheme were used in the simulations. The convergence criterion used was the requirement that the

sum of the absolute normalised residuals be less than $1x10^{-3}$. Furthermore, the percentage blockage is the same as the blockage ratio, which will not be greater than 3%.

3.6.3 Illustrations of the model with mesh generated are shown in **Figure A2** and **Figure A4** of **Annex A**.

3.7 Test Point

3.7.1 Wind Velocity Ratios (VR)s will be adopted as an indicator of wind performance for the Site and its surrounding to show the amount of wind available at pedestrian level. It is defined as Vp/V∞ (V pedestrian/V infinity). V∞ captures the wind velocity at the top of the wind boundary layer (i.e. at over 500 m) and is taken as the wind availability of the Site. Vp captures the wind velocity at the pedestrian level (i.e. 2 m above ground).

3.7.2 Aforementioned the assessment area is approximately 333 m from the Site boundary so as to cover more pedestrian areas (**Figure 3.3**). The test points along the Site boundary are finely positioned to provide enough wind characteristic information around the Site, which are known as perimeter test points. These points are used to assess Site Spatial Average Velocity Ratio (SVR) and give a hint of how the proposed MSBs may affect the wind environment of its immediate vicinity. The perimeter test points are labelled as ID# P01 – P39 evenly along the Site boundary and used to assess the SVR.

3.7.3 The assessment area covers neighbouring roads as well as surrounding buildings, open areas and adjacent pedestrian access/ footpaths. The test points distributed within the assessment area are considered as overall test points with ID# O01 – O193. The overall test points (ID#O01 – O193) and perimeter test points (ID#P01 – P36) are used to assess Local Spatial Average Velocity Ratio (LVR). This gives a hint of how the proposed MSBs may affect the wind environment of the local area. **Figure 3.4** shows the distribution of the perimeter and overall test points for the AVA study.

3.7.4 Furthermore, there are Special Test Points within the Indicative Development Scheme , aiming to review the wind performance of the mentioned design features. The special test points are labelled as ID#S1 – S23. These special test points are evenly distributed on the pedestrian access area within the Site. The special test points are located at the pedestrian footpath at the ground level of the Site. These special test points are only assessed in the Indicative Development Scheme , which can quantitatively evaluate the wind environment of the Site. The special test points are grouped into three major zones. The locations of test points and their zoning are shown in **Figure 3.5**.

3.7.5 All test points are elevated at 2 m above ground. The grouping of overall & perimeter test points is summarized in **Table 3.2**, while the grouping of special test points is summarized in **Table 3.3** below.

Figure 3.4: Distribution of Perimeter and Overall Test Points

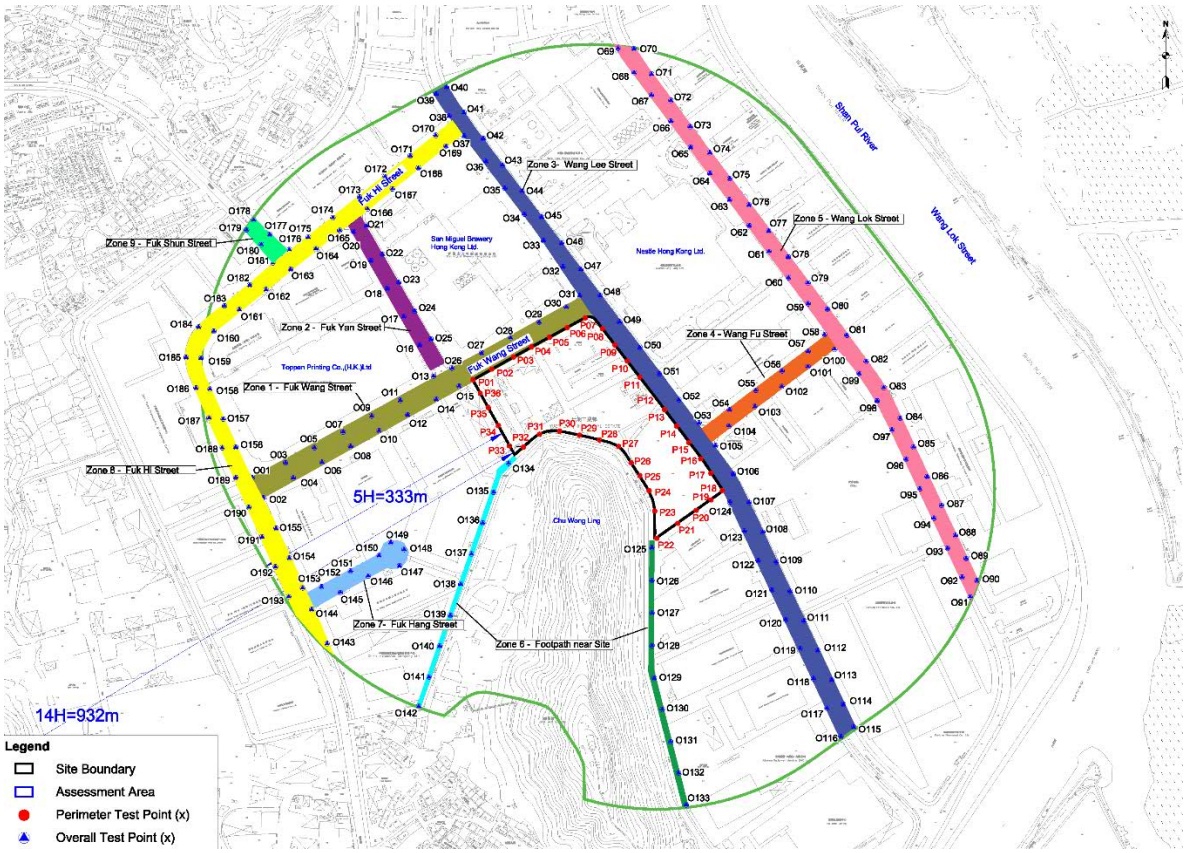


Table 3.2: Summary Table of Overall & Perimeter Test Points

Zone	Test Point Zone	Test Point ID
1	Fuk Wang Street	P01 – P07, O01 – O15, O26 – O30
2	Fuk Yan Street	O16 – O25
3	Wang Lee Street	P8 – P18, O31 – O53, O105 - O124
4	Wang Fu Street	O54 – O58, O100 - O104
5	Wang Lok Street	O59 – O99
6	Footpath near Site	P22 – P23, O125 - O142
7	Fuk Hang Street	O145-O152
8	Fuk Hi Street	O143 – O144, O153 - O193
9	Fuk Shun Street	O176 - O181

Figure 3.5: Distribution of Special Test Points

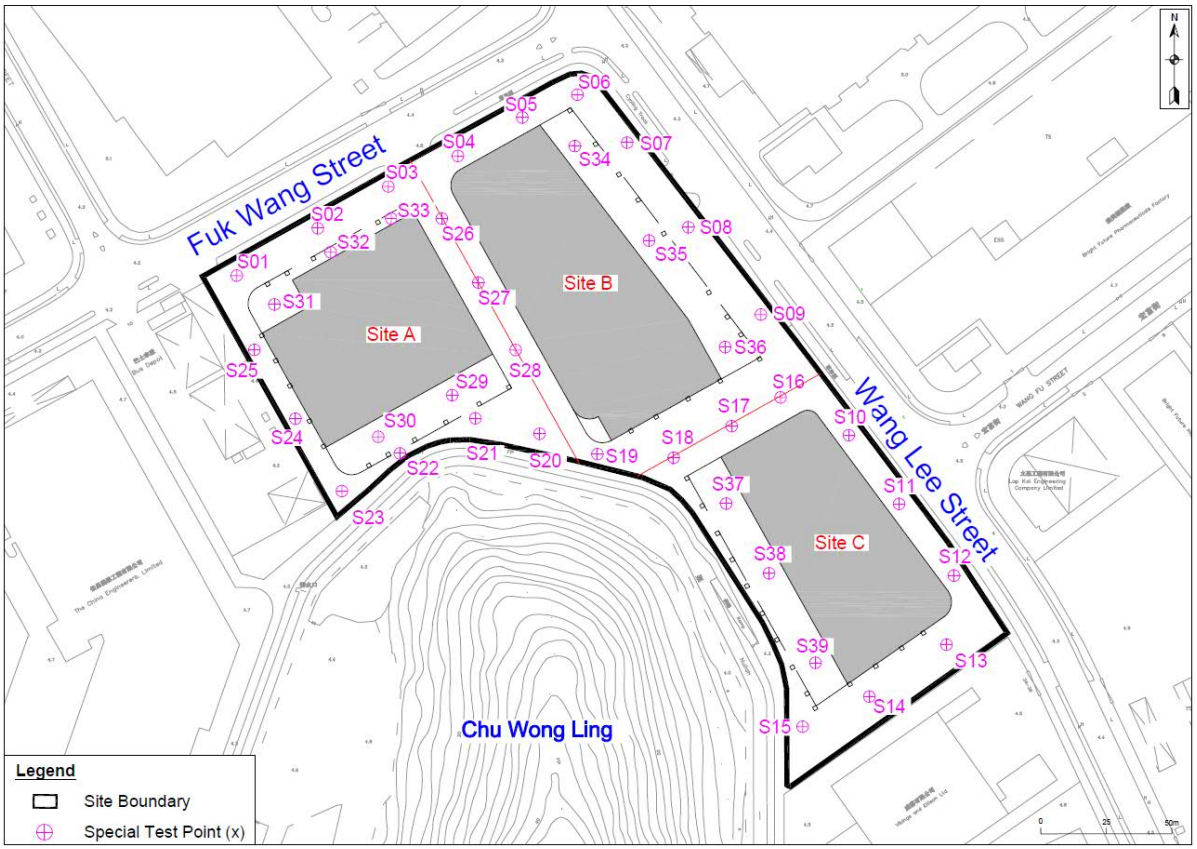


Table 3.3: Summary Table of Special Test Points

Zone	Test Point Zone	Test Point ID
10	Ground Level Footpath of Site A	S01 – S03, S20 – S33
11	Ground Level Footpath of Site B	S04 – S09, S19, S34 – S36
12	Ground Level Footpath of Site C	S10 – S18, S37 – S39

4 Result and Key Findings

4.1 Local Spatial Average Velocity Ratios (LVR)s

4.1.1 Local Spatial Average Velocity Ratios (LVR)s were determined from all perimeter and overall test points in order to quantify the air ventilation effects of the proposed MSBs on the assessment area. The annual and summer LVRs for Baseline Scheme and Indicative Development Scheme are tabulated in **Table 4.1**.

Table 4-1: Summary of Local Spatial Average Velocity Ratios

	Annual Wind Condition		Summer Wind Condition	
	Baseline Scheme	Indicative Development Scheme	Baseline Scheme	Indicative Development Scheme
LVR	0.14	0.13	0.13	0.12

4.1.2 Under annual condition, the LVRs for Baseline Scheme and Indicative Development Scheme are 0.14 and 0.13 respectively, while the summer LVR for Baseline Scheme and Indicative Development Scheme are 0.13 and 0.12 respectively. The result is expected because the Indicative Development Scheme, with significantly higher GFA than the Baseline Scheme[6], would involve three multi-storey building blocks which together would be more massive than the Baseline Scheme. However, the adopted design features in the Indicative Development Scheme enables the easterly wind to facilitate across the Site and reach to the downstream area. It is assessed that there would not be any adverse wind ventilation issues for Indicative Development Scheme during either annual or summer wind condition. More elaboration is given in **Section 4.5**.

4.2 Site Spatial Average Velocity Ratios (SVR)s

4.2.1 Site Spatial Average Velocity Ratios (SVRs) were determined for the Site in order to quantify the air ventilation effects of the proposed MSBs on its immediate surrounding areas. The annual and summer SVRs for Baseline Scheme and Indicative Development Scheme are tabulated in **Table 4.2**.

Table 4.2: Summary of Site Spatial Average Velocity Ratios

	Annual Wind Condition		Summer Wind Condition	
	Baseline Scheme	Indicative Development Scheme	Baseline Scheme	Indicative Development Scheme
SVR	0.18	0.16	0.16	0.14

4.2.2 Under annual condition, the SVRs for the Baseline Scheme and Indicative Development Scheme are 0.18 and 0.16 respectively, while the summer SVRs for Baseline Scheme and Indicative Development Scheme are 0.16 and 0.14 respectively. Again, this is expected because the Indicative Development Scheme, with significantly higher GFA than the Baseline Scheme, would involve three multi-storey building blocks which together would be more massive than the Baseline Scheme. As mentioned in previous discussion, the adopted design features in the Indicative Development Scheme increase the wind permeability through the

[6] Indicative Development Scheme (with a GFA of 161,500 m^2 of the 10 storeys above ground) vs Baseline Scheme (with a GFA of 100,282 m^2 of the 8 storeys above ground)

Site. The building gaps between blocks, building set back from the main roads (i.e. Fuk Wang Street and Wang Lee Street) would benefit the wind environment along the site boundary. The ventilation performance of the pedestrian footpath on the site boundary will be further discussed in **Section 4.7**. It is assessed that there would be sufficient wind environment for both Schemes.

4.2.3 The VRs of the overall and perimeter test points under each wind boundary condition are summarised in **Annex B**. The velocity ratio contour and vector plots are illustrated in **Annex C**.

4.3 Overall Analysis under Annual Condition

4.3.1 As the assessment area mainly consists of low-rise industrial buildings, no significant obstacle on air flow is identified in upwind area of the Site. Furthermore, the road network (e.g. Fuk Wang Street and Wang Lee Street) within the assessment area is generally in line with some of the annual prevailing winds (e.g. ENE in line with Fuk Wang Street and ESE wind in line with Wang Lee Street), which can facilitate the wind penetration and promote the wind distribution within the assessment area. As such, the wind environment of the Development Site is similar to that of the assessment area.

4.3.2 Under annual condition, the incoming winds would enter to the assessment area via Wang Fu Street, Wang Lee Street and Wang Lok Street as they are generally aligned with some of the annual prevailing winds (e.g. ENE and ESE winds). Besides, the open space within Chiho Eco Protection Limited also allow air flow to reach the Site. Although the Site is bounded by Chu Wong Ling in the immediate south, incoming winds from the south are not expected to be largely blocked by the hilly terrain as the elevation of Chu Wong Ling is relatively low. Winds from the south quarter are predicted to skim over the ridge of Chu Wong Ling and reach to the Site, while some of them would deviate and bypass the Chu Wong Ling via the nullah. Taking the local topography into consideration, incoming winds from south to west quarter would generally have higher VRs compared to other winds as Chu Wong Ling amplified the incoming wind velocity. The incoming wind from north to east quarter also has relatively high VRs as there is large area of open space (i.e. Shan Pui River and Nam Sang Wai) in the northeast of the assessment area, which would favour the wind permeation.

4.3.3 In comparison of the annual LVRs and SVRs for the Baseline Scheme and Indicative Development Scheme, it is observed that they share comparable flow pattern. Similar strong and wake zones appeared in the assessment area. The single bulky building configuration of the Baseline Scheme would hinder the wind penetration through the Site. On the other hand, the prevailing wind from different directions can flow through the Site via the building space (about 20m wide) between the building blocks in Indicative Development Scheme. In this regard, the Indicative Development Scheme would perform better in air ventilation than the Baseline Scheme.

4.3.4 Although the average annual LVRs and SVRs for the Baseline Scheme are slightly better than Indicative Development Scheme . Considering the overall wind performance near the Site and within the YL INNOPARK area, it is expected that no significant adverse air impact would be created by the Indicative Development Scheme compared to the Baseline Scheme. There would still be adequate air ventilation at the pedestrian access path for the Indicative

Development Scheme under annual and summer wind condition. More elaboration is given below.

Figure 4.1: Annual Weighted Average VR Contour Plot of Baseline Scheme

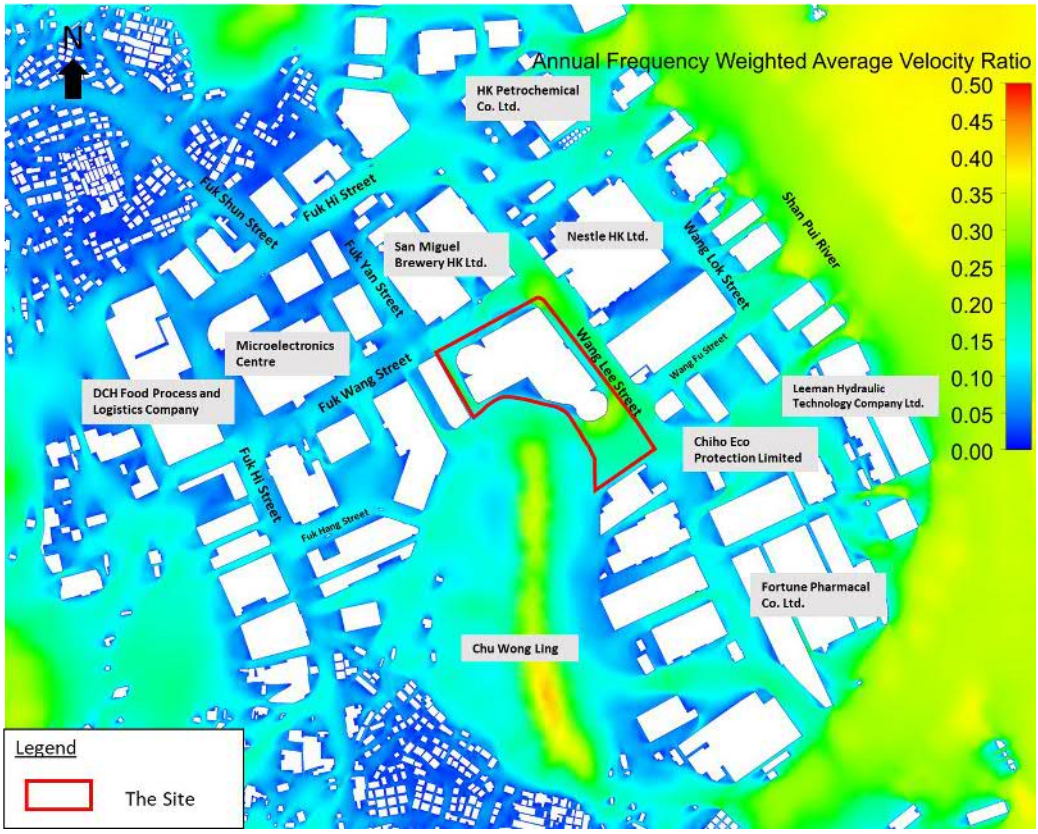
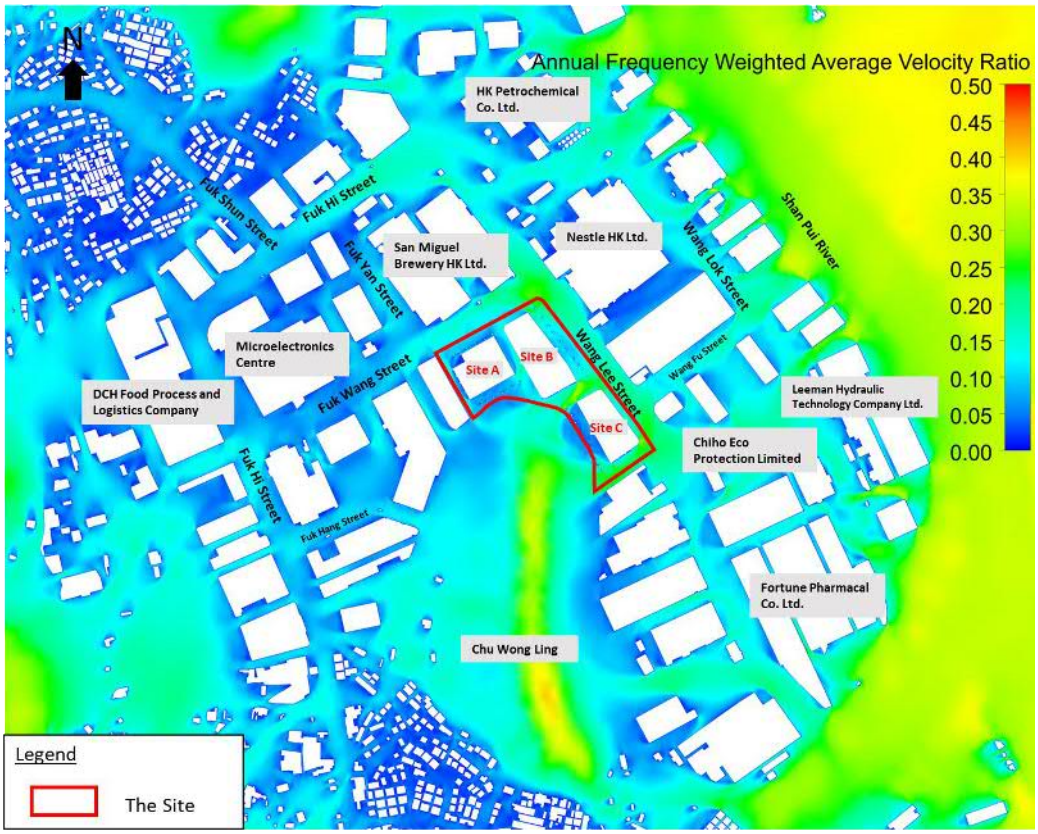


Figure 4.2: Annual Weighted Average VR Contour Plot of Indicative Development Scheme



4.4 Overall Analysis under Summer Condition

4.4.1 During summer months, the incoming winds are mainly from Chu Wong Ling in the immediate south of the Site. As mentioned in **Section 4.3.2**, the summer prevailing winds from the south are not expected to be significantly blocked by the hilly terrain of Chu Wong Ling. It is believed that most of them would reach to the Site after passing Chu Wong Ling and flow to the downstream area of the assessment area. It is also appeared that the major summer prevailing wind (SSW, S, and SW) facilitates a relatively strong wind environment to the whole YL INNOPARK area. As such, the general ventilation performance of the Site would be comparable to that of assessment area.

4.4.2 After passing Chu Wong Ling, the majority of summer prevailing winds would penetrate the Site via the open space between existing developments. Under the Indicative Development Scheme, the incoming wind would penetrate via the space between building structures. The space between building structures will facilitate air ventilation for the downstream area, including allowing the summer prevailing wind to flow through the Site.

4.4.3 In comparing the summer LVRs and SVRs between the Baseline Scheme and the Indicative Development Scheme, it is evident that they exhibit analogous airflow patterns, featuring both robust and wake zones within the assessment area. The substantial monolithic structure of the Baseline Scheme impedes the penetration of wind through the site. Conversely, the Indicative Development Scheme, with the space between the building blocks, allows

prevailing winds from diverse directions to traverse the site. Consequently, the Indicative Development Scheme exhibits better air ventilation compared to the Baseline Scheme.

4.4.4 The summer LVRs and SVRs of the Baseline Scheme are noted to marginally outperform those of the Indicative Development Scheme. However, it is assessed that the Indicative Development Scheme will not engender any significant adverse effects on air quality in contrast to the Baseline Scheme. The permeable design of the Indicative Development Scheme will facilitate enhanced wind penetration, ensuring a favourable wind environment during the summer months.

Figure 4.3: Summer Weighted Average VR Contour Plot of Baseline Scheme

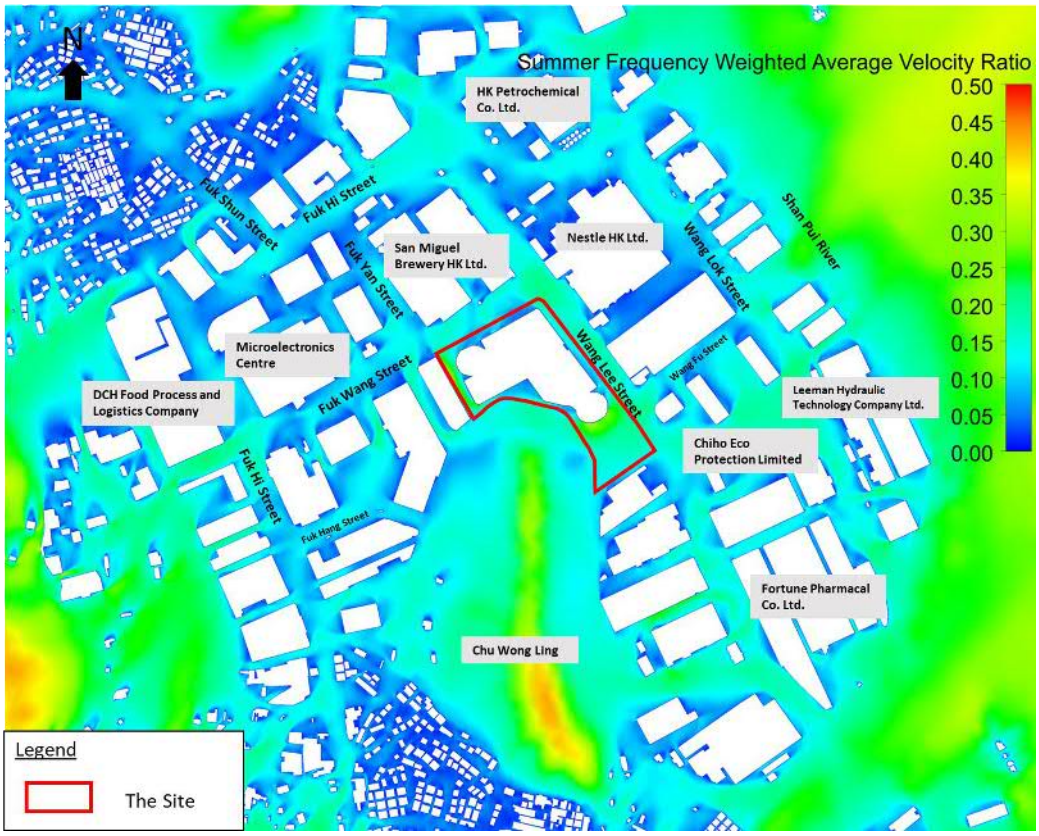
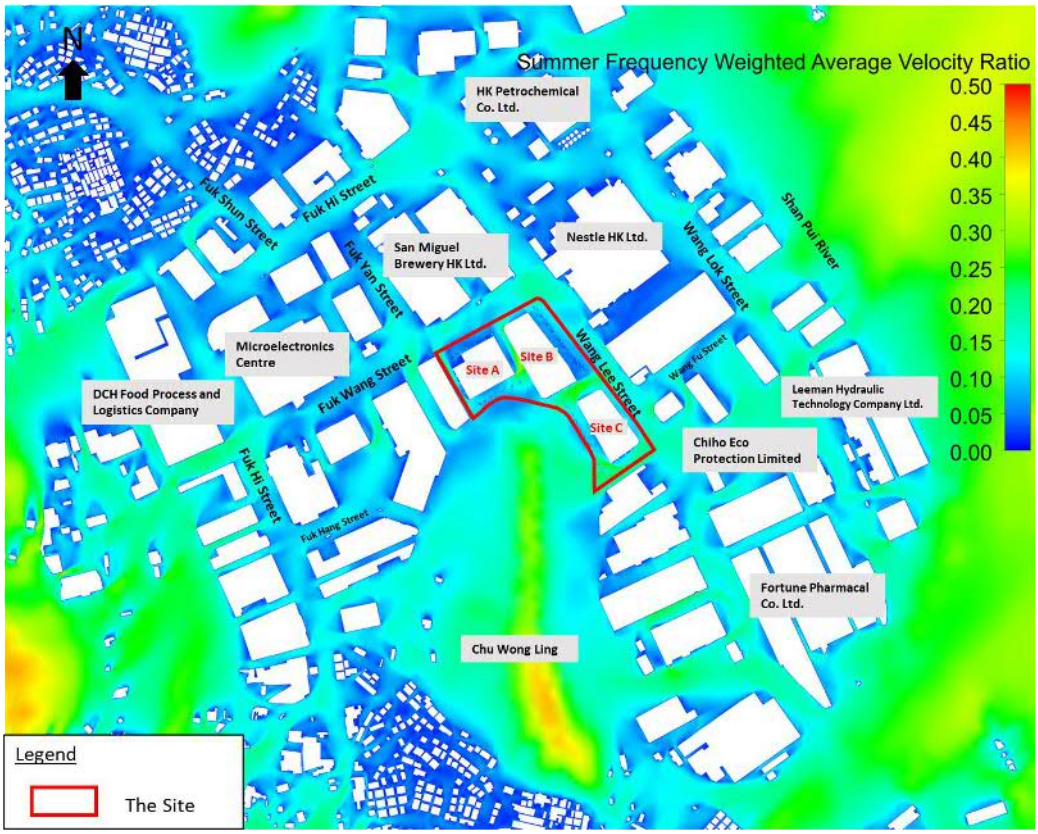


Figure 4.4: Summer Weighted Average VR Contour Plot of Indicative Development Scheme



4.5 Wind Environment Analysis

4.5.1 The ventilation performance of assessment area would vary in different wind directions. According to boundary condition set for this initial study, the annual prevailing winds include E (15.7%), NE (10.8%), ESE (10.5%), ENE (9.8%), SSW (8.5%), S (7.4%), SSE (7.3%), NNE (7.2%) and SE (7.2%), while summer prevailing winds include SSW (17.8%), S (14.6%), SW (13.2%), SSE (9.8%), ESE (8.2%), SE (7.3%) and E (6.2%). The prevailing winds of annual and summer condition cover a total of 10 directions, whose directional wind environments are discussed below.

NNE Wind Analysis

4.5.2 The NNE wind contributes 7.2% and 1.8% of prevailing wind in the annual and summer condition respectively. The NNE wind is not considered as prevailing wind in the summer condition. The contour plots of VR value for Baseline Scheme and Indicative Development Scheme are shown in **Figure 4.5** and **Figure 4.6** respectively.

4.5.3 The NNE wind is approaching to the assessment are via Wang Fu Street and the open space within Chiho Eco Protection Limited. It is observed that Fuk Wang Street and Wang Lee Street are the main pedestrian roads. With the proposed building setback from the site boundary which facing to these two streets, the wind ventilation in the area will be enhanced. The VRs along two streets are relatively high in comparing with other pedestrian roads within the assessment area.

4.5.4 The overall VR of the Indicative Development Scheme is slightly better than Baseline Scheme under NNE prevailing wind. It is observed that the average VRs along Fuk Wang Street is higher in the Indicative Development Scheme. The prevailing wind can travel along the street to the intersection of Fuk Wang Street and Fuk Hi Street. Moreover, the NNE prevailing wind can penetrate through the Site via the building set back between the building structures and empty bays on ground floor of Sites A and B. The permeability of the Indicative Development Scheme enables the NNE wind to provide air ventilation along the pedestrian walkway near the nullah surrounding Chu Wong Ling. In general, the overall wind ventilation performance in the Indicative Development Scheme is slightly better than the Baseline Scheme for the NNE wind.

Figure 4.5: VR Contour Plot Under NNE Wind of Baseline Scheme

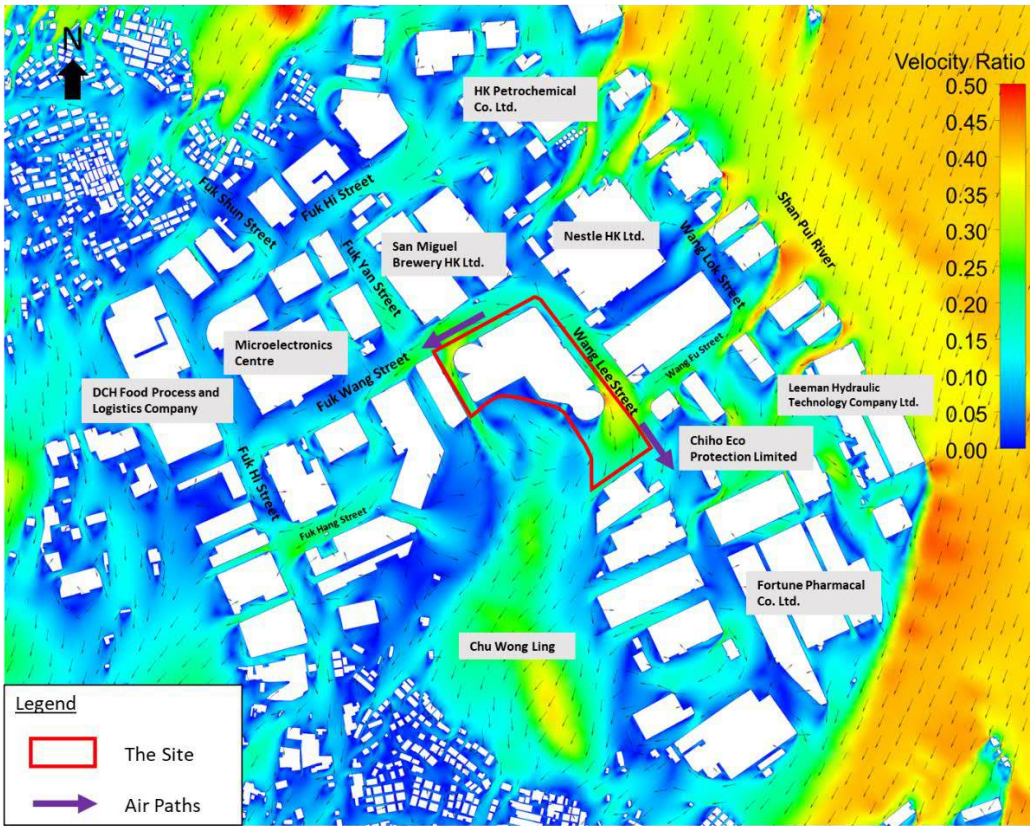
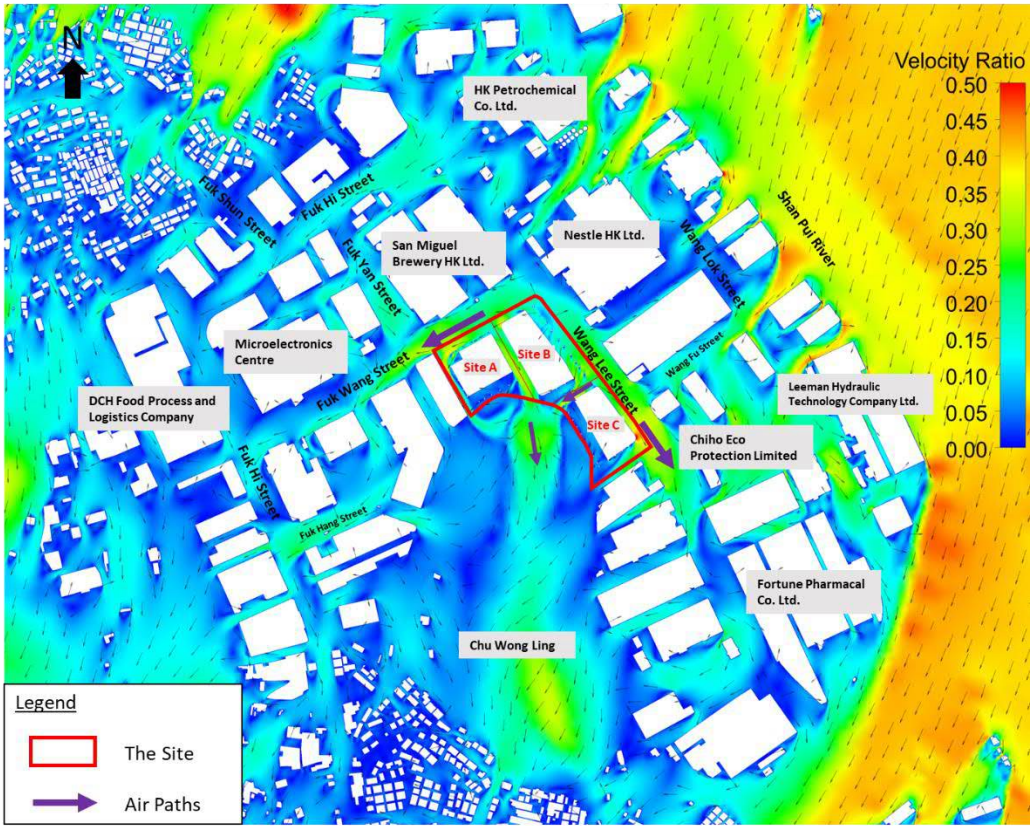


Figure 4.6: VR Contour Plot Under NNE Wind of Indicative Development Scheme



NE Wind Analysis

4.5.5 The NE wind contributes 10.8% and 1.8% of prevailing wind in the annual and summer condition respectively. The NE wind is not considered as prevailing wind in the summer condition. The contour plots of VR value for Baseline Scheme and Indicative Development Scheme are shown in **Figure 4.7** and **Figure 4.8** respectively.

4.5.6 The NE prevailing wind is entering the Site through the open space between the existing development near Shan Pui River in the east of the assessment area. It is also observed that the wind ventilation along Fuk Hi Street is relatively strong as high VR appears to travel along the street in the immediate north of San Miguel Brewery Hong Kong Limited. Similar with NNE prevailing wind, the wind facilitates air flow along the two major pedestrian walkways in the assessment area, Fuk Wang Street and Wang Lee Street. As mentioned in the previous discussion of NNE prevailing wind, the general wind environment in the Indicative Development Scheme is favourable, especially along Fuk Wang Street. Moreover, the permeability of the Indicative Development Scheme allows the NE wind to penetrate and provide air ventilation for the pedestrian walkways that are surrounding the Site

4.5.7 In conclusion, the ventilation performance under NE prevailing wind is comparable with NNE prevailing wind. The overall wind environment in the Indicative Development Scheme is

slightly better than the Baseline Scheme, especially on some of the pedestrian walkway within the assessment area.

Figure 4.7: VR Contour Plot Under NE Wind of Baseline Scheme

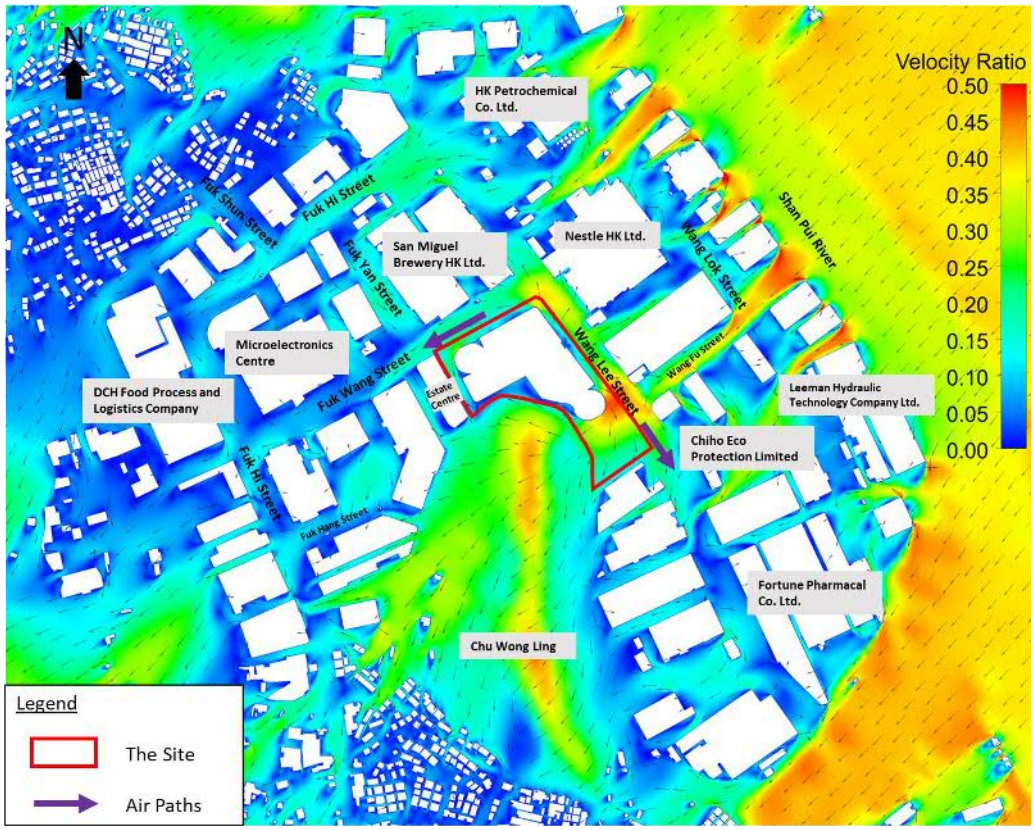
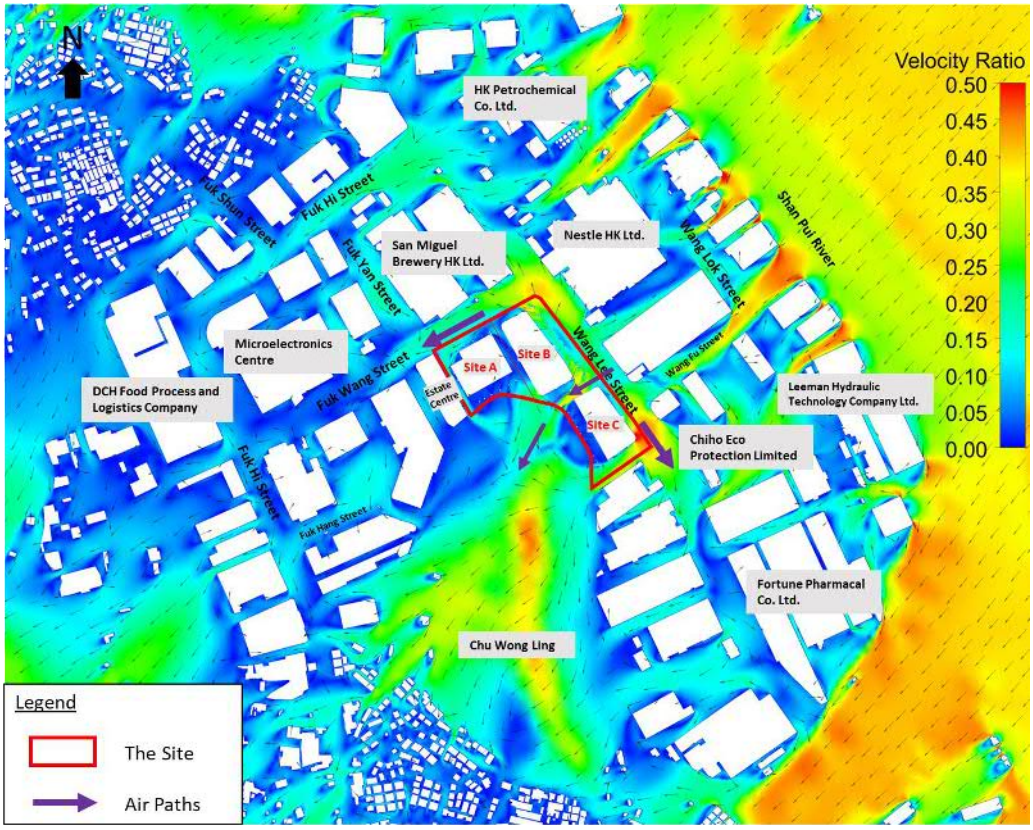


Figure 4.8: VR Contour Plot Under NE Wind of Indicative Development Scheme



ENE Wind Analysis

4.5.8 The ENE wind contributes 9.8% and 2.4% of prevailing wind in the annual and summer condition respectively. The ENE wind is not considered as prevailing wind in the summer condition. The contour plots of VR value for Baseline Scheme and Indicative Development Scheme are shown in **Figure 4.9** and **Figure 4.10** respectively.

4.5.9 It is observed that the ENE wind is entering the Site through Wang Fu Street. The prevailing wind continues to provide ventilation at the pedestrian level along Wang Lee Street. The ENE wind is also approaching the Site via the open space in between Nestle Hong Kong Limited and Hong Kong Petrochemical. Fuk Wang Street is in line with the ENE wind direction, and the air flow could be delivered to the downstream area. It appears that the general wind availability within the assessment area is adequate under ENE prevailing wind. However, it has been noted that a wake zone is formed to the south of Site A under the Indicative Development Scheme. Wind ingress occurs through the building separations between Site B and Site C, also Site C and CHIHO Ltd. with high VR winds originating from Wang Lee Street reaching the site via the building separation. These two wind trajectories converge further to the south of the site, redirecting towards Chu Wong Ling. Consequently, limited wind reaches the southern area of Site A, resulting in the formation of a small wake zone.

4.5.10 The wind environment under ENE wind is similar to abovementioned NNE and NE winds. The wind performance at Wang Lee Street is comparable between both Baseline and Indicative Development Scheme. The ENE wind can penetrate the Site through the building spaces due to the feature of building setback. The ENE wind is slackened to provide wind ventilation to the area at the southwest of the Site. However, the wind would flow across the

opening created by building setback of Site C in the Indicative Development Scheme to provide wind ventilation at the southwest area.

4.5.11 The permeability of the Indicative Development Scheme is providing sufficient wind environment in comparison with the Baseline Scheme under ENE prevailing. In short, the wind ventilation performance for both Baseline and Indicative Development Scheme is comparable as the distribution of VR within the assessment area are similar.

Figure 4.9: VR Contour Plot Under ENE Wind of Baseline Scheme

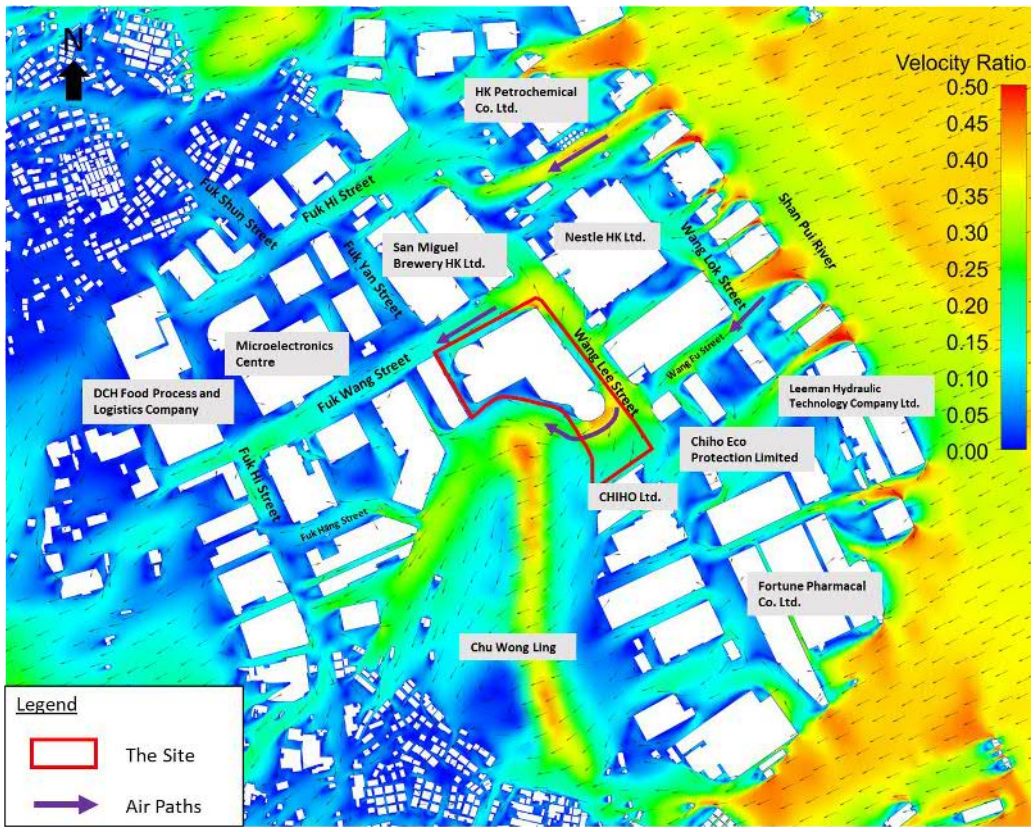
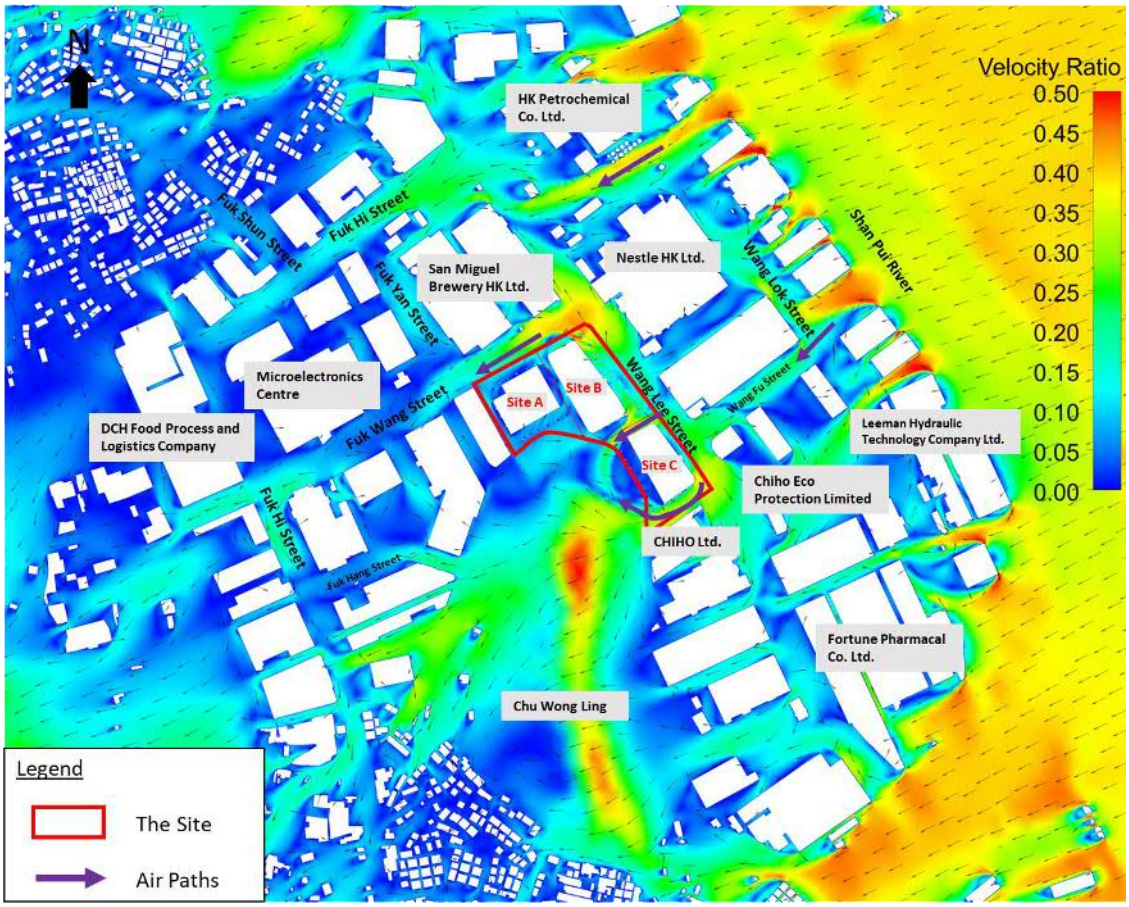


Figure 4.10: VR Contour Plot Under ENE Wind of Indicative Development Scheme



E Wind Analysis

4.5.12 The E wind contributes 15.7% and 6.2% of prevailing wind in the annual and summer condition respectively. The contour plots of VR value for Baseline Scheme and Indicative Development Scheme are shown in **Figure 4.11** and **Figure 4.12** respectively.

4.5.13 The E prevailing wind is the most annual prevailing wind. It is penetrating toward the Site via the open space near Chiho Eco Protection Limited. Some of the E wind is diverted to travel along Wang Lee Street. Wang Lee Street is the major air path within the assessment area since it has relatively higher average VRs among the pedestrian road networks. Under E prevailing wind, it is observed the VRs in west of the assessment area are relatively low. The E prevailing wind would flow along Fuk Hi Street to provide air flow in the north of the assessment area. The E wind is then travel towards further north that is resulted with relatively weak wind environment in the west of the assessment area.

4.5.14 Under the Indicative Development Scheme, it is observed that the VRs on Fuk Wang Street is slightly better than that of Baseline Scheme. It could be due to the permeability of the Indicative Development Scheme that allow the E wind to travel across the Site. The bulk structure in Baseline Scheme could slightly intercept the E prevailing wind to reach Fuk Wang Street. It is also shown that the VR between Site B and Site C is comparably high among the

pedestrian accessible paths (shown in **Figure 4.12**). The building setback between Site B and Site C provide a wind corridor and serve well wind environment within the Site.

4.5.15 Under the most annual prevailing wind condition, the overall wind environment for both Baseline Scheme and Indicative Development Scheme are comparable. The major pedestrian walkways in the Indicative Development Scheme have slightly higher VR and it has higher permeability to provide better wind environment within the Site. In general, the wind environment for both Scheme is comparable.

Figure 4.11: VR Contour Plot Under E Wind of Baseline Scheme

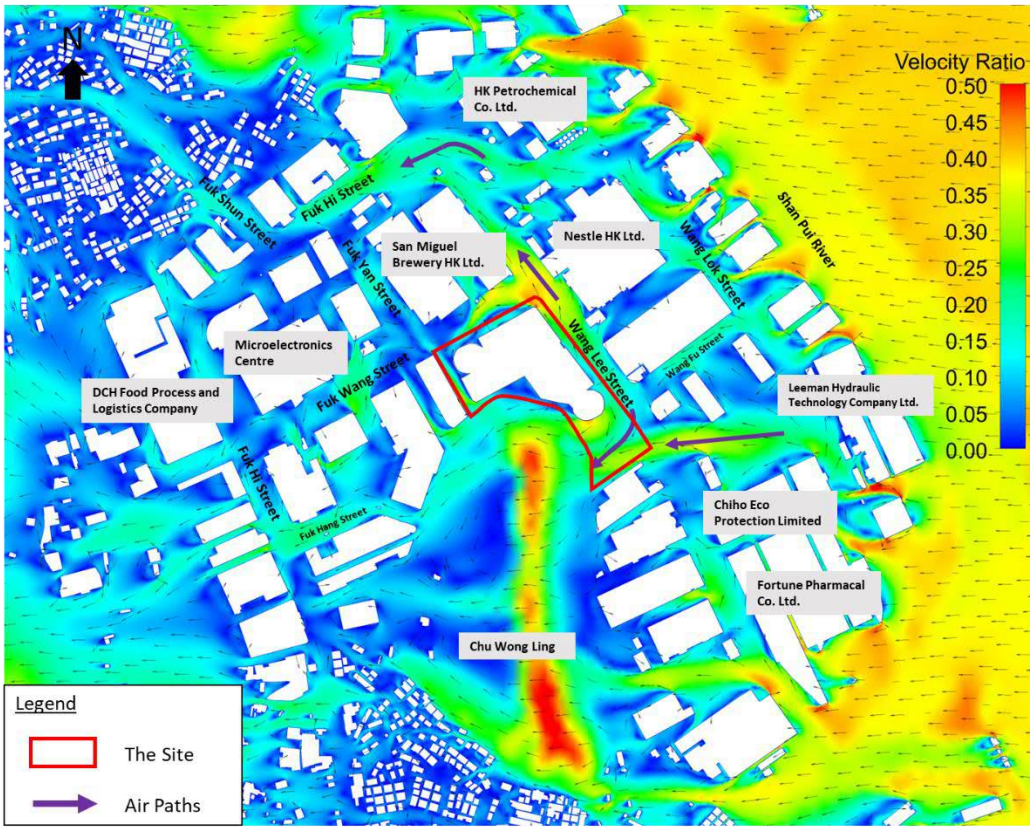
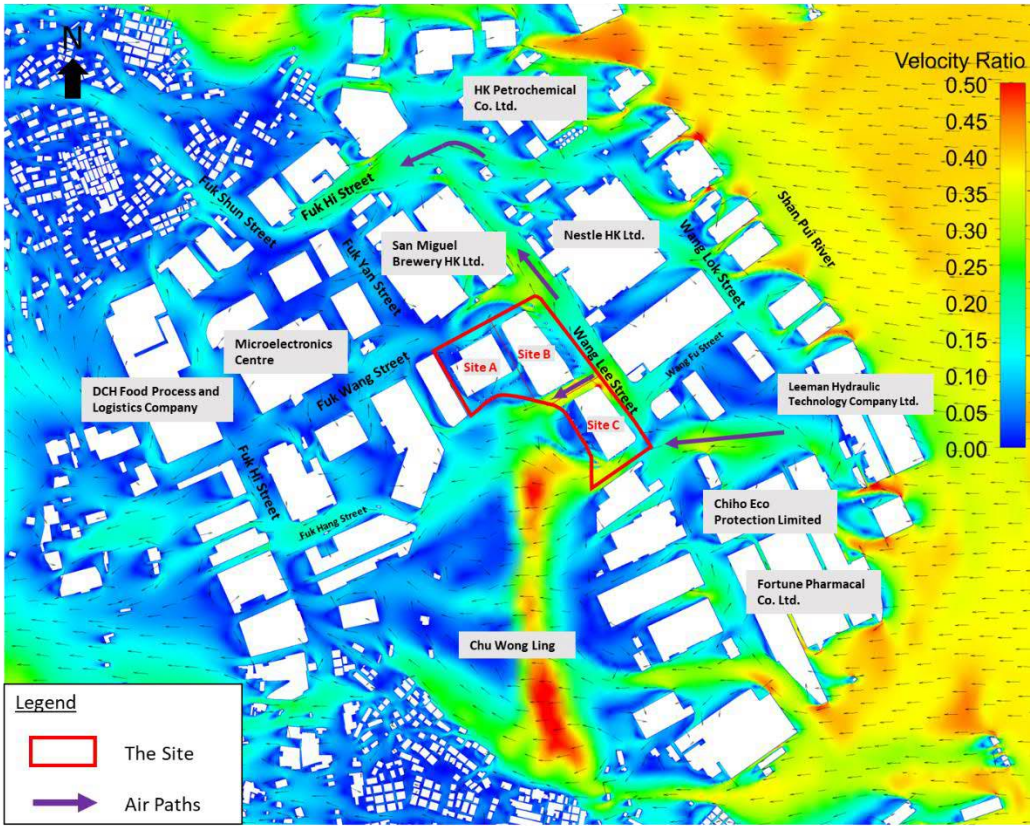


Figure 4.12: VR Contour Plot Under E Wind of Indicative Development Scheme



ESE Wind Analysis

4.5.16 The ESE wind contributes 10.5% and 8.2% of prevailing wind in the annual and summer condition respectively. The contour plots of VR value for Baseline Scheme and Indicative Development Scheme are shown in **Figure 4.13** and **Figure 4.14** respectively.

4.5.17 It appears that the wind environment is comparable during annual and summer wind condition. It is expected that ESE wind would not cause adverse wind ventilation problem to the assessment area that it is not the major prevailing wind in annual and summer wind condition. In both Baseline and Indicative Development Scheme s, it is occurred that the VR along Wang Lee Street bounded by San Miguel Brewer Hong Kong Limited and Nestle Hong Kong Limited is relatively high. In contrast, the wind environment along Fuk Wang Street is slackened under ESE prevailing wind and wind enter Fuk Yan Street is limited. Consequently, the VR of Fuk Yan Street of Indicative Development Scheme is slightly lower than Baseline Scheme,

4.5.18 The ESE wind is entering the assessment area via Wang Lee Street near Fortune Pharmacal Co. Limited as the street is in parallel with the incoming wind direction. The wind continues to the travel and provide adequate wind environment to the downstream area. The ESE wind is also entering the assessment area through Fuk Hi Street, which is parallel to the wind direction. The spacing between Site B and Site C created by building setback act as a small wind corridor for ESE wind to penetrate the Site and reach Fuk Wang Street. However, the strength of the ESE wind is entering the building gap is comparably weak. The wind

environment at the downstream area (i.e. Fuk Wang Street) is resulted to have relatively low VR.

4.5.19 In general, the wind environment of Wang Lee Street for both Baseline Scheme and Indicative Development Scheme is sufficient to provide ventilation at the pedestrian level. The distribution of VR in the assessment area is similar for both Baseline and Indicative Development Scheme.

Figure 4.13: VR Contour Plot Under ESE Wind of Baseline Scheme

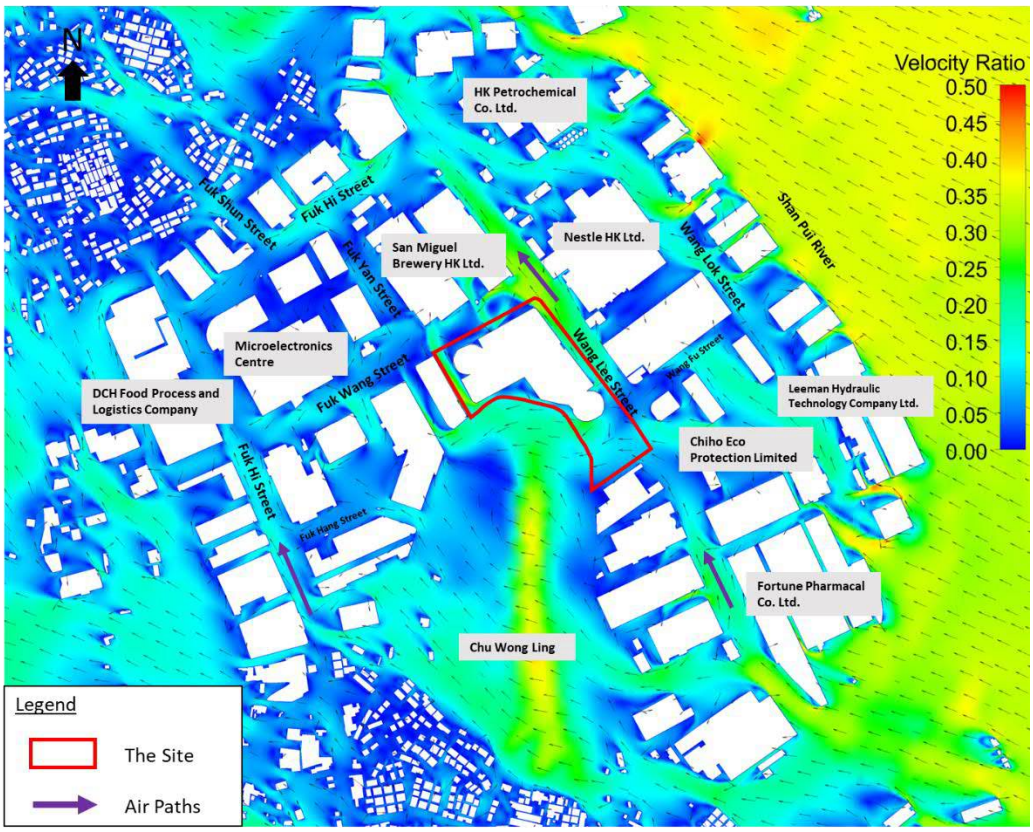
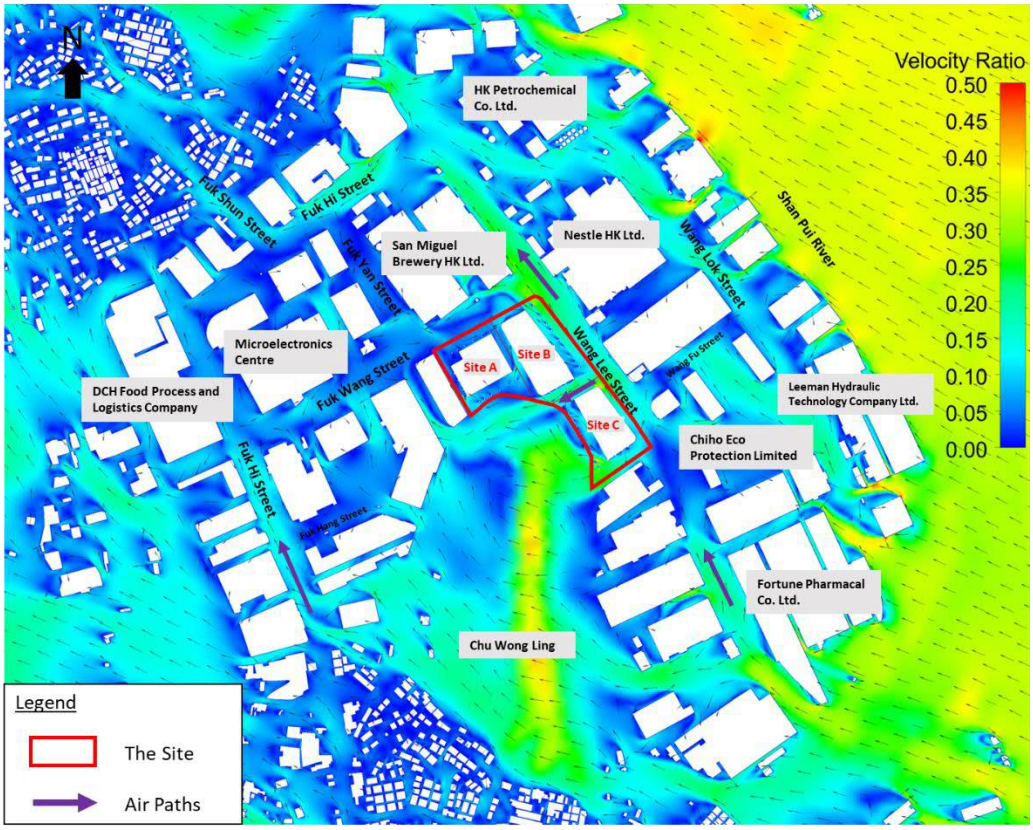


Figure 4.14: VR Contour Plot Under ESE Wind of Indicative Development Scheme



SE Wind Analysis

4.5.20 The SE wind contributes 7.2% and 7.3% of prevailing wind in the annual and summer condition respectively. The contour plots of VR value for Baseline Scheme and Indicative Development Scheme are shown in **Figure 4.15** and **Figure 4.16** respectively.

4.5.21 It appears that the flow pattern and VR distribution are comparable during annual and summer wind condition. It is expected that SE would not cause serious impact to the wind environment to the assessment area that it is not the major prevailing wind in both annual and summer wind condition. The ventilation performance of SE wind is similar to that of ESE wind. The SE wind is also entering into the assessment area through Wang Lee Street. Although the VR in SE wind is slightly higher than ESE wind, the wind flow pattern and wind availability within the assessment area is comparable. The major difference is the ventilation performance along Fuk Hi Street is relatively better in SE wind than ESE wind. Therefore, Fuk Hi Street could help facilitate air ventilation at the pedestrian level to the downstream area such as DCH Food Process and Logistics Company and Microelectronics Centre.

4.5.22 In general, the wind environment of SE wind is sufficient to provide well wind environment to the assessment area similar to ESE wind. Wang Lee Street and Fuk Hi Street are the major corridors to facilitate ventilation for both Baseline Scheme and Indicative Development

Scheme at the pedestrian level. The distribution of VR in the assessment area is similar for both Baseline and Indicative Development Scheme.

Figure 4.15: VR Contour Plot Under SE Wind of Baseline Scheme

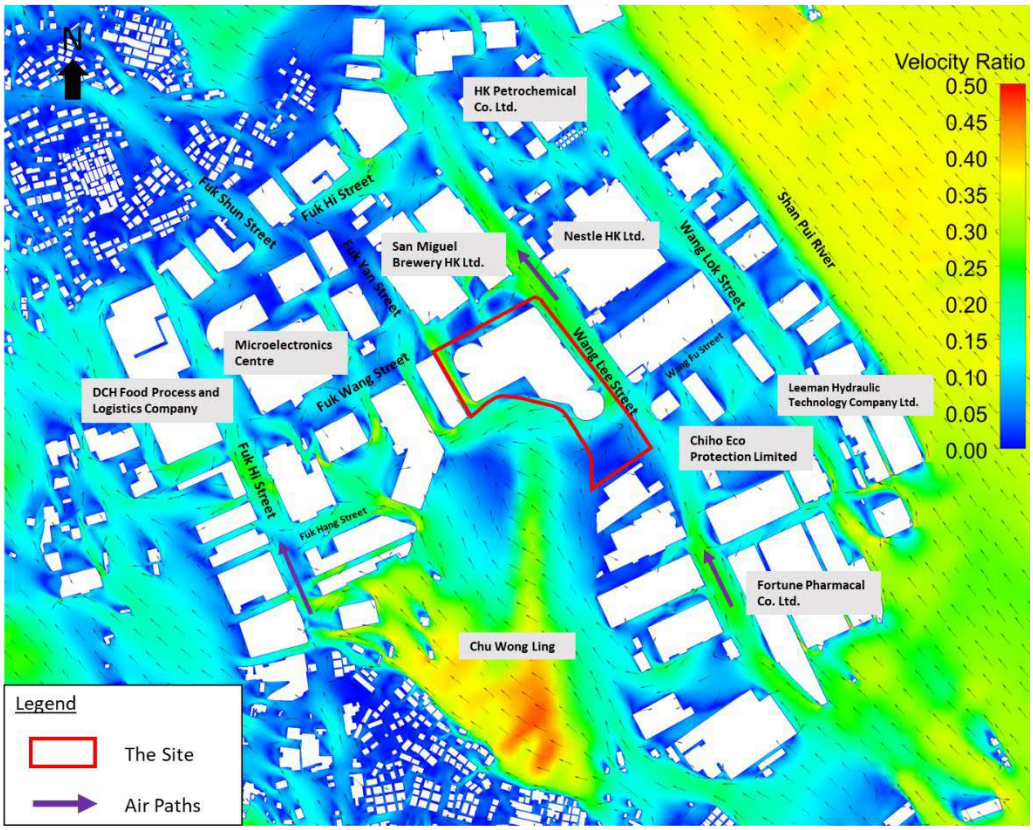
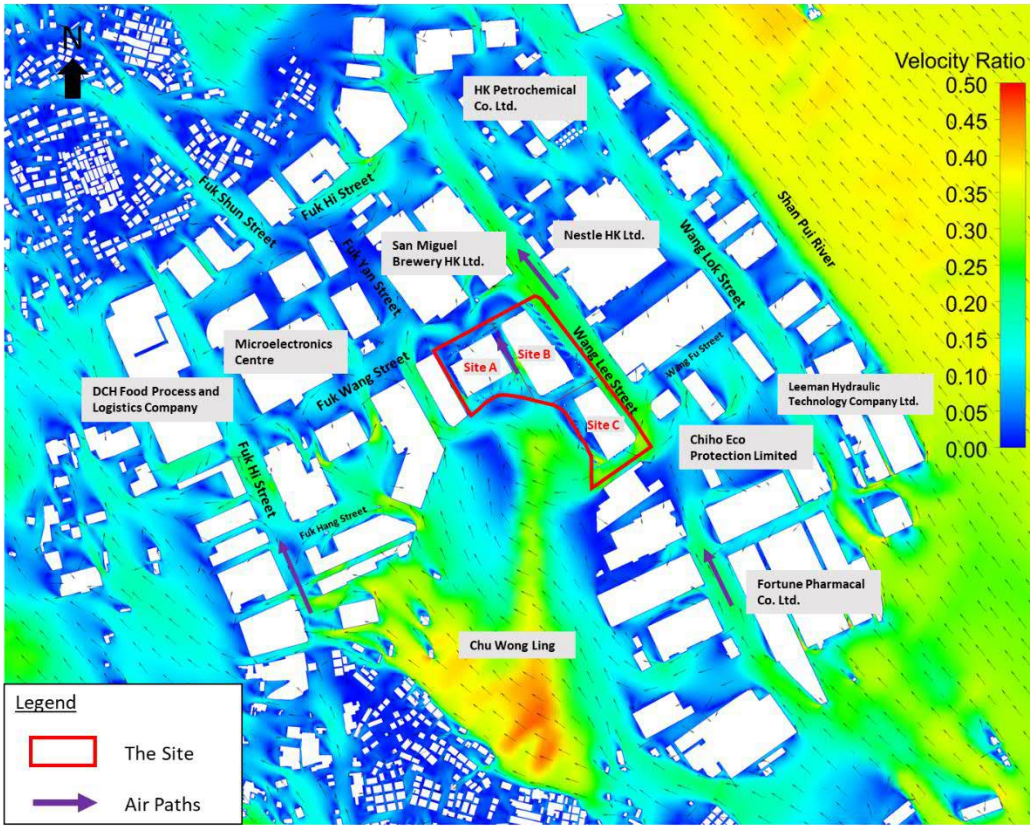


Figure 4.16: VR Contour Plot Under SE Wind of Indicative Development Scheme



SSE Wind Analysis

4.5.23 The SSE wind contributes 7.3% and 9.8% of prevailing wind in the annual and summer condition respectively. The contour plots of VR value for Baseline Scheme and Indicative Development Scheme are shown in **Figure 4.17** and **Figure 4.18** respectively.

4.5.24 The SSE is approaching the assessment area mainly via Fuk Hi Street. The SSE is also approaching the east side of the assessment area through the open space of Chiho Eco Protection Limited. It is observed that the wind environment at the north of the assessment area is relatively low compared to other prevailing wind. On the other hand, the SSE wind facilitate air ventilation throughout the south and east side of the assessment area. The overall wind environment under SSE prevailing wind is comparable well. The average VR at pedestrian level is relatively high. That is beneficial to the some of the pedestrian road such as Fuk Hi Street, Fuk Wang Street, and Wang Lee Street. It is also appeared that the VR along Wing Lok Street is also favourable under SSE wind. The incoming SSE wind travel in parallel to Wang Lok Street, Fuk Hi Street and Wang Lee Street to provide air ventilation to the downwind area.

4.5.25 Under Baseline Scheme, it is observed that the SSE is flowing across the Site to its immediate west, which could help facilitate the prevailing wind to penetrate parallel to Fuk Yan Street. The proposed building setback of the Sites A, B and C will also facilitate SSE wind to pass through the Site. These building features would improve the overall wind ventilation

performance at the downstream area. It is expected that the wind environment in the assessment area is adequate under SSE prevailing wind for Indicative Development Scheme.

Figure 4.17: VR Contour Plot Under SSE Wind of Baseline Scheme

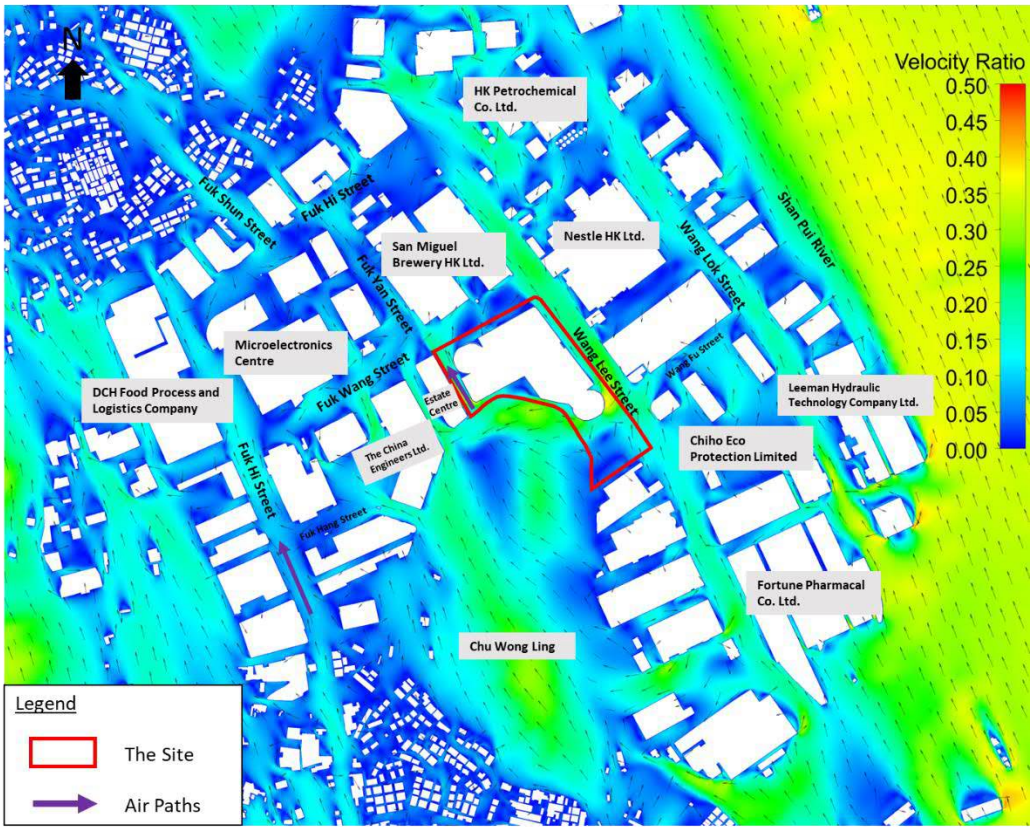
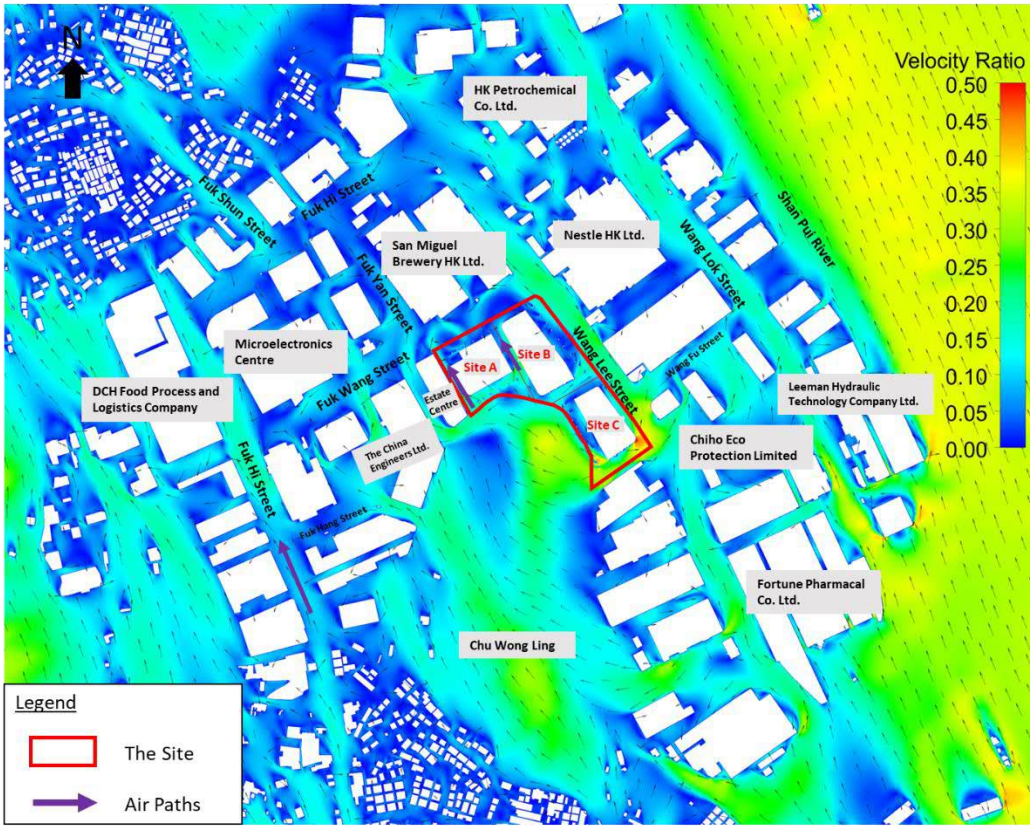


Figure 4.18: VR Contour Plot Under SSE Wind of Indicative Development Scheme



S Wind Analysis

4.5.26 The S wind contributes 7.4% and 14.6% of prevailing wind in the annual and summer condition respectively. The contour plots of VR value for Baseline Scheme and Indicative Development Scheme are shown in **Figure 4.19** and **Figure 4.20** respectively.

4.5.27 The general air permeation performance for S prevailing wind and SSE prevailing wind is similar. It is shown that the S wind enter the Site through Chu Wong Ling. The prevailing wind continues flow via Fuk Yan Street and provide air flow to the downwind area. As mentioned in the discussion of SSE prevailing wind, the permeability of the Indicative Development Scheme will promote and help facilitate the wind ventilation by S wind. It is also shown that the VR in the building setback space is relatively high (shown in **Figure 4.20**). S prevailing wind is one of the main wind directions during the summertime. Although the VR in the area to the north of SanMiguel Brewery HK limited is lower in both Baseline and Indicative Development Scheme , the average VR in the assessment area is comparably high in comparing with other prevailing wind. The general wind environment in the assessment area is comparable between both Baseline and Indicative Development Scheme .

Figure 4.19: VR Contour Plot Under S Wind of Baseline Scheme

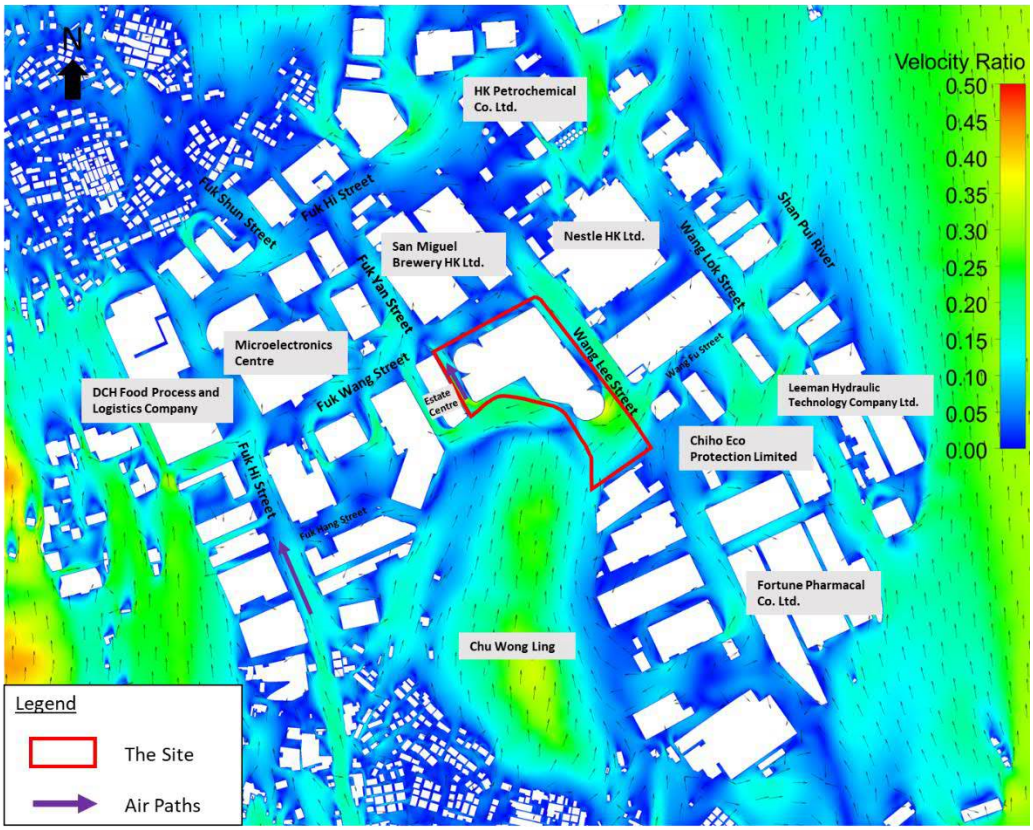
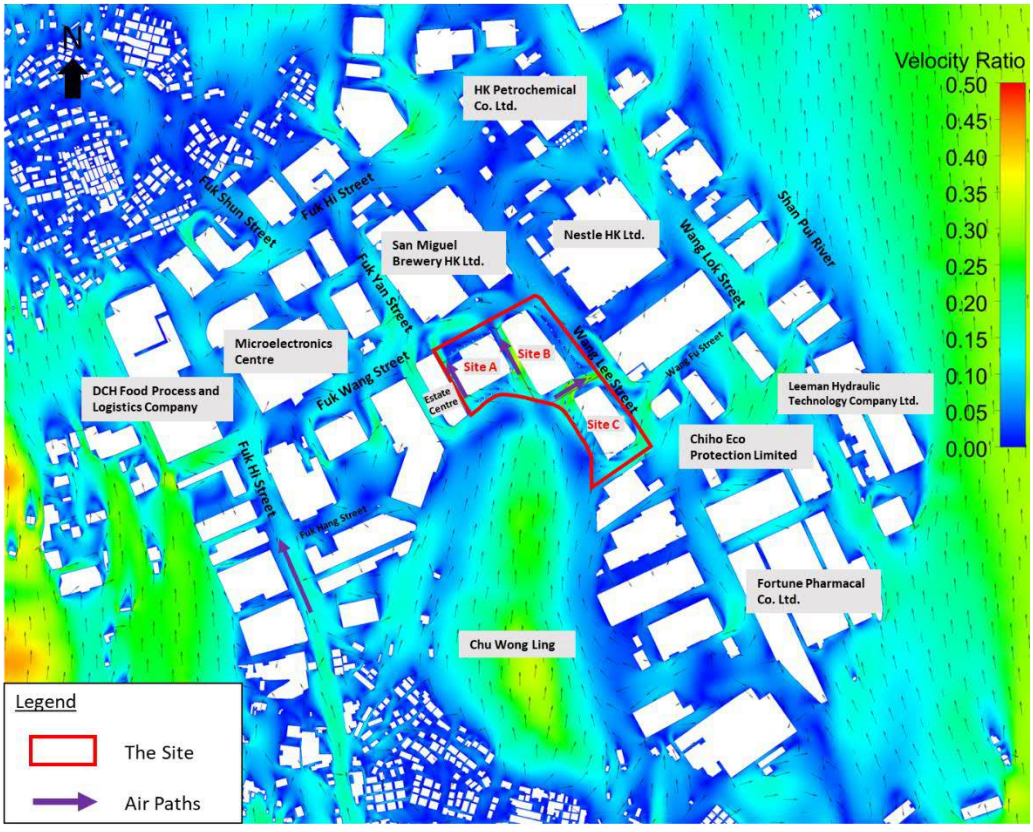


Figure 4.20: VR Contour Plot Under S Wind of Indicative Development Scheme



SSW Wind Analysis

4.5.28 The SSW wind contributes 8.5% and 17.8% of prevailing wind in the annual and summer condition respectively. The contour plots of VR value for Baseline Scheme and Indicative Development Scheme are shown in **Figure 4.21** and **Figure 4.22** respectively.

4.5.29 The SSW wind is the most prevailing wind during the summer, the wind environment is strong in the assessment area, especially near the Site boundary. The SSW wind mainly enters the assessment area through Fuk Wang Street near DCH Food Process and Logistics Company. The wind is then facilitating across the assessment area via Fuk Hi Street. The SSW wind also provides wind ventilation to southeast of the assessment area, where the wind environment at there is commonly clam in other prevailing wind (i.e. Fortune Pharmacal Co. Limited).

4.5.30 A few zones with high ventilation performance have been identified for both Baseline and Indicative Development Scheme. Under Baseline Scheme, one zone is located at the intersection of Fuk Yan Street and Fuk Wang Street; and another zone is located in the southeast of the Site. The SSW wind continues to flow to the downstream area and provides significant air ventilation at the pedestrian level.

4.5.31 Under Indicative Development Scheme, the location of zones with high ventilation performance are similar, being at the Fuk Yan Street and southeast of the Site. There is also an additional zone in the centre of the Site. It is expected that the wind environment inside the Site would remain to be satisfactory. The SSW wind would penetrate through the building setback and provide air ventilation at the pedestrian level at Fuk Wang Street. The building setback of Site C facilitates the SSW wind to provide air permeation at pedestrian level for Chiho Eco Protection Limited, Bright Future Pharmaceutical Lab. Limited, and Leeman Hydraulic Technology Company Limited. However, a decrease in VR is evident in the northern section of Wang Lok Street and the downstream wake zone. Due to the Indicative Development Scheme, the wind environment in the vicinity between Nestle HK Ltd. and Bright Future Pharmaceutical Lab. Limited experiences reduced turbulence, which restricts the extent of wind dispersion into these areas. Nevertheless, this wind flow remains adequate for supporting limited pedestrian access within the specified area.

4.5.32 Most locations along Fuk Hi Street and Fuk Yan Street have relatively high VRs, thus having higher ventilation performance. The VR at northeast of the assessment area (i.e. Hong Kong Petrochemical Co. Limited and Nestle Hong Kong Limited) is relatively low but it is sufficient for the limited pedestrian access in the area.

4.5.33 In conclusion, due to different MSB layout for the Baseline Scheme and the Indicative Development Scheme, the corresponding flow pattern and VR distribution along the Site boundary are therefore different. However, zones with relatively high VR are similar for both schemes. The permeability of Indicative Development Scheme will result in higher VR within the Site at the pedestrian level. As the most prevailing wind during the summertime, it is expected that there would not be any adverse air ventilation under both Baseline Scheme and Indicative Development Scheme.

Figure 4.21: VR Contour Plot Under SSW Wind of Baseline Scheme

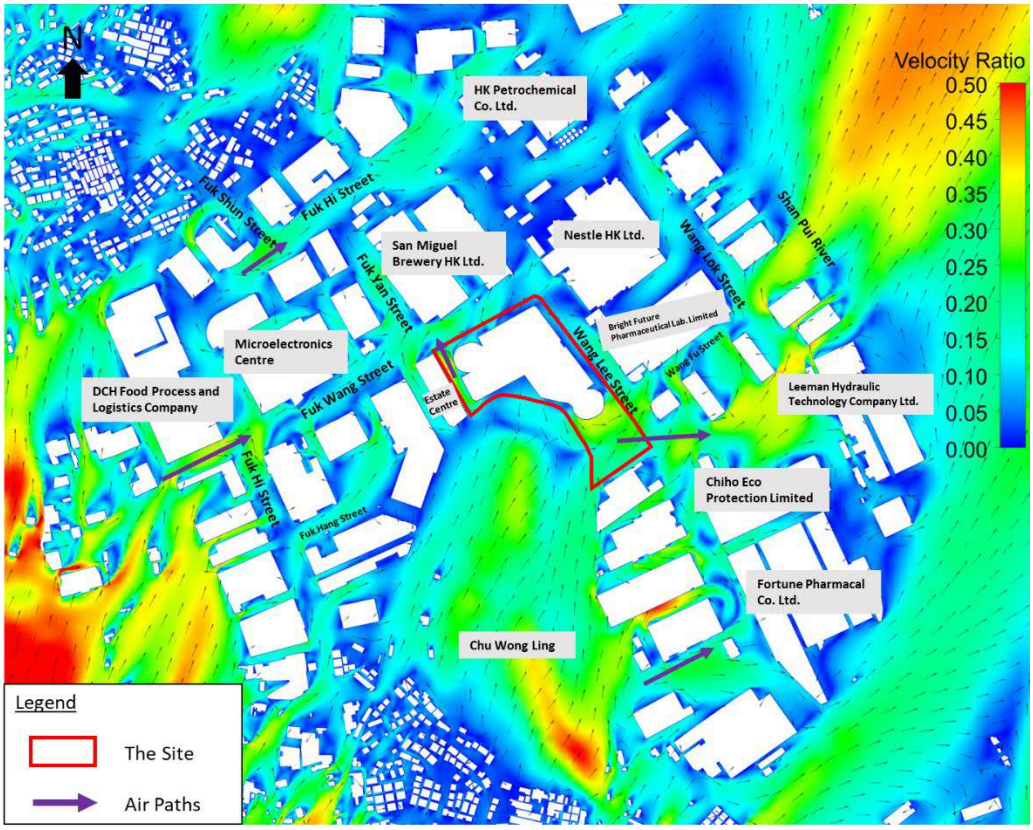
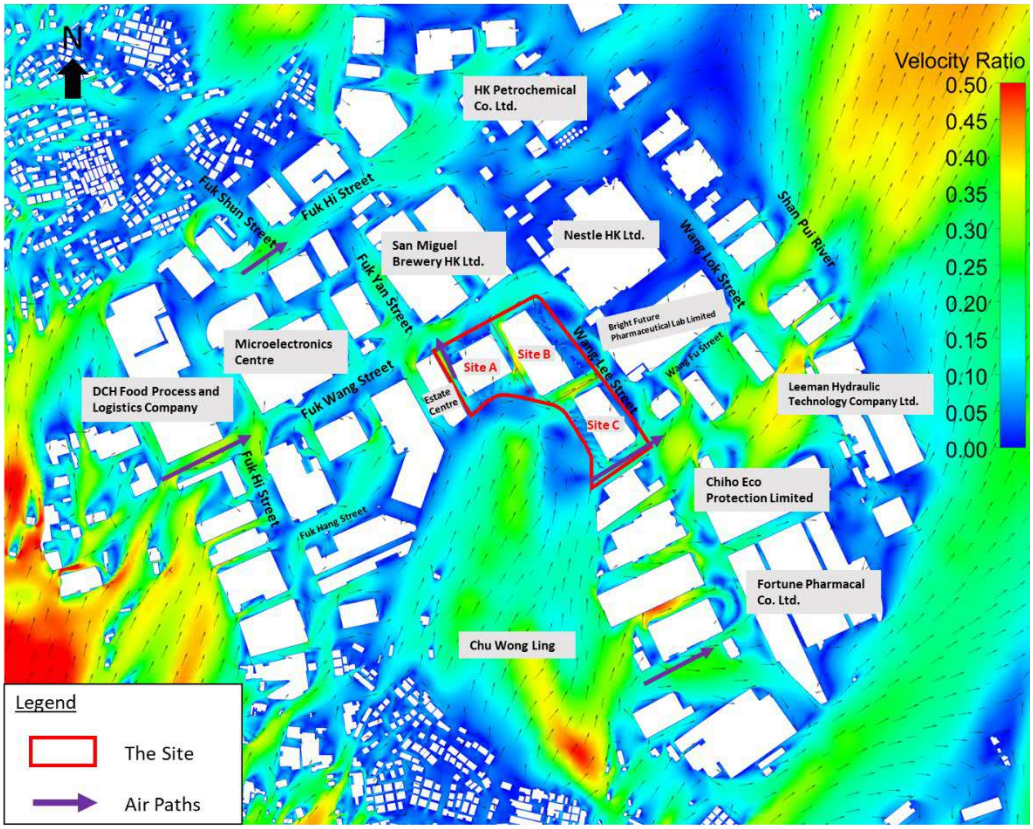


Figure 4.22: VR Contour Plot Under SSW Wind of Indicative Development Scheme



SW Wind Analysis

4.5.34 The SW wind contributes 5.4% and 13.2% of prevailing wind in the annual and summer condition respectively. The SW wind is not considered as prevailing wind in the annual condition. The contour plots of VR value for Baseline Scheme and Indicative Development Scheme are shown in **Figure 4.23** and **Figure 4.24** respectively.

4.5.35 The SW wind travels into the assessment area via Fuk Wang Street near DCH Food Process and Logistics Company. The SW wind also travels through the spaces between the existing low rise industrial building and enter the Site via Fuk Hang Street and Fuk Wang Street. Moreover, the SW wind travels on the ridge of Chu Wong Ling then penetrate towards the east of the assessment area. It appears that the southeast of the assessment area along with Wang Fu Street will have relatively higher VR. The wind availability of the assessment area under SW prevailing wind is relatively high. The average VR and its distribution are providing an adequate wind environment for the YL INNOPARK area. There is neither significant strong nor wake zone obtained in the assessment area.

4.5.36 In comparing the Baseline Scheme and Indicative Development Scheme, the distribution of VR is similar between the schemes. The major difference is observed at the Site boundary. It appears that the average VR surrounding the Site is slightly higher in Indicative Development Scheme. It could be due to the bulky design of Baseline Scheme, which limits the ability to facilitate air penetration. In contrast, the building setback in Indicative Development Scheme provide a pathway for the SW wind to provide ventilation to north of the Site and Fuk Yan Street. The building setback of Site C retains the permeability of the development. It allows the SW wind to penetrate the Indicative Development Scheme to reach Wang Fu Street and the downstream industrial development (i.e. Chiho Eco Protection Limited and Leeman Hydraulic Technology Company Limited). The difference of VR distribution at the Site boundary has resulted in slightly higher SVR for Indicative Development Scheme. Other than that, the general air permeation and wind availability in the assessment area is sufficient under both Baseline and Indicative Development Scheme. It is anticipated that there is no adverse air ventilation issue occurred under SW prevailing wind.

Figure 4.23: VR Contour Plot Under SW Wind of Baseline Scheme

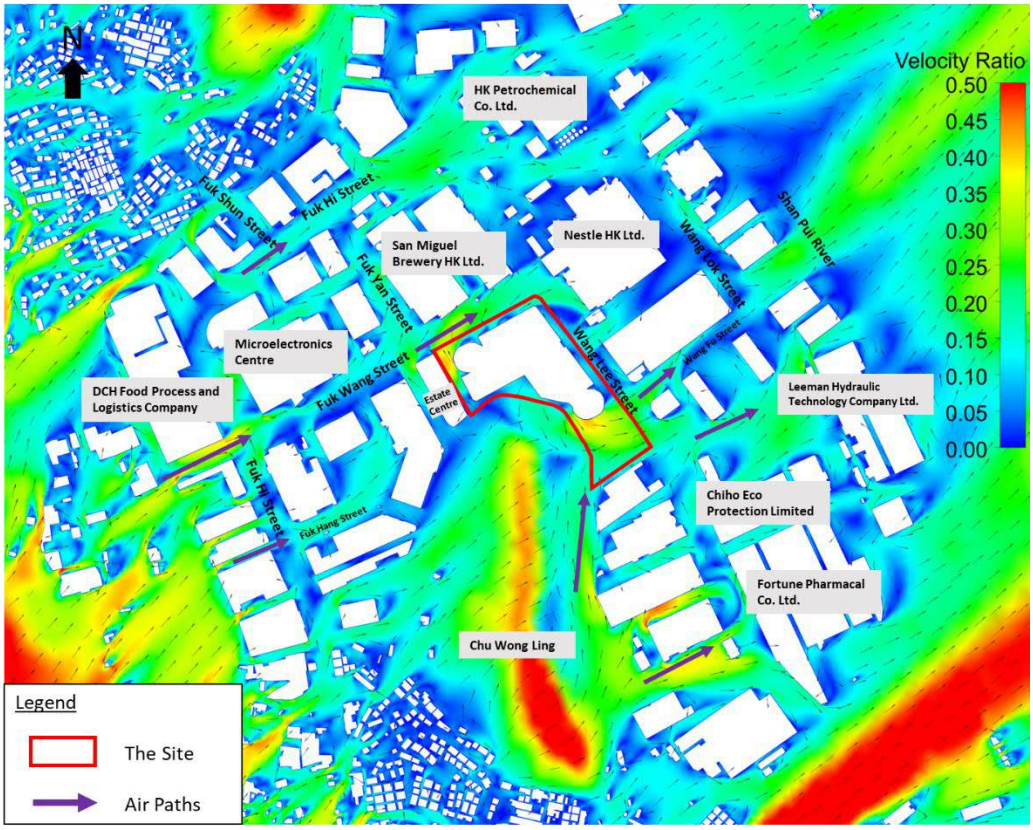
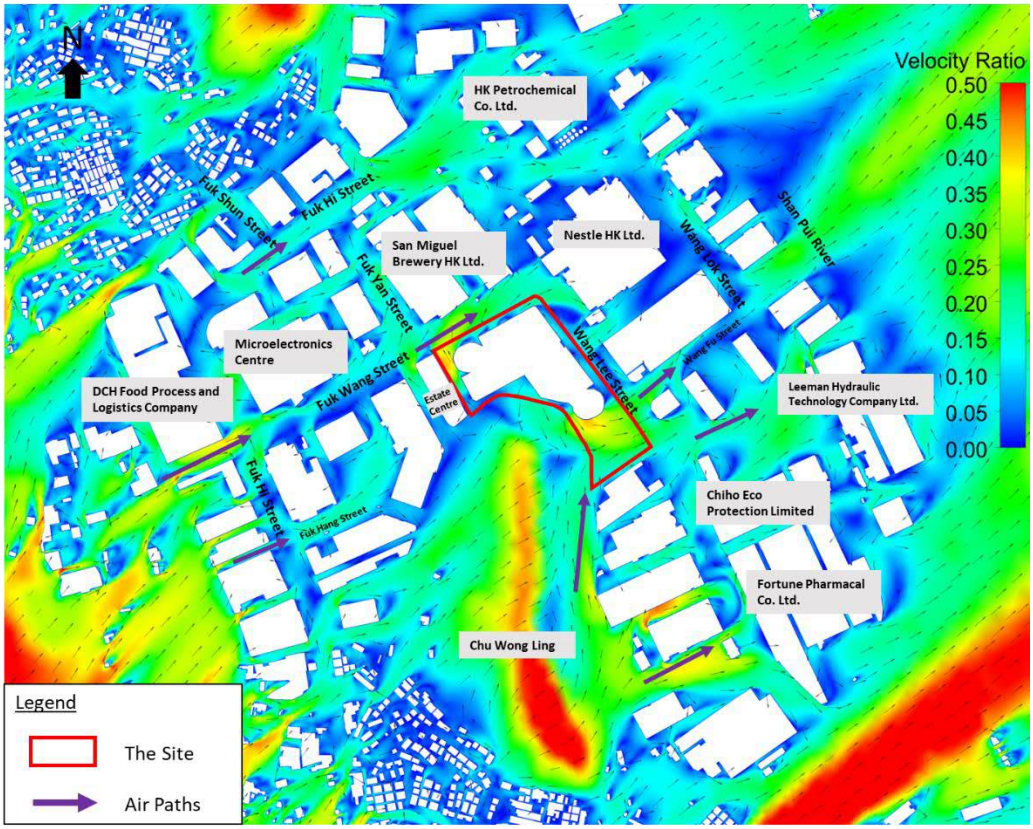


Figure 4.24: VR Contour Plot Under SW Wind of Indicative Development Scheme



4.6 Area of Interest Analysis

4.6.1 As stipulated in Technical Circular, the wind performance of existing developments adjacent to the study area should be assessed. To identify the average velocity ratio in each development, test points located at the pedestrian level of determined zones should be grouped and averaged to reflect the local wind performance at that location.

4.6.2 Average Velocity Ratios (VR)s for each area of interest were determined for the Baseline Scheme and Indicative Development Scheme. The annual ad summer VRs for each area are presented in **Table 4.3**.

Table 4.3: Summary of Average Velocity Ratios for Area of Interest

Zone		Annual Wind Condition		Summer Wind Condition	
		Baseline Scheme	Indicative Development Scheme	Baseline Scheme	Indicative Development Scheme
1	Fuk Wang Street	0.12	0.11	0.12	0.12
2	Fuk Yan Street	0.09	0.09	0.10	0.09
3	Wang Lee Street	0.16	0.16	0.15	0.14
4	Wang Fu Street	0.16	0.14	0.11	0.11
5	Wang Lok Street	0.15	0.14	0.13	0.13
6	Footpath near Site	0.12	0.11	0.13	0.13
7	Fuk Hang Street	0.11	0.09	0.11	0.10
8	Fuk Hi Street	0.11	0.11	0.11	0.12
9	Fuk Shun Street	0.09	0.09	0.10	0.11

Zone 1: Fuk Wang Street

4.6.3 Fuk Wang Street is located at the centre of the assessment area. It is one of the main road networks within the YL INNOPARK area. There is a bicycle lane and pedestrian walkway along Fuk Wang Street. The average annual VR of Baseline Scheme and Indicative Development Scheme are 0.12 and 0.11 respectively. Fuk Wang Street is estimated to enjoy satisfying wind environment under NNE wind, as the alignment of Fuk Wang Street would facilitate the permeation of incoming wind.

4.6.4 The average summer VR for Baseline Scheme and Indicative Development Scheme both are 0.12. The wind availability along the Fuk Wang Street under Baseline Scheme during summer is higher than that under Indicative Development Scheme. However, Fuk Wang Street is expected to have a steady amount of pedestrian access during the calendar year. In addition, the Indicative Development Scheme has empty bays (8m height) on the ground floor of Sites A and B which facilitate the penetration of wind along Fuk Wang Street. Since the annual VR for both schemes are comparable, there should be no adverse impact for the pedestrian within the assessment area.

Zone 2: Fuk Yan Street

4.6.5 Fuk Yan Street is another road that has pedestrian walkway nearby. It lies in the northwest of the Site and is connected Fuk Wang Street and Fuk Hi Street. Its annual VRs of Baseline

and Indicative Development Scheme both are 0.09, while its summer VRs are 0.10 and 0.09 respectively.

4.6.6 It is occurred that SSW wind is impacting the wind availability along Fuk Yan Street. SSW is the most prevailing wind during the summer. That is reflected by the difference of average VR between summer and annual wind conditions. Fuk Yan Street is aligned with the SSW wind. The SSW wind could also penetrate through the opening between the Site and its nearby building. The open space in the Baseline Scheme is comparably larger than Indicative Development Scheme, which enable larger volume of air flow to the downstream area. The difference is expected because the Indicative Development Scheme has a significantly higher GFA than the Baseline Scheme. The façade of Site A in Indicative Development Scheme could intercept the incoming SSW wind to bypass and reach Fuk Yan Street. However, the permeability created by the building setback within the Site would facilitate the SSW wind to travel across. Therefore, the difference of VR for both schemes are minimal. The ventilation performance along Fuk Yan Street is expected to be similar for both Baseline and Indicative Development Scheme.

Zone 3: Wang Lee Street

4.6.7 Wang Lee Street is situated in the immediate east of the Site. It is another main road networks within the YL INNOPARK area besides of Fuk Wang Street. The average annual VR of Baseline Scheme and Indicative Development Scheme are 0.16, while the average summer VR of Baseline Scheme and Indicative Development Scheme are 0.15 and 0.14 respectively.

4.6.8 The average VR along of Wang Lee Street under annual and summer conditions are relatively high. It appears that the wind availability of Wang Lee Street is comparably adequate. Although there are industrial developments located along Wang Lee Street, the building separation of these development would allow air flow to reach to Wang Lee Street. Prevailing winds from the east are likely to be blocked by the industrial developments while the rest would reach to the Wang Lee Street and downstream area.

4.6.9 Furthermore, the Indicative Development Scheme has a building setback from the site boundary faced to Wang Lee Street which would enhance the ability of wind to flow across the street. It is expected that there would have no ventilation issue along Wang Lee Street in both Baseline and Indicative Development Scheme.

Zone 4: Wang Fu Street

4.6.10 Wang Fu Street is located in the east of the Site. It is connecting Wang Lee Street and Wang Lok Street. The average annual VR of Baseline Scheme and Indicative Development Scheme are 0.16 and 0.14 respectively, while the average summer VR of Baseline Scheme and Indicative Development Scheme are 0.11.

4.6.11 The ventilation performance along Wang Fu Street and Fuk Yan Street is similar. Since Wang Fu Street is a connecting road between two major roads (Wang Lee Street and Wang Lok Street), the pedestrian access is relatively lower. The main source of ventilation for Wang Fu Street is induced by the alignment of some of the prevailing wind direction, such as SSW wind. The SSW wind could travel along the ridge of Chu Wong Ling and penetrate the open space near Chiho Eco Protection Limited to reach Wang Fu Street. There is some open area

near Wang Fu Street that will not obstruct the incoming wind to provide ventilation at the pedestrian level.

4.6.12 It is observed that the average VR of both Baseline and Indicative Development Scheme is comparable. The wind environment on Wang Fu Street is sufficient during annual and summer wind conditions.

Zone 5: Wang Lok Street

4.6.13 Wang Fu Street is located in the east of the Site behind of Wang Lee Street. It is connecting Wang Fu Street and Wang Hi Street. The average annual VR of Baseline Scheme and Indicative Development Scheme are 0.15 and 0.14 respectively, while the average summer VR of Baseline Scheme and Indicative Development Scheme are 0.13.

4.6.14 The ventilation performance along Wang Lok Street and Wang Lee Street is similar. Since Wang Fu Street is parallel with Wang Lee Street. The SE and SSE wins could travel along the street to reach the downwind area. There are some open spaces at Wang Lok Street near HK Petrochemical Co. Ltd. allows northerly incoming wind to reach Fuk Hi Street

4.6.15 It is observed that the average VR of both Baseline and Indicative Development Scheme is comparable. The wind environment on Wang Lok Street is sufficient during annual and summer wind conditions.

Zone 6: Footpath Near Site

4.6.16 There is a footpath on the south of the Site, which is near the nullah bounded by Chu Wong Ling. The Footpath Near Site is expected to have the least amount of pedestrian access. The wind availability along the footpath is assessed. The average annual VR of Baseline Scheme and Indicative Development Scheme are 0.12 and 0.11 respectively, while the average summer VR of Baseline Scheme and Indicative Development Scheme both 0.13.

4.6.17 It is observed that S prevailing wind contributes the most to provide ventilation along the footpath near Site. The S wind is directly entering the footpath after skimming across Chu Wong Ling without any obstacle in between them. It is expected to have no serious ventilation issue for the focus area, especially during the summer. Some of the other prevailing wind (i.e. E wind) is enabled to reach the footpath through the openings within the YL INNOPARK area. The result shows the VR is slightly higher in Baseline Scheme. However, the VR in Indicative Development Scheme is considered sufficient in view of the less amount of pedestrian access to the area.

4.6.18 In conclusion, the wind environment of the assessment area and Site are basically comparable in for both the Baseline Scheme and the Indicative Development Scheme.

Zone 7: Fuk Hang Street

4.6.19 Fuk Hang Street is located in the southeast of the Site. It is connecting Fuk Hi Street. The average annual VR of Baseline Scheme and Indicative Development Scheme are 0.11 and 0.09 respectively, while the average summer VR of Baseline Scheme and Indicative Development Scheme are 0.11 and 0.10.

4.6.20 It is observed that the Fuk Hang Street acted as a corridor allows wind to come from south westerly enter the Fuk Wang Street to increase the VR and wind performance at Fuk Wang

Street. Moreover, wind source form Chu Wong Ling can enter the Fuk Hi Street and downwind area via the Fak Hang Street.

4.6.21 It is observed that the average VR of both Baseline and Indicative Development Scheme is comparable. The wind environment on Fak Hang Street is sufficient during annual and summer wind conditions.

Zone 8: Fuk Hi Street

4.6.22 Wang Lee Street is a L-shape street situated in the south and north of the Site, connecting Fuk Wang Street and Fuk Yan Street. It is another main road networks within the YL INNOPARK area. The average annual VR of Baseline Scheme and Indicative Development Scheme are 0.11, while the average summer VR of Baseline Scheme and Indicative Development Scheme are 0.11 and 0.12 respectively.

4.6.23 The average VR along of Wang Lee Street under annual and summer conditions are similar. It appears that the wind availability of Fuk Hi Street is comparably adequate. Annual and summer prevailing wind could enter the Fuk Hi Street from south and northeast. It is observed that the average VR of both Baseline and Indicative Development Scheme is comparable, and the VR of Indicative Development Scheme is slightly better than the Baseline Scheme. The wind environment on Fak Hi Street is sufficient during annual and summer wind conditions.

Zone 9: Fuk Shun Street

4.6.24 Fuk Shun Street is located in the northwest of the Site. It is connecting Fuk Hi Street. The average annual VR of Baseline Scheme and Indicative Development Scheme both are 0.09, while the average summer VR of Baseline Scheme and Indicative Development Scheme are 0.10 and 0.11.

4.6.25 It is observed that the Fuk Hang Street acted as a corridor allows wind to come from easterly reach the downwind area (i.e. Tai Tseng Wai and Tai Tseng Ng Uk Tsuen)

4.6.26 It is observed that the average VR of both Baseline and Indicative Development Scheme is comparable, and the VR of Indicative Development Scheme is slightly better than the Baseline Scheme. The wind environment on Fak Hang Street is sufficient during annual and summer wind conditions.

4.7 Special Test Point

4.7.1 In order to assess the wind environment within the Site, 39 special test points are set to evaluate the wind availability at the pedestrian level. The summary of each zone's velocity ration under annual and summer wind condition are tabulated in **Table 4.4** and **Table 4.5**.

4.7.2 Under annual condition, the VRs of special test point are slightly higher than that under summer condition. The special points are distributed across the Site to evaluate the wind ventilation performance by the building setback. It appears that the VR of the pedestrian footpath in Site C is the best. The average annual and summer VR are 0.18 and 0.17 respectively. The opening created by setback of Site C allows the southerly wind to directly flow through, which benefits the existing industrial development at pedestrian level.

4.7.3 The footpath of Site A and Site B are also assessed. The average annual VR for the Ground Level Footpath of Site A and Site B are 0.09 and 0.15, respectively. The average summer

VR for the Ground Level Footpath of Site A and Site B are 0.09 and 0.10, respectively. It appears that the VR for Site A is comparable under both annual and summer wind condition. Therefore, the ventilation performance of Site A at pedestrian level is consistent throughout the year and the ventilation performance of Site B in annual condition is better than summer. In addition, the building setback between Site A and Site B (ID#S26 - S28 in **Figure 3.5**) the VRs of the building gap 0.10, 0.09 and 0.16 under annual condition, and the summer VRs are 0.11, 0.11 and 0.24. The ventilation performance of the building gap under summer condition is slightly better than annual.

4.7.4 On the other hand, the annual VR for the footpath of Site B is larger than the summer VR. The building setback between Site B and Site C (ID# S16 – S18 in **Figure 3.5**) aligns with the annual prevailing wind. The annual VRs of the building gap are 0.24, 0.27 and 0.22, and the summer VRs are 0.18, 0.23 and 0.22, respectively. The building setback between Sites is acting as an effective wind corridor. The setback promotes the incoming wind to penetrate through the Site during the annual period. The results show that the permeability of the Indicative Development Scheme effectively increases the wind availability of the Site.

4.7.5 In conclusion, the wind environment in the Indicative Development Scheme is sufficient. The footpath of Site A and Site B is comparable under the annual and the summer condition. The footpath of Site C is benefited by the building setback, which promote wind ventilation especially under annual wind condition.

Table 4.4: Summary of Average Velocity Ratios of Special Test Points under Annual Wind Condition

			Annual VR	
			Indicative Development Scheme	Range
6	**Ground Level Footpath of Site A**	S01 – S03, S20 – S33	**0.09**	**0.06 – 0.18**
7	**Ground Level Footpath of Site B**	S04 – S09, S19, S34 – S36	**0.15**	**0.07 – 0.21**
8	**Ground Level Footpath of Site C**	S10 – S18, S37 – S39	**0.18**	**0.12 – 0.23**

Table 4.5: Summary of Average Velocity Ratios of Special Test Points under Summer Wind Condition

			Summer VR	
			Indicative Development Scheme	Range
6	**Ground Level Footpath of Site A**	S01 – S03, S20 – S33	**0.09**	**0.06 – 0.12**
7	**Ground Level Footpath of Site B**	S04 – S09, S19, S34 – S36	**0.10**	**0.07 – 0.16**
8	**Ground Level Footpath of Site C**	S10 – S18, S37 – S39	**0.17**	**0.12 – 0.23**

4.8 Good Design Features

4.8.1 Apart from satisfying the PNAP-152 requirements on building separation and permeability, the following good design features have been adopted in the Proposed Scheme for improving air ventilation performance (as illustrated in **Figure 4.25**):

- Minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Streets for Sites A, B and C.

4.8.2 This feature enhances ventilation performance at the northeast of the Indicative Development Scheme under prevailing wind from the northeast, east-southeast and east-northeast

directions under annual condition and improve the ground wind to reach Fuk Wang Street at low elevation. It also facilitates south, southwest ground wind to reach the Site.

4.8.3 The layout plan of the Indicative Development Scheme and model assumption are enclosed in the **Annex A.**

Building Setback along Wang Lee Street and Fuk Wang Streets

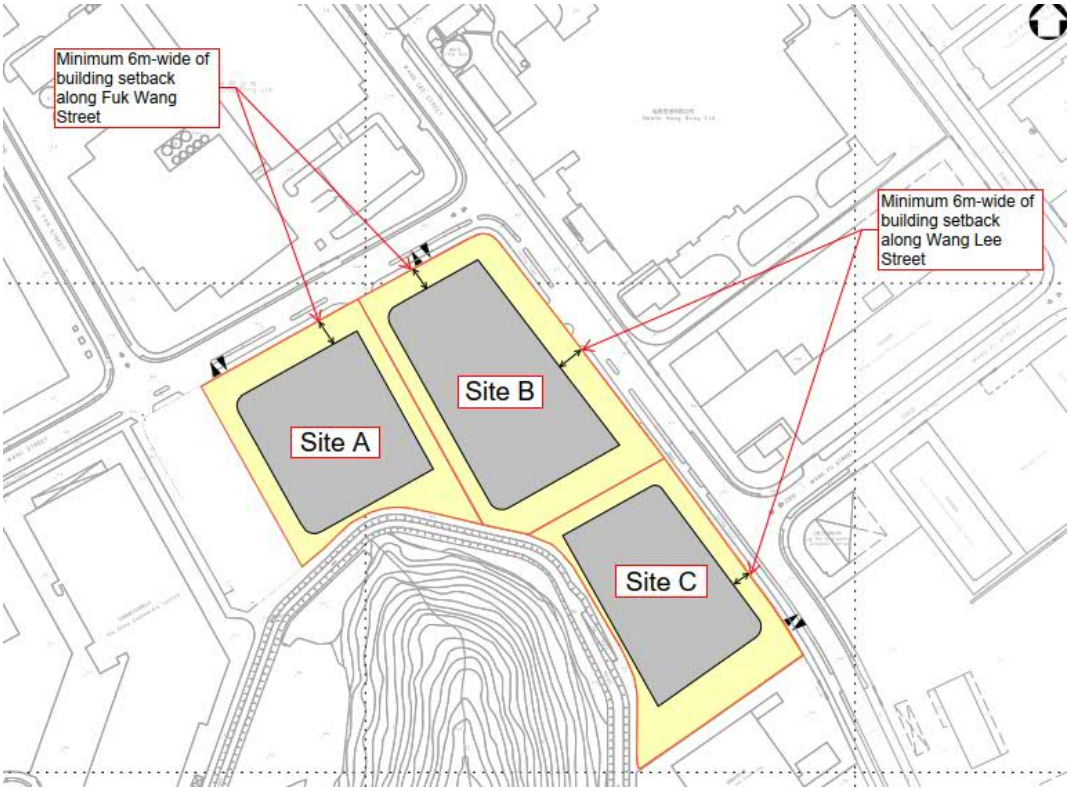
4.8.4 The proposed minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Street for Sites A, B and C, will provide wide wind corridors along the two streets, which will enhance the ventilation performance of the proposed development.

Separation between Buildings

4.8.5 To satisfy the PNAP-152 requirements on building separation and permeability, there will be space between building structures in Sites A, B and C, as illustrated in the Indicative Development Scheme. The space will allow wind penetration and minimise any impediment effect under prevailing winds particularly from the north-northeast and southwest directions and will therefore perform better when compared with the Baseline Scheme, which is of a single-block design.

4.8.6 The spacing acts as a corridor for the wind to penetration through the Site and provide air flow to the downstream area. The ventilation corridors also align with some of the prevailing wind from annual and summer wind conditions.

Figure 4.25: Layout Plan of Indicative Development Scheme with indications of good design features



5 Conclusion

5.1.1 This AVA study investigated the pedestrian wind environment, identifies and assesses the ventilation corridors and the wind availability for the Proposed Development.

5.1.2 The Site is located in Yuen Long INNOPARK (YL INNOPARK), north-west Hong Kong and is bounded by Fuk Wang Street to the northwest, Wang Lee Street to the east, and a wooded hill (i.e. Chu Wong Ling) to the south. The immediate surrounding mainly consists of low-rise industrial buildings and warehouses.

5.1.3 Two Schemes have been reviewed, being the Baseline Scheme and the Indicative Development Scheme, with a comparison of their air ventilation performance.

5.1.4 A series of CFD simulations have been performed based on the AVA methodology as stipulated in the Technical Circular and Technical Guide. Ten wind directions in total, which cover 84.4% and 77.1% of annual and summer wind conditions of the areas, have been considered. The annual prevailing winds for the Site and its surrounding area are coming from E, NE, ESE directions while the summer prevailing wind are coming from SSW, S, SW directions. The ventilation performance for the Proposed Development at the site boundary and within the assessment area was assessed.

5.1.5 A total of 36 perimeter test points and 193 overall test points are selected to assess the ventilation performance of the Proposed Development.

5.1.6 The assessment results have demonstrated that the general wind environments of both schemes are comparable and similar. The annual LVR for the Baseline Scheme and the Indicative Development Scheme are 0.14 and 0.13 respectively, whilst their LVRs range from 0.10 to 0.15 and 0.10 to 0.14 respectively. In terms of the summer LVR, the Baseline Scheme and the Indicative Development Scheme are 0.13 and 0.12, whilst the respective LVRs both are ranging from 0.10 to 0.15.

5.1.7 The annual SVRs for the Baseline Scheme and the Indicative Development Scheme are 0.18 and 0.16, while the SVRs of the two schemes are ranging from 0.14 to 0.20 and 0.11 to 0.21 respectively. The summer SVRs for Baseline and Indicative Development Scheme both are 0.16, while their SVRs are ranging from 0.14 to 0.16 and 0.14 to 0.20 respectively.

5.1.8 The wind ventilation performance of the Indicative Development Scheme is assessed to be slighter weaker than that of the Baseline Scheme. This is expected because the Indicative Development Scheme, with significantly higher GFA than the Baseline Scheme, would involve three multi-storey building blocks which together would be more massive than the Baseline Scheme.

5.1.9 From detailed examination of the wind availability from different directions, it is assessed that the adopted design feature of the Indicative Development Scheme, including building minimum 6m-wide of building setback along Wang Lee Street and Fuk Wang Streets, will enhance the wind ventilation. This is evident from the better ventilation of the Indicative Development Scheme than the Baseline Scheme under the NNE prevailing wind and the

easterly wind. The design features also benefit the wind availability of pedestrian footpath along Fuk Wang Street and Wang Lee Street.

5.1.10 To conclude, the Indicative Development Scheme will provide sufficient wind environment in the vicinity of the Site as well as in the assessment area within YL INNOPARK. The Indicative Development Scheme will not cause significant air ventilation impact on the pedestrian wind environment when compared with the Baseline Scheme, which justifies the proposed development of the Site at a plot ratio of 5.0, resulting in a higher land use efficiency.

Reference

[1] Housing, Planning and Lands Bureau Technical Circular No. 1/06 and, Environment, Transport and Work Bureau Technical Circular No. 1/06 on Air Ventilation Assessments

[2] Site Wind Availability Data for Hong Kong (RAMS), Site Wind Availability Data, Information Services, Official Website of Planning Department

[3] AWES-QAM-1-2001, Wind Engineering Studies of Buildings

[4] American Institute of Aeronautics and Astronautics, Guide for the Verification and Validation of Computational Fluid Dynamics Simulations. G-077-1998, 1998

[5] Fluent, Biography of Fluent User Guide

Annexes

Annex A	CFD Model and Approach Profiles
Annex B	Velocity Ratios of Overall and Perimeter Test Points
Annex C	Velocity Ratio Contour and Vector Plots
Annex D	Proposed Development Layout Plan (Baseline Scheme)
Annex E	Proposed Development Layout Plan (Indicative Development Scheme)

Annex A CFD Model and Approach Profiles

Figure A1 CFD Model for Baseline Scheme

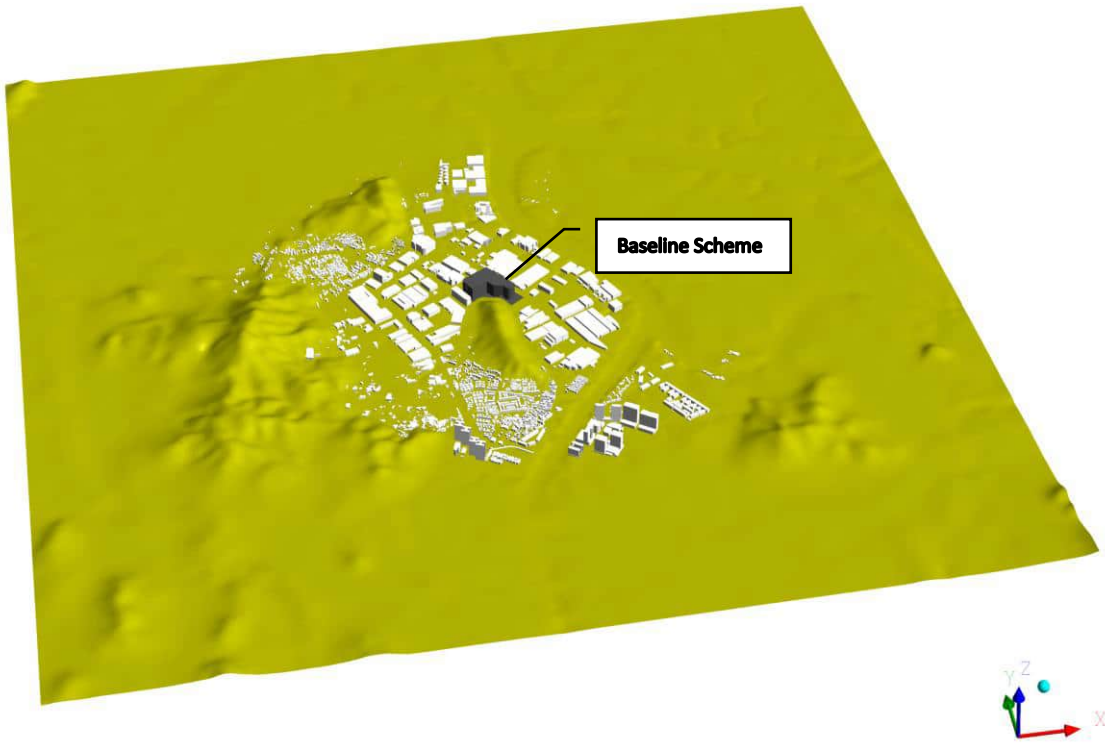
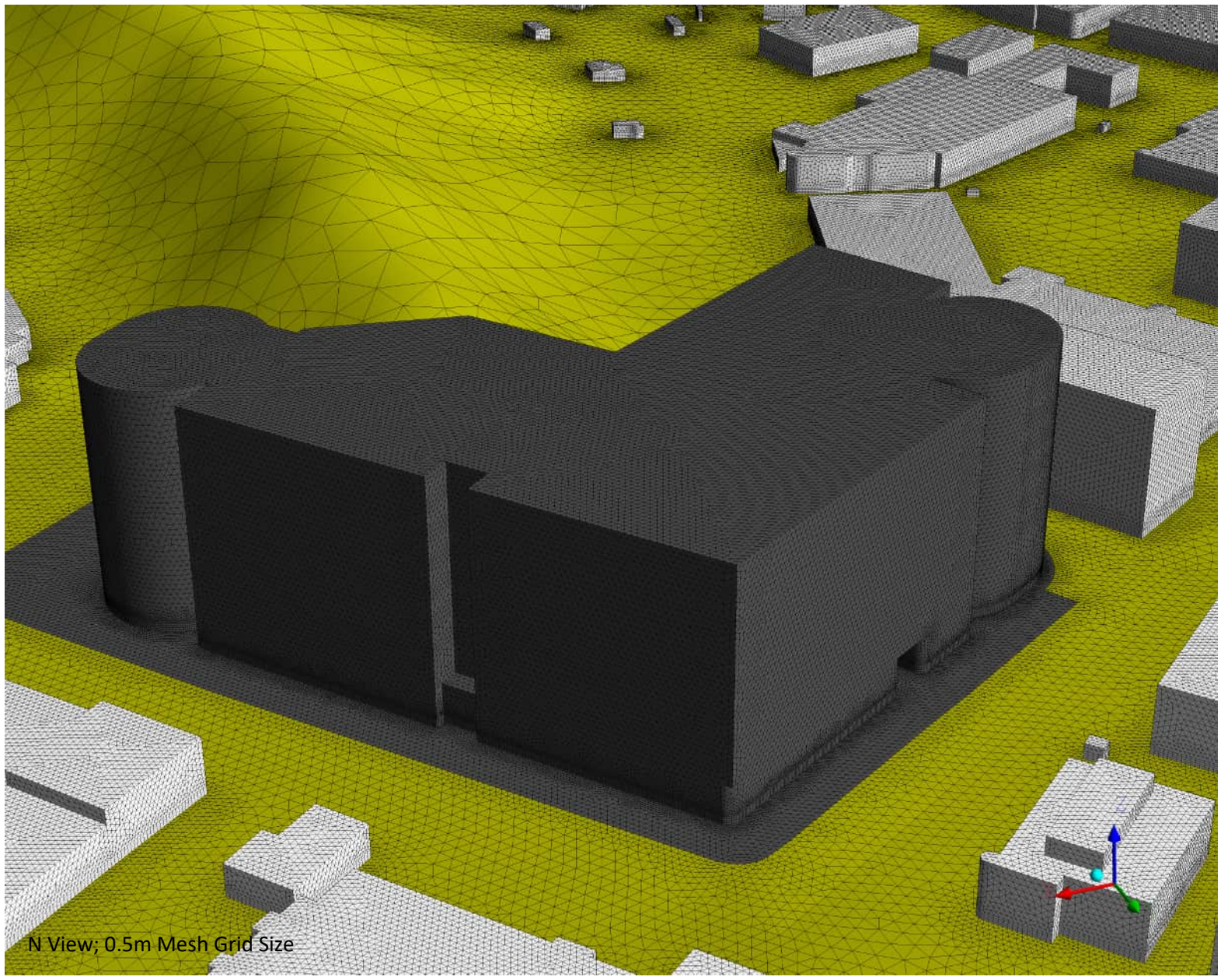


Figure A2 CFD Model for Baseline Scheme with Mesh



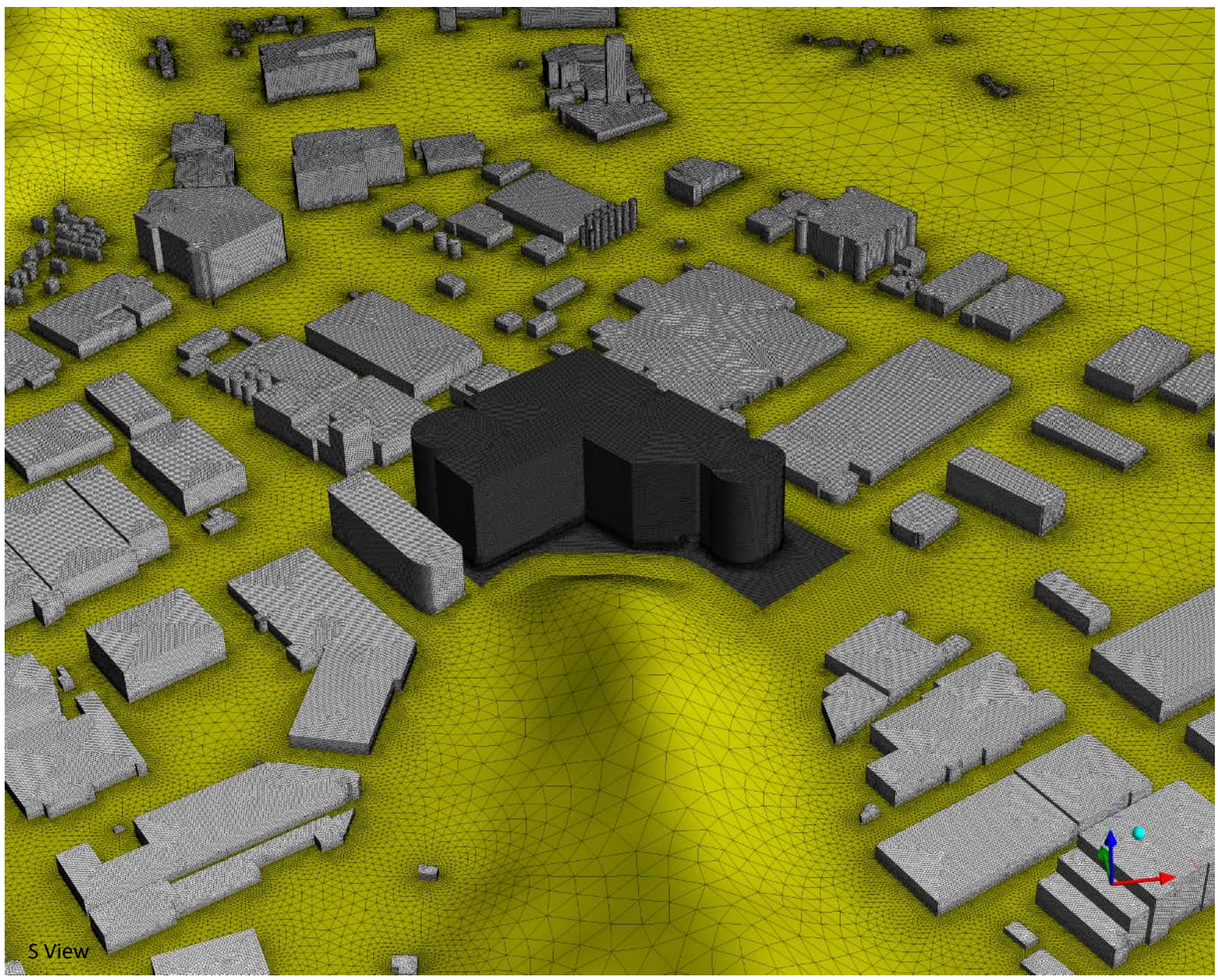
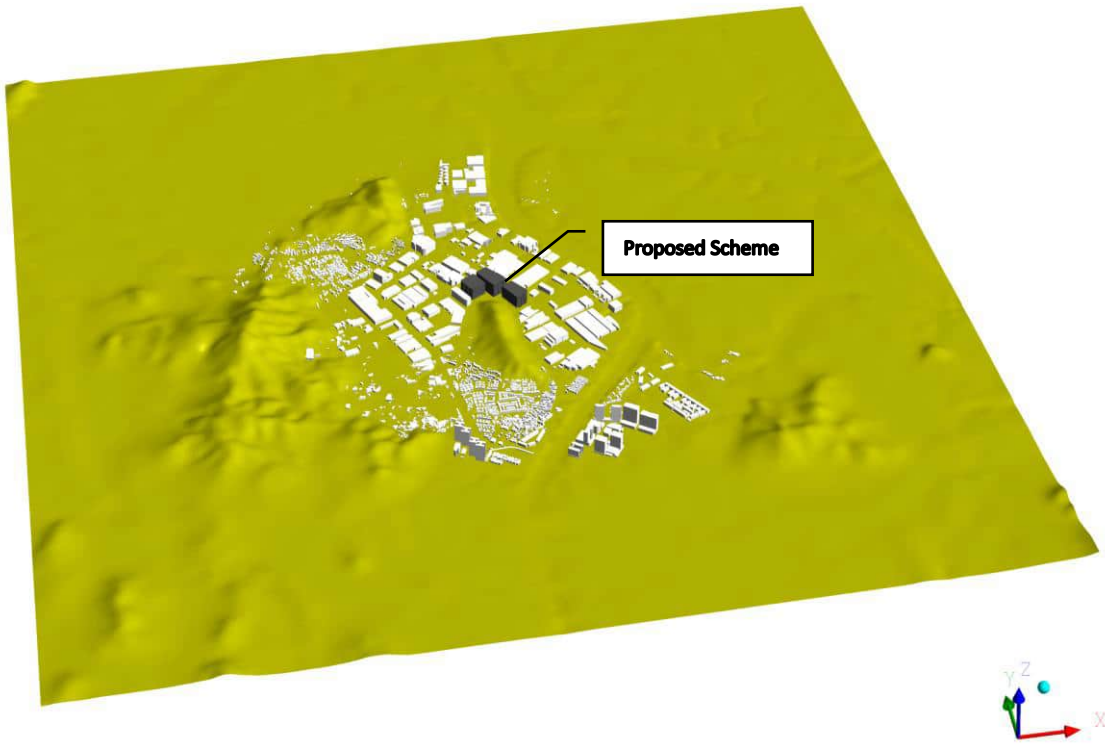
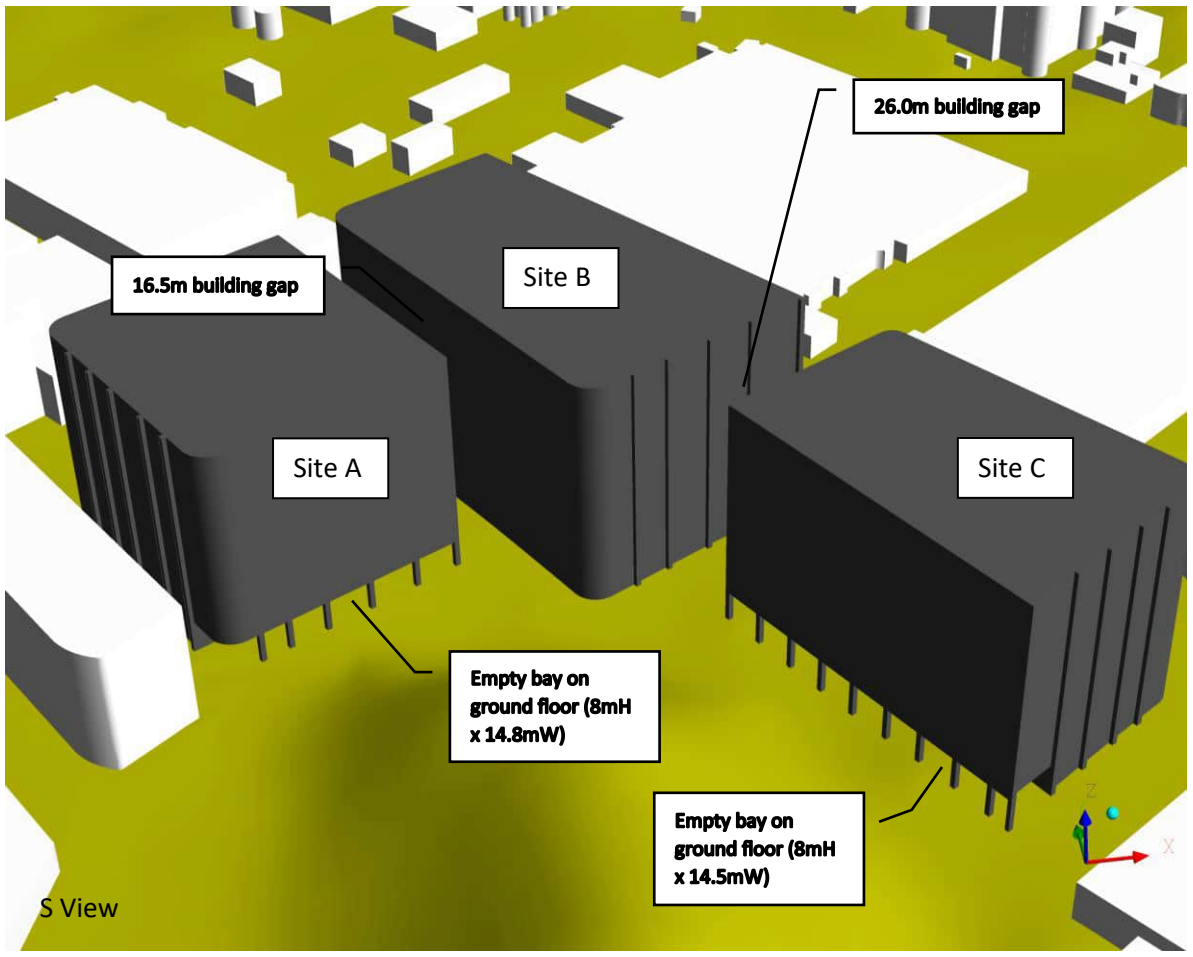


Figure A3 CFD Model for Proposed Scheme



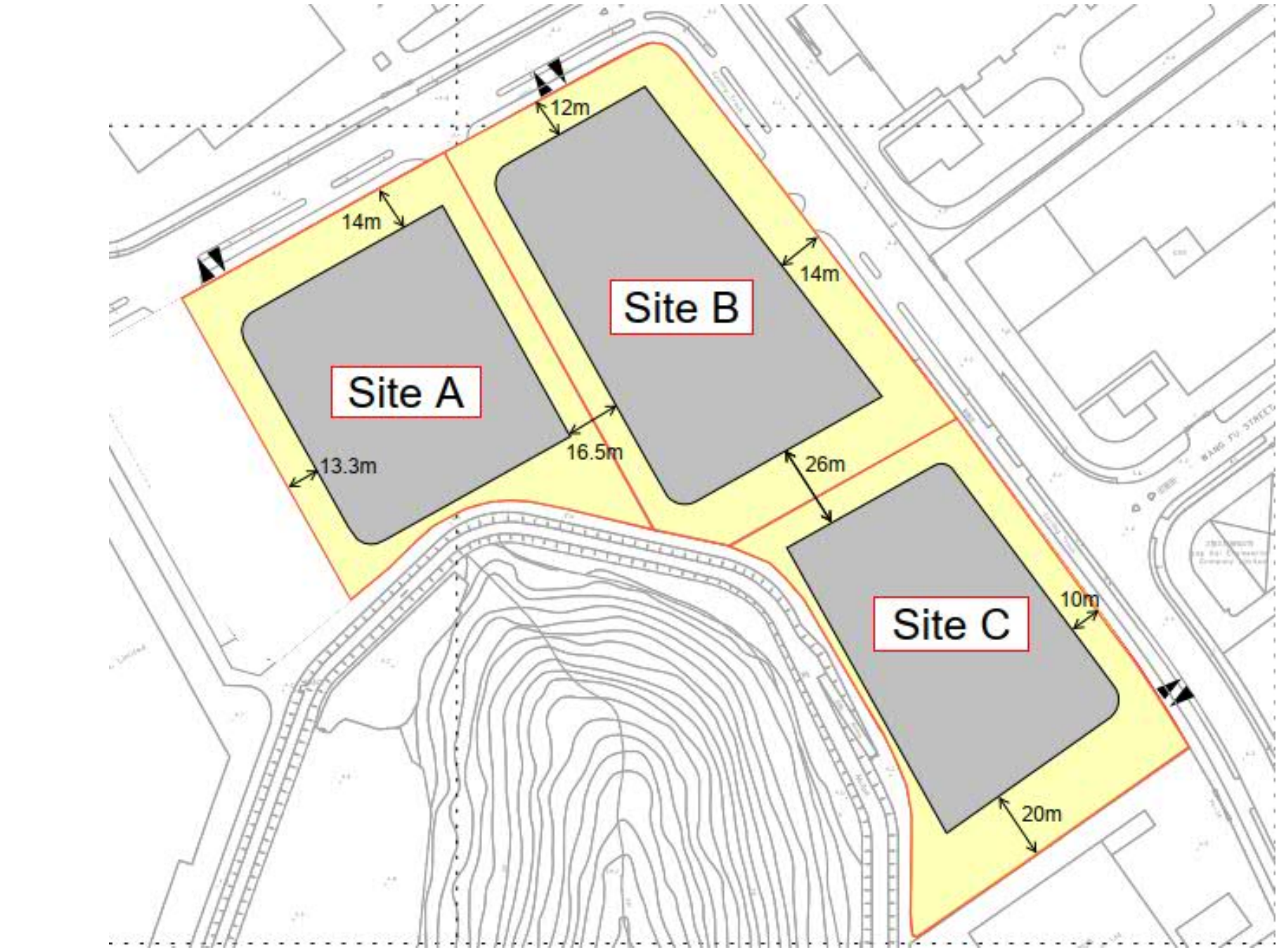


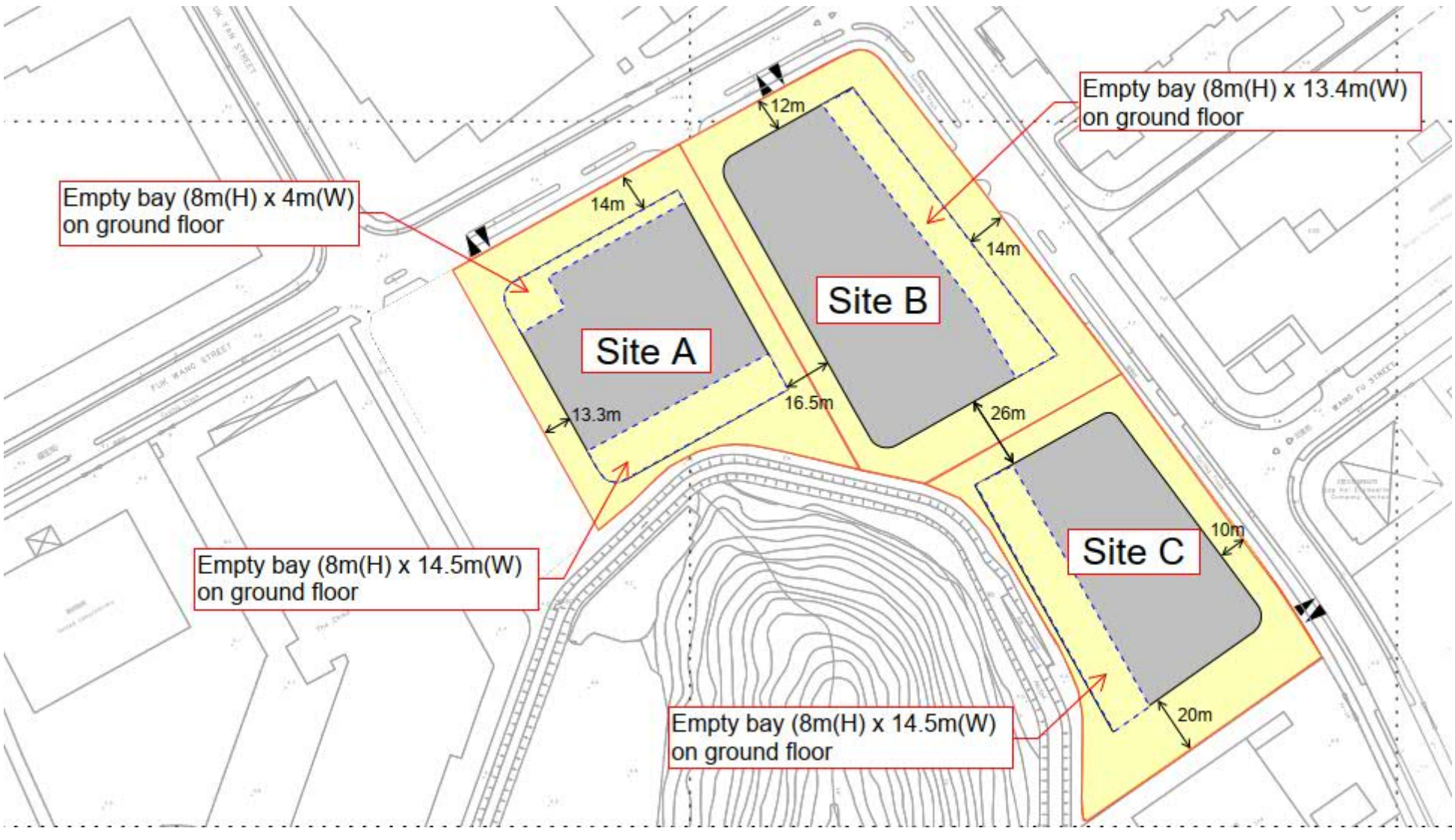
S View

Remark:
The scheme as submitted in this Planning Statement is indicative only and solely for technical assessment purpose. It is used to demonstrate that the proposed increase of maximum GFA and building height would have no significant adverse impacts on the environment, air ventilation, visual quality, etc. This is to allow flexibility to the future disposal of the land parcels in the Site.

Model Assumption for Indicative Development Scheme

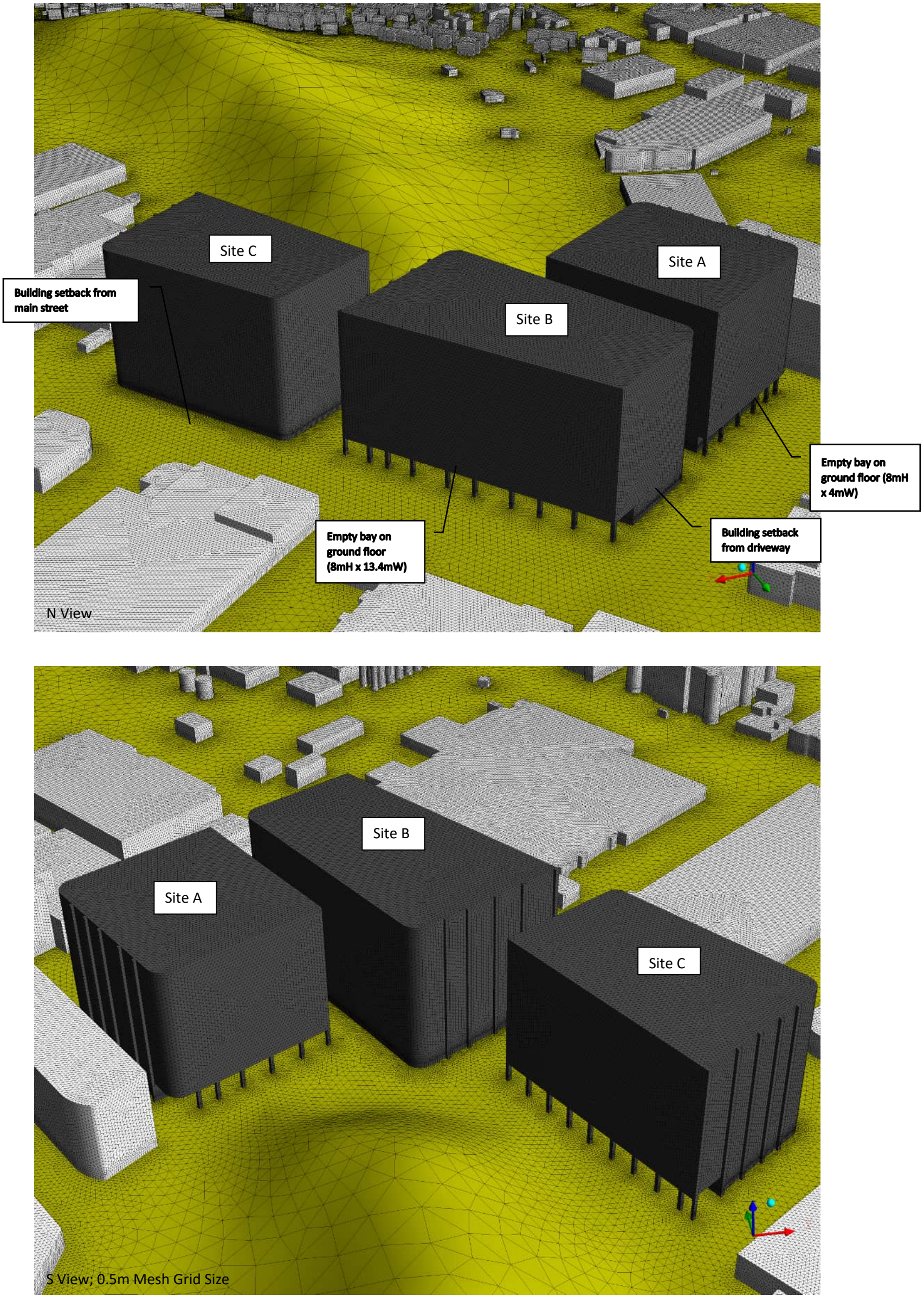
Having regard to the commercial viability, three sub-sites (i.e. Site A, Site B and Site C) of each of about 1 ha are proposed in the Development Site to accommodate MSBs development.





Remark: The actual development layout is subject to change in the implementation stage.

Figure A4 CFD Model for Proposed Scheme with Mesh



Annex B Velocity Ratios of Overall and Perimeter Test Points

Table D1

VRs at Assessment Point Under Annual Condition (Baseline Scheme)

Wind direction	E	NE	ESE	ENE	SSW	S	SSE	NNE	SE	Overall
Percentage	15.7%	10.8%	10.5%	9.8%	8.5%	7.4%	7.3%	7.2%	7.2%	84.4%
P01	0.16	0.13	0.23	0.10	0.23	0.15	0.21	0.17	0.30	0.17
P02	0.08	0.22	0.02	0.17	0.18	0.03	0.12	0.29	0.08	0.13
P03	0.16	0.18	0.01	0.16	0.08	0.04	0.03	0.24	0.03	0.12
P04	0.05	0.14	0.15	0.15	0.14	0.07	0.06	0.20	0.11	0.11
P05	0.13	0.12	0.19	0.14	0.05	0.01	0.05	0.18	0.12	0.11
P06	0.14	0.15	0.03	0.30	0.06	0.07	0.04	0.15	0.04	0.12
P07	0.42	0.35	0.32	0.39	0.09	0.14	0.17	0.17	0.25	0.28
P08	0.35	0.33	0.29	0.33	0.07	0.17	0.19	0.15	0.25	0.26
P09	0.28	0.24	0.25	0.23	0.10	0.16	0.19	0.15	0.24	0.21
P10	0.25	0.19	0.23	0.25	0.10	0.14	0.20	0.18	0.23	0.20
P11	0.21	0.20	0.20	0.23	0.10	0.08	0.21	0.18	0.22	0.18
P12	0.18	0.23	0.18	0.24	0.07	0.06	0.22	0.22	0.20	0.18
P13	0.19	0.30	0.18	0.29	0.02	0.09	0.28	0.28	0.22	0.20
P14	0.18	0.45	0.11	0.37	0.19	0.25	0.32	0.37	0.24	0.27
P15	0.18	0.46	0.03	0.35	0.28	0.24	0.23	0.35	0.16	0.26
P16	0.13	0.36	0.06	0.26	0.26	0.24	0.17	0.30	0.10	0.21
P17	0.13	0.26	0.12	0.22	0.24	0.14	0.15	0.23	0.09	0.18
P18	0.30	0.24	0.09	0.19	0.16	0.07	0.14	0.15	0.09	0.18
P19	0.31	0.17	0.10	0.19	0.16	0.05	0.10	0.16	0.05	0.17
P20	0.30	0.14	0.08	0.18	0.19	0.07	0.01	0.18	0.01	0.16
P21	0.20	0.14	0.06	0.16	0.14	0.07	0.04	0.17	0.03	0.13
P22	0.14	0.17	0.01	0.14	0.22	0.13	0.04	0.16	0.04	0.12
P23	0.27	0.19	0.11	0.17	0.19	0.13	0.04	0.13	0.03	0.17
P24	0.21	0.25	0.14	0.23	0.15	0.14	0.09	0.14	0.05	0.18
P25	0.30	0.27	0.20	0.29	0.23	0.12	0.20	0.09	0.13	0.23
P26	0.28	0.22	0.21	0.24	0.22	0.09	0.26	0.04	0.17	0.21
P27	0.04	0.08	0.11	0.03	0.07	0.10	0.19	0.09	0.12	0.08
P28	0.07	0.11	0.12	0.13	0.10	0.20	0.26	0.05	0.16	0.12
P29	0.09	0.13	0.16	0.13	0.12	0.23	0.23	0.03	0.15	0.13
P30	0.07	0.12	0.12	0.08	0.09	0.21	0.12	0.04	0.05	0.10
P31	0.14	0.05	0.14	0.06	0.07	0.22	0.20	0.04	0.14	0.11
P32	0.17	0.05	0.19	0.09	0.13	0.22	0.21	0.06	0.19	0.14
P33	0.18	0.09	0.16	0.08	0.20	0.18	0.16	0.23	0.15	0.16
P34	0.31	0.15	0.31	0.10	0.28	0.29	0.30	0.27	0.32	0.25
P35	0.24	0.21	0.28	0.12	0.35	0.25	0.25	0.30	0.31	0.25
P36	0.18	0.17	0.26	0.09	0.34	0.20	0.23	0.22	0.30	0.21
O001	0.06	0.05	0.05	0.10	0.24	0.12	0.13	0.08	0.14	0.10
O002	0.06	0.12	0.09	0.21	0.28	0.12	0.12	0.14	0.19	0.14
O003	0.08	0.06	0.09	0.15	0.15	0.05	0.01	0.07	0.15	0.09
O004	0.06	0.11	0.09	0.20	0.12	0.04	0.08	0.12	0.04	0.10
O005	0.07	0.08	0.13	0.17	0.18	0.01	0.11	0.08	0.07	0.10
O006	0.10	0.09	0.08	0.17	0.17	0.10	0.07	0.11	0.03	0.11
O007	0.06	0.06	0.09	0.14	0.09	0.09	0.12	0.04	0.11	0.09
O008	0.09	0.06	0.10	0.13	0.11	0.14	0.10	0.08	0.09	0.10
O009	0.21	0.06	0.06	0.09	0.13	0.12	0.07	0.06	0.09	0.11
O010	0.24	0.05	0.13	0.13	0.06	0.06	0.12	0.07	0.12	0.12
O011	0.14	0.06	0.07	0.10	0.09	0.12	0.10	0.08	0.06	0.10
O012	0.04	0.08	0.03	0.15	0.08	0.10	0.07	0.12	0.07	0.08
O013	0.06	0.06	0.05	0.12	0.18	0.11	0.07	0.10	0.16	0.09
O014	0.03	0.17	0.08	0.16	0.20	0.17	0.15	0.25	0.22	0.14
O015	0.04	0.16	0.02	0.13	0.04	0.03	0.04	0.22	0.05	0.08
O016	0.06	0.13	0.02	0.05	0.23	0.19	0.12	0.20	0.14	0.11
O017	0.14	0.18	0.08	0.11	0.17	0.07	0.02	0.16	0.04	0.12
O018	0.14	0.13	0.07	0.10	0.14	0.04	0.06	0.11	0.01	0.10
O019	0.06	0.05	0.02	0.04	0.07	0.04	0.06	0.07	0.01	0.05
O020	0.07	0.08	0.11	0.06	0.09	0.04	0.11	0.09	0.04	0.08
O021	0.04	0.06	0.06	0.03	0.06	0.08	0.11	0.08	0.02	0.06
O022	0.08	0.11	0.02	0.08	0.09	0.05	0.05	0.10	0.02	0.07
O023	0.13	0.13	0.05	0.10	0.18	0.10	0.06	0.10	0.06	0.11
O024	0.13	0.17	0.06	0.10	0.17	0.11	0.09	0.18	0.03	0.12
O025	0.03	0.15	0.03	0.05	0.14	0.15	0.08	0.19	0.11	0.09
O026	0.05	0.16	0.03	0.14	0.20	0.05	0.05	0.21	0.05	0.11
O027	0.03	0.20	0.08	0.17	0.23	0.10	0.13	0.26	0.14	0.14
O028	0.03	0.19	0.05	0.20	0.15	0.07	0.04	0.22	0.00	0.11
O029	0.35	0.20	0.03	0.25	0.15	0.06	0.02	0.17	0.02	0.18
O030	0.36	0.27	0.29	0.32	0.07	0.04	0.08	0.14	0.23	0.22
O031	0.38	0.29	0.30	0.32	0.12	0.15	0.22	0.07	0.27	0.25

Wind direction	E	NE	ESE	ENE	SSW	S	SSE	NNE	SE	Overall
O032	0.32	0.16	0.28	0.20	0.05	0.09	0.22	0.07	0.26	0.19
O033	0.25	0.03	0.26	0.10	0.06	0.02	0.21	0.09	0.26	0.14
O034	0.18	0.09	0.24	0.08	0.08	0.02	0.18	0.08	0.25	0.13
O035	0.18	0.13	0.23	0.18	0.09	0.02	0.15	0.05	0.24	0.14
O036	0.16	0.18	0.18	0.17	0.10	0.06	0.09	0.12	0.19	0.14
O037	0.18	0.15	0.11	0.15	0.19	0.14	0.04	0.16	0.08	0.15
O038	0.03	0.14	0.13	0.12	0.22	0.24	0.06	0.17	0.17	0.13
O039	0.10	0.10	0.15	0.10	0.06	0.08	0.11	0.10	0.14	0.10
O040	0.14	0.07	0.16	0.08	0.16	0.16	0.17	0.12	0.19	0.13
O041	0.05	0.11	0.13	0.09	0.21	0.19	0.12	0.10	0.17	0.12
O042	0.20	0.13	0.11	0.13	0.16	0.09	0.09	0.12	0.17	0.14
O043	0.12	0.13	0.12	0.12	0.06	0.03	0.11	0.13	0.19	0.11
O044	0.17	0.14	0.17	0.26	0.07	0.02	0.15	0.05	0.21	0.14
O045	0.08	0.08	0.19	0.04	0.05	0.02	0.17	0.10	0.21	0.09
O046	0.19	0.11	0.23	0.12	0.05	0.07	0.21	0.02	0.23	0.14
O047	0.30	0.19	0.25	0.21	0.08	0.11	0.23	0.04	0.24	0.19
O048	0.38	0.32	0.28	0.33	0.12	0.19	0.22	0.08	0.25	0.26
O049	0.34	0.36	0.24	0.34	0.02	0.19	0.20	0.15	0.23	0.25
O050	0.28	0.30	0.21	0.30	0.12	0.18	0.21	0.20	0.22	0.23
O051	0.22	0.26	0.19	0.30	0.18	0.20	0.24	0.22	0.21	0.23
O052	0.16	0.31	0.12	0.27	0.18	0.21	0.24	0.26	0.21	0.21
O053	0.14	0.38	0.05	0.28	0.16	0.15	0.15	0.27	0.14	0.20
O054	0.11	0.22	0.03	0.14	0.13	0.13	0.11	0.20	0.03	0.13
O055	0.18	0.26	0.12	0.28	0.17	0.05	0.07	0.20	0.05	0.17
O056	0.18	0.20	0.11	0.25	0.10	0.09	0.09	0.13	0.08	0.15
O057	0.18	0.23	0.03	0.25	0.12	0.11	0.09	0.13	0.05	0.15
O058	0.15	0.38	0.10	0.21	0.18	0.14	0.10	0.25	0.14	0.19
O059	0.15	0.08	0.13	0.28	0.08	0.07	0.10	0.04	0.17	0.12
O060	0.14	0.18	0.16	0.24	0.04	0.09	0.12	0.07	0.19	0.14
O061	0.08	0.11	0.10	0.09	0.08	0.07	0.13	0.21	0.19	0.10
O062	0.24	0.07	0.23	0.19	0.12	0.05	0.14	0.14	0.19	0.16
O063	0.16	0.12	0.21	0.11	0.14	0.09	0.17	0.04	0.21	0.14
O064	0.15	0.11	0.18	0.06	0.13	0.14	0.17	0.21	0.19	0.14
O065	0.05	0.38	0.14	0.17	0.06	0.15	0.14	0.30	0.16	0.17
O066	0.30	0.06	0.14	0.39	0.11	0.21	0.12	0.09	0.17	0.19
O067	0.10	0.18	0.18	0.16	0.03	0.19	0.10	0.27	0.18	0.14
O068	0.18	0.29	0.18	0.14	0.03	0.02	0.07	0.17	0.17	0.15
O069	0.25	0.24	0.19	0.39	0.04	0.02	0.04	0.15	0.18	0.19
O070	0.29	0.30	0.18	0.43	0.09	0.11	0.10	0.12	0.18	0.22
O071	0.16	0.31	0.13	0.14	0.06	0.24	0.12	0.24	0.17	0.17
O072	0.03	0.09	0.18	0.13	0.06	0.20	0.14	0.10	0.17	0.11
O073	0.22	0.41	0.06	0.28	0.09	0.17	0.14	0.22	0.13	0.20
O074	0.06	0.10	0.09	0.10	0.16	0.13	0.15	0.16	0.13	0.11
O075	0.10	0.06	0.13	0.11	0.18	0.10	0.15	0.03	0.15	0.11
O076	0.06	0.08	0.22	0.04	0.08	0.08	0.12	0.09	0.14	0.09
O077	0.09	0.01	0.05	0.08	0.09	0.08	0.11	0.03	0.15	0.07
O078	0.02	0.13	0.05	0.16	0.08	0.11	0.13	0.09	0.19	0.09
O079	0.09	0.16	0.11	0.15	0.11	0.11	0.14	0.05	0.21	0.12
O080	0.09	0.27	0.09	0.37	0.20	0.14	0.16	0.12	0.20	0.18
O081	0.18	0.34	0.10	0.12	0.25	0.16	0.18	0.43	0.19	0.21
O082	0.23	0.08	0.09	0.07	0.19	0.12	0.19	0.12	0.19	0.14
O083	0.15	0.11	0.04	0.16	0.36	0.19	0.17	0.16	0.16	0.16
O084	0.03	0.15	0.06	0.08	0.26	0.10	0.15	0.06	0.13	0.10
O085	0.09	0.08	0.14	0.04	0.19	0.10	0.12	0.17	0.11	0.11
O086	0.18	0.06	0.17	0.10	0.17	0.12	0.10	0.18	0.14	0.14
O087	0.23	0.04	0.17	0.13	0.13	0.15	0.10	0.26	0.15	0.16
O088	0.13	0.03	0.09	0.10	0.05	0.16	0.16	0.23	0.14	0.11
O089	0.07	0.19	0.09	0.22	0.06	0.18	0.14	0.12	0.04	0.13
O090	0.15	0.07	0.11	0.07	0.06	0.17	0.22	0.19	0.04	0.13
O091	0.22	0.13	0.34	0.05	0.06	0.13	0.28	0.12	0.31	0.17
O092	0.14	0.20	0.05	0.11	0.04	0.18	0.35	0.18	0.34	0.15
O093	0.28	0.20	0.19	0.31	0.03	0.16	0.30	0.21	0.17	0.22
O094	0.21	0.07	0.20	0.17	0.10	0.16	0.30	0.29	0.23	0.18
O095	0.26	0.07	0.21	0.10	0.15	0.13	0.21	0.20	0.22	0.17
O096	0.14	0.10	0.17	0.05	0.25	0.11	0.17	0.16	0.17	0.14
O097	0.04	0.11	0.12	0.08	0.32	0.10	0.16	0.16	0.12	0.12
O098	0.10	0.17	0.11	0.28	0.38	0.22	0.18	0.19	0.15	0.19
O099	0.13	0.04	0.10	0.14	0.13	0.09	0.16	0.04	0.16	0.11
O100	0.18	0.27	0.08	0.13	0.11	0.05	0.08	0.33	0.12	0.16
O101	0.12	0.39	0.07	0.22	0.25	0.16	0.11	0.23	0.10	0.19
O102	0.12	0.34	0.16	0.21	0.09	0.09	0.11	0.15	0.10	0.16
O103	0.08	0.40	0.04	0.29	0.26	0.09	0.09	0.26	0.09	0.19
O104	0.06	0.29	0.05	0.16	0.03	0.14	0.08	0.23	0.06	0.13
O105	0.11	0.41	0.07	0.29	0.28	0.20	0.20	0.26	0.17	0.22
O106	0.22	0.25	0.15	0.18	0.17	0.07	0.13	0.08	0.13	0.17
O107	0.14	0.16	0.05	0.15	0.25	0.06	0.14	0.14	0.13	0.14
O108	0.08	0.13	0.08	0.08	0.09	0.07	0.14	0.08	0.16	0.09
O109	0.10	0.19	0.11	0.16	0.22	0.11	0.16	0.15	0.19	0.15

Wind direction	E	NE	ESE	ENE	SSW	S	SSE	NNE	SE	Overall
O110	0.06	0.09	0.05	0.08	0.12	0.11	0.13	0.05	0.08	0.08
O111	0.13	0.01	0.15	0.03	0.19	0.11	0.15	0.04	0.19	0.10
O112	0.16	0.05	0.17	0.07	0.09	0.11	0.17	0.06	0.21	0.11
O113	0.13	0.08	0.17	0.09	0.14	0.14	0.21	0.11	0.22	0.13
O114	0.12	0.10	0.14	0.09	0.10	0.09	0.16	0.11	0.19	0.11
O115	0.18	0.05	0.13	0.03	0.06	0.04	0.16	0.06	0.23	0.10
O116	0.25	0.06	0.26	0.05	0.15	0.08	0.17	0.10	0.24	0.15
O117	0.11	0.13	0.17	0.13	0.17	0.09	0.18	0.17	0.21	0.14
O118	0.21	0.09	0.20	0.11	0.15	0.15	0.22	0.11	0.26	0.16
O119	0.25	0.04	0.21	0.09	0.05	0.10	0.17	0.04	0.24	0.13
O120	0.18	0.02	0.21	0.09	0.22	0.11	0.18	0.05	0.26	0.14
O121	0.12	0.05	0.17	0.05	0.18	0.10	0.19	0.15	0.24	0.12
O122	0.05	0.16	0.11	0.08	0.12	0.07	0.12	0.12	0.11	0.10
O123	0.07	0.18	0.08	0.13	0.18	0.04	0.12	0.11	0.08	0.11
O124	0.24	0.23	0.07	0.14	0.12	0.06	0.12	0.12	0.08	0.15
O125	0.10	0.17	0.03	0.12	0.21	0.13	0.04	0.15	0.05	0.12
O126	0.08	0.10	0.07	0.10	0.21	0.10	0.04	0.09	0.04	0.10
O127	0.07	0.11	0.05	0.08	0.23	0.09	0.08	0.08	0.07	0.10
O128	0.01	0.06	0.02	0.08	0.24	0.06	0.01	0.05	0.07	0.06
O129	0.03	0.06	0.08	0.03	0.23	0.05	0.04	0.07	0.13	0.07
O130	0.04	0.08	0.12	0.02	0.24	0.06	0.08	0.03	0.15	0.08
O131	0.03	0.06	0.17	0.05	0.28	0.04	0.07	0.11	0.13	0.10
O132	0.15	0.07	0.08	0.07	0.28	0.05	0.13	0.10	0.15	0.12
O133	0.08	0.10	0.07	0.11	0.15	0.06	0.04	0.06	0.17	0.09
O134	0.18	0.15	0.19	0.12	0.02	0.18	0.15	0.04	0.20	0.14
O135	0.15	0.18	0.13	0.22	0.07	0.11	0.17	0.05	0.16	0.14
O136	0.15	0.18	0.10	0.23	0.07	0.01	0.18	0.03	0.09	0.13
O137	0.15	0.20	0.10	0.27	0.07	0.02	0.17	0.01	0.15	0.13
O138	0.12	0.22	0.11	0.29	0.09	0.11	0.14	0.16	0.26	0.15
O139	0.06	0.27	0.09	0.30	0.14	0.15	0.08	0.01	0.20	0.14
O140	0.08	0.31	0.16	0.28	0.15	0.15	0.10	0.02	0.32	0.16
O141	0.07	0.29	0.14	0.24	0.14	0.16	0.10	0.05	0.31	0.15
O142	0.05	0.32	0.15	0.25	0.12	0.12	0.06	0.04	0.35	0.14
O143	0.04	0.01	0.05	0.18	0.09	0.13	0.07	0.08	0.08	0.08
O144	0.18	0.11	0.09	0.05	0.17	0.12	0.05	0.25	0.05	0.13
O145	0.19	0.05	0.04	0.08	0.12	0.04	0.03	0.22	0.16	0.10
O146	0.18	0.09	0.06	0.11	0.15	0.08	0.05	0.20	0.21	0.12
O147	0.15	0.06	0.08	0.19	0.06	0.04	0.12	0.13	0.23	0.11
O148	0.08	0.13	0.08	0.11	0.09	0.03	0.14	0.16	0.25	0.10
O149	0.08	0.16	0.07	0.08	0.17	0.02	0.12	0.15	0.21	0.10
O150	0.11	0.15	0.06	0.15	0.17	0.03	0.08	0.16	0.18	0.12
O151	0.18	0.07	0.06	0.11	0.15	0.05	0.04	0.19	0.20	0.11
O152	0.22	0.10	0.06	0.11	0.14	0.01	0.04	0.21	0.12	0.12
O153	0.19	0.06	0.07	0.09	0.04	0.09	0.07	0.19	0.12	0.11
O154	0.11	0.03	0.09	0.08	0.11	0.08	0.07	0.03	0.16	0.08
O155	0.03	0.03	0.13	0.06	0.16	0.11	0.13	0.03	0.25	0.08
O156	0.07	0.05	0.07	0.03	0.10	0.04	0.13	0.07	0.13	0.07
O157	0.12	0.06	0.09	0.00	0.15	0.08	0.12	0.08	0.13	0.09
O158	0.11	0.10	0.07	0.02	0.13	0.10	0.11	0.09	0.15	0.09
O159	0.11	0.07	0.05	0.03	0.11	0.11	0.06	0.08	0.14	0.08
O160	0.03	0.07	0.06	0.08	0.07	0.05	0.07	0.09	0.05	0.06
O161	0.08	0.12	0.07	0.10	0.13	0.07	0.07	0.13	0.07	0.10
O162	0.01	0.14	0.05	0.10	0.17	0.09	0.06	0.14	0.04	0.09
O163	0.02	0.12	0.05	0.07	0.20	0.10	0.07	0.08	0.06	0.08
O164	0.02	0.13	0.09	0.09	0.16	0.06	0.02	0.09	0.06	0.08
O165	0.12	0.14	0.13	0.13	0.13	0.02	0.08	0.10	0.05	0.11
O166	0.17	0.17	0.09	0.18	0.13	0.09	0.10	0.13	0.12	0.14
O167	0.23	0.21	0.13	0.24	0.13	0.05	0.02	0.16	0.20	0.16
O168	0.22	0.20	0.13	0.23	0.17	0.09	0.05	0.16	0.16	0.17
O169	0.19	0.19	0.10	0.20	0.19	0.14	0.06	0.18	0.07	0.16
O170	0.12	0.18	0.06	0.20	0.19	0.20	0.04	0.13	0.11	0.14
O171	0.23	0.15	0.18	0.20	0.16	0.10	0.05	0.07	0.19	0.16
O172	0.24	0.15	0.16	0.19	0.11	0.04	0.05	0.10	0.19	0.15
O173	0.22	0.15	0.10	0.18	0.12	0.06	0.08	0.09	0.17	0.14
O174	0.20	0.13	0.14	0.15	0.14	0.01	0.10	0.06	0.11	0.13
O175	0.10	0.12	0.14	0.13	0.19	0.07	0.02	0.05	0.05	0.11
O176	0.05	0.06	0.12	0.11	0.22	0.10	0.06	0.07	0.05	0.09
O177	0.10	0.05	0.08	0.03	0.10	0.10	0.12	0.08	0.11	0.08
O178	0.12	0.03	0.08	0.08	0.07	0.08	0.12	0.04	0.10	0.08
O179	0.10	0.04	0.09	0.08	0.13	0.05	0.11	0.05	0.09	0.08
O180	0.08	0.10	0.09	0.05	0.03	0.03	0.10	0.13	0.09	0.08
O181	0.04	0.12	0.06	0.09	0.25	0.13	0.12	0.14	0.12	0.11
O182	0.07	0.10	0.06	0.13	0.19	0.11	0.07	0.10	0.06	0.10
O183	0.10	0.11	0.08	0.12	0.10	0.07	0.09	0.06	0.09	0.09
O184	0.08	0.09	0.08	0.10	0.04	0.07	0.03	0.02	0.04	0.07
O185	0.07	0.03	0.09	0.03	0.10	0.10	0.11	0.09	0.13	0.07
O186	0.14	0.11	0.07	0.06	0.11	0.10	0.11	0.10	0.15	0.10
O187	0.15	0.07	0.09	0.02	0.12	0.07	0.11	0.08	0.13	0.09

Wind direction	E	NE	ESE	ENE	SSW	S	SSE	NNE	SE	Overall
O188	0.11	0.05	0.08	0.03	0.12	0.05	0.10	0.09	0.13	0.08
O189	0.05	0.11	0.11	0.06	0.26	0.08	0.13	0.12	0.17	0.11
O190	0.06	0.08	0.12	0.13	0.21	0.06	0.14	0.10	0.24	0.11
O191	0.11	0.10	0.12	0.19	0.20	0.11	0.13	0.12	0.22	0.13
O192	0.11	0.07	0.12	0.12	0.08	0.06	0.09	0.05	0.14	0.09
O193	0.16	0.09	0.14	0.06	0.04	0.06	0.09	0.17	0.09	0.11

Table D2

VRs at Assessment Point Under Annual Condition (Proposed Scheme)

Wind direction	E	NE	ESE	ENE	SSW	S	SSE	NNE	SE	Annual
Percentage	15.7%	10.8%	10.5%	9.8%	8.5%	7.4%	7.3%	7.2%	7.2%	84.4%
P01	0.05	0.12	0.06	0.07	0.25	0.22	0.18	0.26	0.08	0.13
P02	0.07	0.16	0.07	0.14	0.17	0.03	0.01	0.31	0.06	0.12
P03	0.10	0.12	0.06	0.16	0.05	0.09	0.05	0.25	0.07	0.11
P04	0.12	0.10	0.05	0.22	0.07	0.05	0.03	0.22	0.04	0.11
P05	0.10	0.07	0.10	0.04	0.20	0.06	0.03	0.25	0.08	0.10
P06	0.03	0.32	0.10	0.14	0.15	0.06	0.01	0.20	0.03	0.12
P07	0.31	0.39	0.27	0.42	0.14	0.08	0.16	0.20	0.26	0.26
P08	0.25	0.33	0.24	0.34	0.04	0.10	0.16	0.15	0.24	0.22
P09	0.19	0.24	0.21	0.25	0.03	0.08	0.14	0.16	0.24	0.17
P10	0.15	0.19	0.18	0.17	0.08	0.06	0.04	0.21	0.22	0.14
P11	0.14	0.19	0.15	0.16	0.04	0.04	0.15	0.25	0.21	0.14
P12	0.19	0.23	0.13	0.20	0.04	0.07	0.19	0.28	0.22	0.17
P13	0.32	0.20	0.21	0.22	0.22	0.25	0.12	0.26	0.24	0.23
P14	0.32	0.20	0.22	0.21	0.06	0.03	0.16	0.25	0.26	0.20
P15	0.24	0.24	0.17	0.16	0.02	0.10	0.20	0.26	0.24	0.18
P16	0.18	0.33	0.13	0.21	0.03	0.04	0.26	0.32	0.24	0.19
P17	0.14	0.46	0.11	0.33	0.14	0.18	0.37	0.40	0.28	0.25
P18	0.10	0.43	0.07	0.35	0.18	0.15	0.34	0.33	0.26	0.23
P19	0.14	0.37	0.13	0.31	0.19	0.16	0.34	0.28	0.28	0.23
P20	0.25	0.31	0.14	0.29	0.21	0.15	0.27	0.25	0.23	0.24
P21	0.33	0.30	0.24	0.32	0.16	0.11	0.32	0.15	0.29	0.25
P22	0.32	0.26	0.24	0.32	0.12	0.07	0.26	0.05	0.24	0.22
P23	0.36	0.07	0.26	0.23	0.11	0.03	0.29	0.07	0.24	0.20
P24	0.07	0.02	0.07	0.04	0.08	0.08	0.09	0.07	0.05	0.06
P25	0.05	0.02	0.08	0.02	0.08	0.12	0.03	0.06	0.07	0.05
P26	0.02	0.03	0.10	0.03	0.10	0.14	0.06	0.04	0.07	0.06
P27	0.14	0.22	0.08	0.18	0.17	0.18	0.14	0.19	0.03	0.16
P28	0.30	0.18	0.18	0.10	0.17	0.05	0.11	0.04	0.13	0.16
P29	0.06	0.20	0.04	0.10	0.06	0.12	0.11	0.25	0.08	0.11
P30	0.11	0.05	0.02	0.10	0.08	0.10	0.02	0.04	0.10	0.07
P31	0.05	0.02	0.06	0.06	0.05	0.10	0.13	0.06	0.04	0.06
P32	0.09	0.03	0.10	0.07	0.04	0.12	0.20	0.04	0.10	0.08
P33	0.11	0.16	0.12	0.08	0.10	0.11	0.16	0.25	0.14	0.13
P34	0.11	0.16	0.16	0.09	0.22	0.23	0.27	0.32	0.26	0.18
P35	0.04	0.25	0.08	0.15	0.29	0.21	0.20	0.42	0.15	0.18
P36	0.01	0.17	0.08	0.12	0.33	0.24	0.18	0.27	0.10	0.15
O001	0.05	0.05	0.05	0.09	0.24	0.13	0.16	0.07	0.12	0.10
O002	0.06	0.08	0.10	0.17	0.28	0.13	0.16	0.14	0.17	0.13
O003	0.07	0.02	0.07	0.09	0.15	0.05	0.02	0.07	0.13	0.07
O004	0.09	0.07	0.06	0.15	0.12	0.04	0.07	0.10	0.04	0.09
O005	0.07	0.04	0.11	0.07	0.18	0.02	0.10	0.06	0.07	0.08
O006	0.04	0.04	0.03	0.09	0.19	0.08	0.04	0.10	0.03	0.07
O007	0.05	0.04	0.07	0.06	0.09	0.09	0.11	0.03	0.12	0.06
O008	0.05	0.02	0.08	0.04	0.10	0.13	0.08	0.08	0.11	0.07
O009	0.04	0.05	0.05	0.04	0.13	0.11	0.07	0.06	0.06	0.06
O010	0.08	0.03	0.09	0.04	0.05	0.05	0.11	0.08	0.10	0.07
O011	0.11	0.06	0.05	0.03	0.09	0.12	0.09	0.10	0.10	0.08
O012	0.09	0.06	0.05	0.07	0.09	0.10	0.06	0.20	0.06	0.09
O013	0.10	0.14	0.06	0.14	0.19	0.10	0.09	0.14	0.14	0.12
O014	0.06	0.11	0.04	0.11	0.22	0.16	0.14	0.25	0.19	0.12
O015	0.01	0.10	0.01	0.09	0.03	0.04	0.04	0.19	0.02	0.06
O016	0.04	0.11	0.05	0.06	0.24	0.19	0.13	0.20	0.10	0.11
O017	0.08	0.18	0.05	0.12	0.18	0.08	0.02	0.16	0.02	0.11
O018	0.09	0.12	0.04	0.11	0.14	0.04	0.02	0.11	0.02	0.08
O019	0.05	0.06	0.02	0.05	0.07	0.04	0.04	0.07	0.02	0.05
O020	0.10	0.10	0.04	0.06	0.09	0.02	0.06	0.10	0.04	0.08
O021	0.06	0.08	0.01	0.03	0.07	0.09	0.04	0.09	0.04	0.06
O022	0.06	0.10	0.01	0.08	0.09	0.05	0.04	0.11	0.03	0.07
O023	0.08	0.13	0.03	0.11	0.19	0.12	0.07	0.09	0.04	0.10
O024	0.07	0.17	0.04	0.12	0.17	0.12	0.08	0.17	0.05	0.11
O025	0.02	0.14	0.08	0.07	0.15	0.16	0.09	0.18	0.08	0.10
O026	0.09	0.18	0.05	0.17	0.23	0.09	0.04	0.25	0.05	0.13
O027	0.03	0.21	0.02	0.21	0.26	0.16	0.09	0.27	0.14	0.14
O028	0.11	0.21	0.08	0.27	0.14	0.11	0.05	0.22	0.07	0.15
O029	0.26	0.28	0.04	0.38	0.13	0.08	0.03	0.20	0.03	0.19
O030	0.28	0.34	0.24	0.39	0.15	0.06	0.13	0.17	0.23	0.24
O031	0.29	0.35	0.25	0.39	0.15	0.08	0.21	0.09	0.25	0.24
O032	0.27	0.22	0.24	0.30	0.03	0.07	0.19	0.08	0.24	0.19
O033	0.22	0.12	0.24	0.21	0.05	0.06	0.14	0.10	0.24	0.15
O034	0.19	0.09	0.22	0.05	0.08	0.04	0.10	0.08	0.23	0.12
O035	0.19	0.14	0.22	0.18	0.09	0.04	0.10	0.05	0.22	0.14
O036	0.16	0.16	0.15	0.18	0.11	0.06	0.07	0.11	0.19	0.14
O037	0.17	0.16	0.10	0.15	0.19	0.16	0.05	0.17	0.12	0.15
O038	0.05	0.12	0.13	0.13	0.21	0.23	0.05	0.16	0.20	0.13

Wind direction	E	NE	ESE	ENE	SSW	S	SSE	NNE	SE	Annual
O039	0.11	0.07	0.16	0.10	0.06	0.10	0.09	0.10	0.16	0.10
O040	0.13	0.06	0.16	0.08	0.15	0.15	0.12	0.11	0.20	0.12
O041	0.06	0.11	0.13	0.09	0.21	0.19	0.09	0.10	0.19	0.12
O042	0.20	0.14	0.11	0.13	0.16	0.10	0.08	0.12	0.16	0.14
O043	0.13	0.11	0.12	0.13	0.07	0.04	0.07	0.11	0.18	0.10
O044	0.17	0.16	0.16	0.27	0.08	0.02	0.10	0.05	0.21	0.14
O045	0.11	0.07	0.18	0.01	0.05	0.05	0.08	0.12	0.21	0.09
O046	0.19	0.14	0.20	0.17	0.02	0.05	0.12	0.03	0.21	0.13
O047	0.24	0.24	0.21	0.28	0.02	0.06	0.16	0.04	0.22	0.17
O048	0.27	0.36	0.22	0.38	0.12	0.05	0.23	0.07	0.23	0.23
O049	0.21	0.35	0.18	0.32	0.10	0.06	0.21	0.14	0.21	0.21
O050	0.17	0.28	0.16	0.21	0.09	0.05	0.23	0.20	0.22	0.18
O051	0.19	0.22	0.14	0.17	0.05	0.06	0.23	0.24	0.23	0.17
O052	0.27	0.16	0.18	0.14	0.04	0.14	0.21	0.25	0.23	0.18
O053	0.23	0.24	0.14	0.23	0.11	0.12	0.21	0.26	0.20	0.20
O054	0.15	0.09	0.02	0.19	0.09	0.15	0.14	0.11	0.03	0.12
O055	0.07	0.20	0.11	0.16	0.16	0.10	0.10	0.15	0.10	0.13
O056	0.11	0.08	0.11	0.18	0.09	0.10	0.09	0.10	0.09	0.11
O057	0.15	0.13	0.03	0.22	0.13	0.11	0.10	0.11	0.05	0.13
O058	0.16	0.37	0.11	0.19	0.18	0.13	0.13	0.21	0.14	0.19
O059	0.16	0.08	0.13	0.28	0.06	0.10	0.12	0.03	0.17	0.13
O060	0.15	0.19	0.16	0.25	0.04	0.12	0.14	0.08	0.19	0.15
O061	0.08	0.11	0.10	0.10	0.04	0.11	0.15	0.20	0.19	0.10
O062	0.24	0.07	0.22	0.20	0.05	0.09	0.15	0.11	0.18	0.15
O063	0.15	0.12	0.22	0.09	0.06	0.12	0.19	0.04	0.20	0.13
O064	0.13	0.10	0.18	0.13	0.05	0.18	0.18	0.22	0.18	0.14
O065	0.04	0.37	0.14	0.16	0.02	0.17	0.15	0.31	0.15	0.16
O066	0.30	0.08	0.14	0.39	0.07	0.14	0.15	0.06	0.15	0.18
O067	0.10	0.17	0.18	0.15	0.04	0.13	0.14	0.27	0.16	0.14
O068	0.17	0.28	0.17	0.13	0.03	0.11	0.12	0.18	0.16	0.15
O069	0.25	0.24	0.18	0.39	0.04	0.09	0.09	0.15	0.17	0.20
O070	0.29	0.30	0.17	0.43	0.08	0.14	0.15	0.14	0.17	0.23
O071	0.15	0.30	0.12	0.15	0.05	0.16	0.16	0.24	0.16	0.17
O072	0.02	0.09	0.18	0.13	0.03	0.16	0.17	0.09	0.16	0.10
O073	0.22	0.41	0.06	0.27	0.04	0.17	0.15	0.23	0.12	0.20
O074	0.06	0.10	0.10	0.09	0.04	0.16	0.16	0.15	0.12	0.10
O075	0.10	0.08	0.14	0.09	0.04	0.12	0.17	0.03	0.13	0.10
O076	0.06	0.07	0.22	0.04	0.07	0.09	0.13	0.08	0.13	0.09
O077	0.08	0.01	0.06	0.08	0.07	0.10	0.13	0.03	0.14	0.07
O078	0.02	0.12	0.05	0.16	0.07	0.14	0.15	0.07	0.17	0.09
O079	0.10	0.16	0.11	0.16	0.10	0.14	0.16	0.05	0.21	0.12
O080	0.10	0.26	0.10	0.36	0.20	0.17	0.17	0.09	0.20	0.18
O081	0.19	0.34	0.10	0.11	0.26	0.17	0.17	0.41	0.19	0.21
O082	0.21	0.08	0.09	0.06	0.19	0.12	0.19	0.12	0.19	0.14
O083	0.13	0.10	0.05	0.12	0.37	0.19	0.18	0.16	0.17	0.15
O084	0.04	0.15	0.07	0.10	0.29	0.09	0.16	0.06	0.14	0.11
O085	0.06	0.09	0.14	0.05	0.21	0.09	0.14	0.19	0.11	0.11
O086	0.15	0.06	0.17	0.07	0.16	0.11	0.11	0.20	0.13	0.13
O087	0.22	0.04	0.17	0.11	0.11	0.15	0.13	0.28	0.15	0.15
O088	0.11	0.03	0.09	0.08	0.02	0.16	0.18	0.27	0.14	0.11
O089	0.06	0.18	0.09	0.23	0.06	0.18	0.20	0.16	0.04	0.14
O090	0.15	0.08	0.11	0.07	0.07	0.18	0.25	0.18	0.04	0.13
O091	0.21	0.12	0.34	0.06	0.07	0.14	0.29	0.13	0.31	0.17
O092	0.14	0.21	0.06	0.11	0.04	0.18	0.36	0.21	0.34	0.15
O093	0.29	0.19	0.18	0.30	0.06	0.16	0.32	0.25	0.18	0.22
O094	0.22	0.06	0.20	0.15	0.08	0.15	0.33	0.32	0.24	0.18
O095	0.24	0.07	0.21	0.08	0.13	0.12	0.22	0.22	0.22	0.16
O096	0.11	0.12	0.18	0.04	0.27	0.10	0.19	0.17	0.16	0.14
O097	0.03	0.12	0.13	0.10	0.35	0.10	0.17	0.18	0.13	0.14
O098	0.09	0.15	0.13	0.24	0.38	0.22	0.17	0.19	0.15	0.18
O099	0.12	0.03	0.12	0.12	0.14	0.10	0.14	0.05	0.15	0.10
O100	0.15	0.29	0.09	0.12	0.12	0.08	0.09	0.29	0.12	0.15
O101	0.08	0.38	0.07	0.20	0.24	0.17	0.14	0.19	0.10	0.18
O102	0.08	0.29	0.16	0.18	0.13	0.10	0.12	0.12	0.12	0.15
O103	0.09	0.30	0.05	0.10	0.22	0.13	0.09	0.21	0.08	0.14
O104	0.18	0.17	0.07	0.23	0.04	0.16	0.16	0.10	0.12	0.14
O105	0.20	0.29	0.14	0.23	0.20	0.21	0.32	0.28	0.25	0.23
O106	0.10	0.37	0.08	0.30	0.22	0.12	0.28	0.30	0.18	0.21
O107	0.21	0.30	0.02	0.23	0.30	0.11	0.14	0.27	0.06	0.20
O108	0.06	0.20	0.03	0.17	0.12	0.06	0.14	0.21	0.08	0.12
O109	0.05	0.13	0.09	0.11	0.25	0.09	0.17	0.14	0.15	0.12
O110	0.08	0.08	0.04	0.08	0.11	0.09	0.14	0.07	0.08	0.08
O111	0.09	0.03	0.13	0.05	0.19	0.10	0.16	0.03	0.16	0.10
O112	0.14	0.06	0.16	0.07	0.11	0.11	0.19	0.06	0.18	0.11
O113	0.12	0.08	0.17	0.10	0.13	0.13	0.22	0.10	0.20	0.13
O114	0.11	0.09	0.13	0.09	0.12	0.09	0.17	0.11	0.17	0.11
O115	0.15	0.05	0.12	0.03	0.06	0.04	0.16	0.06	0.21	0.09
O116	0.25	0.05	0.26	0.04	0.17	0.07	0.17	0.11	0.23	0.15

Wind direction	E	NE	ESE	ENE	SSW	S	SSE	NNE	SE	Annual
O117	0.10	0.12	0.16	0.14	0.18	0.09	0.19	0.16	0.19	0.14
O118	0.19	0.08	0.20	0.11	0.17	0.14	0.23	0.09	0.23	0.15
O119	0.22	0.03	0.20	0.09	0.01	0.09	0.17	0.04	0.21	0.12
O120	0.15	0.01	0.19	0.11	0.23	0.09	0.19	0.02	0.23	0.12
O121	0.07	0.14	0.13	0.12	0.21	0.08	0.19	0.17	0.20	0.13
O122	0.05	0.21	0.02	0.20	0.15	0.05	0.09	0.22	0.06	0.12
O123	0.13	0.26	0.01	0.20	0.24	0.07	0.06	0.27	0.03	0.16
O124	0.19	0.37	0.03	0.30	0.20	0.10	0.20	0.31	0.19	0.21
O125	0.26	0.22	0.18	0.28	0.13	0.08	0.22	0.02	0.19	0.19
O126	0.05	0.12	0.03	0.12	0.14	0.07	0.01	0.05	0.01	0.07
O127	0.10	0.12	0.05	0.09	0.17	0.08	0.03	0.05	0.03	0.09
O128	0.02	0.09	0.05	0.03	0.19	0.06	0.05	0.03	0.06	0.06
O129	0.03	0.08	0.05	0.02	0.20	0.05	0.08	0.06	0.13	0.06
O130	0.02	0.04	0.11	0.10	0.22	0.05	0.14	0.04	0.14	0.08
O131	0.00	0.04	0.17	0.04	0.27	0.04	0.13	0.10	0.13	0.09
O132	0.15	0.09	0.09	0.08	0.28	0.05	0.17	0.09	0.15	0.12
O133	0.07	0.11	0.06	0.09	0.15	0.06	0.04	0.05	0.17	0.08
O134	0.13	0.03	0.08	0.02	0.02	0.12	0.20	0.02	0.13	0.08
O135	0.12	0.03	0.10	0.03	0.06	0.07	0.08	0.05	0.10	0.07
O136	0.10	0.03	0.14	0.07	0.07	0.01	0.15	0.06	0.15	0.08
O137	0.15	0.06	0.11	0.12	0.07	0.06	0.17	0.04	0.17	0.10
O138	0.13	0.04	0.11	0.17	0.09	0.12	0.17	0.15	0.27	0.12
O139	0.01	0.17	0.11	0.24	0.13	0.15	0.08	0.03	0.21	0.11
O140	0.08	0.22	0.17	0.29	0.13	0.15	0.11	0.06	0.32	0.15
O141	0.05	0.26	0.15	0.26	0.12	0.15	0.16	0.10	0.30	0.15
O142	0.10	0.26	0.15	0.27	0.11	0.12	0.08	0.08	0.35	0.15
O143	0.09	0.03	0.05	0.15	0.10	0.13	0.07	0.13	0.11	0.09
O144	0.13	0.10	0.11	0.01	0.17	0.13	0.05	0.23	0.03	0.11
O145	0.14	0.07	0.02	0.04	0.11	0.04	0.04	0.20	0.14	0.09
O146	0.14	0.09	0.04	0.07	0.14	0.09	0.05	0.17	0.19	0.10
O147	0.13	0.08	0.07	0.14	0.05	0.03	0.13	0.13	0.22	0.10
O148	0.06	0.12	0.07	0.04	0.08	0.02	0.15	0.15	0.25	0.08
O149	0.08	0.14	0.06	0.00	0.15	0.02	0.13	0.10	0.21	0.08
O150	0.11	0.14	0.04	0.08	0.16	0.05	0.08	0.11	0.17	0.10
O151	0.15	0.07	0.03	0.05	0.14	0.05	0.03	0.15	0.17	0.09
O152	0.17	0.08	0.04	0.06	0.14	0.01	0.07	0.18	0.10	0.10
O153	0.15	0.03	0.10	0.07	0.04	0.10	0.08	0.16	0.11	0.09
O154	0.08	0.03	0.10	0.11	0.11	0.09	0.11	0.04	0.15	0.08
O155	0.02	0.05	0.13	0.05	0.16	0.12	0.18	0.04	0.23	0.09
O156	0.04	0.04	0.07	0.02	0.10	0.04	0.17	0.07	0.10	0.06
O157	0.10	0.05	0.07	0.01	0.15	0.08	0.16	0.07	0.12	0.08
O158	0.12	0.10	0.07	0.02	0.13	0.10	0.15	0.09	0.14	0.10
O159	0.11	0.07	0.06	0.03	0.12	0.12	0.09	0.08	0.12	0.09
O160	0.07	0.07	0.04	0.08	0.07	0.07	0.06	0.07	0.06	0.07
O161	0.05	0.12	0.06	0.10	0.13	0.08	0.07	0.12	0.09	0.09
O162	0.01	0.15	0.01	0.10	0.17	0.10	0.07	0.14	0.05	0.08
O163	0.01	0.11	0.01	0.08	0.21	0.11	0.08	0.10	0.06	0.08
O164	0.05	0.14	0.04	0.10	0.17	0.08	0.03	0.13	0.06	0.09
O165	0.16	0.15	0.08	0.12	0.14	0.03	0.06	0.12	0.06	0.11
O166	0.19	0.19	0.13	0.17	0.13	0.10	0.02	0.14	0.12	0.14
O167	0.23	0.22	0.16	0.25	0.14	0.05	0.07	0.17	0.18	0.17
O168	0.22	0.21	0.13	0.24	0.17	0.10	0.08	0.17	0.15	0.17
O169	0.17	0.20	0.09	0.20	0.19	0.15	0.06	0.19	0.01	0.16
O170	0.12	0.18	0.05	0.20	0.19	0.20	0.03	0.15	0.09	0.14
O171	0.24	0.15	0.19	0.20	0.16	0.10	0.09	0.11	0.19	0.17
O172	0.25	0.14	0.18	0.19	0.11	0.05	0.08	0.12	0.19	0.16
O173	0.23	0.14	0.16	0.18	0.13	0.07	0.02	0.11	0.17	0.14
O174	0.21	0.11	0.13	0.16	0.15	0.01	0.06	0.09	0.12	0.13
O175	0.15	0.09	0.09	0.13	0.20	0.08	0.02	0.09	0.04	0.11
O176	0.08	0.05	0.09	0.1	0.22	0.11	0.07	0.05	0.04	0.09
O177	0.1	0.04	0.1	0.03	0.07	0.1	0.13	0.08	0.12	0.08
O178	0.11	0.01	0.1	0.08	0.08	0.08	0.12	0.04	0.12	0.08
O179	0.1	0.03	0.11	0.08	0.15	0.05	0.12	0.04	0.14	0.08
O180	0.07	0.09	0.1	0.05	0.06	0.03	0.11	0.12	0.14	0.08
O181	0.01	0.12	0.03	0.09	0.25	0.14	0.13	0.14	0.11	0.10
O182	0.05	0.1	0.03	0.12	0.19	0.12	0.07	0.09	0.1	0.09
O183	0.06	0.11	0.06	0.11	0.1	0.08	0.09	0.06	0.11	0.08
O184	0.08	0.1	0.06	0.09	0.05	0.07	0.05	0.03	0.07	0.07
O185	0.07	0.04	0.08	0.04	0.1	0.1	0.15	0.09	0.13	0.08
O186	0.14	0.11	0.07	0.06	0.11	0.1	0.15	0.08	0.13	0.11
O187	0.1	0.05	0.08	0.01	0.12	0.08	0.15	0.08	0.11	0.08
O188	0.06	0.04	0.06	0.05	0.12	0.06	0.15	0.09	0.11	0.07
O189	0.05	0.1	0.09	0.06	0.26	0.09	0.17	0.11	0.15	0.11
O190	0.04	0.06	0.11	0.1	0.2	0.07	0.18	0.1	0.22	0.10
O191	0.09	0.05	0.13	0.19	0.19	0.12	0.16	0.13	0.21	0.13
O192	0.09	0.06	0.13	0.15	0.09	0.07	0.1	0.03	0.13	0.09
O193	0.13	0.09	0.14	0.07	0.05	0.07	0.08	0.15	0.1	0.10

Table D3

VRs at Assessment Point Under Summer Condition (Proposed Scheme)

Wind direction	SSW	S	SW	SSE	ESE	SE	E	Average
Percentage	17.8%	14.6%	13.2%	9.8%	8.2%	7.3%	6.2%	77.1%
P01	0.25	0.22	0.33	0.18	0.06	0.08	0.05	0.19
P02	0.17	0.03	0.05	0.01	0.07	0.06	0.07	0.07
P03	0.05	0.09	0.11	0.05	0.06	0.07	0.10	0.08
P04	0.07	0.05	0.16	0.03	0.05	0.04	0.12	0.08
P05	0.20	0.06	0.25	0.03	0.10	0.08	0.10	0.13
P06	0.15	0.06	0.23	0.01	0.10	0.03	0.03	0.10
P07	0.14	0.08	0.22	0.16	0.27	0.26	0.31	0.18
P08	0.04	0.10	0.04	0.16	0.24	0.24	0.25	0.12
P09	0.03	0.08	0.10	0.14	0.21	0.24	0.19	0.12
P10	0.08	0.06	0.12	0.04	0.18	0.22	0.15	0.11
P11	0.04	0.04	0.08	0.15	0.15	0.21	0.14	0.10
P12	0.04	0.07	0.06	0.19	0.13	0.22	0.19	0.10
P13	0.22	0.25	0.18	0.12	0.21	0.24	0.32	0.22
P14	0.06	0.03	0.10	0.16	0.22	0.26	0.32	0.13
P15	0.02	0.10	0.06	0.20	0.17	0.24	0.24	0.12
P16	0.03	0.04	0.03	0.26	0.13	0.24	0.18	0.10
P17	0.14	0.18	0.05	0.37	0.11	0.28	0.14	0.17
P18	0.18	0.15	0.20	0.34	0.07	0.26	0.10	0.19
P19	0.19	0.16	0.21	0.34	0.13	0.28	0.14	0.20
P20	0.21	0.15	0.26	0.27	0.14	0.23	0.25	0.21
P21	0.16	0.11	0.27	0.32	0.24	0.29	0.33	0.22
P22	0.12	0.07	0.35	0.26	0.24	0.24	0.32	0.21
P23	0.11	0.03	0.28	0.29	0.26	0.24	0.36	0.20
P24	0.08	0.08	0.18	0.09	0.07	0.05	0.07	0.09
P25	0.08	0.12	0.10	0.03	0.08	0.07	0.05	0.08
P26	0.10	0.14	0.07	0.06	0.10	0.07	0.02	0.09
P27	0.17	0.18	0.22	0.14	0.08	0.03	0.14	0.15
P28	0.17	0.05	0.06	0.11	0.18	0.13	0.30	0.13
P29	0.06	0.12	0.01	0.11	0.04	0.08	0.06	0.07
P30	0.08	0.10	0.06	0.02	0.02	0.10	0.11	0.07
P31	0.05	0.10	0.06	0.13	0.06	0.04	0.05	0.07
P32	0.04	0.12	0.08	0.20	0.10	0.10	0.09	0.10
P33	0.10	0.11	0.13	0.16	0.12	0.14	0.11	0.12
P34	0.22	0.23	0.11	0.27	0.16	0.26	0.11	0.20
P35	0.29	0.21	0.30	0.20	0.08	0.15	0.04	0.21
P36	0.33	0.24	0.40	0.18	0.08	0.10	0.01	0.23
O001	0.24	0.13	0.33	0.16	0.05	0.12	0.05	0.18
O002	0.28	0.13	0.21	0.16	0.10	0.17	0.06	0.18
O003	0.15	0.05	0.16	0.02	0.07	0.13	0.07	0.10
O004	0.12	0.04	0.01	0.07	0.06	0.04	0.09	0.06
O005	0.18	0.02	0.18	0.10	0.11	0.07	0.07	0.11
O006	0.19	0.08	0.11	0.04	0.03	0.03	0.04	0.09
O007	0.09	0.09	0.11	0.11	0.07	0.12	0.05	0.09
O008	0.10	0.13	0.05	0.08	0.08	0.11	0.05	0.09
O009	0.13	0.11	0.13	0.07	0.05	0.06	0.04	0.10
O010	0.05	0.05	0.05	0.11	0.09	0.10	0.08	0.07
O011	0.09	0.12	0.11	0.09	0.05	0.10	0.11	0.10
O012	0.09	0.10	0.07	0.06	0.05	0.06	0.09	0.08
O013	0.19	0.10	0.21	0.09	0.06	0.14	0.10	0.14
O014	0.22	0.16	0.23	0.14	0.04	0.19	0.06	0.17
O015	0.03	0.04	0.05	0.04	0.01	0.02	0.01	0.03
O016	0.24	0.19	0.18	0.13	0.05	0.10	0.04	0.16
O017	0.18	0.08	0.17	0.02	0.05	0.02	0.08	0.10
O018	0.14	0.04	0.09	0.02	0.04	0.02	0.09	0.07
O019	0.07	0.04	0.11	0.04	0.02	0.02	0.05	0.05
O020	0.09	0.02	0.14	0.06	0.04	0.04	0.10	0.07
O021	0.07	0.09	0.12	0.04	0.01	0.04	0.06	0.07
O022	0.09	0.05	0.14	0.04	0.01	0.03	0.06	0.07
O023	0.19	0.12	0.15	0.07	0.03	0.04	0.08	0.11
O024	0.17	0.12	0.17	0.08	0.04	0.05	0.07	0.11
O025	0.15	0.16	0.15	0.09	0.08	0.08	0.02	0.12
O026	0.23	0.09	0.21	0.04	0.05	0.05	0.09	0.13
O027	0.26	0.16	0.24	0.09	0.02	0.14	0.03	0.16
O028	0.14	0.11	0.16	0.05	0.08	0.07	0.11	0.11
O029	0.13	0.08	0.23	0.03	0.04	0.03	0.26	0.12
O030	0.15	0.06	0.23	0.13	0.24	0.23	0.28	0.17
O031	0.15	0.08	0.21	0.21	0.25	0.25	0.29	0.19
O032	0.03	0.07	0.08	0.19	0.24	0.24	0.27	0.13
O033	0.05	0.06	0.08	0.14	0.24	0.24	0.22	0.12
O034	0.08	0.04	0.12	0.10	0.22	0.23	0.19	0.12
O035	0.09	0.04	0.15	0.10	0.22	0.22	0.19	0.13
O036	0.11	0.06	0.21	0.07	0.15	0.19	0.16	0.13
O037	0.19	0.16	0.24	0.05	0.10	0.12	0.17	0.16
O038	0.21	0.23	0.07	0.05	0.13	0.20	0.05	0.15

Wind direction	SSW	S	SW	SSE	ESE	SE	E	Average
O039	0.06	0.10	0.10	0.09	0.16	0.16	0.11	0.10
O040	0.15	0.15	0.07	0.12	0.16	0.20	0.13	0.14
O041	0.21	0.19	0.18	0.09	0.13	0.19	0.06	0.16
O042	0.16	0.10	0.25	0.08	0.11	0.16	0.20	0.15
O043	0.07	0.04	0.15	0.07	0.12	0.18	0.13	0.10
O044	0.08	0.02	0.13	0.10	0.16	0.21	0.17	0.11
O045	0.05	0.05	0.10	0.08	0.18	0.21	0.11	0.10
O046	0.02	0.05	0.06	0.12	0.20	0.21	0.19	0.10
O047	0.02	0.06	0.07	0.16	0.21	0.22	0.24	0.11
O048	0.12	0.05	0.18	0.23	0.22	0.23	0.27	0.16
O049	0.10	0.06	0.12	0.21	0.18	0.21	0.21	0.14
O050	0.09	0.05	0.12	0.23	0.16	0.22	0.17	0.13
O051	0.05	0.06	0.09	0.23	0.14	0.23	0.19	0.12
O052	0.04	0.14	0.08	0.21	0.18	0.23	0.27	0.14
O053	0.11	0.12	0.08	0.21	0.14	0.20	0.23	0.14
O054	0.09	0.15	0.13	0.14	0.02	0.03	0.15	0.11
O055	0.16	0.10	0.07	0.10	0.11	0.10	0.07	0.11
O056	0.09	0.10	0.03	0.09	0.11	0.09	0.11	0.09
O057	0.13	0.11	0.06	0.10	0.03	0.05	0.15	0.09
O058	0.18	0.13	0.11	0.13	0.11	0.14	0.16	0.14
O059	0.06	0.10	0.03	0.12	0.13	0.17	0.16	0.10
O060	0.04	0.12	0.05	0.14	0.16	0.19	0.15	0.10
O061	0.04	0.11	0.15	0.15	0.10	0.19	0.08	0.11
O062	0.05	0.09	0.15	0.15	0.22	0.18	0.24	0.13
O063	0.06	0.12	0.07	0.19	0.22	0.20	0.15	0.13
O064	0.05	0.18	0.06	0.18	0.18	0.18	0.13	0.13
O065	0.02	0.17	0.12	0.15	0.14	0.15	0.04	0.11
O066	0.07	0.14	0.02	0.15	0.14	0.15	0.30	0.12
O067	0.04	0.13	0.02	0.14	0.18	0.16	0.10	0.10
O068	0.03	0.11	0.03	0.12	0.17	0.16	0.17	0.09
O069	0.04	0.09	0.09	0.09	0.18	0.17	0.25	0.11
O070	0.08	0.14	0.12	0.15	0.17	0.17	0.29	0.14
O071	0.05	0.16	0.04	0.16	0.12	0.16	0.15	0.11
O072	0.03	0.16	0.06	0.17	0.18	0.16	0.02	0.10
O073	0.04	0.17	0.10	0.15	0.06	0.12	0.22	0.11
O074	0.04	0.16	0.08	0.16	0.10	0.12	0.06	0.10
O075	0.04	0.12	0.02	0.17	0.14	0.13	0.10	0.09
O076	0.07	0.09	0.12	0.13	0.22	0.13	0.06	0.11
O077	0.07	0.10	0.19	0.13	0.06	0.14	0.08	0.11
O078	0.07	0.14	0.06	0.15	0.05	0.17	0.02	0.09
O079	0.10	0.14	0.04	0.16	0.11	0.21	0.10	0.12
O080	0.20	0.17	0.12	0.17	0.10	0.20	0.10	0.16
O081	0.26	0.17	0.15	0.17	0.10	0.19	0.19	0.18
O082	0.19	0.12	0.09	0.19	0.09	0.19	0.21	0.15
O083	0.37	0.19	0.17	0.18	0.05	0.17	0.13	0.21
O084	0.29	0.09	0.12	0.16	0.07	0.14	0.04	0.15
O085	0.21	0.09	0.10	0.14	0.14	0.11	0.06	0.13
O086	0.16	0.11	0.04	0.11	0.17	0.13	0.15	0.12
O087	0.11	0.15	0.04	0.13	0.17	0.15	0.22	0.13
O088	0.02	0.16	0.06	0.18	0.09	0.14	0.11	0.10
O089	0.06	0.18	0.09	0.20	0.09	0.04	0.06	0.11
O090	0.07	0.18	0.12	0.25	0.11	0.04	0.15	0.13
O091	0.07	0.14	0.11	0.29	0.34	0.31	0.21	0.18
O092	0.04	0.18	0.03	0.36	0.06	0.34	0.14	0.15
O093	0.06	0.16	0.10	0.32	0.18	0.18	0.29	0.16
O094	0.08	0.15	0.10	0.33	0.20	0.24	0.22	0.17
O095	0.13	0.12	0.05	0.22	0.21	0.22	0.24	0.15
O096	0.27	0.10	0.10	0.19	0.18	0.16	0.11	0.17
O097	0.35	0.10	0.13	0.17	0.13	0.13	0.03	0.17
O098	0.38	0.22	0.17	0.17	0.13	0.15	0.09	0.22
O099	0.14	0.10	0.06	0.14	0.12	0.15	0.12	0.12
O100	0.12	0.08	0.03	0.09	0.09	0.12	0.15	0.09
O101	0.24	0.17	0.10	0.14	0.07	0.10	0.08	0.15
O102	0.13	0.10	0.05	0.12	0.16	0.12	0.08	0.11
O103	0.22	0.13	0.14	0.09	0.05	0.08	0.09	0.13
O104	0.04	0.16	0.06	0.16	0.07	0.12	0.18	0.10
O105	0.20	0.21	0.07	0.32	0.14	0.25	0.20	0.19
O106	0.22	0.12	0.17	0.28	0.08	0.18	0.10	0.17
O107	0.30	0.11	0.14	0.14	0.02	0.06	0.21	0.16
O108	0.12	0.06	0.11	0.14	0.03	0.08	0.06	0.09
O109	0.25	0.09	0.17	0.17	0.09	0.15	0.05	0.15
O110	0.11	0.09	0.04	0.14	0.04	0.08	0.08	0.09
O111	0.19	0.10	0.11	0.16	0.13	0.16	0.09	0.14
O112	0.11	0.11	0.25	0.19	0.16	0.18	0.14	0.16
O113	0.13	0.13	0.27	0.22	0.17	0.20	0.12	0.18
O114	0.12	0.09	0.11	0.17	0.13	0.17	0.11	0.12
O115	0.06	0.04	0.17	0.16	0.12	0.21	0.15	0.12
O116	0.17	0.07	0.31	0.17	0.26	0.23	0.25	0.20

Wind direction	SSW	S	SW	SSE	ESE	SE	E	Average
O117	0.18	0.09	0.16	0.19	0.16	0.19	0.10	0.15
O118	0.17	0.14	0.07	0.23	0.20	0.23	0.19	0.16
O119	0.01	0.09	0.14	0.17	0.20	0.21	0.22	0.12
O120	0.23	0.09	0.07	0.19	0.19	0.23	0.15	0.16
O121	0.21	0.08	0.16	0.19	0.13	0.20	0.07	0.16
O122	0.15	0.05	0.12	0.09	0.02	0.06	0.05	0.09
O123	0.24	0.07	0.10	0.06	0.01	0.03	0.13	0.11
O124	0.20	0.10	0.08	0.20	0.03	0.19	0.19	0.14
O125	0.13	0.08	0.34	0.22	0.18	0.19	0.26	0.19
O126	0.14	0.07	0.08	0.01	0.03	0.01	0.05	0.07
O127	0.17	0.08	0.15	0.03	0.05	0.03	0.10	0.10
O128	0.19	0.06	0.27	0.05	0.05	0.06	0.02	0.12
O129	0.20	0.05	0.25	0.08	0.05	0.13	0.03	0.13
O130	0.22	0.05	0.23	0.14	0.11	0.14	0.02	0.15
O131	0.27	0.04	0.26	0.13	0.17	0.13	0.00	0.16
O132	0.28	0.05	0.25	0.17	0.09	0.15	0.15	0.17
O133	0.15	0.06	0.20	0.04	0.06	0.17	0.07	0.11
O134	0.02	0.12	0.01	0.20	0.08	0.13	0.13	0.09
O135	0.06	0.07	0.01	0.08	0.10	0.10	0.12	0.07
O136	0.07	0.01	0.04	0.15	0.14	0.15	0.10	0.08
O137	0.07	0.06	0.06	0.17	0.11	0.17	0.15	0.10
O138	0.09	0.12	0.12	0.17	0.11	0.27	0.13	0.13
O139	0.13	0.15	0.20	0.08	0.11	0.21	0.01	0.13
O140	0.13	0.15	0.19	0.11	0.17	0.32	0.08	0.16
O141	0.12	0.15	0.14	0.16	0.15	0.30	0.05	0.15
O142	0.11	0.12	0.16	0.08	0.15	0.35	0.10	0.14
O143	0.10	0.13	0.06	0.07	0.05	0.11	0.09	0.09
O144	0.17	0.13	0.11	0.05	0.11	0.03	0.13	0.11
O145	0.11	0.04	0.13	0.04	0.02	0.14	0.14	0.09
O146	0.14	0.09	0.15	0.05	0.04	0.19	0.14	0.12
O147	0.05	0.03	0.07	0.13	0.07	0.22	0.13	0.09
O148	0.08	0.02	0.11	0.15	0.07	0.25	0.06	0.10
O149	0.15	0.02	0.15	0.13	0.06	0.21	0.08	0.11
O150	0.16	0.05	0.16	0.08	0.04	0.17	0.11	0.11
O151	0.14	0.05	0.16	0.03	0.03	0.17	0.15	0.11
O152	0.14	0.01	0.16	0.07	0.04	0.10	0.17	0.10
O153	0.04	0.10	0.08	0.08	0.10	0.11	0.15	0.08
O154	0.11	0.09	0.06	0.11	0.10	0.15	0.08	0.10
O155	0.16	0.12	0.10	0.18	0.13	0.23	0.02	0.14
O156	0.10	0.04	0.27	0.17	0.07	0.10	0.04	0.12
O157	0.15	0.08	0.23	0.16	0.07	0.12	0.10	0.14
O158	0.13	0.10	0.15	0.15	0.07	0.14	0.12	0.12
O159	0.12	0.12	0.04	0.09	0.06	0.12	0.11	0.10
O160	0.07	0.07	0.06	0.06	0.04	0.06	0.07	0.06
O161	0.13	0.08	0.16	0.07	0.06	0.09	0.05	0.10
O162	0.17	0.10	0.15	0.07	0.01	0.05	0.01	0.10
O163	0.21	0.11	0.16	0.08	0.01	0.06	0.01	0.11
O164	0.17	0.08	0.15	0.03	0.04	0.06	0.05	0.10
O165	0.14	0.03	0.16	0.06	0.08	0.06	0.16	0.10
O166	0.13	0.10	0.18	0.02	0.13	0.12	0.19	0.12
O167	0.14	0.05	0.21	0.07	0.16	0.18	0.23	0.14
O168	0.17	0.10	0.25	0.08	0.13	0.15	0.22	0.15
O169	0.19	0.15	0.25	0.06	0.09	0.01	0.17	0.15
O170	0.19	0.20	0.17	0.03	0.05	0.09	0.12	0.14
O171	0.16	0.10	0.22	0.09	0.19	0.19	0.24	0.16
O172	0.11	0.05	0.14	0.08	0.18	0.19	0.25	0.13
O173	0.13	0.07	0.13	0.02	0.16	0.17	0.23	0.12
O174	0.15	0.01	0.13	0.06	0.13	0.12	0.21	0.11
O175	0.20	0.08	0.13	0.02	0.09	0.04	0.15	0.11
O176	0.22	0.11	0.14	0.07	0.09	0.04	0.08	0.12
O177	0.07	0.10	0.12	0.13	0.10	0.12	0.10	0.10
O178	0.08	0.08	0.13	0.12	0.10	0.12	0.11	0.10
O179	0.15	0.05	0.06	0.12	0.11	0.14	0.10	0.10
O180	0.06	0.03	0.10	0.11	0.10	0.14	0.07	0.08
O181	0.25	0.14	0.14	0.13	0.03	0.11	0.01	0.14
O182	0.19	0.12	0.13	0.07	0.03	0.10	0.05	0.11
O183	0.10	0.08	0.12	0.09	0.06	0.11	0.06	0.09
O184	0.05	0.07	0.08	0.05	0.06	0.07	0.08	0.06
O185	0.10	0.10	0.02	0.15	0.08	0.13	0.07	0.09
O186	0.11	0.10	0.12	0.15	0.07	0.13	0.14	0.11
O187	0.12	0.08	0.15	0.15	0.08	0.11	0.10	0.11
O188	0.12	0.06	0.24	0.15	0.06	0.11	0.06	0.12
O189	0.26	0.09	0.38	0.17	0.09	0.15	0.05	0.19
O190	0.20	0.07	0.11	0.18	0.11	0.22	0.04	0.14
O191	0.19	0.12	0.14	0.16	0.13	0.21	0.09	0.15
O192	0.09	0.07	0.06	0.10	0.13	0.13	0.09	0.09
O193	0.05	0.07	0.07	0.08	0.14	0.10	0.13	0.08

Table D4

VRs at Assessment Point Under Summer Condition (Baseline Scheme)

Wind direction	SSW	S	SW	SSE	ESE	SE	E	Annual
Percentage	17.8%	14.6%	13.2%	9.8%	8.2%	7.3%	6.2%	77.1%
P01	0.23	0.15	0.32	0.21	0.23	0.30	0.16	0.23
P02	0.18	0.03	0.32	0.12	0.02	0.08	0.08	0.13
P03	0.08	0.04	0.20	0.03	0.01	0.03	0.16	0.08
P04	0.14	0.07	0.19	0.06	0.15	0.11	0.05	0.11
P05	0.05	0.01	0.17	0.05	0.19	0.12	0.13	0.09
P06	0.06	0.07	0.15	0.04	0.03	0.04	0.14	0.07
P07	0.09	0.14	0.18	0.17	0.32	0.25	0.42	0.19
P08	0.07	0.17	0.04	0.19	0.29	0.25	0.35	0.16
P09	0.10	0.16	0.07	0.19	0.25	0.24	0.28	0.16
P10	0.10	0.14	0.09	0.20	0.23	0.23	0.25	0.16
P11	0.10	0.08	0.09	0.21	0.20	0.22	0.21	0.14
P12	0.07	0.06	0.09	0.22	0.18	0.20	0.18	0.12
P13	0.02	0.09	0.08	0.28	0.18	0.22	0.19	0.13
P14	0.19	0.25	0.04	0.32	0.11	0.24	0.18	0.19
P15	0.28	0.24	0.26	0.23	0.03	0.16	0.18	0.22
P16	0.26	0.24	0.26	0.17	0.06	0.10	0.13	0.20
P17	0.24	0.14	0.26	0.15	0.12	0.09	0.13	0.18
P18	0.16	0.07	0.21	0.14	0.09	0.09	0.30	0.15
P19	0.16	0.05	0.19	0.10	0.10	0.05	0.31	0.13
P20	0.19	0.07	0.17	0.01	0.08	0.01	0.30	0.12
P21	0.14	0.07	0.13	0.04	0.06	0.03	0.20	0.10
P22	0.22	0.13	0.15	0.04	0.01	0.04	0.14	0.12
P23	0.19	0.13	0.20	0.04	0.11	0.03	0.27	0.14
P24	0.15	0.14	0.22	0.09	0.14	0.05	0.21	0.15
P25	0.23	0.12	0.31	0.20	0.20	0.13	0.30	0.21
P26	0.22	0.09	0.31	0.26	0.21	0.17	0.28	0.21
P27	0.07	0.10	0.07	0.19	0.11	0.12	0.04	0.10
P28	0.10	0.20	0.16	0.26	0.12	0.16	0.07	0.16
P29	0.12	0.23	0.16	0.23	0.16	0.15	0.09	0.17
P30	0.09	0.21	0.12	0.12	0.12	0.05	0.07	0.12
P31	0.07	0.22	0.04	0.20	0.14	0.14	0.14	0.13
P32	0.13	0.22	0.04	0.21	0.19	0.19	0.17	0.16
P33	0.20	0.18	0.06	0.16	0.16	0.15	0.18	0.16
P34	0.28	0.29	0.14	0.30	0.31	0.32	0.31	0.27
P35	0.35	0.25	0.33	0.25	0.28	0.31	0.24	0.29
P36	0.34	0.20	0.41	0.23	0.26	0.30	0.18	0.29
O001	0.24	0.12	0.32	0.13	0.05	0.14	0.06	0.17
O002	0.28	0.12	0.22	0.12	0.09	0.19	0.06	0.17
O003	0.15	0.05	0.16	0.01	0.09	0.15	0.08	0.10
O004	0.12	0.04	0.01	0.08	0.09	0.04	0.06	0.07
O005	0.18	0.01	0.19	0.11	0.13	0.07	0.07	0.11
O006	0.17	0.10	0.10	0.07	0.08	0.03	0.10	0.10
O007	0.09	0.09	0.11	0.12	0.09	0.11	0.06	0.10
O008	0.11	0.14	0.05	0.10	0.10	0.09	0.09	0.10
O009	0.13	0.12	0.12	0.07	0.06	0.09	0.21	0.11
O010	0.06	0.06	0.06	0.12	0.13	0.12	0.24	0.10
O011	0.09	0.12	0.11	0.10	0.07	0.06	0.14	0.10
O012	0.08	0.10	0.06	0.07	0.03	0.07	0.04	0.07
O013	0.18	0.11	0.20	0.07	0.05	0.16	0.06	0.13
O014	0.20	0.17	0.22	0.15	0.08	0.22	0.03	0.17
O015	0.04	0.03	0.06	0.04	0.02	0.05	0.04	0.04
O016	0.23	0.19	0.18	0.12	0.02	0.14	0.06	0.15
O017	0.17	0.07	0.17	0.02	0.08	0.04	0.14	0.11
O018	0.14	0.04	0.09	0.06	0.07	0.01	0.14	0.08
O019	0.07	0.04	0.10	0.06	0.02	0.01	0.06	0.06
O020	0.09	0.04	0.12	0.11	0.11	0.04	0.07	0.08
O021	0.06	0.08	0.10	0.11	0.06	0.02	0.04	0.07
O022	0.09	0.05	0.13	0.05	0.02	0.02	0.08	0.07
O023	0.18	0.10	0.15	0.06	0.05	0.06	0.13	0.12
O024	0.17	0.11	0.17	0.09	0.06	0.03	0.13	0.12
O025	0.14	0.15	0.14	0.08	0.03	0.11	0.03	0.11
O026	0.20	0.05	0.20	0.05	0.03	0.05	0.05	0.11
O027	0.23	0.10	0.25	0.13	0.08	0.14	0.03	0.16
O028	0.15	0.07	0.28	0.04	0.05	0.00	0.03	0.11
O029	0.15	0.06	0.23	0.02	0.03	0.02	0.35	0.12
O030	0.07	0.04	0.18	0.08	0.29	0.23	0.36	0.15
O031	0.12	0.15	0.16	0.22	0.30	0.27	0.38	0.20
O032	0.05	0.09	0.05	0.22	0.28	0.26	0.32	0.15
O033	0.06	0.02	0.08	0.21	0.26	0.26	0.25	0.13
O034	0.08	0.02	0.12	0.18	0.24	0.25	0.18	0.13
O035	0.09	0.02	0.14	0.15	0.23	0.24	0.18	0.13
O036	0.10	0.06	0.20	0.09	0.18	0.19	0.16	0.13
O037	0.19	0.14	0.22	0.04	0.11	0.08	0.18	0.15
O038	0.22	0.24	0.08	0.06	0.13	0.17	0.03	0.15

Wind direction	SSW	S	SW	SSE	ESE	SE	E	Annual
O039	0.06	0.08	0.09	0.11	0.15	0.14	0.10	0.10
O040	0.16	0.16	0.07	0.17	0.16	0.19	0.14	0.15
O041	0.21	0.19	0.17	0.12	0.13	0.17	0.05	0.16
O042	0.16	0.09	0.23	0.09	0.11	0.17	0.20	0.15
O043	0.06	0.03	0.14	0.11	0.12	0.19	0.12	0.10
O044	0.07	0.02	0.13	0.15	0.17	0.21	0.17	0.11
O045	0.05	0.02	0.10	0.17	0.19	0.21	0.08	0.10
O046	0.05	0.07	0.07	0.21	0.23	0.23	0.19	0.12
O047	0.08	0.11	0.04	0.23	0.25	0.24	0.30	0.15
O048	0.12	0.19	0.13	0.22	0.28	0.25	0.38	0.20
O049	0.02	0.19	0.21	0.20	0.24	0.23	0.34	0.18
O050	0.12	0.18	0.08	0.21	0.21	0.22	0.28	0.17
O051	0.18	0.20	0.15	0.24	0.19	0.21	0.22	0.20
O052	0.18	0.21	0.12	0.24	0.12	0.21	0.16	0.18
O053	0.16	0.15	0.12	0.15	0.05	0.14	0.14	0.14
O054	0.13	0.13	0.18	0.11	0.03	0.03	0.11	0.11
O055	0.17	0.05	0.15	0.07	0.12	0.05	0.18	0.12
O056	0.10	0.09	0.05	0.09	0.11	0.08	0.18	0.09
O057	0.12	0.11	0.06	0.09	0.03	0.05	0.18	0.09
O058	0.18	0.14	0.09	0.10	0.10	0.14	0.15	0.13
O059	0.08	0.07	0.09	0.10	0.13	0.17	0.15	0.10
O060	0.04	0.09	0.04	0.12	0.16	0.19	0.14	0.09
O061	0.08	0.07	0.04	0.13	0.10	0.19	0.08	0.09
O062	0.12	0.05	0.11	0.14	0.23	0.19	0.24	0.13
O063	0.14	0.09	0.07	0.17	0.21	0.21	0.16	0.14
O064	0.13	0.14	0.08	0.17	0.18	0.19	0.15	0.14
O065	0.06	0.15	0.10	0.14	0.14	0.16	0.05	0.11
O066	0.11	0.21	0.09	0.12	0.14	0.17	0.30	0.15
O067	0.03	0.19	0.04	0.10	0.18	0.18	0.10	0.11
O068	0.03	0.02	0.01	0.07	0.18	0.17	0.18	0.07
O069	0.04	0.02	0.10	0.04	0.19	0.18	0.25	0.09
O070	0.09	0.11	0.12	0.10	0.18	0.18	0.29	0.14
O071	0.06	0.24	0.05	0.12	0.13	0.17	0.16	0.13
O072	0.06	0.20	0.04	0.14	0.18	0.17	0.03	0.11
O073	0.09	0.17	0.11	0.14	0.06	0.13	0.22	0.13
O074	0.16	0.13	0.09	0.15	0.09	0.13	0.06	0.12
O075	0.18	0.10	0.04	0.15	0.13	0.15	0.10	0.12
O076	0.08	0.08	0.11	0.12	0.22	0.14	0.06	0.11
O077	0.09	0.08	0.15	0.11	0.05	0.15	0.09	0.10
O078	0.08	0.11	0.04	0.13	0.05	0.19	0.02	0.09
O079	0.11	0.11	0.01	0.14	0.11	0.21	0.09	0.11
O080	0.20	0.14	0.04	0.16	0.09	0.20	0.09	0.14
O081	0.25	0.16	0.11	0.18	0.10	0.19	0.18	0.17
O082	0.19	0.12	0.06	0.19	0.09	0.19	0.23	0.15
O083	0.36	0.19	0.20	0.17	0.04	0.16	0.15	0.21
O084	0.26	0.10	0.20	0.15	0.06	0.13	0.03	0.15
O085	0.19	0.10	0.15	0.12	0.14	0.11	0.09	0.14
O086	0.17	0.12	0.10	0.10	0.17	0.14	0.18	0.14
O087	0.13	0.15	0.15	0.10	0.17	0.15	0.23	0.15
O088	0.05	0.16	0.03	0.16	0.09	0.14	0.13	0.10
O089	0.06	0.18	0.09	0.14	0.09	0.04	0.07	0.10
O090	0.06	0.17	0.08	0.22	0.11	0.04	0.15	0.12
O091	0.06	0.13	0.10	0.28	0.34	0.31	0.22	0.18
O092	0.04	0.18	0.01	0.35	0.05	0.34	0.14	0.14
O093	0.03	0.16	0.12	0.30	0.19	0.17	0.28	0.16
O094	0.10	0.16	0.12	0.30	0.20	0.23	0.21	0.17
O095	0.15	0.13	0.12	0.21	0.21	0.22	0.26	0.17
O096	0.25	0.11	0.19	0.17	0.17	0.17	0.14	0.18
O097	0.32	0.10	0.22	0.16	0.12	0.12	0.04	0.18
O098	0.38	0.22	0.18	0.18	0.11	0.15	0.10	0.22
O099	0.13	0.09	0.04	0.16	0.10	0.16	0.13	0.11
O100	0.11	0.05	0.06	0.08	0.08	0.12	0.18	0.09
O101	0.25	0.16	0.02	0.11	0.07	0.10	0.12	0.13
O102	0.09	0.09	0.07	0.11	0.16	0.10	0.12	0.10
O103	0.26	0.09	0.17	0.09	0.04	0.09	0.08	0.14
O104	0.03	0.14	0.23	0.08	0.05	0.06	0.06	0.10
O105	0.28	0.20	0.20	0.20	0.07	0.17	0.11	0.20
O106	0.17	0.07	0.23	0.13	0.15	0.13	0.22	0.15
O107	0.25	0.06	0.13	0.14	0.05	0.13	0.14	0.14
O108	0.09	0.07	0.08	0.14	0.08	0.16	0.08	0.10
O109	0.22	0.11	0.19	0.16	0.11	0.19	0.10	0.16
O110	0.12	0.11	0.10	0.13	0.05	0.08	0.06	0.10
O111	0.19	0.11	0.06	0.15	0.15	0.19	0.13	0.14
O112	0.09	0.11	0.06	0.17	0.17	0.21	0.16	0.13
O113	0.14	0.14	0.19	0.21	0.17	0.22	0.13	0.17
O114	0.10	0.09	0.10	0.16	0.14	0.19	0.12	0.12
O115	0.06	0.04	0.13	0.16	0.13	0.23	0.18	0.11
O116	0.15	0.08	0.27	0.17	0.26	0.24	0.25	0.19

Wind direction	SSW	S	SW	SSE	ESE	SE	E	Annual
O117	0.17	0.09	0.17	0.18	0.17	0.21	0.11	0.16
O118	0.15	0.15	0.10	0.22	0.20	0.26	0.21	0.17
O119	0.05	0.10	0.16	0.17	0.21	0.24	0.25	0.14
O120	0.22	0.11	0.09	0.18	0.21	0.26	0.18	0.17
O121	0.18	0.10	0.11	0.19	0.17	0.24	0.12	0.15
O122	0.12	0.07	0.11	0.12	0.11	0.11	0.05	0.10
O123	0.18	0.04	0.10	0.12	0.08	0.08	0.07	0.10
O124	0.12	0.06	0.09	0.12	0.07	0.08	0.24	0.11
O125	0.21	0.13	0.16	0.04	0.03	0.05	0.10	0.12
O126	0.21	0.10	0.18	0.04	0.07	0.04	0.08	0.12
O127	0.23	0.09	0.25	0.08	0.05	0.07	0.07	0.14
O128	0.24	0.06	0.34	0.01	0.02	0.07	0.01	0.14
O129	0.23	0.05	0.30	0.04	0.08	0.13	0.03	0.14
O130	0.24	0.06	0.26	0.08	0.12	0.15	0.04	0.15
O131	0.28	0.04	0.28	0.07	0.17	0.13	0.03	0.16
O132	0.28	0.05	0.26	0.13	0.08	0.15	0.15	0.17
O133	0.15	0.06	0.20	0.04	0.07	0.17	0.08	0.11
O134	0.02	0.18	0.06	0.15	0.19	0.20	0.18	0.12
O135	0.07	0.11	0.03	0.17	0.13	0.16	0.15	0.10
O136	0.07	0.01	0.03	0.18	0.10	0.09	0.15	0.08
O137	0.07	0.02	0.04	0.17	0.10	0.15	0.15	0.09
O138	0.09	0.11	0.10	0.14	0.11	0.26	0.12	0.12
O139	0.14	0.15	0.18	0.08	0.09	0.20	0.06	0.14
O140	0.15	0.15	0.19	0.10	0.16	0.32	0.08	0.16
O141	0.14	0.16	0.14	0.10	0.14	0.31	0.07	0.15
O142	0.12	0.12	0.17	0.06	0.15	0.35	0.05	0.14
O143	0.09	0.13	0.07	0.07	0.05	0.08	0.04	0.08
O144	0.17	0.12	0.10	0.05	0.09	0.05	0.18	0.12
O145	0.12	0.04	0.14	0.03	0.04	0.16	0.19	0.10
O146	0.15	0.08	0.17	0.05	0.06	0.21	0.18	0.12
O147	0.06	0.04	0.11	0.12	0.08	0.23	0.15	0.10
O148	0.09	0.03	0.14	0.14	0.08	0.25	0.08	0.11
O149	0.17	0.02	0.16	0.12	0.07	0.21	0.08	0.12
O150	0.17	0.03	0.17	0.08	0.06	0.18	0.11	0.12
O151	0.15	0.05	0.17	0.04	0.06	0.20	0.18	0.12
O152	0.14	0.01	0.17	0.04	0.06	0.12	0.22	0.10
O153	0.04	0.09	0.08	0.07	0.07	0.12	0.19	0.09
O154	0.11	0.08	0.05	0.07	0.09	0.16	0.11	0.09
O155	0.16	0.11	0.10	0.13	0.13	0.25	0.03	0.13
O156	0.10	0.04	0.26	0.13	0.07	0.13	0.07	0.12
O157	0.15	0.08	0.20	0.12	0.09	0.13	0.12	0.13
O158	0.13	0.10	0.11	0.11	0.07	0.15	0.11	0.11
O159	0.11	0.11	0.07	0.06	0.05	0.14	0.11	0.09
O160	0.07	0.05	0.04	0.07	0.06	0.05	0.03	0.06
O161	0.13	0.07	0.16	0.07	0.07	0.07	0.08	0.10
O162	0.17	0.09	0.15	0.06	0.05	0.04	0.01	0.10
O163	0.20	0.10	0.16	0.07	0.05	0.06	0.02	0.12
O164	0.16	0.06	0.15	0.02	0.09	0.06	0.02	0.09
O165	0.13	0.02	0.15	0.08	0.13	0.05	0.12	0.10
O166	0.13	0.09	0.16	0.10	0.09	0.12	0.17	0.12
O167	0.13	0.05	0.18	0.02	0.13	0.20	0.23	0.13
O168	0.17	0.09	0.22	0.05	0.13	0.16	0.22	0.15
O169	0.19	0.14	0.23	0.06	0.10	0.07	0.19	0.15
O170	0.19	0.20	0.12	0.04	0.06	0.11	0.12	0.13
O171	0.16	0.10	0.20	0.05	0.18	0.19	0.23	0.15
O172	0.11	0.04	0.15	0.05	0.16	0.19	0.24	0.12
O173	0.12	0.06	0.12	0.08	0.10	0.17	0.22	0.12
O174	0.14	0.01	0.13	0.10	0.14	0.11	0.20	0.11
O175	0.19	0.07	0.13	0.02	0.14	0.05	0.10	0.11
O176	0.22	0.10	0.12	0.06	0.12	0.05	0.05	0.12
O177	0.10	0.10	0.12	0.12	0.08	0.11	0.10	0.10
O178	0.07	0.08	0.12	0.12	0.08	0.10	0.12	0.09
O179	0.13	0.05	0.07	0.11	0.09	0.09	0.10	0.09
O180	0.03	0.03	0.09	0.10	0.09	0.09	0.08	0.07
O181	0.25	0.13	0.14	0.12	0.06	0.12	0.04	0.14
O182	0.19	0.11	0.13	0.07	0.06	0.06	0.07	0.11
O183	0.10	0.07	0.14	0.09	0.08	0.09	0.10	0.10
O184	0.04	0.07	0.06	0.03	0.08	0.04	0.08	0.06
O185	0.10	0.10	0.06	0.11	0.09	0.13	0.07	0.09
O186	0.11	0.10	0.08	0.11	0.07	0.15	0.14	0.10
O187	0.12	0.07	0.13	0.11	0.09	0.13	0.15	0.11
O188	0.12	0.05	0.20	0.10	0.08	0.13	0.11	0.11
O189	0.26	0.08	0.34	0.13	0.11	0.17	0.05	0.18
O190	0.21	0.06	0.12	0.14	0.12	0.24	0.06	0.14
O191	0.20	0.11	0.14	0.13	0.12	0.22	0.11	0.15
O192	0.08	0.06	0.05	0.09	0.12	0.14	0.11	0.09
O193	0.04	0.06	0.07	0.09	0.14	0.09	0.16	0.08

Table D5

Annual Spatial Average Velocity Ratios (Baseline Scheme)

	E	NE	ESE	ENE	SSW	S	SSE	NNE	SE	Annual	Min	Max
LVR	0.14	0.15	0.12	0.15	0.14	0.10	0.12	0.13	0.14	0.14	0.10	0.15
SVR	0.20	0.20	0.15	0.19	0.16	0.14	0.17	0.18	0.20	0.18	0.14	0.20
Zone 1	0.12	0.13	0.10	0.17	0.14	0.08	0.09	0.15	0.12	0.12	0.08	0.17
Zone 2	0.09	0.12	0.05	0.07	0.14	0.09	0.08	0.13	0.09	0.09	0.05	0.14
Zone 3	0.18	0.18	0.16	0.17	0.13	0.11	0.17	0.14	0.18	0.16	0.11	0.18
Zone 4	0.14	0.30	0.08	0.21	0.14	0.11	0.09	0.21	0.14	0.16	0.08	0.30
Zone 5	0.15	0.15	0.14	0.16	0.13	0.13	0.16	0.16	0.15	0.15	0.13	0.16
Zone 6	0.10	0.17	0.10	0.16	0.17	0.10	0.09	0.07	0.10	0.12	0.07	0.17
Zone 7	0.15	0.10	0.07	0.12	0.13	0.04	0.08	0.18	0.15	0.11	0.04	0.18
Zone 8	0.12	0.11	0.10	0.11	0.14	0.08	0.08	0.10	0.12	0.11	0.08	0.14
Zone 9	0.08	0.07	0.09	0.07	0.14	0.08	0.10	0.09	0.08	0.09	0.07	0.14

Zone 1 Fuk Wang Street
Zone 2 Fuk Yan Street
Zone 3 Wang Lee Street
Zone 4 Wang Fu Street
Zone 5 Wang Lok Street
Zone 6 Footpath near Site
Zone 7 Fuk Hang Street
Zone 8 Fuk Hi Street
Zone 9 Fuk Shun Street

Table D6

Annual Spatial Average Velocity Ratios (Proposed Scheme)

	E	NE	ESE	ENE	SSW	S	SSE	NNE	SE	Annual	Min	Max
LVR	0.13	0.14	0.11	0.14	0.13	0.10	0.13	0.14	0.13	0.13	0.10	0.14
SVR	0.15	0.20	0.13	0.18	0.12	0.11	0.16	0.21	0.15	0.16	0.11	0.21
Zone 1	0.09	0.13	0.08	0.14	0.15	0.09	0.08	0.17	0.09	0.11	0.08	0.17
Zone 2	0.07	0.12	0.04	0.08	0.14	0.09	0.06	0.13	0.07	0.09	0.04	0.14
Zone 3	0.17	0.19	0.15	0.18	0.12	0.09	0.16	0.16	0.17	0.16	0.09	0.19
Zone 4	0.12	0.23	0.08	0.18	0.14	0.12	0.12	0.16	0.12	0.14	0.08	0.23
Zone 5	0.14	0.14	0.14	0.16	0.11	0.14	0.18	0.16	0.14	0.14	0.11	0.18
Zone 6	0.11	0.12	0.12	0.14	0.14	0.08	0.13	0.06	0.11	0.11	0.06	0.14
Zone 7	0.12	0.10	0.05	0.06	0.12	0.04	0.08	0.15	0.12	0.09	0.04	0.15
Zone 8	0.11	0.10	0.09	0.11	0.14	0.09	0.09	0.11	0.11	0.11	0.09	0.14
Zone 9	0.08	0.06	0.09	0.07	0.14	0.09	0.11	0.08	0.08	0.09	0.06	0.14

Zone 1 Fuk Wang Street
Zone 2 Fuk Yan Street
Zone 3 Wang Lee Street
Zone 4 Wang Fu Street
Zone 5 Wang Lok Street
Zone 6 Footpath near Site
Zone 7 Fuk Hang Street
Zone 8 Fuk Hi Street
Zone 9 Fuk Shun Street

Table D7

Summer Spatial Average Velocity Ratios (Baseline Scheme)

	SSW	S	SW	SSE	ESE	SE	E	Annual	Min	Max
LVR	0.14	0.10	0.14	0.12	0.12	0.15	0.14	0.13	0.10	0.15
SVR	0.16	0.14	0.17	0.17	0.15	0.15	0.20	0.16	0.14	0.20
Zone 1	0.14	0.08	0.17	0.09	0.10	0.11	0.12	0.12	0.08	0.17
Zone 2	0.14	0.09	0.13	0.08	0.05	0.05	0.09	0.10	0.05	0.14
Zone 3	0.13	0.11	0.13	0.17	0.16	0.19	0.18	0.15	0.11	0.19
Zone 4	0.14	0.11	0.11	0.09	0.08	0.08	0.14	0.11	0.08	0.14
Zone 5	0.13	0.13	0.09	0.16	0.14	0.17	0.15	0.13	0.09	0.17
Zone 6	0.17	0.10	0.18	0.09	0.10	0.15	0.10	0.13	0.09	0.18
Zone 7	0.13	0.04	0.15	0.08	0.07	0.19	0.15	0.11	0.04	0.19
Zone 8	0.14	0.08	0.14	0.08	0.10	0.12	0.12	0.11	0.08	0.14
Zone 9	0.14	0.08	0.11	0.10	0.09	0.09	0.08	0.10	0.08	0.14

Zone 1 Fuk Wang Street
Zone 2 Fuk Yan Street
Zone 3 Wang Lee Street
Zone 4 Wang Fu Street
Zone 5 Wang Lok Street
Zone 6 Footpath near Site
Zone 7 Fuk Hang Street
Zone 8 Fuk Hi Street
Zone 9 Fuk Shun Street

Table D8

Summer Spatial Average Velocity Ratios (Proposed Scheme)

	SSW	S	SW	SSE	ESE	SE	E	Annual	Min	Max
LVR	0.13	0.10	0.13	0.13	0.11	0.15	0.13	0.12	0.10	0.15
SVR	0.12	0.11	0.15	0.16	0.13	0.16	0.15	0.14	0.11	0.16
Zone 1	0.15	0.09	0.16	0.08	0.08	0.10	0.09	0.12	0.08	0.16
Zone 2	0.14	0.09	0.14	0.06	0.04	0.04	0.07	0.09	0.04	0.14
Zone 3	0.12	0.09	0.13	0.16	0.15	0.20	0.17	0.14	0.09	0.20
Zone 4	0.14	0.12	0.08	0.12	0.08	0.09	0.12	0.11	0.08	0.14
Zone 5	0.11	0.14	0.09	0.18	0.14	0.16	0.14	0.13	0.09	0.18
Zone 6	0.14	0.08	0.18	0.13	0.12	0.17	0.11	0.13	0.08	0.18
Zone 7	0.12	0.04	0.14	0.08	0.05	0.18	0.12	0.10	0.04	0.18
Zone 8	0.14	0.09	0.15	0.09	0.09	0.12	0.11	0.12	0.09	0.15
Zone 9	0.14	0.09	0.12	0.11	0.09	0.11	0.08	0.11	0.08	0.14

Zone 1 Fuk Wang Street
Zone 2 Fuk Yan Street
Zone 3 Wang Lee Street
Zone 4 Wang Fu Street
Zone 5 Wang Lok Street
Zone 6 Footpath near Site
Zone 7 Fuk Hang Street
Zone 8 Fuk Hi Street
Zone 9 Fuk Shun Street

Table D9

VRs at Special Test Point Under Annual Condition (Proposed Scheme)

Wind direction	E	NE	ESE	ENE	SSW	S	SSE	NNE	SE	Annual
Percentage	15.7%	10.8%	10.5%	9.8%	8.5%	7.4%	7.3%	7.2%	7.2%	84.4%
S01	0.05	0.15	0.04	0.09	0.12	0.03	0.03	0.29	0.02	0.09
S02	0.12	0.12	0.05	0.10	0.02	0.04	0.08	0.28	0.06	0.10
S03	0.12	0.06	0.06	0.15	0.06	0.06	0.03	0.21	0.04	0.09
S04	0.12	0.03	0.10	0.12	0.22	0.05	0.09	0.29	0.09	0.12
S05	0.05	0.16	0.08	0.08	0.11	0.06	0.01	0.22	0.03	0.09
S06	0.30	0.36	0.27	0.41	0.06	0.09	0.15	0.17	0.26	0.25
S07	0.20	0.22	0.22	0.27	0.04	0.08	0.14	0.10	0.23	0.17
S08	0.13	0.11	0.17	0.12	0.06	0.05	0.03	0.19	0.21	0.11
S09	0.15	0.20	0.12	0.18	0.05	0.07	0.16	0.27	0.15	0.15
S10	0.32	0.12	0.22	0.17	0.04	0.05	0.12	0.24	0.25	0.18
S11	0.20	0.19	0.14	0.09	0.05	0.07	0.18	0.29	0.22	0.15
S12	0.12	0.45	0.10	0.30	0.02	0.09	0.32	0.40	0.25	0.22
S13	0.18	0.35	0.12	0.30	0.20	0.17	0.36	0.28	0.26	0.24
S14	0.33	0.23	0.21	0.29	0.21	0.14	0.25	0.03	0.23	0.23
S15	0.38	0.22	0.26	0.30	0.13	0.07	0.33	0.05	0.28	0.24
S16	0.35	0.27	0.21	0.28	0.27	0.12	0.07	0.20	0.07	0.24
S17	0.36	0.33	0.20	0.35	0.34	0.14	0.06	0.28	0.09	0.27
S18	0.36	0.14	0.18	0.27	0.26	0.23	0.13	0.08	0.04	0.22
S19	0.22	0.21	0.15	0.12	0.18	0.11	0.06	0.04	0.09	0.15
S20	0.09	0.18	0.04	0.09	0.03	0.15	0.10	0.28	0.08	0.11
S21	0.10	0.01	0.04	0.08	0.10	0.10	0.04	0.06	0.11	0.07
S22	0.06	0.02	0.07	0.05	0.05	0.10	0.14	0.05	0.07	0.06
S23	0.09	0.08	0.10	0.07	0.09	0.11	0.18	0.08	0.12	0.10
S24	0.01	0.09	0.04	0.04	0.09	0.03	0.02	0.15	0.02	0.05
S25	0.03	0.23	0.06	0.13	0.29	0.19	0.15	0.37	0.06	0.16
S26	0.06	0.07	0.06	0.08	0.18	0.10	0.07	0.22	0.01	0.10
S27	0.04	0.02	0.05	0.04	0.16	0.16	0.11	0.27	0.03	0.09
S28	0.12	0.04	0.11	0.07	0.31	0.28	0.21	0.30	0.20	0.16
S29	0.11	0.02	0.06	0.08	0.10	0.06	0.16	0.03	0.10	0.08
S30	0.04	0.03	0.08	0.08	0.06	0.11	0.19	0.05	0.10	0.07
S31	0.01	0.14	0.01	0.07	0.08	0.02	0.00	0.20	0.07	0.06
S32	0.09	0.05	0.05	0.02	0.04	0.06	0.06	0.13	0.03	0.06
S33	0.07	0.03	0.04	0.05	0.01	0.01	0.03	0.12	0.07	0.05
S34	0.26	0.27	0.17	0.36	0.05	0.07	0.04	0.16	0.12	0.19
S35	0.12	0.15	0.10	0.17	0.02	0.04	0.05	0.18	0.07	0.11
S36	0.09	0.32	0.08	0.27	0.04	0.06	0.08	0.25	0.04	0.15
S37	0.03	0.03	0.10	0.02	0.06	0.16	0.07	0.05	0.09	0.06
S38	0.03	0.02	0.13	0.03	0.06	0.10	0.07	0.07	0.01	0.06
S39	0.11	0.02	0.09	0.02	0.14	0.08	0.20	0.06	0.14	0.09

Table D10

VRs at Special Test Point Under Summer Condition (Proposed Scheme)

Wind direction	SSW	S	SW	SSE	ESE	SE	E	Annual
Percentage	17.8%	14.6%	13.2%	9.8%	8.2%	7.3%	6.2%	77.1%
S01	0.12	0.03	0.17	0.03	0.04	0.02	0.05	0.08
S02	0.02	0.04	0.05	0.08	0.05	0.06	0.12	0.05
S03	0.06	0.06	0.13	0.03	0.06	0.04	0.12	0.07
S04	0.22	0.05	0.29	0.09	0.10	0.09	0.12	0.15
S05	0.11	0.06	0.20	0.01	0.08	0.03	0.05	0.09
S06	0.06	0.09	0.19	0.15	0.27	0.26	0.30	0.16
S07	0.04	0.08	0.10	0.14	0.22	0.23	0.20	0.12
S08	0.06	0.05	0.12	0.03	0.17	0.21	0.13	0.10
S09	0.05	0.07	0.04	0.16	0.12	0.15	0.15	0.09
S10	0.04	0.05	0.05	0.12	0.22	0.25	0.32	0.12
S11	0.05	0.07	0.04	0.18	0.14	0.22	0.20	0.11
S12	0.02	0.09	0.07	0.32	0.10	0.25	0.12	0.12
S13	0.20	0.17	0.08	0.36	0.12	0.26	0.18	0.19
S14	0.21	0.14	0.37	0.25	0.21	0.23	0.33	0.24
S15	0.13	0.07	0.32	0.33	0.26	0.28	0.38	0.22
S16	0.27	0.12	0.19	0.07	0.21	0.07	0.35	0.18
S17	0.34	0.14	0.35	0.06	0.20	0.09	0.36	0.23
S18	0.26	0.23	0.27	0.13	0.18	0.04	0.36	0.22
S19	0.18	0.11	0.09	0.06	0.15	0.09	0.22	0.13
S20	0.03	0.15	0.01	0.10	0.04	0.08	0.09	0.07
S21	0.10	0.10	0.11	0.04	0.04	0.11	0.10	0.09
S22	0.05	0.10	0.05	0.14	0.07	0.07	0.06	0.08
S23	0.09	0.11	0.11	0.18	0.10	0.12	0.09	0.11
S24	0.09	0.03	0.12	0.02	0.04	0.02	0.01	0.06
S25	0.29	0.19	0.33	0.15	0.06	0.06	0.03	0.19
S26	0.18	0.10	0.15	0.07	0.06	0.01	0.06	0.11
S27	0.16	0.16	0.12	0.11	0.05	0.03	0.04	0.11
S28	0.31	0.28	0.28	0.21	0.11	0.20	0.12	0.24
S29	0.10	0.06	0.11	0.16	0.06	0.10	0.11	0.10
S30	0.06	0.11	0.11	0.19	0.08	0.10	0.04	0.10
S31	0.08	0.02	0.04	0.00	0.01	0.07	0.01	0.04
S32	0.04	0.06	0.04	0.06	0.05	0.03	0.09	0.05
S33	0.01	0.01	0.02	0.03	0.04	0.07	0.07	0.03
S34	0.05	0.07	0.04	0.04	0.17	0.12	0.26	0.09
S35	0.02	0.04	0.07	0.05	0.10	0.07	0.12	0.06
S36	0.04	0.06	0.04	0.08	0.08	0.04	0.09	0.06
S37	0.06	0.16	0.31	0.07	0.10	0.09	0.03	0.13
S38	0.06	0.10	0.23	0.07	0.13	0.01	0.03	0.10
S39	0.14	0.08	0.33	0.20	0.09	0.14	0.11	0.16

Table D11

Annual Velocity Ratios of Special Test Point Zone (Proposed Scheme)

	E	NE	ESE	ENE	SSW	S	SSE	NNE	Annual	Min	Max
Zone 10	0.07	0.08	0.06	0.08	0.11	0.10	0.09	0.18	0.09	0.06	0.18
Zone 11	0.16	0.20	0.15	0.21	0.08	0.07	0.08	0.19	0.15	0.07	0.21
Zone 12	0.23	0.20	0.16	0.20	0.15	0.12	0.18	0.17	0.18	0.12	0.23

Table D12

Summer Velocity Ratios of Special Test Point Zone (Proposed Scheme)

	SSW	S	SW	SSE	ESE	SE	E	Average	Min	Max
Zone 10	0.11	0.10	0.12	0.09	0.06	0.07	0.07	0.09	0.06	0.12
Zone 11	0.08	0.07	0.12	0.08	0.15	0.13	0.16	0.10	0.07	0.16
Zone 12	0.15	0.12	0.22	0.18	0.16	0.16	0.23	0.17	0.12	0.23

Zone 10 – (Ground Level Footpath of Site A
Zone 11 – (Ground Level Footpath of Site B
Zone 12 – (Ground Level Footpath of Site C

Annex C Velocity Ratio Contour and Vector Plots

Figure C1a Velocity Ratio Contour and Vector Plot under E Wind in the Baseline Scheme (Whole Domain)

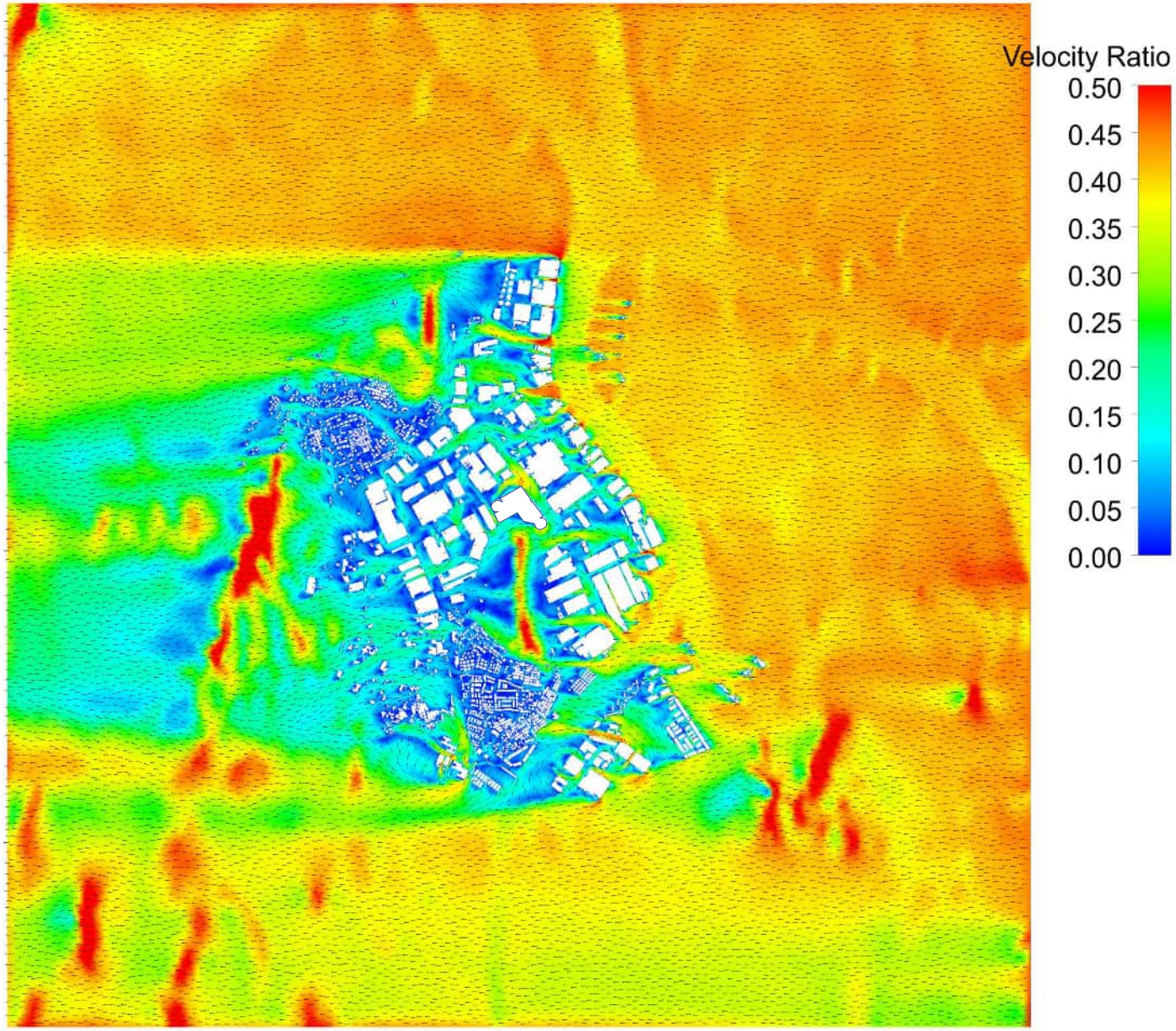


Figure C1b **Velocity Ratio Contour and Vector Plot under E Wind in the Baseline Scheme**

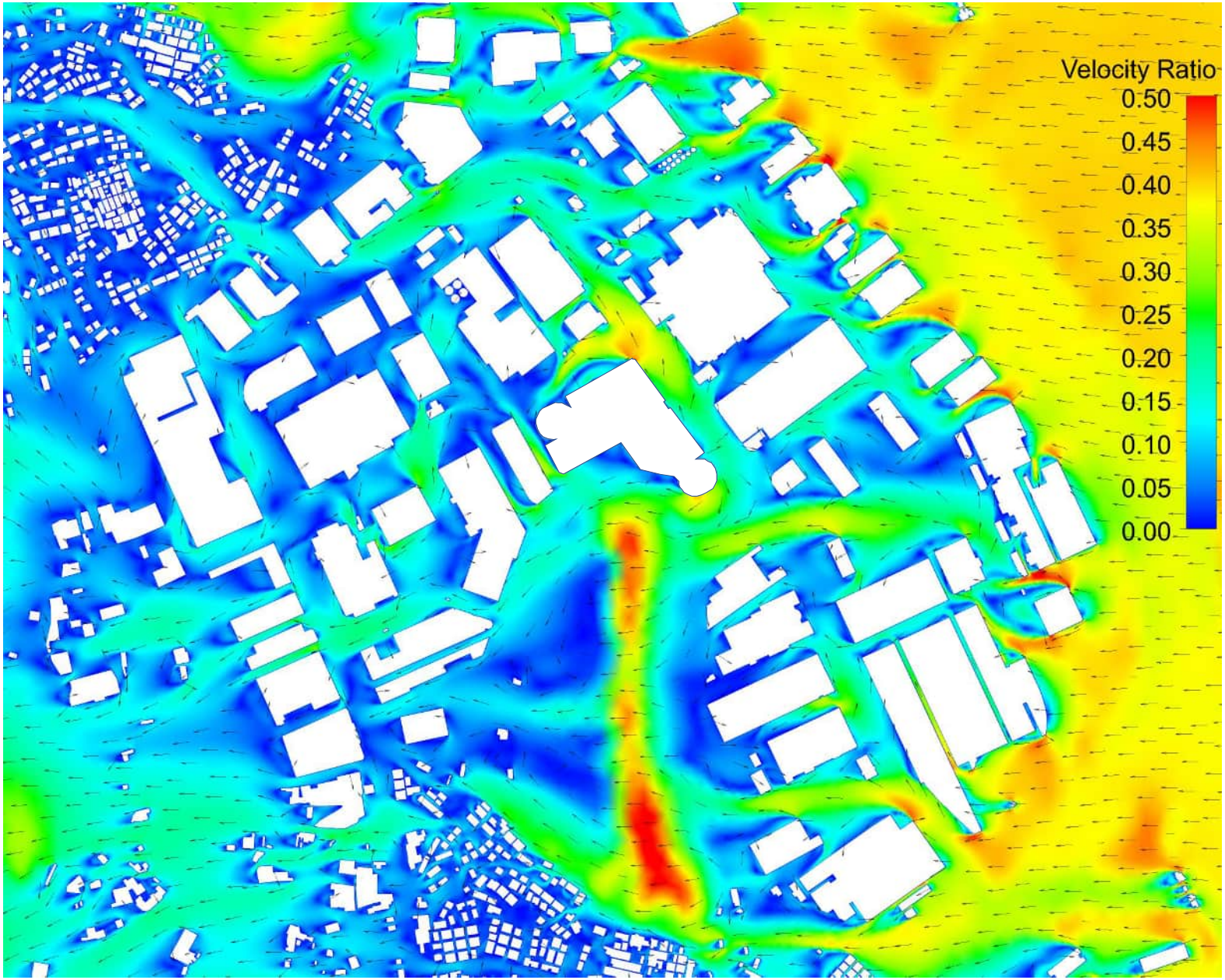


Figure C2a Velocity Ratio Contour and Vector Plot under E Wind in the Proposed Scheme (Whole Domain)

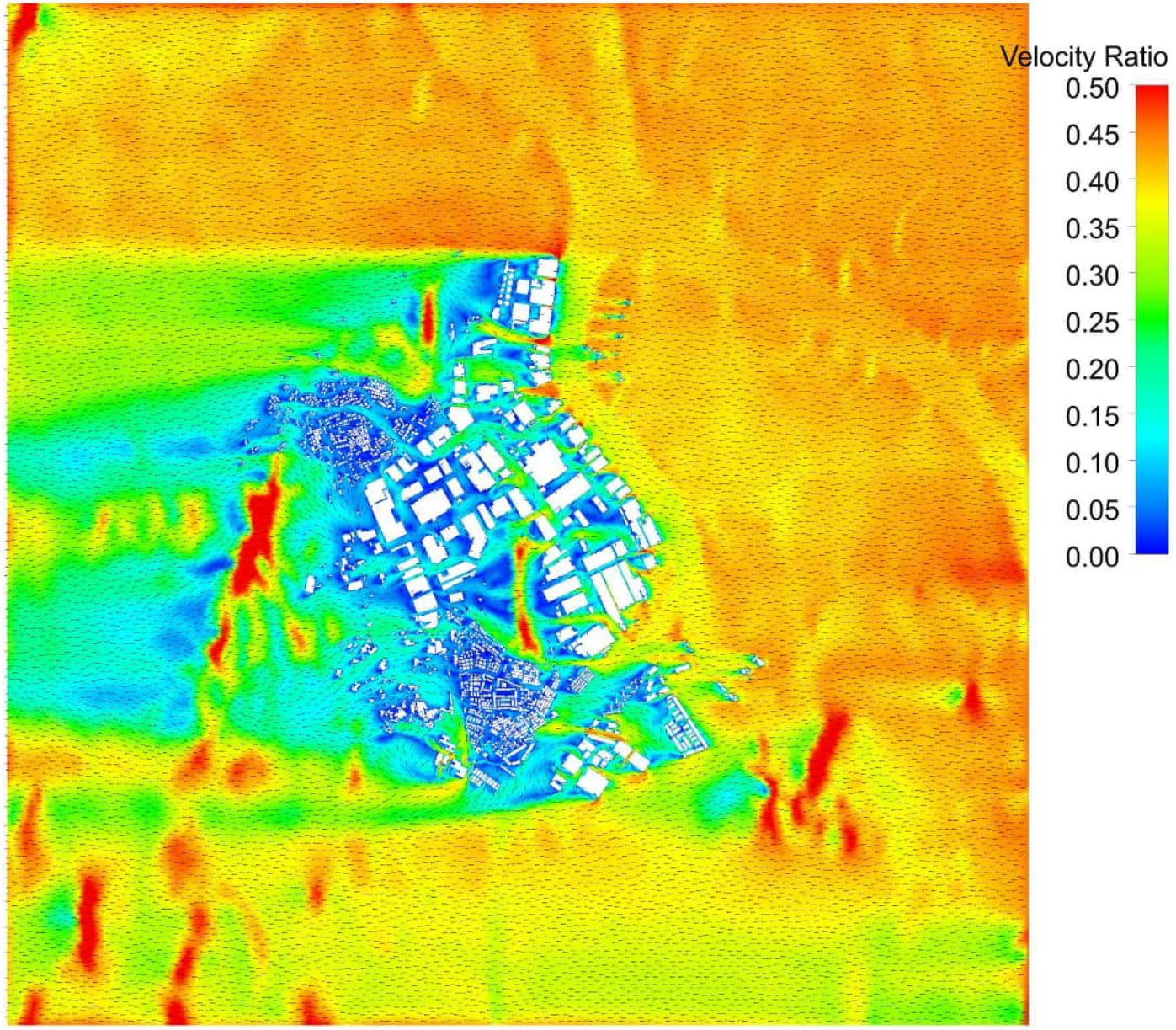


Figure C2b **Velocity Ratio Contour and Vector Plot under E Wind in the Proposed Scheme**

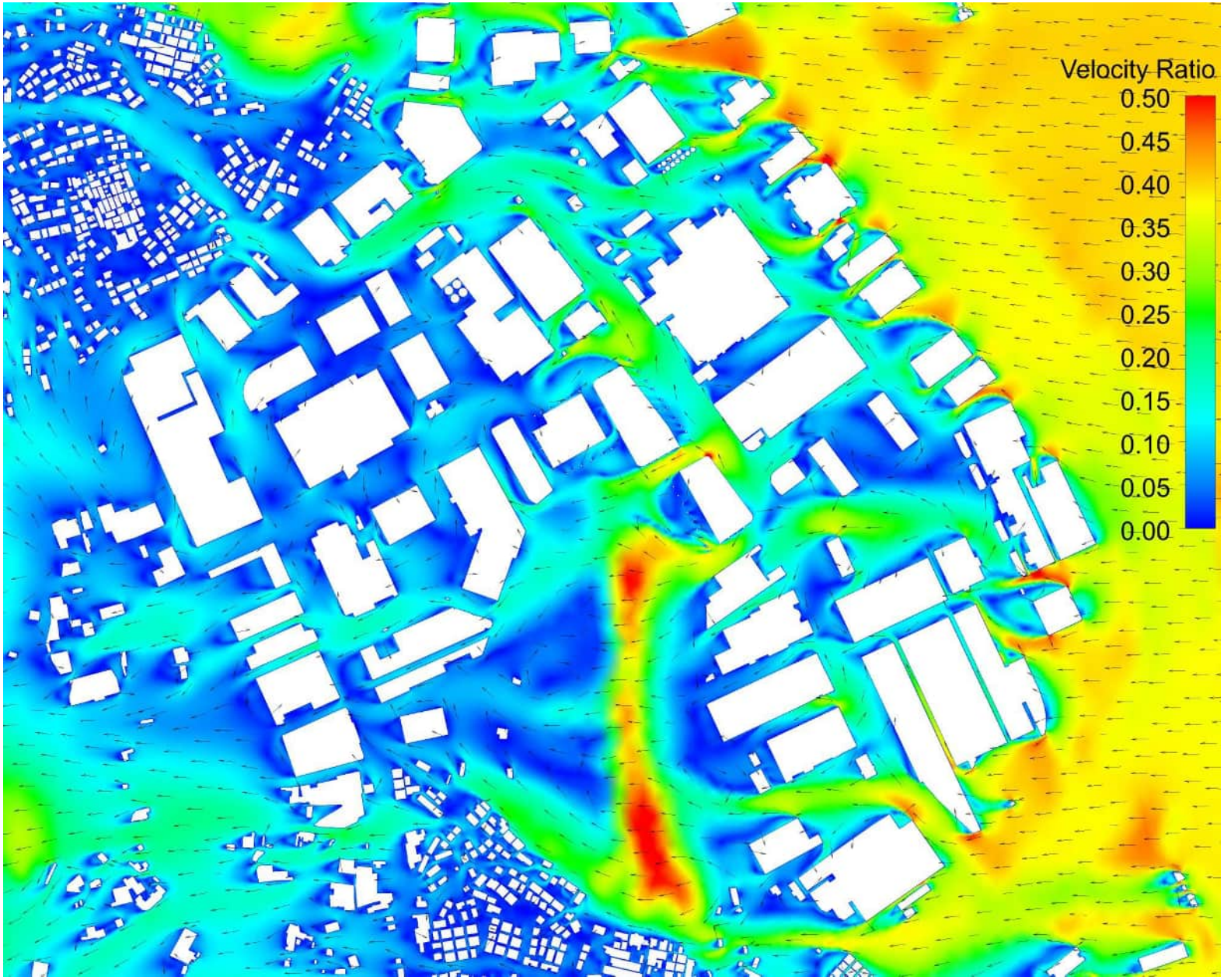


Figure C3a Velocity Ratio Contour and Vector Plot under NE Wind in the Baseline Scheme (Whole Domain)

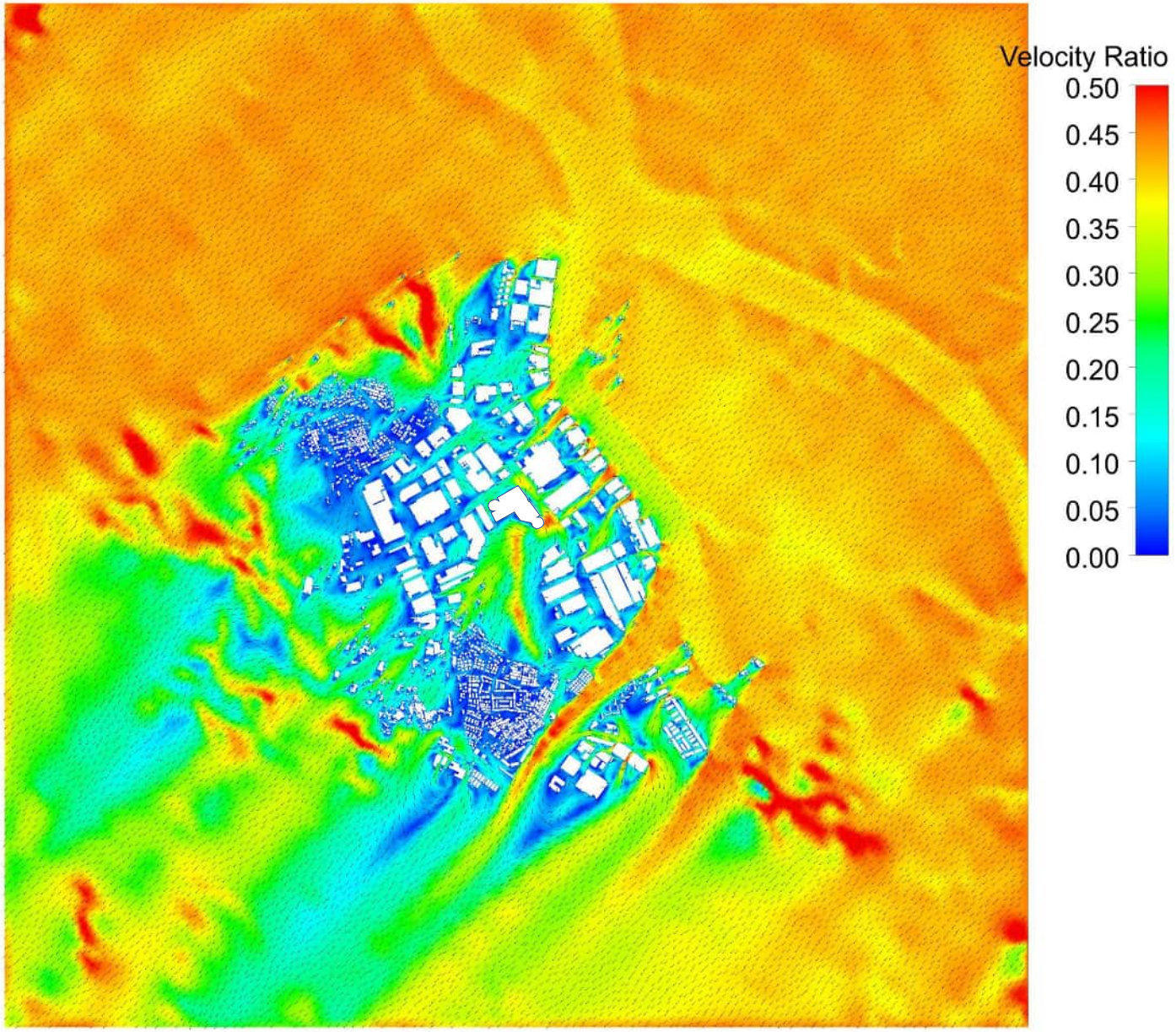


Figure C3b **Velocity Ratio Contour and Vector Plot under NE Wind in the Baseline Scheme**

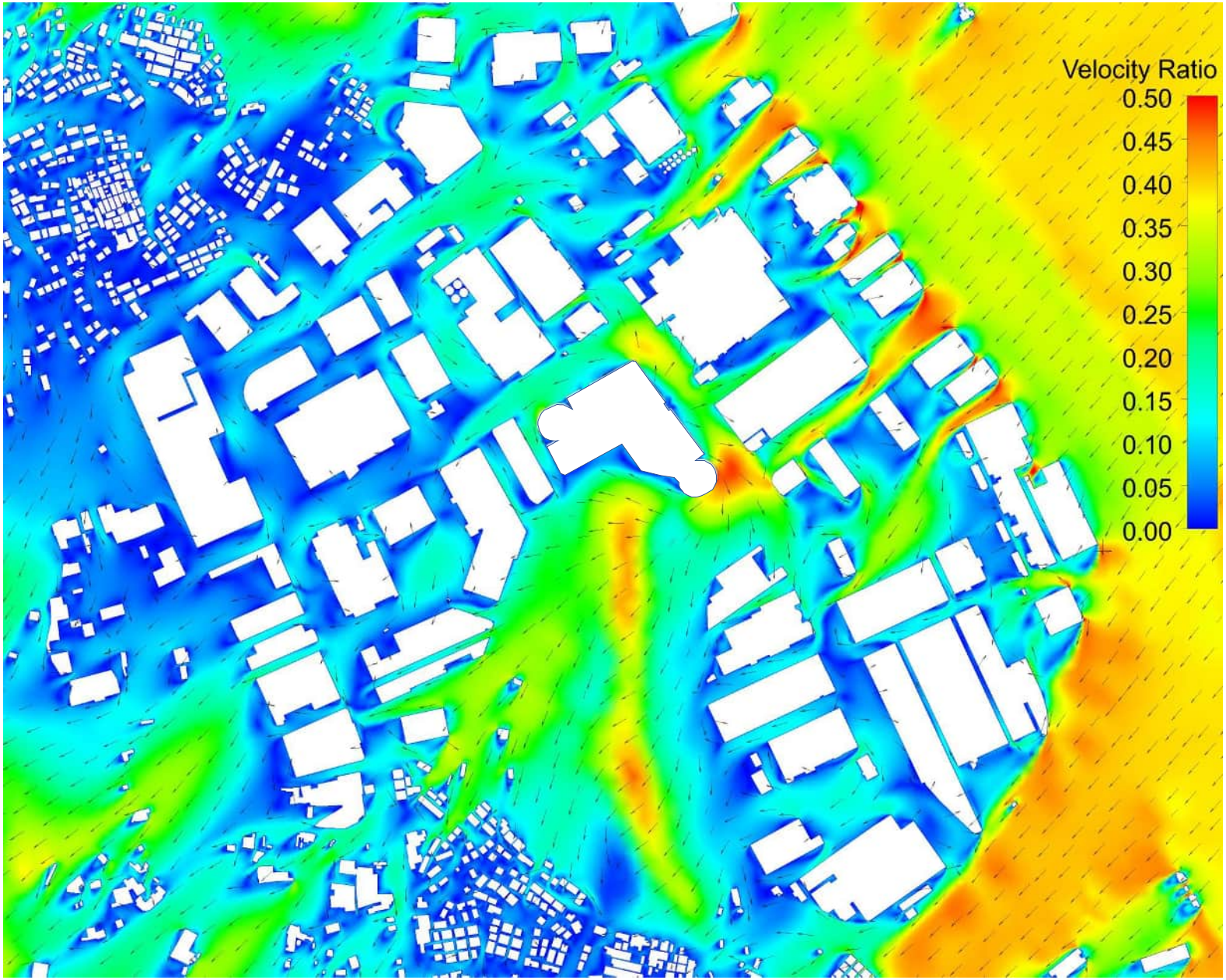


Figure C4a Velocity Ratio Contour and Vector Plot under NE Wind in the Proposed Scheme (Whole Domain)

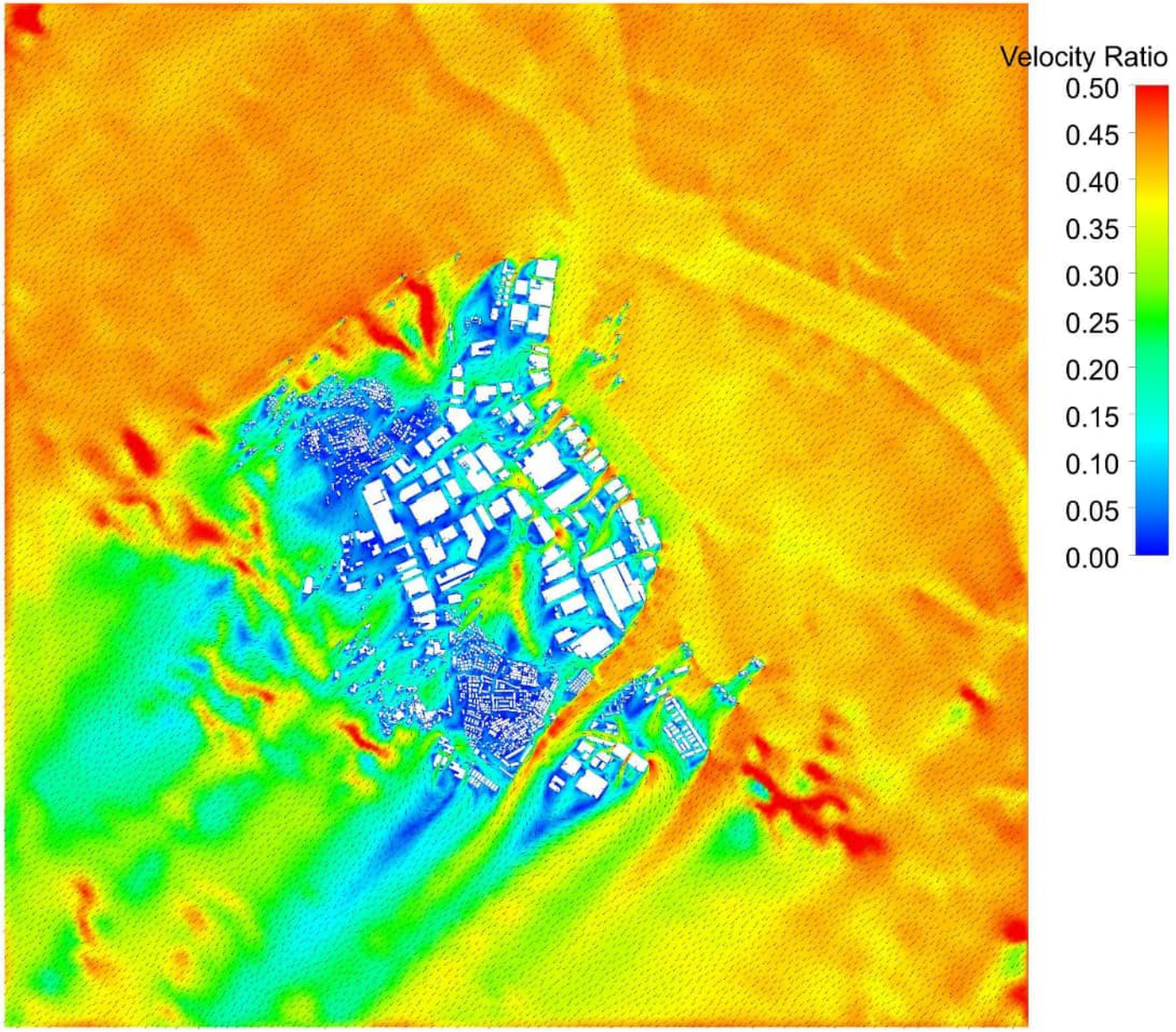


Figure C4b **Velocity Ratio Contour and Vector Plot under NE Wind in the Proposed Scheme**

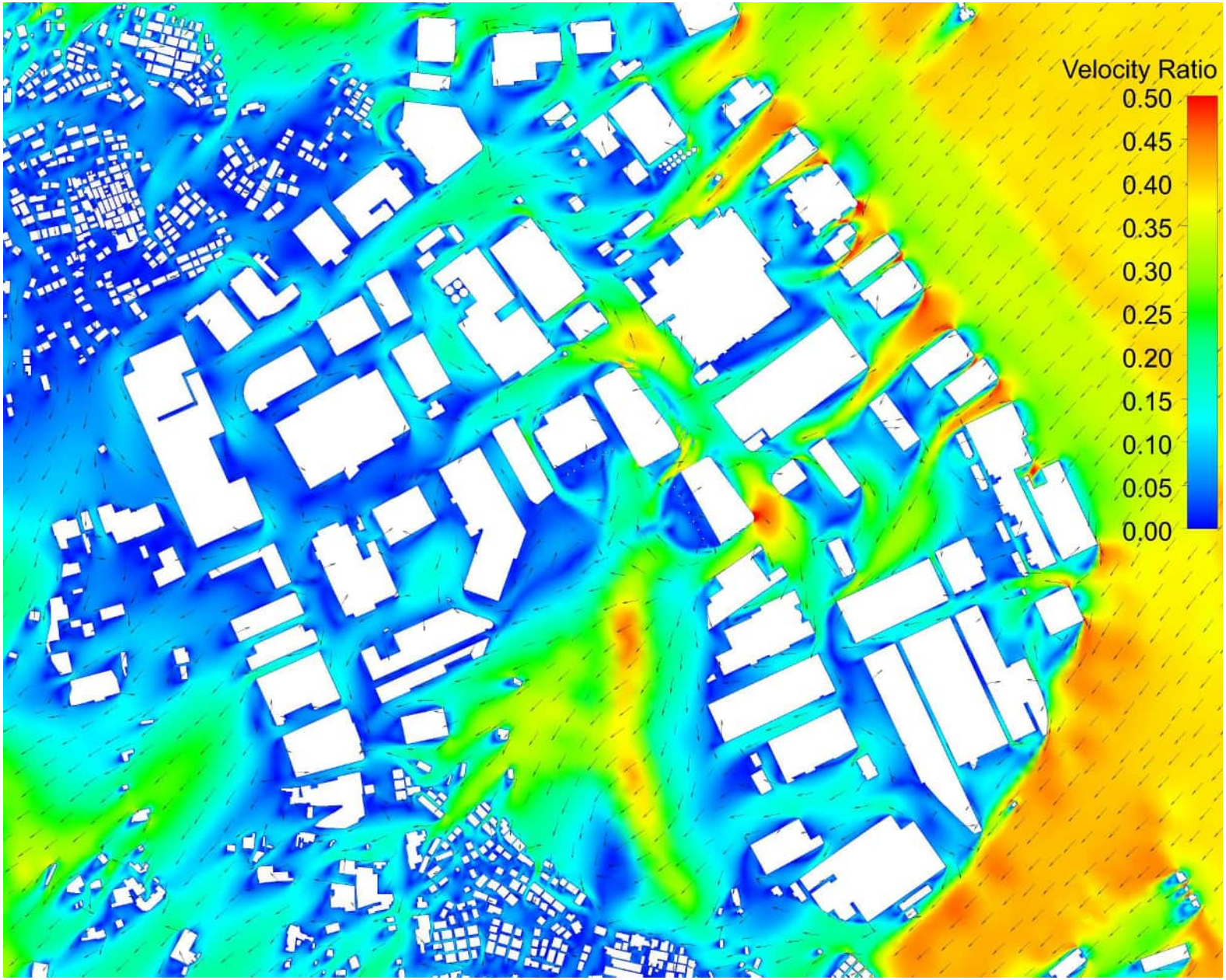


Figure C5a Velocity Ratio Contour and Vector Plot under ESE Wind in the Baseline Scheme (Whole Domain)

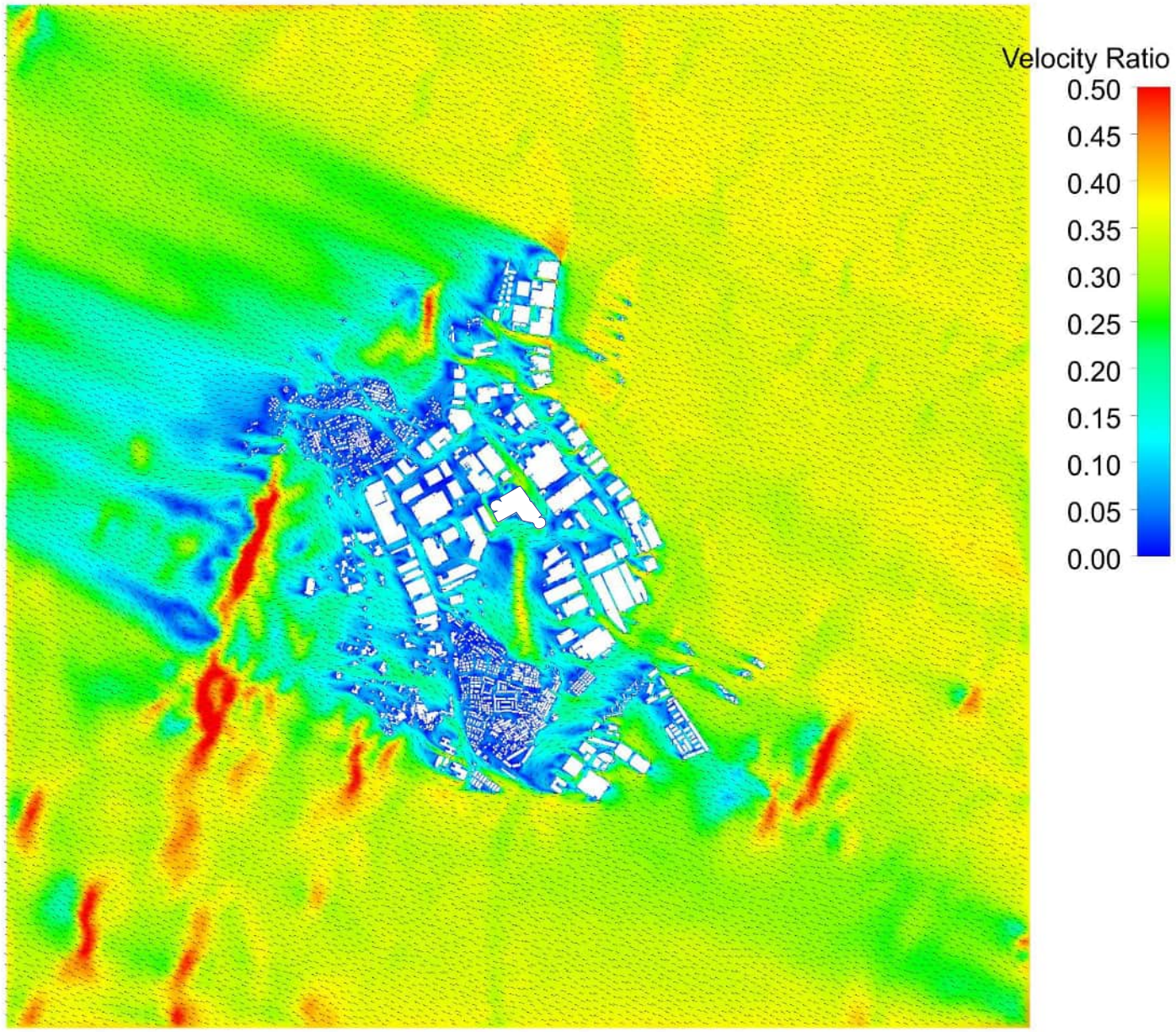


Figure C5b **Velocity Ratio Contour and Vector Plot under ESE Wind in the Baseline Scheme**

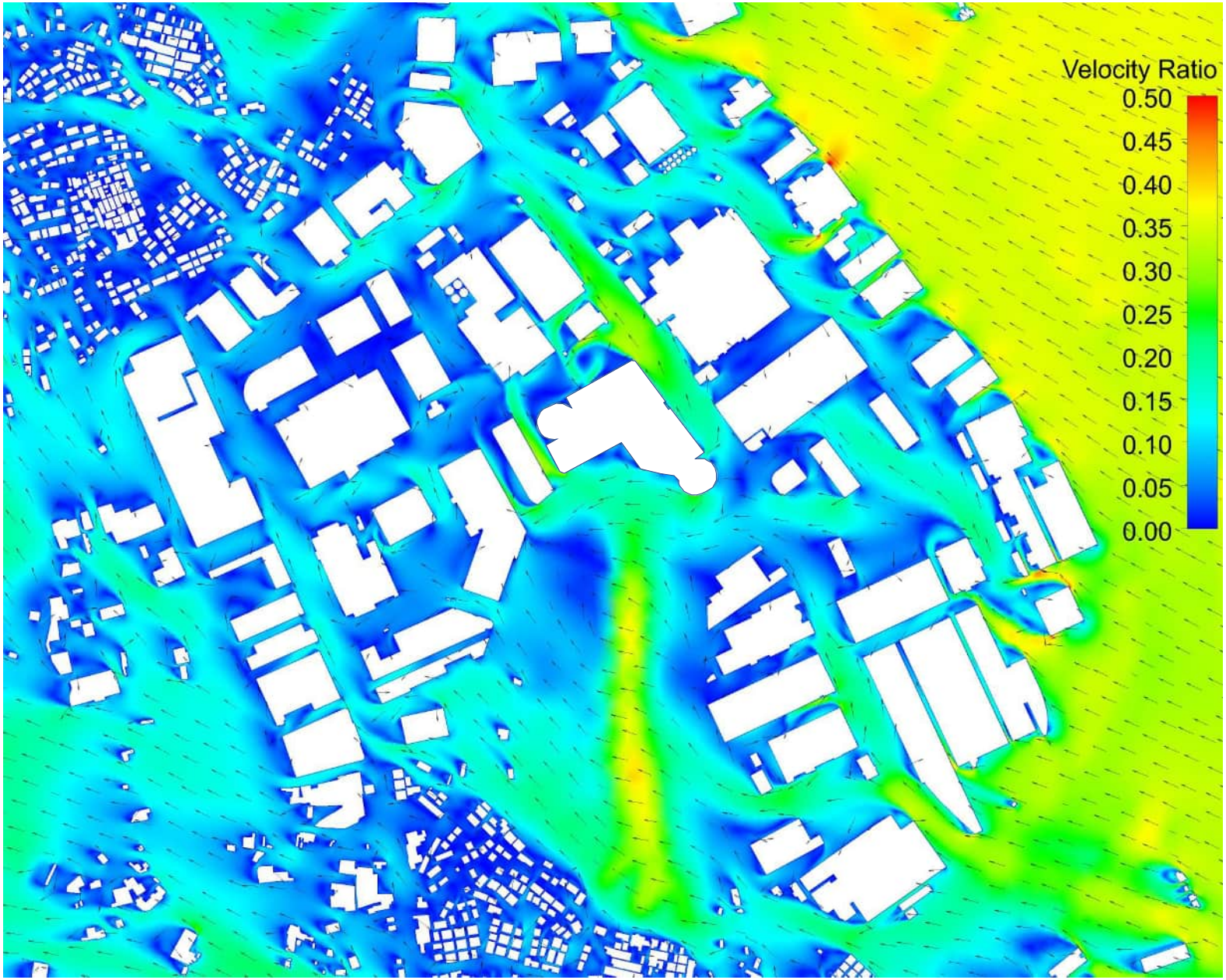


Figure C6a Velocity Ratio Contour and Vector Plot under ESE Wind in the Proposed Scheme (Whole Domain)

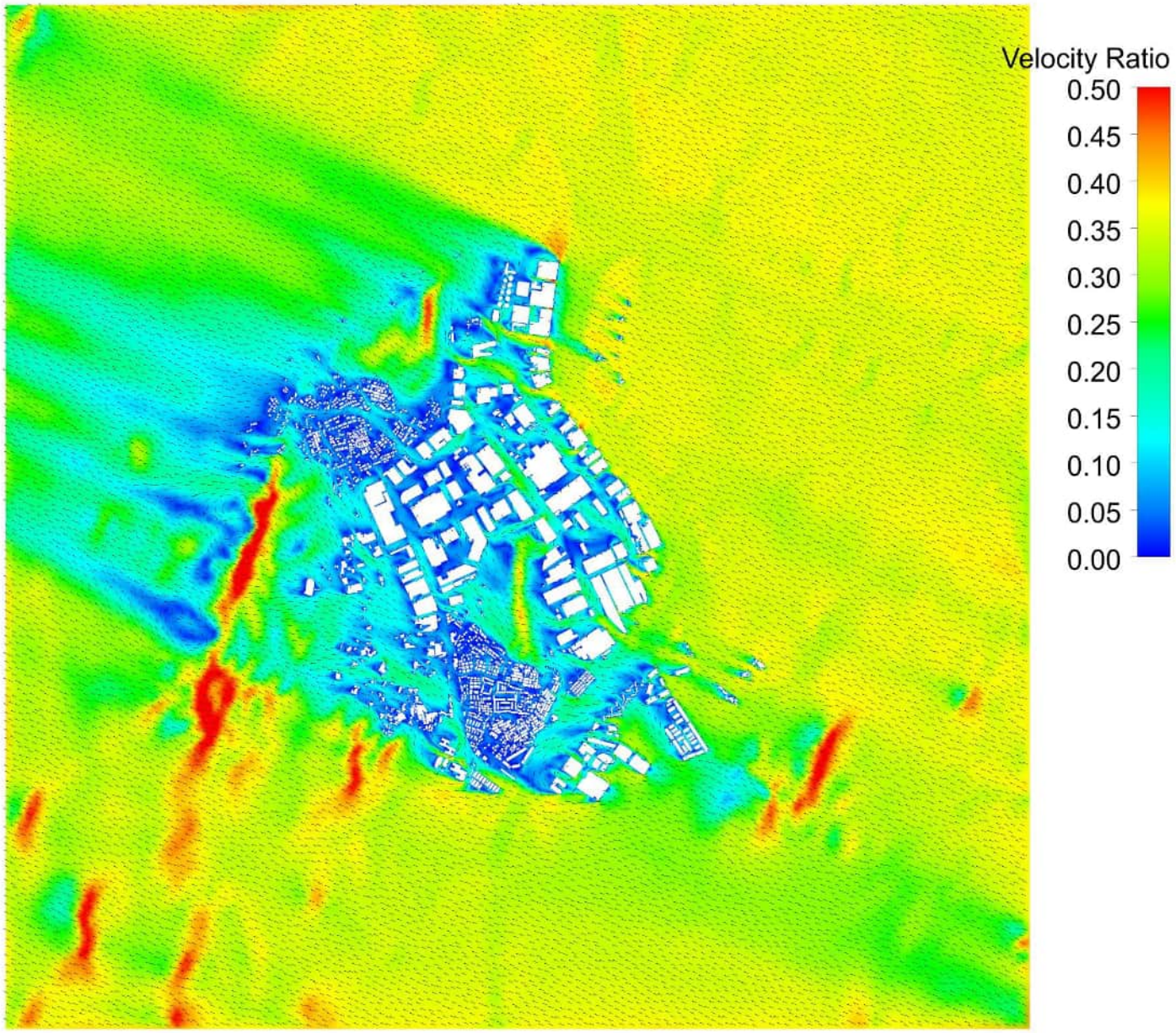


Figure C6b **Velocity Ratio Contour and Vector Plot under ESE Wind in the Proposed Scheme**

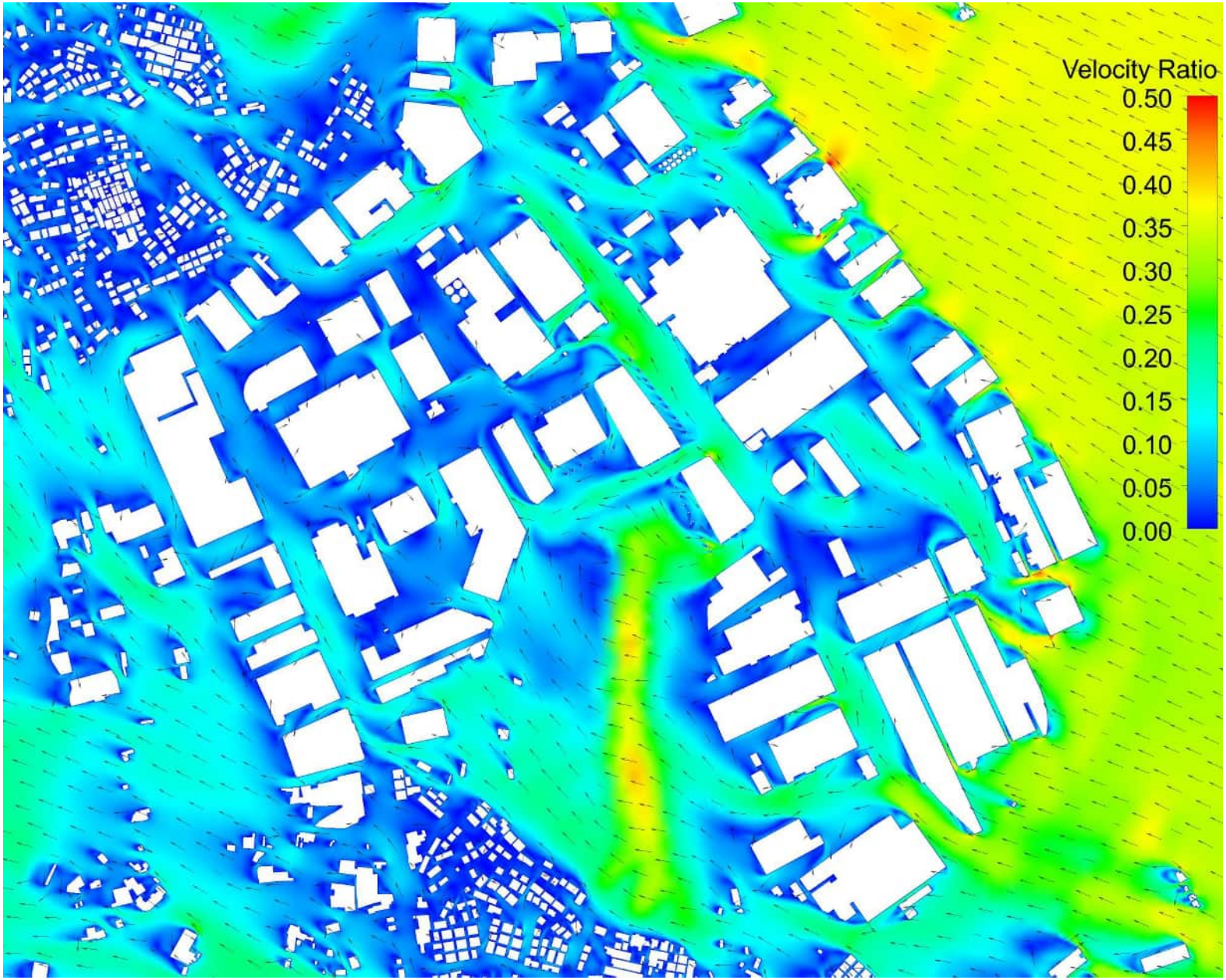


Figure C7a Velocity Ratio Contour and Vector Plot under ENE Wind in the Baseline Scheme (Whole Domain)

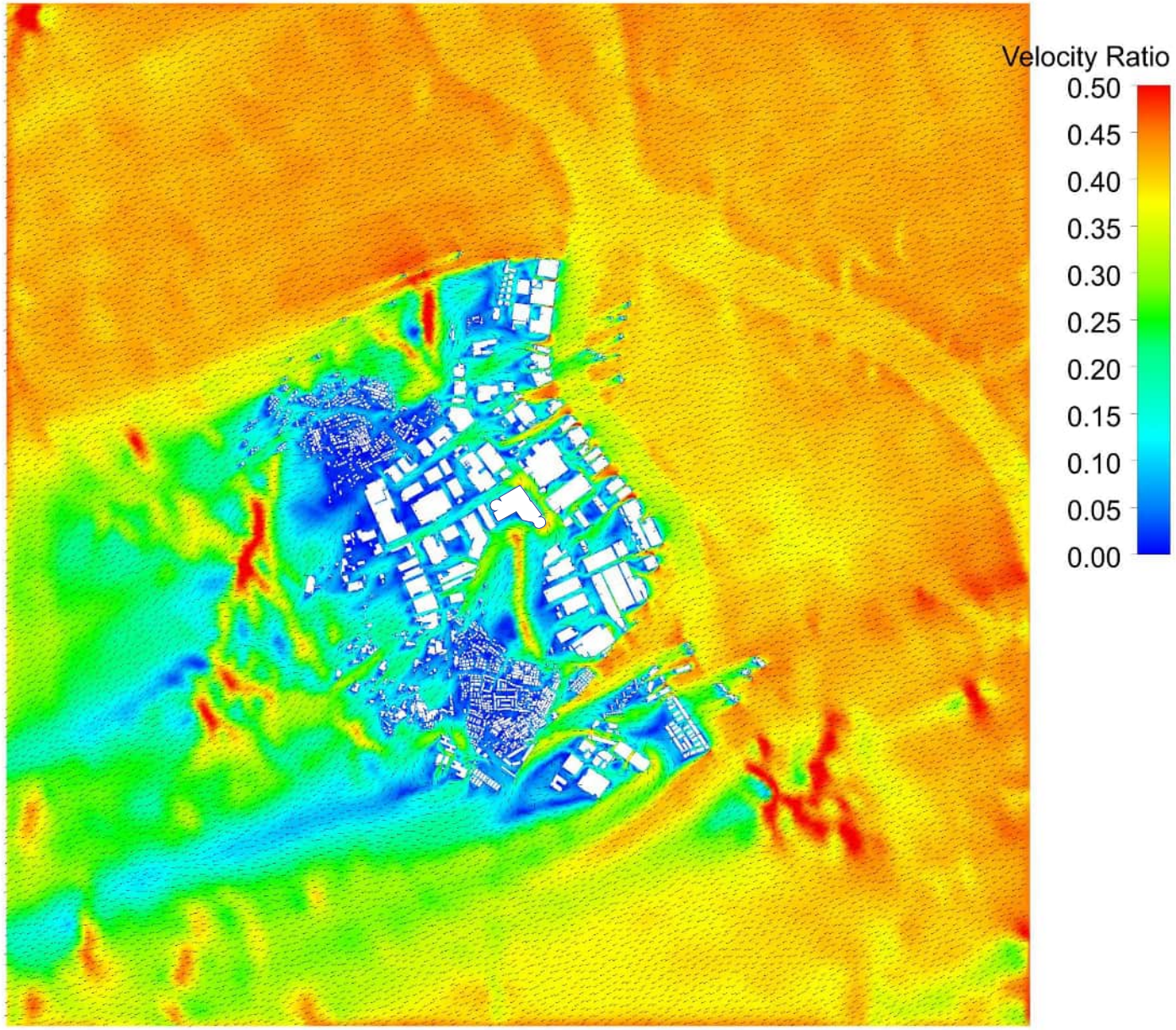


Figure C7b **Velocity Ratio Contour and Vector Plot under ENE Wind in the Baseline Scheme**

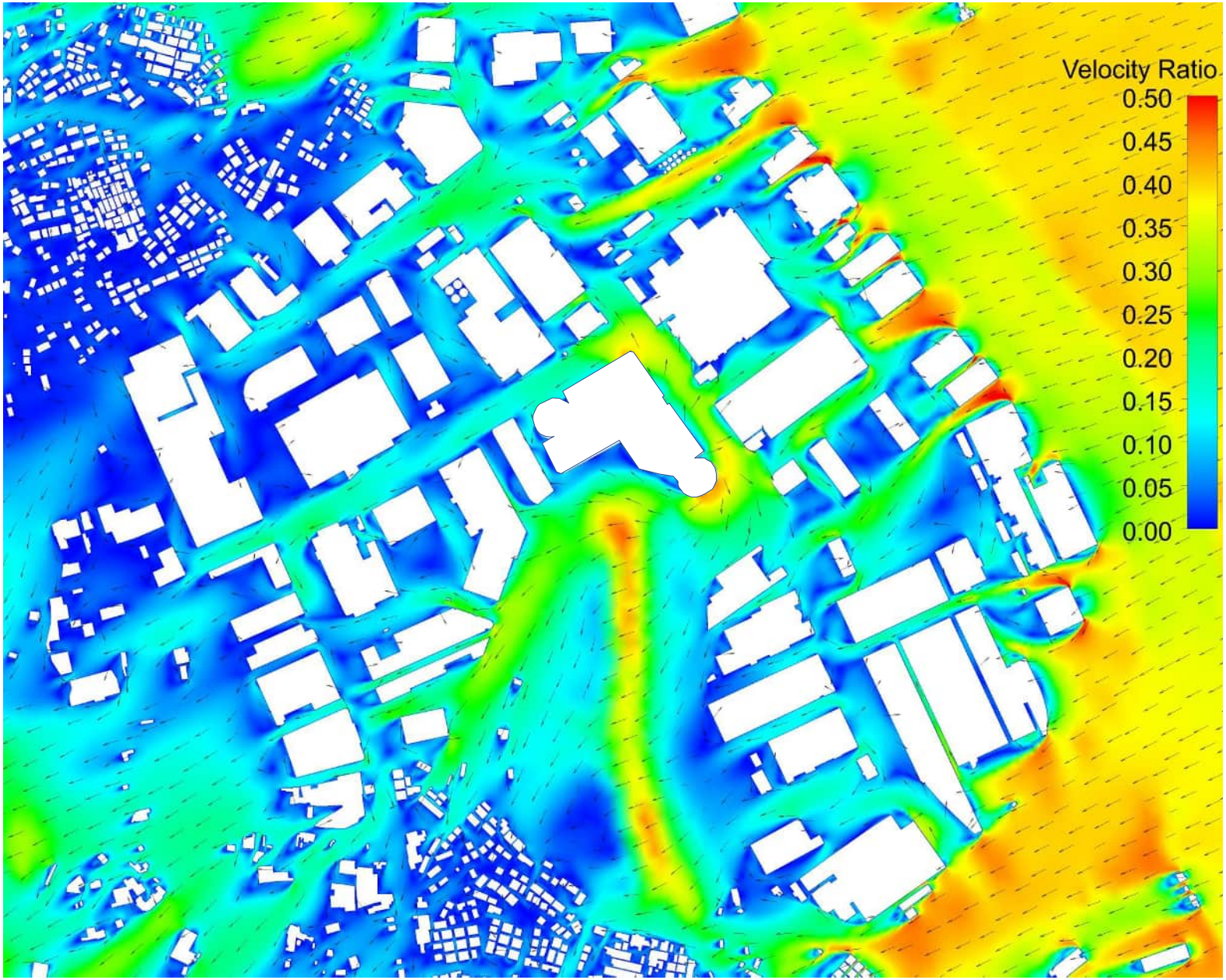


Figure C8a Velocity Ratio Contour and Vector Plot under ENE Wind in the Proposed Scheme (Whole Domain)

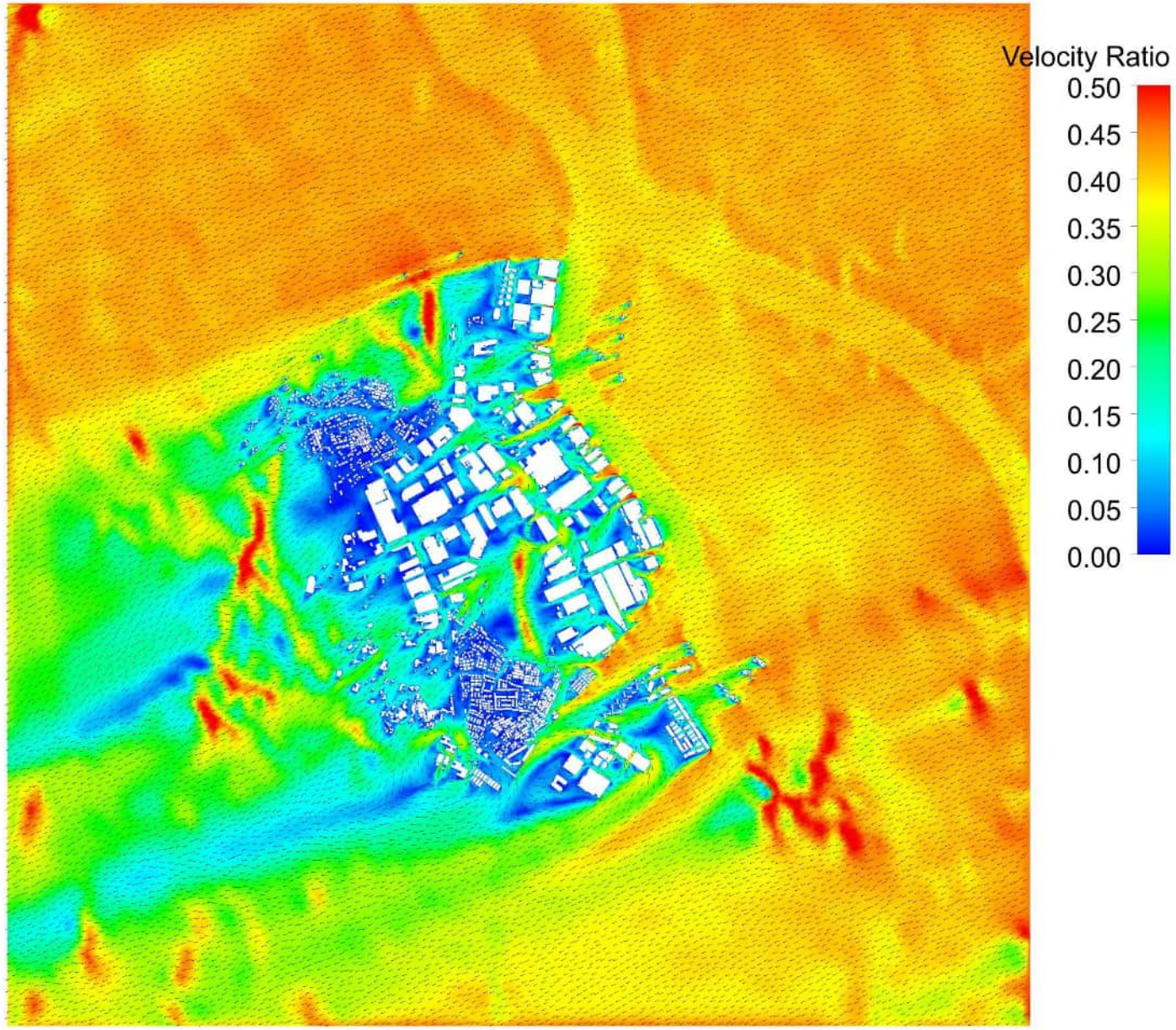


Figure C8b **Velocity Ratio Contour and Vector Plot under ENE Wind in the Proposed Scheme**

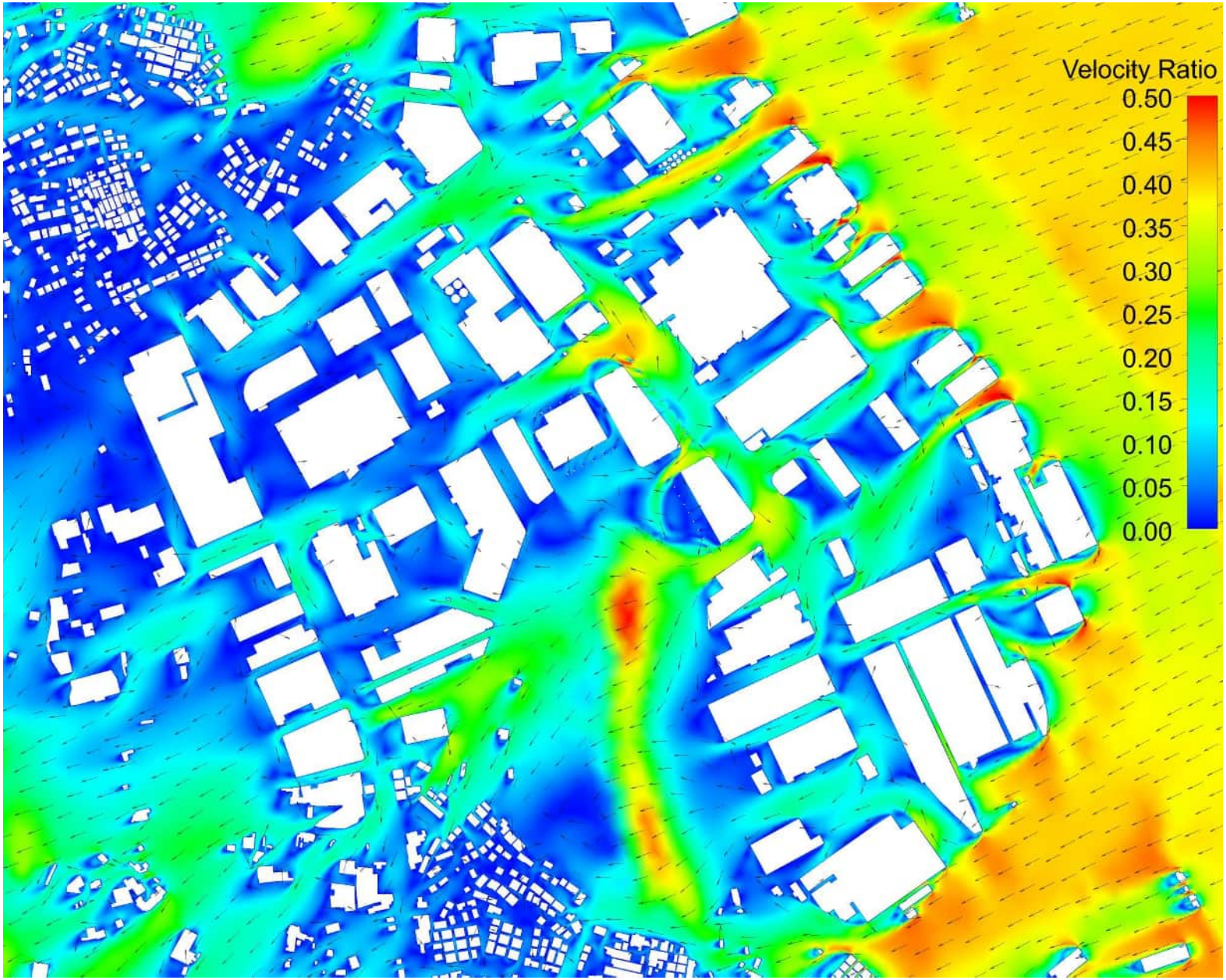


Figure C9a Velocity Ratio Contour and Vector Plot under SSW Wind in the Baseline Scheme (Whole Domain)

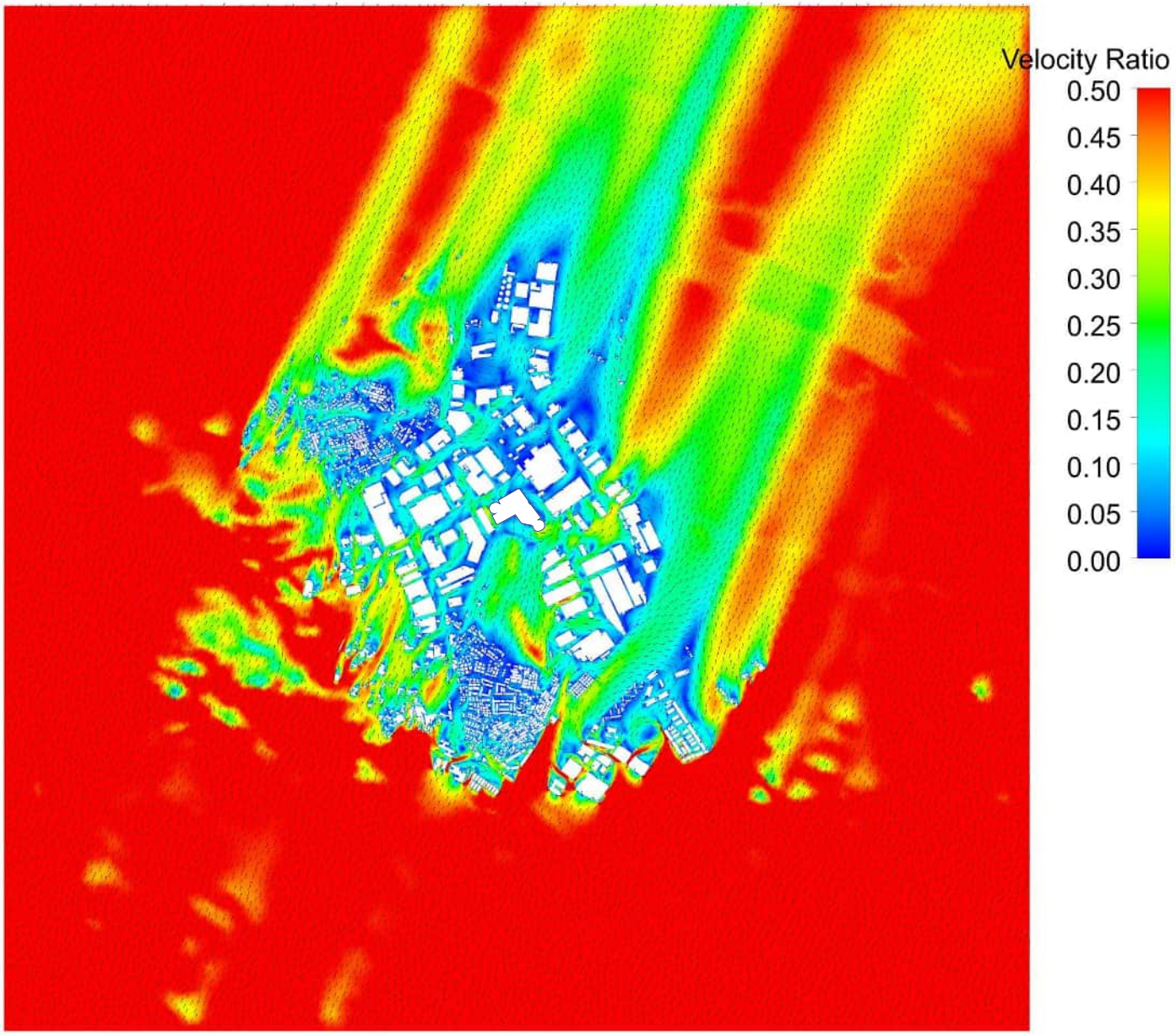


Figure C9b **Velocity Ratio Contour and Vector Plot under SSW Wind in the Baseline Scheme**

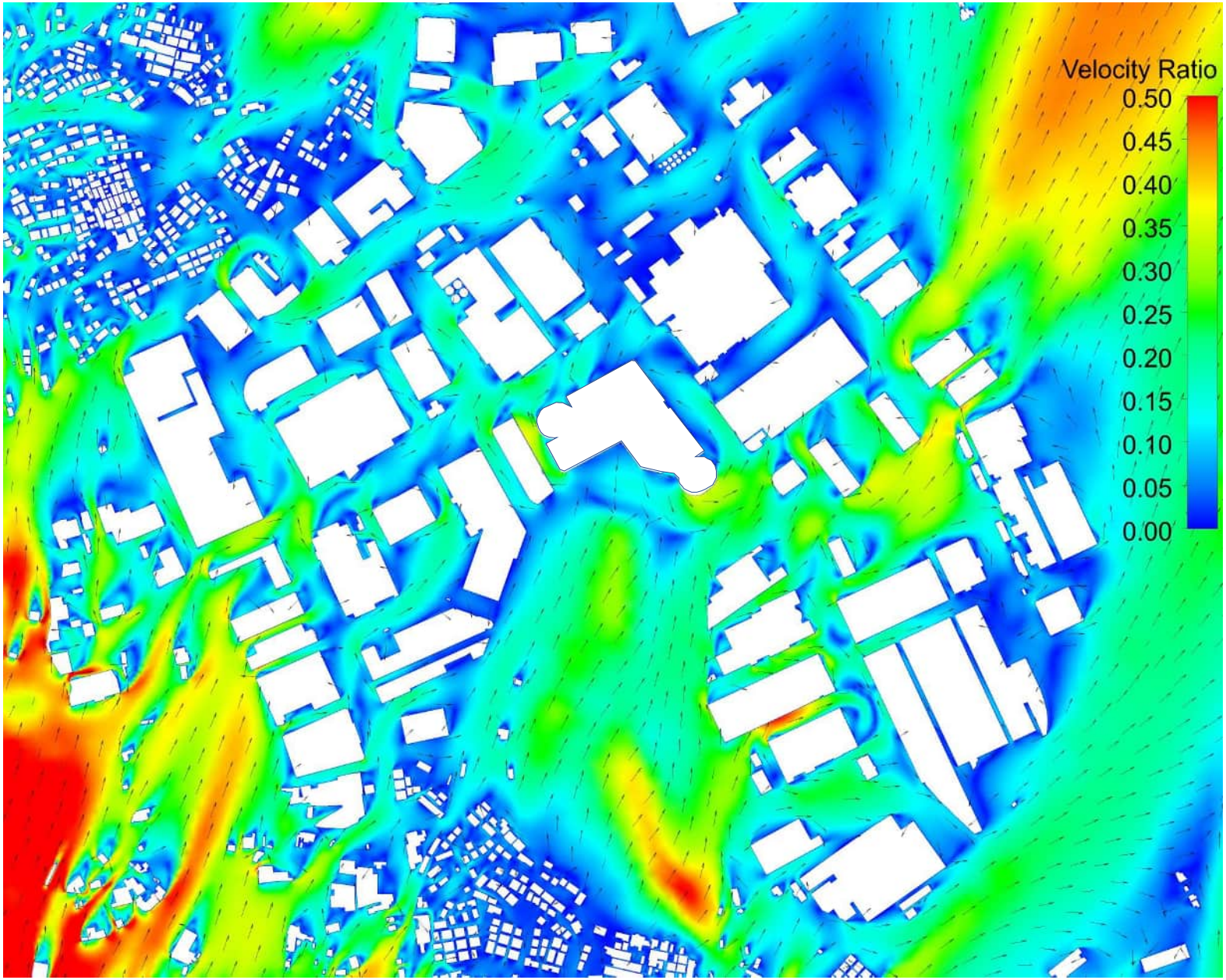


Figure C10a Velocity Ratio Contour and Vector Plot under SSW Wind in the Proposed Scheme (Whole Domain)

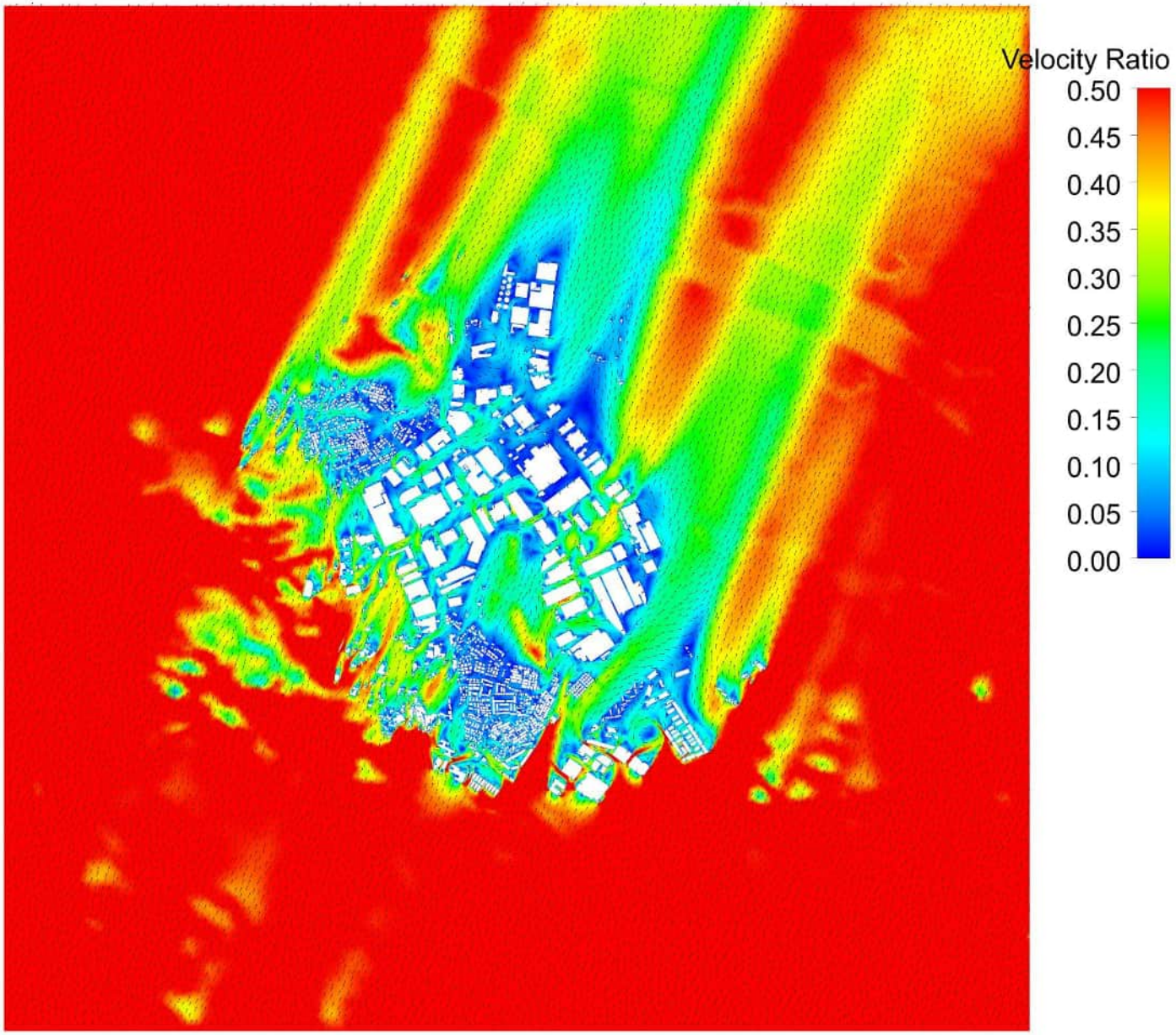


Figure C10b Velocity Ratio Contour and Vector Plot under SSW Wind in the Proposed Scheme

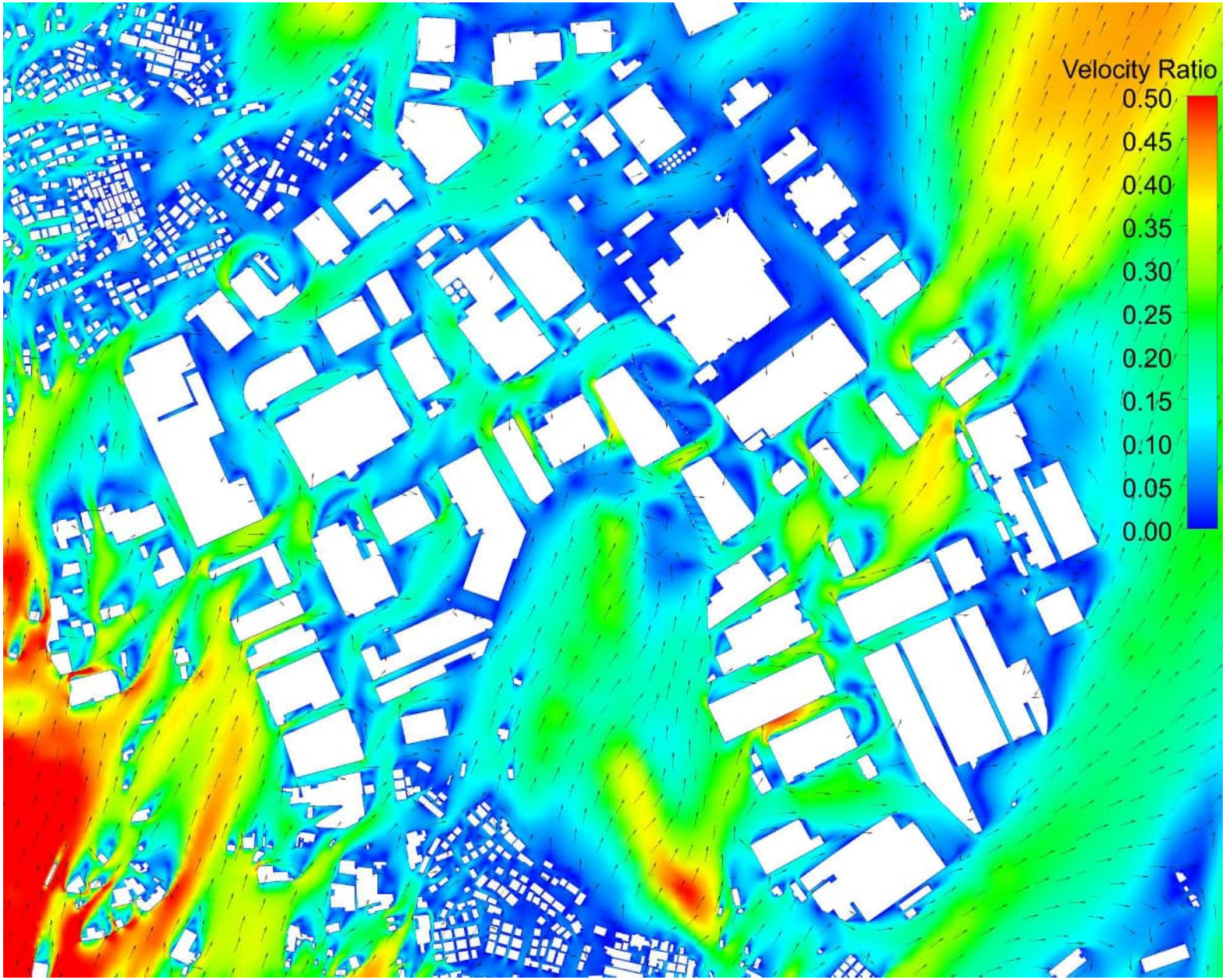


Figure C11a Velocity Ratio Contour and Vector Plot under S Wind in the Baseline Scheme (Whole Domain)

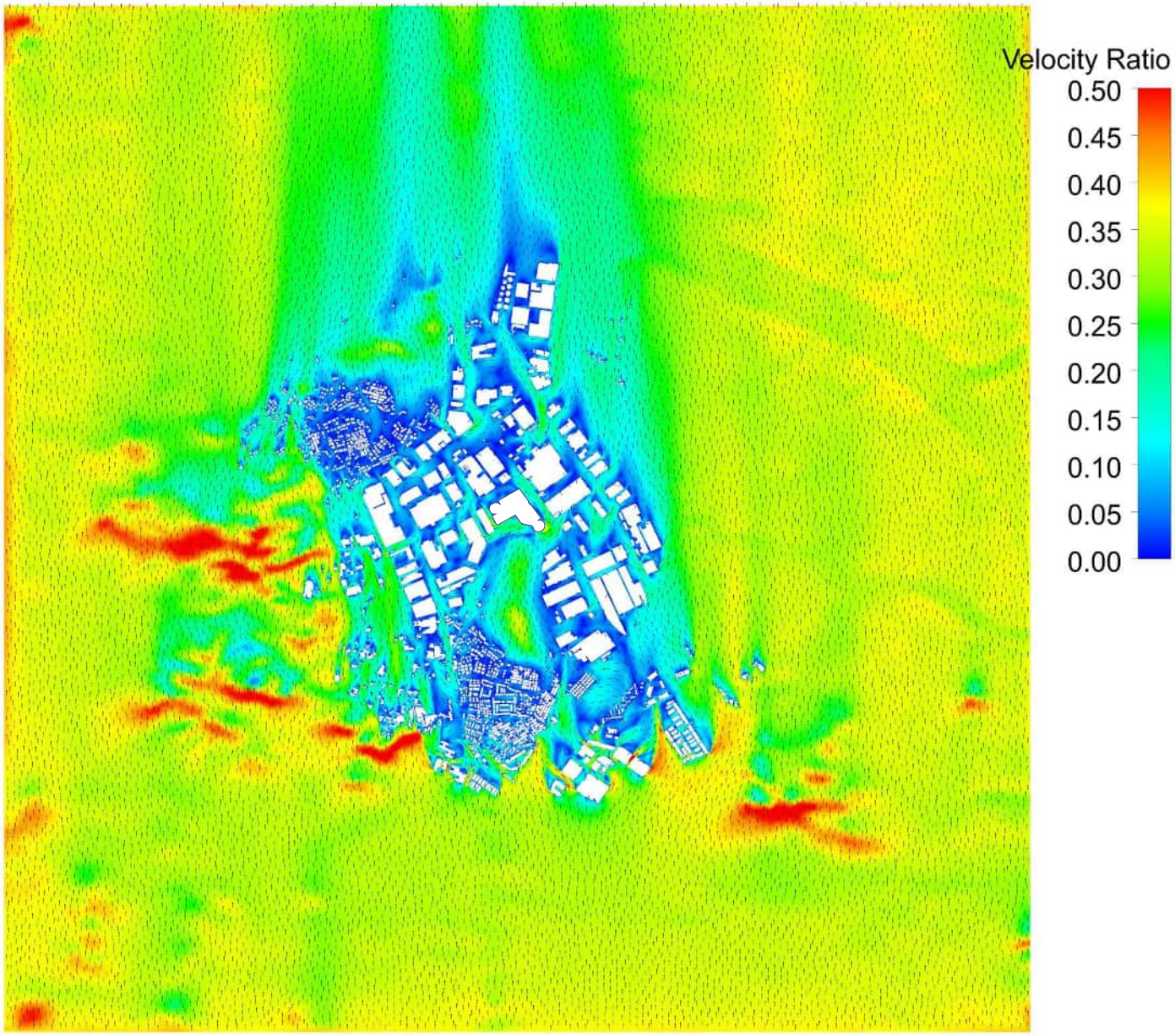


Figure C11b Velocity Ratio Contour and Vector Plot under S Wind in the Baseline Scheme

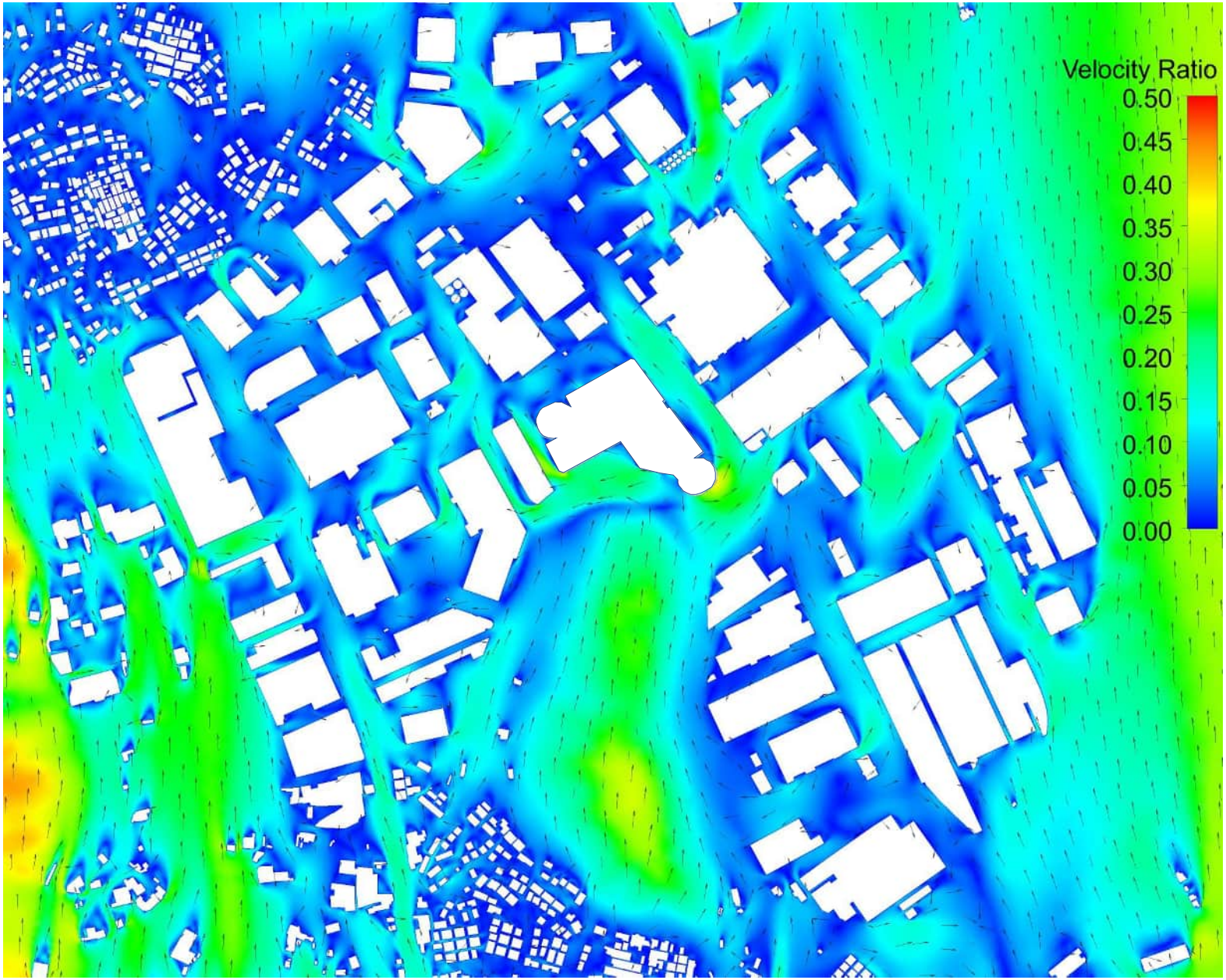


Figure C12a Velocity Ratio Contour and Vector Plot under S Wind in the Proposed Scheme (Whole Domain)

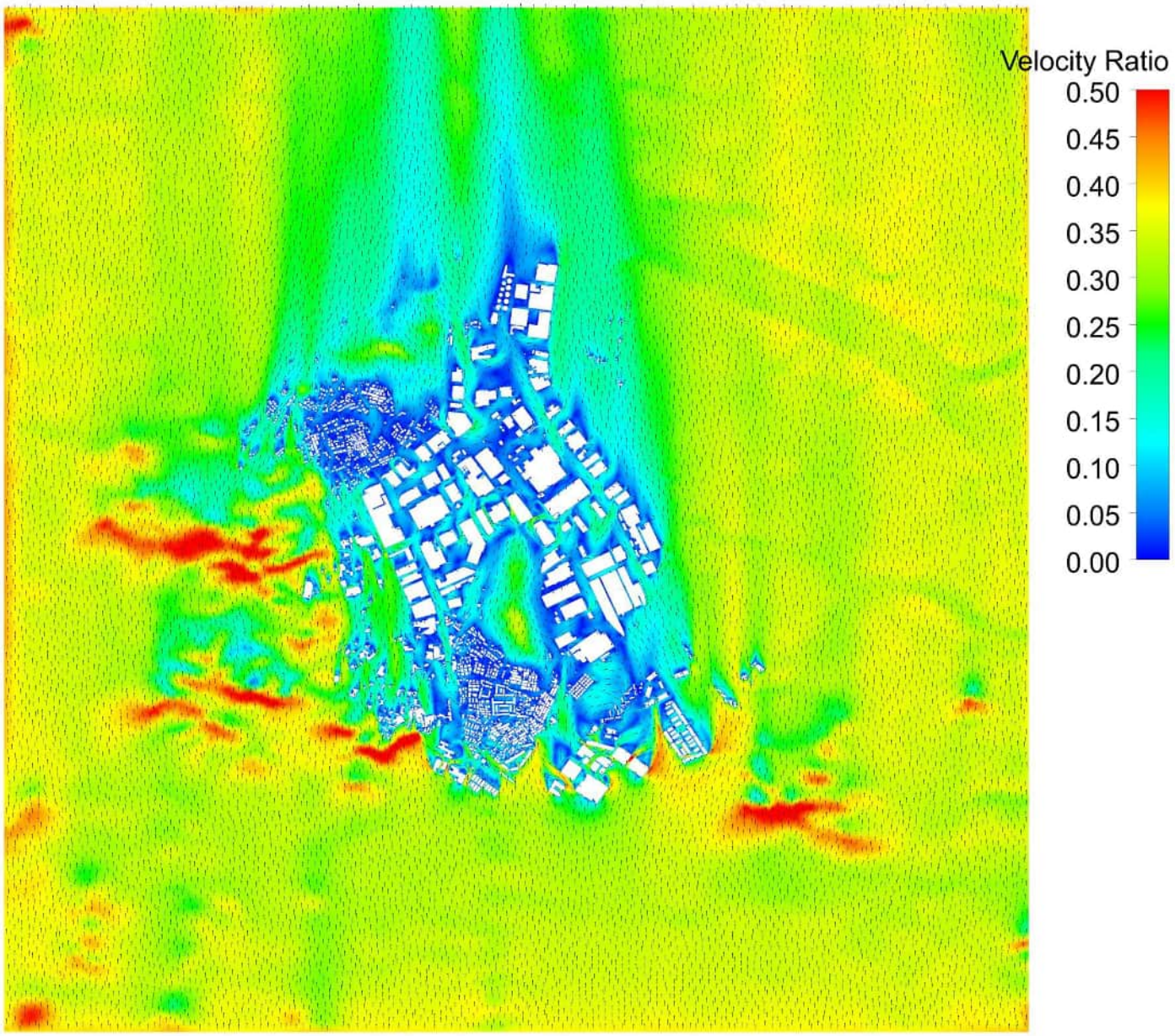


Figure C12b Velocity Ratio Contour and Vector Plot under S Wind in the Proposed Scheme

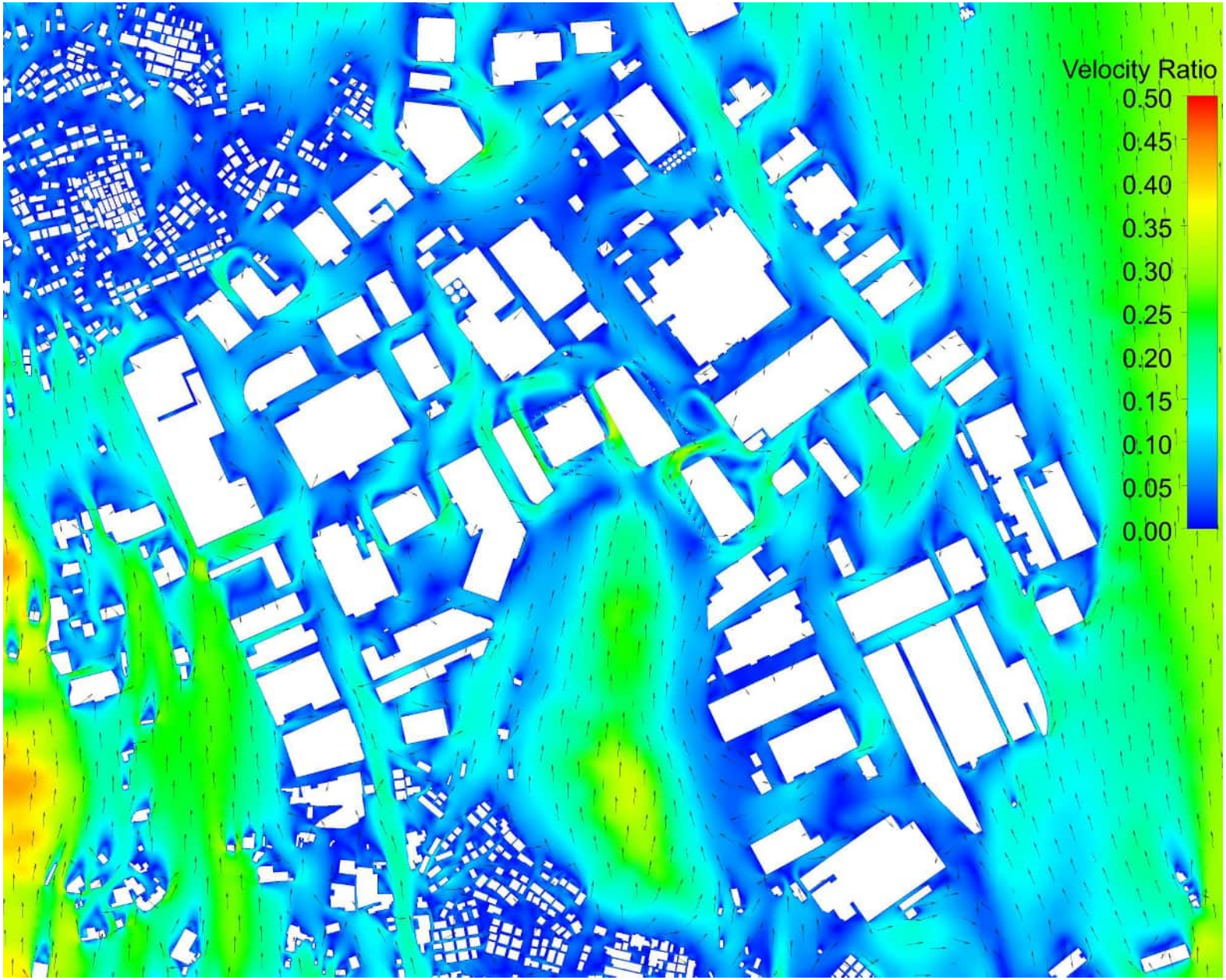


Figure C13a Velocity Ratio Contour and Vector Plot under SSE Wind in the Baseline Scheme (Whole Domain)

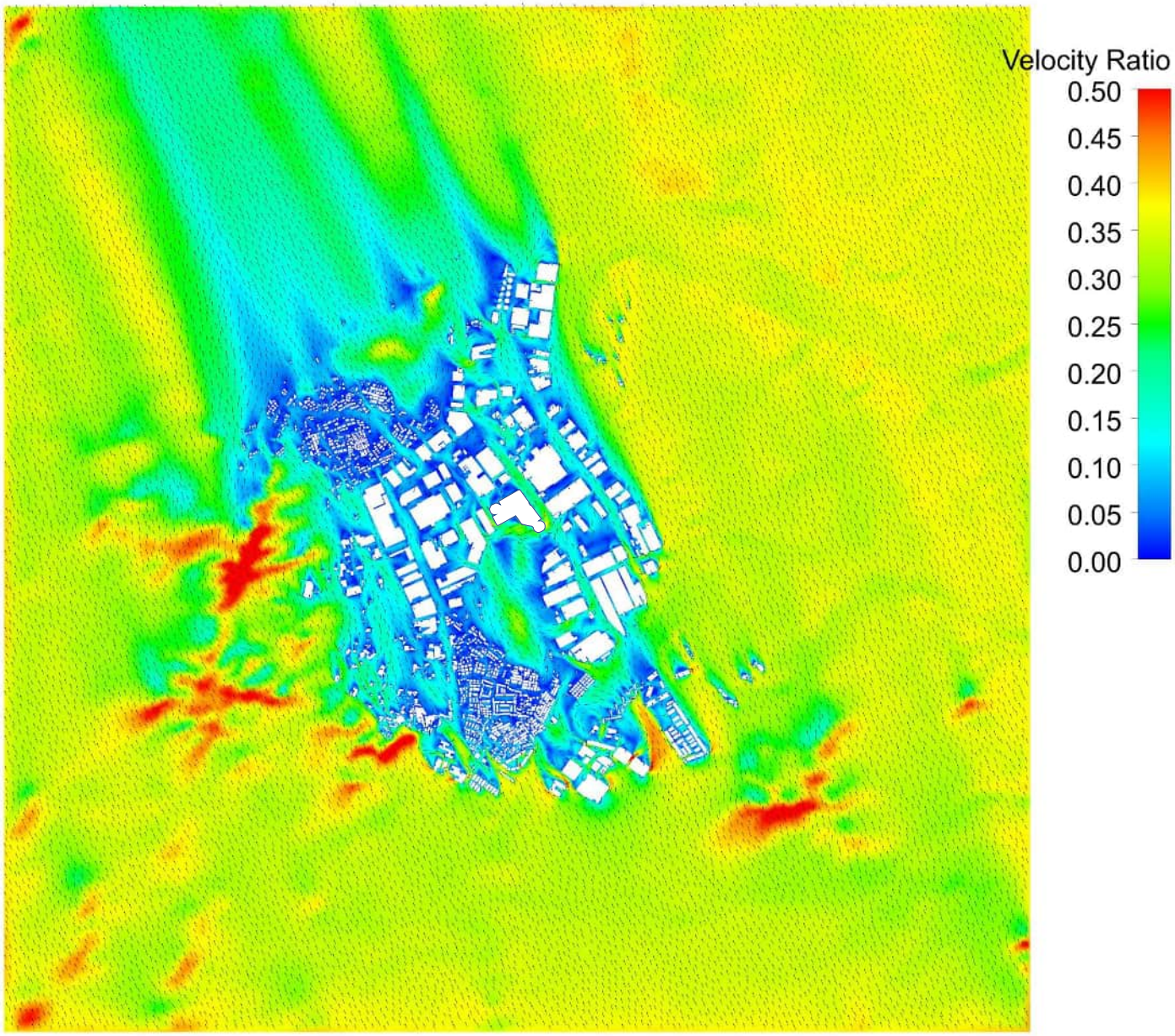


Figure C13b Velocity Ratio Contour and Vector Plot under SSE Wind in the Baseline Scheme

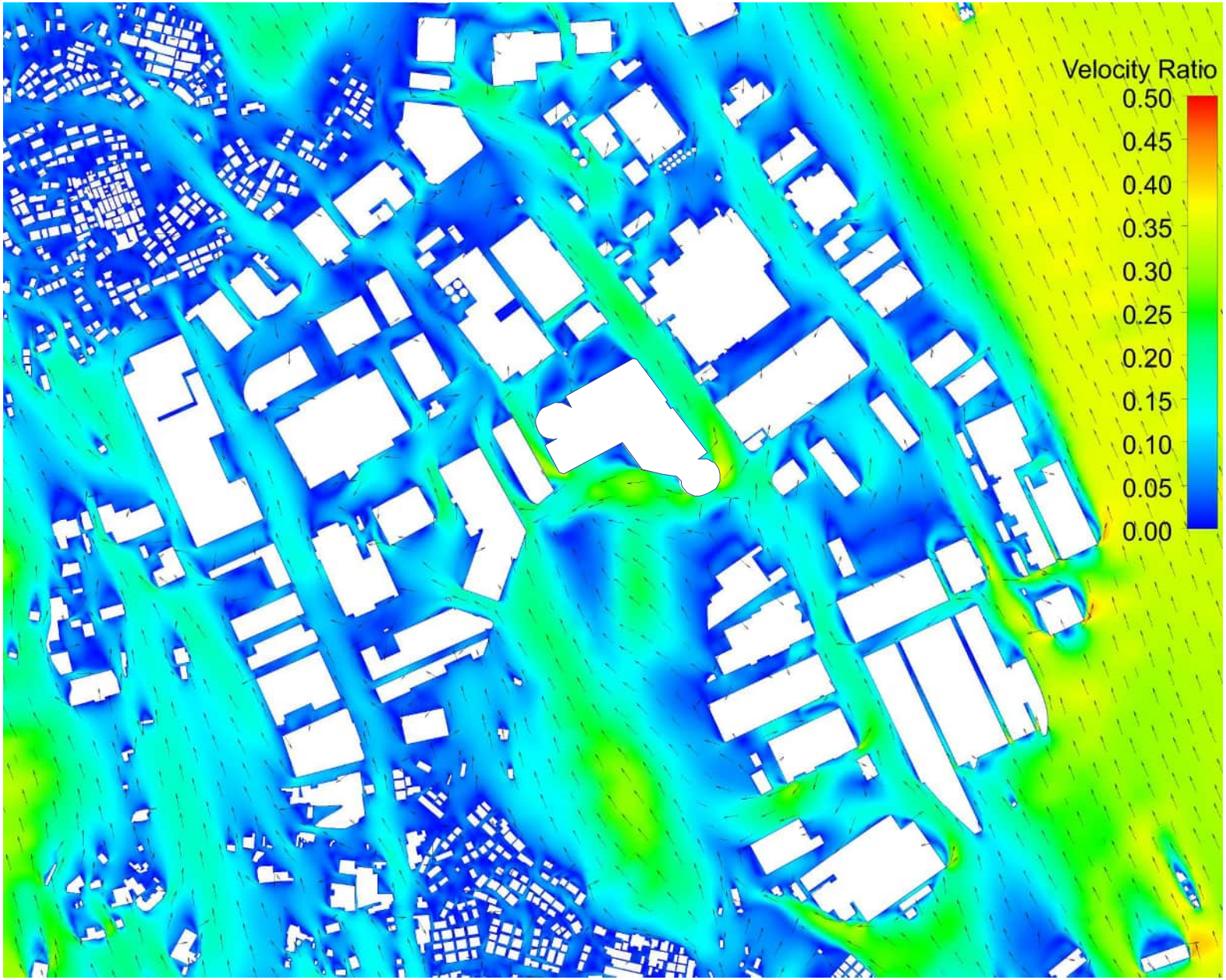


Figure C14a Velocity Ratio Contour and Vector Plot under SSE Wind in the Proposed Scheme (Whole Domain)

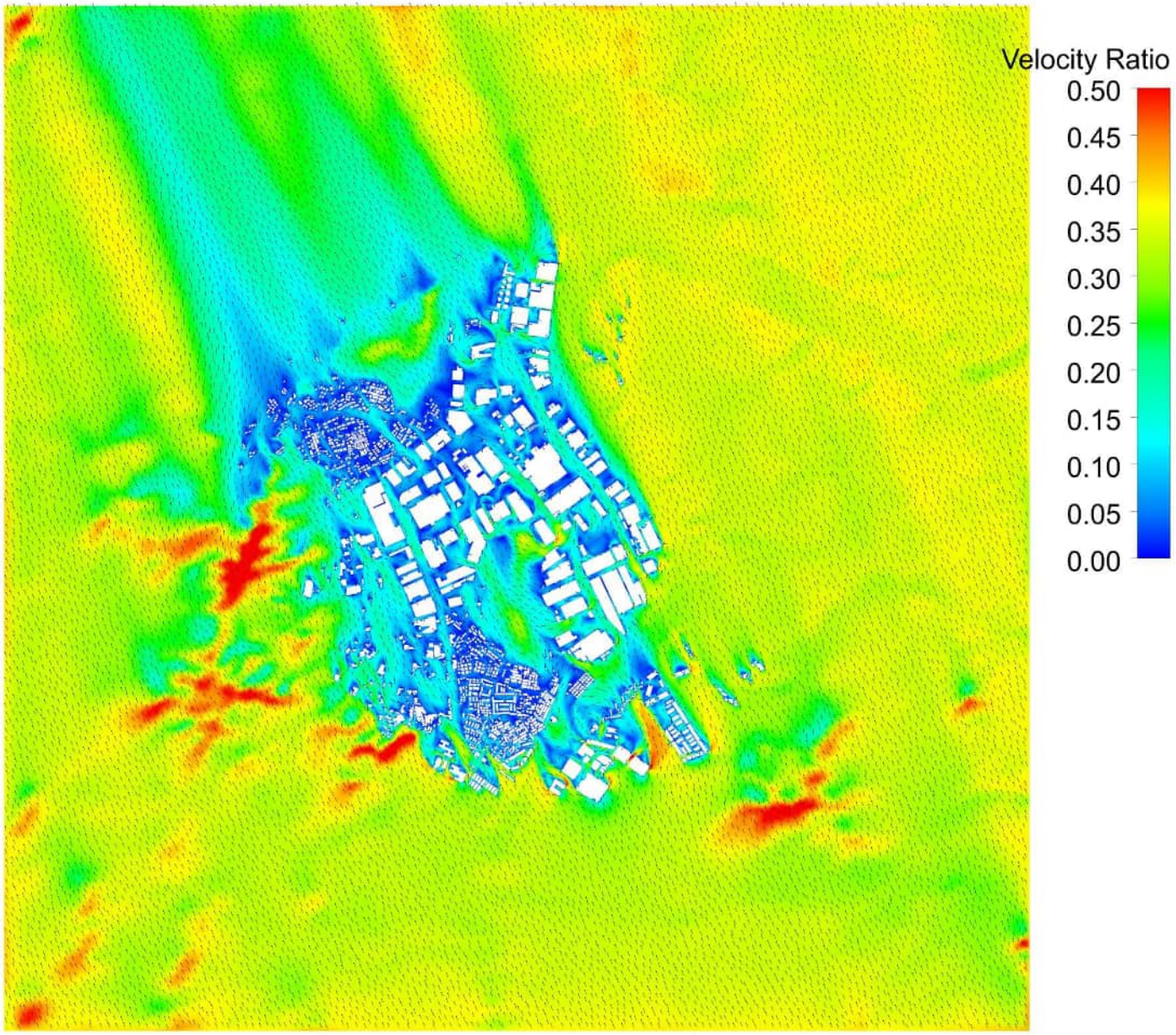


Figure C14b Velocity Ratio Contour and Vector Plot under SSE Wind in the Proposed Scheme

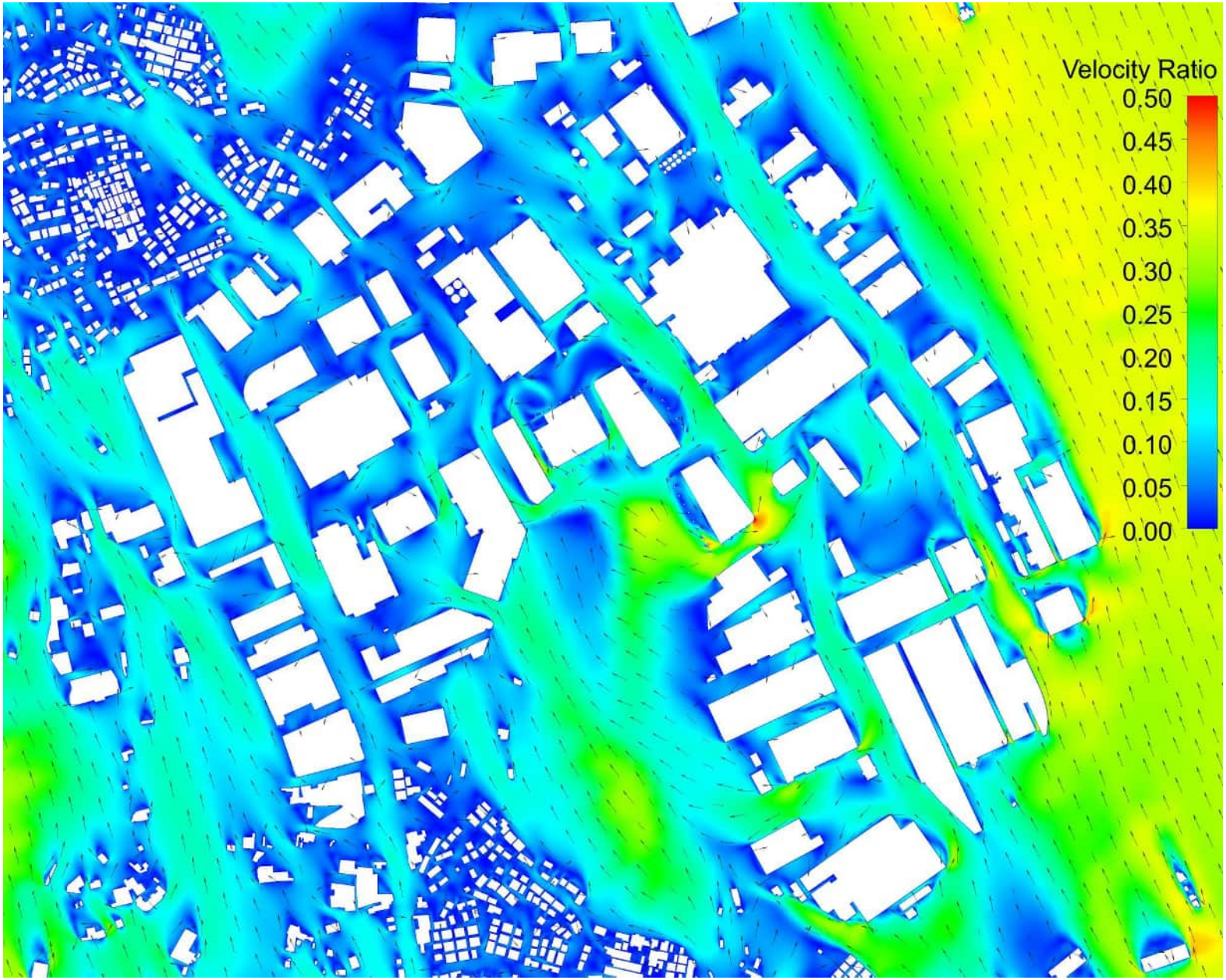


Figure C15a Velocity Ratio Contour and Vector Plot under NNE Wind in the Baseline Scheme (Whole Domain)

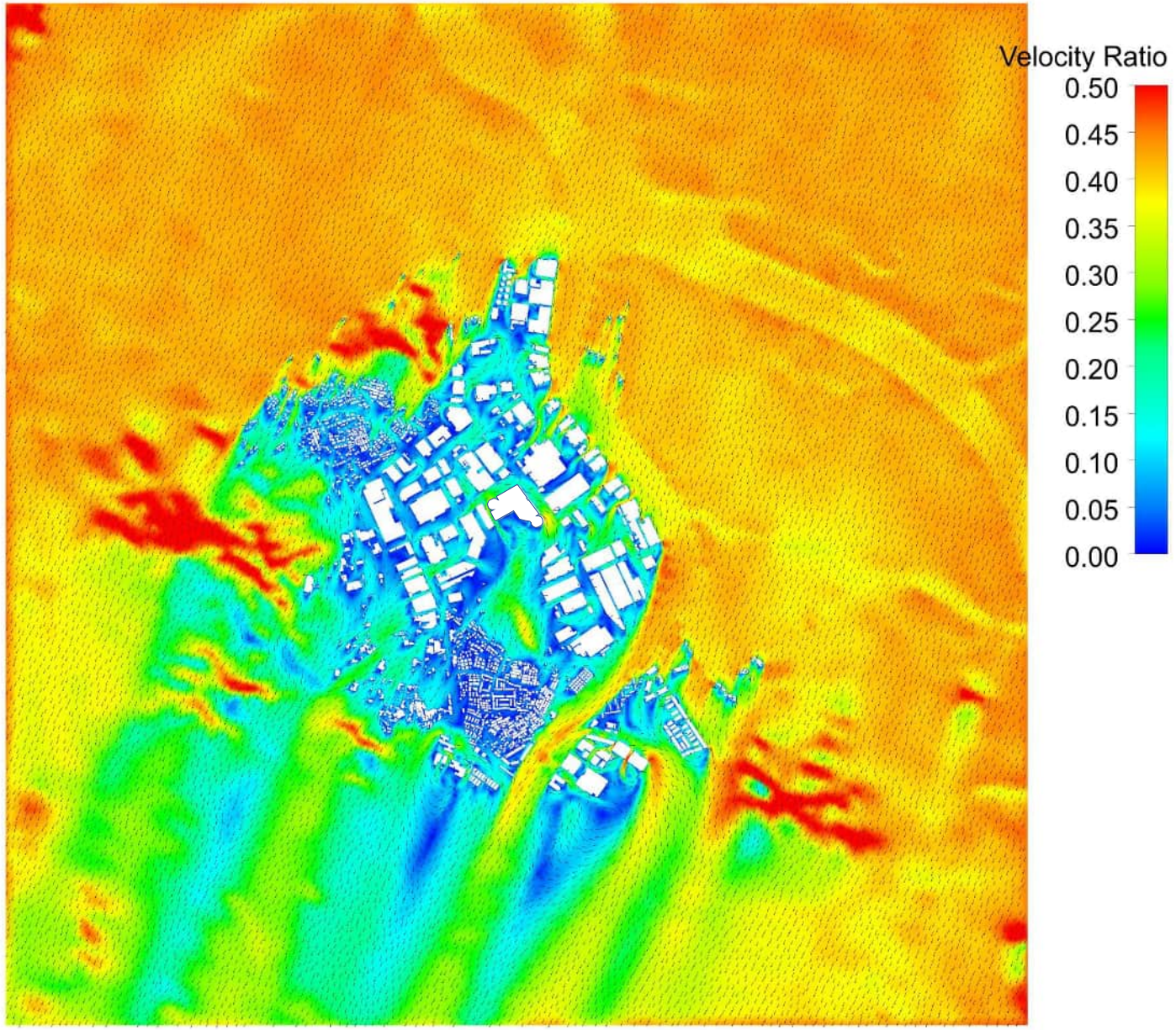


Figure C15b Velocity Ratio Contour and Vector Plot under NNE Wind in the Baseline Scheme

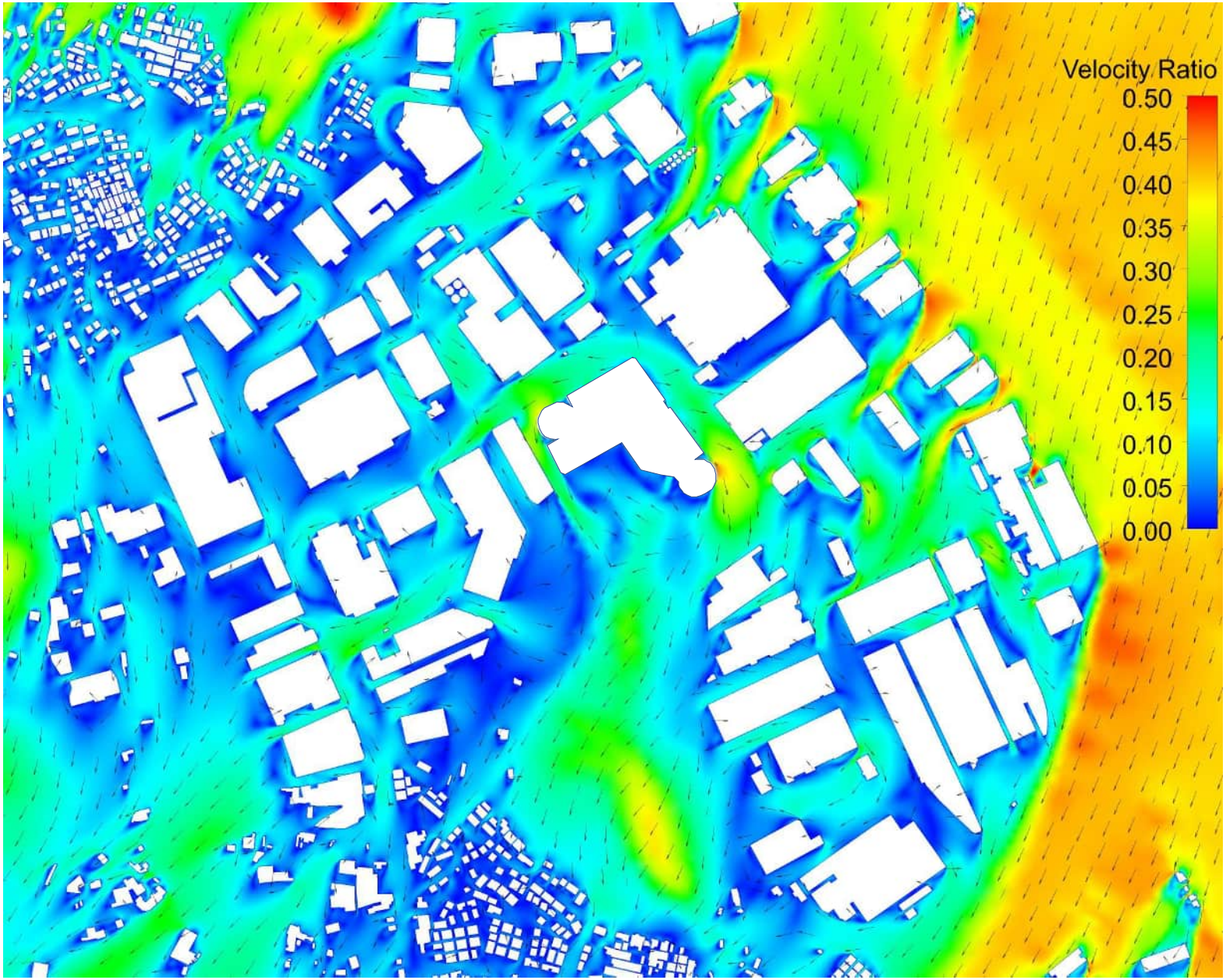


Figure C16a Velocity Ratio Contour and Vector Plot under NNE Wind in the Proposed Scheme (Whole Domain)

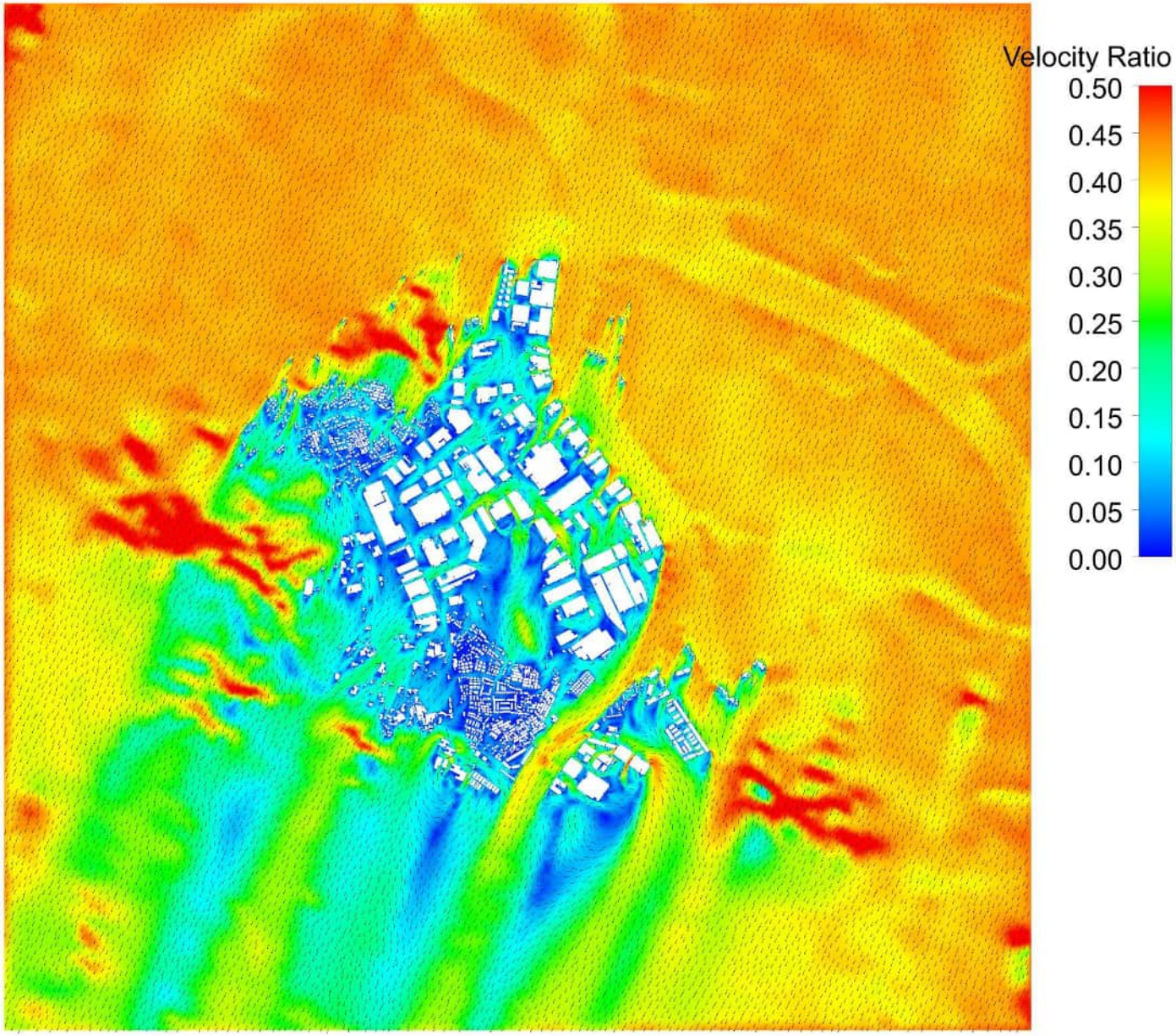


Figure C16b Velocity Ratio Contour and Vector Plot under NNE Wind in the Proposed Scheme

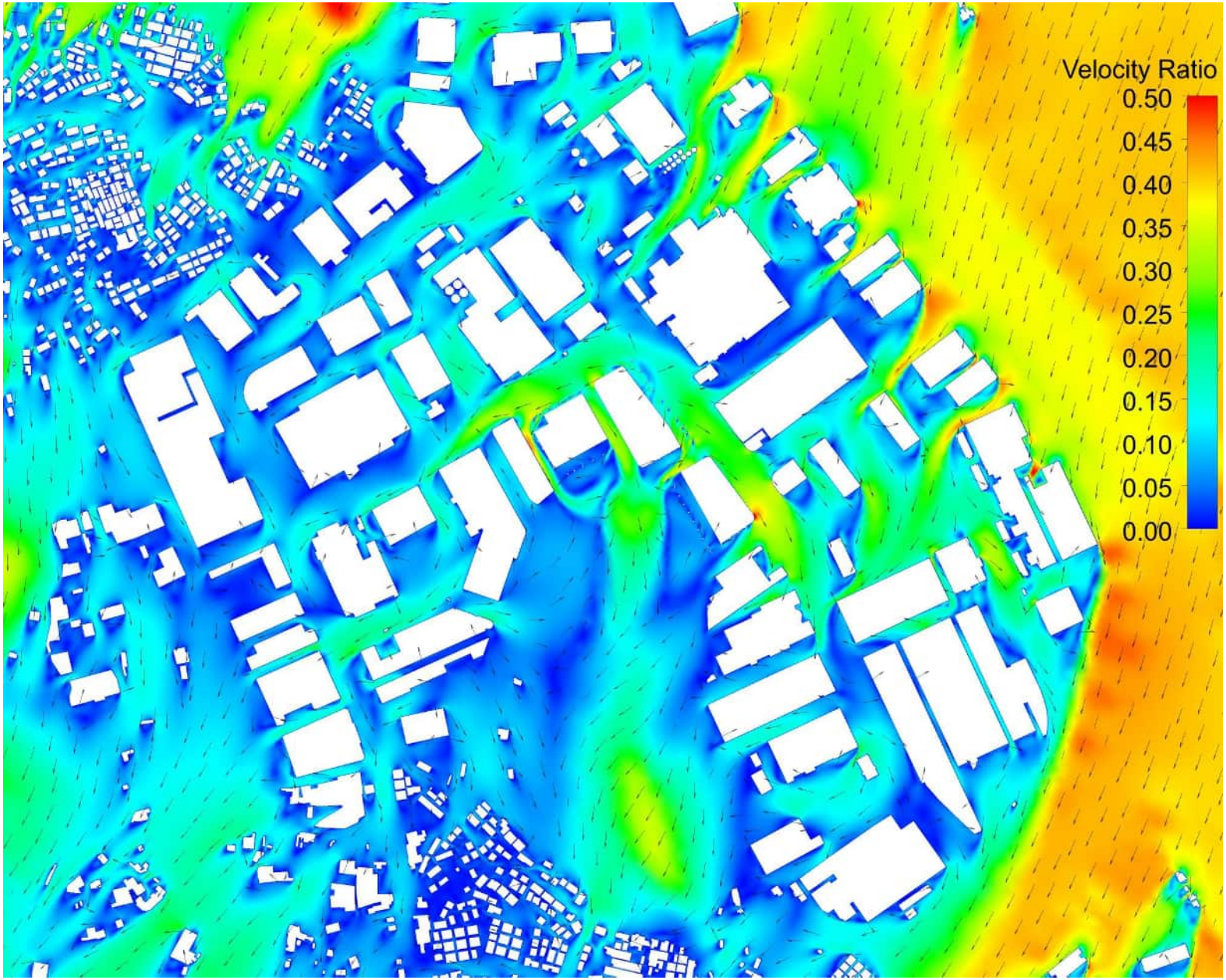


Figure C17a Velocity Ratio Contour and Vector Plot under SW Wind in the Baseline Scheme (Whole Domain)

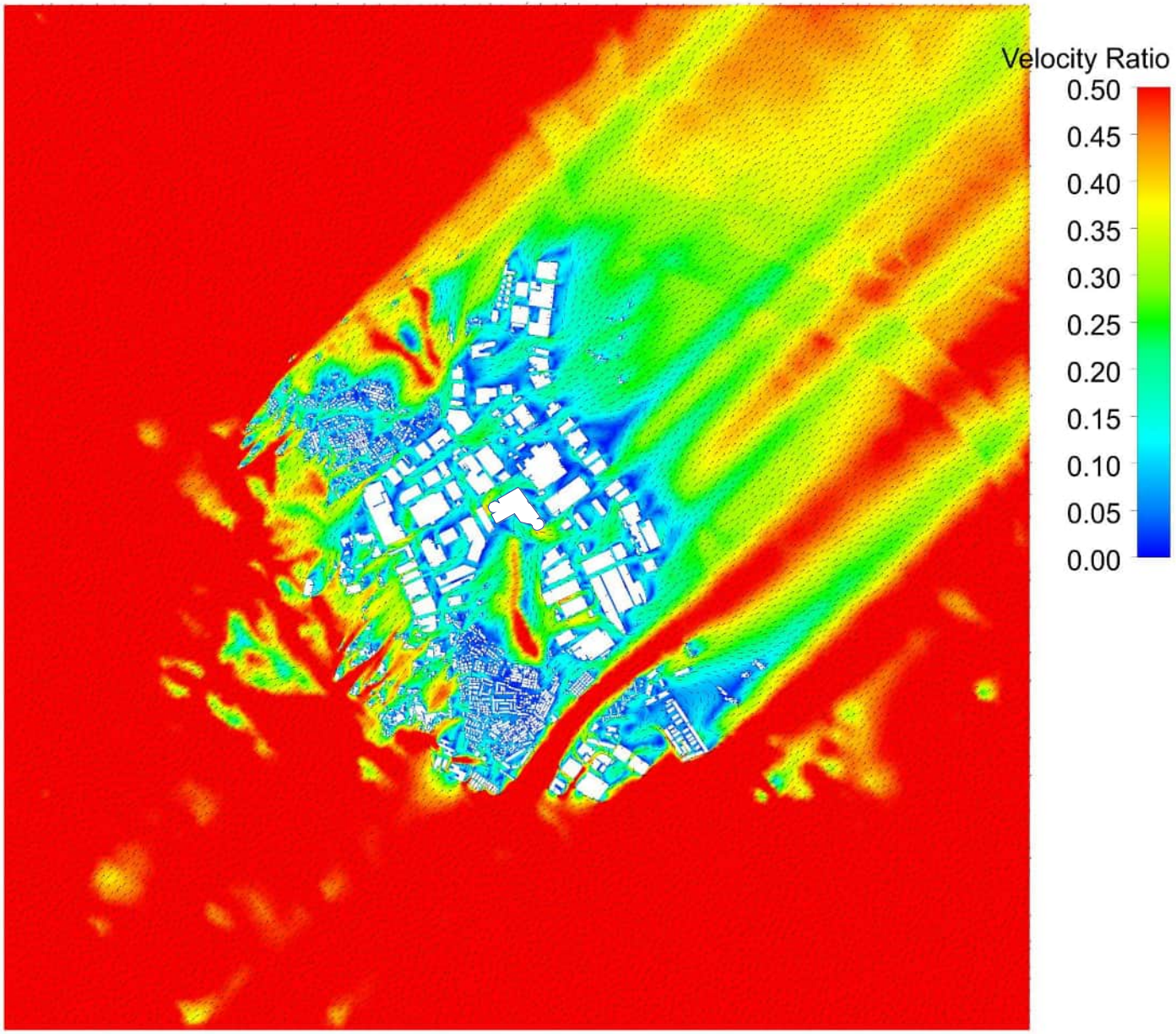


Figure C17b Velocity Ratio Contour and Vector Plot under SW Wind in the Baseline Scheme

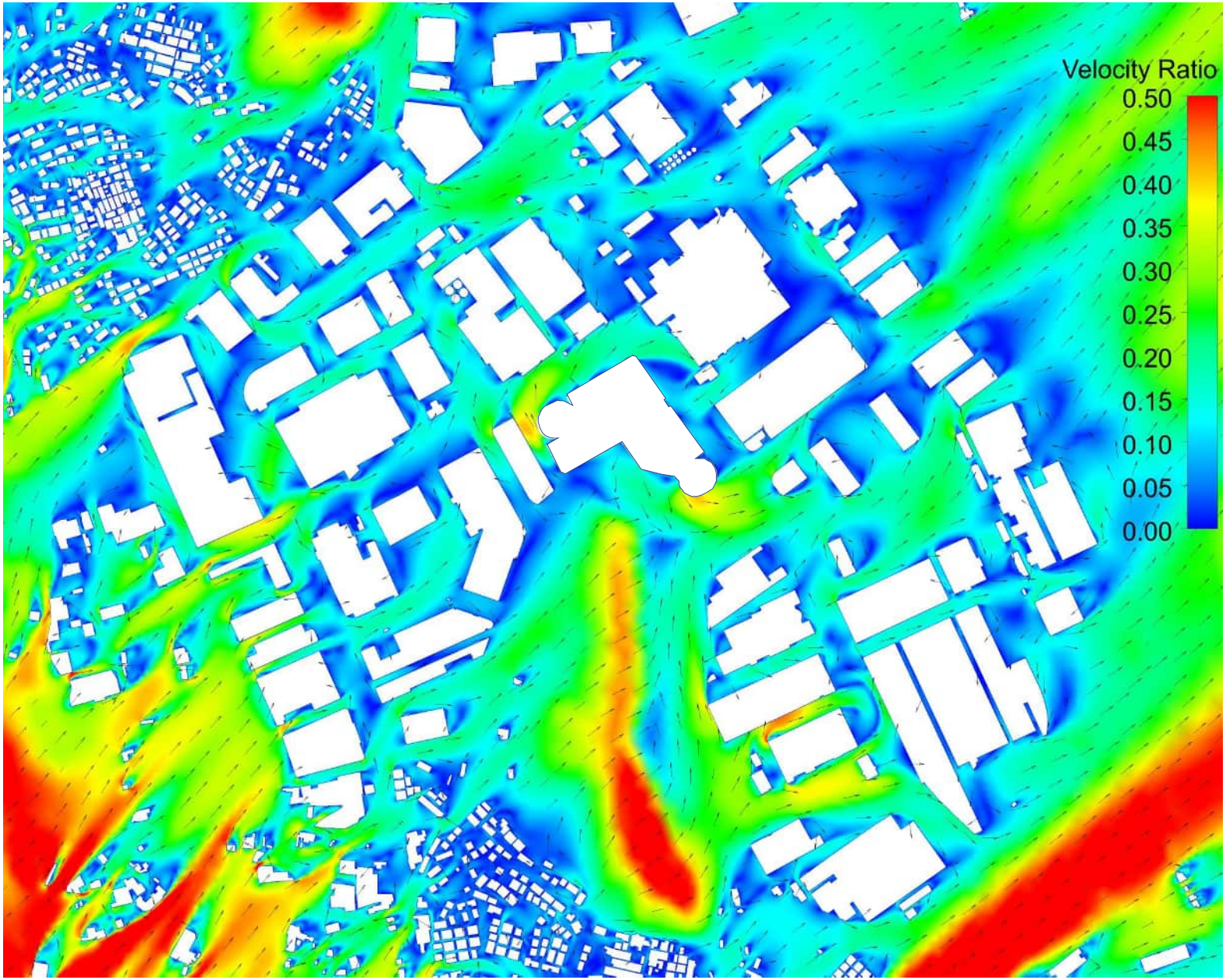


Figure C18a Velocity Ratio Contour and Vector Plot under SW Wind in the Proposed Scheme (Whole Domain)

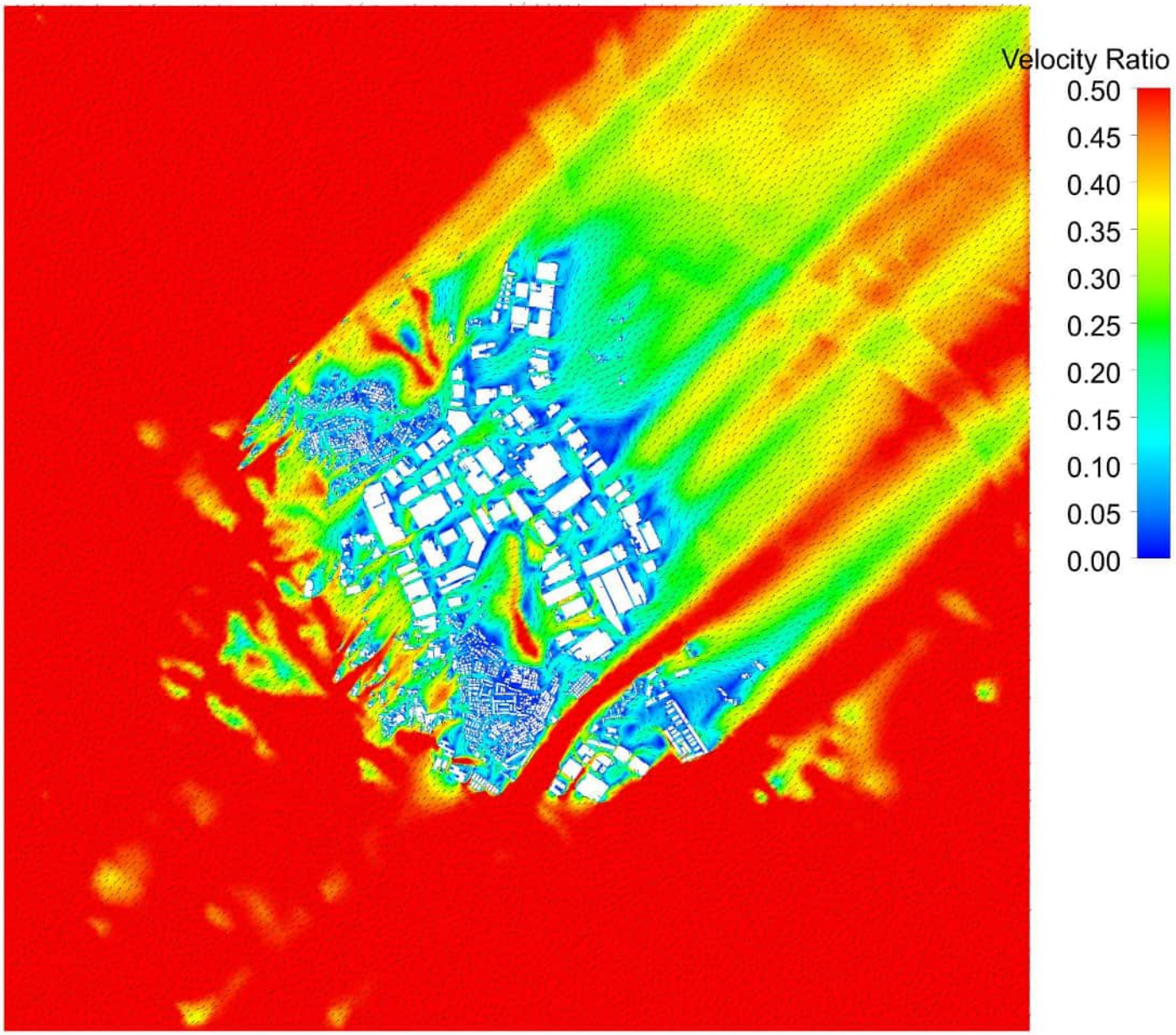


Figure C18b Velocity Ratio Contour and Vector Plot under SW Wind in the Proposed Scheme

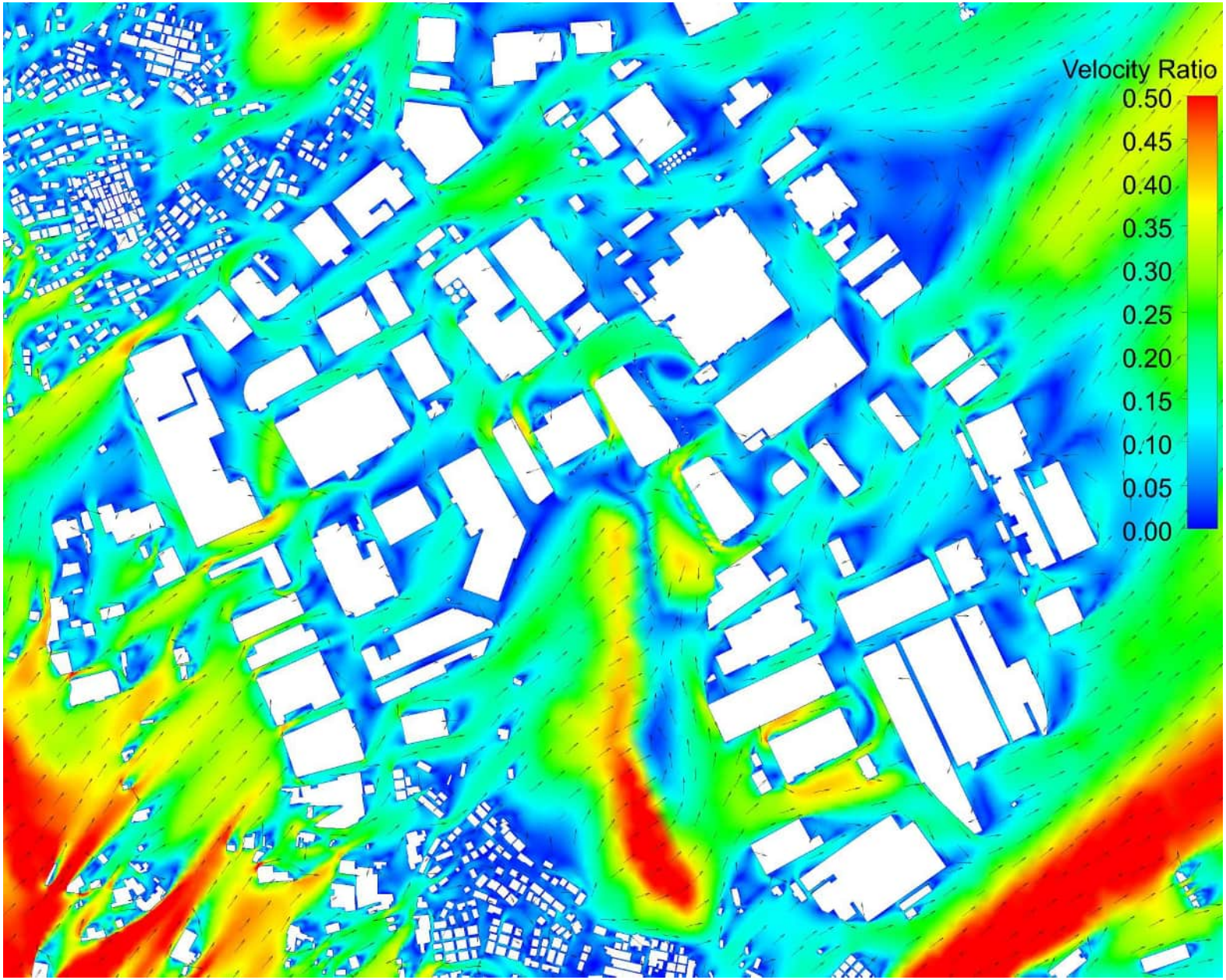


Figure C19a Velocity Ratio Contour and Vector Plot under SE Wind in the Baseline Scheme (Whole Domain)

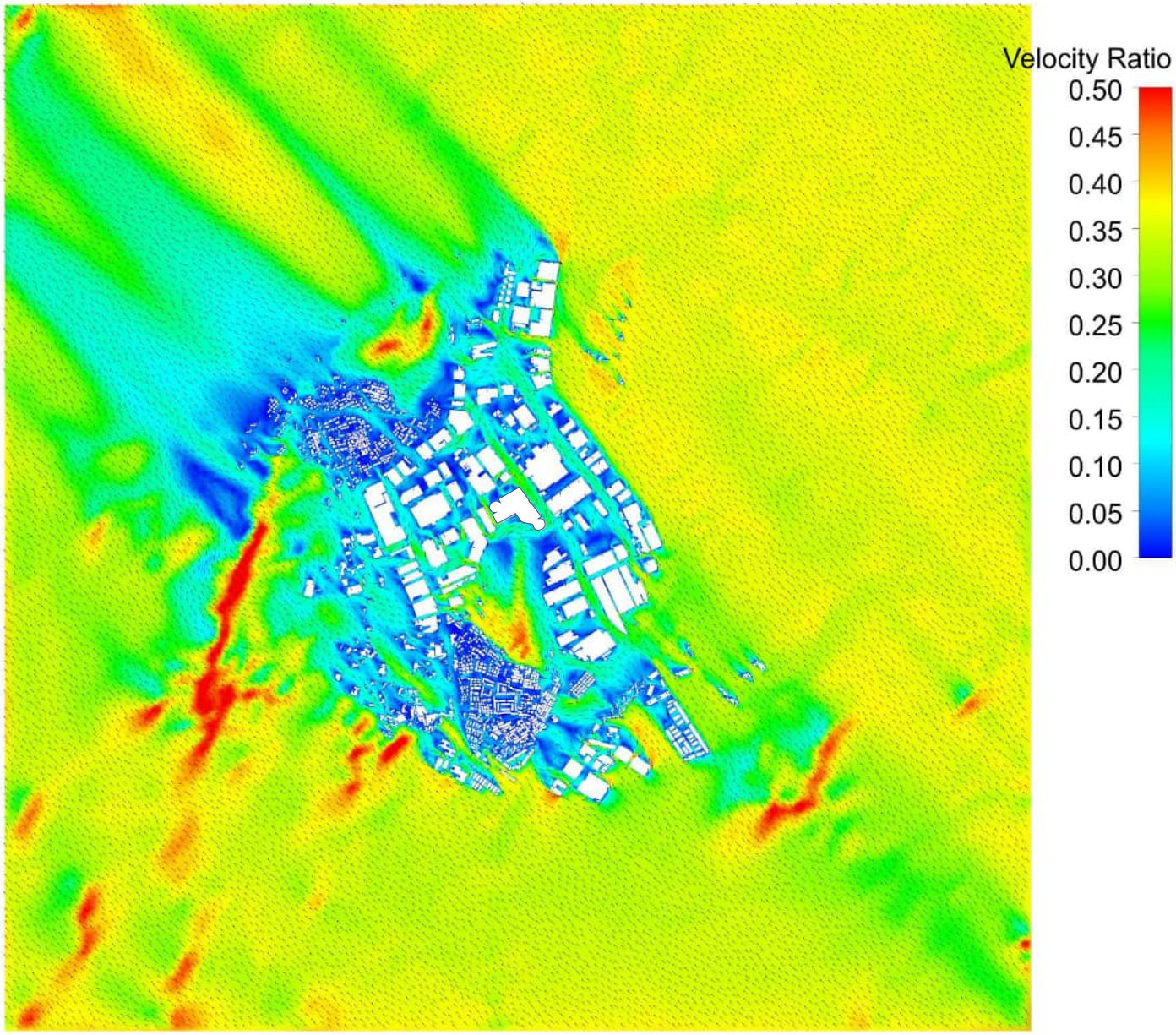


Figure C19b Velocity Ratio Contour and Vector Plot under SE Wind in the Baseline Scheme

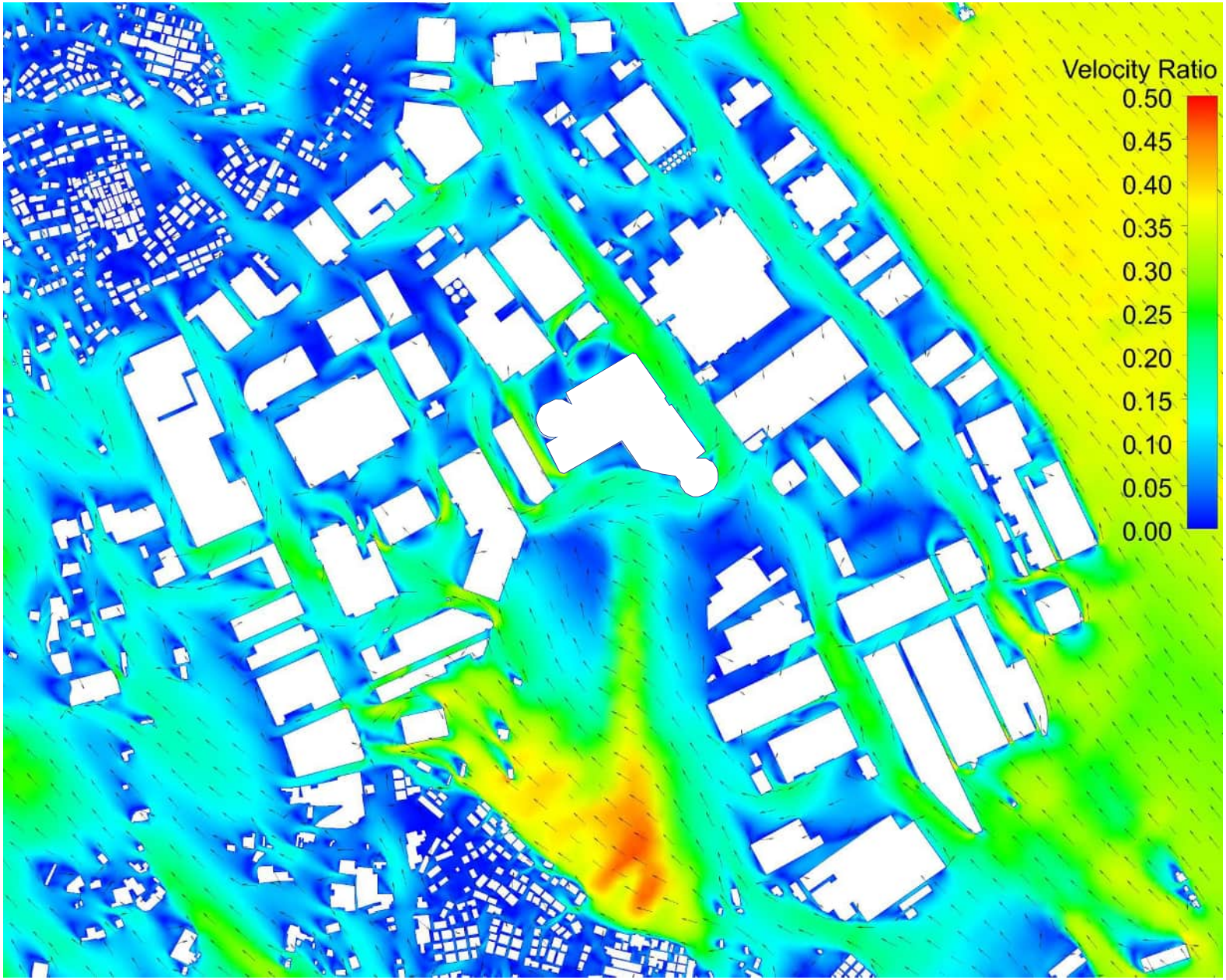


Figure C20a Velocity Ratio Contour and Vector Plot under SE Wind in the Proposed Scheme (Whole Domain)

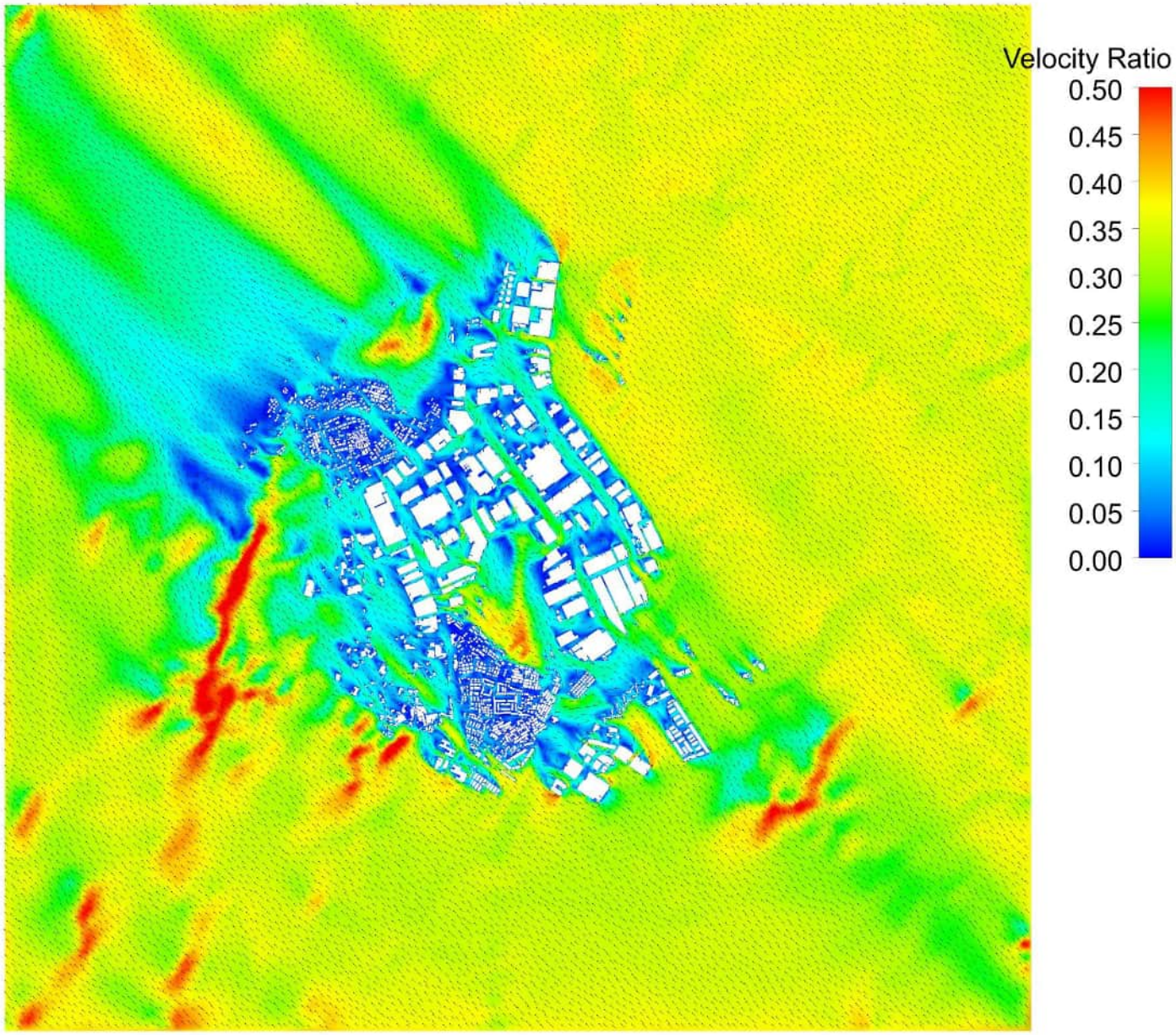
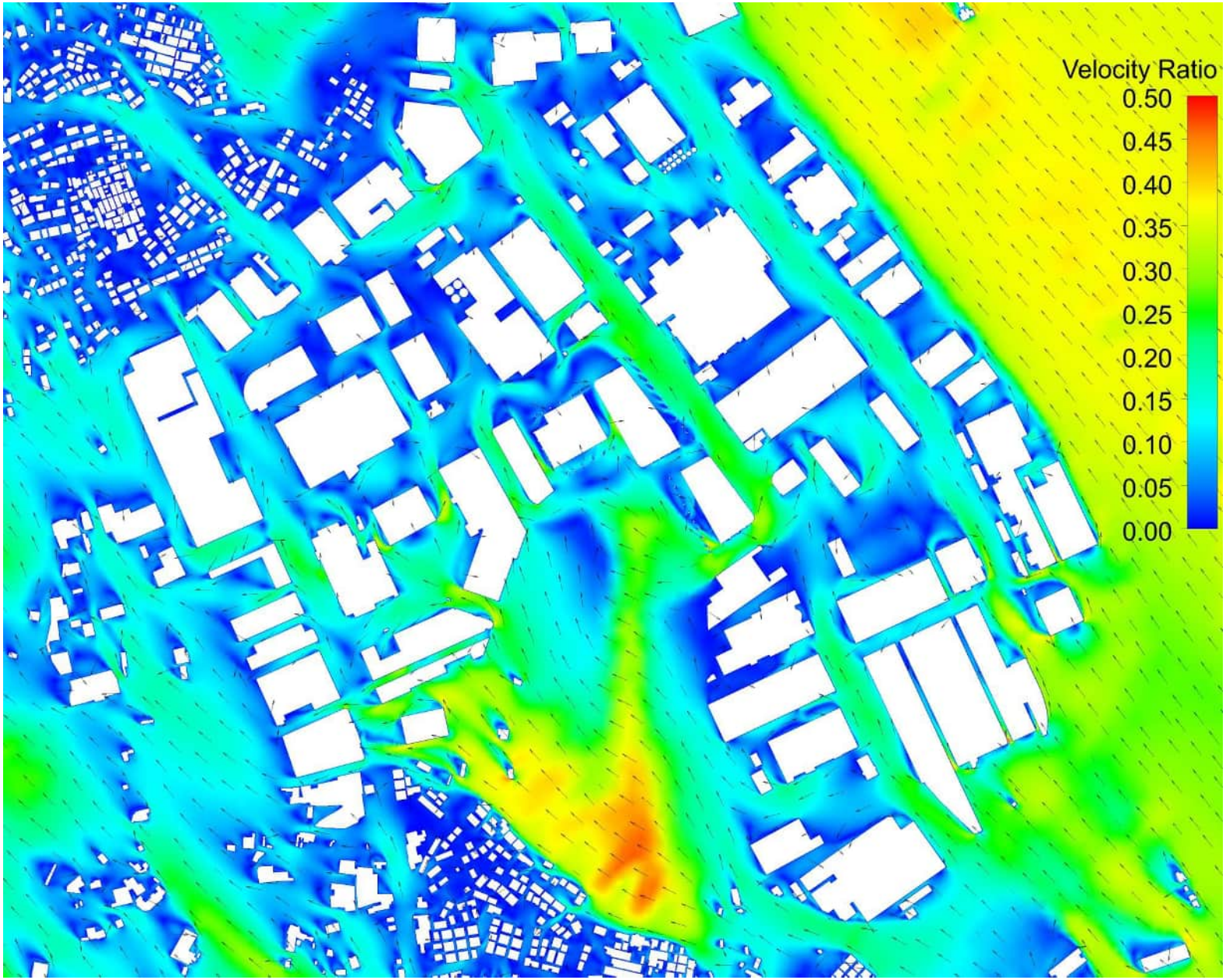
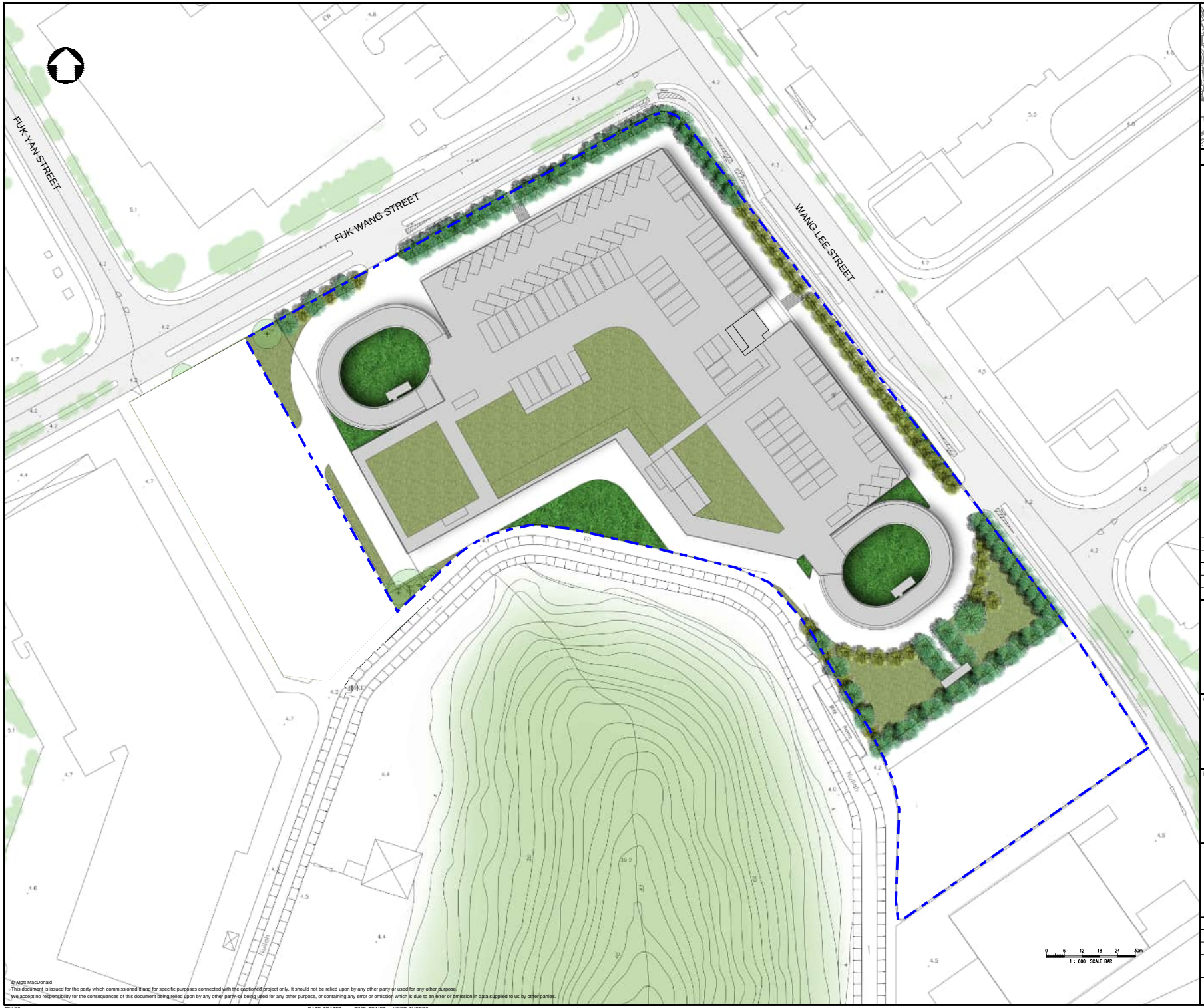
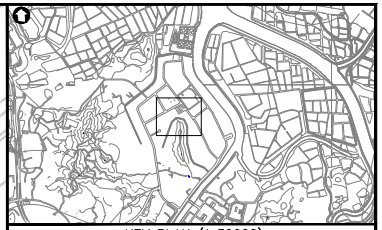


Figure C20b Velocity Ratio Contour and Vector Plot under SE Wind in the Proposed Scheme



Annex D Proposed Development Layout Plan (Baseline Scheme)





KEY PLAN (1: 30000)

LEGEND

DEVELOPMENT SITE

Rev	Date	Drawn	Description	Ch'k'd	App'd
P4	MAY18	CL	RESPOND TO COMMENTS	CJF	SHC
P3	JAN 18	CL	BOUNDARY UPDATE	CJF	SHC
P2	AUG 17	CL	RESPOND TO COMMENTS	CJF	SHC
P1	MAY 17	CL	FIRST ISSUE	CJF	SHC

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CEDD

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE3/2016(CE) STUDY ON PROPOSED MULTI-STOREY BUILDINGS IN YUEN LONG AREA FOR BROWNFIELD OPERATIONS - FEASIBILITY STUDY

Title

BASELINE SCHEME -MASTER PLAN

Designed			Eng check		
Drawn			Coordination		
Dwg check			Approved		
Scale at A1		Status		Rev	

Drawing Number MMH/369397/VIA/001

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$FILE$ DATE: $DATE$ TIME: $TIME$ USER: $USER$

Annex E Proposed Development Layout Plan (Indicative Development Scheme)

820500 E

820750 E

821000 E

835750 N

835500 N

Site A

Site B

Site C

GREEN ROOF

GREEN ROOF

GREEN ROOF

DRIVEWAY

DRIVEWAY

DRIVEWAY

DRIVEWAY

DRIVEWAY

DRIVEWAY

DRIVEWAY

DRIVEWAY

香港生力啤酒廠有限公司
San Miguel Brewery Hong Kong Ltd.

雀巢香港有限公司
Nestle Hong Kong Ltd

WANG LEE STREET

FUK YAN STREET

FUK WANG STREET

FUK HANG STREET

WANG FU STREET

WANG LEE STREET

Bright Future Pharmaceuticals Factory

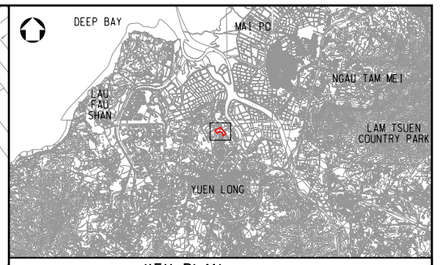
Yip Shing Diesel Engineering Co. Ltd.

The Chinn Engineers, Limited

United Laboratories

Chinese Inspection Company Ltd

0 10 20 30 40 50m
1 : 1 000 SCALE BAR



KEY PLAN (1:100000)

LEGEND:

- SITE BOUNDARY
- RETAINED TREE
- GREENING
- GREEN ROOF
- INDICATIVE LOCATION OF ROAD-SIDE TERMINUS, FOOTPATH AND CYCLE TRACK SUBJECT TO DETAILED DESIGN BY FUTURE PROPONENT

Note:
The affected cycle track will be realigned at the ingress/egress points of the proposed development, together with updating of road marking and traffic signs at those locations.)

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	JUL 2023	AL	SECOND ISSUE	KS	SHC
P1	NOV 2022	AL	FIRST ISSUE	KS	SHC

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE3/2016(CE)
SECTION 16 PLANNING APPLICATION FOR MULTI-STOREY BUILDING DEVELOPMENTS NEAR YUEN LONG INDUSTRIAL ESTATE

Title

INDICATIVE MASTER LAYOUT PLAN - PROPOSED SCHEME

Designed	PK		Eng check	JC	
Drawn	MING		Coordination	JC	
Dwg check	PK		Approved	EC	

Scale at A1	Status	Rev
1:1000	PRE	P2

Drawing Number

MMH/369397/IDS/101

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P:\Hong Kong\INF\Projects\369397 MSBs in YLIE FS\09_Additional Services\s16 Application (Scenario C)_Rev A\Technical Assessment\DATE\Indicative Master Layout Plan.dgn



mottmac.hk

MOTT MACDONALD

Section 16 Planning Application for Multi-storey Building Developments at No. 32 Wang Lee Street and Adjoining Government Land, Yuen Long

Geotechnical Assessment

September 2023

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Section 16 Planning Application for Multi-storey Building Developments at No. 32 Wang Lee Street and Adjoining Government Land, Yuen Long

Geotechnical Assessment

September 2023

Mott MacDonald Hong Kong Limited
registered in Hong Kong no. 236497

Issue and Revision Record

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B	Feb 2023	Various	KS Li	S H Ching	Final Submission
C	Sep 2023	Various	KS Li	S H Ching	Revised Final Submission

Document reference: 369397 | 01B | C |

Information class: Standard

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Table 3.1 Summary of GI Stations within Development Site
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Table 4.1 Summary of Boreholes with MARBLE RECOVERY

Annex

Annex A Summary Table for Existing Ground Investigation Stations

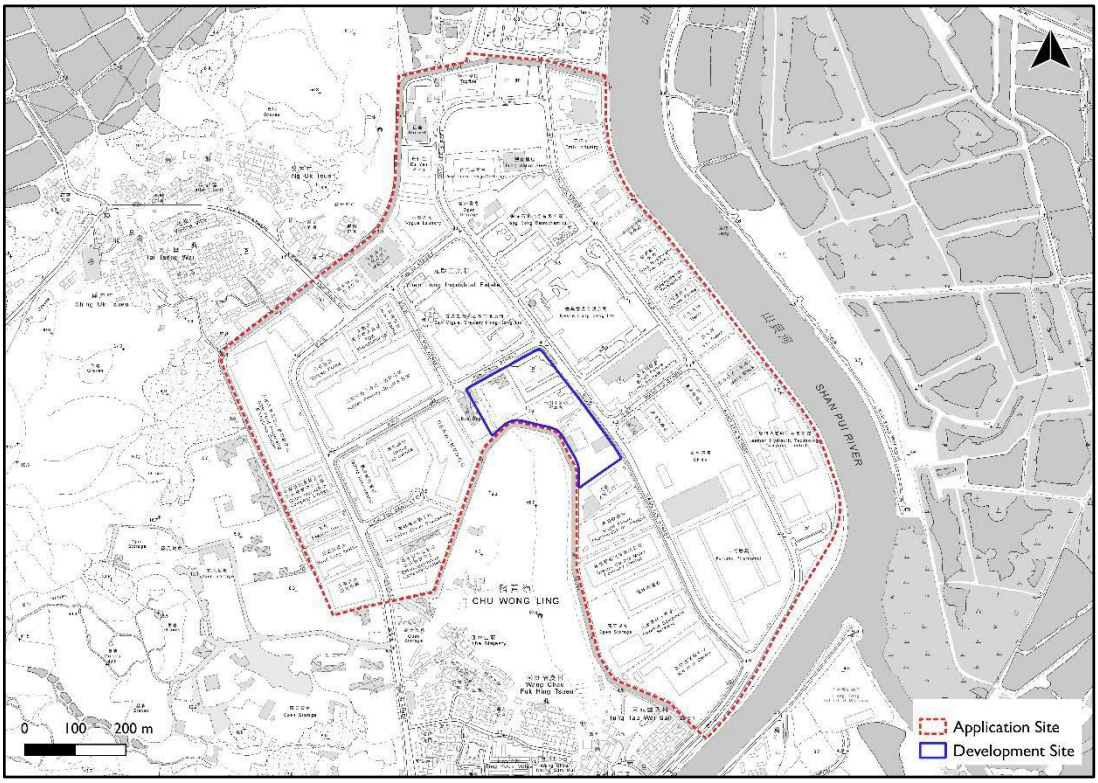
1 Introduction

1.1 Background

1.1.1 This Geotechnical Assessment Report is prepared to support a Section 16 planning application for the proposed multi-storey buildings (MSBs) development (Proposed Development) at No. 32 Wang Lee Street and Adjoining Government Land, Yuen Long.

1.1.2 A Site Location Plan of the Development Site (the Site) is shown in **Figure 1.1**.

Figure 1.1: Site Location Plan



1.2 Structure of this Report

1.2.1 This report contains the following sections in addition to this introduction (Section 1):

Section 2 – Development Proposal

Section 3 – Existing Conditions of Development Site

Section 4 – Geotechnical Appraisal of Development Site

Section 5 – Summary

1.3 Abbreviations

1.3.1 The following abbreviations shall have the meaning hereby assigned to them except when the context of this Report otherwise requires:

Abbreviation for Bureaux/Departments/ organisations	**Full title**
CEDD	Civil Engineering and Development Department
DEVB	Development Bureau
GEO	Geotechnical Engineering Office of the Civil Engineering and Development Department
MSB	Multistorey Building

2 Development Proposal

2.1 Indicative Layout of Proposed MSBs Development

2.1.1 The Site is proposed to provide three sites (**Sites A, B and C**) each about 1 ha to accommodate MSBs developments for industrial uses, totalling 3.23 ha in area.

2.1.2 **Figure 2.1** illustrates the indicative division of land parcels in the Site. It should be noted that the land parcels for proposed MSBs shown in the Site is indicative and solely for technical assessments purpose.

2.1.3 The proposed MSBs at Sites A, B and C are to be developed at a plot ratio of 5 with not more than 10 storeys above ground level excluding basement level.

2.1.4 It is anticipated that the land will be disposed by tender and the MSBs are targeted to start the operation in 2028/2029, with a construction period of 4 to 5 years. Major development parameters and proposed floor uses of the proposed MSBs are summarised in **Table 2.1** and **Table 2.2,** respectively.

Figure 2.1: Indicative Land Parcel for MSBs Development within the Development Site

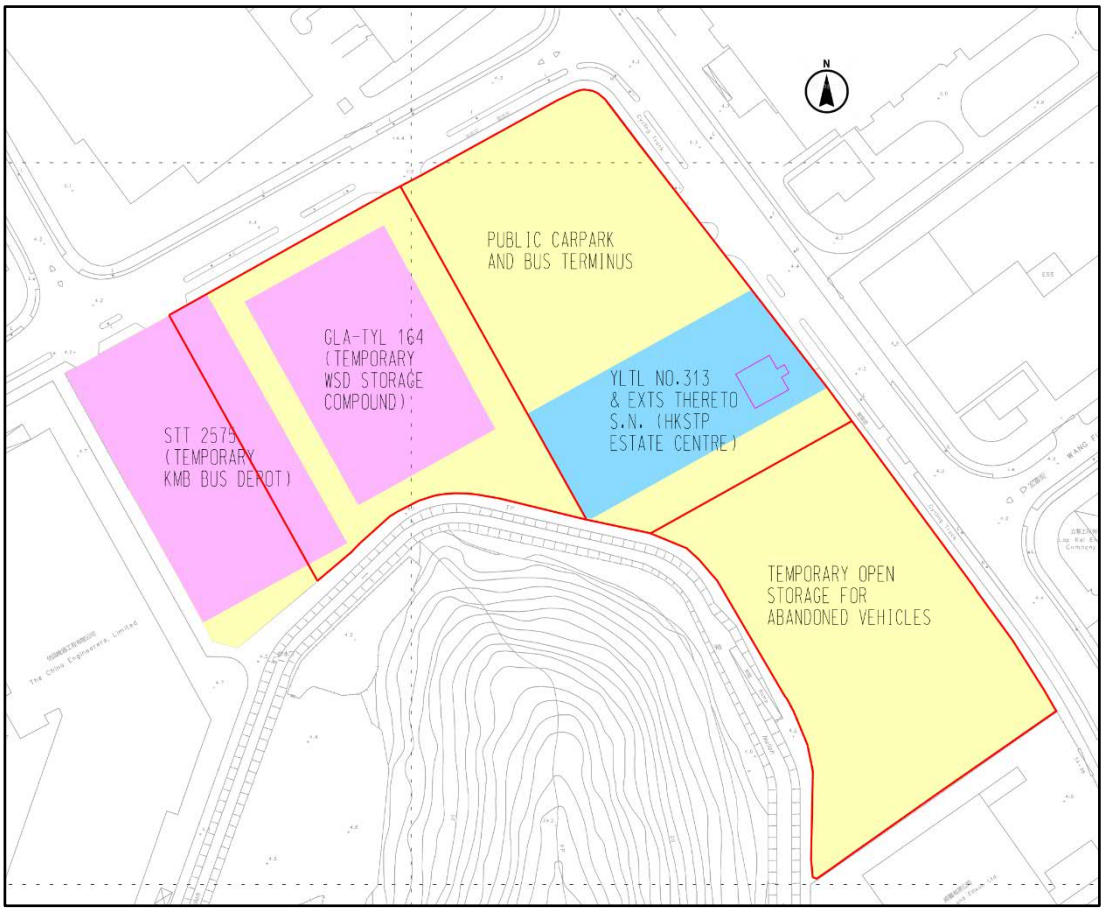


Table 2.1: Development Parameters for Indicative Scheme

Parameters	MSB in Site A	MSB in Site B	MSB in Site C	Total
Site Area	0.98 ha	1.25 ha	1.00 ha	3.23 ha
Maximum Plot Ratio	5			
GFA (m2)	49,000	62,500	50,000	161,500
Site Coverage	Not Specified			
Class of Site	Class A	Class B	Class A	
Land Uses	Vehicle Servicing and Maintenance and/or Logistics Uses + Not less than 30% for accommodating eligible brownfield operators displaced by the government-led development projects (industrial uses)			
No. of Storeys	No more than 10 storeys above ground level			

Table 2.2: Indicative Floor Uses of MSBs Development in Sites A, B and C

Floor	Proposed Uses
G/F-9/F	• Vehicle Servicing and Maintenance; • Logistics Uses; and/or • Industrial Uses (for accommodating eligible brownfield operators)
Basement (1 Level)	Public Vehicle Parking (in Site B)[1]

[1] Subject to the detailed design, a basement may be constructed in Site A and Site C to take up some underground space for ancillary parking, plant room, etc.

3 Existing Conditions of Development Site

3.1 Ground Investigation Reports

3.1.1 There are 26 nos. of previous GI reports with 223 nos. of GI stations in the vicinity of the Site, 219 of which are drillholes and 4 of which are trial pits. The 223 nos. of GI stations are either within the Development Site or not more than 200m (approximately) from the periphery of the Site. Data from those GI stations are summarised in **Table A.1** and their locations in **Figure A.1** in **Annex A**.

3.1.2 Five drillholes were also carried out in 2017 within and near the Site under a study (the "**Study**") investigating the engineering feasibility of the proposed MSBs at the Site. The locations of these five drillholes are shown in **Figure 3.1** and the results in **Table 3.1** for easy reference.

Figure 3.1: Locations of drillholes within/near Development Site

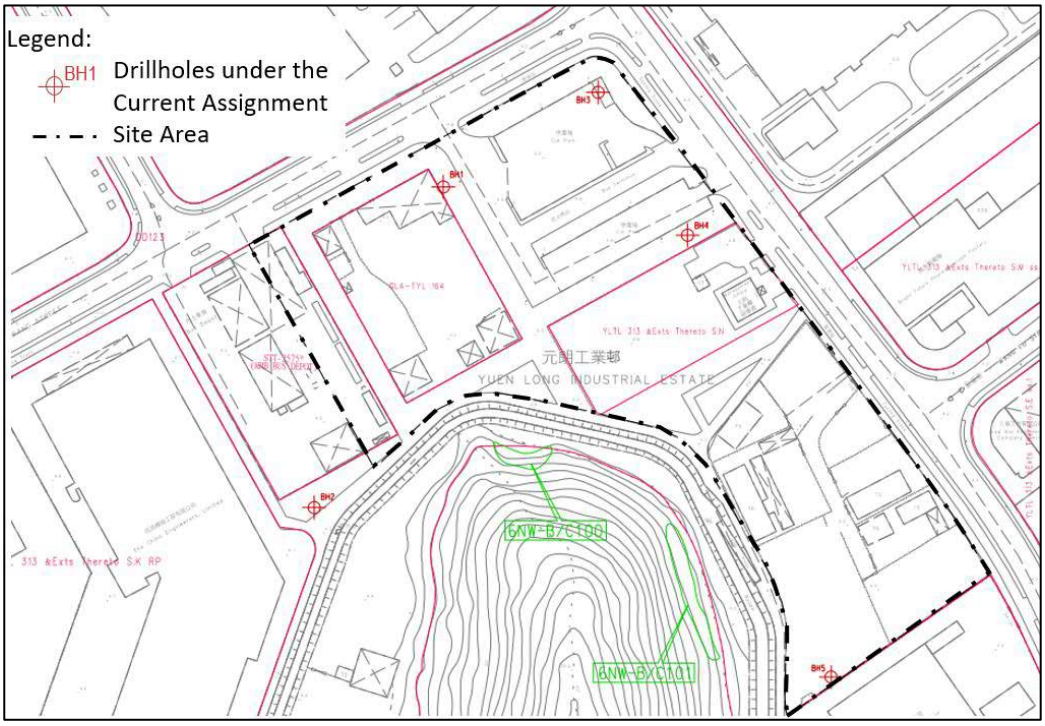


Table 3.1: Summary of GI Stations within/near Development Site

Year	BH	Easting (m)	Northing (m)	GL (mPD)	TD (mPD)	Base fill (mPD)	Base MD-PD (mPD)	Base AV (mPD)	Base Grade V (mPD)	Engineering rockhead (mPD)
2017	BH1	820744.50	835725.24	+4.86	-33.22	+1.26	-	-7.54	-10.76	-19.46
2017	BH2	820685.76	835588.88	+4.23	-96.03	+1.43	+0.23	-8.37	-37.57	-39.87
2017	BH3	820811.62	835762.01	+5.11	-82.54	+0.36	+0.01	-7.69	-60.99	-62.04
2017	BH4	820848.18	835699.39	+4.69	-95.54	-0.31	-0.71	-9.91	-57.81	-58.78
2017	BH5	820896.96	835514.18	+4.77	-25.48	+0.87	-	+0.27	-12.38	-20.48

Remarks:

GL: Ground Level TD: Terminating Depth

3.2 Brief Account of Site History from Aerial Photograph Interpretation

3.2.1 A series of relevant historical aerial photographs showing the development within the Tentative Assessment Area between 1924 and 2015 were collected and reviewed. Based on the findings of the API, the Development Site was mainly occupied by agricultural land and fish ponds from the 1920s all the way to the 1970s. Extensive filling works were carried out over the agricultural land and ponds in the early 1980s, with the reclaimed land mostly ready by 1982. The YLIE development was mostly completed in the 1990s**.**

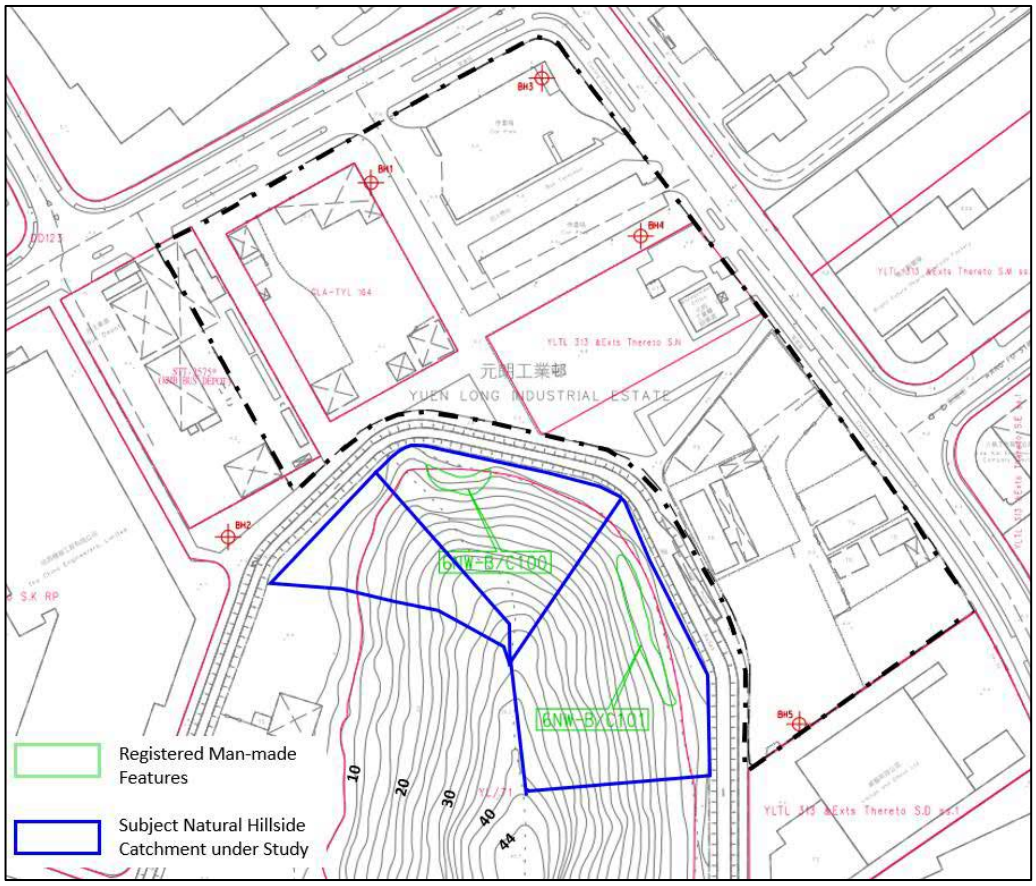
3.3 Man-made Slopes

3.3.1 There are two nos. of registered man-made features, namely 6NW-B/C100 and 6NW-B/C101 at the close vicinity of the Site. Slope Information has been retrieved from the Slope Information System and Slope Maintenance Responsibility Report and the basic slope information of these features is presented in **Table 3.2** and shown in **Figure 3.2**.

Table 3.2: Basic Information of Existing Man-made Features at the vicinity of the Site

Feature	SIFT Class	Consequence-to-life Category	Maximum Height	Facility at Crest	Facility at Toe	Maintenance Responsibility
6NW-B/C100	C1	3	5m	Undeveloped green belt	Remote area or abandoned facilities	LandsD
6NW-B/C101	C1	3	3m	Undeveloped green belt	Road/footpath with low traffic density	LandsD

Figure 3.2: Location of Registered Slopes and Natural Hillside at Close Proximity of Development Site



3.3.2 The features are situated to the South of the Development Site near the toe of the Chu Wong Ling natural hillside. They are cut slopes with maximum heights of respectively 5m and 3m possessing consequence-to-life category 3, with "undeveloped green belt" as crest facilities and "remote area or abandoned facilities" and "road/footpath with low traffic density" as toe facilities. They have SIFT Class C1, being cut features meeting GEO criteria for slope registration and being formed or substantially modified before 30.6.1978 or being illegally formed after 30.6.1978.

3.3.3 Although the features are possessing SIFT Class C1, both of them are separated from the Site by the Chu Wong Ling channel, an existing 9m to 11m (at the portion adjoining the Development Site) wide 3.4m deep nullah, on their toe side. The proposed MSBs development will not render the change in the consequence-to-life category of the features and the features will unlikely affect or be affected by the proposed MSBs development.

3.4 Natural Terrains

3.4.1 Chu Wong Ling natural hillside is overlooking the Development Site on the southern side of the site. Three OH catchments, namely OH1, OH2 and OH3, are identified to dip towards the Site (**Figure 3.2**). Like the two registered man-made features, the OH catchments are separated from the site by Chu Wong Ling channel. The hillside top is up to +46mPD while the proposed future general site formation level of the development at about +5.0mPD.

3.4.2 A preliminary examination on the topographical contours indicates that the hillsides OH3 does not fulfil either the In-principle Objection Criteria and Alert Criteria as laid down in GEO Report No. 138 2nd Edition, while OH1 and OH2 fulfil the Alert Criteria. The nullah may serve as a trench to receive debris from the natural hillside in case of landslides.

4 Geotechnical Appraisal of Development Site

4.1 Possible Complex Geological Conditions

4.1.1 The Site is located in the Scheduled Area of the Northwest New Territories as stipulated in the ETWB TC(W) No. 4/2004 and this is referred to as Scheduled Area No. 2 under Buildings Ordinance as stipulated in PNAP APP 61, where complex geological conditions may be present, including the occurrence of cavity-bearing MARBLE. Geotechnical investigations and foundation works within the Scheduled Area are required to follow the special requirements as stipulated in the above-referenced Circular or PNAP.

4.1.2 The possible complex geological conditions of the Site was revealed by a number of existing boreholes within and in the vicinity (200m line from the boundary of the Site).

4.1.3 Of the 219 nos. of previous boreholes reviewed, 55 nos. were found to have MARBLE recovered. The borehole information is summarised in **Table 4.1** below. The MARBLE surface level is quite diverse at the area, ranging from -105.85mPD to -12.47mPD.

4.1.4 Large cavities, as indicated by non-recoveries encountered in boreholes are present to the Northeast of the Study Site (DH-S13 of GIU Report ref. 18286). In that particular borehole, recovery of MARBLE started at -31.43mPD and karst features were encountered at several ranges of depths along the borehole, including large cavities at depth of -90 mPD to -110mPD.

4.1.5 Two boreholes BH1 and BH2 under GIU Report Ref. 9487 (in 1986) was reported to have recovered MARBLE starting from -52.3mPD and -55.6mPD.

4.1.6 **Figure 4.1** indicatively illustrates the extents of MARBLE-backed areas inferred from interpolated MARBLE-recovered boreholes. One MARBLE-backed area immediately adjoins the western periphery of the Site.

4.1.7 Of the five boreholes carried out under the Study, BH2 and BH4 were drilled to about 100m depth. No marble has been recovered from the five boreholes.

Figure 4.1: Indicative MARBLE-backed Areas

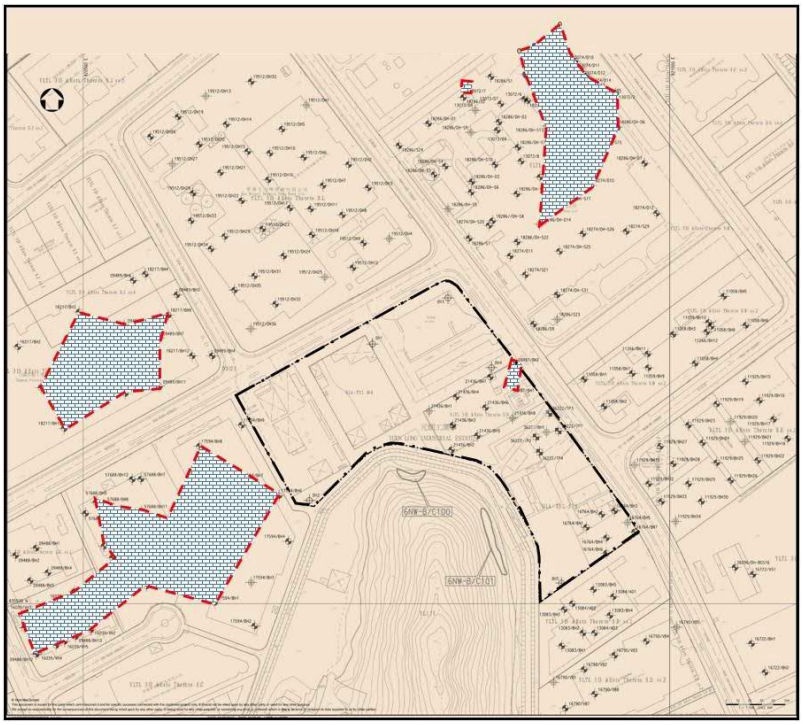


Table 4.1: Summary of Boreholes with MARBLE RECOVERY

Year	GIU Ref.	BH	Easting (m)	Northing (m)	GL (mPD)	TD (mPD)	Base fill (mPD)	Base MD-PD (mPD)	Base AV (mPD)	Base Grade V (mPD)	MARBLE surface (mPD)	Base Level of Surface Karst (mPD)	Depth of Cavity (m)	Thickness of Cavity (m)
1984	9489	BH7	820565	835726	+5	-107.1	+2	-0.5	-10.5	-105.85	-105.85	-	-	-
1984	9489	BH10	820535	835737	+5	-43.43	+1.5	-0.5	-10.5	-	-38.43	-	-	-
1984	9489	BH11	820565	835685	+4.75	-29.61	+1.25	-0.75	-8.25	-24.35	-24.35	-	-	-
1986	9487	BH1	820860	835690	+4.55	-57.47	+0.55	-8.45	-	-52.3	-52.3	-	-	-
1986	9487	BH2	820865	835700	+4.55	-60.67	-0.45	-8.45	-	-55.6	-55.6	-	-	-
1988	13072	1	820906	835998	+4.63	-46.97	+2.63	-0.87	-10.87	-34.87	-34.87	-	-	-
1988	13072	3	820910	835952	+4.77	-38.23	+1.77	-0.73	-12.73	-23.03	-23.3	-	-	-
1988	13072	4	820871	835973	+4.88	-50.37	+3.38	-	-12.12	-38.12	-38.12	-35	-	-
1988	13072	5	820911	835909	+4.93	-37.92	+1.83	-1.07	-23.07	-27.67	-23.07	-	-	-
1988	13072	6	820876	835930	+4.89	-62.91	-	-	-15.11	-47.71	-15.11	-	-	-
1988	13072	8	820873	835877	+4.95	-67.35	+0.45	-2.05	-15.05	-56.05	-15.05	-60	-	-
1989	13073	D3	820887	835977	+4.78	-62.22	-1.22	-2.72	-14.22	-46.82	-46.82	-	-	-
1989	13073	D5	820877	835951	+4.93	-74.94	+1.43	-3.57	-13.57	-56.12	-56.12	-60	-	-
1989	13073	D7	820856	835926	+5.02	-67.33	+1.02	-0.98	-10.98	-40.57	-44.48	-60	-	-
1989	13073	D8	820834	835920	+4.94	-71.78	-1.06	-6.06	-13.56	-56.36	-56.36		-	-
1989	13073	D9	820853	835903	+4.95	-74.08	1	-	-13.55	-55.75	-55.75	-70	-	-
1989	13074	D10	820914	835968	+4.72	-44.69	+-1.28	-3.78	-11.28	-28.78	-28.78	-55	-47.9 to -55	7.1
1989	13074	D11	820919	835962	+4.69	-37.19	-1.31	-3.81	-13.81	-21.46	-21.46	-	-	-
1989	13074	D12	820924	835956	+4.74	-58.08	-1.26	-3.76	-13.76	-36.86	-36.86	-45	-	-
1989	13074	D13	820924	835945	+4.8	-57.3	-1.2	-3.7	-13.7	-28.55	-28.55	-	-	-
1989	13074	D14	820929	835949	+4.71	-61.76	-1.29	-3.79	-13.79	-41.94	-41.94	-55	-	-
1989	13074	D15	820917	835951	+4.79	-37.71	-1.21	-3.71	-16.21	-21.21	-21.21	-	-	-
1989	13074	D16	820927	835938	+4.8	-49.2	-1.2	-3.7	-13.7	-33.75	-33.75	-	-	-
1989	13074	D17	820916	835940	+4.87	-40.53	-1.13	-3.63	-13.63	-24.33	-24.33	-	-	-
1990	16039	VH1	820492	835510	+4.99	-77.04	-0.51	-2.51	-16.51	-51.51	-37.01	-	-	-
1990	16039	VH2	820507	835478	+4.95	-62.09	-0.55	-2.55	-10.55	-45.55	-45.55	-	-	-
1990	16039	VH3	820448	835490	+4.88	-72.27	+1.38	-1.12	-14.62	-32.12	-32.12	-	-	-
1990	16039	VH4	820462	835458	+4.73	-48.92	+1.23	-0.77	-10.77	-31.37	-34.47	-	-	-
1990	16039	VH5	820484	835468	+4.8	-55.61	-0.7	-	-10.7	-39.75	-39.75	-	-	-
1993	17594	BH1	820612	835501	+4.74	-84.91	+4.74	-0.76	-8.26	-79.46	-39.96	-	-	-
1993	17594	BH6	820667	835592	+4.42	-68.98	-0.58	-	-8.58	-58.28	-58.28	-	-	-
1993	17594	BH8	820599	835634	+4.47	-77.28	+0.97	-0.03	-9.03	-71.73	-71.73	-	-	-
1993	18217	BH2	820444	835719	+5.12	-25.43	+0.12	-1.88	-9.88	-19.98	-19.98	-	-	-
1993	18217	BH3	820497	835749	+5.02	-41.05	+1.02	-1.98	-10.98	-41.05	-29.48	-	-	-
1993	18217	BH6	820464	835684	+5.03	-26.1	+1.53	-1.47	-9.47	-26.1	-12.47	-	-	-
1993	18217	BH7	820516	835714	+5.03	-33.24	+1.53	-3.47	-9.97	-33.24	-24.57	-	-	-

Year	GIU Ref.	BH	Easting (m)	Northing (m)	GL (mPD)	TD (mPD)	Base fill (mPD)	Base MD-PD (mPD)	Base AV (mPD)	Base Grade V (mPD)	MARBLE surface (mPD)	Base Level of Surface Karst (mPD)	Depth of Cavity (m)	Thickness of Cavity (m)
1993	18217	BH10	820484	835649	+4.59	-23.31	+0.59	-	-8.91	-17.21	-18.11	-	-	-
1993	18217	BH11	820536	835679	+4.58	-26.25	+0.58	-5.42	-10.42	-21.22	-21.22	-	-	-
1994	18274	DH-D10	820933	835856	+4.9	-75.07	+1.2	-3.1	-13.6	-39.6	-41.95	-	-	-
1994	18274	DH-S17	820906	835841	+4.9	-37.8	+0.9	-0.1	-10.1	-32.4	-32.4	-	-	-
1994	18286	DH-D5	820935	935933	+4.69	-68.71	+0.69	-1.31	-11.81	-48.26	-48.27	-	-	-
1994	18286	DH-D6	820955	835906	+4.72	-86.24	+0.72	-2.28	-12.78	-65.88	-68.43	-	-	-
1994	18286	DH-D8	820889	835863	+4.9	-69.58	+0.9	-3.1	-12.1	-29.5	-29.5	- -50	-	-
1994	18286	DH-D14	820889	835823	+4.88	-95.03	+2.18	-2.12	-12.12	-57.12	-57.12	- -60	-	-
1994	18286	DH-S13	820895	835907	+4.87	-138.18	+0.87	-2.53	-12.63	-31.43	-31.43	- -125	-46.28 to -46.88 -47.33 to -47.93 -48.83 to -49.43 -62.05 to -62.55 -63.45 to -63.85 -64.35 to -64.65 -64.90 to -65.30 -88.67 to -89.07 -90.57 to -95.13 -98.13 to -98.53 -102.38 to -105.13 -105.13 to -116.93	0.6 0.6 0.6 0.5 0.4 0.3 0.5 0.4 4.56 0.4 2.75 11.8
1994	18286	DH-S14	820915	835922	+4.86	-45.74	+0.19	-1.64	-12.14	-24.14	-25.21	-	-	-
1994	18286	DH-S18	820914	835882	+4.88	-76.93	+0.88	-3.12	-12.12	-22.52	-23.62	- -35	-	-
1997	57688	BH3	820554	835515	+4.98	-60.82	-0.52	-	-8.52	-52.12	-52.12	-	-	-
1997	57688	BH5	820584	835547	+4.91	-85.74	+1.41	-0.59	-9.59	-64.39	-51.79	-	-	-
1997	57688	BH6	820570	835570	+4.71	-94.76	+1.21	-0.79	-12.79	-59.81	-59.82	-	-	-
1997	57688	BH8	820526	835581	+4.73	-115.11	+0.23	-	-12.77	-106.77	-86.77	-	-	-
1997	57688	BH9	820511	835586	+4.62	-122.97	+0.64	-1.38	-17.38	-99.88	-99.88	-	-	-
1997	57688	BH10	820518	835549	+4.82	-90.78	-1.68	-	-19.68	-83.38	-83.38	-	-	-
1997	57688	BH11	820550	835579	+4.59	-110.56	-0.41	-2.41	-18.41	-88.41	-88.41	-	-	-
1997	57688	BH12	820542	835606	+4.47	-85.93	-0.53	-2.53	-25.53	-79.78	-79.53	-	-	-

Remarks:

GL: Ground Level TD: Terminating Depth

4.1.9 The above discussion on the presence of MARBLE within and near the Site will be subject to confirmation during the design stage when more extensive ground investigation will be conducted in accordance with the GEO guideline for Scheduled Areas.

4.1.10 Developers of the proposed MSBs are reminded that the Site is located within the Schedule Area No. 2 and may be underlain by cavernous marble. The developers shall submit the proposed building and excavation works to BD for approval as required under the provisions of BO. Depending on the foundation design of the new developments, extensive ground investigation may be required. Such investigation may require a high level of involvement of an experienced geotechnical engineer both in the design and in the supervision of geotechnical aspects of the works required to be carried out on the Site.

4.2 Vibration Impact of MSB Foundation Works on Sensitive Building Structures and Services Nearby

4.2.1 It is noted that there are vibration sensitive structures and services in the vicinity of the Site, including the Microelectronic Centre under construction at Fuk Wang Street, near to the Site A. The closest distance of separation is about 50m away.

4.2.2 Construction activities of the proposed MSBs, including the foundation works, may cause ground vibration that may be transmitted to the nearby vibration sensitive receivers. The construction activities that are likely of concerns comprise piling works, driving sheet piles for basement excavation, breaking of hard materials in foundation, etc.

4.2.3 From literature review, it is assessed that piling works would likely be the major sources of ground vibration (in view of the large energy that may be involved) to the nearby vibration sensitive receivers.

4.2.4 Subject to the design of the proposed MSBs, several foundation options may be considered, including:

- Raft foundation
- Pile foundation, including both percussive piling and non-percussive piling

4.2.5 According to the empirical guidelines on maximum peak particle velocity (PPV) in Appendix A of PNAP APP-137, the guide values of the maximum PPV are:

Type of building	Guide values of maximum ppv (mm/sec)	
	Transient Vibration (eg. Drop hammer)	Continuous Vibration (eg. Vibratory hammer)
Robust and stable buildings in general	15	7.5
Vibration-sensitive/ dilapidated buildings	7.5	3.0

4.2.6 For the assessment of ground-borne vibration, the following empirical formula from CoP for Foundation 2017 may be adopted for the prediction:

$$v_{res} = k_p \left[\frac{\sqrt{W_e}}{r^{1.3}} \right]$$

where v_{res} = resultant ppv (mm/sec)
k_p = ground borne vibration coefficient
W_e = nominal hammer energy (J)
x = distance of recipient from pile measured along ground surface (m)
y = depth of pile toe at the time of assessing v_{res} (m)
r = slope distance of recipient from pile toe (m), i.e. $r = \sqrt{x^2 + y^2}$

Note 1: The empirical formula is extracted from BS 5228-2. Permission to reproduce extracts from British Standards is granted by BSI Standards Limited (BSI). No other use of this material is permitted

The value of k_p may be estimated from relevant previous experience or based on a first approximation of 1.5 (or 3.0 for pile driven to bedrock), and then verified by back analysis of field measurements taken during test driving.

4.2.7 While the guide values of the maximum PPV in PNAP APP-137 are in the order of mm/second when drop hammer or vibratory hammer is used, it is noted that ground vibration of that order, if transmitted unmitigated to sensitive equipment within a building, could far exceed the vibration criteria of the equipment.

4.2.8 Vibration criteria of sensitive equipment (as shown in the figure below) are typically specified in micro-metres/second, which is significantly less than the maximum PPV in PNAP APP-137.

Figure 4.2: Vibration Criteria of Sensitive Equipment

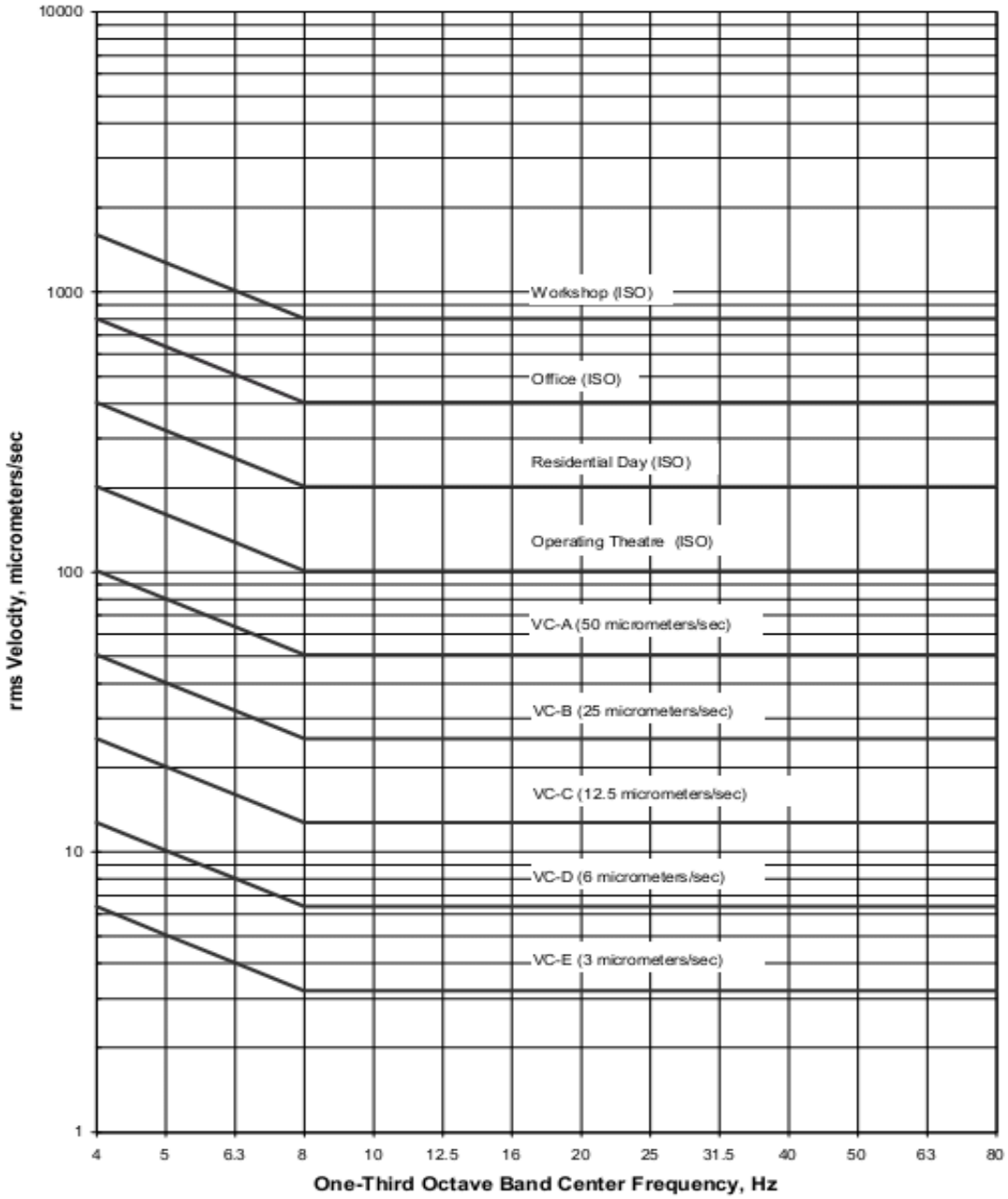


Figure 4.3: Typical Vibration Criteria of Different Types of Sensitive Equipment

VC- A (50 μm/s)	Adequate in most instances for optical microscopes to 400X, micro-balances, and optical balances.
VC- B (25 μm/s)	Micro-surgery, eye surgery and neurosurgery, CT, CAT, PET, fMRI, SPECT, DOT, EROS.
VC- C (12.5 μm/s)	Appropriate for MRIs, NMRs, standard optical microscopes to 1000X magnification, and moderately sensitive electron microscopes to 1μm detail size.
VC- D (6.25 μm/s)	Suitable in most instances for demanding equipment, including may electron microscopes (SEMs and TEMs) at more than 30,000X magnification and up to 0.3 micron geometries, and E-beam systems.
VC- E (3.12 μm/s)	Assumed to be adequate for the most demanding of sensitive systems including long path, laser-based, small target systems, and systems working at nanometer scales.

4.2.9 It should be noted that sensitive equipment accommodated within a building may not necessarily be subject to the same magnitude of ground vibration measured on the free field at the same distance of separation. The vibration “felt” by the sensitive equipment would be highly dependent on the building structural design and foundation design, as well as the mounting details of the sensitive equipment within the premises, particularly on the anti-vibration provision installed.

4.2.10 Notwithstanding the above, the construction methodology to be adopted for the foundation of the proposed MSBs shall not cause any adverse impact on the vibration sensitive structures and services. The requirements of the relevant PNAPs shall be observed and complied with, including, but not limited to, the following:

- PNAP APP18: Foundation Works
- PNAP APP137: Ground-borne Vibrations and Ground Settlements Arising from Pile Driving and Similar Operations

4.2.11 Trial piles with on-site vibration monitoring may be required to demonstrate the acceptability of the proposed methodology.

4.2.12 To minimise the construction noise/vibration impact, quieter construction method for foundation works such as bored piling is recommended when working in the vicinity of the vibration sensitive structures and services.

5 Summary

5.1.1 The Development Site for the proposed MSBs is located in the Scheduled Area of the Northwest New Territories as stipulated in the ETWB TC(W) No. 4/2004 and this is referred to as Scheduled Area No. 2 under Buildings Ordinance as stipulated in PNAP APP 61, where complex geological conditions may be present, including the occurrence of cavity-bearing MARBLE.

5.1.2 Some previously recorded boreholes within and at close proximity of the Development Site have shown the occurrence of MARBLE with varying degree of dissolution and karst features. Five boreholes within the Development Site carried out in 2017 did not identify any presence of MARBLE.

5.1.3 The possible presence of MARBLE within the Development Site or otherwise shall be subject to confirmation during the detailed design stage when more extensive ground investigation will be conducted in accordance with the GEO guideline for Scheduled Areas. Such investigation may require a high level of involvement of an experienced geotechnical engineer both in the design and in the supervision of geotechnical aspects of the works to be carried out on the Site.

5.1.4 As there are vibration sensitive structures and services in the vicinity of the Site, including the Microelectronic Centre under construction at Fuk Wang Street, near to the Site A. The construction methodology to be adopted for the foundation of the proposed MSBs shall not cause any adverse impact on the vibration sensitive structures and services. The requirements of the relevant PNAPs shall be observed and complied with, including, but not limited to, the following:

- PNAP APP18: Foundation Works
- PNAP APP137: Ground-borne Vibrations and Ground Settlements Arising from Pile Driving and Similar Operations

5.1.5 To minimise the construction noise/vibration impact, quieter construction method for foundation works such as bored piling is recommended when working in the vicinity of the vibration sensitive structures and services.

5.1.6 It is noted that the major land uses of the MSBs would be vehicle servicing and maintenance and/or logistics uses. Adverse noise/vibration impacts due to different combination of land uses are not expected in the operation stage.

Annex

Annex A Summary Table for Existing Ground Investigation Stations

Annex A

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Table A.1: Summary Table for Existing Ground Investigation Stations

Year	GIU Ref.	BH	Easting (m)	Northing (m)	GL (mPD)	TD (mPD)	Base fill (mPD)	Base MD-PD (mPD)	Base AV (mPD)	Base Grade V (mPD)	Engineering rockhead (mPD)
1982	9488	BH1	820460	835547	+4.84	-57.36	+1.84	-0.16	-5.16	-34.36	-
1982	9488	BH2	820442	835541	+4.81	-51.09	+1.81	-	-7.69	-50.49	-
1982	9488	BH3	820427	835533	+4.76	-43.94	+1.76	-	-10.24	-43.24	-
1982	9488	BH4	820470	835526	+4.83	-67.37	+1.83	-0.17	-8.17	-65.17	-
1982	9488	BH5	820455	835520	+4.81	-34.19	+1.81	-	-4.69	-33.19	-
1982	9488	BH6	820437	835511	+4.86	-52.24	+3.66	-	-4.14	-49.14	-
1982	9488	BH7	820484	835495	+4.85	-40.35	+1.85	-	-9.15	-39.85	-
1982	9488	BH8	820467	835487	+4.83	-41.57	+1.83	-	-15.17	-40.77	-
1982	9488	BH9	820450	835479	+4.67	-34.44	+1.67	-0.34	-5.34	-33.74	-
1982	9488	BH10	820494	835472	+4.86	-43.24	+2.86	+1.86	-9.14	-42.44	-42.44
1982	9488	BH11	820477	835465	+4.81	-35.19	+1.31	-	-7.69	-32.89	-32.89
1982	9488	BH12	820460	835457	+4.61	-30.29	+2.61	-	-5.39	-29.59	-
1984	9489	BH3	820580	835763	+4.80	-83.86	+0.30	-3.70	-11.70	-78.60	-
1984	9489	BH4	820610	835711	+4.85	-110.25	+1.35	-0.15	-8.15	-108.25	-108.25
1984	9489	BH6	820543	835775	+4.30	-55.50	+0.80	-1.20	-8.70	-50.50	-50.50
1984	9489	BH7*	820565	835726	+5.00	-107.10	+2.00	-0.50	-10.50	-105.85	-
1984	9489	BH10*	820535	835737	+5.00	-43.43	+1.50	-0.50	-10.50	-	-
1984	9489	BH11*	820565	835685	+4.75	-29.61	+1.25	-0.75	-8.25	-24.35	-
1986	9487	BH1*	820860	835690	+4.55	-57.47	+0.55	-8.45	-	-52.30	-
1986	9487	BH2*	820865	835700	+4.55	-60.67	-0.45	-8.45	-	-55.60	-
1987	11058	BH1	820927	835691	+4.63	-39.58	-1.37	-3.37	-13.37	-	-
1987	11058	BH2	820944	835668	+4.58	-41.87	+0.58	-	-11.42	-	-
1987	11058	BH3	821003	835729	+4.71	-35.74	+0.71	-1.29	-13.29	-35.74	-
1987	11058	BH4	821022	835705	+4.62	-35.83	+0.62	-1.38	-11.38	-35.83	-
1987	11058	BH5	821046	835762	+4.59	-29.66	+0.59	-5.41	-11.41	-29.66	-
1987	11058	BH6	821065	835737	+4.47	-35.73	+0.47	-5.53	-13.53	-35.73	-
1987	11058	BH7	820968	835696	+4.75	-35.70	+0.75	-1.25	-13.25	-	-
1987	11058	BH8	821035	835736	+4.61	-37.62	+0.61	-1.39	-11.39	-37.62	-
1988	11059	BH9	820982	835701	+4.74	-70.26	+0.74	-1.26	-13.26	-70.26	-
1988	11059	BH10	821033	835739	+4.71	-60.79	+0.71	-3.29	-11.29	-60.79	-
1988	11266	BH11	820981	835713	+4.75	-25.70	+1.25	-0.75	-12.75	-25.70	-
1988	11266	BH12	821031	835731	+4.73	-26.72	+1.23	-0.77	-10.27	-26.72	-
1988	11929	BH15	821065	835689	+4.20	-27.85	+0.20	-5.80	-11.80	-17.60	-17.60
1988	11929	BH16	821077	835673	+4.20	-76.40	+0.20	-5.80	-10.80	-76.40	-
1988	11929	BH17	821089	835657	+4.25	-61.90	+0.25	-7.75	-12.75	-61.90	-
1988	11929	BH18	822201	835641	+4.30	-59.49	+0.30	-7.70	-11.70	-50.66	-52.56

1988	11929	BH19	821040	835670	+4.20	-52.70	+0.70	-3.80	-12.80	-25.80	-47.20
1988	11929	BH20	821052	835655	+4.20	-42.24	+0.20	-3.80	-14.30	-31.52	-35.57
1988	11929	BH21	821064	835638	+4.30	-75.01	-0.70	-8.20	-15.70	-	-75.01
1988	11929	BH22	821075	835622	+4.30	-57.83	+2.30	-6.20	-10.70	-41.57	-52.14
1988	11929	BH23	821016	835652	+4.20	-73.90	+0.20	-3.80	-11.80	-	-
1988	11929	BH24	821028	835637	+4.20	-30.50	+0.20	-3.80	-12.80	-25.05	-25.05
1988	11929	BH25	821040	835620	+4.30	-28.10	+0.30	-5.20	-11.70	-11.70	-
1988	11929	BH26	821052	835605	+4.30	-22.93	+0.30	-6.70	-12.70	-13.53	-
1988	11929	BH27	820992	835634	+4.20	-61.95	+0.20	-5.30	-9.80	-53.43	-
1988	11929	BH28	821003	835619	+4.20	-76.63	+0.20	-	-6.80	-	-76.63
1988	11929	BH29	821016	835602	+4.30	-40.17	+0.30	-3.70	-6.20	-12.80	-34.30
1988	11929	BH30	821027	835587	+4.30	-70.89	+0.30	-8.20	-	-	-
1988	11929	BH31	820970	835618	+4.20	-75.40	+0.20	-	-8.30	-	-75.40
1988	11929	BH32	820982	835602	+4.20	-75.44	+0.20	-3.80	-9.30	-	-75.44
1988	11929	BH33	820993	835587	+4.30	-73.93	+0.30	-	-11.20	-	-
1988	11929	BH34*	821005	835570	+4.30	-75.52	+0.30	-3.70	-9.70	-	-75.52
1988	13072	5*	820911	835909	+4.93	-37.92	+1.83	-1.07	-23.07	-27.67	-
1988	13072	6*	820876	835930	+4.89	-62.91	-	-	-15.11	-47.71	-
1988	13072	8*	820873	835877	+4.95	-67.35	+0.45	-2.05	-15.05	-56.05	-
1988	13072	1*	820905.5	835998.2	+4.63	-46.97	+2.63	-0.87	-10.87	-34.87	-
1988	13072	2	820953.9	835934.8	+4.60	-67.40	+1.10	-3.40	-15.40	-67.40	-
1988	13072	3*	820909.5	835951.7	+4.77	-38.23	+1.77	-0.73	-12.73	-23.03	-
1988	13072	4*	820871.3	835972.5	+4.88	-50.37	+3.38	-	-12.12	-38.12	-
1988	13072	7	820826.6	835940	+4.90	-67.65	+1.90	-0.60	-17.10	-67.65	-
1988	26096	DH-BGS16	821056	835531	+4.84	-42.36	-3.66	-13.66	-19.13	-42.36	-
1989	13073	D7*	820856	835926	+5.02	-67.33	+1.02	-0.98	-10.98	-40.57	-
1989	13073	D8*	820834	835920	+4.94	-71.78	-1.06	-6.06	-13.56	-56.36	-
1989	13073	D9*	820853	835903	+4.95	-74.08	+1.00	-	-13.55	-55.75	-
1989	13073	D3*	820887.17	835977.13	+4.78	-62.22	-1.22	-2.72	-14.22	-46.82	-
1989	13073	D5*	820876.97	835950.55	+4.93	-74.94	+1.43	-3.57	-13.57	-56.12	-
1989	13074	D10*	820914.46	835968.36	+4.72	-44.69	-1.28	-3.78	-11.28	-28.78	-28.78
1989	13074	D11*	820919.26	835961.96	+4.69	-37.19	-1.31	-3.81	-13.81	-21.46	-21.46
1989	13074	D12*	820924.04	835955.56	+4.74	-58.08	-1.26	-3.76	-13.76	-36.86	-
1989	13074	D13*	820923.95	835945.38	+4.80	-57.30	-1.20	-3.70	-13.70	-28.55	-
1989	13074	D14*	820929	835949.29	+4.71	-61.76	-1.29	-3.79	-13.79	-41.94	-
1989	13074	D15*	820917.11	835950.63	+4.79	-37.71	-1.21	-3.71	-16.21	-21.21	-21.91
1989	13074	D16*	820926.72	835937.83	+4.80	-49.20	-1.20	-3.70	-13.70	-33.75	-
1989	13074	D17*	820915.5	835939.52	+4.87	-40.53	-1.13	-3.63	-13.63	-24.33	-
1989	13083	BH1	820910	835495	+4.76	-17.54	+1.76	-0.74	-3.24	-17.64	-

1989	13083	BH2	820926	835475	+4.74	-15.76	+1.74	-0.76	-4.76	-15.76	-
1989	13083	BH3	820910	835495	+4.75	-19.65	+1.75	-	-0.75	-	-
1989	13083	BH4	820949	835490	+4.93	-24.92	+1.85	-	-0.57	-19.85	-19.85
1989	13083	BH5	820935	835512	+4.92	-15.95	+1.92	-	-0.58	-	-
1989	13084	AD1	820982	835506	+4.77	-36.54	+2.07	+0.57	-7.23	-14.83	-21.53
1989	13084	AD2	820917	835500	+4.45	-24.27	+1.95	-	-	-18.40	-18.40
1989	13084	AD3	820936	835475	+4.62	-24.27	+2.12	-	-	-18.78	-18.78
1990	16039	VH1*	820492	835510	+4.99	-77.04	-0.51	-2.51	-16.51	-51.51	-
1990	16039	VH2*	820507	835478	+4.95	-62.09	-0.55	-2.55	-10.55	-45.55	-
1990	16039	VH3*	820448	835490	+4.88	-72.27	+1.38	-1.12	-14.62	-32.12	-
1990	16039	VH4*	820462	835458	+4.73	-48.92	+1.23	-0.77	-10.77	-31.37	-
1990	16039	VH5*	820484	835468	+4.80	-55.61	-0.70	-	-10.70	-39.75	-
1992	16722	VS1	821071	835525	+4.81	-3.19	+0.00	+0.81	-3.19	-	-
1992	16722	BH1	821069.76	835466.02	+4.90	-70.34	+0.90	-3.60	-3.60	-55.15	-55.15
1992	16722	BH2	821081.27	835441.55	+4.91	-50.16	+0.91	-1.09	-4.59	-34.84	-34.84
1992	16722	BH3	821116.04	835471.03	+4.93	-45.37	+0.93	-5.07	-6.07	-25.67	-39.32
1992	16764	BH1	820929	835565	+4.62	-34.22	+1.12	-0.38	-7.88	-19.14	-19.14
1992	16764	BH2	820942	835576	+4.61	-50.24	+1.11	-0.39	-4.39	-24.59	-35.14
1992	16764	BH3	820953	835579	+4.63	-58.16	+1.13	+0.63	-7.87	-43.16	-43.93
1992	16764	BH4	820946	835556	+4.76	-43.29	+1.76	-0.24	-4.74	-28.24	-28.24
1992	16764	BH5	820964	835569	+4.66	-62.31	+0.96	-0.34	-5.34	-31.49	-
1992	16764	BH6	820946	835543	+4.81	-43.51	+1.31	-0.19	-6.19	-26.03	-28.50
1992	16764	BH7	820970	835561	+4.71	-65.26	+1.71	-1.29	-7.29	-45.59	-56.54
1993	16790	VB1	820901	835433	+4.41	-18.12	+2.91	-	+1.41	-13.06	-13.06
1993	16790	VB2	820927	835444	+4.61	-23.57	+2.11	-	-	-18.57	-18.57
1993	16790	VB3	820953	835456	+4.70	-22.72	+1.70	-	+0.70	-17.08	-17.08
1993	16790	VB4	820980	835468	+4.89	-34.21	+1.89	-	-1.01	-28.96	-28.96
1993	16790	VB5	821006	835480	+4.78	-54.64	+1.78	-0.22	-	-34.48	-34.48
1993	16790	VB7	820911	835411	+4.50	-23.25	+1.50	-	+0.30	-17.43	-17.43
1993	16790	VB8	820936	835423	+4.59	-23.47	+2.59	-	+0.59	-17.96	-17.96
1993	17594	BH1*	820612	835501	+4.74	-84.91	+4.74	-0.76	-8.26	-79.46	-
1993	17594	BH2	820646	835481	+4.42	-29.61	+1.92	-1.08	-7.58	-	-
1993	17594	BH3	820643	835518	+4.32	-33.73	+0.32	-2.68	-9.18	-	-
1993	17594	BH4	820675	835553	+4.25	-34.05	+1.25	-0.75	-6.75	-	-
1993	17594	BH5	820628	835559	+4.71	-35.59	+1.21	-0.79	-8.79	-	-
1993	17594	BH6*	820667	835592	+4.42	-68.98	-0.58	-	-8.58	-58.28	-
1993	17594	BH7	820634	835605	+4.80	-33.50	+0.80	-2.20	-8.70	-	-
1993	17594	BH8*	820599	835634	+4.47	-77.28	+0.97	-0.03	-9.03	-71.73	-
1993	17594	BH9	820635	835652	+4.41	-38.04	+1.41	+4.41	-7.09	-	-

1993	18217	BH2*	820444	835719	+5.12	-25.43	+0.12	-1.88	-9.88	-19.98	-
1993	18217	BH3*	820497	835749	+5.02	-41.05	+1.02	-1.98	-10.98	-41.05	-
1993	18217	BH4	820553	835781	+4.69	-92.91	+0.69	-1.31	-10.31	-85.96	-87.31
1993	18217	BH6*	820464	835684	+5.03	-26.10	+1.53	-1.47	-9.47	-26.10	-
1993	18217	BH7*	820516	835714	+5.03	-33.24	+1.53	-3.47	-9.97	-33.24	-
1993	18217	BH8	820573	835746	+4.65	-45.71	+1.15	-1.85	-7.85	-45.71	-
1993	18217	BH10*	820484	835649	+4.59	-23.31	+0.59	-	-8.91	-17.21	-
1993	18217	BH11*	820536	835679	+4.58	-26.25	+0.58	-5.42	-10.42	-21.22	-
1993	18217	BH12	820593	835711	+4.54	-117.86	-0.46	-1.46	-10.46	-112.81	-112.81
1994	18274	DH-D10*	820933	835856	+4.90	-1.31	+1.20	-3.10	-13.60	-39.60	-55.00
1994	18274	DH-D11	820864	835796	+4.68	-125.32	+0.98	-2.82	-11.82	-	-125.32
1994	18274	DH-D12	820989	835832	+4.86	-95.14	+0.86	-3.14	-11.64	-86.04	-87.24
1994	18274	DH-S17*	820906	835841	+4.90	-37.80	+0.90	-0.10	-10.10	-32.40	-
1994	18274	DH-S20	820846	835822	+4.69	-55.31	+0.69	-1.31	-11.31	-	-
1994	18274	DH-S21	820877	835780	+4.66	-55.34	-0.34	-1.54	-10.84	-	-
1994	18274	DH-S25	820906	835800	+4.82	-55.63	+0.62	-2.68	-11.18	-	-
1994	18274	DH-S26	820926	835815	+4.86	-55.59	+1.36	-2.34	-12.64	-	-
1994	18274	DH-S29	820963	835817	+4.93	-55.52	-0.07	-2.27	-14.57	-55.52	-
1994	18274	DH-S31	820904	835763	+4.85	-55.15	+1.45	-2.15	-11.15	-	-
1994	18286	DH-D1	820794.31	835908.72	+4.71	-95.29	+1.21	-2.29	-10.29	-95.29	-
1994	18286	DH-D3	820854.44	835910.1	+4.91	-95.09	+0.91	-2.09	-11.09	-95.09	-
1994	18286	DH-D5*	820935.17	935932.54	+4.69	-68.71	+0.69	-1.31	-11.81	-48.26	-48.27
1994	18286	DH-D6*	820955.39	835905.76	+4.72	-86.24	+0.72	-2.28	-12.78	-65.88	-65.88
1994	18286	DH-D7	820978.51	835874.94	+4.78	-95.35	+0.78	-1.22	-12.22	-95.35	-
1994	18286	DH-D8*	820889.4	835863.11	+4.90	-69.58	+0.90	-3.10	-12.10	-29.50	+4.90
1994	18286	DH-D9	820884	835738	+4.64	-95.36	+1.64	-2.86	-11.36	-	-95.36
1994	18286	DH-D14*	820889	835823	+4.88	-95.03	+2.18	-2.12	-12.12	-57.12	-74.32
1994	18286	DH-D2	820831	835859	+4.87	-95.13	+0.87	-3.13	-12.13	-95.13	-
1994	18286	DH-S3	820799	835865	+4.71	-55.29	+0.91	-1.29	-11.29	-55.29	-
1994	18286	DH-S4	820809	835872	+4.84	-55.16	+0.84	-1.66	-11.16	-55.16	-
1994	18286	DH-S5	820811	835836	+4.62	-55.58	+0.62	-0.88	-11.38	-46.18	-
1994	18286	DH-S6	820831	835850	+4.82	-55.18	+0.82	-3.18	-12.18	-55.18	-
1994	18286	DH-S7	820829	835811	+4.49	-38.14	+0.99	-1.01	-11.01	-32.56	-32.56
1994	18286	DH-S8	820849	835826	+4.75	-55.25	+0.05	-1.75	-11.25	-	-
1994	18286	DH-S9	820830	835901	+4.93	-54.67	+0.23	-	-11.57	-54.67	-
1994	18286	DH-S10	820851	835874	+4.93	-54.17	+0.63	-3.07	-10.07	-54.17	-
1994	18286	DH-S11	820871	835889	+4.98	-54.52	-1.02	-	-13.52	-54.52	-
1994	18286	DH-S12	820879	835928	+4.85	-55.15	+1.35	-1.65	-12.15	-55.15	-
1994	18286	DH-S13*	820895	835907	+4.87	-138.18	+0.87	-2.53	-12.63	-31.43	-

1994	18286	DH-S14*	820915	835922	+4.86	-45.74	+0.19	-1.64	-12.14	-24.14	-25.21
1994	18286	DH-S15	820934	835897	+4.84	-55.16	+1.34	-1.66	-13.16	-55.16	-
1994	18286	DH-S18*	820914	835882	+4.88	-76.93	+0.88	-3.12	-12.12	-22.52	-56.93
1994	18286	DH-S19	820870	835849	+4.84	-55.16	+1.34	-1.66	-10.66	-55.16	-
1994	18286	DH-S22	820870	835808	+4.65	-54.30	+0.65	-1.85	-13.85	-	-
1994	18286	DH-S23	820904	835742	+4.81	-55.64	+0.81	-2.19	-11.19	-	-
1994	18286	S1	820847.59	835948.57	+4.97	-54.98	-0.03	-2.53	-11.03	-54.98	-
1994	18286	S2	820824.13	835930.99	+4.90	-55.10	+1.40	-1.60	-10.10	-55.10	-
1994	18286	S24	820769.26	835889.87	+4.58	-55.42	+0.58	-	-11.42	-40.52	-
1994	19512	DH1	820690	835925	+4.62	-44.37	+0.12	-2.88	-10.38	-34.62	-37.58
1994	19512	DH2	820726	835874	+4.84	-26.29	+0.34	-2.66	-9.66	-17.16	-20.06
1994	19512	DH3	820743	835854	+4.79	-35.65	+0.79	-0.71	-11.71	-30.21	-
1994	19512	DH4	820761	835811	+4.81	-27.83	+1.25	-2.69	-6.69	-13.09	-21.86
1994	19512	DH5	820670	835904	+4.69	-25.36	-0.01	-1.81	-8.81	-18.81	-19.96
1994	19512	DH6	820688	835880	+4.81	-19.31	-0.19	-1.69	-12.19	-13.19	-13.19
1994	19512	DH7	820704	835856	+4.95	-20.01	-0.05	-1.05	-8.55	-10.95	-14.46
1994	19512	DH8	820721	835831	+4.94	-30.49	+1.94	-1.56	-9.06	-24.96	-
1994	19512	DH9	820739	835807	+4.95	-24.74	-0.05	-1.55	-10.05	-19.15	-19.15
1994	19512	DH10	820659	835884	+4.95	-24.65	+1.20	-2.05	-10.05	-16.05	-19.63
1994	19512	DH11	820694	835836	+5.13	-24.13	+1.13	-2.37	-9.87	-16.12	-16.12
1994	19512	DH12	820730	835786	+4.97	-26.42	+0.97	-0.53	-10.03	-21.38	-21.38
1994	19512	DH13	820605	835932	+4.55	-23.19	+0.55	-4.45	-9.85	-17.50	-17.50
1994	19512	DH14	820622	835908	+4.73	-18.28	+1.23	-3.27	-10.27	-12.77	-12.94
1994	19512	DH15	820640	835885	+4.96	-17.94	+0.46	-2.54	-10.04	-12.49	-12.49
1994	19512	DH16	820658	835861	+5.19	-23.53	+1.79	-2.31	-8.31	-17.91	-18.02
1994	19512	DH17	820676	835837	+5.17	-17.48	+1.67	-1.33	-9.83	-12.05	-12.05
1994	19512	DH18	820695	835814	+5.11	-29.08	+1.61	-1.39	-9.89	-19.79	-21.89
1994	19512	DH19	820581	835914	+4.51	-20.80	-0.19	-2.99	-10.49	-13.87	-14.84
1994	19512	DH20	820599	835891	+4.77	-15.46	+1.27	-0.73	-8.73	-	-9.93
1994	19512	DH21	820617	835867	+5.00	-17.51	+1.50	-1.50	-11.00	-12.20	-12.20
1994	19512	DH22	820635	835843	+5.12	-25.08	-0.38	-3.38	-9.88	-19.58	-19.98
1994	19512	DH23	820653	835819	+5.08	-19.32	+1.58	-0.92	-8.42	-13.57	-14.02
1994	19512	DH24	820671	835796	+5.01	-20.44	+1.36	-2.49	-8.49	-15.09	-15.09
1994	19512	DH25	820706	835778	+4.96	-31.49	+0.96	-2.54	-10.54	-21.28	-25.84
1994	19512	DH26	820557	835898	+4.86	-21.44	+1.86	-1.64	-8.64	-13.24	-14.09
1994	19512	DH27	820576	835875	+4.68	-15.68	+1.18	-1.82	-7.82	-	-8.52
1994	19512	DH28	820594	835850	+4.86	-20.27	+1.36	-1.64	-10.14	-10.76	-14.86
1994	19512	DH29	820621	835813	+5.04	-20.16	+1.04	-2.46	-9.96	-14.46	-14.46
1994	19512	DH30	820643	835945	+4.52	-26.03	+1.02	-2.98	-10.48	-20.48	-20.79

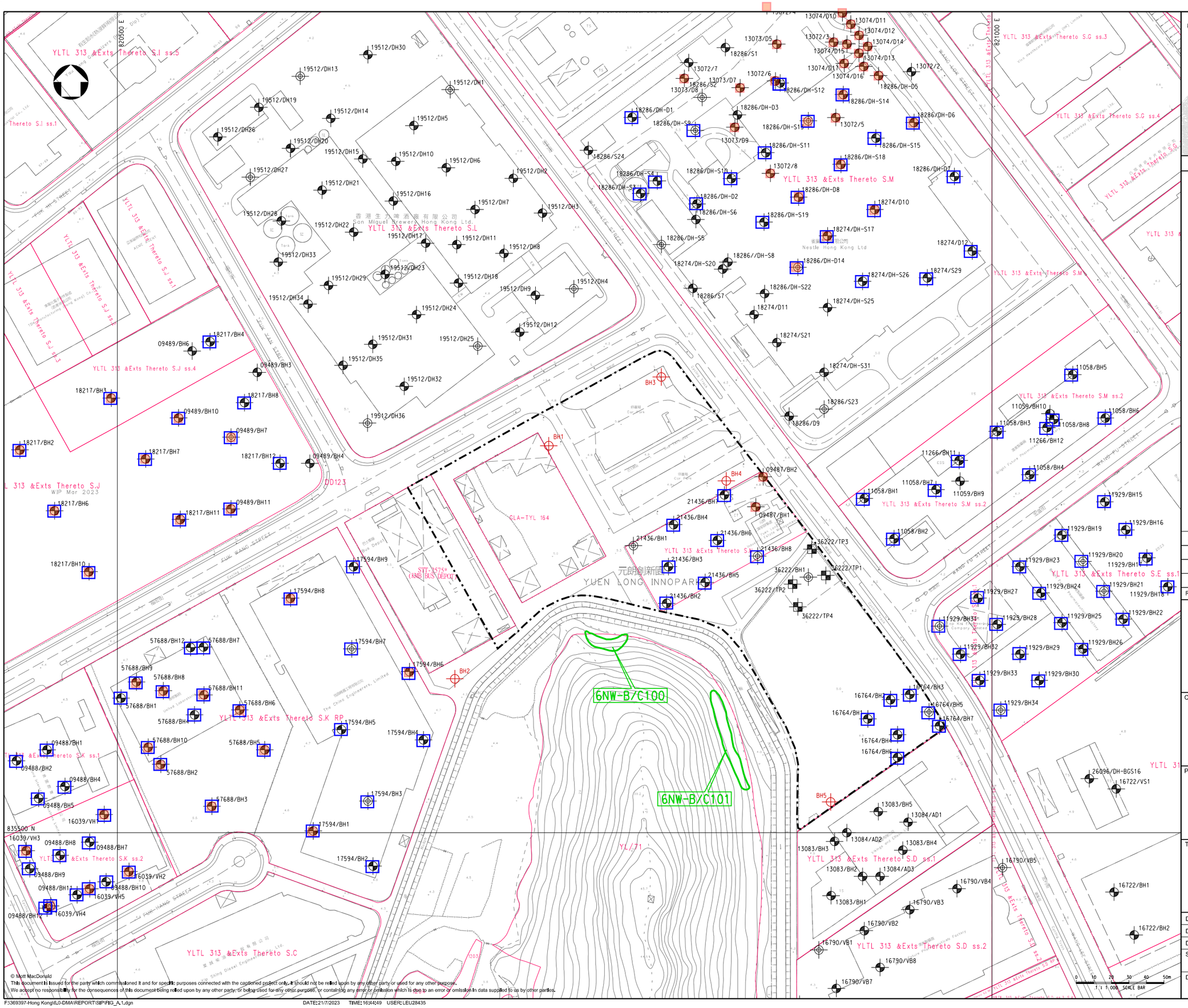
1994	19512	DH31	820646	835779	+4.89	-19.24	+0.89	-2.61	-9.11	-11.53	-14.11
1994	19512	DH32	820664	835755	+4.90	-18.86	+0.05	-2.60	-9.80	-13.10	-13.10
1994	19512	DH33	820592	835826	+4.91	-18.26	+0.41	-2.09	-10.49	-12.78	-12.78
1994	19512	DH34	820609	835802	+4.90	-27.33	+1.70	-1.10	-10.10	-22.42	-22.42
1994	19512	DH35	820629	835767	+4.86	-38.24	+0.86	-2.64	-10.14	-26.56	-
1994	19512	DH36	820643	835734	+4.62	-35.34	+0.62	-2.88	-11.38	-29.08	-29.90
1995	21436	BH1	820795	835664	+4.90	-22.94	+1.40	+0.40	-5.60	-10.27	-12.22
1995	21436	BH2	820814	835631	+4.40	-19.25	+1.90	-0.10	-4.10	-16.00	-
1995	21436	BH3	820815	835652	+4.57	-21.23	+1.57	+0.07	-5.93	-	-
1995	21436	BH4	820818	835676	+4.84	-22.81	+2.84	-1.66	-8.66	-	-
1995	21436	BH5	820836	835643	+4.47	-24.88	+0.97	-1.53	-5.53	-	-
1995	21436	BH6	820843	835667	+4.86	-27.07	+1.86	-0.14	-7.64	-	-
1995	21436	BH7	820847	835693	+4.81	-39.14	+1.31	+0.31	-7.69	-	-
1995	21436	BH8	820866	835658	+4.65	-42.71	+0.15	-1.85	-7.85	-36.83	-36.83
1997	57688	BH1	820502	835577	+4.82	-70.13	-0.68	-3.68	-22.68	-70.13	-
1997	57688	BH2	820525	835539	+4.96	-69.99	+3.26	+1.46	-16.54	-69.99	-
1997	57688	BH3*	820554	835515	+4.98	-60.82	-0.52	-	-8.52	-52.12	-52.12
1997	57688	BH4	820544	835567	+4.74	-70.21	+1.29	-0.76	-16.66	-70.21	-
1997	57688	BH5*	820584	835547	+4.91	-85.74	+1.41	-0.59	-9.59	-64.39	-64.69
1997	57688	BH6*	820570	835570	+4.71	-94.76	+1.21	-0.79	-12.79	-59.81	-59.81
1997	57688	BH7	820549	835606	+4.60	-70.35	+3.30	-1.90	-13.90	-70.35	-
1997	57688	BH8*	820526	835581	+4.73	-115.11	+0.23	-	-12.77	-106.77	-
1997	57688	BH9*	820511	835586	+4.62	-122.97	+0.64	-1.38	-17.38	-99.88	-102.83
1997	57688	BH10*	820518	835549	+4.82	-90.78	-1.68	-	-19.68	-83.38	-
1997	57688	BH11*	820550	835579	+4.59	-110.56	-0.41	-2.41	-18.41	-88.41	-88.86
1997	57688	BH12*	820542	835606	+4.47	-85.93	-0.53	-2.53	-25.53	-79.78	-
2002	36222	BH1	820895	835646	+4.73	-27.72	+0.73	-1.27	-9.77	-	-

Remarks:

(*) denotes the drillholes encountering MARBLE.

(*) denotes the drillholes encountering MARBLE and were drilled with at least 20m of penetration into sound marble (Marble Class II or better).

GL: Ground Level TD: Terminating Depth


820500 E
821000 E
835500 N
YLTL 313 &Exts Thereto S.J ss.5
YLTL 313 &Exts Thereto S.J ss.1
YLTL 313 &Exts Thereto S.J ss.3
YLTL 313 &Exts Thereto S.J ss.4
YLTL 313 &Exts Thereto S.J
WIP Mar 2023
YLTL 313 &Exts Thereto S.L
YLTL 313 &Exts Thereto S.M
YLTL 313 &Exts Thereto S.M ss.2
YLTL 313 &Exts Thereto S.G ss.3
YLTL 313 &Exts Thereto S.G ss.4
YLTL 313 &Exts Thereto S.E ss.1
YLTL 313 &Exts Thereto S.K RP
YLTL 313 &Exts Thereto S.K ss.1
YLTL 313 &Exts Thereto S.K ss.2
YLTL 313 &Exts Thereto S.C
YLTL 313 &Exts Thereto S.D ss.1
YLTL 313 &Exts Thereto S.D ss.2
YUEN LONG INNOPARK
元朗創新區
STT 3575# (KMB) BUS DEPOT
CLA-TYL 164
6NW-B/C100
6NW-B/C101
BH1
BH2
BH3
BH4
BH5
DD123
SHUI MAU TAU
SHUI MAU TAU STREET
WANG YUEN STREET
WANG YUEN STREET EAST
FUK HANG STREET
WANG YUEN STREET
WANG YIP STREET
WANG LOK STREET
San Miguel Brewery Hong Kong Ltd.
Nestle Hong Kong Ltd
The Chinese Manufacturers' Union Primary School
Yuen Long Government Primary School
Yuen Long Government Secondary School
Yuen Long Government Secondary School (Evening Session)
Yuen Long Government Secondary School (Morning Session)
Yuen Long Government Secondary School (Afternoon Session)
Yuen Long Government Primary School (Morning Session)
Yuen Long Government Primary School (Afternoon Session)
Yuen Long Government Primary School (Evening Session)

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