Appendix I of RNTPC
Paper No. A/TP/685A

2022年 10月 6 日
此文件在________________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 - 6 OCT 2022.
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; and**
  位於鄉郊地區土地上及/或建築物內進行為期不超過三年的臨時用途/發展;及
- **(iii) Renewal of permission for temporary use or development in rural areas**
  位於鄉郊地區的臨時用途或發展的許可續期

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

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

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

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

& Please attach documentary proof 請夾附證明文件

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

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

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

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

2202297 7/9 by hand

For Official Use Only 請 勿 填 寫 此 欄	Application No. 申請編號	A/TP/685
	Date Received 收到日期	- 6 OCT 2022

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

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

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

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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)

The Kowloon Motor Bus Co. (1933) Ltd.

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)

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）	Government Land at the junction of Dai Fuk Street & Dai Wah Street
(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 14,600 sq.m 平方米 ☑ About 約 ☑ Gross floor area 總樓面面積 52,368 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）	14,600 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	S/TP/30
(e) Land use zone(s) involved 涉及的土地用途地帶	Other Specified Uses (Bus Depot)
(f) Current use(s) 現時用途	Bus Depot (If there are any Government, institution or community facilities, please illustrate on plan and specify the use and gross floor area) (如有任何政府、機構或社區設施，請在圖則上顯示，並註明用途及總樓面面積)

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

The applicant 申請人 –

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

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

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

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

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

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

(b) The applicant 申請人 –

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

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

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

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

Details of the "current land owner(s)"# notified 已獲通知「現行土地擁有人」#的詳細資料

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

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

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

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

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

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

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

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

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

Others 其他

□ others (please specify)
其他（請指明）

____

____

____

____

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

6. Type(s) of Application 申請類別

□	Type (i) 第(i)類	Change of use within existing building or part thereof 更改現有建築物或其部分內的用途
□	Type (ii) 第(ii)類	Diversion of stream / excavation of land / filling of land / filling of pond as required under Notes of Statutory Plan(s) 根據法定圖則《註釋》內所要求的河道改道／挖土／填土／填塘工程
□	Type (iii) 第(iii)類	Public utility installation / Utility installation for private project 公用事業設施裝置/私人發展計劃的公用設施裝置
☑	Type (iv) 第(iv)類	Minor relaxation of stated development restriction(s) as provided under Notes of Statutory Plan(s) 略為放寬於法定圖則《註釋》內列明的發展限制
□	Type (v) 第(v)類	Use / development other than (i) to (iii) above 上述的(i)至(iii)項以外的用途／發展

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

(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 …………sq. m 平方米 to 至 …………sq. m 平方米

□ Site coverage restriction 上蓋面積限制 From 由 ……………..% to 至 ………………… %

☑ Building height restriction 建築物高度限制
From 由 ……………..m 米 to 至 ………………… m 米
From 由 …………….. mPD 米 (主水平基準上) to 至 ……………..mPD 米 (主水平基準上)
From 由 ……2……… storeys 層 to 至 ……4……… storeys 層

□ Non-building area restriction 非建築用地限制 From 由 ……………..m to 至 ………………… m

□ Others (please specify) 其他（請註明） ……………………………………………………

(v) For Type (v) application 供第(v)類申請

(a) Proposed use(s)/development 擬議用途/發展	Proposed minor relaxation of Building height restriction for permitted Bus Depot (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	….52,368.sqm… sq.m 平方米	□About 約
Proposed plot ratio 擬議地積比率	…3.59…………	□About 約
Proposed site coverage 擬議上蓋面積	above 15m 77.50% ….under.15m 95.33%… %	□About 約
Proposed no. of blocks 擬議座數	………1………	
Proposed no. of storeys of each block 每座建築物的擬議層數	………4……… storeys 層 □ include 包括……storeys of basements 層地庫 □ exclude 不包括……storeys of basements 層地庫	
Proposed building height of each block 每座建築物的擬議高度	…35.74…… mPD 米(主水平基準上)	□About 約
	……………… m 米	□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)

Bus Depot - 52,368 sqm

☐ Open space 休憩用地

(please specify land area(s) 請註明地面面積)

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

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

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

[Block number] [座數]	[Floor(s)] [層數]	[Proposed use(s)] [擬議用途]
1	3/F	Bus Parking
	2/F	Bus Parking
	1/F	Bus Parking, Power Supply E/M, Workshop
	G/F	Car Washing, Power Supply E/M, Lobby

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

………………………………………………

Part 6 (Cont'd) 第 6 部分 (續)

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)

2025

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)) Dai Fuk 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 ____ Motorcycle Parking Spaces 電單車車位 ____ Light Goods Vehicle Parking Spaces 輕型貨車泊車位 ____ Medium Goods Vehicle Parking Spaces 中型貨車泊車位 ____ Heavy Goods Vehicle Parking Spaces 重型貨車泊車位 ____ Others (Please Specify) 其他（請列明） ____ 363 Bus Parking bays ____ 80 Bus maintenance bays ____
	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 ____ Medium Goods Vehicle Spaces 中型貨車車位 ____ Heavy Goods Vehicle Spaces 重型貨車車位 ____ Others (Please Specify) 其他（請列明） ____
	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 …………………………………… …………………………………… …………………………………… …………………………………… ……………………………………
	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..14,600... sq.m 平方米 ☑About 約 Depth of excavation 挖土深度 .....0.43..........m 米 ☑About 約
	No 否	☐

Would the development proposal cause any adverse impacts?
擬議發展計劃會否造成不良影響？

On environment 對環境	Yes 會 ☐	No 不會 ☑
On traffic 對交通	Yes 會 ☐	No 不會 ☑
On water supply 對供水	Yes 會 ☐	No 不會 ☑
On drainage 對排水	Yes 會 ☐	No 不會 ☑
On slopes 對斜坡	Yes 會 ☐	No 不會 ☑
Affected by slopes 受斜坡影響	Yes 會 ☐	No 不會 ☑
Landscape Impact 構成景觀影響	Yes 會 ☐	No 不會 ☑
Tree Felling 砍伐樹木	Yes 會 ☐	No 不會 ☑
Visual Impact 構成視覺影響	Yes 會 ☐	No 不會 ☑
Others (Please Specify) 其他 (請列明)	Yes 會 ☐	No 不會 ☑

Please state measure(s) to minimise the impact(s). For tree felling, please state the number, diameter at breast height and species of the affected trees (if possible)
請註明盡量減少影響的措施。如涉及砍伐樹木，請說明受影響樹木的數目、及胸高度的樹幹直徑及品種(倘可)

This site is an existing bus depot and there is no existing tree on site.
The bus depot is in use since 2002.

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 see attached 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

Mr. NG, Chin To
Name in Block Letters 姓名（請以正楷填寫）

Head of Major Works Department
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 The Kowloon Motor Bus Co. (1933) Ltd.

THE KOWLOON MOTOR BUS CO. (1933) LTD.
Major Works Department
九龍巴士(1933)有限公司

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

Date 日期 26 Aug 2022 (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。

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

Ash interment capacity 骨灰安放容量$^{@}$

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

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

Total number of niches 龕位總數 ______________________

Total number of single niches
單人龕位總數 ______________________

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

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

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

Total number of double niches
雙人龕位總數 ______________________

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

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

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

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

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

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

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

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

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

Proposed operating hours 擬議營運時間 ______________________

____

@ Ash interment capacity in relation to a columbarium means –
就靈灰安置所而言，骨灰安放容量指：

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

Gist of Application 申請摘要

(Please provide details in both English and Chinese as far as possible. This part will be circulated to relevant consultees, uploaded to the Town Planning Board's Website for browsing and free downloading by the public and 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	Government Land at the junction of Dai Fuk Street & Dai Wah Street
Site area 地盤面積	14,600 sq. m 平方米 ☑ About 約 (includes Government land of 包括政府土地 14,600 sq. m 平方米 ☑ About 約)
Plan 圖則	S/TP/30
Zoning 地帶	Other Specified Uses (Bus Depot)
Applied use/ development 申請用途/發展	Proposed minor relaxation of Building height restriction for permitted Bus Depot

(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	52,368 ☑ About 約 ☐ Not more than 不多於	3.59 ☑ About 約 ☐ Not more than 不多於
(ii) No. of block 幢數	Domestic 住用		
	Non-domestic 非住用	1	
	Composite 綜合用途		

(iii) Building height/No. of storeys 建築物高度／層數	Domestic 住用	m 米 ☐ (Not more than 不多於)
		mPD 米(主水平基準上) ☐ (Not more than 不多於)
		Storeys(s) 層 ☐ (Not more than 不多於) *(☐Include 包括/☐ Exclude 不包括* *☐ Carport 停車間* *☐ Basement 地庫* *☐ Refuge Floor 防火層* *☐ Podium 平台)*
	Non-domestic 非住用	30.5 m 米 ☑ (Not more than 不多於)
		mPD 米(主水平基準上) ☐ (Not more than 不多於)
		4 Storeys(s) 層 ☑ (Not more than 不多於) *(☐Include 包括/☐ Exclude 不包括* *☐ Carport 停車間* *☐ Basement 地庫* *☐ Refuge Floor 防火層* *☐ Podium 平台)*
	Composite 綜合用途	m 米 ☐ (Not more than 不多於)
		mPD 米(主水平基準上) ☐ (Not more than 不多於)
		Storeys(s) 層 ☐ (Not more than 不多於) *(☐Include 包括/☐ Exclude 不包括* *☐ Carport 停車間* *☐ Basement 地庫* *☐ Refuge Floor 防火層* *☐ Podium 平台)*
(iv) Site coverage 上蓋面積	(Above 15m) 77.5% (Under 15m) 95.33%	% ☑ About 約
(v) No. of units 單位數目		
(vi) Open space 休憩用地	Private 私人	sq.m 平方米 ☐ Not less than 不少於
	Public 公眾	sq.m 平方米 ☐ Not less than 不少於

(vii) No. of parking spaces and loading / unloading spaces 停車位及上落客貨車位數目	Total no. of vehicle parking spaces 停車位總數 Private Car Parking Spaces 私家車車位 Motorcycle Parking Spaces 電單車車位 Light Goods Vehicle Parking Spaces 輕型貨車泊車位 Medium Goods Vehicle Parking Spaces 中型貨車泊車位 Heavy Goods Vehicle Parking Spaces 重型貨車泊車位 Others (Please Specify) 其他 (請列明) 363 Bus Parking Bays 80 Maintenance Bays	
	Total no. of vehicle loading/unloading bays/lay-bys 上落客貨車位／停車處總數 Taxi Spaces 的士車位 Coach Spaces 旅遊巴車位 Light Goods Vehicle Spaces 輕型貨車車位 Medium Goods Vehicle Spaces 中型貨車位 Heavy Goods Vehicle Spaces 重型貨車車位 Others (Please Specify) 其他 (請列明)	

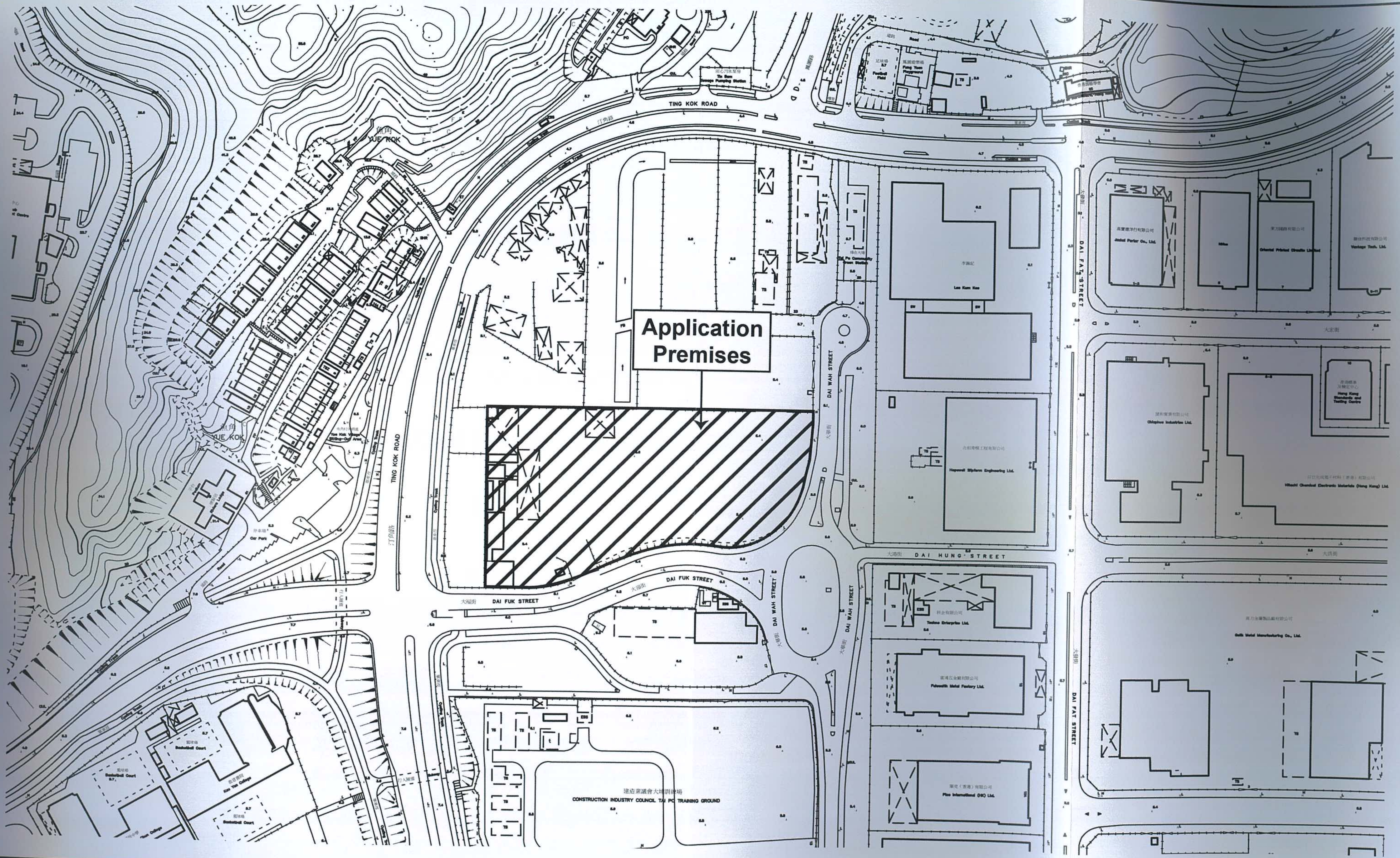
Submitted Plans, Drawings and Documents 提交的圖則、繪圖及文件

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

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

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

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



PROJECT
Sec. 16 Application for Tai Po Bus Depot at Government Land at the junction of Dai Fuk Street & Dai Wah Street, Tai Po, NT

DRAWING
Block Plan

NOTES

DATE
16/08/2022

DWG NO.
A-02

SCALE: 1:2000

REV.

From: htpang@epd.gov.hk
Sent: 01/12/2021 03:16 +00:00
To: Julia Lau CDO
Cc: Thomas Tong CD; stmak@epd.gov.hk; nelsonip@epd.gov.hk
Subject: Re: Request for Policy Support for Planning Application for KMB Proposed Smart Green Depot at Dai Fuk Street, Tai Po.
Attachments: KMB 20210108.pdf

Dear Julia,

Please find the attached e-signed copy for our letter of support regarding the captioned proposal for your advanced information. Please also note that this has been issued by fax and post today.

Best regards,
Daniel Pang
Assistant Environmental Protection Officer
Environmental Protection Department

Sent from my iPad

本署檔號
OUR REF: EP 11/V1/77/2
來函檔號
YOUR REF:
電 話
TEL. NO.: 2594 6309
圖文傳真
FAX NO: 2511 3658
電子郵件
E-MAIL: daveho@epd.gov.hk
網 址
HOMEPAGE: http://www.epd.gov.hk

Environmental Protection Department

15/F & 16/F, East Wing,
Central Government Offices,
2 Tim Mei Avenue,
Tamar, Hong Kong.

環境保護署

香港添馬
添美道2號
政府總部東翼
15及16樓

(By Fax and Post)

Ms. Julia Lau
Project Director
The Kowloon Motor Bus Co. (1933) Ltd.
15/F, 9 Po Lun Street,
Lai Chi Kok, Kowloon

8 January 2021

Dear Ms. Lau,

Policy Support for Planning Application for Proposed Green Depot at Dai Fuk Street, Tai Po

I refer to your letter dated 18 December 2020 on the captioned. While not being the responsible Bureau/Department for approval of the planning application for the project, the Environment Bureau and the Environmental Protection Department are in-principle in support of the Kowloon Motor Bus Co. (1933) Limited's (KMB) proposal and are looking forward to the early completion of the "Smart Green Bus Depot" which is an important milestone in the electrification of public transport.

As electric vehicles have no tailpipe emission and low carbon emissions, the Government has been actively promoting the use of electric vehicles for improving roadside air quality and assisting the community to achieve carbon neutrality. In this regard, the Government is conducting a trial of electric buses with KMB as well as other franchised bus companies.

The development of charging infrastructure is pivotal for achieving our ultimate goal that all franchised buses are electric in the future. KMB's forward-looking initiative of building a four-storey "Smart Green Bus Depot" at Dai Fuk Street, Tai Po, which is for providing charging facilities at all bus parking bays and maintenance bays/pits for supporting the charging needs of the expanding electric bus fleet, is in line with the above government policy.

I thank you for your continual support on greener and sustainable transportation for Hong Kong and partnership all along.

Yours sincerely,

(Dave T.Y. HO)
for Director of Environmental Protection

From: torichan@thb.gov.hk
Sent: 01/18/2021 04:10 +00:00
To: Julia Lau CDO
Subject: Re: Request for Policy Support for Planning Application for KMB Proposed Smart Green Depot at Dai Fuk Street, Tai Po.
Attachments: Reply to KMB dated 18.01.2021.pdf

Dear Ms Lau,

Please find THB's reply in the attached. Many thanks.

Best regards,
Tori

From: Julia Lau CDO <julia.lau@kmb.hk>
To: "torichan@thb.gov.hk" <torichan@thb.gov.hk>,
Date: 04/01/2021 15:50
Subject: Re: Request for Policy Support for Planning Application for KMB Proposed Smart Green Depot at Dai Fuk Street, Tai Po.

Thanks and we await for your reply.
Regards,
Julia Lau

Get Outlook for Android

From: torichan@thb.gov.hk <torichan@thb.gov.hk>
Sent: Wednesday, December 30, 2020 5:43:36 PM
To: Julia Lau CDO <julia.lau@kmb.hk>
Subject: Fw: Request for Policy Support for Planning Application for KMB Proposed Smart Green Depot at Dai Fuk Street, Tai Po.

Dear Ms Lau,

I refer to your email and letter of 18 December 2020 to the Secretary for Transport and Housing concerning the proposed Smart Green Depot at Dai Fuk Street. A substantive reply will be provided in due course. Thank you.

Yours sincerely,

Tori Chan
Assistant Secretary for Transport and Housing (Transport) 1A
Transport and Housing Bureau

----- Forwarded by Tori TY CHAN/THB/HKSARG on 30/12/2020 17:33 -----

From: Julia Lau CDO <julia.lau@kmb.hk>
To: "sthoffice@thb.gov.hk" <sthoffice@thb.gov.hk>,
Cc: Thomas Tong CD <thomastong@kmb.hk>, Julia Lau CDO <julia.lau@kmb.hk>
Date: 2020/12/18 □□ 06:08
Subject: Request for Policy Support for Planning Application for KMB Proposed Smart Green Depot at Dai Fuk Street, Tai Po.

Dear Frank,

Enclosed please find the request for policy letter for KMB Smart Green Depot at Dai Fuk St, Tai Po for your comments/ endorsement.

Should you have any queries, please contact the undersigned at .

Yours Sincerely,

Julia Lau
Project Director

政府總部
運輸及房屋局
運輸科
香港添馬添美道2號
政府總部東翼

Transport and Housing Bureau
Government Secretariat
Transport Branch
East Wing, Central Government Offices,
2 Tim Mei Avenue,
Tamar, Hong Kong

By Email

本局檔號 Our Ref. THB(T)L 2/4/19
來函檔號 Your Ref. MWD/1111/20

電話 Tel No.: 3509 8155
傳真 Fax No.: 2104 7274

18 January 2021

Ms Julia Lau
Project Director
The Kowloon Motor Bus Company (1933) Limited

Dear Ms Lau,

Request for Policy Support for Planning Application for Proposed Green Depot at Dai Fuk Street, Tai Po

I refer to your letter dated 18 December 2020 on the above subject.

We appreciate that your Company is taking the initiative to develop a new multi-storey bus depot at the subject site, which will be conducive to the provision of proper and efficient bus service as well as the electric bus fleet conversion.

We understand that your Company has been working closely with the Planning Department on the subject planning application supported by relevant technical assessments. According to the established procedures, we will review your submission and consider your case in that context.

Thank you for your attention.

Yours sincerely,

(Miss Tori Chan)
for Secretary for Transport and Housing

c.c. Commissioner for Transport (Attn: Ms Vivian Kwan)

九龍巴士（一九三三）有限公司
THE KOWLOON MOTOR BUS CO. (1933) LTD.

Our Ref: MWD/0091A/23

13 February 2023

Town Planning Board Secretariat
15/F, North Point Government Offices
333 Java Road, North Point, Hong Kong
Email: tpbpd@pland.gov.hk
Tel: 2231 4810

(By email & 70 copies By Hand)

Dear Sir / Madam,

TPB No. A/TP/685 - "Further Information" Submission
Section 16 Application for Minor Relaxation of Building Height (from 2 storey to 4 storey) for Proposed Smart Green Bus Depot at Government Land at the junction of Dai Fuk Street & Dai Wah Street, Tai Po

Enclosed please find 70 copies and the ftp link (https://shorturl.at/nxT08) which have included both RtC of various departments, and a consolidated copy of the submission for your approval of the captioned Section 16 application.

The list of documents is as follows -

A. Response-to-comment ("R-to-C") (3+2 pages)
  1. UD&L, Planning Department dated 13 Jan 2023 & 19 Jan 2023
  2. Drainage Services Department dated 20 Jan 2023
  3. Environmental Protection Department dated 3 Feb 2023
  4. Electrical and Mechanical Services Department dated 13 Jan 2023
  5. TD had no in-principle objection to the application from traffic engineering and management viewpoint (Email dated 2 Feb 2023 7:20pm) (2 pages)

B. Consolidated Full Reports
  1. Executive Summary 6 Feb 2023 (2 pages in English & 2 pages in Chinese)
  2. Planning Statement (5 pages) dated 6 Feb 2023 including -
     a. Annex A - (1 page)
        Location Plan of Buses Overnight Parking at Tai Po and Shatin District
     b. Appendix A - (9 pages)
        Full set of schematic plans & planning perimeters
        (Dwg No. A-01 to A-09)
     c. Appendix B - (3 pages)
        Summary of Technical Assessments
  3. Air Quality Impact Assessment (AQIA) Issue 4 (38 pages)
  4. Air Ventilation Assessment (AVA) Issue 4 (48 pages)
  5. Drainage and Sewerage Impact Assessment (DSIA) (53 pages)
  6. Site Appraisal Report issue 5 (84 pages)
  7. Landscape Design Proposal issue 4 and Landscape and Visual Impact Assessment issue 4 (LDP and LVIA) (21 + 78 pages)
  8. Noise Impact Assessment issue 3 (NIA) (71 pages)
  9. Quantitative Risk Assessment Rev.04 (QRA) (98 pages)
  10. Traffic Impact Assessment (TIA)) dated 10 Nov 2022 & program dated 20 Dec 2022 (67 + 1 pages)

Should you have any query or require further information, please feel free to contact our Mr. Alan Fung at Tel: 2786 8847 or the undersigned – Mr. Jacky Ng at Tel: 2786 6075. For technical queries, please contact AEC Cathy Man at 3915 7148. For planning queries, please contact Ms. Julia Lau at 2520 2190.

Thank you for your attention.

Yours faithfully,
for and on behalf of
The Kowloon Motor Bus Company (1933) Limited

Jacky Ng
Head of Major Work Department

Encl.: 70 sets hard copies as listed above (item A&B above)

Distribution List (all by email)

Government Parties

PlanD – Mr. Kevin Lau (E: kkwlau@pland.gov.hk) (T: 2158 6242)

PlanD – Mr. Benson Lau (E: bkclau1@pland.gov.hk) (T: 2158 6225)

UD&L, PlanD – Ms. Katherine Ng (E: kkyng@pland.gov.hk) (T: 3565 3952)

UD&L, PlanD – Ms. Cheryl Yeung (E: cwmyeung@pland.gov.hk) (T: 3565 3941)

DSD – Ms. Karen Ho (E: myho05@dsd.gov.hk) (T: 2300 1364)

LandsD – Mr. Catherize Sze (E: sestp2@landsd.gov.hk) (T: 2654 1107)

TD – Mr. Yanny Li (E: oiyinli@td.gov.hk) (T: 2399 6936)

EPD – Ms. Ada Fung (E: adahyfung@epd.gov.hk) (T: 2835 1186)

ASD – Mr. Calvin Chan (E: chantkc2@archsd.gov.hk) (T: 2154 2398)

EMSD – Ms. Fiona Leung (E: hoyeeleung@eeb.gov.hk) (T: 2808 3657)

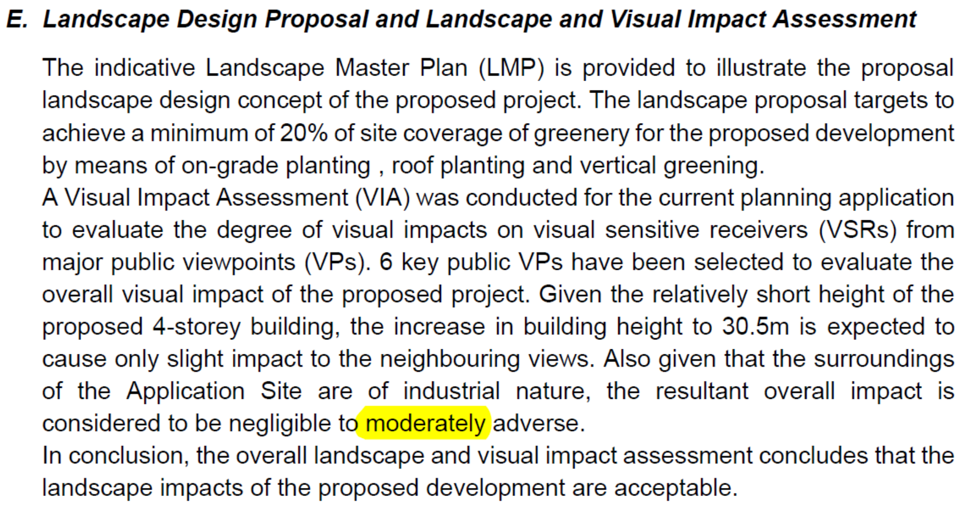
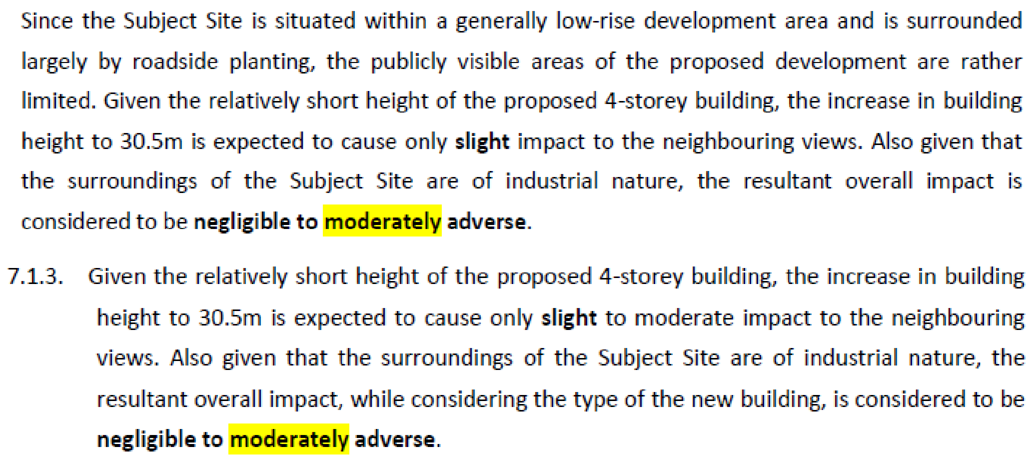
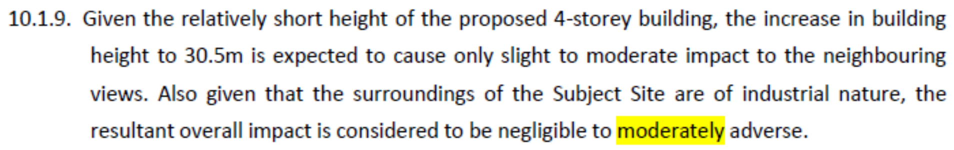
Consultants:

Tracesplus – Ms. Julia Lau (E: julia@tracesplus.com)

AEC - Ms. Cathy Man (E: cm@aechk.com)

Terra Studio - Mr. Aloysius Wong (E: wongal@terralimited.hk)

LLA - Mr. S L Ng (E: slng@lla.com.hk)

Comments	Responses
Comments from **Urban Design & Landscape, Planning Department** received on 19 January 2023 [Contact person: Ms Cheryl YEUNG, Tel: 35653941]	
Urban Design and Visual R-to- C Table: 1. Comments Item (a) on VIA – As both effect on public viewers and effect on visual resources are rated moderate for VP4, the overall visual impact of the proposed development is considered to be ranging from “negligible to moderately adverse” (Executive Summary, Paras. 7.1.3 and 10.1.9 of the Revised VIA and Item E under Appendix B of Planning Application Documents refer).	Noted. Item E under Appendix B of Planning Application Documents is revised accordingly as below.  ***E. Landscape Design Proposal and Landscape and Visual Impact Assessment*** The indicative Landscape Master Plan (LMP) is provided to illustrate the proposal landscape design concept of the proposed project. The landscape proposal targets to achieve a minimum of 20% of site coverage of greenery for the proposed development by means of on-grade planting , roof planting and vertical greening. A Visual Impact Assessment (VIA) was conducted for the current planning application to evaluate the degree of visual impacts on visual sensitive receivers (VSRs) from major public viewpoints (VPs). 6 key public VPs have been selected to evaluate the overall visual impact of the proposed project. Given the relatively short height of the proposed 4-storey building, the increase in building height to 30.5m is expected to cause only slight impact to the neighbouring views. Also given that the surroundings of the Application Site are of industrial nature, the resultant overall impact is considered to be negligible to moderately adverse. In conclusion, the overall landscape and visual impact assessment concludes that the landscape impacts of the proposed development are acceptable. Executive Summary, Paras. 7.1.3 and 10.1.9 of VIA are revised.  Since the Subject Site is situated within a generally low-rise development area and is surrounded largely by roadside planting, the publicly visible areas of the proposed development are rather limited. Given the relatively short height of the proposed 4-storey building, the increase in building height to 30.5m is expected to cause only **slight** impact to the neighbouring views. Also given that the surroundings of the Subject Site are of industrial nature, the resultant overall impact is considered to be **negligible to moderately adverse**. 7.1.3. Given the relatively short height of the proposed 4-storey building, the increase in building height to 30.5m is expected to cause only **slight** to moderate impact to the neighbouring views. Also given that the surroundings of the Subject Site are of industrial nature, the resultant overall impact, while considering the type of the new building, is considered to be **negligible to moderately adverse**.  10.1.9. Given the relatively short height of the proposed 4-storey building, the increase in building height to 30.5m is expected to cause only slight to moderate impact to the neighbouring views. Also given that the surroundings of the Subject Site are of industrial nature, the resultant overall impact is considered to be negligible to moderately adverse.
Revised VIA: 2. Figures 7-4 and 7-7 – The proposed development appears to be lower than its actual proposed BH in the photomontages for VPs 2 and 5. Nevertheless, the visual appraisal in Table 7.1 remains generally applicable for these VPs.	Noted.

Comments	Responses
Comments from **Drainage Services Department** received on 20 January 2023 [Contact person: Ms. Karen HO; Tel: 2300 1364]	
(a) “Tai Fuk Street” should be read as “Dai Fuk Street”.	Noted, section 5.8.3 is revised.
(b) Para. 5.8.3 refers. Please provide a catchment delineation plan showing the extent of the concerned catchment.	Catchment delineation plan is supplement in Figure 2-6.
(c) Figures 2-4 and 2-5 refer. Proposed size and invert level of the drain pipe between manhole nos. SWTM01 and SMH1000577 should be shown.	Size and invert level of the drain pipe shown in Figure 2-4 and 2-5.
(d) Appendix 5-1 refers. The rainfall intensity should be increased by 16% according to Table 28 of SDM Corrigendum No. 1/2022.	16% rainfall increase for “end of 21st Century” as stated in the Corrigendum No. 1/2022 of SDM is incorporated in the assessment. Assessment results in section 5.4 and 5.8 as well as Appendix 5.1 are updated accordingly.
(e) Temporary drainage arrangement and monitoring audit requirement for the construction stage should be provided.	Temporary drainage arrangement and monitoring audit requirement are provided in section 6.
Comments from **Urban Design & Landscape, Planning Department** received on 13 January 2023 [Contact person: Mr. Chak Man NGAI, Tel: 3565 3955]	
Having reviewed the submitted information, our comments are addressed and I have no further comment on the Further information and remain no objection to this application from landscape planning perspective	Note.
Comments from **EMSD on QRA** received on 13 January 2023 [Contact person: Ms Fion LEUNG, Tel: 2808 3657]	
General Comments	
1. The Safeti input files for this bus depot project is missing, please incorporate.	Noted. The report will be updated accordingly.
2. For the population assumptions and any other planned developments within the study area, please incorporate the letter/correspondence from PlanD to show their comments on population data used and associated assumptions made.	Noted, comments from the PlanD will be sought. Any comments received will be addressed accordingly.
Specific Comments on QRA for Tai Po Gas Production Plant (TPGPP)	
3. Section 3.2: Please incorporate the descriptions on naphtha pumping facilities and barge loading facilities in TPGPP connected to Ma Tau Kok plant.	For the Naphtha transfer line, conservatively it is assumed to be operating 100% of the time in the absence of detail information (not provided by towngas). The report will be updated accordingly.
4. Section 3.2Please incorporate the descriptions on Natural Gas Receiving Station (NGRS), Dai Fat Street Pigging Station (DFS), Tai Po East Offtake Station (AGI) and Tai Po Pigging Station in TPGPP.	Noted. The report will be updated accordingly.
5. Table 6.6: Please specify Dai Fat Street offtake and pigging station has been included under the item of “Towngas Export and Others” in the table.	Noted. The report will be updated accordingly.
6. Figure 9.1: It is noted that the individual risk contour corresponding to 1x10 -5 per year extended out of the site boundary of the TPGPP and covered part of the neighboring factories and facilities near TPGPP. Please provide justification on the actual individual risk would be acceptable in accordance with HKRG by taking account of the calculation on presence factor.	The objective of this study is to assess incremental risk due to the new KMB bus depot. Noted that Towngas cannot release process information to the public and any third party due to their confidentiality agreement with the technology licensor of the plant as well as the increasing concern of plant security in the aftermath of the social movements in Hong Kong in 2020. As such, the current study is performed based on conservative assumptions and parameters. Although risk result seems to be outstanding from TPGPP, the development of new KMB bus depot does not result in any increase in societal risk, hence no further action is required. In any case, since TPGPP is a PHI, regular QRA update will be performed by Towngas and review by authority.
7. Section 9.2: The societal risk results and FN curves for this assessment is outstanding. The project consultant is requested to provide the existing societal risk result with FN curve to demonstrate the risk results are still in compliance with HKRG although there is no significant increase in population arising from the project.	The objective of this study is to assess incremental risk due to the new KMB bus depot. Since the new bus depot is outside of the IR contour of 1E-09, hence no PLL result can be obtained. Noted that Towngas cannot release process information to the public and any third party due to their confidentiality agreement with the technology licensor of the plant as well as the increasing concern of plant security in the aftermath of the social movements in Hong Kong in 2020. As such, the current study is performed based on conservative assumptions and parameters. Although risk result seems to be outstanding from TPGPP, the development of new KMB bus depot does not result in any increase in societal risk, hence no further action is required. In any case, since TPGPP is a PHI, regular QRA update will be performed by Towngas and review by authority.
8. Others: The PLL distribution for the gas production facilities in TPGPP are outstanding. Please incorporate.	The objective of this study is to assess incremental risk due to the new KMB bus depot. Since the new bus depot is outside of the IR contour of 1E-09, hence no PLL result can be obtained.
9. Table A1: Please provide justification on the assumed population data in 2025 for site ID Golf, Kok, Fat, Shing , Cheong, Fuk, Kwai, Hei, Shun, which are considered abnormally high when compared with those figures in 2022.	The objective of this study is to assess incremental risk due to the new KMB bus depot. As such, population data for surrounding area has not been obtained. Also, Table A1 does not exist.

Comments	Responses
Comments from **Environmental Protection Department** received on 03 February 2023 [Contact person: Ms. Ada Fung; Tel: 2835 1186]	
Executive Summary and Planning Statement	
1. Planning Statement V.: It is noted that the previous comment made in pre-submission stage has not been addressed: “Please remove “Main Points of Justifications” which is irrelevant to Direct Application of Environmental Permit”. According to s.5(11) of the Environmental Impact Assessment Ordinance, “*The Director may, with the consent of the Secretary, permit an applicant to apply directly for an environmental permit if he satisfies the Director, having regard to the project profile, that the environmental impact of the designated project is unlikely to be adverse and the mitigation measures described in the project profile meet the requirements of the technical memorandum.*”.	Planning Statement V is revised as below: :The subject development is classified as a designated project under Item A.6(a)(c), Part I, Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) – “a transport depot located less than 200m from the nearest boundary of an existing residential area, and educational institution” requires environmental permit (EP) prior to its construction and operation. KMB is preparing the Project Profile in parallel to seek permission to apply directly for an EP under Section 5(11).
2. Executive Summary para.12: Please revise the 1st sentence as follows, “The project requires “~~Direct Application of~~ **an** Environmental Permit” (EP) **prior to its construction and operation and KMB intends to seek permission to apply directly for an EP** under Section 5(11).” Please remove “Main Points of Justifications” which is irrelevant to Direct Application of Environmental Permit.	Para 12 is revised accordingly.
Site Appraisal Report	
1. Section 3.4: Please elaborate on the use of Store Room 3 and address if there is any potential land contamination issue.	The elaboration on the use of Store Room 3 is added in Section 3.4.11: “Located at the northwest of the Project Site, store room 3 is used for equipment storage. According to Photo 33 of Appendix F, store room 3 is paved with good condition and the equipment is stored in a locked cabinet or properly placed in an elevated platform. Hence, land contamination is not expected within the equipment storage room.”
2. Section 4.1.1: As there are potential land contamination issues identified at the Project Site (i.e. Section 3.4.3 refers), the statement “no potential land contamination locations in the Project Site are identified” should be revised for consistency.	Section 4.1.1 is revised as follow: “According to the desktop study and site appraisal presented in Section 3 above, potential land contamination is likely to be occurred at refueling, bus washing and covered bus parking area.”
3. Section 4.1.6: Please revise 2nd sentence as “Yet, site ~~inspection~~ **investigation** shall also be carried …”.	Revised accordingly.
4. Section 4.1.8: Please revise last sentence as “Remediation works, if required, will be carried out according to the Practice Guide **before the commencement of development of project**”.	Revised accordingly.
5. Section 5.1.2: Please clarify whether the Project site was used as “container storage area” as stated in 1st sentence.	The Project site was Yue Kok Temporary Housing Area and a construction site for the road works around the Project Site. The incorrect sentence is revised accordingly.
6. Section 5.1.5: Please revise “… to ascertain the nature and ~~extend~~ extent of contamination before the commencement of the develop**ment** of the proposed depot. Rest assured that the Client, KMB will follow the ~~stator requirements and ordinance~~ **prevailing guidelines on land contamination**”.	Revised accordingly.
Quantitative Risk Assessment (QRA)	
Non-fuel gas dangerous goods risk perspective 1. We note that our previous comment on FN curve has yet to be addressed - Technical Assessment G, Figure 9.2: Please show clearly “Cut-off at F=l E-9/year” and “vertical line at N=1000” on the FN curve.	The purpose of this figure is to show the unedited output result from PHAST Risk to prove there is no societal risk result. There is no feature in PHAST Risk to define a vertical line at N=1000. As such, it is not possible to implement this comment without using photo editing or using third party software. For other QRA reports that have FN results, the curve needs to be plotted using other software, such as Excel, in order to match the format of Hong Kong FN criteria.

Re: TPB No: A/TP/685 S16 Electric Bus Depot Application - Further Information

bkclau1@pland.gov.hk <bkclau1@pland.gov.hk> Thu, Feb 2, 2023 at 7:20 PM
To: Julia Lau <julia@tracesplus.com>
Cc: clyli@pland.gov.hk, KMB jacky ng <jackyng@kmb.hk>, dyftsui@pland.gov.hk

Dear Julia,

Comment from TD is attached for your reference and further action, please.

If you intend to provide further information to make response to the comments or to supplement your application, please make reference to the latest Town Planning Board Guidelines (TPB PG-No. 32A) which is available for public viewing at the website of the Town Planning Board (https://www.info.gov.hk/tpb/en/forms/Guidelines/TPB_PG_32A.pdf).

Should you have any queries on the departmental comments attached, please feel free to contact the respective subject officers. Should you have any other queries related to the captioned application, please contact the undersigned.

Thank you.

Regards,
Benson Lau
TP/TP3, PlanD
Tel: 2158 6225

From: Benson Ka Chun LAU/PLAND/HKSARG
To: Julia Lau <julia@tracesplus.com>
Cc: KMB jacky ng <jackyng@kmb.hk>, Combi Lok Yi LI/PLAND/HKSARG@PLAND, YF TSUI/PLAND/HKSARG@PLAND
Date: 20/01/2023 17:14
Subject: Re: TPB No: A/TP/685 S16 Electric Bus Depot Application - Further Information

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Dear Julia,

Comments from DSD is attached for your reference and further action, please.

[attachment "A_TP_685 Departmental Comments_20230120.pdf" deleted by Benson Ka Chun LAU/PLAND/HKSARG]

[Quoted text hidden]

A_TP_685 Departmental Comments_20230202.pdf
261K

Proposed Minor Relaxation of Building Height Restriction for Permitted Bus Depot
(Application No.: A/TP/685)

- Further Information -

Comments from Transport Department:

Contact person: Ms. Yanny LI (Tel: 2399 6936)

I have no in-principle objection to the application from traffic engineering and management viewpoint.

Executive Summary - OU (Bus Depot) site at Tai Po (OZP S/TP/30) 6/2/2023
Sec 16 Planning Application for Minor Relaxation of Building Height
(fm 2 storey to 4 storey)
For Proposed Smart Green Bus Depot at
Government Land at the junction of Dai Fuk Street & Dai Wah Street, Tai Po.

Executive Summary

1. This application is to apply for relaxing the existing Bus Depot storey limit from 2 storey to 4 storey. The site is currently zone as “OU(Bus Depot)” under OZP no S/TP/30, and is limited to two storey at present.

2. KMB currently occupies it for open bus parking, with several one-storey steel structure for refuelling, washing, and repair work facilities.

3. The site area is 14,600sqm and is located at the junction of Dai Fuk Street & Dai Wah Street, Area 33, just outside of Tai Po Industrial Estate to the east.

4. The site has been in used since 2002.

5. The proposal is a redevelopment of a 4 storey bus depot, which can accommodate about 363 parking bays, plus 80 nos of maintenance bays (inclusive of sunken pits and inspection bays.)

6. KMB aims to go green and surge for higher sustainability goals.
   KMB is proposing a full fleet of electric bus for the site**.**

7. Enclosed please find **Appendix A -** preliminary schematic plans (9 sheets) for your reference & approval.

8. KMB would like to apply for minor relaxation under Sec 16 of the Town Planning Ordinance to relax from the current 2-storey restriction to 4-storey to cater for the following provisions –
   - Parking of about 363 nos of electric bus
   - Provision of 80 maintenance bus bays
   - Bus washing bays
   - workshops, stores
   - w/ associated power supply facilities

9. It will help to reduce carbon emission, air & noise pollution to improve the environment in moving towards carbon neutrality, to support sustainability & Smart Cities goals.

10. The Proposal will help to absorb a total of 183 nos of overparked/ overnight parked buses on-street parking at Tai Po/ Shatin district, which can relieve bus security and public nuisance problem. They are –
    - 63 nos at Dai Wah Street Parking Site;
    - 62 nos of overparked buses at Shatin Depot;
    - 58 nos of overnight parked buses at 7 bus terminus (they are located at Tai Po Central Bus Terminus, Tai Po Market Station Bus Terminus, University Station Bus Terminus, Yuen Chau Kok BusTerminus, Shatin Station Bus Terminus, Tai Wai Station Bus Terminus, Sui Chuen O Bus Terminus). Please refer to **Annex A** for location plan.

11. Upon completion of the new proposal “Bus Depot”, the "Parking Site at Dai Wah Street" can be returned to Government.

12. The project requires an Environmental Permit” (EP) prior to its construction and operation and KMB intends to seek permission to apply directly for an EP under Section 5(11).

13. Summary of Technical Assessments

    The following technical assessments have been conducted & details are under **Appendix B: - 0**

    A. Air Quality Impact Assessment (AQIA)
    B. Air Ventilation Assessment (AVA)
    C. Drainage and Sewerage Impact Assessment
    D. Site Appraisal Report
    E. Landscape Design Proposal and Landscape and Visual Impact Assessment (LDP and LVIA)
    F. Noise Impact Assessment (NIA)
    G. Quantitative Risk Assessment (QRA)
    H. Traffic Impact Assessment (TIA)

Encl. 1. Appendix A
2. Appendix B
3. Annex A

Executive Summary - OU (Bus Depot) site at Tai Po (OZP S/TP/30) 6/2/2023
Sec 16 Planning Application for Minor Relaxation of Building Height
(fm 2 storey to 4 storey)
<u>For Proposed Smart Green Bus Depot at</u>
<u>Government Land at the junction of Dai Fuk Street & Dai Wah Street, Tai Po.</u>

<u>行政摘要</u>

1. 申請的目的是申請把現有的巴士廠由兩層上限放寬至四層。申請處所位處大埔分區大綱核准圖(S/TP/30)的「其他指定用途」註明「巴士廠」，發展限制為兩層高。
2. 九龍巴士(一九三三)有限公司 (下稱「九巴」)現時把申請處所用作露天巴士停車場之用，並設有數個一層高的鋼結構加油、清洗及維修設施。
3. 申請處所地盤面積為 14,600 平方米，位處大埔 33 區在大福街與大華街交界，擬建的巴士廠剛好在大埔工業村旁邊。「巴士廠」的東面是大埔工業村。
4. 申請處所自 2002 年起一直使用至今。
5. 此申請建議是重建成一座 4 層高的巴士廠，並可容納約 363 個巴士泊位及 80 個維修位置(包括下沉坑和檢查位)。
6. 九巴的目標是向可持續發展邁進，並建議申請處所為全電動巴士。
7. 文件的「附錄 A」為 9 張初部示意圖，供 貴方參考及審批。
8. 九巴擬根據《城市規劃條例》第 16 條申請略為放寬，將現時的兩層限制放寬至四 層，並提供以下配置：
    - 停放約 363 輛電動巴士
    - 提供 80 個維修巴士車位
    - 巴士洗車間
    - 車間、士多房
    - 相關電源設施
9. 擬建方案能減少碳排放、空氣和噪音污染，幫助改善環境、邁向碳中和的目標以達玫可持續發展和智慧城市的目標。

10. 擬建方案有助吸納大埔/沙田區合共 183 輛在街上或車站、車廠過夜的巴士，紓緩巴士保安及公眾滋擾的問題。 這 183 輛巴士的位置如下 -
    - 63 輪停泊於大華街巴士停泊處；
    - 62 輛在沙田車廠；
    - 58 輛分佈在 7 個巴士站（分別位於大埔總站、大埔墟站總站、大學站總站、圓洲角總站、沙田站總站、大圍站總站、 水泉澳巴士總站）。 位置圖請參考「附件 A」。

11. 當中位於大華街的巴士停泊處在新巴士廠建成後可歸還政府。

12. 該項目需要於工程開始及營運前申請“環境許可證”(EP)，以及九巴有意根據環境保護條例第 5(11) 條直接申請環境許可證。

13. 技術評估總結

    已經進行了以下技術評估，詳細資料在「附錄 B」 中:-

    A. 空氣質量影響評估 (AQIA)
    B. 通風評估 (AVA)
    C. 排水及排污影響評估
    D. 現場評估報告
    E. 園景設計方案和園景及視覺影響評估（LDP 和 LVIA）
    F. 噪音影響評估 (NIA)
    G. 定量風險評估 (QRA)
    H. 交通影響評估 (TIA)

附件: 附錄 A (Appendix A)
附錄 B (Appendix B)
附件 A (Annex A)

Planning Statement - OU (Bus Depot) site at Tai Po (OZP S/TP/30) 6/2/2023
Sec 16 Planning Application for Minor Relaxation of Building Height
(fm 2 storey to 4 storey)
For Proposed Smart Green Bus Depot at
Government Land at the junction of Dai Fuk Street & Dai Wah Street, Tai Po.

I. Development Site Context

The Subject Site with a site area of 14,600 sq m is located on the northeastern outskirts of Tai Po Town, bounded by Ting Kok Road to the west and Dai Fuk Street to the south, immediately adjoining the GIC site to the north and facing Tai Po Industrial Estate to the east. To the south of Dai Fuk Street is Construction Industry Council (CIC) Tai Po Training Ground, while Tai Po Waterfront Park is located in the far south.

Residential development, known as **Mont Vert**, with storeys ranging from 17 to 28 and village type developments are scattered along Fung Yuen Road to the **north of Ting Kok Road.**

To the **northwest** of the bus depot, across Ting Kok Road is a group of residences – **Yue Kok Village** which are mostly 3 storeys high, and **Rivieria Lodge**, which is a 35 storey residential building.

To the **southwest** of the bus depot, across Ting Kok Road/ Yuen Shin Road, are public rental housing estates, subsidized housing blocks, a few primary and secondary schools. Note that **Kau Yan College** is **within 200m** of the nearest bus boundary.

II. Land Use Context

The Subject Site is currently held by the Applicant under a **short term tenancy (STT)** Tenancy Agreement No 1097 dated Nov 2001. It stated that the rent date started from **22 Dec 2000,** and is use for **"temporary bus depot".**

Surrounding land uses are predominantly of mixed use in nature. The GIC site **north** of the Subject Site is currently occupied by various temporary uses by Government departments and also private operators. The current KMB bus depot only occupies the southern or the south-eastern portion of the subject GIC zone. To the **east** is Tai Po Industrial Estate developed for industrial use. To the **south** of the subject site across Dai Fuk Street is another site zoned GIC with a building height restriction of 8-storey, which is currently held by CIC as a training ground. To the **west/ southwest** are mainly high density residential developments & schools.

To the north and the **northwest across Ting Kok Road** comprises land uses of CDA, R(A), R(C)1, V, GIC, GB and O. Residential developments under R(A) and some GIC buildings including schools are located to the **southwest across Yuen Shin Road.**

Tai Po Industrial Estate under the management of Hong Kong Science and Technology Parks Corporation consists of various industrial buildings and plants ranging from 1 to 12 storeys at about 40mPD+ high. There is one structure located at its centre which is at +70mPD.

III. Objective

The Subject Site is about **14,600 sqm** and is zoned "Other Specified Uses (Bus Depot)" (OU (Bus Dept)) under the current **OZP S/TP/30**, restricted to 2-storey high. Enclose please find the Site Plan (14,600sqm) of this planning application. Note that "Bus Depot" is permitted under Column 1 of OU (Bus Depot) on the Tai Po Outline Zoning Plan No. S/TP/30.

At present, KMB is already occupying this open depot for parking of **115 nos of buses**. For information, the **adjacent GIC** site parks **48 buses**. Due to the **growing fleet** & **transition into electric buses**, KMB is now proposing a **4 storey bus depot** to make provision for about **363 parking bays**, plus **80 nos of maintenance bays**.

KMB aims to **go green** and surge for higher **sustainability goals**. A 4 storey bus depot would necessitate Section 16 application to relax the current restriction of 2-storey limit. KMB is proposing a full fleet of electric bus for the site. Having coordinated with "power supply company", there will be a need to build 1 substation and 5 numbers of E&M power supply related plant rooms to allow enough capacity for the operation. Hence the need to apply relaxation from 2 to 4 storeys. Enclosed please find **Appendix A** - a set of the **preliminary schematic plans** for your comments.

KMB would like to apply for **minor relaxation** under Sec 16 of the Town Planning Ordinance to relax from the current 2-storey restriction to 4-storey to cater for the following provisions –

- Parking of about 363 nos of electric bus
- 80 maintenance bus bays
- Bus washing bays
- workshops, stores
- 1 no. of power supply plant room (size about 28.3m x 20m x 15.6mH)
- 5 nos of E&M power supply related plant rooms

In fact, KMB had already obtained **a draft "Short Term Tenancy"** of 2019 for a 2-storey bus depot **for 7 years** commencing April 2022 (not executed), the use is for " **temporary bus depot**.

IV. Absorb 183nos of overnight/ overparked buses; Handover of Dai Wah St Parking Site

The Proposal will help to absorb a total of 183 nos of overparked/ overnight parked buses on-street parking at Tai Po/ Shatin district, which can relieve bus security and public nuisance problem. They are –

- 63 nos at Dai Wah Street Parking Site;
- 62 nos of overparked buses at Shatin Depot;
- 58 nos of overnight parked buses at 7 bus terminus (they are located at Tai Po Central Bus Terminus, Tai Po Market Station Bus Terminus, University Station Bus Terminus, Yuen Chau Kok BusTerminus, Shatin Station Bus Terminus, Tai Wai Station Bus Terminus, Sui Chuen O Bus Terminus). Please refer to **Annex A** for location plan.
- Upon completion of the new proposal “Bus Depot”, the "Parking Site at Dai Wah Street" can be returned to Government.

V. Direct Application of Environmental Permit

The subject development is classified as a designated project under Item A.6(a)(c), Part I, Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) – “a transport depot located less than 200m from the nearest boundary of an existing residential area, and educational institution” requires environmental permit (EP) prior to its construction and operation.

KMB is preparing the Project Profile in parallel to seek permission to apply directly for an EP under Section 5(11).

VI. Justification

The project site is located at Dai Fuk Street, Area 33, Tai Po, which is zoned as “Other Specified Uses” annotated “Bus Depot” (“OU (Bus Depot)” on the approved Tai Po outline zoning plan no. S/TP/30. It is currently held by KMB under a Short Term Tenancy (“STT”) No 1097 granted by the Government for “temporary bus depot” use with facilities such as - bus open parking and with several steel sheds for refuelling, washing and minor repair purpose.

In 2017, KMB proposed to redevelop the site to a two-storey depot building with an aim to absorb over-parked buses at Shatin Depot and those overnight parking at termini and on-street at Tai Po / Shatin District, which can relieve bus security and public nuisance problem.

To cater for electric buses strategy, KMB intends to build a 4-storey depot for electric buses at the site with modernized depot facilities with sufficient charging facilities. Planning permission from Town Planning Board for minor relaxation of the building height restriction of the site from two-storey to four-storey is required. It is going to support the roadmap on popularization of “Electric Vehicles” released by Environment Bureau in March 2021. About 363 charging-enabling bus parking bays will be provided after the launch of this multi-storey depot. It is a bold step forward to allow wider use of eBus, especially double deck eBus for KMB bus service.

Justifications (continue) -

The eBus fleet returning to Tai Po Depot at late night does not need to queue up for refuelling as in the case for conventional depot entrance, instead they can go straight to park for overnight charging. It eliminates the possible vehicle tail back concern to adjacent traffic flow. As a matter of fact, the buses coming back at late night or going out in early morning would not clash with ambient traffic peak. Traffic impact imposed on the road network and junctions due to the proposed depot development is negligible.

Regarding the environmental impact to the surrounding environment, please understand that electric bus is of zero emission with no toxic gas and particulates generation. No engine and gearbox is required in an eBus. Electric bus is of simpler design (as compare with petrol ones) with mainly HV battery, electronic management system and drive motors. The battery, motors and associated electronics require replacement through daily operation, and onsite repair is rare. There is no need to change engine oil, conduct engine and gearbox overhaul is done at conventional diesel bus depot. In this connection, the eBus Depot will be clean, with zero emission and quiet.

As such, the proposed eBus depot is considered environmentally superior to the conventional fuel bus depot in terms of air and noise pollution. Noise generated from bus servicing is considered minimal to the surrounding.

Franchised buses are one of the major sources of nitrogen oxides emissions, accounting for 17% of vehicular emissions. The community is pushing ahead to electrifying the bus fleet. While the Government and the franchised bus operators are working hard on double-deck eBus trial, provision of supporting charging facilities in depots are essential. Note that facilities enhancement in existing depots are restricted by both available space and power available.
Development of a new depot with tailor-designed charging facilities and abundant power supply is the basic requirement for the promotion of eBus strategy. It has been confirmed from “power supply company” that sufficient power supply can be provided for this site. Design of bus depot will well cater for the required parking spaces with chargers and the tall headroom required for the power substations.

Besides, the depot for the approximate 363 electric vehicles will provide a valuable opportunity for training engineers / technicians to operate and maintain such e-bus electric vehicles in HK and will lay a strong foundation for Hong Kong Roadmap in popularizing use of Electric Vehicles as advocate by Environment Bureau in March 2021.

As such, we would like to submit a planning application to the Town Planning Board to permit the development of a 4-storey depot building, to relax the building height restriction from two-storey to four-storey at the subject application premises.

The new depot will also achieve the following -

- To support sustainability & “Smart Cities” goals.
- Reduce carbon emission.
- Reduce air pollution.
- Reduce noise pollution

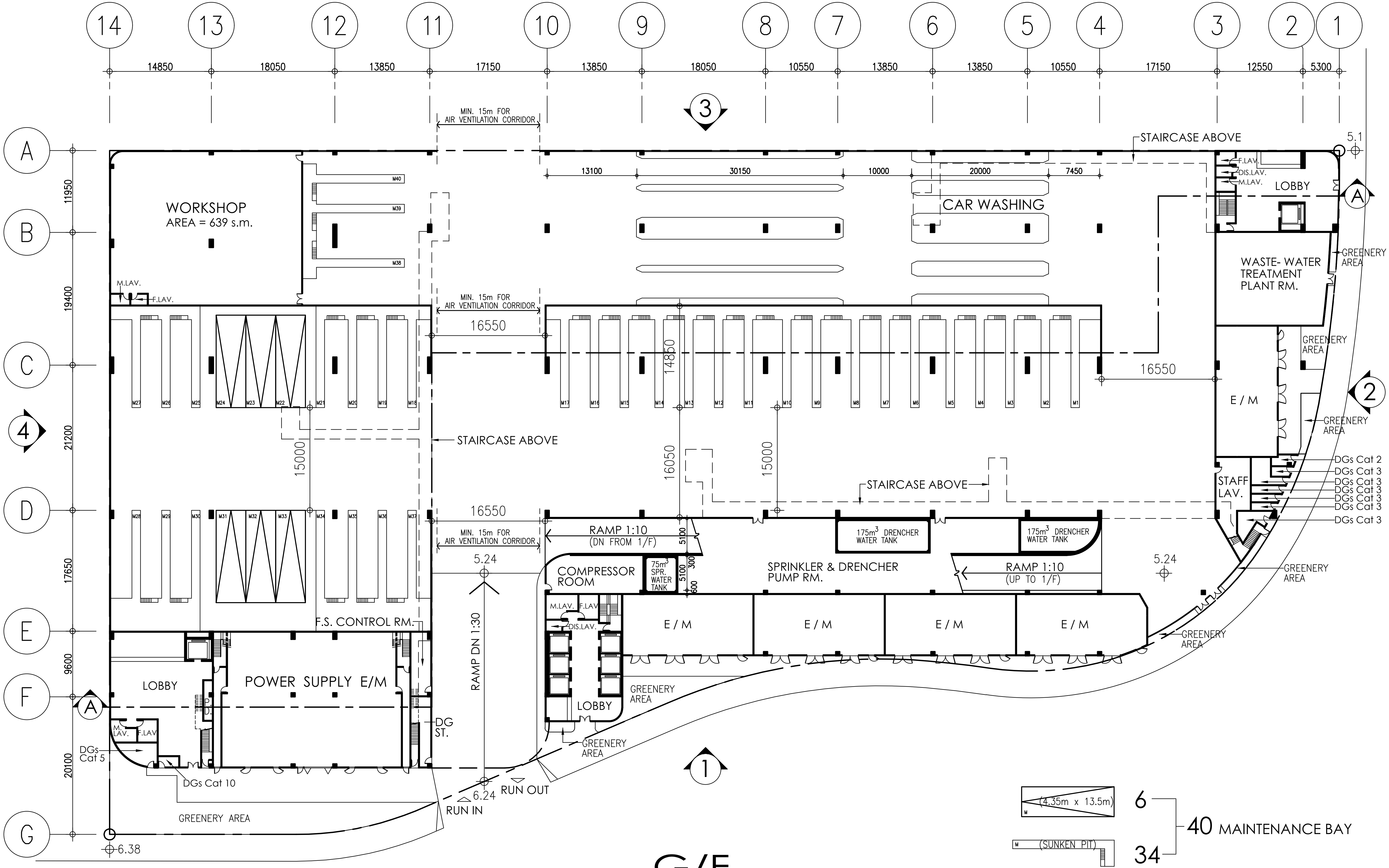
VII. Summary of Technical Assessments

Environmental Assessment has been conducted and is attached in **Appendix B.** Potential impacts, such as construction air quality, vehicular emission, industrial emission of chimney, air ventilation, construction and operation drainage and sewerage Impact, land contamination, landscape and visual impact, road traffic noise, fixed plant noise, quantitative risk assessment and traffic impact have been studied.

Enclosed please find a summary of technical assessments covering the following –

A. Air Quality Impact Assessment (AQIA)
B. Air Ventilation Assessment (AVA)
C. Drainage and Sewerage Impact Assessment
D. Site Appraisal Report
E. Landscape Design Proposal and Landscape and Visual Impact Assessment (LDP and LVIA)
F. Noise Impact Assessment (NIA)
G. Quantitative Risk Assessment (QRA)
H. Traffic Impact Assessment (TIA)

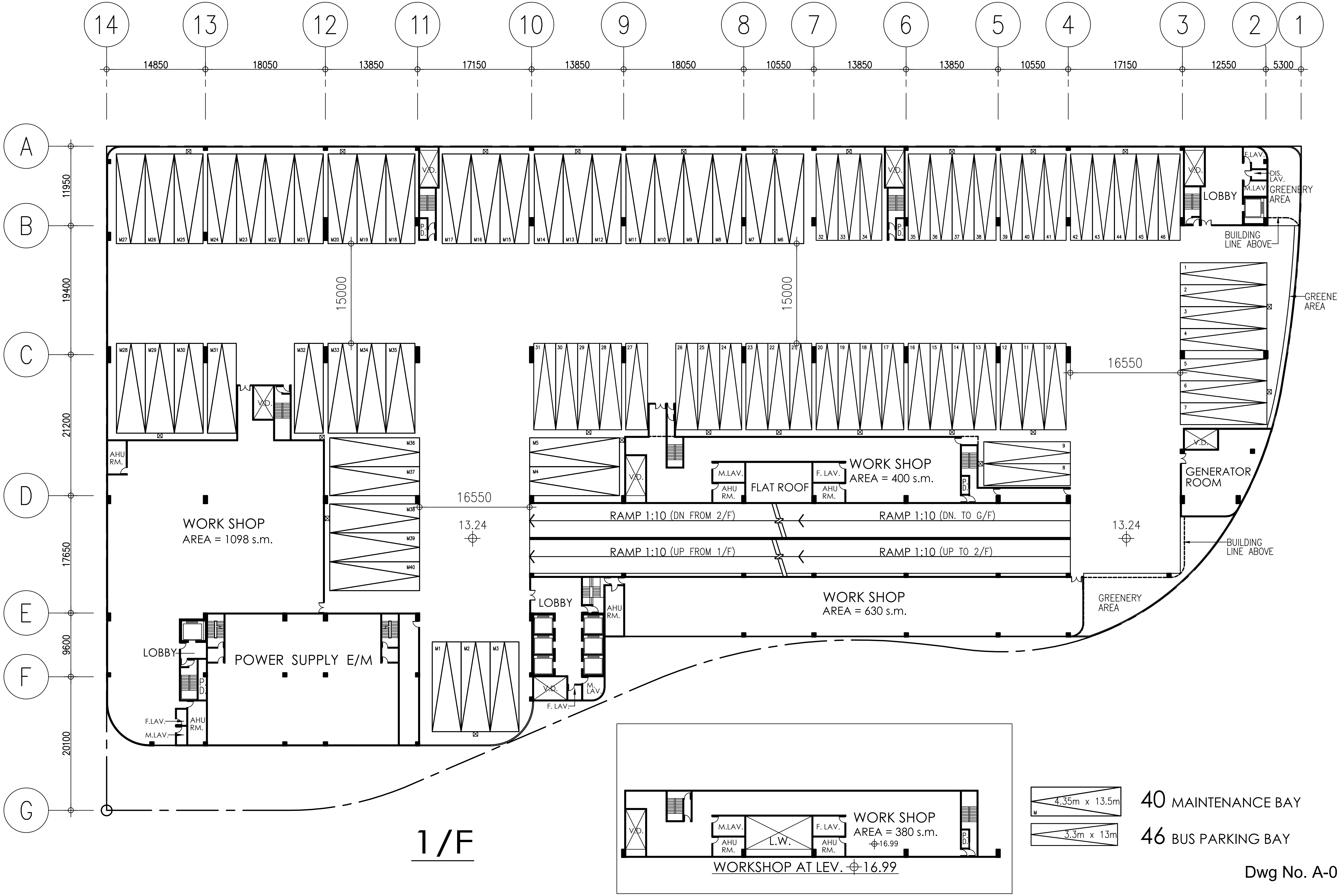
Encl.	Annex A	Location Plan of Buses Overnight Parking at Tai Po and Shatin District
	Appendix A	Full set of schematic plans & key perimeters (Dwg No. A-01 to A-09) (9 sheets)
	Appendix B	Summary of Technical Assessments (3 sheets)



G/F

Dwg No. A-01

JULY 2022 (1)



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Dwg No. A-02

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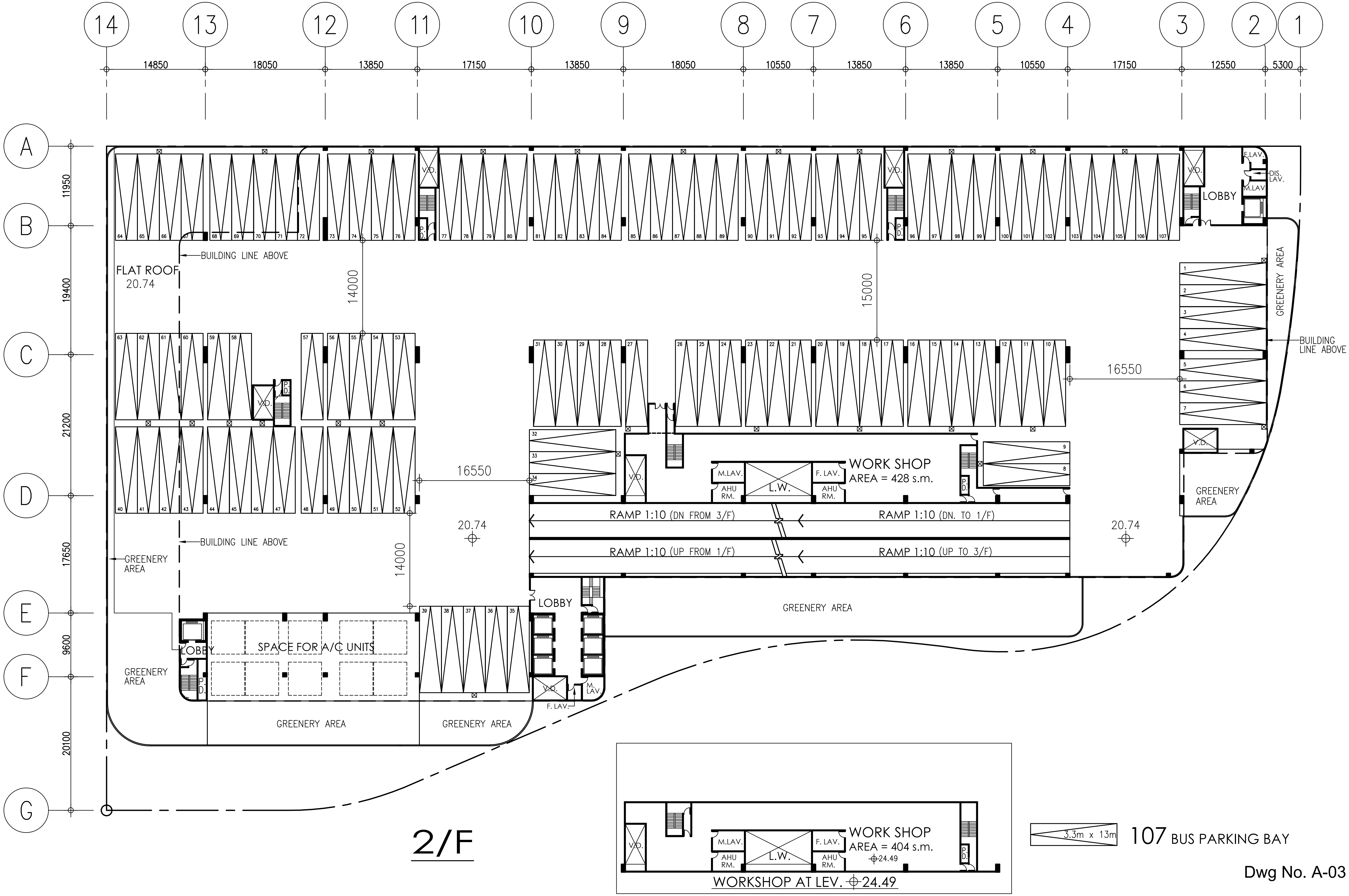


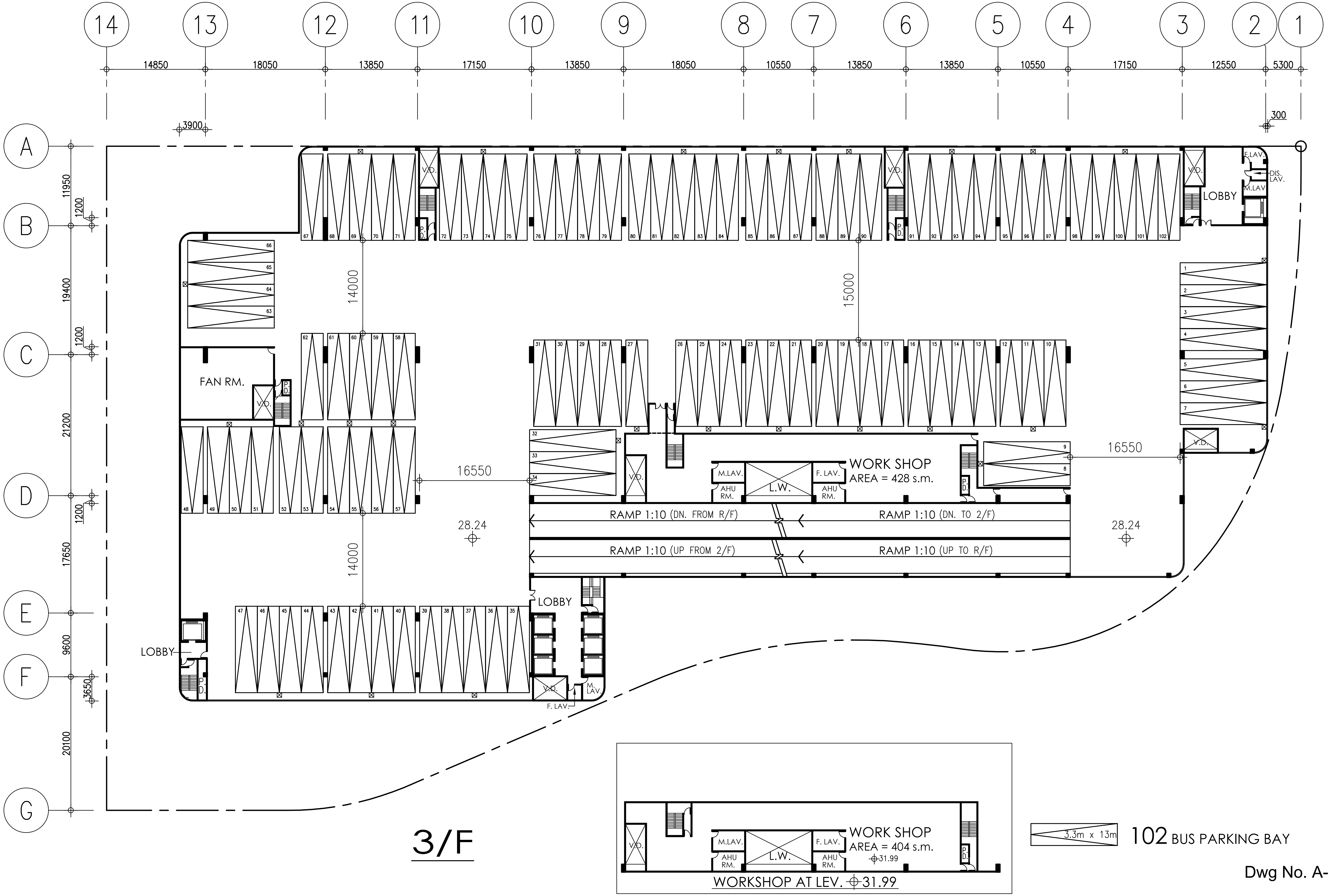
2/F

WORKSHOP AT LEV. ⌖24.49

107 BUS PARKING BAY

Dwg No. A-03

JULY 2022 (1)



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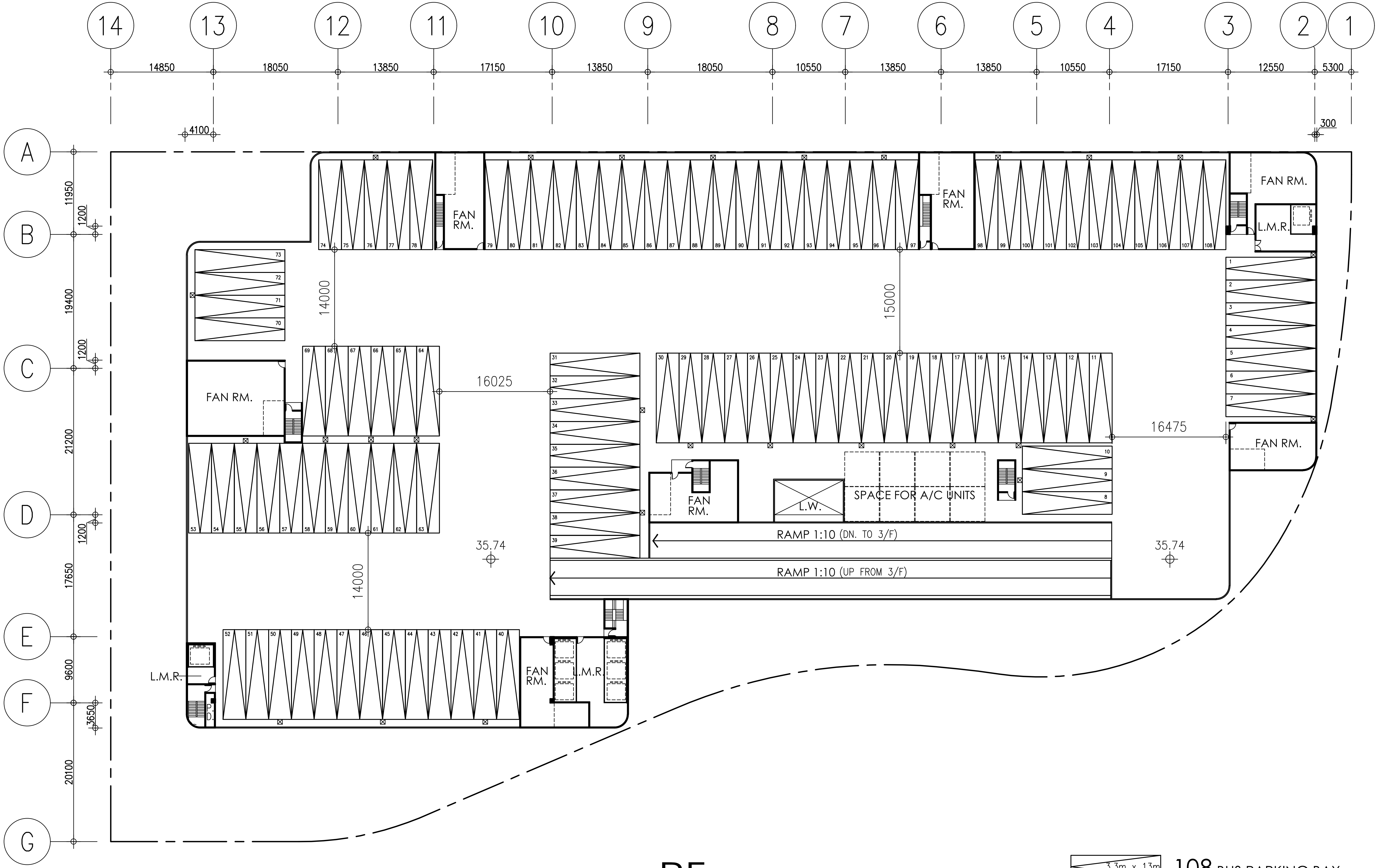

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108 BUS PARKING BAY

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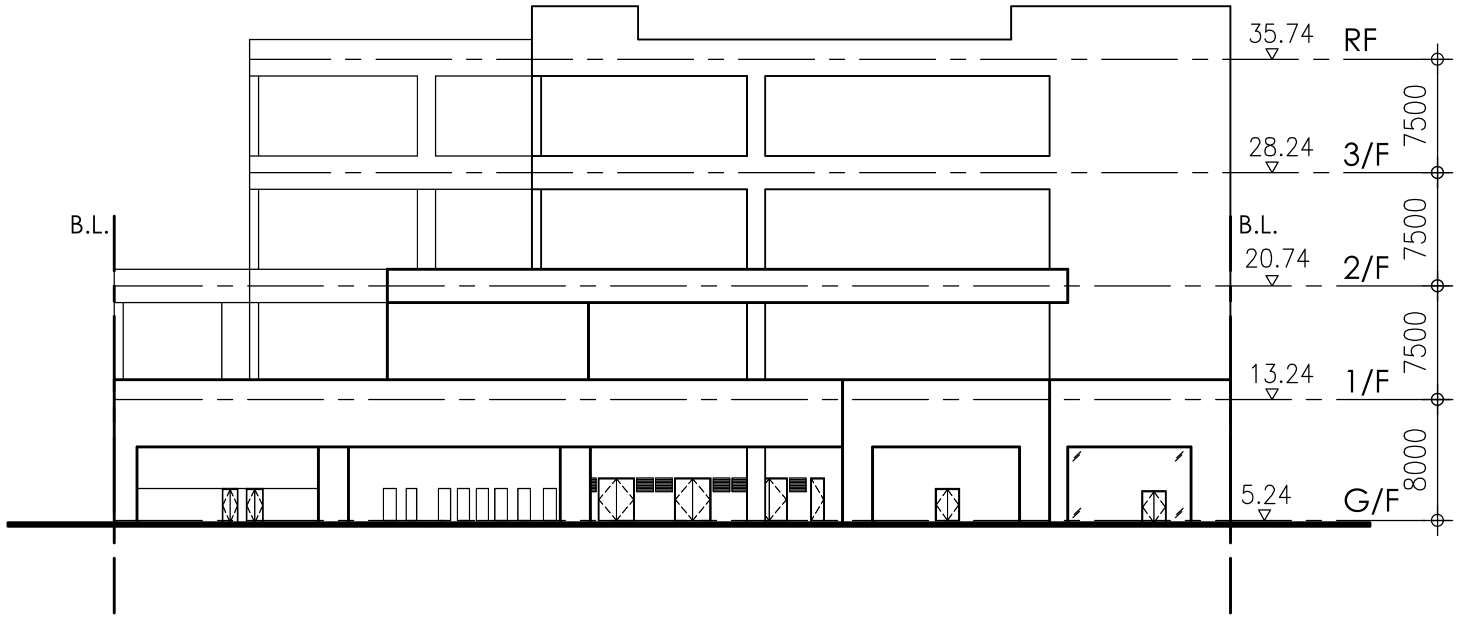
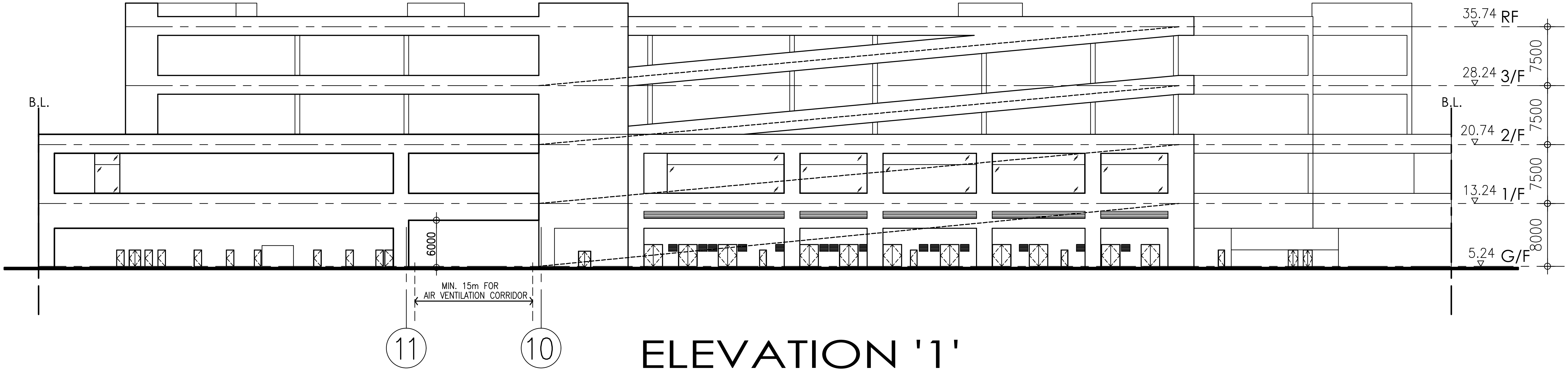


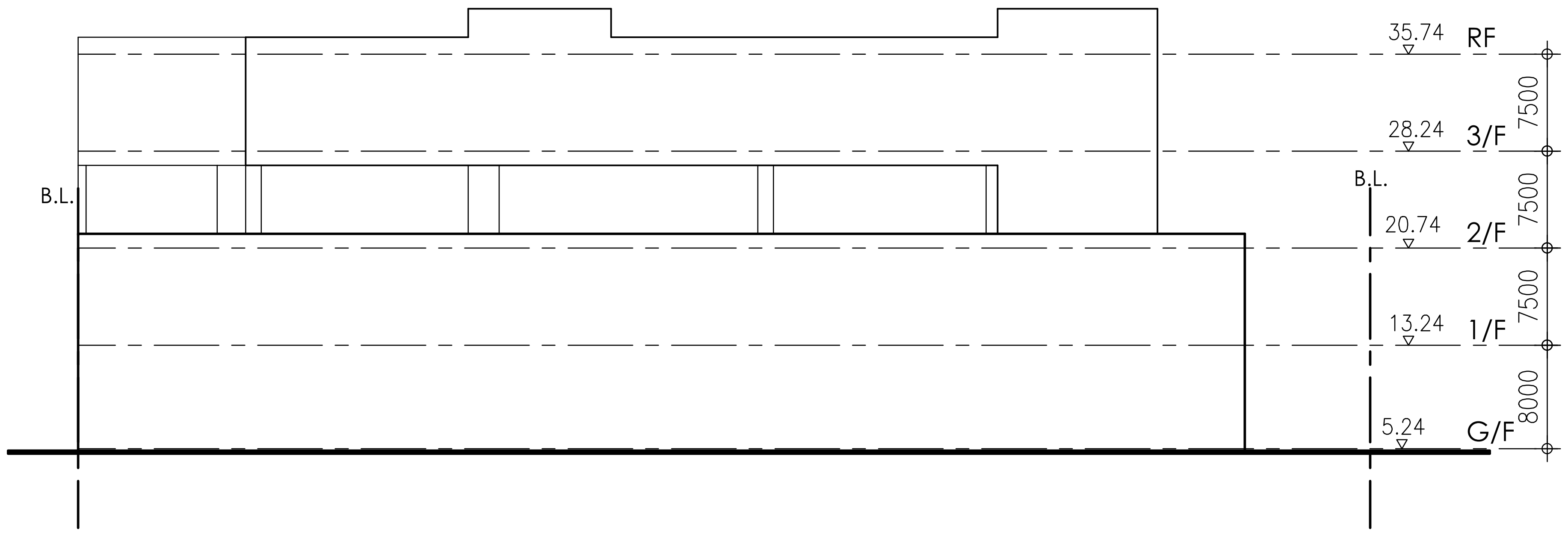
ELEVATION '2'



ELEVATION '1'

Dwg No. A-06

JULY 2022 (1)



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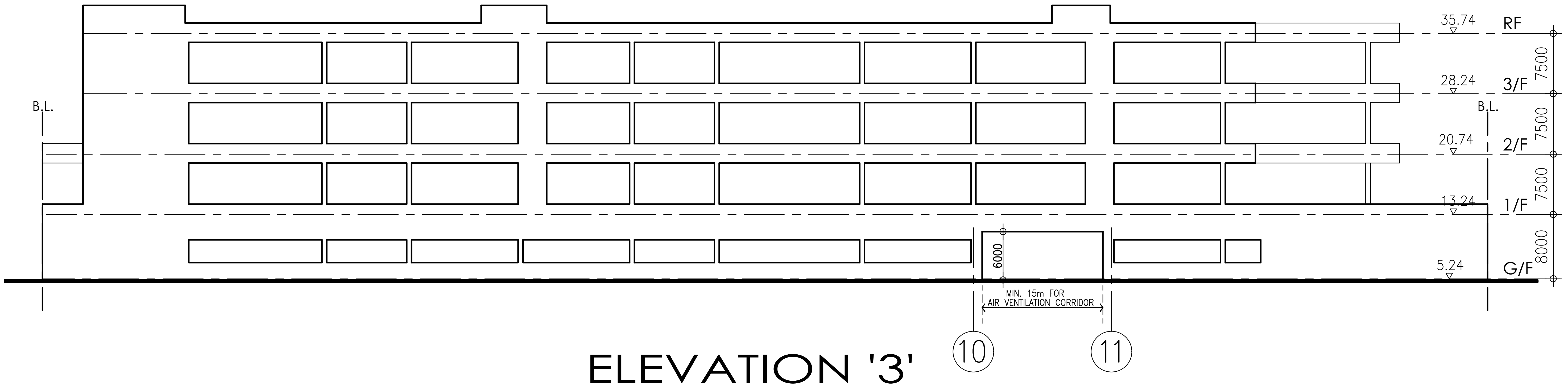

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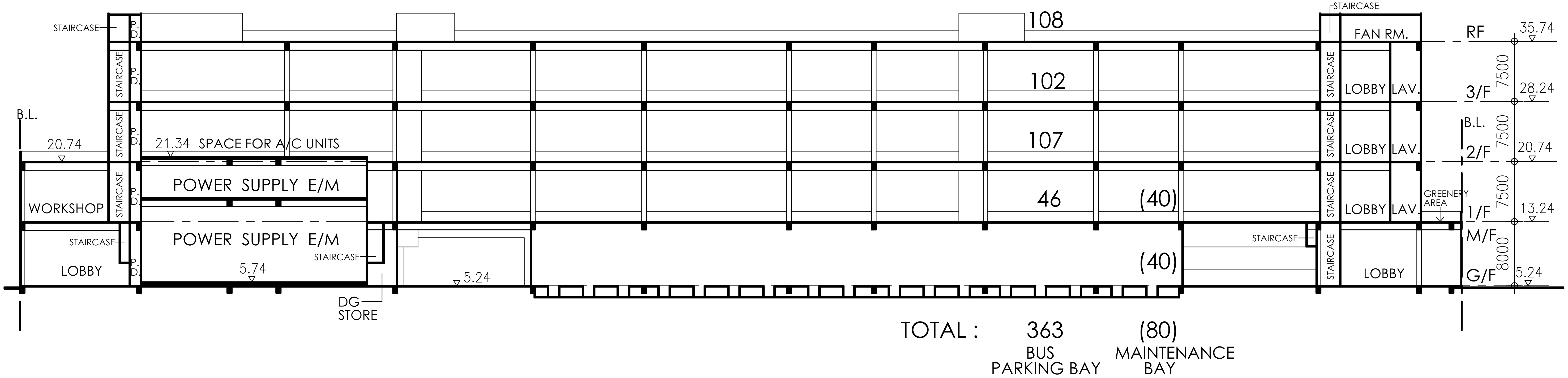
Dwg No. A-07

JULY 2022 (1)

4 STOREYS



SECTION 'A' - 'A'

Dwg No. A-08

JULY 2022 (1)

SITE COVERAGE AND PLOT RATIO CALCULATION :

SITE AREA : 14600 s.m.
CLASS OF SITE : ' B '

ACTUAL SITE COVERAGE

SITE COVERAGE (ABOVE 15m) : 11315 s.m. / 14600s.m. x 100% = 77.50 %
SITE COVERAGE (UNDER 15m) : 13918 s.m. / 14600s.m. x 100% = 95.33 %

ACTUAL GROSS FLOOR AREA

GROUND FLOOR : 13918 s.m. + 653 s.m. = 14571 s.m.
1st FLOOR : 13688 s.m. + 475 s.m. = 14163 s.m.
2nd FLOOR : 11315 s.m. + 502 s.m. = 11817 s.m.
3rd FLOOR : 11315 s.m. + 502 s.m. = 11817 s.m.

TOTAL = 52368 s.m. (PLOT RATIO = 3.59)

Sec 16 Planning Application for Minor Relaxation of Building Height (fm 2 storey to 4 storey)
For Proposed Smart Green Bus Depot at
Government Land at the junction of Dai Fuk Street & Dai Wah Street, Tai Po.

A. *Air Quality Impact Assessment*

No significant fugitive dust impact is anticipated during construction phase with implementation of relevant mitigation measures recommended in the Air Pollution Control (Construction Dust) Regulation.
Two chimneys are identified within 200m of the Application Site. No air sensitive use will be presented at Application Site. All sensitive use (if any) will not rely on natural ventilation from openable windows, but instead MVAC for ventilation. With careful planning, fresh air intake location for sensitive uses (if any) will be located away from the buffer zones for nearby road and chimneys. With the implementation of the mitigation measures above, no adverse air quality impact on the Proposed Development is anticipated during operation phase.
Electric buses (eBus) will be parked at the Proposed Development, which is of zero emission with no toxic gases and particulates generated. Since eBus do not require the use of diesel, no tailpipe emission will be generated, and therefore no adverse air quality impact from the Proposed Development to the surrounding ASRs is anticipated.

B. *Air Ventilation Assessment (AVA)*

An AVA-Expert Evaluation was conducted to provide qualitative evaluation of wind performance of the proposed project under the Baseline Scheme and Proposed Scheme. The Proposed Scheme increased from 20.74mPD to 35.74mPD, which will induce adverse air ventilation impact to downwind areas. Various mitigation measures including i/min 15m-wide permeable design at G/F; ii/ Maximum 10m setback for greenery from the Dai Fuk Street; and iii/ Vast opening at the building façade are adopted the Proposed Scheme, hence, the adverse air ventilation impacts are minimized. Therefore, the current planning application is considered to be acceptable in air ventilation terms.

C. *Drainage and Sewerage Impact Assessment*

Potential water pollution sources have been identified as sewage from workforce and wastewater from bus cleaning machine. There are no public sewer pipes at the vicinity, an on-site Sewage Treatment Plant (STP) is therefore re-provided to treat the effluent from daily operation. The treated effluent will be collected on site and then diverted to the public stormwater drainage system. The effluent standards and requirements stipulated in the WPCO-TM will be complied, therefore no potential sewerage and drainage impact is anticipated.

Sec 16 Planning Application for Minor Relaxation of Building Height (fm 2 storey to 4 storey)
For Proposed Smart Green Bus Depot at
Government Land at the junction of Dai Fuk Street & Dai Wah Street, Tai Po.

D. Site Appraisal Report

In view of the entire Application Site is concrete paved with good condition. No noticeable cracks are observed during the site visit. The four underground oil tanks are considered as source of land contamination. Based on the current design and tentative construction method, the oil tanks will be left and large excavation within the Application Site is not expected. No pathway between the potential contaminant and the receptors is expected during the construction, thus site investigation and soil sampling are not necessary at this stage. Further site investigation will be conducted to identify all land contamination activities within the Application Site at the end of the STT.

E. Landscape Design Proposal and Landscape and Visual Impact Assessment

The indicative Landscape Master Plan (LMP) is provided to illustrate the proposal landscape design concept of the proposed project. The landscape proposal targets to achieve a minimum of 20% of site coverage of greenery for the proposed development by means of on-grade planting , roof planting and vertical greening.

A Visual Impact Assessment (VIA) was conducted for the current planning application to evaluate the degree of visual impacts on visual sensitive receivers (VSRs) from major public viewpoints (VPs). 6 key public VPs have been selected to evaluate the overall visual impact of the proposed project. Given the relatively short height of the proposed 4-storey building, the increase in building height to 30.5m is expected to cause only slight impact to the neighbouring views. Also given that the surroundings of the Application Site are of industrial nature, the resultant overall impact is considered to be negligible to moderately adverse.

In conclusion, the overall landscape and visual impact assessment concludes that the landscape impacts of the proposed development are acceptable.

F. Noise Impact Assessment

The construction noise impact will be short-term and can be reduced to an acceptable level with the implementation of recommended mitigation measures. Hence, construction noise impact from the Proposed Development is not envisaged.

A comparison of the noise levels for the “with project” and “without project” scenarios predicted for year 2040 (i.e. the worst case scenario) indicated that traffic noise contribution from the proposed Project will be insignificant (i.e. less than 1.0 dB(A)). Therefore, operation of proposed Project will have no significant contribution to road traffic noise impact on the nearby NSRs.

For operational fixed plant noise, vehicle repair / testing activities will be carried out under covered area and the MVAC and other fixed noise sources are properly selected with mitigation measures where necessary. The proposed depot will be designed to avoid ventilation louvres and openings facing to the NSRs directly. Quantitative fixed noise assessment was conducted showing that adverse noise impact on the NSRs is not anticipated.

G. *Quantitative Risk Assessment*

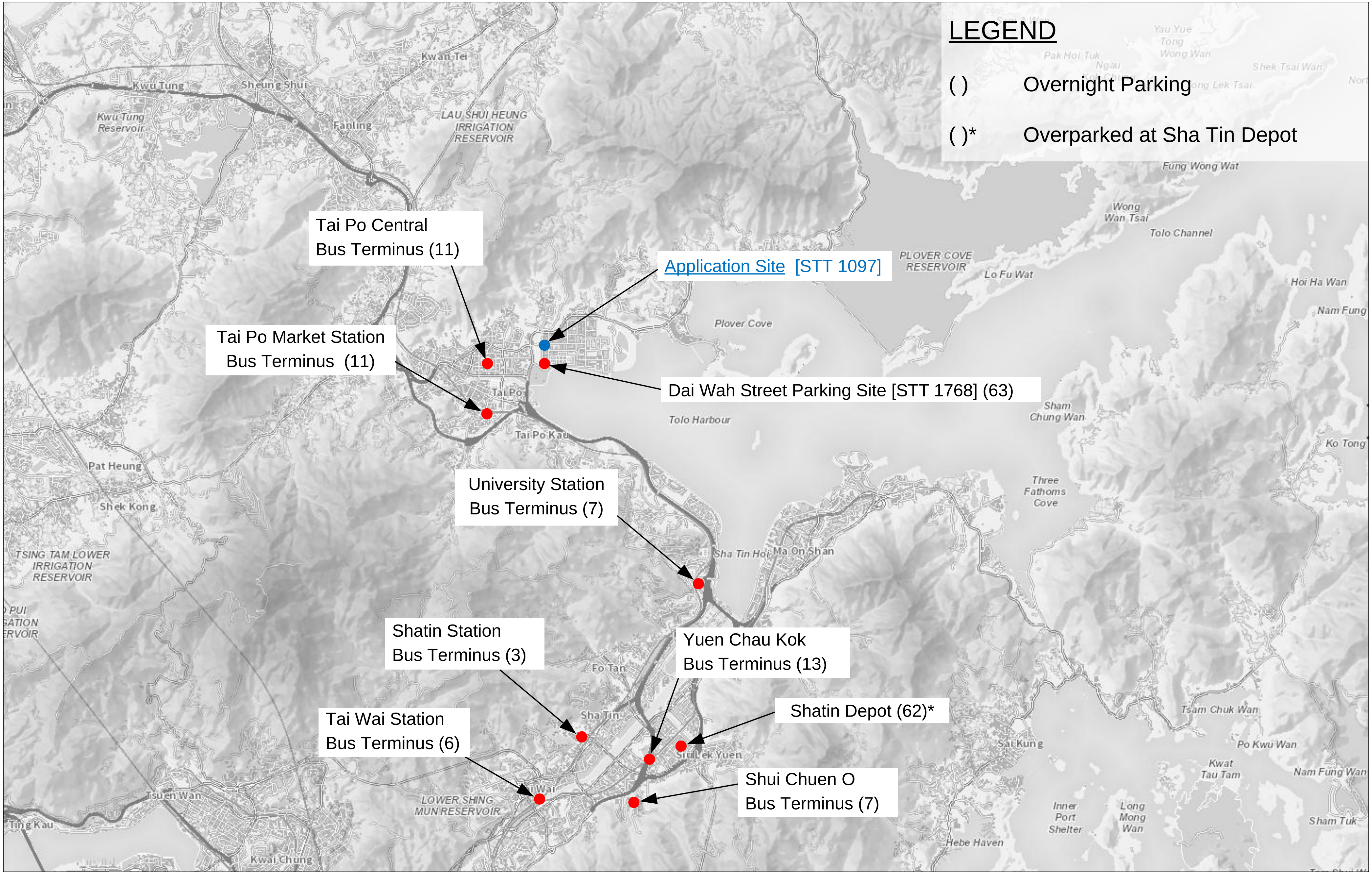
The QRA study shows that the population relating to the construction and operation of the proposed development would have no contribution to the societal risk associated with the Tai Po Gas Production Plant (TPGPP). A number of recommendations have been proposed to minimize any potential impact to the TPGPP, and ensure the emergency response planning of the proposed project.

H. *Traffic Impact Assessment*

The traffic impact assessment demonstrated that he proposed bus depot will not induce significant traffic impact to the surrounding road network and therefore, the proposal is acceptable in traffic viewpoint.

In short, it is concluded that the extent of these environmental impacts would be acceptable with the recommended mitigation measures implemented.

Annex A



<u>Location Plan of Buses Overnight Parking at Tai Po and Shatin District</u>

Issue No. : Issue 4
Issue Date : December 2022
Project No. : 1849

AIR QUALITY IMPACT ASSESSMENT

FOR

KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Prepared by

Allied Environmental Consultants Limited

COMMERCIAL-IN-CONFIDENCE

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Document Verification

Project Title KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po

Project No. 1849

Document Title Air Quality Impact Assessment

Issue No.	**Issue Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**
Issue 1	October 2021	1st Submission	Chris Lo	Joanne Ng	Grace Kwok
Issue 2	March 2022	2nd Submission	Jamie Kam	Cathy Man	Grace Kwok
Issue 3	July 2022	3rd Submission	Cherry Lee	Cathy Man	Grace Kwok
Issue 4	December 2022	4th Submission	Echo Hung	Cathy Man	Grace Kwok

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1. Introduction

1.1.1. Allied Environmental Consultants Limited (AEC) was commissioned by the Kowloon Motor Bus Company (1933) Limited (KMB) to conduct an Air Quality Impact Assessment (AQIA) in support of a Section 16 Planning Application for the Town Planning Application for the Bus Depot of Kowloon Motor Bus Co. (1933) Ltd. (hereafter referred to as the "Proposed Development") at Area 33, Tai Po (hereafter referred to as the "Application Site").

2. Objectives

2.1.1. In support of the Section 16 Planning Application for the Proposed Development, an Air Quality Impact Assessment (AQIA) is conducted to address air quality impact on the air sensitive uses in the Proposed Development and in the vicinity of Application Site, and recommend mitigation measures to minimize the air quality impact where necessary.

3. Description of the Proposed Development

3.1.1. The Application Site at Area 33, Tai Po. The location of the Application Site and its environs is shown in ***Figure 3-1***.

3.1.2. The Application Site is with a site area of 14,600 m^2 is located on the northeastern outskirts of Tai Po Town, bounded by Ting Kok Road to the west, Dai Fuk Street to the south, GIC site to the north and Tai Po Industrial Estate to the east. It served as the proposed depot for electric buses ("eBus") only. eBus will be charged and parked overnight, vehicular maintenance activities and bus washing will also be carried out within the Application Site. Proposed Layout Plan is attached in ***Appendix 3-1***.

4. Environmental Legislation, Standards and Guidelines

4.1. Hong Kong Air Quality Objectives

4.1.1. Air quality in Hong Kong is governed under the Air Pollution Control Ordinance (“APCO”) (Cap. 311) and its subsidiary Regulations. Under this legislation, the Government has designated Air Control Zones (“ACZ”) for the whole territory, along with the new Air Quality Objectives (“AQOs”) which took effect on 1 January 2022. The AQOs stipulate the statutory limits for 7 pollutants and dictate the maximum number of allowable exceedances over specified time periods. For details, please refer to ***Table 4-1*** below.

Table 4-1 Hong Kong Air Quality Objectives (AQOs)

Pollutant	Averaging Time	Concentration Limit (ug/m^3)[1]	Number of Exceedances to be allowed
Sulphur Dioxide (SO_2)	10-minute	500	3
	24-hour	50	3
RSP or PM_{10}[2]	24-hour	100	9
	Annual	50	N/A
FSP or $PM_{2.5}$[3]	24-hour	50	35
	Annual	25	N/A
Nitrogen Dioxide (NO_2)	1-hour	200	18
	Annual	40	N/A
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	N/A

Note:

[1] 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.

[2] Respirable suspended particulates means suspended particles in air with a nominal aerodynamic diameter of 10 µm or less.

[3] Fine suspended particulates means suspended particles in air with a nominal aerodynamic diameter of 2.5 µm or less.

4.2. Hong Kong Planning Standards and Guidelines

4.2.1. General design guidelines are stated in the Hong Kong Planning Standards and Guidelines ("HKPSG") as indicated in ***Table 4-2***.

Table 4-2 Guidelines on Usage of Open Space Site under HKPSG

Polluting Uses	Parameters	Buffer Distance	Permitted Uses
Road and Highways	*Type of Road*		
	Trunk Road and Primary Distributor	>20m	Active and passive recreation uses
		3 - 20m	Passive recreational uses
		<3m	Amenity areas
	District Distributor	>10m	Active and passive recreational uses
		<10m	Passive recreational uses
	Local Distributor	>5m	Active and passive recreational uses
	Under Flyovers	<5m	Passive recreational uses
Industrial areas	*Difference in Height between Industrial Chimney Exit and the Site*		
	＜20m	>200m	Active and passive recreational uses
		5 - 200m	Passive recreational uses
	20 - 30m	>100m	Active and passive recreational uses
		5 - 100m	Passive recreational uses
	30m - 40m	>50m	Active and passive recreational uses
		5 - 50m	Passive recreational uses
	>40m	>10m	Active and passive recreational uses
Construction and earth moving activities	-	<50m	Passive recreational uses
		>50m	Active and passive recreational uses

4.3. Background Air Quality

4.3.1. Tai Po air quality monitoring station (AQMS) is the nearest monitoring station of the Environmental Protection Depart (EPD) to the Project Site. Air pollutants measured at Tai Po AQMS for the latest five years (2016-2020) are summarized in ***Table 4-3***. Fugitive dust (RSP and FSP) are the major air pollutants that would be generated during construction phase. It is expected no air pollutant would be generated during operation of the Project. As shown in ***Table 4-3***, concentrations of all concerned pollutants including SO_2, NO_2, RSP and FSP in the past five-year were below the respective AQOs.

Table 0-3 Air Pollutants at EPD's Tai Po Air Quality Monitoring Station (2016-2020)

Pollutant	Averaging Period	AQOs Concentration Limit ($\mu g/m^3$)[1]	Concentration Limit ($\mu g/m^3$)[2]				
			2016	2017	2018	2019	2020
Sulphur Dioxide (SO_2)	10-minute – 4th highest	500	37	39	24	20	19
	24-hour – 4th highest	50	10	9	8	10	7
RSP or PM_{10}	24-hour – 10th highest	100	74	82	69	65	58
	Annual	50	29	32	31	31	24
FSP or $PM_{2.5}$	24-hour – 36th highest	50	37	39	33	35	28
	Annual	25	20	22	19	20	15
Nitrogen Dioxide (NO_2)	1-hour – 19th highest	200	112	127	125	142	106
	Annual	40	33	39	36	36	30
Ozone	8 hour – 10th highest	160	147	181	167	197	165

Note:

[1] Refer to the set of AQOs that updated with effect on 1 January 2022.

[2] Underlined values represent exceedances of the AQOs.

4.3.2. Future background concentrations were extracted from PATH v2.1 (Pollutants in the Atmosphere and their Transport over Hong Kong), which is a regional air quality model has been developed by EPD to simulate air quality over Hong Kong against Peral River Delta region. Project Site falls with Grid (40, 48) and (41,48).

4.3.3. The PATHv2.1 data at (40,48) and (41,48) in Year 2025 represents background air quality concentrations at the Project Site area. A summary of background concentration in Year 2025 is show in ***Table 4-4*** below.

Table 0-4 Future Background Concentration of Pollutants (Year 2025)

Pollutant	Averaging Period	AQOs Concentration Limit (μg/m³)[1]	Background (40,48_L1)[2]	Background (41,48_L1) [2]
Sulphur Dioxide (SO_2)	10-minute – 4th highest	500	66.4	65.8
	24-hour – 4th highest	50	10.0	9.9
RSP or PM_{10}	24-hour – 10th highest	100	64.7	63.0
	Annual	50	27.1	26.6
FSP or $PM_{2.5}$	24-hour – 36th highest	50	23.3	22.7
	Annual	25	15.1	14.8
Nitrogen Dioxide (NO_2)	1-hour – 19th highest	200	86.8	75.6
	Annual	40	15.6	13.5
Ozone (O_3)	8-hour – 10th highest	160	197.2	195.3
Carbon Monoxide (CO)	1-hour – 1st highest	30,000	845.8	820.9
	8-hour – 1st highest	10,000	768.8	754.0

Note:

[1] Refer to the set of AQOs that updated with effect on 1 January 2022.

[2] Underlined values represent exceedances of the AQOs.

4.3.4. As shown in ***Table 4-4***, the PATH background demonstrates that the concentrations of pollutants are well below the AQO as mentioned in S4.1.1, except for ozone. There is a great buffer from the AQO for most of the pollutants other than ozone.

4.3.5. Ozone is formed from dioxygen by the action of ultraviolet light and also atmospheric electrical discharges. Neither industrial emissions nor vehicular emissions nor portal emissions would be its primary source. Ozone is therefore not considered as a key parameter in this assessment.

5. Identification of Air Sensitive Receivers

5.1.1. According to Annex 12 of Guidelines of Air Quality Assessment of the Environmental Impact Assessment Ordinance Technical Memorandum ("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 shall be considered to be a sensitive receiver". In addition, "Any other premises or place with which, in terms of duration or number of people affected, has a similar sensitivity to the air pollutants as the aforementioned premises and places shall also be considered to be a sensitive receiver".

5.1.2. The ASRs within 500m assessment area of the Application Site is detailed in below ***Table 5-1***. The corresponding locations of the ASRs are shown in ***Figure 5-1*****.**

Table 5-1 Identified ASRs within 500m area of the Application Site

ASR ID	Location / Development	Land Use	Shortest Distance to the Application Site (m)	Height (mPD)
ASR 1	Alice Ho Miu Ling Nethersole Hospital	GIC	264	44.7
ASR 2	Yee Nga Court Yee Lai House	R	388	107.0
ASR 3	Tai Po Waterfront Park	REC	482	~16.0
ASR 4	Fu Shin Estate Shing King House	R	218	102.0
ASR 5	Kau Yan College and adjacent schools	E	147	33.4 to 37.9
ASR 6	Riviera Lodge	R	133	108.5
ASR 7	Yue Kok Village	R	69	~35.0
ASR 8	63 Ting Kok Road	R	194	~15.0
ASR 9	CIC Tai Po Training Ground	E	164	~15.0
ASR 10	Lee Kum Kee	OU	147	22.9
ASR 11	Fung Yuen Playground	REC	175	~5.0
ASR 12	Hopewell Slipform Engineering	OU	130	~12.0
ASR13	Tai Po Community Green Station	GIC	90	~15.0
ASR14	MTRC Tai Po Bus Maintenance Centre	Road	60	~26.0

Notes:
R- Residential; E: Educational; GIC: Government, Institution or Community; Rec: Recreational; OU: Other Specified Use

6. Potential Air Quality Impact in Construction Phase

6.1.1. In the construction phase, various activities of the Proposed Development would generate fugitive dust which may have potential impacts on the surrounding ASRs. The following activities in the construction phase would have potential impact to the surrounding ASRs:

- Foundation;
- Temporary storage of materials; and
- Handling and transportation of materials.

6.1.2. It is anticipated no extensive site formation is expected for the Proposed Development. Moreover, in view of the current construction method, excavation is not expected at Application Site. In view of this, dust emission from the Proposed Development is anticipated to be localised and limited.

6.1.3. Although the abovementioned activities would generate fugitive dust during the construction phase, the surrounding ASRs would not be subject to the adverse dust impact when the following mitigation measures under the Regulations are implemented to this Project.

6.1.4. Under the Air Pollution Control (Construction Dust) Regulation and good site practices, the Contractors are required to inform EPD and adopt proper dust suppression measures while carrying out “Notifiable Works” and “Regulatory Works” to meet the requirements stipulated in the Regulation. The major control measures relevant to this Project are listed below. Based on the control measures listed below, significant dust generated from the construction of the planned developments is not anticipated. Hence, adverse dust impact during the construction phase of the proposed residential development would not be anticipated.

6.1.5. Control Measures:

- Skip hoist for material transport should be totally enclosed by impervious sheeting.
- All dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet.
- All stockpiles of aggregate or spoil should be covered and/or water applied.
- The height from which excavated materials are dropped should be controlled to a minimum practical height to limit fugitive dust generation from unloading.
- Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites.
- The load of dusty materials carried by a vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure dust materials do not leak from the vehicle.
- Provision of hoarding of not less than 2.4m high form ground level along the length of the site boundary except for the site entrance of exit.
- Exposed earth shall be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable surface stabilizer within 6 months after the last construction activity on the

construction site or part of the construction site where the exposed earth lies.

- The working area of any excavation or earth moving operation shall be sprayed with water or a dust suppression chemical immediately before, during and immediately after the operation so as to maintain the entire surface wet.

6.1.6. With reference to DEVB's TC no. 13/2020 (Timely Application of Temporary Electricity and Water Supply for Public Works Contracts and Wider Use of Electric Vehicles in Public Works Contracts), timely provision of electricity and the increase in use of electric vehicles will also considered, and utilised as far as practicable to further reduce the need for fuel-using construction-related machines for the Proposed Development.

6.1.7. With the implementation of good site practices and sufficient dust suppression measures as stipulated under the Air Pollution Control (Construction Dust) Regulation, significant dust generated from the construction of the Proposed Development is not anticipated. Hence, adverse dust impact during the construction phase would not be anticipated.

6.1.8. Construction-related machines employed in the Application Site will follow the requirements as stipulated in the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation to control potential emissions from non-road mobile machinery. Therefore, gaseous emission from construction equipment would be minor and would not cause any adverse air quality impact.

7. Potential Air Quality Impact in Operation Phase

7.1.1. Study area for AQIA has been identified by a distance of 500m from the boundary of the Application Site. ***Figure 3-1*** illustrates the extent of the study area. Key air pollution sources identified in the vicinity of the Application Site are as follows:

- Vehicular Emissions from Open Road Traffic;
- Industrial Emissions from Chimneys; and
- Vehicular Emissions from within the Application Site.

7.2. Vehicular Emissions from Open Road Traffic

7.2.1. The Application Site is surrounded by Dai Wah Street to the east, Dai Fuk Street to the south, and Ting Kok Road to the west and north. According to the Annual Traffic Census 2020 published by Transport Department (TD), Ting Kok Road (from Nam Wan Road to Dai Kwai Street) is classified as Primary Distributor ("PD"). As confirmed by TD in ***Appendix 7-1***, Dai Fuk Street is classified as District Distributor ("DD") and Dai Wah Street is classified as Local Distributor ("LD").

7.2.2. With reference to the HKPSG, recommended minimum buffer distance from the nearby roads to minimise potential adverse air quality impact due to open-road vehicular emissions have been adopted as summarised in ***Table 7-1***.

Table 7-1 Buffer distance from the Adjacent Road

Road Name	Road Type	HKPSG Guideline Buffer Distance Requirement
Ting Kok Road	Primary Distributor	20m
Dai Fuk Street	District Distributor	10m
Dai Wah Street	Local Distributor	5m

7.2.3. Buffer zone for open road traffic emission is presented in ***Figure 7-1.*** Area suitable for air sensitive use / fresh air intake / openable window outside the buffer zone is shown in ***Figure 7-3***. According to the current design, no air sensitive use will be presented at Application Site. All sensitive use (if any) will not rely on natural ventilation from openable windows, but instead MVAC for ventilation. With careful planning, fresh air intake location for sensitive uses (if any) will be located away from the buffer zones. With the implementation of the mitigation measures above, no adverse air quality impact on the Proposed Development is anticipated during operation phase.

7.3. Industrial Emissions from Chimneys

7.3.1. Review of Specified Process license register was conducted on 2 February 2021. It is noted no records of industrial chimney with specified process licence located within 200m radius of the Application Site was identified.

7.3.2. Further study of EIA report in the vicinity of the Application Site was conducted (i.e. Sheun Wan Golf Course [AEIAR-221/2019]). 2 nos. of chimneys are identified at 2 sources, from Lee Kum Kee and Techno Enterprises. The locations of chimneys are given in ***Figure 7-2***.

7.3.3. With reference to the HKPSG, recommended minimum buffer distance from the nearby industrial emission sources to minimise potential adverse air quality impact due to industrial emissions have been adopted as summarised in ***Table 7-2***.

Table 7-2 Buffer distance from the Industrial Emissions

Industrial Emission Sources	No. of Chimneys	Height of Chimneys (mAG)	Ground Level (mPD)	Height Difference between Chimney and Proposed Development [1], [2], [3]	HKPSG Guideline Buffer Distance Requirement
Lee Kum Kee (LECH01)	1	30	5.1	<20m	>200m
Techno Enterprises (TECH01)	1	10	5.6	<20m	>200m

Notes:

[1] With reference to HKPSG chapter 9, the height difference is between the chimney exit level and the highest level of the Proposed Development. All levels are expressed in mPD.

[2] For height difference less than 20m, the height difference shall be expressed as "<20m".

[3] Advised by Applicant, the preliminary height of the Proposed Development is 30.5mAG, ground level of Proposed Development is approximately 5.3mPD.

7.3.4. Buffer zone for industrial emission from chimneys is presented in ***Figure 7-2.*** As shown in ***Figure 7-3a to Figure7-3e***, a number of greenery areas along the east and south site boundary which will be used for transient use (i.e. walkway), would be situated within the 200m buffer zone of industrial emissions. Area suitable for air sensitive use / fresh air intake / openable window outside the buffer zone is shown in ***Figure 7-3***. According to the current design, no air sensitive use will be presented at Application Site. All sensitive use (if any) will not rely on natural ventilation from openable windows, but instead MVAC for ventilation. With careful planning, fresh air intake location for sensitive uses (if any) will be located away from the buffer zones. With the implementation of the mitigation measures above, no adverse air quality impact on the Proposed Development is anticipated during operation phase.

7.4. Vehicular Emissions from Application Site

7.4.1. With reference to the nature of the Proposed Development (i.e. bus depot), vehicle travelling within the Application Site, and vehicles idling during maintenance, washing within the Application Site are identified as the main potential sources of vehicle emission from within the Proposed Development.

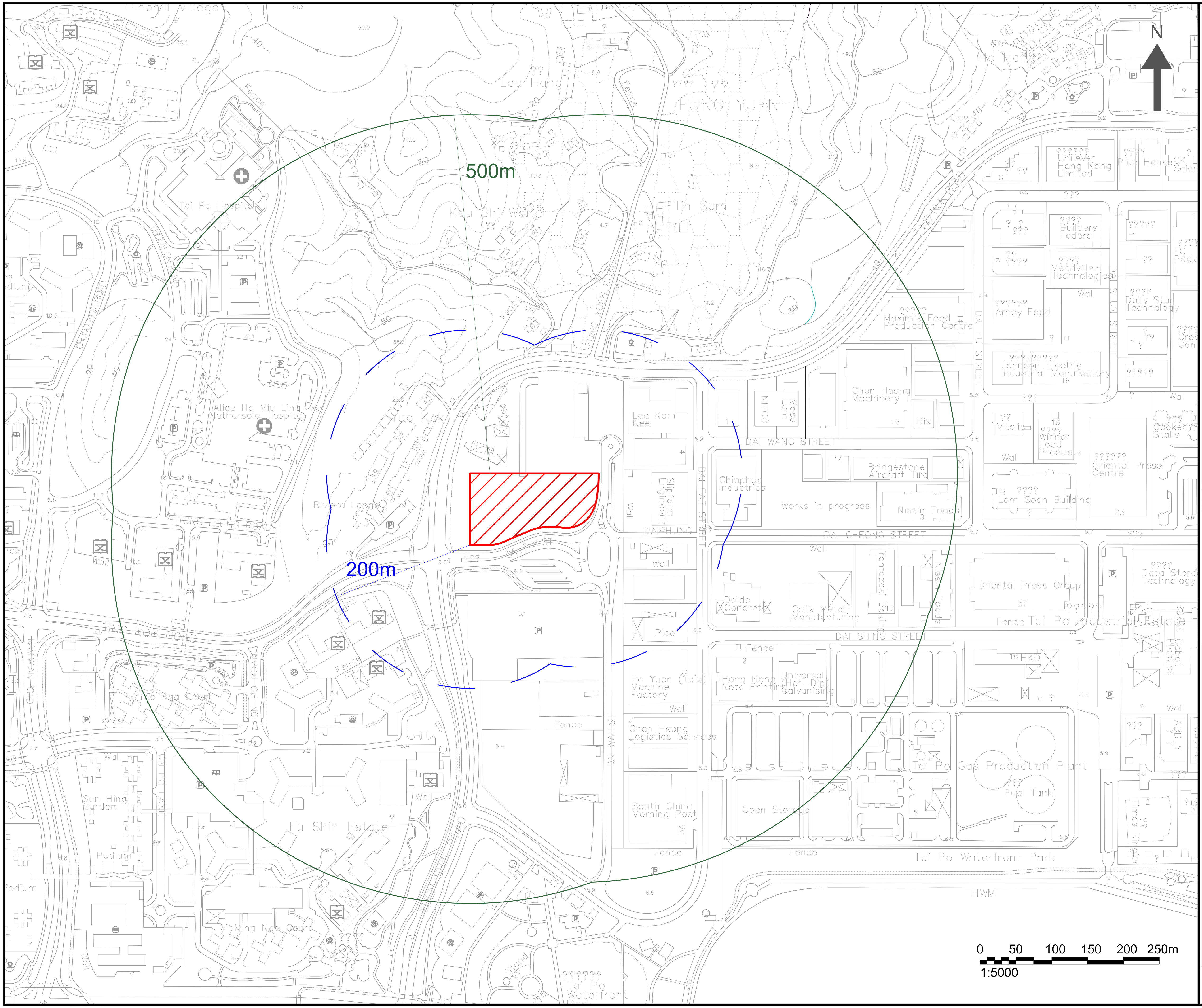
7.4.2. As advised by the Applicant, electric buses (eBus) will be parked at the Proposed Development. eBus is of zero emission with no toxic gases and particulates generated. No engine and gearbox are required in an eBus. eBus is of simple design with mainly High Voltage (HV) battery, electronic management system and drive motors. The battery, motors and associated electronics require replacement in daily operation only with rare onsite repair. Changing of engine oil and conduction of engine and gearbox overhaul as at conventional diesel bus depot are not required. The eBus Depot will be clean, with zero emission and quiet. As such, the proposed depot is considered environmentally superior to conventional fuel bus depot. Since eBus do not require the use of diesel, no tailpipe emission will be generated, and therefore no adverse air quality impact from the Proposed Development to the surrounding ASRs is anticipated.

8. Conclusions

8.1.1. Potential users in the Application Site will not rely on natural ventilation from openable windows, but instead central air conditioning and MVAC for ventilation to minimize the effect of vehicular emissions and industrial emissions as promulgated in the HKPSG. Fresh air intake for potential users in the Application Site will be located outside the buffer zones of open road traffic emission and industrial emissions from chimney. No adverse air quality impact is anticipated at the Application Site during operation phase.

8.1.2. As advised by Applicant, electric buses (eBus) will be parked at the Proposed Development. eBus is of zero emission with no toxic gases and particulates generated. Since eBus do not require the use of diesel, no tailpipe emission will be generated, and therefore no adverse air quality impact from the Proposed Development to the surrounding ASRs is anticipated.

Figures



NOTES :

▨ PROJECT SITE

200m BUFFER DISTANCE

500m BUFFER DISTANCE

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

Drawing By : CL

Project :
KMB DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Drawing Title :
PROJECT SITE LOCATION AND ASSESSMENT AREA

Drawing No :	Revision :
FIGURE 3-1	0
Scale :	Date :
AS SHOWN	OCTOBER 2021

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A3 420 x 297

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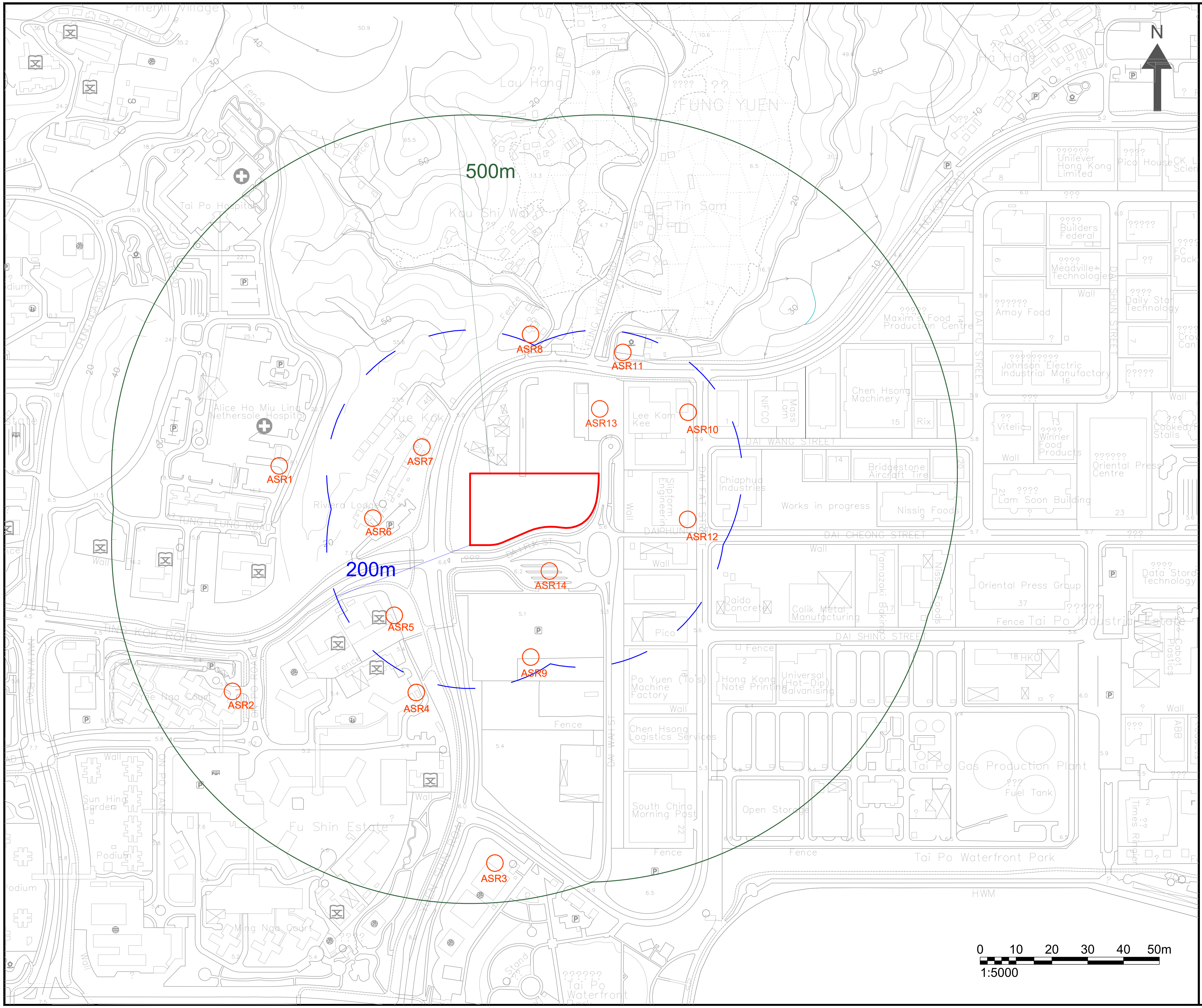


NOTES :

🟥	PROJECT SITE
○	AIR SENSITIVE RECEIVERS
— —	200m BUFFER DISTANCE
——	500m BUFFER DISTANCE

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

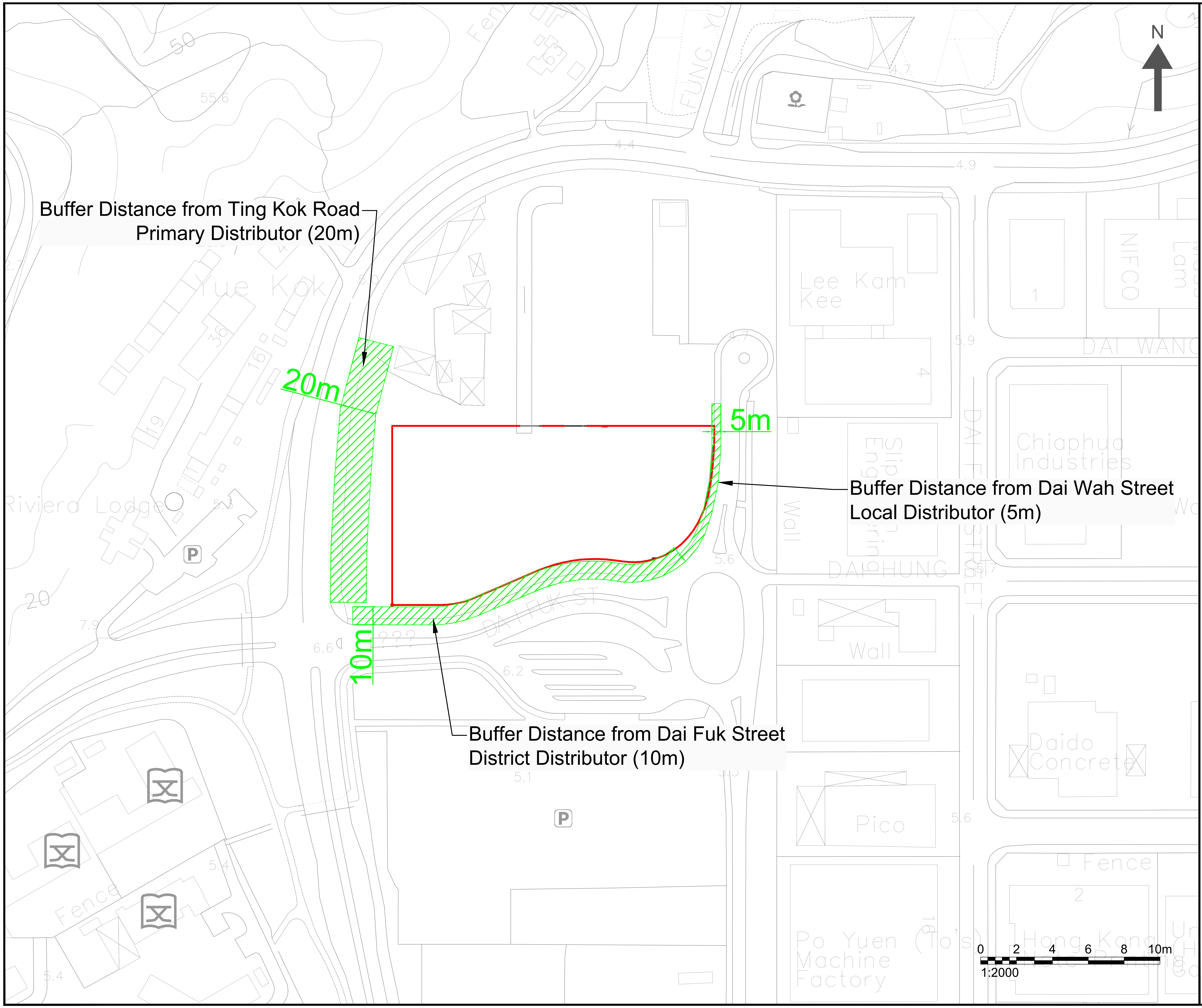
Drawing By : CL

Project :
KMB TAI PO DEPOT

Drawing Title :
LOCATION OF AIR SENSITIVE RECEIVERS

Drawing No :	Revision :
FIGURE 5-1	0
Scale :	Date :
AS SHOWN	JUL 2022

A3 420 x 297



NOTES :

🟥 PROJECT SITE

▨ BUFFER DISTANCE OF ADJACENT ROADS

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

Drawing By : JK

Project :
KMB DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Drawing Title :
BUFFER DISTANCE BETWEEN ADJACENT ROADS AND PROJECT SITE

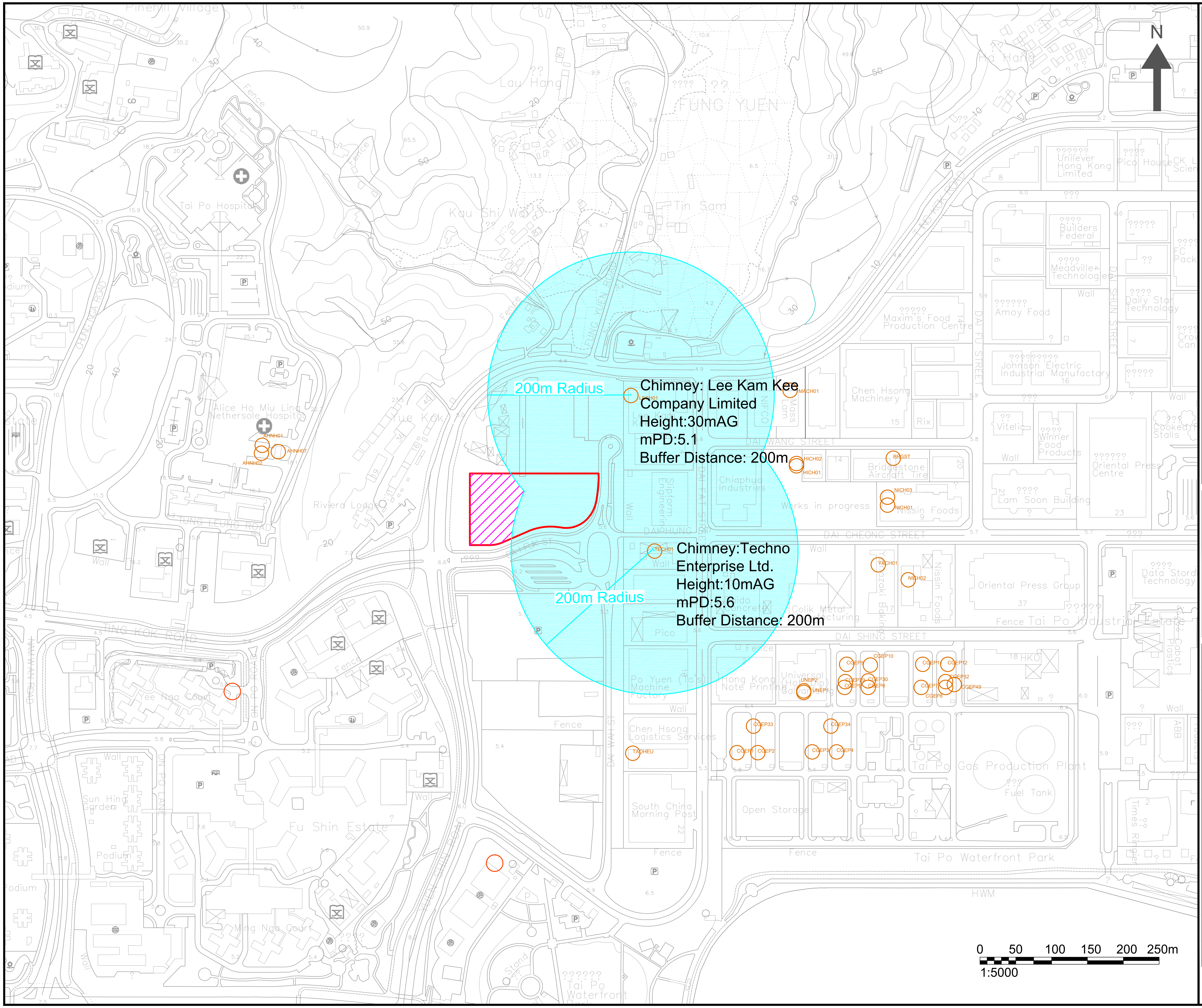
Drawing No : FIGURE 7-1

Revision : 0

Scale : AS SHOWN

Date : MAR 2022

A3 420 x 297



NOTES :

🟥 PROJECT SITE

○ LECH01 CHIMNEY

● BUFFFER DISTANCE OF CHIMNEY

▨ SUGGESTED LOCATION OF FRESH AIR INTAKE

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

Drawing By : CL

Project :
KMB DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Drawing Title :
BUFFER DISTANCE FOR INDUSTRIAL EMISSION FROM CHIMNEY

Drawing No : FIGURE 7-2	Revision : 0
Scale : AS SHOWN	Date : OCTOBER 2021

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A3 420 x 297

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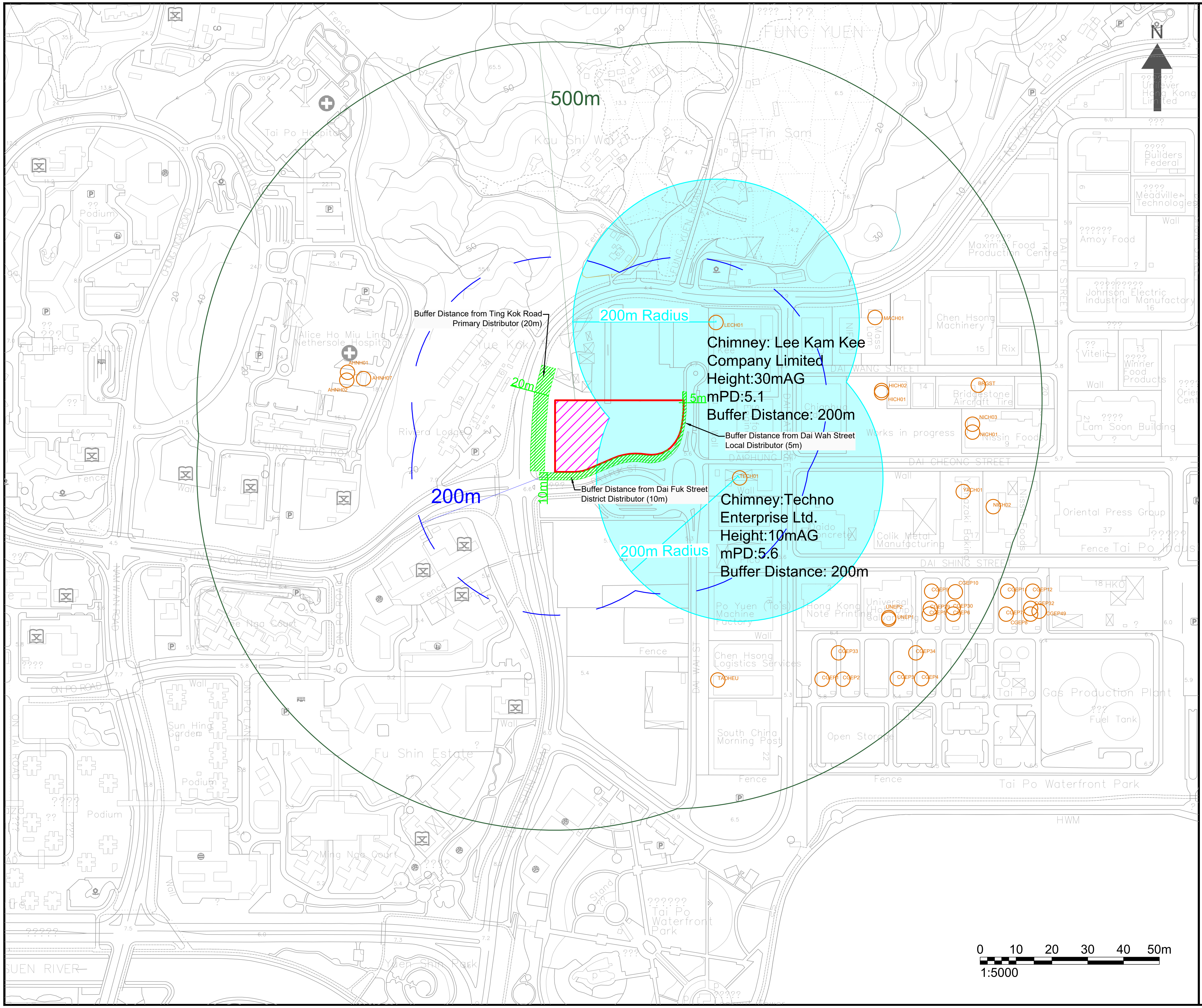


NOTES :

🟥 PROJECT SITE

○ LECH01 CHIMNEY

● BUFFFER DISTANCE OF CHIMNEY

▨ BUFFER DISTANCE OF ADJACENT ROADS

▨ SUGGESTED LOCATION OF FRESH AIR INTAKE

200m BUFFER DISTANCE

500m BUFFER DISTANCE

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

Drawing By : CL

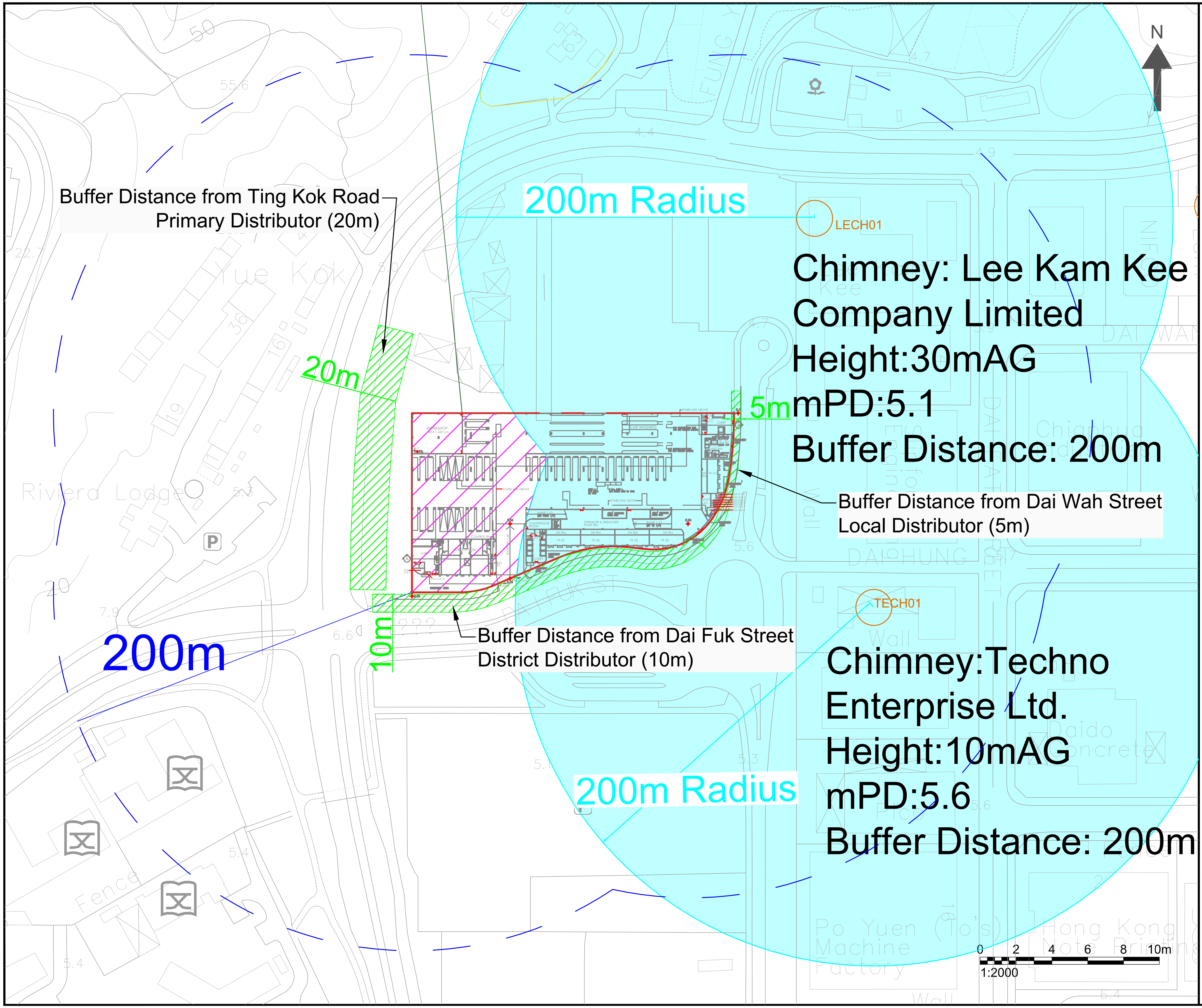
Project :
KMB DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Drawing Title :
BUFFER DISTANCE FOR CHIMNEY AND ROAD AND SUITABLE LOCATION FOR FRESH AIR INTAKE

Drawing No :	Revision :
FIGURE 7-3a	0
Scale :	Date :
AS SHOWN	JUL 2022

A3 420 x 297

P:\1801-1850\1849\05 REPORT\01 AEC REPORT\S16\AQIA\FIGURES\ISSUE 3\1849 FIGURE 7-1 AQIA.DWG



NOTES :

🟥 PROJECT SITE

○ LECH01 CHIMNEY

● BUFFFER DISTANCE OF CHIMNEY

▨ BUFFER DISTANCE OF ADJACENT ROADS

▨ SUGGESTED LOCATION OF FRESH AIR INTAKE

--- 200m BUFFER DISTANCE

— 500m BUFFER DISTANCE

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

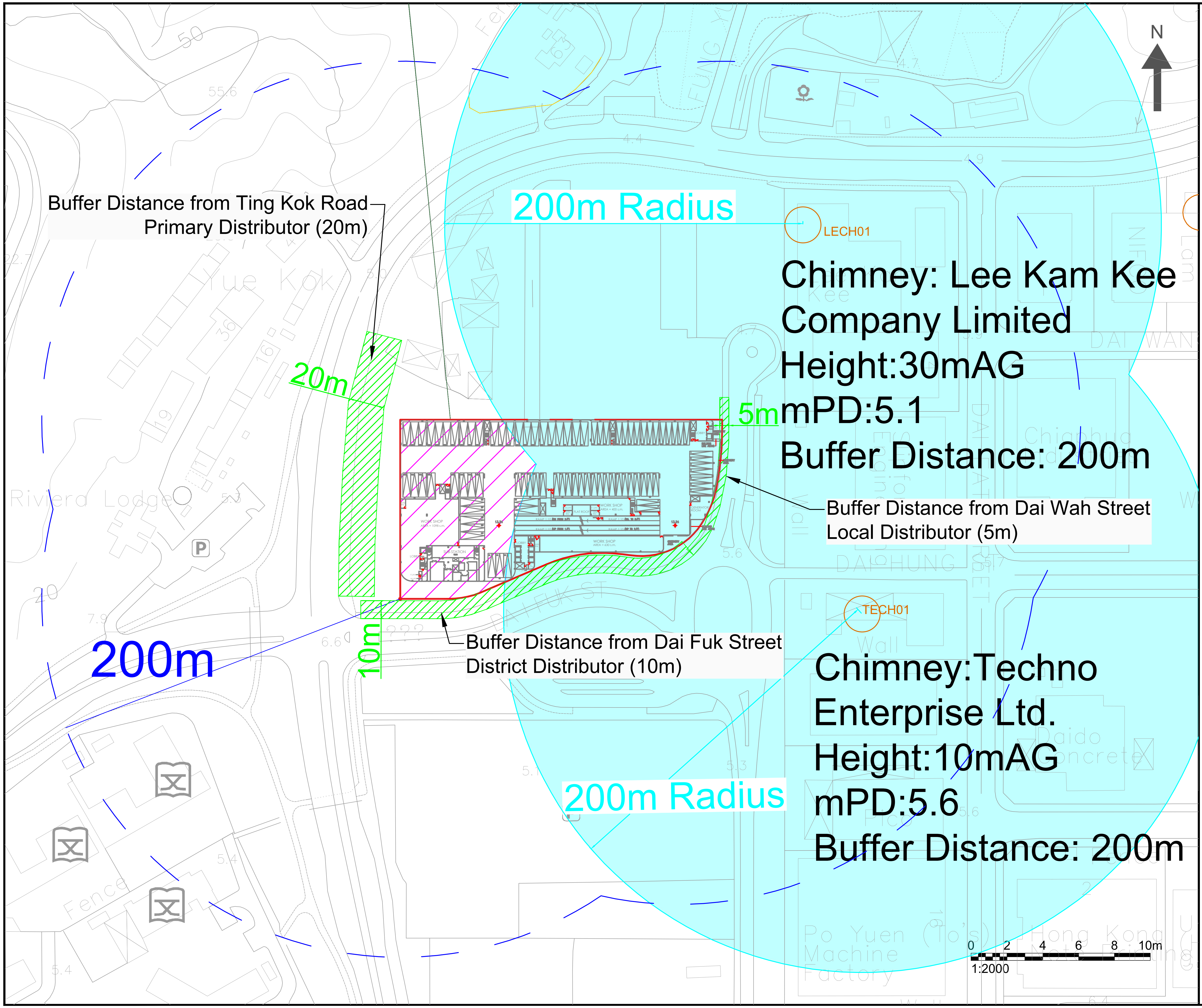
Drawing By : CY

Project :
KMB DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Drawing Title :
BUFFER DISTANCE FOR CHIMNEY AND ROAD AND SUITABLE LOCATION FOR FRESH AIR INTAKE AT G/F

Drawing No :	Revision :
FIGURE 7-3b	0
Scale :	Date :
AS SHOWN	JUL 2022

A3 420 x 297



NOTES :

🟥	PROJECT SITE
○ LECH01	CHIMNEY
●	BUFFFER DISTANCE OF CHIMNEY
▨	BUFFER DISTANCE OF ADJACENT ROADS
▨	SUGGESTED LOCATION OF FRESH AIR INTAKE
┄	200m BUFFER DISTANCE
—	500m BUFFER DISTANCE

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

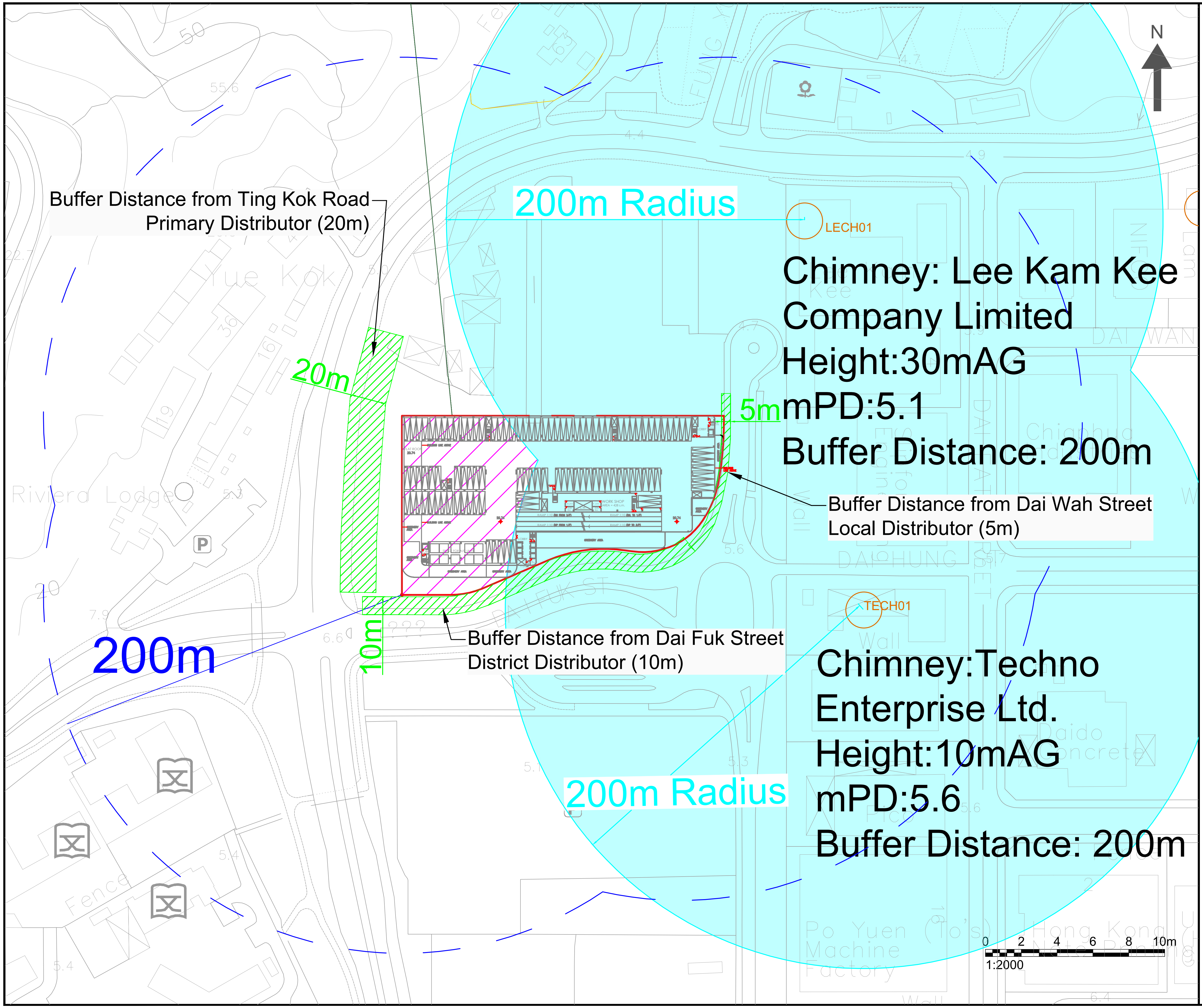
Drawing By : CY

Project :
KMB DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Drawing Title :
BUFFER DISTANCE FOR CHIMNEY AND ROAD AND SUITABLE LOCATION FOR FRESH AIR INTAKE AT 1/F

Drawing No : FIGURE 7-3c	Revision : 0
Scale : AS SHOWN	Date : JUL 2022

A3 420 x 297



NOTES :

🟥	PROJECT SITE
○ LECH01	CHIMNEY
●	BUFFFER DISTANCE OF CHIMNEY
▨	BUFFER DISTANCE OF ADJACENT ROADS
▨	SUGGESTED LOCATION OF FRESH AIR INTAKE
-----	200m BUFFER DISTANCE
———	500m BUFFER DISTANCE

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

Drawing By : CL

Project :
KMB DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Drawing Title :
BUFFER DISTANCE FOR CHIMNEY AND ROAD AND SUITABLE LOCATION FOR FRESH AIR INTAKE AT 2/F

Drawing No :	Revision :
FIGURE 7-3d	0
Scale :	Date :
AS SHOWN	JUL 2022

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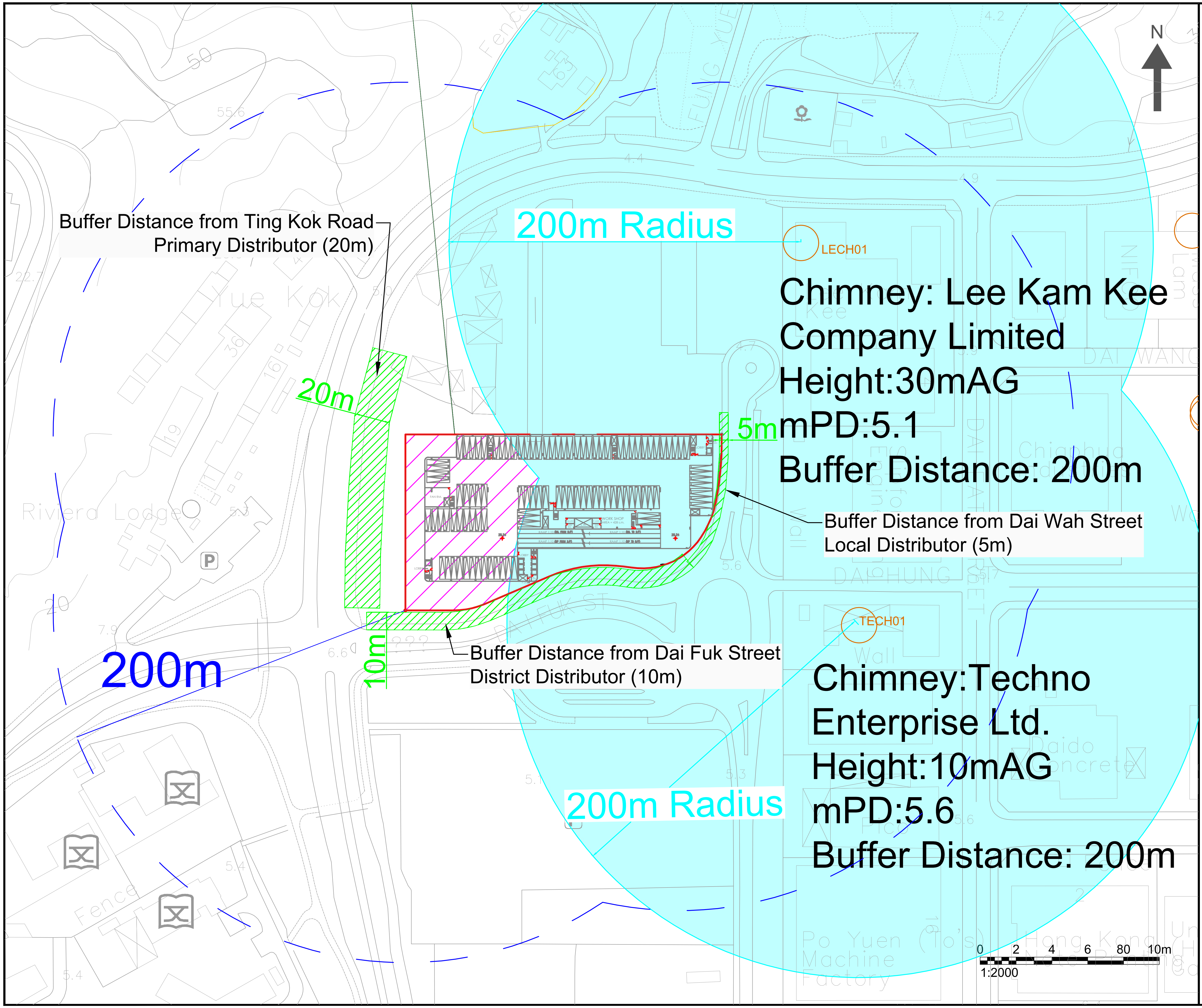
A3 420 x 297

P:\1801-1850\1849\05 REPORT\01 AEC REPORT\S16\AQIA\FIGURES\ISSUE 3\1849 FIGURE 7-1 AQIA.DWG



NOTES :

🟥 PROJECT SITE

○ LECH01 CHIMNEY

● BUFFFER DISTANCE OF CHIMNEY

▨ BUFFER DISTANCE OF ADJACENT ROADS

▨ SUGGESTED LOCATION OF FRESH AIR INTAKE

200m BUFFER DISTANCE

500m BUFFER DISTANCE

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

Drawing By : CL

Project :
KMB DEPOT AT DAI FUK STREET, AREA 33, TAI PO

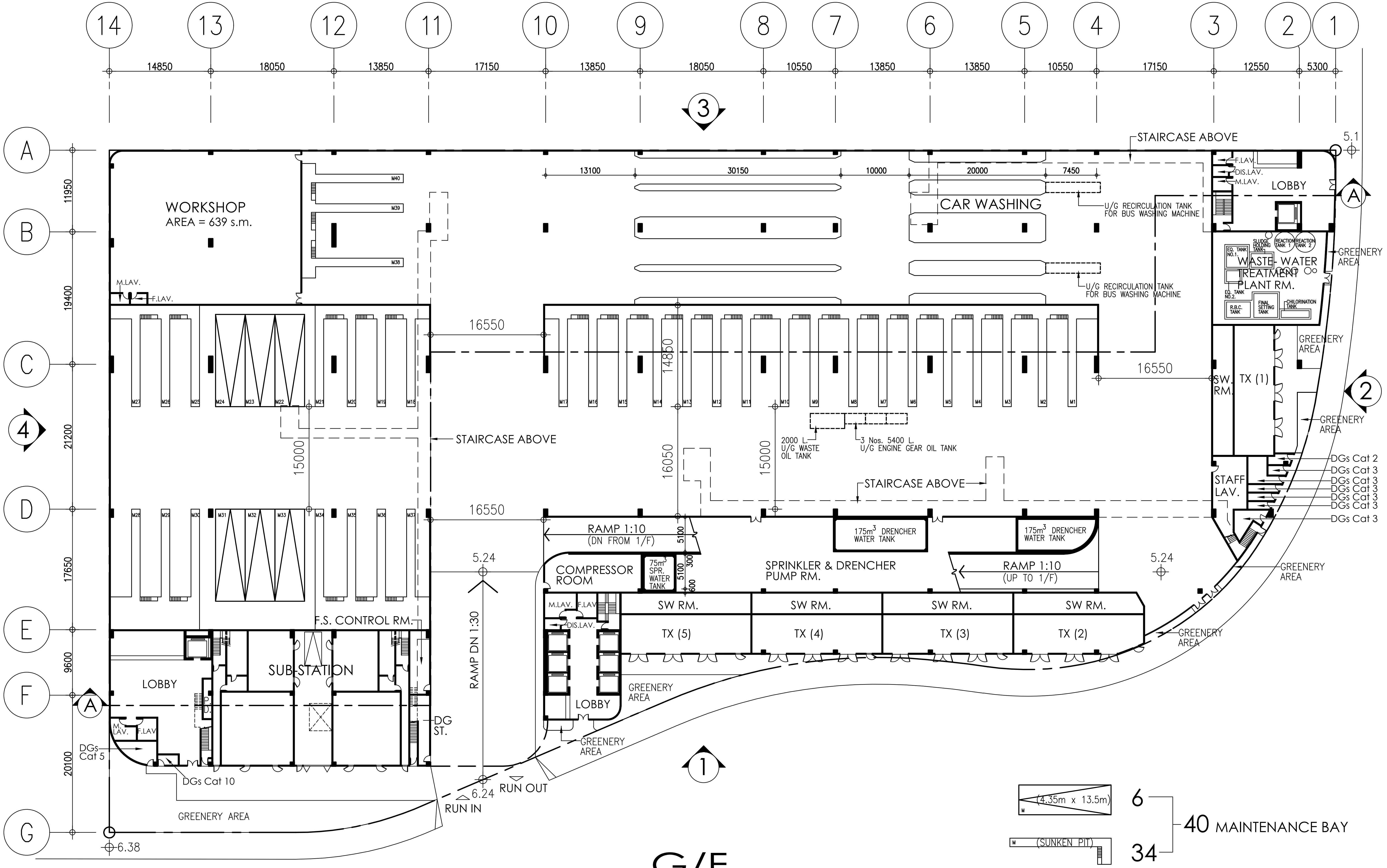
Drawing Title :
BUFFER DISTANCE FOR CHIMNEY AND ROAD AND SUITABLE LOCATION FOR FRESH AIR INTAKE AT 3/F

Drawing No :	Revision :
FIGURE 7-3e	0
Scale :	Date :
AS SHOWN	JUL 2022

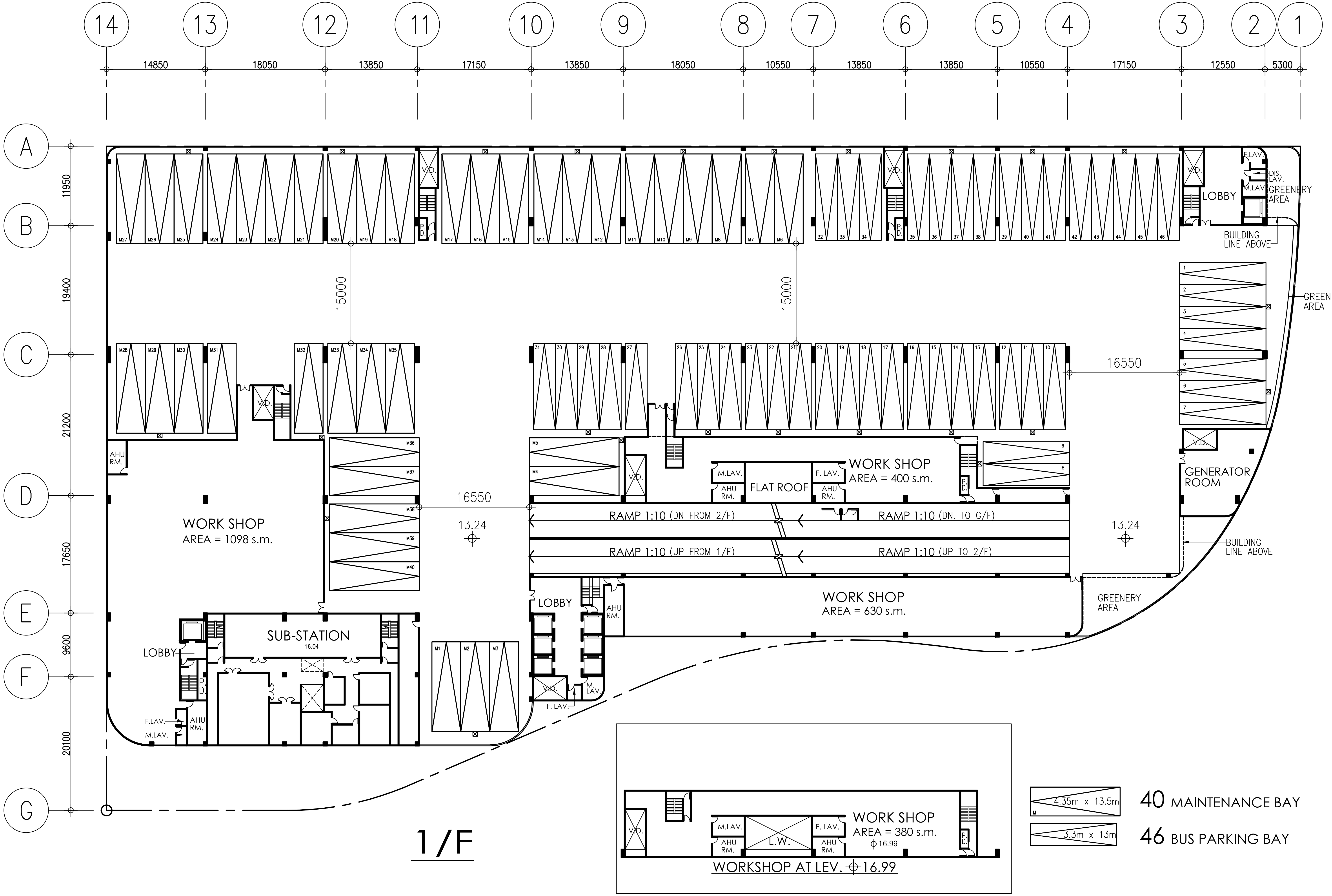
A3 420 x 297

Appendix 3.1

Proposed Layout Plan


14
13
12
11
10
9
8
7
6
5
4
3
2
1
14850
18050
13850
17150
13850
18050
10550
13850
13850
10550
17150
12550
5300
3
STAIRCASE ABOVE
5.1
A
B
C
D
E
F
G
11950
19400
21200
17650
9600
20100
13100
30150
10000
20000
7450
F.LAV.
DIS.LAV.
M.LAV.
LOBBY
WORKSHOP
AREA = 639 s.m.
CAR WASHING
U/G RECIRCULATION TANK FOR BUS WASHING MACHINE
U/G RECIRCULATION TANK FOR BUS WASHING MACHINE
M40
M39
M38
M.LAV.
F.LAV.
EQ. TANK NO.1
SLUDGE HOLDING TANK
REACTION TANK 1
REACTION TANK 2
WASTE WATER TREATMENT PLANT RM.
EQ. TANK NO.2
R.B.C. TANK
FINAL SETTING TANK
CHLORINATION TANK
GREENERY AREA
16550
14850
GREENERY AREA
M27
M26
M25
M24
M23
M22
M21
M20
M19
M18
M17
M16
M15
M14
M13
M12
M11
M10
M9
M8
M7
M6
M5
M4
M3
M2
M1
16550
SW. RM.
TX (1)
2
GREENERY AREA
4
STAIRCASE ABOVE
15000
16050
15000
2000 L. U/G WASTE OIL TANK
3 Nos. 5400 L. U/G ENGINE GEAR OIL TANK
DGs Cat 2
DGs Cat 3
DGs Cat 3
DGs Cat 3
DGs Cat 3
DGs Cat 3
DGs Cat 3
STAFF LAV.
STAIRCASE ABOVE
M28
M29
M30
M31
M32
M33
M34
M35
M36
M37
16550
RAMP 1:10
(DN FROM 1/F)
5100
175m³ DRENCHER WATER TANK
175m³ DRENCHER WATER TANK
5.24
COMPRESSOR ROOM
75m³ SPR. WATER TANK
5100
300
600
SPRINKLER & DRENCHER PUMP RM.
RAMP 1:10
(UP TO 1/F)
5.24
GREENERY AREA
F.S. CONTROL RM.
M.LAV.
F.LAV.
DIS.LAV.
SW RM.
SW RM.
SW RM.
SW RM.
TX (5)
TX (4)
TX (3)
TX (2)
GREENERY AREA
LOBBY
SUB-STATION
RAMP DN 1:30
GREENERY AREA
LOBBY
A
M. LAV.
F.LAV.
P D
DG ST.
GREENERY AREA
DGs Cat 5
DGs Cat 10
6.24
RUN IN
RUN OUT
1
GREENERY AREA
6.38
(4.35m x 13.5m)
M
6
(SUNKEN PIT)
M
34
40 MAINTENANCE BAY

G/F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14850
18050
13850
17150
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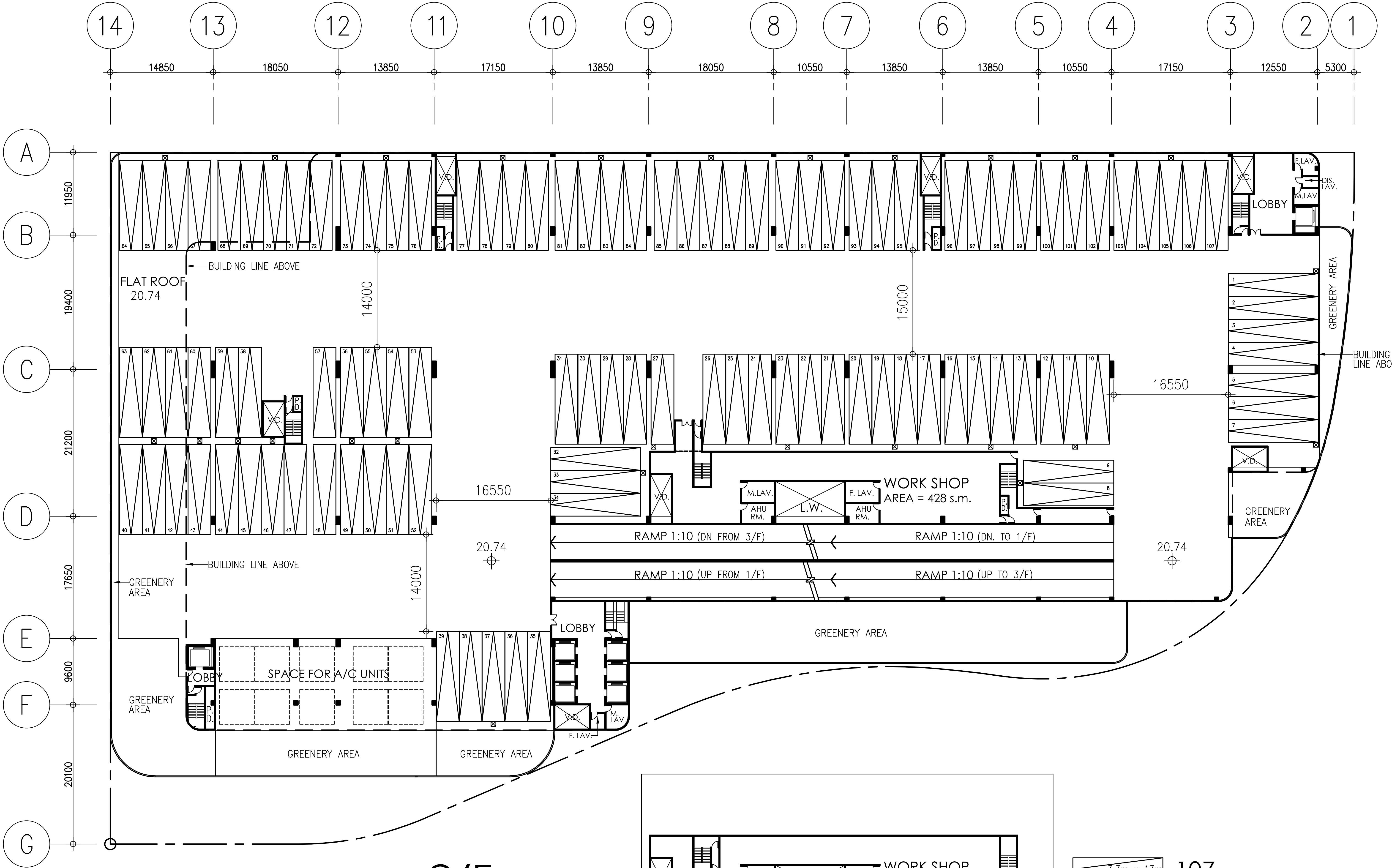
10550
13850
13850
10550
17150
12550
5300
A
B
C
D
E
F
G
11950
19400
21200
17650
9600
20100
V.D.
P.D.
F.LAV.
DIS. LAV.
M.LAV.
LOBBY
GREENERY AREA
BUILDING LINE ABOVE
15000
15000
16550
16550
AHU RM.
WORK SHOP
AREA = 1098 s.m.
WORK SHOP
AREA = 400 s.m.
FLAT ROOF
GENERATOR ROOM
RAMP 1:10 (DN FROM 2/F)
RAMP 1:10 (DN. TO G/F)
RAMP 1:10 (UP FROM 1/F)
RAMP 1:10 (UP TO 2/F)
13.24
13.24
WORK SHOP
AREA = 630 s.m.
SUB-STATION
16.04
F. LAV.
M. LAV
WORK SHOP
AREA = 380 s.m.
L.W.
16.99
WORKSHOP AT LEV. 16.99
4.35m x 13.5m
3.3m x 13m
40 MAINTENANCE BAY
46 BUS PARKING BAY

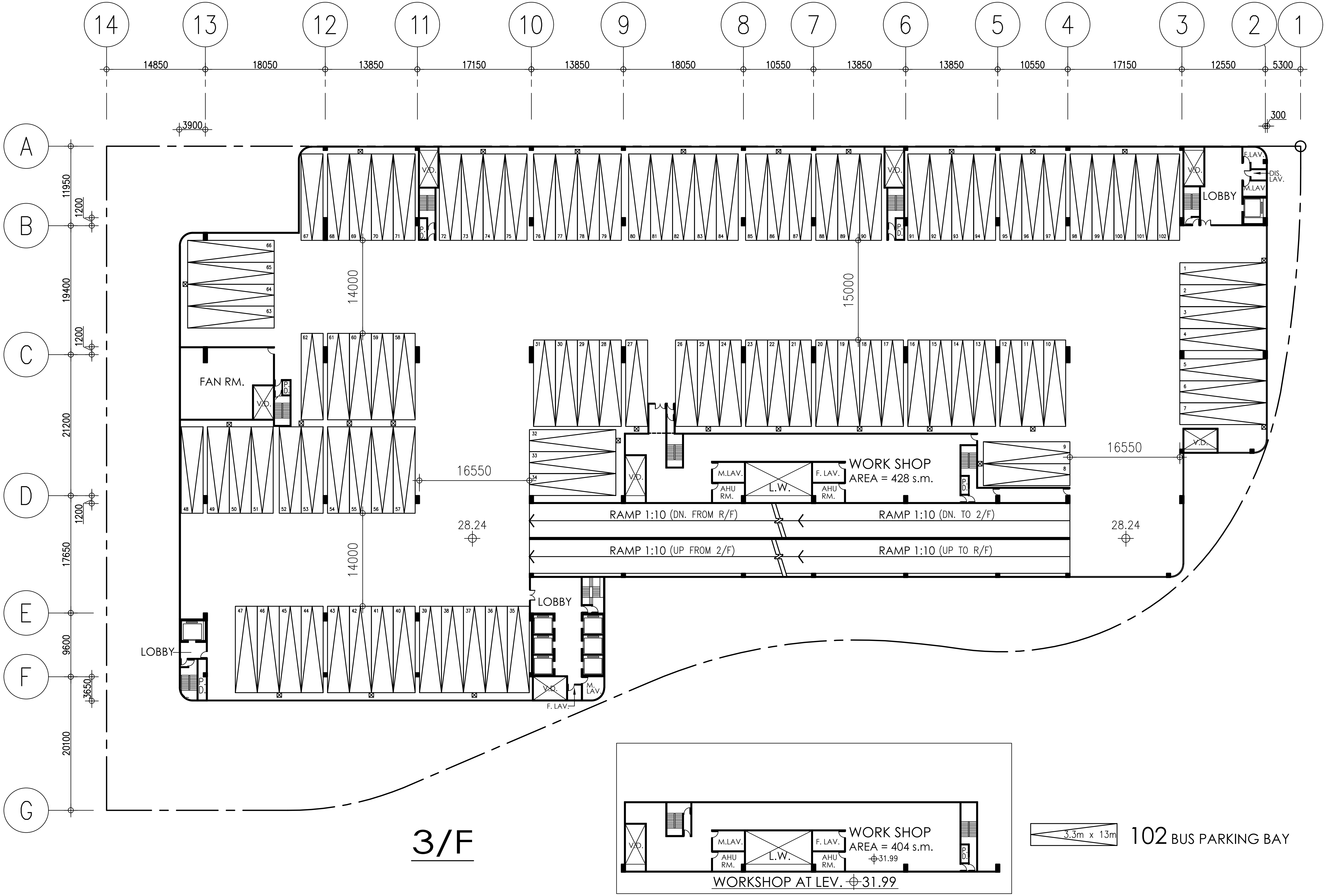
1/F



2/F

WORKSHOP AT LEV. ⌖24.49

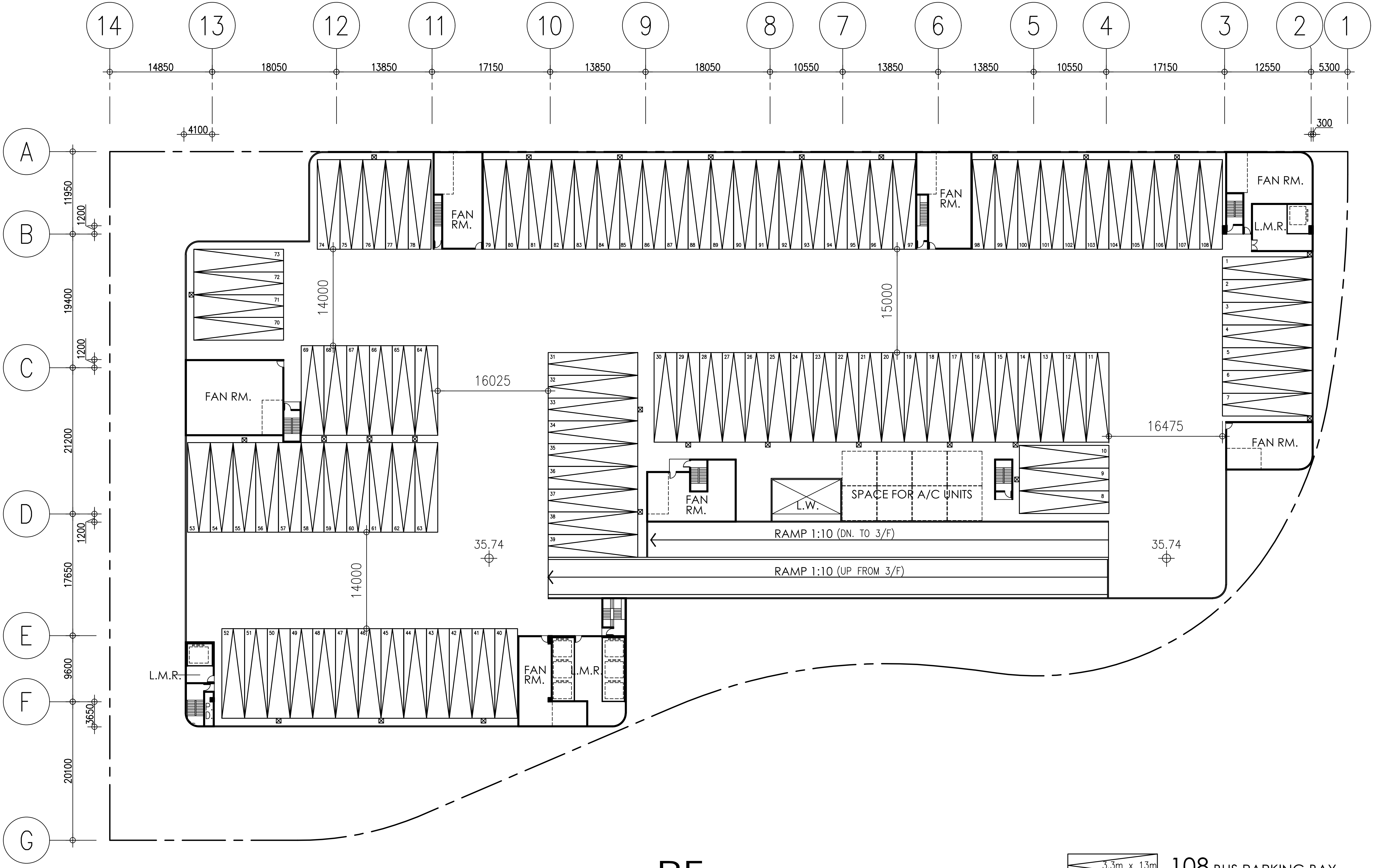
3.3m x 13m 107 BUS PARKING BAY



3/F

WORKSHOP AT LEV. 31.99

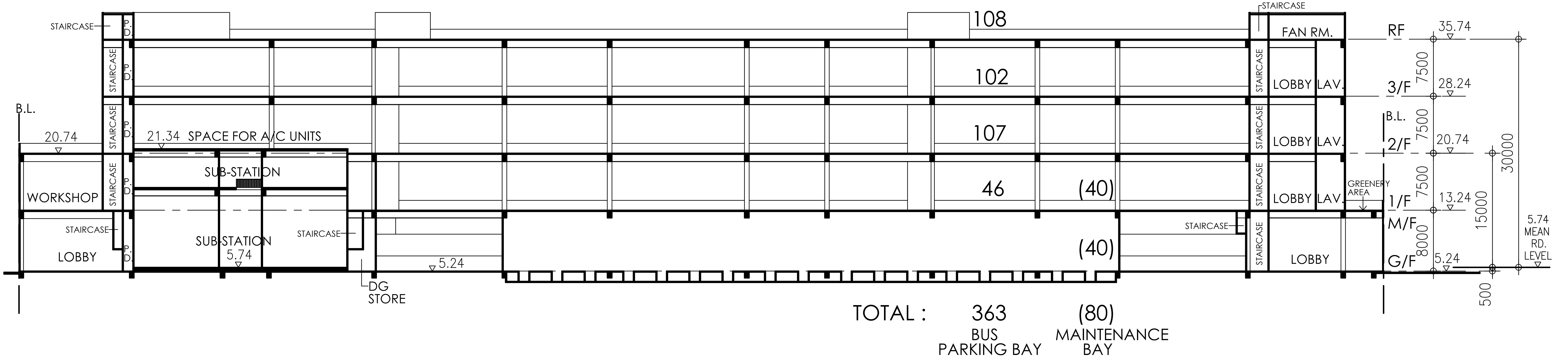
102 BUS PARKING BAY



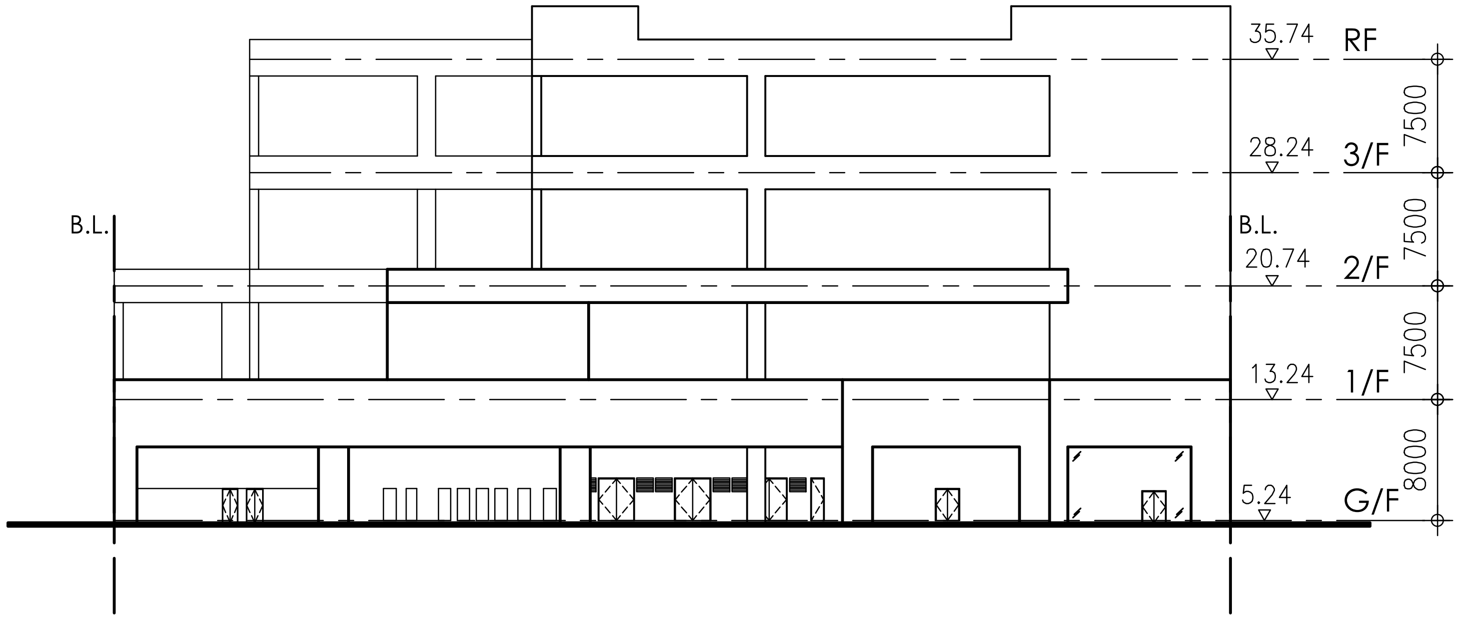
RF

3.3m x 13m 108 BUS PARKING BAY

4 STOREYS



SECTION 'A' - 'A'



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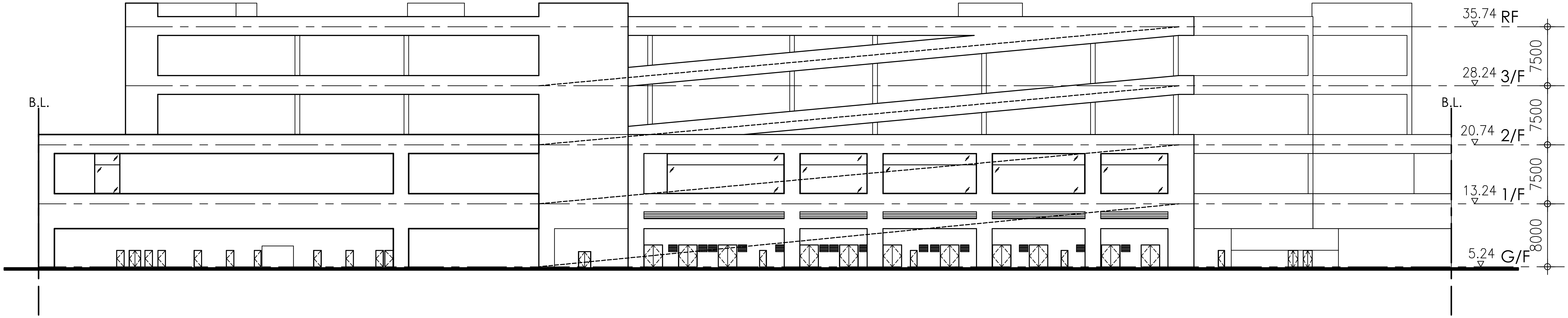

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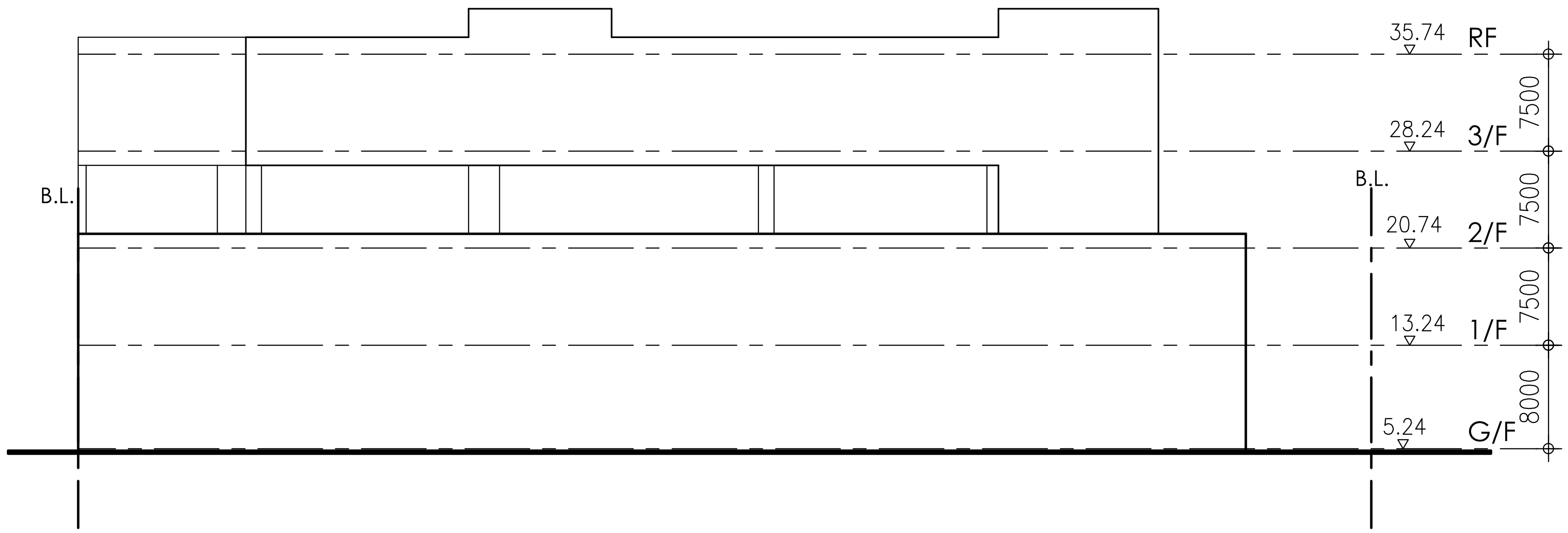

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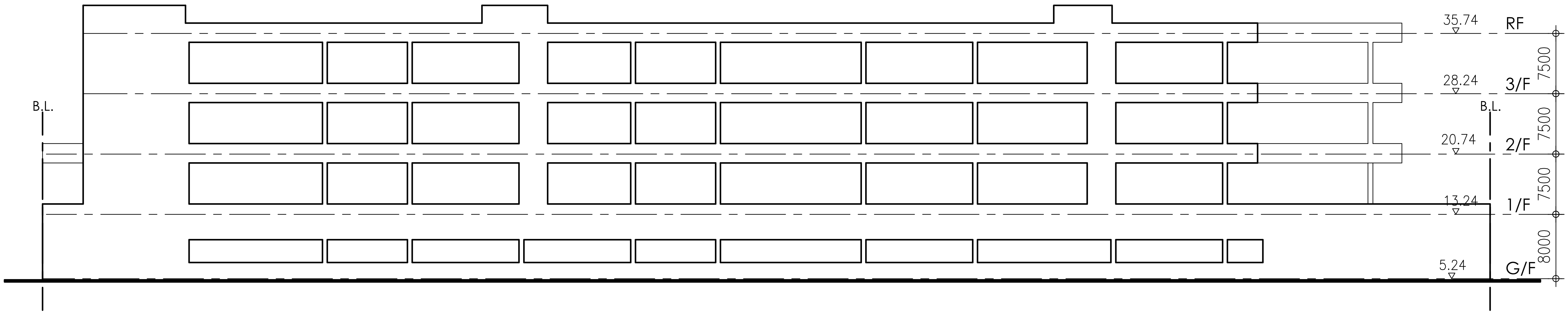

ELEVATION '3'

Appendix 7.1

Confirmation of Road Type from Transport Department

Jamie Kam

From: Ka Fai CHAN <kafaichan@td.gov.hk>
Sent: Monday, 14 March, 2022 8:13 PM
To: Steven Lui
Cc: S L Ng
Subject: Re: Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories // Road Classification

Dear Mr. LUI,

I have no objection to your urban road type on Dai Fuk Street and Dai Wah Street.

Regards,
Issac K F Chan
E/TP2, TE/NTE, TD
Tel: 2399 2406

From: Steven Lui <steven@lla.com.hk>
To: "kafaichan@td.gov.hk" <kafaichan@td.gov.hk>
Cc: S L Ng <slng@lla.com.hk>
Date: 09/03/2022 05:34 PM
Subject: Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories // Road Classification

---

Dear Mr. CHAN,

We are the traffic consultant for the captioned.

As per EPD's comments received recently, we would like to seek your confirmation on the road types of the following road sections fronting the Site:

1. Dai Fuk Street (District Distributor)
2. Dai Wah Street (Local Distributor)

Justifications are provided as below:

Dai Fuk Street
According to Transport Planning and Design Manual (TPDM), it states that district distributors are roads linking districts to the primary distributor roads.
These roads usually have high capacity at-grade junctions, with peak hour stopping restrictions and parking restrictions throughout the day.
Please note that Dai Fuk Street is a dual two carriageway connecting Dai Wah Street to the east and Ting Kok Road to the west.
It links part of the Tai Po Industrial Estate to Ting Kok Road, which is classified as primary distributor under ATC.
Also, peak hour stopping restrictions are observed along both the northern and southern kerbside of the carriageway.

As a result, Dai Fuk Street can be considered to classify as a “district distributor” matching with the definition in the TPDM.

Dai Wah Street
According to TPDM, it states that local distributors are roads within districts linking developments to the district distributor roads.
Please note that Dai Wah Street is a single carriageway which links few developments, such as Hong Kong Institute of Construction – Tai Po Training Ground etc., to Dai Fuk Street and Dai Fat Street.
As a result, Dai Wah Street can be considered to classify as a “local distributor” matching with the definition in the TPDM.

We would be pleased if you could consider and provide your comment on the above.

Should you have any query or require any additional information, please feel free to contact our Mr. S L Ng or the undersigned at 2831 9191.

Thanks & Regards
Steven Lui

LLA Consultancy Ltd.
Unit 610, 6/F., Island Place Tower,
510 King's Road, North Point, Hong Kong
Tel : (852) 2831 9191   Fax : (852) 2831 0003
Web Site : http://www.lla.com.hk
Email : steven@lla.com.hk
Company Email : lla@lla.com.hk

Draft No.	:	4
Issue Date	:	December 2022
Project No.	:	1849

AIR VENTILATION ASSESSMENT – EXPERT EVALUATION

FOR

KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Prepared By:

Allied Environmental Consultants Limited

COMMERCIAL-IN-CONFIDENCE

Document Verification

Project Title KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po

Project No. 1849

Document Title Air Ventilation Assessment – Expert Evaluation

Issue No.	Issue Date	Description	Prepared by	Checked by	Approved by
1	Sep 2021	1st Submission	Cherry Lee	Cathy Man	Grace Kwok
2	Mar 2022	2nd Submission	Cherry Lee	Cathy Man	Grace Kwok
3	Jun 2022	3rd Submission	Cherry Lee	Cathy Man	Grace Kwok
4	Dec 2022	4th Submission	Helen Siu	Cathy Man	Grace Kwok

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1. INTRODUCTION

1.1.1. Allied Environmental Consultants ("AEC") has been appointed to conduct an Air Ventilation Assessment – Expert Evaluation ("AVA-EE") to support of a Section 16 application for the Kowloon Motor Bus (KMB) Bus Depot at Dai Fuk Street, Area 33, Tai Po (hereinafter referred to as "Project Site").

1.1.2. This S16 Planning Application aims to relax the building height from the current 2-storey restriction to 4-storey high, in order to provide more parking spaces and charging facilities for electric buses (eBus) in future.

2. OBJECTIVES

2.1.1. The main objectives of the study are to conduct a qualitative review and to evaluate potential air ventilation impact on the pedestrian wind environment within and in the vicinity of the Project Site using the methodology framework set out by relevant environmental standards, guidelines and technical circulars.

2.1.2. The methodology framework of this study is set out in the Technical Circular No. 1/06 and its Annex A - Technical Guide for Air Ventilation Assessment for Development in Hong Kong. The Technical Circular is jointly issued by Housing, Planning and Lands Bureau (HPLB) and Environment, Transport and Work Bureau (ETWB) in July 2006 (Technical Guide).

2.1.3. The scope of this study shall cover the following:

- To identify any potentially affected areas due to the proposed building design including building heights, layout and deposition;
- To provide recommendations for alleviating the potential air ventilation impact identified;
- To identify any major wind corridors which should be preserved or reserved; and
- To identify good design features.

3. ASSESSMENT METHODOLOGY

3.1. WIND AVAILABILITY DATA

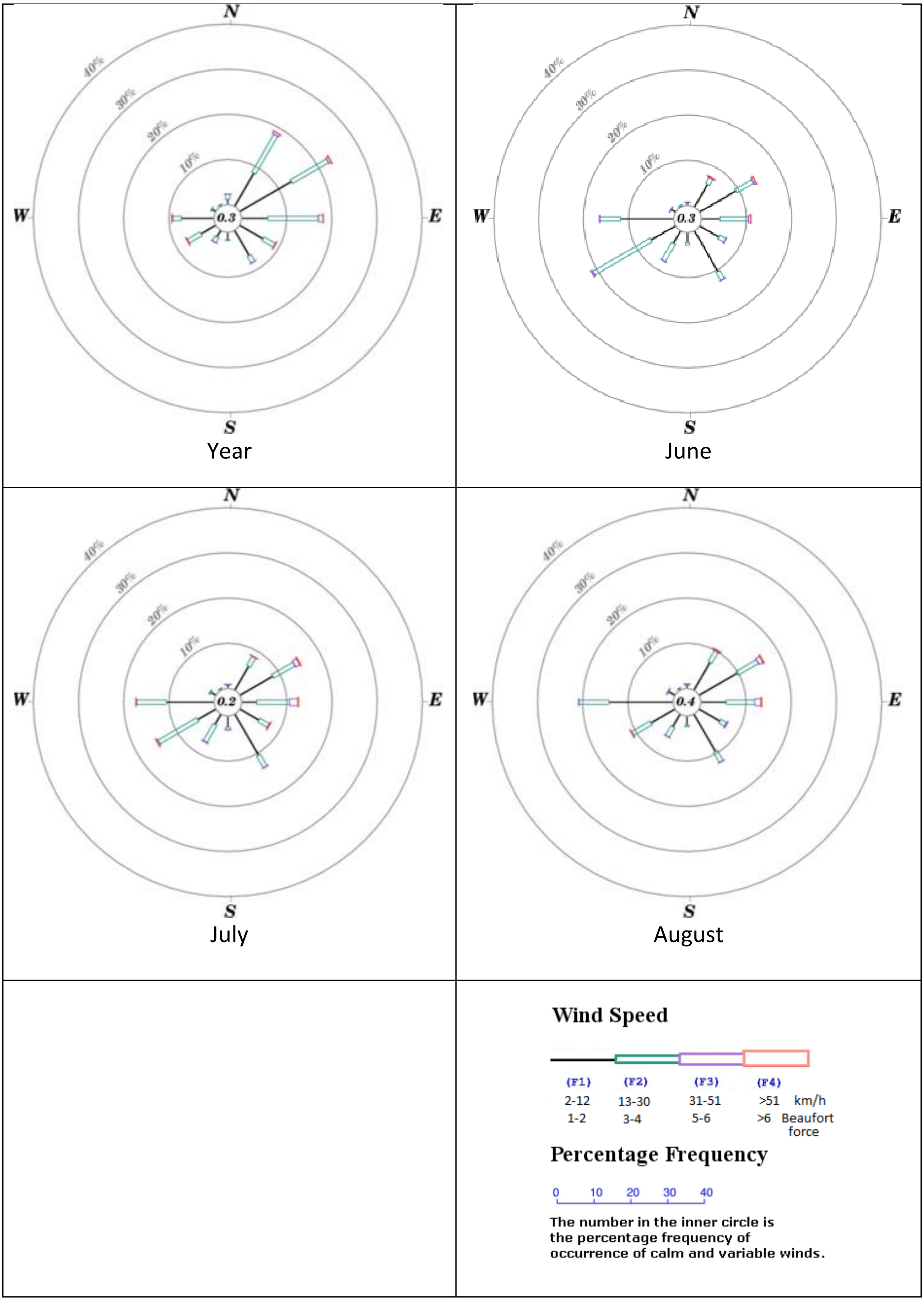
Hong Kong Observatory

3.1.1. The Hong Kong Observatory records the metrological data in Hong Kong. Among all the weather stations in Hong Kong, the nearest weather station to the Project Site is Tai Po Weather Station. Thus, the wind data from Tai Po Weather Station shall be used for the discussion on overall wind environment in the region.

3.1.2. According to the wind availability data from Tai Po Weather Station from 2000-2020, the annual wind rose revealed winds flowing from NNE, ENE and E while summer wind rose revealed winds flowing from NE, ENE, E, SE, WSW and W.

Regional Climate of Hong Kong
Prevailing Wind Direction for January (degrees)

Figure 1 Location of Hong Kong Observatory Weather Station



Year

June

July

August

Figure 2 Annual Wind Rose of Tai Po Weather Station between 2000-2021

Regional Atmospheric Modelling System (RAMS)

3.1.3. Wind availability to the Project Site is evaluated with reference to the "Consultancy Study on Establishment of Simulated Site Wind Availability Data for Air Ventilation Assessments in Hong Kong"[1] simulated by the meso-scale model of Regional Atmospheric Modelling System (RAMS) Version 6.0 at the horizontal resolution of 0.5km * 0.5km**.**

3.1.4. The Project Site is located within grid (081, 073) in Dai Fuk Street, Tai Po. Wind availability data at 200m was adopted in this assessment. According to Planning Department's simulated data, wind roses, wind direction and wind probability data are provided in ***Figure 3*** and ***Table 1.***

---

[1] http://www.pland.gov.hk/pland_en/info_serv/site_wind/site_wind/081073.html

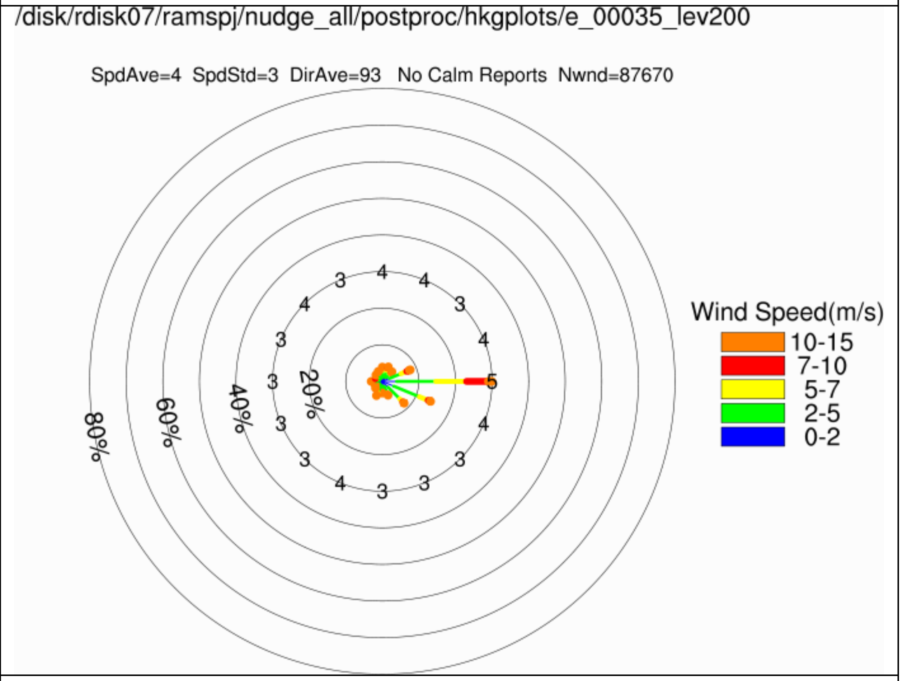
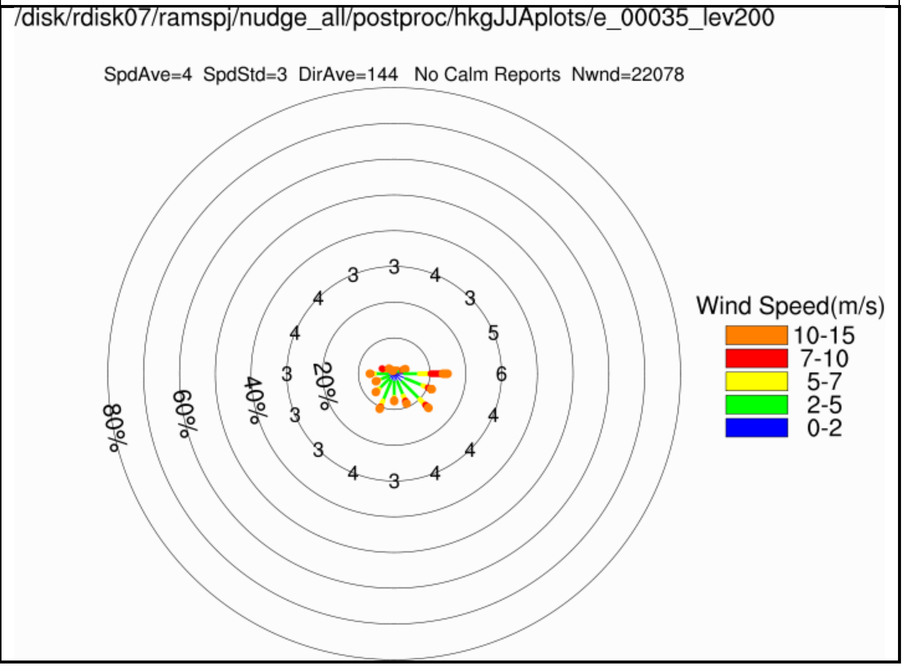
	Wind Rose – Annual
200m	
	Wind Rose – Summer
200m	

Figure 3 Wind Rose at Grid (081, 073)

Table 1 Wind Probability at 200m (Grid 081, 073)

Wind Direction	Annual Probability	Summer Probability
N	3.9%	0.8%
NNE	4.3%	0.7%
NE	3.8%	1.2%
ENE	**8.3%**	3.5%
E	**30.0%**	**15.1%**
ESE	**14.3%**	**11.5%**
SE	**8.4%**	**13.6%**
SSE	4.1%	9.1%
S	3.2%	7.7%
SSW	4.2%	**10.7%**
SW	2.6%	7.3%
WSW	2.2%	5.6%
W	3.0%	6.8%
WNW	2.1%	3.7%
NW	2.5%	2.0%
NNW	3.0%	0.8%

3.1.6. According to RAMS wind data, annual prevailing winds are the incoming winds flowing from E, ENE, ESE and SE, while summer prevailing winds are flowing from E, ESE, SE and SSW directions.

Wind Data from Previous Studies

3.1.7. There are several air ventilation assessments in Tai Po area. Their wind availability are summarized in below:

- Term Consultancy for AVA Services - Expert Evaluation on Air Ventilation Assessment for Tai Po Area (AVR/G/51); and
- Term Consultancy for Expert Evaluation and Advisory Services on Air Ventilation Assessment for Tai Po (AVR/G/90)

3.1.8. According to Term Consultancy for AVA Services - Expert Evaluation on Air Ventilation Assessment for Tai Po Area (AVR/G/51) which cover the entire Project Site, MM5 simulated wind rose of four locations within Tai Po Area was adopted. Location A of the aforementioned report is the closest to Project Site. The report concluded that the annual wind of Location A is mainly from the E while the summer wind is mainly coming from the E and the southerly quarters (including SE).

3.1.9. In Term Consultancy for Expert Evaluation and Advisory Services on Air Ventilation Assessment for Tai Po (AVR/G/90), where the Project Area 3 of aforementioned report is located to the west of Project Site with a distance of approximately 630m, MM5 simulated wind rose is adopted. It concluded that the annual wind mainly comes from the NE and E while the summer wind is mainly coming from the E and the southerly quarters (including SE, S and SW) at 120m height.

3.1.10. In summary, different wind data reference have been review, ***Table 2*** summarises the identified prevailing wind conditions of Dai Fuk Street, Tai Po. For a comprehensive discussion on air ventilation performance of the Project Site and the wind environment at pedestrian level, RAMS data is more appropriate as it is the most updated. In view of the close proximity of the HKO Tai Po Weather Station to the Project Site, the wind data from HKO Tai Po Weather Station is also adopted in this AVA-EE.

Table 2 Wind Data Summary

Sources		**Annual Wind**	**Summer Wind**
HKO Tai Po Weather Station (2000-2020)		NNE, ENE and E	NE, ENE, E, SE, WSW, W
RAMS data (Grid 081, 073)		E, ENE, ESE and SE	E, ESE, SE, SSW
Previous Study	AVA-EE for Tai Po Area (AVR/G/51)	E	E, SE
	AVA-EE for Tai Po (AVR/G/90)	NE, E	SE, S, SW
Summary		N, NE, **<u>NNE, ENE, E, ESE, SE</u>**	ENE, SW **<u>NE, E, ESE, SE, S, SSW</u>**

4. PROJECT DESCRIPTION

4.1. SITE LOCATION AND PROPOSED DEVELOPMENT

4.1.1. Currently, the Project Site is an open depot used for bus parking (including washing and refilling). In order to support the "Roadmap on Popularization of Electric Vehicles" released by Environment Bureau in March 2021, additional storeys with sufficient charging and supporting facilities would be required for electric buses ("eBus"). Thus, KMB intends to develop a 4-storey depot at the Project Site and provide around 363 nos. charging-enabling bus parking bays for eBus.

4.1.2. The Project Site area is approximately 14,600 m^2. It is bounded by Dai Wah Street to the east, the Dai Fuk Street to the south, Ting Kok Road to the west and further north.

4.1.3. The Project Site is zoned as "Other Specified Uses" annotated "Bus Depot" ("OU (Bus Depot)") on the approved Tai Po Outline Zoning Plan ("OZP") No. S/TP/30. The surrounding areas are the Tai Po Industrial Estate ("OU" zone) to the east, the Construction Industry Council (CIC) Tai Po Training Ground (Government, Institution, Community ("G/IC") zone), MTR Tai Po Bus Maintenance Centre ("Road" zone) and Tai Po Waterfront Park ("Open Space" zone) to the south. The residential developments of Riviera Lodge, Fu Shin Estate ("Residential (A)" ("R(A)") zone) and Yue Lok Village ("Village" ("V") zone) are located at the west of the Project Site while the Tai Po Community Green Station, Tin Sam Sewage Pumping Station ("G/IC" zone), residential development at 63 Ting Kok Road ("Residential (C)" ("R(C)") zone) and the "Green Belt" ("GB") zone are situated at the north. ***Figure 4*** shows the location of the Project Site.

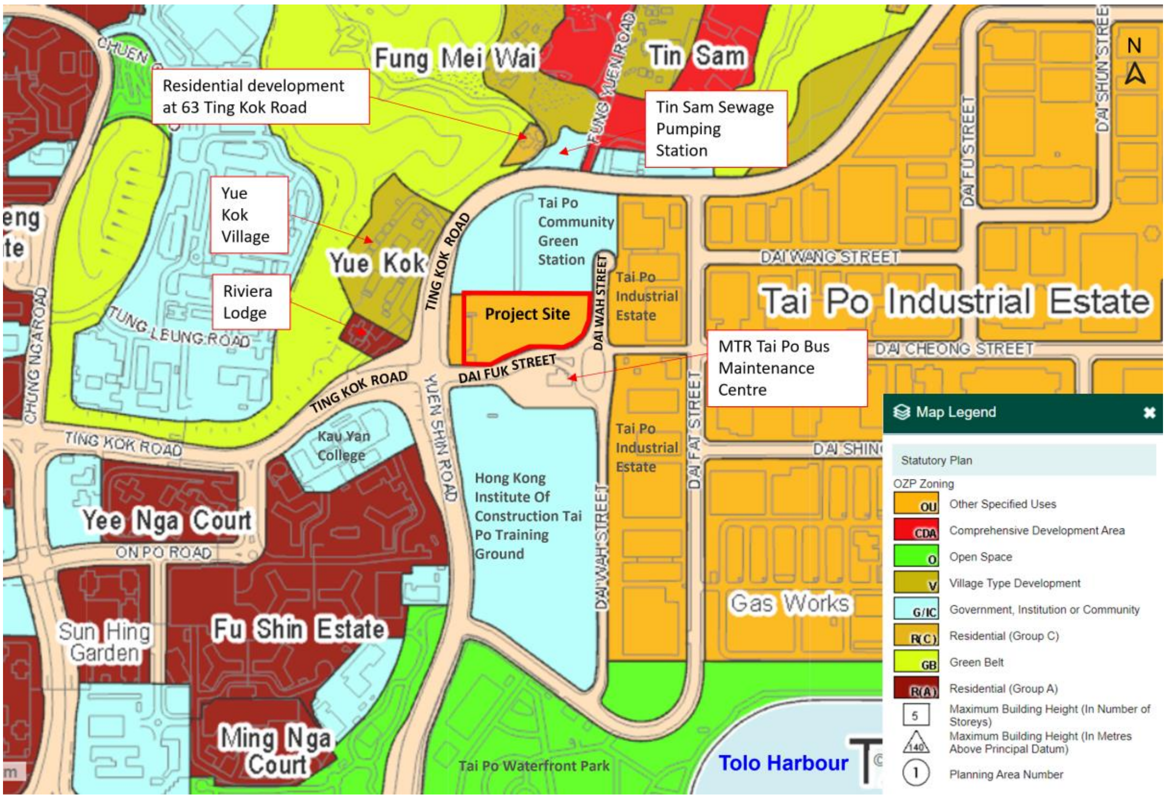


Figure 4 ***Location of Project Site***

4.2. SURROUNDING ENVIRONMENT AND WIND CHARACTERISTICS

Urban Morphology

4.2.1. As mentioned in Section 4.1, the Project Site is surrounding by "V", "G/IC", "R(A)", "R(C)", "OU" and "GB" zone with different building height. ***FIGURE* 5** and ***Table 3*** show the location of the surrounding developments and the relevant building height respectively.

4.2.2. The Construction Industry Council (CIC) Tai Po Training Ground located at the south of the Project Site will be included in the AVA-EE. However, the layout of CIC Tai Po Training Ground is not available at this stage, existing condition of one-storey temporary structure will be applied in this AVA-EE.

Table 3 Building Heights of Major Development in the Surroundings

	Surrounding Buildings	Building Heights (mPD)
1	Lee Kum Kee	22.85
2	Hope well Slipform Engineering Ltd.	~11.9
3	Techno Enterprise Ltd.	11.9
4	Fulwealth Metal Factory Ltd.	11.6
5	Pico International (HK)Ltd.	14.7
6	Lee Kee Group Co. Ltd	20.4
7	The Church of Christ in China (Former Kei Ching School) (currently vacant)	~37
8	Fu Shin Estate	102
9	Kau Yan College and Confucian Tai Shing Ho Kwok Oui Chun College	33.4 to 37.9
10	Riviera Lodge	108.5
11	Yue Lok Village	3 storeys (~30)
12	Residential development at 63 Ting Kok Road (容廷軒)	~15
13	Construction Industry Council (CIC) Tai Po Training Ground [1]	10.5
14	MTR Tai Po Bus Maintenance Centre	11.2
15	Jackel Porter Co. Ltd, Nifco and Oriental Printed Circuits Limited	16.3 / 32.8/ 16.2
16	Chiaphua Industries Ltd., Hong Kong Standards and Testing Centre, Hitachi Chemical Electronic Materials (Hong Kong Ltd.)	29.2 / 23.9 / 31.6
17	Golik Metal Manufacturing Co., Ltd.	21.3
18	Hong Kong Note Printing Ltd., Universal (Hot-Dip) Galvanising Ltd.	13.2 / 15.6
19	South China Morning Post	35
20	Alice Ho Miu Ling Nethersole Hospital	44.7
21	Tai Po Methodist School	43.8

Notes:
[1] As the development programme of the CIC Tai Po Training Ground is currently not available, existing condition is applied.

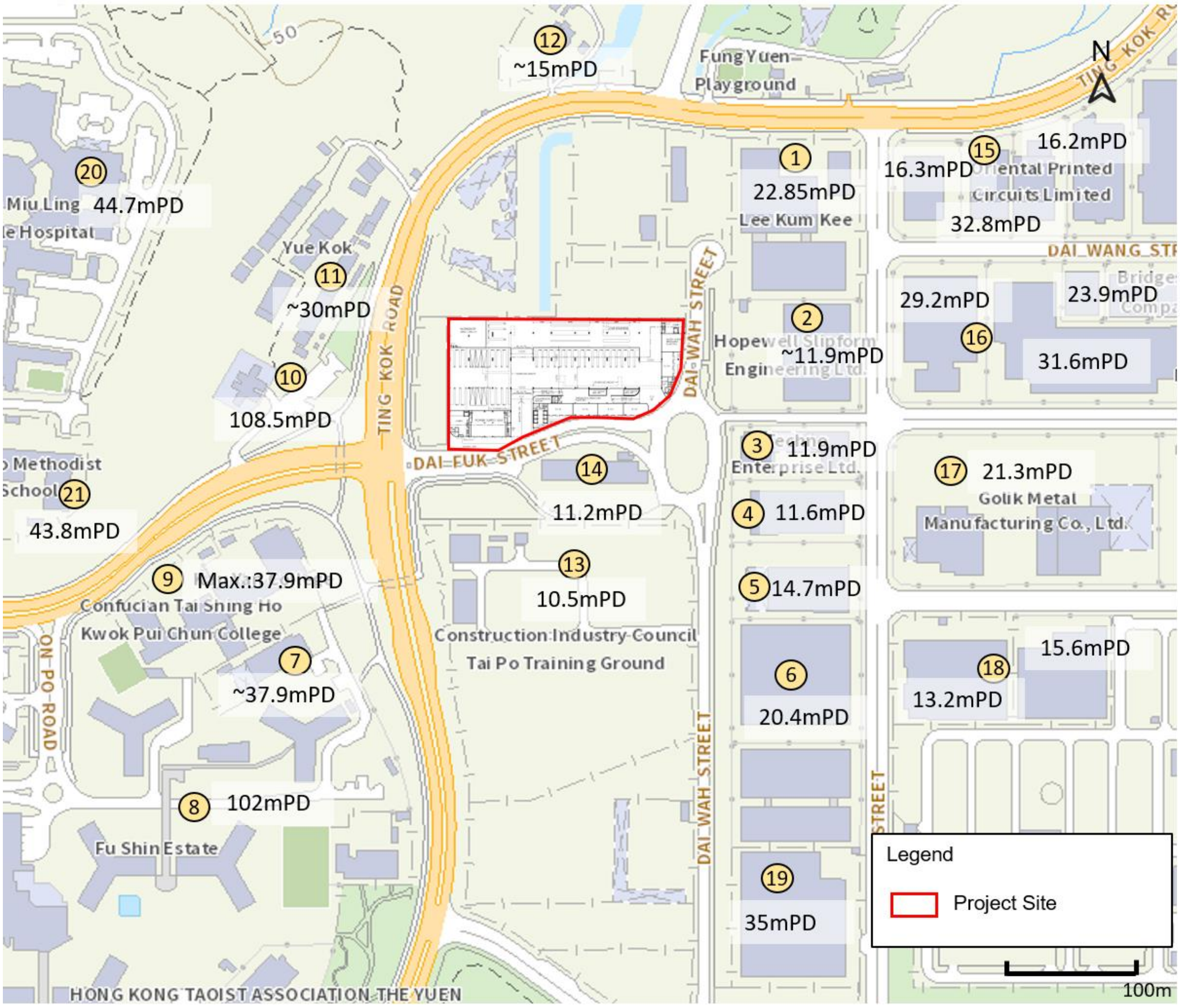


Figure 5 Existing Surrounding Developments

Current Site Wind Environment

4.2.3. Refer to Section 3.1.10, the wind availability in the Project Site mainly come from NNE, ENE, E, ESE, SE in annual condition while winds from NE, E, ESE, SE, S, SSW are available in summer condition.

4.2.4. According to Term Consultancy for AVA Services - Expert Evaluation on Air Ventilation Assessment for Tai Po Area (AVR/G/51), the Project Site together with the unbuilt area on the west of Tai Po Industrial Estate are linked with Tai Po Waterfront Park to the south and hillside to the north, which provide a wide continuous air path connecting north wind system to the east wind system.

Road/ Street Pattern

4.2.5. Road network facilitates wind penetration to the Project Site and the surrounding areas. The annual E wind would be facilitated by the major air path of Dai Hung Street, Dai Fuk Street and Ting Kok Road while Yuen Shin Road, Dai Wah Street would enhance the summer S and SSW wind. The major air paths around the Project Site are illustrated in ***Figure 6***.

Open Spaces and Waterfront

4.2.6. The Fung Yuen Playground is located at the northeast of the Project Site. Locating at the downwind area of Project Site under summer S and SSW wind, the Fung Yuen Playground and the vicinity are expected to receive sufficient downwind wind.

4.2.7. Two open spaces (i.e. Tai Po Waterfront Park and Yuen Shin Park) are located at the further south of the Project Site. It would be easier for the wind entering the Project Site from seaside through the unbuilt area bounded by Yuen Shin Road and Dai Wah Street and located at the west of Tai Po Industrial Estate. It forms a wide continuous air path in particular for summer SE, SSE, S and SSW wind from the sea.

Topography

4.2.8. The topography in the close vicinity of the Project Site is relatively flat (with ground level of around 5 to 6 mPD) and surrounded by the Pat Sin Leng, Cloudy Hill and Sha Lo Tung in the north, Lam Tsuen in the west, Tai Mo Shan in the southwest. The topography descends from the high level at the north of the Project Site toward Tolo Harbour. The topography around the Project Site are illustrated in ***Figure 7.***

4.2.9. For the wind coming from the north, the wind characteristics will be affected by the hills. Turbulence and re-circulation of wind when it moves downhill towards the Project Site is expected. Therefore, wind arriving at the Project Site from the north will be slightly weakened by the obstruction of the hills.

4.2.10. Moreover, the sea breeze coming from Tolo Harbour is unobstructed. The E to S wind is expected to skim over the Tai Po Industrial Estate and reach the Project Site.

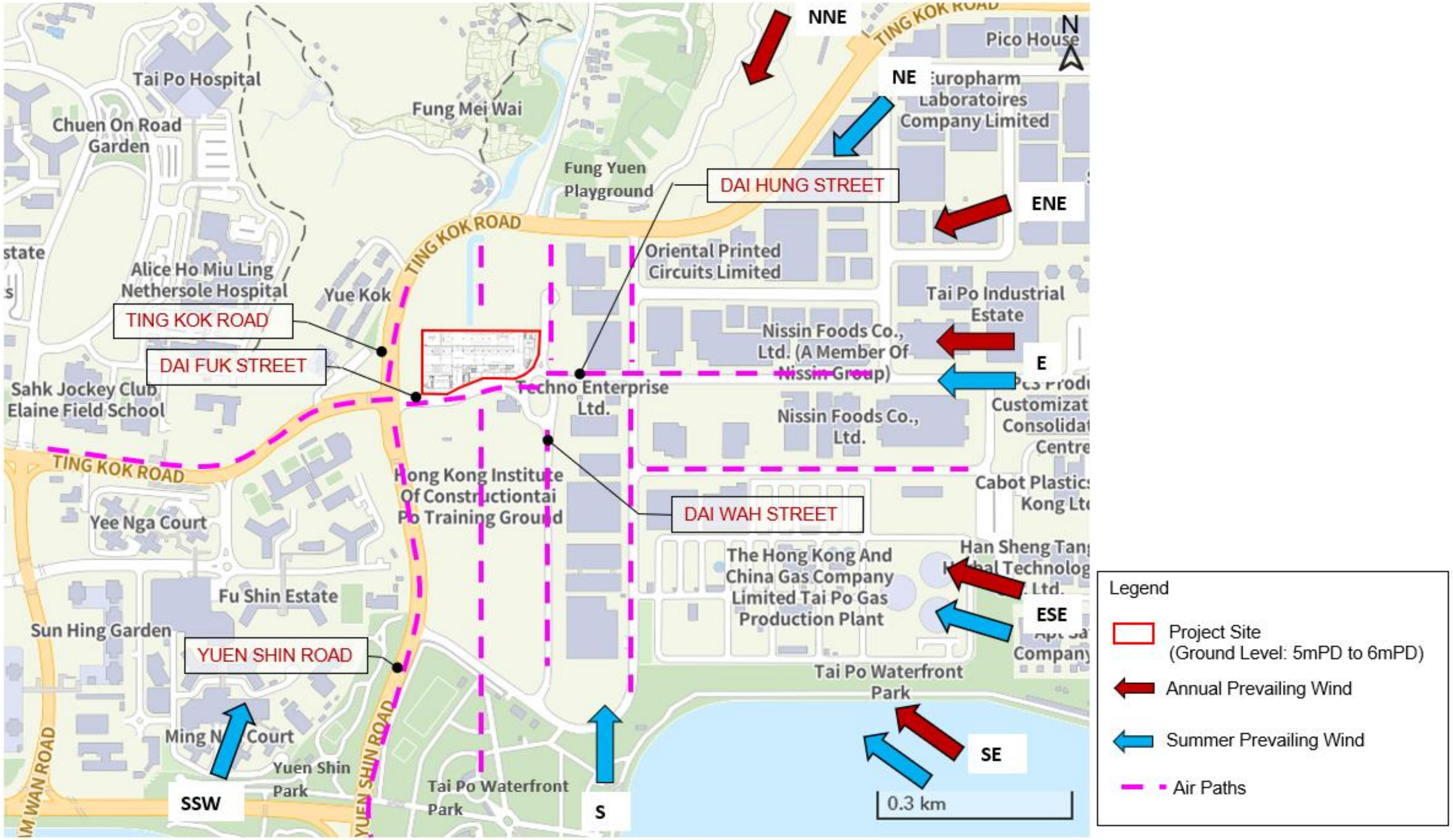


Figure 6 Prevailing Wind Environment in the Project Site

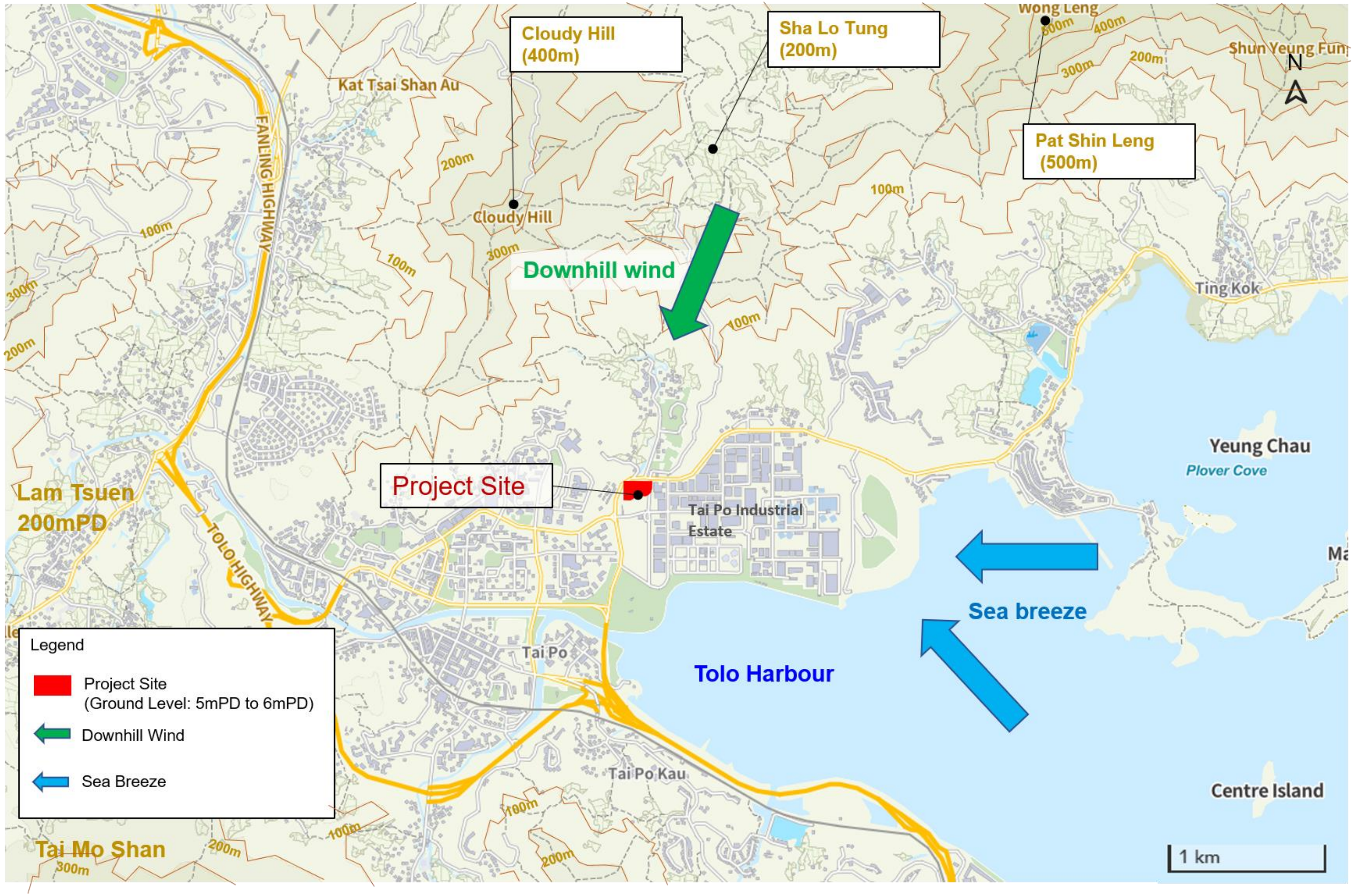


Figure 7 *Topography around the Project Site*

5. BASELINE SCHEME AND PROPOSED SCHEME

5.1.1. The Baseline Scheme presents the OZP compliance scheme. The Baseline Scheme consists of one 2-storey building block with the maximum height of approximately 20.74mPD. It will provide a power supply plant room, workshops, maintenance bays and car parking area.

5.1.2. The Proposed Scheme consists of one 4-storey building block with maximum height of 35.74mPD. Similar to the Baseline Scheme, it consists of a power supply plant room, workshops, maintenance bays and car parking area.

5.1.3. Layout plans and section drawing of both schemes are shown ***Appendix A*** and ***Appendix B*** respectively.

5.1.4. Despite to the Proposed Scheme has a larger site coverage comparing to the Baseline Scheme, more good design features have been incorporated in the Proposed Scheme upon the consideration of Project Site and design constraint criterion. These good design features are discussed in the following sections.

Permeable Design at Ground Floor

5.1.5. Under the Proposed Scheme, the permeable design of min. 15m-wide N-S axis aligned opening with 6m headroom is adopted. It is expected that the opening would facilitate the north and south wind systems towards the downwind regions.

5.1.6. ***Figure 8*** shows the building separation at ground floor under Baseline and Proposed Scheme.

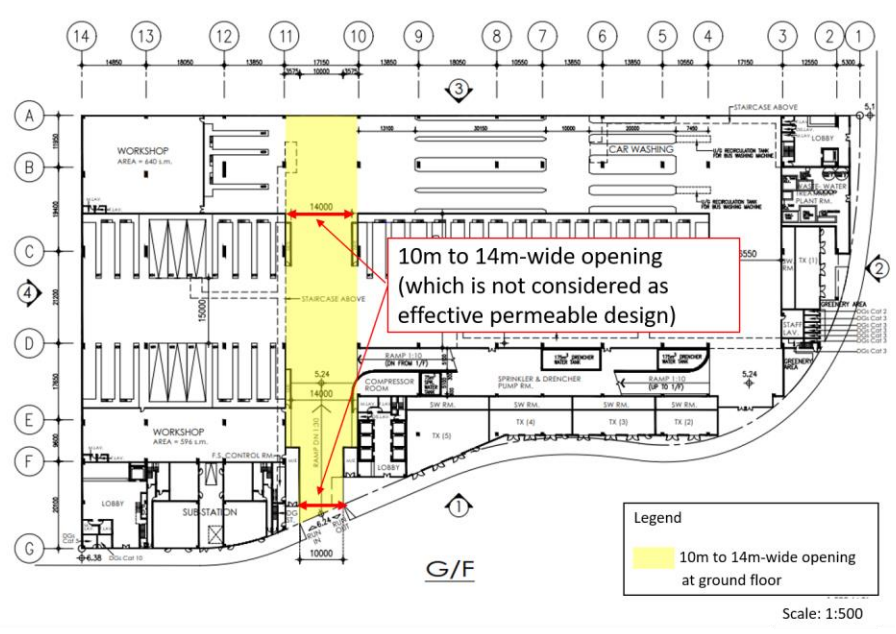
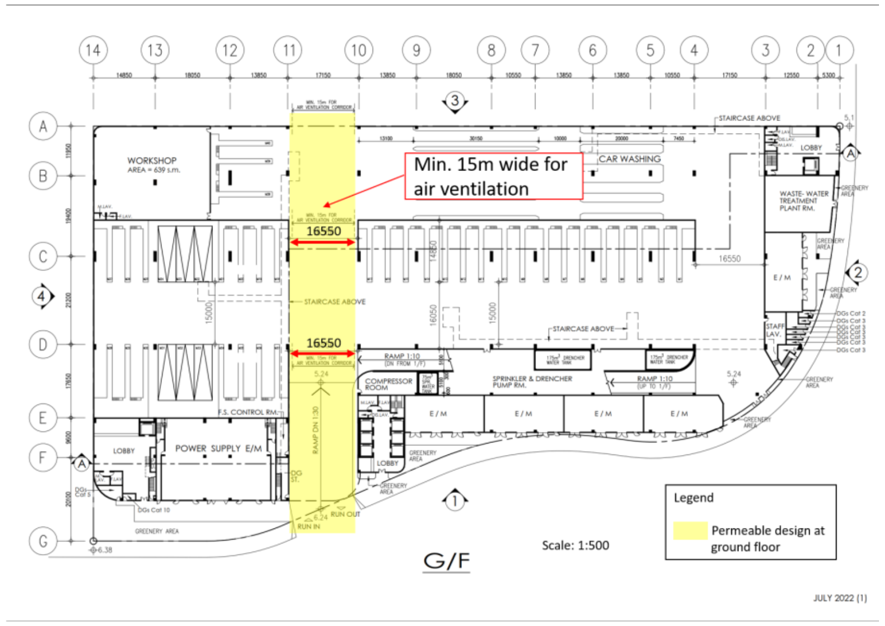
Baseline Scheme	
Proposed Scheme	

Figure 8 ***Ground Floor Layout Plan***

Setback and Greenery Area

5.1.7. Under the Proposed Scheme, part of the building block at the south is slimmed and converted to greenery area. It acts as a setback (max. 10m-wide) from the Dai Fuk Street and allow more annual ENE, E and ESE wind travels along the Dai Fuk Street to the downwind regions including Yue Kok Village and Riviera Lodge etc.

5.1.8. The design of Baseline Scheme and Proposed Scheme are illustrated in ***Figure 9.***

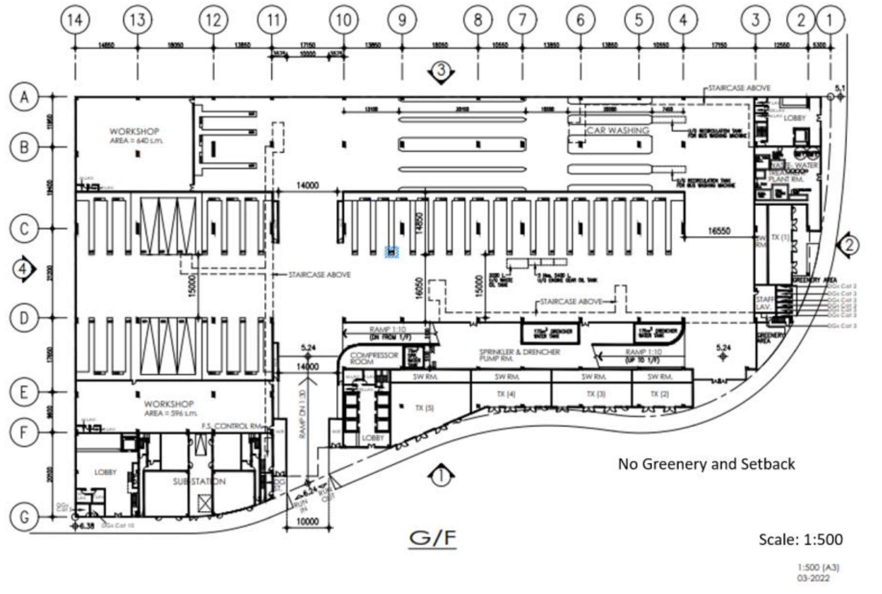
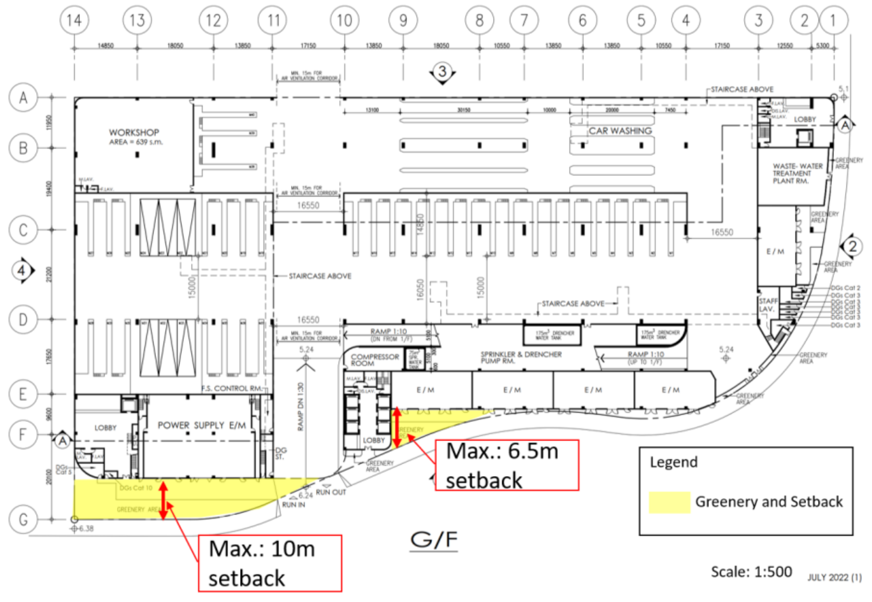
Baseline Scheme	
Proposed Scheme	

Figure 9 Ground Floor Layout Plan

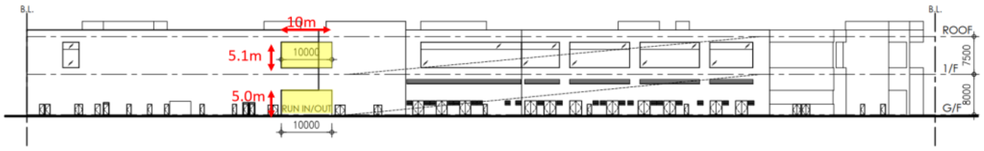
Vast Opening at the Building Façades

5.1.9. The proposed development is an enclosed bus depot with vast openings at the building façades to optimize the use of natural ventilation. Openings are observed under both Baseline and Proposed Scheme.

5.1.10. In view of the building height of the Baseline Scheme (20.74mPD), the incoming wind is expected to skim over the structure and reach the downwind areas. Openings at northern, eastern southern façades are provided to further to optimize the use of natural ventilation.

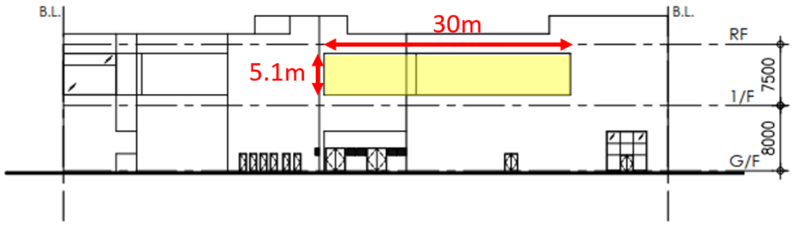
5.1.11. Under the Proposed Scheme (35.74mPD), the incoming wind would be affected by the 4-storey Proposed Scheme. The vast openings are provided at the northern, eastern, and southern façade at G/F to 4/F to reduce the adverse impact to air ventilation caused by the Proposed Scheme. At least 10% area of each façade will be designated to opening in order to optimize the use of natural ventilation. No openings will be provided at the G/F and 1F of western façade to minimize noise impact to the noise sensitive receivers located to the west of the proposed development.

5.1.12. Under the annual condition, the NNE wind would penetrate the Project Site via the vast openings at northern and southern facade and eventually reach the downwind regions e.g. unbuilt area at the west of the Tai Po Industrial Estate. In the summer, the incoming S and SSW wind from waterfront would enter the Project Site and downwind areas through the openings at northern and southern facade. Hence, the adverse air ventilation impacts caused by the Proposed Scheme would be minimized. The sectional drawing of Baseline and Proposed Scheme are illustrated in ***Figure 10.***

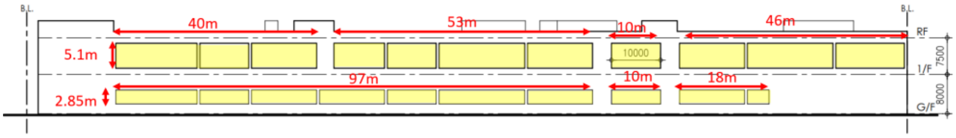
<table>
<tr>
<td>Baseline Scheme</td>
<td>


ELEVATION '1' (From South)

1:500 (A3)
03-2022



ELEVATION '2' (From East)



ELEVATION '3' (From North)

No opening at western building facades

ELEVATION '4' (From West)

Legend

🟨 Openings at facade
</td>
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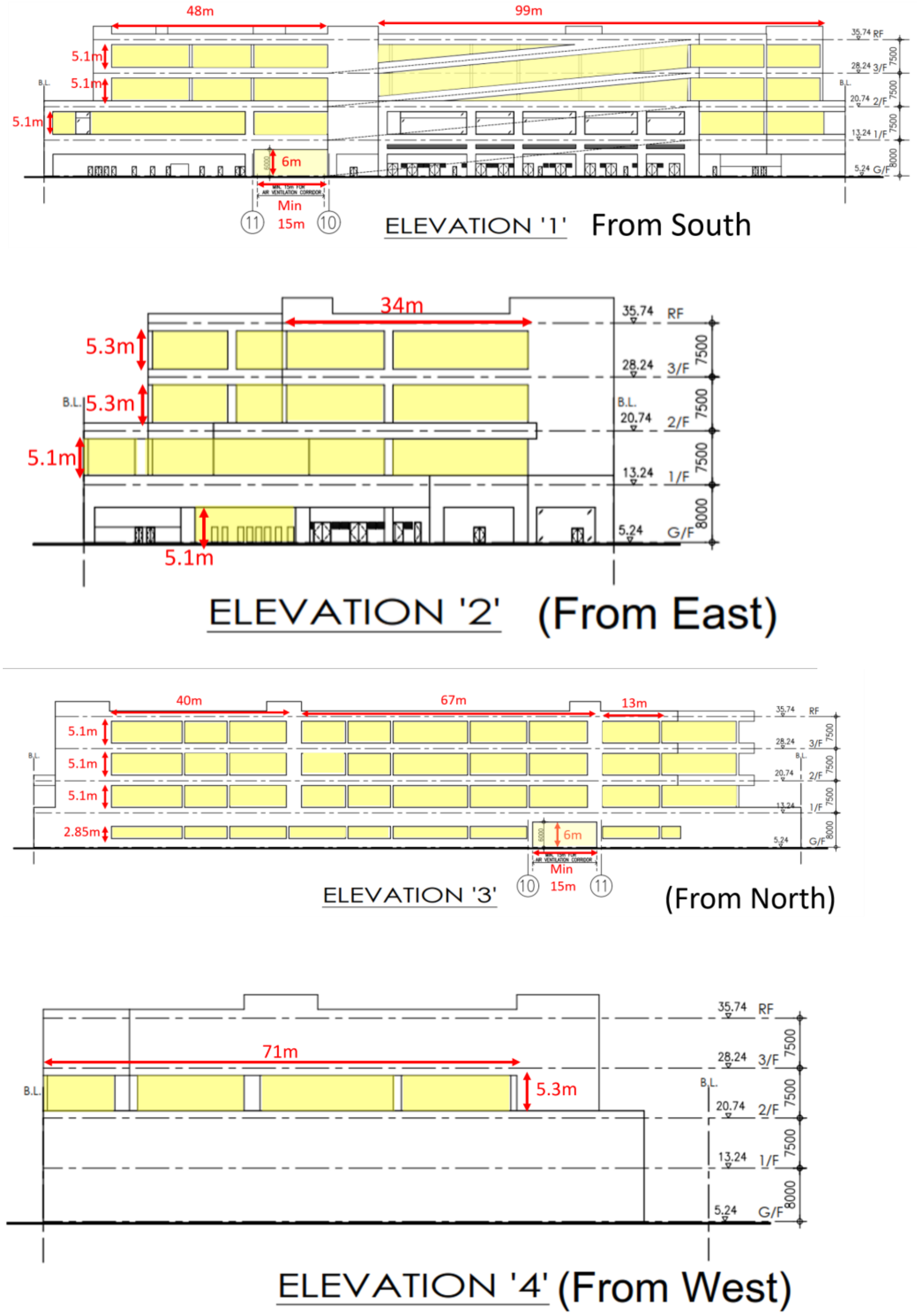
Proposed Scheme

Enclosed depot plenty of vast opening at building facades



Legend

🟨 Openings at facade

Figure 10 *Section Drawings*

6. EXPERT EVALUATION

6.1. NNE AND NE WIND

6.1.1. According to Section 5.3.7 of the Term Consultancy for AVA Services - Expert Evaluation on Air Ventilation Assessment for Tai Po Area (AVR/G/51), the Project Site together with the unbuilt area on the north wind system to east wind system. Thus, the potential air ventilation under north wind system is addressed in this section. According to ***Table 2***, NNE and NE are one of the annual and summer prevailing wind respectively.

6.1.2. Under the Baseline Scheme (20.74mPD), the incoming wind is expected to skim over the 2-storey Baseline Scheme and reach the downwind regions e.g. Kau Yan College (max. 37.9mPD) and the unbuilt area on the west of the Tai Po Industrial Estate (Light blue and dark blue arrows in ***Figure 11***).

6.1.3. Under the Proposed Scheme (35.74mPD), the 4-storey Proposed Scheme may obstruct part of the incoming NNE and NE wind towards the downwind regions. Nevertheless, the vast opening at the northern and southern façade are adopted to allow the natural ventilation and reduce the adverse impact to ventilation caused by the Proposed Scheme (Light blue and dark blue arrows in ***Figure 12***).

Baseline Scheme

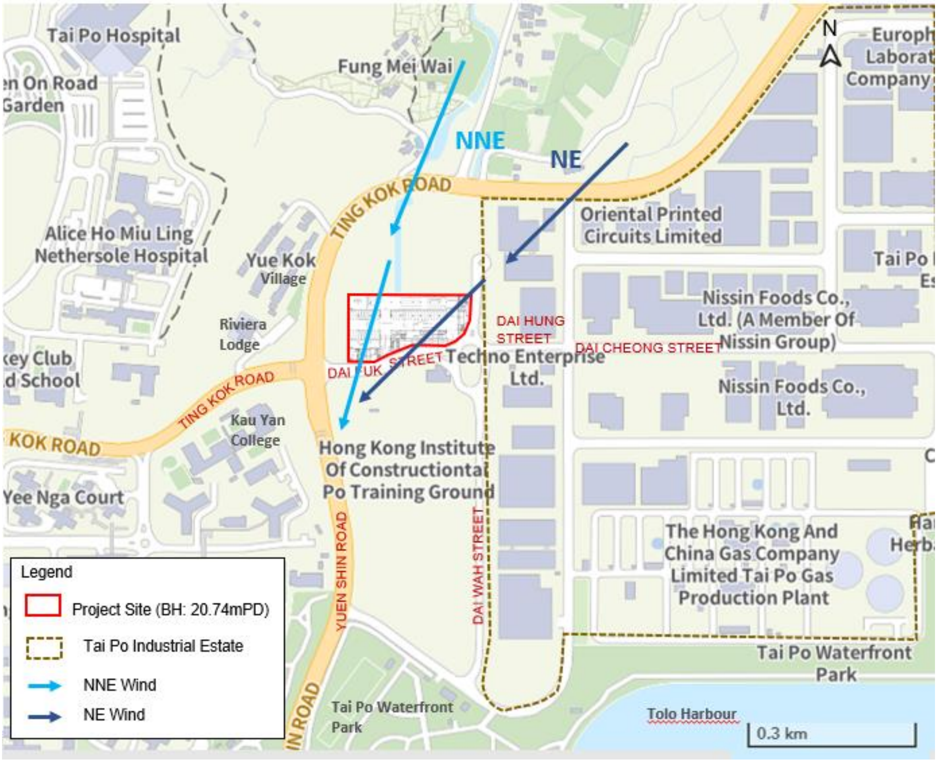


Figure 11 NNE and NE Wind (Baseline Scheme)

Proposed Scheme

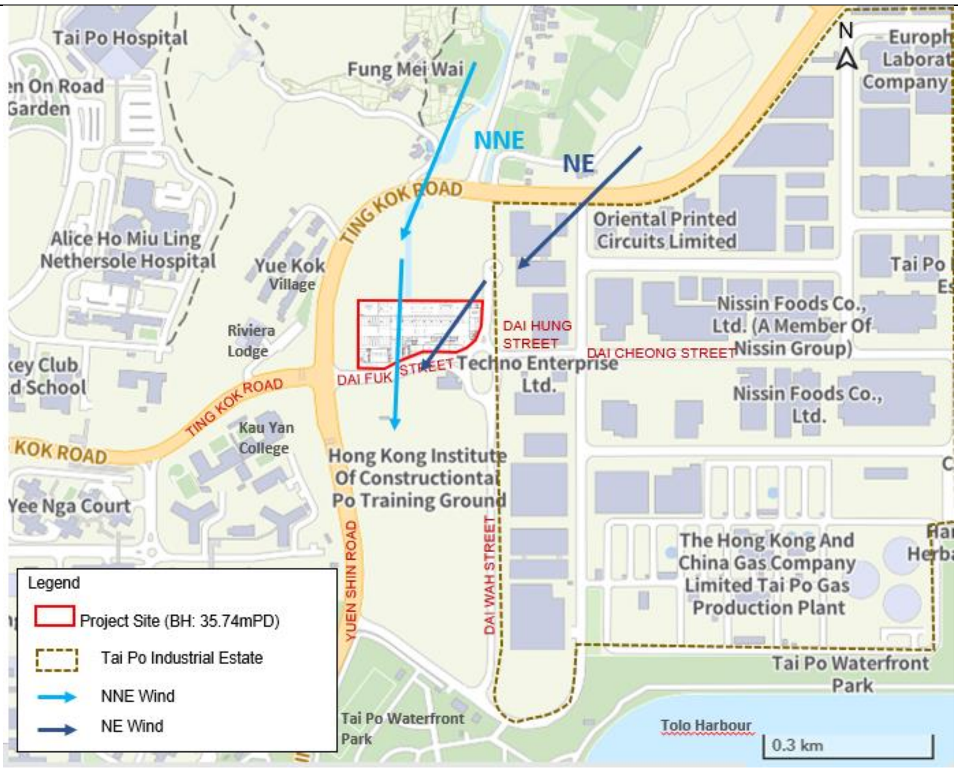


Figure 12 NNE and NE Wind (Proposed Scheme)

6.2. ENE, E AND ESE WIND

6.2.1. E and ESE wind are the major prevailing wind under annual and summer condition while ENE, wind is the 4th prevailing annual wind. As discussed in Section 4.2.8 to 4.2.10, the terrain in the close vicinity of the Project Site is relatively flat (with ground level of around 5 to 6 mPD) and surrounded by several hills and mountain. The wind coming from the north would be weakened by the hills. However, strong wind from Tolo Harbour and the Tai Po Waterfront Park is expected to enter the Project Site under the annual condition. The prevailing ENE, E and ESE wind coming from Tolo Harbour would skim over the low-rise Tai Po Industrial Estate and arrive the Project Site.

6.2.2. Under the Baseline Scheme (20.74mPD), the ENE, E and ESE wind coming from Tolo Harbour are expected to enter the Project Site via the Dai Cheong Street and Dai Hung Street. The incoming wind would skim over the Tai Po Industrial Estate and reach the Project Site. In view of the building height of the Baseline Scheme (20.74mPD), the incoming wind is expected to skim over the structure and reach the downwind regions e.g. Yue Kok Village (~30mPD) and Riviera Lodge (108.5mPD) and Kau Yan College (max. 37.9mPD) (Light blue, dark blue and brown arrows in ***Figure 13***).

6.2.3. Under the Proposed Scheme (35.74mPD), the ENE, E and ESE wind are expected to enter the Project Site via the Dai Cheong Street and Dai Hung Street. Also, a cluster of industrial buildings in Tai Po Industrial Estate is located at the east of Project Site. It is expected that the low-level wind would skim over the Tai Po Industrial Estate and eventually arrive the Project Site. The 4-storey Proposed Scheme is expected to obstruct part of the incoming ENE, and E wind towards the downwind regions such as Rivera Lodge. Nevertheless, the greenery area along the southern site boundary acts as a setback (max. 10m-wide) from the Dai Fuk Street. The incoming ESE wind is anticipated to reach the downwind regions without obstruction by the Proposed Scheme, the Proposed Scheme does not cause significant impact on the ESE wind performance. (Brown arrows in ***Figure 14***). Moreover, openings at eastern and western building facades would allow some incoming E winds to penetrate the Proposed Scheme and minimize the adverse impact to air ventilation. (Dark blue arrows in ***Figure 14***).

Baseline Scheme

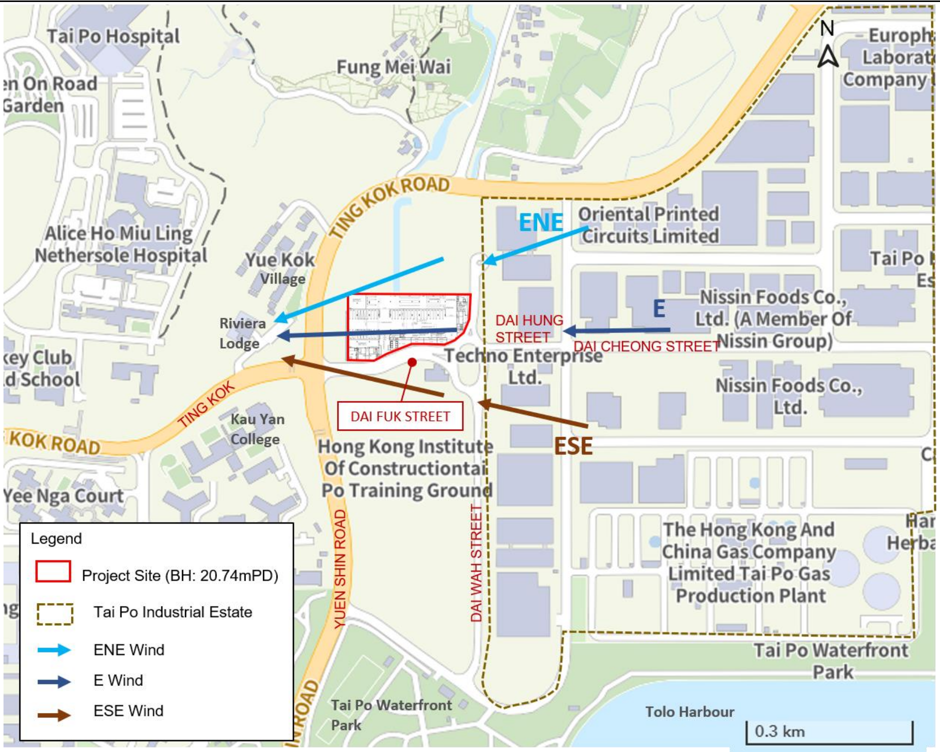


Figure 13 ENE, E and ESE Wind (Baseline Scheme)

Proposed Scheme

Figure 14 ENE, E and ESE Wind (Proposed Scheme)

6.3. SE WIND

6.3.1. SE wind is the annual and summer prevailing wind. The SE wind coming from Tolo Harbour and Tai Po Waterfront Park would skim over the low-rise Tai Po Industrial Estate and arrive the Project Site.

6.3.2. Under the Baseline Scheme (20.74mPD), the SE wind coming would skim over the low-rise Tai Po Industrial Estate and arrive the Project Site. The SE wind would further skim over the Baseline Scheme and reach the downwind regions including Yue Kok Village (~30mPD) (dark blue arrows in ***Figure 15***).

6.3.3. Similar to the Baseline Scheme, the incoming wind would skim over the low-rise Tai Po Industrial Estate. Under the Proposed Scheme (35.74mPD), the incoming SE wind would be reduced by the 4-storey Proposed Scheme and affect the immediate downwind areas. The Proposed Scheme would capture the incoming SE wind and divert to the low level. (Dark blue arrows in ***Figure 16***)

Baseline Scheme

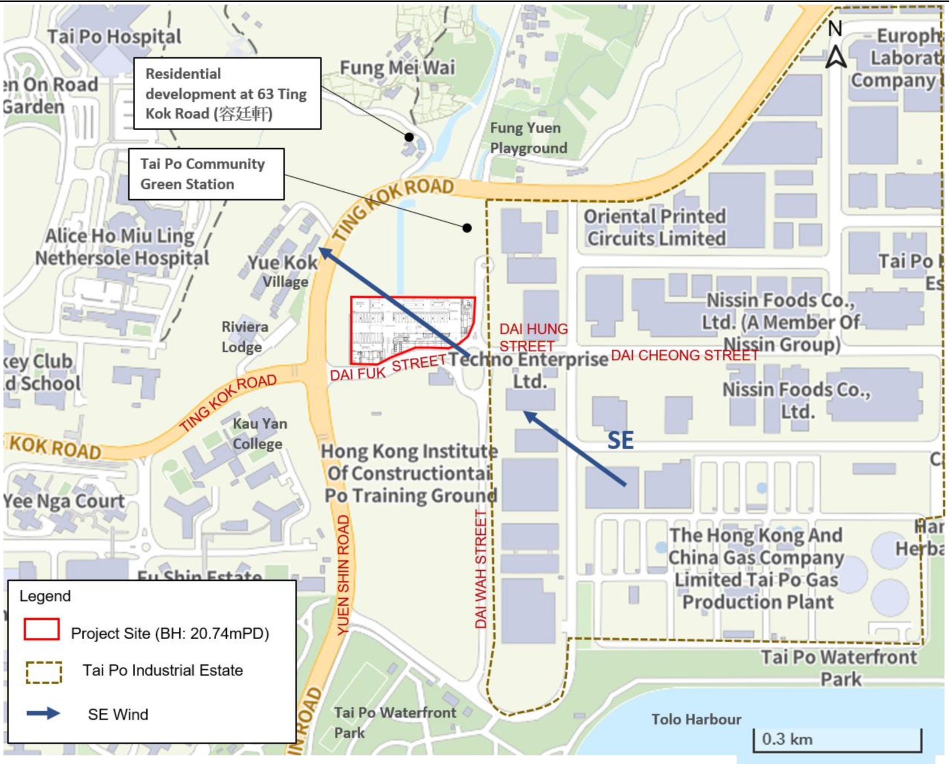


Figure 15 SE Wind (Baseline Scheme)

Proposed Scheme

Figure 16 SE Wind (Proposed Scheme)

6.4. S AND SSW WIND

6.4.1. S and SSW wind are the summer prevailing wind and mainly come from the Tolo Harbour. Sea breeze coming from Tolo Harbour would reach the Project Site through the wide continuous air path to the south of Project Site consist of Tai Po Waterfront Park and CIC Tai Po Training Ground (1-storey temporary structures, 10.5mPD). Moreover, the existing access roads (including Yuen Shin Road and Dai Wah Street) and Yuen Shin Park would act as the air paths and facilitate the summer wind arriving the Project Site.

6.4.2. Under the Baseline Scheme (20.74mPD), the summer S and SSW wind coming would reach the Project Site via the Tai Po Waterfront Park, Yuen Shin Park, CIC Tai Po Training Ground and the existing access roads. The S and SSW wind would further skim over the Baseline Scheme and reach the downwind regions including residential development at 63 Ting Kok Road (~15mPD), Tai Po Community Green Station and Fung Yuen Playground. (Light blue and dark blue arrows in ***Figure 17Figure 17***).

6.4.3. Similar to the Baseline Scheme, the incoming wind would flow along the wide continuous air path of Tai Po Waterfront Park and CIC Tai Po Training Ground (1-storey temporary structures, 10.5mPD) under the Proposed Scheme. Under the Proposed Scheme (35.74mPD), the incoming S and SSW wind would be reduced by the 4-storey Proposed Scheme and affect the immediate downwind areas. Nevertheless, the N-S axis aligned permeable design at G/F is widened to at least 15m-wide under the Proposed Scheme. The S and SSW wind would penetrate the Project Site via the 15m-wide permeable design with 6m headroom at ground floor and reach the downwind regions including residential development at 63 Ting Kok Road (~15mPD), Tai Po Community Green Station and Fung Yuen Playground (Light blue arrows in ***Figure 18***). In addition, the vast openings at the northern and southern façade are adopted to allow the natural ventilation and reduce the adverse impact to downwind regions caused by the Proposed Scheme (Light blue and dark blue arrows in ***Figure 18***).

Baseline Scheme

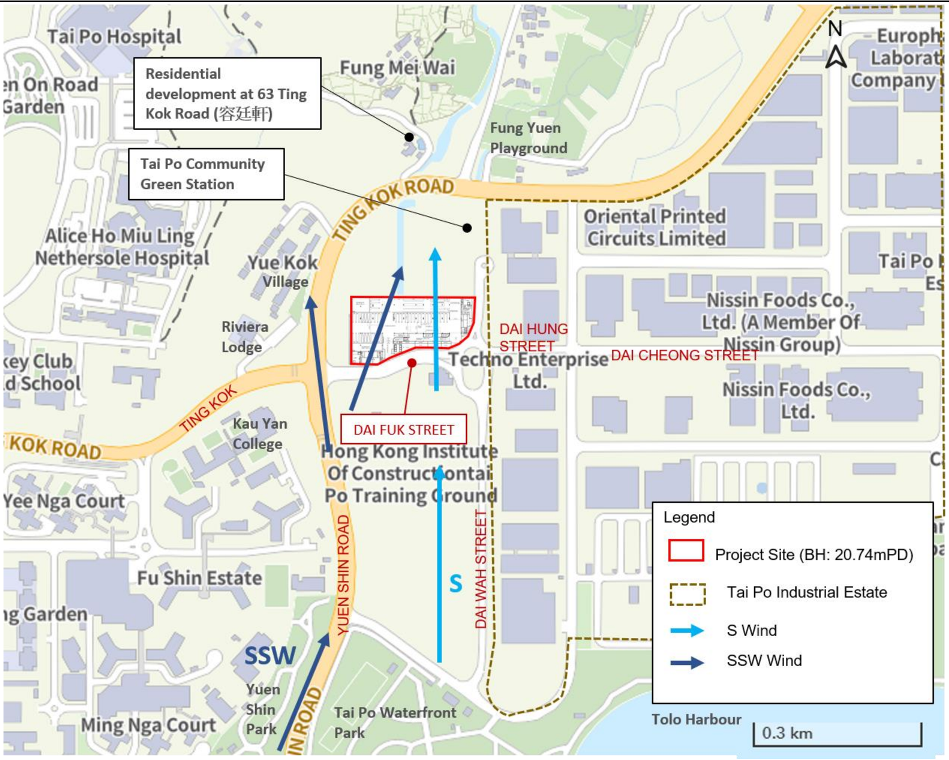


Figure 17 S and SSW Wind (Baseline Scheme)

Proposed Scheme

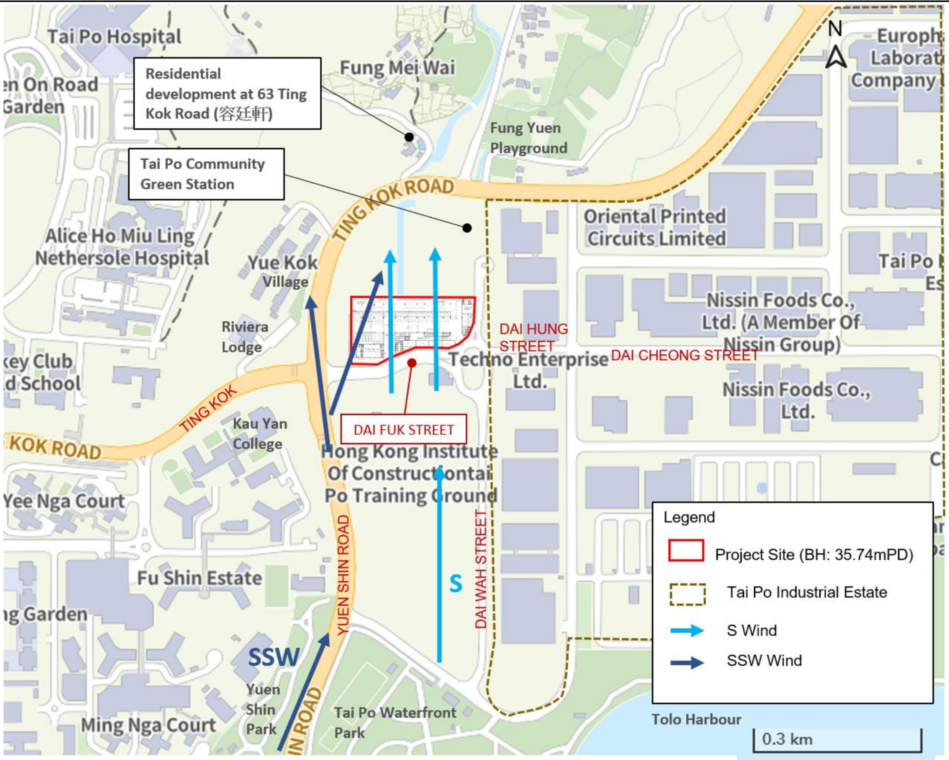


Figure 18 S and SSW Wind (Proposed Scheme)

7. CONCLUSIONS

7.1.1. An AVA-EE study was conducted for the Proposed KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po to provide qualitative evaluation of wind performance of the proposed development under the Baseline and the Proposed Scheme.

7.1.2. The Baseline Scheme represents a OZP compliance scheme with two-storey-height bus depot with maximum height of 20.74mPD. In view of the building height of the Baseline Scheme, the incoming wind would skim over the Baseline Scheme and arrive the downwind regions. The Proposed Scheme presents the 4-storey enclosed depot with vast opening at the northern, eastern, and southern building facades with maximum height of 35.74mPD. It is anticipated that the Proposed Scheme would affect the immediate downwind areas, nevertheless, the following good design features have been incorporated in the Proposed Scheme to minimize the adverse effect to the air ventilation performance.

Permeable Design at Ground Floor

7.1.3. Under the Proposed Scheme, the permeable design of min. 15m-wide N-S axis aligned opening with 6m headroom is adopted. It is anticipated that the opening would facilitate the north and south wind systems towards the downwind regions.

7.1.4. Setback and Greenery Area

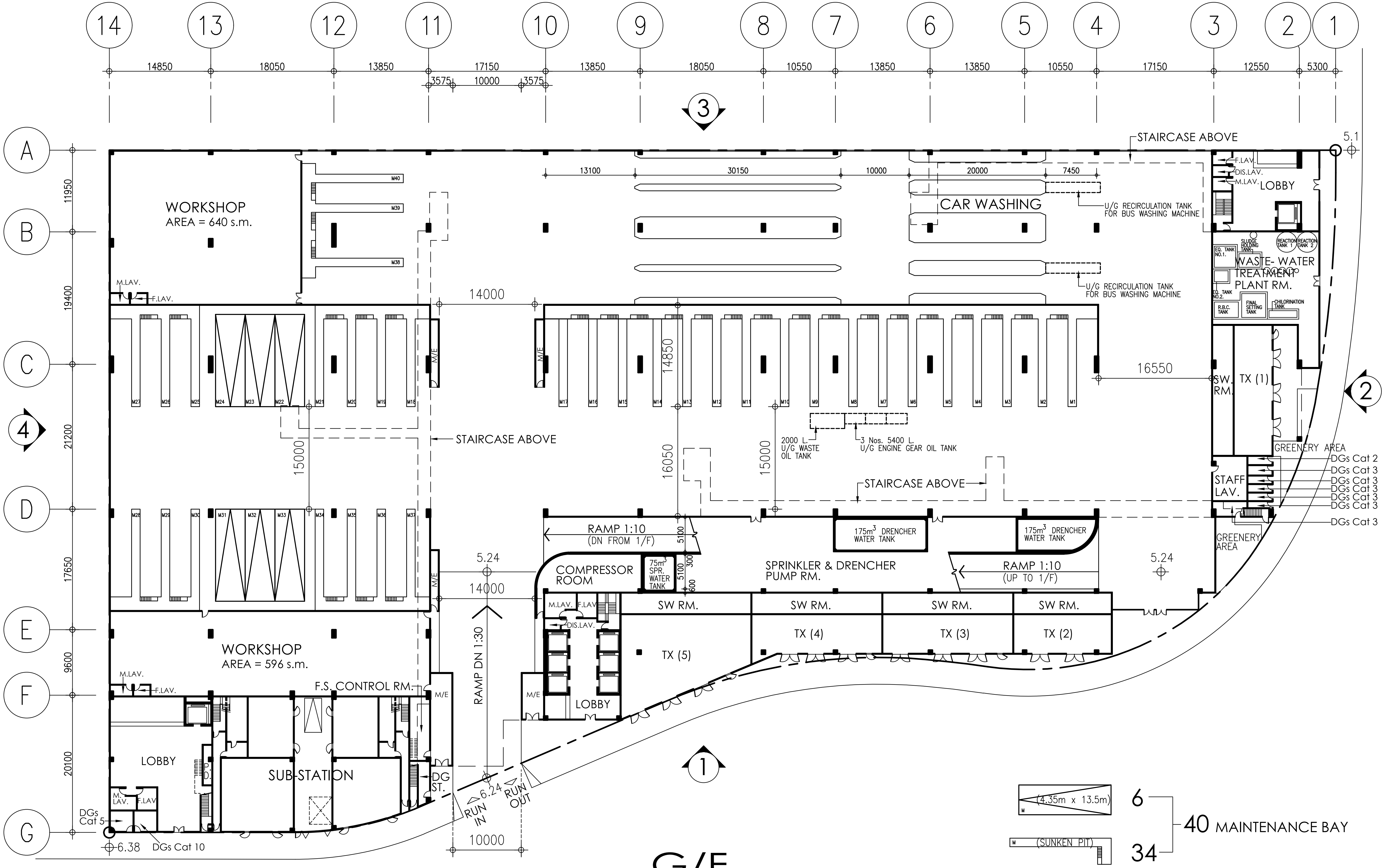
7.1.5. Part of the building block at the south is slimmed and converted to greenery area. It acts as a setback (max. 10m-wide) from the Dai Fuk Street and allow more annual ENE, E and ESE wind travelling to the downwind regions.

Vast Opening at the Building Façade

7.1.6. The vast openings are provided at the northern, eastern, and southern façade at G/F to 4/F to reduce the adverse impact to air ventilation caused by the Proposed Scheme. It is anticipated the openings would be effective to maximize the wind penetration in both annual and summer condition. At least 10% area of each façade will be designated to opening in order to optimize the use of natural ventilation. No openings will be provided at the G/F and 1F of western façade to minimize noise impact to the noise sensitive receivers located to the west of the proposed development.

7.1.7. The building height of the Proposed Scheme increased from 20.74mPD to 35.74mPD. Blockage effect to the immediate downwind regions is anticipated. Due to the building constraint, extensive openings such as: urban window in building facades cannot be provided. Nevertheless, the several good design features have been considered in the Proposed Scheme to minimize the adverse impact to the air ventilation.

Appendix A – Layout Plans and Sectional Drawings of the Baseline Scheme



G/F

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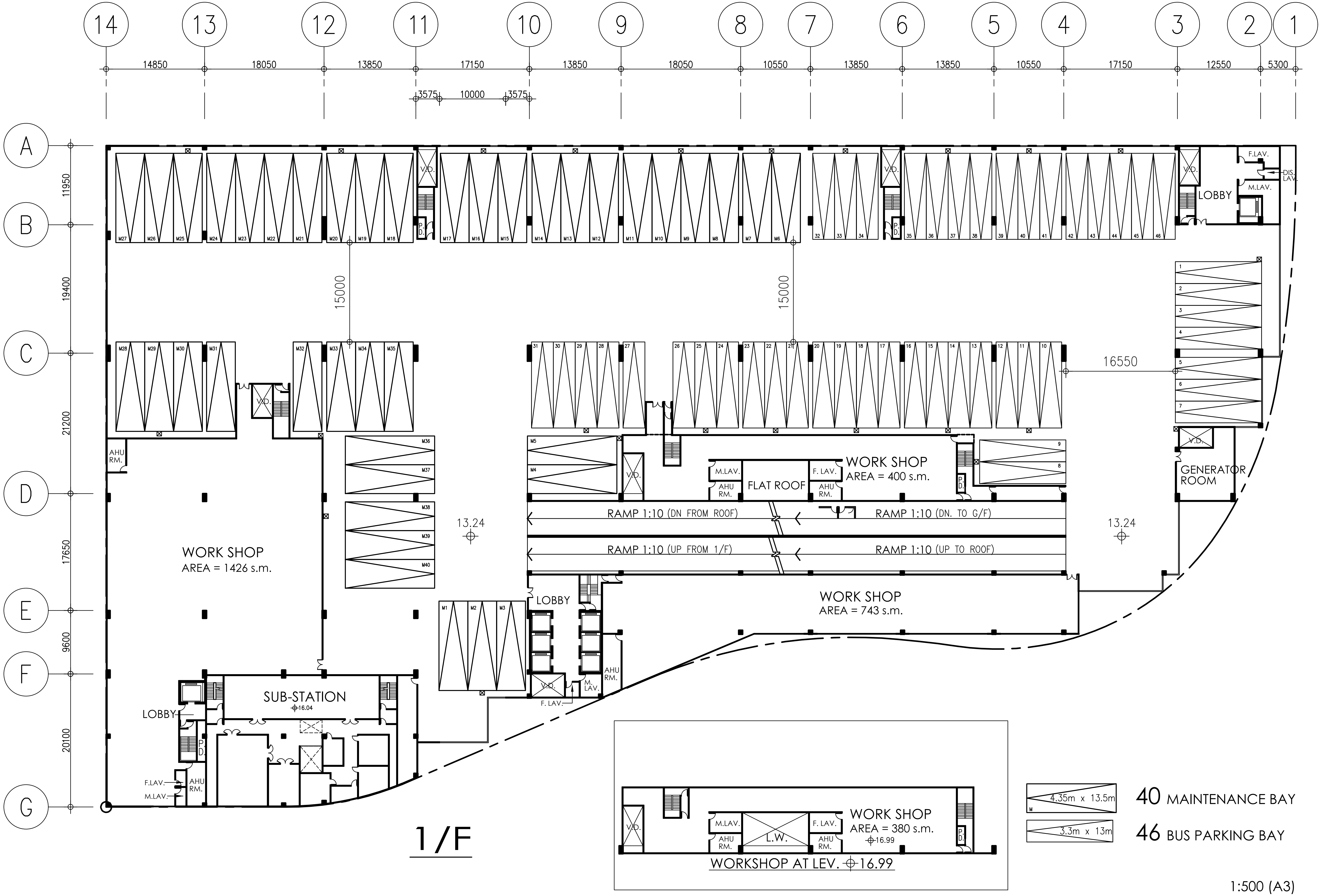
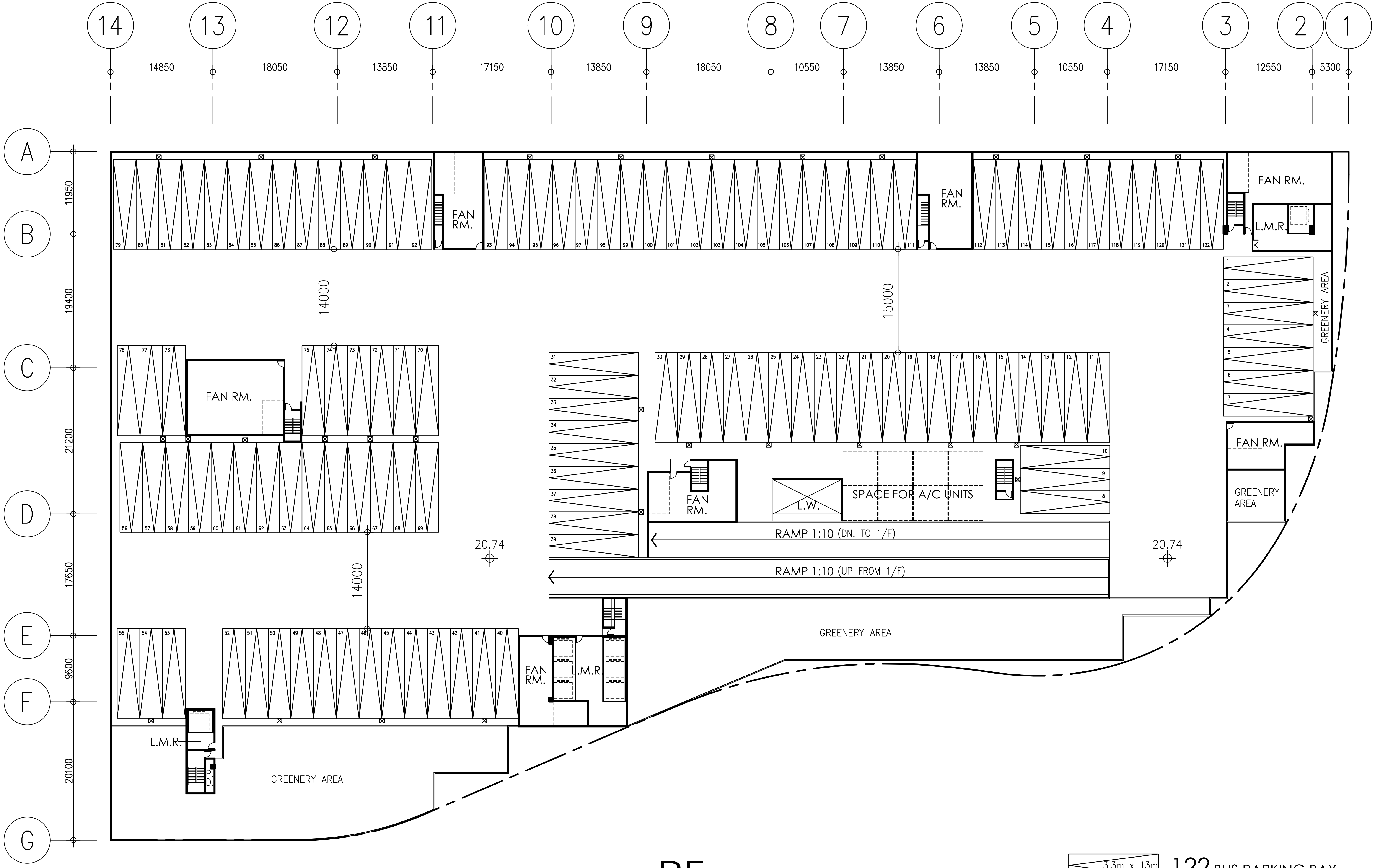
03-2022



1/F

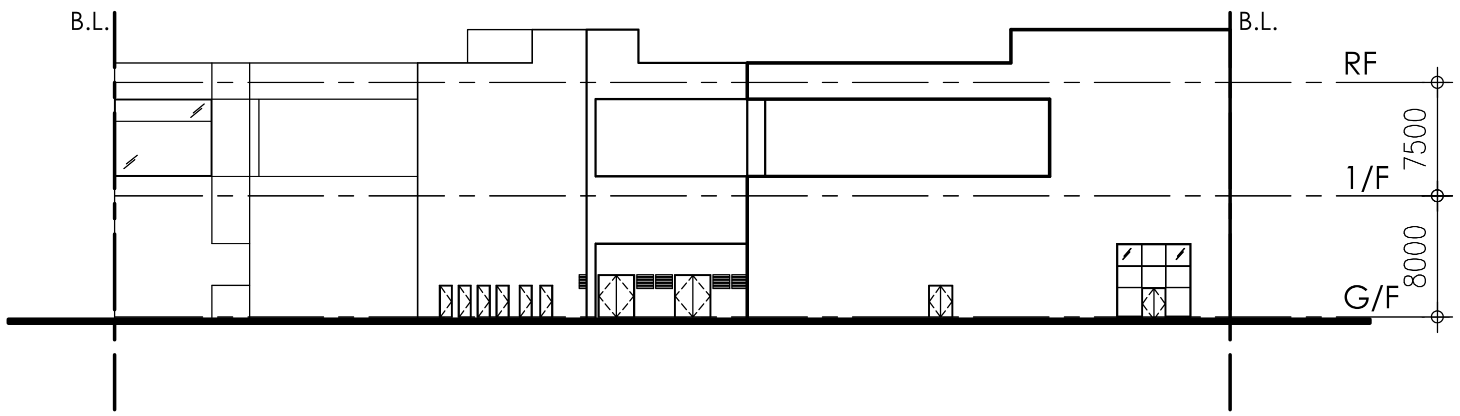
1:500 (A3)
03-2022



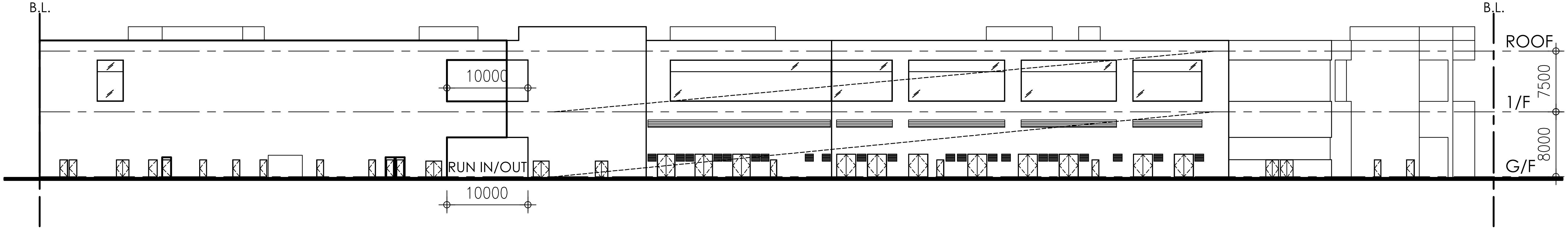
RF

3.3m x 13m 122 BUS PARKING BAY

1:500 (A3)
03-2022



ELEVATION '2'



ELEVATION '1'

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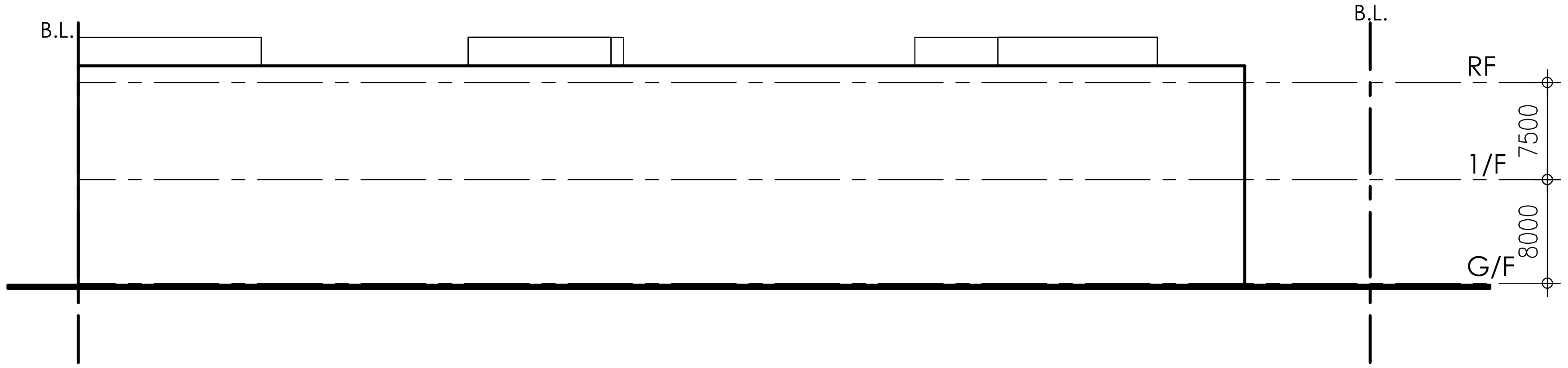
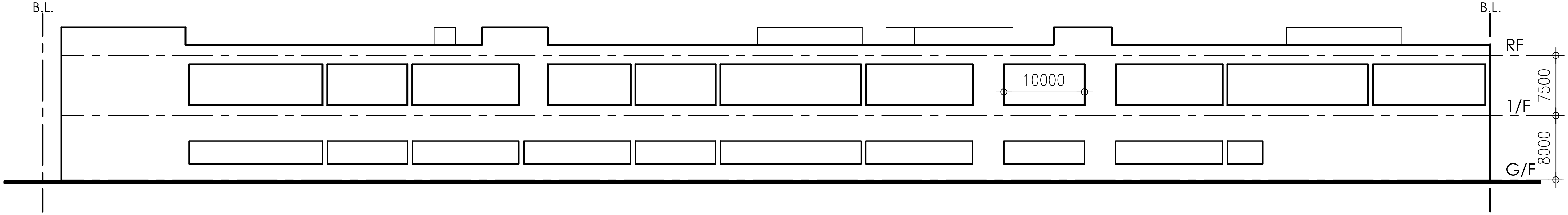


ELEVATION '4'



ELEVATION '3'

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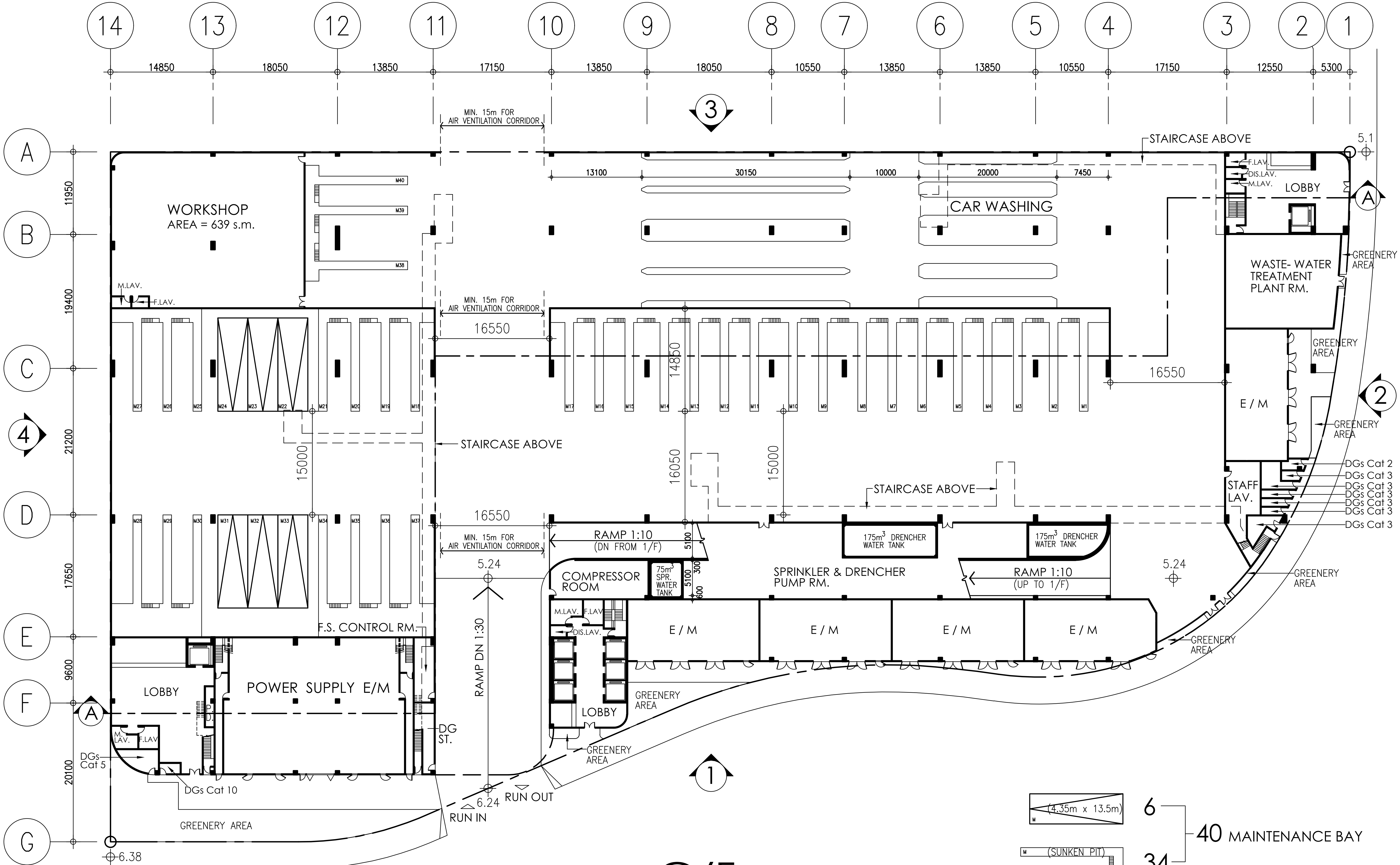
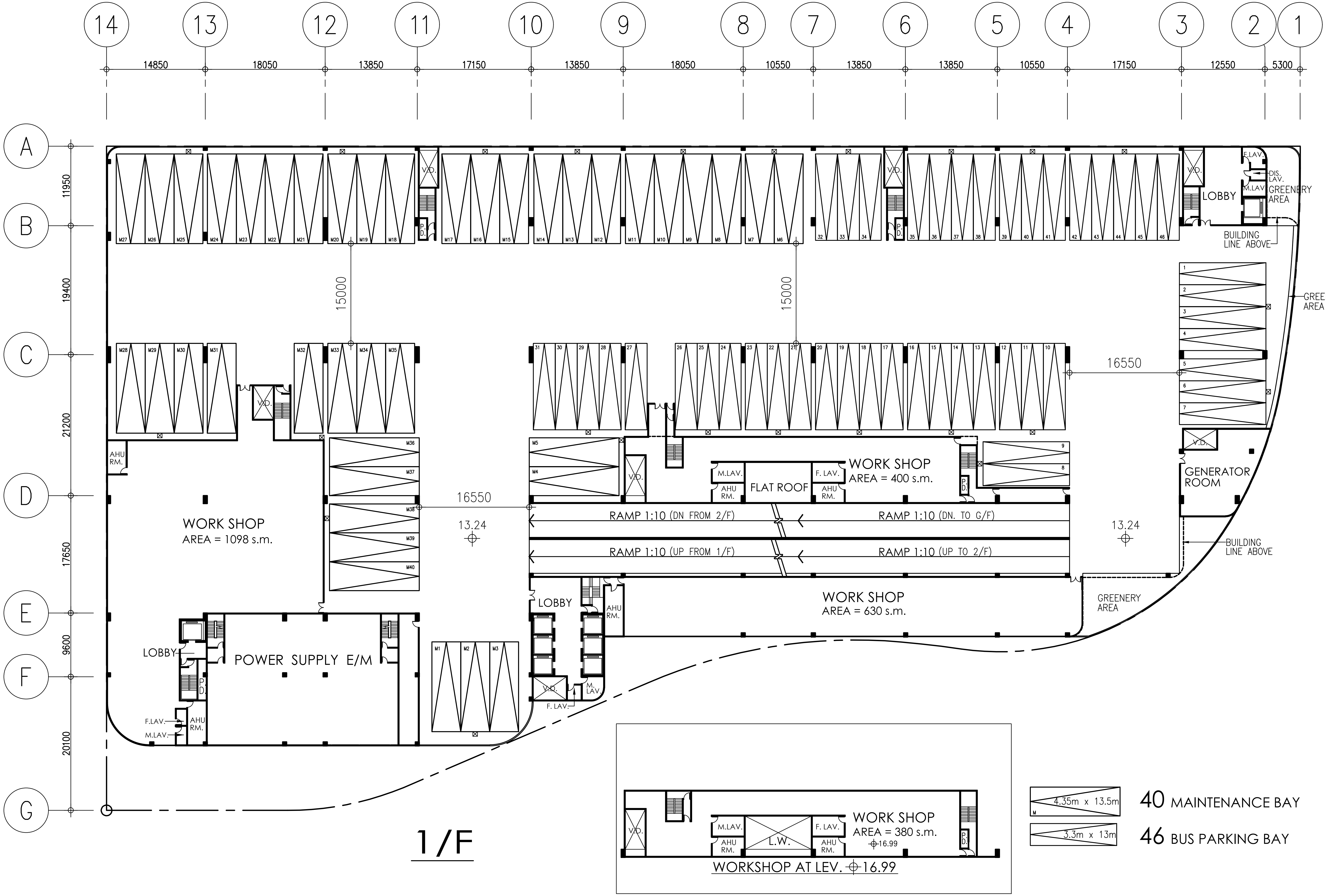
03-2022

Appendix B – Layout Plans and Sectional Drawings of the Proposed Scheme



G/F

JULY 2022 (1)



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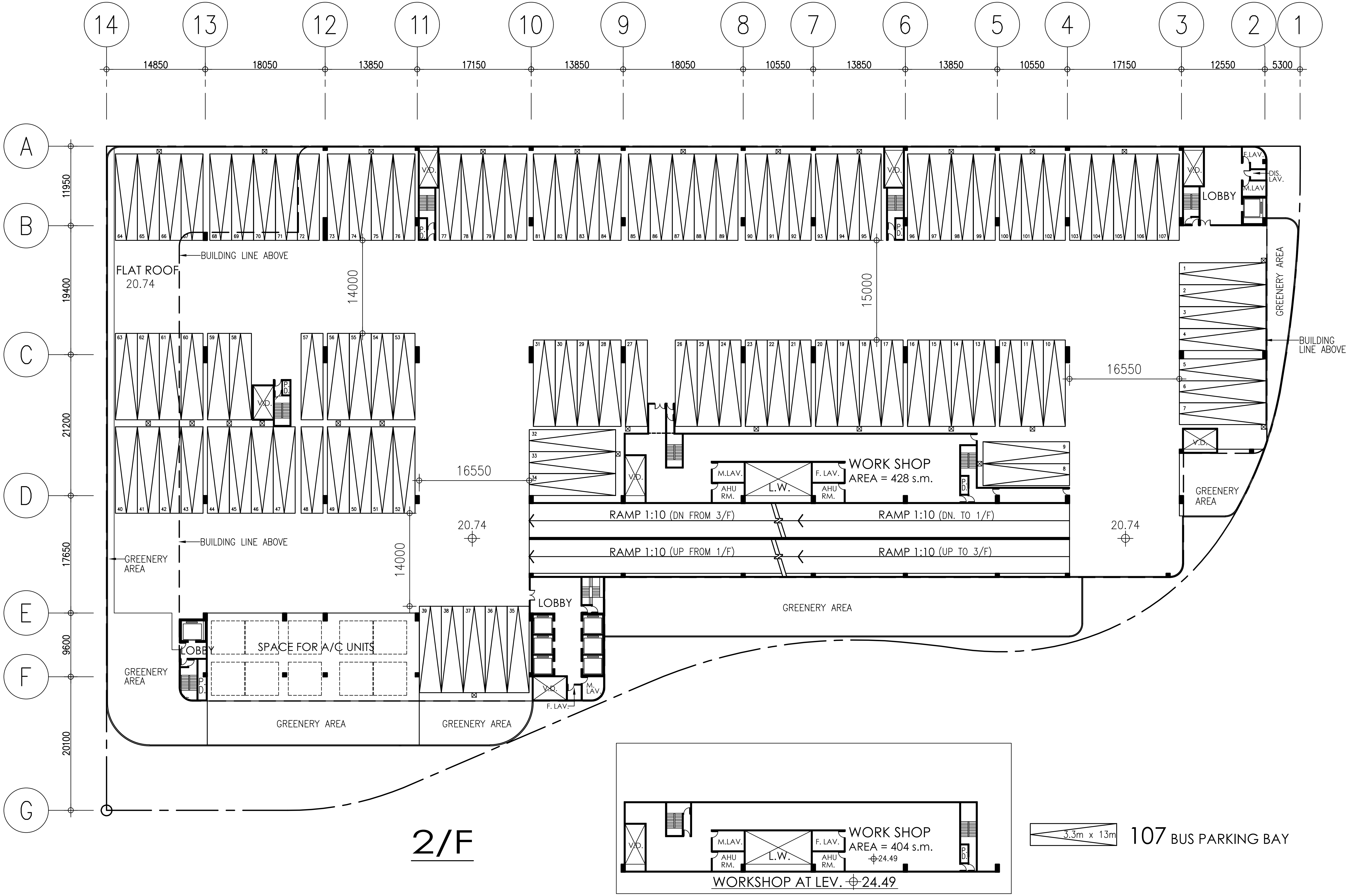

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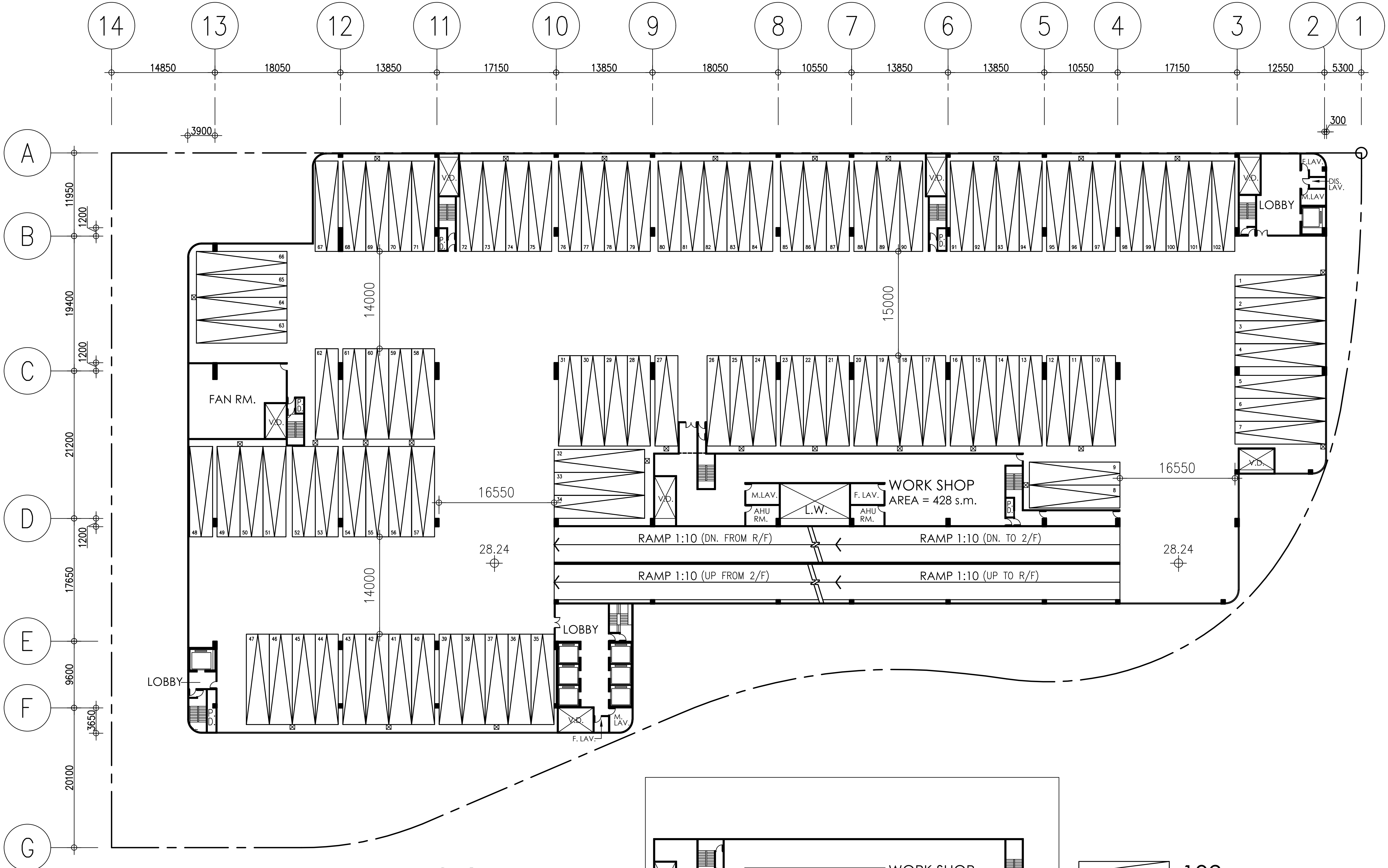

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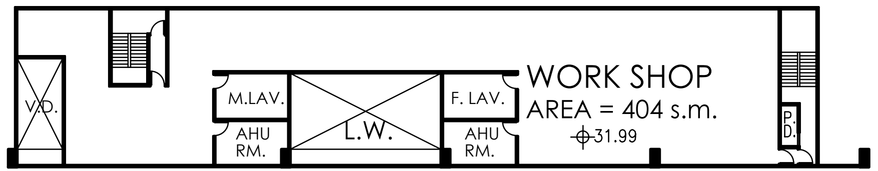
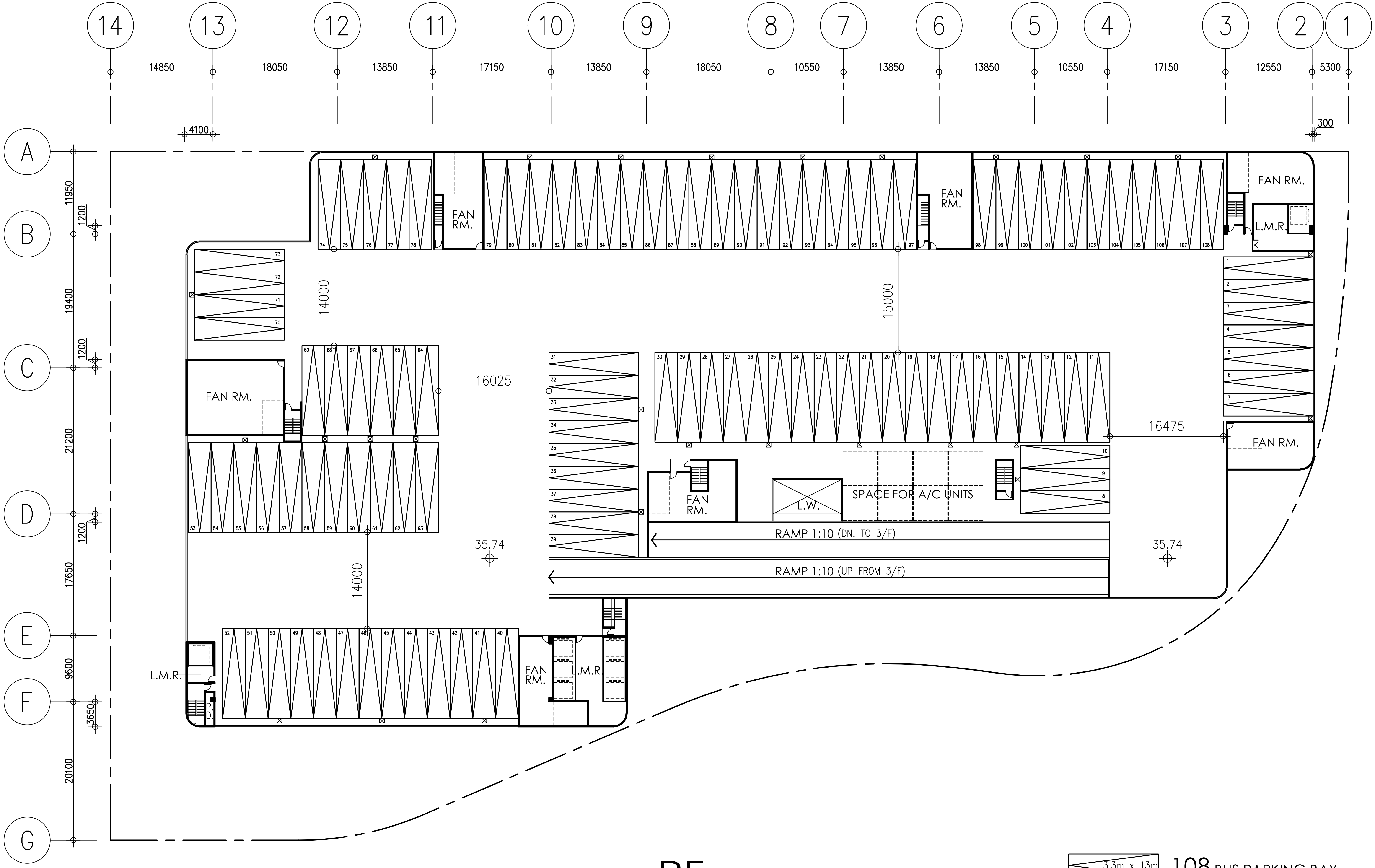


WORKSHOP AT LEV. ⌖31.99

▨ 3.3m x 13m 102 BUS PARKING BAY

JULY 2022 (1)

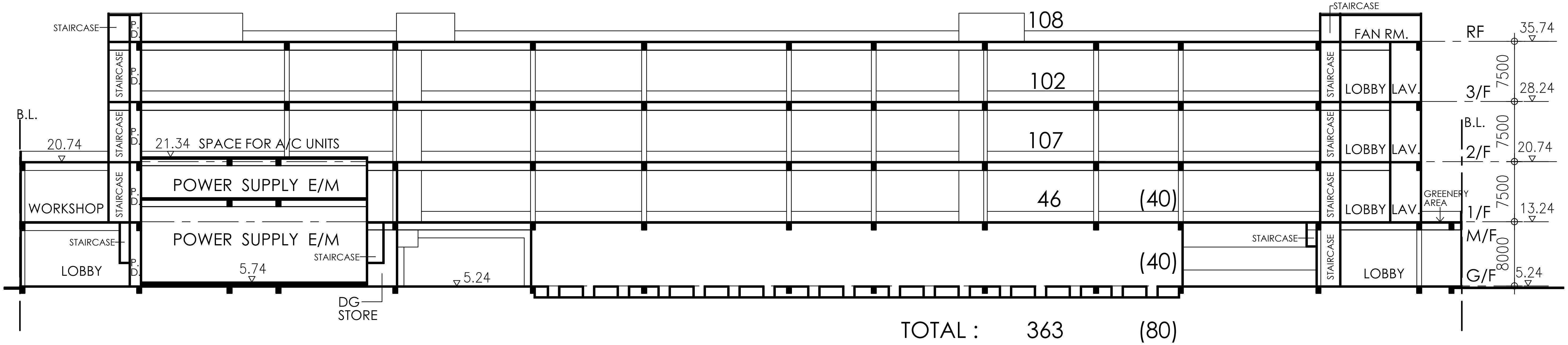


RF

3.3m x 13m 108 BUS PARKING BAY

JULY 2022 (1)

4 STOREYS



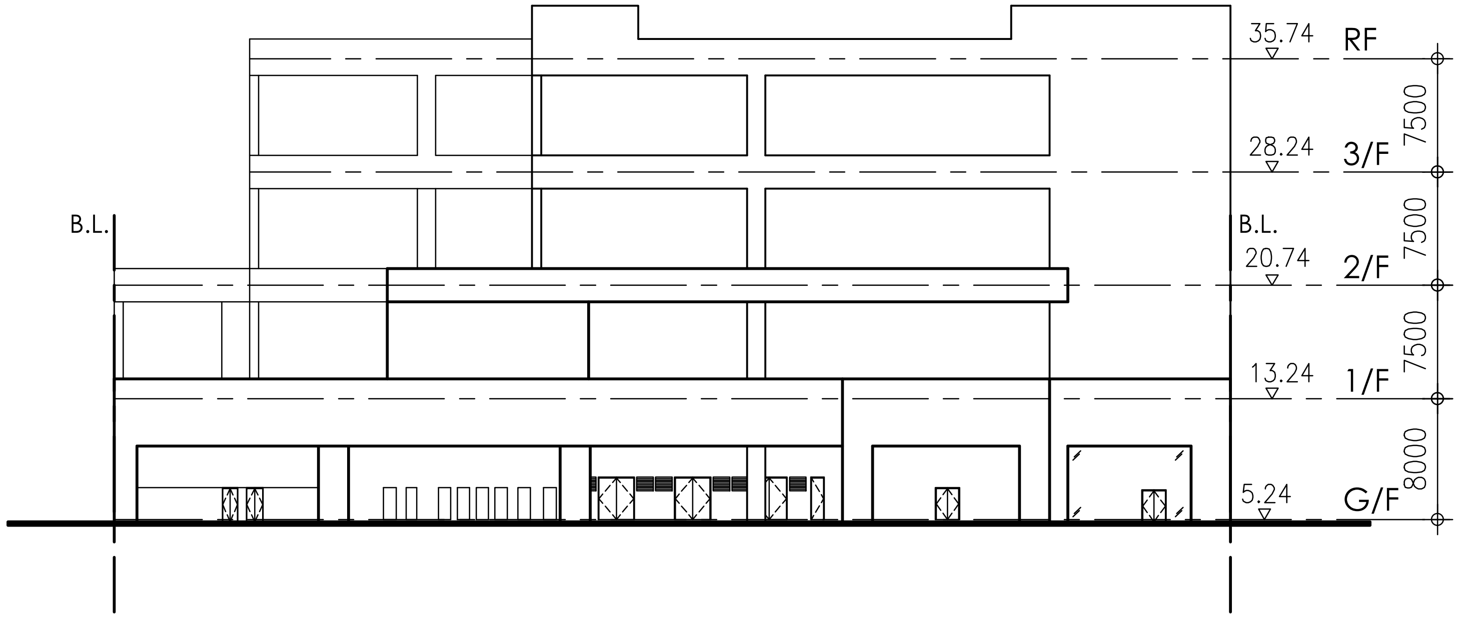
TOTAL : 363 (80)

BUS PARKING BAY

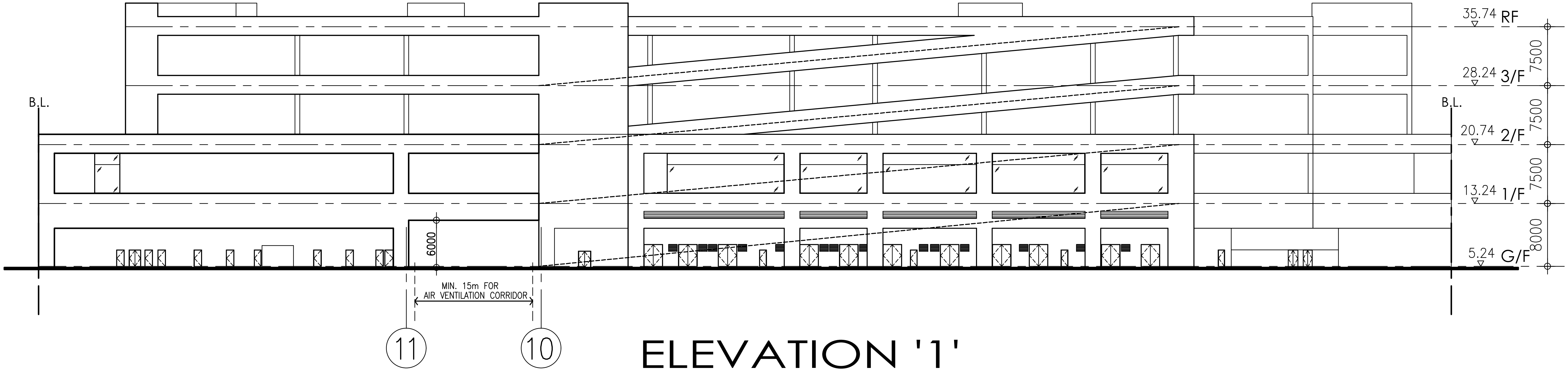
MAINTENANCE BAY

SECTION 'A' - 'A'

JULY 2022 (1)

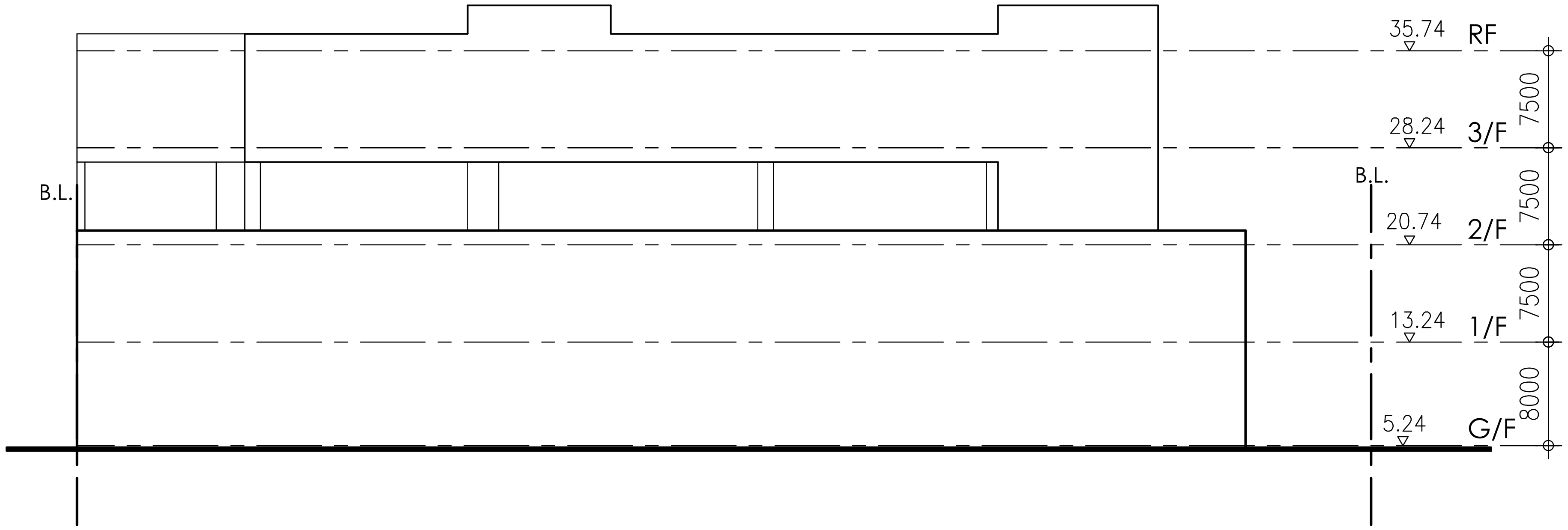


ELEVATION '2'

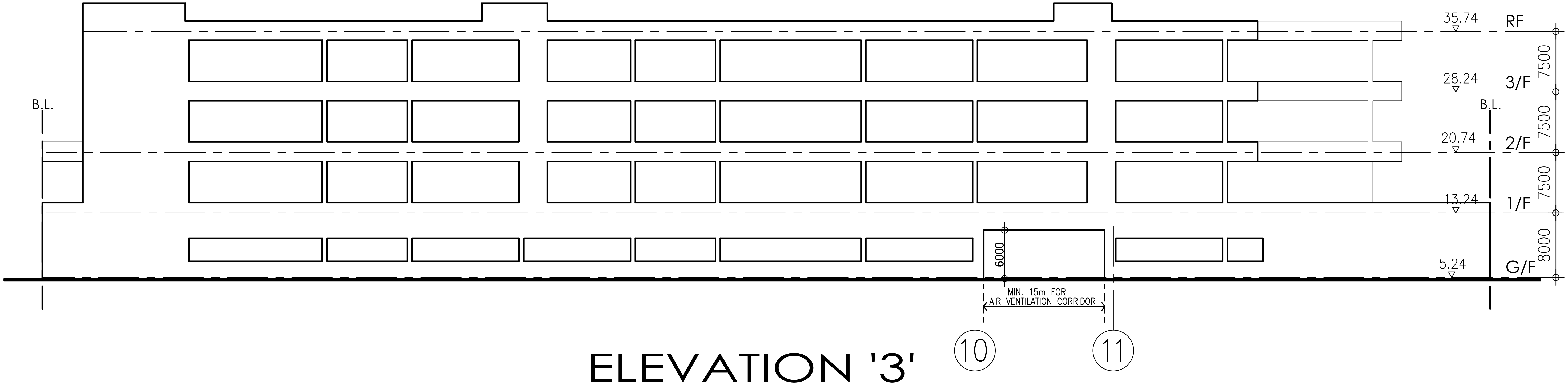


ELEVATION '1'

JULY 2022 (1)



ELEVATION '4'



ELEVATION '3'

JULY 2022 (1)

SITE COVERAGE AND PLOT RATIO CALCULATION :

SITE AREA : 14600 s.m.
CLASS OF SITE : ' B '

ACTUAL SITE COVERAGE

SITE COVERAGE (ABOVE 15m) : 11315 s.m. / 14600s.m. x 100% = 77.50 %
SITE COVERAGE (UNDER 15m) : 13918 s.m. / 14600s.m. x 100% = 95.33 %

ACTUAL GROSS FLOOR AREA

GROUND FLOOR : 13918 s.m. + 653 s.m. = 14571 s.m.
1st FLOOR : 13688 s.m. + 475 s.m. = 14163 s.m.
2nd FLOOR : 11315 s.m. + 502 s.m. = 11817 s.m.
3rd FLOOR : 11315 s.m. + 502 s.m. = 11817 s.m.

TOTAL = 52368 s.m. (PLOT RATIO = 3.59)

Issue No. : 5
Issue Date : Feb 2023
Project No. : 1849

DRAINAGE AND SEWERAGE IMPACT ASSESSMENT

FOR

KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Prepared by

Allied Environmental Consultants Limited

COMMERCIAL-IN-CONFIDENCE

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Document Verification

Project Title	KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po	**Project No.**	1849
Document Title	Drainage and Sewerage Impact Assessment		

Issue No.	**Issue Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**
1	Oct 2021	1st Submission	Jamie Kam	Cathy Man	Grace Kwok
2	Mar 2022	2nd Submission	Jamie Kam	Cathy Man	Grace Kwok
3	Jul 2022	3rd Submission	Helen Siu	Cathy Man	Grace Kwok
4	Nov 2022	4th Submission	Helen Siu	Cathy Man	Grace Kwok
5	Feb 2023	5th Submission	Helen Siu	Cathy Man	Grace Kwok

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1. Introduction

1.1.1. Allied Environmental Consultants Limited (AEC) was commissioned by the Kowloon Motor Bus Company (1933) Limited (KMB) to undertake the Consultancy Service for the Section 16 Town Planning Application for the KMB Tai Po Bus Depot (hereinafter refer to as the "proposed Project").

1.1.2. The Project Site with a site area of 14,600 m^2 is located on the northeastern outskirts of Tai Po Town, bounded by Ting Kok Road to the west and Dai Fuk Street to the south. It will be served as a depot for electric buses ("eBus") only. eBus will be charged and parked overnight, vehicular maintenance activities and bus washing will also be carried out within the Project Site.

1.1.3. This Drainage and Sewerage Impact Assessment (DSIA) is prepared in support of the Section 16 Planning Application to identifies and assesses the potential impacts on public drainage and sewage system and recommends mitigation measures where required, for the construction and operation of the proposed Project. This S16 Planning Application aims to relax the building height from the current 2-storey restriction to 4-storey high, in order to provide 363 nos. bus parking space and charging facilities for electric buses (eBus) in future.

1.1.4. According to Part 1 Schedule 2 Section A.6 (Roads, railways and depot) of the Environmental Impact Assessment Ordinance (EIAO), a transport depot located less than 200m from the nearest boundary of an existing or planned (a) residential area; (b) place of worship; (c) educational institution; or (d) health care institution shall be classified as a Designated Project. As the Project is located at less than 200m from residential developments, namely Yue Kok Village and Riveria Lodge, and educational institutes, including Kau Yan College, it is therefore classified as a Designated Project. Permission to apply directly to permit (DIR) under EIAO is also applied concurrently/ subsequently with this S16 Planning Application.

2. The Proposed Project and Existing Environment

2.1.1. The Proposed Project is situated at the northeastern outskirts of Tai Po Town, bounded by Ting Kok Road to the west and Dai Fuk Street to its south. The location of the Proposed Project and its environs is presented in **Figure 2.1**. The proposed layout plan is attached in **Appendix 2.1**.

2.1.2. The Project Site falls within an area zoned “Other Specified Uses” annotated “Bus Depot” (“OU (Bus Depot)”) on the approved Tai Po Zoning Plan (OZP) (No. S/TP/30). It is currently held by KMB under a Short Term Tenancy (STT) granted by the Government for bus parking (including washing & refilling).

2.1.3. The proposed project will be constructed in the form of a 4-storey depot providing around 363 nos. charging-enabling bus parking bays for eBus only. The building height of the proposed depot is 30.5m tall at +35.74 mPD. The proposed project comprising various facilities for vehicle washing and repair operation, vehicle parking and charging as well as offices. It is anticipated to be constructed in Year 2022, and completed in Year 2025 tentatively. The Project Site is currently paved with concrete surface and the proposed depot is fully covered.

2.1.4. Four automatic vehicle washing machines will be installed in the proposed depot, which are equipped with simple filtration to treat wastewater generated from vehicle washing. The treated effluent will be reused for vehicle washing only, and will not be reused on other purposes such as portable uses, flushing, irrigation or floor cleaning.

2.1.5. Based on the best available information at the time of this study, there are 500mm diameter rising mains run along Ting Kok Road and Dai Fuk Street at the west and south of the site respectively. However, there is no public foul sewer identified along Dai Fuk Street, Dai Wah Street and Ting Kok Road. The existing sewerage system at the vicinity is illustrated in **Figure 2.2**. Therefore, the existing Sewage Treatment Plant (STP) at the southwest corner of the depot will be demolished and rebuilt on site in this proposed project. The re-provided STP will be located near the northeast corner of the Project Site. The location of existing and re-provided STP, as well as the discharge point of the treated effluent from the re-provided STP is presented in **Figure 2.4**.

2.1.6. Based on the drainage layout plan of the existing depot in **Appendix 2-2**, there are storm water manholes and pipes throughout the site. On the other hand, public storm water drains are available at the south of the Project Site, along Dai Fuk Street and connecting to the box culvert at Dai Wah Street. The existing drainage system at the vicinity is presented in **Figure 2.3**.

2.1.7. The surface runoff and treated effluent from the on-site STP from the Proposed Project will be collected by the storm water manholes and surface channel within the Project Site, and discharged to the stormwater terminal manhole (SWTM01), to be diverted to the public stormwater manhole SMH1000577. The preliminary layout of drainage system from G/F to R/F is provided in **Figure 2.5** for indicative purpose only and subject to review and confirm during detail design stage.

3. Environmental Legislation, Standards and Guidelines

3.1. General

3.1.1. Water quality in Hong Kong is legislated by the provisions of the Water Pollution Control Ordinance (Cap 358) (“WPCO”). Hong Kong Waters are divided into ten Water Control Zones (“WCZ”) and four supplementary water control zones. The Project Site is in the Tolo Harbour and Channel WCZ. The Technical Memorandum on Standards for Effluents discharged into Drainage and Sewerage Systems, Inland and Coastal Water gives guidance on the permissible effluent discharges based on the type of receiving water (foul sewers, storm water drains, inland and coastal waters). The water quality standards as stipulated in the TM-DSS will have to be met during the construction and operation stages.

3.1.2. With reference to Table 7 of TM-DSS, as the proposed project is located within Tolo Harbour and Channel WCZ, the pollutant loading for effluents discharged into coastal waters of the respective WCZ shall be considered. The standards of effluents discharge of Biochemical Oxygen Demand (BOD) and Suspended Solids (SS) are extracted below.

Table 3-1 Standards for Effluents Discharge under TM-DSS

Load Type	**Standards for effluents discharge (mg/L)**	
	Flow rate <=1000 m^3/day	**Flow rate >1000 m^3/day and <=6000m^3/day**
BODs	20	10
SS	30	15

3.1.3. As stipulated in the Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations 41(1), 40(2), 41(1), 90 and recap in ProPECC PN 5/93, foul water should be discharged to a foul sewer and surface water should be discharged via rainwater pipes to stormwater drains.

3.1.4. With reference to ProPECC PN 5/93 item (6), suitable treatment facilities may be required to be provided if trade waste may be discharged into any drain or sewer. Moreover, as stated in item (9) of the same Practice Note, the design of small sewage treatment plant should in general meet the requirements given in the “Guidelines for the Design of Small Sewage Treatment Plants” published by EPD. The recommendations in designing small sewage treatment plant shall be considered and followed.

3.1.5. Other relevant guidelines include:

- Water Pollution Control Ordinance (WPCO);
- Hong Kong Planning Standards and Guidelines issued by the Planning Department;
- Water Supplies Department (WSD) Water Quality Criteria;
- Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (WPCO-TM);
- Practice Note for Professional Persons on Construction Site Drainage (ProPECC PN 1/94);
- Practice Note for Professional Persons on Drainage Plans subject to Comment by the Environmental Protection Department (ProPECC PN 5/93);
- Sewerage Manual (SM) and the Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF); and
- Guidelines for the Design of Small Sewage Treatment Plants issued by EPD.

4. Sewerage Impact Assessment

4.1. Scope

4.1.1. The aim of this Sewerage Impact Assessment (SIA) is to assess the sewage discharge requirement arising from the proposed project, and whether the capacity of the existing sewerage network serving the project site is sufficient to cope with the sewage from the proposed project. Recommendations will also be made to cater for the situation in case there is no sufficient capacity of the existing sewerage network.

4.2. Identification of Pollution Sources during Operation Phase

4.2.1. Major potential sources of sewerage impact during operation phase of the proposed project are identified as follows:

- Sewage generated from staff at office and depot; and
- Sewage generated from automatic vehicle washing machine.

4.3. Estimation of Sewage Flow from Proposed Project

4.3.1. Sewage from the operation of the proposed project would be mainly generated from toilet facilities in workshop and office (i.e. sanitary wastewater), and four automatic vehicle washing machines to serve 363 nos. buses parked in the depot. No catering services, e.g. canteen, will be provided in the proposed project. The generated sewage will not comprise of any heavy metal.

4.3.2. Based on the total number of staff as advised by the operator, the amount of sewage generated from staff in depot is estimated in **Table 4-1** and **Appendix 4-1**.

Table 4-1 Total Number of Staff and the Estimated Sewage Generation

Staff	**Person**	**Unit Flow Factor [1]**	**Average Dry Weather Flow (ADWF)**
		m^3/person/day	**m^3/day**
Office Staff	50	0.18	9
Maintenance Staff	320	0.18	57.6
		Total	66.6

Remarks:

[1]: Referring to Table T-2, Category J3 (Transport, Storage and Communication) and Commercial Employee, under the Guidelines for Estimating Sewage Flow for Sewage Infrastructure Planning Version 1.0 (EPD/TP 1/05) issued by the Environmental Protection Department.

4.3.3. Potential contaminated water with oil, grease and suspended solids may be generated from four automatic vehicle washing machines. The machines would be equipped with water recycling system. According to the operator, around 70% of the wastewater will be recycled and reused by the automatic vehicle washing machines. Water loss from evaporation is expected. The wastewater will be collected and discharged to the on-site STP only when the sump pit of 8m^3 (size of 2m x 2m x 2m) overflows. It is assumed that 30% of the water from vehicle washing machines will be discharged to STP as a conservative approach.

Table 4-2 Parameters and Estimated Sewage Generation of Automatic Vehicle Washing Machine

Parameters		Unit	Remarks
No. of Service	500	wash/day	Provided by 4 automatic vehicle washing machine
Water Consumption	250	L/min	
Duration of each Washing	2	min/wash	
Estimated Water Consumption	250	m^3/day	
Efficiency of Wastewater Recycling	70	%	It is assumed that 70% of wastewater in the machine will be reused, and 30% will be discharged to STP.
Estimated Wastewater to STP	**75**	m^3/day	

4.3.4. To summarize, the total average dry weather flows (ADWF) from staff and automatic vehicle washing machines is estimated to be 141.6 m^3/d (66.6 m^3/d + 75 m^3/d). The detail calculation of sewage generation from the proposed project is shown in **Appendix 4-1**.

4.3.5. As mentioned in **S2.1.5**, the existing STP will be demolished and re-provided onsite in the proposed project. The contaminated wastewater would be properly collected and treated within the re-provided STP before discharging to the public drainage system. Oily waste collected by petrol interceptors onsite is considered and disposed of as chemical waste.

4.4. Potential Impact on Public Sewerage System

4.4.1. As mentioned in S2.1.5, there are existing rising mains run along Ting Kok Road and Dai Fuk Street. No public sewer pipe connected from the Project Site to the surrounding sewerage network. Furthermore, the sewage generated onsite will be treated by the re-provided STP and discharged to the public drainage system eventually. Hence, no sewage generated will be discharged to the public sewerage system and impact is not envisaged.

4.5. Onsite Sewage Treatment Plant

4.5.1. "Guidelines for the Design of Small Sewage Treatment Plants" (The STP Guidelines) and WPCO should be followed in designing the on-site STPs in the later detail design stage. The exact treatment process would be subject to later detailed design. It will be necessary for the STP to achieve adequate treatment capacity and the necessary discharge standards, as set out in EPD's Technical Memorandum – Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters.

4.5.2. The capacity of the STP shall be designed to cater for the design flow rate from the proposed project, the design flow factor of 3 times of the ADWF is adopted for the proposed project, with provision of equalization tank. Two duty and one standby pumps will be provided in equalization tanks as far as practicable to limit the flow through the treatment units to within 1.5 times the daily average flow rate during average flow rate during off-peak periods.

4.5.3. A re-provided STP will be constructed to cater for the design peak flow of 424.8 m^3/d, with the provision of an equalization tank. The calculation is given in ***Table 4-3*** and ***Appendix 4-2***.

Table 4-3 Estimation of the Required Volume for the Sewage Treatment Plant

Average Dry Weather Flow (ADWF) (m3/day)		**Total Average Dry Weather Flow (ADWF) (m3/d)**	**ADWF factor [1]**	**Design Peak Flow Rate from Proposed Project (m^3/d)**	**Design Flow Rate from Proposed Project (m^3/hr)**
Sewage (Staff)	**Bus Washing**				
66.6	75.0	141.6	3	424.8	17.7

Note:

[1] The design peak flow factor is reference from EPD's '"Guidelines for the Design of Small Sewage Treatment Plants". For the Proposed Development, 3 times Average Dry Weather Flow (ADWF) is adopted, with equalization tank provided to equalize excess flow.

4.5.4. Sludge storage tank with deodorization facilities will be provided in the STP. The sludge after having been dewatered and thickened will be tankered away to the landfill for disposal, subject to confirmation with future licensed collector/ contractor. All wastewater, if any, generated from the sludge dewatering process should be treated properly by the proposed on-site STP.

4.5.5. As is good practice for STP, measures will be incorporated into the design to minimize the risk of emergency overflow from the STP. As the STP is designed to cater for a peak flow of 3 times the daily average flow rate, 2 duty and 1 standby pumps should be provided in equalization tanks as far as practicable to limit the flow through the treatment units within 1.5 times the daily average flow rate during off-peak periods. This is to even out the flow as much as possible. Other measures include secure power supplies and appropriate alarms, as well as comprehensive Operation and Maintenance procedures, to keep the facilities in good working order. Holding tank for emergency storage/retention will be included with adequate capacity (e.g. to store 6-hour of ADWF discharge) to minimize need of emergency discharge. In the event of any emergency overflow, on-call crews will follow the overflow emergency response plan and proceed with the best response to correct the problem at once. For example, the alarm system will be activated once overflow occurs. The on-call crews will provide instant response by acknowledging the alarm, to investigate the cause of overflow and correct the problem. The alarm system will be repeated until it is acknowledged. In addition, the on-call crews will ensure the standby pump is switched on and contain the overflow sewage using temporary weirs or vacuum trucks, where applicable.

4.5.6. The STP will also be subject to regular maintenance to ensure it functions in designed condition and optimal performance, and can minimize any emergency situation. KMB will be responsible for construction and maintenance of the STP. In addition, regular self-monitoring will be conducted to ensure the quality of the treated effluent shall meet the applicable standard before discharge. Monitoring program will be devised for Terms & Conditions of the system. A discharge license will be applied prior the development commencement and monitoring requirements under the license would be strictly followed as per WPCO. Necessary discharge standards, as set out in EPD’s Technical Memorandum – Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters will be adopted.

4.6. Estimation of Pollutants Loading from Proposed Project

4.6.1. With reference to the STP Guidelines, the following unit load factors ("ULFs") for different types of pollutant generated from the proposed project as shown in ***Table 4-4*** have been used in calculation of total pollutant loads.

Table 4-4 Unit Load Factor

Load Type	**Unit Load Factor**
	Services [1]
BODs (kg/day/person)	0.023
SS (kg/day/person)	0.023

Remarks:

[1]: The recommended loadings for BOD and SS for Office (not including canteen) Appendix 2 in "Guidelines for the Design of Small Sewage Treatment Plants" by EPD are adopted for the calculation for worst case scenario for pollutant loadings generated from the Project Site.

4.6.2. The loadings of pollutants generated from the raw sewage from the proposed project is summarized in ***Table 4-5***.

Table 4-5 Estimated Pollutant Loadings from Proposed Project

Load Type	**Pollutant Loadings (kg/day)**
	Services
SS	8.51
BOD	8.51

4.7. Polluting Loads Removal Requirements

4.7.1. According to WPCO TM-DSS, sewage shall be treated to acceptable standards prior discharge to stormwater drainage, before discharging to the coastal waters of Tolo and Port Shelter WCZ. The STP shall be designed to remove sufficient BOD and SS in the sewage generated from proposed project, to the effluent standards set out, for Group I Coastal Waters, in the Technical Memorandum before discharging into the drainage network. The pollutants loading generated from the proposed project, and the standards for effluents discharge are illustrated in ***Table 4-6***:

Table 4-6 Loading from the Proposed Project

Load Type	Loading from the Proposed Project (kg/day)	Sewage Flow Rate (m^3/day)	Loading from the Proposed Project (mg/L) / (CFU/100ml)	Standards for effluents discharge (mg/L) [1]
BOD	8.51	66.6	127.8	20
SS	8.51	66.6	127.8	30

Remarks:

[1] Reference to Table 7, Standards for effluents discharged into the coastal waters of Tolo and Port Shelter Water Control Zones, Technical Memorandum - Standards of Effluent Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters.

4.8. Conclusion

4.8.1. The treated effluent will be discharged to the terminal stormwater manhole onsite and discharged to public drain along Dai Fuk Street (see **Chapter 5**). Discharge from STP and surface runoff are accounted in the Drainage Impact Assessment. It is confirmed that there will be no additional discharge to public drain after development with treated effluent accounted. No unacceptable impacts are expected from the proposed discharge of the treated effluent. With the STP re-provided onsite, there is no sewerage connection to the public sewerage system.

4.8.2. Details of the proposed STP including emergency discharge, emergency storage/ retention arrangement and the sludge disposal arrangement will be provided after specialist contractor and licensed collector are engaged. The proposal will be submitted to relevant departments for approval.

5. Drainage Impact Assessment

5.1. Scope

5.1.1. The aim of this Drainage Impact Assessment (DIA) is to assess whether capacity of the existing drainage network serving the Project Site is sufficient to cope with the stormwater runoff after development.

5.2. Existing Site and Drainage System

5.2.1. The Project Site is currently paved with concrete without any greenery. As per PNAP-152, greenery area will be maintained as at least 20% in the Proposed Project. It helps to enhance infiltration and reduce surface runoff. In view of increase non-paved area, decrease in total surface runoff is anticipated.

5.2.2. According to the drainage layout plan of the existing depot provided in **Appendix 2-2** and **Figure 2-3**, the storm water terminal manhole (SWTM01) is located at the southeast of the project site, connecting to the public stormwater manhole SMH1000577. It is then conveyed to the box culvert (4000mm width x 2700mm height) along Dai Wah Street.

5.2.3. The surface runoff and treated effluent from the on-site STP from the Proposed Project will be collected by proposed rain water manholes throughout the project site and directed to the SWTM01 for discharging to public drainage network. A preliminary layout of drainage system is provided in **Figure 2-5** for indicative purpose and subject to review and confirm during detail design stage.

5.3. Assessment Methodology

5.3.1. Surface runoff within the Project Site and treated effluent discharged from the re-provided STP will be collected and discharge to public stormwater manhole SMH1000577. The discharge rate of the effluent is presented in **Appendix 5-1**.

5.3.2. The drainage calculations are in accordance with the Storm Water Drainage Manual (fifth edition, Jan 2018) published by Drainage Services Department (DSD). Rational Method shall be applied to estimate the peak surface runoff values. The idea behind the Rational Method is that for a spatially and temporally uniform intensity *i*, which continues indefinitely, the runoff at the outlet of a catchment will increase until the time concentration t_c, when the whole catchment is contributing flow to the outlet. The peak runoff is calculated as follows:

$$Q_P = 0.278\ C\ i\ A \text{.................................. (1)}$$

Where Q_p = peak runoff in m^3/s

C = runoff coefficient (dimensionless)

i = rainfall intensity in mm/hr

A = catchment area in km^2

5.3.3. Runoff coefficient C depends on the permeability, slope and pond character of the surface; rainfall intensity i, is the average rainfall intensity selected on the basis of the design rainfall duration and return period.

5.4. Peak Flow Estimation

5.4.1. The peak flow from the Proposed Project is calculated from equation (1) as mentioned in S5.3.2. Detailed calculation is tabulated in **Appendix 5-1** and summarized in **Table 5-1** below:

Table 5-1 *Estimated Peak Flow for the Project Site*

Catchment / Source	**Peak Flow (m^3/s)**
Project Site Surface Runoff	0.701
Treated effluent discharged from sewage treatment plant	0.005
Total:	0.706

5.5. Potential Impact on Public Stormwater System due to Surface Runoff

5.5.1. The project site is currently a gently flat land and paved with concrete surface. The proposed development is basically built on the paved surface without major changes in surface properties and gradient, which will not significantly alter the overall catchment characteristics. Moreover, eBuses are fully powered by electricity, leakage of diesel or engine oil that contaminate the surface runoff is not expected during heavy rainfall.

5.5.2. All maintenance activities will be carried out in the enclosed depot. No maintenance activity will be carried out on roof floor. Proper drainage will be provided in each plant room on roof floor to ensure no wastewater or run-off from plant room will enter the uncovered portion of the roof. Contamination of rainwater from plant room is not anticipated.

5.5.3. The proposed project is for electric buses only and no engine oil and gearbox oil are required. However, only minimal lubricating oil will be used during bus maintenance. Oil/ Petrol interceptors will be installed at drainage system downstream of any oil/fuel pollution sources. Oil/ Petrol interceptors will be emptied and cleaned regularly to prevent the release of oil and grease into the stormwater drainage. The proposed location of oil/ petrol interceptor at respective floor and the inter-connection with proposed stormwater drainage at each floor is presented in **Figure 2.5**.

5.5.4. No fertilisers or pesticides will be routinely used for vegetation management in landscape area in accordance with the General Specification for Building (2012 edition) by Architectural Services Department (ASD). During heavy rainfall, trace of pollutants may be wash-off and is often bound or adsorbed onto particles (i.e. loose soil or litter). The stormwater drainage system on site will be equipped with silt trap to remove the particles and associated pollutants. The stormwater discharge will satisfy the effluent standards and requirements stipulated in the WPCO-TM, notably, with respect to prohibited substances as stated in clauses 8.4 and 9.1, as the case may be. The detailed design of silt traps will be reviewed and confirmed during detailed design stage so that WPCO-TM, in particular, the aforesaid requirements pertaining to prohibited substances, will be complied with.

5.6. Potential Impact on Public Stormwater System due to Reprovision of STP

5.6.1. In general, the project site will still be entirely paved with concrete surface area as same as the current situation, it is expected that there will be updates on the design flow of the re-provided STP. Referring to **Table 4-3**, the design flow rate of re-provided STP will be 17.7m^3/hr, which is equivalent to 0.005m^3/s. As mentioned, the treated effluent from STP will be collected in SWTM01 and eventually discharge to SMH1000577.

5.6.2. Hydraulic capacities of the stormwater drainage pipes are calculated with reference to the DSD Stormwater Drainage Manual (Fifth Edition).

5.6.3. The capacity check is to evaluate the contribution from the re-provided STP and surface runoff from the subject site. Detail calculation is included in **Appendix 5-1**.

5.7. Drainage Proposal

5.7.1. At present, the surface runoff and treated effluent from existing STP will be collected in SWTM01 and discharged to SMH1000577 through 450mm diameter stormwater pipe, and to be discharged into the box culvert. The stormwater pipe connected between SWTM01 and SMH1000577 need to be upgraded to 675mm diameter to have sufficient drainage capacity as refer to **Appendix 5-1**.

Table 5-2 Details of the Upgraded Stormwater Pipe

Manhole		Diameter of Pipe (mm)	Length of Pipe (m)	Inlet Invert Level (mPD)	Outlet Invert Level (mPD)
From	To				
SWTM01	SMH1000577	**675**	26	3.53	3.18

5.8. Hydraulic Capacity of the Drainage System

5.8.1. The Colebrook-White and Manning frictional resistance equations with reference to the Stormwater Drainage Manual (Fifth Edition) are used to calculate the hydraulic capacities of the stormwater drainage pipes.

5.8.2. As defined in Section 6.6.2 in Stormwater Drainage Manual, 50 years of the return periods for an Urban Drainage Branch System is adopted for the assessment. According to the calculation as tabulated in **Appendix 5-1**, the total flows from the Project Site under 1 in 50 years storm event are found to be 0.706m^3/s after the Proposed Development, as summarised in **Table 5-3**.

5.8.3. Surface runoff from Dai Fuk Street at the immediate south of Project Site is expected to be collected by SMH1000577 and discharged into the box culvert, delineation plan of this catchment is presented in **Figure 2-6**. Runoff from this catchment is also included in the calculation to assess the adequacy of the proposed stormwater pipe, it is found that 0.248m^3/s peak flow is expected from this catchment.

Table 5-3 Estimation of Peak Flow and Capacity Check

Manhole		Catchment	Total Flow from catchment (m^3/s)	Percentage of capacity
From	To			
SWTM01	SMH1000577	Project Site	0.706	77%
SMH1000577	Box Culvert SBP1000262	Project Site, Dai Fuk Street	0.954	36%

5.8.4. With the upgrading works proposed at stormwater pipe connecting SWTM01 and SMH1000577 to 675mm diameter, no adverse stormwater drainage impact due to the Proposed Development would be imposed to the existing drainage system. In addition, the occupancies of pipes are predicted to be below 80% of the full capacity over 50 years return period, when the Proposed Development will undertake.

5.8.5. Layout of major drainage channels within the Proposed Development will be submitted to the relevant authorities (including EPD and DSD) for approval during detailed design stage. All drainage facilities shall be designed and constructed to conform to the requirements laid down in:

- The Stormwater Drainage Manual, DSD
- The General Specification for Civil Engineering Works, Hong Kong Government
- The DSD Standard Drawings

5.9. Conclusion

5.9.1. In general, the Project Site will still be entirely paved with concrete surface area after redevelopment. There is no significant change on gradient and surface characteristics. Onsite Sewage Treatment Plant will be re-provided with higher design flow rate. The treated effluent from STP and surface runoff will be collected at stormwater terminal manhole (SWTM1) and discharge to public drainage network. With the upgrading works of the stormwater pipe connecting SWTM01 and SMH1000577 to 675mm diameter, potential impact to stormwater drainage system is not anticipated.

5.9.2. Since the stormwater will be properly treated to satisfy the effluent standards prior to discharge and complies with the clearance requirements as listed in the WPCO and its TM, no adverse water quality impact on the public stormwater drainage system is anticipated during operation of the Project.

6. Temporary Drainage Arrangement and Audit Requirement for Construction Stage

6.1. Construction Site Runoff

6.1.1. In accordance with Professional Persons Environmental Consultative Committee Practice Notes (ProPECC PN) 1/94, potential water quality impact shall be minimised by the implementation of construction phase mitigation measures and general good site practices including but not limited to the following:

- At the establishment of works site, perimeter cut-off drains to direct off-site water around the Project Site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels (both temporary and permanent drainage pipes and culverts), earth bunds or sand bag barriers should be provided to divert the stormwater to silt removal facilities. The design of the temporary on-site drainage system will be undertaken by the contractor prior to the commencement of construction, followed by proper maintenance and management practices throughout the construction phase;
- Dikes or embankments for flood protection should be implemented around the boundaries of earthwork areas. Temporary ditches should be provided to facilitate the run-off discharge into an appropriate watercourse, through a silt/sediment trap. Silt/sediment traps should also be incorporated in the permanent drainage channels to enhance deposition rates;
- The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 1/94, which states that the retention time for silt/sand traps should be less than 5 minutes under maximum flow conditions. The sizes may vary depending upon the flow rate, but for a flow rate of $0.1m^3/s$, a sedimentation basin of $30m^3$ would be required and for a flow rate of $0.5m^3/s$ the basin would be $150m^3$. The detailed design of the sand/silt raps should be undertaken by the contractor prior to the commencement of construction;
- The construction works should be programmed to minimise surface excavation works during rainy seasons (April to September), as possible. All exposed earth areas should be completed and vegetated as soon as possible after completion of the earthwork, or alternatively, within 14 days of the cessation of earthworks where practicable. If excavation of soil cannot be avoided during the rainy season, or at any time of year when rainstorms are likely, exposed slope surfaces should be covered by tarpaulin or other means, temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Intercepting channels should be provided (e.g. along the crest/edge of excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements should always be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm;

- All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure their proper and efficient operation at all times particularly following rainstorms. Deposited silts and grits should be removed regularly and disposed of by spreading evenly over stable, vegetated areas;
- Precautions to be taken at any time of the year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecasted and during or after rainstorms, are summarised in Appendix A2 of ProPECC PN 1/94. Particular attention should be paid to the control of silty surface run-off during storm events;
- All vehicles and plants should be cleaned before leaving the Project site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing bay should be provided at the exit of Project site where practicable. Wash-water should have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-washing bay to public roads should be paved with sufficient backfall toward the wheel-washing bay to prevent vehicle tracking of soil and silty water to public roads and drains; and
- Oil interceptors should be provided in the drainage system downstream of any oil/fuel pollution sources. Oil interceptors should be emptied and cleaned regularly to prevent the release of oil and grease into the storm water drainage system after accidental spillage. A bypass should be provided for oil interceptors to prevent flushing during heavy rain. Any drainage channels connecting storm drains via designed sand/silt removal facilities should be disconnected/removed after completion of construction stage to prevent any direct discharge to the stormwater system.

6.2. Sewage Generated from On-site Construction Workers

6.2.1. Portable chemical toilets and sewage holding tanks are recommended for the handling of the construction sewage generated by the workforce. A licenced contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance.

6.3. Accidental Spillage of Chemicals

6.3.1. The contractor must register as a chemical waste producer if chemical wastes would be produced from the construction activities. The Waste Disposal Ordinance (Cap. 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes.

6.3.2. Any maintenance facilities should be located on hard standings within a bunded area, and sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should be undertaken within the areas appropriately equipped to control these discharges.

6.4. Audit Requirements

6.4.1. With the implementation of good construction site practices as well as the recommended mitigation measures, no adverse water quality impact is envisaged during the construction phase of the proposed Project. Nevertheless, regular site environmental audit during the construction phase should be conducted to ensure that the recommended mitigation measures are to be properly undertaken. It can also provide an effective control of any malpractices and therefore achieve continual improvement of environmental performance on site.

7. Overall Conclusion

Sewerage Impact Assessment

7.1.1. Potential water pollution sources have been identified as sewage from workforce and wastewater from bus cleaning machine. There are no public foul sewer pipes at the vicinity, on-site STP (minimum design flow of 17.7 m^3/hr) is therefore re-provided to treat the effluent from daily operation. The treated effluent will be collected in the storm water terminal manhole on site and then diverted to the public stormwater drainage system via proper connections. Therefore, adverse sewerage impact due to the proposed project is not anticipated.

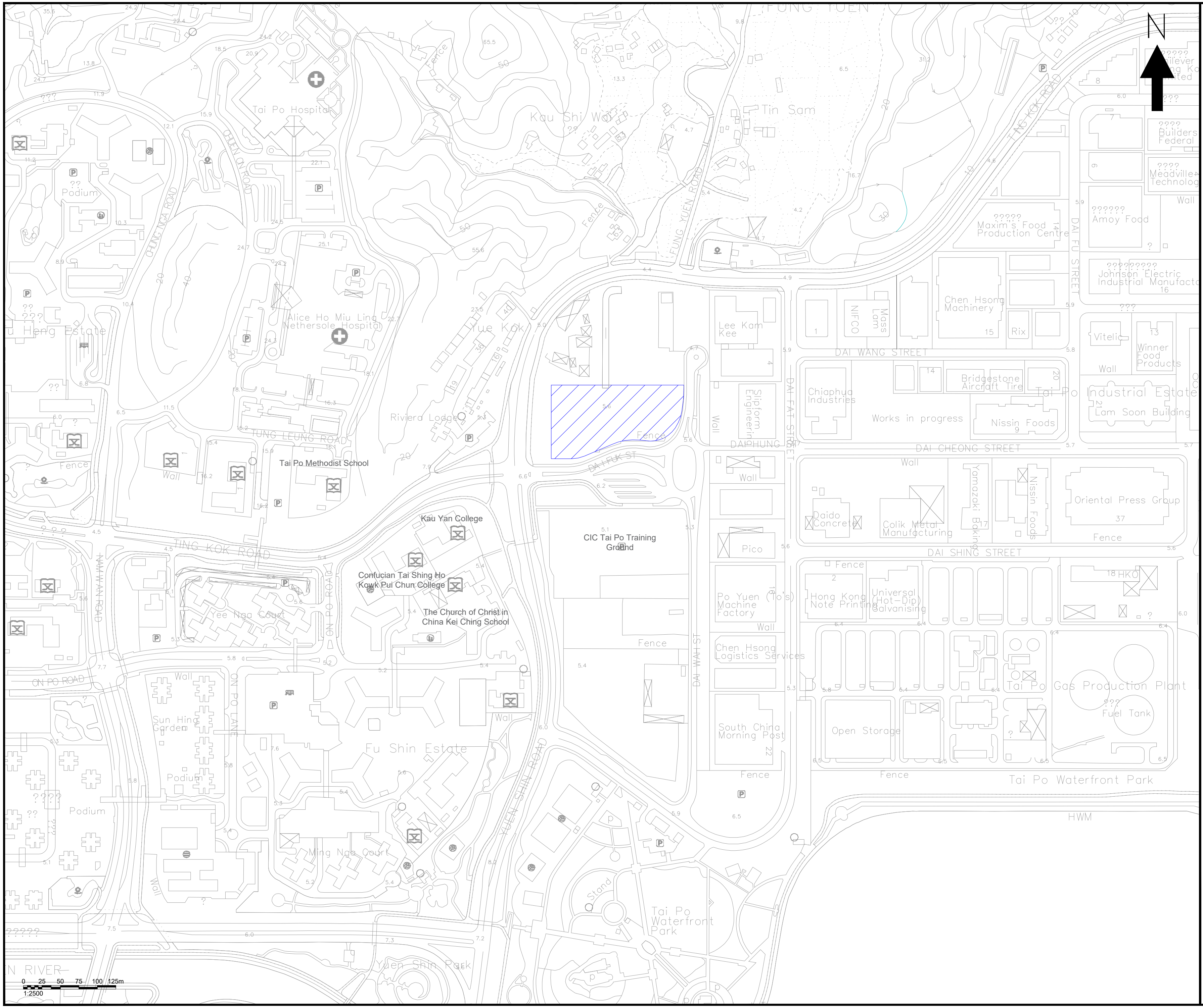
Drainage Impact Assessment

7.1.2. The Project Site is gently flat and entirely paved with concrete surface. There is no significant change on gradient and surface characteristics. As the proposed depot is served for eBuses only, use of diesel and engine oil is not expected.

7.1.3. The hydraulic calculation demonstrated that treated effluent from re-provided STP and surface runoff from subject site contribute insignificant capacity of existing public drainage network and no potential drainage impact is anticipated when considering upgrading works at stormwater pipe connecting SWTM01 and SMH1000577.

7.1.4. Silt trap and oil interceptor will be installed to remove particles and oil/grease from the drainage collected within the Project Sites prior to discharging into the public stormwater drainage system. The effluent standards and requirement stipulated in the WPCO-TM will be installed. There is no additional impact impose to the public drainage system due to the proposed development, and therefore adverse drainage impact is not envisaged.

Figures



NOTES :

▨ SUBJECT SITE

Consultant

Allied Environmental Consultants Limited

Project No. :	1849
File Name :	CC
Project :	KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO
Drawing Title :	SITE LOCATION PLAN
Drawing No :	FIGURE 2-1
Revision :	0
Scale :	AS SHOWN
Date :	NOV 2020

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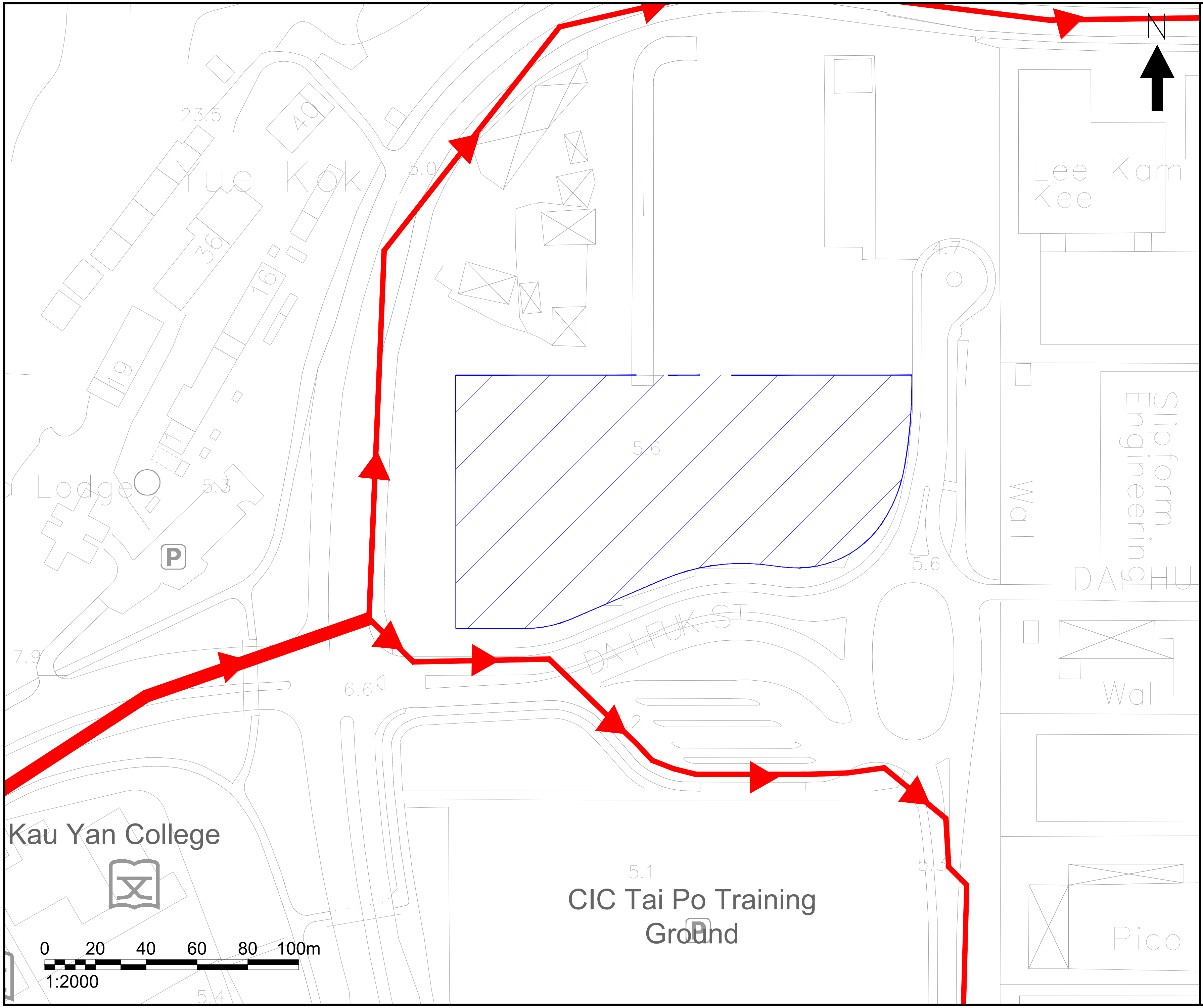
Z:\1801-1850\1849\05 Report\01 AEC Report\Project Profile\Figure\Draft 1_eng\Figure 2-1 & 2-2 Site Layout Plan.dwg

A4 297 x 210



NOTES :

▨ SUBJECT SITE

━ RISING MAIN SEWER

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name :

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

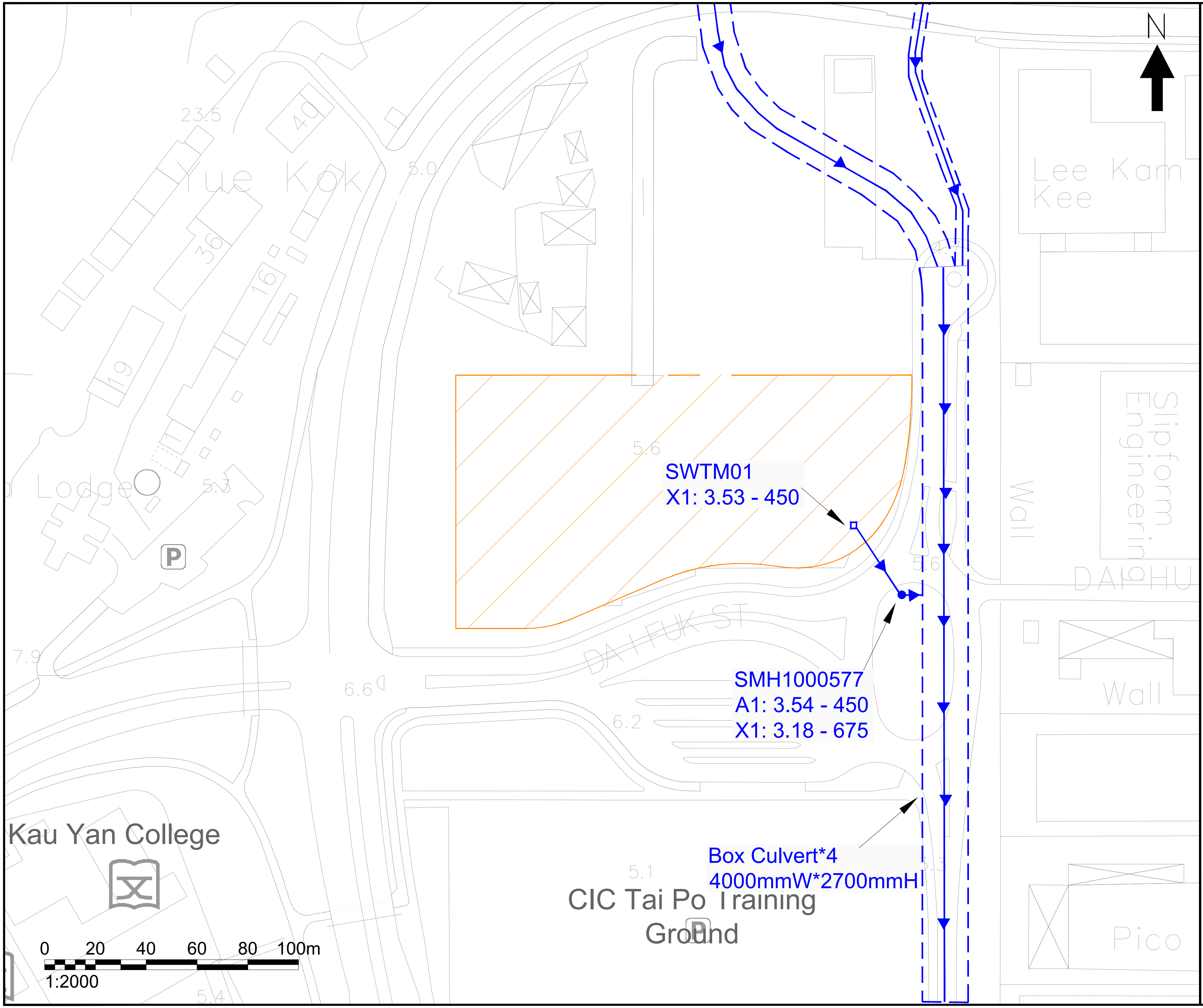
Drawing Title :
EXISTING SEWAGE SYSTEM
AT THE VICINITY

Drawing No : FIGURE 2-2

Revision : 0

Scale : AS SHOWN

Date : SEP 2021



NOTES :

▨ SUBJECT SITE

▬ EXISTING PIPE (STORM)

⬚ EXISTING BOX CULVERT

□ EXISTING STORM WATER TERMINAL MANHOLE

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name :

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

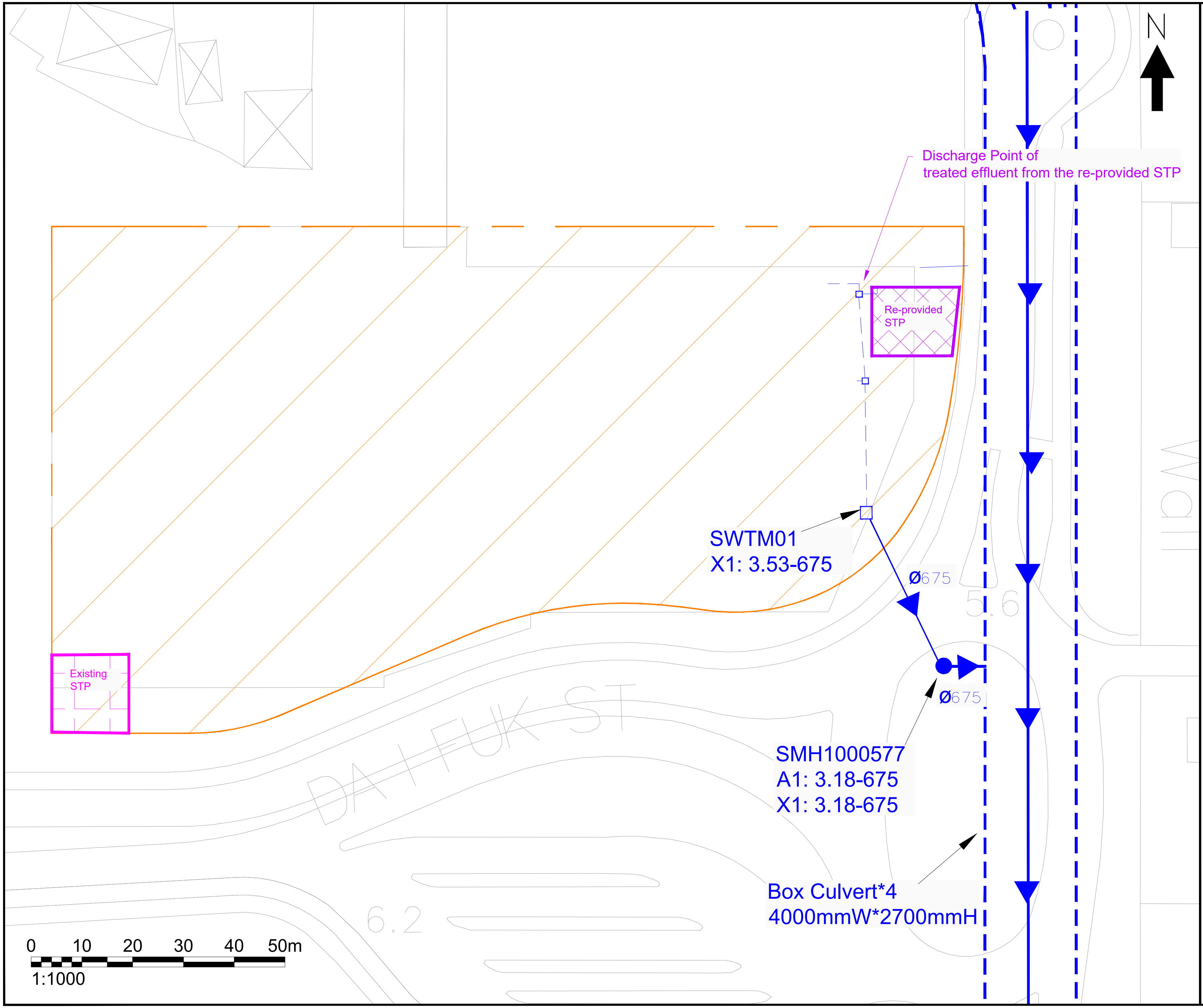
Drawing Title :
EXISTING DRAINAGE SYSTEM
AT THE VICINITY

Drawing No : FIGURE 2-3

Revision : 0

Scale : AS SHOWN

Date : SEP 2021



NOTES :

▨	SUBJECT SITE
▬	EXISTING PIPE (STORM)
☐	EXISTING BOX CULVERT
☐	EXISTING STORM WATER MANHOLE
▦	EXISTING SEWERAGE TREATMENT PLANT
▩	RE-PROVIDED SEWERAGE TREATMENT PLANT

Consultant

Allied Environmental Consultants Limited

Project No. :	1849
File Name :	
Project :	KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO
Drawing Title :	LOCATION OF EXISTING AND RE-PROVIDED SEWERAGE TREATMENT PLANT
Drawing No : FIGURE 2-4	Revision : 1
Scale : AS SHOWN	Date : FEB 2023

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P:\1801-1850\1849\05 Report\01 AEC Report\S16\DSIA\Issue 5\Fig\Figure 2-2 Existing Drainage At The Vicinity_Iss5.dwg

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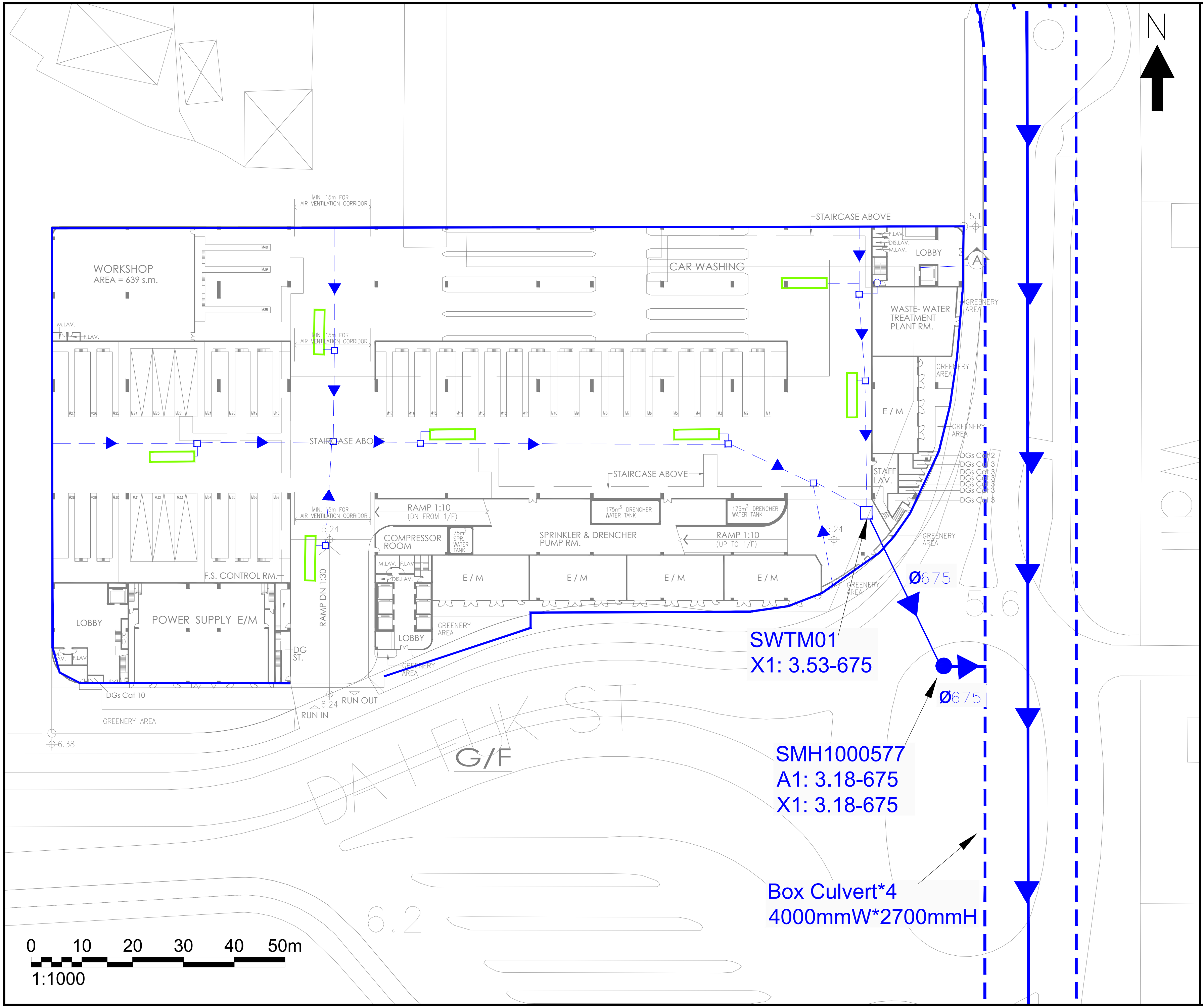

NOTES :

▬ STORMWATER DRAINAGE

– – CONNECTION PIPE

EXISTING BOX CULVERT

☐ PROPOSED STORM WATER MANHOLE

🟩 PETROL INTERCEPTOR

Consultant

AEC

Allied Environmental Consultants Limited

Project No. :	1849
File Name :	

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

Drawing Title :
PRELIMINARY DRAINAGE
LAYOUT PLAN AT G/F

Drawing No : FIGURE 2-5a	Revision : 1
Scale : AS SHOWN	Date : FEB 2023

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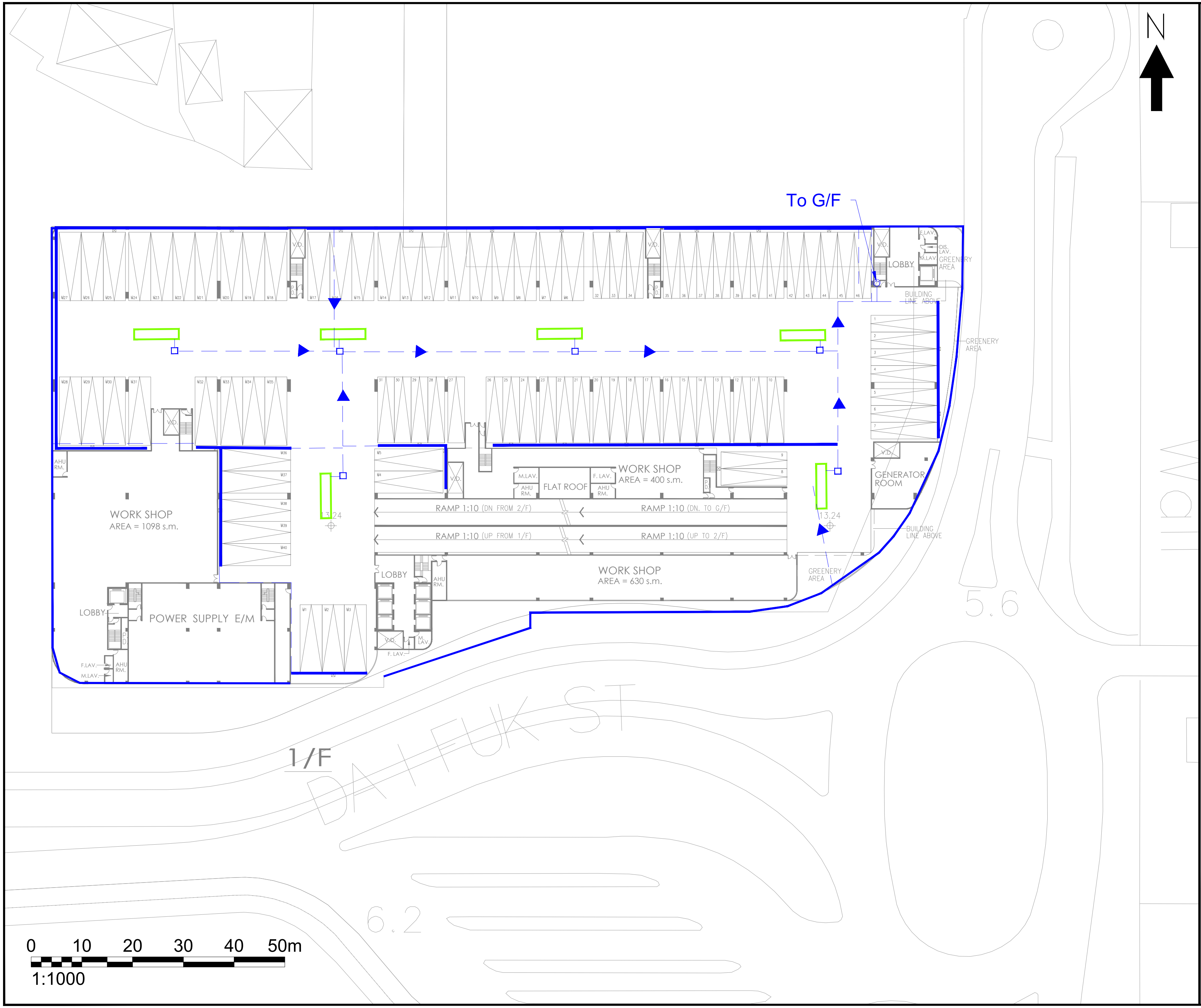

NOTES :

━ STORM WATER DRAINAGE

– – CONNECTION PIPE

□ PROPOSED STORM WATER MANHOLE

▭ PETROL INTERCEPTOR

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name :

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

Drawing Title :
PRELIMINARY DRAINAGE
LAYOUT PLAN AT 1/F

Drawing No : FIGURE 2-5b

Revision : 0

Scale : AS SHOWN

Date : JUL 2022

A4 297 x 210

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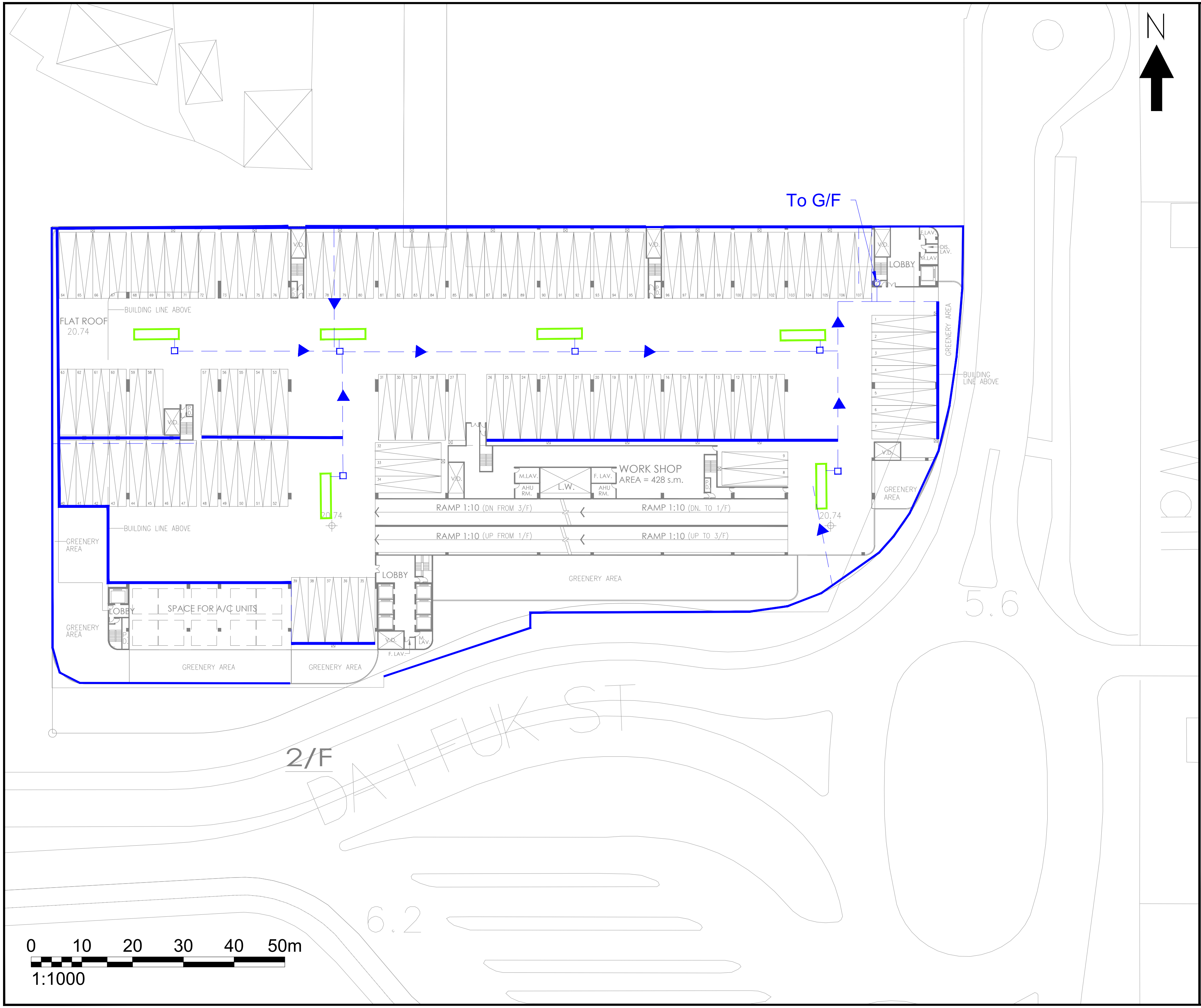

NOTES :

▬	STORM WATER DRAINAGE
— —	CONNECTION PIPE
☐	PROPOSED STORM WATER MANHOLE
▭	PETROL INTERCEPTOR

Consultant

Allied Environmental Consultants Limited

Project No. :	1849
File Name :	
Project :	KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO
Drawing Title :	PRELIMINARY DRAINAGE LAYOUT PLAN AT 2/F

Drawing No : FIGURE 2-5c	Revision : 0
Scale : AS SHOWN	Date : JUL 2022

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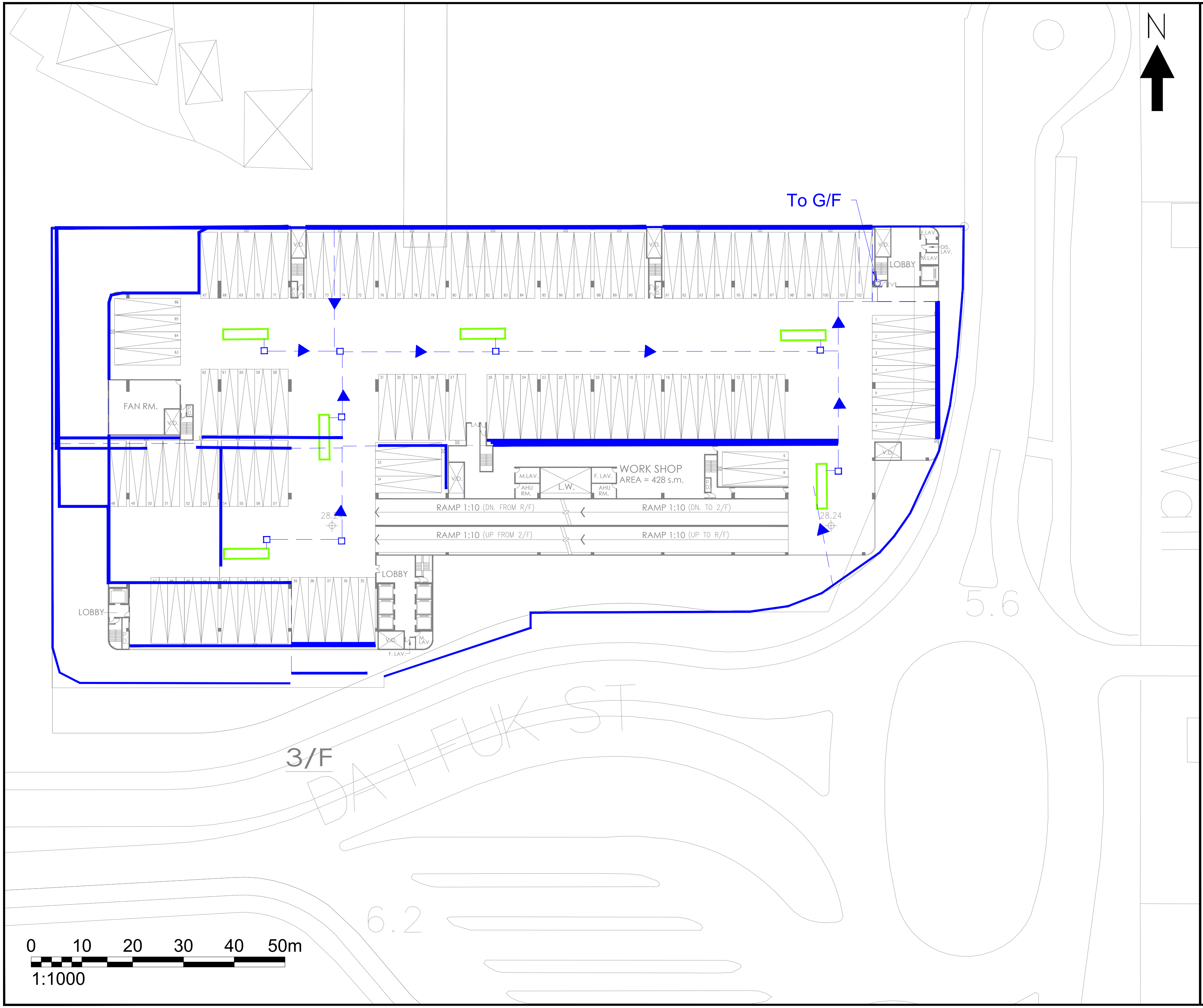

NOTES :

━ STORM WATER DRAINAGE

– – CONNECTION PIPE

□ PROPOSED STORM WATER MANHOLE

▭ PETROL INTERCEPTOR

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name :

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

Drawing Title :
PRELIMINARY DRAINAGE
LAYOUT PLAN AT 3/F

Drawing No : FIGURE 2-5d
Revision : 0

Scale : AS SHOWN
Date : JUL 2022

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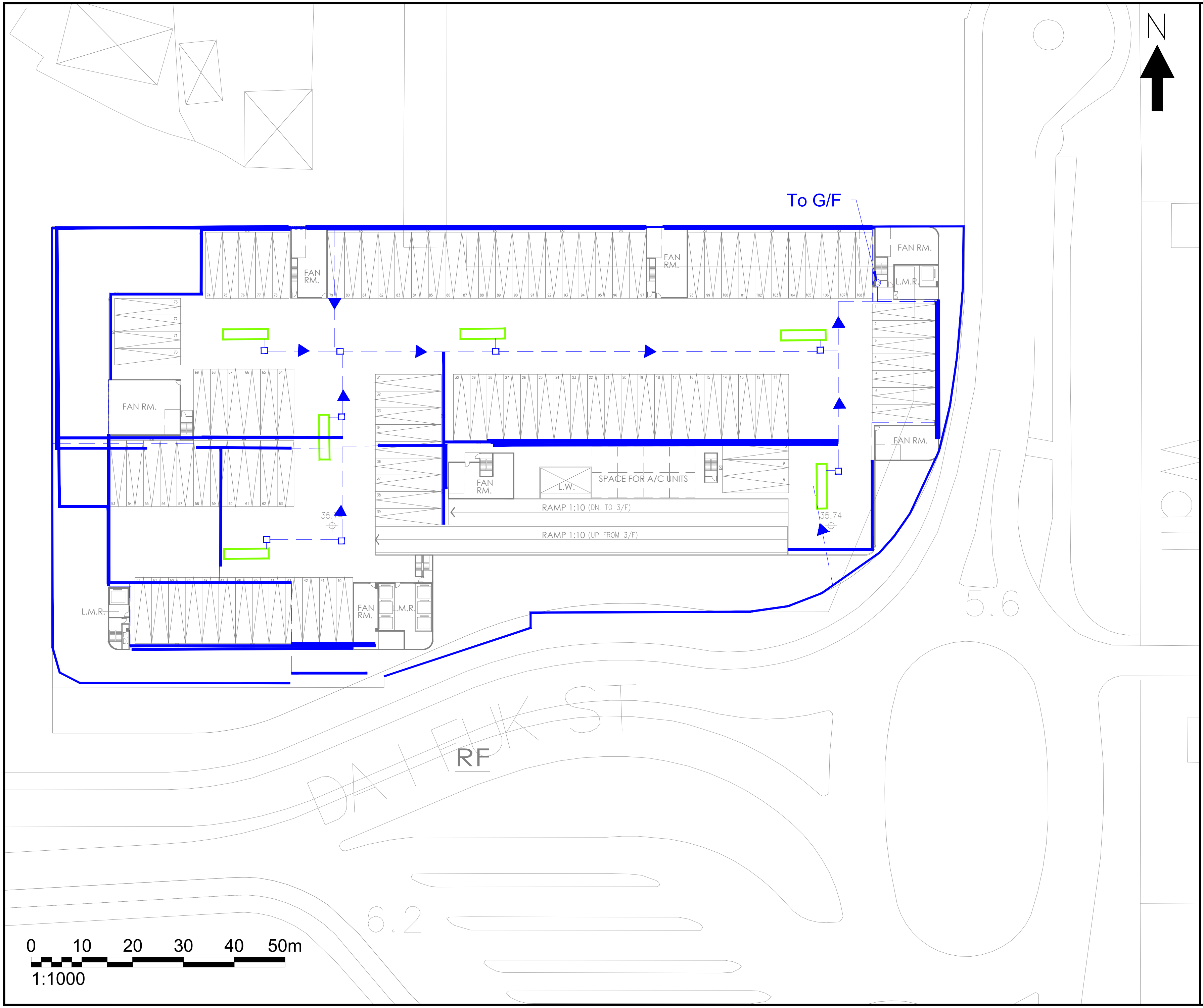

NOTES :

▬ STORM WATER DRAINAGE

– – CONNECTION PIPE

☐ PROPOSED STORM WATER MANHOLE

▭ PETROL INTERCEPTOR

Consultant

Allied Environmental Consultants Limited

Project No. :	1849
File Name :	

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

Drawing Title :
PRELIMINARY DRAINAGE
LAYOUT PLAN AT R/F

Drawing No : FIGURE 2-5e	Revision : 0
Scale : AS SHOWN	Date : JUL 2022

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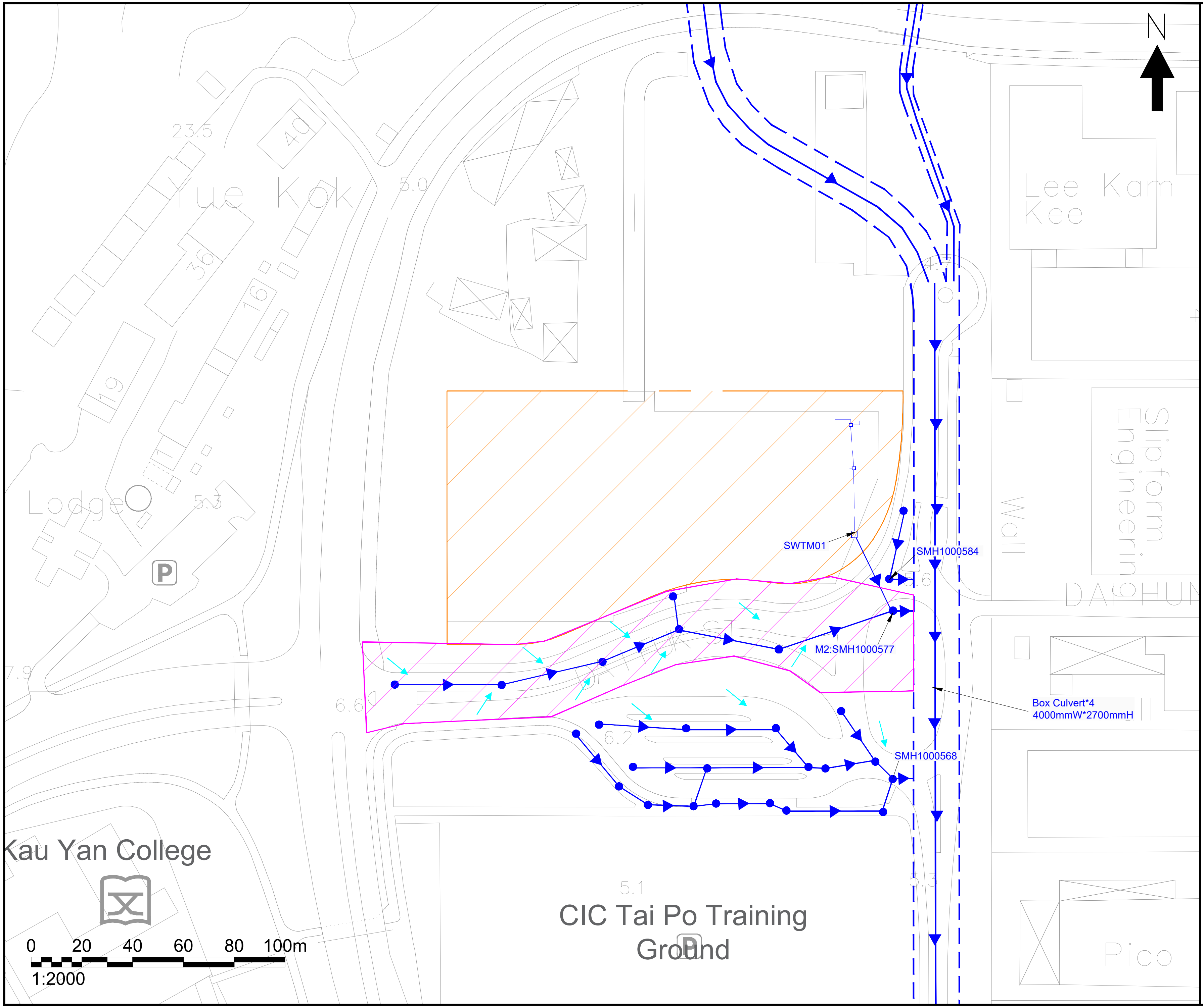


NOTES :

▨ SUBJECT SITE

● EXISTING DRAINAGE SYSTEM

▨ DAI FUK STREET CATCHMENT (~4,750m2)

→ SURFACE RUNOFF FLOW DIRECTION

Consultant

Allied Environmental Consultants Limited

Project No. :	1849
File Name :	

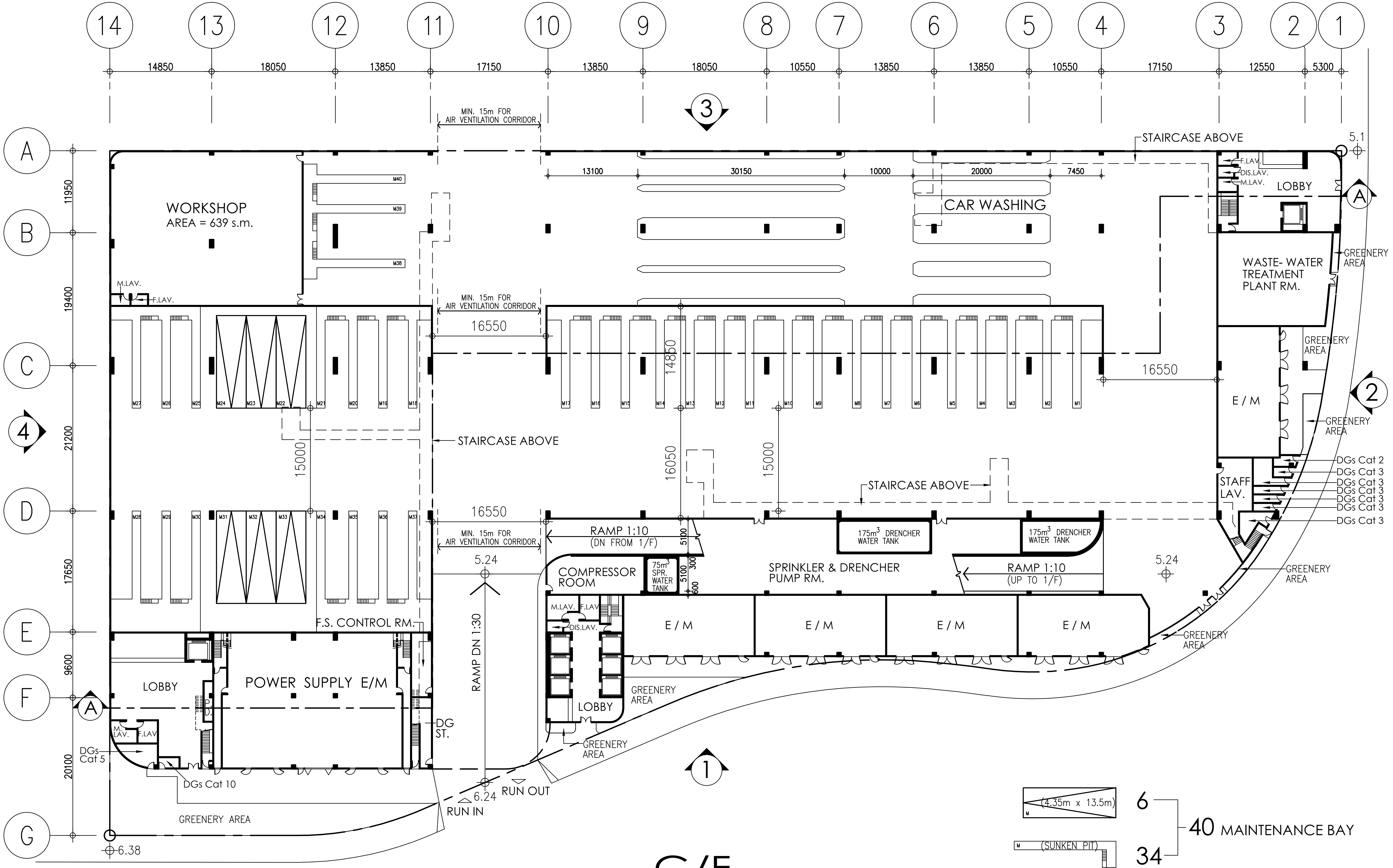
Project :
KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Drawing Title :
CATCHMENT DELINEATION PLAN

Drawing No : FIGURE 2-6	Revision : 0
Scale : AS SHOWN	Date : FEB 2023

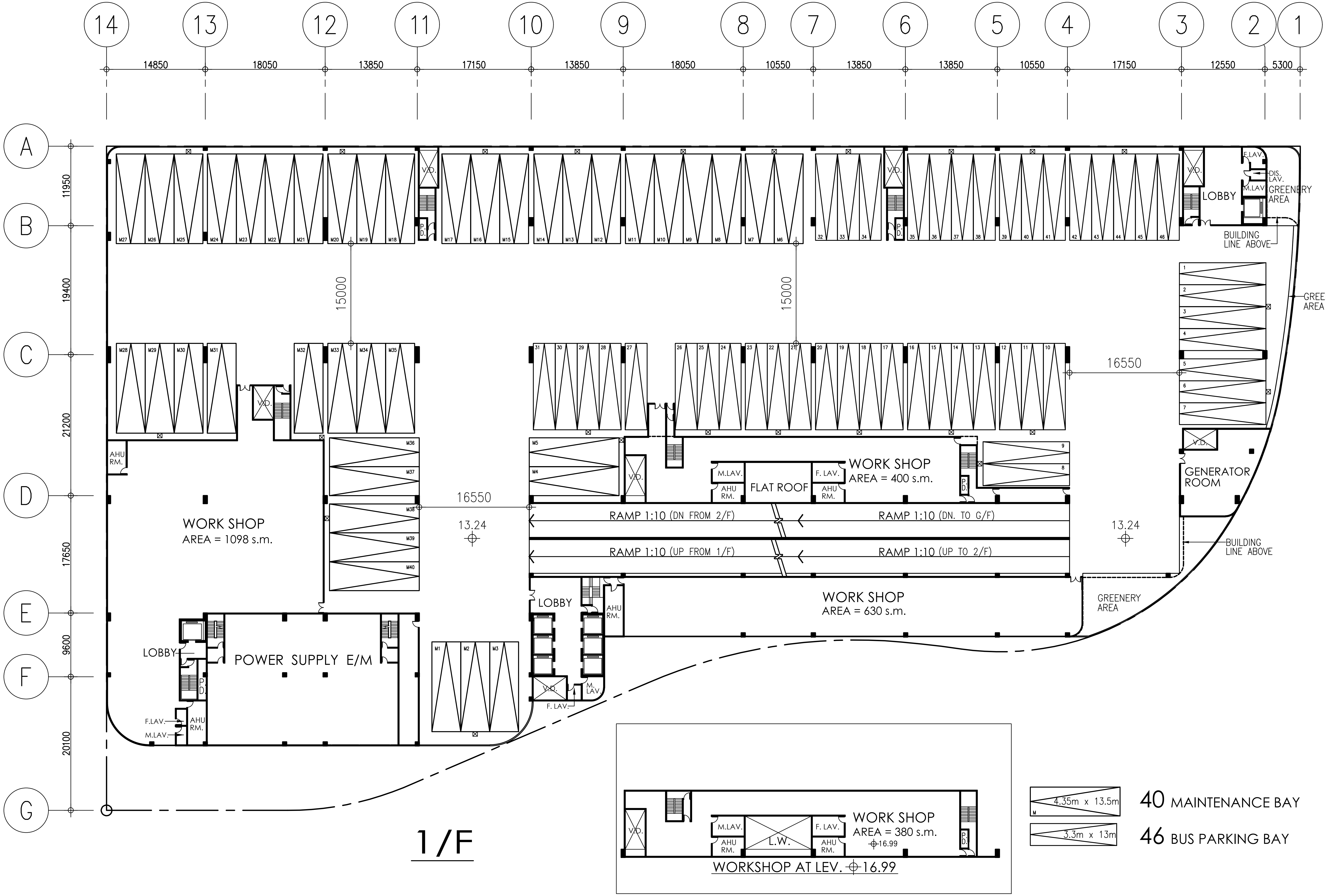
Appendix 2.1

Proposed Layout Plan



G/F

JULY 2022 (1)

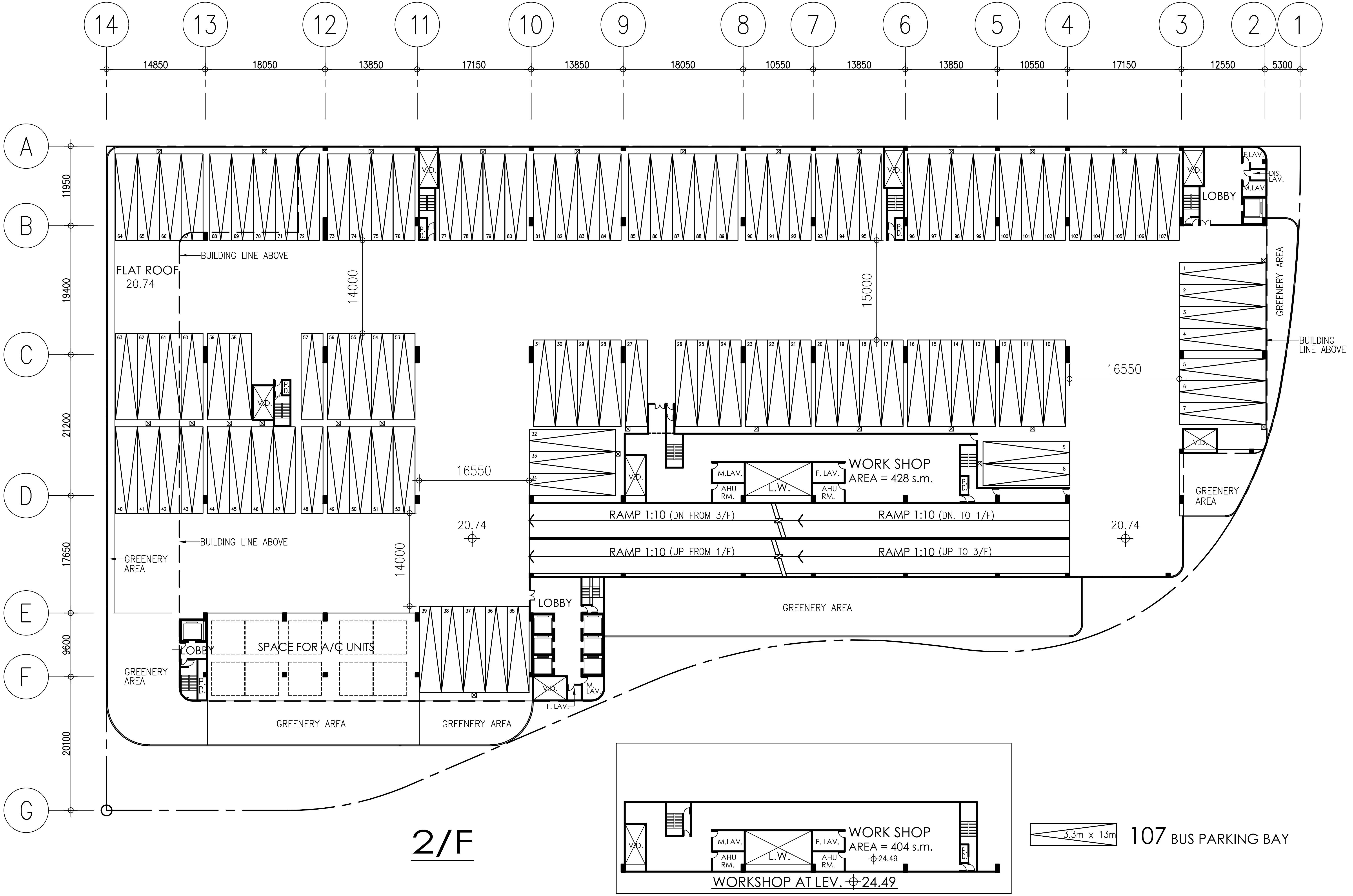


1/F

40 MAINTENANCE BAY

46 BUS PARKING BAY

JULY 2022 (1)



2/F

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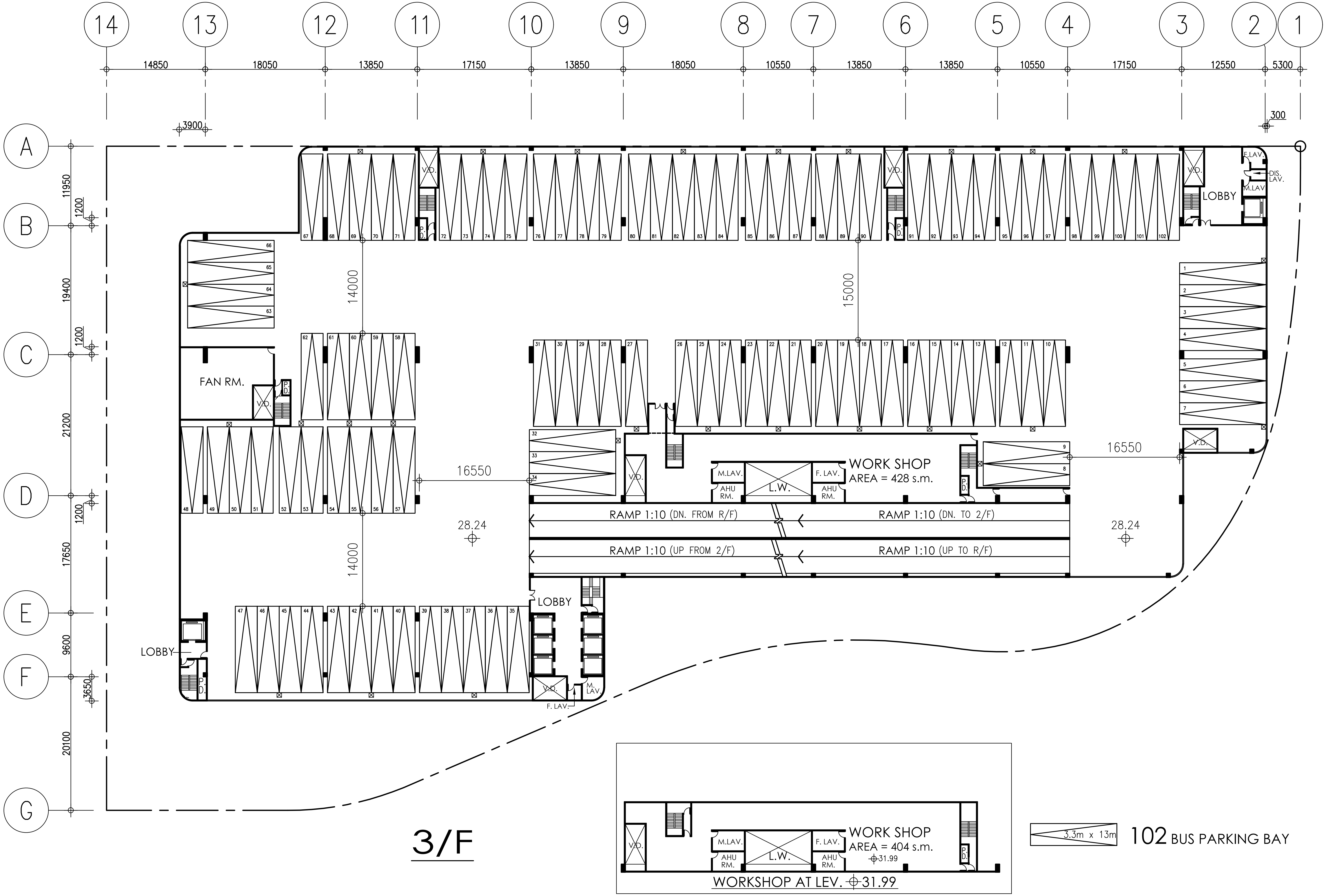
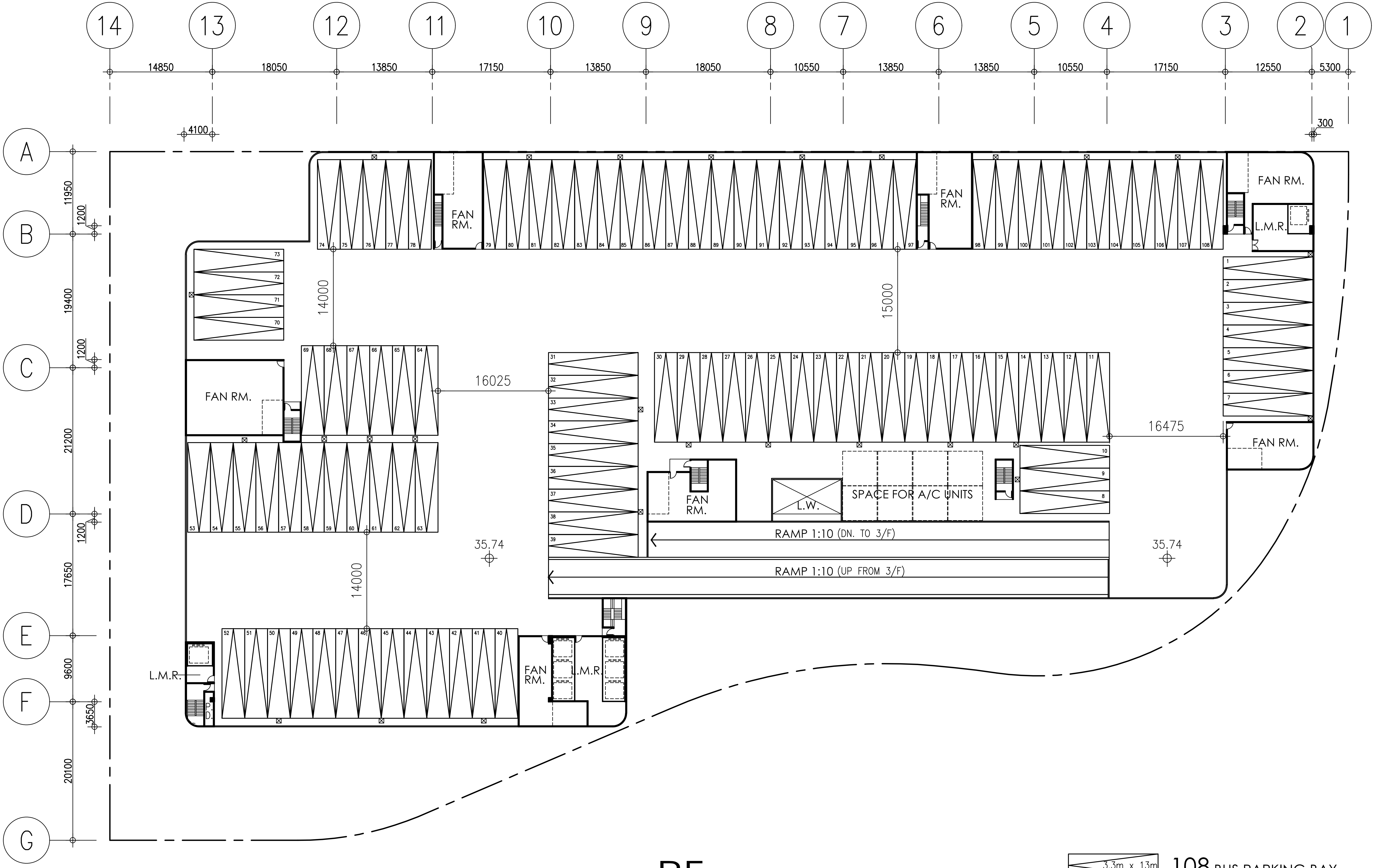


3/F

WORKSHOP AT LEV. ⌖31.99

3.3m x 13m — 102 BUS PARKING BAY

JULY 2022 (1)

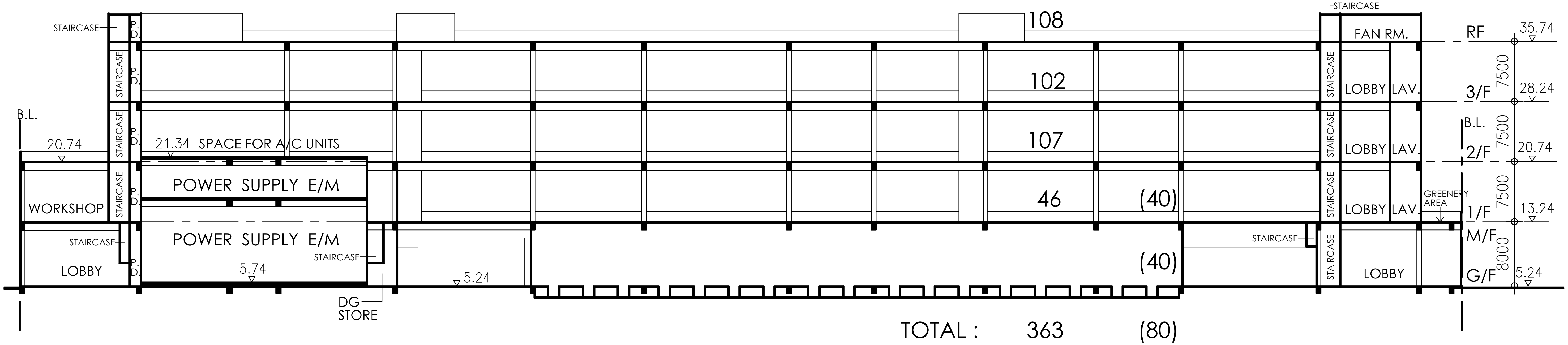


RF

3.3m x 13m 108 BUS PARKING BAY

JULY 2022 (1)

4 STOREYS



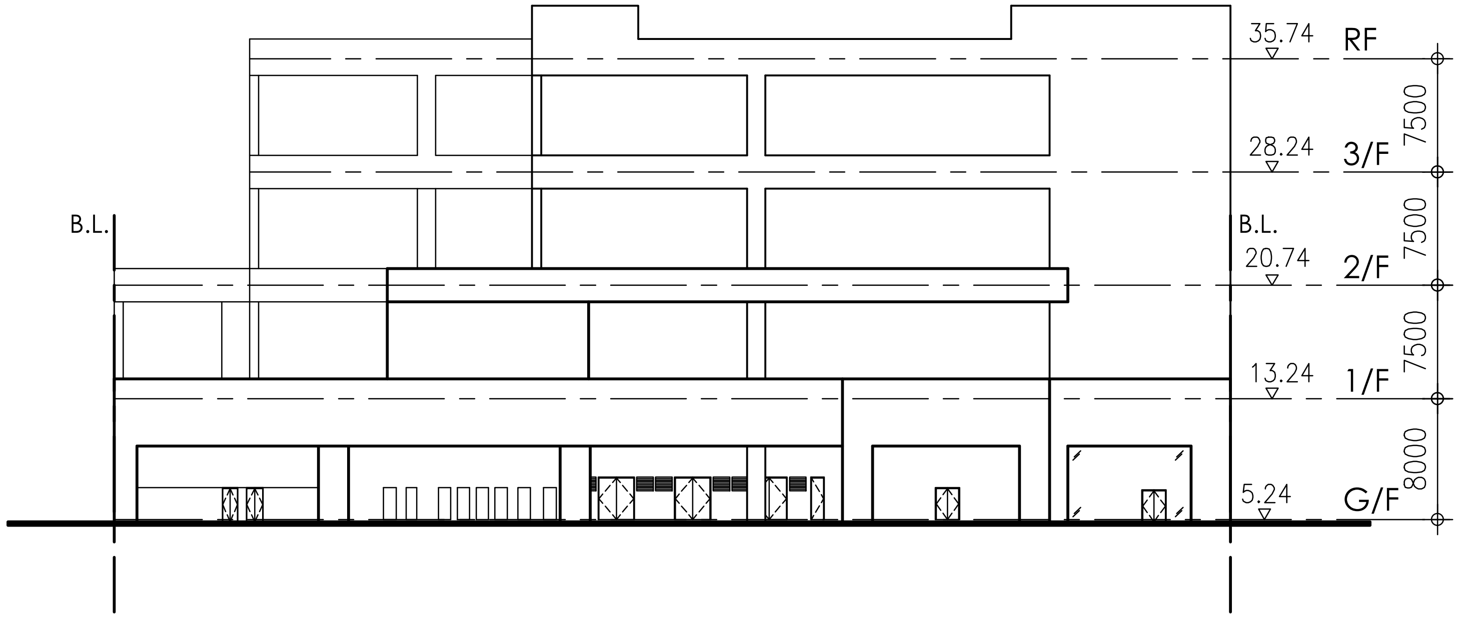
TOTAL : 363 (80)

BUS PARKING BAY

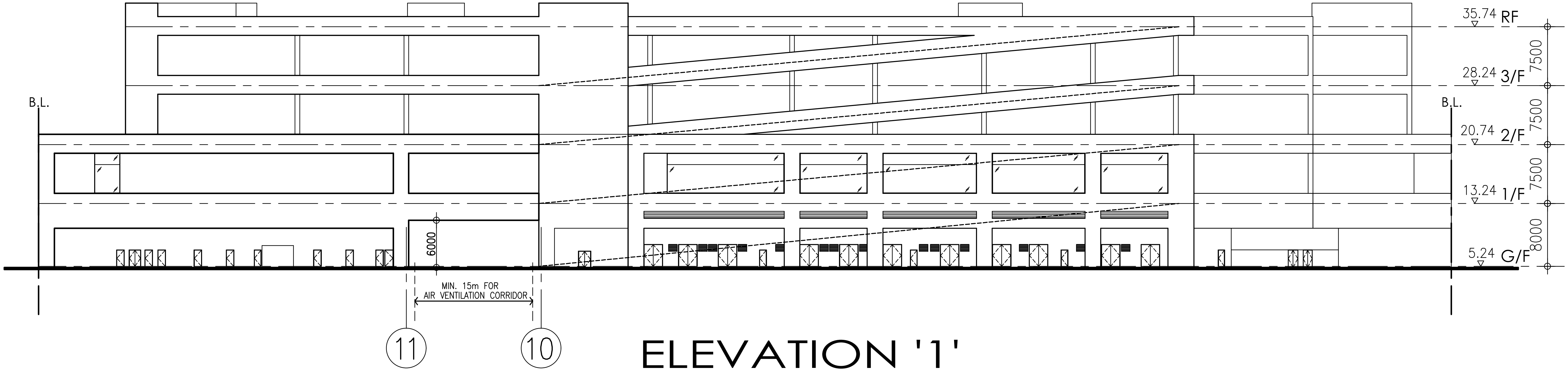
MAINTENANCE BAY

SECTION 'A' - 'A'

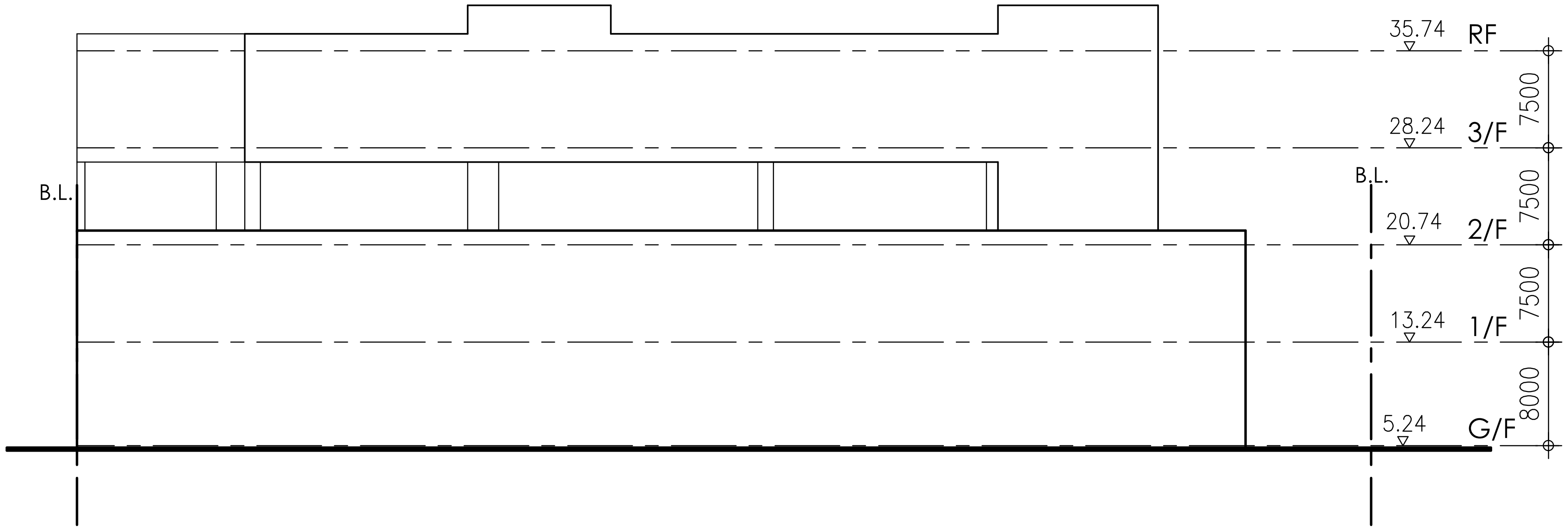
JULY 2022 (1)



ELEVATION '2'



ELEVATION '1'



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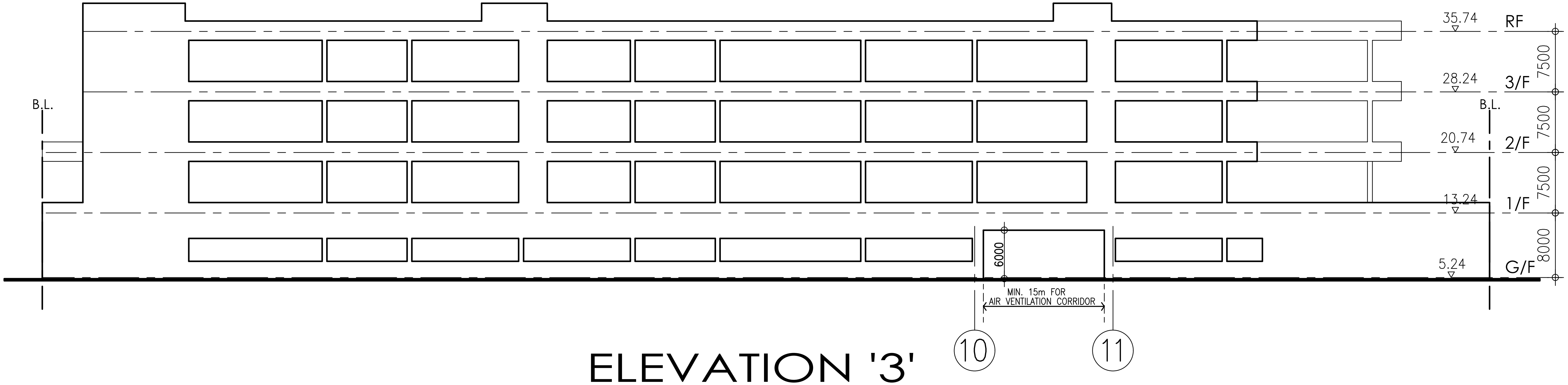


ELEVATION '3'

JULY 2022 (1)

Appendix 2.2

Drainage Layout Plan of Existing Depot

MANHOLE SCHEDULE

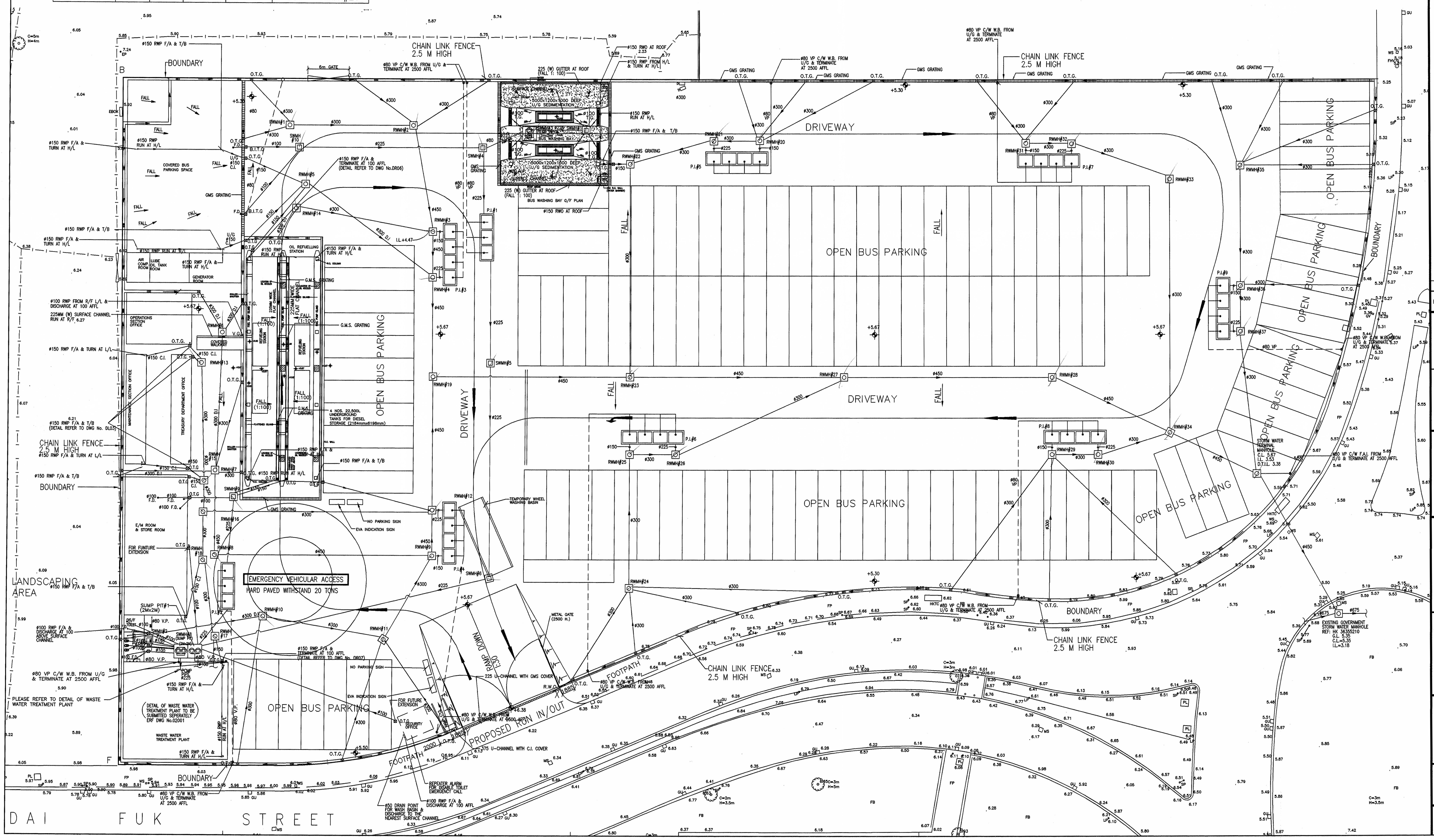
RAIN WATER MANHOLE No. (RWMH#)	COVER LEVEL (C.L.)	INVERT LEVEL (I.L.)	MANHOLE TYPE	DEPTH TO INVERT (mm)	DESCRIPTION
1	5.40	4.800	D	600	
2	5.40	4.640	E	760	
3	5.67	4.560	E	1200	IN – RWMH#2
		4.550			OUT – P.I.#3
		4.700			OUT – RWMH#4
4	5.67	4.460	E	1210	
5	5.67	5.075	D	595	
6	5.67	4.780	D	890	
7	5.67	4.439	E	1231	
8	5.67	4.381	E	1289	
9	5.67	4.231	E	1534	IN – RWMH#8
		4.231			IN – RWMH#11
		4.221			OUT – P.I.#4
		4.371			OUT – RWMH#12
10	5.67	4.640	E	1030	
11	5.67	4.521	E	1149	
12	5.67	4.136	E	1534	
13	5.67	5.124	D	546	
14	5.67	4.695	E	975	
15	5.67	4.993	D	677	
16	5.67	4.960	D	710	
17	5.67	5.132	D	538	
18	5.67	5.045	D	625	
19	5.67	4.108	E	1562	
20	5.40	4.689	E	796	
		4.679			OUT – P.I.#5
		4.829			OUT – RWMH#21

RAIN WATER MANHOLE No. (RWMH#)	COVER LEVEL (C.L.)	INVERT LEVEL (I.L.)	MANHOLE TYPE	DEPTH TO INVERT (mm)	DESCRIPTION
21	5.40	4.594	E	806	
22	5.40	4.514	E	877	
23	5.67	3.972	E	1698	
24	5.30	4.568	E	732	
25	5.67	4.434	E	1297	IN – RWMH#24
		4.424			OUT – P.I.#6
		4.574			OUT – RWMH#26
26	5.67	4.339	E	1307	
27	5.67	3.825	E	1845	
28	5.67	3.682	E	1988	
29	5.67	4.721	E	1034	
		4.711			OUT – P.I.#8
		4.861			OUT – RWMH#30
30	5.67	4.626	E	1044	
31	5.40	4.731	E	754	
		4.721			OUT – P.I.#7
		4.871			OUT – RWMH#32
32	5.40	4.636	D	764	
33	5.40	4.536	D	849	
34	5.67	3.592	E	2078	
35	5.40	4.728	E	672	
36	5.67	4.614	E	1125	
		4.604			OUT – P.I.#9
		4.754			OUT – RWMH#37
37	5.67	4.519	E	1135	

RAIN WATER MANHOLE No. (RWMH#)	COVER LEVEL (C.L.)	INVERT LEVEL (I.L.)	MANHOLE TYPE	DEPTH TO INVERT (mm)	DESCRIPTION
TERMINAL MANHOLE	5.67	3.53	–	2290	IN – RWMH#34
		3.53	–		IN – RWMH#37
		3.38	–		OUT – (D.T.I.L.)
EXISTING GOVERNMENT MANHOLE	5.35	3.54	E	2130	IN – TERMINAL MANHOLE
		3.18	E		OUT – STORMWATER CULVERT

PETROL INTERCEPTOR No. (P.I.#)	INLET LEVEL	OUTLET LEVEL
1	4.08	4.00
2	3.09	3.01
3	4.55	4.47
4	4.22	4.14
5	4.68	4.60
6	4.42	4.34
7	4.72	4.64
8	4.71	4.63
9	4.60	4.52

SEWER WATER MANHOLE No. (SWMH#)	COVER LEVEL (C.L.)	INVERT LEVEL (I.L.)	MANHOLE TYPE	DEPTH TO INVERT (mm)
1	5.30	4.38	E	920
2	5.69	5.17	E	200
3(Sump Pit)	5.40	3.38	2mx2m	2020
4	5.40	4.17	E	1230
5	5.67	3.70	E	1970
6	5.67	3.39	E	2280
7	5.67	2.99	E	2680
8(Sump Pit)	5.67	4.17	2mx2m	1500
9	5.67	3.18	E	2490
10	5.67	4.45	E	1220



DO NOT SCALE DRAWINGS, VERIFY ALL DIMENSIONS ON SITE.

BD REF. NO.: BD 3/9083/01 (TB)

REV	DESCRIPTION	DATE	BY	CHK'D	AUTH
0	AS-BUILT DRAWING	23-09	K.K.	E.N.	G.H.

CLIENT:
KMB THE KOWLOON MOTOR BUS CO. (1933) LTD.

MAIN CONTRACTOR:
REALFIT ENGINEERING LTD

ATKINS
Atkins China Ltd. 安建顧問有限公司

WEC 黃氏(香港)工程顧問有限公司
WONG'S ENGINEERING CONSULTANTS LTD.

Unit 903-904, 9/F.,
Bright Way Tower,
33, Mongkok Road, Kowloon.

TEL : (852) 2393 8688
FAX : (852) 2399 0066
E-mail : crest@netvigator.com

PROJECT
PROPOSED TEMPORARY BUS PARKING
AREA AT DAI FUK STREET
TAI PO, N.T.

DRAWING TITLE
AS-BUILT
DRAINAGE LAYOUT PLAN

SCALE AT A1	DESIGNED	DRAWN	CHECKED	AUTHORISED
1 : 300	DC	KK	EN	PC
	DATE 13/09/02	DATE 13/09/02	DATE 13/09/02	DATE 13/09/02

JOB NO.	DRAWING NO.	REV.
J976B	DL01(AS-BUILT)	0

編號 TP-PD-006

Appendix 4.1

Average Dry Weather Flow Estimation from Proposed Project

KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po

Table 1. Estimation of Sewage Generation from Staff at Office and KMB Depot

KMB Office Staff			*Remarks*
Approx. Number	50	person	Estimated by KMB
Unit Flow Factor	0.18	m^3/person/day	The planning unit flow for J3 in Table-2 of GESF is adopted
Average Dry Weather Flow (ADWF)	9	m^3/day	
KMB Maintenance Staff			
Approx. Number	320	person	Estimated by KMB
Unit Flow Factor	0.18	m^3/person/day	The planning unit flow for J3 in Table-2 of GESF is adopted
Average Dry Weather Flow (ADWF)	57.6	m^3/day	
Total Average Dry Weather Flow (ADWF)	**66.6**	m^3/day	

Table 2. Estimation of Sewage Generation from Bus Cleaning Machine

Number of Service	500	wash/day	
Water Consumption	250	L/min	
Duration of Cleaning	2	min/wash	As advised by KMB operator, bus washing duration will be less than 2mins/ bus
Estimated Water Use	250	m^3/day	
Wastewater Recycling Efficiency of Bus Cleaning Bay	0.7		As advised by supplier, 70% - 80% of water will be reused. Water loss from evaporation is expected. Wastewater from bus cleaning bay will be discharged to STP only when there is sump pit overflow. As worst case scenario, it is assumed 30% of water will be discharged to STP for treatment.
Estimated Volume of Sewage to STP	75	m^3/day	
	0.0521	m^3/min	
	0.8681	L/s	
	0.0009	m^3/s	
Total Average Dry Weather Flow (ADWF)	**75**	m^3/day	

Summary (Combining sewage from staff and bus cleaning machine)

Total Average Dry Weather Flow (ADWF)	**141.6**	m^3/day	
Peaking Factor	6		Table T-5 of GESF
Catment Inflow Factor (P_{CIF})	1.00		Table T-4 of GESF
Peak Wet Weather Flow (PWWF)	849.6	m^3/day	
	0.0098	m^3/s	

Appendix 4.2

Estimation of the Design Flow Rate for Sewage Treatment Plant

Proposal for Sewage Treatment Plant with Equalisation Tank
Appendix 4.2 Estimation of the Design Flow Rate for the Sewage Treatment Plant

Average Dry Weather Flow (ADWF) (m3/day)		Total Average Dry Weather Flow (ADWF) (m3/day)	DWF factor [1]	Design Peak Flow Rate from Project Site (m3/day)	Design Flow Rate from Project Site (m3/hr)
Sewage (Staff)	Bus Cleaning Machine				
66.6	75.0	141.6	3	424.80	17.70

Remarks:

[1]: With reference from EPD's "Guidelines for the Design of Small Sewage Treatment Plants". For the Design Flow Rate of the Proposed Development, the factor of 3 x ADWF is adopted for development with population of under 1000, with the use of equalisation tank.

Appendix 5.1

Detailed Hydraulic Calculation for Stormwater Flow

Appendix 5-1 Peak Runoff Estiamtion

Peak Runoff Estimation of Subcatchments and Subject Site **after** the completion of Proposed Development

		Land Use		**Topography**							**50 - year return period**						**50 - year return period**	
Catchment	**Total Area of the Catchment (m^2)**	**Surface Characteristics**	**Area (m^2)**	**Inlet invert level (mPD)**	**Outlet invert level (mPD)**	**Average Slope, H (m per 100m)**	**Flow Distance, L (m)**	**Inlet Time, t_o (min) [1]**	**Flow Time, t_f (min) [2]**	**Duration, t_c (min) [3]**	**Storm Constant, a [4]**	**Storm Constant, b [4]**	**Storm Constant, c [4]**	**Extreme Mean Intensity, i (mm/hr) [5]**	**Runoff Coefficient, C [6]**	**Rainfall Increase due to Climate Change, % [7]**	**Peak Runoff, Qp (m3/s) [8]**	**Total Peak Runoff, Qp (m3/s) [8]**
Subject Site	14600	Concrete	11680	5.7	5.6	0.08	143	13.02	0	13.02	451.3	2.46	0.337	179.29	0.95	16.0	0.642	0.701
		Grass	2920												0.35		0.059	
Treated effluent discharged from reprovided sewage treatment plant																		0.005
Tai Fuk Street	4750	Concrete	4750	5.98	5.35	0.31818182	198	15.44469	0	15.44	451.3	2.46	0.337	170.69	0.95	16.0	0.248	0.248

Note:

[1] Brandsby William's equation is referenced from Section 7.5.2 in DSD Stormwater Drainage Manual (Fifth Edition).

$$t_o = \frac{0.14465L}{H^{0.2}\ A^{0.1}}$$

where t_o = time of concentration of a natural catchment (min.)

A = catchment area (m^2)

H = average slope (m per 100 m), measured along the line of natural flow, from the summit of the catchment to the point under consideration

L = distance (on plan) measured on the line of natural flow between the summit and the point under consideration (m)

[2] t_f is assumed to be 0 for conservative estimation.

[3] $t_c = t_o + t_f$

[4] Storm constants are referenced to Table 3a in DSD Stormwater Drainage Manual (Fifth Edition) based on corresponding return periods.

[5] Intensity-Duration-Frequency calculation is referenced from Section 4.3.3 in DSD Stormwater Drainage Manual (Fifth Edition).

$$i = \frac{a}{(t_d + b)^c}$$

where i = extreme mean intensity in mm/hr,

t_d = duration in minutes ($t_d \leq 240$), and

a, b, c = storm constants given in Tables 3a, 3b, 3c and 3d.

[6] Runoff coefficient is referenced from Section 7.5.2 in DSD Stormwater Drainage Manual (Fifth Edition). For conservative estimation, coefficient of 0.35 is assumed for unpaved area while that of 0.95 for paved area.

[7] Rainfall increase precentage due to climate change is referenced from Table 28 in DSD Stormwater Drainage Manual (Fifth Edition) and Corrigendum No. 1/2022. 16.0% for End of 21st Century is adopted as worst case scenario.

[8] Rational method for peak runoff estimation is referenced from Section 4.3.3 in DSD Stormwater Drainage Manual (Fifth Edition).

$$Q_p = 0.278\, C\, i\, A$$

where Q_p = peak runoff in m^3/s

C = runoff coefficient (dimensionless)

i = rainfall intensity in mm/hr

A = catchment area in km^2

Peak Runoff Estimation of Subcatchments and Subject Site **after** the completion of Proposed Development

ID	From	ID	To	Diameter, D (m) [1]	Cross-section Area, A (m^2) [2]	Wetted Perimeter, P (m) [2]	Hydraulic Radius, R (m) [3]	Length of Pipe, L (m) [1]	Inlet Invert Level (mPD) [1]	Outlet Invert Level (mPD) [1]	Slope, s [4]	Pipe Roughess, k (m) [5]	Velocity, V (m/s) [6]	Full Capacity, Q (m^3/s) [7]	Contributing Catchment Area [8]	Catchment Areas	Peak Flow, Q (m3/s)	Return Periods (Year) [9]	Additional Peak Flow, Q (m^3/s)	Total Flow from All Catch-ment Area (m^3/s)	Occu-pancy (%)
M1	SWTM01	M2	SMH100577	0.450	0.143	1.414	0.101	26	3.65	3.18	0.018	0.0006	2.56	0.366	Subject Site,Treated effluent discharged from reprovided sewage treatment plant	**Subject Site**	0.701	50	0.706	0.706	193%
																Treated effluent discharged from reprovided sewage treatment plant	0.005				
M2	SMH100577	M3	Box Culvert SBP1000262	0.675	0.340	2.121	0.160	8	3.18	2.48	0.092	0.0006	7.72	2.625	Subject Site,Treated effluent discharged from reprovided sewage treatment plant and Tai Fuk Street	**Subject Site**	0.701	50	0.954	0.954	36%
																Treated effluent discharged from reprovided sewage treatment plant	0.005				
																Tai Fuk Street	0.248				

[5] Surface roughness is assumed to be 3.0mm for slimed concrete pipe with poor condition as worst case scenario, with reference to Table 14 in DSD Stormwater Drainage Manual (Fifth Edition).

[1] Information of stormwater pipe is obtained from the latest drainage record plan.
[2] According to Section 9.3 in DSD Stormwater Drainage Manual (Fifth Edition), 5% / 10% reduction in flow area based on channel gradient is taken into account for the effects to flow capacity due to materials deposited on the bed.
[3] Hydraulic Radius = Cross-section Area / Wetted Perimeter
[4] Slope = (Inlet Invert Level - Outlet Invert Level) / Length of Pipe

Treated e Surface roughness is assumed to be 3.0mm for slimed concrete pipe with poor condition as worst case scenario, with reference to Table 14 in DSD Stormwater Drainage Manual (Fifth Edition).

[6] Velocity is calculated based on Colebrook-White equations.

$$\overline{V} = -\sqrt{32gRS_f}\,\log\left[\frac{k_s}{14.8R} + \frac{1.255\nu}{R\sqrt{32gRS_f}}\right]$$ m Section 7.5.2 in DSD Stormwater Drainage Manual (Fifth Edition).

$\overline{V}$ = cross-sectional mean velocity (m/s)
R = hydraulic radius (m)
S_f = friction gradient (dimensionless)
C = Chézy coefficient ($m^{½}$/s)
n = Manning coefficient (s/$m^{1/3}$)
f = Darcy-Weisbach friction factor (dimensionless)
k_s = surface roughness (m)
ν = kinematic viscosity (m^2/s)
g = acceleration due to gravity (m/s^2)
C_{HW} = Hazen-William coefficient (dimensionless)

With Reference to Table 14 in DSD Stromwater Drainage Manual (Fifth Edition),
Kinematic viscosity is 0.000001306 m/s.
Gravitational acceleration is 9.8m/s^2.
[7] Capacity = Length of Pipe × Velocity
[8] Bold and underlined subcatchment ID stands for stormwater in those subcatchments flowing into the corresponding pipe.
[9] With reference to Table 3 of Section 6.6.2 in DSD Stormwater Drainage Manual (Fifth Edition), 50 years of return period has been adopted.

Peak Runoff Estimation of Subcatchments and Subject Site **after** the completion of Proposed Development **(With upgrading works proposed)**

ID	From	ID	To	Diameter, D (m) [1]	Cross-section Area, A (m^2) [2]	Wetted Perimeter, P (m) [2]	Hydraulic Radius, R (m) [3]	Length of Pipe, L (m) [1]	Inlet Invert Level (mPD) [1]	Outlet Invert Level (mPD) [1]	Slope, s [4]	Pipe Roughess, k (m) [5]	Velocity, V (m/s) [6]	Full Capacity, Q (m^3/s) [7]	Contributing Catchment Area [8]	Catchment Areas	Peak Flow, Q (m3/s)	Return Periods (Year) [9]	Additional Peak Flow, Q (m^3/s)	Total Flow from All Catch-ment Area (m^3/s)	Occu-pancy (%)
M1	SWTM01	M2	SMH100577	0.675	0.322	2.121	0.152	26	3.53	3.18	0.013	0.0006	2.84	0.916	Subject Site,Treated effluent discharged from reprovided sewage treatment plant	**Subject Site**	0.701	50	0.706	0.706	77%
																Treated effluent discharged from reprovided sewage treatment plant	0.005				
M2	SMH100577	M3	Box Culvert SBP1000262	0.675	0.340	2.121	0.160	8	3.18	2.48	0.092	0.0006	7.72	2.625	Subject Site,Treated effluent discharged from reprovided sewage treatment plant and Tai Fuk Street	**Subject Site**	0.701	50	0.954	0.954	36%
																Treated effluent discharged from reprovided sewage treatment plant	0.005				
																Tai Fuk Street	0.248				

[5] Surface roughness is assumed to be 3.0mm for slimed concrete pipe with poor condition as worst case scenario, with reference to Table 14 in DSD Stormwater Drainage Manual (Fifth Edition).

[1] Information of stormwater pipe is obtained from the latest drainage record plan.
[2] According to Section 9.3 in DSD Stormwater Drainage Manual (Fifth Edition), 5% / 10% reduction in flow area based on channel gradient is taken into account for the effects to flow capacity due to materials deposited on the bed.
[3] Hydraulic Radius = Cross-section Area / Wetted Perimeter
[4] Slope = (Inlet Invert Level - Outlet Invert Level) / Length of Pipe

Treated e Surface roughness is assumed to be 3.0mm for slimed concrete pipe with poor condition as worst case scenario, with reference to Table 14 in DSD Stormwater Drainage Manual (Fifth Edition).

[6] Velocity is calculated based on Colebrook-White equations.

$$\bar{V} = -\sqrt{32gRS_f}\,\log\left[\frac{k_s}{14.8R} + \frac{1.255\nu}{R\sqrt{32gRS_f}}\right]$$ m Section 7.5.2 in DSD Stormwater Drainage Manual (Fifth Edition).

$\bar{V}$ = cross-sectional mean velocity (m/s)
R = hydraulic radius (m)
S_f = friction gradient (dimensionless)
C = Chézy coefficient ($m^{½}$/s)
n = Manning coefficient ($s/m^{1/3}$)
f = Darcy-Weisbach friction factor (dimensionless)
k_s = surface roughness (m)
ν = kinematic viscosity (m^2/s)
g = acceleration due to gravity (m/s^2)
C_{HW} = Hazen-William coefficient (dimensionless)

With Reference to Table 14 in DSD Stromwater Drainage Manual (Fifth Edition),
Kinematic viscosity is 0.000001306 m/s.
Gravitational acceleration is 9.8m/s^2.
[7] Capacity = Length of Pipe × Velocity
[8] Bold and underlined subcatchment ID stands for stormwater in those subcatchments flowing into the corresponding pipe.
[9] With reference to Table 3 of Section 6.6.2 in DSD Stormwater Drainage Manual (Fifth Edition), 50 years of return period has been adopted.

Issue No. : 5

Issue Date : Feb 2023

Project No. : 1849

SITE APPRAISAL REPORT

FOR

KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Prepared by

Allied Environmental Consultants Limited

COMMERCIAL-IN-CONFIDENCE

Document Verification

Project Title	KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po	**Project No.** 1849
Document Title	Site Appraisal Report	

Issue No.	Issue Date	Description	Prepared by	Checked by	Approved by
1	Oct 2021	1st Submission	Cherry Lee	Cathy Man	Grace Kwok
2	Mar 2022	2nd Submission	Cherry Lee	Cathy Man	Grace Kwok
3	Jun 2022	3rd Submission	Cherry Lee	Cathy Man	Grace Kwok
4	Dec 2022	4th Submission	Echo Hung	Cathy Man	Grace Kwok
5	Feb 2023	5th Submission	Sally Chiu	Cathy Man	Grace Kwok

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1. Introduction

1.1.1. Allied Environmental Consultants Limited (AEC) was commissioned by the Kowloon Motor Bus Company (1933) Limited (KMB) to conduct a land contamination assessment to assess the contamination status and identify possible contamination source and remedial measure (if necessary) to support of a Section 16 application for the KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po (hereinafter referred to as "Project Site").

1.1.2. At present, the KMB has occupied the Project Site for bus parking of around 163 nos. of buses since 2002 under the Short Term Tenancy (STT). Due to the need for provision of more parking spaces, KMB obtained a draft STT for a 2-storey bus depot for 7 years commencing in April 2022, the nature of the tenancy is temporary. However, in order to support the "Roadmap on Popularization of Electric Vehicles" released by Environment Bureau in March 2021, additional storeys with sufficient charging and supporting facilities would be required for electric buses (eBus). Around 363 nos. charging-enabling bus parking bays will be provided in the new bus depot for eBus. As such, minor relaxation of building height (BH) restriction under Section 16 of the Town Planning Ordinance from the current BH restriction of 2 storeys to 4 storeys will be applied concurrently. This Site Appraisal is conducted to support the Section 16 application.

1.1.3. The new bus depot for eBus will operate for 7 years under STT from tentative date in April 2022 (subject to approval of Town Planning Board).

1.1.4. According to Part 1 Schedule 2 Section A.6 (Roads, railways and depot) of the Environmental Impact Assessment Ordinance (EIAO), a transport depot located less than 200m from the nearest boundary of an existing or planned (a) residential area; (b) place of worship; (c) educational institution; or (d) health care institution shall be classified as a Designated Project. As the Project is located at less than 200m from residential developments, namely Yue Kok Village and Rivieria Lodge, and educational institutes, including Kau Yan College, it is therefore classified as a Designated Project. Permission to apply directly to permit (DIR) under EIAO is also applied concurrently subsequently with this S16 Planning Application.

2. Objectives

2.1.1. The objectives of this Site Appraisal are:

- To assess the potential land contamination impact at the Project Site due to current and historical land uses, on and off-site activities that could result in contamination of the site; and

- To propose forthcoming actions in case the potential land contamination identified.

2.1.2. This Site Appraisal Report has been prepared following the guidance and steps outlined in the Practice Guide for Investigation and Remediation of Contaminated Land, Guidance Manual for Use of Risk-Based Remediation Goals (RBRGs) for Contaminated Land Management, and the Guidance Note for Contaminated Land Assessment and Remediation. All guidance notes and guidance manual are published by the Environmental Protection Department (EPD) of the Government of HKSAR.

3. Currently Available Information

3.1. Site Environs

3.1.1. The location of the Project Site and its environs is shown in ***Figure 1***.

3.1.2. The Project Site with site area of 14,600m^2 is bounded by Tai Po Industrial Estate to the east, the Dai Fuk Street to the south, Ting Kok Road to the west and the GIC site to the north. The Project Site is zoned as “Other Specified Uses” annotated “Bus Depot” (“OU(Bus Depot)”) on the approved Tai Po Outline Zoning Plan (“OZP”) No. S/TP/30.

3.2. Land Use

3.2.1. According to the aerial photograph taken in 1956 by the Lands Department, the Project Site was the sea. The reclamation works started since 1961. Based on the topographic map from Lands Department, the western part of the Project Site was formed and became Yue Kok Temporary Housing Area after the completion of the reclamation in 1977. The rest of the Project Site was eventually formed and remains vacant until 1982.

3.2.2. In the period of the 1982 to 1995, the majority of the Project Site was Yue Kok Temporary Housing Area and no land contamination activities are anticipated. It is also observed that the northern part of the Project Site was covered by the natural vegetation.

3.2.3. The Tai Po Industrial Estate was further developed in 1995. The whole Project Site was converted to the construction site for road works around the Project Site (including the Dai

Fuk Street and Dai Wah Street etc) until Dec 2000. According to the aerial photos in 1997, the construction works of the public road was completed in 1997.

3.2.4. According to Planning Department's reply, the Project Site was granted to KMB for a temporary bus depot since Dec 2000 (refer to Section 3.3). The entire Project Site was under site formation works for temporary open bus depot since 2001.

3.2.5. As confirmed by KMB, the construction work of the bus depot was completed for operation in Dec 2002. The entire Project Site remain unchanged as bus depot since Dec 2002 to now.

3.2.6. The aerial photos are shown in ***Appendix A***. A summary of the land use of the Project Site is given in ***Table 3.1***.

Table 3.1 Land Use Summary on the Project Site

Period / Year	Land Use / Description	Sources of Information
Before 1961	The Project Site was the sea.	Aerial photo from Lands Department
1961-1982	Reclamation at Project Site was started since 1961. The western part of Project Site was formed and converted to Yue Kok Temporary Housing Area in 1977 while the rest the Project Site was eventually formed. It became vacant after the completion of reclamation.	Aerial photos and topographic map (1:1 000 7-NW-5C (Ed 1979-07)) from Lands Department
1982 - 1995	The majority of the Project Site was Yue Kok Temporary Housing Area. Part of the Project Site was covered by the natural vegetation.	Aerial photos and topographic map (1:1 000 7-NW-5C (Ed 1984-11)) from Lands Department
1995 - Dec 2000	The Yue Kok Temporary Housing Area was removed in 1995. The Project Site was a construction site for the road works around the Project Site.	Aerial photo from Lands Department
Dec 2000 – Dec 2002	The Project Site was granted to KMB for a temporary bus depot since Dec 2000.	Reply from Planning Department, refer to Section 2.3
	The Project Site was under site formation works for bus depot since	Aerial photo from Lands Department

Period / Year	Land Use / Description	Sources of Information
	2001.	
Dec 2002 - now	As advised by KMB, the operation of bus depot started since Dec 2002 until now.	Aerial photo from Lands Department, Information provided by KMB

3.3. Information from Government Departments

3.3.1. The following HKSAR Government Departments have been enquired on the latest update on the availability of land use status and records of land contamination and/or spillage for the site. The summary of correspondence is presented in ***Table* 3.2** below. Copy of the letters replied from various Government Departments are included in **Appendix B** for reference.

Table 3.2 Enquiries and Responses on Land Contamination Related Records in the Project Site

Consultant's Letter Ref.	Department	Response Letter Ref.	Response Date	Summary
1849/21-0012	Environmental Protection Department	( )in EP550/W2/4	1 Apr 2021	No record of chemical spillage accident and submission relating to land contamination assessment at the Project Site in the past 3 years.
1849/21-0014	Fire Services Department	(145) in FSD GR 6-5/4 R Pt. 32	31 Mar 2021	The case is being handled. Dangerous Goods License Records from 1990 to present moment and the incident record of past three years of fire and special services incident will be provided.
1849/21-0019		(58) in FSD GR 6-5/4 R Pt. 33	26 Apr 2021	Dangerous goods licenses have been issued by the department to the Project Site. Please refer to ***Appendix B*** for details. No incident record was found at the aforesaid location.
1849/21-0015	Planning Department	( ) in PD/TP 1/33/1 (L)	29 Mar 2021	The Project Site has been granted to KMB under a STT of three years for a temporary bus depot since December 2000.
1849/21-0016	Lands Department	(26) in DLO/TP 95 /TAT/68 11	24 May 2021	The office does not have readily available information in relation to the caption.

3.3.2. The Consultant visited the Building Records Access and Viewing On-line (BRAVO) of Building Department over the internet to obtain records for completed private building. There is neither records of building, structural, drainage, alternation & additions, site formation, minor works nor existing building available at the Project Site. The captured screen of BRAVO is provided in ***Appendix C*** for reference.

3.3.3. In addition, the Consultant visited historical aerial photographs taken by the Lands Department to review the past land use of the Project Site. Details have been summarised in Sections 3.2.

3.3.4. The Consultant visited the territory-wide register of chemical waste producers maintained at the Territory Control Office in Wan Chai on 28 April 2021. The register record is updated as of 17 February 2021. There are currently two registered chemical waste producers at the Project Site. Details of the chemical waste producer is provided in ***Appendix D***.

3.4. Site Visit and Observation

3.4.1. Site visit was conducted on 29 October 2020, 28 June and 21 December 2022 to identify potential sources of contamination. A Site Walkover Checklist has been completed with the Tenant's representative as required in the EPD's Practice Guide and attached in ***Appendix E***. Photo records of the Project Site taken during the site visit are presented in ***Appendix F****.*

Open Bus Parking Area

3.4.2. The majority of the Project Site is for bus parking. The open bus parking area is paved with concrete with good condition. Some vegetations are observed at ground indicating the presence of cracks. Yet these cracks are identified along the site boundary where the area are vacant or man-made slope. No vegetations at ground are found within the open bus parking spaces. Small number of cracks are observed in the open bus parking area. Since no maintenance work nor chemical handling is carried out at the open bus parking area, no land contamination via these cracks is expected. Therefore, it is believed that potential land contamination in bus parking area is unlikely to occur (Photo 1 - 4 of ***Appendix F***). Some stains caused by vehicle smoke mainly consist of carbon soot which is not considered as potential source of contamination.

Refueling, vehicle washing and Covered Bus Parking Area

3.4.3. Part of the Project Site is covered which is designated for refueling, bus washing and maintenance. The covered parking area are designated for maintenance activity. The photos of associated facilities including vehicle washing area (Photo 5), covered parking space (Photo 6 - 11) and the refueling area (Photo 13 - 16) are presented in ***Appendix F***. No major maintenance activity was carried out within the Site, only minor maintenance activity including vehicle repair / testing activities fixing of tyres for safety reasons, braking tests to check brake performance due to operation need. If it is determined that further maintenance and repair is required for the bus fleet after routine inspection, it is delivered to other bus depots of larger scale, such as Sha Tin Depot, where equipped with components parts, welding machines, cranes. Hence, bus maintenance and repair using large scale equipment and machineries will not be taken place in the existing depot. Refueling and the use and storage of chemical (e.g. lubricant and oil) is also involved in the depot operation. The lubricants are mainly used for lubricating the engines and the refilling of lubricant is only carried out in the covered parking area. The above-mentioned areas are paved with concrete with no noticeable cracks observed. No obvious oil stains / suspected contamination such as abnormal odour are observed during the site visit. Nevertheless, the mentioned activities (e.g. use of chemicals, chemical and fuel storage/refilling, maintenance activities) are considered as potential polluting activities under the Practice Guide for Investigation and Remediation of Contaminated Land. A site investigation is proposed and shall be carried out to investigate the potential land contamination issues of the Site.

3.4.4. There are four underground oil tanks located beneath the refueling area as shown in ***Appendix G***. The oil tanks are still in operation during the site visit. It is not feasible to thoroughly inspect the condition of oil tanks. As advised by KMB, daily inspection using the pressure meters (Photo 17 of ***Appendix F***) and regular maintenance of the oil tanks and pipelines was conducted to ensure no leakage from the oil tanks. In addition, no chemical spillage accident was recorded since the operation of the depot. Although spillage and leakage from the oil tanks is not expected, further site investigation is suggested to identify all land contamination issues within the Project Site and it will be will be discussed next section.

Wastewater Treatment Plant

3.4.5. The wastewater treatment plant is located at the southwest of the Project Site. According to Photo 12, 34 – 38 of ***Appendix F***, the wastewater treatment plant is concrete paved and no noticeable cracks are identified during the site visit. All chemicals (including Poly Aluminum Chloride (PAC), Polymer, Flocculant Agent, Sulfuric Acid and Sodium Hydroxide (<5%)) within the wastewater treatment plant are properly stored (Photo 39 – 43 of ***Appendix F)***. Regular inspection for chemical storage is conducted to prevent spillage / leakage. Hence, land contamination is not expected within the wastewater treatment plant.

Chemical Storage

3.4.6. There is chemical storage area within store room 2 at the covered part of the Depot. Appropriate labels are securely attached on each chemical waste containers indicating the corresponding chemical characteristics of the waste such as explosive, flammable etc. According to Photo 22 – 24 of ***Appendix F***, lubricants for top-up use are properly stored in the elevated chemical cupboards. Considered that the entire chemical storage area is paved with good condition, and all lubricants are sealed and carefully stored to prevent secondary contamination, no leakage of lubricants is expected within the store room.

3.4.7. Apart from the lubricants, containers storing anti-rust water, antifreeze and coolant are observed (Photo 25 – 28 of ***Appendix F***) in store room 2. The major substance of the anti-rust water, antifreeze and coolant is ethylene glycol. Considered that the containers are sealed and properly placed in elevated platform, leakage of anti-rust water, antifreeze and coolant is not expected.

3.4.8. As advised by the KMB on-site staff, some containers are used to store the sludge generated from the wastewater treatment plant (Photo 25, 29 and 30 of ***Appendix F***). They are sealed and placed on the elevated platform (Photo 29) to avoid any spillage and land contamination before the collection of licensed collectors.

3.4.9. In view of the chemical storage area within the store room 2 is paved with good condition, all chemical containers are placed in elevated platform / cupboards. No noticeable spillage and leakage of the chemicals are observed during the site visit. In addition, no chemical spillage accident was recorded since the operation of the depot as advised by KMB. Hence, land contamination is not expected within the chemical storage area of the store room.

Indoor Facilities

3.4.10. Several indoor facilities including office and store room 1 are located at the western part of the Project Site. Based on the on-site photos (Photo 18 - 20 of ***Appendix F***), all the indoor facilities are paved with good condition with no obvious cracks. No potentially polluting activities and land contamination are expected within these rooms.

3.4.11. Located at the northwest of the Project Site, store room 3 is used for equipment storage. According to Photo 33 of ***Appendix F***, store room 3 is paved with good condition and the equipment is stored in a locked cabinet or properly placed in an elevated platform. Hence, land contamination is not expected within the equipment storage room.

3.4.12. Moreover, it was observed that there were no other signs of obvious/ suspected contamination such as abnormal odour and /or distress vegetation within the Project Site.

4. Potential Land Contamination Appraisal

4.1.1. According to the desktop study and site appraisal presented in Section 3 above, potential land contamination is likely to be occurred at refueling, bus washing and covered bus parking area.

4.1.2. The entire Project Site is paved by concrete with good condition. No obvious stains and marks were observed during the site visit. Nevertheless, some activities carried out within the Project Site (e.g. use of chemicals, chemical and fuel storage/refilling, maintenance activities) are considered as potential polluting activities under the Practice Guide for Investigation and Remediation of Contaminated Land. A site investigation is proposed and shall be carried out to investigate the potential land contamination issues of the Site.

4.1.3. Chemical storage area was observed in the store room within the Project Site. As mentioned in Section 3.4.6 – 3.4.9, the chemical storage area is concrete paved with good condition. All chemicals are sealed and properly stored in the elevated platform and cupboards. In addition, according to the reply from EPD (refer to Section 3.3), there are no record of chemical spillage accident and submission relating to land contamination assessment at the Project Site in the past 3 years. Thus, potential land contamination in the chemical storage area within store room is unlikely to occur.

4.1.4. During the site visit, the oil tanks are still in operation and it is not feasible to thoroughly inspect their condition. According to the details of underground oil tanks provided by KMB shown in ***Appendix G***, four oil tanks and some pipelines are located inside the underground concrete lined tank chambers.

4.1.5. Moreover, daily checking and regularly maintenance of the diesel tanks and pipeline have been conducted to ensure no leakage of diesel oil from the pipeline, flange joints and cracks. According to the calibration test reports and photos provided by KMB shown in ***Appendix H***, the calibration results of all four diesel tanks are satisfactory with no sign of leakage observed. Also, no compliant was received from the public and other government departments since the operation of the bus depot. Thus, previous spillage or leakage of diesel oil is not anticipated. Nevertheless, as a conservative approach, the oil tanks and the associated pipelines are still considered as a source of land contamination.

4.1.6. In addition, subject to detailed design, if technical feasible, the existing underground oil tank will be left in and will not be demolished. Yet, site investigation shall also be carried at the areas next to the side wall of the tank and pipelines of the refueling station to study the potential land contamination issues from these facilities.

4.1.7. Upon the site visits of the Subject Site, no signs of obvious/ suspected contamination such as abnormal odour and/or distressed vegetation within the Subject Site were observed. No potential hotspot was identified from the site walkover.

4.1.8. In view of various activities carried out within the existing depot are considered as potential polluting activities under the Practice Guide for Investigation and Remediation of Contaminated Land. A site investigation and remediation works, if required, shall be carried out before the commencement of development of the proposed depot. A Contamination Assessment Plan (CAP) will be prepared and submitted to EPD for approval before the Site Investigation. Remediation works, if required, will be carried out according to the Practice Guide before the commencement of development of project.

5. Conclusion of Site Appraisal

5.1.1. The Site Appraisal has been conducted to identify the potential land contamination impact at the Project Site.

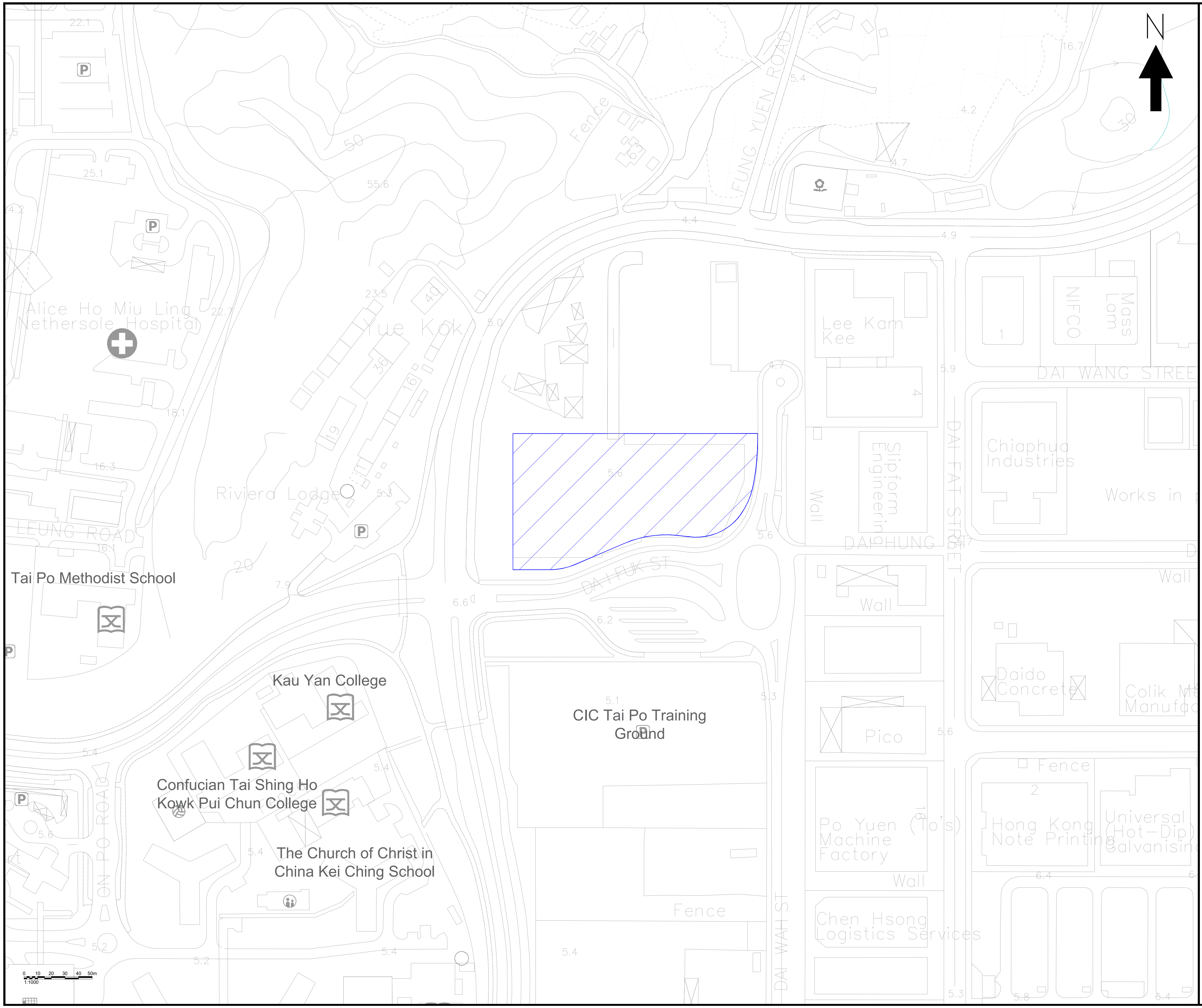
5.1.2. Based on the aerial photographs and responses from HKSAR Government Departments, the Project Site was Yue Kok Temporary Housing Area and a construction site for the road works around the Project Site in the past. It was then converted to temporary bus deport under the STT since Dec 2000. The Project Site was currently used as a temporary bus depot for bus parking, refueling and bus washing with minor maintenance activity carried out at the covered parking area. Storage of chemical was also observed. No record of chemical spillage accident and submission relating to land contamination assessment at the Project Site in the past 3 years.

5.1.3. According to site inspection, the entire Project Site is concrete paved with no noticeable cracks.

5.1.4. There are four underground oil tanks located beneath the refueling area. Daily checking and maintenance of the oil tanks and pipelines were conducted, no sign of leakage is observed. Nevertheless, the oil tanks are considered as a source of land contamination.

5.1.5. In view of the activities conducted in the Project site, such as fuel/chemical storage and refueling, are considered as potentially polluting activities under the EPD's Practice Guide. In view of the above, site investigation and remediation works, if required, will to be conducted according to the Practice Guide to ascertain the nature and extent of contamination before the commencement of the development of the proposed depot. Rest assured that the Client, KMB will follow the prevailing guidelines on land contamination.

Figure



NOTES :

▨ PROJECT SITE

Consultant

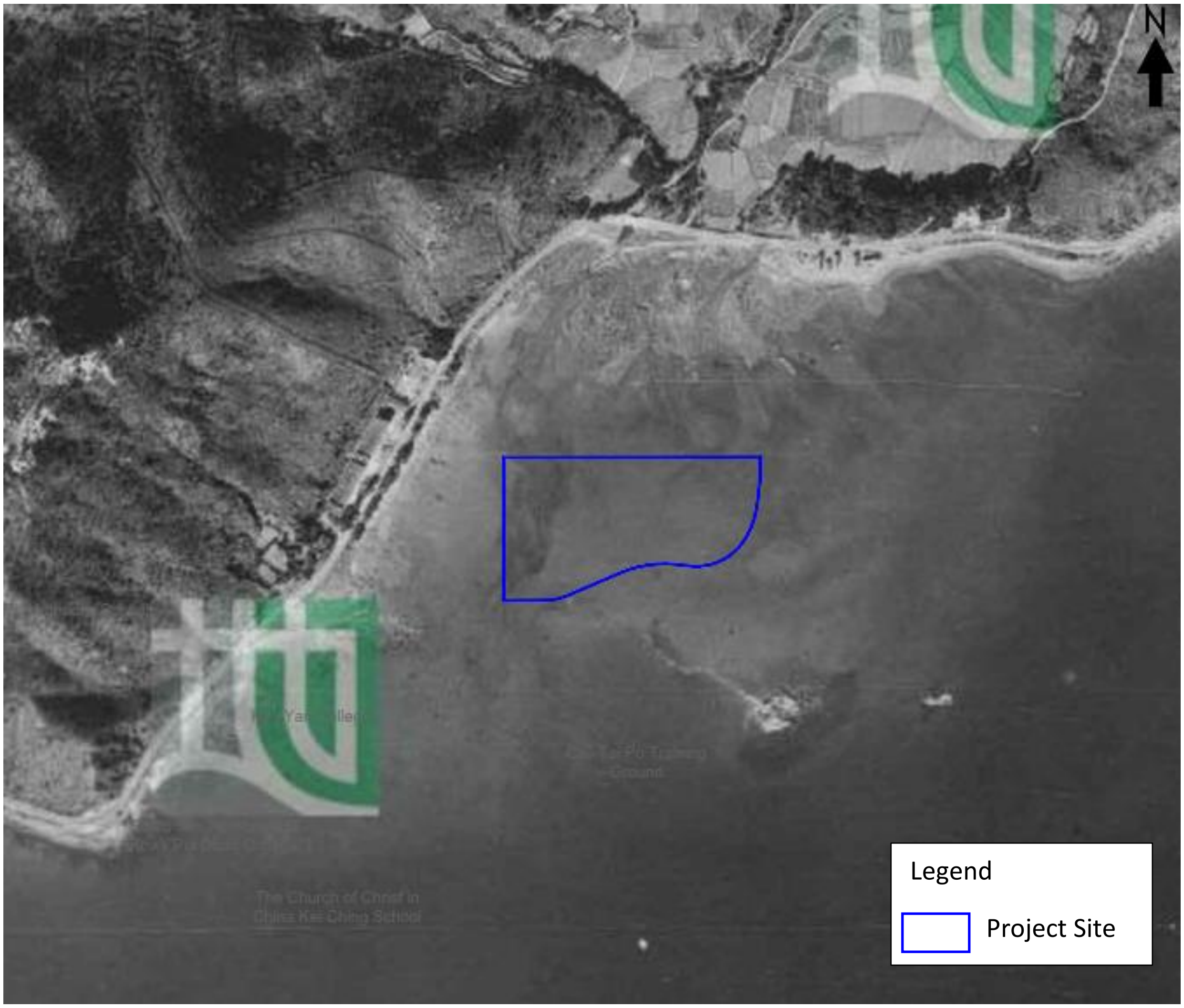
Allied Environmental Consultants Limited

Project No. :	1849
File Name :	CL
Project :	KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO
Drawing Title :	SITE LOCATION PLAN
Drawing No : FIGURE 1	Revision : 0
Scale : AS SHOWN	Date : APR 2021

P:\1801-1850\1849\05 Report\01 AEC Report\S16\Land Con\Fig\Fig1_Site Location.dwg

A4 297 x 210

Appendix A – Aerial Photos

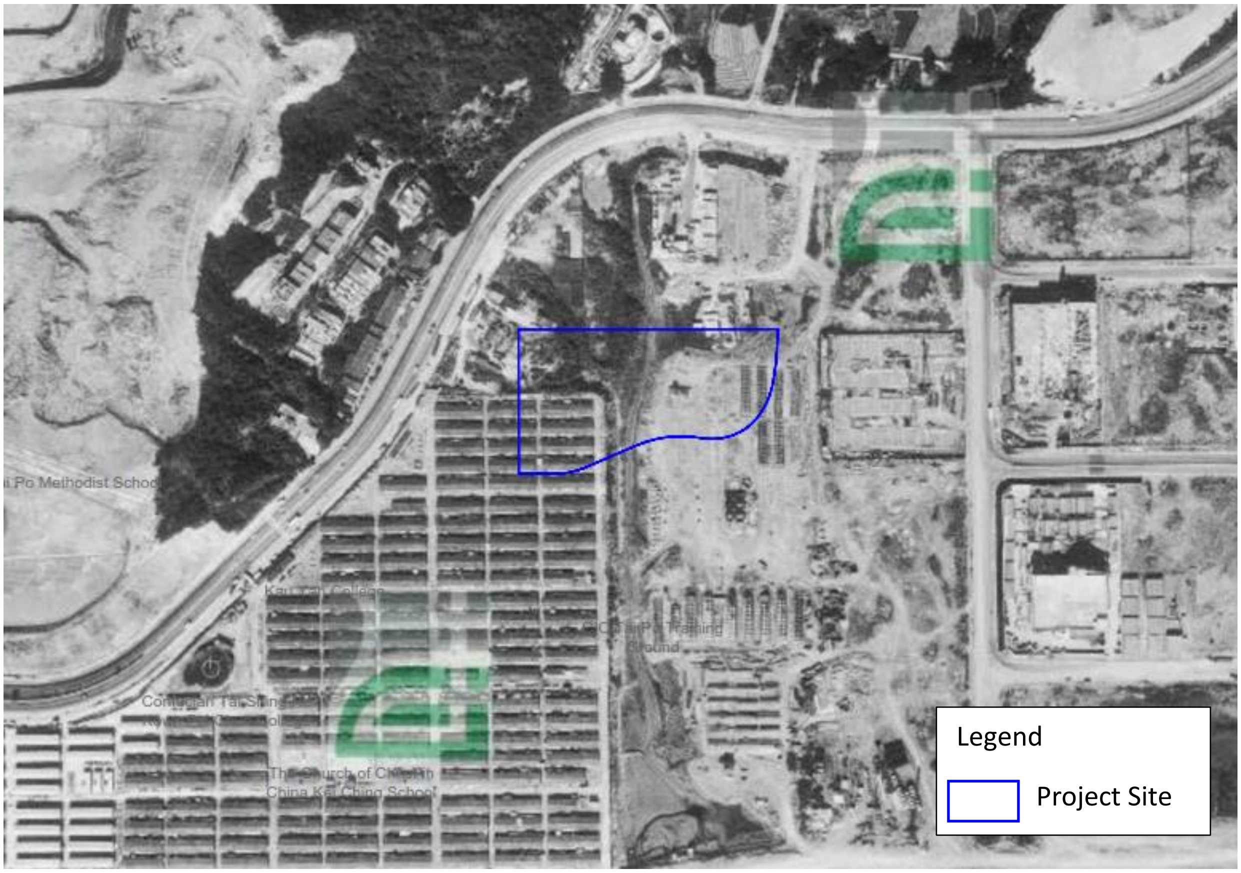

N
Tai Po Training Ground
The Church of Christ in China Kei Ching School
Legend
Project Site

1956


N
Kau Yan College
Confucian Tai Shing Ho Kwok Pui Chun College
Legend
Project Site

1961

1977



1982

1995

2001

2003

2019 (current)

Appendix B – Copy of Letters Replies from Various Government Department

Our Ref. [1849/21-0012]

Environmental Protection Department
Regional Office (North)
10/F., Sha Tin Government Offices
No.1 Sheung Wo Che Road, Sha Tin
New Territories

27/F, Overseas Trust Bank Building
160 Gloucester Road
Wan Chai
Hong Kong
T: +852 2815 7028
F: +852 2815 5399
info@aechk.com
www.asecg.com

25 March 2021

By Post

Dear Sir/Madam,

KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO
<u>Request for Information for Land Contamination Assessment</u>

We are conducting a Land Contamination Assessment study for KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po (Subject Site). As required by the "Practice Guide for Investigation and Remediation of Contaminated Land" published by the Environmental Protection Department of the HKSAR (EPD), information pertaining to the change of land uses/past activities/incidents/accidents at the Subject Site are required as part of the vetting process.

Of particular interests is whether there are any registered chemical waste producers under your record in the Subject Site, any waste disposal record, any accidental spillage record, any submission relating to land contamination assessment and any information you could provide which might be useful for our study. We enclosed herewith a site map showing the location of the Subject Site for your reference.

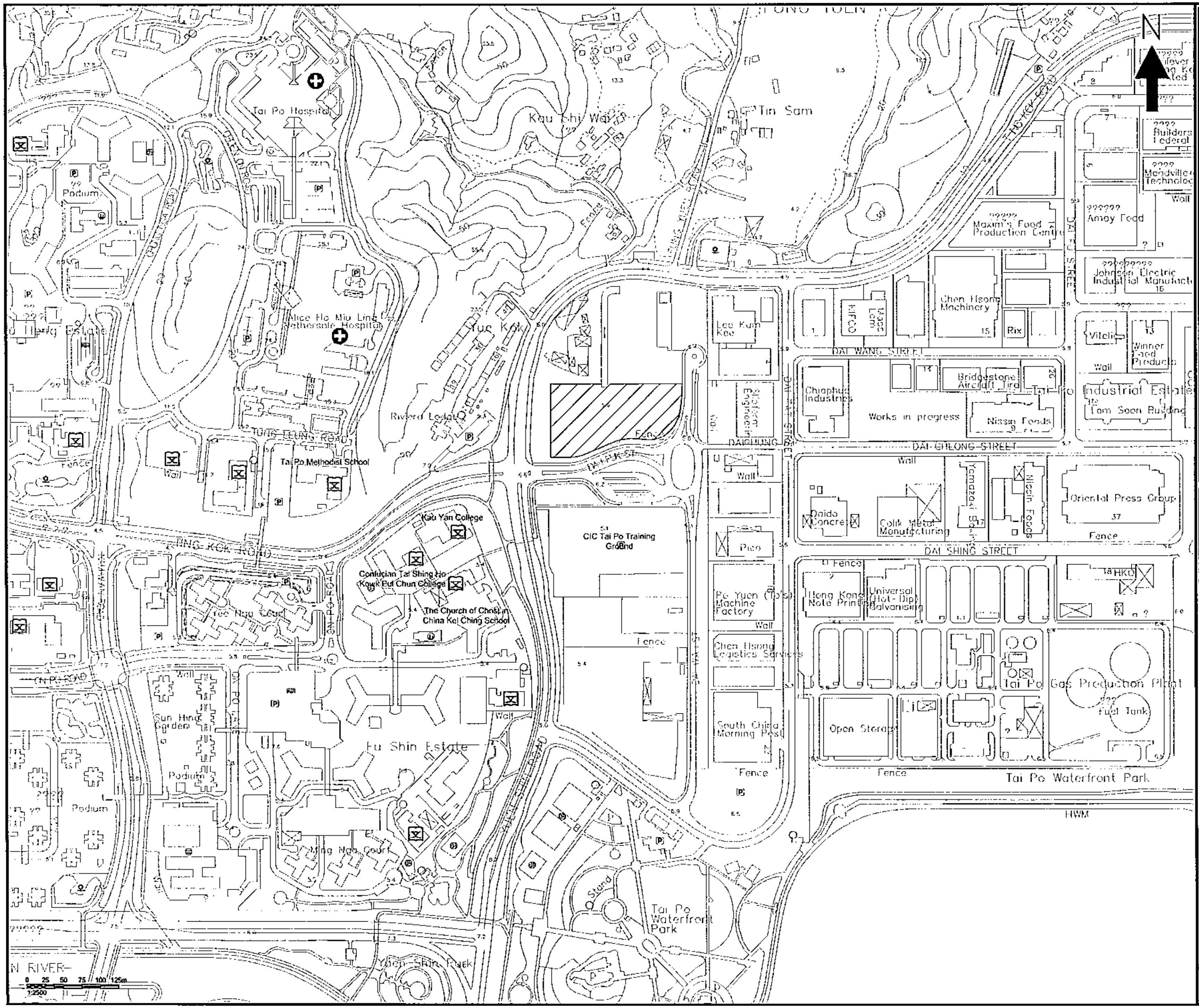
Due to tight schedule, it is highly appreciated if the above information could be available and returned to us via either fax (Fax No. 2815 5399) or email by 9 April 2021.

Thank you very much for your kind attention and assistance. Should you have any queries, please feel free to contact the undersigned at 3915 7148 or Ms. Cherry Lee (cherrylee@aechk.com) at 3915 7153.

Yours sincerely,

Cathy Man
Principal Consultant
CM/cl

Encl.



NOTES :

▨ SUBJECT SITE

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name : CC

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

Drawing Title :
SITE LOCATION PLAN

Drawing No : FIGURE 2-1

Revision : 0

Scale : AS SHOWN

Date : NOV 2020

本署檔案
OUR REF:(　) in EP550/W2/4
來函檔案
YOUR REF: 1849/21-0012
電　話
TEL. NO.: 2158 5801
圖文傳真
FAX NO.: 2650 6033
網　址
HOMEPAGE: http://www.epd.gov.hk/

Environmental Protection Department
Environmental Compliance Division
Regional Office (North)
10/F., Shatin Governmental Offices,
1 Sheung Wo Che Road,
Sha Tin, New Territories,
Hong Kong

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

1 April 2021

Allied Environmental Consultants Limited
27/F., Overseas Trust Bank Building,
160 Gloucester Road,
Wan Chai, Hong Kong
(Attn.: Ms. Cathy MAN)

Dear Ms. MAN,

Re: KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po
Request for Information for Land Contamination Assessment

I refer to your letter dated 25 March 2021 on the captioned subject.

According to the records in this office, there are no record of chemical spillage accident and submission relating to land contamination assessment at the subject site in the past 3 years.

As regards registered Chemical Waste Producer(s) at the location concerned, a registry of chemical waste producers is available in the Territorial Control Office of this department. Please contact our Chief Environmental Protection Inspector (Territorial Control)5, Mr. LEUNG Chi-keung, Dennis at 2835 1017 for making an appointment to view the records.

While we have made a reasonable effort to ensure the completeness and accuracy of the information provided, you should comprehend that the information is provided as is and EPD is not responsible or liable for any claim, loss or damage resulting from the use of this information.

Yours sincerely,

(Maverick AU)
Regional Office (North)
for Director of Environmental Protection

c.c. TCO/EPD (Attn.: Mr. LEUNG Chi-keung, Dennis) Fax: 2305 0453

Our Ref. [1849/21-0013]

Hong Kong Police Force
Explosive Ordinance Disposal Bureau
EOD Mount Butler Depot,
150 Mount Butler Road,
Jardine's Lookout
Hong Kong

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F: +852 2815 5399
info@aechk.com
www.asecg.com

25 March 2021

By Post

Dear Sir/Madam,

KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Request for Information for Land Contamination Assessment

We are conducting a Land Contamination Assessment study for KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po (Subject Site). As required by the "Practice Guide for Investigation and Remediation of Contaminated Land" published by the Environmental Protection Department of the HKSAR (EPD), information pertaining to the change of land uses/past activities/incidents/accidents at the Subject Site are required as part of the vetting process.

Of particular interests are current and historical explosive storage locations and records at the Subject Site, and any explosive spillage and incident reports that we believe your Department might have records of. We enclosed herewith a site map showing the location of the Subject Site for your reference.

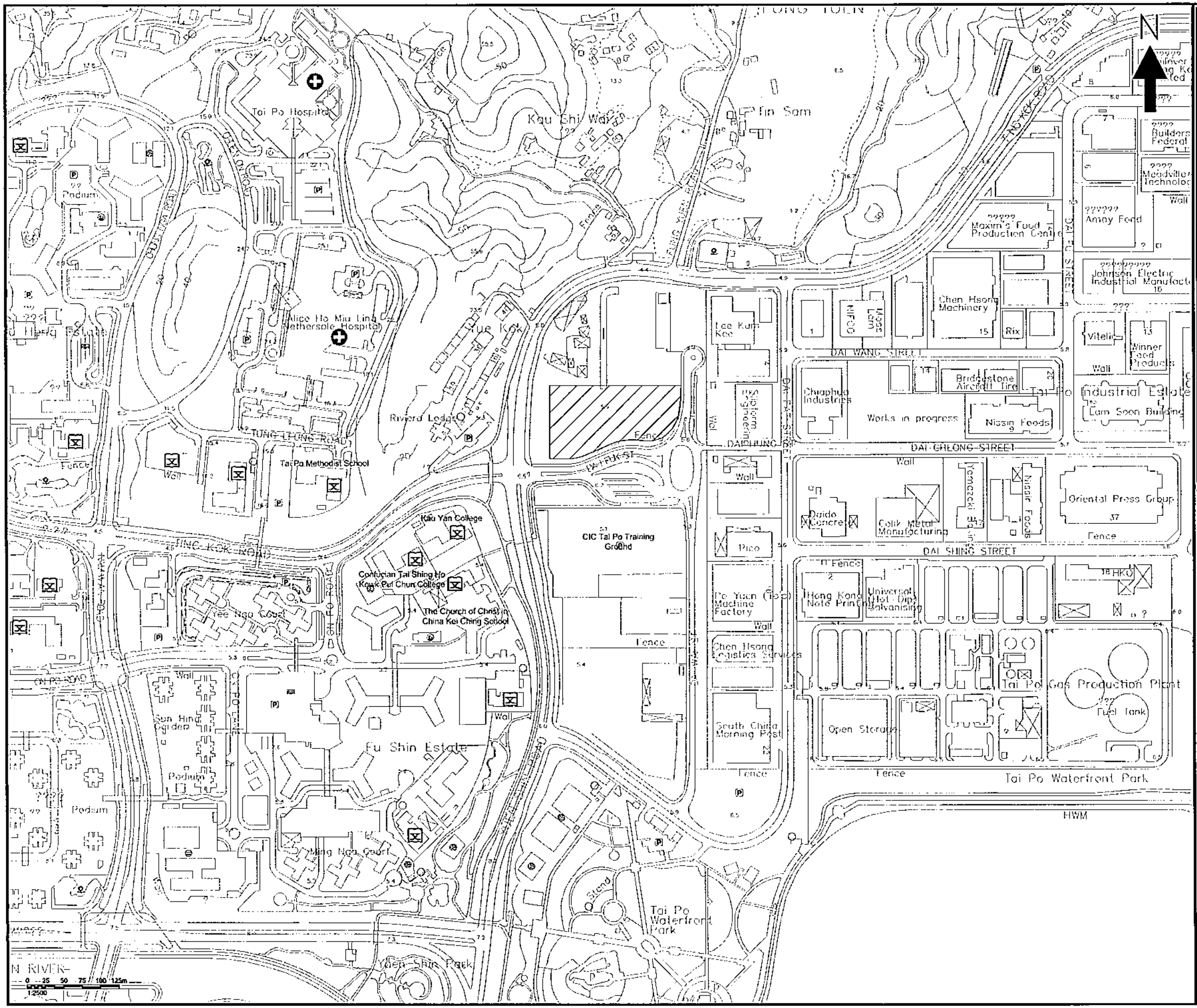
Due to tight schedule, it is highly appreciated if the above information could be available and returned to us via either fax (Fax No. 2815 5399) or email by 9 April 2021.

Thank you very much for your kind attention and assistance. Should you have any queries, please feel free to contact the undersigned at 3915 7148 or Ms. Cherry Lee (cherrylee@aechk.com) at 3915 7153.

Yours sincerely,

Cathy Man
Principal Consultant
CM/cl

Encl.



NOTES :

▨ SUBJECT SITE

Consultant

Allied Environmental Consultants Limited

Project No. :	1849
File Name :	CC

Project :

KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Drawing Title :

SITE LOCATION PLAN

Drawing No : FIGURE 2-1	Revision : 0
Scale : AS SHOWN	Date : NOV 2020

THIS DRAWING IS NOT FOR CONSTRUCTION PURPOSES UNLESS EXPRESSLY STATED. ALL RIGHTS RESERVED AND REPRODUCTION IN ANY FORM MUST BE APPROVED BY ALLIED SUSTAINABILITY AND ENVIRONMENTAL CONSULTANTS GROUP LIMITED

Z:\1801-1850\1849\05 Report\01 AEC Report\Project Profile\Figure\Draft 1_eng\Figure 2-1 & 2-2 Site Layout Plan.dwg

A4 297 x 210

Our Ref. [1849/21-0014]

Fire Services Department / Management Group
9/F, Fire Services Headquarters Building
1 Hong Chong Road
Tsim Sha Tsui East
Kowloon

27/F, Overseas Trust Bank Building
160 Gloucester Road
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F: +852 2815 5399
info@aechk.com
www.asecg.com

25 March 2021

By Post

Dear Sir/Madam,

KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO
Request for Information for Land Contamination Assessment

We are conducting a Land Contamination Assessment study for KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po (Subject Site). As required by the "Practice Guide for Investigation and Remediation of Contaminated Land" published by the Environmental Protection Department of the HKSAR (EPD), information pertaining to the change of land uses/past activities/incidents/accidents at the Subject Site are required as part of the vetting process.

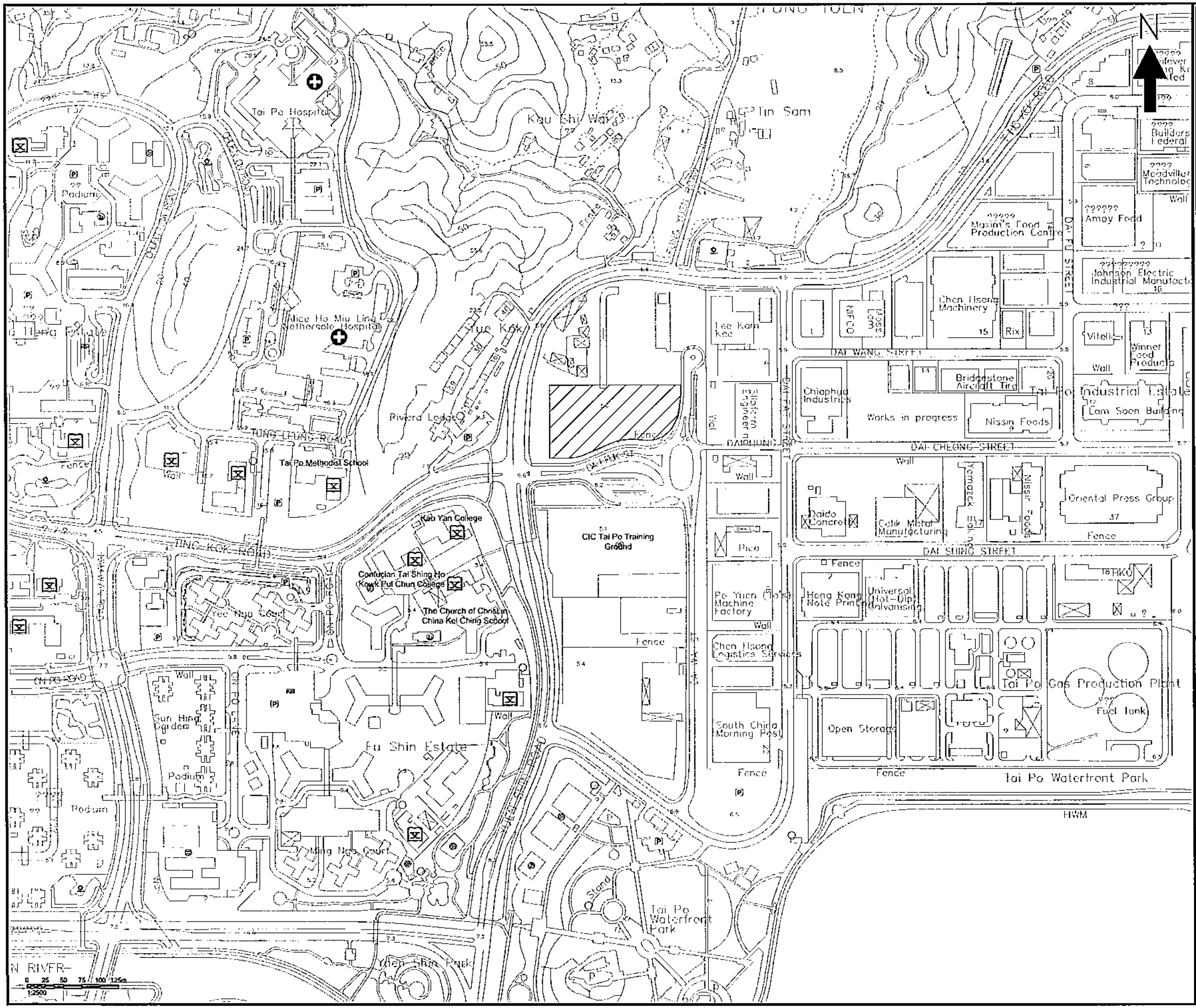
Of particular interests are spill and incident reports (including records of fire at the Subject Site) that we believe your Department might have record of. Furthermore, we would also like to know whether anywhere of the subject site had applied or possessed license for dangerous goods storage. We enclosed herewith a site map showing the location of the Subject Site for your reference.

Due to tight schedule, it is highly appreciated if the above information could be available and returned to us via either fax (Fax No. 2815 5399) or email by 9 April 2021.

Thank you very much for your kind attention and assistance. Should you have any queries, please feel free to contact the undersigned at 3915 7148 or Ms. Cherry Lee (cherrylee@aechk.com) at 3915 7153.

Yours sincerely,

Cathy Man
Principal Consultant
CM/cl



NOTES :

▨ SUBJECT SITE

Consultant

Allied Environmental Consultants Limited

Project No. :	1849
File Name :	CC

Project :

KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Drawing Title :

SITE LOCATION PLAN

Drawing No : FIGURE 2-1	Revision : 0
Scale : AS SHOWN	Date : NOV 2020

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.** : (145) in FSD GR 6-5/4 R Pt. 32
來函檔號 **YOUR REF.** : [1849/21-0014]
電子郵件 **E-mail** : hkfsdenq@hkfsd.gov.hk
圖文傳真 **FAX NO.** : 2739 5879
電　話 **TEL NO.** : 2733 7741

31 March 2021

Allied Environmental Consultants Limited
27/F, Overseas Trust Bank Building,
160 Gloucester Road,
Wan Chai, Hong Kong.
(Attn: Ms. Cathy MAN, Principal Consultant)

By fax (2815 5399) only

Dear Ms. MAN,

KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po
Request for Information of Dangerous Goods & Incident Records

I refer to your letter of 25.3.2021 regarding the captioned subject.

Your case is being handled, and a reply will be furnished to you as soon as possible. Please be advised that due to time lapse, this Department can only provide the following information for your requested information:

(i) Dangerous Goods Licence Record: from the year of 1990 to present moment.

(ii) Incident Record: Past three years of fire and special services incidents.

Please also submit the appointment letter from your client for record.

Should you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(NG Wing-chit)
for Director of Fire Services

消 防 處
香港九龍尖沙咀東部康莊道 1 號
消防處總部大廈

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.** : (58) in FSD GR 6-5/4 R Pt. 33
來函檔號 **YOUR REF.** : [1849/21-0014]
電子郵件 **E-mail** : hkfsdenq@hkfsd.gov.hk
圖文傳真 **FAX NO.** : 2739 5879
電　話 **TEL NO.** : 2733 7741

26 April 2021

Allied Environmental Consultants Limited
27/F, Overseas Trust Bank Building,
160 Gloucester Road,
Wan Chai, Hong Kong.
(Attn: Ms. Cathy MAN, Principal Consultant)

Dear Ms. MAN,

KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po
Request for Information of Dangerous Goods & Incident Records

I refer to your letter of 25.3.2021 and subsequent letter of 22.4.2021 regarding the captioned request and reply below in response to your questions:-

According to our record, from the year of 1990 to present moment, dangerous goods licenses have been issued by this department to the subject address, with details as shown in **Appendix A**. 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,

(NG Wing-chit)
for Director of Fire Services

Ref. number and date should be quoted in reference to this letter
凡 提 及 本 信 時 請 引 述 編 號 及 日 期

Appendix A

KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po
Request for Information of Dangerous Goods & Incident Records

Item	**Type of DG**	**Quantity**	**Store Location**
1.	Diesel Oils (Cat.5 Cl. 3)	22,500 Litres	UG Tank on open ground used as fuel filling station
2.	Diesel Oils (Cat.5 Cl. 3)	22,500 Litres	UG Tank on open ground used as fuel filling station
3.	Diesel Oils (Cat.5 Cl. 3)	22,500 Litres	UG Tank on open ground used as fuel filling station
4	Diesel Oils (Cat.5 Cl. 3)	22,500 Litres	UG Tank on open ground used as fuel filling station

Our Ref. [1849/21-0015]

Planning Department
Sha Tin, Tai Po and North District Planning Office
13/F & 14/F, Sha Tin Government Offices
1 Sheung Wo Che Road
Sha Tin, N.T.

27/F, Overseas Trust Bank Building
160 Gloucester Road
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F: +852 2815 5399
info@aechk.com
www.asecg.com

25 March 2021

By Post

Dear Sir/Madam,

KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO
Request for Information for Land Contamination Assessment

We are conducting a Land Contamination Assessment study for KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po (Subject Site). As required by the "Practice Guide for Investigation and Remediation of Contaminated Land" published by the Environmental Protection Department of the HKSAR (EPD), information pertaining to the change of land uses/past activities/incidents/accidents at the Subject Site are required as part of the vetting process.

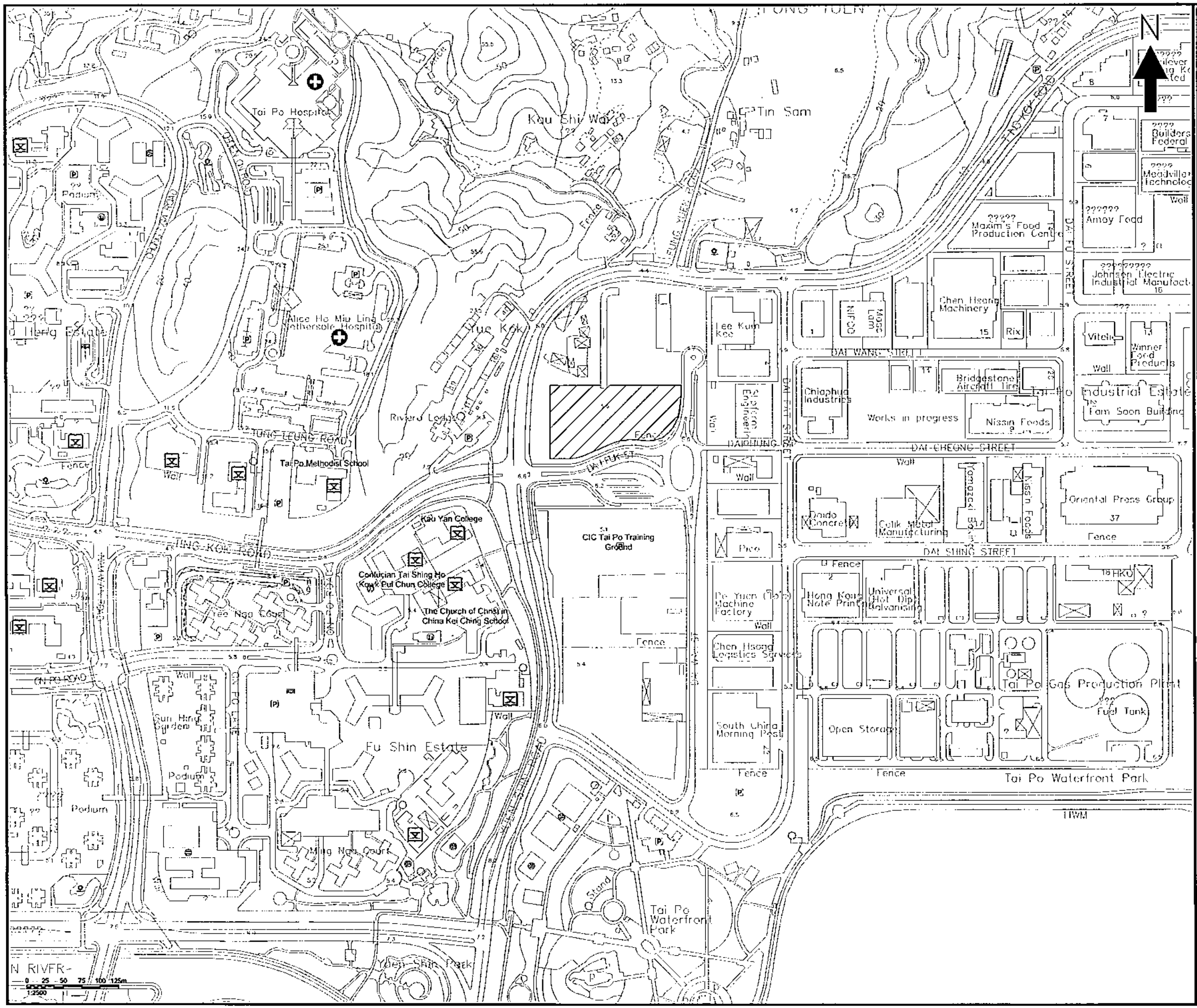
Of particular interests are current and historical site information, any change on the land use and any information you could provide that might be useful for our study. We enclosed herewith a site map showing the location of the subject site for your reference.

Due to tight schedule, it is highly appreciated if the above information could be available and returned to us via either fax (Fax No. 2815 5399) or email by 9 April 2021.

Thank you very much for your kind attention and assistance. Should you have any queries, please feel free to contact the undersigned at 3915 7148 or Ms. Cherry Lee (cherrylee@aechk.com) at 3915 7153.

Yours sincerely,

Cathy Man
Principal Consultant
CM/cl
Encl.



NOTES :

▨ SUBJECT SITE

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name : CC

Project : KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Drawing Title : SITE LOCATION PLAN

Drawing No : FIGURE 2-1

Revision : 0

Scale : AS SHOWN

Date : NOV 2020

規 劃 署

沙田、大埔及北區規劃處
香港新界沙田上禾輋路一號
沙田政府合署
十三樓 1301-1314 室

Planning Department

Sha Tin, Tai Po & North District Planning Office
Rooms 1301-1314, 13/F,
Shatin Government Offices,
1 Sheung Wo Che Road, Sha Tin,
N.T., Hong Kong

來函檔號 Your Reference 1849/21-0015
本署檔號 Our Reference ( ) in PD/TP 1/33/1 (L)
電話號碼 Tel. No. : 2158 6225
傳真機號碼 Fax No. : 2691 2806/2696 2377

Allied Environmental Consultants Limited
27/F, Overseas Trust Bank Building
160 Gloucester Road
Wan Chai, Hong Kong
(Attn.: Ms. Cathy MAN)

By Post & Fax (2815 5399)
(1 page)

29 March 2021

Dear Madam,

KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po
Re: Request for Information for Land Contamination Assessment

I refer to your letter dated 25.3.2021 received by this office on 29.3.2021 regarding the captioned.

According to our record, the subject site has been granted to KMB under a Short Term Tenancy of three years for a temporary bus depot since December 2000. You may consult District Lands Officer/Tai Po of Lands Department for more information.

Should you have any further queries, please contact the undersigned.

Yours faithfully,

Vanessa

(Ms. Vanessa CHUNG)
for District Planning Officer/
Sha Tin, Tai Po & North
Planning Department

Internal
Site Record (TP - 457)

VC/vc

Our Vision – "We plan to make Hong Kong an international city of world prominence."

Our Ref. [1849/21-0016]

Lands Department
District Lands Office, Tai Po
1/F, Tai Po Government Offices
Ting Kok Road
Tai Po, New Territories

27/F, Overseas Trust Bank Building
160 Gloucester Road
Wan Chai
Hong Kong
T: +852 2815 7028
F: +852 2815 5399
info@aechk.com
www.asecg.com

25 March 2021

By Post

Dear Sir/Madam,

KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO
Request for Information for Land Contamination Assessment

We are conducting a Land Contamination Assessment study for KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po (Subject Site). As required by the "Practice Guide for Investigation and Remediation of Contaminated Land" published by the Environmental Protection Department of the HKSAR (EPD), information pertaining to the change of land uses/past activities/incidents/accidents at the Subject Site are required as part of the vetting process.

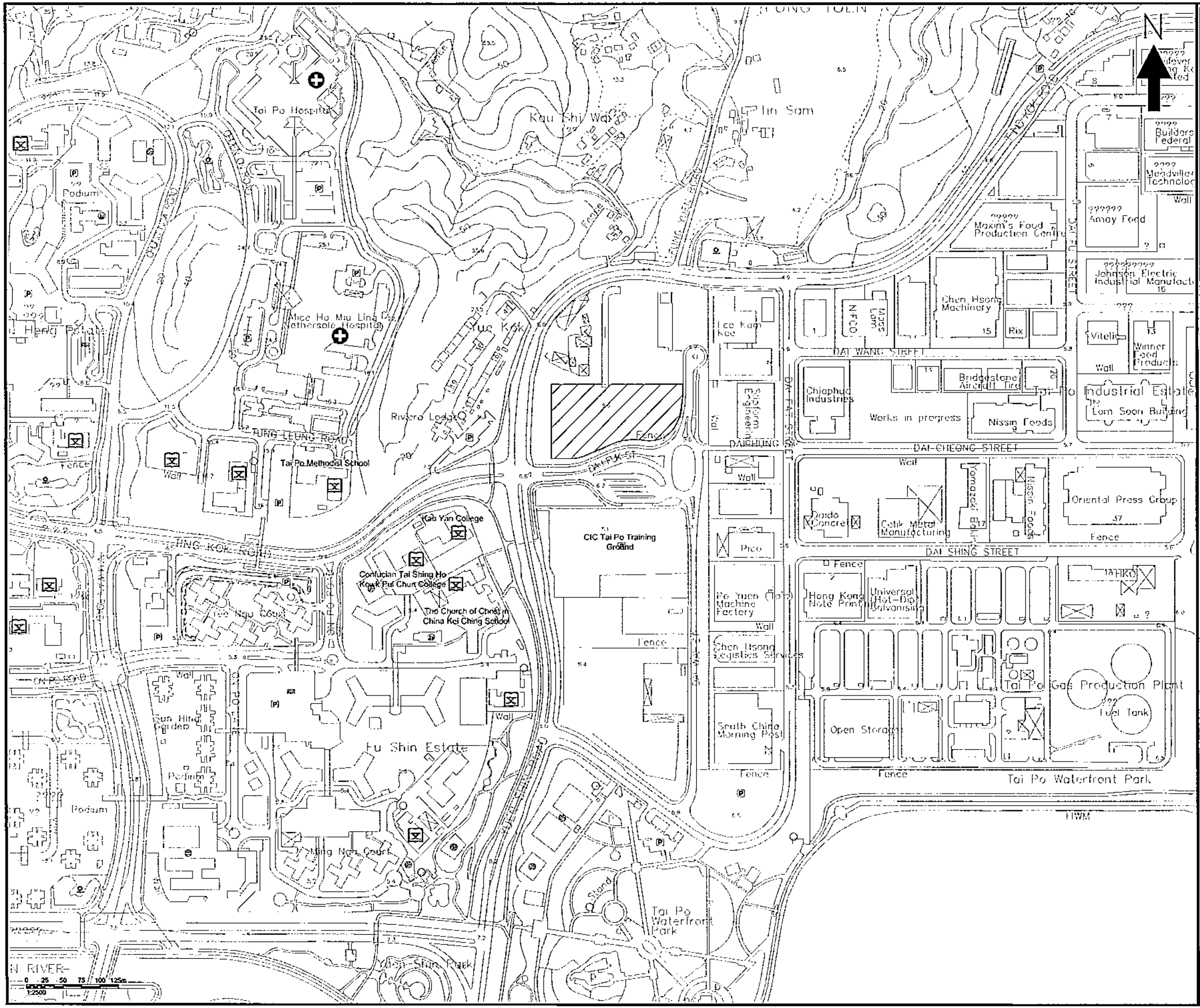
Of particular interests are information on spillage accidents, illegal/contaminating land uses or uncontrolled dumping uses, current and historical land use information, and any information you could provide which might be useful for our study. We enclosed herewith a site map showing the location of the subject site for your reference.

Due to tight schedule, it is highly appreciated if the above information could be available and returned to us via either fax (Fax No. 2815 5399) or email by 9 April 2021.

Thank you very much for your kind attention and assistance. Should you have any queries, please feel free to contact the undersigned at 3915 7148 or Ms. Cherry Lee (cherrylee@aechk.com) at 3915 7153.

Yours sincerely,

Cathy Man
Principal Consultant
CM/cl
Encl.



NOTES :

▨ SUBJECT SITE

Consultant

AEC

Allied Environmental Consultants Limited

Project No. :	1849
File Name :	CC

Project :

KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

Drawing Title :

SITE LOCATION PLAN

Drawing No : FIGURE 2-1	Revision : 0
Scale : AS SHOWN	Date : NOV 2020

THIS DRAWING IS NOT FOR CONSTRUCTION PURPOSES UNLESS EXPRESSLY STATED.

Z:\1801-1850\1849\05 Report\01 AEC Report\Project Profile\Figure\Draft 1_eng\Figure 2-1 & 2-2 Site Layout Plan.dwg

A4 297 x 210

地政總署
大埔地政處
DISTRICT LANDS OFFICE/
TAI PO
LANDS DEPARTMENT

我們矢志努力不懈，提供盡善盡美的土地行政服務。
We strive to achieve excellence in land administration.

新界大埔汀角路一號大埔政府合署一樓
1/F., TAI PO GOVERNMENT OFFICES BUILDING,
1 TING KOK ROAD, TAI PO, NEW TERRITORIES.

網址 Website : www.landsd.gov.hk

電話 Tel: 2654 1336
圖文傳真 Fax: 2650 9896
本署檔號 Our Ref: (26) in DLO/TP 95/TAT/68 II
來函檔號 Your Ref: 1849/21-0016

來函請註明本署檔號
Please quote our reference in your reply

AEC
27/F, Overseas Trust Bank Building
160 Gloucester Road
Wan Chai
Hong Kong

24 May 2021

<u>By Fax and Post</u>
<u>(Fax No.: 2815 5399)</u>

Dear Sir/ Madam,

KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po
Request for Information for
<u>Land Contamination Assessment</u>

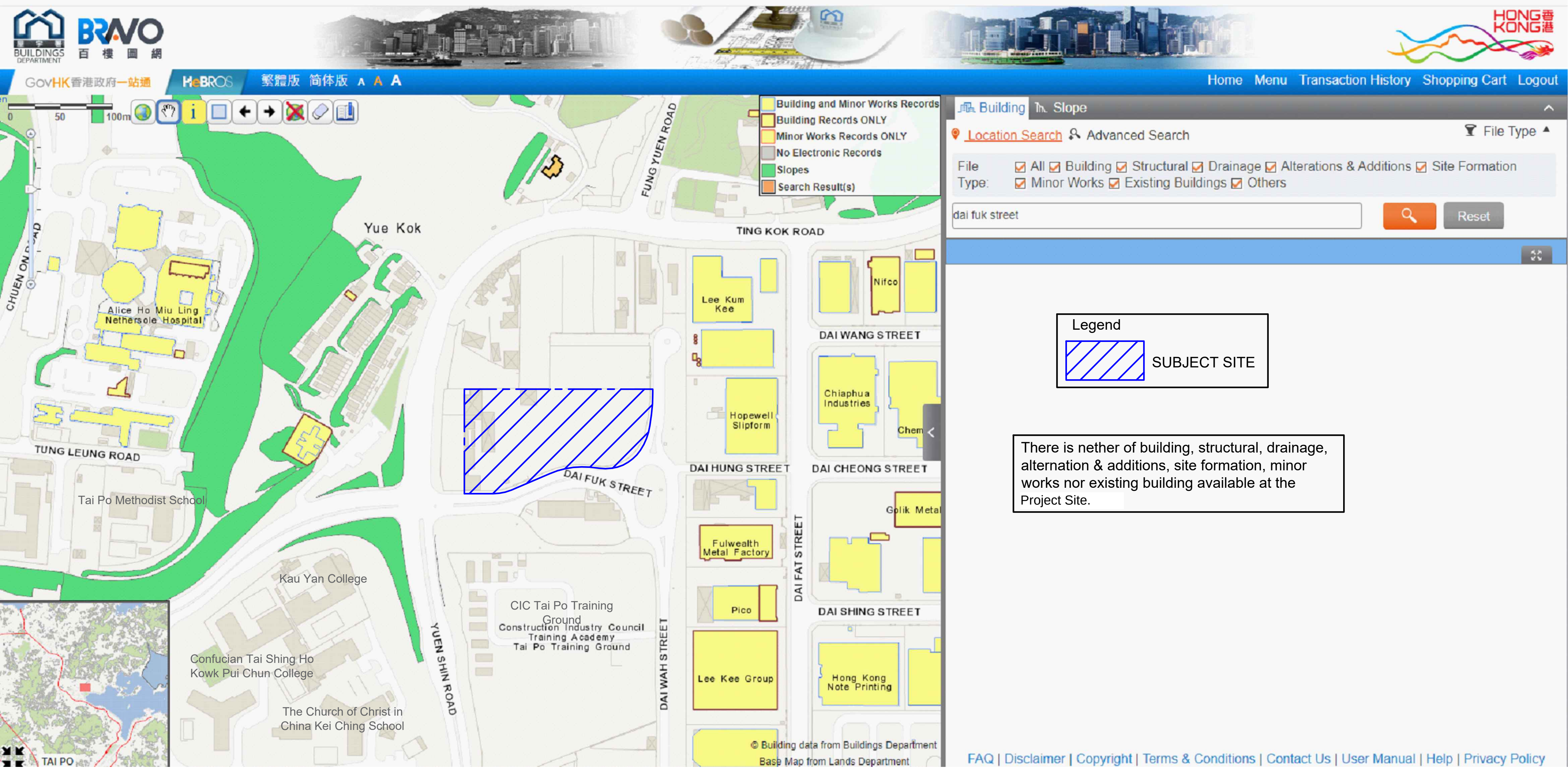
I refer to your letter dated 25 March 2021.

Please note that this office does <u>NOT</u> have readily available information in relation to the caption. As such, you are advised to check whether there are any relevant public information in the website of the Lands Department that you may consider useful and check with other relevant works department.

Yours faithfully,

(Ms. Carmen LEUNG)
for District Lands Officer, Tai Po

Appendix C – Screen Capture of BRAVO



File Type: ☑ All ☑ Building ☑ Structural ☑ Drainage ☑ Alterations & Additions ☑ Site Formation ☑ Minor Works ☑ Existing Buildings ☑ Others

dai fuk street

Legend

▨ SUBJECT SITE

There is nether of building, structural, drainage, alternation & additions, site formation, minor works nor existing building available at the Project Site.

Appendix D – Chemical Waste Producer Records

Valid WPN as of 17.02.2021

Waste Producer Name	**Premises Address**	**Nature of Business**
THE KOWLOON MOTOR BUS COMPANY (1933) LIMITED 九龍巴士(一九三三)有限公司	STT1097, DAI FUK STREET , TAI PO, NEW TERRITORIES.	PASSEGER TRANSPORT
China Geo-Engineering Corporation 中國地質工程集團有限公司	Depot at Dai wah Street, Tai Po, N.T.	Slope Upgrading Works

No Invalid WPN as of 17.02.2021

Appendix E – Site Walkover Checklist

Annex C1

Site Walkover Checklist (29th October 2020)

GENERAL SITE DETAILS

SITE OWNER/CLIENT Kowloon Motor Bus Company (1933) Limited

PROPERTY ADDRESS KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po

PERSON CONDUCTING THE QUESTIONNAIRE

NAME Theo Lai

POSITION Senior Consultant (Allied Environmental Consultants Limited)

AUTHORIZED OWNER/CLIENT REPRESENTATIVE (IF APPLICABLE)

NAME Alan Fung / Nicole Wong

POSITION Senior Officer – Major Works / Senior Facilities Management Officer

TELEPHONE 2786 8847 / 2786 8734

SITE ACTIVITIES

Briefly describe activities carried out on site, including types of products/chemicals/materials handled.

Obtain a flow schematic if possible.

Number of employees:	Full-time:	15
	Part-time:	N/A
	Temporary/Seasonal:	N/A
Maximum no. of people on site at any time:		15
Typical hours of operation:		24 hours
Number of shifts:		3
Days per week:		7
Weeks per year:		52
Scheduled plant shut-down:		Not applicable

Detail the main sources of energy at the site:

Gas	~~Yes~~/No
Electricity	Yes/~~No~~
Coal	~~Yes~~/No
Oil	~~Yes~~/No
Other	~~Yes~~/No

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:	Approximately 14,600 m2
What area of the site is covered by buildings (%):	15%
Please list all current and previous owners/occupiers if possible.	Kowloon Motor Bus Company (1933) Limited since Dec 2020

Current Occupier : Kowloon Motor Bus Company (1933) Limited

Is a site plan available? If yes, please attach. ~~Yes~~/No

Are there any other parties on site as tenants or sub-tenants? ~~Yes~~/No

If yes, identify those parties: ______

Describe surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.

North:	Greenery and Temporary Structures
South:	MTRC Tai Po Bus Station
East:	Tai Po Industrial Estate
West:	Yue Lok and Riveria Lodge (Residential)

Annex C1 – Site Walkover Checklist (Page 43)

Describe the topography of the area (flat terrain, rolling hills, mountains, by a large body of water, vegetation, etc.).

Flat terrain

State the size and location of the nearest residential communities.

Yue Lok (village house) and Riveria Lodge (high rise residential development) are located at the western portion of the Subject Site

Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or sites of special scientific interest?

N/A

Questionnaire with Existing/Previous Site Owner or Occupier

Ref.		Yes/No	Notes
1.	What are the main activities/operations at the above address?	-	Bus parking including refuelling and bus washing
2.	How long have you been occupying the site?	-	Since Dec 2000 (according to PlanD's reply)
3.	Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy?)	-	No information
4.	Prior to your occupancy, who occupied the site?	-	No information
5.	What were the main activities/operations during their occupancy?	-	No information
6.	Have there been any major changes in operations carried out at the site in the last 10 years?	No	Bus parking including refuelling and bus washing
7.	Have any polluting activities been carried out in the vicinity of the site in the past?	-	No information
8.	To the best of your knowledge, has the site ever been used as a petrol filling station/car service garage?	Yes	
9.	Are there any boreholes/wells or natural springs either on the site or in the surrounding area?	-	No information
10	Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	-	No information
11.	Are any chemicals used in your daily operations? (If yes, please provide details.)	Yes	Mainly lubricant
	• Where do you store these chemicals?	No	Store room. All chemicals are sealed and stored in the securely close containers
12.	Material inventory lists, including quantities and locations	No	

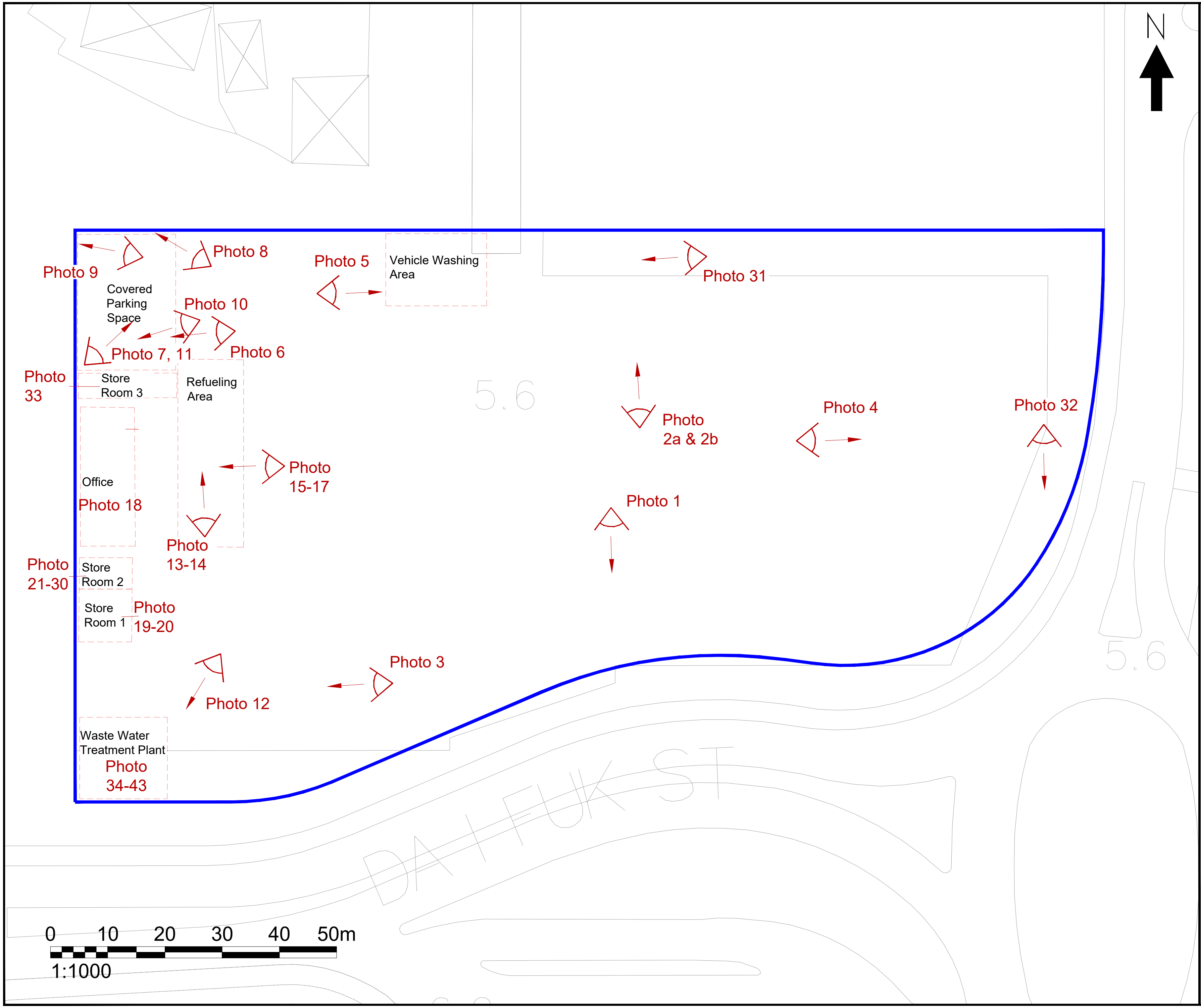
	available? (If yes, how often are these inventories updated?)		
13.	Has the facility produced a separate hazardous substance inventory?	No	
14.	Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details.)	No	
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.)	Yes	Underground oil tanks under the refuelling area (Please refer to Appendix G for the details of the underground oil tank)
	▪ How many underground storage tanks do you have on site?	-	4
	▪ What are the tanks constructed of?	-	No information
	▪ What are the contents of these tanks?	-	Oil for bus refuelling
	▪ Are the pipelines above or below ground?	-	Below ground
	▪ If the pipelines are below ground, has any leak and integrity testing been performed?	No	
	▪ Have there been any spills associated with these tanks?	No	
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	Regular checking of the diesel tanks and pipelines have been conducted. Please refer to Appendix H for the diesel tank calibration report.
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	No	

	rearrangement of 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	Based on the current design, the existing underground oil tank will be left in and will not be demolished
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	

Observations

1.	Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	Yes	The chemical storage area in store room is provided with secondary containment.
2.	What are the conditions of the bund walls and floors?	-	Good condition with no obvious cracks.
3.	Are 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, ash, oily tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?	Yes	Lubricant (for top-up use), anti-rust water, antifreeze/coolant (for minor vehicle maintenance works) are stored in the store room within the Project Site.

Appendix F – Site Visit Photo Records



NOTES :

▭ SUBJECT SITE

PHOTO VIEW POINT (Photo 1)

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name : EH

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

Drawing Title :
PHOTOLOG PLAN

Drawing No : APPENDIX F

Revision : 4

Scale : AS SHOWN

Date : DEC 2022

Photo 1: Southern Portion of the Project Site

Stain caused by vehicle smoke

Photo 2a: Northern Portion of the Project Site (Taken on 29 Oct 2020)

Photo 2b: Removed Stain of Northern Portion of the Project Site (Taken on 29 Nov 2022)

Photo 3: Western Portion of the Project Site

Photo 4: Eastern Portion of the Project Site

Stain caused by vehicle smoke

Photo 5: Vehicle Washing Area

Photo 6: Covered Parking Space

Photo 7: Ground Condition of Covered Parking Space

Photo 8: Storage of Tyres at Covered Parking Space

Photo 9: Furniture and Cardboards at Covered Parking Space

Photo 10: Lifting Equipment at Covered Parking Space

Photo 11: Lifting Equipment at Covered Parking Space


Photo 12: Outlook of Wastewater Treatment Plant


Photo 13: Refuelling Area


Stain caused by vehicle smoke

Photo 14: Refuelling Area


Photo 15: Oil Refuelling Station and Pipes in Refuelling Area

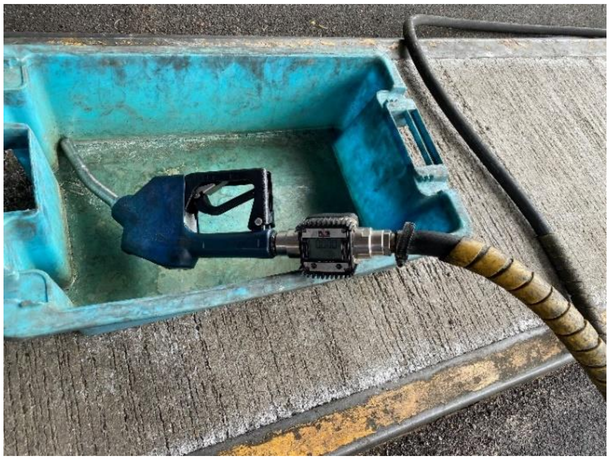


Photo 16: Oil Refuelling Station and Pipes in Refuelling Area


Photo 17: Pressure Meters for Daily Oil Spillage Inspection

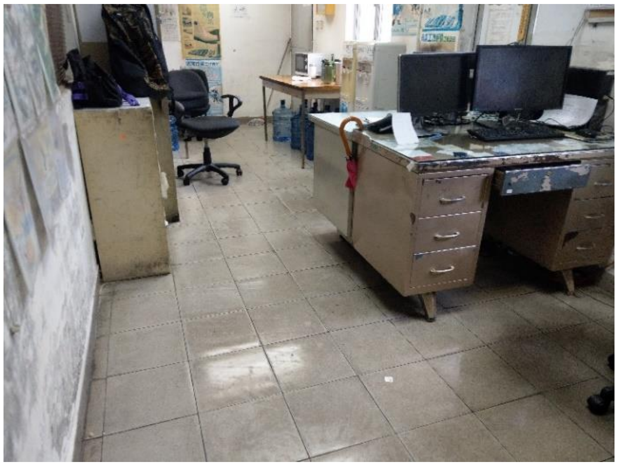


Photo 18: Office

Photo 19: Store Room 1

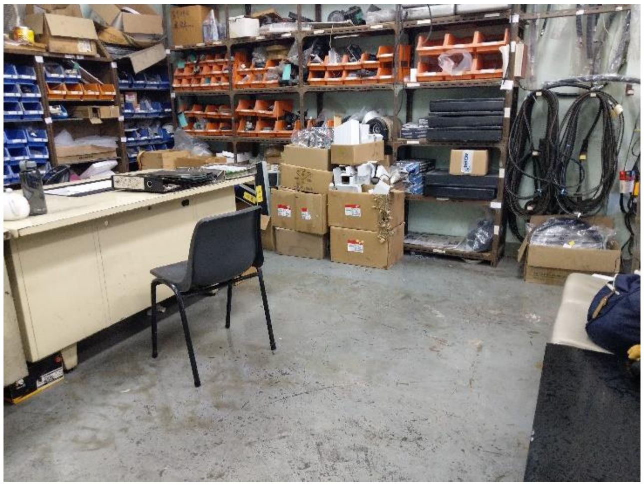


Photo 20: Store Room 1

Photo 21: Store Room 2

Photo 22: Chemical Cupboards for Lubricant within Store Room 2

Lubricant for top-up use

Photo 23: Lubricant in Store Room 2

Photo 24: Lubricant Stored in Chemical Cupboards in Store Room 2

Photo 25: Paved Ground and Chemical Storage Area of Store Room 2

Photo 26: Anti-rust oil, antifreeze/coolant in Store Room 2

Photo 27: Anti-rust oil, antifreeze/coolant in Store Room 2

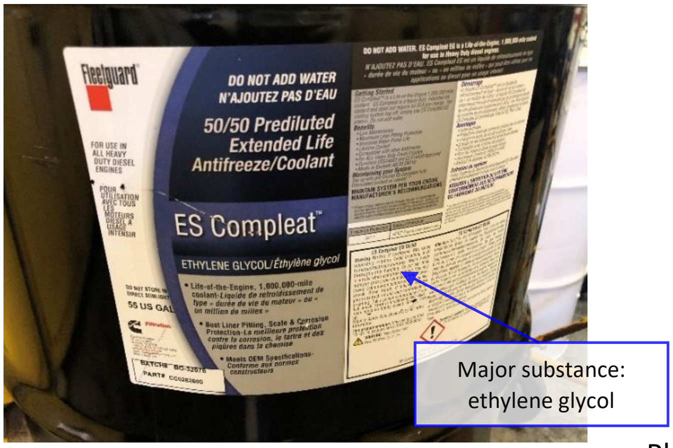


Photo 28: Label of the Anti-rust oil, antifreeze/coolant in Store Room 2

Photo 29: Containers storing sludge in Store Room 2

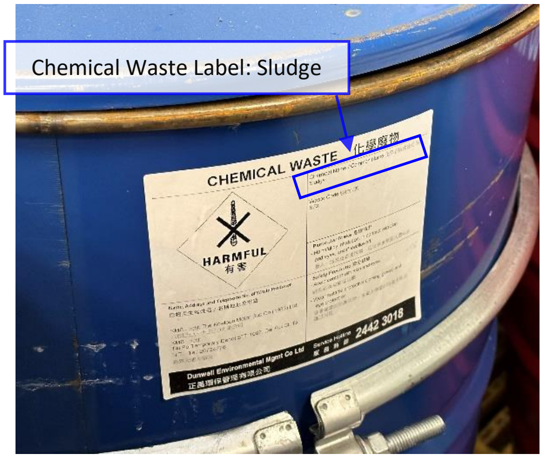


Photo 30: Chemical Waste Label of the Sludge collection containers in Store Room 2

Photo 31: Vegetation around Northern Portion of the Project Site

Photo 32: Vegetation around Eastern Portion of the Project Site

Photo 33: Store Room 3

Photo 34: Effluent Well within the Wastewater Treatment Plant

Photo 35: Reaction Tanks within the Wastewater Treatment Plant

Photo 36: Sludge Storage Tank within the Wastewater Treatment Plant

Photo 37: Equalization Tank within the Wastewater Treatment Plant

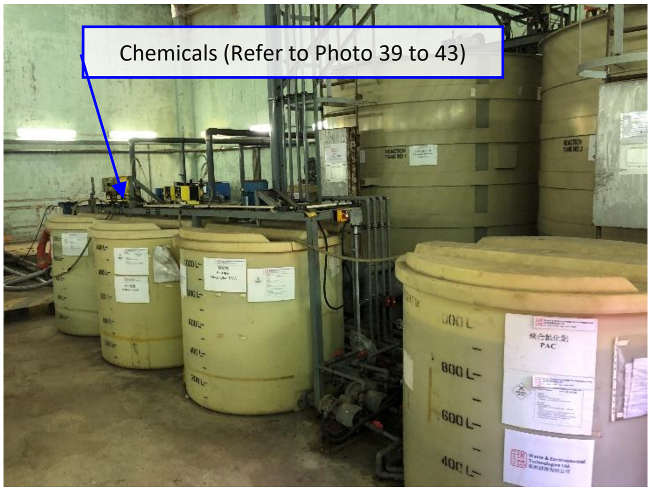


Photo 38: Chemicals within the Wastewater Treatment Plant

Chemicals used within the Wastewater Treatment Plant

Photo 39: Poly Aluminum Chloride (PAC)

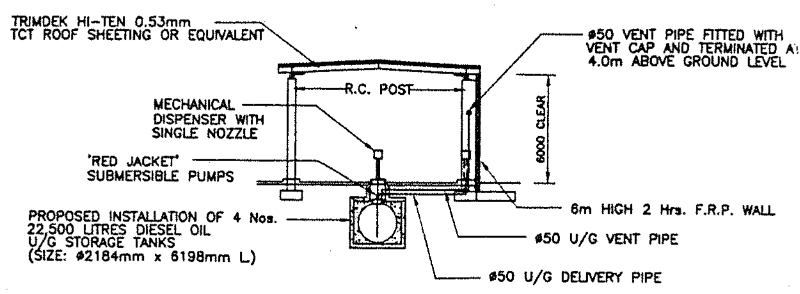
Photo 40: Polymer

Photo 41: Sodium Hydroxide (<5%)

Photo 42: Sulfuric Acid

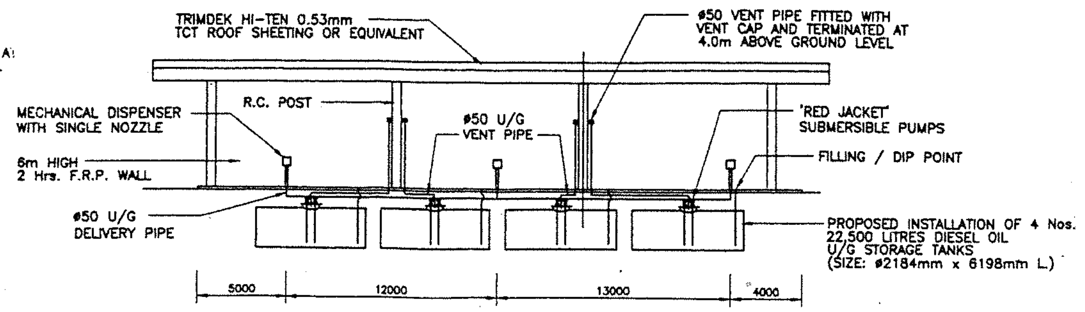
Photo 43: Flocculant Agent

Appendix G – Details of Underground Oil Tanks



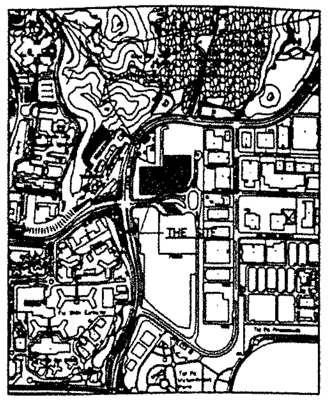
SECTION B – B

1 : 200



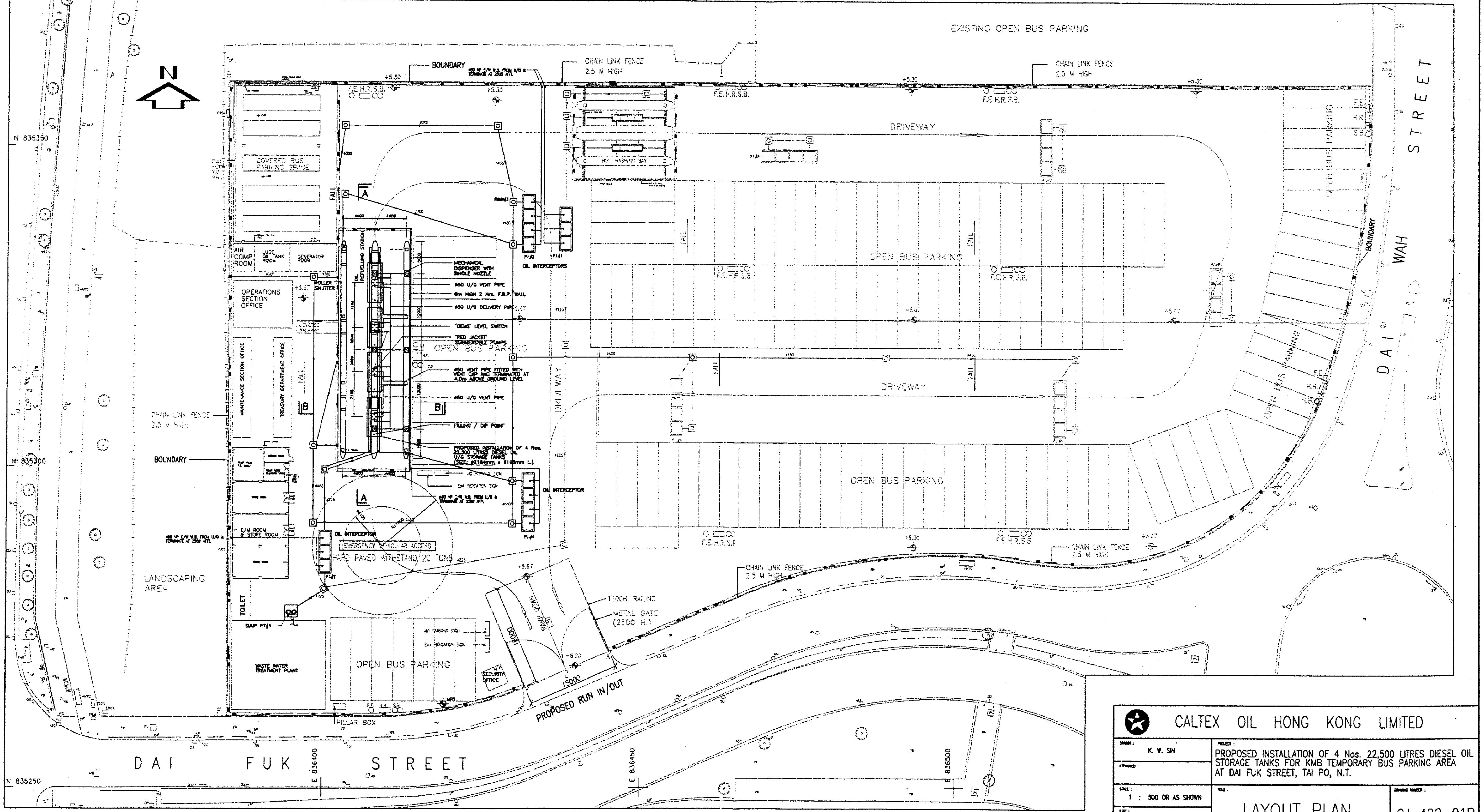
SECTION A – A

1 : 200



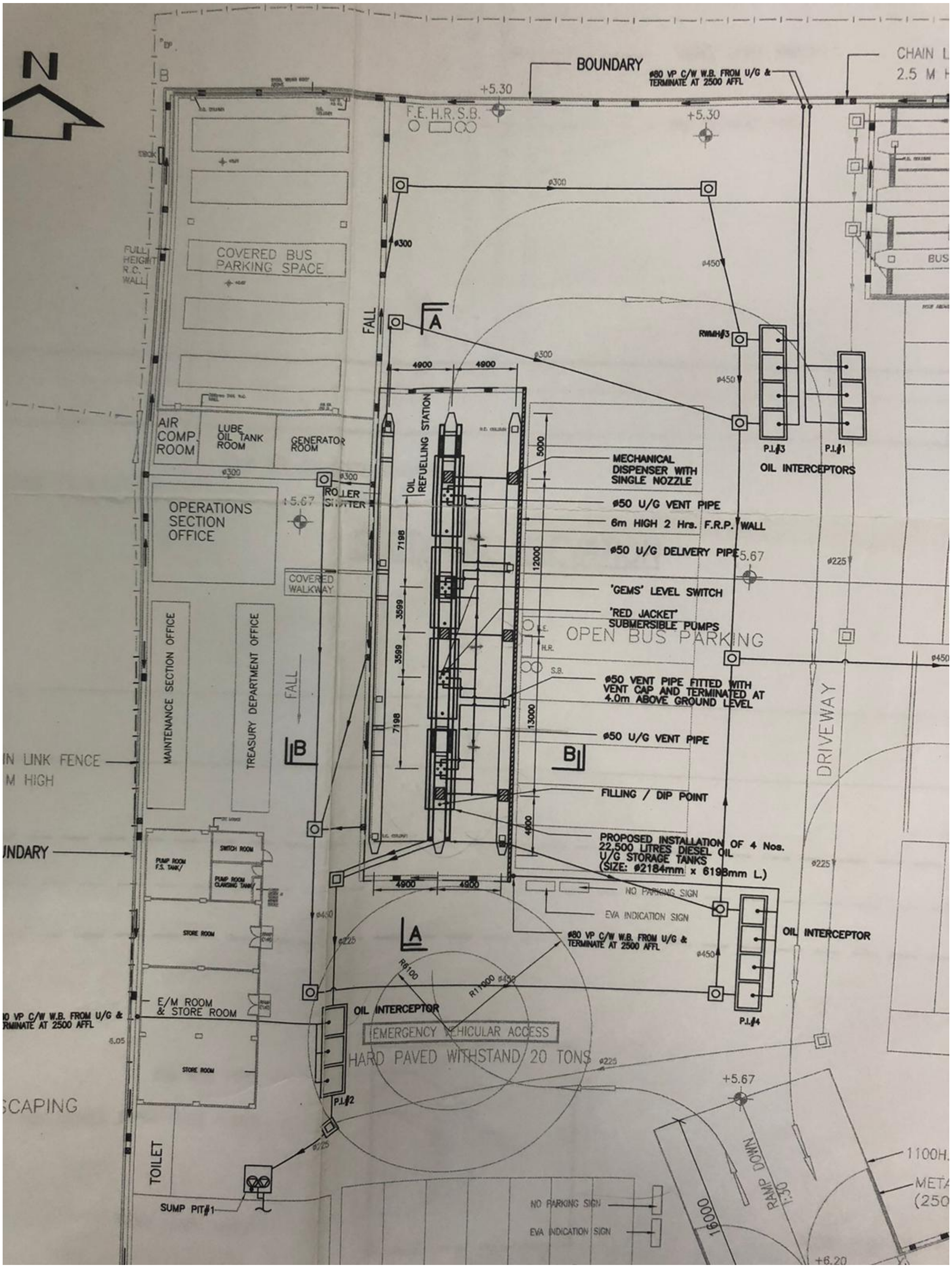
KEY PLAN

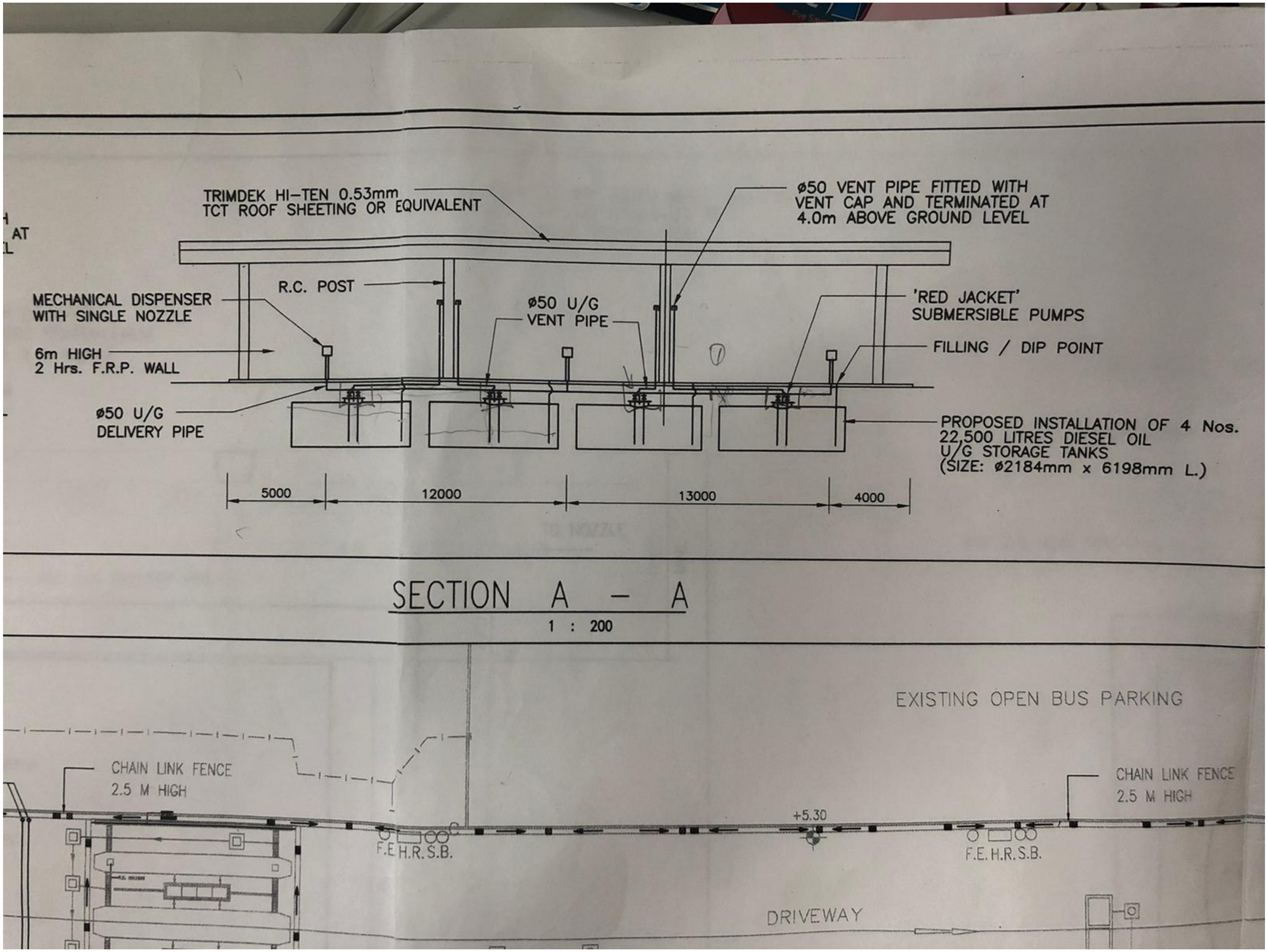
1 : 5 000

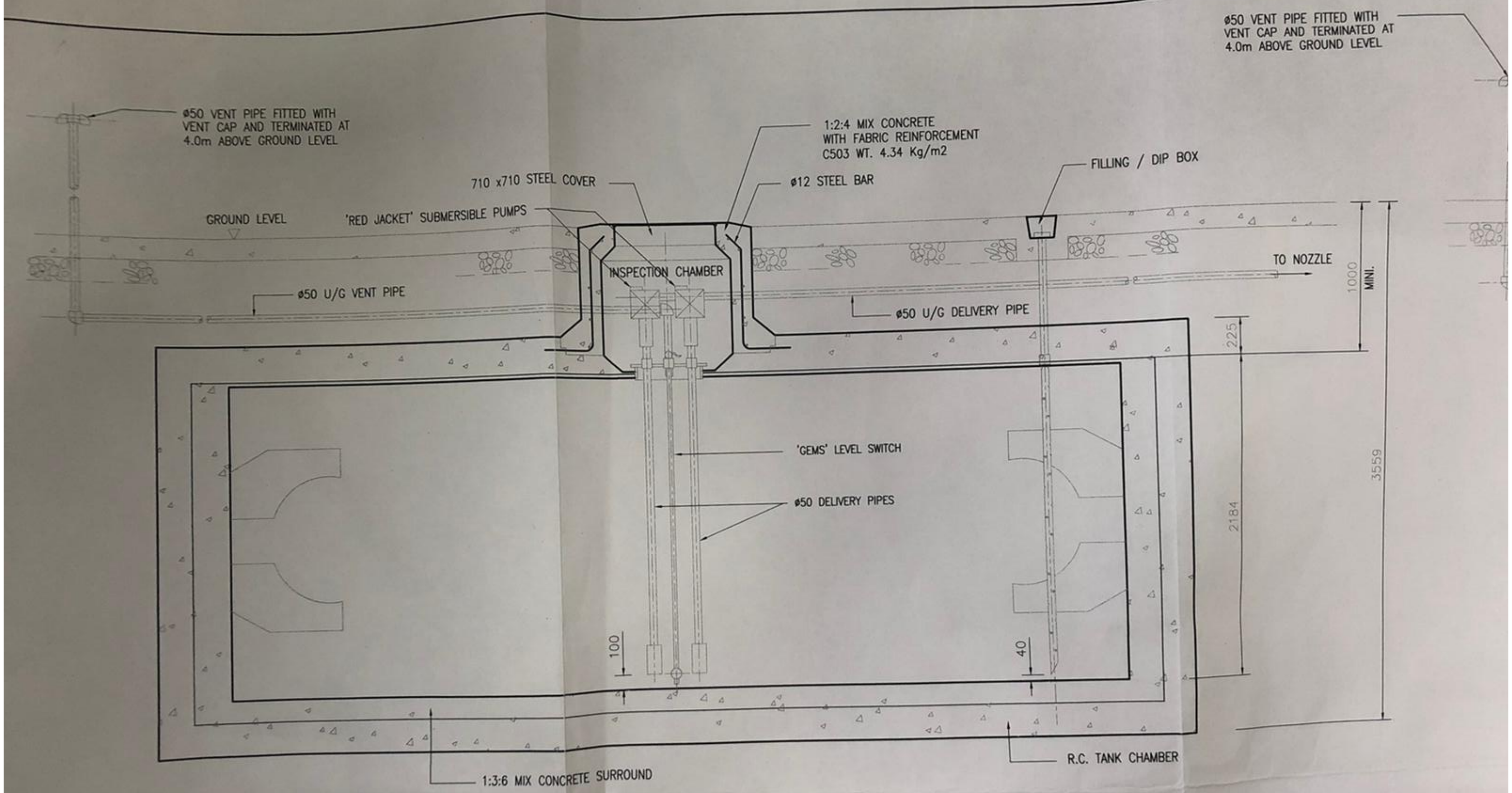


CALTEX OIL HONG KONG LIMITED

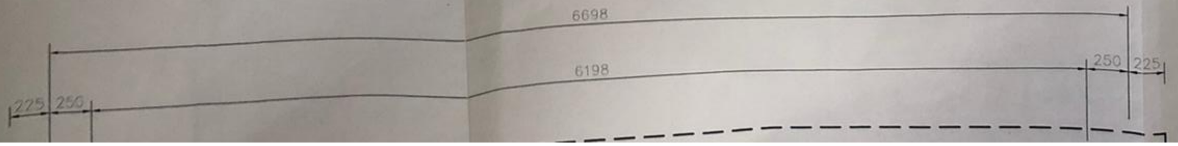
DRAWN : K. W. SIN	PROJECT : PROPOSED INSTALLATION OF 4 Nos. 22,500 LITRES DIESEL OIL STORAGE TANKS FOR KMB TEMPORARY BUS PARKING AREA AT DAI FUK STREET, TAI PO, N.T.
APPROVED :	
SCALE : 1 : 300 OR AS SHOWN	TITLE : LAYOUT PLAN
DATE : OCT,2001	DRAWING NUMBER : CJ-422-01B

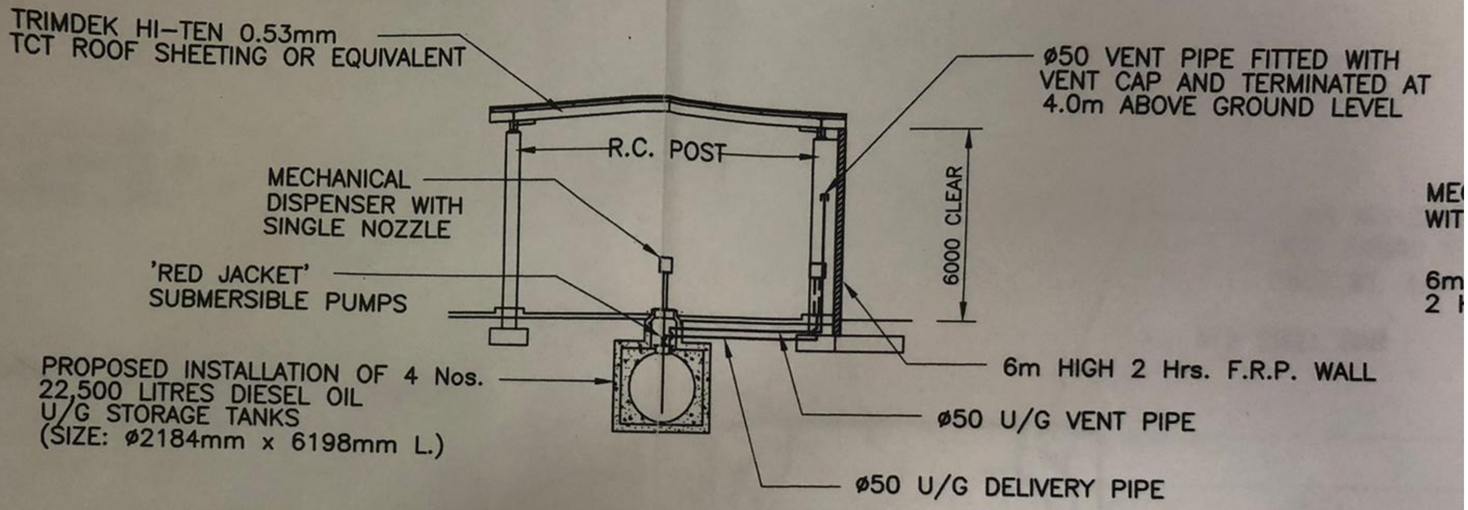

N
BOUNDARY
ø80 VP C/W W.B. FROM U/G & TERMINATE AT 2500 AFFL
CHAIN L
2.5 M H
+5.30
F.E. H.R. S.B.
+5.30
ø300
ø300
ø450
FULL HEIGHT R.C. WALL
COVERED BUS PARKING SPACE
BUS
FALL
A
RWMH#3
ø300
4900
4900
ø450
AIR COMP. ROOM
LUBE OIL TANK ROOM
GENERATOR ROOM
ø300
ø300
ROLLER SHUTTER
+5.67
OPERATIONS SECTION OFFICE
OIL REFUELLING STATION
P.I.#3
P.I.#1
OIL INTERCEPTORS
5000
MECHANICAL DISPENSER WITH SINGLE NOZZLE
ø50 U/G VENT PIPE
6m HIGH 2 Hrs. F.R.P. WALL
7198
12000
ø50 U/G DELIVERY PIPE
+5.67
ø225
COVERED WALKWAY
'GEMS' LEVEL SWITCH
3599
'RED JACKET' SUBMERSIBLE PUMPS
OPEN BUS PARKING
F.E.
H.R.
S.B.
3599
ø450
ø50 VENT PIPE FITTED WITH VENT CAP AND TERMINATED AT 4.0m ABOVE GROUND LEVEL
MAINTENANCE SECTION OFFICE
TREASURY DEPARTMENT OFFICE
FALL
7198
13000
ø50 U/G VENT PIPE
DRIVEWAY
CHAIN LINK FENCE
M HIGH
B
B
FILLING / DIP POINT
BOUNDARY
SWITCH ROOM
PUMP ROOM F.S. TANK/
PUMP ROOM CLARSING TANK/
4600
PROPOSED INSTALLATION OF 4 Nos. 22,500 LITRES DIESEL OIL U/G STORAGE TANKS (SIZE: ø2184mm x 6198mm L.)
ø225
4900
4900
NO PARKING SIGN
EVA INDICATION SIGN
STORE ROOM
ø450
ø225
A
ø80 VP C/W W.B. FROM U/G & TERMINATE AT 2500 AFFL
ø450
OIL INTERCEPTOR
R6100
R11000
ø450
E/M ROOM & STORE ROOM
ø80 VP C/W W.B. FROM U/G & TERMINATE AT 2500 AFFL
OIL INTERCEPTOR
P.I.#4
6.05
EMERGENCY VEHICULAR ACCESS
HARD PAVED WITHSTAND 20 TONS
ø225
STORE ROOM
+5.67
SCAPING
P.I.#2
ø225
1100H
METAL
(250
TOILET
RAMP DOWN 1:30
16000
SUMP PIT#1
NO PARKING SIGN
EVA INDICATION SIGN
+6.20


TRIMDEK HI-TEN 0.53mm
TCT ROOF SHEETING OR EQUIVALENT
ø50 VENT PIPE FITTED WITH
VENT CAP AND TERMINATED AT
4.0m ABOVE GROUND LEVEL
AT
R.C. POST
MECHANICAL DISPENSER
WITH SINGLE NOZZLE
ø50 U/G
VENT PIPE
'RED JACKET'
SUBMERSIBLE PUMPS
FILLING / DIP POINT
6m HIGH
2 Hrs. F.R.P. WALL
ø50 U/G
DELIVERY PIPE
PROPOSED INSTALLATION OF 4 Nos.
22,500 LITRES DIESEL OIL
U/G STORAGE TANKS
(SIZE: ø2184mm x 6198mm L.)
5000
12000
13000
4000
SECTION A – A
1 : 200
EXISTING OPEN BUS PARKING
CHAIN LINK FENCE
2.5 M HIGH
CHAIN LINK FENCE
2.5 M HIGH
+5.30
F.E.H.R.S.B.
F.E.H.R.S.B.
DRIVEWAY



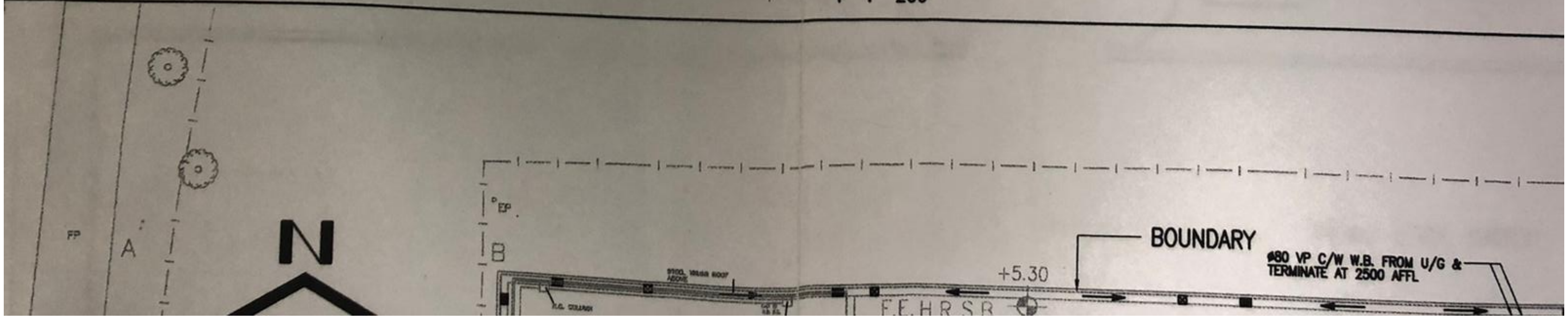
SECTIONAL ELEVATION





SECTION B - B

1 : 200



Appendix H – Calibration Reports and Photos of the Oil Tanks

Risk Safety Consulting
風之健

RISK SAFETY CONSULTING LIMITED
風之健安全顧問有限公司

Services Provided 服務提供：
- HK Registered Professional Engineer (Mechanical and Fire) 香港註冊專業工程師 (機械及消防)
- HKEMSD Registered Energy Assessor 香港機電工程署註冊能源效益評核人
- HKEMSD LPG Competent Person - For LPG Class 1a, 1b and 2 香港機電工程署石油氣第 1a, 1b 及 2 類勝任人士
- HKLD Registered Safety Officer (RSO) and Auditor (RSA) 香港勞工處 註冊安全主任及註冊安全審核員
- HKFSD Approved Person for Gas Free, Gas Cyl & Piped Gas Install 香港消防處簽發證明認可人士 - 無易燃氣體,氣瓶及氣體管道裝置證書

正 本
ORIGINAL

Ref. No. : RSCL-RT-403

Date: 3rd January, 2020.

Test Report

For Pressure Test on the Underground Tank No. 1 (Diesel Oil)
Kowloon Motor Bus Company (1933) Limited
Taipo Temporary Bus Depot, Dai Fuk Street, Taipo, N.T., Hong Kong

This is to certify that at the request of the Sino Success Engineering Limited, we, the undersigned, Risk Safety Consulting Limited, did on the *2nd January, 2020*, attend at the Kowloon Motor Bus Company (1933) Limited, Taipo Temporary Bus Depot, Dai Fuk Street, Taipo, N.T., Hong Kong for the purpose of witnessing the pressure test of one underground steel tank.

We reported as follows,

1. Particulars of the Underground Tank

1.1 Tank Identification : Tank No. 1
1.2 Tank Location : Kowloon Motor Bus Co. (1933) Ltd, Taipo Temporary Bus Depot.
1.3 Tank Construction : Underground type fabricated in mild steel shell with manhole
1.4 Storage Medium : Diesel Oil
1.5 Number of Compartment : One
1.6 Tank Capacity : 22,500 litres

2. Result of Test

The tank was completely drained and cleaned before air was introduced into the tank to the pre-determined pressure setting at 5 psi (0.35 bar). We observed that the tank under pressure for the duration of about one hour and found satisfactory with no sign of leakage was observed..

3. Comment

From the result of the test, we consider that the tank was in satisfactory and sound working conditions and was suitable to carry out its intended services.

This report is issued true and correct to the best of our knowledge.

For and on behalf of
Risk Safety Consulting Limited

Tam Kin Sang Peter
B.Sc., PgD(Fire), M.Sc., RPE, MHKIE, C.Eng., M.I.Mech.E., M.E.I., M.I. Fire E., RSO, RSA, REA, CP-LPG (EMSD) Class 1a, 1b & 2, AP(HKFSD)-Gas Free, Gas Cyl. and Piped Gas Instal.

Risk Safety Consulting
風之健

RISK SAFETY CONSULTING LIMITED
風之健安全顧問有限公司

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- HKEMSD Registered Energy Assessor 香港機電工程署註冊能源效益評核人
- HKEMSD LPG Competent Person - For LPG Class 1a, 1b and 2 香港機電工程署石油氣第 1a, 1b 及 2 類勝任人士
- HKLD Registered Safety Officer (RSO) and Auditor (RSA) 香港勞工處 註冊安全主任及註冊安全審核員
- HKFSD Approved Person for Gas Free, Gas Cyl & Piped Gas Install 香港消防處簽發證明認可人士 - 無易燃氣體,氣瓶及氣體管道裝置證書

正本
ORIGINAL

Ref. No. : RSCL-RT-404_1

Date: 4th January, 2020.

Test Report

For Pressure Test on the Underground Tank No. 2 (Diesel Oil)
Kowloon Motor Bus Company (1933) Limited
Taipo Temporary Bus Depot, Dai Fuk Street, Taipo, N.T., Hong Kong

This is to certify that at the request of the Sino Success Engineering Limited, we, the undersigned, Risk Safety Consulting Limited, did on the *3rd January, 2020*, attend at the Kowloon Motor Bus Company (1933) Limited, Taipo Temporary Bus Depot, Dai Fuk Street, Taipo, N.T., Hong Kong for the purpose of witnessing the pressure test of one underground steel tank.

We reported as follows,

1. Particulars of the Underground Tank

1.1 Tank Identification : Tank No. 2
1.2 Tank Location : Kowloon Motor Bus Co. (1933) Ltd, Taipo Temporary Bus Depot.
1.3 Tank Construction : Underground type fabricated in mild steel shell with manhole
1.4 Storage Medium : Diesel Oil
1.5 Number of Compartment : One
1.6 Tank Capacity : 22,500 litres

2. Result of Test

The tank was completely drained and cleaned before air was introduced into the tank to the pre-determined pressure setting at 5 psi (0.35 bar). We observed that the tank under pressure for the duration of about one hour and found satisfactory with no sign of leakage was observed..

3. Comment

From the result of the test, we consider that the tank was in satisfactory and sound working conditions and was suitable to carry out its intended services.

This report is issued true and correct to the best of our knowledge.

For and on behalf of
Risk Safety Consulting Limited

Tam Kin Sang Peter
B.Sc., PgD(Fire), M.Sc., RPE, MHKIE, C.Eng., M.I.Mech.E., M.E.I., M.I. Fire E., RSO, RSA, REA, CP-LPG (EMSD) Class 1a, 1b & 2, AP(HKFSD)-Gas Free, Gas Cyl. and Piped Gas Instal.

Risk Safety Consulting
風之健

RISK SAFETY CONSULTING LIMITED
風之健安全顧問有限公司

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- HKEMSD LPG Competent Person - For LPG Class 1a, 1b and 2 香港機電工程署石油氣第 1a, 1b 及 2 類勝任人士
- HKLD Registered Safety Officer (RSO) and Auditor (RSA) 香港勞工處 註冊安全主任及註冊安全審核員
- HKFSD Approved Person for Gas Free, Gas Cyl & Piped Gas Install 香港消防處簽發證明認可人士 - 無易燃氣體,氣瓶及氣體管道裝置證書

正本
ORIGINAL

Ref. No. : RSCL-RT-404_2

Date: 5th January, 2020.

Tank Calibration Report

For Underground Steel Tank No. 2 (Diesel Oil)
Kowloon Motor Bus Company (1933) Limited,
Taipo Temporary Bus Depot, Dai Fuk Street, Taipo, N.T., Hong Kong

1. Particulars of the Underground Tank

1.1 Tank Identification : Tank No. 2
1.2 Tank Location : Kowloon Motor Bus Company (1933) Limited, Taipo Temporary Bus Depot, Dai Fuk Street, Taipo, N.T.
1.3 Tank Construction : Underground type and fabricated in mild steel shell with manhole
1.4 Number of Compartment : One
1.5 Tank Capacity : 22,500 litres

2. Tank Calibration

2.1 Date of Calibration : 4th January, 2020
2.2 Calibrated by : Sino Success Engineering Limited
2.3 Calibration Media : Diesel Oil

3. Calibration Method

The calibration was the on-site physical calibration using a metal prover as below,

3.1 Manufacturer of the Prover : MARK
3.2 Capacity : 200 litres
3.3 Identity Number : 20133

4. Result of Calibration

The result of the calibration for the underground tank is as per the attachment 1.

For and on behalf of
Risk Safety Consulting Limited

Tam Kin Sang Peter
B.Sc., PgD(Fire), M.Sc., RPE, MHKIE, C.Eng., M.I.Mech.E., M.E.I., M.I. Fire E., RSO, RSA, REA, CP-LPG (EMSD) Class 1a, 1b & 2, AP(HKFSD)-Gas Free, Gas Cyl. and Piped Gas Instal.

Cont'd in page 2

Address 地址 : 48A Tung Choi Street, 3rd Floor, Rear Block, Mongkok, Kowloon, Hong Kong. 香港九龍旺角通菜街 48A 號四樓 (後座)
Mobile Tel 手提電話 : 9027-8899 E-mail 電子郵件 : risksafety@hotmail.com

Attachment 1 - Result of Calibration for the Underground Tank No. 2 Kowloon Motor Co. (1933) Ltd. Kowloon Bay Depot

Date of Calibration : 4th January, 2020. Tank Capacity : 22500 litres

Quantity (Litres)	Sounding Height *(mm)	Quantity (Litres)	Sounding Height (mm)	Quantity (Litres)	Sounding Height (mm)	Quantity (Litres)	Sounding Height (mm)	Quantity (Litres)	Sounding Height (mm)
200	57	**4800**	554	**9400**	912	**14000**	1251	**18600**	1612
400	95	**5000**	572	**9600**	927	**14200**	1266	**18800**	1629
600	127	**5200**	587	**9800**	942	**14400**	1281	**19000**	1646
800	155	**5400**	605	**10000**	957	**14600**	1297	**19200**	1665
1000	181	**5600**	621	**10200**	974	**14800**	1313	**19400**	1682
1200	207	**5800**	636	**10400**	987	**15000**	1326	**19600**	1700
1400	230	**6000**	653	**10600**	1002	**15200**	1342	**19800**	1718
1600	255	**6200**	670	**10800**	1016	**15400**	1357	**20000**	1737
1800	275	**6400**	685	**11000**	1030	**15600**	1372	**20200**	1756
2000	297	**6600**	700	**11200**	1044	**15800**	1387	**20400**	1776
2200	317	**6800**	717	**11400**	1060	**16000**	1403	**20600**	1795
2400	337	**7000**	732	**11600**	1074	**16200**	1419	**20800**	1815
2600	357	**7200**	747	**11800**	1089	**16400**	1435	**21000**	1836
2800	377	**7400**	762	**12000**	1107	**16600**	1449	**21200**	1857
3000	397	**7600**	777	**12200**	1119	**16800**	1465	**21400**	1878
3200	415	**7800**	797	**12400**	1135	**17000**	1482	**21600**	1901
3400	435	**8000**	808	**12600**	1146	**17200**	1496	**21800**	1925
3600	453	**8200**	823	**12800**	1163	**17400**	1513	**22000**	1949
3800	468	**8400**	838	**13000**	1178	**17600**	1529	**22200**	1975
4000	488	**8600**	853	**13200**	1192	**17800**	1545	**22400**	2001
4200	505	**8800**	868	**13400**	1207	**18000**	1562	**22600**	NA
4400	522	**9000**	882	**13600**	1222	**18200**	1578	**NA**	NA
4600	538	**9200**	898	**13800**	1236	**18400**	1595	**NA**	NA

* Sounding Height is the Diesel oil level (in millimetres (mm)) measuring up from the tank floor inside the tank.

Risk Safety Consulting
風之健

RISK SAFETY CONSULTING LIMITED
風之健安全顧問有限公司

Services Provided 服務提供：
- HK Registered Professional Engineer (Mechanical and Fire) 香港註冊專業工程師 (機械及消防)
- HKEMSD Registered Energy Assessor 香港機電工程署註冊能源效益評核人
- HKEMSD LPG Competent Person - For LPG Class 1a, 1b and 2 香港機電工程署石油氣第 1a, 1b 及 2 類勝任人士
- HKLD Registered Safety Officer (RSO) and Auditor (RSA) 香港勞工處 註冊安全主任及註冊安全審核員
- HKFSD Approved Person for Gas Free, Gas Cyl & Piped Gas Install 香港消防處簽發證明認可人士 - 無易燃氣體,氣瓶及氣體管道裝置證書

正本
ORIGINAL

Ref. No. : RSCL-RT-405_1

Date: 7th January, 2020.

Test Report

For Pressure Test on the Underground Tank No. 3 (Diesel Oil)
Kowloon Motor Bus Company (1933) Limited
Taipo Temporary Bus Depot, Dai Fuk Street, Taipo, N.T., Hong Kong

This is to certify that at the request of the Sino Success Engineering Limited, we, the undersigned, Risk Safety Consulting Limited, did on the *6th January, 2020*, attend at the Kowloon Motor Bus Company (1933) Limited, Taipo Temporary Bus Depot, Dai Fuk Street, Taipo, N.T., Hong Kong for the purpose of witnessing the pressure test of one underground steel tank.

We reported as follows,

1. Particulars of the Underground Tank

1.1 Tank Identification : Tank No. 3
1.2 Tank Location : Kowloon Motor Bus Co. (1933) Ltd, Taipo Temporary Bus Depot.
1.3 Tank Construction : Underground type fabricated in mild steel shell with manhole
1.4 Storage Medium : Diesel Oil
1.5 Number of Compartment : One
1.6 Tank Capacity : 22,500 litres

2. Result of Test

The tank was completely drained and cleaned before air was introduced into the tank to the pre-determined pressure setting at 5 psi (0.35 bar). We observed that the tank under pressure for the duration of about one hour and found satisfactory with no sign of leakage was observed..

3. Comment

From the result of the test, we consider that the tank was in satisfactory and sound working conditions and was suitable to carry out its intended services.

This report is issued true and correct to the best of our knowledge.

For and on behalf of
Risk Safety Consulting Limited

Tam Kin Sang Peter
B.Sc., PgD(Fire), M.Sc., RPE, MHKIE, C.Eng., M.I.Mech.E., M.E.I., M.I. Fire E., RSO, RSA, REA, CP-LPG (EMSD) Class 1a, 1b & 2, AP(HKFSD)-Gas Free, Gas Cyl. and Piped Gas Instal.

Risk Safety Consulting
風之健

RISK SAFETY CONSULTING LIMITED
風之健安全顧問有限公司

Services Provided 服務提供：

- HK Registered Professional Engineer (Mechanical and Fire) 香港註冊專業工程師 (機械及消防)
- HKEMSD Registered Energy Assessor 香港機電工程署註冊能源效益評核人
- HKEMSD LPG Competent Person - For LPG Class 1a, 1b and 2 香港機電工程署石油氣第 1a, 1b 及 2 類勝任人士
- HKLD Registered Safety Officer (RSO) and Auditor (RSA) 香港勞工處 註冊安全主任及註冊安全審核員
- HKFSD Approved Person for Gas Free, Gas Cyl & Piped Gas Install 香港消防處簽發證明認可人士 - 無易燃氣體,氣瓶及氣體管道裝置證書

正 本
ORIGINAL

Ref. No. : RSCL-RT-405_2

Date: 8th January, 2020.

Tank Calibration Report

For Underground Steel Tank No. 3 (Diesel Oil)
Kowloon Motor Bus Company (1933) Limited,
Taipo Temporary Bus Depot, Dai Fuk Street, Taipo, N.T., Hong Kong

1. Particulars of the Underground Tank

1.1 Tank Identification : Tank No. 3
1.2 Tank Location : Kowloon Motor Bus Company (1933) Limited, Taipo Temporary Bus Depot, Dai Fuk Street, Taipo, N.T.
1.3 Tank Construction : Underground type and fabricated in mild steel shell with manhole
1.4 Number of Compartment : One
1.5 Tank Capacity : 22,500 litres

2. Tank Calibration

2.1 Date of Calibration : 7th January, 2020
2.2 Calibrated by : Sino Success Engineering Limited
2.3 Calibration Media : Diesel Oil

3. Calibration Method

The calibration was the on-site physical calibration using a metal prover as below,

3.1 Manufacturer of the Prover : MARK
3.2 Capacity : 200 litres
3.3 Identity Number : 20133

4. Result of Calibration

The result of the calibration for the underground tank is as per the attachment 1.

For and on behalf of
Risk Safety Consulting Limited

Tam Kin Sang Peter
B.Sc., PgD(Fire), M.Sc., RPE, MHKIE, C.Eng., M.I.Mech.E., M.E.I., M.I. Fire E., RSO, RSA, REA, CP-LPG (EMSD) Class 1a, 1b & 2, AP(HKFSD)-Gas Free, Gas Cyl. and Piped Gas Instal.

Cont'd in page 2

Attachment 1 - Result of Calibration for the Underground Tank No. 3
Kowloon Motor Co. (1933) Ltd, Kowloon Bay Depot

Date of Calibration : 7th January, 2020. Tank Capacity : 22500 litres

Quantity (Litres)	Sounding Height *(mm)	Quantity (Litres)	Sounding Height (mm)	Quantity (Litres)	Sounding Height (mm)	Quantity (Litres)	Sounding Height (mm)	Quantity (Litres)	Sounding Height (mm)
200	60	**4800**	558	**9400**	919	**14000**	1261	**18600**	1621
400	97	**5000**	575	**9600**	937	**14200**	1277	**18800**	1638
600	128	**5200**	591	**9800**	950	**14400**	1291	**19000**	1656
800	158	**5400**	609	**10000**	965	**14600**	1307	**19200**	1674
1000	184	**5600**	625	**10200**	978	**14800**	1322	**19400**	1692
1200	209	**5800**	643	**10400**	993	**15000**	1336	**19600**	1709
1400	232	**6000**	657	**10600**	1008	**15200**	1353	**19800**	1727
1600	256	**6200**	674	**10800**	1024	**15400**	1368	**20000**	1745
1800	280	**6400**	691	**11000**	1038	**15600**	1381	**20200**	1764
2000	298	**6600**	706	**11200**	1055	**15800**	1398	**20400**	1785
2200	319	**6800**	721	**11400**	1068	**16000**	1412	**20600**	1805
2400	341	**7000**	737	**11600**	1082	**16200**	1428	**20800**	1823
2600	360	**7200**	753	**11800**	1096	**16400**	1442	**21000**	1845
2800	381	**7400**	766	**12000**	1113	**16600**	1460	**21200**	1866
3000	400	**7600**	784	**12200**	1126	**16800**	1476	**21400**	1886
3200	417	**7800**	801	**12400**	1144	**17000**	1492	**21600**	1909
3400	436	**8000**	814	**12600**	1157	**17200**	1508	**21800**	1934
3600	454	**8200**	829	**12800**	1174	**17400**	1521	**22000**	1957
3800	474	**8400**	844	**13000**	1187	**17600**	1538	**22200**	1982
4000	491	**8600**	860	**13200**	1200	**17800**	1556	**22400**	2012
4200	507	**8800**	877	**13400**	1217	**18000**	1571	**22600**	NA
4400	525	**9000**	889	**13600**	1232	**18200**	1589	**NA**	NA
4600	542	**9200**	906	**13800**	1246	**18400**	1605	**NA**	NA

* Sounding Height is the Diesel oil level (in millimetres (mm)) measuring up from the tank floor inside the tank.

Risk Safety Consulting
風之健

RISK SAFETY CONSULTING LIMITED
風之健安全顧問有限公司

Services Provided 服務提供：
- HK Registered Professional Engineer (Mechanical and Fire) 香港註冊專業工程師 (機械及消防)
- HKEMSD Registered Energy Assessor 香港機電工程署註冊能源效益評核人
- HKEMSD LPG Competent Person - For LPG Class 1a, 1b and 2 香港機電工程署石油氣第 1a, 1b 及 2 類勝任人士
- HKLD Registered Safety Officer (RSO) and Auditor (RSA) 香港勞工處 註冊安全主任及註冊安全審核員
- HKFSD Approved Person for Gas Free, Gas Cyl & Piped Gas Install 香港消防處簽發證明認可人士 - 無易燃氣體,氣瓶及氣體管道裝置證書

正 本
ORIGINAL

Ref. No. : RSCL-RT-406_1

Date: 9th January, 2020.

Test Report

For Pressure Test on the Underground Tank No. 4 (Diesel Oil)
Kowloon Motor Bus Company (1933) Limited
Taipo Temporary Bus Depot, Dai Fuk Street, Taipo, N.T., Hong Kong

This is to certify that at the request of the Sino Success Engineering Limited, we, the undersigned, Risk Safety Consulting Limited, did on the *8th January, 2020*, attend at the Kowloon Motor Bus Company (1933) Limited, Taipo Temporary Bus Depot, Dai Fuk Street, Taipo, N.T., Hong Kong for the purpose of witnessing the pressure test of one underground steel tank.

We reported as follows,

1. Particulars of the Underground Tank

1.1	Tank Identification	: Tank No. 4
1.2	Tank Location	: Kowloon Motor Bus Co. (1933) Ltd, Taipo Temporary Bus Depot.
1.3	Tank Construction	: Underground type fabricated in mild steel shell with manhole
1.4	Storage Medium	: Diesel Oil
1.5	Number of Compartment	: One
1.6	Tank Capacity	: 22,500 litres

2. Result of Test

The tank was completely drained and cleaned before air was introduced into the tank to the pre-determined pressure setting at 5 psi (0.35 bar). We observed that the tank under pressure for the duration of about one hour and found satisfactory with no sign of leakage was observed..

3. Comment

From the result of the test, we consider that the tank was in satisfactory and sound working conditions and was suitable to carry out its intended services.

This report is issued true and correct to the best of our knowledge.

For and on behalf of
Risk Safety Consulting Limited

Tam Kin Sang Peter
B.Sc., PgD(Fire), M.Sc., RPE, MHKIE, C.Eng., M.I.Mech.E., M.E.I., M.I. Fire E., RSO, RSA, REA, CP-LPG (EMSD) Class 1a, 1b & 2, AP(HKFSD)-Gas Free, Gas Cyl. and Piped Gas Instal.

Address 地址：48A Tung Choi Street, 3rd Floor, Rear Block, Mongkok, Kowloon, Hong Kong. 香港九龍旺角通菜街 48A 號四樓 (後座)
Mobile Tel 手提電話：9027-8899 E-mail 電子郵件：risksafety@hotmail.com

Risk Safety Consulting
風之健

RISK SAFETY CONSULTING LIMITED
風之健安全顧問有限公司

Services Provided 服務提供：
- HK Registered Professional Engineer (Mechanical and Fire) 香港註冊專業工程師 (機械及消防)
- HKEMSD Registered Energy Assessor 香港機電工程署註冊能源效益評核人
- HKEMSD LPG Competent Person - For LPG Class 1a, 1b and 2 香港機電工程署石油氣第 1a, 1b 及 2 類勝任人士
- HKLD Registered Safety Officer (RSO) and Auditor (RSA) 香港勞工處 註冊安全主任及註冊安全審核員
- HKFSD Approved Person for Gas Free, Gas Cyl & Piped Gas Install 香港消防處簽發證明認可人士 - 無易燃氣體,氣瓶及氣體管道裝置證書

正本
ORIGINAL

Ref. No. : RSCL-RT-406_2

Date: 10th January, 2020.

Tank Calibration Report

For Underground Steel Tank No. 4 (Diesel Oil)
Kowloon Motor Bus Company (1933) Limited,
Taipo Temporary Bus Depot, Dai Fuk Street, Taipo, N.T., Hong Kong

1. Particulars of the Underground Tank

1.1 Tank Identification	:	Tank No. 4
1.2 Tank Location	:	Kowloon Motor Bus Company (1933) Limited, Taipo Temporary Bus Depot, Dai Fuk Street, Taipo, N.T.
1.3 Tank Construction	:	Underground type and fabricated in mild steel shell with manhole
1.4 Number of Compartment	:	One
1.5 Tank Capacity	:	22,500 litres

2. Tank Calibration

2.1 Date of Calibration	:	9th January, 2020
2.2 Calibrated by	:	Sino Success Engineering Limited
2.3 Calibration Media	:	Diesel Oil

3. Calibration Method

The calibration was the on-site physical calibration using a metal prover as below,

3.1 Manufacturer of the Prover	:	MARK
3.2 Capacity	:	200 litres
3.3 Identity Number	:	20133

4. Result of Calibration

The result of the calibration for the underground tank is as per the attachment 1.

For and on behalf of
Risk Safety Consulting Limited

Tam Kin Sang Peter
B.Sc., PgD(Fire), M.Sc., RPE, MHKIE, C.Eng., M.I.Mech.E., M.E.I., M.I. Fire E., RSO, RSA, REA, CP-LPG (EMSD) Class 1a, 1b & 2, AP(HKFSD)-Gas Free, Gas Cyl. and Piped Gas Instal.

Cont'd in page 2

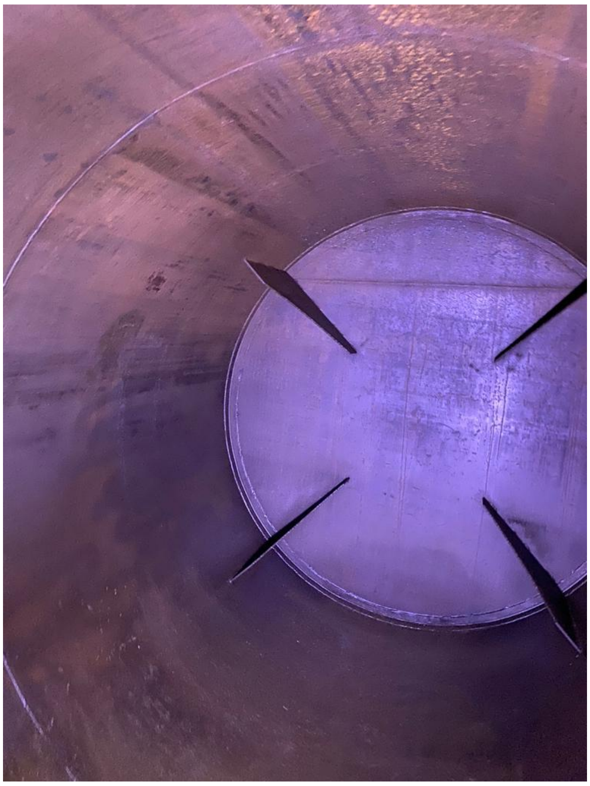
Attachment 1 - Result of Calibration for the Underground Tank No. 4
Kowloon Motor Co. (1933) Ltd, Kowloon Bay Depot

Date of Calibration : 9th January, 2020. Tank Capacity : 22500 litres

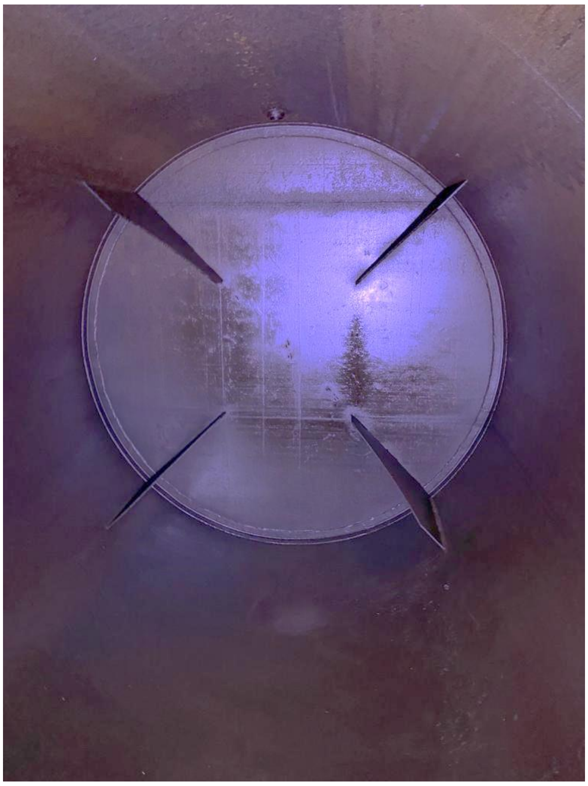
Quantity (Litres)	Sounding Height *(mm)	Quantity (Litres)	Sounding Height (mm)	Quantity (Litres)	Sounding Height (mm)	Quantity (Litres)	Sounding Height (mm)	Quantity (Litres)	Sounding Height (mm)
200	62	**4800**	564	**9400**	925	**14000**	1268	**18600**	1633
400	99	**5000**	582	**9600**	940	**14200**	1283	**18800**	1649
600	136	**5200**	598	**9800**	955	**14400**	1299	**19000**	1668
800	160	**5400**	613	**10000**	971	**14600**	1315	**19200**	1686
1000	189	**5600**	633	**10200**	986	**14800**	1329	**19400**	1704
1200	216	**5800**	647	**10400**	1000	**15000**	1346	**19600**	1721
1400	238	**6000**	661	**10600**	1016	**15200**	1360	**19800**	1741
1600	260	**6200**	677	**10800**	1031	**15400**	1375	**20000**	1758
1800	284	**6400**	695	**11000**	1044	**15600**	1388	**20200**	1777
2000	305	**6600**	710	**11200**	1060	**15800**	1405	**20400**	1797
2200	325	**6800**	727	**11400**	1075	**16000**	1423	**20600**	1816
2400	345	**7000**	743	**11600**	1090	**16200**	1436	**20800**	1837
2600	365	**7200**	759	**11800**	1105	**16400**	1452	**21000**	1857
2800	385	**7400**	774	**12000**	1118	**16600**	1469	**21200**	1879
3000	405	**7600**	787	**12200**	1133	**16800**	1484	**21400**	1902
3200	423	**7800**	802	**12400**	1150	**17000**	1500	**21600**	1924
3400	442	**8000**	820	**12600**	1164	**17200**	1516	**21800**	1946
3600	459	**8200**	833	**12800**	1177	**17400**	1532	**22000**	1972
3800	477	**8400**	849	**13000**	1193	**17600**	1550	**22200**	1997
4000	496	**8600**	863	**13200**	1207	**17800**	1564	**22400**	2025
4200	513	**8800**	879	**13400**	1224	**18000**	1582	**22600**	NA
4400	531	**9000**	899	**13600**	1237	**18200**	1598	**NA**	NA
4600	548	**9200**	911	**13800**	1253	**18400**	1615	**NA**	NA

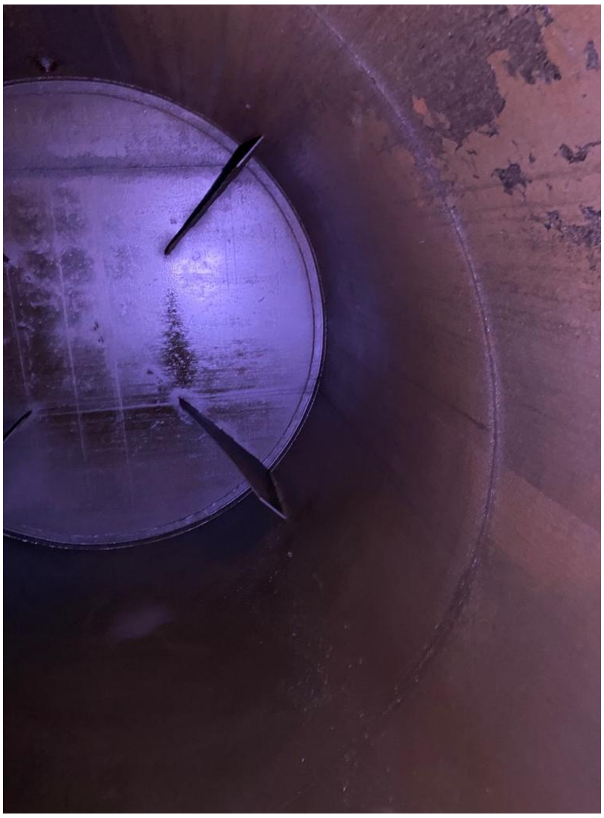
* Sounding Height is the Diesel oil level (in millimetres (mm)) measuring up from the tank floor inside the tank.

Photos of Diesel Oil Tank No. 1 (Date: 2/1/2020)

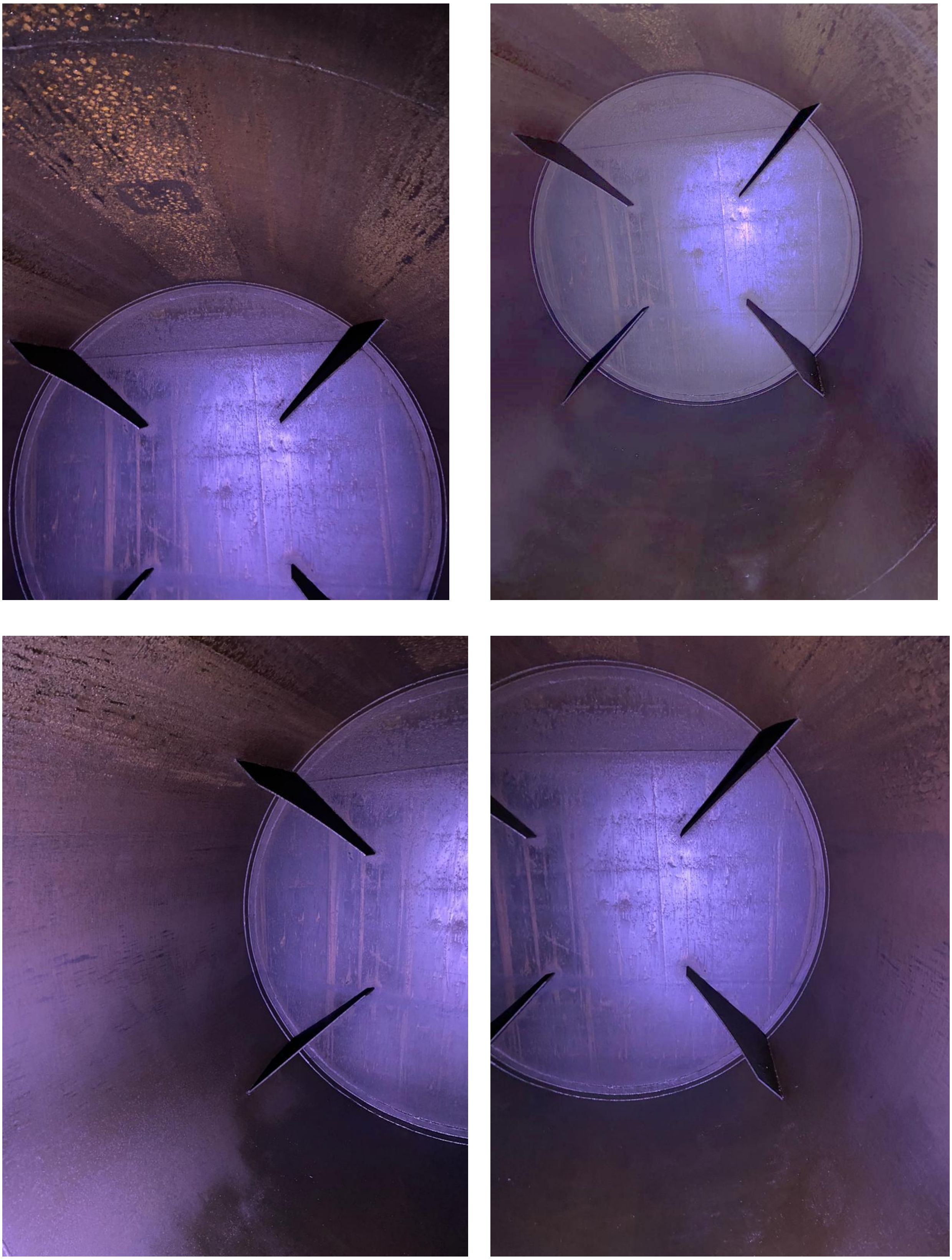


Photos of Diesel Oil Tank No. 2 (Date: 2/1/2020)

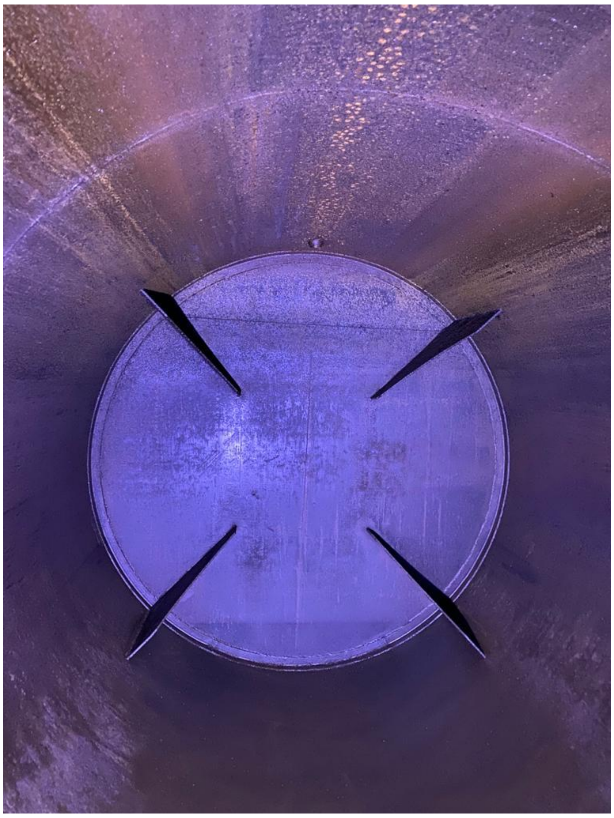


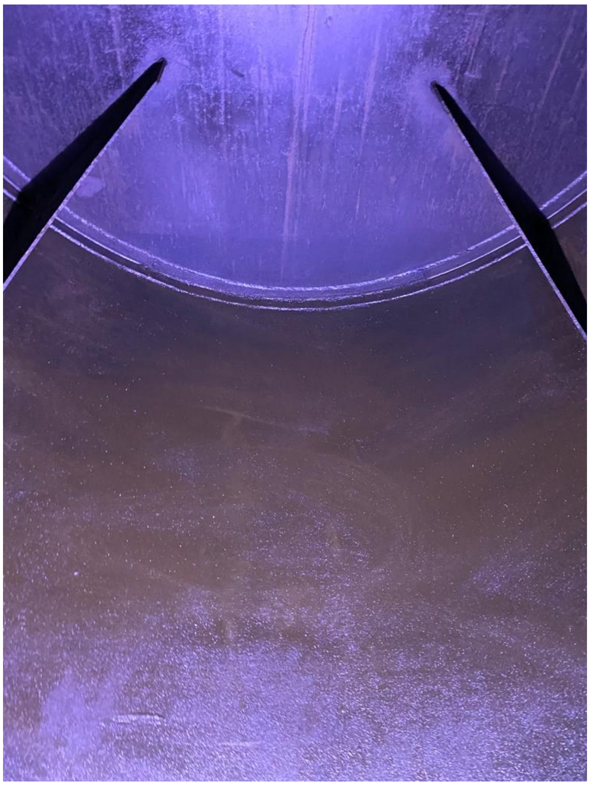


Photos of Diesel Oil Tank No. 3 (Date: 2/1/2020)



Photos of Diesel Oil Tank No. 4 (Date: 2/1/2020)





Issue No. : 5
Issue Date : February 2023
Project No. : 1849

LANDSCAPE AND VISUAL IMPACT ASSESSMENT

FOR

KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Prepared by

Allied Environmental Consultants Limited

COMMERCIAL-IN-CONFIDENCE

Allied Environmental Consultants Limited
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Document Verification

Project Title	KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po	**Project No.** 1849
Document Title	Landscape and Visual Impact Assessment	

Issue No.	**Issue Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**
1	March 2021	1st Submission	Various	Cathy Man	Grace Kwok
2	March 2022	2nd Submission	Various	Cathy Man	Grace Kwok
3	July 2022	3rd Submission	Various	Cathy Man	Grace Kwok
4	December 2022	4th Submission	Various	Cathy Man	Grace Kwok
5	February 2023	5th Submission	Various	Cathy Man	Grace Kwok

Executive Summary

The Project proposes a 4-storey depot building to expand the capacity of the KMB's current open depot. The building height of the proposed depot is 30.5m tall at +35.74 mPD. The Subject Site has an area of 14,600 m^2 and falls within an area zoned "Other Specified Uses" ("OU") on the approved Tai Po Outline Zoning Plan (OZP) (No. S/TP/30). It is currently held by KMB under a Short Term Tenancy granted by the Government for use as a bus depot with temporary building structures.

There are no existing trees within the works boundary and it is not expected that any trees outside the boundary will be affected. Since the project is of a relatively small scale and is limited to an already developed area with no significant landscape value, the landscape impacts are confined to a relatively limited area within the works boundary and the directly adjacent areas. Since the project is entirely located adjacent to the existing G/IC site, it has high compatibility with the existing landscape and causes no disturbance to existing landscape character.

The proposed development involves limited change in terms of landscape resources and landscape character. With the recommended mitigation measures in place, it is considered that the residual landscape impacts can be limited to **slight** and confined to the immediate surroundings of the Subject Site.

Since the Subject Site is situated within a generally low-rise development area and is surrounded largely by roadside planting, the publicly visible areas of the proposed development are rather limited. Given the relatively short height of the proposed 4-storey building, the increase in building height to 30.5m is expected to cause only **slight** impact to the neighbouring views. Also given that the surroundings of the Subject Site are of industrial nature, the resultant overall impact is considered to be **negligible to moderately adverse**.

The overall landscape and visual impact assessment concludes that the landscape impacts of the proposed development are **acceptable**.

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1. Introduction

Projection Description

1.1.1. Allied Environmental Consultants Limited (AEC) was commissioned by the Kowloon Motor Bus Company (1933) Limited (KMB) to conduct a Landscape and Visual Assessment (LVIA) to support of a Section 16 application for the KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po (hereinafter referred to as "Subject Site").

1.1.2. At present, the KMB has occupied the Subject Site for bus parking of around 163 nos. of buses under the Short Term Tenancy (STT). Due to the need for provision of more parking spaces, KMB obtained a draft STT for a 2-storey-high depot in 2019. However, in order to support the "Roadmap on Popularization of Electric Vehicles" released by Environment Bureau in March 2021, additional storeys with sufficient charging and supporting facilities would be required for electric buses (eBus). Around 363 nos. charging-enabling bus parking bays will be provided in the new bus depot for eBus. As such, minor relaxation of building height (BH) restriction under Section 16 of the Town Planning Ordinance from the current BH restriction of 2 storeys to 4 storeys will be applied concurrently. This Site Appraisal is conducted to support the Section 16 application.

1.1.3. The new bus depot for eBus will operation for 7 years under STT from tentative date in April 2022 (subject to approval of Town Planning Board).

1.1.4. The Project will comprise a 4-storey building. The building height of the proposed depot is 30.5m tall at +35.74 mPD. The site location plan and proposed building plans that show the preliminary design are given in ***Figure 1*** and ***Appendix B*** respectively. The Project covers the construction and operation of a permanent depot with the following facilities:

- 363 nos. bus parking space for electric buses;
- 80 nos. maintenance bays (some with sunken pit);
- Bus washing bays;
- Workshops and stores;
- 1 no. of power supply plant room (size about 28.3m x 20m x 15.6mH); and
- 5 nos. of E&M power supply related plant rooms.

1.1.5. The Subject Site has an area of 14,600 m^2 and is located on the northeastern outskirts of Tai Po Town, bounded by Ting Kok Road to the west and Dai Fuk Street to the south, immediately adjoining the GIC site to the north and facing Tai Po Industrial Estate to the east. To the south of Dai Fuk Street is Construction Industry Council (CIC) Tai Po Training Ground, while Tai Po Waterfront Park is located in the far south.

1.1.6. The Subject Site falls within an area zoned “Other Specified Uses” (“OU”) on the approved Tai Po Outline Zoning Plan (OZP) (No. S/TP/30). It is currently held by KMB under a STT granted by the Government for use as a bus depot with temporary building structures.

Objectives

1.1.7. The objective of the current Landscape and Visual Impact Assessment (LVIA) is to assess the potential landscape and visual impacts of the proposed development to the surrounding areas. Identification of landscape and visual resources, landscape characters areas, sensitive receivers, visual envelope, visual elements, and key public viewpoints, and illustrations to show landscape and visual compatibility, obstructions, and proposal of mitigation and enhancement measures to reduce any possible impact shall be included in the report.

Structure of Report

1.1.8. The current LVIA report consists of the following chapters:

(1) Chapter 1 introduces the project and the scope and structure of this report;

(2) Chapter 2 lists out a list of relevant government legislations, standards and guidelines applicable to the evaluation of landscape impacts;

(3) Chapter 3 presents the procedures and methods of identifying potential landscape and visual impacts;

(4) Chapter 4 reviews the landscape baseline conditions within a 500m study area, including desktop and site investigation of landscape resources and the identification of landscape character areas;

(5) Chapter 5 sets out the visual envelope, visual elements, and key viewpoints of the proposed development;

(6) Chapter 6 lists out the potential landscape impacts;

(7) Chapter 7 appraises the visual impacts to the key public viewers;

(8) Chapter 8 presents the proposed mitigation measures;

(9) Chapter 9 describes the residual impacts after mitigation;

(10) Chapter 10 presents the conclusions of this report.

2. List of Relevant Legislations, Standards, and Guidelines

2.1.1. The following legislation, standards and guidelines are made as reference and considered in this assessment:

- Environmental Impact Assessment Ordinance (EIAO) (Cap.499), Annexes 10 and 18 of EIAO Technical Memorandum and EIAO Guidance Note No.8/2010 – Preparation of Landscape and Visual Impact Assessment under the EIAO;
- Town Planning Board Guidelines on Submission of Visual Impact Assessment for Planning Application to the Town Planning Board (TPB) PG-No.41;
- Town Planning Ordinance (Cap.131) and Town Planning (Amendment) Ordinance;
- Hong Kong Planning Standards and Guidelines, Chapter 4: Recreation, Open Space and Greening, Chapter 10: Conservation, and Chapter 11: Urban Design Guidelines;
- Government General Regulation 740 – restrictions on the preservation and felling of trees in Hong Kong;
- Forests and Countryside Ordinance (Cap.96);
- Animal and Plants (Protection of Endangered Species) Ordinance (Cap 187);
- Country Parks and Special Areas Distribution Map;
- Agriculture, Fisheries and Conservation Department (AFCD) Nature Conservation Practice Note No.2 – Measurement of Diameter at Breast Height (DBH);
- AFCD Nature Conservation Practice Note No.3 – The Use of Plant Names;
- AFCD Rare and Precious Plants of Hong Kong, 2003;
- IUCN 2019. The IUCN Red List of Threatened Species. Version 2019-2;
- Development Bureau (DEVB) Technical Circulars (Works) (TCW) No.2/2012 – Allocation of Space for Quality Greening on Roads;
- DEVB TCW No.3/2012 – Site Coverage of Greenery for Government Building Projects;
- DEVB TCW No.6/2015 – Maintenance of Vegetation and Hard Landscape Features;
- DEVB TCW No. 4/2020– Tree Preservation;
- DEVB TCW No.5/2017 – Community Involvement in Planting Works;
- DEVB TCW No.1/2018 Soft Landscape Provisions for Highway Structures;
- Environment, Transport and Works Bureau (ETWB)TCW No.25/93 – Control of Visual Impact of Slopes;
- Works Bureau (WB) Technical Circular No. 17/2000 Improvement to the Appearance of Slopes in connection with ETWB TC 23/93;

- Layman's guide to landscape treatment of slopes, Civil Engineering and Development Department (CEDD);
- ETWB TCW No. 13/2003A – Guidelines and Procedures for Environmental Impact Assessment of Government Projects and Proposals Planning for Provision of Noise Barriers;
- DEVB TCW No. 5/2017 – Community Involvement in Planting Works;
- ETWB TCW No. 11/2004 Cyber Manual For Greening;
- ETWB TCW No. 29/2004 – Registration of Old and Valuable Trees, and Guidelines for their Preservation;
- ETWB TCW No. 5/2005 – Protection of natural streams/rivers from adverse impacts arising from construction works;
- ETWB TCW 8/2005 – Aesthetic Design of Ancillary Buildings in Engineering Projects;
- Geotechnical Engineering Office (GEO) Publication No. 6/2007 – Updating of GEO publication no. 1/2000;
- GEO publication No. 1/2011 'Technical Guidelines on Landscape treatment for Slopes;
- Highways Department (HyD) Guidelines HQ/GN/13 – Interim Guidelines for Tree Transplanting Works under HyD's Vegetation Maintenance Ambit;
- HyD Guidelines HQ/GN/15 – Guidelines for Greening Works along Highways;
- HyD Technical Circular No. 3/2008 – Independent Vetting of Tree works under the Maintenance of HyD;
- Landscape Value Mapping Study in Hong Kong;
- Landscape Character Map of Hong Kong (2005 Edition);
- Management Guidelines for Mature Trees, Greening, Landscape and Tree Management Section (GLTMS) of DEVB;
- General Standards and Maintenance Requirements for Roadside Landscape Works to be Handed Over to Leisure and Cultural Services Department (LCSD) for Maintenance (May 2018);
- Green Infrastructure, GLTM of DEVB;
- Cyber Manual for Greening (GLTM of DEVB);
- Guidelines on Tree Preservation during Development (4/2015), GLTM of DEVB; and
- Project Administration Handbook for Civil Engineering Works, 2006 Edition Section 1.3 and 4.7 of Chapter 4.

3. Assessment Methodology

Landscape Impact Assessment Methodology

3.1.1. The landscape assessment methodology is made reference to Annex 18 of the Technical Memorandum on Environmental Impact Assessment Process issued by the Environmental Protection Department.

3.1.2. The Study Area for the landscape impact assessment includes the areas within a 500m distance from the site boundary of the Project, and is shown in ***Figure 1***.

3.1.3. Identification of the baseline Landscape Resources (LR, physical and cultural) and Landscape Character Area (LCA) found within the 500m study boundary. This is firstly prepared by desktop research study on aerial photos and topographical maps and a subsequent site visit.

3.1.4. Assessment of “Sensitivity to Change” to the LRs and LCAs. The assessment would be affected by factors including:

- The quality of landscape characters/ resources;
- Importance and rarity of special landscape elements;
- The ability of the resource to accommodate changes;
- Significance of the changes in local and regional changes;
- The maturity of the resource;
- Statutory or regulatory limitations / requirements relating to the resource.

3.1.5. The sensitivity rating for each LR / LCA are determined based on the following:

Low	Landscape or landscape resource, the nature of which is largely tolerant to change, insubstantial value, immature, insubstantial significance of the change in local and regional context.
Medium	Landscape or landscape resource of moderately valued, semi-mature of the resource, reasonably tolerant to change. Moderate significance of the change in local and regional context.

High	Rare, important, mature landscape or landscape resource, sensitive to relatively small changes. High significance of the change in local and regional context.

Identification of Potential Sources and Type of Impacts

3.1.6. Various elements of the construction work and operation procedures that would generate landscape and visual impacts are identified and these are discussed in Section 5.

Assessment of the Magnitude of Landscape Impacts

3.1.7. The factors affecting the magnitude of change in assessing landscape impacts are as follows:

- Compatibility of the Works with the surrounding landscape;
- Duration of the impacts under construction and operation phases;
- Scale of Works; and
- Reversibility of change.

3.1.8. The magnitude of change rating for each LR / LCA are determined based on the following:

Negligible	The LRs/LCAs would suffer no discernible change by the Works
Small	The landscape or landscape resource would have experienced small scale of development, short duration of impacts, and High compatibility of the project with the surrounding landscape and reversible of change.
Intermediate	The landscape or landscape resource would have experienced moderate scale of development, reasonable duration of impacts, moderate compatibility of the project with the surrounding landscape and potentially reversible of change.
Large	The landscape or landscape resource would have experienced large scale of development, long duration of impacts, Low compatibility of the project with the surrounding landscape and irreversible of change.

Identification of Potential Landscape Mitigation Measures

3.1.9. Potential mitigation measures will be developed to avoid or reduce adverse landscape impacts derived from the Works. Remedial measures will be recommended to compensate for unavoidable adverse impacts and /or generate potentially beneficial long-term impacts. These may include compensatory planting, landscape treatment and etc. Further details of mitigation measures are provided in Section 5.5.

Prediction of the Significance of Landscape Impacts Before and After the Implementation of the Mitigation Measures

3.1.10. Landscape impacts will be categorized depending on whether the impacts are adverse/beneficial, and irreversible/reversible. Significance threshold of landscape impact before and after mitigation (Day 1 and Year 10) will be assessed under the following categories:

Insubstantial	No discernible change to the existing landscape quality
Slight	Adverse/beneficial impact where the Works would cause a barely perceptible deterioration/improvement to existing landscape quality
Moderate	Adverse/ beneficial impact where the Works would cause a noticeable deterioration/improvement to existing landscape quality
Substantial	Adverse/ beneficial impact where the proposal would cause significant deterioration or improvement in existing landscape quality.

3.1.11. The impact significance will also be determined. ***Table 3.1*** shows the relationship between sensitivity and magnitude of change.

Table 3.1 Relationship between Sensitivity and Impact Magnitude of Change

Magnitude of Change caused by the proposed Works	Sensitivity		
	Low	Medium	High
Large	Moderate	Moderate / Substantial*	Substantial
Intermediate	Slight / Moderate*	Moderate	Moderate / Substantial*
Small	Slight	Slight / Moderate*	Moderate
Negligible	Negligible	Negligible	Negligible

Remarks:

[1]*: In those instances where the lower level of impact is predicted, this is, to be, justified in the description of the impact.

[2] All impacts are adverse unless otherwise noted with beneficial

Prediction of Acceptability of Impacts

3.1.12. An overall assessment of the acceptability, or otherwise, of the impacts has been carried out to determine whether the landscape impacts are beneficial, acceptable, acceptable with mitigation measures, unacceptable or undetermined.

Visual Impact Assessment Methodology

3.1.13. The visual assessment methodology is made reference to the Town Planning Board Guidelines on submissions of Visual Impact Assessment for Planning Applications to the Town Planning Board (TGB PG-No. 41).

3.1.14. A structured and systematic approach for visual impact assessment has been adopted in accordance with TPB PG-No.41 'Guidelines on Submission of Visual Impact Assessment for Planning Applications to the Town Planning Board'. The assessment of the visual impacts has involved the following steps:

- Review of the overall visual character within the wider existing and planned contexts of the area adjacent to the Site;
- Defining the assessment area taking into consideration of the Visual Envelope of the project during the construction and operational phases of the project;
- Identifying the key visual elements within the assessment area including the key physical structures, visual attractors and detractors in the visual envelope;
- Selection of key public viewing points based on the visual sensitivity of viewers;
- Appraisal of visual changes based on the visual composition, obstruction, and their effects on public viewers and visual resources;
- Evaluation of overall impacts.

Identification of the visual envelope

3.1.15. With reference to TPB PG-No.41, the assessment area of the Visual Impact Assessment (VIA) covers the general view sheds formed by natural or man-made features such as ridgeline or buildings. Based on the scale of the proposed developments, initial assessment areas that are three times the building heights have been defined. Since the current VIA focuses on the impacts on public viewers, the visual envelopes are defined based on ground level viewers on public grounds including streets and publicly accessible areas. An aerial photo of the development site area is presented in ***Figure 2***.

3.1.16. The visual envelope has been preliminarily defined by an assessment from topographic maps and the Google Earth model. This information has been further verified during site visit carried out in August and November 2018.

Selection of Key Public Viewing Points

3.1.17. Key public viewing points of the VIA are selected based on finding the most affected viewing points of sensitive public viewers who are impacted by the project. The viewing points could be kinetic or static. Viewing points are taken at human eye level for a realistic presentation of views. The public viewing points, in some instances, may represent those of the nearby VSRs, although the selected viewing points are not intended to cover all identified VSRs.

Assessment of Sensitivity of Key Public Viewers

3.1.18. The visual sensitivity of the public viewers from the viewing points can be qualitatively graded as high, medium, or low, taking into account

- The activity of the viewers;
- The duration and distance over which the proposed development would remain visible; and
- The public perception of value attached to the views being assessed.

Appraisal of Visual Changes

3.1.19. The effects of visual changes on the assessment area and sensitive public viewers are appraised based on the following factors:

(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, characters against the overall backdrop. Visual composition may result in visual balance, compatibility, harmony, unity, or contrast;

(b) **Visual Obstruction** – The appraisal assesses 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. Full blockage or partial blockage of important views should be avoided or minimised;

(c) **Effect on Public Viewers** – The effect of visual changes from key public viewing points with direct sightlines to the proposed development are assessed. The effects of the visual changes are graded qualitatively in terms of magnitude as substantial, moderate, slight, or negligible. Photomontages are used to illustrate the visual impacts of key public viewing points comparing the before and after views from the selected viewing points;

(d) **Effect on Visual Resources** – The appraisal assesses 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. Proposals to enhance or mitigate the impact through design measures are included and presented.

3.1.20. The resultant overall impact may be concluded and classified within a range of thresholds:

Enhanced	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	The proposed development will exhibit enhanced visual effects to some of the identified key public viewing points and at the same time exhibit adverse visual effects to some other key public viewing points.
Negligible	The proposed development will 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	The proposed development will result in overall term some negative visual effects to most of the identified key public viewing points.
Moderately adverse	The proposed development will result in overall term negative visual effects to most of the key identified key public viewing points.
Substantially adverse	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.

Visualization Materials

3.1.21. The findings of this LVIA are presented and supported by a range illustrative material such as plans and photomontages.

4. Baseline Landscape Conditions

Land Use

4.1.1. The Land Use Plan of the study area is provided in ***Figure 3***. The Subject Site falls within an area zoned "Other Specified Uses" ("OU") on the approved Tai Po Outline Zoning Plan (OZP) (No. S/TP/30). It is currently held by KMB under a STT granted by the Government for use as a bus depot with temporary building structures.

4.1.2. The surrounding areas are currently zoned as Other Specified Uses ("OU"), Government, Institution, Community ("GIC"), Village Type Development ("V"), Residential (Group A) ("R(A)") and Green Belt ("GB") according to Approved OZP No. S/TP/30. The land is currently held by KMB under a STT granted by the Government for use as a bus depot.

4.1.3. To the east of the Subject Site is the Tai Po Industrial Estate predominately zoned as "OU". Directly north and south of the Subject Site are "G/IC" plots. Located directly west of the Site are one small "R(A)" plot that is the Rivera Lodge and the Village Type Development Yue Kok Village. Further to the northwest are Nethersole Hospital and Tai Po Hospital ("G/IC") surrounded by Green Belt. To the southwest of the site (and further west) are "R(A)" highrise residential areas comprising of Fu Shin Estate and Yee Nga Court. North of Ting Kok Road extending into the Fung Yuen Valley are low density residential areas that include Fung Mei Wai and Tin Sam Villages and the CDA development Les Jardin.

4.1.4. Future developments in Area 33 "G/IC" plots directly south of the Subject Site is expected to include Public Vehicle Park underneath Football -cum-Rugby Pitch and Training Campus for the Construction Industry Council. There are currently no other major developments or changes in land use to the knowledge of the Consultant.

Trees

4.1.5. There are no existing trees within the site boundary.

4.1.6. Major treed areas found within the 500m landscape study boundary include the hillside woodlands found at the Green Belt areas, the landscaped areas of the residential areas and the two hospitals, and street tree and roadside planting areas of along Ting Kok Road, Yuen Shin Road, and the Tai Po Industrial Estate.

Landscape Resources

4.1.7. The baseline condition of Landscape Resources (LRs) and Landscape Character Areas (LCAs) within the 500m study boundary have been identified in ***Figure 4*** and ***Figure 5*** respectively and listed in the table as below.

Table 4.1 Identified Landscape Resources (LRs)

Code	**Landscape Resource (LR)**	**Description of Landscape Value**	**Sensitivity**
LR1 **Institutional Landscape**			
LR1.1	KMB Tai Po Depot	The Subject Site is currently used as an open depot and contain no trees or other elements of high landscape value. There is, however, a treed area of approximately 2,400m^2 that acts a green buffer between the depot area and Ting Kok Road, which is part of a north-south corridor that connects the Green Belt to the Tai Po waterfront.	Medium
LR1.2	CIC Tai Po Training Ground	This training ground comprises predominantly of concrete grounds with limited vegetation coverage.	Low
LR1.3	Elementary and Secondary Schools	The Study Area includes a number elementary and secondary schools with limited planted areas.	Low
LR1.4	Nethersole Hospital	The hospital site	Low

		comprises of some landscaped area that has some degree of amenity and ecological value.	
LR1.5	Tai Po Hospital	The hospital site comprises of some landscaped area that has some degree of amenity and ecological value.	Low
LR2 **Industrial Urban Landscape**			
LR2.1	Tai Po Industrial Estate	The Tai Po Industrial Estate has some vegetation coverage most notably in the form of street trees. There is especially a north-south tree corridor connecting the Green Belt to the Tai Po Waterfront Park.	Low
LR3 **Residential Urban Landscape**			
LR3.1	Rivera Lodge	Rivera Lodge is one high-rise residential tower that sits to the direct west of the Subject Site.	Medium
LR3.2	Fu Shin Estate	Fu Shin Estate is a public housing estate sitting to the southwest of the Subject Site. It comprises of public amenity spaces and vegetated areas.	Medium
LR3.3	Yee Nga Court	Yee Nga Court is a housing estate built under the	Medium

		Home Ownership Scheme, and situates at the west of the Study Area. It comprises of public amenity spaces and vegetated areas.	
LR4 **Residential Urban Fringe Landscape**			
LR4.1	Le Jardin	Le Jardin is a private farm and garden area that is part of the CDA development related to Mont Vert. The site is a largely vegetated wetland and farm area that is located between Tin Sam Village and the Green Belt.	Medium
LR5 **Public Open Space**			
LR5.1	Yue Kok Village Sitting-Out Area	Yue Kok Village Sitting-Out Area is a small open space with playground sitting at the front of Yue Kok Village facing Ting Kok Road.	Medium
LR5.2	Fung Yuen Playground	Fung Yuen Playground is a park with a basketball court and playground sitting at the southern entrance to Fung Yuen Valley.	Medium
LR5.3	Yuen Shin Park	Yuen Shin Park is a large urban park sitting to the west of Yuen Shin Road	Medium

		that connects to the waterfront.	
LR5.4	Tai Po Waterfront Park	Sitting to the east side of Yuen Shin Road facing the ocean Tolo Harbour is the Tai Po Waterfront Park. It has high recreational value and large expanse of vegetated areas.	Medium
LR6 **Village Landscape**			
LR6.1	Yue Kok Village	Yue Kok Village is a typical village landscape that is situated at the foot of the Green Belt hillside woodland facing Yuen Shin Road.	Medium
LR6.2	Fung Mei Wai Village	Fung Mei Wai Village comprises of a village landscape that is situated at the west side of Fung Yuen Valley and is situated between the CDA development site and the Green Belt which connects uphill to the Cloudy Hil.	Medium
LR6.3	Tin Sam Village	Tin Sam Village is a village situated within Fung Yuen Valley and is situated between Mont Vert and Le Jardin.	Medium
LR7	**Hillside Woodland**	The hilly area to the north of Ting Kok Road slopes up towards the north and is largely a hillside woodland	High

		that surrounds the Fung Yuen Valley. It has a rather complete canopied area and has relatively high ecological value.	
LR8	**Transport Corridor Landscape**	The transport corridor comprises mainly of Ting Kok Road and Yuen Shin Road and chiefly serves the function of a vehicular corridor but parts of it contains generous street trees and roadside planting that also serves as green corridor connecting the Green Belt to the waterfront.	Low
LR9	**Watercourse**	There is an open channel situated to the north of Ting Kong Road that receives water from the Fung Yuen Valley and is largely vegetated on both sides of its banks.	Medium

Landscape Character Areas

4.1.8. The identified Landscape Character Areas within the 500m study area is listed in ***Table 4.2***.

Table 4.2 Identified Landscape Character Areas (LCAs)

Code	Landscape Character Area (LCA)	Description of Landscape Character	Sensitivity
LCA1	Urban Landscape	The urban landscape comprises of the high-rise residential area at the west of the Study Area and the Tai Po Industrial at the east.	Low
LCA2	Urban Fringe Landscape	The urban fringe landscape includes the two hospitals, the G/IC strip between the urban landscape to the east and west of the Site, and the transport corridor.	Low
LCA3	Rural Fringe Landscape	Rural fringe landscape includes the village type developments and the CDA development at Fung Yuen Valley.	Medium
LCA4	Upland Countryside Landscape	Upland countryside landscape is largely the Green Belt woodland that slopes uphill towards Cloudy Hill.	High

5. Baseline Visual Conditions

Visual Envelope

5.1.1. The Subject Site is situated at the foot of the hills to the north that contains the Nethersole and Tai Po Hospitals, the hillside woodland (Green Belt), and the Fung Yuen Valley. Therefore, the site has a somewhat higher exposure towards the north but the northern areas are also highly vegetated and blocks to the view towards the site. Given that the proposed depot building is only four-storey high, it has a rather limited visual envelope and the visual envelope is illustrated in Figure 6.

Visual Elements

5.1.2. The key visual elements that could be seen from the site area include the vegetated hills to the north that has the ridgeline of Cloudy Hill as a backdrop, and the roadside vegetation as foreground. Towards the north and east are generally low-rise development and the open sky is generally visible. Towards the west side, the site is exposed to the Rivera Lodge and the eastern towers of Fu Shin Estate.

Key Viewing Points

5.1.3. Since the Subject Site is situated within a generally low-rise development area and is surrounded largely by roadside planting, the publicly visible areas of the proposed development are rather limited and the six selected viewpoints attempt to cover the visual impacts from all sides. Given the proposed depot’s height of four-storey, it has very limited visibility beyond the 200m distance covered by the first five viewpoints.

5.1.4. The Subject Site area has low pedestrian traffic and has a small number of public viewers. Potential Visual Sensitive Receivers include:

- Travelling viewers including the drivers and cyclists using the surrounding roads and cycling paths;
- The residents of Rivera Lodge, Yue Kok Village, and the northeast towers of Fu Shin Estate;
- The occupational viewers from Kau Yan College and adjacent schools; and
- The occupational viewers from the CIC Tai Po Training Grounds and Tai Po Industrial Estate.

5.1.5. The six selected viewpoints are presented in ***Figure 6*** and ***Figure 7*** and their reasons for selection are explained in ***Table 5.1***.

Table 5.1 List of Key Public Viewpoints

Code	Vantage Point	Viewing Distance (m)	Justification of Selection
VP1	From Ting Kok Road between Rivera Lodge and Kau Yan College	160m	This viewpoint shows the project as seen from the west side approach and broadly represents the view seen by the Rivera Lodge and Kau Yan College.
VP2	From Dai Wah Street next to the entrance of the CIC Tai Po Training Ground	175m	This viewpoint is taken from the southeast of the site and represents the view as seen from the Tai Po Industrial Estate.
VP3	From Fung Yuen Road at the its intersection with Ting Kok Road	200m	This viewpoint sees the project from the north side and represents the impacted views of road users along Fung Yuen Road coming from the villages and private residences of the Fung Yuen Valley.
VP4	From Yue Kok Village Playground	100m	The viewpoint is taken the closest from the site and represents recreational users and residents from the Yue Kok Village.
VP5	From Tai Po Industrial Estate on Dai Cheong Road	220m	This viewpoint represents the view from the Tai Po Industrial Estate to the east mainly along Dai Cheong Road.
VP6	From Tai Po Road across the Tolo Harbour	3km	This viewpoint represents the far panoramic view form the southeast reflecting the general skyline and cityscape. This purpose of this view is to show the overall impact of the proposed building as part of the urban cluster. This view only impacts a very limited number of hikers and road users.

5.1.6. The visual sensitivity of the key public viewers is assessed and presented in ***Table 5.2***.

Table 5.2 List of Key Public Viewers

Code	Types of Viewers	Viewing Distance (m)	Duration of View	Public Perception of Value	Sensitivity
VP1	From Ting Kok Road between Rivera Lodge and Kau Yan College – Residential and Occupational	160m	Short	Low	Low
VP2	From Dai Wah Street next to the entrance of the CIC Tai Po Training Ground – Occupational and Travelling	175m	Short	Low	Low
VP3	From Fung Yuen Road at its intersection with Ting Kok Road - Travelling	200m	Short	Low	Low
VP4	From Yue Kok Village Playground – Residential and Recreational	100m	Short to Medium	Low to Medium	Low to Medium
VP5	From Tai Po Industrial Estate on Dai Cheong Road – Occupational and Travelling	220m	Short	Low	Low
VP6	From Tai Po Road across the Tolo Harbour – Travelling and Recreational	3km	Short	High	Medium

6. Potential Landscape Impacts

Impact on Existing Trees

6.1.1. There are no existing trees within the site boundary and the development works are also no expected to cause any negative impacts on the trees outside of the site boundary. Within the site area, the landscaped areas outside of the east and south side of the building structure can allow for the planting of a few new trees.

6.1.2. The treed buffer that is located between the Ting Kok Road and the works boundary is not expected to be impacted by the proposed development besides the casting of shadows but due considerations shall be taken to ensure that they are not affected by construction works.

Impact on Landscape Resources

6.1.3. Since the project is of a relatively small scale and is limited to an already developed area with no significant landscape value, the landscape impacts are confined to a relatively limited area within the works boundary and the directly adjacent areas. The list of potential unmitigated impacts to the LRs are listed in ***Table 6.1***.

Table 6.1 List of Unmitigated Impacts on Landscape Resources (LRs)

Code	Landscape Resource (LR)	Sources of Impact	Description of Unmitigated Impact	Magnitude of Change
LR1 **Institutional Landscape**				
LR1.1	KMB Tai Po Depot	Construction activities; the development of the 4-storey depot	Air pollution, noise, and other disturbances from construction activities; physical blockage and casted shadows specifically for the treed area to the west of the works boundary	Intermediate
LR1.2	CIC Tai Po Training Ground	Nil	Nil	Negligible
LR1.3	Elementary and Secondary Schools	Nil	Nil	Negligible
LR1.4	Nethersole Hospital	Nil	Nil	Negligible
LR1.5	Tai Po Hospital	Nil	Nil	Negligible
LR2 **Industrial Urban Landscape**				
LR2.1	Tai Po Industrial Estate	Nil	Nil	Negligible
LR3 **Residential Urban Landscape**				

Code	Landscape Resource (LR)	Sources of Impact	Description of Unmitigated Impact	Magnitude of Change
LR3.1	Rivera Lodge	Nil	Nil	Negligible
LR3.2	Fu Shin Estate	Nil	Nil	Negligible
LR3.3	Yee Nga Court	Nil	Nil	Negligible
LR4 **Residential Urban Fringe Landscape**				
LR4.1	Les Jardin	Nil	Nil	Negligible
LR5	**Public Open Space**			
LR5.1	Yue Kok Village Sitting-Out Area	Nil	Nil	Negligible
LR5.2	Fung Yuen Playground	Nil	Nil	Negligible
LR5.3	Yuen Shin Park	Nil	Nil	Negligible
LR5.4	Tai Po Waterfront Park	Nil	Nil	Negligible
LR6 **Village Landscape**				
LR6.1	Yue Kok Village	Nil	Nil	Negligible
LR6.2	Fung Mei Wai Village	Nil	Nil	Negligible
LR6.3	Tin Sam	Nil	Nil	Negligible

Code	Landscape Resource (LR)	Sources of Impact	Description of Unmitigated Impact	Magnitude of Change
	Village			
LR7	**Hillside Woodland**	Nil	Nil	Negligible
LR8	**Transport Corridor Landscape**	Nil	Nil	Negligible
LR9	**Watercourse**	Nil	Nil	Negligible

6.1.4. Considering the sensitivity and magnitude of change, the significance of impacts to the identified LRs are listed in ***Table 6.2***.

Table 6.2 Significance of Impacts on Landscape Resources (LRs) Before Mitigation

Code	Landscape Resource (LR)	Sensitivity to Change	Magnitude of Change	Significance of Impact
LR1 **Institutional Landscape**				
LR1.1	KMB Tai Po Depot	Low	Intermediate	Moderate
LR1.2	CIC Tai Po Training Ground	Low	Negligible	Negligible
LR1.3	Elementary and Secondary Schools	Low	Negligible	Negligible
LR1.4	Nethersole Hospital	Low	Negligible	Negligible
LR1.5	Tai Po Hospital	Low	Negligible	Negligible

Code	Landscape Resource (LR)	Sensitivity to Change	Magnitude of Change	Significance of Impact
LR2 **Industrial Urban Landscape**				
LR2.1	Tai Po Industrial Estate	Low	Negligible	Negligible
LR3 **Residential Urban Landscape**				
LR3.1	Rivera Lodge	Medium	Negligible	Negligible
LR3.2	Fu Shin Estate	Medium	Negligible	Negligible
LR3.3	Yee Nga Court	Medium	Negligible	Negligible
LR4 **Residential Urban Fringe Landscape**				
LR4.1	Les Jardin	Medium	Negligible	Negligible
LR5 **Public Open Space**				
LR5.1	Yue Kok Village Sitting-Out Area	Medium	Negligible	Negligible
LR5.2	Fung Yuen Playground	Medium	Negligible	Negligible
LR5.3	Yuen Shin Park	Medium	Negligible	Negligible
LR5.4	Tai Po Waterfront Park	Medium	Negligible	Negligible

Code	Landscape Resource (LR)	Sensitivity to Change	Magnitude of Change	Significance of Impact
LR6 **Village Landscape**				
LR6.1	Yue Kok Village	Medium	Negligible	Negligible
LR6.2	Fung Mei Wai Village	Medium	Negligible	Negligible
LR6.3	Tin Sam Village	Medium	Negligible	Negligible
LR7	**Hillside Woodland**	High	Negligible	Negligible
LR8	**Transport Corridor Landscape**	Low	Negligible	Negligible
LR9	**Watercourse**	Medium	Negligible	Negligible

Impact on Landscape Character Areas

6.1.5. Since the Project is entirely located within the existing G/IC site, it has high compatibility with the existing landscape and causes no disturbance to existing landscape character.

Table 6.3 List of Unmitigated Impacts on Landscape Character Areas (LCAs)

Code	Landscape Character Area (LCA)	Compatibility	Description of Unmitigated Impact	Magnitude of Change
LCA1	Urban Landscape	Medium	Nil	Negligible
LCA2	Urban Fringe Landscape	Medium	The increase in height of the proposed 4-storey depot building from an open concrete lot.	Small
LCA3	Rural Fringe Landscape	Low	Nil	Negligible
LCA4	Upland Countryside Landscape	Low	Nil	Negligible

6.1.6. The landscape impacts to the existing LCAs are considered insubstantial.

Table 6.4 Significance of Impacts on Landscape Character Areas (LCAs) Before Mitigation

Code	Landscape Character Area (LCA)	Sensitivity to Change	Magnitude of Change	Significance of Impact
LCA1	Urban Landscape	Low	Negligible	Negligible
LCA2	Urban Fringe Landscape	Low	Small	Slight
LCA3	Rural Fringe Landscape	Medium	Negligible	Negligible
LCA4	Upland Countryside Landscape	High	Negligible	Negligible

7. Potential Visual Impacts

Photomontages

7.1.1. Photomontages showing the visual effects of the proposed building on the six viewpoints are presented in ***Figure 7-1*** to ***Figure 7-8***. All six photos are taken on 18 February 2021 around noon time with Nikon D5300 camera with focal lengths of 38mm for VP1, 18mm for VP2 and VP3, 13mm for VP4, 52mm for VP5 and VP6.

7.1.2. The visual impacts on the six viewpoints by the development of the 4-storey depot at the Subject Site are listed in ***Table 7.1***.

Table 7.1 Visual Impacts on Key Public Views

Code	Vantage Point	Visual Composition	Visual Obstruction (Full / Partial / Minor / Negligible)	Effect on Public Viewers (Substantial / Moderate / Slight / Negligible)	Effect on Visual Resources (Substantial / Moderate / Slight / Negligible)
VP1	From Ting Kok Road between Rivera Lodge and Kau Yan College	VP1 is taken from the road situated between the edge of the residential area towards the industrial area. The street is lined by trees on both sides, and the proposed building has very limited visibility (only a small portion of the top storey showing) behind the roadside planting along Ting Kok Road and Yuen Shin Road.	Minor. A small portion of the open sky.	Slight. The slight intrusion of a human made structure upon the open sky.	Slight. There is very limited blockage and the proposed building is in-character with the surrounding landscape.
VP2	From Dai Wah Street next to the entrance of the CIC Tai Po Training Ground	VP2 is taken from the direction of the CIC Tai Po Training Ground, which does not have any multi-storey structures. This viewpoint enjoys an open view with roadside trees as its middle-ground and the Cloudy Hill and the open sky as its background. The proposed building has only limited visibility behind the roadside planting.	Minor. Minor obstruction of the Cloudy Hill backdrop, which peaks at 440mPD	Slight. The slight intrusion of a human made structure upon the green backdrop.	Slight. The will be some blockage of the green hill in the background. However, there is limited impact on the visual resource given the proposed building height, which is far below the ridgeline. The proposed building is in-character

					with the surrounding landscape.
VP3	From Fung Yuen Road at the its intersection with Ting Kok Road	VP3 is taken from the north side of the site and has the character of a low traffic volume T-intersection with street trees lining all three sides. The proposed building has very limited visibility behind the roadside planting.	Minor. The proposed development would slightly interrupt a portion of the existing open sky. This is, however, very limited given the road of street trees along Ting Kok Road.	Slight. Note that this effect will further diminish as the trees in the foreground grow bigger over time.	Slight. There is very limited blockage and the proposed building is in-character with the surrounding landscape.
VP4	From Yue Kok Village Playground – Residential and Recreational	This viewpoint is taken towards the east facing Ting Kok Road but has a nice backdrop of trees and open sky.	Partial. The viewpoint is taken from a close distance and the proposed building would partially block the open sky behind the tree buffer.	Moderate. This viewpoint represents the views from the viewers directly across Ting Kok Road. The proposed building is partially hidden behind trees but does partially block the sky.	Moderate. Partially blocks the open sky and exposes an industrial character building.
VP5	From Tai Po Industrial Estate on Dai Cheong Road – Occupational and	This viewpoint is taken from the Tai Po Industrial Estate, where we can see that the streescape is largely framed by short industrial buildings with a backdrop of trees. Riviera Lodge can be seen in the	Minor. From this angle, the proposed building will be largely hidden by large trees	Slight. From this angle the building is very limited exposure and the building is largely	Slight. Exposes the top parts of the building and blocks some part of the lower sky and part of the Riviera Lodge residential tower.

	Travelling	backdrop dominating the skyline.	and the proposed building would only slightly block the open sky and the lower stories of the Riviera Lodge.	in-character with its industrial setting.	
VP6	From Tai Po Road across the Tolo Harbour – Travelling and Recreational	This is a panoramic view showing the overall sky line of the Tai Po Industrial Estate, which consists of predominantly low-rise buildings. Some highrise residential towers can be spotted in the background in front of the mountain backdrop.	Negligible. Given the relatively short height of the building, it has very limited visibility from this distance and blends into the industrial blocks of the Tai Po Industrial Estate.	Negligible. Almost can’t be seen from this distance.	Negligible. From this angle, it appears that the Tai Po Industrial Estate is joined by one additional building at its western edge. Very limited impact.

7.1.3. Given the relatively short height of the proposed 4-storey building, the increase in building height to 30.5m is expected to cause only **slight** to moderate impact to the neighbouring views. Also given that the surroundings of the Subject Site are of industrial nature, the resultant overall impact, while considering the type of the new building, is considered to be **negligible to moderately adverse**.

8. Mitigation Measures

Potential Mitigation Measures

8.1.1. The development involves one single building within a confined site. The potential mitigation measures are listed below:

(a) Incorporate planting buffers as far as possible between the building and the streets;

(b) Design architecture especially façade with contextually sensitive treatment;

(c) Carefully management construction activities to minimise disturbances during construction.

9. Residual Impacts After Mitigation

9.1.1. The proposed development involves limited change in terms of landscape resources and landscape character. With the recommended mitigation measures in place, it is considered that the residual landscape impacts can be limited to **slight** and confined to the immediate surroundings of the Subject Site.

Table 9.1 Significance of Residual Impacts on LRs After Mitigation

Code	Landscape Resource (LR)	Significance of Impact Before Mitigation	Recommended Mitigation Measures	Significance of Impact After Mitigation
LR1.1	KMB Tai Po Depot	Moderate	a, b, c	Slight
LCA2	Urban Fringe Landscape	Slight	a, b, c	Slight

9.1.2. As far as the visual impacts are concerned, it is recommended that mitigation measures (a) and (b) are incorporated into the design of the new development as far as possible to further minimize the limited impacts.

9.1.3. The overall LVIA concludes that the landscape impacts of the proposed development are **acceptable**.

10. Conclusions

10.1.1. The Project will comprise a 4-storey building. The building height of the proposed depot is 30.5m tall at +35.74 mPD.

10.1.2. The Subject Site has an area of 14,600 m^2 and is located on the northeastern outskirts of Tai Po Town, bounded by Ting Kok Road to the west and Dai Fuk Street to the south, immediately adjoining the G/IC site to the north and facing Tai Po Industrial Estate to the east. To the south of Dai Fuk Street is Construction Industry Council (CIC) Tai Po Training Ground, while Tai Po Waterfront Park is located in the far south.

10.1.3. The Subject Site falls within an area zoned “Other Specified Uses” (“OU”) on the approved Tai Po Outline Zoning Plan (OZP) (No. S/TP/30). It is currently held by KMB under a STT granted by the Government for use as a bus depot with temporary building structures.

10.1.4. There are no existing trees within the works boundary and it is not expected that any trees outside the boundary will be affected.

10.1.5. Since the project is of a relatively small scale and is limited to an already developed area with no significant landscape value, the landscape impacts are confined to a relatively limited area within the works boundary and the directly adjacent areas. Since the project is entirely located within the existing G/IC site, it has high compatibility with the existing landscape and causes no disturbance to existing landscape character.

10.1.6. The redevelopment involves one single building within a confined site. The potential mitigation measures include: (1) Incorporate planting buffers as far as possible between the building and the streets; (2) Design architecture especially façade with contextually sensitive treatment; and (3) Carefully management construction activities to minimise disturbances during construction.

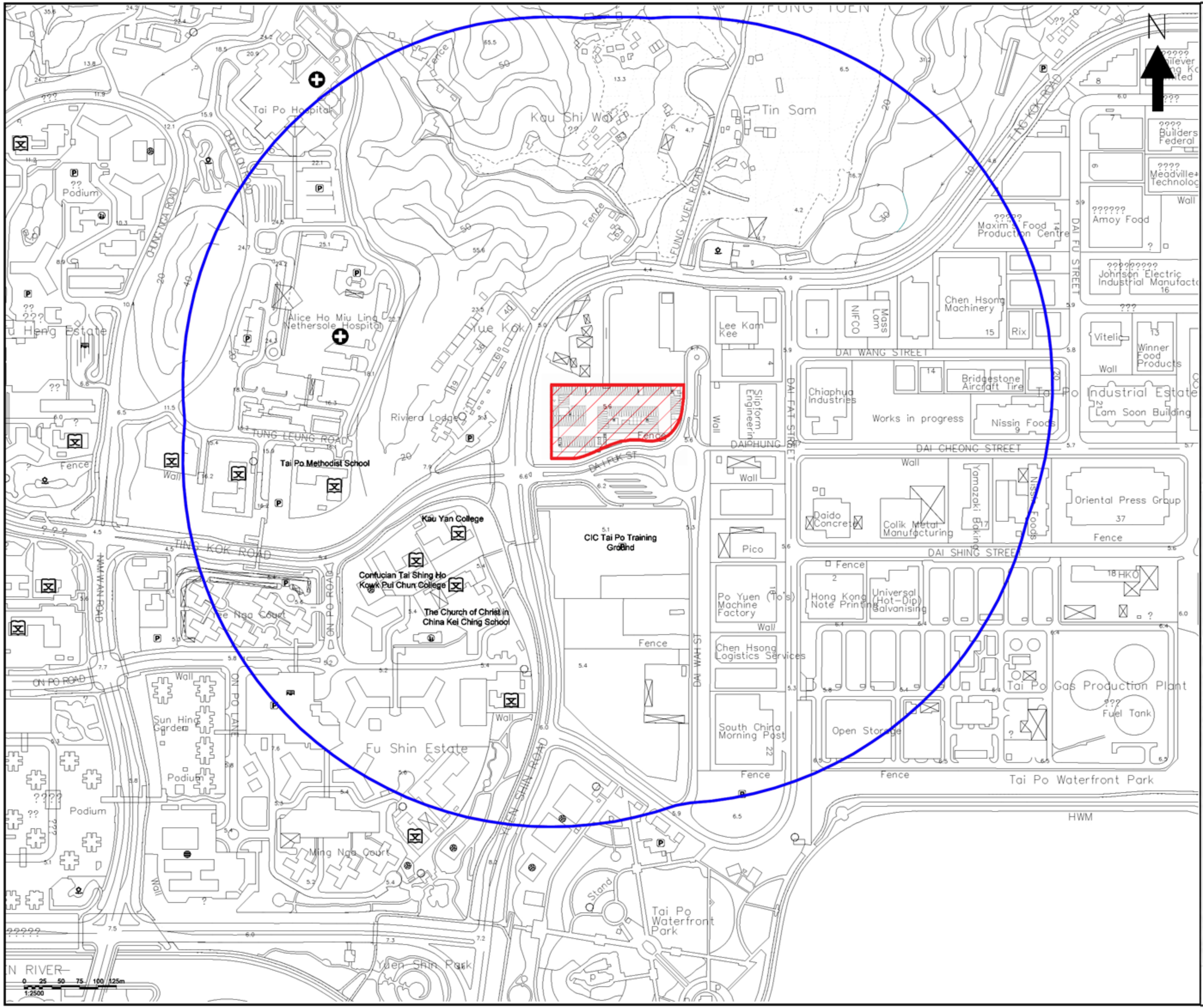
10.1.7. The proposed development involves limited change in terms of landscape resources and landscape character. With the recommended mitigation measures in place, it is considered that the residual landscape impacts can be limited to slight and confined to the immediate surroundings of the Subject Site.

10.1.8. Since the Subject Site is situated within a generally low-rise development area and is surrounded largely by roadside planting, the publicly visible areas of the proposed development are rather limited and the six selected viewpoints attempt to cover the visual impacts from all sides. Given the proposed depot's height of four-storey, it has very limited visibility beyond the 200m distance covered by the six viewpoints.

10.1.9. Given the relatively short height of the proposed 4-storey building, the increase in building height to 30.5m is expected to cause only slight to moderate impact to the neighbouring views. Also given that the surroundings of the Subject Site are of industrial nature, the resultant overall impact is considered to be negligible to moderately adverse.

10.1.10. The overall LVIA concludes that the landscape impacts of the proposed development are acceptable.

Figures



NOTES: 備註:

▨ PROJECT SITE 工程項目

□ 500m LANDSCAPE AND VISUAL STUDY SITE BOUNDARY 500米景觀及視覺研究範圍

Consultant

Allied Environmental Consultants Limited

Project No.: 1849

Drawing By: JK

Project:
KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO
大埔第33區大福街九龍巴士車廠

Drawing Title:

SITE LAYOUT PLAN
項目位置圖

Drawing No: FIGURE 1 圖 1

Revision: 1

Scale: AS SHOWN 如圖示

Date:

A4 297 x 210

NOTES: 備註:

▨	PROJECT SITE 工程項目
☐	500m LANDSCAPE AND VISUAL STUDY SITE BOUNDARY 500米景觀及視覺研究範圍

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

Drawing By : JK

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO
大埔第33區大福街九龍巴士車廠

Drawing Title :
AERIAL PHOTO
(FROM GEOINFO MAP
ACCESSED FEB 2021)
航拍照片
(取自地理資訊地圖2021年二月)

Drawing No : FIGURE 2 圖 2

Revision : 0

Scale : AS SHOWN 如圖示

Date :

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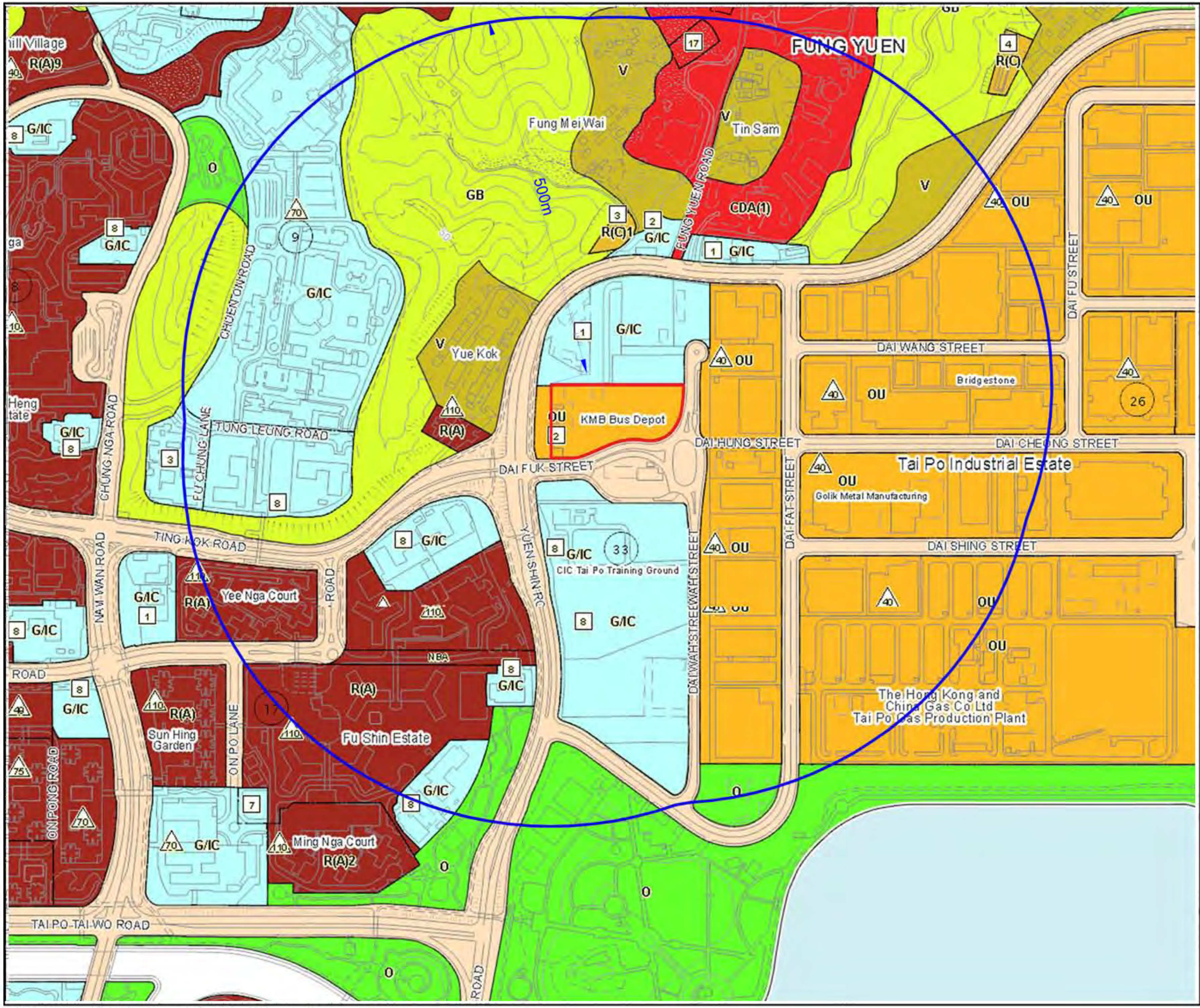
Z:\1801-1850\1849\05 Report\01 AEC Report\Project Profile\Figure\Draft 1_eng\Figure 2-1 & 2-2 Site Layout Plan.dwg

A4 297x210



NOTES： 備註：

▨	PROJECT SITE 工程項目
CDA	Comprehensive Development Area 綜合發展地區
O	Open Space 休憩用地
V	Village Type Development 鄉村式發展
GB	Green Belt 綠化地帶
R(A)	Residential (Group A) 住宅（甲類）
R(C)	Residential (Group C) 住宅（丙類）
G/IC	Government, Institution or Community 政府、機構或社區
OU	Other Specified Uses 其他指定用途
△140	Maximum Building Height (In Metres Above Principal Datum) 最高建築物高度(在主水平基準上若干米)
5	Maximum Building Height (In Number of Storeys) 最高建築物高度(樓層)
○1	Planning Area Number 規劃區編號
☐	500m Landscape Study Site Boundary 500米景觀及視覺研究範圍

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

Drawing By : JK

Project :

KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO
大埔第33區大福街九龍巴士車廠

Drawing Title :

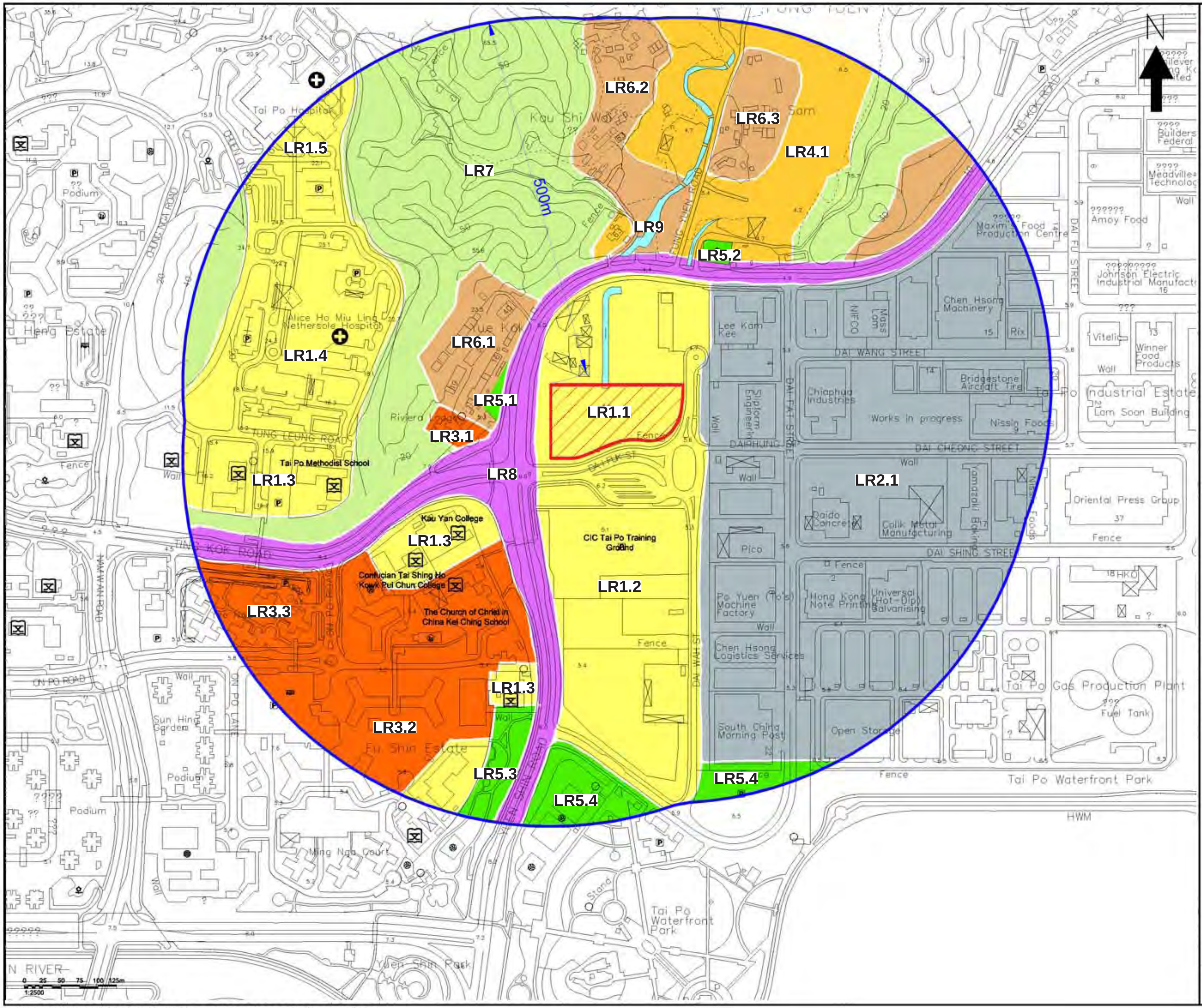
LAND USE PLAN
土地用途圖

Drawing No : **FIGURE 3 圖 3**

Revision : **0**

Scale : **AS SHOWN 如圖示**

Date :



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NOTES: 備註:

▨	SUBJECT SITE 工程項目
☐	500m Landscape Study Site Boundary 500米景觀及視覺研究範圍
🟨	LR1 Institutional Landscape LR1 機構
■	LR2 Industrial Urban Landscape LR2 市區工業區
🟧	LR3 High-rise Residential Landscape LR3 市區住宅
🟨	LR4 Low-rise Residential Landscape LR4 市區邊緣住宅
🟩	LR5 Public Open Space LR5 公眾空間
🟫	LR6 Village Landscape LR6 鄉村
🟩	LR7 Hillside Woodland LR7 山坡樹林
🟪	LR8 Transport Corridor Landscape LR8 交通樞紐旁美化植林
🟦	LR9 Watercourse LR9 明渠

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

Drawing By : JK

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO
大埔第33區大福街九龍巴士車廠

Drawing Title :

LANDSCAPE RESOURCES
景觀資源

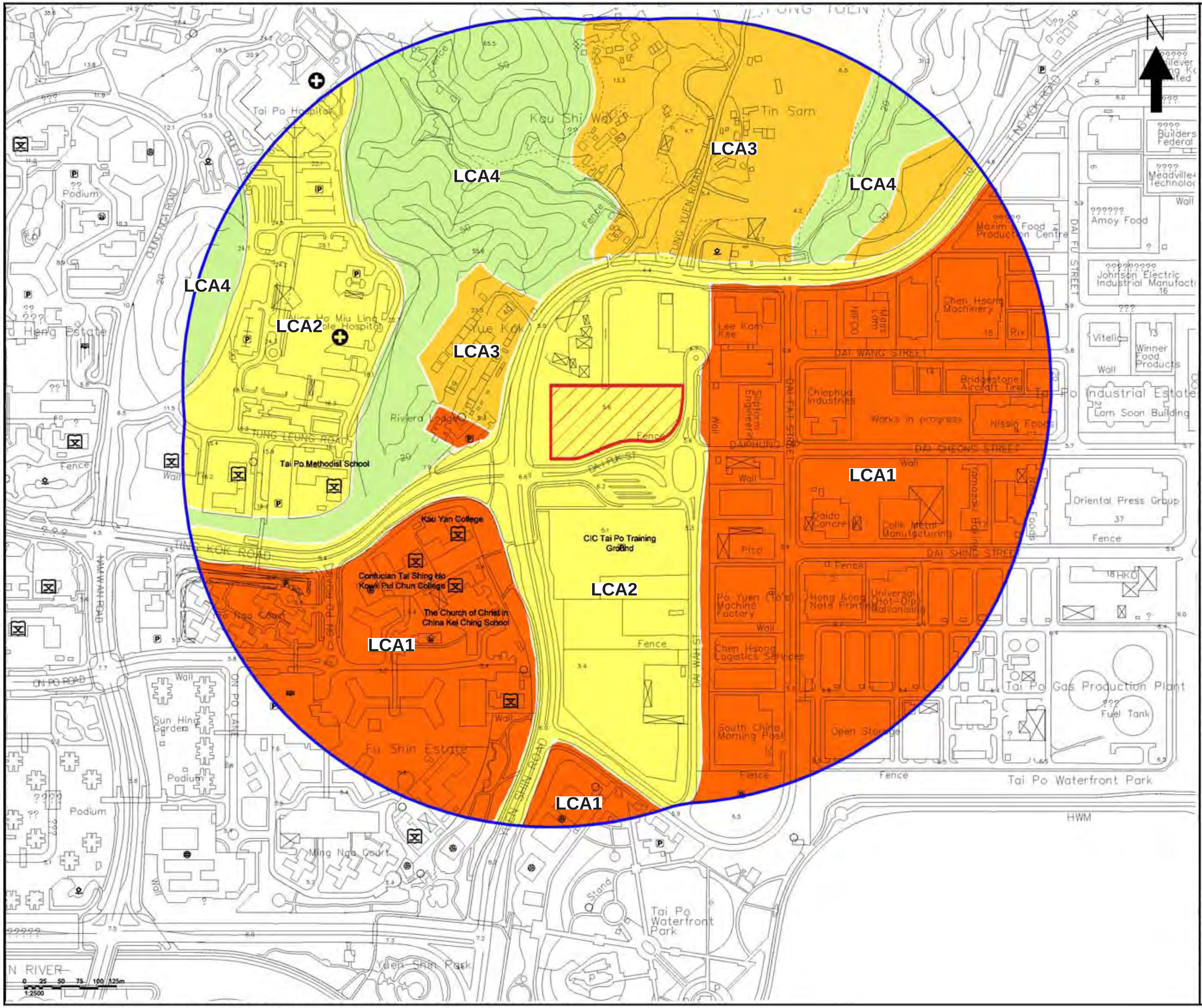
Drawing No : **FIGURE 4 圖4**

Revision : **0**

Scale : **AS SHOWN 如圖示**

Date :

A3 420X297



NOTES :

▨	SUBJECT SITE 工程項目
☐	500m Landscape Study Site Boundary 500米景觀及視覺研究範圍
🟥	LCA1 Urban Landscape LCA1 市區景觀
🟨	LCA2 Urban Fringe Landscape LCA2 市區邊緣景觀
🟧	LCA3 Rural Fringe Landscape LCA3 鄉郊邊緣景觀
🟩	LCA4 Upland Countryside Landscape LCA4 高地郊野景觀

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

Drawing By : JK

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO
大埔第33區大福街九龍巴士車廠

Drawing Title :

LANDSCAPE CHARACTER AREAS
景觀特色區

Drawing No : **FIGURE 5 圖 5**

Revision : **0**

Scale : **AS SHOWN 如圖示**

Date :

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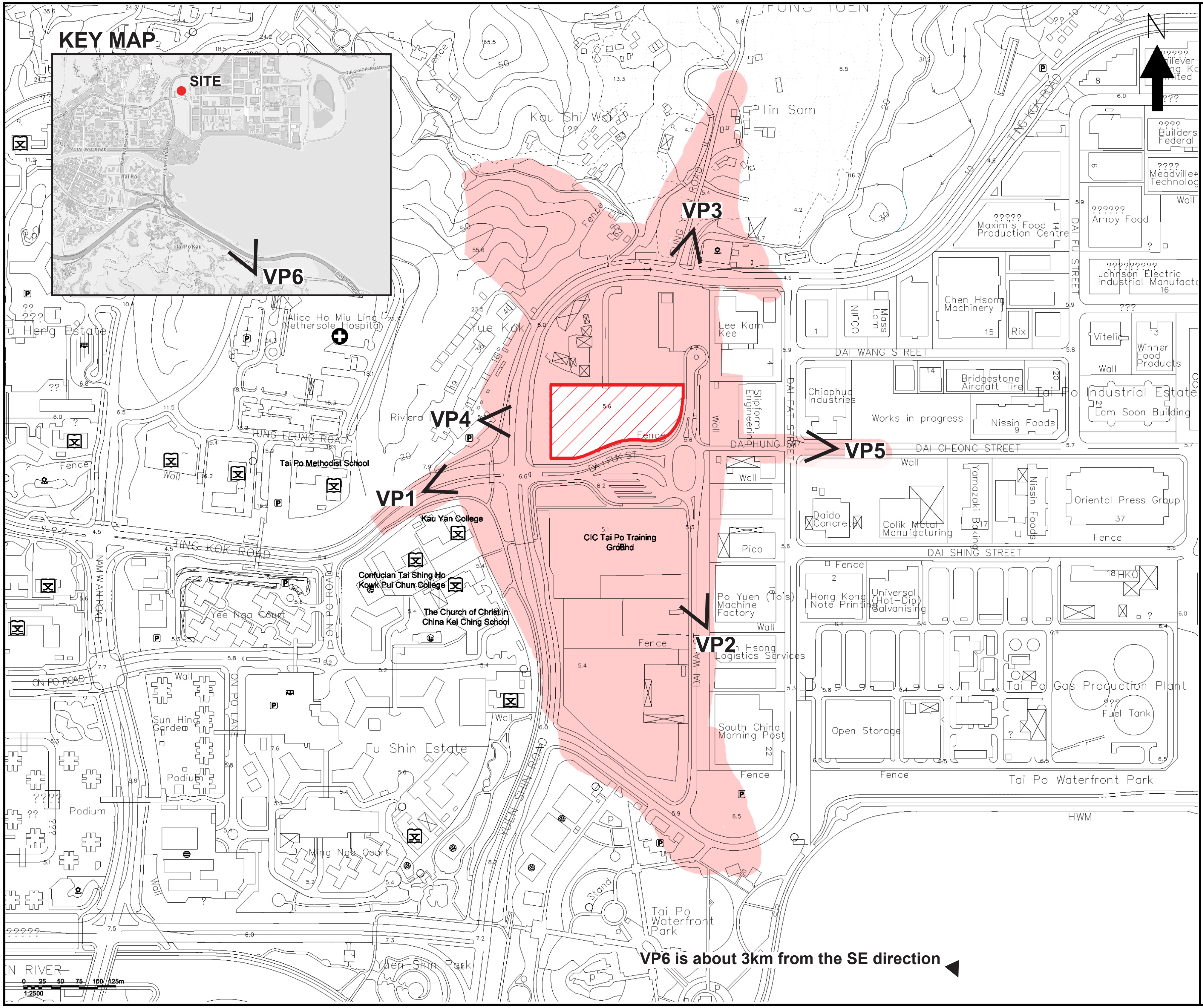
Z:\1801-1850\1849\05 Report\01 AEC Report\Project Profile\Figure\Draft 1_eng\Figure 2-1 & 2-2 Site Layout Plan.dwg

A4 297x210



NOTES : 備註：

▨ SUBJECT SITE 工程項目

🟥 VISUAL ENVELOPE 視覺範圍

< KEY PUBLIC VIEWPOINT 主要公眾視點

Consultant

Allied Environmental Consultants Limited

Project No. :	1849
File Name :	CC

Project :

KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO
大埔第33區大福街九龍巴士車廠

Drawing Title :

VISUAL ENVELOPE AND
KEY PUBLIC VIEWPOINTS
視覺範圍 及
主要公眾視點

Drawing No : FIGURE 6 圖 6	Revision : 1
Scale : AS SHOWN 如圖示	Date :

VP1: From Ting Kok Road between Rivera Lodge and Kau Yan College (Approx. 160m from site)

VP1: 從汀角路在樂賢居和救恩書院間（距離項目約160米）

VP2: From Dai Wah Street next to the entrance of the CIC Tai Po Training Ground (Approx. 175m from site)

VP2: 從大華街建造業議會大鋪訓練場地入口（距離項目約175米）

VP3: From Fung Yuen Road at the its intersection with Ting Kok Road (Approx. 200m from site)

VP3: 從鳳園路與汀角路交界（距離項目約200米）

VP4: From Yue Kok Village Playground (Approx. 100m from site)

VP4: 從魚角村休憩處（距離項目約100米）

NOTES : 備註 :

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name :

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO
大埔第33區大福街九龍巴士車廠

Drawing Title :
KEY PUBLIC VIEWPOINTS (1/2)
主要公眾視點 1/2

Drawing No : FIGURE 7-1 圖 7-1

Revision : 1

Scale : AS SHOWN 如圖示

Date :

VP5: From Tai Po Industrial Estate on Dai Cheong Street (Approx. 220m from site)

VP5: 從大埔工業區大昌街（距離項目約220米）

VP6: From Tai Po Road across the Tolo Harbour (Approx. 3km from site)

VP6: 從吐露港對岸大埔道遠眺大埔工業區（距離項目約3000米）

NOTES : 備註 :

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name :

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO
大埔第33區大福街九龍巴士車廠

Drawing Title :

KEY PUBLIC VIEWPOINTS (2/2)
主要公眾視點 2/2

Drawing No : FIGURE 7-2 圖7-2

Revision : 1

Scale : AS SHOWN 如圖示

Date :

VP1: From Ting Kok Road between Rivera Lodge and Kau Yan College with Proposed Development (Approx. 160m from site)

VP1: 從汀角路在樂賢居和救恩書院間（距離項目約160米）

NOTES : 備註:

Consultant

Allied Environmental Consultants Limited

Project No. :	1849
Drawing By :	JK

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO
大埔第33區大福街九龍巴士車廠

Drawing Title :

PHOTOMONTAGE - VIEWPOINT 1
照片蒙太奇 - 視點 1

Drawing No : **FIGURE 7-3** 圖7-3	Revision : **1**
Scale : **AS SHOWN** 如圖示	Date :

VP2: From Dai Wah Street next to the entrance of the CIC Tai Po Training Ground with Proposed Development (Approx. 175m from site)

VP2: 從大華街建造業議會大鋪訓練場地入口（距離項目約175米）

NOTES : 備註：

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

Drawing By : JK

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO
大埔第33區大福街九龍巴士車廠

Drawing Title :

PHOTOMONTAGE - VIEWPOINT 2
照片蒙太奇 - 視點 2

Drawing No : **FIGURE 7-4** 圖7-4

Revision : **0**

Scale : **AS SHOWN** 如圖示

Date :

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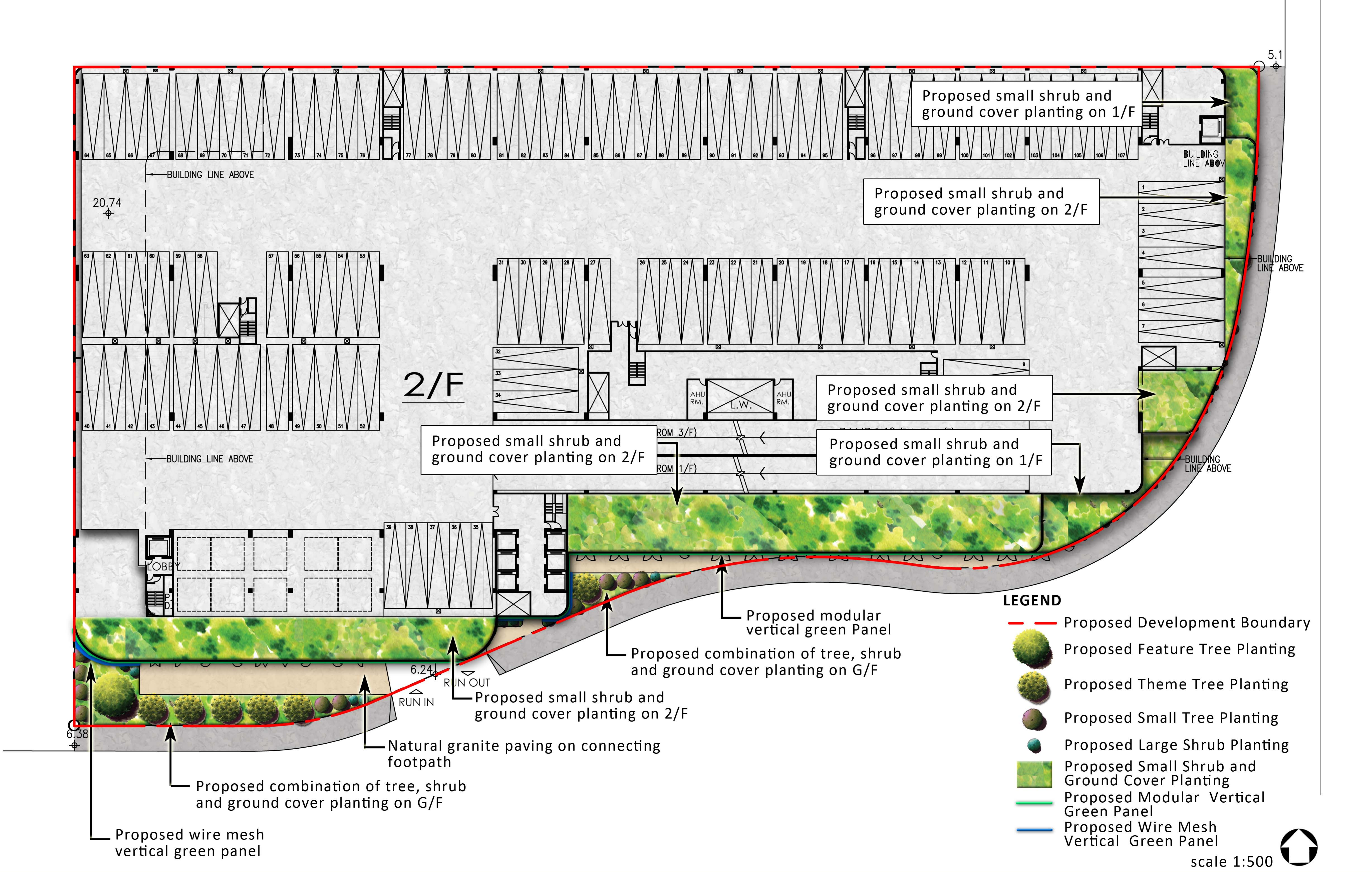
Appendix A – Master Landscape Plan



Proposed small shrub and ground cover planting on 1/F

Proposed small shrub and ground cover planting on 2/F

Proposed small shrub and ground cover planting on 2/F

Proposed small shrub and ground cover planting on 2/F

Proposed small shrub and ground cover planting on 1/F

Proposed modular vertical green Panel

Proposed combination of tree, shrub and ground cover planting on G/F

Proposed small shrub and ground cover planting on 2/F

Natural granite paving on connecting footpath

Proposed combination of tree, shrub and ground cover planting on G/F

Proposed wire mesh vertical green panel

LEGEND

- Proposed Development Boundary
- Proposed Feature Tree Planting
- Proposed Theme Tree Planting
- Proposed Small Tree Planting
- Proposed Large Shrub Planting
- 🟩 Proposed Small Shrub and Ground Cover Planting
- Proposed Modular Vertical Green Panel
- Proposed Wire Mesh Vertical Green Panel

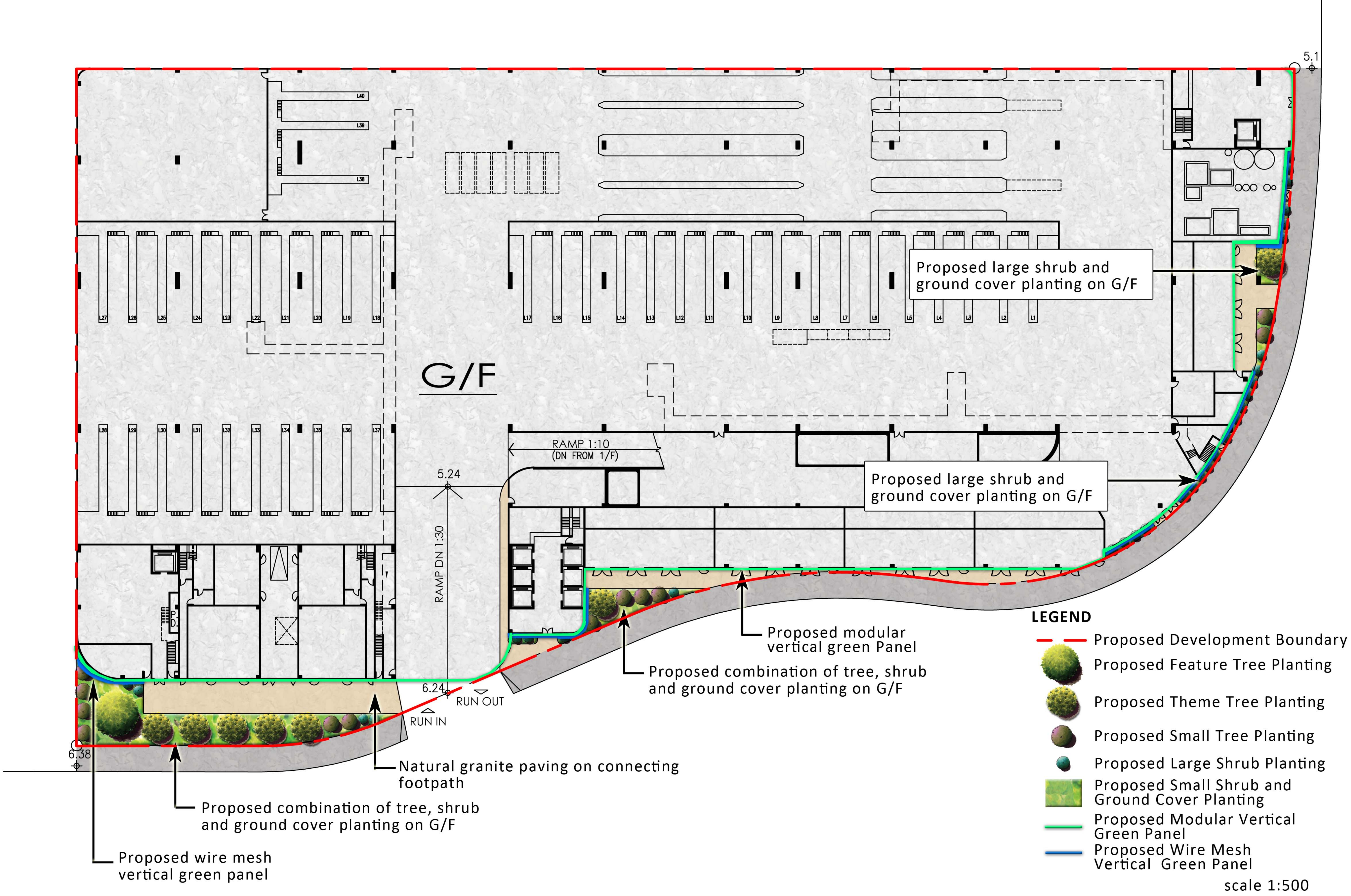
scale 1:500

Proposed Smart Green Bus Depot at Dai Fuk Street, Area 33, Tai Po.

Landscape Master Plan - Combine

Nov 2022

Drawing No. LP-01 rev. C

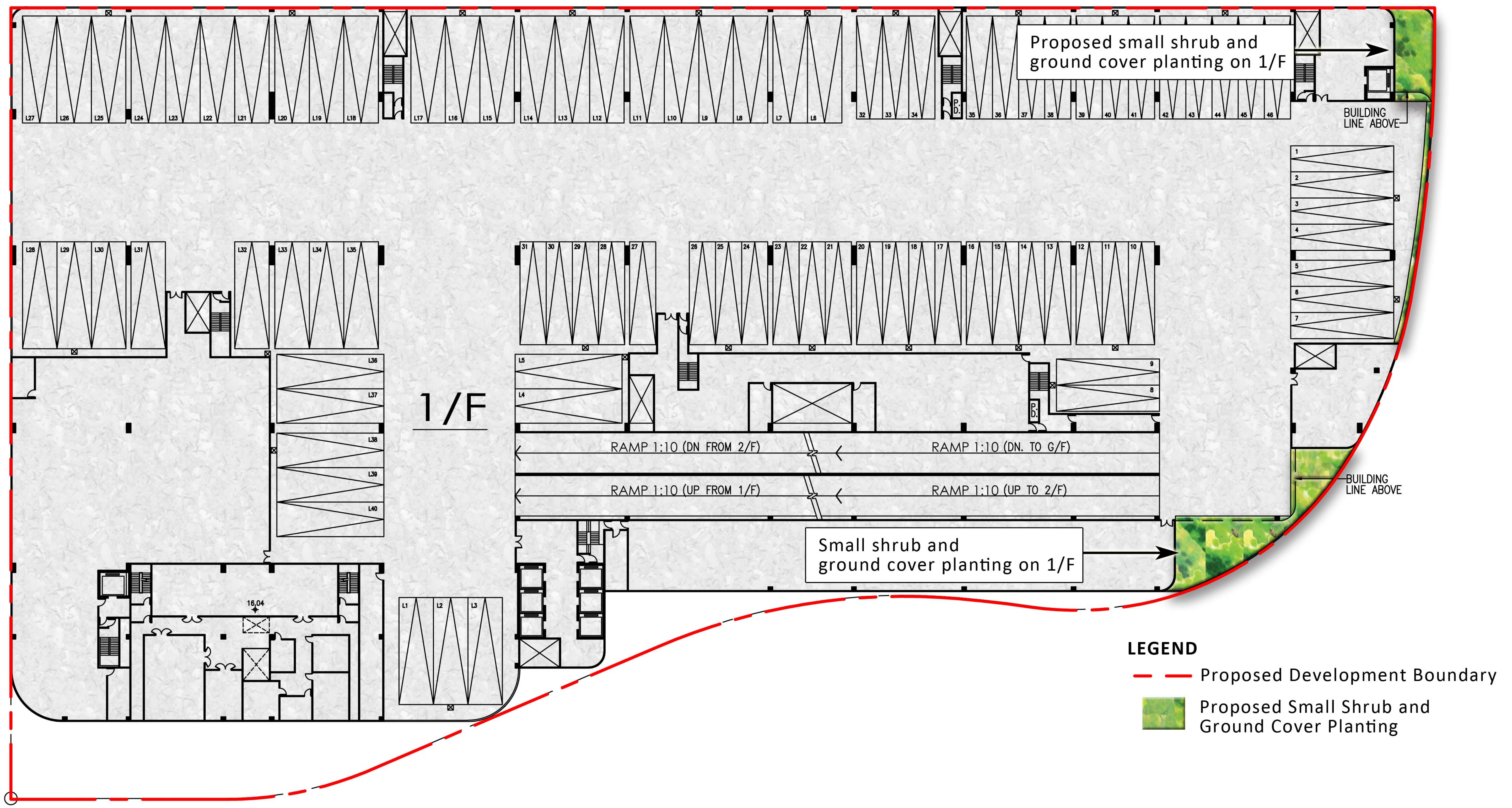


Proposed Smart Green Bus Depot at Dai Fuk Street, Area 33, Tai Po.

Landscape Master Plan - G/F

Nov 2022

Drawing No. LP-02 rev. C



LEGEND

- — — Proposed Development Boundary
- 🟩 Proposed Small Shrub and Ground Cover Planting

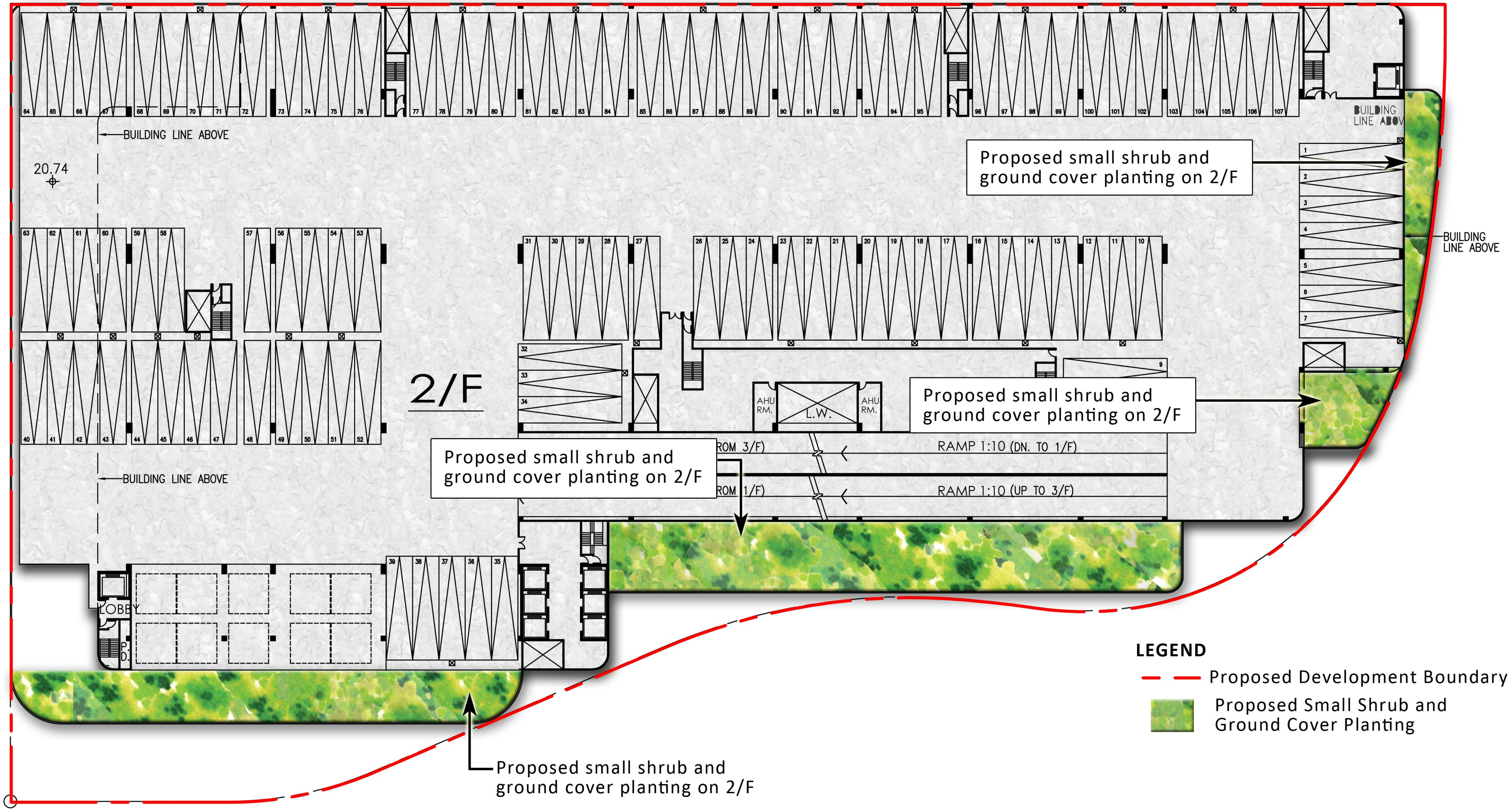
scale 1:500

Proposed Smart Green Bus Depot at Dai Fuk Street, Area 33, Tai Po.

Landscape Master Plan - 1/F

Drawing No. LP-03 rev. A

Nov 2022



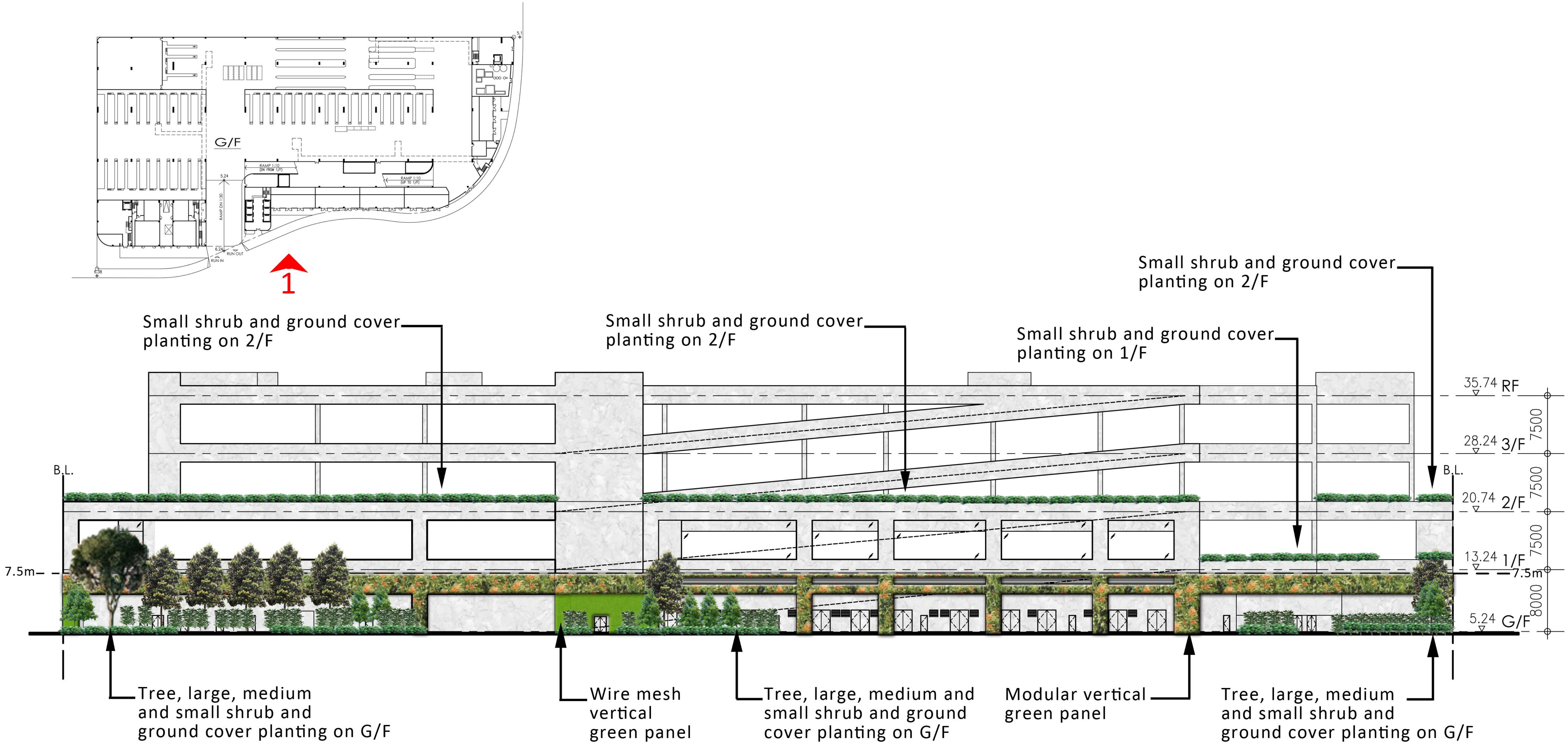
scale 1:500

Proposed Smart Green Bus Depot at Dai Fuk Street, Area 33, Tai Po.

Landscape Master Plan - 2/F

Drawing No. LP-04 rev. A

Nov 2022



ELEVATION '1'

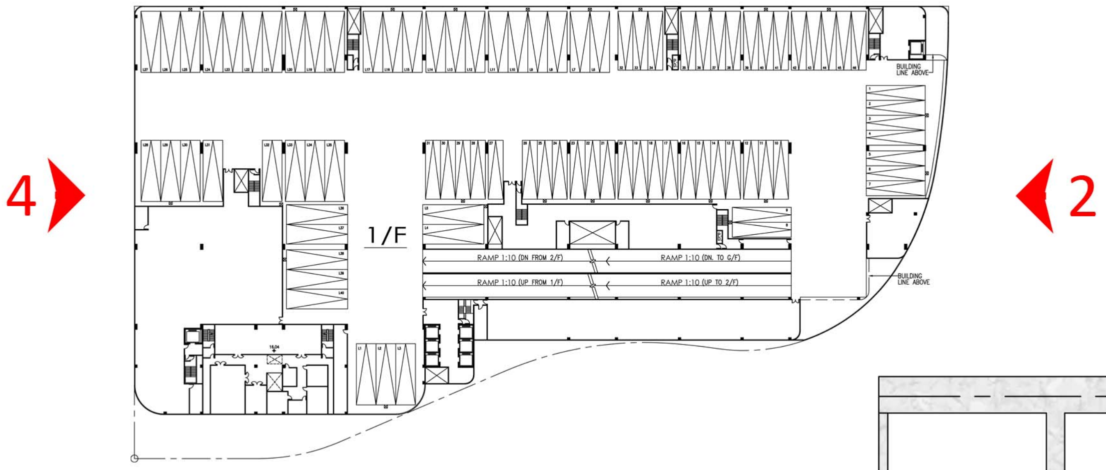
scale 1:500

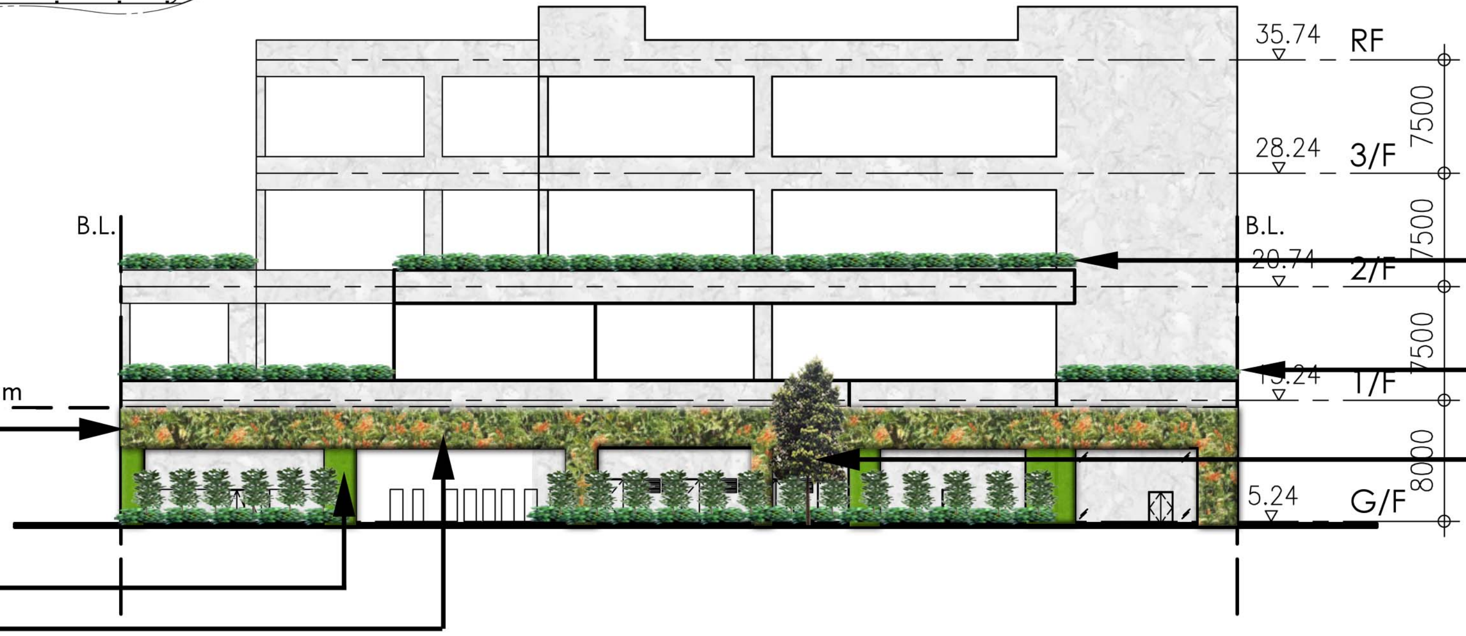
Proposed Smart Green Bus Depot
at Dai Fuk Street, Area 33, Tai Po.

Elevation 1

Drawing No. LS-01 rev. B

Nov 2022





Small shrub and ground cover planting on 2/F

Small shrub and ground cover planting on 1/F

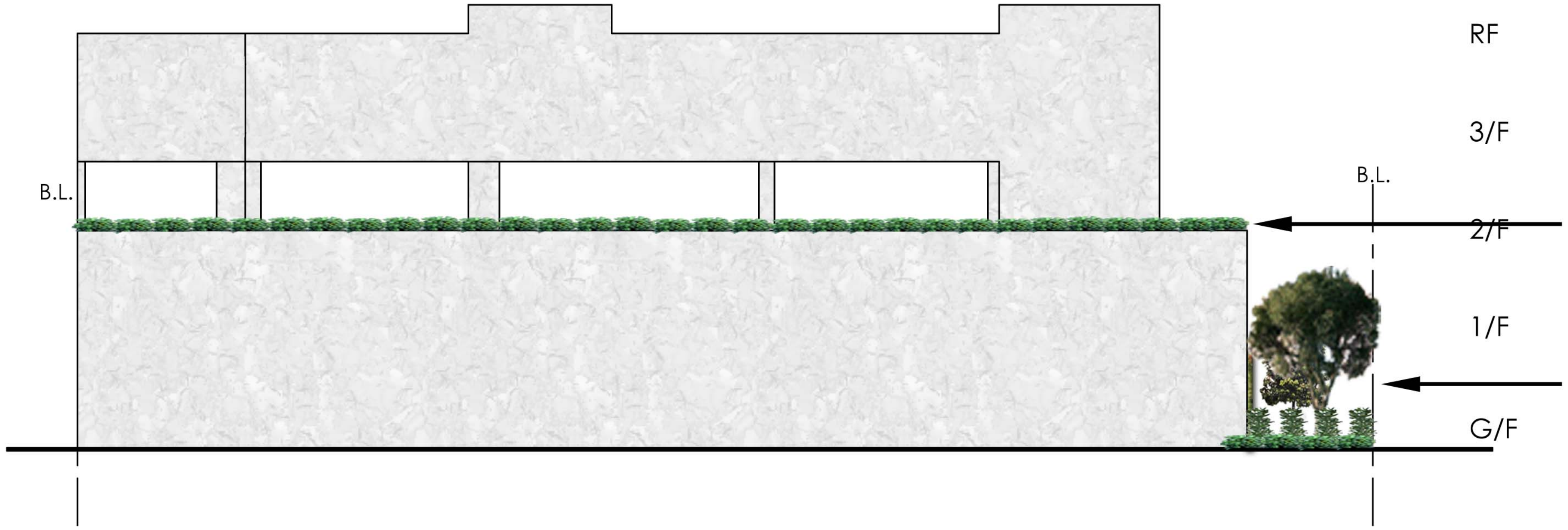
Vertical greening below 7.5m

Tree, large, medium and small shrub and ground cover planting on G/F

Wire mesh vertical green panel

Modular vertical green panel

ELEVATION '2'



Small shrub and ground cover planting on 2/F

Tree, large, medium and small shrub and ground cover planting on G/F

ELEVATION '4'

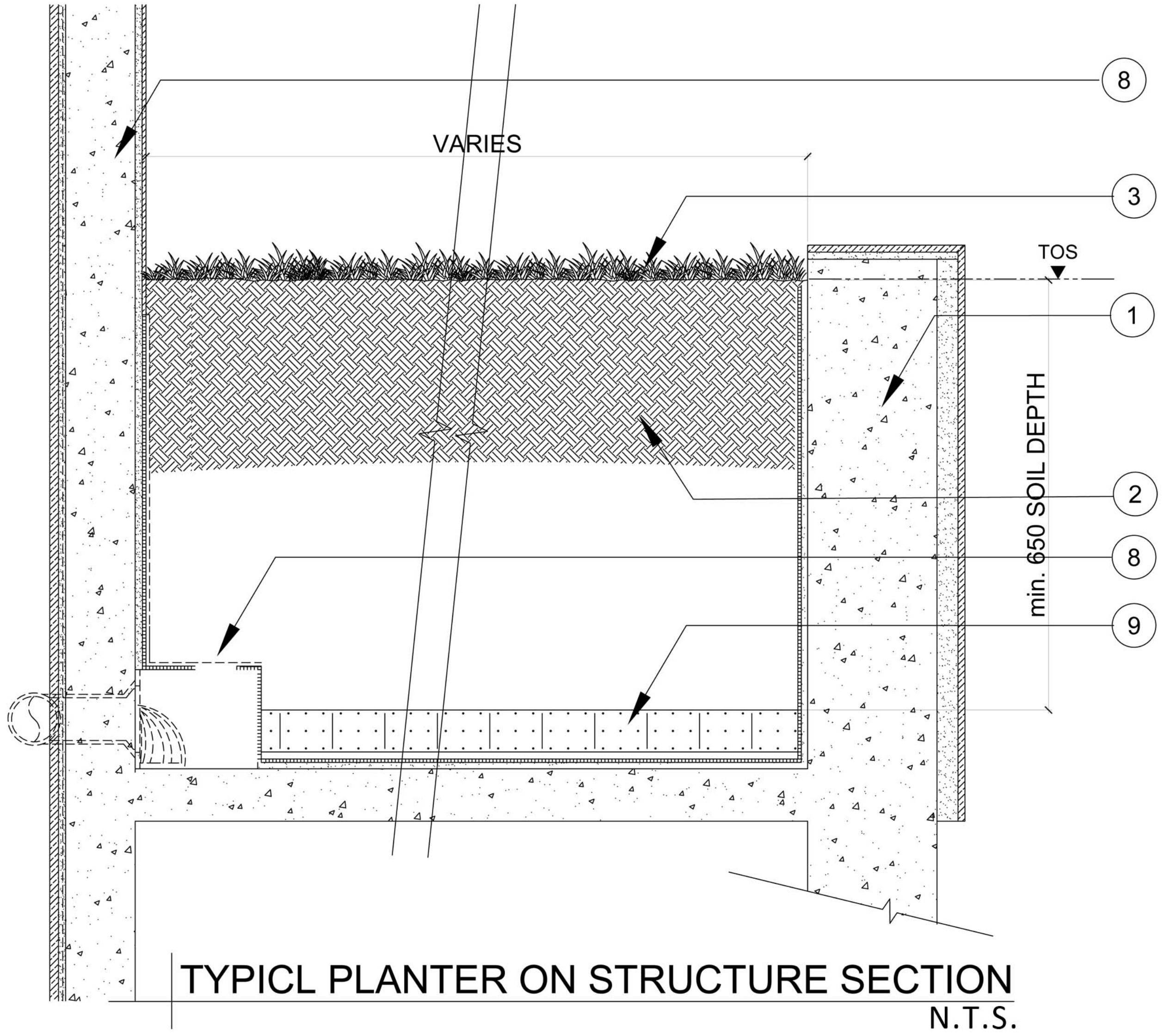
scale 1:500

Proposed Smart Green Bus Depot at Dai Fuk Street, Area 33, Tai Po.

Elevation 2 & 4

Drawing No. LS-02 rev. C

Nov 2022



TYPICL PLANTER ON STRUCTURE SECTION

N.T.S.

STRUCTURAL CODE

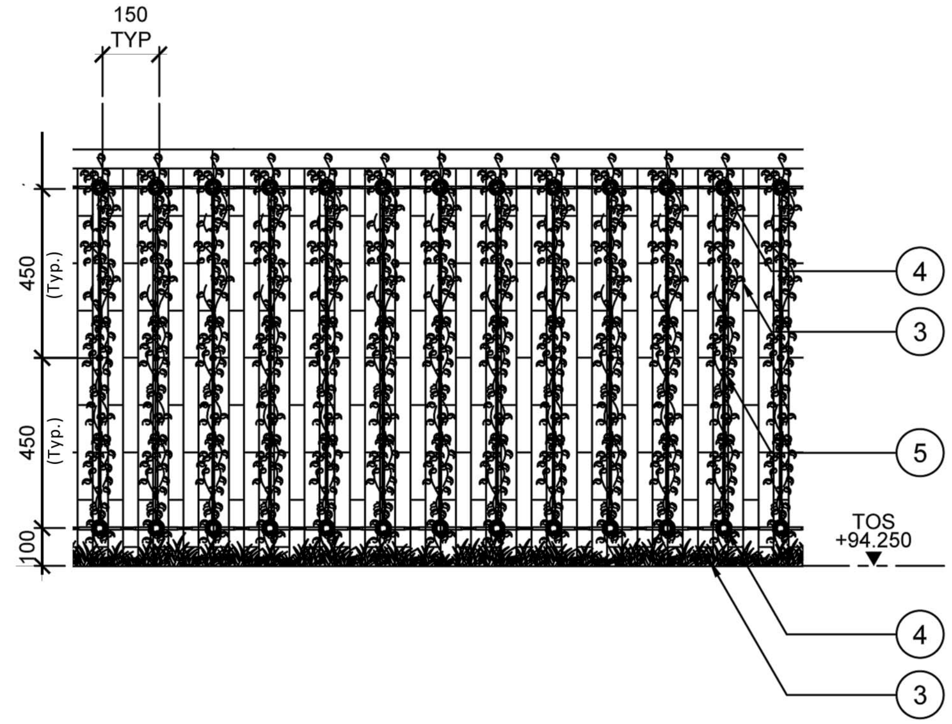
①	R.C STRUCTURE BY ENGINEER
②	PLANTING SOIL MIXTURE AS SPECIFIED
③	PLANTING AS SPECIFIED
⑧	PLANTER DRAINAGE REFER TO ENGINEER
⑨	PLANTER DRAIN CELL

Proposed Smart Green Bus Depot
at Dai Fuk Street, Area 33, Tai Po.

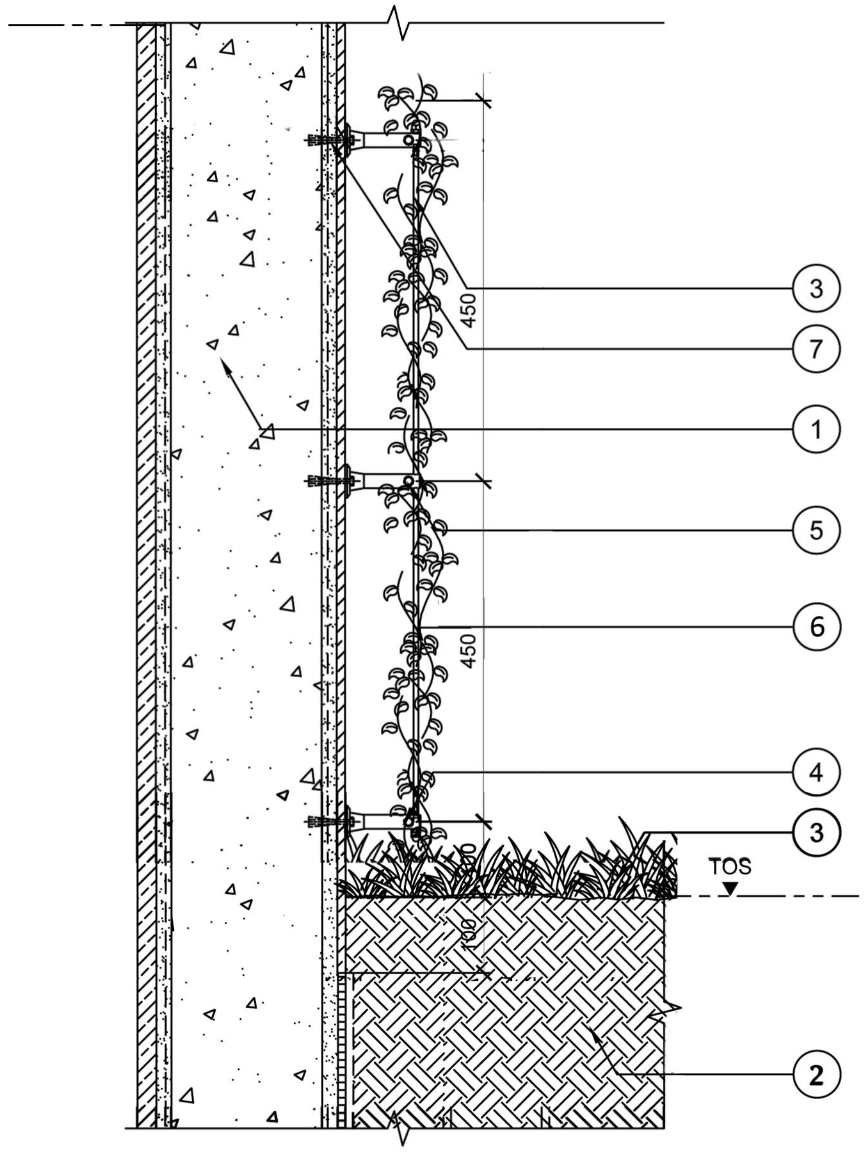
Typical Planter on Structure

Drawing No. LD - 01

Nov 2022



ELEVATION
SCALE: N.T.S.



SECTION
SCALE: N.T.S.

STRUCTURAL CODE

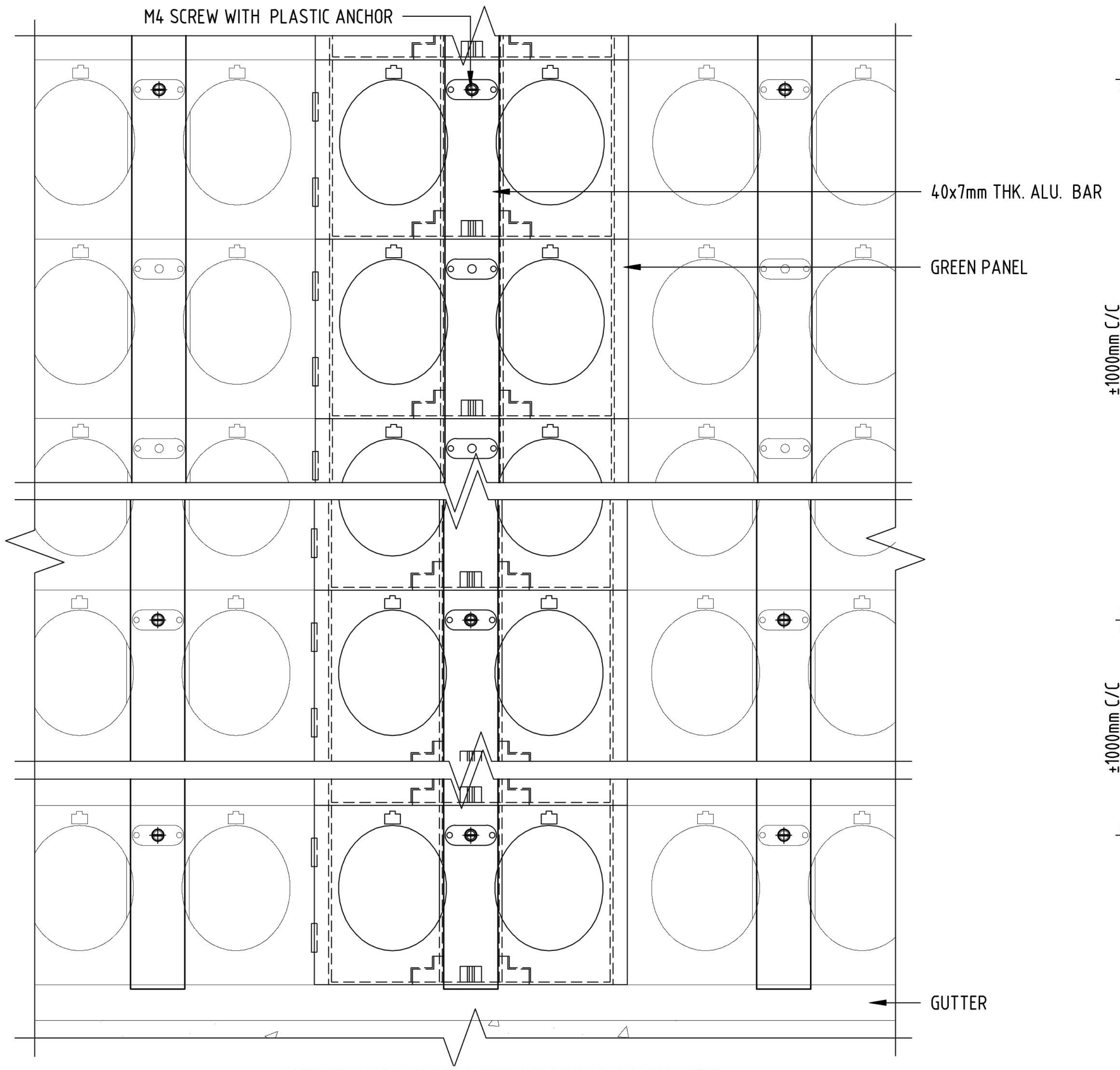
1. R.C STRUCTURE BY ENGINEER
2. PLANTING SOIL MIXTURE AS SPECIFIED
3. PLANTING AS SPECIFIED
4. GRADE 316 STAINLESS STEEL CLAMP AROUND PERIMETER
5. GRADE 316 STAINLESS STEEL CROSS CLAMP CONNECTOR
6. 3mmØ GRADE 316 STAINLESS STEEL CABLE WITH SWAGE ON FITTINGS
7. STAINLESS STEEL EYEBOLT

Proposed Smart Green Bus Depot
at Dai Fuk Street, Area 33, Tai Po.

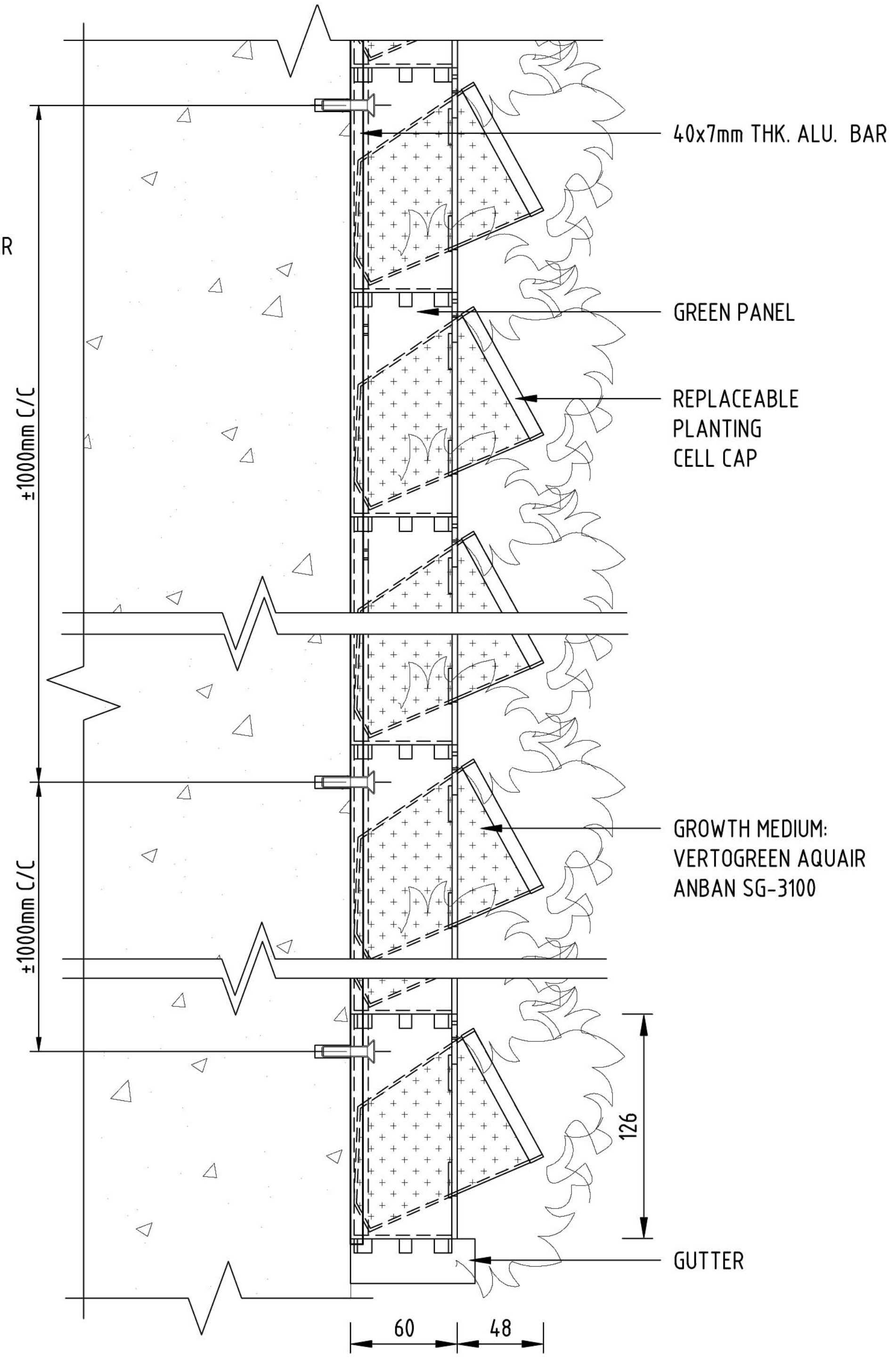
Typical Wire Mesh Panel Detail

Drawing No. LD - 02

Nov 2022



MODULAR VERTICAL GREEN PANEL ELEVATION
SCALE: N.T.S.



VERTICAL GREEN - SIDE
SCALE: N.T.S.

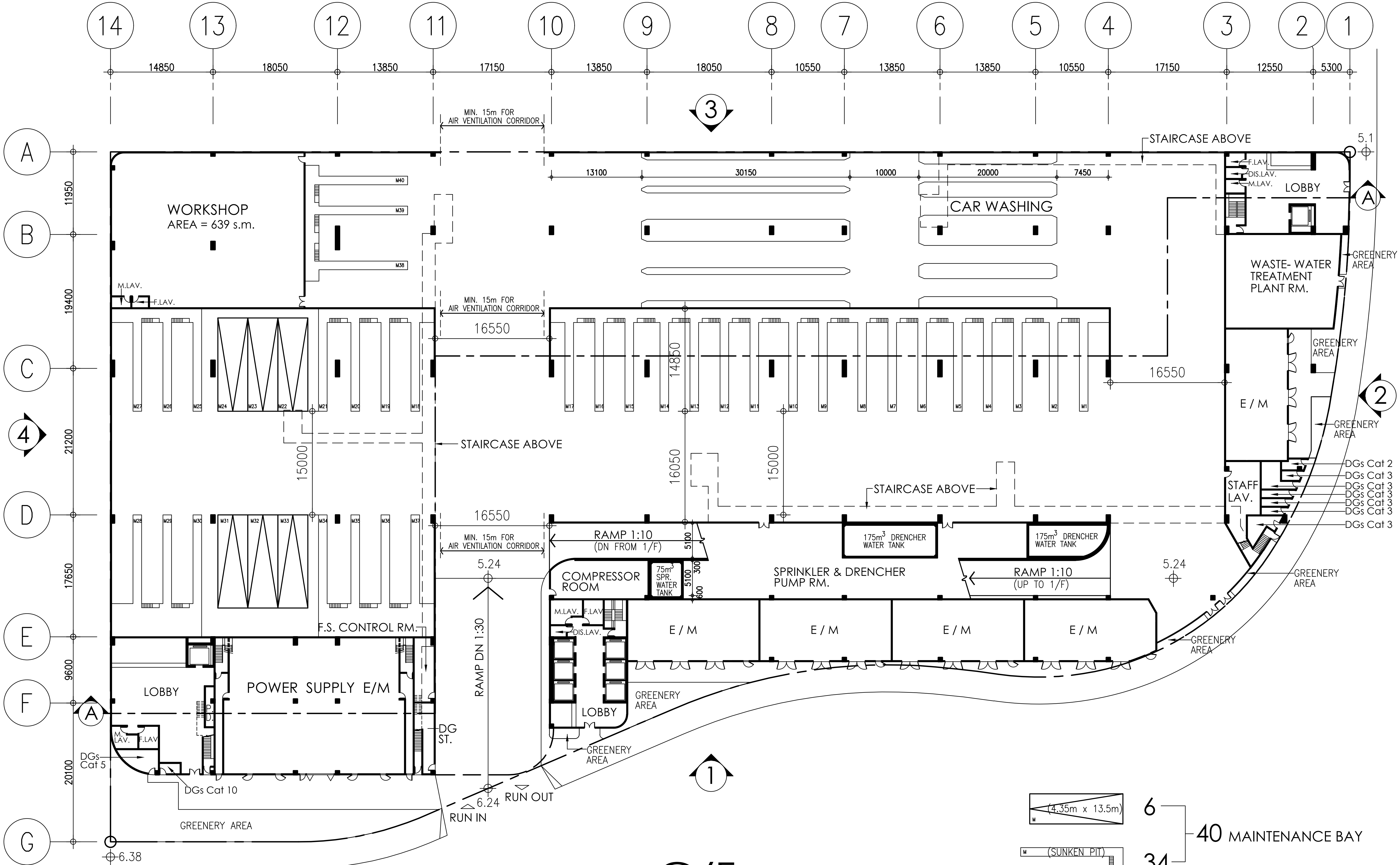
Proposed Smart Green Bus Depot at Dai Fuk Street, Area 33, Tai Po.

Modular Vertical Green Panel Detail

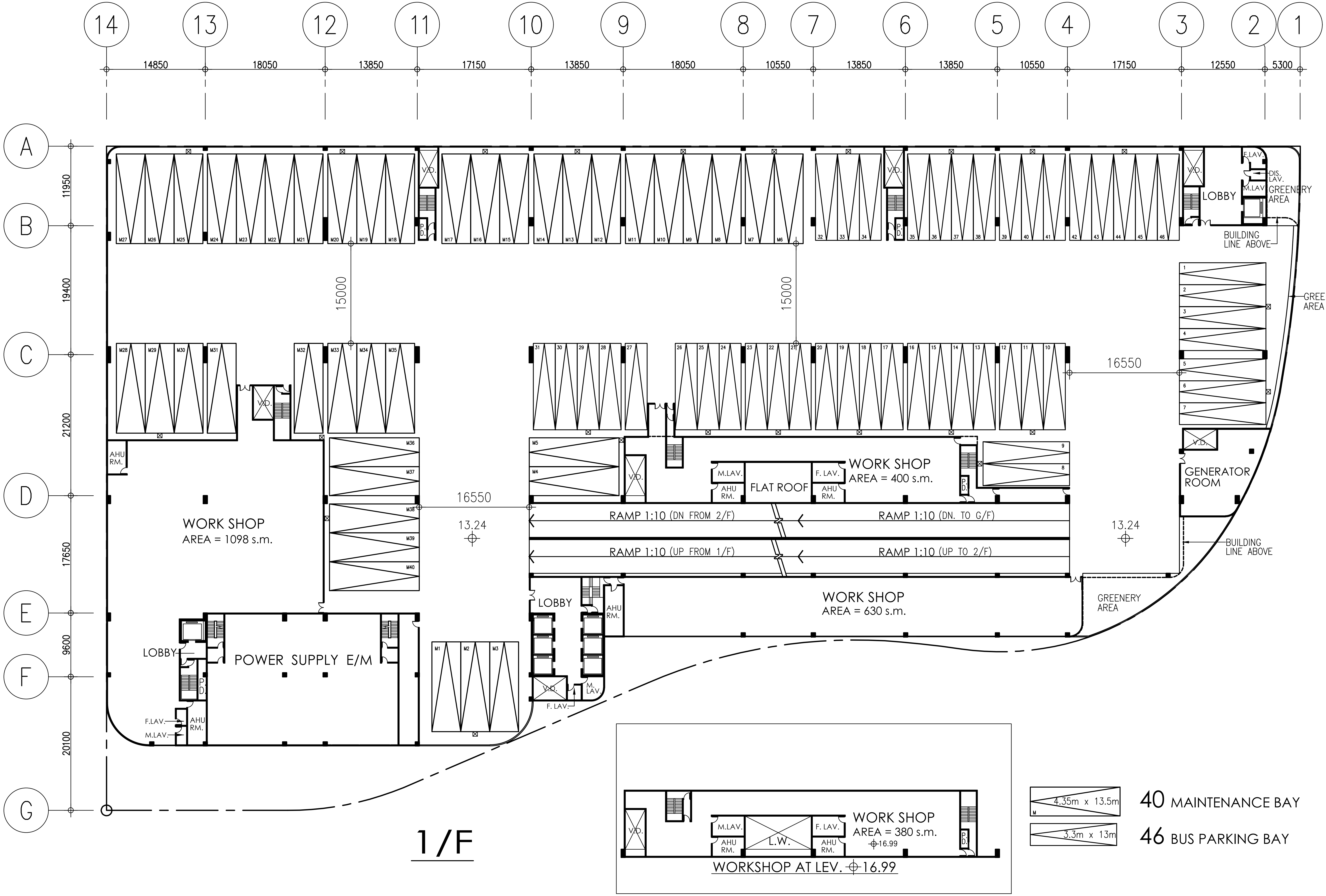
Nov 2022

Drawing No. LD - 03

Appendix B – Proposed Building Plans


14
13
12
11
10
9
8
7
6
5
4
3
2
1
14850
18050
13850
17150
13850
18050
10550
13850
13850
10550
17150
12550
5300
A
B
C
D
E
F
G
11950
19400
21200
17650
9600
20100
MIN. 15m FOR AIR VENTILATION CORRIDOR
STAIRCASE ABOVE
5.1
13100
30150
10000
20000
7450
F.LAV.
DIS.LAV.
M.LAV.
LOBBY
WORKSHOP
AREA = 639 s.m.
CAR WASHING
M40
M39
M38
M.LAV.
F.LAV.
WASTE- WATER TREATMENT PLANT RM.
GREENERY AREA
16550
14850
M27
M26
M25
M24
M23
M22
M21
M20
M19
M18
M17
M16
M15
M14
M13
M12
M11
M10
M9
M8
M7
M6
M5
M4
M3
M2
M1
E / M
STAIRCASE ABOVE
15000
16050
15000
STAIRCASE ABOVE
DGs Cat 2
DGs Cat 3
DGs Cat 3
DGs Cat 3
DGs Cat 3
DGs Cat 3
DGs Cat 3
STAFF LAV.
M28
M29
M30
M31
M32
M33
M34
M35
M36
M37
RAMP 1:10
(DN FROM 1/F)
5100
175m³ DRENCHER WATER TANK
175m³ DRENCHER WATER TANK
5.24
COMPRESSOR ROOM
75m³ SPR. WATER TANK
300
600
SPRINKLER & DRENCHER PUMP RM.
RAMP 1:10
(UP TO 1/F)
5.24
F.S. CONTROL RM.
M.LAV.
F.LAV.
DIS.LAV.
E / M
E / M
E / M
E / M
GREENERY AREA
LOBBY
POWER SUPPLY E/M
RAMP DN 1:30
DG ST.
LOBBY
GREENERY AREA
M. LAV.
F.LAV.
DGs Cat 5
DGs Cat 10
GREENERY AREA
6.24
RUN IN
RUN OUT
GREENERY AREA
6.38
(4.35m x 13.5m)
6
(SUNKEN PIT)
34
40 MAINTENANCE BAY

G/F

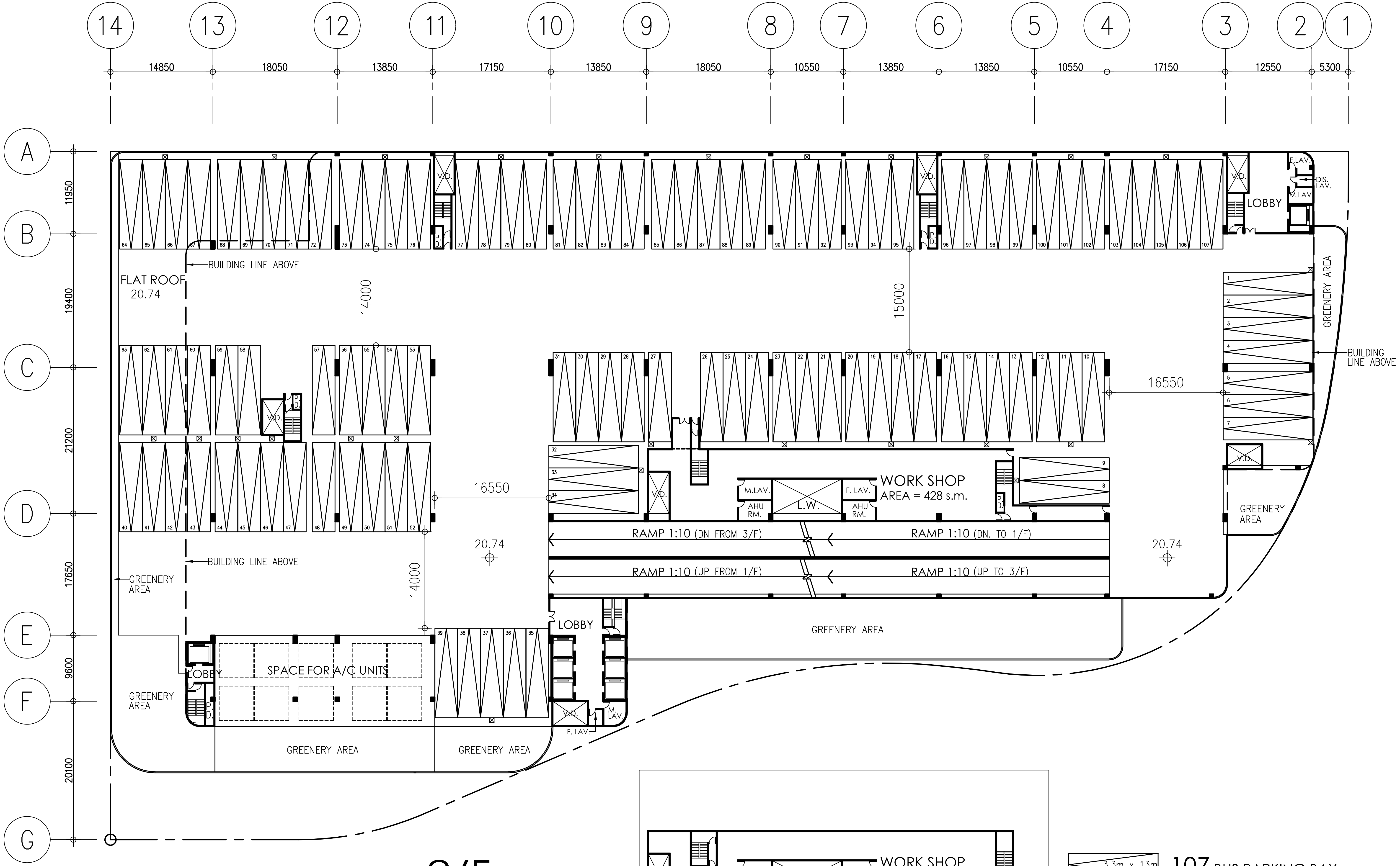


1/F

40 MAINTENANCE BAY

46 BUS PARKING BAY

JULY 2022 (1)



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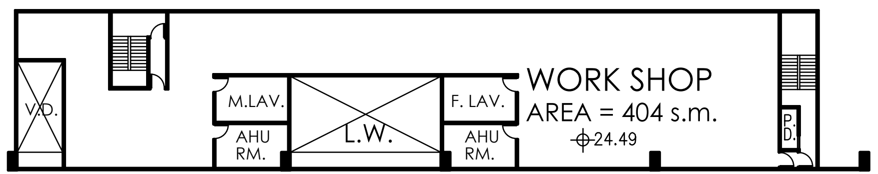
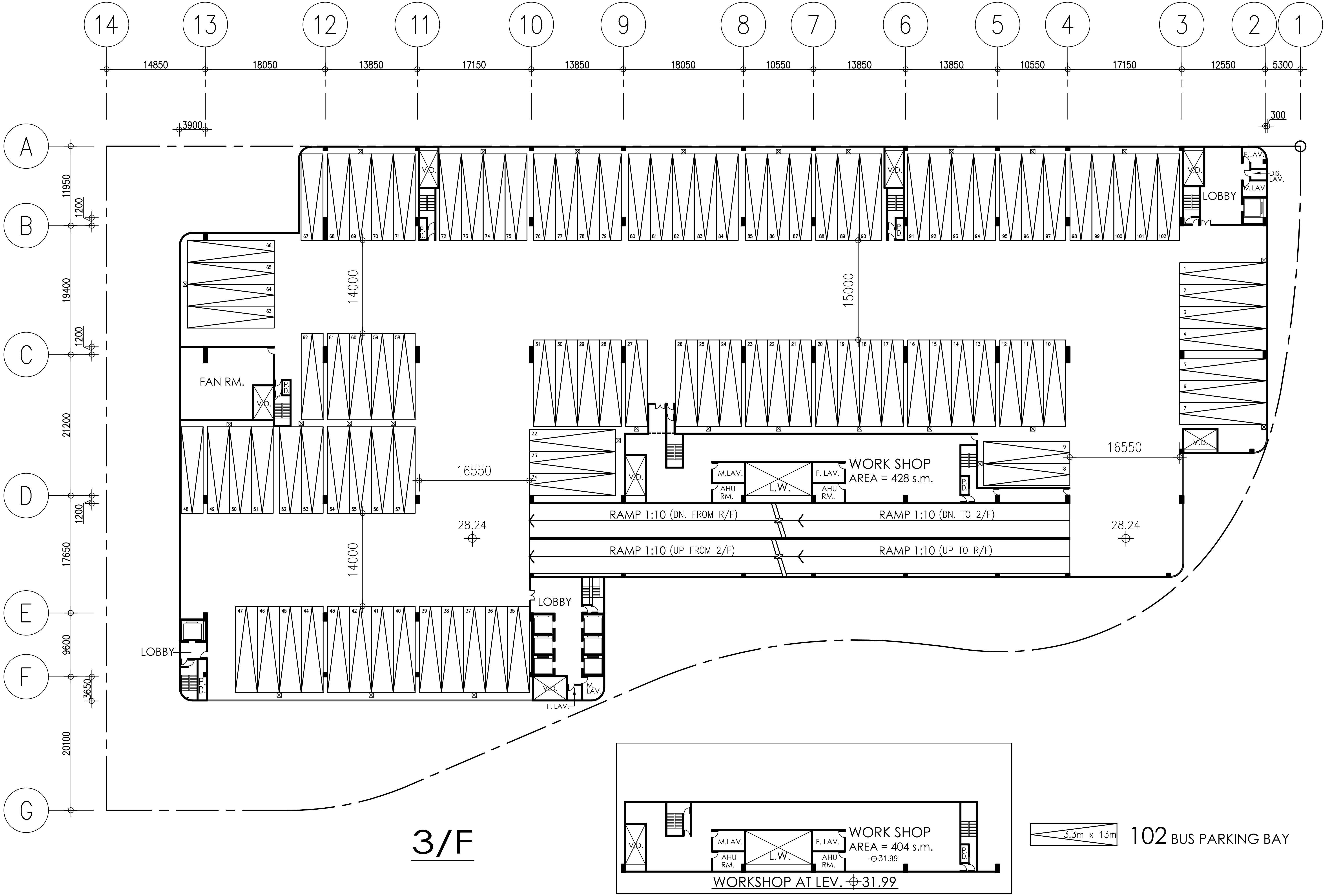


WORKSHOP AT LEV. 24.49

3.3m x 13m — 107 BUS PARKING BAY

JULY 2022 (1)

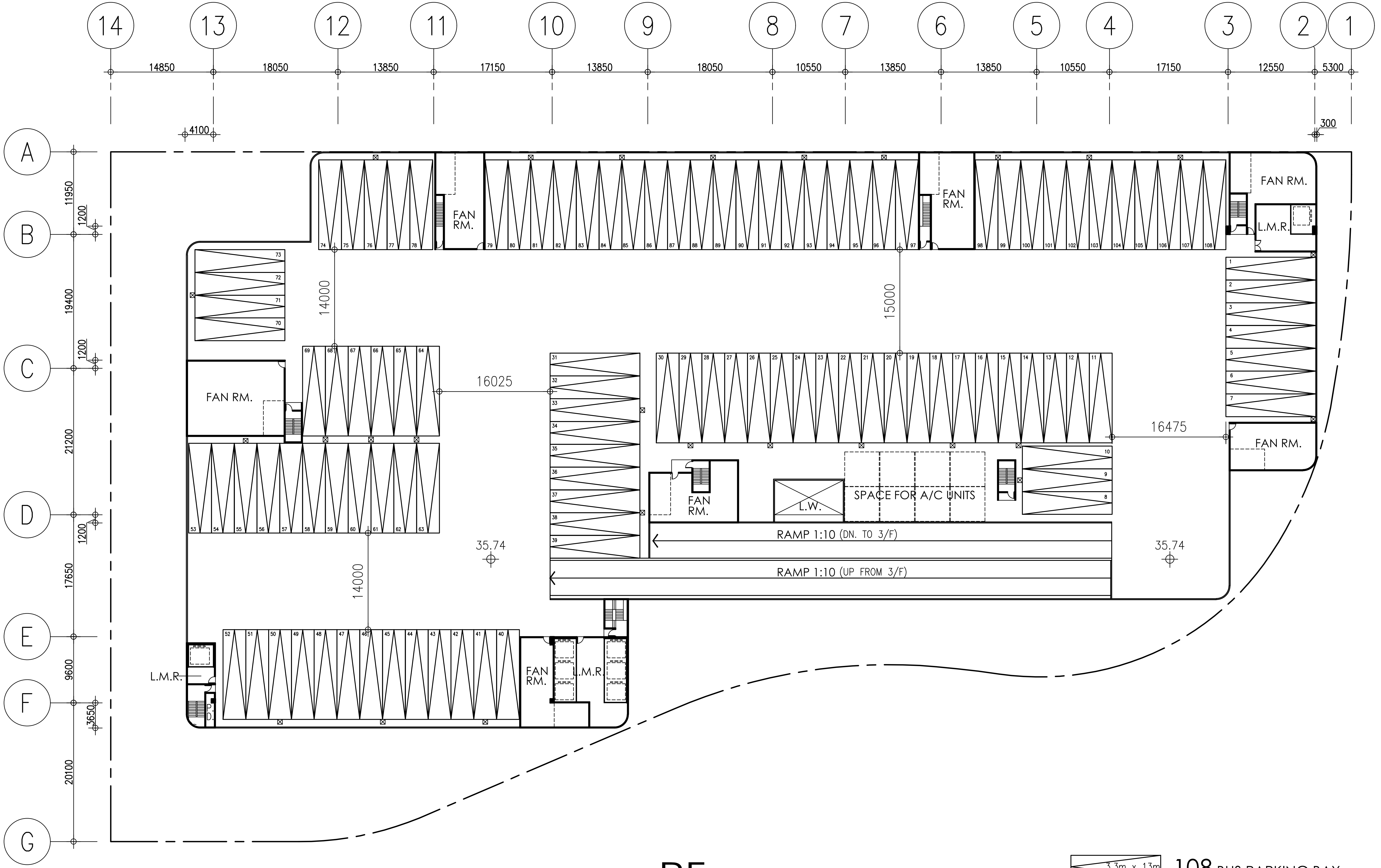


3/F

WORKSHOP AT LEV. ⌖31.99

3.3m x 13m 102 BUS PARKING BAY

JULY 2022 (1)

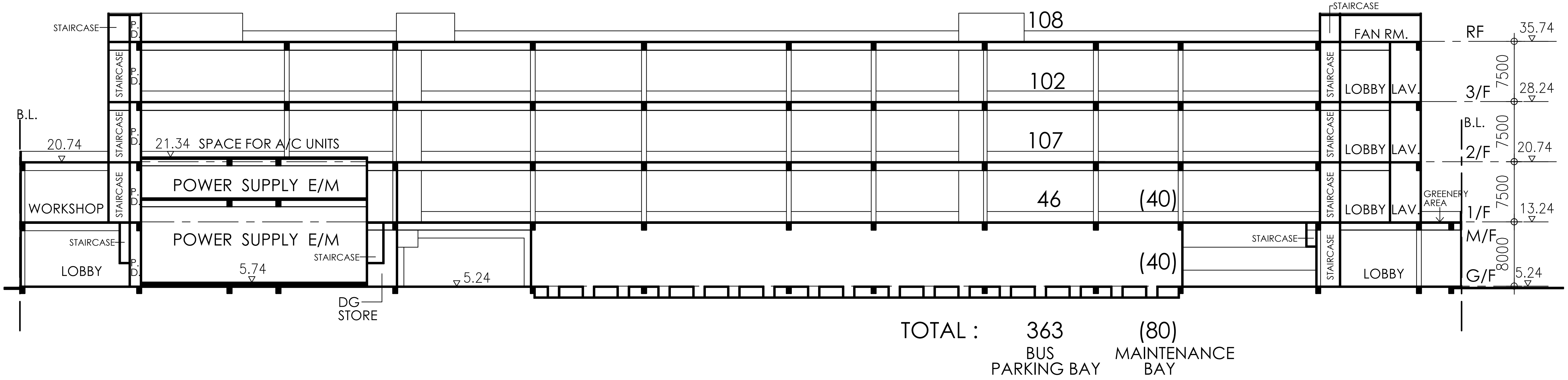


RF

3.3m x 13m **108** BUS PARKING BAY

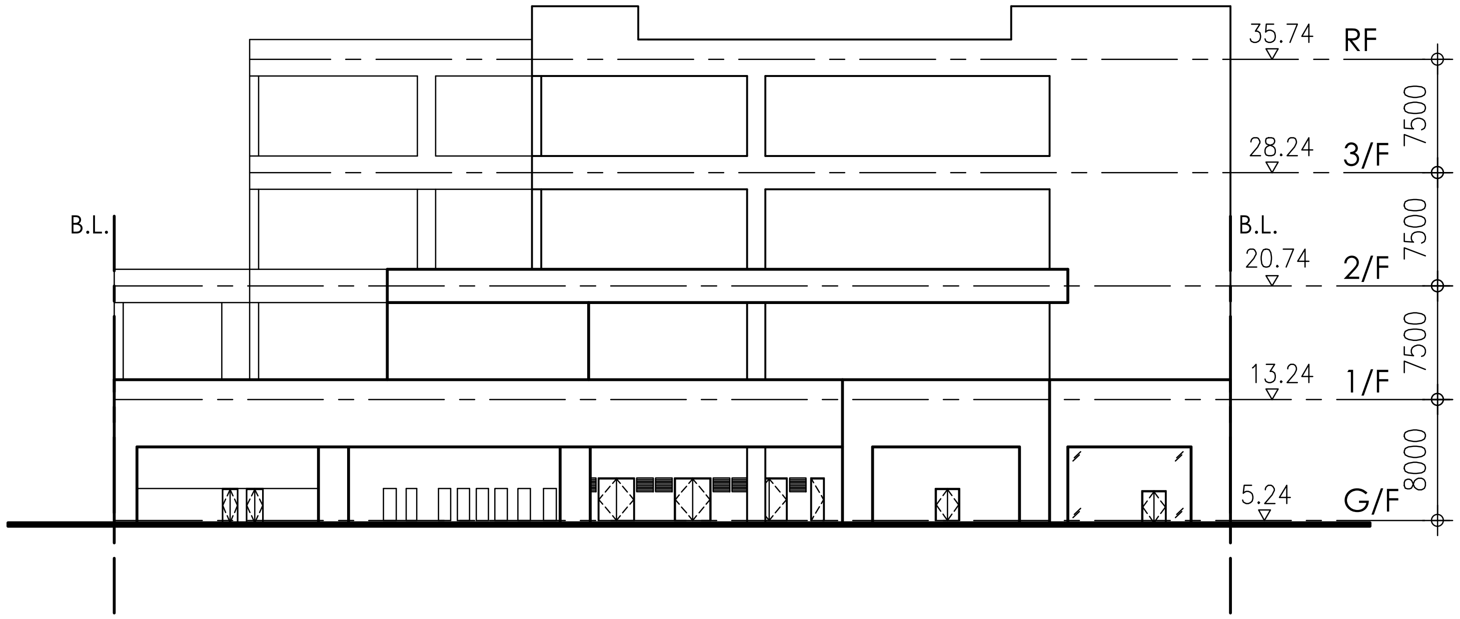
JULY 2022 (1)

4 STOREYS



SECTION 'A' - 'A'

JULY 2022 (1)



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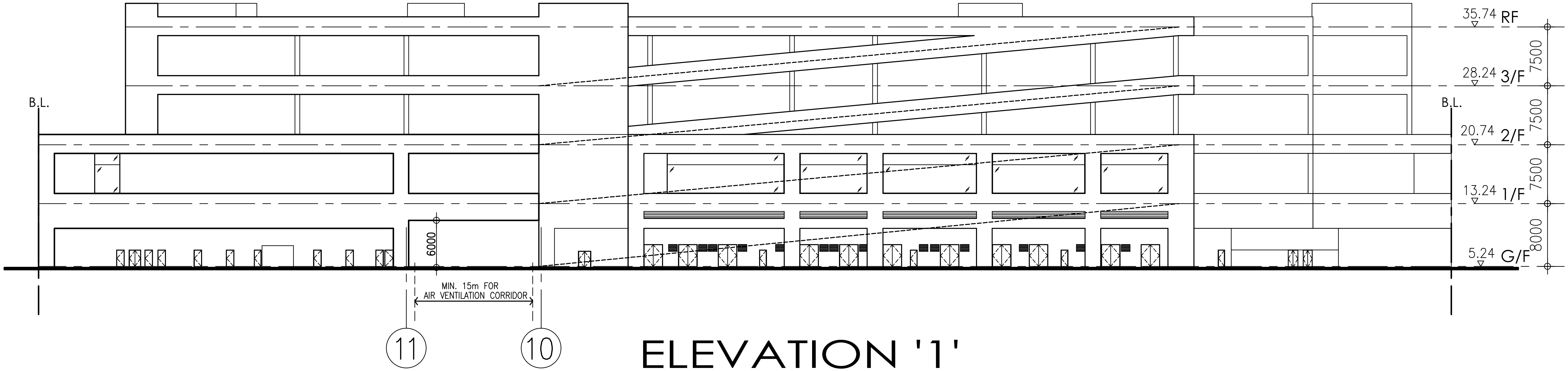
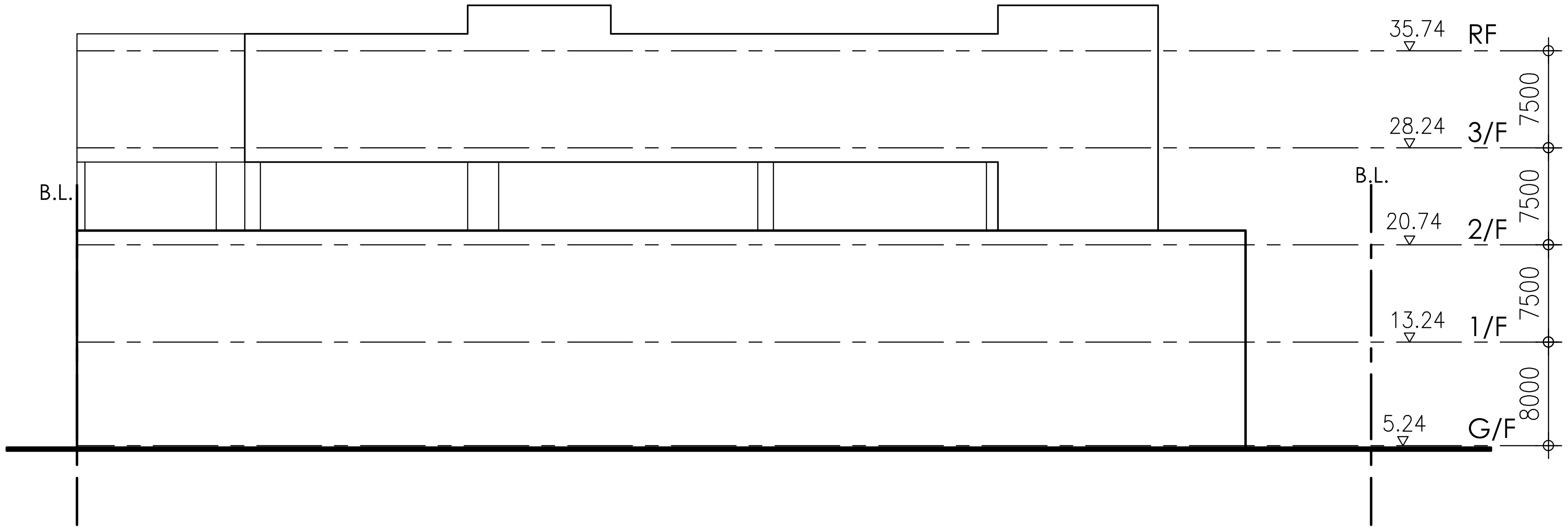
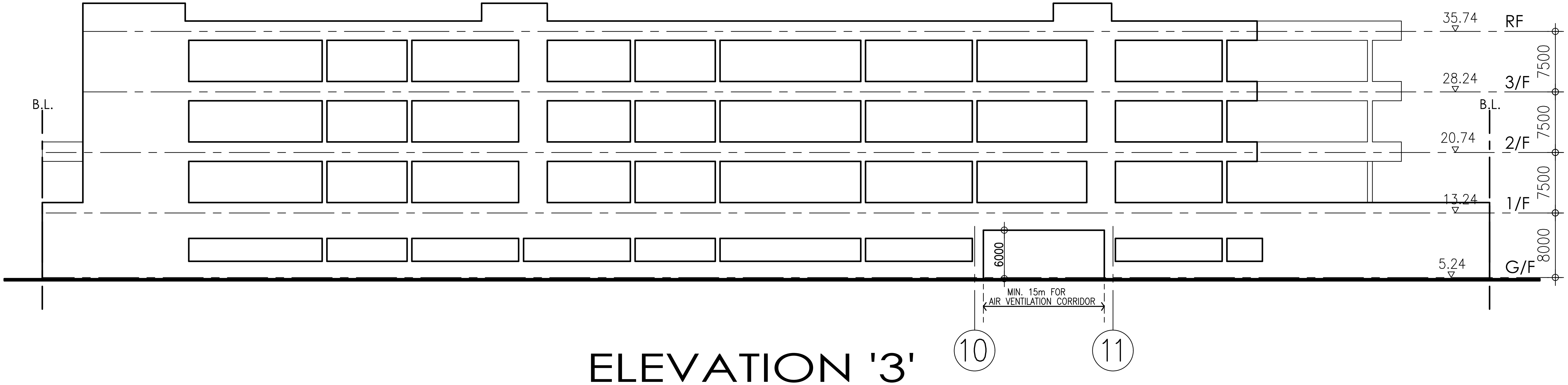


ELEVATION '1'



ELEVATION '4'



ELEVATION '3'

SITE COVERAGE AND PLOT RATIO CALCULATION :

SITE AREA : 14600 s.m.

CLASS OF SITE : ' B '

ACTUAL SITE COVERAGE

SITE COVERAGE (ABOVE 15m) : 11315 s.m. / 14600s.m. x 100% = 77.50 %

SITE COVERAGE (UNDER 15m) : 13918 s.m. / 14600s.m. x 100% = 95.33 %

ACTUAL GROSS FLOOR AREA

GROUND FLOOR : 13918 s.m. + 653 s.m. = 14571 s.m.
1st FLOOR : 13688 s.m. + 475 s.m. = 14163 s.m.
2nd FLOOR : 11315 s.m. + 502 s.m. = 11817 s.m.
3rd FLOOR : 11315 s.m. + 502 s.m. = 11817 s.m.

TOTAL = 52368 s.m. (PLOT RATIO = 3.59)

JULY 2022 (1)

NOTES : 備註 :

VP3: From Fung Yuen Road at the its intersection with Ting Kok Road with Proposed Development (Approx. 200m from site)

VP3: 從鳳園路與汀角路交界（距離項目約200米）

Consultant

Allied Environmental Consultants Limited

Project No. 1849

Drawing By JK

Project

KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO
大埔第三十三區大福街九龍巴士車廠

Drawing Title :

PHOTOMONTAGE - VIEWPOINT 3

照片蒙太奇 - 視點 3

Drawing No **FIGURE 7-5** 圖 7-5

Revision **0**

Scale : **AS SHOWN** 如圖示

Date :

VP4: From Yue Kok Village Playground (Approx. 100m from site)

NOTES :

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name :

Project :
KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Drawing Title :
PHOTOMONTAGE - VIEWPOINT 4

Drawing No : FIGURE 7-5

Revision : 0

Scale : AS SHOWN

Date :

NOTES : 備註 :

VP5: **From Tai Po Industrial Estate on Dai Cheong Road (Approx. 220m from site)**

VP5: 從大埔工業區大昌街（距離項目約220米）

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name :

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO
大埔第33區大福街九龍巴士車廠

Drawing Title :

PHOTOMONTAGE - VIEWPOINT 5
照片蒙太奇 - 視點 5

Drawing No :	Revision :
FIGURE 7-7 圖7-7	**1**
Scale :	Date :
AS SHOWN 如圖示	

Z:\1801-1850\1849\05 Report\01 AEC Report\Project Profile\Figure\Draft 1_eng\Figure 2-1 & 2-2 Site Layout Plan.dwg

A4 297 x 210

VP6: From Tai Po Road across the Tolo Harbour (Approx. 3km from site)

VP6: 從吐露港對岸大埔道遠眺大埔工業區（距離項目約3000米）

NOTES : 備註:

Consultant

Allied Environmental Consultants Limited

Project No. :	1849
File Name :	
Project :	KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO 大埔第33區大福街九龍巴士車廠
Drawing Title :	PHOTOMONTAGE - VIEWPOINT 6 照片蒙太奇 - 視點 6

Drawing No. : FIGURE 7-8 圖7-8	Revision : 0
Scale : AS SHOWN 如圖示	Date :

Issue No. : 4
Issue Date : December 2022
Project No. : 1849

LANDSCAPE MASTER PLAN

FOR

KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Prepared by

Allied Environmental Consultants Limited

COMMERCIAL-IN-CONFIDENCE

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沛然環境評估工程顧問有限公司
沛然環保集團成員（港交所股份代號：8320.HK）
香港灣仔告士打道 160 號海外信託銀行大廈 27 樓

Document Verification

Project Title KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po

Project No. 1849

Document Title Landscape Master Plan

Issue No.	Issue Date	Description	Prepared by	Checked by	Approved by
1	March 2021	1st Submission	Various	Cathy Man	Grace Kwok
2	March 2022	2nd Submission	Various	Cathy Man	Grace Kwok
3	July 2022	3rd Submission	Various	Cathy Man	Grace Kwok
4	December 2022	4th Submission	Various	Cathy Man	Grace Kwok

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Table of Contents

List of Figures

List of Appendix

1. Introduction

1.1.1. Allied Environmental Consultants Limited (AEC) was commissioned by the Kowloon Motor Bus Company (1933) Limited (KMB) to submit the landscape master plan to support of a Section 16 application for the KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po (hereinafter referred to as “Subject Site”).

1.1.2. At present, the KMB has occupied the Subject Site for bus parking of around 163 nos. of buses under the Short Term Tenancy (STT). Due to the need for provision of more parking spaces, KMB obtained a draft STT for a 2-storey-high depot in 2019. However, in order to support the “Roadmap on Popularization of Electric Vehicles” released by Environment Bureau in March 2021, additional storeys with sufficient charging and supporting facilities would be required for electric buses (eBus). Around 363 nos. charging-enabling bus parking bays will be provided in the new bus depot for eBus. As such, minor relaxation of building height (BH) restriction under Section 16 of the Town Planning Ordinance from the current BH restriction of 2 storeys to 4 storeys will be applied concurrently. This Site Appraisal is conducted to support the Section 16 application.

2. Site Description

2.1.1. The Subject Site area is 14,600 m^2 together with a landscape area of about 2,100 s.f. is bounded by Ting Kok Road and Dai Fuk Street. The Subject Site is currently used as KMB bus depot. It is zoned for "Other Specified Use" under the Outline Zoning Plan No. S/TP/28 (Fig. 1 & 2) with restriction of 2 storeys high at present.

2.1.2. The Subject Site is situated at the western end of the Tai Po Industrial Estate. To the northwest of the Subject Site, across Ting Kok Road is a group of residences – Yue Kok Village which are mostly 3 storeys high and Riveria Lodge, which is a high rise building.

2.1.3. To the north is the Fung Yuen area with Tin Sum, Fung Mei Wei, Lau Hang and residential development Mont Vert.

2.1.4. To the southwest of the Subject Site, across Ting Kok Road is Fu Shin Estate. There are 3 schools namely Kau Yan Collage, Confucian Tai Shing Ho Kwok Pui Chun College and Tai Po Methodist School.

2.1.5. The landscape area behind the bus depot acts as a green buffer between the depot area and Ting Kok Road. This green buffer area together with Yuen Shin Park, a large urban park sitting to the West of Yuen Shin Road, provide a continuous vegetated area that connects the Green Belt from Fung Yuen area to the Tai Po waterfront.

Figure 2.1 Outline Zoning Plan No. S/TP/28

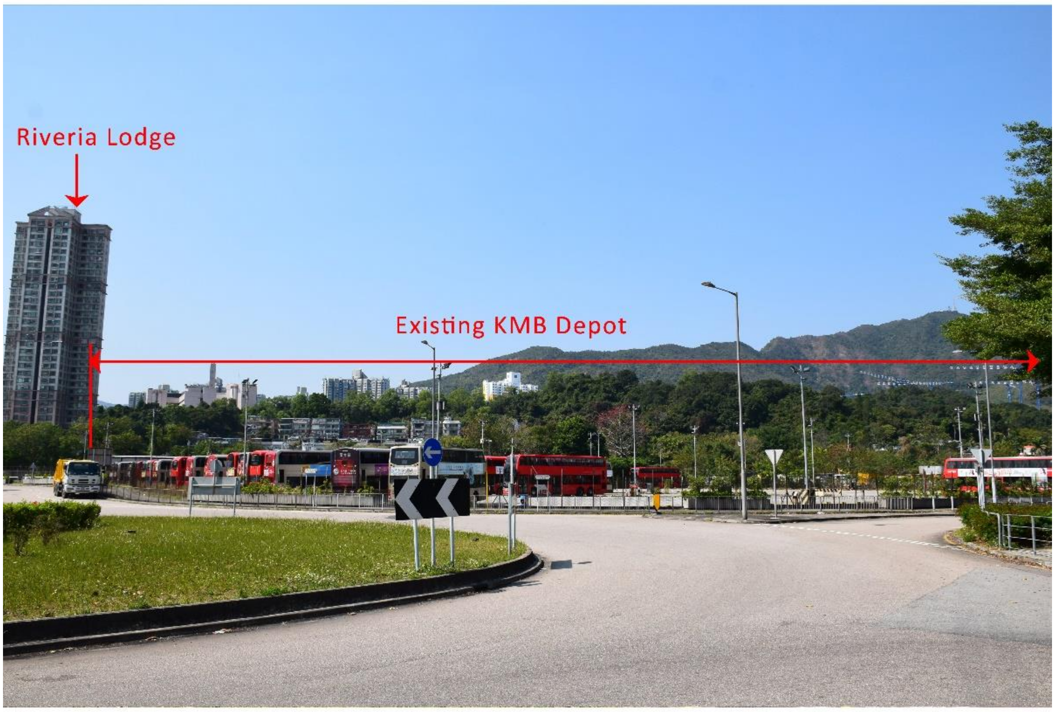


Figure 2.2 The Subject Site looking from the south east direction

3. Tree Issues

3.1.1. The Subject Site is currently an open ground with no trees within the Lot. ***Figure 3.1*** shows the strip of land behind the bus depot is a fenced off area with low overgrown trees.

Figure 3.1 Low overgrown trees located behind the bus depot

3.1.2. A visit of the strip of land finds there are approximately 90 trees inside the area. The predominant tree species are *Macaranga tanarius* (~40%) and *Leucaena leucocephala* (~30%) There are about 25% of *Lagerstroemia spiciosa* and 2 nos. of *Melaleuca cajuputi*.

3.1.3. Since there will be no proposed works inside this area, the trees are recommended to be retailed in-situ.

4. Design Description

4.1. Design Objective

- Maximize planting opportunity within the Subject Site to create a pleasant landscaped environment;
- Ensure all landscape areas are planned and designed to minimize future maintenance requirements.

4.2. Description

4.2.1. The landscape proposal has been prepared with consideration of the existing landscape characteristics and design layout. The Subject Site which is located inside an industrial area, the planting specifications will consider using combination of trees, shrubs and ground cover planting to provide a pleasant landscape setting for the proposed development.

4.2.2. In order to maximize planting opportunity, and considering the functional requirement of future occupants, landscape area with new trees planting has been proposed to maximize the green coverage of the proposed development. Feature and theme tree planting with combination of smaller trees arrangement at G/F (street level) shall form the major greening provisions for the future Subject Site. There are also combination of large shrubs and ground cover plantings on 1/F and 2/F of the future building to soften the building structure. In addition, the footpaths connecting the building with the pavement along Dai Fuk Street will be paved with natural stone paving for durability and easy maintenance. Master Landscape Plans with selected elevations of the proposed KMB depot building are presented in ***Appendix A*** for reference.

4.2.3. The landscape proposal targets to achieve a minimum of 20% of site coverage of greenery for the proposed development by means of on-grade planting on G/F, roof planting on 1/ & 2/F and vertical greening on building facade. Master Landscape Plans with selected elevations of the proposed KMB depot building are presented in ***Appendix A*** for reference.

4.2.4. Summary of Proposed Green Coverage is listed below.

Floor	Provided Greenery Area
Greenery Area Provided (Below 15m) (Primary Zone)	
Greenery at G/F	334 m^2

Floor	Provided Greenery Area
Greenery at 1/F	173 m^2
Greenery at 2/F	1,537 m^2
Total	2,044 m^2
Greenery Feature Provided (Below 15m) (Primary Zone)	
Covered Greenery at G/F	52 m^2 (50% reduction factor)
Covered Greenery at 1/F	18 m^2 (50% reduction factor)
Vertical Greening (Below 7.5m)	835 m^2
Total	905 m^2 (876m^2 Max.)
Greenery at Primary Zone: (required 10%)	
2,044 m^2 / 14,600 m^2 = 14% > 10%	
Overall Greenery Provided: (required 20%)	
(2,044 m^2 + 876 m^2) / 14,600 m^2 = 20% > 20%	

5. Hard and Soft Landscape Materials

Proposed Materials	
Pave Material	**Location**
Natural stone paving	Footpaths

6. Brief Schedule on Soft Work Elements

Proposed New Tree Planting				
Design Function	**Tree Type**	**Species**	**Remarks**	**Proposed Spacing**
Aesthetic and Landscape enhancement	Feature Tree	*Cinnamomum burmanii*	heavy standard	Various arrangement
	Theme Tree	*Tabebuia chrysantha*	heavy standard	
	Small Tree	*Podocarpa macrophyllus* *Garcinia subelliptica*	Light to heavy standard	

Proposed Shrub / Ground Cover Planting				
Design Function	**Type**	**Species**	**Remarks**	**Proposed Spacing (mm)**
Accent Shrub Planting	Large shrub	*Aglaia odorata* *Pittosporum tobira* *Calliandra haematocephala*	Various between 500 – 1000mm in height.	-Various between 750 – 1000mm
	Medium shrub	*Camellia japonica* *Duranta repens* *Gardenia augusta*	Various between 300 – 500mm in height.	-Various between 300 – 600mm in spacing.
	Small shrub and ground cover	*Zanthoxylum beecheyanum'Odorum* *Ixora williamsii* *Cuphea hyssopifolia* *Liriope spicata*	Various between 150 – 350mm in height.	-Various between 200 – 300mm in spacing.
Proposed Vertical Greening				
Accent Planting	Vertical Green	*Pseudocalymma alliaceum* *Quisqualis indica* *Jasminum lanceolarium* *Clematis Paniculata*	Wire mesh panel*	300mm in spacing.
		Epipremnum aureum *Nephrolepis auriculata* *Schefflera arboricola*	Modular Panel*	300mm**

Remarks:

* For building facade with on-grade planters at front, wire mesh planting method is proposed. For building facade without planters, propriety modular vertical green panel is proposed.

**exact measurement might varies according to the design of the propriety product.

7. Soil Depth

7.1.1. The requirement of soil depth shall be incorporated into the design of the future development. The soil depth provisions for planting excluding drainage layer at all planting locations are as follows:

Planting Type	Soil Depth
Tree	Minimum 1200mm
Shrub	Minimum 800mm
Groundcover / climber	Minimum 600mm

8. Drainage Provision

8.1.1. All planted areas within the development are distributed both on grade and on structure. The planting area on structure will be properly drained with planter drainage design while on-grade planters along Dai Fuk Street will be drained naturally.

9. Irrigation

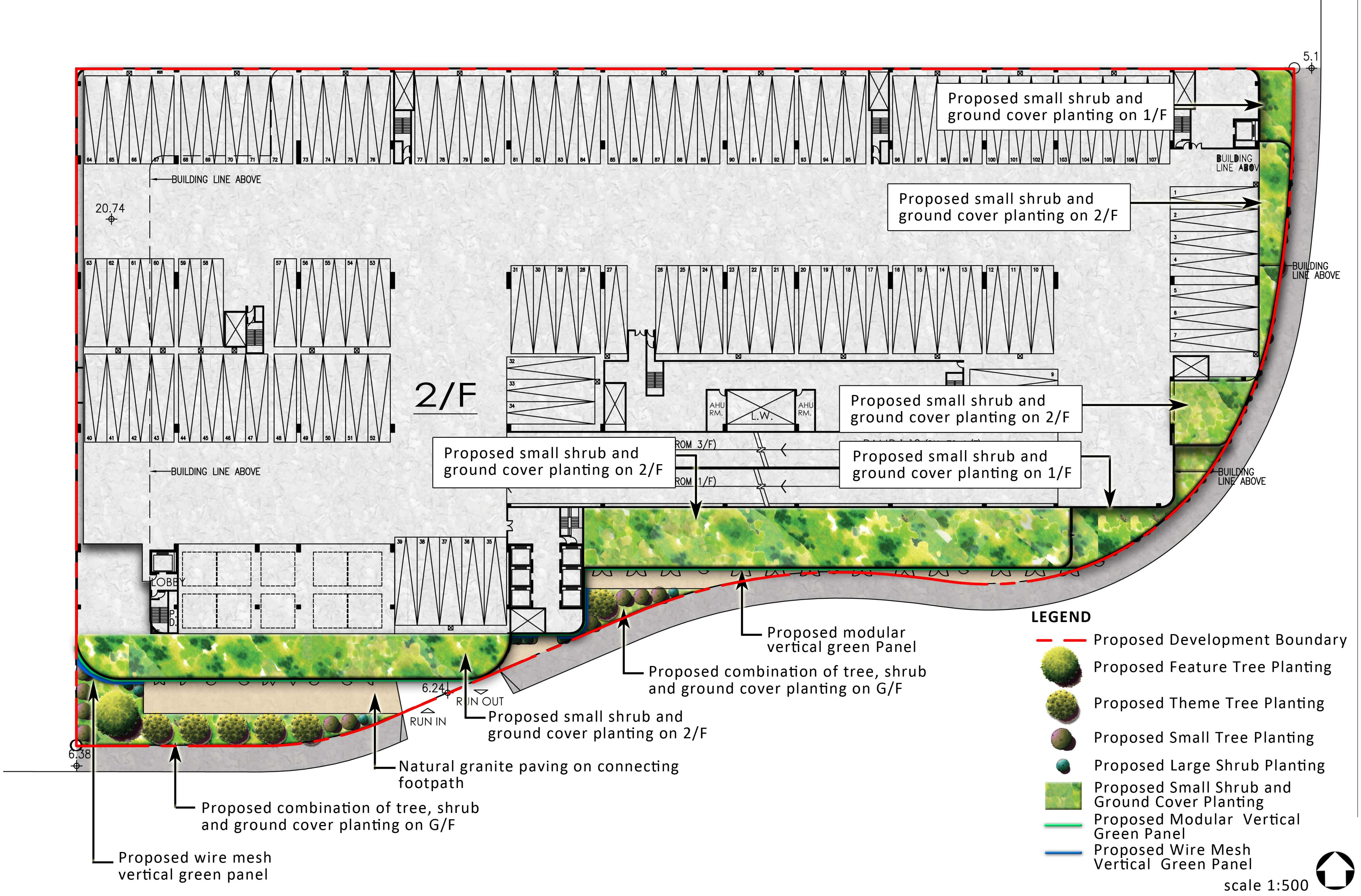
9.1.1. The proposed irrigation system for all landscaped areas will be by means of automatic irrigation and will be incorporated in the design stages.

9.1.2. The proposed source of water supply is subjected to final approval from the Water Services Department.

10. Maintenance Responsibility

10.1.1. The completed landscape works shall be maintained by the property owner or his management agent and regular maintenance, including tree risk assessment, shall be undertaken to maintain the plants in good condition.

Appendix A – Master Landscape Plan

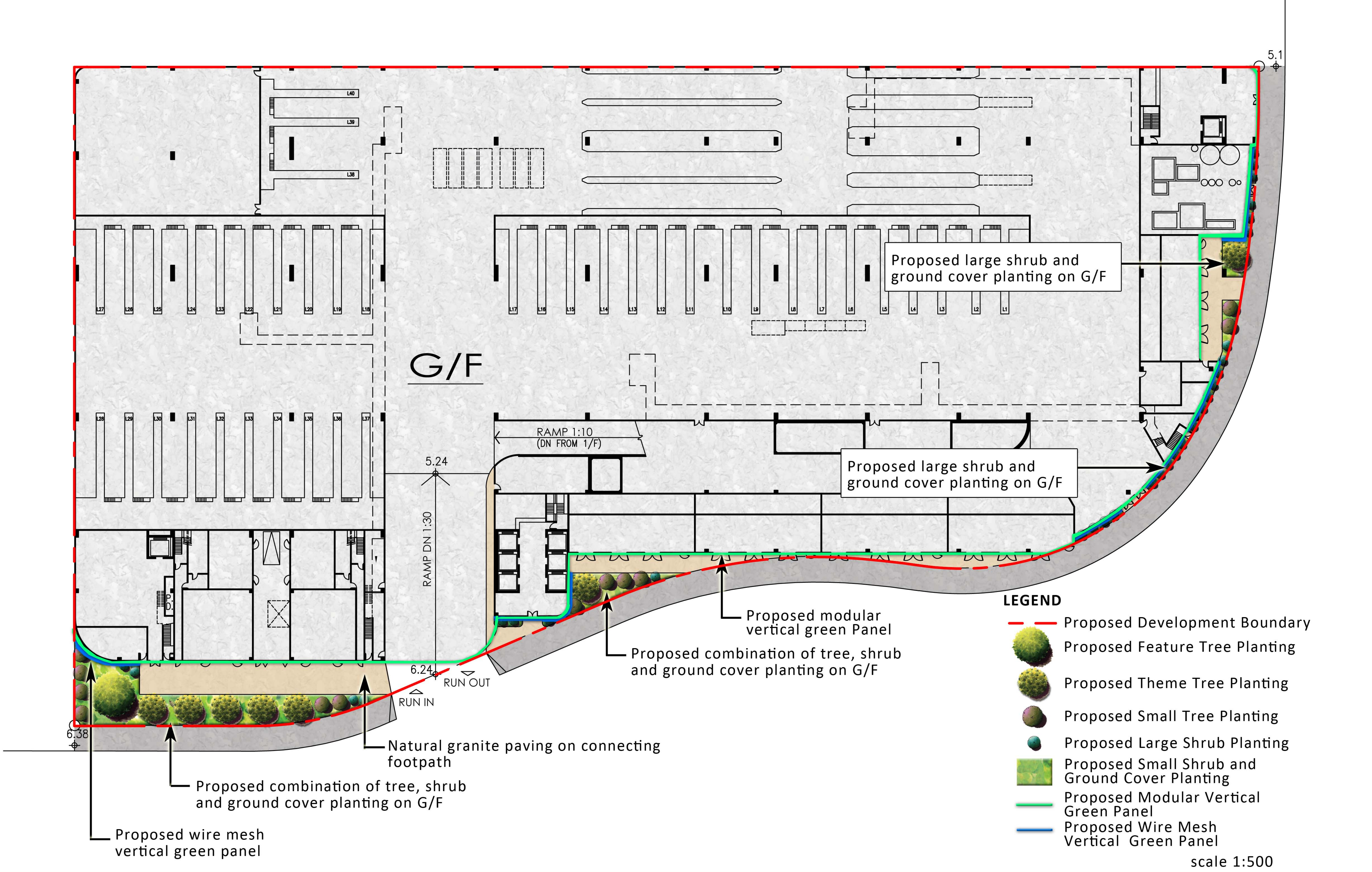


Proposed Smart Green Bus Depot at Dai Fuk Street, Area 33, Tai Po.

Landscape Master Plan - Combine

Nov 2022

Drawing No. LP-01 rev. C

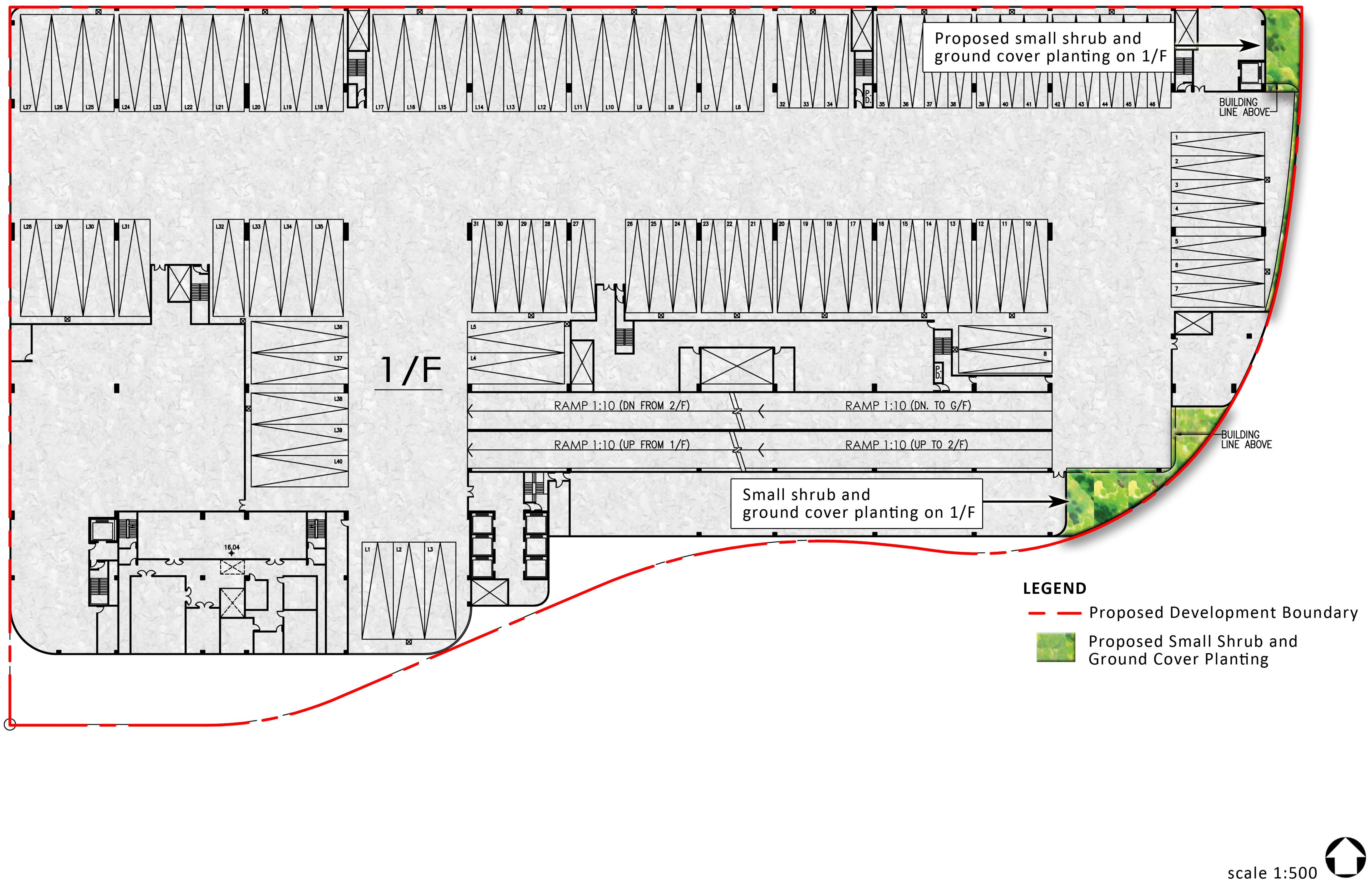


Proposed Smart Green Bus Depot at Dai Fuk Street, Area 33, Tai Po.

Landscape Master Plan - G/F

Nov 2022

Drawing No. LP-02 rev. C

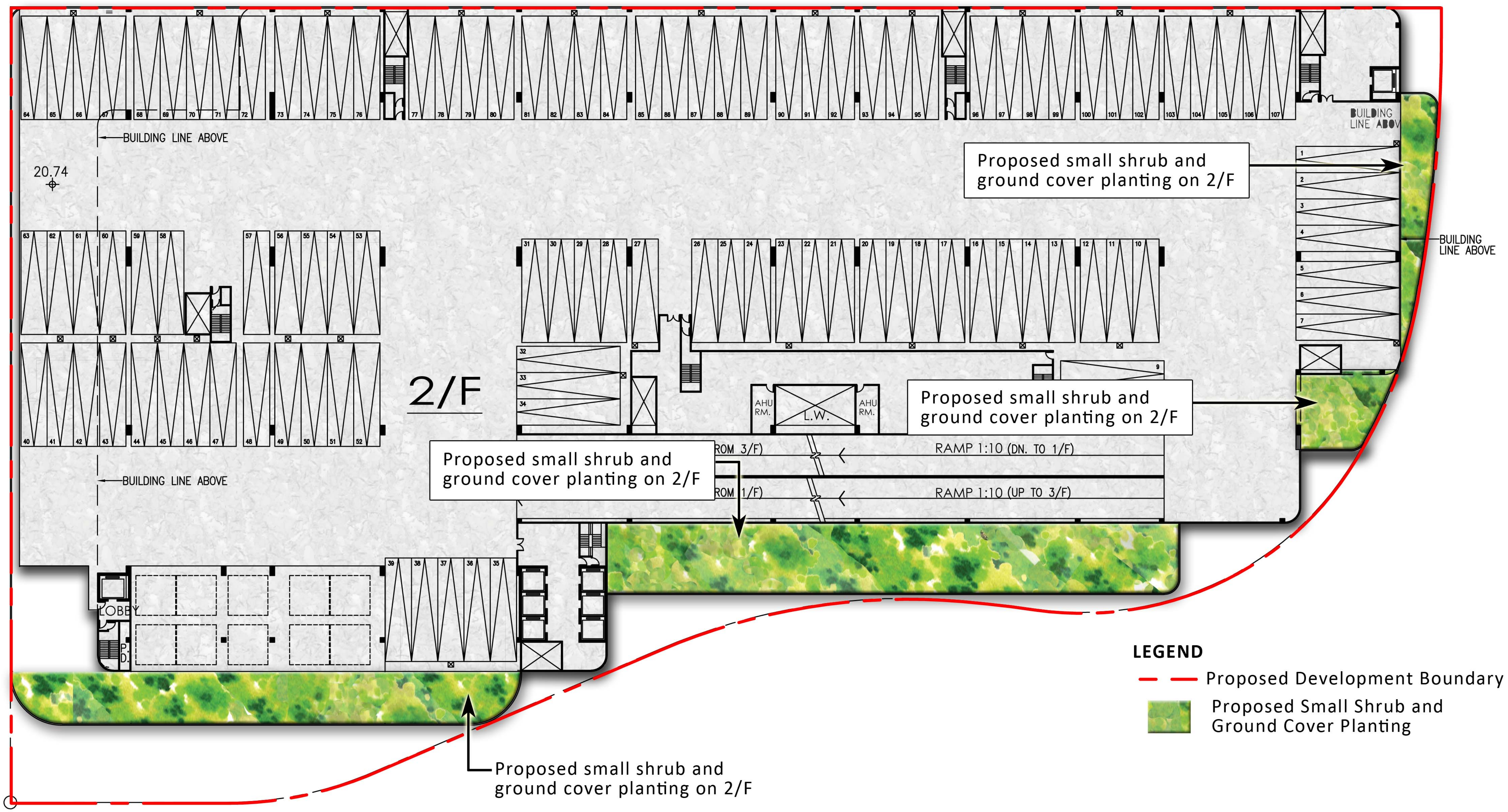


Proposed Smart Green Bus Depot at Dai Fuk Street, Area 33, Tai Po.

Landscape Master Plan - 1/F

Drawing No. LP-03 rev. A

Nov 2022



LEGEND

- - Proposed Development Boundary

🟩 Proposed Small Shrub and Ground Cover Planting

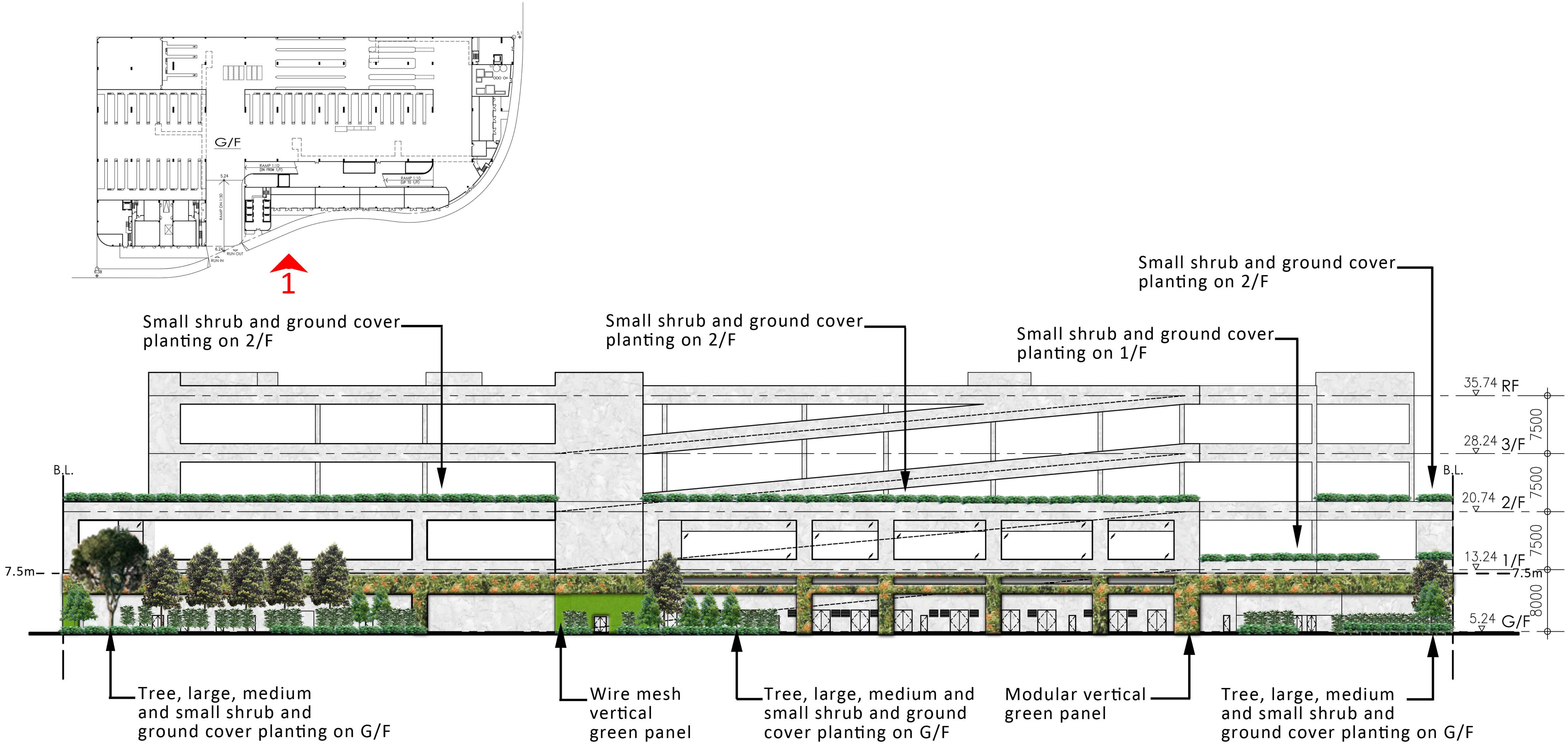
scale 1:500

Proposed Smart Green Bus Depot at Dai Fuk Street, Area 33, Tai Po.

Landscape Master Plan - 2/F

Drawing No. LP-04 rev. A

Nov 2022



ELEVATION '1'

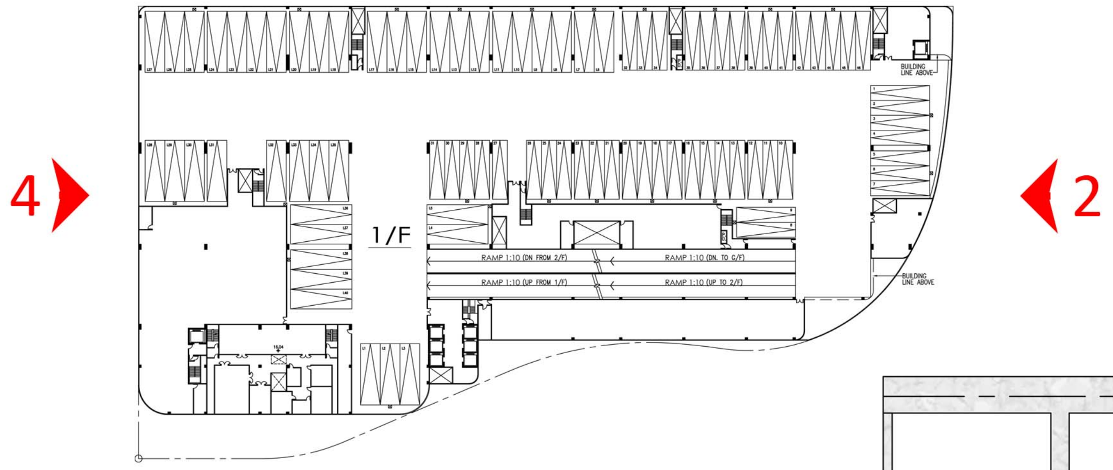
scale 1:500

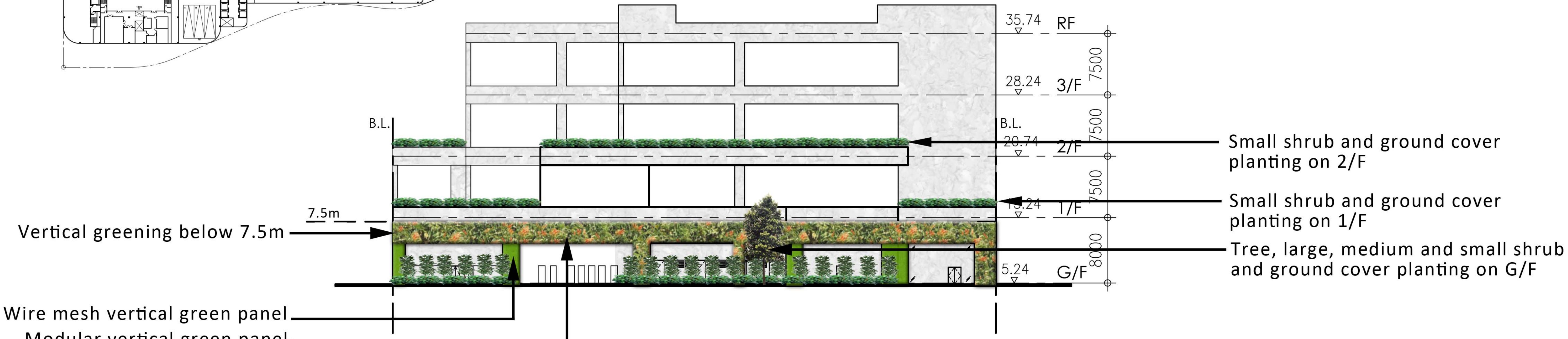
Proposed Smart Green Bus Depot at Dai Fuk Street, Area 33, Tai Po.

Elevation 1

Drawing No. LS-01 rev. B

Nov 2022





Small shrub and ground cover planting on 2/F

Small shrub and ground cover planting on 1/F

Vertical greening below 7.5m

Tree, large, medium and small shrub and ground cover planting on G/F

Wire mesh vertical green panel

Modular vertical green panel

ELEVATION '2'

Small shrub and ground cover planting on 2/F

Tree, large, medium and small shrub and ground cover planting on G/F

ELEVATION '4'

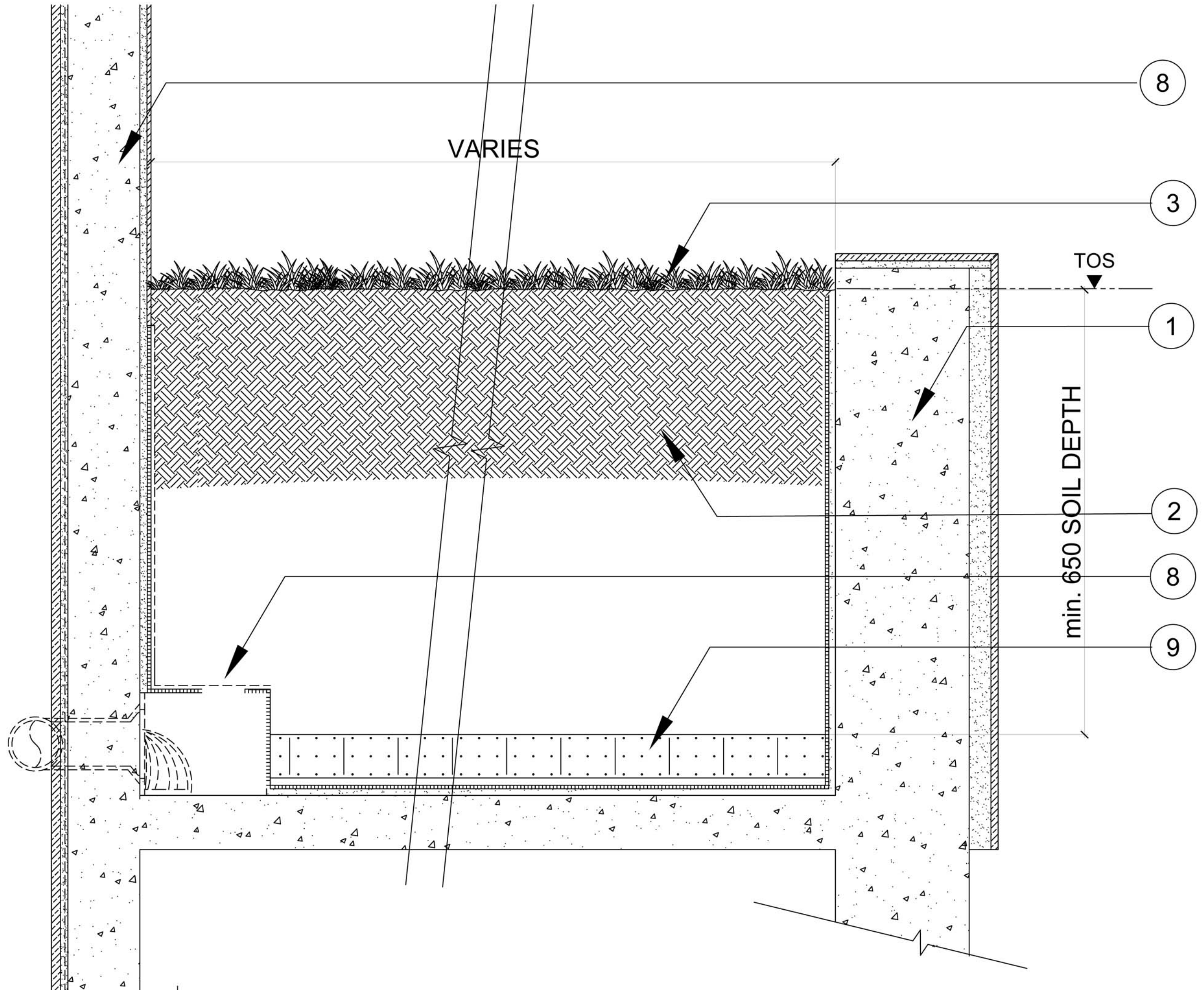
scale 1:500

Proposed Smart Green Bus Depot at Dai Fuk Street, Area 33, Tai Po.

Elevation 2 & 4

Drawing No. LS-02 rev. C

Nov 2022



TYPICL PLANTER ON STRUCTURE SECTION

N.T.S.

STRUCTURAL CODE

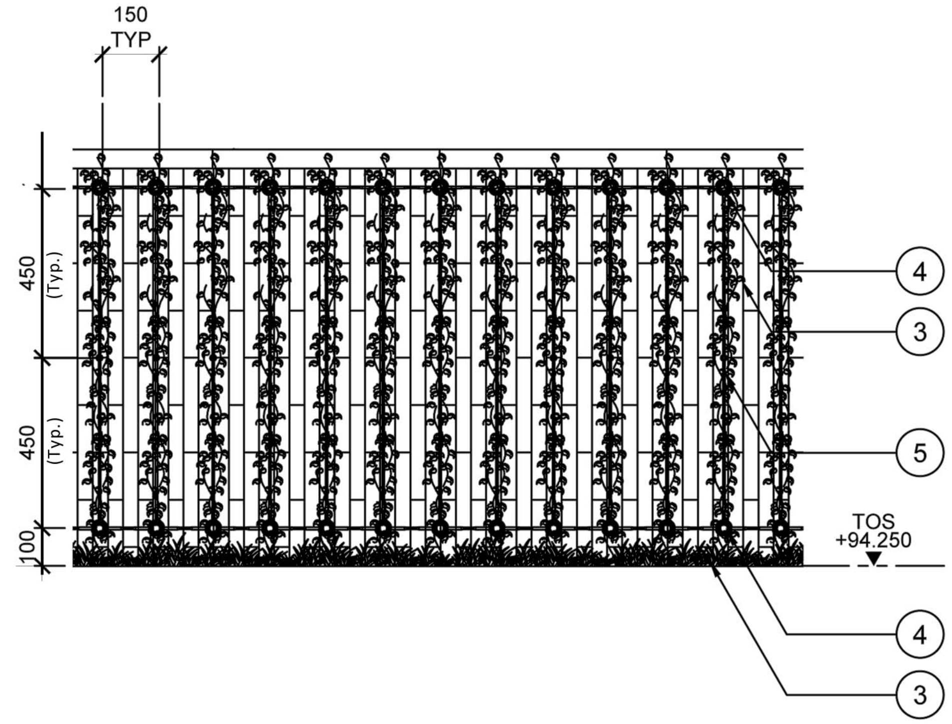
①	R.C STRUCTURE BY ENGINEER
②	PLANTING SOIL MIXTURE AS SPECIFIED
③	PLANTING AS SPECIFIED
⑧	PLANTER DRAINAGE REFER TO ENGINEER
⑨	PLANTER DRAIN CELL

Proposed Smart Green Bus Depot
at Dai Fuk Street, Area 33, Tai Po.

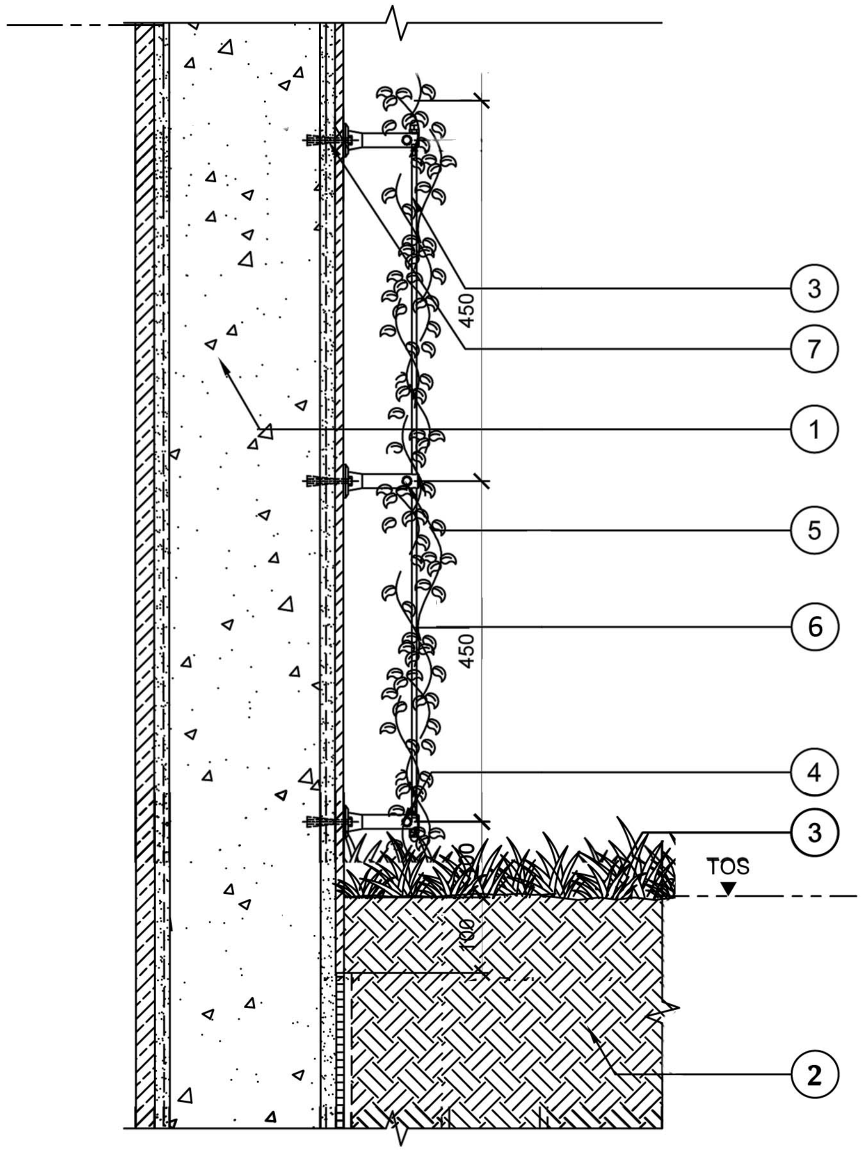
Typical Planter on Structure

Drawing No. LD - 01

Nov 2022



ELEVATION
SCALE: N.T.S.



SECTION
SCALE: N.T.S.

STRUCTURAL CODE

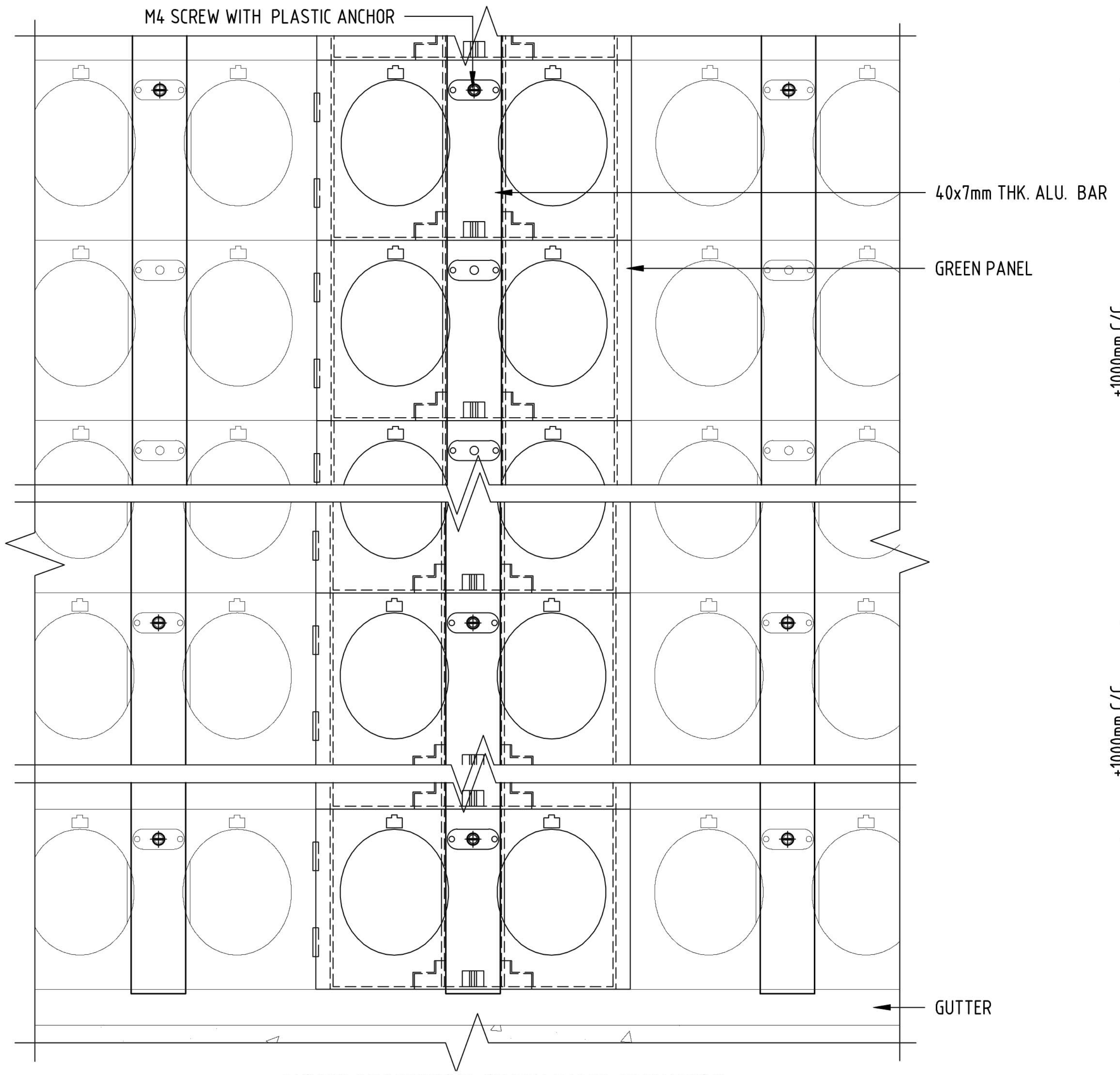
1	R.C STRUCTURE BY ENGINEER
2	PLANTING SOIL MIXTURE AS SPECIFIED
3	PLANTING AS SPECIFIED
4	GRADE 316 STAINLESS STEEL CLAMP AROUND PERIMETER
5	GRADE 316 STAINLESS STEEL CROSS CLAMP CONNECTOR
6	3mmØ GRADE 316 STAINLESS STEEL CABLE WITH SWAGE ON FITTINGS
7	STAINLESS STEEL EYEBOLT

Proposed Smart Green Bus Depot
at Dai Fuk Street, Area 33, Tai Po.

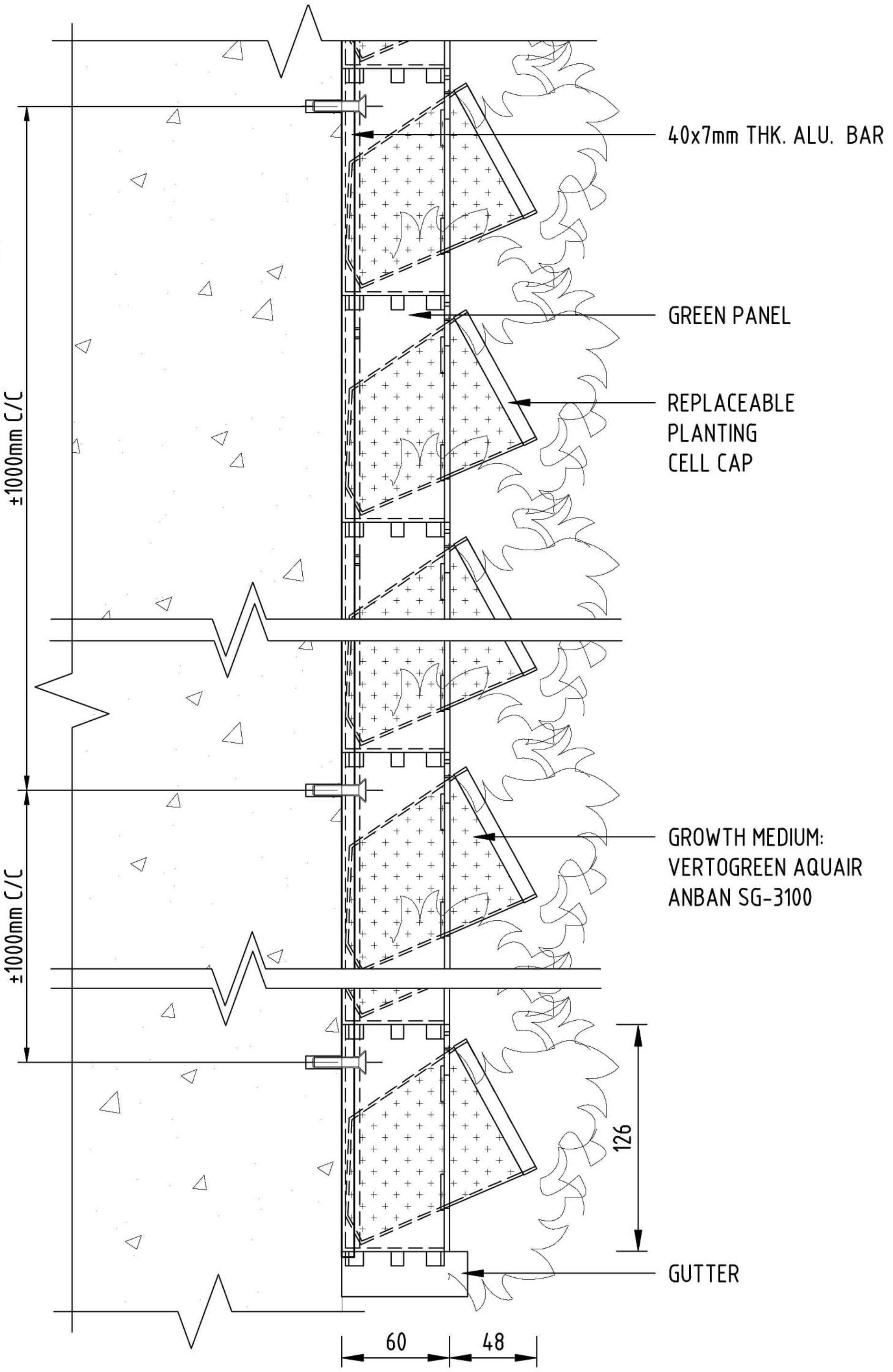
Typical Wire Mesh Panel Detail

Nov 2022

Drawing No. LD - 02



MODULAR VERTICAL GREEN PANEL ELEVATION
SCALE: N.T.S.



VERTICAL GREEN - SIDE
SCALE: N.T.S.

**Proposed Smart Green Bus Depot
at Dai Fuk Street, Area 33, Tai Po.**

Modular Vertical Green Panel Detail

Nov 2022

Drawing No. LD - 03

Issue No. : 3
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NOISE IMPACT ASSESSMENT

FOR

KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Prepared by

Allied Environmental Consultants Limited

COMMERCIAL-IN-CONFIDENCE

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1. Introduction

1.1.1. Allied Environmental Consultants Limited (AEC) was commissioned by the Kowloon Motor Bus Company (1933) Limited (KMB) to undertake the Consultancy Service for the Section 16 Town Planning Application for the KMB Tai Po Bus Depot (hereinafter referred to as the Proposed Project).

2. Objectives

2.1.1. This Noise Impact Assessment (NIA) is prepared in support of the Section 16 Planning Application to identify the noise impact arise from the Proposed Project and recommend mitigation measures to minimize the noise impact to acceptable levels, for the construction and operation of the Proposed Project. This S16 Planning Application aims to relax the building height from the current 2-storey restriction to 4-storey high, in order to provide more parking spaces and charging facilities for electric buses (eBus) in future.

2.1.2. According to Part 1 Schedule 2 Section A.6 (Roads, railways and depot) of the Environmental Impact Assessment Ordinance (EIAO), a transport depot located less than 200m from the nearest boundary of an existing or planned (a) residential area; (b) place of worship; (c) educational institution; or (d) health care institution shall be classified as a Designated Project. As the Project is located at less than 200m from residential developments, namely Yue Kok Village and Riveria Lodge, and educational institutes, including Kau Yan College, it is therefore classified as a Designated Project. Permission to apply directly to permit (DIR) under EIAO is also applied concurrently/ subsequently with this S16 Planning Application.

3. The Proposed Development

3.1.1. The Project Site is located at Dai Fuk Street, Area 33, Tai Po, which is zoned as “Other Specified Uses” annotated “Bus Depot” (“OU (Bus Depot)”) on the Approved Tai Po Outline Zoning Plan No. S/TP/28. It is currently held by KMB under a Short Term Tenancy (STT) granted by the Government for bus parking (including washing & refilling). Location of the Project Site and 300m Assessment Boundary is shown in ***Figure 3-1***.

3.1.2. The Project Site is approximately 14,600m^2, which is bounded by Ting Kok Road to west and Dai Fuk Street to the south, immediately adjoining the GIC site to the north and facing Tai Po Industrial Estate to the East. Residential developments are mainly situated at the northeast, such as 63 Ting Kok Road and Yue Kok Village, while educational institutions are situated at the southwest and immediate south of the Project Site, namely Kau Yan College and CIC Tai Po Training Ground respectively.

3.1.3. The Proposed Project will comprise a 4-storey bus depot providing around 363 nos. charging-enabling bus parking bays for eBus only. The building height of the proposed depot is 30.5m tall at +35.74 mPD. The site layout plan is given in ***Appendix 3-1***. The facilities within the proposed depot include bus parking space with charging facilities for eBuses, maintenance bays, washing bays, substation, wastewater treatment plant and etc. During the operation stage, the depot will operate continuously from Monday to Sunday. The Proposed Project is anticipated to be constructed in Year 2022, and completed in Year 2025 tentatively.

4. Appraisal of Environmental Impact

4.1.1. Construction noise would be arisen from the use of powered mechanical equipment (PME) and piling activity on site. Qualitative construction noise impact assessment is conducted to address the potential adverse noise impact (detailed in *Section 6*).

4.1.2. Since the proposed depot is served for eBuses only, which is fully powered by electricity and refueling is not required when the eBus fleet returning to the depot at nighttime, that eliminates the possible vehicle tailback concern to adjacent traffic flow. However, tyre noise induced by eBuses entering and leaving the proposed Project may potentially increase the traffic noise levels at the surrounding NSRs. Quantitative road Traffic Noise Impact Assessment is therefore conducted to address the potential adverse noise impact (detailed in ***Section 7***).

4.1.3. Operational fixed noise impact arose from the proposed depot to the surrounding NSRs is anticipated. Vehicle repair / testing activities, mechanical ventilation and air conditioning system (MVAC) equipment and other building service equipment within the Proposed Project are identified as potential fixed noise sources. Fixed Noise Impact Assessment is therefore conducted to address the potential adverse noise impact (detailed in ***Section 8***).

5. Identification of Noise Sensitive Receivers

5.1.1. Noise sensitive receivers (NSRs) within 300m radius of the Project Site have been identified, including both existing and planned developments, with reference to the latest best available information at the time of preparation of this report and site survey conducted in February 2021.

5.1.2. In view of the nature of the Proposed Project, no NSRs are identified within the Proposed Project. Offices will be equipped with air-conditioning and will not rely on openable windows for ventilation.

5.1.3. ***Figure 5.1*** and ***Figure 5.2*** shows the Project boundary, representative NSRs and noise assessment points (NAPs) within the 300m assessment area. Details of the representative existing and planned NSRs with the corresponding NAPs are summarized in **Table 5-1**.

Table 5-1 Representative Existing and Planned NSRs with the Corresponding NAPs

NSR ID	Description	Use[1]	Approx. Horizontal Distance from the Project Site, m	NAP ID
NSR01	63 Ting Kok Road	R	194	NAP101
NSR02	Yue Kok Village	R	69	NAP201
				NAP202
				NAP203
NSR03	Riviera Lodge	R	133	NAP301
				NAP302
				NAP303
NSR04	Kau Yan College and adjacent schools	E	147	NAP401
				NAP402

Note: [1] R-Residential, E- Educational

6. Construction Noise Impact Assessment

6.1. Noise Standards

6.1.1. The statutory legislation controlling construction noise is the Noise Control Ordinance (NCO) (Cap.400). The following construction activities are subjected to statutory control under the NCO, as listed in the Practice Notes for Professional Person (ProPECC) PN 1/93 "Noise from Construction Activities – Statutory", A Construction Noise Permit (CNP) will be required.

- Percussive piling;
- Construction works other than percussive piling using powered mechanical equipment (PME) between the hours of 19:00 and 07:00 or at any time on a general holiday (i.e. restricted hours); and
- The use of hand-held percussive breakers and air-compressors.

6.1.2. Other than the abovementioned construction activities or construction activities outside restricted hours, ProPECC PN 2/93 stipulates noise standards of 65 – 75 dB(A) for daytime construction activities, as shown in the ***Table 6-1.***

Table 6-1 Noise Standards for construction activities

Uses	**Noise Level, Leq $_{(30mins)}$ dB(A)**
	0700 to 1900 hours on any day not being a general holiday
Dwelling	75
School	70 65 (during examination)

Notes:

(i) The above standards apply to uses which rely on opened windows for ventilation;

(ii) The above standards shall be viewed as the maximum permissible noise level assessed at 1m from the external façade.

6.2. Potential Construction Noise Impact

6.2.1. Construction works in restricted hours, i.e. between 1900 and 0700 hours or any time on a general holiday including Sundays, and percussive piling works are not anticipated for this Proposed Project as confirmed by the Applicant.

6.2.2. Nonetheless, construction noise may arise from the use of Powered Mechanical Equipment (PME) during construction, including site clearance, foundation works and superstructure works on the Project Site. It would be a short-term impact during construction and can be reduced to an acceptable level with the implementation of sufficient noise mitigation measures.

6.3. Noise Mitigation Measures

6.3.1. The contractor shall be required to implement mitigation measures to minimize construction noise impact during the normal working hours, i.e. 0700-1900 hours on any day not being a general holiday. Mitigation measures suggested below shall be adopted where applicable to minimize the construction noise impacts.

- Proper scheduling of works – noisy activities can be scheduled to avoid simultaneous operation of noisy PME, and/or reduction in the percentage on-time of PME during noise sensitive periods such as school examination period;
- Locating the noise emitting plants and equipment, e.g. emergency generator, at maximum possible distances from NSRs;
- Use of quality powered mechanical equipment (QPME), such as using mini-breaker for chiseling on masonry and concrete, battery driven fastening tools for fastening cables and conduits to reduce noise impact;
- Use of quiet construction methods, for example, silent piling by press-in method to minimize construction noise and vibration to surrounding NSRs;

6.3.2. Use of at-source noise mitigation measures such as movable noise barriers and enclosures wherever necessary;

- Proper maintenance of plants on site;
- Only well-maintained plants should be operated on-site; and
- Implementation of good site practices.

6.3.3. The above-mentioned noise measures will be included in the contractual clauses for implementation by the contractor(s) during the construction stage. The contractor should exhaust all practicable noise mitigation measures. With the implementation of noise mitigation measures, construction noise impact would be minimized. No insurmountable construction noise impact from the Proposed Project is anticipated.

7. Road Traffic Noise Impact Assessment

7.1. Assessment Criteria

7.1.1. Noise standards are recommended in Chapter 9, "Environment" of the HKPSG for planning against noise impact from sources such as road traffic, railway and aircraft. The applicable standard based on the proposed used is road traffic standard on domestic premises, which is $L_{10(1\text{-hour})}$ 70dB(A). The noise standard applies to uses which rely on openable windows for ventilation only.

7.1.2. The relevant criteria are shown in ***Table 7-1*** below.

Table 7-1 Road Traffic Noise Standards for Planning Purposes

Use	**Road Traffic Noise Peak Hour Traffic, $L_{10(1hour)}$ dB(A)**
Domestic premises, Hotel and hostels, Offices	70
Education institutions Places of public worship and courts of law	65

Note: The above standards apply to noise sensitive uses which rely on openable window for ventilation.

7.1.3. No planned NSRs are identified within the Project Site. The above road traffic noise standards as recommended in the HKPSG are applicable.

7.2. Assessment Methodology

7.2.1. Based on the proposed traffic routing of eBus as presented in **Appendix 7.1**, the eBus fleet will be travelled from Ting Kok Road at the west and Yuen Shin Road at the south, and merged at Dai Fuk Street to return to the proposed depot. On the other hand, it is planned that the eBus fleet will leave the proposed depot via Dai Fuk Street and Yuen Shin Road. The eBus will return and leave the proposed depot at the exit at Dai Fuk Street, according to **Appendix 2-1**. The location of ingress/egress of proposed depot is same as the existing depot, which is the most feasible location and provides the shortest routing for eBuses to return and leave the proposed depot from Yuen Shin Road and Ting Kok Road to minimize the road traffic noise impact on surrounding NSRs.

7.2.2. The road traffic noise impact was evaluated according to the "Calculation of Road Traffic Noise" published by the Department of Transport UK and Guidance Note titled "Road Traffic Noise Impact Assessment under the Environmental Impact Assessment Ordinance" (GN 12/2010). The traffic noise impact would be considered insignificant only if the road traffic noise induced by eBuses entering and leaving the proposed depot would not cause the overall traffic noise level to increase by 1.0 dB(A) or more. The proposed traffic routing of eBus is presented in **Appendix 7.1**.

7.2.3. In order to assess the significance of the noise contribution, the assessment year shall be within 15 years upon tentative commencement of the operation, i.e. 2025. Gradual natural increase in traffic flow is expected in the coming 15 years and thus Year 2040 is determined to be the assessment year in which the traffic flow will be the highest. The traffic forecast for "With project" and "Without project" scenarios for Year 2040 were provided by the Traffic Consultant of the proposed Project, which are included in **Appendix 7.2**. The endorsement of traffic forecast issued by TD will be provided once available.

7.2.4. The predicted peak of egress and ingress caused by the proposed Project are at 06:00 to 07:00 hours and 23:00 to 00:00 hours respectively. By comparing the noise levels between "with project" and "without project" during egress and ingress operation peaks, the noise contribution from the road traffic generated by the proposed Project is considered insignificant when the difference in traffic noise levels at the NSRs with and without the project is less than 1.0 dB(A).

7.3. Predicted Road Traffic Noise Level at NSRs

7.3.1. The predicted overall traffic noise levels at NAPs during operational peak in Year 2040 for the "with project" and "without project" scenarios are summarized in **Appendix 7.3**. The assessment result indicated that noise contribution from road traffic generated by the proposed Project will be in the range of 0.1 dB(A) to 0.9 dB(A) at all NAPs in Year 2040. The noise contribution is considered insignificant (i.e. less than 1.0 dB(A)) under the worst case scenario. Hence, the operation of the proposed Project is anticipated to have no significant contribution to road traffic noise impact on the NSRs.

8. Fixed Plant Noise Impact Assessment

8.1. Noise Standards

8.1.1. The NCO and IND-TM control noise from fixed noise sources from places or premises other than domestic premises, public places or construction sites. For the assessment of impacts from fixed noise sources, the Area Sensitive Rating (ASR) of the noise sensitive receivers (NSRs) must be determined in accordance with IND-TM. The appropriate Acceptable Noise Level (ANL) can be determined based on the ASR.

8.1.2. The ASR of NSRs and ANLs based upon different ASRs are shown in **Table 8-1** and **Table 8-2**.

Table 8-1 Area Sensitivity Ratings (ASRs) of NSRs

Type of Area Containing NSR	Degree to which NSR is affected by Influencing Factors (IFs)		
	Not affected	Indirectly affected	Directly affected
I. Rural area, including country parks, or village type developments	A	B	B
II. Low density residential area consisting of low-rise or isolated high-rise developments	A	B	C
III. Urban area	B	C	C
IV. Area other than those above	B	B	C

Table 8-2 ANLs for Fixed Noise Sources

Time Period	ANL, dB(A)		
	ASR "A"	ASR "B"	ASR "C"
Day (0700 to 1900 hours)	60	65	70
Evening (1900 to 2300 hours)	60	65	70
Night (2300 to 0700 hours)	50	55	60

8.1.3. The proposed project and the identified NSRs are located along Yuen Shin Road and Ting Kok Road. According to the Annual Traffic Census (ATC) 2020, the Annual Average Daily Traffic (AADT) flow of Yuen Shin Road and (Road section 6057) and Ting Kok Road (Road Section 5006) are 38,240veh/day and 29,430 veh/day respectively. By definition, only Yuen Shin Road with AADT flow higher than 30,000 veh/day is regarded as an Influencing Factor (IF) within the study area in accordance with the IND-TM.

8.1.4. The area where NSR01 located is mainly surrounded by village type development at the vicinity and Comprehensive Development Area (CDA) at the northeast. The type of area for NSR01 is considered as "(iv) Area other than those above" and it is not affected by an IF (i.e. Yuen Shin Road), therefore ASR "B" is assigned for NSR01. The corresponding daytime ANL is $L_{eq(30min)}$ 65 dB(A) and the night-time ANL is $L_{eq(30min)}$ 55 dB(A).

8.1.5. As for NSR02 to NSR04, the type of area in the vicinity of the proposed project is considered as "(iii) Urban Area", with high density and diverse development of industrial activities and residential premises. As mentioned above, Yuen Shin Road is the IF directly/ indirectly affecting the representative NSRs, hence ASR "C" is assigned for the NSR02 to NSR04. The corresponding daytime ANL is $L_{eq(30min)}$ 70 dB(A) and the night-time ANL is $L_{eq(30min)}$ 60 dB(A).

8.1.6. To plan for a better environment, the noise criteria stipulated in the HKPSG has specified the following requirements: -

i. 5dB(A) below the appropriate ANLs in IND-TM; or

ii. the prevailing background noise levels, whichever is the lower.

8.2. Prevailing Background Noise

8.2.1. In order to determine the appropriate assessment criteria, prevailing background noise survey at the NSRs has been conducted in September 2021 during non-peak hour with lower traffic flow of the surrounding nearby roads. Therefore, it is considered that the measured background prevailing noise level could represent the worst-case scenario for daytime, evening and nighttime.

8.2.2. The prevailing background noise measurement was conducted at M1 and summary of the noise measurement results is given in **Appendix 8.1**. The proposed fixed plant noise criteria at representative NSRs are summarized in **Table 8-3**.

Table 8-3 Measured Prevailing Background Noise Levels

Location of Noise Measurement	Measurement Equipment	Time Period	Time	Measured Background Noise Level L90 (1hr), dB(A)
M1	NTi Audio M2230, SNo. 5630	Daytime	0700 - 0800	60
		Evening time	2200- 2300	56
		Nighttime	0400 - 0500	52

Table 8-4 Proposed Noise Criteria at Representative NSRs due to Fixed Plant Noise Sources

NSR	**Location of Noise Measurement**	**Measured Background Noise Level $L_{90\ (1hr)}$, dB(A)**		**ANL-5 dB(A)**		**Criteria of Fixed Plant Noise Assessment $L_{eq(30mins)}$, dB(A)**	
		Day/Evening Time	Nighttime	Day/Evening Time	Nighttime	Day/Evening Time	Nighttime
NSR01	M1	56	52	60	50	**56**	**50**
NSR02				65	55	**56**	**52**
NSR03							
NSR04 [3]							

Notes:

[1] An Area Sensitivity Rating (ASR) of "B" is assumed for NSR01; ASR "C" is assumed for NSR02 to NSR04.

[2] The prevailing background noise is measured in L90 (1-hr).

[3] NSR04 is educational institution, there is no operation during nighttime period.

8.3. Inventory of Fixed Noise Sources

8.3.1. Operational fixed noise from and associated with the Proposed Project includes the following:

- Vehicle repair / testing activities, including bus washing; and
- Mechanical ventilation and air condition system (MVAC) equipment and other fixed noise sources equipment.

<u>Fixed Plant Noise – Vehicle Repair / Testing Activities</u>

8.3.2. During the operation phase, vehicle repair / testing activities is one of the identified fixed noise sources. To be specific, as confirmed by KMB, only manual repair / testing activities or activities using hand-held tools will be carried out within the covered maintenance bays at G/F and 1/F of the proposed depot. The vehicle repair / testing activities to be carried out include fixing of tyres and parts replacement for safety reasons, braking tests to check brake performance due to operation need. If it is determined that further maintenance and repair is required for eBus fleet after routine inspection, it will be delivered to other bus depots of larger scale, such as Sha Tin Depot, where equipped with components parts, welding machines, cranes. Hence, bus maintenance and repair using large scale equipment and machineries will not be taken place in the proposed depot.

8.3.3. The proposed depot will be designed to avoid ventilation louvres and openings facing to the NSRs directly, no openings are designed at the western façade of the depot building at G/F and 1/F and a 2m high solid parapet will be erected at G/F in the northern side of depot.

8.3.4. All vehicle repair / testing activities to be carried out in the Proposed Project have been verified by the future users. A variety of equipment will be provided in the Proposed Project but not all of them would be considered as noise sources in this assessment. ***Appendix 8-2*** presents the details of the vehicle repair/ testing activities to be carried out. The impacts arising from vehicle repair/ testing activities will be evaluated in next Section (**Section 8.4**).

Table 8-5 List of vehicle repair/ testing activities carried out in proposed depot

Activity	Equipment	Noise Source	Remarks
Bus parking	Nil	No	Based on site inspection, bus is moving at a low speed within covered depot at designated parking area.
Bus washing	Automatic vehicle washing machine	Yes	For all eBuses returned to depot. SWL obtained from DIR-136/2006[1]
Tyre changing / charging	Pneumatic tools	Yes	For 1/3 eBus fleet per day. SWL obtained from EIA-216/2013[2]
Parts replacement	Pneumatic tools for screw fastening	Yes	For 1/3 eBus fleet per day. SWL obtained from EIA-216/2013[2]
Motor testing	Nil	No	Based on site inspection, it is about switching on the motor to test if it runs smoothly, no noticeable noise is found.
Battery charging	Automatic battery charger	No	eBuses remain static when charging, it is anticipated that no noticeable noise during charging.
Braking test	Brake Tester	Yes	No engine for eBus. Braking Test will be taken place on irregular basis due to operational needs within covered maintenance bays. In worst case scenario, it is assumed that braking test will be conducted for once at maximum within 30 minutes period. Each test will last for at most 2 minutes. SWL obtained from EIA-216/2013[2]
Bus Compartment Cleaning	Nil	No	Daily operational cleaning will be carried inside the bus compartment during parking. As

Activity	Equipment	Noise Source	Remarks
			eBuses remain static when cleaning, it is anticipated no noticeable noise will be found.

Note:

[1] SWL of bus washing based on the approved DIR report for Proposed Temporary Bus Depot at Hing Wah Street West, West Kowloon Reclamation (DIR-136/2006), with similar operation scale and nature to serve double decker buses.

[2] SWL of tyre changing/ charging, parts replacement, braking test are based on the approved EIA report for Reprovisioning of FEHD Sai Yee Street Environmental Hygiene Offices-cum-vehicle Depot at Yen Ming Road, West Kowloon Reclamation Area (AEIAR-216/2013). Pneumatic tools will be used for tyre changing and parts replacement, brake tester will be used in braking test, which have similar operation equipment and scale as the approved EIA.

8.3.5. The vehicle repair / testing activities listed in **Table 8-5** will be carried out when the eBus fleet return to the proposed depot. With reference to **Appendix 7-2,** it is predicted that most of the eBuses will be returned between 19:00 - 02:00. Based on normal daily operation in a bus depot, bus washing will be carried out for all eBuses when they return to depot. Tyre changing/ charging and parts replacement will be conducted for approximately one-third of the entire eBus fleet at maximum. As for braking test, it will be taken place on irregular basis due to operational needs within covered maintenance bays. All eBus will then be parked in the depot for overnight charging.

<u>Fixed Plant Noise – MVAC equipment and Other Fixed Noise Sources</u>

8.3.6. The operation of MVAC, electrical and mechanical equipment inside the proposed depot including sewage treatment plant (STP), transformers, lift machine, exhaust fan, etc. is also the major potential fixed noise source during operational phase. According to the current master layout plan in **Appendix 3.1**, all these facilities will be housed within the building structure and enclosed indoor. Furthermore, the layout of the proposed depot shall be optimized such that the louvers facing towards south and east direction and located away from the sensitive receivers as far as practicable.

8.3.7. Noise impacts from the planned fixed plants could be effectively mitigated by implementing good design and noise mitigation measures at source during the detailed design stage. The use of acoustic louvre, silencer for ventilation fan, acoustic door and acoustic absorptive material will be incorporated into the design where appropriate and necessary.

8.3.8. As mentioned, all fixed plants will be enclosed within the building structure. The opening(s) (e.g. ventilation louvres) of plant rooms, where noise emitted, will be located away from the nearby NSRs. As detailed design of the plant rooms is not yet available at this stage, the noise impact due to these planned fixed plants in the Proposed Project will be evaluated by determining the maximum allowable SWLs in next Section (**Section 8.4**).

8.4. Fixed Noise Impact Assessment

Vehicle Repair / Testing Activities

8.4.1. The fixed plant noise impact assessment has been conducted to evaluate the impact from vehicle repair/ testing activities, based on consideration of standard acoustics principles presented in IND-TM as summarized below:

- Based on the proposed layout plan and vehicle repair/ testing activities to be carried out within the proposed project;
- Identify the SWLs associated with the vehicle repair/ testing activities, confirmed the operation duration and frequency with future users;
- Calculate the Sound Pressure Level (SPL) at selected representative NAPs taking distance attenuation, noise shielding effect and façade correction into account; and
- Compare the SPL with the relevant noise criteria and recommend noise mitigation measures if necessary.

8.4.2. The prediction of cumulative fixed noise impact due to vehicle repair/ testing activities is calculated by applying standard acoustic principles. The calculation of predicted noise level can be represented as follows: -

$$SPL = SWL + C_{dist} + C_{fc} + C_{barr} + C_{tone}$$

where

- SPL is the sound pressure level at the representative NAP in dB(A);
- SWL is derived according to measured source pressure level of fixed plant noise source in dB(A);

- C_{dist} is distance attenuation: $C_{dist} = 20\log(d) + 8$ in dB(A), where d is the slant distance between NSR and the fixed noise source;

- C_{fc} is the façade correction of + 3dB(A);

- C_{barr} is the barrier correction of -10 dB(A), it is applied where the line of sight of selected NSR is completely blocked by substantial barrier or building structure; and

- C_{tone} is tonality correction for potential tonality perceived at source points.

8.4.3. As mentioned in S8.3.3, most of the eBuses will be returned between 19:00 – 02:00. Since the fixed noise criteria for nighttime period (i.e. 52 dB(A)) is more stringent than that of daytime (i.e. 56 dB(A)), the arrangement of vehicle repair/ testing activities is designed to meet the nighttime criteria. This fixed plant noise assessment is conducted for nighttime only to demonstrate the worst case scenario.

8.4.4. In general, the vehicle repair/testing activities regarded as noise source include bus washing by 4 automatic vehicle washing machines, tyre changing/charging, parts replacement and braking test. Bus washing will be carried out in the 'Car Washing Area' at G/F for all eBuses returned to the depot; while the remaining vehicle repair/ testing activities will be conducted in designated 'Maintenance Bays' at G/F and 1/F. The location where vehicle repair / testing activities conducted is indicated in **Figure 8.1** as noise source. As mentioned above, tyre changing/ charging and parts replacement will be conducted for 1/3 of eBus fleet per day, except for bus washing and braking test.

8.4.5. As shown in the elevation drawing of **Appendix 3-1**, no openings are designed at the western façade of the depot building at G/F and 1/F, where vehicle repair / testing activities take place. Besides, at the northern side, 2m high solid parapet will be built at G/F. The building structure for noise shielding is indicated in **Figure 8-2**. In view of the separation distance, NSR02 is the most affected receiver. In **Figure 8-3**, the sectional drawings shows that the 2m high solid parapet in the northern side can completely shield the nearest automatic vehicle washing machine, therefore barrier correction of 10dB(A) is applied where appropriate.

8.4.6. The detailed calculation for nighttime period and the predicted fixed plant noise levels due to vehicle repair/ testing activities at the representative floors (high, mid, low zones) of NAPs are presented in **Appendix 8.3** and **Table 8-6**.

Table 8-6 Predicted Fixed Plant Noise Levels due to Vehicle Repair/ Testing Activities

NSRs	Assessment Period	Criteria, $L_{Aeq\ (30\ min)}$ dB(A))	Maximum Cumulative Fixed Plant Noise Level, $L_{Aeq\ (30\ min)}$ dB(A))
NSR01	Nighttime (2300-0700)	50	47
NSR02		52	50
NSR03		52	47
NSR04[1]	Daytime and Evening Time (0700-2300)	56	49

Notes:

[1] NSR04 is educational institution, there is no operation during nighttime period.

MVAC equipment and Other Fixed Noise Sources in Plant Rooms

8.4.7. Since the detail design of the plant rooms is not available at this stage, this section of fixed plant noise impact assessment is to determine the maximum cumulative allowable SWL of all MVAC equipment and other fixed noise sources in plant rooms, which should not be exceeded in order to comply with the fixed plant noise assessment criteria.

8.4.8. The prediction of cumulative fixed noise impact due to MVAC equipment and other fixed noise sources in plant rooms is calculated by applying standard acoustic principles. The selected MVAC equipment and other fixed noise sources in plant rooms will be free of characteristics of tonality, impulsiveness and intermittency. The calculation of predicted noise level can be represented as follows: -

$SPL = Max\ SWL + C_{dist} + C_{fc} + C_{barr}$

where

- SPL is the sound pressure level at the representative NAP in dB(A);
- Max SWL is maximum cumulative allowable sound power level of all MVAC equipment and other fixed noise sources in plant rooms in dB(A);
- C_{dist} is distance attenuation: $C_{dist} = 20\log(d) + 8$ in dB(A), where d is the shortest horizontal distance between NAP and the project site boundary is adopted;
- C_{fc} is the façade correction of + 3dB(A); and
- C_{barr} is the barrier correction of -10 dB(A), it is applied where the line of sight of selected NSR is completely blocked by substantial barriers or building structure.

8.4.9. Since the design of the equipment to be installed in the plant room was not available during the course of this study, the maximum allowable SWLs of all MVAC equipment in plant rooms is deduced based on the shortest horizontal distance between representative NAP and the project site boundary. In addition, shielding effect on plant rooms/ barrier correction is not considered in this assessment as a conservative assumption.

8.4.10. The maximum allowable SWLs for MVAC equipment and other fixed noise sources in **Table 8-7** has been determined taking into account of the concurrent operational noise from vehicle repair/ testing activities, to ensure compliance with noise criteria stipulated in the HKPSG. Detail calculation is included in **Appendix 8-4**.

Table 8-7 Maximum Allowable SWL for MVAC equipment and Other Fixed Noise Sources in Plant Rooms

Noise Source	Maximum Allowable SWL, dB(A)
MVAC equipment and other fixed noise sources in all Plant Rooms	90

8.4.11. Considering the cumulative fixed noise impact from 1) Vehicle Repair/ Testing Activities and 2) MVAC equipment and other fixed noise sources in plant rooms, all identified NSRs comply with the noise criteria during nighttime period. Since the more stringent assessment criteria - nighttime criteria can be met, it is deduced that fixed noise impact for daytime/evening time period is not anticipated. Detail Calculation of fixed noise impact assessment during nighttime period is also attached in **Appendix 8-4**.

Table 8-8 Summary of Overall Predicted Fixed Plant Noise Levels

NSRs	Assessment Period	Criteria, $L_{Aeq\ (30\ min)}$ dB(A))	Maximum Cumulative Fixed Plant Noise Level, $L_{Aeq\ (30\ min)}$ dB(A))
NSR01	Nighttime (2300-0700)	50	48
NSR02		52	52
NSR03		52	48
NSR04[1]	Daytime and Evening Time (0700-2300)	56	50

Notes:

[1] NSR04 is educational institution, there is no operation during nighttime period.

8.5. Conclusion

8.5.1. Vehicle repair / testing activities, MVAC and other fixed plants are the potential fixed noise sources during the operational phase of the proposed depot. Quantitative assessment was conducted for nighttime period to present worst-case scenario and it is concluded that adverse fixed noise impact due to the proposed project is not anticipated.

9. Conclusion

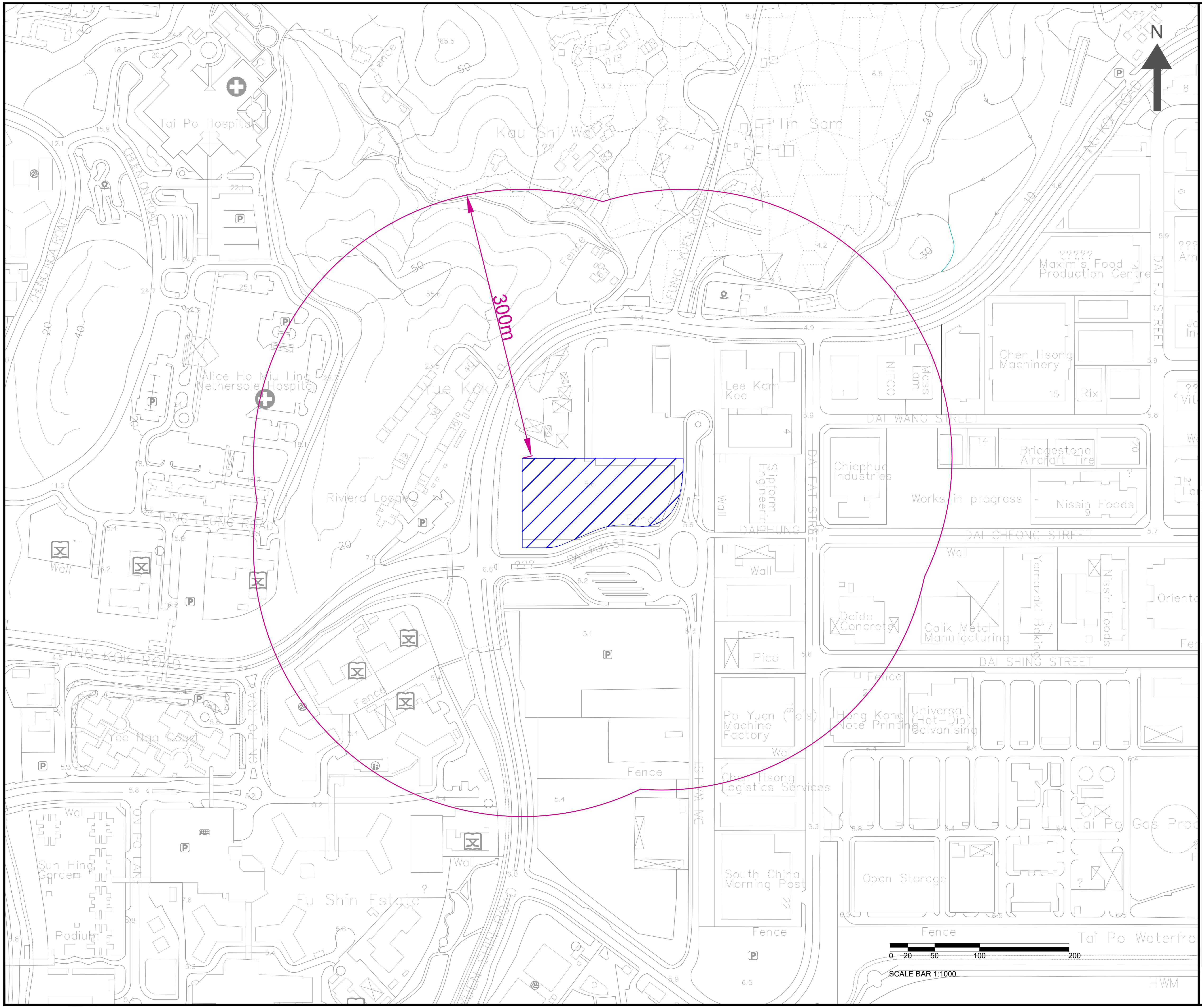
9.1.1. The environmental noise impact, including construction noise, road traffic noise and fixed noise impact during operational phase of the Proposed Development is assessed.

9.1.2. The construction noise impact will be short-term and can be reduced to an acceptable level with the implementation of recommended mitigation measures, including the use of quiet PMEs, installing temporary noise barrier as required in ProPECC PN2/93 and applying good site practices. Hence, construction noise impact from the Proposed Development is not envisaged.

9.1.3. A comparison of the noise levels for the “with project” and “without project” scenarios predicted for year 2040 (i.e. the worst case scenario) indicated that traffic noise contribution from the road traffic generated by the proposed Project will be insignificant. Therefore, operation of proposed Project will have no significant contribution to road traffic noise impact on the nearby NSRs.

9.1.4. As for operational fixed plant noise, vehicle repair / testing activities will be carried out under covered area and the MVAC and other fixed noise sources are properly selected with mitigation measures where necessary. Quantitative fixed noise assessment was conducted and adverse noise impact on the NSRs is not anticipated.

Figures



NOTES :

▨ PROJECT SITE

— 300m ASSESSMENT AREA

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

Drawing By :

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

Drawing Title :
SITE LOCATION PLAN AND 300m
ASSESSMENT AREA

Drawing No : FIGURE 3.1

Revision : 0

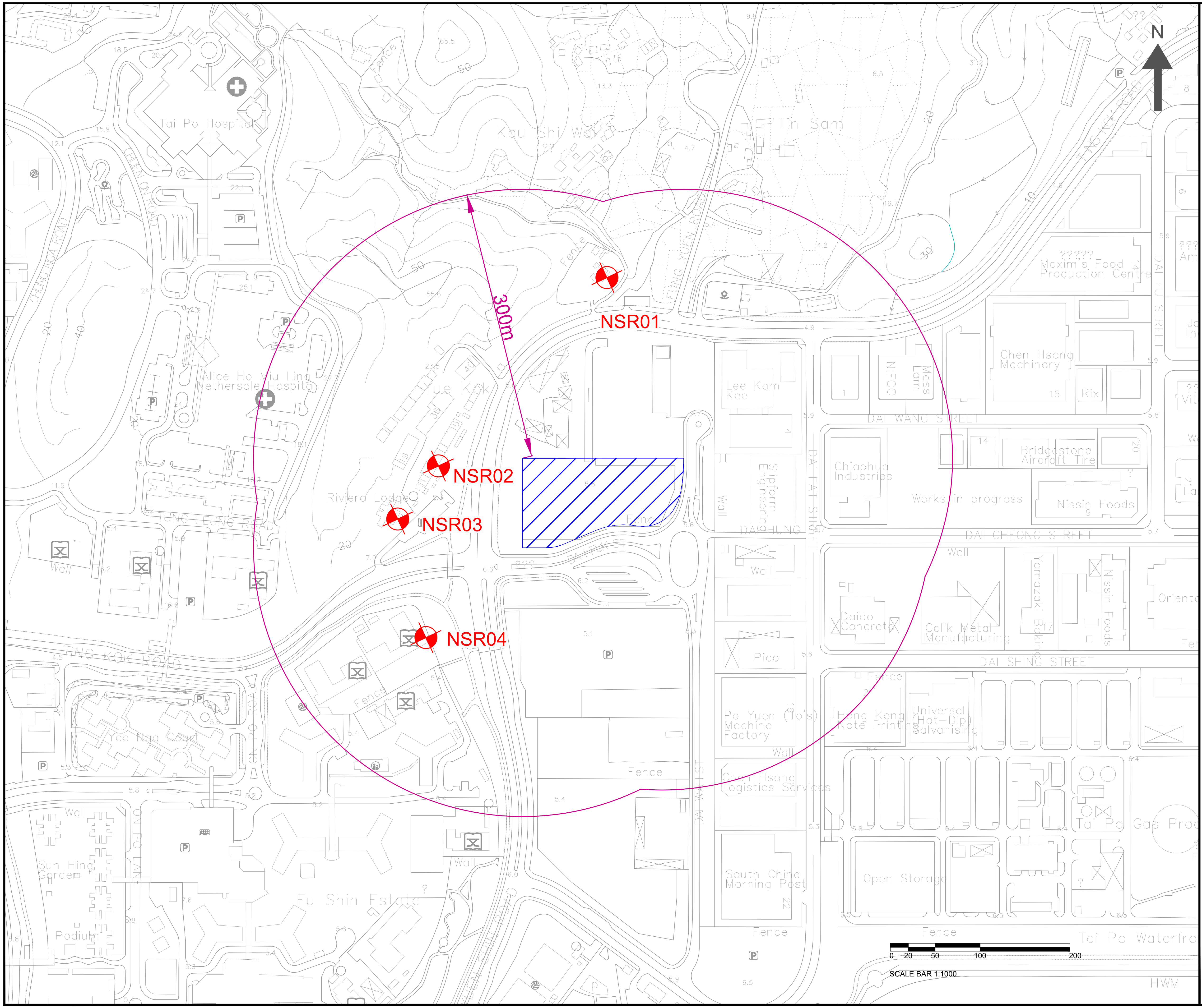
Scale : AS SHOWN

Date : SEP 2021

DO NOT SCALE OFF DRAWING. THIS DRAWING IS NOT FOR CONSTRUCTION PURPOSES UNLESS EXPRESSLY STATED. ALL RIGHTS RESERVED AND REPRODUCTION IN ANY FORM MUST BE APPROVED BY ALLIED ENVIRONMENTAL CONSULTANTS LIMITED.

A3 420 x 297

P:\1801-1850\1849\05 REPORT\01 AEC REPORT\S16\NIA\FIGURE\ISSUE 1\FIG5-1 & FIG5-2 NSR NAP.DWG



NOTES :

▨ PROJECT SITE

— 300m ASSESSMENT AREA

NOISE SENSITIVE RECEIVERS

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

Drawing By :

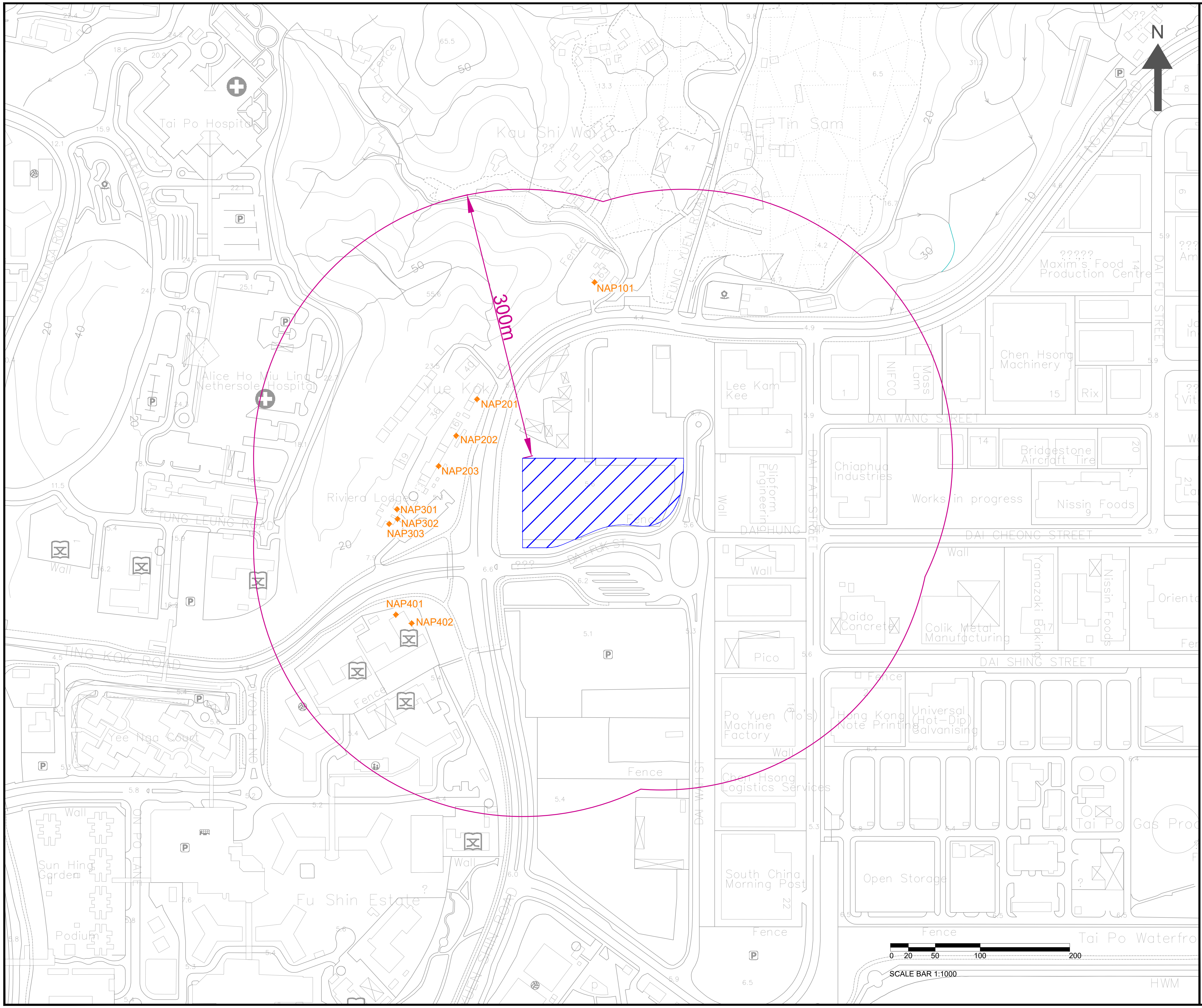
Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

Drawing Title :
LOCATION OF REPRESENTATIVE NOISE SENSITIVE RECEIVERS (NSR)

Drawing No : FIGURE 5.1	Revision : 0
Scale : AS SHOWN	Date : SEP 2021

DO NOT SCALE OFF DRAWING. THIS DRAWING IS NOT FOR CONSTRUCTION PURPOSES UNLESS EXPRESSLY STATED. ALL RIGHTS RESERVED AND REPRODUCTION IN ANY FORM MUST BE APPROVED BY ALLIED ENVIRONMENTAL CONSULTANTS LIMITED.

A3 420 x 297



NOTES :

▨	PROJECT SITE
—	300m ASSESSMENT AREA
⌖	NOISE ASSESSMENT POINT (NAP)

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

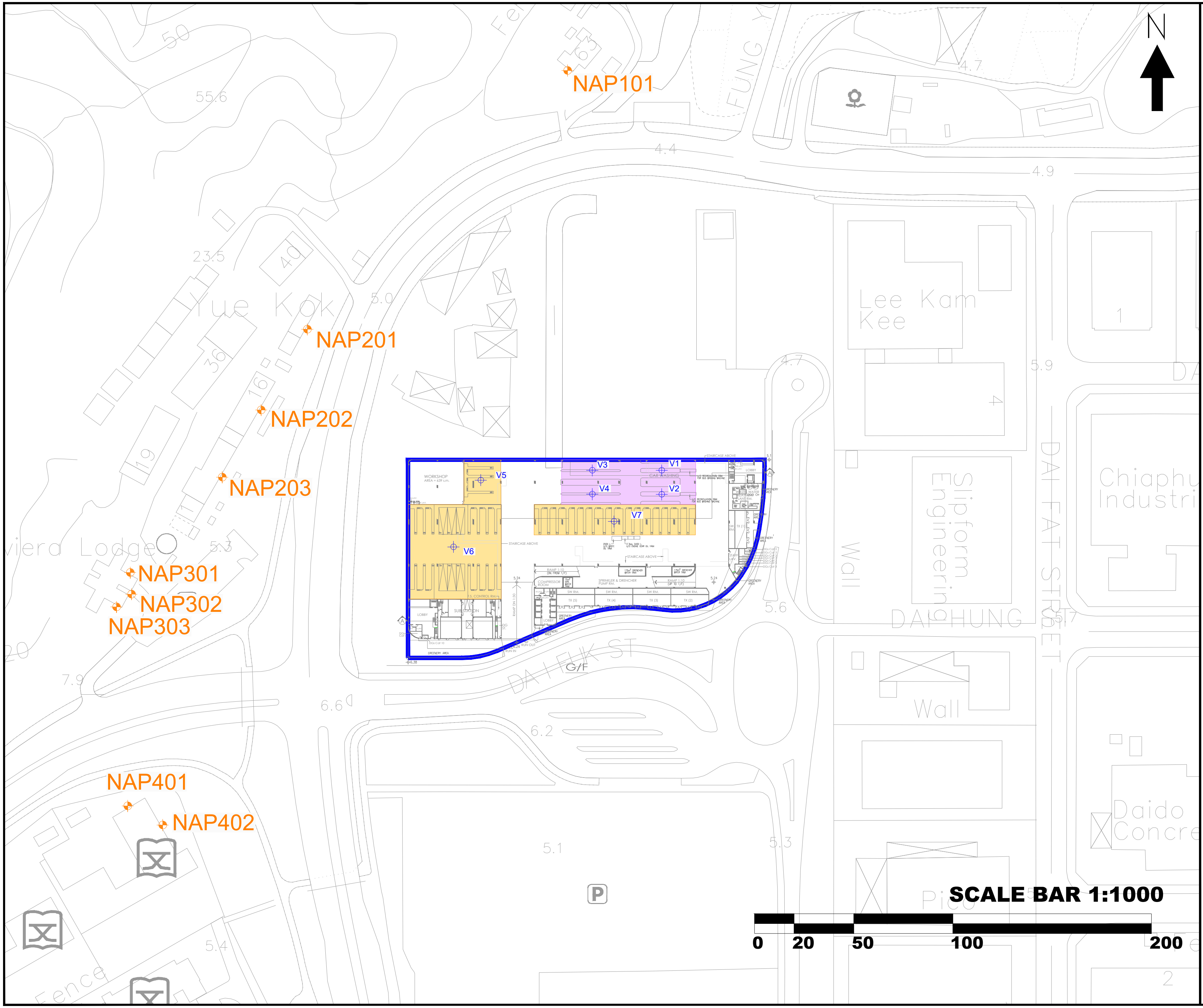
Drawing By :

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

Drawing Title :
LOCATION OF NOISE ASSESSMENT POINT (NAP)

Drawing No : FIGURE 5.2	Revision : 0
Scale : AS SHOWN	Date : SEP 2021

A3 420 x 297



NOTES :

▭ PROJECT SITE

⌖ IDENTIFIED FIXED NOISE SOURCE

🟨 MAINTENANCE BAY

🟪 CAR WASHING AREA

Consultant

AEC

Allied Environmental Consultants Limited

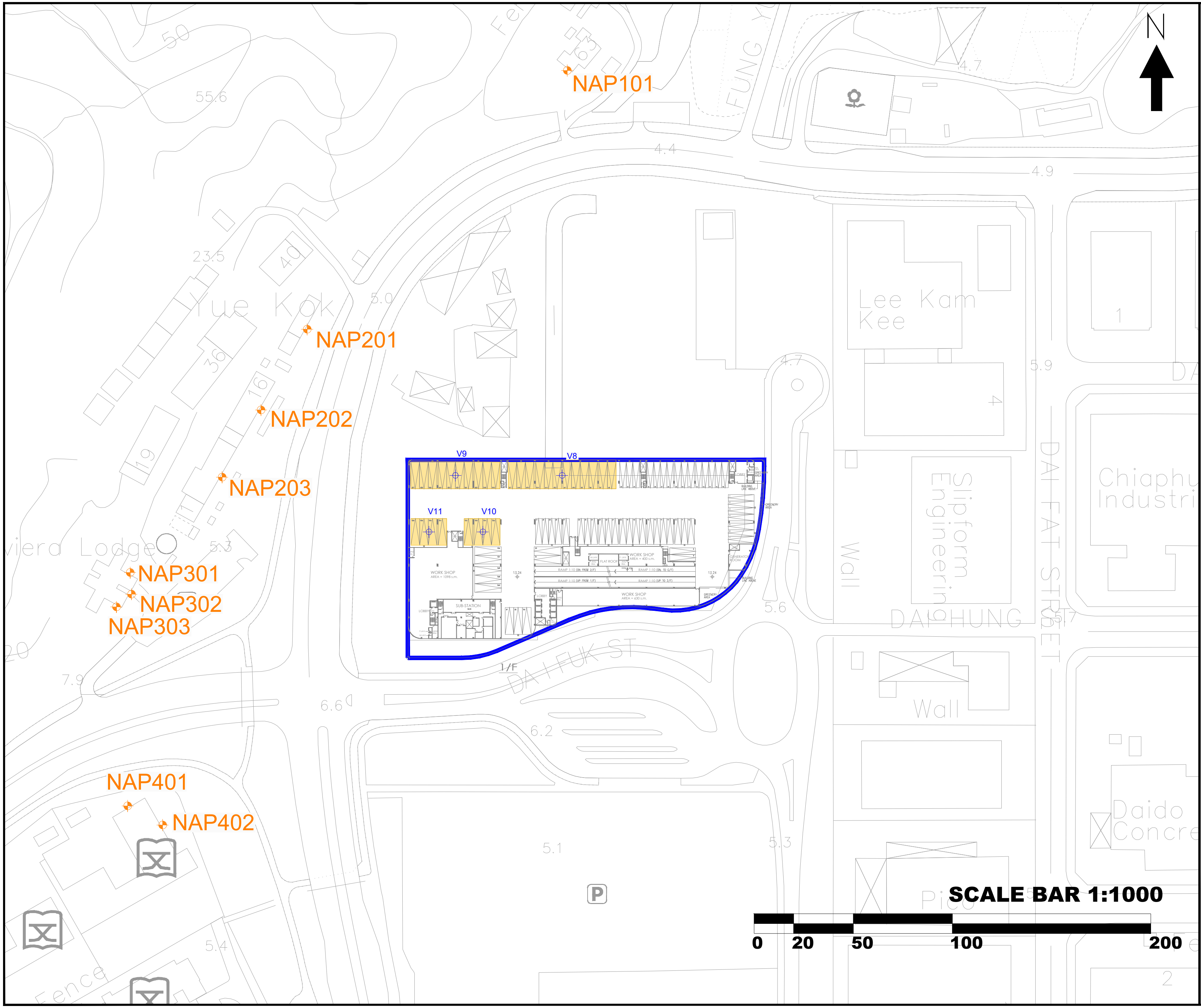
Project No. : 1849

File Name :

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

Drawing Title :
LOCATION OF
CONDUCTING VEHICLE REPAIR/ TESTING
ACTIVITIES WIHIN THE PROPOSED
PROJECT (G/F)

Drawing No : FIGURE 8-1a	Revision : 0
Scale : AS SHOWN	Date : OCT 2021



NOTES :

▭	PROJECT SITE
⌖	IDENTIFIED FIXED NOISE SOURCE
🟨	MAINTENANCE BAY
🟪	CAR WASHING AREA

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name :

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

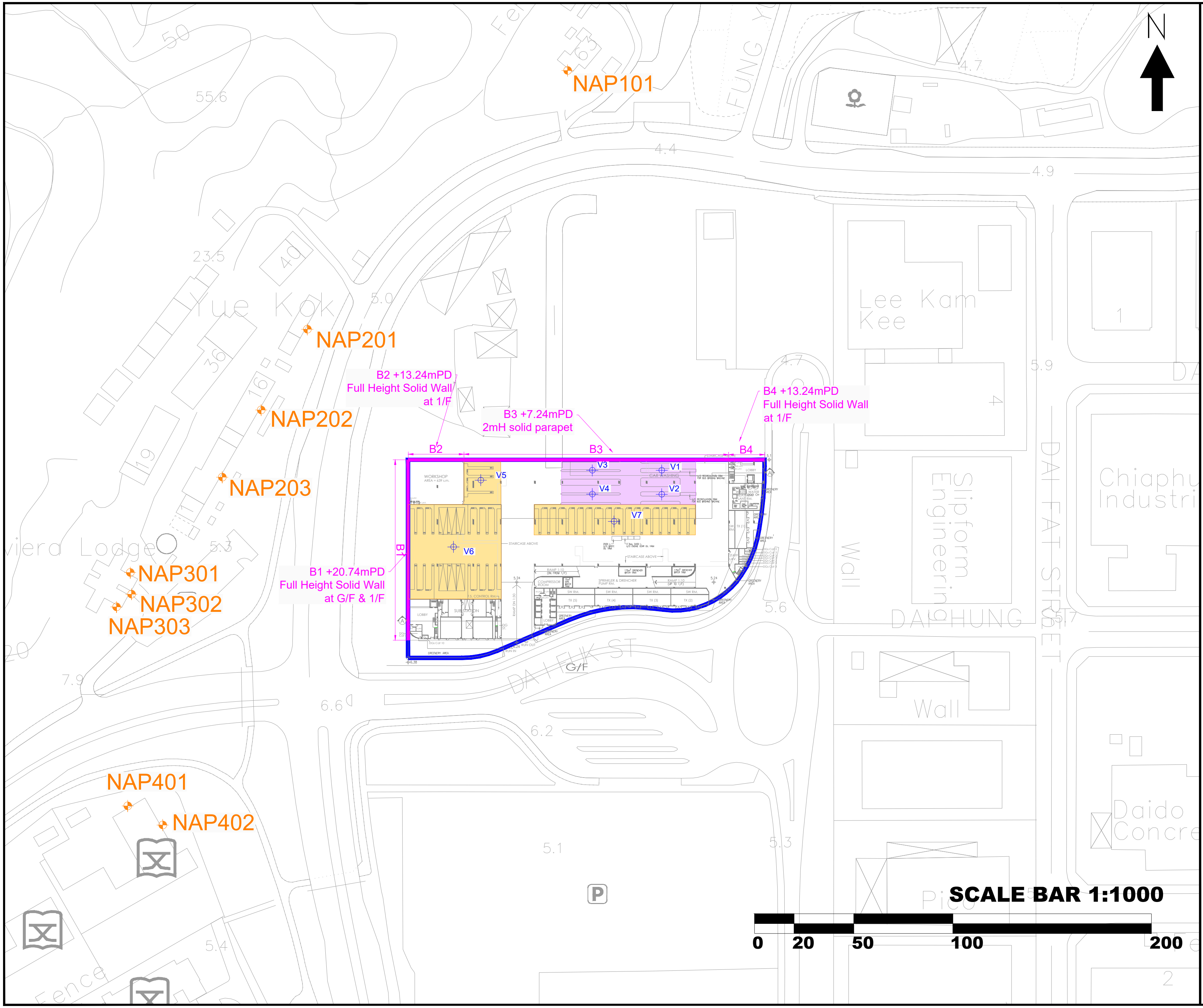
Drawing Title :
LOCATION OF
CONDUCTING VEHICLE REPAIR/ TESTING
ACTIVITIES WIHIN THE PROPOSED
PROJECT (1/F)

Drawing No : FIGURE 8-1b

Revision : 0

Scale : AS SHOWN

Date : OCT 2021



NOTES :

☐	PROJECT SITE
⌖	IDENTIFIED FIXED NOISE SOURCE
🟨	MAINTENANCE BAY
🟪	CAR WASHING AREA
▬	SOLID WALL/ PARAPET

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name :

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

Drawing Title :
LOCATION OF
SOLID STRUCTURE FOR
NOISE SHIELDING (G/F)

Drawing No : FIGURE 8-2a

Revision : 0

Scale : AS SHOWN

Date : OCT 2021

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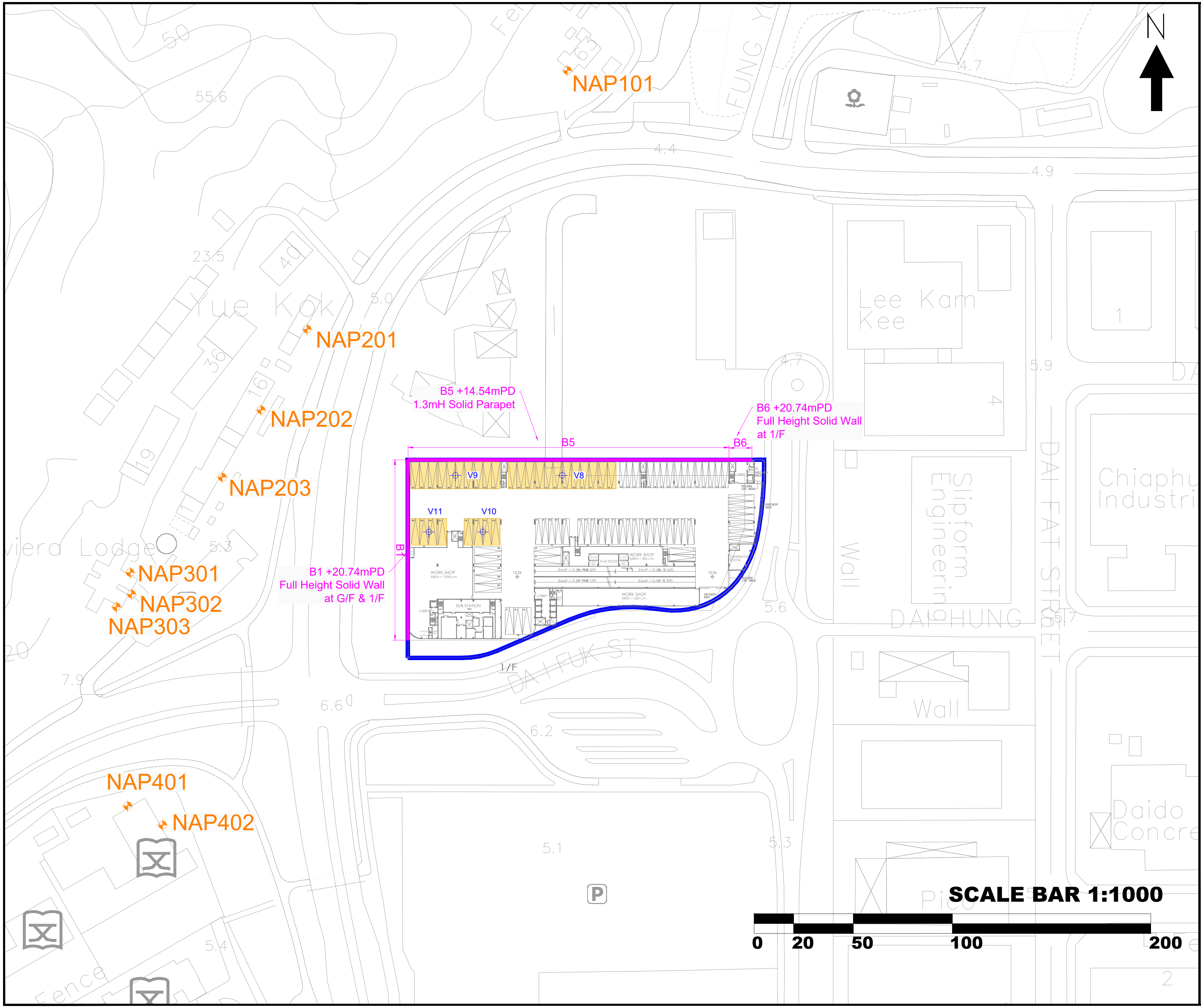
A4 297 x 210



NOTES :

▭ PROJECT SITE

⌖ IDENTIFIED FIXED NOISE SOURCE

🟨 MAINTENANCE BAY

🟪 CAR WASHING AREA

▬ SOLID WALL/ PARAPET

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name :

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

Drawing Title :
LOCATION OF
SOLID STRUCTURE FOR
NOISE SHIELDING (1/F)

Drawing No : FIGURE 8-2b

Revision : 0

Scale : AS SHOWN

Date : OCT 2021

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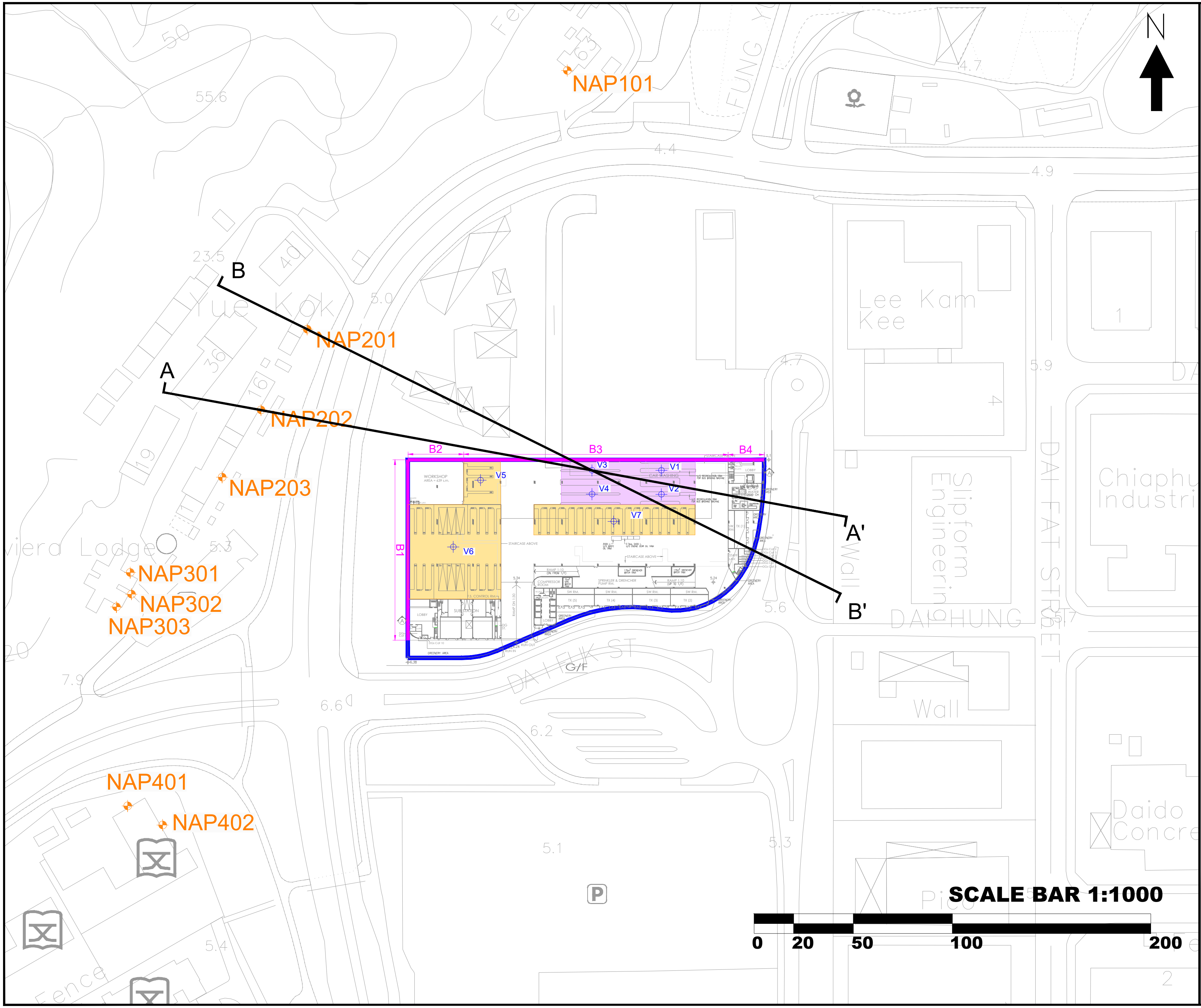

NOTES :

- ☐ PROJECT SITE
- ⌖ IDENTIFIED FIXED NOISE SOURCE
- 🟨 MAINTENANCE BAY
- 🟪 CAR WASHING AREA
- ▬ SOLID WALL/ PARAPET

Consultant

Allied Environmental Consultants Limited

Project No. :	1849
File Name :	

Project :

KMB BUS DEPOT AT DAI FUK STREET, AREA 33, TAI PO

Drawing Title :

SECTIONAL DRAWING SHOWING THE SHIELDING EFFECT

Drawing No : FIGURE 8-3a	Revision : 0
Scale : AS SHOWN	Date : OCT 2021

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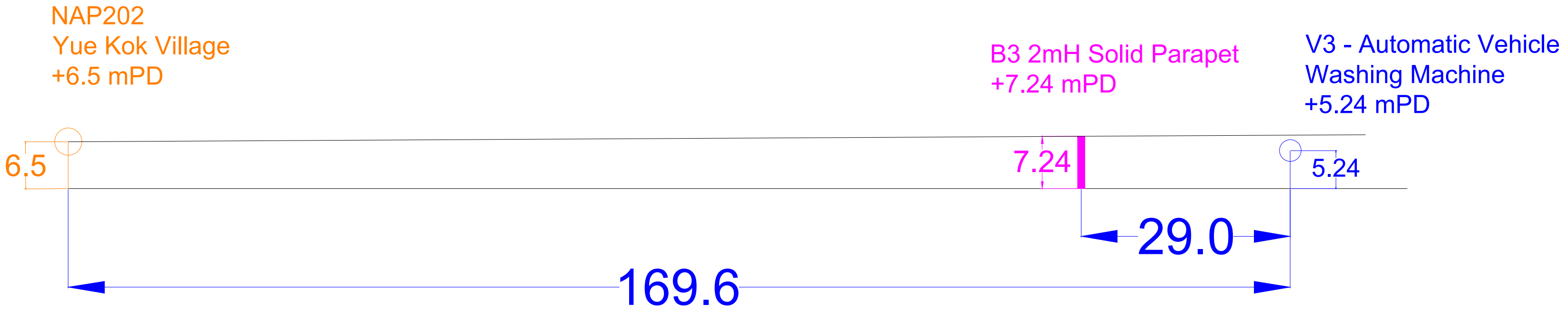
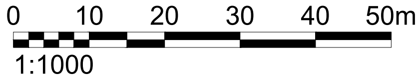
A4 297 x 210

Section AA' (between NAP 202 and Source V3)





NOTES :

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name : CC

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

Drawing Title :
SECTIONAL DRAWING SHOWING THE
SHIELDING EFFECT
(SECTION AA')

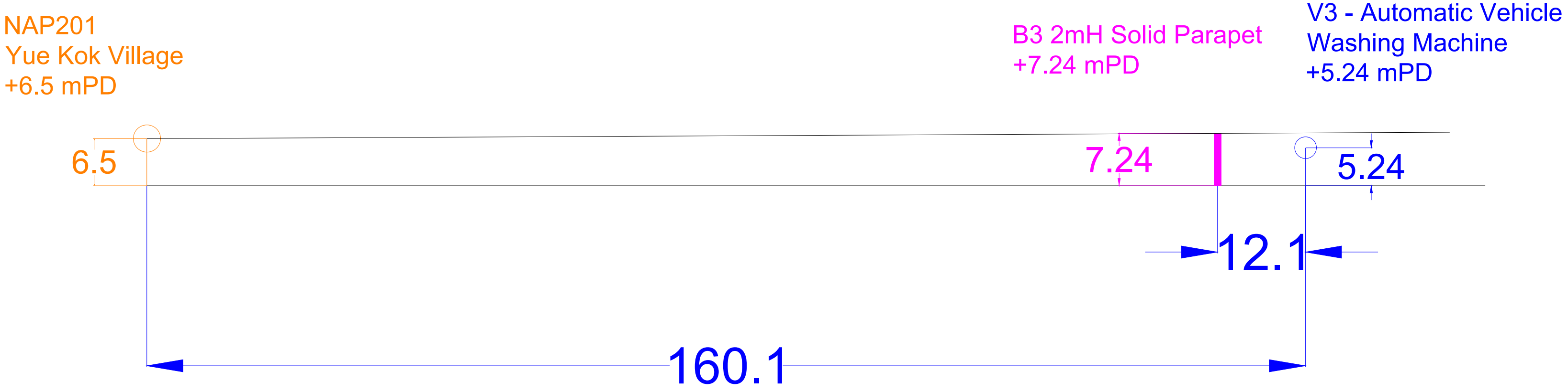
Drawing No : FIGURE 8.3b

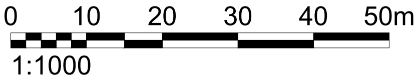
Revision : 0

Scale : AS SHOWN

Date : OCT 2021

Section BB' (between NAP 201 and Source V3)





NOTES :

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name :

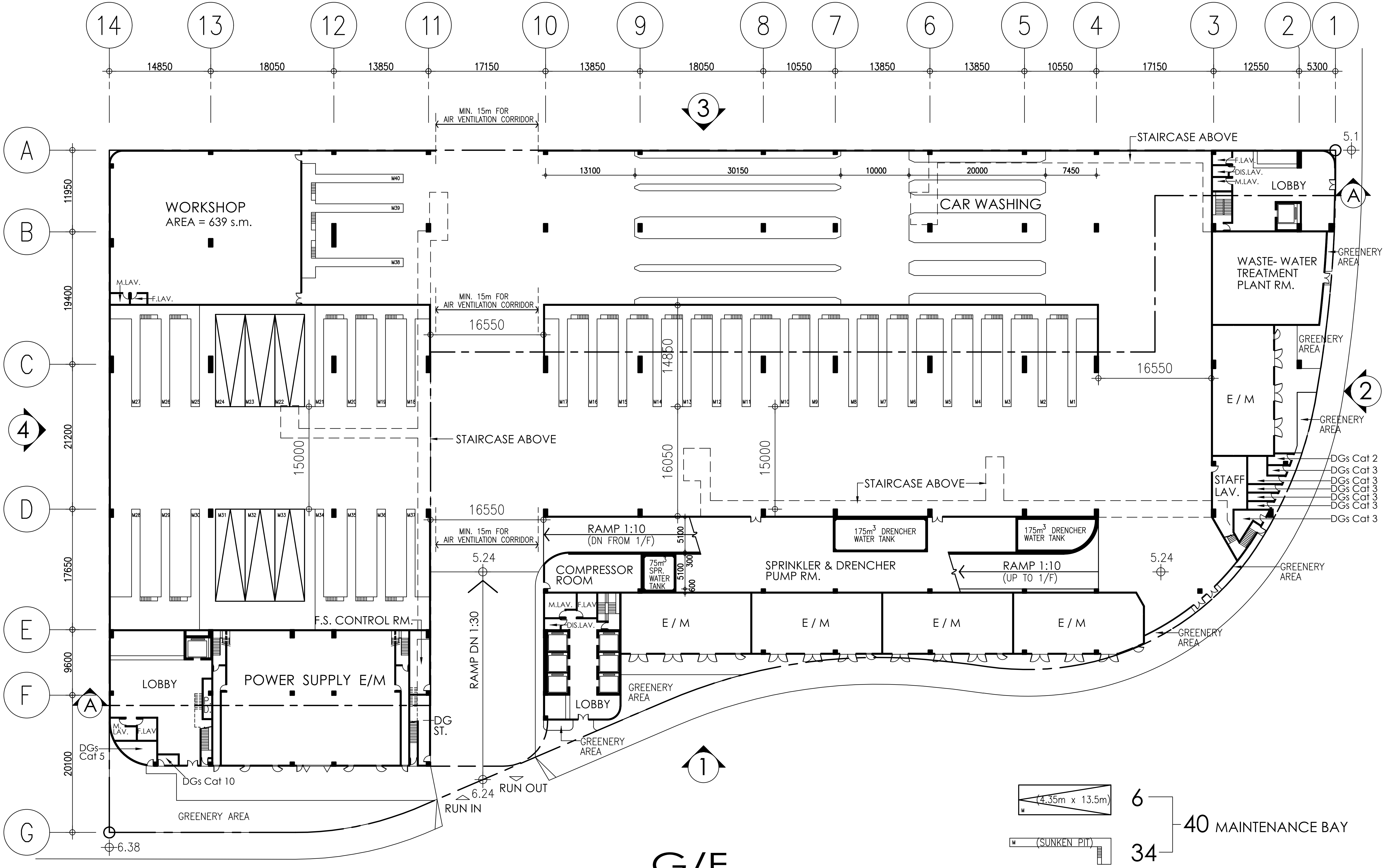
Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

Drawing Title :
SECTIONAL DRAWING SHOWING THE
SHIELDING EFFECT
(SECTION BB')

Drawing No :	Revision :
FIGURE 8.3c	0
Scale : AS SHOWN	Date : OCT 2021

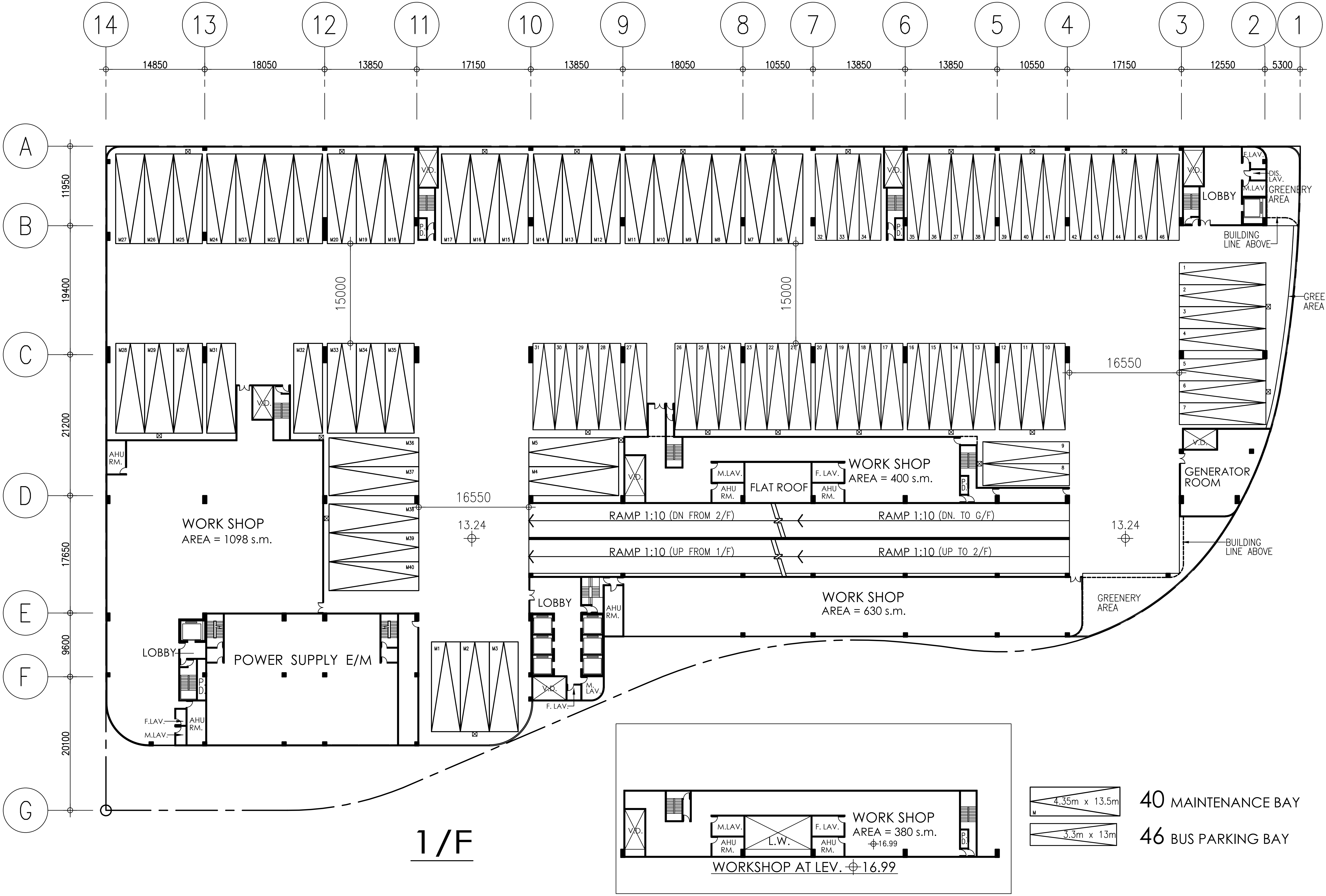
Appendix 3.1

Master Layout Plan of the Proposed Development



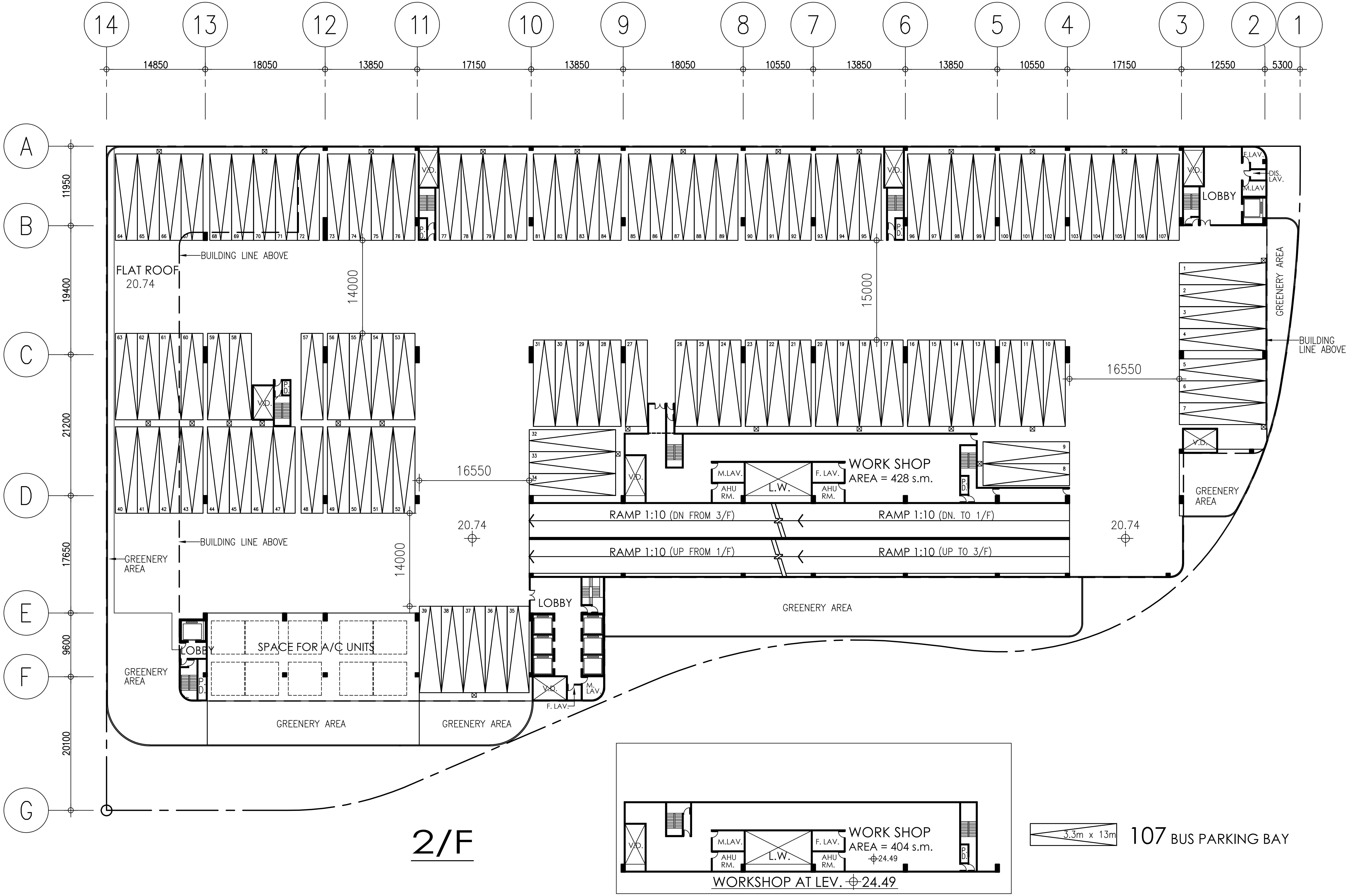
G/F

JULY 2022 (1)



1/F

JULY 2022 (1)

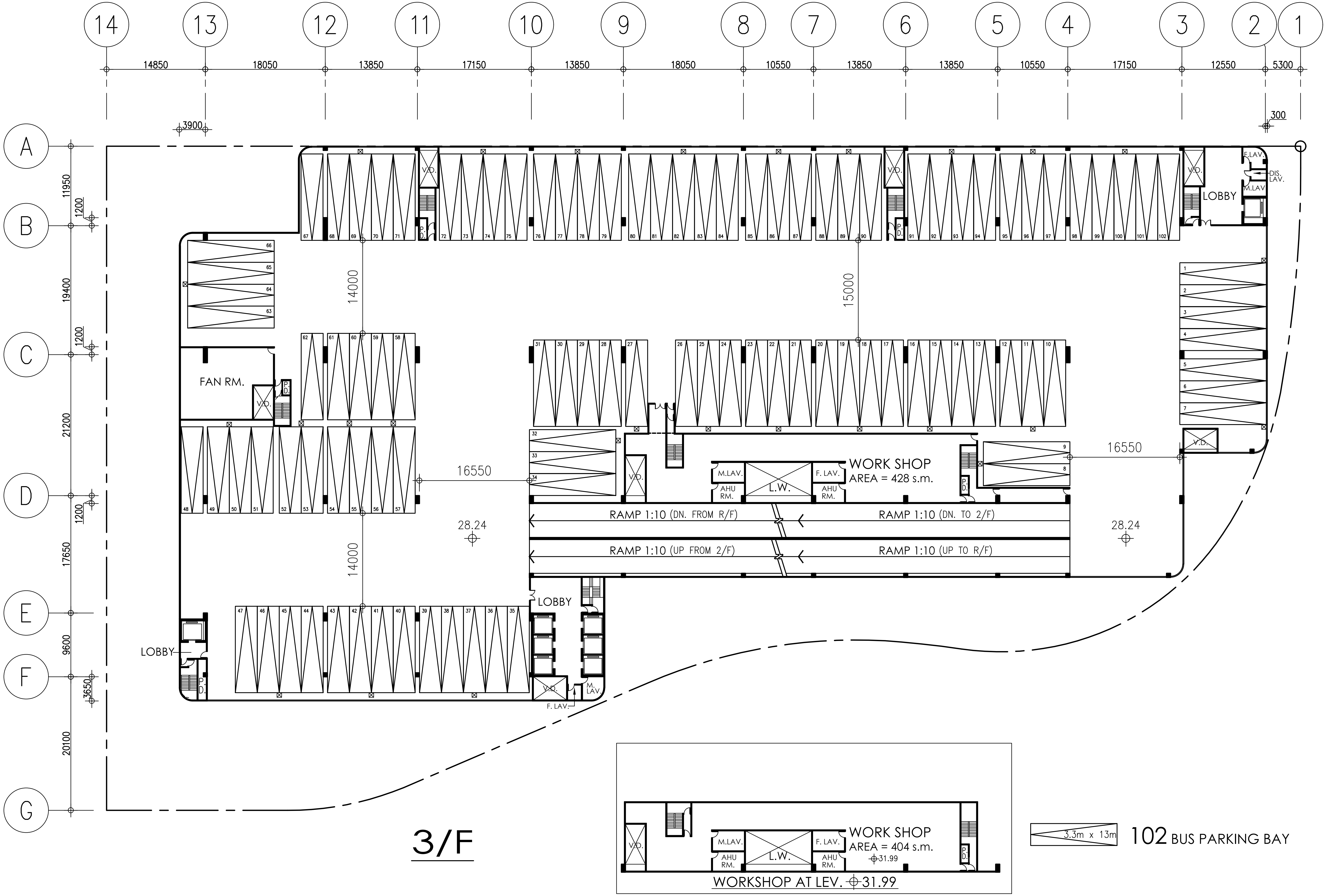


2/F

WORKSHOP AT LEV. 24.49

107 BUS PARKING BAY

JULY 2022 (1)



3/F

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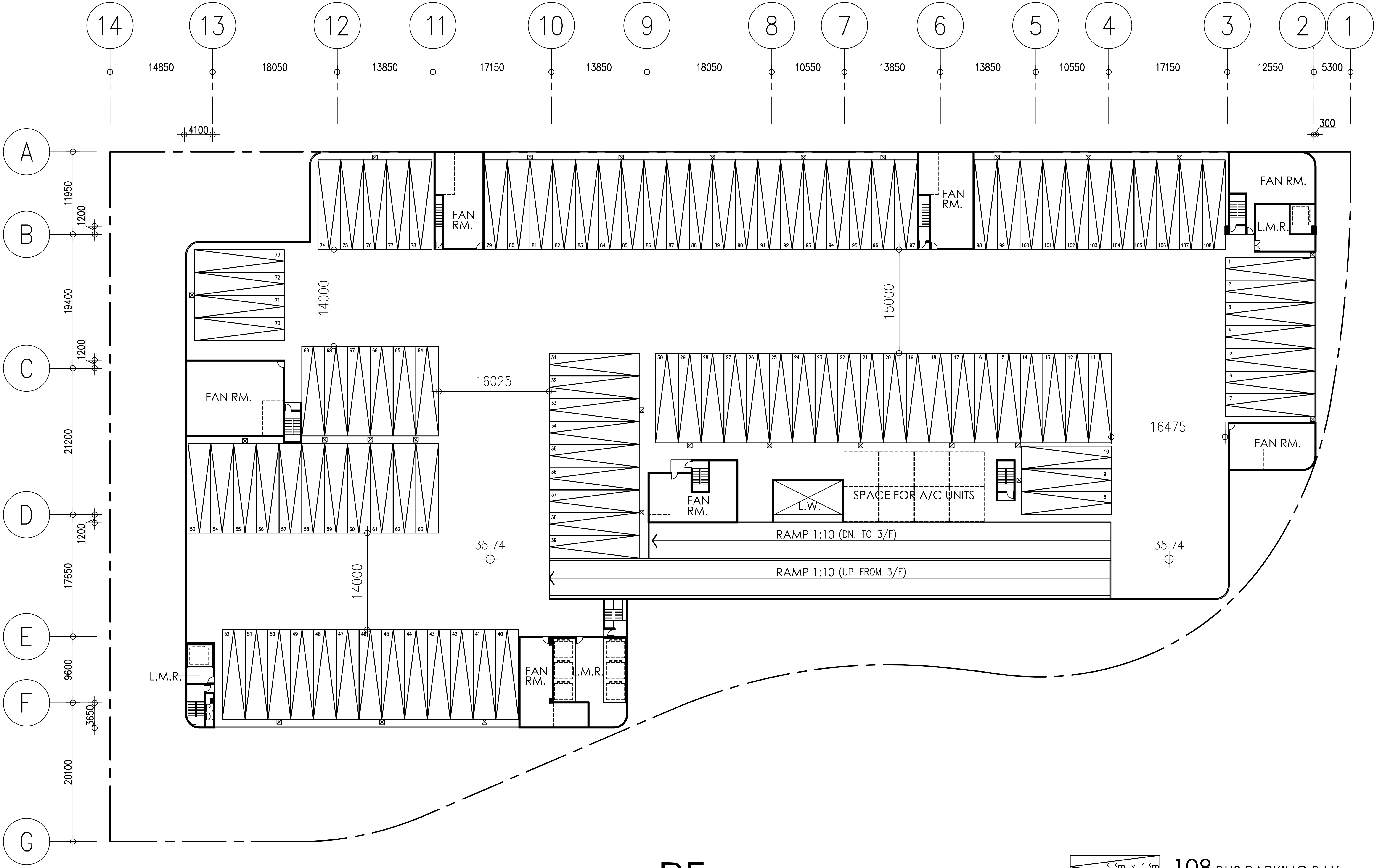
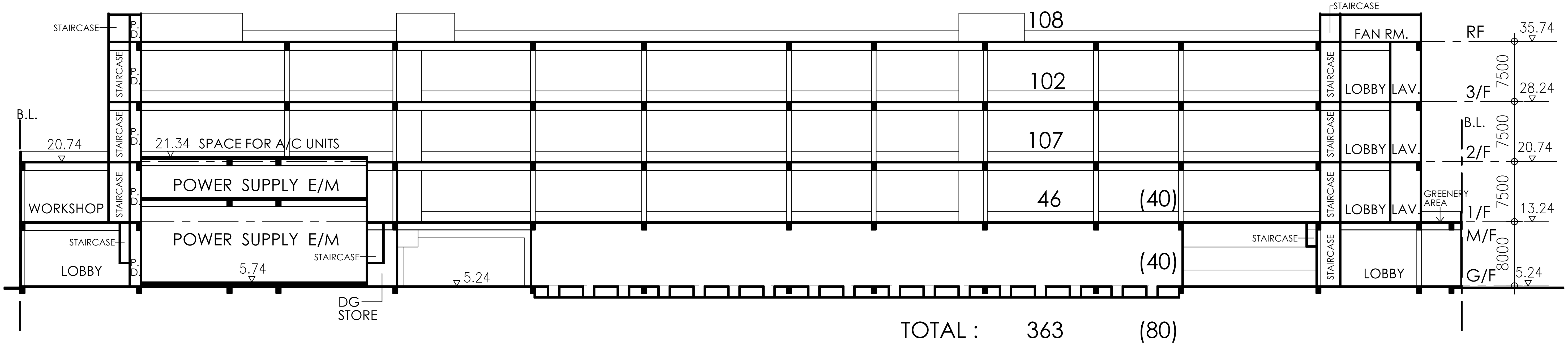


RF

3.3m x 13m **108** BUS PARKING BAY

JULY 2022 (1)

4 STOREYS

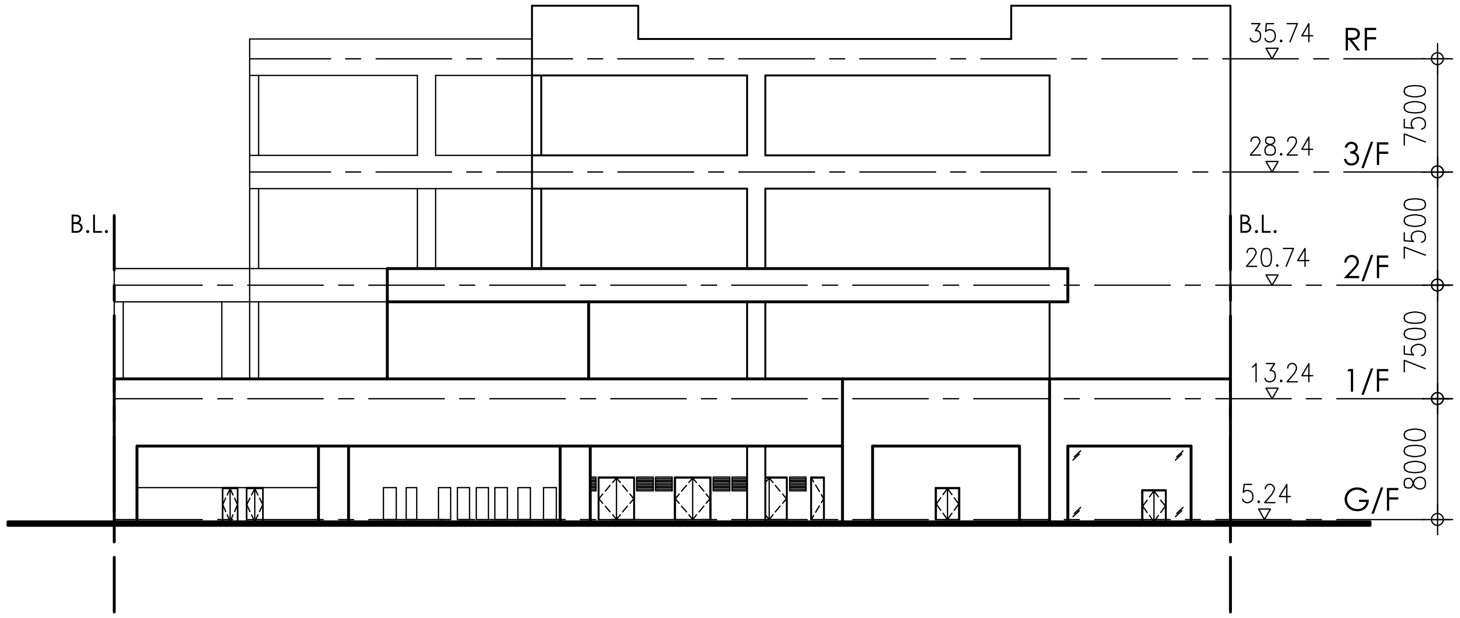


TOTAL : 363 (80)

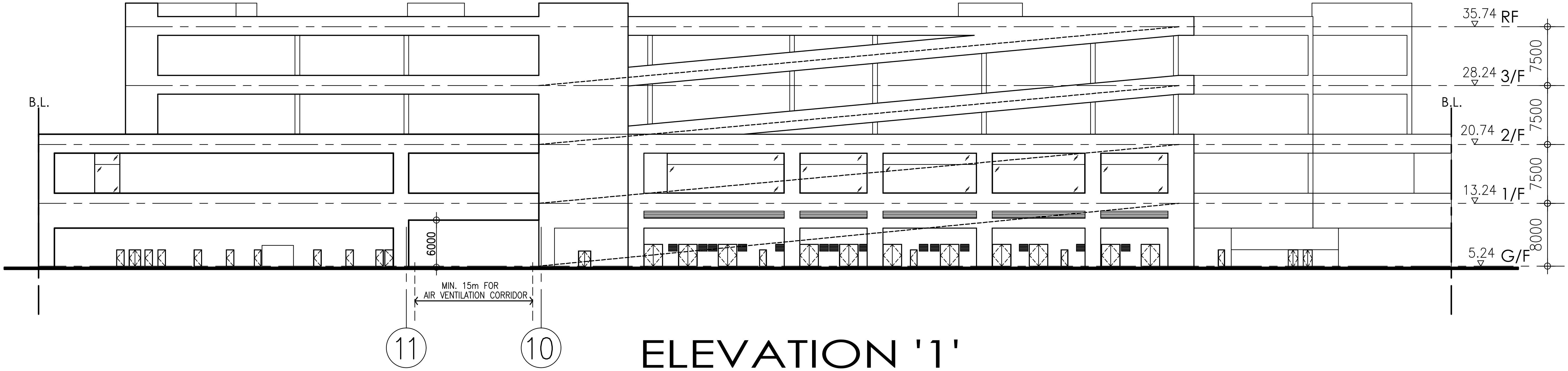
BUS PARKING BAY

MAINTENANCE BAY

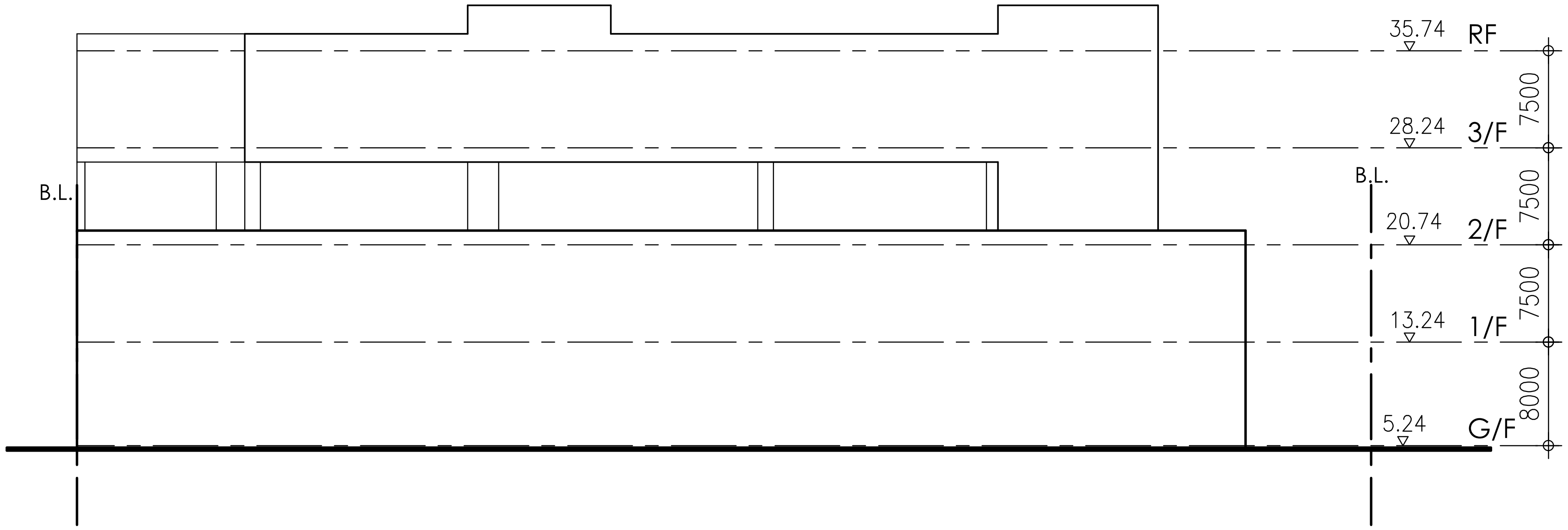
SECTION 'A' - 'A'



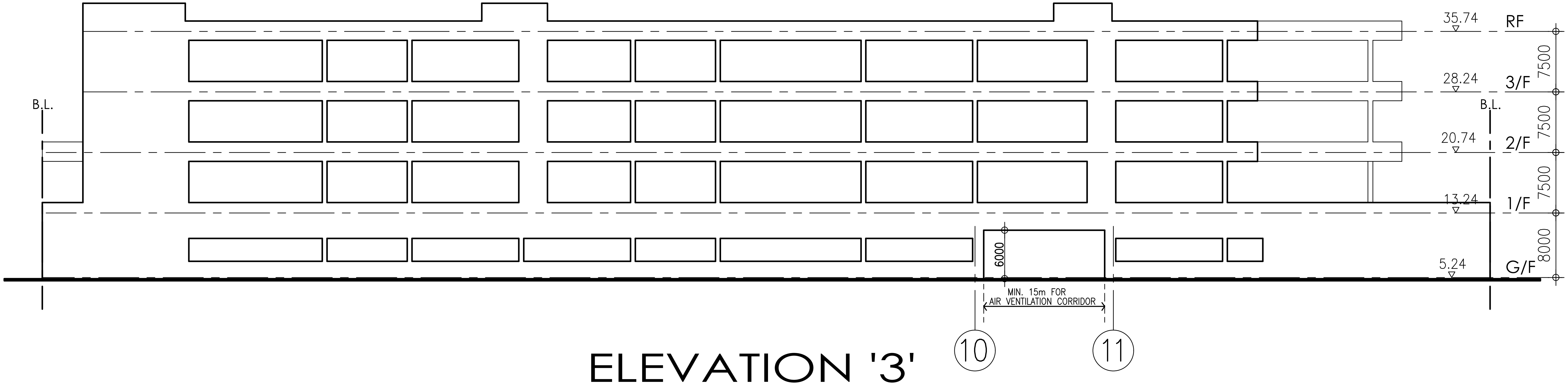
ELEVATION '2'



ELEVATION '1'



ELEVATION '4'



ELEVATION '3'

SITE COVERAGE AND PLOT RATIO CALCULATION :

SITE AREA : 14600 s.m.
CLASS OF SITE : ' B '

ACTUAL SITE COVERAGE

SITE COVERAGE (ABOVE 15m) : 11315 s.m. / 14600s.m. x 100% = 77.50 %
SITE COVERAGE (UNDER 15m) : 13918 s.m. / 14600s.m. x 100% = 95.33 %

ACTUAL GROSS FLOOR AREA

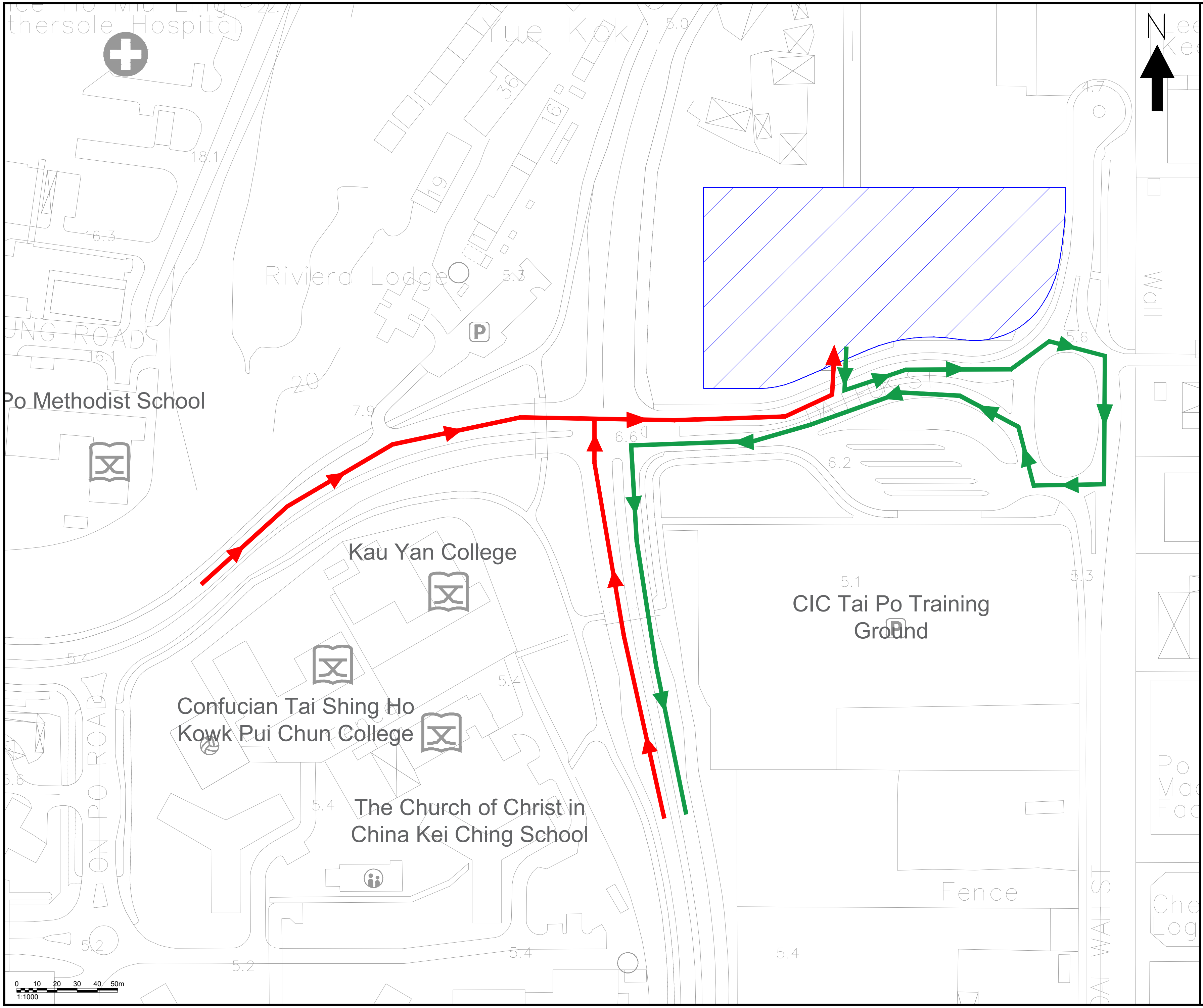
GROUND FLOOR : 13918 s.m. + 653 s.m. = 14571 s.m.
1st FLOOR : 13688 s.m. + 475 s.m. = 14163 s.m.
2nd FLOOR : 11315 s.m. + 502 s.m. = 11817 s.m.
3rd FLOOR : 11315 s.m. + 502 s.m. = 11817 s.m.

TOTAL = 52368 s.m. (PLOT RATIO = 3.59)

JULY 2022 (1)

Appendix 7.1

Proposed Traffic Routing



NOTES :

▨ SUBJECT SITE

🟥🟩 PROPOSED ROUTING

Consultant

Allied Environmental Consultants Limited

Project No. : 1849

File Name :

Project :
KMB BUS DEPOT AT DAI FUK STREET,
AREA 33, TAI PO

Drawing Title :
PROPOSED TRAFFIC ROUTING

Drawing No : APPENDIX 7.1

Revision : 0

Scale : AS SHOWN

Date : SEP 2021

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A4 297 x 210

Appendix 7.2

Summary of Estimated Road Traffic Generation

(Ingress and Egress)

Year 2025 Traffic Forecast

Road ID	Egress Peak of Proposed Project Generated Traffic (06:00-07:00 hrs)				Ingress Peak of Proposed Project Generated Traffic (23:00-00:00 hrs)			
	With Project		Without Project		With Project		Without Project	
	Veh/hr	HV%	Veh/hr	HV%	Veh/hr	HV%	Veh/hr	HV%
A1	84	32%	82	30%	134	82%	37	35%
A2	342	60%	192	28%	114	18%	114	18%
B1-1	23	48%	23	48%	18	28%	18	28%
B1-2	16	56%	16	56%	19	21%	19	21%
B2-1	150	17%	150	17%	64	14%	64	14%
B2-2	106	30%	106	30%	45	42%	45	42%
C1	486	19%	486	19%	261	16%	261	16%
C2	638	16%	638	16%	295	16%	295	16%
C3	596	19%	596	19%	306	15%	306	15%
C4	686	16%	686	16%	332	17%	332	17%
C5	811	19%	811	19%	450	14%	450	14%
C6	972	16%	972	16%	427	16%	427	16%
C7	737	21%	736	21%	413	28%	368	19%
C8	825	29%	726	19%	350	19%	350	19%
C9	789	30%	689	20%	352	22%	352	22%
D1	388	14%	387	14%	355	26%	303	13%
D2	742	21%	691	16%	345	13%	345	13%
D3	1159	18%	1158	18%	500	28%	448	20%
D4	992	27%	941	23%	524	15%	524	15%
E1	163	15%	163	15%	110	24%	110	24%
E2	195	12%	195	12%	101	20%	101	20%
E3	293	26%	293	26%	148	21%	148	21%
E4	353	15%	353	15%	162	16%	162	16%
F-1	122	22%	122	22%	145	17%	145	17%
F-2	145	19%	145	19%	62	23%	62	23%
G1	187	30%	187	30%	96	35%	96	35%
G2	401	25%	401	25%	94	32%	94	32%
G3	101	28%	101	28%	34	53%	34	53%
G4	470	26%	470	26%	102	35%	102	35%
G5	347	23%	347	23%	109	52%	109	52%
G6	112	61%	112	61%	96	17%	96	17%
G7	632	24%	632	24%	141	41%	141	41%
G8	230	57%	230	57%	185	18%	185	18%
G9	691	21%	691	21%	141	35%	141	35%
H-1	200	29%	200	29%	48	42%	48	42%
H-2	258	24%	258	24%	62	40%	62	40%
I1	704	24%	704	24%	152	54%	152	54%
I2	101	61%	101	61%	95	20%	95	20%
J	161	29%	161	29%	103	24%	103	24%
K-1	286	26%	286	26%	58	45%	58	45%
K-2	140	53%	140	53%	98	20%	98	20%

Year 2040 Traffic Forecast

Road ID	Egress Peak of Proposed Project Generated Traffic (06:00-07:00 hrs)				Ingress Peak of Proposed Project Generated Traffic (23:00-00:00 hrs)			
	With Project		Without Project		With Project		Without Project	
	Veh/hr	HV%	Veh/hr	HV%	Veh/hr	HV%	Veh/hr	HV%
A1	102	30%	100	29%	141	79%	44	32%
A2	386	56%	236	29%	141	18%	141	18%
B1-1	23	43%	23	43%	22	27%	22	27%
B1-2	16	50%	16	50%	23	17%	23	17%
B2-1	187	16%	187	16%	77	13%	77	13%
B2-2	123	30%	123	30%	52	42%	52	42%
C1	596	19%	596	19%	316	15%	316	15%
C2	785	16%	785	16%	363	16%	363	16%
C3	734	19%	734	19%	377	15%	377	15%
C4	838	16%	838	16%	407	16%	407	16%
C5	989	19%	989	19%	554	14%	554	14%
C6	1194	16%	1194	16%	524	16%	524	16%
C7	900	21%	899	21%	493	26%	448	19%
C8	988	27%	889	19%	434	20%	434	20%
C9	949	28%	849	19%	436	22%	436	22%
D1	475	13%	474	13%	422	24%	370	13%
D2	900	20%	849	15%	422	13%	422	13%
D3	1420	18%	1419	18%	601	26%	549	19%
D4	1204	26%	1153	22%	640	15%	640	15%
E1	198	14%	198	14%	137	23%	137	23%
E2	229	12%	229	12%	122	20%	122	20%
E3	364	25%	364	25%	181	20%	181	20%
E4	430	15%	430	15%	194	16%	194	16%
F-1	153	22%	153	22%	174	16%	174	16%
F-2	176	19%	176	19%	75	20%	75	20%
G1	229	30%	229	30%	116	34%	116	34%
G2	492	24%	492	24%	115	31%	115	31%
G3	118	25%	118	25%	39	51%	39	51%
G4	575	26%	575	26%	124	36%	124	36%
G5	428	23%	428	23%	135	51%	135	51%
G6	136	62%	136	62%	120	17%	120	17%
G7	774	23%	774	23%	167	40%	167	40%
G8	282	57%	282	57%	229	18%	229	18%
G9	843	21%	843	21%	173	36%	173	36%
H-1	248	28%	248	28%	55	42%	55	42%
H-2	310	24%	310	24%	70	37%	70	37%
I1	867	24%	867	24%	185	54%	185	54%
I2	123	61%	123	61%	116	21%	116	21%
J	193	28%	193	28%	120	21%	120	21%
K-1	353	27%	353	27%	69	45%	69	45%
K-2	170	54%	170	54%	119	18%	119	18%

Estimation of Ingress Traffic at Proposed Depot

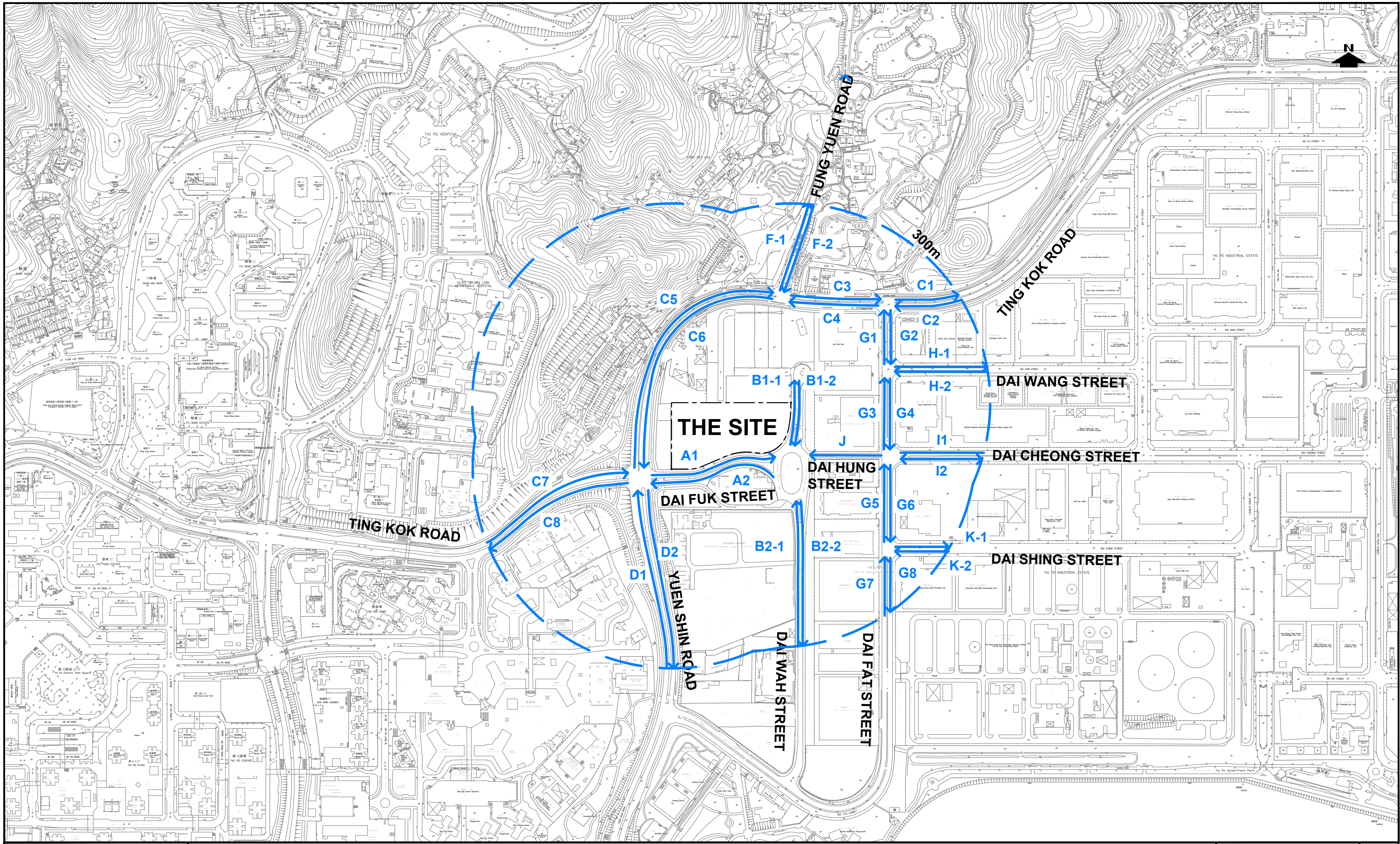
Estimation of In-bound Traffic at Proposed Tai Po Depot

Time Slot	Vehicle Type							Other (Please Specify)	Total
	Private Car	Motor Cycle	Light Bus/Large Van	Medium Van	Light Truck	Other (Please Specify)	E-Bus		
0600-0700							2		2
0700-0800							0		0
0800-0900							1		1
0900-1000							1		1
1000-1100							9		9
1100-1200							18		18
1200-1300							30		30
1300-1400							11		11
1400-1500							3		3
1500-1600							0		0
1600-1700							0		0
1700-1800							0		0
1800-1900							0		0
1900-2000							37		37
2000-2100							36		36
2100-2200							20		20
2200-2300							36		36
2300-2400							97		97
2400-0100							85		85
0100-0200							80		80
0200-0300							0		0
0300-0400							0		0
0400-0500							2		2
0500-0600							2		2
	0	0	0	0	0	0	472	Total	472

Estimation of Egress Traffic at Proposed Depot

Estimation of Out-bound Traffic at Proposed Tai Po Depot

Time Slot	Vehicle Type							Other (Please Specify)	Total
	Private Car	Motor Cycle	Light Bus/Large Van	Medium Van	Light Truck	Other (Please Specify)	E-Bus		
0600-0700							150		150
0700-0800							60		60
0800-0900							0		0
0900-1000							1		1
1000-1100							2		2
1100-1200							0		0
1200-1300							11		11
1300-1400							8		8
1400-1500							10		10
1500-1600							20		20
1600-1700							7		7
1700-1800							7		7
1800-1900							3		3
1900-2000							17		17
2000-2100							20		20
2100-2200							0		0
2200-2300							0		0
2300-2400							0		0
2400-0100							0		0
0100-0200							0		0
0200-0300							0		0
0300-0400							0		0
0400-0500							32		32
0500-0600							120		120
	0	0	0	0	0	0	469	Total	469



PROJECT NO.
40708

PROJECT TITLE
PROPOSED BUS DEPOT AT DAI FUK STREET, TAI PO, NEW TERRITORIES - S16 PLANNING APPLICATION

DRAWING NO.
FIGURE N1

REV.
A

DESIGNED **SLN**
DATE **MAR 2021**
DRAWN **CLL**
SCALE **1:7500**
CHECKED **SLN**

DRAWING TITLE
ROAD SECTIONS WITHIN 300m OF THE SITE

LLA 顧問有限公司
Consultancy Limited

FILE. G:\PROJECT\40708\DATA\DWG\FIGURE_N1A.DWG PLOT SCALE : 1 = 1

Appendix 7.3

Result Summary of Traffic Noise Impact Assessment

Project No. 1849
KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po
Appendix 7.3 - Result Summary of Traffic Noise Impact Assessment
Predicted noise levels for "With Project" and "Without Project" Scenarios during Ingress and Egress Peak in Year 2040

NSRID	NAP ID	Floor	mPD	Egress Peak Traffic Noise in Year 2040 (06:00-07:00) $L_{10(1hr)}$ dBA			Ingress Peak Hour Traffic Noise in Year 2040 (23:00-00:00) $L_{10(1hr)}$ dBA		
				Without Project	**With Project**	**Difference**	**Without Project**	**With Project**	**Difference**
NSR01	NAP101	1/F	10	74	74	0	70.6	70.6	0
NSR02	NAP201	1/F	5.3	77	77.1	0.1	73.6	73.7	0.1
	NAP202	1/F	5.3	75.5	75.6	0.1	72.1	72.2	0.1
	NAP203	1/F	5.3	74.4	74.6	0.2	71	71.3	0.3
NSR03	NAP301	8/F	19.6	70.3	70.7	0.4	67	67.6	0.6
	NAP301	9/F	22.8	70.5	70.9	0.4	67.1	67.7	0.6
	NAP301	10/F	26	70.5	70.9	0.4	67.1	67.6	0.5
	NAP301	11/F	29.2	70.4	70.8	0.4	67.1	67.6	0.5
	NAP301	12/F	32.4	70.4	70.8	0.4	67	67.5	0.5
	NAP301	15/F	35.6	70.3	70.7	0.4	67	67.5	0.5
	NAP301	16/F	38.8	70.3	70.6	0.3	66.9	67.4	0.5
	NAP301	17/F	42	70.2	70.6	0.4	66.9	67.4	0.5
	NAP301	18/F	45.2	70.1	70.5	0.4	66.8	67.3	0.5
	NAP301	19/F	48.4	70.1	70.5	0.4	66.7	67.2	0.5
	NAP301	20/F	51.6	70	70.4	0.4	66.7	67.2	0.5
	NAP301	21/F	54.8	69.9	70.3	0.4	66.6	67.1	0.5
	NAP301	22/F	58	69.9	70.3	0.4	66.5	67	0.5
	NAP301	23/F	61.2	69.8	70.2	0.4	66.4	66.9	0.5
	NAP301	25/F	64.4	69.7	70.1	0.4	66.4	66.9	0.5
	NAP301	26/F	67.6	69.6	70	0.4	66.3	66.8	0.5
	NAP301	27/F	70.8	69.6	70	0.4	66.2	66.7	0.5
	NAP301	28/F	74	69.5	69.9	0.4	66.2	66.7	0.5
	NAP301	29/F	77.2	69.4	69.8	0.4	66.1	66.6	0.5
	NAP301	30/F	80.4	69.4	69.7	0.3	66	66.5	0.5
	NAP301	31/F	83.6	69.3	69.7	0.4	65.9	66.4	0.5
	NAP301	32/F	86.8	69.2	69.6	0.4	65.8	66.3	0.5
	NAP301	33/F	90	69.1	69.5	0.4	65.8	66.3	0.5
	NAP301	35/F	93.2	69	69.4	0.4	65.7	66.2	0.5
	NAP301	36/F	96.4	69	69.4	0.4	65.6	66.1	0.5
	NAP301	37/F	99.6	68.9	69.3	0.4	65.6	66	0.4
	NAP301	38/F	102.8	68.8	69.2	0.4	65.5	66	0.5
	NAP301	39/F	106	68.8	69.2	0.4	65.4	65.9	0.5

NSRID	NAP ID	Floor	mPD	Egress Peak Traffic Noise in Year 2040 (06:00-07:00) $L_{10(1hr)}$ dBA			Ingress Peak Hour Traffic Noise in Year 2040 (23:00-00:00) $L_{10(1hr)}$ dBA		
				Without Project	With Project	Difference	Without Project	With Project	Difference
NSR03	NAP302	8/F	19.6	73.9	74.4	0.5	70.7	71.4	0.7
	NAP302	9/F	22.8	73.8	74.3	0.5	70.6	71.4	0.8
	NAP302	10/F	26	73.7	74.2	0.5	70.6	71.3	0.7
	NAP302	11/F	29.2	73.7	74.2	0.5	70.5	71.2	0.7
	NAP302	12/F	32.4	73.6	74.1	0.5	70.4	71.1	0.7
	NAP302	15/F	35.6	73.5	74	0.5	70.3	71	0.7
	NAP302	16/F	38.8	73.4	73.9	0.5	70.2	70.9	0.7
	NAP302	17/F	42	73.3	73.8	0.5	70.2	70.8	0.6
	NAP302	18/F	45.2	73.2	73.8	0.6	70.1	70.8	0.7
	NAP302	19/F	48.4	73.1	73.6	0.5	70	70.6	0.6
	NAP302	20/F	51.6	73	73.6	0.6	69.9	70.5	0.6
	NAP302	21/F	54.8	73	73.5	0.5	69.8	70.5	0.7
	NAP302	22/F	58	72.8	73.3	0.5	69.7	70.3	0.6
	NAP302	23/F	61.2	72.7	73.3	0.6	69.6	70.2	0.6
	NAP302	25/F	64.4	72.6	73.2	0.6	69.5	70.1	0.6
	NAP302	26/F	67.6	72.6	73.1	0.5	69.4	70	0.6
	NAP302	27/F	70.8	72.5	73	0.5	69.3	69.9	0.6
	NAP302	28/F	74	72.3	72.9	0.6	69.2	69.8	0.6
	NAP302	29/F	77.2	72.3	72.8	0.5	69.1	69.7	0.6
	NAP302	30/F	80.4	72.2	72.7	0.5	69	69.6	0.6
	NAP302	31/F	83.6	72.1	72.6	0.5	68.9	69.5	0.6
	NAP302	32/F	86.8	72	72.5	0.5	68.8	69.4	0.6
	NAP302	33/F	90	71.9	72.4	0.5	68.7	69.3	0.6
	NAP302	35/F	93.2	71.8	72.3	0.5	68.6	69.2	0.6
	NAP302	36/F	96.4	71.7	72.2	0.5	68.5	69.2	0.7
	NAP302	37/F	99.6	71.6	72.1	0.5	68.4	69.1	0.7
	NAP302	38/F	102.8	71.5	72	0.5	68.3	69	0.7
	NAP302	39/F	106	71.4	71.9	0.5	68.2	68.9	0.7
NSR03	NAP303	8/F	19.6	72.7	73.3	0.6	69.6	70.5	0.9
	NAP303	9/F	22.8	72.6	73.2	0.6	69.5	70.4	0.9
	NAP303	10/F	26	72.5	73.1	0.6	69.4	70.3	0.9
	NAP303	11/F	29.2	72.4	73	0.6	69.3	70.2	0.9
	NAP303	12/F	32.4	72.3	72.9	0.6	69.2	70.1	0.9
	NAP303	15/F	35.6	72.2	72.8	0.6	69.1	70	0.9
	NAP303	16/F	38.8	72.1	72.7	0.6	69	69.9	0.9
	NAP303	17/F	42	71.9	72.6	0.7	68.9	69.7	0.8
	NAP303	18/F	45.2	71.8	72.5	0.7	68.8	69.6	0.8
	NAP303	19/F	48.4	71.7	72.4	0.7	68.6	69.5	0.9
	NAP303	20/F	51.6	71.6	72.2	0.6	68.5	69.4	0.9
	NAP303	21/F	54.8	71.5	72.1	0.6	68.4	69.2	0.8
	NAP303	22/F	58	71.3	72	0.7	68.3	69.1	0.8
	NAP303	23/F	61.2	71.2	71.9	0.7	68.2	69	0.8
	NAP303	25/F	64.4	71.1	71.8	0.7	68	68.9	0.9
	NAP303	26/F	67.6	71	71.6	0.6	67.9	68.7	0.8
	NAP303	27/F	70.8	70.9	71.5	0.6	67.8	68.6	0.8
	NAP303	28/F	74	70.7	71.4	0.7	67.7	68.5	0.8
	NAP303	29/F	77.2	70.6	71.3	0.7	67.6	68.4	0.8
	NAP303	30/F	80.4	70.5	71.2	0.7	67.5	68.3	0.8
	NAP303	31/F	83.6	70.4	71.1	0.7	67.3	68.2	0.9
	NAP303	32/F	86.8	70.3	71	0.7	67.2	68.1	0.9
	NAP303	33/F	90	70.2	70.8	0.6	67.1	67.9	0.8
	NAP303	35/F	93.2	70.1	70.7	0.6	67	67.8	0.8
	NAP303	36/F	96.4	70	70.6	0.6	66.9	67.7	0.8
	NAP303	37/F	99.6	69.9	70.5	0.6	66.8	67.6	0.8
	NAP303	38/F	102.8	69.8	70.4	0.6	66.7	67.5	0.8
	NAP303	39/F	106	69.7	70.4	0.7	66.6	67.4	0.8

Project No. 1849
KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po
Appendix 7.3 - Result Summary of Traffic Noise Impact Assessment
Predicted noise levels for "With Project" and "Without Project" Scenarios during Ingress and Egress Peak in Year 2040

NSRID	NAP ID	Floor	mPD	Egress Peak Traffic Noise in Year 2040 (06:00-07:00) $L_{10(1hr)}$ dBA			Ingress Peak Hour Traffic Noise in Year 2040 (23:00-00:00) $L_{10(1hr)}$ dBA		
				Without Project	With Project	Difference	Without Project	With Project	Difference
NSR04	NAP401	G/F	5.4	74.7	75.5	0.8	71.6	72.2	0.6
	NAP401	1/F	12.4	75	75.7	0.7	71.8	72.4	0.6
	NAP401	2/F	15.9	75	75.7	0.7	71.9	72.4	0.5
	NAP401	3/F	19.4	74.9	75.7	0.8	71.8	72.3	0.5
	NAP401	4/F	22.9	74.8	75.5	0.7	71.7	72.2	0.5
	NAP401	5/F	26.4	74.7	75.4	0.7	71.5	72.1	0.6
	NAP401	6/F	29.9	74.5	75.3	0.8	71.4	72	0.6
NSR04	NAP402	G/F	5.4	73	73.7	0.7	70	70.9	0.9
	NAP402	1/F	12.4	73	73.7	0.7	70	70.8	0.8
	NAP402	2/F	15.9	72.9	73.6	0.7	70	70.8	0.8
	NAP402	3/F	19.4	72.9	73.6	0.7	69.9	70.8	0.9
	NAP402	4/F	22.9	72.8	73.5	0.7	69.9	70.7	0.8
	NAP402	5/F	26.4	72.8	73.5	0.7	69.8	70.6	0.8
	NAP402	6/F	29.9	72.7	73.4	0.7	69.7	70.6	0.9

Appendix 8.1

Background Noise Measurement Summary and Photo

Project: **Proposed KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po**
Subject: **Results of Prevailing Background Noise Surveys**

Date:	From 27 September 2021 to 28 September 2021	
Time:	Daytime	0700-0800
	Evening Time	2200-2300
	Nighttime	0400-0500
Survey Personnel:	Mr. Alvin Chow and Mr. Andrew Cham	
Weather Condition:	Fine	
Instrumentation:	Sound Level Meters (NT1 XL2)/ Calibrator (RION NC-73)	

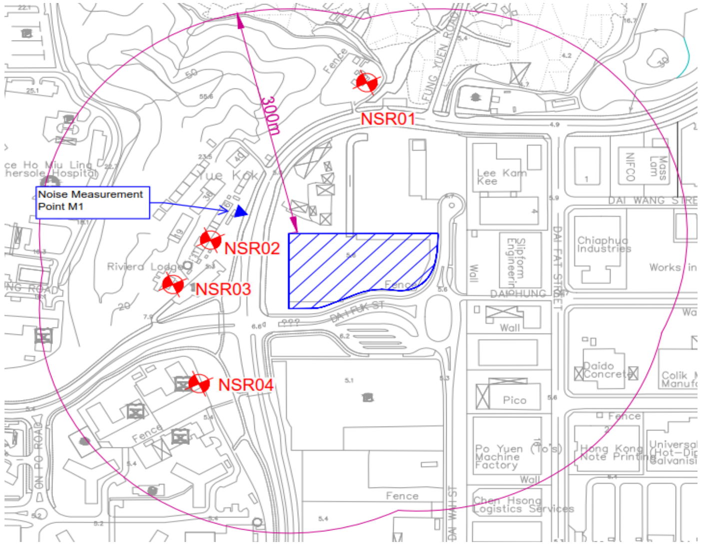


Figure - Location of NSRs and Background Noise Measurement Point

Represented NMP ID	Session	Date	Time	Measured Background Noise Level	Type of Measurement	Applicable Façade Correction	Corrected Background Noise Level
				L90 (1hr), dB(A)		dB(A)	dB(A), L90 (1hr)
M1	Daytime	28-Sep-21	0700-0800	57	Free-field	3	60
	Evening Time	27-Sep-21	2200-2300	53	Free-field	3	56
	Nighttime	28-Sep-21	0400-0500	49	Free-field	3	52

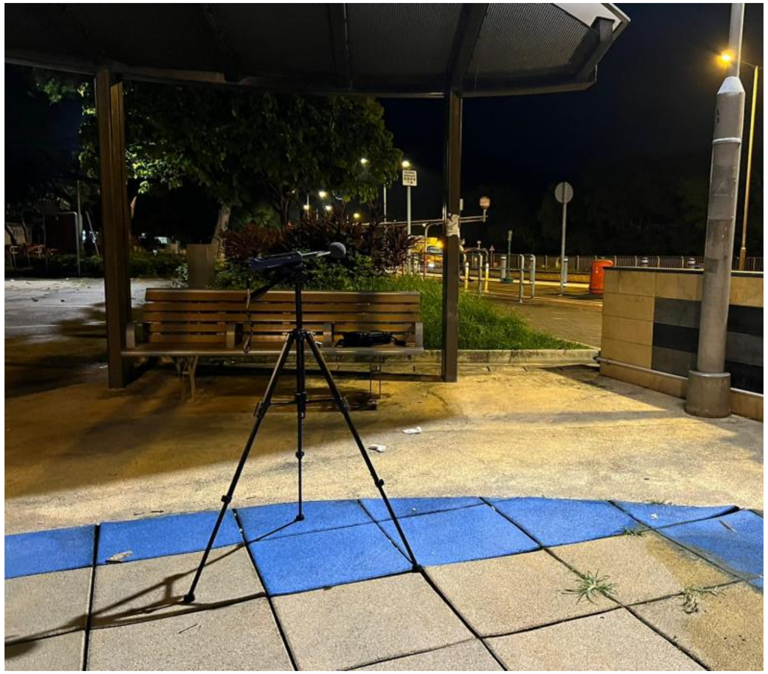
Note:

[1] L90 (1 hour) is used as a measure of the background noise level.

[2] As the measurements were conducted in free-field condition, +3.0 dB(A) have been added to the measured noise levels to represent the measurement at 1m from a building façade.

Project: **Proposed KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po**
Subject: **Photos of Background Noise Measurement**

Date:	From 27 September 2021 to 28 September 2021	
Time:	Daytime	0700-0800
	Evening Time	2200-2300
	Nighttime	0400-0500
Survey Personnel:	Mr. Alvin Chow and Mr. Andrew Cham	
Weather Condition:	Fine	
Instrumentation:	Sound Level Meters (NT1 XL2)/ Calibrator (RION NC-73)	



Appendix 8.2

Inventory of Vehicle Repair/ Testing Activities in the Proposed Project

KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po
Fixed Noise Impact Asssessment (Vehicle Repair and Testing Activities)
Appendix 8.2 - List of Vehicle Repair/ Testing Activities at Proposed Depot

Item	Vehicle Repair/ Testing Activities	Equipment	Noise Source	Max SWL, dB(A)	Maximum Operation Duration per event, mins	Maximum Operation Time of Equipment in 30min in each zone, mins	Maximum Operation Freqency within Depot, nos./30min	Maximum Operation Frequency within Depot per Day	Reference	Remarks
1	Bus Parking	/	N	-	-	-	-	-	-	Based on site inspection, bus is moving at a low speed within covered depot at desiganted parking area, it is not regarded as noise soruce.
2	Bus Washing	Automatic Bus Washing Machine	Y	101	2	30	60	363	SWL obtained from DIR-136/2006	-
3	Tyre Changing/ Charging	Pneumatic Tools	Y	98	10	10	8	128	SWL obtained from EIA-216/2013	-
4	Parts Replacement	Pneumatic Tools for screw fastening	Y	100	2	2	8	128	SWL obtained from EIA-216/2013	-
5	Motor Testing	/	N	-	-	-	-	-	-	Based on site inspection, it is about switching on the motor to test if it runs smoothly, no noticeable noise is found so it is not regarded as noise source.
6	Battery Charging	Automatic Battery Charger	N	-	-	-	-	-	-	Buses remain static when charging, so it is not regarded as noise source.
7	Braking Test	Brake Tester	Y	99	2	2	1	4	SWL obtained from EIA-216/2013	Braking Test will be taken place on irregular basis due to operational needs. The on-time % is assumed to represent worse case scenario.
8	Bus Compartment Cleaning	/	N	-	-	-	-	-	-	Daily operational cleaning will be carried inside the bus compartment during parking. As eBuses remain static when cleaning, it is anticipated no noticeable noise will be found.

Remarks

[1] Bus washing will be carried out for all eBuses when they return to depot. As 363 nos of parking space will be provided, which is equivalent to maximum operation frequency within depot per day

[2] It is verified by operator that approximate 1/3 of bus fleet will undergo vehicle repair/ testing activities and bus washing will be carried out for all buses for daily operation

[3] It is assumed that the tyre changing/charging and parts replacement will be carried out within 8 hours per day.

[4] Braking Tests will be taken place on irregular basis due to operational needs within covered maintenance bays

[5] The quantities of vehicle repair / testing facilities had been verified with the future users. The maximum nos. of concurrent operations of vehicle repair/ testing activities would be dictated by the quantities of facilities/ tools equipped in the proposed project.

[6] A correction of -10 dB(A) was adopted if the external louvres and fixed plant were totally screened by substantial barriers or buildings outside the project or building structures of the project.

[7] The operation duration and frequency of the vehicle repair / testing activities had been obtained from, verified with and confirmed by the future users. The on-time % had been taken into consideration of daily operation needs, time requirements for preparation and setting up of each activity.

[8] Correction Factor for quantity= 10 log (quantity)

[9] Distance correction for SWL= 20 log (distance) + 8

[10] Correction for percentage on-time over 30 mins = 10 log (on-time %)

[11] Detailed design of the plant rooms is not yet available at this stage.

[12] The maximum allowable SWLs for equipment were determined by adopting standard acoustics principles. The following formula was used for calculating the SPLs at NSRs =

SPL= Max SWL+DC+QC+FC+BC+OC+TC+IMC+INTC

SPL	Sound Pressure Level (dB(A))
Max SWL	Maximum allowable Sound Power Level (dB(A))
DC	Distance Attenuation (dB(A))
QC	Quantitiy Correction (dB(A))
FC	Façade Correction (dB(A))
BC	Barrier Correction (dB(A))
OC	Percentage on-time Correction (dB(A))
TC	Correction for Tonality (dB(A))
IMC	Correction for Impulsiveness (dB(A))
INTC	Corrrection for Intermittency (dB(A))

The SWL of the equipment shall not exceed the specified Maximum Allowable SWL in order to achieve the noise criteria. Acoustic treatment would be installed as appropriate to achieve the required SWL.

[13] All maximum allowable SWLs are rounded to the nearest whole dB(A).

[14] As the maximum allowable SWLs were adopted, which the SWL of each equipment may be lower in actual case. The predicted noise level represents a conservative estimation.

Appendix 8.3

Detail Calculations for Fixed Plant Noise Impact Assessment (Vehicle Repair and Testing Activities)

KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po

Appendix 8.3 Detail Calculations for Fixed Plant Noise Impact Assessment (Vehicular Repair and Testing Activities)

NAP	NAP101_1F	Source ID/ Zone	Source Description	SWL, dB(A)	Slant Distance, m	Maximum Quantity	Operation duration per event, min	On Time % over 30 mins	Correction, dB(A)						Predicted Noise Level
Descripton	63 Ting Kok Rd								Distance	Quantity	Barrier	On Time %	Façade	Tonal	dB(A)
x	836466.8	V1	Bus Washing	101	207.1	1	2	100%	-54.3	0	-10	0.0	3	0	40
y	835564.6	V2	Bus Washing	101	218.9	1	2	100%	-54.8	0	-10	0.0	3	0	39
z	8.5	V3	Bus Washing	101	202.0	1	2	100%	-54.1	0	-10	0.0	3	0	40
Period	Nighttime	V4	Bus Washing	101	214.0	1	2	100%	-54.6	0	-10	0.0	3	0	39
Noise Criteria	50 dB(A)	V5	Tyre Changing/ Charging	98	211.1	1	10	33%	-54.5	0	-10	-4.8	3	0	32
			Parts Replacement	100	211.1	1	2	7%	-54.5	0	-10	-11.8	3	0	27
		V6	Tyre Changing/ Charging	98	247.0	2	10	33%	-55.9	3	-10	-4.8	3	0	33
			Parts Replacement	100	247.0	2	2	7%	-55.9	3	-10	-11.8	3	0	28
			Braking Test	99	247.0	1	2	7%	-55.9	0	-10	-11.8	3	0	24
		V7	Tyre Changing/ Charging	98	228.6	1	10	33%	-55.2	0	-10	-4.8	3	0	31
			Parts Replacement	100	228.6	1	2	7%	-55.2	0	-10	-11.8	3	0	26
		V8	Tyre Changing/ Charging	98	204.2	1	10	33%	-54.2	0	-10	-4.8	3	0	32
			Parts Replacement	100	204.2	1	2	7%	-54.2	0	-10	-11.8	3	0	27
		V9	Tyre Changing/ Charging	98	211.9	1	10	33%	-54.5	0	-10	-4.8	3	0	32
			Parts Replacement	100	211.9	1	2	7%	-54.5	0	-10	-11.8	3	0	27
		V10	Tyre Changing/ Charging	98	236.6	1	10	33%	-55.5	0	-10	-4.8	3	0	31
			Parts Replacement	100	236.6	1	2	7%	-55.5	0	-10	-11.8	3	0	26
		V11	Tyre Changing/ Charging	98	242.9	1	10	33%	-55.7	0	-10	-4.8	3	0	31
			Parts Replacement	100	242.9	1	2	7%	-55.7	0	-10	-11.8	3	0	26
														Predicted Total Fixed Noise Level, dB(A)	47

Remarks

[1] The maximum allowable SWLs for equipment were determined by adopting standard acoustics principles. The following formula was used for calculating the SPLs at NSRs =

SPL= Max SWL+DC+QC+FC+BC+OC+TC+IMC+INTC

SPL	Sound Pressure Level (dB(A))
Max SWL	Maximum allowable Sound Power Level (dB(A))
DC	Distance Attenuation (dB(A))
QC	Quantitiy Correction (dB(A))
FC	Façade Correction (dB(A))
BC	Barrier Correction (dB(A))
OC	Percentage on-time Correction (dB(A))
TC	Correction for Tonality (dB(A))
IMC	Correction for Impulsiveness (dB(A))
INTC	Corrrection for Intermittency (dB(A))

The SWL of the equipment shall not exceed the specified Maximum Allowable SWL in order to achieve the noise criteria. Acoustic treatment would be installed as appropriate to achieve the required SWL.

[2] In view of operation need and larger area of V6, the quantity of activities for "tyre changing / charging" and "part replacement" in source 6 is different from other similar sources. 2no. is assumed for these activities and confirmed by the operator.

NAP	NAP201_1F	Source ID/ Zone	Source Description	SWL, dB(A)	Slant Distance, m	Maximum Quantity	Operation duration per event, min	On Time % over 30 mins	Correction, dB(A)						Predicted Noise Level
Descripton	Yue Kok Village								Distance	Quantity	Barrier	On Time %	Façade	Tonal	dB(A)
x	836335.7	V1	Bus Washing	101	192.1	1	2	100%	-53.7	0	-10	0.0	3	0	40
y	835434.1	V2	Bus Washing	101	196.9	1	2	100%	-53.9	0	-10	0.0	3	0	40
z	6.5	V3	Bus Washing	101	160.2	1	2	100%	-52.1	0	-10	0.0	3	0	42
Period	Nighttime	V4	Bus Washing	101	165.8	1	2	100%	-52.4	0	-10	0.0	3	0	42
Noise Criteria	52 dB(A)	V5	Tyre Changing/ Charging	98	115.8	1	10	33%	-49.3	0	-10	-4.8	3	0	37
			Parts Replacement	100	115.8	1	2	7%	-49.3	0	-10	-11.8	3	0	32
		V6	Tyre Changing/ Charging	98	132.1	2	10	33%	-50.4	3	-10	-4.8	3	0	39
			Parts Replacement	100	132.1	2	2	7%	-50.4	3	-10	-11.8	3	0	34
			Braking Test	99	132.1	1	2	7%	-50.4	0	-10	-11.8	3	0	30
		V7	Tyre Changing/ Charging	98	182.3	1	10	33%	-53.2	0	-10	-4.8	3	0	33
			Parts Replacement	100	182.3	1	2	7%	-53.2	0	-10	-11.8	3	0	28
		V8	Tyre Changing/ Charging	98	148.2	1	10	33%	-51.4	0	-10	-4.8	3	0	35
			Parts Replacement	100	148.2	1	2	7%	-51.4	0	-10	-11.8	3	0	30
		V9	Tyre Changing/ Charging	98	105.1	1	10	33%	-48.4	0	-10	-4.8	3	0	38
			Parts Replacement	100	105.1	1	2	7%	-48.4	0	-10	-11.8	3	0	33
		V10	Tyre Changing/ Charging	98	135.3	1	10	33%	-50.6	0	-10	-4.8	3	0	36
			Parts Replacement	100	135.3	1	2	7%	-50.6	0	-10	-11.8	3	0	31
		V11	Tyre Changing/ Charging	98	119.3	1	10	33%	-49.5	0	-10	-4.8	3	0	37
			Parts Replacement	100	119.3	1	2	7%	-49.5	0	-10	-11.8	3	0	32
														Predicted Total Fixed Noise Level, dB(A)	50

NAP	NAP202_1F	Source ID/ Zone	Source Description	SWL, dB(A)	Slant Distance, m	Maximum Quantity	Operation duration per event, min	On Time % over 30 mins	Correction, dB(A)						Predicted Noise Level
Descripton	Yue Kok Village								Distance	Quantity	Barrier	On Time %	Façade	Tonal	dB(A)
x	836312.4	V1	Bus Washing	101	204.1	1	2	100%	-54.2	0	-10	0.0	3	0	40
y	835393.4	V2	Bus Washing	101	206.2	1	2	100%	-54.3	0	-10	0.0	3	0	40
z	6.5	V3	Bus Washing	101	169.6	1	2	100%	-52.6	0	-10	0.0	3	0	41
Period	Nighttime	V4	Bus Washing	101	172.1	1	2	100%	-52.7	0	-10	0.0	3	0	41
Noise Criteria	52 dB(A)	V5	Tyre Changing/ Charging	98	116.1	1	10	33%	-49.3	0	-10	-4.8	3	0	37
			Parts Replacement	100	116.1	1	2	7%	-49.3	0	-10	-11.8	3	0	32
		V6	Tyre Changing/ Charging	98	119.0	2	10	33%	-49.5	3	-10	-4.8	3	0	40
			Parts Replacement	100	119.0	2	2	7%	-49.5	3	-10	-11.8	3	0	35
			Braking Test	99	119.0	1	2	7%	-49.5	0	-10	-11.8	3	0	31
		V7	Tyre Changing/ Charging	98	186.4	1	10	33%	-53.4	0	-10	-4.8	3	0	33
			Parts Replacement	100	186.4	1	2	7%	-53.4	0	-10	-11.8	3	0	28
		V8	Tyre Changing/ Charging	98	155.5	1	10	33%	-51.8	0	-10	-4.8	3	0	34
			Parts Replacement	100	155.5	1	2	7%	-51.8	0	-10	-11.8	3	0	29
		V9	Tyre Changing/ Charging	98	103.6	1	10	33%	-48.3	0	-10	-4.8	3	0	38
			Parts Replacement	100	103.6	1	2	7%	-48.3	0	-10	-11.8	3	0	33
		V10	Tyre Changing/ Charging	98	127.7	1	10	33%	-50.1	0	-10	-4.8	3	0	36
			Parts Replacement	100	127.7	1	2	7%	-50.1	0	-10	-11.8	3	0	31
		V11	Tyre Changing/ Charging	98	104.8	1	10	33%	-48.4	0	-10	-4.8	3	0	38
			Parts Replacement	100	104.8	1	2	7%	-48.4	0	-10	-11.8	3	0	33
														Predicted Total Fixed Noise Level, dB(A)	50

NAP	NAP203_1F	Source ID/ Zone	Source Description	SWL, dB(A)	Slant Distance, m	Maximum Quantity	Operation duration per event, min	On Time % over 30 mins	Correction, dB(A)						Predicted Noise Level
Descripton	Yue Kok Village								Distance	Quantity	Barrier	On Time %	Façade	Tonal	dB(A)
x	836292.8	V1	Bus Washing	101	221.4	1	2	100%	-54.9	0	-10	0.0	3	0	39
y	835359.6	V2	Bus Washing	101	221.6	1	2	100%	-54.9	0	-10	0.0	3	0	39
z	6.5	V3	Bus Washing	101	186.5	1	2	100%	-53.4	0	-10	0.0	3	0	41
Period	Nighttime	V4	Bus Washing	101	186.6	1	2	100%	-53.4	0	-10	0.0	3	0	41
Noise Criteria	52 dB(A)	V5	Tyre Changing/ Charging	98	130.2	1	10	33%	-50.3	0	-10	-4.8	3	0	36
			Parts Replacement	100	130.2	1	2	7%	-50.3	0	-10	-11.8	3	0	31
		V6	Tyre Changing/ Charging	98	121.7	2	10	33%	-49.7	3	-10	-4.8	3	0	40
			Parts Replacement	100	121.7	2	2	7%	-49.7	3	-10	-11.8	3	0	35
			Braking Test	99	121.7	1	2	7%	-49.7	0	-10	-11.8	3	0	31
		V7	Tyre Changing/ Charging	98	198.6	1	10	33%	-54.0	0	-10	-4.8	3	0	32
			Parts Replacement	100	198.6	1	2	7%	-54.0	0	-10	-11.8	3	0	27
		V8	Tyre Changing/ Charging	98	171.5	1	10	33%	-52.7	0	-10	-4.8	3	0	34
			Parts Replacement	100	171.5	1	2	7%	-52.7	0	-10	-11.8	3	0	29
		V9	Tyre Changing/ Charging	98	117.8	1	10	33%	-49.4	0	-10	-4.8	3	0	37
			Parts Replacement	100	117.8	1	2	7%	-49.4	0	-10	-11.8	3	0	32
		V10	Tyre Changing/ Charging	98	134.4	1	10	33%	-50.6	0	-10	-4.8	3	0	36
			Parts Replacement	100	134.4	1	2	7%	-50.6	0	-10	-11.8	3	0	31
		V11	Tyre Changing/ Charging	98	108.1	1	10	33%	-48.7	0	-10	-4.8	3	0	38
			Parts Replacement	100	108.1	1	2	7%	-48.7	0	-10	-11.8	3	0	33
														Predicted Total Fixed Noise Level, dB(A)	49

Remarks

[1] The maximum allowable SWLs for equipment were determined by adopting standard acoustics principles. The following formula was used for calculating the SPLs at NSRs =

SPL= Max SWL+DC+QC+FC+BC+OC+TC+IMC+INTC

SPL	Sound Pressure Level (dB(A))
Max SWL	Maximum allowable Sound Power Level (dB(A))
DC	Distance Attenuation (dB(A))
QC	Quantitiy Correction (dB(A))
FC	Façade Correction (dB(A))
BC	Barrier Correction (dB(A))
OC	Percentage on-time Correction (dB(A))
TC	Correction for Tonality (dB(A))
IMC	Correction for Impulsiveness (dB(A))
INTC	Corrrection for Intermittency (dB(A))

The SWL of the equipment shall not exceed the specified Maximum Allowable SWL in order to achieve the noise criteria. Acoustic treatment would be installed as appropriate to achieve the required SWL.

[2] In view of operation need and larger area of V6, the quantity of activities for "tyre changing / charging" and "part replacement" in source 6 is different from other similar sources. 2no. is assumed for these activities and confirmed by the operator.

KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po
Appendix 8.3 Detail Calculations for Fixed Plant Noise Impact Assessment (Vehicular Repair and Testing Activities)

NAP	NAP301_8F	Source ID/ Zone	Source Description	SWL, dB(A)	Slant Distance, m	Maximum Quantity	Operation duration per event, min	On Time % over 30 mins	Correction, dB(A)						Predicted Noise Level
Descripton	Riviera Lodge								Distance	Quantity	Barrier	On Time %	Façade	Tonal	dB(A)
x	836246.4	V1	Bus Washing	101	273.2	1	2	100%	-56.7	0	-10	0.0	3	0	37
y	835311.5	V2	Bus Washing	101	271.1	1	2	100%	-56.7	0	-10	0.0	3	0	37
z	20.8	V3	Bus Washing	101	239.0	1	2	100%	-55.6	0	-10	0.0	3	0	38
Period	Nighttime	V4	Bus Washing	101	236.7	1	2	100%	-55.5	0	-10	0.0	3	0	39
Noise Criteria	52 dB(A)	V5	Tyre Changing/ Charging	98	183.3	1	10	33%	-53.3	0	-10	-4.8	3	0	33
			Parts Replacement	100	183.3	1	2	7%	-53.3	0	-10	-11.8	3	0	28
		V6	Tyre Changing/ Charging	98	164.2	2	10	33%	-52.3	3	-10	-4.8	3	0	37
			Parts Replacement	100	164.2	2	2	7%	-52.3	3	-10	-11.8	3	0	32
			Braking Test	99	164.2	1	2	7%	-52.3	0	-10	-11.8	3	0	28
		V7	Tyre Changing/ Charging	98	245.6	1	10	33%	-55.8	0	-10	-4.8	3	0	30
			Parts Replacement	100	245.6	1	2	7%	-55.8	0	-10	-11.8	3	0	25
		V8	Tyre Changing/ Charging	98	223.3	1	10	33%	-55.0	0	-10	-4.8	3	0	31
			Parts Replacement	100	223.3	1	2	7%	-55.0	0	-10	-11.8	3	0	26
		V9	Tyre Changing/ Charging	98	171.3	1	10	33%	-52.7	0	-10	-4.8	3	0	34
			Parts Replacement	100	171.3	1	2	7%	-52.7	0	-10	-11.8	3	0	29
		V10	Tyre Changing/ Charging	98	179.1	1	10	33%	-53.1	0	-10	-4.8	3	0	33
			Parts Replacement	100	179.1	1	2	7%	-53.1	0	-10	-11.8	3	0	28
		V11	Tyre Changing/ Charging	98	152.2	1	10	33%	-51.6	0	-10	-4.8	3	0	35
			Parts Replacement	100	152.2	1	2	7%	-51.6	0	-10	-11.8	3	0	30
														Predicted Total Fixed Noise Level, dB(A)	47

NAP	NAP301_23F	Source ID/ Zone	Source Description	SWL, dB(A)	Slant Distance, m	Maximum Quantity	Operation duration per event, min	On Time % over 30 mins	Correction, dB(A)						Predicted Noise Level
Descripton	Riviera Lodge								Distance	Quantity	Barrier	On Time %	Façade	Tonal	dB(A)
x	836246.4	V1	Bus Washing	101	278.6	1	2	100%	-56.9	0	-10	0.0	3	0	37
y	835311.5	V2	Bus Washing	101	276.7	1	2	100%	-56.8	0	-10	0.0	3	0	37
z	62.4	V3	Bus Washing	101	245.2	1	2	100%	-55.8	0	-10	0.0	3	0	38
Period	Nighttime	V4	Bus Washing	101	243.0	1	2	100%	-55.7	0	-10	0.0	3	0	38
Noise Criteria	52 dB(A)	V5	Tyre Changing/ Charging	98	191.4	1	10	33%	-53.6	0	-10	-4.8	3	0	33
			Parts Replacement	100	191.4	1	2	7%	-53.6	0	-10	-11.8	3	0	28
		V6	Tyre Changing/ Charging	98	173.1	2	10	33%	-52.8	3	-10	-4.8	3	0	36
			Parts Replacement	100	173.1	2	2	7%	-52.8	3	-10	-11.8	3	0	31
			Braking Test	99	173.1	1	2	7%	-52.8	0	-10	-11.8	3	0	27
		V7	Tyre Changing/ Charging	98	251.7	1	10	33%	-56.0	0	-10	-4.8	3	0	30
			Parts Replacement	100	251.7	1	2	7%	-56.0	0	-10	-11.8	3	0	25
		V8	Tyre Changing/ Charging	98	228.5	1	10	33%	-55.2	0	-10	-4.8	3	0	31
			Parts Replacement	100	228.5	1	2	7%	-55.2	0	-10	-11.8	3	0	26
		V9	Tyre Changing/ Charging	98	178.1	1	10	33%	-53.0	0	-10	-4.8	3	0	33
			Parts Replacement	100	178.1	1	2	7%	-53.0	0	-10	-11.8	3	0	28
		V10	Tyre Changing/ Charging	98	185.6	1	10	33%	-53.4	0	-10	-4.8	3	0	33
			Parts Replacement	100	185.6	1	2	7%	-53.4	0	-10	-11.8	3	0	28
		V11	Tyre Changing/ Charging	98	159.8	1	10	33%	-52.1	0	-10	-4.8	3	0	34
			Parts Replacement	100	159.8	1	2	7%	-52.1	0	-10	-11.8	3	0	29
														Predicted Total Fixed Noise Level, dB(A)	46

NAP	NAP301_39F	Source ID/ Zone	Source Description	SWL, dB(A)	Slant Distance, m	Maximum Quantity	Operation duration per event, min	On Time % over 30 mins	Correction, dB(A)						Predicted Noise Level
Descripton	Riviera Lodge								Distance	Quantity	Barrier	On Time %	Façade	Tonal	dB(A)
x	836246.4	V1	Bus Washing	101	291.2	1	2	100%	-57.3	0	-10	0.0	3	0	37
y	835311.5	V2	Bus Washing	101	289.3	1	2	100%	-57.2	0	-10	0.0	3	0	37
z	107.2	V3	Bus Washing	101	259.3	1	2	100%	-56.3	0	-10	0.0	3	0	38
Period	Nighttime	V4	Bus Washing	101	257.2	1	2	100%	-56.2	0	-10	0.0	3	0	38
Noise Criteria	52 dB(A)	V5	Tyre Changing/ Charging	98	209.2	1	10	33%	-54.4	0	-10	-4.8	3	0	32
			Parts Replacement	100	209.2	1	2	7%	-54.4	0	-10	-11.8	3	0	27
		V6	Tyre Changing/ Charging	98	192.6	2	10	33%	-53.7	3	-10	-4.8	3	0	36
			Parts Replacement	100	192.6	2	2	7%	-53.7	3	-10	-11.8	3	0	31
			Braking Test	99	192.6	1	2	7%	-53.7	0	-10	-11.8	3	0	27
		V7	Tyre Changing/ Charging	98	265.5	1	10	33%	-56.5	0	-10	-4.8	3	0	30
			Parts Replacement	100	265.5	1	2	7%	-56.5	0	-10	-11.8	3	0	25
		V8	Tyre Changing/ Charging	98	242.2	1	10	33%	-55.7	0	-10	-4.8	3	0	31
			Parts Replacement	100	242.2	1	2	7%	-55.7	0	-10	-11.8	3	0	26
		V9	Tyre Changing/ Charging	98	195.2	1	10	33%	-53.8	0	-10	-4.8	3	0	32
			Parts Replacement	100	195.2	1	2	7%	-53.8	0	-10	-11.8	3	0	27
		V10	Tyre Changing/ Charging	98	202.1	1	10	33%	-54.1	0	-10	-4.8	3	0	32
			Parts Replacement	100	202.1	1	2	7%	-54.1	0	-10	-11.8	3	0	27
		V11	Tyre Changing/ Charging	98	178.7	1	10	33%	-53.0	0	-10	-4.8	3	0	33
			Parts Replacement	100	178.7	1	2	7%	-53.0	0	-10	-11.8	3	0	28
														Predicted Total Fixed Noise Level, dB(A)	46

Remarks

[1] The maximum allowable SWLs for equipment were determined by adopting standard acoustics principles. The following formula was used for calculating the SPLs at NSRs =

SPL= Max SWL+DC+QC+FC+BC+OC+TC+IMC+INTC

SPL	Sound Pressure Level (dB(A))
Max SWL	Maximum allowable Sound Power Level (dB(A))
DC	Distance Attenuation (dB(A))
QC	Quantitiy Correction (dB(A))
FC	Façade Correction (dB(A))
BC	Barrier Correction (dB(A))
OC	Percentage on-time Correction (dB(A))
TC	Correction for Tonality (dB(A))
IMC	Correction for Impulsiveness (dB(A))
INTC	Corrrection for Intermittency (dB(A))

The SWL of the equipment shall not exceed the specified Maximum Allowable SWL in order to achieve the noise criteria. Acoustic treatment would be installed as appropriate to achieve the required SWL.

[2] In view of operation need and larger area of V6, the quantity of activities for "tyre changing / charging" and "part replacement" in source 6 is different from other similar sources. 2no. is assumed for these activities and confirmed by the operator.

NAP	NAP302_8F	Source ID/ Zone	Source Description	SWL, dB(A)	Slant Distance, m	Maximum Quantity	Operation duration per event, min	On Time % over 30 mins	Correction, dB(A)						Predicted Noise Level
Descripton	Riviera Lodge								**Distance**	**Quantity**	**Barrier**	**On Time %**	**Façade**	**Tonal**	**dB(A)**
x	836247.1	V1	Bus Washing	101	274.7	1	2	100%	-56.8	0	-10	0.0	3	0	37
y	835300.6	V2	Bus Washing	101	272.2	1	2	100%	-56.7	0	-10	0.0	3	0	37
z	20.8	V3	Bus Washing	101	240.9	1	2	100%	-55.6	0	-10	0.0	3	0	38
Period	Nighttime	V4	Bus Washing	101	238.0	1	2	100%	-55.5	0	-10	0.0	3	0	38
Noise Criteria	52 dB(A)	V5	Tyre Changing/ Charging	98	185.7	1	10	33%	-53.4	0	-10	-4.8	3	0	33
			Parts Replacement	100	185.7	1	2	7%	-53.4	0	-10	-11.8	3	0	28
		V6	Tyre Changing/ Charging	98	164.7	2	10	33%	-52.3	3	-10	-4.8	3	0	37
			Parts Replacement	100	164.7	2	2	7%	-52.3	3	-10	-11.8	3	0	32
			Braking Test	99	164.7	1	2	7%	-52.3	0	-10	-11.8	3	0	28
		V7	Tyre Changing/ Charging	98	246.3	1	10	33%	-55.8	0	-10	-4.8	3	0	30
			Parts Replacement	100	246.3	1	2	7%	-55.8	0	-10	-11.8	3	0	25
		V8	Tyre Changing/ Charging	98	225.3	1	10	33%	-55.1	0	-10	-4.8	3	0	31
			Parts Replacement	100	225.3	1	2	7%	-55.1	0	-10	-11.8	3	0	26
		V9	Tyre Changing/ Charging	98	174.1	1	10	33%	-52.8	0	-10	-4.8	3	0	33
			Parts Replacement	100	174.1	1	2	7%	-52.8	0	-10	-11.8	3	0	28
		V10	Tyre Changing/ Charging	98	180.0	1	10	33%	-53.1	0	-10	-4.8	3	0	33
			Parts Replacement	100	180.0	1	2	7%	-53.1	0	-10	-11.8	3	0	28
		V11	Tyre Changing/ Charging	98	153.4	1	10	33%	-51.7	0	-10	-4.8	3	0	35
			Parts Replacement	100	153.4	1	2	7%	-51.7	0	-10	-11.8	3	0	30
														Predicted Total Fixed Noise Level, dB(A)	47

NAP	NAP302_23F	Source ID/ Zone	Source Description	SWL, dB(A)	Slant Distance, m	Maximum Quantity	Operation duration per event, min	On Time % over 30 mins	Correction, dB(A)						Predicted Noise Level
Descripton	Riviera Lodge								**Distance**	**Quantity**	**Barrier**	**On Time %**	**Façade**	**Tonal**	**dB(A)**
x	836247.1	V1	Bus Washing	101	280.2	1	2	100%	-56.9	0	-10	0.0	3	0	37
y	835300.6	V2	Bus Washing	101	277.7	1	2	100%	-56.9	0	-10	0.0	3	0	37
z	62.4	V3	Bus Washing	101	247.1	1	2	100%	-55.9	0	-10	0.0	3	0	38
Period	Nighttime	V4	Bus Washing	101	244.3	1	2	100%	-55.8	0	-10	0.0	3	0	38
Noise Criteria	52 dB(A)	V5	Tyre Changing/ Charging	98	193.7	1	10	33%	-53.7	0	-10	-4.8	3	0	32
			Parts Replacement	100	193.7	1	2	7%	-53.7	0	-10	-11.8	3	0	27
		V6	Tyre Changing/ Charging	98	173.6	2	10	33%	-52.8	3	-10	-4.8	3	0	36
			Parts Replacement	100	173.6	2	2	7%	-52.8	3	-10	-11.8	3	0	31
			Braking Test	99	173.6	1	2	7%	-52.8	0	-10	-11.8	3	0	27
		V7	Tyre Changing/ Charging	98	252.3	1	10	33%	-56.0	0	-10	-4.8	3	0	30
			Parts Replacement	100	252.3	1	2	7%	-56.0	0	-10	-11.8	3	0	25
		V8	Tyre Changing/ Charging	98	230.5	1	10	33%	-55.3	0	-10	-4.8	3	0	31
			Parts Replacement	100	230.5	1	2	7%	-55.3	0	-10	-11.8	3	0	26
		V9	Tyre Changing/ Charging	98	180.7	1	10	33%	-53.1	0	-10	-4.8	3	0	33
			Parts Replacement	100	180.7	1	2	7%	-53.1	0	-10	-11.8	3	0	28
		V10	Tyre Changing/ Charging	98	186.4	1	10	33%	-53.4	0	-10	-4.8	3	0	33
			Parts Replacement	100	186.4	1	2	7%	-53.4	0	-10	-11.8	3	0	28
		V11	Tyre Changing/ Charging	98	160.9	1	10	33%	-52.1	0	-10	-4.8	3	0	34
			Parts Replacement	100	160.9	1	2	7%	-52.1	0	-10	-11.8	3	0	29
														Predicted Total Fixed Noise Level, dB(A)	46

NAP	NAP302_39F	Source ID/ Zone	Source Description	SWL, dB(A)	Slant Distance, m	Maximum Quantity	Operation duration per event, min	On Time % over 30 mins	Correction, dB(A)						Predicted Noise Level
Descripton	Riviera Lodge								**Distance**	**Quantity**	**Barrier**	**On Time %**	**Façade**	**Tonal**	**dB(A)**
x	836247.1	V1	Bus Washing	101	292.6	1	2	100%	-57.3	0	-10	0.0	3	0	37
y	835300.6	V2	Bus Washing	101	290.3	1	2	100%	-57.3	0	-10	0.0	3	0	37
z	107.2	V3	Bus Washing	101	261.1	1	2	100%	-56.3	0	-10	0.0	3	0	38
Period	Nighttime	V4	Bus Washing	101	258.5	1	2	100%	-56.2	0	-10	0.0	3	0	38
Noise Criteria	52 dB(A)	V5	Tyre Changing/ Charging	98	211.3	1	10	33%	-54.5	0	-10	-4.8	3	0	32
			Parts Replacement	100	211.3	1	2	7%	-54.5	0	-10	-11.8	3	0	27
		V6	Tyre Changing/ Charging	98	193.1	2	10	33%	-53.7	3	-10	-4.8	3	0	36
			Parts Replacement	100	193.1	2	2	7%	-53.7	3	-10	-11.8	3	0	31
			Braking Test	99	193.1	1	2	7%	-53.7	0	-10	-11.8	3	0	27
		V7	Tyre Changing/ Charging	98	266.1	1	10	33%	-56.5	0	-10	-4.8	3	0	30
			Parts Replacement	100	266.1	1	2	7%	-56.5	0	-10	-11.8	3	0	25
		V8	Tyre Changing/ Charging	98	244.0	1	10	33%	-55.7	0	-10	-4.8	3	0	30
			Parts Replacement	100	244.0	1	2	7%	-55.7	0	-10	-11.8	3	0	25
		V9	Tyre Changing/ Charging	98	197.7	1	10	33%	-53.9	0	-10	-4.8	3	0	32
			Parts Replacement	100	197.7	1	2	7%	-53.9	0	-10	-11.8	3	0	27
		V10	Tyre Changing/ Charging	98	202.9	1	10	33%	-54.1	0	-10	-4.8	3	0	32
			Parts Replacement	100	202.9	1	2	7%	-54.1	0	-10	-11.8	3	0	27
		V11	Tyre Changing/ Charging	98	179.7	1	10	33%	-53.1	0	-10	-4.8	3	0	33
			Parts Replacement	100	179.7	1	2	7%	-53.1	0	-10	-11.8	3	0	28
														Predicted Total Fixed Noise Level, dB(A)	46

Remarks

[1] The maximum allowable SWLs for equipment were determined by adopting standard acoustics principles. The following formula was used for calculating the SPLs at NSRs =

SPL= Max SWL+DC+QC+FC+BC+OC+TC+IMC+INTC

SPL	Sound Pressure Level (dB(A))
Max SWL	Maximum allowable Sound Power Level (dB(A))
DC	Distance Attenuation (dB(A))
QC	Quantitiy Correction (dB(A))
FC	Façade Correction (dB(A))
BC	Barrier Correction (dB(A))
OC	Percentage on-time Correction (dB(A))
TC	Correction for Tonality (dB(A))
IMC	Correction for Impulsiveness (dB(A))
INTC	Corrrection for Intermittency (dB(A))

The SWL of the equipment shall not exceed the specified Maximum Allowable SWL in order to achieve the noise criteria. Acoustic treatment would be installed as appropriate to achieve the required SWL.

[2] In view of operation need and larger area of V6, the quantity of activities for "tyre changing / charging" and "part replacement" in source 6 is different from other similar sources. 2no. is assumed for these activities and confirmed by the operator.

NAP	NAP303_8F	Source ID/ Zone	Source Description	SWL, dB(A)	Slant Distance, m	Maximum Quantity	Operation duration per event, min	On Time % over 30 mins	Correction, dB(A)						Predicted Noise Level
Descripton	Riviera Lodge								Distance	Quantity	Barrier	On Time %	Façade	Tonal	dB(A)
x	836239.5	V1	Bus Washing	101	283.6	1	2	100%	-57.1	0	-10	0.0	3	0	37
y	835294.1	V2	Bus Washing	101	281.0	1	2	100%	-57.0	0	-10	0.0	3	0	37
z	20.8	V3	Bus Washing	101	249.9	1	2	100%	-56.0	0	-10	0.0	3	0	38
Period	Nighttime	V4	Bus Washing	101	246.9	1	2	100%	-55.8	0	-10	0.0	3	0	38
Noise Criteria	52 dB(A)	V5	Tyre Changing/ Charging	98	195.0	1	10	33%	-53.8	0	-10	-4.8	3	0	32
			Parts Replacement	100	195.0	1	2	7%	-53.8	0	-10	-11.8	3	0	27
		V6	Tyre Changing/ Charging	98	173.2	2	10	33%	-52.8	3	-10	-4.8	3	0	36
			Parts Replacement	100	173.2	2	2	7%	-52.8	3	-10	-11.8	3	0	31
			Braking Test	99	173.2	1	2	7%	-52.8	0	-10	-11.8	3	0	27
		V7	Tyre Changing/ Charging	98	254.8	1	10	33%	-56.1	0	-10	-4.8	3	0	30
			Parts Replacement	100	254.8	1	2	7%	-56.1	0	-10	-11.8	3	0	25
		V8	Tyre Changing/ Charging	98	234.4	1	10	33%	-55.4	0	-10	-4.8	3	0	31
			Parts Replacement	100	234.4	1	2	7%	-55.4	0	-10	-11.8	3	0	26
		V9	Tyre Changing/ Charging	98	183.5	1	10	33%	-53.3	0	-10	-4.8	3	0	33
			Parts Replacement	100	183.5	1	2	7%	-53.3	0	-10	-11.8	3	0	28
		V10	Tyre Changing/ Charging	98	188.7	1	10	33%	-53.5	0	-10	-4.8	3	0	33
			Parts Replacement	100	188.7	1	2	7%	-53.5	0	-10	-11.8	3	0	28
		V11	Tyre Changing/ Charging	98	162.2	1	10	33%	-52.2	0	-10	-4.8	3	0	34
			Parts Replacement	100	162.2	1	2	7%	-52.2	0	-10	-11.8	3	0	29
														Predicted Total Fixed Noise Level, dB(A)	46

NAP	NAP303_23F	Source ID/ Zone	Source Description	SWL, dB(A)	Slant Distance, m	Maximum Quantity	Operation duration per event, min	On Time % over 30 mins	Correction, dB(A)						Predicted Noise Level
Descripton	Riviera Lodge								Distance	Quantity	Barrier	On Time %	Façade	Tonal	dB(A)
x	836239.5	V1	Bus Washing	101	288.9	1	2	100%	-57.2	0	-10	0.0	3	0	37
y	835294.1	V2	Bus Washing	101	286.3	1	2	100%	-57.1	0	-10	0.0	3	0	37
z	62.4	V3	Bus Washing	101	255.9	1	2	100%	-56.2	0	-10	0.0	3	0	38
Period	Nighttime	V4	Bus Washing	101	252.9	1	2	100%	-56.1	0	-10	0.0	3	0	38
Noise Criteria	52 dB(A)	V5	Tyre Changing/ Charging	98	202.6	1	10	33%	-54.1	0	-10	-4.8	3	0	32
			Parts Replacement	100	202.6	1	2	7%	-54.1	0	-10	-11.8	3	0	27
		V6	Tyre Changing/ Charging	98	181.7	2	10	33%	-53.2	3	-10	-4.8	3	0	36
			Parts Replacement	100	181.7	2	2	7%	-53.2	3	-10	-11.8	3	0	31
			Braking Test	99	181.7	1	2	7%	-53.2	0	-10	-11.8	3	0	27
		V7	Tyre Changing/ Charging	98	260.7	1	10	33%	-56.3	0	-10	-4.8	3	0	30
			Parts Replacement	100	260.7	1	2	7%	-56.3	0	-10	-11.8	3	0	25
		V8	Tyre Changing/ Charging	98	239.4	1	10	33%	-55.6	0	-10	-4.8	3	0	31
			Parts Replacement	100	239.4	1	2	7%	-55.6	0	-10	-11.8	3	0	26
		V9	Tyre Changing/ Charging	98	189.8	1	10	33%	-53.6	0	-10	-4.8	3	0	33
			Parts Replacement	100	189.8	1	2	7%	-53.6	0	-10	-11.8	3	0	28
		V10	Tyre Changing/ Charging	98	194.8	1	10	33%	-53.8	0	-10	-4.8	3	0	32
			Parts Replacement	100	194.8	1	2	7%	-53.8	0	-10	-11.8	3	0	27
		V11	Tyre Changing/ Charging	98	169.3	1	10	33%	-52.6	0	-10	-4.8	3	0	34
			Parts Replacement	100	169.3	1	2	7%	-52.6	0	-10	-11.8	3	0	29
														Predicted Total Fixed Noise Level, dB(A)	46

NAP	NAP303_39F	Source ID/ Zone	Source Description	SWL, dB(A)	Slant Distance, m	Maximum Quantity	Operation duration per event, min	On Time % over 30 mins	Correction, dB(A)						Predicted Noise Level
Descripton	Riviera Lodge								Distance	Quantity	Barrier	On Time %	Façade	Tonal	dB(A)
x	836239.5	V1	Bus Washing	101	301.0	1	2	100%	-57.6	0	-10	0.0	3	0	36
y	835294.1	V2	Bus Washing	101	298.5	1	2	100%	-57.5	0	-10	0.0	3	0	37
z	107.2	V3	Bus Washing	101	269.5	1	2	100%	-56.6	0	-10	0.0	3	0	37
Period	Nighttime	V4	Bus Washing	101	266.7	1	2	100%	-56.5	0	-10	0.0	3	0	37
Noise Criteria	52 dB(A)	V5	Tyre Changing/ Charging	98	219.5	1	10	33%	-54.8	0	-10	-4.8	3	0	31
			Parts Replacement	100	219.5	1	2	7%	-54.8	0	-10	-11.8	3	0	26
		V6	Tyre Changing/ Charging	98	200.4	2	10	33%	-54.0	3	-10	-4.8	3	0	35
			Parts Replacement	100	200.4	2	2	7%	-54.0	3	-10	-11.8	3	0	30
			Braking Test	99	200.4	1	2	7%	-54.0	0	-10	-11.8	3	0	26
		V7	Tyre Changing/ Charging	98	274.0	1	10	33%	-56.8	0	-10	-4.8	3	0	29
			Parts Replacement	100	274.0	1	2	7%	-56.8	0	-10	-11.8	3	0	24
		V8	Tyre Changing/ Charging	98	252.4	1	10	33%	-56.0	0	-10	-4.8	3	0	30
			Parts Replacement	100	252.4	1	2	7%	-56.0	0	-10	-11.8	3	0	25
		V9	Tyre Changing/ Charging	98	206.0	1	10	33%	-54.3	0	-10	-4.8	3	0	32
			Parts Replacement	100	206.0	1	2	7%	-54.3	0	-10	-11.8	3	0	27
		V10	Tyre Changing/ Charging	98	210.6	1	10	33%	-54.5	0	-10	-4.8	3	0	32
			Parts Replacement	100	210.6	1	2	7%	-54.5	0	-10	-11.8	3	0	27
		V11	Tyre Changing/ Charging	98	187.3	1	10	33%	-53.5	0	-10	-4.8	3	0	33
			Parts Replacement	100	187.3	1	2	7%	-53.5	0	-10	-11.8	3	0	28
														Predicted Total Fixed Noise Level, dB(A)	46

Remarks

[1] The maximum allowable SWLs for equipment were determined by adopting standard acoustics principles. The following formula was used for calculating the SPLs at NSRs =

SPL= Max SWL+DC+QC+FC+BC+OC+TC+IMC+INTC

SPL	Sound Pressure Level (dB(A))
Max SWL	Maximum allowable Sound Power Level (dB(A))
DC	Distance Attenuation (dB(A))
QC	Quantitiy Correction (dB(A))
FC	Façade Correction (dB(A))
BC	Barrier Correction (dB(A))
OC	Percentage on-time Correction (dB(A))
TC	Correction for Tonality (dB(A))
IMC	Correction for Impulsiveness (dB(A))
INTC	Corrrection for Intermittency (dB(A))

The SWL of the equipment shall not exceed the specified Maximum Allowable SWL in order to achieve the noise criteria. Acoustic treatment would be installed as appropriate to achieve the required SWL.

[2] In view of operation need and larger area of V6, the quantity of activities for "tyre changing / charging" and "part replacement" in source 6 is different from other similar sources. 2no. is assumed for these activities and confirmed by the operator.

NAP	NAP401_GF	Source ID/ Zone	Source Description	SWL, dB(A)	Slant Distance, m	Maximum Quantity	Operation duration per event, min	On Time % over 30 mins	Correction, dB(A)						Predicted Noise Level
Descripton	Kau Yan College and Adjacent School								Distance	Quantity	Barrier	On Time %	Façade	Tonal	dB(A)
x	836245.2	V1	Bus Washing	101	317.8	1	2	100%	-58.0	0	-10	0.0	3	0	36
y	835193.8	V2	Bus Washing	101	311.5	1	2	100%	-57.9	0	-10	0.0	3	0	36
z	6.6	V3	Bus Washing	101	288.8	1	2	100%	-57.2	0	-10	0.0	3	0	37
Period	Daytime	V4	Bus Washing	101	281.9	1	2	100%	-57.0	0	-10	0.0	3	0	37
Noise Criteria	56 dB(A)	V5	Tyre Changing/ Charging	98	242.1	1	10	33%	-55.7	0	-10	-4.8	3	0	31
			Parts Replacement	100	242.1	1	2	7%	-55.7	0	-10	-11.8	3	0	26
		V6	Tyre Changing/ Charging	98	209.7	2	10	33%	-54.4	3	-10	-4.8	3	0	35
			Parts Replacement	100	209.7	2	2	7%	-54.4	3	-10	-11.8	3	0	30
			Braking Test	99	209.7	1	2	7%	-54.4	0	-10	-11.8	3	0	26
		V7	Tyre Changing/ Charging	98	283.8	1	10	33%	-57.1	0	-10	-4.8	3	0	29
			Parts Replacement	100	283.8	1	2	7%	-57.1	0	-10	-11.8	3	0	24
		V8	Tyre Changing/ Charging	98	275.2	1	10	33%	-56.8	0	-10	-4.8	3	0	29
			Parts Replacement	100	275.2	1	2	7%	-56.8	0	-10	-11.8	3	0	24
		V9	Tyre Changing/ Charging	98	234.7	1	10	33%	-55.4	0	-10	-4.8	3	0	31
			Parts Replacement	100	234.7	1	2	7%	-55.4	0	-10	-11.8	3	0	26
		V10	Tyre Changing/ Charging	98	226.2	1	10	33%	-55.1	0	-10	-4.8	3	0	31
			Parts Replacement	100	226.2	1	2	7%	-55.1	0	-10	-11.8	3	0	26
		V11	Tyre Changing/ Charging	98	205.4	1	10	33%	-54.3	0	-10	-4.8	3	0	32
			Parts Replacement	100	205.4	1	2	7%	-54.3	0	-10	-11.8	3	0	27
														Predicted Total Fixed Noise Level, dB(A)	45

NAP	NAP401_3F	Source ID/ Zone	Source Description	SWL, dB(A)	Slant Distance, m	Maximum Quantity	Operation duration per event, min	On Time % over 30 mins	Correction, dB(A)						Predicted Noise Level
Descripton	Kau Yan College and Adjacent School								Distance	Quantity	Barrier	On Time %	Façade	Tonal	dB(A)
x	836245.2	V1	Bus Washing	101	318.2	1	2	100%	-58.1	0	-10	0.0	3	0	36
y	835193.8	V2	Bus Washing	101	311.9	1	2	100%	-57.9	0	-10	0.0	3	0	36
z	20.6	V3	Bus Washing	101	289.2	1	2	100%	-57.2	0	-10	0.0	3	0	37
Period	Daytime	V4	Bus Washing	101	282.4	1	2	100%	-57.0	0	-10	0.0	3	0	37
Noise Criteria	56 dB(A)	V5	Tyre Changing/ Charging	98	242.6	1	10	33%	-55.7	0	-10	-4.8	3	0	31
			Parts Replacement	100	242.6	1	2	7%	-55.7	0	-10	-11.8	3	0	26
		V6	Tyre Changing/ Charging	98	210.3	2	10	33%	-54.5	3	-10	-4.8	3	0	35
			Parts Replacement	100	210.3	2	2	7%	-54.5	3	-10	-11.8	3	0	30
			Braking Test	99	210.3	1	2	7%	-54.5	0	-10	-11.8	3	0	26
		V7	Tyre Changing/ Charging	98	284.3	1	10	33%	-57.1	0	-10	-4.8	3	0	29
			Parts Replacement	100	284.3	1	2	7%	-57.1	0	-10	-11.8	3	0	24
		V8	Tyre Changing/ Charging	98	275.3	1	10	33%	-56.8	0	-10	-4.8	3	0	29
			Parts Replacement	100	275.3	1	2	7%	-56.8	0	-10	-11.8	3	0	24
		V9	Tyre Changing/ Charging	98	234.8	1	10	33%	-55.4	0	-10	-4.8	3	0	31
			Parts Replacement	100	234.8	1	2	7%	-55.4	0	-10	-11.8	3	0	26
		V10	Tyre Changing/ Charging	98	226.2	1	10	33%	-55.1	0	-10	-4.8	3	0	31
			Parts Replacement	100	226.2	1	2	7%	-55.1	0	-10	-11.8	3	0	26
		V11	Tyre Changing/ Charging	98	205.4	1	10	33%	-54.3	0	-10	-4.8	3	0	32
			Parts Replacement	100	205.4	1	2	7%	-54.3	0	-10	-11.8	3	0	27
														Predicted Total Fixed Noise Level, dB(A)	45

NAP	NAP401_6F	Source ID/ Zone	Source Description	SWL, dB(A)	Slant Distance, m	Maximum Quantity	Operation duration per event, min	On Time % over 30 mins	Correction, dB(A)						Predicted Noise Level
Descripton	Kau Yan College and Adjacent School								Distance	Quantity	Barrier	On Time %	Façade	Tonal	dB(A)
x	836245.2	V1	Bus Washing	101	318.8	1	2	100%	-58.1	0	-10	0.0	3	0	36
y	835193.8	V2	Bus Washing	101	312.6	1	2	100%	-57.9	0	-10	0.0	3	0	36
z	31.1	V3	Bus Washing	101	289.9	1	2	100%	-57.2	0	-10	0.0	3	0	37
Period	Daytime	V4	Bus Washing	101	283.1	1	2	100%	-57.0	0	-10	0.0	3	0	37
Noise Criteria	56 dB(A)	V5	Tyre Changing/ Charging	98	243.5	1	10	33%	-55.7	0	-10	-4.8	3	0	30
			Parts Replacement	100	243.5	1	2	7%	-55.7	0	-10	-11.8	3	0	26
		V6	Tyre Changing/ Charging	98	211.3	2	10	33%	-54.5	3	-10	-4.8	3	0	35
			Parts Replacement	100	211.3	2	2	7%	-54.5	3	-10	-11.8	3	0	30
			Braking Test	99	211.3	1	2	7%	-54.5	0	-10	-11.8	3	0	26
		V7	Tyre Changing/ Charging	98	285.0	1	10	33%	-57.1	0	-10	-4.8	3	0	29
			Parts Replacement	100	285.0	1	2	7%	-57.1	0	-10	-11.8	3	0	24
		V8	Tyre Changing/ Charging	98	275.7	1	10	33%	-56.8	0	-10	-4.8	3	0	29
			Parts Replacement	100	275.7	1	2	7%	-56.8	0	-10	-11.8	3	0	24
		V9	Tyre Changing/ Charging	98	235.3	1	10	33%	-55.4	0	-10	-4.8	3	0	31
			Parts Replacement	100	235.3	1	2	7%	-55.4	0	-10	-11.8	3	0	26
		V10	Tyre Changing/ Charging	98	226.8	1	10	33%	-55.1	0	-10	-4.8	3	0	31
			Parts Replacement	100	226.8	1	2	7%	-55.1	0	-10	-11.8	3	0	26
		V11	Tyre Changing/ Charging	98	206.1	1	10	33%	-54.3	0	-10	-4.8	3	0	32
			Parts Replacement	100	206.1	1	2	7%	-54.3	0	-10	-11.8	3	0	27
														Predicted Total Fixed Noise Level, dB(A)	45

Remarks

[1] The maximum allowable SWLs for equipment were determined by adopting standard acoustics principles. The following formula was used for calculating the SPLs at NSRs =

SPL= Max SWL+DC+QC+FC+BC+OC+TC+IMC+INTC

SPL	Sound Pressure Level (dB(A))
Max SWL	Maximum allowable Sound Power Level (dB(A))
DC	Distance Attenuation (dB(A))
QC	Quantitiy Correction (dB(A))
FC	Façade Correction (dB(A))
BC	Barrier Correction (dB(A))
OC	Percentage on-time Correction (dB(A))
TC	Correction for Tonality (dB(A))
IMC	Correction for Impulsiveness (dB(A))
INTC	Corrrection for Intermittency (dB(A))

The SWL of the equipment shall not exceed the specified Maximum Allowable SWL in order to achieve the noise criteria. Acoustic treatment would be installed as appropriate to achieve the required SWL.

[2] In view of operation need and larger area of V6, the quantity of activities for "tyre changing / charging" and "part replacement" in source 6 is different from other similar sources. 2no. is assumed for these activities and confirmed by the operator.

NAP	**NAP402_GF**	**Source ID/ Zone**	**Source Description**	**SWL, dB(A)**	**Slant Distance, m**	**Maximum Quantity**	**Operation duration per event, min**	**On Time % over 30 mins**	**Correction, dB(A)**						**Predicted Noise Level**
Descripton	Kau Yan College and Adjacent School								**Distance**	**Quantity**	**Barrier**	**On Time %**	**Façade**	**Tonal**	**dB(A)**
x	836262.8	V1	Bus Washing	101	308.5	1	2	100%	-57.8	0	-10	0.0	3	0	36
y	835184.2	V2	Bus Washing	101	301.7	1	2	100%	-57.6	0	0	0.0	3	0	46
z	6.6	V3	Bus Washing	101	280.7	1	2	100%	-57.0	0	-10	0.0	3	0	37
Period	Daytime	V4	Bus Washing	101	273.3	1	2	100%	-56.7	0	-10	0.0	3	0	37
Noise Criteria	56 dB(A)	V5	Tyre Changing/ Charging	98	236.4	1	10	33%	-55.5	0	-10	-4.8	3	0	31
			Parts Replacement	100	236.4	1	2	7%	-55.5	0	-10	-11.8	3	0	26
		V6	Tyre Changing/ Charging	98	202.8	2	10	33%	-54.1	3	-10	-4.8	3	0	35
			Parts Replacement	100	202.8	2	2	7%	-54.1	3	-10	-11.8	3	0	30
			Braking Test	99	202.8	1	2	7%	-54.1	0	-10	-11.8	3	0	26
		V7	Tyre Changing/ Charging	98	274.1	1	10	33%	-56.8	0	0	-4.8	3	0	39
			Parts Replacement	100	274.1	1	2	7%	-56.8	0	0	-11.8	3	0	34
		V8	Tyre Changing/ Charging	98	267.7	1	10	33%	-56.6	0	-10	-4.8	3	0	30
			Parts Replacement	100	267.7	1	2	7%	-56.6	0	-10	-11.8	3	0	25
		V9	Tyre Changing/ Charging	98	230.0	1	10	33%	-55.2	0	-10	-4.8	3	0	31
			Parts Replacement	100	230.0	1	2	7%	-55.2	0	-10	-11.8	3	0	26
		V10	Tyre Changing/ Charging	98	218.9	1	10	33%	-54.8	0	-10	-4.8	3	0	31
			Parts Replacement	100	218.9	1	2	7%	-54.8	0	-10	-11.8	3	0	26
		V11	Tyre Changing/ Charging	98	199.7	1	10	33%	-54.0	0	-10	-4.8	3	0	32
			Parts Replacement	100	199.7	1	2	7%	-54.0	0	-10	-11.8	3	0	27
									Predicted Total Fixed Noise Level, dB(A)						49

NAP	**NAP402_3F**	**Source ID/ Zone**	**Source Description**	**SWL, dB(A)**	**Slant Distance, m**	**Maximum Quantity**	**Operation duration per event, min**	**On Time % over 30 mins**	**Correction, dB(A)**						**Predicted Noise Level**
Descripton	Kau Yan College and Adjacent School								**Distance**	**Quantity**	**Barrier**	**On Time %**	**Façade**	**Tonal**	**dB(A)**
x	836262.8	V1	Bus Washing	101	308.9	1	2	100%	-57.8	0	-10	0.0	3	0	36
y	835184.2	V2	Bus Washing	101	302.0	1	2	100%	-57.6	0	0	0.0	3	0	46
z	20.6	V3	Bus Washing	101	281.2	1	2	100%	-57.0	0	-10	0.0	3	0	37
Period	Daytime	V4	Bus Washing	101	273.7	1	2	100%	-56.7	0	-10	0.0	3	0	37
Noise Criteria	56 dB(A)	V5	Tyre Changing/ Charging	98	236.9	1	10	33%	-55.5	0	-10	-4.8	3	0	31
			Parts Replacement	100	236.9	1	2	7%	-55.5	0	-10	-11.8	3	0	26
		V6	Tyre Changing/ Charging	98	203.4	2	10	33%	-54.2	3	-10	-4.8	3	0	35
			Parts Replacement	100	203.4	2	2	7%	-54.2	3	-10	-11.8	3	0	30
			Braking Test	99	203.4	1	2	7%	-54.2	0	-10	-11.8	3	0	26
		V7	Tyre Changing/ Charging	98	274.5	1	10	33%	-56.8	0	0	-4.8	3	0	39
			Parts Replacement	100	274.5	1	2	7%	-56.8	0	0	-11.8	3	0	34
		V8	Tyre Changing/ Charging	98	267.7	1	10	33%	-56.6	0	-10	-4.8	3	0	30
			Parts Replacement	100	267.7	1	2	7%	-56.6	0	-10	-11.8	3	0	25
		V9	Tyre Changing/ Charging	98	230.0	1	10	33%	-55.2	0	-10	-4.8	3	0	31
			Parts Replacement	100	230.0	1	2	7%	-55.2	0	-10	-11.8	3	0	26
		V10	Tyre Changing/ Charging	98	218.9	1	10	33%	-54.8	0	-10	-4.8	3	0	31
			Parts Replacement	100	218.9	1	2	7%	-54.8	0	-10	-11.8	3	0	26
		V11	Tyre Changing/ Charging	98	199.8	1	10	33%	-54.0	0	-10	-4.8	3	0	32
			Parts Replacement	100	199.8	1	2	7%	-54.0	0	-10	-11.8	3	0	27
									Predicted Total Fixed Noise Level, dB(A)						49

NAP	**NAP402_6F**	**Source ID/ Zone**	**Source Description**	**SWL, dB(A)**	**Slant Distance, m**	**Maximum Quantity**	**Operation duration per event, min**	**On Time % over 30 mins**	**Correction, dB(A)**						**Predicted Noise Level**
Descripton	Kau Yan College and Adjacent School								**Distance**	**Quantity**	**Barrier**	**On Time %**	**Façade**	**Tonal**	**dB(A)**
x	836262.8	V1	Bus Washing	101	309.6	1	2	100%	-57.8	0	-10	0.0	3	0	36
y	835184.2	V2	Bus Washing	101	302.8	1	2	100%	-57.6	0	0	0.0	3	0	46
z	31.1	V3	Bus Washing	101	281.9	1	2	100%	-57.0	0	-10	0.0	3	0	37
Period	Daytime	V4	Bus Washing	101	274.5	1	2	100%	-56.8	0	-10	0.0	3	0	37
Noise Criteria	56 dB(A)	V5	Tyre Changing/ Charging	98	237.9	1	10	33%	-55.5	0	-10	-4.8	3	0	31
			Parts Replacement	100	237.9	1	2	7%	-55.5	0	-10	-11.8	3	0	26
		V6	Tyre Changing/ Charging	98	204.4	2	10	33%	-54.2	3	-10	-4.8	3	0	35
			Parts Replacement	100	204.4	2	2	7%	-54.2	3	-10	-11.8	3	0	30
			Braking Test	99	204.4	1	2	7%	-54.2	0	-10	-11.8	3	0	26
		V7	Tyre Changing/ Charging	98	275.3	1	10	33%	-56.8	0	0	-4.8	3	0	39
			Parts Replacement	100	275.3	1	2	7%	-56.8	0	0	-11.8	3	0	34
		V8	Tyre Changing/ Charging	98	268.2	1	10	33%	-56.6	0	-10	-4.8	3	0	30
			Parts Replacement	100	268.2	1	2	7%	-56.6	0	-10	-11.8	3	0	25
		V9	Tyre Changing/ Charging	98	230.6	1	10	33%	-55.3	0	-10	-4.8	3	0	31
			Parts Replacement	100	230.6	1	2	7%	-55.3	0	-10	-11.8	3	0	26
		V10	Tyre Changing/ Charging	98	219.5	1	10	33%	-54.8	0	-10	-4.8	3	0	31
			Parts Replacement	100	219.5	1	2	7%	-54.8	0	-10	-11.8	3	0	26
		V11	Tyre Changing/ Charging	98	200.4	1	10	33%	-54.0	0	-10	-4.8	3	0	32
			Parts Replacement	100	200.4	1	2	7%	-54.0	0	-10	-11.8	3	0	27
									Predicted Total Fixed Noise Level, dB(A)						49

Remarks

[1] The maximum allowable SWLs for equipment were determined by adopting standard acoustics principles. The following formula was used for calculating the SPLs at NSRs =

SPL= Max SWL+DC+QC+FC+BC+OC+TC+IMC+INTC

SPL	Sound Pressure Level (dB(A))
Max SWL	Maximum allowable Sound Power Level (dB(A))
DC	Distance Attenuation (dB(A))
QC	Quantitiy Correction (dB(A))
FC	Façade Correction (dB(A))
BC	Barrier Correction (dB(A))
OC	Percentage on-time Correction (dB(A))
TC	Correction for Tonality (dB(A))
IMC	Correction for Impulsiveness (dB(A))
INTC	Corrrection for Intermittency (dB(A))

The SWL of the equipment shall not exceed the specified Maximum Allowable SWL in order to achieve the noise criteria. Acoustic treatment would be installed as appropriate to achieve the required SWL.

[2] In view of operation need and larger area of V6, the quantity of activities for "tyre changing / charging" and "part replacement" in source 6 is different from other similar sources. 2no. is assumed for these activities and confirmed by the operator.

KMB Bus Depot at Dai Fuk Street, Area 33, Tai Po

Appendix 8.3 Detail Calculations for Fixed Plant Noise Impact Assessment (Vehicle Repair and Testing Activities)

	ID	Description	Assessment Period	Criteria of Fixed Plant Noise Assessment, Leq(30mins), dB(A)	Predicted Fixed Noise Level due to Vehicle Repair/ Testing Activities, dB(A)
1	NAP101_1F	63 Ting Kok Rd	Nighttime	50	47
2	NAP201_1F	Yue Kok Village		52	50
3	NAP202_1F	Yue Kok Village			50
4	NAP203_1F	Yue Kok Village			49
5	NAP301_8F	Riviera Lodge			47
6	NAP301_23F	Riviera Lodge			46
7	NAP301_39F	Riviera Lodge			46
8	NAP302_8F	Riviera Lodge			47
9	NAP302_23F	Riviera Lodge			46
10	NAP302_39F	Riviera Lodge			46
11	NAP303_8F	Riviera Lodge			46
12	NAP303_23F	Riviera Lodge			46
13	NAP303_39F	Riviera Lodge			46
14	NAP401_GF	Kau Yan College and Adjacent School	Daytime & Evening time	56	45
15	NAP401_3F	Kau Yan College and Adjacent School			45
16	NAP401_6F	Kau Yan College and Adjacent School			45
17	NAP402_GF	Kau Yan College and Adjacent School			49
18	NAP402_3F	Kau Yan College and Adjacent School			49
19	NAP402_6F	Kau Yan College and Adjacent School			49

Note

[1] NSR04 is educational institution, there is no operation during nighttime period.

Appendix 8.4

Overall Detail Calculations for Fixed Plant Noise Impact Assessment

App 8.4 - Overall Detail Calculations for Fixed Plant Noise Impact Assessment

	NAP ID	NAP Description	Shortest Horizontal Distance from Project Site Boundary,m	Distance Correction, dB(A)	Barrier Correction, dB(A)	Facade Correction, dB(A)	Maximum Allowable SWL of all Plant Rooms, dB(A)	(A) Predicted Total Fixed Noise Level due to Plant Rooms, dB(A)	(B) Predicted Total Fixed Noise Level due to Vehicle Repair/ Testing Activities, dB(A) (from calculation in App8.3)	(C) = (A) + (B) Overall Predicted SPL at NAP, dB(A)	Assessment Period	Criteria of Fixed Plant Noise Assessment Leq(30min), dB(A)
1	NAP101_1F	63 Ting Kok Rd	196	-53.8	0	3	90	39	47	48	Nighttime	**50**
2	NAP201_1F	Yue Kok Village	83	-46.4	0	3	90	47	50	51		**52**
3	NAP202_1F		78	-45.8	0	3	90	47	50	52		
4	NAP203_1F		94	-47.5	0	3	90	46	49	51		
5	NAP301_8F	Riviera Lodge	140	-50.9	0	3	90	42	47	48		
6	NAP301_23F		140	-50.9	0	3	90	42	46	48		
7	NAP301_39F		140	-50.9	0	3	90	42	46	47		
8	NAP302_8F		139	-50.9	0	3	90	42	47	48		
9	NAP302_23F		139	-50.9	0	3	90	42	46	48		
10	NAP302_39F		139	-50.9	0	3	90	42	46	47		
11	NAP303_8F		147	-51.3	0	3	90	42	46	48		
12	NAP303_23F		147	-51.3	0	3	90	42	46	47		
13	NAP303_39F		147	-51.3	0	3	90	42	46	47		
14	NAP401_GF	Kau Yan College and Adjacent School	160	-52.1	0	3	90	41	45	46	Daytime & Evening Time	**56**
15	NAP401_3F		160	-52.1	0	3	90	41	45	46		
16	NAP401_6F		160	-52.1	0	3	90	41	45	46		
17	NAP402_GF		160	-52.1	0	3	90	41	49	50		
18	NAP402_3F		160	-52.1	0	3	90	41	49	50		
19	NAP402_6F		160	-52.1	0	3	90	41	49	50		

Remarks:

[1] Detailed design of the plant rooms is not yet available at this stage.

[2] Shortest Horizontal Distance between NAP and the Project Site Boundary is adopted in evaluating the maximum allowable SWL of all plant rooms as a conservative assumption.

[3] Distance correction for SWL= 20 log (shortest horizontal distance) + 8

[4] Shielding Effect on Plant Rooms/ Barrier Correction is not considered in this assessment as a conservative assumption.

[5] Maximum Allowable SWL of all Plant Rooms represents the cumulative SWL of all Plant Rooms in the Proposed Project, which is deduced based on shortest horizontal distance between NAP and Project Site Boundary.

[6] The maximum allowable SWLs for equipment were determined by adopting standard acoustics principles. The following formula was used for calculating the SPLs at NSRs =

SPL= Max SWL+DC+FC+BC

SPL	Sound Pressure Level (dB(A))
Max SWL	Maximum allowable Sound Power Level (dB(A))
DC	Distance Attenuation (dB(A))
FC	Façade Correction (dB(A))
BC	Barrier Correction (dB(A))

[7] The SPL of NAP include fixed noise from plant rooms and vehicle repair/ testing activities carried out within the Proposed Project.

[8] All maximum allowable SWLs are rounded to the nearest whole dB(A).

[9] NSR04 is educational institution, there is no operation during nighttime period. Daytime period is assessed instead.

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Planning Application for Tai Po Bus Depot at Dai Fuk Street, Tai Po, NT

Quantitative Risk Assessment (QRA)

ALLIED ENVIRONMENTAL
CONSULTANTS LIMITED

THE KOWLOON MOTOR BUS CO.
(1933) LTD.

Planning Application for Tai Po Bus Depot at Dai Fuk Street, Tai Po, NT

Quantitative Risk Assessment (QRA) Report

Project No.: 11-2-21-015

Document No: 01287

Confidential	***X***
Internal	***-***
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TABLE OF CONTENTS

1 INTRODUCTION

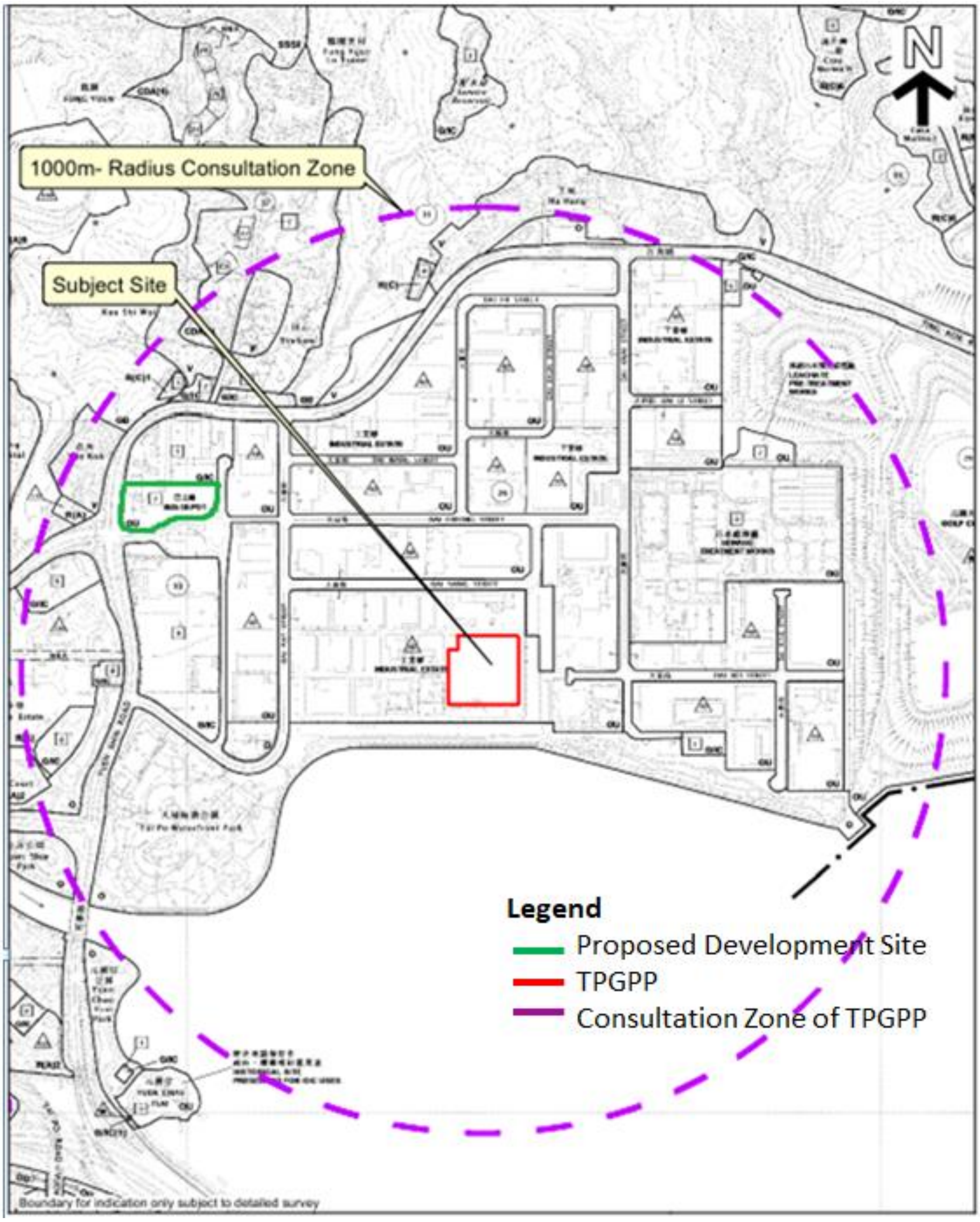
A development project is proposed by Kowloon Motor Bus Co. (1993) involving relaxation of the existing Tai Po Bus Depot at Dai Fuk Street, Tai Po, NT, from 2 storeys to 4 storeys to cater for a bus parking depot of 363 bus parking spaces with 80 maintenance bus bays (hereinafter referred to as the “Proposed Development”).

The Proposed Development is inside the 1 km Consultation Zone (CZ) of the Tai Po Gas production Plant (TPGPP), which is designated as a Potentially Hazardous Installation (PHI) as per the Hong Kong Planning Standards and Guidelines [1]. Therefore, Quantitative Risk Assessment (QRA) is required to evaluate the potential risks associated with the construction and operational phase of the Proposed Development in the vicinity of the TPGPP. This report details the methodology, assumptions and findings of the QRA.

1.1 CONSULTATION ZONE FOR TPGPP

TPGPP is classified as a PHI and a CZ has been defined around the site, extending 1000m from centre of TPGPP as presented in Figure 1.1. The proposed development is located towards the north-western edge of the CZ, and may result in an increase in the number of persons working within the CZ. Such plans are required to be submitted to the Co-ordinating Committee on Land-use Planning and Control relating to Potentially Hazardous Installations (CCPHI) for consideration.

Figure 1.1 Location of the Proposed Development and Consultation zone of the Subject Site [2]



1.2 ASSESSMENT OBJECTIVES

The main objective of the QRA is to demonstrate that the risk criteria set out in Environmental Impact Assessment Ordinance Technical Memorandum (EIAO-TM) [3] will be met during the construction and operational periods of the Proposed Development.

The detailed scope of Assessment includes the following:

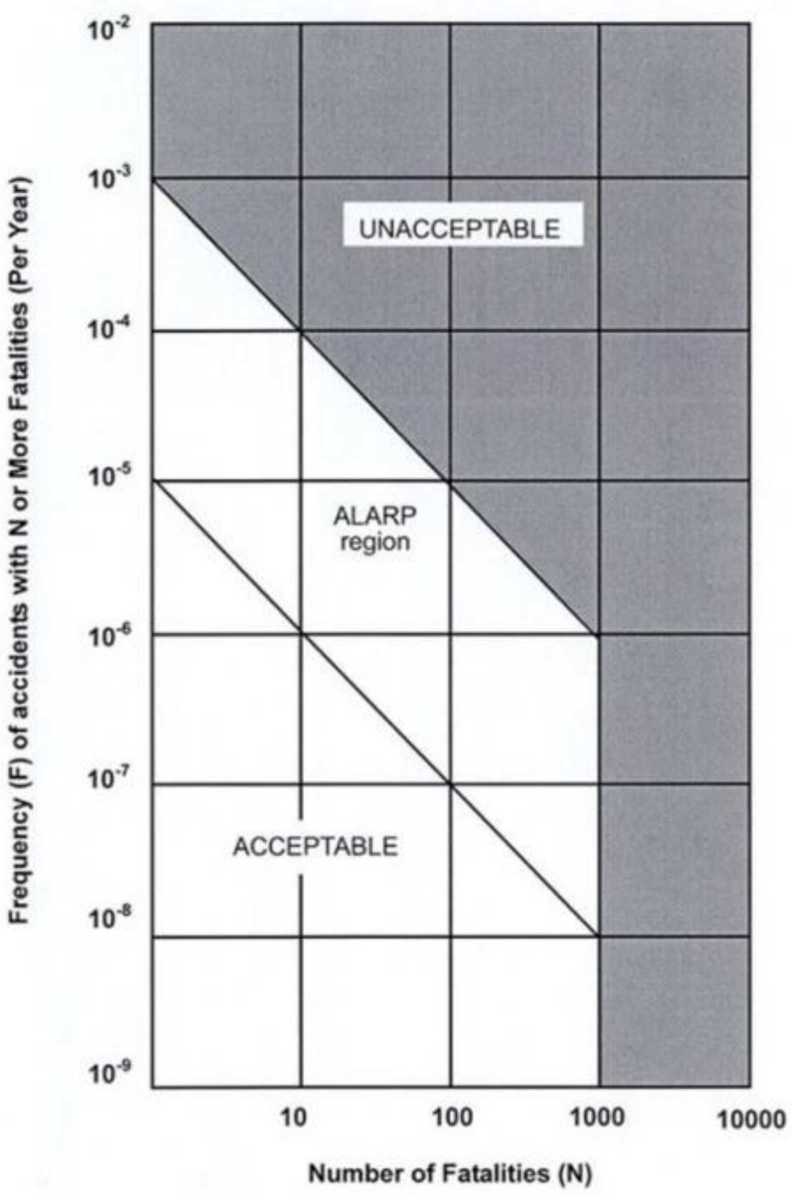
- Undertaking a review of the risks from the TPGPP to determine if risk to life is a key issue with respect to the Risk Guidelines given in Annex 4 of the EIAO-TM[3];
- Identification of hazardous scenarios associated with the operation of the TPGPP;
- Evaluate and quantify the risks to the construction workers and occupants of the Proposed Development due to the operation of the TPGPP;
- Assess the acceptability of the quantified risk levels mentioned in the above objective;

1.3 RISK CRITERIA

The estimated risk levels of hazardous sources have been compared with the risk guidelines stipulated in the EIAO-TM Annex 4 to determine the acceptability. As set out in the EIAO-TM Annex 4, the risk guidelines comprise the following two components:

1. **Individual Risk**: the maximum level of off-site individual risk should not exceed 1×10^{-5} / year, i.e. 1 in 100,000 per year; and
2. **Societal Risk**: Societal risk is expressed in the form of an F-N curve (Figure 1.2), which represents the cumulative frequency (F) of all event outcomes leading to N or more fatalities. The F-N curve consists of three different regions defined as follows:
    - Unacceptable region: where risk is so high that they should usually be reduced regardless of the cost or else the hazardous activity should not proceed;
    - ALARP region: where risk is tolerable, provided that it has been reduced to a level As Low As Reasonably Practicable (ALARP); and
    - Acceptable region: where risk is broadly acceptable and does not require further risk reduction.

Figure 1.2 Hong Kong Societal Risk Criteria



2 PROPOSED DEVELOPMENT

As noted previously, the proposed development involves relaxation of the existing Tai Po Bus Depot in Tai Po, from 2 storeys to 4 storeys. The proposed site area is 14,600m^2. The building height of the proposed redeveloped depot will be 30.5m tall at +35.74mPD. Upon completion of the development, the bus depot will consist of the following facilities:

- Parking of 363 double deck electric buses with charging facilities
- 80 maintenance bays with sunken pits
- 4 washing bays
- 1 CLP substation
- 5 transformer rooms

The construction of the proposed Project will begin in 2022 and operations are expected to start in 2025 [4]. The maximum number of construction workers is estimated to be 150, who will work only in day time.

In operational phase, the estimated number of staff working before and after the proposed development is presented in Table 2.1 and Table 2.2, respectively. The number of population has been provided by the Project and it is representative for construction workforce for the relaxation of the existing Tai Po Bus Depot from 2 storeys to 4 storeys, while noting that number corresponds to the average number of workforce.

Table 2.1 Total Number of Staff Working Prior to Proposed Development

Total Number of Staff Working at KMB Depot			
Location	**Day** **(0800 – 1800)**	**Evening** **(1800 – 2300)**	**Night** **(2300 – 0800)**
Weekday			
In Office	18	18	6
Maintenance Worker	15	30	10
Saturday			
In Office	18	18	6
Maintenance Worker	15	30	10
Sunday/Holiday			
In Office	12	12	6
Maintenance Worker	15	30	10

Table 2.2 Total Number of Staff Working after Completion of Proposed Development

Total Number of Staff Working at Depot			
Location	**Day** **(0800 – 1800)**	**Evening** **(1800 – 2300)**	**Night** **(2300 – 0800)**
Weekday			
In Office	30	10	10
Maintenance Worker	120	100	100
Saturday			
In Office	15	10	10
Maintenance Worker	120	100	100
Sunday/Holiday			
In Office	15	10	10
Maintenance Worker	120	100	100

It is also to be noted that the proposed bus depot development will not induce significant traffic impact to the surrounding road network, as concluded in the Traffic Impact Assessment (TIA) [21].

It is also noted that chemicals / dangerous goods will be stored on site, as summarised in the table below. As only small quantities are stored and handled (well below the storage threshold to be regarded as Potentially hazardous Installation, PHI) and no significant offsite risk impact is anticipated, these chemicals were not further assessed in the QRA.

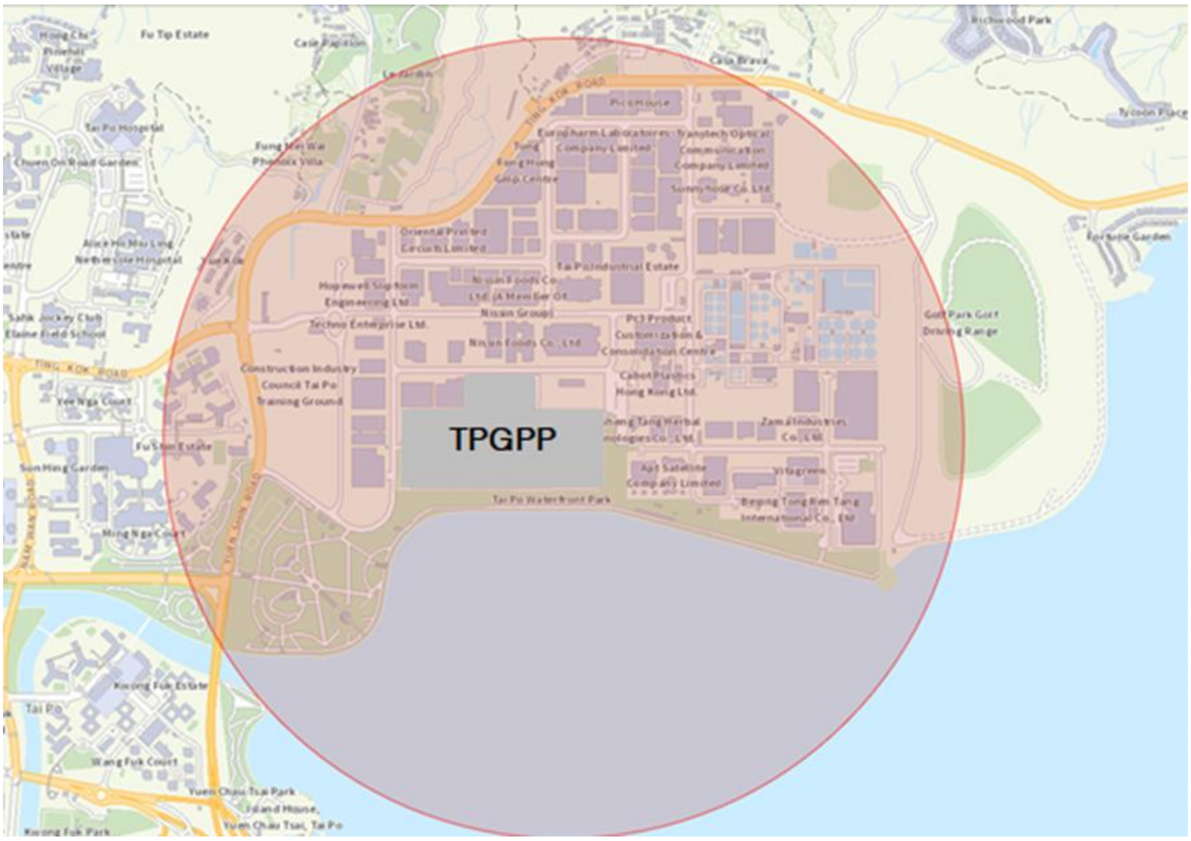
Table 2.3 DG / Chemicals Stored at Proposed Development

DG Categories	Amount (Mass or Volume)	Remarks
Class 2	723L	Oxygen, Argon, Nitrogen
Class 9	1000L	Polyster Resin, Gel Coat, Paint & Thinner
Class 2	48L	Acetylene
	372kg	Refrigerant
Class 3	1650L	Paint, Thinner, Turpentine
Class 8	170kg	Sulphuric Acid
Class 3	500L	Acetone
Class 3A	25000L x 6	Underground diesel oil
Class 3	10L	Methy Ethyl Ketone Peroxide

3 TAI PO GAS PRODUCTION PLANT

Tai Po Gas Production Plant (TPGPP) is in the Tai Po Industrial Estate, covering an area of 11.71 hectares. TPGPP is classified as a Potentially Hazardous Installation (PHI), and a Consultation Zone (CZ) has been defined around the site extending 1000m from centre of TPGPP as presented in the figure below.

Figure 3.1 CZ of TPGPP

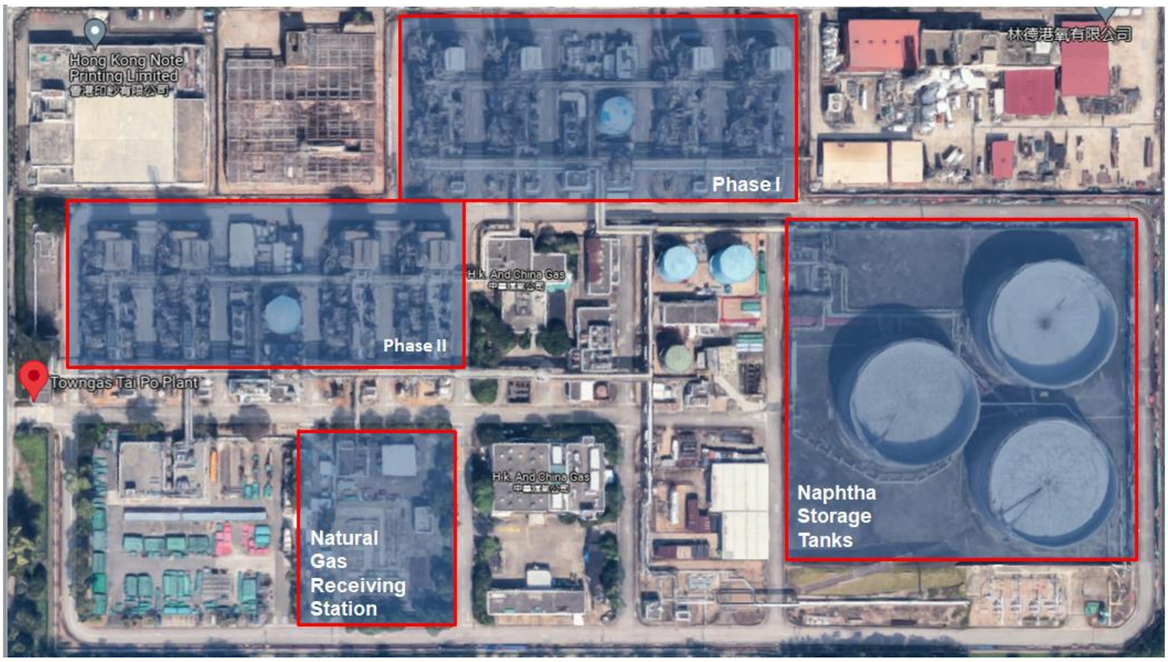


The proposed Project is located within the CZ. Therefore, such development plans are also required to be submitted to the Co-ordinating Committee on Land-use Planning and Control relating to Potentially Hazardous Installations (CCPHI) for consideration.

Town gas is produced at two production plants in Hong Kong. The Tai Po Gas Production Plant (TPGPP) and the Ma Tau Kok Gas Works North Plant (MTKGWNP). TPGPP is responsible for producing over 95% of the entire requirement for Hong Kong, while the remaining 5% is produced at MTKGWNP which acts to satisfy demand during peak consumption periods [5]. Figure 3.2 presents the layout of TPGPP inclusive of Phase I and

II Production trains, the Naphtha Storage area, and the Natural Gas Receiving Station [7], which are the main production facilities of the plant.

Figure 3.2 Layout of TPGPP



3.1 NAPHTHA STORAGE TANKS

The feedstock for town gas production is naphtha, which is stored in 3 naphtha storage tanks. As per the Hong Kong PHI register [2], the TPGPP contains 80,280 tonnes of Volatile Organic Compound (VOC) which is considered to be the Naphtha storage. This is equivalent to about 120,000m^3. Given that TPGPP has 3 storage tanks, each tank will contain 40,000m^3 of naphtha. The naphtha storage tanks are also provided with a bund, which has been designed to contain any spillage or release of naphtha from escaping into the environment if the storage tanks leak. The bund is sized to hold 110% of the volume of one tank as per typical design standard for storage tanks. The height of the bund can be then estimated using the approach adopted in the Kai Tak Development Engineering Study [6].

Table 3.1 Naphtha Storage Tank Information Considered for QRA

Parameter	Value
Tank Diameter	54 m [8]
Tank Capacity	40,000 m^3
Height	16.5 m

In the absence of operation data, the Naphtha transfer line and storage tank loading were assumed to be operating 100% of the time, and the storage tank inventory was assumed to be 100% full. While it is noted that presently more than half of the Towngas is produced from natural gas at TPGPP, it is not possible to relate this with the actual naphtha inventory maintained in the storage tanks, which is specific to the operation decisions. For instance, the operating company may decide to keep the storage tanks full, despite low consumption, for higher production availability or commercial reasons. As such, there is some degree of conservatism relating to inventory storage and unloading operations assumed.

3.2 GAS PRODUCTION TRAINS

Town gas is produced in eight production trains using the Catalytic Rich Gas (CRG) Process, which is a continuous, high-pressure process. A schematic of the process is provided in Figure 3.3 [11]. Also, based on literature in the public domain [10], the following paragraphs present a functional description of each main system in the production train. :

- Naphtha from Storage Tanks is fed through the Naphtha Pre-heated and then to the Naphtha Vaporizer, where it is mixed with hydrogenation gas. Following the mixing, it is superheated to 355-380 degC in the Naphtha Vaporizer.

- The hot vapor is passed to then passed to the Sulphur Hydrogenator where organic sulphur is converted to H_2S by reacting with hydrogen over a nickel/molybdenum catalyst.

- The H_2S and Naphtha is fed into an H_2S Absorber where the H2S is absorbed by zinc oxide.

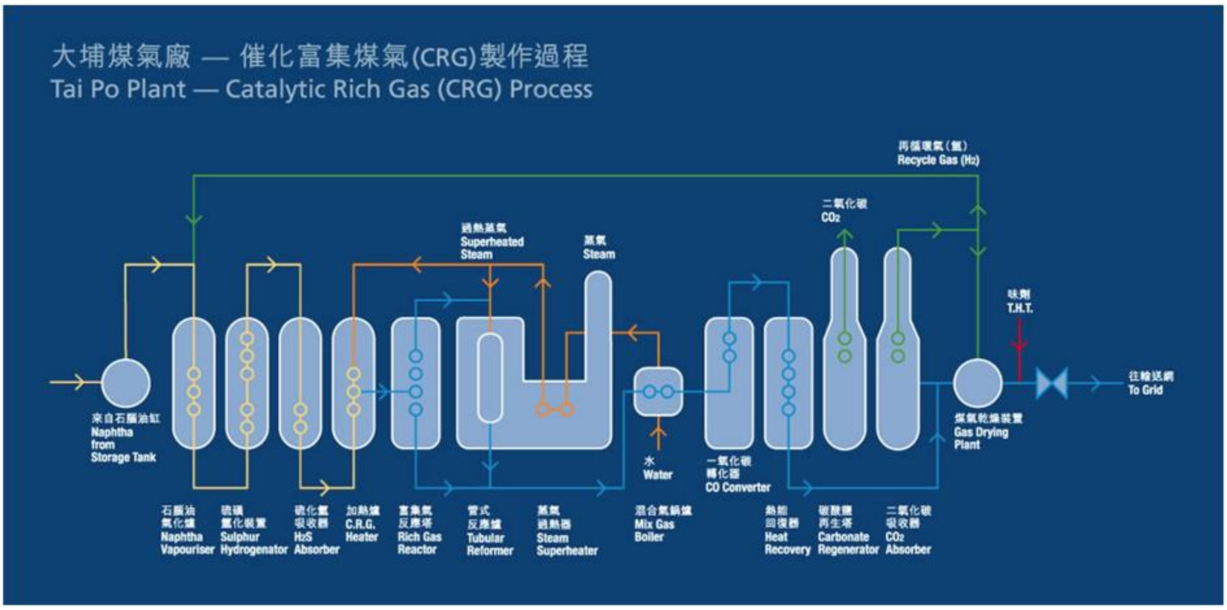
- The Naphtha vapor and hydrogenation gas leaving the Absorber are mixed with steam to be further superheated in the Catalytic Rich Gas Heater of 450-500 degC before being passed to the Rich Gas Reactor. In the reactor, the naphtha vapor and steam react over high nickel CRG-F catalyst to produce, after multiple intermediate reactors, a mixture of CH4, CO2, CO and H2. The reaction is slightly exothermic and the hot rich gas (60-65%) leaves the reactor at a temperature of 517-548 degC.

- In order to produce town gas meeting the required consumer specification, part of the rich gas coming out of the CRG Reactor is further reacted at high temperature with additional steam in the Reformer Furnace. The resulting lean gas is mixed with the gas that bypassed the Reformer Furnace and cooled in the mixed gas.

- The CO2 content of the mixed gas also needs to be reduced. Hence a portion of the mixed gas is passed through a CO2 Absorber. In the Absorber Potassium carbonate solution reacts with the CO2 in the gas forming potassium bicarbonate, which is regenerated in the Carbonate Regenerator, using waste heat from the carbonate Reboiler.

- Gas leaving the CO2 absorber is cooled and knocked out in a KO Drum and then joins the converted gas which bypassed the CO2 Absorber. The product gas is dried and sent for export into a common town gas export header.

Figure 3.3 CRG Process Flow Diagram [11]



In addition, Natural Gas Receiving Station (NGRS), Dai Fat Street Pigging Station (DFS), Tai Po East Offtake Station (AGI) and Tai Po Pigging Station are located inside TPGPP. These facilities are provided to receive natural gas through pipeline from offsite. NG is also used for Towngas production as alternative source of feedstock as Naphtha.

Town gas's production rate at each month varies significantly depending on the consumption. The Hong Kong Monthly Digest of Statistics [8] provides the monthly town gas consumption of Hong Kong from August 2019 to August 2021 in Terajoules (TJ). Using this data, the average consumption rate of town gas in Hong Kong can be calculated based on calorific value of town gas of 17.27 MJ/m^3 [11]. Assuming that 95% of town gas in Hong Kong is produced at TPGPP [5], the average production rate at TPGPP has been estimated to be 173,000 m^3/hr. As the ratio of production rate between Phase I and II is 1:2, Phase I and II production rates can be estimated as 57,650 m^3/hr and 115,300 m^3/hr, respectively.

4 METEOROLOGICAL DATA

The meteorological conditions affect the consequence of gas release in particular the wind direction, speed and stability, which influences the direction and degree of turbulence of gas dispersion. Meteorological data was collected from Tai Po Kau Weather Station [12], considering the past 6-year data (2015 – 2020). Twelve weather directions are considered, and two different sets of Meteorological data are used for representing the Day time and Night time weather condition. Ambient temperature and relative humidity is taken as 25 degC and 80%, respectively [22]. Table 4.1 and Table 4.2 present the day time and night time meteorological data, respectively. Note that the categorization of weather follows the purple book guideline that representative weather in terms of Pasquill classes and wind speeds are grouped based on site specific weather data, as appropriate.

Table 4.1 Day Time Meteorological Data

Direction	Weather Class						Total
	3B	1D	4D	6D	1F	3E	
0 - 30	0.14	0.71	0.11	0.07	1.41	0.01	2.45
30 - 60	0.29	0.96	0.26	0.10	0.78	0.15	2.53
60 - 90	4.72	2.53	2.37	1.08	1.30	0.51	12.5
90 - 120	10.4	4.20	4.94	6.94	3.04	1.04	30.5
120 - 150	2.33	2.88	3.07	1.05	3.97	0.94	14.2
150 - 180	0.88	1.62	0.52	0.00	3.59	0.11	6.71
180 - 210	1.33	1.14	0.22	0.03	1.97	0.03	4.71
210 - 240	1.23	0.74	0.19	0.00	0.89	0.03	3.08
240 - 270	1.07	1.40	0.97	0.08	2.42	0.77	6.71
270 - 300	1.94	1.25	3.05	0.47	2.77	0.70	10.2
300 - 330	1.00	0.71	0.75	0.21	1.38	0.22	4.27
330 - 360	0.44	0.53	0.31	0.03	0.66	0.08	2.05
All	25.7	18.7	16.8	10.1	24.2	4.59	100

Table 4.2 Night Time Meteorological Data

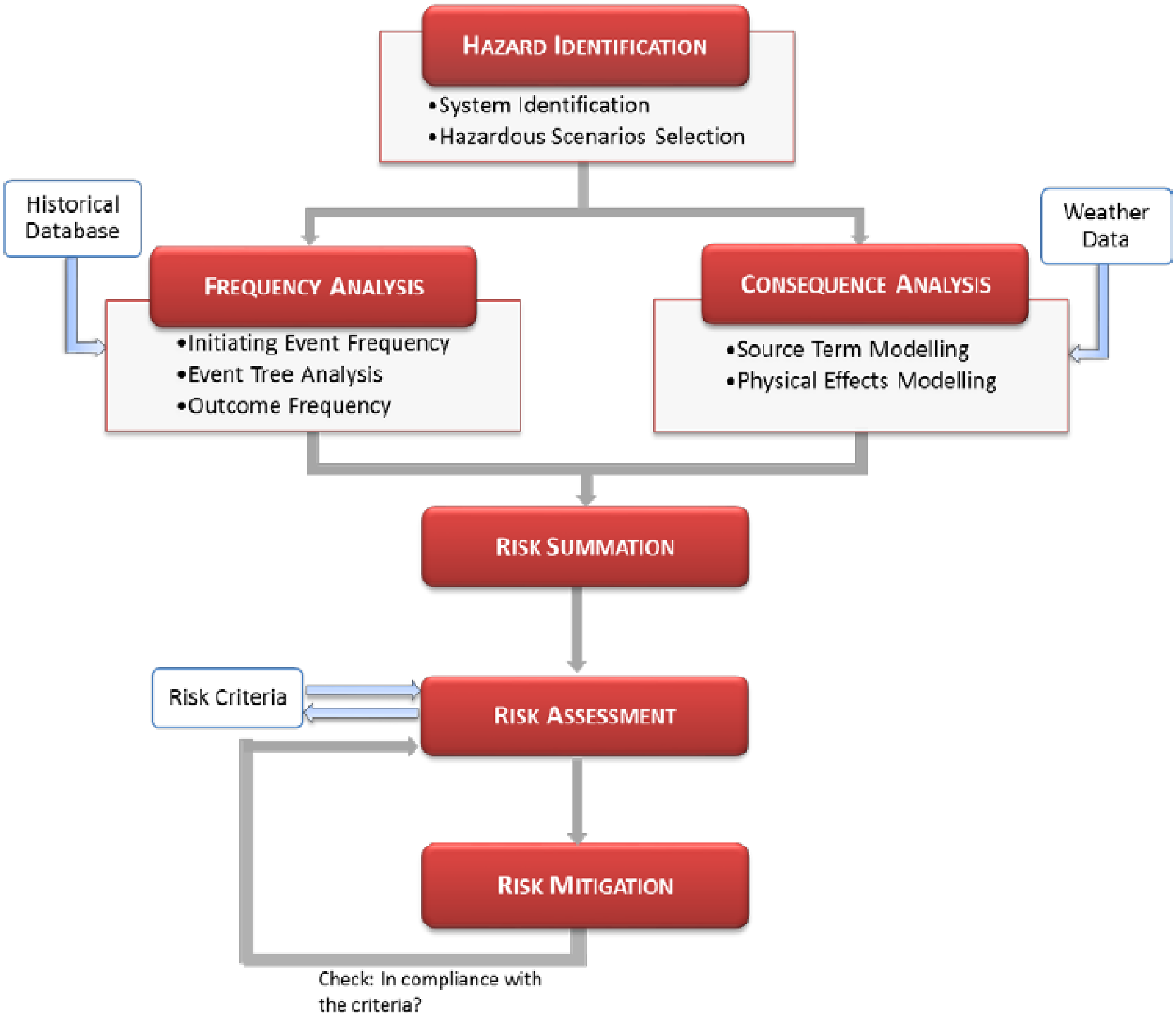
Direction	**Weather Class**					**Total**
	1D	**4D**	**6D**	**1F**	**3E**	
0 - 30	0.06	0.07	0.03	4.96	0.02	5.14
30 - 60	0.03	0.17	0.02	1.30	0.26	1.78
60 - 90	0.06	1.84	0.48	2.28	1.08	5.75
90 - 120	0.09	3.76	3.16	5.07	1.75	13.8
120 - 150	0.21	2.38	0.53	12.78	1.92	17.8
150 - 180	0.17	0.09	0.00	14.79	0.19	15.2
180 - 210	0.09	0.04	0.00	9.68	0.07	9.87
210 - 240	0.08	0.09	0.00	4.86	0.09	5.12
240 - 270	0.21	0.88	0.01	7.85	1.35	10.3
270 - 300	0.09	2.18	0.12	6.97	1.17	10.5
300 - 330	0.02	0.46	0.08	2.35	0.19	3.11
330 - 360	0.03	0.16	0.06	1.19	0.07	1.50
All	1.13	12.13	4.49	74.09	8.16	100

* 3B weather category is not expected to occur based on specific site weather data

5 QRA METHODOLOGY

The key elements of a QRA study are outlined in Figure 5.1.

Figure 5.1 QRA methodology



The main steps of QRA are further described below:

The hazard identification involves a review of the hazardous material properties and a review of the past accidents, with the objective of identifying potential hazards and scenarios to be modelled in the subsequent frequency and consequence analysis,

Consequence analysis aims to obtain an estimate of the impact on people in loss of containment events of flammable and toxic substances. This includes the following primary components which are performed with consequence modelling software, PHASTRISK:

- Source term/ discharge modelling
- Dispersion modelling
- Fire and explosion modelling
- Effects modelling

In frequency analysis, the likelihood of each identified scenario is quantified taking into account the site specific features and project activities.

Risk summation then combines the estimates of likelihood and consequence for the identified hazardous events to produce the risk results, which are expressed in terms of individual risk and societal risk as per EIAO-TM. Risk mitigation measures are recommended, where required to reduce the risk to As low As Reasonable Practicable (ALARP).

6 HAZARD IDENTIFICATION

Hazard identification involves a review of the hazardous properties of the materials being processed. Relevant hazards and the ways in which those hazards are realised are identified. A review of historical accidents was also carried out using the MHIDAS database. A summary of the review of historical accidents is presented in Annexure C.

A review of the hazardous materials in TPGPP is presented below prior to the hazardous scenarios considered in the study. The following hazardous materials are contained in TPGPP:

- Naphtha
- Natural Gas
- Process Gas
- Product Town Gas
- Landfill Gas
- Diesel
- Other Dangerous Goods

6.1 NAPHTHA

Naphtha is a colorless flammable hydrocarbon liquid at normal conditions at normal conditions. It is a mixture of various hydrocarbons. For this study, naphtha has been modelled as 33 wt% n-hexane, 50 wt% n-pentane and 17 wt% cyclohexane. The properties of Naphtha [6] are presented in Table 6.1. Upon released, Naphtha can form a liquid pool on the ground with evaporating flammable vapours, as the pool absorbs heat from the surroundings. Therefore, naphtha presents the hazards of pool fire, flash fire, and Vapour

Cloud Explosion (only allowed to accumulated in congested and confined areas) in case of an ignition.

Table 6.1 Properties of Naphtha

Property	Details
Flammability	Flammable
Auto-ignition Temperature	>220 degC
Flash Points	-20 degC
Lower Flammability Limit	1.1%
Upper Flammability Limit	5.9%
Specific Gravity	0.67 (water = 1)
Vapor Pressure	0.6 kPa (@ 20degC)
Vapor Density	4 (air = 1)

6.2 NATURAL GAS

Natural Gas is a mixture of hydrocarbons and a relatively clean fuel. Natural Gas is introduced as feedstock to the TPGPP as feedstock, in addition to naphtha to produce town gas. Natural Gas is modelled as 4 mol% ethane, 95 mol% methane and 1 mol% propane. Natural gas is pressurized for pipeline transmission; in the event of a release, it can result in jet fire, flash fire and VCE depending on the time of ignition.

Table 6.2 Properties of Natural Gas

Property	Details
Flammability	Flammable
Auto-ignition Temperature	>220 degC
Flash Points	-186 degC
Lower Flammability Limit	4.8%
Upper Flammability Limit	14.8%
Vapor Density	0.58 (air = 1)

6.3 PROCESS GAS

The intermediate gases which are involved in the town gas production process at TPGPP are Hydrogenation Gas, Rich Gas coming out of the Rich Gas Reactor Outlet, Reformed Gas coming out of the Reformer outlet, Mixed Gas upon mixing of Reformed Gas and Rich Gas, Convert Gas coming out of the CO converter. These are all expected to be flammable due to composition of methane and hydrogen. In the event of a release, it can result in jet fire, flash fire and VCE depending on the time of ignition.

As discussed previously, process information including Heat and Mass Balance and process gas composition was not provided by HKCG. Based on literature available, the process gases are typically syngas, which composes of basically of CO, CO2, CH4, H2, and H2O but varies in concentrations across different plant sections. As such, the gas composition has been assumed based on the representative process gas composition to evaluate fire hazards [23].

Table 6.3 Composition of the process gases in the process train assumed

Process Gas	Composition (mol%)				
	CH_4	H_2	CO	CO_2	H_2O
Rich Gas (RHG)	35	7	0.4	11	46
Reformed Gas (RFG)	11	35	7	9	38
Convert Gas (CVG)	18	31	0.2	13	31

6.4 PRODUCT GAS (TOWN GAS)

The final product of the process at TPGPP is the town gas. TPGPP produces town gas which meets a required consumer specification. It is a colorless and odorless gas which is buoyant under ambient conditions. In the town gas production train, the gas coming out of the CO_2 Absorber is mixed with the converted gas which bypassed the CO_2 Absorber. This mixed gas is odorized to make the final product town gas. The gas is odorized to for easy detection upon leakage. In the event of a release, it can result in jet fire, flash fire and VCE depending on the time of ignition.

Table 6.4 Composition of Town Gas [11]

Composition	mol %
CO_2	18.5
CO	2.6
H_2	48
CH_4	30.6
Average Mol. Weight	14.8

Table 6.5 Physical Properties of Town Gas [11]

Physical Properties	Value
Calorific Value	17.27 MJ/m^3
Specific Gravity	0.52
Wobbe Index	24
Weaver Flame Speed	35

6.5 LANDFILL GAS

Landfill gas is imported from NENT and Shuen Wan Landfill Site to TPGPP as fuel gas for Reformer Furnaces. It presents similar fire hazards as with natural gas and process area above. For modelling purpose, Landfill Gas is assumed to be 100% methane conservatively. In the event of a release, it can result in jet fire, flash fire and VCE depending on the time of ignition.

6.6 DIESEL

Diesel is a mixture of hydrocarbons, with an average chemical formula in the form of C12H23, ranging approximately from C10H20 to C15H28. Diesel is likely used as a backup fuel in TPGPP. It is a combustible liquid and is not readily ignitable unless it comes in contact with strong ignition sources such as open flames, sparks and heat. The major hazard associated with diesel leakage is pool fire upon ignition. It is expected that other chemicals are also stored on site to support the daily operation of the plant. These chemicals may include gas cylinders for welding, refrigerants, acid/ base, paints, etc. However, it is expected that all DGs are storage in small quality and in dedicated storage area with adequate leak detection and spill containment/ clean up facilities. As such, it is not expected to contribute significantly towards offsite risk.

6.7 OTHER DANGEROUS GOODS

It is expected that other chemicals are also stored on site to support the daily operation of the plant. These chemicals may include gas cylinders for welding, refrigerants, acid/ base, paints, etc. However, it is expected that all DGs are storage in small quality and in dedicated storage area with adequate leak detection and spill containment/ clean up facilities. As such, it is not expected to contribute significantly towards offsite risk.

6.8 HAZARDOUS SCENARIOS

Based on material properties, the following hazards have been identified to be relevant for TPGPP:

- **Fireball**: In the case of immediate ignition of an instantaneous gas release, this will result in a fireball. Typically a fireball occurs due to catastrophic ruptures of process equipment/vessels. A fireball is of hemispherical shape emitting thermal radiation. Thermal radiation from a fireball is independent of weather and wind direction.

- **Pool Fire** : A pool fire occurs upon the ignition of flammable liquid which has been spilled on the ground.

- **Jet Fire**: A jet fire occurs as a consequence of ignition of pressurized gas releases. A jet fire emits thermal radiation and hence can cause harm to population in the vicinity.

- **Flash Fire**: A flash fire occurs when a flammable gas release occurs, however ignition is delayed. If the ignition source is within the Upper Flammability Limit and Lower Flammability Limit, it shall result in ignition of the flammable release. If the release does not come in contact with an ignition source, prior to being diluted below its Lower Flammability Limit, no harm is anticipated as the gas is too lean for ignition.

As the process train area is congested with various equipment and vessels, VCE was considered to be credible. The hazard events applicable to Naphtha loss of containment include pool fire and flash fire; VCE was not considered in naphtha storage area, as the area has no significant congestion and confinement which are typical conditions required for VCE to occur. Based on the review above, the hazardous systems identified Table 6.6 have been carried on for further assessment. Details of facility systems are documented in a separate data and methodology report [23].

Table 6.6 Hazardous Systems Identified at TPGPP

Hazardous Systems in TPGPP	Main Equipment	Hazardous Material*	Hazard Events
Naphtha Importing and Tank Farm	Piping and Large storage tanks	Naphtha (L)	Pool fire, Flash Fire
Naphtha Pumping and Distribution Headers to PTs	Piping, pumps	Naphtha (L)	Pool fire, Flash Fire

Hazardous Systems in TPGPP	Main Equipment	Hazardous Material*	Hazard Events
Natural Gas Receiving Station and Distribution Headers to PTs	Piping, and pumps	Natural gas (G)	Flash Fire, Jet Fire, Vapor Cloud Explosion
Phase I Production Units - PT1	Piping, pressure vessel, pumps. heat exchangers	Naphtha (L), process gas (G) and town gas (G)	Pool fire, Flash Fire, Jet Fire, Vapor Cloud Explosion, fireball
Phase I Production Units – PT2	Piping, pressure vessel, pumps. heat exchangers	Naphtha (L), process gas (G) and town gas (G)	Pool fire, Flash Fire, Jet Fire, Vapor Cloud Explosion, fireball
Phase I Production Units – PT3	Piping, pressure vessel, pumps. heat exchangers	Naphtha (L), process gas (G) and town gas (G)	Pool fire, Flash Fire, Jet Fire, Vapor Cloud Explosion, fireball
Phase I Production Units – PT4	Piping, pressure vessel, pumps. heat exchangers	Naphtha (L), process gas (G) and town gas (G)	Pool fire, Flash Fire, Jet Fire, Vapor Cloud Explosion, fireball
Phase II Production Units – PT5	Piping, pressure vessel, pumps. heat exchangers	Naphtha (L), process gas (G) and town gas (G)	Pool fire, Flash Fire, Jet Fire, Vapor Cloud Explosion, fireball
Phase II Production Units – PT6	Piping, pressure vessel, pumps. heat exchangers	Naphtha (L), process gas (G) and town gas (G)	Pool fire, Flash Fire, Jet Fire, Vapor Cloud Explosion, fireball
Phase II Production Units – PT7	Piping, pressure vessel, pumps. heat exchangers	Naphtha (L), process gas (G) and town gas (G)	Pool fire, Flash Fire, Jet Fire, Vapor Cloud Explosion, fireball
Phase II Production Units – PT8	Piping, pressure vessel, pumps. heat exchangers	Naphtha (L), process gas (G) and town gas (G)	Pool fire, Flash Fire, Jet Fire, Vapor Cloud Explosion, fireball
Towngas Export and Others (including Dai Fat Street offtake and pigging stating)	Piping	Town gas (G), Landfill Gas (G)	Flash Fire, Jet Fire, Vapor Cloud Explosion

*Note: V is vapour phase, and L is liquid phase

For each of the hazardous system, a range of leak sizes have been modelled to represent the potential failure scenarios, as summarised below based on failure data [15][16]:

- Process Equipment and Piping
  - 10 mm hole
  - 25 mm hole
  - 75 mm hole
  - Full bore rupture of piping
  - Instantaneous release of pressure vessel

- Naphtha Storage Tanks
    - 300 mm hole
    - 1000 mm hole
    - Instantaneous failure of tank

For Naphtha storage area, the presence of the bund acts as an important safeguard against the spread of Naphtha to other process area and offsite area in the case of a release from the tanks or piping. Despite the bund being designed to handle 110% of one storage tank content, bund overfilling may occur in the case of 2 or more tanks failing simultaneously. In addition, bund overtopping can also result due to instantaneous release from a tank unzipping failure (i.e. incident capable of directly resulting in rapid loss of the tank wall), such that the released liquid can vault an inclined side or pile up rapidly at the face of a bund wall and then flow over the top or a major part of it.

7 FREQUENCY ANALYSIS

7.1 FAILURE DATA

Frequency analysis is used to derive the final event outcome frequencies. By using historical failure frequency data, the number of equipment in a given isolatable section and the length of piping in a given section, the final event outcome frequency is determined. The equipment failure frequencies are taken from published international failure database applicable for process facilities, including UK HSE database [15] and the OGP database [16], as tabulated below. Note that pigging frequency was assumed once per 10 years and 3 hours each time in calculating the failure event frequency for pigging systems.

Table 7.1 Failure Frequency Data for Tank

Component	Unit	Hole Size (mm)			Reference
		300	1000	Cat. Rupture	
Single Wall Atmospheric Vessel >12000m3	Per vessel per year	2.50E-03	1.00E-04	5.00E-06	UK HSE

Table 7.2 Failure Frequency Data

Component	Unit	Hole Size (mm)					Reference
		10	25	75	Line Rupture	CAT Rupture	
Pipework (0 - 49mm)	per m-year	1.10E-05	5.00E-06	-	1.00E-06	-	UK HSE
Pipework (50 - 149mm)	per m-year	3.00E-06	1.00E-06	-	5.00E-07	-	UK HSE
Pipework (150 - 299mm)	per m-year	2.00E-06	7.00E-07	4.00E-07	2.00E-07	-	UK HSE
Pipework (300 - 499mm)	per m-year	1.80E-06	5.00E-07	2.00E-07	7.00E-08	-	UK HSE
Pipework (500 - 1000mm)	per m-year	1.70E-06	4.00E-07	1.00E-07	4.00E-08	-	UK HSE
Manual Valve	per item per year	2.00E-04	-	-	-	-	UK HSE
Actuated Valve	per item per year	2.00E-04	-	-	-	-	UK HSE
Flange (smaller than 2")	per item per year	5.00E-06	5.00E-06	-	-	-	UK HSE
Flange (2" and above)	per item per year	5.00E-06	-	5.00E-06	-	-	UK HSE
Pressure Vessel	per item per year	5.00E-05	5.00E-06	5.00E-06	-	4.00E-06	UK HSE
General Reactors	per item per year	5.00E-05	5.00E-06	5.00E-06	-	1.00E-05	UK HSE
Single Seal Pump	per item per year	5.00E-04	-	-	-	3.00E-05	UK HSE
Centrifugal Compressor	per item per year	7.20E-03	4.93E-03	1.43E-04	-	2.90E-06	UK HSE
Shell and Tube Heat Exchanger, Shell Side	per item per year	3.62E-03	5.36E-04	-	-	4.52E-04	OGP

Component	Unit	Hole Size (mm)					
(50<d<150mm)							
Shell and Tube Heat Exchanger, Shell Side d>150mm)	per item per year	3.62E-03	5.36E-04	2.10E-04	-	2.42E-04	OGP
Shell and Tube Heat Exchanger, Tube Side (50<d<150mm)	per item per year	2.47E-03	3.66E-04	-	-	2.77E-04	OGP
Shell and Tube Heat Exchanger, Tube Side d>150mm)	per item per year	2.47E-03	3.66E-04	1.28E-04	-	1.53E-04	OGP
Pig Launcher and Pig Receiver (d > 150 mm)*	per item per year	1.45E-0	2.04E-08	8.92E-09	-	1.76E-08	OGP

*Note: Assume Pigging frequency is once per 10 years and 3 hours each time.

7.2 FAILURE FREQUENCY FOR SCENARIOS ASSOCIATED WITH NAPHTHA STORAGE TANKS

7.2.1 Bund Overfilling Scenario

Bund overfilling is envisaged in the case of simultaneous catastrophic rupture of two tanks at TPGPP. Using the approach adopted from the Hazard to Life assessment of the Airport Fuel Tank Farm (AFTF) [17], the failure frequency of the simultaneous failure of more than one tank can be estimated based on individual tank failure frequency. The frequency of leak or rupture of the tank for Catastrophic Rupture is F_{CatRup} = 5E-06/yr For the existing three storage tanks an independent release from 2 of the tanks would have a frequency of $3F_{CatRup}$ $x2F_{CatRup,}$.Table 7.3 shows the frequency of failure due to simultaneous failure of 2 tanks at TPGPP.

Table 7.3 Frequency of simultaneous failure of tanks

Scenario	Frequency
Simultaneous Catastrophic rupture of Tanks	1.54E-11

7.2.2 Bund Overtopping Scenario

Another potential scenario that may result in bund overtopping is due to the case of instantaneous release from storage tank unzipping leading to flowing over the bund wall.

In order to model such a scenario of overflow of Naphtha over the bund wall, it is necessary to know the fraction of Naphtha retained within the bund, and that overflows over the bund. Such modelling was performed in the Hazard to Life Assessment for the Permanent Aviation Fuel Facility [18], assessing the percentage of tank content which will remain in the bund for a given bund height, tank filling height and radius from centre of tank to bund wall. Using this methodology, the naphtha tank failure leading bund overtopping is assessed below:

To derive the fraction of Naphtha spill overtopping the bund, the following correlation is used [19]:

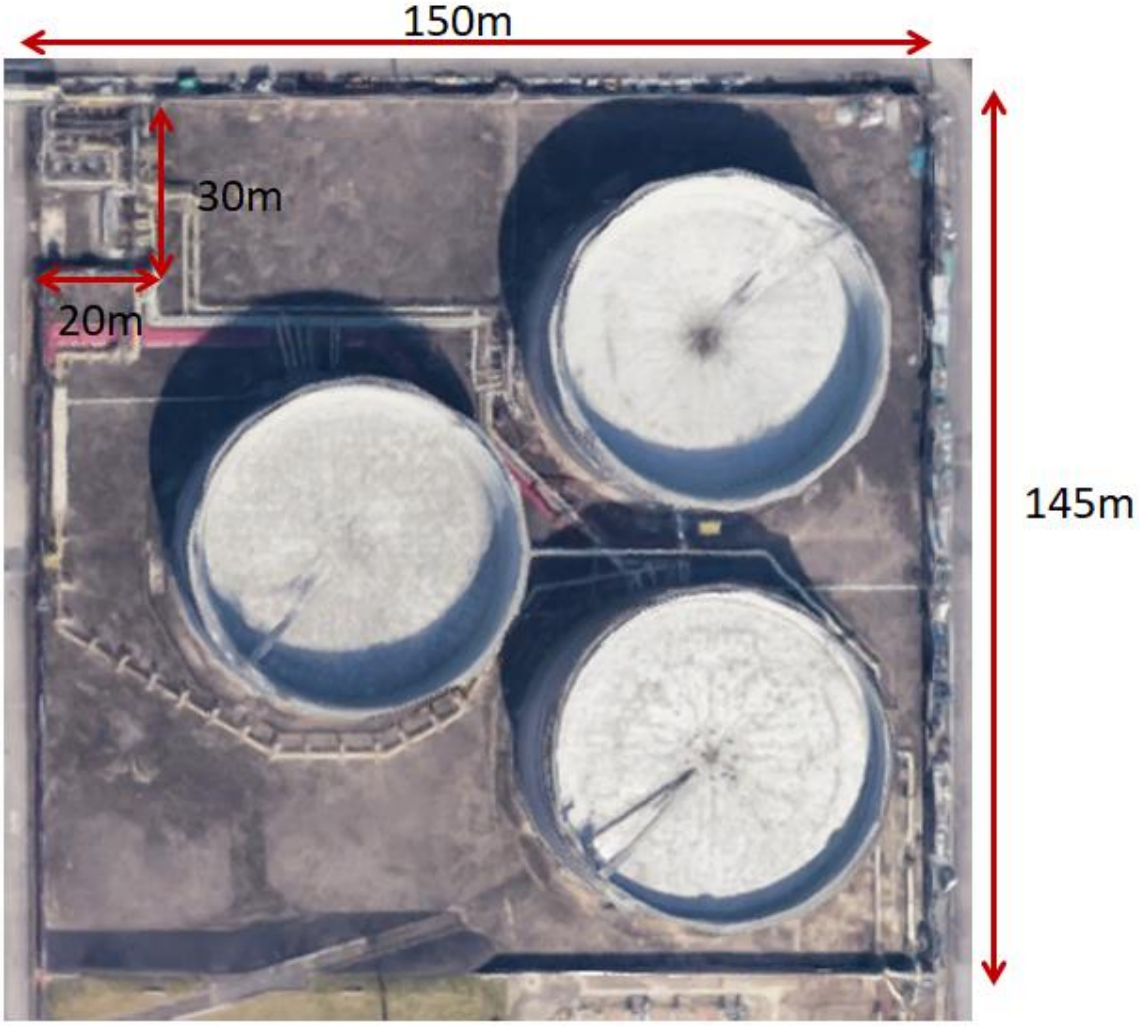
$$\mathrm{Q} = 0.044 - 0.264\ln(\mathrm{h}/\mathrm{H}) - 0.116\ln(\mathrm{r}/\mathrm{H})$$

where Q is the bund overtopping fraction, h is the bund wall height, H in the tank liquid height and r is the distance from the centre of the tank to the bund wall.

The working height of each tank (*H*) is conservatively assumed to be 16.5m, which is the expected maximum .

According to the QRA for Ma Tau Kok Gas Plant [5], the height of bund wall (h) can be calculated based on the design volume of the bund as follows:

Figure 7.1 Naphtha Storage Area and Pumping facility of TPGPP



The bund dimensions are 145m in length and 150m in width, and the pumping area is outside the bund with a dimension of 30m in length and 20m in width. Therefore, the effective bund area can be estimated as follows:

Total bunded area: (145m x 150m) – (20m x 30m) = 21,150 m^2

Total Area occupied by the Tanks : (3 x 3.142 x 542) / 4 = 6,870 m^2

Total Area of bund available to contain Naphtha = 21,150 – 6870 = 14,280 m^2

As the bunded area can hold 110% of the total volume of a tank (40,000 m^3), the height of the bund is calculated as:

h = 44,000 m^3 / 14,280 m^2 = 3.1 m

The distance from tank centre to bund wall is calculated as 82 m on average.

Table 7.4 presents the results of physical modelling for the PAFF assessment for the below mentioned scenarios of bund overtopping, which are also taken into consideration in this study:

- Instantaneous tank removal (100% fill level)
- Unzipping of tank (100% fill level)

Table 7.4 Percentage of Tank Content Retained in the Bund as per PAFF Physical Modelling

Instantaneous tank removal (100% fill level)	Unzipping of tank (100% fill level)
75%	73%

Table 7.5 presents a comparison in the physical dimensions of PAFF Tanks and Naphtha Tanks at TPGPP.

Table 7.5 Comparison of PAFF Tanks and Naphtha Tanks at TPGPP

Description	PAFF	TPGPP
Bund wall height	4.8 m	3.1 m
Distance from tank center to bund wall	30 m	42 m
Height of Tanks(Working level)	25 m	16.5 m
Diameter of Tanks	43.5 m	54 m

Given the above metrics, scaling of metrics needs to be done between PAFF and TPGPP. In doing so, it is possible to estimate the increased or decreased overtopping fraction due to each metric namely Working level (H), bund height (h) and Distance from tank center to bund wall (r).

The Q value for PAFF is 0.4494, while the Q value for TPGPP is 0.3303. This results in a 26.5% decrease in Q value. Thus, the final amount of content retained in the bund after scaling for difference in parameters in PAFF and TPGPP are presented below:

Table 7.6 Overtopping fraction at TPGPP

Item	Instantaneous tank removal (100% fill level)	Unzipping of tank (100% fill level)
Amount of liquid that overtops	(1 – 75%) * (0.3303/0.4494) = 18.37%	(1 - 0.73) * (0.3303/0.4494) = 19.84%
Retained in Bund	(1 – 18.37%) = 81.63%	(1 – 19.84%) = 80.16%

Diameter of Pool fire formed due to a bund overtopping scenario:
The spill areas have been estimated based on the assumption that, allowing for the rough areas of ground and changes in elevation, the spill outside the bund would be 20cm deep on average. This is in line with the results of the physical tests conducted for the PAFF tank designs [17]. The results for Instantaneous tank removal (100% fill level) and Unzipping of tank (100% fill level) are presented in following tables.

Table 7.7 Instantaneous tank removal (100% fill level)

Tank Volume (m^3)	Overtopping Fraction	Overtopping volume(m^3)	Pool Area (m^2)	Pool Radius (m)
37790	0.1837	6942	34710	105

Table 7.8 Unzipping of Tank (100% fill level)

Tank Volume (m^3)	Overtopping Fraction	Overtopping volume(m^3)	Pool Area (m^2)	Pool Radius (m)
37790	0.1984	7498	37488	109

Event Frequency for Bund overtopping scenarios

The methodology applied in the PAFF report for assessing the frequency of an instantaneous release from a tank, involved reviewing all the historical catastrophic failure incidents between 1924 and 1995. The derived frequency of instantaneous failure of a tank is taken as 5 x 10^{-9} / yr [18].

7.3 FAILURE FREQUENCY FOR OTHER SCENARIOS

Table 7.9 presents the total frequencies inclusive of frequencies for leak and rupture, for the sections considered in the study:

Using the numbers provided in Table 7.1 and Table 7.2 above, the failure frequencies related to Tai Po Gas Production Plant assessment are detailed in methodology report [23], while the table below provides a summary of the frequencies (inclusive of frequencies for leak and rupture scenarios) estimated.

Table 7.9 Failure frequency Estimated for Hazardous Sections

Hazardous Systems in TPGPP	Main Equipment	Hazardous Material*	Failure Frequency per year
Naphtha Importing and Tank Farm	Piping and Large storage tanks	Naphtha (L)	1.20E-03
Naphtha Pumping and Distribution Headers to PTs	Piping, pumps	Naphtha (L)	5.30E-03
Natural Gas Receiving Station and Distribution Headers to PTs	Piping, and pumps	Natural gas (G)	9.30E-04
Phase I Production Units - PT1	Piping, pressure vessel, pumps. heat exchangers	Naphtha (L), process gas (G) and town gas (G)	3.90E-02 Note1
Phase I Production Units – PT2	Piping, pressure vessel, pumps. heat exchangers	Naphtha (L), process gas (G) and town gas (G)	3.90E-02
Phase I Production Units – PT3	Piping, pressure vessel, pumps. heat exchangers	Naphtha (L), process gas (G) and town gas (G)	3.90E-02
Phase I Production Units – PT4	Piping, pressure vessel, pumps. heat exchangers	Naphtha (L), process gas (G) and town gas (G)	3.90E-02
Phase II Production Units – PT5	Piping, pressure vessel, pumps. heat exchangers	Naphtha (L), process gas (G) and town gas (G)	3.90E-02
Phase II Production Units – PT6	Piping, pressure vessel, pumps. heat exchangers	Naphtha (L), process gas (G) and town gas (G)	3.90E-02

Hazardous Systems in TPGPP	**Main Equipment**	**Hazardous Material***	**Failure Frequency per year**
Phase II Production Units – PT7	Piping, pressure vessel, pumps. heat exchangers	Naphtha (L), process gas (G) and town gas (G)	3.90E-02
Phase II Production Units – PT8	Piping, pressure vessel, pumps. heat exchangers	Naphtha (L), process gas (G) and town gas (G)	3.90E-02
Towngas Export and Others	Piping	Town gas (G), Landfill Gas (G)	1.40E-02

Note1: The frequency of the entire Production train is cumulative of the different sections considered in the train based on confidential process information provided by HKGC [20]. As TPGPP has multiple production trains, the respective frequency for the train is repeated for the total number of production trains.

The naphtha storage area, i.e. bund area, is provided with fire suppression system. In the event of a naphtha release, it will be contained in the bund where fire / vapour suppression agent will be applied. The agent will cover the surface and blanket the hydrocarbon pool, and thereby prevent air (i.e. oxygen) coming in contact with the hydrocarbon vapours. It is noted that TPGPP implements strict work rules and procedures to control various high-risk operations, with robust backup from automatic alarms and safety interlocks. A high degree of emergency response preparedness is achieved by a wide range of fire-fighting facilities, well trained response teams and frequent emergency drills. Therefore, the fire suppression system was assumed to have a probability of failure on demand of 0.1. In addition an operational factor of 0.75 has been considered for the production trains to reflect the operation [23].

7.4 EVENT TREE ANALYSIS

Upon calculating the failure frequencies of the isolatable sections as presented above, an event tree is used to calculate the frequencies of the possible outcomes, namely jet fire, pool fire, flash fire, fireball etc. In this study, ignition sources were identified as elaborated in Section 7.5. By using Phast Risk and its built-in risk/event tree modelling program, MPACT, the different ignition sources were modelled whereby the various fire event frequencies are determined. The detailed parameters used in Phast Risk are presented in Appendix A. Reference to these parameters was taken from the Kai Tak Development Engineering Study [5].The figures below present the event trees for various scenarios for MPACT which were applied to modelling of various gas and naphtha liquid release scenarios.

Figure 7.2 Event Tree Extracted from MPACT (for Gaseous Release)

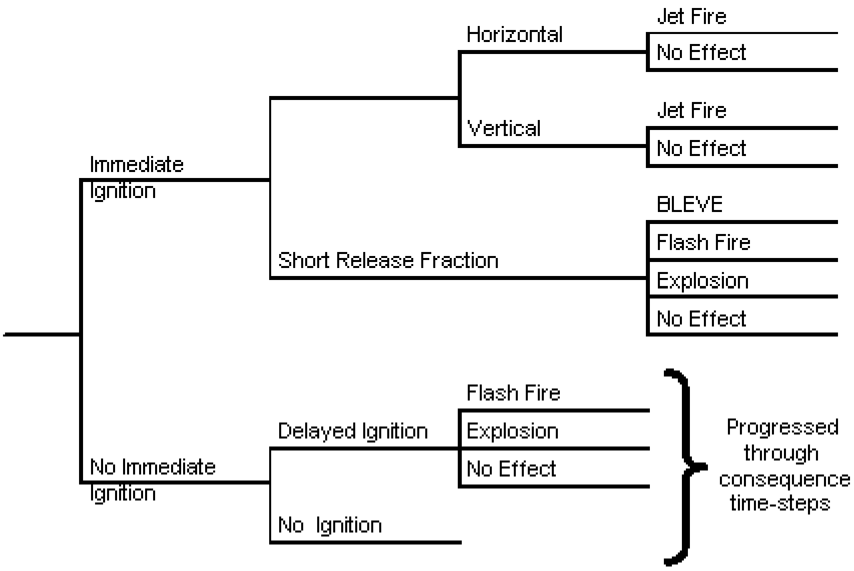


Figure 7.3 Event Tree Extracted from MPACT (for Liquid Release)

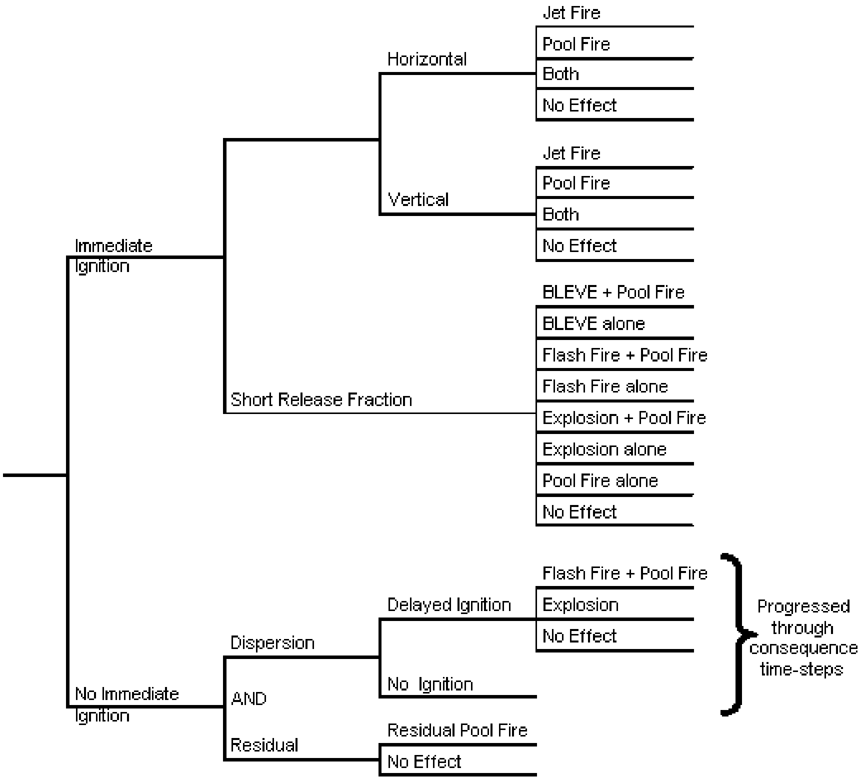
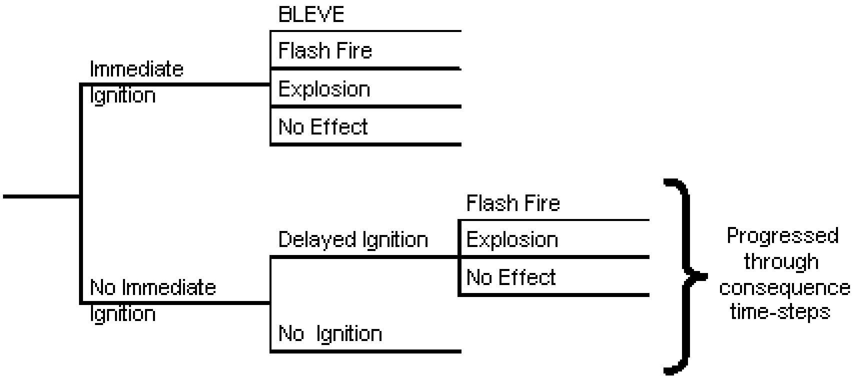


Figure 7.4 Event Tree Extracted from MPACT (for Catastrophic Rupture)



7.5 SOURCES OF IGNITION

Ignition sources, both in TPGPP and offsite area, can cause the ignition of flammable gas releases. Specifically for delayed ignition, fire events such as Vapour Cloud Explosions and Flash Fires may result. The probability of ignition of a release upon reaching an ignition source is dependent on its ignition probability and the presence factor within the source, and approach adopted is based on published literature [13]. On-site ignition sources of TPGPP are mainly the process trains which include heating and rotating equipment. The offsite ignition sources in the vicinity of TPGPP include mainly industrial building and factories. For these facilities, an ignition efficiency of 0.7 in a period of 60 seconds has been assigned. Furthermore, other populated areas in the vicinity includes office buildings and food manufacturing facilities, where smoking, cooking and use of electrical appliances are also considered as ignition sources in the modelling. An ignition efficiency of 0.4 in a period of 60 seconds has been assigned to such areas. In addition, road vehicles are considered as ignition sources, and accordingly ignition sources have been assigned to all nearby roads in the vicinity. Ignition efficiency for vehicles is taken as 0.4 in a period of 60 seconds based on similar previous QRA in Hong Kong [5].

Table 7.10 Summary of Ignition Sources Assumed in QRA

Ignition Sources	Description	Ignition Efficiency*
Flare and furnace	Open flame or very hot surfaces	1
Combined Heat and Power Generation System (CHP) in TPSTW	Hot surface and combustion	1
TPGPP Process Trains	Heating and rotating equipment	0.45
Factories	Potential hot works and heavy machine operations	0.7
Office buildings	Smoking, cooking and use of electrical appliances	0.4
Road Vehicles	Vehicle engines and hot exhaust gases	0.4

Table 7.11 Igntion Probabilities of Ignition Sources

Ignition Sources	Type	Ignition Probability in 60s	Presence Factor
Tai Po Towngas Production Train (PT1 – 8)	Area	0.45	1
Tai Po Towngas Furnace Phase 1	Line	1	1
Tai Po Towngas Furnace Phase 2	Line	1	1
South China Morning Post	Area	0.4	1

Ignition Sources	Type	Ignition Probability in 60s	Presence Factor
Tao Heung Group	Area	0.4	1
Lee Kee Group	Area	0.4	1
Hong Kong Note Printing Ltd.	Area	0.4	1
Hong Kong Yamazaki Baking Co.Ltd.	Area	0.4	1
Nissin Foods	Area	0.4	1
Hitachi Chemical	Area	0.4	1
Linde HKO Ltd.	Area	0.7	1
Golik Metal	Area	0.7	1
Road Vehicles	Line	0.4	0.6 - 1

8 CONSEQUENCE ANALYSIS

Consequence modelling has been performed using Phast Risk for the sections of TPGPP considered in the study. The consequence distances are presented in Annexure B. In the event of a release or rupture of pipeline or equipment, no isolation has been assumed as a conservative approach for assessment. All leak scenarios were modelled as continuous releases (i.e. 30 min), which are anticipated to result in the worst case consequences. For catastrophic rupture of equipment, the entire volume of the process equipment was taken to consideration..

8.1 DISPERSION MODELLING

Dispersion modelling involves mathematical simulation of how the released materials disperse in the ambient atmosphere. Downwind and crosswind concentrations were determined to find the gas cloud hazard footprint. Vapor dispersion modelling was conducted using PHAST's Unified Dispersion Model (UDM). The model considers the following aspects of vapor cloud behavior in dispersion modelling:

- Continuous, instantaneous or time-varying releases;
- Jet, heavy-gas and passive dispersion;
- Elevated, touchdown and ground level dispersion;
- Droplet dispersion, rainout and droplet vaporization; and,
- Dispersion over land or water surfaces.

8.2 PHYSICAL EFFECTS MODELLING

Physical effect modelling determines the magnitude of damage caused by exposure to fire, heat radiation, toxic, or overpressure. The following possible hazardous outcomes were considered in the QRA:

- Fireball;
- Jet Fire;
- Flash Fire;
- Pool fire; and
- Toxic dispersion

8.3 END POINT CRITERIA

Probit functions were used to estimate the probability of fatality due to a physical effect, e.g. thermal radiation, etc.

8.3.1 Flash Fires

All persons outdoor within the flash fire envelope (LFL contour) were assumed to be fatally injured i.e. fatality rate of 100%.

8.3.2 Thermal Radiation

The main hazard for jet fire and fireball is personnel being exposed to the thermal radiation. The probability of fatality due to the exposure to thermal radiation can be calculated with the probit equation in the following form:

$$\mathrm{Pr} = -36.38 + 2.56 \times \ln(Q^{4/3} \times t)$$

Where,

Pr is the probit;

Q is the heat radiation (Wm^{-2}); and

t is the exposure time (s).

8.3.3 Toxic Effects

The probability of fatality due to exposure to toxic CO component of town gas can be calculated with the following probit equation, as shown in PHAST Risk's built-in toxic probit for CO:

$$\mathrm{Pr} = -7.21 + \ln(\mathrm{Ct})$$

Where:

Pr is the probit;

C is the gas concentration (ppm); and,

t is the exposure time (min).

9 RISK SUMMATION

Risk summation involves combining the predicted consequences of an event with the event probabilities, as well as the meteorological data to give estimates of the resulting frequencies of varying levels of fatalities. DNV PHAST RISK v6.7 is used for modelling and risk summation.

9.1 INDIVIDUAL RISK CONTOURS

The individual risk contours of the TPGPP are presented in Figure 9.1. A salient finding from the individual risk assessment for the proposed project is that even the lowest risk contour of $1x10^{-9}$ / yr does not reach the area of the proposed development. This means that the proposed development and associated activities are not exposed to any significant risk from TPGPP.

Besides, the $1x10^{-5}$ / yr contour was found to cover part of the neighboring factories. This is the anticipated existing risk level, irrespective of existence of the proposed project. The occupancy factors of the nearby facilities can be estimated based on the typical percentage of occupancy considered for industrial facilities in past QRA studies [5][25][26] as given the table below:

Table 9.1 Temporary Change in Population for Industrial Population

	Time period			
	Weekday Day (Mon-Fri 0700-1900 hrs)	Weekday Night (Mon-Fri 1900-0700 hrs)	Weekend Day (Sat-Sun 0700-1900 hrs)	Weekend Night (Sat-Sun 1900-0700 hrs)
Presence Factor of the time period	100%	10%	40%	5%
Percentage of the time period over a year	36%	36%	14%	14%

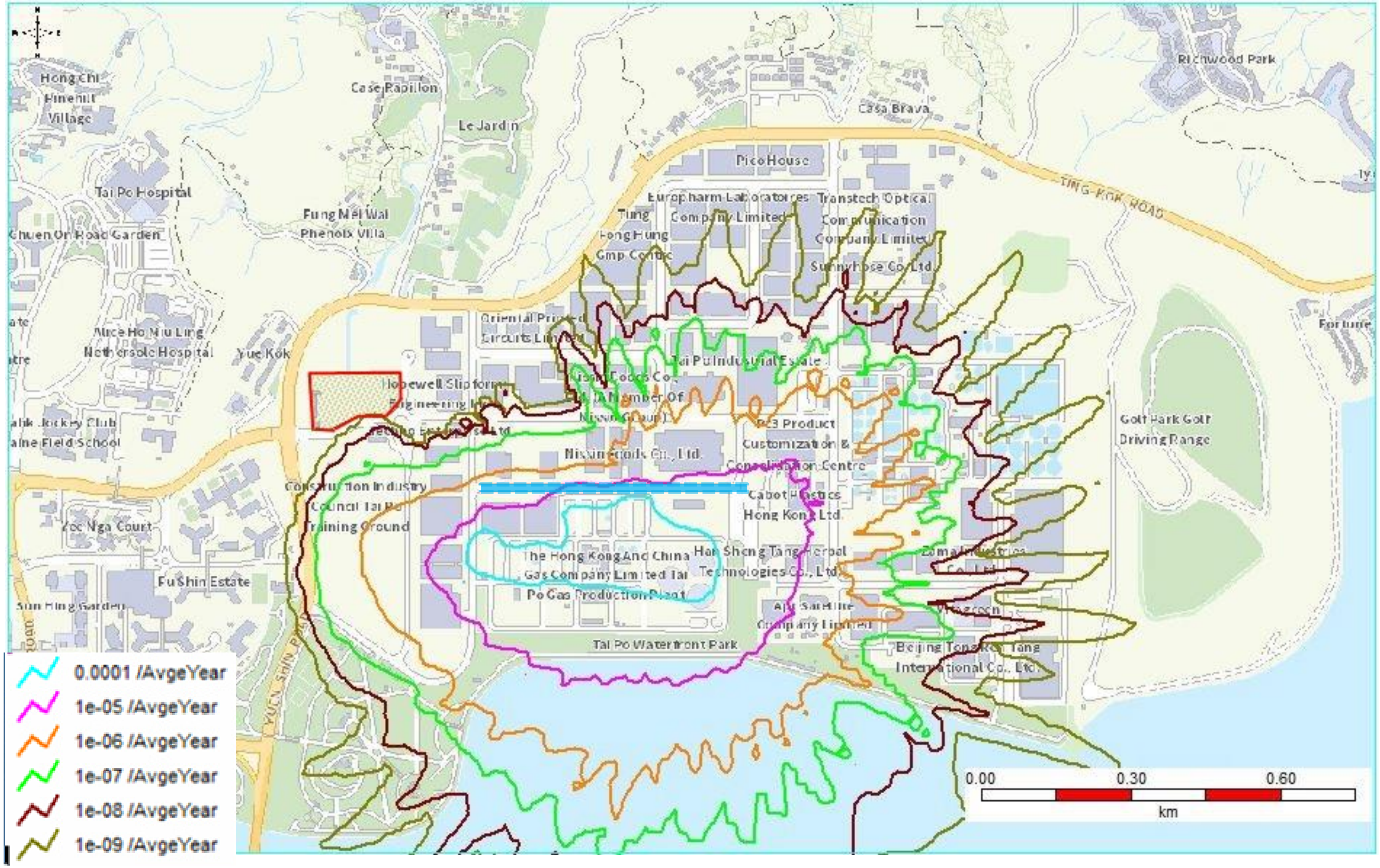
Based on the above table, the average presence factor of industrial population is calculated to 0.46. Therefore, the individual risk posed to the industrial population (i.e. those within the 1 x 10^{-5} / yr contour) after considering their presence level will become lower, at 4.6 x 10^{-6} per year. Furthermore, industrial workers located inside buildings will be protected, thus further reducing the risk to a lower level.

A stretch of area along the northern boundary of TPGPP, as shown in Figure 9.1 (shaded area in blue), was selected to be representative to evaluate the risk contributors to the surrounding population. The top 10 risk contributors identified are listed below:

Table 9.2 Top 10 Risk Contributor

Scenarios	Outcome	%
300mm leak release of Naphtha Storage Tanks	Flash fire with Pool fire	15.98
300mm leak release of Naphtha Storage Tanks	Explosion	10.65
75mm leak release of Naphtha Feed Header to Phase I	Flash fire with Pool fire	7.35
75mm leak release of Naphtha Feed Header to Phase I	Explosion	5.06
Catastrophic Rupture of Naphtha Pumps in Pumping area	Explosion	3.87
Full bore rupture of Naphtha Feed Header to Phase I	Flash fire with Pool fire	3.68
Full bore rupture of Natural Gas from M&R Station to TPs	Explosion	3.24
Full bore rupture of Naphtha Feed Header to Phase I	Explosion	2.53
75mm leak release of Naphtha Pumps in N.W Pumping area	Jet fire with Pool fire	2.42
Full bore rupture of Natural Gas feed from Natural Gas Pre-heater to Tubular Reformer including H2S Absorber	Jet fire	2.28

Figure 9.1 IR Contour Map

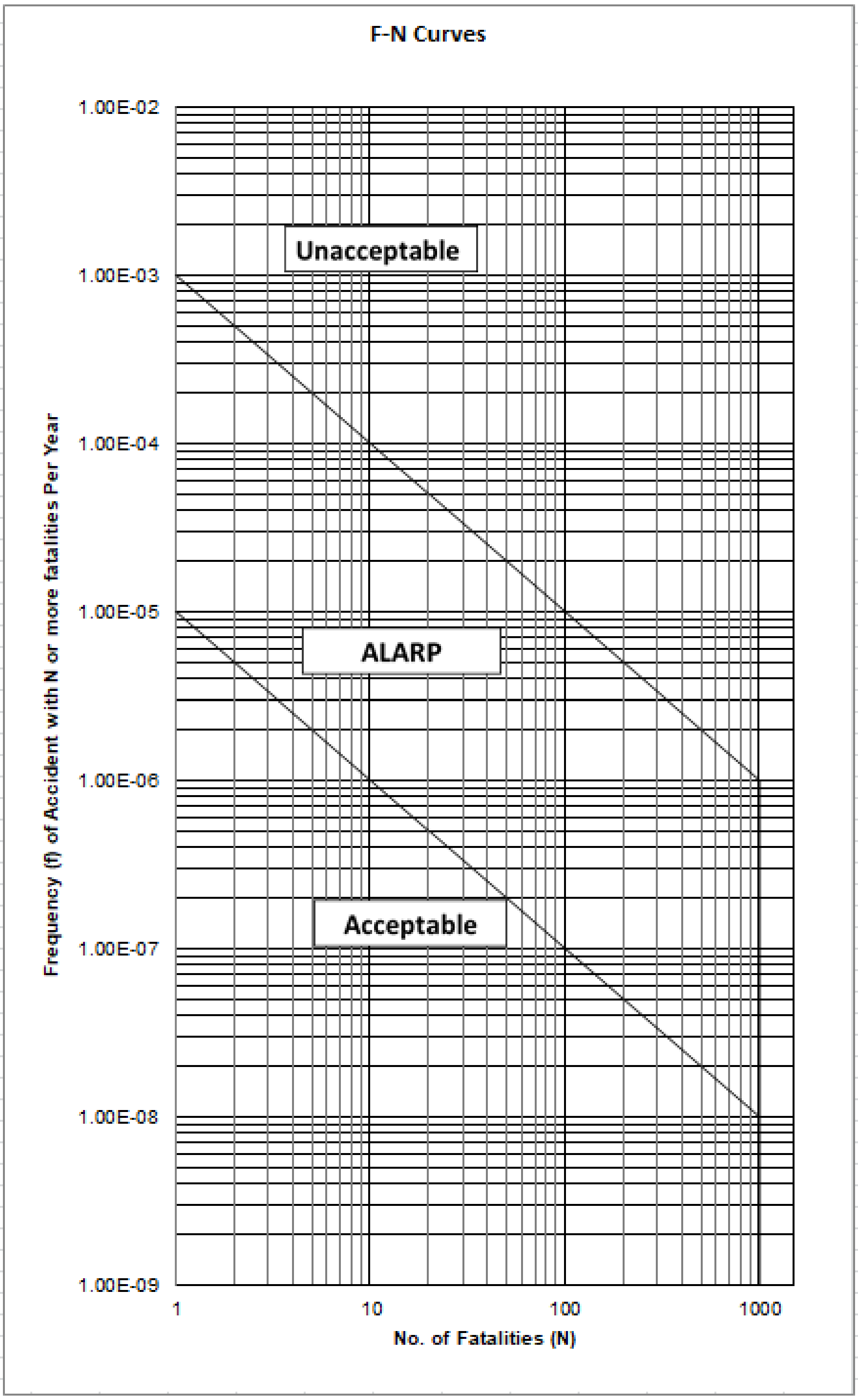


9.2 SOCIETAL RISK

As presented in Table 9.2, the 1 x10^{-9} /yr risk contour does not extend to the area of proposed development. Referring to societal risk criteria in Figure 1.2, risk levels below 1 x 10^{-9} /yr is below the lowest frequency threshold of the FN plot range mandated by the HKRG. This means that the project will not introduce any change to the existing FN curve, with respect to the FN curve region of frequency above 1E-9 per year which is the lowest limit of the criteria. As such, it can be concluded that FN curves for "with" and "without" project will be the same as existing situation before the proposed project.

A check case was also performed by assigning population at the proposed KMB site in the risk model to illustrate if any change in societal risk would result due to the proposed project. As shown Figure 9.2, the TPGPP FN curve for the introduced project population is nil based on PHASTRISK modelling. This result reassures the above conclusion that the proposed project does not affect the societal risk level associated with TPGPP.

Figure 9.2 PHAST Risk Input and Output for Societal Risk Check Case



10 DISCUSSIONS ON ASSESSMENT UNCERTAINTY AND EXPECTED SAFETY MEASURES IN TPGPP

Sensitive information with regards to the TPGPP facility was provided by TPGPP facility owner although some such information has not been presented in this report due to confidentiality agreement with TPGPP facility owner. Furthermore, due to security reasons, only part of the required process information for the Study was made available by the TPGPP facility owner. Hence for information that was not available, estimates were be made with regards to process parameters, equipment details, etc. in the process plant, based on information available in the public domain as well as previous similar studies, such as the QRA MTK [5], with a view to producing a conservative estimate of the risk results. A number of significant assumptions which would reduce further the risks are discussed below:

<u>Plant Emergency Actions - Leak Detection, Automatic Isolation and Evacuation</u>

It is typical for fuel or flammable gas processing facilities like TPGPP to install sophisticated leak detection and automatic safety systems, for instance, flame and flammable detectors should be placed at strategic plant locations whereby any leak and fire detection will trigger automatic emergency plant actions such as facility shutdown, system isolation and blowdown of inventory. The time required to activate these measures can be as short as 1 minute following a leak [24]. In addition, no allowance has been made in the QRA for evacuation even though the surrounding areas are denoted as CZ where coordinated emergency communication and response is expected to be in place.

<u>Assumptions in relation to Naphtha and Process Train Systems</u>

Towngas is produced by dual feedstock of Naphtha and Natural Gas (NG) in TPGPP. Not only NG is regarded as a cleaner feedstock than Naphtha, but it is also buoyant gas with a strong tendency to disperse and dissipate in case of a release as opposed to Naphtha, which will form a flammable liquid pool upon released with subsequent flammable vapours accumulating and persisting above the pool at near ground level. In the absence of Naphtha storage operational data, the QRA assumed all three large naphtha storage tanks are full for 100% of the time. In actual operations, the storage quantities will be lower than this level. It is also anticipated that the use of the cleaner Natural Gas will increase (i.e. naphtha will decrease) in future for more environmentally friendly Towngas production. Besides, it is typical that fire suppression foam will be provided for naphtha systems; the foam can provide a varying degree of flammable vapour suppression of naphtha pool, thus lowering the flammable effect zones. However, such consequence reduction effects were not modelled in the QRA , as it is specific to the foam type and system design. In relation to the process trains, process conditions were estimated based on literatures available as well as limited information provided HKCG. The data has been approximated in such a way that it will tend to give conservative estimates in risk results [23].

<u>Past Safety Records and Safety Management System of TPGPP</u>

TPGPP Phase 1 has been in operation since 1986 and Phase 2 expansion was completed in 1992, so Phase 1 has been in operation for 36 years while Phase 2 has been for 30 years. During TPGPP has started operations, there is no recorded major loss of containment scenarios that leads to injury or fatality for both onsite operators and offsite public. Based on the frequency analysis performed, apart from piping, there are more than 5,000 components (accounting for vessels, pumps, flanges, valves, etc) in the overall TPGPP. With operating year of 30 to 36 years, the overall operating experience is in the range of 150,000 component-year.

With statistical techniques, it is possible to estimate the frequency of events related to systems where 'zero fatal accident' have occurred. It is assumed that the accident obeys a Poisson distribution in the time interval while the intervals between the events follow an exponential distribution. The Poisson Distribution equation can be written as:

$$p(x) = \frac{\lambda^x e^{-\lambda}}{x!}$$

where,
x is a discrete random variable;
p(x) is the probability function of x; and
l is a positive constant

In the case of 'zero fatal accident' where x = 0, the equation will be simplified to only p(x) = e-l. For 'zero fatal accident', the failure rates associated with various confidence levels can then be calculated. Starting with 90% confidence level in the calculation, the 90% probability of getting 'zero fatal accident' would be equal to l90% = ln (1/0.1) = 2.3.

Applying the existing operating experience of 150,000 component-year, the 'zero fatal accident' at 90% confidence level would then be 2.3/150,000 = 1.53 x 10^{-5} per year. Given that the IR contour result predicted the maximum individual risk is in region of 1 x 10^{-4} per year in TPGPP, it can be concluded with 90% confidence that currently assessed IR result based on industrial average statistics is on the conservative side.

It is noteworthy TPGPP has maintained a high standard of operations and safety which will reduce the chance of accident. For example, it is common for operating plants to implement Risk Based Inspection (RBI) programme, which is a systematic risk-based approach identifying the main mechanical damage mechanisms and their frequencies of occurrence for aspects such as thickness thinning, stress corrosion cracking and corrosion under insulation; the programme will assist in defining and optimising inspection method and interval for safety critical systems and equipment, thus lowering the risk of release and justifying a better safety performance over the industrial average figures. With a demonstrated RBI and / or plant Safety Regime, the effects of risk mitigation can also be quantified and incorporated into QRA; however, this has not been performed in this study in the absence of related information. Besides, TPGPP is also anticipated to have suitable safety verification programme, for instance safety audit and safety case study to be carried out and updated regularly to ensure safety system integrity as required by regulations in Hong Kong.

11 RISK MITIGATION MEASURES

Overall, while the assessed risk is expected to err on the side of conservative as discussed in the previous subsection, the estimated $1x10^{-9}$ /yr contour does not extend into the proposed development area. As such, it can be safely concluded that the risk associated with the proposed development is acceptable in accordance with the Hong Kong Risk Guidelines.

Despite the finding that the risk experienced by personnel at the Proposed KMB Development is not significant, it is recommended to follow good practices as the Proposed Development is within the CZ of the TPGPP, including the followings:

- During the construction phase, suitable planning should be implemented to avoid road congestion due to the project construction vehicles. Also, all construction workers, temporary construction offices, equipment, construction materials, etc., should always be kept inside the KMB depot premises;
- Emergency response plan for operational and construction phase of the proposed development should be developed addressing the potential accidents in TPGPP. This may include emergency communication channel between TPGPP or Fire Services Department (FSD), such that suitable emergency response actions will be promptly taken at proposed development site in the event of a major fire and loss of containment accident at TPGPP; and

- Carry out regular fire and safety drills to increase awareness of both construction workers and operation personnel at the KMB Bus Depot.

12 CONCLUSION

In support of a planning application for relaxation of the existing Tai Po Bus Depot at Dai Fuk Street, Tai Po, NT, from 2 storeys to 4 storeys, a Quantitative Risk Assessment (QRA) was carried out for Tai Po Gas Production Plant (TPGPP) which is in the vicinity of the proposed development.

A salient finding from the risk assessment is that the proposed development, though located towards north-western the edge of TPGPP PHI CZ, is found to fall outside the lowest risk contour of $1x10^{-9}$ / yr associated with TPGPP. As such, the proposed development is not exposed to any significant risk from TPGPP. Also, referring to the societal risk criteria of Hong Kong (Figure 1.2), risk levels below 1×10^{-9} /yr is below the lowest frequency threshold of the FN plot range mandated by the HKRG. Therefore, it is concluded that the population relating to the construction and operation of the proposed development would have no material change or contribution to existing societal risk level associated with TPGPP. Nevertheless, a number of recommendations, in accordance with good practices, have been proposed to minimize any potential impact to the TPGPP, as well as to ensure the emergency response planning of the proposed project.

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ANNEXURE A : PHAST RISK PARAMETERS

Tai Po Project Biogas 22Feb2022 (RunRow STW

Parameters

Discharge Parameters

Continuous Critical Weber number	12.5	
Instantaneous Critical Weber number	12.5	
Venting equation constant	24.82	
Relief valve safety factor	1.2	
Minimum RV diameter ratio	1	
Critical pressure greater than flow phase	0.3447	bar
Maximum release velocity	500	m/s
Minimum drop diameter allowed	0.01	um
Maximum drop diameter allowed	1E4	um
Default Liquid Fraction	1	fraction
Continuous Drop Slip factor	1	
Instantaneous Drop Slip factor	1	
Number of Time Steps	100.00	
Maximum Number of Data Points	1,000.00	
Tolerance	0.0001	
Thermal coupling to the wall	No modelling of heat transfer	
Use Bernoulli for forced -phase liq-liq discharge	Use compressible flow eqn	
Capping of pipe flow rates	Use leak scenario cap, disallow flashing	
Velocity capping method	FixedVelocity	
Droplet Method - continuous only	Modified CCPS	
Thermodynamic Option for Gas Pipellines	Non-ideal Gas	
Excess Flow Valve velocity head losses	0	
Non-Return Valve velocity head losses	0	
Shut-Off Valve velocity head losses	0	
Frequency of bends in long pipes	0	/m
Frequency of couplings in long pipes	0	/m
Frequency of junctions in long pipes	0	/m
Line length	10	m
Pipe roughness	0.0457	mm
Air changes	3	/hr
Elevation	1	m
Atmospheric Expansion Method	Closest to Initial Conditions	
Tank Roof Failure Model Effects	Instantaneous effects	
Frequency of Excess Flow Valves	0	/m
Frequency of Non-Return Valves	0	/m
Frequency of Shut-Off Valves	0	/m
Mechanism for forcing droplet breakup - Inst.	Use flashing correlation	
Mechanism for forcing droplet breakup - Cont	Do not force correlation	
Flashing in the orifice	No flashing in the orifice	
Handling of droplets	Not Trapped	
Indoor mass modification factor	3	
Vacuum Relief Valve	Operating	
Vacuum Relief Valve Set Point	0	bar

Dispersion Parameters

Expansion zone length/source diameter ratio	0.01
Near Field Passive Entrainment Parameter	1
Jet Model	Morton et.al.
Jet entrainment coefficient alpha1	0.17
Jet entrainment coefficient alpha2	0.35

Drag coefficient between plume and air	0	
Dense cloud parameter gamma - continuous	0	
Dense cloud parameter gamma - instant	0.3	
Dense cloud parameter K - continuous	1.15	
Dense cloud parameter K - instantaneous	1.15	
Modeling of instantaneous expansion	Standard Method	
Maximum Cloud/Ambient Velocity Difference	0.1	
Maximum Cloud/Ambient Density Difference	0.015	
Maximum Non-passive entrainment fraction	0.3	
Maximum Richardson number	15	
Distance multiple for full passive entrainment	2	
Core Averaging Time	18.75	s
Ratio instantaneous/continuous sigma-y	1	
Ratio instantaneous/continuous sigma-z	1	
Droplet evaporation thermodynamics model	Rainout, Non-equilibrium	
Ratio Droplet/ expansion velocity for inst. release	0.8	
Expansion energy cutoff for droplet angle	0.69	kJ/kg
Coefficient of Initial Rainout	0	
Flag to reset rainout position	Do not reset rainout position	
Richardson Number for passive transition above pool	0.015	
Pool Vaporization entrainment parameter	1.5	
Richardson number criterion for cloud lift-off	-20	
Flag for Heat/Water vapor transfer	Heat and Water	
Surface over which the dispersion occurs	Land	
Minimum temperature allowed	-262.1	degC
Maximum temperature allowed	626.9	degC
Minimum release velocity for cont. release	0.1	m/s
Minimum Continuous Release Height	0	m
Maximum distance for dispersion	5E4	m
Maximum height for dispersion	1000	m
Minimum cloud depth	0.02	m
Treatment of top mixing layer	Constrained	
Model In Use	Best Estimate	
Lee Length	Calculate	
Lee Half-Width	Calculate	
Lee Height	Calculate	
K-Factor	Calculate	
Switch Distance	Calculate	
Maximum Initial Step Size	10	m
Minimum Number of Steps per Zone	5.00	
Factor for Step Increase	1.2	
Maximum Number of Output Steps	1,000.00	
Flag for finite duration correction	QI without Duration Adjustment	
Quasi-instantaneous transition parameter	0.8	
Relative tolerance for dispersion calculations	0.001	
Relative tolerance for droplet calculations	0.001	
Initial integration step size - Instantaneous	0.01	s
Initial integration step size - Continuous	0.01	m
Maximum integration step size - Instantaneous	100	s
Maximum integration step size - Continuous	100	m
Criterion for halting dispersion model	Risk based	
Impingement Option	Use Velocity Modification Factor	
Impinged velocity limit	500	m/s
Impinged Velocity Factor	0.25	
Dispersion Model to use	Version 2 model	

Fixed step size - Instantaneous	0.01	s
Fixed step size - Continuous	0.1	m
Number of fixed size output steps	20.00	
Multiplier for output step sizes	1.2	

Event Tree Probabilities

Probability of a BLEVE	1	fraction
Probability of a Pool Fire	1	fraction
Toxic Probability	1	fraction
Continuous no Rainout Immediate Ignition	0.3	fraction
Continuous no Rainout Long Duration Horizontal Fraction	0.6	fraction
Continuous no Rainout Long Duration Horizontal Jet Fire	1	fraction
Continuous no Rainout Long Duration Vertical Jet Fire	1	fraction
Continuous no Rainout Short Duration Fraction	1	fraction
Continuous no Rainout Short Duration BLEVE	1	fraction
Continuous no Rainout Short Duration Flash Fire	0	fraction
Continuous no Rainout Short Duration Explosion	0	fraction
Continuous no Rainout Delayed Ignition Flash Fire	1	fraction
Continuous no Rainout Delayed Ignition Explosion	0	fraction
Continuous with Rainout Immediate Ignition	0.3	fraction
Continuous with Rainout Long Duration Horizontal Fraction	0.6	fraction
Continuous with Rainout Long Duration Horizontal Jet Fire	0	fraction
Continuous with Rainout Long Duration Horizontal Pool Fire	0	fraction
Continuous with Rainout Long Duration Horizontal Jet Fire with Pool Fire	1	fraction
Continuous with Rainout Long Duration Vertical Pool Fire	0	fraction
Continuous with Rainout Long Duration Vertical Jet Fire	0	fraction
Continuous with Rainout Short Duration Fraction	1	fraction
Continuous with Rainout Long Duration Vertical Jet Fire with Pool Fire	1	fraction
Continuous with Rainout Short Duration BLEVE with Pool Fire	1	fraction
Continuous with Rainout Short Duration BLEVE alone	0	fraction
Continuous with Rainout Short Duration Flash Fire with Pool Fire	0	fraction
Continuous with Rainout Short Duration Flash Fire Alone	0	fraction
Continuous with Rainout Short Duration Explosion with Pool Fire	0	fraction
Continuous with Rainout Short Duration Explosion Alone	0	fraction
Continuous with Rainout Short Duration Pool Fire	0	fraction
Continuous with Rainout Residual Pool Fire	0.15	fraction
Continuous with Rainout Delayed Ignition Flash Fire	1	fraction
Continuous with Rainout Delayed Ignition Explosion	0	fraction
Instantaneous no Rainout Immediate Ignition	0.3	fraction
Instantaneous no Rainout BLEVE	1	fraction
Instantaneous no Rainout Immediate Flash Fire	0	fraction
Instantaneous no Rainout Immediate Explosion	0	fraction
Instantaneous no Rainout Delayed Ignition Flash Fire	1	fraction
Instantaneous no Rainout Delayed Ignition Explosion	0	fraction
Instantaneous with Rainout Immediate Ignition	0.3	fraction
Instantaneous with Rainout BLEVE with Pool Fire	1	fraction
Instantaneous with Rainout BLEVE Alone	0	fraction
Instantaneous with Rainout Immediate Flash Fire with Pool Fire	0	fraction
Instantaneous with Rainout Immediate Flash Fire Alone	0	fraction
Instantaneous with Rainout Immediate Explosion with Pool Fire	0	fraction
Instantaneous with Rainout Immediate Explosion Alone	0	fraction
Instantaneous with Rainout Immediate Pool Fire Alone	0	fraction
Instantaneous with Rainout Residual Pool Fire	0.15	fraction
Instantaneous with Rainout Delayed Ignition Flash Fire	1	fraction
Instantaneous with Rainout Delayed Ignition Explosion	0	fraction

Immediate Ignition	0.1	fraction
Explosion Given Ignition	0.5	fraction
Long Duration Jet Fire	0.5	fraction
Short Duration Any Ignition of Cloud	0.5	fraction
Short Duration Ignition of Cloud with Pool Fire	0	fraction
Long Duration Horizontal Jet Fire with Pool	0	fraction
Long Duration Vertical Jet Fire with Pool	0	fraction
Short Duration Fraction for Effects	0	fraction
Short Duration BLEVE not Flash Fire	0.5	fraction
Volume based explosion probabilities	No	
FlamespeedLowMedium	0.45	m/s
FlamespeedMediumHigh	0.75	m/s
Obstructed Cloud Volume (1)	200	m3
Obstructed Cloud Volume (2)	3000	m3
Obstructed Cloud Volume (3)	6000	m3
Low Flame Speed Probability (1)	0	fraction
Low Flame Speed Probability (2)	0.3	fraction
Low Flame Speed Probability (3)	0.6	fraction
Medium Flame Speed Probability (1)	0.3	fraction
Medium Flame Speed Probability (2)	0.6	fraction
Medium Flame Speed Probability (3)	0.9	fraction
High Flame Speed Probability (1)	0.6	fraction
High Flame Speed Probability (2)	0.9	fraction
High Flame Speed Probability (3)	1	fraction

Explosion Parameters

Over Pressure Level 1	0.02068	bar
Over Pressure Level 2	0.1379	bar
Over Pressure Level 3	0.2068	bar
Explosion Location Criterion	Cloud Front (LFL Fraction)	
Minimum explosive mass	0	kg
Minimum Explosion Energy	5E6	kJ
Explosion Efficiency	0.1	fraction
Coefficient for zone of heavy damage	0.03	
Coefficient for zone of light damage	0.06	
Explosion efficiency	10	%
Air or Ground burst	Air burst	
Explosion Mass Modification Factor	3	
Use of mass modification factor	Early and late explosions	

Fireball and BLEVE Blast Parameters

Maximum surface emissive power	400	kW/m2
Radiation Dose for Fireball risk calculations	5.784E6	
Calculate Dose	Unselected	
Calculate Probit	Unselected	
Calculate Lethality	Unselected	
TNO model flame temperature	1727	degC
Mass Modification Factor	3	
Calculation method for fireball	DNV Recommended	
Fireball Maximum Exposure Duration	20	s
Intensity Levels (1)	9.8	kW/m2
Intensity Levels (2)	19.5	kW/m2
Intensity Levels (3)	35	kW/m2
Probit Levels (1)	2.73	
Probit Levels (2)	3.72	

Probit Levels (3)	7.5	
Dose Levels (1)	1.27E6	
Dose Levels (2)	5.8E6	
Dose Levels (3)	2.51E7	
Lethality Levels (1)	0.01	
Lethality Levels (2)	0.1	
Lethality Levels (3)	1	
Ground Reflection	Ground Burst	
Ideal Gas Modeling	Model as real gas	
Minimum Distance	0	m
Number of Distance Points	100.00	
Ground Reflection	Ground Burst	
Ideal Gas Modeling	Model as real gas	
Minimum Distance	0	m
Number of Distance Points	100.00	
Ground Reflection	Ground Burst	
Ideal Gas Modeling	Model as real gas	
Minimum Distance	0	m
Number of Distance Points	100.00	

Flammable Parameters

Height for calculation of flammable effects	1	m
Flammable result grid step in X-direction	10	m
LFL fraction to finish	1	
Angle of inclination	0	deg
Observer direction	Variable	
Flammable mass calculation method	Mass between LFL and UFL	
Flammable Base averaging time	18.75	s
Radiation level for Jet/Pool Fire Risk	35	kW/m2
Cut Off fraction for cloud volume	0.001	fraction
UFL Multiple for immediate ignition	1	
Cut Off Time for Short Continuous Releases	20	s
Observer type radiation modelling flag	Planar	
Probit A Value	-36.38	
Probit B Value	2.56	
Probit N Value	1.333	
Height for reports	Centreline Height	
Angle of orientation	0	deg
Relative tolerance for radiation calculations	0.01	fraction
Number of Lethality Ellipses	5.00	
Ellipse linear spacing variable	Probit	
Minimum Probability Of Death	0.01	fraction
Number of radiation/distance points in linked radiation calculations	50.00	
Method for fitting ellipse to flash fire shape	ChiSq method	
Absolute tolerance for linked radiation calcs	1e-010	
Solar radiation	Exclude from calculations	
For time-varying releases	Don't Model Short Duration Effects	
Match fireball duration and mass released	No	

General Parameters

Maximum release duration	3600	s
Height for concentration output	0	m
Rotation	0	deg
Lower Elevation	0	m
Multicomponent aerosol behaviour	Single aerosol modelling	

General Risk Parameters

Use Free Field Modelling	No Free Field	
Distance to Site Boundary	0	m
Late Pool Fire	Exclude Effects	
Minimum Case Frequency	1e-012	/AvgeYear
Minimum Event Probability	1e-012	
Population Omega Factor	0	
Maximum Number of Subsquares across Ellipse	10.00	
Maximum Number of Subdivisions per Square	1.00	
Factor for Toxic F-N Spread	2	
Grid Sizing	Calculated	
Grid Bounds Minimum X	-1000	m
Grid Bounds Maximum X	1000	m
Grid Bounds Minimum Y	-1000	m
Grid Bounds Maximum Y	1000	m
Grid Calculation Method	Number of cells	
Grid cell size	10	m
Maximum number of cells	40,000.00	
Aversion Index	1.2	
Indoor Population Omega Factor	0	
Number of wind subdivisions per sector	1.00	
Method for handling Indoor/Outdoor risk	Indoor and outdoor risk calculations	
Inter-ellipse interpolation method	Weighted	
Method option	Normal dispersion	
Cylinder height over radius ratio	3	
Building damage method	Worst point	
Reflection method	Calculated Angle	
Number of X steps per view	11.00	
Minimum X step	0.1	m
Number of time steps - continuous clouds	5.00	
Between Cloud Views	Minimise Gaps	
Pressure exceedance curves	Calculate	
Elevation of Floor or Ceiling	0	m
Concentration method for filling	Stoichiometric	
Minimum probability of death for explosions	0.001	
Minimum Pressure Filter	0.01	bar
Separation specification	Use Ratio	
Critical Separation Ratio	0.5	
Cloud Shape of Area Integration	Elliptical	
Explosion efficiency method	100% efficiency	
Explosion Type Calculation Method	Polynomial Curve-Fit Equations	
Number of Blast Curve Discretization Points	30,000.00	
Maximum No. effect points along transect	2.00	
Low to medium criterion	0.006	
Medium to high criterion	0.08	
Options available	Volume Averaged	
Method option:	Ground reflection	
Reflection factor	1	
Unconfined Explosion Strength	2	
Explosion Efficiency	1	fraction
Flammable Mass Calculation Type	Area Weighted Mass Integral	
Minimum Explosion Energy	0	kJ
Maximum number of time steps	100.00	
Number of timesteps - time varying clouds	10.00	
Active Shut Down	No Shut Down	

Fraction of Population Indoors for Societal Risk	0.9	fraction
Fraction of Population Indoors for Individual Risk	0	fraction

Indoor Vulnerability

Vulnerability Model	Discrete Overpressure	
Pressure Method - Building calculation	Reflected	
Pressure Method - Individual Risk	Side on	
Pressure Method - Grid population	Side on	
Overpressure for Lethality (1)	0.1	bar
Overpressure for Lethality (2)	0.3	bar
Lethality (1)	0.025	fraction
Lethality (2)	1	fraction
Lethality (1)	1	fraction
Equation Constant (1)	0.3	bar
Equation Exponent (1)	1	
Overpressure Offset (1)	0.3	bar
Impulse Offset (1)	0	N.s/m2
ProbitA	-10.46	
ProbitB	1.35	
ProbitN	1	
Number of overpressures	2.00	
Number of impulses	1.00	
Pool Fire Radiation Soc Vulnerabilities (1)	0.001	fraction
Pool Fire Radiation Soc Vulnerabilities (2)	0.05	fraction
Pool Fire Radiation Soc Vulnerabilities (3)	0.099	fraction
Pool Fire Radiation Ind Vulnerabilities (1)	0.001	fraction
Pool Fire Radiation Ind Vulnerabilities (2)	0.05	fraction
Pool Fire Radiation Ind Vulnerabilities (3)	0.099	fraction
Fire Ball Radiation Soc Vulnerabilities (1)	0.001	fraction
Fire Ball Radiation Soc Vulnerabilities (2)	0.05	fraction
Fire Ball Radiation Soc Vulnerabilities (3)	0.099	fraction
Fire Ball Radiation Ind Vulnerabilities (1)	0.001	fraction
Fire Ball Radiation Ind Vulnerabilities (2)	0.05	fraction
Fire Ball Radiation Ind Vulnerabilities (3)	0.099	fraction
Jet Fire Radiation Soc Vulnerabilities (1)	0.001	fraction
Jet Fire Radiation Soc Vulnerabilities (2)	0.05	fraction
Jet Fire Radiation Soc Vulnerabilities (3)	0.099	fraction
Jet Fire Radiation Ind Vulnerabilities (1)	0.001	fraction
Jet Fire Radiation Ind Vulnerabilities (2)	0.05	fraction
Jet Fire Radiation Ind Vulnerabilities (3)	0.099	fraction
Exposure time required for damage from Pool Fire	20	s
Exposure time required for damage from Jet Fire	20	s
Fireball (Societal Radiation Criteria Zone)	0.1	fraction
Fireball (Individual Radiation Criteria Zone)	0.1	fraction
Fireball (Societal Flammable Probit Zone)	0.1	fraction
Fireball (Individual Flammable Probit Zone)	0.1	fraction
Jet Fire (Societal Radiation Criteria Zone)	0.1	fraction
Jet Fire (Individual Radiation Criteria Zone)	0.1	fraction
Jet Fire (Societal Flammable Probit Zone)	0.1	fraction
Jet Fire (Individual Flammable Probit Zone)	0.1	fraction
Pool Fire (Societal Radiation Criteria Zone)	0.1	fraction
Pool Fire (Individual Radiation Criteria Zone)	0.1	fraction
Pool Fire (Societal Flammable Probit Zone)	0.1	fraction
Pool Fire (Individual Flammable Probit Zone)	0.1	fraction
Light Explosion Damage vulnerability	0.025	fraction

Heavy explosion damage vulnerability	1	fraction
Method for Radiation Vulnerability	Use Probit method	
Flash Fire Vulnerability	1	
Toxic Vulnerability	1	
Pool Fire Radiation Intensity Level (1)	9.8	kW/m2
Pool Fire Radiation Intensity Level (2)	19.5	kW/m2
Pool Fire Radiation Intensity Level (3)	35	kW/m2
Jet Fire Radiation Intensity Level (1)	9.8	kW/m2
Jet Fire Radiation Intensity Level (2)	19.5	kW/m2
Jet Fire Radiation Intensity Level (3)	35	kW/m2
Fire Ball Radiation Intensity Level (1)	9.8	kW/m2
Fire Ball Radiation Intensity Level (2)	19.5	kW/m2
Fire Ball Radiation Intensity Level (3)	35	kW/m2

Jet Fire Parameters

Maximum SEP for a Jet Fire	400	kW/m2
Jet Fire Averaging Time	20	s
Calculate Dose	Unselected	
Calculate Probit	Unselected	
Calculate Lethality	Unselected	
Crosswind Angle	0	deg
Correlation	DNV Recommended	
Horizontal Options	Use standard method	
Rate Modification Factor	3	
Jet Fire Maximum Exposure Duration	20	s
Emissivity Method	E and F calculated	
Intensity Levels (1)	9.8	kW/m2
Intensity Levels (2)	19.5	kW/m2
Intensity Levels (3)	35	kW/m2
Probit Levels (1)	2.73	
Probit Levels (2)	3.72	
Probit Levels (3)	7.5	
Dose Levels (1)	1.27E6	
Dose Levels (2)	5.8E6	
Dose Levels (3)	2.51E7	
Lethality Levels (1)	0.01	
Lethality Levels (2)	0.1	
Lethality Levels (3)	1	

Outdoor Vulnerability

Vulnerability Model	Overpressure Probit Method	
Pressure Method - Building calculation	Reflected	
Pressure Method - Individual Risk	Side on	
Pressure Method - Grid population	Side on	
Overpressure for Lethality (1)	0.3	bar
Lethality (1)	1	fraction
Lethality (1)	1	fraction
Equation Constant (1)	0.3	bar
Equation Exponent (1)	1	
Overpressure Offset (1)	0.3	bar
Impulse Offset (1)	0	N.s/m2
ProbitA	1.47	
ProbitB	1.35	
ProbitN	1	
Number of overpressures	1.00	

Number of impulses	1.00	
Pool Fire Radiation Soc Vulnerabilities (1)	0.01	fraction
Pool Fire Radiation Soc Vulnerabilities (2)	0.5	fraction
Pool Fire Radiation Soc Vulnerabilities (3)	0.99	fraction
Pool Fire Radiation Ind Vulnerabilities (1)	0.01	fraction
Pool Fire Radiation Ind Vulnerabilities (2)	0.5	fraction
Pool Fire Radiation Ind Vulnerabilities (3)	0.99	fraction
Fire Ball Radiation Soc Vulnerabilities (1)	0.01	fraction
Fire Ball Radiation Soc Vulnerabilities (2)	0.5	fraction
Fire Ball Radiation Soc Vulnerabilities (3)	0.99	fraction
Fire Ball Radiation Ind Vulnerabilities (1)	0.01	fraction
Fire Ball Radiation Ind Vulnerabilities (2)	0.5	fraction
Fire Ball Radiation Ind Vulnerabilities (3)	0.99	fraction
Jet Fire Radiation Soc Vulnerabilities (1)	0.01	fraction
Jet Fire Radiation Soc Vulnerabilities (2)	0.5	fraction
Jet Fire Radiation Soc Vulnerabilities (3)	0.99	fraction
Jet Fire Radiation Ind Vulnerabilities (1)	0.01	fraction
Jet Fire Radiation Ind Vulnerabilities (2)	0.5	fraction
Jet Fire Radiation Ind Vulnerabilities (3)	0.99	fraction
Exposure time required for damage from Pool Fire	20	s
Exposure time required for damage from Jet Fire	20	s
Fireball (Societal Radiation Criteria Zone)	1	fraction
Fireball (Individual Radiation Criteria Zone)	1	fraction
Fireball (Societal Flammable Probit Zone)	1	fraction
Fireball (Individual Flammable Probit Zone)	1	fraction
Jet Fire (Societal Radiation Criteria Zone)	1	fraction
Jet Fire (Individual Radiation Criteria Zone)	1	fraction
Jet Fire (Societal Flammable Probit Zone)	1	fraction
Jet Fire (Individual Flammable Probit Zone)	1	fraction
Pool Fire (Societal Radiation Criteria Zone)	1	fraction
Pool Fire (Individual Radiation Criteria Zone)	1	fraction
Pool Fire (Societal Flammable Probit Zone)	1	fraction
Pool Fire (Individual Flammable Probit Zone)	1	fraction
Light Explosion Damage vulnerability	0	fraction
Heavy explosion damage vulnerability	1	fraction
Method for Radiation Vulnerability	Use Probit method	
Flash Fire Vulnerability	1	
Toxic Vulnerability	1	
Pool Fire Radiation Intensity Level (1)	9.8	kW/m2
Pool Fire Radiation Intensity Level (2)	19.5	kW/m2
Pool Fire Radiation Intensity Level (3)	35	kW/m2
Jet Fire Radiation Intensity Level (1)	9.8	kW/m2
Jet Fire Radiation Intensity Level (2)	19.5	kW/m2
Jet Fire Radiation Intensity Level (3)	35	kW/m2
Fire Ball Radiation Intensity Level (1)	9.8	kW/m2
Fire Ball Radiation Intensity Level (2)	19.5	kW/m2
Fire Ball Radiation Intensity Level (3)	35	kW/m2

Pool Fire Parameters

Instantaneous releases	10	s
Continuous releases	10	s
Calculate Dose	Not selected	
Calculate Probit	Not selected	
Calculate Lethality	Not selected	
MaxExposureDuration	20	s

Radiative fraction for general fires	0.4	fraction
Intensity Levels (1)	9.8	kW/m2
Intensity Levels (2)	19.5	kW/m2
Intensity Levels (3)	35	kW/m2
Dose Levels (1)	1.27E6	
Dose Levels (2)	5.8E6	
Dose Levels (3)	2.51E7	
Probit Levels (1)	2.73	
Probit Levels (2)	3.72	
Probit Levels (3)	7.5	
Lethality Levels (1)	0.01	
Lethality Levels (2)	0.1	
Lethality Levels (3)	1	

Pool Vaporization Parameters

Toxics cut-off rate for pool evaporation	0.001	kg/s
Flammable cut-off rate for pool evaporation	0.1	kg/s
Concentration power to use in pool rate load calculation	1	
Maximum number of pool evaporation rates	10.00	
Pool minimum thickness	5	mm
Surface thermal conductivity	0.00221	kJ/m.s.degK
Surface roughness factor	2.634	
Surface thermal diffusivity	9.48E-7	m2/s
Type of Bund Surface	Concrete	
Bund Height	0	m
Bund Failure Modeling	Bund cannot fail	

Toxic Parameters

Toxics: minimum probability of death	0.001	
Toxics: height for calculation of effects	0	m
Toxics: results grid step in Y-direction	2.5	m
Toxics: results grid step in X-direction	25	m
Multi-comp. toxic calc. method	Most Toxic Material Probit	
Toxic Averaging Time - New Parameter	600	s
Probit Calculation Method	Use Probit	
Building Exchange Rate	4	/hr
Tail Time	1800	s
Indoor Calculations	Selected	
Wind Dependent Exchange Rate	Case Specified	
Set averaging time equal to exposure time	Use a fixed averaging time	
Cut-off fraction of toxic load for exposure time calculation	0.05	fraction
Cut-off concentration for exposure time calculations	0	fraction

Weather Parameters

Atmospheric pressure	1.013	bar
Atmospheric molecular weight	28.97	
Atmospheric specific heat at constant pressure	1.004	kJ/kg.degK
Wind speed reference height	10	m
Temperature reference height	0	m
Cut-off height for wind speed profile	1	m
Wind speed profile	Power Law	
Atmospheric T and P Profile	Temp.Logarithmic; Pres.Linear	
Atmospheric Temperature	25	degC
Relative Humidity	0.8	fraction
Parameter	0.1	
Length	183.2	mm

Surface Roughness	Use Parameter	
Surface Temperature for Dispersion Calculations	25	degC
Surface Temperature for Pool Calculations	25	degC
Solar Radiation Flux	0.5	kW/m2
Building Exchange Rate	4	/hr
Tail Time	1800	s
Surface Type	User-defined	
Mixing Layer Height for Pasquil Stability A	1300	m
Mixing Layer Height for Pasquil Stability A/B	1080	m
Mixing Layer Height for Pasquil Stability B	920	m
Mixing Layer Height for Pasquil Stability B/C	880	m
Mixing Layer Height for Pasquil Stability C	840	m
Mixing Layer Height for Pasquil Stability C/D	820	m
Mixing Layer Height for Pasquil Stability D	800	m
Mixing Layer Height for Pasquil Stability E	400	m
Mixing Layer Height for Pasquil Stability F	100	m
Mixing Layer Height for Pasquil Stability G	100	m

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Parameters

Discharge Parameters

Continuous Critical Weber number	12.5	
Instantaneous Critical Weber number	12.5	
Venting equation constant	24.82	
Relief valve safety factor	1.2	
Minimum RV diameter ratio	1	
Critical pressure greater than flow phase	0.3447	bar
Maximum release velocity	500	m/s
Minimum drop diameter allowed	0.01	um
Maximum drop diameter allowed	1E4	um
Default Liquid Fraction	1	fraction
Continuous Drop Slip factor	1	
Instantaneous Drop Slip factor	1	
Number of Time Steps	100.00	
Maximum Number of Data Points	1,000.00	
Tolerance	0.0001	
Thermal coupling to the wall	No modelling of heat transfer	
Use Bernoulli for forced -phase liq-liq discharge	Use compressible flow eqn	
Capping of pipe flow rates	Use leak scenario cap, disallow flashing	
Velocity capping method	FixedVelocity	
Droplet Method - continuous only	Modified CCPS	
Thermodynamic Option for Gas Pipellines	Non-ideal Gas	
Excess Flow Valve velocity head losses	0	
Non-Return Valve velocity head losses	0	
Shut-Off Valve velocity head losses	0	
Frequency of bends in long pipes	0	/m
Frequency of couplings in long pipes	0	/m
Frequency of junctions in long pipes	0	/m
Line length	10	m
Pipe roughness	0.0457	mm
Air changes	3	/hr
Elevation	1	m
Atmospheric Expansion Method	Closest to Initial Conditions	
Tank Roof Failure Model Effects	Instantaneous effects	
Frequency of Excess Flow Valves	0	/m
Frequency of Non-Return Valves	0	/m
Frequency of Shut-Off Valves	0	/m
Mechanism for forcing droplet breakup - Inst.	Use flashing correlation	
Mechanism for forcing droplet breakup - Cont	Do not force correlation	
Flashing in the orifice	No flashing in the orifice	
Handling of droplets	Not Trapped	
Indoor mass modification factor	3	
Vacuum Relief Valve	Operating	
Vacuum Relief Valve Set Point	0	bar

Dispersion Parameters

Expansion zone length/source diameter ratio	0.01	
Near Field Passive Entrainment Parameter	1	
Jet Model	Morton et.al.	
Jet entrainment coefficient alpha1	0.17	
Jet entrainment coefficient alpha2	0.35	

Drag coefficient between plume and air	0	
Dense cloud parameter gamma - continuous	0	
Dense cloud parameter gamma - instant	0.3	
Dense cloud parameter K - continuous	1.15	
Dense cloud parameter K - instantaneous	1.15	
Modeling of instantaneous expansion	Standard Method	
Maximum Cloud/Ambient Velocity Difference	0.1	
Maximum Cloud/Ambient Density Difference	0.015	
Maximum Non-passive entrainment fraction	0.3	
Maximum Richardson number	15	
Distance multiple for full passive entrainment	2	
Core Averaging Time	18.75	s
Ratio instantaneous/continuous sigma-y	1	
Ratio instantaneous/continuous sigma-z	1	
Droplet evaporation thermodynamics model	Rainout, Non-equilibrium	
Ratio Droplet/ expansion velocity for inst. release	0.8	
Expansion energy cutoff for droplet angle	0.69	kJ/kg
Coefficient of Initial Rainout	0	
Flag to reset rainout position	Do not reset rainout position	
Richardson Number for passive transition above pool	0.015	
Pool Vaporization entrainment parameter	1.5	
Richardson number criterion for cloud lift-off	-20	
Flag for Heat/Water vapor transfer	Heat and Water	
Surface over which the dispersion occurs	Land	
Minimum temperature allowed	-262.1	degC
Maximum temperature allowed	626.9	degC
Minimum release velocity for cont. release	0.1	m/s
Minimum Continuous Release Height	0	m
Maximum distance for dispersion	5E4	m
Maximum height for dispersion	1000	m
Minimum cloud depth	0.02	m
Treatment of top mixing layer	Constrained	
Model In Use	Best Estimate	
Lee Length	Calculate	
Lee Half-Width	Calculate	
Lee Height	Calculate	
K-Factor	Calculate	
Switch Distance	Calculate	
Maximum Initial Step Size	10	m
Minimum Number of Steps per Zone	5.00	
Factor for Step Increase	1.2	
Maximum Number of Output Steps	1,000.00	
Flag for finite duration correction	QI without Duration Adjustment	
Quasi-instantaneous transition parameter	0.8	
Relative tolerance for dispersion calculations	0.001	
Relative tolerance for droplet calculations	0.001	
Initial integration step size - Instantaneous	0.01	s
Initial integration step size - Continuous	0.01	m
Maximum integration step size - Instantaneous	100	s
Maximum integration step size - Continuous	100	m
Criterion for halting dispersion model	Risk based	
Impingement Option	Use Velocity Modification Factor	
Impinged velocity limit	500	m/s
Impinged Velocity Factor	0.25	
Dispersion Model to use	Version 2 model	

Fixed step size - Instantaneous	0.01	s
Fixed step size - Continuous	0.1	m
Number of fixed size output steps	20.00	
Multiplier for output step sizes	1.2	

Event Tree Probabilities

Probability of a BLEVE	1	fraction
Probability of a Pool Fire	1	fraction
Toxic Probability	1	fraction
Continuous no Rainout Immediate Ignition	0.3	fraction
Continuous no Rainout Long Duration Horizontal Fraction	0.6	fraction
Continuous no Rainout Long Duration Horizontal Jet Fire	1	fraction
Continuous no Rainout Long Duration Vertical Jet Fire	1	fraction
Continuous no Rainout Short Duration Fraction	1	fraction
Continuous no Rainout Short Duration BLEVE	1	fraction
Continuous no Rainout Short Duration Flash Fire	0	fraction
Continuous no Rainout Short Duration Explosion	0	fraction
Continuous no Rainout Delayed Ignition Flash Fire	0.6	fraction
Continuous no Rainout Delayed Ignition Explosion	0.4	fraction
Continuous with Rainout Immediate Ignition	0.3	fraction
Continuous with Rainout Long Duration Horizontal Fraction	0.6	fraction
Continuous with Rainout Long Duration Horizontal Jet Fire	0	fraction
Continuous with Rainout Long Duration Horizontal Pool Fire	0	fraction
Continuous with Rainout Long Duration Horizontal Jet Fire with Pool Fire	1	fraction
Continuous with Rainout Long Duration Vertical Pool Fire	0	fraction
Continuous with Rainout Long Duration Vertical Jet Fire	0	fraction
Continuous with Rainout Short Duration Fraction	1	fraction
Continuous with Rainout Long Duration Vertical Jet Fire with Pool Fire	1	fraction
Continuous with Rainout Short Duration BLEVE with Pool Fire	1	fraction
Continuous with Rainout Short Duration BLEVE alone	0	fraction
Continuous with Rainout Short Duration Flash Fire with Pool Fire	0	fraction
Continuous with Rainout Short Duration Flash Fire Alone	0	fraction
Continuous with Rainout Short Duration Explosion with Pool Fire	0	fraction
Continuous with Rainout Short Duration Explosion Alone	0	fraction
Continuous with Rainout Short Duration Pool Fire	0	fraction
Continuous with Rainout Residual Pool Fire	0.15	fraction
Continuous with Rainout Delayed Ignition Flash Fire	0.6	fraction
Continuous with Rainout Delayed Ignition Explosion	0.4	fraction
Instantaneous no Rainout Immediate Ignition	0.3	fraction
Instantaneous no Rainout BLEVE	1	fraction
Instantaneous no Rainout Immediate Flash Fire	0	fraction
Instantaneous no Rainout Immediate Explosion	0	fraction
Instantaneous no Rainout Delayed Ignition Flash Fire	0.6	fraction
Instantaneous no Rainout Delayed Ignition Explosion	0.4	fraction
Instantaneous with Rainout Immediate Ignition	0.3	fraction
Instantaneous with Rainout BLEVE with Pool Fire	1	fraction
Instantaneous with Rainout BLEVE Alone	0	fraction
Instantaneous with Rainout Immediate Flash Fire with Pool Fire	0	fraction
Instantaneous with Rainout Immediate Flash Fire Alone	0	fraction
Instantaneous with Rainout Immediate Explosion with Pool Fire	0	fraction
Instantaneous with Rainout Immediate Explosion Alone	0	fraction
Instantaneous with Rainout Immediate Pool Fire Alone	0	fraction
Instantaneous with Rainout Residual Pool Fire	0.15	fraction
Instantaneous with Rainout Delayed Ignition Flash Fire	0.6	fraction
Instantaneous with Rainout Delayed Ignition Explosion	0.4	fraction

Immediate Ignition	0.1	fraction
Explosion Given Ignition	0.5	fraction
Long Duration Jet Fire	0.5	fraction
Short Duration Any Ignition of Cloud	0.5	fraction
Short Duration Ignition of Cloud with Pool Fire	0	fraction
Long Duration Horizontal Jet Fire with Pool	0	fraction
Long Duration Vertical Jet Fire with Pool	0	fraction
Short Duration Fraction for Effects	0	fraction
Short Duration BLEVE not Flash Fire	0.5	fraction
Volume based explosion probabilities	No	
FlamespeedLowMedium	0.45	m/s
FlamespeedMediumHigh	0.75	m/s
Obstructed Cloud Volume (1)	200	m3
Obstructed Cloud Volume (2)	3000	m3
Obstructed Cloud Volume (3)	6000	m3
Low Flame Speed Probability (1)	0	fraction
Low Flame Speed Probability (2)	0.3	fraction
Low Flame Speed Probability (3)	0.6	fraction
Medium Flame Speed Probability (1)	0.3	fraction
Medium Flame Speed Probability (2)	0.6	fraction
Medium Flame Speed Probability (3)	0.9	fraction
High Flame Speed Probability (1)	0.6	fraction
High Flame Speed Probability (2)	0.9	fraction
High Flame Speed Probability (3)	1	fraction

Explosion Parameters

Over Pressure Level 1	0.02068	bar
Over Pressure Level 2	0.1379	bar
Over Pressure Level 3	0.2068	bar
Explosion Location Criterion	Cloud Front (LFL Fraction)	
Minimum explosive mass	0	kg
Minimum Explosion Energy	5E6	kJ
Explosion Efficiency	0.1	fraction
Coefficient for zone of heavy damage	0.03	
Coefficient for zone of light damage	0.06	
Explosion efficiency	10	%
Air or Ground burst	Air burst	
Explosion Mass Modification Factor	3	
Use of mass modification factor	Early and late explosions	

Fireball and BLEVE Blast Parameters

Maximum surface emissive power	400	kW/m2
Radiation Dose for Fireball risk calculations	5.784E6	
Calculate Dose	Unselected	
Calculate Probit	Unselected	
Calculate Lethality	Unselected	
TNO model flame temperature	1727	degC
Mass Modification Factor	3	
Calculation method for fireball	DNV Recommended	
Fireball Maximum Exposure Duration	20	s
Intensity Levels (1)	9.8	kW/m2
Intensity Levels (2)	19.5	kW/m2
Intensity Levels (3)	35	kW/m2
Probit Levels (1)	2.73	
Probit Levels (2)	3.72	

Probit Levels (3)	7.5	
Dose Levels (1)	1.27E6	
Dose Levels (2)	5.8E6	
Dose Levels (3)	2.51E7	
Lethality Levels (1)	0.01	
Lethality Levels (2)	0.1	
Lethality Levels (3)	1	
Ground Reflection	Ground Burst	
Ideal Gas Modeling	Model as real gas	
Minimum Distance	0	m
Number of Distance Points	100.00	
Ground Reflection	Ground Burst	
Ideal Gas Modeling	Model as real gas	
Minimum Distance	0	m
Number of Distance Points	100.00	
Ground Reflection	Ground Burst	
Ideal Gas Modeling	Model as real gas	
Minimum Distance	0	m
Number of Distance Points	100.00	

Flammable Parameters

Height for calculation of flammable effects	0	m
Flammable result grid step in X-direction	10	m
LFL fraction to finish	1	
Angle of inclination	0	deg
Observer direction	Variable	
Flammable mass calculation method	Mass between LFL and UFL	
Flammable Base averaging time	18.75	s
Radiation level for Jet/Pool Fire Risk	35	kW/m2
Cut Off fraction for cloud volume	0.001	fraction
UFL Multiple for immediate ignition	1	
Cut Off Time for Short Continuous Releases	20	s
Observer type radiation modelling flag	Planar	
Probit A Value	-36.38	
Probit B Value	2.56	
Probit N Value	1.333	
Height for reports	Centreline Height	
Angle of orientation	0	deg
Relative tolerance for radiation calculations	0.01	fraction
Number of Lethality Ellipses	5.00	
Ellipse linear spacing variable	Probit	
Minimum Probability Of Death	0.01	fraction
Number of radiation/distance points in linked radiation calculations	50.00	
Method for fitting ellipse to flash fire shape	ChiSq method	
Absolute tolerance for linked radiation calcs	1e-010	
Solar radiation	Exclude from calculations	
For time-varying releases	Don't Model Short Duration Effects	
Match fireball duration and mass released	No	

General Parameters

Maximum release duration	3600	s
Height for concentration output	0	m
Rotation	0	deg
Lower Elevation	0	m
Multicomponent aerosol behaviour	Single aerosol modelling	

General Risk Parameters

Use Free Field Modelling	No Free Field	
Distance to Site Boundary	0	m
Late Pool Fire	Exclude Effects	
Minimum Case Frequency	1e-012	/AvgeYear
Minimum Event Probability	1e-012	
Population Omega Factor	0	
Maximum Number of Subsquares across Ellipse	10.00	
Maximum Number of Subdivisions per Square	1.00	
Factor for Toxic F-N Spread	2	
Grid Sizing	Calculated	
Grid Bounds Minimum X	-1000	m
Grid Bounds Maximum X	1000	m
Grid Bounds Minimum Y	-1000	m
Grid Bounds Maximum Y	1000	m
Grid Calculation Method	Number of cells	
Grid cell size	10	m
Maximum number of cells	40,000.00	
Aversion Index	1.2	
Indoor Population Omega Factor	0	
Number of wind subdivisions per sector	1.00	
Method for handling Indoor/Outdoor risk	Indoor and outdoor risk calculations	
Inter-ellipse interpolation method	Weighted	
Method option	Normal dispersion	
Cylinder height over radius ratio	3	
Building damage method	Worst point	
Reflection method	Calculated Angle	
Number of X steps per view	11.00	
Minimum X step	0.1	m
Number of time steps - continuous clouds	5.00	
Between Cloud Views	Minimise Gaps	
Pressure exceedance curves	Calculate	
Elevation of Floor or Ceiling	0	m
Concentration method for filling	Stoichiometric	
Minimum probability of death for explosions	0.001	
Minimum Pressure Filter	0.01	bar
Separation specification	Use Ratio	
Critical Separation Ratio	0.5	
Cloud Shape of Area Integration	Elliptical	
Explosion efficiency method	100% efficiency	
Explosion Type Calculation Method	Polynomial Curve-Fit Equations	
Number of Blast Curve Discretization Points	30,000.00	
Maximum No. effect points along transect	2.00	
Low to medium criterion	0.006	
Medium to high criterion	0.08	
Options available	Volume Averaged	
Method option:	Ground reflection	
Reflection factor	1	
Unconfined Explosion Strength	2	
Explosion Efficiency	1	fraction
Flammable Mass Calculation Type	Area Weighted Mass Integral	
Minimum Explosion Energy	0	kJ
Maximum number of time steps	100.00	
Number of timesteps - time varying clouds	10.00	
Active Shut Down	No Shut Down	

Fraction of Population Indoors for Societal Risk	0.9	fraction
Fraction of Population Indoors for Individual Risk	0	fraction

Indoor Vulnerability

Vulnerability Model	Discrete Overpressure	
Pressure Method - Building calculation	Reflected	
Pressure Method - Individual Risk	Side on	
Pressure Method - Grid population	Side on	
Overpressure for Lethality (1)	0.1	bar
Overpressure for Lethality (2)	0.3	bar
Lethality (1)	0.025	fraction
Lethality (2)	1	fraction
Lethality (1)	1	fraction
Equation Constant (1)	0.3	bar
Equation Exponent (1)	1	
Overpressure Offset (1)	0.3	bar
Impulse Offset (1)	0	N.s/m2
ProbitA	-10.46	
ProbitB	1.35	
ProbitN	1	
Number of overpressures	2.00	
Number of impulses	1.00	
Pool Fire Radiation Soc Vulnerabilities (1)	0.001	fraction
Pool Fire Radiation Soc Vulnerabilities (2)	0.05	fraction
Pool Fire Radiation Soc Vulnerabilities (3)	0.099	fraction
Pool Fire Radiation Ind Vulnerabilities (1)	0.001	fraction
Pool Fire Radiation Ind Vulnerabilities (2)	0.05	fraction
Pool Fire Radiation Ind Vulnerabilities (3)	0.099	fraction
Fire Ball Radiation Soc Vulnerabilities (1)	0.001	fraction
Fire Ball Radiation Soc Vulnerabilities (2)	0.05	fraction
Fire Ball Radiation Soc Vulnerabilities (3)	0.099	fraction
Fire Ball Radiation Ind Vulnerabilities (1)	0.001	fraction
Fire Ball Radiation Ind Vulnerabilities (2)	0.05	fraction
Fire Ball Radiation Ind Vulnerabilities (3)	0.099	fraction
Jet Fire Radiation Soc Vulnerabilities (1)	0.001	fraction
Jet Fire Radiation Soc Vulnerabilities (2)	0.05	fraction
Jet Fire Radiation Soc Vulnerabilities (3)	0.099	fraction
Jet Fire Radiation Ind Vulnerabilities (1)	0.001	fraction
Jet Fire Radiation Ind Vulnerabilities (2)	0.05	fraction
Jet Fire Radiation Ind Vulnerabilities (3)	0.099	fraction
Exposure time required for damage from Pool Fire	20	s
Exposure time required for damage from Jet Fire	20	s
Fireball (Societal Radiation Criteria Zone)	0.1	fraction
Fireball (Individual Radiation Criteria Zone)	0.1	fraction
Fireball (Societal Flammable Probit Zone)	0.1	fraction
Fireball (Individual Flammable Probit Zone)	0.1	fraction
Jet Fire (Societal Radiation Criteria Zone)	0.1	fraction
Jet Fire (Individual Radiation Criteria Zone)	0.1	fraction
Jet Fire (Societal Flammable Probit Zone)	0.1	fraction
Jet Fire (Individual Flammable Probit Zone)	0.1	fraction
Pool Fire (Societal Radiation Criteria Zone)	0.1	fraction
Pool Fire (Individual Radiation Criteria Zone)	0.1	fraction
Pool Fire (Societal Flammable Probit Zone)	0.1	fraction
Pool Fire (Individual Flammable Probit Zone)	0.1	fraction
Light Explosion Damage vulnerability	0.025	fraction

Heavy explosion damage vulnerability	1	fraction
Method for Radiation Vulnerability	Use Probit method	
Flash Fire Vulnerability	1	
Toxic Vulnerability	1	
Pool Fire Radiation Intensity Level (1)	9.8	kW/m2
Pool Fire Radiation Intensity Level (2)	19.5	kW/m2
Pool Fire Radiation Intensity Level (3)	35	kW/m2
Jet Fire Radiation Intensity Level (1)	9.8	kW/m2
Jet Fire Radiation Intensity Level (2)	19.5	kW/m2
Jet Fire Radiation Intensity Level (3)	35	kW/m2
Fire Ball Radiation Intensity Level (1)	9.8	kW/m2
Fire Ball Radiation Intensity Level (2)	19.5	kW/m2
Fire Ball Radiation Intensity Level (3)	35	kW/m2

Jet Fire Parameters

Maximum SEP for a Jet Fire	400	kW/m2
Jet Fire Averaging Time	20	s
Calculate Dose	Unselected	
Calculate Probit	Unselected	
Calculate Lethality	Unselected	
Crosswind Angle	0	deg
Correlation	DNV Recommended	
Horizontal Options	Use standard method	
Rate Modification Factor	3	
Jet Fire Maximum Exposure Duration	20	s
Emissivity Method	E and F calculated	
Intensity Levels (1)	9.8	kW/m2
Intensity Levels (2)	19.5	kW/m2
Intensity Levels (3)	35	kW/m2
Probit Levels (1)	2.73	
Probit Levels (2)	3.72	
Probit Levels (3)	7.5	
Dose Levels (1)	1.27E6	
Dose Levels (2)	5.8E6	
Dose Levels (3)	2.51E7	
Lethality Levels (1)	0.01	
Lethality Levels (2)	0.1	
Lethality Levels (3)	1	

Outdoor Vulnerability

Vulnerability Model	Overpressure Probit Method	
Pressure Method - Building calculation	Reflected	
Pressure Method - Individual Risk	Side on	
Pressure Method - Grid population	Side on	
Overpressure for Lethality (1)	0.3	bar
Lethality (1)	1	fraction
Lethality (1)	1	fraction
Equation Constant (1)	0.3	bar
Equation Exponent (1)	1	
Overpressure Offset (1)	0.3	bar
Impulse Offset (1)	0	N.s/m2
ProbitA	1.47	
ProbitB	1.35	
ProbitN	1	
Number of overpressures	1.00	

Number of impulses	1.00	
Pool Fire Radiation Soc Vulnerabilities (1)	0.01	fraction
Pool Fire Radiation Soc Vulnerabilities (2)	0.5	fraction
Pool Fire Radiation Soc Vulnerabilities (3)	0.99	fraction
Pool Fire Radiation Ind Vulnerabilities (1)	0.01	fraction
Pool Fire Radiation Ind Vulnerabilities (2)	0.5	fraction
Pool Fire Radiation Ind Vulnerabilities (3)	0.99	fraction
Fire Ball Radiation Soc Vulnerabilities (1)	0.01	fraction
Fire Ball Radiation Soc Vulnerabilities (2)	0.5	fraction
Fire Ball Radiation Soc Vulnerabilities (3)	0.99	fraction
Fire Ball Radiation Ind Vulnerabilities (1)	0.01	fraction
Fire Ball Radiation Ind Vulnerabilities (2)	0.5	fraction
Fire Ball Radiation Ind Vulnerabilities (3)	0.99	fraction
Jet Fire Radiation Soc Vulnerabilities (1)	0.01	fraction
Jet Fire Radiation Soc Vulnerabilities (2)	0.5	fraction
Jet Fire Radiation Soc Vulnerabilities (3)	0.99	fraction
Jet Fire Radiation Ind Vulnerabilities (1)	0.01	fraction
Jet Fire Radiation Ind Vulnerabilities (2)	0.5	fraction
Jet Fire Radiation Ind Vulnerabilities (3)	0.99	fraction
Exposure time required for damage from Pool Fire	20	s
Exposure time required for damage from Jet Fire	20	s
Fireball (Societal Radiation Criteria Zone)	1	fraction
Fireball (Individual Radiation Criteria Zone)	1	fraction
Fireball (Societal Flammable Probit Zone)	1	fraction
Fireball (Individual Flammable Probit Zone)	1	fraction
Jet Fire (Societal Radiation Criteria Zone)	1	fraction
Jet Fire (Individual Radiation Criteria Zone)	1	fraction
Jet Fire (Societal Flammable Probit Zone)	1	fraction
Jet Fire (Individual Flammable Probit Zone)	1	fraction
Pool Fire (Societal Radiation Criteria Zone)	1	fraction
Pool Fire (Individual Radiation Criteria Zone)	1	fraction
Pool Fire (Societal Flammable Probit Zone)	1	fraction
Pool Fire (Individual Flammable Probit Zone)	1	fraction
Light Explosion Damage vulnerability	0	fraction
Heavy explosion damage vulnerability	1	fraction
Method for Radiation Vulnerability	Use Probit method	
Flash Fire Vulnerability	1	
Toxic Vulnerability	1	
Pool Fire Radiation Intensity Level (1)	9.8	kW/m2
Pool Fire Radiation Intensity Level (2)	19.5	kW/m2
Pool Fire Radiation Intensity Level (3)	35	kW/m2
Jet Fire Radiation Intensity Level (1)	9.8	kW/m2
Jet Fire Radiation Intensity Level (2)	19.5	kW/m2
Jet Fire Radiation Intensity Level (3)	35	kW/m2
Fire Ball Radiation Intensity Level (1)	9.8	kW/m2
Fire Ball Radiation Intensity Level (2)	19.5	kW/m2
Fire Ball Radiation Intensity Level (3)	35	kW/m2

Pool Fire Parameters

Instantaneous releases	10	s
Continuous releases	10	s
Calculate Dose	Not selected	
Calculate Probit	Not selected	
Calculate Lethality	Not selected	
MaxExposureDuration	20	s

Radiative fraction for general fires	0.4	fraction
Intensity Levels (1)	9.8	kW/m2
Intensity Levels (2)	19.5	kW/m2
Intensity Levels (3)	35	kW/m2
Dose Levels (1)	1.27E6	
Dose Levels (2)	5.8E6	
Dose Levels (3)	2.51E7	
Probit Levels (1)	2.73	
Probit Levels (2)	3.72	
Probit Levels (3)	7.5	
Lethality Levels (1)	0.01	
Lethality Levels (2)	0.1	
Lethality Levels (3)	1	

Pool Vaporization Parameters

Toxics cut-off rate for pool evaporation	0.001	kg/s
Flammable cut-off rate for pool evaporation	0.1	kg/s
Concentration power to use in pool rate load calculation	1	
Maximum number of pool evaporation rates	10.00	
Pool minimum thickness	5	mm
Surface thermal conductivity	0.00221	kJ/m.s.degK
Surface roughness factor	2.634	
Surface thermal diffusivity	9.48E-7	m2/s
Type of Bund Surface	Concrete	
Bund Height	0	m
Bund Failure Modeling	Bund cannot fail	

Toxic Parameters

Toxics: minimum probability of death	0.001	
Toxics: height for calculation of effects	0	m
Toxics: results grid step in Y-direction	2.5	m
Toxics: results grid step in X-direction	25	m
Multi-comp. toxic calc. method	Mixture Probit	
Toxic Averaging Time - New Parameter	600	s
Probit Calculation Method	Use Probit	
Building Exchange Rate	4	/hr
Tail Time	1800	s
Indoor Calculations	Unselected	
Wind Dependent Exchange Rate	Case Specified	
Set averaging time equal to exposure time	Use a fixed averaging time	
Cut-off fraction of toxic load for exposure time calculation	0.05	fraction
Cut-off concentration for exposure time calculations	0	fraction

Weather Parameters

Atmospheric pressure	1.013	bar
Atmospheric molecular weight	28.97	
Atmospheric specific heat at constant pressure	1.004	kJ/kg.degK
Wind speed reference height	10	m
Temperature reference height	0	m
Cut-off height for wind speed profile	1	m
Wind speed profile	Power Law	
Atmospheric T and P Profile	Temp.Logarithmic; Pres.Linear	
Atmospheric Temperature	25	degC
Relative Humidity	0.8	fraction
Parameter	0.1	
Length	183.2	mm

Surface Roughness	Use Parameter	
Surface Temperature for Dispersion Calculations	25	degC
Surface Temperature for Pool Calculations	25	degC
Solar Radiation Flux	0.5	kW/m2
Building Exchange Rate	4	/hr
Tail Time	1800	s
Surface Type	User-defined	
Mixing Layer Height for Pasquil Stability A	1300	m
Mixing Layer Height for Pasquil Stability A/B	1080	m
Mixing Layer Height for Pasquil Stability B	920	m
Mixing Layer Height for Pasquil Stability B/C	880	m
Mixing Layer Height for Pasquil Stability C	840	m
Mixing Layer Height for Pasquil Stability C/D	820	m
Mixing Layer Height for Pasquil Stability D	800	m
Mixing Layer Height for Pasquil Stability E	400	m
Mixing Layer Height for Pasquil Stability F	100	m
Mixing Layer Height for Pasquil Stability G	100	m

Tai Po Project LPG-APX 23Feb22 (RunRow AP

Parameters

Discharge Parameters

Continuous Critical Weber number	12.5	
Instantaneous Critical Weber number	12.5	
Venting equation constant	24.82	
Relief valve safety factor	1.2	
Minimum RV diameter ratio	1	
Critical pressure greater than flow phase	0.3447	bar
Maximum release velocity	500	m/s
Minimum drop diameter allowed	0.01	um
Maximum drop diameter allowed	1E4	um
Default Liquid Fraction	1	fraction
Continuous Drop Slip factor	1	
Instantaneous Drop Slip factor	1	
Number of Time Steps	100.00	
Maximum Number of Data Points	1,000.00	
Tolerance	0.0001	
Thermal coupling to the wall	No modelling of heat transfer	
Use Bernoulli for forced -phase liq-liq discharge	Use compressible flow eqn	
Capping of pipe flow rates	Use leak scenario cap, disallow flashing	
Velocity capping method	FixedVelocity	
Droplet Method - continuous only	Modified CCPS	
Thermodynamic Option for Gas Pipellines	Non-ideal Gas	
Excess Flow Valve velocity head losses	0	
Non-Return Valve velocity head losses	0	
Shut-Off Valve velocity head losses	0	
Frequency of bends in long pipes	0	/m
Frequency of couplings in long pipes	0	/m
Frequency of junctions in long pipes	0	/m
Line length	10	m
Pipe roughness	0.0457	mm
Air changes	3	/hr
Elevation	1	m
Atmospheric Expansion Method	Closest to Initial Conditions	
Tank Roof Failure Model Effects	Instantaneous effects	
Frequency of Excess Flow Valves	0	/m
Frequency of Non-Return Valves	0	/m
Frequency of Shut-Off Valves	0	/m
Mechanism for forcing droplet breakup - Inst.	Use flashing correlation	
Mechanism for forcing droplet breakup - Cont	Do not force correlation	
Flashing in the orifice	No flashing in the orifice	
Handling of droplets	Not Trapped	
Indoor mass modification factor	3	
Vacuum Relief Valve	Operating	
Vacuum Relief Valve Set Point	0	bar

Dispersion Parameters

Expansion zone length/source diameter ratio	0.01
Near Field Passive Entrainment Parameter	1
Jet Model	Morton et.al.
Jet entrainment coefficient alpha1	0.17
Jet entrainment coefficient alpha2	0.35

Drag coefficient between plume and air	0	
Dense cloud parameter gamma - continuous	0	
Dense cloud parameter gamma - instant	0.3	
Dense cloud parameter K - continuous	1.15	
Dense cloud parameter K - instantaneous	1.15	
Modeling of instantaneous expansion	Standard Method	
Maximum Cloud/Ambient Velocity Difference	0.1	
Maximum Cloud/Ambient Density Difference	0.015	
Maximum Non-passive entrainment fraction	0.3	
Maximum Richardson number	15	
Distance multiple for full passive entrainment	2	
Core Averaging Time	18.75	s
Ratio instantaneous/continuous sigma-y	1	
Ratio instantaneous/continuous sigma-z	1	
Droplet evaporation thermodynamics model	Rainout, Non-equilibrium	
Ratio Droplet/ expansion velocity for inst. release	0.8	
Expansion energy cutoff for droplet angle	0.69	kJ/kg
Coefficient of Initial Rainout	0	
Flag to reset rainout position	Do not reset rainout position	
Richardson Number for passive transition above pool	0.015	
Pool Vaporization entrainment parameter	1.5	
Richardson number criterion for cloud lift-off	-20	
Flag for Heat/Water vapor transfer	Heat and Water	
Surface over which the dispersion occurs	Land	
Minimum temperature allowed	-262.1	degC
Maximum temperature allowed	626.9	degC
Minimum release velocity for cont. release	0.1	m/s
Minimum Continuous Release Height	0	m
Maximum distance for dispersion	5E4	m
Maximum height for dispersion	1000	m
Minimum cloud depth	0.02	m
Treatment of top mixing layer	Constrained	
Model In Use	Best Estimate	
Lee Length	Calculate	
Lee Half-Width	Calculate	
Lee Height	Calculate	
K-Factor	Calculate	
Switch Distance	Calculate	
Maximum Initial Step Size	10	m
Minimum Number of Steps per Zone	5.00	
Factor for Step Increase	1.2	
Maximum Number of Output Steps	1,000.00	
Flag for finite duration correction	QI without Duration Adjustment	
Quasi-instantaneous transition parameter	0.8	
Relative tolerance for dispersion calculations	0.001	
Relative tolerance for droplet calculations	0.001	
Initial integration step size - Instantaneous	0.01	s
Initial integration step size - Continuous	0.01	m
Maximum integration step size - Instantaneous	100	s
Maximum integration step size - Continuous	100	m
Criterion for halting dispersion model	Risk based	
Impingement Option	Use Velocity Modification Factor	
Impinged velocity limit	500	m/s
Impinged Velocity Factor	0.25	
Dispersion Model to use	Version 2 model	

Fixed step size - Instantaneous	0.01	s
Fixed step size - Continuous	0.1	m
Number of fixed size output steps	20.00	
Multiplier for output step sizes	1.2	

Event Tree Probabilities

Probability of a BLEVE	1	fraction
Probability of a Pool Fire	1	fraction
Toxic Probability	1	fraction
Continuous no Rainout Immediate Ignition	0.3	fraction
Continuous no Rainout Long Duration Horizontal Fraction	0.6	fraction
Continuous no Rainout Long Duration Horizontal Jet Fire	1	fraction
Continuous no Rainout Long Duration Vertical Jet Fire	1	fraction
Continuous no Rainout Short Duration Fraction	1	fraction
Continuous no Rainout Short Duration BLEVE	1	fraction
Continuous no Rainout Short Duration Flash Fire	0	fraction
Continuous no Rainout Short Duration Explosion	0	fraction
Continuous no Rainout Delayed Ignition Flash Fire	0.6	fraction
Continuous no Rainout Delayed Ignition Explosion	0.4	fraction
Continuous with Rainout Immediate Ignition	0.3	fraction
Continuous with Rainout Long Duration Horizontal Fraction	0.6	fraction
Continuous with Rainout Long Duration Horizontal Jet Fire	0	fraction
Continuous with Rainout Long Duration Horizontal Pool Fire	0	fraction
Continuous with Rainout Long Duration Horizontal Jet Fire with Pool Fire	1	fraction
Continuous with Rainout Long Duration Vertical Pool Fire	0	fraction
Continuous with Rainout Long Duration Vertical Jet Fire	0	fraction
Continuous with Rainout Short Duration Fraction	1	fraction
Continuous with Rainout Long Duration Vertical Jet Fire with Pool Fire	1	fraction
Continuous with Rainout Short Duration BLEVE with Pool Fire	1	fraction
Continuous with Rainout Short Duration BLEVE alone	0	fraction
Continuous with Rainout Short Duration Flash Fire with Pool Fire	0	fraction
Continuous with Rainout Short Duration Flash Fire Alone	0	fraction
Continuous with Rainout Short Duration Explosion with Pool Fire	0	fraction
Continuous with Rainout Short Duration Explosion Alone	0	fraction
Continuous with Rainout Short Duration Pool Fire	0	fraction
Continuous with Rainout Residual Pool Fire	0.15	fraction
Continuous with Rainout Delayed Ignition Flash Fire	0.6	fraction
Continuous with Rainout Delayed Ignition Explosion	0.4	fraction
Instantaneous no Rainout Immediate Ignition	0.3	fraction
Instantaneous no Rainout BLEVE	1	fraction
Instantaneous no Rainout Immediate Flash Fire	0	fraction
Instantaneous no Rainout Immediate Explosion	0	fraction
Instantaneous no Rainout Delayed Ignition Flash Fire	0.6	fraction
Instantaneous no Rainout Delayed Ignition Explosion	0.4	fraction
Instantaneous with Rainout Immediate Ignition	0.3	fraction
Instantaneous with Rainout BLEVE with Pool Fire	1	fraction
Instantaneous with Rainout BLEVE Alone	0	fraction
Instantaneous with Rainout Immediate Flash Fire with Pool Fire	0	fraction
Instantaneous with Rainout Immediate Flash Fire Alone	0	fraction
Instantaneous with Rainout Immediate Explosion with Pool Fire	0	fraction
Instantaneous with Rainout Immediate Explosion Alone	0	fraction
Instantaneous with Rainout Immediate Pool Fire Alone	0	fraction
Instantaneous with Rainout Residual Pool Fire	0.15	fraction
Instantaneous with Rainout Delayed Ignition Flash Fire	0.6	fraction
Instantaneous with Rainout Delayed Ignition Explosion	0.4	fraction

Immediate Ignition	0.1	fraction
Explosion Given Ignition	0.5	fraction
Long Duration Jet Fire	0.5	fraction
Short Duration Any Ignition of Cloud	0.5	fraction
Short Duration Ignition of Cloud with Pool Fire	0	fraction
Long Duration Horizontal Jet Fire with Pool	0	fraction
Long Duration Vertical Jet Fire with Pool	0	fraction
Short Duration Fraction for Effects	0	fraction
Short Duration BLEVE not Flash Fire	0.5	fraction
Volume based explosion probabilities	No	
FlamespeedLowMedium	0.45	m/s
FlamespeedMediumHigh	0.75	m/s
Obstructed Cloud Volume (1)	200	m3
Obstructed Cloud Volume (2)	3000	m3
Obstructed Cloud Volume (3)	6000	m3
Low Flame Speed Probability (1)	0	fraction
Low Flame Speed Probability (2)	0.3	fraction
Low Flame Speed Probability (3)	0.6	fraction
Medium Flame Speed Probability (1)	0.3	fraction
Medium Flame Speed Probability (2)	0.6	fraction
Medium Flame Speed Probability (3)	0.9	fraction
High Flame Speed Probability (1)	0.6	fraction
High Flame Speed Probability (2)	0.9	fraction
High Flame Speed Probability (3)	1	fraction

Explosion Parameters

Over Pressure Level 1	0.02068	bar
Over Pressure Level 2	0.1379	bar
Over Pressure Level 3	0.2068	bar
Explosion Location Criterion	Cloud Front (LFL Fraction)	
Minimum explosive mass	0	kg
Minimum Explosion Energy	5E6	kJ
Explosion Efficiency	0.1	fraction
Coefficient for zone of heavy damage	0.03	
Coefficient for zone of light damage	0.06	
Explosion efficiency	10	%
Air or Ground burst	Air burst	
Explosion Mass Modification Factor	3	
Use of mass modification factor	Early and late explosions	

Fireball and BLEVE Blast Parameters

Maximum surface emissive power	400	kW/m2
Radiation Dose for Fireball risk calculations	5.784E6	
Calculate Dose	Unselected	
Calculate Probit	Unselected	
Calculate Lethality	Unselected	
TNO model flame temperature	1727	degC
Mass Modification Factor	3	
Calculation method for fireball	DNV Recommended	
Fireball Maximum Exposure Duration	20	s
Intensity Levels (1)	9.8	kW/m2
Intensity Levels (2)	19.5	kW/m2
Intensity Levels (3)	35	kW/m2
Probit Levels (1)	2.73	
Probit Levels (2)	3.72	

Probit Levels (3)	7.5	
Dose Levels (1)	1.27E6	
Dose Levels (2)	5.8E6	
Dose Levels (3)	2.51E7	
Lethality Levels (1)	0.01	
Lethality Levels (2)	0.1	
Lethality Levels (3)	1	
Ground Reflection	Ground Burst	
Ideal Gas Modeling	Model as real gas	
Minimum Distance	0	m
Number of Distance Points	100.00	
Ground Reflection	Ground Burst	
Ideal Gas Modeling	Model as real gas	
Minimum Distance	0	m
Number of Distance Points	100.00	
Ground Reflection	Ground Burst	
Ideal Gas Modeling	Model as real gas	
Minimum Distance	0	m
Number of Distance Points	100.00	

Flammable Parameters

Height for calculation of flammable effects	0	m
Flammable result grid step in X-direction	10	m
LFL fraction to finish	1	
Angle of inclination	0	deg
Observer direction	Variable	
Flammable mass calculation method	Mass between LFL and UFL	
Flammable Base averaging time	18.75	s
Radiation level for Jet/Pool Fire Risk	35	kW/m2
Cut Off fraction for cloud volume	0.001	fraction
UFL Multiple for immediate ignition	1	
Cut Off Time for Short Continuous Releases	20	s
Observer type radiation modelling flag	Planar	
Probit A Value	-36.38	
Probit B Value	2.56	
Probit N Value	1.333	
Height for reports	Centreline Height	
Angle of orientation	0	deg
Relative tolerance for radiation calculations	0.01	fraction
Number of Lethality Ellipses	5.00	
Ellipse linear spacing variable	Probit	
Minimum Probability Of Death	0.01	fraction
Number of radiation/distance points in linked radiation calculations	50.00	
Method for fitting ellipse to flash fire shape	ChiSq method	
Absolute tolerance for linked radiation calcs	1e-010	
Solar radiation	Exclude from calculations	
For time-varying releases	Don't Model Short Duration Effects	
Match fireball duration and mass released	No	

General Parameters

Maximum release duration	3600	s
Height for concentration output	0	m
Rotation	0	deg
Lower Elevation	0	m
Multicomponent aerosol behaviour	Single aerosol modelling	

General Risk Parameters

Use Free Field Modelling	No Free Field	
Distance to Site Boundary	0	m
Late Pool Fire	Exclude Effects	
Minimum Case Frequency	1e-012	/AvgeYear
Minimum Event Probability	1e-012	
Population Omega Factor	0	
Maximum Number of Subsquares across Ellipse	10.00	
Maximum Number of Subdivisions per Square	1.00	
Factor for Toxic F-N Spread	2	
Grid Sizing	Calculated	
Grid Bounds Minimum X	-1000	m
Grid Bounds Maximum X	1000	m
Grid Bounds Minimum Y	-1000	m
Grid Bounds Maximum Y	1000	m
Grid Calculation Method	Number of cells	
Grid cell size	10	m
Maximum number of cells	40,000.00	
Aversion Index	1.2	
Indoor Population Omega Factor	0	
Number of wind subdivisions per sector	1.00	
Method for handling Indoor/Outdoor risk	Indoor and outdoor risk calculations	
Inter-ellipse interpolation method	Weighted	
Method option	Normal dispersion	
Cylinder height over radius ratio	3	
Building damage method	Worst point	
Reflection method	Calculated Angle	
Number of X steps per view	11.00	
Minimum X step	0.1	m
Number of time steps - continuous clouds	5.00	
Between Cloud Views	Minimise Gaps	
Pressure exceedance curves	Calculate	
Elevation of Floor or Ceiling	0	m
Concentration method for filling	Stoichiometric	
Minimum probability of death for explosions	0.001	
Minimum Pressure Filter	0.01	bar
Separation specification	Use Ratio	
Critical Separation Ratio	0.5	
Cloud Shape of Area Integration	Elliptical	
Explosion efficiency method	100% efficiency	
Explosion Type Calculation Method	Polynomial Curve-Fit Equations	
Number of Blast Curve Discretization Points	30,000.00	
Maximum No. effect points along transect	2.00	
Low to medium criterion	0.006	
Medium to high criterion	0.08	
Options available	Volume Averaged	
Method option:	Ground reflection	
Reflection factor	1	
Unconfined Explosion Strength	2	
Explosion Efficiency	1	fraction
Flammable Mass Calculation Type	Area Weighted Mass Integral	
Minimum Explosion Energy	0	kJ
Maximum number of time steps	100.00	
Number of timesteps - time varying clouds	10.00	
Active Shut Down	No Shut Down	

Fraction of Population Indoors for Societal Risk	0.9	fraction
Fraction of Population Indoors for Individual Risk	0	fraction

Indoor Vulnerability

Vulnerability Model	Discrete Overpressure	
Pressure Method - Building calculation	Reflected	
Pressure Method - Individual Risk	Side on	
Pressure Method - Grid population	Side on	
Overpressure for Lethality (1)	0.1	bar
Overpressure for Lethality (2)	0.3	bar
Lethality (1)	0.025	fraction
Lethality (2)	1	fraction
Lethality (1)	1	fraction
Equation Constant (1)	0.3	bar
Equation Exponent (1)	1	
Overpressure Offset (1)	0.3	bar
Impulse Offset (1)	0	N.s/m2
ProbitA	-10.46	
ProbitB	1.35	
ProbitN	1	
Number of overpressures	2.00	
Number of impulses	1.00	
Pool Fire Radiation Soc Vulnerabilities (1)	0.001	fraction
Pool Fire Radiation Soc Vulnerabilities (2)	0.05	fraction
Pool Fire Radiation Soc Vulnerabilities (3)	0.099	fraction
Pool Fire Radiation Ind Vulnerabilities (1)	0.001	fraction
Pool Fire Radiation Ind Vulnerabilities (2)	0.05	fraction
Pool Fire Radiation Ind Vulnerabilities (3)	0.099	fraction
Fire Ball Radiation Soc Vulnerabilities (1)	0.001	fraction
Fire Ball Radiation Soc Vulnerabilities (2)	0.05	fraction
Fire Ball Radiation Soc Vulnerabilities (3)	0.099	fraction
Fire Ball Radiation Ind Vulnerabilities (1)	0.001	fraction
Fire Ball Radiation Ind Vulnerabilities (2)	0.05	fraction
Fire Ball Radiation Ind Vulnerabilities (3)	0.099	fraction
Jet Fire Radiation Soc Vulnerabilities (1)	0.001	fraction
Jet Fire Radiation Soc Vulnerabilities (2)	0.05	fraction
Jet Fire Radiation Soc Vulnerabilities (3)	0.099	fraction
Jet Fire Radiation Ind Vulnerabilities (1)	0.001	fraction
Jet Fire Radiation Ind Vulnerabilities (2)	0.05	fraction
Jet Fire Radiation Ind Vulnerabilities (3)	0.099	fraction
Exposure time required for damage from Pool Fire	20	s
Exposure time required for damage from Jet Fire	20	s
Fireball (Societal Radiation Criteria Zone)	0.1	fraction
Fireball (Individual Radiation Criteria Zone)	0.1	fraction
Fireball (Societal Flammable Probit Zone)	0.1	fraction
Fireball (Individual Flammable Probit Zone)	0.1	fraction
Jet Fire (Societal Radiation Criteria Zone)	0.1	fraction
Jet Fire (Individual Radiation Criteria Zone)	0.1	fraction
Jet Fire (Societal Flammable Probit Zone)	0.1	fraction
Jet Fire (Individual Flammable Probit Zone)	0.1	fraction
Pool Fire (Societal Radiation Criteria Zone)	0.1	fraction
Pool Fire (Individual Radiation Criteria Zone)	0.1	fraction
Pool Fire (Societal Flammable Probit Zone)	0.1	fraction
Pool Fire (Individual Flammable Probit Zone)	0.1	fraction
Light Explosion Damage vulnerability	0.025	fraction

Heavy explosion damage vulnerability	1	fraction
Method for Radiation Vulnerability	Use Probit method	
Flash Fire Vulnerability	1	
Toxic Vulnerability	1	
Pool Fire Radiation Intensity Level (1)	9.8	kW/m2
Pool Fire Radiation Intensity Level (2)	19.5	kW/m2
Pool Fire Radiation Intensity Level (3)	35	kW/m2
Jet Fire Radiation Intensity Level (1)	9.8	kW/m2
Jet Fire Radiation Intensity Level (2)	19.5	kW/m2
Jet Fire Radiation Intensity Level (3)	35	kW/m2
Fire Ball Radiation Intensity Level (1)	9.8	kW/m2
Fire Ball Radiation Intensity Level (2)	19.5	kW/m2
Fire Ball Radiation Intensity Level (3)	35	kW/m2

Jet Fire Parameters

Maximum SEP for a Jet Fire	400	kW/m2
Jet Fire Averaging Time	20	s
Calculate Dose	Unselected	
Calculate Probit	Unselected	
Calculate Lethality	Unselected	
Crosswind Angle	0	deg
Correlation	DNV Recommended	
Horizontal Options	Use standard method	
Rate Modification Factor	3	
Jet Fire Maximum Exposure Duration	20	s
Emissivity Method	E and F calculated	
Intensity Levels (1)	9.8	kW/m2
Intensity Levels (2)	19.5	kW/m2
Intensity Levels (3)	35	kW/m2
Probit Levels (1)	2.73	
Probit Levels (2)	3.72	
Probit Levels (3)	7.5	
Dose Levels (1)	1.27E6	
Dose Levels (2)	5.8E6	
Dose Levels (3)	2.51E7	
Lethality Levels (1)	0.01	
Lethality Levels (2)	0.1	
Lethality Levels (3)	1	

Outdoor Vulnerability

Vulnerability Model	Overpressure Probit Method	
Pressure Method - Building calculation	Reflected	
Pressure Method - Individual Risk	Side on	
Pressure Method - Grid population	Side on	
Overpressure for Lethality (1)	0.3	bar
Lethality (1)	1	fraction
Lethality (1)	1	fraction
Equation Constant (1)	0.3	bar
Equation Exponent (1)	1	
Overpressure Offset (1)	0.3	bar
Impulse Offset (1)	0	N.s/m2
ProbitA	1.47	
ProbitB	1.35	
ProbitN	1	
Number of overpressures	1.00	

Number of impulses	1.00	
Pool Fire Radiation Soc Vulnerabilities (1)	0.01	fraction
Pool Fire Radiation Soc Vulnerabilities (2)	0.5	fraction
Pool Fire Radiation Soc Vulnerabilities (3)	0.99	fraction
Pool Fire Radiation Ind Vulnerabilities (1)	0.01	fraction
Pool Fire Radiation Ind Vulnerabilities (2)	0.5	fraction
Pool Fire Radiation Ind Vulnerabilities (3)	0.99	fraction
Fire Ball Radiation Soc Vulnerabilities (1)	0.01	fraction
Fire Ball Radiation Soc Vulnerabilities (2)	0.5	fraction
Fire Ball Radiation Soc Vulnerabilities (3)	0.99	fraction
Fire Ball Radiation Ind Vulnerabilities (1)	0.01	fraction
Fire Ball Radiation Ind Vulnerabilities (2)	0.5	fraction
Fire Ball Radiation Ind Vulnerabilities (3)	0.99	fraction
Jet Fire Radiation Soc Vulnerabilities (1)	0.01	fraction
Jet Fire Radiation Soc Vulnerabilities (2)	0.5	fraction
Jet Fire Radiation Soc Vulnerabilities (3)	0.99	fraction
Jet Fire Radiation Ind Vulnerabilities (1)	0.01	fraction
Jet Fire Radiation Ind Vulnerabilities (2)	0.5	fraction
Jet Fire Radiation Ind Vulnerabilities (3)	0.99	fraction
Exposure time required for damage from Pool Fire	20	s
Exposure time required for damage from Jet Fire	20	s
Fireball (Societal Radiation Criteria Zone)	1	fraction
Fireball (Individual Radiation Criteria Zone)	1	fraction
Fireball (Societal Flammable Probit Zone)	1	fraction
Fireball (Individual Flammable Probit Zone)	1	fraction
Jet Fire (Societal Radiation Criteria Zone)	1	fraction
Jet Fire (Individual Radiation Criteria Zone)	1	fraction
Jet Fire (Societal Flammable Probit Zone)	1	fraction
Jet Fire (Individual Flammable Probit Zone)	1	fraction
Pool Fire (Societal Radiation Criteria Zone)	1	fraction
Pool Fire (Individual Radiation Criteria Zone)	1	fraction
Pool Fire (Societal Flammable Probit Zone)	1	fraction
Pool Fire (Individual Flammable Probit Zone)	1	fraction
Light Explosion Damage vulnerability	0	fraction
Heavy explosion damage vulnerability	1	fraction
Method for Radiation Vulnerability	Use Probit method	
Flash Fire Vulnerability	1	
Toxic Vulnerability	1	
Pool Fire Radiation Intensity Level (1)	9.8	kW/m2
Pool Fire Radiation Intensity Level (2)	19.5	kW/m2
Pool Fire Radiation Intensity Level (3)	35	kW/m2
Jet Fire Radiation Intensity Level (1)	9.8	kW/m2
Jet Fire Radiation Intensity Level (2)	19.5	kW/m2
Jet Fire Radiation Intensity Level (3)	35	kW/m2
Fire Ball Radiation Intensity Level (1)	9.8	kW/m2
Fire Ball Radiation Intensity Level (2)	19.5	kW/m2
Fire Ball Radiation Intensity Level (3)	35	kW/m2

Pool Fire Parameters

Instantaneous releases	10	s
Continuous releases	10	s
Calculate Dose	Not selected	
Calculate Probit	Not selected	
Calculate Lethality	Not selected	
MaxExposureDuration	20	s

Radiative fraction for general fires	0.4	fraction
Intensity Levels (1)	9.8	kW/m2
Intensity Levels (2)	19.5	kW/m2
Intensity Levels (3)	35	kW/m2
Dose Levels (1)	1.27E6	
Dose Levels (2)	5.8E6	
Dose Levels (3)	2.51E7	
Probit Levels (1)	2.73	
Probit Levels (2)	3.72	
Probit Levels (3)	7.5	
Lethality Levels (1)	0.01	
Lethality Levels (2)	0.1	
Lethality Levels (3)	1	

Pool Vaporization Parameters

Toxics cut-off rate for pool evaporation	0.001	kg/s
Flammable cut-off rate for pool evaporation	0.1	kg/s
Concentration power to use in pool rate load calculation	1	
Maximum number of pool evaporation rates	10.00	
Pool minimum thickness	5	mm
Surface thermal conductivity	0.00221	kJ/m.s.degK
Surface roughness factor	2.634	
Surface thermal diffusivity	9.48E-7	m2/s
Type of Bund Surface	Concrete	
Bund Height	0	m
Bund Failure Modeling	Bund cannot fail	

Toxic Parameters

Toxics: minimum probability of death	0.001	
Toxics: height for calculation of effects	0	m
Toxics: results grid step in Y-direction	2.5	m
Toxics: results grid step in X-direction	25	m
Multi-comp. toxic calc. method	Mixture Probit	
Toxic Averaging Time - New Parameter	600	s
Probit Calculation Method	Use Probit	
Building Exchange Rate	4	/hr
Tail Time	1800	s
Indoor Calculations	Unselected	
Wind Dependent Exchange Rate	Case Specified	
Set averaging time equal to exposure time	Use a fixed averaging time	
Cut-off fraction of toxic load for exposure time calculation	0.05	fraction
Cut-off concentration for exposure time calculations	0	fraction

Weather Parameters

Atmospheric pressure	1.013	bar
Atmospheric molecular weight	28.97	
Atmospheric specific heat at constant pressure	1.004	kJ/kg.degK
Wind speed reference height	10	m
Temperature reference height	0	m
Cut-off height for wind speed profile	1	m
Wind speed profile	Power Law	
Atmospheric T and P Profile	Temp.Logarithmic; Pres.Linear	
Atmospheric Temperature	25	degC
Relative Humidity	0.8	fraction
Parameter	0.1	
Length	183.2	mm

Surface Roughness	Use Parameter	
Surface Temperature for Dispersion Calculations	25	degC
Surface Temperature for Pool Calculations	25	degC
Solar Radiation Flux	0.5	kW/m2
Building Exchange Rate	4	/hr
Tail Time	1800	s
Surface Type	User-defined	
Mixing Layer Height for Pasquil Stability A	1300	m
Mixing Layer Height for Pasquil Stability A/B	1080	m
Mixing Layer Height for Pasquil Stability B	920	m
Mixing Layer Height for Pasquil Stability B/C	880	m
Mixing Layer Height for Pasquil Stability C	840	m
Mixing Layer Height for Pasquil Stability C/D	820	m
Mixing Layer Height for Pasquil Stability D	800	m
Mixing Layer Height for Pasquil Stability E	400	m
Mixing Layer Height for Pasquil Stability F	100	m
Mixing Layer Height for Pasquil Stability G	100	m

Tai Po Project 26Nov21 TGS Test (RunRow NG

Parameters

Discharge Parameters

Continuous Critical Weber number	12.5	
Instantaneous Critical Weber number	12.5	
Venting equation constant	24.82	
Relief valve safety factor	1.2	
Minimum RV diameter ratio	1	
Critical pressure greater than flow phase	0.3447	bar
Maximum release velocity	500	m/s
Minimum drop diameter allowed	0.01	um
Maximum drop diameter allowed	1E4	um
Default Liquid Fraction	1	fraction
Continuous Drop Slip factor	1	
Instantaneous Drop Slip factor	1	
Number of Time Steps	100.00	
Maximum Number of Data Points	1,000.00	
Tolerance	0.0001	
Thermal coupling to the wall	No modelling of heat transfer	
Use Bernoulli for forced -phase liq-liq discharge	Use compressible flow eqn	
Capping of pipe flow rates	Use leak scenario cap, disallow flashing	
Velocity capping method	FixedVelocity	
Droplet Method - continuous only	Modified CCPS	
Thermodynamic Option for Gas Pipellines	Non-ideal Gas	
Excess Flow Valve velocity head losses	0	
Non-Return Valve velocity head losses	0	
Shut-Off Valve velocity head losses	0	
Frequency of bends in long pipes	0	/m
Frequency of couplings in long pipes	0	/m
Frequency of junctions in long pipes	0	/m
Line length	10	m
Pipe roughness	0.0457	mm
Air changes	3	/hr
Elevation	1	m
Atmospheric Expansion Method	Closest to Initial Conditions	
Tank Roof Failure Model Effects	Instantaneous effects	
Frequency of Excess Flow Valves	0	/m
Frequency of Non-Return Valves	0	/m
Frequency of Shut-Off Valves	0	/m
Mechanism for forcing droplet breakup - Inst.	Use flashing correlation	
Mechanism for forcing droplet breakup - Cont	Do not force correlation	
Flashing in the orifice	No flashing in the orifice	
Handling of droplets	Not Trapped	
Indoor mass modification factor	3	
Vacuum Relief Valve	Operating	
Vacuum Relief Valve Set Point	0	bar

Dispersion Parameters

Expansion zone length/source diameter ratio	0.01
Near Field Passive Entrainment Parameter	1
Jet Model	Morton et.al.
Jet entrainment coefficient alpha1	0.17
Jet entrainment coefficient alpha2	0.35

Drag coefficient between plume and air	0	
Dense cloud parameter gamma - continuous	0	
Dense cloud parameter gamma - instant	0.3	
Dense cloud parameter K - continuous	1.15	
Dense cloud parameter K - instantaneous	1.15	
Modeling of instantaneous expansion	Standard Method	
Maximum Cloud/Ambient Velocity Difference	0.1	
Maximum Cloud/Ambient Density Difference	0.015	
Maximum Non-passive entrainment fraction	0.3	
Maximum Richardson number	15	
Distance multiple for full passive entrainment	2	
Core Averaging Time	18.75	s
Ratio instantaneous/continuous sigma-y	1	
Ratio instantaneous/continuous sigma-z	1	
Droplet evaporation thermodynamics model	Rainout, Non-equilibrium	
Ratio Droplet/ expansion velocity for inst. release	0.8	
Expansion energy cutoff for droplet angle	0.69	kJ/kg
Coefficient of Initial Rainout	0	
Flag to reset rainout position	Do not reset rainout position	
Richardson Number for passive transition above pool	0.015	
Pool Vaporization entrainment parameter	1.5	
Richardson number criterion for cloud lift-off	-20	
Flag for Heat/Water vapor transfer	Heat and Water	
Surface over which the dispersion occurs	Land	
Minimum temperature allowed	-262.1	degC
Maximum temperature allowed	626.9	degC
Minimum release velocity for cont. release	0.1	m/s
Minimum Continuous Release Height	0	m
Maximum distance for dispersion	5E4	m
Maximum height for dispersion	1000	m
Minimum cloud depth	0.02	m
Treatment of top mixing layer	Constrained	
Model In Use	Best Estimate	
Lee Length	Calculate	
Lee Half-Width	Calculate	
Lee Height	Calculate	
K-Factor	Calculate	
Switch Distance	Calculate	
Maximum Initial Step Size	10	m
Minimum Number of Steps per Zone	5.00	
Factor for Step Increase	1.2	
Maximum Number of Output Steps	1,000.00	
Flag for finite duration correction	QI without Duration Adjustment	
Quasi-instantaneous transition parameter	0.8	
Relative tolerance for dispersion calculations	0.001	
Relative tolerance for droplet calculations	0.001	
Initial integration step size - Instantaneous	0.01	s
Initial integration step size - Continuous	0.01	m
Maximum integration step size - Instantaneous	100	s
Maximum integration step size - Continuous	100	m
Criterion for halting dispersion model	Risk based	
Impingement Option	Use Velocity Modification Factor	
Impinged velocity limit	500	m/s
Impinged Velocity Factor	0.25	
Dispersion Model to use	Version 2 model	

Fixed step size - Instantaneous	0.01	s
Fixed step size - Continuous	0.1	m
Number of fixed size output steps	20.00	
Multiplier for output step sizes	1.2	

Event Tree Probabilities

Probability of a BLEVE	1	fraction
Probability of a Pool Fire	1	fraction
Toxic Probability	1	fraction
Continuous no Rainout Immediate Ignition	0.3	fraction
Continuous no Rainout Long Duration Horizontal Fraction	0.5	fraction
Continuous no Rainout Long Duration Horizontal Jet Fire	0.5	fraction
Continuous no Rainout Long Duration Vertical Jet Fire	0.5	fraction
Continuous no Rainout Short Duration Fraction	1	fraction
Continuous no Rainout Short Duration BLEVE	1	fraction
Continuous no Rainout Short Duration Flash Fire	0	fraction
Continuous no Rainout Short Duration Explosion	0	fraction
Continuous no Rainout Delayed Ignition Flash Fire	0.6	fraction
Continuous no Rainout Delayed Ignition Explosion	0.4	fraction
Continuous with Rainout Immediate Ignition	0.3	fraction
Continuous with Rainout Long Duration Horizontal Fraction	0.6	fraction
Continuous with Rainout Long Duration Horizontal Jet Fire	0	fraction
Continuous with Rainout Long Duration Horizontal Pool Fire	0	fraction
Continuous with Rainout Long Duration Horizontal Jet Fire with Pool Fire	1	fraction
Continuous with Rainout Long Duration Vertical Pool Fire	0	fraction
Continuous with Rainout Long Duration Vertical Jet Fire	0	fraction
Continuous with Rainout Short Duration Fraction	1	fraction
Continuous with Rainout Long Duration Vertical Jet Fire with Pool Fire	1	fraction
Continuous with Rainout Short Duration BLEVE with Pool Fire	1	fraction
Continuous with Rainout Short Duration BLEVE alone	0	fraction
Continuous with Rainout Short Duration Flash Fire with Pool Fire	0	fraction
Continuous with Rainout Short Duration Flash Fire Alone	0	fraction
Continuous with Rainout Short Duration Explosion with Pool Fire	0	fraction
Continuous with Rainout Short Duration Explosion Alone	0	fraction
Continuous with Rainout Short Duration Pool Fire	0	fraction
Continuous with Rainout Residual Pool Fire	0.15	fraction
Continuous with Rainout Delayed Ignition Flash Fire	0.6	fraction
Continuous with Rainout Delayed Ignition Explosion	0.4	fraction
Instantaneous no Rainout Immediate Ignition	0.3	fraction
Instantaneous no Rainout BLEVE	1	fraction
Instantaneous no Rainout Immediate Flash Fire	0	fraction
Instantaneous no Rainout Immediate Explosion	0	fraction
Instantaneous no Rainout Delayed Ignition Flash Fire	0.6	fraction
Instantaneous no Rainout Delayed Ignition Explosion	0.4	fraction
Instantaneous with Rainout Immediate Ignition	0.3	fraction
Instantaneous with Rainout BLEVE with Pool Fire	1	fraction
Instantaneous with Rainout BLEVE Alone	0	fraction
Instantaneous with Rainout Immediate Flash Fire with Pool Fire	0	fraction
Instantaneous with Rainout Immediate Flash Fire Alone	0	fraction
Instantaneous with Rainout Immediate Explosion with Pool Fire	0	fraction
Instantaneous with Rainout Immediate Explosion Alone	0	fraction
Instantaneous with Rainout Immediate Pool Fire Alone	0	fraction
Instantaneous with Rainout Residual Pool Fire	0.15	fraction
Instantaneous with Rainout Delayed Ignition Flash Fire	0.6	fraction
Instantaneous with Rainout Delayed Ignition Explosion	0.4	fraction

Immediate Ignition	0.1	fraction
Explosion Given Ignition	0.5	fraction
Long Duration Jet Fire	0.5	fraction
Short Duration Any Ignition of Cloud	0.5	fraction
Short Duration Ignition of Cloud with Pool Fire	0	fraction
Long Duration Horizontal Jet Fire with Pool	0	fraction
Long Duration Vertical Jet Fire with Pool	0	fraction
Short Duration Fraction for Effects	0	fraction
Short Duration BLEVE not Flash Fire	0.5	fraction
Volume based explosion probabilities	No	
FlamespeedLowMedium	0.45	m/s
FlamespeedMediumHigh	0.75	m/s
Obstructed Cloud Volume (1)	200	m3
Obstructed Cloud Volume (2)	3000	m3
Obstructed Cloud Volume (3)	6000	m3
Low Flame Speed Probability (1)	0	fraction
Low Flame Speed Probability (2)	0.3	fraction
Low Flame Speed Probability (3)	0.6	fraction
Medium Flame Speed Probability (1)	0.3	fraction
Medium Flame Speed Probability (2)	0.6	fraction
Medium Flame Speed Probability (3)	0.9	fraction
High Flame Speed Probability (1)	0.6	fraction
High Flame Speed Probability (2)	0.9	fraction
High Flame Speed Probability (3)	1	fraction

Explosion Parameters

Over Pressure Level 1	0.02068	bar
Over Pressure Level 2	0.1379	bar
Over Pressure Level 3	0.2068	bar
Explosion Location Criterion	Cloud Front (LFL Fraction)	
Minimum explosive mass	0	kg
Minimum Explosion Energy	5E6	kJ
Explosion Efficiency	0.1	fraction
Coefficient for zone of heavy damage	0.03	
Coefficient for zone of light damage	0.06	
Explosion efficiency	10	%
Air or Ground burst	Air burst	
Explosion Mass Modification Factor	3	
Use of mass modification factor	Early and late explosions	

Fireball and BLEVE Blast Parameters

Maximum surface emissive power	400	kW/m2
Radiation Dose for Fireball risk calculations	5.784E6	
Calculate Dose	Unselected	
Calculate Probit	Unselected	
Calculate Lethality	Unselected	
TNO model flame temperature	1727	degC
Mass Modification Factor	3	
Calculation method for fireball	DNV Recommended	
Fireball Maximum Exposure Duration	20	s
Intensity Levels (1)	9.8	kW/m2
Intensity Levels (2)	19.5	kW/m2
Intensity Levels (3)	35	kW/m2
Probit Levels (1)	2.73	
Probit Levels (2)	3.72	

Probit Levels (3)	7.5	
Dose Levels (1)	1.27E6	
Dose Levels (2)	5.8E6	
Dose Levels (3)	2.51E7	
Lethality Levels (1)	0.01	
Lethality Levels (2)	0.1	
Lethality Levels (3)	1	
Ground Reflection	Ground Burst	
Ideal Gas Modeling	Model as real gas	
Minimum Distance	0	m
Number of Distance Points	100.00	
Ground Reflection	Ground Burst	
Ideal Gas Modeling	Model as real gas	
Minimum Distance	0	m
Number of Distance Points	100.00	
Ground Reflection	Ground Burst	
Ideal Gas Modeling	Model as real gas	
Minimum Distance	0	m
Number of Distance Points	100.00	

Flammable Parameters

Height for calculation of flammable effects	0	m
Flammable result grid step in X-direction	10	m
LFL fraction to finish	1	
Angle of inclination	0	deg
Observer direction	Variable	
Flammable mass calculation method	Mass between LFL and UFL	
Flammable Base averaging time	18.75	s
Radiation level for Jet/Pool Fire Risk	35	kW/m2
Cut Off fraction for cloud volume	0.001	fraction
UFL Multiple for immediate ignition	1	
Cut Off Time for Short Continuous Releases	20	s
Observer type radiation modelling flag	Planar	
Probit A Value	-36.38	
Probit B Value	2.56	
Probit N Value	1.333	
Height for reports	Centreline Height	
Angle of orientation	0	deg
Relative tolerance for radiation calculations	0.01	fraction
Number of Lethality Ellipses	5.00	
Ellipse linear spacing variable	Probit	
Minimum Probability Of Death	0.01	fraction
Number of radiation/distance points in linked radiation calculations	50.00	
Method for fitting ellipse to flash fire shape	ChiSq method	
Absolute tolerance for linked radiation calcs	1e-010	
Solar radiation	Exclude from calculations	
For time-varying releases	Don't Model Short Duration Effects	
Match fireball duration and mass released	No	

General Parameters

Maximum release duration	3600	s
Height for concentration output	0	m
Rotation	0	deg
Lower Elevation	0	m
Multicomponent aerosol behaviour	Single aerosol modelling	

General Risk Parameters

Use Free Field Modelling	No Free Field	
Distance to Site Boundary	0	m
Late Pool Fire	Exclude Effects	
Minimum Case Frequency	1e-012	/AvgeYear
Minimum Event Probability	1e-012	
Population Omega Factor	0	
Maximum Number of Subsquares across Ellipse	10.00	
Maximum Number of Subdivisions per Square	1.00	
Factor for Toxic F-N Spread	2	
Grid Sizing	Calculated	
Grid Bounds Minimum X	-330	m
Grid Bounds Maximum X	1177	m
Grid Bounds Minimum Y	-650	m
Grid Bounds Maximum Y	678	m
Grid Calculation Method	Number of cells	
Grid cell size	10	m
Maximum number of cells	40,000.00	
Aversion Index	1.2	
Indoor Population Omega Factor	0	
Number of wind subdivisions per sector	1.00	
Method for handling Indoor/Outdoor risk	Indoor and outdoor risk calculations	
Inter-ellipse interpolation method	Weighted	
Method option	Normal dispersion	
Cylinder height over radius ratio	3	
Building damage method	Worst point	
Reflection method	Calculated Angle	
Number of X steps per view	11.00	
Minimum X step	0.1	m
Number of time steps - continuous clouds	5.00	
Between Cloud Views	Minimise Gaps	
Pressure exceedance curves	Calculate	
Elevation of Floor or Ceiling	0	m
Concentration method for filling	Stoichiometric	
Minimum probability of death for explosions	0.001	
Minimum Pressure Filter	0.01	bar
Separation specification	Use Ratio	
Critical Separation Ratio	0.5	
Cloud Shape of Area Integration	Elliptical	
Explosion efficiency method	100% efficiency	
Explosion Type Calculation Method	Polynomial Curve-Fit Equations	
Number of Blast Curve Discretization Points	30,000.00	
Maximum No. effect points along transect	2.00	
Low to medium criterion	0.006	
Medium to high criterion	0.08	
Options available	Volume Averaged	
Method option:	Ground reflection	
Reflection factor	1	
Unconfined Explosion Strength	2	
Explosion Efficiency	1	fraction
Flammable Mass Calculation Type	Area Weighted Mass Integral	
Minimum Explosion Energy	0	kJ
Maximum number of time steps	100.00	
Number of timesteps - time varying clouds	10.00	
Active Shut Down	No Shut Down	

Fraction of Population Indoors for Societal Risk	0.9	fraction
Fraction of Population Indoors for Individual Risk	0	fraction

Indoor Vulnerability

Vulnerability Model	Discrete Overpressure	
Pressure Method - Building calculation	Reflected	
Pressure Method - Individual Risk	Side on	
Pressure Method - Grid population	Side on	
Overpressure for Lethality (1)	0.1	bar
Overpressure for Lethality (2)	0.3	bar
Lethality (1)	0.025	fraction
Lethality (2)	1	fraction
Lethality (1)	1	fraction
Equation Constant (1)	0.3	bar
Equation Exponent (1)	1	
Overpressure Offset (1)	0.3	bar
Impulse Offset (1)	0	N.s/m2
ProbitA	-10.46	
ProbitB	1.35	
ProbitN	1	
Number of overpressures	2.00	
Number of impulses	1.00	
Pool Fire Radiation Soc Vulnerabilities (1)	0.001	fraction
Pool Fire Radiation Soc Vulnerabilities (2)	0.05	fraction
Pool Fire Radiation Soc Vulnerabilities (3)	0.099	fraction
Pool Fire Radiation Ind Vulnerabilities (1)	0.001	fraction
Pool Fire Radiation Ind Vulnerabilities (2)	0.05	fraction
Pool Fire Radiation Ind Vulnerabilities (3)	0.099	fraction
Fire Ball Radiation Soc Vulnerabilities (1)	0.001	fraction
Fire Ball Radiation Soc Vulnerabilities (2)	0.05	fraction
Fire Ball Radiation Soc Vulnerabilities (3)	0.099	fraction
Fire Ball Radiation Ind Vulnerabilities (1)	0.001	fraction
Fire Ball Radiation Ind Vulnerabilities (2)	0.05	fraction
Fire Ball Radiation Ind Vulnerabilities (3)	0.099	fraction
Jet Fire Radiation Soc Vulnerabilities (1)	0.001	fraction
Jet Fire Radiation Soc Vulnerabilities (2)	0.05	fraction
Jet Fire Radiation Soc Vulnerabilities (3)	0.099	fraction
Jet Fire Radiation Ind Vulnerabilities (1)	0.001	fraction
Jet Fire Radiation Ind Vulnerabilities (2)	0.05	fraction
Jet Fire Radiation Ind Vulnerabilities (3)	0.099	fraction
Exposure time required for damage from Pool Fire	20	s
Exposure time required for damage from Jet Fire	20	s
Fireball (Societal Radiation Criteria Zone)	0.1	fraction
Fireball (Individual Radiation Criteria Zone)	0.1	fraction
Fireball (Societal Flammable Probit Zone)	0.1	fraction
Fireball (Individual Flammable Probit Zone)	0.1	fraction
Jet Fire (Societal Radiation Criteria Zone)	0.1	fraction
Jet Fire (Individual Radiation Criteria Zone)	0.1	fraction
Jet Fire (Societal Flammable Probit Zone)	0.1	fraction
Jet Fire (Individual Flammable Probit Zone)	0.1	fraction
Pool Fire (Societal Radiation Criteria Zone)	0.1	fraction
Pool Fire (Individual Radiation Criteria Zone)	0.1	fraction
Pool Fire (Societal Flammable Probit Zone)	0.1	fraction
Pool Fire (Individual Flammable Probit Zone)	0.1	fraction
Light Explosion Damage vulnerability	0.025	fraction

Heavy explosion damage vulnerability	1	fraction
Method for Radiation Vulnerability	Use Probit method	
Flash Fire Vulnerability	1	
Toxic Vulnerability	1	
Pool Fire Radiation Intensity Level (1)	9.8	kW/m2
Pool Fire Radiation Intensity Level (2)	19.5	kW/m2
Pool Fire Radiation Intensity Level (3)	35	kW/m2
Jet Fire Radiation Intensity Level (1)	9.8	kW/m2
Jet Fire Radiation Intensity Level (2)	19.5	kW/m2
Jet Fire Radiation Intensity Level (3)	35	kW/m2
Fire Ball Radiation Intensity Level (1)	9.8	kW/m2
Fire Ball Radiation Intensity Level (2)	19.5	kW/m2
Fire Ball Radiation Intensity Level (3)	35	kW/m2

Jet Fire Parameters

Maximum SEP for a Jet Fire	400	kW/m2
Jet Fire Averaging Time	20	s
Calculate Dose	Unselected	
Calculate Probit	Unselected	
Calculate Lethality	Unselected	
Crosswind Angle	0	deg
Correlation	DNV Recommended	
Horizontal Options	Use standard method	
Rate Modification Factor	3	
Jet Fire Maximum Exposure Duration	20	s
Emissivity Method	E and F calculated	
Intensity Levels (1)	9.8	kW/m2
Intensity Levels (2)	19.5	kW/m2
Intensity Levels (3)	35	kW/m2
Probit Levels (1)	2.73	
Probit Levels (2)	3.72	
Probit Levels (3)	7.5	
Dose Levels (1)	1.27E6	
Dose Levels (2)	5.8E6	
Dose Levels (3)	2.51E7	
Lethality Levels (1)	0.01	
Lethality Levels (2)	0.1	
Lethality Levels (3)	1	

Outdoor Vulnerability

Vulnerability Model	Overpressure Probit Method	
Pressure Method - Building calculation	Reflected	
Pressure Method - Individual Risk	Side on	
Pressure Method - Grid population	Side on	
Overpressure for Lethality (1)	0.3	bar
Lethality (1)	1	fraction
Lethality (1)	1	fraction
Equation Constant (1)	0.3	bar
Equation Exponent (1)	1	
Overpressure Offset (1)	0.3	bar
Impulse Offset (1)	0	N.s/m2
ProbitA	1.47	
ProbitB	1.35	
ProbitN	1	
Number of overpressures	1.00	

Number of impulses	1.00	
Pool Fire Radiation Soc Vulnerabilities (1)	0.01	fraction
Pool Fire Radiation Soc Vulnerabilities (2)	0.5	fraction
Pool Fire Radiation Soc Vulnerabilities (3)	0.99	fraction
Pool Fire Radiation Ind Vulnerabilities (1)	0.01	fraction
Pool Fire Radiation Ind Vulnerabilities (2)	0.5	fraction
Pool Fire Radiation Ind Vulnerabilities (3)	0.99	fraction
Fire Ball Radiation Soc Vulnerabilities (1)	0.01	fraction
Fire Ball Radiation Soc Vulnerabilities (2)	0.5	fraction
Fire Ball Radiation Soc Vulnerabilities (3)	0.99	fraction
Fire Ball Radiation Ind Vulnerabilities (1)	0.01	fraction
Fire Ball Radiation Ind Vulnerabilities (2)	0.5	fraction
Fire Ball Radiation Ind Vulnerabilities (3)	0.99	fraction
Jet Fire Radiation Soc Vulnerabilities (1)	0.01	fraction
Jet Fire Radiation Soc Vulnerabilities (2)	0.5	fraction
Jet Fire Radiation Soc Vulnerabilities (3)	0.99	fraction
Jet Fire Radiation Ind Vulnerabilities (1)	0.01	fraction
Jet Fire Radiation Ind Vulnerabilities (2)	0.5	fraction
Jet Fire Radiation Ind Vulnerabilities (3)	0.99	fraction
Exposure time required for damage from Pool Fire	20	s
Exposure time required for damage from Jet Fire	20	s
Fireball (Societal Radiation Criteria Zone)	1	fraction
Fireball (Individual Radiation Criteria Zone)	1	fraction
Fireball (Societal Flammable Probit Zone)	1	fraction
Fireball (Individual Flammable Probit Zone)	1	fraction
Jet Fire (Societal Radiation Criteria Zone)	1	fraction
Jet Fire (Individual Radiation Criteria Zone)	1	fraction
Jet Fire (Societal Flammable Probit Zone)	1	fraction
Jet Fire (Individual Flammable Probit Zone)	1	fraction
Pool Fire (Societal Radiation Criteria Zone)	1	fraction
Pool Fire (Individual Radiation Criteria Zone)	1	fraction
Pool Fire (Societal Flammable Probit Zone)	1	fraction
Pool Fire (Individual Flammable Probit Zone)	1	fraction
Light Explosion Damage vulnerability	0	fraction
Heavy explosion damage vulnerability	1	fraction
Method for Radiation Vulnerability	Use Probit method	
Flash Fire Vulnerability	1	
Toxic Vulnerability	1	
Pool Fire Radiation Intensity Level (1)	9.8	kW/m2
Pool Fire Radiation Intensity Level (2)	19.5	kW/m2
Pool Fire Radiation Intensity Level (3)	35	kW/m2
Jet Fire Radiation Intensity Level (1)	9.8	kW/m2
Jet Fire Radiation Intensity Level (2)	19.5	kW/m2
Jet Fire Radiation Intensity Level (3)	35	kW/m2
Fire Ball Radiation Intensity Level (1)	9.8	kW/m2
Fire Ball Radiation Intensity Level (2)	19.5	kW/m2
Fire Ball Radiation Intensity Level (3)	35	kW/m2

Pool Fire Parameters

Instantaneous releases	10	s
Continuous releases	10	s
Calculate Dose	Not selected	
Calculate Probit	Not selected	
Calculate Lethality	Not selected	
MaxExposureDuration	20	s

Radiative fraction for general fires	0.4	fraction
Intensity Levels (1)	9.8	kW/m2
Intensity Levels (2)	19.5	kW/m2
Intensity Levels (3)	35	kW/m2
Dose Levels (1)	1.27E6	
Dose Levels (2)	5.8E6	
Dose Levels (3)	2.51E7	
Probit Levels (1)	2.73	
Probit Levels (2)	3.72	
Probit Levels (3)	7.5	
Lethality Levels (1)	0.01	
Lethality Levels (2)	0.1	
Lethality Levels (3)	1	

Pool Vaporization Parameters

Toxics cut-off rate for pool evaporation	0.001	kg/s
Flammable cut-off rate for pool evaporation	0.1	kg/s
Concentration power to use in pool rate load calculation	1	
Maximum number of pool evaporation rates	10.00	
Pool minimum thickness	5	mm
Surface thermal conductivity	0.00221	kJ/m.s.degK
Surface roughness factor	2.634	
Surface thermal diffusivity	9.48E-7	m2/s
Type of Bund Surface	Concrete	
Bund Height	0	m
Bund Failure Modeling	Bund cannot fail	

Toxic Parameters

Toxics: minimum probability of death	0.001	
Toxics: height for calculation of effects	0	m
Toxics: results grid step in Y-direction	2.5	m
Toxics: results grid step in X-direction	25	m
Multi-comp. toxic calc. method	Mixture Probit	
Toxic Averaging Time - New Parameter	600	s
Probit Calculation Method	Use Probit	
Building Exchange Rate	4	/hr
Tail Time	1800	s
Indoor Calculations	Unselected	
Wind Dependent Exchange Rate	Case Specified	
Set averaging time equal to exposure time	Use a fixed averaging time	
Cut-off fraction of toxic load for exposure time calculation	0.05	fraction
Cut-off concentration for exposure time calculations	0	fraction

Weather Parameters

Atmospheric pressure	1.013	bar
Atmospheric molecular weight	28.97	
Atmospheric specific heat at constant pressure	1.004	kJ/kg.degK
Wind speed reference height	10	m
Temperature reference height	0	m
Cut-off height for wind speed profile	1	m
Wind speed profile	Power Law	
Atmospheric T and P Profile	Temp.Logarithmic; Pres.Linear	
Atmospheric Temperature	25	degC
Relative Humidity	0.8	fraction
Parameter	0.1	
Length	183.2	mm

Surface Roughness	Use Parameter	
Surface Temperature for Dispersion Calculations	25	degC
Surface Temperature for Pool Calculations	25	degC
Solar Radiation Flux	0.5	kW/m2
Building Exchange Rate	4	/hr
Tail Time	1800	s
Surface Type	User-defined	
Mixing Layer Height for Pasquil Stability A	1300	m
Mixing Layer Height for Pasquil Stability A/B	1080	m
Mixing Layer Height for Pasquil Stability B	920	m
Mixing Layer Height for Pasquil Stability B/C	880	m
Mixing Layer Height for Pasquil Stability C	840	m
Mixing Layer Height for Pasquil Stability C/D	820	m
Mixing Layer Height for Pasquil Stability D	800	m
Mixing Layer Height for Pasquil Stability E	400	m
Mixing Layer Height for Pasquil Stability F	100	m
Mixing Layer Height for Pasquil Stability G	100	m

ANNEXURE B : CONSEQUENCE DATA

Table B1 : Representative Consequence Distances

Section Name	Scenario	Maximum Downwind Distance(m)			
		JF(12.5 kW/m2)	FB(12.5 kW/m2)	PF(12.5 kW/m2)	FF(LFL)
Naphtha filling lines to Naphtha Tanks	10mm	30	-	-	48
	25mm	66	-	22	150
	75mm	175	-	98	420
	Rupture	428	-	304	610
Naphtha Tanks	300mm	221	-	160	400
	1000mm	420	-	160	880
	Catastrophic Rupture	-	-	160	800
Piping from Naphtha piping to Pumps	10mm	23	-	17	42
	25mm	32	-	52	100
	Rupture	38	-	52	165
Naphtha Pumps	10mm	23	-	17	42
	Rupture	94	-	93	240
Naphtha feed line to Feed Header	10mm	42	-	-	39
	25mm	65	-	26	152
	Rupture	29	-	51	175
Production trains consisting of Naphtha Vaporizer, Sulphur Hydrogenator, H2S Absorber, C.R.G Heater, C.R.G Reactor, Tubular Reformer, CO Converter, Heat Recovery Section, Carbonate Regenerator, CO2 Absorber and a Gas drying section.	10mm	-	-	-	5
	25mm	20	-	-	12
	75mm	20	-	-	12
	Rupture	17	-	-	14
	Catastrophic Rupture	-	155	-	43
Town Gas Export Line	10mm	-	-	-	5
	25mm	20	-	-	13
	75mm	60	-	-	50
	Rupture	80	-	-	68
Natural Gas Import Line	10mm	11	-	-	7
	25mm	30	-	-	19
	75mm	71	-	-	64
	Rupture	305	-	-	380

Section Name	Scenario	Maximum Downwind Distance(m)			
		JF(12.5 kW/m2)	FB(12.5 kW/m2)	PF(12.5 kW/m2)	FF(LFL)
Bund Overtopping	Instantaneous Tank Removal	-	-	265	-
Bund Overtopping	Tank Unzipping	-	-	265	-

ANNEXURE C: REVIEW OF HISTORICAL ACCIDENTS

Historical Accidents related to Naphtha

A review of the MHIDAS database for historical accidents pertaining to Naphtha storage and transfer was carried out. The causes of the historical accidents is summarised in Table C1.

Table C0.1 Historical Accidents associated with Naphtha

Hazardous Events	Cause
Tank Fire	Earthquake, Fire escalation, lightning
Bund Fire	Spillage/Pipe Leakage and subsequent ignited
Pool Fire	Tank/Pipe Leakage or Spillage and subsequent ignited
Release but not ignited, bund contained	Earthquake lead to tank rupture

Hazards identified with Naphtha

Failures of gas facilities are subject to various initial events as shown in Table C2

Table C2 Hazards associated with Naphtha

Location	Categories	Potential initial events
Naphtha Filling line	Loss of containment	• Naphtha leak from filling piping
Gas Plant – Naphtha Storage Tank	Loss of containment	• Naphtha leak from tank • Naphtha leak from pipework
Gas Plant	Loss of containment	• Naphtha leakage

Table C3 Hazards associated with Towngas

Location	Categories	Potential initial events
• Gas Station • Gas Plant – Reforming Process • Gas Plant - Pipeline	Spontaneous failure	• Pipeline failure • Process vessel failure • Pumps Failure
	Partial failure	• Process vessel leakage • Pipeline leakage • Blown seal

Failure of a process vessel can be cold catastrophic failures and pipeline failures are line ruptures. These may occur due to thermal and pressure loading, material or construction defect leading to instantaneous release of Towngas. In cold partial failure, it results in continuous release of Towngas to the atmosphere through a crack or leak.

Document Status Control Record

Proposed Bus Depot at Dai Fuk Street,
Tai Po, New Territories - S16 Planning Application

Traffic Impact Assessment Report

Originating Organisation : LLA Consultancy Limited Unit 610, 6/F Island Place Tower 510 King's Road North Point, Hong Kong	Prepared by: SKL	SKL	Date: 10 November 2022
	Approved by: SLN		Date: 10 November 2022
	Revision No.:		Date of Issue: 10 November 2022

1 INTRODUCTION

1.1 Background

1.1.1 At present, Dai Fuk Street is operating as a bus depot by the Kowloon Motor Bus Co.(1933) Limited. (hereafter, the Applicant). In order to meet the future operational needs, it is proposed to construct a four-storeys building to provide additional bus parking spaces and supporting facilities (hereafter, the proposed bus depot).

1.1.2 The Site is about 14,600 m^2 and is zoned "Other Specified Uses" (OU) under the current OZP S/TP/28, restricted to 2-storey high. A draft short-term tenancy (STT) has been granted by the Government for use as a bus depot with temporary building structures in 2019. Note that the "Bus Depot" use is permitted under Colum 1 of OU on the Tai Po Outline Zoning Plan No. S/TP/28.

1.1.3 LLA Consultancy Limited was commissioned to undertake a traffic impact assessment study in support of the S16 planning application. This report presents the findings of the study.

1.2 Objectives

1.2.1 The objectives of the study are as follows:

- to review the existing traffic conditions in the vicinity of the proposed bus depot;
- to project the future traffic situation of the surrounding network in vicinity of the proposed bus depot;
- to estimate the traffic generation from the proposed bus depot;
- to appraise the potential traffic impact and propose appropriate traffic improvement measures, if necessary; and
- to recommend the access arrangement of the proposed bus depot.

2 THE PROPOSED DEVELOPEMNT

2.1 The Location

2.1.1 The Subject Site with a site area of 14,600m^2 is located on the northeast side of Tai Po Town, bounded by Ting Kok Road to the west and Dai Fuk Street to the south, immediately adjoining the GIC site to the north and facing Tai Po Industrial Estate to the east. To the south of Dai Fuk Street is Construction Industry Council (CIC) Tai Po Training Ground, while Tai Po Waterfront Park is located at the far south.

2.1.2 The Site is currently operating as an open-air bus depot and the vehicular access is located at Dai Fuk Street. The location of the Site is presented in **Figure 2.1**.

2.2 The Proposed Bus Depot

2.2.1 The vehicular access of the proposed bus depot will be located at Dai Fuk Street. The proposed bus depot will provide a total of 363 bus parking spaces for electric buses. Moreover, an additional 80 maintenance bays will also be provided within the proposed bus depot. The proposed bus depot layout plan is enclosed in **Appendix A**.

2.2.2 For the daily operation, most of the buses leave and return to the depot between 00:00am and 6:00am. There are limited number of buses leave and return the depot during day time.

2.2.3 The traffic of the proposed bus depot is anticipated to operate in a similar pattern as the existing bus depot. Therefore, the traffic generated from the bus depot will not affect the normal highway peak hour traffic.

2.3 Swept Path Analysis

2.3.1 To ensure an efficient layout is being designed, swept path analysis was conducted and demonstrated that adequate space is provided for the bus for manoeuvring as shown in **Appendix B**.

3 EXISTING TRAFFIC CONDITION

3.1 The Existing Road Network

3.1.1 Yuen Shin Road is a dual-two primary distributor. It connects Ting Kok Road to its northern end and Tolo Highway to its southern end. It serves as a major connection for Tai Po area to Tolo Highway. Footpaths and cycle tracks are found on some sections of the road. In 2020, Yuen Shin Road carried an AADT of 38,240 vehicles.

3.1.2 Ting Kok Road is a district distributor connects Tai Mei Tuk to Tai Po and Tai Wo area. The section between Nam Wan Road and Dai Kwai Street carried an AADT of 29,430 vehicles.

3.1.3 Dai Fuk Street is a local road which the vehicular access of the existing bus depot located, it links the existing bus depot to Yuen Shin Road and Ting Kok Road.

3.2 Traffic Count Surveys

3.2.1 In order to appraise the existing traffic conditions, vehicle count survey was carried out during the time period from 0:00am to 6:00am on 23 February 2021 (Tuesday) at the key junctions in the vicinity of the Site. The locations of the surveyed junctions and the area of influence are presented in **Figure 3.1**.

- J/O Ting Kok Road / Dai Fuk Street / Yuen Shin Road
- J/O Yuen Shin Road / Dai Fat Street
- J/O Yuen Shin Road / Tai Po Tai Wo Road
- J/O Ting Kok Road / Nam Wan Road
- J/O Ting Kok Road / Ting Tai Road / Ting Lai Road; and
- J/O Ting Tai Road / Tai Po Tai Wo Road

3.2.2 The identified peak hours in the surveyed time period are 0:00am to 1:00am and 5:00am to 6:00am. Having considered that the traffic conditions have been unstable in the territory due to COVID-19, a conservative factor of +1.4% (to be discussed in **Section 4.2**) was added to the surveyed traffic flows considering a normal situation without COVID-19. The existing 2021 traffic flows are presented in **Figure 3.2**.

3.3 Existing Junction Capacity Assessment

3.3.1 Based on the observed traffic flows, the performance of the surveyed junctions was assessed. The results are summarized and presented in **Table 3.1** and the detailed calculation sheets are attached in **Appendix C**.

Table 3.1 Existing Junction Capacity Assessment

Ref.	Junction	Type/ Capacity Index[1]	Peak Hour	
			Returning	Leaving
J1	Ting Kok Road / Dai Fuk Street / Yuen Shin Road	Signalized/RC	525%	549%
J2	Yuen Shin Road / Dai Fat Street	Signalized/RC	559%	603%
J3	Yuen Shin Road / Tai Po Tai Wo Road	Signalized/RC	475%	961%
J4	Ting Kok Road / Nam Wan Road	Signalized/RC	360%	327%
J5	Ting Kok Road / Ting Tai Road / Ting Lai Road	Signalized/RC	445%	306%
J6	Ting Tai Road / Tai Po Tai Wo Road	Signalized/RC	289%	309%

Note: (1) RC = Reserve Capacity for signalized junction.

3.3.2 The assessment results indicated that all junctions in the vicinity are operating satisfactory during the surveyed peak hour.

4 FUTURE TRAFFIC SITUATION

4.1 Design Year

4.1.1 It is anticipated that the proposed bus depot will start operation in 2025. To consider 3 years after the commencement of operation, a design year of 2028 will be adopted in this study.

4.2 Traffic Growth

ATC Historical Data

4.2.1 Reference was made to the 2016 to 2020 Annual Traffic Census Reports published by the Transport Department, to determine the traffic growth. The traffic data recorded at counting stations in the vicinity of the Application Site are shown in **Table 4.1a**.

Table 4.1a Annual Traffic Census Data (2016 – 2020)

Stn. No.	Road Section			AADT(1)					Avg Growth %
	Road	From	To	2016	2017	2018	2019	2020	
5006	Ting Kok Rd	Nam Wan Rd	Dai Kwai St	29,650	30,680 (3.5%)	30,900 (0.7%)	30,840 (-0.2%)	29,430 (-4.6%)	-0.2%
5243	Ting Kok Rd	Nam Wan Rd	Tai Po Tai Wo Rd	17,170	16,900 (-1.6%)	16,450 (-2.7%)	18,890 (14.8%)	18,110 (-4.1%)	1.3%
5862	Tai Po Tai Wo Rd	Nam Wan Rd	Yuen Shin Rd	27,240	28,340 (4%)	29,240 (3.2%)	30,410 (4%)	28,950 (-4.8%)	1.5%
6057	Yuen Shin Rd	Tolo Highway	Ting Kok Rd	47,860	37,750 (-21.1%)	38,630 (2.3%)	40,170 (4%)	38,240 (-4.8%)	-5.5%
			Total	121,920	113,670 (-6.8%)	115,220 (1.4%)	120,310 (4.4%)	114,730 (-4.6%)	-1.5%

Note: (1) Figures in bracket indicated the % increase/decrease between two years.

4.2.2 **Table 4.1a** shows that the AADT at the concerned ATC stations has an overall annual growth of negative 1.5% in between the years 2016 to 2020. However, having considered the historical traffic data of 2019 and 2020 was affected by the social event and pandemic, reference was also made to data before these two years and shown in **Table 4.1b**.

Table 4.1b Annual Traffic Census Data (2014 – 2018)

Stn. No.	Road Section			AADT(1)					Avg Growth %
	Road	From	To	2014	2015	2016	2017	2018	
5006	Ting Kok Rd	Nam Wan Rd	Dai Kwai St	26,060	26,760 (2.7%)	29,650 (10.8%)	30,680 (3.5%)	30,900 (0.7%)	4.4%
5243	Ting Kok Rd	Nam Wan Rd	Tai Po Tai Wo Rd	16,630	16,490 (-0.8%)	17,170 (4.1%)	16,900 (-1.6%)	16,450 (-2.7%)	-0.3%
5862	Tai Po Tai Wo Rd	Nam Wan Rd	Yuen Shin Rd	24,320	25,440 (4.6%)	27,240 (7.1%)	28,340 (4%)	29,240 (3.2%)	4.7%
6057	Yuen Shin Rd	Tolo Highway	Ting Kok Rd	43,300	45,300 (4.6%)	47,860 (5.7%)	37,750 (-21.1%)	38,630 (2.3%)	-2.8%
			Total	110,310	113,990 (3.3%)	121,920 (7%)	113,670 (-6.8%)	115,220 (1.4%)	1.1%

Note: (1) Figures in bracket indicated the % increase/decrease between two years.

4.2.3 **Table 4.1a** shows that the AADT at the concerned ATC stations has an overall annual growth of 1.1% in between the years 2014 to 2018.

Territorial Population and Employment Data Matrix (TPEDM) Projection Data

4.2.4 Reference was also made to the 2019–based TPEDM published by the Planning Department. The population and employment data of year 2019 and 2031 in the Tai Po District are summarized in **Table 4.2**.

Table 4.2 Population and Employment Data in Tai Po District

Year	Population	Employment	Total
2019	250,050	86,750	336,800
2031	263,800	78,550	342,350
Average Annual Growth Rate	**0.4%**	**-0.8%**	**0.1%**

4.2.5 As shown in **Table 4.2**, the projected average annual growth rate of the population, employment and total number under the TPEDM in Tai Po district is +0.4%, -0.8% and +0.1% respectively between the years 2019 to 2031. Having considered the growth rates derived from ATC and TPEDM data are less than +1.4% (growth rate adopted in previous TIA report), to be conservative, the growth rate of +1.4% is adopted for the subsequent traffic forecast.

4.3 Development Traffic of the Proposed Bus Depot

4.3.1 The proposed bus depot will provide 363 bus parking spaces will be provided for electric buses. The proposed bus depot is anticipated to operate in a similar pattern as existing depot. According to the projected schedule provided by the Applicant, the proposed bus depot will attract and generate 300 vehicle trips (1-way), which equivalent to 600 pcu/hr, during the bus returning peak hour and leaving peak hour, respectively. The development traffic is distributed onto the road network as shown in **Figure 4.1**.

4.4 Reference and Design Flows

4.4.1 The 2028 Reference Flows (**Figure 4.2**), i.e. the traffic flows in the local road were estimated based on the following equation.

2028 Reference Flows = 2021 Existing Flows x $(1 + 1.4\%)^7$

4.4.2 The 2028 Design Flows (**Figure 4.3**), i.e. the traffic flows in the local road network with the additional traffic generated by the proposed bus depot were estimated based on the following equation:

2028 Design Flows = 2028 Reference Flows + Additional Traffic Flows Generated by the Proposed Bus Depot

4.5 Future Junction Capacity Assessment

4.5.1 Junction capacity assessment was carried out for design year 2028. The junction capacity assessment results are shown in **Table 4.3** and detailed junction calculation sheets are attached in **Appendix D**.

Table 4.3 Year 2028 Junction Capacity Assessment

Ref.	Junction	Type/ Capacity Index(1)	Reference		Design	
			Returning	Leaving	Returning	Leaving
J1	Ting Kok Road / Dai Fuk Street / Yuen Shin Road	Signalized/ RC	465%	485%	32%	129%
J2	Yuen Shin Road / Dai Fat Street	Signalized/ RC	494%	537%	237%	249%
J3	Yuen Shin Road / Tai Po Tai Wo Road	Signalized/ RC	420%	856%	293%	443%
J4	Ting Kok Road / Nam Wan Road	Signalized/ RC	317%	304%	147%	185%
J5	Ting Kok Road / Ting Tai Road / Ting Lai Road	Signalized/ RC	399%	266%	194%	197%
J6	Ting Tai Road / Tai Po Tai Wo Road	Signalized/ RC	253%	270%	253%	158%

Note: (1) RC = Reserve Capacity for signalized junction.

4.5.2 The results show that the surveyed junctions are expected to operate with capacities during the bus returning and leaving peak hour in 2028. The junctions analysed have sufficient capacity to accommodate the expected traffic growth and the traffic generated by the proposed bus depot.

5 SUMMARY AND CONCLUSION

5.1 Summary

5.1.1 At present, Dai Fuk Street is operating as a bus depot by the Kowloon Motor Bus Co.(1933) Limited. In order to meet the future operational needs, it is proposed to construct a four-storeys building to provide additional bus parking spaces and supporting facilities.

5.1.2 The vehicular access of the proposed bus depot will be located at Dai Fuk Street. The proposed bus depot will provide a total of 363 bus parking spaces for electric buses. The traffic of the proposed bus depot is anticipated to operate in a similar pattern as the existing bus depot. Therefore, the traffic generated from the proposed bus depot will not affect the normal highway peak hour traffic.

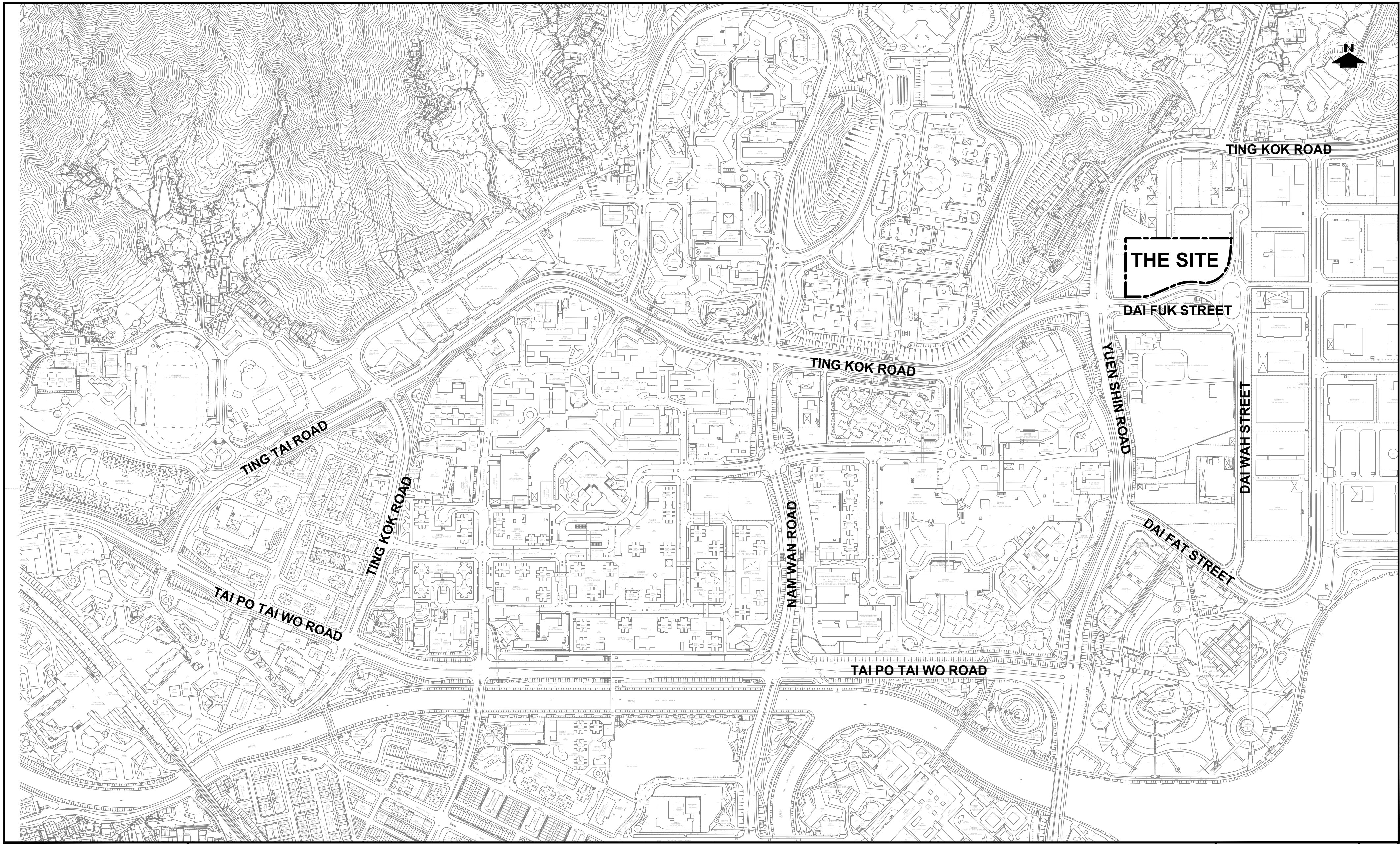
5.1.3 Traffic count survey was conducted to establish the current traffic conditions at the concerned junctions during the time period from 0:00am to 6:00am on 23 February 2021 (Tuesday).

5.1.4 The proposed bus depot is expected to generate and attract a traffic of 600 pcu/hr during the returning and leaving peak hour. By assigning the proposed development traffic to the 2028 Reference Flows, the 2028 Design Flows were obtained.

5.1.5 Junction capacity assessments were carried out for the key junctions for Reference and Design scenarios in 2028. The results show that the surveyed junctions are expected to operate with capacities during the peak hour in 2028.

5.2 Conclusion

5.2.1 It is concluded from this study that the proposed bus depot will not induce significant traffic impact to the surrounding road network and therefore, the proposal is acceptable in traffic viewpoint.



PROJECT NO. 40708

PROJECT TITLE
PROPOSED BUS DEPOT AT DAI FUK STREET, TAI PO, NEW TERRITORIES - S16 PLANNING APPLICATION

DRAWING NO. **FIGURE 2.1**

REV. -

DESIGNED **SLN**

DATE **NOV 2021**

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DRAWING TITLE

LOCATION PLAN

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FILE. G:\PROJECT\40708\DATA\DWG\FIGURE2.1.DWG PLOT SCALE : 1 = 1

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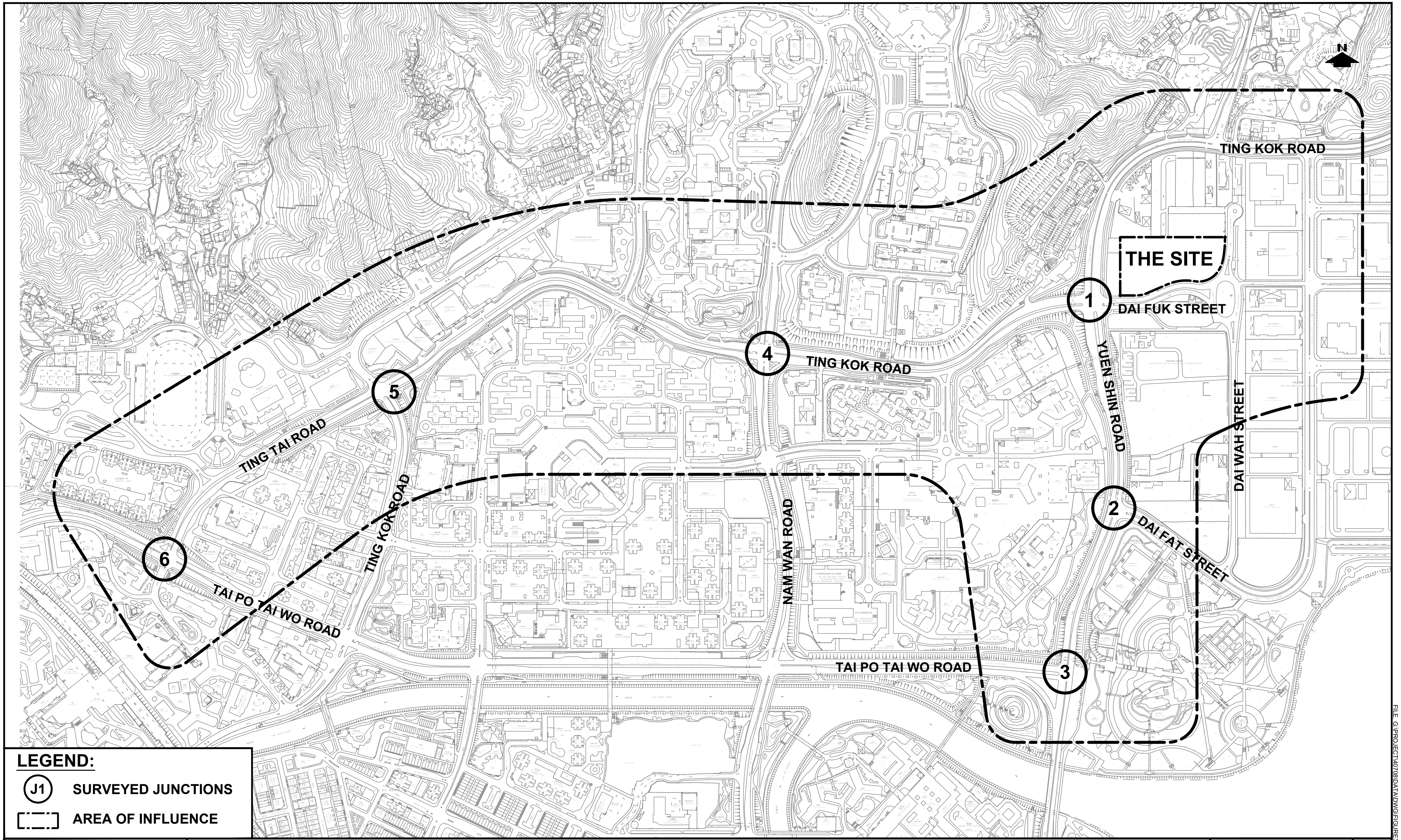

PROJECT NO. 40708

PROJECT TITLE PROPOSED BUS DEPOT AT DAI FUK STREET, TAI PO, NEW TERRITORIES - S16 PLANNING APPLICATION

DRAWING NO. **FIGURE 3.1**

REV. -

DESIGNED SLN

DATE NOV 2021

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DRAWING TITLE

LOCATION OF SURVEYED JUNCTIONS AND AREA OF INFLUENCE

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FILE. G:\PROJECT\40708\DATA\DWG\FIGURE3.1.DWG PLOT SCALE : 1 = 1

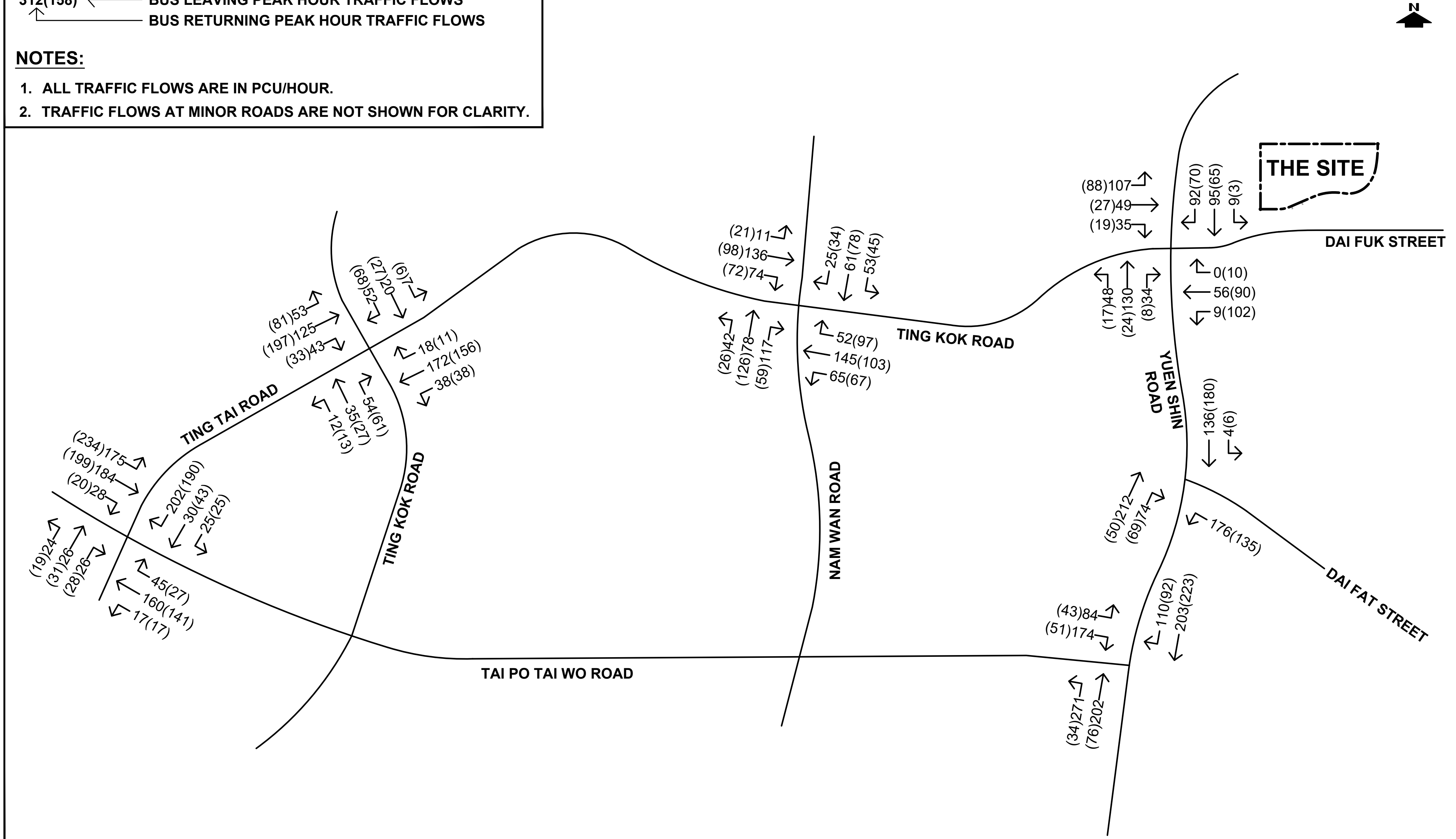
LEGEND:

312(158) ← BUS LEAVING PEAK HOUR TRAFFIC FLOWS

↰ BUS RETURNING PEAK HOUR TRAFFIC FLOWS

NOTES:

1. ALL TRAFFIC FLOWS ARE IN PCU/HOUR.
2. TRAFFIC FLOWS AT MINOR ROADS ARE NOT SHOWN FOR CLARITY.



PROJECT NO.	PROJECT TITLE	DRAWING NO.	REV.
40708	PROPOSED BUS DEPOT AT DAI FUK STREET, TAI PO, NEW TERRITORIES - S16 PLANNING APPLICATION	FIGURE 3.2	A

DESIGNED SLN

DATE JUN 2022

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DRAWING TITLE

EXISTING TRAFFIC FLOW

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FILE. G:\PROJECT\40708\DATA\DWG\FIGURE3.2A.DWG PLOT SCALE : 1 = 1

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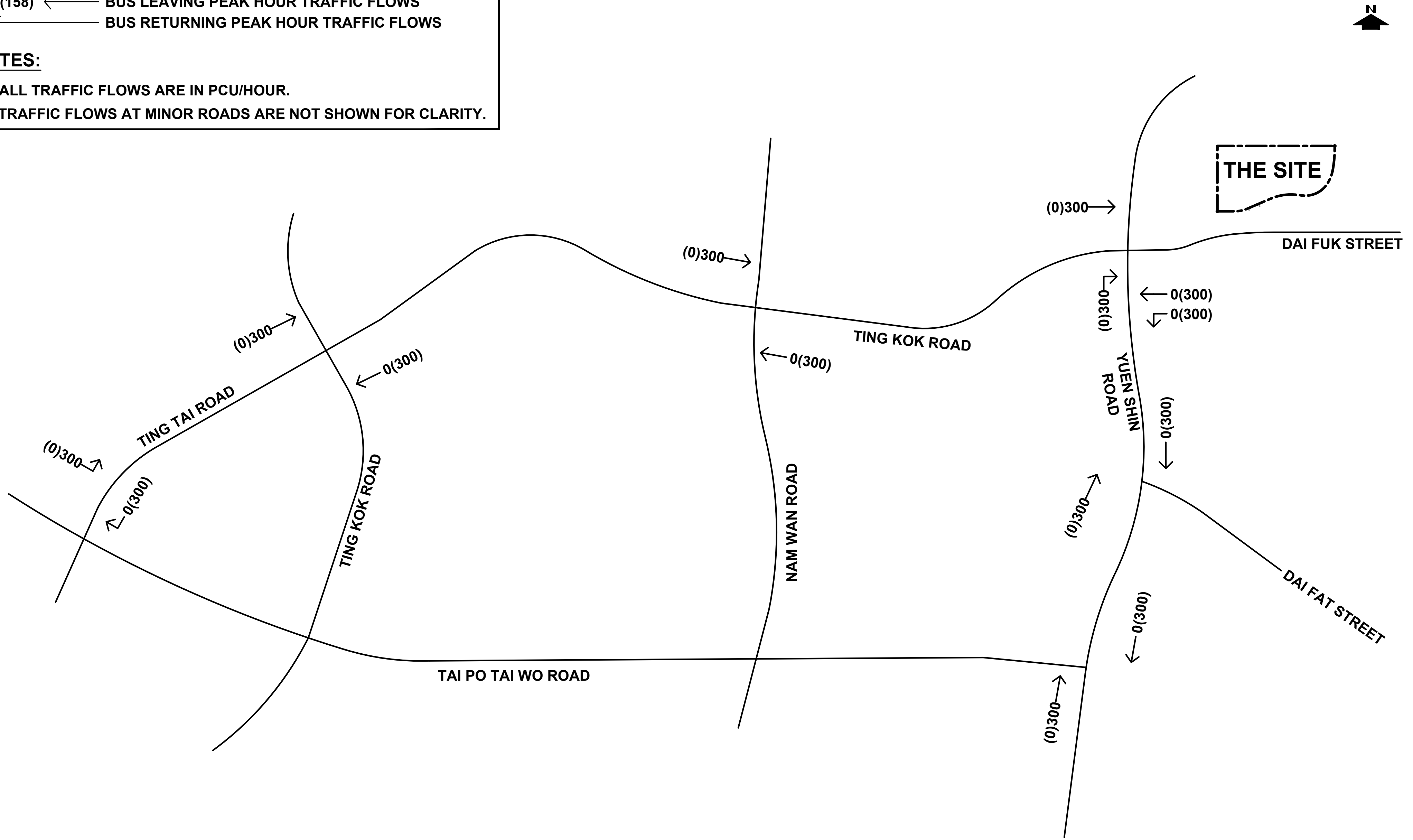
LEGEND:

312(158) ← BUS LEAVING PEAK HOUR TRAFFIC FLOWS
↑ BUS RETURNING PEAK HOUR TRAFFIC FLOWS

NOTES:

1. ALL TRAFFIC FLOWS ARE IN PCU/HOUR.
2. TRAFFIC FLOWS AT MINOR ROADS ARE NOT SHOWN FOR CLARITY.



PROJECT NO. 40708	PROJECT TITLE PROPOSED BUS DEPOT AT DAI FUK STREET, TAI PO, NEW TERRITORIES - S16 PLANNING APPLICATION	DRAWING NO. FIGURE 4.1	REV. A
DESIGNED SLN DRAWN CLL CHECKED SLN	DATE JUN 2022 SCALE N.T.S.	DRAWING TITLE **DEVELOPMENT TRAFFIC FLOW**	LLA 顧問有限公司 Consultancy Limited

FILE. G:\PROJECT\40708\DATA\DWG\FIGURE4.1A.DWG PLOT SCALE : 1 = 1

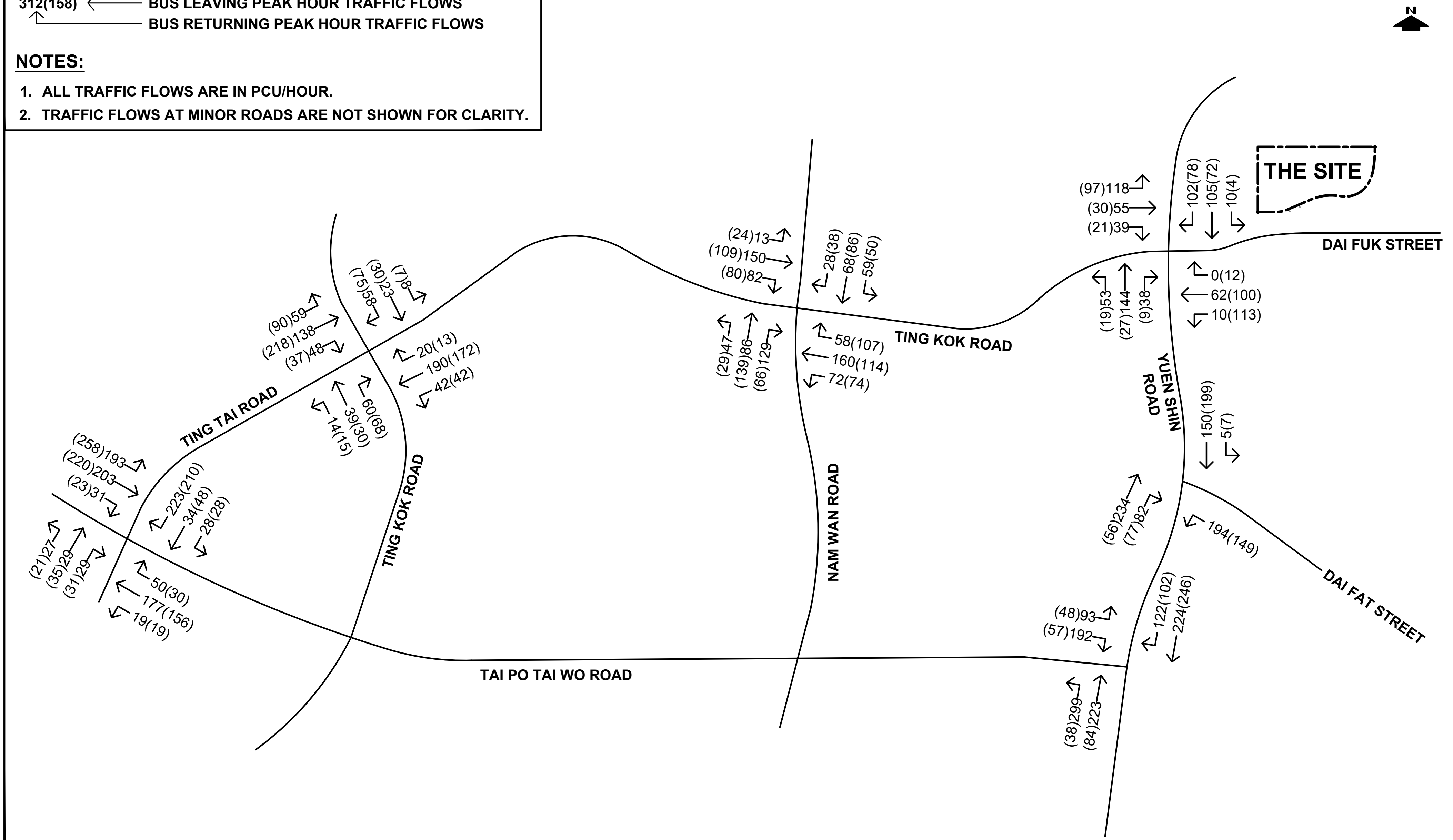
LEGEND:

312(158) ← BUS LEAVING PEAK HOUR TRAFFIC FLOWS

↑ BUS RETURNING PEAK HOUR TRAFFIC FLOWS

NOTES:

1. ALL TRAFFIC FLOWS ARE IN PCU/HOUR.
2. TRAFFIC FLOWS AT MINOR ROADS ARE NOT SHOWN FOR CLARITY.



PROJECT NO. 40708

PROJECT TITLE PROPOSED BUS DEPOT AT DAI FUK STREET, TAI PO, NEW TERRITORIES - S16 PLANNING APPLICATION

DRAWING NO. FIGURE 4.2

REV. A

DESIGNED SLN

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DRAWING TITLE

2028 REFERENCE TRAFFIC FLOW

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FILE. G:\PROJECT\40708\DATA\DWG\FIGURE4.2A.DWG PLOT SCALE : 1 = 1

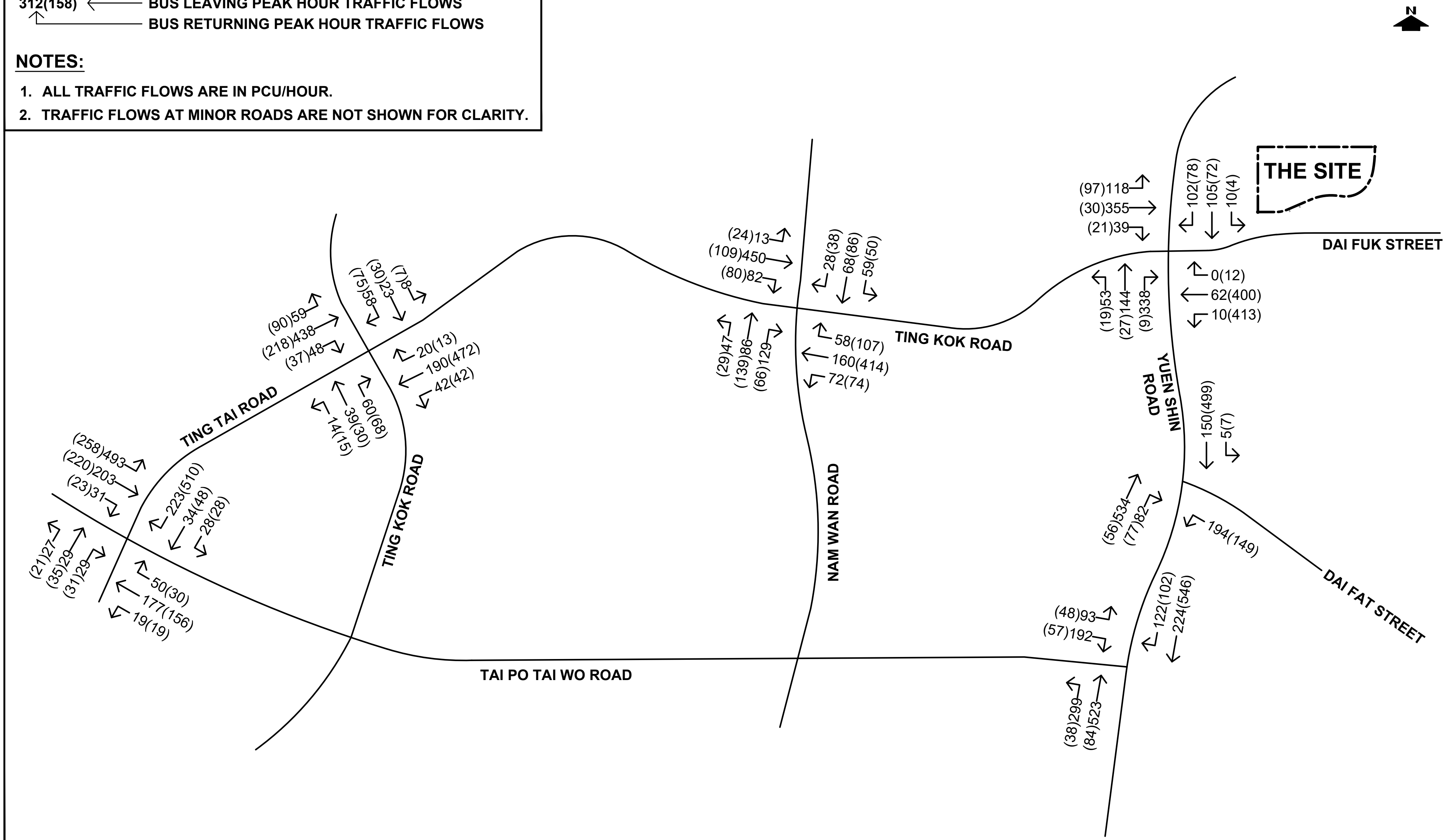
LEGEND:

312(158) ← BUS LEAVING PEAK HOUR TRAFFIC FLOWS

↑ BUS RETURNING PEAK HOUR TRAFFIC FLOWS

NOTES:

1. ALL TRAFFIC FLOWS ARE IN PCU/HOUR.
2. TRAFFIC FLOWS AT MINOR ROADS ARE NOT SHOWN FOR CLARITY.



PROJECT NO. 40708	PROJECT TITLE PROPOSED BUS DEPOT AT DAI FUK STREET, TAI PO, NEW TERRITORIES - S16 PLANNING APPLICATION	DRAWING NO. FIGURE 4.3	REV. A
DESIGNED SLN / DATE JUN 2022	DRAWING TITLE 2028 DESIGN TRAFFIC FLOW	LLA 顧問有限公司 Consultancy Limited	
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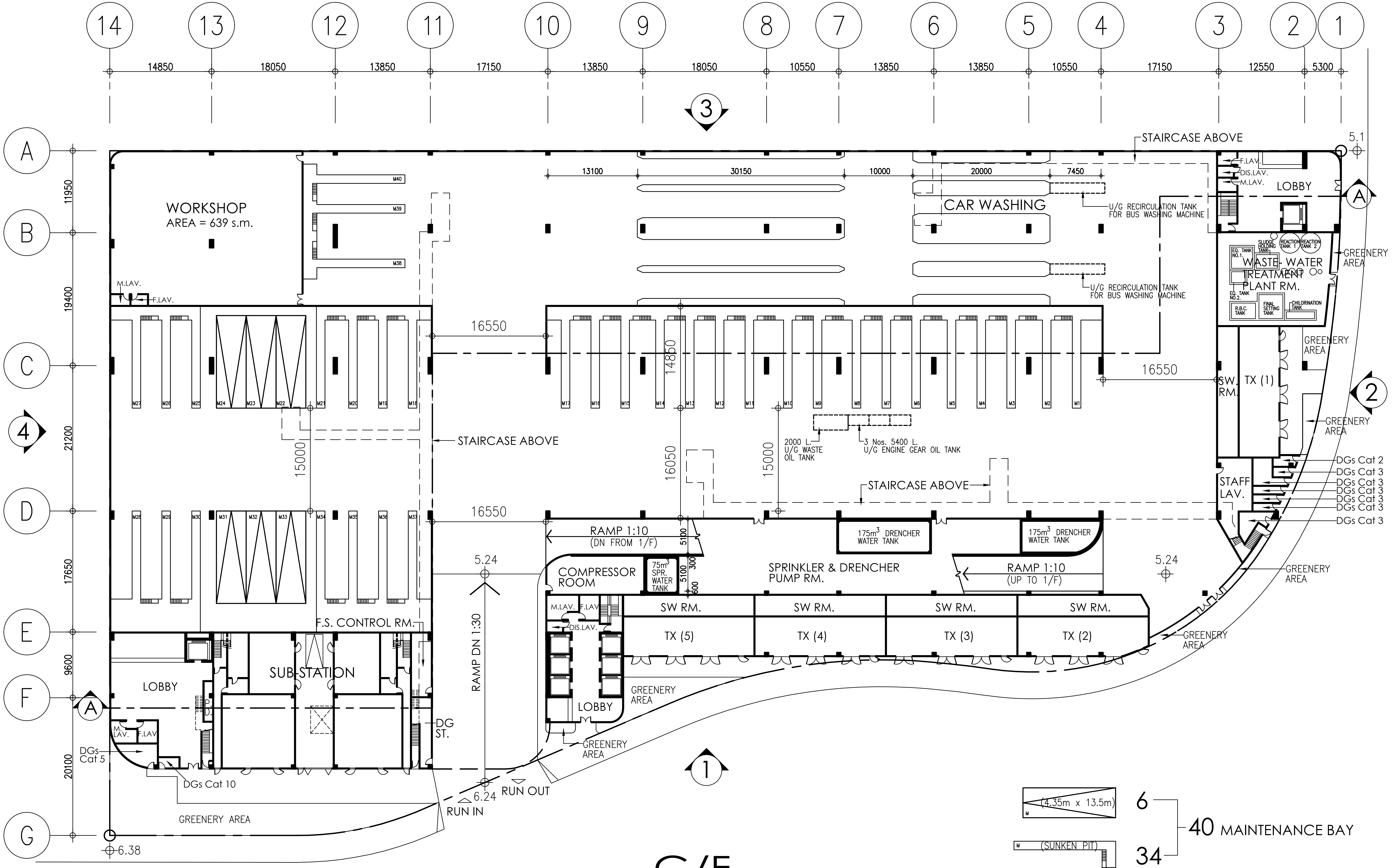
Appendix A

Proposed Bus Depot Layout Plan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11950
19400
21200
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9600
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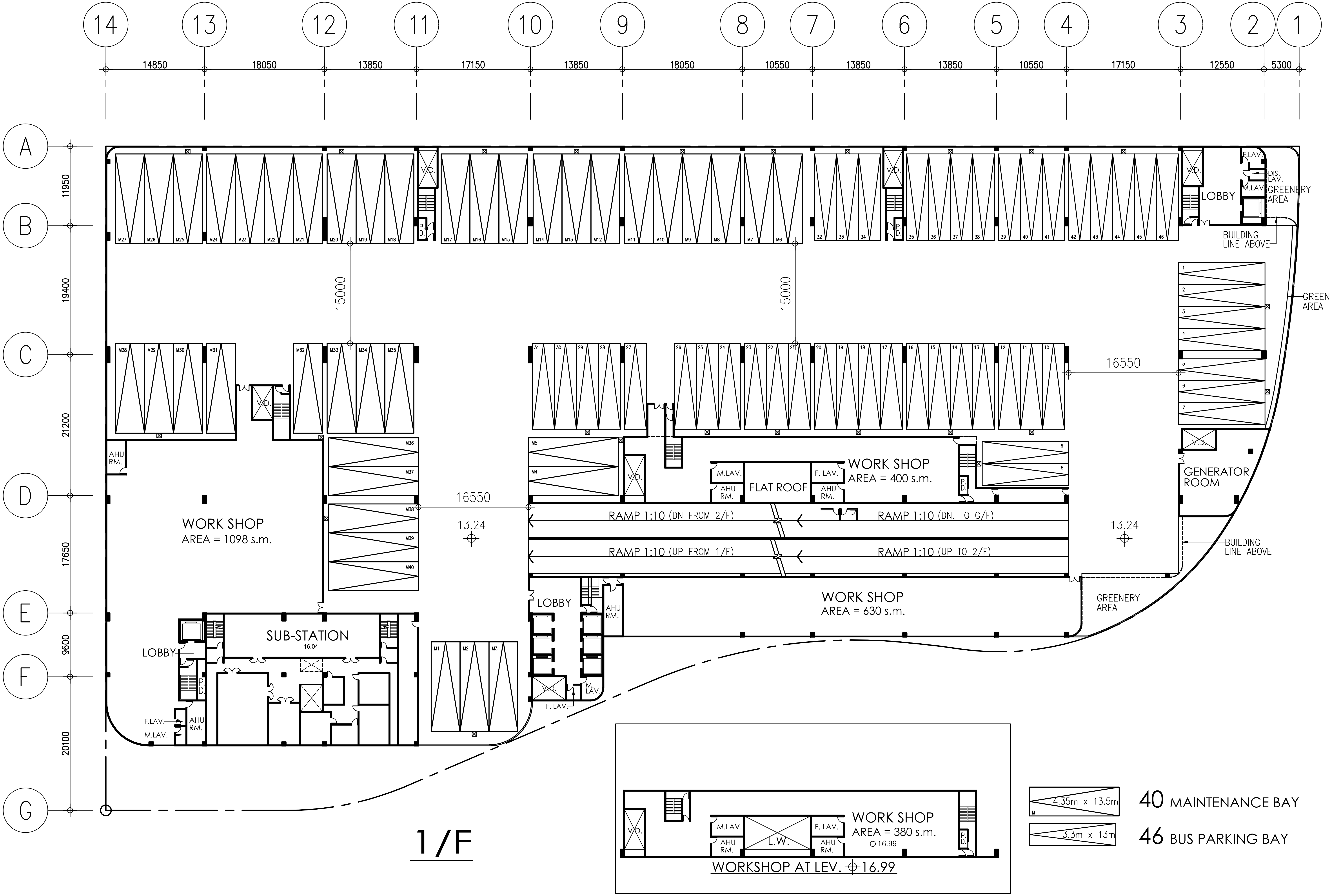
STAIRCASE ABOVE
5.1
13100
30150
10000
20000
7450
F.LAV.
DIS.LAV.
M.LAV.
LOBBY
WORKSHOP
AREA = 639 s.m.
CAR WASHING
U/G RECIRCULATION TANK FOR BUS WASHING MACHINE
U/G RECIRCULATION TANK FOR BUS WASHING MACHINE
WASTE WATER TREATMENT PLANT RM.
EQ. TANK NO.1
SLUDGE HOLDING TANK
REACTION TANK 1
REACTION TANK 2
EQ. TANK NO.2
R.B.C. TANK
FINAL SETTING TANK
CHILORINATION TANK
GREENERY AREA
M.LAV.
F.LAV.
16550
14850
16550
SW. RM.
TX (1)
GREENERY AREA
GREENERY AREA
STAIRCASE ABOVE
15000
16050
15000
2000 L. U/G WASTE OIL TANK
3 Nos. 5400 L. U/G ENGINE GEAR OIL TANK
STAIRCASE ABOVE
DGs Cat 2
DGs Cat 3
DGs Cat 3
DGs Cat 3
DGs Cat 3
DGs Cat 3
DGs Cat 3
STAFF LAV.
16550
RAMP 1:10
(DN FROM 1/F)
5100
175m³ DRENCHER WATER TANK
175m³ DRENCHER WATER TANK
5.24
5.24
COMPRESSOR ROOM
75m³ SPR. WATER TANK
300
5100
600
SPRINKLER & DRENCHER PUMP RM.
RAMP 1:10
(UP TO 1/F)
GREENERY AREA
F.S. CONTROL RM.
SW RM.
SW RM.
SW RM.
SW RM.
TX (5)
TX (4)
TX (3)
TX (2)
GREENERY AREA
M.LAV.
F.LAV.
DIS.LAV.
SUB-STATION
LOBBY
RAMP DN 1:30
LOBBY
GREENERY AREA
DG ST.
M.LAV.
F.LAV.
DGs Cat 5
DGs Cat 10
GREENERY AREA
6.24
RUN IN
RUN OUT
6.38
(4.35m x 13.5m)
6
(SUNKEN PIT)
34
40 MAINTENANCE BAY
M1 M2 M3 M4 M5 M6 M7 M8 M9 M10 M11 M12 M13 M14 M15 M16 M17
M18 M19 M20 M21 M22 M23 M24 M25 M26 M27
M28 M29 M30 M31 M32 M33 M34 M35 M36 M37
M38 M39 M40

G/F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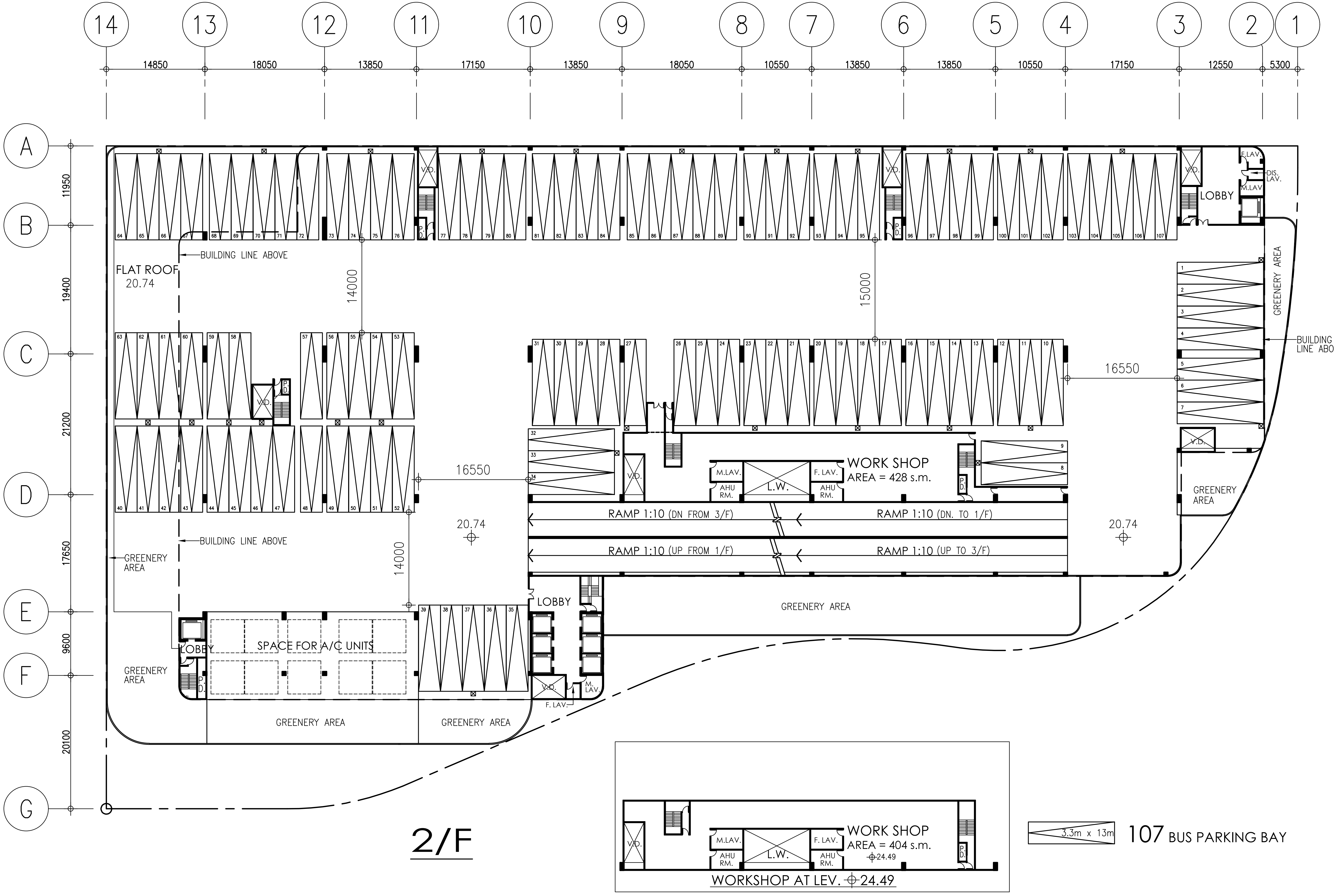
P.D.
F.LAV.
DIS. LAV.
M.LAV.
LOBBY
GREENERY AREA
BUILDING LINE ABOVE
15000
15000
16550
16550
AHU RM.
WORK SHOP
AREA = 1098 s.m.
WORK SHOP
AREA = 400 s.m.
FLAT ROOF
GENERATOR ROOM
RAMP 1:10 (DN FROM 2/F)
RAMP 1:10 (DN. TO G/F)
RAMP 1:10 (UP FROM 1/F)
RAMP 1:10 (UP TO 2/F)
13.24
13.24
WORK SHOP
AREA = 630 s.m.
SUB-STATION
16.04
LOBBY
WORK SHOP
AREA = 380 s.m.
16.99
L.W.
WORKSHOP AT LEV. 16.99
4.35m x 13.5m
3.3m x 13m
40 MAINTENANCE BAY
46 BUS PARKING BAY

1/F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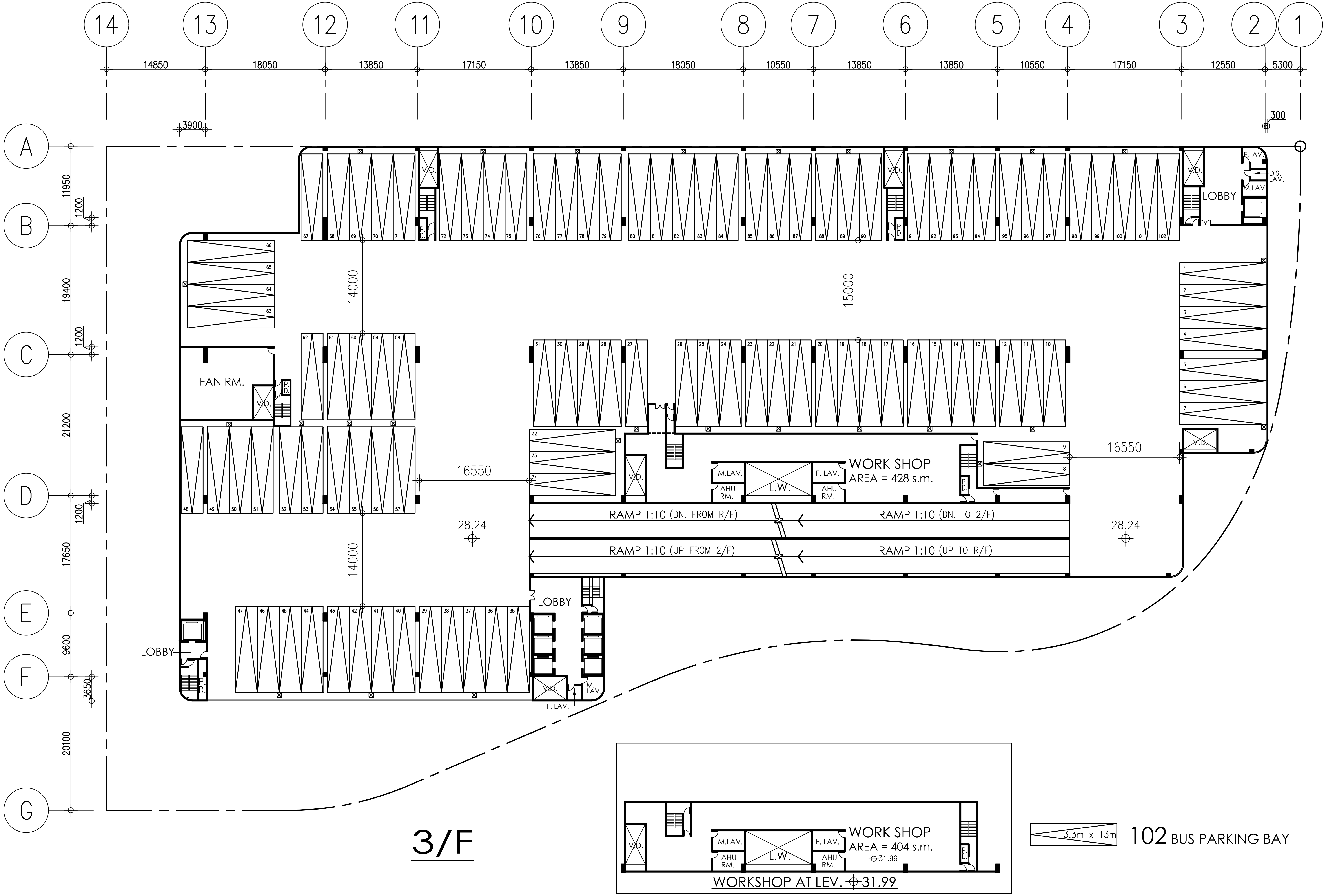
P.D.
F.LAV.
DIS. LAV.
M.LAV
LOBBY
BUILDING LINE ABOVE
FLAT ROOF
20.74
14000
15000
16550
GREENERY AREA
WORK SHOP
AREA = 428 s.m.
M.LAV.
F. LAV.
AHU RM.
L.W.
RAMP 1:10 (DN FROM 3/F)
RAMP 1:10 (DN. TO 1/F)
RAMP 1:10 (UP FROM 1/F)
RAMP 1:10 (UP TO 3/F)
SPACE FOR A/C UNITS
M. LAV
F. LAV.
2/F
WORK SHOP
AREA = 404 s.m.
24.49
WORKSHOP AT LEV. 24.49
3.3m x 13m
107 BUS PARKING BAY



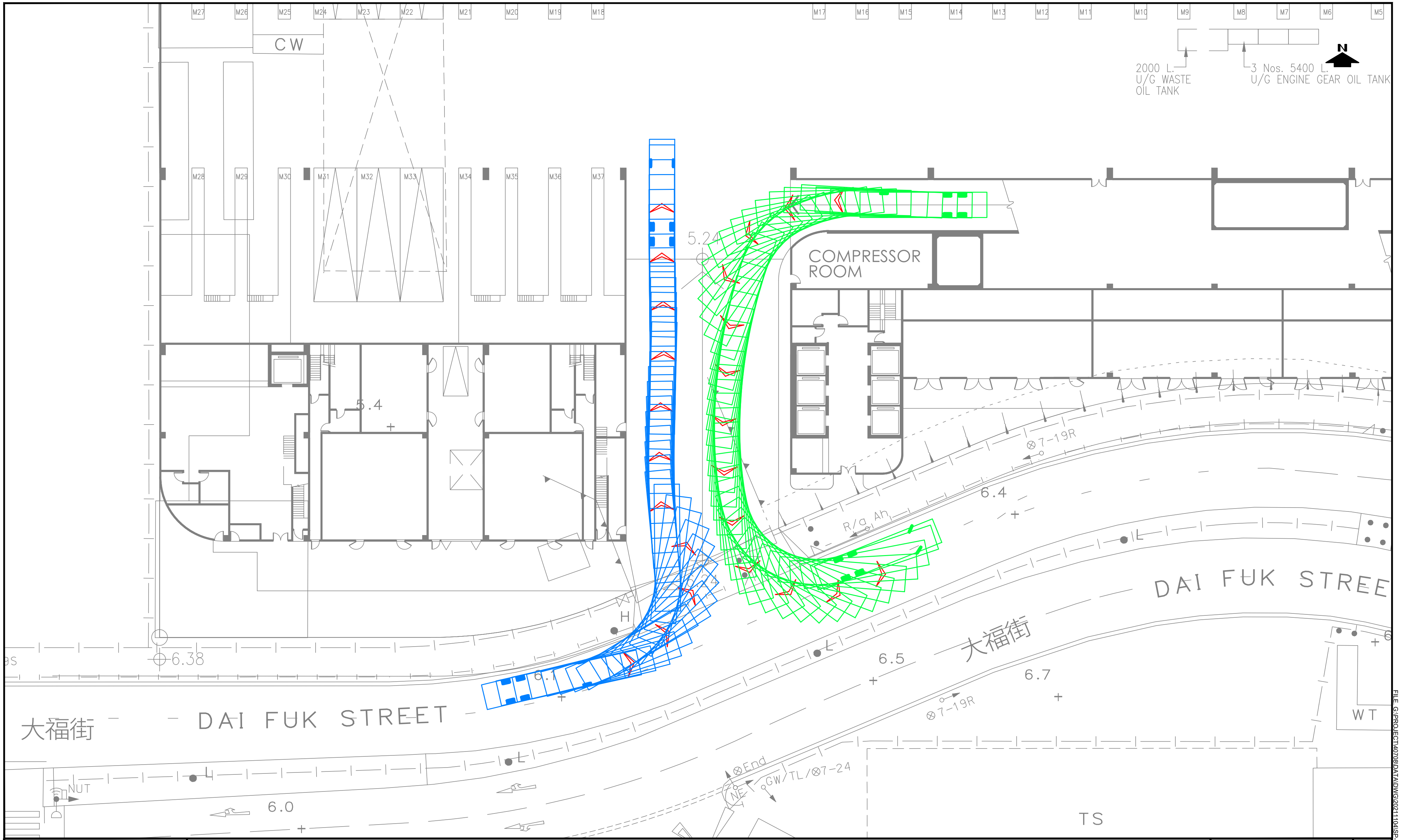
WORKSHOP AT LEV. 31.99

3/F

102 BUS PARKING BAY

Appendix B

Swept path Analysis



PROJECT NO. 40708

PROJECT TITLE
PROPOSED BUS DEPOT AT DAI FUK STREET, TAI PO, NEW TERRITORIES - S16 PLANNING APPLICATION

DRAWING NO. SP-01

REV. .

DESIGNED SLN

DATE NOV 2021

DRAWN CLL

SCALE 1:500

CHECKED SLN

DRAWING TITLE

SWEPT PATH ANALYSIS - 12.8m BUS (G/F)

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Consultancy Limited

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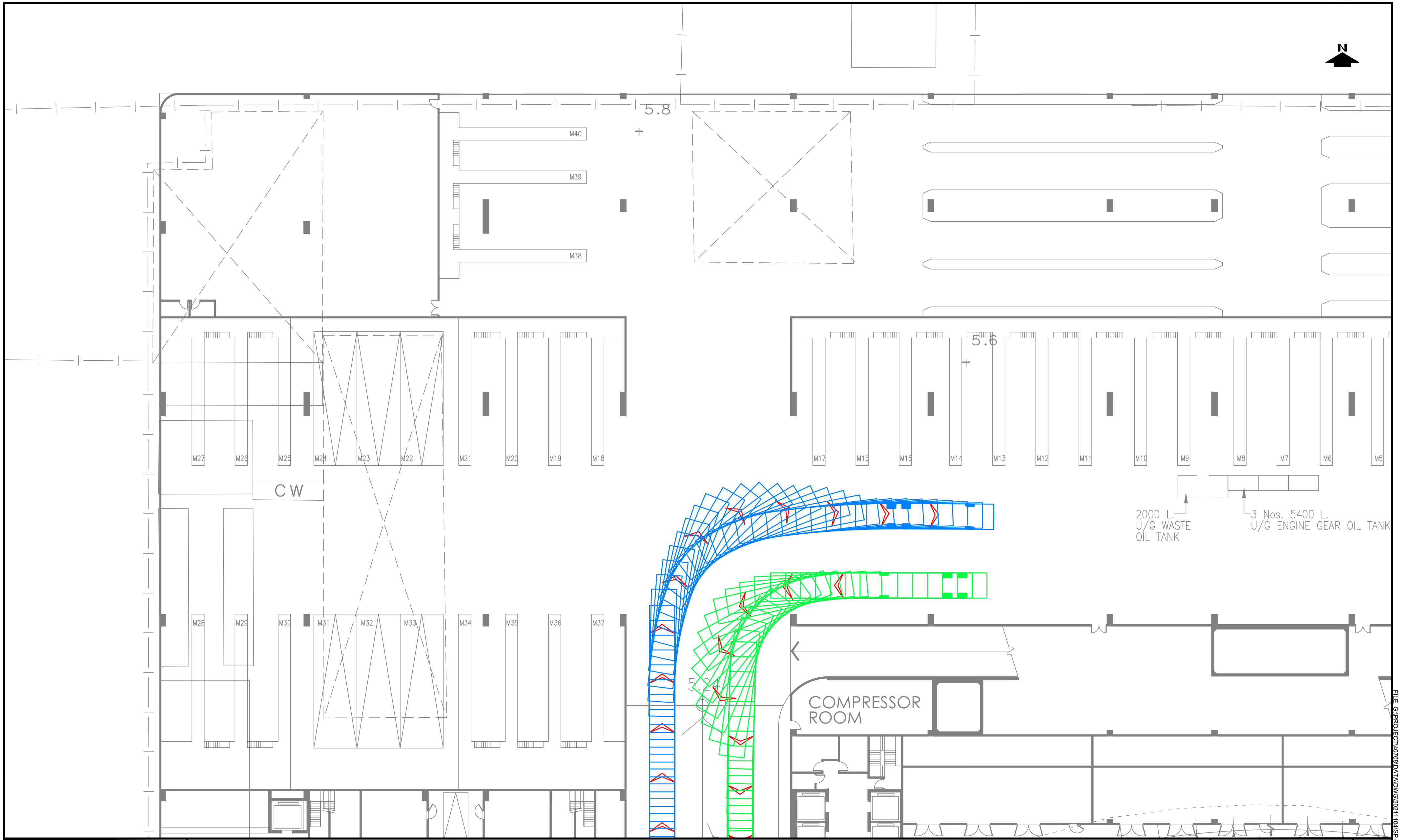

PROJECT NO.
40708

PROJECT TITLE
PROPOSED BUS DEPOT AT DAI FUK STREET, TAI PO, NEW TERRITORIES - S16 PLANNING APPLICATION

DRAWING NO.
SP-02

REV.
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DESIGNED SLN
DATE NOV 2021
DRAWN CLL
SCALE 1:500
CHECKED SLN

DRAWING TITLE
SWEPT PATH ANALYSIS - 12.8m BUS (G/F)

LLA 顧問有限公司
Consultancy Limited

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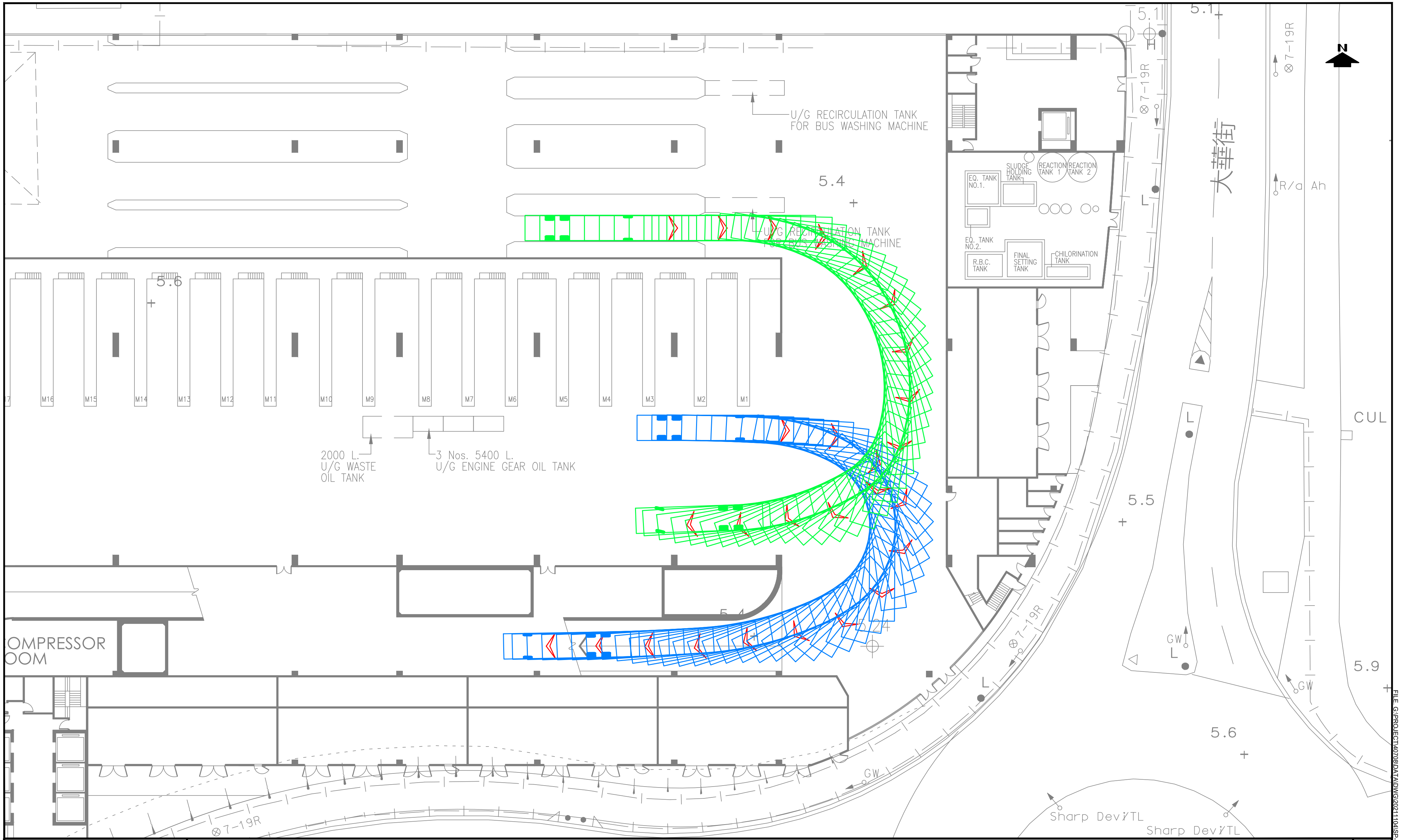

PROJECT NO.
40708

PROJECT TITLE
PROPOSED BUS DEPOT AT DAI FUK STREET, TAI PO, NEW TERRITORIES - S16 PLANNING APPLICATION

DRAWING NO.
SP-03

REV.
.

DESIGNED SLN
DATE NOV 2021
DRAWN CLL
SCALE 1:500
CHECKED SLN

DRAWING TITLE
SWEPT PATH ANALYSIS - 12.8m BUS (G/F)

LLA 顧問有限公司 Consultancy Limited

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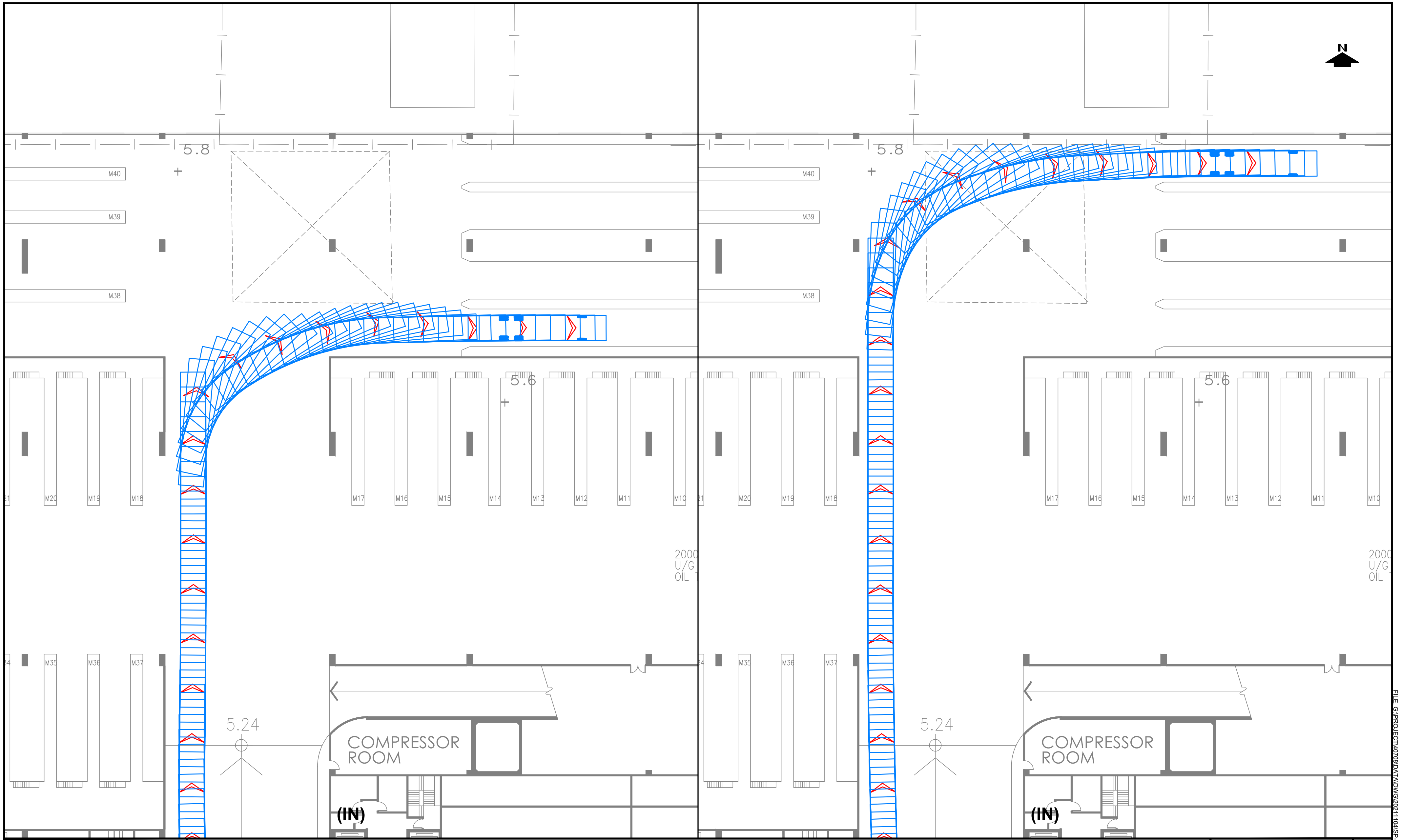

PROJECT NO. 40708	PROJECT TITLE PROPOSED BUS DEPOT AT DAI FUK STREET, TAI PO, NEW TERRITORIES - S16 PLANNING APPLICATION	DRAWING NO. SP-04
DESIGNED SLN	DATE NOV 2021	REV. .
DRAWN CLL	SCALE 1:500	
CHECKED SLN		

DRAWING TITLE

SWEPT PATH ANALYSIS - 12.8m BUS (G/F)

LLA 顧問有限公司 Consultancy Limited

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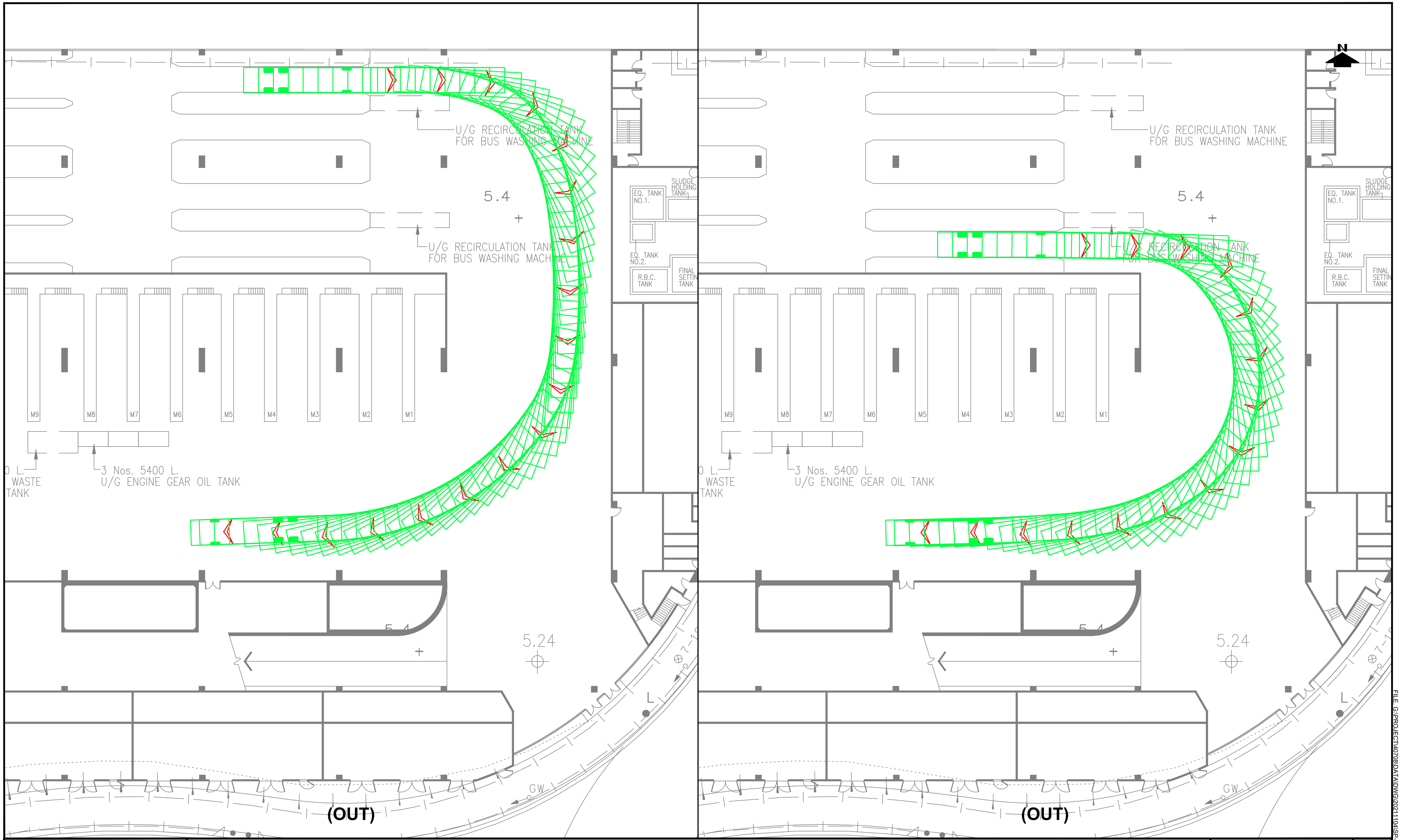

PROJECT NO. 40708	PROJECT TITLE PROPOSED BUS DEPOT AT DAI FUK STREET, TAI PO, NEW TERRITORIES - S16 PLANNING APPLICATION	DRAWING NO. SP-05	REV. .

DESIGNED SLN	DATE NOV 2021	DRAWING TITLE **SWEPT PATH ANALYSIS - 12.8m BUS (G/F)**	**LLA** 顧問有限公司 Consultancy Limited
DRAWN CLL	SCALE 1:500		
CHECKED SLN			

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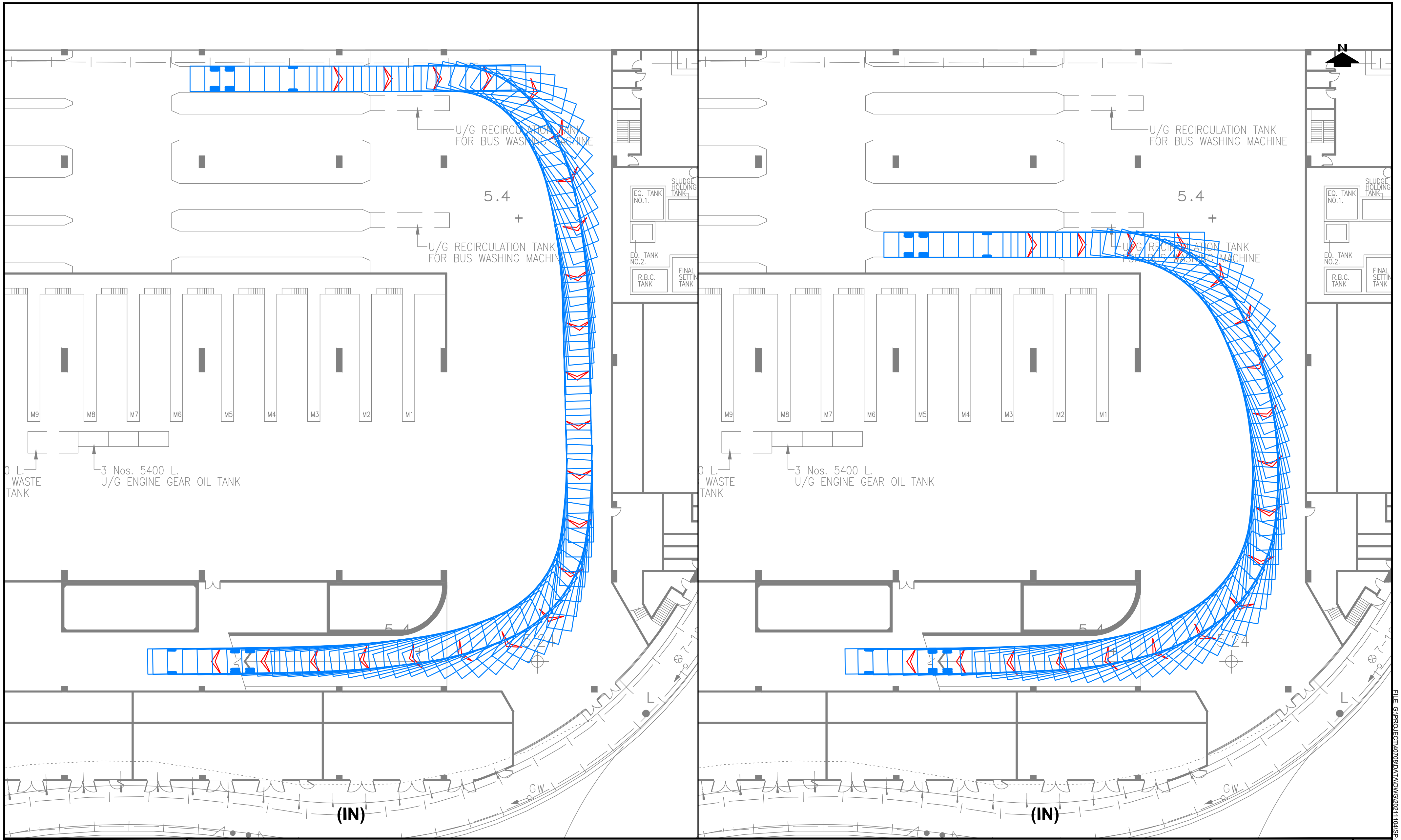

PROJECT NO. 40708		PROJECT TITLE	PROPOSED BUS DEPOT AT DAI FUK STREET, TAI PO, NEW TERRITORIES - S16 PLANNING APPLICATION	DRAWING NO. SP-06	REV. .
DESIGNED SLN	DATE NOV 2021	DRAWING TITLE	**SWEPT PATH ANALYSIS - 12.8m BUS (G/F)**	**LLA** 顧問有限公司 Consultancy Limited	
DRAWN CLL	SCALE 1:500				
CHECKED SLN					

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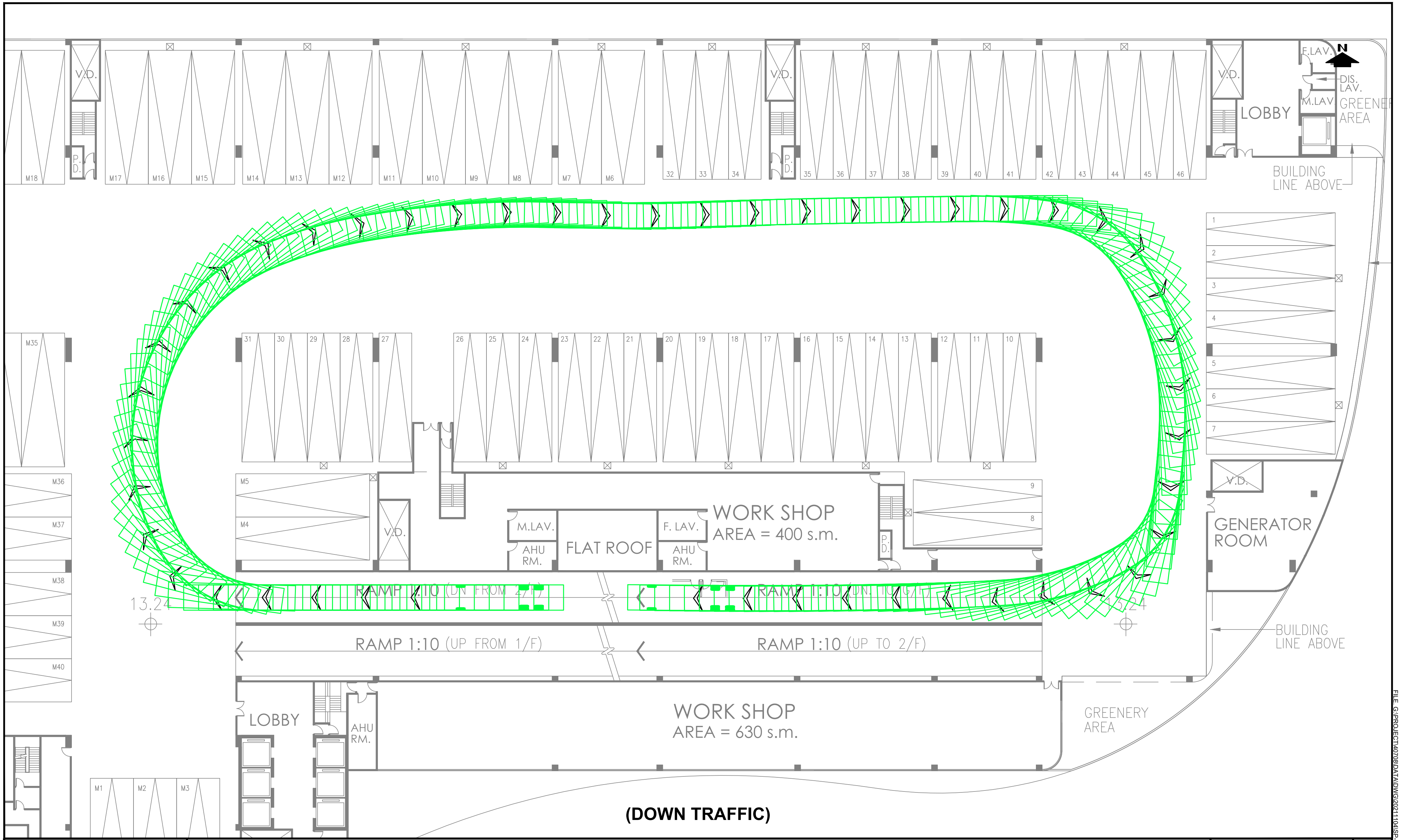

PROJECT NO.
40708

PROJECT TITLE
PROPOSED BUS DEPOT AT DAI FUK STREET, TAI PO, NEW TERRITORIES - S16 PLANNING APPLICATION

DRAWING NO.
SP-07

REV.
.

DESIGNED SLN
DATE NOV 2021
DRAWN CLL
SCALE 1:500
CHECKED SLN

DRAWING TITLE
SWEPT PATH ANALYSIS - 12.8m BUS (1/F)

LLA 顧問有限公司
Consultancy Limited

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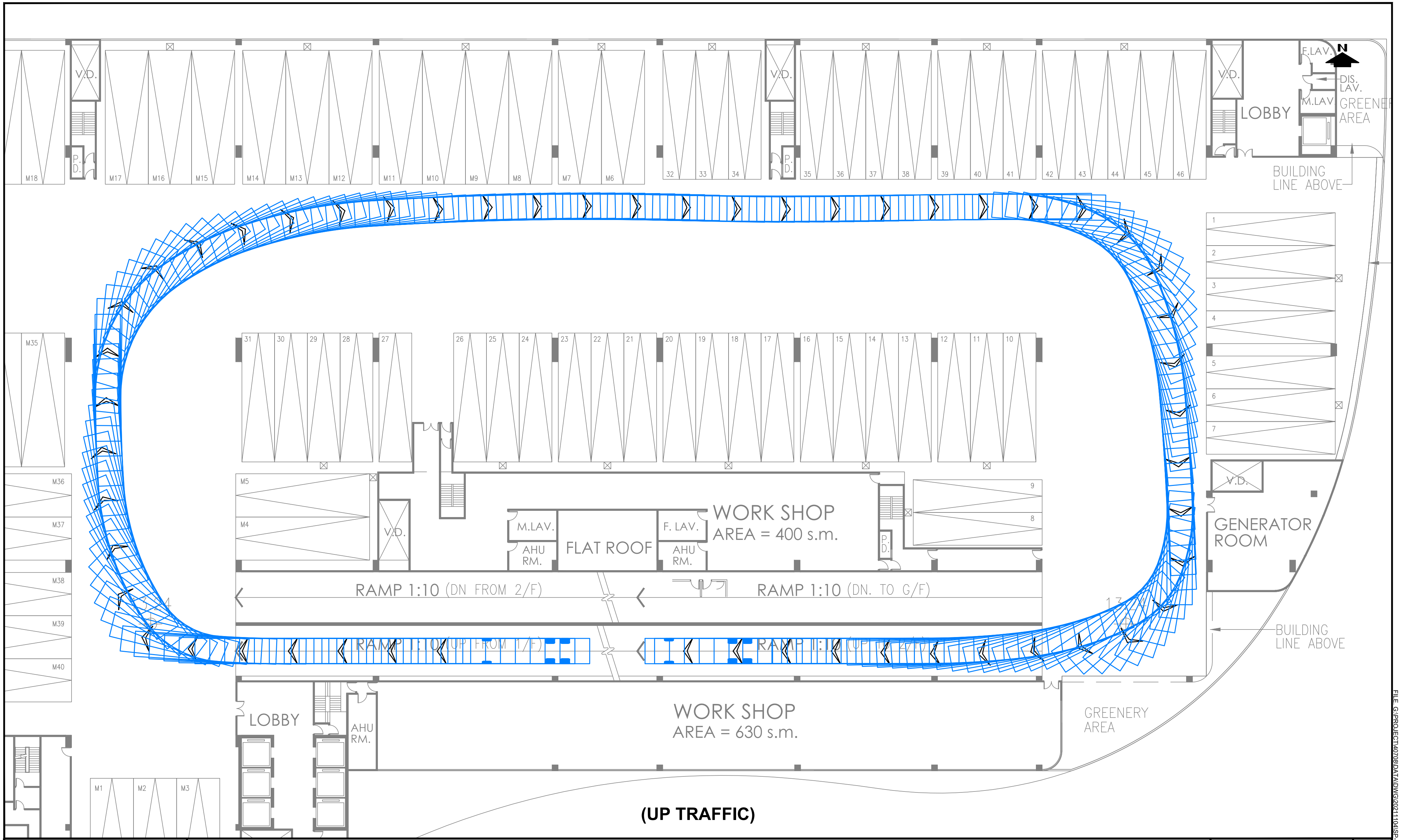

(UP TRAFFIC)

PROJECT NO.
40708

PROJECT TITLE
PROPOSED BUS DEPOT AT DAI FUK STREET, TAI PO, NEW TERRITORIES - S16 PLANNING APPLICATION

DRAWING NO.
SP-08

REV.
.

DESIGNED SLN
DATE NOV 2021
DRAWN CLL
SCALE 1:500
CHECKED SLN

DRAWING TITLE
SWEPT PATH ANALYSIS - 12.8m BUS (1/F)

LLA 顧問有限公司
Consultancy Limited

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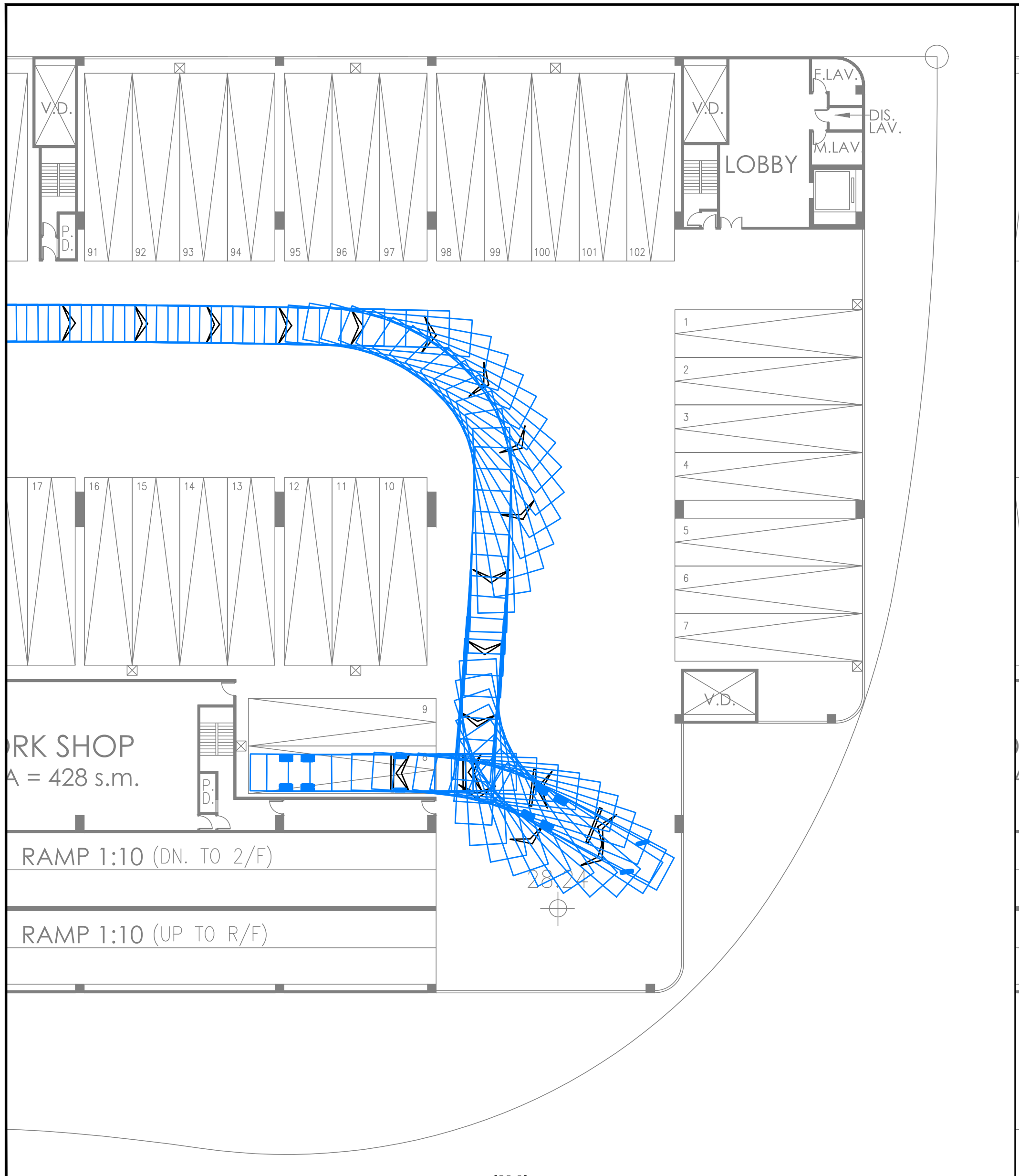
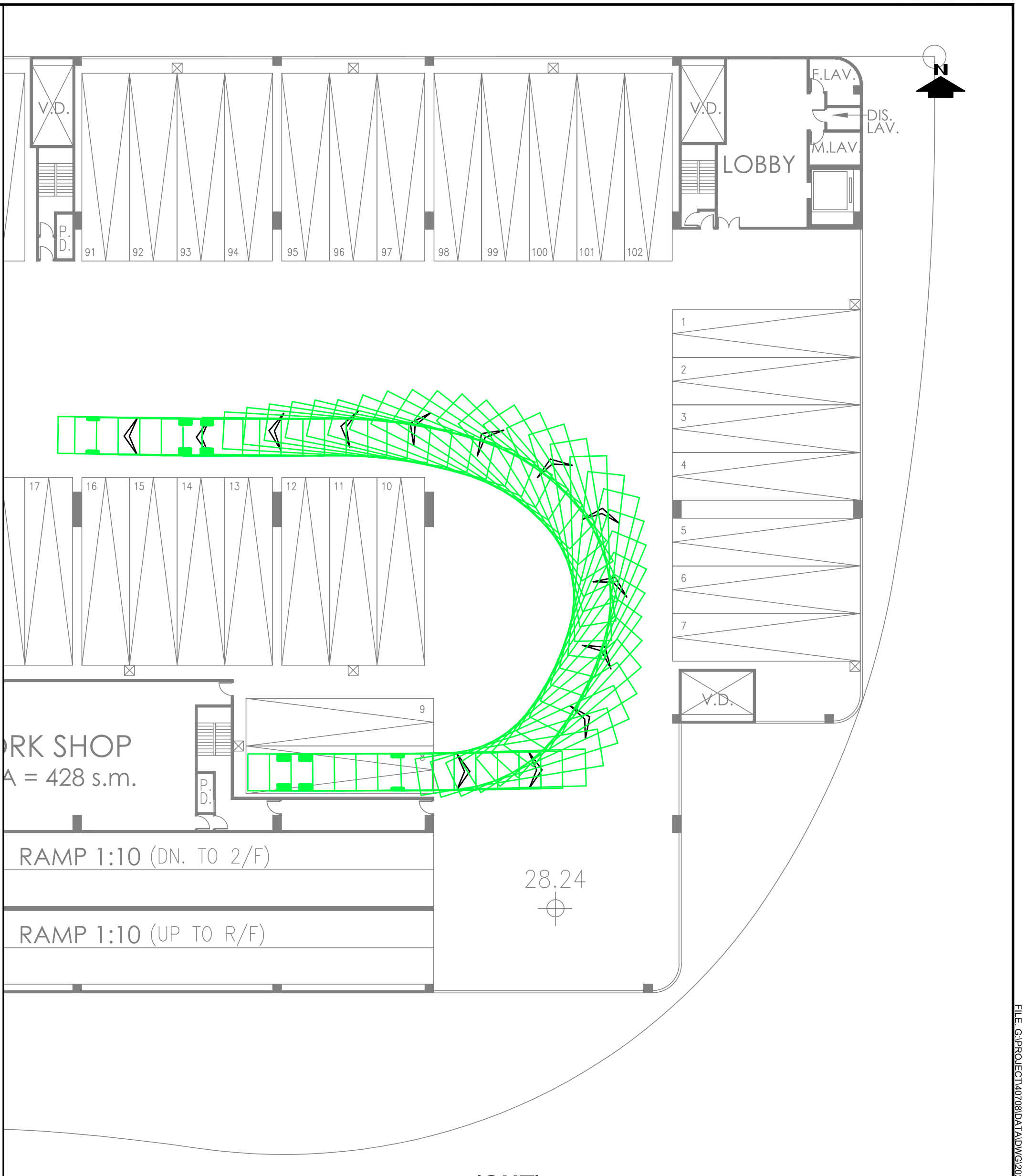


(IN)



(OUT)

PROJECT NO.
40708

PROJECT TITLE
PROPOSED BUS DEPOT AT DAI FUK STREET, TAI PO, NEW TERRITORIES - S16 PLANNING APPLICATION

DRAWING NO.
SP-09

REV.
.

DESIGNED **SLN**
DATE **NOV 2021**
DRAWN **CLL**
SCALE **1:500**
CHECKED **SLN**

DRAWING TITLE
SWEPT PATH ANALYSIS - 12.8m BUS (3/F)

LLA 顧問有限公司
Consultancy Limited

FILE. G:\PROJECT\40708\DATA\DWG\20211104\SP-09.DWG PLOT SCALE : 1 = 1

Appendix C

Junction Capacity Assessments

- Existing Scenario

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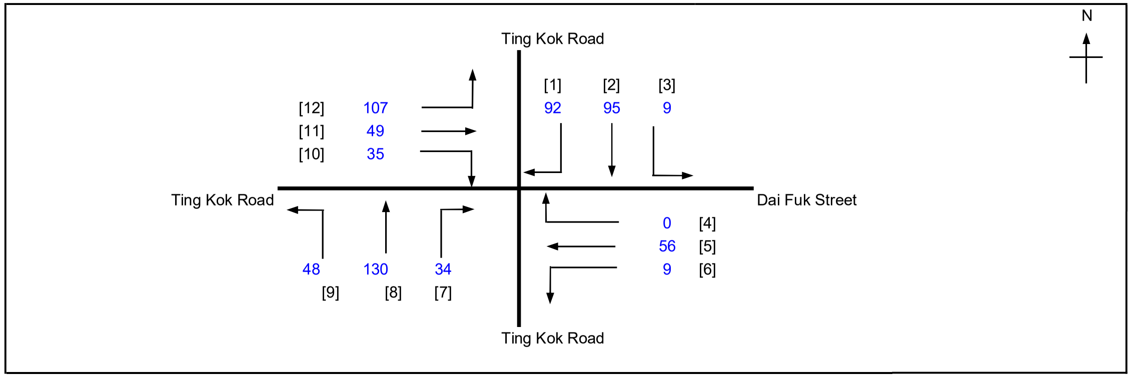
TRAFFIC SIGNAL CALCULATION

Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application

2021 Existing Returning Peak

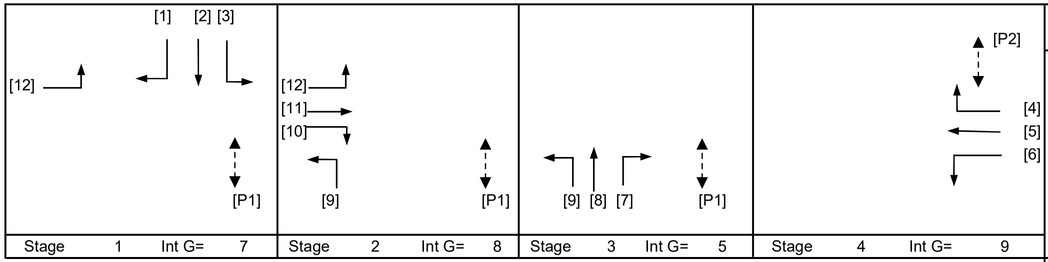
J1 Yuen Shin Road/Ting Kok Road/Dai Fuk Street

			INITIALS	DATE
PROJECT NO.:	40708	Prepared By:	SKL	Jun-22
FILENAME :	J1_YSR_TKR_DF	Checked By:	SLN	Jun-22
REFERENCE NO.:		Reviewed By:	SLN	Jun-22



Existing Cycle Time

No. of stages per cycle N = 4
Cycle time C = 88 sec
Sum(y) Y = 0.093
Loss time L = 31 sec
Total Flow = 664 pcu
Co = (1.5*L+5)/(1-Y) = 56.8 sec
Cm = L/(1-Y) = 34.2 sec
Yult = 0.668
R.C.ult = (Yult-Y)/Y*100% = 615.2 %
Cp = 0.9*L/(0.9-Y) = 34.6 sec
Ymax = 1-L/C = 0.648
R.C.(C) = (0.9*Ymax-Y)/Y*100% = 525 %



Stage	1	Int G=	7	Stage	2	Int G=	8	Stage	3	Int G=	5	Stage	4	Int G=	9

Stage	Green
1	**15**
2	**13**
3	**16**
4	**15**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	FG	Delay	Green Time Provided (s) SG	FG
P1	1,2,3	12	9	7	0	57	7
P2	4	7	5	10	8	6	10

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Straight pcu/h	Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec			
																				25					
1	1	3.65		2	15			4240			92	92	1.00	3855			3855	0.024			15	16			
2	1	3.65		1				2120		55		55	0.00	2120			2120	0.026	0.026		16	16			
2,3	1	3.65		1	15		N	1980	9	40		49	0.18	1944			1944	0.025			15	16			
12	1,2	3.50		2	12		N	4070	107			107	1.00	3618			3618	0.030			18	59			
10	2	3.50		1	18			2105			35	35	1.00	1943			1943	0.018			11	14			
11	2	3.50		1				2105		49		49	0.00	2105			2105	0.023	0.023		14	14			
7	3	3.30		1	21			2085			34	34	1.00	1946			1946	0.017			11	17			
8	3	3.30		3				6255		130		130	0.00	6255			6255	0.021			13	17			
9	3	3.30		1	12		N	1945	48			48	1.00	1729			1729	0.028	0.028		17	17			
4,5	4	3.50		1	21			2105		34	0	34	0.00	2105			2105	0.016		6	10	16			
5,6	4	3.50		1	12		N	1965	9	22		31	0.29	1896			1896	0.016	0.016		10	16			

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED

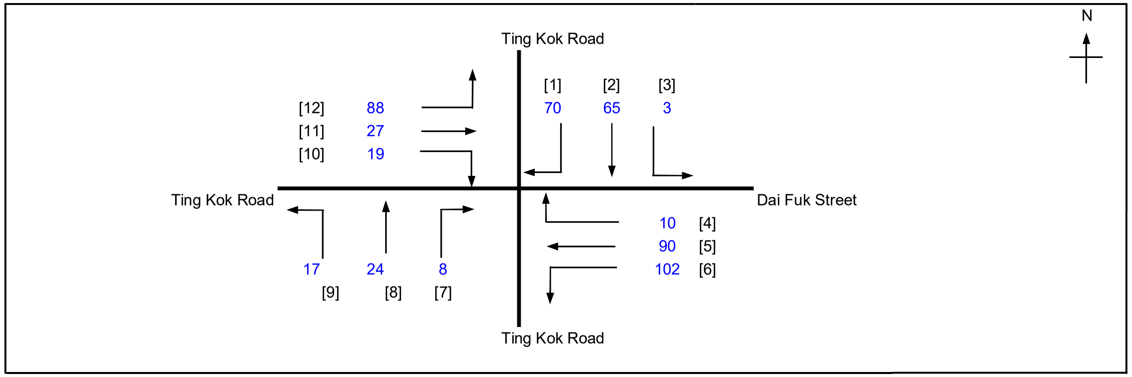
TRAFFIC SIGNAL CALCULATION

Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application

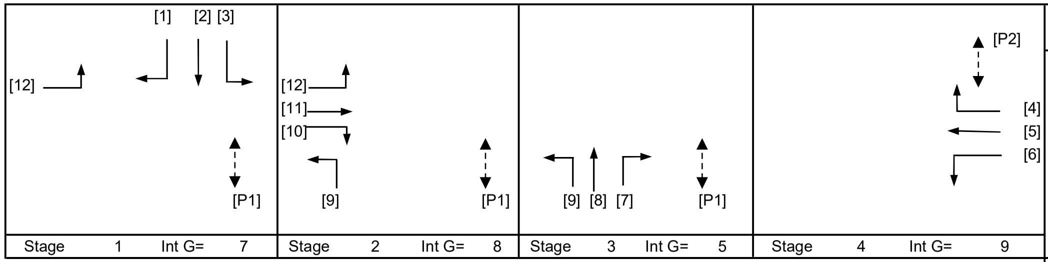
2021 Existing Leaving Peak

J1 Yuen Shin Road/Ting Kok Road/Dai Fuk Street

			INITIALS	DATE
PROJECT NO.: 40708		Prepared By:	SKL	Jun-22
FILENAME : J1_YSR_TKR_DF		Checked By:	SLN	Jun-22
REFERENCE NO.:		Reviewed By:	SLN	Jun-22



			Existing Cycle Time
No. of stages per cycle		N =	4
Cycle time		C =	88 sec
Sum(y)		Y =	0.099
Loss time		L =	25 sec
Total Flow		=	523 pcu
Co	= (1.5*L+5)/(1-Y)	=	47.2 sec
Cm	= L/(1-Y)	=	27.8 sec
Yult		=	0.713
R.C.ult	= (Yult-Y)/Y*100%	=	618.1 %
Cp	= 0.9*L/(0.9-Y)	=	28.1 sec
Ymax	= 1-L/C	=	0.716
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	549 %



Stage 1 Int G= 7 | Stage 2 Int G= 8 | Stage 3 Int G= 5 | Stage 4 Int G= 9

Stage	Green
1	**11**
2	**7**
3	**5**
4	**36**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	FG	Delay	Green Time Provided (s) SG	FG
P1	1,2,3	12	9	7	0	36	7
P2	4	7	5	10	8	27	10

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Straight pcu/h	Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
																				25		
1	1	3.65		2	15			4240			70	70	1.00	3855			3855	0.018	0.018		12	12
2	1	3.65		1				2120		35		35	0.00	2120			2120	0.017			10	12
2,3	1	3.65		1	15		N	1980	3	30		33	0.09	1962			1962	0.017			11	12
12	1,2	3.50		2	12		N	4070	88			88	1.00	3618			3618	0.024			15	70
10	2	3.50		1	18			2105			19	19	1.00	1943			1943	0.010			6	8
11	2	3.50		1				2105		27		27	0.00	2105			2105	0.013	0.013		8	8
7	3	3.30		1	21			2085			8	8	1.00	1946			1946	0.004			3	6
8	3	3.30		3				6255		24		24	0.00	6255			6255	0.004			2	6
9	3	3.30		1	12		N	1945	17			17	1.00	1729			1729	0.010	0.010		6	6
4,5	4	3.50		1	21			2105		90	10	100	0.10	2090			2090	0.048			30	37
5,6	4	3.50		1	12		N	1965	102	0		102	1.00	1747			1747	0.058	0.058		37	37

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

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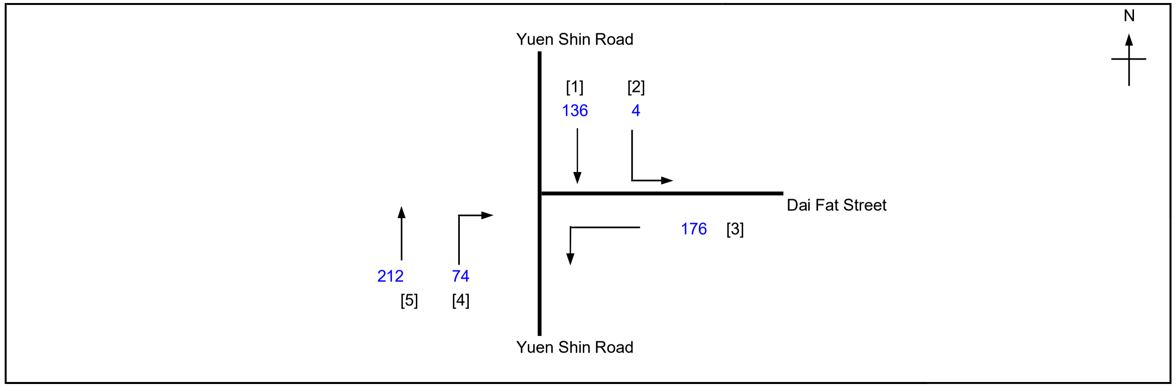
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application

J2 Yuen Shin Road/Dai Fat Street

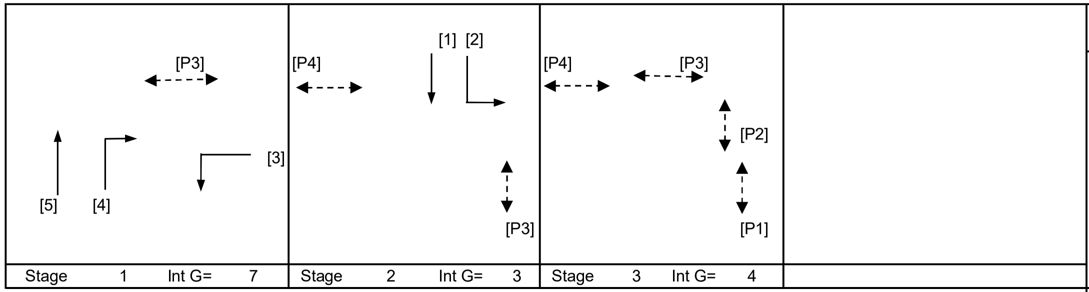
TRAFFIC SIGNAL CALCULATION

2021 Existing Returning Peak

			INITIALS	DATE
PROJECT NO.:	40708	Prepared By:	SKL	Jun-22
FILENAME :	J2_YSR_DFS.xlsx	Checked By:	SLN	Jun-22
REFERENCE NO.:		Reviewed By:	SLN	Jun-22



			Existing Cycle Time
No. of stages per cycle		N =	3
Cycle time		C =	88 sec
Sum(y)		Y =	0.087
Loss time		L =	32 sec
Total Flow		=	602 pcu
Co	= (1.5*L+5)/(1-Y)	=	58.0 sec
Cm	= L/(1-Y)	=	35.0 sec
Yult		=	0.660
R.C.ult	= (Yult-Y)/Y*100%	=	659.2 %
Cp	= 0.9*L/(0.9-Y)	=	35.4 sec
Ymax	= 1-L/C	=	0.636
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	559 %



Stage 1 Int G= 7 | Stage 2 Int G= 3 | Stage 3 Int G= 4

Stage	Green
1	**33**
2	**21**
3	**20**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	FG	Delay	Green Time Provided (s) SG	FG
P1	3	7	5	8	0	16	8
P2	3	9	5	8	7	9	8
P3	1,3	7	5	8	2	54	8
P4	2.3	8	5	8	4	36	8

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec			
																				12					
3	1	3.65		2	20		N	4100	176			176	1.00	3814			3814	0.046			30	34			
4	1	3.50		1	25			2105			74	74	1.00	1986			1986	0.037			24	34			
4,5	1	3.50		1	25			2105		110	0	110	0.00	2105			2105	0.052	0.052		34	34			
5	1	3.50		1			N	1965		102		102	0.00	1965			1965	0.052			33	34			
1	2	3.50		1				2105		73		73	0.00	2105			2105	0.035	0.035		22	22			
1,2	2	3.50		1	15		N	1965	4	63		67	0.06	1953			1953	0.034			22	22			
PED	3																			20					

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

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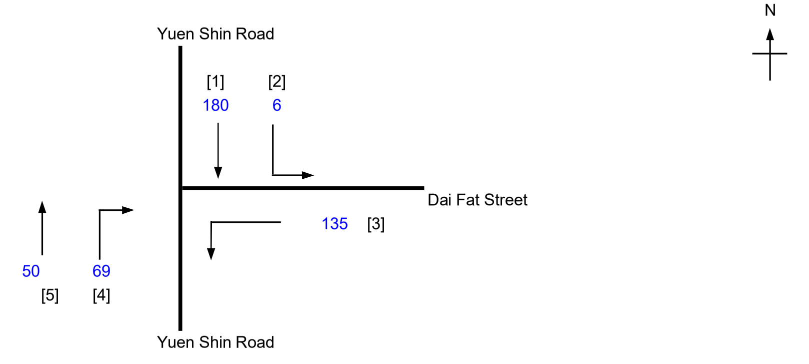
TRAFFIC SIGNAL CALCULATION

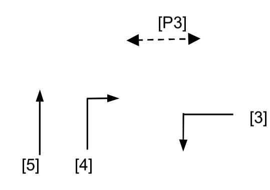
2021 Existing Leaving Peak

Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application
J2 Yuen Shin Road/Dai Fat Street

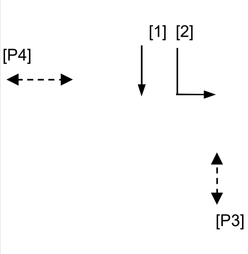
			INITIALS	DATE
PROJECT NO.:	40708	Prepared By:	SKL	Jun-22
FILENAME :	J2_YSR_DFS.xlsx	Checked By:	SLN	Jun-22
REFERENCE NO.:		Reviewed By:	SLN	Jun-22



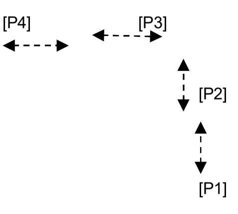
			Existing Cycle Time
No. of stages per cycle		N =	3
Cycle time		C =	88 sec
Sum(y)		Y =	0.082
Loss time		L =	32 sec
Total Flow		=	440 pcu
Co	= (1.5*L+5)/(1-Y)	=	57.7 sec
Cm	= L/(1-Y)	=	34.8 sec
Yult		=	0.660
R.C.ult	= (Yult-Y)/Y*100%	=	709.8 %
Cp	= 0.9*L/(0.9-Y)	=	35.2 sec
Ymax	= 1-L/C	=	0.636
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	603 %



Stage 1 Int G= 7



Stage 2 Int G= 3



Stage 3 Int G= 4

Stage	Green
1	**23**
2	**31**
3	**20**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	FG	Delay	Green Time Provided (s) SG	FG
P1	3	7	5	8	0	16	8
P2	3	9	5	8	7	9	8
P3	1,3	7	5	8	2	44	8
P4	2.3	8	5	8	4	46	8

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Straight pcu/h	Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
																				12		
3	1	3.65		2	20		N	4100	135			135	1.00	3814			3814	0.035	0.035		24	24
4	1	3.50		1	25			2105			39	39	1.00	1986			1986	0.020			13	24
4,5	1	3.50		1	25			2105		10	30	40	0.75	2014			2014	0.020			14	24
5	1	3.50		1			N	1965		40		40	0.00	1965			1965	0.020			14	24
1	2	3.50		1				2105		96		96	0.00	2105			2105	0.046			31	32
1,2	2	3.50		1	15		N	1965	6	84		90	0.07	1952			1952	0.046	0.046		32	32
PED	3																			20		

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

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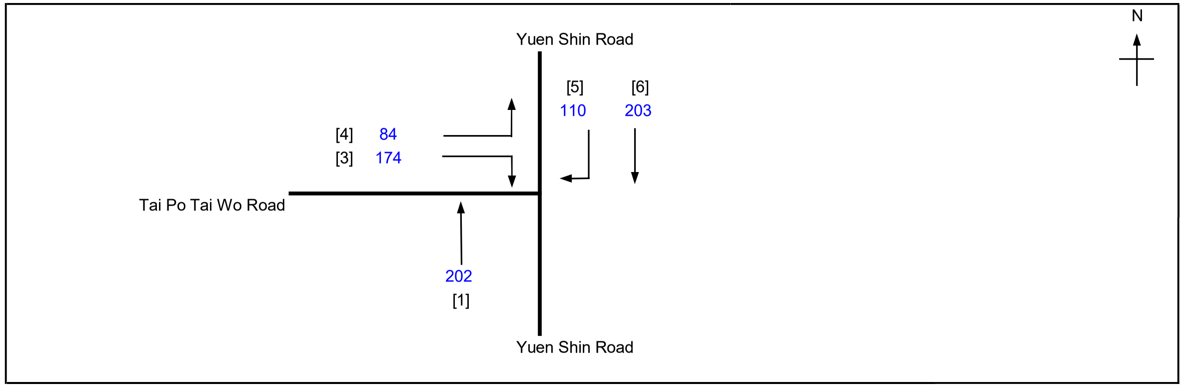
TRAFFIC SIGNAL CALCULATION

Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application

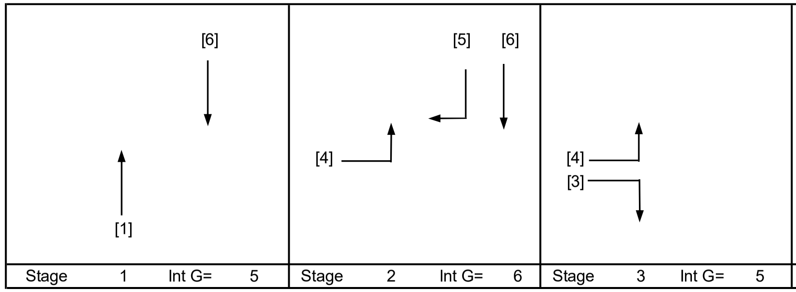
J3 Tai Po Tai Wo Road/Yuen Shin Road

2021 Existing Returning Peak

			INITIALS	DATE
PROJECT NO.: 40708		Prepared By:	SKL	Jun-22
FILENAME : J3_TPTWR_YSR		Checked By:	SLN	Jun-22
REFERENCE NO.:		Reviewed By:	SLN	Jun-22



			Existing Cycle Time	
No. of stages per cycle		N =	3	
Cycle time		C =	88	sec
Sum(y)		Y =	0.133	
Loss time		L =	13	sec
Total Flow		=	773	pcu
Co	= (1.5*L+5)/(1-Y)	=	28.3	sec
Cm	= L/(1-Y)	=	15.0	sec
Yult		=	0.803	
R.C.ult	= (Yult-Y)/Y*100%	=	501.9	%
Cp	= 0.9*L/(0.9-Y)	=	15.3	sec
Ymax	= 1-L/C	=	0.852	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	475	%



Stage 1 Int G= 5

Stage 2 Int G= 6

Stage 3 Int G= 5

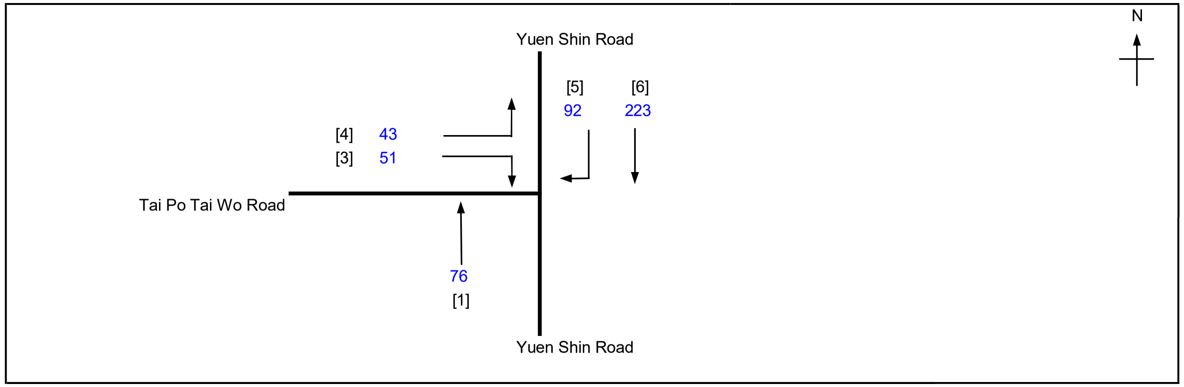
Stage	Green
1	**17**
2	**31**
3	**24**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	Green Time Required (s) FG	Green Time Required (s) Delay	Green Time Provided (s) SG	Green Time Provided (s) FG

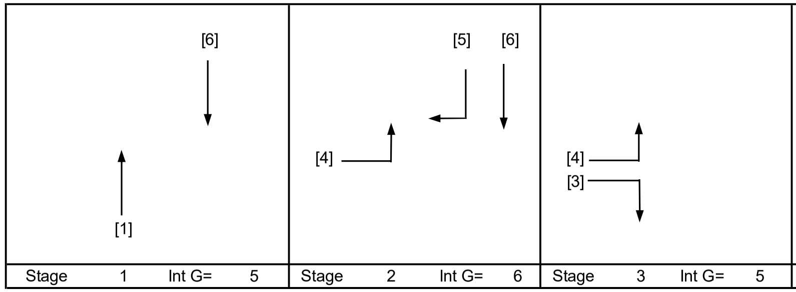
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec			
1	1	3.30		3				6255		202		202	0.00	6255			6255	0.032	0.032	13	18	18			
6	1,2	3.50		2			N	4070		203		203	0.00	4070			4070	0.050			28	54			
5	2	3.50		1	20			2105			110	110	1.00	1958			1958	0.056	0.056		32	32			
4	2,3	3.30		1	12		N	1945	84			84	1.00	1729			1729	0.049			27	63			
3	3	3.30		2	20			4170			174	174	1.00	3879			3879	0.045	0.045		25	25			

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

***LLA* CONSULTANCY LIMITED**	TRAFFIC SIGNAL CALCULATION				INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2021 Existing Leaving Peak**	PROJECT NO.:	40708	Prepared By:	SKL	Jun-22
		FILENAME :	J3_TPTWR_YSR	Checked By:	SLN	Jun-22
J3 Tai Po Tai Wo Road/Yuen Shin Road		REFERENCE NO.:		Reviewed By:	SLN	Jun-22



			Existing Cycle Time
No. of stages per cycle		N =	3
Cycle time		C =	88 sec
Sum(y)		Y =	0.072
Loss time		L =	13 sec
Total Flow		=	485 pcu
Co	= (1.5*L+5)/(1-Y)	=	26.4 sec
Cm	= L/(1-Y)	=	14.0 sec
Yult		=	0.803
R.C.ult	= (Yult-Y)/Y*100%	=	1010.2 %
Cp	= 0.9*L/(0.9-Y)	=	14.1 sec
Ymax	= 1-L/C	=	0.852
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	961 %



Stage 1 Int G= 5 | Stage 2 Int G= 6 | Stage 3 Int G= 5

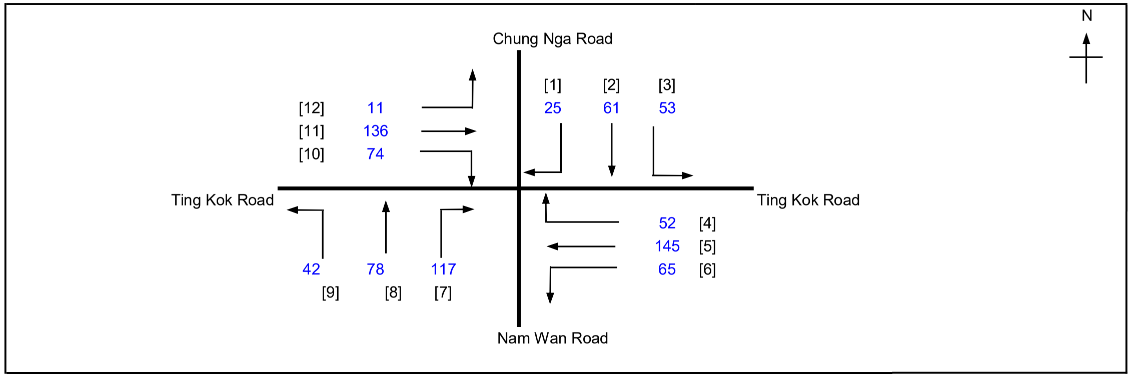
Stage	Green
1	**12**
2	**48**
3	**13**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	FG	Delay	Green Time Provided (s) SG	FG

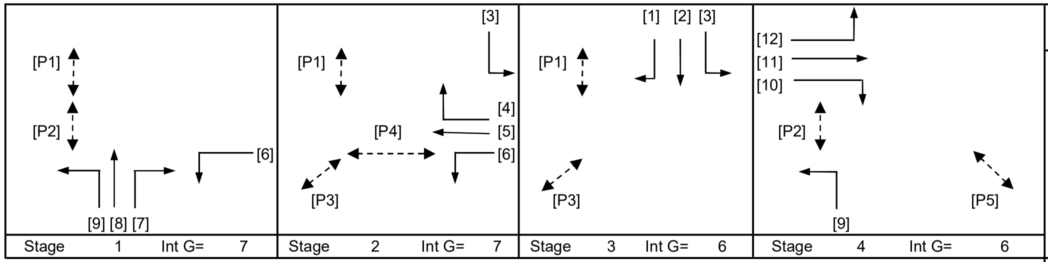
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec			
1	1	3.30		3				6255		76		76	0.00	6255			6255	0.012	0.012	13	13	13			
6	1,2	3.50		2			N	4070		223		223	0.00	4070			4070	0.055			57	65			
5	2	3.50		1	20			2105			92	92	1.00	1958			1958	0.047	0.047		49	49			
4	2,3	3.30		1	12		N	1945	43			43	1.00	1729			1729	0.025			26	68			
3	3	3.30		2	20			4170			51	51	1.00	3879			3879	0.013	0.013		14	14			

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED	TRAFFIC SIGNAL CALCULATION			INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2021 Existing Returning Peak**	PROJECT NO.: 40708	Prepared By:	SKL	Jun-22
		FILENAME : J4_TKR_NMR_CI	Checked By:	SLN	Jun-22
J4 Ting Kok Road/Nam Wan Road/Chung Nga Road		REFERENCE NO.:	Reviewed By:	SLN	Jun-22



		Existing Cycle Time
No. of stages per cycle	N =	4
Cycle time	C =	88 sec
Sum(y)	Y =	0.147
Loss time	L =	22 sec
Total Flow	=	859 pcu
Co = (1.5*L+5)/(1-Y)	=	44.5 sec
Cm = L/(1-Y)	=	25.8 sec
Yult	=	0.735
R.C.ult = (Yult-Y)/Y*100%	=	401.1 %
Cp = 0.9*L/(0.9-Y)	=	26.3 sec
Ymax = 1-L/C	=	0.750
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	360 %



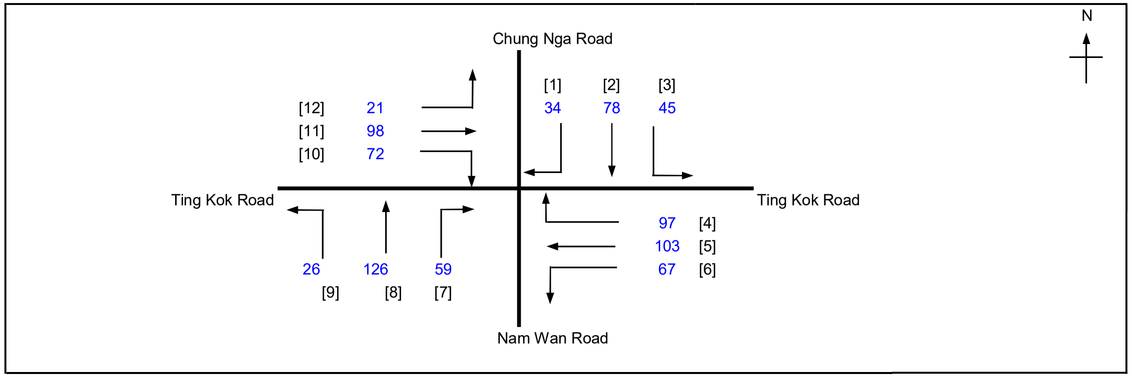
Stage	Green
1	**19**
2	**14**
3	**12**
4	**17**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	FG	Delay	Green Time Provided (s) SG	FG
P1	1,2,3	13	7	11	0	54	11
P2	1,4	10	5	8	8	33	8
P3	2,3	5	7	5	0	34	5
P4	2	21	6	9	0	12	9
P5	4	5	5	5	0	18	5

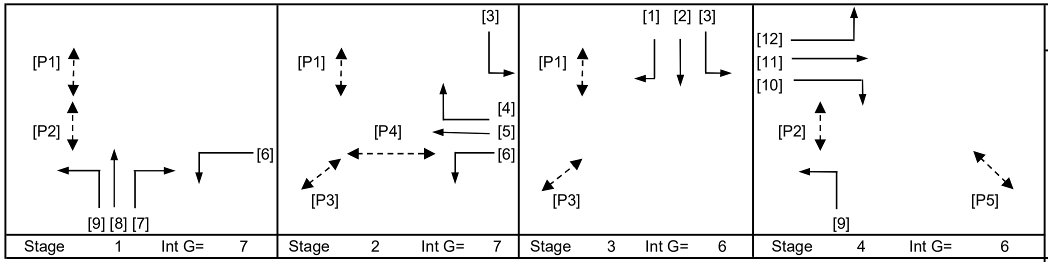
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Straight pcu/h	Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
																				22		
7	1	3.40		1	20			2095			86	86	1.00	1949			1949	0.044	0.044		20	20
7,8	1	3.40		1	20			2095		78	31	109	0.28	2051	15	450	2501	0.044			20	20
9	1,4	3.40		1	50		N	1955	42			42	1.00	1898			1898	0.022			10	37
4,5	2	3.30		1	20			2085		55	52	107	0.49	2012	30	1200	3212	0.033			15	15
5	2	3.30		1				2085		90		90	0.00	2085	15	600	2685	0.034	0.034		15	15
6	1,2	3.30		1	35		N	1945	65			65	1.00	1865			1865	0.035			16	34
1	3	3.30		1	20			2085			25	25	1.00	1940			1940	0.013			6	13
1,2	3	3.30		1	20			2085		61	0	61	0.00	2085			2085	0.029	0.029		13	13
3	2,3	3.30		1	12		N	1945	53			53	1.00	1729			1729	0.031			14	27
10	4	3.30		1	20			2085			74	74	1.00	1940			1940	0.038			17	18
10,11	4	3.30		1	20			2085		136	0	136	0.00	2085	40	1333	3418	0.040	0.040		18	18
12	4	3.30		1	12		N	1945	11			11	1.00	1729			1729	0.006			3	18

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED	TRAFFIC SIGNAL CALCULATION			INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2021 Existing Leaving Peak**	PROJECT NO.: 40708	Prepared By:	SKL	Jun-22
		FILENAME : J4_TKR_NMR_Cl	Checked By:	SLN	Jun-22
J4 Ting Kok Road/Nam Wan Road/Chung Nga Road		REFERENCE NO.:	Reviewed By:	SLN	Jun-22



		Existing Cycle Time
No. of stages per cycle	N =	4
Cycle time	C =	88 sec
Sum(y)	Y =	0.158
Loss time	L =	22 sec
Total Flow	=	826 pcu
Co = (1.5*L+5)/(1-Y)	=	45.1 sec
Cm = L/(1-Y)	=	26.1 sec
Yult	=	0.735
R.C.ult = (Yult-Y)/Y*100%	=	364.6 %
Cp = 0.9*L/(0.9-Y)	=	26.7 sec
Ymax = 1-L/C	=	0.750
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	327 %



Stage	1	Int G=	7	Stage	2	Int G=	7	Stage	3	Int G=	6	Stage	4	Int G=	6

Stage	Green
1	**20**
2	**13**
3	**15**
4	**14**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	FG	Delay	Green Time Provided (s) SG	FG
P1	1,2,3	13	7	11	0	57	11
P2	1,4	10	5	8	8	31	8
P3	2,3	5	7	5	0	36	5
P4	2	21	6	9	0	11	9
P5	4	5	5	5	0	15	5

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Straight pcu/h	Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
																				22		
7	1	3.40		1	20			2095			59	59	1.00	1949			1949	0.030			13	**21**
7,8	1	3.40		1	20			2095		126	0	126	0.00	2095	15	429	2524	0.050	0.050		21	**21**
9	1,4	3.40		1	50		N	1955	26			26	1.00	1898			1898	0.014			6	**35**
4,5	2	3.30		1	20			2085		11	97	108	0.90	1953	30	1286	3239	0.033			14	**14**
5	2	3.30		1				2085		92		92	0.00	2085	15	643	2728	0.034	0.034		14	**14**
6	1,2	3.30		1	35		N	1945	67			67	1.00	1865			1865	0.036			15	**34**
1	3	3.30		1	20			2085			34	34	1.00	1940			1940	0.018			7	**16**
1,2	3	3.30		1	20			2085		78	0	78	0.00	2085			2085	0.037	0.037		16	**16**
3	2,3	3.30		1	12		N	1945	45			45	1.00	1729			1729	0.026			11	**29**
10	4	3.30		1	20			2085			72	72	1.00	1940			1940	0.037	0.037		15	**15**
10,11	4	3.30		1	20			2085		98	0	98	0.00	2085	40	1600	3685	0.027			11	**15**
12	4	3.30		1	12		N	1945	21			21	1.00	1729			1729	0.012			5	**15**

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED

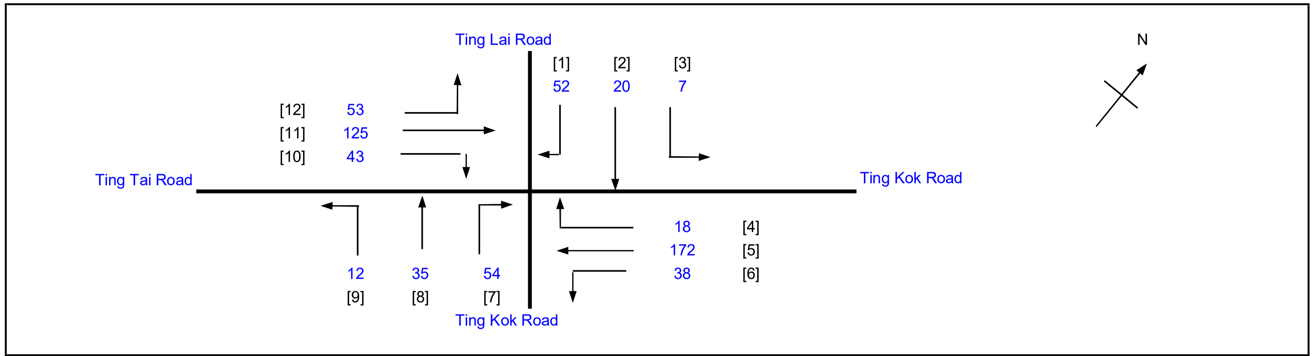
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application

J5 Ting Kok Road/Ting Tai Road/Ting Lai Road

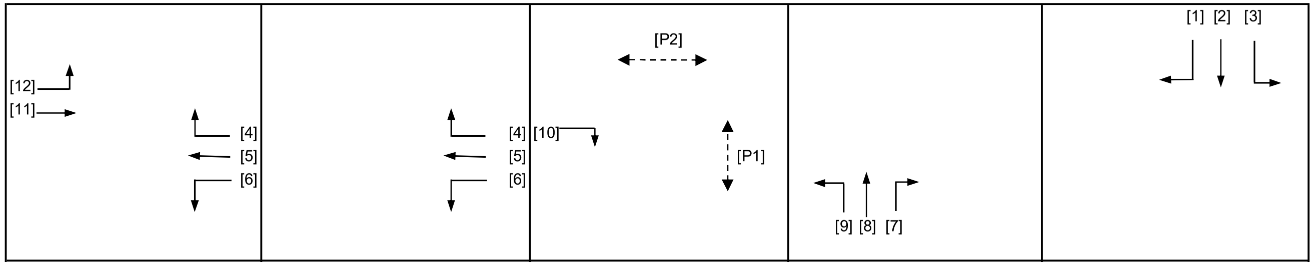
TRAFFIC SIGNAL CALCULATION

2021 Existing Returning Peak

			INITIALS	DATE
PROJECT NO.:	40708	Prepared By:	BSL	Jun-22
FILENAME :	J5_TKR_TTR_TLR.xlsx	Checked By:	SLN	Jun-22
		Reviewed By:	SLN	Jun-22



No. of stages per cycle		N =	5
Cycle time		C =	100 sec
Sum(y)		Y =	0.126
Loss time		L =	24 sec
Total Flow		=	629 pcu
Co	= (1.5*L+5)/(1-Y)	=	46.9 sec
Cm	= L/(1-Y)	=	27.4 sec
Yult		=	0.720
R.C.ult	= (Yult-Y)/Y*100%	=	473.4 %
Cp	= 0.9*L/(0.9-Y)	=	27.9 sec
Ymax	= 1-L/C	=	0.760
R.C.(C)	**= (0.9*Ymax-Y)/Y*100%**	**=**	**445 %**



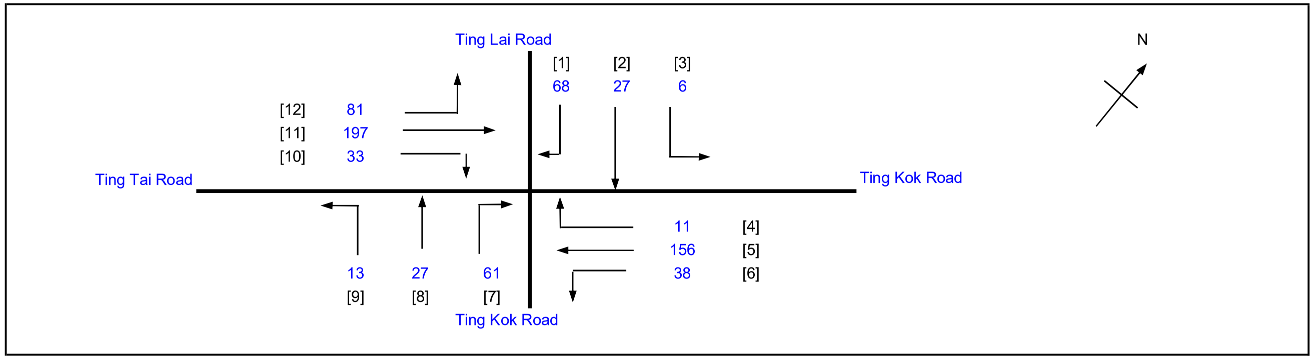
Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
G= 27	G= 5	G= 16	G= 13	G= 15
Int =	Int = 5	Int = 7	Int = 5	Int = 7

Pedestrian Phase	Stage	Width (m)	Green Time Required SG	FG	Delay	Green Time Provided SG	FG
P1	3	20	5	10	1	12	10
P2	3	17	5	8	9	6	8

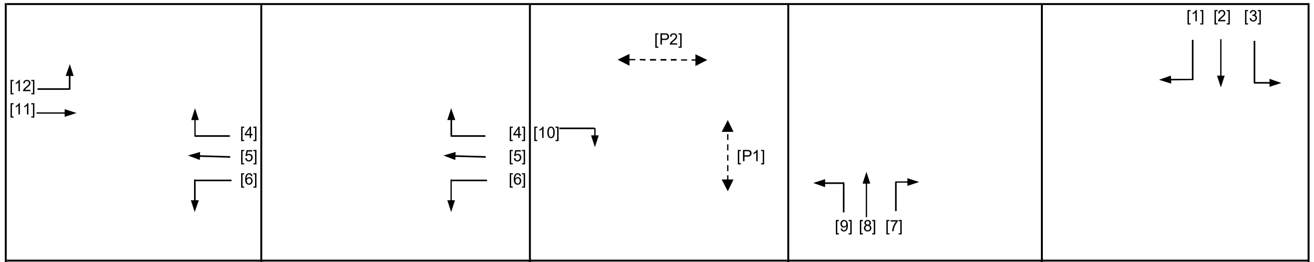
Move-ment	Stage	Lane Width m.	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement			Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare Lane m.	Flare Effect pcu/hr	Site Factor	Site Effect pcu/hr	Gradient %	Gradient Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
								Left pcu/h	Straight pcu/h	Right pcu/h															
																							20		
11,12	1	3.30	1	12		N	1945	53	29		82	0.65	1800							1800	0.046			28	28
11	1	3.30	1				2085		96		96	0.00	2085							2085	0.046			28	28
5,6	1,2	3.30	1	12		N	1945	38	61		99	0.38	1856							1856	0.053	0.053	1	32	33
5	1,2	3.30	1				2085		111		111	0.00	2085							2085	0.053			32	33
4	1,2	3.30	1	21			2085			18	18	1.00	1946							1946	0.009			6	33
10	3	3.30	1	18			2085			43	43	1.00	1925							1925	0.022	0.022	3	14	17
9	4	3.30	1	12		N	1945	12			12	1.00	1729							1729	0.007			4	14
7,8	4	3.30	1	18			2085		35	10	45	0.22	2047							2047	0.022			13	14
7	4	3.30	1	18			2085			44	44	1.00	1925							1925	0.023	0.023		14	14
2,3	5	3.30	1	10		N	1945	7	20		27	0.26	1872							1872	0.014			9	16
1	5	3.30	1	18			2085			52	52	1.00	1925							1925	0.027	0.027		16	16

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED	**TRAFFIC SIGNAL CALCULATION**				INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2021 Existing Leaving Peak**	PROJECT NO.:	40708	Prepared By:	BSL	Jun-22
		FILENAME :	J5_TKR_TTR_TLR.xlsx	Checked By:	SLN	Jun-22
J5 Ting Kok Road/Ting Tai Road/Ting Lai Road				Reviewed By:	SLN	Jun-22



No. of stages per cycle N = 5
Cycle time C = 100 sec
Sum(y) Y = 0.146
Loss time L = 34 sec
Total Flow = 718 pcu
Co = (1.5*L+5)/(1-Y) = 65.6 sec
Cm = L/(1-Y) = 39.8 sec
Yult = 0.645
R.C.ult = (Yult-Y)/Y*100% = 340.7 %
Cp = 0.9*L/(0.9-Y) = 40.6 sec
Ymax = 1-L/C = 0.660
R.C.(C) = (0.9*Ymax-Y)/Y*100% = 306 %



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
G= 31	G= 5	G= 16	G= 9	G= 15
Int =	Int = 5	Int = 7	Int = 5	Int = 7

Pedestrian Phase	Stage	Width (m)	Green Time Required SG	Green Time Required FG	Green Time Required Delay	Green Time Provided SG	Green Time Provided FG
P1	3	20	5	10	1	12	10
P2	3	17	5	8	9	6	8

Move-ment	Stage	Lane Width m.	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare Lane m.	Flare Effect pcu/hr	Site Factor	Site Effect pcu/hr	Gradient %	Gradient Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
																							20		
11,12	1	3.30	1	12		N	1945	81	48		129	0.63	1803							1803	0.072	0.072		32	32
11	1	3.30	1				2085		149		149	0.00	2085							2085	0.071			32	32
5,6	1,2	3.30	1	12		N	1945	38	53		91	0.42	1849							1849	0.049		5	22	37
5	1,2	3.30	1				2085		103		103	0.00	2085							2085	0.049			22	37
4	1,2	3.30	1	21			2085			11	11	1.00	1946							1946	0.006			3	37
10	3	3.30	1	18			2085			33	33	1.00	1925							1925	0.017	0.017	9	8	17
9	4	3.30	1	12		N	1945	13			13	1.00	1729							1729	0.008			3	10
7,8	4	3.30	1	18			2085		27	18	45	0.40	2018							2018	0.022			10	10
7	4	3.30	1	18			2085			43	43	1.00	1925							1925	0.022	0.022		10	10
2,3	5	3.30	1	10		N	1945	6	27		33	0.18	1893							1893	0.017			8	16
1	5	3.30	1	18			2085			68	68	1.00	1925							1925	0.035	0.035		16	16

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

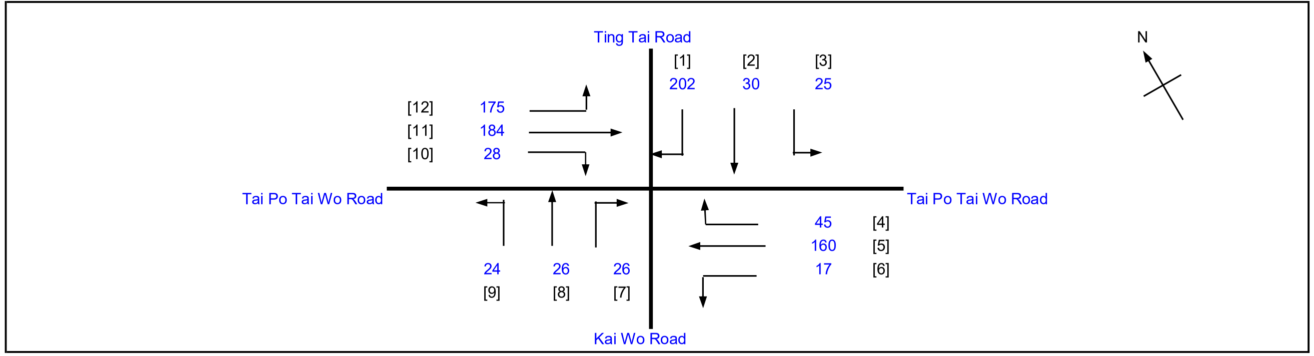
LLA CONSULTANCY LIMITED

TRAFFIC SIGNAL CALCULATION

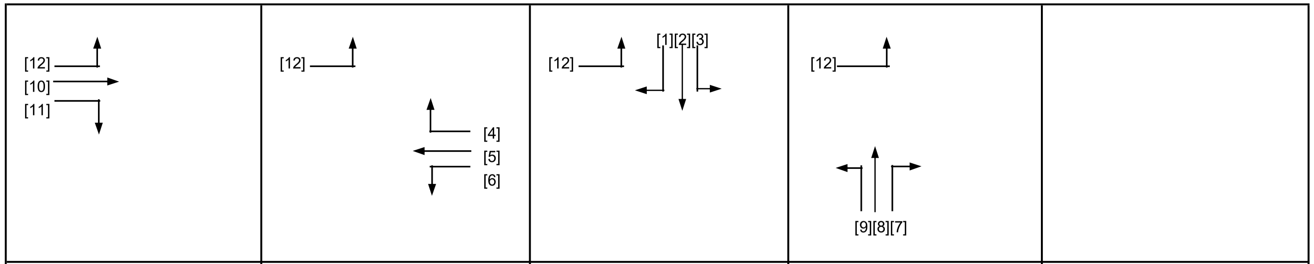
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application
J6 Ting Tai Road / Tai Po Tai Wo Road

2021 Existing Returning Peak

			INITIALS	DATE
PROJECT NO.: 40708		Prepared By:	BSL	Jun-22
FILENAME : J6_TTR_TPTWR.xlsx		Checked By:	SKL	Jun-22
		Reviewed By:	SLN	Jun-22



No. of stages per cycle		N =	4
Cycle time		C =	90 sec
Sum(y)		Y =	0.169
Loss time		L =	24 sec
Total Flow		=	942 pcu
Co	= (1.5*L+5)/(1-Y)	=	49.4 sec
Cm	= L/(1-Y)	=	28.9 sec
Yult		=	0.720
R.C.ult	= (Yult-Y)/Y*100%	=	324.9 %
Cp	= 0.9*L/(0.9-Y)	=	29.6 sec
Ymax	= 1-L/C	=	0.733
R.C.(C)	**= (0.9*Ymax-Y)/Y*100%**	**=**	**289 %**



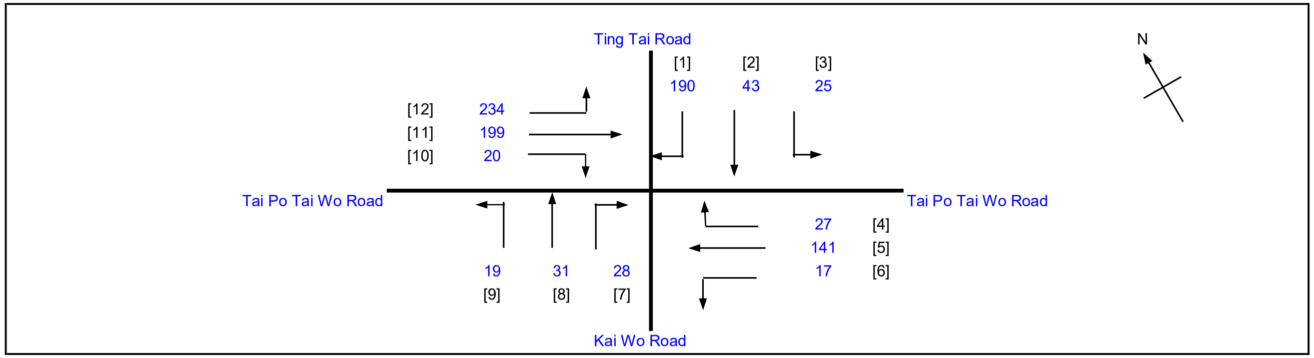
Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
G= 19	G= 14	G= 19	G= 10	G=
Int = 9	Int = 6	Int = 7	Int = 6	Int =

Pedestrian Phase	Stage	Width (m)	Green Time Required SG	Green Time Required FG	Green Time Required Delay	Green Time Provided SG	Green Time Provided FG

Move-ment	Stage	Lane Width m.	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement			Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare Lane m.	Flare Effect pcu/hr	Site Factor	Site Effect pcu/hr	Gradient %	Gradient Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec			
								Left pcu/h	Straight pcu/h	Right pcu/h																		
																							24					
12	Free	3.10	1	21		N	1925	175			175	1.00	1797							1797	0.097			38	38			
11	1	3.10	1				2065		107		107	0.00	2065							2065	0.052			20	20			
10,11	1	3.10	1	19			2065		77	28	105	0.27	2022							2022	0.052	0.052		20	20			
5.6	2	3.30	1	13		N	1945	17	53		70	0.24	1892							1892	0.037			14	15			
5	2	3.30	1				2085		79		79	0.00	2085							2085	0.038	0.038		15	15			
4,5	2	3.30	1	17			2085		28	45	73	0.62	1977							1977	0.037			14	15			
2,3	3	3.30	1	12		N	1945	25	30		55	0.45	1840							1840	0.030			12	20			
1	3	3.30	2	19			4170			202	202	1.00	3865							3865	0.052	0.052		20	20			
8,9	4	3.30	1	11		N	1945	24	26		50	0.48	1826							1826	0.027	0.027		11	11			
7	4	3.30	1	16			2085			26	26	1.00	1906							1906	0.014			5	11			

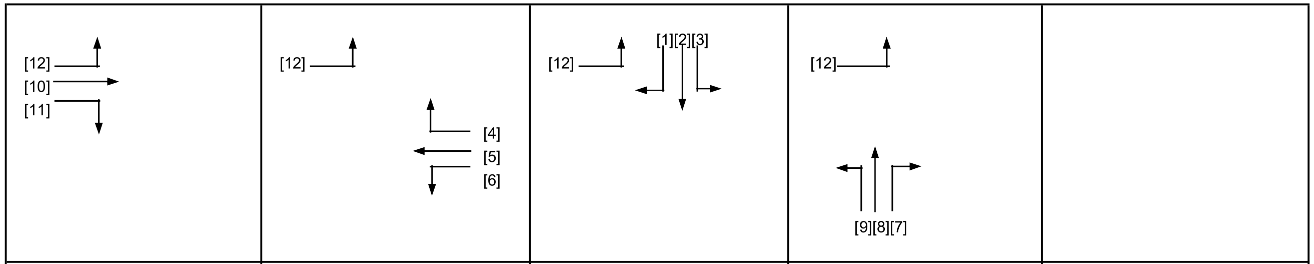
NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED	**TRAFFIC SIGNAL CALCULATION**			INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2021 Existing Leaving Peak**	PROJECT NO.: 40708	Prepared By:	BSL	Jun-22
		FILENAME : J6_TTR_TPTWR.xlsx	Checked By:	SKL	Jun-22
J6 Ting Tai Road / Tai Po Tai Wo Road			Reviewed By:	SLN	Jun-22



No. of stages per cycle N = 4
Cycle time C = 90 sec
Sum(y) Y = 0.161
Loss time L = 24 sec
Total Flow = 974 pcu
Co = (1.5*L+5)/(1-Y) = 48.9 sec
Cm = L/(1-Y) = 28.6 sec
Yult = 0.720
R.C.ult = (Yult-Y)/Y*100% = 346.4 %
Cp = 0.9*L/(0.9-Y) = 29.2 sec
Ymax = 1-L/C = 0.733

R.C.(C) = (0.9*Ymax-Y)/Y*100% = 309 %



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
G= 21	G= 12	G= 19	G= 10	G=
Int = 9	Int = 6	Int = 7	Int = 6	Int =

Pedestrian Phase	Stage	Width (m)	Green Time Required SG	FG	Delay	Green Time Provided SG	FG

Move-ment	Stage	Lane Width m.	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Straight pcu/h	Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare Lane m.	Flare Effect pcu/hr	Site Factor	Site Effect pcu/hr	Gradient %	Gradient Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec			
12	Free	3.10	1	21		N	1925	234			234	1.00	1797							1797	0.130		24	53	53			
11	1	3.10	1				2065		111		111	0.00	2065							2065	0.054	0.054		22	22			
10,11	1	3.10	1	19			2065		88	20	108	0.19	2035							2035	0.053			22	22			
5.6	2	3.30	1	13		N	1945	17	42		59	0.29	1882							1882	0.031	0.031		13	13			
5	2	3.30	1				2085		64		64	0.00	2085							2085	0.031			13	13			
4,5	2	3.30	1	17			2085		35	27	62	0.44	2008							2008	0.031			13	13			
2,3	3	3.30	1	12		N	1945	25	43		68	0.37	1860							1860	0.037			15	20			
1	3	3.30	2	19			4170			190	190	1.00	3865							3865	0.049	0.049		20	20			
8,9	4	3.30	1	11		N	1945	19	31		50	0.38	1849							1849	0.027	0.027		11	11			
7	4	3.30	1	16			2085			28	28	1.00	1906							1906	0.015			6	11			

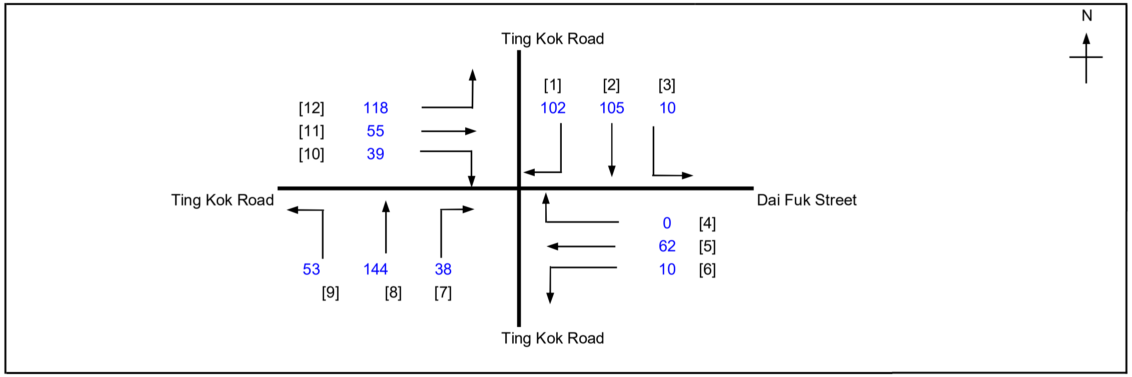
NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

Appendix D

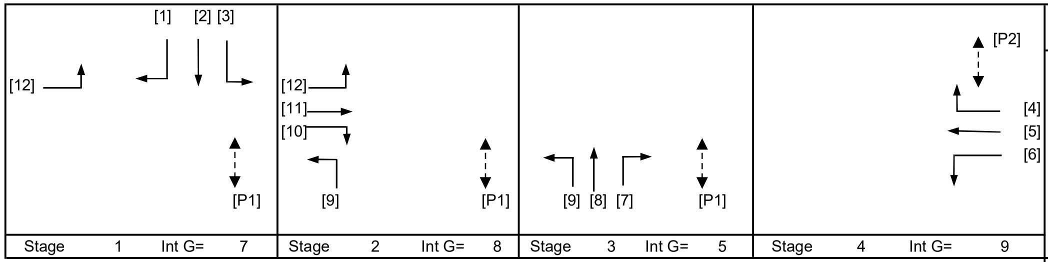
Junction Capacity Assessments

- Reference & Design Scenarios

LLA CONSULTANCY LIMITED	TRAFFIC SIGNAL CALCULATION				INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2028 Reference Returning Peak**	PROJECT NO.:	40708	Prepared By:	SKL	Jun-22
		FILENAME :	J1_YSR_TKR_DF	Checked By:	SLN	Jun-22
J1 Yuen Shin Road/Ting Kok Road/Dai Fuk Street		REFERENCE NO.:		Reviewed By:	SLN	Jun-22



			Existing Cycle Time
No. of stages per cycle		N =	4
Cycle time		C =	88 sec
Sum(y)		Y =	0.103
Loss time		L =	31 sec
Total Flow		=	736 pcu
Co	= (1.5*L+5)/(1-Y)	=	57.4 sec
Cm	= L/(1-Y)	=	34.6 sec
Yult		=	0.668
R.C.ult	= (Yult-Y)/Y*100%	=	547.2 %
Cp	= 0.9*L/(0.9-Y)	=	35.0 sec
Ymax	= 1-L/C	=	0.648
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	465 %



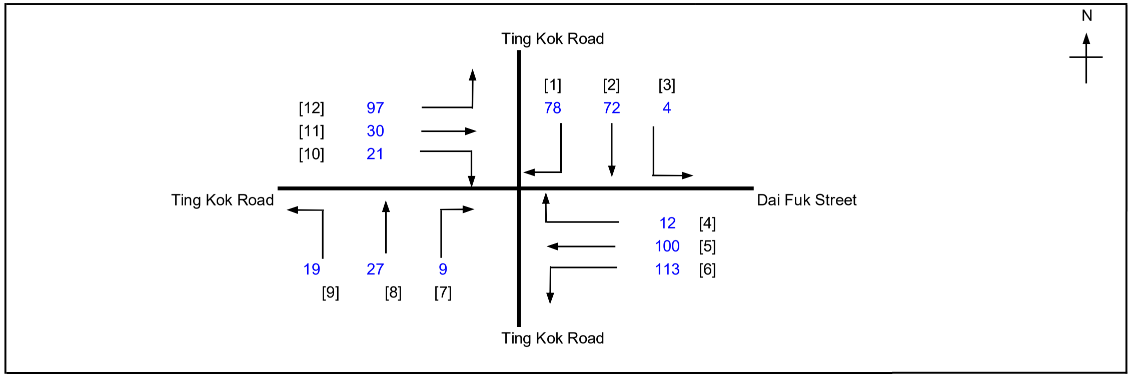
Stage	Green
1	**15**
2	**13**
3	**16**
4	**15**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	Green Time Required (s) FG	Green Time Required (s) Delay	Green Time Provided (s) SG	Green Time Provided (s) FG
P1	1,2,3	12	9	7	0	57	7
P2	4	7	5	10	8	6	10

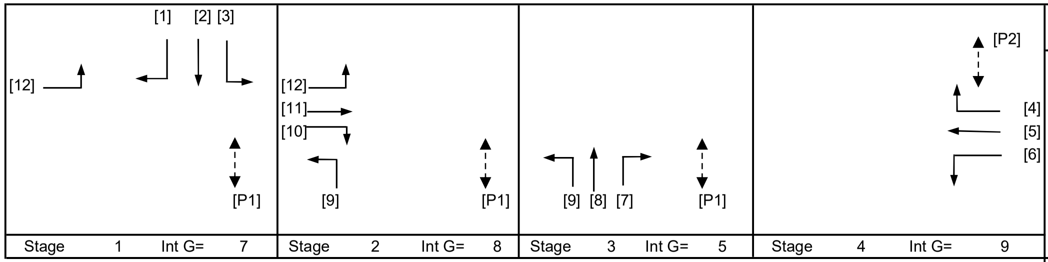
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
																				25		
1	1	3.65		2	15			4240			102	102	1.00	3855			3855	0.026			15	16
2	1	3.65		1				2120		60		60	0.00	2120			2120	0.028	0.028		16	16
2,3	1	3.65		1	15		N	1980	10	45		55	0.18	1945			1945	0.028			16	16
12	1,2	3.50		2	12		N	4070	118			118	1.00	3618			3618	0.033			18	59
10	2	3.50		1	18			2105			39	39	1.00	1943			1943	0.020			11	14
11	2	3.50		1				2105		55		55	0.00	2105			2105	0.026	0.026		14	14
7	3	3.30		1	21			2085			38	38	1.00	1946			1946	0.020			11	17
8	3	3.30		3				6255		144		144	0.00	6255			6255	0.023			13	17
9	3	3.30		1	12		N	1945	53			53	1.00	1729			1729	0.031	0.031		17	17
4,5	4	3.50		1	21			2105		38	0	38	0.00	2105			2105	0.018	0.018		10	16
5,6	4	3.50		1	12		N	1965	10	24		34	0.29	1895			1895	0.018		6	10	16

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED	TRAFFIC SIGNAL CALCULATION			INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2028 Reference Leaving Peak**	PROJECT NO.: 40708	Prepared By:	SKL	Jun-22
		FILENAME : J1_YSR_TKR_DF	Checked By:	SLN	Jun-22
J1 Yuen Shin Road/Ting Kok Road/Dai Fuk Street		REFERENCE NO.:	Reviewed By:	SLN	Jun-22



		Existing Cycle Time
No. of stages per cycle	N =	4
Cycle time	C =	88 sec
Sum(y)	Y =	0.110
Loss time	L =	25 sec
Total Flow	=	582 pcu
Co = (1.5*L+5)/(1-Y)	=	47.8 sec
Cm = L/(1-Y)	=	28.1 sec
Yult	=	0.713
R.C.ult = (Yult-Y)/Y*100%	=	546.7 %
Cp = 0.9*L/(0.9-Y)	=	28.5 sec
Ymax = 1-L/C	=	0.716
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	485 %



Stage 1 Int G= 7
Stage 2 Int G= 8
Stage 3 Int G= 5
Stage 4 Int G= 9

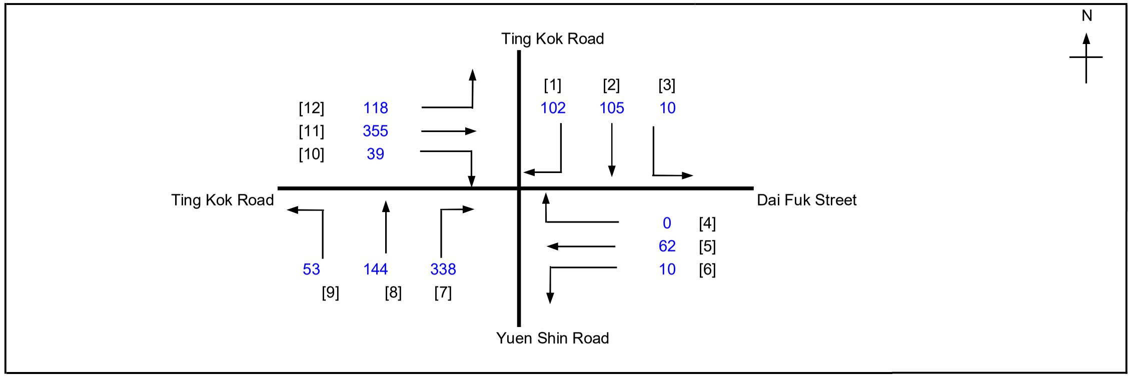
Stage	Green
1	**11**
2	**7**
3	**5**
4	**36**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	Green Time Required (s) FG	Green Time Required (s) Delay	Green Time Provided (s) SG	Green Time Provided (s) FG
P1	1,2,3	12	9	7	0	36	7
P2	4	7	5	10	8	27	10

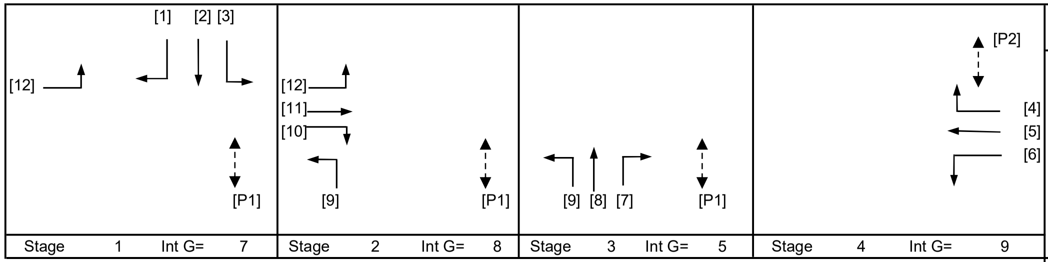
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec			
																				25					
1	1	3.65		2	15			4240			78	78	1.00	3855			3855	0.020	0.020		12	12			
2	1	3.65		1				2120		40		40	0.00	2120			2120	0.019			11	12			
2,3	1	3.65		1	15		N	1980	4	32		36	0.11	1958			1958	0.018			11	12			
12	1,2	3.50		2	12		N	4070	97			97	1.00	3618			3618	0.027			15	70			
10	2	3.50		1	18			2105			21	21	1.00	1943			1943	0.011			6	8			
11	2	3.50		1				2105		30		30	0.00	2105			2105	0.014	0.014		8	8			
7	3	3.30		1	21			2085			9	9	1.00	1946			1946	0.005			3	6			
8	3	3.30		3				6255		27		27	0.00	6255			6255	0.004			2	6			
9	3	3.30		1	12		N	1945	19			19	1.00	1729			1729	0.011	0.011		6	6			
4,5	4	3.50		1	21			2105		100	12	112	0.11	2089			2089	0.054			31	37			
5,6	4	3.50		1	12		N	1965	113	0		113	1.00	1747			1747	0.065	0.065		37	37			

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED	TRAFFIC SIGNAL CALCULATION			INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2028 Design Returning Peak**	PROJECT NO.: 40708	Prepared By:	SKL	Jun-22
		FILENAME : J1_YSR_TKR_DF	Checked By:	SLN	Jun-22
J1 Yuen Shin Road/Ting Kok Road/Dai Fuk Street		REFERENCE NO.:	Reviewed By:	SLN	Jun-22



			Existing Cycle Time
No. of stages per cycle		N =	4
Cycle time		C =	88 sec
Sum(y)		Y =	0.389
Loss time		L =	38 sec
Total Flow		=	1336 pcu
Co	= (1.5*L+5)/(1-Y)	=	101.4 sec
Cm	= L/(1-Y)	=	62.2 sec
Yult		=	0.615
R.C.ult	= (Yult-Y)/Y*100%	=	58.2 %
Cp	= 0.9*L/(0.9-Y)	=	66.9 sec
Ymax	= 1-L/C	=	0.568
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	32 %



Stage 1 Int G= 7 | Stage 2 Int G= 8 | Stage 3 Int G= 5 | Stage 4 Int G= 9

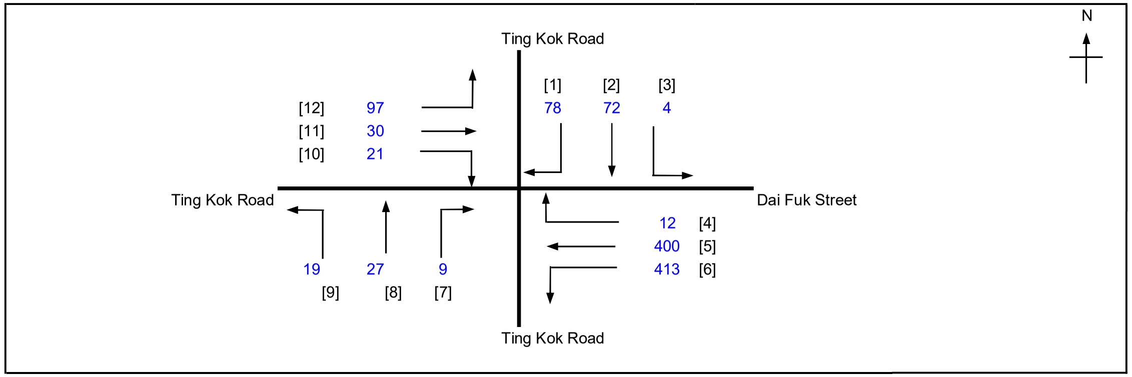
Stage	Green
1	**3**
2	**21**
3	**21**
4	**14**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	FG	Delay	Green Time Provided (s) SG	FG
P1	1,2,3	12	9	7	0	58	7
P2	4	7	5	10	8	5	10

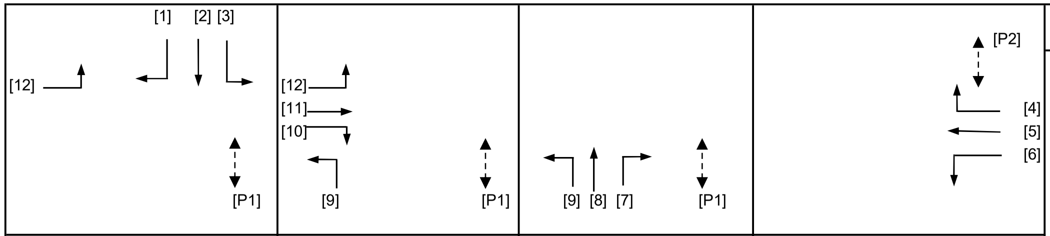
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
1	1	3.65		2	15			4240			102	102	1.00	3855			3855	0.026		25	3	4
2	1	3.65		1				2120		60		60	0.00	2120			2120	0.028	0.028		4	4
2,3	1	3.65		1	15		N	1980	10	45		55	0.18	1945			1945	0.028			4	4
12	1,2	3.50		2	12		N	4070	118			118	1.00	3618			3618	0.033			4	54
10	2	3.50		1	18			2105			39	39	1.00	1943			1943	0.020			3	22
11	2	3.50		1				2105		355		355	0.00	2105			2105	0.169	0.169		22	22
7	3	3.30		1	21			2085			338	338	1.00	1946			1946	0.174	0.174		22	22
8	3	3.30		3				6255		144		144	0.00	6255			6255	0.023			3	22
9	3	3.30		1	12		N	1945	53			53	1.00	1729			1729	0.031			4	22
4,5	4	3.50		1	21			2105		38	0	38	0.00	2105			2105	0.018	0.018	13	2	15
5,6	4	3.50		1	12		N	1965	10	24		34	0.29	1895			1895	0.018			2	15

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED	TRAFFIC SIGNAL CALCULATION				INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2028 Design Leaving Peak**	PROJECT NO.:	40708	Prepared By:	SKL	Jun-22
		FILENAME :	J1_YSR_TKR_DF	Checked By:	SLN	Jun-22
J1 Yuen Shin Road/Ting Kok Road/Dai Fuk Street		REFERENCE NO.:		Reviewed By:	SLN	Jun-22



			Existing Cycle Time
No. of stages per cycle		N =	4
Cycle time		C =	88 sec
Sum(y)		Y =	0.282
Loss time		L =	25 sec
Total Flow		=	1182 pcu
Co	= (1.5*L+5)/(1-Y)	=	59.2 sec
Cm	= L/(1-Y)	=	34.8 sec
Yult		=	0.713
R.C.ult	= (Yult-Y)/Y*100%	=	152.7 %
Cp	= 0.9*L/(0.9-Y)	=	36.4 sec
Ymax	= 1-L/C	=	0.716
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	129 %



Stage 1 Int G= 7 Stage 2 Int G= 8 Stage 3 Int G= 5 Stage 4 Int G= 9

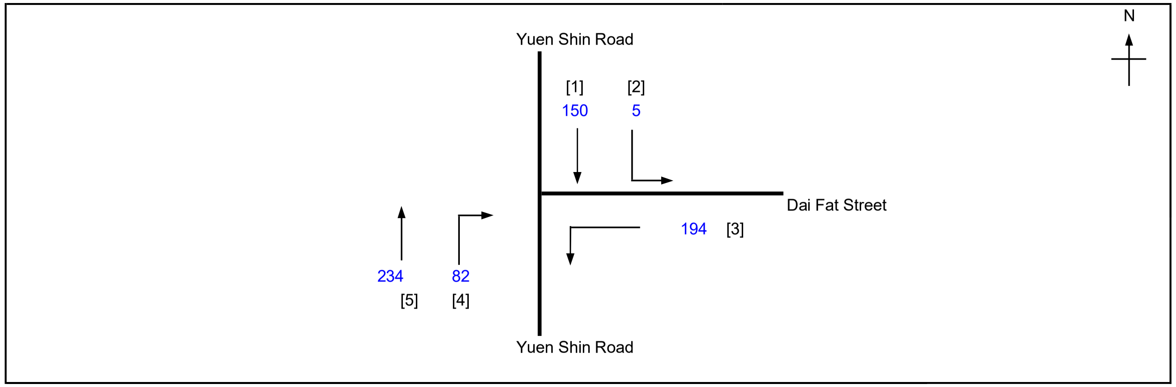
Stage	Green
1	**4**
2	**2**
3	**1**
4	**52**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	FG	Delay	Green Time Provided (s) SG	FG
P1	1,2,3	12	9	7	0	20	7
P2	4	7	5	10	8	43	10

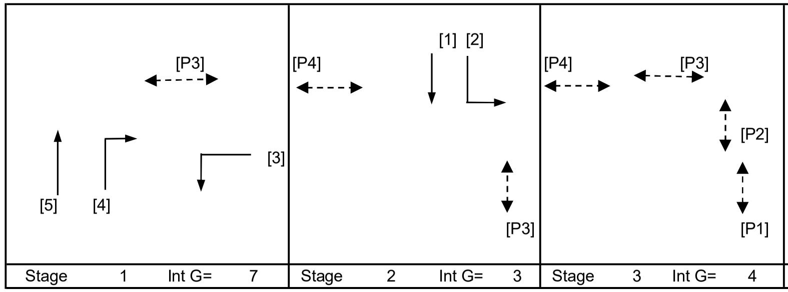
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
																				25		
1	1	3.65		2	15			4240			78	78	1.00	3855			3855	0.020	0.020		5	5
2	1	3.65		1				2120		40		40	0.00	2120			2120	0.019			4	5
2,3	1	3.65		1	15		N	1980	4	32		36	0.11	1958			1958	0.018			4	5
12	1,2	3.50		2	12		N	4070	97			97	1.00	3618			3618	0.027			6	74
10	2	3.50		1	18			2105			21	21	1.00	1943			1943	0.011			2	3
11	2	3.50		1				2105		30		30	0.00	2105			2105	0.014	0.014		3	3
7	3	3.30		1	21			2085			9	9	1.00	1946			1946	0.005			1	2
8	3	3.30		3				6255		27		27	0.00	6255			6255	0.004			1	2
9	3	3.30		1	12		N	1945	19			19	1.00	1729			1729	0.011	0.011		2	2
4,5	4	3.50		1	21			2105		400	12	412	0.03	2101			2101	0.196			44	53
5,6	4	3.50		1	12		N	1965	413	0		413	1.00	1747			1747	0.236	0.236		53	53

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED	TRAFFIC SIGNAL CALCULATION			INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2028 Reference Returning Peak**	PROJECT NO.: 40708	Prepared By:	SKL	Jun-22
		FILENAME : J2_YSR_DFS.xlsx	Checked By:	SLN	Jun-22
J2 Yuen Shin Road/Dai Fat Street		REFERENCE NO.:	Reviewed By:	SLN	Jun-22



			Existing Cycle Time
No. of stages per cycle		N =	3
Cycle time		C =	88 sec
Sum(y)		Y =	0.096
Loss time		L =	32 sec
Total Flow		=	665 pcu
Co	= (1.5*L+5)/(1-Y)	=	58.7 sec
Cm	= L/(1-Y)	=	35.4 sec
Yult		=	0.660
R.C.ult	= (Yult-Y)/Y*100%	=	584.4 %
Cp	= 0.9*L/(0.9-Y)	=	35.8 sec
Ymax	= 1-L/C	=	0.636
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	494 %



Stage 1 Int G= 7 | Stage 2 Int G= 3 | Stage 3 Int G= 4

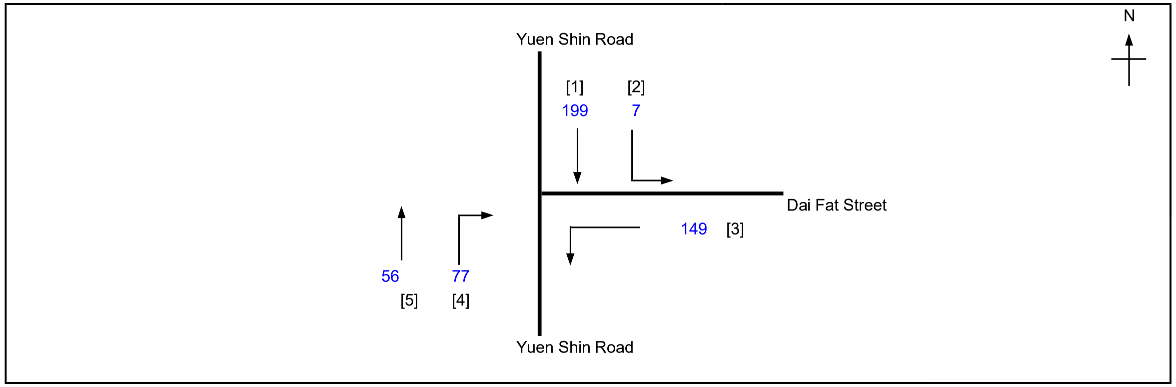
Stage	Green
1	**33**
2	**21**
3	**20**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	FG	Delay	Green Time Provided (s) SG	FG
P1	3	7	5	8	0	16	8
P2	3	9	5	8	7	9	8
P3	1,3	7	5	8	2	54	8
P4	2.3	8	5	8	4	36	8

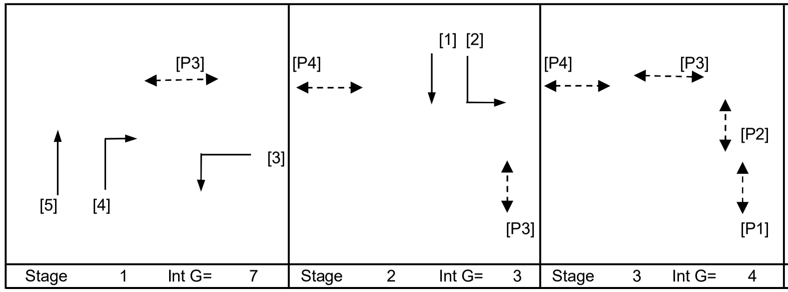
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Straight pcu/h	Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
																				12		
3	1	3.65		2	20		N	4100	194			194	1.00	3814			3814	0.051			30	34
4	1	3.50		1	25			2105			82	82	1.00	1986			1986	0.041			24	34
4,5	1	3.50		1	25			2105		122	0	122	0.00	2105			2105	0.058	0.058		34	34
5	1	3.50		1			N	1965		112		112	0.00	1965			1965	0.057			33	34
1	2	3.50		1				2105		81		81	0.00	2105			2105	0.038	0.038		22	22
1,2	2	3.50		1	15		N	1965	5	69		74	0.07	1952			1952	0.038			22	22
PED	3																			20		

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED	TRAFFIC SIGNAL CALCULATION				INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2028 Reference Leaving Peak**	PROJECT NO.:	40708	Prepared By:	SKL	Jun-22
		FILENAME :	J2_YSR_DFS.xlsx	Checked By:	SLN	Jun-22
J2 Yuen Shin Road/Dai Fat Street		REFERENCE NO.:		Reviewed By:	SLN	Jun-22



			Existing Cycle Time	
No. of stages per cycle		N =	3	
Cycle time		C =	88 sec	
Sum(y)		Y =	0.090	
Loss time		L =	32 sec	
Total Flow		=	488 pcu	
Co	= (1.5*L+5)/(1-Y)	=	58.2 sec	
Cm	= L/(1-Y)	=	35.2 sec	
Yult		=	0.660	
R.C.ult	= (Yult-Y)/Y*100%	=	634.2 %	
Cp	= 0.9*L/(0.9-Y)	=	35.6 sec	
Ymax	= 1-L/C	=	0.636	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	537 %	



Stage 1 Int G= 7 Stage 2 Int G= 3 Stage 3 Int G= 4

Stage	Green
1	**23**
2	**31**
3	**20**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s)			Green Time Provided (s)	
			SG	FG	Delay	SG	FG
P1	3	7	5	8	0	16	8
P2	3	9	5	8	7	9	8
P3	1,3	7	5	8	2	44	8
P4	2.3	8	5	8	4	46	8

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement			Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec			
									Left pcu/h	Straight pcu/h	Right pcu/h														
																				12					
3	1	3.65		2	20		N	4100	149			149	1.00	3814			3814	0.039	0.039		24	24			
4	1	3.50		1	25			2105			44	44	1.00	1986			1986	0.022			14	24			
4,5	1	3.50		1	25			2105		12	33	45	0.73	2016			2016	0.022			14	24			
5	1	3.50		1			N	1965		44		44	0.00	1965			1965	0.022			14	24			
1	2	3.50		1				2105		107		107	0.00	2105			2105	0.051	0.051		32	32			
1,2	2	3.50		1	15		N	1965	7	92		99	0.07	1951			1951	0.051			32	32			
PED	3																			20					

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED

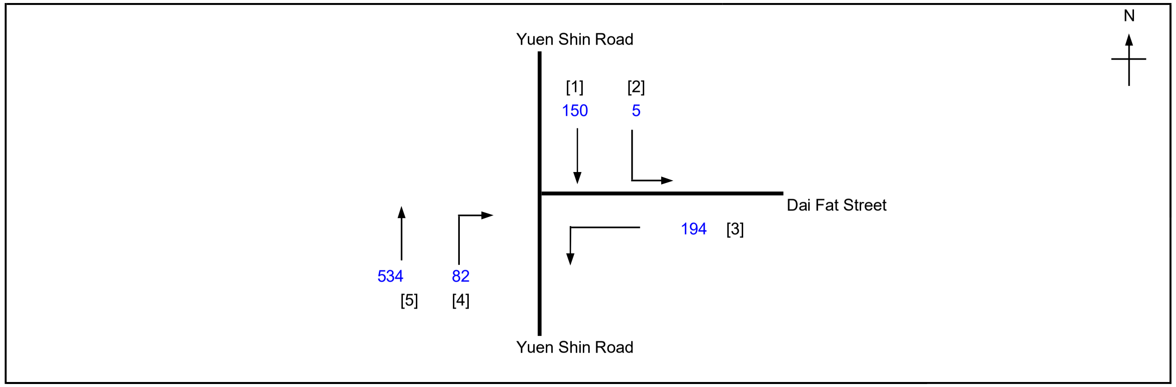
TRAFFIC SIGNAL CALCULATION

Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application

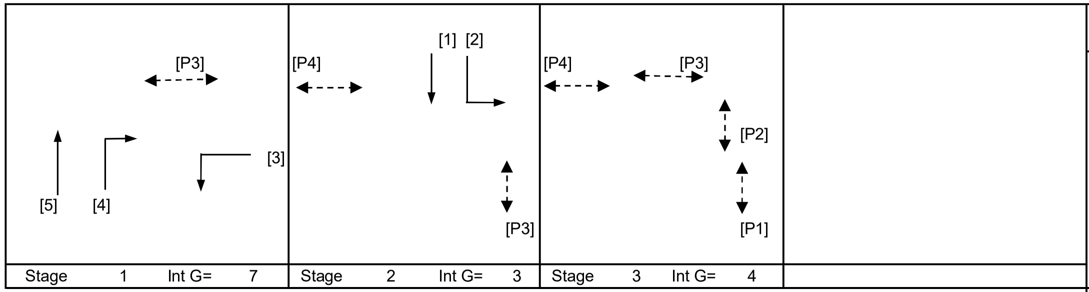
J2 Yuen Shin Road/Dai Fat Street

2028 Design Returning Peak

			INITIALS	DATE
PROJECT NO.: 40708		Prepared By:	SKL	Jun-22
FILENAME : J2_YSR_DFS.xlsx		Checked By:	SLN	Jun-22
REFERENCE NO.:		Reviewed By:	SLN	Jun-22



			Existing Cycle Time
No. of stages per cycle		N =	3
Cycle time		C =	88 sec
Sum(y)		Y =	0.170
Loss time		L =	32 sec
Total Flow		=	965 pcu
Co	= (1.5*L+5)/(1-Y)	=	63.8 sec
Cm	= L/(1-Y)	=	38.5 sec
Yult		=	0.660
R.C.ult	= (Yult-Y)/Y*100%	=	288.9 %
Cp	= 0.9*L/(0.9-Y)	=	39.4 sec
Ymax	= 1-L/C	=	0.636
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	237 %



Stage 1 Int G= 7 | Stage 2 Int G= 3 | Stage 3 Int G= 4

Stage	Green
1	**42**
2	**12**
3	**20**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	Green Time Required (s) FG	Green Time Required (s) Delay	Green Time Provided (s) SG	Green Time Provided (s) FG
P1	3	7	5	8	0	16	8
P2	3	9	5	8	7	9	8
P3	1,3	7	5	8	2	63	8
P4	2.3	8	5	8	4	27	8

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
																				12		
3	1	3.65		2	20		N	4100	194			194	1.00	3814			3814	0.051			17	43
4	1	3.50		1	25			2105			82	82	1.00	1986			1986	0.041			14	43
4,5	1	3.50		1	25			2105		276	0	276	0.00	2105			2105	0.131			43	43
5	1	3.50		1			N	1965		258		258	0.00	1965			1965	0.131	0.131		43	43
1	2	3.50		1				2105		80		80	0.00	2105			2105	0.038			13	13
1,2	2	3.50		1	15		N	1965	5	70		75	0.07	1952			1952	0.038	0.038		13	13
PED	3																			20		

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

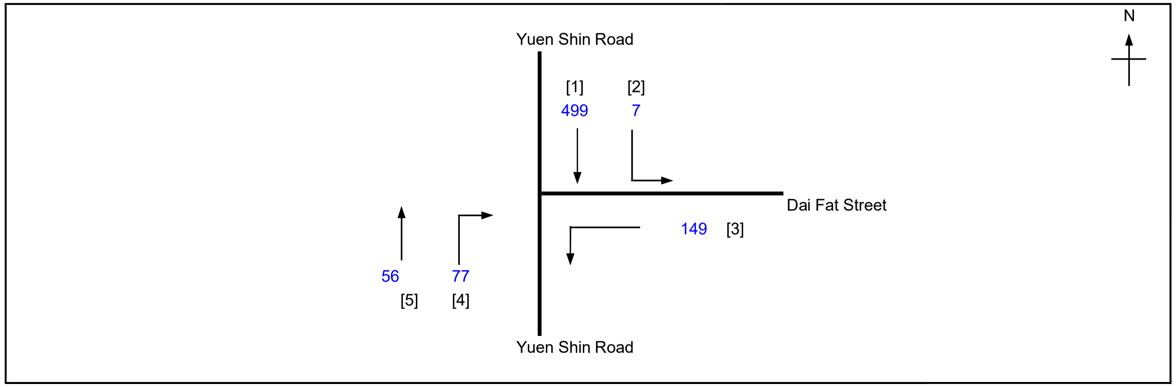
TRAFFIC SIGNAL CALCULATION

Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application

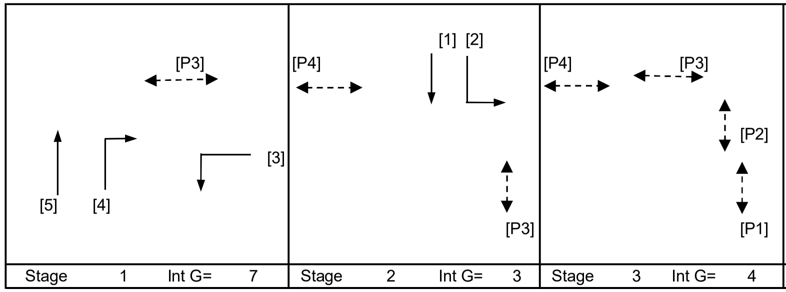
2028 Design Leaving Peak

J2 Yuen Shin Road/Dai Fat Street

			INITIALS	DATE
PROJECT NO.:	40708	Prepared By:	SKL	Jun-22
FILENAME :	J2_YSR_DFS.xlsx	Checked By:	SLN	Jun-22
REFERENCE NO.:		Reviewed By:	SLN	Jun-22



			Existing Cycle Time
No. of stages per cycle		N =	3
Cycle time		C =	88 sec
Sum(y)		Y =	0.164
Loss time		L =	32 sec
Total Flow		=	788 pcu
Co	= (1.5*L+5)/(1-Y)	=	63.4 sec
Cm	= L/(1-Y)	=	38.3 sec
Yult		=	0.660
R.C.ult	= (Yult-Y)/Y*100%	=	302.4 %
Cp	= 0.9*L/(0.9-Y)	=	39.1 sec
Ymax	= 1-L/C	=	0.636
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	249 %



Stage 1 Int G= 7 | Stage 2 Int G= 3 | Stage 3 Int G= 4

Stage	Green
1	**12**
2	**42**
3	**20**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s)			Green Time Provided (s)	
			SG	FG	Delay	SG	FG
P1	3	7	5	8	0	16	8
P2	3	9	5	8	7	9	8
P3	1,3	7	5	8	2	33	8
P4	2.3	8	5	8	4	57	8

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Straight pcu/h	Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
																				12		
3	1	3.65		2	20		N	4100	149			149	1.00	3814			3814	0.039	0.039		13	13
4	1	3.50		1	25			2105			44	44	1.00	1986			1986	0.022			8	13
4,5	1	3.50		1	25			2105		12	33	45	0.73	2016			2016	0.022			8	13
5	1	3.50		1			N	1965		44		44	0.00	1965			1965	0.022			8	13
1	2	3.50		1				2105		263		263	0.00	2105			2105	0.125	0.125		43	43
1,2	2	3.50		1	15		N	1965	7	236		243	0.03	1959			1959	0.124			42	43
PED	3																			20		

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

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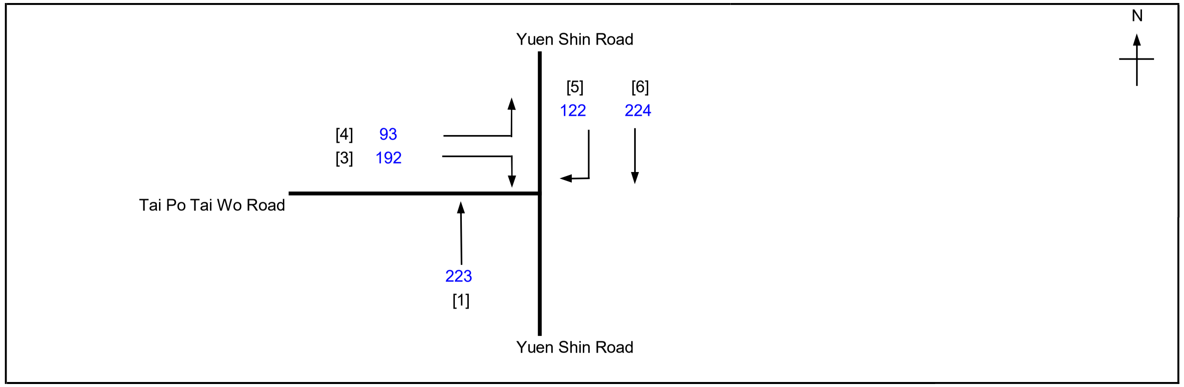
TRAFFIC SIGNAL CALCULATION

Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application

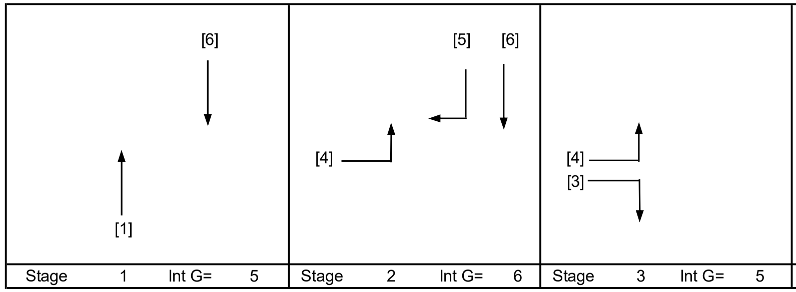
J3 J/O Tai Po Tai Wo Road/Yuen Shin Road

2028 Reference Returning Peak

			INITIALS	DATE
PROJECT NO.: 40708		Prepared By:	SKL	Jun-22
FILENAME : J3_TPTWR_YSR		Checked By:	SLN	Jun-22
REFERENCE NO.:		Reviewed By:	SLN	Jun-22



		Existing Cycle Time
No. of stages per cycle	N =	3
Cycle time	C =	88 sec
Sum(y)	Y =	0.147
Loss time	L =	13 sec
Total Flow	=	854 pcu
Co = (1.5*L+5)/(1-Y)	=	28.7 sec
Cm = L/(1-Y)	=	15.2 sec
Yult	=	0.803
R.C.ult = (Yult-Y)/Y*100%	=	444.2 %
Cp = 0.9*L/(0.9-Y)	=	15.5 sec
Ymax = 1-L/C	=	0.852
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	420 %



Stage 1 Int G= 5 | Stage 2 Int G= 6 | Stage 3 Int G= 5

Stage	Green
1	**17**
2	**31**
3	**24**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	Green Time Required (s) FG	Green Time Required (s) Delay	Green Time Provided (s) SG	Green Time Provided (s) FG

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec			
1	1	3.30		3				6255		223		223	0.00	6255			6255	0.036	0.036	13	18	**18**			
6	1,2	3.50		2			N	4070		224		224	0.00	4070			4070	0.055			28	**54**			
5	2	3.50		1	20			2105			122	122	1.00	1958			1958	0.062	0.062		32	**32**			
4	2,3	3.30		1	12		N	1945	93			93	1.00	1729			1729	0.054			27	**63**			
3	3	3.30		2	20			4170			192	192	1.00	3879			3879	0.049	0.049		25	**25**			

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED

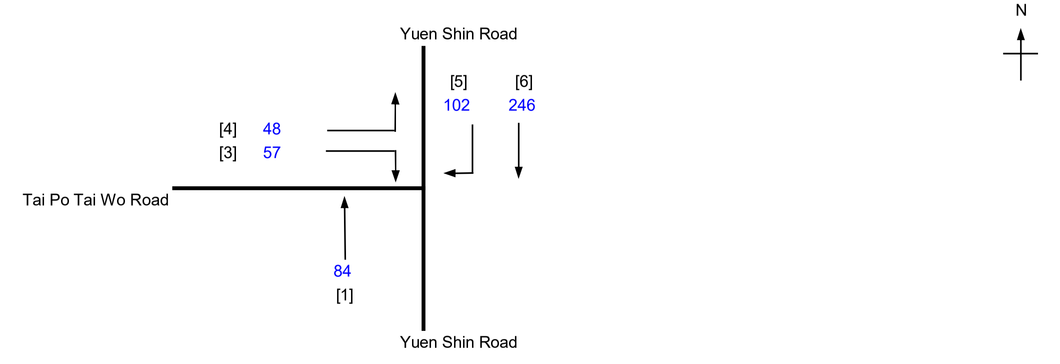
TRAFFIC SIGNAL CALCULATION

Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application

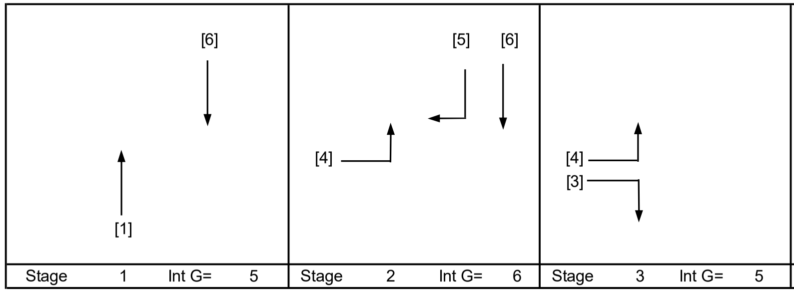
2028 Reference Leaving Peak

J3 Tai Po Tai Wo Road/Yuen Shin Road

			INITIALS	DATE
PROJECT NO.:	40708	Prepared By:	SKL	Jun-22
FILENAME :	J3_TPTWR_YSR	Checked By:	SLN	Jun-22
REFERENCE NO.:		Reviewed By:	SLN	Jun-22



			Existing Cycle Time
No. of stages per cycle		N =	3
Cycle time		C =	88 sec
Sum(y)		Y =	0.080
Loss time		L =	13 sec
Total Flow		=	537 pcu
Co	= (1.5*L+5)/(1-Y)	=	26.6 sec
Cm	= L/(1-Y)	=	14.1 sec
Yult		=	0.803
R.C.ult	= (Yult-Y)/Y*100%	=	900.5 %
Cp	= 0.9*L/(0.9-Y)	=	14.3 sec
Ymax	= 1-L/C	=	0.852
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	856 %



Stage 1 Int G= 5 | Stage 2 Int G= 6 | Stage 3 Int G= 5

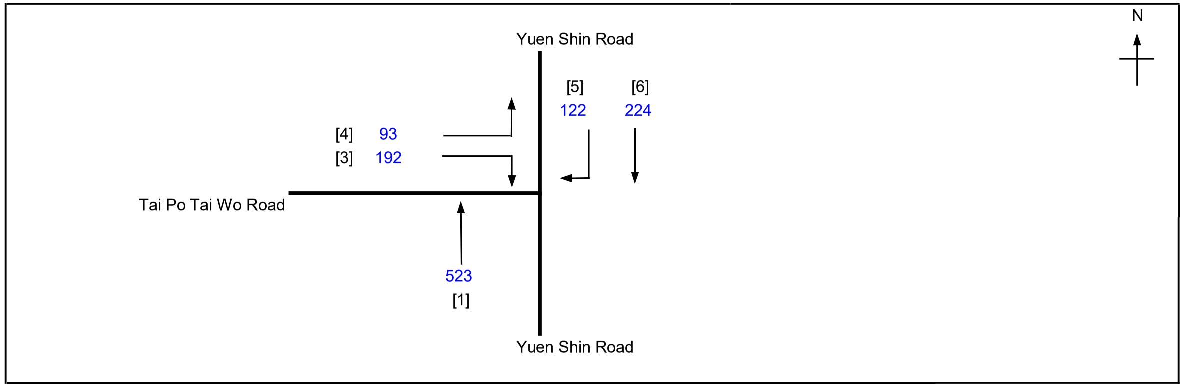
Stage	Green
1	**12**
2	**48**
3	**13**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	FG	Delay	Green Time Provided (s) SG	FG

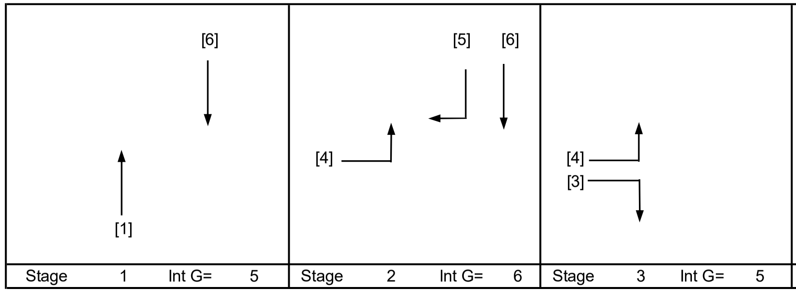
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec			
1	1	3.30		3				6255		84		84	0.00	6255			6255	0.013	0.013	13	13	13			
6	1,2	3.50		2			N	4070		246		246	0.00	4070			4070	0.060			57	65			
5	2	3.50		1	20			2105			102	102	1.00	1958			1958	0.052	0.052		49	49			
4	2,3	3.30		1	12		N	1945	48			48	1.00	1729			1729	0.028			26	68			
3	3	3.30		2	20			4170			57	57	1.00	3879			3879	0.015	0.015		14	14			

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

***LLA* CONSULTANCY LIMITED**	TRAFFIC SIGNAL CALCULATION			INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2028 Design Returning Peak**	PROJECT NO.: 40708	Prepared By:	SKL	Jun-22
		FILENAME : J3_TPTWR_YSR	Checked By:	SLN	Jun-22
J3 J/O Tai Po Tai Wo Road/Yuen Shin Road		REFERENCE NO.:	Reviewed By:	SLN	Jun-22



			Existing Cycle Time
No. of stages per cycle		N =	3
Cycle time		C =	88 sec
Sum(y)		Y =	0.195
Loss time		L =	13 sec
Total Flow		=	1154 pcu
Co	= (1.5*L+5)/(1-Y)	=	30.5 sec
Cm	= L/(1-Y)	=	16.2 sec
Yult		=	0.803
R.C.ult	= (Yult-Y)/Y*100%	=	310.7 %
Cp	= 0.9*L/(0.9-Y)	=	16.6 sec
Ymax	= 1-L/C	=	0.852
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	293 %



Stage	Green
1	**31**
2	**23**
3	**18**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	FG	Delay	Green Time Provided (s) SG	FG

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
																				13		
1	1	3.30		3				6255		523		523	0.00	6255			6255	0.084	0.084		32	32
6	1,2	3.50		2			N	4070		224		224	0.00	4070			4070	0.055			21	60
5	2	3.50		1	20			2105			122	122	1.00	1958			1958	0.062	0.062		24	24
4	2,3	3.30		1	12		N	1945	93			93	1.00	1729			1729	0.054			21	49
3	3	3.30		2	20			4170			192	192	1.00	3879			3879	0.049	0.049		19	19

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

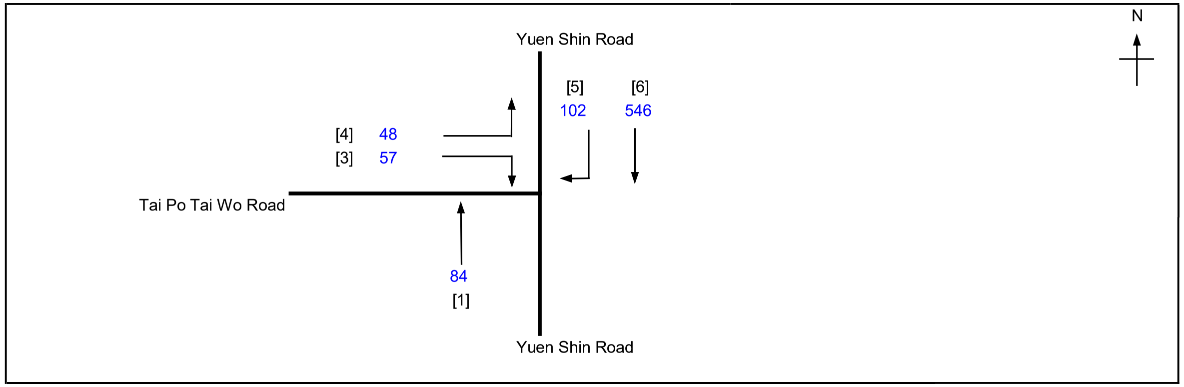
LLA CONSULTANCY LIMITED

TRAFFIC SIGNAL CALCULATION

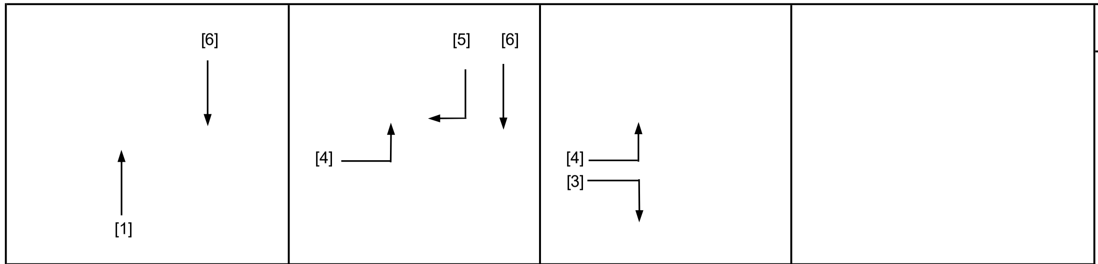
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application
J3 Tai Po Tai Wo Road/Yuen Shin Road

2028 Design Leaving Peak

			INITIALS	DATE
PROJECT NO.: 40708		Prepared By:	SKL	Jun-22
FILENAME : J3_TPTWR_YSR		Checked By:	SLN	Jun-22
REFERENCE NO.:		Reviewed By:	SLN	Jun-22



			Existing Cycle Time
No. of stages per cycle		N =	3
Cycle time		C =	88 sec
Sum(y)		Y =	0.149
Loss time		L =	9 sec
Total Flow		=	837 pcu
Co	= (1.5*L+5)/(1-Y)	=	21.7 sec
Cm	= L/(1-Y)	=	10.6 sec
Yult		=	0.833
R.C.ult	= (Yult-Y)/Y*100%	=	459.3 %
Cp	= 0.9*L/(0.9-Y)	=	10.8 sec
Ymax	= 1-L/C	=	0.898
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	443 %



Stage 1 Int G=
Stage 2 Int G= 6
Stage 3 Int G= 5

Stage	Green
1	**6**
2	**27**
3	**7**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	FG	Delay	Green Time Provided (s) SG	FG

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Straight pcu/h	Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
1	1	3.30		3				6255		84		84	0.00	6255			6255	0.013		9	7	7
6	1,2	3.50		2			N	4070		546		546	0.00	4070			4070	0.134	0.134		71	34
5	2	3.50		1	20			2105			102	102	1.00	1958			1958	0.052			28	28
4	2,3	3.30		1	12		N	1945	48			48	1.00	1729			1729	0.028			15	41
3	3	3.30		2	20			4170			57	57	1.00	3879			3879	0.015	0.015		8	8

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED

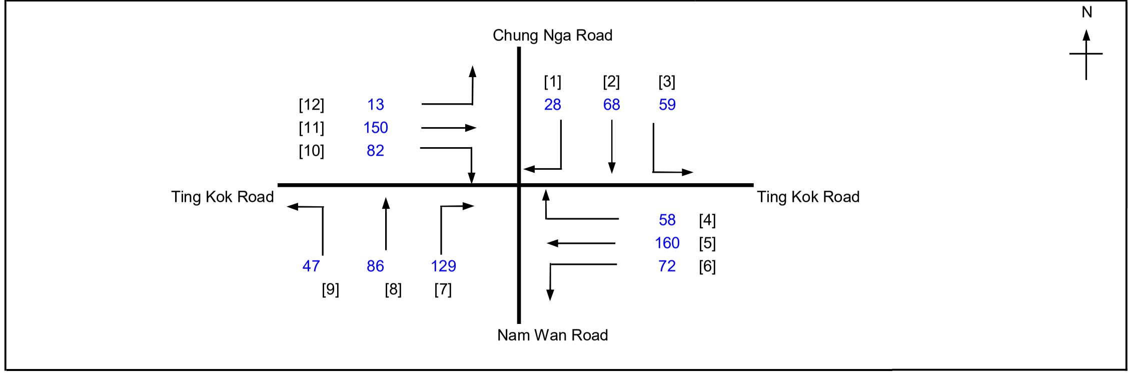
TRAFFIC SIGNAL CALCULATION

2028 Reference Returning Peak

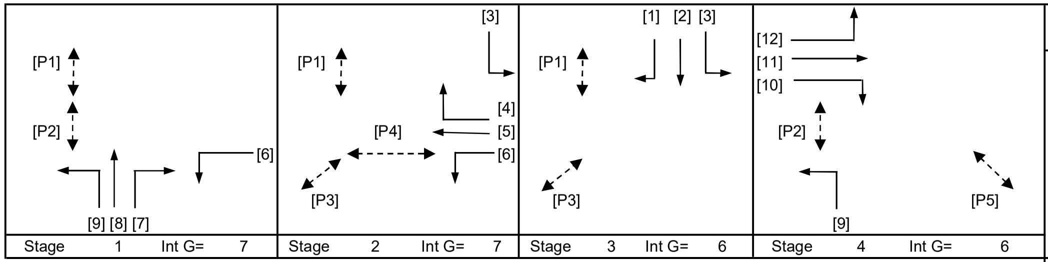
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application

J4 Ting Kok Road/Nam Wan Road/Chung Nga Road

			INITIALS	DATE
PROJECT NO.:	40708	Prepared By:	SKL	Jun-22
FILENAME :	J4_TKR_NMR_CI	Checked By:	SLN	Jun-22
REFERENCE NO.:		Reviewed By:	SLN	Jun-22



		Existing Cycle Time
No. of stages per cycle	N =	4
Cycle time	C =	88 sec
Sum(y)	Y =	0.162
Loss time	L =	22 sec
Total Flow	=	952 pcu
Co = (1.5*L+5)/(1-Y)	=	45.3 sec
Cm = L/(1-Y)	=	26.3 sec
Yult	=	0.735
R.C.ult = (Yult-Y)/Y*100%	=	353.9 %
Cp = 0.9*L/(0.9-Y)	=	26.8 sec
Ymax = 1-L/C	=	0.750
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	317 %



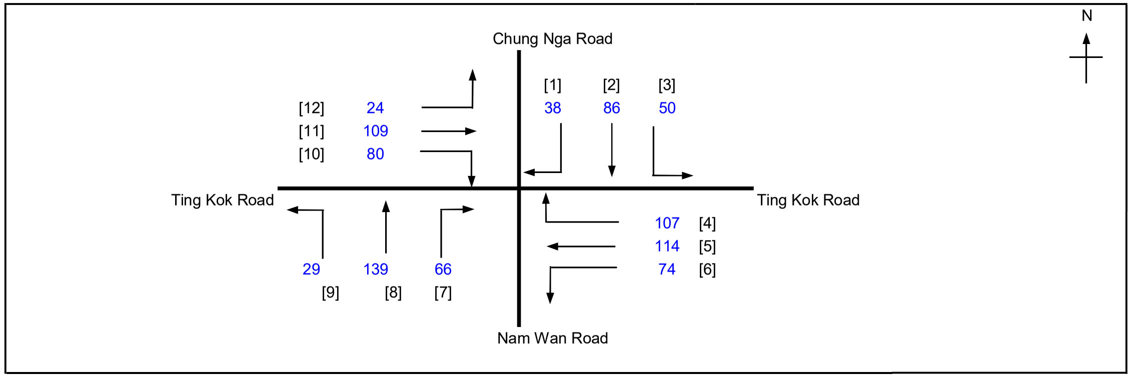
Stage	Green
1	**19**
2	**14**
3	**12**
4	**17**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	Green Time Required (s) FG	Green Time Required (s) Delay	Green Time Provided (s) SG	Green Time Provided (s) FG
P1	1,2,3	13	7	11	0	54	11
P2	1,4	10	5	8	8	33	8
P3	2,3	5	7	5	0	34	5
P4	2	21	6	9	0	12	9
P5	4	5	5	5	0	18	5

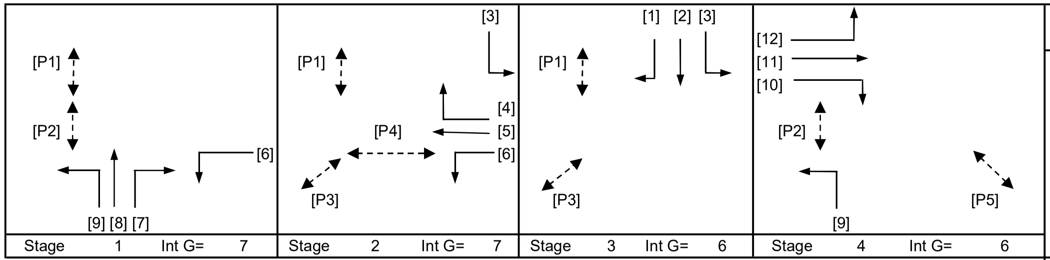
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
																				22		
7	1	3.40		1	20			2095			94	94	1.00	1949			1949	0.048			20	20
7,8	1	3.40		1	20			2095		86	35	121	0.29	2051	15	450	2501	0.048	0.048		20	20
9	1,4	3.40		1	50		N	1955	47			47	1.00	1898			1898	0.025			10	37
4,5	2	3.30		1	20			2085		61	58	119	0.49	2011	30	1200	3211	0.037	0.037		15	15
5	2	3.30		1				2085		99		99	0.00	2085	15	600	2685	0.037			15	15
6	1,2	3.30		1	35		N	1945	72			72	1.00	1865			1865	0.039			16	34
1	3	3.30		1	20			2085			28	28	1.00	1940			1940	0.014			6	13
1,2	3	3.30		1	20			2085		68	0	68	0.00	2085			2085	0.033	0.033		13	13
3	2,3	3.30		1	12		N	1945	59			59	1.00	1729			1729	0.034			14	27
10	4	3.30		1	20			2085			82	82	1.00	1940			1940	0.042			17	18
10,11	4	3.30		1	20			2085		150	0	150	0.00	2085	40	1333	3418	0.044	0.044		18	18
12	4	3.30		1	12		N	1945	13			13	1.00	1729			1729	0.008			3	18

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

***LLA* CONSULTANCY LIMITED**	TRAFFIC SIGNAL CALCULATION			INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2028 Reference Leaving Peak**	PROJECT NO.: 40708	Prepared By:	SKL	Jun-22
		FILENAME : J4_TKR_NMR_CI	Checked By:	SLN	Jun-22
J4 Ting Kok Road/Nam Wan Road/Chung Nga Road		REFERENCE NO.:	Reviewed By:	SLN	Jun-22



		Existing Cycle Time
No. of stages per cycle	N =	4
Cycle time	C =	88 sec
Sum(y)	Y =	0.167
Loss time	L =	22 sec
Total Flow	=	916 pcu
Co = (1.5*L+5)/(1-Y)	=	45.6 sec
Cm = L/(1-Y)	=	26.4 sec
Yult	=	0.735
R.C.ult = (Yult-Y)/Y*100%	=	339.5 %
Cp = 0.9*L/(0.9-Y)	=	27.0 sec
Ymax = 1-L/C	=	0.750
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	304 %



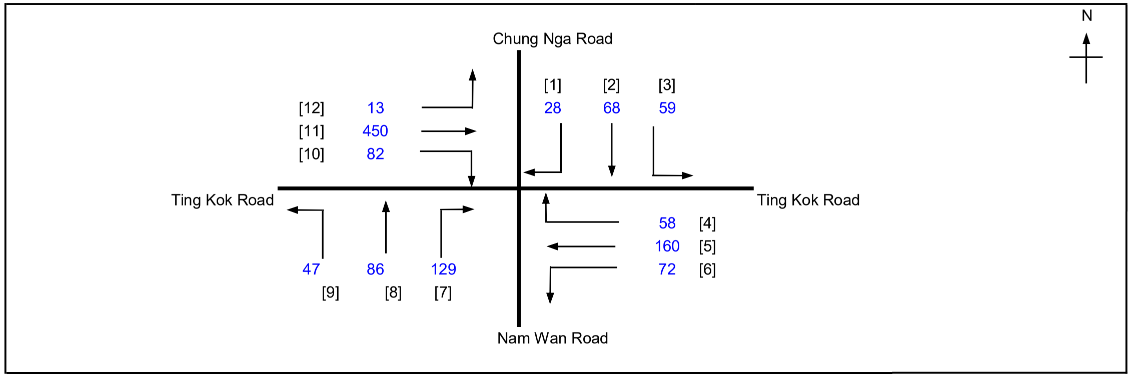
Stage	Green
1	**21**
2	**14**
3	**15**
4	**12**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s)			Green Time Provided (s)	
			SG	FG	Delay	SG	FG
P1	1,2,3	13	7	11	0	59	11
P2	1,4	10	5	8	8	30	8
P3	2,3	5	7	5	0	37	5
P4	2	21	6	9	0	12	9
P5	4	5	5	5	0	13	5

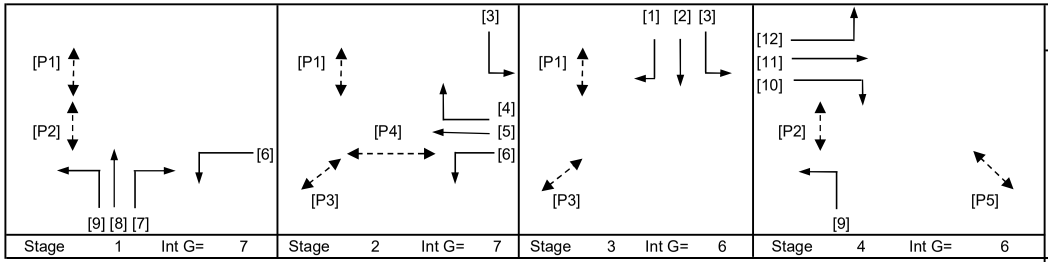
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec			
																				22					
7	1	3.40		1	20			2095			66	66	1.00	1949			1949	0.034			13	22			
7,8	1	3.40		1	20			2095		139	0	139	0.00	2095	15	409	2504	0.056	0.056		22	22			
9	1,4	3.40		1	50		N	1955	29			29	1.00	1898			1898	0.015			6	34			
4,5	2	3.30		1	20			2085		12	107	119	0.90	1953	30	1200	3153	0.038			15	15			
5	2	3.30		1				2085		102		102	0.00	2085	15	600	2685	0.038	0.038		15	15			
6	1,2	3.30		1	35		N	1945	74			74	1.00	1865			1865	0.040			16	36			
1	3	3.30		1	20			2085			38	38	1.00	1940			1940	0.020			8	16			
1,2	3	3.30		1	20			2085		86	0	86	0.00	2085			2085	0.041	0.041		16	16			
3	2,3	3.30		1	12		N	1945	50			50	1.00	1729			1729	0.029			11	30			
10	4	3.30		1	20			2085			63	63	1.00	1940			1940	0.032	0.032		13	13			
10,11	4	3.30		1	20			2085		109	17	126	0.13	2064	40	1846	3910	0.032			13	13			
12	4	3.30		1	12		N	1945	24			24	1.00	1729			1729	0.014			5	13			

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED	TRAFFIC SIGNAL CALCULATION			INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2028 Design Returning Peak**	PROJECT NO.: 40708	Prepared By:	SKL	Jun-22
		FILENAME : J4_TKR_NMR_CI	Checked By:	SLN	Jun-22
J4 Ting Kok Road/Nam Wan Road/Chung Nga Road		REFERENCE NO.:	Reviewed By:	SLN	Jun-22



		Existing Cycle Time
No. of stages per cycle	N =	4
Cycle time	C =	88 sec
Sum(y)	Y =	0.273
Loss time	L =	22 sec
Total Flow	=	1252 pcu
Co = (1.5*L+5)/(1-Y)	=	52.3 sec
Cm = L/(1-Y)	=	30.3 sec
Yult	=	0.735
R.C.ult = (Yult-Y)/Y*100%	=	168.9 %
Cp = 0.9*L/(0.9-Y)	=	31.6 sec
Ymax = 1-L/C	=	0.750
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	147 %



Stage 1 Int G= 7 | Stage 2 Int G= 7 | Stage 3 Int G= 6 | Stage 4 Int G= 6

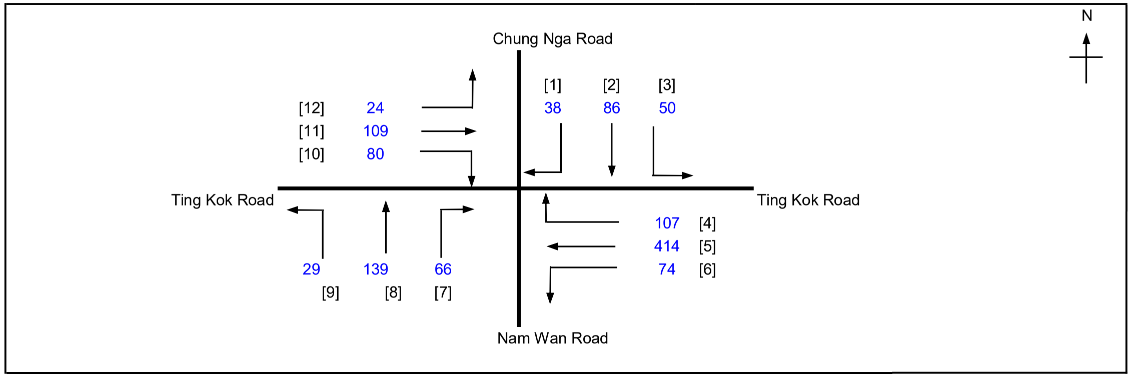
Stage	Green
1	**10**
2	**6**
3	**7**
4	**40**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	FG	Delay	Green Time Provided (s) SG	FG
P1	1,2,3	13	7	11	0	31	11
P2	1,4	10	5	8	8	46	8
P3	2,3	5	7	5	0	21	5
P4	2	21	6	9	0	4	9
P5	4	5	5	5	0	41	5

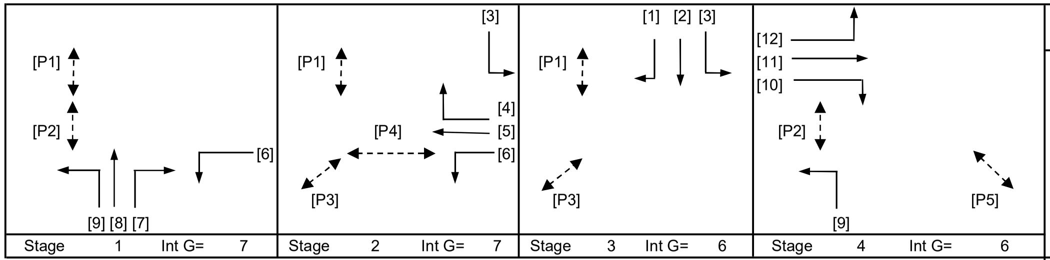
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Straight pcu/h	Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
																				22		
7	1	3.40		1	20			2095			87	87	1.00	1949			1949	0.045			11	11
7,8	1	3.40		1	20			2095		86	42	128	0.33	2045	15	818	2863	0.045	0.045		11	11
9	1,4	3.40		1	50		N	1955	47			47	1.00	1898			1898	0.025			6	50
4,5	2	3.30		1	20			2085		68	58	126	0.46	2015	30	2571	4587	0.027	0.027		7	7
5	2	3.30		1				2085		92		92	0.00	2085	15	1286	3371	0.027			7	7
6	1,2	3.30		1	35		N	1945	72			72	1.00	1865			1865	0.039			9	16
1	3	3.30		1	20			2085			28	28	1.00	1940			1940	0.014			3	8
1,2	3	3.30		1	20			2085		68	0	68	0.00	2085			2085	0.033	0.033		8	8
3	2,3	3.30		1	12		N	1945	59			59	1.00	1729			1729	0.034			8	14
10	4	3.30		1	20			2085			82	82	1.00	1940			1940	0.042			10	41
10,11	4	3.30		1	20			2085		450	0	450	0.00	2085	40	585	2670	0.169	0.169		41	41
12	4	3.30		1	12		N	1945	13			13	1.00	1729			1729	0.008			2	41

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA **CONSULTANCY LIMITED**	TRAFFIC SIGNAL CALCULATION				INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2028 Design Leaving Peak**	PROJECT NO.:	40708	Prepared By:	SKL	Jun-22
		FILENAME :	J4_TKR_NMR_CI	Checked By:	SLN	Jun-22
J4 Ting Kok Road/Nam Wan Road/Chung Nga Road		REFERENCE NO.:		Reviewed By:	SLN	Jun-22



		Existing Cycle Time
No. of stages per cycle	N =	4
Cycle time	C =	88 sec
Sum(y)	Y =	0.237
Loss time	L =	22 sec
Total Flow	=	1216 pcu
Co = (1.5*L+5)/(1-Y)	=	49.8 sec
Cm = L/(1-Y)	=	28.8 sec
Yult	=	0.735
R.C.ult = (Yult-Y)/Y*100%	=	210.4 %
Cp = 0.9*L/(0.9-Y)	=	29.9 sec
Ymax = 1-L/C	=	0.750
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	185 %



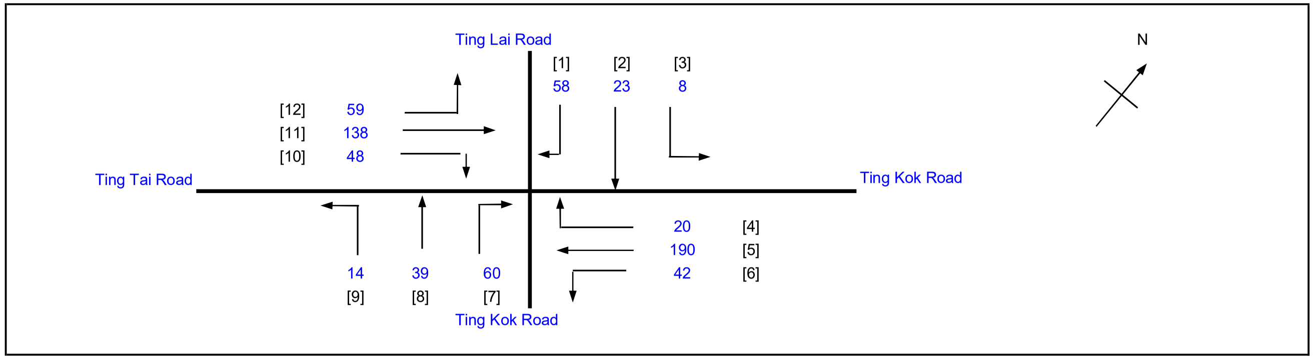
Stage	Green
1	**13**
2	**28**
3	**10**
4	**10**

Pedestrian Phase	Stage	Width (m)	Green Time Required (s) SG	Green Time Required (s) FG	Green Time Required (s) Delay	Green Time Provided (s) SG	Green Time Provided (s) FG
P1	1,2,3	13	7	11	0	61	11
P2	1,4	10	5	8	8	21	8
P3	2,3	5	7	5	0	46	5
P4	2	21	6	9	0	26	9
P5	4	5	5	5	0	11	5

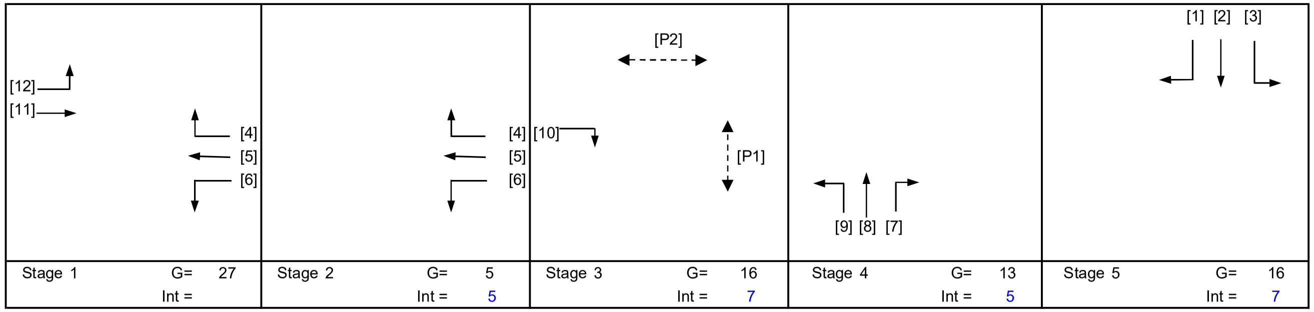
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare lane Length m.	Flare lane Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec			
																				22					
7	1	3.40		1	20			2095			66	66	1.00	1949			1949	0.034			9	**14**			
7,8	1	3.40		1	20			2095		139	0	139	0.00	2095	15	643	2738	0.051	0.051		14	**14**			
9	1,4	3.40		1	50		N	1955	29			29	1.00	1898			1898	0.015			4	**25**			
4,5	2	3.30		1	20			2085		167	107	274	0.39	2026	30	621	2646	0.104	0.104		29	**29**			
5	2	3.30		1				2085		247		247	0.00	2085	15	310	2395	0.103			29	**29**			
6	1,2	3.30		1	35		N	1945	74			74	1.00	1865			1865	0.040			11	**42**			
1	3	3.30		1	20			2085			38	38	1.00	1940			1940	0.020			5	**11**			
1,2	3	3.30		1	20			2085		86	0	86	0.00	2085			2085	0.041	0.041		11	**11**			
3	2,3	3.30		1	12		N	1945	50			50	1.00	1729			1729	0.029			8	**39**			
10	4	3.30		1	20			2085			80	80	1.00	1940			1940	0.041	0.041		11	**11**			
10,11	4	3.30		1	20			2085		109	0	109	0.00	2085	40	2182	4267	0.026			7	**11**			
12	4	3.30		1	12		N	1945	24			24	1.00	1729			1729	0.014			4	**11**			

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED	**TRAFFIC SIGNAL CALCULATION**				INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2028 Reference Returning Peak**	PROJECT NO.:	40708	Prepared By:	BSL	Jun-22
		FILENAME :	J5_TKR_TTR_TLR.xlsx	Checked By:	SLN	Jun-22
J5 Ting Kok Road/Ting Tai Road/Ting Lai Road				Reviewed By:	SLN	Jun-22



No. of stages per cycle N = 5
Cycle time C = 100 sec
Sum(y) Y = 0.139
Loss time L = 23 sec
Total Flow = 699 pcu
Co = (1.5*L+5)/(1-Y) = 45.9 sec
Cm = L/(1-Y) = 26.7 sec
Yult = 0.728
R.C.ult = (Yult-Y)/Y*100% = 423.3 %
Cp = 0.9*L/(0.9-Y) = 27.2 sec
Ymax = 1-L/C = 0.770
R.C.(C) = (0.9*Ymax-Y)/Y*100% = 399 %



Pedestrian Phase	Stage	Width (m)	Green Time Required SG	Green Time Required FG	Green Time Required Delay	Green Time Provided SG	Green Time Provided FG
P1	3	20	5	10	1	12	10
P2	3	17	5	8	9	6	8

Move-ment	Stage	Lane Width m.	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare Lane m.	Flare Effect pcu/hr	Site Factor	Site Effect pcu/hr	Gradient %	Gradient Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
																							20		
11,12	1	3.30	1	12		N	1945	59	32		91	0.65	1799							1799	0.051			28	28
11	1	3.30	1				2085		106		106	0.00	2085							2085	0.051			28	28
5,6	1,2	3.30	1	12		N	1945	42	67		109	0.39	1856							1856	0.059			33	33
5	1,2	3.30	1				2085		123		123	0.00	2085							2085	0.059	0.059		33	33
4	1,2	3.30	1	21			2085			20	20	1.00	1946							1946	0.010			6	33
10	3	3.30	1	18			2085			48	48	1.00	1925							1925	0.025	0.025	3	14	17
9	4	3.30	1	12		N	1945	14			14	1.00	1729							1729	0.008			4	14
7,8	4	3.30	1	18			2085		39	12	51	0.24	2045							2045	0.025			14	14
7	4	3.30	1	18			2085			48	48	1.00	1925							1925	0.025	0.025		14	14
2,3	5	3.30	1	10		N	1945	8	23		31	0.26	1873							1873	0.017			9	17
1	5	3.30	1	18			2085			58	58	1.00	1925							1925	0.030	0.030		17	17

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED

Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application

J5 Ting Kok Road/Ting Tai Road/Ting Lai Road

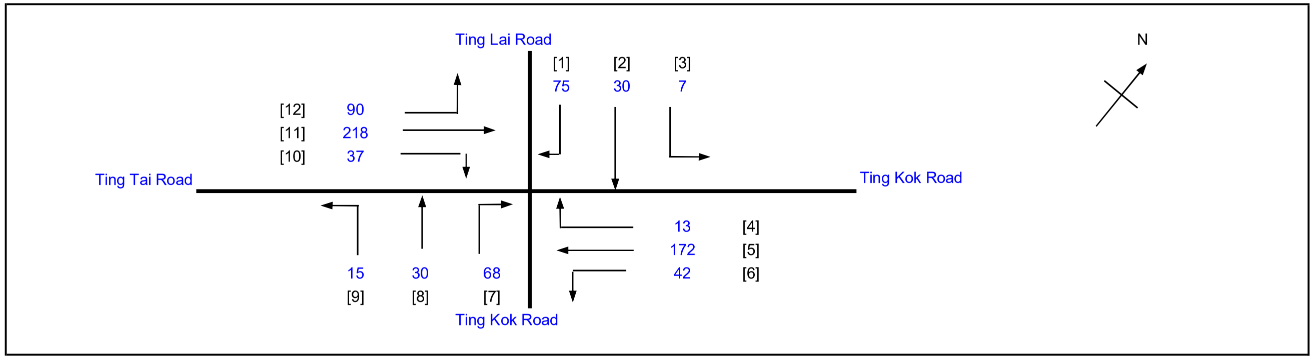
TRAFFIC SIGNAL CALCULATION

2028 Reference Leaving Peak

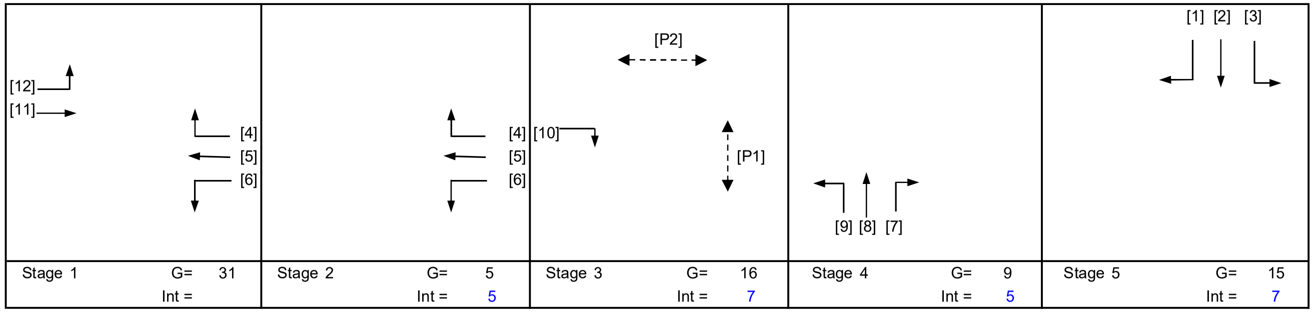
PROJECT NO.: 40708

FILENAME : J5_TKR_TTR_TLR.xlsx

	INITIALS	DATE
Prepared By:	BSL	Jun-22
Checked By:	SLN	Jun-22
Reviewed By:	SLN	Jun-22



No. of stages per cycle		N =	5
Cycle time		C =	100 sec
Sum(y)		Y =	0.162
Loss time		L =	34 sec
Total Flow		=	797 pcu
Co	= (1.5*L+5)/(1-Y)	=	66.9 sec
Cm	= L/(1-Y)	=	40.6 sec
Yult		=	0.645
R.C.ult	= (Yult-Y)/Y*100%	=	297.1 %
Cp	= 0.9*L/(0.9-Y)	=	41.5 sec
Ymax	= 1-L/C	=	0.660
R.C.(C)	**= (0.9*Ymax-Y)/Y*100%**	**=**	**266 %**



Pedestrian Phase	Stage	Width (m)	Green Time Required			Green Time Provided	
			SG	FG	Delay	SG	FG
P1	3	20	5	10	1	12	10
P2	3	17	5	8	9	6	8

Move-ment	Stage	Lane Width m.	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement			Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare Lane m.	Flare Effect pcu/hr	Site Factor	Site Effect pcu/hr	Gradient %	Gradient Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
								Left pcu/h	Straight pcu/h	Right pcu/h															
																							20		
11,12	1	3.30	1	12		N	1945	90	53		143	0.63	1803							1803	0.079	0.079		32	32
11	1	3.30	1				2085		165		165	0.00	2085							2085	0.079			32	32
5,6	1,2	3.30	1	12		N	1945	42	58		100	0.42	1848							1848	0.054		5	22	37
5	1,2	3.30	1				2085		114		114	0.00	2085							2085	0.055			22	37
4	1,2	3.30	1	21			2085			13	13	1.00	1946							1946	0.007			3	37
10	3	3.30	1	18			2085			37	37	1.00	1925							1925	0.019	0.019	9	8	17
9	4	3.30	1	12		N	1945	15			15	1.00	1729							1729	0.009			4	10
7,8	4	3.30	1	18			2085		30	20	50	0.40	2018							2018	0.025			10	10
7	4	3.30	1	18			2085			48	48	1.00	1925							1925	0.025	0.025		10	10
2,3	5	3.30	1	10		N	1945	7	30		37	0.19	1891							1891	0.020			8	16
1	5	3.30	1	18			2085			75	75	1.00	1925							1925	0.039	0.039		16	16

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED

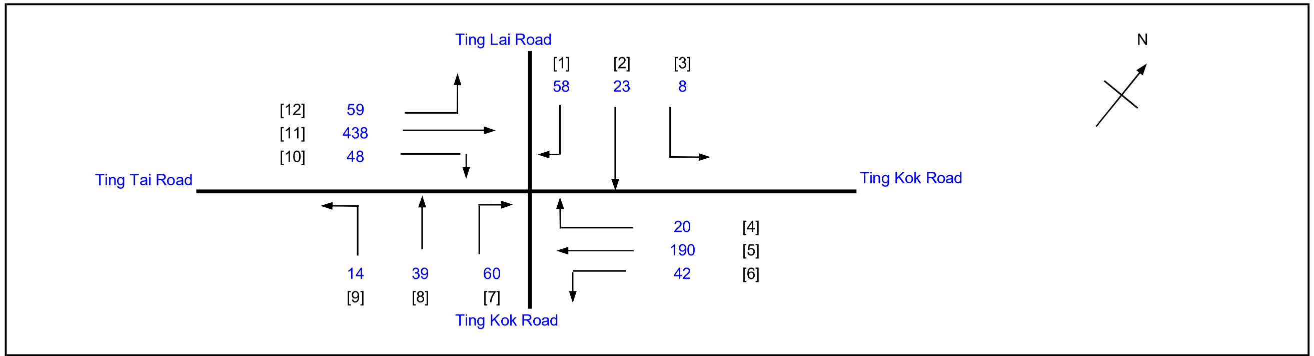
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application

J5 Ting Kok Road/Ting Tai Road/Ting Lai Road

TRAFFIC SIGNAL CALCULATION

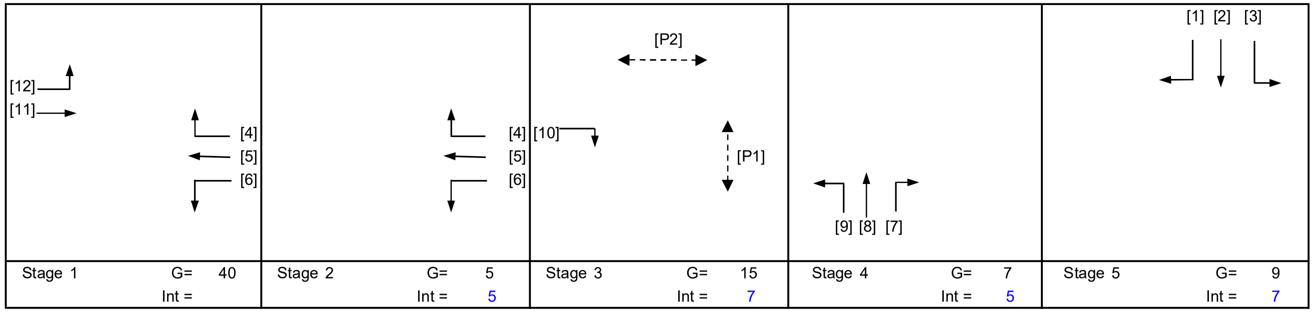
2028 Design Returning Peak

			INITIALS	DATE
PROJECT NO.:	40708	Prepared By:	BSL	Jun-22
FILENAME :	J5_TKR_TTR_TLR.xlsx	Checked By:	SLN	Jun-22
		Reviewed By:	SLN	Jun-22



No. of stages per cycle N = 5
Cycle time C = 100 sec
Sum(y) Y = 0.205
Loss time L = 33 sec
Total Flow = 999 pcu
Co = (1.5*L+5)/(1-Y) = 68.6 sec
Cm = L/(1-Y) = 41.5 sec
Yult = 0.653
R.C.ult = (Yult-Y)/Y*100% = 218.1 %
Cp = 0.9*L/(0.9-Y) = 42.7 sec
Ymax = 1-L/C = 0.670

R.C.(C) = (0.9*Ymax-Y)/Y*100% = 194 %

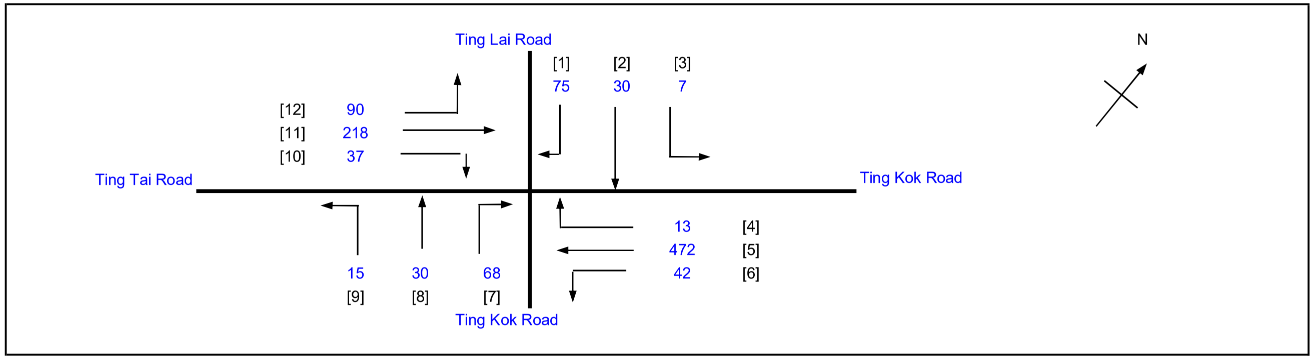


Pedestrian Phase	Stage	Width (m)	Green Time Required SG	FG	Delay	Green Time Provided SG	FG
P1	3	20	5	10	1	11	10
P2	3	17	5	8	9	5	8

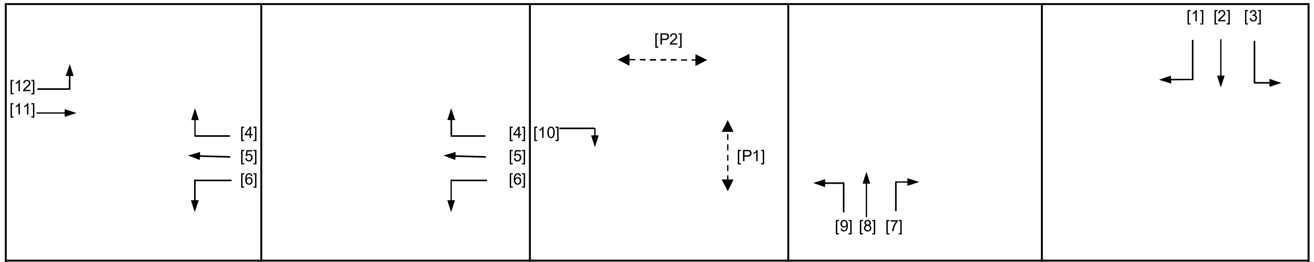
Move-ment	Stage	Lane Width m.	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Straight pcu/h	Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare Lane m.	Flare Effect pcu/hr	Site Factor	Site Effect pcu/hr	Gradient %	Gradient Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec			
																							20					
11,12	1	3.30	1	12		N	1945	59	177		236	0.25	1886							1886	0.125	0.125		41	41			
11	1	3.30	1				2085		261		261	0.00	2085							2085	0.125			41	41			
5,6	1,2	3.30	1	12		N	1945	42	68		110	0.38	1856							1856	0.059		5	19	46			
5	1,2	3.30	1				2085		122		122	0.00	2085							2085	0.059			19	46			
4	1,2	3.30	1	21			2085			20	20	1.00	1946							1946	0.010			3	46			
10	3	3.30	1	18			2085			48	48	1.00	1925							1925	0.025	0.025	8	8	16			
9	4	3.30	1	12		N	1945	14			14	1.00	1729							1729	0.008			3	8			
7,8	4	3.30	1	18			2085		39	12	51	0.24	2045							2045	0.025			8	8			
7	4	3.30	1	18			2085			48	48	1.00	1925							1925	0.025	0.025		8	8			
2,3	5	3.30	1	10		N	1945	8	23		31	0.26	1873							1873	0.017			5	10			
1	5	3.30	1	18			2085			58	58	1.00	1925							1925	0.030	0.030		10	10			

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED	**TRAFFIC SIGNAL CALCULATION**				INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2028 Design Leaving Peak**	PROJECT NO.:	40708	Prepared By:	BSL	Jun-22
J5 Ting Kok Road/Ting Tai Road/Ting Lai Road		FILENAME :	J5_TKR_TTR_TLR.xlsx	Checked By:	SLN	Jun-22
				Reviewed By:	SLN	Jun-22



No. of stages per cycle		N =	5
Cycle time		C =	100 sec
Sum(y)		Y =	0.212
Loss time		L =	30 sec
Total Flow		=	1097 pcu
Co	= (1.5*L+5)/(1-Y)	=	63.5 sec
Cm	= L/(1-Y)	=	38.1 sec
Yult		=	0.675
R.C.ult	= (Yult-Y)/Y*100%	=	218.2 %
Cp	= 0.9*L/(0.9-Y)	=	39.3 sec
Ymax	= 1-L/C	=	0.700
R.C.(C)	**= (0.9*Ymax-Y)/Y*100%**	**=**	**197 %**



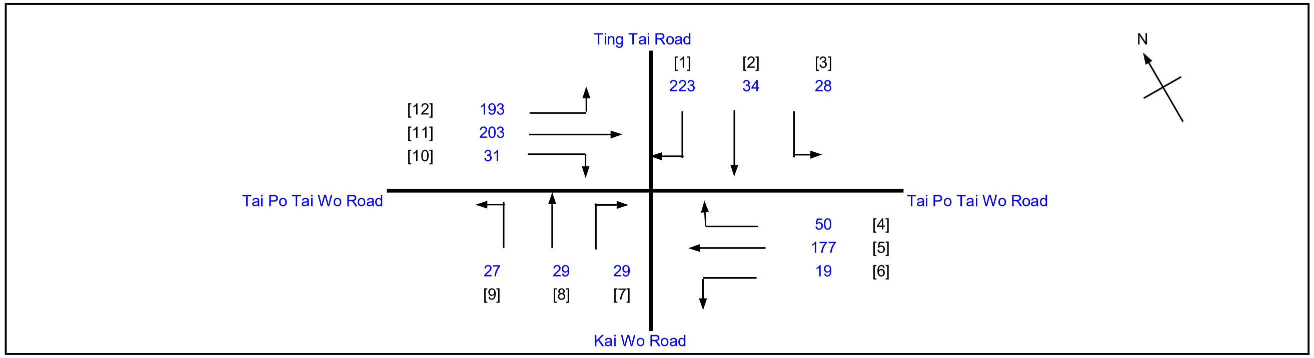
Stage 1	G= 25	Int =
Stage 2	G= 16	Int = 5
Stage 3	G= 15	Int = 7
Stage 4	G= 7	Int = 5
Stage 5	G= 12	Int = 7

Pedestrian Phase	Stage	Width (m)	Green Time Required SG	FG	Delay	Green Time Provided SG	FG
P1	3	20	5	10	1	11	10
P2	3	17	5	8	9	5	8

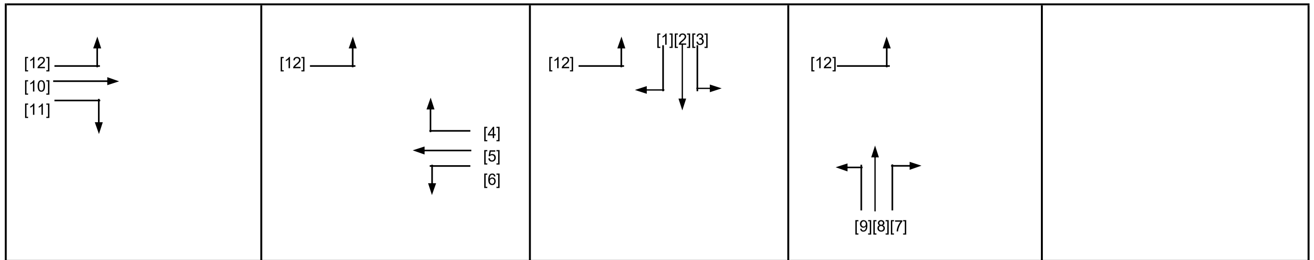
Move-ment	Stage	Lane Width m.	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Straight pcu/h	Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare Lane m.	Flare Effect pcu/hr	Site Factor	Site Effect pcu/hr	Gradient %	Gradient Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
																							20		
11,12	1	3.30	1	12		N	1945	90	53		143	0.63	1803							1803	0.079			26	26
11	1	3.30	1				2085		165		165	0.00	2085							2085	0.079			26	26
5,6	1,2	3.30	1	12		N	1945	42	203		245	0.17	1904							1904	0.129			42	43
5	1,2	3.30	1				2085		269		269	0.00	2085							2085	0.129	0.129		43	43
4	1,2	3.30	1	21			2085			13	13	1.00	1946							1946	0.007			2	43
10	3	3.30	1	18			2085			37	37	1.00	1925							1925	0.019	0.019	10	6	16
9	4	3.30	1	12		N	1945	15			15	1.00	1729							1729	0.009			3	8
7,8	4	3.30	1	18			2085		30	20	50	0.40	2018							2018	0.025			8	8
7	4	3.30	1	18			2085			48	48	1.00	1925							1925	0.025	0.025		8	8
2,3	5	3.30	1	10		N	1945	7	30		37	0.19	1891							1891	0.020			6	13
1	5	3.30	1	18			2085			75	75	1.00	1925							1925	0.039	0.039		13	13

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED	**TRAFFIC SIGNAL CALCULATION**				INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2028 Reference Returning Peak**	PROJECT NO.:	40708	Prepared By:	BSL	Jun-22
J6 Ting Tai Road / Tai Po Tai Wo Road		FILENAME :	J6_TTR_TPTWR.xlsx	Checked By:	SKL	Jun-22
				Reviewed By:	SLN	Jun-22



No. of stages per cycle		N =	4
Cycle time		C =	90 sec
Sum(y)		Y =	0.187
Loss time		L =	24 sec
Total Flow		=	1043 pcu
Co	= (1.5*L+5)/(1-Y)	=	50.4 sec
Cm	= L/(1-Y)	=	29.5 sec
Yult		=	0.720
R.C.ult	= (Yult-Y)/Y*100%	=	284.6 %
Cp	= 0.9*L/(0.9-Y)	=	30.3 sec
Ymax	= 1-L/C	=	0.733
R.C.(C)	**= (0.9*Ymax-Y)/Y*100%**	**=**	**253 %**



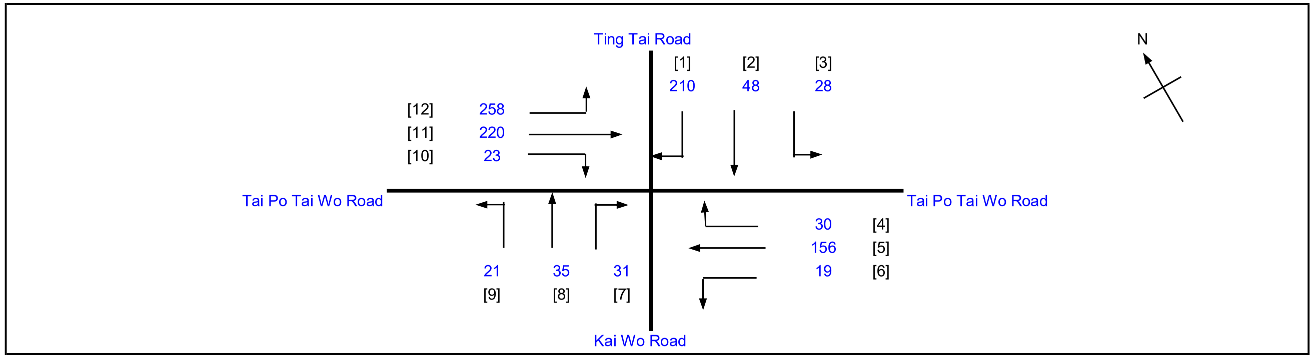
Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
G= 19	G= 14	G= 19	G= 10	G=
Int = 9	Int = 6	Int = 7	Int = 6	Int =

Pedestrian Phase	Stage	Width (m)	Green Time Required SG	FG	Delay	Green Time Provided SG	FG

Move-ment	Stage	Lane Width m.	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Straight pcu/h	Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare Lane m.	Flare Effect pcu/hr	Site Factor	Site Effect pcu/hr	Gradient %	Gradient Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
																							24		
12	Free	3.10	1	21		N	1925	193			193	1.00	1797							1797	0.107			38	38
11	1	3.10	1				2065		118		118	0.00	2065							2065	0.057			20	20
10,11	1	3.10	1	19			2065		85	31	116	0.27	2022							2022	0.057	0.057		20	20
5.6	2	3.30	1	13		N	1945	19	59		78	0.24	1892							1892	0.041			15	15
5	2	3.30	1				2085		86		86	0.00	2085							2085	0.041			15	15
4,5	2	3.30	1	17			2085		32	50	82	0.61	1979							1979	0.041	0.041		15	15
2,3	3	3.30	1	12		N	1945	28	34		62	0.45	1841							1841	0.034			12	20
1	3	3.30	2	19			4170			223	223	1.00	3865							3865	0.058	0.058		20	20
8,9	4	3.30	1	11		N	1945	27	29		56	0.48	1825							1825	0.031	0.031		11	11
7	4	3.30	1	16			2085			29	29	1.00	1906							1906	0.015			5	11

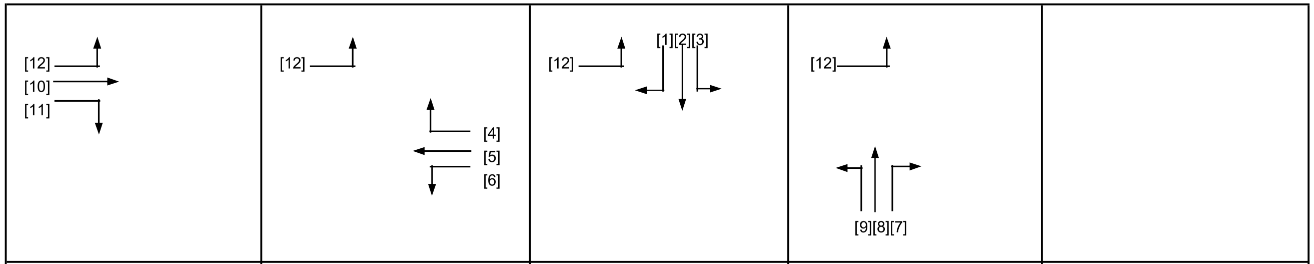
NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED	**TRAFFIC SIGNAL CALCULATION**			INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2028 Reference Leaving Peak**	PROJECT NO.: 40708	Prepared By:	BSL	Jun-22
		FILENAME : J6_TTR_TPTWR.xlsx	Checked By:	SKL	Jun-22
J6 Ting Tai Road / Tai Po Tai Wo Road			Reviewed By:	SLN	Jun-22



No. of stages per cycle N = 4
Cycle time C = 90 sec
Sum(y) Y = 0.179
Loss time L = 24 sec
Total Flow = 1079 pcu
Co = (1.5*L+5)/(1-Y) = 49.9 sec
Cm = L/(1-Y) = 29.2 sec
Yult = 0.720
R.C.ult = (Yult-Y)/Y*100% = 303.1 %
Cp = 0.9*L/(0.9-Y) = 29.9 sec
Ymax = 1-L/C = 0.733

R.C.(C) = (0.9*Ymax-Y)/Y*100% = 270 %



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
G= 21	G= 12	G= 19	G= 10	G=
Int = 9	Int = 6	Int = 7	Int = 6	Int =

Pedestrian Phase	Stage	Width (m)	Green Time Required SG	Green Time Required FG	Green Time Required Delay	Green Time Provided SG	Green Time Provided FG

Move-ment	Stage	Lane Width m.	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare Lane m.	Flare Effect pcu/hr	Site Factor	Site Effect pcu/hr	Gradient %	Gradient Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
12	Free	3.10	1	21		N	1925	258			258	1.00	1797							1797	0.144		24	53	53
11	1	3.10	1				2065		122		122	0.00	2065							2065	0.059			22	22
10,11	1	3.10	1	19			2065		98	23	121	0.19	2034							2034	0.059	0.059		22	22
5.6	2	3.30	1	13		N	1945	19	45		64	0.30	1881							1881	0.034			13	13
5	2	3.30	1				2085		72		72	0.00	2085							2085	0.035	0.035		13	13
4,5	2	3.30	1	17			2085		39	30	69	0.43	2008							2008	0.034			13	13
2,3	3	3.30	1	12		N	1945	28	48		76	0.37	1859							1859	0.041			15	20
1	3	3.30	2	19			4170			210	210	1.00	3865							3865	0.054	0.054		20	20
8,9	4	3.30	1	11		N	1945	21	35		56	0.38	1850							1850	0.030	0.030		11	11
7	4	3.30	1	16			2085			31	31	1.00	1906							1906	0.016			6	11

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED

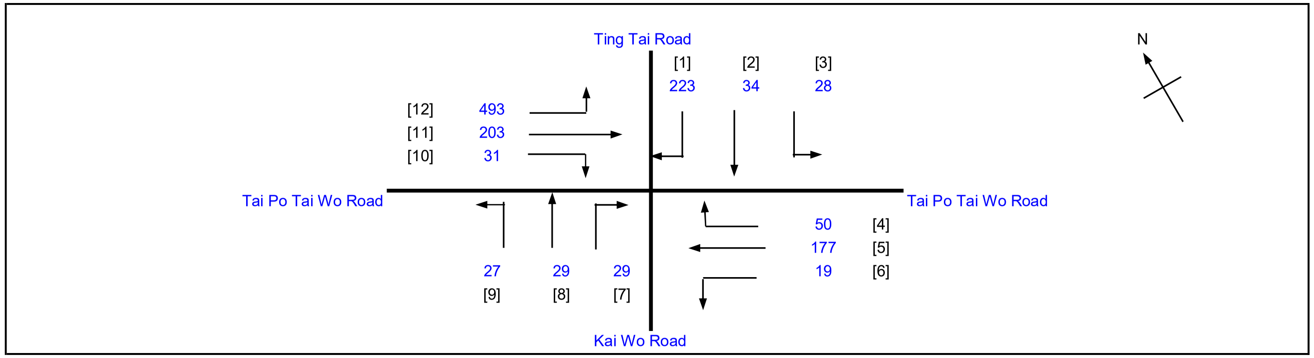
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application

J6 Ting Tai Road / Tai Po Tai Wo Road

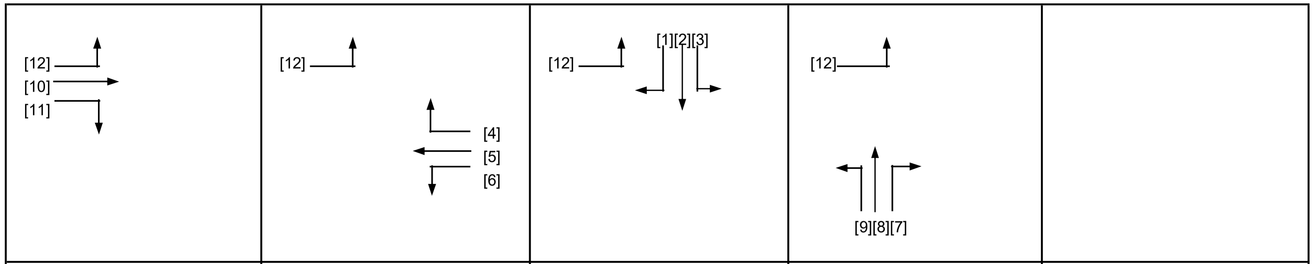
TRAFFIC SIGNAL CALCULATION

2028 Design Returning Peak

			INITIALS	DATE
PROJECT NO.: 40708		Prepared By:	BSL	Jun-22
FILENAME : J6_TTR_TPTWR.xlsx		Checked By:	SKL	Jun-22
		Reviewed By:	SLN	Jun-22



No. of stages per cycle N = 4
Cycle time C = 90 sec
Sum(y) Y = 0.187
Loss time L = 24 sec
Total Flow = 1343 pcu
Co = (1.5*L+5)/(1-Y) = 50.4 sec
Cm = L/(1-Y) = 29.5 sec
Yult = 0.720
R.C.ult = (Yult-Y)/Y*100% = 284.6 %
Cp = 0.9*L/(0.9-Y) = 30.3 sec
Ymax = 1-L/C = 0.733
R.C.(C) = (0.9*Ymax-Y)/Y*100% = 253 %



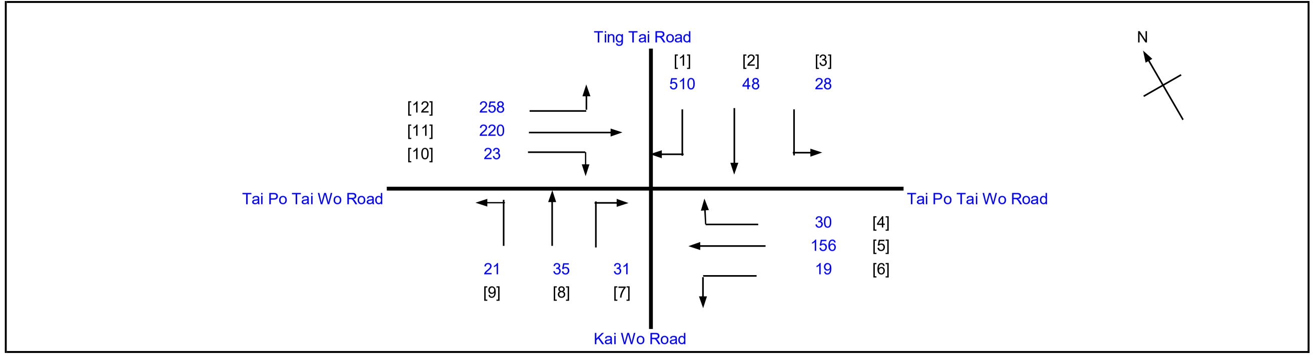
Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
G= 19	G= 14	G= 19	G= 10	G=
Int = 9	Int = 6	Int = 7	Int = 6	Int =

Pedestrian Phase	Stage	Width (m)	Green Time Required SG	Green Time Required FG	Green Time Required Delay	Green Time Provided SG	Green Time Provided FG

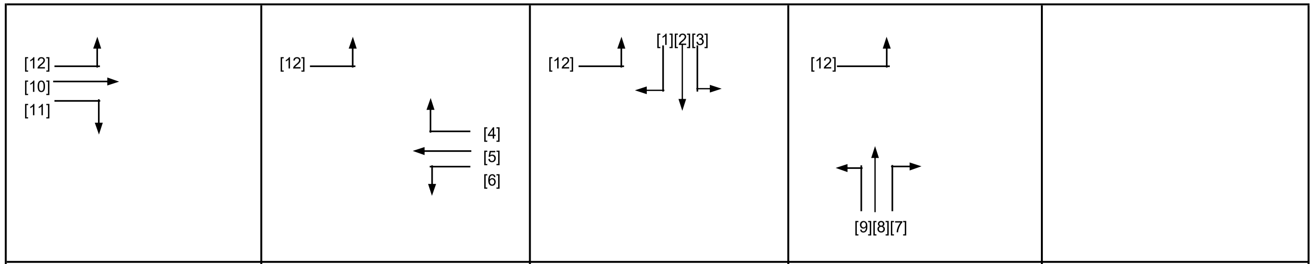
Move-ment	Stage	Lane Width m.	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare Lane m.	Flare Effect pcu/hr	Site Factor	Site Effect pcu/hr	Gradient %	Gradient Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
12	Free	3.10	1	21		N	1925	493			493	1.00	1797							1797	0.274		24	97	97
11	1	3.10	1				2065		118		118	0.00	2065							2065	0.057			20	20
10,11	1	3.10	1	19			2065		85	31	116	0.27	2022							2022	0.057	0.057		20	20
5.6	2	3.30	1	13		N	1945	19	59		78	0.24	1892							1892	0.041			15	15
5	2	3.30	1				2085		86		86	0.00	2085							2085	0.041			15	15
4,5	2	3.30	1	17			2085		32	50	82	0.61	1979							1979	0.041	0.041		15	15
2,3	3	3.30	1	12		N	1945	28	34		62	0.45	1841							1841	0.034			12	20
1	3	3.30	2	19			4170			223	223	1.00	3865							3865	0.058	0.058		20	20
8,9	4	3.30	1	11		N	1945	27	29		56	0.48	1825							1825	0.031	0.031		11	11
7	4	3.30	1	16			2085			29	29	1.00	1906							1906	0.015			5	11

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

LLA CONSULTANCY LIMITED	**TRAFFIC SIGNAL CALCULATION**				INITIALS	DATE
Proposed Bus Depot at Dai Fuk Street, Tai Po, New Territories - S16 Planning Application	**2028 Design Leaving Peak**	PROJECT NO.:	40708	Prepared By:	BSL	Jun-22
		FILENAME :	J6_TTR_TPTWR.xlsx	Checked By:	SKL	Jun-22
J6 Ting Tai Road / Tai Po Tai Wo Road				Reviewed By:	SLN	Jun-22



No. of stages per cycle N = 4
Cycle time C = 90 sec
Sum(y) Y = 0.256
Loss time L = 24 sec
Total Flow = 1379 pcu
Co = (1.5*L+5)/(1-Y) = 55.1 sec
Cm = L/(1-Y) = 32.3 sec
Yult = 0.720
R.C.ult = (Yult-Y)/Y*100% = 181.0 %
Cp = 0.9*L/(0.9-Y) = 33.6 sec
Ymax = 1-L/C = 0.733
R.C.(C) = (0.9*Ymax-Y)/Y*100% = 158 %



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
G= 14	G= 8	G= 33	G= 7	G=
Int = 9	Int = 6	Int = 7	Int = 6	Int =

Pedestrian Phase	Stage	Width (m)	Green Time Required			Green Time Provided	
			SG	FG	Delay	SG	FG

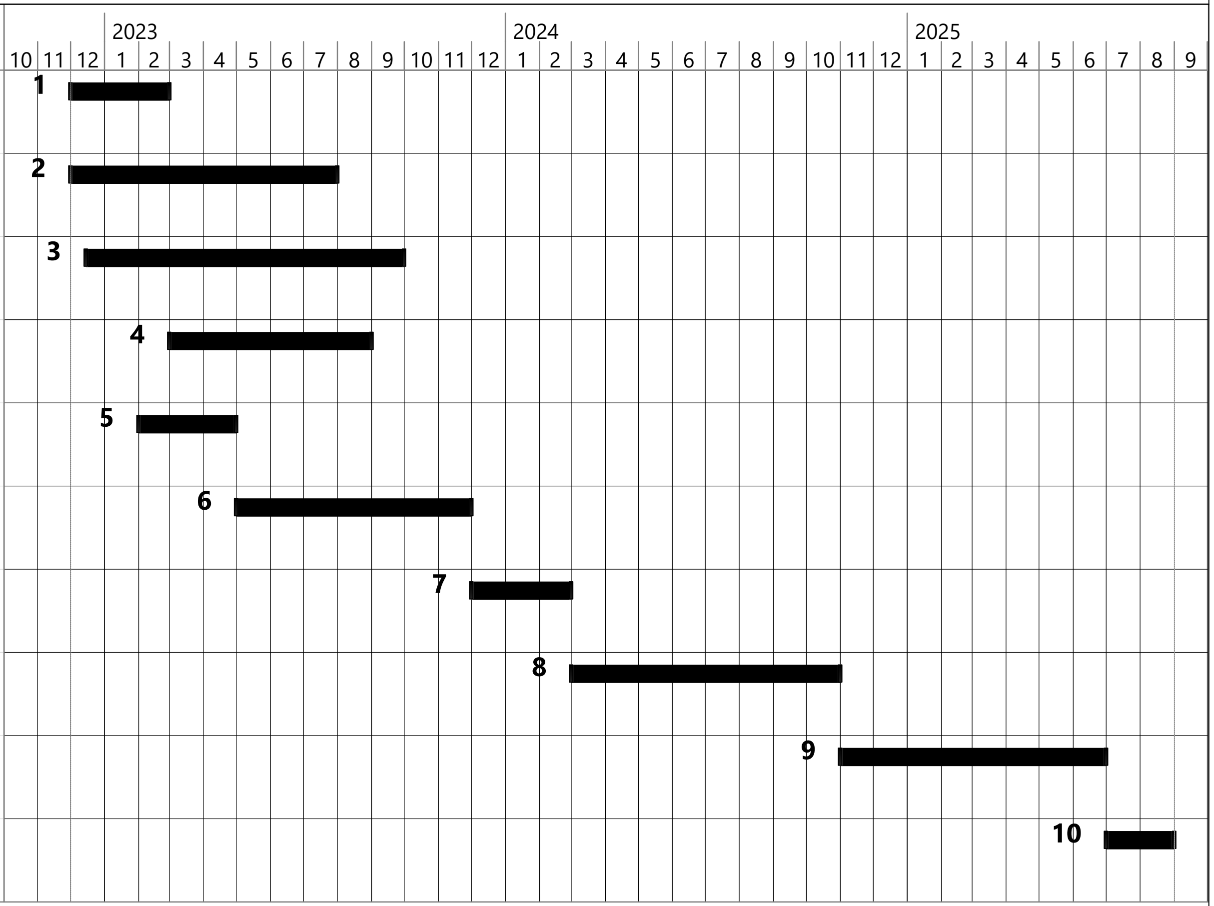
Move-ment	Stage	Lane Width m.	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	Movement Left pcu/h	Movement Straight pcu/h	Movement Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Flare Lane m.	Flare Effect pcu/hr	Site Factor	Site Effect pcu/hr	Gradient %	Gradient Effect pcu/hr	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec
12	Free	3.10	1	21		N	1925	258			258	1.00	1797							1797	0.144		24	37	37
11	1	3.10	1				2065		122		122	0.00	2065							2065	0.059			15	15
10,11	1	3.10	1	19			2065		98	23	121	0.19	2034							2034	0.059	0.059		15	15
5.6	2	3.30	1	13		N	1945	19	46		65	0.29	1882							1882	0.035	0.035		9	9
5	2	3.30	1				2085		71		71	0.00	2085							2085	0.034			9	9
4,5	2	3.30	1	17			2085		39	30	69	0.43	2008							2008	0.034			9	9
2,3	3	3.30	1	12		N	1945	28	48		76	0.37	1859							1859	0.041			11	34
1	3	3.30	2	19			4170			510	510	1.00	3865							3865	0.132	0.132		34	34
8,9	4	3.30	1	11		N	1945	21	35		56	0.38	1850							1850	0.030	0.030		8	8
7	4	3.30	1	16			2085			31	31	1.00	1906							1906	0.016			4	8

NOTE : O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRAIN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

KMB-TaiPo Smart Depot Program - Target 3Q 2025 Completion

Issue Date: 20 Dec 2022

ID	Task Name	Start	Finish
1	Sec. 16 Submission	1/12/22	28/2/23
2	Direct EP (8 months)	1/12/22	31/7/23
3	Land Contamination Works (6-9.5m)	15/12/22	30/9/23
4	Land Matters	1/3/23	31/8/23
5	GI Works (3 months)	1/2/23	30/4/23
6	BD Submissions	1/5/23	30/11/23
7	Demolition Works (3 months)	1/12/23	29/2/24
8	Foundation Works (8 months)	1/3/24	31/10/24
9	Superstructure Works (8 months)	1/11/24	30/6/25
10	BD BA13 Submission (2 months)	1/7/25	31/8/25



Appendix II of RNTPC
Paper No. A/TP/685A

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

A/TP/685 KMB Bus Depot
01/11/2022 02:48

From: [redacted]
To: tpbpd <tpbpd@pland.gov.hk>
File Ref:

A/TP/685 KMB Bus Depot Dai Fuk Street and Dai Wah Street, Tai Po

Government Land at the junction of Dai Fuk Street and Dai Wah Street, Tai Po

Site area: About 14,600sq.m

Zoning: "Other Specified Uses" annotated "Bus Depot"

Applied development: 100% Relaxation of BHR for Permitted Bus Depot

Dear TPB Members,

While the site is zoned Bus Depot, one has to question why such a large site of government land close to community facilities like a hospital and a large park is to be used for parking buses?

Surely this type of activity should be located further away from popular amenities?

KMB parent company SHK owns millions of square feet of brownfield, why the use of public land?

Presumably the GIC to the north is also government land? Why no plans to build a PH estate there or a large GIC complex to provide some of the many community services currently in deficit in the district?

Bus depot at this location is a waste of valuable land.

Mary Mulvihill

Recommended Advisory Clauses

(a) to note the comments of the Chief Building Surveyor/New Territories West, Buildings Department that:

(i) before any new building works (including containers/open sheds as temporary buildings) are to be carried out on the application site, the prior approval and consent from the Building Authority (BA) should be obtained, otherwise they are Unauthorized Building Works (UBW). An Authorized Person (AP) should be appointed as the co-ordinator for the proposed building works in accordance with the Buildings Ordinance (BO);

(ii) for UBW erected on leased land, enforcement action may be taken by the BA to effect their removal in accordance with Buildings Department (BD)'s enforcement policy against UBW as and when necessary. The granting of any planning approval should not be construed as an acceptance of any existing building works or UBW on the application site under the BO

(iii) if the Site abuts on a specified street of not less than 4.5m wide, its permitted development intensity shall be within the permissible plot ratio and site coverage as stipulated in the First Schedule of the Building (Planning) Regulations (B(P)R);

(iv) the Site shall be provided with means of obtaining access thereto from a street and emergency vehicular access in accordance with Regulations 5 and 41D of the B(P)R respectively; and

(v) formal submission of any proposed new building works for approval and consent under the BO is required. Detailed consideration will be made at the building plan submission stage.

(b) to note the comments of the Chief Architect/Central Management Division 2, Architectural Services Department that the applicant is suggested to provide 20% greenery within the Site in accordance with PNAP APP-152;

(c) to note the comments of the Director of Environmental Protection that since the subject development is classified as a designated project under Item A.6, Part I, Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance, the applicant is reminded to follow the statutory EIA process and obtain an environmental permit for the construction and operation of the project;

(d) to note the comments of the Director of Fire Services that:

(i) detailed fire services requirements will be formulated upon receipt of formal submission of general building plans. Nevertheless, applicant is advised to observe the requirements of emergency vehicular access (EVA) as stipulated in Section 6, Part D of the *Code of Practice for Fire Safety in Buildings 2011*, which is administered by the BD;

(ii) applicant is also advised to observe FSD Circular Letter No. 4/2020 for additional fire safety requirements for car parking facilities installed with electric vehicle charging facilities; and

(iii) comments in relation to Potentially Hazardous Installations would be offered upon receipt of formal submission/ referral via the Coordinating Committee on Land-use Planning and Control relating to Potentially Hazardous Installations (CCPHI).

(e) to note the comments of the Director of Electrical and Mechanical Services that the quantitative risk assessment has to be submitted to the CCPHI as soon as practicable in early design stage for their consideration and endorsement.