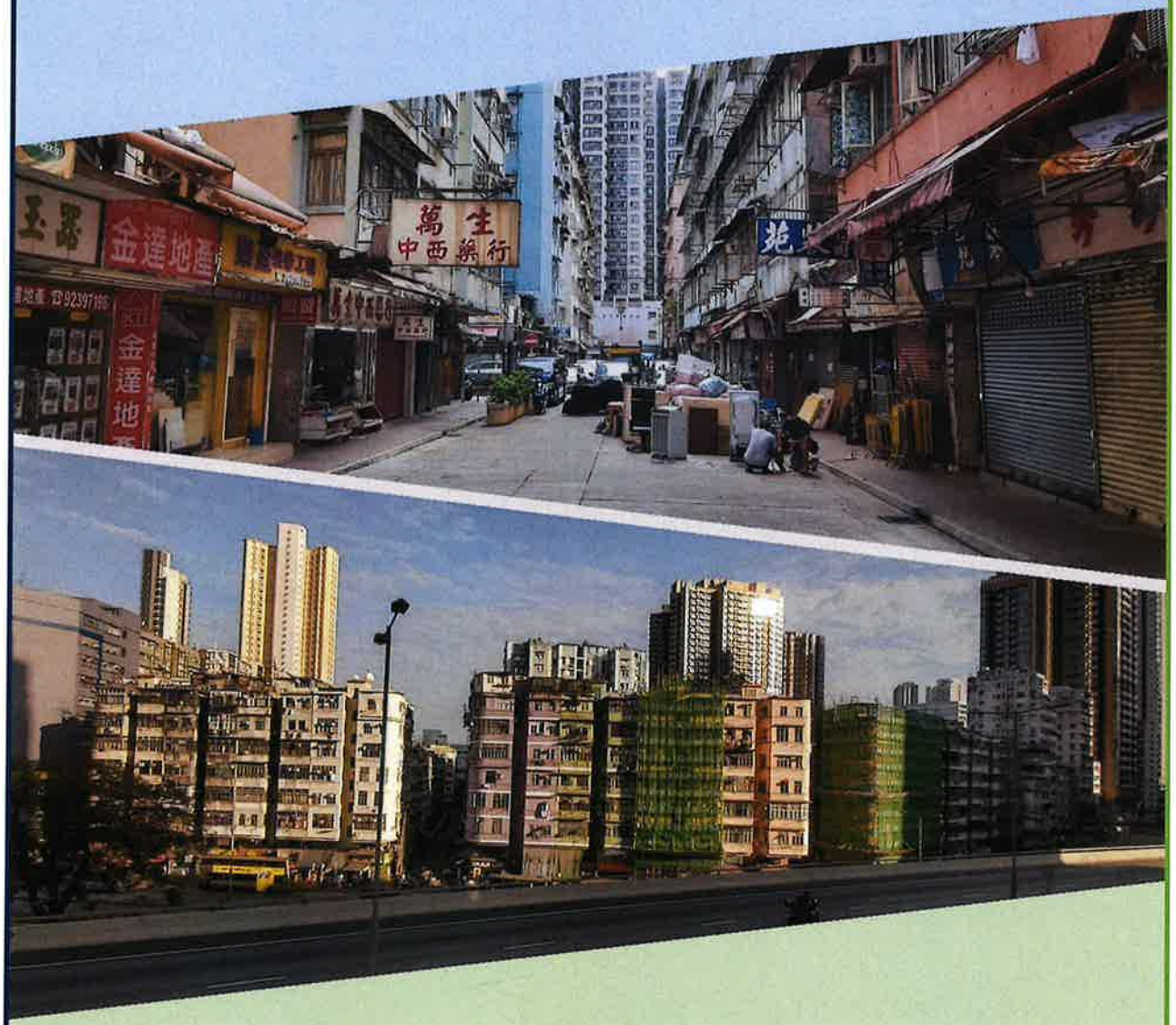
In Urban Renewal Authority Development Scheme

Prepared under Section 25 (3) of the Urban Renewal Authority Ordinance



To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Planning Report

March 2021

市區重建局
URBAN RENEWAL AUTHORITY

EXECUTIVE SUMMARY

1. The Urban Renewal Authority (URA) submits this planning report to seek approval of the Town Planning Board (TPB) for the draft Development Scheme Plan (DSP) No. S/K9/URA3/A. The draft DSP refers to the proposed Development Scheme (the Scheme) at To Kwa Wan Road / Wing Kwong Street Development (KC-016).

2. Under a "planning-led" and "district-based" approach in urban renewal works in recent years, URA has identified in the vicinity of Wing Kwong Street, To Kwa Wan as Kowloon City Action Area 1 (KCAA1) for holistic planning on urban renewal works. The Scheme, being part of the KCAA1 and situated at a strategic location between KCAA1 and the To Kwa Wan Mass Transit Railway (MTR) station, aims to manifest the planning gains and create synergy effect with the adjoining URA redevelopment projects. The Scheme is in line with the Urban Renewal Plan (URP) recommended in the Kowloon City District Urban Renewal Forum (KC DURF), which has also identified this part of the KC district as "Proposed Redevelopment Priority Area".

3. Through re-structuring and re-planning of existing land uses and road network, the Scheme will optimise the land uses to enhance walkability and connectivity of the neighbourhood. With the proposed closure of three road sections within the Scheme for comprehensive redevelopment and re-routing of the traffic road network, the traffic circulation will be more effective.

4. To accommodate the needs of the district on social welfare facilities, not less than 5,500 sq.m. non-domestic GFA is proposed for GIC uses in the Scheme. The provision of floor space for GIC uses is in line with the promotion of the government's policy on "Single Site, Multiple Uses".

5. A relaxation of maximum building height from 100mPD to 140mPD is proposed in the draft DSP to facilitate greater design flexibility of the building blocks in the Scheme to serve the needs to meet noise impact and Air Quality Objectives (AQOs) requirements for the residential portion of the development as well as accommodating provision of facilities for GIC uses.

6. Through integration of redevelopment and revitalisation initiatives, the Scheme also provides a valuable opportunity to create a direct east-west pedestrian connection between the To Kwa Wan MTR Station and the wider neighbourhood adjoining the Scheme. To capture the opportunity, a footbridge connection is proposed at the Scheme to facilitate the

possible development of a footbridge to connect with the To Kwa Wan MTR station exits under separate revitalisation initiatives by URA.

7. All in all, the proposed draft DSP is a continuation of planning-led and district-based approach of urban renewal in the KCAA1. The Scheme would create synergy with the URA's urban renewal efforts in the neighbourhood and, which goes beyond demolition and reconstruction of individual single-block buildings but multiplying the planning merits to the wider neighbourhood through the opportunities brought by the integration of redevelopment and revitalization initiatives of the Scheme.

行政摘要

1. 市區重建局(市建局) 向城市規劃委員會提交發展計劃草圖(編號S/K9/URA3/A)，並命名為土瓜灣道/榮光街發展計劃(KC-016) (該計劃)。

2. 市建局以「規劃主導」及「小區發展」的模式，近年於土瓜灣榮光街一帶制定九龍城行動區(KCAA1) ，貫徹以全面的規劃方式進行市區更新工作。該計劃屬 KCAA1 的一部份，位於一個具策略性的位置，旨在彰顯規劃裨益及與鄰近市建局的其它重建項目發揮協同效應。該計劃落實九龍城市區更新地區諮詢平台編制的「市區更新計劃」內，提出將該區域納入為“建議重建優先範圍”的建議。

3. 該計劃藉著重整及重新規劃現有土地及道路網絡，優化土地用途，以提升社區的步行性及連接性。透過於計劃內建議封閉三段道路作整體性重建及重整交通道路網絡，使未來的交通網絡更具效益。

4. 為配合地區對社會福利設施的需求，該計劃建議提供不少於 5,500 平方米的非住宅樓面面積作政府、機構或社區設施用途。有關建議亦切合政府現行提倡「一地多用」的政策。

5. 發展計劃草圖建議把該計劃土地的建築物高度限制由 100 米(主水平基準以上)放寬至 140 米(主水平基準以上)，為該計劃內的樓宇設計提供更大彈性，同時滿足噪音及空氣質素指標對住宅發展部分的要求，亦可容納政府、機構或社區設施。

6. 透過結合重建及活化的市區更新手法，該計劃亦希望藉機會為周邊社區締造一個直接的行人通道連接至毗鄰的港鐵土瓜灣站。因此，該計劃建議在平台預留行人天橋接駁口，留待日後市建局與政府部門商討以活化形式，興建天橋連接至鄰近港鐵站之用。

7. 總括來說，擬議的發展計劃草圖屬市建局於 KCAA1 範圍內以「規劃主導」及「小區規劃」模式進行市區更新的延續。該計劃藉著以綜合重建及活化手法，讓發展計劃與市建局於鄰近的市區更新工作產生協同效應。相比純以拆卸樓宇作單幢式重建的方式，發展計劃能為社區帶來更大的規劃裨益。

CONTENTS

PART 1 PLANNING REPORT

1. Introduction
2. The Development Scheme Plan Area
3. Background and Existing Conditions
4. Planning and Land Use Proposals
5. Planning and Design Merits
6. Implementation of the Development Scheme

Plan 1:	Location Plan
Plan 2	Scheme Area
Plan 3:	Existing Zoning of the Development Scheme
Plan 4:	The Scheme & Surrounding URA Projects in KCAA1
Plan 5:	Building Age
Plan 6:	Building Height
Plan 7:	Building Condition
Plan 8:	Ownership Pattern
Plan 9:	Gazetted Road Scheme of KCAA1
Plan 10:	Site Photos
Plan 11:	Site Photos

PART 2 THE DRAFT PLAN

1 Draft Development Scheme Plan

2 Notes of the Plan

3 Explanatory Statement

PART 3 SUPPLEMENTARY INFORMATION

Appendix 1	Preliminary Design
Appendix 2	Visual Impact Assessment (VIA) Report
Appendix 3	Social Impact Assessment (Stage 1) Report
Appendix 4	Traffic Impact Assessment (TIA) Report
Appendix 5	Environmental Assessment (EA) Report
Appendix 6	Air Ventilation Assessment (AVA) Report
Appendix 7	Drainage & Sewerage Impact Assessment (DSIA) Report

Appendix 8	Water Supply Impact Assessment (WSIA) Report
Appendix 9	Qualitative Risk Assessment (QRA) Report
Appendix 10	Tentative Implementation Programme
Appendix 11	Acquisition and Resumption of Affected Properties
Appendix 12	Rehousing and Ex-Gratia Payment Package for Domestic and Non-domestic Tenan

PART 1

PLANNING REPORT

1. INTRODUCTION

1.1 The Development Scheme (the Scheme) involves about 53 street numbers of buildings comprising 1- 31 To Kwa Wan Road (odd nos.), 111-127D Ma Tau Wai Road (odd nos.), 2 – 6 and 10 – 14 Hung Fook Street (even nos.), 1 – 5 and 11 – 19 Kai Ming Street (odd nos.), 1-7 Yuk Shing Street (odd nos.) and 2-12 Yuk Shing Street (even nos.). The Scheme also includes the whole of Yuk Shing Street, part of the road sections of Hung Fook Street and Kai Ming Street, government back lanes and the surrounding pubic pavement. The total gross site area of the Scheme is about 6,592sq.m.

1.2 The Development Scheme is included in the URA's 19th Business Plan, which was approved by the Financial Secretary for commencement in 2020/21. It is proposed to be processed as a Development Scheme under section 25 of the URA Ordinance (URAO). On 29 October 2020, the URA's Board approved the submission of the Development Scheme under section 25(5) of the URAO to the Town Planning Board (TPB). The draft Development Scheme Plan (DSP) No. S/K9/URA3/A is prepared for submission to the TPB.

1.3 Pursuant to section 23(1) of the URAO, the URA notified the public in the Government Gazette about the commencement of the Development Scheme on 5 March 2021. The draft DSP is now submitted under section 25(5) of the URAO to the TPB for consideration.

1.4 This planning report (Part 1 of the whole report) is prepared to provide the TPB with the necessary background information and the planning proposal to facilitate its consideration of the draft DSP (Part 2 of the report), submitted under section 25 of the URAO. Supplementary information, including the preliminary design of the proposed development, key technical assessments, social impact assessment (SIA) (Stage 1), and implementation approach are enclosed in Part 3 for reference.

2. THE DEVELOPMENT SCHEME PLAN AREA

2.1 The Development Scheme (the Scheme) is located in Kowloon City (KC) District and broadly bounded by To Kwa Wan Road, Ma Tau Wai Road, Wing Kwong Street, Kai Ming Street, Hung Fook Street and Ngan Hon Street. **Plan 1** shows the location of the Scheme.

2.2 The scheme area covers about a gross site area of 6,592 sq.m., which includes about 1,044 sq.m. pavement of the affected buildings overhang. The pavement area will be excluded from the plot ratio (PR) calculation. Subject to site survey upon DSP approval, the site area for PR calculation is about 5,548 sq.m. including private lots, government lanes and public streets within the Scheme. The Scheme Area is shown in **Plan 2**.

2.3 The scheme area is currently zoned "Residential (Group A)" ("R(A)"), with Yuk Shing Street, Hung Fook Street and Kai Ming Street and the pavement within the Scheme Area shown as "Road" on the Approved Hung Hom Outline Zoning Plan (OZP) No. S/K9/26. An extract of the OZP is shown on **Plan 3**.

Planning Objectives

2.4 The Urban Renewal Strategy (URS) issued in 2011 promulgates a comprehensive and holistic approach to carry out urban renewal with the following objectives:

- Restructuring and replanning of concerned urban areas;
- Designing more effective and environmentally-friendly local transport and road networks within the concerned urban areas;
- Rationalising land uses within the concerned urban areas;
- Redeveloping dilapidated buildings into new buildings of modern standard and environmentally-friendly design; and
- Providing more open space and community/welfare facilities.

2.5 With a "planning-led" and "district-based" approach in urban renewal works in recent years, URA has identified an area in the vicinity of Wing Kwong Street of To Kwa Wan as Kowloon City Action Area 1 (KCAA1) for holistic planning for urban renewal works and already commenced seven redevelopment projects in the vicinity of the Scheme. The seven commenced URA's redevelopment projects in KCAA1 are shown in **Plan 4**.

2.6 The Scheme aims to achieve the said URS objectives (section 2.4 above) and to bring in wider planning merits through continuation of the holistic

planning and urban renewal actions in KCAA1 through the following key planning features:

District-based approach in enhancing walkability and connectivity

i. Through re-structuring and re-planning of existing land uses, the Scheme will optimise the land uses to enhance walkability in the area. With the proposed closure of three road sections and re-routing of the traffic road network, the area required for vehicular traffic circulation within KCAA1 will be further reduced, and at the same time more pedestrian walkways will be created to provide a safe and pleasant walking environment.

ii. The proposed pedestrian network in the Scheme will be integrated with the planned pedestrian walkways and urban spaces in the other URA redevelopment projects in the KCAA1 to enhance connectivity in the neighbourhood, including from north to south and from east to west. With the integrated pedestrian network between the Scheme and the surrounding URA projects, pedestrian can find more direct at-grade connection on the east via the pedestrianised Hung Fook Street and the adjoining URA developments towards Sung On Street to approach to the waterfront, which is proposed to be developed as a waterfront promenade in the KC DURF.

iii. Through integration of redevelopment and revitalisation initiatives, the Scheme provides a valuable opportunity to link up the wider neighbourhood with the To Kwa Wan MTR Station. To capture the opportunity, a footbridge connection is proposed at the Scheme to facilitate to develop a footbridge across To Kwa Wan Road to connect with the MTR station under separate URA's revitalisation initiatives.

Other planning features in the Scheme

iv. An all-weathered communal space is proposed in the Scheme to create a focal point for community gathering and place-making opportunities. It will be connected with the adjoining pedestrian walkways and retail shops to bring in vibrancy.

v. To enhance planning gains and to align with the "Single site, Multiple Use" model promoted by the Government, it is proposed to provide not less than 5,500sq.m. non-domestic GFA for "Government, Institution or Community" ("GIC") facilities within the Scheme to meet the community's needs.

3. BACKGROUND AND EXISTING CONDITIONS

Historical Background

3.1 There are different narratives for the origin of the name "To Kwa Wan". One was named after the bay with plentiful crops of sweet potatoes or dioscorea ("To Kwa"). Another suggests that the Hoi Sum Island (in the middle of the sea) opposite to Kwa Wan was shaped like a "To Kwa".

3.2 Before the 1890s, To Kwa Wan was a bay lined by beaches and mud-flats with a stream originated from the hinterland named Ma Tau Chung where flowed closely along the existing Ma Hang Chung Road. The headland to the north of the bay is Ma Tau Kok, which might be named after the long pier of Kowloon Walled City nearby. A string of agricultural and stone-cutter villages along the coast of To Kwa Wan Bay sharing the name of To Kwa Wan Village was believed to be the largest village in the Hung Hom and To Kwa Wan area. Quarrying became active in the mid-18th century that Quarry Hill and San Shan (new quarry) Road were believed to commemorate these activities.

3.3 After the reclamation undertaken in the 1890s, To Kwa Wan started being developed by industrial activities extended from Hung Hom and the ex-Whampoa Docks. Streets including Mok Cheong (timber factory) Street and Pau Cheung (firecracker) Street were believed to commemorate the factory development in the early 20th century. The Scheme area was at the coast in the pre-war era and its vicinity was where the former Bailey's Shipyard located. Bailey Street, where is to the south of the Scheme, was named after the founder of the shipyard.

3.4 The second large-scale reclamation of To Kwa Wan started in the 1950s while industrial activities in Kowloon became more prosperous. The Scheme and its vicinity became inland and were then transformed into a mixture of residential developments and industrial uses including manufacturing, car-repairing, weaving, bleaching and dyeing, printing and electroplating. Today, industrial buildings still scatter along To Kwa Wan Road.

Existing Uses, Building and Living Conditions

3.5 The Scheme consists of three clusters of tenement buildings with 8 storeys high and a standalone building named Wong Teck Building with 15 storeys high. The tenement buildings were completed in 1957 and 1958 (i.e. aged from 63 to 64), while Wong Teck Building was completed in 1974 (i.e. aged 47). As shown in the approved General Building Plans (GBPs), all these buildings are permitted for domestic use on the upper floors, with ground floors and mezzanine floors for non-domestic uses. According to the GBP records, except for Wong Teck Building which is of lifts, all the rest of the buildings are without lift and the serviceability of

these buildings are generally poor. The building characteristics in terms of building age and building height are shown in **Plan 5** and **Plan 6** respectively.

3.6 Despite of the relatively younger building age of Wong Teck Building as compared to other tenement buildings within the Scheme, Wong Teck Building will be over 50 years old by the time of building demolition in a few years should the Scheme be approved for implementation. In addition, given Wong Teck Building is located at the very central part of the Scheme as well as the whole KCAA1, the exclusion of Wong Teck Building from the Scheme would loss the opportunity to have an integrated re-structuring and redevelopment of the area to achieve a wider planning merits for the neighbourhood.

3.7 Based on non-obtrusive site observation conducted in February 2021, buildings within the scheme area are mainly residential in nature on the upper floors with a few are occupied by commercial use/ businesses. Commercial premises are occupying the ground floor. These commercial premises are primarily engaging in business of retail of goods, food, grocery and eateries. Vehicle repair workshops are found in some ground floor premises at Yuk Shing Street, Hung Fook Street and Kai Ming Street respectively. Staircase shops are found on the ground floor of some buildings within the Scheme.

3.8 Based on the URA's Building Condition Assessment carried out in January 2021, 18 out of the 32 building blocks within the Scheme (i.e. about 56%) are of either "Varied" or "Marginal" conditions. The remaining 14 building blocks (about 44%) are in "Satisfactory" or "Acceptable" conditions. The better building conditions of these buildings are due to the fact that these buildings have recently completed/ carrying building rehabilitation works. Based on the URA's experience and the consultant's advice, for buildings in "Varied" condition, their structural elements, components, finishes and facilities are observed in decay condition due to lack of building repairs and ongoing maintenance, major repair works will be required. For buildings in "Acceptable" condition, minor defects are found on the structural elements. Appropriate building repairs and ongoing maintenance works will be required in order to maintain the habitability and avoid further deterioration of the building. Results of the Building Condition Assessment within the scheme areas are shown in **Plan 7.**

3.9 According to Home Affairs Department (HAD)'s "Database of Private Buildings in Hong Kong" as of February 2021, 13 out of the total of 32 building blocks within the Scheme (about 41%) are "3-nil" buildings without management body for building management.

3.10 According to Buildings Department (BD)'s records held by the URA as at January 2021, most of the building blocks within the Scheme have outstanding Fire Safety Notices (FSDN) and building orders S26/26A, S28 or S30B respectively. Building at 2-6 Hung Fook Street is carrying out improvement works under Fire Safety Improvement Works Subsidy Scheme (FSWS). Eleven (11) out of the 32 building blocks (about 34%) have outstanding S28 building orders for drainage repair, implying hygiene concerns and their vulnerabilities particularly under the COVID-19 pandemic period.

3.11 BD's records showed that more than half of the buildings within the Scheme Area completed building rehabilitation works under Operation Building Bright (OBB1.0) in the last ten years. As at December 2020, there are 15 out of 32 building blocks in the Scheme undertaking rehabilitation works under OBB2.0 (111-113 and 127 -127D Ma Tau Wai Road; 5-7, 17-23 and 29-31 To Kwa Wan Road). It is understood that OBB works comprise mainly repairing defects (e.g. major cracks, spalling) and FSWS works comprise improvement of fire services installations, equipment and fire safety construction measures in common or public areas of the buildings. Repair works to the interior of private units are not included. Based on URA's past experience in rehabilitation works, even buildings that have undergone such repair works/schemes need to undertake comprehensive building rehabilitation regularly in order to avoid deterioration.

Demographic Background

3.12 Population of the Scheme is estimated to be 1,760 in around 840 households. Detailed demographic information of the Scheme will be ascertained after Freezing Survey (FS) and incorporated in the SIA (Stage 2) report.

Ownership Pattern

3.13 As at February 2021, all the buildings within the Scheme are under multiple ownerships, except No. 19 To Kwa Wan Road, which is in single ownership (**Plan 8**).

Surrounding Land Uses

3.14 The street blocks adjoining the Scheme are a mix of residential and commercial uses. There are some newly built residential developments completed by private sector through redevelopment, including Upper East at Sung On Street, Viva and Axis at Ma Tau Wai Road. Industrial uses are more concentrated to the northeast and northwest of Ngan Hon Street. Some of the industrial buildings appear not to be engaged in manufacturing activities but mainly for office, storage, workshop / showroom uses.

3.15 Under district-based and planning-led approach, URA has commenced seven redevelopment projects in the KCAA1, forming a cluster of URA projects for redevelopment of the existing tenement buildings concentrated in the area and allowing broader restructuring and replanning of the neighbourhood. These seven projects include:

- Kai Ming Street Demand-led Redevelopment Project (DL-8:KC)
- Bailey Street / Wing Kwong Street Development Project (KC-009)
- Hung Fook Street / Ngan Hon Street Development Scheme (KC-010)
- Hung Fook Street / Kai Ming Street Development Project (KC-011)
- Wing Kwong Street Development Project (KC-012)
- Kai Ming Street / Wing Kwong Street Development Project (KC-013)
- Wing Kwong Street / Sung On Street Development Project (KC-014)

3.16 The seven URA redevelopment projects will remove the existing old and dilapidated buildings and develop modern residential developments with commercial/retail uses in the low floors, with restructuring of land uses and road network to provide pedestrian walkways and open space in the neighbourhood. A public vehicle park will be provided at KC-009 to relief the on-street parking demand in the neighbourhood. The seven projects are tentatively completed between 2025 and 2027 (refer to **Plan 4** on the location of the 7 URA redevelopment projects).

3.17 To the south-east and north-east of the Scheme near the waterfront are predominately schools, parks and playground. There are several primary and secondary schools in these areas. Hoi Sham Park is one of the larger parks in To Kwa Wan where Hoi Sham Rock and Fishtail Rock are well-known local landmarks.

3.18 To the south of the Scheme near Hok Yuen Street is a mix of industrial and commercial buildings. It appears that the industrial buildings are no

longer engaged in manufacturing activities but are used for office/retail shop or showroom for jewellery products.

3.19 To the north-west of the Scheme opposite To Kwa Wan Road is LCSD's Ma Tau Wai Road/To Kwa Wan Road Garden (the LCSD Garden). The LCSD Garden comprises a children playground and an open plaza. The MTRC To Kwa Wan Station Exit D is also located within it.

3.20 Ko Shan Road Park is located to the west of the Scheme where Ko Shan Theatre and Ko Shan Theatre New Wing are located. It is a popular local venue for holding community events and art performance.

Existing Traffic Network

3.21 The Scheme is broadly bounded by To Kwa Wan Road and Ma Tau Wai Road to the northwest and west, which is a 6-lane two-way district distributor, forming the main traffic road connecting north and south. To the east the Scheme are minor local roads providing connection between street blocks. Some of the local roads are frequently occupied by road-side parking, storage and loading/unloading activities. Hung Fook Street and Kai Ming Street are dead-end roads with a portion of the streets being designated as restricted pedestrian streets and for emergency vehicular use only.

3.22 Under the holistic planning of KCAA1, the URA aims to enhance the walkability of the KCAA1. Through restructuring of the land uses in the redevelopment of the seven commenced projects, URA proposed re-routing of some existing traffic network and to pedestrianize some of the road sections to make the road network more effective. As a result of the restructuring in the KCAA1, it is estimated that the ratio between pedestrian path/walkways and carriageway in the KCAA1 will be improved from about 45%:55% to about 60:40%, representing a higher ratio of pedestrian walkways in the area and a more walkable neighbourhood. The proposed road scheme was approved and gazetted under Roads (Works, Use and Compensation) Ordinance (Chapter 370) on 11 September 2020 and will be implemented in connection with the construction works of the respective URA projects in KCAA1 (**Plan 9**).

3.23 The Scheme, being part of the KCAA1, will integrate with the above planned new traffic and pedestrian networks via the planning and re-structuring proposal in the Scheme and will further enhance the walkability and connectivity of the area with a further increase of the ratio of the pedestrian path against carriageway in the KCAA1. **Figure 1.1 of**

Appendix 1 demonstrates the holistic re-planning of the traffic and pedestrian network in the KCAA1 through the URA's commenced projects and the Scheme, with details of the proposal of the Scheme refers to Section 4 below.

Existing Pedestrian Network

3.24 The Scheme is located next to To Kwa Wan Road and Ma Tau Wai Road which are the major pedestrian corridors in the vicinity. High pedestrian flow is found along the pavement of the two main streets. To the immediate east of the Scheme are three inner streets, i.e. Yuk Shing Street, Hung Fook Street and Kai Ming Street. Pedestrian flow along these three streets are relatively low, likely due to its difficulty in pathfinding and unwelcoming pedestrian environment caused by the car repairing activities, dumping and roadside storage often occupied the pavement of these streets. The whole Yuk Shing Street, a section of Hung Fook Street and Kai Ming Street respectively are included in the Scheme.

Environmental and Hygiene Condition

3.25 The Scheme is bounded by the heavily trafficked Ma Tau Wai Road and To Kwa Wan Road to the immediate west and northwest, and the East Kowloon Corridor (EKC) (elevated road) and Chatham Road North (underneath) to the further west. The Scheme is envisaged to be subject to severe traffic noise and air pollutants generated from the heavy traffic along these major roads.

3.26 Fresh food and vegetable shops, car repairing activities, dumping and road-side storage are found along the inner streets, including Yuk Shing Street, Hung Fook Street and Kai Ming Street. As lack of maintenance and cleaning are observed, there is hygiene problem at some streets and back alleys in the area.

Planned Development in the Vicinity

3.27 The Scheme falls within one of the "Proposed Redevelopment Priority Areas", in the Urban Renewal Plan (URP) prepared by Kowloon City District Urban Renewal Forum (KC DURF). The URP recommended that "*redevelopment should be given priority as the urban renewal approach for the area*". Besides, the URP has identified several locations along the waterfront, including Harbour Centre Tower 2, King Wan Street and Kowloon City Ferry Pier to the east of the Scheme, for waterfront

enhancement proposals with a view to connect the segmented waterfront areas and enhancing the promenade environment in the long term.

3.28 To the northwest of the Scheme across To Kwa Wan Road is the To Kwa Wan MTR Station Exit D of Tuen Ma Line (TML), which is located within the Ma Tau Wai Road / To Kwa Wan Road Garden (the LCSD Garden) under the ownership and management of Leisure and Cultural Services Department (LCSD). To arrive to the MTRC station exit D, pedestrian will need to cross the 6-lane To Kwa Wan Road / Ma Tau Wai Road via the at-grade pedestrian crossings either at the northern or the southern side of the Scheme. It is anticipated that high pedestrian flow will be generated between the neighbourhood of the Scheme and the MTR station exits when the MTR station comes in operation in Q3/2021 (operation time according to MTRC's Press Release in May 2020).

3.29 To the west of the Scheme across EKC, Hong Kong Housing Authority (HKHA) has a public housing site located at the junction between Ko Shan Road and Shansi Street. The site is currently zoned as "R(A)3" with maximum permissible building height of 130mPD. The proposed development involves a single residential tower of 33 storeys to provide about 450 flats and basements for both ancillary and public car parks. The development is tentatively to be completed in 2024.

4 PLANNING & LAND USE PROPOSALS

Development Intensity

4.1 Under the draft DSP, the scheme area in orange color is proposed to be zoned "R(A)", which is primarily for residential use, with the lowest three floors or in the purpose-designed non-residential portion of a building for commercial use as stipulated in the proposed Notes of the "R(A)" zone.

4.2 In the proposed Notes of "R(A)" zone, the proposed PR is 7.5 for domestic building or 9.0 for a building that is partly domestic and partly non-domestic, which is in line with the development intensity of "R(A)" zone under the prevailing Hung Hom OZP. Not less than 5,500 sq.m. non-domestic GFA is proposed for GIC uses in the Scheme. It is proposed a clause to be included in the "Remarks" of the proposed Notes of "R(A)" that "any floor space that is constructed or intended for use solely as GIC facilities, as required by the Government, may be disregarded from GFA/PR calculation". As such, the maximum PR of the proposed development is 9.0 under the DSP, of which PR 7.5 is for domestic uses and PR 1.5 is for non-domestic uses. An addition of about 5,548 sq.m. non-domestic GFA (PR = 1, subject to site survey) will be for GIC uses to be exempted from GFA/PR calculation under the DSP.

4.3 Portion of Hung Fook Street and Kai Ming Street, and the whole section of Yuk Shing Street within the Scheme, which are shown as "Road" under the existing Hung Hom OZP, are proposed to be permanently closed for redevelopment and/or creation of pedestrian walkway and an all-weathered communal space. Given the said road sections would no longer serve the purpose as a traffic road upon redevelopment and the area is proposed to be included for comprehensive redevelopment under "R(A)" zone, the closed road sections within the Scheme will form part of the site area for PR calculation.

4.4 A relaxation of maximum building height from 100mPD to 140mPD is proposed under the draft DSP to enable a higher podium design to satisfy the air quality requirements under the Air Quality Objectives (AQOs) and to mitigate the severe traffic noise generated from the surrounding road traffic (details on technical assessments described in paragraph 4.22 to 4.33). This will not only allow for accommodating GIC facilities with appropriate headroom in the podia, but also facilitate greater design flexibility of the building blocks in the Scheme. The proposed building height of 140mPD in the Scheme is considered compatible with the nearby built environment, which includes Lok Man

Sun Chuen (140mPD) and Ko Shan Road Public Housing Development (130mPD) to the West of the Scheme.

4.5 The proposed development parameters of the Scheme are shown in **Table 4.1**, which will be subject to adjustments in the detailed design stage after DSP's approval.

Table 4.1 Proposed Development Parameters of the Scheme

Parameters	**Details**
Scheme Area	About 6,592 sq.m.
Site Area for PR Calculation*	About 5,548 sq.m. (Subject to survey and detailed design)
Proposed Zoning	"R(A)"
Proposed Maximum Building Height (relaxation of Maximum Building Height of 100mPD under OZP)	Not more than 140mPD
Proposed Maximum Domestic GFA (PR)^	41,610 sq.m. (PR = 7.5)
Proposed Maximum Non-domestic GFA (excluding GIC Provision (PR))^	8,322 sq.m. (PR = 1.5)
Proposed Non-domestic GFA for GIC Provision (PR) ^ # (proposed to be exempted from GFA calculation under DSP)	About 5,548 sq.m. (PR = 1)
Total GFA (PR) under DSP	Around 49,932 sq.m. (9)
Total GFA (PR) under B(P)R (Class B site)	About 55,480 sq.m. (Conform to First Schedule under B(P)R)
No. of Flats@	About 900 flats
Average Flat Size@ (GFA)	About 46 sq.m.
Internal Transport Facilities for the proposed development (including the proposed provision for GIC facilities)	Basement ancillary car park to accommodate: - 114 nos. private car parking spaces (2 nos. for disabled parking) - 14 motor-cycle parking spaces

	- 13 nos. L/UL bays (subject to liaison and agreement with Transport Department)

Notes:

* Site Area for PR Calculation includes all private lots, government lanes, Yuk Shing Street, portions of Hung Fook Street and Kai Ming Street within the Scheme boundary. Public pavement is not included for PR calculation.

^ The exact GFA and PR are subject to TPB approval, detailed design and prevailing First Schedule of Building (Planning) Regulations (B(P)R).

The total GFA shall not exceed the maximum permissible plot ratio under B(P)R.

@ Indicative only, subject to detailed design at project implementation stage.

Conceptual Layout

4.6 As shown in the indicative block plan and the section plan of the notional design for the Scheme in (**Figures 1.2 and 1.3 in Appendix 1**), the proposed development comprises two residential towers on top of commercial/GIC podia (T1 and T2), a low-rise commercial/retail block (the Low Block) with an all-weathered communal space underneath and an ancillary basement car park.

Re-planning and Re-structuring of Traffic and Pedestrian Network to enhance Walkability and Connectivity of Neighbourhood

4.7 The Scheme will involve closure and diversion of three existing road sections to create a car-free zone to enable walkability. Three sections of streets proposed to be closed permanently within the Scheme are: a portion of Hung Fook Street, a portion of Kai Ming Street and the whole of Yuk Shing Street. Yuk Shing Street is currently serving the vehicular accesses for the existing buildings along the two sides of the street. With the demolition of the existing buildings for redevelopment, Yuk Shing Street is no longer required to serve its original purpose. For the portions of Hung Fook Street and Kai Ming Street within the Scheme, they are already closed and converted to Emergency Vehicular Access (EVA) and pedestrian street under the recent approved road gazettal plan (refer to paragraph 3.22 above.) The proposed permanent closure of the two street portions for comprehensive redevelopment in the draft DSP would tally the land uses and status of the two street portions in both planning and land administration.

4.8 With the above re-planning and re-structuring within the Scheme, it can enable a more effective traffic network within the Scheme; while

optimizing the land uses for redevelopment and/or provision of more pedestrian walkways/communal space to create a safe and pleasant pedestrian walking environment. The proposal traffic road diversion and pedestrian walkways within the Scheme would integrate with the planned traffic and pedestrian network in the KCAA1 to manifest the planning gains generated from the district-based planning approach for the wide neighbourhood, comprising both the URA redevelopments and other adjoining existing developments (refers to **Figure 1 of Appendix 1)**. As compared to the ratio 60:40 of the pedestrian path against carriageway in the KCAA1 that was achieved through the recently gazetted road scheme alone as described in paragraph 3.22 above, the Scheme can facilitate a further increase to about 70:30 for betterment of pedestrian walking environment, which will be subject to the approval and gazettal of the road closure and pedestrianisation proposals under Roads (Works, Use and Compensation) Ordinance (Chapter 370) upon implementation of the Scheme in future.

All-weathered Communal Space for the Community

4.9 Situated at the relatively central part of the KCAA1, the Scheme occupies a strategic location in terms of connection between north-south direction and east-west direction. To capture the locational advantage and create a focal point for community gathering and place-making at the KCAA1 neighbourhood, an all-weathered communal space is proposed underneath the Low Block of the Scheme. It will be a covered/semi-covered ground floor/sunken communal space with open-air design to enhance air ventilation and visual openness of the space. It will be provided with sitting-out area and landscaping, and will be connected with the retail shops at the Low Block to bring in vibrancy and attraction to the space and the surrounding streets. The all-weathered communal space would integrate with the adjoining pedestrian walkways and open spaces created by other adjoining URA projects, forming an urban square at the KCAA1, which would become a main community hub for future gathering and place-making opportunities in the KCAA1 neighbourhood. An indicative location and design of the all-weathered communal space is shown in **Figure 1.2 in Appendix 1**.

4.10 To ensure a cohesive design within the KCAA1 and good maintenance, the all-weathered communal space will be designed, owned and managed by the URA or its future joint venture partner or its assignee. It will be opened for the public at reasonable hours.

Building Height Relaxation for Better Urban Design and Building Permeability

4.11 Under the current notional design, T1 is situated at the northern part of the site along To Kwa Wan Road; whereas T2 is situated at southern part of the site along Ma Tau Wai Road. The Low Block is situated at eastern part of the site. To maintain the east-west breezeway across KCAA1 and to create a visual comfort for pedestrian/passengers coming out from the MTR station at the LCSD Garden, T1 is shifted towards the southern side to create a maximum full-height setback of not less than 45m of the residential portion from the northern boundary at Ngan Hon Street to maintain the east-west breezeway. Besides, two intervening spaces/urban windows at the podia is designed to enhance the permeability of the podia and facilitate air ventilation at the street levels (Details on air ventilation refers to section 4.30).

4.12 Given the Scheme adjoins to two heavy traffic roads (i.e. To Kwa Wan Road and Ma Tau Wai Road), two 5-storey podia are designed at T1 and T2, with an aim to raise the residential floors to higher levels to mitigate air and noise impacts according to the respective technical assessments (Details on technical assessments provided in para. 4.22 to 4.33). At the same time, the two proposed residential towers in the Scheme will adopt careful design on block size, disposition and layout to provide sufficient building separation as recommended in the Sustainable Building Design (SBD) Guidelines to improve permeability.

4.13 As a responsive urban design and to address the various environmental constraints including noise impact and air quality concerns, as well as to improve air ventilation and visual permeability as explained above, a staggered height profile for the two tower blocks is proposed, with the higher tower block (T1) of about 140mPD, cascading down to the lower tower block (T2) of not more than 110mPD. The proposed building height design will generally respect the existing urban design and building height profile in the vicinity (including the permissible maximum building height of 140mPD for Lok Man Sun Chuen and permissible 130mPD of the nearby public housing estate to the west) away from the coast.

4.14 A low-rise commercial/retail block (the Low Block) is proposed at the eastern part of the Scheme to further respond to the waterfront and create a spatial and visual comfort among several high-density residential developments in the neighbourhood. With the proposed all-weathered communal space underneath the Low Block, it would further enhance the air flow and visual permeability of the inner part of street blocks in KCAA1.

4.15 Alternatively, should the building height restriction of the scheme area maintain at 100mPD as in the existing OZP, the proposed residential towers would likely require to adopt a wider building form or to have one more residential tower to absorb the permissible GFA. It would inevitably jeopardise the opportunity to maintain good building separation and urban design features to enhance the air penetration and visual permeability of the area.

4.16 Taking into account of the above site constraints and to achieve the urban design consideration, it is proposed to have a relaxation of maximum Building Height Restriction (BHR) of the Scheme from 100mPD to 140mPD. With the proposed increase of building height to 140mPD, residential towers can be designed in staggered height to address site constraints as well as urban design consideration, with more flexible building form and layout to achieve the planning and design merits.

Pedestrianisation and Landscaping

4.17 The closed sections of Hung Fook Street and Kai Ming Street will be pedestrianised with proper landscaping to create a pleasant walking environment and maintain as a breezeway to enhance air ventilation at the street level, with decked over by podium/ footbridges/design features above to provide linkages and connectivity. Special consideration will be given to create a compatible landscape design with the adjoining street environment of the seven commenced URA projects to create a cohesive and attractive landscape.

Provision of GIC to enhance Planning Gain

4.18 To further enhance planning gain and align with "Single Site, Multiple Uses" principle promoted by Government, it is proposed to provide about 5,548sq.m. non-domestic GFA (PR = 1) for provision of GIC facilities within the Scheme to meet the community's need. As a district-based approach, the over 5,000sq.m. of GIC GFA provision can serve the wider neighbourhood on GIC demand and facilitate to accommodate a combination of facilities or facility requiring larger area. The actual use of the GIC provision will be subject to liaison with Planning Department as well as collecting views from the local stakeholders after DSP approval.

4.19 Given the intended GIC use is yet to be confirmed and there is no parking requirement for GIC facilities under the Hong Kong Planning Standards

and Guidelines (HKPSG), a preliminary design of 5 car parking spaces and 2 loading/unloading bays are considered in the notional design to support the future GIC provision. The actual parking provision for GIC will be subject to liaison with relevant Government Departments.

Other Separated Urban Renewal Initiatives to be considered after approval of DSP

Provision of Footbridge between the Scheme and To Kwa Wan MTR Station (Footbridge not form part of the Scheme)

4.20 Situated at the strategic location between the KCAA1 and the To Kwa Wan MTR station, the Scheme provides a valuable opportunity to enhance the connectivity in terms of east-west direction between KCAA1 and the MTR station. In view of the technical constraints including the existence of large scale underground utilities along To Kwa Wan Road/ Ma Tau Wai Road and the protected MTR diaphragm wall underneath MTR station, it is more feasible to provide a footbridge, instead of a subway, to provide a direct linkage between the Scheme and the MTR station.

4.21 A footbridge connection is proposed at the podium of the proposed development in the Scheme to facilitate a possible development of a footbridge to connect with the LCSD Garden where the To Kwa Wan MTR station exits located. The proposed connection will provide a safe and direct route for the neighbourhood to the MTR station without the need to cross the 6-lane To Kwa Wan Road/Ma Tau Wai Road at-grade. Given the proposed footbridge is outside the Scheme, the URA will liaise with the relevant Government Departments on the implementation of the footbridge proposal via a separate revitalisation initiative upon the approval of DSP. Opportunities will also be sought for possible enhancement to the LCSD Garden in conjunction with the proposed footbridge to facilitate its direct landing at the LCSD Garden.

Technical Assessment

Visual Impact Assessment (VIA)

4.22 A Visual Impact Assessment (VIA) was conducted (see **Appendix 2**) to study the potential visual impact with the implementation of the Scheme. Visual appraisal has made reference to the Town Planning Board Guidelines No. 41 and been carried out both locally and at the strategic view point from opposite side of the Victoria Harbour. The proposed

relaxation of building height to 140mPD respects and complements the building height profile of the surrounding context. The study has demonstrated that the proposed development was visually compatible with the surrounding built environment and would not create significant visual impact in general.

Social Impact

4.23 In accordance with the URS, a non-obtrusive SIA (Stage 1) has been conducted and the report is included as **Appendix 3**. The report highlights characteristics of the local population, which will need to be prepared for and borne in mind during the implementation of the Scheme. The Stage 2 SIA report is under preparation based on factual data and opinions collected from the freezing survey and SIA interviews, which has been conducted on the commencement of the Scheme. The Stage 2 SIA report will be submitted to TPB separately. The SIA reports are to assess the likely effect of the implementation of the Scheme and to propose mitigation measures to minimise any social impact.

Traffic Impact

4.24 A TIA (see **Appendix 4**) has been conducted to assess the traffic impact of the Scheme and the proposed provision of internal transport facilities of the proposed development. The TIA has taken into account of the planned road scheme under the KCAA1, which was approved and gazetted for implementation. The TIA demonstrated that the Scheme has no adverse traffic impact on the local traffic network and the pedestrian walking environment. All junctions would operate with ample capacities in design scenario in year 2035 (i.e. 3 years after tentative completion year of proposed development in 2032). The proposed parking provision and the internal transport facilities aligns with the requirements in the HKPSG and are acceptable from traffic engineering point of view. Pedestrian assessment showed that the proposed footbridge connection between podium of proposed development and the To Kwa Wan MTR station will improve the pedestrian walking conditions.

Environmental Aspect

4.25 An Environmental Assessment (EA) (see **Appendix 5**) was conducted to study any potential environmental impact/benefits associated with the implementation of the Scheme. The study concluded that the impact on air quality, noise impact, land contamination and waste management were not insurmountable with mitigation measures adopted if necessary.

4.26 Air quality impact assessment (AQIA) indicated that in view of the local air quality condition, fresh air intake and residential units for the proposed development in the scheme area shall be located at minimum about 27mAG (i.e. about 34mPD) for T1 and 28mAG (i.e. about 35mPD) for T2 above ground to meet the air quality requirement under AQOs.

4.27 On noise assessment, with appropriate noise mitigation measures implemented during the construction period, no adverse impact arising from the construction activities is expected. Based on the notional layout and adoption of mitigated measures such as acoustic fins, acoustic balcony/window, the road traffic noise will be minimized and a noise compliance rate of 90% by flat could be achieved. The potential noise impact from the fixed noise sources has also assessed and no adverse noise impact is anticipated with mitigated measures adopted.

4.28 Land Contamination appraisal was made for the scheme area. It is considered that potential land contamination is very low as the site has been occupied mainly for residential purposes for decades and there was no dangerous good license issued for any activity in the Scheme in EPD's records.

4.29 On waste management, appropriate sustainable measures/approaches to waste management are proposed to produce less waste and reuse or recover value from waste, no adverse environmental impacts arising from handling, storage, transportation or disposal of the wastes generated the construction and operation stage of the Scheme are envisaged.

Air Ventilation

4.30 An Air Ventilation Assessment (AVA) has been conducted to assess the ventilation performance of the area surrounding the Scheme (see **Appendix 6**). A comparison of air ventilation was made between the notional design under the OZP-compliant Scheme (the Baseline Scheme) and the notional design under the draft DSP (the Proposed Scheme). Results indicated that under the Proposed Scheme, the ventilation performance at Kai Ming Street, Hung Fook Street and at the all-weathered communal space are improved compared to the same locations as in the Baseline Scheme under both annual and summer conditions. It indicated that the proposed design features including the residential portion setback and provision of urban intervening spaces/urban windows at the podia of the Proposed Scheme can

facilitate the air breezeway along Kai Ming Street and Hung Fook Street respectively. Besides, the design of the Low Block in the Proposed Scheme with an all-weathered communal space underneath can enhance the air movement at the street level as compared to the Baseline Scheme under OZP-compliant Scheme. It is concluded that no adverse air ventilation impact, if not better, is anticipated for the Proposed Scheme as compared to the Baseline Scheme.

Drainage and Sewerage Impact

4.31 A Drainage and Sewerage Impact Assessment (DSIA) was conducted (see **Appendix 7**). The DSIA report has taken into account of the planned drainage and sewerage upgrading works committed under the other adjacent URA projects in assessment. It concluded that the impact on the capacities of the existing/planned drainage and sewerage system due to the increase in population from the proposed development of the Scheme will be acceptable. The existing/planned public drainage network and public sewerage system would have sufficient capacity to cater for the proposed development. Except for the proposed new pipes to connect the drainage and sewerage discharge of the proposed development to the public system, no upgrade plan of sewerage and drainage system for the proposed development are required.

Water Supply Impact Assessment

4.32 Water Supply Impact Assessment (WSIA) was also conducted (see **Appendix 8**). Findings of WSIA concluded that there would be no adverse impact to the water supply due to the proposed development.

Quantitative Risk Assessment

4.33 Quantitative Risk Assessment (QRA) was conducted (see **Appendix 9)** to assess risk impact arising from Liquefied Petroleum Gas (LPG) Compound of Lok Man Sun Chuen, which is located to the west of the Scheme. Assessment results shown that risk level is in acceptable level and no mitigation measure is required in the site.

5 PLANNING MERTIS

5.1 The Scheme will provide the following planning and environmental benefits:-

- Re-structuring and rationalising the land uses in the Scheme to enhance walkability and connectivity of the neighbourhood;
- Create the opportunity at the Scheme for possible footbridge proposal across Ma Tau Wai Road under URA's separate revitalisation initiatives to enhance the connectivity between the KCAA1 neighbourhood with the future MTR station;
- Creation of an all-weathered communal space with retail elements to create a vibrant hub in the neighbourhood for leisure and place-making opportunities;
- Provision of not less than 5,500sq.m. non-domestic GFA for GIC to enhance planning gains to the community;
- Redevelop existing dilapidated buildings within the Scheme into quality residential development with commercial/retail/GIC podia to meet modern standards and contribute to more housing supply in the urban area; and
- Enhancing the townscape, urban design and environment through sensible building layout and design.

6 IMPLEMENTATION OF THE DEVELOPMENT SCHEME

6.1. The URA does not own or lease any land within the boundaries of the Scheme and will acquire all the private lots within the Development Scheme boundary. The URA intends to acquire the property within the Scheme boundary by purchase under the current acquisition policy. An owner of domestic and non-domestic property will receive the market value of his property (valued on vacant possession basis). As for the owner-occupier of domestic property, on top of the said market value, the URA will pay a Home Purchase Allowance, which is assessed based on a 7-year notional replacement unit of similar size within the same locality.

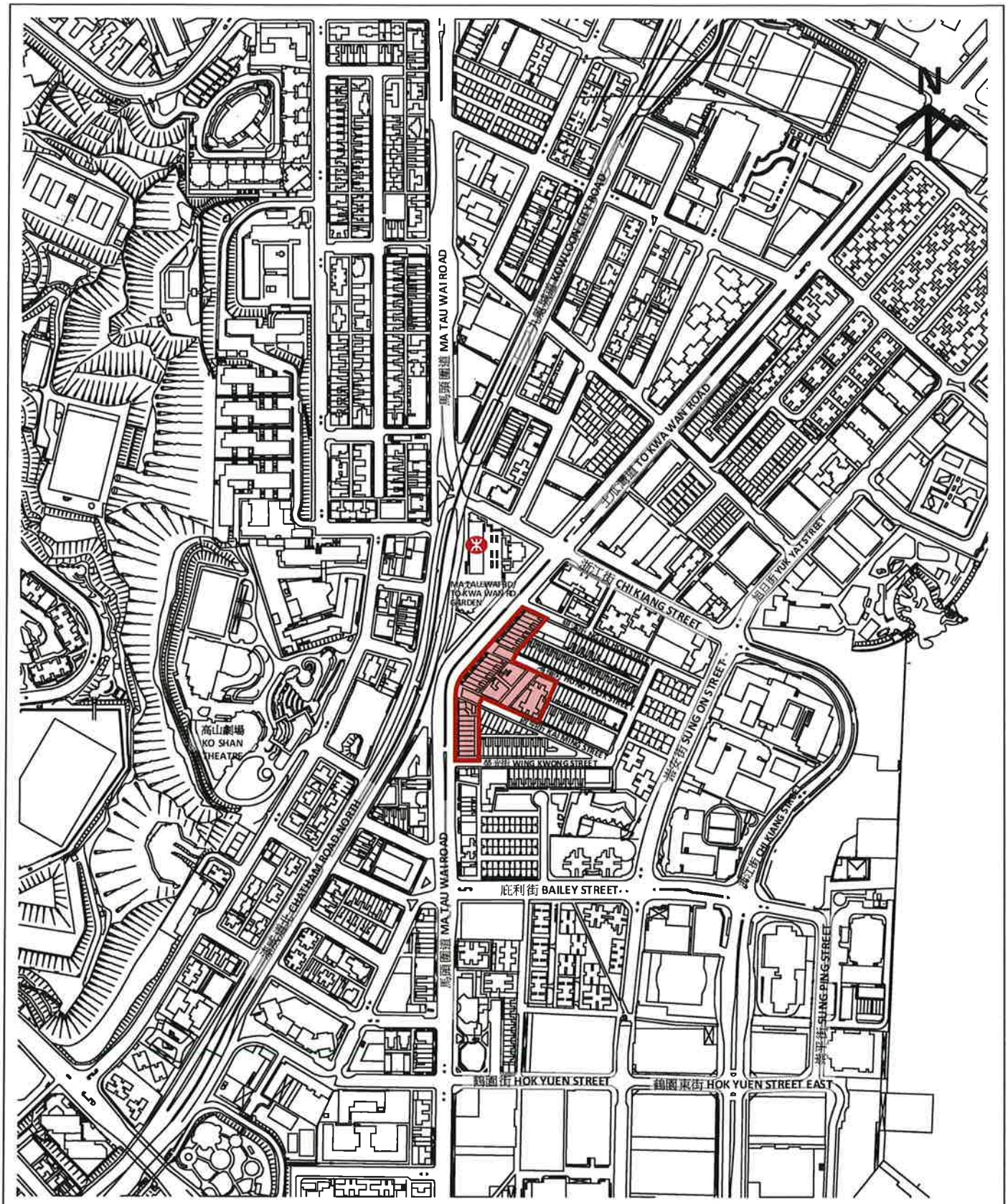
6.2. Supplementary documents detailing the implementation programme for the Scheme is attached in **Appendix 10**. The URA may implement the Scheme in association with one or more parties or implementing the Scheme by itself alone.

6.3. Supplementary documents detailing The URA's rehousing, compensation, acquisition and resumption principles, which is subject to prevailing policies at the time of issuing acquisition offers, are attached in **Appendices 11 and 12** respectively.

6.4 Any information contained in this document relating to compensation and re-housing arrangement are with reference to the URA's prevailing policy on compensation and re-housing arrangement ("Compensation Package") offered by the URA to owners/ tenants at the time of issuance of this document. The Compensation Package may be subject to change from time to time upon any review carried out by the URA. The Compensation Package to be offered by the URA to owners/ tenants affected by the URA's project shall be that Compensation Package prevailing at the time of offer. Nothing contained in this document shall constitute any representation or warranty on the part of the URA or give rise to any expectation that the Compensation Package contained in this document will not be changed at the time of implementation of the project.

URBAN RENEWAL AUTHORITY

March 2021



THE SCHEME

TO KWA WAN MTR STATION EXITS

EXTRACT PLAN PREPARED ON 20.11.2020 BASED ON SURVEY SHEET No. 11-NE-16A, 11-NE-16C, 11-NE-21A, 11-NW-20B,11-NW-20D, 11-NW-25B

LOCATION PLAN

DEVELOPMENT SCHEME

AT TO KWA WAN ROAD / WING KWONG STREET

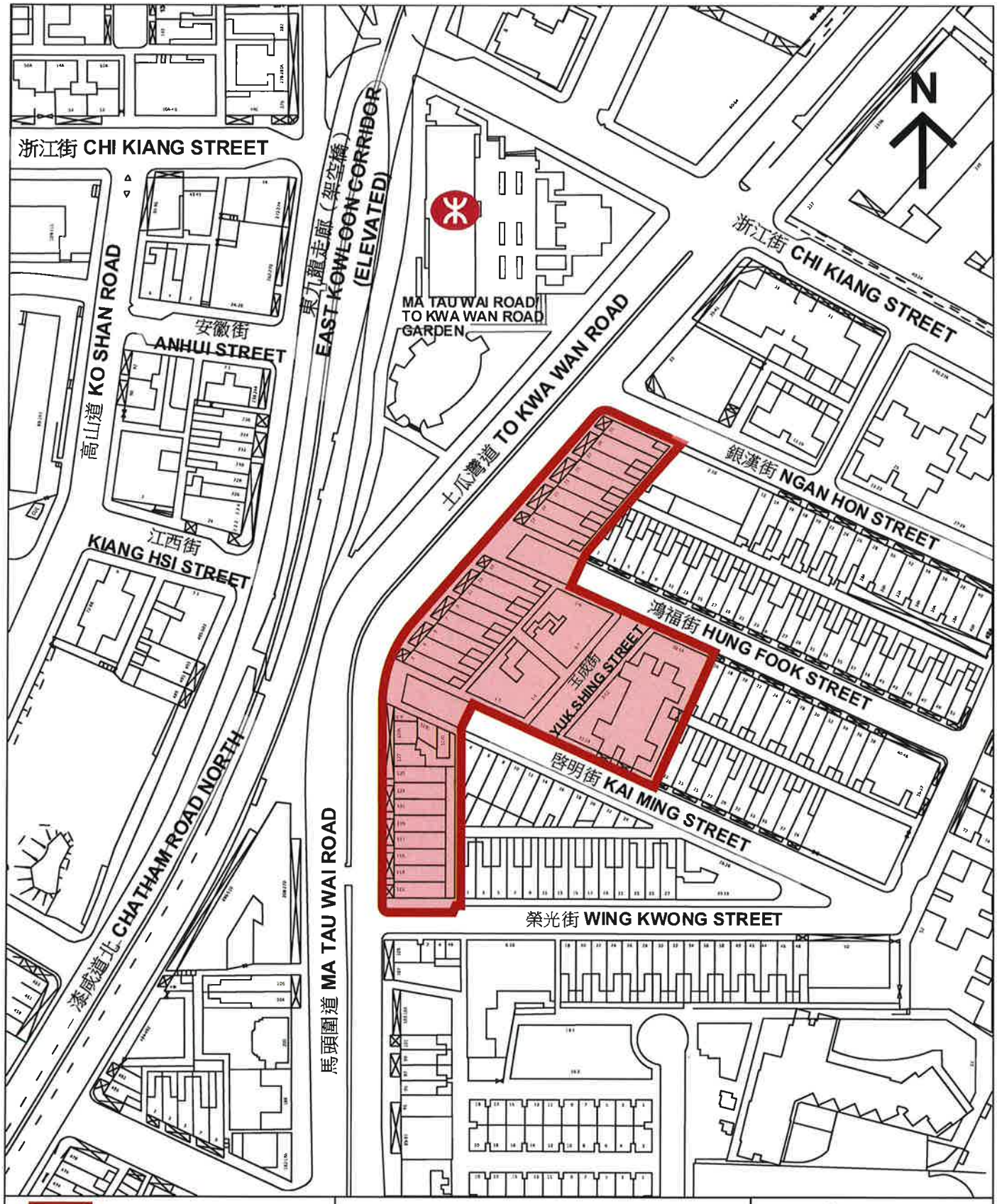
SCALE 1 : 5000

METRES 100 0 100 200 METRES

市區重建局
URBAN RENEWAL AUTHORITY

KC-016

PLAN 1



THE SCHEME

TO KWA WAN MTR STATION EXITS

EXTRACT PLAN PREPARED ON 20.11.2020
BASED ON SURVEY SHEET No.11-NE-16C, 11-NW-20D

SCHEME AREA

DEVELOPMENT SCHEME
AT TO KWA WAN ROAD / WING KWONG STREET

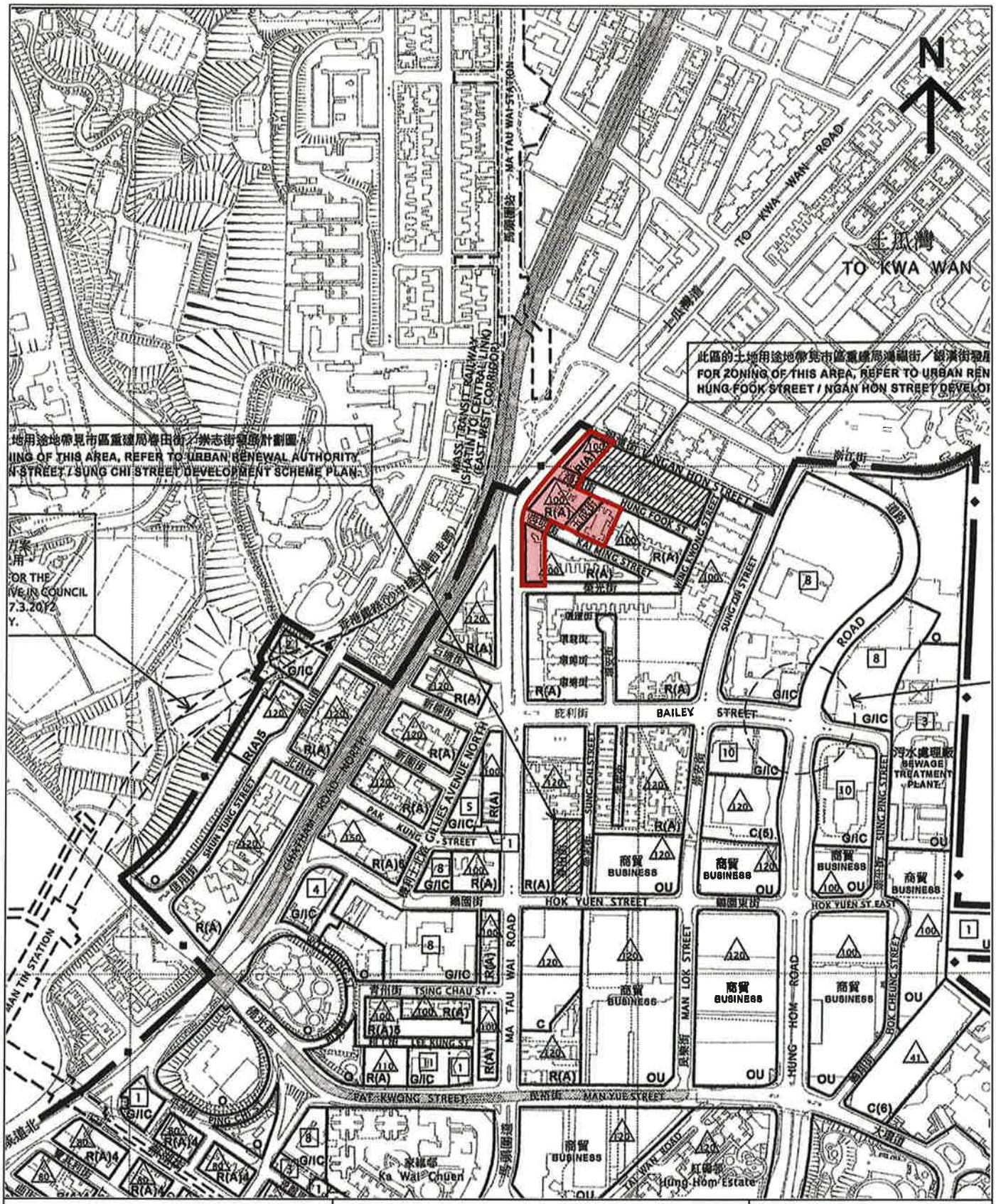
SCALE 1 : 1500

METRES 15 0 15 30 45 60 75 METRES

市區重建局
URBAN RENEWAL AUTHORITY

KC-016

PLAN 2



THE SCHEME

EXTRACT PLAN BASED ON
APPROVED HUNG HOM OUTLINE ZONING
PLAN No.S/K9/26

EXISTING ZONING OF THE DEVELOPMENT SCHEME

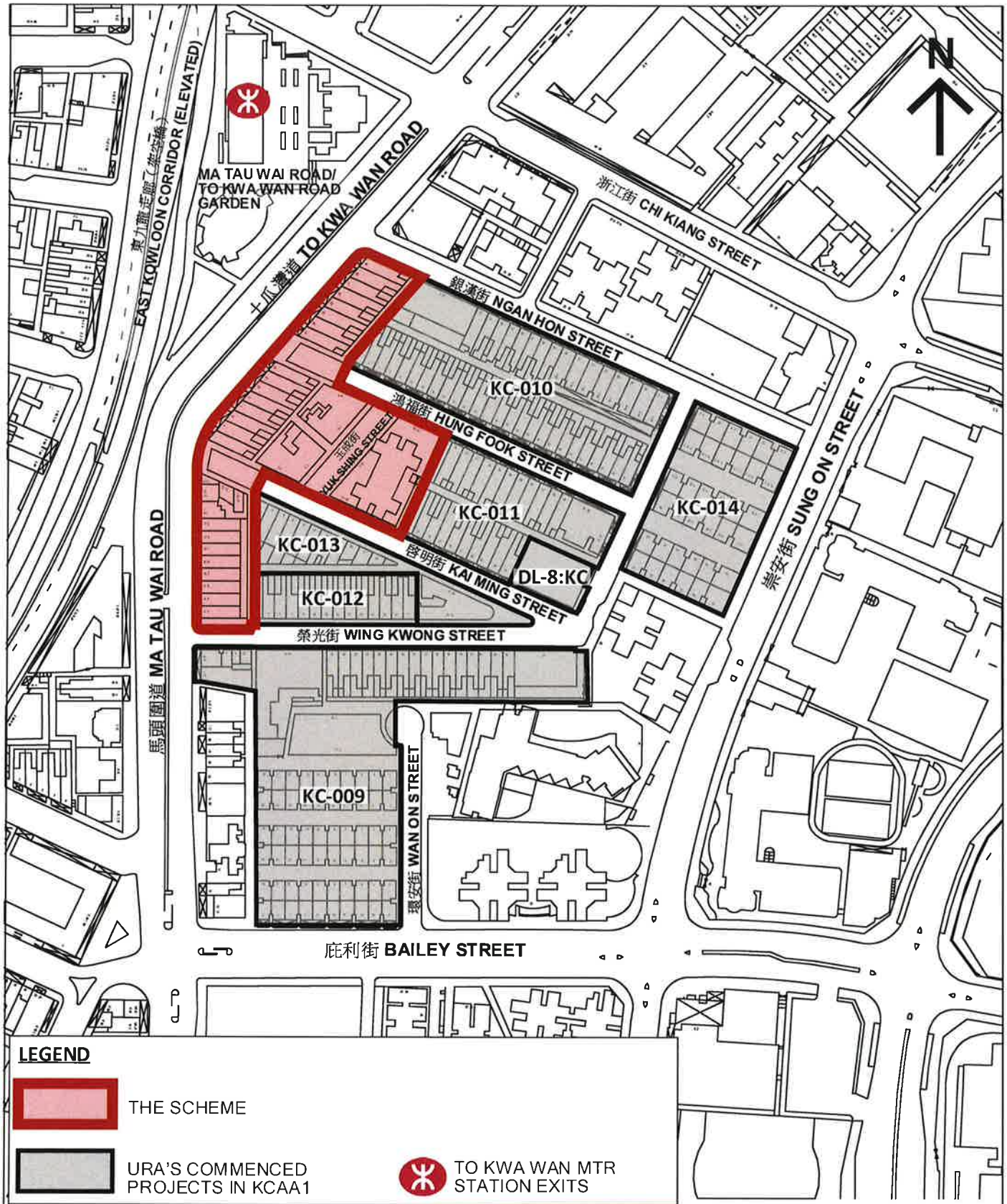
DEVELOPMENT SCHEME
AT TO KWA WAN ROAD / WING KWONG STREET
SCALE 1 : 5000

METRES 100 0 100 200 METRES

市區重建局
URBAN RENEWAL AUTHORITY

KC-016

PLAN 3



EXTRACT PLAN PREPARED ON 20.11.2020
BASED ON SURVEY SHEET No.11-NE-16C, 11-NW-20D

THE SCHEME & SURROUNDING URA PROJECTS IN KCAA1

DEVELOPMENT SCHEME
AT TO KWA WAN ROAD / WING KWONG STREET

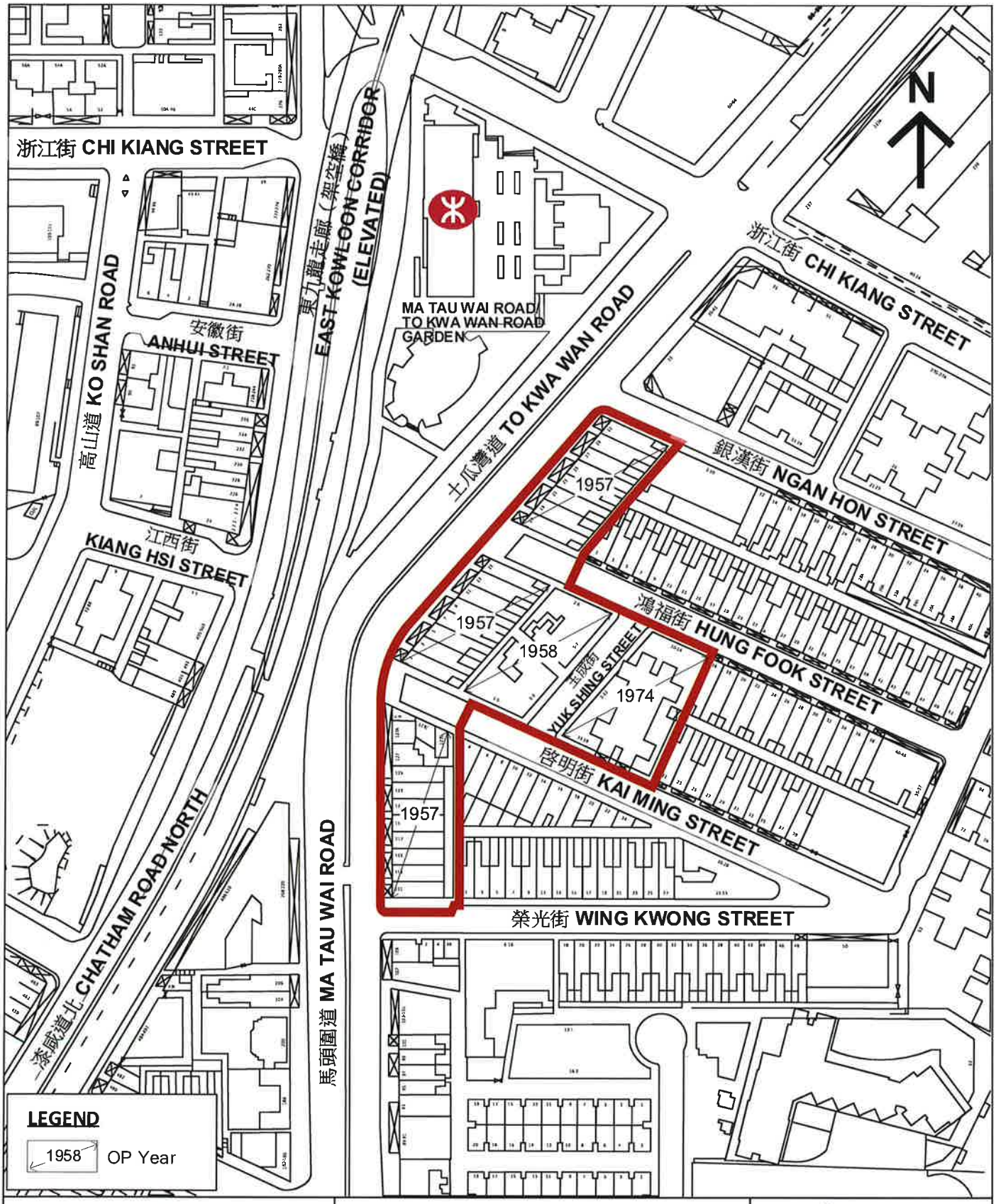
SCALE 1 : 2000

METRES 20 0 20 40 60 80 100 METRES

市區重建局
URBAN RENEWAL AUTHORITY

KC-016

PLAN 4



EXTRACT PLAN PREPARED ON 20.11.2020
BASED ON SURVEY SHEET No.11-NE-16C, 11-NW-20D

BUILDING AGE

DEVELOPMENT SCHEME
AT TO KWA WAN ROAD / WING KWONG STREET

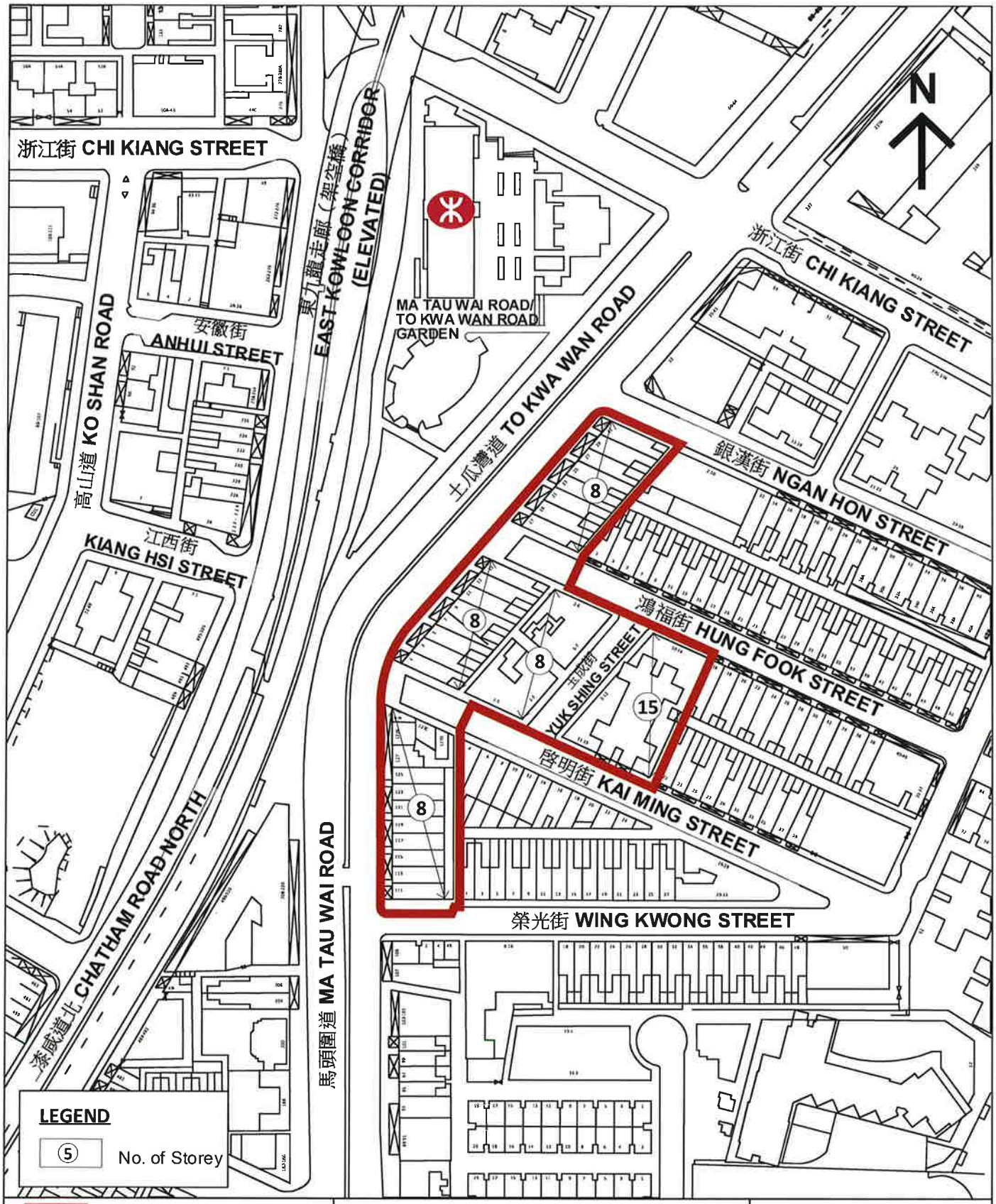
SCALE 1 : 1500

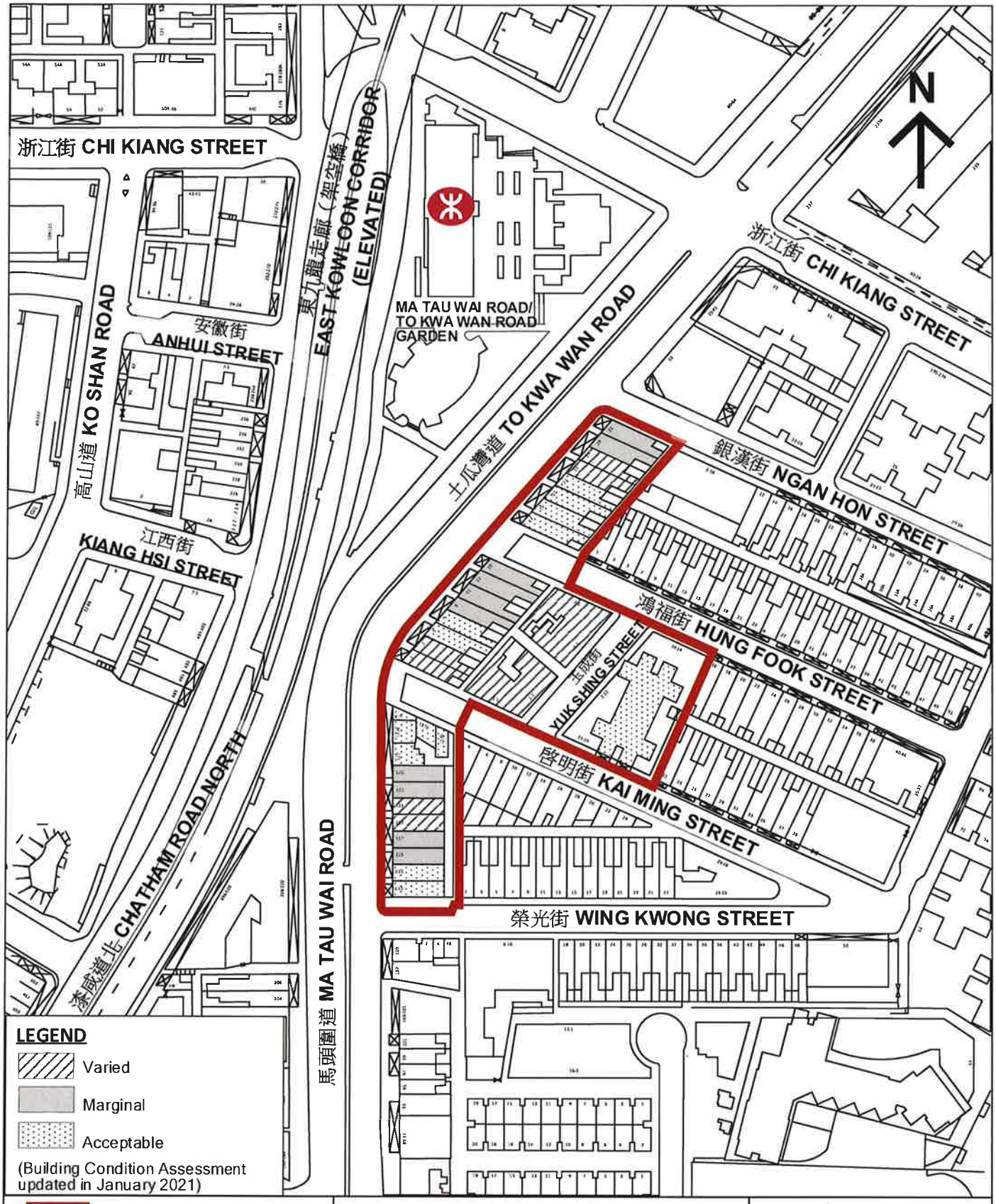
METRES 15 0 15 30 45 60 75 METRES

市區重建局
URBAN RENEWAL AUTHORITY

KC-016

PLAN 5


浙江街 CHI KIANG STREET
高山道 KO SHAN ROAD
安徽街 ANHUI STREET
江西街 KIANG HSI STREET
東九龍走廊（架空橋） EAST KOWLOON CORRIDOR (ELEVATED)
MA TAU WAI ROAD/ TO KWA WAN ROAD GARDEN
土瓜灣道 TO KWA WAN ROAD
浙江街 CHI KIANG STREET
銀漢街 NGAN HON STREET
鴻福街 HUNG FOOK STREET
玉成街 YUK SHING STREET
啓明街 KAI MING STREET
榮光街 WING KWONG STREET
漆咸道北 CHATHAM ROAD NORTH
馬頭圍道 MA TAU WAI ROAD
N
8
8
8
8
15
LEGEND
⑤ No. of Storey
THE SCHEME
TO KWA WAN MTR STATION EXITS
EXTRACT PLAN PREPARED ON 20.11.2020
BASED ON SURVEY SHEET No.11-NE-16C, 11-NW-20D
BUILDING HEIGHT
DEVELOPMENT SCHEME
AT TO KWA WAN ROAD / WING KWONG STREET
SCALE 1 : 1500
METRES 15 0 15 30 45 60 75 METRES
市區重建局
URBAN RENEWAL AUTHORITY
KC-016
PLAN 6



THE SCHEME

TO KWA WAN MTR STATION EXITS

EXTRACT PLAN PREPARED ON 20.11.2020
BASED ON SURVEY SHEET No.11-NE-16C, 11-NW-20D

BUILDING CONDITION

DEVELOPMENT SCHEME
AT TO KWA WAN ROAD / WING KWONG STREET

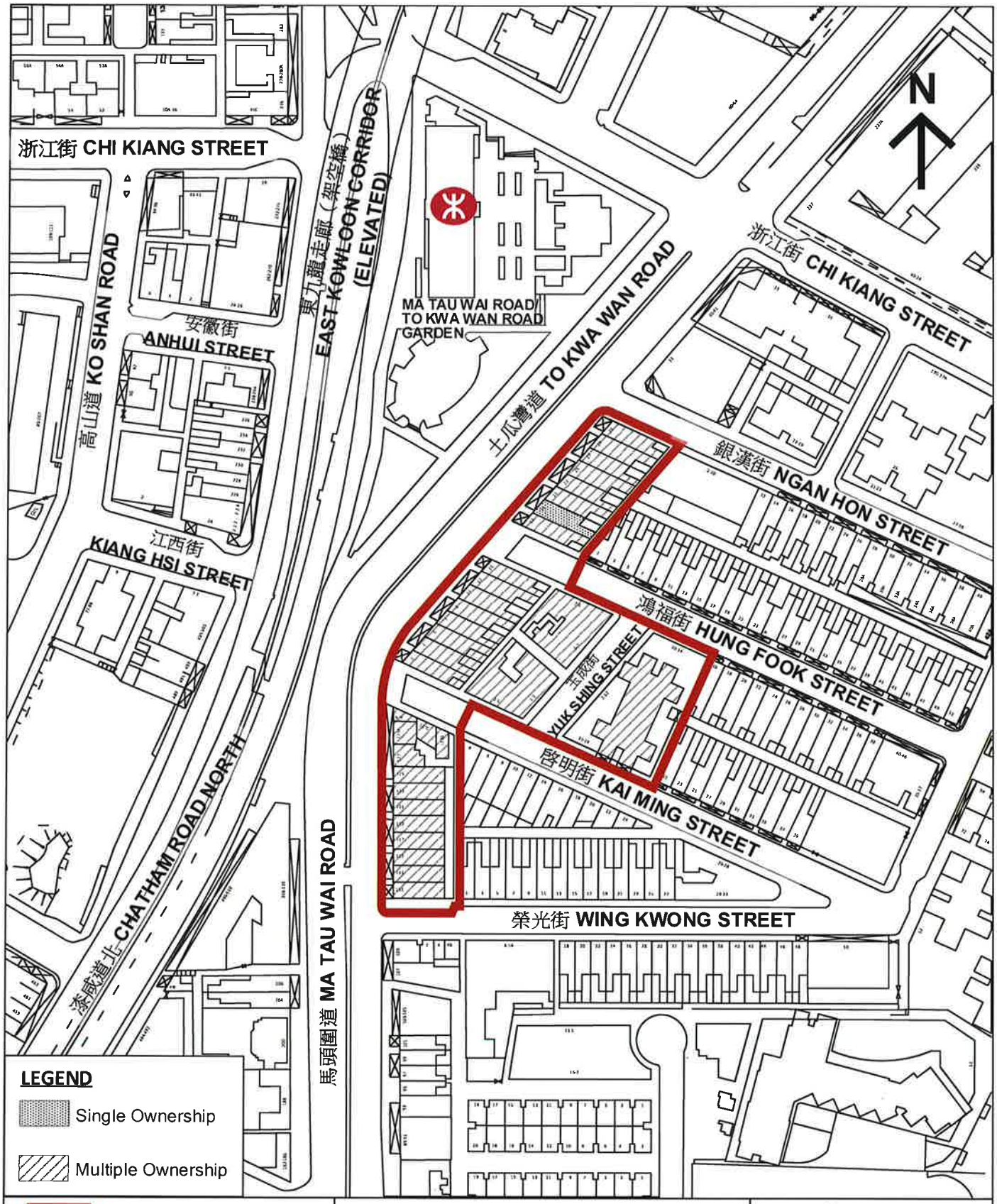
SCALE 1 : 1500

METRES 15 0 15 30 45 60 75 METRES

市區重建局
URBAN RENEWAL AUTHORITY

KC-016

PLAN 7



THE SCHEME

TO KWA WAN MTR STATION EXITS

EXTRACT PLAN PREPARED ON 20.11.2020
BASED ON SURVEY SHEET No.11-NE-16C, 11-NW-20D

OWNERSHIP PATTERN

DEVELOPMENT SCHEME
AT TO KWA WAN ROAD / WING KWONG STREET

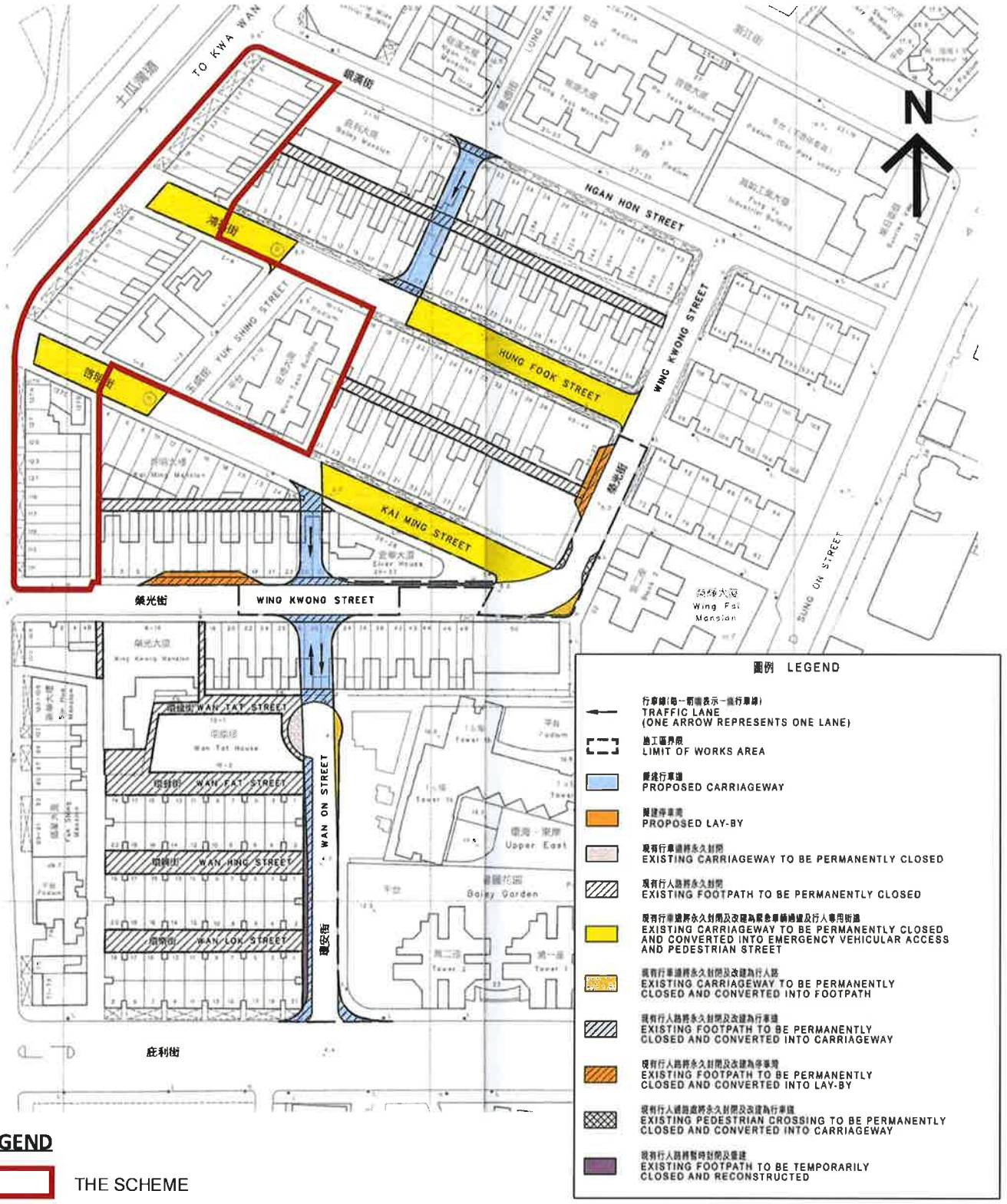
SCALE 1 : 1500

METRES 15 0 15 30 45 60 75 METRES

市區重建局
URBAN RENEWAL AUTHORITY

KC-016

PLAN 8



EXTRACT PLAN PREPARED ON 18.12.2020
BASED ON GAZETTED PLAN NO. KM10291
PUBLISHED ON 15 MAY 2020

THE SCHEME AND THE GAZETTED ROAD SCHEME OF KCAA1

DEVELOPMENT SCHEME

AT TO KWA WAN ROAD / WING KWONG STREET

SCALE 1 : 1500

METRES 15 0 15 30 45 60 75 METRES

市區重建局
URBAN RENEWAL AUTHORITY

KC-016

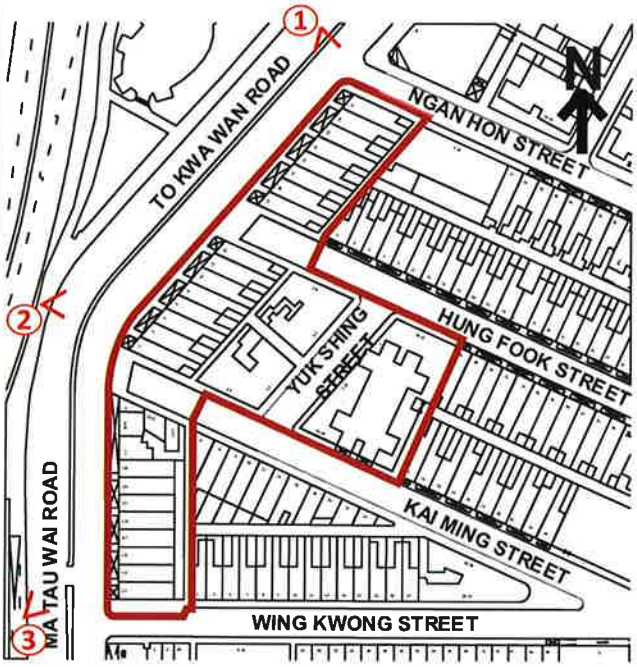
PLAN 9



VIEW 1: BUILDINGS WITHIN SCHEME AREA ALONG TO KWA WAN ROAD



VIEW 2: BUILDINGS WITHIN SCHEME AREA ALONG TO KWA WAN ROAD





VIEW 3: BUILDINGS WITHIN SCHEME AREA ALONG MA TAU WAI ROAD

THE SCHEME

PHOTOS TAKEN IN NOVEMBER 2020

SITE PHOTOS

DEVELOPMENT SCHEME
AT TO KWA WAN ROAD / WING KWONG STREET

市區重建局
URBAN RENEWAL AUTHORITY

KC-016

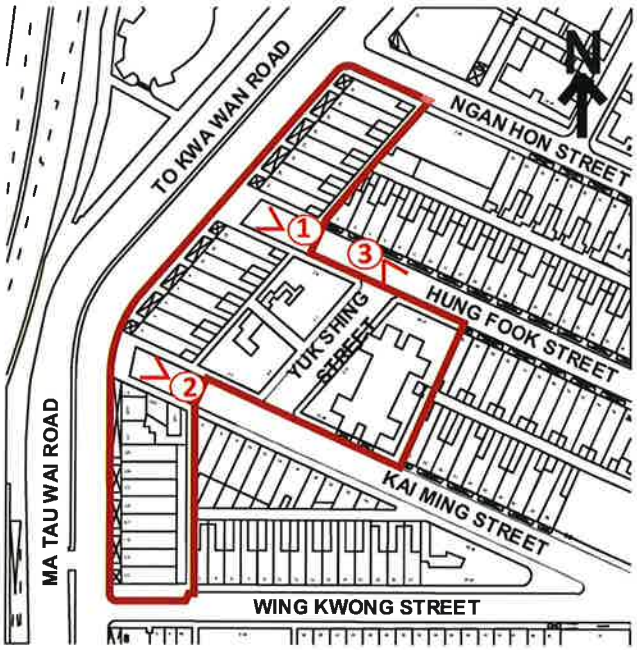
PLAN 10



VIEW 1: HUNG FOOK STREET (DEAD-END ROAD, RESTRICTED PEDESTRIAN STREET FOR EMERGENCY USE ONLY)



VIEW 2: KAI MING STREET (DEAD-END ROAD, RESTRICTED PEDESTRIAN STREET FOR EMERGENCY USE ONLY)





VIEW 3: WONG TECK BUILDING

THE SCHEME

PHOTOS TAKEN IN NOVEMBER 2020

SITE PHOTOS

DEVELOPMENT SCHEME
AT TO KWA WAN ROAD / WING KWONG STREET

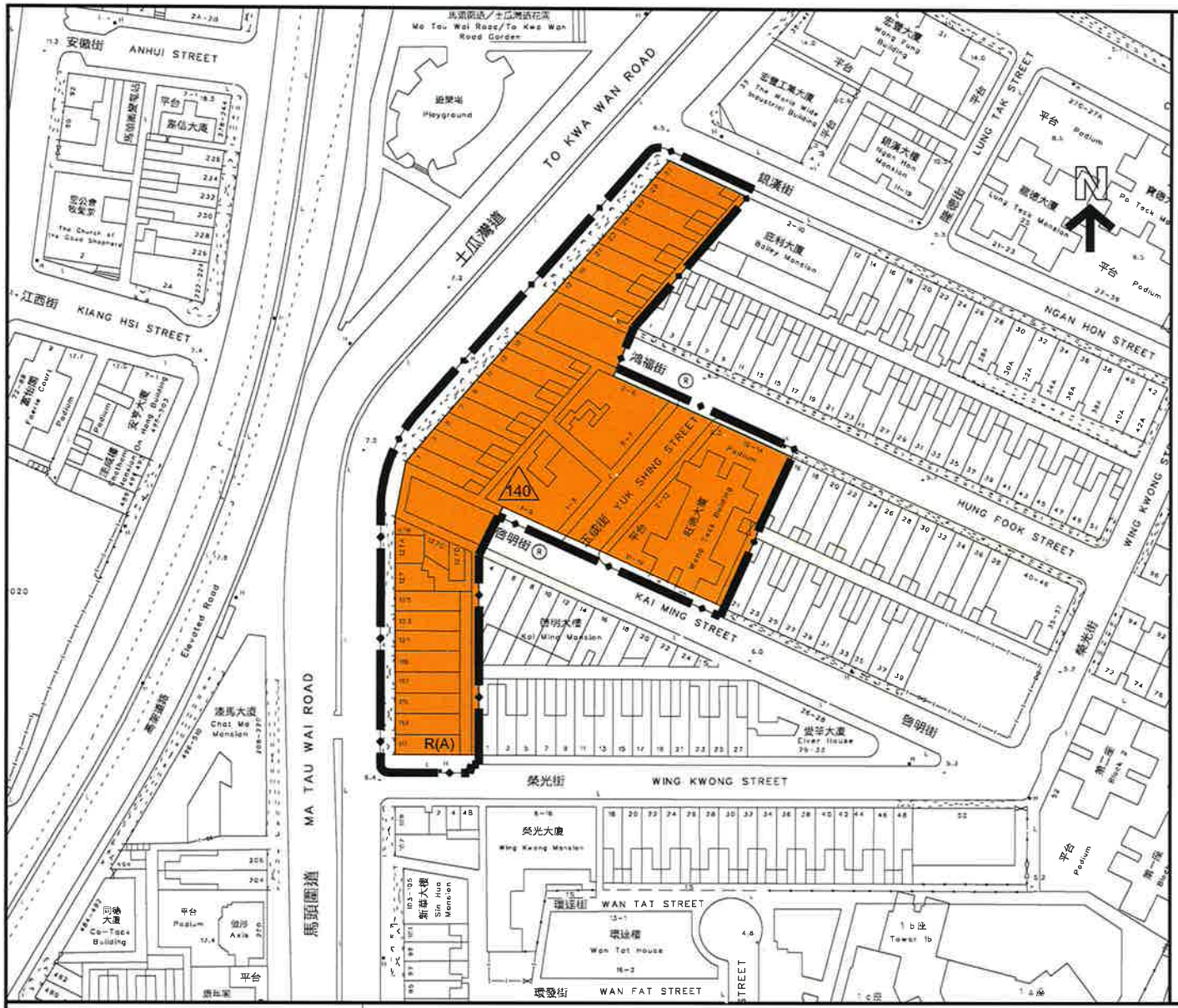
市區重建局
URBAN RENEWAL AUTHORITY

KC-016

PLAN 11

PART 2

THE DRAFT PLAN



圖例
NOTATION

BOUNDARY OF DEVELOPMENT SCHEME ..... 發展計劃範圍界線

RESIDENTIAL (GROUP A) ..... R(A) ..... 住宅(甲類)

MAXIMUM BUILDING HEIGHT (IN METRES ABOVE PRINCIPAL DATUM) ..... 140 ..... 最高建築物高度(在主水平基準上若干米)

夾附的<<註釋>>屬這份圖則的一部分

THE ATTACHED NOTES ALSO FORM PART OF THIS PLAN

2021年 月 日城市規劃委員會根據市區重建局條例第25(6)(a)條視為圖則獲宣布。並於2021年 月 日按照城市規劃條例第5條展示。

PLAN DEEMED SUITABLE BY THE TOWN PLANNING BOARD FOR PUBLICATION UNDER SECTION 25(6)(a) OF THE URBAN RENEWAL AUTHORITY ORDINANCE ON 2021 AND EXHIBITED UNDER SECTION 5 OF THE TOWN PLANNING ORDINANCE ON 2021.

SECRETARY, TOWN PLANNING BOARD 城市規劃委員會秘書

香港城市規劃委員會依據城市規劃條例擬備的市區重建局土瓜灣道/榮光街發展計劃圖則
TOWN PLANNING ORDINANCE, HONG KONG TOWN PLANNING BOARD URBAN RENEWAL AUTHORITY TO KWA WAN ROAD / WING KWONG STREET DEVELOPMENT SCHEME PLAN

SCALE 1 : 1000 比例尺

※ METRES 10 0 10 20 30 40 50 METRES※

依據市區重建局條例第25(3)(a)條擬備
PREPARED UNDER SECTION 25(3)(a) OF THE URBAN RENEWAL AUTHORITY ORDINANCE

圖則編號 PLAN No. S/K9/URA3/A

DRAFT URBAN RENEWAL AUTHORITY
TO KWA WAN ROAD / WING KWONG STREET
DEVELOPMENT SCHEME PLAN NO. S/K9/URA3/A

(Being a Draft Plan for the Purposes of the Town Planning Ordinance prepared by the Urban Renewal Authority under section 25 of the Urban Renewal Authority Ordinance)

NOTES

(N.B. These form part of the Plan)

(1) These Notes show the uses or developments on land falling within the boundaries of the Plan which are always permitted and which may be permitted by the Town Planning Board, with or without conditions, on application. Where permission from the Town Planning Board for a use or development is required, the application for such permission should be made in a prescribed form. The application shall be addressed to the Secretary of the Town Planning Board, from whom the prescribed application form may be obtained.

(2) Any use or development which is always permitted or may be permitted in accordance with these Notes must also conform to any other relevant legislation, the conditions of the Government lease concerned, and any other Government requirements, as may be applicable.

(3) (a) No action is required to make the existing use of any land or building conform to this Plan until there is a material change of use or the building is redeveloped.

(b) Any material change of use or any other development (except minor alteration and/or modification to the development of the land or building in respect of the existing use which is always permitted) or redevelopment must be always permitted in terms of the Plan or, if permission is required, in accordance with the permission granted by the Town Planning Board.

(c) For the purposes of subparagraph (a) above, "existing use of any land or building" means –

(i) before the publication in the Gazette of the notice of the first statutory plan covering the land or building (hereafter referred as 'the first plan');

- a use in existence before the publication of the first plan which has continued since it came into existence; or

- a use or a change of use approved under the Buildings Ordinance which relates to an existing building; and

(ii) after the publication of the first plan,

- a use permitted under a plan which was effected during the effective period of that plan and has continued since it was effected; or

- a use or a change of use approved under the Buildings Ordinance which relates to an existing building and permitted under a plan prevailing at the time when the use or change of use was approved.

(4) Except as otherwise specified by the Town Planning Board, when a use or material change of use is effected or a development or redevelopment is undertaken, as always permitted in terms of the Plan or in accordance with a permission granted by the Town Planning Board, all permissions granted by the Town Planning Board in respect of the site of the use or material change of use or development or redevelopment shall lapse.

(5) Road widths, road junctions and alignments of roads may be subject to minor adjustments as detailed planning proceeds.

(6) Temporary uses (expected to be 5 years or less) of any land or building are always permitted as long as they comply with any other relevant legislation, the conditions of the Government lease concerned, and any other Government requirements, and there is no need for these to conform to the zoned use or these Notes. For temporary uses expected to be over 5 years, the uses must conform to the zoned use or these Notes.

(7) The following uses or developments are always permitted on land falling within the boundaries of the Plan except where the uses or developments are specified in Column 2 of the Schedule of Uses:

(a) provision, maintenance or repair of plant nursery, amenity planting, open space, rain shelter, refreshment kiosk, road, bus/public light bus stop or lay-by, cycle track, Mass Transit Railway station entrance, Mass Transit Railway structure below ground level, taxi rank, nullah, public utility pipeline, electricity mast, lamp pole, telephone booth, telecommunications radio base station, automatic teller machine and shrine; and

(b) geotechnical works, local public works, road works, sewerage works, drainage works, environmental improvement works, marine related facilities, waterworks (excluding works on service reservoir) and such

other public works co-ordinated or implemented by Government.

(8) Unless otherwise specified, all building, engineering and other operations incidental to and all uses directly related and ancillary to the permitted uses and developments within the same zone are always permitted and no separate permission is required.

(9) In these Notes, "existing building" means a building, including a structure, which is physically existing and is in compliance with any relevant legislation and the conditions of the Government lease concerned.

(10) Any development not compatible with the Urban Renewal Authority's Development Scheme for the area is prohibited by virtue of section 25(4) of the Urban Renewal Authority Ordinance.

DRAFT URBAN RENEWAL AUTHORITY
TO KWA WAN ROAD / WING KWONG STREET
DEVELOPMENT SCHEME PLAN NO. S/K9/URA3/A

Schedule of Uses

	Page
RESIDENTIAL (GROUP A)	1

S/K9/URA3/A

RESIDENTIAL (GROUP A)

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
Ambulance Depot	Commercial Bathhouse/ Massage Establishment
Flat	Eating Place
Government Use (not elsewhere specified)	Education Institution
House	Exhibition or Convention Hall
Library	Government Refuse Collection Point
Market	Hospital
Place of Recreation, Sports or Culture	Hotel
Public Clinic	Institutional Use (not elsewhere specified)
Public Transport Terminus or Station (excluding open-air terminus or station)	Mass Transit Railway Vent Shaft and/or Other Structure above Ground Level other than Entrances
Residential Institution	Office
School (in free-standing purpose-designed building only)	Petrol Filling Station
Social Welfare Facility	Place of Entertainment
Utility Installation for Private Project	Private Club
	Public Convenience
	Public Transport Terminus or Station (not elsewhere specified)
	Public Utility Installation
	Public Vehicle Park (excluding container vehicle)
	Religious Institution
	School (not elsewhere specified)
	Shop and Services (not elsewhere specified)
	Training Centre

(Please see next page)

RESIDENTIAL (GROUP A) (Cont'd)

In addition, the following uses are always permitted (a) on the lowest three floors of a building, taken to include basements; or (b) in the purpose-designed non-residential portion of a building, both excluding floors containing wholly or mainly car parking, loading / unloading bay and / or plant room:
Eating Place Educational Institution Institutional Use (not elsewhere specified) Off-course Betting Centre Office Place of Entertainment Private Club Public Convenience Recyclable Collection Centre School Shop and Services Training Centre

Planning Intention

This zone is intended primarily for high-density residential developments. Commercial uses are always permitted on the lowest three floors of a building or in the purpose-designed non-residential portion of a building.

Remarks

(1) No new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in the plot ratio for the building upon development and/or redevelopment in excess of 7.5 for a domestic building or 9.0 for a building that is partly domestic and partly non-domestic, or the plot ratio of the existing building, whichever is the greater. Except where the plot ratio is permitted to be exceeded under paragraphs (6) and/or (7) hereof, under no circumstances shall the plot ratio for the domestic part of any building, to which this paragraph applies, exceed 7.5.

(2) For a non-domestic building to be erected on the site, the maximum plot ratio shall not exceed 9.0 except where the plot ratio is permitted to be exceeded under paragraphs (6) and/or (7) hereof.

(Please see next page)

RESIDENTIAL (GROUP A) (Cont'd)

Remarks (Cont'd)

(3) For the purposes of paragraph (1) above, no addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of the relevant maximum domestic and/or non-domestic plot ratio(s), or the domestic and/or non-domestic port ratio(s) or the existing building, whichever is the greater, subject to, as applicable –

(i) the plot ratio(s) of the existing building shall apply only if any addition, alteration and/or modification to or redevelopment of an existing building is for the same type of building as the existing building, i.e. domestic, non-domestic, or partly domestic and partly non-domestic building; or

(ii) the maximum domestic and/or non-domestic plot ratio(s) stated in paragraph (1) above shall apply if any addition, alteration and/or modification to or redevelopment of an existing building is not for the same type of building as the existing building, i.e. domestic, non-domestic, or partly domestic and partly non-domestic building.

(4) In determining the relevant maximum plot ratio for the purposes of paragraph (1) and (2) above, any floor space that is constructed or intended for use solely as car park, loading/ unloading bay, plant room, caretaker's office, or caretaker's quarters and recreational facilities for the use and benefit of all the owners or occupiers of the domestic building or domestic part of the building, provided such uses and facilities are ancillary and directly related to the development or redevelopment, can be disregarded. Any floor space that is constructed or intended for use solely as Government, institution or community facilities, as required by the Government, may also be disregarded.

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

(Please see next page)

RESIDENTIAL (GROUP A) (Cont'd)

Remarks (Cont'd)

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

(7) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the plot ratio and building height restrictions as stated in paragraphs (1), (2) and (5) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

DRAFT URBAN RENEWAL AUTHORITY

TO KWA WAN ROAD / WING KWONG STREET

DEVELOPMENT SCHEME PLAN NO. S/K9/URA3/A

EXPLANATORY STATEMENT

DRAFT URBAN RENEWAL AUTHORITY

TO KWA WAN ROAD / WING KWONG STREET

DEVELOPMENT SCHEME PLAN NO. S/K9/URA3/A

Contents

		Page
1.	INTRODUCTION	1
2.	AUTHORITY FOR THE PLAN AND PROCEDURES	1
3.	OBJECT OF THE PLAN	2
4.	NOTES OF THE PLAN	2
5.	AREA COVERED BY THE PLAN	3
6.	EXISTING CONDITIONS	3
7.	PLANNING AND LAND USE PROPOSALS	4
8.	IMPLEMENTATION OF THE DEVELOPMENT SCHEME	6

DRAFT URBAN RENEWAL AUTHORITY TO KWA WAN ROAD / WING KWONG STREET DEVELOPMENT SCHEME PLAN NO. S/K9/URA3/A

(Being a Draft Plan for the Purposes of the Town Planning Ordinance prepared by the Urban Renewal Authority under section 25 of the Urban Renewal Authority Ordinance)

EXPLANATORY STATEMENT

Note: For the purposes of the Town Planning Ordinance (the Ordinance), this statement shall not be deemed to constitute a part of the Plan.

1. INTRODUCTION

This explanatory statement is intended to assist an understanding of the draft Urban Renewal Authority (URA) To Kwa Wan Road/Wing Kwong Street Development Scheme Plan (DSP) No. S/K9/URA3/A. It reflects the planning intention and objectives of the Town Planning Board (the Board) for the area covered by the Plan.

2. AUTHORITY FOR THE PLAN AND PROCEDURES

2.1 In the URA's 19th Business Plan (2020/21) which was approved by the Financial Secretary, the To Kwa Wan Road/Wing Kwong Street Development Scheme (KC-016) was proposed to be processed as a Development Scheme (the Scheme) under section 25 of the URA Ordinance (URAO).

2.2 On 5 March 2021, pursuant to section 23(1) of the URAO, the URA notified in the Government Gazette the commencement of implementation of the To Kwa Wan Road/Wing Kwong Street Development Scheme.

2.3 On the same day of commencement (i.e. 5 March 2021), the URA submitted the draft URA To Kwa Wan Road/Wing Kwong Street DSP to the Board under section 25(5) of the URAO.

2.4 On XXXX, the Board, under section 25(6)(a) of the URAO, deemed the draft URA To Kwa Wan Road/Wing Kwong Street DSP as being suitable for publication. Under section 25(7) of the URAO, the draft DSP, which the Board has deemed suitable for publication, is deemed to be a draft plan prepared by the Board for the purposes of the Town Planning Ordinance (the Ordinance).

2.5 On XXXX, the draft To Kwa Wan Road/Wing Kwong Street DSP No. S/K9/URA3/1 (the Plan) was exhibited under section 5 of the Ordinance. By virtue of section 25(9) of the URAO, the Plan has from the date replaced the Approved Hung Hom Outline Zoning Plan (OZP) No. S/K9/26 in respect of the area delineated and described herein.

3. OBJECT OF THE PLAN

The Plan illustrates that the Development Scheme Area in orange colour (the Area) is designated as "Residential (Group A)" ("R(A)"). It is planned to be developed by means of the Development Scheme prepared under section 25 of the URAO. The Development Scheme intends to be primarily for a high-density residential development. Commercial uses are always permitted on the lowest three floors of a building or in the purpose-designed non-residential portion of a building.

4. NOTES OF THE PLAN

4.1 Attached to the Plan is a set of Notes which shows the types of uses or developments which are always permitted within the Area in this zone and which may be permitted by the Board, with or without conditions, on application. The provision for application for planning permission under section 16 of the Ordinance allows greater flexibility in land use planning and control of development to meet changing needs.

4.2 For the guidance of the general public, a set of definitions that explains some of the terms used in the Notes may be obtained from the Technical Services Division of the Planning Department and can be downloaded from the Board's website at http://www.info.gov.hk/tpb.

5. AREA COVERED BY THE PLAN

5.1 The Development Scheme boundary which is shown in heavy broken line on the Plan. The Area is broadly bounded by To Kwa Wan Road to the north-west, Ma Tau Wai Road to the west, Wing Kwong Street to the south, Kai Ming Street and Hung Fook Street to the east, and Ngan Hon Street to the north. With a total gross site area of about 6,592m^2, the Scheme includes buildings built on private lots, government lanes, roads and the surrounding public pavement.

5.2 On the Approved Hung Hom OZP No. S/K9/26, the Area is zoned "Residential (Group A)", and the pavement and streets are shown as "Road" before the exhibition of the Plan.

6. EXISTING CONDITIONS

6.1 Buildings within the Area are of 8 to 15 storeys high, and were completed between 1957 and 1974. They are predominantly for domestic use on upper floors and non-domestic uses on mezzanine floors and ground floors. Except for Wong Teck Building at Yuk Shing Street which is of lift, all buildings are without lift and the serviceability is poor.

6.2 Yuk Shing Street is an one-way local road connecting Hung Fook Street and Kai Ming Street. The street currently serves as vehicular access to the three existing buildings along Yuk Shing Street. Roadside storage, refuse dumping and car repairing activities are often found along the street.

6.3 Sections of Hung Fook Street and Kai Ming Street are included in the Area. The two road sections are existing carriageways recently gazetted for emergency vehicular access and pedestrian street under the Roads (Works, Use and Compensation) Ordinance (Chapter 370). Road side storage and dumping are commonly found in these road sections.

7. PLANNING AND LAND USE PROPOSALS

7.1 On the Plan, the Area is zoned "R(A)" and the Notes of the Plan indicated broadly the intended land uses within the Area.

Uses

7.2 The "R(A)" zone is intended primarily for a high-density residential development. Commercial uses are always permitted on the lowest three floors of a building or in the purpose-designed non-domestic portion of a building.

7.3 The maximum plot ratio within the "R(A)" zone is 9.0, or the plot ratio of the existing building(s), whichever is the greater. Except where the plot ratio is permitted to be exceeded under the Notes of the Plan or under Building (Planning) Regulations 22(1) or (2), under no circumstances shall the plot ratio for the domestic part of any development exceed 7.5. The "R(A)" zone is also subject to a maximum building height of 140 metres above Principal Datum (mPD).

7.4 To provide design flexibility, minor relaxation of the plot ratio and building height restrictions may be considered by the Board on application under section 16 of the Ordinance taking into account its individual planning and design merits.

Pedestrian and Vehicular Circulation

7.5 To enhance walkability and connectivity of the Area with the surrounding neighbourhood, the sections of Hung Fook Street and Kai Ming Street respectively, and the whole of Yuk Shing Street within the Area will be closed permanently for redevelopment and/or creation of pedestrian walkways and all-weathered communal space. Proper paving

and landscaping, where appropriate, will be provided at the pedestrian walkways to create a safe and pleasant walking environment. Possible podium/footbridges/design features above the pedestrian walkways are proposed, where appropriate, to provide linkages between podia of the proposed development.

7.6 The proposed pedestrian walkways in the Area will be integrated with the planned pedestrian network in the vicinity to enhance the connectivity with the wider area in the neighbourhood. The vehicular traffic roads will be re-routed to provide more direct and effective traffic network in the Area.

7.7 To further enhance the pedestrian circulation and pavement environment, appropriate ground floor setback of the proposed development along To Kwa Wan Road and Ma Tau Wai Road, where appropriate, would be explored in the Area.

All-weathered Communal Space

7.8 An all-weathered communal space will be provided in the eastern part of the Area bounded between Hung Fook Street and Kai Ming Street. It will be situated underneath the retail/commercial block (the Low Block) in the proposed development to provide a place for community gathering and place-making. It will be a covered/semi-covered ground floor/sunken communal space with open-air design as far as practicable to enhance air ventilation and visual openness of the space. It will be provided with sitting-out area and landscaping, and will be connected with retail shops at the Low Block to bring in vibrancy and attraction to the space and the surrounding streets. The all-weathered communal space will be designed and managed by the URA or its future joint venture partner(s), or its assignee. It will be opened for public use at reasonable hours to benefit the local community.

7.9 The all-weathered communal space will also integrate with the adjoining pedestrian walkways and open spaces planned in other adjoining URA developments, to create an urban square which will become a community hub for the neighbourhood.

Government, Institution or Community (GIC) Facilities

7.10 Not less than 5,500m^2 non-domestic GFA would be proposed for GIC use within the non-domestic portion. The intended GIC use would be subject to further liaison with relevant Government Departments as well as views from local stakeholders. In determining the relevant maximum plot ratio of the development and/or redevelopment, any floor space that is constructed or intended for use solely as GIC facilities, as required by the Government, may be disregarded.

Internal Transport Facilities

7.11 Ancillary car parking spaces and loading/unloading bays would be provided in a basement car park to serve the proposed development and GIC facilities. The number of car parking spaces, loading/unloading bays will be based on the relevant requirements under the Hong Kong Planning Standards and Guidelines (HKPSG) and subject to agreement with Transport Department.

Air Ventilation and Permeability

7.12 To maintain the east-west direction wind breezeway along Hung Fook Street and Kai Ming Street as identified in the air ventilation assessment report, "Good Design Features" (i.e. residential portion setback of the proposed development from the northern boundary of the Area; and provision of 2 numbers of intervening space/urban window) are proposed in the proposed development to enhance the air ventilation as well as visual comfort. A maximum full height setback of not less than 45m of the residential portion of the proposed development from the northern boundary of the Area at Ngan Hon Street is proposed to maintain the east-west breezeway along Ngan Hon Street. Two intervening spaces/urban windows design with a maximum dimension of not less than 15m in height and 15m in width, excluding architectural features, open-side deck and circulation, will be designed at the podia, where appropriate and practicable, in the proposed development. The proposed development will also meet the requirements under

Sustainable Building Design Guidelines (SBDG) as far as practicable. Together with the design of Low Block and all-weathered communal space on the east of the Area, the above design features and building layout can enhance the permeability of the proposed development and facilitate air ventilation at the street levels.

7.13 In the event that the proposed "Good Design Features" are not adopted in the future design scheme or no other alternative and equivalent design features to be agreed with Planning Department, further AVA study would be conducted by the project proponent in accordance with the joint Housing Planning and Lands Bureau – Environment, Transport and Works Bureau Technical Circular No. 1/-06 on Air Ventilation Assessments (or its latest version) for demonstrating that the performance of any future development would not be worse than the scheme adopted in the AVA 2021.

Urban Design and Visual Enhancement

7.14 As a responsive urban design to the local building context, a staggered height profile for the proposed development will be adopted in the Area. Taller building height of not more than 140mPD will be adopted on the building on the northern part of the Area, and a lower building height for building on the southern part of the Area. Another low building block (the Low Block) will be provided on the eastern part of the Area to further create a cascading down effect of building heights from inland towards waterfront.

Provision of Footbridge Connection

7.15 To enhance the pedestrian connectivity between the Area and To Kwa Wan MTR station exits located at the Ma Tau Wai Road / To Kwa Wan Road Garden (the LCSD Garden), a footbridge connection is proposed at the podium of the proposed development in the Area to facilitate a possible provision of a footbridge to connect between the proposed development in the Area and the LCSD Garden managed by Leisure and Culture Services Department (LCSD). Given the footbridge is outside the DSP boundary and does not form part of the DSP, the URA will liaise with relevant Government Departments on the proposal via a separate

revitalisation initiatives subject to the approval of DSP and detailed technical feasibility.

8. IMPLEMENTATION OF THE DEVELOPMENT SCHEME

8.1 The proposals set out in the Plan form an integral part of the Development Scheme for the Area.

8.2 The URA does not own or lease any land within the boundaries of the Development Scheme and intends to acquire the properties within the Area of the Development Scheme. With respect to any of such properties which cannot be acquired by purchase, the Secretary for Development would consider, upon the application of the URA, recommending to the Chief Executive in Council the resumption of properties under the Lands Resumption Ordinance, if necessary.

8.3 All eligible tenants will be offered an ex-gratia payment package in accordance with URA's policy. The URA has already entered into agreement with the Hong Kong Housing Society (HKHS) and the Hong Kong Housing Authority (HKHA) for the purpose of making available rehousing units by HKHS or HKHA to rehouse affected tenants who satisfy the eligibility criteria of HKHS or HKHA.

8.4 Non-domestic tenants of properties acquired by URA whose tenancies are terminated by URA due to implementation of the Development Scheme may be offered an ex-gratia allowance to assist in their business relocation.

8.5 Details of the acquisition, rehousing and ex-gratia allowance policies are subject to the URA's prevailing policies at the time of acquisition. The URA may implement the Development Scheme on its own or in association with one or more partners.

TOWN PLANNING BOARD
March 2021

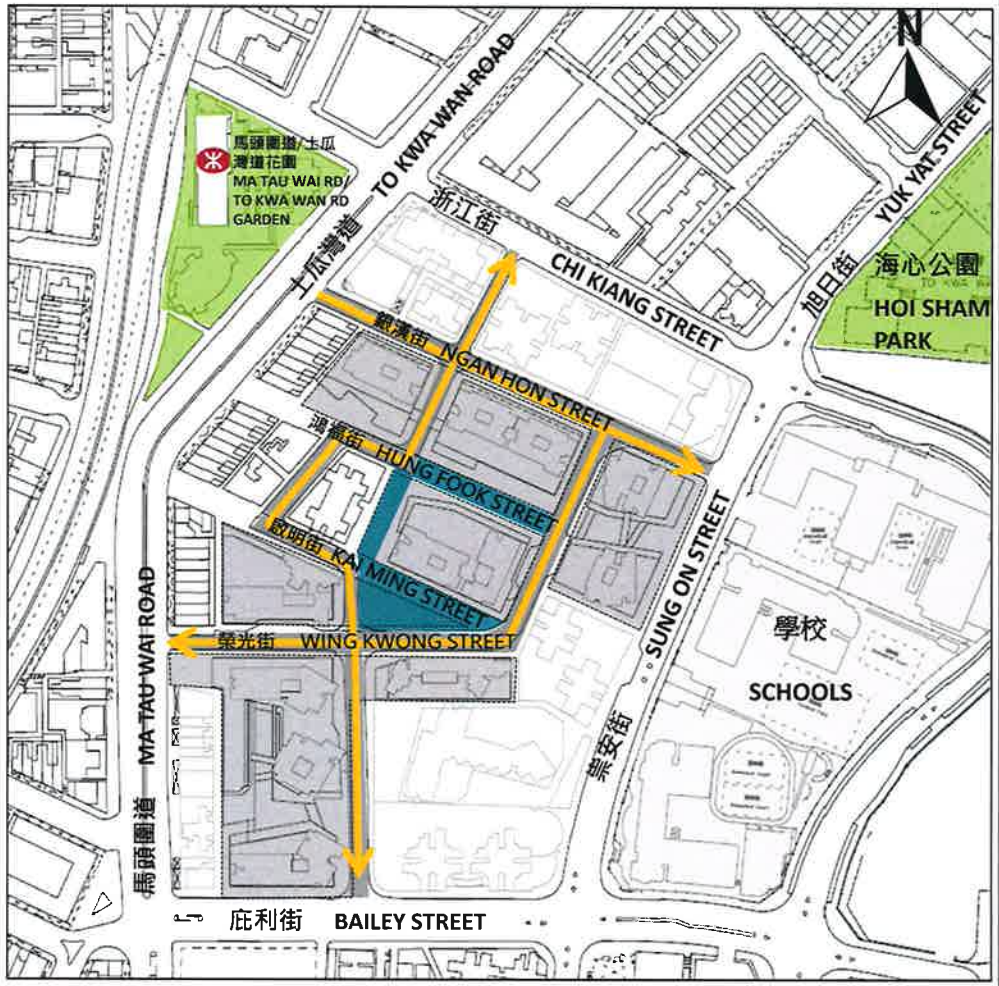
PART 3

SUPPLEMENTARY INFORMATION

Appendix 1

Preliminary Design

Restructuring and replanning of pedestrian network according to approved road scheme

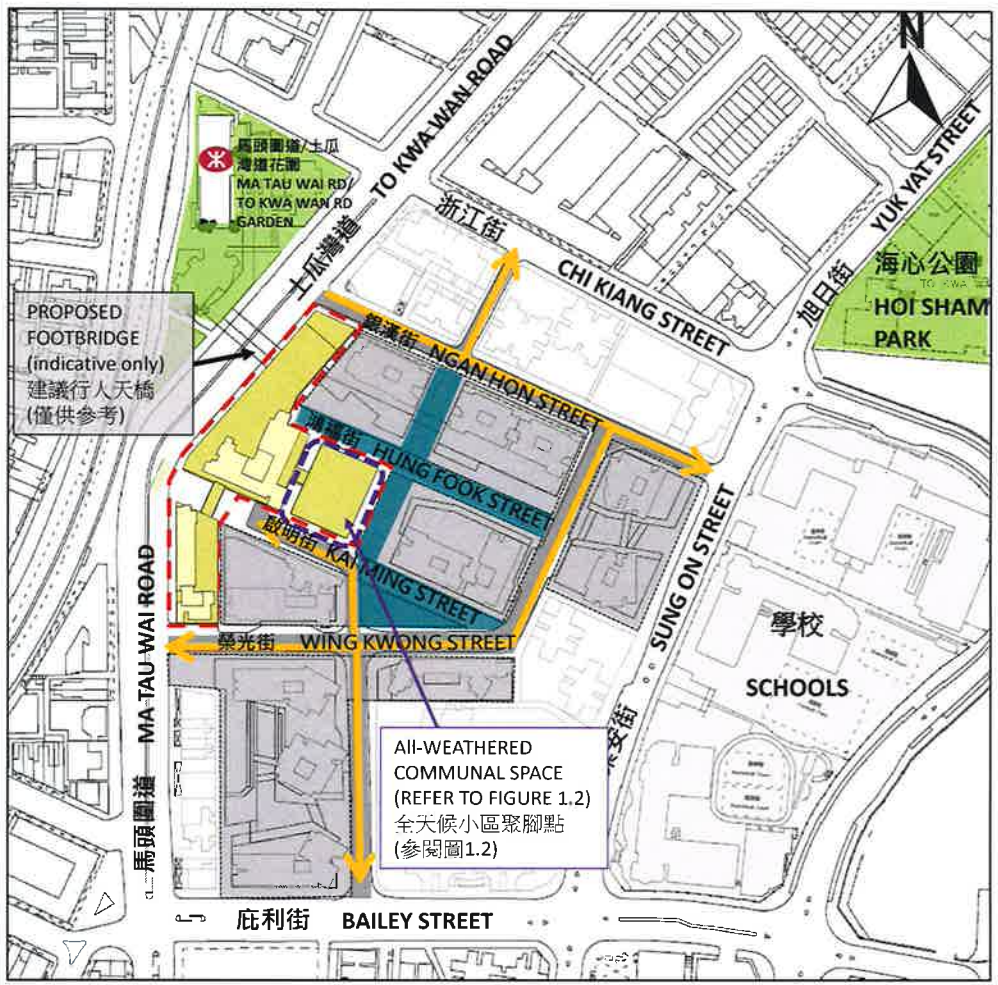


LEGEND

- Road network according to approved road scheme
- Pedestrianways / At-grade open space according to approved road scheme
- URA commenced projects
- To Kwa Wan MTR Station

(Remarks: Based on approved road scheme gazette on 15 May 2020)

Future restructuring and planning of pedestrian network through KC-016 (Notional Design)

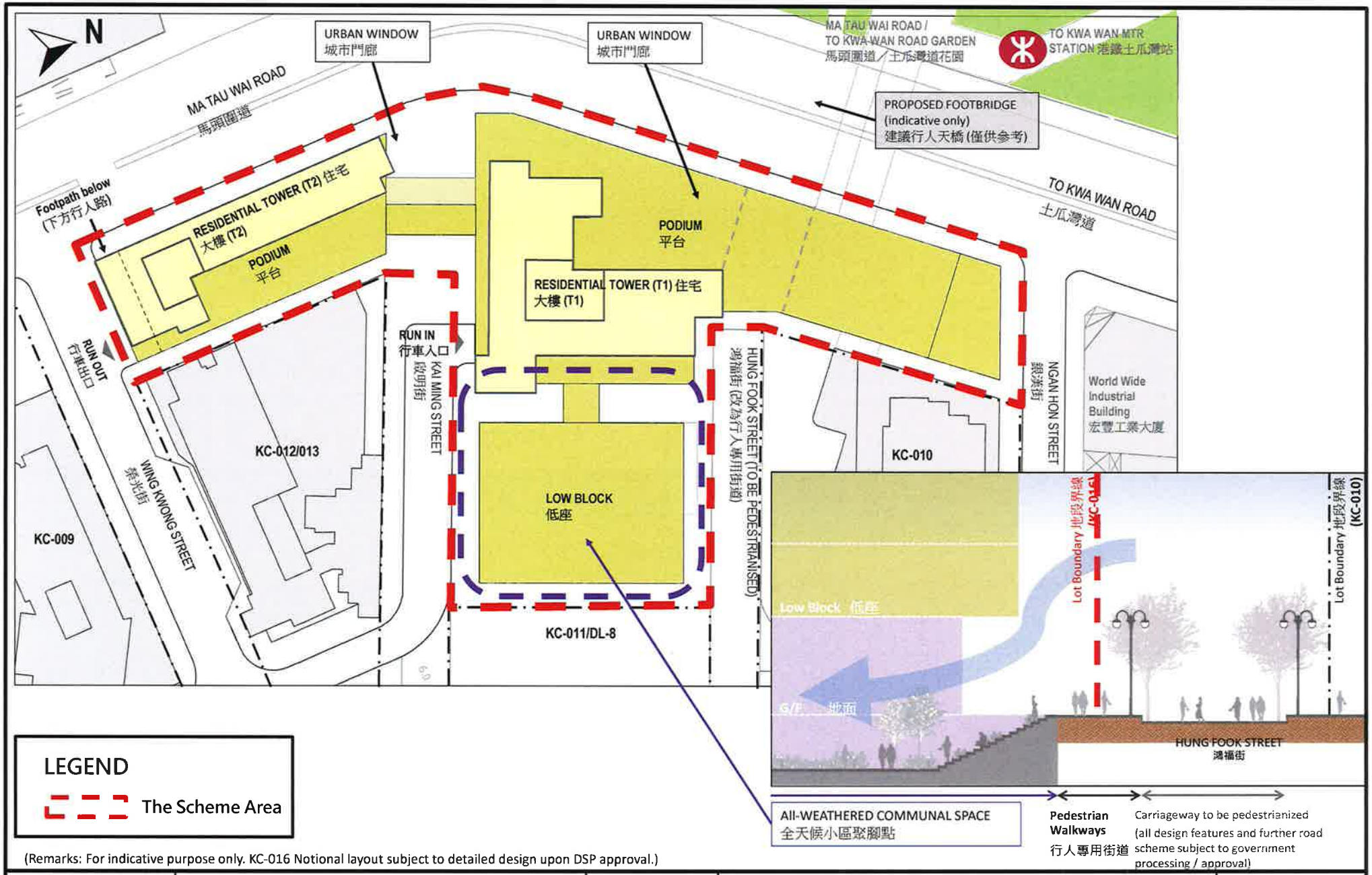


LEGEND

- Future road network
- The Scheme
- Future Pedestrianways / At-grade open space
- URA commenced projects
- To Kwa Wan MTR Station

(Remarks: For indicative purpose only. KC-016 Notional layout subject to detailed design upon DSP approval.)

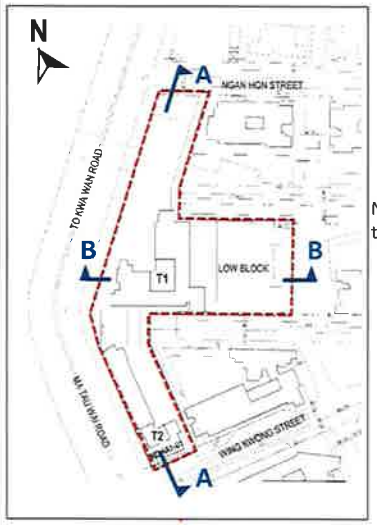
市區重建局 URBAN RENEWAL AUTHORITY	URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)	Figure 1.1	**Notional Design – Holistic Replanning of Traffic and Pedestrian Network**	Not drawn to scale Mar 2021



(Remarks: For indicative purpose only. KC-016 Notional layout subject to detailed design upon DSP approval.)

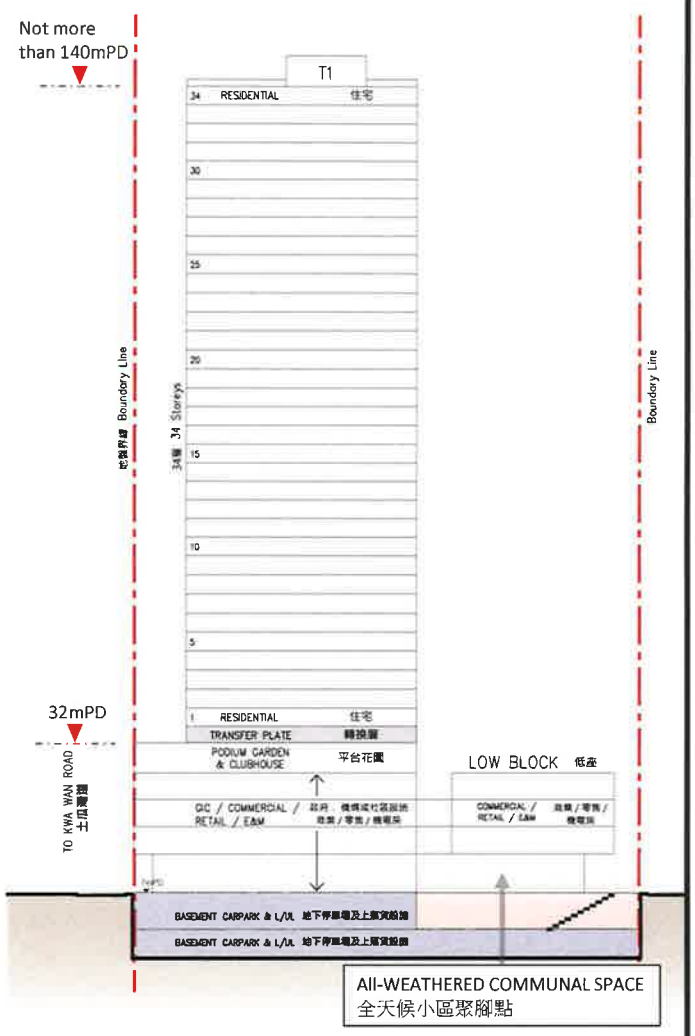
市區重建局 URBAN RENEWAL AUTHORITY	URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)	Figure 1.2	**Notional Design – Block Plan**	Not drawn to scale Mar 2021

Key Plan



Section A

Section B



(Remarks: For indicative purpose only. KC-016 Notional layout subject to detailed design upon DSP approval.)

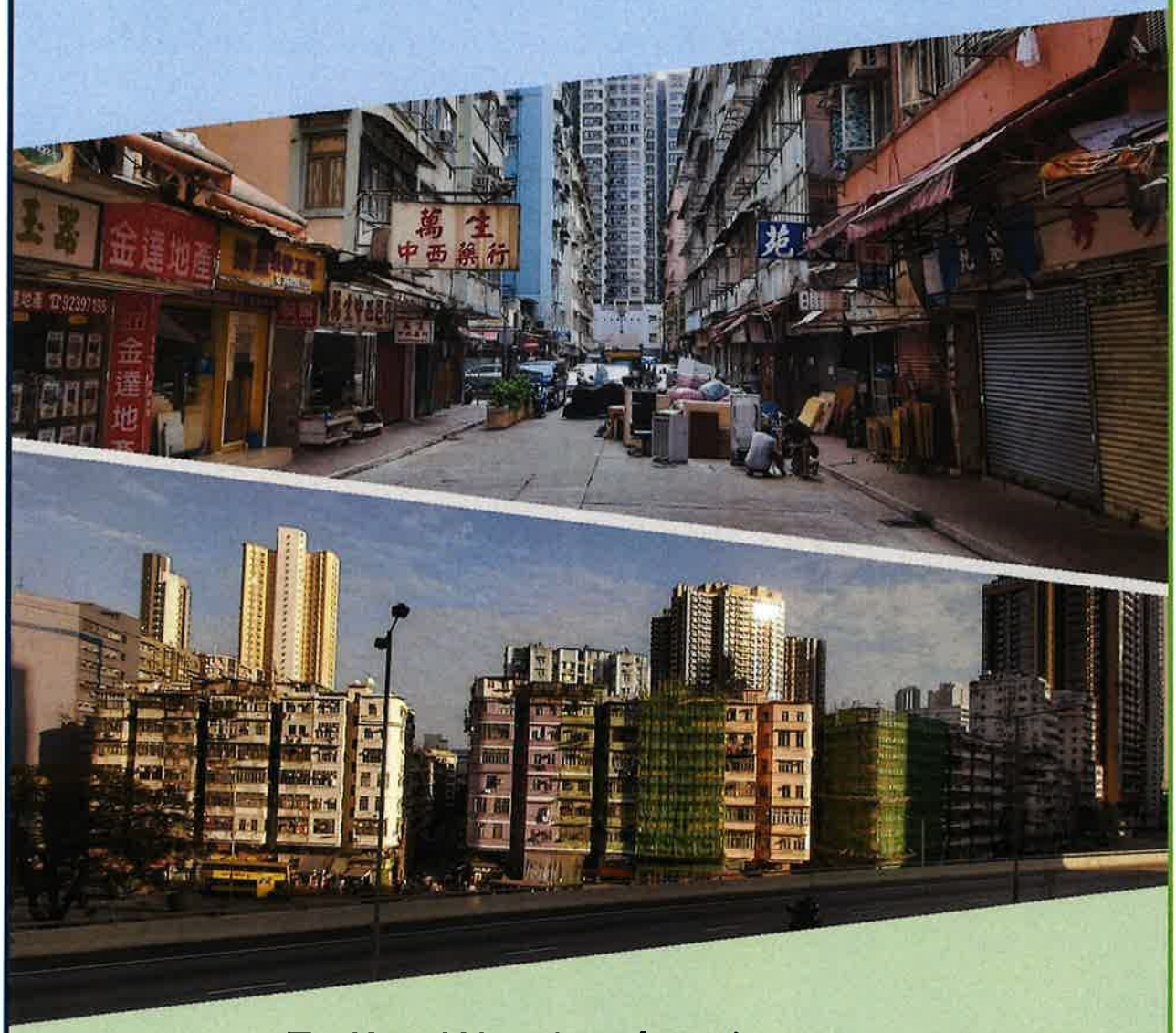
市區重建局 URBAN RENEWAL AUTHORITY	URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)	Figure 1.3	**Notional Design – Schematic Section**	Not drawn to scale Mar 2021

Appendix 2

Visual Impact Assessment (VIA) Report

Urban Renewal Authority Development Scheme

Prepared under Section 25 (3) of the Urban Renewal Authority Ordinance



To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Visual Impact Assessment

March 2021

市區重建局
URBAN RENEWAL AUTHORITY

Content

1 INTRODUCTION 1
2 THE PROPOSED SCHEME 2
3 METHODOLOGY 4
4 VISUAL IMPACT ANALYSIS 5
5 EVALUATION OF OVERALL VISUAL IMPACT AND CONCLUSION 21

List of Tables

Table 2.1 Development Parameters of the Proposed Scheme 2
Table 4.1 Viewing Points 6
Table 4.2 Summary of Visual Changes 16

List of Figures

Figure 2.1 Layout Plan of the Proposed Scheme
Figure 2.2 Layout Plan of the OZP-compliant Scheme
Figure 4.1 The Assessment Area and Visual Elements
Figure 4.2 Locations of Local Viewing Points
Figure 4.3 Photos of Local Viewing Points
Figure 4.4 Location of the Strategic Viewing Point (VP7)
Figure 4.5 Photomontages of VP1
Figure 4.6 Photomontages of VP2
Figure 4.7 Photomontages of VP3
Figure 4.8 Photomontages of VP4
Figure 4.9 Photomontages of VP5
Figure 4.10 Photomontages of VP6
Figure 4.11 Photomontage of VP7

1 INTRODUCTION

1.1 The Urban Renewal Authority (URA) has commenced To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) (the Scheme) under Section 25 of the Urban Renewal Authority Ordinance (URAO). The draft Development Scheme Plan (DSP) No. S/K9/URA3/A is submitted to the Town Planning Board (the Board) for consideration.

1.2 With a gross site area of about 6,592 sq.m. the Scheme is located in To Kwa Wan, which area is broadly bounded by To Kwa Wan Road, Ma Tau Wai Road, Wing Kwong Street, Kai Ming Street, Hung Fook Street and Ngan Hon Street. Subject to site survey upon DSP approval, the net site area for PR calculation is about 5,548 sq.m. Part of the Scheme area is currently zoned "Residential (Group A)" ("R(A)") with maximum building height of 100mPD on the Approved Hung Hom Outline Zoning Plan (OZP) no. S/K9/26. The remaining part, including Yuk Shing Street, Hung Fook Street, Kai Ming Street and the pavement within the Scheme area are shown as "Road" on the OZP.

1.3 Under the draft DSP, the Scheme area is proposed to be zoned "R(A)" with an overall plot ratio (PR) of 9.0 of which PR of 7.5 is for domestic uses and the remaining PR of 1.5 is for non-domestic uses. About 5,548 sq.m. non-domestic GFA is also proposed for GIC uses in the Scheme area which is to be exempted from GFA / PR calculation under the draft DSP. A relaxation of maximum building height from 100mPD to 140mPD is proposed under the draft DSP.

1.4 This Visual Impact Assessment (VIA) report is prepared to study the potential visual impact with the implementation of the Scheme under the notional design for consideration by the Board.

2 THE PROPOSED SCHEME

2.1 **Figure 2.1** shows the layout plan of the notional design (the Proposed Scheme). The Proposed Scheme comprises two residential towers (T1 and T2) on top of commercial / GIC podia, a low-rise retail block (the Low Block) with an all-weathered communal space underneath, and an ancillary basement carpark. T1 (about 140mPD) is situated at the northern part of the site along To Kwa Wan Road whereas T2 (about 110mPD) is situated at the southern part of the site along Ma Tau Wai Road, and the Low Block is situated at the eastern part of the site.

2.2 The Proposed Scheme is carefully designed with staggered height to address site constraints as well as urban design consideration with more flexible building form and layout, and provision of sufficient building separation. At the same time, the Proposed Scheme includes two intervening spaces / urban windows at podia to improve the building permeability and air ventilation at street levels. Besides, URA proposed to build a footbridge to provide a direct and safe pedestrian linkage between the Scheme and the Ma Tau Wai Road / To Kwa Wan Road Garden where the To Kwa Wan MTR Station Exit D is located under a separate revitalisation initiatives upon approval of the draft DSP. To capture such opportunity, a footbridge connection, which does not form part of the Scheme, at the podium of the proposed development in the Scheme to facilitate the proposal in future. The notional design is subject to change at the detailed design stage.

2.3 **Table 2.1** presents the development parameters of the Proposed Scheme:

Table 2.1 Development Parameters of the Proposed Scheme

Scheme Total Area	6,592 sq.m.
Net Site Area	5,548 sq.m. (subject to survey and detailed design)
Plot Ratio	7.5 (Domestic) 1.5 (Non-domestic)
Total GFA - **Domestic GFA** - **Non-domestic GFA (excluding GFA for GIC Provision)**	About 49,932 sq.m. - About 41,610 sq.m. - About 8,322 sq.m.
GFA for GIC Provision (proposed to be exempted from GFA calculation under DSP)	About 5,548 sq.m.
Number of Blocks *	3 (including the Low Block)
Building Height *	T1: Not more than 140mPD T2: Not more than 110mPD Low Block: About 27mPD
Number of storeys *	T1: About 34 (on top of a 5-storey commercial / GIC podium) T2: About 23 (on top of a 5-storey commercial / GIC podium) Low Block: 4

** Remarks: All design parameters are subject to change at the detailed design stage.*

2.4 To comprehensively compare the visual impact of the Proposed Scheme, an OZP-compliant Scheme is also presented on **Figure 2.2**. To comply with the current OZP, the area shown as "Road" is not included in the OZP-compliant Scheme. Residential PR of 7.5 and non-residential PR of 1.5 have been adopted. Thus, the net site area, GFA and the possible residential units of the OZP-compliant Scheme are less than the Proposed Scheme. The OZP-compliant Scheme has based on the assumption as a private market practice and adopted a different tower layout with four residential towers (T1 to T4) on top of their individual podia. The building height restriction of 100mPD as stated on the current OZP has been adopted.

2.5 This VIA will compare the visual changes of both the Proposed Scheme and the OZP-compliant Scheme and thus appraise the visual impact.

3 METHODOLOGY

3.1 With reference to the *Town Planning Board Guidelines on Submission of Visual Impact Assessment for Planning Application to the Town Planning Board* (TPB-PG No.41), this VIA would adopt the following procedures:

3.2 ***1) Define the assessment area (i.e. visual envelope)***. The assessment area would cover the area of visual influence within which the proposed development is pronouncedly visible from key sensitive viewers. The extent of the assessment area would be determined having regard to the size of the proposed development, the distance of the development, potential visibility from the selected viewing points, and the actual site and the surrounding topographical conditions.

3.3 ***2) Identify Viewing Points (VPs) within the assessment area.*** The assessment would take into account views from key local and strategic viewing points. Local VPs are determined with reference to the setting of the project and views of local significance. For strategic VP(s), reference would be made to *Chapter 11 – Urban Design Guidelines in the Hong Kong Planning Standards and Guidelines* (HKPSG). VPs should be at human eye level for a realistic presentation of views. For each identified VPs, their sensitivity would be classified as high, medium or low by their activity, public perception and other relevant factors.

3.4 ***3) Appraise visual changes.*** Visual changes on visual composition, visual obstruction, effect on public views and effect on visual resources would be appraised. Perspectives indicating visual changes will be illustrated by photomontages for each identified VPs.

4 VISUAL IMPACT ANALYSIS

4.1 ASSESSMENT AREA

4.1.1 The assessment area for this VIA is defined by the visual envelope of the indicative Proposed Scheme. This visual envelope covers the fields of views from all sensitive viewers in direct sight of the proposed development. With verification by ground inspection, the assessment area of this VIA is defined by a distance equal to three times of the height (3H) of T1 in the Proposed Scheme, i.e. 420m, away from the Scheme area.

Visual Elements in the Assessment Area

4.1.2 **Figure 4.1** shows the extent of assessment area. The area extends to the waterfront to the east, Hok Yuen Street to the south, Lok Shan Road to the north and Ko Shan Road Park to the west. **Figure 4.1** and the following will present the current and future visual elements within the assessment area:

4.1.3 The assessment area is densely developed with increasing number of high-rise developments. To the immediate east and south of the Scheme area are mainly tenement buildings of 6 to 8 storeys high mixed with several high-rise residential developments. The northern and southern sides of the assessment area are then generally mid-rise residential buildings of 10 to 20 storeys high located along Ma Tau Wai Road, To Kwa Wan Road and Chatham Road North.

4.1.4 In recent years, there have been more high-rise developments of 100mPD or above completed within the assessment area. Developments of high building height include Bayview (about 145mPD), Chatham Gate (about 145 mPD) and City Hub (about 120 mPD) to the northeast, southwest and north of the Scheme area respectively. To the closer east and south of the Scheme area, there are also several high-rise developments including Sunrise Villa (about 115mPD), L·Harbour 18 (about 100mPD) and Upper East (about 100mPD).

4.1.5 In the future, there would be more developments of 100mPD or above within the assessment area. To the west and south of the Scheme area are two sites under construction which are the Ko Shan Road Public Housing Development (about 130mPD) and The Vantage (about 100mPD) respectively. To the further south, there is also a commercial site being redeveloped into an office tower of about 120mPD by the private sector. Minor relaxation of maximum building height of that commercial site from 100mPD to 120mPD was approved by the Board on 17 May 2019 (Application No. A/K9/274). To the further northwest, the existing Lok Man Sun Chuen site has a permissible maximum building height restriction (BHR) of 140mPD in the Outline Zoning Plan (OZP).

4.1.6 In the immediate east and south of the Scheme area, most of the aforementioned tenement buildings of 6 to 8 storeys high are within the following commenced URA projects and would be redeveloped into high-rise residential developments reaching 100mPD to 120mPD in the future:

- Chun Tin Street / Sung Chi Street Development Scheme (KC-008(A))
- Bailey Street / Wing Kwong Street Development Project (KC-009)
- Hung Fook Street / Ngan Hon Street Development Scheme (KC-010)
- Kai Ming Street Demand-Led Redevelopment Project (DL-8:KC)
- Hung Fook Street / Kai Ming Street Development Project (KC-011)
- Wing Kwong Street Development Project (KC-012)
- Kai Ming Street / Wing Kwong Street Development Project (KC-013)
- Wing Kwong Street / Sung On Street Development Project (KC-014)

4.1.7 Major open spaces are located in the further western and eastern extents of the assessment area. To the west of the Scheme area is Ko Shan Road Park where is backed by a strip of green belt on a knoll called Quarry Hill of about 105mPD. To the east of the Scheme area is Hoi Sham Park located at the coast. Developments near Hoi Sham Park and the coast are generally low to mid-rise buildings such as schools and GIC facilities.

4.1.8 Ma Tau Wai Road / To Kwa Wan Road Garden is the closest open space to the Scheme area. The Garden is at the opposite side of To Kwa Wan Road from the Scheme area. The LCSD Garden comprises a children playground and an open plaza outside the MTRC To Kwa Wan Station Exit D

4.1.9 To conclude, the assessment area is densely developed with residential buildings. There is an increasing number of high-rise developments reaching 100mPD or above in the vicinity of the Scheme area. Some developments within the assessment area are of building height exceeding 120mPD, such as Bayview, Chatham Gate and the future Ko Shan Road Public Housing Development. Two major open spaces, including Ko Shan Road Park and Hoi Sham Park are identified to the west and east of the Scheme area. A strip of green belt backs the Ko Shan Road Park, serving as the major vegetated backdrop of the assessment area. The assessment area also covers a section of coast between Hoi Sham Park and Hok Yuen area.

4.2 IDENTIFICATION OF VIEWING POINTS

4.2.1 Based on the assessment area and visual elements identified, six local viewing points (VPs) are identified within the visual envelope as indicated on **Figure 4.2** and their photos are shown on **Figure 4.3**. **Figure 4.4** then presents the location of the strategic viewing point identified with reference to the HKPSG.

Table 4.1 Viewing Points

VP	Location	Approximate Distance from the Scheme area
Local Viewing Points		
VP1	Junction between Ma Tau Wai Road and Lok Shan Road	360m
VP2	Ko Shan Road Park	160m
VP3	Ma Tau Wai Road / To Kwa Wan Road Garden	70m
VP4	Hoi Sham Park	300m
VP5	Junction between Ma Tau Wai Road and Bailey Street	120m
VP6	Junction between Ma Tau Wai Road and Hok Yuen Street	320m
Strategic Viewing Point		
VP7	Hong Kong Convention and Exhibition Centre	3.5km

4.3 APPRAISAL OF VISUAL CHANGES

4.3.1 Photos of the existing condition and photomontages of both the Proposed Scheme and the OZP-compliant Scheme are prepared for full appraisal and comparison of the visual changes before and after the proposed redevelopment at the Scheme area together with future developments within its vicinity. The following will describe the visual composition and appraise visual changes of views for each selected VP. **Table 4.2** in the later part of this section will summarise the visual changes of all seven viewing points.

VP1 – Junction between Ma Tau Wai Road and Lok Shan Road

4.3.2 In accordance with **Figures 4.2** and **4.3**, VP1 is about 360m to the north of the Scheme area. Ma Tau Wai Road is the major road and activity corridor in To Kwa Wan with lots of shops and services. To Kwa Wan Market, which is the major social node of the neighbourhood, is located near VP1. The two sides of junction between Ma Tau Wai Road and Lok Shan Road are where the To Kwa Wan MTR Station Exits A and B are located. Active pedestrian activities are anticipated that the visual sensitivity of public viewers from this VP is graded as **high**.

Visual Composition and Visual Obstruction

4.3.3 **Figure 4.5** presents the existing visual composition of the view from VP1 and potential visual compositions under the OZP-compliant Scheme and the Proposed Scheme respectively.

4.3.4 For the existing condition, the To Kwa Wan Market and Government Offices, and BMW Houses (both about 50mPD) dominate the foreground of the view from VP1. The right-hand-side of the view is mainly formed by residential buildings including a high-rise tower named Breamar Court (about 85mPD). In the background behind the Government Offices are several high-rise developments including City Hub (about 120mPD), iClub Ma Tau Wai Hotel (about 85mPD) and The Vantage (about 100mPD). A wide open sky can be seen from VP1.

4.3.5 For the OZP-compliant Scheme, only T2 is visible from VP1 in front of The Vantage while other blocks are behind the Government Offices and BMW House. For the Proposed Scheme, both towers will be visible in the background of the view from VP1. It is shown that T2 appears slightly taller than The Vantage while most part of T1 is behind the Government Offices and BMW House. With reference to **Figure 4.5**, negligible change on the openness of sky view, visual composition and visual obstruction is anticipated by the Proposed Scheme compared to both existing condition and the OZP-compliant Scheme.

Effect on Public Viewers and Visual Resources

4.3.6 Public viewers at VP1 enjoys a wide open sky and sight to the landmarked To Kwa Wan Market and Government Offices. As visual obstructions caused by towers in the Proposed Scheme is considered negligible, negligible effect on public viewers is anticipated.

4.3.7 T2 of both the OZP-compliant Scheme and the Proposed Scheme will appear almost as tall as The Vantage in the background of view from VP1. Although T1 will be visible from VP1, most part of the tower will be concealed by the Government Offices and BMW House. Least noticeable portion of the visual resources of this view, in particular the sky view, will be obstructed and thus negligible effect on visual resources is anticipated by the Proposed Scheme.

VP2 – Ko Shan Road Park

4.3.8 Ko Shan Road Park is a major open space in To Kwa Wan which located about 160m to the west of the Scheme area. The park is on the hillside to the west of Ko Shan Road. An indoor theatre namely Ko Shan Theatre with two wings is within the park. The Park mainly comprises passive recreation facilities. With reference to **Figures 4.2** and **4.3**, VP2 is located at the entrance of Ko Shan Road Park. Key public viewers of this VP mainly include residents living nearby, performers and audience visiting the theatre. The visual sensitivity of public viewers from this VP is graded as **high**.

Visual Composition and Obstruction

4.3.9 **Figure 4.6** presents the existing visual composition of the view from VP2 and potential visual compositions under the OZP-compliant Scheme and the Proposed Scheme respectively.

4.3.10 For the existing condition, the view from VP2 is generally open. Trees inside the park serve as an visual buffer against the residential developments outside the park. The Ko Shan Road Public Housing Development site is in the foreground while works are in progress. A residential tower named Faerie Court (about 90mPD) and the existing buildings within the Scheme area are visible in the foreground. Some high-rise developments near Hoi Sham Park, including Bayview (about 145mPD), Sunrise Villa (about 115mPD) and L·Harbour 18 (about 100mPD) form the background of the view.

4.3.11 The future Ko Shan Road Public Housing Development (about 130mPD) would dominate the foreground of the view from VP2. The public housing development would obstruct most part of the open sky seen from VP2 and conceals most residential blocks in the Scheme area. In both the OZP-compliant Scheme and the Proposed Scheme, only T2 will be visible from VP2 behind the visual buffer offered by trees inside the park. As compared to the existing condition, the visual composition of view from VP2 is slightly affected as a small part of open sky would be obstructed by T2. However, with reference to **Figure 4.5**, with similar blockage of open sky, the change of visual composition and obstruction caused by the Proposed Scheme compared to the OZP-compliant Scheme is regarded as negligible.

Effect on Public Viewers and Visual Resources

4.3.12 Ko Shan Road Park is a major open space with mainly passive recreation facilities that the wide open sky is an important visual resource and value for public viewers. The future Ko Shan Road Public Housing Development would dominate the foreground of the view while the trees inside the park serve a visual buffer between the park and the Scheme area. As the public housing development would conceal a large part of residential towers within the Scheme area, minimal effect on public viewers and visual resources caused by the Proposed Scheme is anticipated. Compared to the OZP-compliant Scheme, the effect on public viewers and visual resources caused by the redevelopment under the Proposed Scheme is considered negligible.

VP3 – Ma Tau Wai Road / To Kwa Wan Road Garden

4.3.13 With reference to **Figures 4.2** and **4.3**, LCSD's Ma Tau Wai Road / To Kwa Wan Road Garden (the LSCD Garden) is located to the north-west of the Scheme area across To Kwa Wan Road. The LCSD Garden comprises a children playground and an open plaza. The To Kwa Wan MTR Station Exit D is located within it which serves as the major access of this part of To Kwa Wan to the railway service. Major bus stops are also found on the two sides of the LCSD Garden. More active pedestrian activities are anticipated when the MTR Station comes in operation in Q3/2021 (operation time according to MTRC's Press Release in May 2020). Key public viewers of this VP are mainly residents nearby who enjoy the LCSD Garden or use the railway or bus services nearby. The visual sensitivity of public viewers from this VP is graded as **high**.

Visual Composition and Visual Obstruction

4.3.14 **Figure 4.9** presents the existing visual composition of the view from VP3 and potential visual compositions under the OZP-compliant Scheme and the Proposed Scheme respectively.

4.3.15 The open plaza of the LCSD Garden provides a wide and pleasant foreground with trees at the back acting as a visual buffer against the surrounding buildings. Behind the LCSD Garden are the existing buildings of 8 storeys high within the Scheme area. In the background are several high-rise residential developments including The Vantage (about 100mPD), Axis (about 95mPD) and Chatham Gate (about 145mPD). A wide open sky can be viewed from VP3.

4.3.16 In accordance with **Figure 4.9**, the future residential tower at KC-010 (about 100mPD) will be visible from VP3 after redevelopment. Under the OZP-compliant Scheme, although the residential towers are generally harmonious with the surrounding developments, there will be moderately adverse visual obstructions of the view from VP3. T1 and T4 under the OZP-compliant Scheme will create a wall effect and thus obstruct a large portion of the wide open sky. Visual permeability and openness are also reduced by the large building mass.

4.3.17 On the contrary, the Proposed Scheme will enhance the composition and obstruction of the view from VP3. As shown on **Figure 4.9**, T4 under the OZP-compliant Scheme is removed while only T1 and a minimal part of T2 will be

visible under the Proposed Scheme. As T1 is more distant from the LCSD Garden then T1, T1 still remains harmonious with the future residential tower to be redeveloped in KC-010. The repositioning of building blocks creates sufficient building separation and thus significantly reduces the degree of visual obstruction to the open sky. The visual openness and visual permeability of the view from VP3 is better preserved under the Proposed Scheme. Therefore, by comparing with the OZP-compliant Scheme, the Proposed Scheme will enhance the view from VP3, in particular visual obstruction.

Effect on Public Viewers and Visual Resources

4.3.18 The wide open sky view is an important visual resource of the view from VP3. While the OZP-compliant Scheme will induce a wall effect that detriments the visual permeability and openness of the view from VP3, developments under the OZP-compliant Scheme will inevitably cause an adverse effect on public viewers and visual resources to the existing condition.

4.3.19 By repositioning the building block, sufficient building separation between KC-010 and T1 under the Proposed Scheme is maintained to improve the visual permeability and visual openness. Moreover, the urban window located next to junction between To Kwa Wan Road and Hung Fook Street will further reduce the building mass at lower levels thus improve the visual permeability. Therefore, the Proposed Scheme will enhance the effect on public viewers and visual resources over the OZP-compliant Scheme.

VP4 – Hoi Sham Park

4.3.20 Hoi Sham Park is another major open space in To Kwa Wan which located about 300m to the northeast of the Scheme area. Situated at the waterfront the park is multi-functional which comprises active recreation facilities including football pitches and basketball courts, a children playground and some passive recreation facilities. **Figures 4.2** and **4.3** show that VP4 is located at the side of football pitches of the park which possesses an open sky view at the direction to the Scheme area. Key public viewers of this VP include residents in the larger neighborhood of To Kwa Wan and students of nearby schools who are usually engaged in core activities, such as basketball and football. These viewers are relatively less sensitive to visual impact than viewers engaged in

passive recreation and leisure activities. Therefore, the visual sensitivity of public viewers from this VP is graded as **medium**.

Visual Composition and Obstruction

4.3.21 **Figure 4.8** presents the existing visual composition of the view from VP4 and potential visual compositions under the OZP-compliant Scheme and the Proposed Scheme respectively.

4.3.22 The current foreground of the view from VP4 is mixed with the trees inside the park and Gee Chang Industrial Building (about 45mPD) of a large building mass. Although two residential towers including Sunrise Villa (about 115mPD) and L·Harbour 18 (about 100mPD) form major visual obstructions at the middle of view, the sky view from VP4 is generally open. The background of the view from VP4 are mainly residential developments along Sung On Street including Upper East (about 100mPD) and Bailey Garden (about 90mPD).

4.3.23 As presented on **Figure 4.8**, two future developments by the URA, including KC-010 (about 100mPD) and KC-014 (about 100mPD), will be mostly concealed by Sunrise Villa and L·Harbour 18 to form the background of the view from VP4. All towers under both the OZP-compliant Scheme and the Proposed Scheme will be concealed by Gee Chang Industrial Building and L·Harbour 18. Thus, no change to the visual composition of the view from VP4 is anticipated. No visual obstruction will be induced by the Proposed Scheme.

Effect on Public Viewers and Visual Resources

4.3.24 Given that all towers will not be visible from VP4, no effect on public viewers and visual resources is anticipated by the Proposed Scheme.

VP5 – Junction between Ma Tau Wai Road and Bailey Street

4.3.25 With reference to **Figures 4.2** and **4.3**, VP5 is located about 120m to the south of the Scheme area. A small resting garden is located next to this junction. With a low level of pedestrian and business activity observed near this VP, considered that this VP is close to the Scheme area, the visual sensitivity of public viewers from this VP is graded as **medium**.

Visual Composition and Visual Obstruction

4.3.26 **Figure 4.9** presents the existing visual composition of the view from VP5 and potential visual compositions under the OZP-compliant Scheme and the Proposed Scheme respectively.

4.3.27 The current foreground of VP5 is mixed by two high-rise residential towers including Axis (about 95mPD) and Viva (about 95mPD), and tenement buildings of 6 to 15 storeys high (about 30 – 50mPD) including the existing buildings within the Scheme area. No open sky view is available from VP5. Behind the existing buildings within the Scheme area is City Hub (about 120mPD). At the end of the urban canyon along Ma Tau Wai Road, a small portion of the ridgeline to the east of Lion Rock can be seen from VP5 while the landmarked Lion Rock is not visible from VP5.

4.3.28 As presented on **Figure 4.9**, two future developments at KC-009 (about 100mPD) and KC-010 (about 100mPD) by the URA will be visible behind the residential buildings along Ma Tau Wai Road. Compared to the visual obstruction caused by the existing buildings, only a small portion of the sky view will be blocked under either the OZP-compliant Scheme or the Proposed Scheme. Under the Proposed Scheme, most portion of the taller T1 (about 140mPD) would be concealed by T2 (about 100mPD). As the Proposed Scheme would obstruct only slightly greater portion of the sky view as compared to the OZP-compliant Scheme, slightly adverse impact to the visual composition and obstruction is considered.

Effect on Public Viewers and Visual Resources

4.3.29 No wide open sky view could be enjoyed by the public viewers at VP5. Although the Proposed Scheme would inflict a slightly increased visual obstruction to the sky view from VP5, the impact to the quality, value and character of the view is considered minimal. Slightly adverse impact to public viewers and visual resources at VP5 is anticipated.

VP6 – Junction between Ma Tau Wai Road and Hok Yuen Street

4.3.30 With reference to **Figures 4.2** and **4.3**, VP6 is located about 320m to the south of the Scheme area. This section of Ma Tau Wai Road is the connector between Hung Hom and To Kwa Wan communities with shops and services.

VP6 is located on the major path towards major bus stops along Chatham Road North and Ma Tau Wai Road, and Ho Man Tin MTR Station to the farther west. With a moderate level of pedestrian activity and shorter duration of activity, the visual sensitivity of public viewers from this VP is graded as **medium**.

Visual Composition and Visual Obstruction

4.3.31 **Figure 4.10** presents the existing visual composition of the view from VP6 and potential visual compositions under the OZP-compliant Scheme and the Proposed Scheme respectively.

4.3.32 The current foreground of the view from VP6 is dominated by the two high-rise residential towers of eResidence (about 100mPD) completed by the URA. Behind eResidece there are two more high-rise residential developments including The Vantage (about 100mPD) and Viva (about 95mPD) and thus the sky seen from VP6 is not open. Similar to VP5, a small portion of the ridgeline to the east of Lion Rock can be seen from VP6 while the landmarked Lion Rock is not visible from VP6.

4.3.33 For both the OZP-compliant Scheme and the Proposed Scheme, most part of the residential towers are concealed by developments in the foreground including The Vantage and Viva. The visible parts of residential towers in both schemes appear not taller than the developments in the foreground while the blockage to the sky view is minimal. Besides, the sight to the ridgeline from VP6 is not obstructed under both the OZP-compliant Scheme and the Proposed Scheme. Therefore, the effect on visual composition and visual obstruction of the view from VP6 is considered negligible.

Effect on Public Viewers and Visual Resources

4.3.34 The change of visual openness of both the foreground and the background of the view from VP6 would be negligible. Without any degradation of condition, quality and character of the view from VP6, negligible effect on public viewers and visual resources is anticipated by the Proposed Scheme.

VP7 – Hong Kong Convention and Exhibition Centre

4.3.35 With reference to **Figure 4.3**, VP7 is one of the key public viewing points stipulated on Chapter 11 in the HKPSG. Viewing from the Hong Kong Convention and Exhibition Centre at the opposite side of the Victoria Harbour, the ridgeline behind Kowloon shall be protected. As shown on **Figure 4.3**, the Proposed Scheme is in front of the ridgeline between Tsz Wan Shan and Kowloon Peak.

4.3.36 By utilizing 3D GIS tools, **Figure 4.11** present the visual impact analysis of the Proposed Scheme to the view from VP7. The 3D GIS skyline analysis shows that Chatham Gate (about 145mPD) will conceal the Proposed Scheme. In addition, the Proposed Scheme will not block the ridgeline. As the Proposed Scheme will be completed concealed by Chatham Gate in the foreground, negligible visual impact on the view from VP7 is anticipated by the Proposed Scheme.

Table 4.2 Summary of Anticipated Visual Changes

Visual Elements	Sensitivity of Public Viewers	Visual Change
VP1 – Junction between Ma Tau Wai Road and Lok Shan Road		
Foreground dominated by by the To Kwa Wan Market and Government Offices and BMW House. Background mainly formed by a wide open sky with several modern high-rise developments of 85mPD or above.	***High*** Active pedestrian activities are anticipated with the opening of To Kwa Wan MTR Station.	***Visual Composition and Visual Obstruction:*** T2 under the Proposed Scheme will appear slightly taller than The Vantage in the background. With minimal portion of T1 being visible, negligible change on the openness of sky view, visual composition and obstruction is anticipated. ***Effect on Public Viewers and Visual Resources:*** With open sky view and sight to the landmarked To Kwa Wan Market preserved, the effect on public viewers and visual resources is regarded as negligible. ***Overall Visual Impact:*** **Negligible**
VP2 – Ko Shan Road Park		
Foreground dominated by the Ko Shan Road Public Housing Development site with trees as visual buffer. Background mainly formed by a wide open sky with several high-rise developments of 100mPD or above.	***High*** The park is highly utilized by the general public.	***Visual Composition and Visual Obstruction:*** The future Ko Shan Road Public Housing Development will conceal most portion of residential towers under both the OZP-compliant and the Proposed Scheme. T2 under both Schemes will be visible behind the visual buffer offered by trees inside the park causing similar obstruction to the sky view. As compared to the OZP-compliant Scheme, negligible change on the visual composition and visual obstruction caused by the Proposed Scheme is considered. ***Effect on Public Viewers and Visual Resources:*** The Public Housing Development would obstruct more parts of open sky and conceal a large part of residential towers under the Proposed Scheme. As compared

Visual Elements	Sensitivity of Public Viewers	Visual Change
		to the OZP-compliant Scheme, the Proposed Scheme will inflict negligible effect on public viewers and visual resources. ***Overall Visual Impact:*** **Negligible**
VP3 – Ma Tau Wai Road / To Kwa Wai Road Garden		
Foreground mainly formed by trees in the garden and existing buildings of 8 storeys high within the Scheme area. Background formed by a wide open sky with several high-rise developments of 95mPD or above.	***High*** Active pedestrian activities are anticipated with the opening of To Kwa Wan MTR Station.	***Visual Composition and Visual Obstruction:*** Residential towers under both the OZP-compliant Scheme and Proposed Scheme will block a substantial part of open sky view. However, compared to the OZP-compliant Scheme, towers under the Proposed Scheme will not cause a wall effect and provide a substantial building separation with the neighbouring future residential developments of similar building height. With sufficient building separation, the degree of visual obstruction to the open sky view is substantially reduced. The Proposed Scheme is considered enhancing the visual composition and visual obstruction of view from VP3, as compared to the OZP-compliant Scheme. ***Effect on Public Viewers and Visual Resources:*** As the sky view is an important visual resource of the view from VP3, with slimmer building form and sufficient building separation, the visual permeability and visual openness under the Proposed Scheme will be enhanced compared to the OZP-compliant Scheme. ***Overall Visual Impact:*** **Enhanced**

Visual Elements	Sensitivity of Public Viewers	Visual Change
VP4 – Hoi Sham Park		
Foreground mixed with trees inside the park and some mid-rise industrial buildings of large building mass. Background mainly formed by a wide open sky with several high-rise developments of 90mPD or above.	***Medium*** Although the park is highly utilised by the general public, the natures of their activities are less sensitive to visual impact.	Buildings in the foreground conceal all residential towers under the Proposed Scheme. No visual change is anticipate. ***Overall Visual Impact:*** **Negligible**
VP5 – Junction between Ma Tau Wai Road and Bailey Street		
Foreground mixed by high-rise developments of about 95mPD and tenement buildings of up to about 50mPD. No open sky can be seen.	***Medium*** Considered that this VP is close to the Scheme area, a low level of pedestrian activity and shorter duration of activity is observed and anticipated.	***Visual Composition and Visual Obstruction:*** Although the Proposed Scheme would only obstruct a small portion of the limited sky view from VP5, the Proposed Scheme would obstruct slightly greater portion of the sky view as compared to the OZP-compliant Scheme Slightly adverse impact to the visual composition and obstruction is considered ***Effect on Public Viewers and Visual Resources:*** As the Proposed Scheme would inflict a slightly increased visual obstruction to the sky view from VP5 as compared to the OZP-compliant, the impact to the quality, value and character of the view is considered slightly adverse. ***Overall Visual Impact:*** **Slightly adverse**

Visual Elements	Sensitivity of Public Viewers	Visual Change
VP6 – Junction between Ma Tau Wai Road and Hok Yuen Street		
Foreground dominated by high-rise developments of 95mPD or above. No open sky can be seen.	***Medium*** A moderate level of pedestrian activity and shorter duration of activity is observed and anticipated.	***Visual Composition and Visual Obstruction:*** As most part of the residential towers are concealed by high-rise developments in the foreground, the visual obstruction to the sky view is minimal. With compatible building height, the change on visual composition is considered negligible. ***Effect on Public Viewers and Visual Resources:*** As compared to the OZP-compliant Scheme, no noticeable change of visual openness will be caused by the Proposed Scheme. Without any degradation of condition, quality and character of the assessment area, negligible effect on public viewers and visual resources is anticipated. ***Overall Visual Impact:*** **Negligible**
VP7 – Hong Kong Convention and Exhibition Centre		
View mainly formed by the Victoria Harbour, the dense urban development in Kowloon, a wide open sky and the ridgeline from Tsz Wan Shan to Kowloon Peak.	-	Although the Proposed Scheme will slightly encroach the 20% building free zone, Chatham Gate in the foreground will completely conceal the Proposed Scheme. No visual change is anticipated. ***Overall Visual Impact:*** **Negligible**

5 EVALUATION OF OVERALL VISUAL IMPACT AND CONCLUSION

5.1 The above analysis has compared the visual impact induced by the future redevelopment under both the OZP-compliant Scheme and the Proposed Scheme. Block size, disposition and layout of the Proposed Scheme have been carefully designed with respect to the existing urban design, building height profile and key public viewing points in the vicinity. To enhance the visual quality and reduce the visual impact, buildings are repositioned in the Proposed Scheme with providing two urban windows to enhance permeability.

5.2 The Scheme area is located in a densely developed residential neighbourhood with an increasing number of high-rise residential developments. Several tall developments of 130mPD or above are commonly found in its vicinity, such as Bayview, Chatham Gate and the future Ko Shan Road Public Housing Development. The maximum building height of the neighbouring URA commenced projects will range from 100mPD to 130mPD. Therefore, the relaxation of building height from 100mPD to 140mPD at the Scheme area will not result in visual incompatibility nor sore thumb development.

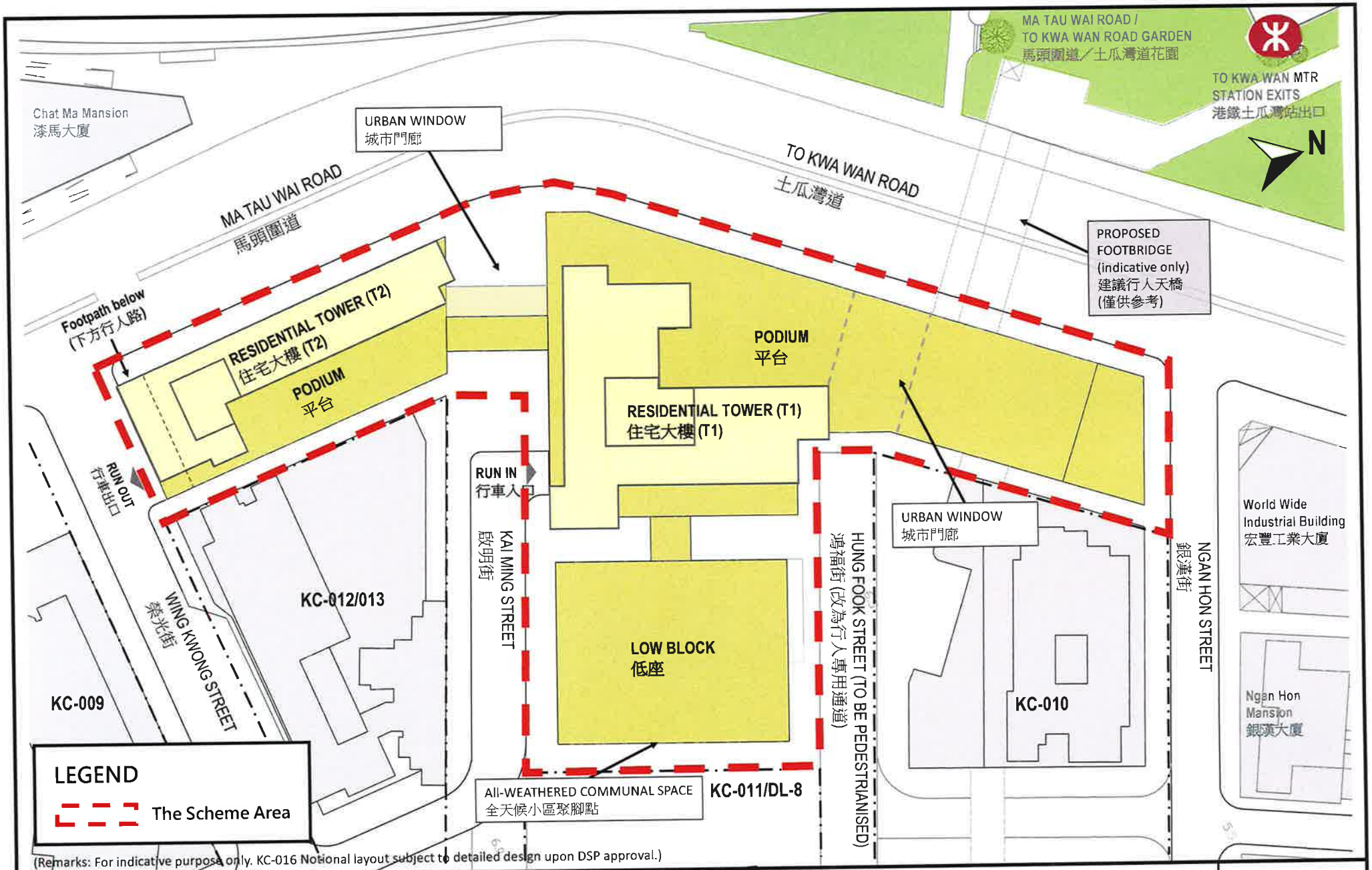
5.3 Referring to VP3, the proposed relaxation of building height has offered the opportunity to provide sufficient building separation to the future redevelopment as presented under the Proposed Scheme. Instead of a wall effect caused under the OZP-compliant Scheme, the Proposed Scheme will improve the visual permeability and visual openness of the view from the visually sensitive VP3, where the future MTR station exit is located. The Proposed Scheme will provided an ***enhanced*** visual impact.

5.4 Referring to the visual impact analysis at VP1, VP4, VP6 and VP7, the Proposed Scheme will be entirely or mostly concealed by existing developments. For VP2, while the future Ko Shan Road Public Housing Development would conceal a large portion of the residential towers under the Proposed Scheme, the visual obstruction and impact caused by either the OZP-compliant Scheme or the Proposed Schemes are similar. ***Negligible*** visual impact to views of these local or strategic VPs is anticipated by the Proposed Scheme.

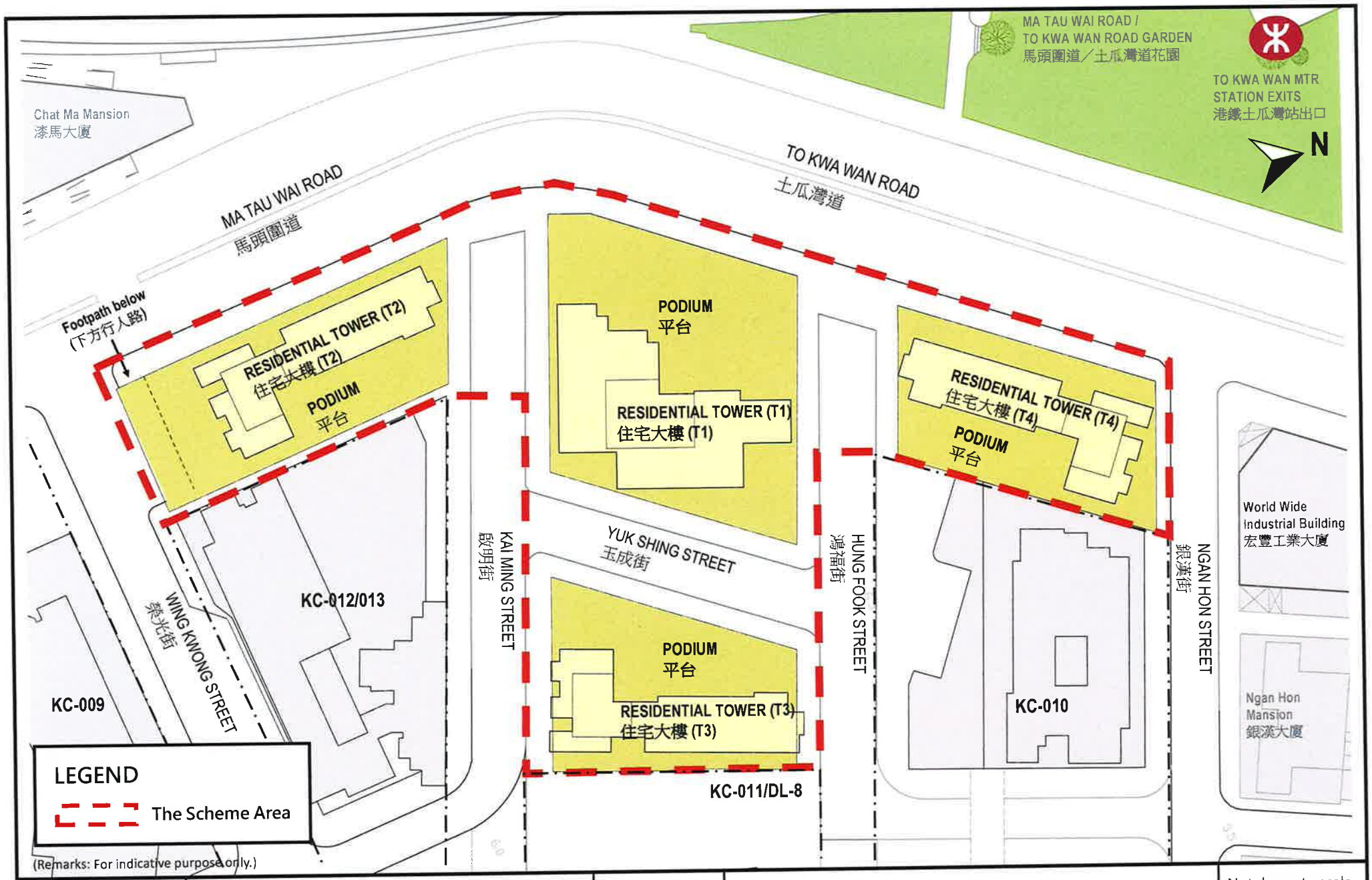
5.5 For VP5, the residential towers under the Proposed Scheme will only obstruct a small portion of the sky view while the taller T1 of about 140mPD would be mostly concealed by T2. As slightly increased portion of the sky view will be blocked by the Proposed Scheme as compared to the OZP-compliant Scheme, ***Slightly adverse*** visual impact on views from VP2 and VP5 is anticipated by the Proposed Scheme.

5.6 In conclusion, the Proposed Scheme will induce no significant adverse visual impact. The Proposed Scheme is visually compatible to its context and its induced visual obstruction could be minimized, in particular from the visually sensitive VP3, compared to the OZP-compliant Scheme. Moreover, it is important that the future redevelopment will also provide some intervening spaces / urban windows to enhance the visual permeability and visual elements of the vicinity. Therefore, the result overall visual impact is concluded as ***partly enhanced / partly adverse***.

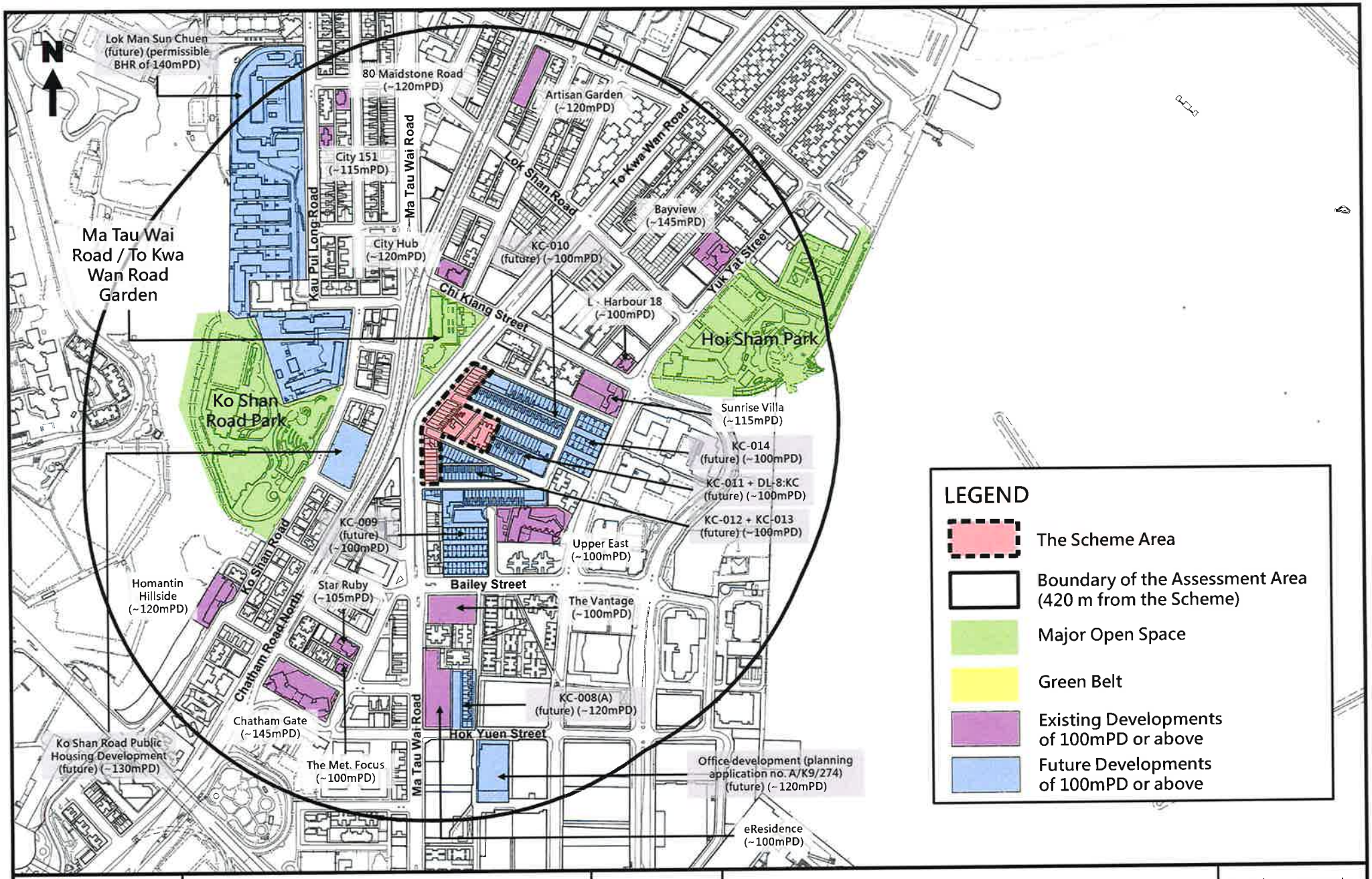
URBAN RENEWAL AUTHORITY
March 2021



市區重建局 URBAN RENEWAL AUTHORITY	URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) **Visual Impact Assessment**	Figure 2.1	**Layout Plan of the Proposed Scheme (max. 140mPD)**	Not drawn to scale Mar 2021



市區重建局 URBAN RENEWAL AUTHORITY	URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) **Visual Impact Assessment**	Figure 2.2	Layout Plan of the OZP-compliant Scheme (max. 100mPD)	Not drawn to scale Mar 2021



URBAN RENEWAL AUTHORITY 市區重建局

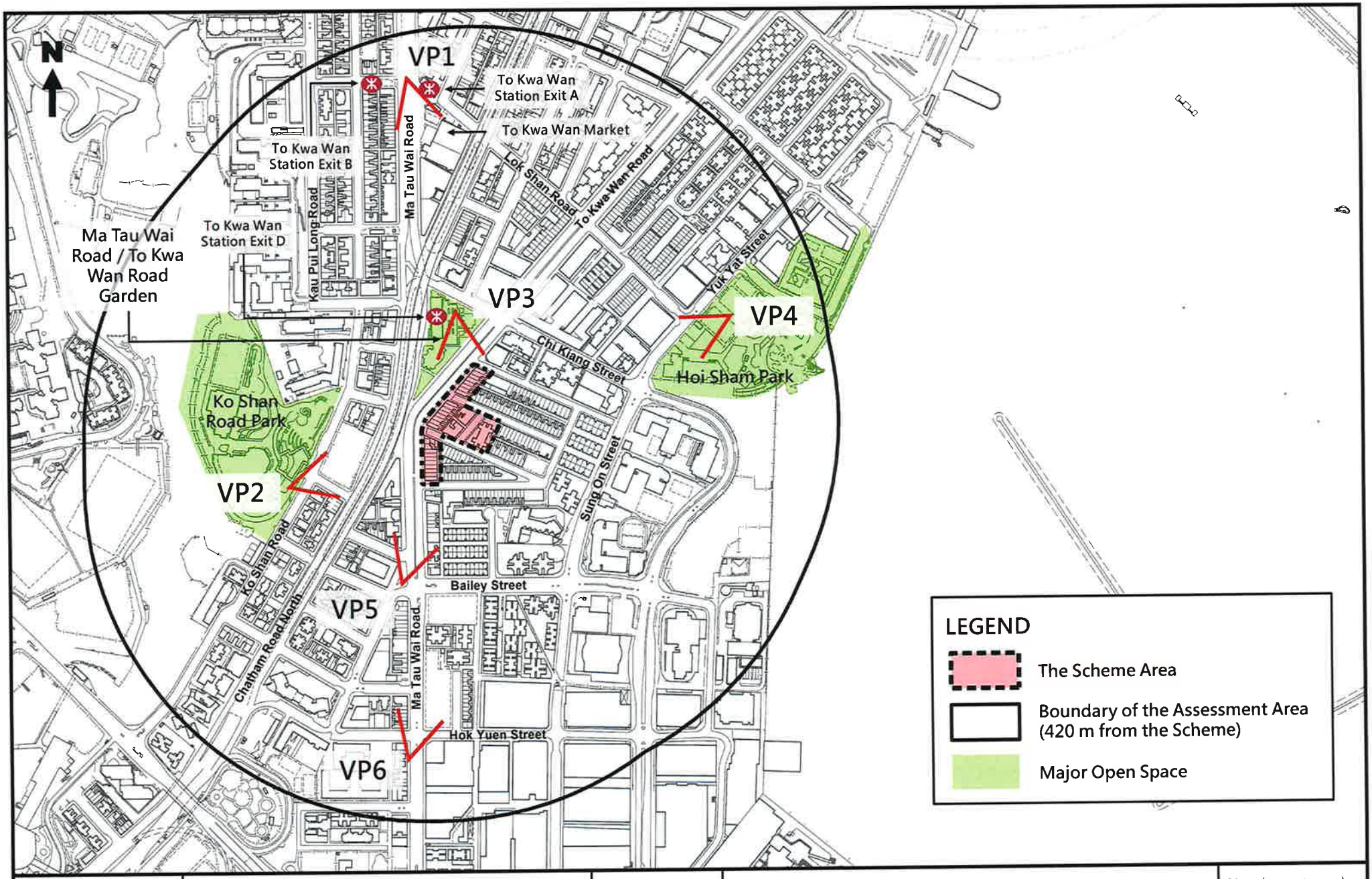
URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)
Visual Impact Assessment

Figure 4.1

Assessment Area and Visual Elements

Not drawn to scale

Mar 2021



市區重建局 URBAN RENEWAL AUTHORITY	URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) **Visual Impact Assessment**	Figure 4.2	Locations of Local Viewing Points	Not drawn to scale Mar 2021



VP1
Junction between Ma Tau Wai Road and Lok Shan Road



VP2
Ko Shan Road Park



VP3
Ma Tau Wai Road / To Kwa Wan Road Garden



VP4
Hoi Sham Park

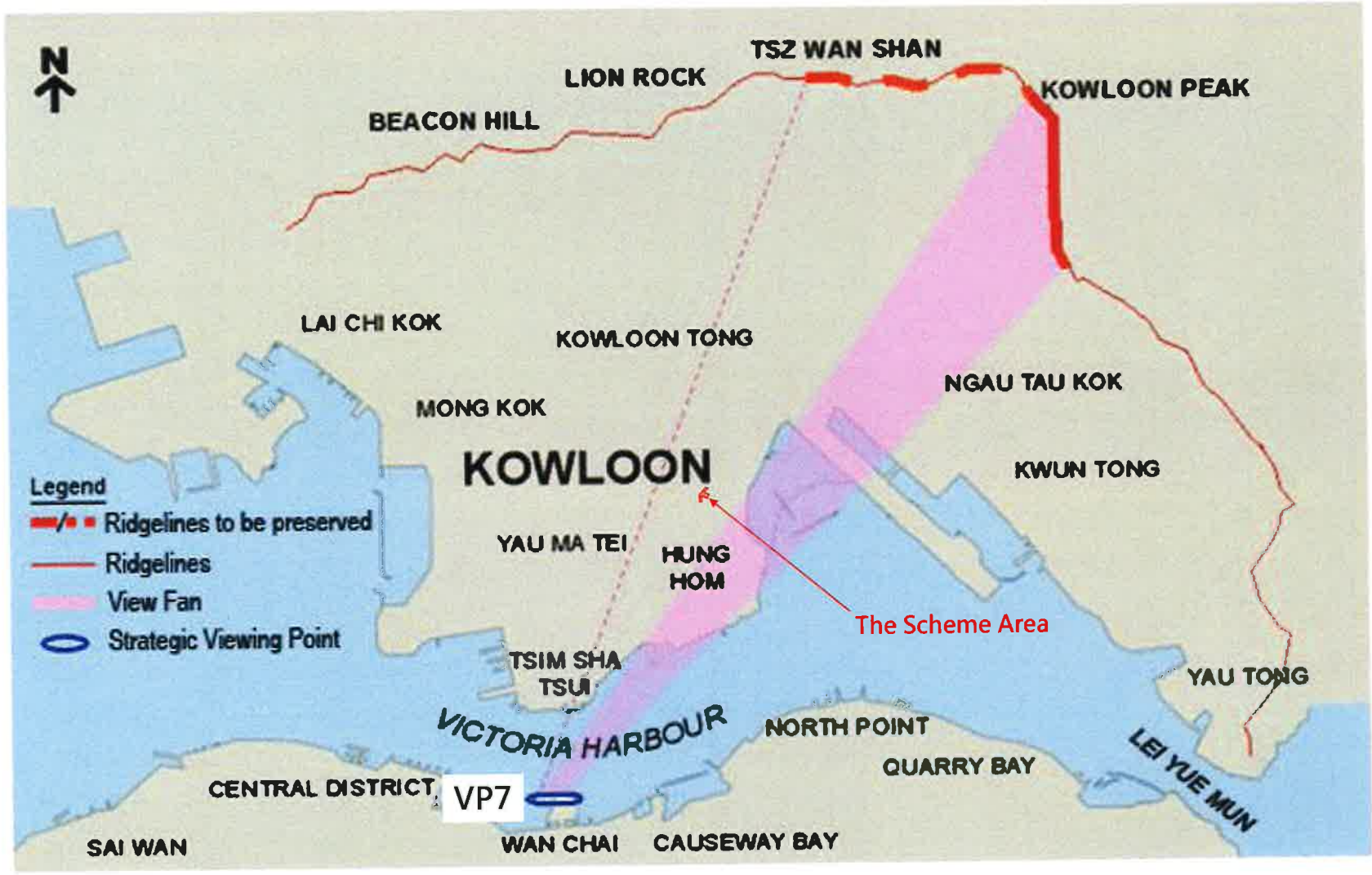


VP5
Junction between Ma Tau Wai Road and Bailey Street



VP6
Junction between Ma Tau Wai Road and Hok Yuen Street

市區重建局 URBAN RENEWAL AUTHORITY	URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) **Visual Impact Assessment**	Figure 4.3	Photos of Local Viewing Points	Mar 2021



Source:
Strategic Viewing Points Webpage of Planning Department for the Town Planning Board Guidelines for Submission of Visual Impact Assessment to the Town Planning Board (TPB PG-No. 41) https://www.pland.gov.hk/pland_en/info_serv/via/web/vp_eng.html

市區重建局 URBAN RENEWAL AUTHORITY	URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) **Visual Impact Assessment**	Figure 4.4	Location of the Strategic Viewing Point (VP7)	Mar 2021

Key Plan

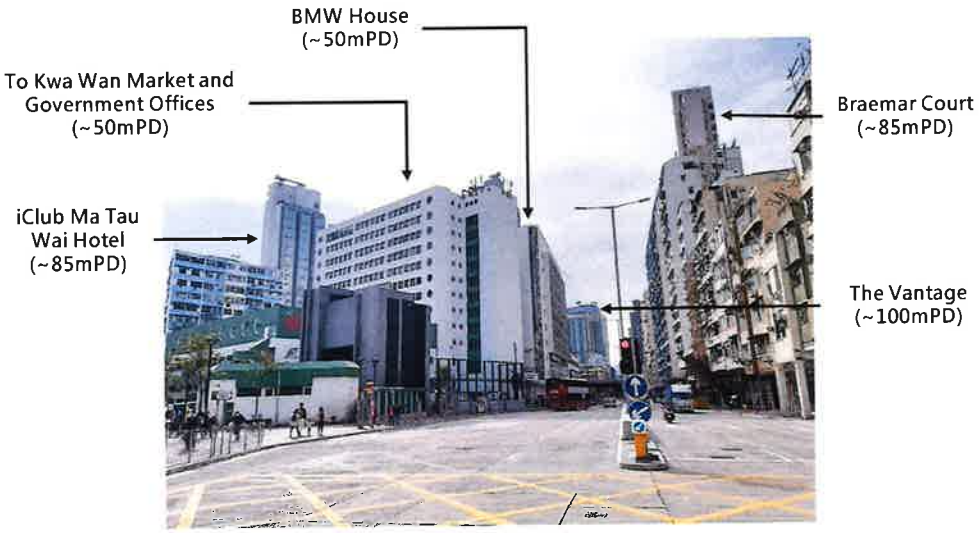


The Scheme Area

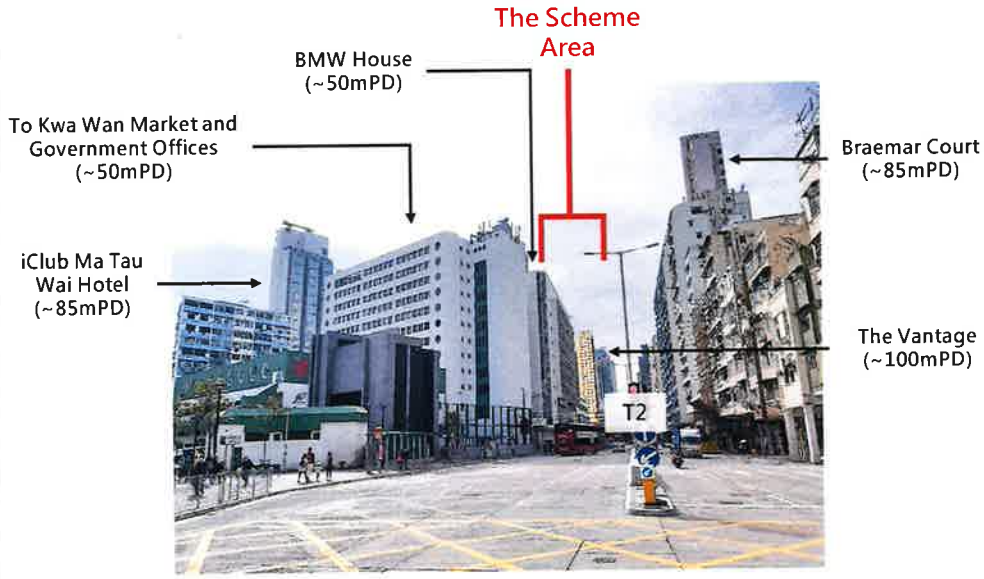
Boundary of the Assessment Area (420 m from the Scheme)

VP1

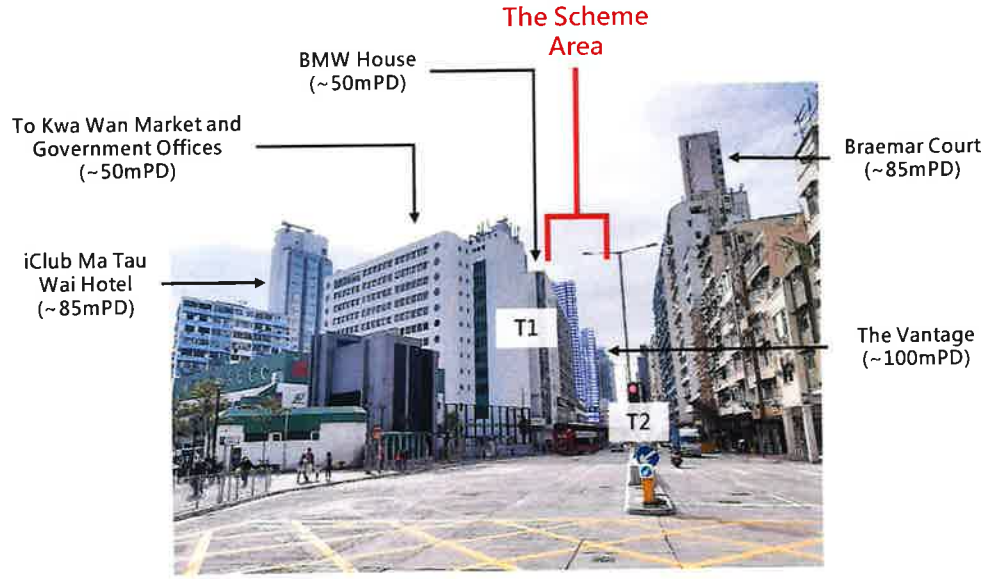
(not drawn in scale)



Existing Condition



OZP-Compliant Scheme



Proposed Scheme

市區重建局 URBAN RENEWAL AUTHORITY	URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) **Visual Impact Assessment**	Figure 4.5	Photomontages of VP1	Mar 2021

Key Plan



The Scheme Area

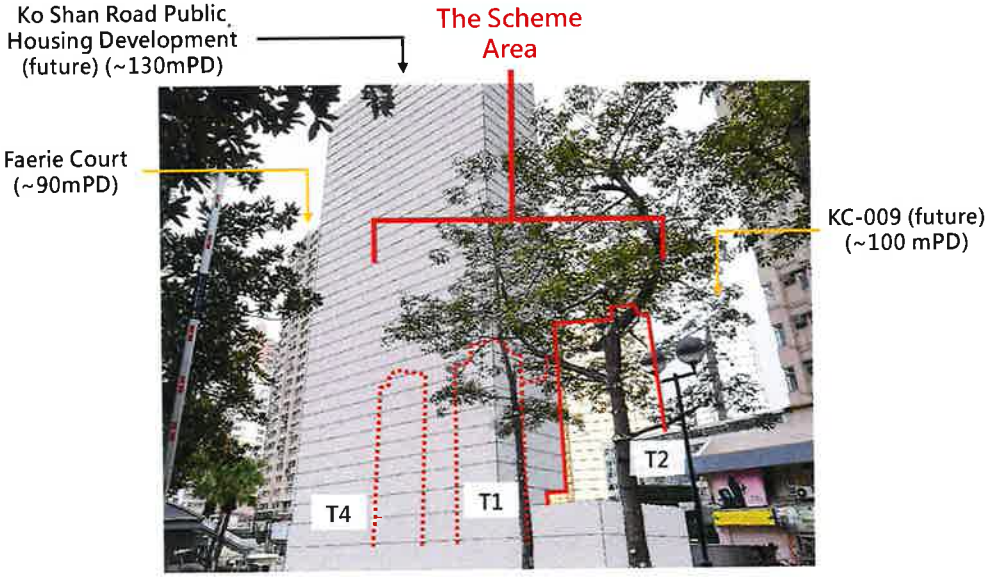
Boundary of the Assessment Area (420 m from the Scheme)

VP2

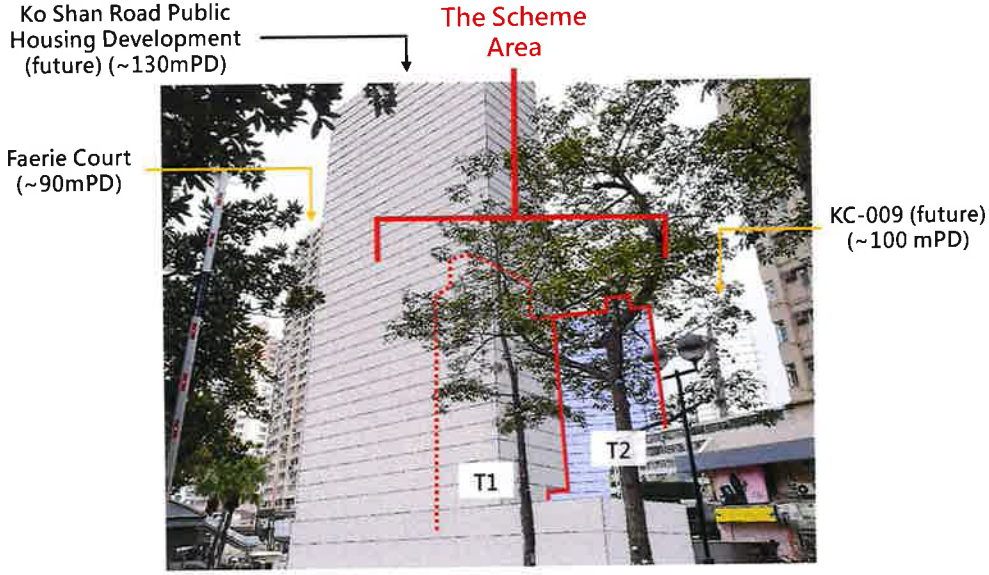
(not drawn in scale)



Existing Condition



OZP-Compliant Scheme



Proposed Scheme

市區重建局 URBAN RENEWAL AUTHORITY	URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) **Visual Impact Assessment**	Figure 4.6	Photomontages of VP2	Mar 2021

Key Plan

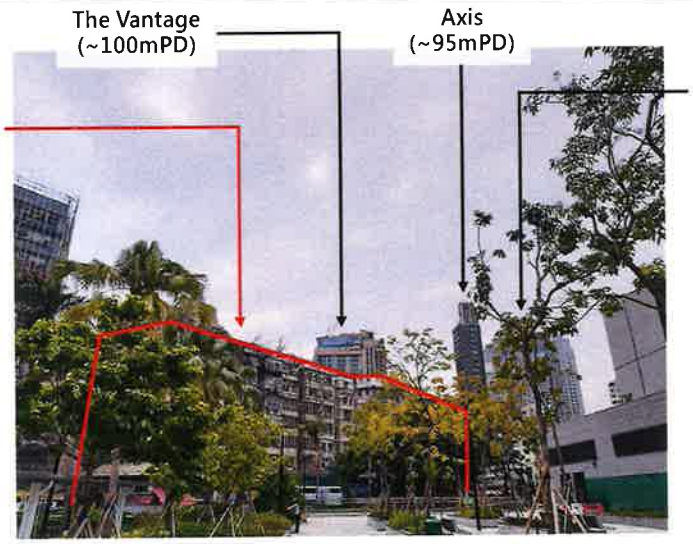


The Scheme Area

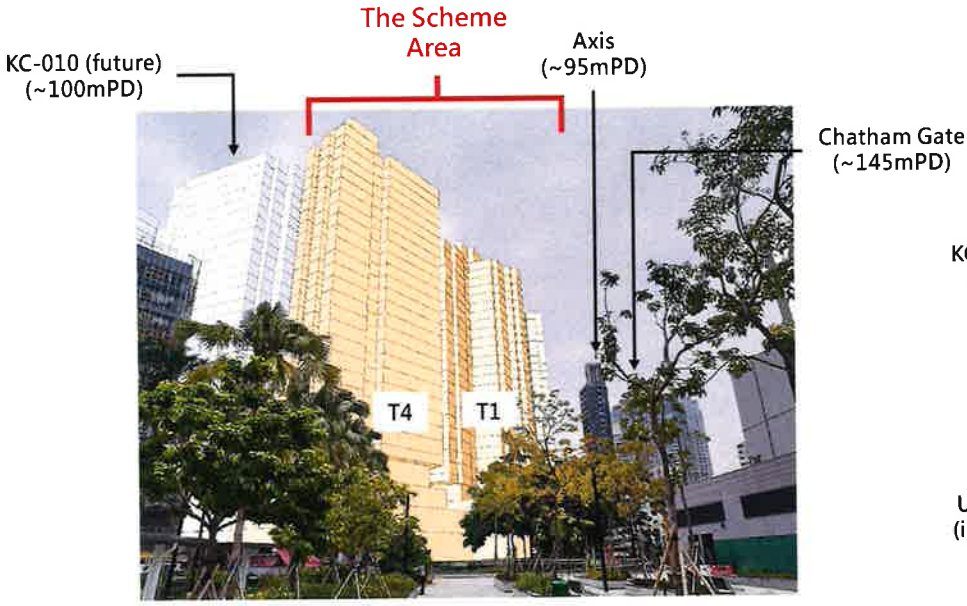
Boundary of the Assessment Area (420 m from the Scheme)

VP3

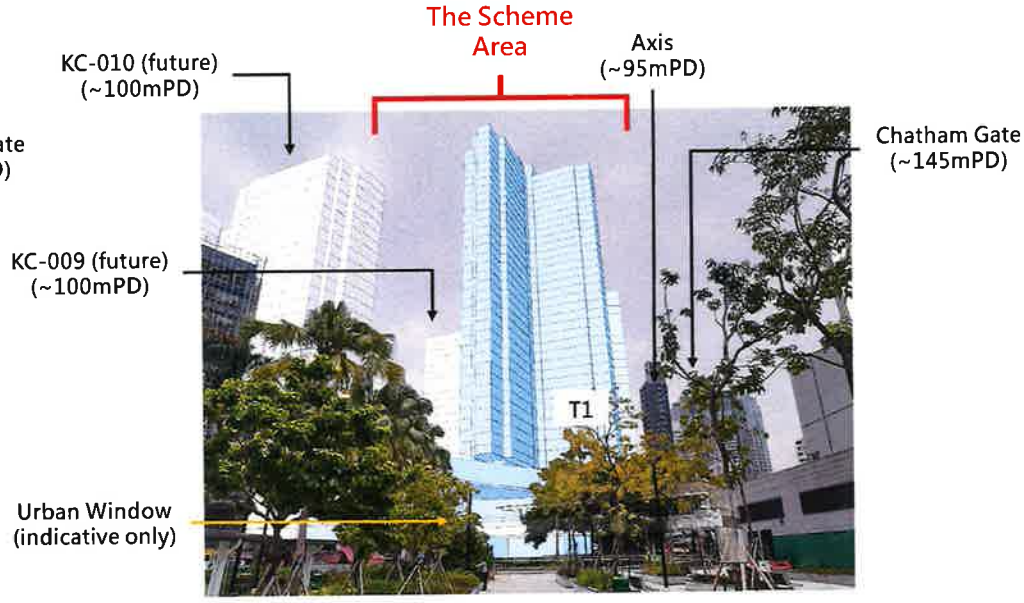
(not drawn in scale)



Existing Condition



OZP-Compliant Scheme



Proposed Scheme

市區重建局 URBAN RENEWAL AUTHORITY	URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) **Visual Impact Assessment**	Figure 4.7	Photomontages of VP3	Mar 2021

Key Plan



The Scheme Area

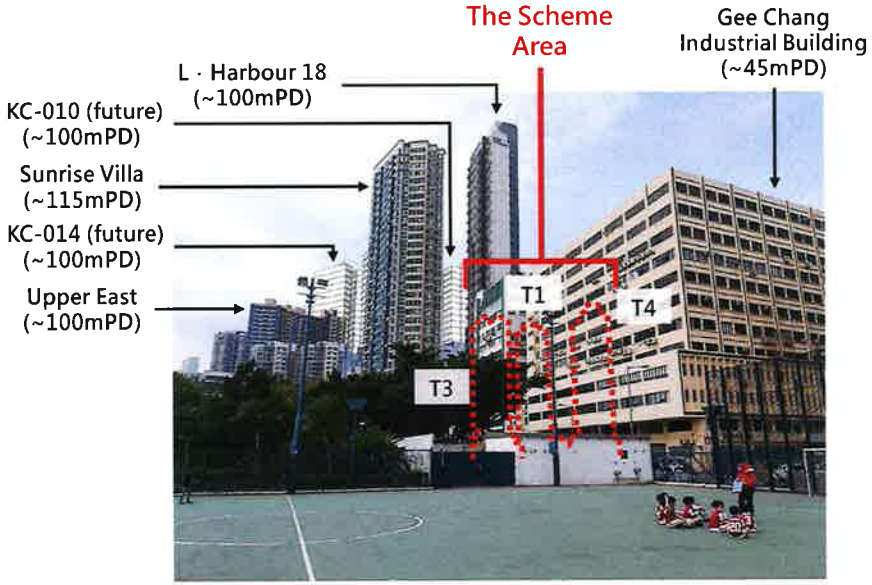
Boundary of the Assessment Area (420 m from the Scheme)

VP4

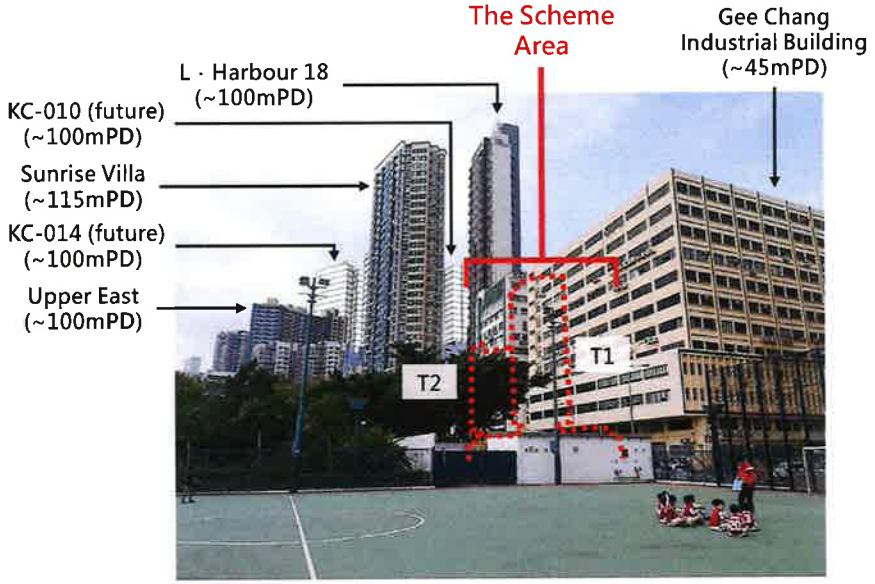
(not drawn in scale)



Existing Condition



OZP-Compliant Scheme



Proposed Scheme

市區重建局 URBAN RENEWAL AUTHORITY	URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) **Visual Impact Assessment**	Figure 4.8	Photomontages of VP4	Mar 2021

Key Plan



The Scheme Area

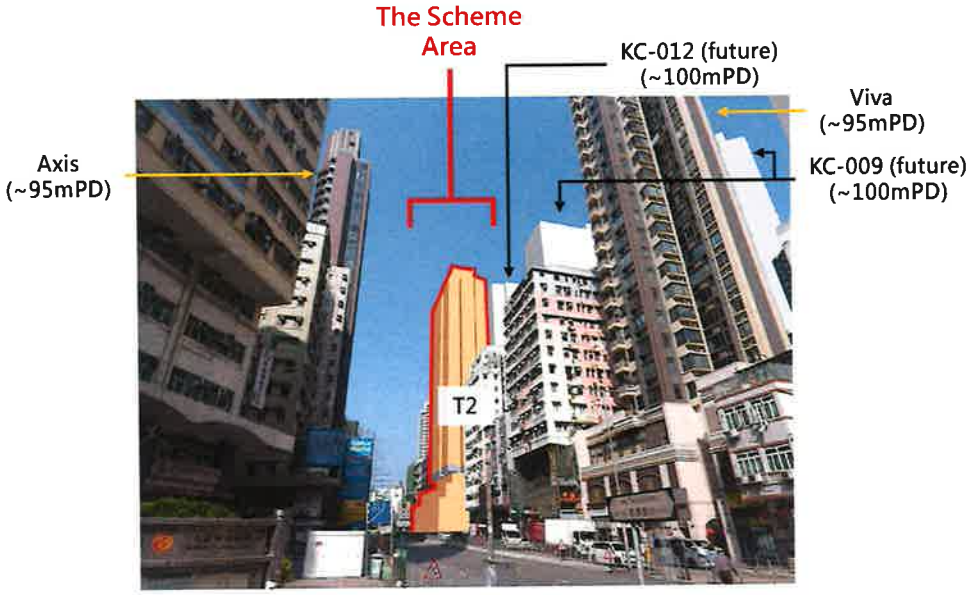
Boundary of the Assessment Area (420 m from the Scheme)

VP5

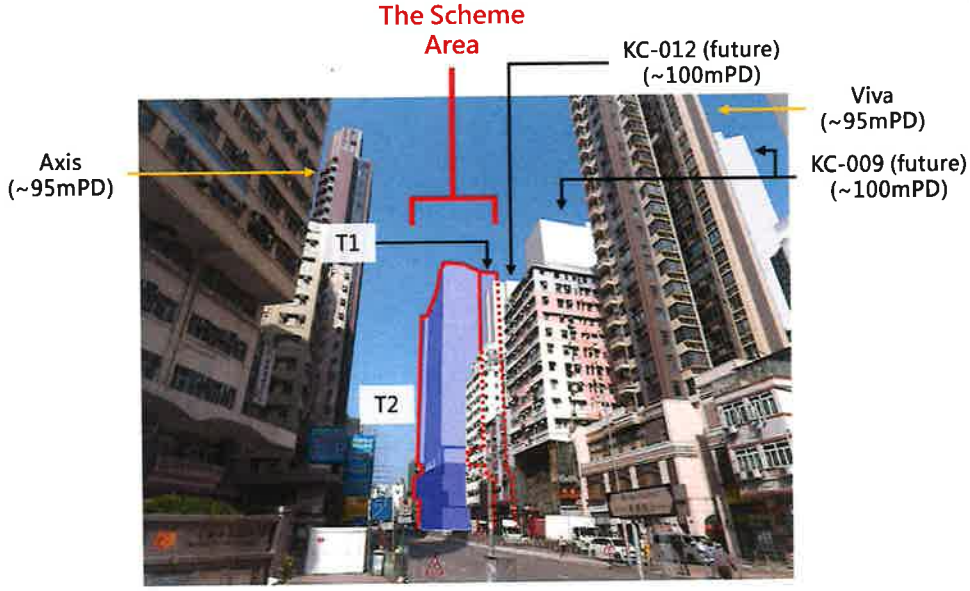
(not drawn in scale)



Existing Condition



OZP-Compliant Scheme



Proposed Scheme

市區重建局 URBAN RENEWAL AUTHORITY	URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) **Visual Impact Assessment**	Figure 4.9	Photomontages of VP5	Mar 2021

Key Plan



The Scheme Area

Boundary of the Assessment Area (420 m from the Scheme)

VP6

(not drawn in scale)



Existing Condition



OZP-Compliant Scheme



Proposed Scheme

市區重建局 URBAN RENEWAL AUTHORITY	URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) **Visual Impact Assessment**	Figure 4.10	Photomontages of VP6	Mar 2021



Source:
Strategic Viewing Points Webpage of Planning Department for the Town Planning Board Guidelines for Submission of Visual Impact Assessment to the Town Planning Board (TPB PG-No. 41) *https://www.pland.gov.hk/pland_en/info_serv/via/web/vp_eng.html*

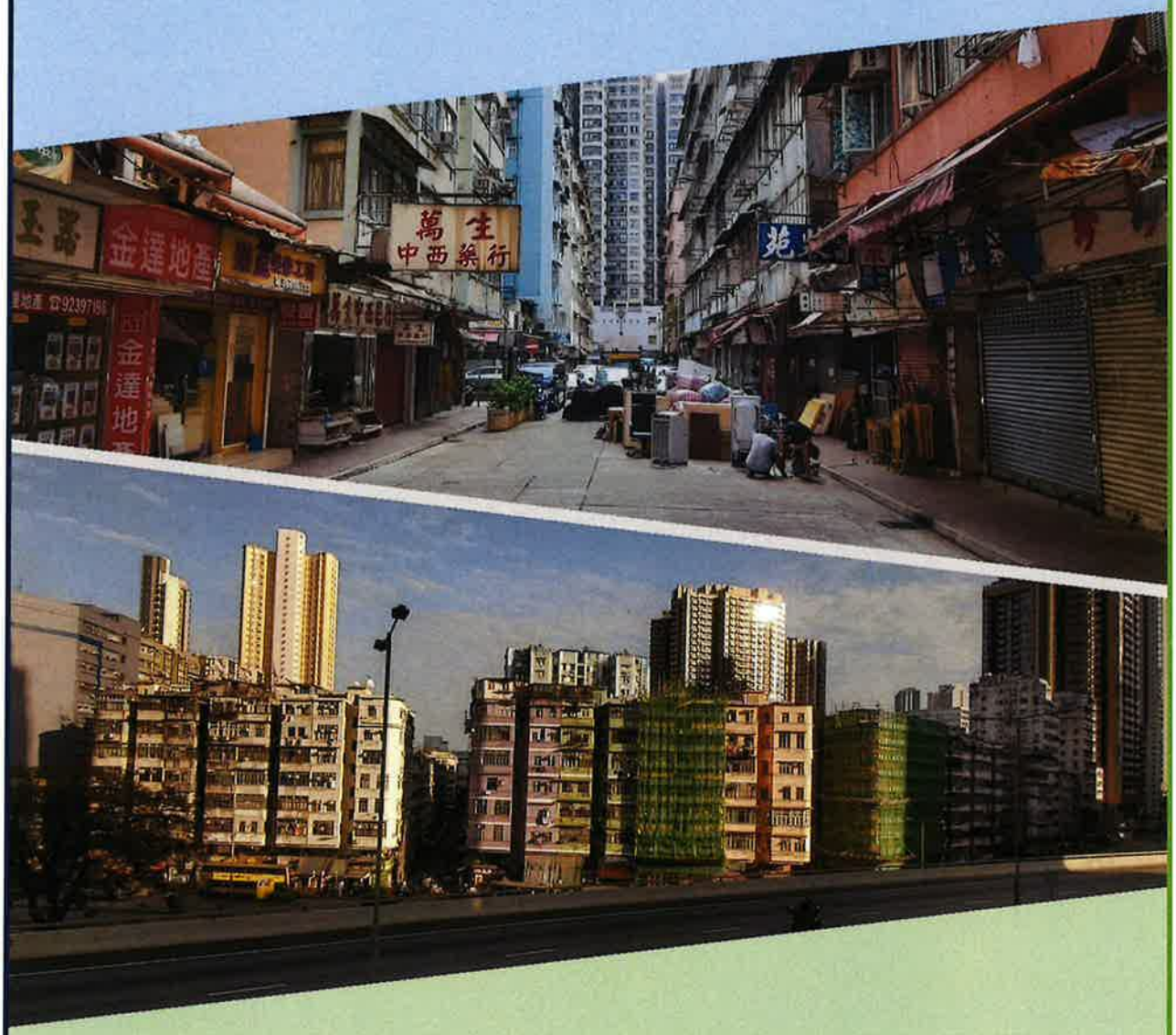
市區重建局 URBAN RENEWAL AUTHORITY	URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) **Visual Impact Assessment**	Figure 4.11	Photomontage of VP7	Mar 2021

Appendix 3

Social Impact Assessment (Stage 1) Report

Urban Renewal Authority Development Scheme

Prepared under Section 25 (3) of the Urban Renewal Authority Ordinance



To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Stage 1 Social Impact Assessment

March 2021

市區重建局
URBAN RENEWAL AUTHORITY

Content

1 INTRODUCTION 1
2 THE DEVELOPMENT SCHEME 3
3 HISTORICAL BACKGROUND AND LOCAL CHARACTERISTICS 9
4 POPULATION & SOCIO-ECONOMIC CHARACTERISTICS 13
5 HOUSING & ENVIRONMENTAL CONDITIONS 22
6 CULTURAL & LOCAL CHARACTERISTICS, AND CHARACTERISTICS OF LOCAL BUSINESS ACTIVITIES 26
7 RECREATIONAL, AMENITY & COMMUNITY AND WELFARE FACILITIES 30
8 INITIAL ASSESSMENT OF POTENTIAL SOCIAL IMPACT, AND MITIGATION MEASURES 37
9 CONCLUSION 43

List of Figures

Figure 2.1 Location Plan 4
Figure 2.2 URA Projects in the Vicinity 8
Figure 3.1 Places with Historical Background and Local Characters in To Kwa Wan 12
Figure 4.1 Boundaries of To Kwa Wan North (G16) and To Kwa Wan South (G17) Constituencies and Tertiary Planning Unit (TPU) 244 15
Figure 4.2 Street Block Boundaries Covering the Scheme 16
Figure 7.1 Community Facilities, Amenity, and Social Welfare Service Units within 500m Radius from the Scheme 32

List of Tables

Table 4.1 Proportions of Singletons, Doubletons, and 3-person or above Households by Geographical Division Levels 18
Table 4.2 Percentages of Working Population and Elderly Residents by Geographical Division Levels 19
Table 4.3 Percentages of Ethnic Minorities by Geographical Division Levels 20
Table 4.4 Percentages of Owner-Occupiers and Tenanted Occupiers by Geographical Division Levels 20
Table 4.5 Median Monthly Household Rents by Geographical Division Levels 21
Table 6.1 Ground Floor Business Activities within the Scheme 27
Table 7.1 Existing Community Facilities and Social Welfare Service Units within 500m Radius from the Scheme 33

1 INTRODUCTION

1.1 According to the Urban Renewal Strategy (URS) issued by the Government in February 2011, the Urban Renewal Authority (URA) will carry out Social Impact Assessment (SIA) studies in the form of "*a Stage 1 social impact assessment ..... before the publication of any proposed redevelopment project in the Government Gazette*", and "*a Stage 2 social impact assessment ..... after the proposed project has been published in the Government Gazette*". This Stage 1 SIA is prepared by the URA for the proposed To Kwa Wan Road / Wing Kwong Street Development Scheme (the Scheme).

1.2 The URS also states "*Early social impact assessments will be initiated and conducted by DURF (District Urban Renewal Forum) before redevelopment is recommended as the preferred option. The URA will update these assessments by DURF before implementing any specific redevelopment project.*" As the Scheme falls within the study area of Kowloon City District Urban Renewal Forum ("KC DURF"), consultants for the KC DURF had completed a DURF SIA report of the Urban Renewal Plan (URP) for Kowloon City in 2014. This Stage 1 SIA is prepared with reference to the DURF SIA report, where appropriate.

1.3 According to the URS, the main elements of the Stage 1 SIA conducted by the URA before the publication of a proposed project should include:

- the population characteristics of the area;
- the socio-economic characteristics of the area;
- the housing conditions in the area;
- the characteristics of local business activities, including small shops and street stalls;
- the degree of overcrowding in the area;
- the availability of amenities, community and welfare facilities in the area;
- the historical background of the area;
- the cultural and local characteristics of the area;
- an initial assessment of the potential social impact of the proposed project; and
- an initial assessment of the mitigation measures required.

1.4 The Stage 2 SIA will be conducted after the publication of the project based on the factual information collected in the Freezing Survey (FS) upon project commencement. The URS stipulates the URA should submit both Stage 1 and Stage 2 SIA reports to the Town Planning Board (TPB) under section 25 of the Urban Renewal Authority Ordinance (URAO), and should release the reports for public information.

2 THE DEVELOPMENT SCHEME

2.1 The Scheme locates in Kowloon City (KC) District, which is broadly bounded by To Kwa Wan Road, Ma Tau Wai Road, Wing Kwong Street, Kai Ming Street, Hung Fook Street and Ngan Hon Street **(Figure 2.1)**. The Scheme involves 53 street numbers of buildings comprising 1 – 31 To Kwan Wan Road (odd nos.), 111 – 127D Ma Tau Wai Road (odd nos.), 2 – 6 and 10 – 14 Hung Fook Street (even nos.), 1 – 5 and 11 – 19 Kai Ming Street (odd nos.), 1 – 7 Yuk Shing Street (odd nos.) and 2 – 12 Yuk Shing Street (even nos.). The Scheme also includes the whole of Yuk Shing Street, part of the road sections of Hung Fook Street and Kai Ming Street, government back lanes and the surrounding pubic pavement. The total gross site area of the Scheme is about 6,592sq.m. Subject to site survey and detailed design, the site area for Plot Ratio (PR) calculation is about 5,548 sq.m. including private lots, government lanes and public streets within the Scheme.

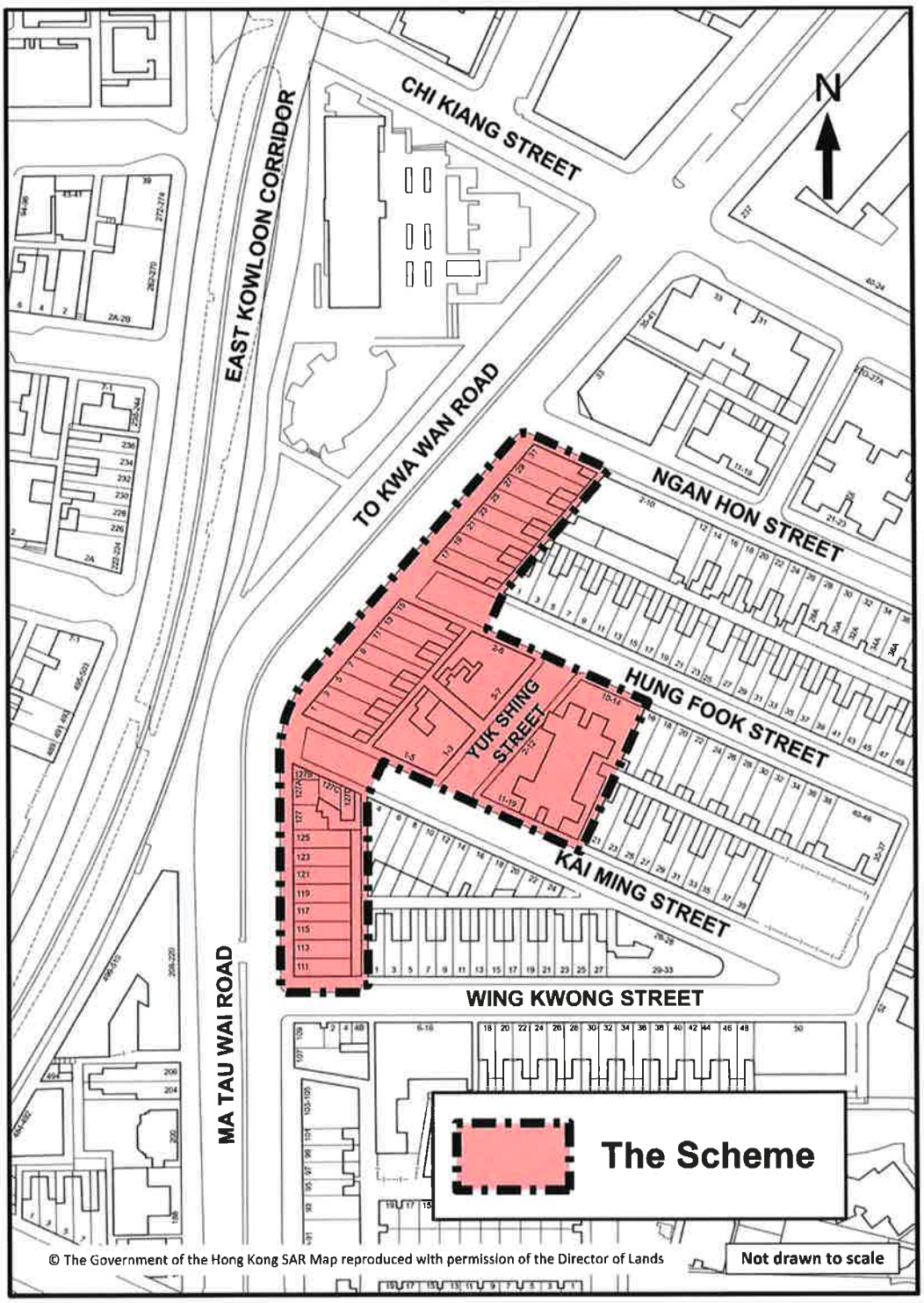


Figure 2.1 Location Plan

2.2 The Scheme falls within one of the "Proposed Redevelopment Priority Areas", in the KC DURF's URP. The URP recommended that *"redevelopment should be given priority as the urban renewal approach for the area"*. The Scheme, being a redevelopment project, is tally with the recommendations of KC DURF. To assess the preliminary social impact of the redevelopment, this SIA1 Report will take into consideration of the SIA of KC DURF, in particularly the community profile complied for this Priority Area.

Planning Objectives

2.3 The URS issued in 2011 promulgates a comprehensive and holistic approach to carry out urban renewal with the following objectives:

- Restructuring and replanning of concerned urban areas;
- Designing more effective and environmentally-friendly local transport and road networks within the concerned urban areas;
- Rationalising land uses within the concerned urban areas;
- Redeveloping dilapidated buildings into new buildings of modern standard and environmentally-friendly design; and
- Providing more open space and community / welfare facilities.

2.4 The Scheme aims to achieve the above objectives stipulated in the URS through redevelopment and to manifest the planning merits brought by the "planning-led" and "district-based" approach in taking forward urban renewal by URA in this part of To Kwa Wan of Kowloon City (KC) District. The URA has identified an area in the vicinity of Wing Kwong Street of To Kwa Wan as Kowloon City Action Area 1 (KCAA1) for holistic planning of urban renewal works in recent years. The Scheme, being part of the KCAA1 area, includes the following key planning proposals to achieve the said URS objectives:

i. Through re-structuring and re-planning of existing land uses, the Scheme will optimise the land uses to enhance connectivity and walkability in the area. With the proposed closure of three road sections and re-routing of the traffic road network, the vehicular traffic circulation in KCAA1 will be further reduced, and at the same time more pedestrian walkways will be created to provide a safe and pleasant walking environment.

ii. The proposed pedestrian network in the Scheme will be integrated with the planned pedestrian walkways and urban spaces in the other URA redevelopment projects in the KCAA1 to enhance connectivity in the neighbourhood, including from north to south and from east to west. With the integrated pedestrian network between the Scheme and the surrounding URA projects, pedestrian can find more direct at-grade walkways on the east via the pedestrianised Hung Fook Street and the adjoining URA developments towards Sung On Street to approach to the waterfront, which is proposed to be developed as a waterfront promenade in the KC DURF.

iii. Through integration of redevelopment and revitalisation initiatives, the Scheme provides a valuable opportunity to link up the wider neighbourhood with the To Kwa Wan MTR Station. To capture the opportunity, a footbridge connection is proposed at the Scheme to facilitate to develop a footbridge across To Kwa Wan Road to connect with the MTR station under separate URA's revitalisation initiatives.

iv. An all-weathered communal space is proposed in the Scheme to create a focal point for gathering and place-making opportunities. It will be connected with the adjoining pedestrian walkways and retail shops to bring in vibrancy.

v. To enhance planning gains and to align with the "Single site, Multiple Use" model promoted by the Government, it is proposed to provide not less than 5,500sq.m. non-domestic GFA for "Government, Institution or Community" ("GIC") facilities within the Scheme to meet the community's needs.

URA Projects in the Vicinity

2.5 Under the holistic planning of KCAA1, the URA has already commenced seven redevelopment projects in the vicinity of the Scheme as shown in **Figure 2.2** in recent years, forming a cluster of URA projects for redevelopment of the existing tenement buildings concentrated in KCAA1. These projects include:

- Bailey Street / Wing Kwong Street Development Project (KC-009)
- Hung Fook Street / Ngan Hon Street Development Scheme (KC-010)
- Kai Ming Street Demand-Led Redevelopment Project (DL-8:KC)
- Hung Fook Street / Kai Ming Street Development Project (KC-011)
- Wing Kwong Street Development Project (KC-012)
- Kai Ming Street / Wing Kwong Street Development Project (KC-013)
- Wing Kwong Street / Sung On Street Development Project (KC-014)

2.6 To the south of KCAA1, URA has commenced the Ma Tau Wai Road / Chun Tin Street Development Project (TKW/1/002) in 2010 (currently named as "eResidence") and has recently been completed and designated as Starter Home subsidised housing. URA Chun Tin Street / Sung Chi Street Development Scheme (KC-008(A)) is another on-going project to the immediate east of eResidence, which will be Phase 2 of the Starter Home initiatives.

2.7 There are also several URA projects to the north of KCAA1, including Chi Kiang Street / Ha Heung Road Development Project (TKW/1/001) (completed and named "City Hub") and Kowloon City Road / Sheung Heung Road Development Project (KC-007) (completed and named "Artisan Garden"). In May 2020, the URA also announced commencement of Kau Pui Lung Road / Chi Kiang Street Development Scheme (CBS-2:KC) covering a cluster of Civil Servants' Co-operative Building Society (CBS) sites for redevelopment.

2.8 The Scheme, which forms part of KCAA1 district-based planning, will further contribute as a vital part of the comprehensive urban renewal of this part of Kowloon City.

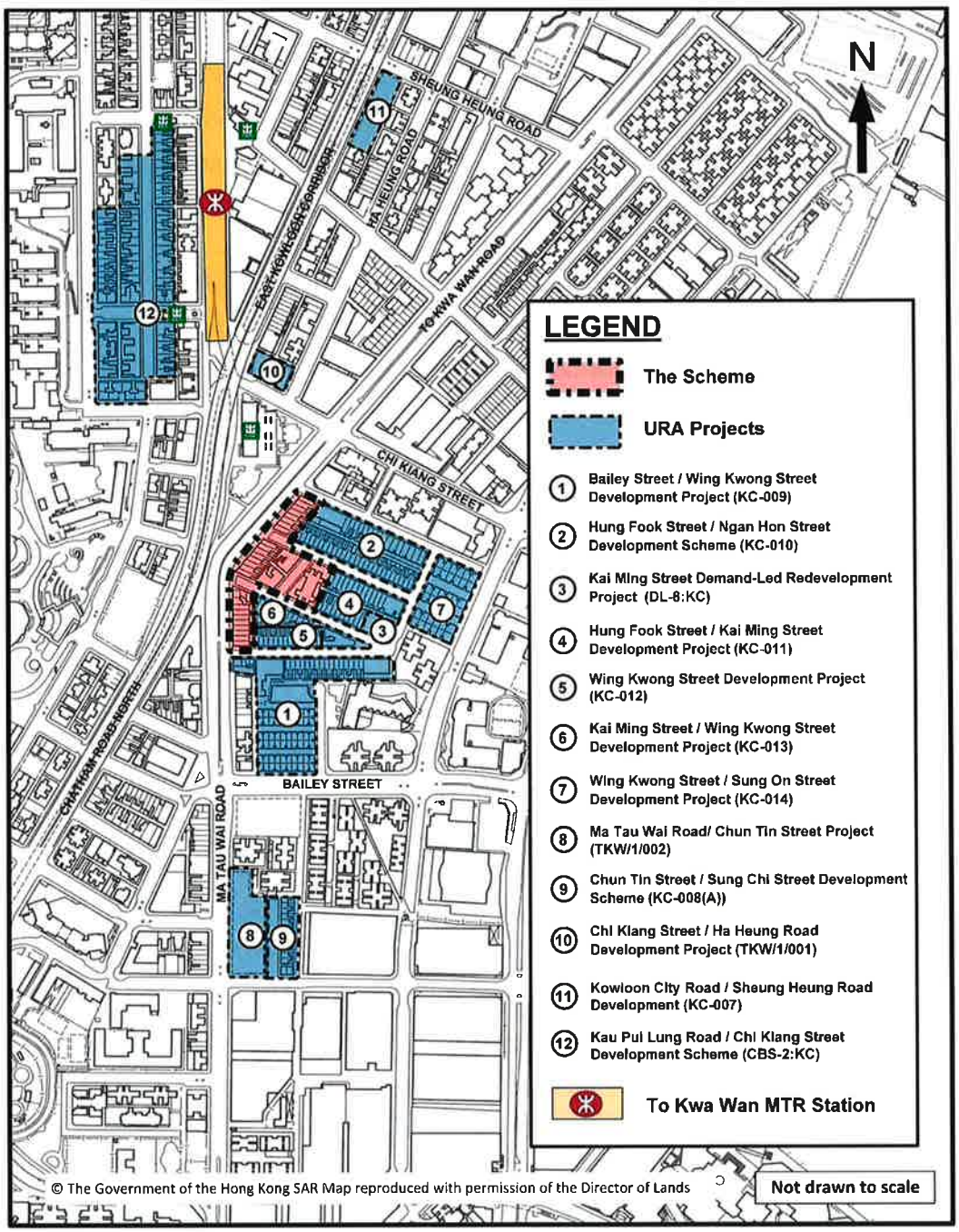


Figure 2.2 URA Projects in the Vicinity

3 HISTORICAL BACKGROUND AND LOCAL CHARACTERISTICS

Historical Background

3.1 As stated on the DURF SIA, the KC District has a rich historical background. Major historical and cultural assets are concentrated near the former Kowloon Walled City while various historical buildings and heritage are also found in To Kwa Wan, including the Fishtail Rock inside Hoi Sham Park and Pak Tai Temple.

3.2 There are different narratives for the origin of the name "To Kwa Wan". One was named after the bay with plentiful crops of sweet potatoes or dioscorea ("To Kwa"). Another suggests that the Hoi Sum Island (in the middle of the sea) opposite to To Kwa Wan was shaped like a "To Kwa".

3.3 Before the 1890s, To Kwa Wan was a bay lined by beaches and mud-flats with a stream originated from the hinterland named Ma Tau Chung where flowed closely along the existing Ma Hang Chung Road. The headland to the north of the bay is Ma Tau Kok, which might be named after the long pier of Kowloon Walled City nearby. A string of agricultural and stone-cutter villages along the coast of To Kwa Wan Bay sharing the name of To Kwa Wan Village was believed to be the largest village in the Hung Hom and To Kwa Wan area. Quarrying became active in the mid-18th century that Quarry Hill and San Shan (new quarry) Road were believed to commemorate these activities.

3.4 After the reclamation undertaken in the 1890s, To Kwa Wan started being developed by industrial activities extended from Hung Hom and the ex-Whampoa Docks. Streets including Mok Cheong (timber factory) Street and Pau Cheung (firecracker) Street were believed to commemorate the factory development in the early 20th century. The Scheme was at the coast in the pre-war era and its vicinity was where the former Bailey's Shipyard located. Bailey Street, where is to the south of the Scheme, was named after the founder of the shipyard.

3.5 The second large-scale reclamation of To Kwa Wan started in the 1950s while industrial activities in Kowloon became more prosperous. The Scheme and its vicinity became inland and were then transformed into a mixture of residential developments and industrial uses including manufacturing, car-repairing, weaving, bleaching and dyeing, printing and electroplating. Today, industrial buildings still scatter along To Kwa Wan Road.

Hoi Sum Island and Tin Hau Temple

3.6 Hoi Sum Island was originally a small island but was subsequently linked with the mainland by reclamation during the 1950s-1960s. Hoi Sum Island was then developed as Hoi Sham Park where is to the east of the Scheme with the landmark of Fishtail Rock. The Lung Mo Temple on the island was relocated into the Tin Hau Temple at 49 Ha Heung Road in 1964. The Tin Hau Temple has been graded the Grade III status by the Antiquities Advisory Board.

Pak Tai Temple

3.7 Pak Tai Temple was previously located on a hillock at the junction of the present Tsing Chau Street and Ma Tau Wai Road. According to the inscription on the incense burner, the temple was built in 1876. In the 1930s, the temple was relocated to the junction of Pak Kung Street and Ma Tau Wai Road. The Temple had undergone major renovation in 2005.

Ex-Green Island Cement Pier

3.8 The Green Island Cement Company was founded in Macau in the 1880s. The company then set up a cement plant in Hok Yuen area, near the junction of Hok Yuen Street East and Hung Hom Road in around 1900. The plant covered a large area with both rail and pier for raw materials and products transportation. It supplied cement for both local and overseas construction projects and provided support to the city development. The plant was redeveloped into industrial and commercial blocks in the 1980s while part of the pier still exists near the present "Harbour Centre".

Ko Shan Theatre

3.9 Ko Shan Theatre is situated to the west of the Scheme. It is a popular venue for Cantonese opera performances first opened in March 1983 and was designed as a 3,000 seat semi-open-air theatre. In view of the inclement weather and noise problems, the Theatre was re-designed as an in indoor theatre and re-opened in October 1996. Ko Shan Theatre underwent extension works in 2008-2009 with a new wing with a 600-seat theatre, activity and dance rooms. The new wing opened in October 2014.

To Kwa Wan Market

3.10 To the north of the Scheme is To Kwa Wan Market where locates at the central location of the neighbourhood and was built in 1984. Local citizens usually call the market as the "Red Apple Market" for its featured apple paintings on the wall. Together with the street market and sitting-out places along Kowloon City Road, the market is an important community hub of the To Kwan Wan area.

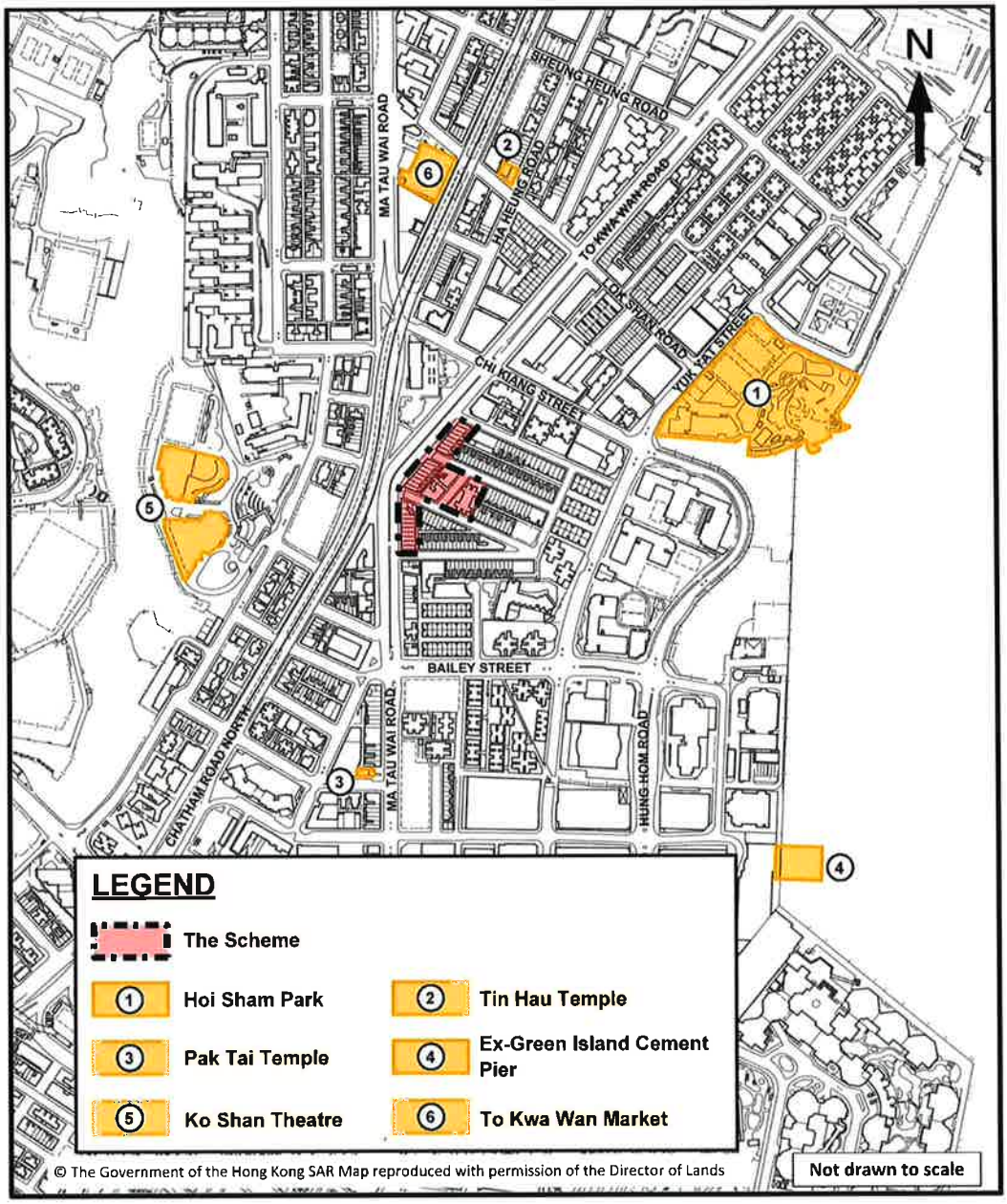


Figure 3.1 Places with Historical Background and Local Characters in To Kwa Wan

4 POPULATION & SOCIO-ECONOMIC CHARACTERISTICS

4.1 The DURF SIA completed in 2014 had provided an overview of the population and socio-economic characteristics of the "*Proposed Redevelopment Priority Area*" in the KC DURF's URP where the Scheme falls within. To further update and analyse these characteristics of the Scheme, a combination of the 2016 Population By-Census results and the experience from other URA projects are used to assess the population and socio-economic characteristics. The accommodation assessment is then based on inspection of approved building plans and on-site non-obtrusive observation. Given the general and non-obtrusive nature of data sources available to conduct this Stage 1 SIA, the assessment derived should only be considered as indicative and is for reference use.

4.2 The Census and Statistics Department's (C&SD) website provides the 2016 Population By-Census results. Depending on the type of information, the most disaggregated data available are down to various geographical division levels, including Tertiary Planning Units (TPU), District Council Constituencies, Large Street Block Groups (LSBG) and Small Street Block Groups (SSBG).

4.3 The Scheme is within the Tertiary Planning Unit 244. It falls within To Kwa Wan North (G16) and To Kwa Wan South (G17) constituencies of the Kowloon City (KC) District, which were formerly numbered as G13 and G14 during the 2016 Population By-Census respectively **(Figure 4.1)**. The boundaries of the two constituencies have remained unchanged since 2016.

4.4 The Scheme lies within the SSBGs 244/01, 244/02, 244/03 and 244/07. It is also within LSBGs 24401, 24402L and 24403 **(Figure 4.2)**. These 3 LSBGs are bounded by To Kwa Wan Road and Ma Tau Wai Road to the west, Ngan Hon Street to the north and Wing Kwong Street to the east and south, covering both the buildings within the Scheme and other buildings included in 5 on-going URA projects including DL-8:KC, KC-010, KC-011, KC-012 and KC-013. Given all the buildings within these 3 LSBGs are of similar age ranges, the socio-economic characteristics reflected by the census data in LSBG and SSBG levels are assumed to be similar to those residing within the Scheme.

4.5 Based on the URA experience, the average household size of those within the Scheme is assumed to be around 2.1. The tenure split between owner-occupied and tenanted households is assumed to be 30:70 for this Stage 1 SIA. Site observation indicates some existing units in the Scheme appear to be converted into sub-divided units. Given similar sub-division situation found in various past URA projects, it is estimated that the degree of sharing in the Scheme is about 2 based on URA experience. Actual numbers will be ascertained as far as practicable at the Stage 2 SIA.

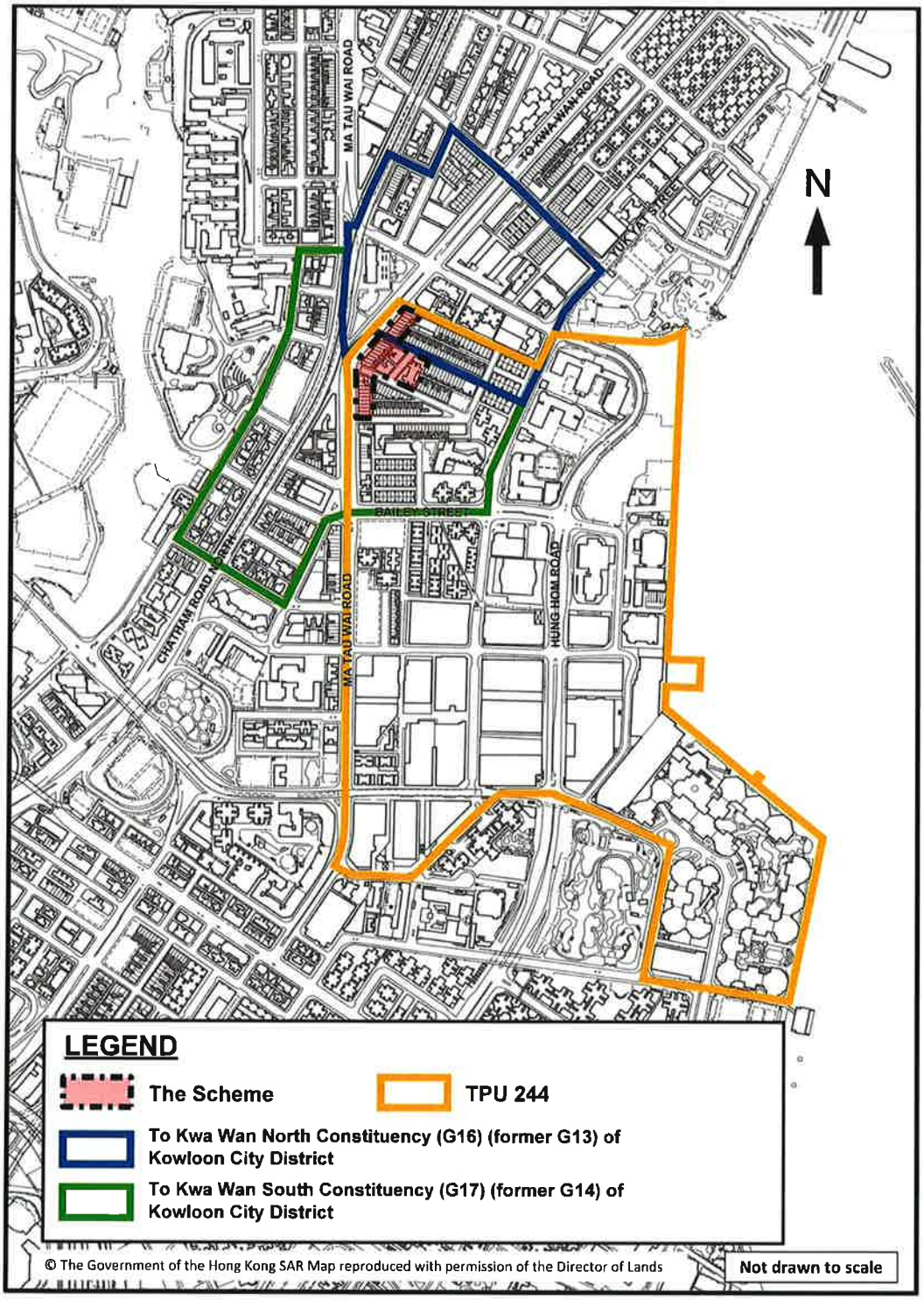


Figure 4.1 Boundaries of To Kwa Wan North (G16) and To Kwa Wan South (G17) constituencies and Tertiary Planning Unit (TPU) 244

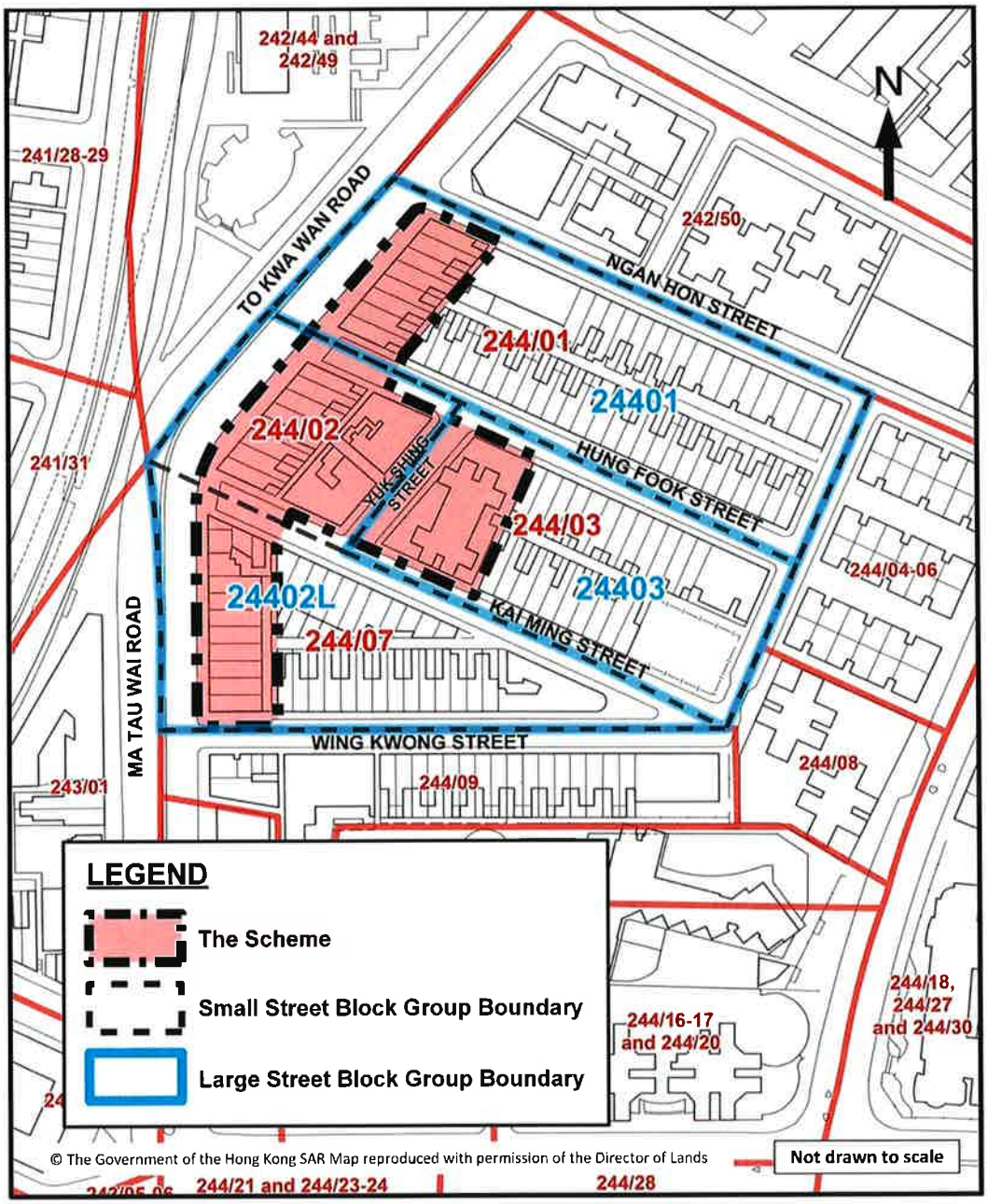


Figure 4.2 Street Block Boundaries Covering the Scheme

Overview of Housing & Population Characteristics of Kowloon City District

4.6 As revealed in the 2016 By-Census, the KC district has a population of about 418,732. In terms of monthly household income, the area covering by the Scheme is less affluent. The median household incomes of To Kwa Wan North (G16) and To Kwa Wan South (G17) constituencies were $18,000 and $19,750 respectively, which were lower than the medians of KC District ($25,500) and the territory ($25,000). While the DURF SIA revealed similar results, it related

the lower level of affluence to residents' occupations and lower educational attainment. The household income level, including nos. of households with Comprehensive Social Security Assistance (CSSA) Recipients, and the social characteristics of the affected in the Scheme will be ascertained in the Freezing Survey (FS) upon commencement.

4.7 According to the 2016 By-Census, private housing blocks are the major type of living quarters in KC District (about 73%) which is higher than the territorial percentage of about 53%. On the other hand, there are only 26% of living quarters in public rental housings / subsidized home ownership housings which is lower than the territorial average of 45%. Public housings in KC District are mainly public rental housings which account for about 25% of living quarters of the district. There is no Public Rental Housing (PRH) or Home Ownership Scheme (HOS) within the Scheme, TPU 244 and the two constituencies.

Household Composition

4.8 In accordance with approved General Building Plan (GBP) records, all upper units are for domestic use and the total number of upper floor residential units within the Scheme is 418. The ground floor units and mezzanine floor units are for non-domestic uses. Based on the 2016 By-Census, the degree of sharing of KC District and the territory is 1.0 (i.e. one household per unit). However, based on URA experience, the degree of sharing within redevelopment projects is generally about 2 due to the existing of sub-divided units. By adopting the degree of sharing of 2, the total number of households within the Scheme is estimated to be about 836 households to reflect the overcrowded and unsatisfactory living conditions which are commonly found in URA redevelopment projects. The actual number of domestic units may be different from that under the approved GBP. The household composition will be verified in the FS upon commencement.

4.9 According to the 2016 By-Census, the overall proportion of singleton (16%), doubletons (28%) and 3-person or above households (56%) in the three LSBGs (which is the closest area coverage as the Scheme) are similar to the proportions under the various geographical division levels **(Table 4.1)**. The actual proportion of household types in the Scheme will be verified in Stage 2 SIA.

Table 4.1 Proportions of Singletons, Doubletons, and 3-person or above Households by Geographical Division Levels

	Singletons	**Doubletons**	**3-person or above households**
LSBGs 24401, 24402L and 24403	**16%**	**28%**	**56%**
TPU 244	17%	25%	58%
To Kwa Wan North (G16) Constituency	18%	34%	47%
To Kwa Wan South (G17) Constituency	28%	29%	43%
KC District	19%	27%	54%
Territorial	18%	27%	55%

4.10 Based on the By-Census results and URA experience as stated in Para. 4.5 above, the average household size within the Scheme is estimated to be around 2.1, which is lower than the average household sizes of KC District (2.8) and the territory (2.8). The assessment adopts a lower household size to reflect the presence of lots of sub-divided units and/or cubicle apartments in previous URA projects, which can be assumed to be occupied by some singleton and doubleton households.

Population

4.11 With the estimated average household size of 2.1 and the estimated number of households of 836, the number of residents living within the Scheme is estimated to be around 1,760 persons. The Stage 2 SIA will verify the number of households, living quarters and population affected.

4.12 **Table 4.2** compares the distribution of the percentage of working population (aged 15-64) and elderly residents (aged 65 or above) among the various geographical division levels. The LSBGs data, which has the most similar area coverage to the Scheme, indicates that the percentage of working population is slightly higher than ones of the wider district / the territory. Besides, the percentage of elderly of the LSBGs is lower than the wider district / territory. Despite so, particular attention would be paid to elderly residents and their needs when the Scheme is implemented.

Table 4.2 Percentages of Working Population and Elderly Residents by Geographical Division Levels

	Percentage of working population	Percentage of elderly residents
LSBGs 24401, 24402L and 24403	**75.2%**	**11.8%**
TPU 244	77.4%	10.5%
To Kwa Wan North (G16) Constituency	71.0%	17.1%
To Kwa Wan South (G17) Constituency	76.0%	13.6%
KC District	73.1%	15.3%
Territorial	72.8%	15.9%

4.13 As presented in **Table 4.3**, the percentages of ethnic minorities residing in the LSBGs, TPU 244 and KC district were above 10% which were higher than the territorial percentage. Special attention would be paid to residents of ethnic minorities and their needs when the Scheme is implemented. The FS and Stage 2 SIA will ascertain the actual number of households and residents of ethnic minorities as far as practicable.

Table 4.3 Percentages of Ethnic Minorities by Geographical Division Levels

	Percentage of ethnic minorities
LSBGs 24401, 24402L and 24403	**10.1%**
TPU 244	14.1%
To Kwa Wan North (G16) Constituency	6.8%
To Kwa Wan South (G17) Constituency	10.7%
KC District	10.1%
Territorial	8.0%

4.14 **Table 4.4** shows the comparison of percentages of owner-occupiers and tenanted occupiers among the various geographical division levels. In accordance with the LSBG data, percentages of tenanted occupiers within the Scheme may probably be higher than the ones of the wider district / territory respectively. Based on the URA's experience obtained from previous redevelopment projects, a higher proportion of tenanted households (70%) is assumed in the Scheme in consideration of existence of sub-divided units which are mainly for rental in the tenement buildings in the older district. The composition will be ascertained in the FS and reported in the Stage 2 SIA.

Table 4.4 Percentages of Owner-Occupiers and Tenanted Occupiers by Geographical Division Levels

	Percentage of owner-occupiers	**Percentage of tenanted occupiers**
LSBGs 24401, 24402L and 24403	**36%**	**64%**
TPU 244	58%	42%
To Kwa Wan North (G16) Constituency	44%	56%
To Kwa Wan South (G17) Constituency	47%	53%
KC District	47%	53%
Territorial	48%	52%

4.15 Higher median monthly rents were recorded in the LSBGs and the two constituencies than KC District and the whole territory. However, as there is no subsidized public housing in the LSBGs and the two constituencies, the assessment further compare the median monthly household rents of private permanent housings. **Table 4.5** shows that the median rents of private housings at the LSBGs, TPU and Constituency levels are all much lower than the KC District and the territory levels. This is probably caused by the relatively poor building condition and living environment of the Scheme's vicinity as compared to the general private permanent housings and therefore the median rent is lower.

Table 4.5 Median Monthly Household Rents by Geographical Division Levels

	Median monthly household rents of all housing types	**Median monthly household rents of private permanent housings**
LSBGs 24401, 24402L and 24403	$4,300	$4,300*
TPU 244	$7,000	$7,000*
To Kwa Wan North (G16) Constituency	$5,000	$5,000*
To Kwa Wan South (G17) Constituency	$5,500	$5,500*
KC District	$2,750	$9,000
Territorial	$2,180	$9,200

** As about 99% of housings in TPU 244 and the two constituencies are private permanent housings, the median monthly household rents of private permanent housings are assumed to be the same as the ones of all housing types.*

4.16 The Stage 2 SIA to be conducted upon project commencement will give clearer and accurate information concerning the existing population residing in the Scheme and their socio-economic characteristics.

5 HOUSING & ENVIRONMENTAL CONDITIONS

Building Age, Building and Living Condition

5.1 The Scheme consists of three clusters of tenement buildings with 8 storeys high and a standalone residential building named Wong Teck Building with 15 storeys high. The tenement buildings were completed in 1957 and 1958 (i.e. aged from 63 to 64) while Wong Teck Building was completed in 1974 (i.e. aged 47). According to the GBP records, except for Wong Teck Building which is of lifts, all the rest of the buildings are without lift and the serviceability of these buildings are generally poor.

5.2 Based on the ownership records in the Land Registry as of February 2021, all the buildings within the Scheme are under multiple ownerships, except 19 To Kwa Wan Road, which is of single ownership. According to Home Affairs Department's "Database of Private Buildings in Hong Kong" as of February 2021, 13 out of the total of 32 building blocks within the Scheme (about 41%) are "3-nil" buildings without any management body for building management.

5.3 Based on the URA's Building Condition Assessment information as of January 2021, 18 out of the 32 buildings within the Scheme (about 56%) are of either "Varied" or "Marginal" conditions. Based on the URA's experience and the consultant's advice, major repair works will be required for buildings of "Varied" condition as their structural elements, components, finishes and facilities are observed in decay condition due to lack of building repairs and ongoing maintenance.

5.4 Nine (9) out of the 32 buildings (about 28%) are projected as "Satisfactory" or "Acceptable" conditions as rehabilitation works are in progress under Operation Building Bright 2.0 (OBB 2.0). For the remaining 5 buildings of "Acceptable" condition (about 16%), 4 of them had their rehabilitation works recently completed under OBB 2.0. It is understood that OBB works comprise mainly repairing defects (e.g. major cracks, spalling) in common or public areas of the buildings however repair works to the interior of private units are not included. Based on URA's past experience in rehabilitation works, even buildings that have undergone such repair works / schemes need to undertake comprehensive building rehabilitation regularly in order to avoid deterioration. Appropriate

building repairs and ongoing maintenance works will be required in order to maintain the habitability and avoid further deterioration of the building.

5.5 Moreover, according to Buildings Department (BD)'s records held by the URA as of January 2021, most of the buildings within the Scheme have outstanding Fire Safety Directions (FSDns) and building orders issued under S26, S26A, S28 or S30B of Building Ordinance. 11 out of the 32 buildings (about 34%) have outstanding S28 building orders for drainage repair implying their vulnerability particularly under the COVID-19 pandemic period.

5.6 Non-obtrusive site observations conducted in February 2021 found that some of the original units as shown in the approved GBPs were suspected to be sub-divided into smaller units, which will be ascertained in the FS.

Existing Uses

5.7 Based on non-obtrusive observation site observation conducted in early 2021, buildings within the Scheme are mainly residential in nature on the upper floors with a few are occupied by commercial uses / businesses. Commercial premises are occupying the ground floor. These commercial premises are primarily engaging in business of retail of goods, food, grocery and eateries. Car repair workshops are found in some ground floor premises at Yuk Shing Street, Hung Fook Street and Kai Ming Street respectively. Staircase shops are found on the ground floor of some buildings within the Scheme.

Existing Pedestrian Network

5.8 The Scheme is located next to To Kwa Wan Road and Ma Tau Wai Road which are the major pedestrian corridors in the vicinity. Heavy pedestrian flow is found along the pavement of the two roads. To the immediate east and southeast of the Scheme are three inner streets, i.e. Yuk Shing Street, Hung Fook Street and Kai Ming Street. Pedestrian flow along these three inner streets are relatively low, likely due to its difficulty in pathfinding and unwelcoming pedestrian environment caused by the car repairing activities, dumping and roadside storage often occupied the pavement of these streets. The whole Yuk Shing Street, a section of Hung Fook Street and Kai Ming Street respectively are included in the Scheme.

Environmental and Hygiene Condition

5.9 The Scheme is bounded by the heavily trafficked Ma Tau Wai Road / To Kwa Wai Road to the immediate west, and the East Kowloon Corridor (EKC) (elevated road) and Chatham Road North (underneath) to the further west. The Scheme is envisaged to be subject to severe traffic noise and air pollutants generated from the heavy traffic along these major roads.

5.10 Fresh food and vegetable shops, car repairing activities, dumping and road-side storage are found along the inner streets, including Yuk Shing Street, Hung Fook Street and Kai Ming Street. As lack of maintenance and cleaning are observed, there is hygiene problem at some streets and back alleys in the area.

Planning Intention and Planned Developments in the Vicinity

5.11 The Scheme is currently zoned "Residential (Group A)" ("R(A)") and the streets and pavement shown as "Road" on the Approved Hung Hom Outline Zoning Plan (OZP) no. S/K9/26. The "R(A)" zone is intended primarily for high-density residential developments with commercial uses are always permitted on the lowest three floors of buildings. The area where the Scheme locates is generally residential neighbourhood with ground floor shops.

5.12 To the north-west of the Scheme across To Kwa Wan Road is the To Kwa Wan MTR Station Exit D of Tuen Ma Line (TML). The To Kwa Wan MTR Station Exit D is located at Ma Tau Wai Road / To Kwa Wan Road Garden under the ownership and management of Leisure and Cultural Services Department (LCSD). Pedestrian will need to cross the 6-lane To Kwa Wan Road / Ma Tau Wai Road via the at-grade pedestrian crossings either at the northern or the southern sides of the Scheme. It is anticipated that high pedestrian flow will be generated between the neighbourhood of the Scheme and the MTR station exits when the MTR station comes in operation in Q3/2021 (operation time according to MTRC's Press Release in May 2020).

5.13 To the west of the Scheme across EKC, Hong Kong Housing Authority (HKHA) has a housing site located at the junction between Ko Shan Road and Shan Si Street. The site is currently zoned as "R(A)3" with maximum permissible building height of 130mPD. The proposed development involves a single residential tower of 33 storeys to provide about 450 flats and basements for both ancillary and public car parks. The development is tentatively to be completed in 2024.

Enhancement of Traffic and Pedestrian Network

5.14 Under the holistic planning of KCAA1, the URA aims to enhance the walkability of the KCAA1. Through restructuring of the land uses in the redevelopment process of the 7 commenced projects, URA proposed diversion of some existing traffic network and to pedestrianize some of the road sections to make the road network more effective. As a result of the restructuring in the KCAA1, it is estimated that the ratio between pedestrian and road in the KCAA1 will change from about 45%:55% to about 60:40%, representing a higher ratio of pedestrian walkways in the area and a more walkable neighbourhood. The proposed road scheme was approved and gazetted under Roads (Works, Use and Compensation) Ordinance (Chapter 370) on 15 May 2020 and will be implemented in connection with the construction works of the respective URA projects in KCAA1.

5.15 The Scheme will integrate with the above planned new traffic and pedestrian networks gazetted for implementation and will further enhance the walkability and connectivity of the area.

6 CULTURAL & LOCAL CHARACTERISTICS, AND CHARACTERISTICS OF LOCAL BUSINESS ACTIVITIES

6.1 The Scheme and its vicinity is an older part of To Kwa Wan area in KC District, with predominantly mixed developments of residential and industrial uses with lower floors for commercial uses such as retail shops, eateries and car repair shops. There are more industrial and commercial buildings to the northeast and south of the Scheme. Most of these buildings appear not be engaged in manufacturing activities but mainly office, storage, workshop and showroom uses. Some industrial buildings are being acquired or redeveloped for residential / commercial uses.

6.2 To the north of the Scheme is To Kwa Wan Market and a street market with ground floor retail shops along a section of Lok Shan Road. Shops and hawkers are selling daily necessities, groceries, fruits, meat and vegetable, etc. Eateries, Chinese restaurants, groceries and general services are common along the section of To Kwa Wan Road between Chi Kiang Street and Sheung Heung Road. To the northeast of the Scheme is a string of industrial buildings along Yuk Yat Street. By non-obtrusive observation conducted in February 2021, no polluting industries are found operating at these industrial buildings.

6.3 Similar kinds of local shops, together with car repair shops, are commonly found KCAA1. Upon completion of the 7 URA redevelopment projects, commercial and retail uses are allowed at the podia of the future developments. Suffice retail spaces would be supplied and it is the URA's intention to provide more street front shops to maintain the street vibrancy. The neighbourhood will be concentrated with similar kinds of local business activities, including groceries, general services and eateries, to serve the community upon completion of URA projects in the vicinity.

6.4 About 92 shops were identified at ground floor of the Scheme during site visits in February 2021. In general, ground floor business activities within the Scheme are commonly found in the vicinity. Shops facing major roads, i.e. along Ma Tau Wai Road and To Kwa Wan Road, are mainly eateries, shops selling daily necessities such as clothing and household goods stores, and services including property agencies and engineering companies. Shops facing internal streets including Yuk Shing Street, Hung Fook Street and Kai Ming Street are mainly car repair shops, food stores and engineering companies. Several shops

were un-identified and suspected vacant. **Table 6.1** lists the addresses and business nature of shops.

6.5 By non-obtrusive observation, there are some non-domestic uses, including salon, photo studio and church on cocklofts and upper floors of buildings within the Scheme. The exact number of business operators / details and nature of the businesses within the Scheme will be verified in the FS upon commencement of the Scheme and reported in the Stage 2 SIA.

Table 6.1 Ground Floor Business Activities within the Scheme

	Address	Current Use*
1.	111 Ma Tau Wai Road	(suspected vacant)
2.		Property agency
3.		Grocery shop
4.		Beverage shop
5.		Convenience store
6.	113 Ma Tau Wai Road	Pharmacy
7.	115 Ma Tau Wai Road	Bakery
8.	Staircase shop, 115-117 Ma Tau Wai Road	Household goods store
9.	117 Ma Tau Wai Road	Engineering company
10.	119 Ma Tau Wai Road	Eatery
11.	Staircase shop, 119-121 Ma Tau Wai Road	(suspected vacant)
12.	121 Ma Tau Wai Road	Clothing shop
13.	123 Ma Tau Wai Road	Eatery
14.	Staircase shop, 123-125 Ma Tau Wai Road	Clothing shop
15.	125 Ma Tau Wai Road	Pharmacy
16.	127-127D Ma Tau Wai Road	Eatery
17.		Food store
18.		Shoe shop
19.		Household goods store
20.		Clothing shop
21.		(suspected vacant)
22.		Clothing shop
23.		Clothing shop
24.		Recycling service operator
25.	1 To Kwa Wan Road	Decoration and engineering company
26.		Property agency
27.		Jewellery shop
28.		Engineering company
29.		Engineering company
30.		Fruits stall
31.		Clothing shop
32.		Chinese herbal tea shop
33.	Staircase shop, 1-3 To Kwa Wan Road	Accessories
34.	3 To Kwa Wan Road	Clothing shop

35.	5 To Kwa Wan Road	Design and decoration company
36.	Staircase shop, 5-7 To Kwa Wan Road	Locksmith
37.	7 To Kwa Wan Road	Grocery shop
38.	9 To Kwa Wan Road	Eatery
39.	Staircase shop, 9-11 To Kwa Wan Road	Property agency
40.	11 To Kwa Wan Road	Grocery shop
41.	13 To Kwa Wan Road	Chinese medicine store
42.	Staircase shop, 13-15 To Kwa Wan Road	Antique shop
43.	15 To Kwa Wan Road	Eatery
44.		(suspected vacant)
45.		(suspected vacant)
46.		Decoration and engineering company
47.	17 To Kwa Wan Road	Decoration and engineering company
48.		Barber shop
49.		Chinese medical clinic
50.		Ginseng shop
51.		(suspected vacant)
52.		Property agency
53.		Telecom accessories shop
54.	19 To Kwa Wan Road	Household goods store
55.	21 To Kwa Wan Road	Bakery
56.	23 To Kwa Wan Road	Eatery
57.	25 To Kwa Wan Road	Clothing shop
58.	27 To Kwa Wan Road	Eatery
59.	29 To Kwa Wan Road	Jewellery shop
60.	31 To Kwa Wan Road	Produce stall
61.		Currency exchange
62.		Food stall
63.		Property agency
64.		Clothing and garment alteration shop
65.	1-3 Yuk Shing Street	Chinese medicine store
66.		Food factory
67.		(suspected vacant)
68.		Snacks store
69.		Seafood stall
70.		Decoration and engineering company
71.		Vegetable stall
72.	5-7 Yuk Shing Street	Vegetable and meat stall
73.		Car repair shop
74.		(suspected vacant)
75.		Car repair shop
76.		Property agency
77.		Chinese medicine store
78.		Jewellery shop
79.	2-12 Yuk Shing Street	Car repair shop
80.		Car repair shop
81.		Laundromat
82.		Car product shop
83.		Food store
84.		Seafood stall

85.		Car repair shop
86.		(suspected vacant)
87.		Seafood stall
88.		General store
89.		Eatery
90.		Office
91.		Seafood stall
92.		Car repair shop

(Based on site visits conducted in February 2021)

** Nature / details of business activities are subject to FS and Stage 2 SIA*

7 RECREATIONAL, AMENITY & COMMUNITY AND WELFARE FACILITIES

7.1 **Figure 7.1** shows the locations of various existing public open spaces, and government, institution and community (GIC) facilities within the 500m radius area of the Scheme.

7.2 There are several large-scale public open spaces within the 500m radius from the Scheme. Hoi Sham Park, Tsing Chau Street Playground and To Kwa Wan Recreation Ground to the east, southwest and northeast of the Scheme respectively are major open spaces providing active recreation facilities including basketball courts and football pitches, with passive recreation facilities such as sitting-out spaces and amphitheatres. To Kwa Wan Sports Centre where is within To Kwa Wan Recreation Ground comprises of an arena, squash courts, activity rooms and a fitness room. Ko Shan Road Park mainly provides passive recreation facilities.

7.3 There are also several small-scale rest gardens and sitting-out areas scattered in the To Kwa Wan area. LCSD's Ma Tau Wai Road / To Kwa Wan Road Garden (the LCSD Garden), at the opposite side of To Kwa Wan Road from the Scheme, is the closest open space to the Scheme. The LCSD Garden comprises a children playground and an open plaza. The MTRC To Kwa Wan Station Exit D is also located within it.

7.4 Various GIC facilities are scattered in areas to the north and southeast of the Scheme. Major GIC facilities in the vicinity are located at To Kwa Wan Municipal Services Building and Government Offices which comprises a market, a library, a general clinic and some social welfare service units. Kowloon City Government Offices to the southeast also comprises a community hall, a dental clinic and a maternal and child health centre. Social welfare service units for different social groups, including children, working population, elderly and the disabled are provided around the Scheme. A list of existing community facilities and social welfare service units within 500m radius from the Scheme is provided in **Table 7.1** below. There are also a number of educational facilities including kindergartens and primary schools near the Scheme.

7.5 In future, subject to funding arrangement from Government Departments, there will also be a Neighbourhood Elderly Centre (NEC) within URA's project DL-8:KC, and about 1,000sq.m. community facility space within the URA's eResidence to the further south from the Scheme. Besides, under the district-based planning approach, URA has planned a comprehensive urban space and pedestrian network in the neighbourhood to enhance walkability and urban space. Upon redevelopment of URA's Projects KC-012 and KC-013, there will be about 300sq.m. at-grade open space to be provided within the developments. An urban square and pedestrian walkways are also designed within URA's projects KC-010 and KC-011 to further enhance the environment.

7.6 Despite of the existing GIC facilities in the neighbourhood and the planned GIC facilities in URA projects, the Scheme would take the redevelopment opportunity to provide not less than 5,500 sq.m. non-domestic GFA for GIC facilities in the area. The actual use of the GIC provision will be subject to liaison with the Planning Department as well as views from local stakeholders after the approval of the DSP.

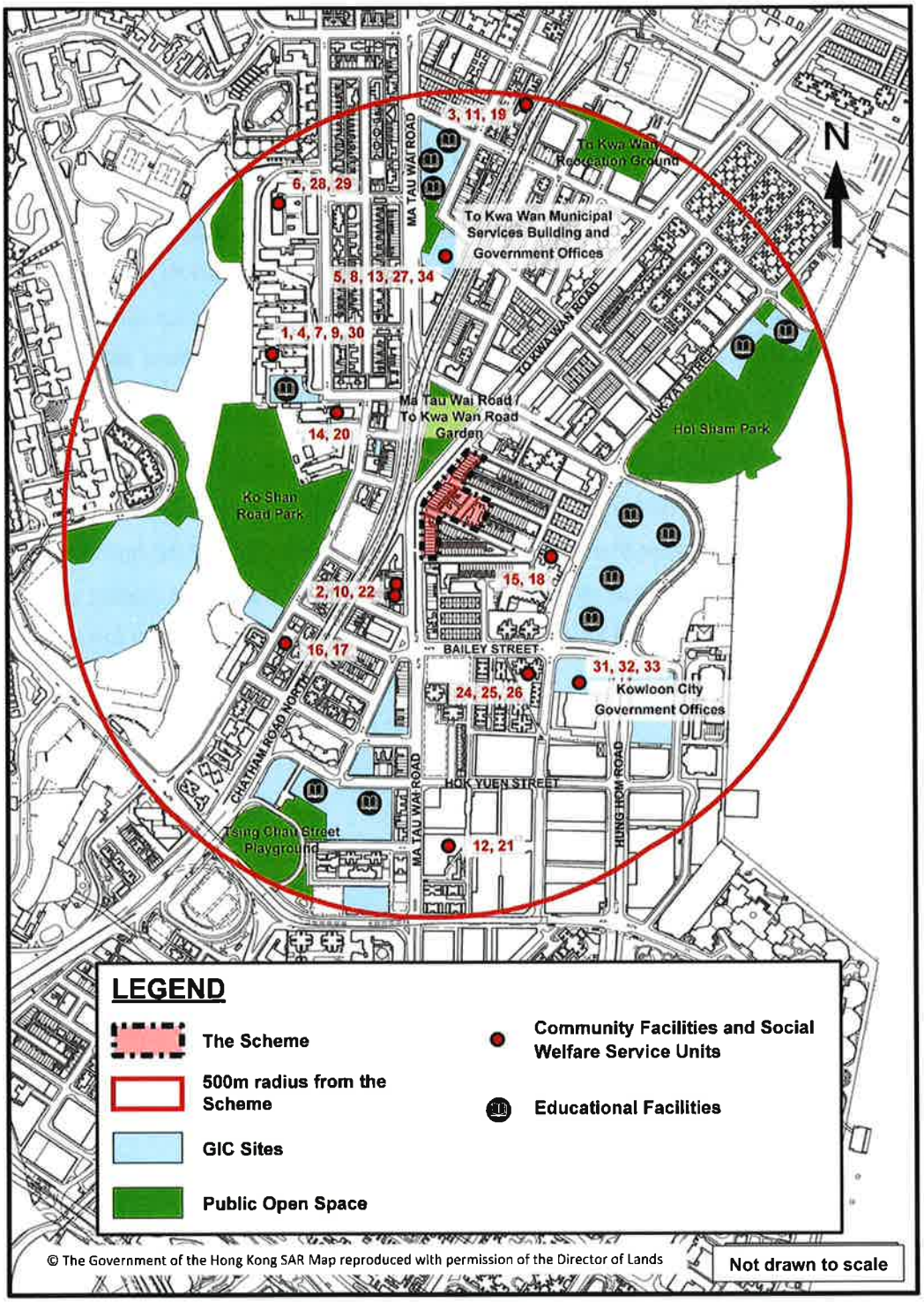


Figure 7.1 Existing Community Facilities, Amenity, and Social Welfare Service Units within 500m Radius from the Scheme

Source: Social Welfare Department's website: Local District Service Profile: Welfare Service Units Managed or Funded by Social Welfare Department (Kowloon City) as of February 2021. Hong Kong Geodata Store: Community Halls & Community Centres, Clinic / Health Centres under the Department of Health, and General Outpatient Clinics under The Hospital Authority as of February 2021.

Table 7.1 Community Facilities and Social Welfare Service Units within 500m Radius from the Scheme

Community Facility / Service Unit	Operator	Address
A. Family and Child welfare		
Agency-based Enhancement of Professional Staff Support Services in Residential Care Homes		
1. TWGHs Agency-based Enhancement of Professional Staff Support Services in Residential Care Homes (HQs contact)	Tung Wah Group of Hospitals	G/F, Block B, (Lok Kei Lau), 160 Kau Pui Lung Road, Lok Man Sun Chuen, To Kwa Wan, Kowloon
Extended Hours Child Care Service		
2. PLK Chan Lai Wai Lin Nursery (OCCS)/ Chan Lai Wai Lin Kindergarten-cum-Nursery (IP in KCCC)	Po Leung Kuk	G/F, 1/F and 2/F, Honour Court, 188-194 Ma Tau Wai Road, Kowloon City, Kowloon
3. Sik Sik Yuen Ho Oi Day Nursery (OCCS)	Sik Sik Yuen	Shop 1A, 1B 2A & 2B, G/F, Harmony Garden, No. 55-61 Kowloon City Road, Kowloon City, Kowloon
Emergency/Short-term Care in Small Group Home		
4. TWGHs - Emergency / Short-term Care in Small Group Home	Tung Wah Group of Hospitals	G/F, Block B, (Lok Kei Lau), 160 Kau Pui Lung Road, Lok Man Sun Chuen, To Kwa Wan, Kowloon
Family Aide		
5. To Kwa Wan Integrated Family Service Centre	Social Welfare Department	Unit 903, 9/F, To Kwa Wan Government Offices, 165 Ma Tau Wai Road, Kowloon
Family Life Education		
6. BGCA Kowloon City Family Life Education Unit	Boys' and Girls' Clubs Association of Hong Kong (The)	G/F, Block G, Lok Man Sun Chuen, To Kwa Wan, Kowloon
Foster Care		
7. TWGHs Foster Care Service	Tung Wah Group of Hospitals	G/F, Block B, (Lok Kei Lau), 160 Kau Pui Lung Road, Lok Man Sun Chuen, To Kwa Wan, Kowloon
Integrated Family Service Centre		
8. To Kwa Wan Integrated Family Service Centre	Social Welfare Department	Unit 903, 9/F, To Kwa Wan Government Offices, 165 Ma Tau Wai Road, Kowloon
Neighbourhood Support Child Care Project		
9. TWGHs Nanny Buddy - Neighbourhood Support Child Care Project (Kowloon City)	Tung Wah Group of Hospitals	G/F, Block B, (Lok Kei Lau), 160 Kau Pui Lung Road, Lok Man Sun Chuen, To Kwa Wan, Kowloon

Community Facility / Service Unit	Operator	Address
Occasional Child Care Service		
10. PLK Chan Lai Wai Lin Nursery (OCCS)/ Chan Lai Wai Lin Kindergarten-cum-Nursery (IP in KCCC)	Po Leung Kuk	G/F, 1/F and 2/F, Honour Court, 188-194 Ma Tau Wai Road, Kowloon City, Kowloon
11. Sik Sik Yuen Ho Oi Day Nursery (OCCS)	Sik Sik Yuen	Shop 1A, 1B 2A & 2B, G/F, Harmony Garden, No. 55-61 Kowloon City Road, Kowloon City, Kowloon
B. Social Security		
Integrated Employment Assistance Programme for Self-reliance		
12. HKLSS, LCHKS Integrated Employment Assistance Programme for Self-reliance	Hong Kong Lutheran Social Service, the Lutheran Church - Hong Kong Synod Limited	Room B, Unit 01, 9/F, Tower B, Hunghom Commercial Centre, Nos. 37-39 Ma Tau Wai Road, Hunghom, Kowloon
Social Security Services		
13. To Kwa Wan Social Security Field Unit	Social Welfare Department	7/F, To Kwa Wan Government Offices, 165 Ma Tau Wai Road, Kowloon City, Kowloon
C. Services for the Elderly		
District Elderly Community Centre		
14. HKSKH Lok Man Alice Kwok Integrated Service Centre	Hong Kong Sheng Kung Hui Welfare Council Limited	G/F, Block H, Lok Man Sun Chuen, 111 Ko Shan Road, To Kwa Wan, Kowloon
Integrated Home Care Services (Agency and District-based)		
15. HKSKH Hok Yuen Integrated Home Care Services Team	Hong Kong Sheng Kung Hui Welfare Council Limited	Unit 8, G/F, Wing Fai Mansion, 52 Wing Kwong Street, Hung Hom, Kowloon
16. HKSKH Lok Man Alice Kwok Integrated Service Centre - Integrated Home Care Services Team	Hong Kong Sheng Kung Hui Welfare Council Limited	Shop No. 2 & 4-5, G/F, Tak Lee Court, 10 Ko Shan Road, To Kwa Wan, Kowloon
17. HKSKH Lok Man Integrated Home Care Services Team	Hong Kong Sheng Kung Hui Welfare Council Limited	Shop No. 2 & 4-5, G/F, Tak Lee Court, 10 Ko Shan Road, To Kwa Wan, Kowloon
Neighbourhood Elderly Centre		
18. Chung Sing Benevolent Society - Tan Siu Lin Neighbourhood Elderly Centre	Chung Sing Benevolent Society	Shop 9-13 & 27, G/F, Wing Fai Mansion, 52 Wing Kwong Street, Hung Hom, Kowloon
19. HKFWS Kowloon City Centre for Active Ageing	Hong Kong Family Welfare Society	1/F, Block 2, Harmony Garden, 55-61 Kowloon City Road, To Kwa Wan, Kowloon

Community Facility / Service Unit	Operator	Address
Support Team for the Elderly Based at District Elderly Community Centres		
20. HKSKH Lok Man Alice Kwok Integrated Service Centre	Hong Kong Sheng Kung Hui Welfare Council Limited	G/F, Block H, Lok Man Sun Chuen, 111 Ko Shan Road, To Kwa Wan, Kowloon
D. Rehabilitation and Medical Social Services		
Integrated Community Centre for Mental Wellness		
21. SRACP Vitality Place (Kowloon City) (1.1 Team)	Society of Rehabilitation and Crime Prevention, Hong Kong (The)	Unit 11B, 9/F, Tower B, Hunghom Commercial Centre, 37 Ma Tau Wai Road, Kowloon
Integrated Programme in Kindergarten-cum-Child Care Centre		
22. PLK Chan Lai Wai Lin Nursery (OCCS)/ Chan Lai Wai Lin Kindergarten-cum-Nursery (IP in KCCC)	Po Leung Kuk	G/F, 1/F and 2/F, Honour Court, 188-194 Ma Tau Wai Road, Kowloon City, Kowloon
23. Salvation Army (The) - Lok Man Nursery School	Salvation Army (The)	1/F, Block H, Lok Chi House, Lok Man Sun Chuen, 111 Ko Shan Road, To Kwa Wan, Kowloon
On the Job Training Programme for People with Disabilities		
24. HKSOD Employment and Training Centre - Supported Employment Service	Hong Kong Society for the Deaf (The)	Nos. F & G, 1/F, Sunshine Plaza, 17 Sung On Street, Hung Hom, Kolwoon
Sunnyway - On the Job Training Programme for Young People with Disabilities		
25. HKSOD Employment and Training Centre - Supported Employment Service	Hong Kong Society for the Deaf (The)	Nos. F & G, 1/F, Sunshine Plaza, 17 Sung On Street, Hung Hom, Kolwoon
Supported Employment		
26. HKSOD Employment and Training Centre - Supported Employment Service	Hong Kong Society for the Deaf (The)	Nos. F & G, 1/F, Sunshine Plaza, 17 Sung On Street, Hung Hom, Kolwoon
E. Services for Offenders		
Probation and Community Service Orders Office		
27. Kowloon City Probation and Community Service Orders Office (2)	Social Welfare Department	11/F, To Kwa Wan Government Offices, 165 Ma Tau Wai Road, Kowloon City, Kowloon
F. Services for Young People		
After School Care Programme		
28. BGCA Lok Man Children and Family Integrated Activity Centre	Boys' and Girls' Clubs Association of Hong Kong (The)	G/F, Block G, Lok Man Sun Chuen, To Kwa Wan, Kowloon
Children Centres with Reading/Study Rooms		
29. BGCA Lok Man Children and Family Integrated Activity Centre	Boys' and Girls' Clubs Association of Hong Kong (The)	G/F, Block G, Lok Man Sun Chuen, To Kwa Wan, Kowloon

Community Facility / Service Unit	Operator	Address
School Social Work Service (provided for all secondary schools)		
30. BBHK School Social Work Division	Boys' Brigade, Hong Kong (The)	G/F, Block A, Lok Man Sun Chuen, To Kwa Wan, Kowloon
G. Community Hall		
31. Hung Hom Community Hall	Home Affairs Department	UG/F & 1/F, Kowloon City Government Offices, 42 Bailey Street, Hung Hom, Kowloon
H. Public Healthcare Facilities		
32. Kowloon City Dental Clinic	Department of Health	3/F, Kowloon City Health Centre, Kowloon City Government Offices, 42 Bailey Street, Hung Hom, Kowloon
33. Kowloon City Maternal and Child Health Centre	Department of Health	4/F, Kowloon City Health Centre, Kowloon City Government Offices, 42 Bailey Street, Hung Hom, Kowloon
34. Shun Tak Fraternal Association Leung Kau Kui Clinic	Hospital Authority	2/F, To Kwa Wan Market & Government Offices Building, 165 Ma Tau Wai Road, To Kwa Wan, Hung Hom, Kowloon

Source: Social Welfare Department's website: Local District Service Profile: Welfare Service Units Managed or Funded by Social Welfare Department (Kowloon City) as of February 2021. Hong Kong Geodata Store: Community Halls & Community Centres, Clinic / Health Centres under the Department of Health, and General Outpatient Clinics under The Hospital Authority as of February 2021.

8 INITIAL ASSESSMENT OF POTENTIAL SOCIAL IMPACT, AND MITIGATION MEASURES

Potential Social Impact

8.1 The Scheme is estimated to affect 836 households, with 1,760 residents. About 92 shops were identified in the Scheme during site visits. Based on non-obtrusive observation, there are some original units appeared to be sub-divided into smaller units (sub-divided units / cubicles). The exact number of affected residents and shop operators will be verified in the Stage 2 SIA.

8.2 The proposed redevelopment can achieve and contribute to the holistic urban renewal efforts and planning gains under URA's district-based planning approach for KCAA1. Apart from supplying more quality housing to meet modern standards by redeveloping existing buildings, the Scheme can rationalise the land uses to enhance and connectivity for the neighbourhood. Moreover, the proposed all-weathered communal space in the Scheme will create a focal point for community gathering and place-making opportunities for the community. The community would be further benefited with not less than 5,500sq.m. of new GIC facilities provided by the Scheme.

8.3 The Scheme, if implemented, will inevitably affect the domestic and non-domestic occupants within the Scheme. Generally, the most vulnerable resident groups in the Scheme are the elderly, the disabled, single parent families, low-income households, and those who rely heavily on their social network (including receiving support / care from their friends / relatives who live nearby). Upon implementation of the Scheme, the existing residents will be displaced to areas where they have to rebuild their social networks, whereas the existing shops will have to move to other locations to continue their businesses, depending on individual operator's needs.

8.4 The FS and SIA Questionnaire will help identifying needy cases such as households with single elderly, elderly couples, family members with disability or new immigrants worried about the impact of redevelopment on employment, living expenses and social network etc. The Social Service Team (SST) commissioned by the Urban Renewal Fund (URF) is expected to provide assistance to those in need. This SST is independent of the URA and it will directly report to the Board of the URF.

Mitigation Measures

8.5 Upon implementation, compensation based on the prevailing URA Policy would be offered to the affected owners. For affected tenanted households, rehousing or ex-gratia allowance would be offered. The URA will arrange briefing session(s) / recording video(s) to the owners and tenants to explain the URA acquisition, rehousing and ex-gratia allowance policies. An in-house URA engagement team will visit the affected owners and tenants accordingly as to care for those who are unclear about compensation and require any other assistance.

8.6 If affected residents and/or business operators are not clear about the URA acquisition, rehousing and ex-gratia allowance policies or future arrangement, the SST will endeavour to clarify their doubts with full support from the URA. If the affected residents and/or business operators are ethnic minorities who are not familiar with Chinese or English languages, the URA will arrange translation services as far as practicable to alleviate their concerns on the redevelopment.

8.7 In handling problems related to different kinds of livelihood problems, the SST, apart from offering counselling, will mobilise different community resources to liaise closely with Government departments and work with the URA to resolve the residents' and operators' problems and reduce their anxiety. The SST will also provide orientation assistance for those in needs after moving home such as familiarisation with new neighbourhood, accommodation and local facilities.

8.8 For the vulnerable groups (including the elderly, disabled and single parent families), arrangements for assistance such as child care/ foster services, domestic help services, etc. offered by the Social Welfare Department, and other social service agencies would be made. For the low-income households, arrangement could be made with the Hong Kong Housing Authority or the Hong Kong Housing Society on public rental housing allocation if they are eligible. In addition, if practicable, those vulnerable groups would be re-housed on compassionate ground.

8.9 If the Scheme is to be implemented, the URA will ensure the construction works follow and fulfil the mitigation measures and practices as stipulated by Environmental Protection Department (EPD) for construction site. Appropriate measures will be proposed to mitigate potential noise and dust impact during the construction phase of the Scheme. The URA will closely monitor and consult Food and Environmental Hygiene Department (FEHD), if necessary, on considering any mitigation measures required to minimise the impact on the street market activities.

Compensation & Rehousing Policies for Domestic Premises

8.10 The URA will offer an owner-occupier of domestic property the market value (valued on vacant possession basis) of his/her property plus an ex-gratia allowance, namely Home Purchase Allowance (HPA), for purchase of the property. The assessment of HPA is based on the unit rate of a notional replacement flat, which is defined as a hypothetical seven-year-old flat in a building of comparable quality, situated in a similar locality in terms of characteristics and accessibility, and located at the middle floor with average orientation. The HPA is the difference between the value of the notional replacement flat and the market value of the property being acquired.

8.11 The URA may also offer "flat-for-flat" (FFF) (subject to any changes in the relevant legislations) in a URA new development in-situ or in the same district or at available site(s) (as URA may select for the purpose provided that necessary approval / authorization has been obtained at the time of FFF offer), as an additional choice to cash compensation to owner-occupiers of domestic units. The amount of cash compensation and ex-gratia payment offered to an owner-occupier will not be changed by his/her choice of using that amount, or part of it, to join the flat-for-flat arrangement or otherwise.

8.12 According to the new URS, the URA will offer an ex-gratia allowance to eligible elderly owners of tenanted domestic properties on compassionate ground in exceptional circumstances such as elderly owners who rely on the rental income from their properties for a living.

8.13 Eligible domestic tenants affected by URA's redevelopment projects are provided with rehousing to public housing, if eligible, or units at URA's rehousing blocks, subject to meeting URA's requirements, or Ex-gratia Allowance (EGA), which is calculated with a sliding scale that begins with the first $10,000 of the rateable value of their leased properties multiplied by 9, the second $10,000 of the rateable value multiplied by 8, and so on. The EGA for eligible domestic tenants will be subject to a minimum amount of $180,000 for one-person household and $200,000 for two-person or larger household. The minimum amount is subject to annual review.

8.14 Domestic tenants who are not provided re-housing due to various reasons or who decline re-housing, will be offered ex-gratia allowances. The amount of ex-gratia allowance will be dependent on, amongst other things, whether the domestic tenants have been living in the project area before and since the first date of the FS and have no alternative accommodation.

8.15 In case where tenants were notified that their tenancies would not be renewed, URA will explain to their owners that they would not get more compensation by evicting the tenants. The URA has also introduced the "Domestic Tenants Compassionate Assistance Programme" to take care of those domestic tenants whose tenancies commenced before the FS of this Scheme and moved out from the properties because they have been required to move out from their properties by their landlords upon expiry or termination of their tenancies and before URA purchases the properties. In general, eligible domestic tenants who meet the criteria under this programme will be offered special ex-gratia allowance based on the sliding scale as mentioned in paragraph 8.13, or public housing, if eligible, or units at URA's rehousing blocks, subject to meeting URA's requirements.

Compensation & Rehousing Policies for Non-Domestic Premises

8.16 For owner-occupied non-domestic premises, the market value of the affected property plus an ex-gratia allowance of 4 times the rateable value or 35% of the market value of the affected property, whichever is the higher, will be offered. Owner-occupiers may lodge a claim for business loss in lieu of both the ex-gratia allowance and the Ex-gratia Business Allowance (EGBA) as stated in the next paragraph. For owners of tenanted or vacant non-domestic properties, the market value of the affected property plus an ex-gratia allowance of 1 time the rateable value or 10% of the market value of the affected property, whichever is the higher, will be offered. In addition, the owners of vacant non-domestic properties will be offered an allowance for vacant properties at 2 times the amount of rateable value subject to the fulfilment of certain conditions: i) left the affected properties vacant on the date of freezing survey and thereafter; ii) accepted URA's offer within the validity period of the initial offer; and iii) sold the affected properties with vacant possession to the URA.

8.17 For non-domestic tenants of non-domestic premises, an ex-gratia allowance of 3 times the rateable value of the affected premises will be offered. An additional payment of EGBA is also payable to tenants who commenced occupying the premises for business before the date of FS. The amount is subject to a minimum of $110,000 and a maximum of $700,000, depending on the number of years of continuous operation by the tenant-operator as business owner in the property. In calculating the number of years of continuous operation, the expiry date of continuous operation in 2 years from the date which URA issues initial acquisition offer to property owners. The EGBA arrangement will also be applicable to non-domestic owner-operators occupying the properties for their own businesses. Those non-domestic tenant-operators who have occupied the properties before FS and are evicted by their landlords before acquisition of the properties by the URA, can apply for the Special EGBA. The minimum payment of EGBA will be subject to annual review.

8.18 According to the new URS, if requested, the URA will help identify suitable premises in the district of the redevelopment projects to enable the affected shop operators to relocate and continue operation in the same district as far as practicable.

Review of Measures and Policies

8.19 The acquisition, rehousing and ex-gratia allowance policies are subject to prevailing policies at the time of issuing acquisition policies. The policies are published on the URA's website and will be communicated to affected persons when acquisition of property interests for this Scheme commences. Prevailing policies relating to property acquisition, rehousing and ex-gratia allowances will be reviewed by the URA from time to time.

8.20 The Stage 2 SIA to be conducted after the FS will further assess the impact of the Scheme in detail on both domestic and non-domestic occupants and propose mitigation measures. It may also be able to highlight the psychological stress and worry for some of the affected within the Scheme. Special measures may have to be adopted under exceptional circumstances.

9 CONCLUSION

9.1 The local community and the surrounding neighbourhoods are likely to experience gains and losses due to the proposed redevelopment. Residents, business operators and their employees within the Scheme will be affected in different ways and to various degrees depending on their particular circumstances. Those who currently live in overcrowded or poor building condition within the Scheme may welcome the opportunity to improve their living environment through cash compensation or rehousing if eligible; whilst others (e.g. some business operators) may prefer to remain un-disturbed and maintain the status quo. The various degrees of concerns and social impacts to the affected residents, business operators and their employees within the Scheme will be assessed in the Stage 2 SIA in detail.

9.2 This Stage 1 SIA study provides a general profile of the Scheme. Based on URA's experience of similar scale and context of redevelopment projects, it can be expected that there will be some sharing of living quarters and a relatively low average household income for those within the Scheme. The assumptions in this report will be verified by the Stage 2 SIA to be carried out after the FS. The Stage 2 SIA will assess needs of the affected households and appropriate arrangements to minimise major adverse social impact, if any.

9.3 For non-domestic uses, a number of ground floor shops are witnessed in the Scheme, whereas the upper floor non-domestic uses, if any, are to be recorded in the FS upon commencement of the Scheme under section 23 of the URAO. The ground floor business activities are commonly found in the vicinity which is possible for most of them to be relocated in the surrounding area. Needs of the affected non-domestic occupants will be assessed in the Stage 2 SIA.

9.4 The holistic "planning-led" and "district-based" approach adopted for this Scheme aims to achieve the following objectives upon implementation:

i. Re-structuring and re-planning of existing land uses and existing road network to optimise the land uses, reduce area required for vehicular traffic circulation within KCAA1, provide more pedestrian walkways and, enhance walkability and create a safe and pleasant walking environment, and ;

ii. Integrating the Scheme with the planned pedestrian walkways and urban space in the KCAA1 to enhance connectivity with all directions in the neighbourhood, including from north to south and from east to west;

iii. Facilitating the development of a footbridge across To Kwa Wan Road to connect with the To Kwa Wan MTR Station to link up the wider neighbourhood with the MTR Station;

iv. Creating a focal point for gathering and place-making opportunities by a proposed all-weathered communal space in the Scheme which will be connected with the adjoining pedestrian walkways and retail shops to enhance street vibrancy; and

v. Providing not less than 5,500sq.m. non-domestic GFA for GIC facilities within the Scheme to enhance planning gains and to align with the "Single Site, Multiple Uses" model as promoted by the Government.

9.5 The above initiatives as well as the holistic planning of urban renewal works in this area will create a more people-oriented community and bring greater benefits to residents. It is anticipated that the local urban environment and residents will be benefited from the better built and planned environment in the long term.

URBAN RENEWAL AUTHORITY
March 2021

Appendix 4

Traffic Impact Assessment (TIA) Report

To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Traffic Impact Assessment

Final Report

March 2021

CTA Consultants Limited
志達顧問有限公司

LIST OF CONTENTS

1. INTRODUCTION 1
1.1 Background 1
1.2 Study Objectives 1
1.3 Structure of the Report 2

2. THE PROPOSED DEVELOPMENT 3
2.1 Site Location 3
2.2 Development Proposal 3
2.3 Proposed Traffic and Pedestrian Network of the Scheme and its Neighbourhood 5
2.4 Proposed Footbridge Connection to MTR Station nearby (Footbridge Outside the Scheme Area) 5
2.5 Provision of Internal Transport Facilities 6
2.6 Vehicular Access Arrangement 9

3. EXISTING TRAFFIC CONDITION 10
3.1 Public Transport Services in the Vicinity 10
3.2 Existing Road Network 12
3.3 Existing Operation Performance of Critical Junctions 12

4. FUTURE TRAFFIC CONDITION & TRAFFIC IMPACT ASSESSMENT 15
4.1 Design Year 15
4.2 Traffic Forecast 15
4.3 Traffic Generations of Planned Adjacent Developments 17
4.4 Planned Junction Layouts 20
4.5 Reference Traffic Flow in Year 2035 20
4.6 Traffic Trips of the Proposed Development 21
4.7 Traffic Forecast for Design Year 2035 21
4.8 Operational Assessment 22

5. PEDESTRIAN ASSESSMENT 24
5.1 Existing Pedestrian Condition 24
5.2 Pedestrian Traffic Forecast 27
5.3 Proposed Pedestrian Footbridge 32

6. SUMMARY AND CONCLUSION 34
6.1 Summary 34
6.2 Conclusion 35

APPENDIX I Junction Calculation Sheets

LIST OF TABLES

Table 2.1 Parameters of the Proposed Development 4
Table 2.2 Internal Transport Facilities Provision required under the HKPSG 6
Table 2.3 Proposed Provision of Internal Transport Facilities 7
Table 3.1 Public Transport Services in the Vicinity of the Proposed Development 10
Table 3.2 Identified Critical Junctions 13
Table 3.3 Existing Operational Performance of Critical Junctions in 2020 14
Table 4.1 Historical Traffic Data from Annual Traffic Census (ATC) 16
Table 4.2 2016-Based Planning Data from 2016 to 2026 16
Table 4.3 Major Planned/ Committed Developments in the Vicinity 18
Table 4.4 Adopted Traffic Rates for Adjacent Development 19
Table 4.5 Traffic Generations and Attractions of Adjacent Development 19
Table 4.6 Planned New Junctions under Restructuring of Traffic Network 20
Table 4.7 Adopted Traffic Trips Rate of Proposed Development 21
Table 4.8 Estimated Traffic Trips of the Proposed Development 21
Table 4.9 Operational Performance of Critical Junctions in Year 2035 22
Table 5.1 Flow Comparison between Surveyed Flow and ATC flow 24
Table 5.2 LOS Assessment of the Critical Sections of Footpath in Observed Year 2020 26
Table 5.3 Capacity Assessment of the Critical Sections of Crossing in Observed Year 2020 26
Table 5.4 Pedestrian Trip Rates of Surveyed Developments 27
Table 5.5 Pedestrian Trips of Adjacent Developments 27
Table 5.6 Surveyed Modal Split 28
Table 5.7 LOS Assessment of the Critical Sections of Footpath in Reference Year 2035 29
Table 5.8 Capacity Assessment of the Critical Sections of Crossing in Reference Year 2035 29
Table 5.9 Pedestrian Trips of Proposed Development 30
Table 5.10 LOS Assessment of the Critical Sections of Footpath in Design Year 2035 (Without Proposed footbridge) 31
Table 5.11 Capacity Assessment of the Critical Sections of Crossing in Design Year 2035 (Without Proposed footbridge) 31
Table 5.12 LOS Assessment of the Critical Sections of Footpath in Design Year 2035 (With Proposed Footbridge) 32
Table 5.13 Capacity Assessment of the Critical Sections of Crossing in Design Year 2035 (With Proposed Footbridge) 33

LIST OF FIGURES

Figure 1.1	Site Location Plan
Figure 2.1	Proposed GF Plan
Figure 2.2	Proposed B1 Plan
Figure 2.3	Proposed B2 Plan
Figure 2.4	Location of Nearby Public Transport Services
Figure 3.1	Key Junctions
Figure 3.2	Existing Junction Layout of Ma Tau Wai Road / Bailey Street (A)
Figure 3.3	Existing Junction Layout of Ma Tau Wai Road / Wing Kwong Street (B)
Figure 3.4	Existing Junction Layout of To Kwa Wan Road / Chi Kiang Street (C)
Figure 3.5	Existing Junction Layout of Sung On Street / Yuk Yat Street / Chi Kiang Street (D)
Figure 3.6	Existing Junction Layout of Bailey Street / Sung On Street (E)
Figure 3.7	Existing Junction Layout of Bailey Street / Wan On Street (F)
Figure 3.8	Existing Junction Layout of Ngan Hon Street / Wing Kwong Street (G)
Figure 3.9	Existing Junction Layout of Ngan Hon Street / Lung Tak Street (H)
Figure 3.10	Existing Junction Layout of Wing Kwong Street / Hung Fook Street (I)
Figure 3.11	Existing Junction Layout of Wing Kwong Street / Kai Ming Street (J)
Figure 3.12	2020 Observed Traffic Flows
Figure 4.1	Future Junction Layout of Sung On Street / Ngan Hon Street (K)
Figure 4.2	Future Junction Layout of Wing Kwong Street / Wan On Street / Kai Ming Street (L)
Figure 4.3	2035 Reference Traffic Flows
Figure 4.4	2035 Design Traffic Flows
Figure 5.1	Pedestrian Index

Figure 5.2 2020 Observed Pedestrian Flow

Figure 5.3 2035 Reference Pedestrian Flow

Figure 5.4 2035 Design Pedestrian Flow (Without Proposed Footbridge)

Figure 5.5 2035 Design Pedestrian Flow (With Proposed Footbridge)

Figure SP-01 Swept Path Analysis of 11m HGV - GF

Figure SP-02 Swept Path Analysis of 11m HGV – B1

Figure SP-03 Swept Path Analysis of 11m HGV - B1

Figure SP-04 Swept Path Analysis of 11m HGV - B1

Figure SP-05 Swept Path Analysis of 11m HGV - B1

Figure SP-06 Swept Path Analysis of Private Car – B2

1. INTRODUCTION

1.1 Background

1.1.1 The Urban Renewal Authority (URA) has proposed To Kwa Wan Road / Wing Kwong Street Development Scheme (the Scheme) under section 25 of the Urban Renewal Authority Ordinance (URAO). This Environmental Assessment (EA) is to support the submission of a draft Development Scheme Plan (DSP) with its planning proposal to the Town Planning Board (TPB) for consideration.

1.1.2 We, CTA Consultants Limited (CTA), are commissioned as the traffic consultant to prepare the Traffic Impact Assessment (TIA) and provide technical justifications in supporting the application from traffic engineering point of view.

1.2 Study Objectives

1.2.1 Main objectives of this study are listed below:

- To assess the existing and proposed traffic arrangement & provision of internal transport facilities at the Scheme;
- To assess the existing traffic condition in the vicinity of the proposed development;
- To estimate traffic trips related to the proposed development;
- To carry out forecasts about traffic demand of the adjacent road network in design year 2035;
- To appraise any possible traffic impact induced by the proposed development on the adjacent road network;
- To recommend traffic improvement measures to alleviate any foreseeable traffic problem to the surrounding road network, if any.

1.3 Structure of the Report

1.3.1 Following this introductory chapter, there are FIVE further chapters:

- **Chapter 2 – THE PROPOSED DEVELOPMENT**, which presents the site location and operation information of the proposed development;
- **Chapter 3 – EXISTING TRAFFIC CONDITION**, which describes the existing local road network and vehicular traffic conditions in the vicinity of the subject site;
- **Chapter 4 – FUTURE TRAFFIC CONDITION & TRAFFIC IMPACT ASSESSMENT**, which estimates future vehicular traffic on the surrounding road network, and presents findings of the traffic impact assessment for the design year 2035;
- **Chapter 5 – PEDESTRIAN ASSESSMENT**, which describes the existing pedestrian network in the vicinity of the subject site and estimates the future condition for design year 2035; and
- **Chapter 6 – SUMMARY AND CONCLUSION**, which summarizes the study findings and presents the conclusion regarding the proposed development.

2. THE PROPOSED DEVELOPMENT

2.1 Site Location

2.1.1 The Scheme is located at To Kwa Wan, Kowloon which is broadly bounded by To Kwa Wan Road, Ngan Hon Street, Hung Fook Street, Kai Ming Street, Wing Kwong Street and Ma Tau Wai Road (see **Figure 1.1)**. The scheme area is currently zoned as "Residential (Group A)" (R(A)), with building height restriction of 100 mPD, and the pavement and road sections are shown as "Road" in the Approved Hung Hom Outline Zoning Plan No. S/K9/26.

2.1.2 The Scheme comprises the buildings along 1-31 To Kwa Wan Road (odd nos.), 111-127D Ma Tau Wai Road (odd nos.), 2-6 and 10-14 Hung Fook Street (even nos.), 1-5 and 11-19 Kai Ming Street (odd nos.), 1-7 Yuk Shing Street (odd nos.) and 2-12 Yuk Shing Street, and the whole of Yuk Shing Street, part of the road sections and its pavement of Hung Fook Street and Kai Ming Street. The location of the Scheme is shown in **Figure 1.1.**

2.2 Development Proposal

2.2.1 The URA proposes to rezone the scheme area into "R(A)" in the draft Development Scheme Plan (DSP) for high-density residential development, with commercial uses always permitted on the lowest three floors of a building or in the purpose-designed non-residential portion of a building. The maximum building height for the Scheme area is proposed to be relaxed from 100mPD to 140mPD.

2.2.2 Under current notional design, the Scheme proposes to develop two residential towers (Tower T1 & T2) on top of podia which would incorporate GIC/commercial/retail uses, podium garden and private clubhouse facilities, and a low block (the Low Block) with commercial/retail uses with an all-weathered communal space underneath. Ancillary car park is proposed in the basement of the development. To rationalize the land uses within the scheme area, the three existing road sections within the Scheme will be closed for comprehensive redevelopment and/or creation of pedestrian walkways. Through the redevelopment opportunity, the Scheme also proposes a restructuring and replanning of the pedestrian and traffic network to tie with the surrounding network to further enhance the walkability and accessibility of the district. To support the proposed Scheme, a

traffic impact assessment is required to review and appraise any possible traffic impact induced by the proposed development of the Scheme on the adjacent road network.

2.2.3 The parameters of the proposed development are listed in **Table 2.1**.

Table 2.1 Parameters of the Proposed Development

Proposed Development	Parameters
Gross Site Area	6,592sq.m.
Net Site Area (subject to site survey)	5,548sq.m.
Total Domestic GFA (Plot Ratio (PR))	Around 41,610 m^2 (PR 7.5)
Total Non-Domestic GFA (Plot Ratio (PR))	Around 8,322 m^2 (PR 1.5)
Proposed GIC GFA (Plot Ratio (PR)) (exempted under planning)	Around 5,548 m^2 (PR 1.0)
Total GFA (Plot Ratio (PR)) (conform to B(P)R)	Around 55,480 m^2 (PR 10.0)
Proposed No. of Residential Tower	2 residential towers
No. of Residential Floor	(About) T1: 34 floors; T2: 22 floors
Total Number of Residential Flats	(About) 900 units
Average Flat Size	(About) 46m^2

2.2.4 It is anticipated that the proposed development will be completed in year 2032. Therefore, design year 2035 (i.e. 3 years after the planned completion year of the proposed development) is adopted for the Traffic Impact Assessment.

2.3 Proposed Traffic and Pedestrian Network of the Scheme and its Neighbourhood

2.3.1 With a district-based planning approach, URA aims to enhance walkability and connectivity of this part of To Kwa Wan neighbourhood through redevelopment. URA has commenced 7 redevelopment projects in the neighbourhood in the earlier time and proposed re-planning and re-structuring of the traffic and pedestrian network (see **Figure 1.2**). The proposed revised road network has already been gazetted under Roads (Works, Use and Compensation) Ordinance (Chapter 370) from 15 May 2020 to 22 May 2020 and no comment received during road gazettal. Approval of the road scheme has been gazetted on 11 September 2020.

2.3.2 With the close proximity of the 7 commenced projects, the Scheme proposes further restructuring of the traffic and pedestrian network through its redevelopment opportunity. Under the proposed development of the Scheme, Yuk Shing Street, and portions of Hung Fook Street and Kai Ming Street would be closed and re-structured with the adjoining lots to form new pedestrian walkway and an all-weathered communal space. The proposal will integrate with the pedestrian network and an urban square created in the adjoining URA commenced projects to collectively form a car-free zone and well-connected pedestrian walking environment to enhance walkability and pedestrian walking environment for the neighbourhood. **(Figure 1.3)**.

2.4 Proposed Footbridge Connection to MTR Station nearby (Footbridge Outside the Scheme Area)

2.4.1 To further enhance the connectivity of the Scheme and its neighbourhood with the To Kwa Wan MTR Station of Tuen Ma Line (TML) located at the opposite side of To Kwa Wan Road, a connection at the podium of the proposed development is proposed for developing an elevated footbridge to connect to the Ma Tau Wai Road/To Kwa Wan Road Garden where the To Kwa Wan MTR station exits locate (shown in **Figure 2.2**). The proposed footbridge connection will provide a safe and direct pedestrian route to cross the 6-lane traffic of To Kwa Wan Road. Given the proposed footbridge is outside the draft DSP, a connection will be proposed in the draft DSP for the possible footbridge connection in future. The proposed footbridge will be subject to further liaison and agreement with relevant Government Departments separately upon CE in C's approval of the draft DSP.

2.5 Provision of Internal Transport Facilities

2.5.1 **Table 2.2** summarized the internal transport facilities provision for the proposed development based on the recommendations in the latest Hong Kong Planning Standards and Guidelines (HKPSG).

Table 2.2 Internal Transport Facilities Provision required under the HKPSG

<table>
<tr><th rowspan="2">Proposed Development</th><th colspan="3">Parking Requirement</th><th>Loading/Unloading Requirement</th></tr>
<tr><th>Private Car Parking Space (5m(L) x 2.5m(W) x 2.4m(H))</th><th>Accessible Car Parking Space (5m(L) x 3.5m(W) x 2.4m(H))</th><th>Motorcycle Parking Space (2.4m(L) x 1m(W) x 2.4m(H))</th><th>Loading / Unloading Bay for Goods Vehicles (LGV: 7m(L) x 3.5 m(W) x 3.6m(H)) (HGV: 11m(L) x 3.5 m(W) x 4.7m(H))</th></tr>
<tr><td rowspan="8">Private Housing (GFA: 41,610m^2, PR: 7.5, No. of Flats: About 900, Nos. of blocks: 2)</td><td>GPS: 1 space per 6-9 flats</td><td rowspan="10">2 space per 51-150 car parking spaces</td><td rowspan="8">1 space per 100-150 flats</td><td rowspan="8">Provision of minimum 1 L/UL bay for goods vehicles within the site for every 800 flats or part thereof, subject to a minimum of 1 bay for each housing block or as determined by the Authority</td></tr>
<tr><td>R1: Flat Size Between 40 and 70m^2: 0.7</td></tr>
<tr><td>R2: Within a 500m-radius of rail station: 0.75</td></tr>
<tr><td>R3: Domestic Plot Ratio Between 5.00 and 8.00: 0.90</td></tr>
<tr><td>Parking Requirement = GPS x R1 x R2 x R3</td></tr>
<tr><td>48 to 71</td></tr>
<tr><td>1-5 visitor spaces per block</td></tr>
<tr><td>2 to 10</td></tr>
<tr><td rowspan="2">Retail (GFA: 8,322 m^2)</td><td>1 space per 200-300 m^2 GFA</td><td>5 to 10% of total provision of non-domestic car parking spaces</td><td>1 bay for every 800 to 1,200 m^2 or part of thereof</td></tr>
<tr><td>28 to 42</td><td rowspan="2">2 to 5</td><td>7 to 11 (LGV 65%, HGV 35%)</td></tr>
<tr><td>Community Use (GFA: 5,548 m^2)</td><td>5(1)</td><td>2(1) (LGV 65%, HGV 35%)</td></tr>
<tr><td>Total</td><td colspan="2">83 to 128(2)</td><td>8 to 14</td><td>11(LGV:6, HGV:5) to 15(LGV:8, HGV:7)</td></tr>
</table>

Remarks:

(1) Proposed no. of parking spaces for GIC use in view that no specific parking standard for GIC use in the HKPSG.

(2) Including 2 accessible car parking spaces

2.5.2 As shown in Table 2.2, the Scheme is required under HKPSG to provide about 83-128 nos. of private car parking space, 8-14 nos. of motorcycle parking spaces and 11-15 nos. of loading / unloading bays.

Proposed Relaxation from HKPSG

2.5.3 Ancillary car park is proposed for the proposed development of the Scheme. A summary of the proposed internal transport facilities is shown in **Table 2.3** below:

Table 2.3 Proposed Provision of Internal Transport Facilities

Type	HKPSG Standard adopted	Total
Private Car parking spaces for Residential flats	High-end	*71*
Private Car parking spaces for Visitors (including 1 disabled parking space)	High-end	*10*
Private Car parking spaces for Retail uses (including 1 disabled parking space)	**Low-end**	*28*
Private Car parking spaces for GIC uses	No specific standard in HKPSG	*5*
	Sub-total:	**114**
Motorcycle parking spaces	High-end	**14**
L/UL bays for HGV for Residential flats	High-end	*2*
L/UL bays for LGV for Retail uses	Within the range	*6*
L/UL bays for HGV for Retail uses	Within the range	*3*
L/UL bays for LGV for GIC uses	No specific standard in HKPSG	*1*
L/UL bays for HGV for GIC uses	No specific standard in HKPSG	*1*
	Sub-total:	**13**

2.5.4 It is proposed to adopt a high-end provision for the all the internal transport facilities, except for parking and loading / unloading provision for retail uses. Justification for the proposed low-end provision for retail parking spaces is stated below.

2.5.5 According to HKPSG, "generally nil provision is permitted for small road-side retail shops which are mainly serving local residents". In the proposed development of the Scheme, the proposed retail portion of about 8,322sq.m. non-domestic GFA intends to provide some road-side shops with street frontage and shops along the pedestrian walkway and all-weathered communal space, which can be regarded as "small road-side shops" and therefore can assume nil parking provision required. Besides, the proposed retail facilities are intended to provide mainly neighbourhood-type shops selling daily necessities, convenience goods, household retail service and dining services, etc., to serve the small community. It is anticipated that these kinds of neighbourhood-type shops would not attract shoppers from other districts but only local residents largely travelled by walking or public transport to the shops. Hence, parking demand generated from these neighbourhood-type shops are envisaged to be low.

2.5.6 In addition, URA has proposed to develop an underground public car park at URA Project KC-009 at Bailey Street / Wing Kwong Street on the immediate southern side of the Scheme. The proposed public car park will provide 100 nos. of private car parking space on top of the ancillary car parking space for project KC-009. While the proposed public car park will accommodate 43 nos. of on-street meter-parking space and 20 nos. of on-street motorcycle parking space, approx. 50 nos. of parking space will be provided to cater parking demand within the neighbourhood area. The S. 16 application of the public car park was approved by the TPB on 21 December 2018. The URA KC-009 project with the public car park is anticipated to be completed by 2027 under current programme. With the provision of the public car park in the close neighbourhood, it is anticipated that parking demand arising from retail uses of the Scheme as well as demand on public parking spaces could be largely accommodated.

2.5.7 In view of the above consideration, it is recommended that a low-end provision is adopted for the retail provision in the proposed development, with high-end standard for the rest of the internal transport facilities, including residential parking, visitor parking, motorcycles parking as well as the L/UL bay provision. The Proposed GF, B1 and B2 Plan are shown in **Figures 2.1** to **2.3** respectively. Swept path analysis has been carried out and shown in **Figure SP-01** to **SP-06.**

2.6 Vehicular Access Arrangement

2.6.1 Vehicular ingress of the site will be located at Kai Ming Street. Vehicles could access from south via Wan On Street or from north via Wing Kwong Street. Vehicles could access to the ancillary basement car park via the ramp. The proposed egress will be located at Wing Kwong Street adjacent to the junction of Ma Tau Wai Road / Wing Kwong Street. The egress traffic could travel via Ma Tau Wai Road southbound to Bailey Street or Gillies Avenue North to other places. The locations of vehicular access are shown in **Figure 2.1**.

2.6.2 As mentioned in Section 2.3, the three existing carriageways will be closed for redevelopment and traffic will be re-routed to create a more effective traffic circulation. Land use will be re-structured to create more pedestrian walkways and reduce the traffic carriageways to enhance walkability in the area. Under the proposed re-structuring of land uses, all traffic will be diverted to use Wing Kwong Street or Kai Ming Street in the area, a separate run-in and run-out at Kai Ming Street and Wing Kwong Street respectively is proposed for the Scheme to facilitate a better traffic circulation. Swept path analysis has been carried out and shown in **Figure SP-01**. It shows that the proposed arrangement is feasible.

2.6.3 Upon approval of the DSP, alternative option of ingress arrangement can be explored in the detailed design stage to use the run-in/out at the URA development KC-010 adjoining the Scheme. Opportunity would be explored to develop a connected basement between the two developments to provide vehicular access to the basement of the Scheme. Such arrangement can further minimise the ingress/egress on the road surface. Nevertheless, these alternative options shall be explored and subject to liaison and agreement with relevant departments in terms of land matters, future ownership and management/maintenance issues, etc.

3. EXISTING TRAFFIC CONDITION

3.1 Public Transport Services in the Vicinity

3.1.1 Numerous road-based public transport services, for instance, franchised buses and GMB are also provided in vicinity of the proposed development. Details of the current services of franchised buses and GMB routes within the catchment area of 500 meters are listed in **Table 3.1**, and the location of the nearby public transport stations are shown in **Figure 2.4**.

Table 3.1 Public Transport Services in the Vicinity of the Proposed Development

Service	Route	Origin - Destination	Frequency (min)
Franchised Bus	2E	Kowloon City Ferry Pier – Pak Tin Estate	15-25
	3B	Tsz Wan Shan (Central) – Hung Hom (Hung Luen Road)	15-25
	5	Fu Shan – Star Ferry Pier	8-20
	5A[1]	Kowloon City (Shing Tak Street) – Star Ferry Pier	12-30
	5C	Tsz Wan Shan (Central) – Star Ferry Pier	6-12
	5D	Telford Gardens – Hung Hom	15-35
	5P[1]	Tsz Wan Shan (Central) – Star Ferry Pier	15
	6C	Kowloon City Ferry Pier – Mei Foo	9-12
	6F	Kowloon City Ferry – Lai Kok Estate	20-30
	6X[1]	Mei Foo – Kowloon City Ferry Pier	30
	11	Diamond Hill Station – Kowloon Station	10-20
	11K	Chuk Yuen Estate – Hung Hom Station	15-20
	11X	Sau Mau Ping (Upper) – Hung Hom Station	10-20
	12A	Whampoa Garden – Cheung Sha Wan (Sham Mong Road)	8-20
	14	Lei Yue Mun Estate – China Ferry Pier Terminal	12-25
	15	Ping Tin – Hung Hom (Hung Luen Road)	12-20
	15X[1]	Lam Tin (Kwong Tin Estate) – Hung Hom Station	20
	21	Choi Wan – Hung Hom Station	15-25
	26	Shun Tin – Tsim Sha Tsui East	7-20
	28	Lok Wah – Star Ferry Pier	8-15
	41	Tsing Yi (Cheung Ching Estate) – Kowloon City Ferry Pier	25-35
	45	Kowloon City Ferry Pier – Lai Yiu Estate	20-30
	75X	Fu Shin Estate – Kowloon City Ferry Pier	8-15
	85	Fo Tan (Shan Mei Street) – Kowloon City Ferry Pier	13-25
	85B	Chun Shek – Kowloon City Ferry Pier	20-30
	85S[1]	Yiu On – Hung Hom (Hung Luen Road)	15
	85X	Man On Shan Town Centre – Hung Hom (Hung Luen Road)	10-20
	93K	Po Lam – Mong Kok East Station	15-25
	101	Kwun Tong (Yue Man Square) – Kennedy Town	3-14
	106	Wong Tai Sin – Siu Sai Wan Island Resort	4-12
	106A[1]	Wong Tai Sin – Tai Koo Kornhill Plaza	10
	106P[1]	Wong Tai Sin – Siu Sai Wan Island Resort	20
	107	Kowloon Bay – Wah Kwai	7-20
	108	Kai Yip – Braemar Hill	10-25
	111	Ping Shek – Macau Ferry Pier	3-14
	115	Kowloon City Ferry Pier – Macau Ferry Pier	6-20

Service	Route	Origin - Destination	Frequency (min)
	116	Tsz Wan Shan (Central) – Quarry Bay (Yau Man Street)	4-12
	297	Hang Hau (North) – Hung Hom (Hung Luen Road)	12-25
	297P[1]	Hang Hau (North) – Hung Hom (Hung Luen Road)	15
	608	Grand Promenade – Kowloon City (Shing Tak Street)	15-30
	796X	Tseung Kwan O Industrial Estate – Tsim Sha Tsui (East)	12-20
	A22	Airport – Lam Tin Station	15-20
	A23	Airport – Tsz Wan Shan (North)	30
	E23	Airport – Tsz Wan Shan (North)	15-20
	E23A	Airport – Tsz Wan Shan (North)	15-20
	N23[2]	Tung Chung Station – Tsz Wan Shan (North)	30-60
	N121[2]	Macau Ferry Pier – Ngau Tau Kok	15
GMB	2	Whampoa Garden – Festival Walk	10-15
	2A	Whampoa Garden – Festival Walk	10-15
	13	Kowloon Tong (Broadcast Drive) – Hung Hom (Hung Luen Road)	15-20
	26	To Kwa Wan (Chi Kiang Street) – Kowloon Station	8-12
	26W[1]	Laguna Verde – Hung Hom Station	5-7
	27M	Lok Man Sun Chuen – Mok Kok Station	7-15
	28MS	Wyler Gardens – Ho Man Tin Station	10-15
	105	Tseung Kwan O (Hong Sing Garden) – To Kwa Wan (Ko Shan Theatre)	5-9
	105S[2]	Tseung Kwan O (Hong Sing Garden) – To Kwa Wan (Ko Shan Theatre)	15

Note: [1] Morning or Evening Peak Service only; [2] Night Service Only

3.1.2 To the north-west of the Scheme is the nearest exits of To Kwa Wan MTR Station of TML which is located at the Ma Tau Wai Road/To Kwa Wan Road Garden managed by LCSD (the LCSD Garden). The exits are located within 300m walking distance from the Scheme via at-grade traffic light pedestrian crossings currently available at Ma Tau Wai Road and To Kwa Wan Road respectively.

3.1.3 In view of the comprehensive coverage of the public transport services and the availability of different choices on transport modes, the Scheme is considered to have very good accessibility via the public transport.

3.2 Existing Road Network

3.2.1 The existing road network in the vicinity of the subject site is shown in **Figure 3.1**.

3.2.2 To Kwa Wan Road is a district distributor which connects Ma Tau Wai Road and Sung Wong Toi Road. To Kwa Wan Road could lead traffic to To Kwa Wan and Kai Tak areas.

3.2.3 Ma Tau Wai Road is a district distributor which connects To Kwa Wan Road and Wuhu Street in order to lead traffic to Hung Hom areas.

3.2.4 Wing Kwong Street is a one-way local distributor which connects Ngan Hon Street and Ma Tau Wai Road.

3.2.5 Yuk Shing Street, Hung Fook Street and Kai Ming Street are local roads which connect Ngan Hon Street and Wing Kwong Street. The western end sections of Hung Fook Street and Kai Ming Street are cul-de-sac which serve as Emergency Vehicular Accesses (EVA). Parts of Hung Fook Street and Kai Ming Street will be converted to pedestrian walkway under the approved Road Gazette.

3.3 Existing Operation Performance of Critical Junctions

3.3.1 Ten (10) junctions are identified to be critical for the Traffic Impact Assessment due to the proposed development. Relevant details are listed in **Table 3.2** and shown in **Figure 3.1**. Existing junction layouts are shown in **Figures 3.2** to **Figure 3.11** respectively.

3.3.2 In order to study the existing traffic condition of the above critical junctions, traffic survey in the form of manual-classified count was conducted for the 10 junctions during the weekday AM and PM peak periods on a typical weekday on July 2020. The survey provides most up-to-date details of the traffic condition within the study area under normal operation. Based on the observed traffic flows, it reveals that weekday AM and PM peak hour occurred from 08:30AM to 09:30AM, 05:45PM to 06:45PM respectively. The observed traffic flows are presented in **Figure 3.12**.

Table 3.2 Identified Critical Junctions

Ref.	Junction	Type	Figure No.
A	Ma Tau Wai Road / Bailey Street	Signalized	3.2
B	Ma Tau Wai Road / Wing Kwong Street	Signalized	3.3
C	To Kwa Wan Road / Chi Kiang Street	Signalized	3.4
D	Sung On Street / Yuk Yat Street / Chi Kiang Street	Signalized	3.5
E	Bailey Street / Sung On Street	Signalized	3.6
F	Bailey Street / Wan On Street	Priority	3.7
G	Ngan Hon Street / Wing Kwong Street	Priority	3.8
H	Ngan Hon Street / Lung Tak Street	Priority	3.9
I	Wing Kwong Street / Hung Fook Street	Priority	3.10
J	Wing Kwong Street / Kai Ming Street	Priority	3.11

3.3.3 Existing operational performance of the critical junctions are listed in **Table 3.3** below.

Table 3.3 Existing Operational Performance of Critical Junctions in 2020

Ref.	Junction	Method of Control	Year 2020 DFC/RC (1)	
			Weekday AM Peak	Weekday PM Peak
A	Ma Tau Wai Road / Bailey Street	Signalized	129%	120%
B	Ma Tau Wai Road / Wing Kwong Street	Signalized	340%	339%
C	To Kwa Wan Road / Chi Kiang Street	Signalized	127%	83%
D	Sung On Street / Yuk Yat Street / Chi Kiang Street	Signalized	39%	39%
E	Bailey Street / Sung On Street	Signalized	142%	124%
F	Bailey Street / Wan On Street	Priority	0.02	0.02
G	Ngan Hon Street / Wing Kwong Street	Priority	0.01	0.01
H	Ngan Hon Street / Lung Tak Street	Priority	N/A	N/A
I	Wing Kwong Street / Hung Fook Street	Priority	0.06	0.06
J	Wing Kwong Street / Kai Ming Street	Priority	0.05	0.04

Notes: (1) RC = Reserve Capacity for Signal Junction;
DFC = Design Ratio of Flow to Capacity for Priority Junction/Roundabout
(2) Only ingress traffic is allowed from Ngan Hon Street to Lung Tak Street but not revised. No traffic conflicts or delay is expected in this location.

3.3.4 The assessment results in **Table 3.3** indicate that all critical junctions are at present operating with positive capacities during the peak hours.

4. FUTURE TRAFFIC CONDITION & TRAFFIC IMPACT ASSESSMENT

4.1 Design Year

4.1.1 It is anticipated that the proposed development would be completed in 2032. In order to assess the possible traffic impacts to the local road network due to the proposed development, year 2035 (i.e. 3 years after completion) has been adopted as the design year for this study.

4.2 Traffic Forecast

4.2.1 To estimate the reference traffic flow in year 2035 (without the proposed development) in the local road network, an appropriate growth factor has to be identified for the area in the first instance. The following approaches have been adopted to derive the growth factor for the Area of Influence.

Historical Trend

4.2.2 Numerous traffic-count stations are located in the vicinity of the proposed development. The traffic counts reported in the Annual Traffic Census (ATC), which is published by Transport Department, over a period of five years, i.e. 2014 to 2019 are summarized in **Table 4.1**.

Table 4.1 Historical Traffic Data from Annual Traffic Census (ATC)

ATC Stn	Road Name	Annual Average Daily Traffic (AADT)						Avg. Annual Growth Rate
		2014	2015	2016	2017	2018	2019	
3014	Ma Tau Wai Rd & To Kwa Wan Rd (From San Lau St & Bailey St to Chi Kiang St)	26,640	23,980	24,170	23,660	23,940	23,670	-2.34%
3245	To Kwa Wan Rd (From Kwei Chow St to Chi Kiang St)	21,550	21,230*	21,350*	21,250	22,400	17,620	-3.95%
3887	Bailey St (From Ma Tau Wai Rd to Hung Hom Rd)	14,000	13,790	13,690	14,790	14,720*	14,420	0.59%
4040	Ma Tau Wai Rd (From San Lau St & Bailey St to Fat Kwong St)	16,950*	16,700	16,790	16,660	15,170	14,860 *	-2.60%
4077	San Lau St (From Ma Tau Wai Rd to Chatham Rd N)	6,500*	6,410*	6,440*	6,930	7,010	6,860*	1.08%
4213	East Kowloon Corridor <Flyover> (From Ma Tau Kok Rd to Chatham Rd N)	77,910	74,070	74,250	74,220	78,030	73,310	-1.21%
Total		**158,370**	**163,550**	**156,180**	**156,690**	**157,510**	**150,740**	**-1.62%**

*Note: *AADT estimated by Growth factor*

Planning Data

4.2.3 Reference has also been made to the latest 2016-Based Territorial Population Employment Data Matrices (TPEDM) planning data published by the Planning Department for projection of population and employment within the study district from years 2016 to 2026. The average annual growth rates in terms of population and employment from 2016 to 2026 are tabulated in **Table 4.2**.

Table 4.2 2016-Based Planning Data from 2016 to 2026

Zone	Population			Avg. Annual Growth Rate	Employment			Avg. Annual Growth Rate
	2016	2021	2026		2016	2021	2026	
Kowloon City	425,250	439,950	456,150	**+0.70%**	219,050	227,900	241,350	**+0.97%**
Weighted Average	**+0.80%**							

Adopted Growth Rate

4.2.4 A.A.D.T. of ATC indicates that the traffic flow of the local road network has an average annual growth rate of -1.62% from year 2014 to year 2019.

4.2.5 Whilst, the planning data indicates that the population and employment of the study area are expected to grow with an average annual growth rate of +0.70% and +0.97% respectively from 2016 to 2026, with weighted average of +0.80%.

4.2.6 As a conservative approach, annual growth rate in accordance to the Planning Data (i.e. **+1.0%** p.a.) is adopted. It is deemed sufficient to allow for any unexpected future growth as a result of some changes in land use or development in the study area. The year 2035 reference traffic flows (with existing development) are presented in **Figure 4.1**.

4.3 Traffic Generations of Planned Adjacent Developments

4.3.1 To fully reflect the growth traffic, trip generation of the future planned adjacent developments have been taken into consideration. The planned development is detailed in **Table 4.3**.

Table 4.3 Major Planned/ Committed Developments in the Vicinity

URA Project Nos. / Private Site Location	Proposed Use	Development Parameters*
URA Project KC-008(A)	Residential & Commercial	Residential GFA= 12,270 m^2 Commercial GFA = 2,454 m^2 No. of Flats = About 310 Average Flat Size = About 39.6 m^2
URA Project KC-009	Residential & Commercial	Residential GFA= 55,522 m^2 Commercial GFA = 11,105 m^2 No. of Flats = About 1,150 Average Flat Size = About 48 m^2
URA Project KC-010	Residential & Commercial	Residential GFA= 34,215 m^2 Commercial GFA = 6,843 m^2 No. of Flats = About 713 Average Flat Size = About 48 m^2
URA Projects KC-011 & DL-8	Residential & Commercial	Residential GFA= 22,088 m^2 Commercial GFA = 4,418 m^2 No. of Flats = About 460 Average Flat Size = About 48m^2
URA Projects KC-012 & KC-013	Residential & Commercial	Residential GFA= 18,608 m^2 Commercial GFA = 3,722 m^2 No. of Flats = About 400 Average Flat Size = About 46.5m^2
URA Project KC-014	Residential & Commercial	Residential GFA= 21,427.5 m^2 Commercial GFA = 4,285.5 m^2 No. of Flats = About 500 Average Flat Size = About 42.9m^2
URA Project CBS-2:KC	Residential & Commercial	Residential GFA= 122,263 m^2 Commercial GFA = 12,232 m^2 No. of Flats = About 2,491 Average Flat Size = About 49m^2
13 Hok Yuen Street	Office & Retail	Office GFA= 47,007.307 m^2 Retail GFA= 269.993 m^2

Remarks:

* URA projects parameters as of August 2020.

* Development parameters of URA projects are subject to changes at detailed design of the developments.

4.3.2 Based on the latest Transport Planning and Design Manuel (T.P.D.M.) and on site survey, the adopted trip rates and the trip generations and attractions of the adjacent development are summarized in **Table 4.4** and **Table 4.5**.

Table 4.4 Adopted Traffic Rates for Adjacent Development

Land Use	Unit	Trip Generation (pcu/hr)			
		AM Peak		PM Peak	
		Generation	Attraction	Generation	Attraction
Residential (FS 45sqm) *	pcu/hr/flat	0.0463	0.0290	0.0181	0.0205
Residential (FS 50sqm)	pcu/hr/flat	0.0622	0.0426	0.0297	0.0401
Residential (FS 60sqm)	pcu/hr/flat	0.0718	0.0425	0.0286	0.0370
Office	pcu/hr/100 sqm GFA	0.1703	0.2452	0.1573	0.1175
Retail	pcu/hr/100 sqm GFA	0.2296	0.2434	0.3100	0.3563

* Trip Rate by interpolation

Table 4.5 Traffic Generations and Attractions of Adjacent Development

URA Project No. / Private Site Location	Proposed Use	Trip Generation (pcu/hr)			
		AM Peak		PM Peak	
		Generation	Attraction	Generation	Attraction
KC-008(A)	Residential	14	9	6	6
	Commercial	6	6	8	9
KC-009	Residential	72	49	34	46
	Commercial	25	27	34	40
KC-010	Residential	44	30	21	29
	Commercial	16	17	21	24
KC-011 & DL-8	Residential	29	20	14	18
	Commercial	10	11	14	16
KC-012 & KC-013	Residential	19	12	7	8
	Commercial	9	9	12	13
KC-014	Residential	23	15	9	10
	Commercial	10	10	13	15
CBS-2:KC	Residential	155	106	74	100
	Commercial	28	30	38	44
13 Hok Yuen Street	Office	80	115	74	55
	Retail	1	1	1	1

4.4 Planned Junction Layouts

4.4.1 Through the district-based approach with the redevelopment of 7 URA commenced projects and the proposed development of the Scheme (see **Section 2.3**), the traffic road network and pedestrian network in this area will be re-structured and largely enhanced. With the future implementation of road gazettal scheme at Ngan Hon Street, Hung Fook Street, Kai Ming Street and Wing Kwong Street, junction I and J will no longer be existed. There will be two new junctions created, Junction Sung On Street / Ngan Hon Street (K) and Junction Wing Kwong Street / Wan On Street / Kai Ming Street (L) respectively.

4.4.2 Further then upon the implementation of the further road enhancement under the Scheme, the road traffic connected Ngan Hon Street/Hung Fook Street/Yuk Shing Street/Kai Ming Street/Wing Kwong Street will be closed. The traffic direction of remaining section of Kai Ming Street will be reversed. The changes of traffic circulation please refer to **Figures 1.2** and **1.3** respectively.

4.4.3 The detail is presented in **Table 4.6**, **Figures 4.1** and **4.2**.

Table 4.6 Planned New Junctions under Restructuring of Traffic Network

Ref.	Junction	Type	Figure No.
K	Sung On Street / Ngan Hon Street	Priority	4.1
L	Wing Kwong Street / Wan On Street / Kai Ming Street	Priority	4.2

4.5 Reference Traffic Flow in Year 2035

4.5.1 It is noted that TML is under construction right now, the traffic condition in this area will be very different from now. Therefore, it is not suitable to use existing traffic flow to derive future traffic flow.

4.5.2 Thus, the year 2035 reference traffic flow is estimated by applying the adopted growth rate to the year 2026 Base District Traffic Models (BDTM) traffic model flow.

4.5.3 The 2035 reference traffic flows are presented in **Figure 4.3**.

2035 Reference Flows (without proposed development)	=	**2026 BDTM Traffic Model Flows**	x	**Adopted Growth Factor i.e. +1.0% p.a. for 9 years**	+	**Traffic Trips of Adjacent Development**

4.6 Traffic Trips of the Proposed Development

4.6.1 In order to estimate the traffic generation and attraction of the proposed development, reference has been made to the trip generation rates as stipulated in Volume 1 Chapter 3 Appendix D Table 1 of the latest T.P.D.M. published by Transport Department. The adopted trip rates are summarized in below **Table 4.7**.

Table 4.7 Adopted Traffic Trips Rate of Proposed Development

Use	Units	Trip Rate			
		Weekday AM Peak		Weekday PM Peak	
		Gen.	Att.	Gen.	Att.
Retail	pcu/hr/100 sqm GFA	0.2296	0.2434	0.3100	0.3563
Residential (Average Flat Size 60m^2)	pcu/hr/flat	0.0718	0.0425	0.0286	0.037

4.6.2 Based on the adopted trip rate listed in the above **Table 4.7** and the development parameters in **Table 2.1**, the trip generated and attracted by the proposed development are estimated and summarized in the **Table 4.8**.

Table 4.8 Estimated Traffic Trips of the Proposed Development

Use	Weekday AM Peak (pcu/hr)		Sunday Peak (pcu/hr)	
	Gen.	Att.	Gen.	Att.
Retail	19	20	26	30
Residential	65	38	26	33
Total	**84**	**58**	**52**	**63**

4.7 Traffic Forecast for Design Year 2035

4.7.1 The traffic trips of the proposed development are then superimposed onto the year 2035 reference traffic flow (without the proposed development) as shown in **Figure 4.4** to derive the year 2035 design traffic flow (with the proposed development).

Year 2035 Design Flow (with the Proposed Development)	=	**Year 2035 Reference Flow (without the Proposed Development)**	+	**Traffic Trips of the Proposed Development**

4.7.2 The traffic flow during AM and PM peak periods in the design year 2035 (with the proposed development) are shown in **Figure 4.2**.

4.8 Operational Assessment

4.8.1 To assess traffic impacts due to the proposed development, operational assessment of the critical junctions identified in Chapter 3 are carried out for both reference (without the proposed development) and design (with the proposed development) scenarios in year 2035. The results are summarized in **Table 4.9**.

Table 4.9 Operational Performance of Critical Junctions in Year 2035

Ref.	Junction	Method of Control	Year 2035 DFC/RC [1]			
			Reference Scenario (Without the Proposed Development)		Design Scenario (With the Proposed Development)	
			Weekday AM Peak	Weekday PM Peak	Weekday AM Peak	Weekday PM Peak
A	Ma Tau Wai Road / Bailey Street	Signalized	37%	65%	35%	64%
B	Ma Tau Wai Road / Wing Kwong Street	Signalized	110%	159%	89%	137%
C	To Kwa Wan Road / Chi Kiang Street	Signalized	73%	67%	71%	66%
D	Sung On Street / Yuk Yat Street / Chi Kiang Street	Signalized	24%	36%	16%	30%
E	Bailey Street / Sung On Street	Signalized	121%	128%	121%	128%
F	Bailey Street / Wan On Street	Priority	0.44	0.44	0.45	0.45
G	Ngan Hon Street / Wing Kwong Street	Priority	0.33	0.23	0.34	0.24
H	Ngan Hon Street / Lung Tak Street [2]	Priority	N/A	N/A	N/A	N/A
I	Wing Kwong Street / Hung Fook Street [3]	N/A	N/A	N/A	N/A	N/A
J	Wing Kwong Street / Kai Ming Street [3]	N/A	N/A	N/A	N/A	N/A
K	Sung On Street / Ngan Hon Street	Priority	0.31	0.22	0.31	0.22

L	Wing Kwong Street / Wing On Street / Kai Ming Street	Priority	0.17	0.13	0.19	0.14

Notes: (1) RC = Reserve Capacity for Signal Junction;
DFC = Design Ratio of Flow to Capacity for Priority Junction/Roundabout

(2) Only ingress traffic is allowed from Ngan Hon Street to Lung Tak Street but not revised. No traffic conflicts or delay is expected in this location.

(3) No longer exist in design year due to road enhancement scheme

4.8.2 The assessment result in **Table 4.5** reveals that all junctions would operate with positive capacities in both reference and design scenarios in year 2035. It should be therefore considered acceptable from the perspective of traffic engineering

5. PEDESTRIAN ASSESSMENT

5.1 Existing Pedestrian Condition

5.1.1 In order to acquire the existing pedestrian condition around the proposed development, a pedestrian headcount survey was conducted at concerned footpath sections during the weekday AM and PM peak periods on a typical weekday on August 2020. The survey provides most up-to-date details of the traffic condition within the study area under normal operation. Based on the observed traffic flows, it reveals that weekday AM and PM peak hour occurred from 08:30AM to 09:30AM, 05:45PM to 06:45PM respectively. The layout of the critical sections of footpath is shown in **Figure 5.1**.

5.1.2 Besides, due to the effect of COVID-19, it is understood that the pedestrian flow is lower than normal. In order to find out the "corrected" factor, a link flow survey has also been carried out at the ATC core station No. 3014 at To Kwa Wan Road as a reference. The survey flow and ATC flow are compared and summarized as **Table 5.1** below:

Table 5.1 Flow Comparison between Surveyed Flow and ATC flow

Road Section at ATC Core Station No. 3016 at Junction Road	Flow (veh/hr)			
	NB		SB	
	AM	PM	AM	PM
2018 ATC	330	390	1280	1130
2020 ATC (By Estimation)*	340	400	1300	1150
2020 Survey	310	400	820	770
COVID-19 Factor	**1.10**	**1.00**	**1.59**	**1.49**

*Growth rate of 0.80% adopted in the TIA report

5.1.3 From **Table 5.1** above, all the existing flow has decreased compare with ATC flow. By taking a conservative approach, the survey pedestrian flow was factor-up by the greatest factor 1.59 to reflect the situation without the effect of COVID-19. The adopted observed flow is shown in **Figure 5.2**.

5.1.4 The concept of Minimum Width of Footways and Level-of-service (LOS) in accordance with T.P.D.M. Volume 2 Chapter 3.4.11 and Volume 6 Chapter 10 have been applied for assessing the concerned walkways. The Minimum Width of Footways refers to the desirable minimum effective widths of footways according to pedestrian volume and

type of land use. LOS directly relates to the pedestrian comfort and ease with which pedestrians queued and proceed at the walkway.

5.1.5 Besides, to determine the Volume-to-Capacity (V/C) ratio at crossing points, the following empirical formula is used for checking whether the light signal crossing facilities provided are adequate for the pedestrian volumes wishing to cross:.

PC = K x GTP x W
PC = Pedestrian crossing capacity in pedestrians per hour
GTP = Green time proportion i.e. (Pedestrian green + flashing green time)/Cycle time
W = Lateral width of pedestrian crossing
K = A constant equivalent to saturation flow for pedestrians, may be taken as 1900 ped/metre/hours

5.1.6 Based on the pedestrian flow shown in **Figure 5.2**, LOS and V/C ratio are found out and summarized in **Table 5.2** and **5.3**.

Table 5.2 LOS Assessment of the Critical Sections of Footpath in Observed Year 2020

Critical Sections	Effective Width (m)	Observed Scenario (Year 2020)					
		AM Peak			PM Peak		
		Two-way Pedestrian Flow (ped/hr)	Two-way Pedestrian Flow Rate (ped/min/m)	LOS	Two-way Pedestrian Flow (ped/hr)	Two-way Pedestrian Flow Rate (ped/min/m)	LOS
C	2.73	985	6.01	A	1,590	9.71	A
D	2.20	435	3.30	A	650	4.92	A
F	0.23	255	18.48	B	360	26.09	C
G	1.95	190	1.62	A	160	1.37	A
H	2.04	1,215	9.93	A	1,460	11.93	A
I	1.07	125	1.95	A	120	1.87	A
J	2.72	595	3.65	A	720	4.41	A
K	12.00	230	0.32	A	260	0.36	A
L	1.36	1,405	17.22	B	1,495	18.32	B
M	11.50	285	0.41	A	370	0.54	A
N	1.69	1,220	12.03	A	1,655	16.32	B
O	0.70	1,120	26.67	C	1,245	29.64	C
R	2.22	190	1.43	A	280	2.10	A
S	0.53	85	2.67	A	95	2.99	A
T	0.75	600	13.33	A	575	12.78	A

Table 5.3 Capacity Assessment of the Critical Sections of Crossing in Observed Year 2020

Critical Sections	Crossing Width (m)	Observed Scenario (Year 2020)							
		AM Peak				PM Peak			
		Green Time Proportion	Two-way Pedestrian Flow (ped/hr)	Capacity (ped/hr	V/C Ratio	Green Time Proportion	Two-way Pedestrian Flow (ped/hr)	Capacity (ped/hr	V/C Ratio
A	3.72	0.51	495	3,599	0.14	0.51	590	3,599	0.16
B1	8.38	0.21	1,635	3,391	0.48	0.21	1,500	3,391	0.44
B2	7.82	0.57	1,635	8,530	0.19	0.57	1,500	8,530	0.18
E	4.20	0.22	980	1,773	0.55	0.22	1,035	1,773	0.58
P	6.04	0.75	975	8,563	0.11	0.75	1,050	8,563	0.12
Q	4.50	0.22	870	1,842	0.47	0.22	1,135	1,842	0.62

5.1.7 The pedestrian assessment results have revealed the section of footpath and crossing have LOS A and V/C Ratio below 1.0 at the observed situation.

5.2 Pedestrian Traffic Forecast

Adjacent Development

5.2.1 To estimate the pedestrian trips related to the adjacent developments, survey on similar existing developments has been carried out and summarized in the **Table 5.4**.

Table 5.4 Pedestrian Trip Rates of Surveyed Developments

Use	Type	Units	Weekday AM Peak		Weekday PM Peak	
			Gen.	Att.	Gen.	Att.
Heya Delight, Cheung Sha Wan (Flat Size 40 to 70 sqm)	Private Housing	(ped/hr/flat)	0.6231	0.1385	0.1462	0.3077
	Retail	(ped/hr/GFA)	0.0631	0.0179	0.0419	0.0405

5.2.2 Based on the trip rate surveyed and the development parameters in **Table 4.3**, the future pedestrian trips related to the adjacent development are estimated and summarized in the **Table 5.5**.

Table 5.5 Pedestrian Trips of Adjacent Developments

URA No.	Type	Units	Weekday AM Peak		Weekday PM Peak	
			Gen.	Att.	Gen.	Att.
KC-009	Private Housing	(ped/hr)	715	160	170	355
	Retail	(ped/hr)	700	200	465	450
KC-010	Private Housing	(ped/hr)	445	100	105	220
	Retail	(ped/hr)	430	120	285	275
KC-011 & DL-8	Private Housing	(ped/hr)	285	65	65	140
	Retail	(ped/hr)	280	80	185	180
KC-012 & KC-013	Private Housing	(ped/hr)	250	55	60	125
	Retail	(ped/hr)	235	65	155	150
KC-014	Private Housing	(ped/hr)	310	70	75	155
	Retail	(ped/hr)	270	75	180	175

5.2.3 Moreover, a survey has been conducted to estimate the modal split of the proposed development and summarized in **Table 5.6** below:

Table 5.6 Surveyed Modal Split

Transport Mode	Modal Split (%)	Modal Split (Excluded Walk) (%)
Rail	21%	29%
Franchised Bus	22%	30%
PLB	9%	13%
Private Vehicle	18%	26%
Special Purpose Bus	1%	1%
Taxi	1%	1%
Ferry	0%	0%
Walk	28%	-
Total	**100%**	**100%**

5.2.4 From the survey, about 70% of people would take mechanised trips for their journey. It is noted that there are numerous of public transport along Ma Tau Wai Road or To Kwa Wan Road near the Site. Therefore, it is assumed 21% of the people in vicinity will re-route to MTR station.

5.2.5 To assess the future conflict due to the proposed development, based on the corrected survey flow and the adopted growth rate of +1.0%, future reference pedestrian flows (without the proposed development) and at the critical sections are estimated and summarized in **Figure 5.3**. The LOS and V/C ratio are also assessed and summarized in **Tables 5.7** and **5.8** below:

Table 5.7 LOS Assessment of the Critical Sections of Footpath in Reference Year 2035

Critical Sections	Effective Width (m)	Reference Scenario (Year 2035)					
		AM Peak			PM Peak		
		Two-way Pedestrian Flow (ped/hr)	Two-way Pedestrian Flow Rate (ped/min/m)	LOS	Two-way Pedestrian Flow (ped/hr)	Two-way Pedestrian Flow Rate (ped/min/m)	LOS
C	2.73	1,580	9.65	A	2,210	13.49	A
D	2.20	510	3.86	A	760	5.76	A
F	0.23	305	22.10	B	415	30.07	C
G	1.95	1,310	11.20	A	1,025	8.76	A
H	2.04	3,325	27.17	C	3,145	25.69	C
I	1.07	1,235	19.24	B	970	15.11	A
J	2.72	1,535	9.41	A	1,380	8.46	A
K	12.00	805	1.12	A	715	0.99	A
L	1.36	2,130	26.10	C	2,085	25.55	C
M	11.50	440	0.64	A	490	0.71	A
N	1.69	2,030	20.02	B	2,340	23.08	C
O	**0.70**	**2,095**	**49.88**	**E**	**2,100**	**50.00**	**E**
R	2.22	325	2.44	A	410	3.08	A
S	**0.53**	**1,130**	**35.53**	**D**	**790**	**24.84**	**C**
T	0.75	720	16.00	A	680	15.11	A

Table 5.8 Capacity Assessment of the Critical Sections of Crossing in Reference Year 2035

Critical Sections	Crossing Width (m)	Reference Scenario (Year 2035)							
		AM Peak				PM Peak			
		Green Time Proportion	Two-way Pedestrian Flow (ped/hr)	Capacity (ped/hr	V/C Ratio	Green Time Proportion	Two-way Pedestrian Flow (ped/hr)	Capacity (ped/hr	V/C Ratio
A	3.72	0.51	1,375	3,599	0.38	1,415	3,599	0.39	0.51
B1	8.38	0.21	2,705	3,391	0.80	2,480	3,391	0.73	0.21
B2	7.82	0.57	2,705	8,530	0.32	2,480	8,530	0.29	0.57
E	**4.20**	**0.22**	**2,265**	**1,773**	**1.28**	**2,070**	**1,773**	**1.17**	**0.22**
P	6.04	0.75	1,855	8,563	0.22	1,970	8,563	0.23	0.75
Q	4.50	0.22	1,550	1,842	0.84	1,765	1,842	0.96	0.22

Proposed Development

5.2.6 Based on the trip rate surveyed and the development parameters in **Table 4.3**, the future pedestrian trips related to the proposed development are estimated and summarized in the **Table 5.9**.

Table 5.9 Pedestrian Trips of Proposed Development

Type	Units	Weekday AM Peak		Weekday PM Peak	
		Gen.	Att.	Gen.	Att.
Private Housing	(ped/hr)	560	125	130	275
Retail	(ped/hr)	525	150	350	335
Community Use*	(ped/hr)	50	50	50	50
Total	(ped/hr)	**1,135**	**325**	**530**	**660**

*Nominal Trips

5.2.7 Based on the **Table 5.9**, the estimated trips are superimposed to the network, the future pedestrian design flow could be estimated summarized in **Figure 5.4**. The assessment of the design scenario is summarized in **Tables 5.10** and **5.11**.

Table 5.10 LOS Assessment of the Critical Sections of Footpath in Design Year 2035 (Without Proposed footbridge)

Critical Sections	Effective Width (m)	Design Scenario (Year 2035)					
		AM Peak			PM Peak		
		Two-way Pedestrian Flow (ped/hr)	Two-way Pedestrian Flow Rate (ped/min/m)	LOS	Two-way Pedestrian Flow (ped/hr)	Two-way Pedestrian Flow Rate (ped/min/m)	LOS
C	2.73	1,685	10.29	A	2,290	13.98	A
D	2.20	510	3.86	A	760	5.76	A
F	0.23	305	22.10	B	415	30.07	C
G	1.95	1,310	11.20	A	1,025	8.76	A
H	2.04	3,900	31.86	C	3,590	29.33	C
I	1.07	1,235	19.24	B	970	15.11	A
J	2.72	1,655	10.14	A	1,480	9.07	A
K	12.00	805	1.12	A	715	0.99	A
L	1.36	2,385	29.23	C	2,275	27.88	C
M	11.50	440	0.64	A	490	0.71	A
N	1.69	2,290	22.58	B	2,495	24.61	C
O	**0.70**	**2,250**	**53.57**	**E**	**2,265**	**53.93**	**E**
R	2.22	325	2.44	A	410	3.08	A
S	**0.53**	**1,130**	**35.53**	**D**	**790**	**24.84**	**C**
T	0.75	720	16.00	A	680	15.11	A

Table 5.11 Capacity Assessment of the Critical Sections of Crossing in Design Year 2035 (Without Proposed footbridge)

Critical Sections	Crossing Width (m)	Design Scenario (Year 2035)							
		AM Peak				PM Peak			
		Green Time Proportion	Two-way Pedestrian Flow (ped/hr)	Capacity (ped/hr)	V/C Ratio	Green Time Proportion	Two-way Pedestrian Flow (ped/hr)	Capacity (ped/hr	V/C Ratio
A	3.72	0.51	1,650	3,599	0.46	0.51	1,685	3,599	0.47
B1	8.38	0.21	2,980	3,391	0.88	0.21	2,750	3,391	0.81
B2	7.82	0.57	2,980	8,530	0.35	0.57	2,750	8,530	0.32
E	**4.20**	**0.22**	**2,645**	**1,773**	**1.49**	**0.22**	**2,425**	**1,773**	**1.37**
P	6.04	0.75	2,050	8,563	0.24	0.75	2,155	8,563	0.25
Q	4.50	0.22	1,625	1,842	0.88	0.22	1,830	1,842	0.99

5.2.8 It is revealed from the assessment results in **Tables 5.10** and **5.11** that the concerned sections of footpaths and crossing would all operate with LOS C or below except Critical Section O & S and the V/C ratio below 1.0 in peak periods except Critical Section E.

5.3 Proposed Pedestrian Footbridge

5.3.1 Based on **Table 5.10** and **5.11**, it is revealed that there is a high demand of pedestrian flow between the proposed development and MTR station. In the draft DSP, a footbridge connection point is proposed at the podium of the proposed development to allow for a proposed footbridge to be constructed to link up the To Kwa Wan MTR Station exits and the proposed development directly. With the proposed footbridge, it is anticipated that most of the people from the proposed development and its adjacent developments will be re-routed to use the proposed footbridge to/from MTR station.

5.3.2 With an assumption that the draft DSP is approved by CE in C for implementation, an assessment is made to compare the scenario between LOS with the proposed footbridge and without footbridge, both at the design year 2035 when the proposed development of the DSP is completed.

5.3.3 The future pedestrian design flow with the proposed footbridge could be estimated summarized in **Figure 5.5**. The assessment of the design scenario is summarized in **Tables 5.12** and **5.13**.

Table 5.12 LOS Assessment of the Critical Sections of Footpath in Design Year 2035 (With Proposed Footbridge)

Critical Sections	Effective Width (m)	Design Scenario (Year 2035)					
		AM Peak			PM Peak		
		Two-way Pedestrian Flow (ped/hr)	Two-way Pedestrian Flow Rate (ped/min/m)	LOS	Two-way Pedestrian Flow (ped/hr)	Two-way Pedestrian Flow Rate (ped/min/m)	LOS
C	2.73	1,685	10.29	A	2,290	13.98	A
D	2.20	510	3.86	A	760	5.76	A
F	0.23	305	22.10	B	415	30.07	C
G	1.95	1,060	9.06	A	825	7.05	A
H	2.04	3,305	27.00	C	3,155	25.78	C
I	1.07	985	15.34	A	770	11.99	A
J	2.72	1,210	7.41	A	1,120	6.86	A
K	12.00	685	0.95	A	615	0.85	A
L	1.36	2,350	28.80	C	2,255	27.63	C
M	11.50	440	0.64	A	490	0.71	A
N	1.69	2,275	22.44	B	2,490	24.56	C
O	0.70	1,820	43.33	D	1,945	46.31	D
R	2.22	245	1.84	A	345	2.59	A
S	0.53	880	27.67	C	605	19.03	B
T	0.75	720	16.00	A	680	15.11	A

Table 5.13 Capacity Assessment of the Critical Sections of Crossing in Design Year 2035 (With Proposed Footbridge)

Critical Sections	Crossing Width (m)	Design Scenario (Year 2035)							
		AM Peak				PM Peak			
		Green Time Proportion	Two-way Pedestrian Flow (ped/hr)	Capacity (ped/hr)	V/C Ratio	Green Time Proportion	Two-way Pedestrian Flow (ped/hr)	Capacity (ped/hr	V/C Ratio
A	3.72	0.51	900	3,599	0.25	0.51	1,025	3,599	0.28
B1	8.38	0.21	1,900	3,391	0.56	0.21	1,825	3,391	0.54
B2	7.82	0.57	1,900	8,530	0.22	0.57	1,825	8,530	0.21
E	4.20	0.22	1,755	1,773	0.99	0.22	1,640	1,773	0.92
P	6.04	0.75	1,675	8,563	0.20	0.75	1,830	8,563	0.21
Q	4.50	0.22	1,420	1,842	0.77	0.22	1,665	1,842	0.90

5.3.4 It is revealed from the assessment results in **Tables 5.12** and **5.13** that the concerned sections of footpaths and crossings would all operate with LOS below D and the V/C ratio below 1.0 in peak periods. By comparing the results between scenarios with footbridge and without footbridge, the footpath condition would be relieved from the worst case of LOS E to D and V/C from over 1.0 to below 1.0. This is because part of the pedestrian will use the footbridge, the pedestrian flow would be diverted from Wing Kwong Street and Ma Tau Wai Road crossing to footbridge and the new pedestrian walkway, thus the pedestrian condition of the critical sections would be relieved. Thus, the construction of footbridge connecting the between MTR entrance and proposed development is supported from traffic engineering point of view.

6. SUMMARY AND CONCLUSION

6.1 Summary

6.1.1 The Scheme is located at To Kwa Wan, Kowloon which is broadly bounded by To Kwa Wan Road, Ngan Hon Street, Hung Fook Street, Kai Ming Street, Wing Kwong Street and Ma Tau Wai Road. URA proposes "R(A)" zoning of the scheme area and to redevelop the scheme area for high-density residential development, with commercial uses always permitted on the lowest three floors of a building or in the purpose-designed non-residential portion of a building. To support the proposed redevelopment, a traffic impact assessment is required to review and appraise any possible traffic impact induced by the proposed development of the Scheme on the adjacent road network.

Internal Transport Facilities

6.1.2 As for the internal transport facilities provision, it is proposed to provide 114 nos. private car parking space and 15 nos. of L/UL space. High-end of provision for the all the internal transport facilities, except for parking provision for retail uses. Vehicles would ingress to the proposed development at the run-in at Kai Ming Street and move to basement car park by ramp, and then leaving the proposed development at run-out at Wing Kwong Street.

Traffic Impact Assessment (TIA)

6.1.3 It is anticipated that the proposed development would be completed in 2032 tentatively with full intended operation. In order to assess the possible traffic impacts to the local road network due to the proposed development, year 2035 (i.e. 3 years after completion) has been adopted as the design year for this study. Assumption has made to take into account of the road network re-structuring recently gazetted under Roads Ordinance as a result of the proposed developments of URA's 7 commenced projects in the neighbourhood.

6.1.4 Year 2035 traffic forecasts have been derived from the 2026 BDTM traffic model flows and traffic generation by population growth. Besides, future traffic growth in Kowloon City District has also been considered based on the TPEDM by Planning Department

and Annual Traffic Census (ATC) by Transport Department. A conservative growth rate of 1.0% p.a. was adopted.

6.1.5 Junctions operational performance analysis has been carried out in both reference and design scenarios in year 2035. All of the junctions would operate with ample capacities in both reference and design scenarios in year 2035.

Proposed Footbridge Connection and Pedestrian Assessment

6.1.6 An elevated footbridge located outside the Scheme is proposed to be constructed. It connects between the LCSD Garden where the To Kwa Wan MTR Station exit is located and the proposed development directly.

6.1.7 Pedestrian assessment in term of LOS on footpaths and V/C ratio on crossing points has been carried out. It is found out that part of the concerned footpaths and crossing points would be operated with LOS E or V/C ratio above 1.0 in both reference and design scenarios in year 2035 even without the proposed development. With the proposed footbridge connecting between MTR station and proposed development, the LOS would be improved from E to D and V/C ratio would below 1.0. Thus, the construction of footbridge could improve the walking condition in vicinity.

6.1.8 Based on the above assessments, the proposed Scheme is supported from the traffic points of view.

6.2 Conclusion

6.2.1 In conclusion, this Traffic Impact Assessment (TIA) study demonstrated that the related traffic trips related to the proposed development can be absorbed by the nearby road network and no significant traffic impact will be induced.

6.2.2 Therefore, the proposed development is reckoned feasible from traffic engineering point of view.

Appendix I

Junction Calculation Sheets

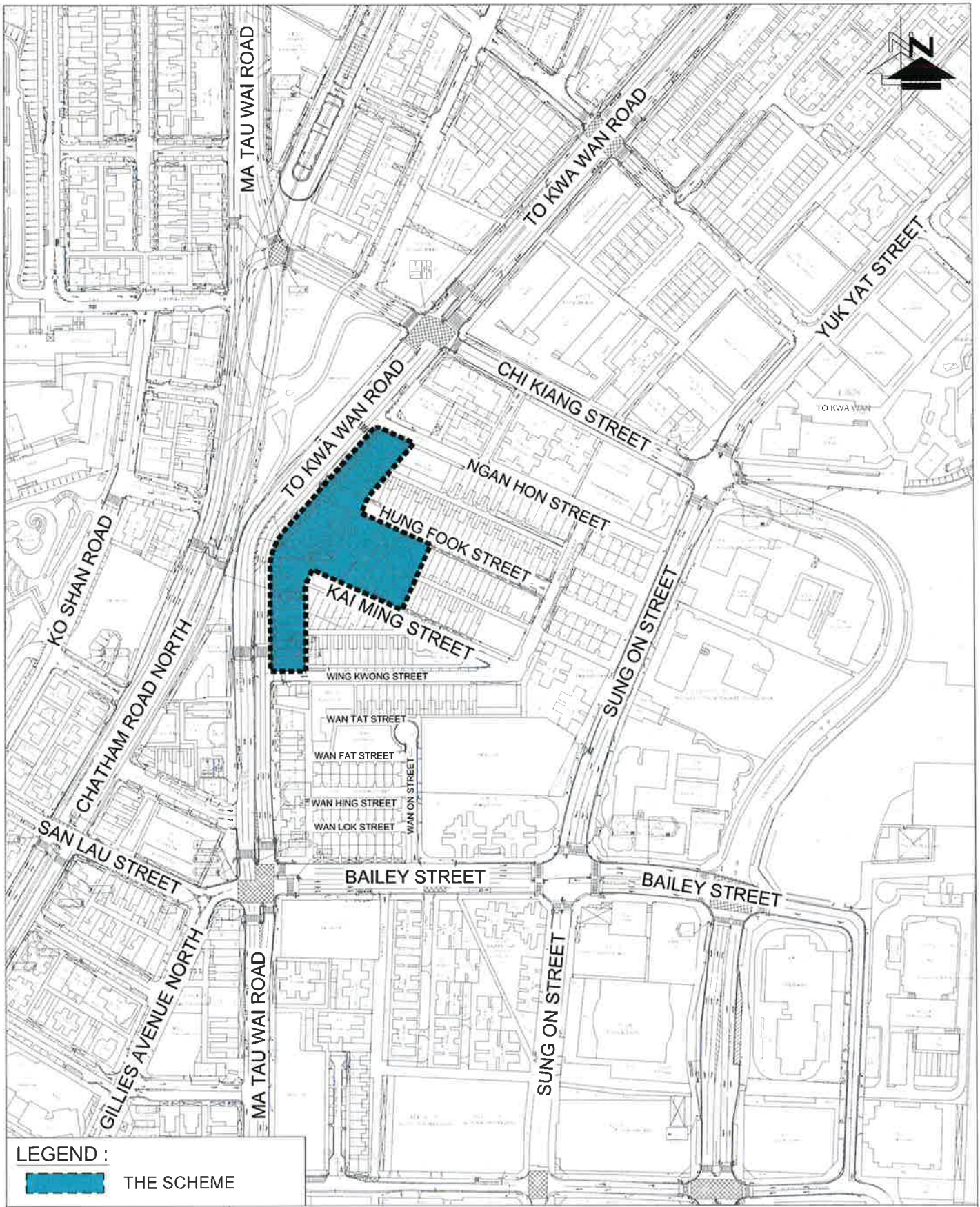


FIGURE NO.: 1.1	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: SITE LOCATION PLAN
SCALE: 1 : 3000 @ A4 / DATE: 18 DEC 2020	CTA Consultants Limited 志達顧問有限公司

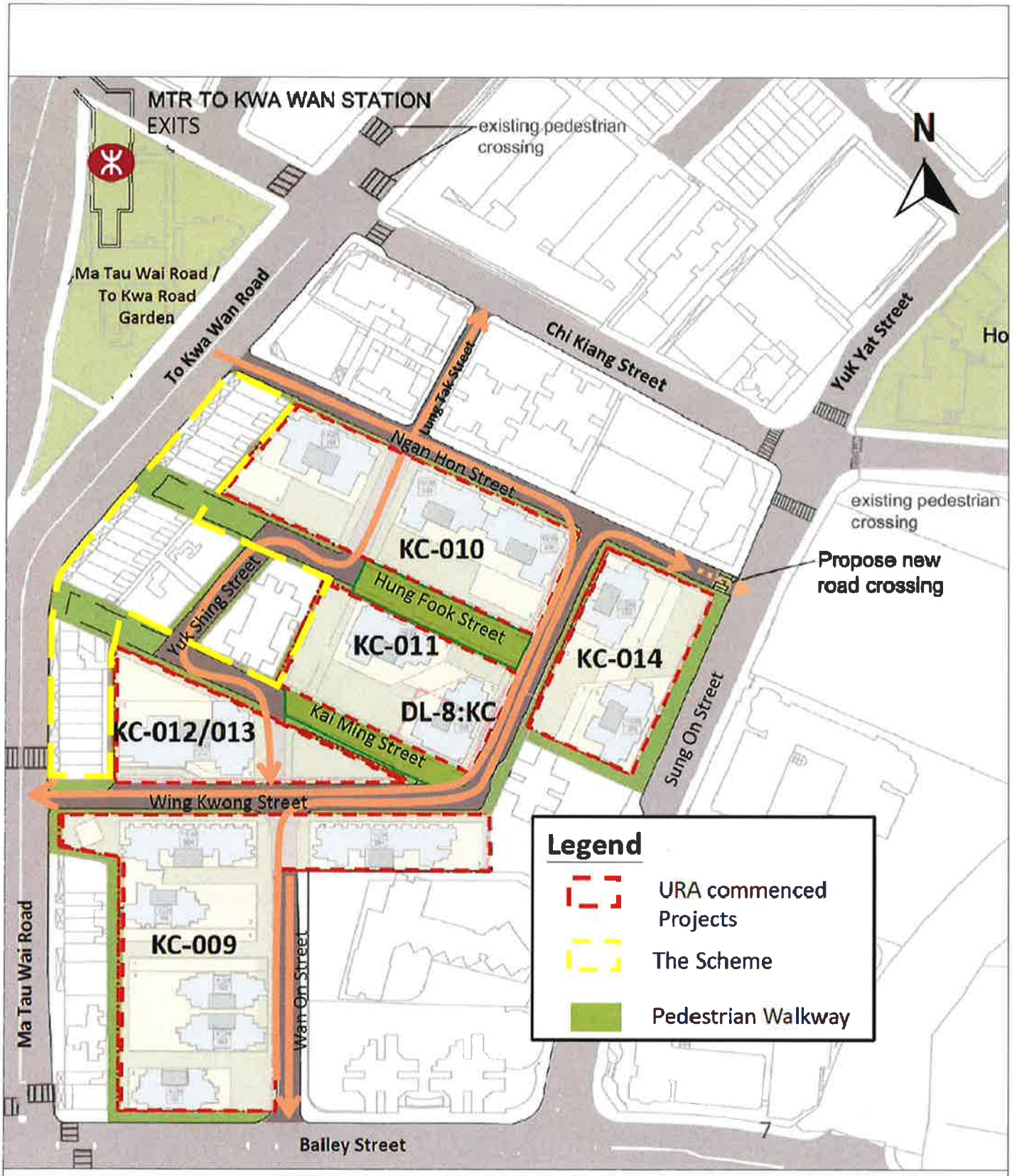
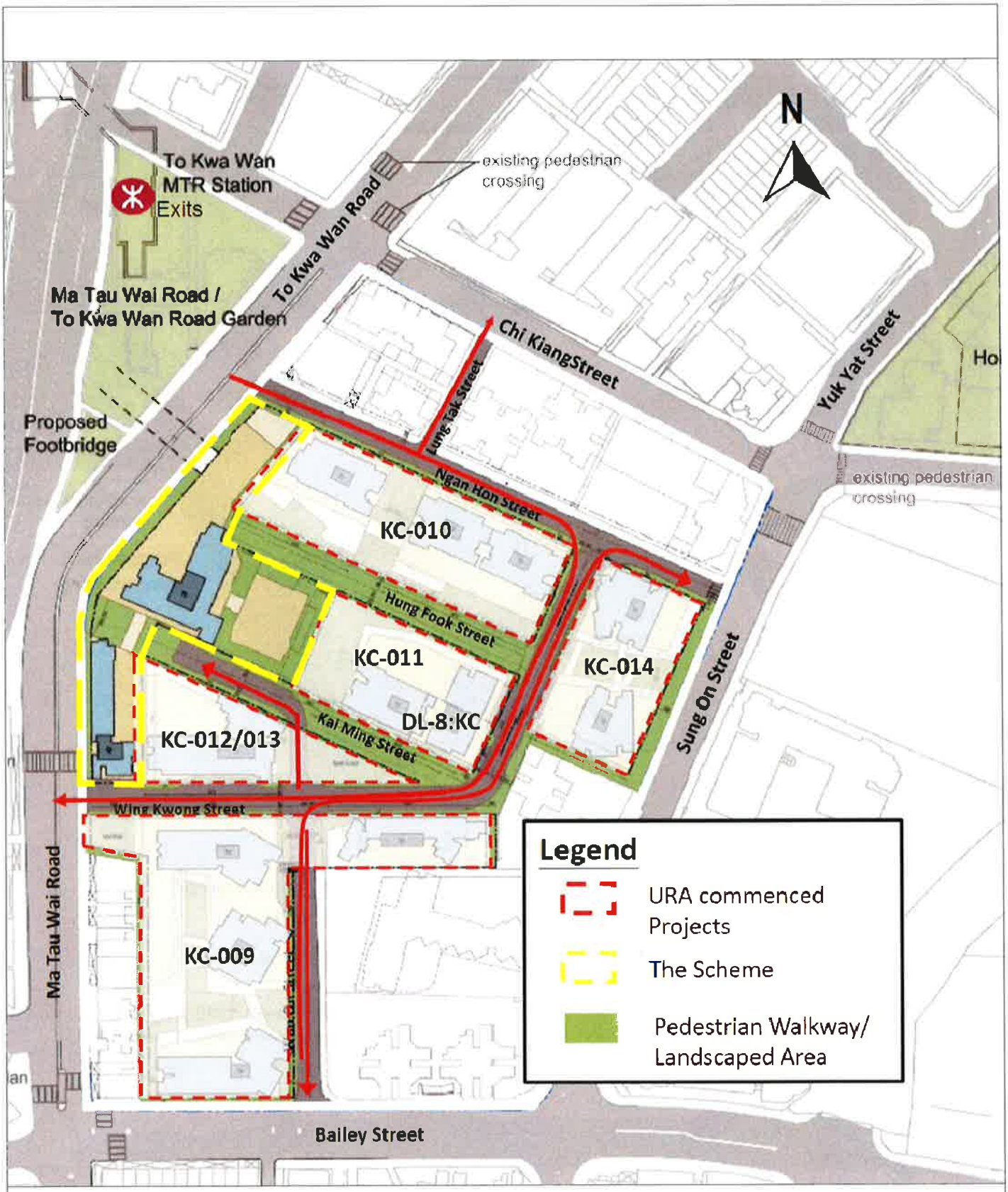


FIGURE NO.: 1.2	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: URA COMMENCED PROJECTS AND GAZETTED TRAFFIC AND PEDESTRIAN NETWORK
SCALE: N.T.S. / DATE: 28 DEC 2020	CTA Consultants Limited 志達顧問有限公司



(Remarks: Notional layout subject to detailed design)

FIGURE NO.: 1.3	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: PROPOSED FURTHER RESTRUCTURING OF TRAFFIC AND PEDESTRIAN NETWORK
SCALE: N.T.S. / DATE: 28 DEC 2020	CTA Consultants Limited 志達顧問有限公司

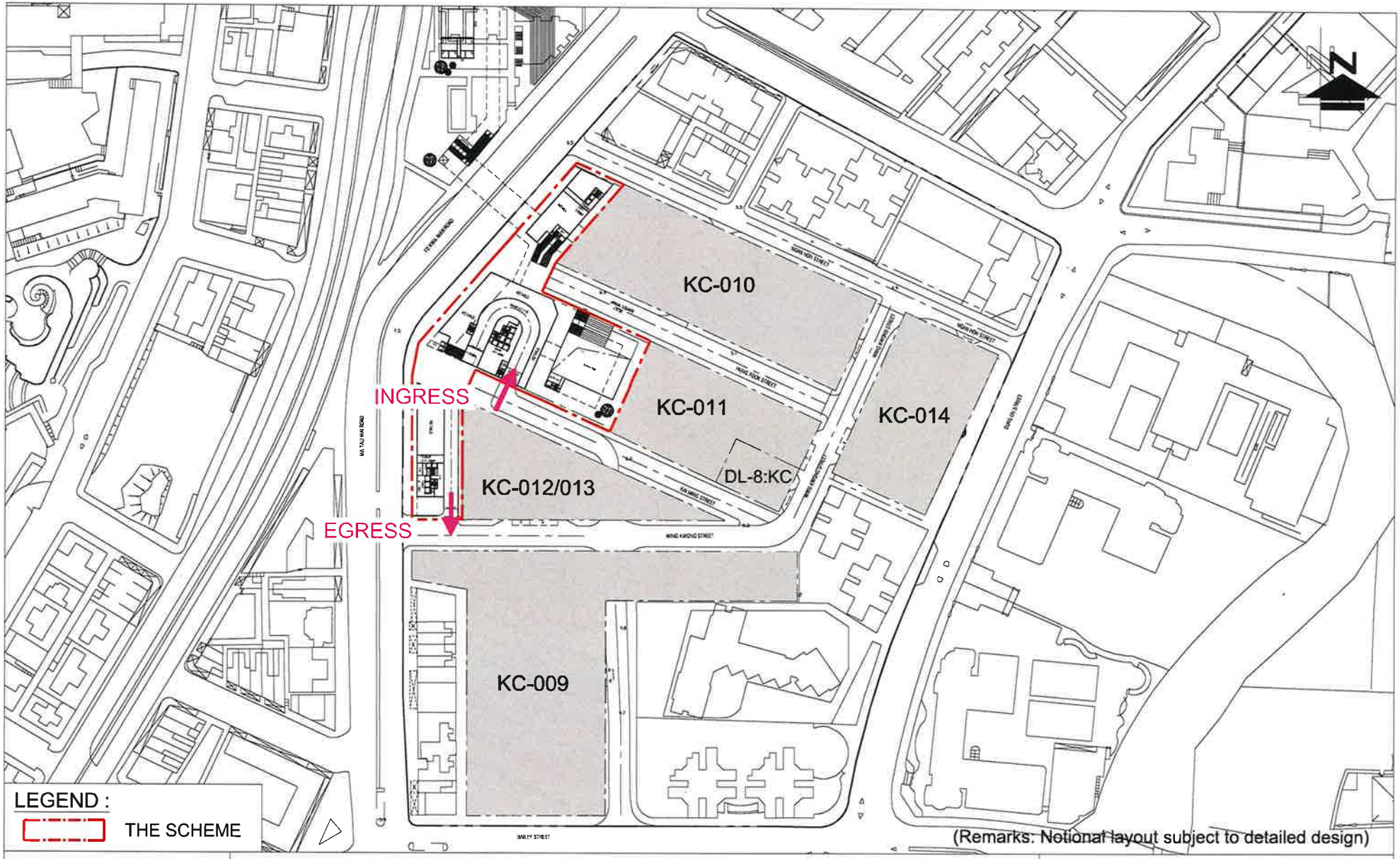


FIGURE NO.: 2.1	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: PROPOSED G/F PLAN
SCALE: 1 : 2500 @ A4	DATE: 18 DEC 2020

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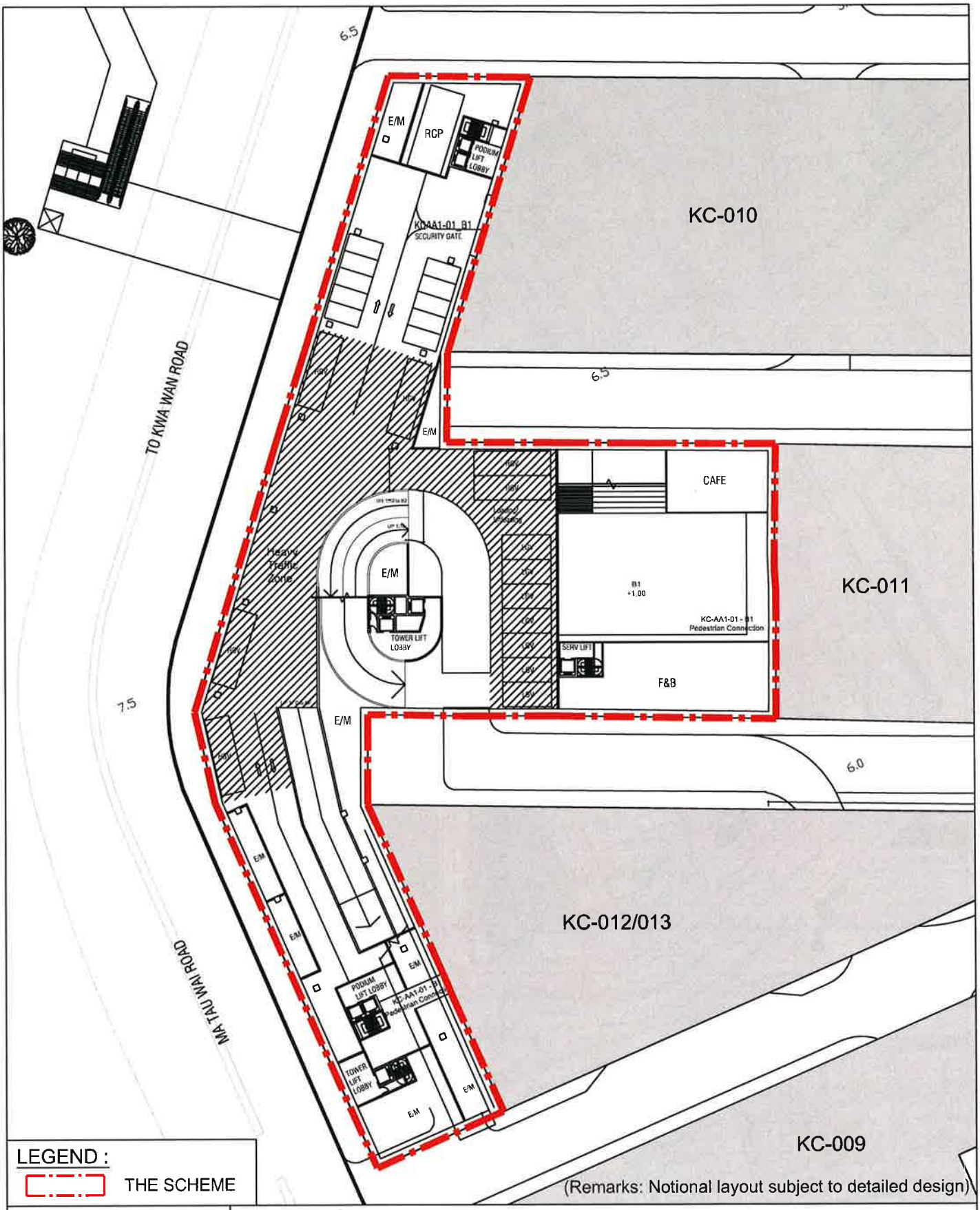

FIGURE NO.: 2.2	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: PROPOSED B1 PLAN
SCALE: 1 : 700 @A4	DATE: 22 FEB 2021

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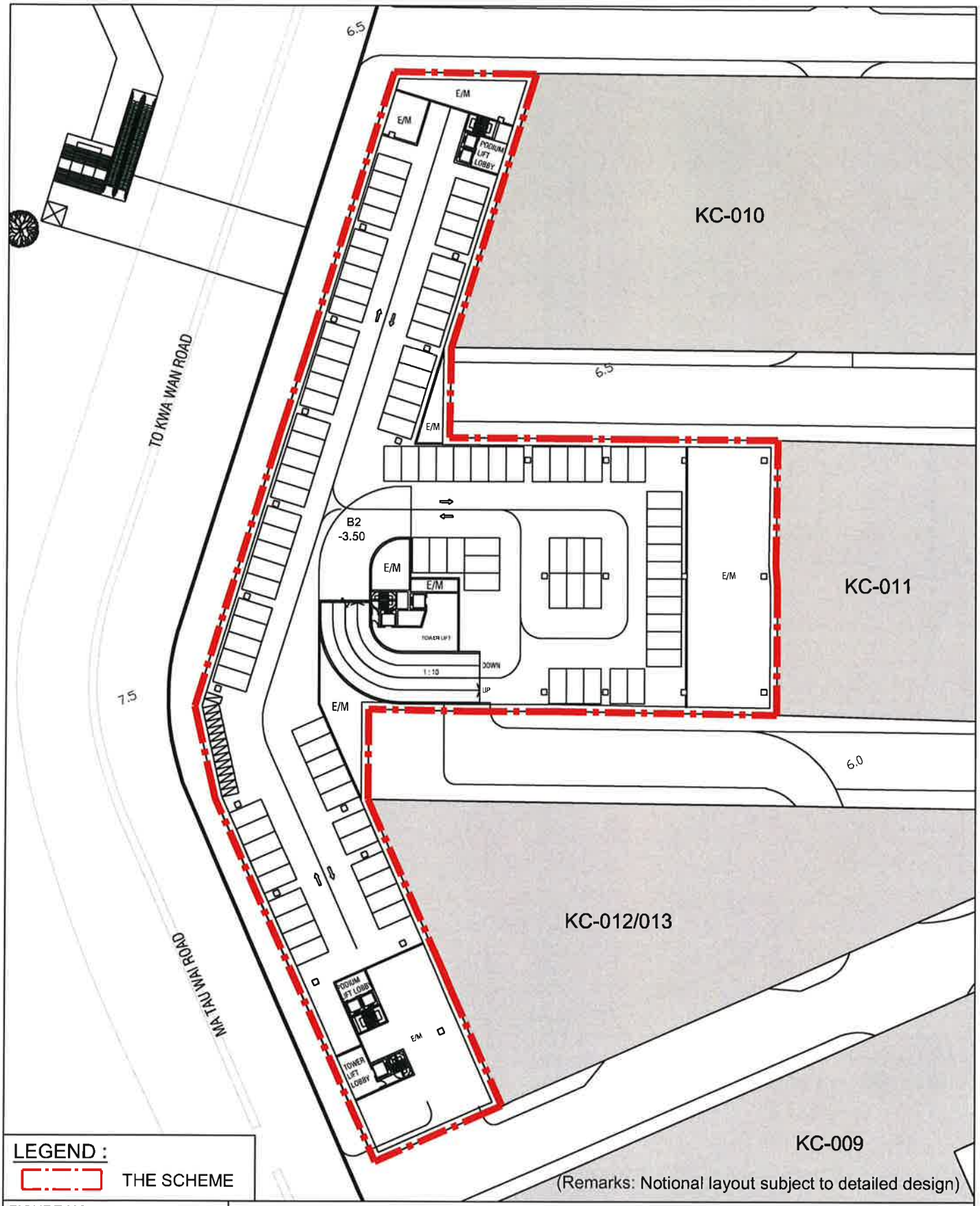


LEGEND :

THE SCHEME

(Remarks: Notional layout subject to detailed design)

FIGURE NO.: 2.3	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: PROPOSED B2 PLAN
SCALE: 1 : 700 @A4 / DATE: 22 FEB 2020	CTA Consultants Limited 志達顧問有限公司

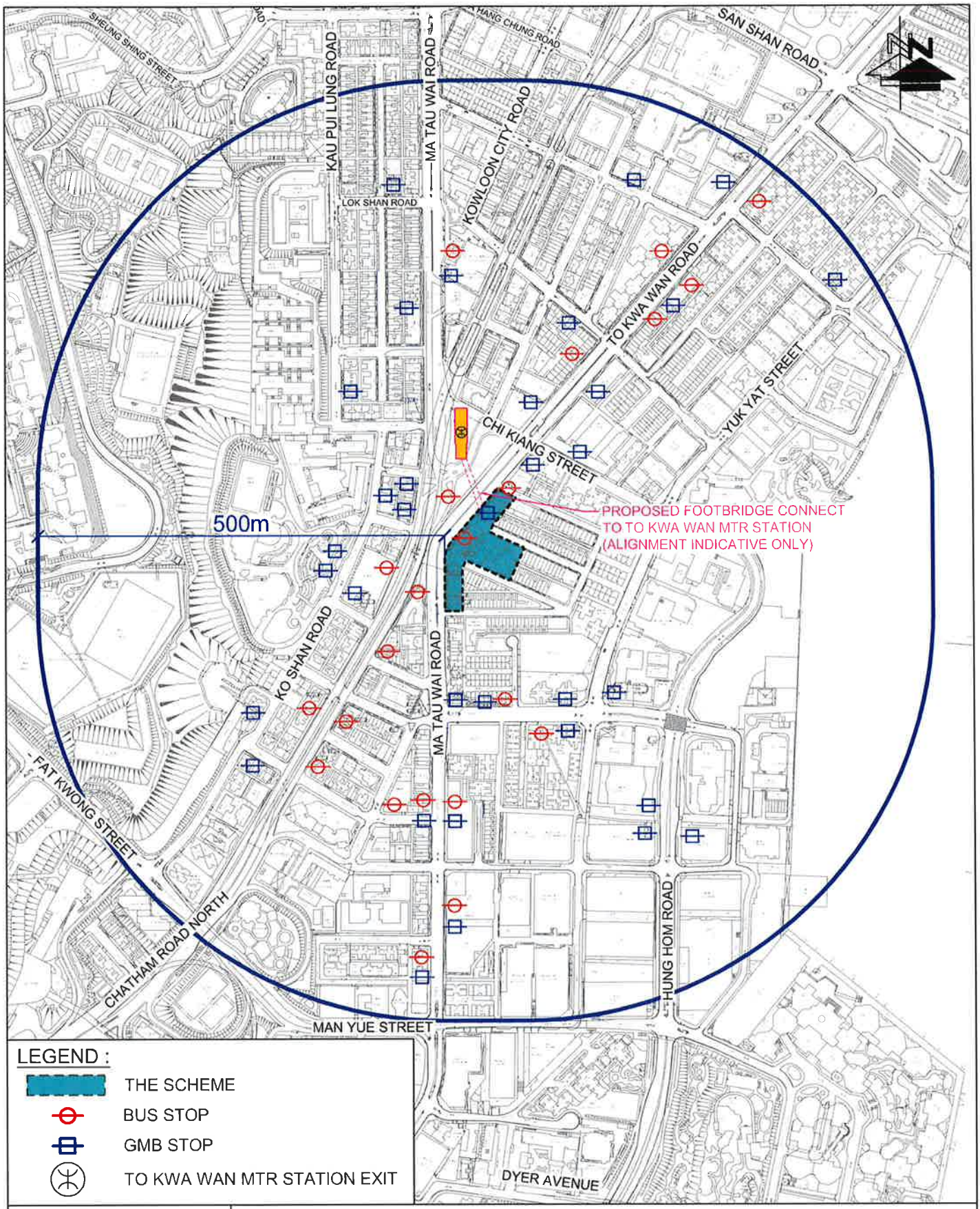
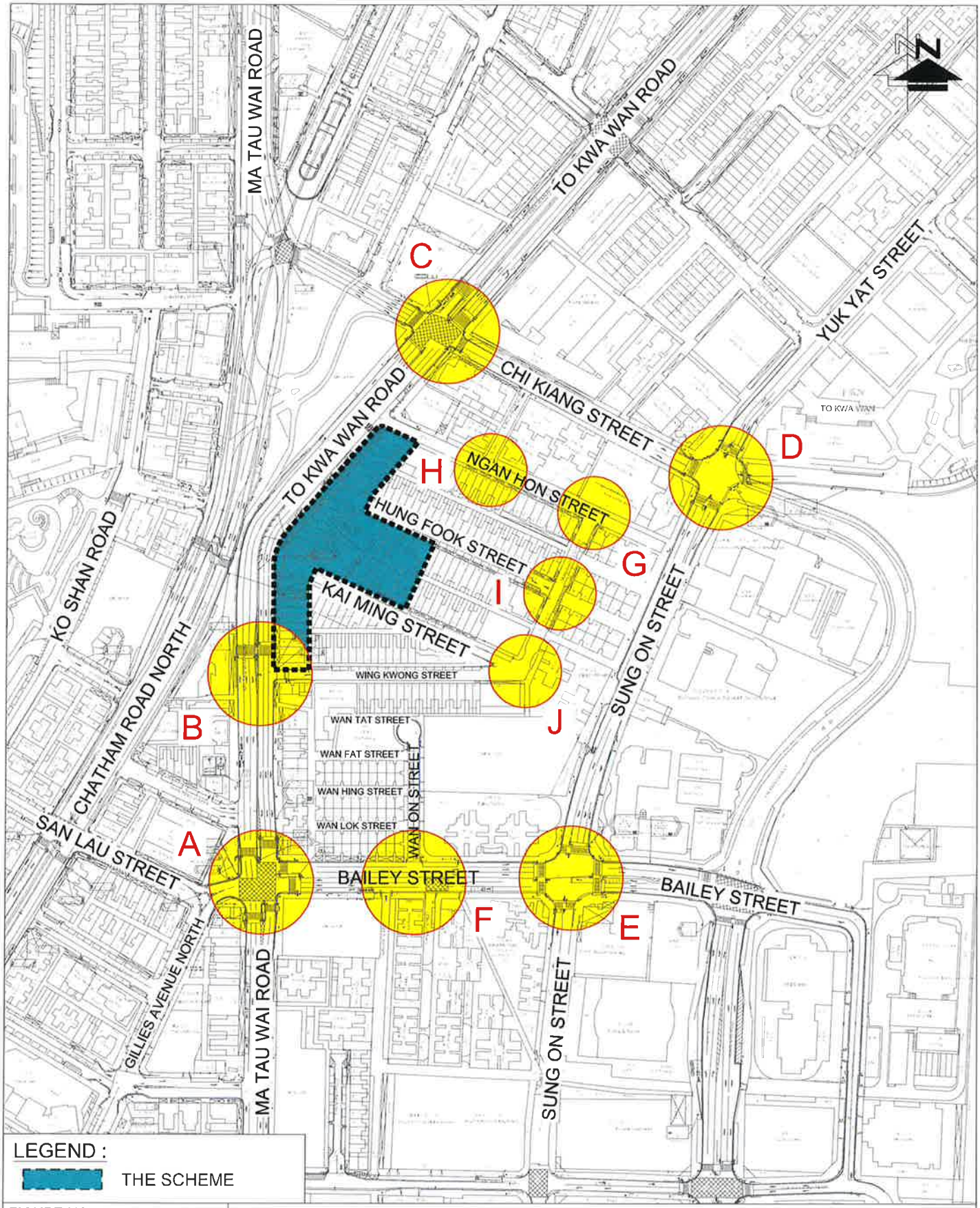


FIGURE NO.: 2.4	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: LOCATION OF NEARBY PUBLIC TRANSPORT SERVICES
SCALE: 1 : 6000 @ A4	DATE: 29 DEC 2020
	CTA Consultants Limited 志達顧問有限公司



LEGEND :

THE SCHEME

FIGURE NO.: 3.1	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: KEY JUNCTION
SCALE: 1 : 3000 @ A4	DATE: 18 DEC 2020

CTA Consultants Limited 志達顧問有限公司

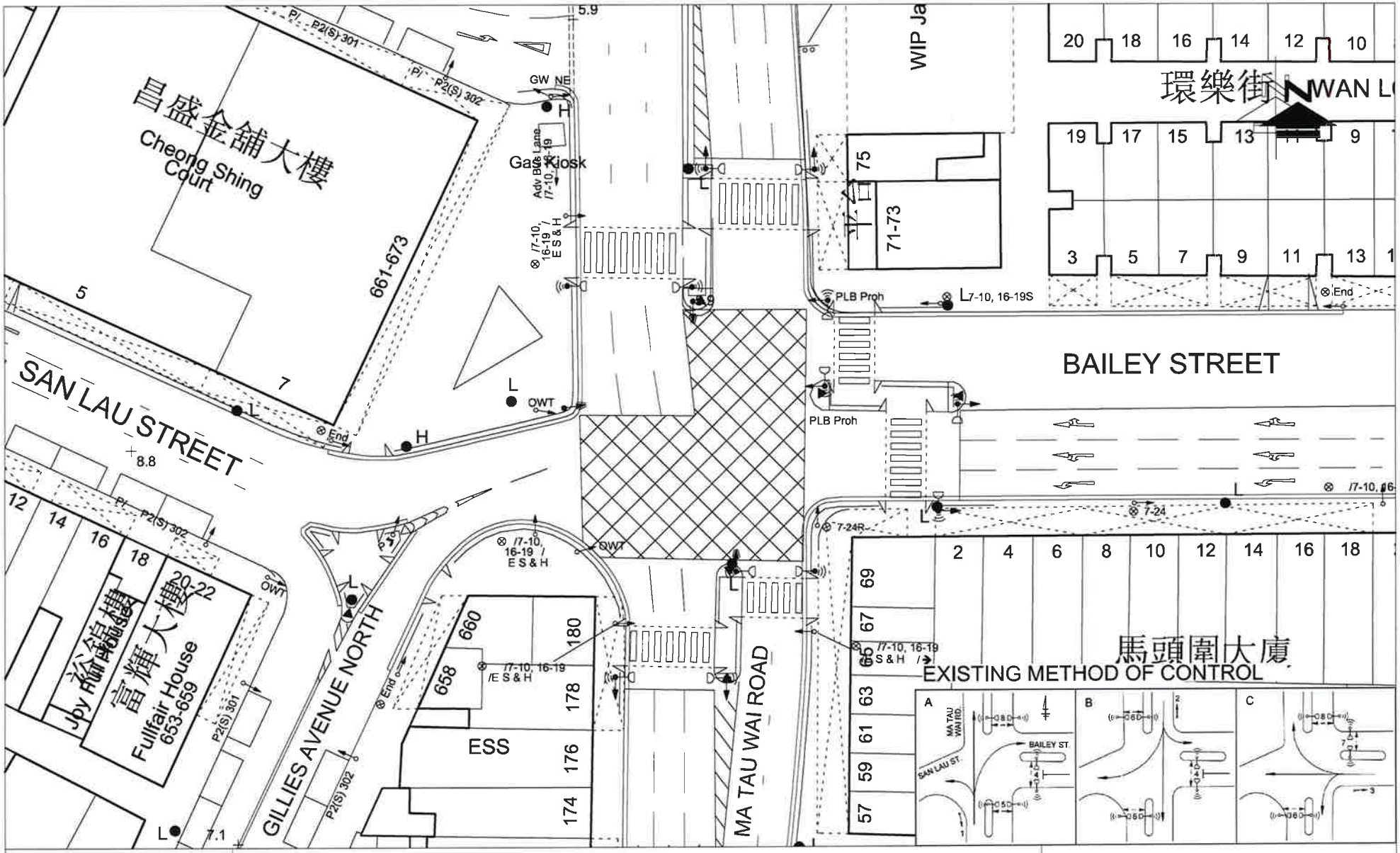


FIGURE NO.: 3.2	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)	
PROJECT NO.: 19044HK-01	DRAWING TITLE: EXISTING JUNCTION LAYOUT OF MA TAU WAI ROAD / BAILEY STREET (A)	CTA Consultants Limited 志達顧問有限公司
SCALE: 1 : 500 @A4	DATE: 18 DEC 2020	

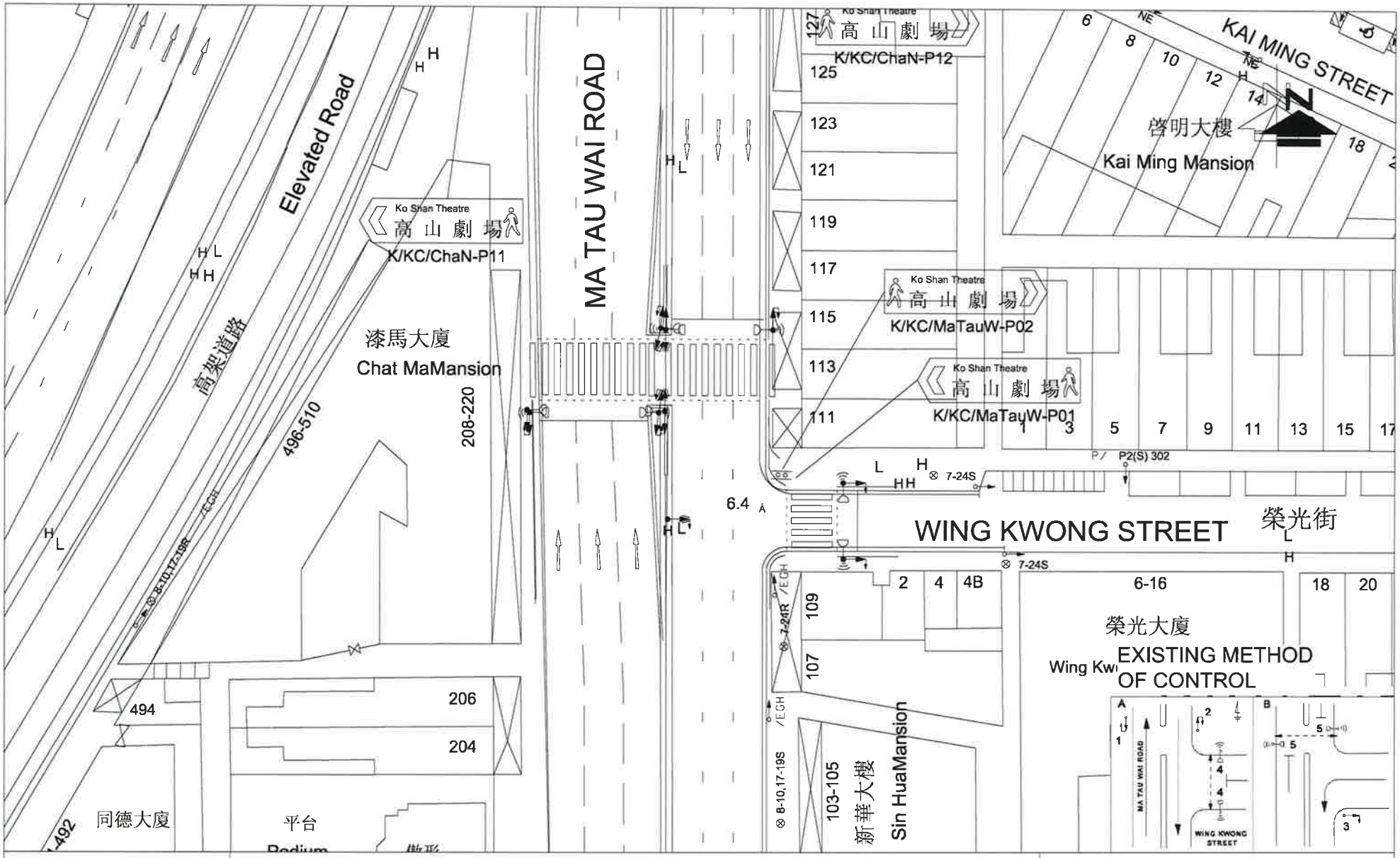


FIGURE NO.: 3.3	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: EXISTING JUNCTION LAYOUT OF MA TAU WAI ROAD / WING KWONG STREET (B)
SCALE: 1 : 500 @A4	DATE: 18 DEC 2020

CTA Consultants Limited
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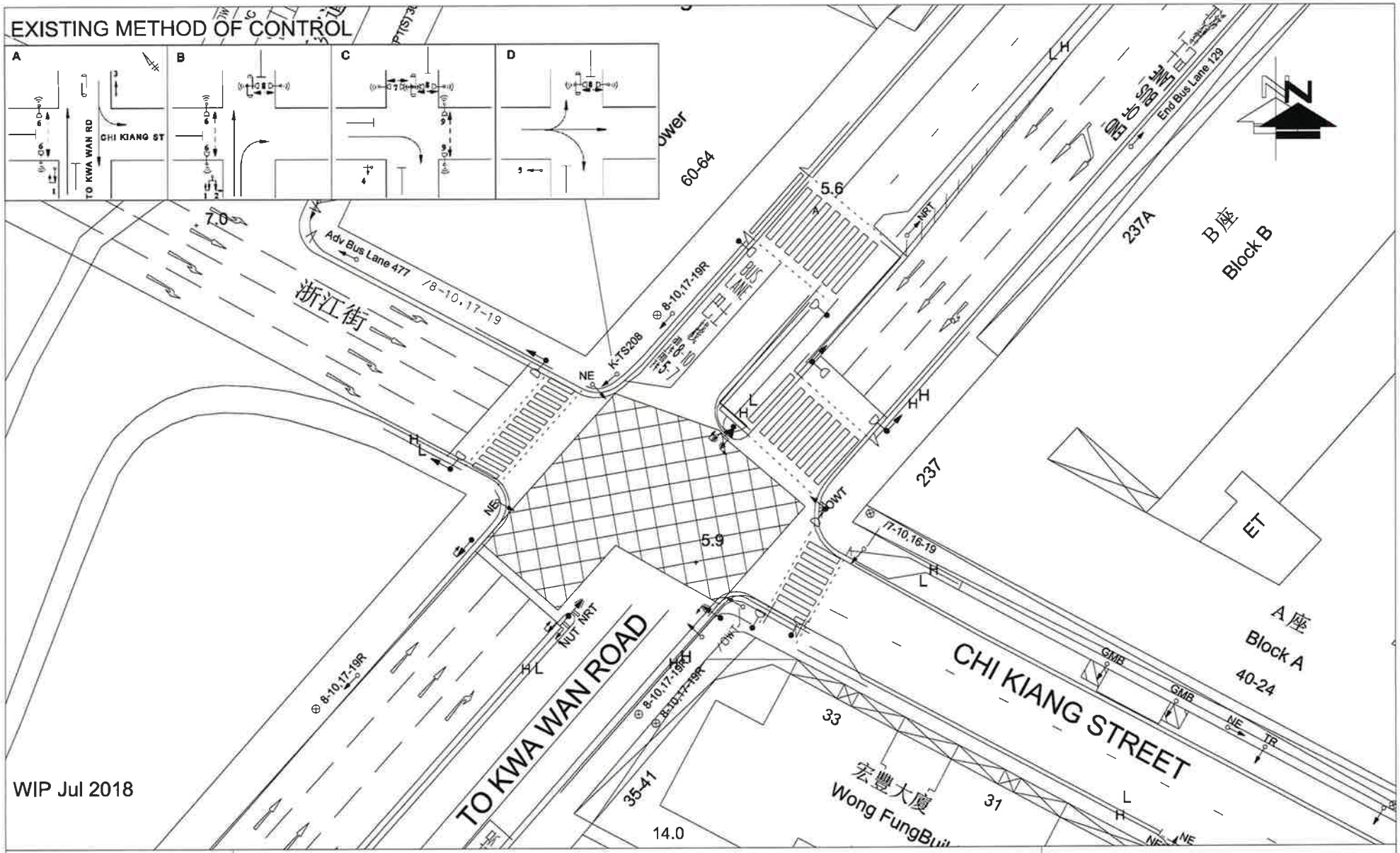

FIGURE NO.: 3.4		PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)	CTA Consultants Limited 志達顧問有限公司
PROJECT NO.: 19044HK-01		DRAWING TITLE: EXISTING JUNCTION LAYOUT OF TO KWA WAN ROAD / CHI KIANG STREET (C)	
SCALE: 1 : 500 @A4	DATE: 18 DEC 2020		

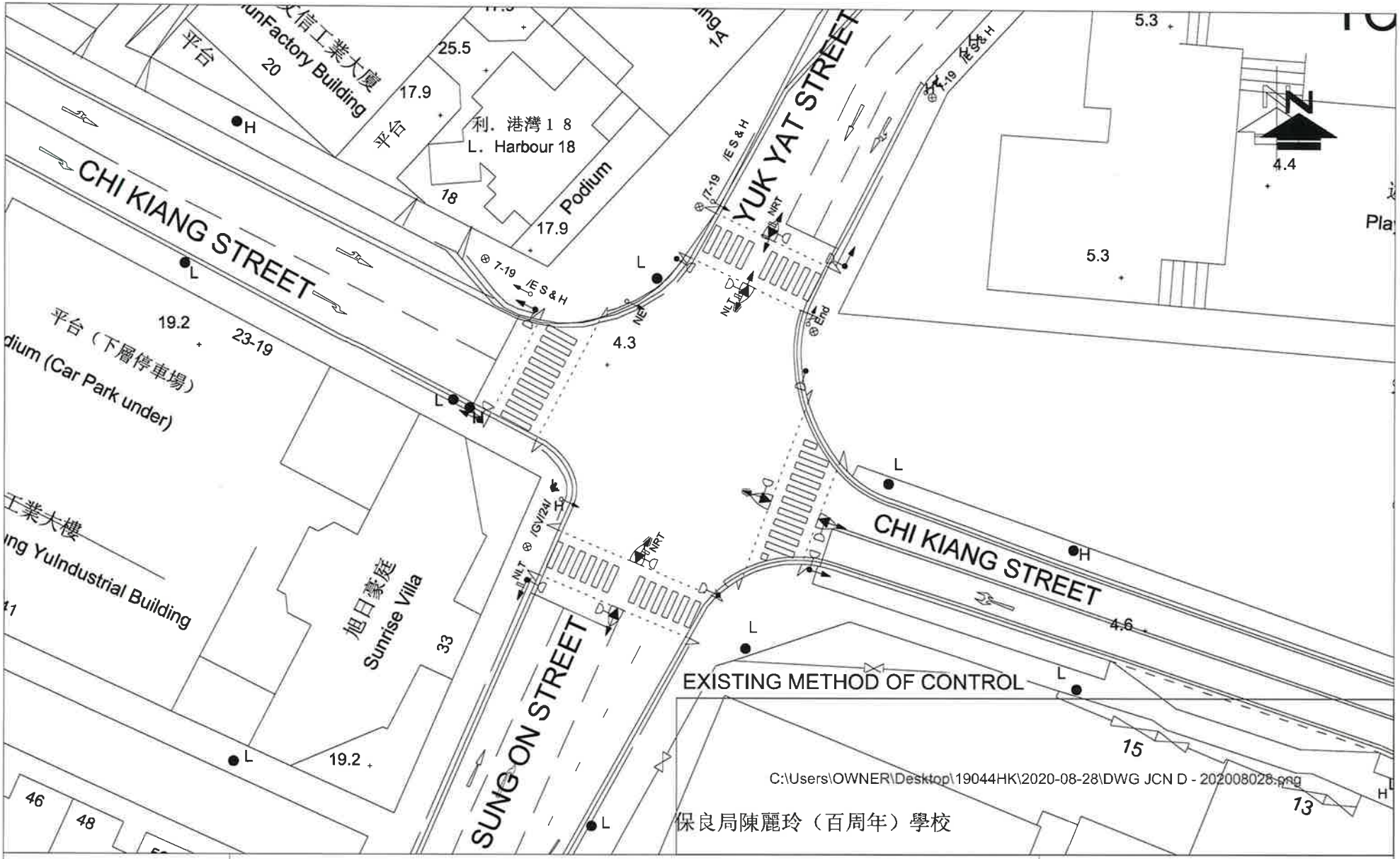

FIGURE NO.: 3.5	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: EXISTING JUNCTION LAYOUT OF SUNG ON STREET / YUK YAT STREET / CHI KIANG STREET (D)
SCALE: 1 : 500 @A4	DATE: 18 DEC 2020

CTA Consultants Limited
志達顧問有限公司

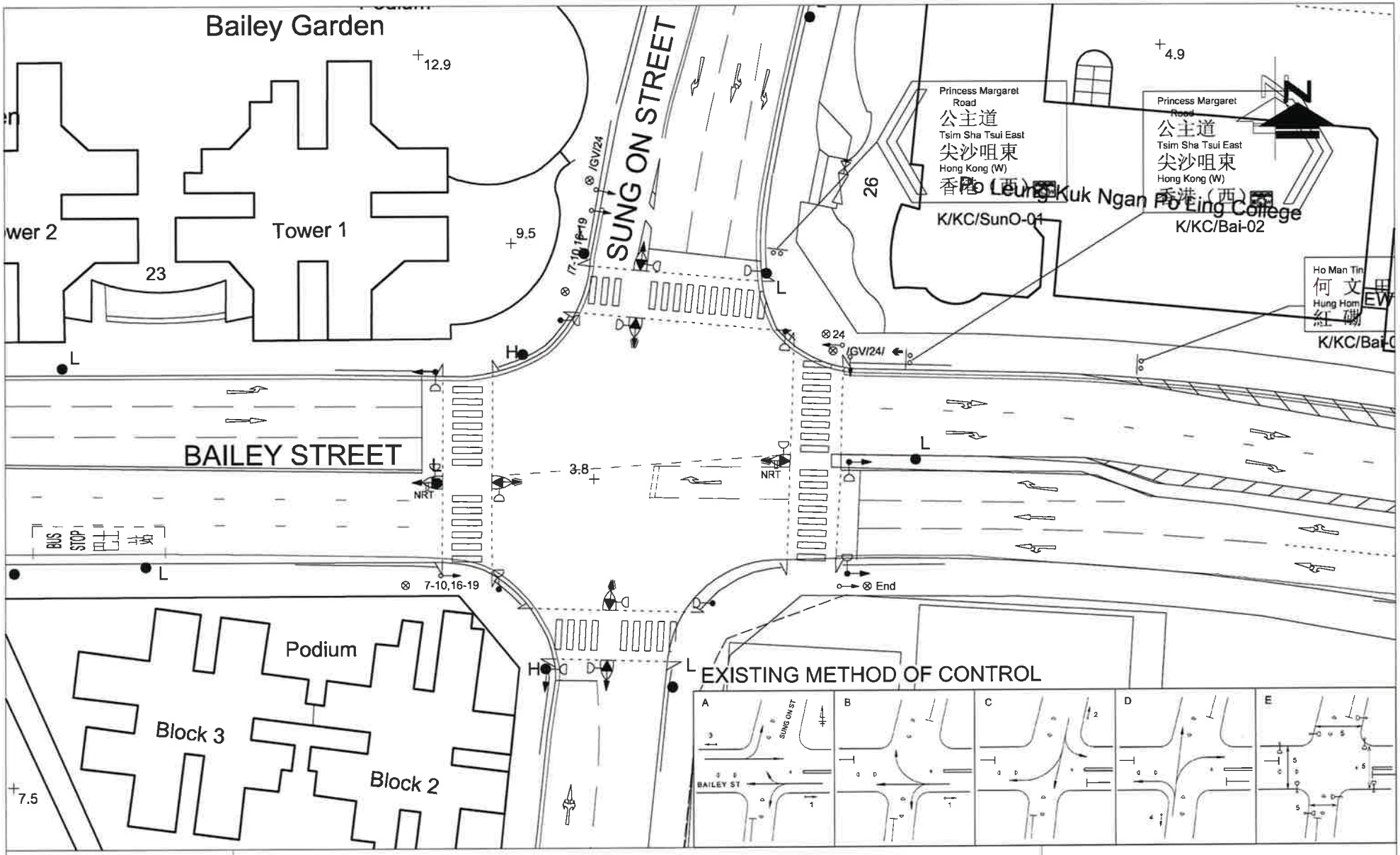

FIGURE NO.: 3.6	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: EXISTING JUNCTION LAYOUT OF BAILEY STREET / SUNG ON STREET (E)
SCALE: 1 : 500 @A4	DATE: 18 DEC 2020

CTA Consultants Limited
志達顧問有限公司

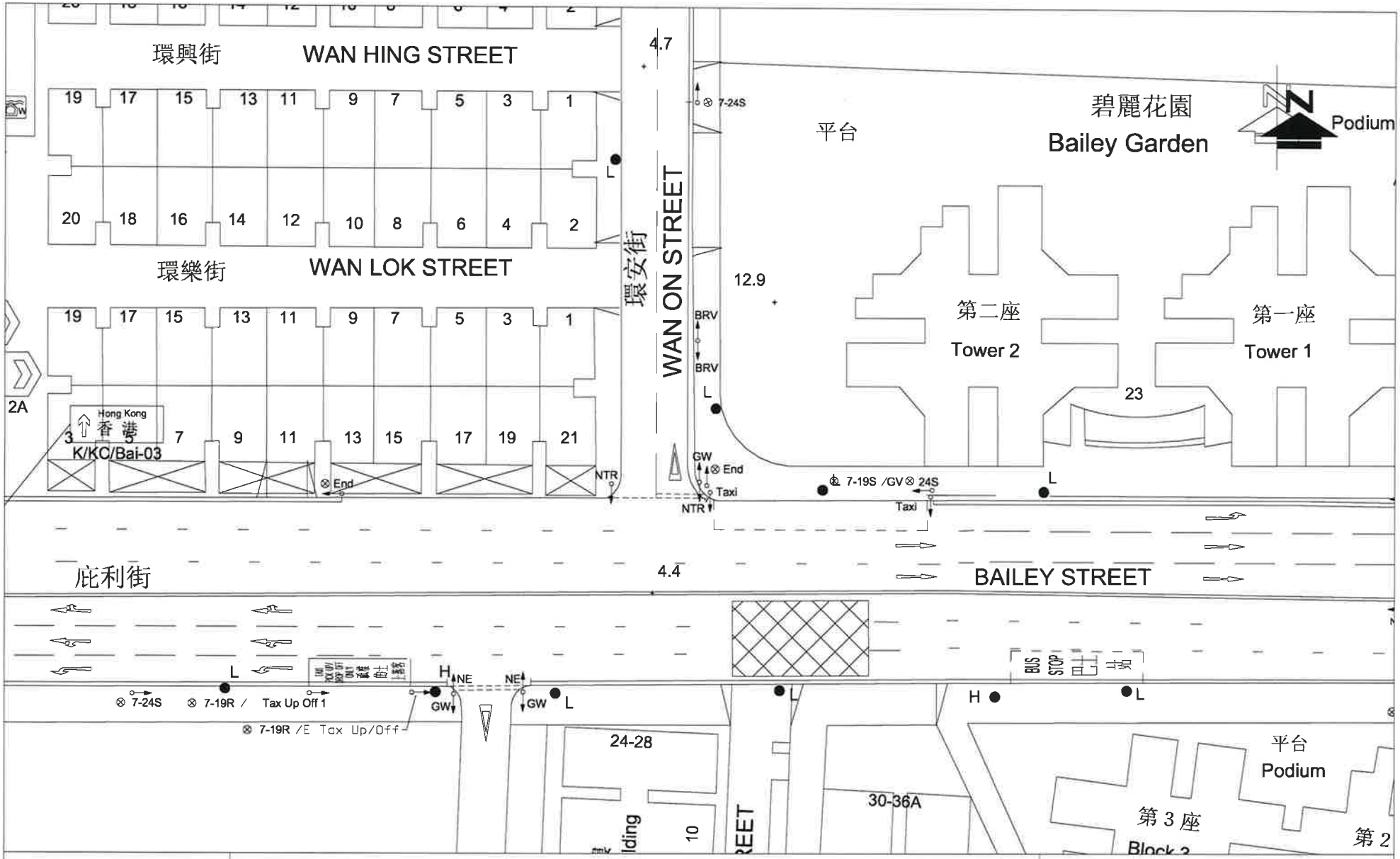

FIGURE NO.: 3.7	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: EXISTING JUNCTION LAYOUT OF BAILEY STREET / WAN ON STREET (F)
SCALE: 1 : 500 @A4	DATE: 18 DEC 2020

CTA Consultants Limited
志達顧問有限公司

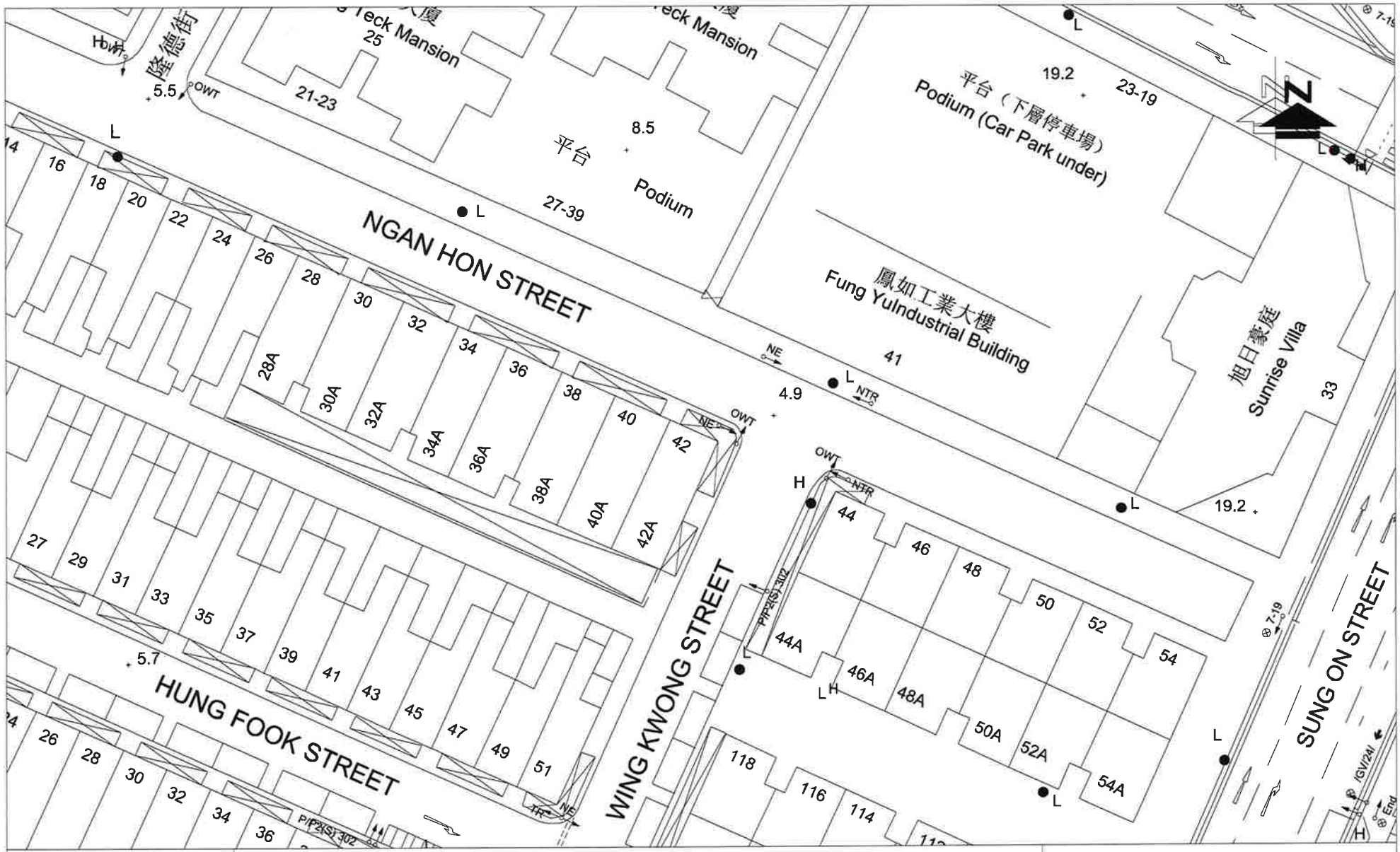

FIGURE NO.: 3.8	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: EXISTING JUNCTION LAYOUT OF NGAN HON STREET / WING KWONG STREET (G)
SCALE: 1 : 500 @A4	DATE: 18 DEC 2020

CTA Consultants Limited
志達顧問有限公司

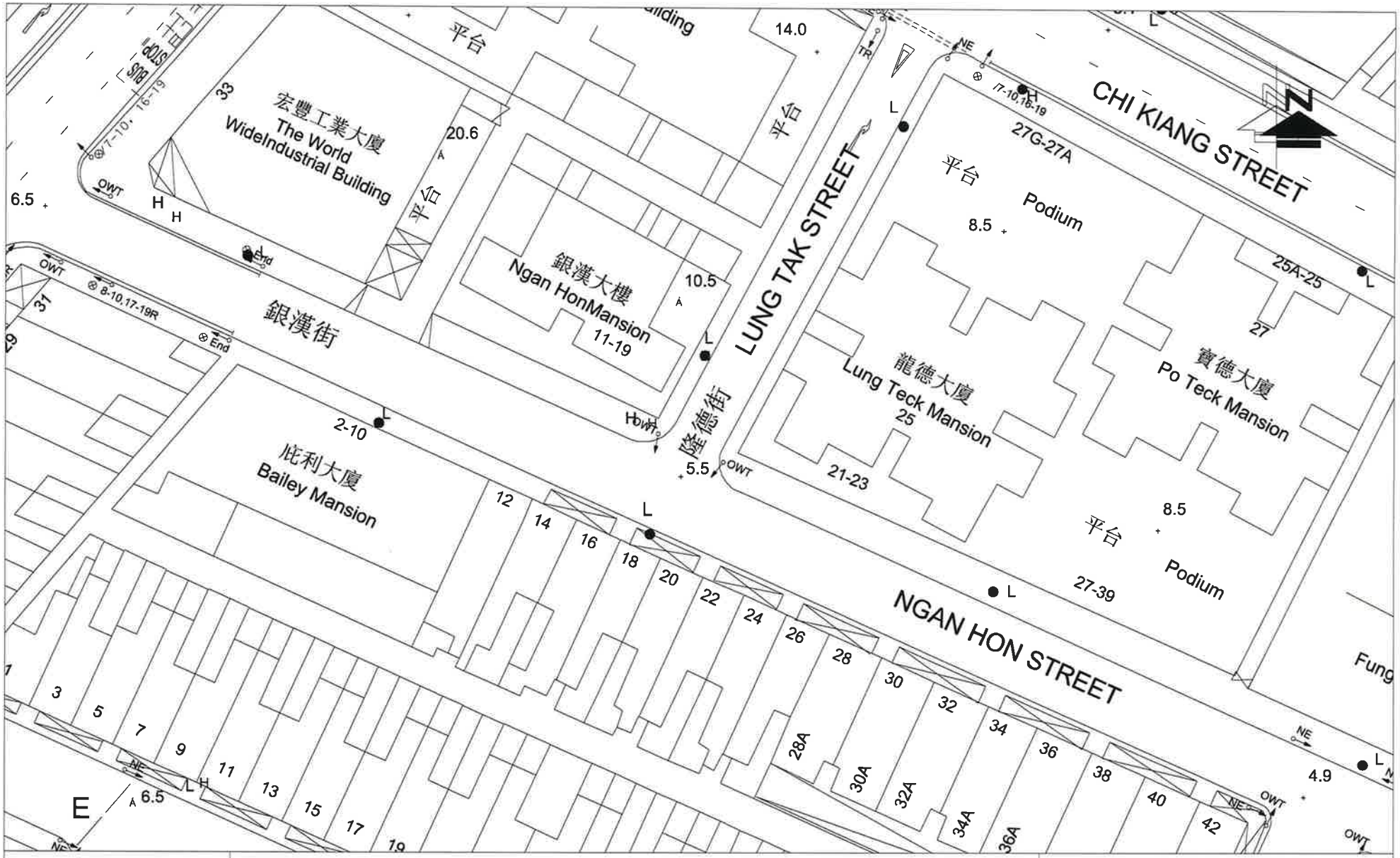

FIGURE NO.: 3.9	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)	CTA Consultants Limited 志達顧問有限公司
PROJECT NO.: 19044HK-01	DRAWING TITLE: EXISTING JUNCTION LAYOUT OF NGAN HON STREET / LUNG TAK STREET (H)	
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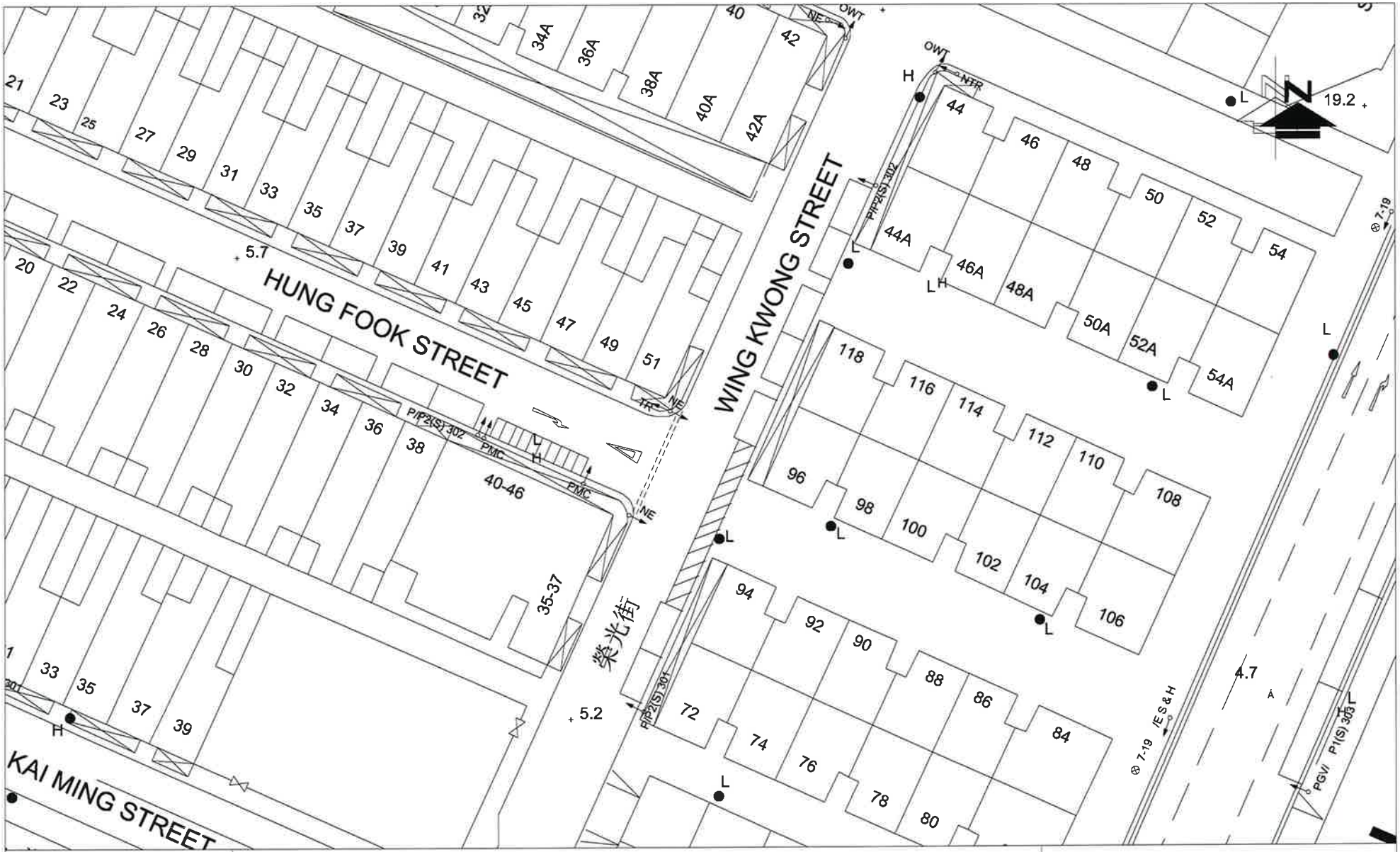

FIGURE NO.: 3.10	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)	CTA Consultants Limited 志達顧問有限公司
PROJECT NO.: 19044HK-01	DRAWING TITLE: EXISTING JUNCTION LAYOUT OF WING KWONG STREET / HUNG FOOK STREET (I)	
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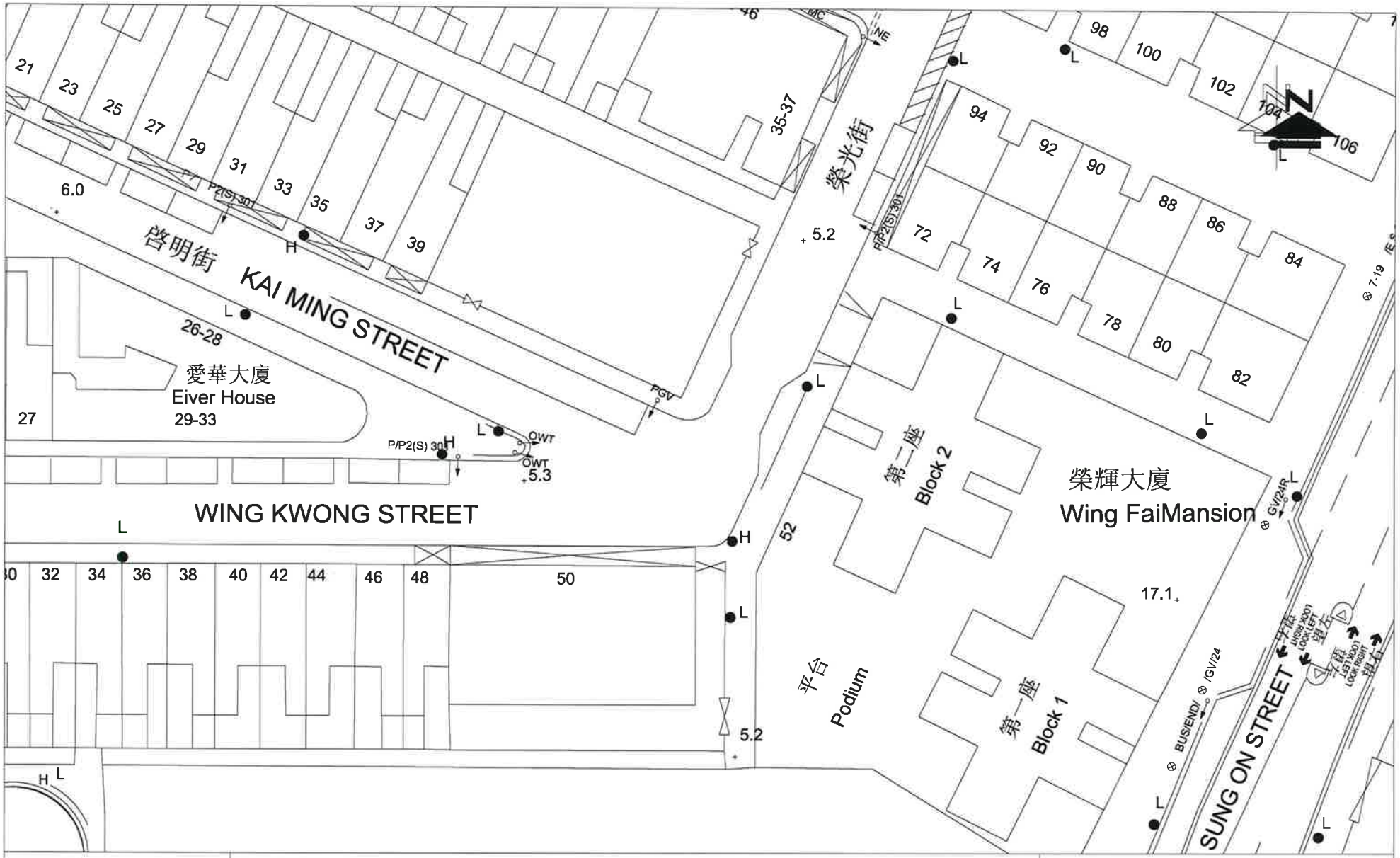
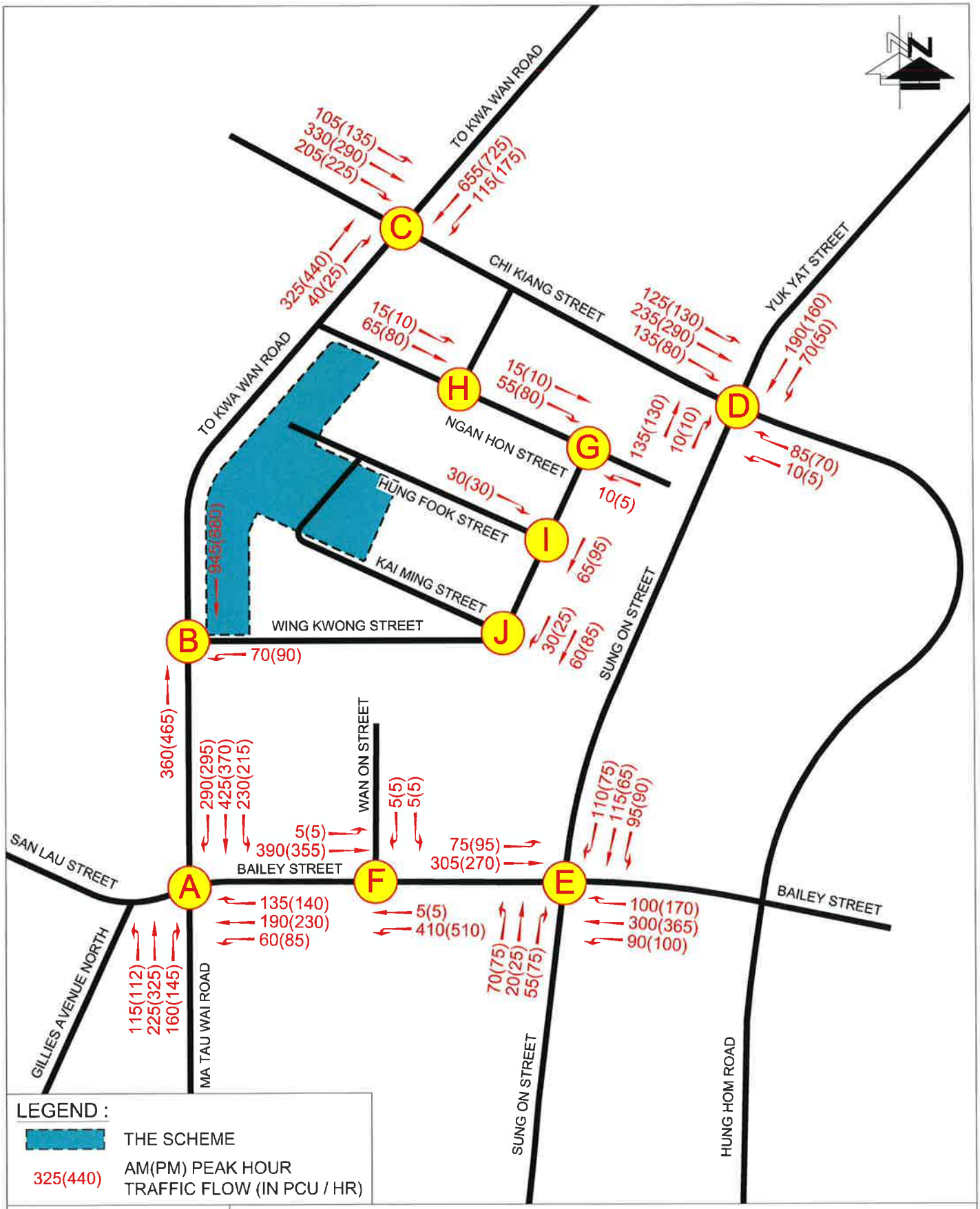


FIGURE NO.: 3.11	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: EXISTING JUNCTION LAYOUT OF WING KWONG STREET KAI MING STREET (J)
SCALE: 1 : 500 @A4	DATE: 18 DEC 2020

CTA Consultants Limited
志達顧問有限公司



LEGEND :

THE SCHEME

325(440) AM(PM) PEAK HOUR TRAFFIC FLOW (IN PCU / HR)

FIGURE NO.: 3.12	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: 2020 OBSERVED TRAFFIC FLOWS
SCALE: 1 : 2500 @ A4	DATE: 18 DEC 2020

CTA Consultants Limited 志達顧問有限公司

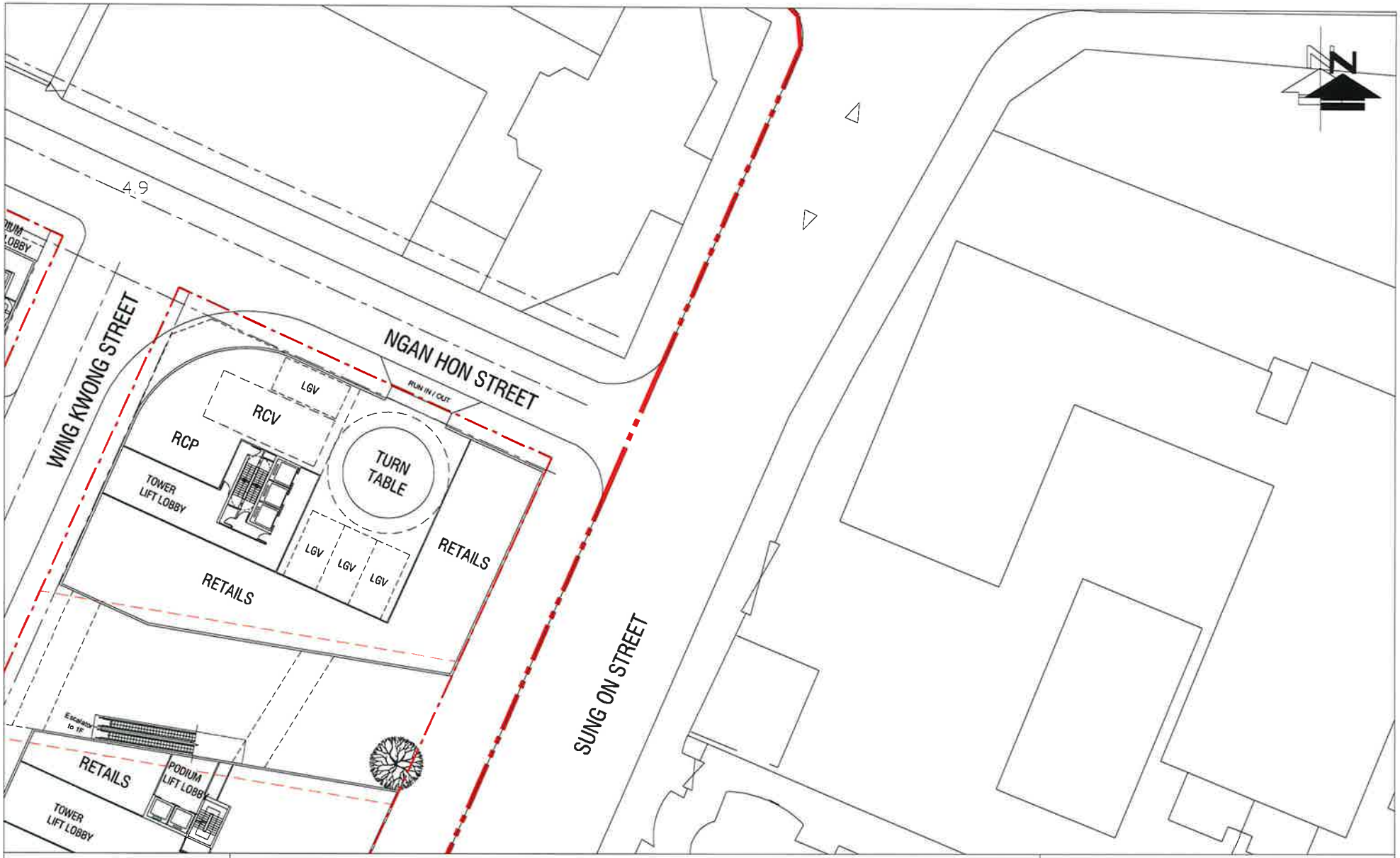


FIGURE NO.: 4.1	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: FUTURE JUNCTION LAYOUT OF SUNG ON STREET / NGAN HON STREET (K)
SCALE: 1 : 500 @ A4	DATE: 18 DEC 2020

CTA Consultants Limited
志達顧問有限公司

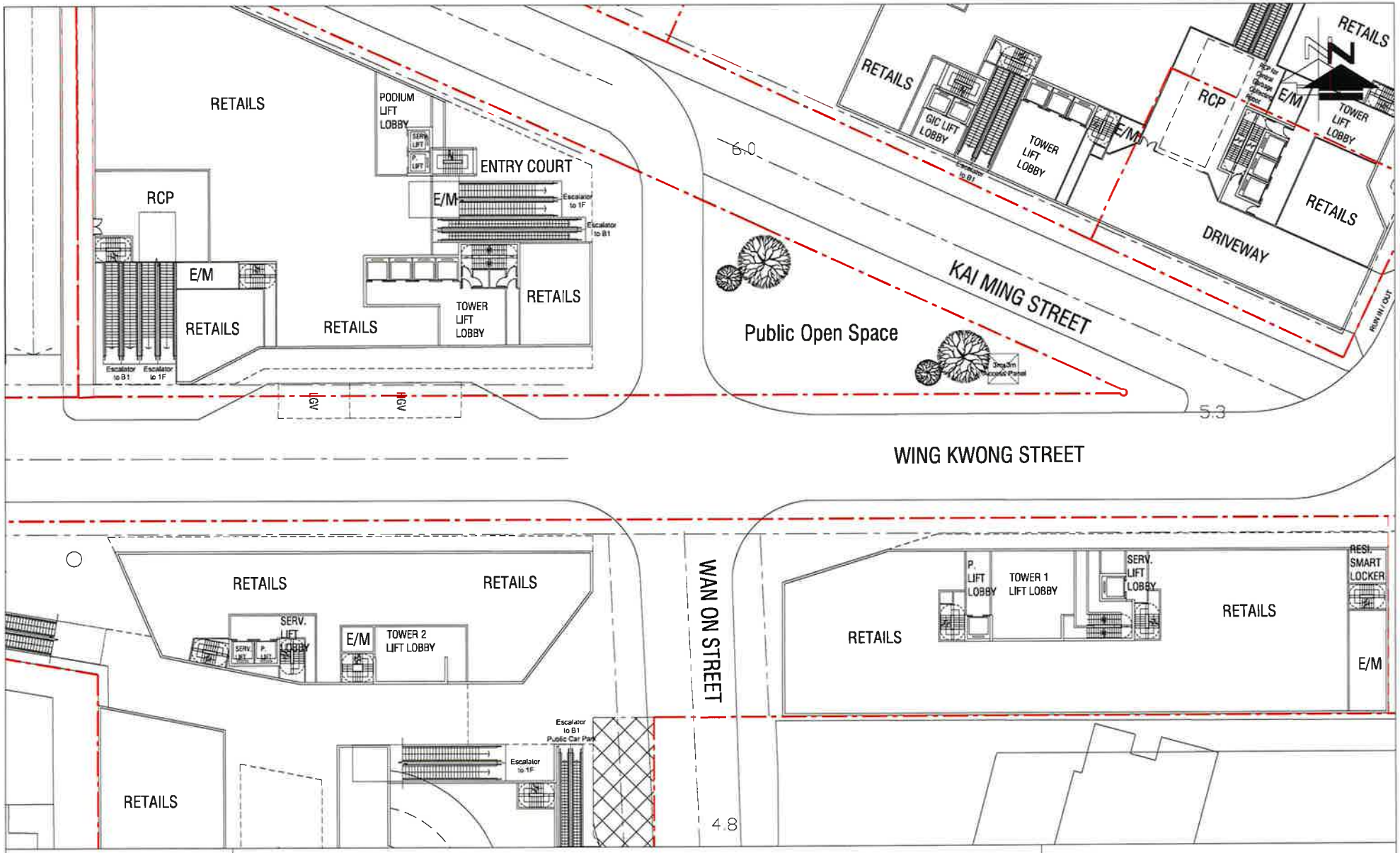


FIGURE NO.: 4.2	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: FUTURE JUNCTION LAYOUT OF WING KWONG STREET / WAN ON STREET / KAI MING STREET (L)
SCALE: 1 : 500 @ A4	DATE: 18 DEC 2020

CTA Consultants Limited
志達顧問有限公司

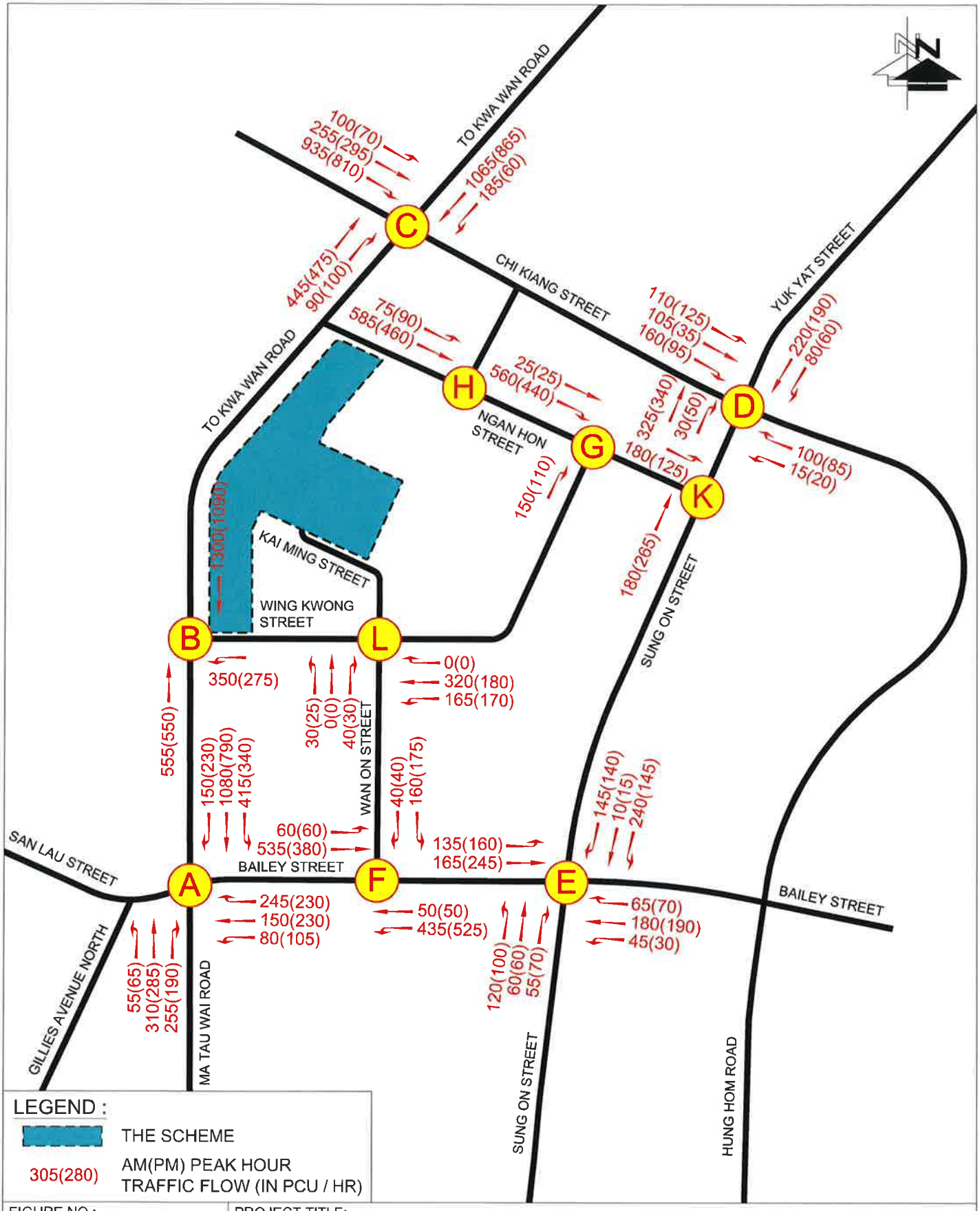


FIGURE NO.: 4.3	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: 2035 REFERENCE TRAFFIC FLOWS
SCALE: 1 : 2500 @ A4	DATE: 18 DEC 2020

CTA Consultants Limited
志達顧問有限公司

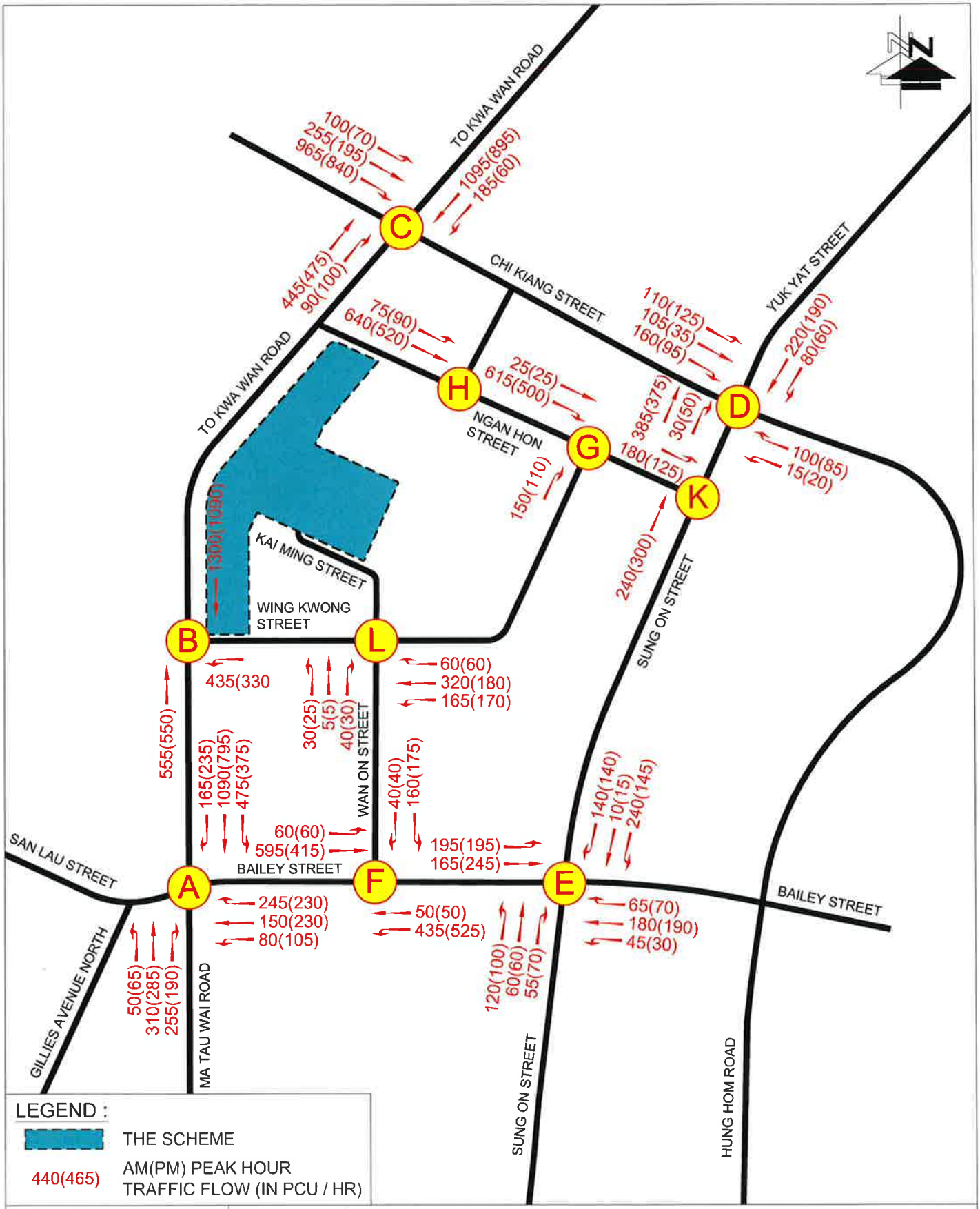


FIGURE NO.: 4.4	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: 2035 DESIGN TRAFFIC FLOWS
SCALE: 1 : 2500 @ A4	DATE: 18 DEC 2020

CTA Consultants Limited
志達顧問有限公司

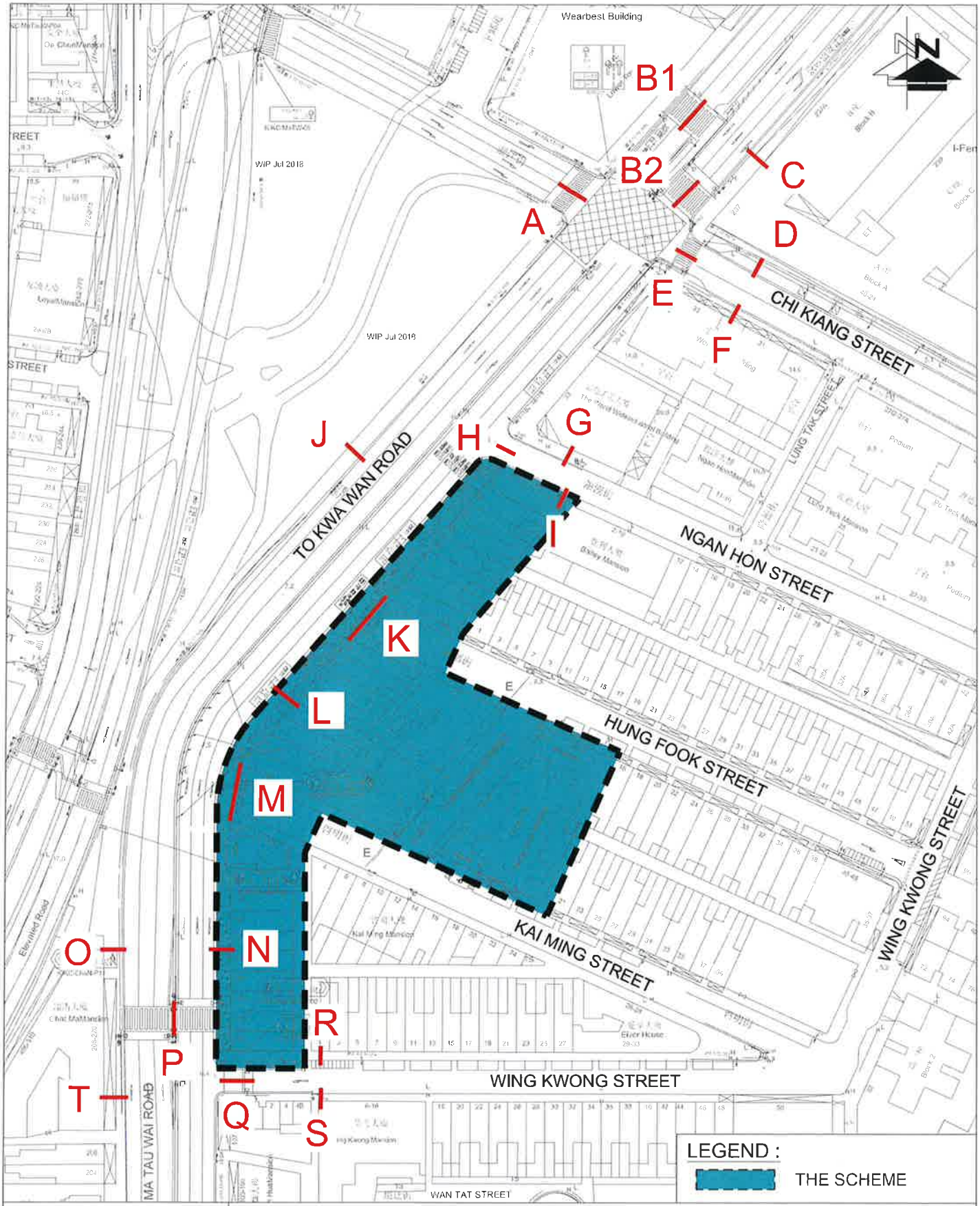


FIGURE NO.: 5.1	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: PEDESTRIAN INDEX
SCALE: 1 : 1200 @ A4	DATE: 18 DEC 2020

CTA Consultants Limited
志達顧問有限公司

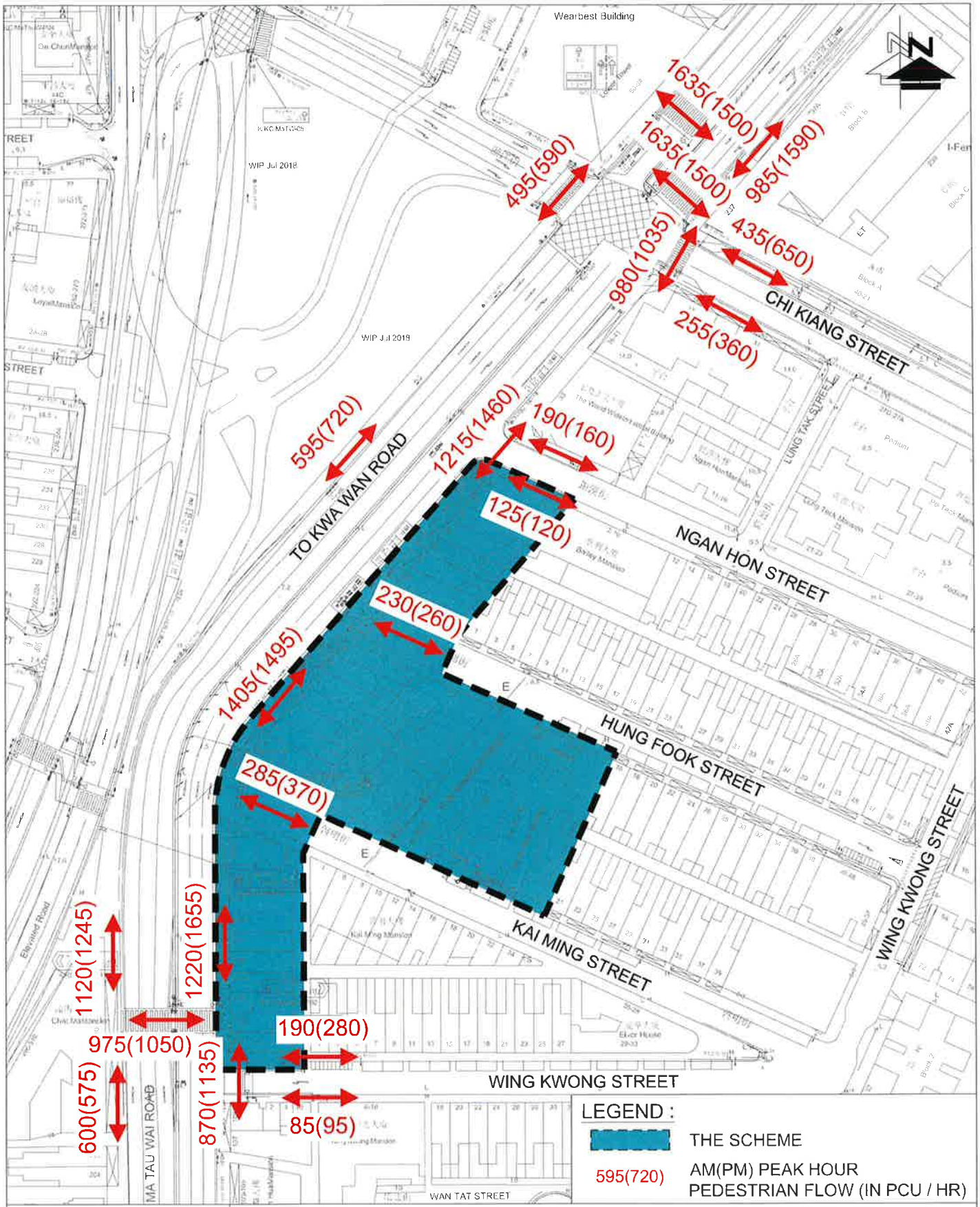


FIGURE NO.: 5.2	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: 2020 OBSERVED PEDESTRIAN FLOW
SCALE: 1 : 1200 @ A4	DATE: 18 DEC 2020

CTA Consultants Limited
志達顧問有限公司

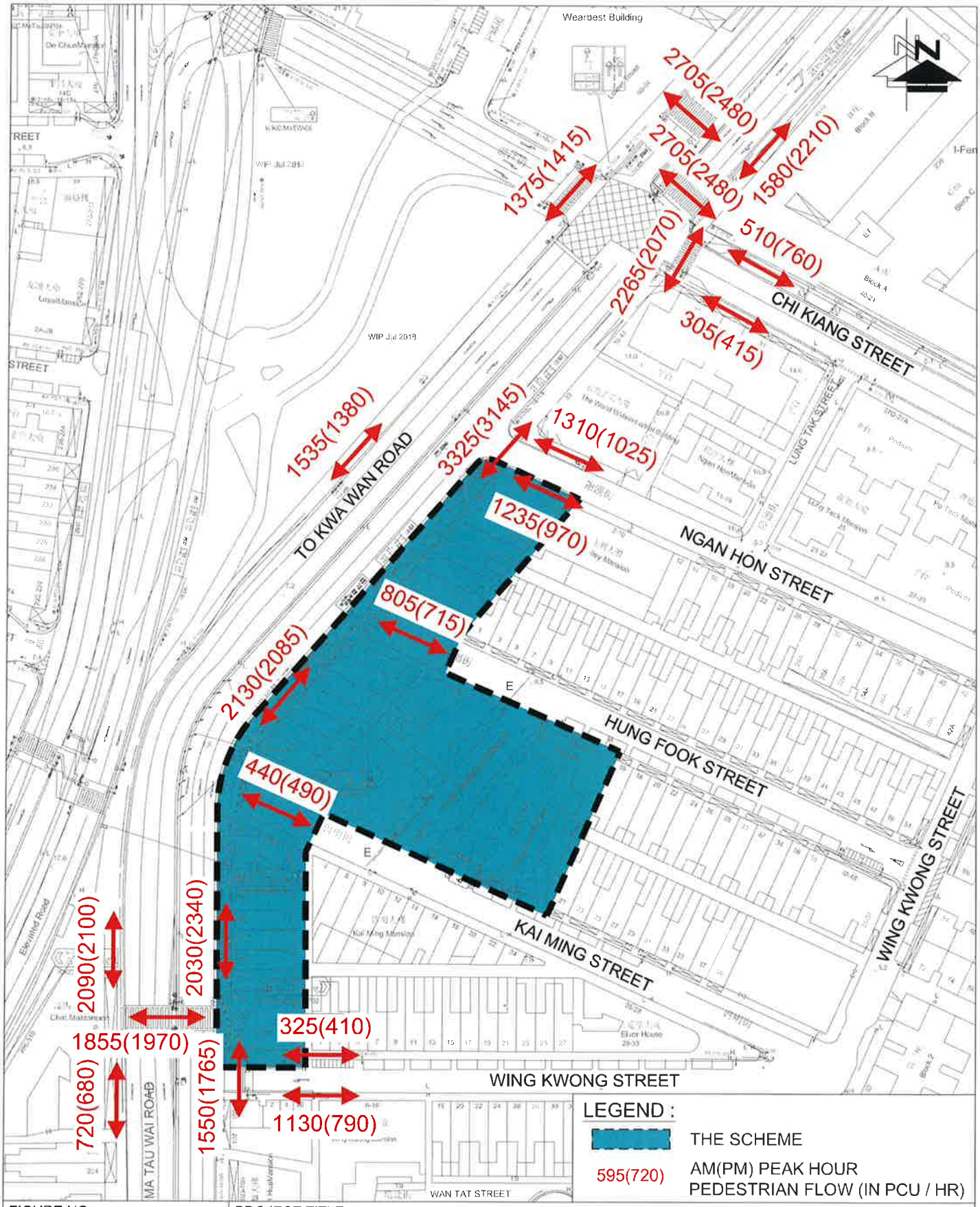


FIGURE NO.: 5.3	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: 2035 REFERENCE PEDESTRIAN FLOW
SCALE: 1 : 1200 @ A4	DATE: 18 DEC 2020

CTA Consultants Limited
志達顧問有限公司

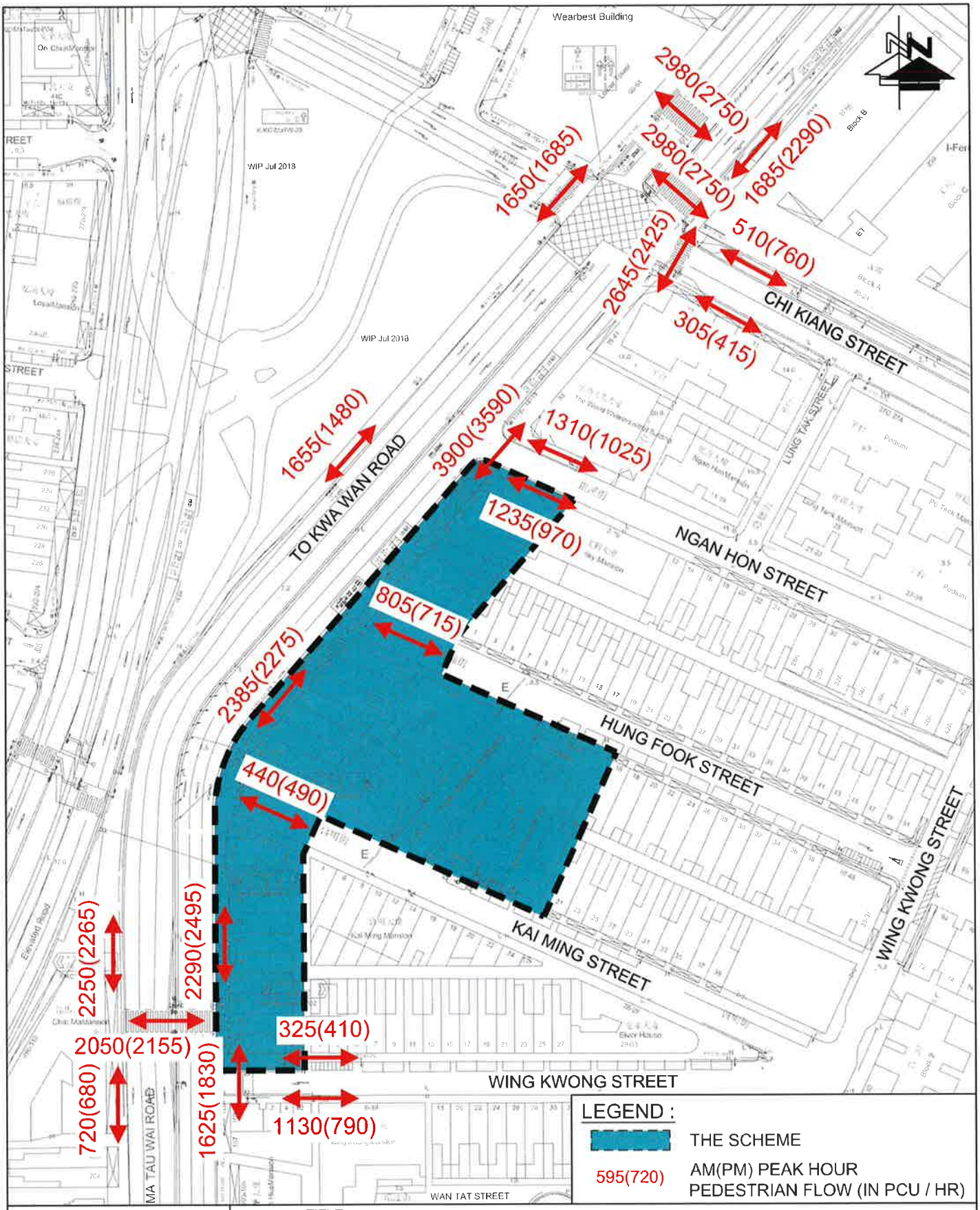


FIGURE NO.: 5.4	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: 2035 DESIGN PEDESTRIAN FLOW (WITHOUT PROPOSED FOOTBRIDGE)
SCALE: 1 : 1200 @ A4	DATE: 18 DEC 2020

CTA Consultants Limited
志達顧問有限公司

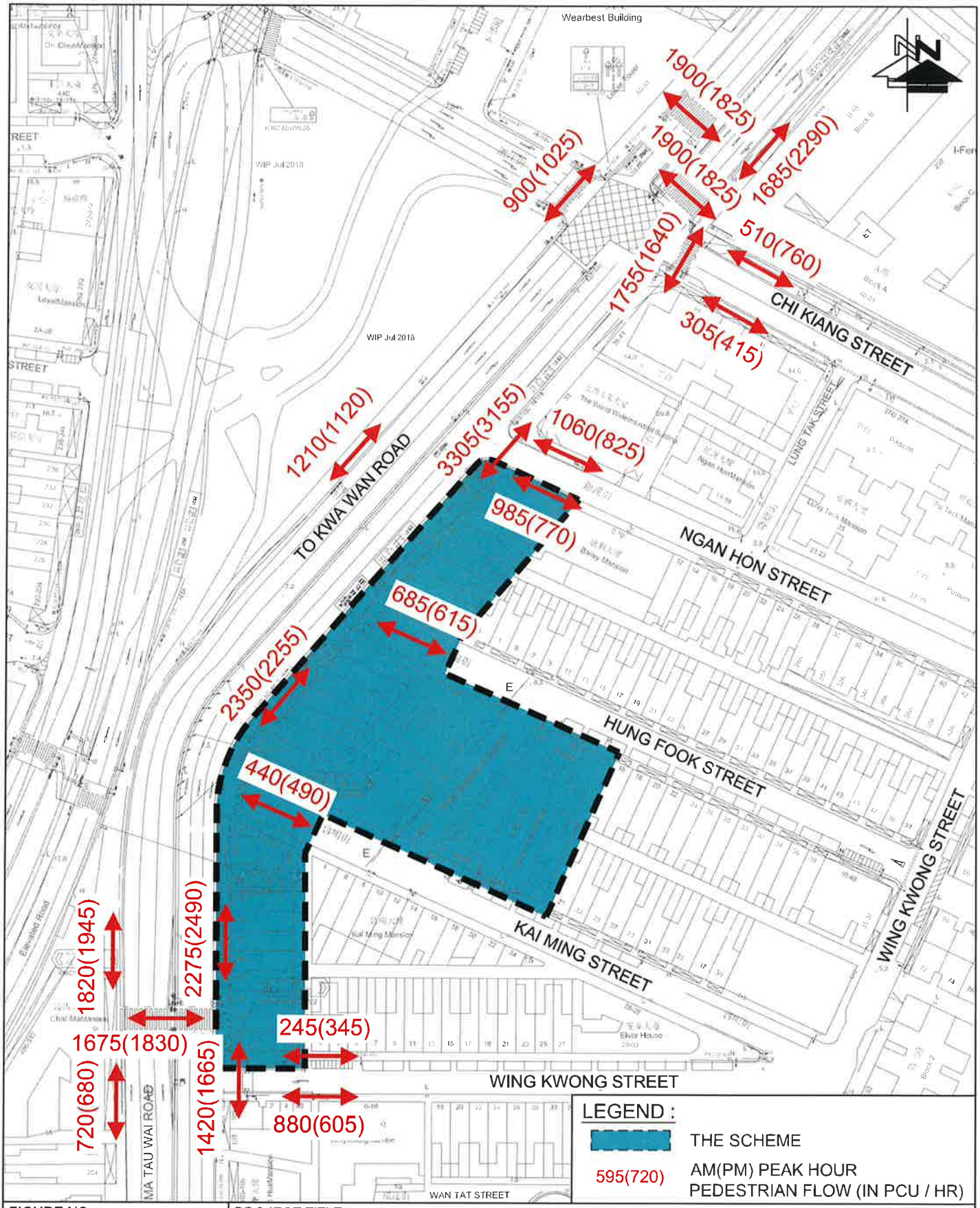


FIGURE NO.: 5.5	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: 2035 DESIGN PEDESTRIAN FLOW (WITH PROPOSED FOOTBRIDGE)
SCALE: 1 : 1200 @ A4	DATE: 18 DEC 2020

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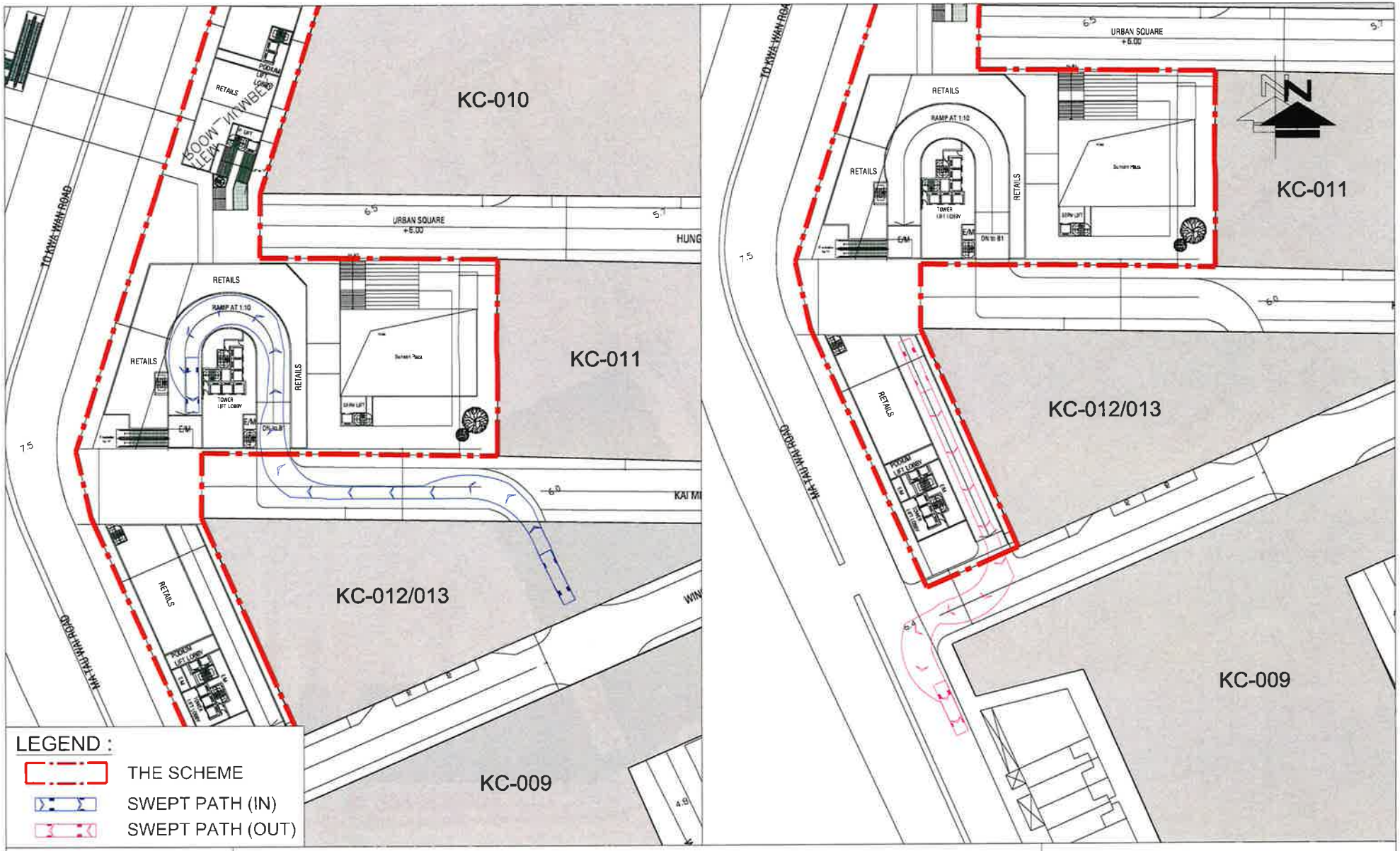

FIGURE NO.: SP-01	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: SWEPT PATH ANALYSIS OF 11m HGV - G/F
SCALE: 1 : 500 @A4	DATE: 28 DEC 2020

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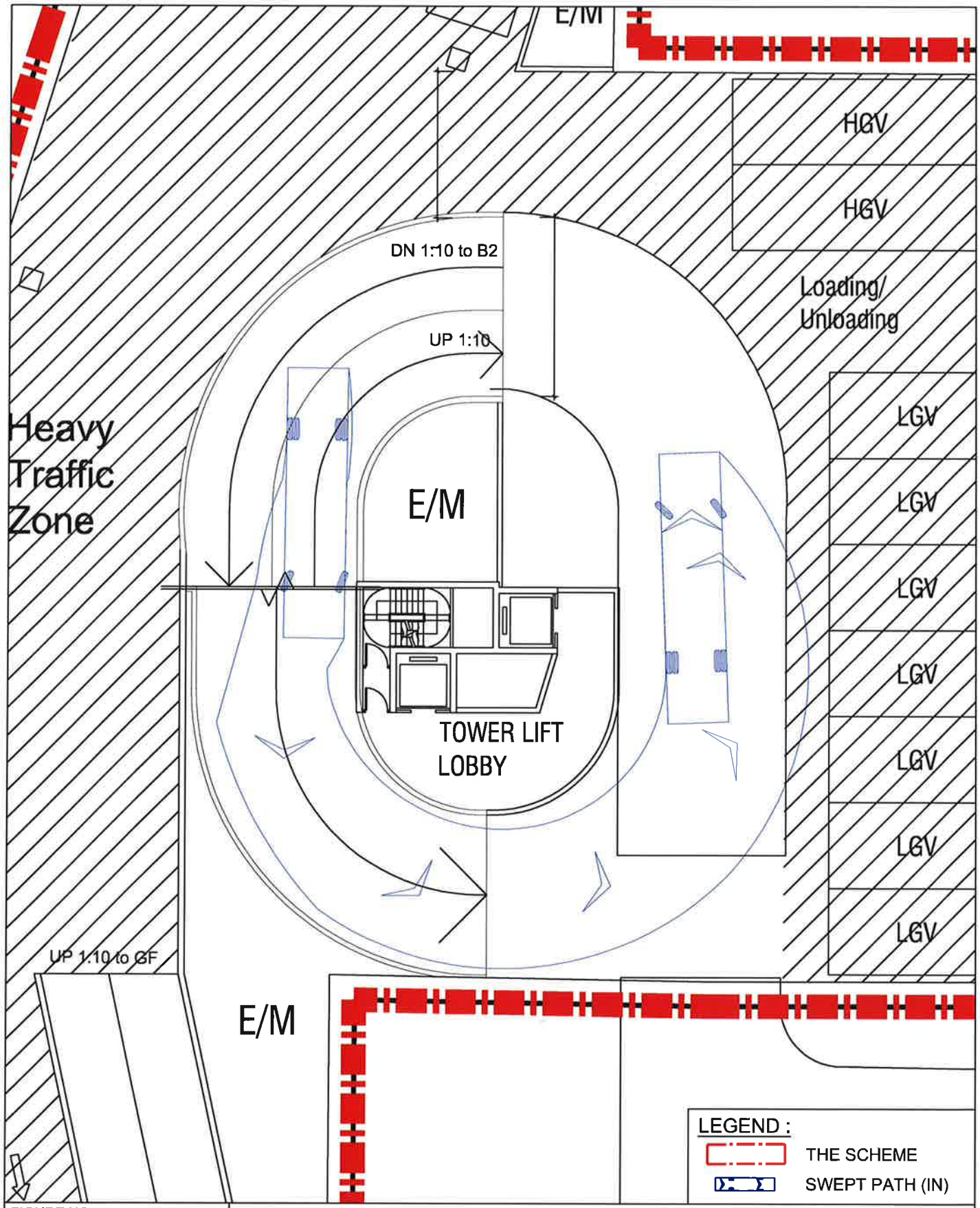

FIGURE NO.: SP-02	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: SWEPT PATH ANALYSIS OF 11m HGV - B1
SCALE: 1 : 200 @A4 / DATE: 22 FEB 2021	CTA Consultants Limited 志達顧問有限公司

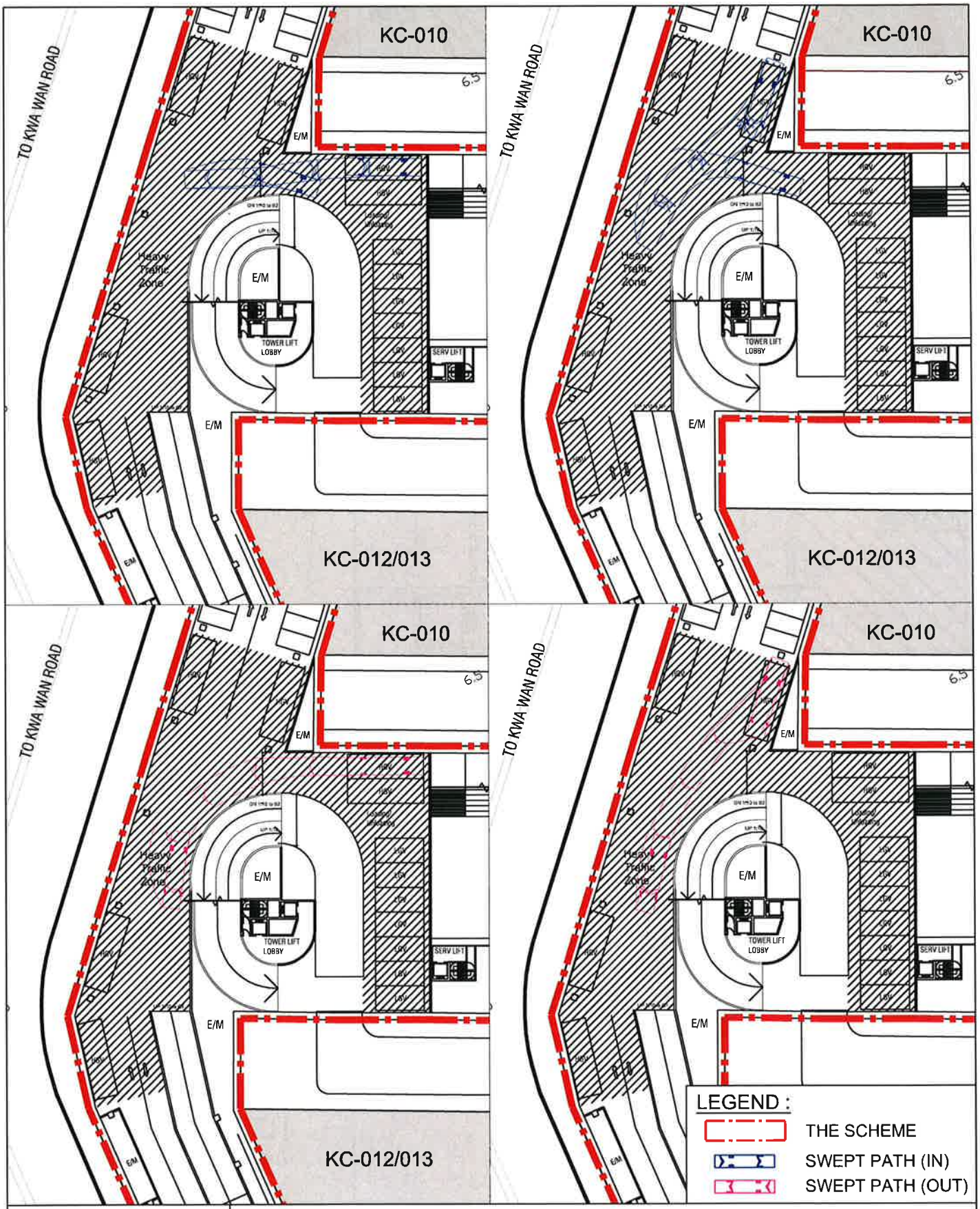

FIGURE NO.: SP-03	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: SWEPT PATH ANALYSIS OF 11m HGV - B1
SCALE: 1 : 700 @A4 / DATE: 22 FEB 2021	CTA Consultants Limited 志達顧問有限公司

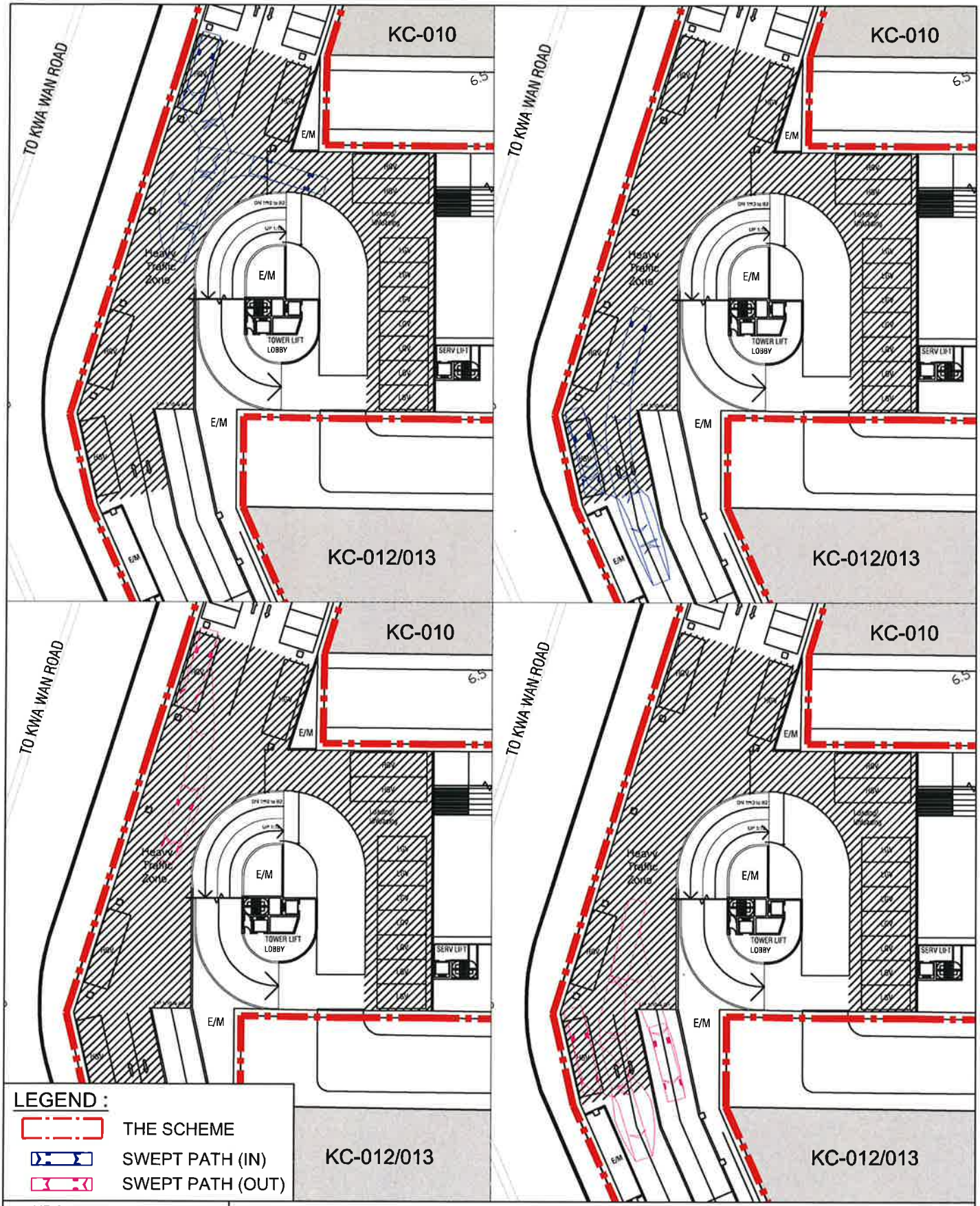

FIGURE NO.: SP-04	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: SWEPT PATH ANALYSIS OF 11m HGV - B1
SCALE: 1 : 700 @A4	DATE: 23 FEB 2021

CTA Consultants Limited
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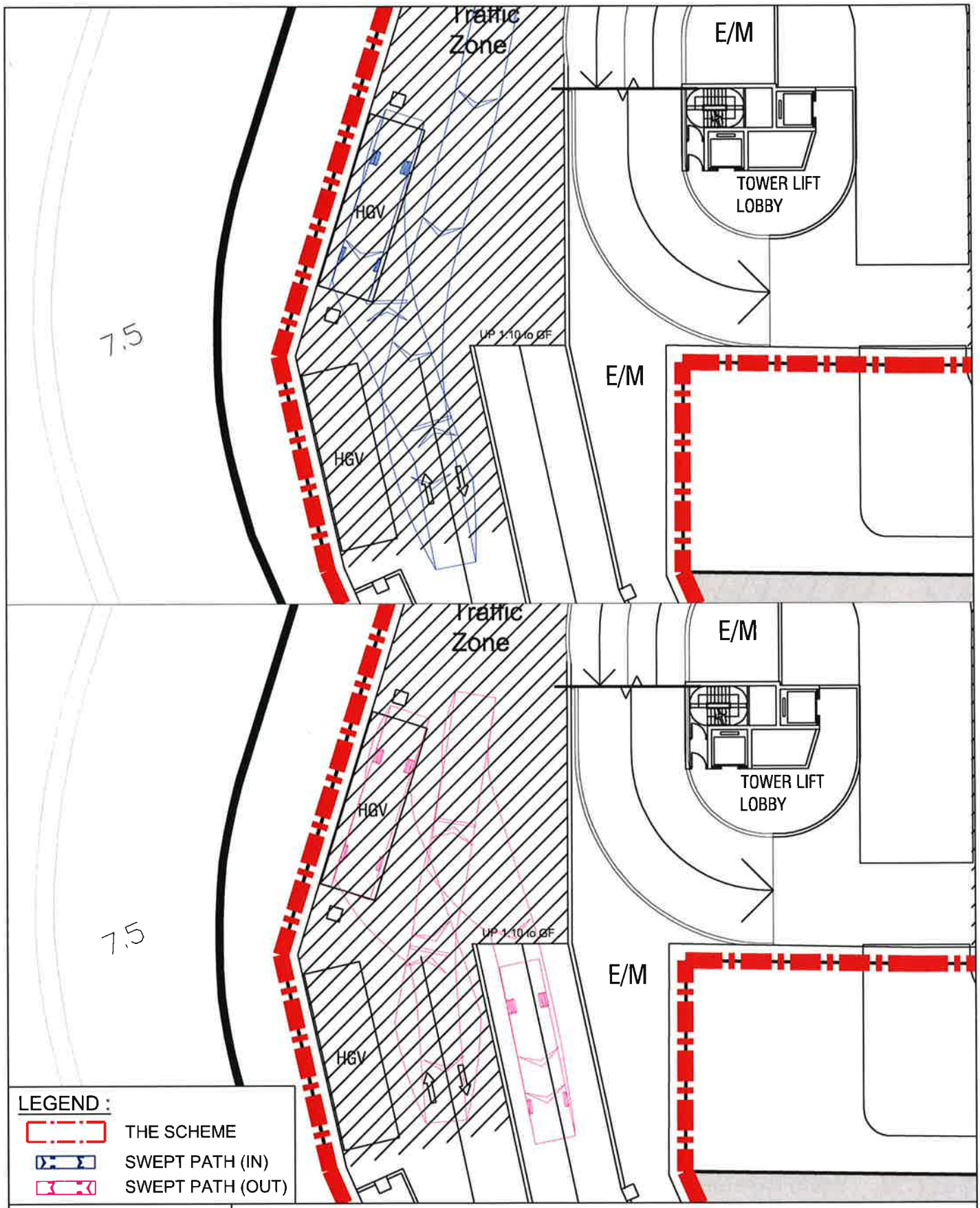


LEGEND :

THE SCHEME

SWEPT PATH (IN)

SWEPT PATH (OUT)

FIGURE NO.: SP-05	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: SWEPT PATH ANALYSIS OF 11m HGV - B1
SCALE: 1 : 300 @A4 / DATE: 22 FEB 2020	CTA Consultants Limited 志達顧問有限公司

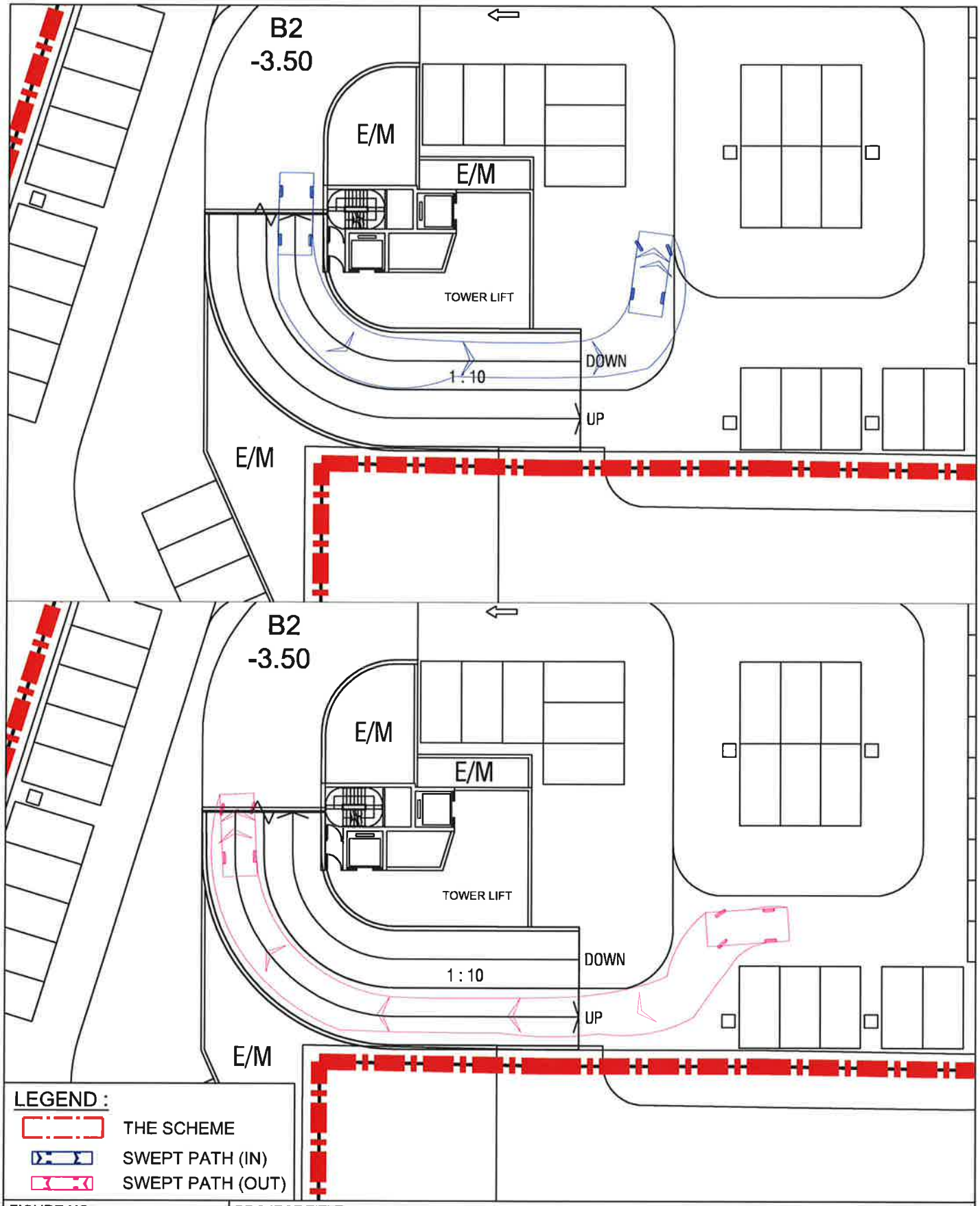


FIGURE NO.: SP-06	PROJECT TITLE: To Kwa Wan Road/ Wing Kwong Street Development Scheme (KC-016)
PROJECT NO.: 19044HK-01	DRAWING TITLE: SWEPT PATH ANALYSIS OF PRIVATE CAR - B2
SCALE: 1 : 300 @A4 / DATE: 22 FEB 2021	CTA Consultants Limited 志達顧問有限公司

Appendix I

Junction Calculation Sheets

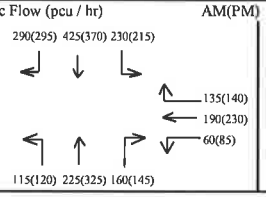
TRAFFIC SIGNALS CALCULATION Job No: 19044HK-01 **CTA Consultants Ltd.**

Junction: (A) Ma Tau Wai Road/ Bailey Street
Description: 2020 Observed Flow

Approach	Direction	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	Nearside 0/1	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Saturation Flow (pcu/hr)	Total Saturation Flow (pcu/hr)	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	Total Revised Saturation Flow (pcu/hr) A.M.	Total Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Ma Tau Wai Road	N		1	A	3.4	15	0	1	74%	66%	1955	6125	1820	1835	5875	5920	155	0.085	0.085	183	0.100	0.100
	N		1	A	3.3	0	0	0	0%	0%	2085	0	2085	2085	0	0	177	0.085		208	0.100	
	N		1	A	3.3	0	25	1	95%	73%	2085	0	1970	2000	0	0	168	0.085		199	0.100	
Ma Tau Wai Road	S		2	B	3.5	13	0	1	51%	58%	1965	4070	1855	1840	3960	3945	117	0.063	0.068	147	0.080	0.080
	S		2	B	3.5	0	0	0	0%	0%	2105	0	2105	2105	0	0	133	0.063		168	0.080	
	S		2	B	3.5	0	27.5	1	100%	100%	2105	2105	1995	1995	1995	1995	135	0.068		140	0.070	
Bailey Street	W		3	C	3.5	13	0	1	100%	100%	1965	6155	1760	1760	5665	5655	230	0.131		215	0.122	
	W		3	C	3.3	15	0	0	62%	58%	2085	0	1965	1970	0	0	370	0.188	0.188	346	0.175	0.175
	W		3	C	3.5	0	15	1	84%	92%	2105	0	1940	1925	0	0	345	0.178		319	0.166	
Pedestrian crossing			4P	A,B	Min. Crossing Time = 5GM + 8FGM = 13s														*			*
			5P	A	Min. Crossing Time = 5GM + 6FGM = 11s																	
			6P	B,C	Min. Crossing Time = 5GM + 8FGM = 13s																	
			7P	C	Min. Crossing Time = 5GM + 7FGM = 12s																	
			8P	A,C	Min. Crossing Time = 5GM + 9FGM = 14s																	
			9P	B	Min. Crossing Time = 5GM + 9FGM = 14s																	

Notes:

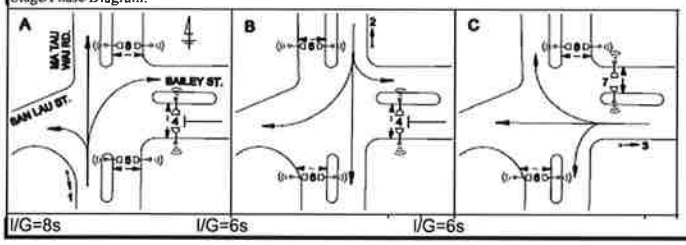
Traffic Flow (pcu / hr) AM(PM)



A.M. Check Phase	
εy	0.341
L (sec)	17
C (sec)	130
y pract.	0.782
R.C. (%)	**129%**

P.M. Check Phase	
εy	0.355
L (sec)	17
C (sec)	130
y pract.	0.782
R.C. (%)	**120%**

Stage/Phase Diagram:



TRAFFIC SIGNALS CALCULATION Job No: 19044HK-01 **CTA Consultants Ltd.**

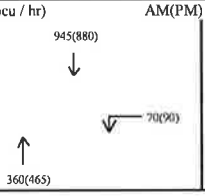
Junction: **(B) Ma Tau Wai Road / Wing Kwong Street**

Description: **2020 Observed Flow**

Approach	Direction	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	Nearside 0/1	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Saturation Flow (pcu/hr)	Total Saturation Flow (pcu/hr)	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	Total Revised Saturation Flow (pcu/hr) A.M.	Total Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Ma Tau Wai Road	N	↑	1	A	3.3	0	0	1	0%	0%	1945	6175	1945	1945	6175	6175	113	0.058		146	0.075	
	N	↑	1	A	3.6	0	0	0	0%	0%	2115	0	2115	2115	0	0	123	0.058		159	0.075	
	N	↑	1	A	3.6	0	0	0	0%	0%	2115	0	2115	2115	0	0	123	0.058		159	0.075	
Ma Tau Wai Road	S	↓	2	A	3.3	0	0	1	0%	0%	1945	6175	1945	1945	6175	6175	298	0.153	0.153	277	0.143	0.143
	S	↓	2	A	3.6	0	0	0	0%	0%	2115	0	2115	2115	0	0	324	0.153		301	0.143	
	S	↓	2	A	3.6	0	0	0	0%	0%	2115	0	2115	2115	0	0	324	0.153		301	0.143	
Wing Kwong Street	W	↱	3	B	5.3	10	0	1	100%	100%	2145	2145	1865	1865	1865	1865	70	0.038	0.038	90	0.048	0.048
Pedestrian crossing		^ v	4P	A	Min. Crossing Time = 5GM + 6FGM = 11s														*			*
		< >	5P	B	Min. Crossing Time = 5GM + 10FGM = 15s																	

Notes:

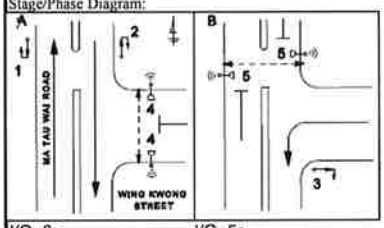
Traffic Flow (pcu / hr) AM(PM)



A.M. Check Phase	
Σy	0.191
L (sec)	9
C (sec)	130
y pract.	0.838
R.C. (%)	**340%**

P.M. Check Phase	
Σy	0.191
L (sec)	9
C (sec)	130
y pract.	0.838
R.C. (%)	**339%**

Stage/Phase Diagram:



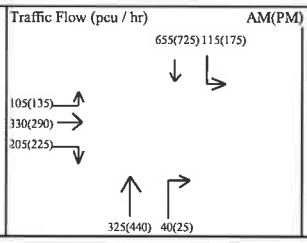
TRAFFIC SIGNALS CALCULATION Job No: 19044HK-01 **CTA Consultants Ltd.**

Junction: (C) To Kwa Wan Road / Chi Kiang Street
Description: 2020 Observed Flow

Approach	Direction	Movement notation	Phase	Stage	Width (m)	Radius (m)		Nearside 0/1	Pro. Turning (%)		Saturation Flow (pcu/hr)	Total Saturation Flow (pcu/hr)	Revised Saturation Flow (pcu/hr)		Total Revised Saturation Flow (pcu/hr)		A.M. Peak			P.M. Peak		
						Left	Right		A.M.	P.M.			A.M.	P.M.	A.M.	P.M.	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critical y
To Kwa Wan Road	N	↑	1	A,B	3.5	0	0	1	0%	0%	1825	3930	1825	1825	3930	3930	151	0.083		204	0.112	
	N	↑	1	A,B	3.5	0	0	0	0%	0%	2105	0	2105	2105	0	0	174	0.083		236	0.112	
	N	↱	2	B	3.5	0	15	0	100%	100%	2105	2105	1915	1915	1915	1915	40	0.021	0.021	25	0.013	0.013
To Kwa Wan Road	S	↓↱	3	A	3.0	10	0	1	49%	65%	1915	6025	1785	1745	5895	5855	233	0.131	0.131	268	0.154	0.154
	S	↓	3	A	3.0	0	0	0	0%	0%	2055	0	2055	2055	0	0	269	0.131		316	0.154	
	S	↓	3	A	3.0	0	0	0	0%	0%	2055	0	2055	2055	0	0	269	0.131		316	0.154	
Chi Kiang Street	E	↰	5	D	3.0	10	0	1	100%	100%	1915	1915	1665	1665	1665	1665	105	0.063		135	0.081	
	E	→	5	D	3.0	0	0	0	0%	0%	2055	2055	2055	2055	2055	2055	330	0.161		290	0.141	
	E	↘	4,5	C,D	3.0	0	25	0	100%	100%	2055	4110	1940	1940	3850	3850	375	0.194	0.194	506	0.261	0.261
	E	↘	4,5	C,D	3.0	0	20	0	100%	100%	2055	0	1910	1910	0	0	370	0.194		499	0.261	
Pedestrian crossing		↕	6P	A,B		Min. Crossing Time = 6GM + 11FGM = 17s													*			*
		↔	7P	C		Min. Crossing Time = 5GM + 8FGM = 13s																
		↔	8P	B,C,D		Min. Crossing Time = 5GM + 9FGM = 14s																
		↕	9P	A		Min. Crossing Time = 5GM + 8FGM = 13s																

Notes:

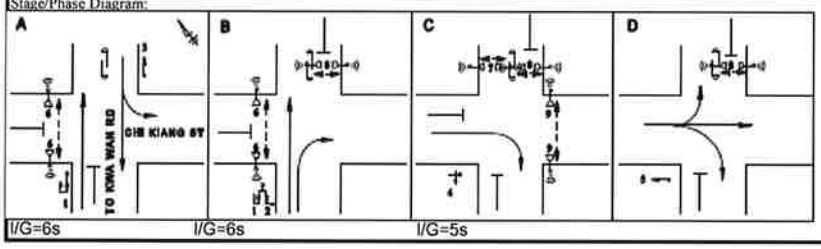
Traffic Flow (pcu / hr) AM(PM)



A.M. Check Phase	
Ey	0.345
L (sec)	14
C (sec)	108
y pract.	0.783
R.C. (%)	**127%**

P.M. Check Phase	
Ey	0.428
L (sec)	14
C (sec)	108
y pract.	0.783
R.C. (%)	**83%**

Stage/Phase Diagram:



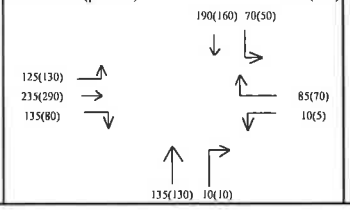
TRAFFIC SIGNALS CALCULATION Job No: 19044HK-01 **CTA Consultants Ltd.**

Junction: (D) Sung On Street / Yuk Yat Street / Chi Kiang Street
Description: 2020 Observed Flow

Approach	Direction	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	Nearside 0/1	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Saturation Flow (pcu/hr)	Total Saturation Flow (pcu/hr)	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	Total Revised Saturation Flow (pcu/hr) A.M.	Total Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Sung On Street	N	↑	3	C	4.5	0	0	1	0%	0%	2065	2065	2065	2065	2065	2065	135	0.065	0.065	130	0.063	0.063
	N	↱	3	C	4.5	0	15	0	100%	100%	2205	2205	2005	2005	2005	2005	10	0.005		10	0.005	
Yuk Yat Street	S	↓↱	2	B	3.0	15	0	1	57%	51%	1915	3970	1810	1825	3865	3880	122	0.067	0.067	99	0.054	0.054
	S	↓	2	B	3.0	0	0	0	0%	0%	2055	0	2055	2055	0	0	138	0.067		111	0.054	
Chi Kiang Street	E	↰↳	1	A	5.0	15	0	1	35%	31%	2115	2115	2045	2050	2045	2050	360	0.176	0.176	420	0.205	0.205
	E	↳	1	A	5.0	0	20	0	100%	100%	2255	2255	2100	2100	2100	2100	125	0.060		130	0.062	
Chi Kiang Street	W	↰↲	4	D	3.7	10	15	1	11% / 89%	7% / 93%	1980	1980	1790	1795	1790	1795	95	0.053	0.053	75	0.042	0.042
Pedestrian crossing		↑ / ↔	5P	B,C,D		Min. Crossing Time = 8GM + 9FGM = 17s													*			*
			6P	E		Min. Crossing Time = 8GM + 8FGM = 16s																

Notes:

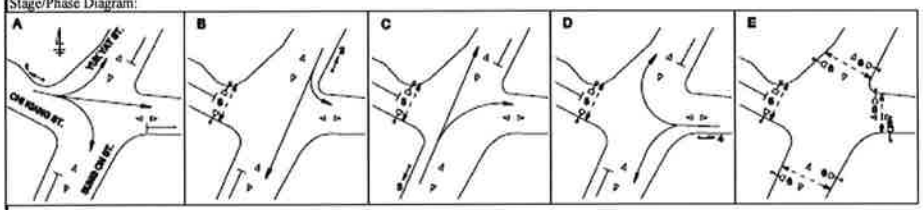
Traffic Flow (pcu / hr) AM(PM)



A.M. Check Phase	
Ey	0.362
L (sec)	44
C (sec)	100
y pract.	0.504
R.C. (%)	**39%**

P.M. Check Phase	
Ey	0.364
L (sec)	44
C (sec)	100
y pract.	0.504
R.C. (%)	**39%**

Stage/Phase Diagram:



I/G=3s I/G=6s I/G=6s I/G=6s I/G=27s

TRAFFIC SIGNALS CALCULATION Job No: 19044HK-01 **CTA Consultants Ltd.**

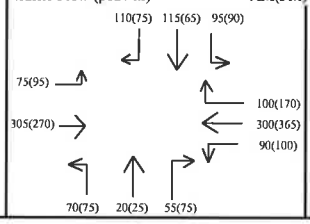
Junction: **(E) Bailey Street/ Sung On Street**

Description: **2020 Observed Flow**

Approach	Direction	Movement notation	Phase	Stage	Width (m)	Radius (m)		Nearside 0/1	Pro. Turning (%)		Saturation Flow (pcu/hr)	Total Saturation Flow (pcu/hr)	Revised Saturation Flow (pcu/hr)		Total Revised Saturation Flow (pcu/hr)		A.M. Peak			P.M. Peak		
						Left	Right		A.M.	P.M.			A.M.	P.M.	A.M.	P.M.	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critical y
Bailey Street	E		3	A	3.5	11	0	1	100%	100%	1965	1965	1730	1730	1730	1730	75	0.043		95	0.055	
	E	→	3	A	3.5	0	0	0	0%	0%	1825	3930	1825	1825	3930	3930	142	0.078		125	0.069	
	E	→	3	A	3.5	0	0	0	0%	0%	2105	0	2105	2105	0	0	163	0.078		145	0.069	
Bailey Street	W		1	A,B	3.0	13	0	1	49%	46%	1915	3970	1810	1820	3865	3875	183	0.101		218	0.120	
	W	←	1	A,B	3.0	0	0	0	0%	0%	2055	0	2055	2055	0	0	207	0.101	0.101	247	0.120	0.120
	W		1	A,B	3.0	0	12	0	100%	100%	2055	2055	1825	1825	1825	1825	100	0.055		170	0.093	
Sung On Street	S		2	C	3.5	18	0	1	100%	100%	1965	4070	1815	1815	3920	3885	95	0.052	0.056	72	0.040	0.040
	S		2	C	3.5	20	0	0	0%	21%	2105	0	2105	2070	0	0	115	0.055		83	0.040	
	S		2	C	3.5	0	20	0	100%	100%	2105	2105	1960	1960	1960	1960	110	0.056		75	0.038	
Sung On Street	N		4	D	4.0	15	20	1	8% / 38% / 43%		2015	2015	1870	1875	1870	1875	145	0.078	0.078	175	0.093	0.093
Pedestrian crossing			5P	E		Min. Crossing Time = 11GM + 11FGM = 22s													*			*

Notes:

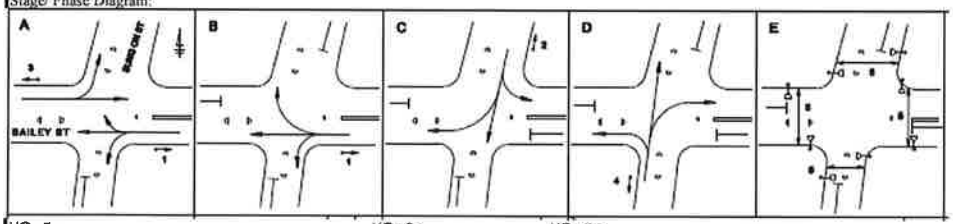
Traffic Flow (pcu / hr) AM(PM)



A.M. Check Phase	
εy	0.235
L (sec)	48
C (sec)	130
y pract.	0.568
R.C. (%)	**142%**

P.M. Check Phase	
εy	0.253
L (sec)	48
C (sec)	130
y pract.	0.568
R.C. (%)	**124%**

Stage/ Phase Diagram:



TRAFFIC SIGNALS CALCULATION Job No: 19044HK-01 **CTA Consultants Ltd.**

Junction: **(A) Ma Tau Wai Road/ Bailey Street**

Description: **2035 Reference Flow**

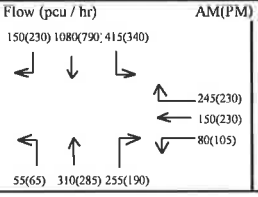
Approach	Direction	Movement notation	Phase	Stage	Width (m)	Radius (m)		Nearside 0/1	Pro. Turning (%)		Saturation Flow (pcu/hr)	Total Saturation Flow (pcu/hr)	Revised Saturation Flow (pcu/hr)		Total Revised Saturation Flow (pcu/hr)		A.M. Peak			P.M. Peak		
						Left	Right		A.M.	P.M.			A.M.	P.M.	A.M.	P.M.	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critical y
Ma Tau Wai Road	N		1	A	3.4	15	0	1	32%	39%	1955	6125	1895	1880	5945	5930	174	0.092	0.130	166	0.088	0.097
	N		1	A	3.3	0	0	0	0%	0%	2085	0	2085	2085	0	0	191	0.092		184	0.088	
	N		1	A	3.3	0	25	1	100%	100%	2085	0	1965	1965	0	0	255	0.130		190	0.097	
Ma Tau Wai Road	S		2	B	3.5	13	0	1	75%	68%	1965	4070	1810	1825	3915	3930	106	0.059	0.123	155	0.085	0.115
	S		2	B	3.5	0	0	0	0%	0%	2105	0	2105	2105	0	0	124	0.059		180	0.085	
	S		2	B	3.5	0	27.5	1	100%	100%	2105	2105	1995	1995	1995	1995	245	0.123		230	0.115	
Bailey Street	W		3	C	3.5	13	0	1	100%	100%	1965	6155	1760	1760	5770	5750	415	0.236		340	0.193	
	W		3	C	3.3	15	0	0	67%	55%	2085	0	1955	1975	0	0	620	0.317	0.317	519	0.263	0.263
	W		3	C	3.5	0	15	1	25%	46%	2105	0	2055	2015	0	0	610	0.297		501	0.249	

Pedestrian crossing

	4P	A,B	Min. Crossing Time = 5GM + 8FGM = 13s
	5P	A	Min. Crossing Time = 5GM + 6FGM = 11s
	6P	B,C	Min. Crossing Time = 5GM + 8FGM = 13s
	7P	C	Min. Crossing Time = 5GM + 7FGM = 12s
	8P	A,C	Min. Crossing Time = 5GM + 9FGM = 14s
	9P	B	Min. Crossing Time = 5GM + 9FGM = 14s

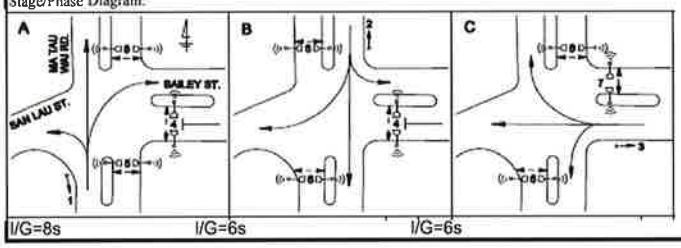
Notes:

Traffic Flow (pcu / hr) AM(PM)



A.M. Check Phase		P.M. Check Phase	
Σy	0.569	Σy	0.475
L (sec)	17	L (sec)	17
C (sec)	130	C (sec)	130
y pract.	0.782	y pract.	0.782
R.C. (%)	37%	R.C. (%)	65%

Stage/Phase Diagram:



TRAFFIC SIGNALS CALCULATION Job No: 19044HK-01 **CTA Consultants Ltd.**

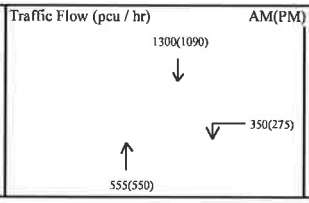
Junction: **(B) Ma Tau Wai Road / Wing Kwong Street**

Description: **2035 Reference Flow**

Approach	Direction	Movement notation	Phase	Stage	Width (m)	Radius (m)		Nearside 0/1	Pro. Turning (%)		Saturation Flow (pcu/hr)	Total Saturation Flow (pcu/hr)	Revised Saturation Flow (pcu/hr)		Total Revised Saturation Flow (pcu/hr)		A.M. Peak			P.M. Peak		
						Left	Right		A.M.	P.M.			A.M.	P.M.	A.M.	P.M.	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critical y
Ma Tau Wai Road	N	↑	1	A	3.3	0	0	1	0%	0%	1945	6175	1945	1945	6175	6175	175	0.090		173	0.089	
	N	↑	1	A	3.6	0	0	0	0%	0%	2115	0	2115	2115	0	0	190	0.090		188	0.089	
	N	↑	1	A	3.6	0	0	0	0%	0%	2115	0	2115	2115	0	0	190	0.090		188	0.089	
Ma Tau Wai Road	S	↓	2	A	3.3	0	0	1	0%	0%	1945	6175	1945	1945	6175	6175	409	0.211	0.211	343	0.177	0.177
	S	↓	2	A	3.6	0	0	0	0%	0%	2115	0	2115	2115	0	0	445	0.211		373	0.177	
	S	↓	2	A	3.6	0	0	0	0%	0%	2115	0	2115	2115	0	0	445	0.211		373	0.177	
Wing Kwong Street	W	↙	3	B	5.3	10	0	1	100%	100%	2145	2145	1865	1865	1865	1865	350	0.188	0.188	275	0.147	0.147
Pedestrian crossing		∧ ∨	4P	A	Min. Crossing Time = 5GM + 6FGM = 11s														*			*
		< >	5P	B	Min. Crossing Time = 5GM + 10FGM = 15s																	

Notes:

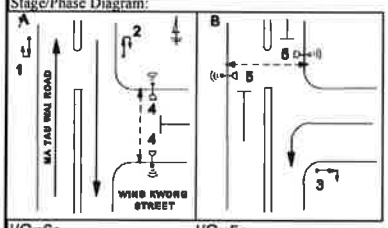
Traffic Flow (pcu / hr) AM(PM)



A.M. Check Phase	
εy	0.398
L (sec)	9
C (sec)	130
y pract.	0.838
R.C. (%)	**110%**

P.M. Check Phase	
εy	0.324
L (sec)	9
C (sec)	130
y pract.	0.838
R.C. (%)	**159%**

Stage/Phase Diagram:



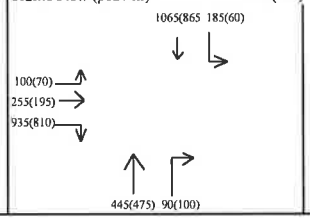
TRAFFIC SIGNALS CALCULATION Job No: 19044HK-01 **CTA Consultants Ltd.**

Junction: (C) To Kwa Wan Road / Chi Kiang Street
Description: 2035 Reference Flow

Approach	Direction	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	Nearside 0/1	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Saturation Flow (pcu/hr)	Total Saturation Flow (pcu/hr)	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	Total Revised Saturation Flow (pcu/hr) A.M.	Total Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
To Kwa Wan Road	N	↑	1	A,B	3.5	0	0	1	0%	0%	1825	3930	1825	1825	3930	3930	207	0.113		221	0.121	
	N	↑	1	A,B	3.5	0	0	0	0%	0%	2105	0	2105	2105	0	0	238	0.113		254	0.121	
	N	↱	2	B	3.5	0	15	0	100%	100%	2105	2105	1915	1915	1915	1915	90	0.047	0.047	100	0.052	0.052
To Kwa Wan Road	S	↓↱	3	A	3.0	10	0	1	49%	21%	1915	6025	1785	1855	5895	5965	378	0.212	0.212	288	0.155	0.155
	S	↓	3	A	3.0	0	0	0	0%	0%	2055	0	2055	2055	0	0	436	0.212		319	0.155	
	S	↓	3	A	3.0	0	0	0	0%	0%	2055	0	2055	2055	0	0	436	0.212		319	0.155	
Chi Kiang Street	E	↰↑	5	D	3.0	10	0	1	100%	100%	1915	1915	1665	1665	1665	1665	100	0.060		70	0.042	
	E	→	5	D	3.0	0	0	0	0%	0%	2055	2055	2055	2055	2055	2055	255	0.124		195	0.095	
	E	↴	4,5	C,D	3.0	0	25	0	100%	100%	2055	4110	1940	1940	3850	3850	375	0.194	0.194	506	0.261	0.261
	E	↴	4,5	C,D	3.0	0	20	0	100%	100%	2055	0	1910	1910	0	0	370	0.194		499	0.261	
Pedestrian crossing		∧ ∨	6P	A,B		Min. Crossing Time = 6GM + 11FGM = 17s													*			*
		< >	7P	C		Min. Crossing Time = 5GM + 8FGM = 13s																
		< > ∧ ∨	8P	B,C,D		Min. Crossing Time = 5GM + 9FGM = 14s																
			9P	A		Min. Crossing Time = 5GM + 8FGM = 13s																

Notes:

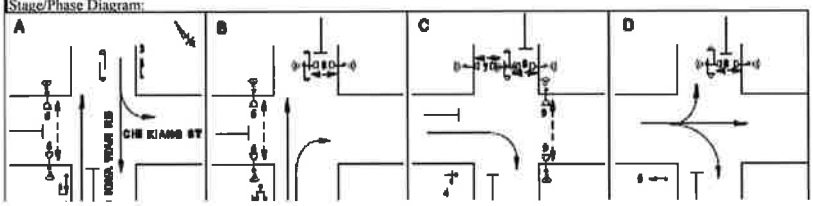
Traffic Flow (pcu / hr) AM(PM)



A.M. Check Phase	
εy	0.453
L (sec)	14
C (sec)	108
y pract.	0.783
R.C. (%)	**73%**

P.M. Check Phase	
εy	0.468
L (sec)	14
C (sec)	108
y pract.	0.783
R.C. (%)	**67%**

Stage/Phase Diagram:



TRAFFIC SIGNALS CALCULATION Job No: 19044HK-01 **CTA Consultants Ltd.**

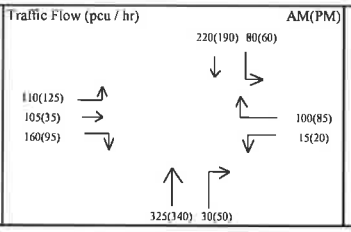
Junction: (D) Sung On Street / Yuk Yat Street / Chi Kiang Street

Description: 2035 Reference Flow

Approach	Direction	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	Nearside 0/1	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Saturation Flow (pcu/hr)	Total Saturation Flow (pcu/hr)	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	Total Revised Saturation Flow (pcu/hr) A.M.	Total Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Sung On Street	N	↑	3	C	4.5	0	0	1	0%	0%	2065	2065	2065	2065	2065	2065	325	0.157	0.157	340	0.165	0.165
	N	↱	3	C	4.5	0	15	0	100%	100%	2205	2205	2005	2005	2005	2005	30	0.015		50	0.025	
Yuk Yat Street	S	↓↱	2	B	3.0	15	0	1	57%	51%	1915	3970	1810	1820	3865	3875	141	0.078	0.078	117	0.065	0.065
	S	↓	2	B	3.0	0	0	0	0%	0%	2055	0	2055	2055	0	0	159	0.078		133	0.064	
Chi Kiang Street	E	↰→	1	A	5.0	15	0	1	51%	78%	2115	2115	2010	1960	2010	1960	215	0.107	0.107	160	0.082	0.082
	E	↴	1	A	5.0	0	20	0	100%	100%	2255	2255	2100	2100	2100	2100	110	0.052		125	0.060	
Chi Kiang Street	W	↰←	4	D	3.7	10	15	1	13% / 87%	19% / 81%	1980	1980	1790	1785	1790	1785	115	0.064	0.064	105	0.059	0.059
Pedestrian crossing			5P	B,C,D		Min. Crossing Time = 8GM + 9FGM = 17s													*			*
			6P	E		Min. Crossing Time = 8GM + 8FGM = 16s																

Notes:

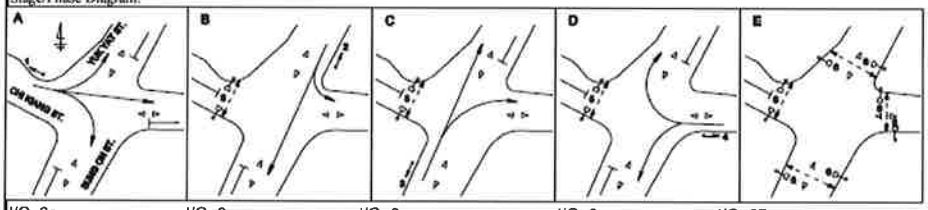
Traffic Flow (pcu / hr) AM(PM)



A.M. Check Phase	
Σy	0.406
L (sec)	44
C (sec)	100
y pract.	0.504
R.C. (%)	**24%**

P.M. Check Phase	
Σy	0.370
L (sec)	44
C (sec)	100
y pract.	0.504
R.C. (%)	**36%**

Stage/Phase Diagram:



TRAFFIC SIGNALS CALCULATION Job No: 19044HK-01 **CTA Consultants Ltd.**

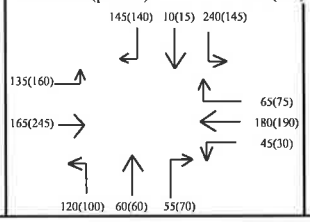
Junction: **(E) Bailey Street/ Sung On Street**

Description: **2035 Reference Flow**

Approach	Direction	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	Nearside 0/1	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Saturation Flow (pcu/hr)	Total Saturation Flow (pcu/hr)	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	Total Revised Saturation Flow (pcu/hr) A.M.	Total Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Bailey Street	E		3	A	3.5	11	0	1	100%	100%	1965	1965	1730	1730	1730	1730	135	0.078		160	0.092	
	E	→	3	A	3.5	0	0	0	0%	0%	1825	3930	1825	1825	3930	3930	77	0.042		114	0.062	
	E	→	3	A	3.5	0	0	0	0%	0%	2105	0	2105	2105	0	0	88	0.042		131	0.062	
Bailey Street	W		1	A,B	3.0	13	0	1	43%	29%	1915	3970	1825	1855	3880	3910	106	0.058		104	0.056	
	W	←	1	A,B	3.0	0	0	0	0%	0%	2055	0	2055	2055	0	0	119	0.058	0.058	116	0.056	0.056
	W		1	A,B	3.0	0	12	0	100%	100%	2055	2055	1825	1825	1825	1825	65	0.036		75	0.041	
Sung On Street	S		2	C	3.5	18	0	1	100%	100%	1965	4070	1815	1815	3785	3800	120	0.066	0.074	76	0.042	0.071
	S		2	C	3.5	20	0	0	92%	82%	2105	0	1970	1985	0	0	130	0.066		84	0.042	
	S		2	C	3.5	0	20	0	100%	100%	2105	2105	1960	1960	1960	1960	145	0.074		140	0.071	
Sung On Street	N		4	D	4.0	15	20	1	1% / 23% / 30%		2015	2015	1885	1890	1885	1890	235	0.125	0.125	230	0.122	0.122
Pedestrian crossing			5P	E	Min. Crossing Time = 11GM + 11FGM = 22s														*			*

Notes:

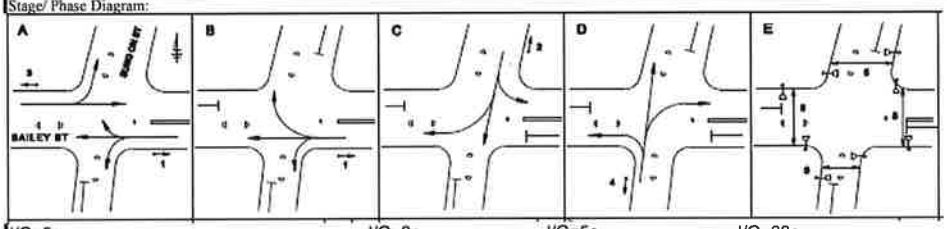
Traffic Flow (pcu / hr) AM(PM)



A.M. Check Phase	
Σy	0.257
L (sec)	48
C (sec)	130
y pract.	0.568
R.C. (%)	**121%**

P.M. Check Phase	
Σy	0.249
L (sec)	48
C (sec)	130
y pract.	0.568
R.C. (%)	**128%**

Stage/ Phase Diagram:



TRAFFIC SIGNALS CALCULATION Job No: 19044HK-01 **CTA Consultants Ltd.**

Junction: **(A) Ma Tau Wai Road/ Bailey Street**

Description: **2035 Design Flow**

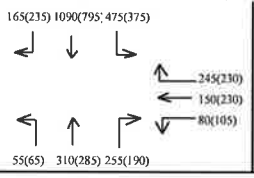
Approach	Direction	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	Nearside 0/1	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Saturation Flow (pcu/hr)	Total Saturation Flow (pcu/hr)	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	Total Revised Saturation Flow (pcu/hr) A.M.	Total Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Ma Tau Wai Road	N		1	A	3.4	15	0	1	32%	39%	1955	6125	1895	1880	5945	5930	174	0.092	0.130	166	0.088	0.097
	N		1	A	3.3	0	0	0	0%	0%	2085	0	2085	2085	0	0	191	0.092		184	0.088	
	N		1	A	3.3	0	25	1	100%	100%	2085	0	1965	1965	0	0	255	0.130		190	0.097	
Ma Tau Wai Road	S		2	B	3.5	13	0	1	75%	68%	1965	4070	1810	1825	3915	3930	106	0.059	0.123	155	0.085	0.115
	S		2	B	3.5	0	0	0	0%	0%	2105	0	2105	2105	0	0	124	0.059		180	0.085	
	S		2	B	3.5	0	27.5	1	100%	100%	2105	2105	1995	1995	1995	1995	245	0.123		230	0.115	
Bailey Street	W		3	C	3.5	13	0	1	100%	100%	1965	6155	1760	1760	5750	5740	475	0.270		375	0.213	
	W		3	C	3.3	15	0	0	75%	59%	2085	0	1940	1970	0	0	633	0.326	0.326	524	0.266	0.266
	W		3	C	3.5	0	15	1	27%	46%	2105	0	2050	2010	0	0	622	0.304		506	0.252	

Pedestrian crossing

	4P	A,B	Min. Crossing Time = 5GM + 8FGM = 13s
<···>	5P	A	Min. Crossing Time = 5GM + 6FGM = 11s
<···>	6P	B,C	Min. Crossing Time = 5GM + 8FGM = 13s
	7P	C	Min. Crossing Time = 5GM + 7FGM = 12s
<···>	8P	A,C	Min. Crossing Time = 5GM + 9FGM = 14s
<···>	9P	B	Min. Crossing Time = 5GM + 9FGM = 14s

Notes:

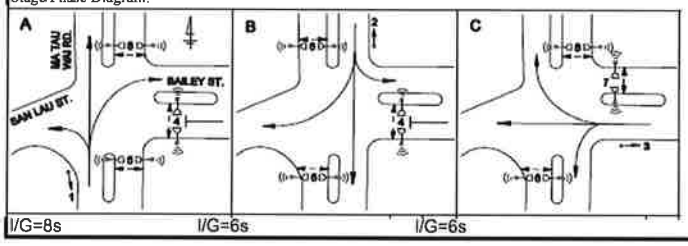
Traffic Flow (pcu / hr) AM(PM)



A.M. Check Phase	
εy	0.579
L (sec)	17
C (sec)	130
y pract.	0.782
R.C. (%)	**35%**

P.M. Check Phase	
εy	0.478
L (sec)	17
C (sec)	130
y pract.	0.782
R.C. (%)	**64%**

Stage/Phase Diagram:



TRAFFIC SIGNALS CALCULATION Job No: 19044HK-01 **CTA Consultants Ltd.**

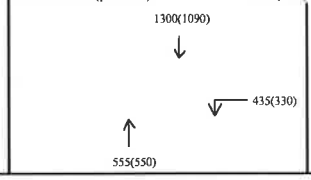
Junction: **(B) Ma Tau Wai Road / Wing Kwong Street**

Description: **2035 Design Flow**

Approach	Direction	Movement notation	Phase	Stage	Width (m)	Radius (m)		Nearside 0/1	Pro. Turning (%)		Saturation Flow (pcu/hr)	Total Saturation Flow (pcu/hr)	Revised Saturation Flow (pcu/hr)		Total Revised Saturation Flow (pcu/hr)		A.M. Peak			P.M. Peak		
						Left	Right		A.M.	P.M.			A.M.	P.M.	A.M.	P.M.	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critical y
Ma Tau Wai Road	N	↑	1	A	3.3	0	0	1	0%	0%	1945	6175	1945	1945	6175	6175	175	0.090		173	0.089	
	N	↑	1	A	3.6	0	0	0	0%	0%	2115	0	2115	2115	0	0	190	0.090		188	0.089	
	N	↑	1	A	3.6	0	0	0	0%	0%	2115	0	2115	2115	0	0	190	0.090		188	0.089	
Ma Tau Wai Road	S	↓	2	A	3.3	0	0	1	0%	0%	1945	6175	1945	1945	6175	6175	409	0.211	0.211	343	0.177	0.177
	S	↓	2	A	3.6	0	0	0	0%	0%	2115	0	2115	2115	0	0	445	0.211		373	0.177	
	S	↓	2	A	3.6	0	0	0	0%	0%	2115	0	2115	2115	0	0	445	0.211		373	0.177	
Wing Kwong Street	W	↱	3	B	5.3	10	0	1	100%	100%	2145	2145	1865	1865	1865	1865	435	0.233	0.233	330	0.177	0.177
Pedestrian crossing		^ V < >	4P	A	Min. Crossing Time = 5GM + 6FGM = 11s														*			*
			5P	B	Min. Crossing Time = 5GM + 10FGM = 15s																	

Notes:

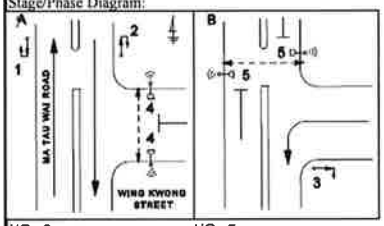
Traffic Flow (pcu / hr) AM(PM)



A.M. Check Phase	
εy	0.444
L (sec)	9
C (sec)	130
y pract.	0.838
R.C. (%)	**89%**

P.M. Check Phase	
εy	0.353
L (sec)	9
C (sec)	130
y pract.	0.838
R.C. (%)	**137%**

Stage/Phase Diagram:



I/G=6s I/G=5s

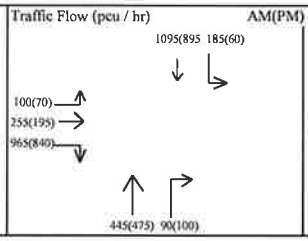
TRAFFIC SIGNALS CALCULATION Job No: 19044HK-01 **CTA Consultants Ltd.**

Junction: (C) To Kwa Wan Road / Chi Kiang Street
Description: 2035 Design Flow

Approach	Direction	Movement notation	Phase	Stage	Width (m)	Radius (m)		Nearside 0/1	Pro. Turning (%)		Saturation Flow (pcu/hr)	Total Saturation Flow (pcu/hr)	Revised Saturation Flow (pcu/hr)		Total Revised Saturation Flow (pcu/hr)		A.M. Peak			P.M. Peak		
						Left	Right		A.M.	P.M.			A.M.	P.M.	A.M.	P.M.	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critical y
To Kwa Wan Road	N	↑	1	A,B	3.5	0	0	1	0%	0%	1825	3930	1825	1825	3930	3930	207	0.113		221	0.121	
	N	↑	1	A,B	3.5	0	0	0	0%	0%	2105	0	2105	2105	0	0	238	0.113		254	0.121	
	N	↱	2	B	3.5	0	15	0	100%	100%	2105	2105	1915	1915	1915	1915	90	0.047	0.047	100	0.052	0.052
To Kwa Wan Road	S	↓↱	3	A	3.0	10	0	1	48%	20%	1915	6025	1785	1860	5895	5970	388	0.217	0.217	297	0.160	0.160
	S	↓	3	A	3.0	0	0	0	0%	0%	2055	0	2055	2055	0	0	446	0.217		329	0.160	
	S	↓	3	A	3.0	0	0	0	0%	0%	2055	0	2055	2055	0	0	446	0.217		329	0.160	
Chi Kiang Street	E	↰	5	D	3.0	10	0	1	100%	100%	1915	1915	1665	1665	1665	1665	100	0.060		70	0.042	
	E	→	5	D	3.0	0	0	0	0%	0%	2055	2055	2055	2055	2055	2055	255	0.124		195	0.095	
	E	↴	4,5	C,D	3.0	0	25	0	100%	100%	2055	4110	1940	1940	3850	3850	375	0.194	0.194	506	0.261	0.261
	E	↴	4,5	C,D	3.0	0	20	0	100%	100%	2055	0	1910	1910	0	0	370	0.194		499	0.261	
Pedestrian crossing		↑↓	6P	A,B		Min. Crossing Time = 6GM + 11FGM = 17s													*			*
		← →	7P	C		Min. Crossing Time = 5GM + 8FGM = 13s																
		← →	8P	B,C,D		Min. Crossing Time = 5GM + 9FGM = 14s																
		↑↓	9P	A		Min. Crossing Time = 5GM + 8FGM = 13s																

Notes:

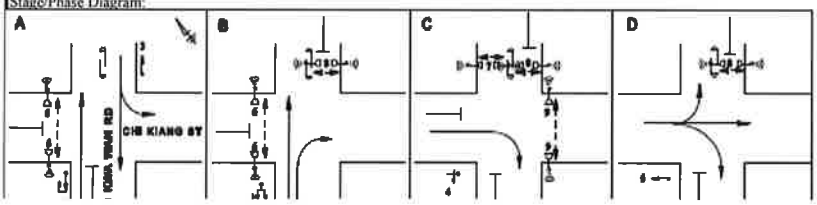
Traffic Flow (pcu / hr) AM(PM)



A.M. Check Phase	
Σy	0.458
L (sec)	14
C (sec)	108
y pract.	0.783
R.C. (%)	**71%**

P.M. Check Phase	
Σy	0.473
L (sec)	14
C (sec)	108
y pract.	0.783
R.C. (%)	**66%**

Stage/Phase Diagram:



TRAFFIC SIGNALS CALCULATION Job No: 19044HK-01 **CTA Consultants Ltd.**

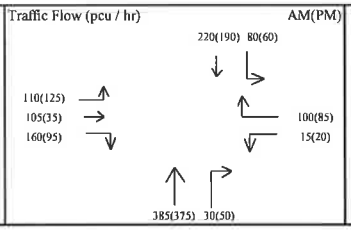
Junction: (D) Sung On Street / Yuk Yat Street / Chi Kiang Street

Description: 2035 Design Flow

Approach	Direction	Movement notation	Phase	Stage	Width (m)	Radius (m)		Nearside 0/1	Pro. Turning (%)		Saturation Flow (pcu/hr)	Total Saturation Flow (pcu/hr)	Revised Saturation Flow (pcu/hr)		Total Revised Saturation Flow (pcu/hr)		A.M. Peak			P.M. Peak		
						Left	Right		A.M.	P.M.			A.M.	P.M.	A.M.	P.M.	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critical y
Sung On Street	N	↑	3	C	4.5	0	0	1	0%	0%	2065	2065	2065	2065	2065	2065	385	0.186	0.186	375	0.182	0.182
	N	↱	3	C	4.5	0	15	0	100%	100%	2205	2205	2005	2005	2005	2005	30	0.015		50	0.025	
Yuk Yat Street	S	↳	2	B	3.0	15	0	1	57%	51%	1915	3970	1810	1820	3865	3875	141	0.078	0.078	117	0.065	0.065
	S	↓	2	B	3.0	0	0	0	0%	0%	2055	0	2055	2055	0	0	159	0.078		133	0.064	
Chi Kiang Street	E	↱	1	A	5.0	15	0	1	51%	78%	2115	2115	2010	1960	2010	1960	215	0.107	0.107	160	0.082	0.082
	E	↴	1	A	5.0	0	20	0	100%	100%	2255	2255	2100	2100	2100	2100	110	0.052		125	0.060	
Chi Kiang Street	W	↰	4	D	3.7	10	15	1	13% / 87%	19% / 81%	1980	1980	1790	1785	1790	1785	115	0.064	0.064	105	0.059	0.059
Pedestrian crossing		∧ 	5P	B,C,D		Min. Crossing Time = 8GM + 9FGM = 17s													*			*
			6P	E		Min. Crossing Time = 8GM + 8FGM = 16s																

Notes:

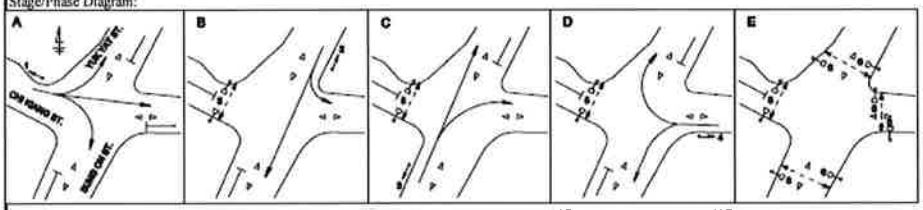
Traffic Flow (pcu / hr) AM(PM)



A.M. Check Phase	
gy	0.435
L (sec)	44
C (sec)	100
y pract.	0.504
R.C. (%)	**16%**

P.M. Check Phase	
gy	0.387
L (sec)	44
C (sec)	100
y pract.	0.504
R.C. (%)	**30%**

Stage/Phase Diagram:



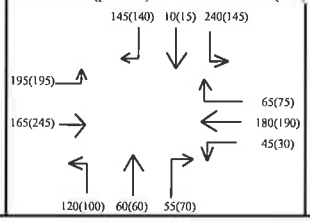
TRAFFIC SIGNALS CALCULATION Job No: 19044HK-01 **CTA Consultants Ltd.**

Junction: **(E) Bailey Street/ Sung On Street**
Description: **2035 Design Flow**

Approach	Direction	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	Nearside 0/1	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Saturation Flow (pcu/hr)	Total Saturation Flow (pcu/hr)	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	Total Revised Saturation Flow (pcu/hr) A.M.	Total Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Bailey Street	E		3	A	3.5	11	0	1	100%	100%	1965	1965	1730	1730	1730	1730	195	0.113		195	0.113	
	E	→	3	A	3.5	0	0	0	0%	0%	1825	3930	1825	1825	3930	3930	77	0.042		114	0.062	
	E	→	3	A	3.5	0	0	0	0%	0%	2105	0	2105	2105	0	0	88	0.042		131	0.062	
Bailey Street	W		1	A,B	3.0	13	0	1	43%	29%	1915	3970	1825	1855	3880	3910	106	0.058		104	0.056	
	W	←	1	A,B	3.0	0	0	0	0%	0%	2055	0	2055	2055	0	0	119	0.058	0.058	116	0.056	0.056
	W		1	A,B	3.0	0	12	0	100%	100%	2055	2055	1825	1825	1825	1825	65	0.036		75	0.041	
Sung On Street	S		2	C	3.5	18	0	1	100%	100%	1965	4070	1815	1815	3785	3800	120	0.066	0.074	76	0.042	0.071
	S		2	C	3.5	20	0	0	92%	82%	2105	0	1970	1985	0	0	130	0.066		84	0.042	
	S		2	C	3.5	0	20	0	100%	100%	2105	2105	1960	1960	1960	1960	145	0.074		140	0.071	
Sung On Street	N		4	D	4.0	15	20	1	1% / 23'3% / 30'		2015	2015	1885	1890	1885	1890	235	0.125	0.125	230	0.122	0.122
Pedestrian crossing			5P	E		Min. Crossing Time = 11GM + 11FGM = 22s													*			*

Notes:

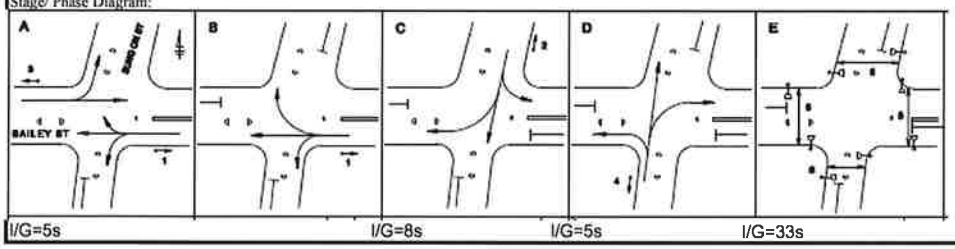
Traffic Flow (pcu / hr) AM(PM)



A.M. Check Phase	
εy	0.257
L (sec)	48
C (sec)	130
y pract.	0.568
R.C. (%)	**121%**

P.M. Check Phase	
εy	0.249
L (sec)	48
C (sec)	130
y pract.	0.568
R.C. (%)	**128%**

Stage/ Phase Diagram:



Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.5.523 [19102,19/06/2015]
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Filename: 19044HK-01 Junction F.arc8
Path: F:\19044HK-01 (wkk) - URA TCS for Development Scheme at Kolwoon City (KC-AAC-01)\Calculation\TIA\Junction 8 \2020-11-26
Report generation date: 26/11/2020 12:57:18

» (Default Analysis Set) - Ext, AM
» (Default Analysis Set) - Ext, PM
» (Default Analysis Set) - Ref, AM
» (Default Analysis Set) - Ref, PM
» (Default Analysis Set) - Des, AM
» (Default Analysis Set) - Des, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - Des							
Stream B-AC	0.82	14.84	0.45	B	0.81	13.66	0.45	B
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.12	8.92	0.11	A	0.11	8.24	0.10	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-
	A1 - Ext							
Stream B-AC	0.02	8.52	0.02	A	0.02	8.55	0.02	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.01	7.25	0.01	A	0.01	7.16	0.01	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-
	A1 - Ref							
Stream B-AC	0.78	14.13	0.44	B	0.79	13.31	0.44	B
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.12	8.68	0.11	A	0.11	8.12	0.10	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - Ext, AM " model duration: 8:00 - 9:30
"D2 - Ext, PM" model duration: 8:00 - 9:30
"D3 - Ref, AM" model duration: 8:00 - 9:30
"D4 - Ref, PM" model duration: 8:00 - 9:30
"D5 - Des, AM" model duration: 8:00 - 9:30
"D6 - Des, PM" model duration: 8:00 - 9:30

Run using Junctions 8.0.5.523 at 26/11/2020 12:57:16

File summary

Title	(untitled)
Location	
Site Number	
Date	28/8/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	user
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCU	PCU	perHour	s	-Min	perMin

(Default Analysis Set) - Ext, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ext, AM	Ext	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	8.10	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	10.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.072	0.182	0.114	0.260
1	B-C	623.937	0.079	0.200	-	-
1	C-B	573.963	0.184	0.184	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	395.00	100.000
B	FLAT	✓	10.00	100.000
C	FLAT	✓	415.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	5.000	390.000
	B	5.000	0.000	5.000
	C	410.000	5.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.01	0.99
	B	0.50	0.00	0.50
	C	0.99	0.01	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.02	8.52	0.02	A
C-A	-	-	-	-
C-B	0.01	7.25	0.01	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	9.91	0.00	432.68	0.023	0.02	8.513	A
C-A	410.00	410.00	0.00	-	-	-	-	-
C-B	5.00	4.96	0.00	501.41	0.010	0.01	7.251	A
A-B	5.00	5.00	0.00	-	-	-	-	-
A-C	390.00	390.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	10.00	0.00	432.67	0.023	0.02	8.516	A
C-A	410.00	410.00	0.00	-	-	-	-	-
C-B	5.00	5.00	0.00	501.41	0.010	0.01	7.251	A
A-B	5.00	5.00	0.00	-	-	-	-	-
A-C	390.00	390.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	10.00	0.00	432.67	0.023	0.02	8.516	A
C-A	410.00	410.00	0.00	-	-	-	-	-
C-B	5.00	5.00	0.00	501.41	0.010	0.01	7.251	A
A-B	5.00	5.00	0.00	-	-	-	-	-
A-C	390.00	390.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	10.00	0.00	432.67	0.023	0.02	8.516	A
C-A	410.00	410.00	0.00	-	-	-	-	-
C-B	5.00	5.00	0.00	501.41	0.010	0.01	7.251	A
A-B	5.00	5.00	0.00	-	-	-	-	-
A-C	390.00	390.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	10.00	0.00	432.67	0.023	0.02	8.518	A
C-A	410.00	410.00	0.00	-	-	-	-	-
C-B	5.00	5.00	0.00	501.41	0.010	0.01	7.251	A
A-B	5.00	5.00	0.00	-	-	-	-	-
A-C	390.00	390.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	10.00	0.00	432.67	0.023	0.02	8.518	A
C-A	410.00	410.00	0.00	-	-	-	-	-
C-B	5.00	5.00	0.00	501.41	0.010	0.01	7.251	A
A-B	5.00	5.00	0.00	-	-	-	-	-
A-C	390.00	390.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ext, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ext, PM	Ext	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	8.09	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	10.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.072	0.182	0.114	0.260
1	B-C	623.937	0.079	0.200	-	-
1	C-B	573.963	0.184	0.184	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	360.00	100.000
B	FLAT	✓	10.00	100.000
C	FLAT	✓	515.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	5.000	355.000
	B	5.000	0.000	5.000
	C	510.000	5.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.01	0.99
	B	0.50	0.00	0.50
	C	0.99	0.01	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.02	8.55	0.02	A
C-A	-	-	-	-
C-B	0.01	7.16	0.01	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	9.91	0.00	431.11	0.023	0.02	8.545	A
C-A	510.00	510.00	0.00	-	-	-	-	-
C-B	5.00	4.96	0.00	507.84	0.010	0.01	7.158	A
A-B	5.00	5.00	0.00	-	-	-	-	-
A-C	355.00	355.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	10.00	0.00	431.10	0.023	0.02	8.548	A
C-A	510.00	510.00	0.00	-	-	-	-	-
C-B	5.00	5.00	0.00	507.84	0.010	0.01	7.158	A
A-B	5.00	5.00	0.00	-	-	-	-	-
A-C	355.00	355.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	10.00	0.00	431.10	0.023	0.02	8.548	A
C-A	510.00	510.00	0.00	-	-	-	-	-
C-B	5.00	5.00	0.00	507.84	0.010	0.01	7.158	A
A-B	5.00	5.00	0.00	-	-	-	-	-
A-C	355.00	355.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	10.00	0.00	431.10	0.023	0.02	8.548	A
C-A	510.00	510.00	0.00	-	-	-	-	-
C-B	5.00	5.00	0.00	507.84	0.010	0.01	7.158	A
A-B	5.00	5.00	0.00	-	-	-	-	-
A-C	355.00	355.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	10.00	0.00	431.10	0.023	0.02	8.550	A
C-A	510.00	510.00	0.00	-	-	-	-	-
C-B	5.00	5.00	0.00	507.84	0.010	0.01	7.158	A
A-B	5.00	5.00	0.00	-	-	-	-	-
A-C	355.00	355.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	10.00	0.00	431.10	0.023	0.02	8.550	A
C-A	510.00	510.00	0.00	-	-	-	-	-
C-B	5.00	5.00	0.00	507.84	0.010	0.01	7.158	A
A-B	5.00	5.00	0.00	-	-	-	-	-
A-C	355.00	355.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ref, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ref, AM	Ref	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	13.04	B

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	10.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.072	0.182	0.114	0.260
1	B-C	623.937	0.079	0.200	-	-
1	C-B	573.963	0.184	0.184	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	595.00	100.000
B	FLAT	✓	200.00	100.000
C	FLAT	✓	485.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	60.000	535.000
	B	40.000	0.000	160.000
	C	435.000	50.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.10	0.90
	B	0.20	0.00	0.80
	C	0.90	0.10	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.44	14.13	0.78	B
C-A	-	-	-	-
C-B	0.11	8.68	0.12	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	200.00	196.94	0.00	454.73	0.440	0.76	13.811	B
C-A	435.00	435.00	0.00	-	-	-	-	-
C-B	50.00	49.52	0.00	464.67	0.108	0.12	8.662	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	535.00	535.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	200.00	199.96	0.00	454.68	0.440	0.77	14.126	B
C-A	435.00	435.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	464.67	0.108	0.12	8.681	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	535.00	535.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	200.00	199.99	0.00	454.68	0.440	0.78	14.131	B
C-A	435.00	435.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	464.67	0.108	0.12	8.681	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	535.00	535.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	200.00	199.99	0.00	454.68	0.440	0.78	14.131	B
C-A	435.00	435.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	464.67	0.108	0.12	8.681	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	535.00	535.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	200.00	200.00	0.00	454.68	0.440	0.78	14.134	B
C-A	435.00	435.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	464.67	0.108	0.12	8.681	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	535.00	535.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	200.00	200.00	0.00	454.68	0.440	0.78	14.134	B
C-A	435.00	435.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	464.67	0.108	0.12	8.681	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	535.00	535.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ref, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ref, PM	Ref	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	12.33	B

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	10.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.072	0.182	0.114	0.260
1	B-C	623.937	0.079	0.200	-	-
1	C-B	573.963	0.184	0.184	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	440.00	100.000
B	FLAT	✓	215.00	100.000
C	FLAT	✓	575.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	60.000	380.000
	B	40.000	0.000	175.000
	C	525.000	50.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.14	0.86
	B	0.19	0.00	0.81
	C	0.91	0.09	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.44	13.31	0.79	B
C-A	-	-	-	-
C-B	0.10	8.12	0.11	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	215.00	211.90	0.00	485.59	0.443	0.77	13.014	B
C-A	525.00	525.00	0.00	-	-	-	-	-
C-B	50.00	49.55	0.00	493.14	0.101	0.11	8.107	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	380.00	380.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	215.00	214.96	0.00	485.55	0.443	0.78	13.300	B
C-A	525.00	525.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	493.14	0.101	0.11	8.123	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	380.00	380.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	215.00	214.99	0.00	485.55	0.443	0.79	13.303	B
C-A	525.00	525.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	493.14	0.101	0.11	8.123	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	380.00	380.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	215.00	214.99	0.00	485.55	0.443	0.79	13.305	B
C-A	525.00	525.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	493.14	0.101	0.11	8.123	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	380.00	380.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	215.00	215.00	0.00	485.55	0.443	0.79	13.305	B
C-A	525.00	525.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	493.14	0.101	0.11	8.123	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	380.00	380.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	215.00	215.00	0.00	485.55	0.443	0.79	13.305	B
C-A	525.00	525.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	493.14	0.101	0.11	8.123	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	380.00	380.00	0.00	-	-	-	-	-

(Default Analysis Set) - Des, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Des, AM	Des	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	13.66	B

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	10.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.072	0.182	0.114	0.260
1	B-C	623.937	0.079	0.200	-	-
1	C-B	573.963	0.184	0.184	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	655.00	100.000
B	FLAT	✓	200.00	100.000
C	FLAT	✓	485.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	60.000	595.000
	B	40.000	0.000	160.000
	C	435.000	50.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.09	0.91
	B	0.20	0.00	0.80
	C	0.90	0.10	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.45	14.84	0.82	B
C-A	-	-	-	-
C-B	0.11	8.92	0.12	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	200.00	196.80	0.00	442.59	0.452	0.80	14.468	B
C-A	435.00	435.00	0.00	-	-	-	-	-
C-B	50.00	49.51	0.00	453.65	0.110	0.12	8.897	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	595.00	595.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	200.00	199.95	0.00	442.53	0.452	0.81	14.833	B
C-A	435.00	435.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	453.65	0.110	0.12	8.918	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	595.00	595.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	200.00	199.98	0.00	442.53	0.452	0.82	14.839	B
C-A	435.00	435.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	453.65	0.110	0.12	8.918	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	595.00	595.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	200.00	199.99	0.00	442.53	0.452	0.82	14.839	B
C-A	435.00	435.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	453.65	0.110	0.12	8.918	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	595.00	595.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	200.00	200.00	0.00	442.53	0.452	0.82	14.842	B
C-A	435.00	435.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	453.65	0.110	0.12	8.918	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	595.00	595.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	200.00	200.00	0.00	442.53	0.452	0.82	14.842	B
C-A	435.00	435.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	453.65	0.110	0.12	8.918	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	595.00	595.00	0.00	-	-	-	-	-

(Default Analysis Set) - Des, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Des, PM	Des	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	12.64	B

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	10.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.072	0.182	0.114	0.260
1	B-C	623.937	0.079	0.200	-	-
1	C-B	573.963	0.184	0.184	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	475.00	100.000
B	FLAT	✓	215.00	100.000
C	FLAT	✓	575.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	60.000	415.000
	B	40.000	0.000	175.000
	C	525.000	50.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.13	0.87
	B	0.19	0.00	0.81
	C	0.91	0.09	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.45	13.66	0.81	B
C-A	-	-	-	-
C-B	0.10	8.24	0.11	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	215.00	211.82	0.00	478.51	0.449	0.79	13.348	B
C-A	525.00	525.00	0.00	-	-	-	-	-
C-B	50.00	49.55	0.00	486.71	0.103	0.11	8.226	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	415.00	415.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	215.00	214.96	0.00	478.46	0.449	0.81	13.655	B
C-A	525.00	525.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	486.71	0.103	0.11	8.243	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	415.00	415.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	215.00	214.99	0.00	478.46	0.449	0.81	13.660	B
C-A	525.00	525.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	486.71	0.103	0.11	8.243	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	415.00	415.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	215.00	214.99	0.00	478.46	0.449	0.81	13.660	B
C-A	525.00	525.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	486.71	0.103	0.11	8.243	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	415.00	415.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	215.00	215.00	0.00	478.46	0.449	0.81	13.663	B
C-A	525.00	525.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	486.71	0.103	0.11	8.243	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	415.00	415.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	215.00	215.00	0.00	478.46	0.449	0.81	13.663	B
C-A	525.00	525.00	0.00	-	-	-	-	-
C-B	50.00	50.00	0.00	486.71	0.103	0.11	8.243	A
A-B	60.00	60.00	0.00	-	-	-	-	-
A-C	415.00	415.00	0.00	-	-	-	-	-

Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.5.523 [19102,19/06/2015]
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Filename: 19044HK-01 Junction G.arc8
Path: F:\19044HK-01 (wkk) - URA TCS for Development Scheme at Kolwoon City (KC-AAC-01)\Calculation\TIA\Junction 8 \2020-11-26
Report generation date: 26/11/2020 13:00:57

» (Default Analysis Set) - Ext, AM
» (Default Analysis Set) - Ext, PM
» (Default Analysis Set) - Ref, AM
» (Default Analysis Set) - Ref, PM
» (Default Analysis Set) - Des, AM
» (Default Analysis Set) - Des, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - Des							
Stream B-AC	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.52	12.51	0.34	B	0.31	10.22	0.24	B
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-
	A1 - Ext							
Stream B-AC	0.01	3.97	0.01	A	0.01	3.98	0.01	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-
	A1 - Ref							
Stream B-AC	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.50	12.02	0.33	B	0.30	9.86	0.23	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - Ext, AM " model duration: 8:00 - 9:30
"D2 - Ext, PM" model duration: 8:00 - 9:30
"D3 - Ref, AM" model duration: 8:00 - 9:30
"D4 - Ref, PM" model duration: 8:00 - 9:30
"D5 - Des, AM" model duration: 8:00 - 9:30
"D6 - Des, PM" model duration: 8:00 - 9:30

Run using Junctions 8.0.5.523 at 26/11/2020 13:00:55

File summary

Title	(untitled)
Location	
Site Number	
Date	28/8/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	user
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCU	PCU	perHour	s	-Min	perMin

(Default Analysis Set) - Ext, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ext, AM	Ext	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	3.97	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	5.00										250	250

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	836.589	0.146	0.368	0.232	0.526
1	B-C	937.767	0.137	0.348	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	70.00	100.000
B	FLAT	✓	10.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	15.000	55.000
	B	0.000	0.000	10.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.21	0.79
	B	0.00	0.00	1.00
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.01	3.97	0.01	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	9.96	0.00	916.59	0.011	0.01	3.970	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	559.07	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	55.00	55.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	10.00	0.00	916.59	0.011	0.01	3.970	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	559.07	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	55.00	55.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	10.00	0.00	916.59	0.011	0.01	3.970	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	559.07	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	55.00	55.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	10.00	0.00	916.59	0.011	0.01	3.970	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	559.07	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	55.00	55.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	10.00	0.00	916.59	0.011	0.01	3.970	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	559.07	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	55.00	55.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	10.00	10.00	0.00	916.59	0.011	0.01	3.970	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	559.07	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	55.00	55.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ext, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ext, PM	Ext	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	3.98	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	5.00										250	250

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	836.589	0.146	0.368	0.232	0.526
1	B-C	937.767	0.137	0.348	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	90.00	100.000
B	FLAT	✓	5.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	10.000	80.000
	B	0.000	0.000	5.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.11	0.89
	B	0.00	0.00	1.00
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.01	3.98	0.01	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	5.00	4.98	0.00	908.59	0.006	0.01	3.983	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	5.00	5.00	0.00	908.59	0.006	0.01	3.983	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	5.00	5.00	0.00	908.59	0.006	0.01	3.983	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	5.00	5.00	0.00	908.59	0.006	0.01	3.983	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	5.00	5.00	0.00	908.59	0.006	0.01	3.983	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	5.00	5.00	0.00	908.59	0.006	0.01	3.983	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ref, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ref, AM	Ref	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	12.02	B

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	5.00										250	250

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	836.589	0.146	0.368	0.232	0.526
1	B-C	937.767	0.137	0.348	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	585.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	150.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	25.000	560.000
	B	0.000	0.000	0.000
	C	0.000	150.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.04	0.96
	B	0.33	0.33	0.33
	C	0.00	1.00	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.33	12.02	0.50	B
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	629.39	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	150.00	148.04	0.00	449.53	0.334	0.49	11.865	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	560.00	560.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	628.71	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	150.00	149.98	0.00	449.53	0.334	0.50	12.015	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	560.00	560.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	628.70	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	150.00	149.99	0.00	449.53	0.334	0.50	12.018	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	560.00	560.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	628.70	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	150.00	150.00	0.00	449.53	0.334	0.50	12.018	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	560.00	560.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	628.70	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	150.00	150.00	0.00	449.53	0.334	0.50	12.018	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	560.00	560.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	628.70	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	150.00	150.00	0.00	449.53	0.334	0.50	12.018	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	560.00	560.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ref, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ref, PM	Ref	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	9.86	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	5.00										250	250

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	836.589	0.146	0.368	0.232	0.526
1	B-C	937.767	0.137	0.348	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	465.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	110.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	25.000	440.000
	B	0.000	0.000	0.000
	C	0.000	110.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.05	0.95
	B	0.33	0.33	0.33
	C	0.00	1.00	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.23	9.86	0.30	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	687.02	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	110.00	108.81	0.00	475.05	0.232	0.30	9.799	A
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	440.00	440.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	686.62	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	110.00	109.99	0.00	475.05	0.232	0.30	9.861	A
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	440.00	440.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	686.62	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	110.00	110.00	0.00	475.05	0.232	0.30	9.861	A
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	440.00	440.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	686.62	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	110.00	110.00	0.00	475.05	0.232	0.30	9.861	A
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	440.00	440.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	686.62	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	110.00	110.00	0.00	475.05	0.232	0.30	9.861	A
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	440.00	440.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	686.62	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	110.00	110.00	0.00	475.05	0.232	0.30	9.861	A
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	440.00	440.00	0.00	-	-	-	-	-

(Default Analysis Set) - Des, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Des, AM	Des	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	12.51	B

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	5.00										250	250

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	836.589	0.146	0.368	0.232	0.526
1	B-C	937.767	0.137	0.348	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	640.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	150.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	25.000	615.000
	B	0.000	0.000	0.000
	C	0.000	150.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.04	0.96
	B	0.33	0.33	0.33
	C	0.00	1.00	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.34	12.51	0.52	B
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	609.08	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	150.00	147.96	0.00	437.83	0.343	0.51	12.335	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	615.00	615.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	608.36	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	150.00	149.98	0.00	437.83	0.343	0.52	12.504	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	615.00	615.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	608.35	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	150.00	149.99	0.00	437.83	0.343	0.52	12.506	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	615.00	615.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	608.35	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	150.00	150.00	0.00	437.83	0.343	0.52	12.506	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	615.00	615.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	608.35	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	150.00	150.00	0.00	437.83	0.343	0.52	12.506	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	615.00	615.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	608.35	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	150.00	150.00	0.00	437.83	0.343	0.52	12.506	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	615.00	615.00	0.00	-	-	-	-	-

(Default Analysis Set) - Des, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Des, PM	Des	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	10.22	B

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	5.00										250	250

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	836.589	0.146	0.368	0.232	0.526
1	B-C	937.767	0.137	0.348	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	525.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	110.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	25.000	500.000
	B	0.000	0.000	0.000
	C	0.000	110.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.05	0.95
	B	0.33	0.33	0.33
	C	0.00	1.00	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.24	10.22	0.31	B
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	665.06	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	110.00	108.77	0.00	462.29	0.238	0.31	10.148	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	500.00	500.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	664.65	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	110.00	109.99	0.00	462.29	0.238	0.31	10.218	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	500.00	500.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	664.65	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	110.00	110.00	0.00	462.29	0.238	0.31	10.218	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	500.00	500.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	664.64	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	110.00	110.00	0.00	462.29	0.238	0.31	10.218	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	500.00	500.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	664.64	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	110.00	110.00	0.00	462.29	0.238	0.31	10.218	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	500.00	500.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	664.64	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	110.00	110.00	0.00	462.29	0.238	0.31	10.218	B
A-B	25.00	25.00	0.00	-	-	-	-	-
A-C	500.00	500.00	0.00	-	-	-	-	-

Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.5.523 [19102,19/06/2015]
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Filename: 19044HK-01 Junction H.arc8
Path: F:\19044HK-01 (wkk) - URA TCS for Development Scheme at Kolwoon City (KC-AAC-01)\Calculation\TIA\Junction 8 \2020-11-26
Report generation date: 26/11/2020 13:03:36

» (Default Analysis Set) - Ext, AM
» (Default Analysis Set) - Ext, PM
» (Default Analysis Set) - Ref, AM
» (Default Analysis Set) - Ref, PM
» (Default Analysis Set) - Des, AM
» (Default Analysis Set) - Des, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - Des							
Stream B-AC	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-
	A1 - Ext							
Stream B-AC	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-
	A1 - Ref							
Stream B-AC	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - Ext, AM " model duration: 8:00 - 9:30
"D2 - Ext, PM" model duration: 8:00 - 9:30
"D3 - Ref, AM" model duration: 8:00 - 9:30
"D4 - Ref, PM" model duration: 8:00 - 9:30
"D5 - Des, AM" model duration: 8:00 - 9:30
"D6 - Des, PM" model duration: 8:00 - 9:30

Run using Junctions 8.0.5.523 at 26/11/2020 13:03:33

File summary

Title	(untitled)
Location	
Site Number	
Date	28/8/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	user
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCU	PCU	perHour	s	-Min	perMin

(Default Analysis Set) - Ext, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ext, AM	Ext	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	0.00	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.083	0.210	0.132	0.301
1	B-C	623.937	0.091	0.231	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	80.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	15.000	65.000
	B	0.000	0.000	0.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.19	0.81
	B	0.33	0.33	0.33
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	525.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	556.95	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	65.00	65.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	525.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	556.95	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	65.00	65.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	525.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	556.95	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	65.00	65.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	525.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	556.95	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	65.00	65.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	525.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	556.95	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	65.00	65.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	525.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	556.95	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	65.00	65.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ext, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ext, PM	Ext	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	0.00	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.083	0.210	0.132	0.301
1	B-C	623.937	0.091	0.231	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	90.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	10.000	80.000
	B	0.000	0.000	0.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.11	0.89
	B	0.33	0.33	0.33
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	522.57	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	522.57	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	522.57	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	522.57	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	522.57	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	522.57	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ref, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ref, AM	Ref	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	0.00	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.083	0.210	0.132	0.301
1	B-C	623.937	0.091	0.231	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	660.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	75.000	585.000
	B	0.000	0.000	0.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.11	0.89
	B	0.33	0.33	0.33
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	404.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	433.58	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	585.00	585.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	404.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	433.58	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	585.00	585.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	404.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	433.58	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	585.00	585.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	404.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	433.58	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	585.00	585.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	404.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	433.58	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	585.00	585.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	404.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	433.58	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	585.00	585.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ref, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ref, PM	Ref	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	0.00	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.083	0.210	0.132	0.301
1	B-C	623.937	0.091	0.231	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	550.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	90.000	460.000
	B	0.000	0.000	0.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.16	0.84
	B	0.33	0.33	0.33
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	431.01	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	456.97	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	460.00	460.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	431.01	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	456.97	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	460.00	460.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	431.01	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	456.97	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	460.00	460.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	431.01	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	456.97	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	460.00	460.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	431.01	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	456.97	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	460.00	460.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	431.01	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	456.97	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	460.00	460.00	0.00	-	-	-	-	-

(Default Analysis Set) - Des, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Des, AM	Des	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	0.00	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.083	0.210	0.132	0.301
1	B-C	623.937	0.091	0.231	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	715.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	75.000	640.000
	B	0.000	0.000	0.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.10	0.90
	B	0.33	0.33	0.33
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	392.18	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	421.88	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	640.00	640.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	392.18	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	421.88	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	640.00	640.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	392.18	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	421.88	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	640.00	640.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	392.18	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	421.88	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	640.00	640.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	392.18	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	421.88	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	640.00	640.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	392.18	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	421.88	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	640.00	640.00	0.00	-	-	-	-	-

(Default Analysis Set) - Des, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Des, PM	Des	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	0.00	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.083	0.210	0.132	0.301
1	B-C	623.937	0.091	0.231	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	610.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	90.000	520.000
	B	0.000	0.000	0.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.15	0.85
	B	0.33	0.33	0.33
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	417.64	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	444.21	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	520.00	520.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	417.64	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	444.21	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	520.00	520.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	417.64	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	444.21	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	520.00	520.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	417.64	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	444.21	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	520.00	520.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	417.64	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	444.21	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	520.00	520.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	417.64	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	444.21	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	520.00	520.00	0.00	-	-	-	-	-

Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.5.523 [19102,19/06/2015]
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Filename: 19044HK-01 Junction I.arc8
Path: F:\19044HK-01 (wkk) - URA TCS for Development Scheme at Kolwoon City (KC-AAC-01)\Calculation\TIA\Junction 8 \2020-11-26
Report generation date: 26/11/2020 13:04:35

» (Default Analysis Set) - Ext, AM
» (Default Analysis Set) - Ext, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - Ext							
Stream B-AC	0.07	8.16	0.06	A	0.07	8.22	0.06	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - Ext, AM " model duration: 8:00 - 9:30
"D2 - Ext, PM" model duration: 8:00 - 9:30

Run using Junctions 8.0.5.523 at 26/11/2020 13:04:34

File summary

Title	(untitled)
Location	
Site Number	
Date	28/8/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	user
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCU	PCU	perHour	s	-Min	perMin

(Default Analysis Set) - Ext, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ext, AM	Ext	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	One-way from C to A	A,B,C	8.16	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	6.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.064	0.163	0.102	0.232
1	B-C	623.937	0.071	0.179	-	-
1	C-B	573.963	0.164	0.164	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	0.00	100.000
B	FLAT	✓	30.00	100.000
C	FLAT	✓	65.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	0.000
	B	30.000	0.000	0.000
	C	65.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.33	0.33	0.33
	B	1.00	0.00	0.00
	C	1.00	0.00	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.06	8.16	0.07	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	29.73	0.00	471.20	0.064	0.07	8.149	A
C-A	65.00	65.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	471.20	0.064	0.07	8.159	A
C-A	65.00	65.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	471.20	0.064	0.07	8.159	A
C-A	65.00	65.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	471.20	0.064	0.07	8.159	A
C-A	65.00	65.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	471.20	0.064	0.07	8.159	A
C-A	65.00	65.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	471.20	0.064	0.07	8.159	A
C-A	65.00	65.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ext, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ext, PM	Ext	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	One-way from C to A	A,B,C	8.22	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	6.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.064	0.163	0.102	0.232
1	B-C	623.937	0.071	0.179	-	-
1	C-B	573.963	0.164	0.164	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	0.00	100.000
B	FLAT	✓	30.00	100.000
C	FLAT	✓	95.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	0.000
	B	30.000	0.000	0.000
	C	95.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.33	0.33	0.33
	B	1.00	0.00	0.00
	C	1.00	0.00	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.06	8.22	0.07	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	29.73	0.00	468.14	0.064	0.07	8.206	A
C-A	95.00	95.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	468.14	0.064	0.07	8.216	A
C-A	95.00	95.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	468.14	0.064	0.07	8.216	A
C-A	95.00	95.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	468.14	0.064	0.07	8.216	A
C-A	95.00	95.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	468.14	0.064	0.07	8.216	A
C-A	95.00	95.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	468.14	0.064	0.07	8.216	A
C-A	95.00	95.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.5.523 [19102,19/06/2015]
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Filename: 19044HK-01 Junction J.arc8
Path: F:\19044HK-01 (wkk) - URA TCS for Development Scheme at Kolwoon City (KC-AAC-01)\Calculation\TIA\Junction 8 \2020-11-26
Report generation date: 26/11/2020 13:05:22

» (Default Analysis Set) - Ext, AM
» (Default Analysis Set) - Ext, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - Ext							
Stream B-AC	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.06	6.62	0.05	A	0.05	6.56	0.04	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - Ext, AM " model duration: 8:00 - 9:30
"D2 - Ext, PM" model duration: 8:00 - 9:30

Run using Junctions 8.0.5.523 at 26/11/2020 13:05:21

File summary

Title	(untitled)
Location	
Site Number	
Date	28/8/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	user
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCU	PCU	perHour	s	-Min	perMin

(Default Analysis Set) - Ext, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ext, AM	Ext	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	One-way from C to A	A,B,C	6.62	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	6.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.064	0.163	0.102	0.232
1	B-C	623.937	0.071	0.179	-	-
1	C-B	573.963	0.164	0.164	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	0.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	90.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	0.000
	B	0.000	0.000	0.000
	C	60.000	30.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.33	0.33	0.33
	B	0.33	0.33	0.33
	C	0.67	0.33	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.05	6.62	0.06	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	532.70	0.000	0.00	0.000	A
C-A	60.00	60.00	0.00	-	-	-	-	-
C-B	30.00	29.78	0.00	573.96	0.052	0.05	6.610	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	532.67	0.000	0.00	0.000	A
C-A	60.00	60.00	0.00	-	-	-	-	-
C-B	30.00	30.00	0.00	573.96	0.052	0.05	6.617	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	532.67	0.000	0.00	0.000	A
C-A	60.00	60.00	0.00	-	-	-	-	-
C-B	30.00	30.00	0.00	573.96	0.052	0.06	6.617	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	532.67	0.000	0.00	0.000	A
C-A	60.00	60.00	0.00	-	-	-	-	-
C-B	30.00	30.00	0.00	573.96	0.052	0.06	6.617	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	532.67	0.000	0.00	0.000	A
C-A	60.00	60.00	0.00	-	-	-	-	-
C-B	30.00	30.00	0.00	573.96	0.052	0.06	6.617	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	532.67	0.000	0.00	0.000	A
C-A	60.00	60.00	0.00	-	-	-	-	-
C-B	30.00	30.00	0.00	573.96	0.052	0.06	6.617	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ext, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ext, PM	Ext	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	One-way from C to A	A,B,C	6.56	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	6.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.064	0.163	0.102	0.232
1	B-C	623.937	0.071	0.179	-	-
1	C-B	573.963	0.164	0.164	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	0.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	110.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	0.000
	B	0.000	0.000	0.000
	C	85.000	25.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.33	0.33	0.33
	B	0.33	0.33	0.33
	C	0.77	0.23	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.04	6.56	0.05	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	531.79	0.000	0.00	0.000	A
C-A	85.00	85.00	0.00	-	-	-	-	-
C-B	25.00	24.82	0.00	573.96	0.044	0.05	6.554	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	531.76	0.000	0.00	0.000	A
C-A	85.00	85.00	0.00	-	-	-	-	-
C-B	25.00	25.00	0.00	573.96	0.044	0.05	6.557	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	531.76	0.000	0.00	0.000	A
C-A	85.00	85.00	0.00	-	-	-	-	-
C-B	25.00	25.00	0.00	573.96	0.044	0.05	6.557	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	531.76	0.000	0.00	0.000	A
C-A	85.00	85.00	0.00	-	-	-	-	-
C-B	25.00	25.00	0.00	573.96	0.044	0.05	6.557	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	531.76	0.000	0.00	0.000	A
C-A	85.00	85.00	0.00	-	-	-	-	-
C-B	25.00	25.00	0.00	573.96	0.044	0.05	6.557	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	531.76	0.000	0.00	0.000	A
C-A	85.00	85.00	0.00	-	-	-	-	-
C-B	25.00	25.00	0.00	573.96	0.044	0.05	6.559	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.5.523 [19102,19/06/2015]
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Filename: 19044HK-01 Junction K.arc8
Path: F:\19044HK-01 (wkk) - URA TCS for Development Scheme at Kolwoon City (KC-AAC-01)\Calculation\TIA\Junction 8 \2020-11-26
Report generation date: 26/11/2020 13:07:19

» (Default Analysis Set) - Ref, AM
» (Default Analysis Set) - Ref, PM
» (Default Analysis Set) - Des, AM
» (Default Analysis Set) - Des, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - Des							
Stream B-AC	0.46	9.15	0.31	A	0.29	8.26	0.22	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-
	A1 - Ref							
Stream B-AC	0.44	8.86	0.31	A	0.28	8.12	0.22	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D3 - Ref, AM " model duration: 8:00 - 9:30
"D4 - Ref, PM" model duration: 8:00 - 9:30
"D5 - Des, AM" model duration: 8:00 - 9:30
"D6 - Des, PM" model duration: 8:00 - 9:30

Run using Junctions 8.0.5.523 at 26/11/2020 13:07:17

File summary

Title	(untitled)
Location	
Site Number	
Date	28/8/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	user
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCU	PCU	perHour	s	-Min	perMin

(Default Analysis Set) - Ref, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ref, AM	Ref	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	8.86	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	9.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.076	0.191	0.120	0.273
1	B-C	623.937	0.083	0.210	-	-
1	C-B	573.963	0.193	0.193	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	180.00	100.000
B	FLAT	✓	180.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	180.000
	B	0.000	0.000	180.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.00	1.00
	B	0.00	0.00	1.00
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.31	8.86	0.44	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	178.25	0.00	586.10	0.307	0.44	8.789	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	539.16	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	179.99	0.00	586.10	0.307	0.44	8.864	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	539.16	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	180.00	0.00	586.10	0.307	0.44	8.864	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	539.16	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	180.00	0.00	586.10	0.307	0.44	8.864	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	539.16	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	180.00	0.00	586.10	0.307	0.44	8.864	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	539.16	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	180.00	0.00	586.10	0.307	0.44	8.864	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	539.16	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ref, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ref, PM	Ref	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	8.12	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	9.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.076	0.191	0.120	0.273
1	B-C	623.937	0.083	0.210	-	-
1	C-B	573.963	0.193	0.193	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	265.00	100.000
B	FLAT	✓	125.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	265.000
	B	0.000	0.000	125.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.00	1.00
	B	0.00	0.00	1.00
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.22	8.12	0.28	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	123.88	0.00	568.24	0.220	0.28	8.082	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	522.72	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	265.00	265.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	124.99	0.00	568.24	0.220	0.28	8.121	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	522.72	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	265.00	265.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	125.00	0.00	568.24	0.220	0.28	8.121	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	522.72	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	265.00	265.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	125.00	0.00	568.24	0.220	0.28	8.121	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	522.72	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	265.00	265.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	125.00	0.00	568.24	0.220	0.28	8.121	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	522.72	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	265.00	265.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	125.00	0.00	568.24	0.220	0.28	8.121	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	522.72	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	265.00	265.00	0.00	-	-	-	-	-

(Default Analysis Set) - Des, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Des, AM	Des	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	9.15	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	9.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.076	0.191	0.120	0.273
1	B-C	623.937	0.083	0.210	-	-
1	C-B	573.963	0.193	0.193	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	240.00	100.000
B	FLAT	✓	180.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	240.000
	B	0.000	0.000	180.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.00	1.00
	B	0.00	0.00	1.00
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.31	9.15	0.46	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	178.20	0.00	573.49	0.314	0.45	9.068	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	527.56	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	240.00	240.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	179.99	0.00	573.49	0.314	0.45	9.148	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	527.56	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	240.00	240.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	180.00	0.00	573.49	0.314	0.46	9.148	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	527.56	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	240.00	240.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	180.00	0.00	573.49	0.314	0.46	9.148	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	527.56	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	240.00	240.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	180.00	0.00	573.49	0.314	0.46	9.148	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	527.56	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	240.00	240.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	180.00	0.00	573.49	0.314	0.46	9.148	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	527.56	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	240.00	240.00	0.00	-	-	-	-	-

(Default Analysis Set) - Des, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Des, PM	Des	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	8.26	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	9.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.076	0.191	0.120	0.273
1	B-C	623.937	0.083	0.210	-	-
1	C-B	573.963	0.193	0.193	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	300.00	100.000
B	FLAT	✓	125.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	300.000
	B	0.000	0.000	125.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.00	1.00
	B	0.00	0.00	1.00
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.22	8.26	0.29	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	123.87	0.00	560.88	0.223	0.28	8.216	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	515.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	300.00	300.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	124.99	0.00	560.88	0.223	0.29	8.258	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	515.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	300.00	300.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	125.00	0.00	560.88	0.223	0.29	8.258	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	515.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	300.00	300.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	125.00	0.00	560.88	0.223	0.29	8.258	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	515.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	300.00	300.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	125.00	0.00	560.88	0.223	0.29	8.258	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	515.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	300.00	300.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	125.00	0.00	560.88	0.223	0.29	8.258	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	515.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	300.00	300.00	0.00	-	-	-	-	-

Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.5.523 [19102,19/06/2015]
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Filename: 19044HK-01 Junction L.arc8
Path: F:\19044HK-01 (wkk) - URA TCS for Development Scheme at Kolwoon City (KC-AAC-01)\Calculation\TIA\Junction 8 \2020-11-26
Report generation date: 26/11/2020 13:10:58

» (Default Analysis Set) - Ref, AM
» (Default Analysis Set) - Ref, PM
» (Default Analysis Set) - Des, AM
» (Default Analysis Set) - Des, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - Des							
Stream B-ACD	0.23	11.28	0.19	B	0.16	9.80	0.14	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-
Stream A-D	0.12	7.00	0.10	A	0.12	7.00	0.10	A
Stream D-ABC	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream C-D	-	-	-	-	-	-	-	-
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A
	A1 - Ref							
Stream B-ACD	0.21	10.69	0.17	B	0.14	9.37	0.13	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-
Stream A-D	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream D-ABC	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream C-D	-	-	-	-	-	-	-	-
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - Ref, AM " model duration: 8:00 - 9:30
"D2 - Ref, PM" model duration: 8:00 - 9:30
"D3 - Des, AM" model duration: 8:00 - 9:30
"D4 - Des, PM" model duration: 8:00 - 9:30

Run using Junctions 8.0.5.523 at 26/11/2020 13:10:55

File summary

Title	(untitled)
Location	
Site Number	
Date	28/8/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	user
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCU	PCU	perHour	s	-Min	perMin

(Default Analysis Set) - Ref, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ref, AM	Ref	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	Crossroads	Two-way	A,B,C,D	10.69	B

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major
D	D	(untitled)		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	6.00		0.00		2.20	0.00		
C	6.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	2.20										0	0
D	One lane	2.20										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1	A-D	573.963	-	-	-	-	-	-	0.222	0.318	0.222	-	-	-
1	B-A	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	-	0.202	0.202	0.101
1	B-C	573.963	0.088	0.222	-	-	-	-	-	-	-	-	-	-
1	B-D, nearside lane	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	0.127	-	-	-
1	B-D, offside lane	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	0.127	-	-	-
1	C-B	573.963	0.222	0.222	0.318	-	-	-	-	-	-	-	-	-
1	D-A	573.963	-	-	-	-	-	-	0.222	-	0.088	-	-	-
1	D-B, nearside lane	439.579	0.127	0.127	0.289	-	-	-	0.202	0.202	0.080	-	-	-
1	D-B, offside lane	439.579	0.127	0.127	0.289	-	-	-	0.202	0.202	0.080	-	-	-
1	D-C	439.579	-	0.127	0.289	0.101	0.202	0.202	0.202	0.202	0.080	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	485.00	100.000
B	FLAT	✓	70.00	100.000
C	FLAT	✓	0.00	100.000
D	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	165.000	320.000	0.000
	B	40.000	0.000	30.000	0.000
	C	0.000	0.000	0.000	0.000
	D	0.000	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.34	0.66	0.00
	B	0.57	0.00	0.43	0.00
	C	0.25	0.25	0.25	0.25
	D	0.25	0.25	0.25	0.25

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.000	1.000
	B	1.000	1.000	1.000	1.000
	C	1.000	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.0	0.0	0.0	0.0
	B	0.0	0.0	0.0	0.0
	C	0.0	0.0	0.0	0.0
	D	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.17	10.69	0.21	B
A-B	-	-	-	-
A-C	-	-	-	-
A-D	0.00	0.00	0.00	A
D-ABC	0.00	0.00	0.00	A
C-D	-	-	-	-
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	70.00	69.18	0.00	406.85	0.172	0.20	10.636	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	416.31	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	466.11	0.000	0.00	0.000	A

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	70.00	69.99	0.00	406.85	0.172	0.21	10.686	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	416.28	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	466.11	0.000	0.00	0.000	A

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	70.00	70.00	0.00	406.85	0.172	0.21	10.686	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	416.28	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	466.11	0.000	0.00	0.000	A

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	70.00	70.00	0.00	406.85	0.172	0.21	10.686	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	416.28	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	466.11	0.000	0.00	0.000	A

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	70.00	70.00	0.00	406.85	0.172	0.21	10.686	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	416.28	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	466.11	0.000	0.00	0.000	A

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	70.00	70.00	0.00	406.85	0.172	0.21	10.686	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	416.28	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	466.11	0.000	0.00	0.000	A

(Default Analysis Set) - Ref, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ref, PM	Ref	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	Crossroads	Two-way	A,B,C,D	9.37	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major
D	D	(untitled)		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	6.00		0.00		2.20	0.00		
C	6.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	2.20										0	0
D	One lane	2.20										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1	A-D	573.963	-	-	-	-	-	-	0.222	0.318	0.222	-	-	-
1	B-A	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	-	0.202	0.202	0.101
1	B-C	573.963	0.088	0.222	-	-	-	-	-	-	-	-	-	-
1	B-D, nearside lane	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	0.127	-	-	-
1	B-D, offside lane	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	0.127	-	-	-
1	C-B	573.963	0.222	0.222	0.318	-	-	-	-	-	-	-	-	-
1	D-A	573.963	-	-	-	-	-	-	0.222	-	0.088	-	-	-
1	D-B, nearside lane	439.579	0.127	0.127	0.289	-	-	-	0.202	0.202	0.080	-	-	-
1	D-B, offside lane	439.579	0.127	0.127	0.289	-	-	-	0.202	0.202	0.080	-	-	-
1	D-C	439.579	-	0.127	0.289	0.101	0.202	0.202	0.202	0.202	0.080	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	350.00	100.000
B	FLAT	✓	55.00	100.000
C	FLAT	✓	0.00	100.000
D	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	170.000	180.000	0.000
	B	30.000	0.000	25.000	0.000
	C	0.000	0.000	0.000	0.000
	D	0.000	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.49	0.51	0.00
	B	0.55	0.00	0.45	0.00
	C	0.25	0.25	0.25	0.25
	D	0.25	0.25	0.25	0.25

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.000	1.000
	B	1.000	1.000	1.000	1.000
	C	1.000	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.0	0.0	0.0	0.0
	B	0.0	0.0	0.0	0.0
	C	0.0	0.0	0.0	0.0
	D	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.13	9.37	0.14	A
A-B	-	-	-	-
A-C	-	-	-	-
A-D	0.00	0.00	0.00	A
D-ABC	0.00	0.00	0.00	A
C-D	-	-	-	-
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	55.00	54.43	0.00	439.35	0.125	0.14	9.340	A
A-B	170.00	170.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	432.30	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	496.13	0.000	0.00	0.000	A

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	55.00	55.00	0.00	439.35	0.125	0.14	9.366	A
A-B	170.00	170.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	432.27	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	496.13	0.000	0.00	0.000	A

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	55.00	55.00	0.00	439.35	0.125	0.14	9.366	A
A-B	170.00	170.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	432.27	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	496.13	0.000	0.00	0.000	A

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	55.00	55.00	0.00	439.35	0.125	0.14	9.366	A
A-B	170.00	170.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	432.27	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	496.13	0.000	0.00	0.000	A

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	55.00	55.00	0.00	439.35	0.125	0.14	9.366	A
A-B	170.00	170.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	432.27	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	496.13	0.000	0.00	0.000	A

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	55.00	55.00	0.00	439.35	0.125	0.14	9.366	A
A-B	170.00	170.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	432.27	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	496.13	0.000	0.00	0.000	A

(Default Analysis Set) - Des, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Des, AM	Des	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	Crossroads	Two-way	A,B,C,D	9.38	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major
D	D	(untitled)		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	6.00		0.00		2.20	0.00		
C	6.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	2.20										0	0
D	One lane	2.20										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1	A-D	573.963	-	-	-	-	-	-	0.222	0.318	0.222	-	-	-
1	B-A	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	-	0.202	0.202	0.101
1	B-C	573.963	0.088	0.222	-	-	-	-	-	-	-	-	-	-
1	B-D, nearside lane	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	0.127	-	-	-
1	B-D, offside lane	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	0.127	-	-	-
1	C-B	573.963	0.222	0.222	0.318	-	-	-	-	-	-	-	-	-
1	D-A	573.963	-	-	-	-	-	-	0.222	-	0.088	-	-	-
1	D-B, nearside lane	439.579	0.127	0.127	0.289	-	-	-	0.202	0.202	0.080	-	-	-
1	D-B, offside lane	439.579	0.127	0.127	0.289	-	-	-	0.202	0.202	0.080	-	-	-
1	D-C	439.579	-	0.127	0.289	0.101	0.202	0.202	0.202	0.202	0.080	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	545.00	100.000
B	FLAT	✓	75.00	100.000
C	FLAT	✓	0.00	100.000
D	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	165.000	320.000	60.000
	B	40.000	0.000	30.000	5.000
	C	0.000	0.000	0.000	0.000
	D	0.000	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.30	0.59	0.11
	B	0.53	0.00	0.40	0.07
	C	0.25	0.25	0.25	0.25
	D	0.25	0.25	0.25	0.25

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.000	1.000
	B	1.000	1.000	1.000	1.000
	C	1.000	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.0	0.0	0.0	0.0
	B	0.0	0.0	0.0	0.0
	C	0.0	0.0	0.0	0.0
	D	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.19	11.28	0.23	B
A-B	-	-	-	-
A-C	-	-	-	-
A-D	0.10	7.00	0.12	A
D-ABC	0.00	0.00	0.00	A
C-D	-	-	-	-
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	75.00	74.07	0.00	394.31	0.190	0.23	11.209	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	60.00	59.54	0.00	573.96	0.105	0.12	6.992	A
D-ABC	0.00	0.00	0.00	400.38	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	447.05	0.000	0.00	0.000	A

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	75.00	74.99	0.00	394.24	0.190	0.23	11.276	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	400.22	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	446.90	0.000	0.00	0.000	A

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	75.00	75.00	0.00	394.24	0.190	0.23	11.276	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	400.22	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	446.90	0.000	0.00	0.000	A

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	75.00	75.00	0.00	394.24	0.190	0.23	11.276	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	400.22	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	446.90	0.000	0.00	0.000	A

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	75.00	75.00	0.00	394.24	0.190	0.23	11.276	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	400.22	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	446.90	0.000	0.00	0.000	A

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	75.00	75.00	0.00	394.24	0.190	0.23	11.276	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	400.22	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	446.90	0.000	0.00	0.000	A

(Default Analysis Set) - Des, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Des, PM	Des	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	Crossroads	Two-way	A,B,C,D	8.40	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major
D	D	(untitled)		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	6.00		0.00		2.20	0.00		
C	6.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	2.20										0	0
D	One lane	2.20										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1	A-D	573.963	-	-	-	-	-	-	0.222	0.318	0.222	-	-	-
1	B-A	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	-	0.202	0.202	0.101
1	B-C	573.963	0.088	0.222	-	-	-	-	-	-	-	-	-	-
1	B-D, nearside lane	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	0.127	-	-	-
1	B-D, offside lane	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	0.127	-	-	-
1	C-B	573.963	0.222	0.222	0.318	-	-	-	-	-	-	-	-	-
1	D-A	573.963	-	-	-	-	-	-	0.222	-	0.088	-	-	-
1	D-B, nearside lane	439.579	0.127	0.127	0.289	-	-	-	0.202	0.202	0.080	-	-	-
1	D-B, offside lane	439.579	0.127	0.127	0.289	-	-	-	0.202	0.202	0.080	-	-	-
1	D-C	439.579	-	0.127	0.289	0.101	0.202	0.202	0.202	0.202	0.080	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	400.00	100.000
B	FLAT	✓	60.00	100.000
C	FLAT	✓	0.00	100.000
D	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	165.000	175.000	60.000
	B	30.000	0.000	25.000	5.000
	C	0.000	0.000	0.000	0.000
	D	0.000	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.41	0.44	0.15
	B	0.50	0.00	0.42	0.08
	C	0.25	0.25	0.25	0.25
	D	0.25	0.25	0.25	0.25

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.000	1.000
	B	1.000	1.000	1.000	1.000
	C	1.000	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.0	0.0	0.0	0.0
	B	0.0	0.0	0.0	0.0
	C	0.0	0.0	0.0	0.0
	D	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.14	9.80	0.16	A
A-B	-	-	-	-
A-C	-	-	-	-
A-D	0.10	7.00	0.12	A
D-ABC	0.00	0.00	0.00	A
C-D	-	-	-	-
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	60.00	59.35	0.00	427.28	0.140	0.16	9.768	A
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	175.00	175.00	0.00	-	-	-	-	-
A-D	60.00	59.54	0.00	573.96	0.105	0.12	6.992	A
D-ABC	0.00	0.00	0.00	417.60	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	479.29	0.000	0.00	0.000	A

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	60.00	60.00	0.00	427.21	0.140	0.16	9.803	A
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	175.00	175.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	417.45	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	479.14	0.000	0.00	0.000	A

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	60.00	60.00	0.00	427.21	0.140	0.16	9.803	A
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	175.00	175.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	417.45	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	479.14	0.000	0.00	0.000	A

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	60.00	60.00	0.00	427.21	0.140	0.16	9.803	A
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	175.00	175.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	417.45	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	479.14	0.000	0.00	0.000	A

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	60.00	60.00	0.00	427.21	0.140	0.16	9.803	A
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	175.00	175.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	417.45	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	479.14	0.000	0.00	0.000	A

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	60.00	60.00	0.00	427.21	0.140	0.16	9.803	A
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	175.00	175.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	417.45	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	479.14	0.000	0.00	0.000	A

Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.5.523 [19102,19/06/2015]
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Filename: 19044HK-01 Junction H.arc8
Path: F:\19044HK-01 (wkk) - URA TCS for Development Scheme at Kolwoon City (KC-AAC-01)\Calculation\TIA\Junction 8 \2020-11-26
Report generation date: 26/11/2020 13:03:36

» (Default Analysis Set) - Ext, AM
» (Default Analysis Set) - Ext, PM
» (Default Analysis Set) - Ref, AM
» (Default Analysis Set) - Ref, PM
» (Default Analysis Set) - Des, AM
» (Default Analysis Set) - Des, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - Des							
Stream B-AC	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-
	A1 - Ext							
Stream B-AC	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-
	A1 - Ref							
Stream B-AC	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - Ext, AM " model duration: 8:00 - 9:30
"D2 - Ext, PM" model duration: 8:00 - 9:30
"D3 - Ref, AM" model duration: 8:00 - 9:30
"D4 - Ref, PM" model duration: 8:00 - 9:30
"D5 - Des, AM" model duration: 8:00 - 9:30
"D6 - Des, PM" model duration: 8:00 - 9:30

Run using Junctions 8.0.5.523 at 26/11/2020 13:03:33

File summary

Title	(untitled)
Location	
Site Number	
Date	28/8/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	user
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCU	PCU	perHour	s	-Min	perMin

(Default Analysis Set) - Ext, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ext, AM	Ext	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	0.00	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.083	0.210	0.132	0.301
1	B-C	623.937	0.091	0.231	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	80.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	15.000	65.000
	B	0.000	0.000	0.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.19	0.81
	B	0.33	0.33	0.33
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	525.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	556.95	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	65.00	65.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	525.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	556.95	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	65.00	65.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	525.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	556.95	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	65.00	65.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	525.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	556.95	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	65.00	65.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	525.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	556.95	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	65.00	65.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	525.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	556.95	0.000	0.00	0.000	A
A-B	15.00	15.00	0.00	-	-	-	-	-
A-C	65.00	65.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ext, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ext, PM	Ext	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	0.00	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.083	0.210	0.132	0.301
1	B-C	623.937	0.091	0.231	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	90.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	10.000	80.000
	B	0.000	0.000	0.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.11	0.89
	B	0.33	0.33	0.33
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	522.57	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	522.57	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	522.57	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	522.57	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	522.57	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	522.57	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	554.82	0.000	0.00	0.000	A
A-B	10.00	10.00	0.00	-	-	-	-	-
A-C	80.00	80.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ref, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ref, AM	Ref	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	0.00	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.083	0.210	0.132	0.301
1	B-C	623.937	0.091	0.231	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	660.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	75.000	585.000
	B	0.000	0.000	0.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.11	0.89
	B	0.33	0.33	0.33
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	404.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	433.58	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	585.00	585.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	404.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	433.58	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	585.00	585.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	404.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	433.58	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	585.00	585.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	404.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	433.58	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	585.00	585.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	404.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	433.58	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	585.00	585.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	404.46	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	433.58	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	585.00	585.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ref, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ref, PM	Ref	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	0.00	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.083	0.210	0.132	0.301
1	B-C	623.937	0.091	0.231	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	550.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	90.000	460.000
	B	0.000	0.000	0.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.16	0.84
	B	0.33	0.33	0.33
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	431.01	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	456.97	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	460.00	460.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	431.01	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	456.97	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	460.00	460.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	431.01	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	456.97	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	460.00	460.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	431.01	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	456.97	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	460.00	460.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	431.01	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	456.97	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	460.00	460.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	431.01	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	456.97	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	460.00	460.00	0.00	-	-	-	-	-

(Default Analysis Set) - Des, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Des, AM	Des	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	0.00	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.083	0.210	0.132	0.301
1	B-C	623.937	0.091	0.231	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	715.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	75.000	640.000
	B	0.000	0.000	0.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.10	0.90
	B	0.33	0.33	0.33
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	392.18	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	421.88	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	640.00	640.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	392.18	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	421.88	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	640.00	640.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	392.18	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	421.88	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	640.00	640.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	392.18	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	421.88	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	640.00	640.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	392.18	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	421.88	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	640.00	640.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	392.18	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	421.88	0.000	0.00	0.000	A
A-B	75.00	75.00	0.00	-	-	-	-	-
A-C	640.00	640.00	0.00	-	-	-	-	-

(Default Analysis Set) - Des, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Des, PM	Des	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	0.00	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.083	0.210	0.132	0.301
1	B-C	623.937	0.091	0.231	-	-
1	C-B	573.963	0.213	0.213	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	610.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	90.000	520.000
	B	0.000	0.000	0.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.15	0.85
	B	0.33	0.33	0.33
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	417.64	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	444.21	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	520.00	520.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	417.64	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	444.21	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	520.00	520.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	417.64	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	444.21	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	520.00	520.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	417.64	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	444.21	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	520.00	520.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	417.64	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	444.21	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	520.00	520.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	417.64	0.000	0.00	0.000	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	444.21	0.000	0.00	0.000	A
A-B	90.00	90.00	0.00	-	-	-	-	-
A-C	520.00	520.00	0.00	-	-	-	-	-

Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.5.523 [19102,19/06/2015]
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Filename: 19044HK-01 Junction I.arc8
Path: F:\19044HK-01 (wkk) - URA TCS for Development Scheme at Kolwoon City (KC-AAC-01)\Calculation\TIA\Junction 8 \2020-11-26
Report generation date: 26/11/2020 13:04:35

» (Default Analysis Set) - Ext, AM
» (Default Analysis Set) - Ext, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - Ext							
Stream B-AC	0.07	8.16	0.06	A	0.07	8.22	0.06	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - Ext, AM " model duration: 8:00 - 9:30
"D2 - Ext, PM" model duration: 8:00 - 9:30

Run using Junctions 8.0.5.523 at 26/11/2020 13:04:34

File summary

Title	(untitled)
Location	
Site Number	
Date	28/8/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	user
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCU	PCU	perHour	s	-Min	perMin

(Default Analysis Set) - Ext, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ext, AM	Ext	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	One-way from C to A	A,B,C	8.16	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	6.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.064	0.163	0.102	0.232
1	B-C	623.937	0.071	0.179	-	-
1	C-B	573.963	0.164	0.164	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	0.00	100.000
B	FLAT	✓	30.00	100.000
C	FLAT	✓	65.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	0.000
	B	30.000	0.000	0.000
	C	65.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.33	0.33	0.33
	B	1.00	0.00	0.00
	C	1.00	0.00	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.06	8.16	0.07	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	29.73	0.00	471.20	0.064	0.07	8.149	A
C-A	65.00	65.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	471.20	0.064	0.07	8.159	A
C-A	65.00	65.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	471.20	0.064	0.07	8.159	A
C-A	65.00	65.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	471.20	0.064	0.07	8.159	A
C-A	65.00	65.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	471.20	0.064	0.07	8.159	A
C-A	65.00	65.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	471.20	0.064	0.07	8.159	A
C-A	65.00	65.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ext, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ext, PM	Ext	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	One-way from C to A	A,B,C	8.22	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	6.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.064	0.163	0.102	0.232
1	B-C	623.937	0.071	0.179	-	-
1	C-B	573.963	0.164	0.164	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	0.00	100.000
B	FLAT	✓	30.00	100.000
C	FLAT	✓	95.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	0.000
	B	30.000	0.000	0.000
	C	95.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.33	0.33	0.33
	B	1.00	0.00	0.00
	C	1.00	0.00	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.06	8.22	0.07	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	29.73	0.00	468.14	0.064	0.07	8.206	A
C-A	95.00	95.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	468.14	0.064	0.07	8.216	A
C-A	95.00	95.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	468.14	0.064	0.07	8.216	A
C-A	95.00	95.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	468.14	0.064	0.07	8.216	A
C-A	95.00	95.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	468.14	0.064	0.07	8.216	A
C-A	95.00	95.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	30.00	30.00	0.00	468.14	0.064	0.07	8.216	A
C-A	95.00	95.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.5.523 [19102,19/06/2015]
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Filename: 19044HK-01 Junction J.arc8
Path: F:\19044HK-01 (wkk) - URA TCS for Development Scheme at Kolwoon City (KC-AAC-01)\Calculation\TIA\Junction 8 \2020-11-26
Report generation date: 26/11/2020 13:05:22

» (Default Analysis Set) - Ext, AM
» (Default Analysis Set) - Ext, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - Ext							
Stream B-AC	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.06	6.62	0.05	A	0.05	6.56	0.04	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - Ext, AM " model duration: 8:00 - 9:30
"D2 - Ext, PM" model duration: 8:00 - 9:30

Run using Junctions 8.0.5.523 at 26/11/2020 13:05:21

File summary

Title	(untitled)
Location	
Site Number	
Date	28/8/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	user
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCU	PCU	perHour	s	-Min	perMin

(Default Analysis Set) - Ext, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ext, AM	Ext	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	One-way from C to A	A,B,C	6.62	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	6.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.064	0.163	0.102	0.232
1	B-C	623.937	0.071	0.179	-	-
1	C-B	573.963	0.164	0.164	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	0.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	90.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	0.000
	B	0.000	0.000	0.000
	C	60.000	30.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.33	0.33	0.33
	B	0.33	0.33	0.33
	C	0.67	0.33	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.05	6.62	0.06	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	532.70	0.000	0.00	0.000	A
C-A	60.00	60.00	0.00	-	-	-	-	-
C-B	30.00	29.78	0.00	573.96	0.052	0.05	6.610	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	532.67	0.000	0.00	0.000	A
C-A	60.00	60.00	0.00	-	-	-	-	-
C-B	30.00	30.00	0.00	573.96	0.052	0.05	6.617	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	532.67	0.000	0.00	0.000	A
C-A	60.00	60.00	0.00	-	-	-	-	-
C-B	30.00	30.00	0.00	573.96	0.052	0.06	6.617	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	532.67	0.000	0.00	0.000	A
C-A	60.00	60.00	0.00	-	-	-	-	-
C-B	30.00	30.00	0.00	573.96	0.052	0.06	6.617	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	532.67	0.000	0.00	0.000	A
C-A	60.00	60.00	0.00	-	-	-	-	-
C-B	30.00	30.00	0.00	573.96	0.052	0.06	6.617	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	532.67	0.000	0.00	0.000	A
C-A	60.00	60.00	0.00	-	-	-	-	-
C-B	30.00	30.00	0.00	573.96	0.052	0.06	6.617	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ext, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ext, PM	Ext	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	One-way from C to A	A,B,C	6.56	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	6.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.064	0.163	0.102	0.232
1	B-C	623.937	0.071	0.179	-	-
1	C-B	573.963	0.164	0.164	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	0.00	100.000
B	FLAT	✓	0.00	100.000
C	FLAT	✓	110.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	0.000
	B	0.000	0.000	0.000
	C	85.000	25.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.33	0.33	0.33
	B	0.33	0.33	0.33
	C	0.77	0.23	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.00	0.00	0.00	A
C-A	-	-	-	-
C-B	0.04	6.56	0.05	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	531.79	0.000	0.00	0.000	A
C-A	85.00	85.00	0.00	-	-	-	-	-
C-B	25.00	24.82	0.00	573.96	0.044	0.05	6.554	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	531.76	0.000	0.00	0.000	A
C-A	85.00	85.00	0.00	-	-	-	-	-
C-B	25.00	25.00	0.00	573.96	0.044	0.05	6.557	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	531.76	0.000	0.00	0.000	A
C-A	85.00	85.00	0.00	-	-	-	-	-
C-B	25.00	25.00	0.00	573.96	0.044	0.05	6.557	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	531.76	0.000	0.00	0.000	A
C-A	85.00	85.00	0.00	-	-	-	-	-
C-B	25.00	25.00	0.00	573.96	0.044	0.05	6.557	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	531.76	0.000	0.00	0.000	A
C-A	85.00	85.00	0.00	-	-	-	-	-
C-B	25.00	25.00	0.00	573.96	0.044	0.05	6.557	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	0.00	0.00	0.00	531.76	0.000	0.00	0.000	A
C-A	85.00	85.00	0.00	-	-	-	-	-
C-B	25.00	25.00	0.00	573.96	0.044	0.05	6.559	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	0.00	0.00	0.00	-	-	-	-	-

Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.5.523 [19102,19/06/2015]
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Filename: 19044HK-01 Junction K.arc8
Path: F:\19044HK-01 (wkk) - URA TCS for Development Scheme at Kolwoon City (KC-AAC-01)\Calculation\TIA\Junction 8 \2020-11-26
Report generation date: 26/11/2020 13:07:19

» (Default Analysis Set) - Ref, AM
» (Default Analysis Set) - Ref, PM
» (Default Analysis Set) - Des, AM
» (Default Analysis Set) - Des, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - Des							
Stream B-AC	0.46	9.15	0.31	A	0.29	8.26	0.22	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-
	A1 - Ref							
Stream B-AC	0.44	8.86	0.31	A	0.28	8.12	0.22	A
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D3 - Ref, AM " model duration: 8:00 - 9:30
"D4 - Ref, PM" model duration: 8:00 - 9:30
"D5 - Des, AM" model duration: 8:00 - 9:30
"D6 - Des, PM" model duration: 8:00 - 9:30

Run using Junctions 8.0.5.523 at 26/11/2020 13:07:17

File summary

Title	(untitled)
Location	
Site Number	
Date	28/8/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	user
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCU	PCU	perHour	s	-Min	perMin

(Default Analysis Set) - Ref, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ref, AM	Ref	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	8.86	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	9.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.076	0.191	0.120	0.273
1	B-C	623.937	0.083	0.210	-	-
1	C-B	573.963	0.193	0.193	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	180.00	100.000
B	FLAT	✓	180.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	180.000
	B	0.000	0.000	180.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.00	1.00
	B	0.00	0.00	1.00
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.31	8.86	0.44	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	178.25	0.00	586.10	0.307	0.44	8.789	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	539.16	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	179.99	0.00	586.10	0.307	0.44	8.864	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	539.16	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	180.00	0.00	586.10	0.307	0.44	8.864	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	539.16	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	180.00	0.00	586.10	0.307	0.44	8.864	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	539.16	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	180.00	0.00	586.10	0.307	0.44	8.864	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	539.16	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	180.00	0.00	586.10	0.307	0.44	8.864	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	539.16	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-

(Default Analysis Set) - Ref, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ref, PM	Ref	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	8.12	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	9.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.076	0.191	0.120	0.273
1	B-C	623.937	0.083	0.210	-	-
1	C-B	573.963	0.193	0.193	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	265.00	100.000
B	FLAT	✓	125.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	265.000
	B	0.000	0.000	125.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.00	1.00
	B	0.00	0.00	1.00
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.22	8.12	0.28	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	123.88	0.00	568.24	0.220	0.28	8.082	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	522.72	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	265.00	265.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	124.99	0.00	568.24	0.220	0.28	8.121	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	522.72	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	265.00	265.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	125.00	0.00	568.24	0.220	0.28	8.121	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	522.72	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	265.00	265.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	125.00	0.00	568.24	0.220	0.28	8.121	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	522.72	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	265.00	265.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	125.00	0.00	568.24	0.220	0.28	8.121	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	522.72	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	265.00	265.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	125.00	0.00	568.24	0.220	0.28	8.121	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	522.72	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	265.00	265.00	0.00	-	-	-	-	-

(Default Analysis Set) - Des, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Des, AM	Des	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	9.15	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	9.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.076	0.191	0.120	0.273
1	B-C	623.937	0.083	0.210	-	-
1	C-B	573.963	0.193	0.193	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	240.00	100.000
B	FLAT	✓	180.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	240.000
	B	0.000	0.000	180.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.00	1.00
	B	0.00	0.00	1.00
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.31	9.15	0.46	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	178.20	0.00	573.49	0.314	0.45	9.068	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	527.56	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	240.00	240.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	179.99	0.00	573.49	0.314	0.45	9.148	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	527.56	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	240.00	240.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	180.00	0.00	573.49	0.314	0.46	9.148	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	527.56	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	240.00	240.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	180.00	0.00	573.49	0.314	0.46	9.148	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	527.56	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	240.00	240.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	180.00	0.00	573.49	0.314	0.46	9.148	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	527.56	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	240.00	240.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	180.00	180.00	0.00	573.49	0.314	0.46	9.148	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	527.56	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	240.00	240.00	0.00	-	-	-	-	-

(Default Analysis Set) - Des, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Des, PM	Des	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C	8.26	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	9.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	477.852	0.076	0.191	0.120	0.273
1	B-C	623.937	0.083	0.210	-	-
1	C-B	573.963	0.193	0.193	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	300.00	100.000
B	FLAT	✓	125.00	100.000
C	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	300.000
	B	0.000	0.000	125.000
	C	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.00	1.00
	B	0.00	0.00	1.00
	C	0.33	0.33	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.000
	B	1.000	1.000	1.000
	C	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.22	8.26	0.29	A
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A
A-B	-	-	-	-
A-C	-	-	-	-

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	123.87	0.00	560.88	0.223	0.28	8.216	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	515.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	300.00	300.00	0.00	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	124.99	0.00	560.88	0.223	0.29	8.258	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	515.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	300.00	300.00	0.00	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	125.00	0.00	560.88	0.223	0.29	8.258	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	515.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	300.00	300.00	0.00	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	125.00	0.00	560.88	0.223	0.29	8.258	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	515.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	300.00	300.00	0.00	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	125.00	0.00	560.88	0.223	0.29	8.258	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	515.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	300.00	300.00	0.00	-	-	-	-	-

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-AC	125.00	125.00	0.00	560.88	0.223	0.29	8.258	A
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	515.96	0.000	0.00	0.000	A
A-B	0.00	0.00	0.00	-	-	-	-	-
A-C	300.00	300.00	0.00	-	-	-	-	-

Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.5.523 [19102,19/06/2015]
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Filename: 19044HK-01 Junction L.arc8
Path: F:\19044HK-01 (wkk) - URA TCS for Development Scheme at Kolwoon City (KC-AAC-01)\Calculation\TIA\Junction 8 \2020-11-26
Report generation date: 26/11/2020 13:10:58

» (Default Analysis Set) - Ref, AM
» (Default Analysis Set) - Ref, PM
» (Default Analysis Set) - Des, AM
» (Default Analysis Set) - Des, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - Des							
Stream B-ACD	0.23	11.28	0.19	B	0.16	9.80	0.14	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-
Stream A-D	0.12	7.00	0.10	A	0.12	7.00	0.10	A
Stream D-ABC	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream C-D	-	-	-	-	-	-	-	-
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A
	A1 - Ref							
Stream B-ACD	0.21	10.69	0.17	B	0.14	9.37	0.13	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-
Stream A-D	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream D-ABC	0.00	0.00	0.00	A	0.00	0.00	0.00	A
Stream C-D	-	-	-	-	-	-	-	-
Stream C-A	-	-	-	-	-	-	-	-
Stream C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	A

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - Ref, AM " model duration: 8:00 - 9:30
"D2 - Ref, PM" model duration: 8:00 - 9:30
"D3 - Des, AM" model duration: 8:00 - 9:30
"D4 - Des, PM" model duration: 8:00 - 9:30

Run using Junctions 8.0.5.523 at 26/11/2020 13:10:55

File summary

Title	(untitled)
Location	
Site Number	
Date	28/8/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	user
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCU	PCU	perHour	s	-Min	perMin

(Default Analysis Set) - Ref, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ref, AM	Ref	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	Crossroads	Two-way	A,B,C,D	10.69	B

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major
D	D	(untitled)		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	6.00		0.00		2.20	0.00		
C	6.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	2.20										0	0
D	One lane	2.20										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1	A-D	573.963	-	-	-	-	-	-	0.222	0.318	0.222	-	-	-
1	B-A	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	-	0.202	0.202	0.101
1	B-C	573.963	0.088	0.222	-	-	-	-	-	-	-	-	-	-
1	B-D, nearside lane	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	0.127	-	-	-
1	B-D, offside lane	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	0.127	-	-	-
1	C-B	573.963	0.222	0.222	0.318	-	-	-	-	-	-	-	-	-
1	D-A	573.963	-	-	-	-	-	-	0.222	-	0.088	-	-	-
1	D-B, nearside lane	439.579	0.127	0.127	0.289	-	-	-	0.202	0.202	0.080	-	-	-
1	D-B, offside lane	439.579	0.127	0.127	0.289	-	-	-	0.202	0.202	0.080	-	-	-
1	D-C	439.579	-	0.127	0.289	0.101	0.202	0.202	0.202	0.202	0.080	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	485.00	100.000
B	FLAT	✓	70.00	100.000
C	FLAT	✓	0.00	100.000
D	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	165.000	320.000	0.000
	B	40.000	0.000	30.000	0.000
	C	0.000	0.000	0.000	0.000
	D	0.000	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.34	0.66	0.00
	B	0.57	0.00	0.43	0.00
	C	0.25	0.25	0.25	0.25
	D	0.25	0.25	0.25	0.25

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.000	1.000
	B	1.000	1.000	1.000	1.000
	C	1.000	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.0	0.0	0.0	0.0
	B	0.0	0.0	0.0	0.0
	C	0.0	0.0	0.0	0.0
	D	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.17	10.69	0.21	B
A-B	-	-	-	-
A-C	-	-	-	-
A-D	0.00	0.00	0.00	A
D-ABC	0.00	0.00	0.00	A
C-D	-	-	-	-
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	70.00	69.18	0.00	406.85	0.172	0.20	10.636	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	416.31	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	466.11	0.000	0.00	0.000	A

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	70.00	69.99	0.00	406.85	0.172	0.21	10.686	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	416.28	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	466.11	0.000	0.00	0.000	A

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	70.00	70.00	0.00	406.85	0.172	0.21	10.686	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	416.28	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	466.11	0.000	0.00	0.000	A

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	70.00	70.00	0.00	406.85	0.172	0.21	10.686	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	416.28	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	466.11	0.000	0.00	0.000	A

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	70.00	70.00	0.00	406.85	0.172	0.21	10.686	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	416.28	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	466.11	0.000	0.00	0.000	A

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	70.00	70.00	0.00	406.85	0.172	0.21	10.686	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	416.28	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	466.11	0.000	0.00	0.000	A

(Default Analysis Set) - Ref, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Ref, PM	Ref	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	Crossroads	Two-way	A,B,C,D	9.37	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major
D	D	(untitled)		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	6.00		0.00		2.20	0.00		
C	6.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	2.20										0	0
D	One lane	2.20										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1	A-D	573.963	-	-	-	-	-	-	0.222	0.318	0.222	-	-	-
1	B-A	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	-	0.202	0.202	0.101
1	B-C	573.963	0.088	0.222	-	-	-	-	-	-	-	-	-	-
1	B-D, nearside lane	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	0.127	-	-	-
1	B-D, offside lane	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	0.127	-	-	-
1	C-B	573.963	0.222	0.222	0.318	-	-	-	-	-	-	-	-	-
1	D-A	573.963	-	-	-	-	-	-	0.222	-	0.088	-	-	-
1	D-B, nearside lane	439.579	0.127	0.127	0.289	-	-	-	0.202	0.202	0.080	-	-	-
1	D-B, offside lane	439.579	0.127	0.127	0.289	-	-	-	0.202	0.202	0.080	-	-	-
1	D-C	439.579	-	0.127	0.289	0.101	0.202	0.202	0.202	0.202	0.080	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	350.00	100.000
B	FLAT	✓	55.00	100.000
C	FLAT	✓	0.00	100.000
D	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	170.000	180.000	0.000
	B	30.000	0.000	25.000	0.000
	C	0.000	0.000	0.000	0.000
	D	0.000	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.49	0.51	0.00
	B	0.55	0.00	0.45	0.00
	C	0.25	0.25	0.25	0.25
	D	0.25	0.25	0.25	0.25

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.000	1.000
	B	1.000	1.000	1.000	1.000
	C	1.000	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.0	0.0	0.0	0.0
	B	0.0	0.0	0.0	0.0
	C	0.0	0.0	0.0	0.0
	D	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.13	9.37	0.14	A
A-B	-	-	-	-
A-C	-	-	-	-
A-D	0.00	0.00	0.00	A
D-ABC	0.00	0.00	0.00	A
C-D	-	-	-	-
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	55.00	54.43	0.00	439.35	0.125	0.14	9.340	A
A-B	170.00	170.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	432.30	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	496.13	0.000	0.00	0.000	A

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	55.00	55.00	0.00	439.35	0.125	0.14	9.366	A
A-B	170.00	170.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	432.27	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	496.13	0.000	0.00	0.000	A

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	55.00	55.00	0.00	439.35	0.125	0.14	9.366	A
A-B	170.00	170.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	432.27	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	496.13	0.000	0.00	0.000	A

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	55.00	55.00	0.00	439.35	0.125	0.14	9.366	A
A-B	170.00	170.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	432.27	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	496.13	0.000	0.00	0.000	A

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	55.00	55.00	0.00	439.35	0.125	0.14	9.366	A
A-B	170.00	170.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	432.27	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	496.13	0.000	0.00	0.000	A

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	55.00	55.00	0.00	439.35	0.125	0.14	9.366	A
A-B	170.00	170.00	0.00	-	-	-	-	-
A-C	180.00	180.00	0.00	-	-	-	-	-
A-D	0.00	0.00	0.00	573.96	0.000	0.00	0.000	A
D-ABC	0.00	0.00	0.00	432.27	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	496.13	0.000	0.00	0.000	A

(Default Analysis Set) - Des, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Des, AM	Des	AM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	Crossroads	Two-way	A,B,C,D	9.38	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major
D	D	(untitled)		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	6.00		0.00		2.20	0.00		
C	6.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	2.20										0	0
D	One lane	2.20										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1	A-D	573.963	-	-	-	-	-	-	0.222	0.318	0.222	-	-	-
1	B-A	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	-	0.202	0.202	0.101
1	B-C	573.963	0.088	0.222	-	-	-	-	-	-	-	-	-	-
1	B-D, nearside lane	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	0.127	-	-	-
1	B-D, offside lane	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	0.127	-	-	-
1	C-B	573.963	0.222	0.222	0.318	-	-	-	-	-	-	-	-	-
1	D-A	573.963	-	-	-	-	-	-	0.222	-	0.088	-	-	-
1	D-B, nearside lane	439.579	0.127	0.127	0.289	-	-	-	0.202	0.202	0.080	-	-	-
1	D-B, offside lane	439.579	0.127	0.127	0.289	-	-	-	0.202	0.202	0.080	-	-	-
1	D-C	439.579	-	0.127	0.289	0.101	0.202	0.202	0.202	0.202	0.080	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	545.00	100.000
B	FLAT	✓	75.00	100.000
C	FLAT	✓	0.00	100.000
D	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	165.000	320.000	60.000
	B	40.000	0.000	30.000	5.000
	C	0.000	0.000	0.000	0.000
	D	0.000	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.30	0.59	0.11
	B	0.53	0.00	0.40	0.07
	C	0.25	0.25	0.25	0.25
	D	0.25	0.25	0.25	0.25

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.000	1.000
	B	1.000	1.000	1.000	1.000
	C	1.000	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.0	0.0	0.0	0.0
	B	0.0	0.0	0.0	0.0
	C	0.0	0.0	0.0	0.0
	D	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.19	11.28	0.23	B
A-B	-	-	-	-
A-C	-	-	-	-
A-D	0.10	7.00	0.12	A
D-ABC	0.00	0.00	0.00	A
C-D	-	-	-	-
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	75.00	74.07	0.00	394.31	0.190	0.23	11.209	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	60.00	59.54	0.00	573.96	0.105	0.12	6.992	A
D-ABC	0.00	0.00	0.00	400.38	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	447.05	0.000	0.00	0.000	A

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	75.00	74.99	0.00	394.24	0.190	0.23	11.276	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	400.22	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	446.90	0.000	0.00	0.000	A

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	75.00	75.00	0.00	394.24	0.190	0.23	11.276	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	400.22	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	446.90	0.000	0.00	0.000	A

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	75.00	75.00	0.00	394.24	0.190	0.23	11.276	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	400.22	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	446.90	0.000	0.00	0.000	A

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	75.00	75.00	0.00	394.24	0.190	0.23	11.276	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	400.22	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	446.90	0.000	0.00	0.000	A

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	75.00	75.00	0.00	394.24	0.190	0.23	11.276	B
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	320.00	320.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	400.22	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	446.90	0.000	0.00	0.000	A

(Default Analysis Set) - Des, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Des, PM	Des	PM		FLAT	08:00	09:30	90	15		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
1	(untitled)	Crossroads	Two-way	A,B,C,D	8.40	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	(untitled)		Major
B	B	(untitled)		Minor
C	C	(untitled)		Major
D	D	(untitled)		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	6.00		0.00		2.20	0.00		
C	6.00		0.00		2.20	0.00		

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	2.20										0	0
D	One lane	2.20										0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1	A-D	573.963	-	-	-	-	-	-	0.222	0.318	0.222	-	-	-
1	B-A	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	-	0.202	0.202	0.101
1	B-C	573.963	0.088	0.222	-	-	-	-	-	-	-	-	-	-
1	B-D, nearside lane	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	0.127	-	-	-
1	B-D, offside lane	439.579	0.080	0.202	0.202	-	-	-	0.127	0.289	0.127	-	-	-
1	C-B	573.963	0.222	0.222	0.318	-	-	-	-	-	-	-	-	-
1	D-A	573.963	-	-	-	-	-	-	0.222	-	0.088	-	-	-
1	D-B, nearside lane	439.579	0.127	0.127	0.289	-	-	-	0.202	0.202	0.080	-	-	-
1	D-B, offside lane	439.579	0.127	0.127	0.289	-	-	-	0.202	0.202	0.080	-	-	-
1	D-C	439.579	-	0.127	0.289	0.101	0.202	0.202	0.202	0.202	0.080	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	FLAT	✓	400.00	100.000
B	FLAT	✓	60.00	100.000
C	FLAT	✓	0.00	100.000
D	FLAT	✓	0.00	100.000

Turning Proportions

Turning Counts / Proportions (PCU/hr) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	165.000	175.000	60.000
	B	30.000	0.000	25.000	5.000
	C	0.000	0.000	0.000	0.000
	D	0.000	0.000	0.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.41	0.44	0.15
	B	0.50	0.00	0.42	0.08
	C	0.25	0.25	0.25	0.25
	D	0.25	0.25	0.25	0.25

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.000	1.000
	B	1.000	1.000	1.000	1.000
	C	1.000	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.0	0.0	0.0	0.0
	B	0.0	0.0	0.0	0.0
	C	0.0	0.0	0.0	0.0
	D	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.14	9.80	0.16	A
A-B	-	-	-	-
A-C	-	-	-	-
A-D	0.10	7.00	0.12	A
D-ABC	0.00	0.00	0.00	A
C-D	-	-	-	-
C-A	-	-	-	-
C-B	0.00	0.00	0.00	A

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	60.00	59.35	0.00	427.28	0.140	0.16	9.768	A
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	175.00	175.00	0.00	-	-	-	-	-
A-D	60.00	59.54	0.00	573.96	0.105	0.12	6.992	A
D-ABC	0.00	0.00	0.00	417.60	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	479.29	0.000	0.00	0.000	A

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	60.00	60.00	0.00	427.21	0.140	0.16	9.803	A
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	175.00	175.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	417.45	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	479.14	0.000	0.00	0.000	A

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	60.00	60.00	0.00	427.21	0.140	0.16	9.803	A
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	175.00	175.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	417.45	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	479.14	0.000	0.00	0.000	A

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	60.00	60.00	0.00	427.21	0.140	0.16	9.803	A
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	175.00	175.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	417.45	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	479.14	0.000	0.00	0.000	A

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	60.00	60.00	0.00	427.21	0.140	0.16	9.803	A
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	175.00	175.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	417.45	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	479.14	0.000	0.00	0.000	A

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
B-ACD	60.00	60.00	0.00	427.21	0.140	0.16	9.803	A
A-B	165.00	165.00	0.00	-	-	-	-	-
A-C	175.00	175.00	0.00	-	-	-	-	-
A-D	60.00	60.00	0.00	573.96	0.105	0.12	7.003	A
D-ABC	0.00	0.00	0.00	417.45	0.000	0.00	0.000	A
C-D	0.00	0.00	0.00	-	-	-	-	-
C-A	0.00	0.00	0.00	-	-	-	-	-
C-B	0.00	0.00	0.00	479.14	0.000	0.00	0.000	A

Appendix 5

Environmental Assessment (EA) Report

Urban Renewal Authority
To Kwa Wan Road / Wing Kwong Street Development Scheme
(KC-016)

Environmental Assessment Report

(V2.0)

March 2021

Approved By _____

(Project Manager: K.S. Lee)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

CINOTECH accepts no responsibility for changes made to this report by third parties.

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TABLE OF CONTENTS

1 INTRODUCTION 1

1.1 BACKGROUND 1
1.2 PURPOSE AND SCOPE OF REPORT 2

2 DESCRIPTION OF THE ENVIRONMENT 3

3 THE PROPOSED DEVELOPMENT 4

4 AIR QUALITY IMPACT ASSESSMENT 5

4.1 INTRODUCTION 5
4.2 LEGISLATION, STANDARDS & GUIDELINES 5
4.3 BACKGROUND AIR QUALITY 6
4.4 CONSTRUCTION PHASE AIR QUALITY IMPACT ASSESSMENT 7
4.5 OPERATION PHASE AIR QUALITY IMPACT ASSESSMENT 9
4.6 CONCLUSION 15

5 NOISE IMPACT ASSESSMENT 17

5.1 INTRODUCTION 17
5.2 STANDARDS AND GUIDELINES 17
5.3 CONSTRUCTION NOISE IMPACT ASSESSMENT 18
5.4 OPERATION NOISE IMPACT ASSESSMENT 19
5.5 CONCLUSION 24

6 WASTE MANAGEMENT CONSIDERATION 25

6.1 LEGISLATIONS AND REQUIREMENTS 25
6.2 WASTE MANAGEMENT FOR CONSTRUCTION PHASE 26
6.3 WASTE MANAGEMENT FOR OPERATION PHASE 30
6.4 CONCLUSION 30

7 POTENTIAL LAND CONTAMINATION 31

8 CONCLUSION 32

LIST OF TABLES

Table 4-1 Hong Kong AQO for 1-hour, 24-hours Average and Annual Concentration for NO2, RSP & FSP 6
Table 4-2 Background Air Quality of Grid (41, 33) of PATH-2016 7
Table 4-3 Background Air Quality of Grid (42, 33) of PATH-2016 7
Table 4-4 Summary of the Assessment Points (Air Quality) 9
Table 4-5 Road Types within the Study Area 11
Table 4-6 Diurnal Temperature and Relative Humidity Profile for each Seasons 12
Table 4-7 Marine Emission adopted in the Current Study 13
Table 4-8 Emission inventory for the Diamond Hill from Approved EIA Report 14
Table 4-9 Summary of the Predicted Pollutant Concentration 15
Table 4-10 Summary of the Predicted Annual Averaged NO_2 Concentration 15
Table 5-1 HKPSG Road Traffic Noise Planning Criteria 17
Table 5-2 Acceptable Noise Levels for Fixed Noise Impact (ANLs), dB(A), Leq, (30mins) 17
Table 5-3 Summary of Representative Noise Sensitive Receivers and Assessment Points for Traffic Noise Impact Assessment 19
Table 5-4 Summary of Traffic Noise Impact Assessment 22
Table 6-1 Estimated Quantities of C&D materials to be Generated, Reused and Disposed of 27

LIST OF FIGURES

Figure 1-1 Location Plan of the Scheme
Figure 2-1 URA's Project in the Vicinity
Figure 2-2 Future Road Network in the Neighborhood
Figure 3-1 Notional Block Plan of the Proposed Scheme
Figure 3-2 Notional Section Plan of the Proposed Scheme
Figure 4-1 Assessment Boundary (Air Quality)
Figure 4-2 Assessment Points - Podium Structures & Low Block (Air Quality)
Figure 4-3 Assessment Points – Residential Towers (Air Quality)
Figure 5-1 Assessment Boundary (Traffic Noise)
Figure 5-2a Representative Assessment Point – Tower T1 (Traffic Noise)
Figure 5-2b Representative Assessment Point – Tower T2 (Traffic Noise)
Figure 5-3 Proposed Mitigation Measures – Acoustic Fins
Figure 5-4a Noise Exceedance with Acoustic Fins – Tower T1 (Traffic Noise)
Figure 5-4b Noise Exceedance with Acoustic Fins – Tower T2 (Traffic Noise)
Figure 5-5a Typical Section for Acoustic Balcony
Figure 5-5b Typical Section for Acoustic Window (Top-hung type)
Figure 5-5c Typical Section for Acoustic Window with Balcony
Figure 5-6a Proposed Mitigation Measures – Acoustic Fins & Acoustic Balcony/Windows – Tower 1
Figure 5-6b Proposed Mitigation Measures – Acoustic Fins & Acoustic Balcony/Windows – Tower 2
Figure 5-7 Noise Exceedance with Acoustic Fins & Acoustic Balcony/Windows – Tower 1 (Traffic Noise)

LIST OF APPENDICES

Appendix 4-1 Endorsement of Traffic Forecast from Transport Department (Pending)
Appendix 4-2 Sensitivity Test for Traffic Emission
Appendix 4-3 Caline4 Input
Appendix 4-4 Summary of Marine Sources
Appendix 4-5 Predicted Pollutant Concentration (Air Quality)
Appendix 4-6 Summary of Annual Averaged NO_2 Concentration (Air Quality)
Appendix 5-1 Predicted Traffic Flow at Peak Hour in Year 2047
Appendix 5-2 Traffic Noise Assessment Results (Base Scenario)
Appendix 5-3 Traffic Noise Assessment Results (Mitigated Scenario – With Acoustic Fins)
Appendix 5-4 Proposed Mitigation Measures & Traffic Noise Assessment Results (Mitigated Scenario - With Acoustic Fins & Acoustic Balcony/Windows)
Appendix 7-1 Reply letters from EPD and FSD for Land Contamination Enquires

1 INTRODUCTION

1.1 Background

1.1.1 The Urban Renewal Authority (URA) has proposed To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) (the Scheme) under section 25 of the Urban Renewal Authority Ordinance (URAO). This Environmental Assessment (EA) is to support the submission of a draft Development Scheme Plan (DSP) with its planning proposal to the Town Planning Board (TPB) for consideration.

1.1.2 The Scheme is broadly bounded by To Kwa Wan Road, Ma Tau Wai Road, Wing Kwong Street, Kai Ming Street, Hung Fook Street and Ngan Hon Street. The scheme area is currently zoned as "Residential (Group A)" (R(A)), with building height restriction of 100 mPD, and the pavement and road sections are shown as "Road" in the Approved Hung Hom Outline Zoning Plan No. S/K9/26.

1.1.3 The Scheme comprises three rows of tenement buildings along Ma Tau Wai Road (No. 111-127D odd numbers) and To Kwa Wan Road (No. 1-15 & 17-31 odd numbers), buildings at Yuk Shing Street (No. 1-7 odd numbers), Wong Teck Building (Yuk Shing Street No. 2-12 even numbers), and the whole of Yuk Shing Street, part of the road sections of Hung Fook Street and Kai Ming Street. The location of the Scheme is shown in **Figure 1-1**.

1.1.4 The URA proposes to redevelop the scheme area for high-density residential development, with commercial uses always permitted on the lowest three floors of a building or in the purpose-designed non-residential portion of a building. The maximum building height for the scheme area is proposed to be relaxed from 100mPD to 140 mPD.

1.1.5 Under current notional design, the Scheme proposes to develop two residential towers (Tower T1 & T2) on top of two podia which would incorporate GIC/commercial/retail, podium garden and private clubhouse facilities, and a low block (the Low Block) with retail/ commercial uses with an all-weathered communal space underneath. The three road sections within the Scheme will be closed for replanning and restructuring for redevelopment and creation of pedestrian walkways and all-weathered communal space. Notional design is subject to change at detailed design stage.

1.1.6 Cinotech Consultants Limited was commissioned by URA to carry out an Environmental Assessment (EA) to assess and envisage any potential environmental impact on the implementation of the proposed development and to recommend mitigation measures as necessary.

1.2 Purpose and Scope of Report

1.2.1 This EA is prepared to assess the potential environmental impact/benefit associated with the implementation of the Scheme in supporting the submission of the draft DSP to TPB's consideration. It has been undertaken with reference to the guidance for environmental considerations provided in Chapter 9 "Environment" of the Hong Kong Planning Standards and Guidelines (HKPSG).

1.2.2 This EA presents the study of the potential environmental impacts of the following aspects:

- Air Quality
- Noise
- Waste Management
- Land Contamination

1.2.3 Drainage Impact, Sewerage Impact, Water Supply Impact and Air Ventilation Impact will be assessed in separate reports.

2 DESCRIPTION OF THE ENVIRONMENT

2.1.1 The gross site area of the Scheme is about 6,592 m^2. The net site area is about 5,548 m^2, subject to site survey and detailed design.

2.1.2 The Scheme is part of URA's district-based approach in Kowloon City action area (KCAA1). As a district-based approach on redevelopment to bring more planning merits in the neighbourhood, URA has already commenced 7 projects in the vicinity of the Scheme, including KC-009, KC-010, KC-011, KC-012, KC-013, KC-014, & DL-8:KC (**Figure 2-1**), and has proposed re-planning and re-structuring of the existing traffic and pedestrian network through the commenced projects. With the ultimate re-planning of road network through this Scheme, it will further improve the neighbourhood in terms of connectivity and enhanced walkability. The future road network of the neighbourhood after the completion of the proposed development of the Scheme is shown in **Figure 2-2**.

2.1.3 On the west of the Site, the Scheme directly adjoins To Kwa Wan Road and Ma Tau Wai Road which are 6-lane District Distributor Roads. The elevated East Kowloon Corridor on the further west side of the Site is a Truck Road. As such, traffic emission and traffic noise are anticipated to be major environmental issues of the Scheme.

2.1.4 To the north-west of the Scheme across To Kwa Wan Road is Ma Tau Wai Road / To Kwa Wan Road Garden managed by Leisure and Culture Services Department (LCSD) where the future To Kwa Wan MTR station exits located. It is expected that people living near the southern of the Scheme will walk along from Ma Tau Wai Road to the abovementioned MTR station exits via the existing pedestrian crossing of the junction between To Kwa Wan Road and Chi Kiang Street.

3 THE PROPOSED DEVELOPMENT

3.1.1 With the net site area of about 5,548 m^2. (subject to site survey), the proposed total Gross Floor Area ("GFA") is about 55,480 m^2 (Plot Ratio (PR) = 10), of which 41,610 m^2 is for domestic (PR=7.5), 8,322 m^2 for commercial/retail (PR=1.5), and 5,548 m^2 for GIC provision (PR=1) in the Scheme.

3.1.2 Under current notional design, the Scheme proposes to develop two residential towers, namely T1 on the north with 34 residential storeys and T2 on the south with 23 residential storeys on top of 5 storeys podia and the Low Block of 4 storeys is located on the east for retail/ commercial uses with an all-weathered communal space underneath. A 2-storey basement ancillary car park will be provided for loading/unloading bays and private car parking spaces. Yuk Shing Street and portions of Kai Ming Street and Hung Fook Street are proposed to be closed through replanning and restructuring for the creation of pedestrian walkways and/or all-weathered communal space. The notional plan of the proposed development is shown in **Figures 3-1 & 3-2**. The notional design is subject to change in detailed design stage.

3.1.3 A staggered height profile of the residential Tower T1 & T2 is proposed with 140mPD for T1 cascading down to T2 of not more than 110mPD, to maintain the East-West breezeway across the surrounding neighbourhood at the northern part of the Scheme.

3.1.4 An elevated footbridge connection (shown in **Figure 2-2**) which is located outside the Scheme boundary across the 6-lanes traffic of To Kwan Wan Road is proposed under a separated revitalisation initiative upon approval of the DSP. It connects between the proposed development and the future To Kwa Wan MTR station exits in Ma Tau Wai Road/To Kwa Wan Road Garden managed by Leisure and Culture Services Department (LCSD). The proposed footbridge connection will provide a safe and direct route between the proposed development and the MTR station. Initial views on the footbridge alignment to the LCSD Garden are being sought from LCSD and Highways Department (HyD).

4 AIR QUALITY IMPACT ASSESSMENT

4.1 Introduction

4.1.1 The purpose of this chapter is to demonstrate that the proposed development will not impose adverse air quality impact to the surrounding area during the construction phase and the air sensitive receivers (ASRs) of the proposed development will not receive insurmountable air quality impact from the surrounding area during operation phase according to the notional layout plan.

4.1.2 This chapter assessed the potential air quality impact from the following aspects: (i) Construction Phase - the potential air quality impact generated from the construction activities of the proposed development to the surroundings; (ii) Operation Phase - road traffic emission to the proposed developments in the Scheme. It also recommends appropriate mitigation measures to the potential impacts if any.

4.2 Legislation, Standards & Guidelines

4.2.1 The air quality impact assessment criteria were made reference to the Hong Kong Planning Standards and Guidelines (HKPSG) and the Air Pollution Control Ordinance (Cap.311) (APCO).

4.2.2 The Air Pollutant Control Ordinance (APCO) provides the statutory authority for controlling air pollutants from a variety of sources. The Hong Kong Air Quality Objectives (AQO) stipulate the maximum allowable concentrations over specific periods for the criteria pollutants. The concerned air pollutants during construction phase are the Respirable Suspended Particulates (RSP) and Fine Suspended Particulates (FSP) arising from the construction work of the Road Improvement Works. The emission source during the operational phase of the road work would be the vehicular emission on the roads. There are no active industrial chimneys identified within the assessment area.

4.2.3 In Hong Kong, Sulphur Dioxide (SO_2) is primarily from the combustion of Sulphur-containing fossil fuels in power stations and marine vessels. A statutory minimum requirement has been enacted since April 2002 to restrict vehicles to use ULSD (Ultra Low Sulphur Diesel) with a sulphur content of only 0.005% and has been further tightened to a sulphur content of only 0.001% from 1 July 2010 onward. Therefore, emission of vehicular SO_2 is not a significant source. For marine vessel, according to Air Pollution Control (Fuel for Vessels) Regulation, starting from 1 January 2019, all marine vessels except for specified vessel types as set out in the Regulation, are required to use compliant fuel (i.e.: liquid fuel with sulphur content not more than 0.5% by weight, liquefied natural gas, or other approved fuel) within Hong Kong waters, irrespective of whether they are sailing or berthing.

4.2.4 Carbon Monoxide (CO) is one of the primary pollutants emitted by road transports. However, the CO concentration is still relatively minor in compared to the AQO criteria. There is a large margin to the AQO for CO concentration. If the predicted NO_2 concentrations comply with the corresponding AQO, CO would also comply with its respective AQO. Therefore, CO is not considered as key pollutants to be assessed.

4.2.5 Ozone (O_3) is formed from dioxygen by the action of ultraviolet light and also atmospheric electrical discharges. It is not a primary pollutant emitted from vehicular emission thus is not considered as key criteria pollutants for the project.

4.2.6 Leaded petrol has been banned in Hong Kong since 1999. It is not considered concerned pollutants for vehicular emission.

4.2.7 To sum up, the Nitrogen Dioxide (NO_2), Respirable Suspended Particulates (RSP), and Fine Suspended Particulates (FSP) are chosen to be the key criteria pollutants for the assessment of the air quality impact in this project. The relevant AQO are shown in **Table 4-1**.

Table 4-1 Hong Kong AQO for 1-hour, 24-hours Average and Annual Concentration for NO2, RSP & FSP

Pollutant	Maximum Concentration ($\mu g/m^3$)[1]		
	1-hour[2]	24-hour[3]	Annual
Nitrogen Dioxide (NO_2)	200	N.A.	40
Respirable Suspended Particulates (RSP)[4]	N.A.	100	50
Fine Suspended Particulates (FSP)[4]	N.A.	75	35

Note:
[1] Measured at 293K and 101.325 kPa;
[2] Not to be exceeded more than 18 times per year;
[3] Not to be exceeded more than 9 times per year;
[4] Suspended particulates in air with a nominal aerodynamic diameter of 10 μm or smaller for RSP and 2.5 μm or smaller for FSP.

4.3 Background Air Quality

4.3.1 PATH-2016 is a macro-scale air quality model developed by EPD to predict future air quality over the whole Pearl River Delta region including Hong Kong. For the purpose of this assessment, the predicted values from PATH-2016 are adopted as the background air quality. The PATH grids corresponding to the Scheme are (41, 33) & (42, 33) as shown in **Figure 4-1**. **Table 4-2** & **Table 4-3** give the predicted background air quality for Year 2016 to Year 2020.

Table 4-2 Background Air Quality of Grid (41, 33) of PATH-2016

Pollutant	Averaging Time	AQOs [μg/m³] [i]	PATH Model Concentration [μg/m³]				
			Year 2016	Year 2017	Year 2018	Year 2019	Year 2020
RSP [PM_{10}]	24-hour (10th Max)	100 (9)	83	82	82	81	80
	Annual	50	37	36	36	36	35
FSP [$PM_{2.5}$]	24-hour (10th Max)	75 (9)	62	62	61	61	60
	Annual	35	26	26	26	25	25
NO_2	1-hour (19th Max)	200	158	152	147	143	137
	Annual	40	**41**	39	36	34	32

Note:
(i) The numbers in brackets () refer to number of exceedance allowed per year.
(ii) FSP concentrations were obtained from RSP concentration.

Table 4-3 Background Air Quality of Grid (42, 33) of PATH-2016

Pollutant	Averaging Time	AQOs [μg/m³] [i]	PATH Model Concentration [μg/m³]				
			Year 2016	Year 2017	Year 2018	Year 2019	Year 2020
RSP [PM_{10}]	24-hour (10th Max)	100 (9)	81	80	80	79	78
	Annual	50	36	36	35	35	35
FSP [$PM_{2.5}$]	24-hour (10th Max)	75 (9)	61	60	60	59	59
	Annual	35	25	25	25	25	25
NO_2	1-hour (19th Max)	200	151	145	140	135	129
	Annual	40	37	35	33	31	28

Note:
(i) The numbers in brackets () refer to number of exceedance allowed per year.
(ii) FSP concentrations were obtained from RSP concentration.

4.3.2 All predicted background pollutant concentrations show a decreasing trend from Year 2016 to Year 2020 as shown in **Table 4-2**, and it is likely to continue to reduce after Year 2020. The background RSP, FSP and hourly NO_2 concentrations are well below the AQO criteria. The predicted annual background NO_2 concentrations exceed the AQO criteria only for year 2016 in grid (41,33), and gradually reducing and providing some margin in later years.

4.4 Construction Phase Air Quality Impact Assessment

4.4.1 Major dust emitting construction activities will be the demolition of existing structures, excavation for basement construction, foundation works and construction activities (e.g. the construction of superstructure). Fugitive dust would be generated. The concerned air pollutants during the construction phase are the Respirable Suspended Particulates (RSP) and Fine Suspended Particulates (FSP) arising from the construction work of the Project.

4.4.2 Dust control measures under the Air Pollution Control (Construction Dust) Regulation (Cap. 311R) and good site practice shall be implemented to mitigate dust impact arising from

demolition work by preventing dust generation and/or by screening, suppressing and removing dust generated:

- Enclose the whole wall of the building to a height of at least 1m higher than the highest level of the structure to be demolished with impervious dust screens or sheeting on façade abutting or fronting upon a street
- Existing structures are proposed to be demolished by non-percussive equipment such as hydraulic crusher to reduce dust emission; no blasting will be involved.
- Water or a dust suppression chemical shall be sprayed immediate prior to, during and immediately after demolition/excavation works
- Cover stockpile or dusty materials with tarpaulin to prevent wind erosion
- Any dusty materials remaining after a stockpile is removed shall be wetted with water and cleared from the surface of roads or streets
- Every vehicle shall be washed to remove any dusty materials from its body and wheels before leaving the construction site
- Where a vehicle leaving a construction site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle
- Store cement bags in shelter with 3 sides and the top covered by impervious materials if the stack exceeds 20 bags
- Maintain a reasonable height when dropping excavated materials to limit dust generation
- Limit vehicle speed within site to 10 km/h and confine vehicle movement in haul road
- Minimize exposed earth after completion of work in a certain area by hydroseeding, vegetating or soil compacting
- Cover materials on trucks before leaving the site to prevent dropping or being blown away by wind
- Regular maintenance of plant equipment to prevent black smoke emission
- Throttle down or switch off unused machines or machine in intermittent use

4.4.3 No significant dust impact on the surrounding air sensitive receivers (ASRs) is expected with proper implementation of mitigation measures. No quantitative construction dust assessment is considered necessary.

4.4.4 Operation of Powered Mechanical Equipment (PME) during demolition/construction work would emit gaseous air pollutants such as nitrogen dioxide (NO_2) via fuel burning. According to Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation, only approved or exempted Non-Road Mobile Machinery (NRMM) with a proper label are allowed to be used in specified activities and locations including construction sites. Supportive information and documents (e.g. third-party emission certificates, model and serial numbers of machines and engines, etc.) for each NRMM would be provided to EPD to prove that the concerned NRMM is in line with the prescribed emission standards. Since the number of PME expected to be used on-site will be limited and much less than vehicles travelled on surrounding roads (e.g. East Kowloon Corridor), no significant impact is anticipated.

4.5 Operation Phase Air Quality Impact Assessment

General Flow of the Assessment

4.5.1 Firstly, the assessment year will be determined by comparing the daily vehicular emission of the different years and the year with highest vehicular emission will be adopted as assessment year.

4.5.2 Then, the cumulative pollutant concentration will be computed. Besides the PATH-2016 background, the following pollutant sources will be considered:

- Vehicular Emission from open public road sections within 500 m assessment area
- Other major emission sources within 4 km of the scheme area

4.5.3 If any of the representative ASRs exceed the AQO criteria, feasible locations for openable windows and/or fresh air intake will be suggested.

Air Sensitive Receivers

4.5.4 During operation phase, no major emission is anticipated from the residential, G/IC and commercial components of the proposed development. On the other hand, the residential flats, shops and G/IC areas of the Scheme are ASRs which should be assessed.

4.5.5 The residential flats in the Scheme rely on openable windows for ventilation; the shops and G/IC in the podium and in the Low Block would rely on air-conditioning with fresh air intake. Therefore, façades of the Residential Towers, as well as the potential fresh air in-take locations of the podium and the Low Block should be assessed. The locations of the assessment points are illustrated in **Figures 4-2 & 4-3** and listed in **Table 4-4**.

Table 4-4 Summary of the Assessment Points (Air Quality)

Locations	ID	Assessment Height (mAG)[1][2]
Façade of the Podium Structure of the Residential Tower 1	P1-01 to P1-15	G/F - 01.5 1/F - 08.5 2/F - 12.4 3/F - 16.9 4/F - 21.4, 24.0 5/F - 26.4, 28.0 6/F - 29.1
Façade of the Podium Structure of the Residential Tower 2	P2-01 to P2-08	
Façade of the Low Retail Block	RB-01 to RB-08	
Façade of the Residential Tower 1	T1-01 to T1-19	6/F - 29.1 8/F - 35.3 10/F – 41.5
Façade of the Residential Tower 2	T2-01 to T2-12	

[1] The Ground level of the Scheme is 7mPD.
[2] The notional design including the elevation is subject to change.

Meteorological Data

For AERMOD, AERMET, & CALINE4

4.5.6 The hourly meteorological data from PATH model and the hourly stability classes calculated by PCRAMMET has be adopted. The PCRAMMET model can estimate the stability class based on the existing meteorological data for CALINE4 (for traffic emission). As CALINE4

imposes the limitation of wind speed on each of the stability class, the adopted stability class has been shifted toward class 3 for classes 1 & 2, and the adopted wind speed has been reduced for classes 5 & 6, when necessary, for conservative assessment.

4.5.7 The hourly data from PATH Model has been prepared into on-site data as AERMET input. The output meteorological data form AERMET was later be used by AERMOD (for non-road traffic emission). The input mixing height data was restricted to between 121m and 1667m, which were the observed extreme values by the Hong Kong Observatory in year 2010. To avoid the occurrence of calm hours in the model, a minimum wind speed of 1.0m/s was adopted and any wind direction <0.1° was replaced by 360°.

4.5.8 The surface characteristics of the AERMET input were prepared following the recommendations in "AERMOD Implementation Guide" revised in August 2015 by USEPA. The Albedo and Bowen ratio adopted are the average values based on the land use of the 10km × 10km region centred on the study area. The surface roughness lengths were determined based on the land use of 1km upwind in sector widths no smaller than 30 degrees. The surface roughness, Albedo and Bowen of different land use are adopted with referenced to Table 4-2 to Table 4-6 of User's Guide for the AERMOD Meteorological Preprocessor (AERMET).

For Road Traffic Emission factor from EMFAC v4.2

4.5.9 Hong Kong Observatory's hourly temperature and relative humidity at King's Park during year 2019 has be adopted for determining the road traffic emission factor. Meteorological data at King's Park is representative as it is located at core of developed area, similar to the Subject Site.

Assessment Year

4.5.10 The proposed development is planned to be completed by Year 2032, the assessment year for traffic air quality impact shall be predicted based on the worst scenario within 15 years after the completion of the proposed development.

4.5.11 The traffic flow forecast for Years 2032, 2040 & 2047 has been provided by traffic consultant. The predicted traffic flow has been submitted to the Transport Department (TD) for agreement with the methodology. The Endorsement of Traffic Forecast from TD will be enclosed in **Appendix 4-1** when available.

4.5.12 Sensitivity test for traffic emission has been conducted using traffic data of Years 2032 & 2047 with emission factor of Years 2032 & 2040 (no available information beyond 2040 in EMFAC) respectively. Due to the increasing tendency of the traffic flow, the use of traffic flow data of Year 2040 will not produce higher traffic emission than that of the Year 2047 since the same set of emission factor will be applied. Therefore, scenario of year 2040, for both traffic flow and emission factor, is not included in the current assessment.

4.5.13 The total traffic emission of Year 2032 is found to be worse than Year 2047, thus Year 2032 has been adopted for the Assessment Year. The result of sensitivity test is enclosed in **Appendix 4-2**. The methodology of the sensitivity test is explained in the following paragraphs.

4.5.14 The methodology for determining the vehicular emission is explained in the following paragraphs.

Methodology – Road Traffic Emission Factors & Sensitivity Test

4.5.15 The latest version of EMFAC – HK V4.2 which was issued by EPD in late 2019 has been adopted to compile the traffic emission inventory. "Emfac Mode", which can provide RUN emission per vehicle kilometre travelled (in g/VKT) and START emission per trip (in g/trip) under which different temperature, relative humidity and traffic speed has been selected for the assessment. As a conservative approach, the highest START emission across various soak time will be adopted. The START emission has been converted into emission/VKT using the trip/VKT ratio from EMFAC v4.2 of the corresponding year and combine with the RUN emission. Therefore, a set of emission factors (NOx, NO_2, RSP & FSP) for vehicles emission with cold start and another set of emission factors for vehicles emission without cold start has been obtained.

4.5.16 In this assessment, the road has been categorized into 2 road types as summarized in **Table 4-5**. For road with cold start (Type 1), both RUN emission and START emission will be adopted. For road without cold start (Type 2), only RUN emission will be adopted. It should be noted that, Franchised Buses (FBSD & FBDD) are not expected to perform cold start on normal public roads. Therefore, the START emission for FBSD & FBDD has not been included in the determination of road traffic emission.

Table 4-5 Road Types within the Study Area

Road Type	Description
Type 1	Roads with cold start
Type 2	Roads without cold start

4.5.17 For mapping the corresponding emission factor to each road section without underestimation or over-estimation, the yearly temperature and relative humidity from Hong Kong Observatory has been broken into 4 seasons, namely Q1: Dec – Feb, Q2: Mar-May, Q3: Jun-Aug, & Q4: Sep – Nov. Daily profiles for each season with the lowest hourly temperature and relative humidity in each season (**Table 4-6**) has been adopted to identify the corresponding hourly emission factors for each road section. Then, the hourly road traffic emission of each road section was calculated by multiplying the vehicle counts, road length and the corresponding emission factor.

4.5.18 Finally, sensitivity testing has been conducted by comparing the daily road traffic emissions under 4 seasons of different scenarios (i.e. traffic flow for year 2032 and year 2047) and the year with the highest 4 seasons averaged daily emission has been be adopted as the assessment year.

Table 4-6 Diurnal Temperature and Relative Humidity Profile for each Seasons

	Q1		Q2		Q3		Q4	
Hour	Temp (°C)	RH (%)	Temp (°C)	RH (%)	Temp (°C)	RH (%)	Temp (°C)	RH (%)
1	11	23	15	68	23	64	18	28
2	11	24	15	67	23	62	18	27
3	11	24	15	66	23	62	18	28
4	11	26	15	69	23	62	17	31
5	11	25	15	68	23	67	17	29
6	11	28	15	66	23	67	17	31
7	11	29	15	60	24	68	16	32
8	11	27	16	56	25	62	16	29
9	11	27	16	51	24	58	17	30
10	14	24	16	44	24	56	19	32
11	14	21	16	39	25	61	20	30
12	14	19	17	39	26	59	21	30
13	13	20	17	42	25	56	21	31
14	13	21	16	44	24	58	22	33
15	13	19	16	43	25	54	22	32
16	13	20	17	50	25	58	21	34
17	13	18	17	50	25	57	20	33
18	13	22	16	52	25	56	19	34
19	13	19	16	54	24	60	19	36
20	14	19	17	59	24	62	19	37
21	14	21	17	58	25	73	19	37
22	14	23	16	64	26	70	19	37
23	14	23	16	70	25	66	19	33
24	14	24	15	68	25	63	18	32

[1] The hourly temperature and relative humidity at King's Park during year 2019 has been adopted.
[2] Temperature and Relative Humidity are rounded to integer.

Methodology – CALINE4

4.5.19 The total hourly road traffic emission of each road section has been divided by the total hourly vehicle count and the road length (in Mile) to obtain the hourly fleets averaged emission factors (emission/Vehicle Mile Travelled, in g/VMT).

4.5.20 The hourly fleets averaged emission factors in each season together with the hourly traffic flow of each link (road section) were then utilized in CALINE4 to simulate the dispersion of the vehicle exhaust pollutants from the surrounding open road network.

4.5.21 The surface roughness adopted in CALINE4 is 370cm according to EPD's recommendation for urban area. The molecular weight for NO_x & NO_2 in CALINE4 is 46.

Methodology – Major emission sources within 4 km

4.5.22 The major emission source within 4 km include: the hotelling marine vessels of Ocean Terminal ~2.8km in south-west direction, Kai Tak Cruise Terminal ~2.2km in east direction. The emission from Diamond Hill Crematorium in ~3.9 km in north-east direction has been reviewed but not considered as major emission sources affecting the Scheme. The details of those sources are descripted in the following paragraphs.

Marine Source

4.5.23 For the Ocean Terminal, the emission inventory for two hotelling ocean going vessels (OGVs) (emission points OGV1a, OGV1b, OGV1c, OGV1d, OGV2a, OGV2b, OGV2c, OGV2d) from Table 5 in Appendix 3.6 of the approved EIA Report (AEIAR-179/2013) has been adopted directly, considering one hotelling OGV operating during 8:00-20:00, while another OGV operating 24 hours non-stop.

4.5.24 For the Kai Tak Cruise Terminal, the information of the hotelling ocean vessels (emission points H1 & H2), including the reference OGV, engine power, stack height, emission temperature, exhaust velocity and stack diameter are referred to Appendix 3.6 of the approved EIA Report (AEIAR-204/2017). On the other hand, the load factor and emission factor of the reference OGV has been estimated based on *Study on Marine Vessels Emission Inventory* by HKUST in 2012 to reproduce a suitable emission inventory for OGV in Hong Kong.

4.5.25 The adopted major emission sources within 4km (marine emission) are listed in **Table 4-7** and detailed in **Appendix 4-4**.

Table 4-7 Marine Emission adopted in the Current Study

Source	ID	Source Strength (g/s)			Emission Height, mPD	Temp, K	Exhaust Velocity, m/s	Diameter, m	Operation hour	Remark
		NOx	RSP	FSP						
Kai Tak Cruise Terminal	H1	24.07	0.57	0.51	48	537	24.6	1.9	23 hours / day	Emission from H1a & H2a in Appendix 3.6 of the approved EIA AEIAR-204/2017 has been included.
	H2								23 hours / day	
Ocean Terminal	OGV1a	3.24	0.47	0.44	50	448.2	10.65	0.6	8:00-20:00	4 emission sources per vessel
	OGV1b									
	OGV1c									
	OGV1D									
	OGV2a	3.64	0.49	0.46			11.22		24 hours / day	
	OGV2b									
	OGV2c									
	OGV2D									

Diamond Hill Crematorium

4.5.26 The emission inventory of Diamond Hill Crematorium has been obtained from Table 4.7 & Table 4.9 from the Approved EIA report - *Reprovisioning of Diamond Hill Crematorium* (AEIAR-076/2004) and summarised in **Table 4-8**. The emissions form the Diamond Hill Crematorium is far below the source strength of the marine based sources. In addition, the sources are located far from the Scheme (~4 km) and emit at a very high elevation (101mPD). The air quality impact arising from the emission of Diamond Hill Crematorium to the Scheme should be minimal, if any. The PATH-2016 background should already cover this type of far and relatively weak sources properly. Therefore, the emission from Diamond Hill Crematorium is not included in the assessment.

Table 4-8 Emission inventory for the Diamond Hill from Approved EIA Report

Source	Source Strength, NOx (g/s)	Source Strength, RSP (g/s)	Emission Height, mPD	Temp, K	Exhaust Velocity, m/s	Diameter, m	Operation hour	Remark
170 kg Cremator x 4	0.1898 x 4 = 0.7592	0.04994 x 4 = 0.19976	101	393.2	15	0.22	9:30 – 19:30	NO_x inventory is obtained from NO_2 inventory
250 kg cremator x 2	0.2447 x 2 = 0.4894	0.06439 x 2 = 0.12879	101	393.2	15	0.3	9:30 – 19:30	NO_x inventory is obtained from NO_2 inventory

4.5.27 Dispersion modelling has been be undertaken using USEPA approved AMS/EPA Regulatory Model (AERMOD) to assess the Marine Emission.

Cumulative Pollutant Concentration

4.5.28 The cumulative pollutant concentration at each of the assessment point has been calculated by summing the background concentration (from PATH-2016), the traffic emission (from CALINE4), and other emissions (from AERMOD).

4.5.29 The Ozone Limiting Method (OLM) has been adopted for the conversion of NO_x to NO_2 based on the hourly O_3 concentrations predicted by PATH-2016 in the corresponding grid.

4.5.30 For all vehicle emissions, the calculated initial NO_2 concentration based on NO_2 emission factor of Emfac v4.2 has been adopted. The NO_2/NO_x conversion has been calculated as follows:

$$[NO_2]_{pred} = [NO_2]_{init} + MIN\ \{[NO_x]_{pred} - [NO_2]_{init}, \text{ or } (46/48) \times [O_3]_{PATH}\}$$

4.5.31 For all non-vehicular emissions, initial NO_2/NO_x ratios reported in the Heathrow Airport EIA report are adopted, which is 10%.

$$[NO_2]_{pred} = 0.1 \times [NO_x]_{pred} + MIN\ \{0.9 \times [NO_x]_{pred}, \text{ or } (46/48) \times [O_3]_{PATH}\}$$

4.5.32 As OLM has been performed separately for vehicular and non-vehicular emission. The cumulative NO_2 concentration at each ASR is considered conservative.

Results and Discussion

4.5.33 The detailed results are listed in **Appendix 4-5**. The summary of the Annual Averaged NO_2 concentration is provided in **Appendix 4-6**. The result are also summarised in **Table 4-9** & **Table 4-10**.

4.5.34 The Annual Averaged & Daily Averaged of RSP, Annual Average & Daily Averaged of FSP, as well as Hourly Averaged NO_2 concentration at all assessment points comply with AQOs. Whereas, the Annual Averaged NO_2 concentrations on or below 24 mAG (31 mPD) for T1 Blocks, 26.4 mAG (33.4 mPD) for T2 Blocks, as well as 24 mAG (31 mPD) for Low Block have exceeded the AQO.

4.5.35 Under current notional design, the predicted air quality at all residential flats comply with the AQOs. The fresh air in-take for the podium structures of T1 & T2 would be designed to be located at or above 26.4mAG & 28.0 mAG respectively. The fresh air in-take for the Low Block would be designed to be located at or above 26.4 mAG. Subject to the CE in C's

approval of the draft DSP, URA/ future joint venture partner should explore and implement all practicable design in order to ensure all openable windows for ventilation and fresh air intakes comply with the AQO criteria at the detailed design stage.

4.5.36 It should be noted that the exceedance is partially due to the high NO_2 background concentration of the available year (in Year 2020 - 32 $\mu g/m^3$ for Grid 41,33; AQO: 40 $\mu g/m^3$) as only predicted concentration up to Year 2020 is available. Considering the decreasing tendency of the Annual Averaged NO_2 concentration (**Table 4-2** & **Table 4-3**), and the Government's measures to promote the use of electric vehicles[1], it is expected that the future background pollution concentration as well as the road traffic emission should be much lower than that in the current calculation up on complete of the Scheme (Year 2032), thus the limitation for the elevation of openable windows for ventilation and/or fresh air intakes will be lessen accordingly.

Table 4-9 Summary of the Predicted Pollutant Concentration

	Pollutant Concentration ($\mu g/m^3$)					
	Daily 10th Maximum RSP	Annual RSP	Daily 10th Maximum FSP	Annual FSP	Hourly 19th Maximum NO2	Annual NO_2
Criteria	**100**	**50**	**75**	**35**	**200**	**40**
Podium T1	78-81	35-37	59-61	25-27	142-189	36-**58**
Podium T2	81-81	36-37	60-61	25-27	147-192	39-**56**
Low Block	79-81	35-36	59-61	25-26	138-164	36-**50**
Tower T1	80-81	36-36	60-60	25-25	144-150	37-39
Tower T2	80-81	36-36	60-60	25-25	144-149	37-40

Table 4-10 Summary of the Predicted Annual Averaged NO_2 Concentration

Location		Annual Averaged NO_2 Concentration ($\mu g/m^3$) at different Height								
	mAG	1.5	8.5	12.4	16.9	21.4	24	26.4	28	29.1
	mPD	8.5	15.5	19.4	23.9	28.4	31	33.4	35	36.1
Podium T1	min	**49**	**45**	**42**	40	38	37	37	36	36
	max	**58**	**49**	**47**	**44**	**42**	**41**	40	40	39
Podium T2	min	**52**	**49**	**47**	**44**	**42**	**41**	40	40	39
	max	**56**	**49**	**47**	**45**	**43**	**41**	**41**	40	40
Low Block	min	**47**	**45**	**43**	**41**	39	38	37	36	36
	max	**50**	**48**	**46**	**44**	**42**	**41**	40	40	39
Location		Annual Averaged NO_2 Concentration ($\mu g/m^3$) at different Height								
	mAG	29.1	35.3	41.5						
	mPD	36.1	42.3	48.5						
Tower T1	min	39	38	37						
	max	39	38	37						
Tower T2	min	40	38	37						
	max	40	38	37						

Note: Criteria = 40 $\mu g/m^3$

4.6 Conclusion

4.6.1 The air quality impact arising from the proposed development to the surrounding area and air quality impact from the surrounding area to the proposed development has been assessed.

[1] https://www.epd.gov.hk/epd/english/environmentinhk/air/prob_solutions/promotion_ev.html

4.6.2 With the implementation of dust suppression measures stipulated under the Air Pollution Control (Construction Dust) Regulation and the adoption of good site practice, no adverse air quality impact associated with the construction works is expected.

4.6.3 Air emission is not anticipated from the proposed development during operation phase. The air model based on the current notional design demonstrated that the predicted air quality at all proposed residential flats comply with the AQOs. The fresh air intake for the podiums structure of T1 & T2 should be placed on or above 26.4 mAG & 28.0 mAG respectively; the fresh air intake of the Low Block should be placed on or above 26.4 mAG to ensure compliance with AQOs. The air quality upon completion of the Scheme will be similar to, if not better than, the existing situation and no insurmountable air quality impact is anticipated.

5 NOISE IMPACT ASSESSMENT

5.1 Introduction

5.1.1 The purpose of this chapter is to demonstrate the noise sensitive receivers (NSRs) of the proposed development within the Scheme comply with the noise criteria of The Hong Kong Planning Standards and Guidelines (HKPSG).

5.1.2 The potential noise impact from the following aspects have been assessed: (i) Construction noise - the potential noise impact generated from the construction activities of the proposed development to the surroundings; (ii) Traffic noise - the potential noise impact generated from the nearby road networks to the proposed development during operation phase; (iii) Fixed noise - the potential noise impact generated from the surrounding fixed noise sources to the proposed development.

5.1.3 Effective mitigation measures and recommendations are proposed to mitigate the excessive noise level to achieve an acceptable compliance level under the current notional design.

5.2 Standards and Guidelines

Road Traffic Noise

5.2.1 HKPSG provides guidance on acceptable road traffic noise levels at the openable windows of various types of noise sensitive buildings. The relevant criteria are shown in **Table 5-1**.

Table 5-1 HKPSG Road Traffic Noise Planning Criteria

Uses	Road Traffic Noise L_{10}, (1hr) dB(A)
Domestic Premises	**70**
Hotel and Hostels	70
Offices	70
Educational institutions	65
Hospital & Clinics	55
Places of public worship and courts of law	65

Note: The above criteria apply to noise sensitive uses which rely on opened window for ventilation.

Fixed Noise Sources

5.2.2 Acceptable Noise Levels (ANL) shown in Table 2 of the Technical Memorandum for the Assessment of Noise from Places Other than Domestic Premises, Public Places or Construction Sites (IND-TM). According to IND-TM, the ANLs for different Area Sensitivity Ratings (ASRs) are given in **Table 5-2**.

Table 5-2 Acceptable Noise Levels for Fixed Noise Impact (ANLs), dB(A), Leq, (30mins)

Time Period	ASR A	ASR B	ASR C
Day (0700 to 1900 hours)	60	65	70
Evening (1900 to 2300 hours)			
Night (2300 to 0700 hours)	50	55	60

5.2.3 The Scheme is located in the urban area of To Kwa Wan. According to TD's Annual Traffic Census (ATC2019), the daily traffic of East Kowloon Corridor Flyover alone is more than 70,000. Therefore, the Scheme and its surroundings are considered directly affected by Influencing Factor (IF); the ASR of the site would be classified "C".

5.2.4 As the site is subject to traffic noise impact from East Kowloon Corridor flyover (an urban truck road, Street No. 4213 in ATC2019), Ma Tau Wai Road & To Kwan Wan Road (district distributors, Street No. 3014 in ATC2019), it is expected that the prevailing background noise level would be higher than ANL-5dB for both daytime and night-time, thus ANL-5 dB would be adopted as the planned fixed noise sources criterion. The planning criteria would be 65 dB(A) for day and evening time and 55 dB(A) for night time.

5.3 Construction Noise Impact Assessment

5.3.1 The use of powered mechanical equipment (PME) will generate construction noise impact to the nearby NSRs. The major noise emitting activities will be the demolition of existing structures and foundation works of future development.

5.3.2 As the site is situated in a well-developed urban area, the number of PME that it can accommodate is limited, however, the noise from construction activities may still be an impact if the construction works are not planned and arranged properly.

5.3.3 The "Practice Note for Professional *Persons* Environmental Consultative Committee" (ProPECC) "Noise from Construction Activities –Non-statutory Controls" (PN 2/93) suggests assessment criteria relating to construction noise and some practical noise abatement measures to reduce the construction noise.

5.3.4 To minimize noise generation, non-percussive equipment such as hydraulic crusher is proposed for demolishing existing building and structure. Also, adoption of non-percussive piling method for foundation work is also recommended. As these activities would only last for a short period of time, significant noise impact on sensitive receivers is not expected with proper implementation of mitigation measures:

- Adopt good site practice, such as throttle down or switch off equipment unused or intermittently used between works
- Regular maintenance of equipment to prevent noise emission due to impairment
- Position mobile noisy equipment in locations away from nearby NSRs and point the noise sources to directions away from NSRs
- Make good use of other structures for noise screening
- Use of quiet plants and working methods to mitigate at source
- Use of mobile noise barriers/enclosures along the path of noise propagation
- Schedule work to minimize concurrent activity and duration of impact

5.3.5 With the aforementioned noise mitigation measures implemented during the construction phase, no adverse noise impact arising from the construction activities is expected.

5.4 Operation Noise Impact Assessment

Representative Noise Sensitive Receivers during Operation Phase

5.4.1 All flats of the residential tower were identified as NSRs according to the nature of use. Commercial & retail area, clubhouse and GIC facilities in the podium and the Low Block will be provided with air-conditioning system and will not rely on openable windows for ventilation, and thus the noise standard is not applicable. The noise assessment points were located 1.2m above the slab level and 1m away from the façade. All potential windows locations of all residential flats are covered.

5.4.2 There are (T1: 34 floors x 19 flats + T2: 23 floors x 12 flats) = 922 residential flats based on the notional layout of typical floor. However, project proponent (URA) plan to reduce the number flats on the 38/F & 39/F of Tower T1, as well as 27/F & 28/F of Tower T2. Therefore, the actual number of residential flats will be around 900. For assessment purpose, all 922 flats have been assessed and the compliance rate is based on the 922 flats. The representative assessment points are summarised in **Table 5-3** and their locations are illustrated in **Figures 5-2a & 5-2b**. It should be noted that the notional layout of the Scheme is for assessment purpose only and subjected to change.

Table 5-3 Summary of Representative Noise Sensitive Receivers and Assessment Points for Traffic Noise Impact Assessment

Tower	Number of Flats per floor	NSR ID [1]	Number of Floor	Elevation of the Assessment Point [2]
1	19	T1-01-1 to T1-19-2 19 flats and 43 assessment points on each floor	34 floors (6/F – 39/F)	35.8 mPD for 6/F + 3.1m for each floor
2	12	T2-01-1 to T2-12-2 12 flats and 25 assessment points on each floor	23 floors (6/F – 28/F)	

[1] NSR ID is in the form of TX-XX-Y, where TX is tower identity = T1 or T2, XX is flat number = 1 – 19; Y is assessment point number within a flat = 1 – 3.
[2] The notional design including the elevation is subject to change.

Road Traffic Noise

Assessment Methodology

5.4.3 An in-house noise model (MARC) was used to predict the traffic noise levels arising from the road network. It adopts the methodology provided in the UK Department of Transport's Calculation of Road Traffic Noise (CRTN) 1988, which is stipulated in Chapter 9, Section 4.2.7 of the HKPSG for assessing road traffic noise impact. Road traffic noise levels are presented in terms of noise levels exceeded for 10% of the one-hour period for the hour having the peak traffic flow [L10 (1-hour) dB(A)].

5.4.4 The assessment was based on the projected peak hour flows for the worst year within 15 years after completion of the Project in Year 2032. Based on the traffic forecast provided by the traffic consultant, the PM peak hour flows in Year 2047 will be the maximum projected peak hour traffic flow within 15 years from the completion of the Scheme. The major roads within 300m from the boundary of the Scheme have been included in the assessment and are shown in **Appendix 5-1**.

5.4.5 To minimise the traffic noise impact to the Scheme, the following architectural design consideration has been adopted:

- No openable windows for ventilation are designed to face the major roads to the west for Tower T2 (**Figure 5-2b**).
- Tower T2 has been used as a noise barrier for the south facing NSRs of Tower T1.
- View angle from the openable windows for ventilation facing west has been minimized for Tower T1.
- Tower T1 has been setback from the major road traffic and a 5-level podium is designed to shield the west-facing windows at the low levels from the road traffic noise.

5.4.6 Three scenarios have been considered in the traffic noise impact assessment. The first one is a (A) Base Scenario which considered architectural design consideration such as careful building disposition as well as location of the openable windows; the second scenario is a (B) Mitigated Scenario with acoustic fins; the last scenario is (C) Mitigated Scenario with Acoustic Fins and Acoustic Windows.

Impact Identification and Assessment

5.4.7 The peak hour traffic flow of individual roads in the assessment year (Year 2047) is listed in **Appendix 5-1**. The traffic forecast has been submitted to the Transport Department for their endorsement. As hourly traffic flow of AM Peak are higher than that of PM Peak, thus the traffic noise for AM peak hours were calculated.

a) Base Scenario: Careful Buildings Disposition & Windows Locations

5.4.8 In the Base Scenario, residential towers have been arranged to have setback from the main roads (i.e. To Kwa Wan Road) and in the way that the view angle from the windows to the road traffic has been minimised by buildings deposition, buildings orientation and windows locations. Without this design, the traffic noise level in the base scenario is expected to be much higher.

5.4.9 The detailed results of Base Scenario are presented in **Appendix 5-2**. This Base Scenario results in about 57% flats complying with the noise criteria of 70 dB(A). The maximum exceedance is 9 dB, i.e. 79 dB(A), at the assessment point T1-02-1 (living room), which is directly facing the major road traffic in the west.

b) Mitigated Scenario: With Acoustic Fins

5.4.10 Given the Base Scenario has already adopted design means to achieve noise protection including residential tower setback, podium design, building disposition as well as location of the openable windows, at-receiver mitigation measures are considered in order to further minimize the traffic noise impact on the proposed residential units. Before exploring the windows/balcony design, the effectiveness of the acoustic fins has been explored.

5.4.11 In this scenario, 2 acoustic fins for each tower, each with 1.5m length, from the first residential floor to the highest residential floors, have been proposed. Locations of these mitigation measures are illustrated in **Figure 5-3**.

5.4.12 The detailed results of the With Acoustic Fins Scenario are presented in **Appendix 5-3**. With Acoustic Fins Scenario results in about 67% flats complying with the noise criteria of 70 dB(A), which is about 10% improvement over the Base Scenario. The maximum exceedance is the same as the Base Scenario as the worst assessment point (T1-02-1) is not protected by the acoustic fins. The exceeded facades are highlighted in **Figures 5-4a – 5-4b.**

c) Mitigated Scenario: With Acoustic Fins & Acoustic Balcony/Windows

5.4.13 Subject to detailed design, two additional types of mitigation measures are proposed in this mitigated scenario:

- Type I: Acoustic Balcony (Noise Reduction: -2 dB(A))
  This type of acoustic balcony is less complex and has a depth of more than 1m deep, solid parapet of about 1.2m high, and its ceiling is lined with absorptive material.
- Type II: Top-hung Type Acoustic Window (Noise Reduction: -5 dB(A))
  The design of a top-hung window with a horizontal fin on the bottom of the window coupled with Micro-perforated absorbers (MPA) on the inner side of the window and a pelmet in the indoor area behind the top-hung window, can effectively resist noise from entering domestic premises directly and hence minimize the impact caused to the residents. The design is similar to the type adopted in Hong Tsuen Road Residential Development at Sai Kung (Park Mediterranean). The ratio of vertical distance from opening of the top-hung window to the length of the horizontal acoustic fin (aspect ratio) will be less than the aspect ratio (0.55) of the acoustic window in Park Mediterranean.

5.4.14 Top-hung Type Acoustic Window[2] has been proposed in the current assessment as it has been adopted and well proven in private housing for years. Therefore, the calculated traffic noise level is reliable and conservative.

5.4.15 It should be noted that at-receiver mitigation measure with higher acoustic performance exist. However, their noise reduction effect and ventilation performance are highly depended on the detailed design. For example, the Baffle Type Acoustic Windows[3] broadly adopted in public house in recent years can reduce the traffic noise by 4-8 dB depended on the dimensions of the room and windows. With acoustic linings, suitable orientation and nearby acoustic fins, its noise reduction effect could be even higher. The major issue of adopting Baffle Type Acoustic Windows at the current stage is that, with room dimension may be significantly changed in the later stage, it is hard to estimate whether any combination of window pane separation, windows height, window opening and windows overlapping, etc. can provide both sufficient ventilation and acoustic performance. Therefore, adopting Baffle Type Acoustic Windows at the current stage may lead to under-estimate of acoustic performance if we go for conservative, or lead to impossible scenario if the adopted acoustic performance is too optimistic.

[2] Sample for Top-hung Type Acoustic Window https://www.epd.gov.hk/epd/Innovative/greeny/eng/content/hong-tsuen-road-residential-development-sai-kung.html?type=ftab_21
[3] Sample for Baffle Type Acoustic Windows
https://www.epd.gov.hk/epd/Innovative/greeny/eng/content/king-tai-court.html?type=ftab_20

5.4.16 Despite the uncertainties, the use of acoustic windows with higher noise reduction effect is encouraged in detailed design stage. As more information is available at that stage for the designer/engineer to choose the most suitable acoustic windows design with consideration of both acoustic and air ventilation performance.

5.4.17 Section drawings of the typical Top-hung Type Acoustic Windows and/or balcony are illustrated in **Figures 5-5a – 5-5c**. Locations of these proposed mitigation measures are marked in **Figures 5-6a & 5-6b** and also listed in **Appendix 5-4**.

5.4.18 The detailed predicted noise levels with both acoustic fins and acoustic balcony/windows are presented in **Appendix 5-4**. Given specific noise reduction measures at different assessment points, the compliance rate by flat has been increased to 90%. Only residential flats at Tower T1 are expect to experience traffic noise exceedances, while Tower T2 is expected to completely comply. The maximum exceedance is 4 dB, i.e. 74 dB(A), at the assessment point T1-02-1 (living room), while both of its bedrooms are expected to comply with the noise criteria at all floors. The other exceedances are limited to 1-2 dB. The exceeded facades are highlighted in **Figure 5-7**.

Table 5-4 Summary of Traffic Noise Impact Assessment

Scenario	Total Number of Flat	Number of Flat with Traffic Noise Exceedance	Compliance Rate	Max Traffic Noise Level [$L_{10\ (1\text{-hour})}$ dB(A)]
Base Case	922	394	57.3%	79
With Acoustic Fin	922	304	67.0%	79
With Acoustic Fins & Acoustic Balcony/Windows	922	89	90.4%	74

Fixed Noise Sources in the Surroundings

5.4.19 For the fixed noise sources in the surrounding affecting the proposed Scheme, no adverse fixed noise impact is anticipated and no quantitative assessment is necessary due to the following information:

- Site visits have been organized to identify major fixed noise sources in the neighbourhood of the Scheme during late June to August 2020. The Scheme is mostly surrounded by residential buildings that no significant fixed noise sources is anticipated. Although there are some industrial buildings in the surrounding, i.e. The World Wide Industrial Building and Fung Yu Industrial Building, no significant fixed noise sources have been identified. Instead, those industrial buildings are mostly served with windows/split type air conditioners which will have little, if any, impact to the proposed Scheme.
- The other URA's 7 on-going projects in the surrounding, i.e. KC-009, KC-010, KC-011, KC-012, KC-013, KC-014, & DL-8:KC, may introduce new fixed noise sources in the future. However, those URA's on-going projects will be developed for residential development cum commercial/retail podia, the development will also be required to follow the ANL requirement for their planed fixed noise sources, no adverse fixed noise sources impact from those URA's projects is anticipated.
- The NSRs of the proposed development (residential flats) of the Scheme will be surrounded by other URA's projects each with around 100mPD maximum building height from north-east to south direction. These future new buildings can serve as noise

barriers blocking the noise from further away. For the directions not blocked by the high-rise buildings, the openable windows will be equipped with noise mitigation measures, i.e. acoustic windows, to mitigate the noise impact (**Figure 5-6a**).

Fixed Noise Sources of the Scheme

5.4.20 The Scheme will provide central air ventilation for commercial & retail area, clubhouse, GIC facilities and basement carpark. The associated HVAC system may cause noise impact to surrounding NSRs. Although the large exhaust fans are usually located indoor enclosed within the air ducts, the fan noise will transmit via the ventilation pipe and emit at the duct exhaust. Therefore, the potential planned fixed noise sources of the Scheme are the large exhaust fans and the outdoor units of air conditioner. Other equipment such as water pumps and lift motors will be located in enclosed rooms thus no adverse noise impact to the surrounding is anticipated.

5.4.21 In the proposed development, the commercial/retail area and the GIC facilities will be closed outside operation hours and the associated HVAC system are expected to stop during night time. Besides, the expected ventilation requirement of the basement carpark during night-time is expected to be very low thus the primary exhaust fan is unlikely required. Due to the relatively small size of the served zones, Variable Refrigerant Volume (VRV) system is preferred over chiller plants and/or water-cooling tower as VRV provide flexible cooling capacity with high efficiency over large range of loading.

5.4.22 Although the Scheme is still in early stage thus no detailed design including the location of the noisy plants is available, no adverse fixed noise impact to the NSRs is anticipated if the choice of equipment, installation locations, installation and mitigations are properly designed.

Design Consideration for the Chiller Plant

5.4.23 The developer plans to put all of the chiller plants into semi-confined rooms with the wall on the facades equipping acoustic louvers. With the low noise design of the modern VRV available in the market, the noise from the VRV should not be a concern.

Design Consideration for the Exhaust Duct

5.4.24 The duct exhausts are planned to locate within covered area that will not be visible from all of the NSRs, e.g. within the carpark near entrance/exit on G/F and/or within plant room that equipped with acoustic louvers on the façades side. The ventilation pipes will be equipped with silencer to reduce the in-duct noise level. And if necessary, additional acoustic louvers will be equipped at the duct exits.

5.4.25 The planned fixed noise source from the proposed development of Scheme should not introduce adverse noise impact to the surroundings with proper design and mitigation measures. To ensure the compliance in the final design, the project proponent (URA) should incorporate the fixed source noise planning criteria, i.e. At NSR noise level of 65 dB(A) for day and evening time and 55 dB(A) for night time in $L_{eq,30min}$, to the tender document of this Scheme.

5.5 Conclusion

5.5.1 The overall noise impact during the construction phase is considered insignificant. Mitigation measures shall be implemented in accordance with ProPECC PN 2/93 during construction to minimize construction noise impact on the nearby NSRs.

5.5.2 Traffic noise impact has been taken into consideration when designing the notional layout of the residential development. The view angle from the windows to the road traffic has been minimised by buildings deposition, buildings orientation and windows locations. In the base scenario where tower setback, buildings deposition, buildings orientation and windows locations are considered, only 57% of flats complies with the 70 dB(A) traffic noise assessment criteria as demonstrated. In the mitigated scenario where acoustic fins are considered, the compliance rate by flat has been increased to 67%, which is far from satisfactory. In the mitigated scenario where acoustic fins and acoustic balcony/windows are also considered, the compliance rate by flat has been increased to 90%. Given the notional design is at planning stage and the proposed development is subject to detailed design upon CE in C's approval of the Scheme, the current assessment is based on a notional design and anticipated results. It should also be noted that the traffic noise assessment is based on a typical Top-hung Type Acoustic Window. By using acoustic windows with higher noise reduction performance in the detail design stage, it may be possible to achieve a higher compliance rate.

5.5.3 A preliminary study of fixed noise sources based on the existing situation and the available information for planned developments show that no adverse fixed noise impact to the Scheme is anticipated. There are no existing significant fixed noise sources identified in the vicinity of the Scheme. The other URA's commenced projects in the surrounding is also not expected to impose any adverse fixed noise impact to the Scheme. Moreover, the URA's commenced projects in the surrounding will act as noise barriers shielding the Scheme from noise source in north-east, east and south direction. For the directions not blocked by the high-rise buildings, noise mitigation measures such as acoustic windows will be equipped (mainly for traffic noise) which will protect the Scheme.

5.5.4 The planned fixed noise source from the proposed Scheme should not introduce adverse noise impact to the surroundings with proper design. To ensure the compliance in the final design, the project proponent (URA) should incorporate the fixed source noise planning criteria to the tender document of the Scheme.

6 WASTE MANAGEMENT CONSIDERATION

6.1 Legislations and Requirements

6.1.1 In general, sustainable approaches to waste management should be adopted to produce less waste and reuse or recover value from waste. The consideration on waste management for the Project will take into account of the below Ordinances/Guidelines/Practice Notes adopted in Hong Kong.

6.1.2 The following legislations/guidelines related to the handling, treatment and disposal of waste in Hong Kong are listed:

- Waste Disposal Ordinance (Cap. 354) (WDO)
- Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C)
- Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)
- Land (Miscellaneous Provisions) Ordinance (Cap. 28)
- ETWB TC(W) 19/2005 Environmental Management on Construction Sites
- Project Administration Handbook for Civil Engineering Works (PAH)
- DEVB TC(W) No. 06/2010 Trip Ticket System for Disposal of Construction and Demolition Materials
- Code of Practice on the Packaging, Labelling and Storage of Chemical Waste
- Air Pollution Control Ordinance (Control of Asbestos (sections 51 to 84))
- ProPECC PN2/97 Handling of Asbestos Containing Materials in Buildings
- ETWB TCW No. 34/2002 - Management of Dredged/Excavated Sediment
- Code of Practice on the Handling, Transportation and Disposal of Asbestos Wastes

6.1.3 Waste collection and disposal is covered by the Waste Disposal Ordinance (Cap. 354) (WDO). This provides a licensing system for the disposal of certain wastes and for the control of certain wastes by regulation. All wastes should be properly stored and disposed in accordance with relevant waste management regulations and guidelines.

6.1.4 Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C) outlines the requirement for chemical waste handling and disposal.

6.1.5 Under the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N), construction waste delivered to a landfill for disposal must not contain more than 50% by weight of inert materials. Construction waste delivered to a sorting facility for disposal must contain more than 50% by weight of inert materials, and construction waste delivered to a public fill reception facility for disposal must consist entirely of inert materials.

6.1.6 Land (Miscellaneous Provisions) Ordinance (Cap. 28) provides control over placing and maintaining of C&D materials on unleased land. If the occupier does not hold the relevant license, the Department of Lands will take action accordingly.

6.1.7 The Project Administration Handbook for Civil Engineering Works (PAH) stipulates the requirement which is applicable to all public works projects, such as particular specification clauses to be included in the tender documents for waste management.

6.1.8 The ETWB TC(W) No. 19/2005 – Environmental Management on Construction Sites details the waste management method regarding the avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal.

6.1.9 The DEVB TC(W) No. 06/2010 details the trip ticket system for disposal of construction and demolition materials.

6.1.10 The Technical Circular ETWB TCW No. 34/2002 covers the approval of dredging/excavation proposals and marine disposal of dredging/excavated sediment.

6.2 Waste Management for Construction Phase

Waste Types

6.2.1 The demolition and construction activities to be carried out for the proposed development would generate a variety of waste that can be divided into distinct categories based on their composition and ultimate method of disposal. The identified waste types include:

- Construction and demolition (C&D) materials, comprising inert and non-inert materials, from the demolition and construction works;
- Potential asbestos containing materials
- Chemical waste from any maintenance of construction plant and equipment; and
- General refuse from the workforce.

Inert and non-inert C&D Materials

6.2.2 Inert C&D Material (or public fills) includes construction debris, soil, rock and concrete, should be re-used on-site as filling materials or off-site as public fill at public fills reception facilities. Non-inert C&D Material (or C&D waste) includes metal from the existing structures, wood from formwork, equipment parts, and materials and equipment wrappings, etc. should be re-used or recycled as far as possible.

6.2.3 As the Scheme involves demolition of existing buildings and construction of 2 floors of basement, there will be generation of inert C&D materials during construction. It is estimated that about 68,000 m^3 excavated materials would be generated and about 12,000 m^3 would be suitable for backfilling during site formation stage. It is also estimated that about 14,000 m^3 C&D materials will be generated during the demolition work.

6.2.4 To account the quantity of C&D materials to be generated from construction of the new building, C&D materials generation rate of 0.1 m^3 per m^2 of GFA constructed is adopted in accordance with the "Reduction of Construction Waste Final Report, Hong Kong Polytechnic University (March 1993)". The total GFA of the proposed development from the Scheme will be around 55,500 m^2 (Domestic:41,600; Non-domestic:13,870). The C&D materials generated from superstructure construction is approximately 5,550 m^3. Hence, the total amount of inert C&D waste generated by the Project is projected at 85,595m^3.

6.2.5 The volume of non-inert C&D material, such as maintenance and packaging waste being generated by the Project is projected at 1,955m^3, which will be subject to specific construction procedures and site practices. The estimated amount of non-inert C&D material generated during site clearance and construction of superstructure works would be minimal with careful design, planning, good site management and control of ordering procedures etc.

6.2.6 The estimated quantities of inert and non-inert C&D material generated from the construction of the Scheme are presented in **Table 6-1.**

Table 6-1 Estimated Quantities of C&D materials to be Generated, Reused and Disposed of

Construction Activities	C&D material (m^3)	C&D material to be Reused/Recycled/disposed of (m3)					
		Inert			Non-inert		
		Reused/ Recycled On-Site	Reused/ Recycled Off-Site[a]	Disposed Off-Site	Reused/ Recycled On-Site	Reused/ Recycled Off-Site [b]	Disposed Off-Site
Excavation	68,000	12,000	0	56,000[c]	0	0	0
Demolition of Existing Buildings	14,000	0	0	12,600	0	140	1260
Superstructure Construction	5,550	0	0	4,995	0	55.5	499.5
All	**87,550**	12,000	0	73,595	0	196	1,760
		Total Inert C&D Waste:		85,595	Total non-Inert C&D Waste:		1,955

Note
a) The inert C&D material not reused on-site shall be disposed off-site to the Fill Bank at Tseung Kwan O Area 137
b) Non-inert C&D materials should be reused or recycled as much as possible before disposed off-site, estimated to be 10% of the generation.
c) Approximately 10,000m^3 of excavated sediment is estimated to be generated and disposed off-site from the Project.

6.2.7 It is estimated that about 14% of inert C&D material to be reused on-site. It is proposed to dispose the rest of inert C&D materials to the Fill Bank at Tseung Kwan O Area 137. The remaining non-recyclable C&D Waste is not suitable for public fill and requires disposal to licensed landfill facilities (the closest landfill is the South East New Territories (SENT) Landfill). In addition, as the land of the Site is within reclamation ground, approximately 10,000m^3 of excavated sediment is estimated to be generated and disposed off-site from the Project. The marine disposal of the sediment should be disposed in accordance to the *ETWB TCW No. 34/2002*.

6.2.8 Detailed design of the foundation works and building construction is not yet available at this stage. A preliminary estimation of the amount of inert C&D materials arising from the Scheme should be reviewed in the Environmental Management Plan (EMP) in accordance with ETWB TCW 19/2005 Environmental Management on Construction Sites prepared by the Contractor, and should be submitted to Architect/Engineer prior to the commencement of construction works. Control measures according to Regulations/Guidelines would be adopted, as appropriate and as practicable, for the management of C&D materials, as stated in **Section 6.2.12** and **6.2.17**. In addition, according to Section 4.1.3 of the PAH, as this project is expected to generate more than 50,000 m^3 of C&D materials including rock or which requires imported fill in excess of 50,000 m^3, the project office / Contractor is required to draw up a Construction and Demolition Material Management Plan (C&DMMP) at the feasibility study or preliminary design stage of the project.

Chemical Waste

6.2.9 Chemical waste, such as cleaning fluids, solvents, spent lubricants and fuel for equipment or waste battery, may be generated. As far as the scale of the works is small, the quantity of chemical waste generated would be minimal. It is expected that the approximate quantity of the lubrication oil is about 100L/month and hence approximately 6 m^3 of chemical waste will be generated during construction period of 60 months (general assumption of construction time for URA redevelopment projects adopted). A licensed collector should be employed to handle and dispose of the chemical waste. Furthermore, the chemical waste should be handled in accordance with the *Waste Disposal (Chemical Waste)(General) Regulation*. The Works Contractor should register as a Chemical Waste Producer under the WDO.

6.2.10 Since the existing structures to be demolished were mostly built in 1950s and 1970s, asbestos containing materials may be present at the existing structures which would be demolished. Asbestos investigation would be carried out before the commencement of demolition works. Asbestos investigation and asbestos abatement plan will be made in accordance with Air Pollution Control Ordinance, Waste Disposal (Chemical Waste) (General) Regulation and other Codes of Practice listed in Appendix III in ProPECC PN2/97 Handling of Asbestos Containing Materials in Buildings if any asbestos is found in the Site.

6.2.11 In addition, other chemical waste, if any, to be generated during the demolition works will be handled and disposed of in accordance with the *Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C)*. For asbestos wastes, if any, will be handled and disposed of in accordance with the Code of Practice on the Handling, Transportation and Disposal of Asbestos Wastes.

6.2.12 With the implementation of proper chemical waste management measures listed in **Section 6.2.23**, the impact is anticipated to be insignificant.

6.2.13 No hazardous materials or hazardous wastes are expected to be generated during the construction of the Site.

General Refuse

6.2.14 General refuse such as food scraps, waste paper, empty containers, etc., would be generated from construction workforce during construction phase.

6.2.15 The maximum number of construction workers to be employed will be approximately 100 workers per day. The daily arising of general refuse from the construction workforce can be estimated based on a generation rate of 0.65kg per worker per day, the estimated quantity of the general refuse is 65kg (= 100 workers x 0.65kg/worker/day).

6.2.16 Such refuse should be properly managed so intentional or accidental release to the surrounding environment does not occur. If the general refuse is recyclable, such as paper, plastics and aluminum materials, the reuse and recycling of such waste is encouraged. Effective collection of site wastes such as providing enclosed bins or compaction units would be required to prevent waste materials being blown around by wind, flushed or leached into nearby waters, or creating an odour nuisance or pest and vermin problem. Waste storage areas should be well maintained and cleaned regularly.

6.2.17 With the implementation of good waste management practices as suggested in **Section 6.2.22** at the site, adverse environmental impacts are not expected to arise from the storage, handling and transportation of general refuse generated by construction workers.

Mitigation Measures

6.2.18 Prior to the commencement of the construction works, the contractor will identify the types and amount of waste generated and its associated mitigation measures according to the requirements as stipulated in ETWB TCW No. 19/2005.

C&D Materials

6.2.19 In general, minimization/reuse/recycling of C&D materials (i.e. both inert and non-inert C&D materials) should be considered prior to disposal. Waste minimization measures should be adopted during construction phase, measures may include:

- On-site sorting of C&D materials;
- Recycling of construction materials for on-site use;
- Avoidance and minimization to reduce the potential quantity of C&D materials generated;
- Reuse of materials as practical as possible;
- Recovery and Recycling as practical as possible;
- Provide training to workers on the importance of appropriate waste management procedures, including waste reduction, reuse and recycling.

6.2.20 The Contractor should adopt the trip ticket system under DEVB TC(W) No. 6/2010 and good housekeeping practices such as waste segregation prior to disposal. Stockpiling and segregating areas should be provided at site. Effective collection of site wastes would be required to prevent waste materials being blown around by wind, flushed or leached into nearby waters, or creating an odour nuisance or pest and vermin problems. Waste storage areas should be well maintained and cleaned regularly.

6.2.21 During inclement weather (e.g. heavy rainstorm), the stockpile should be covered by tarpaulin or other water-resistant fabric. This can prevent dust and waste from being blown away by wind or washed into watercourses/drainage system.

General Refuse

6.2.22 General refuse should be stored in enclosed bins or compaction units separate from C&D materials. 3-color recycle bins for the collection of recyclable municipal waste should also be provided. A reputable waste collector should be employed by the Contractor to remove or recycle general refuse from the Site, separately from C&D materials. Preferably an enclosed and covered area should be provided to reduce the occurrence of "wind-blown" light materials.

Chemical Waste

6.2.23 If chemical waste is produced at the construction site, the Contractor will be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the *Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C).* Chemical waste

should be stored in appropriate containers and collected by a licensed chemical waste collector. The chemical waste management measures should include, but not limited to the following :

- Minimise the production of Chemical Waste
- Registration of Chemical Waste Producers with EPD should be carried out for any person who produces chemical waste
- Give notification of certain Chemical Waste for Disposal to EPD as required in *Section 4 of the Regulation & Section 17 of the Ordinance*
- Carry out Packaging, Labelling and Storage of Chemical Wastes as per *Sections 9 to 19 of the Regulation*
- Collection of Chemical Waste and the "Trip Ticket" System as per *Sections 20 to 29 of the Regulation*
- Precautions Against Dangers from Spillages, Leakages or Accidents involving Chemical Waste as per *Sections 30 to 32 of the Regulation*

6.2.24 Provided that good site practices are strictly followed, there would be no adverse impacts related to waste management during construction phase.

6.3 Waste Management for Operation Phase

6.3.1 Domestic wastes will be expected as the major type of waste from the redevelopment, including food residues, plastic and metal products, and paper. No chemical or hazardous waste is anticipated. Wastes generated will be collected and disposed of on a regular basis. Building management will be arranged by the future owners to manage the development including waste disposal. With reference to the "*Monitoring of Solid Waste in Hong Kong - Waste Statistics for 2019*", assuming 0.87 kg/person/day of general refuse is expected to be generated from the domestic waste, the total amount of general refuse produced from the Project during operation phase is projected at 2349m^3.

6.3.2 As the domestic waste will be collected (at a refuse collection point) and regularly disposed of at landfill or regularly sent to recyclers, waste recycling would be carried out during operation phase. Adverse impacts due to waste management will not be anticipated.

6.4 Conclusion

6.4.1 A variety of wastes including inert C&D material, C&D waste, chemical waste and general refuse would be generated during the construction phase and domestic waste would be generated during operation phase. Provided that the wastes generated would be managed with appropriate measures, no adverse environmental impacts arising from the handling, storage, transportation or disposal of the wastes generated during the construction and operation stage of the Scheme would be envisaged.

7 POTENTIAL LAND CONTAMINATION

7.1.1 The Project Site has been used for residential purposes for decades with no land contaminating activities. According to EPD's record, there is no chemical leakage/spillage incident within the Project Site. According to Fire Service Department's (FSD) record, there is no dangerous good licence was issued within the Project Site. The replies from EPD and FSD regarding land contamination records are enclosed in **Appendix 7-1**.

7.1.2 However, according to site survey conducted during June 2020, multiple car repair workshops were identified within or near the Scheme, for example, on the G/F of Wing Kwong Street, Kai Ming Street, & Hung Fook Street respectively. The photo record of the Site survey is attached in **Appendix 7-2**. As those car repair workshops as well as the rest of the areas to be assessed are in use, the potential land contamination issue should be reviewed during the detailed design stage. Detailed Land Contamination Assessment and Remediation, if applicable, should be conducted with reference to the Practice Guide for Investigation and Remediation of Contaminated Land prior to the development of Site. The project proponent should note that no construction works or development of site should be carried out prior to the completion of land contamination assessment and remediation, if necessary.

8 CONCLUSION

8.1.1 An Environmental Assessment has been carried out to evaluate the potential environmental benefits and impacts likely to arise from the proposed Scheme. The key environmental issues associated with the Scheme are construction dust impact, construction noise impact and waste management during the construction phase and potential air quality and noise impact during the operational phase.

8.1.2 With the implementation of dust suppression measures stipulated under the Air Pollution Control (Construction Dust) Regulation and the adoption of good site practice, no adverse air quality impact associated with the construction works is expected.

8.1.3 Air emission is not anticipated from the proposed development during operation phase. The air model based on the current notional design demonstrated that the predicted air quality at all proposed residential flats comply with the AQOs. The fresh air intake for the podiums structure of T1 & T2 should be placed on or above 26.4 mAG & 28.0 mAG respectively; the fresh air intake of the Low Block should be placed on or above 26.4 mAG to ensure compliance with AQOs. The air quality upon completion of the Scheme will be similar to, if not better than, the existing situation and no insurmountable air quality impact is anticipated.

8.1.4 Construction noise impact is considered insignificant with proper implementation of the recommended mitigation measures.

8.1.5 Traffic noise impact has been taken into consideration when designing the notional layout of the residential development. The view angle from the windows to the road traffic has been minimised by buildings deposition, buildings orientation and windows locations. In the base scenario where buildings deposition, buildings orientation and windows locations are considered, only 57% of flats complies with the 70 dB(A) traffic noise assessment criteria as demonstrated. In the mitigated scenario where acoustic fins and acoustic balcony/windows are considered, the compliance rate by flat has been increased to 90%.

8.1.6 A preliminary study of fixed noise sources based on the existing situation and the available information for planned developments show that no adverse fixed noise impact to the Scheme is anticipated. There are no existing significant fixed noise sources identified in the vicinity of the Scheme. The plan URA's developments in the surrounding is also not expected to impose adverse fixed noise impact to the Scheme. Moreover, the URA's planned developments in the surrounding will act as noise barriers shielding the proposed Scheme from noise source in east direction. For the directions not blocked by the high-rise buildings, acoustic balcony/windows will be equipped (mainly for traffic noise) which will protect the proposed Scheme.

8.1.7 The planned fixed noise source from the proposed Scheme should not introduce adverse noise impact to the surroundings with proper design. To ensure the compliance in the final design, the project proponent (URA) should incorporate the fixed source noise planning criteria to the tender document of this Project.

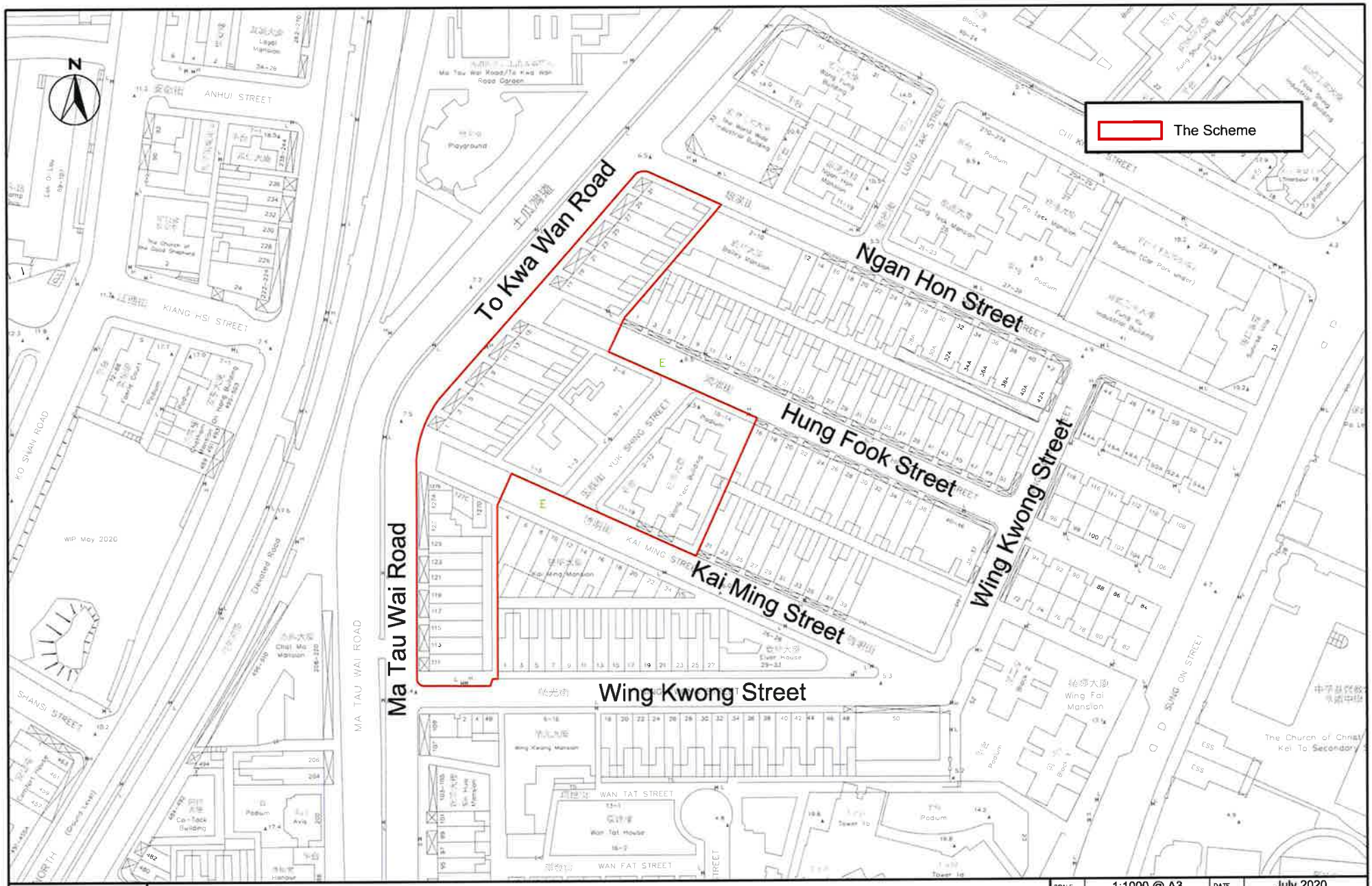
8.1.8 If the draft DSP is approved by CE in C, a detailed design of the proposed development will be carried out and if the block layout is changed and subject to requirement by relevant government departments, a revised noise impact assessment would be carried out to demonstrate the noise compliance.

8.1.9 A variety of wastes including inert C&D material, C&D waste, chemical waste and general refuse would be generated during the construction phase and domestic waste during

operation phase. Provided that the wastes generated would be managed with appropriate measures, no adverse environmental impacts arising from the handling, storage, transportation or disposal of the wastes generated during the operation phase of the Scheme would be envisaged.

8.1.10 Detailed Land Contamination Assessment and Remediation, if applicable, should be conducted with reference to the Practice Guide for Investigation and Remediation of Contaminated Land prior to the development of Site.

FIGURES



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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Location Plan of the Scheme

SCALE	1:1000 @ A3	DATE	July 2020
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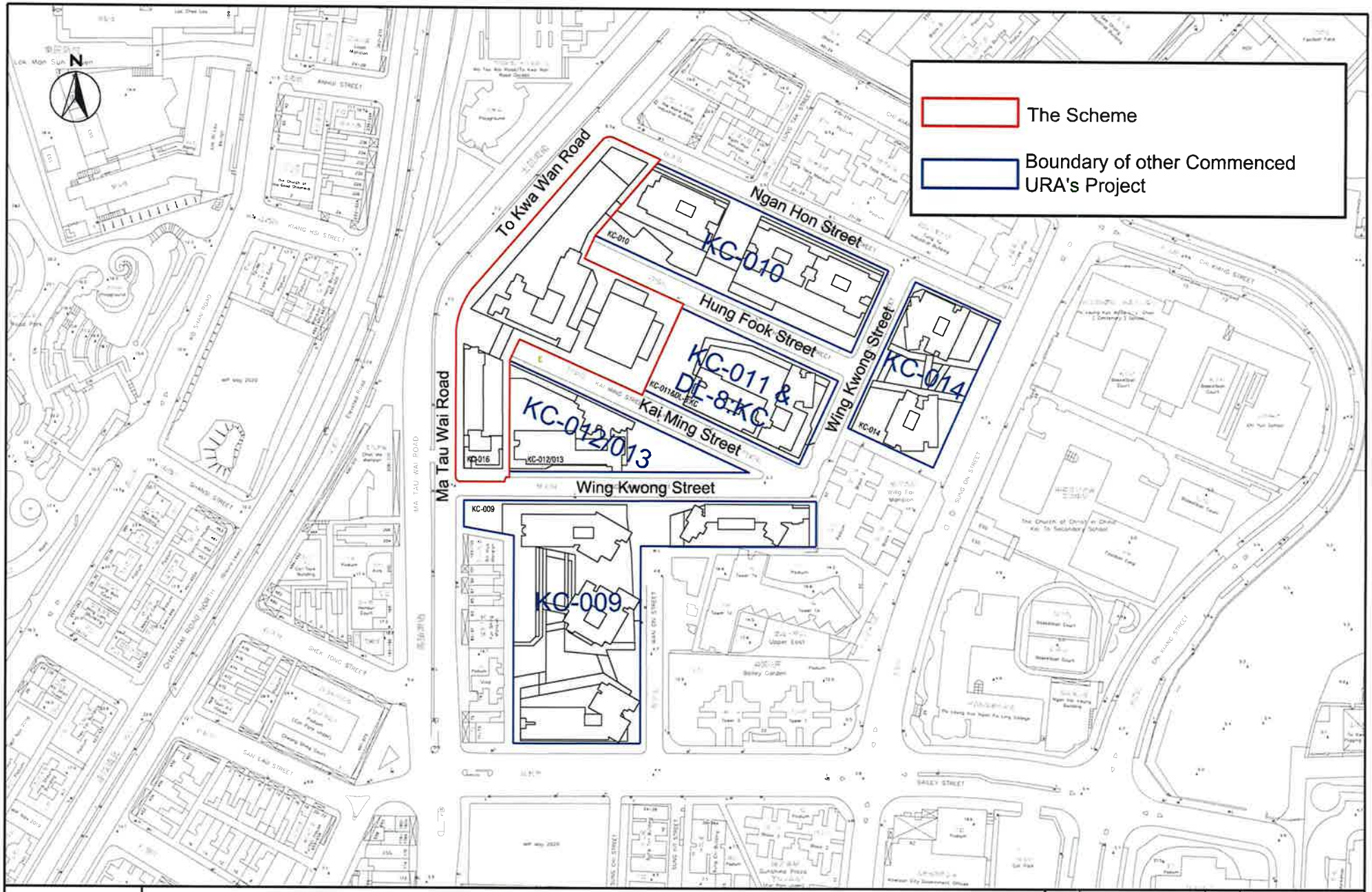
		REV	-



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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

URA's Projects in the Vicinity

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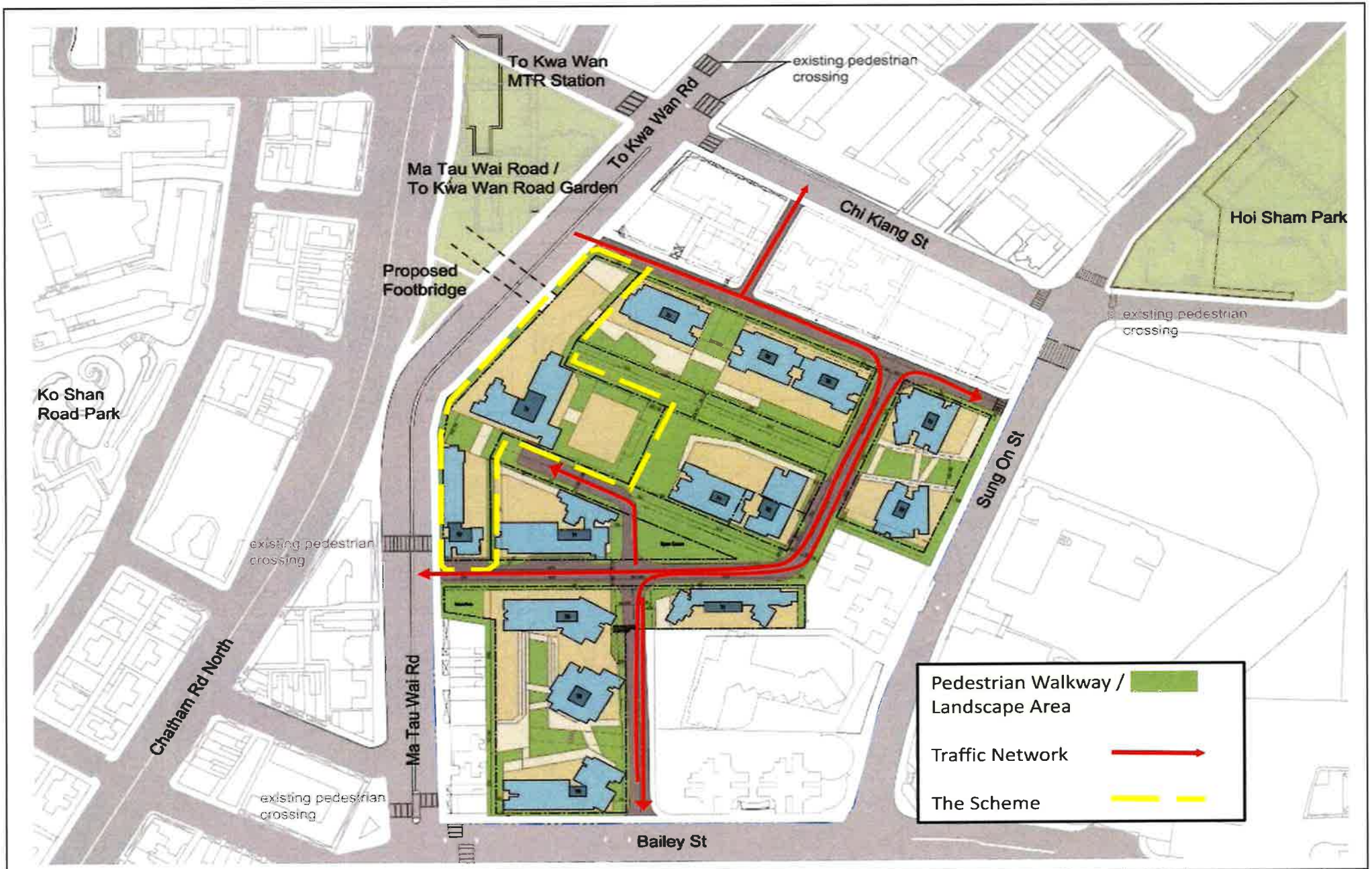

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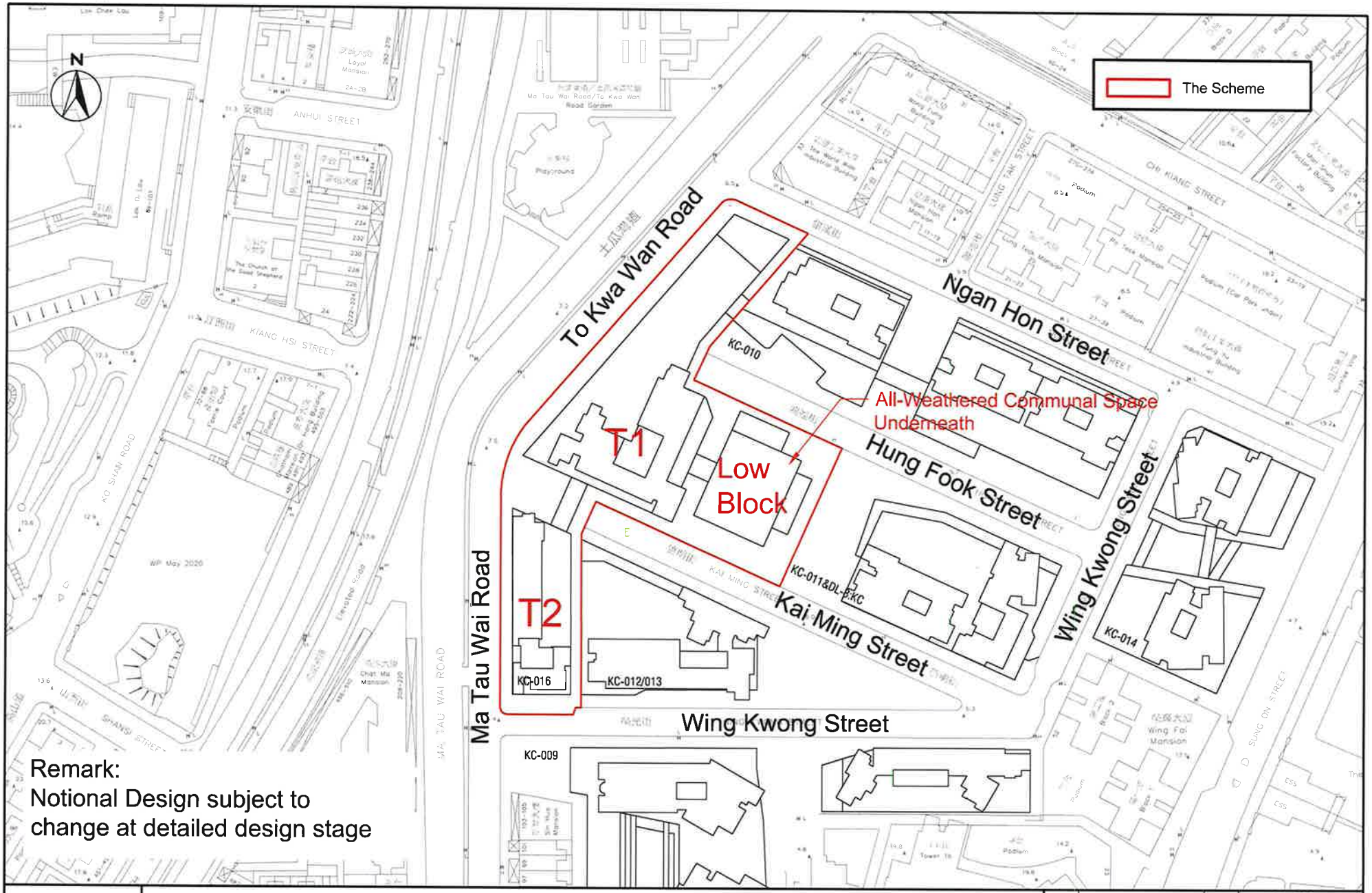
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Future Road Network in the Neighborhood

SCALE	N.T.S.	DATE	Nov-20
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KCAA1-01	FIGURE NO.	2-2
			REV. -



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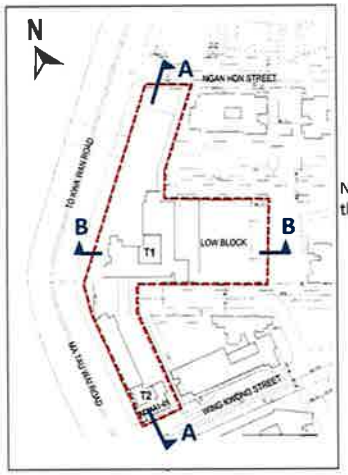
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Notional Block Plan of the Proposed Scheme

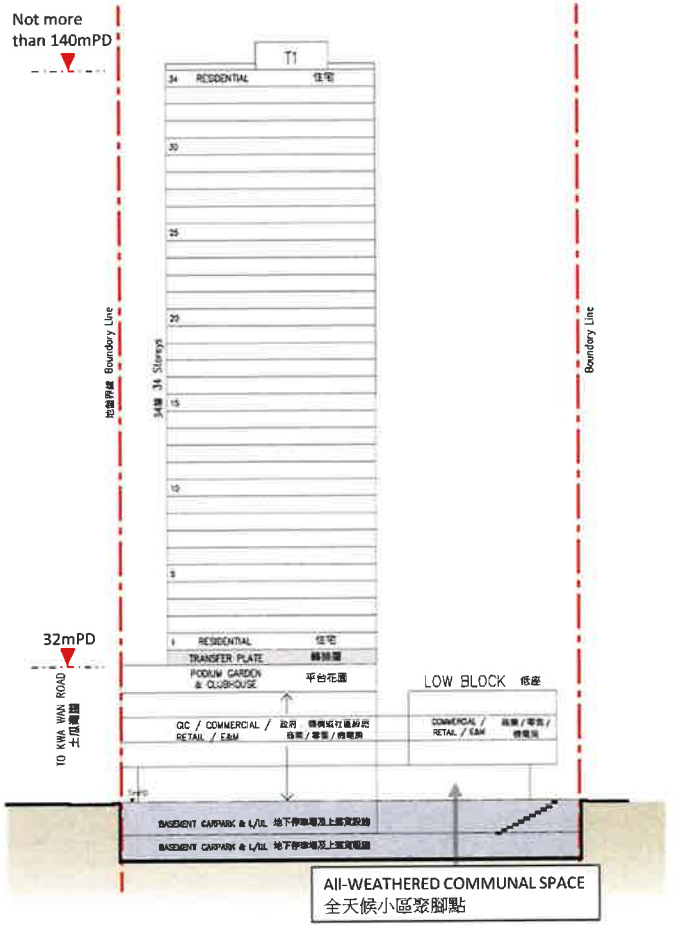
SCALE	1:1000 @ A3	DATE	Mar 2021
CHECK	KC	DRAWN	CC
JOB No.	IA 19021-KCAA101	DRAWING No.	3-1
		REV	-

Key Plan



Section A

Section B



Remark:
Notional Design subject to change at detailed design stage

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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Notional Section Plan of the Proposed Scheme

SCALE	N.T.S.	DATE	Dec-20
CHECK	KC	DRAWN	CC
JOB NO.	IA9021-KCAA101	FIGURE NO.	3-2
			REV. -



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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Assessment Boundary (Air Quality)

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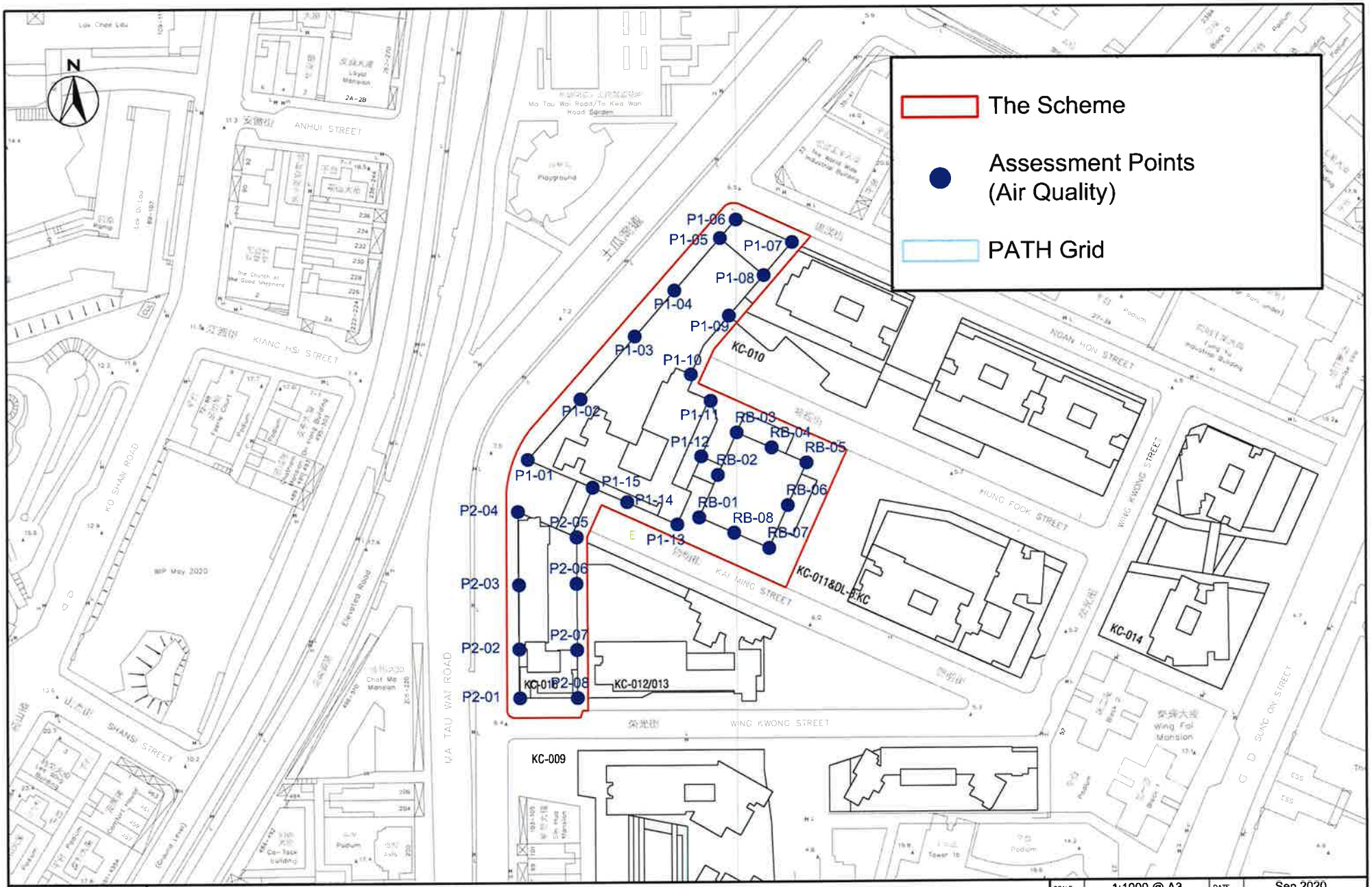

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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Assessment Points - Podium Structures & Low Block (Air Quality)

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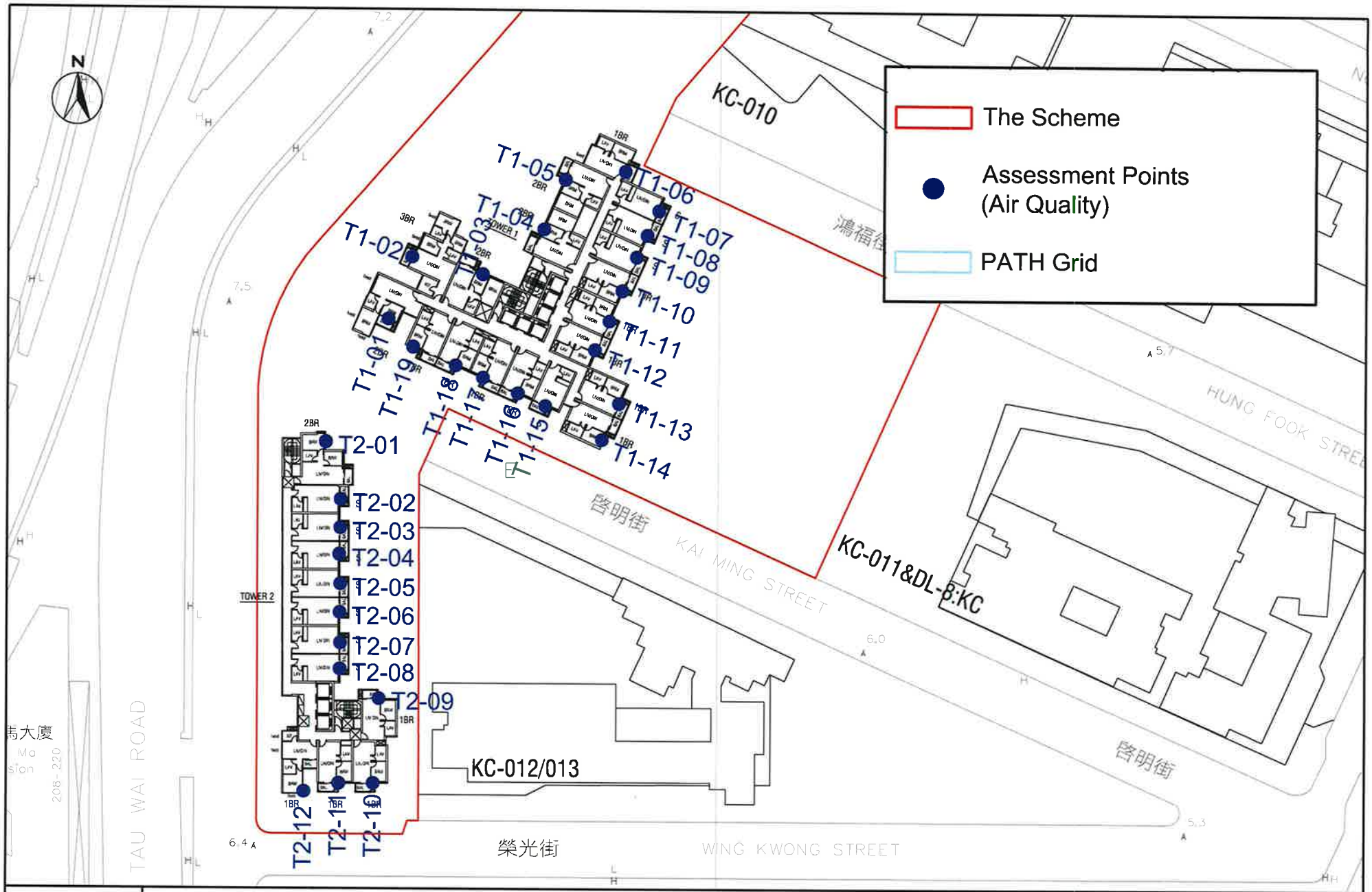

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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Assessment Points - Residential Towers (Air Quality)

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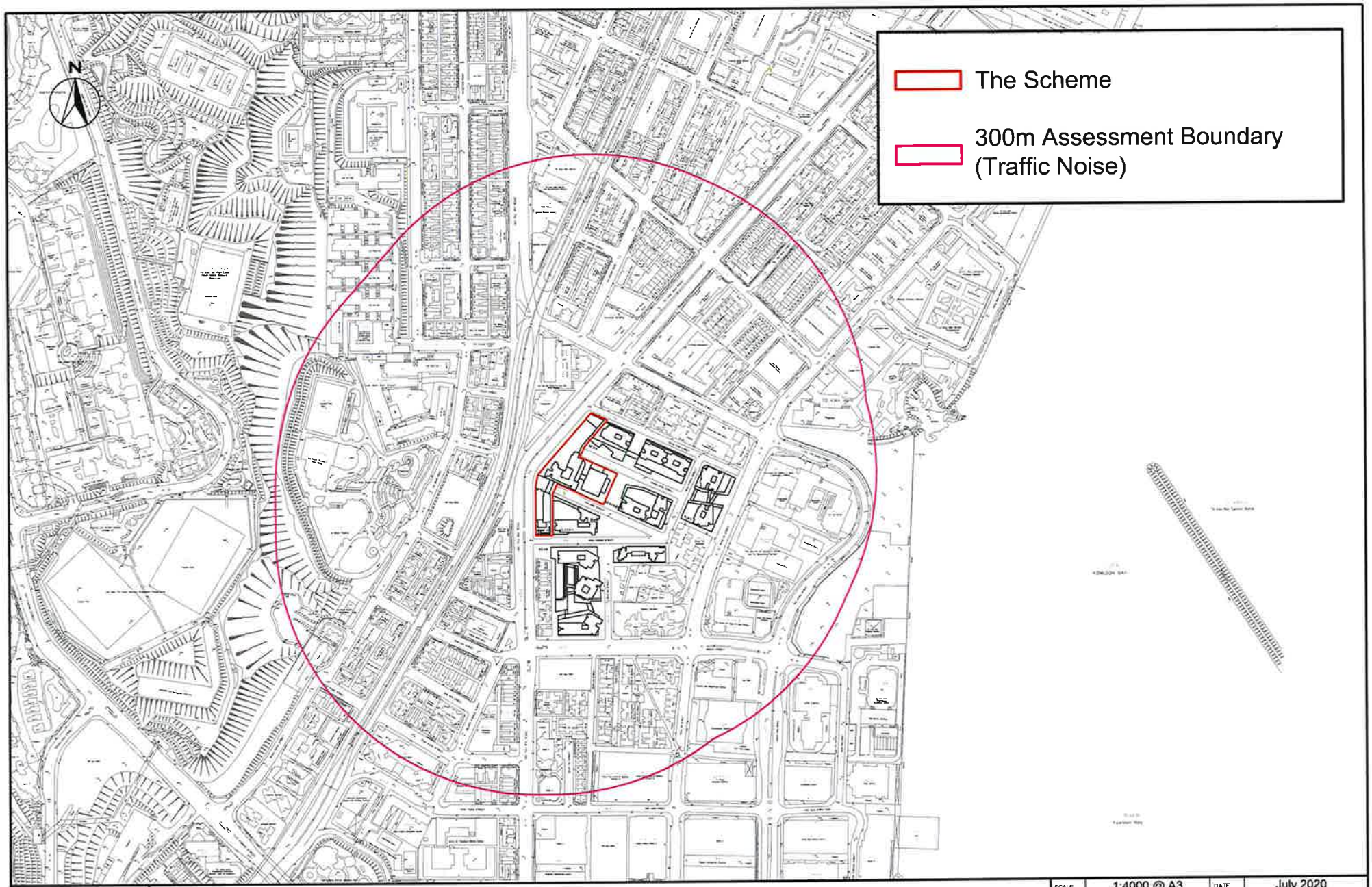

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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Assessment Boundary (Traffic Noise)

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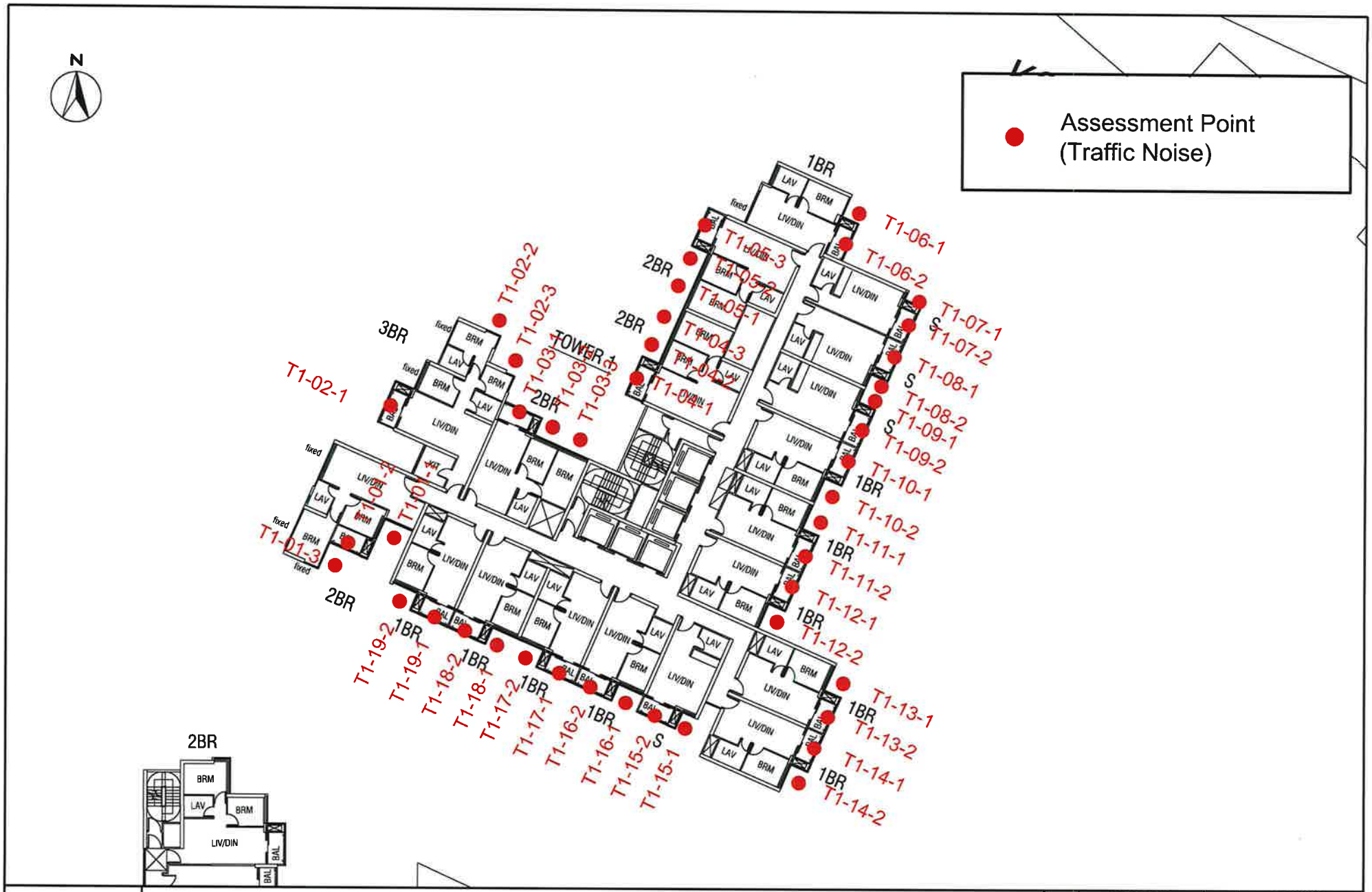
			REV -



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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Representative Assessment Points - Tower T1 (Traffic Noise)

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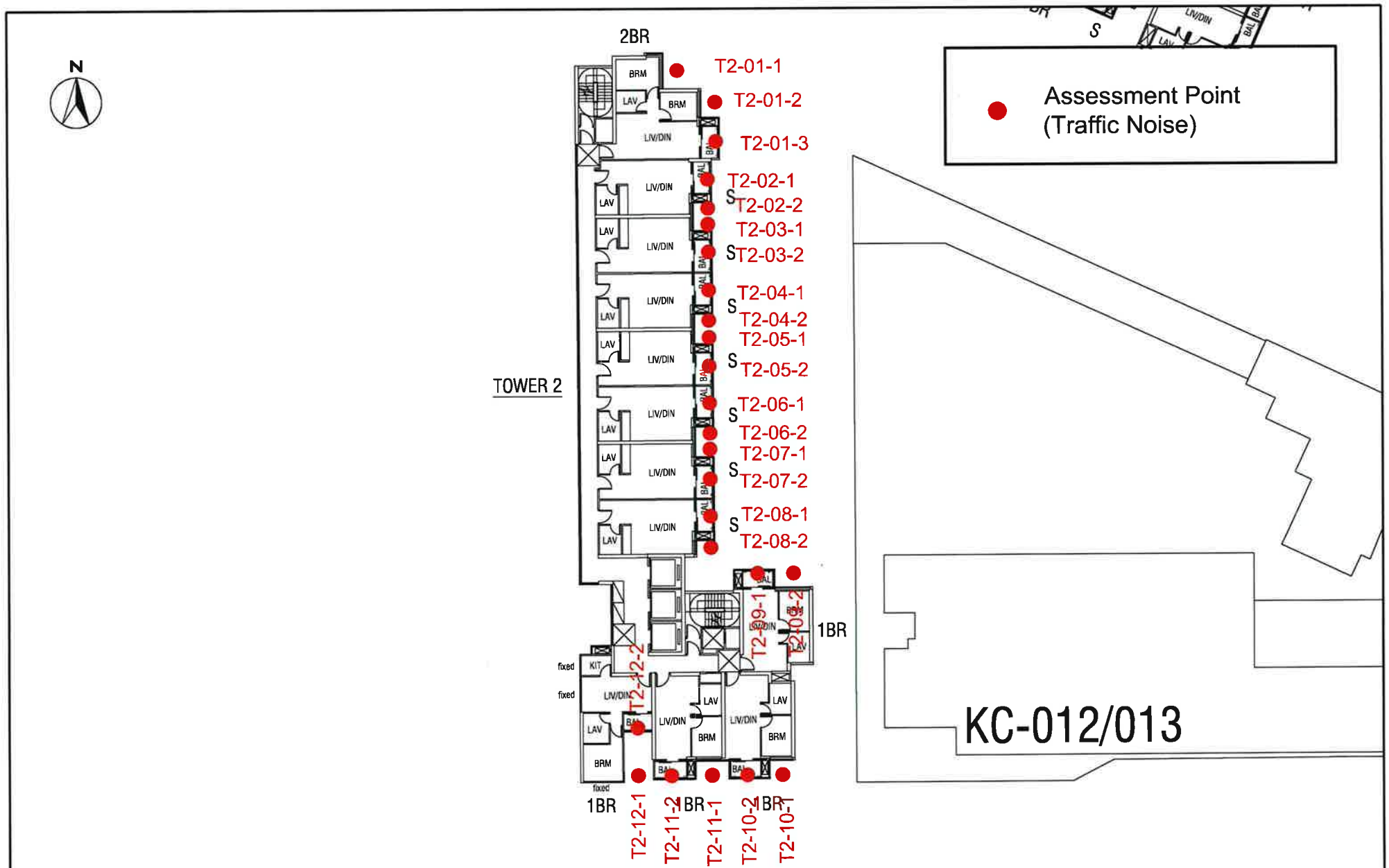

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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Representative Assessment Points - Tower T2 (Traffic Noise)

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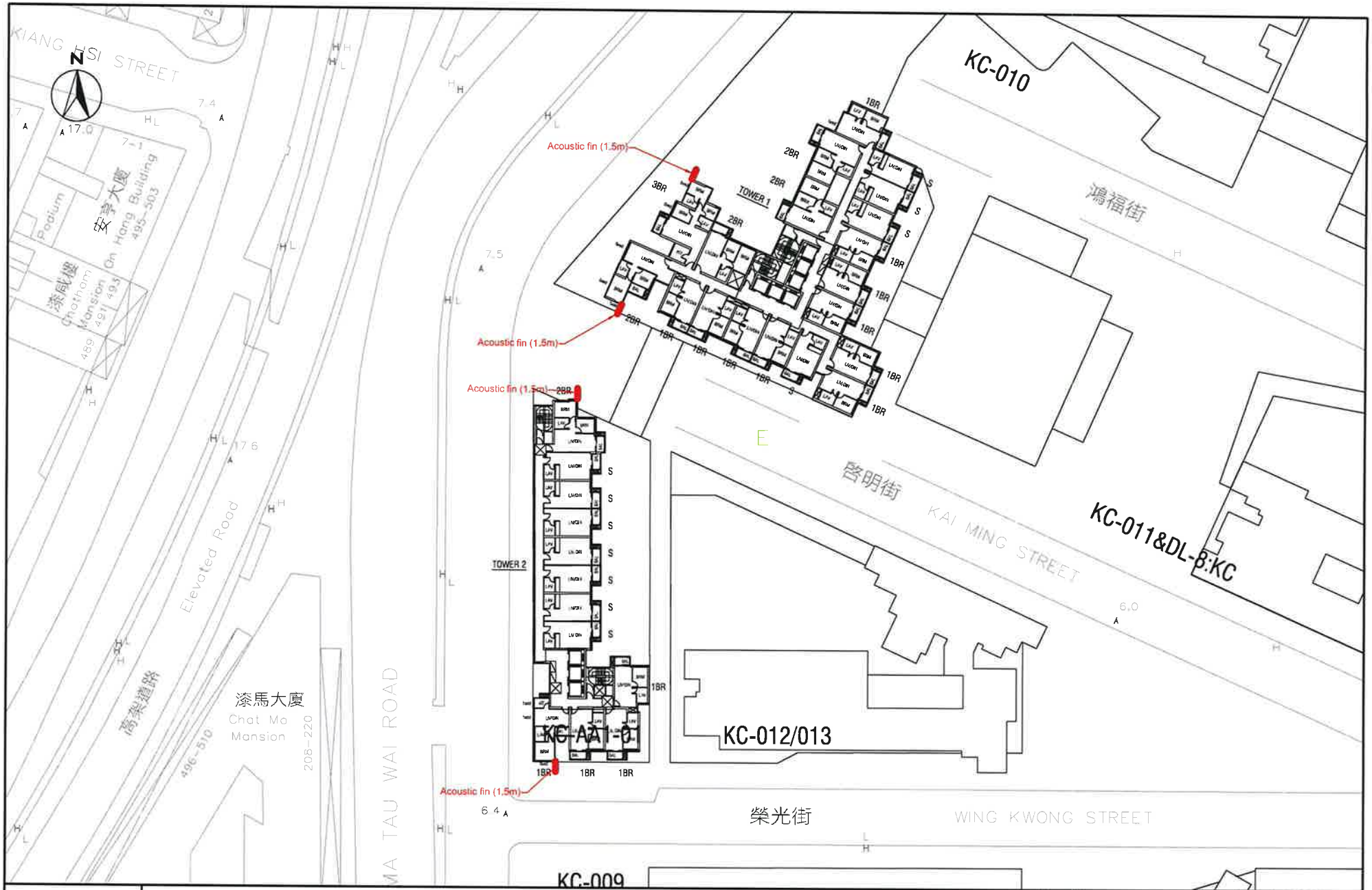

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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Proposed Mitigation Measures - Acoustic Fins

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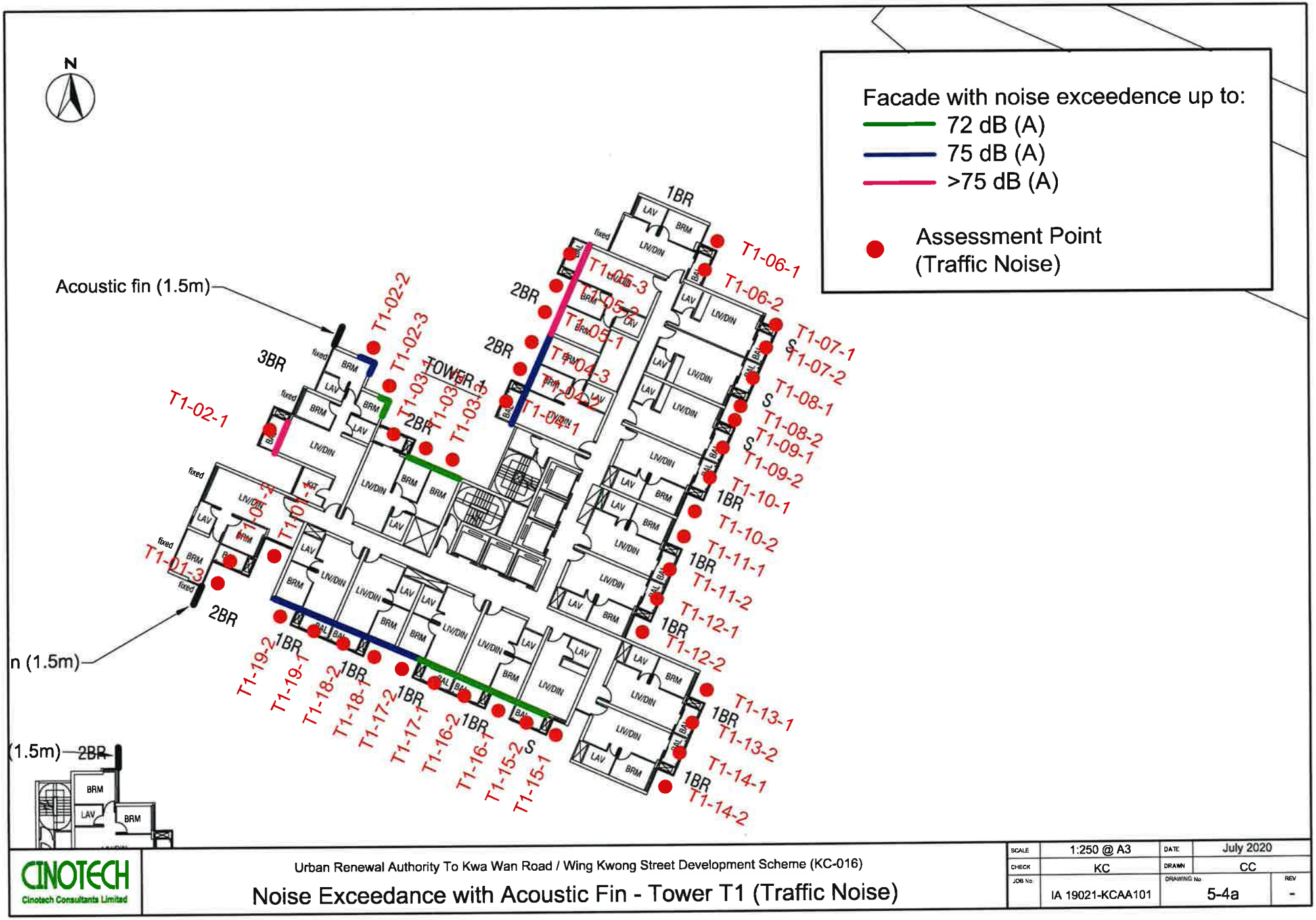

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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Noise Exceedance with Acoustic Fin - Tower T1 (Traffic Noise)

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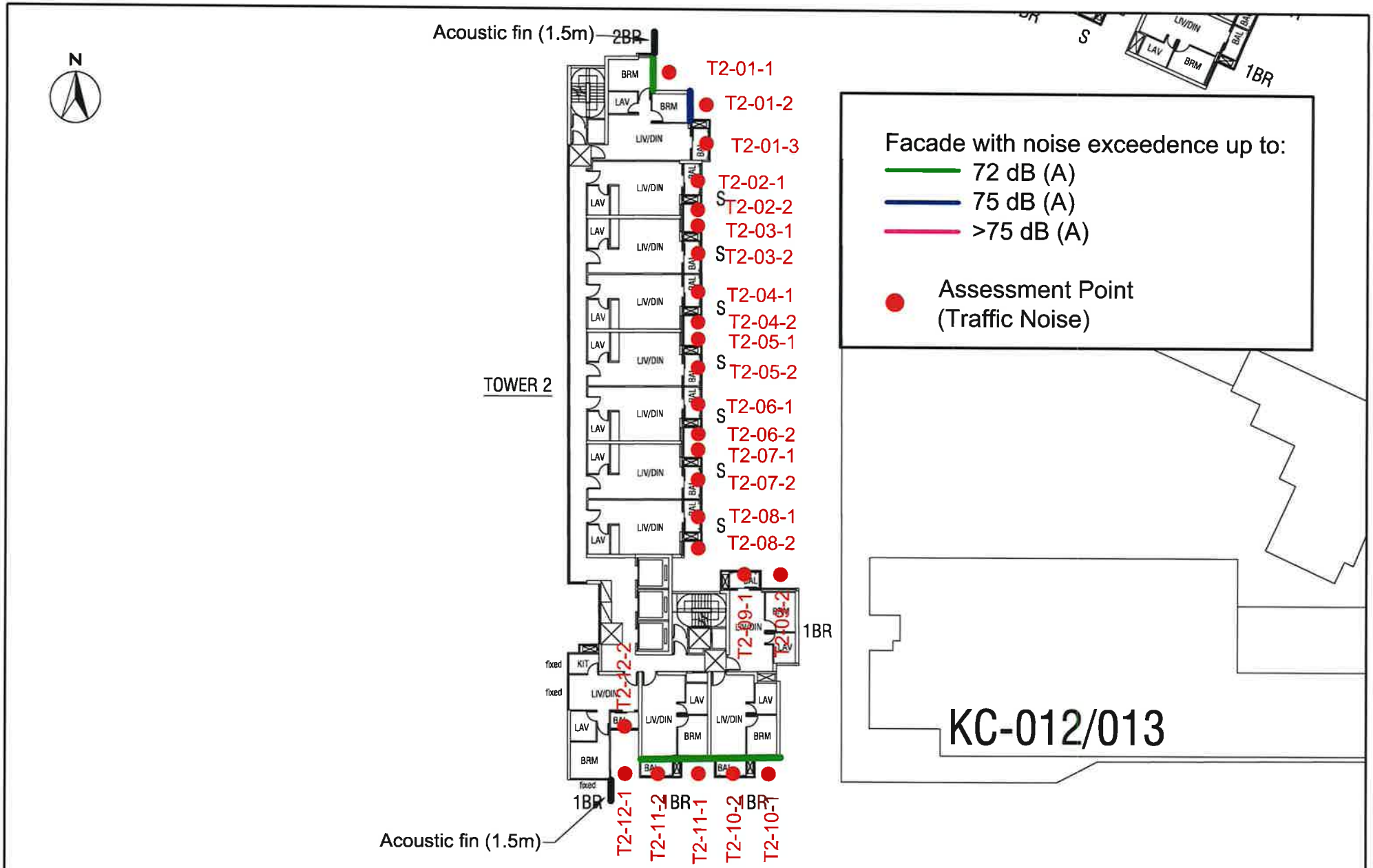
JOB No.	IA 19021-KCAA101	DRAWING No.	5-4a
		REV	-



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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Noise Exceedance with Acoustic Fin - Tower T2 (Traffic Noise)

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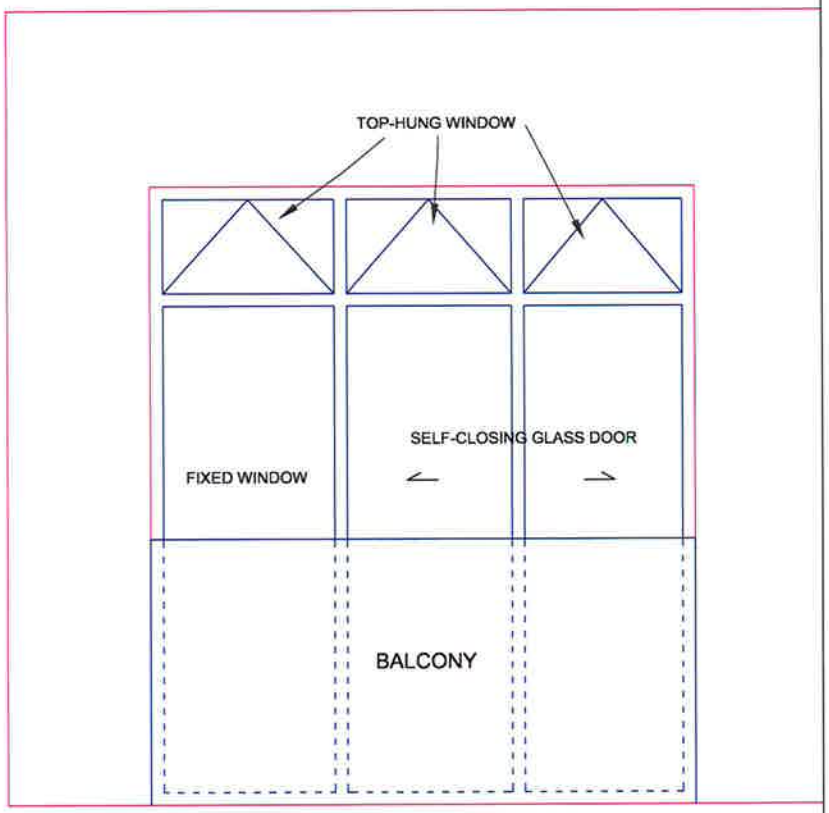
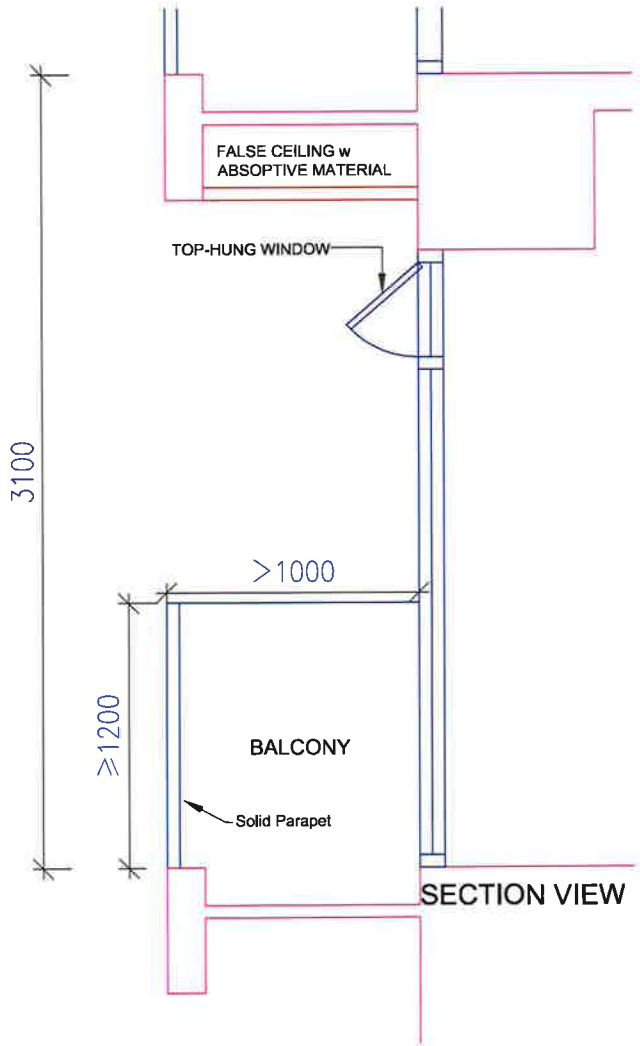


ELEVATION VIEW



SECTION VIEW

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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Typical Section for Acoustic Balcony

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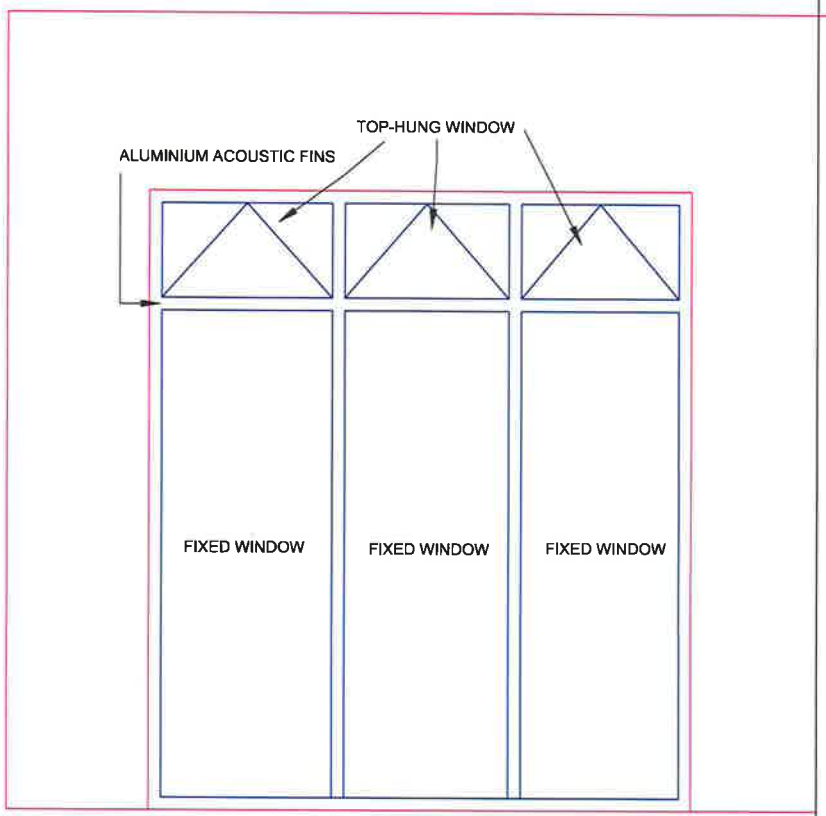
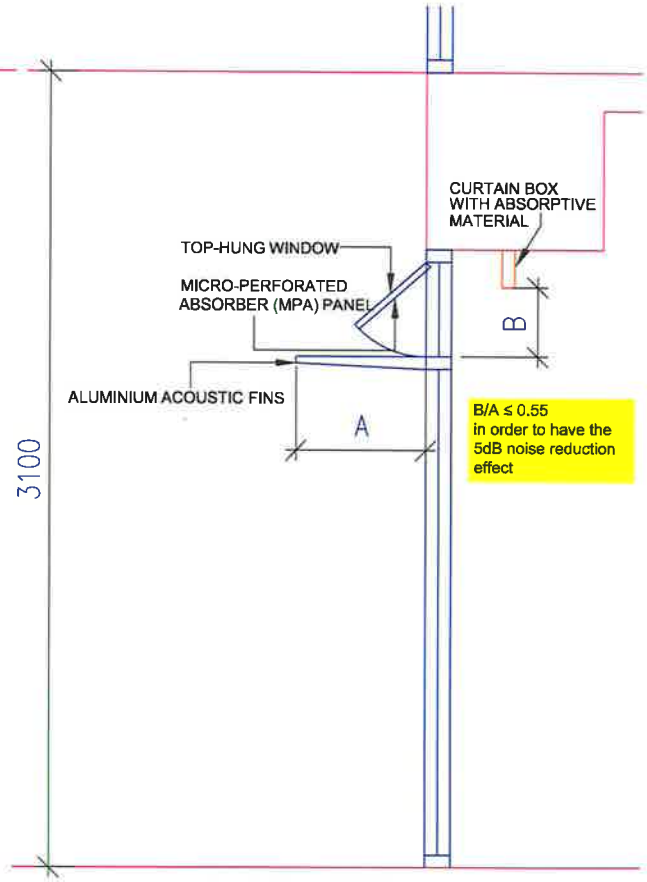


ELEVATION VIEW



SECTION VIEW

CINOTECH
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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Typical Section for Acoustic Window (Top-hung type)

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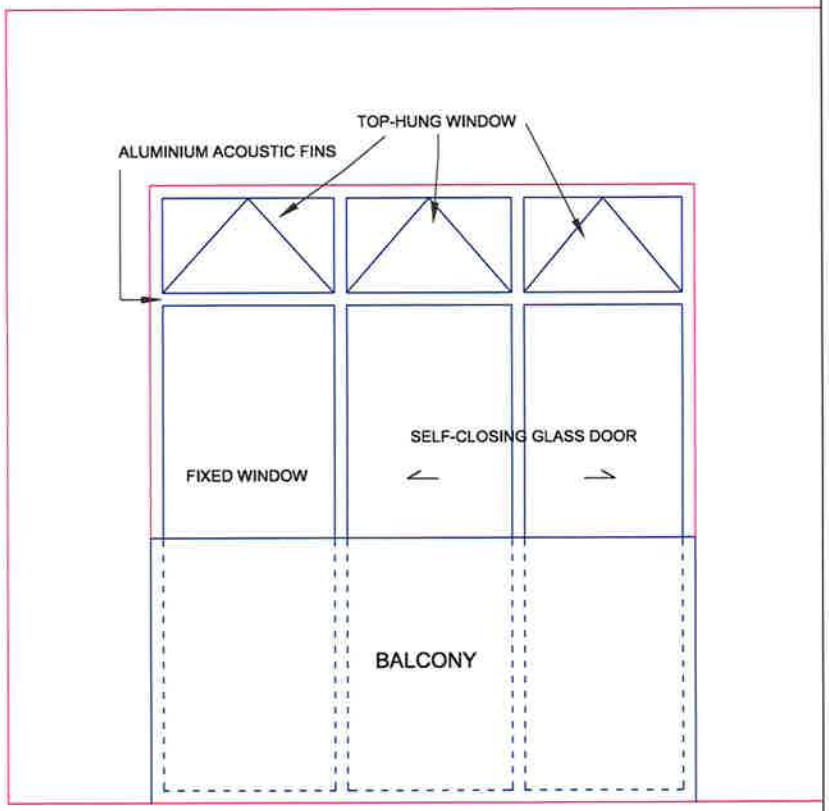
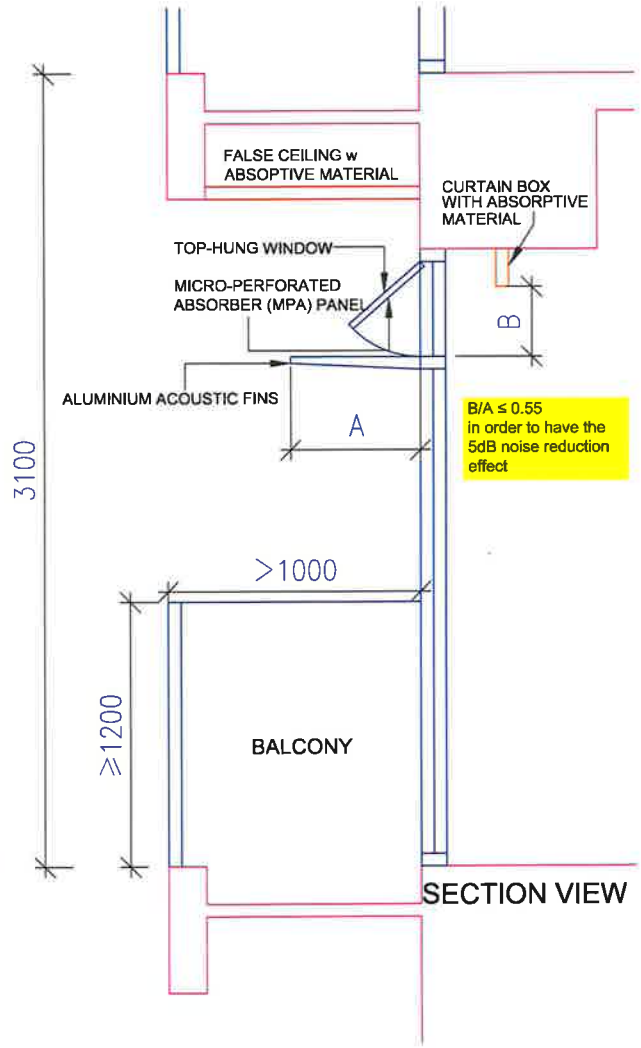


ELEVATION VIEW



SECTION VIEW

CINOTECH
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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Typical Section for Acoustic Window with Balcony

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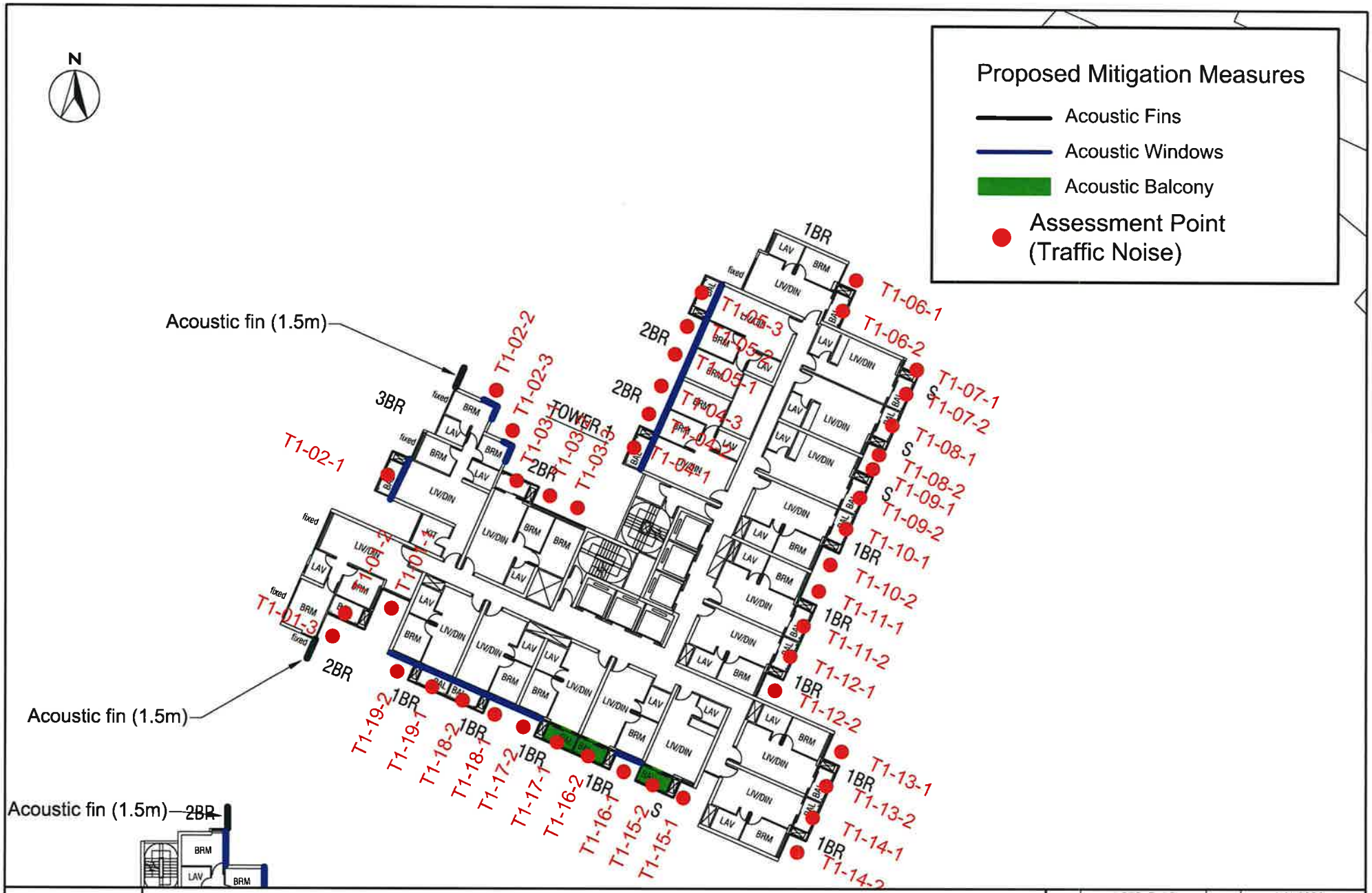
CHECK	KC	DRAWN	CC
JOB No.	IA 19021-KCAA101	DRAWING No.	5-5c
		REV	-

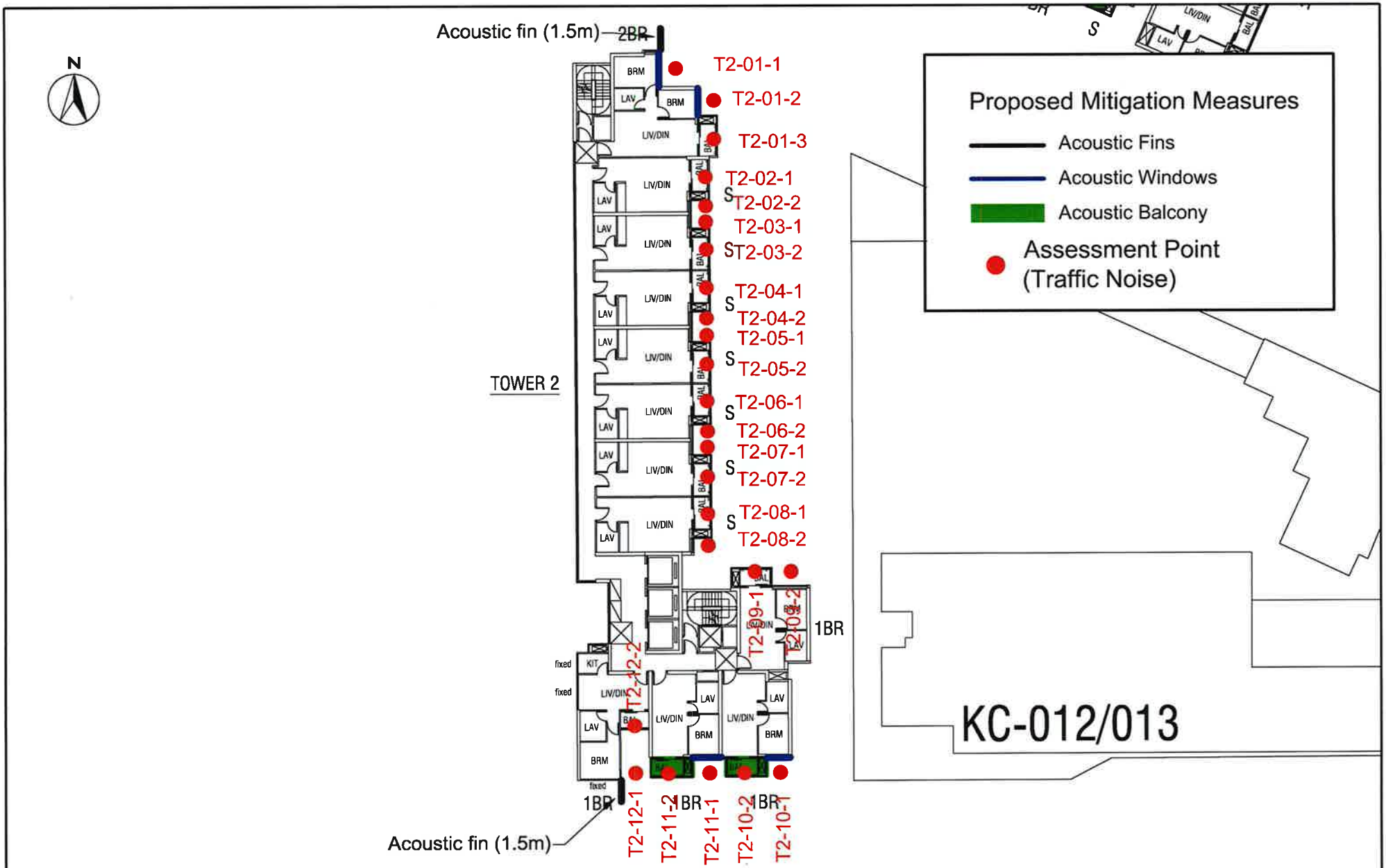


CINOTECH
Cinotech Consultants Limited

Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Proposed Mitigation Measures - Acoustic Fins & Acoustic Balcony/Windows - Tower 1

SCALE	1:250 @ A3	DATE	July 2020
CHECK	KC	DRAWN	CC
JOB No.	IA19021-KCAA101	DRAWING No	5-6a
		REV	-

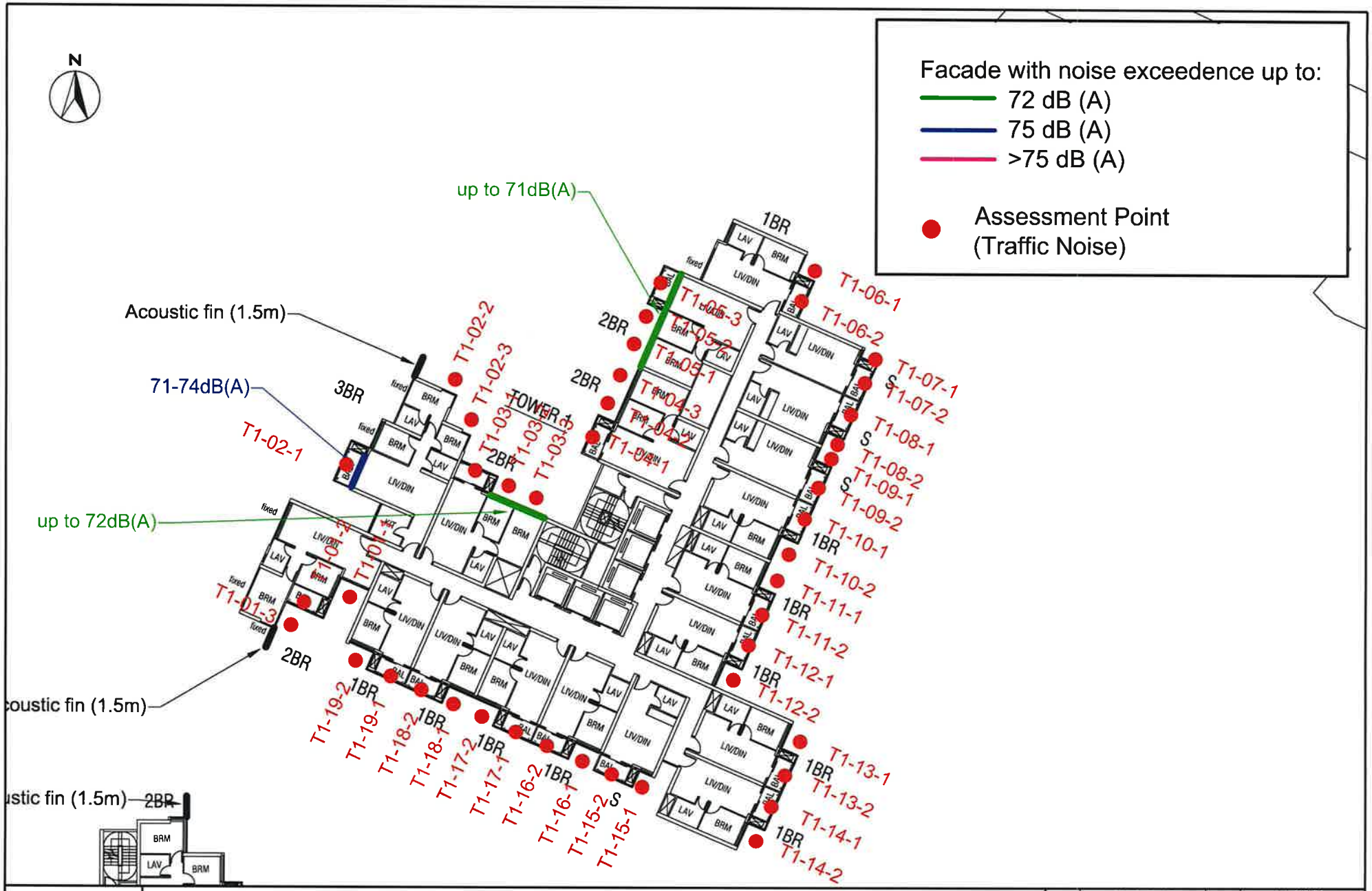


CINOTECH
Cinotech Consultants Limited

Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Proposed Mitigation Measures - Acoustic Fins & Acoustic Balcony/Windows - Tower 2

SCALE	1:250 @ A3	DATE	July 2020
CHECK	KC	DRAWN	CC
JOB No.	IA19021-KCAA101	DRAWING No.	5-6b
		REV	-



CINOTECH
Cinotech Consultants Limited

Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Noise Exceedance with Acoustic Fins & Acoustic Balcony/Windows - Tower 1 (Traffic Noise)

SCALE	1:250 @ A3	DATE	July 2020
CHECK	KC	DRAWN	CC
JOB No.	IA19021-KCAA101	DRAWING No.	5-7
		REV	-

APPENDIX 4-1

Endorsement of Traffic Forecast from Transport Department

APPENDIX 4-2

Sensitivity Test for Traffic Emission

Result of Sensitively Test (Traffic Emission)

Scenario	Traffic: Year 2032 Emfac: Year 2032	Traffic: Year 2047 Emfac: Year 2040
Quarter	NOx Emission (kg/day)	
Q1 (Dec - Feb)	150.99	130.75
Q2 (Mar - May)	138.36	119.00
Q3 (Jun - Aug)	121.31	103.51
Q4 (Sep - Nov)	140.66	120.71
Average	**137.83**	**118.49**

Note:

[1] The NOx Emissions were calculated by the emission factor of EMFAC-HK v4.2 (EMFAC mode), traffic flow data, traffic speed, cold start availability and road length from traffic consultant.

[2] The latest availabe assessment year in EMFAC-HK v4.2 is year 2040. Considering the growing traffic flow and the declining emission factor, the use of year 2047's traffic flow with year 2040's emission factor will produce a higher traffic emission than that of years 2040 & 2047.

APPENDIX 4-3

Caline4 Input

Caline 4 input for 2032 Q1

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1=2	837144.25	819218.15	837283.38	819316.45	18	0	1
R1-1=1-2	837133.85	819273.96	837146.19	819294.34	9	0	1
R1-1=1-2	837148.19	819294.34	837178.20	819275.45	8	0	1
R3=4	837203.30	819316.71	837244.44	819385.38	18	0	1
R3=4	837244.44	819385.38	837294.34	819500.43	18	0	1
R5=6	837136.87	819222.88	837181.42	819180.17	18	0	1
R7	837252.30	819287.88	837203.88	819018.88	18	0	1
R8	837250.13	819395.18	837287.53	819386.57	18	0	1
R9	837181.44	819180.13	837114.47	819083.78	14	0	1
R9	837114.47	819083.78	837071.73	819001.82	14	0	1
R10	837254.86	819182.55	837178.04	819137.84	14	0	1
R10	837178.04	819137.84	837189.32	819180.25	18	0	1
R10	837185.32	819100.25	837138.28	819052.06	14	0	1
R10	837138.28	819052.06	837118.88	819027.81	14	0	1
R10	837118.88	819027.81	837083.15	818991.79	14	0	1
R11	837181.06	819180.20	837297.41	819366.58	14	0	1
R12	837205.83	819182.75	837311.47	819380.17	14	0	1
R13=14	837285.88	819500.82	837318.18	819609.31	18	0	1
R15	837299.42	819385.30	837350.19	819483.70	18	0	1
R15	837350.19	819483.70	837366.53	819558.09	18	0	1
R18	837311.53	819380.82	837355.82	819482.82	14	0	1
R18	837335.82	819482.82	837348.37	819433.08	14	0	1
R18	837348.37	819433.08	837374.20	819511.47	14	0	1
R18	837374.20	819511.47	837378.30	819544.32	14	0	1
R18	837379.30	819544.32	837388.91	819599.02	14	0	1
R18	837388.91	819599.02	837389.89	819636.45	14	0	1
R17	837293.80	819498.19	837340.69	819483.86	18	0	1
R18	837338.38	819531.80	837303.51	819508.48	18	0	1
R19	837388.79	819641.46	837479.21	819584.48	18	0	1
R20	837309.72	819810.00	837286.21	819810.48	18	0	1
R21	837568.95	820025.52	837521.82	819952.21	18	10	4
R21	837521.82	819952.21	837482.10	819895.92	18	10	4
R21	837482.10	819895.92	837383.58	819848.78	18	10	4
R21	837383.58	819848.78	837371.88	819827.53	18	10	4
R21	837371.88	819827.53	837338.46	819822.74	18	10	4
R21	837338.46	819822.74	837349.78	819476.27	18	10	4
R21	837349.78	819476.27	837336.42	819436.91	18	10	4
R21	837336.42	819436.91	837309.44	819382.87	18	10	4
R21	837309.44	819382.87	837188.91	819147.58	18	10	4
R21	837188.91	819147.58	837134.75	819080.88	18	5	4
R21	837134.75	819080.88	837079.22	818996.37	18	8	1
R22	837587.30	820017.81	837531.11	819848.18	18	10	4
R22	837531.11	819848.18	837407.82	819481.77	18	10	4
R22	837407.82	819481.77	837388.81	819382.91	18	10	4
R22	837388.81	819382.91	837377.18	819576.36	18	10	4
R22	837377.18	819576.36	837367.78	819567.82	18	10	4
R22	837387.78	819587.82	837348.85	819442.16	18	10	4
R22	837348.85	819442.18	837321.86	819383.06	18	10	4
R22	837321.86	819383.06	837176.20	819140.81	18	10	4
R22	837176.20	819140.81	837142.84	819078.01	18	5	4
R22	837142.64	819078.01	837115.31	819034.88	18	0	1
R22	837115.31	819034.88	837082.10	818995.22	18	0	1
R23=24	837208.88	819810.18	837253.13	819809.82	18	0	1
R23=24	837253.13	819809.82	837291.40	819884.34	18	0	1
R25	837365.87	819804.07	837364.84	819884.29	18	0	1
R26	837375.84	819884.44	837377.07	819709.26	17	0	1
R26	837377.07	819709.26	837388.20	819836.33	17	0	1
R27	837421.24	819809.84	837408.96	819672.38	13	0	1
R27	837408.96	819672.38	837382.16	819678.45	13	0	1
R27	837382.16	819678.45	837458.14	819823.83	13	0	1
R27-1=27-2	837436.99	819736.79	837487.36	819713.23	18	0	1
R28	837441.48	819814.32	837515.91	819774.27	18	0	1
R28	837518.13	819774.12	837580.87	819914.86	18	0	1
R30	837653.22	819880.53	837582.77	819737.87	18	0	1
R31	837587.02	819715.44	837708.83	819852.48	18	0	1
R32	837721.65	819850.04	837584.52	819705.67	18	0	1
R33	837782.47	819838.14	837854.85	819867.74	13	0	1
R34	837717.34	819586.31	837584.48	819715.85	18	0	1
R35	837587.03	819715.45	837480.51	819583.72	18	0	1
R38	837584.51	819705.88	837481.85	819588.80	18	0	1
R37	837588.99	819715.41	837471.78	819811.84	18	0	1
R38=39	837781.33	819857.04	837674.27	819539.83	18	0	1
R38=39	837674.27	819539.83	837555.84	819502.99	18	0	1
R40	837370.55	819252.71	837587.13	819425.93	18	0	1
R40	837367.13	819425.03	837379.01	819454.42	18	0	1
R40	837379.01	819454.42	837383.63	819484.43	18	0	1
R40	837383.63	819484.43	837480.25	819583.95	18	0	1
R41	837491.55	819584.79	837380.25	819462.04	18	0	1
R41	837380.25	819462.04	837380.18	819318.87	18	0	1
R41	837380.18	819318.87	837383.41	819255.41	18	0	1
R42=43	837471.48	819258.12	837479.84	819381.89	13	0	1
R44	837470.96	819382.07	837380.21	819382.12	14	0	1
R44-1	837471.54	819382.08	837471.55	819414.34	14	0	1
R44-1	837471.55	819414.34	837410.47	819442.02	14	0	1
R45=46	837470.96	819382.07	837380.04	819382.04	14	0	1
R45=46	837538.04	819382.04	837579.78	819478.33	14	0	1
R47	837514.08	819508.88	837542.71	819582.45	11	0	1
R48	837447.83	819528.73	837380.01	819478.85	13	0	1

VKT/hr for each road (include the VKT for each sub-section; not directly used by caline4)

Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
39.006	24.000	14.306	11.795	10.500	13.700	25.900	71.511	74.111	69.222	65.722	67.111	72.284	67.600	73.305	70.994	74.493	76.694	78.594	74.794	64.289	58.000	53.994	48.600
78.450	48.416	28.550	24.370	21.050	27.350	52.316	143.983	149.067	138.866	131.300	134.966	104.650	97.083	104.934	102.233	107.033	110.333	113.033	107.633	92.584	83.283	77.850	69.734
78.450	48.416	28.550	24.370	21.050	27.350	52.316	143.983	149.067	138.866	131.300	134.966	104.650	97.083	104.934	102.233	107.033	110.333	113.033	107.633	92.584	83.283	77.850	69.734
38.850	23.800	13.837	11.443	10.550	13.550	25.585	70.423	73.436	68.336	64.687	66.536	82.135	77.015	83.050	80.950	84.850	87.250	89.350	85.164	73.100	65.586	61.036	55.350
38.850	23.800	13.837	11.443	10.550	13.550	25.585	70.423	73.436	68.336	64.687	66.536	82.135	77.015	83.050	80.950	84.850	87.250	89.350	85.164	73.100	65.586	61.036	55.350
14.520	9.020	5.406	4.395	3.900	5.100	9.720	26.745	27.745	25.950	24.650	25.145	42.680	39.826	43.190	41.885	43.990	45.245	46.345	44.085	37.921	34.167	31.908	28.649
1.240	0.802	0.440	0.360	0.320	0.484	0.840	2.364	2.402	2.342	2.165	2.162	7.562	6.958	7.642	7.360	7.720	8.002	8.160	7.760	6.680	5.958	5.558	4.998
6.100	3.750	2.200	1.850	1.703	2.098	4.050	11.150	11.550	10.750	10.233	10.450	7.500	6.947	7.602	7.350	7.750	7.950	8.150	7.750	6.700	6.000	5.548	5.050
72.480	44.480	26.400	22.080	19.520	25.440	48.000	132.809	137.440	128.000	121.448	124.312	124.800	116.488	125.760	122.232	128.320	132.000	135.360	128.800	110.712	99.680	92.952	83.848
72.480	44.480	26.400	22.080	19.520	25.440	48.000	132.809	137.440	128.000	121.448	124.312	124.800	116.488	125.760	122.232	128.320	132.000	135.360	128.800	110.712	99.680	92.952	83.848
96.640	59.528	35.200	29.273	26.080	34.088	64.328	176.800	183.360	170.720	162.088	165.920	155.208	144.640	156.488	152.168	159.528	164.168	168.328	160.336	137.928	124.176	115.680	104.000

Caline 4 input for 2032 Q1

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R49	837580.07	819478.84	837634.27	819454.01	13	0	1
R50	837490.85	819587.90	837656.18	819500.06	19	0	1
R51+52	837656.64	819502.99	837589.72	819343.19	28	0	1
R51+52	837586.72	819343.18	837562.52	819256.02	28	0	1
R53+54	837654.81	819487.71	837727.20	819473.80	14	0	1
R53+54	837727.20	819473.80	837789.09	819428.85	14	0	1
R53+54	837790.06	819426.85	837746.05	819388.89	14	0	1
R53+54	837746.05	819388.98	837698.63	819327.32	14	0	1
R53+54	837698.63	819327.32	837690.34	819301.31	14	0	1
R53+54	837680.34	819301.31	837659.18	819246.02	14	0	1
R55+56	837379.38	819257.83	837584.22	819258.11	25	0	1
R58-1	837654.87	819257.83	837447.06	819071.48	11	0	1
R56-2+56-3	837425.73	819150.58	837434.82	819071.89	16	0	1
R57+58	837564.88	819258.09	837981.38	819251.64	25	0	1
R59	837691.18	819248.24	837745.72	819231.27	14	0	1
R58	837745.72	819231.27	837738.65	819072.31	14	0	1
R60	837680.25	819247.58	837651.48	819069.36	15	0	1
R61	837670.39	819244.48	837681.88	819089.18	15	0	1
R62+63	837585.29	819255.28	837552.77	819138.26	17	0	1
R64+65	837380.69	819255.27	837378.88	819196.90	21	0	1
R64+65	837376.88	819196.90	837375.43	819071.78	21	0	1
R66+67	837376.09	819128.90	837282.22	819128.79	18	0	1
R68	837290.79	819225.67	837368.82	819269.11	18	0	1
R69	837283.67	819290.88	837338.49	819246.42	18	0	1
R69	837338.49	819246.43	837378.32	819253.86	19	0	1
R70+71	837238.08	819234.56	837318.11	819185.17	18	0	1
R72+73	837204.77	819182.18	837292.22	819129.60	18	0	1
R74+75	837347.48	819248.52	837292.25	819129.79	18	0	1
R76	837292.22	819129.60	837287.77	819078.01	18	0	1
R77	837266.87	819073.43	837202.18	819110.48	15	0	1
R77	837202.18	819110.48	837167.06	819125.41	15	0	1
R77-1+77-2	837218.56	819101.10	837181.53	819039.58	12	0	1
R78	837287.86	819072.24	837375.45	819071.13	18	0	1
R79	837187.48	818930.82	837217.48	818979.71	12	0	1
R79	837217.48	818979.71	837186.74	819022.62	12	0	1
R78	837186.74	819022.62	837140.45	819055.94	12	0	1
R80+81	837375.48	818871.78	837373.52	818888.96	21	0	1
R80-1+80-2	837374.53	818864.57	837228.05	818885.77	12	0	1
R80-1+80-2	837228.05	818885.77	837227.84	818932.14	12	0	1
R80-1+80-2	837227.84	818932.14	837357.66	818930.87	12	0	1
R82	837375.44	819072.43	837548.00	819072.00	15	0	1
R83	837545.29	818905.96	837548.30	819072.00	18	0	1
R84+85	837548.30	819071.82	837656.81	819087.81	13	0	1
R86+87	837656.82	819088.10	837655.06	818848.83	24	0	1
R88	837656.75	819086.78	837781.39	819089.96	13	0	1
R88	837781.39	819089.96	837782.18	819011.28	13	0	1
R89	837781.87	819057.79	837822.86	819019.59	18	0	1
R89	837822.89	819019.58	837880.58	819588.45	18	0	1
R88	837880.58	819588.45	837942.35	818896.19	18	0	1
R89	837940.35	818896.19	837972.06	818758.24	18	0	1
R90	837781.03	819057.31	837871.51	819756.82	18	0	1
R91	837903.23	819778.91	837879.37	819748.90	15	0	1
R92	837872.25	819758.53	837748.58	819872.80	18	0	1
R92-1	837684.09	819725.98	837717.80	819714.33	13	0	1
R93-1	837717.80	819714.33	837857.01	819814.10	13	0	1
R92-2	837684.86	819631.41	837830.84	819782.97	13	0	1
R93	837783.24	819825.48	837821.72	819878.91	13	0	1
R86+95	837774.83	819919.41	837714.67	819851.38	28	0	1
R96+97	837833.60	819690.36	837655.12	819838.05	18	0	1
R98	837704.88	818598.48	837630.23	819837.12	18	0	1
R99	837582.88	819914.03	837618.82	819987.86	14	0	1
R96	837818.82	819987.86	837565.57	820011.10	14	0	1
R99	837565.57	820011.10	837529.83	819838.48	14	0	1
R100	837500.18	820018.78	837514.18	819942.95	13	0	1
R101+102	837464.33	819998.67	837493.82	820030.48	18	0	1
R103+104	837514.79	819944.23	837371.46	820018.77	18	0	1
R105+106	837369.85	820024.78	837375.43	819884.41	28	0	1
R107+108	837251.06	819889.85	837291.72	819884.34	18	0	1
R108-1	837367.38	820009.78	837308.24	819884.25	18	0	1
R109	837291.42	819883.77	837370.43	819884.77	18	0	1
R110+111	837483.95	819998.87	837414.74	819880.38	18	0	1
R110+111	837414.74	819880.38	837408.09	819823.33	18	0	1
R112	837458.50	819823.92	837513.96	819643.98	12	0	1
R113	837530.06	819636.45	837471.36	819809.89	12	0	1
R114+115	836932.82	819968.02	836953.22	819980.42	16	0	1
R114+115	836852.22	819580.42	837026.89	819532.62	16	0	1
R114+115	837026.89	819532.62	837133.17	819488.00	16	0	1
R114+115	837133.17	819488.00	837215.91	819455.65	16	0	1
R114+115	837210.91	819455.65	836887.35	819427.73	19	0	1
R118+117	836948.57	819130.96	837023.42	819062.49	26	0	1
R118+119	837135.68	819223.51	837079.43	819129.58	18	0	1
R118+118	837079.43	819129.58	837022.42	819062.49	18	0	1
R120+121	837023.86	819063.84	837118.97	818957.84	22	0	1

VKT/hr for each road (include the VKT for each sub-section; not directly used by caline4)

Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
1.900	1.200	0.700	0.600	0.500	0.639	1.300	3.511	3.650	3.411	3.211	3.300	1.800	1.700	1.800	1.750	1.850	1.900	1.950	1.859	1.900	1.450	1.350	1.200
38.842	23.833	13.982	12.080	10.572	13.694	25.692	70.834	73.412	68.309	64.888	66.450	35.250	32.910	35.615	34.529	36.383	37.470	38.368	36.572	31.469	28.174	26.378	23.861
215.680	132.480	78.600	65.470	58.120	75.640	143.000	395.218	409.240	381.200	361.658	370.102	332.610	310.088	335.160	325.832	341.930	351.600	360.560	342.790	295.312	265.680	247.542	223.258
215.680	132.480	78.600	65.470	58.120	75.640	143.000	395.218	409.240	381.200	361.658	370.102	332.610	310.088	335.160	325.832	341.930	351.600	360.560	342.790	295.312	265.680	247.542	223.258
108.340	66.728	39.395	32.670	29.180	38.188	72.028	197.996	205.460	191.320	181.693	185.920	170.008	158.440	171.388	166.773	174.728	179.768	184.328	175.432	151.133	135.976	126.680	113.796

Caline 4 input for 2032 Q1

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	337144.25	819218.15	337203.38	819316.45	18	8	1
R1-1+1-2	337133.65	819273.98	337148.19	818294.34	8	8	1
R1-1+1-2	337148.19	819294.34	337178.20	819275.45	8	8	1
R3+4	337203.20	819216.71	337244.44	819385.38	15	8	1
R3+4	337244.44	819385.38	337294.34	819500.43	15	8	1
R5+6	337138.87	819222.68	337191.42	819190.17	18	8	1
R7	337252.30	819267.96	337203.68	819316.89	18	8	1
R8	337258.13	819395.18	337297.53	819366.57	18	8	1
R9	337191.44	819180.13	337114.47	819083.78	14	8	1
R9	337114.47	819083.78	337071.72	819001.82	14	8	1
R10	337204.98	819182.55	337178.04	819137.84	14	8	1
R10	337178.04	819137.84	337185.32	819120.25	14	8	1
R10	337185.32	819120.25	337138.28	819052.08	14	8	1
R10	337138.28	819052.08	337118.98	819027.81	14	8	1
R10	337118.98	819027.81	337089.15	818981.79	14	8	1
R11	337191.08	819180.20	337297.41	819366.58	14	8	1
R12	337203.03	819182.75	337311.47	819380.17	14	8	1
R13+14	337295.88	819501.02	337310.18	819528.31	18	8	1
R15	337299.42	819385.30	337250.19	819483.70	18	8	1
R15	337250.19	819483.70	337366.53	819408.09	18	8	1
R16	337311.53	819380.02	337335.82	819402.92	14	8	1
R16	337335.82	819402.92	337548.37	819433.08	14	8	1
R16	337548.37	819433.08	337374.20	819511.47	14	8	1
R16	337374.20	819511.47	337378.30	819544.32	14	8	1
R16	337378.30	819544.32	337388.91	819599.02	14	8	1
R16	337388.91	819599.02	337389.89	819608.45	14	8	1
R17	337293.80	819499.19	337348.68	819483.68	18	8	1
R18	337358.39	819551.60	337303.51	819558.49	18	8	1
R19	337389.79	819641.48	337478.21	819584.48	18	8	1
R20	337308.72	819619.09	337388.21	819819.48	18	8	1
R21	337358.83	820035.52	337321.62	819952.21	18	18	4
R21	337321.62	819952.21	337402.13	819695.92	18	18	4
R21	337402.13	819695.92	337383.08	819648.78	18	18	4
R21	337383.08	819648.78	337371.68	819607.03	18	18	4
R21	337371.68	819607.03	337358.48	819522.74	18	18	4
R21	337358.48	819522.74	337348.79	819478.27	18	18	4
R21	337348.79	819478.27	337338.42	819436.51	18	18	4
R21	337336.42	819436.51	337309.44	819382.87	18	18	4
R21	337309.44	819382.87	337168.51	819147.38	18	18	4
R21	337168.51	819147.38	337134.75	819080.88	18	8	4
R21	337134.75	819080.88	337079.22	818998.37	18	8	1
R22	337567.30	820017.81	337531.11	819948.16	18	18	4
R22	337531.11	819948.16	337407.02	819681.71	18	18	4
R22	337407.02	819681.71	337388.81	819632.81	18	18	4
R22	337388.81	819632.81	337277.18	819578.34	18	18	4
R22	337277.18	819578.34	337267.78	819507.82	18	18	4
R22	337267.78	819507.82	337248.65	819442.16	18	18	4
R22	337248.65	819442.16	337221.88	819383.08	18	18	4
R22	337221.88	819383.08	337178.20	819140.91	18	18	4
R22	337178.20	819140.91	337142.64	819078.01	18	8	4
R22	337142.64	819078.01	337115.31	819034.09	18	8	1
R22	337115.21	819034.09	337082.10	818965.22	18	8	1
R23+24	337309.88	819812.18	337253.13	819800.82	18	8	1
R23+24	337253.13	819808.82	337251.42	819884.34	18	8	1
R25	337365.87	819805.07	337264.64	819884.29	18	8	1
R26	337373.94	819884.44	337277.07	819709.26	17	8	1
R26	337277.07	819709.26	337388.20	819836.33	17	8	1
R27	337471.04	819809.84	337406.98	819672.39	13	8	1
R27	337406.98	819672.39	337392.18	819679.45	13	8	1
R27	337382.18	819679.45	337456.14	819823.43	13	8	1
R27-1+27-2	337436.98	819738.79	337467.35	819713.25	18	8	1
R28	337441.48	819814.32	337515.91	819774.27	18	8	1
R29	337318.13	819774.12	337580.87	819814.88	18	8	1
R30	337833.22	819890.53	337562.77	819737.87	18	8	1
R31	337587.02	819715.44	337708.43	819653.48	16	8	1
R32	337721.85	819850.04	337594.02	819705.87	16	8	1
R33	337782.47	819838.14	337634.05	819667.74	13	8	1
R34	337717.34	819588.31	337584.68	819705.93	16	8	1
R35	337587.33	819715.45	337482.51	819593.72	16	8	1
R36	337584.31	819705.86	337491.45	819588.80	16	8	1
R37	337588.99	819715.41	337471.78	819811.84	16	8	1
R38+39	337781.33	819857.04	337674.27	819538.63	16	8	1
R38+39	337674.27	819538.63	337655.64	819502.99	16	8	1
R40	337372.55	819252.71	337367.13	819425.03	16	8	1
R40	337367.13	819425.03	337370.01	819454.42	16	8	1
R40	337370.31	819454.42	337382.83	819484.43	16	8	1
R40	337382.83	819484.43	337480.29	819503.95	16	8	1
R41	337491.55	819588.75	337380.25	819462.08	16	8	1
R41	337380.25	819462.08	337385.18	819319.87	16	8	1
R41	337380.18	819318.87	337383.41	819255.41	16	8	1
R42+43	337471.48	819258.12	337470.84	819381.99	13	8	1
R44	337470.96	819382.67	337380.21	819582.13	14	8	1
R44-1	337471.54	819382.58	337471.56	819414.34	14	8	1
R44-1	337471.55	819414.34	337415.47	819442.02	14	8	1
R45+46	337470.86	819382.07	337308.04	819582.04	14	8	1
R45+46	337308.04	819382.04	337579.78	819479.33	14	8	1
R47	337514.88	819508.88	337542.71	819562.45	11	8	1
R48	337447.83	819538.73	337588.01	819479.85	13	8	1

Vehicle count for each road																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
390	240	143	118	105	137	259	715	741	692	657	671	723	676	733	710	745	767	786	748	643	580	540	486
264	163	96	82	71	93	176	484	501	467	441	454	353	327	354	345	361	372	381	363	312	281	262	235
264	163	96	82	71	93	176	484	501	467	441	454	353	327	354	345	361	372	381	363	312	281	262	235
132	81	47	39	36	46	87	239	249	232	219	226	278	260	281	274	787	295	302	288	247	222	206	187
132	81	47	39	36	46	87	239	249	232	219	226	278	260	281	274	787	295	302	288	247	222	206	187
146	91	54	43	39	51	98	269	278	261	248	253	432	403	437	424	445	458	469	446	384	346	323	290
31	20	11	9	8	12	21	59	60	56	54	54	189	174	191	184	193	200	204	194	167	149	139	125
122	75	44	37	34	47	81	223	231	215	205	209	150	139	152	147	155	159	163	155	134	120	111	101
453	278	165	138	122	159	300	830	859	800	759	777	780	728	786	764	802	825	846	805	692	623	581	524
453	278	165	138	122	159	300	830	859	800	759	777	780	728	786	764	802	825	846	805	692	623	581	524
604	372	220	183	163	213	402	1105	1146	1067	1013	1037	970	904	978	951	997	1026	1052	1002	862	776	723	650
604	372	220	183	163	213	402	1105	1146	1067	1013	1037	970	904	978	951	997	1026	1052	1002	862	776	723	650
604	372	220	183	163	213	402	1105	1146	1067	1013	1037	970	904	978	951	997	1026	1052	1002	862	776	723	650
604	372	220	183	163	213	402	1105	1146	1067	1013	1037	970	904	978	951	997	1026	1052	1002	862	776	723	650
604	372	220	183	163	213	402	1105	1146	1067	1013	1037	970	904	978	951	997	1026	1052	1002	862	776	723	650
454	279	166	138	122	159	300	832	862	803	762	779	783	731	789	767	805	828	849	808	695	626	583	526
716	440	261	217	193	251	475	1312	1359	1266	1201	1229	1039	968	1047	1018	1068	1098	1126	1070	923	830	773	697
496	305	180	152	133	173	329	906	939	875	829	850	609	567	613	597	625	645	660	628	542	486	454	408
684	420	250	208	184	240	454	1253	1298	1208	1146	1176	1164	1085	1174	1141	1196	1231	1262	1200	1033	929	867	780
684	420	250	208	184	240	454	1253	1298	1208	1146	1176	1164	1085	1174	1141	1196	1231	1262	1200	1033	929	867	780
644	397	235	196	174	227	427	1179	1222	1138	1079	1105	1049	978	1056	1028	1077	1109	1137	1081	933	837	782	704
644	397	235	196	174	227	427	1179	1222	1138	1079	1105	1049	978	1056	1028	1077	1109	1137	1081	933	837	782	704
644	397	235	196	174	227	427	1179	1222	1138	1079	1105	1049	978	1056	1028	1077	1109	1137	1081	933	837	782	704
644	397	235	196	174	227	427	1179	1222	1138	1079	1105	1049	978	1056	1028	1077	1109	1137	1081	933	837	782	704
644	397	235	196	174	227	427	1179	1222	1138	1079	1105	1049	978	1056	1028	1077	1109	1137	1081	933	837	782	704
11	6	4	3	3	4	6	19	20	19	18	19	18	18	18	18	19	20	20	20	16	15	14	13
7	4	3	3	2	3	4	14	14	13	13	13	37	33	38	37	38	39	40	38	33	29	26	25
741	455	270	227	199	259	491	1354	1405	1309	1240	1272	1003	935	1010	985	1031	1061	1088	1035	892	802	749	673
167	103	62	50	45	59	111	307	318	296	280	288	260	244	262	256	268	277	283	270	233	209	194	175
1819	1118	665	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1218	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
160	99	57	47	43	57	106	293	304	283	269	275	462	430	467	453	475	490	501	477	410	367	342	309
160	99	57	47	43	57	106	293	304	283	269	275	462	430	467	453	475	490	501	477	410	367	342	309
391	240	143	119	105	136	259	715	740	689	654	670	673	627	679	660	692	712	730	694	597	538	502	452
1007	620	368	306	273	353	669	1845	1913	1782	1690	1732	1525	1421	1536	1496	1567	1613	1653	1573	1355	1218	1136	1021
1007	620	368	306	273	353	669	1845	1913	1782	1690	1732	1525	1421	1536	1496	1567	1613	1653	1573	1355	1218	1136	1021
3	2	1	1	1	1	2	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
3	2	1	1	1	1	2	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
3	2	1	1	1	1	2	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
124	77	44	37	34	42	83	227	235	219	209	213	163	151	165	160	168	173	177	168	146	131	121	110
125	77	46	38	34	44	84	230	238	223	210	216	129	122	130	128	134	137	141	134	116	104	97	88
338	207	123	103	91	118	224	618	641	597	566	580	578	539	583	566	594	610	627	596	513	461	431	388
50	19	11	10	8	10	19	53	55	52	48	50	37	35	37	37	38	40	40	38	33	30	27	24
190	117	70	58	51	66	126	347	360	334	317	327	306	286	309	299	315	324	332	315	271	244	228	206
535	323	193	160	142	184	348	962	997	929	880	902	671	626	677	658	690	711	728	692	597	536	501	451
34	20	13	10	10	11	22	60	62	58	55	56	76	71	77	73	78	80	82	78	67	61	56	52
350	215	128	106	94	122	232	640	663	619	585	599	622	581	628	609	640	658	675	641	553	497	463	417
256	157	93	78	69	90	170	468	485	452	428	439	452	422	456	444	464	480	491	467	402	362	338	305
566	349	207	173	154	198	376	1037	1076	1003	950	975	724	675	730	709	744	765	785	747	643	578	540	485
143	88	52	43	38	51	94	260	270	252	238	244	280	243	263	255	268	277	283	269	232	208	195	175
688	422	250	209	185	241	455	1257	1302	1213	1151	1178	1041	972	1050	1021	1071	1103	1130	1075	926	832	776	700
688	422	250	209	185	241	455	1257	1302	1213	1151	1178	1041	972	1050	1021	1071	1103	1130	1075	926	832	776	700
239	147	87	74	65	84	158	437	453	422	400	410	447	417	451	437	460	473	485	462	397	357	333	300
239	147	87	74	65	84	158	437	453	422	400	410	447	417	451	437	460	473	485	462	397	357	333	300
239	147	87	74	65	84	158	437	453	422	400	410	447	417	451	437	460	473	485	462	397	357	333	300
239	147	87	74	65	84	158	437	453	422	400	410	447	417	451	437	460	473	485	462	397	357	333	300
622	382	227	189	167	218	412	1138	1179	1098	1041	1067	877	817	884	861	903	927	951	905	780	702	653	589
622	382	227	189	167	218	412	1138	1179	1098	1041	1067	877	817	884	861	903	927	951	905	780	702	653	589
622	382	227	189	167	218	412	1138	1179	1098	1041	1067	877	817	884	861	903	927	951	905	780	702	653	589
635	392	231	192	171	225	423	1164	1206	1123	1067	1091	1159	1078	1169	1135	1190	1226	1256	1196	1029	925	862	775
44	27	15	12	12	16	29	81	84	78	74	75	48	44	48	47	49	51	52	49	43	38	36	32
50	29	17	14	13	16	31	86	89	80	79	81	74	71	74	72	79	79	81	79	67	59	57	51
50	29	17	14	13	16	31	86	89	80	79	81	74	71	74	72	79	79	81	79	67	59	57	51
576	354	210	175	156	201	383	1055	1093	1018	967	988	933	870	941	914	960	987	1012	963	829	746	694	627
576	354	210	175	156	201	383	1055	1093	1018	967	988	933	870	941	914	960	987	1012	963	829	746	694	627
40	24	14	12	10	13	26	70	73	66	64	66	30	29	30	29	32	32	33	32	27	24	23	21
211	130	77	64	57	73	140	388	401	375	355	363	263	245	265	258	270	278	285	272	234	210	196	176

Caline 4 input for 2032 Q1

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R49	837581.07	819478.94	837634.37	819454.01	13	0	1
R50	837480.93	819587.90	837696.15	819580.06	18	0	1
R51+52	837605.64	819502.99	837586.72	819343.19	20	0	1
R51+52	837586.72	819343.19	837562.52	819256.02	28	0	1
R53+54	837654.81	819497.71	837727.26	819473.96	14	0	1
R53+54	837727.26	819473.90	837789.08	819426.65	14	0	1
R53+54	837788.09	819426.65	837748.05	819369.98	14	0	1
R52+54	837748.05	819369.98	837698.42	819327.32	14	0	1
R53+54	837698.43	819327.32	837680.34	819301.31	14	0	1
R53+54	837680.34	819301.31	837658.16	819246.02	14	0	1
R55+56	837378.36	819257.83	837564.22	819258.11	25	0	1
R56-1	837454.97	819257.83	837447.06	819071.48	11	0	1
R56-3+56-5	837425.73	819180.58	837424.82	819071.89	16	0	1
R57+58	837564.84	819258.08	837861.38	819251.84	25	0	1
R58	837861.12	819246.24	837745.70	819231.27	14	0	1
R59	837745.70	819231.27	837739.85	819070.31	14	0	1
R60	837860.25	819247.58	837831.46	819089.38	15	0	1
R61	837670.38	819244.48	837681.86	819089.13	15	0	1
R62+63	837585.20	819255.28	837562.77	819138.26	17	0	1
R64+65	837380.68	819256.27	837378.89	819196.90	21	0	1
R64+65	837378.88	819196.90	837375.43	819071.79	21	0	1
R66+67	837378.09	819128.90	837292.22	819129.79	18	0	1
R68	837290.78	819325.67	837369.83	819289.11	15	0	1
R69	837283.97	819282.98	837338.48	819346.43	18	0	1
R68	837338.48	819346.43	837379.52	819293.88	18	0	1
R70+71	837238.05	819234.50	837318.11	819185.17	18	0	1
R72+73	837204.77	819182.19	837292.22	819129.60	18	0	1
R74+75	837347.48	819248.52	837292.25	819129.79	18	0	1
R76	837292.22	819129.60	837287.77	819076.01	18	0	1
R77	837286.87	819073.43	837202.18	819110.48	18	0	1
R77	837202.18	819110.48	837187.06	819105.41	18	0	1
R77-1+77-2	837218.56	819101.10	837181.53	819039.58	12	0	1
R78	837267.98	819072.24	837275.43	819071.10	18	0	1
R79	837147.48	819830.82	837217.48	819978.71	12	0	1
R79	837217.48	819979.71	837186.74	819022.02	12	0	1
R79	837186.74	819022.02	837140.45	819055.94	12	0	1
R80+81	837375.48	819071.79	837373.52	818888.96	21	0	1
R80-1+80-2	837374.52	819864.57	837228.05	819865.77	12	0	1
R80-1+80-2	837228.05	819865.77	837227.84	819832.14	12	0	1
R80-1+80-2	837227.84	819832.14	837337.68	819830.87	12	0	1
R82	837375.44	819072.43	837549.06	819072.00	15	0	1
R83	837545.29	818905.68	837548.30	819072.00	18	0	1
R84+85	837548.32	819071.82	837656.81	819067.81	13	0	1
R84+87	837656.82	819069.13	837655.06	818848.83	24	0	1
R88	837656.75	819066.76	837781.38	819068.98	13	0	1
R89	837761.38	819068.98	837755.18	819011.28	13	0	1
R88	837791.97	819057.78	837822.86	818818.58	18	0	1
R89	837822.89	819818.59	837890.36	819582.45	18	0	1
R89	837890.36	819583.45	837948.35	819696.19	18	0	1
R89	837940.35	819696.19	837972.06	819756.34	18	0	1
R90	837791.53	819657.31	837871.51	819756.82	18	0	1
R91	837903.23	819779.91	837979.37	819749.90	15	0	1
R92	837672.23	819756.53	837740.90	819872.80	18	0	1
R92-1	837894.09	819733.86	837717.80	819714.33	13	0	1
R92-1	837717.80	819714.33	837897.01	819614.10	13	0	1
R92-2	837864.96	819831.41	837830.84	819782.97	13	0	1
R93	837783.24	819835.48	837821.72	819878.91	13	0	1
R94+95	837774.63	819819.41	837714.67	819851.36	28	0	1
R96+97	837833.80	819890.38	837855.12	819958.05	18	0	1
R98	837704.89	819858.48	837530.23	819937.12	18	0	1
R99	837582.86	819914.03	837816.82	819987.88	14	0	1
R99	837816.82	819987.88	837565.57	820011.12	14	0	1
R99	837565.57	820011.12	837529.93	819836.49	14	0	1
R100	837590.18	820019.70	837514.19	819842.95	13	0	1
R101+102	837484.33	819966.67	837493.82	820030.46	18	0	1
R103+104	837514.79	819944.33	837371.40	820010.77	18	0	1
R105+106	837389.85	820024.78	837370.46	819884.41	26	0	1
R107+108	837251.06	819988.85	837251.72	819884.34	18	0	1
R108-1	837367.38	820009.79	837368.24	819884.25	18	0	1
R108	837251.42	819883.77	837370.45	819884.77	18	0	1
R110+111	837483.90	819996.87	837414.74	819880.38	18	0	1
R110+111	837414.74	819880.38	837458.00	819823.33	18	0	1
R112	837458.50	819823.90	837513.98	819843.08	12	0	1
R113	837530.06	819838.43	837471.38	819809.88	12	0	1
R114+115	838932.02	819868.03	838853.22	819590.42	18	0	1
R114+115	838953.22	819590.42	837626.89	819532.62	18	0	1
R114+115	837529.89	819532.62	837033.17	819488.00	18	0	1
R114+115	837533.17	819488.00	837510.91	819455.65	18	0	1
R114+115	837510.91	819455.65	838887.35	819427.73	18	0	1
R116+117	838848.57	819126.90	837022.43	819062.49	28	0	1
R118+119	837135.66	819223.51	837079.43	819129.58	18	0	1
R118+119	837079.43	819129.58	837022.42	819062.49	18	0	1
R120+121	837023.88	819083.94	837118.97	818957.84	22	0	1

Vehicle count for each road																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
38	24	14	12	10	13	26	70	73	68	64	66	36	34	36	35	37	38	39	37	33	29	27	24
216	132	78	67	59	76	143	394	408	379	360	369	196	183	198	192	202	208	213	203	175	157	147	133
1169	718	426	355	315	410	775	2142	2218	2066	1960	2006	1819	1696	1833	1782	1870	1923	1972	1875	1615	1453	1354	1221
1169	718	426	355	315	410	775	2142	2218	2066	1960	2006	1819	1696	1833	1782	1870	1923	1972	1875	1615	1453	1354	1221
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
568	350	207	173	154	199	378	1042	1081	1008	955	977	1032	962	1041	1011	1061	1090	1119	1065	916	825	768	693
17	11	7	5	4	6	11	31	32	29	28	29	23	22	23	23	24	24	25	24	21	18	17	16
1400	860	511	425	377	491	929	2565	2657	2474	2347	2405	2203	2053	2221	2159	2264	2329	2388	2270	1956	1759	1640	1477
761	469	277	230	205	268	504	1391	1443	1344	1275	1305	1197	1116	1206	1174	1229	1265	1297	1232	1065	955	892	802
3	2	1	1	1	1	2	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
3	2	1	1	1	1	2	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
231	142	84	70	64	81	152	422	438	409	387	393	305	284	305	298	311	321	329	313	270	243	228	203
169	104	61	51	45	58	112	310	321	299	284	291	248	231	253	244	257	264	271	258	222	199	186	167
125	77	45	38	35	44	82	229	239	224	211	217	267	249	270	262	275	282	290	277	237	214	199	180
691	424	253	211	186	243	458	1267	1313	1221	1159	1189	1201	1118	1212	1178	1234	1270	1302	1238	1066	958	893	805
691	424	253	211	186	243	458	1267	1312	1221	1159	1189	1201	1118	1212	1178	1234	1270	1302	1238	1066	958	893	805
1385	852	505	423	373	486	918	2533	2627	2447	2319	2377	2052	1913	2066	2013	2108	2170	2225	2116	1825	1639	1531	1377
4	2	1	1	1	1	2	7	7	7	6	6	6	5	6	6	6	6	6	6	3	6	6	4
138	85	51	41	36	49	92	255	264	245	234	238	420	391	423	412	431	444	455	434	374	336	313	282
138	85	51	41	36	49	92	255	264	245	234	238	420	391	423	412	431	444	455	434	374	336	313	282
178	109	66	53	48	63	117	326	338	315	298	307	378	362	280	374	287	297	303	390	249	224	208	188
1826	1122	666	557	492	640	1210	3341	3464	3227	3058	3137	3639	3391	3669	3568	3741	3847	3945	3752	3233	2906	2712	2439
2036	1251	743	622	549	712	1351	3724	3861	3596	3409	3495	2808	2619	2829	2755	2886	2969	3045	2895	2496	2244	2094	1883
158	96	57	48	42	55	105	288	298	279	264	269	176	162	175	172	181	186	190	179	157	140	131	117
24	12	9	5	4	9	15	40	41	37	36	38	29	25	29	29	30	31	31	30	26	23	21	19
24	13	9	5	4	9	15	40	41	37	36	38	29	25	29	29	30	31	31	30	26	23	21	19
278	172	101	84	74	99	184	510	528	493	466	478	422	396	426	415	436	448	459	437	376	339	315	284
5	5	4	2	2	2	5	10	10	9	9	11	34	32	34	32	36	36	37	36	30	28	26	24
14	6	4	3	3	8	7	21	23	22	21	21	21	20	21	21	21	23	23	22	19	17	16	14
14	6	4	3	3	8	7	21	23	22	21	21	21	20	21	21	21	23	23	22	19	17	16	14
14	6	4	3	3	8	7	21	23	22	21	21	21	20	21	21	21	23	23	22	19	17	16	14
1933	1188	705	589	522	677	1283	3536	3667	3416	3237	3322	3861	3601	3893	3785	3969	4082	4186	3981	3430	3084	2879	2588
1686	1036	616	514	455	589	1119	3085	3196	2976	2823	2893	2478	2311	2498	2430	2547	2670	2687	2554	2201	1980	1847	1662
1686	1036	616	514	455	589	1119	3085	3196	2976	2823	2893	2478	2311	2498	2430	2547	2670	2687	2554	2201	1980	1847	1662
1686	1036	616	514	455	589	1119	3085	3196	2976	2823	2893	2478	2311	2498	2430	2547	2670	2687	2554	2201	1980	1847	1662
97	60	37	29	26	34	64	178	184	172	163	167	118	110	118	115	122	125	128	122	105	95	87	78
209	129	76	64	56	73	140	384	397	370	351	359	312	292	314	306	321	330	338	322	277	249	232	208
1118	689	407	340	302	393	742	2048	2123	1979	1876	1922	1687	1573	1700	1655	1725	1784	1829	1740	1498	1348	1257	1130
117	72	43	36	33	41	79	214	222	207	196	203	264	247	267	259	271	279	286	272	234	211	196	177
319	196	116	97	86	112	212	583	604	563	533	547	598	557	602	587	615	631	648	617	530	477	446	401
319	196	116	97	86	112	212	583	604	563	533	547	598	557	602	587	615	631	648	617	530	477	446	401
287	176	105	86	78	100	190	523	543	506	479	491	598	557	602	586	614	631	647	616	530	478	445	399
287	176	105	86	78	100	190	523	543	506	479	491	598	557	602	586	614	631	647	616	530	478	445	399
287	176	105	86	78	100	190	523	543	506	479	491	598	557	602	586	614	631	647	616	530	478	445	399
287	176	105	86	78	100	190	523	543	506	479	491	598	557	602	586	614	631	647	616	530	478	445	399
201	124	73	60	54	70	133	365	380	353	335	344	329	307	332	323	339	348	357	340	292	264	245	221
435	268	159	133	116	153	288	795	824	767	728	746	873	814	879	856	897	924	947	900	777	698	651	585
328	203	120	100	90	116	219	603	625	584	551	565	571	533	577	561	588	606	621	591	509	456	425	384
6	4	2	2	2	2	4	12	12	11	11	11	15	14	15	14	15	16	16	15	13	12	11	10
6	4	2	2	2	2	4	12	12	11	11	11	15	14	15	14	15	16	16	15	13	12	11	10
8	5	3	2	2	3	5	14	15	14	13	14	14	13	14	14	14	15	15	14	12	11	10	9
8	5	4	3	3	3	5	16	16	15	15	15	8	6	8	8	8	8	8	8	6	6	6	4
925	569	336	282	251	323	614	1689	1754	1633	1551	1590	1408	1314	1470	1383	1447	1489	1527	1452	1249	1124	1049	944
82	51	31	24	22	28	55	152	158	148	141	141	100	94	102	98	103	107	109	104	91	83	75	69
287	177	105	88	77	100	190	525	545	508	481	494	353	329	354	348	362	371	383	363	314	282	263	236
22	14	8	7	5	7	15	39	41	38	36	37	35	33	36	34	36	37	38	37	32	28	26	24
22	14	8	7	5	7	15	39	41	38	36	37	35	33	36	34	36	37	38	37	32	28	26	24
22	14	8	7	5	7	15	39	41	38	36	37	35	33	36	34	36	37	38	37	32	28	26	24
343	210	124	105	91	120	228	628	652	606	573	589	586	548	591	575	605	622	637	606	521	469	438	395
398	244	146	121	106	138	264	728	753	701	665	682	685	635	691	672	704	725	743	707	608	547	511	460
1014	624	371	308	274	356	674	1858	1926	1794	1701	1744	1537	1433	1548	1508	1579	1626	1666	1586	1366	1227	1145	1029
128	79	47	39	35	45	86	235	243	228	214	221	134	126	135	133	139	142	146	139	120	108	100	91
345	211	126	105	92	120	229	633	654	609	577	592	590	551	595	578	606	623	640	609	524	470	440	396
80	49	30	24	22	29	54	147	152	141	135	138	138	130	139	136	142	147	150	142	123	110	104	93
134	84	50	42	36	48	90	249	257	238	226	232	361	337	364	353	370	381	391	372	320	288	270	242
37	23	14	12	9	12	24	66	68	64	59	62	49	47	49	49	50	53	53	51	44	39	36	32
37	23	14	12	9	12	24	66	68	64	59	62	49	47	49	49	50	53	53	51	44	39	36	32
31	19	13	9	8	11	20	57	59	56	52	53	55	52	57	54	59	60	61	59	51	45	42	38
5	3	2	2	2	3	3	10	10	9	9	9	9	9	9	9	9	10	10	10	8	7	7	6
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
863	530	316	263	233	302	572	1580	1638	1526	1446	1482	1249	1165	1260	1224	1284	1321	1355	1288	1110	997	932	839
64	39	24	20	18	21	41	113	117	110	103	106	113	106	114	110	116	120	122	116	100	91	83	76
64	39	24	20	18	21	41	113	117	110	103	106	113	106	114	110	116	120	122	116	100	91	83	76
540	332	198	164	145	188	358	987	1023	953	902	926	928	867	937	908	955	982	1007	956	824	741	691	623

Caline 4 input for 2032 Q1

Road Pair	Coordinate (m)				Width (Including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	337144.25	819218.15	337203.38	819316.45	16	0	1
R1-1+1-2	337132.85	819273.86	337148.18	819294.34	8	0	1
R1-1+1-2	337148.18	819294.34	337178.20	819275.45	8	0	1
R3+4	337253.20	819316.71	337244.44	819385.38	15	0	1
R3+4	337244.44	819385.38	337294.34	819900.43	15	0	1
R5+6	337138.87	819222.68	337191.42	819192.17	18	0	1
R7	337252.30	819287.96	337203.68	819318.89	18	0	1
R8	337250.13	819305.18	337297.53	819368.57	16	0	1
R8	337191.46	819190.13	337114.47	819063.78	14	0	1
R8	337114.47	819063.78	337071.73	819001.82	14	0	1
R10	337204.88	819182.55	337178.04	819137.84	14	0	1
R10	337178.04	819137.84	337185.32	819100.25	14	0	1
R10	337185.32	819100.25	337138.28	819052.68	14	0	1
R10	337138.28	819052.68	337118.88	819027.81	14	0	1
R10	337118.88	819027.81	337085.15	818991.79	16	0	1
R11	337191.08	819190.20	337297.41	819386.58	14	0	1
R12	337205.03	819182.75	337311.47	819386.17	14	0	1
R13+14	337295.88	819500.02	337318.18	819609.31	18	0	1
R15	337298.42	819385.30	337350.18	819483.70	18	0	1
R15	337356.19	819483.78	337368.53	819808.09	18	0	1
R16	337311.55	819300.02	337335.82	819402.92	14	0	1
R16	337335.82	819402.92	337348.37	819433.08	14	0	1
R16	337348.37	819433.08	337374.20	819511.47	14	0	1
R16	337374.20	819511.47	337378.30	819544.32	14	0	1
R16	337378.30	819544.32	337388.91	819589.02	14	0	1
R16	337388.91	819589.02	337388.89	819638.45	14	0	1
R17	337293.93	819489.19	337349.89	819483.88	18	0	1
R18	337358.29	819551.80	337303.51	819558.48	18	0	1
R19	337388.79	819641.48	337479.21	819584.48	18	0	1
R20	337309.72	819610.00	337386.21	819810.48	18	0	1
R21	337358.93	820026.52	337521.62	819852.21	18	18	4
R21	337521.62	819852.21	337402.12	819695.92	18	18	4
R21	337402.12	819695.92	337383.08	819648.79	18	18	4
R21	337383.08	819648.79	337371.89	819607.03	16	18	4
R21	337371.89	819607.03	337358.48	819522.74	16	18	4
R21	337358.48	819522.74	337348.79	819478.27	16	18	4
R21	337348.79	819478.27	337338.42	819438.51	16	18	4
R21	337338.42	819438.51	337309.44	819382.87	16	18	4
R21	337309.44	819382.87	337188.51	819147.58	16	18	4
R21	337188.51	819147.58	337134.75	819080.88	16	6	4
R21	337134.75	819080.88	337079.22	818996.37	16	0	1
R22	337567.30	820017.81	337521.11	819948.18	16	18	4
R22	337521.11	819948.18	337467.22	819881.71	16	18	4
R22	337467.22	819881.71	337388.81	819832.91	16	18	4
R22	337388.91	819832.91	337377.18	819579.34	16	18	4
R22	337377.18	819578.34	337367.78	819507.82	16	18	4
R22	337367.78	819507.82	337349.83	819442.16	16	18	4
R22	337349.83	819442.16	337321.88	819383.08	16	18	4
R22	337321.88	819383.08	337178.20	819140.91	16	18	4
R22	337178.20	819140.91	337142.84	819078.61	16	8	4
R22	337142.84	819078.61	337115.31	819034.08	16	0	1
R22	337115.31	819034.08	337082.12	818995.22	16	0	1
R23+24	337309.88	819810.18	337253.13	819809.82	18	0	1
R23+24	337253.13	819809.82	337251.42	819884.24	18	0	1
R25	337365.87	819808.37	337284.84	819884.29	16	0	1
R26	337375.84	819884.44	337377.07	819709.26	17	0	1
R26	337377.07	819709.26	337388.20	819638.33	17	0	1
R27	337471.04	819859.84	337406.98	819872.39	13	0	1
R27	337406.98	819872.39	337382.18	819878.40	13	0	1
R27	337382.18	819878.40	337456.14	819823.83	13	0	1
R27-1+27-2	337408.99	819738.79	337487.35	819713.23	18	0	1
R28	337441.48	819814.52	337515.91	819774.27	18	0	1
R29	337518.13	819774.12	337580.87	819914.88	18	0	1
R30	337633.22	819890.53	337562.77	819737.87	18	0	1
R31	337587.02	819715.44	337718.83	819853.49	16	0	1
R32	337721.85	819850.64	337584.52	819703.87	16	0	1
R33	337782.47	819838.14	337634.05	819867.74	12	0	1
R34	337717.34	819588.31	337564.48	819705.85	16	0	1
R35	337587.03	819715.45	337480.51	819583.72	16	0	1
R36	337584.51	819705.66	337491.85	819588.00	16	0	1
R37	337588.99	819715.41	337471.78	819811.84	18	0	1
R38+39	337791.33	819857.64	337574.27	819539.85	18	0	1
R38+39	337574.27	819539.85	337555.64	819502.89	18	0	1
R40	337370.55	819252.71	337387.13	819425.03	16	0	1
R40	337387.13	819425.03	337370.01	819454.42	16	0	1
R40	337370.01	819454.42	337383.63	819484.43	16	0	1
R40	337383.63	819484.43	337480.25	819583.55	16	0	1
R41	337491.55	819588.70	337386.25	819482.08	16	0	1
R41	337380.25	819482.08	337380.18	819319.87	16	0	1
R41	337380.18	819319.87	337383.41	819255.41	16	0	1
R42+43	337471.68	819258.12	337479.84	819381.99	12	0	1
R44	337470.88	819382.07	337380.21	819382.12	14	0	1
R44-1	337471.54	819382.28	337471.55	819414.34	14	0	1
R44-1	337471.55	819414.34	337413.47	819442.02	14	0	1
R45+46	337470.98	819382.07	337508.04	819382.04	14	0	1
R45+46	337508.04	819382.04	337579.78	819478.33	14	0	1
R47	337514.28	819508.88	337542.71	819562.45	11	0	1
R48	337447.83	819538.73	337580.21	819478.85	13	0	1

NO_x x 100 (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
112.8420	105.3996	105.1410	105.0624	97.5586	108.1039	106.3468	102.3536	103.8725	104.3296	108.8018	108.0060	86.8457	88.5304	88.5811	82.2525	82.5496	80.4408	82.0173	97.0845	93.5266	92.7693	89.8797	98.3620
126.0467	112.2113	117.1652	119.7710	117.1756	121.7650	115.7640	118.2288	126.3131	121.1346	125.8689	125.6006	129.3110	130.1337	131.9358	125.0473	127.0767	125.9925	128.5375	136.4768	127.7043	128.8646	121.5372	130.5791
126.0467	112.2113	117.1652	119.7710	117.1756	121.7650	115.7640	118.2288	126.3131	121.1346	125.8689	125.6006	129.3110	130.1337	131.9358	125.0473	127.0767	125.9925	128.5375	136.4768	127.7043	128.8646	121.5372	130.5791
108.8663	99.2842	85.9294	83.3322	80.5017	86.3413	97.7764	81.7126	81.9661	85.5792	90.0338	87.7942	69.9999	70.5084	72.8785	66.7837	67.1050	64.3363	66.4694	86.5572	81.9916	82.3094	82.4407	88.0341
108.8663	99.2842	85.9294	83.3322	80.5017	86.3413	97.7764	81.7126	81.9661	85.5792	90.0338	87.7942	69.9999	70.5084	72.8785	66.7837	67.1050	64.3363	66.4694	86.5572	81.9916	82.3094	82.4407	88.0341
106.5928	98.3250	89.2275	84.6179	81.4664	89.3626	96.4875	83.4630	83.6874	84.3007	88.2785	87.0274	68.9036	68.5379	70.8104	64.6457	64.5388	61.7582	63.1845	83.2210	79.2665	79.7611	77.4038	85.2851
87.7622	74.1134	76.1715	80.8399	82.2857	78.2595	75.9243	75.1217	76.4566	76.1505	80.4479	78.3401	77.8409	78.9800	79.9941	73.4817	74.7383	73.7607	74.8059	90.8187	89.6247	89.3042	85.7768	88.7905
115.3942	87.6520	78.5869	80.3230	79.3134	81.3387	91.8462	101.4092	103.5906	104.9326	108.6228	107.5312	127.6422	132.2589	129.7239	122.9665	125.4582	130.1923	131.9242	130.9720	127.5716	127.2091	123.9101	128.7349
103.2278	82.0737	85.8691	88.0366	87.7198	88.5161	87.5345	91.3055	97.4545	96.7139	99.3681	97.8806	101.2941	105.8703	109.7669	103.5730	108.4249	107.3971	114.4118	123.2069	115.3452	114.9923	112.1849	117.3204
103.2278	82.0737	85.8691	88.0366	87.7198	88.5161	87.5345	91.3055	97.4545	96.7139	99.3681	97.8806	101.2941	105.8703	109.7669	103.5730	108.4249	107.3971	114.4118	123.2069	115.3452	114.9923	112.1849	117.3204
112.5147	86.1581	88.1509	90.7244	91.9951	91.0202	94.1132	99.8283	106.9906	105.8541	108.7551	106.9674	94.2229	98.1133	101.7473	93.6758	99.8392	98.5333	102.8857	115.1118	108.1798	107.6279	103.1015	108.3655

Caline 4 input for 2032 Q1

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R49	837580.67	819478.84	837634.37	819494.01	13	0	1
R50	837486.83	819987.80	837636.19	819500.08	18	0	1
R51+52	837635.64	819002.99	837596.72	819043.19	20	0	1
R51+52	837586.73	819343.19	837582.52	819256.02	20	0	1
R53+54	837654.81	819487.71	837737.20	819473.80	14	0	1
R53+54	837727.26	819473.80	837789.29	819426.65	14	0	1
R53+54	837789.09	819426.65	837746.25	819388.98	14	0	1
R53+54	837746.05	819388.98	837686.83	819327.32	14	0	1
R53+54	837686.83	819327.32	837680.34	819301.31	14	0	1
R53+54	837680.34	819301.31	837636.16	819248.52	14	0	1
R55+56	837378.38	819257.83	837564.22	819258.11	25	0	1
R56-1	837454.97	819257.83	837447.06	819071.48	11	0	1
R56-2+56-3	837425.73	819150.58	837424.80	819071.89	18	0	1
R57+58	837564.88	819258.09	837681.38	819251.64	25	0	1
R59	837981.18	818246.24	837745.70	819231.27	14	0	1
R59	837745.70	819231.27	837739.03	819070.31	14	0	1
R60	837680.25	818247.58	837681.48	819069.38	15	0	1
R61	837670.38	818244.46	837681.86	819068.13	15	0	1
R62+63	837565.28	818255.28	837552.77	819138.28	17	0	1
R64+65	837380.49	818255.27	837378.88	819196.90	21	0	1
R64+65	837376.88	819198.90	837375.43	819071.75	21	0	1
R66+67	837376.09	819128.90	837292.22	819129.79	18	0	1
R68	837290.79	819325.67	837389.82	819289.11	18	0	1
R69	837283.97	819282.88	837338.48	819246.42	18	0	1
R69	837338.48	819246.42	837375.52	819253.88	18	0	1
R70+71	837236.08	819234.50	837318.11	819165.17	18	0	1
R72+73	837204.77	819182.19	837292.22	819129.90	18	0	1
R74+75	837347.48	819248.52	837292.25	819126.79	18	0	1
R76	837292.22	819129.80	837267.77	819076.01	18	0	1
R77	837266.87	819073.43	837262.18	819110.48	15	0	1
R77	837202.18	819110.48	837167.08	819105.41	15	0	1
R77-1+77-2	837218.56	819151.10	837181.53	819038.58	12	0	1
R78	837267.08	819072.24	837375.45	819071.10	18	0	1
R78	837218.48	818979.71	837196.74	819022.62	12	0	1
R79	837196.74	819022.62	837142.45	819053.84	12	0	1
R80+81	837375.48	819071.78	837373.52	818889.96	21	0	1
R80-1+80-2	837374.53	818964.57	837228.05	818965.77	12	0	1
R80-1+80-2	837228.05	818965.77	837227.94	818822.14	12	0	1
R80-1+80-2	837227.94	818822.14	837137.68	818830.87	12	0	1
R82	837375.44	819072.43	837549.00	819072.00	15	0	1
R83	837545.29	818805.98	837548.30	819072.00	18	0	1
R84+85	837548.30	819071.82	837696.61	819067.81	13	0	1
R86+87	837658.62	818958.10	837655.06	818949.83	24	0	1
R88	837696.75	819086.78	837781.38	819088.98	13	0	1
R88	837791.39	819089.96	837753.18	819011.28	13	0	1
R88	837791.97	819057.79	837822.99	819019.59	18	0	1
R88	837822.89	819019.58	837890.56	819088.45	18	0	1
R88	837890.58	819088.45	837946.35	819086.19	18	0	1
R89	837946.35	819086.19	837872.06	819756.34	18	0	1
R90	837781.93	819657.31	837871.51	819756.82	18	0	1
R91	837903.23	819778.91	837879.37	819749.90	15	0	1
R92	837872.23	819758.53	837742.50	819872.80	18	0	1
R92-1	837884.29	819735.86	837717.86	819814.33	13	0	1
R92-1	837717.86	819814.33	837807.01	819814.10	13	0	1
R92-2	837884.96	819831.41	837830.94	819782.97	13	0	1
R83	837783.24	818835.46	837821.72	819679.91	13	0	1
R94+95	837774.83	819918.47	837714.67	819851.36	28	0	1
R96+97	837833.80	819890.36	837855.13	819938.05	18	0	1
R98	837704.89	819836.46	837630.23	819837.12	18	0	1
R99	837582.68	819914.03	837814.82	819987.88	14	0	1
R99	837814.82	819987.88	837965.57	820011.10	14	0	1
R98	837965.57	820011.10	837829.93	819938.49	14	0	1
R100	837550.18	820019.70	837514.18	819942.95	13	0	1
R101+102	837464.33	819998.67	837492.82	820030.48	18	0	1
R103+104	837514.79	819944.23	837371.46	820019.77	18	0	1
R105+106	837388.93	820024.76	837372.45	819884.41	28	0	1
R107+108	837251.56	819889.95	837251.72	819884.34	18	0	1
R108-1	837367.38	820008.79	837308.24	819884.25	18	0	1
R109	837251.42	819883.77	837275.45	819884.77	18	0	1
R110+111	837465.90	819998.57	837414.74	819860.38	18	0	1
R110+111	837414.74	819860.38	837458.00	819823.33	18	0	1
R112	837458.90	819823.82	837513.96	819943.06	12	0	1
R113	837530.06	819936.43	837471.38	819809.88	12	0	1
R114+115	836932.62	819969.23	836952.22	819960.42	18	0	1
R114+115	836952.22	819960.42	837028.89	819532.62	18	0	1
R114+115	837028.89	819532.62	837333.17	819488.50	18	0	1
R114+115	837333.17	819488.50	837512.91	819455.65	18	0	1
R116+115	837512.91	819455.65	838837.35	819427.73	18	0	1
R118+117	838648.07	819135.86	837022.42	819062.48	28	0	1
R118+119	837153.68	819223.91	837079.43	819129.58	18	0	1
R118+119	837079.43	819129.58	837022.42	819062.49	18	0	1
R120+121	837023.66	819003.94	837118.97	818957.84	22	0	1

NO_x x 100 (g/VMT)																						
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
118.7804	119.3661	112.9796	100.0830	95.3808	117.9582	126.8265	137.8969	142.1199	132.9716	137.1947	138.2143	78.5597	81.2002	77.9522	72.9315	72.3393	71.0240	71.0794	80.7585	79.7894	77.4217	76.8992	84.2333
127.5905	90.4838	81.3461	79.6153	79.3833	84.0195	101.7750	137.9184	142.6225	139.0890	143.3817	143.9130	130.7362	131.6982	133.4194	126.8283	128.6243	127.8964	130.3090	132.2096	119.4045	111.7501	99.1416	101.4975
105.3187	82.9189	85.6677	87.1162	87.6013	88.5466	88.4600	95.3000	100.2517	99.2461	102.0457	100.5455	97.3813	102.7837	104.8693	98.8000	103.0787	102.0728	108.5922	117.0962	109.8427	109.3355	106.6290	111.7207
105.3187	82.9189	85.6677	87.1162	87.6013	88.5466	88.4600	95.3000	100.2517	99.2461	102.0457	100.5455	97.3813	102.7837	104.8693	98.8000	103.0787	102.0728	108.5922	117.0962	109.8427	109.3355	106.6290	111.7207
113.8588	88.5892	88.3652	90.1817	91.1862	91.0848	96.3605	100.8508	107.5321	106.6597	109.6958	107.9426	95.7715	99.8127	103.0900	95.1394	100.9454	99.5397	103.8310	115.9591	109.2603	108.7856	104.1191	109.7658

Caline 4 input for 2032 Q1

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	837144.25	819218.15	837203.38	819316.45	18	8	1
R1-1+1-2	837132.95	819273.98	837196.19	819294.34	8	8	1
R1-1+1-2	837148.19	819294.34	837178.20	819275.45	8	8	1
R3+4	837203.25	819318.71	837244.44	819385.38	18	8	1
R3+4	837244.44	819385.38	837294.34	819500.43	18	8	1
R5+6	837138.97	819222.88	837191.42	819190.17	18	8	1
R7	837252.30	819257.98	837203.88	819316.88	18	8	1
R8	837258.13	819395.19	837297.53	819386.57	18	8	1
R9	837191.44	819190.13	837114.47	819043.78	14	8	1
R8	837114.47	819063.78	837071.73	819001.82	14	8	1
R10	837204.98	819182.55	837178.04	819137.84	14	8	1
R10	837178.04	819137.84	837185.32	819100.25	14	8	1
R12	837185.32	819100.25	837138.28	819052.08	14	8	1
R10	837138.28	819052.08	837119.88	819027.81	14	8	1
R12	837119.88	819027.81	837085.15	818991.79	14	8	1
R11	837191.06	819190.20	837297.41	819366.58	14	8	1
R12	837205.03	819182.75	837311.47	819360.17	14	8	1
R13+14	837293.88	819400.02	837310.16	819409.31	18	8	1
R15	837299.42	819365.30	837350.19	819483.70	18	8	1
R15	837350.19	819483.70	837366.53	819409.06	18	8	1
R16	837311.53	819381.02	837335.82	819402.92	14	8	1
R18	837335.82	819402.92	837348.37	819433.08	14	8	1
R16	837348.37	819433.08	837374.20	819511.47	14	8	1
R16	837374.20	819511.47	837378.50	819544.32	14	8	1
R18	837378.50	819544.32	837388.91	819589.02	14	8	1
R16	837388.91	819589.02	837389.89	819638.45	14	8	1
R17	837390.82	819499.19	837348.89	819483.06	18	8	1
R18	837356.38	819551.60	837303.51	819558.49	18	8	1
R18	837388.79	819641.48	837473.21	819584.49	18	8	1
R20	837309.72	819810.06	837386.21	819810.48	18	8	1
R21	837596.83	820020.82	837521.62	819952.21	18	10	4
R21	837521.62	819952.21	837402.10	819895.92	18	10	4
R21	837402.10	819895.92	837383.08	819848.75	18	10	4
R21	837383.08	819848.75	837371.88	819827.03	18	10	4
R21	837371.88	819827.03	837358.48	819822.74	18	10	4
R21	837358.48	819822.74	837349.79	819479.27	18	10	4
R21	837349.79	819479.27	837328.42	819438.91	18	10	4
R21	837328.42	819438.91	837309.44	819382.87	18	10	4
R21	837309.44	819382.87	837188.51	819147.58	18	10	4
R21	837188.51	819147.58	837134.75	819080.88	18	5	4
R21	837134.75	819080.88	837079.22	818996.37	18	0	1
R22	837567.30	820017.81	837531.11	819948.18	18	10	4
R22	837531.11	819948.18	837407.02	819881.71	18	10	4
R22	837407.02	819881.71	837388.81	819832.81	18	10	4
R22	837388.81	819832.81	837377.18	819578.34	18	10	4
R22	837377.18	819578.34	837367.79	819567.62	18	10	4
R22	837367.78	819567.62	837348.85	819442.18	18	10	4
R22	837349.55	819442.18	837321.88	819383.08	18	10	4
R22	837321.88	819383.08	837178.20	819140.91	18	10	4
R22	837178.20	819140.91	837142.64	819078.01	18	5	4
R22	837142.64	819078.01	837115.31	819034.09	18	8	1
R22	837115.31	819034.09	837082.10	818985.22	18	8	1
R23+24	837209.68	819810.18	837253.13	819909.82	18	8	1
R23+24	837253.13	819909.82	837291.42	819884.34	18	8	1
R25	837365.87	819888.87	837384.64	819884.29	18	8	1
R26	837375.94	819884.44	837377.07	819729.26	17	8	1
R26	837377.07	819709.28	837388.20	819838.33	17	8	1
R27	837471.24	819809.84	837406.98	819672.36	13	8	1
R27	837406.98	819672.36	837382.18	819679.45	13	8	1
R27	837382.18	819679.45	837458.14	819823.83	13	8	1
R27-1+27-2	837406.98	819738.79	837487.35	819713.23	18	8	1
R28	837441.48	819814.32	837515.91	819774.27	18	8	1
R29	837516.12	819774.12	837585.87	819914.88	18	8	1
R30	837533.22	819898.53	837562.77	819737.87	18	8	1
R31	837587.02	819715.44	837708.83	819853.49	18	8	1
R32	837721.85	819850.04	837584.52	819705.67	18	8	1
R33	837782.47	819838.14	837834.05	819867.74	13	8	1
R34	837717.34	819586.31	837584.88	819705.85	18	8	1
R35	837587.03	819715.45	837482.51	819583.72	18	8	1
R36	837584.51	819705.88	837491.85	819588.80	18	8	1
R37	837584.88	819715.41	837471.78	819811.84	18	8	1
R38+39	837781.33	819857.04	837674.27	819538.83	18	8	1
R38+39	837674.27	819538.83	837655.84	819502.98	18	8	1
R40	837370.35	819252.71	837367.13	819425.03	16	8	1
R40	837367.13	819425.03	837370.01	819454.42	16	8	1
R40	837370.21	819434.42	837383.43	819484.43	16	8	1
R40	837383.43	819484.43	837480.25	819583.95	16	8	1
R41	837491.55	819588.75	837380.25	819462.08	16	8	1
R41	837380.25	819462.08	837380.18	819319.87	16	8	1
R41	837380.18	819319.87	837383.41	819255.41	16	8	1
R42+43	837471.46	819258.12	837479.94	819381.99	13	8	1
R44	837475.96	819382.57	837380.21	819382.12	16	8	1
R44-1	837471.54	819382.26	837471.58	819414.34	14	8	1
R44-1	837471.55	819414.34	837419.47	819442.02	14	8	1
R45+46	837475.96	819382.57	837536.04	819382.04	14	8	1
R45+46	837536.04	819382.04	837578.78	819478.53	14	8	1
R47	837514.28	819368.88	837542.71	819462.45	11	8	1
R48	837447.83	819328.73	837380.01	819479.83	13	8	1

NO_2 x 100 (g/VMT)

Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
10.0731	9.1577	9.6344	9.6817	9.3275	10.8493	11.6271	15.2710	16.6198	15.4126	15.9999	16.3889	10.8239	11.3120	10.4920	9.7499	9.8166	10.0779	10.0509	8.5413	8.0313	7.8190	7.2114	8.0637
12.3604	10.8132	11.9348	12.3816	12.5939	13.5301	13.8862	18.8574	21.6445	19.1123	19.8941	20.4380	20.8989	21.1462	19.9973	18.7899	18.8942	19.4634	19.4266	15.6531	14.2983	14.2823	12.7698	14.3245
12.3604	10.8132	11.9348	12.3816	12.5939	13.5301	13.8862	18.8574	21.6445	19.1123	19.8941	20.4380	20.8989	21.1462	19.9973	18.7899	18.8942	19.4634	19.4266	15.6531	14.2983	14.2823	12.7698	14.3245
7.8460	7.2228	6.0506	5.5918	5.8306	6.4386	8.3200	9.3685	10.0168	9.6269	10.0392	10.1274	5.7732	5.7813	5.6896	5.2773	5.3042	5.3265	5.3976	5.4775	5.0878	5.0137	4.9902	5.1324
7.8460	7.2228	6.0506	5.5918	5.8306	6.4386	8.3200	9.3685	10.0168	9.6269	10.0392	10.1274	5.7732	5.7813	5.6896	5.2773	5.3042	5.3265	5.3976	5.4775	5.0878	5.0137	4.9902	5.1324
7.7536	7.1856	6.5157	5.7987	6.0366	6.7471	8.3350	9.8837	10.5943	9.7730	10.0717	10.3724	5.7433	5.7230	5.7083	5.2294	5.2881	5.3177	5.3324	5.1731	4.8092	4.8251	4.5105	4.8777
7.1713	6.9367	7.1055	7.0647	7.6371	7.5974	7.2944	9.0708	9.4777	8.7413	9.2726	9.4181	8.4220	8.3565	8.0744	7.3950	7.5544	7.8073	7.6953	7.0431	6.9613	6.7788	6.2875	6.4305
10.9914	8.1564	7.4271	7.7809	7.9374	8.2036	10.4694	15.4822	16.7592	15.7708	16.3095	16.6347	21.9808	23.1890	20.9864	19.7119	19.9165	21.3898	21.7429	16.2689	15.5364	15.3702	14.2257	15.4901
9.8093	9.2945	9.8838	10.0210	10.0116	10.5822	10.7655	12.4454	13.5941	12.7334	13.0888	13.4946	13.3730	13.3242	12.9975	12.2145	12.5177	12.6797	13.0968	11.8282	11.3700	11.1403	10.9064	11.1009
9.8093	9.2945	9.8838	10.0210	10.0116	10.5822	10.7655	12.4454	13.5941	12.7334	13.0888	13.4946	13.3730	13.3242	12.9975	12.2145	12.5177	12.6797	13.0968	11.8282	11.3700	11.1403	10.9064	11.1009
10.7493	9.9600	10.3571	10.4952	10.6563	11.0378	11.1365	13.5625	14.8318	13.8548	14.2531	14.7104	11.8074	11.7273	11.4820	10.5422	11.0400	11.1510	11.2938	10.5265	10.1503	9.9180	9.5222	9.7084

Caline 4 input for 2032 Q1

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R48	837580.07	819478.94	837834.37	819454.21	13	8	1
R50	837496.83	819587.90	837838.18	819500.36	18	8	1
R51+52	837855.64	819502.98	837588.72	819343.19	20	8	1
R51+52	837588.72	819343.19	837562.52	819256.02	20	8	1
R53+54	837854.81	819487.71	837727.20	819473.80	14	8	1
R53+54	837727.20	819473.80	837788.06	819428.65	14	8	1
R53+54	837788.06	819428.65	837746.05	819389.98	14	8	1
R53+54	837746.05	819389.98	837688.83	819327.32	14	8	1
R53+54	837688.83	819327.32	837680.34	819301.31	14	8	1
R52+54	837682.34	819301.31	837658.16	819248.02	14	8	1
R55+56	837378.38	819257.83	837564.22	819258.11	25	8	1
R58-1	837454.97	819257.83	837447.06	819071.48	11	8	1
R56-2+56-3	837425.73	819150.58	837424.80	819071.89	18	8	1
R57+58	837564.86	819258.09	837661.38	819231.64	25	8	1
R59	837661.10	819248.24	837745.76	819231.27	14	8	1
R59	837745.76	819231.27	837739.26	819070.31	14	8	1
R60	837660.25	819247.58	837651.46	819069.36	15	8	1
R61	837670.34	819244.46	837661.86	819069.18	15	8	1
R62+63	837585.20	819255.28	837582.77	819138.29	17	8	1
R64+65	837386.68	819256.27	837378.88	819196.90	21	8	1
R64+65	837378.88	819196.90	837375.43	819071.78	21	8	1
R66+67	837378.59	819128.90	837292.22	819129.79	18	8	1
R65	837290.78	819325.67	837269.82	819288.11	18	8	1
R68	837263.97	819280.98	837238.49	819246.43	18	8	1
R69	837238.48	819248.43	837370.52	819253.96	18	8	1
R70+71	837236.38	819234.50	837318.11	819185.17	18	8	1
R72+73	837204.77	819182.19	837292.22	819129.60	18	8	1
R74+75	837347.48	819248.52	837292.25	819129.79	18	8	1
R76	837292.22	819129.60	837267.77	819076.81	18	8	1
R77	837266.87	819073.43	837202.19	819110.48	15	8	1
R77	837202.19	819110.48	837187.06	819105.41	15	8	1
R77-1+77-2	837218.58	819101.10	837181.52	819038.58	12	8	1
R78	837267.66	819072.24	837375.45	819071.10	18	8	1
R79	837187.48	819030.82	837217.48	818979.71	12	8	1
R79	837217.48	818979.71	837196.74	819022.02	12	8	1
R79	837196.74	819022.02	837140.45	819055.94	12	8	1
R80+81	837375.46	819071.78	837373.52	818988.96	21	8	1
R80-1+80-2	837374.53	818964.57	837228.05	818985.77	12	8	1
R80-1+80-2	837228.05	818985.77	837227.94	818932.14	12	8	1
R80-1+80-2	837227.94	818932.14	837137.88	818930.87	12	8	1
R82	837373.44	819072.43	837349.00	819072.00	15	8	1
R83	837345.29	819055.88	837348.30	819072.00	18	8	1
R84+85	837348.30	819071.82	837806.81	819067.81	13	8	1
R86+87	837656.62	819069.10	837655.04	818948.63	24	8	1
R88	837956.75	818986.76	837761.39	819069.98	12	8	1
R88	837761.39	819069.98	837753.18	819011.26	13	8	1
R89	837761.87	819057.79	837822.99	819019.59	18	8	1
R86	837822.99	819019.59	837890.56	819583.45	18	8	1
R89	837890.56	819583.45	837946.35	819686.19	18	8	1
R89	837946.35	819686.19	837872.06	819756.34	18	8	1
R90	837781.23	819857.31	837761.51	819756.62	18	8	1
R91	837903.23	819776.91	837879.27	819748.90	15	8	1
R92	837872.23	819756.53	837740.56	819872.80	18	8	1
R92-1	837884.09	819733.89	837717.80	819714.33	13	8	1
R92-1	837717.80	819714.33	837627.01	819814.10	13	8	1
R92-2	837884.86	819831.41	837830.94	819782.87	13	8	1
R93	837783.24	819835.48	837821.72	819878.91	13	8	1
R94+95	837774.83	819819.41	837714.47	819851.36	28	8	1
R96+97	837633.80	819830.36	837655.12	819836.01	18	8	1
R98	837754.58	819836.48	837530.23	819837.12	18	8	1
R99	837582.58	819814.63	837610.82	819887.88	14	8	1
R99	837618.82	819887.88	837585.57	820011.10	14	8	1
R99	837585.57	820011.10	837529.83	819836.40	14	8	1
R100	837588.18	820019.70	837514.19	819942.85	13	8	1
R101+102	837484.33	819988.87	837483.82	820030.46	18	8	1
R103+104	837514.79	819944.23	837371.40	820011.77	18	8	1
R105+106	837388.85	820024.76	837379.45	819884.41	26	8	1
R107+108	837391.08	819883.85	837291.72	819884.34	18	8	1
R108-1	837307.58	820009.79	837388.84	819884.25	18	8	1
R109	837291.42	819883.77	837375.45	819884.77	18	8	1
R110+111	837483.90	819966.87	837414.74	819860.38	18	8	1
R110+111	837414.74	819860.38	837488.08	819823.33	18	8	1
R112	837458.50	819823.82	837513.98	819843.08	12	8	1
R113	837530.06	819838.43	837471.38	819809.88	12	8	1
R114+115	836932.82	819868.03	836850.22	819580.42	16	8	1
R114+115	836953.22	819580.42	837026.88	819532.82	16	8	1
R114+115	837026.88	819532.82	837033.17	819468.00	16	8	1
R114+115	837033.17	819468.00	837010.91	819455.85	16	8	1
R116+115	837010.91	819455.85	836887.35	819427.73	16	8	1
R116+117	836948.07	819135.80	837022.42	819062.49	26	8	1
R118+119	837135.66	819223.51	837078.43	819129.58	18	8	1
R118+119	837078.43	819129.58	837022.42	819062.49	18	8	1
R120+121	837023.86	819063.94	837118.97	818957.84	22	8	1

NO_2 x 100 (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
15.2675	14.1558	14.7644	13.1867	13.2368	12.1573	19.9065	27.3915	30.1290	26.3969	27.5113	28.0735	11.6924	12.5258	11.1935	10.4214	10.5139	10.8803	10.7726	8.3729	7.8013	7.5160	6.8810	8.0958
17.0191	11.4718	11.2689	11.1350	11.5970	12.8018	16.4972	27.3053	29.9065	27.5762	28.7366	29.2820	23.5147	23.9761	22.5688	21.1680	21.2813	22.0317	21.9039	17.2228	15.1313	13.9714	11.7166	12.6023
10.0431	9.3270	9.8095	9.8715	9.9777	10.5389	10.4043	13.1351	14.1558	13.2068	13.5887	14.0036	12.9246	13.1023	12.5512	11.7804	12.0513	12.2311	12.6289	11.2663	10.8110	10.5761	10.3015	10.5559
10.0431	9.3270	9.8095	9.8715	9.9777	10.5389	10.4043	13.1351	14.1558	13.2068	13.5887	14.0036	12.9246	13.1023	12.5512	11.7804	12.0513	12.2311	12.6289	11.2663	10.8110	10.5761	10.3015	10.5559
10.8810	10.0252	10.1965	10.2592	10.4137	10.9036	11.4008	13.8906	15.1730	14.1835	14.6048	15.0498	12.2084	12.2095	11.8643	10.9340	11.3927	11.5144	11.6525	10.7390	10.3536	10.1323	9.6732	9.9433

Caline 4 input for 2032 Q1

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	837144.25	819218.15	837203.38	819318.45	16	0	1
R1-1+1-2	837133.65	819273.86	837168.19	819394.34	8	0	1
R1-1+1-2	837148.19	819294.34	837178.20	819275.45	8	0	1
R3+4	837203.20	819318.71	837244.44	819385.28	15	0	1
R3+4	837244.44	819385.28	837294.34	819500.43	15	0	1
R5+6	837136.67	819222.68	837191.42	819190.17	16	0	1
R7	837252.30	819287.98	837203.68	819318.86	16	0	1
R8	837250.13	819385.16	837297.53	819366.57	16	0	1
R9	837191.44	819190.15	837114.47	819063.78	14	0	1
R9	837114.47	819063.78	837071.73	819001.82	14	0	1
R10	837204.98	819182.55	837178.04	819137.84	14	0	1
R10	837178.04	819137.84	837165.32	819100.25	14	0	1
R10	837165.32	819100.25	837138.28	819052.08	14	0	1
R10	837138.28	819052.08	837118.98	819027.81	14	0	1
R10	837118.88	819027.81	837085.15	818991.79	14	0	1
R11	837191.08	819190.26	837287.41	819366.58	14	0	1
R12	837205.63	819182.75	837311.47	819360.17	14	0	1
R13+14	837295.88	819302.02	837318.18	819008.31	18	0	1
R15	837288.42	819283.30	837350.19	819483.70	18	0	1
R15	837350.19	819483.70	837288.53	819608.09	18	0	1
R16	837311.53	819360.02	837335.92	819402.92	14	0	1
R16	837335.92	819402.92	837348.37	819433.08	14	0	1
R16	837348.37	819433.08	837374.20	819511.47	14	0	1
R16	837374.20	819511.47	837379.30	819544.32	14	0	1
R16	837379.30	819544.32	837388.91	819589.02	14	0	1
R16	837388.91	819589.02	837389.89	819836.49	14	0	1
R17	837293.85	819489.19	837348.89	819483.66	18	0	1
R18	837358.38	819551.60	837303.51	819558.48	18	0	1
R19	837388.79	819641.48	837479.21	819584.49	18	0	1
R20	837308.72	819612.00	837388.21	819818.46	18	0	1
R21	837358.93	820029.52	837521.62	819952.21	18	18	4
R21	837521.62	819952.21	837402.10	819895.52	18	18	4
R21	837402.10	819895.52	837383.08	819648.78	18	18	4
R21	837383.08	819648.78	837371.69	819607.23	18	18	4
R21	837371.69	819607.23	837358.48	819522.74	18	18	4
R21	837358.48	819522.74	837348.79	819476.27	18	18	4
R21	837348.79	819476.27	837338.42	819436.51	18	18	4
R21	837338.42	819436.51	837309.44	819382.87	18	18	4
R21	837309.44	819382.87	837168.51	819147.58	18	18	4
R21	837168.51	819147.58	837134.75	819080.68	18	5	6
R21	837134.75	819080.68	837079.22	818996.37	18	9	1
R22	837967.30	820017.81	837531.11	819948.18	18	18	4
R22	837531.11	819948.18	837407.02	819681.71	18	18	4
R22	837407.02	819681.71	837388.81	819632.91	18	18	4
R22	837388.81	819632.91	837377.18	819579.34	18	18	4
R22	837377.18	819576.34	837367.78	819507.82	18	18	4
R22	837367.78	819507.82	837348.65	819442.18	18	18	4
R22	837348.65	819442.18	837321.88	819383.08	18	18	4
R22	837321.88	819383.08	837178.20	819140.91	18	18	4
R22	837178.20	819140.91	837142.84	819078.01	18	5	4
R22	837142.84	819078.01	837115.31	819034.09	18	0	1
R22	837115.31	819034.09	837082.10	818995.22	18	0	1
R23+24	837308.68	819812.18	837252.13	819809.82	18	0	1
R23+24	837253.13	819809.82	837251.42	819884.34	18	0	1
R25	837365.87	819808.07	837384.84	819884.29	16	0	1
R26	837375.94	819884.44	837377.27	819709.26	17	0	1
R26	837377.27	819709.26	837384.20	819836.53	17	0	1
R27	837471.04	819808.84	837406.98	819672.38	13	0	1
R27	837406.98	819672.38	837392.18	819678.45	13	0	1
R27	837382.18	819678.45	837458.14	819823.63	13	0	1
R27-1+27-2	837458.09	819738.79	837487.35	819713.23	18	0	1
R28	837441.48	819814.32	837515.91	819774.27	18	0	1
R29	837516.13	819774.12	837580.87	819814.88	18	0	1
R30	837633.22	819890.53	837662.77	819737.87	19	0	1
R31	837587.22	819715.44	837708.83	818832.48	16	0	1
R32	837721.65	818850.04	837584.52	819705.67	16	0	1
R33	837782.47	819836.14	837834.05	819847.74	13	0	1
R34	837717.34	819586.31	837584.88	819705.85	16	0	1
R35	837587.03	819715.45	837480.51	819503.72	16	0	1
R36	837584.51	819705.88	837491.65	819588.80	16	0	1
R37	837588.89	819715.41	837471.78	818811.84	19	0	1
R38+39	837781.33	819657.04	837674.27	819538.83	19	0	1
R38+39	837674.27	819538.83	837655.64	819502.88	19	0	1
R40	837370.35	819252.71	837367.13	819425.23	16	0	1
R40	837367.13	819425.23	837370.01	819454.42	16	0	1
R40	837370.01	819454.42	837383.83	819484.43	16	0	1
R40	837383.83	819484.43	837480.25	819583.95	16	0	1
R41	837481.35	819588.70	837380.25	819482.28	16	0	1
R41	837380.25	819482.28	837380.18	819319.87	16	0	1
R41	837380.18	819319.87	837383.41	819255.41	16	0	1
R42+43	837471.48	819258.12	837470.94	819381.99	13	0	1
R44	837470.98	819382.87	837380.21	819382.12	14	0	1
R44-1	837471.54	819382.05	837471.55	819414.34	14	0	1
R44-1	837471.55	819414.34	837410.47	819442.02	14	0	1
R45+46	837470.98	819382.87	837536.94	819382.04	14	0	1
R45+46	837538.04	819382.04	837679.78	819478.33	14	0	1
R47	837314.08	819508.88	837542.71	819582.45	11	0	1
R48	837447.83	819534.73	837580.01	819478.85	13	0	1

RSP (g/VMT)																						
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
0.0196	0.0145	0.0160	0.0137	0.0145	0.0156	0.0185	0.0252	0.0275	0.0266	0.0262	0.0264	0.0209	0.0223	0.0221	0.0213	0.0221	0.0226	0.0235	0.0208	0.0193	0.0192	0.0178	0.0188
0.0235	0.0171	0.0171	0.0177	0.0192	0.0191	0.0223	0.0296	0.0332	0.0312	0.0309	0.0313	0.0350	0.0371	0.0366	0.0350	0.0365	0.0373	0.0385	0.0355	0.0326	0.0333	0.0307	0.0327
0.0235	0.0171	0.0171	0.0177	0.0192	0.0191	0.0223	0.0296	0.0332	0.0312	0.0309	0.0313	0.0350	0.0371	0.0366	0.0350	0.0365	0.0373	0.0385	0.0355	0.0326	0.0333	0.0307	0.0327
0.0215	0.0145	0.0120	0.0110	0.0125	0.0179	0.0178	0.0228	0.0248	0.0249	0.0244	0.0241	0.0179	0.0190	0.0198	0.0191	0.0201	0.0203	0.0215	0.0204	0.0186	0.0188	0.0180	0.0182
0.0215	0.0145	0.0120	0.0110	0.0125	0.0179	0.0178	0.0228	0.0248	0.0249	0.0244	0.0241	0.0179	0.0190	0.0198	0.0191	0.0201	0.0203	0.0215	0.0204	0.0186	0.0188	0.0180	0.0182
0.0200	0.0138	0.0119	0.0108	0.0122	0.0127	0.0169	0.0224	0.0244	0.0238	0.0232	0.0232	0.0159	0.0165	0.0171	0.0166	0.0174	0.0177	0.0186	0.0166	0.0152	0.0153	0.0142	0.0144
0.0296	0.0195	0.0183	0.0208	0.0242	0.0194	0.0233	0.0293	0.0315	0.0307	0.0317	0.0307	0.0215	0.0225	0.0232	0.0219	0.0232	0.0240	0.0247	0.0236	0.0226	0.0225	0.0209	0.0210
0.0230	0.0152	0.0132	0.0147	0.0160	0.0145	0.0194	0.0272	0.0297	0.0291	0.0288	0.0288	0.0364	0.0389	0.0378	0.0357	0.0373	0.0395	0.0402	0.0359	0.0341	0.0341	0.0320	0.0341
0.0417	0.0266	0.0277	0.0288	0.0300	0.0292	0.0328	0.0383	0.0423	0.0418	0.0422	0.0413	0.0449	0.0487	0.0507	0.0479	0.0512	0.0513	0.0547	0.0572	0.0529	0.0535	0.0514	0.0542
0.0417	0.0266	0.0277	0.0288	0.0300	0.0292	0.0328	0.0383	0.0423	0.0418	0.0422	0.0413	0.0449	0.0487	0.0507	0.0479	0.0512	0.0513	0.0547	0.0572	0.0529	0.0535	0.0514	0.0542
0.0467	0.0292	0.0297	0.0312	0.0327	0.0314	0.0363	0.0423	0.0468	0.0462	0.0467	0.0456	0.0398	0.0431	0.0449	0.0418	0.0454	0.0454	0.0479	0.0505	0.0468	0.0473	0.0448	0.0473

Caline 4 input for 2032 Q1

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R49	837582.07	819478.94	837654.37	819454.01	13	0	1
R50	837490.85	819587.90	837656.18	819500.06	18	0	1
R51+52	837653.84	819502.98	837566.72	819343.18	26	0	1
R51+52	837584.72	819343.19	837582.52	819256.02	20	0	1
R53+54	837634.81	819497.71	837727.26	819472.80	14	0	1
R53+54	837727.25	819473.80	837788.09	819426.85	14	0	1
R53+54	837769.09	819426.85	837748.05	819369.98	14	0	1
R53+54	837746.05	819369.98	837698.43	819327.32	14	0	1
R53+54	837698.43	819327.32	837680.34	819301.31	14	0	1
R53+54	837680.34	819301.31	837659.18	819248.02	14	0	1
R55+56	837278.38	819257.83	837564.22	819258.11	29	0	1
R56-1	837454.87	819257.83	837447.06	819271.48	11	0	1
R56-2+56-3	837425.73	819150.58	837424.80	819271.89	16	0	1
R57+58	837564.88	819258.09	837681.38	819251.84	25	0	1
R58	837681.10	819246.24	837745.70	819231.27	14	0	1
R58	837745.70	819231.27	837738.05	819070.31	14	0	1
R60	837680.25	819247.58	837651.46	819068.36	15	0	1
R61	837670.39	819244.48	837651.36	819068.18	15	0	1
R62+63	837565.20	819255.28	837552.77	819138.26	17	0	1
R64+65	837360.88	819255.27	837378.88	819196.80	21	0	1
R64+65	837378.88	819196.80	837375.43	819071.78	21	0	1
R66+67	837376.08	819128.90	837292.22	819129.79	18	0	1
R68	837290.78	819025.67	837389.82	819289.11	18	0	1
R69	837262.87	819280.86	837338.49	819246.43	18	0	1
R69	837338.49	819246.43	837370.32	819253.86	18	0	1
R70+71	837236.08	819234.50	837218.11	819165.17	18	0	1
R72+72	837254.77	819182.19	837292.22	819129.60	18	0	1
R74+75	837347.48	819248.52	837292.25	819129.79	18	0	1
R76	837292.22	819129.60	837267.77	819078.81	18	0	1
R77	837266.87	819073.43	837202.19	818114.48	15	0	1
R77	837202.18	819110.48	837187.96	819105.41	15	0	1
R77-1+77-2	837218.56	819101.10	837181.53	819039.58	12	0	1
R78	837267.66	819072.24	837275.45	819071.10	18	0	1
R79	837147.48	818930.82	837217.48	818979.71	12	0	1
R79	837217.48	818979.71	837196.74	819022.52	12	0	1
R79	837196.74	819022.52	837146.45	819055.94	12	0	1
R80+81	837375.48	819071.78	837373.52	818888.96	21	0	1
R80-1+80-2	837374.52	819064.57	837228.05	818985.77	12	0	1
R80-1+80-2	837228.05	818985.77	837227.94	818932.14	12	0	1
R80-1+80-2	837227.94	818932.14	837137.88	818930.87	12	0	1
R82	837375.64	819072.43	837549.00	819072.00	15	0	1
R83	837545.29	818905.88	837548.30	819072.00	19	0	1
R84+85	837548.30	819071.82	837656.91	819067.81	13	0	1
R86+87	837656.82	819069.10	837655.06	818948.83	24	0	1
R88	837656.75	819066.76	837781.39	819069.96	13	0	1
R88	837781.39	819069.96	837753.16	819011.26	13	0	1
R89	837781.87	819057.79	837822.99	819019.58	19	0	1
R89	837822.99	819019.58	837890.56	819068.45	15	0	1
R89	837890.56	819068.45	837940.35	819066.19	18	0	1
R89	837940.35	819066.19	837972.06	819756.34	19	0	1
R90	837781.03	819057.31	837871.51	819756.82	18	0	1
R91	837903.23	819776.91	837879.37	819749.60	15	0	1
R92	837872.23	819756.53	837740.50	819872.80	18	0	1
R92-1	837694.09	819735.86	837717.80	819714.33	13	0	1
R92-1	837717.80	819714.33	837807.01	819814.10	13	0	1
R92-2	837804.96	819631.41	837830.94	819792.87	13	0	1
R93	837783.24	819835.48	837821.72	819878.91	13	0	1
R94+95	837774.83	819919.41	837714.87	819831.38	28	0	1
R96+97	837833.80	819890.38	837655.13	819838.05	18	0	1
R98	837704.89	819856.46	837530.23	819837.12	18	0	1
R99	837582.88	819814.03	837616.82	819887.88	14	0	1
R99	837616.82	819887.88	837565.57	820011.10	14	0	1
R99	837565.57	820011.10	837526.93	819938.49	14	0	1
R100	837550.13	820018.70	837514.19	819942.95	13	0	1
R101+102	837484.33	819966.67	837483.82	820030.46	18	0	1
R103+104	837514.79	819944.23	837371.40	820010.77	18	0	1
R105+106	837388.85	820024.76	837370.45	819884.41	28	0	1
R107+108	837251.06	819869.95	837251.72	819884.34	18	0	1
R106-1	837567.38	820009.79	837308.24	819884.25	18	0	1
R109	837251.42	819883.77	837279.45	819884.77	18	0	1
R110+111	837483.90	819966.87	837414.74	819880.38	18	0	1
R110+111	837414.74	819880.38	837498.00	819823.33	18	0	1
R112	837458.30	819823.92	837513.96	819943.06	12	0	1
R113	837530.38	819838.43	837421.38	819809.88	13	0	1
R114+115	836932.82	819869.03	836953.22	819590.42	18	0	1
R114+115	836953.22	819590.42	837526.89	819532.82	18	0	1
R114+115	837526.89	819532.82	837533.17	819468.00	18	0	1
R114+115	837533.17	819468.00	837518.91	819455.85	18	0	1
R114+115	837518.91	819455.85	836887.35	819427.73	18	0	1
R116+117	836946.57	819130.90	837522.42	819062.48	26	0	1
R118+119	837133.66	818223.91	837578.43	819129.58	18	0	1
R118+119	837579.43	819129.58	837522.42	819062.48	18	0	1
R120+121	837523.66	819063.94	837118.87	818907.84	22	0	1

RSP (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
0.0168	0.0154	0.0162	0.0155	0.0162	0.0187	0.0215	0.0293	0.0321	0.0289	0.0292	0.0300	0.0157	0.0166	0.0151	0.0147	0.0150	0.0157	0.0158	0.0114	0.0108	0.0106	0.0097	0.0101
0.0227	0.0166	0.0166	0.0170	0.0183	0.0188	0.0229	0.0329	0.0358	0.0336	0.0343	0.0347	0.0362	0.0385	0.0379	0.0358	0.0370	0.0376	0.0388	0.0350	0.0313	0.0302	0.0273	0.0292
0.0413	0.0262	0.0269	0.0280	0.0293	0.0286	0.0324	0.0388	0.0424	0.0419	0.0422	0.0414	0.0414	0.0452	0.0465	0.0439	0.0469	0.0470	0.0502	0.0519	0.0481	0.0486	0.0466	0.0491
0.0413	0.0262	0.0269	0.0280	0.0293	0.0286	0.0324	0.0388	0.0424	0.0419	0.0422	0.0414	0.0434	0.0452	0.0465	0.0439	0.0469	0.0470	0.0502	0.0519	0.0481	0.0486	0.0466	0.0491
0.0446	0.0281	0.0283	0.0295	0.0310	0.0300	0.0350	0.0410	0.0453	0.0447	0.0451	0.0441	0.0392	0.0425	0.0441	0.0412	0.0445	0.0446	0.0470	0.0493	0.0457	0.0462	0.0437	0.0462

Caline 4 input for 2032 Q1

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	837144.25	819218.15	837205.38	819318.45	16	8	1
R1.1+1-2	837133.65	819273.98	837148.19	819294.34	8	8	1
R1.1+1-2	837148.19	819294.34	837178.20	819275.45	8	8	1
R3+4	837263.25	819318.71	837244.44	819383.38	15	8	1
R3+4	837244.44	819383.38	837294.34	819500.43	15	8	1
R5+6	837136.87	819222.68	837191.42	819190.17	18	8	1
R7	837252.30	819287.96	837203.68	819314.88	18	8	1
R8	837296.13	819396.16	837297.53	819388.57	18	8	1
R9	837191.44	819190.13	837114.47	819063.79	14	8	1
R9	837114.47	819063.79	837071.73	819001.82	14	8	1
R10	837204.88	819182.55	837178.04	819137.84	14	8	1
R10	837178.04	819137.84	837165.32	819100.25	14	8	1
R10	837185.32	819100.25	837138.28	819052.08	14	8	1
R10	837138.28	819052.08	837119.88	819027.81	14	8	1
R10	837119.88	819027.81	837085.15	818991.79	14	8	1
R11	837191.06	819190.20	837297.41	819384.58	14	8	1
R12	837205.03	819182.73	837311.47	819388.17	14	8	1
R13+14	837295.88	819300.62	837312.16	819609.31	18	8	1
R15	837299.42	819265.30	837356.19	819485.70	18	8	1
R15	837356.19	819483.70	837388.53	819608.09	18	8	1
R16	837311.52	819268.03	837335.82	819402.82	14	8	1
R16	837335.82	819402.82	837348.37	819433.28	14	8	1
R16	837348.37	819433.28	837374.20	819511.47	14	8	1
R16	837374.20	819511.47	837378.30	819544.32	14	8	1
R16	837378.30	819544.32	837388.91	819588.02	14	8	1
R16	837388.91	819588.02	837388.89	819638.43	14	8	1
R17	837283.83	819496.19	837349.69	819483.98	18	8	1
R18	837358.38	819551.80	837303.91	819508.48	18	8	1
R18	837389.79	819641.48	837479.21	819594.48	18	8	1
R20	837308.72	819410.00	837388.21	819610.46	18	8	1
R21	837596.83	820030.52	837521.82	819952.21	16	10	4
R21	837521.82	819952.21	837402.10	819885.82	16	10	4
R21	837402.10	819895.92	837383.08	819648.78	16	10	4
R21	837383.08	819648.78	837371.89	819607.03	16	10	4
R21	837371.89	819607.03	837358.48	819522.74	16	10	4
R21	837358.48	819522.74	837349.79	819476.27	16	10	4
R21	837349.79	819476.27	837336.42	819436.51	16	10	4
R21	837336.42	819436.51	837309.44	819362.87	16	10	4
R21	837309.44	819382.87	837168.51	819147.38	16	10	4
R21	837168.51	819147.38	837134.75	819080.88	16	5	4
R21	837134.75	819080.88	837079.22	818996.37	16	0	1
R22	837367.32	820017.81	837321.11	819848.18	16	10	4
R22	837321.11	819848.18	837407.22	819681.71	16	10	4
R22	837407.22	819681.71	837388.81	819632.91	16	10	4
R22	837388.81	819632.91	837377.18	819576.34	16	10	4
R22	837377.18	819576.34	837367.78	819507.82	16	10	4
R22	837367.78	819507.82	837349.65	819442.16	16	10	4
R22	837349.65	819442.16	837321.88	819383.08	16	10	4
R22	837321.88	819383.08	837178.28	819140.91	16	10	4
R22	837178.28	819140.91	837142.64	819078.51	16	5	4
R22	837142.64	819078.51	837115.31	819034.09	16	0	1
R22	837115.31	819034.09	837092.19	818995.22	16	0	1
R23+24	837309.68	819610.18	837293.13	819600.83	18	0	1
R23+24	837253.13	819609.82	837251.42	819884.34	18	0	1
R25	837365.87	819668.27	837364.64	819884.29	16	0	1
R26	837375.94	819884.44	837377.57	819709.28	17	0	1
R26	837377.27	819709.28	837388.25	819838.33	17	0	1
R27	837471.04	819809.84	837406.96	819672.39	13	0	1
R27	837406.96	819672.39	837392.19	819679.45	13	0	1
R27	837392.19	819679.45	837408.14	819823.83	13	0	1
R27-1+27-2	837436.99	819736.79	837487.35	819713.23	18	0	1
R28	837441.46	819614.32	837515.81	819774.27	18	0	1
R29	837516.13	819774.12	837580.87	819914.86	18	0	1
R30	837653.22	819890.55	837962.77	819737.57	18	0	1
R31	837587.02	819715.44	837708.83	819853.49	16	0	1
R32	837721.85	819850.04	837584.52	819755.67	16	0	1
R33	837782.47	819836.14	837634.05	819687.74	13	0	1
R34	837717.34	819568.31	837564.88	819705.85	18	0	1
R35	837587.53	819715.45	837483.51	819583.72	16	0	1
R36	837584.51	819705.86	837481.85	819588.80	16	0	1
R37	837568.89	819715.41	837471.78	819851.84	18	0	1
R38+39	837781.33	819657.04	837674.27	819538.83	18	0	1
R38+39	837674.27	819538.83	837655.84	819502.99	18	0	1
R40	837370.55	819252.71	837367.13	819425.83	16	0	1
R40	837367.13	819425.83	837370.01	819454.42	16	0	1
R40	837370.01	819454.42	837383.83	819484.43	16	0	1
R40	837383.83	819484.43	837480.25	819583.85	16	0	1
R41	837491.55	819588.79	837380.25	819482.08	16	0	1
R41	837380.25	819482.08	837380.18	819319.87	16	0	1
R41	837380.18	819319.87	837383.41	819255.41	16	0	1
R42+43	837471.46	819258.12	837470.94	819381.99	12	0	1
R44	837475.86	819382.57	837380.21	819382.12	14	0	1
R44-1	837471.54	819382.08	837471.55	819414.34	14	0	1
R44-1	837471.55	819414.34	837410.47	819442.52	14	0	1
R45+46	837473.98	819382.57	837536.04	819382.04	14	0	1
R45+46	837536.04	819382.04	837579.78	819478.30	14	0	1
R47	837514.08	819508.88	837542.71	819562.45	11	0	1
R48	837447.82	819539.73	837580.01	819478.85	13	0	1

FSP (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
0.0181	0.0133	0.0129	0.0126	0.0133	0.0144	0.0170	0.0231	0.0253	0.0244	0.0241	0.0243	0.0190	0.0205	0.0203	0.0195	0.0203	0.0207	0.0215	0.0191	0.0177	0.0176	0.0164	0.0173
0.0216	0.0157	0.0157	0.0163	0.0177	0.0176	0.0205	0.0272	0.0305	0.0286	0.0284	0.0288	0.0222	0.0341	0.0337	0.0322	0.0336	0.0343	0.0354	0.0326	0.0300	0.0307	0.0282	0.0301
0.0216	0.0157	0.0157	0.0163	0.0177	0.0176	0.0205	0.0272	0.0305	0.0286	0.0284	0.0288	0.0222	0.0341	0.0337	0.0322	0.0336	0.0343	0.0354	0.0326	0.0300	0.0307	0.0282	0.0301
0.0198	0.0134	0.0111	0.0101	0.0115	0.0119	0.0164	0.0209	0.0228	0.0229	0.0224	0.0221	0.0165	0.0175	0.0183	0.0176	0.0185	0.0186	0.0198	0.0188	0.0173	0.0173	0.0166	0.0167
0.0198	0.0134	0.0111	0.0101	0.0115	0.0119	0.0164	0.0209	0.0228	0.0229	0.0224	0.0221	0.0165	0.0175	0.0183	0.0176	0.0185	0.0186	0.0198	0.0188	0.0173	0.0173	0.0166	0.0167
0.0184	0.0127	0.0110	0.0100	0.0112	0.0117	0.0156	0.0206	0.0225	0.0218	0.0213	0.0213	0.0145	0.0152	0.0157	0.0152	0.0160	0.0162	0.0170	0.0153	0.0140	0.0145	0.0130	0.0133
0.0273	0.0180	0.0168	0.0192	0.0222	0.0178	0.0214	0.0270	0.0289	0.0282	0.0292	0.0282	0.0198	0.0207	0.0213	0.0202	0.0214	0.0221	0.0228	0.0217	0.0208	0.0208	0.0192	0.0193
0.0212	0.0140	0.0121	0.0135	0.0147	0.0133	0.0179	0.0250	0.0273	0.0267	0.0265	0.0264	0.0335	0.0358	0.0349	0.0329	0.0343	0.0363	0.0370	0.0331	0.0315	0.0314	0.0294	0.0314
0.0384	0.0245	0.0255	0.0265	0.0276	0.0269	0.0302	0.0352	0.0389	0.0385	0.0388	0.0380	0.0413	0.0448	0.0466	0.0440	0.0471	0.0471	0.0503	0.0526	0.0486	0.0492	0.0473	0.0499
0.0384	0.0245	0.0255	0.0265	0.0276	0.0269	0.0302	0.0352	0.0389	0.0385	0.0388	0.0380	0.0413	0.0448	0.0466	0.0440	0.0471	0.0471	0.0503	0.0526	0.0486	0.0492	0.0473	0.0499
0.0429	0.0269	0.0273	0.0287	0.0301	0.0289	0.0334	0.0390	0.0430	0.0425	0.0430	0.0420	0.0366	0.0396	0.0413	0.0385	0.0418	0.0418	0.0441	0.0465	0.0431	0.0435	0.0412	0.0435

Caline 4 input for 2032 Q1

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R49	337385.07	819478.94	337634.37	819454.01	13	0	1
R50	337460.85	819587.96	337696.18	819562.06	18	0	1
R51+52	337655.64	819562.89	337588.72	819343.19	20	0	1
R51+52	337588.72	819343.19	337982.52	819256.32	20	0	1
R53+54	337854.81	819467.71	337727.35	819473.00	14	0	1
R53+54	337727.35	819473.00	337788.08	819426.65	14	0	1
R53+54	337788.08	819426.65	337748.05	819369.98	14	0	1
R53+54	337748.05	819369.98	337698.83	819327.32	14	0	1
R53+54	337698.83	819327.32	337682.34	819301.31	14	0	1
R53+54	337682.34	819301.31	337658.16	819248.02	14	0	1
R55+56	337378.38	819257.83	337564.22	819258.11	25	0	1
R56-1	337454.97	819257.83	337447.08	819071.48	11	0	1
R56-2+56-3	337425.73	819150.58	337424.80	819071.88	18	0	1
R57+58	337564.88	819258.09	337681.39	819251.64	25	0	1
R59	337681.16	819246.24	337745.70	819231.27	14	0	1
R59	337745.70	819231.27	337738.05	819070.31	14	0	1
R60	337682.25	819247.58	337651.46	819069.36	15	0	1
R61	337672.38	819244.46	337661.96	819069.18	15	0	1
R62+63	337565.20	819255.28	337552.77	819138.28	17	0	1
R64+65	337392.68	819253.27	337378.88	819196.80	21	0	1
R64+65	337378.88	819196.80	337375.43	819071.78	21	0	1
R66+67	337378.08	819128.80	337292.22	819129.78	18	0	1
R68	337290.78	819325.67	337069.82	819289.11	18	0	1
R69	337263.97	819280.98	337338.49	819246.43	18	0	1
R69	337338.49	819246.43	337370.52	819253.88	18	0	1
R70+71	337338.08	819234.50	337318.11	819185.17	18	0	1
R72+73	337204.77	819182.19	337292.22	819129.80	18	0	1
R74+75	337347.48	819248.52	337292.25	819129.78	18	0	1
R76	337292.22	819129.80	337267.77	819076.01	18	0	1
R77	337266.87	819073.42	337202.18	819116.48	15	0	1
R77	337202.18	819116.48	337187.06	819125.41	15	0	1
R77-1+77-2	337218.58	819101.10	337181.53	819039.58	12	0	1
R78	337267.66	819072.24	337275.45	819071.10	18	0	1
R79	337187.48	819830.82	337217.48	819879.71	12	0	1
R79	337217.48	819879.71	337186.74	819822.02	12	0	1
R79	337186.74	819822.02	337140.45	819056.94	12	0	1
R80+81	337375.48	819071.78	337375.52	818888.06	21	0	1
R80-1+80-2	337374.53	819864.57	337228.05	819865.77	12	0	1
R80-1+80-2	337228.05	819865.77	337227.84	819832.14	12	0	1
R80-1+80-2	337227.84	819832.14	337337.88	819830.87	12	0	1
R82	337375.44	819072.43	337548.00	819072.00	15	0	1
R83	337545.29	818905.88	337548.30	819072.00	18	0	1
R84+85	337548.30	819071.82	337656.81	819067.81	13	0	1
R84+87	337656.82	819068.10	337655.06	818848.83	24	0	1
R88	337656.75	819066.79	337781.39	819069.86	13	0	1
R88	337781.39	819069.86	337753.16	819011.29	13	0	1
R89	337781.87	819057.79	337822.89	819019.58	18	0	1
R88	337822.89	819019.58	337890.56	818988.45	18	0	1
R89	337890.56	818988.45	337840.35	818896.19	18	0	1
R88	337840.35	818896.19	337872.06	818756.34	18	0	1
R90	337791.23	818857.31	337871.91	818756.82	18	0	1
R91	337853.23	818778.91	337879.37	818749.90	15	0	1
R92	337872.23	818756.53	337740.50	818572.80	18	0	1
R93-1	337894.09	818735.86	337717.80	819714.33	13	0	1
R93-1	337717.80	819714.33	337867.21	819814.10	12	0	1
R93-2	337864.96	818831.41	337830.84	819792.87	12	0	1
R93	337783.24	818835.46	337821.72	818878.91	13	0	1
R94+95	337774.63	819919.41	337714.67	819851.36	28	0	1
R96+97	337833.60	819880.38	337655.12	819836.05	18	0	1
R98	337754.86	819836.46	337520.23	819837.12	18	0	1
R99	337582.68	819914.03	337818.82	819987.86	14	0	1
R99	337818.82	819987.88	337565.57	820011.10	14	0	1
R99	337565.57	820011.10	337529.83	819836.49	14	0	1
R100	337550.18	820018.70	337514.19	819842.85	13	0	1
R101+102	337484.33	819966.97	337483.82	820030.48	18	0	1
R103+104	337514.79	819844.23	337371.40	820018.77	18	0	1
R105+106	337389.85	820024.76	337372.45	819884.41	28	0	1
R107+108	337251.58	819889.95	337291.72	819884.34	18	0	1
R108-1	337317.38	820009.78	337308.24	819884.25	18	0	1
R108	337251.42	819883.77	337272.45	819884.77	18	0	1
R110+111	337483.80	819966.87	337414.74	819860.38	18	0	1
R110+111	337414.74	819860.38	337458.30	818823.33	18	0	1
R112	337458.30	819823.82	337513.96	819943.06	12	0	1
R113	337530.06	819838.43	337471.38	819828.89	12	0	1
R114+115	336932.82	819868.03	336932.22	819580.42	16	0	1
R114+115	336953.22	819580.42	337028.89	819532.82	16	0	1
R114+115	337029.88	819532.82	337033.17	819468.00	16	0	1
R114+115	337033.17	819468.00	337012.91	819456.85	16	0	1
R114+115	337012.91	819456.85	336987.35	819427.73	16	0	1
R116+117	336946.07	819135.90	337022.42	819062.49	26	0	1
R118+119	337135.66	819223.51	337079.43	819129.58	18	0	1
R118+119	337079.43	819129.58	337022.42	819062.49	18	0	1
R120+121	337023.66	819093.94	337118.87	818957.84	22	0	1

FSP (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
0.0154	0.0142	0.0149	0.0143	0.0149	0.0172	0.0198	0.0270	0.0295	0.0266	0.0268	0.0276	0.0244	0.0153	0.0139	0.0136	0.0138	0.0145	0.0145	0.0105	0.0099	0.0097	0.0089	0.0093
0.0209	0.0153	0.0152	0.0156	0.0168	0.0173	0.0211	0.0302	0.0329	0.0308	0.0315	0.0319	0.0333	0.0354	0.0349	0.0330	0.0341	0.0346	0.0357	0.0322	0.0288	0.0277	0.0251	0.0269
0.0380	0.0241	0.0248	0.0257	0.0269	0.0263	0.0299	0.0357	0.0390	0.0385	0.0389	0.0381	0.0381	0.0416	0.0428	0.0404	0.0432	0.0433	0.0461	0.0478	0.0442	0.0447	0.0428	0.0452
0.0380	0.0241	0.0248	0.0257	0.0269	0.0263	0.0299	0.0357	0.0390	0.0385	0.0389	0.0381	0.0381	0.0416	0.0428	0.0404	0.0432	0.0433	0.0461	0.0478	0.0442	0.0447	0.0428	0.0452
0.0410	0.0258	0.0260	0.0272	0.0286	0.0276	0.0322	0.0377	0.0417	0.0411	0.0416	0.0406	0.0361	0.0390	0.0406	0.0379	0.0410	0.0410	0.0433	0.0454	0.0420	0.0425	0.0402	0.0425

Caline 4 input for 2032 Q2

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	837144.25	819218.15	837203.38	819318.65	16	0	1
R1-1+1-2	837133.65	819273.98	837146.18	819294.34	8	0	1
R1-1+1-2	837148.18	819294.34	837179.20	819275.45	8	0	1
R3+4	837203.20	819318.71	837264.44	819385.38	15	0	1
R3+4	837244.44	819365.38	837294.34	819500.43	15	0	1
R5+8	837136.97	819222.68	837191.42	819190.17	18	0	1
R7	837252.30	819287.98	837203.68	819318.65	18	0	1
R8	837256.13	819395.16	837297.53	819586.57	16	0	1
R8	837191.44	819190.13	837114.47	819063.78	14	0	1
R9	837114.47	819063.78	837271.73	819001.82	14	0	1
R10	837204.98	819182.55	837178.04	819137.84	14	0	1
R10	837178.04	819137.84	837185.23	819100.25	14	0	1
R10	837165.32	819100.25	837138.29	819052.06	14	0	1
R10	837138.29	819052.06	837119.98	819027.81	14	0	1
R10	837119.98	819027.81	837095.15	818991.79	14	0	1
R11	837191.06	819190.20	837297.41	819386.58	14	0	1
R12	837205.03	819182.75	837311.47	819360.17	14	0	1
R13+14	837295.88	819500.52	837312.18	819806.31	18	0	1
R15	837298.42	819385.30	837350.19	819483.79	18	0	1
R15	837356.18	819483.79	837366.30	819608.06	18	0	1
R16	837311.53	819360.62	837335.82	819402.92	14	0	1
R16	837335.82	819402.92	837348.37	819433.08	14	0	1
R16	837348.37	819433.08	837374.20	819511.47	14	0	1
R16	837374.20	819511.47	837378.30	819544.32	14	0	1
R16	837374.30	819544.32	837388.91	819589.02	14	0	1
R17	837388.91	819589.02	837388.89	819636.45	14	0	1
R17	837293.82	819489.19	837348.66	819483.86	18	0	1
R18	837336.29	819551.60	837363.31	819558.48	16	0	1
R19	837388.79	819641.48	837479.21	819804.48	18	0	1
R20	837309.72	819612.06	837268.24	819612.46	18	0	1
R21	837508.93	820020.52	837521.62	819852.21	16	10	4
R21	837521.62	819852.21	837402.10	819695.82	16	10	4
R21	837402.10	819695.82	837383.08	819648.78	16	10	4
R21	837383.08	819648.78	837371.88	819607.03	16	10	4
R21	837371.88	819607.03	837358.48	819522.74	16	10	4
R21	837358.46	819522.74	837348.78	819478.27	16	10	4
R21	837348.78	819478.27	837336.42	819436.51	16	10	4
R21	837336.42	819436.51	837328.44	819382.87	16	10	4
R21	837328.44	819382.87	837188.51	819147.58	16	10	4
R21	837188.51	819147.58	837134.75	819080.88	16	5	4
R21	837134.75	819080.88	837078.22	818896.37	16	0	1
R22	837567.30	820017.81	837531.11	819848.18	16	10	4
R22	837521.11	819848.18	837487.02	819681.71	16	10	4
R22	837487.02	819681.71	837388.81	819532.91	16	10	4
R22	837388.81	819532.91	837377.18	819478.34	16	10	4
R22	837377.18	819478.34	837367.78	819407.82	16	10	4
R22	837367.78	819407.82	837348.85	819442.18	16	10	4
R22	837348.65	819442.18	837321.88	819383.08	16	10	4
R22	837321.88	819383.08	837176.20	819140.91	16	10	4
R22	837178.20	819140.91	837142.64	819078.51	16	5	4
R22	837142.64	819078.51	837115.31	819034.09	16	0	1
R22	837115.31	819034.09	837082.19	818965.22	16	0	1
R23+24	837308.68	819810.18	837253.13	819809.82	16	0	1
R23+24	837253.13	819809.82	837251.42	819884.34	18	0	1
R25	837385.87	819808.67	837364.64	819884.29	16	0	1
R26	837375.94	819884.44	837377.07	819709.26	17	0	1
R26	837377.07	819709.26	837388.20	819838.33	17	0	1
R27	837471.04	819909.84	837406.98	819672.39	13	0	1
R27	837408.98	819672.39	837382.18	819579.45	13	0	1
R27	837382.18	819579.45	837458.14	819823.63	13	0	1
R27-1+27-2	837438.99	819738.79	837487.35	819713.23	18	0	1
R28	837441.48	819814.32	837515.91	819774.27	18	0	1
R29	837514.13	819774.12	837580.87	819814.98	18	0	1
R30	837833.22	819880.53	837962.77	819737.87	18	0	1
R31	837587.02	819715.44	837708.83	819853.48	16	0	1
R32	837721.85	819858.04	837584.52	819705.67	16	0	1
R33	837782.47	819838.14	837834.35	819887.74	13	0	1
R34	837717.34	819586.21	837584.88	819705.85	16	0	1
R35	837587.03	819715.45	837482.51	819593.72	16	0	1
R36	837584.51	819705.66	837481.65	819584.82	16	0	1
R37	837586.99	819713.41	837471.78	819811.84	18	0	1
R38+39	837791.33	819957.04	837874.27	819539.63	18	0	1
R38+39	837874.27	819538.63	837855.84	819302.99	12	0	1
R40	837370.55	818252.71	837387.13	819425.03	16	0	1
R40	837367.13	819425.03	837370.01	819454.42	16	0	1
R40	837370.01	819454.42	837383.83	819484.43	16	0	1
R40	837383.83	819484.43	837488.25	819583.95	16	0	1
R41	837481.55	819588.70	837380.25	819482.08	16	0	1
R41	837380.25	819482.08	837380.18	819319.87	16	0	1
R41	837380.18	819319.87	837383.41	819255.41	16	0	1
R42+43	837471.48	819258.12	837470.84	819381.89	13	0	1
R44	837470.98	819382.57	837388.21	819582.12	14	0	1
R44-1	837471.54	819382.08	837471.55	819414.34	14	0	1
R44-1	837471.55	819414.34	837472.47	819442.02	14	0	1
R45+46	837470.86	819382.57	837538.04	819382.04	14	0	1
R45+46	837538.04	819382.04	837579.78	819479.33	14	0	1
R47	837514.08	819508.88	837542.71	819582.45	11	0	1
R48	837447.62	819538.73	837540.01	819478.95	12	0	1

VKT/hr for each road (include the VKT for each sub-section; not directly used by caline4)

Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
39.006	24.000	14.306	11.795	10.500	13.700	25.900	71.511	74.111	69.221	65.722	67.111	72.284	67.600	73.305	70.994	74.493	76.694	78.594	74.794	64.289	58.000	53.994	48.600
78.450	48.416	28.550	24.370	21.050	27.350	52.316	143.983	149.067	138.866	131.300	134.966	104.650	97.083	104.934	102.233	107.033	110.333	113.033	107.633	92.584	83.283	77.850	69.734
78.450	48.416	28.550	24.370	21.050	27.350	52.316	143.983	149.067	138.866	131.300	134.966	104.650	97.083	104.934	102.233	107.033	110.333	113.033	107.633	92.584	83.283	77.850	69.734
38.850	23.800	13.817	11.442	10.550	13.550	25.585	70.423	73.436	68.336	64.687	66.536	82.135	77.015	83.050	80.950	84.850	87.250	89.350	85.164	73.100	65.586	61.036	55.350
38.850	23.800	13.817	11.442	10.550	13.550	25.585	70.423	73.436	68.336	64.687	66.536	82.135	77.015	83.050	80.950	84.850	87.250	89.350	85.164	73.100	65.586	61.036	55.350
14.520	9.020	5.406	4.295	3.900	5.100	9.720	26.745	27.745	25.950	24.650	25.145	42.680	39.826	43.190	41.885	43.990	45.245	46.345	44.085	37.923	34.167	31.908	28.649
1.240	0.802	0.440	0.360	0.320	0.484	0.840	2.364	2.402	2.242	2.165	2.162	7.562	6.958	7.642	7.360	7.720	8.002	8.160	7.760	6.680	5.958	5.558	4.998
6.100	3.750	2.200	1.850	1.703	2.098	4.050	11.150	11.550	10.750	10.253	10.450	7.500	6.947	7.602	7.350	7.750	7.950	8.150	7.750	6.700	6.000	5.548	5.050
72.480	44.480	26.400	22.080	19.520	25.440	48.000	132.809	137.440	128.000	121.448	124.312	124.800	116.488	125.760	122.232	128.320	132.000	135.360	128.800	110.712	99.680	92.952	83.848
72.480	44.480	26.400	22.080	19.520	25.440	48.000	132.809	137.440	128.000	121.448	124.312	124.800	116.488	125.760	122.232	128.320	132.000	135.360	128.800	110.712	99.680	92.952	83.848
96.640	59.528	35.200	29.273	26.080	34.088	64.328	176.800	183.360	170.720	162.088	165.920	155.208	144.640	156.488	152.168	159.528	164.168	168.328	160.336	137.928	124.176	115.680	104.000

Caline 4 input for 2032 Q2

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R49	837580.07	819478.94	837634.37	819454.51	13	0	1
R50	837490.85	819587.90	837656.18	819300.08	18	0	1
R51+52	837655.64	819502.99	837588.72	819343.19	20	0	1
R51+52	837586.72	819343.19	837562.52	819250.32	20	0	1
R53+54	837854.81	819487.71	837727.20	819473.90	14	0	1
R53+54	837727.20	819473.90	837768.09	819426.65	14	0	1
R53+54	837788.09	819426.65	837746.05	819389.88	14	0	1
R53+54	837746.05	819389.88	837688.82	819327.32	14	0	1
R53+54	837688.82	819327.32	837680.24	819301.31	14	0	1
R53+54	837680.24	819301.31	837659.16	819248.02	14	0	1
R56+58	837378.38	819257.63	837564.22	819258.11	25	0	1
R56-1	837454.97	819257.83	837447.06	819671.48	11	0	1
R56-2+56-3	837425.73	819150.58	837424.80	819071.89	18	0	1
R57+58	837564.89	819258.09	837661.38	819251.84	25	0	1
R59	837681.10	819246.24	837745.70	819231.27	14	0	1
R59	837745.70	819231.27	837739.25	819070.31	14	0	1
R60	837680.25	819247.58	837651.46	819089.36	15	0	1
R61	837677.38	819244.46	837661.86	819089.13	15	0	1
R62+63	837565.20	819255.28	837562.77	819138.28	17	0	1
R64+65	837380.69	819255.27	837378.88	819136.90	21	0	1
R64+65	837376.88	819136.90	837375.43	819071.78	21	0	1
R66+67	837378.09	819128.80	837292.22	819129.79	18	0	1
R68	837380.78	819325.67	837389.82	819288.11	18	0	1
R68	837293.97	819280.98	837338.49	819246.43	18	0	1
R69	837338.48	819246.43	837379.52	819253.88	18	0	1
R70+71	837256.58	819234.56	837319.11	819183.17	18	0	1
R72+73	837264.77	819182.19	837292.22	819129.80	18	0	1
R74+75	837347.48	819248.52	837292.25	819129.79	18	0	1
R76	837292.22	819129.80	837287.77	819078.91	18	0	1
R77	837266.87	819073.43	837202.18	819110.48	15	0	1
R77	837202.18	819110.48	837187.08	819105.41	15	0	1
R77-1+77-2	837214.56	819101.10	837181.53	819038.58	12	0	1
R78	837267.66	819072.24	837275.45	819071.10	18	0	1
R79	837187.48	819030.82	837217.48	819078.71	12	0	1
R79	837217.48	819078.71	837186.74	819022.02	12	0	1
R79	837186.74	819022.02	837140.45	819055.94	12	0	1
R80+81	837375.46	819071.78	837373.32	819888.90	21	0	1
R80-1+80-2	837374.52	819864.57	837228.05	819865.77	12	0	1
R80-1+80-2	837228.05	819865.77	837227.94	819832.14	12	0	1
R80-1+80-2	837227.94	819832.14	837227.88	819830.87	12	0	1
R82	837375.44	819072.43	837549.00	819072.00	16	0	1
R83	837545.29	819885.86	837548.30	819072.00	18	0	1
R84+85	837549.30	819071.82	837656.81	819067.81	13	0	1
R86+87	837638.82	819089.10	837655.06	818848.83	24	0	1
R88	837656.75	819066.78	837781.38	819069.86	13	0	1
R88	837781.38	819069.86	837750.18	819011.29	13	0	1
R89	837781.97	819057.79	837922.89	819818.56	18	0	1
R89	837922.89	819818.56	837890.36	819588.43	18	0	1
R89	837890.36	819588.43	837940.35	819096.19	18	0	1
R89	837940.35	819096.19	837872.06	818736.34	18	0	1
R90	837781.83	819057.31	837671.91	818736.82	18	0	1
R91	837863.23	819778.91	837879.37	819748.90	15	0	1
R92	837872.23	819736.53	837740.90	818872.80	18	0	1
R92-1	837864.09	819733.86	837717.89	819714.33	13	0	1
R92-1	837717.82	819714.33	837667.21	819614.10	13	0	1
R92-2	837864.96	819831.41	837830.94	819792.97	13	0	1
R93	837783.24	818833.48	837821.72	819678.91	13	0	1
R94+95	837774.83	819018.41	837714.67	818851.36	28	0	1
R96+97	837853.60	819880.38	837856.12	819836.05	18	0	1
R98	837704.89	819858.48	837520.23	818837.12	18	0	1
R99	837582.68	819814.03	837816.82	819887.88	14	0	1
R99	837818.82	819887.88	837565.57	820011.10	14	0	1
R99	837565.57	820011.10	837529.93	819836.48	14	0	1
R100	837558.18	820019.73	837514.19	819842.95	13	0	1
R101+102	837464.33	819868.87	837483.82	820030.46	18	0	1
R103+104	837514.79	819844.23	837371.40	820012.77	18	0	1
R105+106	837388.85	820024.78	837370.45	819884.41	28	0	1
R107+108	837251.08	819869.95	837291.72	819884.34	18	0	1
R108-1	837307.38	820008.79	837309.24	819884.25	18	0	1
R109	837251.42	819882.77	837270.45	819884.77	18	0	1
R110+111	837483.80	819866.87	837414.74	819890.38	18	0	1
R110+111	837414.74	819890.38	837458.00	819823.33	18	0	1
R112	837458.52	819823.92	837513.96	819843.06	12	0	1
R113	837530.08	819838.43	837471.36	819808.69	12	0	1
R114+115	836932.92	819868.03	836953.22	819590.42	18	0	1
R114+115	836953.22	819590.42	837026.89	819532.82	18	0	1
R114+115	837026.89	819532.82	837033.17	819468.00	18	0	1
R114+115	837033.17	819468.00	837010.91	819455.95	18	0	1
R114+115	837010.91	819455.95	836887.33	819427.73	18	0	1
R116+117	836946.07	819126.90	837022.42	819062.49	26	0	1
R118+119	837130.68	819223.51	837079.43	819129.58	18	0	1
R118+119	837079.43	819129.58	837022.42	819062.49	18	0	1
R120+121	837023.00	819043.94	837118.67	819357.84	22	0	1

VKT/hr for each road (include the VKT for each sub-section; not directly used by caline4)																				
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
1.900	1.200	0.700	0.600	0.500	0.639	1.300	3.511	3.650	3.411	3.211	3.300	1.800	1.700	1.800	1.750	1.850	1.900	1.950	1.859	1.600	1.450	1.350	1.200
38.842	21.833	13.982	12.080	10.572	13.694	25.692	70.834	73.412	68.309	64.888	66.450	35.250	32.910	35.615	34.529	36.383	37.470	38.368	36.572	31.469	28.174	26.378	23.861
215.680	132.480	78.600	65.470	58.120	75.640	143.000	395.218	409.240	381.200	361.658	370.102	332.610	310.088	335.160	335.832	341.930	351.600	360.560	342.790	295.312	265.680	247.542	223.258
215.680	132.480	78.600	65.470	58.120	75.640	143.000	395.218	409.240	381.200	361.658	370.102	332.610	310.088	335.160	335.832	341.930	351.600	360.560	342.790	295.312	265.680	247.542	223.258
108.340	66.728	39.395	32.670	29.180	38.188	72.028	197.996	205.460	191.320	181.693	185.920	170.008	158.440	171.388	166.773	174.728	179.768	184.328	175.432	151.133	135.976	126.680	113.796

Caline 4 input for 2032 Q2

Road Pair	Coordinate (m)				Width (including mixing zones)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	337144.25	819218.15	337203.38	819318.45	16	0	1
R1-1+1-2	337133.65	819273.98	337148.19	819294.34	8	0	1
R1-1+1-2	337148.19	819294.34	337178.20	819275.45	8	0	1
R3+4	337203.20	819316.71	337244.44	819385.38	15	0	1
R3+4	337244.44	819385.38	337294.34	819500.43	15	0	1
R5+6	337136.87	818222.68	337191.42	819196.17	18	0	1
R7	337250.38	819267.96	337203.68	819318.86	18	0	1
R8	337250.13	819295.18	337297.53	819388.57	18	0	1
R9	337191.44	819180.13	337114.47	819043.78	14	0	1
R9	337114.47	819043.78	337071.73	819001.82	14	0	1
R10	337204.88	819182.55	337178.04	819137.84	14	0	1
R10	337178.04	819137.84	337185.32	819100.25	14	0	1
R10	337185.32	819100.25	337138.28	819052.06	14	0	1
R10	337138.28	819052.06	337119.88	819027.81	14	0	1
R10	337118.88	819027.81	337085.15	818981.79	14	0	1
R11	337191.06	819190.20	337297.41	819368.58	14	0	1
R12	337205.03	819182.75	337311.47	819380.17	14	0	1
R13+14	337295.88	819002.02	337318.18	819008.31	16	0	1
R15	337298.42	818985.30	337350.19	819483.79	18	0	1
R15	337350.19	819483.78	337368.53	819808.09	18	0	1
R16	337211.53	818380.02	337335.82	819402.92	14	0	1
R16	337335.82	819402.92	337348.37	819433.08	14	0	1
R16	337348.37	819433.08	337374.20	819511.47	14	0	1
R16	337374.20	819511.47	337378.30	819544.32	14	0	1
R16	337378.30	819544.32	337388.91	819588.02	14	0	1
R16	337388.91	819589.02	337388.89	819838.45	14	0	1
R17	337393.82	819400.18	337348.68	819483.68	18	0	1
R18	337358.38	819501.62	337303.51	819558.48	18	0	1
R19	337388.78	819641.48	337479.21	819864.49	18	0	1
R20	337308.72	819618.06	337288.21	819618.48	18	0	1
R21	337358.83	820020.52	337321.62	819952.21	18	10	4
R21	337321.62	819952.21	337402.10	819895.82	18	10	4
R21	337402.10	819895.82	337383.08	819848.78	18	10	4
R21	337383.08	819848.78	337371.88	819807.03	18	10	4
R21	337371.88	819807.03	337358.48	819522.74	18	10	4
R21	337358.48	819522.74	337348.78	819478.27	18	10	4
R21	337348.78	819478.27	337338.42	819438.51	18	10	4
R21	337338.42	819438.51	337309.44	819382.87	18	10	4
R21	337309.44	819382.87	337188.51	819147.58	18	10	4
R21	337188.51	819147.58	337134.75	819080.88	18	5	4
R21	337134.75	819080.88	337079.22	818996.37	18	0	1
R22	337367.38	820017.81	337531.11	819948.18	18	10	4
R22	337531.11	819948.18	337407.62	819681.71	18	10	4
R22	337407.62	819681.71	337388.81	819632.91	18	10	4
R22	337388.81	819632.91	337377.18	819576.34	18	10	4
R22	337377.18	819576.34	337367.78	819567.82	18	10	4
R22	337367.78	819567.82	337348.65	819442.18	18	10	4
R22	337348.65	819442.18	337321.88	819383.88	18	10	4
R22	337321.88	819383.08	337178.20	819140.91	18	10	4
R22	337178.20	819140.91	337142.64	819078.01	18	5	4
R22	337142.64	819078.01	337115.31	819034.09	18	0	1
R22	337115.31	819034.09	337082.18	818995.22	18	0	1
R23+24	337208.68	819818.18	337253.13	819809.82	18	0	1
R23+24	337253.13	819809.82	337291.42	819884.34	18	0	1
R25	337265.87	819868.87	337364.64	819884.29	16	0	1
R26	337375.84	819884.44	337377.67	819700.26	17	0	1
R26	337377.67	819728.28	337388.20	819834.33	17	0	1
R27	337471.24	819809.84	337408.98	819872.38	13	0	1
R27	337408.98	819872.38	337382.18	819879.45	13	0	1
R27	337382.18	819879.45	337458.14	819823.43	13	0	1
R27-1+27-2	337436.88	819738.79	337487.35	819713.23	18	0	1
R28	337441.48	819814.32	337515.91	819774.27	18	0	1
R29	337518.13	819774.12	337588.87	819814.88	18	0	1
R30	337853.22	819898.53	337962.77	819737.87	18	0	1
R31	337587.02	819718.44	337708.83	819853.48	18	0	1
R32	337721.65	819858.04	337584.52	819703.87	18	0	1
R33	337782.47	819838.14	337834.05	819887.74	13	0	1
R34	337717.34	819586.31	337584.88	819705.85	18	0	1
R35	337587.03	819715.45	337480.91	819580.72	18	0	1
R36	337584.51	819705.88	337491.55	819588.60	18	0	1
R37	337588.88	819715.41	337471.78	819811.84	18	0	1
R38+39	337781.33	819457.84	337674.27	819538.63	18	0	1
R38+39	337674.27	819538.63	337855.84	819902.88	18	0	1
R40	337370.55	819252.71	337367.13	819425.03	18	0	1
R40	337367.13	819425.03	337379.01	819454.42	18	0	1
R40	337370.01	819454.42	337383.63	819484.43	18	0	1
R40	337383.63	819484.43	337482.25	819583.95	18	0	1
R41	337481.36	819588.75	337380.25	819462.08	18	0	1
R41	337380.25	819462.08	337380.18	819318.87	18	0	1
R41	337388.18	819318.87	337383.41	819295.41	18	0	1
R42+43	337471.48	819258.12	337479.94	819381.99	13	0	1
R44	337470.98	819382.87	337380.21	819382.12	14	0	1
R44-1	337471.54	819382.08	337471.55	819414.34	14	0	1
R44-1	337471.55	819414.34	337410.47	819442.02	14	0	1
R45+46	337472.98	819382.87	337536.84	819382.04	14	0	1
R45+46	337536.84	819382.04	337579.78	819479.33	14	0	1
R47	337514.88	819588.48	337542.71	819582.45	11	0	1
R48	337447.83	819538.72	337580.21	819479.85	13	0	1

Vehicle count for each road																						
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
390	240	143	118	105	137	259	715	741	692	657	671	723	676	733	710	745	767	786	748	643	580	540	486
264	163	96	82	71	92	176	484	501	467	441	454	353	327	354	345	361	372	381	363	312	281	262	235
264	163	96	82	71	92	176	484	501	467	441	454	353	327	354	345	361	372	381	363	312	281	262	235
132	81	47	39	36	46	87	239	249	232	219	226	278	260	281	274	287	295	302	288	247	222	206	187
132	81	47	39	36	46	87	239	249	232	219	226	278	260	281	274	287	295	302	288	247	222	206	187
146	91	54	43	39	51	98	269	279	261	248	253	432	403	437	424	445	458	469	446	384	346	323	290
31	20	11	9	8	12	21	59	60	56	54	54	189	174	191	184	193	200	204	194	167	149	139	125
122	75	44	37	34	42	81	223	231	215	205	209	150	139	152	147	155	159	163	155	134	120	111	101
453	278	165	138	122	159	300	830	859	800	759	777	780	728	786	764	802	825	846	805	692	623	581	524
453	278	165	138	122	159	300	830	859	800	759	777	780	728	786	764	802	825	846	805	692	623	581	524
604	372	220	183	163	213	402	1105	1146	1067	1013	1037	970	904	978	951	997	1026	1052	1002	862	776	723	650

Caline 4 input for 2032 Q2

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R49	337582.07	819478.84	337634.37	819454.01	13	0	1
R50	337460.85	819587.60	337606.18	819500.06	18	0	1
R51~52	337655.64	819502.69	337586.72	819543.19	20	0	1
R51~52	337586.72	819543.19	337562.52	819256.62	20	0	1
R53~54	337854.81	819487.71	337727.20	819473.90	14	0	1
R53~54	337727.20	819473.90	337788.09	819426.65	14	0	1
R53~54	337789.09	819426.65	337748.55	819388.88	14	0	1
R52~54	337748.05	819389.88	337868.83	819327.32	14	0	1
R53~54	337888.83	819327.32	337882.34	819301.31	14	0	1
R53~54	337882.34	819301.31	337858.18	819248.02	14	0	1
R55~56	337378.38	819257.83	337564.22	819258.11	25	0	1
R56-1	337454.87	819257.83	337447.06	819871.48	11	0	1
R56-2~56-3	337425.73	819158.58	337424.80	819871.88	16	0	1
R57~58	337964.88	819258.09	337881.36	819251.64	25	0	1
R58	337881.10	819248.24	337745.70	819231.27	14	0	1
R58	337745.70	819231.27	337728.05	819075.31	14	0	1
R60	337880.25	819247.58	337851.46	819068.38	15	0	1
R61	337870.59	819244.46	337861.88	819068.13	15	0	1
R62~63	337865.20	819255.28	337552.77	819138.28	17	0	1
R64~65	337380.89	819255.27	337379.88	819196.90	21	0	1
R64~65	337378.88	819196.90	337375.43	819071.75	21	0	1
R66~67	337378.09	819128.90	337292.22	819128.79	18	0	1
R68	337290.73	819325.87	337388.83	819289.11	18	0	1
R69	337293.87	819290.98	337338.49	819248.43	18	0	1
R69	337338.49	819248.43	337370.52	819253.89	18	0	1
R70~71	337338.68	819234.90	337318.11	819183.17	18	0	1
R72~73	337204.77	819182.19	337292.22	819129.60	18	0	1
R74~75	337347.48	819248.32	337292.35	819129.79	18	0	1
R76	337292.22	819128.60	337267.77	819078.01	18	0	1
R77	337268.87	819073.43	337202.18	819110.48	15	0	1
R77	337203.18	819110.48	337187.08	819105.41	15	0	1
R77-1~77-2	337218.58	819101.10	337181.53	819038.58	12	0	1
R78	337267.88	819072.24	337275.45	818871.10	18	0	1
R79	337187.48	818930.82	337217.48	818878.71	12	0	1
R79	337217.48	818878.71	337196.74	819022.02	12	0	1
R79	337196.74	819022.02	337148.45	819055.94	12	0	1
R80~81	337375.46	819071.78	337372.52	818888.96	21	0	1
R80-1~80-2	337374.53	818884.57	337228.05	818885.77	12	0	1
R80-1~80-2	337228.05	818885.77	337227.94	818832.14	12	0	1
R80-1~80-2	337227.94	818832.14	337337.88	818830.87	12	0	1
R82	337375.44	819072.43	337548.00	819072.00	15	0	1
R83	337545.29	818905.98	337548.30	819072.00	18	0	1
R84~85	337548.30	819071.82	337856.81	819067.81	13	0	1
R86~87	337858.42	819089.10	337855.06	818849.83	24	0	1
R88	337858.75	819088.75	337781.28	819088.96	13	0	1
R88	337781.28	819088.96	337783.18	819017.28	13	0	1
R88	337781.97	819057.79	337822.99	819018.58	18	0	1
R88	337822.99	819018.58	337880.58	819089.40	18	0	1
R89	337880.58	819088.40	337946.33	819088.19	18	0	1
R89	337940.35	819088.19	337873.08	819736.34	18	0	1
R90	337781.63	819657.31	337871.51	819736.42	18	0	1
R91	337903.23	819778.91	337878.37	819748.90	15	0	1
R92	337872.23	819736.53	337740.50	819872.80	18	0	1
R92-1	337684.09	819733.86	337717.80	819714.23	13	0	1
R92-1	337717.80	819714.33	337807.01	819814.10	13	0	1
R92-2	337964.86	818831.41	337930.94	819792.97	13	0	1
R93	337783.24	818833.48	337821.72	819678.91	13	0	1
R94~95	337774.83	819919.41	337714.67	818851.38	28	0	1
R96~97	337633.60	818890.36	337656.12	819838.05	18	0	1
R98	337704.69	818758.48	337500.23	819837.12	18	0	1
R99	337582.88	819814.03	337818.82	819887.88	14	0	1
R99	337818.82	819887.88	337565.57	820011.10	14	0	1
R99	337565.57	820011.10	337529.93	819938.48	14	0	1
R100	337500.18	820019.70	337314.19	819942.95	13	0	1
R101~102	337464.33	819988.67	337483.82	820030.48	18	0	1
R103~104	337514.79	819944.23	337371.48	820010.77	18	0	1
R105~106	337389.85	820024.78	337370.45	819884.41	28	0	1
R107~108	337291.08	819888.95	337291.72	819884.34	18	0	1
R108-1	337307.38	820008.79	337308.24	819884.25	18	0	1
R109	337291.42	819883.77	337370.45	819884.77	18	0	1
R110~111	337483.80	819948.87	337414.74	819880.38	18	0	1
R110~111	337414.74	819880.38	337458.00	819823.33	18	0	1
R112	337458.50	819823.82	337513.80	819943.08	12	0	1
R113	337526.06	819926.43	337471.36	819808.69	12	0	1
R114~115	336932.62	819888.03	336953.22	819590.42	16	0	1
R114~115	336953.22	819590.42	337226.89	819532.62	18	0	1
R114~115	337226.89	819532.82	337533.17	819488.00	16	0	1
R114~115	337533.17	819488.00	337518.91	819455.85	16	0	1
R114~115	337518.91	819456.85	338887.35	819427.73	16	0	1
R116~117	336946.07	819135.90	337222.42	819062.48	28	0	1
R118~119	337135.88	819223.51	337079.43	819129.58	18	0	1
R118~119	337079.43	819129.58	337222.42	819062.48	18	0	1
R120~121	337023.68	819063.94	337118.97	818957.84	22	0	1

Vehicle count for each road																						
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
38	24	14	12	10	13	26	70	73	68	64	66	36	34	36	35	37	38	39	37	32	29	27	24
216	132	78	67	59	76	143	394	408	379	360	369	196	183	198	192	202	208	213	203	179	157	147	133
1169	718	426	355	315	410	775	2142	2218	2066	1960	2006	1819	1696	1833	1782	1870	1923	1972	1875	1615	1453	1354	1221
1169	718	426	355	315	410	775	2142	2218	2066	1960	2006	1819	1696	1833	1782	1870	1923	1972	1875	1615	1453	1354	1221
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
568	350	207	173	154	199	378	1042	1081	1008	955	977	1032	963	1041	1011	1061	1090	1119	1065	916	825	768	693
17	11	7	5	4	6	11	31	33	29	28	29	33	32	23	23	24	24	25	24	21	18	17	16
1400	860	511	425	377	491	929	2565	2657	2474	2347	2405	2303	2053	2221	2159	2264	2329	2388	2270	1956	1759	1640	1477
761	469	277	230	205	268	504	1391	1443	1344	1275	1305	1197	1116	1205	1174	1229	1265	1297	1232	1065	955	892	802
3	2	1	1	1	1	2	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
3	2	1	1	1	1	2	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
231	142	84	70	64	81	153	422	438	409	387	397	305	284	305	298	311	321	329	313	270	243	228	203
169	104	61	51	45	58	112	310	321	299	284	291	348	231	253	244	257	264	271	258	222	199	186	167
125	77	45	38	35	44	82	229	239	224	211	217	267	249	270	262	275	282	290	277	237	214	199	180
691	424	253	211	186	243	458	1267	1312	1221	1159	1189	1201	1118	1212	1178	1234	1270	1302	1238	1066	958	893	805
691	424	253	211	186	243	458	1267	1312	1221	1159	1189	1201	1118	1212	1178	1234	1270	1302	1238	1066	958	893	805
1385	852	505	423	373	486	918	2533	2627	2447	2319	2377	2052	1913	2066	2013	2108	2170	2225	2116	1825	1639	1531	1377
4	2	1	1	1	1	2	7	7	7	6	6	6	5	6	6	6	6	6	6	5	6	6	4
138	85	51	41	36	49	92	255	264	245	234	238	420	391	423	412	431	444	455	434	374	336	313	282
138	85	51	41	36	49	92	255	264	245	234	238	420	391	423	412	431	444	455	434	374	336	313	282
178	109	66	53	48	63	117	326	338	315	298	307	278	262	280	274	287	297	303	290	249	224	208	188
1826	1122	666	557	492	640	1210	3341	3464	3227	3058	3137	3639	3391	3669	3568	3741	3847	3945	3752	3233	2906	2712	2439
2036	1251	743	622	549	712	1351	3724	3861	3566	3409	3495	2808	2619	2829	2755	2886	2969	3045	2895	2496	2244	2094	1883
158	96	57	48	42	55	105	288	298	278	264	269	176	162	175	172	181	186	190	179	157	140	131	117
24	12	9	5	4	9	15	40	41	37	36	38	29	25	29	29	30	31	31	30	26	23	21	19
24	12	9	5	4	9	15	40	41	37	36	38	29	25	29	29	30	31	31	30	26	23	21	19
278	172	101	84	74	99	184	510	528	493	466	478	422	396	426	415	436	448	459	437	376	339	315	284
5	5	4	2	2	2	5	10	10	9	9	11	34	32	34	32	36	36	37	36	30	28	26	24
14	6	4	3	3	8	7	21	23	22	21	21	21	20	21	21	21	23	23	22	19	17	16	14
14	6	4	3	3	8	7	21	23	22	21	21	21	20	21	21	21	23	23	22	19	17	16	14
14	6	4	3	3	8	7	21	23	22	21	21	21	20	21	21	21	23	23	22	19	17	16	14
1933	1188	705	589	522	677	1283	3536	3667	3416	3237	3322	3861	3601	3893	3785	3969	4082	4186	3981	3430	3084	2879	2588
1686	1036	616	514	455	589	1119	3085	3196	2976	2823	2893	2478	2311	2498	2430	2547	2620	2687	2554	2201	1980	1847	1662
1686	1036	616	514	455	589	1119	3085	3196	2976	2823	2893	2478	2311	2498	2430	2547	2620	2687	2554	2201	1980	1847	1662
1686	1036	616	514	455	589	1119	3085	3196	2976	2823	2893	2478	2311	2498	2430	2547	2620	2687	2554	2201	1980	1847	1662
97	60	37	29	26	34	64	178	184	172	163	167	118	110	118	115	122	125	128	122	105	95	87	78
209	129	76	64	56	73	140	384	397	370	351	359	312	292	314	306	321	330	338	322	277	249	232	208
1118	689	407	340	302	393	742	2048	2123	1979	1876	1922	1687	1573	1700	1655	1735	1784	1829	1740	1498	1348	1257	1130
117	72	43	36	33	41	29	214	222	207	196	203	264	247	267	259	271	279	286	272	234	211	196	177
319	196	116	97	86	112	212	583	604	563	533	547	598	557	602	587	615	631	648	617	530	477	446	401
319	196	116	97	86	112	212	583	604	563	533	547	598	557	602	587	615	631	648	617	530	477	446	401
287	176	105	86	78	100	190	523	543	506	479	491	598	557	602	586	614	631	647	616	530	478	445	399
287	176	105	86	78	100	190	523	543	506	479	491	598	557	602	586	614	631	647	616	530	478	445	399
287	176	105	86	78	100	190	523	543	506	479	491	598	557	602	586	614	631	647	616	530	478	445	399
287	176	105	86	78	100	190	523	543	506	479	491	598	557	602	586	614	631	647	616	530	478	445	399
201	124	73	60	54	70	133	365	380	353	335	344	329	307	332	323	339	348	357	340	292	264	245	221
435	268	159	133	116	153	288	795	824	767	728	746	873	814	879	856	897	924	947	900	777	698	651	585
328	203	120	100	90	116	219	603	625	584	551	565	571	533	577	561	588	606	621	591	509	456	425	384
6	4	2	2	2	2	4	12	12	11	11	11	15	14	15	14	15	16	16	15	13	12	11	10
6	4	2	2	2	2	4	12	12	11	11	11	15	14	15	14	15	16	16	15	13	12	11	10
8	5	3	2	2	3	5	14	15	14	13	14	14	13	14	14	14	15	15	14	12	11	10	9
8	5	4	3	3	3	5	16	16	15	15	15	8	6	8	8	8	8	8	8	6	6	6	4
925	569	336	282	251	323	614	1689	1754	1633	1551	1590	1408	1314	1420	1383	1447	1489	1527	1452	1249	1124	1049	944
82	51	31	24	22	28	55	152	158	148	141	141	100	94	102	98	103	107	109	104	91	83	75	69
287	177	105	88	77	100	190	525	545	508	481	494	353	329	354	348	362	371	383	363	314	282	263	236
22	14	8	7	5	7	15	39	41	38	36	37	35	33	36	34	36	37	38	37	32	28	26	24
22	14	8	7	5	7	15	39	41	38	36	37	35	33	36	34	36	37	38	37	32	28	26	24
22	14	8	7	5	7	15	39	41	38	36	37	35	33	36	34	36	37	38	37	32	28	26	24
343	210	124	105	92	120	228	628	651	606	573	589	586	548	591	575	605	622	637	606	531	469	438	395
398	244	146	121	106	138	264	728	753	701	665	682	685	639	691	672	704	725	743	707	608	547	511	460
1014	624	371	308	274	355	674	1858	1926	1794	1701	1744	1537	1433	1548	1508	1579	1626	1666	1586	1366	1227	1145	1029
128	79	47	39	35	45	86	235	243	228	214	221	134	126	135	133	139	142	146	139	120	108	100	91
345	211	126	105	92	120	229	631	654	609	577	592	590	551	595	578	606	623	640	609	524	470	440	396
80	49	30	24	22	29	54	147	152	141	135	138	138	130	139	136	142	147	150	142	123	110	104	93
134	84	50	42	36	48	90	249	257	238	226	232	361	337	364	353	370	381	391	372	320	288	270	242
37	23	14	12	9	12	24	66	68	64	59	62	49	47	49	49	50	53	53	51	44	39	36	32
37	23	14	12	9	12	24	66	68	64	59	62	49	47	49	49	50	53	53	51	44	39	36	32
31	19	13	9	8	11	20	57	59	56	52	53	55	52	57	54	59	60	61	59	51	45	42	38
5	3	2	2	1	2	3	10	10	9	9	9	9	9	9	9	9	10	10	10	8	7	7	6
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
863	530	318	263	233	302	572	1580	1638	1526	1446	1482	1249	1165	1260	1224	1284	1321	1355	1288	1110	997	932	839
64	39	24	20	18	21	41	113	117	110	103	106	113	106	114	110	116	120	122	116	100	91	83	76
64	39	24	20	18	21	41	113	117	110	103	106	113	106	114	110	116	120	122	116	100	91	83	76
540	332	198	164	145	188	358	987	1023	953	902	926	928	867	927	908	955	982	1007	956	824	741	691	623

Caline 4 input for 2032 Q2

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	337144.25	919218.19	337203.38	919316.45	18	0	1
R1-1+1-2	337133.85	919273.98	337146.19	919294.34	8	0	1
R1-1+1-2	337146.18	919294.34	337178.25	919278.45	8	0	1
R3+4	337203.25	919316.71	337244.44	919385.38	15	0	1
R3+4	337244.44	919385.38	337294.34	919560.43	15	0	1
R5+6	337167.87	919222.68	337191.42	919190.17	18	0	1
R7	337252.38	919287.86	337203.68	919318.86	18	0	1
R8	337250.13	919295.18	337297.53	919366.57	18	0	1
R9	337191.46	919190.13	337114.47	919083.78	14	0	1
R10	337114.47	919083.78	337071.73	919001.82	14	0	1
R10	337204.98	919182.55	337178.04	919137.84	14	0	1
R10	337178.04	919137.84	337185.32	919100.25	14	0	1
R10	337185.32	919100.25	337138.28	919052.08	14	0	1
R10	337138.28	919052.08	337119.98	919027.81	14	0	1
R12	337118.68	919027.81	337085.15	918991.79	14	0	1
R11	337191.06	919190.28	337297.41	919386.58	14	0	1
R12	337203.53	919182.75	337311.47	919366.17	14	0	1
R13+14	337295.88	919500.52	337312.18	919826.31	18	0	1
R15	337298.42	919365.30	337350.18	919483.75	18	0	1
R15	337350.18	919483.75	337388.52	919604.88	18	0	1
R16	337311.53	919360.02	337335.82	919402.92	14	0	1
R16	337335.82	919402.92	337348.37	919433.08	14	0	1
R16	337348.37	919433.08	337374.20	919511.47	14	0	1
R16	337374.20	919511.47	337379.30	919544.32	14	0	1
R16	337379.30	919544.32	337388.91	919598.02	14	0	1
R16	337388.91	919598.02	337388.88	919636.45	14	0	1
R17	337293.86	919499.19	337349.68	919483.66	18	0	1
R18	337388.39	919501.86	337303.91	919559.48	18	0	1
R18	337388.79	919641.48	337479.21	919584.48	18	0	1
R20	337309.72	919610.00	337388.21	919810.48	18	0	1
R21	337196.93	920020.52	337321.82	919852.21	18	10	4
R21	337321.82	919852.21	337402.10	919695.92	18	10	4
R21	337402.10	919695.92	337383.08	919648.78	18	10	4
R21	337383.08	919648.78	337371.89	919607.03	18	10	4
R21	337371.88	919607.03	337358.48	919522.74	18	10	4
R21	337358.48	919522.74	337348.79	919476.27	18	10	4
R21	337348.79	919476.27	337336.42	919436.51	18	10	4
R21	337336.42	919436.51	337309.44	919382.87	18	10	4
R21	337309.44	919382.87	337188.51	919147.58	18	10	4
R21	337188.51	919147.58	337134.75	919080.88	18	5	4
R21	337134.75	919080.88	337079.22	918996.37	18	0	1
R22	337567.30	920017.81	337531.11	919948.18	18	10	4
R22	337531.11	919948.18	337407.02	919681.71	18	10	4
R22	337407.02	919681.71	337388.81	919632.91	18	10	4
R22	337388.81	919632.91	337377.18	919578.34	18	10	4
R22	337377.18	919578.34	337367.79	919507.82	18	10	4
R22	337367.79	919507.82	337349.65	919442.16	18	10	4
R22	337349.65	919442.16	337321.88	919383.08	18	10	4
R22	337321.88	919383.08	337179.20	919140.91	18	10	4
R22	337179.20	919140.91	337142.64	919078.01	18	5	4
R22	337142.64	919078.01	337115.31	919034.09	18	0	1
R22	337115.31	919034.09	337082.10	918995.22	18	0	1
R23+24	337308.48	919810.18	337293.13	919809.82	18	0	1
R23+24	337293.13	919809.82	337251.42	919884.34	18	0	1
R25	337365.87	919968.67	337364.64	919884.29	18	0	1
R28	337375.94	919884.44	337377.07	919769.29	17	0	1
R26	337377.07	919769.29	337388.20	919638.33	17	0	1
R27	337471.04	919809.84	337408.96	919672.28	13	0	1
R27	337408.96	919672.28	337392.18	919679.45	13	0	1
R27	337392.18	919679.45	337458.14	919823.83	13	0	1
R27-1+27-2	337438.09	919738.76	337467.35	919713.23	18	0	1
R29	337441.48	919914.32	337515.91	919774.27	18	0	1
R29	337518.13	919774.12	337582.87	919914.86	18	0	1
R30	337833.22	919880.52	337582.77	919737.87	18	0	1
R31	337587.22	919715.44	337708.83	919853.49	18	0	1
R32	337721.85	919850.04	337584.52	919705.67	18	0	1
R33	337782.47	919838.14	337834.05	919867.74	13	0	1
R34	337717.34	919588.31	337584.98	919705.85	18	0	1
R35	337587.03	919715.45	337488.31	919582.72	18	0	1
R36	337584.31	919705.88	337491.85	919588.60	18	0	1
R37	337588.89	919715.41	337471.78	919811.84	18	0	1
R38+39	337781.33	919857.04	337674.27	919539.83	18	0	1
R38+39	337674.27	919538.83	337555.84	919502.98	18	0	1
R40	337378.55	919252.71	337347.13	919425.03	18	0	1
R40	337347.13	919425.03	337370.01	919454.42	18	0	1
R40	337370.01	919454.42	337383.63	919484.43	18	0	1
R40	337383.63	919484.43	337480.25	919583.95	18	0	1
R41	337481.55	919588.70	337380.25	919482.88	18	0	1
R41	337380.25	919482.88	337380.18	919319.87	18	0	1
R41	337380.18	919319.87	337383.41	919055.41	18	0	1
R42+43	337471.48	919218.12	337470.94	919381.99	13	0	1
R44	337479.98	919382.87	337380.21	919382.12	14	0	1
R44-1	337471.54	919382.08	337471.55	919414.34	14	0	1
R44-1	337471.55	919414.34	337419.47	919442.02	14	0	1
R45+48	337479.98	919382.87	337538.64	919382.04	14	0	1
R45+48	337538.64	919382.04	337579.78	919479.33	14	0	1
R47	337314.98	919588.88	337542.71	919562.45	11	0	1
R48	337447.63	919538.73	337380.21	919479.85	13	0	1

NO_x x 100 (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
98.7744	91.4678	91.2498	90.7588	84.5492	94.6381	95.2835	92.7877	95.5681	98.6801	103.3014	101.2475	79.4758	81.9601	81.8670	74.0231	74.1809	73.5609	74.3508	85.2148	82.4976	81.8741	78.4319	88.0180
110.7397	98.7860	102.5810	104.4957	102.5820	107.0484	104.5502	107.9360	116.9335	114.9372	119.8897	118.2597	120.7725	122.4165	123.9243	114.9627	116.6001	117.1005	118.4957	122.5981	115.2328	116.6404	108.4060	118.7573
110.7397	98.7860	102.5810	104.4957	102.5820	107.0484	104.5502	107.9360	116.9335	114.9372	119.8897	118.2597	120.7725	122.4165	123.9243	114.9627	116.6001	117.1005	118.4957	122.5981	115.2328	116.6404	108.4060	118.7573
93.9359	85.1104	73.4488	70.7159	68.7505	74.4611	86.6235	73.1557	74.5902	80.4955	85.0250	81.6584	63.1419	64.5302	66.6401	59.2269	59.4451	58.1481	59.5816	75.1616	71.5037	72.3371	71.2198	78.1863
93.9359	85.1104	73.4488	70.7159	68.7505	74.4611	86.6235	73.1557	74.5902	80.4955	85.0250	81.6584	63.1419	64.5302	66.6401	59.2269	59.4451	58.1481	59.5816	75.1616	71.5037	72.3371	71.2198	78.1863
91.8760	84.2001	76.3684	71.8427	69.5890	77.0414	85.4537	74.7267	76.1600	79.2873	83.3448	80.9562	61.8767	62.4708	64.4903	57.0204	56.8477	55.5742	56.3400	71.7798	68.7092	69.7597	66.4873	75.4314
76.9045	64.9274	66.6119	70.3497	72.1822	68.9744	68.4031	68.5092	70.6712	72.1993	76.6210	73.6886	71.1640	72.9729	73.8758	66.0237	67.1022	67.4318	67.7678	79.7815	79.1607	78.3256	74.8968	79.4726
101.3079	76.4841	68.4017	69.8162	69.1897	71.3469	82.6964	92.4701	95.7832	99.5360	103.4162	101.1516	119.8634	124.9525	122.3747	113.6791	115.7559	121.5316	122.1619	138.4059	115.8740	115.7647	111.2153	117.6526
92.5106	73.2683	76.6915	78.3922	78.2946	79.6254	80.2495	84.2717	91.0536	92.2761	95.1932	92.8272	95.2391	100.1242	103.6952	95.8903	100.1958	100.3516	106.0681	111.8556	105.2096	105.0430	101.1590	107.5610
92.5106	73.2683	76.6915	78.3922	78.2946	79.6254	80.2495	84.2717	91.0536	92.2761	95.1932	92.8272	95.2391	100.1242	103.6952	95.8903	100.1958	100.3516	106.0681	111.8556	105.2096	105.0430	101.1590	107.5610
101.0971	77.1239	78.9499	81.0097	82.3387	82.0838	86.4762	92.2676	100.0774	101.0580	104.2533	101.5368	88.2019	92.4601	95.7871	86.3517	91.8812	91.7710	95.0695	104.0149	98.2032	97.9202	92.5314	99.0031

Caline 4 input for 2032 Q2

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R48	337360.07	819478.94	337434.37	819434.01	13	0	1
R50	337466.85	819587.90	337698.16	819300.08	18	0	1
R51+52	337855.94	819502.98	337568.72	819342.19	20	0	1
R51+52	337586.72	819343.19	337582.52	819256.02	20	0	1
R53+54	337854.81	819487.71	337727.20	819473.80	14	0	1
R53+54	337727.20	819473.80	337799.09	819428.85	14	0	1
R53+54	337798.09	819426.55	337748.05	819389.98	14	0	1
R53+54	337746.05	819388.98	337698.83	819327.32	14	0	1
R53+54	337698.83	819327.32	337680.34	819301.31	14	0	1
R53+54	337680.34	819301.31	337659.16	819248.02	14	0	1
R55+56	337378.38	819257.83	337564.22	819258.11	25	0	1
R56-1	337454.87	819257.83	337447.06	819071.48	11	0	1
R56-2+56-3	337425.72	819150.58	337424.80	819071.89	16	0	1
R57+58	337564.88	819258.06	337661.38	819251.64	25	0	1
R58	337681.10	819248.24	337745.70	819231.27	14	0	1
R59	337745.70	819231.27	337739.05	819075.31	14	0	1
R60	337660.25	819247.58	337601.48	819089.38	15	0	1
R61	337670.38	819244.46	337681.86	819089.15	15	0	1
R62+63	337585.20	819255.28	337552.77	819138.29	17	0	1
R64+65	337382.88	819255.27	337378.88	819136.80	21	0	1
R64+65	337378.88	819136.80	337375.43	819071.79	21	0	1
R66+67	337378.09	819128.90	337282.22	819128.79	18	0	1
R66	337290.76	819035.67	337349.82	819288.11	18	0	1
R68	337293.97	819280.98	337338.48	819246.43	18	0	1
R69	337338.48	819246.43	337370.52	819253.86	18	0	1
R70+71	337236.08	819234.56	337218.11	819193.17	18	0	1
R72+73	337254.77	819182.19	337282.22	819128.80	18	0	1
R74+75	337347.48	819248.52	337282.25	819128.79	18	0	1
R76	337282.22	819128.80	337267.77	819076.01	18	0	1
R77	337288.87	819073.43	337282.18	819110.48	15	0	1
R77	337282.18	819110.48	337187.06	819125.41	15	0	1
R77-1+77-2	337219.56	819101.15	337181.53	819038.58	12	0	1
R78	337267.68	819072.24	337375.45	819071.10	18	0	1
R78	337187.48	819330.82	337217.48	819879.71	12	0	1
R79	337217.48	819879.71	337196.74	819022.02	12	0	1
R79	337196.74	819022.02	337140.45	819055.94	12	0	1
R80+81	337375.48	819071.79	337373.52	818888.98	21	0	1
R80-1+80-2	337374.52	818864.97	337229.05	818865.77	12	0	1
R80-1+80-2	337229.05	818865.77	337227.94	818932.14	12	0	1
R80-1+80-2	337227.94	818932.14	337337.68	818930.57	12	0	1
R82	337375.44	819072.43	337549.00	819072.00	15	0	1
R83	337545.28	818903.88	337548.32	819072.00	18	0	1
R84+85	337548.32	819071.82	337656.81	819067.51	13	0	1
R86+87	337656.82	819069.10	337655.04	818948.63	24	0	1
R88	337656.75	819068.75	337781.38	819068.66	13	0	1
R88	337781.38	819068.66	337753.18	819011.28	13	0	1
R89	337781.97	819057.79	337822.89	818918.58	18	0	1
R89	337822.89	818918.58	337890.58	818588.45	18	0	1
R89	337890.58	818588.45	337940.35	818698.19	18	0	1
R90	337781.63	819057.31	337771.91	818796.62	18	0	1
R91	337903.23	819770.91	337878.37	819748.90	15	0	1
R92	337872.89	819796.53	337740.98	819872.80	18	0	1
R92-1	337894.09	819735.86	337717.85	819714.53	13	0	1
R92-1	337717.85	819714.53	337657.01	819814.10	13	0	1
R92-2	337864.98	819831.41	337830.94	819792.97	13	0	1
R93	337783.24	819655.48	337821.72	819878.91	13	0	1
R94+95	337774.83	819819.41	337714.67	819851.38	28	0	1
R96+97	337833.80	819836.38	337856.12	819836.05	18	0	1
R98	337704.89	819858.48	337530.23	819837.12	18	0	1
R99	337582.68	819814.03	337610.82	819887.88	14	0	1
R99	337818.82	819887.88	337585.57	820011.10	14	0	1
R99	337585.57	820011.10	337529.83	819836.49	14	0	1
R100	337500.19	820019.73	337514.19	819942.95	13	0	1
R101+102	337464.33	819868.87	337483.82	820030.48	18	0	1
R103+104	337514.79	819944.23	337371.42	820010.77	18	0	1
R105+106	337389.85	820024.78	337370.45	819884.41	28	0	1
R107+108	337251.06	819869.85	337251.72	819884.54	18	0	1
R108-1	337307.38	820009.79	337308.24	819884.25	18	0	1
R109	337251.42	819883.77	337370.45	819884.77	18	0	1
R112+111	337483.80	819868.87	337414.74	819880.38	18	0	1
R112+111	337414.74	819880.38	337458.00	819823.33	18	0	1
R113	337458.52	819823.82	337513.96	819843.06	12	0	1
R113	337530.06	819858.43	337471.36	819809.89	12	0	1
R114+115	338932.82	819868.33	338955.22	819580.42	18	0	1
R114+115	338955.22	819580.42	337929.89	819532.62	18	0	1
R114+115	337929.89	819532.62	337933.17	819488.00	18	0	1
R114+115	337933.17	819488.00	337918.91	819455.95	18	0	1
R114+115	337918.91	819455.95	338667.30	819427.73	18	0	1
R116+117	338646.37	819135.90	337222.42	819062.49	28	0	1
R118+119	337135.68	819223.51	337579.43	819129.58	18	0	1
R118+119	337579.43	819129.58	337222.42	819062.49	18	0	1
R120+121	337923.68	819043.84	337118.97	818957.84	22	0	1

NO_x x 100 (g/VMT)																						
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
105.9092	106.3914	100.8698	88.7851	84.8785	106.0773	116.3088	127.4990	132.9625	126.9347	131.4788	131.1690	72.8980	75.2167	72.0407	65.6400	65.0100	64.9764	64.4345	70.6527	70.1456	68.5177	66.9028	75.2421
114.7860	81.1991	73.0742	71.2597	71.3015	76.0631	93.8812	128.1029	133.9430	133.0791	137.7308	136.9794	122.9587	124.5939	126.0372	117.4606	118.8857	119.5348	120.8216	119.7495	108.6174	101.8174	89.0575	92.8697
94.3327	73.9586	76.4372	77.5038	78.1241	79.5803	81.0595	87.9304	93.6410	94.6765	97.7402	95.3326	91.4018	97.0738	98.9309	91.3164	95.1003	95.2605	100.5485	106.0842	99.9739	99.6970	95.9443	102.2700
94.3327	73.9586	76.4372	77.5038	78.1241	79.5803	81.0595	87.9304	93.6410	94.6765	97.7402	95.3326	91.4018	97.0738	98.9309	91.3164	95.1003	95.2605	100.5485	106.0842	99.9739	99.6970	95.9443	102.2700
102.0668	79.0920	78.9357	80.3125	81.4093	81.9492	88.3612	93.0866	100.4738	101.7607	105.0832	102.3693	89.6059	94.0252	97.0126	87.6573	92.8537	92.6731	95.9063	104.7054	99.1095	98.9075	93.3731	100.2254

Caline 4 input for 2032 Q2

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1=2	337144.25	819218.15	337203.38	819318.45	18	8	1
R1-1=1-2	337133.65	819273.96	337148.19	819294.34	8	8	1
R1-1=1-2	337148.19	819294.34	337179.25	819275.45	8	8	1
R3=4	337293.20	819318.71	337244.44	819385.38	18	8	1
R3=4	337244.44	819385.38	337294.34	819500.43	18	8	1
R5=6	337134.67	819222.68	337191.42	819190.17	18	8	1
R7	337252.20	819287.86	337203.68	819318.89	18	8	1
R8	337258.13	819399.15	337297.53	819386.57	18	8	1
R8	337191.44	819190.13	337114.47	819065.78	14	8	1
R9	337114.47	819063.78	337071.73	819001.82	14	8	1
R10	337204.88	819182.55	337178.04	819137.84	14	8	1
R10	337178.04	819137.84	337188.32	819100.25	14	8	1
R10	337165.32	819100.25	337138.28	819052.06	14	8	1
R10	337138.28	819052.06	337119.88	819027.81	14	8	1
R10	337119.88	819027.81	337085.13	818991.79	14	8	1
R11	337191.08	819190.20	337297.41	819388.58	14	8	1
R12	337205.63	819182.75	337311.47	819380.17	14	8	1
R13=14	337293.88	819500.32	337312.18	819808.31	18	8	1
R15	337298.42	819385.30	337350.19	819483.72	18	8	1
R15	337350.19	819483.72	337388.53	819808.09	18	8	1
R16	337311.53	819380.02	337335.82	819402.82	14	8	1
R16	337335.82	819402.82	337348.37	819433.08	14	8	1
R16	337348.37	819433.08	337374.05	819511.47	14	8	1
R18	337374.05	819511.47	337378.30	819544.32	14	8	1
R16	337378.30	819544.32	337388.91	819569.02	14	8	1
R18	337388.91	819569.02	337389.88	819634.45	14	8	1
R17	337293.82	819499.18	337349.89	819483.86	18	8	1
R18	337358.38	819551.60	337303.51	819558.49	18	8	1
R18	337389.79	819641.46	337478.21	819584.48	18	8	1
R20	337388.72	819810.06	337388.21	819810.48	18	8	1
R21	337508.93	820020.52	337521.62	819852.21	18	18	4
R21	337521.62	819852.21	337402.10	819695.92	18	18	4
R21	337402.10	819695.92	337383.08	819648.78	18	18	4
R21	337383.08	819648.78	337371.69	819607.03	18	18	4
R21	337371.69	819607.03	337358.48	819522.74	18	18	4
R21	337358.48	819522.74	337349.79	819478.27	18	18	4
R21	337349.79	819478.27	337338.42	819438.51	18	18	4
R21	337338.42	819438.51	337309.44	819382.87	18	18	4
R21	337309.44	819382.87	337188.91	819147.58	18	18	4
R21	337188.91	819147.58	337134.75	819093.68	18	8	4
R21	337134.75	819093.68	337079.22	818996.37	18	8	1
R22	337967.30	820017.81	337531.11	819848.16	18	18	4
R22	337531.11	819848.16	337407.02	819681.71	18	18	4
R22	337407.02	819681.71	337388.91	819632.91	18	18	4
R22	337388.91	819632.91	337377.18	819576.34	18	18	4
R22	337277.18	819576.34	337367.78	819507.82	18	18	4
R22	337367.78	819507.82	337349.65	819442.18	18	18	4
R22	337349.65	819442.18	337321.86	819383.08	18	18	4
R22	337321.86	819383.08	337178.20	819140.91	18	18	4
R22	337178.20	819140.91	337142.84	819076.01	18	8	4
R22	337142.84	819076.01	337115.31	819034.09	18	8	1
R22	337115.31	819034.09	337082.10	818985.22	18	8	1
R23=24	337309.88	819810.18	337253.13	819809.82	18	8	1
R23=24	337253.13	819809.82	337251.42	819884.34	18	8	1
R25	337365.87	819808.67	337364.64	819884.29	18	8	1
R28	337375.94	819884.44	337377.07	819703.28	17	8	1
R28	337377.07	819709.28	337388.20	819838.33	17	8	1
R27	337471.04	819809.84	337406.96	819672.38	13	8	1
R27	337406.96	819672.38	337262.18	819679.45	13	8	1
R27	337392.16	819679.45	337458.14	819823.83	13	8	1
R27-1=27-2	337438.89	819736.79	337487.35	819713.23	18	8	1
R28	337341.46	819814.32	337515.91	819774.27	18	8	1
R28	337518.13	819774.12	337580.87	819814.88	18	8	1
R30	337833.22	819890.53	337582.77	819737.87	18	8	1
R31	337587.02	819715.44	337709.83	819853.49	18	8	1
R32	337721.65	819850.04	337584.52	819705.87	18	8	1
R33	337782.47	819838.14	337634.05	819667.74	13	8	1
R34	337717.34	819588.21	337384.68	819705.95	16	8	1
R35	337587.03	819715.45	337480.31	819593.72	18	8	1
R36	337584.31	819725.86	337481.85	819588.60	18	8	1
R37	337588.99	819715.41	337471.78	819811.84	18	8	1
R38=38	337781.32	819657.04	337674.27	819528.83	18	8	1
R38=38	337674.27	819529.83	337655.64	819502.88	18	8	1
R40	337370.55	818252.71	337387.13	819425.03	16	8	1
R40	337367.13	819425.03	337379.01	819454.42	16	8	1
R40	337379.01	819454.42	337383.83	819484.43	16	8	1
R40	337383.83	819484.43	337480.25	819585.95	16	8	1
R41	337491.55	819588.75	337390.25	819482.08	16	8	1
R41	337380.25	819482.08	337380.18	819318.87	16	8	1
R41	337380.18	819318.87	337383.61	819256.41	16	8	1
R42=43	337471.48	819258.12	337479.84	819381.99	13	8	1
R44	337470.86	819382.87	337388.21	819382.12	16	8	1
R44-1	337471.54	819382.08	337471.55	819414.34	16	8	1
R44-1	337471.55	819414.34	337410.47	819442.82	16	8	1
R45=46	337470.86	819382.87	337536.04	819383.04	14	8	1
R45=46	337536.04	819382.54	337579.78	819478.33	14	8	1
R47	337314.08	819568.48	337542.71	819582.45	11	8	1
R48	337447.83	819538.73	337582.01	819478.85	13	8	1

NO_2 x 100 (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
9.1433	8.3256	8.7869	8.8020	8.5013	9.9690	10.8303	14.2692	15.6844	14.7866	15.4189	15.6644	10.2305	10.7479	9.9526	9.0691	9.1108	9.4543	9.3559	7.7711	7.3375	7.1531	6.5142	7.4276
11.2662	9.8769	10.9288	11.3035	11.5233	12.4798	12.9698	17.6508	20.4549	18.3510	19.1835	19.5547	19.8714	20.1808	19.0606	17.5954	17.6473	18.3383	18.1660	14.3709	13.1901	13.1823	11.6482	13.2576
11.2662	9.8769	10.9288	11.3035	11.5233	12.4798	12.9698	17.6508	20.4549	18.3510	19.1835	19.5547	19.8714	20.1808	19.0606	17.5954	17.6473	18.3383	18.1660	14.3709	13.1901	13.1823	11.6482	13.2576
7.0567	6.5067	5.4551	5.0078	5.2636	5.8577	7.6940	8.7011	9.4089	9.2093	9.6544	9.6457	5.3946	5.4375	5.3493	4.8465	4.8644	4.9472	4.9718	4.9174	4.5906	4.5390	4.4571	4.6671
7.0567	6.5067	5.4551	5.0078	5.2636	5.8577	7.6940	8.7011	9.4089	9.2093	9.6544	9.6457	5.3946	5.4375	5.3493	4.8465	4.8644	4.9472	4.9718	4.9174	4.5906	4.5390	4.4571	4.6671
6.9742	6.4752	5.8847	5.2058	5.4380	6.1266	7.7111	9.1873	9.9539	9.3520	9.6874	9.8833	5.3664	5.3857	5.3634	4.8015	4.8459	4.9428	4.9170	4.6366	4.3255	4.3514	4.0154	4.4302
6.5380	6.3551	6.5160	6.4440	6.9822	7.0107	8.8060	8.4947	8.9612	8.9953	8.9433	9.0132	7.9490	7.9228	7.6465	6.8690	7.0029	7.3174	7.1573	6.3985	6.3533	6.1934	5.6631	5.8930
10.0209	7.4466	6.8067	7.1242	7.2790	7.5698	9.7818	14.4777	15.8407	15.1474	15.7315	15.9179	20.9377	22.1649	20.0303	18.5039	18.6510	20.1928	19.9461	14.9905	14.3609	14.2051	13.0131	14.3758
9.0096	8.5802	9.1399	9.2428	9.2451	9.8409	9.6548	11.7076	12.8969	12.2585	12.6522	12.9508	12.7491	12.7396	12.4102	11.4701	11.7268	11.9720	12.2764	10.9002	10.5304	10.3146	9.9877	10.3040
9.0096	8.5802	9.1399	9.2428	9.2451	9.8409	9.6548	11.7076	12.8969	12.2585	12.6522	12.9508	12.7491	12.7396	12.4102	11.4701	11.7268	11.9720	12.2764	10.9002	10.5304	10.3146	9.9877	10.3040
9.8763	9.1961	9.5842	9.6856	9.8377	10.2694	10.4702	12.7451	14.0623	13.3425	13.7805	14.1163	11.2356	11.1974	10.9512	9.8838	10.3224	10.5161	10.5724	9.6805	9.3789	9.1642	8.7042	8.9963

Caline 4 input for 2032 Q2

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R48	337580.37	819478.94	337834.37	819454.01	13	8	1
R50	337490.85	819487.90	337658.18	819500.08	18	8	1
R51=52	337656.84	819502.98	337586.72	819343.19	20	8	1
R51=52	337586.72	819343.19	337562.52	819258.02	20	8	1
R53=54	337654.61	819487.71	337727.20	819473.90	14	8	1
R53=54	337727.20	819473.90	337768.38	819428.65	14	8	1
R53=54	337768.38	819428.65	337746.05	819389.88	14	8	1
R53=54	337746.05	819389.88	337666.43	819327.22	14	8	1
R53=54	337666.43	819327.22	337660.34	819301.31	14	8	1
R52=54	337660.34	819301.31	337658.18	819248.02	14	8	1
R50=56	337378.36	819257.83	337564.22	819258.11	25	8	1
R56-1	337454.87	819257.83	337447.06	819071.48	11	8	1
R56-2=56-3	337425.73	819150.58	337424.80	819071.89	18	8	1
R57=56	337564.88	819258.08	337881.38	819251.64	25	8	1
R59	337661.10	819248.24	337745.70	819231.27	14	8	1
R58	337745.70	819231.27	337738.05	819070.31	14	8	1
R60	337880.25	819247.58	337691.46	819068.36	15	8	1
R61	337879.38	819244.46	337881.88	819088.13	15	8	1
R62=63	337566.20	819255.29	337552.77	819138.26	17	8	1
R64=65	337380.89	819256.27	337378.88	819196.80	21	8	1
R64=65	337378.88	819196.80	337375.43	819071.78	21	8	1
R66=67	337378.09	819128.90	337292.22	819129.79	18	8	1
R68	337380.78	818325.67	337389.82	819288.11	18	8	1
R69	337283.87	819280.68	337338.49	819248.43	18	8	1
R69	337338.49	819248.43	337370.52	819230.98	18	8	1
R70=71	337206.08	819234.56	337318.11	819185.17	18	8	1
R72=73	337204.77	819182.19	337292.22	819129.80	18	8	1
R74=75	337547.48	819248.52	337292.25	819129.79	18	8	1
R76	337292.22	819129.80	337287.77	819078.01	18	8	1
R77	337298.87	819073.43	337202.18	819110.48	15	8	1
R77	337202.18	819110.48	337187.06	819105.41	15	8	1
R77-1=77-2	337218.96	819101.10	337181.53	819030.58	12	8	1
R78	337287.66	819072.24	337375.45	819071.10	18	8	1
R79	337187.48	819030.82	337217.48	818979.71	12	8	1
R79	337217.48	818979.71	337196.74	819022.62	12	8	1
R79	337196.74	819022.62	337140.45	819055.94	12	8	1
R80=81	337375.48	819071.78	337373.52	818888.96	21	8	1
R80-1=80-2	337374.53	818984.57	337228.25	818883.77	12	8	1
R80-1=80-2	337228.25	818883.77	337227.94	818832.14	12	8	1
R80-1=80-2	337227.94	818832.14	337137.88	818830.87	12	8	1
R82	337379.44	819072.43	337549.00	819072.55	15	8	1
R83	337545.29	819065.84	337548.38	819072.66	18	8	1
R84=85	337548.20	819071.82	337696.61	819067.81	13	8	1
R86=87	337696.62	819069.10	337655.06	818948.83	24	8	1
R88	337696.75	819066.76	337781.38	819088.96	13	8	1
R88	337781.38	819068.88	337753.18	819011.26	13	8	1
R89	337781.87	819057.79	337822.99	819018.58	18	8	1
R89	337822.99	819018.58	337896.56	818984.45	18	8	1
R89	337896.56	818984.45	337940.35	818986.19	18	8	1
R89	337940.35	818986.19	337972.06	818736.54	18	8	1
R90	337781.63	819057.31	337871.51	819058.62	18	8	1
R91	337903.23	819779.91	337879.37	819749.90	15	8	1
R92	337872.23	819756.52	337740.90	819672.80	18	8	1
R92-1	337894.09	819755.88	337717.80	819714.33	13	8	1
R92-1	337717.80	819714.33	337587.21	819614.10	13	8	1
R92-2	337894.96	819831.41	337830.84	819782.97	13	8	1
R93	337783.24	819835.48	337821.72	819878.91	13	8	1
R94=95	337774.63	819819.41	337714.67	819851.36	28	8	1
R96=97	337933.80	819850.38	337855.12	819838.55	18	8	1
R98	337724.89	819656.48	337530.23	819837.12	18	8	1
R99	337587.88	819914.53	337916.82	819967.88	14	8	1
R99	337816.82	819967.88	337585.57	820011.10	14	8	1
R99	337585.57	820011.10	337529.83	819838.49	14	8	1
R100	337580.18	820019.70	337514.19	819842.95	13	8	1
R101=102	337464.33	819968.67	337483.82	820030.48	18	8	1
R103=104	337514.79	819844.23	337371.48	820018.77	18	8	1
R105=106	337388.85	820024.78	337370.45	819884.41	28	8	1
R107=108	337251.08	819888.95	337251.72	819884.34	18	8	1
R108-1	337307.38	820009.79	337308.24	819884.25	18	8	1
R109	337251.42	819883.77	337370.45	819884.77	18	8	1
R110=111	337483.00	819968.87	337414.74	819860.38	18	8	1
R110=111	337414.74	819860.38	337458.00	819823.33	18	8	1
R112	337458.00	819823.82	337513.98	819843.06	12	8	1
R113	337530.06	819838.43	337471.38	819859.89	12	8	1
R114=115	336832.82	819888.23	336953.22	819580.42	18	8	1
R114=115	336953.22	819580.42	337029.89	819532.82	18	8	1
R114=115	337029.89	819532.82	337033.17	819488.06	18	8	1
R114=115	337033.17	819488.06	337012.91	819455.85	18	8	1
R114=115	337012.91	819455.85	336867.35	819427.73	18	8	1
R116=117	336848.07	819125.96	337022.42	819062.48	28	8	1
R118=119	337133.66	819223.51	337279.43	819129.58	18	8	1
R118=119	337279.43	819129.58	337022.42	819062.48	18	8	1
R120=121	337023.86	819063.84	337118.87	818957.84	22	8	1

NO_2 x 100 (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
14.0230	13.0272	13.6348	12.1609	12.2340	15.9379	18.6992	25.7253	28.5577	25.4024	26.5820	26.9161	11.0737	11.9191	10.6333	9.7223	9.7904	10.2327	10.0470	7.6465	7.1465	6.9023	6.7163	7.4583
15.6673	10.6025	10.4665	10.3252	10.7730	11.9664	15.5570	25.6850	28.3766	26.5509	27.7845	28.1017	22.4091	22.9298	21.5518	19.9005	19.9396	20.8020	20.5404	15.8827	14.0167	12.9477	10.7464	11.7290
9.2201	8.6046	9.0699	9.1035	9.2078	9.8010	9.7807	12.3478	13.4268	12.7150	13.1362	13.4398	12.3157	12.5289	11.9435	11.0571	11.2855	11.5485	11.8324	10.3783	10.0067	9.7876	9.4284	9.7948
9.2201	8.6046	9.0699	9.1035	9.2078	9.8010	9.7807	12.3478	13.4268	12.7150	13.1362	13.4398	12.3157	12.5289	11.9435	11.0571	11.2855	11.5485	11.8324	10.3783	10.0067	9.7876	9.4284	9.7948
9.9878	9.2455	9.4270	9.4599	9.6072	10.1375	10.7108	13.0466	14.3801	13.6542	14.1164	14.4366	11.6151	11.6563	11.3144	10.2492	10.6505	10.8574	10.9068	9.8737	9.5649	9.3605	8.8394	9.2121

Caline 4 input for 2032 Q2

Road Pair	Coordinate (m)				Width (Including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	837164.25	819218.15	837203.38	819318.45	18	0	1
R1-1+1-2	837153.65	819273.98	837146.19	819294.34	8	0	1
R1-1+1-2	837148.19	819294.34	837179.25	819275.45	8	0	1
R3+4	837263.25	819318.71	837244.44	819385.38	15	0	1
R3+4	837244.44	819385.38	837294.34	819501.43	15	0	1
R5+6	837138.97	819222.88	837191.42	819195.17	18	0	1
R7	837252.30	819297.98	837253.88	819318.88	18	0	1
R8	837258.13	819395.18	837297.53	819368.57	16	0	1
R8	837191.44	819190.13	837114.47	819083.78	14	0	1
R9	837114.47	819083.78	837071.73	819001.82	14	0	1
R10	837204.98	819182.55	837178.94	819137.84	14	0	1
R10	837178.04	819137.84	837185.32	819100.25	14	0	1
R10	837185.32	819100.25	837138.28	819052.08	14	0	1
R10	837138.28	819052.08	837118.88	819027.81	14	0	1
R10	837118.88	819027.81	837085.15	818991.79	14	0	1
R11	837191.06	819190.20	837287.41	819388.58	14	0	1
R12	837205.03	819182.75	837311.47	819388.17	14	0	1
R13+14	837285.88	819388.02	837312.18	819609.31	18	0	1
R15	837289.42	819383.30	837350.19	819483.79	18	0	1
R15	837350.19	819483.79	837388.53	819609.09	18	0	1
R16	837211.53	819388.02	837353.82	819402.92	14	0	1
R16	837235.82	819402.92	837348.37	819433.08	14	0	1
R16	837348.37	819433.08	837374.20	819511.47	14	0	1
R16	837374.20	819511.47	837378.30	819544.32	14	0	1
R16	837378.30	819544.32	837388.91	819588.02	14	0	1
R16	837388.91	819589.02	837388.89	819638.45	14	0	1
R17	837283.82	819499.18	837248.08	819483.08	18	0	1
R18	837358.39	819551.80	837383.51	819558.48	18	0	1
R19	837388.79	819641.48	837478.21	819584.48	18	0	1
R20	837309.72	819810.06	837288.21	819810.48	18	0	1
R21	837558.83	820029.52	837521.62	819952.21	18	10	4
R21	837521.62	819952.21	837402.18	819895.92	18	10	4
R21	837402.18	819895.92	837383.08	819848.78	18	10	4
R21	837383.08	819848.78	837371.89	819827.03	18	10	4
R21	837371.89	819827.03	837358.48	819523.74	18	10	4
R21	837358.48	819523.74	837348.79	819478.27	18	10	4
R21	837348.79	819478.27	837338.42	819438.91	18	10	4
R21	837338.42	819438.91	837309.44	819382.87	18	10	4
R21	837309.44	819382.87	837188.51	819147.58	18	10	4
R21	837188.91	819147.58	837134.75	819080.88	18	5	4
R21	837134.75	819080.88	837079.22	818996.37	18	0	1
R22	837987.30	820017.81	837531.11	819848.16	18	10	4
R22	837531.11	819848.16	837407.62	819681.71	18	10	4
R22	837407.62	819681.71	837388.81	819632.81	18	10	4
R22	837388.81	819632.81	837377.18	819578.34	18	10	4
R22	837377.18	819578.34	837367.78	819507.42	18	10	4
R22	837367.78	819507.42	837348.85	819442.16	18	10	4
R22	837348.85	819442.16	837321.88	819383.38	18	10	4
R22	837321.88	819383.38	837178.20	819140.91	18	10	4
R22	837178.20	819140.91	837142.64	819078.51	16	5	4
R22	837142.64	819078.51	837115.31	819034.09	16	0	1
R22	837115.31	819034.09	837082.15	818995.22	16	0	1
R23+24	837309.68	819512.18	837252.13	819609.52	18	0	1
R23+24	837253.13	819609.52	837251.42	819884.34	18	0	1
R25	837383.87	819868.07	837364.64	819884.29	18	0	1
R26	837375.94	819884.44	837377.07	819708.28	17	0	1
R26	837377.07	819709.28	837388.20	819838.33	17	0	1
R27	837471.04	819609.84	837406.98	819672.28	13	0	1
R27	837406.98	819672.28	837382.18	819679.45	13	0	1
R27	837382.18	819679.45	837458.14	819823.63	13	0	1
R27-1+27-2	837438.99	819736.79	837487.35	819713.23	18	0	1
R28	837441.48	819814.32	837515.91	819774.27	18	0	1
R29	837516.13	819774.12	837588.87	819914.86	18	0	1
R30	837833.22	819898.55	837562.77	819737.87	18	0	1
R31	837587.02	819715.44	837708.83	819853.49	18	0	1
R32	837721.65	819858.04	837584.32	819705.47	18	0	1
R33	837782.47	819838.14	837834.95	819887.74	13	0	1
R34	837717.34	819588.31	837584.88	819705.85	18	0	1
R35	837587.03	819715.45	837482.91	819583.72	18	0	1
R36	837584.51	819705.88	837481.85	819588.40	18	0	1
R37	837588.88	819715.41	837471.78	819811.84	18	0	1
R38+39	837781.33	819857.04	837674.27	819538.83	18	0	1
R38+39	837674.27	819538.83	837655.64	819502.98	18	0	1
R40	837370.55	819252.71	837367.13	819425.03	16	0	1
R40	837367.13	819425.03	837378.01	819494.42	16	0	1
R40	837378.01	819494.42	837383.83	819484.43	16	0	1
R40	837383.83	819484.43	837488.25	819583.95	16	0	1
R41	837491.55	819588.70	837386.25	819482.08	16	0	1
R41	837380.25	819482.08	837380.18	819319.87	16	0	1
R41	837380.18	819319.87	837383.41	819255.41	16	0	1
R42+43	837471.48	819258.12	837479.84	819381.98	13	0	1
R44	837470.95	819382.57	837380.21	819382.12	14	0	1
R44-1	837471.54	819382.06	837471.55	819414.34	14	0	1
R44-1	837471.55	819414.34	837410.47	819442.02	14	0	1
R45+48	837470.96	819382.57	837536.04	819382.04	14	0	1
R45+48	837536.04	819382.04	837579.78	819478.33	14	0	1
R47	837514.08	819508.88	837542.71	819562.45	11	0	1
R48	837447.83	819528.73	837580.01	819478.85	12	0	1

RSP (g/VMT)																						
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
0.0196	0.0145	0.0140	0.0137	0.0145	0.0156	0.0185	0.0253	0.0275	0.0266	0.0262	0.0264	0.0309	0.0223	0.0271	0.0213	0.0221	0.0226	0.0235	0.0208	0.0193	0.0192	0.0178	0.0188
0.0235	0.0171	0.0171	0.0177	0.0197	0.0191	0.0223	0.0296	0.0332	0.0312	0.0309	0.0313	0.0350	0.0371	0.0366	0.0350	0.0365	0.0373	0.0385	0.0355	0.0326	0.0333	0.0307	0.0327
0.0235	0.0171	0.0171	0.0177	0.0192	0.0191	0.0223	0.0296	0.0332	0.0312	0.0309	0.0313	0.0350	0.0371	0.0366	0.0350	0.0365	0.0373	0.0385	0.0355	0.0326	0.0333	0.0307	0.0327
0.0215	0.0145	0.0120	0.0110	0.0125	0.0129	0.0178	0.0228	0.0248	0.0249	0.0244	0.0241	0.0179	0.0190	0.0198	0.0191	0.0201	0.0203	0.0215	0.0204	0.0186	0.0188	0.0180	0.0182
0.0215	0.0145	0.0120	0.0110	0.0125	0.0129	0.0178	0.0228	0.0248	0.0249	0.0244	0.0241	0.0179	0.0190	0.0198	0.0191	0.0201	0.0203	0.0215	0.0204	0.0186	0.0188	0.0180	0.0182
0.0200	0.0138	0.0119	0.0108	0.0122	0.0127	0.0169	0.0224	0.0244	0.0238	0.0232	0.0232	0.0159	0.0165	0.0171	0.0166	0.0174	0.0177	0.0186	0.0166	0.0152	0.0153	0.0142	0.0144
0.0296	0.0195	0.0183	0.0208	0.0242	0.0194	0.0233	0.0293	0.0315	0.0307	0.0317	0.0307	0.0215	0.0225	0.0231	0.0219	0.0232	0.0240	0.0247	0.0236	0.0226	0.0225	0.0209	0.0210
0.0230	0.0153	0.0132	0.0147	0.0160	0.0145	0.0194	0.0272	0.0297	0.0291	0.0288	0.0288	0.0364	0.0389	0.0378	0.0357	0.0372	0.0395	0.0402	0.0359	0.0341	0.0341	0.0320	0.0341
0.0417	0.0266	0.0277	0.0288	0.0300	0.0292	0.0328	0.0383	0.0423	0.0418	0.0422	0.0413	0.0449	0.0487	0.0507	0.0479	0.0512	0.0513	0.0547	0.0572	0.0529	0.0535	0.0514	0.0542
0.0417	0.0266	0.0277	0.0288	0.0300	0.0292	0.0328	0.0383	0.0423	0.0418	0.0422	0.0413	0.0449	0.0487	0.0507	0.0479	0.0512	0.0513	0.0547	0.0572	0.0529	0.0535	0.0514	0.0542
0.0467	0.0292	0.0297	0.0312	0.0327	0.0314	0.0363	0.0423	0.0468	0.0462	0.0467	0.0456	0.0398	0.0431	0.0449	0.0418	0.0454	0.0454	0.0479	0.0505	0.0468	0.0473	0.0448	0.0473

Caline 4 input for 2032 Q2

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R49	837580.07	819479.94	837834.37	819454.51	13	9	1
R50	837480.85	819587.80	837656.18	819560.06	19	9	1
R51+52	837835.64	819502.89	837588.72	819543.19	20	9	1
R51+52	837588.72	819543.19	837562.52	819296.02	20	9	1
R53+54	837834.81	819487.71	837727.20	819473.90	14	9	1
R53+54	837727.20	819473.90	837788.08	819426.65	14	9	1
R53+54	837788.09	819426.65	837746.05	819368.88	14	9	1
R53+54	837746.05	819389.88	837888.83	819327.32	14	9	1
R53+54	837888.83	819327.32	837680.34	819301.31	14	9	1
R53+54	837680.34	819301.31	837936.18	819248.02	14	9	1
R55+56	837378.39	819257.83	837564.22	819258.11	35	9	1
R56-1	837454.87	819257.83	837447.08	819071.49	11	9	1
R56-2+56-3	837425.73	819150.58	837424.80	819071.89	18	9	1
R57+58	837564.88	819258.09	837661.38	819251.64	25	9	1
R59	837661.16	819248.24	837749.70	819231.27	14	9	1
R59	837745.79	819231.27	837738.05	819070.31	14	9	1
R60	837680.25	819247.58	837651.46	819069.26	15	9	1
R61	837670.39	819244.46	837681.89	819068.13	15	9	1
R62+63	837565.20	819255.28	837562.77	819138.26	17	9	1
R64+65	837380.69	819250.27	837376.88	819196.90	21	9	1
R64+65	837378.88	819196.90	837375.43	819071.78	21	9	1
R66+67	837378.09	819128.90	837292.22	819129.78	18	9	1
R68	837290.78	819325.67	837289.82	819289.11	18	9	1
R69	837283.87	819282.99	837338.49	819246.43	18	9	1
R69	837338.49	819246.43	837370.52	819253.88	18	9	1
R70+71	837236.08	819234.50	837318.11	819165.17	18	9	1
R72+73	837254.77	819182.19	837292.22	819129.80	18	9	1
R74+75	837347.48	819248.52	837292.35	819126.79	18	9	1
R76	837292.22	819129.80	837267.77	819078.01	18	9	1
R77	837286.87	819073.43	837202.18	819110.48	15	9	1
R77	837202.18	819110.48	837167.08	819103.41	15	9	1
R77-1+77-2	837218.56	819101.10	837181.52	819038.58	12	9	1
R78	837267.88	819072.24	837375.45	819071.12	18	9	1
R79	837187.48	819030.82	837217.48	818979.71	12	9	1
R79	837217.48	818979.71	837196.74	819022.02	12	9	1
R79	837196.74	819022.02	837142.45	819053.94	12	9	1
R80+81	837375.48	819071.78	837373.52	818888.96	21	9	1
R80-1+80-2	837374.53	818884.57	837228.05	818888.77	12	9	1
R80-1+80-2	837228.05	818885.77	837227.94	818832.14	12	9	1
R80-1+80-2	837227.94	818832.14	837337.68	818830.87	12	9	1
R82	837375.44	819072.43	837548.00	819072.00	15	9	1
R83	837545.29	819065.96	837548.30	819072.00	18	9	1
R84+85	837548.30	819071.82	837656.81	819067.81	13	9	1
R86+87	837656.82	819069.10	837655.08	818948.53	24	9	1
R88	837656.75	819066.76	837791.39	819068.96	13	9	1
R88	837791.39	819068.96	837753.10	819011.28	13	9	1
R89	837781.97	819057.79	837822.89	818918.58	18	9	1
R89	837822.89	819018.58	837880.56	819068.45	18	9	1
R89	837880.56	819068.45	837946.35	819066.19	18	9	1
R89	837942.35	819066.19	837872.06	818796.34	18	9	1
R90	837781.63	819057.31	837871.51	818796.62	18	9	1
R91	837903.23	819776.91	837878.37	819748.90	15	9	1
R92	837872.23	819758.53	837742.50	819672.80	18	9	1
R92-1	837894.06	819735.88	837717.80	819714.33	13	9	1
R92-1	837717.80	819714.33	837657.01	819814.10	13	9	1
R92-2	837664.96	819831.41	837638.94	819792.97	13	9	1
R93	837783.24	819835.48	837921.72	819878.91	13	9	1
R94+95	837774.63	819918.41	837714.87	819851.36	25	9	1
R96+97	837633.60	819890.38	837555.12	819838.85	18	9	1
R98	837704.89	819858.48	837538.23	819537.12	18	9	1
R99	837582.68	819914.03	837618.82	819987.88	14	9	1
R95	837618.82	819987.88	837585.57	820011.12	14	9	1
R98	837585.57	820011.12	837329.93	819938.49	14	9	1
R100	837556.18	820019.78	837514.19	819942.95	13	9	1
R101+102	837484.33	819868.67	837483.82	820032.48	18	9	1
R103+104	837514.78	819844.23	837371.48	820010.77	18	9	1
R105+106	837368.93	820024.76	837370.45	819884.41	28	9	1
R107+108	837251.06	819868.95	837251.72	819884.34	18	9	1
R108-1	837307.38	820009.78	837308.24	819884.25	18	9	1
R109	837251.42	819883.77	837373.45	819884.77	18	9	1
R110+111	837482.90	819868.87	837414.74	819860.38	18	9	1
R110+111	837414.74	819860.38	837458.00	819823.33	18	9	1
R112	837458.50	819823.82	837513.96	819943.06	12	9	1
R113	837530.06	819836.43	837471.38	819826.89	12	9	1
R114+115	836832.92	819868.03	836952.22	819390.42	18	9	1
R114+115	836953.22	819390.42	837529.88	819532.82	18	9	1
R114+115	837526.89	819532.82	837533.17	819488.00	18	9	1
R114+115	837533.17	819488.00	837010.91	819450.65	18	9	1
R114+115	837010.91	819450.65	836887.35	819427.73	18	9	1
R116+117	836848.87	819135.90	837222.42	819002.48	26	9	1
R118+119	837135.98	819223.51	837078.43	819129.58	18	9	1
R118+119	837078.43	819129.58	837222.42	819062.48	18	9	1
R120+121	837223.66	819063.84	837118.97	818957.84	22	9	1

RSP (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
0.0168	0.0154	0.0162	0.0155	0.0162	0.0187	0.0215	0.0293	0.0321	0.0289	0.0292	0.0300	0.0357	0.0166	0.0151	0.0147	0.0150	0.0157	0.0158	0.0114	0.0108	0.0106	0.0097	0.0101
0.0227	0.0166	0.0166	0.0170	0.0183	0.0188	0.0229	0.0329	0.0358	0.0336	0.0343	0.0347	0.0362	0.0385	0.0379	0.0358	0.0370	0.0376	0.0388	0.0350	0.0313	0.0302	0.0273	0.0292
0.0413	0.0262	0.0269	0.0280	0.0293	0.0286	0.0324	0.0388	0.0424	0.0419	0.0422	0.0414	0.0414	0.0452	0.0465	0.0439	0.0469	0.0470	0.0502	0.0519	0.0481	0.0486	0.0466	0.0491
0.0413	0.0262	0.0269	0.0280	0.0293	0.0286	0.0324	0.0388	0.0424	0.0419	0.0422	0.0414	0.0414	0.0452	0.0465	0.0439	0.0469	0.0470	0.0502	0.0519	0.0481	0.0486	0.0466	0.0491
0.0446	0.0281	0.0283	0.0295	0.0310	0.0300	0.0350	0.0410	0.0453	0.0447	0.0451	0.0441	0.0392	0.0425	0.0441	0.0412	0.0445	0.0446	0.0470	0.0493	0.0457	0.0462	0.0437	0.0462

Caline 4 input for 2032 Q2

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	337144.25	819213.15	337202.38	819316.45	18	8	1
R1-1+1-2	337133.65	819273.96	337148.19	819294.34	8	8	1
R1-1+1+2	337146.19	819294.34	337178.29	819275.45	8	0	1
R3+4	337253.20	819316.71	337244.44	819385.38	15	0	1
R3+4	337244.44	819385.38	337294.34	819500.42	15	8	1
R5+6	337136.97	819222.68	337181.42	819190.17	18	8	1
R7	337252.30	819287.96	337253.68	819318.86	18	8	1
R8	337250.13	819395.18	337297.53	819366.57	18	8	1
R9	337191.44	819186.13	337114.47	819063.78	14	8	1
R9	337114.47	819063.78	337071.73	819001.82	14	0	1
R10	337254.88	819182.59	337178.04	819137.84	14	0	1
R10	337178.04	819137.84	337165.32	819100.25	14	8	1
R10	337185.32	819100.25	337138.28	819052.06	14	8	1
R10	337138.28	819052.06	337119.98	819027.81	14	8	1
R10	337119.98	819027.81	337065.15	818961.78	14	8	1
R11	337191.58	819186.20	337297.41	819366.58	14	8	1
R12	337265.83	819182.75	337311.47	819360.17	14	8	1
R13+14	337295.88	819586.02	337310.16	819609.31	16	8	1
R15	337288.42	819585.30	337330.19	819483.79	16	8	1
R16	337350.18	819483.79	337368.53	819608.09	16	8	1
R16	337311.63	819360.02	337335.92	819402.92	14	8	1
R16	337335.83	819402.92	337348.37	819433.28	14	8	1
R16	337348.37	819433.28	337374.25	819511.47	14	8	1
R16	337374.25	819511.47	337378.30	819544.52	14	8	1
R18	337378.30	819544.52	337388.91	819586.02	14	8	1
R18	337388.91	819586.02	337388.89	819638.45	14	8	1
R17	337293.82	819486.18	337348.89	819483.86	18	8	1
R18	337358.39	819551.60	337303.51	819558.49	18	8	1
R19	337388.79	819641.46	337479.21	819584.48	18	8	1
R20	337308.72	819618.00	337388.21	819612.48	18	8	1
R21	337558.93	820025.52	337521.62	819952.21	16	10	4
R21	337521.62	819952.21	337402.10	819695.92	16	10	4
R21	337402.10	819695.92	337383.08	819648.78	16	10	4
R21	337383.08	819648.78	337371.89	819607.03	16	10	4
R21	337371.89	819607.03	337358.46	819522.74	16	10	4
R21	337358.46	819522.74	337348.79	819476.27	16	10	4
R21	337348.79	819476.27	337336.42	819436.51	16	10	4
R21	337336.42	819436.51	337309.44	819382.87	16	10	4
R21	337309.44	819382.87	337188.51	819147.58	16	10	4
R21	337188.51	819147.58	337134.75	819062.68	16	8	4
R21	337134.75	819062.68	337079.22	818998.37	16	8	1
R22	337367.36	820017.81	337331.11	819948.16	16	10	4
R22	337331.11	819948.16	337407.02	819881.71	16	10	4
R22	337407.02	819881.71	337388.91	819832.91	16	10	4
R22	337388.91	819832.91	337377.18	819576.34	16	10	4
R22	337377.18	819576.34	337367.79	819507.82	16	10	4
R22	337367.79	819507.82	337348.65	819442.16	16	10	4
R22	337348.65	819442.16	337321.86	819383.08	16	10	4
R22	337321.86	819383.08	337178.20	819140.91	16	10	4
R22	337178.20	819140.91	337142.64	819076.01	16	8	4
R22	337142.64	819076.01	337113.31	819034.09	16	8	1
R22	337113.31	819034.09	337092.10	818995.22	16	8	1
R23+24	337309.68	819610.18	337253.13	819609.82	18	8	1
R23+24	337253.13	819609.82	337251.42	819684.54	18	8	1
R25	337365.87	819808.07	337364.64	819884.29	18	8	1
R26	337375.84	819884.44	337377.07	819709.26	17	8	1
R28	337377.07	819709.26	337383.20	819636.33	17	8	1
R27	337471.84	819808.84	337404.96	819672.39	13	8	1
R27	337404.96	819672.39	337392.18	819679.45	13	8	1
R27	337392.18	819679.45	337458.14	819823.63	13	8	1
R27-1+27-2	337436.99	819736.79	337487.35	819713.23	18	8	1
R28	337441.48	819814.32	337515.91	819774.27	18	0	1
R29	337518.13	819774.12	337580.87	819914.86	18	0	1
R30	337633.22	819890.33	337562.77	819737.87	18	8	1
R31	337587.02	819715.44	337708.83	819853.48	18	8	1
R32	337721.65	819830.84	337584.52	819705.87	18	8	1
R33	337782.47	819838.14	337834.01	819867.74	13	0	1
R34	337717.34	819588.31	337584.88	819705.95	18	0	1
R35	337587.03	819715.45	337488.91	819593.72	18	8	1
R36	337584.51	819705.66	337491.85	819588.60	18	8	1
R37	337588.99	819715.41	337471.78	819811.84	18	8	1
R38+39	337791.33	819857.04	337674.27	819539.83	18	8	1
R38+39	337674.27	819538.83	337655.84	819562.99	18	8	1
R40	337370.55	819252.71	337367.13	819425.83	18	8	1
R40	337367.13	819425.83	337372.01	819454.42	18	8	1
R40	337372.01	819454.42	337383.83	819484.43	18	8	1
R40	337383.83	819484.43	337480.25	819993.95	18	8	1
R41	337491.55	819988.75	337380.25	819462.08	18	8	1
R41	337380.25	819462.08	337380.18	819318.87	18	8	1
R41	337380.18	819318.87	337383.41	819255.41	18	8	1
R42+43	337471.48	819258.12	337470.84	819381.99	12	8	1
R44	337472.96	819382.27	337380.21	819382.12	14	8	1
R44-1	337471.54	819382.06	337471.55	819414.34	14	8	1
R44-1	337471.35	819414.34	337410.47	819442.02	14	8	1
R45+46	337473.96	819382.87	337528.04	819382.04	14	8	1
R45+46	337528.04	819382.04	337579.78	819479.33	14	8	1
R47	337514.08	819508.88	337542.71	819562.45	11	8	1
R48	337447.63	819538.73	337380.01	819479.83	13	8	1

FSP (g/VMT)																						
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
0.0181	0.0133	0.0129	0.0126	0.0133	0.0144	0.0170	0.0231	0.0253	0.0244	0.0241	0.0243	0.0192	0.0205	0.0203	0.0195	0.0203	0.0207	0.0215	0.0191	0.0177	0.0176	0.0164	0.0173
0.0216	0.0157	0.0157	0.0163	0.0177	0.0176	0.0205	0.0272	0.0305	0.0286	0.0284	0.0288	0.0222	0.0241	0.0237	0.0222	0.0236	0.0243	0.0254	0.0226	0.0200	0.0207	0.0282	0.0201
0.0216	0.0157	0.0157	0.0163	0.0177	0.0176	0.0205	0.0272	0.0305	0.0286	0.0284	0.0288	0.0222	0.0241	0.0237	0.0222	0.0236	0.0243	0.0254	0.0226	0.0200	0.0207	0.0282	0.0201
0.0198	0.0134	0.0111	0.0101	0.0115	0.0119	0.0164	0.0209	0.0228	0.0229	0.0224	0.0221	0.0165	0.0175	0.0183	0.0176	0.0185	0.0186	0.0198	0.0188	0.0171	0.0173	0.0166	0.0167
0.0198	0.0134	0.0111	0.0101	0.0115	0.0119	0.0164	0.0209	0.0228	0.0229	0.0224	0.0221	0.0165	0.0175	0.0183	0.0176	0.0185	0.0186	0.0198	0.0188	0.0171	0.0173	0.0166	0.0167
0.0184	0.0127	0.0110	0.0100	0.0112	0.0117	0.0156	0.0206	0.0225	0.0219	0.0213	0.0213	0.0145	0.0152	0.0157	0.0152	0.0160	0.0162	0.0170	0.0153	0.0140	0.0141	0.0130	0.0133
0.0773	0.0180	0.0168	0.0192	0.0222	0.0178	0.0234	0.0270	0.0289	0.0282	0.0292	0.0282	0.0198	0.0207	0.0213	0.0202	0.0214	0.0221	0.0228	0.0217	0.0208	0.0208	0.0192	0.0193
0.0212	0.0140	0.0121	0.0135	0.0147	0.0133	0.0179	0.0250	0.0273	0.0267	0.0265	0.0264	0.0335	0.0358	0.0349	0.0329	0.0343	0.0363	0.0370	0.0331	0.0315	0.0314	0.0294	0.0314
0.0384	0.0245	0.0255	0.0265	0.0276	0.0269	0.0302	0.0352	0.0389	0.0385	0.0388	0.0380	0.0413	0.0448	0.0466	0.0440	0.0471	0.0471	0.0503	0.0526	0.0486	0.0492	0.0473	0.0499
0.0384	0.0245	0.0255	0.0265	0.0276	0.0269	0.0302	0.0352	0.0389	0.0385	0.0388	0.0380	0.0413	0.0448	0.0466	0.0440	0.0471	0.0471	0.0503	0.0526	0.0486	0.0492	0.0473	0.0499
0.0429	0.0269	0.0273	0.0287	0.0301	0.0289	0.0334	0.0390	0.0430	0.0425	0.0430	0.0420	0.0366	0.0396	0.0413	0.0385	0.0418	0.0418	0.0441	0.0465	0.0431	0.0435	0.0412	0.0435

Caline 4 input for 2032 Q2

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R48	837580.07	819478.84	837634.57	819454.01	13	0	1
R50	837480.93	819587.90	837656.18	819500.06	18	0	1
R51+52	837655.64	819502.09	837586.72	819343.19	20	0	1
R51+52	837586.72	819343.19	837962.52	819256.22	20	0	1
R53+54	837694.81	819487.71	837727.20	819472.90	14	0	1
R53+54	837727.20	819472.90	837789.09	819426.85	14	0	1
R53+54	837789.09	819426.85	837746.05	819369.98	14	0	1
R53+54	837746.05	819369.98	837698.63	819327.32	14	0	1
R53+54	837698.63	819327.32	837680.34	819301.31	14	0	1
R53+54	837680.34	819301.31	837658.16	819248.02	14	0	1
R50+56	837378.38	819257.83	837564.22	819238.11	25	0	1
R56-1	837454.97	819257.83	837447.06	819071.48	11	0	1
R56-2+56-3	837425.73	819150.58	837424.82	819071.89	16	0	1
R57+58	837564.88	819258.09	837661.36	819251.64	25	0	1
R58	837661.10	819246.24	837745.70	819231.27	16	0	1
R58	837745.70	819231.27	837739.55	819070.31	14	0	1
R60	837686.25	819247.58	837651.48	819088.36	15	0	1
R61	837670.38	819244.48	837661.86	819089.19	13	0	1
R62+63	837585.20	819255.29	837552.77	819138.26	17	0	1
R64+65	837380.66	819255.27	837376.84	819196.90	21	0	1
R64+65	837376.84	819196.90	837375.43	819071.75	21	0	1
R66+67	837378.06	819128.90	837292.22	819129.79	18	0	1
R68	837290.78	819325.67	837289.82	819289.11	18	0	1
R69	837283.87	819280.88	837338.49	819246.43	18	0	1
R68	837338.48	819246.43	837375.52	819253.88	18	0	1
R70+71	837336.04	819254.56	837318.11	819185.17	18	0	1
R72+73	837264.77	819182.18	837292.22	819129.80	18	0	1
R74+75	837347.48	819248.52	837292.25	819129.79	18	0	1
R76	837292.22	819129.80	837287.77	819076.51	18	0	1
R77	837266.87	819073.43	837202.18	819110.48	15	0	1
R77	837202.18	819110.48	837167.08	819105.41	15	0	1
R77-1+77-2	837218.58	819101.10	837181.53	819038.58	13	0	1
R78	837267.66	819072.24	837275.45	819071.10	18	0	1
R79	837187.48	819030.82	837217.48	818979.71	12	0	1
R79	837217.48	818979.71	837196.74	819022.62	12	0	1
R79	837196.74	819022.62	837140.45	819050.94	12	0	1
R80+81	837375.46	819071.78	837373.52	818888.96	21	0	1
R80-1+80-2	837374.53	819064.57	837228.05	819065.77	12	0	1
R80-1+80-2	837228.05	819065.77	837227.94	819032.14	12	0	1
R80-1+80-2	837227.84	819032.14	837137.88	819030.87	12	0	1
R82	837375.44	819072.43	837549.20	819072.00	15	0	1
R83	837545.29	819005.98	837548.30	819072.00	18	0	1
R84+85	837548.30	819071.82	837656.81	819067.91	13	0	1
R86+87	837656.82	819069.10	837655.09	818948.83	24	0	1
R88	837656.75	819066.76	837791.38	819068.96	13	0	1
R89	837791.38	819068.96	837753.18	819011.28	13	0	1
R89	837791.87	819057.79	837822.89	819018.59	18	0	1
R89	837822.89	819018.59	837890.06	819068.45	18	0	1
R89	837890.06	819068.45	837940.35	819068.19	18	0	1
R89	837940.35	819068.19	837872.09	819056.24	18	0	1
R90	837791.03	819057.31	837871.51	818756.62	18	0	1
R91	837963.23	819779.91	837879.37	819749.90	15	0	1
R92	837872.23	819756.53	837740.50	818872.80	18	0	1
R92-1	837894.09	819735.86	837717.80	819714.33	13	0	1
R92-1	837717.80	819714.33	837907.21	819814.10	13	0	1
R92-2	837894.96	819831.41	837830.84	819792.87	13	0	1
R93	837783.24	819835.48	837921.72	819878.91	13	0	1
R94+95	837774.43	819819.41	837714.67	819831.36	28	0	1
R96+97	837833.80	819890.38	837656.12	819838.05	18	0	1
R98	837704.89	819856.46	837530.23	819937.12	18	0	1
R99	837582.88	819914.03	837615.82	819987.88	14	0	1
R99	837614.82	819987.88	837565.57	820011.10	14	0	1
R99	837565.57	820011.10	837528.93	819936.49	14	0	1
R100	837550.18	820019.70	837514.19	819942.95	12	0	1
R101+102	837484.33	819998.67	837493.82	820030.48	18	0	1
R103+104	837514.79	819944.33	837371.40	820010.77	18	0	1
R105+106	837389.85	820024.78	837370.45	819884.41	28	0	1
R107+108	837251.36	819889.95	837251.72	819884.34	18	0	1
R108-1	837367.38	820000.79	837308.24	819884.25	18	0	1
R109	837251.42	819883.77	837370.45	819884.77	18	0	1
R110+111	837493.90	819998.87	837414.74	819880.38	18	0	1
R110+111	837414.74	819880.38	837458.00	819823.32	18	0	1
R112	837458.52	819823.92	837513.98	819943.08	12	0	1
R113	837530.26	819936.43	837471.38	819809.86	12	0	1
R114+115	838932.02	819888.03	838953.22	819986.42	18	0	1
R114+115	838953.22	819590.42	837926.89	819532.62	18	0	1
R114+115	837926.89	819532.62	837833.17	819488.00	18	0	1
R114+115	837833.17	819488.00	837512.91	819456.65	18	0	1
R114+115	837512.91	819456.65	836867.35	819427.73	18	0	1
R116+117	838648.07	819136.90	837022.42	819042.48	26	0	1
R118+119	837135.66	819225.91	837078.43	819129.58	18	0	1
R118+119	837078.43	819129.58	837022.42	819042.48	18	0	1
R120+121	837023.66	819043.84	837116.97	819957.84	22	0	1

FSP (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
0.0134	0.0143	0.0149	0.0143	0.0149	0.0172	0.0198	0.0270	0.0295	0.0266	0.0269	0.0276	0.0144	0.0153	0.0139	0.0136	0.0138	0.0145	0.0145	0.0105	0.0099	0.0097	0.0089	0.0093
0.0209	0.0153	0.0152	0.0156	0.0168	0.0173	0.0211	0.0302	0.0329	0.0308	0.0315	0.0319	0.0333	0.0354	0.0349	0.0330	0.0341	0.0346	0.0357	0.0322	0.0288	0.0277	0.0251	0.0269
0.0380	0.0241	0.0248	0.0257	0.0269	0.0263	0.0299	0.0357	0.0390	0.0385	0.0389	0.0381	0.0381	0.0416	0.0428	0.0404	0.0432	0.0433	0.0461	0.0478	0.0442	0.0447	0.0428	0.0452
0.0380	0.0241	0.0248	0.0257	0.0269	0.0263	0.0299	0.0357	0.0390	0.0385	0.0389	0.0381	0.0381	0.0416	0.0428	0.0404	0.0432	0.0433	0.0461	0.0478	0.0442	0.0447	0.0428	0.0452
0.0410	0.0258	0.0260	0.0272	0.0286	0.0276	0.0322	0.0377	0.0417	0.0411	0.0416	0.0406	0.0361	0.0390	0.0406	0.0379	0.0410	0.0410	0.0433	0.0454	0.0420	0.0425	0.0402	0.0425

Caline 4 input for 2032 Q3

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1-2	837144.25	819218.13	837205.38	819316.45	18	8	1
R1-1+1-2	837133.85	819273.98	837146.19	819294.34	8	8	1
R1-1+1-2	837148.19	819294.34	837178.25	819275.45	8	8	1
R3+4	837203.25	819318.71	837244.44	819385.38	15	8	1
R3+4	837244.44	819385.38	837294.34	819500.43	15	8	1
R5+6	837136.97	819222.88	837191.42	819190.17	18	8	1
R7	837252.30	819287.96	837203.68	819318.89	18	8	1
R8	837250.13	819295.18	837297.53	819386.57	18	8	1
R9	837191.44	819190.13	837114.47	819063.78	14	8	1
R8	837114.47	819063.78	837071.73	819001.82	14	8	1
R10	837204.98	819182.95	837178.04	819137.84	14	8	1
R10	837178.04	819137.84	837185.32	819100.25	14	8	1
R10	837185.32	819100.25	837138.28	819052.06	14	8	1
R10	837138.28	819052.06	837119.98	819027.81	14	8	1
R10	837119.98	819027.81	837095.15	818991.79	14	8	1
R11	837191.06	819190.26	837297.41	819368.58	14	8	1
R12	837205.03	819182.75	837311.47	819360.17	14	8	1
R13+14	837286.88	819500.02	837310.18	819608.31	18	8	1
R15	837289.42	819385.30	837356.19	819483.70	18	8	1
R15	837350.19	819483.70	837388.53	819608.09	18	8	1
R16	837311.52	819380.02	837335.82	819402.92	14	8	1
R16	837335.82	819402.92	837348.37	819433.08	14	8	1
R16	837348.37	819433.08	837374.20	819511.47	14	8	1
R16	837374.20	819511.47	837379.30	819544.32	14	8	1
R16	837379.30	819544.32	837388.91	819589.02	14	8	1
R16	837388.91	819589.02	837388.88	819836.45	14	8	1
R17	837283.80	819408.19	837348.69	819483.56	18	8	1
R18	837358.28	819501.80	837383.51	819508.48	18	8	1
R19	837388.78	819641.46	837479.21	819584.48	18	8	1
R20	837308.72	819618.00	837388.21	819810.46	18	8	1
R21	837558.93	820020.52	837521.82	819852.21	18	10	4
R21	837521.82	819852.21	837402.10	819695.92	18	10	4
R21	837402.10	819695.92	837383.08	819648.79	18	10	4
R21	837383.08	819648.79	837371.68	819607.03	18	10	4
R21	837371.68	819607.03	837358.46	819522.74	18	10	4
R21	837358.46	819522.74	837348.79	819478.27	18	10	4
R21	837349.79	819478.27	837338.42	819438.51	18	10	4
R21	837338.42	819438.51	837309.44	819382.87	18	10	4
R21	837309.44	819382.87	837168.51	819147.58	18	10	4
R21	837168.51	819147.58	837134.75	819083.68	18	5	4
R21	837134.75	819083.68	837079.22	818996.37	18	8	1
R22	837567.30	820017.81	837521.11	819948.18	18	10	4
R22	837521.11	819948.18	837407.02	819681.71	18	10	4
R22	837407.02	819681.71	837388.81	819632.91	18	10	4
R22	837388.81	819632.91	837377.18	819578.34	18	10	4
R22	837377.18	819578.34	837367.78	819507.82	18	10	4
R22	837367.78	819507.82	837348.65	819442.18	18	10	4
R22	837348.65	819442.18	837321.88	819383.08	18	10	4
R22	837321.88	819383.08	837178.20	819140.91	18	10	4
R22	837178.20	819140.91	837142.64	819078.01	18	8	1
R22	837142.64	819078.01	837113.31	819034.06	18	8	1
R22	837113.31	819034.09	837092.10	818995.22	18	8	1
R23+24	837308.88	819618.18	837253.13	819609.82	18	8	1
R23+24	837253.13	819609.82	837251.42	819884.34	18	8	1
R25	837385.57	819888.87	837384.84	819884.29	18	8	1
R28	837375.94	819884.44	837377.07	819709.29	17	8	1
R26	837377.07	819709.29	837388.20	819638.33	17	8	1
R27	837471.04	819888.84	837405.98	819672.39	13	8	1
R27	837405.98	819672.39	837392.18	819679.45	13	8	1
R27	837392.18	819679.45	837439.14	819823.85	13	8	1
R27-1+27-2	837458.99	819736.79	837487.35	819713.23	18	8	1
R28	837441.48	819914.32	837515.91	819774.27	18	8	1
R29	837516.13	819774.12	837580.87	819914.88	18	8	1
R30	837833.22	819895.53	837562.77	819737.87	18	8	1
R31	837567.02	819719.44	837708.83	819853.48	18	8	1
R32	837721.85	819850.04	837564.52	819705.47	18	8	1
R33	837782.47	819836.14	837634.55	819687.74	13	8	1
R34	837717.34	819586.31	837564.68	819705.35	18	8	1
R35	837587.03	819719.45	837480.51	819583.72	18	8	1
R36	837584.51	819705.88	837481.85	819588.80	18	8	1
R37	837588.89	819715.41	837471.78	819611.84	18	8	1
R38+39	837781.33	819857.04	837874.27	819539.65	18	8	1
R38+38	837874.27	819539.83	837855.84	819502.89	18	8	1
R40	837370.35	819252.71	837387.13	819425.03	18	8	1
R40	837387.13	819425.03	837370.01	819454.42	18	8	1
R40	837370.01	819454.42	837383.93	819484.43	18	8	1
R40	837383.93	819484.43	837480.25	819583.95	18	8	1
R41	837481.55	819588.70	837380.25	819482.08	18	8	1
R41	837380.25	819482.08	837380.18	819319.87	18	8	1
R41	837380.18	819319.87	837383.41	819255.41	18	8	1
R42+43	837471.48	819258.12	837470.94	819351.89	13	8	1
R44	837470.89	819382.87	837380.21	819382.12	14	8	1
R44-1	837471.54	819382.08	837471.55	819414.34	14	8	1
R44-1	837471.55	819414.34	837410.47	819442.02	14	8	1
R45-46	837470.98	819382.87	837536.84	819382.04	14	8	1
R45+46	837536.24	819382.04	837579.78	819478.33	14	8	1
R47	837514.28	819508.88	837542.71	819582.45	11	8	1
R48	837447.83	819538.73	837580.01	819479.85	13	8	1

VKT/hr for each road (include the VKT for each sub-section; not directly used by caline4)

Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
39.006	24.000	14.306	11.795	10.500	13.700	25.900	71.511	74.111	69.221	65.722	67.111	72.284	67.600	73.305	70.994	74.493	76.694	78.594	74.794	64.289	58.000	53.994	48.600
78.450	48.416	28.550	24.370	21.050	27.350	52.316	143.983	149.067	138.866	131.300	134.966	104.650	97.083	104.934	102.233	107.033	110.333	113.033	107.633	92.584	83.283	77.850	69.734
78.450	48.416	28.550	24.370	21.050	27.350	52.316	143.983	149.067	138.866	131.300	134.966	104.650	97.083	104.934	102.233	107.033	110.333	113.033	107.633	92.584	83.283	77.850	69.734
38.850	23.800	13.837	11.442	10.550	13.550	25.585	70.423	73.436	68.336	64.687	66.536	82.135	77.015	83.050	80.950	84.850	87.250	89.350	85.164	73.100	65.586	61.036	55.350
38.850	23.800	13.837	11.442	10.550	13.550	25.585	70.423	73.436	68.336	64.687	66.536	82.135	77.015	83.050	80.950	84.850	87.250	89.350	85.164	73.100	65.586	61.036	55.350
14.520	9.020	5.406	4.295	3.900	5.100	9.720	26.745	27.745	25.950	24.650	25.145	42.680	39.826	43.190	41.885	43.990	45.345	46.345	44.085	37.921	34.167	31.908	28.649
1.240	0.802	0.440	0.360	0.320	0.484	0.840	2.364	2.402	2.242	2.165	2.162	7.562	6.958	7.642	7.360	7.770	8.002	8.160	7.760	6.680	5.958	5.558	4.998
6.100	3.750	2.200	1.850	1.703	2.098	4.050	11.150	11.550	10.750	10.253	10.450	7.500	6.947	7.802	7.350	7.750	7.950	8.150	7.750	6.700	6.000	5.548	5.050
72.480	44.480	26.400	22.080	19.320	25.440	48.000	132.809	137.440	128.000	121.448	124.312	124.800	116.488	125.760	122.232	128.320	132.000	135.360	128.800	110.712	99.680	92.952	83.848
72.480	44.480	26.400	22.080	19.320	25.440	48.000	132.809	137.440	128.000	121.448	124.312	124.800	116.488	125.760	122.232	128.320	132.000	135.360	128.800	110.712	99.680	92.952	83.848
96.640	59.528	35.200	29.273	26.080	34.088	64.328	176.800	183.360	170.720	162.088	165.920	155.208	144.640	156.488	152.168	159.528	164.168	168.328	160.336	137.928	124.176	115.680	104.000
96.640	59.528	35.200	29.273	26.080	34.088	64.328	176.800	183.360	170.720	162.088	165.920	155.208	144.640	156.488	152.168	159.528	164.168	168.328	160.336	137.928	124.176	115.680	104.000
96.640	59.528	35.200	29.273	26.080	34.088	64.328	176.800	183.360	170.720	162.088	165.920	155.208	144.640	156.488	152.168	159.528	164.168	168.328	160.336	137.928	124.176	115.680	104.000
96.640	59.528	35.200	29.273	26.080	34.088	64.328	176.800	183.360	170.720	162.088	165.920	155.208	144.640	156.488	152.168	159.528	164.168	168.328	160.336	137.928	124.176	115.680	104.000
96.640	59.528	35.200	29.273	26.080	34.088	64.328	176.800	183.360	170.720	162.088	165.920	155.208	144.640	156.488	152.168	159.528	164.168	168.328	160.336	137.928	124.176	115.680	104.000
90.800	55.800	33.200	27.600	24.400	31.800	60.400	166.411	172.400	160.600	152.411	155.789	158.600	146.711	157.800	153.389	161.000	165.600	169.800	161.600	138.989	125.200	116.589	105.211
143.200	88.000	52.200	43.390	38.600	50.200	95.000	262.410	271.800	253.200	240.210	245.790	207.810	193.600	209.400	203.600	213.610	219.600	225.200	213.990	184.600	166.000	154.990	139.410
92.403	56.936	33.600	28.580	24.780	32.220	61.516	166.353	175.397	163.398	154.623	158.776	120.057	111.523	120.524	117.403	122.923	126.766	129.823	123.583	106.427	95.623	89.400	80.144
177.840	109.200	65.000	54.080	47.840	62.400	118.040	325.794	337.480	314.066	297.960	305.774	302.640	282.100	305.254	296.660	310.960	320.060	328.120	312.000	268.566	241.526	225.406	202.800
177.840	109.200	65.000	54.080	47.840	62.400	118.040	325.794	337.480	314.066	297.960	305.774	302.640	282.100	305.254	296.660	310.960	320.060	328.120	312.000	268.566	241.526	225.406	202.800
167.440	103.233	61.100	50.960	45.240	59.033	111.020	306.540	317.720	295.880	280.540	287.287	272.740	254.280	274.547	267.280	280.007	288.340	295.620	281.060	242.593	217.607	203.320	183.053
167.440	103.233	61.100	50.960	45.240	59.033	111.020	306.540	317.720	295.880	280.540	287.287	272.740	254.280	274.547	267.280	280.007	288.340	295.620	281.060	242.593	217.607	203.320	183.053
167.440	103.233	61.100	50.960	45.240	59.033	111.020	306.540	317.720	295.880	280.540	287.287	272.740	254.280	274.547	267.280	280.007	288.340	295.620	281.060	242.593	217.607	203.320	183.053
167.440	103.233	61.100	50.960	45.240	59.033	111.020	306.540	317.720	295.880	280.540	287.287	272.740	254.280	274.547	267.280	280.007	288.340	295.620	281.060	242.593	217.607	203.320	183.053
167.440	103.233	61.100	50.960	45.240	59.033	111.020	306.540	317.720	295.880	280.540	287.287	272.740	254.280	274.547	267.280	280.007	288.340	295.620	281.060	242.593	217.607	203.320	183.053
0.550	0.300	0.200	0.150	0.150	0.200	0.300	0.950	1.000	0.950	0.900	0.953	0.900	0.907	0.900	0.903	0.953	1.003	1.003	1.006	0.800	0.754	0.704	0.655
0.350	0.200	0.150	0.150	0.100	0.150	0.200	0.700	0.700	0.650	0.650	0.650	1.850	1.650	1.901	1.851	1.900	1.950	2.000	1.900	1.650	1.450	1.300	1.250
74.107	45.500	27.000	22.708	19.900	25.900	49.100	135.400	140.507	130.907	124.000	127.207	100.300	93.500	100.992	98.508	103.100	106.100	108.800	103.500	89.200	80.200	74.908	67.300
8.350	5.150	3.103	2.498	2.250	2.950	5.550	15.353	15.902	14.802	14.000	14.403	13.000	12.205	13.100	12.803	13.402	13.855	14.152	13.505	11.655	10.453	9.700	8.752
2546.600	1565.200	928.131	775.600	686.000	891.800	1688.332	4657.732	4830.000	4499.600	4262.932	4373.668	5042.936	4701.268	5083.537	4943.468	5184.336	5331.268	5467.068	5199.668	4480.068	4027.868	3760.537	3379.600
2546.600	1565.200	928.131	775.600	686.000	891.800	1688.332	4657.732	4830.000	4499.600	4262.932	4373.668	5042.936	4701.268	5083.537	4943.468	5184.336	5331.268	5467.068	5199.668	4480.068	4027.868	3760.537	3379.600
2546.600	1565.200	928.131	775.600	686.000	891.800	1688.332	4657.732	4830.000	4499.600	4262.932	4373.668	5042.936	4701.268	5083.537	4943.468	5184.336	5331.268	5467.068	5199.668	4480.068	4027.868	3760.537	3379.600
2546.600	1565.200	928.131	775.600	686.000	891.800	1688.332	4657.732	4830.000	4499.600	4262.932	4373.668	5042.936	4701.268	5083.537	4943.468	5184.336	5331.268	5467.068	5199.668	4480.068	4027.868	3760.537	3379.600
2546.600	1565.200	928.131	775.600	686.000	891.800	1688.332	4657.732	4830.000	4499.600	4262.932	4373.668	5042.936	4701.268	5083.537	4943.468	5184.336	5331.268	5467.068	5199.668	4480.068	4027.868	3760.537	3379.600
2546.600	1565.200	928.131	775.600	686.000	891.800	1688.332	4657.732	4830.000	4499.600	4262.932	4373.668	5042.936	4701.268	5083.537	4943.468	5184.336	5331.268	5467.068	5199.668	4480.068	4027.868	3760.537	3379.600
2546.600	1565.200	928.131	775.600	686.000	891.800	1688.332	4657.732	4830.000	4499.600	4262.932	4373.668	5042.936	4701.268	5083.537	4943.468	5184.336	5331.268	5467.068	5199.668	4480.068	4027.868	3760.537	3379.600
2546.600	1565.200	928.131	775.600	686.000	891.800	1688.332	4657.732	4830.000	4499.600	4262.932	4373.668	5042.936	4701.268	5083.537	4943.468	5184.336	5331.268	5467.068	5199.668	4480.068	4027.868	3760.537	3379.600
1813.068	1134.468	662.268	553.067	490.072	634.200	1204.068	3318.136	3438.468	3201.800	3036.668	3112.268	2527.000	2357.669	2546.600	2478.068	2597.000	2671.200	2739.800	2603.932	2245.600	2018.800	1883.000	1694.000
1813.068	1134.468	662.268	553.067	490.072	634.200	1204.068	3318.136	3438.468	3201.800	3036.668	3112.268	2527.000	2357.669	2546.600	2478.068	2597.000	2671.200	2739.800	2603.932	2245.600	2018.800	1883.000	1694.000
1813.068	1134.468	662.268	553.067	490.072	634.200	1204.068	3318.136	3438.468	3201.800	3036.668	3112.268	2527.000	2357.669	2546.600	2478.068	2597.000	2671.200	2739.800	2603.932	2245.600	2018.800	1883.000	1694.000
1813.068	1134.468	662.268	553.067	490.072	634.200	1204.068	3318.136	3438.468	3201.800	3036.668	3112.268	2527.000	2357.669	2546.600	2478.068	2597.000	2671.200	2739.800	2603.932	2245.600	2018.800	1883.000	1694.000
1813.068	1134.468	662.268	553.067	490.072	634.200	1204.068	3318.136	3438.468	3201.800	3036.668	3112.268	2527.000	2357.669	2546.600	2478.068	2597.000	2671.200	2739.800	2603.932	2245.600	2018.800	1883.000	1694.000
1813.068	1134.468	662.268	553.067	490.072	634.200	1204.068	3318.136	3438.468	3201.800	3036.668	3112.268	2527.000	2357.669	2546.600	2478.068	2597.000	2671.200	2739.800	2603.932	2245.600	2018.800	1883.000	1694.000
1813.068	1134.468	662.268	553.067	490.072	634.200	1204.068	3318.136	3438.468	3201.800	3036.668	3112.268	2527.000	2357.669	2546.600	2478.068	2597.000	2671.200	2739.800	2603.932	2245.600	2018.800	1883.000	1694.000
1813.068	1134.468	662.268	553.067	490.072	634.200	1204.068	3318.136	3438.468	3201.800	3036.668	3112.268	2527.000	2357.669	2546.600	2478.068	2597.000	2671.200	2739.800	2603.932	2245.600	2018.800	1883.000	1694.000
0.900	0.600	0.300	0.300	0.300	0.300	0.600	1.500	1.500	1.500	1.202	1.500	1.500	1.200	1.500	1.500	1.500	1.500	1.500	1.500	1.200	1.200	0.900	0.900
0.900	0.600	0.300	0.300	0.300	0.300	0.600	1.500	1.500	1.500	1.202	1.500	1.500	1.200	1.500	1.500	1.500	1.500	1.500	1.500	1.200	1.200	0.900	0.900
0.900	0.600	0.300	0.300	0.300	0.300	0.600	1.500	1.500	1.500	1.202	1.500	1.500	1.200	1.500	1.500	1.500	1.500	1.500	1.500	1.200	1.200	0.900	0.900
6.220	3.870	2.200	1.850	1.703	2.098	4.170	11.390	11.790	10.990	10.493	10.690	8.285	7.673	8.388	8.135	8.535	8.795	8.995	8.535	7.426	6.667	6.155	5.599
21.250	13.090	7.820	6.460	5.780	7.480	14.289	39.100	40.460	37.919	35.700	36.728	21.930	20.758	22.100	21.770	22.789	23.290	23.979	22.788	19.729	17.689	16.499	14.970
50.700	31.034	18.450	15.450	13.650	17.700	33.600	92.700	96.150	89.550	84.900	87.000	86.700	80.850	87.450	84.887	89.100	91.488	94.050	89.400	76.937	69.137	64.650	58.200
4.812	3.049	1.760	1.620	1.280	1.600	3.040	8.480	8.800	8.330	7.870	8.000	5.929	5.610	5.929	5.939	6.089	6.418	6.409	6.089	5.291	4.812	4.320	3.840
34.200	21.060	12.608	10.440	9.180	11.880	22.680	62.460	64.800	60.112	57.051	58.869	55.089	51.489	55.629	53.820	56.708	58.329	59.769	56.700	48.780	43.920	41.040	37.089
94.486	58.140	34.754	28.800	25.560	33.170	67.626	173.160	179.460	167.220	158.400	162.360	120.780	112.680	121.860	118.440	124.200	127.996	131.040	124.560	107.460	96.480	90.196	81.196
7.494	4.400	2.880	2.200	2.228	2.420	4.840	13.200	13.640	12.760	12.100	12.320	16.720	15.620	16.952	16.051	17.160	17.600	18.040	17.160	14.740	13.432	12.320	11.454
56.000	34.400	20.480	16.960	15.040	19.520	37.120	102.400	106.080	99.059	93.600	95.821	99.520	92.974	100.494	97.426	102.400	105.280	108.000	102.546	88.480	79.520	74.066	66.720
38.400	23.550	13.950	11.700	10.350	13.500	25.500	70.200	72.750	67.800	64.200	65.850	67.793	63.300	68.400	66.600	69.593	72.008	73.650	70.050	60.300	54.300	50.700	45.758
84.889	52.350	31.050	25.950	23.112	29.689	56.400	155.539	161.400	150.461	142.500	146.261	108.600	101.250	109.500	106.337	111.600	114.750	117.750	112.050	96.450	86.700	81.000	72.750
21.485	12.866	7.800	6.450	5.700	7.688	14.100	39.000	40.500	37.800	35.700	36.600	39.000	36.473	39.473	38.250	40.223	41.597	42.473	40.373	34.823	31.200	29.273	26.273
86.583	53.120	31.500	26.340	23.300	30.360	57.300	158.429	164.020	152.780	144.971	148.372	140.457	131.128	141.600	137.652	144.460	148.683	152.400	145.000	124.755	112.220	104.652	94.408
86.583	53.120	31.500	26.340	23.300	30.360	57.300	158.429	164.020	152.780	144.971	148.372	140.457	131.128	141.600	137.652	144.460	148.683	152.400	145.000	124.755	112.220	104.652	94.408
90.820	55.860	33.060	28.142	24.719	31.920	60.040	166.060	172.140	160.360	152.000	155.800	169.842	158.442	171.361	166.026	174.782	179.722	184.282	175.560	150.842	135.642	126.522	114.000
90.820	55.860	33.060	28.142	24.719	31.920	60.040	166.060	172.140	160.360	152.000	155.800	169.842	158.442	171.361	166.026	174.782	179.722	184.282	175.560	150.842	135.642	126.522	114.000
90.820	55.860	33.060	28.142	24.719	31.920	60.040	166.060	172.140	160.360	152.000	155.800	169.842	158.442	171.361	166.026	174.782	179.722	184.282	175.560	150.842	135.642	126.522	114.000
90.820	55.860	33.060	28.142	24.719	31.920	60.040	166.060	172.140	160.360	152.000	155.800	169.842	158.442	171.361	166.026	174.782	179.722	184.282	175.560	150.842	135.642	126.522	114.000
236.360	145.160	86.760	71.820	63.460	82.840	156.560	432.489	448.020	417.240	395.580	405.460	333.260	310.418	335.920	327.222	343.182	352.260	361.380	343.900	296.442	266.802	248.098	223.862
236.360	145.160	86.760	71.820	63.460	82.840	156.560	432.489	448.020	417.240	395.580	405.460	333.260	310.418	335.920	327.222	343.182	352.260	361.380	343.900	296.442	266.802	248.098	223.862
236.360	145.160	86.760	71.820	63.460	82.840	156.560	432.489	448.020	417.240	395.580	405.460	333.260	310.418	335.920	327.222	343.182	352.260	361.380	343.900	296.442	266.802	248.098	108.998
97.880	60.330	35.640	29.633	26.400	34.572	65.168	179.164	185.762	172.962	164.253	168.082	162.770	151.598	164.130	159.528	167.248	172.170	176.488	168.096	144.608	130.134	121.238	108.998
3.960	2.430	1.364	1.097	1.080	1.440	2.610	7.290	7.560	7.020	6.660	6.762	4.320	3.997	4.320	4.230	4.410	4.590	4.680	4.410	3.870	3.420	3.240	2.880
5.993	3.480	2.040	1.680	1.560	1.920	3.720	10.320	10.680	9.617	9.480	9.720	8.857	8.483	8.910	8.655	9.450	9.469	9.724	9.450	8.023	7.056	6.783	6.069
5.993	3.480	2.040	1.680	1.560	1.920	3.720	10.320	10.680	9.617	9.480	9.720	8.857	8.483	8.910	8.655	9.450	9.469	9.724	9.450	8.023	7.056	6.783	6.069
96.900	59.550	35.400	29.450	26.103	33.898	64.450	177.561	183.950	171.350	162.664	166.239	164.100	153.159	165.402	160.739	168.750	173.550	177.950	169.350	145.689	131.200	122.136	110.761
96.900	59.550	35.400	29.450	26.103	33.898	64.450	177.561	183.950	171.350	162.664	166.239	164.100	153.159	165.402	160.739	168.750	173.550	177.950	169.350	145.689	131.200	122.136	110.761
2.019	1.200	0.700	0.600	0.500	0.650	1.300	3.500	3.650	3.283	3.200	3.300	1.510	1.466	1.519	1.468	1.619	1.612	1.663	1.619	1.371	1.218	1.174	1.029
29.540	18.200	10.780	8.960	7.980	10.190	19.600	54.351	56.140	52.531	49.731	50.820	36.820	34.300	37.100	36.120	37.800	38.920	39.900	38.126	32.760	29.400	27.440	24.640

Caline 4 input for 2032 Q3

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R49	337580.27	819478.84	337834.37	819464.91	13	0	1
R50	337480.85	819587.80	337698.18	819502.06	18	0	1
R51+52	337666.84	819502.89	337588.72	819543.19	20	0	1
R51+52	337588.72	819543.19	337582.52	819256.62	20	0	1
R53+54	337654.81	819487.71	337727.28	819473.90	14	0	1
R53+54	337727.28	819473.90	337788.89	819426.85	14	0	1
R53+54	337789.09	819426.85	337746.05	819388.88	14	0	1
R53+54	337746.05	819388.88	337686.62	819327.32	14	0	1
R53+54	337698.62	819327.32	337680.34	819301.31	14	0	1
R53+54	337680.34	819301.31	337656.18	819248.02	14	0	1
R55+56	337378.38	819257.63	337564.22	819258.11	25	0	1
R58-1	337494.87	819257.83	337447.08	819071.48	11	0	1
R58-2+58-3	337425.73	819150.58	337424.80	819071.89	16	0	1
R57+58	337564.84	819258.09	337681.38	819251.84	25	0	1
R59	337661.10	819248.24	337745.70	819231.27	14	0	1
R59	337745.70	819231.27	337736.05	819070.31	14	0	1
R60	337690.25	819247.58	337691.46	819068.36	15	0	1
R61	337670.39	819244.46	337681.84	819068.18	15	0	1
R63+63	337565.20	819255.28	337552.77	819138.28	17	0	1
R64+65	337380.69	819250.27	337376.88	819196.90	21	0	1
R64+65	337376.88	819196.90	337375.43	819071.78	21	0	1
R66+67	337378.09	819128.90	337292.22	819128.79	18	0	1
R68	337290.78	819325.67	337369.82	819269.11	18	0	1
R69	337263.67	819280.88	337338.49	819248.43	18	0	1
R69	337338.49	819248.43	337373.52	819263.85	18	0	1
R70+71	337238.58	819234.90	337318.11	819185.17	18	0	1
R72+73	337204.77	819182.18	337292.22	819129.80	18	0	1
R74+75	337347.48	819248.32	337292.25	819129.79	18	0	1
R76	337292.22	819129.80	337267.77	819078.01	18	0	1
R77	337266.87	819073.43	337202.18	819110.48	15	0	1
R77	337202.18	819110.48	337167.06	819105.41	15	0	1
R77-1+77-2	337218.56	819101.15	337181.53	819039.56	12	0	1
R78	337267.88	819072.24	337375.45	819071.10	18	0	1
R79	337187.48	819830.82	337217.48	819879.71	12	0	1
R79	337217.48	819879.71	337186.74	819922.02	12	0	1
R78	337186.74	819922.02	337140.46	819955.94	12	0	1
R80+81	337375.48	819071.78	337373.52	818888.98	21	0	1
R82-1+82-2	337374.53	818884.57	337228.05	818885.77	13	0	1
R83-1+83-2	337228.05	818885.77	337227.84	818832.14	12	0	1
R83-1+83-2	337227.84	818832.14	337337.88	818830.87	12	0	1
R83	337376.44	819072.43	337568.02	819072.00	15	0	1
R83	337543.29	818905.88	337548.38	819072.00	19	0	1
R84+85	337548.38	819071.82	337656.61	819067.81	13	0	1
R86+87	337656.62	819069.10	337655.06	818848.63	24	0	1
R88	337656.79	819066.78	337781.39	819089.96	13	0	1
R85	337781.38	819088.96	337753.18	819011.28	13	0	1
R89	337781.87	819057.79	337822.86	819019.58	18	0	1
R89	337822.89	819019.58	337886.58	818988.45	18	0	1
R89	337886.58	818988.45	337940.35	818996.19	18	0	1
R89	337940.35	818996.19	337872.08	818758.34	18	0	1
R90	337781.03	819057.31	337871.51	818758.62	18	0	1
R91	337903.23	818778.91	337878.37	818749.90	15	0	1
R92	337872.23	818758.53	337748.58	818672.80	18	0	1
R92-1	337884.08	818735.86	337717.82	818714.33	13	0	1
R92-1	337717.82	818714.33	337607.21	818614.10	13	0	1
R92-2	337884.86	818431.41	337830.84	818782.87	13	0	1
R93	337873.24	818535.48	337821.72	818878.91	13	0	1
R94+95	337774.63	818919.41	337714.67	818851.38	25	0	1
R96+97	337833.90	818880.38	337835.12	818838.05	18	0	1
R98	337704.89	818858.48	337532.23	818837.12	18	0	1
R99	337582.88	818814.03	337818.82	818967.88	14	0	1
R99	337818.82	818967.88	337565.57	820011.10	14	0	1
R99	337565.57	820011.10	337529.93	819936.48	14	0	1
R100	337590.18	820019.70	337514.19	819942.95	13	0	1
R101+102	337464.32	819998.87	337493.82	820030.48	18	0	1
R103+104	337514.79	819944.23	337371.48	820018.77	18	0	1
R105+106	337388.83	820024.76	337372.45	819884.61	28	0	1
R107+108	337291.04	819888.85	337291.72	819884.34	18	0	1
R108-1	337367.38	820029.79	337308.24	819884.25	18	0	1
R109	337291.42	819883.77	337372.45	819884.77	18	0	1
R110+111	337483.95	819968.87	337414.74	819880.38	18	0	1
R110+111	337414.74	819880.38	337459.00	819823.33	18	0	1
R112	337458.52	819823.92	337513.98	819943.06	12	0	1
R113	337532.06	819936.43	337471.36	819828.69	12	0	1
R114+115	338032.92	819968.63	338053.22	819580.42	18	0	1
R114+115	338052.22	819580.42	337026.88	819532.62	18	0	1
R114+115	337026.88	819532.62	337023.17	819484.06	18	0	1
R114+115	337023.17	819484.06	337013.91	819455.65	18	0	1
R114+115	337013.91	819455.65	336887.35	819427.73	18	0	1
R118+117	338648.27	819135.90	337022.42	819062.49	28	0	1
R119+119	337135.06	819223.91	337079.43	819129.58	18	0	1
R119+119	337079.43	819129.58	337022.42	819062.49	18	0	1
R120+121	337023.06	819062.94	337118.97	818957.84	22	0	1

VKT/hr for each road (include the VKT for each sub-section; not directly used by caline4)

Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
1.900	1.200	0.700	0.600	0.500	0.639	1.300	3.511	3.650	3.411	3.211	3.300	1.800	1.700	1.800	1.750	1.850	1.900	1.950	1.859	1.600	1.450	1.350	1.200
38.840	23.833	13.582	12.080	10.572	13.694	25.692	70.834	73.412	68.309	64.888	66.450	35.250	32.910	35.615	34.529	36.383	37.470	38.368	36.572	31.469	28.174	26.378	23.861
215.680	132.480	78.600	65.470	58.120	75.640	143.000	395.218	409.240	381.200	361.658	370.102	332.610	310.088	335.160	325.832	341.930	351.600	360.560	342.790	295.312	265.680	247.542	223.258
215.680	132.480	78.600	65.470	58.120	75.640	143.000	395.218	409.240	381.200	361.658	370.102	332.610	310.088	335.160	325.832	341.930	351.600	360.560	342.790	295.312	265.680	247.542	223.258
108.340	66.728	39.395	32.670	29.180	38.188	72.028	197.996	205.460	191.320	181.693	185.920	170.008	158.440	171.388	166.773	174.728	179.768	184.328	175.432	151.133	135.976	126.680	113.796

Caline 4 input for 2032 Q3

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1=2	337144.25	819218.15	337203.38	819316.45	18	0	1
R1-1=1-2	337133.65	819273.84	337146.19	819294.34	8	0	1
R1-1=1-2	337146.19	819294.34	337178.20	819275.45	8	0	1
R3=4	337203.20	819316.71	337244.44	819385.38	15	0	1
R3=4	337244.44	819385.38	337284.34	819500.43	15	0	1
R5=6	337128.67	819222.68	337191.42	819190.17	18	0	1
R7	337252.36	819287.96	337203.68	819316.89	18	0	1
R8	337290.13	819395.16	337297.53	819366.57	18	0	1
R9	337191.44	819190.13	337114.47	819083.78	14	0	1
R9	337114.47	819083.78	337071.73	819001.82	14	0	1
R10	337204.98	819132.55	337178.84	819137.84	14	0	1
R10	337178.84	819137.84	337185.32	819100.25	14	0	1
R10	337185.32	819100.25	337138.28	819052.06	14	0	1
R10	337138.28	819052.06	337118.98	819027.81	14	0	1
R10	337118.98	819027.81	337095.15	818991.78	14	0	1
R11	337191.08	819190.20	337297.41	819366.58	14	0	1
R12	337203.03	819182.75	337311.47	819380.17	14	0	1
R13=14	337295.88	819308.02	337313.16	819809.31	18	0	1
R15	337298.42	819385.30	337336.19	819483.70	18	0	1
R15	337350.19	819483.72	337368.53	819808.09	18	0	1
R16	337311.53	819380.02	337333.82	819402.92	14	0	1
R16	337335.82	819402.92	337348.37	819433.08	14	0	1
R16	337348.37	819433.08	337374.20	819511.47	14	0	1
R16	337374.20	819511.47	337378.30	819544.32	14	0	1
R16	337378.30	819544.32	337388.91	819589.02	14	0	1
R16	337388.91	819589.02	337388.88	819636.45	14	0	1
R17	337292.80	819489.19	337348.69	819483.86	18	0	1
R18	337358.38	819551.80	337303.51	819558.49	18	0	1
R19	337288.79	819641.46	337479.21	819894.49	18	0	1
R20	337309.72	819610.00	337366.21	819812.46	18	0	1
R21	337558.93	820035.52	337521.82	819952.21	18	10	4
R21	337521.82	819952.21	337402.10	819895.92	18	10	4
R21	337402.10	819895.92	337383.08	819648.78	18	10	4
R21	337383.08	819648.78	337371.69	819607.03	18	10	4
R21	337371.88	819607.03	337358.48	819522.74	18	10	4
R21	337358.48	819522.74	337349.78	819478.27	18	10	4
R21	337349.78	819478.27	337336.42	819438.51	18	10	4
R21	337336.42	819438.51	337309.44	819382.87	18	10	4
R21	337309.44	819382.87	337188.51	819147.58	18	10	4
R21	337188.51	819147.58	337134.75	819080.88	18	5	4
R21	337134.75	819080.88	337079.22	819098.37	18	0	1
R22	337587.32	820017.81	337531.11	819948.18	18	10	4
R22	337531.11	819948.18	337407.02	819881.71	18	10	4
R22	337407.02	819881.71	337388.81	819832.91	18	10	4
R22	337388.81	819832.91	337377.18	819578.34	18	10	4
R22	337377.18	819578.34	337367.78	819507.82	18	10	4
R22	337367.78	819507.82	337349.65	819442.16	18	10	4
R22	337349.65	819442.16	337321.88	819383.58	18	10	4
R22	337321.88	819383.08	337178.20	819140.91	18	10	4
R22	337178.20	819140.91	337142.64	819078.01	18	5	4
R22	337142.64	819078.01	337115.31	819034.09	18	0	1
R22	337115.31	819034.09	337082.10	818985.22	18	0	1
R23=24	337309.88	819610.18	337253.13	819609.82	18	0	1
R23=24	337253.13	819609.82	337251.42	819684.34	18	0	1
R25	337365.87	819808.07	337384.64	819884.29	18	0	1
R26	337375.84	819884.44	337377.07	819708.26	17	0	1
R26	337377.07	819708.26	337388.20	819836.33	17	0	1
R27	337471.54	819808.84	337404.96	819672.39	13	0	1
R27	337404.96	819672.39	337392.18	819679.45	13	0	1
R27	337392.18	819679.45	337458.14	819823.83	13	0	1
R27-1=27-2	337438.99	819736.79	337467.35	819713.23	18	0	1
R28	337441.48	819814.32	337515.91	819774.27	18	0	1
R29	337518.13	819774.12	337580.87	819814.88	18	0	1
R30	337433.22	819890.53	337562.77	819737.87	18	0	1
R31	337587.02	819715.44	337708.85	819853.49	18	0	1
R32	337721.65	819830.04	337584.52	819705.87	18	0	1
R33	337782.47	819838.14	337834.05	819867.74	13	0	1
R34	337717.34	819588.31	337584.88	819705.35	18	0	1
R35	337587.03	819715.45	337480.31	819593.72	18	0	1
R36	337984.91	819705.96	337491.85	819588.60	18	0	1
R37	337988.98	819715.41	337471.78	819811.84	18	0	1
R38=39	337781.33	819857.04	337874.27	819838.83	19	0	1
R38=39	337874.27	819838.83	337855.84	819802.99	19	0	1
R40	337370.96	819252.71	337347.13	819425.03	18	0	1
R40	337367.13	819425.03	337370.01	819494.42	18	0	1
R40	337370.01	819454.42	337383.83	819484.43	18	0	1
R40	337383.83	819484.43	337480.25	819393.95	18	0	1
R41	337491.55	819588.78	337380.25	819482.88	18	0	1
R41	337380.25	819482.88	337388.18	819318.87	18	0	1
R41	337388.18	819318.87	337382.41	819255.41	18	0	1
R42=43	337471.48	819258.12	337479.84	819091.99	13	0	1
R44	337479.86	819382.07	337388.21	819382.12	14	0	1
R44-1	337471.54	819382.06	337471.55	819414.34	14	0	1
R44-1	337471.55	819414.34	337410.47	819442.02	14	0	1
R45=48	337479.86	819382.07	337528.04	819382.04	14	0	1
R45=48	337528.04	819382.04	337579.78	819479.33	14	0	1
R47	337514.18	819568.88	337542.71	819562.45	11	0	1
R48	337447.83	819538.73	337580.01	819479.85	13	0	1

Vehicle count for each road																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
390	240	143	118	105	137	259	715	741	692	657	671	723	676	733	710	745	767	786	748	643	580	540	486
264	163	96	82	71	92	176	484	501	467	441	454	353	327	354	345	361	372	381	363	312	281	262	235
264	163	96	82	71	92	176	484	501	467	441	454	353	327	354	345	361	372	381	363	312	281	262	235
132	81	47	39	36	46	87	239	249	232	219	226	278	260	281	274	287	295	302	288	247	222	206	187
132	81	47	39	36	46	87	239	249	232	219	226	278	260	281	274	287	295	302	288	247	222	206	187
146	91	54	43	39	51	98	269	279	261	248	253	432	403	437	424	445	458	469	446	384	346	323	290
31	20	11	9	8	12	21	59	60	56	54	54	189	174	191	184	193	200	204	194	167	149	139	125
122	75	44	37	34	42	81	223	231	215	205	209	150	139	152	147	155	159	163	155	134	120	111	101
453	278	165	138	122	159	300	830	859	800	759	777	780	728	786	764	802	825	846	805	692	623	581	524
453	278	165	138	122	159	300	830	859	800	759	777	780	728	786	764	802	825	846	805	692	623	581	524
604	372	220	183	163	213	402	1105	1146	1067	1013	1037	970	904	978	951	997	1026	1052	1002	862	776	723	650
604	372	220	183	163	213	402	1105	1146	1067	1013	1037	970	904	978	951	997	1026	1052	1002	862	776	723	650
604	372	220	183	163	213	402	1105	1146	1067	1013	1037	970	904	978	951	997	1026	1052	1002	862	776	723	650
604	372	220	183	163	213	402	1105	1146	1067	1013	1037	970	904	978	951	997	1026	1052	1002	862	776	723	650
604	372	220	183	163	213	402	1105	1146	1067	1013	1037	970	904	978	951	997	1026	1052	1002	862	776	723	650
454	279	166	138	122	159	302	832	862	803	767	779	783	731	789	767	805	828	849	808	695	626	583	526
718	440	261	217	193	251	475	1312	1359	1266	1201	1229	1039	968	1047	1018	1068	1098	1126	1070	923	830	773	697
496	305	180	152	133	173	329	906	939	875	829	850	609	567	613	597	625	645	660	628	542	486	454	408
684	420	250	208	184	240	454	1253	1298	1208	1146	1176	1164	1085	1174	1141	1196	1231	1262	1200	1033	929	867	780
684	420	250	208	184	240	454	1253	1298	1208	1146	1176	1164	1085	1174	1141	1196	1231	1262	1200	1033	929	867	780
644	397	235	196	174	227	427	1179	1222	1138	1079	1105	1049	978	1056	1028	1077	1109	1137	1081	933	837	782	704
644	397	235	196	174	227	427	1179	1222	1138	1079	1105	1049	978	1056	1028	1077	1109	1137	1081	933	837	782	704
644	397	235	196	174	227	427	1179	1222	1138	1079	1105	1049	978	1056	1028	1077	1109	1137	1081	933	837	782	704
644	397	235	196	174	227	427	1179	1222	1138	1079	1105	1049	978	1056	1028	1077	1109	1137	1081	933	837	782	704
644	397	235	196	174	227	427	1179	1222	1138	1079	1105	1049	978	1056	1028	1077	1109	1137	1081	933	837	782	704
11	6	4	3	3	4	6	19	20	19	18	19	18	18	18	18	19	20	20	20	16	15	14	13
7	4	3	3	2	3	4	14	14	13	13	13	37	33	38	37	38	39	40	38	33	29	26	25
741	455	270	227	199	259	491	1354	1405	1309	1240	1272	1003	935	1010	985	1031	1061	1088	1035	892	802	748	673
187	103	62	50	45	59	111	307	318	296	280	288	260	244	262	256	268	277	283	270	233	209	194	175
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1819	1118	663	554	490	637	1206	3327	3450	3214	3045	3124	3602	3358	3631	3531	3703	3808	3905	3714	3200	2877	2686	2414
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1295	796	473	395	350	453	860	2370	2456	2287	2169	2223	1805	1684	1819	1770	1855	1908	1957	1860	1604	1442	1345	1210
1007	620	368	306	273	353	669	1845	1913	1782	1690	1732	1525	1421	1536	1496	1567	1613	1653	1573	1355	1218	1136	1021
1007	620	368	306	273	353	669	1845	1913	1782	1690	1732	1525	1421	1536	1496	1567	1613	1653	1573	1355	1218	1136	1021
3	2	1	1	1	1	2	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
3	2	1	1	1	1	2	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
3	2	1	1	1	1	2	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
160	99	57	47	43	57	106	293	304	283	269	275	462	430	467	453	475	490	501	477	410	367	342	309
160	99	57	47	43	57	106	293	304	283	269	275	462	430	467	453	475	490	501	477	410	367	342	309
391	240	143	119	105	136	259	715	740	689	654	670	673	627	679	660	692	712	730	694	597	538	502	452
1007	620	368	306	273	353	669	1845	1913	1782	1690	1732	1525	1421	1536	1496	1567	1613	1653	1573	1355	1218	1136	1021
1007	620	368	306	273	353	669	1845	1913	1782	1690	1732	1525	1421	1536	1496	1567	1613	1653	1573	1355	1218	1136	1021
3	2	1	1	1	1	2	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
3	2	1	1	1	1	2	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
3	2	1	1	1	1	2	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
124	77	44	37	34	42	83	227	235	218	209	213	163	151	165	160	168	173	177	168	146	131	121	110
125	77	46	38	34	44	84	230	238	223	210	216	129	122	130	128	134	137	141	134	116	104	97	88
338	207	123	103	91	118	224	618	641	597	566	580	578	539	583	566	594	610	627	596	513	461	431	388
30	19	11	10	8	10	19	53	55	52	48	50	37	35	37	37	38	40	40	38	33	30	27	24
190	117	70	58	51	66	126	347	360	334	317	327	306	286	309	299	315	324	332	315	271	244	228	206
525	323	193	160	142	184	348	962	997	929	880	902	671	626	677	658	690	711	728	692	597	536	501	451
34	20	13	10	10	11	22	60	62	58	55	56	76	71	77	73	78	80	82	78	67	61	56	52
350	215	128	106	94	122	232	640	663	619	585	599	622	581	628	609	640	658	675	641	553	497	463	417
256	157	93	78	69	90	170	468	485	452	428	439	452	422	458	444	464	480	493	467	402	362	338	305
566	349	207	173	154	198	376	1037	1076	1003	950	975	724	675	730	709	744	765	785	747	643	578	540	485
143	86	52	43	38	51	94	260	270	252	238	244	260	243	263	255	268	277	283	269	232	208	195	175
688	422	250	209	185	241	455	1257	1302	1213	1151	1178	1041	972	1050	1021	1071	1103	1130	1075	926	832	776	700
688	422	250	209	185	241	455	1257	1302	1213	1151	1178	1041	972	1050	1021	1071	1103	1130	1075	926	832	776	700
239	147	87	74	65	84	158	437	453	422	400	410	447	417	451	437	460	473	485	462	397	357	333	300
239	147	87	74	65	84	158	437	453	422	400	410	447	417	451	437	460	473	485	462	397	357	333	300
239	147	87	74	65	84	158	437	453	422	400	410	447	417	451	437	460	473	485	462	397	357	333	300
239	147	87	74	65	84	158	437	453	422	400	410	447	417	451	437	460	473	485	462	397	357	333	300
622	382	227	189	167	218	412	1138	1179	1098	1041	1067	877	817	884	861	903	927	951	905	780	702	653	589
622	382	227	189	167	218	412	1138	1179	1098	1041	1067	877	817	884	861	903	927	951	905	780	702	653	589
622	382	227	189	167	218	412	1138	1179	1098	1041	1067	877	817	884	861	903	927	951	905	780	702	653	589
635	392	231	192	171	225	423	1164	1206	1123	1067	1091	1159	1078	1169	1135	1190	1226	1256	1196	1029	925	862	775
44	27	15	12	12	16	29	81	84	78	74	75	48	44	48	47	49	51	52	49	43	38	36	32
50	29	17	14	13	16	31	86	89	80	79	81	74	71	74	72	79	79	81	79	67	59	57	51
50	29	17	14	13	16	31	86	89	80	79	81	74	71	74	72	79	79	81	79	67	59	57	51
576	354	210	175	156	201	383	1055	1093	1018	967	988	933	870	941	914	960	987	1012	963	829	746	694	627
576	354	210	175	156	201	383	1055	1093	1018	967	988	933	870	941	914	960	987	1012	963	829	746	694	627
40	24	14	12	10	13	26	70	73	66	64	66	30	28	30	29	32	32	33	32	27	24	23	21
211	130	77	64	57	73	140	388	401	375	355	363	263	245	265	258	270	278	285	272	234	210	196	176

Caline 4 input for 2032 Q3

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R49	837980.07	819478.94	837834.37	819454.01	13	0	1
R50	837490.83	819587.90	837656.18	819500.06	18	0	1
R51+52	837855.84	819582.99	837586.72	819343.18	20	0	1
R51+52	837588.72	819343.19	837582.52	819256.02	20	0	1
R53+54	837954.91	819467.71	837727.30	819473.90	14	0	1
R53+54	837727.20	819473.90	837788.09	819426.85	14	0	1
R53+54	837788.09	819426.85	837748.05	819388.98	14	0	1
R52+54	837746.05	819388.98	837688.62	819327.32	14	0	1
R52+54	837686.62	819327.32	837680.34	819301.31	14	0	1
R52+54	837680.34	819301.31	837659.16	819248.02	14	0	1
R55+56	837378.38	819257.63	837564.22	819258.11	25	0	1
R56-1	837454.97	819257.83	837447.06	819071.48	11	0	1
R56-2+56-3	837425.72	819150.58	837424.80	819071.89	18	0	1
R57+58	837364.88	819258.09	837681.38	819251.84	25	0	1
R58	837681.10	819246.24	837745.70	819231.27	14	0	1
R58	837745.70	819231.27	837739.65	819070.31	14	0	1
R60	837660.25	819247.58	837651.46	819088.36	15	0	1
R61	837670.38	819244.46	837681.86	819088.13	15	0	1
R62+63	837385.20	819255.28	837552.77	819138.28	17	0	1
R64+65	837380.69	819255.27	837376.88	819196.90	21	0	1
R64+65	837376.88	819196.90	837375.43	819071.78	21	0	1
R66+67	837378.08	819128.90	837292.22	819129.79	18	0	1
R68	837296.78	819325.67	837389.82	819289.11	18	0	1
R69	837263.87	819260.88	837338.49	819246.43	18	0	1
R69	837338.49	819246.43	837372.52	819253.88	18	0	1
R70+71	837236.08	819254.50	837319.11	819185.17	18	0	1
R72+73	837264.77	819182.19	837292.22	819129.80	18	0	1
R74+75	837347.48	819248.52	837292.25	819129.79	18	0	1
R76	837292.22	819129.80	837267.77	819078.01	18	0	1
R77	837286.87	819073.43	837202.19	819110.48	15	0	1
R77	837202.18	819110.48	837167.08	819105.41	15	0	1
R77-1+77-2	837219.98	819181.18	837181.53	819030.58	12	0	1
R78	837267.66	819072.24	837275.45	819071.12	18	0	1
R79	837187.48	819030.82	837217.48	818978.71	12	0	1
R79	837217.48	818979.71	837196.74	819022.02	12	0	1
R79	837196.74	819022.02	837140.45	819055.94	12	0	1
R80+81	837375.46	819071.78	837373.52	818888.96	21	0	1
R80-1+80-2	837374.52	818984.57	837228.85	818985.77	12	0	1
R80-1+80-2	837229.85	818983.77	837227.84	818832.14	12	0	1
R80-1+80-2	837227.84	818832.14	837137.88	818830.87	12	0	1
R82	837379.44	819072.43	837549.00	819072.50	15	0	1
R83	837545.29	818905.98	837546.30	819072.00	18	0	1
R84+85	837562.30	819071.82	837656.81	819067.81	13	0	1
R86+87	837656.82	819069.10	837655.08	818848.82	24	0	1
R88	837656.75	819066.78	837791.39	819069.06	13	0	1
R88	837791.39	819069.96	837753.18	819011.28	13	0	1
R89	837791.97	819657.79	837822.09	819618.58	18	0	1
R89	837822.99	819618.58	837890.56	819588.45	18	0	1
R89	837890.58	819588.45	837940.35	819606.10	18	0	1
R89	837940.35	819606.10	837972.06	819756.34	18	0	1
R90	837791.63	819657.31	837871.51	819756.82	18	0	1
R91	837963.23	819778.91	837879.37	819749.90	15	0	1
R92	837972.23	819756.53	837740.50	819672.50	18	0	1
R92-1	837694.09	819735.88	837717.83	819714.33	13	0	1
R92-1	837717.80	819714.33	837907.01	819814.10	13	0	1
R92-2	837694.96	819831.41	837830.84	819792.97	13	0	1
R93	837783.24	819835.48	837821.72	819878.91	13	0	1
R94+95	837774.83	819819.41	837714.67	819851.36	28	0	1
R96+97	837833.60	819890.38	837855.12	819838.05	18	0	1
R98	837704.89	819856.48	837530.23	819837.12	18	0	1
R99	837582.88	819914.83	837616.82	819987.88	14	0	1
R99	837616.82	819987.88	837565.57	820011.10	14	0	1
R99	837565.57	820011.10	837528.93	819936.49	14	0	1
R100	837500.19	820019.70	837514.19	819942.95	13	0	1
R101+102	837484.33	819966.67	837483.82	820030.46	18	0	1
R103+104	837514.79	819944.23	837371.40	820010.77	18	0	1
R105+106	837369.85	820024.78	837370.45	819884.41	28	0	1
R107+108	837251.06	819888.95	837251.72	819884.34	18	0	1
R108-1	837367.38	820009.79	837368.24	819884.25	18	0	1
R109	837251.42	819883.77	837370.45	819884.77	18	0	1
R110+111	837483.80	819866.87	837414.74	819860.38	18	0	1
R110+111	837414.74	819860.38	837458.00	819823.33	18	0	1
R112	837458.30	819823.92	837513.94	819843.09	12	0	1
R113	837530.26	819838.43	837471.38	819809.88	13	0	1
R114+115	836932.82	819968.53	836953.22	819960.42	18	0	1
R114+115	836953.22	819960.42	837029.88	819532.82	18	0	1
R114+115	837029.88	819532.82	837033.17	819488.00	18	0	1
R114+115	837033.17	819488.00	837519.91	819456.85	18	0	1
R114+115	837010.91	819455.85	836887.35	819427.73	18	0	1
R116+117	836948.07	819136.90	837022.42	819042.40	28	0	1
R118+119	837135.06	818223.31	837079.43	819129.38	18	0	1
R118+119	837079.43	819129.38	837022.42	819042.40	18	0	1
R120+121	837023.06	819043.94	837118.87	818957.84	22	0	1

Vehicle count for each road																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
38	24	14	12	10	13	26	70	73	68	64	66	36	34	36	35	37	38	39	37	32	29	27	24
216	132	78	67	59	76	143	394	408	379	360	369	196	183	198	192	202	208	213	203	175	157	147	133
1169	738	426	355	315	410	775	2142	2218	2066	1960	2006	1819	1696	1833	1782	1870	1923	1972	1875	1615	1453	1354	1221
1169	738	426	355	315	410	775	2142	2218	2066	1960	2006	1819	1696	1833	1782	1870	1923	1972	1875	1615	1453	1354	1221
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
568	350	207	173	154	199	378	1042	1081	1008	955	977	1032	962	1041	1011	1061	1090	1119	1065	916	825	768	693
17	11	7	5	4	6	11	31	32	29	28	29	33	27	23	23	24	24	25	24	21	18	17	16
1400	860	511	425	377	491	929	2565	2657	2474	2347	2405	2203	2053	2221	2159	2264	2329	2388	2270	1956	1759	1640	1477
761	469	277	230	205	268	504	1391	1443	1344	1275	1303	1197	1116	1205	1174	1229	1265	1297	1232	1065	955	892	802
3	2	1	1	1	1	2	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
3	2	1	1	1	1	2	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
231	142	84	70	64	81	152	422	438	409	387	397	305	284	305	298	311	321	329	313	270	243	228	203
169	104	61	51	45	58	112	310	321	299	284	291	248	231	253	244	257	264	271	258	222	199	186	167
125	77	45	38	35	44	82	229	239	224	211	217	267	249	270	262	275	282	290	277	237	214	199	180
691	424	253	211	186	243	458	1267	1312	1221	1159	1189	1203	1118	1212	1178	1234	1270	1302	1238	1066	958	893	805
691	424	253	211	186	243	458	1267	1312	1221	1159	1189	1203	1118	1212	1178	1234	1270	1302	1238	1066	958	893	805
1385	852	505	423	373	486	918	2533	2627	2447	2319	2377	2052	1913	2066	2013	2108	2170	2225	2116	1825	1639	1531	1377
4	2	1	1	1	1	2	7	7	7	6	6	6	5	6	6	6	6	6	6	3	6	6	4
138	85	51	41	36	49	92	255	264	245	234	238	420	391	423	412	431	444	455	434	374	336	313	282
138	85	51	41	36	49	92	255	264	245	234	238	420	391	423	412	431	444	455	434	374	336	313	282
178	109	66	53	48	63	117	326	338	315	298	307	278	262	280	274	287	297	303	290	249	224	208	188
1826	1122	668	557	492	640	1210	3341	3464	3227	3058	3137	3639	3391	3669	3568	3741	3847	3945	3752	3233	2906	2712	2439
2036	1251	743	622	549	712	1351	3724	3861	3596	3409	3495	2808	2619	2829	2755	2866	2969	3045	2895	2496	2244	2064	1883
158	96	57	48	42	55	105	288	298	279	264	269	176	162	175	172	181	186	190	179	157	140	131	117
24	12	9	5	4	9	15	40	41	37	36	38	29	25	29	29	30	31	31	30	26	23	21	19
24	12	9	5	4	9	15	40	41	37	36	38	29	25	29	29	30	31	31	30	26	23	21	19
278	172	101	84	74	99	184	510	528	493	466	478	422	396	426	415	436	448	459	437	376	339	315	284
5	5	4	2	2	2	5	10	10	9	9	11	34	32	34	32	36	36	37	36	30	28	26	24
14	6	4	3	3	8	7	21	23	22	21	21	21	20	21	21	21	23	23	22	19	17	16	14
14	6	4	3	3	8	7	21	23	22	21	21	21	20	21	21	21	23	23	22	19	17	16	14
14	6	4	3	3	8	7	21	23	22	21	21	21	20	21	21	21	23	23	22	19	17	16	14
1933	1188	705	589	532	677	1283	3536	3667	3416	3237	3322	3861	3601	3893	3785	3969	4082	4186	3981	3430	3084	2879	2588
1686	1036	616	514	455	589	1119	3085	3196	2976	2823	2893	2478	2311	2498	2430	2547	2620	2687	2554	2201	1980	1847	1662
1686	1036	616	514	455	589	1119	3085	3196	2976	2823	2893	2478	2311	2498	2430	2547	2620	2687	2554	2201	1980	1847	1662
1686	1036	616	514	455	589	1119	3085	3196	2976	2823	2893	2478	2311	2498	2430	2547	2620	2687	2554	2201	1980	1847	1662
97	60	37	29	26	34	64	178	184	172	163	167	118	110	118	115	122	125	128	122	105	95	87	78
209	129	76	64	56	73	140	384	397	370	351	359	312	292	314	306	321	330	338	322	277	249	232	208
1118	689	407	340	302	393	742	2048	2123	1979	1876	1922	1687	1573	1700	1655	1735	1784	1829	1740	1488	1348	1257	1130
117	72	43	36	33	41	79	214	222	207	196	203	264	247	267	259	271	279	286	272	234	211	196	177
319	196	116	97	86	112	212	583	604	563	533	547	598	557	602	587	615	631	648	617	530	477	446	401
319	196	116	97	86	112	212	583	604	563	533	547	598	557	602	587	615	631	648	617	530	477	446	401
287	176	105	86	78	100	190	523	543	506	479	491	598	557	602	586	614	631	647	616	530	478	445	399
287	176	105	86	78	100	190	523	543	506	479	491	598	557	602	586	614	631	647	616	530	478	445	399
287	176	105	86	78	100	190	523	543	506	479	491	598	557	602	586	614	631	647	616	530	478	445	399
287	176	105	86	78	100	190	523	543	506	479	491	598	557	602	586	614	631	647	616	530	478	445	399
201	124	73	60	54	70	133	365	380	353	335	344	329	307	332	323	339	348	357	340	292	264	245	221
435	268	159	133	116	153	288	795	824	767	728	746	673	614	679	656	697	724	742	707	608	551	510	585
328	203	120	100	90	116	219	603	625	584	551	565	571	533	577	561	588	606	621	591	509	456	425	384
6	4	2	2	2	2	4	12	12	11	11	11	15	14	15	14	15	16	16	15	13	12	11	10
6	4	2	2	2	2	4	12	12	11	11	11	15	14	15	14	15	16	16	15	13	12	11	10
8	5	3	2	2	3	5	14	15	14	13	14	14	13	14	14	14	15	15	14	12	11	10	9
8	5	4	3	3	3	5	16	16	15	15	15	8	6	8	8	8	8	8	8	6	6	6	4
925	569	336	282	251	323	614	1689	1754	1633	1551	1590	1408	1314	1420	1383	1447	1489	1527	1452	1249	1124	1049	944
82	51	31	24	22	28	55	152	158	148	141	141	100	94	102	98	103	107	109	104	91	83	75	69
287	177	105	88	77	100	190	535	545	508	481	494	353	329	354	348	362	371	383	363	314	283	263	236
22	14	8	7	5	7	15	39	41	38	36	37	35	33	36	34	36	37	38	37	32	28	26	24
22	14	8	7	5	7	15	39	41	38	36	37	35	33	36	34	36	37	38	37	32	28	26	24
22	14	8	7	5	7	15	39	41	38	36	37	35	33	36	34	36	37	38	37	32	28	26	24
343	210	124	105	91	120	228	628	651	606	573	589	586	548	591	575	605	622	637	606	521	469	438	395
398	244	146	121	106	138	264	728	753	701	665	682	685	639	691	672	704	725	743	707	608	547	511	460
1014	624	371	308	274	355	674	1858	1926	1794	1701	1744	1537	1433	1548	1508	1579	1626	1666	1588	1366	1227	1145	1029
128	78	47	39	35	45	86	235	243	228	214	221	134	126	135	133	139	142	146	139	120	108	100	91
345	211	128	105	92	120	229	631	654	609	577	592	590	551	595	578	606	623	640	609	524	470	440	396
80	49	30	24	22	28	54	147	152	141	135	138	138	130	139	136	142	147	150	142	123	110	104	93
134	84	50	42	36	48	90	249	257	238	226	232	361	337	364	353	370	381	391	372	320	288	270	242
37	23	14	12	9	12	24	66	68	64	59	62	49	47	49	49	50	53	53	51	44	39	36	32
37	23	14	12	9	12	24	66	68	64	59	62	49	47	49	49	50	53	53	51	44	39	36	32
31	19	13	9	8	11	20	57	59	56	57	53	55	52	57	54	59	60	61	59	51	45	42	38
5	3	2	2	1	2	3	10	10	9	9	9	9	9	9	9	9	10	10	10	8	7	7	6
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
863	530	316	263	233	302	572	1580	1638	1526	1446	1482	1249	1165	1260	1224	1284	1321	1355	1288	1110	997	932	839
64	39	24	20	18	21	41	113	117	110	103	106	113	106	114	110	116	120	122	116	100	91	83	76
64	39	24	20	18	21	41	113	117	110	103	106	113	106	114	110	116	120	122	116	100	91	83	76
540	332	198	164	145	188	358	987	1023	953	902	926	928	867	937	908	955	982	1007	956	824	741	691	623

Caline 4 input for 2032 Q3

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	837144.25	819218.15	837203.38	819316.45	15	8	1
R1-1+1-2	837133.85	819273.95	837148.19	819294.34	8	8	1
R1-1+1-2	837148.19	819294.34	837178.20	819275.45	8	8	1
R3+4	837203.20	819316.71	837244.44	819385.38	15	8	1
R3+4	837244.44	819385.38	837294.34	819500.43	15	8	1
R5+6	837158.97	819222.68	837191.42	819190.17	15	8	1
R7	837262.30	819287.96	837203.68	819316.89	15	8	1
R8	837256.13	819295.16	837297.53	819366.57	15	8	1
R8	837191.46	819190.13	837114.47	819083.78	14	8	1
R8	837114.47	819083.78	837071.73	819001.82	14	8	1
R10	837204.98	819182.55	837178.04	819137.84	14	8	1
R10	837178.04	819137.84	837165.32	819100.25	14	8	1
R12	837165.32	819100.25	837138.28	819052.06	14	8	1
R10	837138.28	819052.06	837116.98	819027.81	14	8	1
R10	837119.98	819027.81	837085.15	818991.79	14	8	1
R11	837191.08	819190.20	837297.41	819386.58	14	8	1
R12	837205.03	819182.75	837311.47	819360.17	14	8	1
R13+14	837295.88	819500.02	837310.18	819609.31	14	8	1
R15	837298.42	819365.36	837350.18	819483.70	15	8	1
R15	837350.18	819483.70	837366.52	819529.09	15	8	1
R16	837311.53	819390.02	837335.82	819402.92	14	8	1
R16	837335.82	819402.92	837348.37	819433.28	14	8	1
R16	837348.37	819433.28	837374.20	819511.47	14	8	1
R16	837374.20	819511.47	837378.30	819544.32	14	8	1
R16	837378.30	819544.32	837388.91	819588.22	14	8	1
R16	837388.91	819588.02	837388.89	819836.45	14	8	1
R17	837293.80	819488.19	837348.88	819483.06	15	8	1
R18	837358.38	819551.90	837303.51	819558.49	15	8	1
R19	837389.79	819641.48	837479.21	819384.48	15	8	1
R20	837309.72	819612.06	837388.21	819613.48	15	15	4
R21	837508.93	820020.52	837521.62	819852.21	15	15	4
R21	837521.62	819852.21	837402.12	819695.92	15	15	4
R21	837402.10	819695.92	837383.08	819648.78	15	15	4
R21	837383.08	819648.78	837371.88	819607.03	15	15	4
R21	837371.88	819607.03	837358.48	819522.74	15	15	4
R21	837358.48	819522.74	837348.79	819476.27	15	15	4
R21	837348.79	819476.27	837338.42	819438.51	15	15	4
R21	837338.42	819438.51	837309.44	819382.87	15	15	4
R21	837309.44	819382.87	837188.51	819147.38	15	15	4
R21	837188.51	819147.38	837134.75	819083.68	15	5	4
R21	837134.75	819083.68	837078.22	818995.37	15	8	1
R22	837667.30	820017.81	837521.11	819948.16	15	15	4
R22	837521.11	819948.16	837407.02	819681.71	15	15	4
R22	837407.02	819681.71	837388.81	819632.91	15	15	4
R22	837388.81	819632.91	837377.18	819578.34	15	15	4
R22	837377.18	819578.34	837367.78	819507.82	15	15	4
R22	837367.78	819507.82	837348.85	819442.18	15	15	4
R22	837348.85	819442.18	837321.88	819383.08	15	15	4
R22	837321.88	819383.08	837178.20	819140.91	15	15	4
R22	837178.20	819140.91	837142.64	819078.01	15	5	4
R22	837142.64	819078.01	837115.31	819034.08	15	8	1
R22	837115.31	819034.08	837082.10	818995.22	15	8	1
R23+24	837308.68	819810.18	837253.13	819809.82	15	8	1
R23+24	837253.13	819809.82	837251.42	819884.34	15	8	1
R25	837385.87	819808.97	837364.64	819884.29	15	8	1
R26	837375.94	819884.44	837377.07	819728.26	17	8	1
R26	837377.07	819709.28	837388.23	819838.33	17	8	1
R27	837471.04	819809.84	837406.98	819672.38	13	8	1
R27	837406.98	819672.38	837382.16	819679.45	13	8	1
R27	837382.16	819679.45	837458.14	819823.83	13	8	1
R27-1+27-2	837438.89	819758.79	837487.35	819713.25	18	8	1
R28	837461.46	819814.32	837515.91	819774.27	18	8	1
R28	837516.13	819774.12	837582.87	819914.88	18	8	1
R30	837533.22	819890.53	837582.77	819737.87	18	8	1
R31	837587.02	819715.44	837708.83	818833.49	16	8	1
R32	837721.65	819830.04	837584.52	819705.67	16	8	1
R33	837782.47	819838.14	837634.05	819687.74	13	8	1
R34	837717.34	819586.31	837584.88	819705.55	16	8	1
R35	837587.03	819715.45	837480.51	819583.72	16	8	1
R36	837594.51	819705.66	837481.85	819584.60	16	8	1
R37	837586.99	819715.41	837471.78	819811.84	18	8	1
R38+39	837781.33	819857.04	837674.27	819539.83	18	8	1
R38+39	837674.27	819539.83	837655.84	819502.89	18	8	1
R40	837372.55	819252.71	837367.13	819425.03	16	8	1
R40	837367.13	819425.03	837379.01	819454.42	16	8	1
R40	837379.01	819454.42	837383.83	819484.43	16	8	1
R40	837383.83	819484.43	837482.25	819583.95	16	8	1
R41	837481.55	819588.75	837380.25	819482.08	16	8	1
R41	837380.25	819482.08	837380.18	819318.57	16	8	1
R41	837380.18	819318.57	837383.41	819255.41	16	8	1
R42+43	837471.46	819238.12	837470.84	819381.98	13	8	1
R44	837473.98	819382.07	837380.21	819382.12	14	8	1
R44-1	837471.54	819382.06	837471.35	819414.34	14	8	1
R44-1	837471.35	819414.34	837410.47	819442.02	14	8	1
R45+46	837470.98	819382.07	837536.04	819382.04	14	8	1
R45+46	837538.04	819382.04	837579.78	819478.53	14	8	1
R47	837514.08	819508.68	837542.71	819562.45	11	8	1
R48	837447.83	819538.73	837380.01	819479.95	13	8	1

NO_x x 100 (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
86.7160	80.5406	79.9740	80.0482	73.0812	81.4583	79.9543	80.8999	85.2820	87.0167	87.0139	85.6952	68.5906	70.6859	70.6651	64.7611	65.3007	64.6019	65.4437	75.3324	67.6988	66.6334	67.3526	74.7820
98.5959	87.3668	90.7480	93.0885	89.6687	93.0464	88.7205	94.7686	104.9927	102.0380	101.8195	100.8216	106.7150	108.3466	109.6689	102.6675	104.6377	105.0605	106.5590	110.7462	97.4564	98.1715	95.6898	104.1485
98.5959	87.3668	90.7480	93.0885	89.6687	93.0464	88.7205	94.7686	104.9927	102.0380	101.8195	100.8216	106.7150	108.3466	109.6689	102.6675	104.6377	105.0605	106.5590	110.7462	97.4564	98.1715	95.6898	104.1485
82.0799	73.9863	63.2979	61.2139	58.4409	62.9212	71.4815	62.9348	65.7953	70.1092	70.5780	68.1536	53.5093	54.5478	56.5109	53.0266	51.5818	50.2287	51.6103	65.7431	57.7302	57.8527	60.3557	65.4145
82.0799	73.9863	63.2979	61.2139	58.4409	62.9212	71.4815	62.9348	65.7953	70.1092	70.5780	68.1536	53.5093	54.5478	56.5109	53.0266	51.5818	50.2287	51.6103	65.7431	57.7302	57.8527	60.3557	65.4145
80.1905	73.1942	65.9173	62.2323	59.1573	65.0894	70.4906	64.3022	67.1885	69.0516	69.1475	67.6022	52.1716	52.4614	54.3530	48.8673	49.0759	47.7285	48.5078	62.3819	55.0139	55.3271	55.9224	62.5893
68.6521	57.6756	58.8180	62.4467	63.1891	59.8225	57.8237	60.0667	63.3476	63.9447	65.0364	62.7347	61.3226	62.7031	63.6727	57.6465	58.9842	58.1669	59.5759	70.5651	65.0564	64.6317	64.3499	67.5404
90.1221	67.2147	60.1121	61.9279	60.2317	61.5513	69.9121	81.1068	85.9319	88.2923	87.7492	86.1534	106.6472	111.3954	109.0555	102.1074	104.4440	109.6674	110.4710	107.5907	98.8667	98.3213	98.9078	104.1029
83.9670	66.3295	69.1969	71.1721	69.8284	70.6914	69.5191	74.8016	82.5067	82.8436	82.0301	80.1457	84.7740	89.3170	92.5204	86.1553	90.4498	90.6024	96.0013	101.9793	90.1712	89.6995	90.4305	95.7376
83.9670	66.3295	69.1969	71.1721	69.8284	70.6914	69.5191	74.8016	82.5067	82.8436	82.0301	80.1457	84.7740	89.3170	92.5204	86.1553	90.4498	90.6024	96.0013	101.9793	90.1712	89.6995	90.4305	95.7376
91.9893	70.0128	71.4330	73.7424	73.6428	73.0741	75.1215	81.9883	90.7636	90.8341	89.9597	87.7534	78.0976	82.0199	85.0241	77.2544	82.6242	82.5046	85.6977	94.4224	83.6513	83.0473	82.2428	87.5217

Caline 4 input for 2032 Q3

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R48	337560.07	819478.94	337534.37	819454.01	13	8	1
R50	337490.85	819587.90	337556.18	819650.06	18	8	1
R51+52	337555.64	819582.99	337584.72	819543.19	20	8	1
R51+52	337584.72	819343.19	337582.52	819236.02	20	8	1
R53+54	337554.81	819487.71	337727.20	819473.90	14	8	1
R53+54	337727.20	819473.90	337768.09	819426.95	14	8	1
R53+54	337768.09	819426.95	337746.85	819386.98	14	8	1
R53+54	337746.85	819386.98	337688.43	819327.32	14	8	1
R53+54	337686.82	819327.32	337680.34	819301.31	14	8	1
R53+54	337680.34	819301.31	337658.16	819248.82	14	8	1
R55+56	337379.38	819257.63	337564.22	819258.11	29	8	1
R56-1	337454.87	819257.83	337447.06	819271.48	11	8	1
R56-2+56-3	337425.73	819150.58	337424.85	819071.89	16	8	1
R57+58	337564.88	819258.08	337661.38	819251.64	25	8	1
R58	337681.16	819246.24	337749.72	819231.27	14	8	1
R58	337745.78	819231.27	337739.65	819070.31	14	8	1
R60	337682.25	819247.58	337691.46	819088.38	15	8	1
R61	337670.38	819244.48	337661.88	819089.18	15	8	1
R62+63	337565.20	819255.28	337552.77	819138.28	17	8	1
R64+65	337383.88	819255.27	337376.88	819186.80	21	8	1
R64+65	337376.88	819186.80	337375.43	819071.78	21	8	1
R66+67	337376.06	819128.90	337292.22	819129.78	18	8	1
R68	337296.78	819325.67	337369.82	819289.11	18	8	1
R69	337283.97	819280.98	337338.48	819246.43	18	8	1
R69	337338.48	819246.43	337370.52	819252.88	18	8	1
R70+71	337256.28	819234.50	337318.11	819185.17	18	8	1
R72+73	337204.77	819182.19	337292.22	819129.80	18	8	1
R74+75	337347.48	819248.52	337292.25	819129.78	18	8	1
R76	337292.22	819129.80	337287.77	819076.01	18	8	1
R77	337288.87	819073.43	337202.18	819110.48	18	8	1
R77	337202.18	819110.48	337187.26	819185.41	15	8	1
R77-1+77-2	337218.98	819101.10	337181.52	819038.58	12	8	1
R78	337257.66	819072.24	337375.43	819071.10	18	8	1
R78	337187.48	819038.82	337217.48	818979.71	12	8	1
R79	337217.48	818979.71	337196.74	819022.02	12	8	1
R79	337196.74	819022.02	337140.45	819055.94	12	8	1
R80+81	337375.46	819071.78	337373.52	818988.96	21	8	1
R80-1+80-2	337374.53	818964.57	337228.85	818985.77	12	8	1
R80-1+80-2	337228.85	818985.77	337227.94	818932.14	12	8	1
R80-1+80-2	337227.94	818932.14	337337.88	818930.87	12	8	1
R82	337375.44	819072.43	337548.00	819072.00	15	8	1
R83	337545.29	818805.68	337548.30	819072.00	10	8	1
R84+85	337548.30	819071.82	337658.81	819087.81	13	8	1
R86+87	337658.82	819088.12	337655.06	818948.83	24	8	1
R88	337656.75	819086.78	337781.39	819089.96	12	8	1
R88	337781.39	819089.96	337752.15	819011.28	13	8	1
R89	337781.97	819057.78	337822.89	819018.59	18	8	1
R89	337822.89	819018.59	337890.56	819083.43	18	8	1
R88	337890.56	819088.45	337940.35	819086.19	18	8	1
R89	337940.35	819086.19	337872.06	819758.54	18	8	1
R90	337791.83	819857.31	337781.34	819758.82	18	8	1
R91	337903.23	819779.91	337879.37	819749.90	15	8	1
R92	337872.23	819758.52	337740.50	819872.80	18	8	1
R92-1	337894.06	819735.86	337717.80	819714.33	13	8	1
R92-1	337717.80	819714.33	337697.01	819814.10	13	8	1
R92-2	337894.96	819831.41	337830.94	819782.57	13	8	1
R93	337793.24	819835.46	337821.72	819878.91	13	8	1
R94+95	337774.83	819819.41	337714.67	819851.38	28	8	1
R96+97	337833.80	819880.38	337855.12	819938.85	18	8	1
R98	337754.86	819858.48	337530.23	819857.12	18	8	1
R99	337582.98	819914.83	337516.82	819887.88	14	8	1
R99	337616.82	819887.88	337565.57	820011.10	16	8	1
R99	337565.57	820011.10	337529.93	819936.49	14	8	1
R100	337550.18	820019.70	337514.19	819942.85	13	8	1
R101+102	337484.33	819966.87	337483.82	820030.48	18	8	1
R103+104	337514.79	819944.23	337371.40	820010.77	15	8	1
R105+106	337388.93	820024.78	337370.45	819884.41	25	8	1
R107+108	337291.04	819889.95	337291.72	819884.34	16	8	1
R108-1	337307.38	820009.79	337368.24	819884.25	16	8	1
R109	337291.42	819883.77	337370.45	819884.77	18	8	1
R110+111	337483.80	819998.87	337414.74	819880.38	18	8	1
R110+111	337414.74	819880.38	337458.20	819823.33	18	8	1
R112	337458.32	819823.80	337515.96	819943.06	12	8	1
R113	337530.08	819936.45	337471.36	819806.89	12	8	1
R114+115	338932.82	819888.83	338953.22	819586.42	16	8	1
R114+115	338953.22	819586.42	337029.89	819532.82	16	8	1
R114+115	337029.86	819532.82	337033.17	819488.00	16	8	1
R114+115	337033.17	819488.00	337016.91	819456.65	16	8	1
R114+115	337010.91	819456.65	336887.35	819427.73	16	8	1
R116+117	336948.67	819135.90	337022.42	819042.48	26	8	1
R118+119	337135.98	819223.51	337079.43	819129.58	16	8	1
R118+119	337079.43	819129.58	337022.42	819042.48	16	8	1
R120+121	337023.68	819043.84	337118.67	818957.84	22	8	1

NO_x x 100 (g/VMT)																						
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
95.6905	96.3307	91.0417	80.3861	75.5176	94.2036	100.8256	113.4600	120.7334	114.1809	113.5324	113.4776	63.0730	64.9815	62.2338	57.5080	57.2937	57.1243	56.7248	62.2774	57.3512	55.5298	57.2231	63.6536
104.6169	73.9347	66.3492	65.0435	64.0705	68.0819	82.1359	114.5326	122.1018	120.7639	119.6470	119.1099	109.6148	111.3340	112.5728	105.6949	107.4213	108.0565	109.4583	109.0030	92.8810	86.6614	79.2761	82.2834
85.5705	66.9046	68.9032	70.3060	69.6166	70.5856	70.1738	78.0168	84.8241	84.9683	84.1838	82.2721	81.2105	86.4248	88.1052	81.9243	85.7347	85.8806	90.8731	96.3356	85.4606	84.8826	85.5507	90.7488
85.5705	66.9046	68.9032	70.3060	69.6166	70.5856	70.1738	78.0168	84.8241	84.9683	84.1838	82.2721	81.2105	86.4248	88.1052	81.9243	85.7347	85.8806	90.8731	96.3356	85.4606	84.8826	85.5507	90.7488
92.6658	71.6199	71.2367	72.9269	72.6228	72.7673	76.5508	82.6083	91.0240	91.3458	90.5224	88.3401	79.2981	83.3601	86.0630	78.3904	83.4651	83.2782	86.4129	94.9909	84.3453	83.7988	82.9172	88.5117

Caline 4 input for 2032 Q3

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	337144.25	6192118.15	337203.38	6192218.45	16	0	1
R1-1+1-2	337133.65	6192273.86	337146.18	6192294.34	8	0	1
R1-1+1-2	337148.19	6192294.34	337179.20	6192275.45	8	0	1
R3+4	337203.20	6193116.71	337244.44	6193385.38	15	0	1
R3+4	337244.44	6193385.38	337294.34	6193600.43	15	0	1
R5+6	337136.97	6192223.68	337191.42	6192190.17	16	0	1
R7	337252.20	6192287.96	337203.68	6192318.69	16	0	1
R8	337250.13	6193395.16	337297.55	6193506.57	16	0	1
R9	337191.44	6193190.13	337114.47	6193083.79	14	0	1
R9	337114.47	6193083.79	337071.72	6193001.82	14	0	1
R10	337204.88	6192182.56	337178.04	6192127.84	14	0	1
R10	337178.04	6192127.84	337165.32	6192100.25	14	0	1
R10	337165.32	6192100.25	337138.28	6192052.06	14	0	1
R10	337138.28	6192052.06	337118.88	6192027.81	14	0	1
R10	337118.88	6192027.81	337085.15	6191991.79	14	0	1
R11	337191.06	6193190.20	337297.41	6193386.58	14	0	1
R12	337205.03	6193182.75	337311.47	6193360.17	14	0	1
R13+14	337295.88	6193502.03	337315.18	6193809.21	16	0	1
R15	337298.42	6193385.30	337350.19	6193483.70	16	0	1
R15	337350.19	6193483.70	337386.53	6193609.09	16	0	1
R16	337311.53	6193386.02	337335.82	6193402.62	14	0	1
R16	337335.82	6193402.62	337348.37	6193433.68	14	0	1
R16	337348.37	6193433.68	337374.20	6193511.47	14	0	1
R16	337374.20	6193511.47	337378.32	6193544.32	14	0	1
R16	337379.20	6193544.32	337388.91	6193598.02	14	0	1
R16	337388.91	6193598.02	337389.89	6193638.45	14	0	1
R17	337393.80	6193490.19	337348.69	6193483.06	18	0	1
R18	337398.39	6193551.90	337303.51	6193558.48	18	0	1
R19	337388.79	6193641.48	337478.21	6193584.49	18	0	1
R20	337308.72	6193612.00	337388.21	6193612.48	18	0	1
R21	337398.93	6200220.52	337521.62	6193952.21	16	10	4
R21	337521.62	6193952.21	337402.10	6193895.92	16	10	4
R21	337402.10	6193895.92	337383.08	6193848.78	16	10	4
R21	337383.08	6193848.78	337371.89	6193807.03	16	10	4
R21	337371.89	6193807.03	337338.46	6193722.74	16	10	4
R21	337338.46	6193722.74	337348.79	6193676.27	16	10	4
R21	337348.79	6193676.27	337338.42	6193638.51	16	10	4
R21	337338.42	6193638.51	337309.44	6193582.87	16	10	4
R21	337309.44	6193582.87	337188.51	6193147.58	16	10	4
R21	337188.51	6193147.58	337134.75	6193092.88	16	5	4
R21	337134.75	6193092.88	337079.22	6192995.37	16	0	1
R22	337587.30	6200017.81	337531.11	6193848.18	16	10	4
R22	337531.11	6193848.18	337407.02	6193881.71	16	10	4
R22	337407.02	6193881.71	337388.91	6193832.91	16	10	4
R22	337388.91	6193832.91	337377.18	6193578.34	16	10	4
R22	337377.18	6193578.34	337387.78	6193507.82	16	10	4
R22	337387.78	6193507.82	337349.85	6193442.18	16	10	4
R22	337349.85	6193442.18	337321.89	6193383.08	16	10	4
R22	337321.89	6193383.08	337178.20	6193140.91	16	10	4
R22	337178.20	6193140.91	337142.84	6193076.01	16	5	4
R22	337142.84	6193076.01	337115.31	6193034.09	16	0	1
R22	337115.31	6193034.09	337082.10	6192995.22	16	0	1
R23+24	337309.88	6193618.18	337253.13	6193609.82	18	0	1
R23+24	337253.13	6193609.82	337251.42	6193884.34	18	0	1
R25	337385.87	6193609.27	337364.64	6193884.29	16	0	1
R28	337375.54	6193884.44	337377.87	6193709.26	17	0	1
R26	337377.07	6193709.25	337384.20	6193636.33	17	0	1
R27	337471.04	6193609.84	337408.96	6193672.39	13	0	1
R27	337408.96	6193672.39	337382.16	6193679.45	13	0	1
R27	337382.16	6193679.45	337458.14	6193823.83	13	0	1
R27-1+27-2	337458.99	6193736.79	337487.35	6193713.33	18	0	1
R28	337441.48	6193814.32	337515.91	6193774.27	18	0	1
R29	337516.13	6193774.12	337580.87	6193814.58	18	0	1
R30	337533.22	6193690.53	337582.77	6193737.87	18	0	1
R31	337587.02	6193715.44	337718.65	6193853.49	18	0	1
R32	337721.85	6193850.04	337584.52	6193705.67	18	0	1
R33	337782.47	6193838.14	337634.85	6193887.74	13	0	1
R34	337717.34	6193588.31	337584.48	6193705.85	18	0	1
R35	337587.03	6193715.45	337482.51	6193583.72	18	0	1
R36	337584.51	6193705.88	337481.65	6193588.80	18	0	1
R37	337588.98	6193715.41	337471.78	6193811.84	18	0	1
R38+39	337781.33	6193657.84	337674.27	6193538.83	18	0	1
R38+39	337674.27	6193539.83	337655.84	6193502.89	18	0	1
R40	337370.55	6193252.71	337367.13	6193425.03	18	0	1
R40	337367.13	6193425.03	337370.01	6193454.42	18	0	1
R40	337370.01	6193454.42	337383.82	6193484.43	18	0	1
R40	337383.83	6193484.43	337480.25	6193583.95	18	0	1
R41	337491.55	6193588.75	337380.25	6193482.08	18	0	1
R41	337380.25	6193482.08	337382.18	6193319.87	18	0	1
R41	337380.18	6193319.87	337383.41	6192955.41	18	0	1
R42+43	337471.46	6193258.12	337479.84	6193381.88	13	0	1
R44	337479.88	6193382.87	337380.21	6193382.12	14	0	1
R44-1	337471.34	6193382.06	337471.55	6193414.34	14	0	1
R44-1	337471.55	6193414.34	337410.47	6193442.82	14	0	1
R45+46	337470.98	6193382.87	337536.04	6193382.04	14	0	1
R45+46	337536.04	6193382.04	337579.78	6193479.33	14	0	1
R47	337514.08	6193608.68	337542.71	6193582.45	11	0	1
R48	337447.82	6193538.73	337580.01	6193478.85	13	0	1

NO_2 x 100 (g/VMT)

Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
8.4067	7.6710	8.0890	8.1539	7.7565	9.0619	9.6014	12.8363	14.3656	13.4443	13.4979	13.7071	9.1762	9.6704	8.9442	8.2090	8.2796	8.5902	8.5175	7.1046	6.3175	6.1326	5.8298	6.6342
10.4009	9.1414	10.0990	10.5112	10.5538	11.3793	11.5425	15.9015	18.7466	16.7095	16.8254	17.1374	12.9448	18.2890	17.2520	16.0139	16.1176	16.7667	16.6403	13.2481	11.5011	11.4607	10.5565	12.0001
10.4009	9.1414	10.0990	10.5112	10.5538	11.3793	11.5425	15.9015	18.7466	16.7095	16.8254	17.1374	12.9448	18.2890	17.2520	16.0139	16.1176	16.7667	16.6403	13.2481	11.5011	11.4607	10.5565	12.0001
6.4330	5.9423	4.9693	4.5800	4.7501	5.2639	6.7464	7.7836	8.5836	8.3277	8.3926	8.3886	4.7785	4.8261	4.7370	4.3364	4.3726	4.4438	4.4738	4.4456	3.8880	3.8132	3.9315	4.0896
6.4330	5.9423	4.9693	4.5800	4.7501	5.2639	6.7464	7.7836	8.5836	8.3277	8.3926	8.3886	4.7785	4.8261	4.7370	4.3364	4.3726	4.4438	4.4738	4.4456	3.8880	3.8132	3.9315	4.0896
6.3584	5.9156	5.3680	4.7683	4.9073	5.5168	6.7665	8.2260	9.0846	8.4628	8.4274	8.6048	4.7405	4.7674	4.7478	4.2916	4.3527	4.4290	4.4147	4.1767	3.6431	3.6448	3.5247	3.8720
6.0309	5.8947	6.0349	5.9849	6.4061	6.4068	6.0587	7.6786	8.2402	7.6569	7.8787	7.9383	7.1117	7.1046	6.8620	6.1940	6.3421	6.6283	6.4928	5.8274	5.4581	5.2969	5.0679	5.2489
9.2395	8.8967	6.3008	6.6316	6.6868	6.9198	8.7262	13.0535	14.5459	13.8076	13.8214	13.9737	18.9667	20.1491	18.1999	16.8866	17.0794	18.5071	18.3151	13.8551	12.5753	12.4288	11.8388	13.0660
8.3695	8.0190	8.5342	8.6724	8.5435	9.0697	8.6794	10.8265	11.9001	11.2363	11.2052	11.4643	11.5721	11.6000	11.2835	10.4727	10.7433	10.9831	11.2799	10.0723	9.2288	9.0190	9.0970	9.3714
8.3695	8.0190	8.5342	8.6724	8.5435	9.0697	8.6794	10.8265	11.9001	11.2363	11.2052	11.4643	11.5721	11.6000	11.2835	10.4727	10.7433	10.9831	11.2799	10.0723	9.2288	9.0190	9.0970	9.3714
9.1831	8.5984	8.9550	9.0924	9.0941	9.4688	9.4156	11.5405	12.9658	12.2159	12.1852	12.4829	10.1768	10.1725	9.9319	9.0082	9.4406	9.6282	9.6965	8.9301	8.1958	7.9860	7.9109	8.1545

Caline 4 input for 2032 Q3

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R49	837580.07	819478.94	837634.37	819454.01	13	0	1
R50	837490.85	819587.90	837536.18	819500.08	18	0	1
R51+52	837655.84	819502.08	837586.72	819343.19	20	0	1
R51+52	837586.72	819342.19	837582.52	819258.02	20	0	1
R53+54	837654.81	819487.71	837727.20	819473.90	14	0	1
R53+54	837727.20	819473.90	837769.09	819428.65	14	0	1
R53+54	837769.09	819428.65	837748.05	819389.98	14	0	1
R53+54	837748.05	819389.98	837698.83	819327.32	14	0	1
R53+54	837688.63	819327.32	837680.34	819301.31	14	0	1
R53+54	837680.34	819301.31	837659.18	819248.02	14	0	1
R55+56	837375.38	819257.83	837564.22	819258.11	25	0	1
R56-1	837454.67	819257.83	837447.06	819271.48	11	0	1
R56-2+56-3	837425.73	819150.58	837424.80	819071.89	16	0	1
R57+58	837564.88	819258.09	837661.38	819251.84	25	0	1
R59	837681.10	819246.24	837745.70	819231.27	14	0	1
R59	837745.70	819231.27	837739.05	819070.31	14	0	1
R60	837860.25	819247.58	837851.46	819069.38	15	0	1
R61	837672.38	819244.46	837661.38	819069.18	15	0	1
R62+63	837585.20	819255.28	837562.77	819138.26	17	0	1
R64+65	837386.89	819255.27	837378.86	819188.80	21	0	1
R64+65	837378.86	819188.80	837375.43	819071.78	21	0	1
R66+67	837376.09	819128.90	837292.22	819129.79	18	0	1
R68	837290.78	819325.57	837368.82	819288.11	18	0	1
R68	837263.97	819280.88	837338.49	819248.43	18	0	1
R69	837338.49	819248.43	837375.52	819253.88	18	0	1
R70+71	837236.08	819234.52	837318.11	819185.17	18	0	1
R72+73	837204.77	819182.19	837292.22	819129.80	18	0	1
R74+75	837347.48	819248.52	837292.25	819129.79	18	0	1
R76	837292.22	819129.80	837267.77	819078.21	18	0	1
R77	837298.87	819073.43	837202.18	819110.48	15	0	1
R77	837202.18	819110.48	837187.68	819105.41	15	0	1
R77-1+77-2	837218.98	819101.10	837181.53	819038.58	12	0	1
R78	837267.86	819072.24	837375.45	819071.10	18	0	1
R79	837167.48	818930.82	837217.46	819079.71	12	0	1
R79	837217.48	818879.71	837196.74	819022.52	12	0	1
R79	837196.74	819022.52	837140.45	818950.94	12	0	1
R80+81	837375.48	819071.78	837373.52	818888.98	21	0	1
R80-1+80-2	837374.53	818984.57	837228.35	818985.77	12	0	1
R80-1+80-2	837228.35	818985.77	837227.84	818932.14	12	0	1
R80-1+80-2	837227.84	818932.14	837337.88	818930.87	12	0	1
R82	837373.44	819072.43	837548.00	819072.00	15	0	1
R83	837545.29	818905.98	837548.30	819072.00	18	0	1
R84+85	837548.30	819071.82	837696.41	819087.81	12	0	1
R86+87	837696.82	819088.10	837855.06	818848.83	24	0	1
R88	837858.75	819066.76	837781.39	819069.96	13	0	1
R88	837781.38	819069.96	837763.18	819011.29	13	0	1
R89	837781.97	819057.79	837822.99	819019.59	18	0	1
R89	837822.99	819019.59	837830.56	819088.45	18	0	1
R89	837830.56	819088.45	837840.35	819096.19	18	0	1
R89	837840.35	819096.19	837872.06	818796.34	18	0	1
R90	837791.03	819057.31	837871.31	819756.62	18	0	1
R91	837903.33	818778.81	837879.37	819749.90	15	0	1
R92	837872.23	818756.53	837740.52	818672.80	19	0	1
R93-1	837694.09	818735.86	837717.80	818714.33	13	0	1
R92-1	837717.80	818714.33	837857.01	818814.10	13	0	1
R92-2	837694.94	818631.41	837830.84	818792.97	13	0	1
R93	837783.24	818635.48	837821.72	818878.91	13	0	1
R94+95	837774.83	818919.41	837714.67	818851.38	28	0	1
R96+97	837833.60	818980.38	837856.12	819036.05	18	0	1
R98	837704.88	818856.46	837530.23	818837.12	18	0	1
R99	837582.88	818914.23	837618.82	818967.88	14	0	1
R99	837618.82	818967.88	837585.57	820011.10	14	0	1
R99	837585.57	820011.10	837529.93	819938.49	14	0	1
R100	837530.18	820019.70	837514.19	819942.95	13	0	1
R101+102	837484.33	819998.67	837493.82	820030.48	18	0	1
R103+104	837514.79	819944.23	837371.40	820010.77	15	0	1
R105+106	837388.85	820024.76	837379.45	819884.41	28	0	1
R107+108	837251.08	819889.95	837251.72	819884.34	18	0	1
R108-1	837307.38	820009.79	837308.24	819884.25	18	0	1
R109	837251.42	819883.77	837379.45	819884.77	18	0	1
R110+111	837463.90	819866.87	837414.74	819880.38	18	0	1
R110+111	837414.74	819882.38	837458.00	819823.33	18	0	1
R112	837458.50	819823.82	837513.84	819942.06	12	0	1
R113	837530.08	819858.43	837471.38	819809.69	12	0	1
R114+115	836832.82	819868.03	836953.22	819580.42	18	0	1
R114+115	836953.22	819580.42	837028.88	819532.82	18	0	1
R114+115	837026.89	819532.82	837033.17	819468.90	18	0	1
R114+115	837033.17	819468.90	837010.91	819455.85	18	0	1
R114+115	837010.91	819455.85	836887.35	819427.71	18	0	1
R116+117	836946.87	819136.90	837022.42	819062.48	26	0	1
R118+119	837135.98	819223.91	837078.43	819129.58	18	0	1
R118+119	837078.43	819129.58	837022.42	819062.48	18	0	1
R120+121	837023.98	819083.94	837118.87	818957.84	20	0	1

NO_2 x 100 (g/VMT)																						
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
13.0349	12.1486	12.7241	11.4069	11.3191	14.6742	16.7725	23.2726	26.2744	23.2344	23.4524	23.7267	9.9764	10.7725	9.6041	8.8341	8.9310	9.3386	9.1859	7.0120	6.1841	5.9462	5.5806	6.6879
14.5906	9.9277	9.8191	9.7337	10.0167	11.0975	14.0322	23.2782	26.1570	24.3235	24.5607	24.8120	20.3146	20.8678	19.5968	18.1734	18.2708	19.0746	18.8754	14.6972	12.3006	11.3465	9.8038	10.6973
8.5682	8.0399	8.4673	8.5405	8.5077	9.0314	8.7940	11.1989	12.3816	11.6476	11.6219	11.8874	11.1765	11.3990	10.8916	10.0967	10.3391	10.5928	10.8682	9.5885	8.7659	8.5529	8.5840	8.9021
8.5682	8.0399	8.4673	8.5405	8.5077	9.0314	8.7940	11.1989	12.3816	11.6476	11.6219	11.8874	11.1765	11.3990	10.8916	10.0967	10.3391	10.5928	10.8682	9.5885	8.7659	8.5529	8.5840	8.9021
9.2789	8.6357	8.8011	8.8746	8.8745	9.3404	9.6195	11.8249	13.2511	12.4937	12.4705	12.7534	10.5168	10.5856	10.2589	9.3388	9.7388	9.9387	10.0012	9.1065	8.3549	8.1534	8.0307	8.3469

Caline 4 input for 2032 Q3

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	837144.25	819218.15	837203.38	819318.45	16	0	1
R1-1+1-2	837133.65	819273.66	837146.19	819294.34	8	0	1
R1-1+1-2	837146.19	819294.34	837179.20	819275.45	8	0	1
R3+4	837203.20	819318.71	837244.44	819385.38	15	0	1
R3+4	837244.44	819385.38	837264.34	819502.43	15	0	1
R5+6	837136.97	819223.66	837191.42	819190.17	18	0	1
R7	837252.30	819287.96	837203.68	819318.89	18	0	1
R8	837250.13	819395.18	837297.53	819368.57	18	0	1
R9	837191.44	819180.13	837114.47	819063.78	14	0	1
R9	837114.47	819083.78	837071.73	819001.83	14	0	1
R10	837264.88	819182.55	837178.04	819137.84	14	0	1
R10	837179.04	819137.84	837165.32	819100.25	14	0	1
R15	837165.32	819100.25	837138.28	819002.06	14	0	1
R13	837138.28	819052.08	837119.88	819027.61	14	0	1
R10	837119.88	819027.61	837083.15	818891.79	14	0	1
R11	837191.06	819190.20	837297.41	819386.58	14	0	1
R12	837205.03	819182.75	837311.47	818360.17	14	0	1
R13+14	837295.88	819502.02	837312.18	819609.31	18	0	1
R15	837298.42	819365.30	837350.19	819483.70	18	0	1
R15	837350.19	819483.70	837388.52	819605.29	18	0	1
R16	837311.53	819386.02	837355.82	819402.82	14	0	1
R16	837355.82	819402.82	837348.37	819433.58	14	0	1
R16	837348.37	819403.06	837374.30	819511.47	14	0	1
R16	837374.30	819511.47	837378.30	819544.32	14	0	1
R16	837378.30	819544.32	837388.91	819589.02	14	0	1
R16	837388.91	819589.02	837389.89	819636.45	14	0	1
R17	837293.83	819486.19	837548.69	819483.96	18	0	1
R18	837338.39	819551.80	837303.51	819558.49	18	0	1
R19	837388.79	819641.48	837479.21	819584.48	18	0	1
R20	837309.72	819612.00	837366.21	819612.48	18	0	1
R21	837598.93	820035.52	837521.62	819952.21	16	10	4
R21	837521.62	819952.21	837402.10	819895.92	16	10	4
R21	837402.10	819895.92	837383.08	819648.78	16	10	4
R21	837383.08	819648.78	837371.89	819607.03	16	10	4
R21	837371.89	819607.03	837338.48	819522.74	16	10	4
R21	837338.48	819522.74	837348.79	819476.27	16	10	4
R21	837348.79	819476.27	837336.42	819436.51	16	10	4
R21	837336.42	819436.51	837306.44	819382.87	16	10	4
R21	837369.44	819382.87	837168.51	819147.58	16	10	4
R21	837168.51	819147.58	837134.75	819080.88	16	5	4
R21	837134.75	819080.88	837079.22	818996.37	16	0	1
R22	837567.30	820017.81	837531.11	819948.18	16	10	4
R22	837531.11	819948.18	837407.02	819861.71	16	10	4
R22	837407.02	819861.71	837388.81	819832.91	16	10	4
R22	837388.81	819832.91	837377.18	819578.34	16	10	4
R22	837377.18	819578.34	837367.78	819507.82	16	10	4
R22	837367.78	819507.82	837348.85	819442.18	16	10	4
R22	837348.85	819442.18	837321.88	819383.08	16	10	4
R22	837321.88	819383.08	837178.20	819140.91	16	10	4
R22	837178.20	819140.91	837142.64	819078.01	16	5	4
R22	837142.64	819078.01	837115.31	819034.09	16	0	1
R22	837115.31	819034.09	837082.10	818995.22	16	0	1
R23+24	837309.66	819610.18	837253.13	819609.82	18	0	1
R23+24	837253.13	819609.82	837201.42	819584.34	18	0	1
R25	837385.87	819808.67	837364.64	819884.29	16	0	1
R29	837375.64	819884.44	837377.37	819709.28	17	0	1
R29	837377.37	819709.28	837388.20	819636.33	17	0	1
R27	837471.04	819830.84	837426.96	819672.39	13	0	1
R27	837406.96	819672.39	837392.16	819679.45	13	0	1
R27	837382.16	819679.45	837458.14	819823.83	13	0	1
R27-1+27-2	837438.98	819736.79	837487.35	819713.23	18	0	1
R28	837441.46	819814.32	837515.91	819774.27	18	0	1
R29	837516.13	819774.13	837580.87	819914.86	18	0	1
R30	837633.22	819890.53	837562.77	819737.87	18	0	1
R31	837587.03	819715.44	837708.83	819853.49	18	0	1
R32	837721.85	819830.24	837584.52	819705.87	18	0	1
R33	837782.47	819838.14	837634.05	819967.74	13	0	1
R34	837717.34	819588.31	837564.88	819705.35	18	0	1
R35	837587.03	819715.45	837480.51	819583.72	18	0	1
R36	837584.51	819705.66	837481.80	819588.80	18	0	1
R37	837586.99	819715.41	837471.78	819811.84	18	0	1
R38+39	837781.33	819857.04	837874.27	819939.83	18	0	1
R38+39	837874.27	819939.83	837655.84	819962.98	18	0	1
R40	837370.55	819252.71	837367.13	819425.03	18	0	1
R40	837367.13	819425.03	837370.01	819454.42	18	0	1
R40	837370.01	819454.42	837383.82	819484.43	18	0	1
R40	837383.82	819484.43	837480.25	819580.90	18	0	1
R41	837491.55	819588.70	837380.25	819462.58	18	0	1
R41	837380.25	819462.58	837380.18	819319.87	18	0	1
R41	837380.18	819319.87	837383.41	819295.41	18	0	1
R42+43	837471.48	819258.12	837470.94	819381.99	13	0	1
R46	837476.96	819382.87	837536.21	819382.12	14	0	1
R46-1	837471.54	819382.98	837471.55	819414.34	14	0	1
R46-1	837471.55	819414.34	837410.47	819442.02	14	0	1
R45+46	837476.96	819382.87	837536.04	819382.04	14	0	1
R45+46	837536.04	819382.04	837579.78	819478.33	14	0	1
R47	837514.08	819588.68	837542.71	819582.45	11	0	1
R48	837447.62	819538.73	837580.01	819478.85	13	0	1

RSP (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
0.0196	0.0145	0.0140	0.0137	0.0145	0.0156	0.0185	0.0252	0.0275	0.0266	0.0262	0.0264	0.0209	0.0223	0.0221	0.0213	0.0221	0.0226	0.0235	0.0208	0.0193	0.0192	0.0178	0.0188
0.0235	0.0171	0.0171	0.0177	0.0192	0.0191	0.0223	0.0296	0.0332	0.0312	0.0309	0.0313	0.0350	0.0371	0.0366	0.0350	0.0365	0.0373	0.0385	0.0355	0.0326	0.0333	0.0307	0.0327
0.0235	0.0171	0.0171	0.0177	0.0192	0.0191	0.0223	0.0296	0.0332	0.0312	0.0309	0.0313	0.0350	0.0371	0.0366	0.0350	0.0365	0.0373	0.0385	0.0355	0.0326	0.0333	0.0307	0.0327
0.0215	0.0145	0.0120	0.0110	0.0125	0.0129	0.0178	0.0228	0.0248	0.0249	0.0244	0.0241	0.0179	0.0190	0.0198	0.0191	0.0201	0.0203	0.0215	0.0204	0.0186	0.0188	0.0180	0.0182
0.0215	0.0145	0.0120	0.0110	0.0125	0.0129	0.0178	0.0228	0.0248	0.0249	0.0244	0.0241	0.0179	0.0190	0.0198	0.0191	0.0201	0.0203	0.0215	0.0204	0.0186	0.0188	0.0180	0.0182
0.0200	0.0138	0.0119	0.0108	0.0122	0.0127	0.0169	0.0224	0.0244	0.0238	0.0232	0.0232	0.0159	0.0165	0.0171	0.0166	0.0174	0.0177	0.0186	0.0166	0.0152	0.0153	0.0142	0.0144
0.0296	0.0195	0.0183	0.0208	0.0242	0.0194	0.0233	0.0293	0.0315	0.0307	0.0317	0.0307	0.0215	0.0225	0.0231	0.0219	0.0232	0.0240	0.0247	0.0236	0.0226	0.0225	0.0209	0.0210
0.0230	0.0152	0.0132	0.0147	0.0160	0.0145	0.0194	0.0272	0.0297	0.0291	0.0288	0.0288	0.0364	0.0389	0.0378	0.0357	0.0373	0.0395	0.0402	0.0359	0.0341	0.0341	0.0320	0.0341
0.0417	0.0266	0.0277	0.0288	0.0300	0.0292	0.0328	0.0383	0.0423	0.0418	0.0422	0.0413	0.0449	0.0487	0.0507	0.0479	0.0512	0.0513	0.0547	0.0572	0.0529	0.0535	0.0524	0.0542
0.0417	0.0266	0.0277	0.0288	0.0300	0.0292	0.0328	0.0383	0.0423	0.0418	0.0422	0.0413	0.0449	0.0487	0.0507	0.0479	0.0512	0.0513	0.0547	0.0572	0.0529	0.0535	0.0514	0.0542
0.0467	0.0292	0.0297	0.0312	0.0327	0.0314	0.0363	0.0423	0.0468	0.0462	0.0467	0.0458	0.0398	0.0431	0.0449	0.0418	0.0454	0.0454	0.0479	0.0505	0.0468	0.0473	0.0448	0.0473

Caline 4 input for 2032 Q3

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R49	837580.27	819479.94	837634.37	819454.01	13	0	1
R50	837490.85	819587.90	837656.16	819502.08	18	0	1
R51+52	837658.64	819502.89	837588.73	819343.19	30	0	1
R51+52	837588.72	819343.19	837662.52	819256.02	20	0	1
R53+54	837654.81	819467.71	837727.20	819473.90	14	0	1
R53+54	837727.20	819473.90	837769.09	819428.65	14	0	1
R53+54	837769.09	819428.65	837746.05	819388.98	14	0	1
R53+54	837746.05	819388.98	837698.63	819327.32	14	0	1
R53+54	837698.63	819327.32	837680.34	819301.31	14	0	1
R53+54	837680.34	819301.31	837658.16	819248.02	14	0	1
R55+56	837579.28	819257.53	837564.22	819256.11	25	0	1
R56-1	837454.97	819257.53	837447.06	819271.48	11	0	1
R56-2+56-3	837429.73	819152.58	837424.80	819071.39	18	0	1
R57+58	837564.88	819258.09	837661.38	819251.64	25	0	1
R59	837681.10	819246.24	837745.73	819231.27	14	0	1
R59	837745.70	819231.27	837738.05	819070.31	14	0	1
R60	837860.25	819247.58	837851.46	819088.38	15	0	1
R61	837870.59	819244.48	837861.86	819089.18	15	0	1
R62+63	837965.20	819255.29	837952.77	819138.26	17	0	1
R64+65	837960.69	819256.27	837978.88	819146.90	21	0	1
R64+65	837978.88	819146.90	837975.43	819071.78	21	0	1
R66+67	837978.38	819128.90	837992.22	819129.78	18	0	1
R68	837990.78	819325.87	837989.82	819289.11	18	0	1
R69	837963.67	819280.98	837338.48	819248.43	18	0	1
R69	837338.48	819248.43	837370.52	819252.88	18	0	1
R70+71	837236.08	819234.58	837318.11	819185.17	18	0	1
R72+73	837204.77	819182.19	837992.22	819129.80	18	0	1
R74+75	837347.48	819248.52	837992.25	819129.78	18	0	1
R76	837992.22	819128.80	837967.77	819076.01	18	0	1
R77	837996.87	819073.43	837992.18	819112.48	15	0	1
R77	837992.18	819112.48	837187.06	819105.41	15	0	1
R77-1+77-2	837219.36	819101.10	837181.53	819039.58	12	0	1
R78	837287.86	819072.24	837275.45	819071.10	18	0	1
R79	837187.48	818930.83	837217.48	818979.71	12	0	1
R79	837217.48	818979.71	837196.74	819022.02	12	0	1
R79	837196.74	819022.02	837140.45	819055.84	12	0	1
R80+81	837375.46	819071.78	837373.52	818888.96	21	0	1
R80-1+80-2	837374.53	819864.57	837228.05	818985.77	12	0	1
R80-1+80-2	837228.05	818985.77	837227.94	818932.14	12	0	1
R80-1+80-2	837227.94	818932.14	837337.68	818930.87	12	0	1
R82	837375.44	819672.43	837548.00	819672.05	15	0	1
R83	837545.29	819805.98	837548.30	819672.06	18	0	1
R84+85	837548.30	819671.82	837656.81	819067.81	13	0	1
R86+87	837656.62	819049.10	837655.06	818848.83	24	0	1
R88	837656.75	819066.78	837781.39	819069.96	13	0	1
R88	837781.39	819069.96	837753.18	819011.29	13	0	1
R89	837781.97	819657.79	837822.89	819010.58	18	0	1
R89	837822.89	819619.58	837890.36	819583.45	18	0	1
R90	837890.96	819583.45	837940.35	819096.18	18	0	1
R89	837940.33	819696.18	837872.06	819756.34	18	0	1
R90	837781.83	819657.31	837871.31	819756.62	18	0	1
R91	837903.23	819778.91	837879.37	819749.90	15	0	1
R92	837872.23	819756.53	837740.50	819672.80	18	0	1
R92-1	837894.09	819735.98	837717.80	819714.33	13	0	1
R92-1	837717.80	819714.33	837807.21	819814.13	13	0	1
R92-2	837894.96	819831.41	837830.84	819782.97	13	0	1
R93	837783.24	819835.46	837821.72	819678.91	13	0	1
R94+95	837774.63	819819.41	837714.67	819831.26	25	0	1
R96+97	837833.60	819690.38	837655.12	819636.05	18	0	1
R98	837704.89	819658.46	837530.23	819837.12	18	0	1
R99	837582.68	819914.03	837618.82	819687.88	18	0	1
R99	837618.82	819687.88	837585.57	820011.10	18	0	1
R99	837585.57	820011.10	837529.83	819938.49	14	0	1
R100	837550.18	820019.70	837514.19	819942.95	13	0	1
R101+102	837484.33	819966.87	837483.82	820030.48	18	0	1
R103+104	837514.78	819944.23	837371.45	820015.77	18	0	1
R105+106	837368.85	820024.78	837370.45	819884.41	25	0	1
R107+108	837291.26	819989.85	837291.72	819884.54	18	0	1
R108-1	837367.38	820008.79	837368.24	819884.25	18	0	1
R108	837291.42	819883.77	837370.45	819884.77	18	0	1
R110+111	837483.90	819966.87	837414.74	819845.38	18	0	1
R110+111	837414.74	819880.38	837498.00	819823.33	18	0	1
R112	837498.50	819823.82	837513.96	819943.26	12	0	1
R113	837530.08	819836.43	837471.36	819808.89	12	0	1
R114+115	836932.82	819969.33	836953.22	819580.42	18	0	1
R114+115	836953.22	819580.42	837026.89	819532.62	18	0	1
R114+115	837026.89	819532.62	837033.17	819468.00	18	0	1
R114+115	837033.17	819468.00	837010.91	819450.85	18	0	1
R114+115	837010.91	819455.85	836887.35	819427.73	18	0	1
R116+117	836948.27	819135.90	837022.42	819062.49	28	0	1
R118+119	837135.68	818223.91	837079.43	819129.58	18	0	1
R118+119	837079.43	819129.58	837022.42	819062.49	18	0	1
R120+121	837023.88	819063.84	837118.87	818957.84	22	0	1

RSP (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
0.0168	0.0154	0.0162	0.0155	0.0162	0.0187	0.0215	0.0293	0.0321	0.0289	0.0292	0.0300	0.0157	0.0166	0.0151	0.0147	0.0150	0.0157	0.0158	0.0114	0.0108	0.0106	0.0097	0.0101
0.0327	0.0166	0.0166	0.0170	0.0183	0.0188	0.0229	0.0329	0.0358	0.0336	0.0343	0.0347	0.0362	0.0385	0.0379	0.0358	0.0370	0.0376	0.0388	0.0350	0.0313	0.0302	0.0273	0.0292
0.0413	0.0262	0.0269	0.0280	0.0293	0.0286	0.0324	0.0388	0.0424	0.0419	0.0422	0.0414	0.0414	0.0452	0.0465	0.0439	0.0469	0.0470	0.0502	0.0519	0.0481	0.0486	0.0466	0.0491
0.0413	0.0262	0.0269	0.0280	0.0293	0.0286	0.0324	0.0388	0.0424	0.0419	0.0422	0.0414	0.0414	0.0452	0.0465	0.0439	0.0469	0.0470	0.0502	0.0519	0.0481	0.0486	0.0466	0.0491
0.0446	0.0281	0.0283	0.0295	0.0310	0.0300	0.0350	0.0410	0.0453	0.0447	0.0451	0.0441	0.0392	0.0425	0.0441	0.0412	0.0445	0.0446	0.0470	0.0493	0.0457	0.0462	0.0437	0.0462

Caline 4 input for 2032 Q3

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	837144.25	819218.15	837203.38	819316.45	19	0	1
R1-1+1-2	837123.65	819273.98	837146.18	819294.34	8	0	1
R1-1+1-2	837146.19	819294.34	837178.20	819275.45	8	0	1
R3+4	837203.20	819318.71	837244.44	819385.38	15	0	1
R3+4	837244.44	819385.38	837294.34	819500.43	19	0	1
R5+6	837136.87	819222.68	837191.42	819160.17	19	0	1
R7	837252.30	819287.96	837203.88	819318.88	19	0	1
R8	837250.13	819395.18	837297.53	819366.57	19	0	1
R8	837181.44	819180.13	837114.47	819063.78	14	0	1
R8	837114.47	819063.78	837071.73	819001.62	14	0	1
R10	837204.38	819182.35	837178.04	819137.84	14	0	1
R10	837178.04	819137.84	837195.32	819100.25	14	0	1
R15	837185.32	819100.25	837136.28	819052.06	14	0	1
R10	837138.28	819052.06	837119.98	819027.81	14	0	1
R10	837119.98	819027.81	837085.15	818991.78	14	0	1
R11	837191.06	819180.20	837287.41	819368.58	14	0	1
R12	837205.03	819182.75	837311.47	819360.17	14	0	1
R13+14	837295.88	819502.02	837310.18	819809.31	18	0	1
R15	837298.42	819385.30	837350.18	819483.70	16	0	1
R15	837350.19	819483.70	837388.53	819558.09	16	0	1
R16	837311.53	819386.22	837335.82	819402.82	14	0	1
R16	837335.83	819402.82	837348.37	819423.08	14	0	1
R16	837348.37	819423.08	837374.20	819511.47	14	0	1
R16	837374.20	819511.47	837378.50	819544.32	14	0	1
R15	837378.50	819544.32	837388.91	819599.02	16	0	1
R15	837388.91	819599.02	837388.88	819634.45	14	0	1
R17	837283.80	819499.19	837349.69	819483.88	18	0	1
R17	837358.39	819551.80	837303.31	819556.49	18	0	1
R19	837389.79	819641.48	837479.21	819584.48	18	0	1
R20	837309.72	819610.20	837388.21	819810.46	18	0	1
R21	837398.93	820020.52	837521.82	819952.21	16	10	4
R21	837521.82	819952.21	837402.10	819695.92	16	10	4
R21	837402.10	819695.92	837383.08	819648.78	16	10	4
R21	837383.08	819648.78	837371.88	819607.03	16	10	4
R21	837371.88	819607.03	837358.48	819522.74	16	10	4
R21	837359.46	819522.74	837348.79	819478.27	16	10	4
R21	837348.79	819478.27	837336.42	819436.51	16	10	4
R21	837336.42	819436.51	837309.44	819382.87	16	10	4
R21	837309.44	819382.87	837188.51	819147.58	16	10	4
R21	837188.51	819147.58	837134.75	819080.88	16	5	4
R21	837134.75	819080.88	837079.22	818996.37	16	0	1
R22	837587.30	820017.81	837531.11	819948.15	16	10	4
R22	837531.11	819948.15	837407.02	819681.71	16	10	4
R22	837407.02	819681.71	837388.81	819632.81	16	10	4
R22	837388.81	819632.81	837377.18	819576.34	16	10	4
R22	837377.18	819576.34	837367.78	819507.82	16	10	4
R22	837367.78	819507.82	837348.65	819442.18	16	10	4
R22	837349.65	819442.18	837321.88	819383.09	16	10	4
R22	837321.88	819383.09	837176.20	819140.91	16	10	4
R22	837176.20	819140.91	837142.64	819078.01	16	5	4
R22	837142.64	819078.01	837115.31	819034.09	16	0	1
R22	837115.31	819034.09	837082.10	818995.22	16	0	1
R23+24	837309.88	819810.18	837253.13	819809.83	18	0	1
R23+24	837253.13	819809.82	837251.42	819884.34	18	0	1
R25	837395.87	819608.37	837364.64	819884.29	16	0	1
R28	837375.84	819884.44	837377.87	819709.26	17	0	1
R28	837377.87	819709.26	837388.26	819838.33	17	0	1
R27	837471.04	819809.84	837406.96	819672.38	12	0	1
R27	837406.96	819672.38	837282.16	819678.45	13	0	1
R27	837282.16	819679.45	837498.14	819823.83	13	0	1
R27-1+27-2	837406.98	819738.76	837487.35	819713.23	18	0	1
R28	837441.46	819814.52	837515.91	819774.27	18	0	1
R29	837516.13	819774.12	837582.87	819914.86	18	0	1
R30	837533.22	819890.53	837582.77	819737.87	19	0	1
R31	837587.02	819715.44	837705.83	819853.48	16	0	1
R32	837721.85	819850.04	837584.52	819705.87	16	0	1
R33	837782.47	819836.14	837634.05	819667.74	13	0	1
R34	837717.34	819588.31	837584.68	819705.85	18	0	1
R35	837587.03	819715.45	837480.51	819583.72	16	0	1
R36	837584.51	819705.86	837481.65	819588.80	16	0	1
R37	837588.98	819715.41	837471.78	819611.84	19	0	1
R38+39	837781.33	819857.04	837674.27	819539.63	18	0	1
R38+39	837674.27	819539.63	837696.64	819502.86	18	0	1
R40	837375.55	819252.71	837387.13	819425.03	18	0	1
R40	837387.13	819425.03	837370.01	819454.42	18	0	1
R40	837370.01	819454.42	837383.63	819484.43	18	0	1
R40	837383.63	819484.43	837482.25	819583.95	18	0	1
R41	837491.55	819588.70	837380.25	819482.08	18	0	1
R41	837380.25	819482.08	837380.18	819319.87	18	0	1
R41	837380.18	819319.87	837383.47	819255.41	18	0	1
R42+43	837471.48	819258.12	837476.84	819381.98	13	0	1
R46	837470.88	819382.07	837380.21	819382.12	14	0	1
R44-1	837471.34	819382.08	837471.55	819414.34	14	0	1
R44-1	837471.55	819414.34	837410.47	819442.02	14	0	1
R45+48	837470.98	819382.07	837536.04	819382.04	14	0	1
R45+48	837536.04	819382.04	837529.78	819478.33	14	0	1
R47	837514.38	819508.88	837542.71	819582.45	11	0	1
R48	837447.83	819528.73	837560.01	819478.85	13	0	1

FSP (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
0.0181	0.0133	0.0129	0.0126	0.0133	0.0144	0.0170	0.0231	0.0253	0.0244	0.0241	0.0243	0.0192	0.0205	0.0203	0.0195	0.0203	0.0207	0.0215	0.0191	0.0177	0.0176	0.0164	0.0178
0.0216	0.0157	0.0157	0.0163	0.0177	0.0176	0.0205	0.0272	0.0305	0.0286	0.0284	0.0288	0.0322	0.0341	0.0337	0.0322	0.0336	0.0343	0.0354	0.0326	0.0300	0.0307	0.0282	0.0301
0.0216	0.0157	0.0157	0.0163	0.0177	0.0176	0.0205	0.0272	0.0305	0.0286	0.0284	0.0288	0.0322	0.0341	0.0337	0.0322	0.0336	0.0343	0.0354	0.0326	0.0300	0.0307	0.0282	0.0301
0.0198	0.0134	0.0111	0.0101	0.0115	0.0119	0.0164	0.0209	0.0278	0.0229	0.0224	0.0221	0.0165	0.0175	0.0183	0.0176	0.0185	0.0186	0.0198	0.0188	0.0171	0.0173	0.0166	0.0167
0.0198	0.0134	0.0111	0.0101	0.0115	0.0119	0.0164	0.0209	0.0278	0.0229	0.0224	0.0221	0.0165	0.0175	0.0183	0.0176	0.0185	0.0186	0.0198	0.0188	0.0171	0.0173	0.0166	0.0167
0.0184	0.0127	0.0110	0.0100	0.0112	0.0117	0.0156	0.0206	0.0275	0.0219	0.0213	0.0213	0.0145	0.0152	0.0157	0.0152	0.0160	0.0162	0.0170	0.0152	0.0140	0.0141	0.0130	0.0133
0.0273	0.0180	0.0168	0.0192	0.0222	0.0178	0.0214	0.0270	0.0389	0.0282	0.0292	0.0282	0.0198	0.0207	0.0213	0.0202	0.0214	0.0221	0.0228	0.0217	0.0208	0.0208	0.0192	0.0193
0.0212	0.0140	0.0121	0.0135	0.0147	0.0133	0.0179	0.0250	0.0273	0.0267	0.0265	0.0264	0.0335	0.0358	0.0349	0.0329	0.0343	0.0363	0.0370	0.0331	0.0315	0.0314	0.0294	0.0314
0.0384	0.0245	0.0255	0.0265	0.0276	0.0269	0.0302	0.0352	0.0389	0.0385	0.0388	0.0380	0.0413	0.0448	0.0466	0.0440	0.0471	0.0471	0.0503	0.0526	0.0486	0.0492	0.0473	0.0499
0.0384	0.0245	0.0255	0.0265	0.0276	0.0269	0.0302	0.0352	0.0389	0.0385	0.0388	0.0380	0.0413	0.0448	0.0466	0.0440	0.0471	0.0471	0.0503	0.0526	0.0486	0.0492	0.0473	0.0499
0.0429	0.0269	0.0273	0.0287	0.0301	0.0289	0.0334	0.0390	0.0430	0.0425	0.0430	0.0420	0.0366	0.0396	0.0413	0.0385	0.0418	0.0418	0.0441	0.0465	0.0431	0.0435	0.0412	0.0435

Caline 4 input for 2032 Q3

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R48	837380.07	819478.94	837634.37	819454.01	13	8	1
R50	837480.85	819567.90	837696.18	819500.06	16	8	1
R51+52	837655.64	819562.86	837586.72	819543.19	20	8	1
R51+52	837588.72	819343.19	837582.52	819256.02	20	8	1
R53+54	837654.81	819487.71	837727.20	819473.90	16	8	1
R53+54	837727.20	819473.90	837789.09	819426.65	16	8	1
R53+54	837789.09	819426.65	837748.05	819369.88	16	8	1
R53+54	837748.05	819369.88	837686.83	819327.32	16	8	1
R53+54	837686.83	819327.32	837682.34	819301.31	16	8	1
R53+54	837682.34	819301.31	837658.16	819348.02	16	8	1
R55+56	837378.38	819257.62	837564.22	819258.11	25	8	1
R56-1	837454.97	819257.62	837447.06	819071.48	11	8	1
R56-2+56-3	837425.73	819152.58	837424.80	819071.39	18	8	1
R57+58	837564.88	819258.09	837681.38	819251.64	25	8	1
R59	837681.10	819246.24	837745.70	819231.27	14	8	1
R59	837745.70	819231.27	837738.05	819072.31	14	8	1
R60	837682.29	819247.58	837651.46	819068.38	13	8	1
R61	837670.38	819244.48	837681.86	819068.13	13	8	1
R62+63	837565.20	819256.28	837552.77	819138.28	17	8	1
R64+65	837380.89	819255.27	837378.88	819196.90	21	8	1
R64+65	837378.88	819196.90	837375.43	819071.78	21	8	1
R66+67	837378.09	819128.90	837292.22	819129.79	13	8	1
R68	837290.73	819326.67	837368.82	819268.11	15	8	1
R69	837282.97	819280.98	837338.48	819248.43	15	8	1
R69	837338.48	819248.43	837372.32	819253.88	15	8	1
R70+71	837236.06	819234.50	837318.11	819185.17	15	8	1
R72+73	837204.77	819182.19	837292.22	819129.60	18	8	1
R74+75	837547.48	819248.52	837292.25	819129.79	18	8	1
R76	837282.22	819128.60	837267.77	819078.01	13	8	1
R77	837298.57	819073.43	837202.18	819118.48	15	8	1
R77	837202.18	819118.48	837167.06	819125.41	15	8	1
R77-1+77-2	837218.56	819101.10	837181.53	819038.38	12	8	1
R78	837367.66	819072.24	837375.45	819071.18	18	8	1
R79	837187.48	818830.82	837217.48	818879.71	12	8	1
R79	837217.48	818879.71	837196.74	819022.02	12	8	1
R79	837196.74	819022.02	837146.45	819055.94	12	8	1
R80+81	837375.48	819071.78	837373.52	819068.96	21	8	1
R80-1+80-2	837374.53	819084.57	837228.05	819085.77	12	8	1
R80-1+80-2	837228.05	819085.77	837227.94	818932.14	12	8	1
R80-1+80-2	837227.94	818932.14	837337.68	818930.67	12	8	1
R82	837375.44	819072.43	837348.00	819072.00	15	8	1
R82	837345.29	818905.98	837348.30	819072.00	18	8	1
R84+85	837348.30	819071.82	837606.61	819067.51	13	8	1
R86+87	837956.62	819088.18	837955.06	818948.82	24	8	1
R88	837856.75	819068.76	837781.38	819069.96	13	8	1
R88	837781.38	819068.96	837753.18	819011.28	13	8	1
R89	837781.67	819057.79	837622.98	819078.58	18	8	1
R89	837622.98	819018.59	837680.58	819068.45	18	8	1
R89	837890.58	819068.45	837940.35	819096.19	18	8	1
R89	837940.35	819096.19	837972.06	819156.54	18	8	1
R90	837781.62	819057.31	837871.91	819156.62	18	8	1
R91	837963.23	819776.91	837879.37	819749.90	13	8	1
R92	837872.22	819756.52	837740.50	819672.86	18	8	1
R92-1	837894.09	819735.88	837717.80	819714.33	13	8	1
R92-1	837717.80	819714.33	837807.61	819814.12	13	8	1
R92-2	837884.98	819831.41	837830.94	819782.97	13	8	1
R93	837783.24	819835.68	837821.72	819878.91	13	8	1
R94+95	837774.83	819819.41	837714.87	819831.36	28	8	1
R96+97	837833.80	819880.38	837855.12	819836.05	18	8	1
R98	837724.88	819856.48	837530.23	819837.12	18	8	1
R98	837582.68	819814.33	837618.82	819867.88	14	8	1
R99	837818.82	819867.88	837965.57	820011.10	14	8	1
R99	837965.57	820011.10	837528.80	819836.48	16	8	1
R100	837550.18	820018.70	837514.18	819842.95	13	8	1
R101+102	837464.33	819968.87	837483.82	820030.48	18	8	1
R103+104	837314.79	819844.23	837271.46	820018.77	18	8	1
R105+106	837368.95	820024.78	837370.45	819884.41	28	8	1
R107+108	837251.08	819868.93	837291.72	819884.34	18	8	1
R108-1	837307.38	820009.78	837308.24	819884.25	18	8	1
R108	837291.42	819883.77	837270.45	819884.77	18	8	1
R110+111	837463.90	819968.87	837414.74	819882.38	18	8	1
R110+111	837414.74	819860.38	837458.06	819823.33	18	8	1
R112	837458.50	819823.82	837513.86	819843.08	12	8	1
R113	837532.08	819838.42	837471.38	819828.88	12	8	1
R114+115	836932.82	819868.33	836953.22	819580.42	16	8	1
R114+115	836953.22	819580.42	837026.88	819532.82	16	8	1
R114+115	837026.88	819532.82	837533.17	819483.00	18	8	1
R114+115	837533.17	819483.00	837010.91	819450.83	16	8	1
R114+115	837010.91	819455.95	836867.35	819427.73	16	8	1
R116+117	836848.07	819130.90	837022.42	819062.48	28	8	1
R118+119	837135.86	818225.51	837078.43	819129.58	18	8	1
R118+119	837078.43	819129.58	837022.42	819062.48	18	8	1
R120+121	837023.86	819063.94	837118.87	818957.84	22	8	1

FSP (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
0.0154	0.0143	0.0149	0.0143	0.0149	0.0172	0.0198	0.0270	0.0295	0.0266	0.0269	0.0276	0.0144	0.0153	0.0139	0.0136	0.0138	0.0145	0.0145	0.0105	0.0099	0.0097	0.0089	0.0093
0.0209	0.0153	0.0152	0.0156	0.0168	0.0173	0.0211	0.0302	0.0329	0.0308	0.0315	0.0319	0.0333	0.0354	0.0349	0.0330	0.0341	0.0346	0.0357	0.0322	0.0288	0.0277	0.0251	0.0269
0.0380	0.0241	0.0248	0.0357	0.0269	0.0263	0.0299	0.0357	0.0390	0.0385	0.0389	0.0381	0.0381	0.0416	0.0428	0.0406	0.0432	0.0433	0.0461	0.0478	0.0442	0.0447	0.0428	0.0452
0.0380	0.0241	0.0248	0.0357	0.0269	0.0263	0.0299	0.0357	0.0390	0.0385	0.0389	0.0381	0.0381	0.0416	0.0428	0.0406	0.0432	0.0433	0.0461	0.0478	0.0442	0.0447	0.0428	0.0452
0.0410	0.0258	0.0260	0.0272	0.0286	0.0276	0.0322	0.0377	0.0417	0.0411	0.0416	0.0406	0.0361	0.0390	0.0406	0.0379	0.0410	0.0410	0.0433	0.0454	0.0420	0.0425	0.0402	0.0425

Caline 4 input for 2032 Q4

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	337144.25	819218.15	337203.38	819316.45	18	0	1
R1-1+1-2	337133.85	819273.96	337148.19	819294.34	8	0	1
R1-1+1-2	337148.19	819294.34	337178.20	819273.45	8	0	1
R3+4	337203.20	819318.71	337244.44	819385.38	15	0	1
R3+4	337244.44	819385.38	337294.34	819500.43	15	0	1
R5+6	337138.87	819222.88	337191.42	819190.17	18	0	1
R7	337252.30	819287.98	337203.69	819218.86	18	0	1
R8	337250.13	819295.18	337297.53	819368.57	18	0	1
R9	337191.44	819190.13	337114.47	819083.78	14	0	1
R9	337114.47	819083.78	337071.75	819001.82	14	0	1
R10	337254.98	819182.55	337178.04	819137.84	14	0	1
R10	337178.04	819137.84	337165.32	819100.25	14	0	1
R10	337165.32	819100.25	337138.28	819052.06	14	0	1
R10	337138.28	819052.06	337118.98	819027.81	14	0	1
R10	337118.98	819027.81	337085.15	818991.79	14	0	1
R11	337191.26	819190.20	337287.41	819368.58	14	0	1
R12	337205.03	819182.75	337311.47	819360.17	14	0	1
R13+14	337295.88	819500.02	337318.18	819809.31	16	0	1
R15	337299.42	819365.30	337350.19	819483.70	16	0	1
R15	337350.19	819483.70	337396.53	819606.09	16	0	1
R16	337311.53	819360.02	337333.82	819402.92	14	0	1
R16	337335.83	819402.92	337348.37	819433.68	14	0	1
R16	337348.37	819433.68	337374.20	819511.47	14	0	1
R16	337374.20	819511.47	337378.30	819564.32	14	0	1
R18	337378.30	819564.32	337388.91	819588.02	14	0	1
R18	337388.91	819588.02	337389.89	819636.45	14	0	1
R17	337393.80	819499.19	337349.68	819483.86	18	0	1
R19	337398.39	819551.80	337303.51	819508.49	18	0	1
R19	337388.79	819641.46	337479.21	819584.49	18	0	1
R20	337309.72	819610.00	337386.21	819610.48	18	0	1
R21	337558.85	820020.52	337521.62	819952.21	16	10	4
R21	337521.62	819952.21	337402.12	819695.92	16	10	4
R21	337402.10	819695.92	337383.08	819648.78	16	10	4
R21	337383.08	819648.78	337371.88	819627.03	16	10	4
R21	337371.88	819627.03	337358.48	819522.74	16	10	4
R21	337358.48	819522.74	337349.78	819478.27	16	10	4
R21	337349.79	819478.27	337338.42	819438.51	16	10	4
R21	337338.42	819438.51	337309.44	819382.87	16	10	4
R21	337309.44	819382.87	337188.51	819147.58	16	10	4
R21	337188.51	819147.58	337154.75	819080.88	16	5	4
R21	337134.75	819082.88	337079.22	818998.37	16	5	1
R22	337567.30	820017.81	337531.11	819948.19	16	10	4
R22	337531.11	819948.19	337467.22	819681.71	16	10	4
R22	337467.22	819681.71	337388.81	819632.91	16	10	4
R22	337388.81	819632.91	337377.18	819576.34	16	10	4
R22	337377.18	819576.34	337367.78	819527.82	16	10	4
R22	337367.78	819527.82	337349.85	819442.16	16	10	4
R22	337349.85	819442.16	337321.86	819383.08	16	10	4
R22	337321.86	819383.08	337176.20	819140.91	16	10	4
R23	337178.20	819140.91	337142.84	819076.01	16	5	4
R22	337142.84	819076.01	337115.31	819034.09	16	5	1
R22	337115.31	819034.09	337082.10	818985.22	16	5	1
R23+24	337309.88	819810.18	337253.13	819709.82	18	0	1
R23+24	337253.13	819709.82	337291.42	819684.34	18	0	1
R25	337365.87	819808.27	337384.84	819884.29	16	0	1
R26	337375.84	819884.44	337377.07	819709.26	17	0	1
R26	337377.07	819709.26	337388.20	819658.33	17	0	1
R27	337471.04	819809.84	337408.96	819672.39	13	0	1
R27	337408.96	819672.39	337392.16	819679.45	13	0	1
R27	337382.16	819679.45	337458.14	819823.63	13	0	1
R27-1+27-2	337428.99	819736.79	337487.35	819713.23	18	0	1
R28	337441.48	819814.32	337315.91	819774.27	18	0	1
R28	337316.13	819774.12	337280.87	819914.86	18	0	1
R30	337833.22	819890.53	337562.77	819737.87	18	0	1
R31	337587.32	819715.44	337708.83	819853.49	16	0	1
R32	337721.85	819830.04	337584.52	819705.87	16	0	1
R33	337782.47	819836.14	337634.05	819687.74	13	0	1
R34	337717.34	819588.31	337584.88	819705.85	18	0	1
R35	337587.33	819715.45	337482.01	819583.72	18	0	1
R36	337584.51	819705.68	337481.80	819568.80	18	0	1
R37	337586.88	819715.41	337471.78	819811.54	18	0	1
R38+39	337781.33	819857.04	337674.27	819539.83	18	0	1
R38+39	337674.27	819539.83	337655.84	819502.99	18	0	1
R40	337370.55	819252.71	337367.13	819425.03	16	0	1
R40	337367.13	819425.03	337370.01	819434.42	16	0	1
R40	337370.01	819434.42	337383.63	819484.43	16	0	1
R40	337383.63	819484.43	337480.25	819583.95	16	0	1
R41	337491.55	819588.72	337380.25	819462.08	16	0	1
R41	337380.25	819462.08	337380.18	819319.87	16	0	1
R41	337380.18	819319.87	337383.41	819256.41	16	0	1
R42+43	337471.48	819258.12	337470.94	819381.96	13	0	1
R44	337470.96	819382.07	337380.21	819382.12	14	0	1
R44-1	337471.34	819382.08	337471.35	819414.34	14	0	1
R44-1	337471.35	819414.34	337410.47	819442.02	14	0	1
R45+46	337472.96	819382.07	337536.04	819382.04	14	0	1
R45+46	337536.04	819382.04	337579.78	819478.33	14	0	1
R47	337514.08	819508.68	337542.71	819582.45	11	0	1
R48	337447.82	819538.73	337580.01	819478.85	13	0	1

VKT/hr for each road (include the VKT for each sub-section; not directly used by caline4)

Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
39.006	24.000	14.306	11.795	10.500	13.700	25.900	71.311	74.111	69.221	65.722	67.111	72.284	67.600	73.305	70.994	74.493	76.694	78.594	74.794	64.289	58.000	53.994	48.600
78.450	48.416	28.550	24.370	21.050	27.350	52.316	143.983	149.067	138.866	131.300	134.966	104.650	97.083	104.934	102.233	107.033	110.333	113.033	107.633	92.584	83.283	77.850	69.734
78.450	48.416	28.550	24.370	21.050	27.350	52.316	143.983	149.067	138.866	131.300	134.966	104.650	97.083	104.934	102.233	107.033	110.333	113.033	107.633	92.584	83.283	77.850	69.734
38.850	23.800	13.837	11.442	10.550	13.550	25.585	70.423	73.436	68.336	64.687	66.536	82.135	77.015	83.050	80.950	84.850	87.250	89.350	85.164	73.100	65.586	61.036	55.350
38.850	23.800	13.837	11.442	10.550	13.550	25.585	70.423	73.436	68.336	64.687	66.536	82.135	77.015	83.050	80.950	84.850	87.250	89.350	85.164	73.100	65.586	61.036	55.350
14.520	9.020	5.406	4.295	3.900	5.100	9.720	26.745	27.745	25.950	24.650	25.145	42.680	39.826	43.190	41.885	43.990	45.245	46.345	44.085	37.921	34.167	31.908	28.649
1.240	0.802	0.440	0.360	0.320	0.484	0.840	2.364	2.402	2.242	2.165	2.162	7.562	6.958	7.642	7.360	7.720	8.002	8.160	7.760	6.680	5.958	5.558	4.998
6.100	3.750	2.200	1.850	1.703	2.098	4.050	11.150	11.550	10.750	10.353	10.450	7.500	6.947	7.603	7.350	7.750	7.950	8.150	7.750	6.700	6.000	5.548	5.050
72.480	44.480	26.400	22.080	19.520	25.440	48.000	132.809	137.440	128.000	121.448	124.312	124.800	116.688	125.760	122.232	128.320	132.000	135.360	128.800	110.712	99.680	92.952	83.848
72.480	44.480	26.400	22.080	19.520	25.440	48.000	132.809	137.440	128.000	121.448	124.312	124.800	116.688	125.760	122.232	128.320	132.000	135.360	128.800	110.712	99.680	92.952	83.848
96.640	59.528	35.200	29.273	26.080	34.088	64.328	176.800	183.360	170.720	162.088	165.920	155.208	144.640	156.488	152.168	159.528	164.168	168.328	160.336	137.928	124.176	115.680	104.000

Caline 4 input for 2032 Q4

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R48	337580.57	819478.94	337934.37	819454.91	43	0	1
R50	337490.85	819587.90	337858.18	819500.38	18	0	1
R51=52	337855.64	819502.99	337588.72	819343.19	20	0	1
R51=52	337584.72	819343.19	337582.52	819256.02	20	0	1
R53=54	337854.81	819487.71	337727.20	819473.90	14	0	1
R53=54	337727.20	819473.90	337780.09	819426.83	14	0	1
R53=54	337780.09	819426.83	337746.26	819386.98	14	0	1
R53=54	337746.26	819386.98	337688.43	819327.32	14	0	1
R53=54	337688.43	819327.32	337680.34	819301.31	14	0	1
R53=54	337680.34	819301.31	337658.16	819248.32	14	0	1
R55=56	337379.38	819257.43	337364.22	819258.11	25	0	1
R58-1	337454.97	819257.83	337447.06	819071.48	11	0	1
R56-2=58-3	337425.73	819150.38	337424.80	819071.88	18	0	1
R57=58	337564.88	819258.09	337661.36	819251.84	25	0	1
R58	337681.10	819248.34	337745.70	819231.27	14	0	1
R58	337745.70	819231.27	337759.95	819070.31	14	0	1
R60	337660.25	819247.58	337651.48	819089.38	15	0	1
R61	337679.38	819244.48	337681.88	819089.18	15	0	1
R62=63	337585.20	819255.28	337582.77	819138.26	17	0	1
R64=65	337280.68	819255.27	337276.88	819136.80	21	0	1
R64=65	337278.88	819136.80	337275.43	819071.78	21	0	1
R66=67	337278.08	819128.80	337292.22	819129.79	18	0	1
R68	337280.78	819225.67	337288.82	819289.11	18	0	1
R69	337283.97	819260.88	337338.48	819248.43	18	0	1
R69	337338.48	819248.43	337370.52	819252.88	18	0	1
R70=71	337234.08	819234.50	337318.11	819185.17	18	0	1
R72=73	337204.77	819182.19	337292.22	819129.80	18	0	1
R74=75	337347.48	819248.32	337282.25	819129.79	18	0	1
R76	337292.22	819129.80	337287.77	819078.01	18	0	1
R77	337288.87	819073.43	337202.18	819110.48	15	0	1
R77	337202.18	819110.48	337187.08	819105.41	15	0	1
R77-1=77-2	337218.98	819101.10	337181.53	819038.58	12	0	1
R78	337287.66	819072.24	337375.45	819071.10	18	0	1
R79	337187.48	819930.82	337217.48	819979.71	12	0	1
R79	337217.48	819879.71	337186.74	819022.32	12	0	1
R79	337186.74	819022.32	337140.45	819055.94	13	0	1
R80=81	337375.48	819071.78	337373.52	818888.96	21	0	1
R82-1=82-2	337374.53	818884.57	337228.55	818885.77	12	0	1
R82-1=82-2	337228.55	818885.77	337227.94	818832.14	12	0	1
R82-1=82-2	337227.94	818832.14	337337.88	818830.67	12	0	1
R82	337375.44	819072.43	337548.80	819072.00	18	0	1
R83	337545.29	818905.98	337548.30	819072.00	18	0	1
R84=85	337548.30	819071.82	337656.81	819087.51	13	0	1
R84=87	337656.82	819088.10	337655.06	818948.83	24	0	1
R88	337658.75	819066.79	337781.36	819089.96	12	0	1
R88	337781.36	819089.96	337753.16	819011.28	13	0	1
R89	337781.87	819057.79	337822.89	819018.58	18	0	1
R89	337822.89	819018.58	337890.56	819588.45	18	0	1
R89	337890.56	819588.45	337940.35	819695.19	18	0	1
R89	337940.35	819696.19	337672.06	819756.34	18	0	1
R90	337781.33	819057.31	337871.51	819736.62	18	0	1
R91	337903.23	819776.91	337879.37	819749.90	15	0	1
R92	337872.23	819756.53	337740.56	819872.80	18	0	1
R92-1	337894.09	819735.86	337717.80	819714.33	13	0	1
R92-1	337717.80	819714.33	337807.51	819814.10	13	0	1
R92-2	337894.96	819831.41	337830.84	819782.87	13	0	1
R93	337781.24	819835.46	337821.72	819878.81	13	0	1
R94=95	337774.63	819818.41	337714.67	819851.36	28	0	1
R96=97	337833.60	819890.36	337655.12	819838.85	18	0	1
R98	337754.86	819858.46	337530.23	819837.12	18	0	1
R99	337582.88	819914.03	337816.82	819887.88	14	0	1
R99	337816.82	819887.88	337965.57	820011.10	14	0	1
R99	337965.57	820011.10	337529.83	819938.49	14	0	1
R100	337358.18	820019.76	337514.19	819942.95	13	0	1
R101=102	337464.33	819966.87	337483.62	820030.66	18	0	1
R103=104	337514.78	819944.23	337371.40	820010.77	18	0	1
R105=106	337369.85	820024.76	337370.45	819884.41	28	0	1
R107=108	337251.06	819889.95	337251.72	819884.54	18	0	1
R108-1	337307.38	820009.79	337368.24	819884.25	18	0	1
R108	337251.42	819883.77	337370.45	819884.77	18	0	1
R110=111	337483.90	819966.87	337414.74	819880.38	18	0	1
R110=111	337414.74	819880.38	337458.00	819823.33	18	0	1
R112	337458.30	819823.82	337513.98	819943.06	12	0	1
R113	337530.06	819836.43	337471.36	819809.89	12	0	1
R114=115	336932.82	819968.83	336952.22	819580.42	18	0	1
R114=115	336953.22	819980.42	337029.88	819532.82	18	0	1
R114=115	337029.88	819532.82	337033.17	819488.00	18	0	1
R114=115	337033.17	819488.00	337010.91	819455.85	18	0	1
R114=115	337010.91	819455.85	336887.35	819427.73	18	0	1
R116=117	336948.37	819135.90	337022.42	819042.48	26	0	1
R118=119	337139.66	819223.51	337079.43	819129.58	18	0	1
R118=119	337079.43	819129.58	337022.42	819042.48	18	0	1
R120=121	337023.88	819043.84	337118.87	818957.84	22	0	1

VKT/hr for each road (include the VKT for each sub-section; not directly used by caline4)

Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
1.900	1.200	0.700	0.600	0.500	0.639	1.300	3.511	3.650	3.413	3.311	3.300	1.800	1.700	1.800	1.750	1.850	1.900	1.950	1.859	1.600	1.450	1.350	1.200
38.842	23.833	13.987	12.080	10.572	13.694	25.692	70.834	73.412	68.309	64.888	66.450	35.350	32.910	35.615	34.529	36.383	37.470	38.368	36.572	31.469	28.174	26.378	23.840
215.680	132.480	78.600	65.470	58.120	75.640	143.000	395.218	409.240	381.200	361.658	370.102	332.610	310.088	335.160	325.832	341.930	351.600	360.560	342.790	295.312	265.680	247.542	223.258
215.680	132.480	78.600	65.470	58.120	75.640	143.000	395.218	409.240	381.200	361.658	370.102	332.610	310.088	335.160	325.832	341.930	351.600	360.560	342.790	295.312	265.680	247.542	223.258
108.340	66.728	39.395	32.670	29.180	38.188	72.028	197.996	205.460	191.320	181.893	185.920	170.008	158.440	171.388	166.773	174.728	179.768	184.328	175.432	151.133	135.976	126.680	113.796
108.340	66.728	39.395	32.670	29.180	38.188	72.028	197.996	205.460	191.320	181.693

Caline 4 input for 2032 Q4

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	337144.25	819218.15	337203.38	819316.45	16	0	1
R1.1+1.2	337133.85	819273.96	337148.18	819294.34	8	0	1
R1.1+1.2	337148.18	819294.34	337178.29	819273.45	8	0	1
R3+4	337203.20	819316.71	337244.44	819385.38	15	0	1
R3+4	337244.44	819385.38	337284.34	819502.43	15	0	1
R3+8	337136.57	819222.86	337191.42	819195.17	16	0	1
R7	337262.30	819287.96	337203.68	819316.86	16	0	1
R8	337250.13	819395.16	337297.53	819386.57	16	0	1
R8	337191.44	819190.13	337114.47	819083.78	14	0	1
R8	337114.47	819083.78	337071.73	819001.82	14	0	1
R10	337204.98	819182.55	337178.04	819137.94	14	0	1
R10	337179.04	819137.84	337165.32	819100.25	14	0	1
R10	337165.32	819100.25	337138.28	819052.06	14	0	1
R10	337138.28	819052.06	337118.98	819027.81	14	0	1
R10	337118.98	819027.81	337095.15	818991.79	14	0	1
R11	337191.06	819198.20	337297.41	819366.58	14	0	1
R12	337205.03	819182.75	337311.47	819360.17	14	0	1
R13+14	337295.88	819500.92	337318.18	819609.21	18	0	1
R15	337298.42	819385.30	337350.19	819483.70	16	0	1
R15	337350.19	819483.70	337386.53	819608.09	16	0	1
R16	337311.53	819360.02	337335.82	819402.92	14	0	1
R16	337335.82	819402.92	337348.37	819433.08	14	0	1
R16	337348.37	819433.08	337374.20	819511.47	14	0	1
R16	337374.20	819511.47	337378.30	819544.32	14	0	1
R16	337378.30	819544.32	337388.91	819589.02	16	0	1
R16	337388.91	819589.02	337389.89	819636.45	16	0	1
R17	337293.80	819499.19	337348.88	819483.98	16	0	1
R18	337336.39	819551.80	337363.51	819558.49	16	0	1
R19	337389.79	819641.46	337479.21	819584.49	16	0	1
R20	337309.72	819618.90	337366.21	819618.48	16	0	1
R21	337396.93	820020.52	337521.62	819952.21	16	10	4
R21	337521.62	819952.21	337402.10	819695.92	16	10	4
R21	337402.10	819695.92	337283.58	819648.78	16	10	4
R21	337283.09	819648.78	337371.89	819607.03	16	10	4
R21	337371.89	819607.03	337358.46	819522.74	16	10	4
R21	337358.46	819522.74	337348.79	819476.27	16	10	4
R21	337348.79	819476.27	337338.42	819436.51	16	10	4
R21	337338.42	819436.51	337309.44	819383.87	16	10	4
R21	337309.44	819383.87	337168.51	819147.58	16	10	4
R21	337168.51	819147.58	337134.75	819080.88	16	5	4
R21	337134.75	819080.88	337079.22	818996.37	16	0	1
R22	337367.30	820017.81	337531.11	819948.18	16	10	4
R22	337531.11	819948.18	337407.02	819691.71	16	10	4
R22	337407.02	819691.71	337288.81	819632.91	16	10	4
R22	337288.81	819632.91	337377.18	819578.34	16	10	4
R22	337377.18	819578.34	337367.78	819567.82	16	10	4
R22	337367.78	819567.82	337349.65	819442.18	16	10	4
R22	337349.65	819442.18	337321.88	819383.09	16	10	4
R22	337321.88	819383.88	337179.20	819140.91	16	10	4
R22	337179.20	819140.91	337142.84	819079.01	16	5	4
R22	337142.84	819079.01	337115.31	819034.09	16	0	1
R22	337119.31	819034.09	337082.10	818995.22	16	0	1
R23+24	337208.86	819612.18	337253.13	819609.82	16	0	1
R23+24	337253.13	819609.82	337291.42	819884.34	16	0	1
R25	337385.87	819808.07	337364.84	819884.29	16	0	1
R26	337375.94	819884.44	337377.37	819799.26	17	0	1
R28	337377.27	819799.26	337388.20	819638.33	17	0	1
R27	337471.24	819838.84	337406.96	819672.30	13	0	1
R27	337406.96	819672.30	337382.19	819679.45	13	0	1
R27	337382.19	819679.45	337458.14	819823.83	13	0	1
R27-1+27-2	337436.99	819736.79	337487.35	819713.23	18	0	1
R28	337441.48	819814.32	337515.91	819774.27	18	0	1
R29	337519.13	819774.12	337580.87	819914.36	18	0	1
R30	337533.22	819890.53	337582.77	819737.87	18	0	1
R31	337587.02	819715.44	337708.83	819853.49	18	0	1
R32	337721.85	819850.24	337584.52	819705.67	18	0	1
R33	337782.47	819836.14	337834.05	819687.74	13	0	1
R34	337717.34	819568.31	337584.88	819705.85	18	0	1
R35	337587.03	819715.45	337482.51	819583.72	18	0	1
R36	337584.51	819705.86	337491.85	819588.80	18	0	1
R37	337584.86	819715.41	337471.78	819611.84	18	0	1
R38+39	337781.33	819657.04	337674.27	819538.83	18	0	1
R38+39	337674.27	819539.63	337635.94	819502.99	18	0	1
R40	337370.55	819252.71	337367.13	819425.03	18	0	1
R40	337367.13	819425.03	337370.01	819454.42	18	0	1
R40	337370.01	819454.42	337383.83	819484.43	18	0	1
R40	337383.83	819484.43	337480.25	819583.95	18	0	1
R41	337481.55	819588.70	337380.25	819462.58	18	0	1
R41	337383.25	819462.58	337382.19	819319.87	18	0	1
R41	337383.19	819319.87	337383.41	819255.41	18	0	1
R42+43	337471.46	819258.12	337470.84	819381.98	13	0	1
R44	337479.96	819382.07	337380.21	819382.12	14	0	1
R44-1	337471.54	819382.08	337471.55	819414.34	14	0	1
R44-1	337471.55	819414.34	337410.47	819442.52	14	0	1
R45+46	337479.98	819382.07	337536.04	819382.04	14	0	1
R45+46	337536.04	819382.04	337579.78	819478.33	14	0	1
R47	337514.08	819508.88	337542.71	819582.49	11	0	1
R48	337447.82	819538.73	337580.01	819478.85	13	0	1

Vehicle count for each road																						
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
390	240	143	118	105	137	259	715	741	692	657	671	723	676	733	710	745	767	786	748	643	580	540	486
264	163	96	82	71	92	176	484	501	467	441	454	353	327	354	345	361	372	381	363	312	281	262	235
264	163	96	82	71	92	176	484	501	467	441	454	353	327	354	345	361	372	381	363	312	281	262	235
132	81	47	39	36	46	87	239	249	232	219	226	278	260	281	274	287	295	302	288	247	222	206	187
132	81	47	39	36	46	87	239	249	232	219	226	278	260	281	274	287	295	302	288	247	222	206	187
146	91	54	43	39	51	98	269	279	261	248	253	432	403	437	424	445	458	469	446	384	346	323	290
31	20	11	9	8	12	21	59	60	56	54	54	189	174	191	184	193	200	204	194	167	149	139	125
122	75	44	37	34	42	81	223	231	215	205	209	150	139	152	147	155	159	163	155	134	120	111	101
453	278	165	138	122	159	300	830	859	800	759	777	780	728	786	764	802	825	846	805	692	623	581	524
453	278	165	138	122	159	300	830	859	800	759	777	780	728	786	764	802	825	846	805	692	623	581	524
604	372	220	183	163	213	402	1105	1146	1067	1013	1037	970	904	978	951	997	1026	1052	1002	862	776	723	650

Caline 4 input for 2032 Q4

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R48	337585.07	819478.84	337634.37	819454.31	13	8	1
R52	337490.35	819587.80	337606.18	819500.09	18	8	1
R51=52	337555.84	819502.89	337586.72	819343.19	20	8	1
R51=52	337586.72	819343.18	337562.62	819256.02	20	8	1
R53=54	337654.81	819487.71	337727.30	819472.30	14	8	1
R52=54	337727.30	819473.90	337788.09	819426.65	14	8	1
R53=54	337788.09	819426.65	337749.25	819388.98	14	8	1
R53=54	337746.05	819388.98	337698.63	819327.32	14	8	1
R53=54	337698.63	819327.32	337680.34	819301.31	14	8	1
R53=54	337680.34	819301.31	337658.18	819248.22	14	8	1
R55=56	337578.38	818257.83	337564.22	819258.11	25	8	1
R56-1	337454.87	819257.83	337447.06	819071.48	11	8	1
R56-2=56-3	337429.73	819130.58	337424.80	819071.89	18	8	1
R57=58	337564.88	819258.09	337661.36	819251.64	25	8	1
R58	337661.10	819248.24	337745.70	819231.27	14	8	1
R58	337745.70	819231.27	337738.05	819070.31	14	8	1
R60	337690.25	819247.58	337651.48	819069.36	15	8	1
R61	337672.36	819244.48	337681.88	819069.13	15	8	1
R62=63	337565.20	819255.29	337562.77	819138.26	17	8	1
R64=65	337380.88	819295.27	337378.88	819196.80	21	8	1
R64=65	337378.88	819196.80	337375.43	819071.79	21	8	1
R66=67	337378.06	819128.90	337292.22	819129.79	18	8	1
R68	337290.78	819325.87	337389.82	819288.11	18	8	1
R68	337283.87	819290.98	337338.48	819248.43	18	8	1
R69	337338.48	819248.43	337370.52	819253.88	18	8	1
R70=71	337298.08	819234.50	337318.11	819183.17	18	8	1
R72=73	337304.77	819192.19	337292.22	819129.80	18	8	1
R74=75	337347.48	819248.52	337292.25	819129.79	18	8	1
R76	337292.22	819129.60	337267.77	819078.01	18	8	1
R77	337268.87	819073.43	337202.18	819112.48	15	8	1
R77	337202.18	819112.48	337147.06	819105.41	15	8	1
R77=77-2	337218.98	819101.10	337181.52	819039.58	12	8	1
R78	337267.66	819072.24	337375.45	819071.10	18	8	1
R79	337187.48	818930.82	337217.48	818879.71	12	8	1
R79	337217.48	818879.71	337196.74	819022.02	12	8	1
R79	337196.74	819022.02	337148.45	819056.84	12	8	1
R80=81	337375.48	819071.79	337373.52	818888.96	21	8	1
R80-1=80-2	337374.53	818884.57	337228.05	818985.77	12	8	1
R80-1=80-2	337228.05	818985.77	337227.94	818832.14	12	8	1
R80-1=80-2	337227.94	818932.14	337337.88	818830.87	12	8	1
R82	337375.44	819072.43	337549.00	819072.00	15	8	1
R83	337545.29	818905.88	337548.30	819072.00	18	8	1
R84=85	337548.30	819071.82	337856.61	819067.81	13	8	1
R86=87	337656.82	819089.10	337856.06	818848.03	24	8	1
R88	337858.75	819066.78	337781.39	819089.96	13	8	1
R88	337781.39	819089.96	337752.18	819011.28	13	8	1
R89	337781.87	819057.79	337822.98	818918.58	18	8	1
R89	337822.98	818918.58	337895.98	818988.45	18	8	1
R89	337840.98	819088.45	337840.33	819096.18	18	8	1
R89	337840.33	819096.18	337872.06	818758.34	18	8	1
R90	337781.83	819057.31	337871.31	818758.62	18	8	1
R91	337903.23	818778.91	337879.37	818749.90	15	8	1
R92	337872.23	818758.53	337740.50	818672.80	18	8	1
R92-1	337694.08	818733.96	337717.80	818714.33	13	8	1
R92-1	337717.80	818714.33	337807.01	818814.12	13	8	1
R92-2	337844.96	818831.41	337830.94	818782.97	13	8	1
R93	337783.24	818835.48	337821.72	818678.91	13	8	1
R94=95	337774.83	818918.41	337714.87	818851.38	28	8	1
R96=97	337833.00	818890.38	337855.12	819038.05	18	8	1
R98	337704.89	818938.48	337830.23	819037.12	18	8	1
R98	337982.88	819014.03	337818.82	819067.88	14	8	1
R99	337818.82	819067.88	337565.57	820011.10	14	8	1
R99	337565.57	820011.10	337529.93	819836.49	14	8	1
R100	337550.18	820018.79	337514.18	819842.95	13	8	1
R101=102	337464.33	819886.87	337483.82	820030.46	18	8	1
R103=104	337514.79	819844.23	337371.40	820010.77	18	8	1
R105=106	337389.85	820034.79	337378.48	819884.41	28	8	1
R107=108	337251.96	819888.95	337251.72	819884.34	18	8	1
R108-1	337367.38	820099.79	337308.24	819884.25	18	8	1
R109	337291.42	819883.77	337370.48	819884.77	18	8	1
R110=111	337483.90	819868.87	337414.74	819880.38	18	8	1
R110=111	337414.74	819860.38	337458.00	819823.33	18	8	1
R112	337458.50	819823.80	337313.96	819843.08	12	8	1
R113	337530.24	819938.43	337471.36	819809.88	12	8	1
R114=115	336952.92	819868.03	336953.22	819580.42	18	8	1
R114=115	336953.22	819580.42	337029.84	819532.62	18	0	1
R114=115	337029.84	819532.62	337033.17	819488.00	18	0	1
R114=115	337033.17	819488.00	337013.91	819455.65	18	8	1
R116=115	337012.91	819455.65	336887.35	819427.73	18	8	1
R116=117	336948.07	819135.90	337022.42	819062.40	26	8	1
R118=119	337135.88	819223.91	337079.43	819129.58	18	8	1
R118=119	337079.43	819129.58	337022.42	819062.40	18	8	1
R120=121	337023.66	819083.84	337118.97	818857.84	22	8	1

Vehicle count for each road																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
38	24	14	12	10	13	26	70	73	68	64	66	36	34	36	35	37	38	39	37	32	29	27	24
216	132	78	67	59	76	143	394	408	379	360	369	196	183	198	192	202	208	213	203	175	157	147	133
1169	718	426	355	315	410	775	2142	2218	2066	1960	2006	1819	1696	1833	1782	1870	1923	1972	1875	1615	1453	1354	1221
1169	718	426	355	315	410	775	2142	2218	2066	1960	2006	1819	1696	1833	1782	1870	1923	1972	1875	1615	1453	1354	1221
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
721	444	262	217	194	254	479	1317	1367	1273	1209	1237	1118	1042	1127	1097	1149	1182	1212	1153	994	894	833	748
568	350	207	173	154	199	378	1042	1081	1008	955	977	1032	962	1041	1011	1061	1090	1119	1065	916	825	768	693
17	11	7	5	4	6	11	31	32	29	28	29	23	22	23	23	24	24	25	24	21	18	17	16
1400	860	511	425	377	491	929	2565	2657	2474	2347	2405	2203	2053	2221	2159	2264	2329	2388	2270	1956	1759	1640	1477
761	499	277	230	205	268	504	1391	1443	1344	1275	1305	1197	1116	1205	1174	1229	1265	1297	1232	1065	955	892	802
3	2	1	1	1	1	3	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
3	2	1	1	1	1	3	5	5	5	4	5	5	4	5	5	5	5	5	5	4	4	3	3
231	142	84	70	64	81	152	422	438	409	387	397	305	284	305	298	311	321	329	313	270	243	228	203
169	104	61	51	45	58	112	310	321	299	284	291	248	231	253	244	257	264	271	258	222	199	188	167
125	77	45	38	35	44	82	229	239	224	211	217	267	249	270	262	275	282	290	277	237	214	199	180
691	424	253	211	186	243	458	1267	1312	1221	1159	1189	1201	1118	1212	1178	1234	1270	1302	1238	1066	958	893	805
691	424	253	211	186	243	458	1267	1312	1221	1159	1189	1201	1118	1212	1178	1234	1270	1302	1238	1066	958	893	805
1385	852	505	423	373	486	918	2533	2627	2447	2319	2377	2052	1913	2066	2013	2108	2170	2225	2116	1825	1639	1531	1377
4	2	1	1	1	1	2	7	7	7	6	6	6	5	6	6	6	6	6	6	5	4	4	3
138	85	51	41	36	49	92	255	264	245	234	238	420	391	423	412	431	444	455	434	374	336	313	282
138	85	51	41	36	49	92	255	264	245	234	238	420	391	423	412	431	444	455	434	374	336	313	282
178	109	66	53	48	63	117	326	338	315	298	307	278	262	280	274	287	297	303	290	249	224	208	188
1826	1122	666	557	492	640	1210	3341	3464	3227	3058	3137	3639	3391	3669	3568	3741	3847	3945	3752	3233	2906	2712	2439
2036	1251	743	622	549	712	1351	3724	3861	3596	3409	3495	2808	2619	2829	2755	2886	2969	3045	2895	2496	2244	2094	1883
158	96	57	48	42	55	105	288	298	279	264	269	176	162	175	172	181	186	190	179	157	140	131	117
24	12	9	5	4	9	15	40	41	37	36	38	29	25	29	29	30	31	31	30	26	23	21	19
24	12	9	5	4	9	15	40	41	37	36	38	29	25	29	29	30	31	31	30	26	23	21	19
278	172	101	84	74	99	184	510	528	493	466	478	422	396	426	415	436	448	459	437	376	339	315	284
5	5	4	2	2	2	5	10	10	9	9	11	34	32	34	32	36	36	37	36	30	28	26	24
14	6	4	3	3	8	7	21	23	22	21	21	21	20	21	21	21	23	23	22	19	17	16	14
14	6	4	3	3	8	7	21	23	22	21	21	21	20	21	21	21	23	23	22	19	17	16	14
14	6	4	3	3	8	7	21	23	22	21	21	21	20	21	21	21	23	23	22	19	17	16	14
1933	1188	705	589	522	677	1283	3536	3667	3416	3237	3322	3861	3601	3893	3785	3969	4082	4186	3981	3430	3084	2879	2588
1686	1036	616	514	455	589	1119	3085	3196	2976	2823	2893	2478	2311	2498	2430	2547	2620	2687	2554	2201	1980	1847	1662
1686	1036	616	514	455	589	1119	3085	3196	2976	2823	2893	2478	2311	2498	2430	2547	2620	2687	2554	2201	1980	1847	1662
1686	1036	616	514	455	589	1119	3085	3196	2976	2823	2893	2478	2311	2498	2430	2547	2620	2687	2554	2201	1980	1847	1662
97	60	37	29	26	34	64	178	184	172	163	167	118	110	118	115	122	125	128	122	105	93	87	78
209	129	76	64	56	73	140	384	397	370	351	359	312	292	314	306	321	330	338	322	277	249	232	208
1118	689	407	340	302	393	742	2048	2123	1979	1876	1922	1687	1573	1700	1655	1735	1784	1839	1740	1498	1348	1257	1130
117	72	43	36	33	41	79	214	222	207	196	203	264	247	267	259	271	279	286	272	234	211	196	177
319	196	116	97	86	112	212	583	604	563	533	547	598	557	602	587	615	631	648	617	530	477	446	401
319	196	116	97	86	112	212	583	604	563	533	547	598	557	602	587	615	631	648	617	530	477	446	401
287	176	105	86	78	100	190	523	543	506	479	491	598	557	602	586	614	631	647	616	530	478	445	399
287	176	105	86	78	100	190	523	543	506	479	491	598	557	602	586	614	631	647	616	530	478	445	399
287	176	105	86	78	100	190	523	543	506	479	491	598	557	602	586	614	631	647	616	530	478	445	399
287	176	105	86	78	100	190	523	543	506	479	491	598	557	602	586	614	631	647	616	530	478	445	399
201	124	73	60	54	70	133	365	380	353	335	344	329	307	332	323	339	348	357	340	293	264	245	221
435	268	159	133	116	153	288	795	824	767	728	746	873	814	879	856	897	924	947	900	777	698	651	585
328	203	120	100	90	116	219	603	625	584	551	565	571	533	577	561	588	606	621	591	509	456	425	384
6	4	2	2	2	2	4	12	12	11	11	11	15	14	15	14	15	16	16	15	13	12	11	10
6	4	2	2	2	2	4	12	12	11	11	11	15	14	15	14	15	16	16	15	13	12	11	10
8	5	3	2	2	3	5	14	15	14	13	14	14	13	14	14	14	15	15	14	12	11	10	9
8	5	4	3	3	3	5	16	16	15	15	15	8	6	8	8	8	8	8	8	6	6	6	4
925	569	336	282	251	323	614	1689	1754	1633	1551	1590	1408	1314	1420	1383	1447	1489	1527	1452	1249	1124	1049	944
82	51	31	24	22	28	55	152	158	148	141	141	100	94	102	98	103	107	109	104	91	83	75	69
787	177	105	88	77	100	190	525	545	508	481	494	353	329	354	348	362	371	383	363	314	282	263	236
22	14	8	7	5	7	15	39	41	38	36	37	35	33	36	34	36	37	38	37	32	28	26	24
22	14	8	7	5	7	15	39	41	38	36	37	35	33	36	34	36	37	38	37	32	28	26	24
22	14	8	7	5	7	15	39	41	38	36	37	35	33	36	34	36	37	38	37	32	28	26	24
343	210	124	105	91	120	228	628	651	606	573	589	586	548	591	575	605	622	637	606	521	469	438	395
398	244	146	121	106	138	264	728	753	701	665	682	685	639	691	672	704	725	743	707	608	547	511	460
1014	624	371	308	274	355	674	1858	1926	1794	1701	1744	1537	1433	1548	1508	1579	1626	1666	1586	1366	1227	1145	1029
128	79	47	39	35	45	86	235	243	228	214	221	134	126	135	133	139	142	146	139	120	108	100	91
345	211	126	105	92	120	229	631	654	609	577	592	590	551	595	578	606	623	640	609	524	470	440	396
80	49	30	24	22	29	54	147	152	141	135	138	138	130	139	136	142	147	150	142	123	110	104	93
134	84	50	42	36	48	90	249	257	238	226	232	361	337	364	353	370	381	391	372	320	288	270	242
37	23	14	12	9	12	24	66	68	64	59	62	49	47	49	49	50	53	53	51	44	39	36	32
37	23	14	12	9	12	24	66	68	64	59	62	49	47	49	49	50	53	53	51	44	39	36	32
31	19	13	9	8	11	20	57	59	56	52	53	55	52	57	54	59	60	61	59	51	45	42	38
5	3	2	2	1	2	3	10	10	9	9	9	9	9	9	9	9	10	10	10	8	7	7	6
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
315	194	116	96	85	110	210	577	598	557	527	543	435	408	439	427	449	461	473	449	387	348	325	294
863	530	316	263	233	301	572	1580	1638	1526	1446	1482	1249	1165	1260	1224	1284	1321	1355	1288	1110	997	932	839
64	39	24	20	18	21	41	113	117	110	103	106	113	106	114	110	116	120	122	116	100	91	83	76
64	39	24	20	18	21	41	113	117	110	103	106	113	106	114	110	116	120	122	116	100	91	83	76
540	332	198	164	145	188	358	987	1023	953	902	926	928	867	937	908	955	982	1007	956	824	741	691	623

Caline 4 input for 2032 Q4

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	337144.25	819218.13	337203.38	819316.45	18	8	1
R1-1+1-2	337133.65	819273.98	337146.19	819294.34	8	8	1
R1-1+1-2	337146.19	819294.34	337179.29	819275.45	8	8	1
R3+4	337203.26	819218.71	337244.44	819385.38	15	8	1
R3+4	337244.44	819385.38	337294.34	819560.43	15	8	1
R5+8	337136.87	819222.88	337191.42	819190.17	18	8	1
R7	337252.30	819267.96	337203.68	819318.88	18	8	1
R8	337256.13	819395.18	337297.53	819386.57	18	8	1
R6	337191.44	819190.13	337114.47	819063.78	14	8	1
R9	337114.47	819063.78	337071.73	819001.82	14	8	1
R10	337204.68	819182.55	337179.04	819137.84	14	8	1
R10	337179.04	819137.84	337165.32	819100.25	14	8	1
R10	337165.32	819100.25	337138.28	819052.06	14	8	1
R10	337138.28	819052.06	337118.68	819027.81	14	8	1
R10	337118.68	819027.81	337095.15	818991.79	14	8	1
R11	337191.06	819190.20	337297.41	819366.58	14	8	1
R12	337205.53	819182.75	337311.47	819360.17	14	8	1
R13+14	337295.88	819500.02	337315.16	819609.21	18	0	1
R15	337298.42	819383.30	337358.19	819483.76	18	0	1
R15	337358.19	819483.76	337368.53	819608.09	18	8	1
R18	337311.53	819380.02	337335.82	819402.92	14	8	1
R18	337335.82	819402.82	337348.37	819433.08	14	8	1
R16	337348.37	819433.08	337374.20	819511.47	14	8	1
R16	337374.20	819511.47	337378.30	819544.32	14	8	1
R16	337378.30	819544.32	337388.91	819598.02	14	0	1
R16	337388.91	819598.02	337388.88	819636.45	14	0	1
R17	337293.82	819409.19	337348.88	819483.66	18	8	1
R18	337358.28	819531.60	337303.51	819558.49	18	8	1
R19	337388.78	819641.48	337478.21	819584.49	18	8	1
R20	337309.72	819610.00	337388.21	819810.48	18	8	1
R21	337358.83	820020.82	337321.62	819852.21	18	10	4
R21	337321.82	819852.21	337402.12	819695.92	18	10	4
R21	337402.12	819695.92	337383.08	819648.78	18	10	4
R21	337383.08	819648.78	337371.89	819607.03	18	10	4
R21	337371.89	819607.03	337358.46	819522.74	18	10	4
R21	337358.48	819522.74	337348.78	819478.27	18	10	4
R21	337348.78	819478.27	337338.42	819436.51	18	10	4
R21	337338.42	819436.51	337309.44	819382.87	18	10	4
R21	337309.44	819382.87	337188.51	819147.58	18	10	4
R21	337188.51	819147.58	337134.79	819080.88	18	5	4
R21	337134.75	819080.88	337079.22	818996.37	18	0	1
R22	337587.30	820017.81	337531.11	819848.18	18	10	4
R22	337531.11	819848.18	337407.02	819681.71	18	10	4
R22	337407.02	819681.71	337388.81	819632.91	18	10	4
R22	337388.81	819632.91	337377.18	819579.34	18	10	4
R22	337377.18	819579.34	337367.78	819507.82	18	10	4
R22	337367.78	819507.82	337348.65	819442.18	18	10	4
R22	337348.65	819442.18	337321.88	819383.08	18	10	4
R22	337321.88	819383.08	337178.20	819140.91	18	10	4
R22	337178.20	819140.91	337142.64	819078.81	18	5	4
R22	337142.64	819078.81	337115.31	819034.09	18	8	1
R22	337115.31	819034.09	337082.18	818993.22	18	8	1
R23+24	337309.58	819810.18	337253.13	819609.82	18	8	1
R23+24	337253.13	819609.82	337251.42	819884.34	18	8	1
R25	337365.87	819868.07	337384.84	819884.29	18	8	1
R28	337375.84	819884.44	337377.07	819709.29	17	8	1
R26	337377.07	819708.25	337388.20	819836.33	17	8	1
R27	337471.04	819809.84	337408.98	819872.39	13	8	1
R27	337408.98	819872.38	337382.18	819879.45	13	8	1
R27	337382.18	819879.45	337438.14	819823.83	13	8	1
R27-1+27-2	337434.89	819736.79	337487.35	819713.23	18	8	1
R28	337441.46	819814.32	337515.91	819774.27	18	8	1
R29	337518.13	819774.12	337580.87	819814.86	18	8	1
R30	337803.22	818890.53	337562.77	819737.87	18	8	1
R31	337587.22	819715.44	337768.63	819853.48	18	8	1
R32	337721.65	819850.04	337584.32	819705.67	18	8	1
R33	337782.47	819838.14	337854.05	819847.74	13	8	1
R34	337717.34	819588.31	337584.88	819705.85	18	8	1
R35	337587.03	819715.40	337480.31	819583.72	18	8	1
R38	337584.51	819705.88	337491.85	819588.80	18	8	1
R37	337588.89	819715.41	337471.78	819811.84	18	8	1
R38+39	337781.33	819857.04	337874.27	819839.63	18	8	1
R38+39	337874.27	819838.83	337855.84	819802.99	18	8	1
R40	337375.55	819252.71	337367.13	819425.03	18	8	1
R40	337367.13	819425.03	337378.51	819434.42	18	8	1
R40	337370.01	819454.42	337383.63	819484.43	18	8	1
R40	337383.63	819484.43	337480.29	819583.95	18	8	1
R41	337481.55	819588.79	337388.25	819482.08	18	8	1
R41	337380.25	819482.08	337380.19	819519.82	16	8	1
R41	337380.19	819519.82	337383.41	819755.41	16	8	1
R42+43	337471.48	819258.12	337479.94	819581.99	13	8	1
R44	337470.86	819382.07	337380.21	819382.12	14	8	1
R44-1	337471.54	819382.08	337471.55	819414.34	14	8	1
R44-1	337471.55	819414.34	337410.47	819442.02	14	8	1
R45+48	337470.98	819382.07	337538.04	819382.04	14	8	1
R45+48	337538.04	819382.04	337579.78	819478.33	14	8	1
R47	337514.38	819568.88	337542.71	819582.40	11	8	1
R48	337447.83	819538.73	337380.21	819478.85	13	8	1

NO_x x 100 (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
103.6989	96.4692	95.6999	96.3631	89.9566	99.7456	100.0163	98.1325	98.9304	98.5173	101.5514	99.7135	78.0695	78.8329	78.7832	73.5505	74.7867	74.1459	74.9087	87.7934	84.7549	83.9120	82.5402	91.8426
116.9135	103.7088	107.6684	110.8866	109.0918	112.7966	109.6269	113.9437	121.0129	114.9835	118.2490	116.8284	119.9251	119.5906	121.1440	115.2729	118.1977	118.7057	120.0539	126.4720	118.5838	120.1051	114.2461	124.2604
116.9135	103.7088	107.6684	110.8866	109.0918	112.7966	109.6269	113.9437	121.0129	114.9835	118.2490	116.8284	119.9251	119.5906	121.1440	115.2729	118.1977	118.7057	120.0539	126.4720	118.5838	120.1051	114.2461	124.2604
99.1114	89.7211	76.9221	75.1663	73.2277	78.5117	91.0882	77.6436	77.2903	80.0962	83.1460	79.9973	61.5610	61.3729	63.4737	58.5076	59.7360	58.3991	59.8076	72.4079	73.4101	73.9940	74.9265	81.5052
99.1114	89.7211	76.9221	75.1663	73.2277	78.5117	91.0882	77.6436	77.2903	80.0962	83.1460	79.9973	61.5610	61.3729	63.4737	58.5076	59.7360	58.3991	59.8076	72.4079	73.4101	73.9940	74.9265	81.5052
96.9227	88.7557	79.9966	76.3593	74.1174	81.2469	89.8556	79.3077	78.9136	78.8819	81.4716	79.3096	60.1710	59.1688	61.1747	56.1739	57.0213	55.7168	56.4673	73.8943	70.5074	71.2689	69.9125	78.5695
81.1568	68.4057	69.8068	74.5958	76.9923	72.5891	71.7011	72.3078	73.1132	72.1541	75.5249	72.7092	69.8811	70.0552	71.0509	65.5654	67.6476	67.9721	68.2739	82.2043	81.3434	81.3349	78.8308	82.9370
106.9308	80.6226	71.6443	74.0004	73.4927	75.0960	86.7019	97.6189	99.1011	99.5215	101.9271	99.8394	119.3177	122.5136	120.0736	114.1911	117.4562	123.3299	123.8918	122.1488	119.2694	119.3031	117.2123	123.1488
97.7178	77.3511	80.4826	82.9457	83.0742	83.7124	83.9208	88.6542	94.1211	92.5753	94.3707	92.1034	94.8659	98.2797	101.9062	96.4218	101.7540	101.9079	107.6595	115.4651	108.3428	108.3776	106.6637	112.7058
97.7178	77.2511	80.4826	82.9457	83.0742	83.7124	83.9208	88.6542	94.1211	92.5753	94.3707	92.1034	94.8659	98.2797	101.9062	96.4218	101.7540	101.9079	107.6595	115.4651	108.3428	108.3776	106.6637	112.7058
106.8294	81.3449	82.8745	85.7070	87.3106	86.2957	90.4222	97.0517	103.4632	101.4480	103.4479	100.8278	87.6640	90.4673	93.8466	86.6756	93.2183	93.0989	96.4042	107.3447	101.1008	100.9384	97.5374	103.6698

Caline 4 input for 2032 Q4

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R48	337580.07	819478.94	337634.37	819404.01	13	0	1
R50	337486.85	819587.96	337536.18	819560.08	18	0	1
R51=52	337535.64	819502.99	337589.72	819342.19	20	0	1
R51=52	337586.72	819343.19	337562.52	819258.02	20	0	1
R53=54	337854.61	819487.71	337727.26	819472.96	14	0	1
R53=54	337727.26	819473.86	337789.08	819426.65	14	0	1
R53=54	337788.98	819426.65	337746.05	819368.86	14	0	1
R53=54	337746.05	819368.86	337698.43	819327.32	14	0	1
R53=54	337698.63	819327.32	337680.34	819301.31	14	0	1
R53=54	337680.34	819301.31	337658.18	819248.02	14	0	1
R55=56	337579.38	819257.63	337564.22	819258.11	25	0	1
R58-1	337454.87	819257.83	337447.08	819071.48	11	0	1
R56-2=56-3	337425.73	819150.58	337424.30	819071.88	18	0	1
R57=58	337564.88	819258.09	337681.28	819251.84	25	0	1
R59	337681.10	819248.24	337745.70	819231.27	14	0	1
R58	337745.70	819231.27	337729.35	819070.31	14	0	1
R60	337680.25	819247.58	337691.46	819069.36	15	0	1
R61	337870.28	819244.46	337681.58	819069.18	15	0	1
R62=63	337565.20	819255.26	337562.77	819138.26	17	0	1
R64=65	337380.88	819255.27	337578.88	819195.90	21	0	1
R64=65	337378.88	819198.90	337375.43	819071.78	21	0	1
R66=67	337378.09	819128.90	337292.22	819128.79	18	0	1
R68	337290.78	819325.67	337389.82	819289.11	19	0	1
R69	337293.87	819282.88	337338.49	819246.43	18	0	1
R69	337338.49	819246.43	337379.52	819253.33	19	0	1
R70=71	337256.38	819234.50	337318.11	819185.17	18	0	1
R72=73	337204.77	819182.19	337292.22	819128.60	18	0	1
R74=75	337347.48	819248.52	337292.25	819128.79	18	0	1
R76	337292.22	819128.60	337267.77	819078.81	18	0	1
R77	337266.87	819073.43	337202.18	819110.48	15	0	1
R77	337202.18	819110.48	337167.08	819103.41	15	0	1
R77-1=77-2	337218.96	819101.10	337181.53	819038.58	12	0	1
R78	337267.88	819072.24	337375.43	819071.10	19	0	1
R79	337137.48	819030.82	337217.48	819078.71	12	0	1
R79	337217.48	819078.71	337198.74	819022.62	12	0	1
R79	337198.74	819022.62	337140.45	819055.94	12	0	1
R80=81	337375.46	819071.78	337373.52	818889.98	21	0	1
R80-1=80-2	337374.53	818984.57	337228.05	818983.77	12	0	1
R80-1=80-2	337228.05	818985.77	337227.84	818932.14	12	0	1
R80-1=80-2	337227.84	818932.14	337337.68	818930.87	12	0	1
R82	337375.64	819072.43	337548.00	819072.06	15	0	1
R83	337540.29	819069.98	337548.30	819072.06	18	0	1
R84=85	337548.30	819071.82	337656.81	819067.81	13	0	1
R86=87	337656.82	819069.10	337656.06	818948.63	24	0	1
R88	337694.75	819066.78	337781.39	819068.98	13	0	1
R88	337761.39	819068.98	337753.18	819011.29	13	0	1
R88	337781.67	819057.79	337822.98	819018.58	18	0	1
R88	337822.98	819018.58	337880.36	819068.45	18	0	1
R88	337880.58	819068.45	337948.35	819096.19	18	0	1
R88	337940.35	819096.19	337972.06	818756.24	18	0	1
R90	337781.03	819057.31	337871.51	819756.62	18	0	1
R91	337903.23	819778.91	337979.37	819749.90	15	0	1
R92	337872.23	819738.55	337740.50	819672.80	19	0	1
R92-1	337894.09	819735.88	337717.85	819714.33	13	0	1
R92-1	337717.80	819714.33	337807.51	819814.10	13	0	1
R92-2	337864.98	819831.41	337836.94	819782.67	13	0	1
R93	337873.24	819835.46	337821.72	819878.91	13	0	1
R94=95	337774.83	819818.41	337714.67	819851.56	28	0	1
R96=97	337633.80	819880.36	337556.12	819836.05	18	0	1
R98	337704.69	819858.40	337530.23	819937.12	18	0	1
R99	337582.68	819914.53	337518.82	819887.86	14	0	1
R99	337518.82	819887.88	337585.57	820011.10	14	0	1
R99	337585.57	820011.10	337529.83	819836.49	14	0	1
R100	337508.18	820018.73	337514.19	819942.95	13	0	1
R101=102	337464.33	819998.67	337483.82	820030.48	18	0	1
R103=104	337514.79	819944.23	337371.40	820010.77	18	0	1
R105=106	337368.85	820024.76	337370.45	819884.41	28	0	1
R107=108	337231.26	819888.95	337231.72	819884.34	18	0	1
R108-1	337307.38	820009.79	337368.24	819884.25	18	0	1
R109	337251.42	819883.77	337370.45	819884.77	18	0	1
R110=111	337483.90	819868.87	337414.74	819862.38	18	0	1
R110=111	337414.74	819860.38	337458.00	819823.33	18	0	1
R112	337458.50	819823.92	337512.96	819843.06	12	0	1
R113	337530.06	819838.43	337471.38	819809.89	12	0	1
R114=115	338832.92	819868.03	338863.22	819960.42	16	0	1
R114=115	338863.22	819960.42	337029.88	819552.92	16	0	1
R114=115	337029.88	819522.82	337033.17	819488.00	16	0	1
R114=115	337033.17	819488.00	337010.91	819456.85	16	0	1
R114=115	337012.91	819455.85	336887.35	819427.73	16	0	1
R116=117	338848.67	819135.90	337022.42	819062.48	28	0	1
R118=119	337135.66	819223.91	337079.43	819129.58	18	0	1
R118=119	337079.43	819129.58	337022.42	819062.48	18	0	1
R120=121	337023.66	819083.94	337118.87	818957.84	22	0	1

NO_x x 100 (g/VMT)																						
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
111.7829	112.3264	105.9208	93.9706	89.9691	111.5717	121.6470	134.0744	137.4180	127.3720	130.3678	130.2037	71.6168	72.3272	69.2585	65.1775	65.4907	65.4477	64.8528	72.7225	72.0040	70.1380	70.3301	78.4053
121.2106	85.6345	76.6038	75.2559	75.4256	79.8253	98.0239	134.5152	138.3626	133.7055	136.8748	136.2335	122.4824	122.2918	123.8161	118.0638	120.6450	121.3153	122.5560	123.5332	111.7825	104.8996	93.7816	97.1129
99.6408	77.9861	80.2079	82.0074	82.8494	83.6725	84.7740	92.5219	96.7998	94.9758	96.8834	94.5796	90.9554	95.1560	97.0936	91.7456	96.5279	96.6850	102.0043	109.4835	102.9292	102.8064	101.1423	107.1158
99.6408	77.9861	80.2079	82.0074	82.8494	83.6725	84.7740	92.5219	96.7998	94.9758	96.8834	94.5796	90.9554	95.1560	97.0936	91.7456	96.5279	96.6850	102.0043	109.4835	102.9292	102.8064	101.1423	107.1158
107.8454	83.4248	82.8489	84.9864	86.3428	86.1671	92.4242	97.9511	103.8806	102.1153	104.2037	101.5855	89.0375	91.9657	95.0112	87.9682	94.1926	94.0013	97.2394	108.0524	102.0287	101.9420	98.4218	104.9417

Caline 4 input for 2032 Q4

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	337144.25	819218.15	337203.38	819316.45	18	0	1
R1-1+1-2	337133.85	819273.86	337146.19	819294.34	9	0	1
R1-1+1-2	337146.19	819294.34	337178.25	819275.45	9	0	1
R3+4	337203.38	819316.71	337244.44	819385.38	15	0	1
R3+4	337244.44	819385.38	337284.34	819500.43	15	0	1
R5+6	337136.87	819222.58	337191.42	819180.17	18	0	1
R7	337202.30	819287.86	337203.88	819316.89	18	0	1
R8	337250.13	819365.18	337287.53	819286.57	18	0	1
R9	337191.44	819180.13	337114.47	819065.78	14	0	1
R9	337114.47	819083.78	337071.73	819001.82	14	0	1
R10	337204.98	819182.95	337178.04	819137.84	14	0	1
R10	337178.04	819137.84	337185.32	819100.25	14	0	1
R10	337185.32	819100.25	337138.28	819052.08	14	0	1
R10	337138.28	819052.08	337118.98	819027.81	14	0	1
R10	337118.98	819027.81	337085.15	818991.78	14	0	1
R11	337191.08	819180.20	337297.41	819368.58	14	0	1
R12	337205.03	819182.75	337311.47	819380.17	14	0	1
R13+14	337295.58	819001.03	337310.18	819008.31	18	0	1
R15	337298.42	819365.38	337356.18	819483.76	18	0	1
R15	337350.19	819483.76	337366.53	819508.09	18	0	1
R16	337211.53	819380.03	337335.82	819402.92	14	0	1
R16	337335.82	819402.92	337348.37	819433.08	14	0	1
R16	337348.37	819433.08	337374.20	819511.47	14	0	1
R16	337374.20	819511.47	337378.30	819544.32	14	0	1
R16	337378.30	819544.32	337388.91	819589.02	14	0	1
R16	337388.91	819589.02	337389.89	819638.45	14	0	1
R17	337293.93	819489.19	337349.69	819483.66	18	0	1
R18	337358.39	819501.80	337383.51	819558.48	18	0	1
R19	337388.79	819641.48	337475.21	819584.49	18	0	1
R20	337309.72	818810.05	337366.21	819818.48	18	0	1
R21	337598.93	820030.52	337521.62	819952.21	18	10	4
R21	337521.62	819952.21	337402.10	819895.92	18	10	4
R21	337402.10	819895.92	337383.08	819848.79	18	10	4
R21	337383.08	819848.78	337371.69	819807.03	18	10	4
R21	337371.69	819807.03	337358.48	819522.74	18	10	4
R21	337358.48	819522.74	337348.79	819478.27	18	10	4
R21	337348.79	819478.27	337336.42	819438.51	18	10	4
R21	337336.42	819438.51	337309.44	819382.87	18	10	4
R21	337309.44	819382.87	337188.51	819147.58	18	10	4
R21	337188.51	819147.58	337134.75	819086.88	18	9	4
R21	337134.75	819086.88	337079.22	818996.37	18	0	1
R22	337567.30	820017.81	337531.11	819948.16	18	10	4
R22	337531.11	819948.16	337407.02	819881.71	18	10	4
R22	337407.02	819881.71	337388.81	819832.91	18	10	4
R22	337388.81	819832.91	337377.18	819578.34	18	10	4
R22	337377.18	819578.34	337367.78	819507.82	18	10	4
R22	337367.78	819507.82	337349.65	819442.16	18	10	4
R22	337349.65	819442.16	337321.86	819383.08	18	10	4
R22	337321.86	819383.08	337178.20	819140.91	18	10	4
R22	337178.20	819140.91	337142.64	819076.01	18	0	1
R22	337142.64	819076.01	337115.31	819034.09	18	0	1
R22	337115.31	819034.09	337082.12	818995.22	18	0	1
R23+24	337309.68	819510.18	337253.13	819508.82	18	0	1
R23+24	337253.13	819508.82	337251.42	819884.34	18	0	1
R25	337365.87	819808.07	337384.64	819884.29	18	0	1
R26	337375.64	819884.44	337277.07	819709.26	17	0	1
R26	337277.07	819709.26	337388.20	819836.33	17	0	1
R27	337431.06	819809.84	337406.96	819672.39	13	0	1
R27	337406.96	819672.39	337292.18	819879.45	13	0	1
R27	337292.18	819879.45	337458.14	819823.63	13	0	1
R27-1+27-2	337438.88	819736.79	337467.35	819713.25	18	0	1
R28	337441.48	819814.32	337515.91	819774.27	18	0	1
R29	337518.13	819774.12	337580.37	819814.96	18	0	1
R30	337633.22	819830.53	337562.77	819737.67	18	0	1
R31	337587.02	819715.44	337706.83	819853.49	18	0	1
R32	337721.45	819858.04	337584.52	819705.67	18	0	1
R33	337782.47	819838.14	337654.05	819667.74	13	0	1
R34	337717.34	819588.31	337584.88	819705.85	18	0	1
R35	337587.05	819715.45	337481.31	819593.72	18	0	1
R36	337584.51	819705.88	337481.65	819588.80	18	0	1
R37	337588.89	819715.41	337471.78	819611.84	18	0	1
R38+39	337781.33	819857.64	337674.27	819839.63	18	0	1
R38+39	337674.27	819838.63	337655.64	819502.99	18	0	1
R40	337370.55	819252.71	337367.13	819425.03	18	0	1
R40	337367.13	819425.03	337378.01	819454.42	18	0	1
R40	337378.01	819454.42	337383.63	819484.43	18	0	1
R40	337383.63	819484.43	337482.25	819583.95	18	0	1
R41	337491.55	819588.75	337380.25	819482.08	18	0	1
R41	337380.25	819482.08	337380.18	819518.87	18	0	1
R41	337380.18	819518.87	337383.41	819255.41	18	0	1
R42+43	337471.46	819238.12	337470.84	819381.98	13	0	1
R44	337479.96	819382.07	337380.21	819382.12	14	0	1
R44-1	337471.34	819382.06	337471.55	819414.34	14	0	1
R44-1	337471.55	819414.34	337419.47	819442.02	14	0	1
R45+46	337470.88	819382.07	337538.04	819382.04	14	0	1
R45+46	337538.04	819382.04	337579.78	819479.33	14	0	1
R47	337314.08	819508.58	337542.71	819562.45	11	0	1
R48	337447.83	819538.73	337580.81	819479.85	13	0	1

NO_2 x 100 (g/VMT)

Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
9.6456	8.7775	9.2162	9.2924	8.9863	10.4592	11.2960	14.9554	16.1992	14.8820	15.3690	15.6188	10.2111	10.5869	9.8022	9.1307	9.2529	9.6026	9.4899	8.0079	7.5435	7.3673	6.8499	7.7681
11.8882	10.4118	11.4709	11.9329	12.1822	13.0937	13.5236	18.4907	21.1199	18.4776	19.1389	19.5097	19.8925	19.9640	18.8624	17.7550	17.9474	18.6518	18.4632	14.8188	13.5757	13.6051	12.2590	13.8802
11.8882	10.4118	11.4709	11.9329	12.1822	13.0937	13.5236	18.4907	21.1199	18.4776	19.1389	19.5097	19.8925	19.9640	18.8624	17.7550	17.9474	18.6518	18.4632	14.8188	13.5757	13.6051	12.2590	13.8802
7.4497	6.8656	5.7243	5.2930	5.5668	6.1487	8.0343	9.1382	9.7218	9.2576	9.5971	9.6005	5.3596	5.3209	5.2262	4.8636	4.9333	5.0138	5.0336	5.0676	4.7232	4.6682	4.6890	4.8814
7.4497	6.8656	5.7243	5.2930	5.5668	6.1487	8.0343	9.1382	9.7218	9.2576	9.5971	9.6005	5.3596	5.3209	5.2262	4.8636	4.9333	5.0138	5.0336	5.0676	4.7232	4.6682	4.6890	4.8814
7.3609	6.8314	6.1623	5.4977	5.7511	6.4296	8.0505	9.6456	10.2881	9.4012	9.6303	9.8385	5.3228	5.2566	5.2371	4.8119	4.9080	5.0083	4.9685	4.7737	4.4398	4.4706	4.2195	4.6278
6.8855	6.6876	6.0185	6.7864	7.3833	7.3327	7.0843	8.8894	9.2434	8.4439	8.9152	8.9843	7.9326	7.7693	7.5197	6.9085	7.1062	7.4277	7.2558	6.5898	6.5341	6.3799	5.9666	6.1644
10.5649	7.8417	7.1258	7.4933	7.6736	7.9194	10.1880	15.1602	16.3460	15.2481	15.6914	15.8815	10.9775	21.9456	19.8448	18.6758	18.9657	20.5394	20.2746	15.4491	14.7740	14.6790	13.6937	15.0434
9.4904	9.0221	9.5709	9.7178	9.7417	10.2914	10.0372	12.2313	13.2927	12.3426	12.6313	12.9298	12.7677	12.6138	12.2947	11.5735	11.9223	12.1754	12.4773	11.2359	10.8333	10.6463	10.5067	10.7829
9.4904	9.0221	9.5709	9.7178	9.7417	10.2914	10.0372	12.2313	13.2927	12.3426	12.6313	12.9298	12.7677	12.6138	12.2947	11.5735	11.9223	12.1754	12.4773	11.2359	10.8333	10.6463	10.5067	10.7829
10.4091	9.6701	10.0381	10.1848	10.3684	10.7414	10.8885	13.3249	14.5028	13.4341	13.7526	14.0967	11.2482	11.0778	10.8356	9.9683	10.4958	10.6931	10.7392	9.9815	9.6469	9.4586	9.1567	9.4131

Caline 4 input for 2032 Q4

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R49	837580.07	819478.94	837834.37	819454.01	13	8	1
R50	837490.85	819587.90	837696.18	819600.06	18	8	1
R51+52	837655.84	819502.89	837546.72	819343.19	20	0	1
R51+52	837585.72	819343.19	837562.52	819256.02	20	8	1
R53+54	837654.81	819487.71	837727.20	819473.90	14	0	1
R53+54	837727.20	819473.90	837769.09	819426.85	14	8	1
R53+54	837769.09	819426.85	837746.25	819399.98	14	8	1
R53+54	837746.05	819369.98	837696.81	819327.32	14	8	1
R53+54	837698.63	819327.32	837699.34	819301.31	14	8	1
R53+54	837682.34	819301.31	837658.18	819248.22	14	8	1
R55+56	837578.34	819257.63	837564.22	819258.11	25	0	1
R56-1	837454.97	819257.63	837447.06	819071.48	11	8	1
R56-2+56-3	837425.73	819150.58	837424.80	819071.89	16	8	1
R57+58	837564.98	819258.09	837661.38	819251.84	25	8	1
R58	837881.10	819246.24	837745.70	819231.27	14	8	1
R58	837745.70	819231.27	837736.05	819070.31	14	8	1
R60	837660.25	819247.58	837651.46	819089.36	15	8	1
R61	837670.38	819244.46	837661.86	819069.18	15	8	1
R62+63	837645.20	819255.29	837632.77	819138.26	17	8	1
R64+65	837380.88	819255.27	837376.88	819196.90	21	8	1
R64+65	837378.88	819196.90	837375.43	819071.78	21	8	1
R66+67	837376.09	819128.90	837292.22	819129.79	18	8	1
R68	837290.78	819325.67	837368.82	819288.11	13	0	1
R69	837283.87	819292.98	837336.49	819248.42	18	8	1
R69	837338.49	819248.42	837370.52	819252.88	18	8	1
R70+71	837236.08	819234.50	837318.11	819185.17	18	8	1
R72+73	837204.77	819182.19	837292.22	819129.80	18	8	1
R74+75	837347.48	819248.52	837292.25	819129.79	18	8	1
R78	837292.22	819129.80	837267.77	819076.81	16	8	1
R77	837296.87	819073.43	837202.18	819110.48	15	8	1
R77	837202.18	819110.48	837167.06	819103.41	15	8	1
R77-1+77-2	837218.98	819101.10	837161.53	819039.58	12	8	1
R79	837267.66	819072.24	837375.45	819071.10	18	8	1
R79	837187.49	819030.82	837217.48	818976.71	12	8	1
R79	837217.48	818976.71	837198.74	819022.02	12	8	1
R79	837198.74	819022.02	837140.45	819055.94	12	8	1
R80+81	837375.48	819071.78	837373.52	818888.96	21	8	1
R80-1+80-2	837374.53	818964.57	837228.05	818969.77	12	8	1
R80-1+80-2	837228.05	818965.77	837227.84	818932.14	12	8	1
R80-1+80-2	837227.84	818932.14	837337.88	818930.87	12	8	1
R82	837375.44	819072.43	837569.50	819072.00	15	8	1
R83	837545.29	818905.98	837548.30	819072.00	18	8	1
R84+85	837548.30	819071.82	837696.81	819067.81	12	8	1
R86+87	837696.82	819088.10	837855.06	819848.63	24	0	1
R88	837696.75	819086.78	837781.39	819088.96	13	8	1
R88	837781.39	819088.96	837763.18	819011.28	13	8	1
R88	837791.97	819057.79	837822.99	819018.58	18	8	1
R88	837822.99	819018.58	837890.36	819088.45	18	8	1
R88	837890.36	819088.45	837940.30	819096.19	18	8	1
R89	837940.35	819096.19	837972.06	819756.34	18	8	1
R90	837781.03	819057.31	837871.51	819756.82	18	8	1
R91	837903.23	819776.91	837879.37	819748.90	15	8	1
R92	837872.23	819756.53	837748.50	819872.82	18	8	1
R92-1	837884.09	819735.86	837717.86	819714.33	13	8	1
R92-1	837717.80	819714.33	837807.01	819814.10	13	8	1
R92-2	837884.86	819831.47	837830.84	819792.67	13	8	1
R93	837873.24	819835.48	837921.72	819878.91	13	8	1
R94+95	837774.53	819819.41	837714.67	819851.36	28	8	1
R96+97	837833.50	819890.36	837655.12	819836.05	18	8	1
R98	837704.89	819858.46	837530.23	819857.12	18	8	1
R99	837582.88	819914.03	837818.82	819987.88	14	8	1
R99	837818.82	819987.88	837565.57	820011.10	14	8	1
R99	837565.57	820011.10	837529.93	819836.48	14	8	1
R100	837556.18	820019.79	837514.18	819943.95	13	8	1
R101+102	837464.33	819988.67	837483.82	820030.48	18	8	1
R103+104	837514.79	819944.23	837371.46	820012.77	18	8	1
R105+106	837389.85	820024.76	837378.45	819884.41	28	8	1
R107+108	837251.06	819888.90	837251.72	819884.34	18	8	1
R108-1	837307.38	820009.79	837308.24	819884.25	18	8	1
R109	837251.42	819883.77	837372.45	819884.77	18	8	1
R110+111	837483.90	819868.57	837414.74	819890.38	18	8	1
R110+111	837414.74	819890.38	837458.00	819823.33	18	8	1
R112	837458.50	819823.80	837513.96	819943.08	12	8	1
R113	837530.08	819938.43	837471.36	819809.89	12	8	1
R114+115	838832.82	819868.03	836953.22	819590.42	16	8	1
R114+113	836953.22	819590.42	837026.89	819532.82	16	8	1
R114+115	837026.89	819532.82	837033.17	819488.00	16	8	1
R114+116	837033.17	819488.00	837010.91	819455.85	16	8	1
R114+115	837010.91	819455.85	836887.35	819427.73	18	8	1
R118+117	838848.57	819135.90	837022.42	819082.48	26	8	1
R118+119	837133.88	819221.91	837578.43	819129.58	18	8	1
R118+119	837578.43	819129.58	837922.42	819082.48	18	8	1
R120+121	837323.88	819083.84	837118.37	818957.84	22	8	1

NO_2 x 100 (g/VMT)																						
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
14.7827	13.7335	14.3038	12.7916	12.8818	16.7007	19.4732	26.9222	28.4674	25.5918	26.5441	26.8905	11.0666	11.7611	10.4928	9.7910	9.9440	10.3912	10.1954	7.8749	7.3477	7.1028	6.5293	7.7921
16.5134	15.1535	15.9503	10.8290	11.3128	12.4982	16.1649	26.8543	29.2680	26.7515	27.7555	28.0810	22.4550	22.7095	21.3593	20.0879	20.2768	21.1536	20.8751	16.3676	14.4158	13.3543	11.2920	12.2480
9.7155	9.0522	9.5030	9.5707	9.7020	10.2536	10.1689	12.9035	13.8399	12.8008	13.1097	13.4166	12.3326	12.3984	11.8662	11.1553	11.4737	11.7425	12.0231	10.6974	10.2916	10.1004	9.9165	10.2465
9.7155	9.0522	9.5030	9.5707	9.7020	10.2536	10.1689	12.9035	13.8399	12.8008	13.1097	13.4166	12.3326	12.3984	11.8662	11.1553	11.4737	11.7425	12.0231	10.6974	10.2916	10.1004	9.9165	10.2465
10.5284	9.7244	9.8745	9.9490	10.1263	10.6049	11.1418	13.6439	14.8322	13.7479	14.0866	14.4153	11.6780	11.5309	11.1949	10.3371	10.8295	11.0403	11.0794	10.1809	9.8385	9.6607	9.2995	9.6390

Caline 4 input for 2032 Q4

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	837144.25	819218.15	837203.38	819316.45	18	8	1
R1-1+1-2	837133.65	819273.98	837146.19	819294.34	9	8	1
R1-1+1-2	837146.19	819294.34	837179.20	819275.45	8	8	1
R3+4	837203.20	819316.71	837244.46	819585.38	15	8	1
R3+4	837244.44	819383.38	837284.34	819502.45	15	8	1
R5+6	837136.87	819222.68	837191.42	819180.17	18	8	1
R7	837252.36	819287.98	837203.68	819316.89	18	8	1
R8	837250.13	819385.18	837267.53	819386.57	18	8	1
R9	837191.44	819196.13	837114.47	819063.78	14	8	1
R9	837114.47	819063.78	837071.73	819001.82	14	8	1
R10	837254.98	819182.55	837178.04	819137.84	14	8	1
R10	837178.04	819137.84	837165.32	819150.25	14	8	1
R12	837165.32	819150.25	837138.28	819052.98	14	8	1
R12	837138.28	819052.98	837119.98	819027.81	14	8	1
R12	837119.98	819027.81	837085.15	818991.78	14	8	1
R11	837191.06	819190.20	837267.41	819366.58	14	8	1
R12	837265.63	819182.75	837311.47	819380.17	14	8	1
R13+14	837295.88	819500.02	837310.18	819609.31	18	8	1
R15	837298.42	819365.30	837330.18	819483.70	18	8	1
R15	837330.18	819483.70	837366.52	819604.89	18	8	1
R16	837311.53	819380.02	837335.82	819402.92	14	8	1
R16	837335.82	819402.92	837348.37	819433.08	14	8	1
R18	837348.37	819433.08	837374.20	819511.47	14	8	1
R16	837374.20	819511.47	837378.30	819544.32	14	8	1
R16	837378.30	819544.32	837388.91	819599.02	14	8	1
R18	837388.91	819599.02	837389.88	819638.45	14	8	1
R17	837293.80	819499.19	837348.68	819483.86	18	8	1
R18	837358.38	819551.80	837303.51	819556.48	18	8	1
R19	837388.79	819647.48	837479.21	819564.48	18	8	1
R20	837309.72	819610.00	837366.21	819610.48	18	8	1
R21	837556.93	820020.52	837521.62	819932.21	18	10	4
R21	837521.62	819932.21	837482.10	819895.92	18	10	4
R21	837402.10	819695.92	837383.08	819648.78	18	10	4
R21	837383.08	819648.78	837371.68	819607.03	18	10	4
R21	837371.68	819607.03	837358.46	819522.74	18	10	4
R21	837358.46	819522.74	837348.79	819476.27	18	10	4
R21	837348.79	819476.27	837336.42	819436.51	18	10	4
R21	837336.42	819436.51	837309.44	819382.87	18	10	4
R21	837309.44	819382.87	837168.51	819147.58	18	10	4
R21	837168.51	819147.58	837134.75	819080.68	18	5	4
R21	837134.75	819080.68	837079.22	818996.37	18	0	1
R22	837367.30	820017.81	837531.11	819648.16	18	10	4
R22	837531.11	819648.16	837407.02	819681.71	18	10	4
R22	837407.02	819681.71	837388.81	819632.91	18	10	4
R22	837388.81	819632.91	837377.18	819578.34	18	10	4
R22	837377.18	819578.34	837367.79	819507.82	18	10	4
R22	837367.79	819507.82	837348.65	819442.18	18	10	4
R22	837349.65	819442.18	837321.88	819383.58	18	10	4
R22	837321.88	819383.58	837178.20	819140.91	18	10	4
R20	837178.20	819140.91	837142.84	819078.01	18	5	4
R22	837142.84	819078.01	837115.31	819034.09	18	0	1
R22	837115.31	819034.09	837282.13	818995.22	18	0	1
R23+24	837309.68	819812.18	837252.13	819609.82	18	0	1
R23+24	837253.13	819609.82	837251.42	819884.34	18	0	1
R25	837365.87	819804.07	837364.64	819884.29	18	0	1
R26	837373.84	819884.44	837377.27	819708.26	17	0	1
R26	837377.27	819708.26	837388.20	819836.33	17	0	1
R27	837471.04	819809.84	837406.96	819672.39	13	0	1
R27	837406.96	819672.39	837392.16	819679.43	13	0	1
R27	837392.16	819679.43	837458.14	819823.83	13	0	1
R27-1+27-2	837438.98	819758.79	837467.35	819713.23	18	0	1
R28	837441.48	819814.32	837515.91	819774.27	18	0	1
R29	837518.13	819774.12	837588.87	819814.88	18	0	1
R30	837633.22	819890.53	837562.77	819737.87	18	0	1
R31	837587.02	819715.44	837708.83	819853.48	18	0	1
R32	837721.85	819852.04	837584.52	819705.87	18	0	1
R33	837782.47	819838.14	837834.05	819867.74	13	0	1
R34	837717.34	819598.31	837584.68	819705.85	18	0	1
R35	837587.02	819715.45	837480.51	819583.72	18	0	1
R36	837384.51	819705.86	837491.85	819588.60	18	0	1
R37	837588.98	819715.41	837471.78	819811.84	18	0	1
R38+38	837781.33	819457.04	837874.27	819538.83	18	0	1
R38+38	837874.27	819538.83	837855.64	819502.99	18	0	1
R40	837375.55	819252.71	837367.13	819425.63	18	0	1
R40	837367.13	819425.63	837370.21	819454.42	18	0	1
R40	837370.21	819454.42	837383.63	819484.43	18	0	1
R40	837383.63	819484.43	837488.25	819583.95	18	0	1
R41	837491.55	819588.70	837386.25	819462.08	18	0	1
R41	837380.25	819462.08	837380.18	819318.87	18	0	1
R41	837380.18	819318.87	837383.41	819255.41	18	0	1
R42+43	837471.46	819258.12	837475.84	819581.98	13	0	1
R44	837478.98	819582.87	837388.21	819582.12	14	0	1
R44-1	837471.54	819582.08	837471.55	819414.34	14	0	1
R44-1	837471.55	819414.34	837418.47	819442.62	14	0	1
R45+46	837478.98	819582.87	837538.04	819582.04	14	0	1
R45+46	837538.04	819582.04	837579.78	819479.33	14	0	1
R47	837514.28	819568.88	837542.71	819582.45	11	0	1
R48	837447.83	819538.73	837582.01	819479.85	13	0	1

RSP (g/VMT)																						
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
0.0196	0.0145	0.0140	0.0137	0.0145	0.0156	0.0185	0.0252	0.0275	0.0266	0.0262	0.0264	0.0209	0.0223	0.0221	0.0213	0.0221	0.0226	0.0235	0.0208	0.0193	0.0192	0.0178	0.0188
0.0235	0.0171	0.0171	0.0177	0.0192	0.0191	0.0223	0.0296	0.0332	0.0312	0.0309	0.0313	0.0350	0.0371	0.0366	0.0350	0.0365	0.0373	0.0385	0.0355	0.0326	0.0333	0.0307	0.0327
0.0235	0.0171	0.0171	0.0177	0.0192	0.0191	0.0223	0.0296	0.0332	0.0312	0.0309	0.0313	0.0350	0.0371	0.0366	0.0350	0.0365	0.0373	0.0385	0.0355	0.0326	0.0333	0.0307	0.0327
0.0213	0.0145	0.0120	0.0110	0.0125	0.0129	0.0178	0.0228	0.0248	0.0249	0.0244	0.0241	0.0179	0.0190	0.0198	0.0191	0.0201	0.0203	0.0215	0.0204	0.0186	0.0188	0.0180	0.0182
0.0215	0.0145	0.0120	0.0110	0.0125	0.0129	0.0178	0.0228	0.0248	0.0249	0.0244	0.0241	0.0179	0.0190	0.0198	0.0191	0.0201	0.0203	0.0215	0.0204	0.0186	0.0188	0.0180	0.0182
0.0200	0.0138	0.0119	0.0108	0.0122	0.0127	0.0169	0.0224	0.0244	0.0238	0.0232	0.0232	0.0159	0.0165	0.0171	0.0166	0.0174	0.0177	0.0186	0.0166	0.0152	0.0153	0.0142	0.0144
0.0296	0.0195	0.0183	0.0208	0.0242	0.0194	0.0233	0.0293	0.0315	0.0307	0.0317	0.0307	0.0215	0.0225	0.0231	0.0219	0.0232	0.0240	0.0247	0.0236	0.0226	0.0225	0.0209	0.0210
0.0330	0.0152	0.0130	0.0147	0.0160	0.0145	0.0194	0.0273	0.0297	0.0291	0.0288	0.0288	0.0364	0.0389	0.0378	0.0357	0.0373	0.0395	0.0402	0.0359	0.0341	0.0341	0.0320	0.0341
0.0417	0.0266	0.0277	0.0288	0.0300	0.0292	0.0328	0.0383	0.0423	0.0418	0.0422	0.0413	0.0449	0.0487	0.0507	0.0479	0.0512	0.0513	0.0547	0.0572	0.0529	0.0535	0.0514	0.0542
0.0417	0.0266	0.0277	0.0288	0.0300	0.0292	0.0328	0.0383	0.0423	0.0418	0.0422	0.0413	0.0449	0.0487	0.0507	0.0479	0.0512	0.0513	0.0547	0.0572	0.0529	0.0535	0.0514	0.0542
0.0467	0.0292	0.0297	0.0312	0.0327	0.0314	0.0363	0.0423	0.0468	0.0462	0.0467	0.0456	0.0398	0.0431	0.0449	0.0418	0.0454	0.0454	0.0479	0.0505	0.0468	0.0473	0.0448	0.0473

Caline 4 input for 2032 Q4

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R48	837380.07	819478.94	837634.37	819454.01	19	0	1
R50	837480.85	819587.90	837658.18	819500.08	19	0	1
R51+52	837836.64	819502.98	837588.72	819343.19	30	0	1
R51+52	837588.72	819343.19	837582.52	819256.02	30	0	1
R53+54	837674.81	819497.71	837727.26	819472.90	14	0	1
R53+54	837727.26	819473.90	837789.09	819426.85	14	0	1
R53+54	837789.09	819426.85	837748.05	819368.98	14	0	1
R53+54	837748.05	819369.98	837698.63	819327.32	14	0	1
R53+54	837698.63	819327.32	837680.34	819301.31	14	0	1
R53+54	837680.34	819301.31	837658.18	819248.02	14	0	1
R55+56	837378.38	819257.83	837564.22	819258.11	25	0	1
R56-1	837454.97	819257.83	837447.06	819071.48	11	0	1
R56-2+56-3	837425.73	819190.58	837424.82	819071.89	18	0	1
R57+58	837564.88	819258.09	837681.38	819251.84	25	0	1
R58	837681.10	819246.24	837745.70	819231.37	14	0	1
R59	837745.70	819231.37	837738.05	819070.31	14	0	1
R62	837686.25	819247.58	837651.46	819089.38	15	0	1
R61	837670.38	819244.48	837681.86	819089.13	15	0	1
R62+63	837565.20	819255.28	837552.77	819138.26	17	0	1
R64+65	837380.69	819255.27	837378.88	819185.90	21	0	1
R64+65	837378.88	819196.90	837375.43	819071.78	21	0	1
R66+67	837378.59	819128.90	837292.23	819129.79	18	0	1
R68	837290.78	819025.67	837369.82	819288.11	18	0	1
R69	837263.97	819280.88	837338.49	819246.43	18	0	1
R68	837338.48	819246.43	837370.52	819252.88	18	0	1
R70+71	837238.08	819234.50	837318.11	819165.17	18	0	1
R72+73	837204.77	819182.19	837292.22	819129.60	18	0	1
R74+75	837347.48	819248.52	837292.25	819129.79	18	0	1
R76	837292.22	819129.80	837267.77	819078.01	18	0	1
R77	837266.87	819072.43	837202.18	819112.48	15	0	1
R77	837202.18	819112.48	837187.06	819105.41	15	0	1
R77-1+77-2	837218.58	819101.10	837181.53	819038.58	12	0	1
R78	837267.68	819072.24	837275.48	819071.10	18	0	1
R79	837187.48	819032.82	837217.48	819070.71	12	0	1
R79	837217.48	819070.71	837196.74	819022.82	12	0	1
R79	837196.74	819022.82	837140.45	819055.94	12	0	1
R80+81	837375.48	819071.78	837373.52	818888.96	21	0	1
R80-1+80-2	837374.53	818884.57	837228.85	818995.77	12	0	1
R80-1+80-2	837228.85	818995.77	837227.94	818932.14	12	0	1
R80-1+80-2	837227.94	818932.14	837337.98	818930.87	12	0	1
R82	837375.44	819072.43	837349.60	819072.00	15	0	1
R83	837345.29	819005.88	837349.30	819072.00	18	0	1
R84+85	837348.30	818871.82	837836.81	819067.81	13	0	1
R86+87	837856.62	819089.10	837855.08	818948.83	24	0	1
R88	837856.75	819066.76	837781.39	819069.96	13	0	1
R88	837781.39	819069.96	837753.18	819011.29	13	0	1
R89	837791.97	819057.79	837822.99	819019.59	18	0	1
R89	837822.99	819019.59	837890.56	819068.45	18	0	1
R89	837890.56	819068.45	837948.35	819096.19	18	0	1
R89	837940.35	819096.19	837972.06	819756.24	18	0	1
R90	837781.23	819057.31	837871.51	819756.82	18	0	1
R91	837903.23	819776.91	837879.37	819746.90	15	0	1
R92	837872.23	819756.53	837746.92	819872.80	19	0	1
R92-1	837884.09	819735.85	837717.80	819714.33	13	0	1
R92-1	837717.80	819714.33	837697.01	819614.10	13	0	1
R92-2	837944.98	819831.41	837930.94	819782.97	13	0	1
R93	837783.24	819835.48	837821.72	819878.91	13	0	1
R94+95	837774.83	819819.41	837714.67	819851.36	25	0	1
R96+97	837833.80	819880.36	837855.12	819938.05	18	0	1
R98	837784.69	819836.48	837530.23	819837.12	18	0	1
R98	837582.86	819914.03	837818.82	819987.86	14	0	1
R99	837818.82	819987.86	837565.57	820011.10	14	0	1
R99	837565.57	820011.10	837529.93	819836.48	14	0	1
R100	837558.18	820019.70	837514.19	819942.95	13	0	1
R101+102	837484.33	819966.67	837493.82	820038.48	18	0	1
R103+104	837514.79	819944.23	837371.40	820010.77	18	0	1
R105+106	837369.85	820024.76	837379.45	819884.41	28	0	1
R107+108	837251.06	819888.95	837291.72	819884.54	18	0	1
R108-1	837367.38	820009.79	837368.24	819884.25	18	0	1
R109	837251.42	819883.77	837375.45	819884.77	18	0	1
R110+111	837483.90	819966.87	837414.74	819880.38	18	0	1
R110+111	837414.74	819880.38	837488.80	819823.33	18	0	1
R112	837488.50	819823.82	837513.98	819943.06	12	0	1
R113	837530.06	819908.43	837471.38	819809.86	12	0	1
R114+115	836932.92	819868.83	836953.22	819580.42	16	0	1
R114+115	836953.22	819580.42	837028.88	819532.62	16	0	1
R114+115	837028.88	819532.62	837033.17	819488.00	16	0	1
R114+115	837033.17	819488.00	837010.91	819455.95	16	0	1
R114+115	837010.91	819455.95	836887.35	819427.73	16	0	1
R116+117	836948.07	819136.90	837022.42	819062.49	26	0	1
R118+119	837135.96	819223.91	837078.43	819129.56	18	0	1
R118+119	837078.43	819129.56	837022.42	819062.49	18	0	1
R120+121	837023.86	819063.94	837118.97	818957.84	22	0	1

RSP (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
0.0168	0.0154	0.0162	0.0155	0.0162	0.0187	0.0215	0.0293	0.0321	0.0289	0.0292	0.0300	0.0157	0.0166	0.0151	0.0147	0.0150	0.0157	0.0158	0.0114	0.0108	0.0106	0.0097	0.0101
0.0227	0.0166	0.0166	0.0170	0.0183	0.0188	0.0229	0.0329	0.0358	0.0336	0.0343	0.0347	0.0362	0.0385	0.0379	0.0358	0.0370	0.0376	0.0388	0.0350	0.0313	0.0302	0.0273	0.0292
0.0413	0.0262	0.0269	0.0280	0.0293	0.0286	0.0324	0.0388	0.0424	0.0419	0.0422	0.0414	0.0414	0.0452	0.0465	0.0439	0.0469	0.0470	0.0502	0.0519	0.0481	0.0486	0.0466	0.0491
0.0413	0.0262	0.0269	0.0280	0.0293	0.0286	0.0324	0.0388	0.0424	0.0419	0.0422	0.0414	0.0414	0.0452	0.0465	0.0439	0.0469	0.0470	0.0502	0.0519	0.0481	0.0486	0.0466	0.0491
0.0446	0.0281	0.0283	0.0295	0.0310	0.0300	0.0350	0.0410	0.0453	0.0447	0.0451	0.0441	0.0392	0.0425	0.0441	0.0412	0.0445	0.0446	0.0470	0.0493	0.0457	0.0462	0.0437	0.0462

Caline 4 input for 2032 Q4

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R1+2	837144.25	819218.15	837203.38	819316.45	18	8	1
R1-1+1-2	837133.93	819273.96	837146.18	819294.34	8	8	1
R1-1+1-2	837148.19	819294.34	837179.25	819275.45	8	8	1
R3+4	837203.20	819318.71	837244.44	819385.58	15	8	1
R3+4	837244.44	819385.58	837264.34	819360.43	15	8	1
R5+8	837138.87	819222.68	837191.42	819190.17	18	8	1
R7	837252.30	819267.96	837203.68	819318.89	18	8	1
R6	837250.13	819395.18	837297.52	819366.57	18	8	1
R9	837191.44	819190.13	837114.47	819082.78	14	8	1
R9	837114.47	819082.78	837071.73	819001.82	14	8	1
R10	837204.68	819182.55	837178.04	819127.84	14	8	1
R10	837178.04	819127.84	837165.32	819100.25	14	8	1
R10	837183.32	819100.25	837138.28	819052.06	14	8	1
R10	837138.28	819052.06	837119.98	819027.81	14	8	1
R10	837119.98	819027.81	837085.15	818991.79	14	8	1
R11	837191.06	819195.20	837297.41	819366.58	14	8	1
R12	837205.03	819182.75	837311.47	819260.17	14	8	1
R13+14	837295.88	819500.03	837310.16	819609.31	16	8	1
R15	837298.42	819365.50	837350.19	819483.70	16	8	1
R15	837350.19	819483.70	837368.53	819608.09	16	8	1
R18	837311.53	819360.02	837335.82	819402.82	14	8	1
R18	837335.82	819402.82	837348.37	819433.08	14	8	1
R18	837348.37	819433.08	837374.20	819511.47	14	8	1
R18	837374.20	819511.47	837378.30	819544.32	14	8	1
R18	837378.30	819544.32	837388.91	819589.03	14	8	1
R18	837388.91	819589.03	837389.89	819636.45	14	8	1
R17	837293.85	819498.18	837348.69	819483.66	16	8	1
R18	837358.28	819551.60	837363.51	819558.49	16	8	1
R19	837389.79	819641.46	837479.21	819584.49	18	8	1
R20	837306.72	819612.00	837368.21	819612.48	18	8	1
R21	837556.93	820020.52	837621.62	819952.21	18	18	8
R21	837521.62	819952.21	837462.18	819895.92	18	18	8
R21	837402.10	819895.92	837383.09	819848.78	16	16	4
R21	837383.09	819848.78	837371.89	819807.03	16	16	4
R21	837371.89	819807.03	837358.46	819522.74	16	16	4
R21	837358.46	819522.74	837348.78	819478.27	16	16	4
R21	837348.79	819478.27	837336.42	819436.51	16	16	4
R21	837336.42	819436.51	837309.64	819382.87	16	16	4
R21	837309.64	819382.87	837188.51	819147.58	16	16	4
R21	837188.51	819147.58	837134.75	819080.68	16	5	4
R21	837134.75	819080.68	837079.32	818996.37	16	0	1
R22	837367.30	820017.81	837321.11	819948.16	16	16	4
R22	837321.11	819948.16	837407.02	819681.71	16	16	4
R22	837407.02	819681.71	837388.81	819632.81	16	16	4
R22	837388.81	819632.81	837377.18	819576.34	16	16	4
R22	837377.18	819576.34	837367.78	819507.82	16	16	4
R22	837367.78	819507.82	837348.65	819442.16	16	16	4
R22	837348.65	819442.16	837321.88	819383.08	16	16	4
R22	837321.88	819383.08	837178.20	819140.91	16	16	4
R22	837178.20	819140.91	837142.64	819076.01	16	5	4
R22	837142.64	819076.01	837115.31	819034.08	16	0	1
R22	837115.31	819034.08	837082.10	818995.23	16	0	1
R23+24	837308.88	819612.18	837252.13	819609.82	18	0	1
R23+24	837253.13	819609.82	837251.42	819884.34	18	0	1
R25	837365.87	819808.57	837364.64	819884.29	16	0	1
R26	837375.84	819884.44	837377.07	819709.26	17	0	1
R28	837377.07	819709.26	837388.20	819836.33	17	0	1
R27	837471.54	819808.84	837406.98	819872.39	13	0	1
R27	837406.98	819872.39	837392.18	819879.45	13	0	1
R27	837392.18	819879.45	837438.14	819823.65	13	0	1
R27-1+27-2	837438.89	819736.79	837467.35	819713.23	18	0	1
R28	837441.48	819814.32	837515.91	819774.27	18	0	1
R29	837516.13	819774.12	837580.87	819914.96	18	0	1
R30	837833.22	819890.53	837962.77	819737.87	18	0	1
R31	837587.02	819713.44	837708.83	819853.49	16	0	1
R32	837721.65	819650.04	837584.52	819705.87	16	0	1
R33	837782.47	819838.14	837834.05	819667.74	13	0	1
R34	837717.34	819588.31	837584.88	819705.85	16	0	1
R35	837587.03	819715.45	837480.91	819593.72	16	0	1
R36	837584.51	819705.86	837491.65	819588.60	16	0	1
R37	837588.99	819715.41	837471.78	819811.84	18	0	1
R38+39	837781.33	819657.04	837874.27	819928.83	18	0	1
R38+39	837874.27	819539.83	837655.64	819502.88	18	0	1
R40	837370.55	819252.71	837367.13	819425.03	16	0	1
R40	837367.13	819425.03	837370.01	819454.42	16	0	1
R40	837370.21	819454.42	837383.83	819584.42	16	0	1
R40	837383.83	819584.42	837480.25	819593.95	16	0	1
R41	837481.55	819588.70	837380.25	819462.98	16	0	1
R41	837380.25	819462.98	837380.18	819318.87	16	0	1
R41	837380.18	819318.87	837383.41	819255.41	16	0	1
R42+43	837471.48	819258.12	837470.94	819381.98	13	0	1
R44	837470.98	819382.87	837380.21	819382.12	14	0	1
R44-1	837471.54	819382.98	837471.55	819414.34	14	0	1
R44-1	837471.55	819414.34	837412.47	819442.02	14	0	1
R45+48	837470.98	819382.87	837536.04	819382.04	14	0	1
R45+48	837536.04	819382.04	837579.78	819478.33	14	0	1
R47	837514.88	819508.68	837542.71	819562.45	11	0	1
R48	837447.63	819538.73	837580.21	819478.85	13	0	1

FSP (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
0.0181	0.0133	0.0129	0.0126	0.0133	0.0144	0.0190	0.0231	0.0253	0.0244	0.0241	0.0243	0.0192	0.0205	0.0203	0.0195	0.0203	0.0207	0.0215	0.0191	0.0177	0.0176	0.0164	0.0173
0.0216	0.0157	0.0157	0.0163	0.0177	0.0176	0.0205	0.0272	0.0305	0.0286	0.0284	0.0288	0.0322	0.0341	0.0337	0.0322	0.0336	0.0343	0.0354	0.0326	0.0300	0.0307	0.0282	0.0301
0.0216	0.0157	0.0157	0.0163	0.0177	0.0176	0.0205	0.0272	0.0305	0.0286	0.0284	0.0288	0.0322	0.0341	0.0337	0.0322	0.0336	0.0343	0.0354	0.0326	0.0300	0.0307	0.0282	0.0301
0.0198	0.0134	0.0111	0.0101	0.0115	0.0119	0.0164	0.0209	0.0228	0.0229	0.0224	0.0221	0.0165	0.0175	0.0183	0.0176	0.0185	0.0186	0.0198	0.0188	0.0171	0.0173	0.0166	0.0167
0.0198	0.0134	0.0111	0.0101	0.0115	0.0119	0.0164	0.0209	0.0228	0.0229	0.0224	0.0221	0.0165	0.0175	0.0183	0.0176	0.0185	0.0186	0.0198	0.0188	0.0171	0.0173	0.0166	0.0167
0.0184	0.0127	0.0110	0.0100	0.0112	0.0117	0.0156	0.0206	0.0225	0.0219	0.0213	0.0213	0.0145	0.0152	0.0157	0.0152	0.0160	0.0162	0.0170	0.0152	0.0140	0.0141	0.0130	0.0133
0.0273	0.0180	0.0168	0.0192	0.0222	0.0178	0.0214	0.0270	0.0289	0.0282	0.0292	0.0282	0.0198	0.0207	0.0213	0.0202	0.0214	0.0221	0.0228	0.0217	0.0208	0.0208	0.0192	0.0193
0.0212	0.0140	0.0121	0.0135	0.0147	0.0123	0.0179	0.0250	0.0273	0.0267	0.0265	0.0264	0.0335	0.0358	0.0349	0.0329	0.0343	0.0363	0.0370	0.0331	0.0315	0.0314	0.0294	0.0314
0.0384	0.0245	0.0255	0.0265	0.0276	0.0269	0.0302	0.0352	0.0389	0.0385	0.0388	0.0380	0.0413	0.0448	0.0466	0.0440	0.0471	0.0471	0.0503	0.0526	0.0486	0.0492	0.0473	0.0499
0.0384	0.0245	0.0255	0.0265	0.0276	0.0269	0.0302	0.0352	0.0389	0.0385	0.0388	0.0380	0.0413	0.0448	0.0466	0.0440	0.0471	0.0471	0.0503	0.0526	0.0486	0.0492	0.0473	0.0499
0.0429	0.0269	0.0273	0.0287	0.0301	0.0289	0.0334	0.0390	0.0430	0.0425	0.0430	0.0420	0.0366	0.0396	0.0413	0.0385	0.0418	0.0418	0.0441	0.0465	0.0431	0.0435	0.0412	0.0435

Caline 4 input for 2032 Q4

Road Pair	Coordinate (m)				Width (including mixing zone)	Height (m)	Road Type (caline 4)
	X1	Y1	X2	Y2			
R49	337580.57	819478.94	337634.37	819454.01	13	0	1
R50	337480.85	819587.80	337636.18	819500.06	18	0	1
R51+52	337650.84	819560.89	337588.72	819543.19	20	0	1
R51+52	337588.72	819543.19	337582.52	819256.02	20	0	1
R53+54	337694.81	819487.71	337727.20	819473.80	14	0	1
R53+54	337727.20	819473.80	337789.09	819426.83	14	0	1
R52+54	337789.09	819426.83	337748.25	819388.98	14	0	1
R53+54	337748.25	819389.98	337896.63	819327.32	14	0	1
R53+54	337898.63	819327.32	337880.34	819301.31	14	0	1
R53+54	337880.34	819301.31	337839.18	819248.02	14	0	1
R55+56	337379.28	819257.83	337564.22	819208.11	25	0	1
R56-1	337454.87	819257.83	337447.06	819071.48	11	0	1
R56-2+56-3	337425.73	819190.58	337424.80	819071.89	18	0	1
R57+58	337564.84	819258.09	337661.38	819251.64	25	0	1
R59	337661.10	819246.24	337745.70	819231.27	14	0	1
R58	337745.70	819231.27	337728.05	819070.31	14	0	1
R60	337680.25	819247.58	337691.46	819068.36	15	0	1
R61	337675.39	819244.48	337661.88	819068.15	15	0	1
R62+63	337565.20	819255.29	337562.77	819138.26	17	0	1
R64+65	337388.89	819255.27	337376.84	819196.90	21	0	1
R64+65	337378.88	819196.90	337375.43	819071.78	21	0	1
R66+67	337376.09	819128.90	337290.22	819129.79	18	0	1
R68	337290.79	819325.67	337368.82	819289.11	18	0	1
R69	337263.67	819292.98	337338.48	819246.43	18	0	1
R69	337338.48	819246.43	337375.52	819252.98	18	0	1
R70+71	337236.58	819254.50	337318.11	819185.17	18	0	1
R72+73	337204.77	819182.19	337292.22	819126.82	18	0	1
R74+75	337347.48	819248.52	337292.25	819129.79	18	0	1
R76	337292.22	819129.80	337267.77	819078.61	18	0	1
R77	337268.87	819073.43	337202.18	819118.48	15	0	1
R77	337252.18	819110.48	337187.06	819105.41	15	0	1
R77-1+77-2	337218.58	819101.10	337181.52	819038.58	12	0	1
R78	337267.68	819072.24	337375.45	818871.10	18	0	1
R79	337187.48	819830.82	337217.48	818878.71	12	0	1
R79	337217.48	818878.71	337196.74	819022.02	12	0	1
R79	337198.74	819022.02	337140.45	819058.84	12	0	1
R80+81	337375.48	819071.78	337373.52	818888.98	21	0	1
R80-1+80-2	337374.53	818884.57	337228.05	818865.77	12	0	1
R80-1+80-2	337228.05	818865.77	337227.84	818852.14	12	0	1
R80-1+80-2	337227.84	818852.14	337237.68	818830.87	12	0	1
R82	337375.44	819072.43	337348.00	819072.00	15	0	1
R83	337345.29	818805.88	337348.30	819072.00	18	0	1
R84+85	337348.30	819071.82	337856.61	819067.81	13	0	1
R86+87	337856.82	819069.10	337855.08	818848.63	24	0	1
R88	337858.75	819068.78	337781.39	819069.96	13	0	1
R88	337781.39	819069.96	337753.18	819011.28	13	0	1
R88	337781.97	819057.79	337822.98	818818.58	18	0	1
R88	337822.98	818819.58	337880.56	818588.45	18	0	1
R89	337880.56	818588.45	337948.35	818886.19	18	0	1
R85	337948.35	818886.19	337872.06	818756.34	18	0	1
R90	337781.33	819057.31	337871.51	818758.82	18	0	1
R91	337903.23	818776.91	337879.37	818748.98	15	0	1
R92	337872.23	818758.53	337740.92	818672.80	18	0	1
R92-1	337884.09	818735.86	337717.80	818714.33	13	0	1
R92-1	337717.80	818714.33	337607.81	818614.10	13	0	1
R92-2	337884.96	818631.47	337830.84	818782.97	13	0	1
R93	337783.24	818635.46	337821.72	818678.91	13	0	1
R94+95	337774.63	819018.41	337714.67	818851.38	28	0	1
R96+97	337833.50	818890.36	337855.12	818838.05	18	0	1
R98	337704.88	818856.46	337530.23	818837.12	18	0	1
R99	337582.88	819014.53	337616.82	818987.88	14	0	1
R99	337616.82	818987.88	337965.57	820011.10	14	0	1
R99	337965.57	820011.10	337529.93	819838.49	14	0	1
R100	337550.18	820019.70	337514.19	819942.95	13	0	1
R101+102	337464.33	819998.67	337493.82	820030.48	18	0	1
R103+104	337514.79	819944.23	337371.40	820010.77	18	0	1
R105+106	337388.85	820024.78	337370.45	819884.41	28	0	1
R107+108	337251.06	819869.95	337251.72	819884.34	18	0	1
R108-1	337307.38	820009.79	337308.24	819884.25	18	0	1
R109	337251.42	819883.77	337370.43	819884.77	18	0	1
R110+111	337483.90	819998.87	337414.74	819880.38	18	0	1
R110+111	337414.74	819880.38	337459.00	818823.33	18	0	1
R112	337458.90	818823.82	337513.96	819943.06	12	0	1
R113	337530.06	819938.43	337471.36	819808.89	12	0	1
R114+115	336932.92	819868.53	336953.22	819980.42	18	0	1
R114+115	336953.22	819980.42	337026.89	819932.82	18	0	1
R114+115	337026.89	819932.82	337033.17	819988.00	18	0	1
R114+115	337033.17	819988.00	337010.91	819955.85	18	0	1
R114+115	337010.91	819955.85	336887.35	819927.73	18	0	1
R116+117	336848.57	819135.96	337222.42	819062.48	28	0	1
R118+119	337135.66	819223.51	337378.43	819129.58	18	0	1
R118+119	337378.43	819129.58	337222.42	819062.48	18	0	1
R120+121	337222.66	819083.94	337118.97	818957.84	20	0	1

FSP (g/VMT)																							
Hr00	Hr01	Hr02	Hr03	Hr04	Hr05	Hr06	Hr07	Hr08	Hr09	Hr10	Hr11	Hr12	Hr13	Hr14	Hr15	Hr16	Hr17	Hr18	Hr19	Hr20	Hr21	Hr22	Hr23
0.0154	0.0142	0.0149	0.0143	0.0149	0.0172	0.0198	0.0270	0.0295	0.0266	0.0269	0.0276	0.0144	0.0153	0.0139	0.0136	0.0138	0.0145	0.0145	0.0105	0.0099	0.0097	0.0089	0.0093
0.0209	0.0153	0.0152	0.0156	0.0168	0.0173	0.0211	0.0302	0.0329	0.0308	0.0315	0.0319	0.0333	0.0354	0.0349	0.0330	0.0341	0.0346	0.0357	0.0322	0.0288	0.0277	0.0251	0.0269
0.0380	0.0241	0.0248	0.0257	0.0269	0.0263	0.0299	0.0357	0.0390	0.0385	0.0389	0.0381	0.0381	0.0416	0.0428	0.0404	0.0432	0.0433	0.0461	0.0478	0.0442	0.0447	0.0428	0.0452
0.0380	0.0241	0.0248	0.0257	0.0269	0.0263	0.0299	0.0357	0.0390	0.0385	0.0389	0.0381	0.0381	0.0416	0.0428	0.0404	0.0432	0.0433	0.0461	0.0478	0.0442	0.0447	0.0428	0.0452
0.0410	0.0258	0.0260	0.0272	0.0286	0.0276	0.0322	0.0377	0.0417	0.0411	0.0416	0.0406	0.0361	0.0390	0.0406	0.0379	0.0410	0.0410	0.0433	0.0454	0.0420	0.0425	0.0402	0.0425

APPENDIX 4-4

Summary of Marine Sources

Marine Emission for Kai Tak Cruise Terminal

Table 1 - Marine Emission for Kai Tak Cruise Terminal

		(unit)	Remark / Reference
Vessel/Chimney Information			
Vessel Name	World Dream		
Stack Height	48	mPD	
Emission Temperature	537	K	Note 1 - Section 7
Exhaust Velocity	24.6	m/s	
Stack Diameter	1.9	m	
Engine Information			
Power of Main Engine	88000	kW	Note 1 - EIA (AEIAR-179/2013) - Appendix 3.6 - Table 1
Power of Auxiliary Engine	14843.75	kW	
Power of Boiler	1000	kW	Note 2 - MVEI Report - Table 3-23 - Item c. Cruise/Ferry
Load Factor (Hotelling)	0.416		Note 2 - MVEI Report - Table 3-21 - Item c. Cruise/Ferry - Hotelling
Emissions factor (from emission table, excluse Load Factor)			
Auxiliary Engine - NO_X	13.900	g/kwh	
Auxiliary Engine - RSP	0.320	g/kwh	Note 2 - MVEI Report - Table 3-28 - 0.5% Sulphur content
Auxiliary Engine - FSP	0.290	g/kwh	
Boiler - NO_X	2.000	g/kwh	
Boiler - RSP	0.190	g/kwh	Note 2 - MVEI Report - Table 3-29 - 0.5% Sulphur content
Boiler - FSP	0.140	g/kwh	
Emissions Rate per Vessel (Emission Factor x Engine Power x Load Factor)			
Auxiliary Engine (Hotelling) - NO_X	85832.5	g/h	
Auxiliary Engine (Hotelling) - RSP	1976.0	g/h	
Auxiliary Engine (Hotelling) - FSP	1790.8	g/h	
Boiler (Hotelling) - NO_X	832.0	g/h	
Boiler (Hotelling) - RSP	79.0	g/h	
Boiler (Hotelling) - FSP	58.2	g/h	
Auxiliary Engine + Boiler (Hotelling) - NO_X	**2.407E+01**	**g/s**	**Auxiliary Engine + Boiler**
Auxiliary Engine + Boiler (Hotelling) - RSP	**5.708E-01**	**g/s**	**Unit Conversion**
Auxiliary Engine + Boiler (Hotelling) - FSP	**5.136E-01**	**g/s**	

Estimation of Particle Size

Particle Size, um	Cumulative %
<=1	82%
<=2	88%
<=2.5	90%
<=6	93%
<=10	96%

Note 3 - AP-42, Appendix B.2, Table B.2-2., Category 1

Mean diameter for RSP	0.95	µm
Mean diameter for FSP	0.61	µm

Note/Reference:

1 Appendix 3.6 of the approved EIA Report of Kai Tak Multi-purpose Sport Complex (AEIAR-204/2017).
2 HKUST (2012), Study on Marine Vessels Emission Inventory
3 AP-42, Appendix B.2 - Generalized Particle Size Distributions

Summary of Marine Emission

Table 2 - Source strength of Hotelling OGV for Kai Tak Curise Terminal

Source	ID	Easting (m)	Northing (m)	Individual Source Strength			Emission Height	Temp	Exhaust Velocity	Diameter	Operation hour	Remark
				NOx (g/s)	RSP (g/s)	FSP (g/s)	(mPD)	(K)	(m/s)	(m)		
Kai Tak Cruise Terminal	H1	839974.7	818474.4	24.07	0.57	0.51	48	537	24.6	1.9	23 hours / day 00:00-17:00 - 100% 17:00-19:00 - 50% 19:00-00:00 - 100%	Emission from H1 & H1a in Appendix 3.6 of the approved EIA AEIAR-204/2017 has been included.
	H2	839683.2	818756.5								23 hours / day 00:00-19:00 - 100% 19:00-21:00 - 50% 21:00-00:00 - 100%	Emission from H2 & H2a in Appendix 3.6 of the approved EIA AEIAR-204/2017 has been included.

Note/Referrence:

1 Chimney Information extracted from Section 7 & Table 7 in Appendix 3.6 of the approved EIA AEIAR-204/2017

2 The emission rate can be found in **Table 1**

3 The distribution of particle size is estimated according to AP-42, Appendix B.2 - Generalized Particle Size Distributions.
The average particle sized for AERMOD models are 0.95μm for RSP and 0.61μm for FSP.

Table 3 - Source strength of Hotelling OGV for Ocean Terminal

Source	ID	Easting (m)	Northing (m)	Individual Source Strength			Emission Height	Temp	Exhaust Velocity	Diameter	Operation hour	Remark
				NOx (g/s)	RSP (g/s)	FSP (g/s) [2]	(mPD)	(K)	(m/s)	(m)		
Ocean Terminal	OGV1a	835175.4	817276.3	3.24	0.47	0.44	50	448.2	10.65	0.6	8:00-20:00	4 emission sources per vessel
	OGV1b											
	OGV1c											
	OGV1D											
	OGV2a	835170.5	817393.3	3.64	0.49	0.46			11.22	0.6	24 hours / day	
	OGV2b											
	OGV2c											
	OGV2D											

Note/Referrence:

1 Source data extracted from Table 5 in Appendix 3.6 of the approved EIA AEIAR-179/2013

2 FSP emission from Ocean Terminal and the distribution of particle size are estimated according to AP-42, Appendix B.2 - Generalized Particle Size Distributions.
The average particle sized for AERMOD models are 0.95μm for RSP and 0.61μm for FSP.

APPENDIX 4-5

Predicted Pollutant Concentration (Air Quality)

Appendix 4-5 - Predicted Pollutant Concentration

Assessment Point	PATH Grid	Easting (m)	Northing (m)	Level (mAG)	Level (mPD)	Concentraion (µg/m³)								
						Daily 1st Maximum RSP	Daily 10th Maximum RSP	Annual RSP	Daily 1st Maximum FSP	Daily 10th Maximum FSP	Annual FSP	Hourly 1st Maximum NO2	Hourly 19th Maximum NO2	Annual NO2
Criteria (AQO)						--	100	50	--	75	35	--	200	40
P1-01	[41,33]	837391.25	819458.82	1.5	8.5	111	81	37	84	61	27	260	189	56
P1-01	[41,33]	837391.25	819458.82	8.5	15.5	110	81	36	83	61	26	259	166	49
P1-01	[41,33]	837391.25	819458.82	12.4	19.4	109	81	36	82	61	26	257	163	47
P1-01	[41,33]	837391.25	819458.82	16.9	23.9	109	81	36	82	61	26	256	153	44
P1-01	[41,33]	837391.25	819458.82	21.4	28.4	109	81	36	82	61	26	253	151	42
P1-01	[41,33]	837391.25	819458.82	24	31	108	81	36	81	61	26	252	150	41
P1-01	[41,33]	837391.25	819458.82	26.4	33.4	108	81	36	81	60	26	250	150	40
P1-01	[41,33]	837391.25	819458.82	28	35	108	81	36	81	60	26	249	149	40
P1-01	[41,33]	837391.25	819458.82	29.1	36.1	108	81	36	81	60	25	248	149	39
P1-02	[41,33]	837406.53	819476.34	1.5	8.5	111	81	37	84	61	27	254	185	55
P1-02	[41,33]	837406.53	819476.34	8.5	15.5	110	81	36	83	61	26	246	166	49
P1-02	[41,33]	837406.53	819476.34	12.4	19.4	109	81	36	82	61	26	245	163	46
P1-02	[41,33]	837406.53	819476.34	16.9	23.9	109	81	36	82	61	26	243	153	44
P1-02	[41,33]	837406.53	819476.34	21.4	28.4	108	81	36	82	61	26	241	151	42
P1-02	[41,33]	837406.53	819476.34	24	31	108	81	36	81	60	26	240	150	41
P1-02	[41,33]	837406.53	819476.34	26.4	33.4	108	81	36	81	60	26	239	150	40
P1-02	[41,33]	837406.53	819476.34	28	35	108	81	36	81	60	25	238	150	40
P1-02	[41,33]	837406.53	819476.34	29.1	36.1	108	81	36	81	60	25	237	150	39
P1-03	[41,33]	837422.24	819494.43	1.5	8.5	111	81	37	84	61	27	254	183	55
P1-03	[41,33]	837422.24	819494.43	8.5	15.5	110	81	36	83	61	26	237	166	48
P1-03	[41,33]	837422.24	819494.43	12.4	19.4	109	81	36	82	61	26	236	160	46
P1-03	[41,33]	837422.24	819494.43	16.9	23.9	109	81	36	82	61	26	234	154	44
P1-03	[41,33]	837422.24	819494.43	21.4	28.4	108	81	36	82	61	26	232	151	42
P1-03	[41,33]	837422.24	819494.43	24	31	108	81	36	81	60	26	231	150	41
P1-03	[41,33]	837422.24	819494.43	26.4	33.4	108	81	36	81	60	26	230	150	40
P1-03	[41,33]	837422.24	819494.43	28	35	108	81	36	81	60	25	229	150	39
P1-03	[41,33]	837422.24	819494.43	29.1	36.1	108	81	36	81	60	25	229	150	39
P1-04	[41,33]	837433.72	819507.66	1.5	8.5	111	81	37	84	61	27	254	183	55
P1-04	[41,33]	837433.72	819507.66	8.5	15.5	110	81	36	82	61	26	235	165	48
P1-04	[41,33]	837433.72	819507.66	12.4	19.4	109	81	36	82	61	26	233	159	46
P1-04	[41,33]	837433.72	819507.66	16.9	23.9	109	81	36	82	61	26	229	155	44
P1-04	[41,33]	837433.72	819507.66	21.4	28.4	108	81	36	82	60	26	228	151	42
P1-04	[41,33]	837433.72	819507.66	24	31	108	81	36	81	60	26	226	150	41
P1-04	[41,33]	837433.72	819507.66	26.4	33.4	108	81	36	81	60	26	225	150	40
P1-04	[41,33]	837433.72	819507.66	28	35	108	81	36	81	60	25	224	150	39
P1-04	[41,33]	837433.72	819507.66	29.1	36.1	108	81	36	81	60	25	224	150	39
P1-05	[41,33]	837446.95	819522.86	1.5	8.5	111	81	37	84	61	27	253	183	56
P1-05	[41,33]	837446.95	819522.86	8.5	15.5	109	81	36	82	61	26	233	164	48
P1-05	[41,33]	837446.95	819522.86	12.4	19.4	109	81	36	82	61	26	231	159	45
P1-05	[41,33]	837446.95	819522.86	16.9	23.9	109	81	36	82	61	26	225	154	43
P1-05	[41,33]	837446.95	819522.86	21.4	28.4	108	81	36	82	60	26	223	151	41
P1-05	[41,33]	837446.95	819522.86	24	31	108	81	36	81	60	26	222	150	40
P1-05	[41,33]	837446.95	819522.86	26.4	33.4	108	81	36	81	60	26	220	150	40
P1-05	[41,33]	837446.95	819522.86	28	35	108	81	36	81	60	25	220	149	39
P1-05	[41,33]	837446.95	819522.86	29.1	36.1	108	81	36	81	60	25	219	149	39
P1-06	[41,33]	837451.58	819528.20	1.5	8.5	111	81	37	84	61	27	253	183	58
P1-06	[41,33]	837451.58	819528.20	8.5	15.5	109	81	36	82	61	26	237	164	48
P1-06	[41,33]	837451.58	819528.20	12.4	19.4	109	81	36	82	61	26	235	159	45
P1-06	[41,33]	837451.58	819528.20	16.9	23.9	109	81	36	82	61	26	233	154	43
P1-06	[41,33]	837451.58	819528.20	21.4	28.4	108	81	36	82	60	26	230	151	41
P1-06	[41,33]	837451.58	819528.20	24	31	108	81	36	81	60	26	228	150	40
P1-06	[41,33]	837451.58	819528.20	26.4	33.4	108	81	36	81	60	25	227	150	40
P1-06	[41,33]	837451.58	819528.20	28	35	108	81	36	81	60	25	225	150	39
P1-06	[41,33]	837451.58	819528.20	29.1	36.1	108	81	36	81	60	25	224	149	39
P1-07	[42,33]	837467.75	819521.57	1.5	8.5	107	79	36	80	60	26	234	162	51
P1-07	[42,33]	837467.75	819521.57	8.5	15.5	106	79	35	80	59	25	226	153	45
P1-07	[42,33]	837467.75	819521.57	12.4	19.4	106	79	35	79	59	25	205	151	42
P1-07	[42,33]	837467.75	819521.57	16.9	23.9	106	79	35	79	59	25	189	148	40
P1-07	[42,33]	837467.75	819521.57	21.4	28.4	106	79	35	79	59	25	189	144	38
P1-07	[42,33]	837467.75	819521.57	24	31	106	79	35	79	59	25	188	144	37
P1-07	[42,33]	837467.75	819521.57	26.4	33.4	106	79	35	79	59	25	188	143	37
P1-07	[42,33]	837467.75	819521.57	28	35	106	78	35	79	59	25	192	143	36
P1-07	[42,33]	837467.75	819521.57	29.1	36.1	106	78	35	79	59	25	196	143	36
P1-08	[42,33]	837459.52	819512.02	1.5	8.5	107	79	36	80	60	26	235	161	49
P1-08	[42,33]	837459.52	819512.02	8.5	15.5	106	79	35	80	59	25	226	153	45
P1-08	[42,33]	837459.52	819512.02	12.4	19.4	106	79	35	79	59	25	205	151	43
P1-08	[42,33]	837459.52	819512.02	16.9	23.9	106	79	35	79	59	25	190	147	40
P1-08	[42,33]	837459.52	819512.02	21.4	28.4	106	79	35	79	59	25	189	143	38
P1-08	[42,33]	837459.52	819512.02	24	31	106	79	35	79	59	25	188	143	38
P1-08	[42,33]	837459.52	819512.02	26.4	33.4	106	79	35	79	59	25	188	142	37
P1-08	[42,33]	837459.52	819512.02	28	35	106	79	35	79	59	25	192	142	36
P1-08	[42,33]	837459.52	819512.02	29.1	36.1	106	78	35	79	59	25	196	142	36
P1-09	[41,33]	837449.45	819500.34	1.5	8.5	110	81	37	83	61	26	250	168	51
P1-09	[41,33]	837449.45	819500.34	8.5	15.5	109	81	36	82	61	26	233	163	48
P1-09	[41,33]	837449.45	819500.34	12.4	19.4	109	81	36	82	61	26	218	157	46
P1-09	[41,33]	837449.45	819500.34	16.9	23.9	109	81	36	82	61	26	216	154	43
P1-09	[41,33]	837449.45	819500.34	21.4	28.4	108	81	36	81	60	26	215	150	42
P1-09	[41,33]	837449.45	819500.34	24	31	108	81	36	81	60	26	215	149	41
P1-09	[41,33]	837449.45	819500.34	26.4	33.4	108	81	36	81	60	26	214	149	40
P1-09	[41,33]	837449.45	819500.34	28	35	108	81	36	81	60	25	214	149	39
P1-09	[41,33]	837449.45	819500.34	29.1	36.1	108	81	36	81	60	25	213	149	39
P1-10	[41,33]	837438.38	819483.44	1.5	8.5	110	81	37	83	61	26	249	167	51
P1-10	[41,33]	837438.38	819483.44	8.5	15.5	109	81	36	82	61	26	233	164	48
P1-10	[41,33]	837438.38	819483.44	12.4	19.4	109	81	36	82	61	26	219	158	46
P1-10	[41,33]	837438.38	819483.44	16.9	23.9	109	81	36	82	61	26	218	153	44
P1-10	[41,33]	837438.38	819483.44	21.4	28.4	108	81	36	81	61	26	218	149	42
P1-10	[41,33]	837438.38	819483.44	24	31	108	81	36	81	60	26	217	149	41
P1-10	[41,33]	837438.38	819483.44	26.4	33.4	108	81	36	81	60	26	217	149	40
P1-10	[41,33]	837438.38	819483.44	28	35	108	81	36	81	60	25	216	150	39
P1-10	[41,33]	837438.38	819483.44	29.1	36.1	108	81	36	81	60	25	216	149	39
P1-11	[41,33]	837444.08	819475.78	1.5	8.5	109	81	36	82	61	26	240	164	50
P1-11	[41,33]	837444.08	819475.78	8.5	15.5	109	81	36	82	61	26	232	163	48
P1-11	[41,33]	837444.08	819475.78	12.4	19.4	109	81	36	82	61	26	218	158	46
P1-11	[41,33]	837444.08	819475.78	16.9	23.9	109	81	36	82	61	26	215	154	44
P1-11	[41,33]	837444.08	819475.78	21.4	28.4	108	81	36	81	61	26	214	149	42
P1-11	[41,33]	837444.08	819475.78	24	31	108	81	36	81	60	26	214	149	41
P1-11	[41,33]	837444.08	819475.78	26.4	33.4	108	81	36	81	60	26	213	148	40
P1-11	[41,33]	837444.08	819475.78	28	35	108	81	36	81	60	25	213	150	39
P1-11	[41,33]	837444.08	819475.78	29.1	36.1	108	81	36	81	60	25	213	150	39

Appendix 4-5 - Predicted Pollutant Concentration

Assessment Point	PATH Grid	Easting (m)	Northing (m)	Level (mAG)	Level (mPD)	Concentraion (µg/m³)								
						Daily 1st Maximum RSP	Daily 10th Maximum RSP	Annual RSP	Daily 1st Maximum FSP	Daily 10th Maximum FSP	Annual FSP	Hourly 1st Maximum NO2	Hourly 19th Maximum NO2	Annual NO2
Criteria (AQO)						--	100	50	--	75	35	--	200	40
P1-12	[41,33]	837441.29	819459.59	1.5	8.5	109	81	36	82	61	26	234	164	50
P1-12	[41,33]	837441.29	819459.59	8.5	15.5	109	81	36	82	61	26	232	162	48
P1-12	[41,33]	837441.29	819459.59	12.4	19.4	109	81	36	82	61	26	218	158	46
P1-12	[41,33]	837441.29	819459.59	16.9	23.9	109	81	36	82	61	26	215	154	44
P1-12	[41,33]	837441.29	819459.59	21.4	28.4	108	81	36	81	61	26	214	149	42
P1-12	[41,33]	837441.29	819459.59	24	31	108	81	36	81	60	26	214	148	41
P1-12	[41,33]	837441.29	819459.59	26.4	33.4	108	81	36	81	60	26	213	148	40
P1-12	[41,33]	837441.29	819459.59	28	35	108	81	36	81	60	25	213	150	40
P1-12	[41,33]	837441.29	819459.59	29.1	36.1	108	81	36	81	60	25	213	149	39
P1-13	[41,33]	837434.33	819439.90	1.5	8.5	109	81	36	82	61	26	235	164	50
P1-13	[41,33]	837434.33	819439.90	8.5	15.5	109	81	36	82	61	26	232	162	48
P1-13	[41,33]	837434.33	819439.90	12.4	19.4	109	81	36	82	61	26	219	158	46
P1-13	[41,33]	837434.33	819439.90	16.9	23.9	109	81	36	82	61	26	216	153	44
P1-13	[41,33]	837434.33	819439.90	21.4	28.4	108	81	36	81	61	26	216	149	42
P1-13	[41,33]	837434.33	819439.90	24	31	108	81	36	81	60	26	216	149	41
P1-13	[41,33]	837434.33	819439.90	26.4	33.4	108	81	36	81	60	26	215	148	40
P1-13	[41,33]	837434.33	819439.90	28	35	108	81	36	81	60	25	215	148	40
P1-13	[41,33]	837434.33	819439.90	29.1	36.1	108	81	36	81	60	25	215	148	39
P1-14	[41,33]	837419.85	819446.42	1.5	8.5	110	81	37	82	61	26	242	166	51
P1-14	[41,33]	837419.85	819446.42	8.5	15.5	109	81	36	82	61	26	233	164	48
P1-14	[41,33]	837419.85	819446.42	12.4	19.4	109	81	36	82	61	26	226	160	46
P1-14	[41,33]	837419.85	819446.42	16.9	23.9	109	81	36	82	61	26	225	153	44
P1-14	[41,33]	837419.85	819446.42	21.4	28.4	108	81	36	81	61	26	224	149	42
P1-14	[41,33]	837419.85	819446.42	24	31	108	81	36	81	60	26	224	149	41
P1-14	[41,33]	837419.85	819446.42	26.4	33.4	108	81	36	81	60	26	223	148	40
P1-14	[41,33]	837419.85	819446.42	28	35	108	81	36	81	60	25	223	149	40
P1-14	[41,33]	837419.85	819446.42	29.1	36.1	108	81	36	81	60	25	223	149	39
P1-15	[41,33]	837409.91	819450.64	1.5	8.5	110	81	37	83	61	26	249	172	52
P1-15	[41,33]	837409.91	819450.64	8.5	15.5	109	81	36	82	61	26	234	165	49
P1-15	[41,33]	837409.91	819450.64	12.4	19.4	109	81	36	82	61	26	233	159	47
P1-15	[41,33]	837409.91	819450.64	16.9	23.9	109	81	36	82	61	26	233	152	44
P1-15	[41,33]	837409.91	819450.64	21.4	28.4	108	81	36	81	61	26	232	149	42
P1-15	[41,33]	837409.91	819450.64	24	31	108	81	36	81	61	26	231	149	41
P1-15	[41,33]	837409.91	819450.64	26.4	33.4	108	81	36	81	60	26	230	149	40
P1-15	[41,33]	837409.91	819450.64	28	35	108	81	36	81	60	26	230	149	40
P1-15	[41,33]	837409.91	819450.64	29.1	36.1	108	81	36	81	60	25	230	149	39
P2-01	[41,33]	837388.79	819389.95	1.5	8.5	110	81	37	83	61	27	275	184	56
P2-01	[41,33]	837388.79	819389.95	8.5	15.5	109	81	36	82	61	26	274	162	49
P2-01	[41,33]	837388.79	819389.95	12.4	19.4	109	81	36	82	61	26	273	157	47
P2-01	[41,33]	837388.79	819389.95	16.9	23.9	109	81	36	82	61	26	271	152	45
P2-01	[41,33]	837388.79	819389.95	21.4	28.4	108	81	36	81	61	26	269	150	43
P2-01	[41,33]	837388.79	819389.95	24	31	108	81	36	81	61	26	268	149	41
P2-01	[41,33]	837388.79	819389.95	26.4	33.4	108	81	36	81	61	26	266	148	41
P2-01	[41,33]	837388.79	819389.95	28	35	108	81	36	81	60	26	265	147	40
P2-01	[41,33]	837388.79	819389.95	29.1	36.1	108	81	36	81	60	25	265	148	40
P2-02	[41,33]	837388.63	819404.05	1.5	8.5	110	81	37	83	61	27	274	186	55
P2-02	[41,33]	837388.63	819404.05	8.5	15.5	109	81	36	82	61	26	273	162	49
P2-02	[41,33]	837388.63	819404.05	12.4	19.4	109	81	36	82	61	26	272	158	47
P2-02	[41,33]	837388.63	819404.05	16.9	23.9	109	81	36	82	61	26	270	152	45
P2-02	[41,33]	837388.63	819404.05	21.4	28.4	108	81	36	81	61	26	268	150	43
P2-02	[41,33]	837388.63	819404.05	24	31	108	81	36	81	61	26	267	149	41
P2-02	[41,33]	837388.63	819404.05	26.4	33.4	108	81	36	81	60	26	265	149	41
P2-02	[41,33]	837388.63	819404.05	28	35	108	81	36	81	60	26	264	148	40
P2-02	[41,33]	837388.63	819404.05	29.1	36.1	108	81	36	81	60	25	264	148	40
P2-03	[41,33]	837388.56	819422.63	1.5	8.5	110	81	37	83	61	27	271	186	55
P2-03	[41,33]	837388.56	819422.63	8.5	15.5	109	81	36	82	61	26	270	164	49
P2-03	[41,33]	837388.56	819422.63	12.4	19.4	109	81	36	82	61	26	269	159	47
P2-03	[41,33]	837388.56	819422.63	16.9	23.9	109	81	36	82	61	26	267	152	45
P2-03	[41,33]	837388.56	819422.63	21.4	28.4	108	81	36	81	61	26	265	150	42
P2-03	[41,33]	837388.56	819422.63	24	31	108	81	36	81	61	26	264	149	41
P2-03	[41,33]	837388.56	819422.63	26.4	33.4	108	81	36	81	60	26	263	149	40
P2-03	[41,33]	837388.56	819422.63	28	35	108	81	36	81	60	26	262	148	40
P2-03	[41,33]	837388.56	819422.63	29.1	36.1	108	81	36	81	60	25	261	148	40
P2-04	[41,33]	837388.34	819443.71	1.5	8.5	111	81	37	84	61	27	269	192	56
P2-04	[41,33]	837388.34	819443.71	8.5	15.5	110	81	36	82	61	26	268	165	49
P2-04	[41,33]	837388.34	819443.71	12.4	19.4	109	81	36	82	61	26	267	161	47
P2-04	[41,33]	837388.34	819443.71	16.9	23.9	109	81	36	82	61	26	265	153	44
P2-04	[41,33]	837388.34	819443.71	21.4	28.4	108	81	36	82	61	26	263	151	42
P2-04	[41,33]	837388.34	819443.71	24	31	108	81	36	81	61	26	261	150	41
P2-04	[41,33]	837388.34	819443.71	26.4	33.4	108	81	36	81	60	26	260	150	40
P2-04	[41,33]	837388.34	819443.71	28	35	108	81	36	81	60	26	259	149	40
P2-04	[41,33]	837388.34	819443.71	29.1	36.1	108	81	36	81	60	25	258	149	40
P2-05	[41,33]	837405.27	819436.27	1.5	8.5	110	81	37	83	61	26	250	173	53
P2-05	[41,33]	837405.27	819436.27	8.5	15.5	109	81	36	82	61	26	235	166	49
P2-05	[41,33]	837405.27	819436.27	12.4	19.4	109	81	36	82	61	26	235	159	47
P2-05	[41,33]	837405.27	819436.27	16.9	23.9	109	81	36	82	61	26	234	152	44
P2-05	[41,33]	837405.27	819436.27	21.4	28.4	108	81	36	81	61	26	233	149	42
P2-05	[41,33]	837405.27	819436.27	24	31	108	81	36	81	61	26	233	149	41
P2-05	[41,33]	837405.27	819436.27	26.4	33.4	108	81	36	81	60	26	232	148	40
P2-05	[41,33]	837405.27	819436.27	28	35	108	81	36	81	60	26	232	148	40
P2-05	[41,33]	837405.27	819436.27	29.1	36.1	108	81	36	81	60	25	231	148	39
P2-06	[41,33]	837405.17	819422.92	1.5	8.5	110	81	37	83	61	26	250	172	52
P2-06	[41,33]	837405.17	819422.92	8.5	15.5	109	81	36	82	61	26	234	165	49
P2-06	[41,33]	837405.17	819422.92	12.4	19.4	109	81	36	82	61	26	233	159	47
P2-06	[41,33]	837405.17	819422.92	16.9	23.9	109	81	36	82	61	26	233	152	44
P2-06	[41,33]	837405.17	819422.92	21.4	28.4	108	81	36	81	61	26	232	149	42
P2-06	[41,33]	837405.17	819422.92	24	31	108	81	36	81	61	26	231	149	41
P2-06	[41,33]	837405.17	819422.92	26.4	33.4	108	81	36	81	60	26	231	148	40
P2-06	[41,33]	837405.17	819422.92	28	35	108	81	36	81	60	26	230	148	40
P2-06	[41,33]	837405.17	819422.92	29.1	36.1	108	81	36	81	60	25	230	148	40
P2-07	[41,33]	837405.26	819403.82	1.5	8.5	110	81	37	83	61	26	249	171	53
P2-07	[41,33]	837405.26	819403.82	8.5	15.5	109	81	36	82	61	26	234	164	49
P2-07	[41,33]	837405.26	819403.82	12.4	19.4	109	81	36	82	61	26	233	158	47
P2-07	[41,33]	837405.26	819403.82	16.9	23.9	109	81	36	82	61	26	233	152	44
P2-07	[41,33]	837405.26	819403.82	21.4	28.4	108	81	36	81	61	26	232	149	42
P2-07	[41,33]	837405.26	819403.82	24	31	108	81	36	81	61	26	232	148	41
P2-07	[41,33]	837405.26	819403.82	26.4	33.4	108	81	36	81	60	26	231	148	40
P2-07	[41,33]	837405.26	819403.82	28	35	108	81	36	81	60	26	231	147	40
P2-07	[41,33]	837405.26	819403.82	29.1	36.1	108	81	36	81	60	25	231	148	40

Appendix 4-5 - Predicted Pollutant Concentration

Assessment Point	PATH Grid	Easting (m)	Northing (m)	Level (mAG)	Level (mPD)	Concentraion (μg/m³)								
						Daily 1st Maximum RSP	Daily 10th Maximum RSP	Annual RSP	Daily 1st Maximum FSP	Daily 10th Maximum FSP	Annual FSP	Hourly 1st Maximum NO2	Hourly 19th Maximum NO2	Annual NO2
Criteria (AQO)						--	100	50	--	75	35	--	200	40
P2-08	[41,33]	837405.37	819389.95	1.5	8.5	110	81	37	83	61	26	249	170	53
P2-08	[41,33]	837405.37	819389.95	8.5	15.5	109	81	36	82	61	26	234	164	49
P2-08	[41,33]	837405.37	819389.95	12.4	19.4	109	81	36	82	61	26	234	158	47
P2-08	[41,33]	837405.37	819389.95	16.9	23.9	109	81	36	82	61	26	234	152	45
P2-08	[41,33]	837405.37	819389.95	21.4	28.4	108	81	36	81	61	26	233	149	42
P2-08	[41,33]	837405.37	819389.95	24	31	108	81	36	81	61	26	232	148	41
P2-08	[41,33]	837405.37	819389.95	26.4	33.4	108	81	36	81	60	26	232	148	40
P2-08	[41,33]	837405.37	819389.95	28	35	108	81	36	81	60	26	232	147	40
P2-08	[41,33]	837405.37	819389.95	29.1	36.1	108	81	36	81	60	25	231	147	40
RB-01	[41,33]	837440.63	819441.86	1.5	8.5	109	81	36	82	61	26	234	164	50
RB-01	[41,33]	837440.63	819441.86	8.5	15.5	109	81	36	82	61	26	232	162	48
RB-01	[41,33]	837440.63	819441.86	12.4	19.4	109	81	36	82	61	26	219	158	46
RB-01	[41,33]	837440.63	819441.86	16.9	23.9	109	81	36	82	61	26	214	154	44
RB-01	[41,33]	837440.63	819441.86	21.4	28.4	108	81	36	81	61	26	213	149	42
RB-01	[41,33]	837440.63	819441.86	24	31	108	81	36	81	60	26	213	148	41
RB-01	[41,33]	837440.63	819441.86	26.4	33.4	108	81	36	81	60	26	213	148	40
RB-01	[41,33]	837440.63	819441.86	28	35	108	81	36	81	60	25	212	148	40
RB-01	[41,33]	837440.63	819441.86	29.1	36.1	108	81	36	81	60	25	212	148	39
RB-02	[41,33]	837446.07	819454.21	1.5	8.5	109	81	36	82	61	26	234	163	50
RB-02	[41,33]	837446.07	819454.21	8.5	15.5	109	81	36	82	61	26	232	162	48
RB-02	[41,33]	837446.07	819454.21	12.4	19.4	109	81	36	82	61	26	219	158	46
RB-02	[41,33]	837446.07	819454.21	16.9	23.9	109	81	36	82	61	26	212	154	44
RB-02	[41,33]	837446.07	819454.21	21.4	28.4	108	81	36	81	61	26	212	149	42
RB-02	[41,33]	837446.07	819454.21	24	31	108	81	36	81	60	26	211	148	41
RB-02	[41,33]	837446.07	819454.21	26.4	33.4	108	81	36	81	60	26	211	148	40
RB-02	[41,33]	837446.07	819454.21	28	35	108	81	36	81	60	25	211	149	40
RB-02	[41,33]	837446.07	819454.21	29.1	36.1	108	81	36	81	60	25	211	148	39
RB-03	[41,33]	837451.51	819466.57	1.5	8.5	109	81	36	82	61	26	234	163	50
RB-03	[41,33]	837451.51	819466.57	8.5	15.5	109	81	36	82	61	26	232	162	48
RB-03	[41,33]	837451.51	819466.57	12.4	19.4	109	81	36	82	61	26	218	157	46
RB-03	[41,33]	837451.51	819466.57	16.9	23.9	109	81	36	82	61	26	211	154	44
RB-03	[41,33]	837451.51	819466.57	21.4	28.4	108	81	36	81	61	26	211	149	42
RB-03	[41,33]	837451.51	819466.57	24	31	108	81	36	81	60	26	210	149	41
RB-03	[41,33]	837451.51	819466.57	26.4	33.4	108	81	36	81	60	26	210	148	40
RB-03	[41,33]	837451.51	819466.57	28	35	108	81	36	81	60	25	210	150	39
RB-03	[41,33]	837451.51	819466.57	29.1	36.1	108	81	36	81	60	25	210	149	39
RB-04	[42,33]	837461.58	819462.14	1.5	8.5	106	79	35	80	59	25	226	154	47
RB-04	[42,33]	837461.58	819462.14	8.5	15.5	106	79	35	80	59	25	216	152	45
RB-04	[42,33]	837461.58	819462.14	12.4	19.4	106	79	35	79	59	25	204	149	43
RB-04	[42,33]	837461.58	819462.14	16.9	23.9	106	79	35	79	59	25	191	147	41
RB-04	[42,33]	837461.58	819462.14	21.4	28.4	106	79	35	79	59	25	188	144	39
RB-04	[42,33]	837461.58	819462.14	24	31	106	79	35	79	59	25	185	141	38
RB-04	[42,33]	837461.58	819462.14	26.4	33.4	106	79	35	79	59	25	183	140	37
RB-04	[42,33]	837461.58	819462.14	28	35	106	79	35	79	59	25	187	139	36
RB-04	[42,33]	837461.58	819462.14	29.1	36.1	106	79	35	79	59	25	191	139	36
RB-05	[42,33]	837471.64	819457.71	1.5	8.5	106	79	35	80	59	25	226	153	47
RB-05	[42,33]	837471.64	819457.71	8.5	15.5	106	79	35	80	59	25	215	152	45
RB-05	[42,33]	837471.64	819457.71	12.4	19.4	106	79	35	79	59	25	204	149	43
RB-05	[42,33]	837471.64	819457.71	16.9	23.9	106	79	35	79	59	25	192	146	41
RB-05	[42,33]	837471.64	819457.71	21.4	28.4	106	79	35	79	59	25	186	144	39
RB-05	[42,33]	837471.64	819457.71	24	31	106	79	35	79	59	25	183	141	38
RB-05	[42,33]	837471.64	819457.71	26.4	33.4	106	79	35	79	59	25	182	141	37
RB-05	[42,33]	837471.64	819457.71	28	35	106	79	35	79	59	25	186	139	36
RB-05	[42,33]	837471.64	819457.71	29.1	36.1	106	79	35	79	59	25	189	139	36
RB-06	[42,33]	837466.21	819445.35	1.5	8.5	106	79	35	80	59	25	226	153	47
RB-06	[42,33]	837466.21	819445.35	8.5	15.5	106	79	35	80	59	25	216	152	45
RB-06	[42,33]	837466.21	819445.35	12.4	19.4	106	79	35	79	59	25	205	149	43
RB-06	[42,33]	837466.21	819445.35	16.9	23.9	106	79	35	79	59	25	192	146	41
RB-06	[42,33]	837466.21	819445.35	21.4	28.4	106	79	35	79	59	25	185	144	39
RB-06	[42,33]	837466.21	819445.35	24	31	106	79	35	79	59	25	183	141	38
RB-06	[42,33]	837466.21	819445.35	26.4	33.4	106	79	35	79	59	25	181	140	37
RB-06	[42,33]	837466.21	819445.35	28	35	106	79	35	79	59	25	185	139	36
RB-06	[42,33]	837466.21	819445.35	29.1	36.1	106	79	35	79	59	25	189	139	36
RB-07	[42,33]	837460.77	819432.99	1.5	8.5	106	79	36	80	59	25	226	153	47
RB-07	[42,33]	837460.77	819432.99	8.5	15.5	106	79	35	80	59	25	217	152	45
RB-07	[42,33]	837460.77	819432.99	12.4	19.4	106	79	35	79	59	25	205	149	43
RB-07	[42,33]	837460.77	819432.99	16.9	23.9	106	79	35	79	59	25	192	146	41
RB-07	[42,33]	837460.77	819432.99	21.4	28.4	106	79	35	79	59	25	185	144	39
RB-07	[42,33]	837460.77	819432.99	24	31	106	79	35	79	59	25	182	141	38
RB-07	[42,33]	837460.77	819432.99	26.4	33.4	106	79	35	79	59	25	181	140	37
RB-07	[42,33]	837460.77	819432.99	28	35	106	79	35	79	59	25	184	139	36
RB-07	[42,33]	837460.77	819432.99	29.1	36.1	106	79	35	79	59	25	188	138	36
RB-08	[41,33]	837450.70	819437.42	1.5	8.5	109	81	36	82	61	26	234	163	50
RB-08	[41,33]	837450.70	819437.42	8.5	15.5	109	81	36	82	61	26	232	162	48
RB-08	[41,33]	837450.70	819437.42	12.4	19.4	109	81	36	82	61	26	220	158	46
RB-08	[41,33]	837450.70	819437.42	16.9	23.9	109	81	36	82	61	26	210	153	44
RB-08	[41,33]	837450.70	819437.42	21.4	28.4	108	81	36	81	61	26	210	150	42
RB-08	[41,33]	837450.70	819437.42	24	31	108	81	36	81	60	26	210	148	41
RB-08	[41,33]	837450.70	819437.42	26.4	33.4	108	81	36	81	60	26	209	148	40
RB-08	[41,33]	837450.70	819437.42	28	35	108	81	36	81	60	25	209	148	40
RB-08	[41,33]	837450.70	819437.42	29.1	36.1	108	81	36	81	60	25	209	147	39
T1-01	[41,33]	837403.76	819458.56	29.1	36.1	108	81	36	81	60	25	236	150	39
T1-01	[41,33]	837403.76	819458.56	35.3	42.3	108	80	36	81	60	25	233	147	38
T1-01	[41,33]	837403.76	819458.56	41.5	48.5	108	80	36	81	60	25	230	147	37
T1-02	[41,33]	837407.11	819467.50	29.1	36.1	108	81	36	81	60	25	235	150	39
T1-02	[41,33]	837407.11	819467.50	35.3	42.3	108	80	36	81	60	25	232	147	38
T1-02	[41,33]	837407.11	819467.50	41.5	48.5	108	80	36	81	60	25	228	147	37
T1-03	[41,33]	837417.32	819465.03	29.1	36.1	108	81	36	81	60	25	226	149	39
T1-03	[41,33]	837417.32	819465.03	35.3	42.3	108	80	36	81	60	25	224	147	38
T1-03	[41,33]	837417.32	819465.03	41.5	48.5	108	80	36	81	60	25	222	147	37
T1-04	[41,33]	837426.14	819471.51	29.1	36.1	108	81	36	81	60	25	221	149	39
T1-04	[41,33]	837426.14	819471.51	35.3	42.3	108	80	36	81	60	25	219	146	38
T1-04	[41,33]	837426.14	819471.51	41.5	48.5	108	80	36	81	60	25	217	146	37
T1-05	[41,33]	837429.20	819478.71	29.1	36.1	108	81	36	81	60	25	220	149	39
T1-05	[41,33]	837429.20	819478.71	35.3	42.3	108	80	36	81	60	25	218	147	38
T1-05	[41,33]	837429.20	819478.71	41.5	48.5	108	80	36	81	60	25	216	146	37
T1-06	[41,33]	837437.84	819479.91	29.1	36.1	108	81	36	81	60	25	216	149	39
T1-06	[41,33]	837437.84	819479.91	35.3	42.3	108	80	36	81	60	25	214	146	38
T1-06	[41,33]	837437.84	819479.91	41.5	48.5	108	80	36	81	60	25	212	145	37

Appendix 4-5 - Predicted Pollutant Concentration

Assessment Point	PATH Grid	Easting (m)	Northing (m)	Level (mAG)	Level (mPD)	Concentraion (µg/m³)								
						Daily 1st Maximum RSP	Daily 10th Maximum RSP	Annual RSP	Daily 1st Maximum FSP	Daily 10th Maximum FSP	Annual FSP	Hourly 1st Maximum NO2	Hourly 19th Maximum NO2	Annual NO2
Criteria (AQO)						--	100	50	--	75	35	--	200	40
T1-07	[41,33]	837442.71	819474.24	29.1	36.1	108	81	36	81	60	25	213	150	39
T1-07	[41,33]	837442.71	819474.24	35.3	42.3	108	80	36	81	60	25	212	146	38
T1-07	[41,33]	837442.71	819474.24	41.5	48.5	108	80	36	81	60	25	210	145	37
T1-08	[41,33]	837441.05	819470.71	29.1	36.1	108	81	36	81	60	25	214	149	39
T1-08	[41,33]	837441.05	819470.71	35.3	42.3	108	80	36	81	60	25	212	146	38
T1-08	[41,33]	837441.05	819470.71	41.5	48.5	108	80	36	81	60	25	211	144	37
T1-09	[41,33]	837439.52	819467.61	29.1	36.1	108	81	36	81	60	25	214	149	39
T1-09	[41,33]	837439.52	819467.61	35.3	42.3	108	80	36	81	60	25	213	146	38
T1-09	[41,33]	837439.52	819467.61	41.5	48.5	108	80	36	81	60	25	211	144	37
T1-10	[41,33]	837437.46	819462.74	29.1	36.1	108	81	36	81	60	25	215	149	39
T1-10	[41,33]	837437.46	819462.74	35.3	42.3	108	80	36	81	60	25	213	146	38
T1-10	[41,33]	837437.46	819462.74	41.5	48.5	108	80	36	81	60	25	212	144	37
T1-11	[41,33]	837435.62	819458.38	29.1	36.1	108	81	36	81	60	25	215	149	39
T1-11	[41,33]	837435.62	819458.38	35.3	42.3	108	80	36	81	60	25	214	146	38
T1-11	[41,33]	837435.62	819458.38	41.5	48.5	108	80	36	81	60	25	212	144	37
T1-12	[41,33]	837433.55	819454.22	29.1	36.1	108	81	36	81	60	25	216	149	39
T1-12	[41,33]	837433.55	819454.22	35.3	42.3	108	80	36	81	60	25	214	146	38
T1-12	[41,33]	837433.55	819454.22	41.5	48.5	108	80	36	81	60	25	213	145	37
T1-13	[41,33]	837437.05	819446.48	29.1	36.1	108	81	36	81	60	25	214	148	39
T1-13	[41,33]	837437.05	819446.48	35.3	42.3	108	80	36	81	60	25	213	146	38
T1-13	[41,33]	837437.05	819446.48	41.5	48.5	108	80	36	81	60	25	211	144	37
T1-14	[41,33]	837434.61	819441.30	29.1	36.1	108	81	36	81	60	25	215	148	39
T1-14	[41,33]	837434.61	819441.30	35.3	42.3	108	80	36	81	60	25	214	146	38
T1-14	[41,33]	837434.61	819441.30	41.5	48.5	108	80	36	81	60	25	212	145	37
T1-15	[41,33]	837426.41	819446.09	29.1	36.1	108	81	36	81	60	25	219	149	39
T1-15	[41,33]	837426.41	819446.09	35.3	42.3	108	80	36	81	60	25	218	146	38
T1-15	[41,33]	837426.41	819446.09	41.5	48.5	108	80	36	81	60	25	216	145	37
T1-16	[41,33]	837422.46	819447.92	29.1	36.1	108	81	36	81	60	25	221	149	39
T1-16	[41,33]	837422.46	819447.92	35.3	42.3	108	80	36	81	60	25	220	146	38
T1-16	[41,33]	837422.46	819447.92	41.5	48.5	108	80	36	81	60	25	218	144	37
T1-17	[41,33]	837417.40	819450.14	29.1	36.1	108	81	36	81	60	25	224	149	39
T1-17	[41,33]	837417.40	819450.14	35.3	42.3	108	80	36	81	60	25	223	146	38
T1-17	[41,33]	837417.40	819450.14	41.5	48.5	108	80	36	81	60	25	221	145	37
T1-18	[41,33]	837413.45	819451.89	29.1	36.1	108	81	36	81	60	25	227	148	39
T1-18	[41,33]	837413.45	819451.89	35.3	42.3	108	80	36	81	60	25	225	146	38
T1-18	[41,33]	837413.45	819451.89	41.5	48.5	108	80	36	81	60	25	223	145	37
T1-19	[41,33]	837407.31	819454.55	29.1	36.1	108	81	36	81	60	25	232	149	39
T1-19	[41,33]	837407.31	819454.55	35.3	42.3	108	80	36	81	60	25	230	147	38
T1-19	[41,33]	837407.31	819454.55	41.5	48.5	108	80	36	81	60	25	227	147	37
T2-01	[41,33]	837394.78	819440.84	29.1	36.1	108	81	36	81	60	25	241	149	40
T2-01	[41,33]	837394.78	819440.84	35.3	42.3	108	81	36	81	60	25	238	147	38
T2-01	[41,33]	837394.78	819440.84	41.5	48.5	108	80	36	81	60	25	235	146	37
T2-02	[41,33]	837396.98	819432.54	29.1	36.1	108	81	36	81	60	25	238	148	40
T2-02	[41,33]	837396.98	819432.54	35.3	42.3	108	81	36	81	60	25	236	146	38
T2-02	[41,33]	837396.98	819432.54	41.5	48.5	108	80	36	81	60	25	233	145	37
T2-03	[41,33]	837396.93	819428.42	29.1	36.1	108	81	36	81	60	25	238	148	40
T2-03	[41,33]	837396.93	819428.42	35.3	42.3	108	81	36	81	60	25	236	146	38
T2-03	[41,33]	837396.93	819428.42	41.5	48.5	108	80	36	81	60	25	233	145	37
T2-04	[41,33]	837396.80	819424.60	29.1	36.1	108	81	36	81	60	25	239	148	40
T2-04	[41,33]	837396.80	819424.60	35.3	42.3	108	81	36	81	60	25	236	146	38
T2-04	[41,33]	837396.80	819424.60	41.5	48.5	108	80	36	81	60	25	234	145	37
T2-05	[41,33]	837396.97	819420.32	29.1	36.1	108	81	36	81	60	25	239	148	40
T2-05	[41,33]	837396.97	819420.32	35.3	42.3	108	81	36	81	60	25	237	146	38
T2-05	[41,33]	837396.97	819420.32	41.5	48.5	108	80	36	81	60	25	234	144	37
T2-06	[41,33]	837396.91	819416.22	29.1	36.1	108	81	36	81	60	25	239	148	40
T2-06	[41,33]	837396.91	819416.22	35.3	42.3	108	81	36	81	60	25	237	146	38
T2-06	[41,33]	837396.91	819416.22	41.5	48.5	108	80	36	81	60	25	235	144	37
T2-07	[41,33]	837397.01	819411.87	29.1	36.1	108	81	36	81	60	25	239	147	40
T2-07	[41,33]	837397.01	819411.87	35.3	42.3	108	81	36	81	60	25	237	146	38
T2-07	[41,33]	837397.01	819411.87	41.5	48.5	108	80	36	81	60	25	235	144	37
T2-08	[41,33]	837396.95	819408.13	29.1	36.1	108	81	36	81	60	25	240	147	40
T2-08	[41,33]	837396.95	819408.13	35.3	42.3	108	81	36	81	60	25	238	146	38
T2-08	[41,33]	837396.95	819408.13	41.5	48.5	108	80	36	81	60	25	236	144	37
T2-09	[41,33]	837402.59	819403.90	29.1	36.1	108	81	36	81	60	25	233	147	40
T2-09	[41,33]	837402.59	819403.90	35.3	42.3	108	80	36	81	60	25	232	145	38
T2-09	[41,33]	837402.59	819403.90	41.5	48.5	108	80	36	81	60	25	230	145	37
T2-10	[41,33]	837401.80	819391.63	29.1	36.1	108	81	36	81	60	25	235	147	40
T2-10	[41,33]	837401.80	819391.63	35.3	42.3	108	80	36	81	60	25	234	144	38
T2-10	[41,33]	837401.80	819391.63	41.5	48.5	108	80	36	81	60	25	232	145	37
T2-11	[41,33]	837396.82	819391.60	29.1	36.1	108	81	36	81	60	25	243	147	40
T2-11	[41,33]	837396.82	819391.60	35.3	42.3	108	80	36	81	60	25	241	144	38
T2-11	[41,33]	837396.82	819391.60	41.5	48.5	108	80	36	81	60	25	239	145	37
T2-12	[41,33]	837391.81	819390.40	29.1	36.1	108	81	36	81	60	25	255	148	40
T2-12	[41,33]	837391.81	819390.40	35.3	42.3	108	81	36	81	60	25	252	144	38
T2-12	[41,33]	837391.81	819390.40	41.5	48.5	108	80	36	81	60	25	249	145	37

APPENDIX 4-6

Summary of Annual Averaged NO_2 Concentration (Air Quality)

	Assessment Point		Annual Averaged NO_2 Concentration ($\mu g/m^3$) at different Height								
		mAG	1.5	8.5	12.4	16.9	21.4	24	26.4	28	29.1
		mPD	8.5	15.5	19.4	23.9	28.4	31	33.4	35	36.1
Podium T1	P1-01		56	49	47	44	42	41	40	40	39
	P1-02		55	49	46	44	42	41	40	40	39
	P1-03		55	48	46	44	42	41	40	39	39
	P1-04		55	48	46	44	42	41	40	39	39
	P1-05		56	48	45	43	41	40	40	39	39
	P1-06		58	48	45	43	41	40	40	39	39
	P1-07		51	45	42	40	38	37	37	36	36
	P1-08		49	45	43	40	38	38	37	36	36
	P1-09		51	48	46	43	42	41	40	39	39
	P1-10		51	48	46	44	42	41	40	39	39
	P1-11		50	48	46	44	42	41	40	39	39
	P1-12		50	48	46	44	42	41	40	40	39
	P1-13		50	48	46	44	42	41	40	40	39
	P1-14		51	48	46	44	42	41	40	40	39
	P1-15		52	49	47	44	42	41	40	40	39
Podium T2	P2-01		56	49	47	45	43	41	41	40	40
	P2-02		55	49	47	45	43	41	41	40	40
	P2-03		55	49	47	45	42	41	40	40	40
	P2-04		56	49	47	44	42	41	40	40	40
	P2-05		53	49	47	44	42	41	40	40	39
	P2-06		52	49	47	44	42	41	40	40	40
	P2-07		53	49	47	44	42	41	40	40	40
	P2-08		53	49	47	45	42	41	40	40	40
Low Block	RB-01		50	48	46	44	42	41	40	40	39
	RB-02		50	48	46	44	42	41	40	40	39
	RB-03		50	48	46	44	42	41	40	39	39
	RB-04		47	45	43	41	39	38	37	36	36
	RB-05		47	45	43	41	39	38	37	36	36
	RB-06		47	45	43	41	39	38	37	36	36
	RB-07		47	45	43	41	39	38	37	36	36
	RB-08		50	48	46	44	42	41	40	40	39

Exceedance of Annual NO2 (40 $\mu g/m^3$)

	Assessment Point		Annual Averaged NO_2 Concentration ($\mu g/m^3$) at different Height		
		mAG	29.1	35.3	41.5
		mPD	36.1	42.3	48.5
Tower T1	T1-01		39	38	37
	T1-02		39	38	37
	T1-03		39	38	37
	T1-04		39	38	37
	T1-05		39	38	37
	T1-06		39	38	37
	T1-07		39	38	37
	T1-08		39	38	37
	T1-09		39	38	37
	T1-10		39	38	37
	T1-11		39	38	37
	T1-12		39	38	37
	T1-13		39	38	37
	T1-14		39	38	37
	T1-15		39	38	37
	T1-16		39	38	37
	T1-17		39	38	37
	T1-18		39	38	37
	T1-19		39	38	37
Tower T2	T2-01		40	38	37
	T2-02		40	38	37
	T2-03		40	38	37
	T2-04		40	38	37
	T2-05		40	38	37
	T2-06		40	38	37
	T2-07		40	38	37
	T2-08		40	38	37
	T2-09		40	38	37
	T2-10		40	38	37
	T2-11		40	38	37
	T2-12		40	38	37

Exceedance of Annual NO2 (40 $\mu g/m^3$)

APPENDIX 5-1

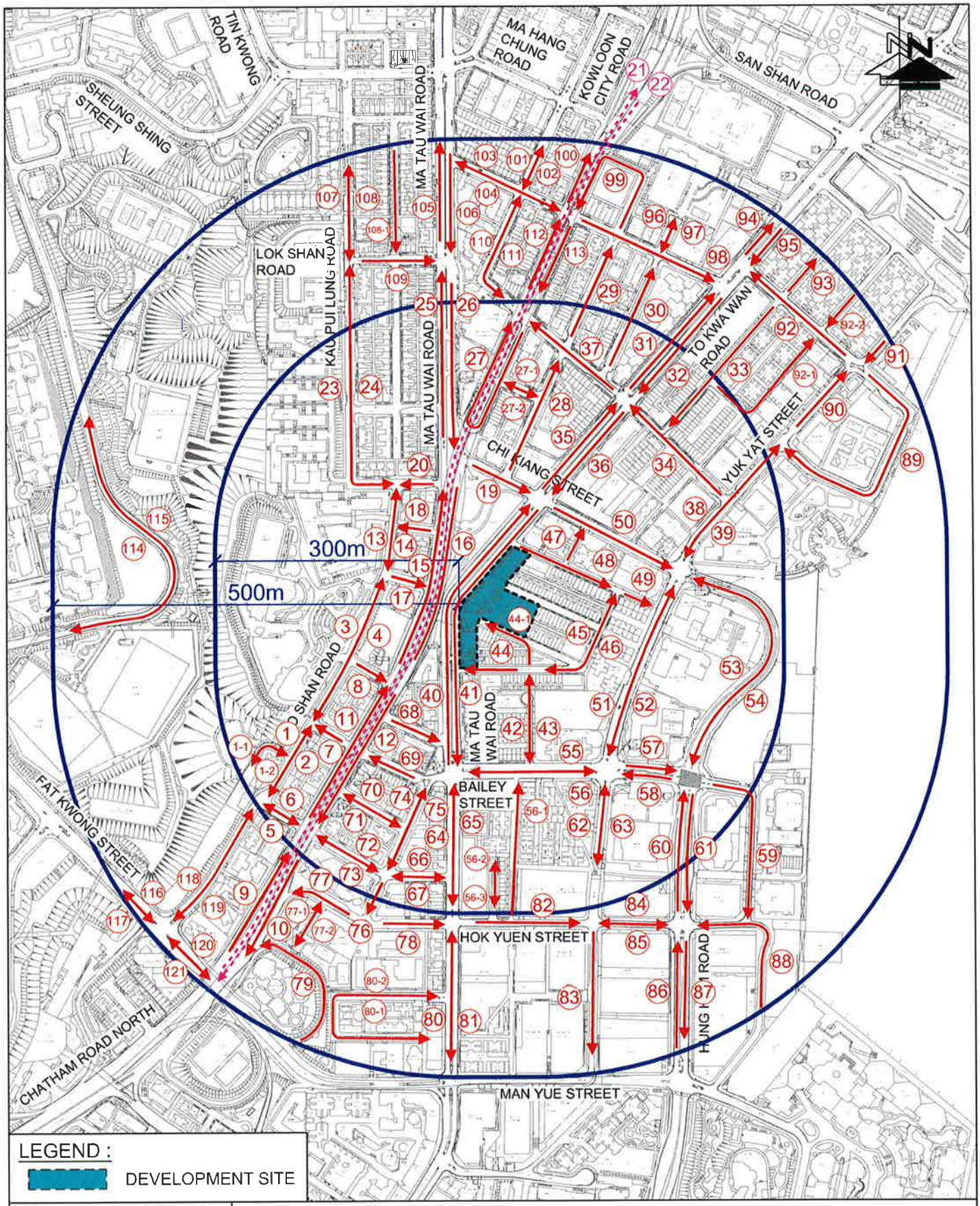
Predicted Traffic Flow at Peak Hour in Year 2047

KC - AA1 - 01 DEVELOPMENT SCHEME

TRAFFIC FORECAST FOR TRAFFIC NOISE IMPACT ASSESSMENT

Link No.	Road Name	Direction	Speed Limit (km/h)	Year 2047			
				AM Peak		PM Peak	
				Traffic Flow (veh/hr)	HV%	Traffic Flow (veh/hr)	HV%
1	Ko Shan Road	NB	50	465	25%	335	25%
1-1	Wai Yin Path	EB	50	5	0%	5	0%
1-2	Wai Yin Path	WB	50	5	0%	5	0%
2	Ko Shan Road	SB	50	270	10%	445	5%
3	Ko Shan Road	NB	50	495	25%	380	25%
4	Ko Shan Road	SB	50	240	10%	290	5%
5	Pak Kung Street	WB	50	5	35%	15	5%
6	Pak Kung Street	EB	50	435	25%	280	15%
7	San Lau Street	WB	50	60	20%	200	10%
8	Shan Si Street	EB	50	225	25%	160	35%
9	Chatham Road North	NB	50	925	35%	910	35%
10	Chatham Road North	SB	50	1,210	40%	1,085	30%
11	Chatham Road North	NB	50	935	35%	925	35%
12	Chatham Road North	SB	50	1,420	35%	1,160	30%
13	Ko Shan Road	NB	50	215	25%	155	25%
14	Ko Shan Road	SB	50	225	10%	275	5%
15	Chatham Road North	NB	50	1,365	35%	1,330	45%
16	Chatham Road North	SB	50	1,285	35%	1,170	25%
17	Kiang Hsi Street	EB	50	20	15%	20	40%
18	Anhui Street	WB	50	15	20%	40	80%
19	Chi Kiang Street	EB	50	1,525	25%	1,205	15%
20	Chi Kiang Street	WB	50	375	5%	345	5%
21	East Kowloon Corridor	NB	70	3,380	20%	3,825	25%
22	East Kowloon Corridor	SB	70	2,405	30%	1,915	10%
23	Kau Pui Lung Street	NB	50	295	25%	225	35%
24	Kau Pui Lung Street	SB	50	280	10%	345	5%
25	Ma Tau Wai Road	NB	50	725	45%	715	70%
26	Ma Tau Wai Road	SB	50	2,090	35%	1,785	25%
27	Kowloon City Road	SB	50	5	0%	5	0%
27-1	Sze Chuen Street	EB	50	10	10%	10	10%
27-2	Sze Chuen Street	WB	50	10	10%	10	10%
28	Ha Heung Road	NB	50	235	10%	135	10%
29	Ha Heung Road	NB	50	730	15%	685	15%
30	Cheung Ning Street	NB	50	55	45%	40	40%
31	To Kwa Wan Road	NB	50	415	85%	385	75%
32	To Kwa Wan Road	SB	50	1,115	30%	840	35%
33	Mei Kng Street	SB	50	60	25%	80	15%
34	Lok Shan Road	WB	50	775	20%	750	25%
35	To Kwa Wan Road	NB	50	540	55%	540	55%
36	To Kwa Wan Road	SB	50	1,195	30%	895	45%
37	Lok Shan Road	WB	50	390	25%	365	20%
38	Yuk Yat Street	NB	50	620	15%	505	20%
39	Yuk Yat Street	SB	50	530	25%	635	30%
40	To Kwa Wan Road	NB	50	505	60%	535	60%
41	To Kwa Wan Road	SB	50	1,515	25%	1,160	35%
42	Wan On Street	NB	50	15	20%	15	15%
43	Wan On Street	SB	50	175	20%	110	15%
44	Wing Kwong Street	WB	50	130	20%	85	15%
44-1	Kai Ming Street	NB	50	80	20%	85	15%
45	Wing Kwong Street	NB	50	210	20%	145	15%
46	Wing Kwong Street	SB	50	345	20%	365	15%
47	Lung Tak Street	NB	50	70	20%	40	15%

Link No.	Road Name	Direction	Speed Limit (km/h)	Year 2047			
				AM Peak		PM Peak	
				Traffic Flow (veh/hr)	HV%	Traffic Flow (veh/hr)	HV%
48	Ngan Hon Street	EB	50	585	40%	495	15%
49	Ngan Hon Street	EB	50	175	40%	110	15%
50	Chi Kiang Street	EB	50	295	50%	160	40%
51	Shung On Street	NB	50	390	20%	345	5%
52	Shung On Street	SB	50	435	35%	405	35%
53	Chi Kiang Street	NB	50	485	15%	365	30%
54	Chi Kiang Street	SB	50	205	40%	200	35%
55	Bailey Street	EB	50	365	5%	345	5%
56	Bailey Street	WB	50	315	30%	290	40%
56-1	Sung Chi Street	NB	50	25	50%	20	25%
56-2	Chun Tin Street	NB	50	40	50%	40	25%
56-3	Chun Tin Street	SB	50	45	50%	35	25%
57	Bailey Street	EB	50	595	25%	675	20%
58	Bailey Street	WB	50	195	30%	185	40%
59	Shung Ping Street	SB	50	5	0%	5	0%
60	Hung Hom Road	NB	50	435	15%	310	30%
61	Hung Hom Road	SB	50	255	30%	230	15%
62	Shung On Street	NB	50	90	30%	70	40%
63	Shung On Street	SB	50	45	15%	30	35%
64	Ma Tau Wai Road	NB	50	355	50%	300	50%
65	Ma Tau Wai Road	SB	50	510	45%	325	60%
66	Pak Kung Street	EB	50	125	90%	175	30%
67	Pak Kung Street	WB	50	640	20%	470	30%
68	Shek Tong Street	EB	50	5	100%	0	100%
69	San Lau Street	WB	50	180	35%	315	35%
70	San Wai Street	EB	50	5	35%	5	55%
71	San Wai Street	WB	50	185	25%	50	85%
72	Pak Kung Street	EB	50	185	65%	225	20%
73	Pak Kung Street	WB	50	670	20%	580	30%
74	Gillies Ave North	NB	50	30	15%	50	40%
75	Gillies Ave North	SB	50	400	15%	335	30%
76	Gillies Ave North	SB	50	265	20%	170	20%



LEGEND :

DEVELOPMENT SITE

FIGURE NO.: 1	PROJECT TITLE: KC - AA1 - 01 Development Scheme	
PROJECT NO.: 19044HK-01	DRAWING TITLE: INDEX PLAN	CTA Consultants Limited 志達顧問有限公司
SCALE: 1 : 6000 @ A4	DATE: 07 AUG 2020	

APPENDIX 5-2

Traffic Noise Assessment Results (Base Scenario)

Predicted Traffic Noise Level, dB(A) - (a) Base Scenario: Careful Buildings Disposition & Windows Locations

Tower 1 - by façade

Floor	T1-01-1	T1-01-2	T1-01-3	T1-02-1	T1-02-2	T1-02-3	T1-03-1	T1-03-2	T1-03-3	T1-04-1	T1-04-2	T1-04-3	T1-05-1	T1-05-2	T1-05-3	T1-06-1	T1-06-2	T1-07-1	T1-07-2	T1-08-1	T1-08-2	T1-09-1	T1-09-2	T1-10-1	T1-10-2	T1-11-1	T1-11-2	T1-12-1	T1-12-2	T1-13-1	T1-13-2	T1-14-1	T1-14-2	T1-15-1	T1-15-2	T1-16-1	T1-16-2	T1-17-1	T1-17-2	T1-18-1	T1-18-2	T1-19-1	T1-19-2
6/F	69	58	74	77	75	70	59	68	68	69	70	70	71	71	72	60	54	63	55	54	54	54	53	53	54	56	57	49	61	62	62	63	70	70	71	71	72	72	73	73	74	75
7/F	70	59	74	78	76	71	61	70	71	73	73	74	74	74	75	62	55	65	56	55	55	55	54	56	57	57	58	58	51	61	62	62	62	71	71	71	72	72	73	73	74	75
8/F	70	60	74	79	76	71	63	70	71	74	74	75	75	75	76	64	56	66	58	57	57	57	57	58	58	58	59	59	51	61	62	62	62	71	71	72	72	73	73	74	74	75
9/F	70	60	74	79	77	72	64	70	71	74	75	75	75	76	76	65	58	67	60	58	58	58	58	58	58	59	59	59	51	61	61	61	62	71	71	72	72	73	73	74	74	75
10/F	70	60	75	79	77	72	65	71	71	74	75	75	76	76	76	66	60	68	61	59	59	58	58	58	59	59	59	59	51	61	61	61	62	71	71	72	72	73	73	74	74	75
11/F	70	60	75	79	77	72	66	71	72	74	75	75	76	76	76	67	62	68	62	60	59	58	58	58	59	59	59	59	51	61	61	61	62	71	71	72	72	73	73	74	74	75
12/F	70	61	75	79	77	72	67	71	72	74	75	76	76	76	77	67	62	69	63	61	59	59	58	58	59	59	59	59	51	61	61	61	61	71	71	72	72	73	73	74	74	75
13/F	70	61	75	79	77	73	67	71	72	75	75	76	76	76	77	67	63	69	63	61	59	59	58	58	59	59	59	59	51	61	61	61	61	71	71	72	72	73	73	74	74	75
14/F	70	62	75	79	77	72	67	71	72	75	75	76	76	76	77	68	63	69	63	62	60	59	58	58	59	59	59	59	51	62	62	61	61	71	71	72	72	72	73	73	74	75
15/F	70	63	75	79	77	72	67	71	72	75	75	76	76	76	76	68	63	69	64	62	60	59	58	58	59	59	59	59	51	62	62	61	61	71	71	72	72	72	73	73	74	75
16/F	70	63	75	78	77	72	67	71	72	75	75	76	76	76	76	68	64	69	64	62	60	59	58	58	59	59	58	53	62	62	61	61	61	71	71	71	72	72	73	73	74	74
17/F	70	64	75	78	77	73	67	72	72	74	75	75	76	76	76	68	64	69	64	62	60	59	58	59	59	59	58	52	62	62	61	61	61	71	71	71	72	72	73	73	74	74
18/F	70	64	73	78	76	72	68	71	72	74	75	75	76	76	76	68	64	69	64	63	60	59	58	59	59	59	58	52	62	62	61	61	61	70	71	71	72	72	73	73	74	74
19/F	70	64	72	78	76	73	68	71	72	74	75	75	76	76	76	68	64	70	64	63	60	59	58	58	59	58	58	52	62	62	62	61	61	70	71	71	72	72	73	73	74	74
20/F	69	64	72	78	76	72	68	71	72	74	75	75	76	76	76	68	64	70	64	62	60	59	58	58	58	58	58	52	62	62	62	60	61	70	71	71	72	72	73	73	74	74
21/F	69	64	72	78	76	73	68	71	72	74	75	75	76	76	76	68	64	70	64	62	60	59	58	58	58	58	58	52	62	62	62	60	60	70	71	71	72	72	73	73	73	74
22/F	69	64	72	78	76	72	68	71	72	74	75	75	76	76	76	68	64	70	64	62	60	59	58	58	58	58	58	52	62	62	62	60	60	70	70	71	71	72	72	72	73	73	74
23/F	69	64	72	77	76	71	68	71	72	74	75	75	76	76	76	68	64	70	64	62	60	59	58	58	58	58	58	52	62	62	62	60	60	70	70	71	71	72	72	72	73	73	74
24/F	69	64	73	77	76	72	68	71	72	74	75	75	76	76	76	68	64	70	64	62	59	59	58	58	58	58	58	53	62	62	62	60	60	70	70	71	71	72	72	72	73	73	74
25/F	69	64	72	77	76	71	68	71	72	74	75	75	76	76	76	68	64	70	64	62	59	59	58	58	58	58	58	53	62	62	62	60	60	70	70	71	71	72	72	72	73	73	74
26/F	69	64	72	77	75	71	68	71	72	74	75	75	76	76	76	68	64	70	64	61	59	59	58	58	58	58	58	52	62	62	62	60	60	70	70	71	71	72	72	72	73	73	74
27/F	69	64	71	77	75	71	68	71	72	74	75	75	76	76	76	68	64	69	64	61	59	59	58	58	58	58	58	53	62	62	62	60	60	70	70	71	71	72	72	72	73	73	74
28/F	69	64	71	77	75	71	68	71	72	74	75	75	75	76	76	68	64	69	64	61	59	59	58	58	58	58	58	52	62	62	62	60	60	70	70	71	71	72	72	72	73	73	74
29/F	69	64	71	77	75	71	67	71	72	74	74	75	75	76	76	68	64	69	64	61	59	59	58	58	58	58	58	53	62	62	62	60	60	69	70	70	71	71	71	72	72	72	73
30/F	68	64	71	77	75	71	67	71	72	74	74	75	75	75	76	68	64	69	64	61	59	59	58	58	58	58	58	53	62	62	62	60	60	69	70	70	71	71	71	72	72	72	73
31/F	68	64	71	76	75	71	67	71	71	74	74	75	75	75	76	68	64	69	64	61	59	59	58	58	58	58	58	53	62	62	62	60	60	69	70	70	70	71	71	71	72	72	73
32/F	68	64	71	76	75	71	67	71	71	74	74	75	75	75	75	68	64	69	64	61	59	59	58	58	58	58	58	53	62	61	59	60	60	69	70	70	70	71	71	71	72	72	73
33/F	68	63	71	76	75	71	67	71	71	74	74	74	75	75	75	68	64	69	64	61	59	59	58	58	58	58	58	53	62	61	59	60	60	69	70	70	70	71	71	71	72	72	73
34/F	68	63	71	76	75	71	67	71	71	73	74	74	75	75	75	68	64	69	64	61	59	59	58	58	58	58	58	54	62	61	59	60	60	69	70	70	70	71	71	72	72	72	73
35/F	68	63	71	76	75	71	67	71	71	73	74	74	75	75	75	68	64	69	64	61	59	59	58	58	58	58	58	54	62	61	60	61	61	69	70	70	70	71	71	72	72	72	73
36/F	69	63	71	76	74	71	67	70	71	73	74	74	75	75	75	68	64	69	64	61	60	59	58	58	58	58	58	54	62	61	60	61	61	69	70	70	70	71	71	72	72	72	73
37/F	69	63	71	76	74	71	67	70	71	73	74	74	74	75	75	68	64	69	64	61	60	59	59	58	58	58	58	54	62	61	60	61	61	69	70	70	70	71	71	72	72	72	73
38/F	69	63	71	76	74	71	67	70	71	73	74	74	74	75	75	68	64	69	64	61	60	59	59	58	58	58	58	55	62	62	60	61	61	69	70	70	70	71	71	72	72	72	73
39/F	69	63	71	76	74	70	67	70	71	73	74	74	74	75	75	68	64	69	64	61	60	59	59	58	58	58	58	55	62	62	60	61	61	69	70	70	70	71	71	71	72	72	73
min	68	58	71	76	74	70	59	68	68	69	70	70	71	71	72	60	54	62	55	54	54	54	53	53	54	54	56	57	49	61	61	59	60	69	70	70	70	71	71	71	72	72	73
max	70	65	74	79	77	72	68	71	72	75	75	76	76	76	77	68	64	70	64	62	60	59	59	59	59	59	59	59	55	62	62	62	63	71	71	72	72	73	73	74	74	75	75

Tower 2 - by façade

Floor	T2-01-1	T2-01-2	T2-01-3	T2-02-1	T2-02-2	T2-02-3	T2-03-1	T2-03-2	T2-04-1	T2-04-2	T2-05-1	T2-05-2	T2-06-1	T2-06-2	T2-07-1	T2-07-2	T2-08-1	T2-08-2	T2-09-1	T2-09-2	T2-10-1	T2-10-2	T2-11-1	T2-11-2	T2-12-1	T2-12-2
6/F	74	74	65	60	58	58	57	55	55	54	54	53	52	52	52	52	51	51	56	57	72	73	73	73	72	64
7/F	74	74	68	62	60	59	58	57	57	57	56	56	56	56	55	55	55	55	59	60	72	73	73	73	73	64
8/F	74	74	69	63	62	62	62	59	58	58	57	57	57	57	56	56	61	62	72	73	73	73	73	72	72	64
9/F	74	74	69	63	61	61	60	59	59	59	58	58	58	57	57	57	57	61	62	73	73	73	73	72	72	64
10/F	74	74	68	63	61	61	60	59	59	59	59	58	58	58	58	57	57	61	63	72	72	72	73	72	72	64
11/F	74	74	68	63	61	61	60	59	59	59	59	58	58	58	58	57	57	61	63	72	72	72	72	72	72	64
12/F	74	74	68	63	61	61	60	59	59	59	59	58	58	58	58	57	57	61	63	72	72	72	72	72	72	64
13/F	74	74	68	63	61	61	61	60	59	59	59	58	58	58	58	57	57	61	63	73	72	72	72	71	71	63
14/F	73	74	68	63	61	61	61	60	59	59	59	58	58	58	58	57	57	61	62	73	73	72	72	71	71	63
15/F	73	74	68	63	61	61	61	60	59	59	59	58	58	58	58	57	57	61	62	73	73	73	72	71	71	63
16/F	73	73	68	63	61	61	61	60	59	59	59	58	58	58	58	57	57	61	62	73	73	73	73	71	71	63
17/F	73	73	68	63	61	61	61	60	59	59	59	58	58	58	58	57	57	60	62	73	73	73	73	71	70	62
18/F	73	73	68	63	61	61	61	60	59	59	59	58	58	58	58	57	57	60	62	73	73	73	73	71	70	62
19/F	73	73	68	63	61	61	61	60	59	59	59	58	58	58	58	57	57	60	62	73	73	73	73	71	70	62
20/F	73	73	68	63	61	61	61	60	59	59	59	58	58	58	58	57	57	60	62	73	73	73	73	71	70	62
21/F	73	73	68	63	61	61	60	59	59	59	59	58	58	58	58	57	57	60	62	73	73	73	73	70	70	62
22/F	72	73	68	62	61	61	60	59	59	59	58	58	58	58	58	57	57	60	62	73	73	73	73	70	70	62
23/F	72	73	67	62	61	61	60	59	59	59	58	58	58	58	58	57	57	60	62	73	73	73	73	70	70	62
24/F	72	73	67	62	61	60	60	59	59	59	58	58	58	58	57	57	57	60	62	73	73	73	73	70	70	61
25/F	73	72	67	62	61	60	60	59	58	58	58	58	57	57	57	57	57	60	62	73	73	73	73	70	70	61
26/F	72	73	67	62	61	60	60	59	58	58	58	58	57	57	57	57	57	60	61	73	73	73	73	70	70	61
27/F	73	72	67	62	60	60	60	59	58	58	58	58	57	57	57	57	57	60	61	73	73	73	73	70	70	61
28/F	72	72	67	63	60	60	60	59	58	58	58	57	57	57	57	57	57	60	61	73	73	73	73	70	70	61
min	72	72	65	60	58	58	57	55	55	54	54	53	52	52	52	52	51	51	56	57	71	71	71	71	70	61
max	74	74	69	63	61	61	61	60	59	59	59	58	58	58	58	57	57	61	63	73	73	73	73	73	73	64

Predicted Traffic Noise Level, dB(A) - (a) Base Scenario: Careful Buildings Disposition & Windows Locations

Tower 1 - by flat

Floor	T1-01	T1-02	T1-03	T1-04	T1-05	T1-06	T1-07	T1-08	T1-09	T1-10	T1-11	T1-12	T1-13	T1-14	T1-15	T1-16	T1-17	T1-18	T1-19
6/F	74	77	68	70	72	60	62	54	54	54	56	57	61	60	70	70	71	72	73
7/F	74	78	71	74	76	62	69	55	56	57	58	58	62	62	71	71	73	74	75
8/F	74	79	71	75	76	64	66	57	57	58	58	59	63	63	71	72	73	74	75
9/F	74	79	71	75	76	65	67	58	58	58	59	59	61	63	71	72	73	74	75
10/F	73	79	71	75	76	66	68	59	58	59	59	59	61	62	71	72	73	74	75
11/F	73	79	72	75	76	67	68	60	59	59	59	59	61	62	71	72	73	74	75
12/F	73	79	72	76	77	67	69	61	59	59	59	59	61	61	71	72	73	74	75
13/F	73	79	72	76	77	67	69	61	59	59	59	59	61	61	71	72	73	74	75
14/F	73	79	73	76	77	68	69	61	59	59	59	59	62	61	71	72	73	74	75
15/F	73	79	72	76	76	68	69	62	59	59	59	58	62	61	71	72	73	74	75
16/F	73	78	72	75	76	68	69	62	59	59	59	58	62	61	71	72	73	74	75
17/F	73	78	72	75	76	68	69	62	59	59	59	58	62	61	72	72	73	74	74
18/F	73	78	72	75	76	68	69	62	59	59	59	58	62	61	71	72	73	73	74
19/F	72	78	72	75	76	68	70	62	59	59	59	58	62	61	71	72	73	73	74
20/F	72	78	73	75	76	68	70	62	59	58	58	58	62	61	71	72	72	73	74
21/F	72	78	72	75	76	68	70	62	59	58	58	58	62	60	71	72	72	73	74
22/F	72	78	72	75	76	68	70	62	59	58	58	58	62	60	70	72	72	73	74
23/F	72	77	72	75	76	68	70	62	59	58	58	58	62	60	70	72	72	73	74
24/F	72	77	72	75	76	68	70	62	59	58	58	58	62	60	70	72	72	73	74
25/F	72	77	72	75	76	68	70	62	59	58	58	58	62	60	70	72	72	73	74
26/F	72	77	72	75	76	68	70	61	59	58	58	58	62	60	70	72	72	72	73
27/F	71	77	72	75	76	68	69	61	59	58	58	58	62	60	70	72	72	72	73
28/F	71	77	72	75	76	68	69	61	59	58	58	58	62	60	70	71	72	72	73
29/F	71	77	73	75	76	68	69	61	59	58	58	58	62	60	70	71	71	72	73
30/F	71	77	73	75	76	68	69	61	59	58	58	58	62	60	70	71	71	72	73
31/F	71	76	73	75	76	68	69	61	59	58	58	58	62	60	70	70	71	72	73
32/F	71	76	73	75	75	68	69	61	59	58	58	58	62	60	70	70	71	72	73
33/F	71	76	73	74	75	68	69	61	59	58	58	58	62	60	70	70	71	72	73
34/F	71	76	73	74	75	68	69	61	59	58	58	58	62	60	70	70	71	72	73
35/F	71	76	73	74	75	68	69	61	59	58	58	58	62	61	70	70	71	72	73
36/F	71	76	73	74	75	68	69	61	59	58	58	58	62	61	70	71	71	72	73
37/F	71	76	73	74	75	68	69	61	59	58	58	58	62	62	70	71	71	72	73
38/F	71	76	73	74	75	68	69	61	59	59	58	58	62	63	70	71	71	72	73
39/F	71	76	73	74	75	68	69	61	59	59	58	58	62	63	70	71	71	72	73
min	71	76	68	70	72	60	62	54	54	54	56	57	61	60	70	70	71	72	73
max	74	79	72	76	77	68	70	62	59	59	59	58	62	63	71	72	73	74	75

Tower 2 - by flat

Floor	T2-01	T2-02	T2-03	T2-04	T2-05	T2-06	T2-07	T2-08	T2-09	T2-10	T2-11	T2-12
6/F	74	60	58	55	54	53	52	51	57	71	71	70
7/F	74	62	60	58	57	56	56	55	60	73	73	73
8/F	74	63	60	59	58	57	57	56	62	73	73	72
9/F	74	63	61	59	59	58	57	57	63	73	73	72
10/F	74	63	61	59	59	58	58	57	63	72	73	72
11/F	74	63	61	59	59	58	58	57	63	72	72	72
12/F	74	63	61	59	59	58	58	57	63	72	72	71
13/F	74	63	61	60	59	58	58	57	63	72	72	71
14/F	74	63	61	60	59	58	58	57	62	71	72	71
15/F	74	63	61	60	59	58	58	57	62	71	72	71
16/F	73	63	61	60	59	58	58	57	62	71	71	71
17/F	73	63	61	60	59	58	58	57	62	71	71	71
18/F	73	63	61	60	59	58	58	57	62	72	71	70
19/F	73	63	61	60	59	58	58	57	62	71	71	70
20/F	73	63	61	60	59	58	58	57	62	72	71	70
21/F	73	63	61	59	59	58	58	57	62	71	71	70
22/F	73	62	61	59	59	58	58	57	62	71	71	70
23/F	73	62	61	59	59	58	58	57	62	71	71	70
24/F	73	62	60	59	59	58	58	57	62	72	71	70
25/F	72	62	60	59	58	58	58	57	62	71	71	70
26/F	72	62	60	59	58	58	58	57	61	71	71	70
27/F	72	62	60	59	58	58	57	57	61	71	71	70
28/F	72	62	60	59	58	58	57	57	61	72	71	70
min	72	60	58	55	54	53	52	51	57	71	71	70
max	74	63	61	60	59	58	58	57	63	73	73	73

APPENDIX 5-3

Traffic Noise Assessment Results
(Mitigated Scenario – With Acoustic Fins)

Predicted Traffic Noise Level, dB(A) - (b) Mitigated Scenario: With Acoustic Fins

Tower 1 - by façade

Floor	T1-01-1	T1-01-2	T1-01-3	T1-02-1	T1-02-2	T1-02-3	T1-03-1	T1-03-2	T1-03-3	T1-04-1	T1-04-2	T1-04-3	T1-05-1	T1-05-2	T1-05-3	T1-06-1	T1-06-2	T1-07-1	T1-07-2	T1-08-1	T1-08-2	T1-09-1	T1-09-2	T1-10-1	T1-10-2	T1-11-1	T1-11-2	T1-12-1	T1-12-2	T1-13-1	T1-13-2	T1-14-1	T1-14-2	T1-15-1	T1-15-2	T1-16-1	T1-16-2	T1-17-1	T1-17-2	T1-18-1	T1-18-2	T1-19-1	T1-19-2
6/F	66	45	59	77	73	70	59	68	68	69	70	70	71	71	72	60	54	62	55	54	54	54	53	53	54	54	56	57	49	61	61	59	60	68	69	69	70	70	70	71	71	71	72
7/F	67	46	59	78	74	71	63	70	71	72	73	73	74	74	75	62	55	65	56	55	55	55	55	56	56	57	58	58	51	61	62	62	62	70	71	71	72	72	73	73	74	74	74
8/F	67	47	60	79	75	71	63	70	71	73	74	74	75	75	75	64	56	66	58	57	57	57	57	58	58	58	58	59	51	62	62	62	62	70	71	71	72	72	73	73	74	74	75
9/F	67	48	60	79	75	72	64	70	71	74	74	75	75	76	76	65	58	67	60	58	58	58	58	58	58	58	59	59	51	61	61	61	62	70	71	71	72	72	73	73	74	74	75
10/F	67	49	60	79	75	72	65	71	71	74	74	75	75	76	76	66	60	68	62	59	59	58	58	58	58	59	59	59	51	61	61	61	62	70	71	71	72	72	73	73	74	74	74
11/F	67	50	61	79	75	72	66	71	72	74	75	75	76	76	76	67	62	68	62	60	59	59	58	58	58	59	59	59	51	61	61	61	62	70	71	71	72	72	73	73	74	74	74
12/F	67	50	61	79	75	72	67	71	72	74	75	75	76	76	76	67	62	68	62	61	59	59	58	58	58	59	59	59	51	61	61	61	62	70	71	71	72	72	73	73	74	74	74
13/F	67	50	61	79	75	72	67	71	72	74	75	75	76	76	76	67	63	68	63	61	59	59	58	58	58	59	59	59	51	61	61	61	62	70	71	71	72	72	73	73	74	74	74
14/F	67	50	62	79	75	72	67	71	72	74	75	75	76	76	76	68	63	69	63	61	60	59	58	58	58	59	59	59	51	62	62	61	62	70	70	71	71	72	72	73	73	74	74
15/F	67	50	63	79	75	72	67	71	72	74	75	75	76	76	76	68	63	69	64	62	60	59	58	58	59	59	59	58	51	62	62	61	62	70	70	71	71	72	72	73	73	74	74
16/F	67	50	63	79	75	72	67	71	72	74	75	75	76	76	76	68	64	69	64	62	60	59	58	59	59	59	59	58	52	62	62	61	62	70	70	71	71	72	72	73	73	74	74
17/F	67	50	63	80	75	72	67	71	72	74	75	75	76	76	76	68	64	69	64	62	60	59	58	59	59	59	59	58	52	62	62	61	62	70	70	71	71	72	72	73	73	74	74
18/F	67	50	64	80	75	72	68	71	72	74	75	75	76	76	76	68	64	69	64	62	60	59	58	59	59	59	59	58	52	62	62	61	62	70	70	71	71	72	72	73	73	74	74
19/F	67	50	64	80	75	72	68	71	72	74	75	75	76	76	76	68	64	70	64	62	60	59	58	58	59	59	58	58	52	62	62	61	62	70	70	70	71	71	72	72	73	73	73
20/F	67	50	64	79	75	72	68	71	72	74	75	75	76	76	76	68	64	70	64	62	60	59	58	58	58	58	58	58	52	62	62	61	62	70	70	70	71	71	72	72	73	73	73
21/F	67	50	64	79	74	72	68	71	72	74	75	75	76	76	76	68	64	70	64	62	60	59	58	58	58	58	58	58	52	62	62	60	61	69	70	70	71	71	72	72	73	73	73
22/F	67	49	64	78	74	72	68	71	72	74	75	75	76	76	76	68	64	70	64	62	60	59	58	58	58	58	58	58	52	62	62	60	60	69	70	70	71	71	72	72	72	73	73
23/F	67	49	64	77	74	73	68	71	72	74	75	75	75	76	76	68	64	70	64	62	60	59	58	58	58	58	58	58	52	62	62	60	60	69	70	70	71	71	72	72	72	73	73
24/F	67	49	64	77	74	72	68	71	72	74	75	75	75	76	76	68	64	70	64	62	59	59	58	58	58	58	58	58	52	62	62	60	60	69	70	70	70	71	71	72	72	72	72
25/F	66	49	64	77	74	72	68	71	72	74	74	75	75	75	76	68	64	70	64	62	59	59	58	58	58	58	58	58	52	62	62	60	60	69	69	70	70	71	71	72	72	72	72
26/F	66	49	63	77	74	72	68	71	72	74	74	75	75	75	76	68	64	70	64	62	59	59	58	58	58	58	58	58	52	62	62	60	60	69	69	70	70	70	71	71	72	72	72
27/F	66	49	63	77	74	71	68	71	72	74	74	75	75	75	76	68	64	69	64	61	59	59	58	58	58	58	58	58	52	62	62	60	60	69	69	70	70	70	71	71	72	72	72
28/F	66	49	63	77	74	71	68	71	72	74	74	75	75	75	75	68	64	69	64	61	59	59	58	58	58	58	58	58	52	62	62	60	60	69	69	70	70	70	71	71	72	72	72
29/F	66	50	63	77	73	71	67	71	73	74	74	75	75	75	75	68	64	69	64	61	59	59	58	58	58	58	58	58	52	62	62	60	60	69	69	69	70	70	71	71	71	72	72
30/F	66	52	64	77	73	71	67	71	72	73	74	75	75	75	76	68	64	69	64	61	59	59	58	58	58	58	58	58	53	62	62	60	60	69	69	70	70	70	71	71	71	72	72
31/F	66	55	64	76	73	71	67	71	73	73	74	74	75	75	75	68	64	69	64	61	59	59	58	58	58	58	58	58	53	62	62	60	60	68	69	69	70	70	70	71	71	71	72
32/F	67	58	65	76	73	71	67	71	73	73	74	74	75	75	75	68	64	69	64	61	59	59	58	58	58	58	58	58	53	62	62	60	60	68	69	69	70	70	70	71	71	71	72
33/F	67	59	65	76	73	71	67	71	73	73	74	74	75	75	75	68	64	69	64	61	59	59	58	58	58	58	58	58	53	62	61	59	60	68	69	69	70	70	70	71	71	71	72
34/F	67	59	65	76	73	71	67	71	73	73	74	74	75	75	75	68	64	69	64	61	59	59	58	58	58	58	58	58	53	62	61	59	60	68	69	69	70	70	70	71	71	72	72
35/F	67	59	65	76	73	71	67	70	71	73	74	74	74	75	75	68	64	69	64	61	60	59	58	58	58	58	58	58	54	62	61	59	61	68	69	69	70	70	71	71	71	72	72
36/F	67	58	65	76	73	71	67	70	71	73	74	74	74	75	75	68	64	69	64	61	60	59	58	58	58	58	58	58	54	62	61	60	61	68	69	69	70	70	71	71	71	72	72
37/F	67	59	65	76	73	71	67	70	71	73	74	74	74	75	75	68	64	69	64	61	60	59	58	58	58	58	58	58	54	62	61	60	62	68	69	69	70	70	71	71	71	72	72
38/F	67	59	65	76	73	71	67	70	71	73	73	74	74	75	75	68	64	69	64	61	60	59	59	59	58	58	58	58	55	62	62	60	63	69	69	70	70	70	71	71	72	72	73
39/F	67	60	65	76	73	70	67	70	71	73	73	74	74	74	75	68	64	69	64	61	60	59	59	59	58	58	58	58	55	62	62	60	63	69	69	70	70	70	71	71	72	72	73
min	66	45	59	76	73	70	59	68	68	69	70	70	71	71	72	60	54	62	55	54	54	54	53	53	54	54	56	57	49	61	61	59	60	68	69	69	70	70	70	71	71	71	72
max	67	60	65	79	75	72	68	71	72	74	75	75	76	76	76	68	64	70	64	62	60	59	59	59	59	59	59	59	55	62	62	62	63	70	71	71	74	73	73	73	74	74	75

Tower 2 - by façade

Floor	T2-01-1	T2-01-2	T2-01-3	T2-02-1	T2-02-2	T2-02-3	T2-03-1	T2-03-2	T2-04-1	T2-04-2	T2-05-1	T2-05-2	T2-06-1	T2-06-2	T2-07-1	T2-07-2	T2-08-1	T2-08-2	T2-09-1	T2-09-2	T2-10-1	T2-10-2	T2-11-1	T2-11-2	T2-12-1	T2-12-2
6/F	70	73	65	80	58	58	57	55	55	54	54	53	52	52	52	52	51	51	55	57	72	72	72	72	69	62
7/F	71	73	68	62	60	60	59	58	57	57	56	56	56	55	55	55	55	55	59	60	72	72	72	72	69	62
8/F	71	73	69	63	60	60	60	59	58	58	58	57	57	57	57	57	56	56	61	62	72	72	72	72	69	62
9/F	71	73	69	63	61	61	60	59	59	59	58	58	58	57	57	57	57	57	61	62	72	72	72	71	68	62
10/F	71	73	68	63	61	61	60	59	59	59	58	58	58	58	58	58	57	57	61	63	71	72	72	71	68	61
11/F	71	73	68	63	61	61	60	59	59	59	58	58	58	58	58	58	57	57	61	63	71	71	71	71	68	61
12/F	71	73	68	63	61	61	61	59	59	59	58	58	58	58	58	58	57	57	61	63	71	71	71	71	68	61
13/F	71	73	68	63	61	61	61	60	59	59	59	58	58	58	58	58	57	57	61	63	71	71	71	71	67	61
14/F	71	73	68	63	61	61	61	60	59	59	59	58	58	58	58	58	57	57	61	62	71	71	71	70	67	61
15/F	71	73	68	63	61	61	61	60	59	59	59	58	58	58	58	58	57	57	61	63	71	71	71	70	67	61
16/F	71	72	68	63	61	61	61	60	59	59	59	58	58	58	58	58	57	57	61	63	71	71	71	70	67	61
17/F	70	72	68	63	61	61	61	60	59	59	59	58	58	58	58	58	57	57	60	62	70	71	71	70	67	61
18/F	70	72	68	63	61	61	61	60	59	59	59	58	58	58	58	58	57	57	60	62	70	70	70	70	67	60
19/F	70	72	68	63	61	61	61	60	59	59	59	58	58	58	58	58	57	57	60	62	70	70	70	70	67	60
20/F	70	72	68	63	61	61	61	60	59	59	59	58	58	58	58	58	57	57	60	62	70	70	70	70	66	60
21/F	70	72	68	63	61	61	61	60	59	59	58	58	58	58	58	58	57	57	60	62	70	70	70	70	66	60
22/F	70	72	68	62	61	61	60	59	59	59	58	58	58	58	58	58	57	57	60	62	70	70	70	69	66	60
23/F	70	72	67	62	61	61	60	59	59	58	58	58	58	58	58	58	57	57	60	62	70	70	70	69	66	60
24/F	70	71	67	62	61	60	60	59	59	58	58	58	58	58	58	57	57	57	60	62	70	70	70	69	66	60
25/F	70	71	67	62	61	60	60	59	59	58	58	58	58	58	58	57	57	57	60	62	70	70	70	69	65	60
26/F	70	71	67	62	61	60	60	59	59	58	58	58	58	58	58	57	57	57	60	61	70	70	70	69	65	60
27/F	70	71	67	62	60	60	60	59	58	58	58	58	57	57	57	57	57	57	60	61	70	70	70	69	65	59
28/F	69	71	67	62	60	60	60	59	58	58	58	58	57	57	57	57	57	57	60	61	70	70	70	69	65	59
min	69	71	65	60	58	58	57	55	55	54	54	53	52	52	52	52	51	51	55	57	70	70	70	69	65	59
max	71	73	69	63	61	61	61	60	59	59	59	58	58	58	58	58	57	57	61	63	72	72	72	72	69	62

Predicted Traffic Noise Level, dB(A) - (b) Mitigated Scenario: With Acoustic Fins

Tower 1 - by flat

Floor	T1-01	T1-02	T1-03	T1-04	T1-05	T1-06	T1-07	T1-08	T1-09	T1-10	T1-11	T1-12	T1-13	T1-14	T1-15	T1-16	T1-17	T1-18	T1-19
6/F	66	77	68	70	72	60	62	54	54	54	56	57	61	63	70	71	72	73	74
7/F	67	78	71	71	75	62	65	55	56	57	58	58	62	63	71	72	75	74	75
8/F	67	79	72	74	75	64	66	57	57	58	58	59	62	63	71	73	75	74	75
9/F	67	79	72	75	75	65	67	58	58	58	59	59	61	63	71	73	75	74	74
10/F	67	79	72	75	76	66	68	59	58	59	59	59	61	62	71	72	75	74	74
11/F	67	79	72	75	76	67	68	60	59	59	59	59	61	62	71	72	75	74	74
12/F	67	79	72	75	76	67	69	61	59	59	59	59	61	61	71	72	75	73	74
13/F	67	79	72	75	76	67	69	61	59	59	59	59	61	61	71	71	72	75	74
14/F	67	79	72	75	76	68	69	61	59	59	59	59	61	61	70	71	72	73	74
15/F	67	79	72	75	76	68	69	62	59	59	59	58	62	61	70	71	72	73	74
16/F	67	78	72	75	76	68	69	62	59	59	59	58	62	61	70	71	72	73	74
17/F	67	78	72	75	76	68	69	62	59	59	59	58	62	61	70	71	72	73	73
18/F	67	78	72	75	76	68	69	62	59	59	59	58	62	61	70	71	72	73	73
19/F	67	78	72	75	76	68	70	62	59	59	58	58	62	61	70	71	72	73	73
20/F	67	78	72	75	76	68	70	62	59	58	58	58	62	61	70	71	72	72	73
21/F	67	78	72	75	76	68	70	62	59	58	58	58	62	60	70	71	72	72	73
22/F	67	78	72	75	76	68	70	62	59	58	58	58	62	60	70	71	71	72	73
23/F	67	77	72	75	76	68	70	62	59	58	58	58	62	60	70	70	71	72	72
24/F	67	77	73	75	76	68	70	62	59	58	58	58	62	60	69	70	71	72	72
25/F	66	77	72	75	76	68	70	62	59	58	58	58	62	60	69	70	71	72	72
26/F	66	77	72	75	76	68	70	61	59	58	58	58	62	60	69	70	71	72	72
27/F	66	77	72	75	76	68	69	61	59	58	58	58	62	60	69	70	71	72	72
28/F	66	77	72	75	76	68	69	61	59	58	58	58	62	60	69	70	71	71	72
29/F	66	77	72	75	76	68	69	61	59	58	58	58	62	60	69	70	71	71	72
30/F	66	77	72	75	76	68	69	61	59	58	58	58	62	60	69	70	71	72	72
31/F	66	76	71	74	75	68	69	61	59	58	58	58	62	60	69	70	70	71	72
32/F	67	76	71	74	75	68	69	61	59	58	58	58	62	60	69	70	70	71	72
33/F	67	76	71	74	75	68	69	61	59	58	58	58	62	60	69	70	70	71	72
34/F	67	76	71	74	75	68	69	61	59	58	58	58	62	60	69	70	71	71	72
35/F	67	76	71	74	75	68	69	61	59	58	58	58	62	61	69	70	71	71	72
36/F	67	76	71	74	75	68	69	61	59	58	58	58	62	61	69	70	71	71	72
37/F	67	76	71	74	75	68	69	61	59	58	58	58	62	62	69	70	71	71	72
38/F	67	76	71	74	75	68	69	61	59	59	58	58	62	63	69	70	71	72	72
39/F	67	76	71	74	75	68	69	61	59	59	58	58	62	63	69	70	71	72	72
min	66	76	68	70	72	60	62	54	54	54	56	57	61	60	69	70	70	71	72
max	67	79	72	75	76	68	70	62	59	59	59	59	62	63	71	73	75	74	75

Tower 2 - by flat

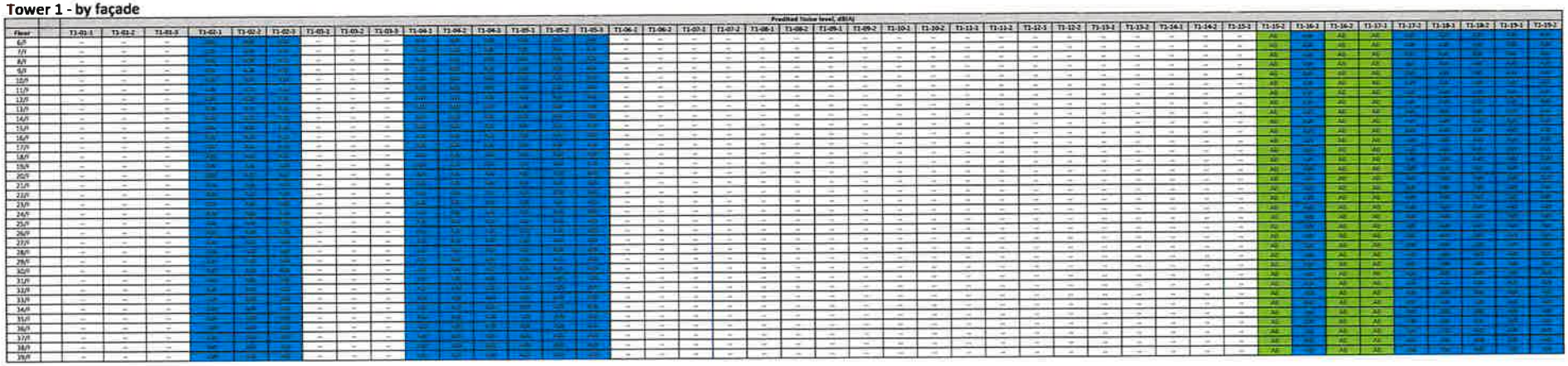
Floor	T2-01	T2-02	T2-03	T2-04	T2-05	T2-06	T2-07	T2-08	T2-09	T2-10	T2-11	T2-12
6/F	72	60	58	55	54	53	52	51	57	72	72	69
7/F	73	62	60	58	57	56	56	55	60	72	72	68
8/F	73	63	60	59	58	57	57	56	62	72	72	68
9/F	73	63	61	59	59	58	57	57	62	72	72	68
10/F	73	63	61	59	59	58	58	57	63	72	72	68
11/F	73	63	61	59	59	58	58	57	63	71	72	68
12/F	73	63	61	59	59	58	58	57	63	71	71	68
13/F	73	63	61	60	59	58	58	57	63	71	72	67
14/F	73	63	61	60	59	58	58	57	62	71	71	67
15/F	73	63	61	60	59	58	58	57	62	71	71	67
16/F	72	63	61	60	59	58	58	57	62	71	71	67
17/F	72	63	61	60	59	58	58	57	62	71	72	67
18/F	72	63	61	60	59	58	58	57	62	70	70	67
19/F	72	63	61	60	59	58	58	57	62	70	70	66
20/F	72	63	61	60	59	58	58	57	62	70	70	66
21/F	72	63	61	59	59	58	58	57	62	70	70	66
22/F	72	62	61	59	59	58	58	57	62	70	70	66
23/F	72	63	61	59	59	58	58	57	62	70	70	66
24/F	71	62	60	59	59	58	58	57	62	70	70	66
25/F	71	62	60	59	58	58	57	57	62	70	70	65
26/F	71	62	60	59	58	58	57	57	61	70	70	65
27/F	71	62	60	59	58	57	57	57	61	70	70	65
28/F	71	62	60	59	58	57	57	57	61	70	70	65
min	71	60	58	55	54	53	52	51	57	70	70	65
max	73	63	61	60	59	58	58	57	63	72	72	69

APPENDIX 5-4

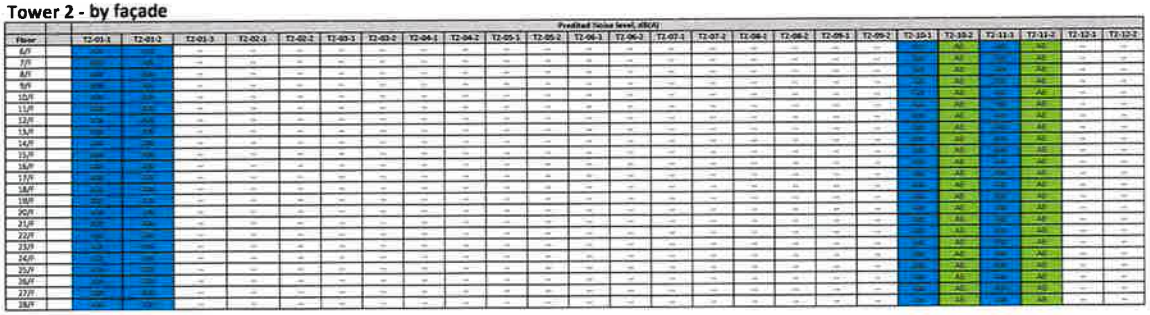
Proposed Mitigation Measures & Traffic Noise Assessment Results (Mitigated Scenario - With Acoustic Fins & Acoustic Balcony/Windows)

Proposed Noise Mitigation

Tower 1 - by façade



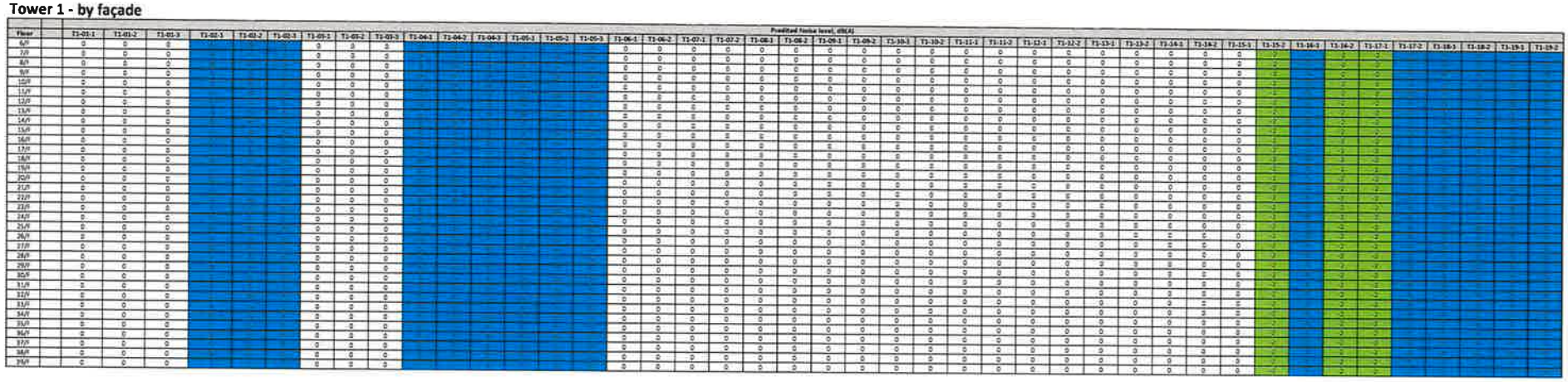
Tower 2 - by façade



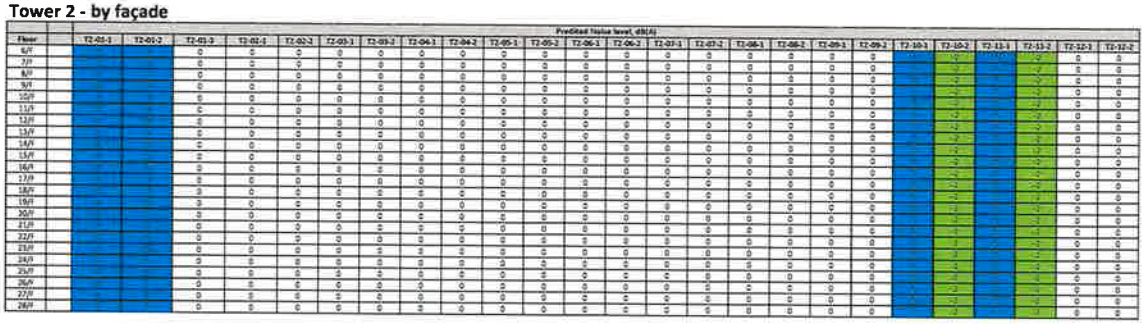


Noise Correction from the Mitigation, dB(A)

Tower 1 - by façade



Tower 2 - by façade



ID	Description	Correction	
—	Normal Windows	0	dB
AC	Acoustic Balcony	-3	dB

Predicted Traffic Noise Level, dB(A) - (c) Mitigated Scenario: With Acoustic Fins & Acoustic Balcony/Windows

Tower 1 - by façade

Floor	T1-01-1	T1-01-2	T1-01-3	T1-02-1	T1-02-2	T1-02-3	T1-03-1	T1-03-2	T1-03-3	T1-04-1	T1-04-2	T1-04-3	T1-05-1	T1-05-2	T1-05-3	T1-06-1	T1-06-2	T1-07-1	T1-07-2	T1-08-1	T1-08-2	T1-09-1	T1-09-2	T1-10-1	T1-10-2	T1-11-1	T1-11-2	T1-12-1	T1-12-2	T1-13-1	T1-13-2	T1-14-1	T1-14-2	T1-15-1	T1-15-2	T1-16-1	T1-16-2	T1-17-1	T1-17-2	T1-18-1	T1-18-2	T1-19-1	T1-19-2
6/F	66	45	59	72	68	65	59	68	68	64	65	66	66	66	67	60	54	62	55	54	54	54	53	53	54	54	58	57	49	61	62	62	63	69	68	65	69	69	67	68	68	69	69
7/F	67	48	59	73	69	66	62	70	71	67	68	68	69	69	70	62	55	63	56	55	55	55	56	56	57	57	58	58	55	61	62	62	62	70	69	66	70	70	68	68	69	69	70
8/F	67	47	60	74	70	66	62	70	71	68	69	69	70	70	70	64	56	66	58	57	57	57	57	58	58	58	58	58	55	61	62	62	62	70	69	66	70	70	68	68	69	69	69
9/F	67	48	60	74	70	67	64	70	71	69	69	70	70	71	71	65	58	67	60	58	58	58	58	58	58	58	59	59	55	61	62	62	62	70	69	66	70	70	68	68	69	69	69
10/F	67	49	60	74	70	67	65	71	71	69	69	70	70	71	71	66	60	68	61	59	59	58	58	58	58	59	59	59	55	61	61	61	62	70	69	66	70	70	68	68	69	69	69
11/F	67	50	61	74	70	67	66	71	72	69	70	70	71	71	71	67	62	68	62	60	59	59	58	58	58	59	59	59	55	61	61	61	62	70	69	66	70	70	68	68	69	69	69
12/F	67	50	61	74	70	67	67	71	72	69	70	70	71	71	71	67	62	69	63	61	59	59	58	58	58	59	59	59	55	61	61	61	62	70	69	66	69	70	67	68	68	69	69
13/F	67	50	61	74	70	67	67	71	72	69	70	70	71	71	71	67	63	69	63	61	59	59	58	58	58	59	59	59	55	61	62	62	62	70	68	66	69	70	67	68	68	69	69
14/F	67	50	62	74	70	67	67	71	72	69	70	70	71	71	71	68	63	69	64	62	60	59	58	58	59	59	59	59	56	61	62	62	62	70	68	66	69	70	67	68	68	68	69
15/F	67	50	63	74	70	67	67	71	72	69	70	70	71	71	71	68	64	69	64	62	60	59	58	58	59	59	59	59	56	61	62	62	62	70	68	66	69	70	67	68	68	68	69
16/F	67	50	63	74	70	67	67	71	72	69	70	70	71	71	71	68	64	69	64	62	60	59	58	58	59	59	59	59	56	61	62	62	62	70	68	66	69	69	67	67	68	68	68
17/F	67	50	63	74	70	67	67	71	72	69	70	70	71	71	71	68	64	69	64	62	60	59	58	58	59	59	59	59	56	61	62	62	62	70	68	66	69	69	67	67	68	68	68
18/F	67	50	64	74	70	67	68	71	72	69	70	70	71	71	71	68	64	69	64	62	60	59	58	58	59	59	59	58	56	61	62	62	62	70	68	65	69	69	67	67	68	68	68
19/F	67	50	64	74	70	67	68	71	72	69	70	70	71	71	71	68	64	70	64	62	60	59	58	58	58	58	58	58	52	62	62	62	60	61	69	68	65	69	69	67	67	67	68	68
20/F	67	50	64	74	70	67	68	71	72	69	70	70	71	71	71	68	64	70	64	62	60	59	58	58	58	58	58	58	52	62	62	62	60	60	69	68	65	69	69	67	67	67	68	68
21/F	67	50	64	74	69	67	68	71	72	69	70	70	71	71	71	68	64	70	64	62	60	59	58	58	58	58	58	58	52	62	62	62	60	60	69	68	65	69	69	67	67	67	68	68
22/F	67	49	64	74	69	67	68	71	72	69	70	70	71	71	71	68	64	70	64	62	60	59	58	58	58	58	58	58	52	62	62	62	60	60	69	68	65	69	69	66	67	67	67	67
23/F	67	49	64	74	69	67	68	71	72	69	70	70	70	71	71	68	64	70	64	63	60	59	58	58	58	58	58	58	52	62	62	62	60	60	69	67	65	68	69	66	67	67	67	67
24/F	67	49	64	74	69	67	68	71	72	69	70	70	70	71	71	68	64	70	64	63	60	59	59	58	58	58	58	58	52	62	62	62	60	60	69	67	65	68	69	66	66	67	67	67
25/F	66	49	64	74	69	67	68	71	72	69	69	70	70	71	71	68	64	70	64	62	59	59	58	58	58	58	58	58	52	62	62	62	60	60	68	67	65	68	68	66	66	67	67	67
26/F	66	49	63	73	69	67	68	71	72	69	69	70	70	71	71	68	64	69	64	61	59	59	58	58	58	58	58	58	52	62	62	62	60	60	68	67	65	68	68	66	66	67	67	67
27/F	66	49	63	73	69	66	68	71	72	69	69	70	70	71	71	68	64	69	64	61	59	59	58	58	58	58	58	58	52	62	62	62	60	60	68	67	65	68	68	66	66	67	67	67
28/F	66	49	63	73	69	66	68	71	72	69	69	70	70	70	71	68	64	69	64	61	59	59	58	58	58	58	58	58	53	62	62	62	60	60	68	67	64	68	68	66	66	67	67	67
29/F	66	50	63	73	68	66	67	71	72	69	69	70	70	70	71	68	64	69	64	61	59	59	58	58	58	58	58	58	53	62	62	62	60	60	68	67	64	68	68	66	66	66	67	67
30/F	66	53	64	73	68	66	67	71	72	68	69	70	70	70	71	68	64	69	64	61	59	59	58	58	58	58	58	58	53	62	62	62	60	60	68	67	64	68	68	65	66	66	66	67
31/F	66	55	64	73	68	66	67	71	71	68	68	69	70	70	70	68	64	69	64	61	59	59	58	58	58	58	58	58	53	62	61	59	60	68	67	64	68	68	65	66	66	66	67	
32/F	67	58	65	73	68	66	67	71	71	68	68	69	70	70	70	68	64	69	64	61	59	59	58	58	58	58	58	58	53	62	61	59	60	68	67	64	68	68	65	66	66	67	67	
33/F	67	59	65	73	68	66	67	71	71	68	68	69	70	70	70	68	64	69	64	61	59	59	58	58	58	58	58	58	53	62	61	59	60	68	67	64	68	68	66	66	66	67	67	
34/F	67	59	65	73	68	66	67	71	71	68	69	69	70	70	70	68	64	69	64	61	59	59	58	58	58	58	58	58	54	62	61	59	60	68	67	64	68	68	66	66	66	67	67	
35/F	67	59	65	73	68	66	67	70	71	68	69	69	70	70	70	68	64	69	64	61	60	59	58	58	58	58	58	58	54	62	61	59	60	68	67	64	68	68	66	66	66	67	67	
36/F	67	59	65	73	68	66	67	70	71	68	69	69	70	70	70	68	64	69	64	61	60	59	58	58	58	58	58	58	54	62	61	60	62	69	67	64	68	68	66	66	66	67	67	
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max	67	60	65	74	70	67	68	71	72	69	70	70	71	71	71	68	64	70	64	62	60	59	59	59	59	59	59	59	55	62	62	62	63	70	69	66	70	70	68	68	69	69	70	

Tower 2 - by façade

Floor	T2-01-1	T2-01-2	T2-01-3	T2-02-1	T2-02-2	T2-02-3	T2-03-1	T2-03-2	T2-04-1	T2-04-2	T2-05-1	T2-05-2	T2-06-1	T2-06-2	T2-07-1	T2-07-2	T2-08-1	T2-08-2	T2-09-1	T2-09-2	T2-10-1	T2-10-2	T2-11-1	T2-11-2	T2-12-1	T2-12-2
6/F	65	67	65	60	58	58	57	55	55	54	54	53	52	52	52	51	51	55	57	67	70	67	70	69	67	
7/F	66	68	68	63	60	60	59	58	57	57	56	56	56	55	55	55	59	60	67	70	67	70	69	67		
8/F	66	68	69	63	60	60	60	59	58	58	58	57	57	57	57	56	56	61	67	70	67	70	69	67		
9/F	66	68	69	63	61	61	60	59	59	59	58	58	58	57	57	57	57	61	67	70	67	69	68	67		
10/F	66	68	68	63	61	61	60	59	59	59	58	58	58	58	57	57	57	61	66	70	67	69	68	67		
11/F	66	68	68	63	61	61	60	59	59	59	58	58	58	58	57	57	57	61	66	69	66	69	68	67		
12/F	66	68	68	63	61	61	61	59	59	59	58	58	58	58	57	57	57	61	66	69	66	69	68	67		
13/F	66	68	68	63	61	61	61	60	59	59	58	58	58	58	57	57	57	61	66	69	66	69	67	67		
14/F	66	68	68	63	61	61	61	60	59	59	58	58	58	58	57	57	57	61	66	69	66	68	67	67		
15/F	66	68	68	63	61	61	61	60	59	59	58	58	58	58	57	57	57	61	66	69	66	68	67	67		
16/F	66	67	68	63	61	61	61	60	59	59	58	58	58	58	57	57	57	61	65	69	66	68	67	67		
17/F	65	67	68	63	61	61	61	60	59	59	59	58	58	58	57	57	57	60	66	68	65	68	67	67		
18/F	65	67	68	63	61	61	61	60	59	59	59	58	58	58	57	57	57	60	65	68	65	68	66	66		
19/F	65	67	68	63	61	61	61	60	59	59	59	58	58	58	57	57	57	60	65	68	65	68	66	66		
20/F	65	67	68	63	61	61	61	60	59	59	59	58	58	58	57	57	57	60	65	68	65	68	66	66		
21/F	65	67	68	63	61	61	61	60	59	59	59	58	58	58	57	57	57	60	65	68	65	67	66	66		
22/F	65	67	68	62	61	61	61	60	59	59	59	58	58	58	57	57	57	60	65	68	65	67	66	66		
23/F	65	67	67	62	61	61	61	60	59	59	58	58	58	58	57	57	57	60	65	68	65	67	66	66		
24/F	65	66	67	62	61	61	60	60	59	59	58	58	58	58	57	57	57	60	65	68	65	67	66	66		
25/F	65	66	67	62	61	60	60	59	59	58	58	58	57	57	57	57	57	60	65	68	65	67	65	66		
26/F	65	66	67	62	61	60	60	59	58	58	58	58	57	57	57	57	57	60	65	68	65	67	65	66		
27/F	65	66	67	62	60	60	60	59	58	58	58	57	57	57	57	57	57	60	65	68	65	67	65	66		
28/F	64	66	67	62	60	60	60	59	58	58	58	57	57	57	57	57	57	60	65	68	65	67	65	66		
min	64	66	65	60	58	58	57	55	55	54	54	53	52	52	52	51	51	55	57	65	68	65	67	65	59	
max	66	68	69	63	61	61	61	60	59	59	59	58	58	58	58	57	57	61	63	67	70	67	70	69	62	

Predicted Traffic Noise Level, dB(A) - (c) Mitigated Scenario: With Acoustic Fins & Acoustic Balcony/Windows

Tower 1 - by flat

Floor	Predicted Noise Level, dB(A)																		
	T1-01	T1-02	T1-03	T1-04	T1-05	T1-06	T1-07	T1-08	T1-09	T1-10	T1-11	T1-12	T1-13	T1-14	T1-15	T1-16	T1-17	T1-18	T1-19
6/F	66	70	68	65	67	60	62	54	54	54	56	57	61	60	68	68	68	66	67
7/F	67	73	73	68	70	62	65	55	56	57	58	58	62	62	70	70	70	69	70
8/F	67	74	73	69	70	64	66	57	57	58	58	59	62	62	70	70	70	69	70
9/F	67	74	74	70	71	65	67	58	58	58	59	59	62	62	70	70	70	69	69
10/F	67	74	73	70	71	66	68	59	58	59	59	59	61	62	70	70	70	69	69
11/F	67	74	72	70	71	67	68	60	59	59	59	59	61	62	70	70	70	69	69
12/F	67	74	72	70	71	67	69	61	59	59	59	59	61	61	70	70	70	68	69
13/F	67	74	72	70	71	67	69	61	59	59	59	59	61	61	70	69	70	68	69
14/F	67	74	72	70	71	68	69	61	59	59	59	59	62	61	70	69	70	68	69
15/F	67	74	72	70	71	68	69	62	59	59	59	58	62	61	70	69	70	68	69
16/F	67	73	72	70	71	68	69	62	59	59	59	58	62	61	70	69	70	68	69
17/F	67	73	72	70	71	68	69	62	59	59	59	58	62	61	70	69	69	68	68
18/F	67	73	72	70	71	68	69	62	59	59	59	58	62	61	70	69	69	68	68
19/F	67	73	72	70	71	68	70	62	59	59	58	58	62	61	70	69	69	68	68
20/F	67	73	72	70	71	68	70	62	59	58	58	58	62	61	69	69	69	67	68
21/F	67	73	72	70	71	68	70	62	59	58	58	58	62	60	69	69	69	67	68
22/F	67	73	72	70	71	68	70	62	59	58	58	58	62	60	69	69	69	67	68
23/F	67	73	72	70	71	68	70	62	59	58	58	58	62	60	69	68	69	67	67
24/F	67	73	72	70	71	68	70	62	59	58	58	58	62	60	69	68	69	67	67
25/F	66	72	72	70	71	68	70	62	59	58	58	58	62	60	69	68	69	67	67
26/F	66	72	72	70	71	68	70	61	59	58	58	58	62	60	69	68	68	67	67
27/F	66	72	73	70	71	68	69	61	59	58	58	58	62	60	69	68	68	67	67
28/F	66	72	72	70	71	68	69	61	59	58	58	58	62	60	69	68	68	66	67
29/F	66	73	72	70	72	68	69	61	59	58	58	58	62	60	69	68	68	66	67
30/F	66	72	72	70	72	68	69	61	59	58	58	58	62	60	68	68	68	66	67
31/F	66	71	72	69	70	68	69	61	59	58	58	58	62	60	68	68	68	66	67
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34/F	67	71	73	69	70	68	69	61	59	58	58	58	62	60	68	68	68	66	67
35/F	67	71	73	69	70	68	69	61	59	58	58	58	62	61	68	68	68	66	67
36/F	67	71	73	69	70	68	69	61	59	58	58	58	62	61	69	68	68	66	67
37/F	67	71	73	69	70	68	69	61	59	58	58	58	62	62	69	68	68	66	67
38/F	67	71	73	69	70	68	69	61	59	59	58	58	62	63	69	68	68	67	67
39/F	67	71	73	69	70	68	69	61	59	59	58	58	62	63	69	68	68	67	67
min	66	71	68	65	67	60	62	54	54	54	56	57	61	60	68	68	68	66	67
max	67	74	73	70	71	68	70	62	59	59	59	59	62	63	70	70	70	69	70

Tower 2 - by flat

Floor	Predicted Noise Level, dB(A)											
	T2-01	T2-02	T2-03	T2-04	T2-05	T2-06	T2-07	T2-08	T2-09	T2-10	T2-11	T2-12
6/F	67	62	58	55	54	53	52	52	57	70	70	69
7/F	68	62	60	58	57	56	56	55	60	70	70	69
8/F	69	63	60	59	58	57	57	56	62	70	70	69
9/F	69	63	61	59	59	58	57	57	62	70	69	68
10/F	68	63	61	59	59	58	58	57	61	70	69	68
11/F	68	63	61	59	59	58	58	57	61	69	69	68
12/F	68	63	61	59	58	58	58	57	61	69	69	68
13/F	68	63	61	60	59	58	58	57	61	69	69	67
14/F	68	63	61	60	59	58	58	57	62	69	68	67
15/F	68	63	61	60	59	58	58	57	62	69	68	67
16/F	68	63	61	60	59	58	58	57	62	69	68	67
17/F	68	63	61	60	59	58	58	57	62	69	68	67
18/F	68	63	61	60	59	58	58	57	62	68	68	67
19/F	68	63	61	60	59	58	58	57	62	68	68	66
20/F	68	63	61	60	59	58	58	57	62	68	68	66
21/F	68	63	61	59	59	58	58	57	62	68	67	66
22/F	68	62	61	59	59	58	58	57	62	68	67	66
23/F	67	62	61	59	59	58	58	57	62	68	67	66
24/F	67	62	60	59	59	58	58	57	62	68	67	66
25/F	67	62	60	59	58	58	58	57	62	68	67	65
26/F	67	62	60	59	58	58	57	57	61	68	67	65
27/F	67	62	60	59	58	57	57	57	61	68	67	65
28/F	67	62	60	59	58	57	57	57	61	68	67	65
min	67	60	58	55	54	53	52	51	57	68	67	65
max	69	63	61	60	59	58	58	57	63	70	70	69

APPENDIX 7-1

Reply letters from EPD and FSD for Land Contamination Enquires

TOTAL P.01

本署檔號 Our Ref: ( ) in EP650/P7/1 Pt. 4
來函檔號 Your Ref: CCL/IA19021/KCAA101/ks200713b
電話 Tel. No.: 2117 7527
圖文傳真 Fax No.: 2756 8586
電子郵件 E-Mail: vivianatstong@epd.gov.hk
網址 Homepage: http://www.epd.gov.hk/

Environmental Protection Department
Environmental Compliance Division
Regional Office (East)
5th Floor, Nan Fung Commercial Centre,
19 Lam Lok Street, Kowloon Bay,
Kowloon, Hong Kong.

環境保護署
環保法規管理科
區域辦事處(東)
香港九龍九龍灣臨樂街
十九號南豐商業中心五樓

By Post and Fax (3107 1388)

6 August 2020

Cinotech Consultants Limited
Room 1710, 17/F., Technology Park
18 On Lai Street, Shatin, Hong Kong
(Attn: Mr. KS LEE, Project Manager)

Dear Mr. LEE,

Environmental Assessment for
Proposed Urban Renewal Authority Development Scheme at Kowloon City
Enquiry on Record of Land Contamination

I refer to your letter dated 13 July 2020 regarding the subject.

Under the Waste Disposal (Chemical Waste)(General) Regulation, the Director of Environmental Protection has maintained a register containing the name of producers of chemical waste, the location of the premises where the chemical waste is produced, and the description of the businesses or activities concerned. The register is open for inspection by public at the Territorial Control Office of this Department on 25/F., Southorn Centre, 130 Hennessey Road, Wan Chai, Hong Kong. Please contact Mr. Dennis LEUNG at 2835 1017 for making an appointment to view the records.

Please note that this office has no record of reported accidents of chemical spillage or leakage within the Site as indicated in your attached location plan in the past 5 years. As this information is not exhaustive, you may need to seek further advice from other relevant departments (including Fire Services Department) or parties and previous users of the buildings on such issue.

Yours faithfully,

(Viviana TONG)
Regional Office (East)
for Director of Environmental Protection

回收紙
RECYCLED PAPER

06-AUG-2020 12:30 E P D ROE +852 2756 6277 P.01

消防處
香港九龍尖沙咀東部麼地道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. : (44) in FSD GR 6-5/4 R Pt. 28
來函檔號 YOUR REF. : CCL/1A19021/KCAA101/ks200713a
電子郵件 E-mail : hkfsdenq@hkfsd.gov.hk
圖文傳真 FAX NO. : 2739 5879
電 話 TEL NO. : 2733 7741

20 August 2020

CINOTECH Consultants Limited
Room 1710, 17/F, Technology Park,
18 On Lai Street, Shatin, N.T.
(Attn: KS LEE, Project Manager)

By fax (3107 1388) only

Dear Mr. LEE,

Environmental Assessment for
Proposed Urban Renewal Authority Development Scheme at Kowloon City
Request for Information of Dangerous Goods & Incident Records

I refer to your letter of 13.7.2020 regarding the captioned request and reply below in response to your questions.

1. No Dangerous Goods Licence was issued in respect of the captioned address.

2. A total of one incident record was found at the subject location. Please refer to Appendix A for details.

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

Yours sincerely,

(KONG Wai-chung)
for Director of Fire Services

Appendix A

Environmental Assessment for
Proposed Urban Renewal Authority Development Scheme at Kowloon City
Request for Information of Dangerous Goods & Incident Records

No.	Date	Type of Incident	Address
1.	12.10.2017	No.1 Fire Alarm	G/F, No. 33 Kai Ming Street

APPENDIX 7-2

Site Survey Photo Record

There are many car workshops in To Kwa Wan area, those workshops are identified as having potential for causing land contamination under EPD's Guidance Note for Contamination Land Assessment and Remediation. However, as land contamination is localized, contamination issues affected by these areas to the Scheme is unknown.

It is recommended to carry out a site assessment to determinate whether the site is contaminated and assess the extent of any contamination, and implement proper remedial measures to restore the land to an acceptable condition for its intended purpose, if necessary.



Car Workshop in Wing Kwong St.



Car Workshop in Kai Ming St.



Car Workshop in Hung Fook St.

Appendix 6

Air Ventilation Assessment (AVA) Report

Urban Renewal Authority
To Kwa Wan Road / Wing Kwong Street Development Scheme
(KC-016)

Air Ventilation Assessment
(v2.0)

March 2021

Approved By _____
(Project Manager: KS Lee)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

CINOTECH accepts no responsibility for changes made to this report by third parties.

CINOTECH CONSULTANTS LIMITED
Room 1710, Technology Park
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Email: info@cinotech.com.hk

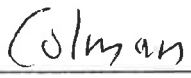
Prepared by	Colman Wong		2 March 2021
Checked by	Karina Chan		2 March 2021

TABLE OF CONTENTS

1 INTRODUCTION 1

1.1 PROJECT BACKGROUND 1
1.2 THE PROPOSED SCHEME (140MPD SCHEME) 1
1.3 THE BASELINE SCHEME (100MPD SCHEME) 3
1.4 DESIGN CONSIDERATION OF THE PROPOSED SCHEME 3
1.5 THE SURROUNDING ENVIRONMENT 4
1.6 OBJECTIVE 5

2 THE WIND ENVIRONMENT 6

2.1 INTRODUCTION 6
2.2 SELECTION OF WIND DATA SOURCE 6
2.3 ADOPTED WIND CONDITIONS 7

3 ASSESSMENT METHODOLOGY 11

3.1 ASSESSMENT TOOL 11
3.2 ASSESSMENT AREA AND SURROUND AREA 11
3.3 TEST POINTS 11
3.4 ASSESSED PARAMETERS 12
3.5 STUDIED SCENARIOS 13
3.6 COMPUTATIONAL DOMAIN AND BOUNDARY CONDITION 13
3.7 MODEL SETTING 14
3.8 LIST OF MODELS 15

4 ASSESSMENT RESULTS 17

4.1 MODEL RESULTS 17
4.2 DIRECTIONAL ANALYSIS 20
4.3 WIND AMPLIFICATION 24

5 CONCLUSIONS 25

LIST OF TABLES

Table 2-1 Occurrence Probability for Each Wind Directions and The Average Wind Speed at 500m Elevation (Annual) 9
Table 2-2 Occurrence Probability for Each Wind Directions and The Average Wind Speed at 500m Elevation (Summer) 9
Table 2-3 Vertical Wind Profiles for different Wind Directions 10
Table 3-1 Summary of Modeling Settings 15
Table 3-2 List of Wind Conditions Included in the AVA Study 16
Table 4-1 Summary of Spatial Averaged Velocity Ratios for the Subject Site 19

LIST OF FIGURES

Figure 1-1 Location Plan of the Scheme
Figure 1-2 Notional Block Plan of the Proposed Scheme
Figure 1-3 Notional Section Plan of the Proposed Scheme
Figure 1-4 OZP Capture from Approved Hung Hom Outline Zoning Plan No. S/K9/26
Figure 1-5 Notional Block Plan of the Baseline Scheme
Figure 1-6a Comparison of the Schemes
Figure 1-6b Comparison of the Schemes (Section)
Figure 1-7 URA's Project in the Vicinity
Figure 1-8 Future Road Network in the Neighborhood without the Scheme
Figure 1-9 Future Road Network in the Neighborhood with the Scheme
Figure 2-1a The Wind Roses at grid [083,041] from RAMS
Figure 2-1b The Wind Profile at grid [083,041] from RAMS
Figure 3-1 Assessment Area and Surrounding Area
Figure 3-2a Perimeter Test Points
Figure 3-2b Overall Test Points
Figure 3-3a Special Test Points (Baseline Scheme)
Figure 3-3b Special Test Points (Proposed Scheme)
Figure 3-4 Zoning of Assessment Areas
Figure 3-5 Buildings Included in the CFD Models
Figure 3-6a 3D Model of the Baseline Building (Superstructure) adopted in CFD
Figure 3-6b 3D Model of the Proposed Building (Superstructure) adopted in CFD
Figure 3-7 Comparison between Baseline and Proposed Model
Figure 3-8 Computational Domain
Figure 3-9 Meshes on 2D Surfaces
Figure 3-10 Meshes in 3D Space
Figure 4-1a-m Contours of Wind Velocity Ratio at 2mAG

Figure 4-2a-m Vector of Wind Velocity Ratio at 2mAG
Figure 4-3 Concerned Wind Paths of the Proposed Scheme
Figure 4-4 Flow Streamline near the Low Block under 90 deg wind

LIST OF APPENDICES

Appendix 2-1 Wind Data at grid [83,41] form RAMS
Appendix 3-1 Adopted Building Height in the Assessment
Appendix 4-1 Detailed Simulated Velocity Ratio

1 INTRODUCTION

1.1 Project Background

1.1.1 The Urban Renewal Authority (URA) has proposed To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) (the Scheme) under section 25 of the Urban Renewal Authority Ordinance (URAO). This Air Ventilation Assessment (AVA) is to support the submission of a draft Development Scheme Plan (DSP) with its planning proposal to the Town Planning Board (TPB) for consideration.

1.1.2 The Scheme is broadly bounded by To Kwa Wan Road, Ma Tau Wai Road, Wing Kwong Street, Kai Ming Street, Hung Fook Street and Ngan Hon Street. The area of the draft Development Scheme Plan (DSP) is currently zoned as "Residential (Group A)" (R(A)) with building height restriction of 100 mPD, and the road sections and pavement within the Scheme are shown as "Road" in the Approved Hung Hom Outline Zoning Plan (OZP) No. S/K9/26. The Gross site area of the Scheme is about 6,592sq.m.. The location of the Scheme is shown in **Figure 1-1**.

1.1.3 The Scheme is proposed to rezone the area of the draft DSP into "R(A)", with a maximum building height of 140mPD. The Scheme involves the closure of three existing road sections within the Scheme, i.e. the whole of Yuk Shing Street, part of Hung Fook Street and part of Kai Ming Street, for redevelopment.

1.1.4 Given the Scheme proposes a relaxation of maximum building height from the OZP and closure of some existing road sections for redevelopment, Cinotech Consultants Limited was commissioned by URA to carry out an Air Ventilation Assessment (AVA) to assess and envisage any potential/adverse air ventilation impact on the implementation of the Proposed Scheme as compared to the OZP-compliance notional redevelopment (i.e. 100mPD) and to recommend mitigation measures when necessary.

1.1.5 This AVA study was conducted in accordance with the recommendations of "*Feasibility Study for Establishment of Air Ventilation Assessment System – Final Report*" by Planning Department in 2005, and "*Technical Circular No. 1/06 on Air Ventilation Assessments*" by HPLB & ETWB in 2006 (Technical Circular).

1.2 The Proposed Scheme (140mPD Scheme)

1.2.1 The Proposed Scheme involves demolition of existing 8-15 storeys buildings along Ma Tau Wai Road (No. 111-127D odd numbers) and To Kwa Wan Road (No. 1-15 & 17-31 odd numbers), Yuk Shing Street (No. 1-7 odd numbers and No. 2-12 even

numbers), Hung Fook Street (2 – 6 & 10 – 14 even numbers) and Kai Ming Street (1 – 5 & 11 – 19 odd numbers).

1.2.2 The notional layout plan of the proposed development is shown in **Figures 1-2 & 1-3**. The notional design of the Proposed Scheme is subject to change in the detailed design stage upon CE in C's approval of the draft DSP. Under current notional design of the Proposed Scheme, the Scheme proposes to develop two residential towers (Tower T1 & T2) on top of 5-storey podia which would incorporate GIC/commercial/retail, private clubhouse facilities and podium garden, a basement carpark and a 4-storey low block (the Low Block) with retail/commercial uses with an all-weathered communal space underneath. The proposed building height of the Scheme is 140mPD. Yuk Shing Street and portions of Kai Ming Street and Hung Fook Street are proposed to be closed for redevelopment and creation of pedestrian walkways.

1.2.3 A maximum building height of 140mPD is proposed for the Scheme. To maintain the east-west direction wind breezeway along Hung Fook Street and Kai Mig Street, the current notional design adopts a full height setback of 45m of the residential portion of the residential tower from the northern boundary of the Scheme boundary at Ngan Hon Street. Despite of the proposed maximum building height of 140mPD of the Scheme, the current notional design adopted a staggered height profile for the 2 residential tower blocks, with 140mPD for T1 on the northern part of the site along To Kwa Wan Road, and cascades down to about 106mPD for T2 on the southern side of the site. The staggered height design also aims to contribute to the wind environment and breezeway on the southern part of the site. A low-rise commercial/ retail block (the Low Block) is proposed at the eastern part of the Scheme to enhance the air flow and visual permeability of the inner part of the streets in the area. Besides, at the podia of the proposed development, urban window/intervening space concept is designed at the podia of T1 and T2, which will create a continuation of east-west breezeway along Hung Fook Street and Kai Ming Street respectively. An AVA study is conducted to assess any positive / negative air ventilation impact is induced by the proposed layout and design features in the Proposed Scheme on the pedestrian wind environment as compared to the maximum building height permissible in the current OZP.

1.2.4 More specifically, the Hung Fook Street section will be turned into pedestrian walkway and decked by the podium structure of Tower T1 with opening of ~15m above ground (22.4 mPD), instead of completely blocked, to optimise the natural ventilation under the east-west wind condition. The Kai Ming Street section will not be decked, instead, there is a linked bridge connecting the podium structures of T1 & T2, at height of ~20m above ground (26.9 mPD), which is not expected to significantly affect the ventilation. Yuk Shing Street will be closed for redevelopment and creation of pedestrian walkway and all-weathered communal space, with a linked

bridge built over to connect from the podium of Tower T1 to the Low Block on the east of the site. It is anticipated that the existing Yuk Shing Street, which will turn into redevelopment and/or pedestrian walkway linking up with the all-weathered communal space and the covered landscape area, will maintain a wind pathway for north-south ventilation at pedestrian level, similar to the effect of the existing Yuk Shing Street.

1.2.5 The proposed all-weathered communal space and covered landscape area in the Scheme will be connected to the urban square and pedestrian walkways planned at the URA's redevelopment projects in the vicinity. The combined effect of the all-weathered communal space, covered landscape area, as well as the urban square and pedestrian walkway in the neighbourhood is anticipated to create a wider benefit on the overall air ventilation performance of its surrounding open area on street level, where people will likely be gathered in future.

1.3 The Baseline Scheme (100mPD Scheme)

1.3.1 A Baseline Scheme fulfilling the maximum building height restriction (100mPD) of Approved Hung Hom OZP No. S/K9/26, has been used to represent the intended air ventilation performance as permitted in the current OZP. The zonings of OZP No. S/K9/26 are illustrated in **Figure 1-4** for reference.

1.3.2 In the Baseline Scheme, four residential towers are set in the four land parcels/sites within the scheme area to reflect the possible redevelopment by market practice, which is shown in **Figure 1-5**. No development is built on area shown as "Road" in the OZP.

1.3.3 Comparison of the two schemes is illustrated in **Figures 1-6a & 1-6b**.

1.4 Design Consideration of the Proposed Scheme

1.4.1 The major difference in the Proposed Scheme as compared with the Baseline Scheme are summarised as follows:

- Reduction of number of towers (from 4 to 2 and a Low-block);
- Building setback at the northern boundary from Ngan Hon Street;
- Staggered height design for 2 towers and a Low-block;
- Provision of a low-rise block of about 4 storeys (Low-block) in the inner part of the site;
- Provision of all-weathered communal area (open/semi-opened area without side walls) on G/F of the Low Block.
- Two urban windows / intervening spaces design at the podia;

- A deck structure over the closed Hung Fook Street Section;
- A link bridge over the closed Kai Mai Street Section;
- Turning Yuk Shing Street into redevelopment for pedestrian walkway and all-weathered communal space;

1.4.2 In the Baseline Scheme, all three road sections, mentioned above, are simulated in the model according to the existing situation, and hence the ventilation performance of the Baseline Scheme is considered appropriate to serve as a baseline for comparison with the Proposed Scheme.

1.4.3 The key design consideration of the Scheme is to not obstructing the wind going through the closed Hung Fook Street and Kai Mai Street sections under easterly wind condition, which is the most common wind direction in Hong Kong. Although the Yuk Shing Street is not considered as an effective wind-path, the ventilation provided by Yuk Shing Street is valuable in summer when south-western wind is dominance.

1.4.4 According to the difference between the Proposed and Baseline Schemes, it is expected that the flow penetration of the closed Hung Fook Street and Yuk Shing Street will likely be slightly affected as one street will be decked and another street will become narrower. On the other hand, the closed Kai Mai Street Section should not be affected much as only a small link bridge will be provided.

1.4.5 In order to counter the negative effects and improve the flow penetration of the Proposed Scheme, the following design features have been adopted in the notional design of the Proposed Scheme:

- Widening the opening of the closed Hung Fook Street Section from ~15m to ~24m;
- Providing an opening of ~15m height to the decked Hung Fook Street Section; and
- Providing an open area (all-weathered communal space) on the G/F of the Low Block.

1.5 The Surrounding Environment

1.5.1 The Scheme is located in a developed urban area, with a mix of old tenement buildings, newer high-rise residential buildings, and industrial buildings, whereas most of the existing buildings within and/or close to the Scheme are the relatively low 6-8 storeys tenement buildings. To the West of the Scheme is the elevated East Kowloon Corridor.

1.5.2 With a district-based approach, URA already commenced 7 redevelopment projects in this area, with an aim to enhance walkability and connectivity through restructuring

and replanning of the land uses through redevelopment opportunities. The projects include KC-009, KC-010, KC-011& DL-8:KC, KC-012 & KC-013, and KC-014 (**Figure 1-7**). Existing buildings of these projects, will be demolished and redeveloped for high-rise residential buildings. Redevelopment will be undertaken in the 7 projects with residential developments on top of commercial/retail podium as permitted under the "R(A)" zoning of the current OZP. Completion years of these projects are anticipated to be around 2025 to 2027. Some of the existing traffic roads and pedestrian networks are proposed to be revised to enhance the walkability in the area. The proposed road scheme was approved and gazetted under Cap 370 Roads (Works, Use and Compensation) Ordinance on 11 September 2020, the planned future road network after the completion of the 7 redevelopment projects without the Scheme is shown in **Figure 1-8**. With the Scheme, the planned future road network in the vicinity will be more pedestrian friendly as shown in **Figure 1-9**.

1.5.3 Assessments in this report have considered the latest information available for the abovementioned 7 redevelopment projects. The height of the buildings in the surroundings has been estimated and presented in **Appendix 3-1** for reference.

1.6 Objective

1.6.1 The objective of this AVA study is to demonstrate that the air ventilation impact on the surrounding area at the pedestrian level of the Proposed Scheme will not worsen, if not better, than the Baseline Scheme, which has adopted the requirement as listed in the *Approved Hung Hom OZP No. S/K9/26*, by qualitatively comparing the two schemes. This comparison is conducted using the Velocity Ratio (VR) computed by Computational Fluid Dynamics (CFD) models for the two schemes.

1.6.2 It should be noted that the Proposed Scheme is a notional design and subject to change at detailed design stage. The results and conclusion in this report is used to compare the air ventilation performance between a typical design under the planning permission of the current OZP and the proposed design under the proposed planning parameters of the Scheme.

2 THE WIND ENVIRONMENT

2.1 Introduction

2.1.1 The selection and evaluation of the wind availability data for the upstream wind conditions are described in this section. The following sources of wind data have been reviewed for this AVA study as follows:

- Measurement from Hong Kong Observatory (HKO) weather station.
- Measurement from Wind Tunnel Test in Experimental Site Wind Availability Study[1].
- Simulated results from Meso-Scale Model Regional Atmospheric System (RAMS)[2] in Planning Department website.

2.2 Selection of Wind Data Source

2.2.1 Simulated result of RAMS from Planning Department website is adopted in this AVA study. The reason for the selection of this wind data source is explained in the following paragraphs.

2.2.2 HKO weather stations provided reliable wind data in Hong Kong. The closest HKO weather station to the Site is King's Park Automatic Weather Station which is located approximately 1.5k m away from the Site. The next closest HKO weather station is in Kowloon City which is more than 2 km away. Since the measurement location of HKO weather station is often at low height or a few meters above roof top, the wind at the weather station is inevitably affected by nearby developments or topography. Its data should be applied with caution specifically when the station is not very close to the Site.

2.2.3 The measurement level of the wind data from the King's Park Automatic Weather Station is 65 mPD which is 75 m lower than the Tower T1 of the Proposed Scheme and considering that the weather station is located within urban area, it should only be adopted when no other alternatives are preferred. However, the Waglan Island Automatic Weather Station is located in an undisturbed area and its measured wind data can describe the overall wind condition for Hong Kong well. Therefore, the wind data from Waglan Island Automatic Weather Station is often adopted in AVA study.

2.2.4 A series of experimental site wind availability studies for various regions in Hong Kong using wind tunnel experiment have been conducted and some of the reports are available to public. The closest location can be found in "*Experimental Site Wind*

[1] https://www.pland.gov.hk/pland_en/info_serv/site_wind/index.html
[2] https://www.pland.gov.hk/pland_en/info_serv/site_wind/site_wind/index.html

Availability Study for Tsim Sha Tsui, Hong Kong - Investigation Report WWTF003-2007". As the site of this development is approximately 1 km away from its study area. The wind data from WWTF003-2007 should only be adopted when no other alternatives are available.

2.2.5 In order to provide a comprehensive set of standardized and reasonably representative site wind availability data for both qualitative and quantitative AVA, a consultancy study was commissioned by the Planning Department. The study adopted meso-scale model RAMS to simulated 10-year wind climate at horizontal resolution of 0.5km x 0.5km, covering the whole Hong Kong. Three levels of nested domains with realistic boundary conditions were adopted to provide reasonable approaching wind condition to the finest level of nesting. To refine the model results, the wind data from various wind stations have been used in RAMS.

2.2.6 When comparing the RAMS to the wind tunnel experiments in the experimental site wind availability studies, the RAMS have the following advantage:

- RAMS covers a much larger upwind area, with terrain height and land surface type, compare to those wind tunnel experiments;
- RAMS considers the atmospheric stability where those wind tunnel experiments do not consider thermal effect;
- RAMS provides wind data for every single grid at various elevation, unlike those wind tunnel experiments that can only provide data at predetermined locations, and HKO's measurements that only provide surface data.

2.2.7 Considering that the grid from RAMS can cover the Site and the advantages of the RAMS over those wind tunnel experiments, the data of grid [83,41] from RAMS is best suited for this AVA study.

2.3 Adopted Wind Conditions

2.3.1 The wind speed and the vertical wind profiles of grid [83,41] from RAMS[3] have been adopted in order to provide a realistic flow condition.

2.3.2 The wind velocity and wind direction at 500m elevation have been adopted in the analysis of general wind condition of the site, while the vertical wind profiles are adopted as the inlet conditions of the numerical analysis.

2.3.3 It should be noted that the wind profiles from RAMS are grouped into four range of wind directions, therefore, all wind directions within the same 90-degree segment share the same profiles (with different free stream flow velocities). The boundary

[3] https://www.pland.gov.hk/pland_en/info_serv/site_wind/site_wind/index.html

layer height is assumed to be 500m, thus the flow velocity at 500m is the free stream flow velocity and the flow above 500m is uniform.

2.3.4 The wind rose at 500m elevation of grid [83,41] and the wind profile from RAMS are illustrated in **Figures 2-1a and 2-1b**. The top 80% of wind directions, which has been assessed in this study, are presented in the **Table 2-1 & Table 2-2**. Detailed occurrence probability for each wind direction and wind speed at 500m elevation are listed in **Appendix 2-1**. The adopted wind profile from 10-500m were extracted from the wind profile curve provided by PlanD (**Figure 2-1b**). The wind profiles for different wind direction, in term of ratio to the free stream flow velocity at different heights, are summarised in **Table 2-3**.

2.3.5 Under annual condition, the major wind direction is East. For around 60% of the time, the wind comes from NE, ENE, E, ESE, or SE. Around 17% of the wind comes from S, SSW, or SW. The occurrence chance for the rest of wind directions are all below 5% each.

2.3.6 Under summer condition, the major wind direction shifted to South-Western. For around 47% of the time, the wind comes from S, SSW, SW, or WSW. Around 34% of the wind comes from E, ESE, SE, or SSE. The occurrence chance for the rest of wind directions are all below 6% each.

2.3.7 Generally, the major wind direction of concern is the east direction for the whole year and the south-western direction for summer. A good designer should have considered those two major wind directions to reduce the impact of air ventilation to the surrounding area.

Table 2-1 Occurrence Probability for Each Wind Directions and The Average Wind Speed at 500m Elevation (Annual)

Wind Direction	Wind Direction (degree)	Occurrence Probability at 500m elevation	Speed (m/s) rounded to integer
E	90	22.2%	7
ENE	67.5	13.5%	7
ESE	112.5	11.6%	7
NE	45	7.4%	6
NNE	22.5	6.4%	6
SW	225	6.2%	6
SSW	202.5	6.0%	6
SE	135	5.6%	6
S	180	4.4%	5
Sum	--	**83.3%**	--

Table 2-2 Occurrence Probability for Each Wind Directions and The Average Wind Speed at 500m Elevation (Summer)

Wind Direction	Wind Direction (degree)	Occurrence Probability at 500m elevation	Speed (m/s) rounded to integer
SW	225	14.9%	6
SSW	202.5	13.5%	7
WSW	247.5	9.7%	6
ESE	112.5	9.6%	7
E	90	9.3%	7
S	180	9.3%	6
SE	135	8.0%	6
SSE	157.5	7.3%	5
Sum	--	**81.6%**	--

Table 2-3 Vertical Wind Profiles for different Wind Directions

Heights (m)	Wind speed (Ratio to the freestream flow velocity) for different Wind directions (degree from North)			
	22.5- 112.5°	112.5-202.4°	202.5-292.4°	292.5-22.4°
10	0.48	0.36	0.46	0.41
50	0.51	0.40	0.51	0.46
100	0.54	0.43	0.54	0.48
150	0.56	0.45	0.56	0.50
200	0.60	0.48	0.58	0.54
250	0.68	0.58	0.65	0.65
300	0.76	0.67	0.73	0.73
350	0.83	0.76	0.81	0.81
400	0.90	0.83	0.87	0.89
450	0.97	0.92	0.94	0.98
500 and above	1.00	1.00	1.00	1.00

3 ASSESSMENT METHODOLOGY

3.1 Assessment Tool

3.1.1 The microclimate around the Site for the two Schemes have been assessed by Computational Fluid Dynamics (CFD). Open source CFD code, OpenFOAM 2.4.0, has been utilized for calculating the local wind speed. GroovyBC has been used for applying the inlet boundary condition. The model solves the algebraic equations by applying the conservation laws of physics to finite volumes of space and time. Realisable k-epsilon with wall model is adopted to handle the flow turbulence.

3.2 Assessment Area and Surround Area

3.2.1 According to the Technical Circular, the Assessment Area of the Scheme should include the Scheme's surrounding up to a perpendicular distance H from the Scheme boundary, H being the height of the tallest building on site. Surrounding Area of up to a perpendicular distance of 2H from the DSP boundary must be included. Since no building is higher than the proposed Tower T1 (140 mPD) within 140m from the Scheme boundary, a conservative area of 150m and 300m from the Scheme boundary are adopted as the Assessment Area and Surrounding Area, respectively. The Assessment Area and Surrounding Area are illustrated in **Figure 3-1**.

3.3 Test Points

3.3.1 43 perimeter test points (P01-P43) have been used to examine the air ventilation around the Site. The perimeter test points are evenly spread, with around 10m separation, on the nearby streets which covering the boundary of the Site. Since the site is adjoining the planned structure of KC-010 & KC012/013, no perimeter test point has been provided within the site of KC-010 & KC012/013. On the other hand, the western portion of another adjoining Site (KC-011 & DL-8:KC) is planned to be open area, perimeter test points are provided there. The locations of the perimeter test points are illustrated in **Figure 3-2a**.

3.3.2 146 overall test points (O01-O146) have been used to examine the air ventilation of the local area. Overall test points are evenly spread, with around 25m separation, on all roads within the Assessment Area, where there are frequent pedestrian access. Besides the roads, overall test points are also placed at road garden, sitting out area, as well as open area of existing/planned developments, with generally shorter separation due to the limited assessment area. The locations of the perimeter test points are illustrated in **Figure 3-2b**.

3.3.3 The special test points (D01-D21) are provided to examine the ventilation performance within the closed road sections of the Proposed Scheme, for demonstrating the flow penetration performance compare to the Baseline Scheme and to determine does the good design features work as intended. Only location that exist in both Baseline Scheme and Proposed Scheme have been chosen for a fair comparison. The locations of the special test points within the proposed development of the Scheme are illustrated in **Figure 3-3a & 3-3b**.

3.3.4 The vertical locations of all test points are 2mAG. The road sections and other concerned areas covered in the assessment are illustrated in **Figure 3-4**.

3.4 Assessed Parameters

3.4.1 According to the Technical Circular, Wind Velocity Ratio (VR) should be used as an indicator of wind performance for the AVA. It is defined as

$$\boldsymbol{VR = V_P/V_g}$$

Where V_g is the wind velocity at the top of boundary layer (at 500m in this AVA) and V_P is the wind velocity at pedestrian level (2m above ground or slab).

3.4.2 To quantitatively assess the air ventilation for the Site and in the surrounding area, two spatial averaged values, namely Site Air Ventilation Assessment (SVR) and Local Air Ventilation Assessment (LVR) will be used.

3.4.3 SVR is the average (weighted by the occurrence probability of the wind directions) of the VRs along the Site boundary (i.e. P01-P45), to quantify the air ventilation of the Site. LVR is the average of the VRs for the whole assessment area (average of all perimeter and overall test points), for quantify the air ventilation of the local region.

3.4.4 It should be noted that the VRs (also SVRs and LVRs) should only be compared between the Baseline Scheme and the Proposed Scheme of the study which have applied identical setting for each parameter, and should not be directly compared with on-site measurement and/or wind tunnel experiment.

3.4.5 Averaged VRs for smaller areas (e.g. a street section) will also be presented to examine the effect of the building design to air ventilation of individual regions within the Assessment Area.

3.5 Studied Scenarios

3.5.1 Two scenarios were considered in this study. The first scenario is based on the design of the Baseline Scheme. The other scenario is based on the Proposed Scheme. The results of the scenarios will be compared to draw the conclusion.

3.5.2 In both scenarios, all buildings in the surrounding area are included. As the North-East of the surrounding area has a rather open area (Hoi Sham Park), which would allow the adopted wind profiles, as stated in **Section 2.3**, to enter the pedestrian level of assessment area directly, resulting in an unexpectedly high VR at the NE boundary wind condition during the simulation. Therefore, Oblate Primary School in the North-East outsides of the surrounding area is also included. The buildings (and flyovers) included in the CFD are illustrated in **Figure 3-5**. The adopted buildings' height of the models are illustrated in **Appendix 3-1**.

3.5.3 The main difference between the two scenarios is the design of the block layout of the development as shown in **Figures 1-6a & 1-6b**. The Baseline Scheme have 4 residential towers with individual podium structures. The road sections are maintained and no development is developed on top of the road sections; while the Proposed Scheme have 2 residential towers with connected podia and the road sections within the Proposed Scheme are closed for redevelopment and creation of pedestrian walkway. The simplified 3D model of the development adopted in both scenarios are illustrated in **Figures 3-6a & 3-6b** for Baseline Scheme and Proposed Scheme, respectively. A side-by-side comparison is also illustrated in **Figure 3-7**.

3.5.4 Both scenarios share the identical boundary conditions and other modelling parameters to have a fair comparison focused on the design between the Proposed Scheme and Baseline Scheme only. The details models' setting will be explained later.

3.6 Computational Domain and Boundary Condition

3.6.1 The global domain size is 3000m (length) x 3000m (width) x 1500m (height) centered at 837434.3308m (E), 819439.8960m (N). All the buildings within the surrounding area have been included in the model. The distance between the side boundaries of the domain and the buildings are more than 5 times the highest building adopted. The Blockage ratio is less than 3% for all wind directions. The domain boxes were built in the way that the prevailing wind is perpendicular to the flow inlet and outlet, while parallel to the side boundaries.

3.6.2 Velocity inlet has been applied on the flow inlet using data provided as stated in **Section 2.3**. Outflow condition (fixed value for pressure, zero gradient for other variables) has been applied on the flow outlet. Free slip condition has been applied on

the top boundary and two side boundaries. **Figure 3-8** shows the boundary conditions using the southerly wind direction (180°) as an example.

3.6.3 The computation domain has been discretized by triangle and tetrahedral meshes for 2D surfaces and 3D volumes, respectively. The triangle meshes on the surface of buildings and flyovers are mostly in the range of 1m – 10m. The tetrahedral meshes with size of 1m - 80m were used in the discretization of the computation domain. In order to resolve the near ground flow velocity, as the data sampling point is 2m above ground, 3 viscous layers with a total thickness of 1.2m were applied on the Ground. The different in size of neighborhood grids, also called grid expansion ratio, are in the range of 10%-30% for the whole domain. Generally, smaller grids were placed near the building surfaces and ground in order to resolve the near surface flow properly. The meshes adopted in the model are illustrated in **Figures 3-9 & 3-10**.

3.7 Model Setting

3.7.1 The Realisable k-epsilon model has been used in this study as it can provide better results than the standard k-epsilon model. Wall functions are applied on the solid boundaries, i.e. ground and building facades, to account for the turbulence, generated by flow over surfaces.

3.7.2 SIMPLE algorithm is adopted to handle the velocity-pressure coupling.

3.7.3 Convergence criterion is used to control when the iteration will stop. When the residual value reaches the target tolerance value, the iteration will stop and progress to the next step. For iterations of individual variable, a tolerance of 1e-7 was applied to the pressure equation; a tolerance of 1e-8 was applied to the momentum equation; and a tolerance of 1e-6 was applied to the turbulence related equations. For the velocity-pressure couple (SIMPLE algorithm), a tolerance of 1e-4 was used for the pressure and turbulence parameters, and a tolerance of 1e-5 was used for the flow velocities. By nature, the Realisable k-epsilon model is harder to converge compared to the Standard k-epsilon model. When the variables cannot achieve the target residual due to the nature of turbulence model, the model is assumed to be converged when the residual remains below < 5e-4 for a sufficiently long time (> 50% of the total running time). A summary of the model setting can be found in **Table 3-1**.

Table 3-1 Summary of Modeling Settings

Software	Pre-processing	Salome 9.2.2
	Processing	OpenFOAM 2.4.0 with GroovyBC
	Post-processing	OpenFOAM 2.4.0 (data extraction); ParaView (graphic)
Domain Size	3000m x 3000m x 1500m (Width x Length x Height)	
Boundary Conditions	Inlet	Flow inlet
	Outlet	Outflow Condition
	Top	Free Slip Condition
	Sides	Free Slip Condition
	Ground and Building Surfaces	No Slip Condition with Wall Function
Grid Expansion Ratio	<= 30%	
Blockage Ratio	< 3%	
Primary Variables	U	Flow Speed
	P	Pressure
	K	Turbulence Kinetic Energy
	Epsilon	Dissipation Rate of Turbulence Energy
Residual (Individual Variable)	U	1e-8
	P	1e-7
	K	1e-6
	Epsilon	1e-6
Residual (SIMPLE Algorithm)	U	1e-5 (or stay below 5e-4 for half of the iteration steps)
	P	1e-4 (or stay below 5e-4 for half of the iteration steps)
	K	1e-4 (or stay below 5e-4 for half of the iteration steps)
	Epsilon	1e-4 (or stay below 5e-4 for half of the iteration steps)

3.8 List of Models

3.8.1 The wind environment of the site has been discussed in **Section 2**. The top 80% wind directions for both annual and summer condition has been adopted in this study (**Table 2-1** & **Table 2-2**). The averaged wind speed at 500m has be adopted at the free stream flow velocity. As some wind directions and their corresponding wind speed in annual and summer are overlapped, only 13 wind conditions thus 26 models are required for two scenarios (**Table 3-2**).

Table 3-2 List of Wind Conditions Included in the AVA Study

Wind Direction		Averaged Wind Speed at 500m (m/s)	Occurrence Probability (Annual)	Occurrence Probability (Summer)
22.5	NNE	6	6.4%	
45	NE	6	7.4%	
67.5	ENE	7	13.5%	
90	E	7	22.2%	9.3%
112.5	ESE	7	11.6%	9.6%
135	SE	6	5.6%	8.0%
157.5	SSE	5		7.3%
180	S	5	4.4%	
180	S	6		9.3%
202.5	SSW	6	6.0%	
202.5	SSW	7		13.5%
225	SW	6	6.2%	14.9%
247.5	WSW	6		9.7%
Total			**83.3%**	**81.6%**

4 ASSESSMENT RESULTS

4.1 Model Results

4.1.1 Two (2) Scenarios (Baseline Scheme and Proposed Scheme) each with 13 wind configurations, as stated in **Table 3-2** have been conducted based on the methodology mentioned in **Section 3**. A summary of the predicted spatial averaged VRs of the test points are presented in **Table 4-1** including the average SVR for all perimeter test points (P Points) and the average LVR for all perimeter and overall test points (P & O Points). In order to examine the localised ventilation, the spatial averaged VRs have been broken into 22 zones for road sections and 11 zones for public areas (refer to **Figure 3-4** and **Table 4-1**. The detailed simulated VRs at individual test points are listed in **Appendix 4-1**. The bar charts for the comparison between the 2 scenarios are also illustrated in **Appendix 4-1**. The contours of VRs at 2m above ground are illustrated in **Figures 4-1a to 4-1m**; the vectors of VRs at 2m above ground are illustrated in **Figures 4-2a to 4-2m**.

Spatial and Wind Directions Averaged VRs

4.1.2 Generally, the SVR and LVR are higher in annual condition than that in the summer condition. The SVR for both the Baseline Scheme and Proposed Scheme are 0.13 for annual wind condition. During summer, the SVRs are 0.12 in both Schemes. The LVRs of both Baseline and Proposed Schemes are 0.15 for annual wind condition and 0.13 for summer condition.

4.1.3 Although the Proposed Scheme has larger podia and taller towers, the air ventilation performance could be benefited by reducing the total number of towers and increasing the openings on ground level (the decked Hung Fook Street section and the covered open area of Low Block). Assessment results in **Table 4-1** indicated that there is no different in overall SVR and LVR for both annual and summer conditions between the 2 schemes. Therefore, the baseline and proposed schemes have similar effect to the local wind environment in average.

4.1.4 For the 22 road sections zones, the averaged VRs for each sub-zone shows little variations between the Baseline Scheme and the Proposed Scheme. The change of averaged VRs is in the range of -0.01 to +0.02 for annual wind condition and -0.02 to +0.02 for summer condition. The results indicated that local wind condition would redistribute due to the Proposed Scheme but the air ventilation performance would not be degraded.

4.1.5 For the 11 open areas, larger variations have been identified. The changes of averaged VRs are in the range of -0.04 to +0.05 for annual wind condition and -0.02 to +0.01 for

summer condition. It is necessary to look into details in order to identify if there any improvement and/or degraded in ventilation performance.

The overall effectiveness of the good design features

4.1.6 The key concerned areas are the Closed Hung Fook Street Section (Z02), the Closed Kai Ming Street Section (Z03), and the Closed Yuk Shing Street (Z04). As their result can demonstrate the effectiveness of the good design features to enhance flow penetration in the Proposed Scheme as stated in **Section 1.4.5**.

4.1.7 For the Closed Hung Fook Street Section (Z02), the averaged VR is slightly increased (0.01) in annual wind condition and slightly reduced (-0.02) in summer condition.

4.1.8 For the Closed Kai Ming Street Section (Z03), the averaged VR is largely increased (0.05) in annual wind condition and slightly increased (0.01) in summer condition.

4.1.9 For the Closed Yuk Shing Street (Z04), the averaged VR is slightly increased (0.01) in both annual and summer conditions.

4.1.10 Under annual condition, all 3 zones have improved VR. Under summer condition, 2 out of 3 zone experience improved in VR. From VR alone, it seems the flow penetration and/or local ventilation at the Closed Hung Fook Street Section (Z02) under summer condition is reduced. However, it is not the case. As the width of the Closed Hung Fook Street Section (Z02) is largely increased (from 15m to 24-29m), the wind speed is expected to be reduced proportionally if the flow rate remains unchanged. Considering the reduction in VR is only from 0.14 to 0.12, the actual flow rate along there as well as the flow penetration and/or local ventilation should not be degraded. Moreover, the wind speed distribution is not regular within the area. Use 225 degree wind for example, which is one of the major prevailing wind direction in summer, a stream of higher speed wind is located at the northern portion of the road (Z02) where no assessment points can be provided because that location is within podium structure in Baseline Scheme (**Figures 3-3a, 3-3b & 4-1l**).

4.1.11 In short, the results of the Proposed Scheme are consistent with the objective of the good design features and the flow penetration and/or local ventilation is not degraded in general.

The other concerned areas

4.1.12 The other concerned areas include Road Garden (Z01), Sitting-out Area (Z05), and a number of open areas of other developments (Z06-Z11). In general, the changes in averaged VR of those locations are within +/-0.01. The only exception is the Open Area of KC-011 & DL-8:KC (Z09), which experience reduction of 0.04 under annual condition.

4.1.13 Comparing the 2 schemes, the massive podium structure under Tower T3 (~100 mPD) in Baseline Scheme is replaced by an open space at ground level (the all-weathered communal space) and a Low Block (~27 mPD) on top. Therefore, the wind, especially the east wind, could go freely and spread into a wider open area in the Proposed Scheme. Although the averaged VR is reduced in annual wind condition at Z09, the averaged VR in summer condition remain unchanged in comparison with the Baseline Scheme. Moreover, assessment results indicated that the VRs at the downstream area are improved (i.e. Kai Ming Street (R13 & Z03) under annual wind condition and, Open Area of KC-010 (Z08) under summer wind condition), as the upstream air can enter downstream area through the open area of the Low Block. Flow streamline around the Low Block under 90 deg wind has been illustrated in **Figure 4-4** for reference.

Table 4-1 Summary of Spatial Averaged Velocity Ratios for the Subject Site

Test Points for the Subject Site and Assessment Area		Baseline		Proposed	
		Annual	Summer	Annual	Summer
Overall					
Site Air Ventilation Assessment (SVR) (All P Points)		0.13	0.12	0.13	0.12
Local Air Ventilation Assessment (LVR) (All P & O Points)		0.15	0.13	0.15	0.13
Road Sections					
R01	Ma Tau Wai Road Section connected to To Kwa Wan Road (P01-P08, O001-O009)	0.13	0.18	0.13	0.18
R02	To Kwa Wan Road (P09-P18, O010-O019, O103)	0.17	0.15	0.17	0.14
R03	Chatham Road North (O020-O027)	0.22	0.15	0.21	0.15
R04	Ma Tau Wai Road connected to Chatham Road North (O028-O035)	0.16	0.10	0.16	0.11
R05	Ko Shan Road (O036-O045)	0.09	0.12	0.10	0.12
R06	Wan On Street (O046-O049)	0.17	0.15	0.18	0.16
R07	Sung On Street (O050-O055)	0.14	0.12	0.14	0.12
R08	Wing Kwong Street (O056-O059)	0.17	0.11	0.16	0.11
R09	Lung Tak Street (O060-O061)	0.06	0.03	0.06	0.05
R10	Ha Heung Road (O062-O064)	0.14	0.09	0.14	0.10
R11	Bailey Street (O065-O068)	0.31	0.18	0.31	0.17
R12	Wing Kwong Street (P41-P43, O069-O073)	0.10	0.10	0.10	0.09
R13	Kai Ming Street (P33-P40, O074-O075)	0.08	0.08	0.10	0.08
R14	Hung Fook Street (P22-P28, O076-O077)	0.22	0.15	0.21	0.13
R15	Ngan Hon Street (P19-P21, O078-O084)	0.21	0.15	0.21	0.15
R16	Shek Tong Street (O085-O088)	0.13	0.11	0.12	0.11
R17	Shansi Street (O089-O090)	0.07	0.06	0.08	0.07
R18	Kiang Hsi Street (O091-O092)	0.09	0.14	0.09	0.14
R19	Anhui Street (O093-O094)	0.17	0.12	0.18	0.13
R20	Chi Kiang Street, to the west of Ma Tau Wai Road (O095-O096)	0.14	0.09	0.15	0.08
R21	Chi Kiang Street, to the east of Ma Tau Wai Road (O097-O107)	0.23	0.18	0.22	0.17
R22	San Lau Street (O120-O122)	0.15	0.15	0.16	0.15
	Other Concerned Area (Open Area)				

Test Points for the Subject Site and Assessment Area		Baseline		Proposed	
		Annual	Summer	Annual	Summer
Z01	Ma Tau Wai Road/To Kwa Wan Road Garden (O108-O119)	0.15	0.12	0.16	0.12
Z02	Closed Hung Fook Street Section (D01-D06)	0.19	0.14	0.20	0.12
Z03	Closed Kai Ming Street Section (D07-D12)	0.07	0.06	0.12	0.07
Z04	Closed Yuk Shing Street (D13-D21)	0.09	0.06	0.10	0.07
Z05	Sung On Street Sitting-out Area (O122-O123)	0.20	0.13	0.20	0.13
Z06	Private Open Area I-Feng Mansion (O124-O129)	0.04	0.03	0.04	0.03
Z07	Open Area of KC-009 (O130)	0.17	0.16	0.16	0.15
Z08	Open Area of KC-010 (O133-O134)	0.10	0.07	0.11	0.08
Z09	Open Area of KC-011 & DL-8:KC (P29-P32, O131-O132)	0.15	0.09	0.11	0.09
Z10	Open Area of KC-014 (O135-136)	0.25	0.17	0.24	0.16
Z11	Open Area of KC-012/013 (O137-O139)	0.11	0.10	0.12	0.10

4.2 Directional Analysis

4.2.1 The spatial and wind conditions averaged VRs have been presented in previous section and concluded that there is no different in overall SVR and LVR for both annual and summer conditions between the 2 schemes. This section presented the air ventilation performance under different wind directions. Details of the assessment results for the 13 wind conditions are provided in **Appendix 4-1**. Results indicated that the local ventilation performance under different wind direction would be different for the 2 schemes, however, the overall air ventilation performance between 2 schemes are similar.

4.2.2 Since the discrete test points could not provide full picture for the wind flow and corresponding wind magnitude, wind contours and vector plot at the assessment height (2mAG) has been adopted for comparing the wind performance between the 2 scenarios. The side-by-side comparison of contours and vectors plots of the VR under different wind conditions are illustrated in **Figures 4-1 & 4-2**, respectively.

4.2.3 In general, the wind contours between the 2 schemes are comparable. No stagnation point nor strong wind amplification point is found for the Proposed Scheme. In order to discuss the wind simulation results, two major range of wind conditions are used for representing the annual condition and summer condition as shown below: -

- from 45deg to 135deg (most occurrence at 90deg, i.e. Easterly wind) for annual condition, and;
- from 180deg to 247.5deg (most occurrence at 225deg, i.e. South-Western wind) for summer condition.

Major Prevailing Wind in Annual Condition

4.2.4 Under the major prevailing wind direction in annual condition, i.e. Easterly wind, main focus is on the Hung Fook Street and Kai Ming Street section near the site, as the site would block the upstream flow reaching the downstream area if the existing wind paths are blocked. Therefore, wind pathways are provided, by decking the Hung Fook Street section (Z02) over 15.4mAG instead of completely blocking it; and only adopt a link bridge over Kai Ming Street section (Z03) to prevent the worst scenario. On the eastern portion of the Scheme, open area (all-weathered communal space) is provided at pedestrian level of the Low Block with intention of bringing fresh air into the core region of the site under Easterly wind. The concerned wind pathways are illustrated in **Figure 4-3**.

4.2.5 The contours of VR under 45deg to 135deg wind are illustrated in **Figures 4-1b to 4-1f**. The contours show that the ventilation performance of the Hung Fook Street (R14) in the Proposed Scheme is not worse than the Baseline Scheme, showing the wider opening at the junction of Hung Fook Street and To Kwa Wan Road (Z02, actual width subject to future design) is effective. For Kai Ming Street (R13 & Z03), better ventilation performance compared to the Baseline Scheme is generally found which is likely the result of the open area provided by the G/F of the Low Block (i.e.: the all-weathered communal space and covered landscape area).

4.2.6 On the other hand, the averaged VR for Easterly wind at the Open Area of KC-011 & DL-8:KC (Z09) is reduced in Proposed Scheme. The relatively lower of wind velocity at Z09 can be explained by the dispersion of air to a wider area (i.e. all-weathered communal space) created in the Proposed Scheme, but a better downstream air volume and better downstream air circulation.

4.2.7 The vectors of VR under 45deg to 135deg wind (**Figures 4-2b to 4-2f**) shows that with the all-weathered communal space on G/F of the Low Block, the wind is no longer forced to go parallel to the building façade along the relative narrow open area (in north-south direction). Instead, the wind can go freely and spread into the a much wider open area resulting in lower wind velocity. In fact, flow recirculation has been observed in that region (Z09). Despite the average wind speed at Z09 is reduced, the results show that the volume of air flow through the Scheme area along Kai Ming Street (Z03) under Easterly wind is not reduced. It is observed that a large portion of wind flow into Kai Ming Street (R13) is from Hung Fook Street (R14) in the Baseline Scenario, which require sharp change in wind direction twice. With the all-weathered communal space at G/F of the Low Block under Proposed Scenario, the flow from Hung Fook Street (R14) only need a much gentle change in wind direction which

result in less flow resistance and higher flow volume, ultimately lead to higher averaged VR at Closed Kai Ming Street Section (Z03) as stated in **Section 4.1.8**.

Major Prevailing Wind in Summer Condition

4.2.8 Under the major prevailing wind direction in summer condition, i.e. South-Western wind, the ventilation performance of the site is expected to be worse than the annual condition as list in Table 4-1. One of the main factors for the low VR is due to the ground level upstream wind flow to the core region of the Scheme is blocked by the developments in the surroundings under both Baseline Scheme and Proposed Scheme. As shown in contours in **Figure 4-1h to 4-1m**, as well as vectors in **Figure 4-2h to 4-2m**, the wind flow velocity in the Yuk Shing Street (Z04), which in the core region of the site, under 180deg to 247.5deg wind is very small thus Yuk Shing Street (Z04) is not an effective wind path under Baseline Scheme.

4.2.9 The major existing wind paths under South-Western wind are the Ma Tau Wai Road (R01) and To Kwa Wan Road (R02) adjoining the Scheme boundary on the west. On the adjoining east, the Wan On Street (R06), open areas of KC-009 (Z07), KC-012/013 (Z11), KC-011 (Z09), KC-010 (Z08) and Lung Tak Street (R09) are connected and form a new wind pathway in north-south direction. Although the new north-south wind pathway is blocked by building blocks at both ends thus not as efficient as the main roads in the west, it is the major pathway for wind to penetrate into the URA's planned building group in the region. Therefore, the focus of summer wind is on the ventilation performance of those three wind paths, i.e. Ma Tau Wai Road, To Kwa Wan Road, and the new wind path created by the planned URA projects, as illustrated in **Figure 4-3**.

4.2.10 The ventilation performance of the Ma Tau Wai Road is not significantly affected by the Proposed Scheme in general, besides under 180deg wind direction case. In the 180deg wind direction case, the wind flow near the west façade of T2's podium is slower which is likely the result of larger tower.

4.2.11 For the To Kwa Wan Road section near the site boundary (R01), under 180deg & 202.5deg wind conditions, the VR is lower which is likely the results of larger Tower T1. For under 225deg – 247.5deg wind conditions, no significant change in VR has been identified in the To Kwa Wan Road section near the site boundary (R02).

4.2.12 The aforementioned effects of the Proposed Scheme on Ma Tau Wai Road Section (R01) and To Kwa Wan Road Section (R02) under summer condition are also resulted in the slightly lower averaged VR in **Table 4-1**.

4.2.13 To offset the negative effect of the Proposed Scheme due to Tower T1, the Proposed Scheme intended to improve the ventilation in the eastern part of the site, which will

be the core region of the open pedestrian network in the future (**Figure 1-9**). The Low Block is offset from the site boundary to create a wider wind path, together with the open all-weathered communal space provided at ground level, more wind is allowed to pass though there under 180deg - 202.5deg wind condition.

4.2.14 The effect of the offset Low Block and the all-weathered communal space on G/F to the new north-south wind pathway in the east are not the same under various major summer wind directions. Under 202.5deg & 247.5deg wind conditions, the VR contours in the new north-south wind pathway at of downstream of the Proposed Scheme (including open area in the east of the Proposed Scheme, open area of KC-010 and Lung Tak Street) show significant improvement. Under 225deg wind condition, significant improvement is identified only at the area immediately adjoining the all-weathered communal space (Z09), while the improvement in the further downstream area is limited. Under 180deg wind condition, slight improvement in ventilation performance at the upstream open area of KC-012/013 (Z11) is identified which should be the by-product of lower flow resistance along the wind path.

4.2.15 The open space with frequent pedestrian access and significant change in ventilation under each wind directions are reported in the following paragraphs.

22.5 deg wind direction

4.2.16 Under 22.5 deg wind, improvements are identified at the Closed Hung Fook Street Section (Z02), Closed Kai Ming Street Section (Z03), and Open Area of KC-012/013 (Z11). Whereas reductions in VRs are identified at the Open Area of KC-010 & KC-011 (Z08 & Z09).

45 deg wind direction

4.2.17 Under 45 deg wind, improvement is identified at the Closed Kai Ming Street Section (Z03). Whereas reductions are identified at the Closed Hung Fook Street Section (Z02), Closed Yuk Shing Street (Z04) & Open Area of KC-011 (Z09).

67.5 deg wind direction

4.2.18 Under 45 deg wind, improvement is identified at the Closed Kai Ming Street Section (Z03). Whereas reduction is identified at the Open Area of KC-011 (Z09).

90 deg wind direction

4.2.19 Under 90 deg wind, improvements are identified at the Closed Hung Fook Street Section (Z02), Closed Kai Ming Street Section (Z03), and Ma Tau Wai Road/To Kwa Wan Road Garden (Z01). Whereas reductions are identified at the Open Area of KC-009 (Z07) and Open Area of KC-011 (Z09).

112.5 deg wind direction

4.2.20 Under 90 deg wind, improvement is identified at the Closed Kai Ming Street Section (Z03). Whereas no significant reduction at open space is identified.

135 deg wind direction

4.2.21 Under 135 deg wind, no significant improvement nor significant reduction at open space is identified.

157.5 deg wind direction

4.2.22 Under 157.5 deg wind, no significant improvement nor significant reduction at open space is identified.

180 deg wind direction

4.2.23 Under 180 deg wind, no significant improvement nor significant reduction at open space is identified.

202.5 deg wind direction

4.2.24 Under 202.5 deg wind, improvement is identified at the Open Area of KC-010 (Z08). Whereas no significant reduction at open space is identified.

225 deg wind direction

4.2.25 Under 225 deg wind, no significant improvement at open space is identified. Whereas reductions are identified at the Street Section (Z02), Closed Kai Ming Street Section (Z03), and Open Area of KC-014 (Z10).

247.5 deg wind direction

4.2.26 Under 247.5 deg wind, improvement is identified at the Open Area of KC-014 (Z09). Whereas reductions are identified at the Closed Hung Fook Street Section (Z02), Open Area of KC-009 (Z07) and Open Area of KC-012/013 (Z11).

4.3 Wind Amplification

4.3.1 Wind amplification usually occurs near building corners of high-rise buildings. Extreme wind amplification will lead to comfort and safety issue. As the proposed development is located in core region of an urban area and with the surrounding high-rise buildings in the future scenario, no significant wind amplification around the proposed blocks and towers has been identified.

5 CONCLUSIONS

5.1.1 The Urban Renewal Authority (URA) has proposed To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) (the Scheme) under section 25 of the Urban Renewal Authority Ordinance (URAO). An Air Ventilation Assessment (AVA) has been conducted in accordance with the recommendations of "*Feasibility Study for Establishment of Air Ventilation Assessment System – Final Report*" by Planning Department, and "*Technical Circular No. 1/06 on Air Ventilation Assessments*" by HPLB & ETWB to support the submission of a draft Development Scheme Plan (DSP) with its planning proposal to the Town Planning Board (TPB) for consideration.

5.1.2 The microclimate around the Site for the two scenarios, i.e. the Baseline Scheme (i.e. OZP-compliance development) and the Proposed Schemes (the proposed development of the draft DSP), have been assessed by Computational Fluid Dynamics (CFD) using well proven CFD code. The model settings have been compared to previous studies to ensure the reliability of the model results.

5.1.3 The models result suggested that the averaged air ventilation performance of the Proposed Scheme is similar to that of the Baseline Scheme in both annual and summer conditions, thus no further air ventilation mitigation measures would be required for the Proposed Scheme.

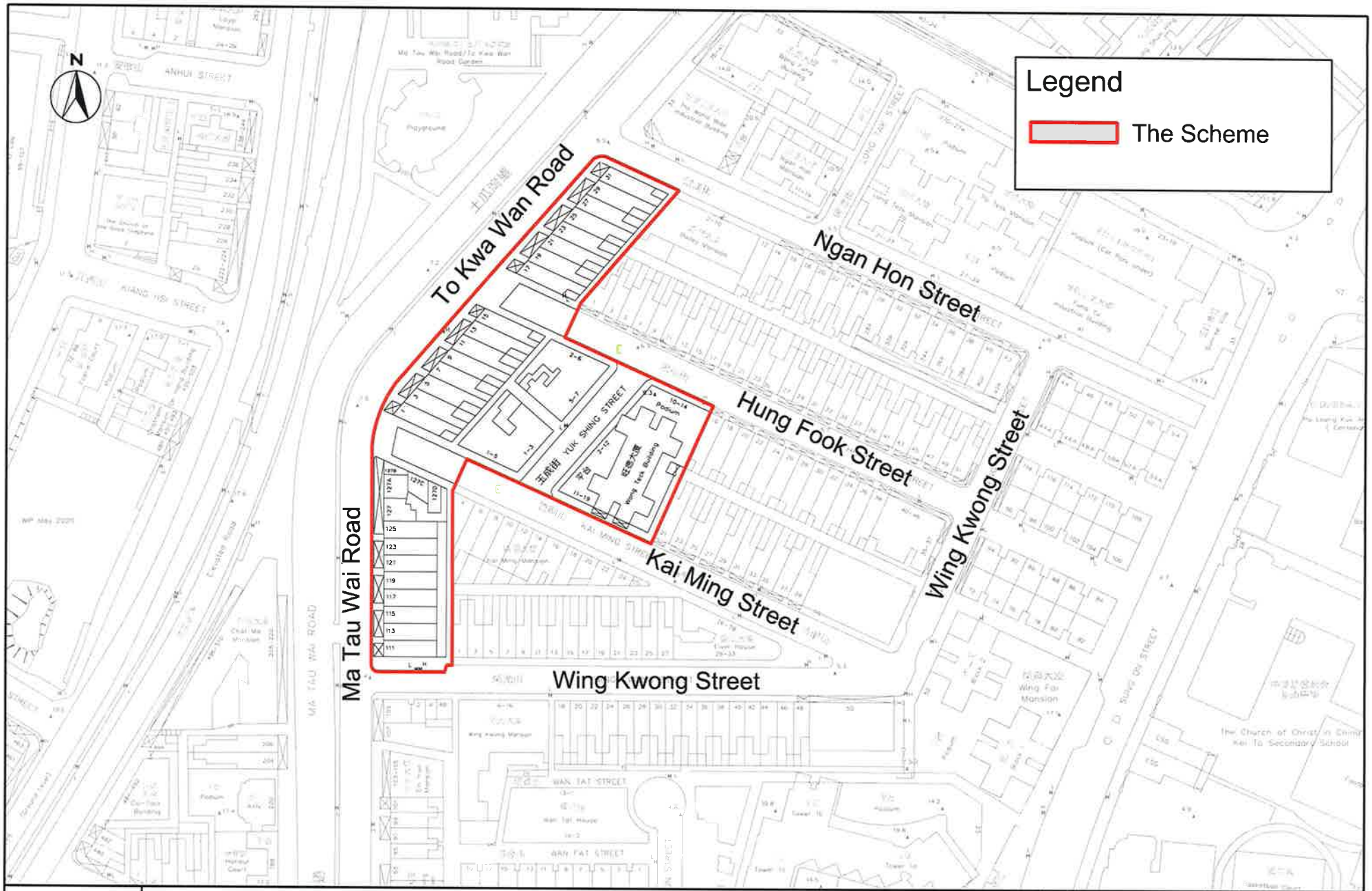
5.1.4 The most significant difference is identified at Kai Ming Street, which is expected to be improved under prevailing wind in both annual condition and summer condition in the Proposed Scheme with the urban window design. At the same time, the ventilation performance at the area immediately adjoining the all-weathered communal space (area near P30-P33) is slightly worse than the Baseline Scheme in terms of the wind velocity. This, however, can be explained by the dispersion of air to a wider area (i.e. all weathered communal space) created in the Proposed Scheme, resulting in a slower wind velocity but a better downstream air volume and better downstream air circulation.

5.1.5 Analysis for different wind directions show that the design consideration in the Proposed Scheme, e.g. residential tower setback from Ngan Hon Street, urban window design at Hung Fook Street and Kai Ming Street sections, and the all-weathered communal space on G/F of Low Block, are effective in improving the wind performance in the area.

5.1.6 No significant wind amplification around the proposed blocks and towers has been identified thus the Proposed Scheme which should not has any significant comfort and safety concerns.

5.1.7 In conclusion, no adverse AVA impact is anticipated for the Proposed Scheme as compared to the Baseline Scheme.

FIGURES



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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Location Plan of the Scheme

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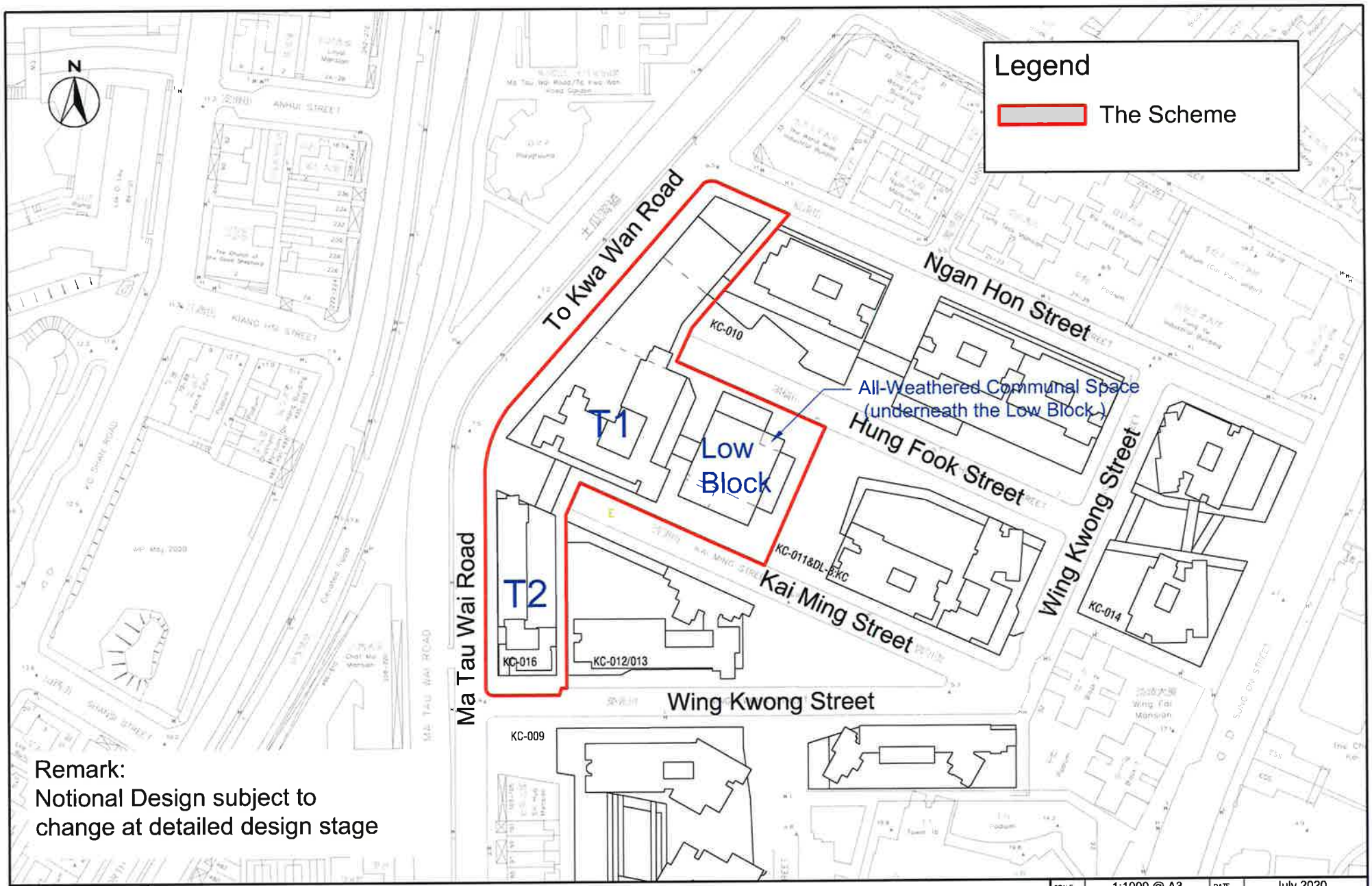

Remark:
Notional Design subject to
change at detailed design stage

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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Notional Block Plan of the Proposed Scheme

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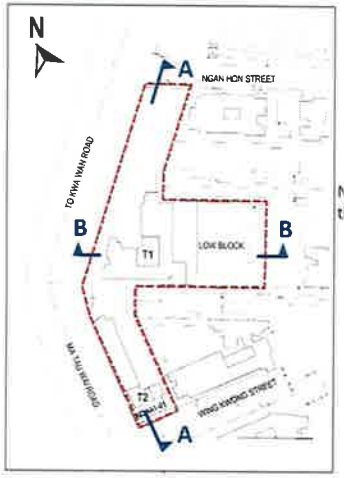
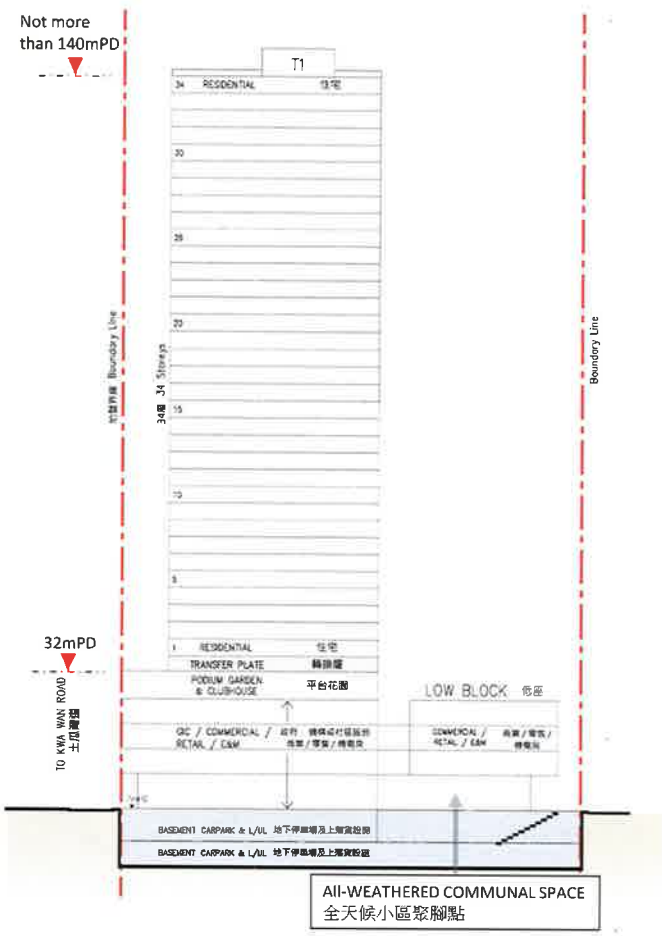
Key Plan



Section A

Section B



Remark:
Notional Design subject to change at detailed design stage

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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Notional Section Plan of the Proposed Scheme

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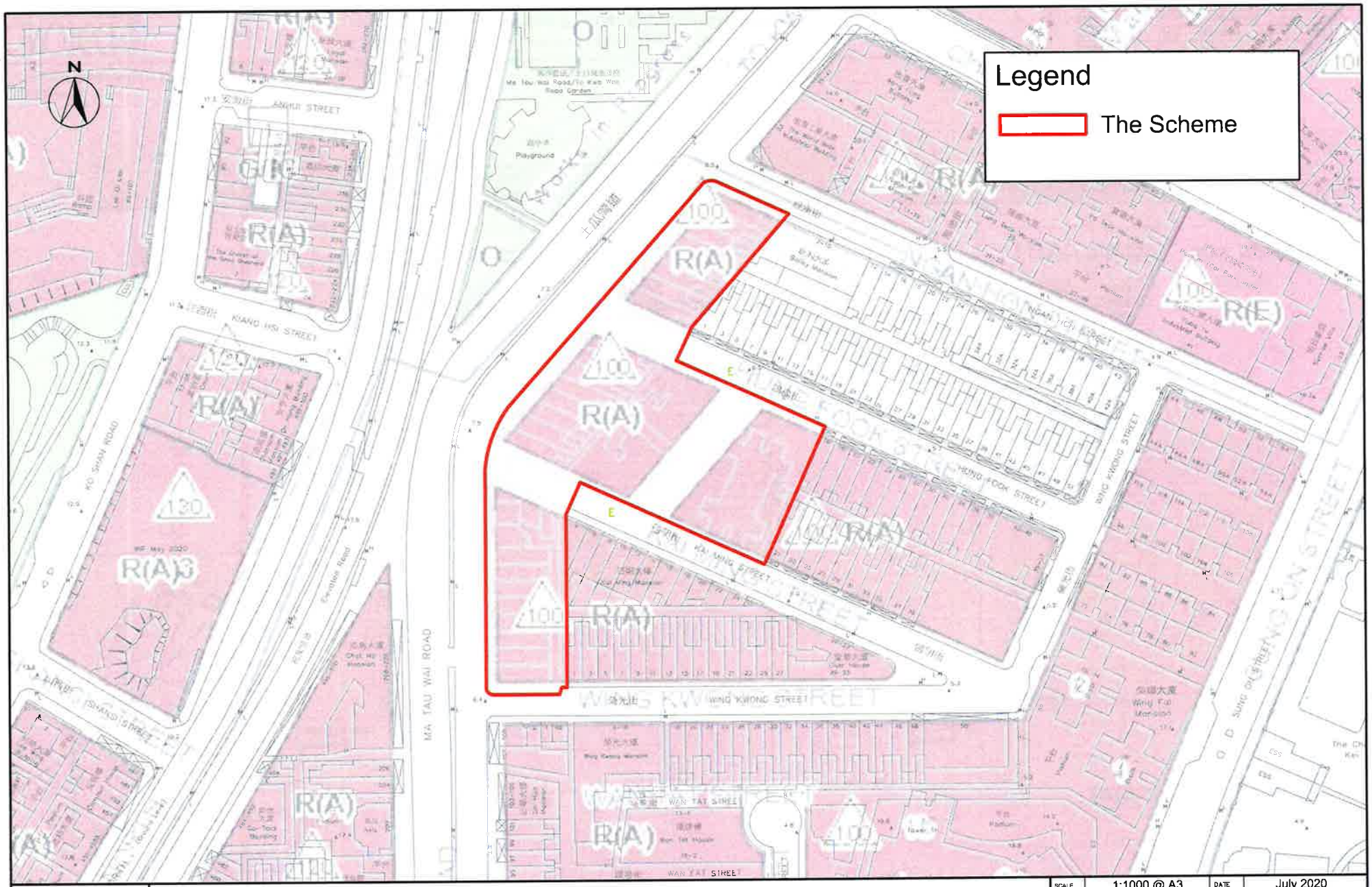

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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

OZP Capture from Approved Hung Hom Outline Zoning Plan No. S/K9/26

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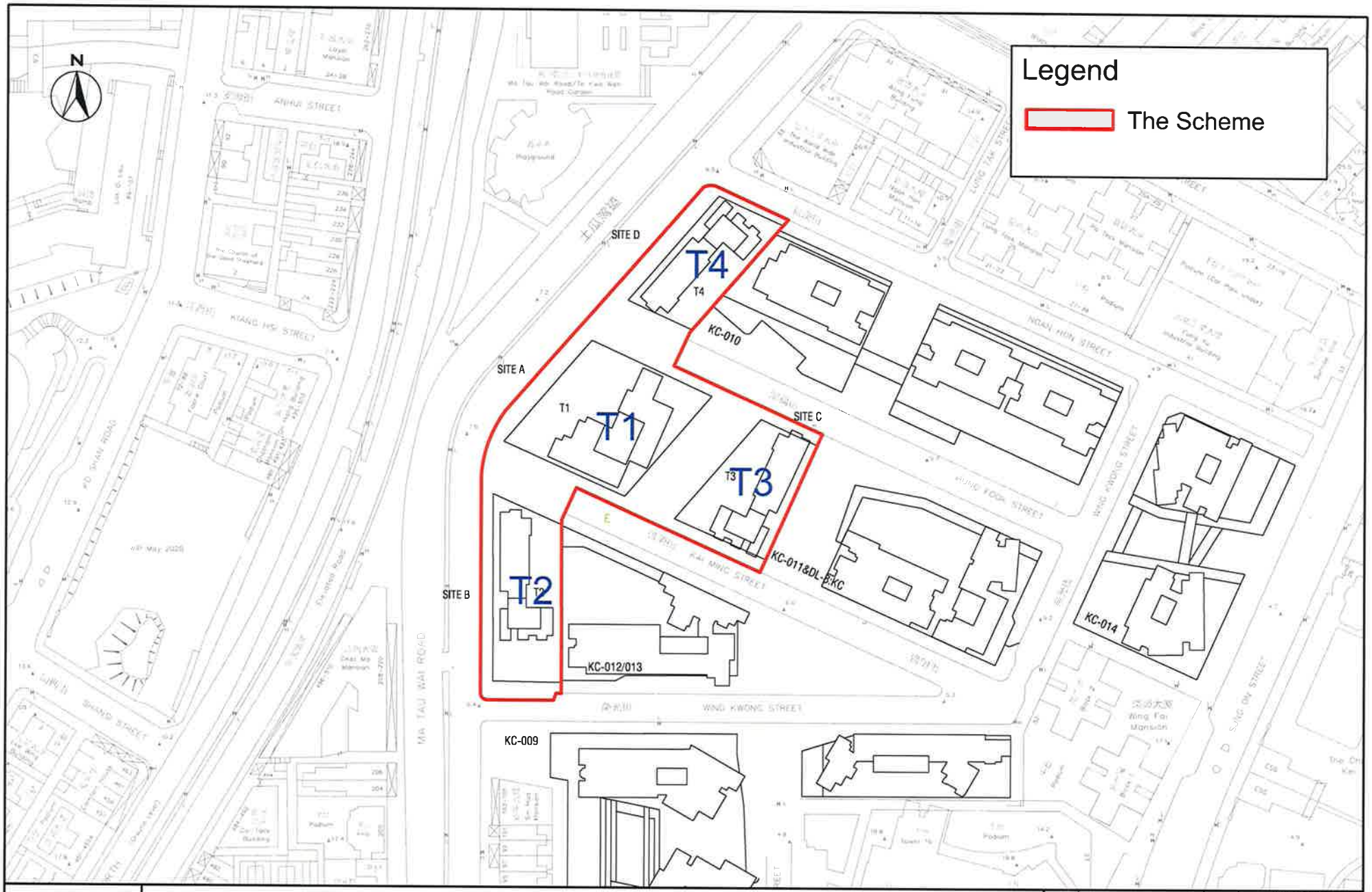

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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Notional Block Plan of the Baseline Scheme

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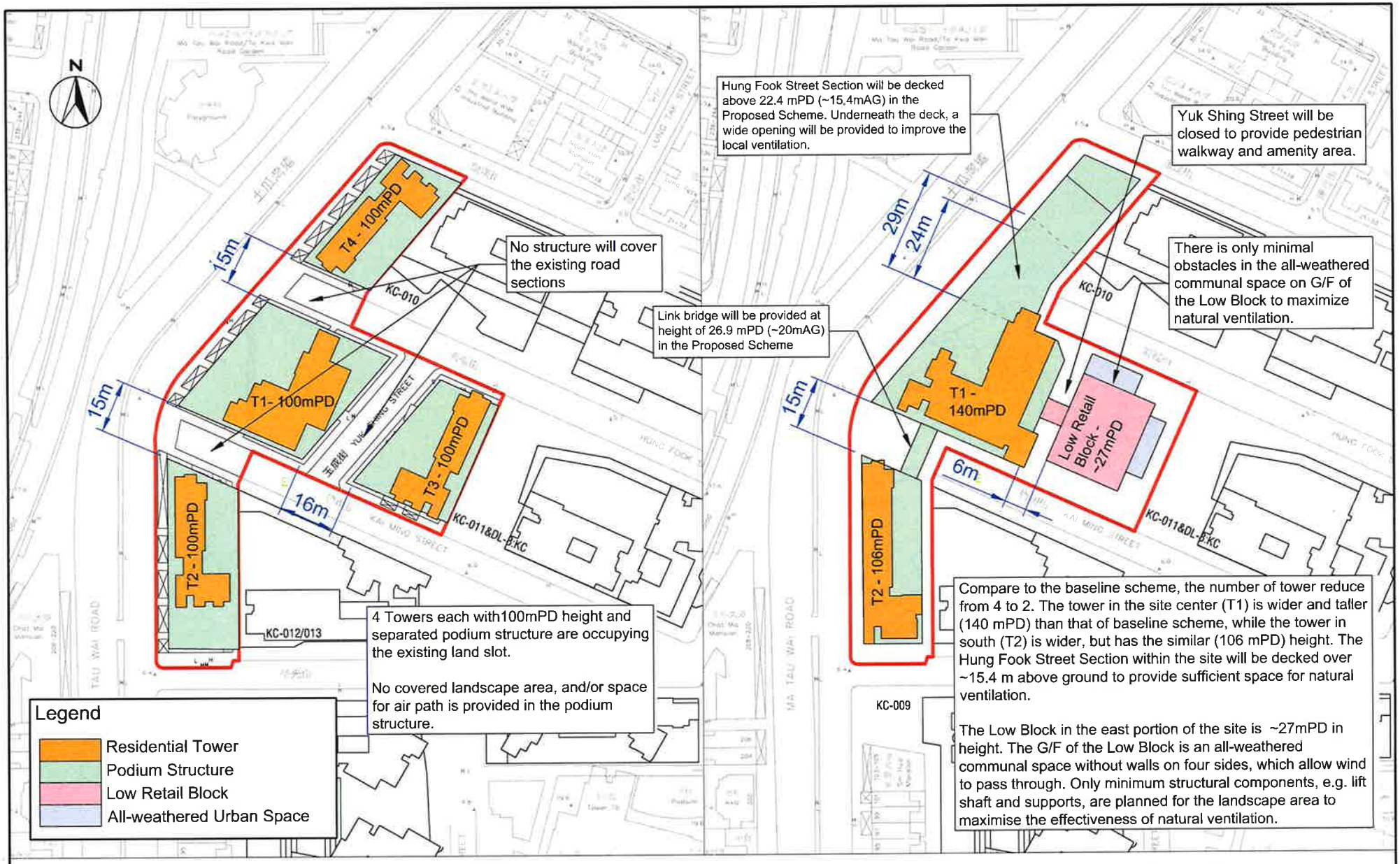

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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Comparison of the Schemes

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CHECK	KC	DRAWN	CC
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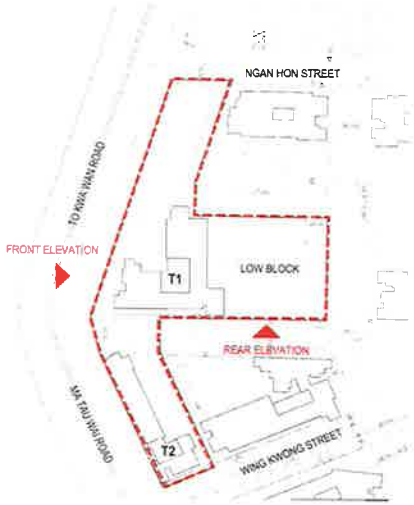
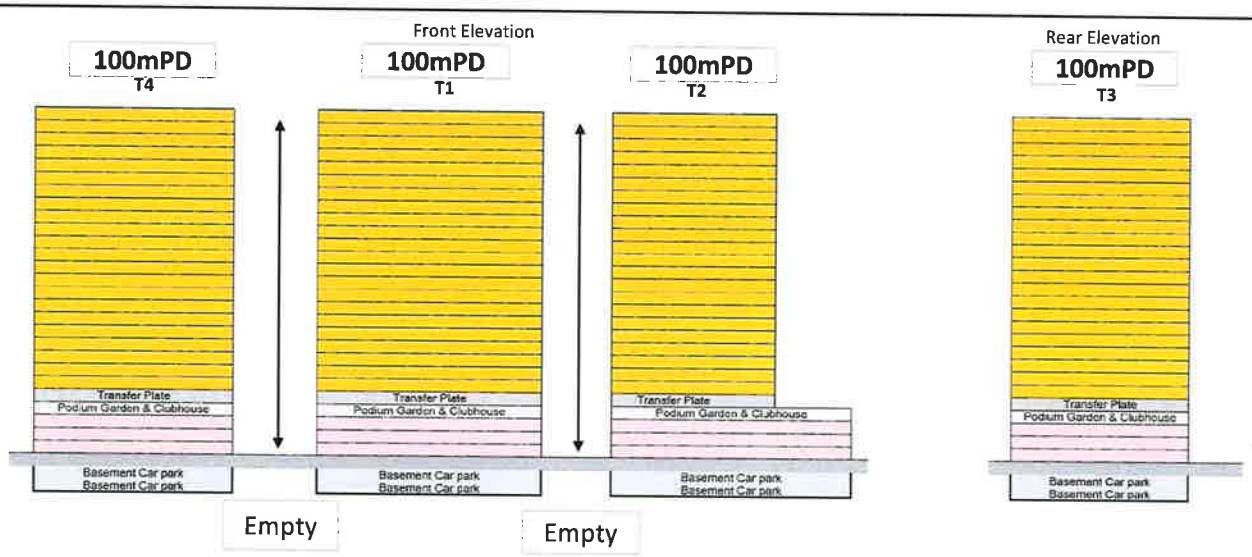
		REV	-

Baseline Scheme

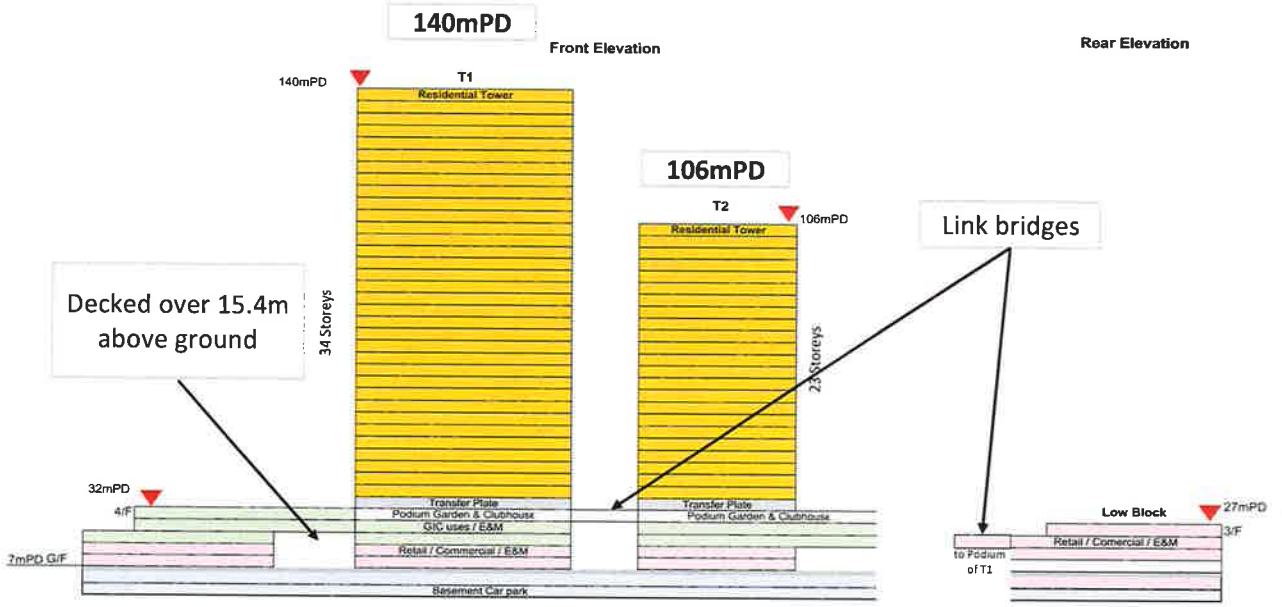
4 towers each with 100mPD in height and separate podium





Proposed Scheme

2 towers with 140mPD & 106 mPD in height and a Low Block. The podia and the Low Block are connected by decking and/or link bridge.



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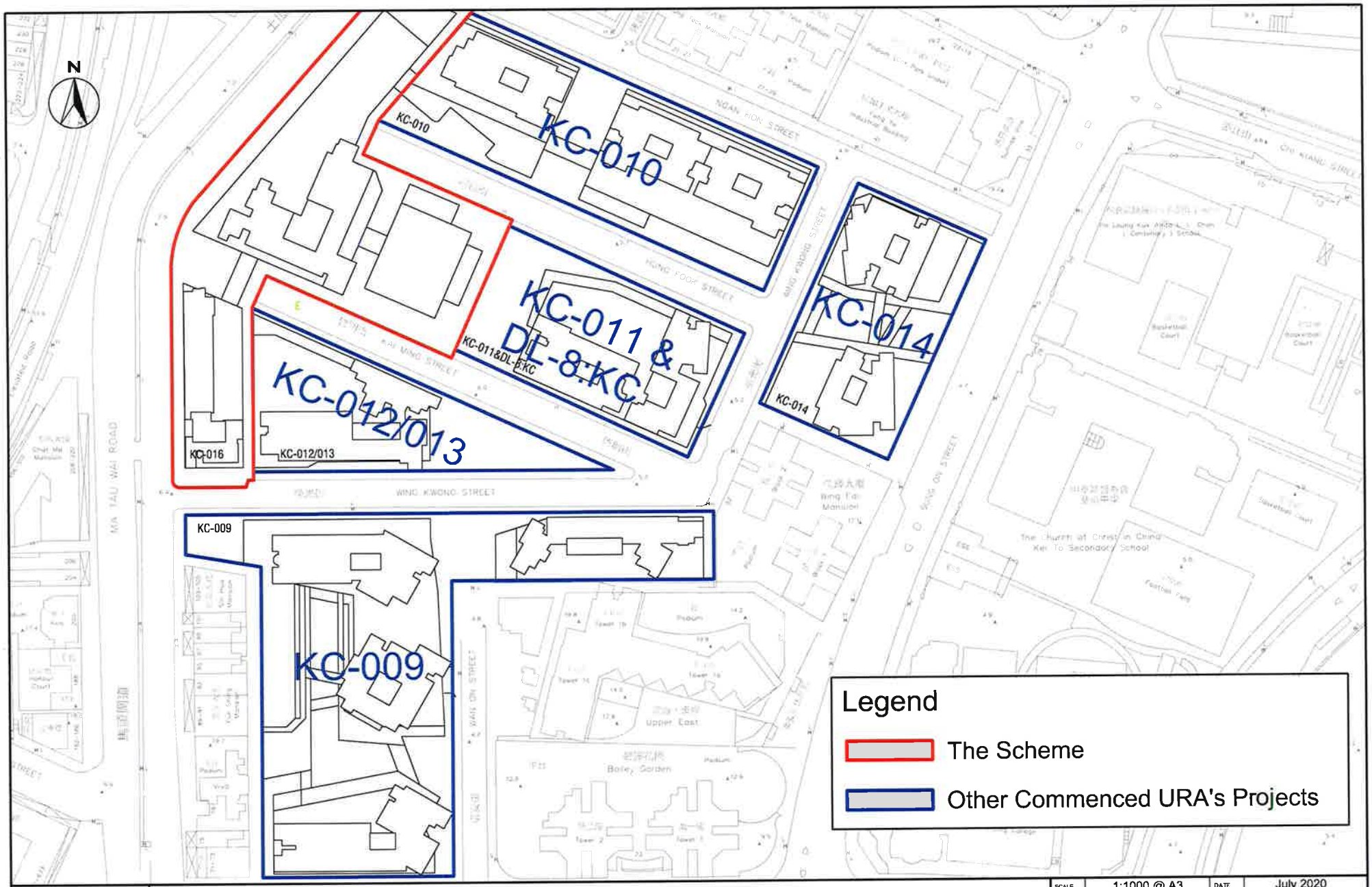
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Comparison of the Schemes (Section)

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	[illegible]	FIGURE NO.	1-6b
			REV. -



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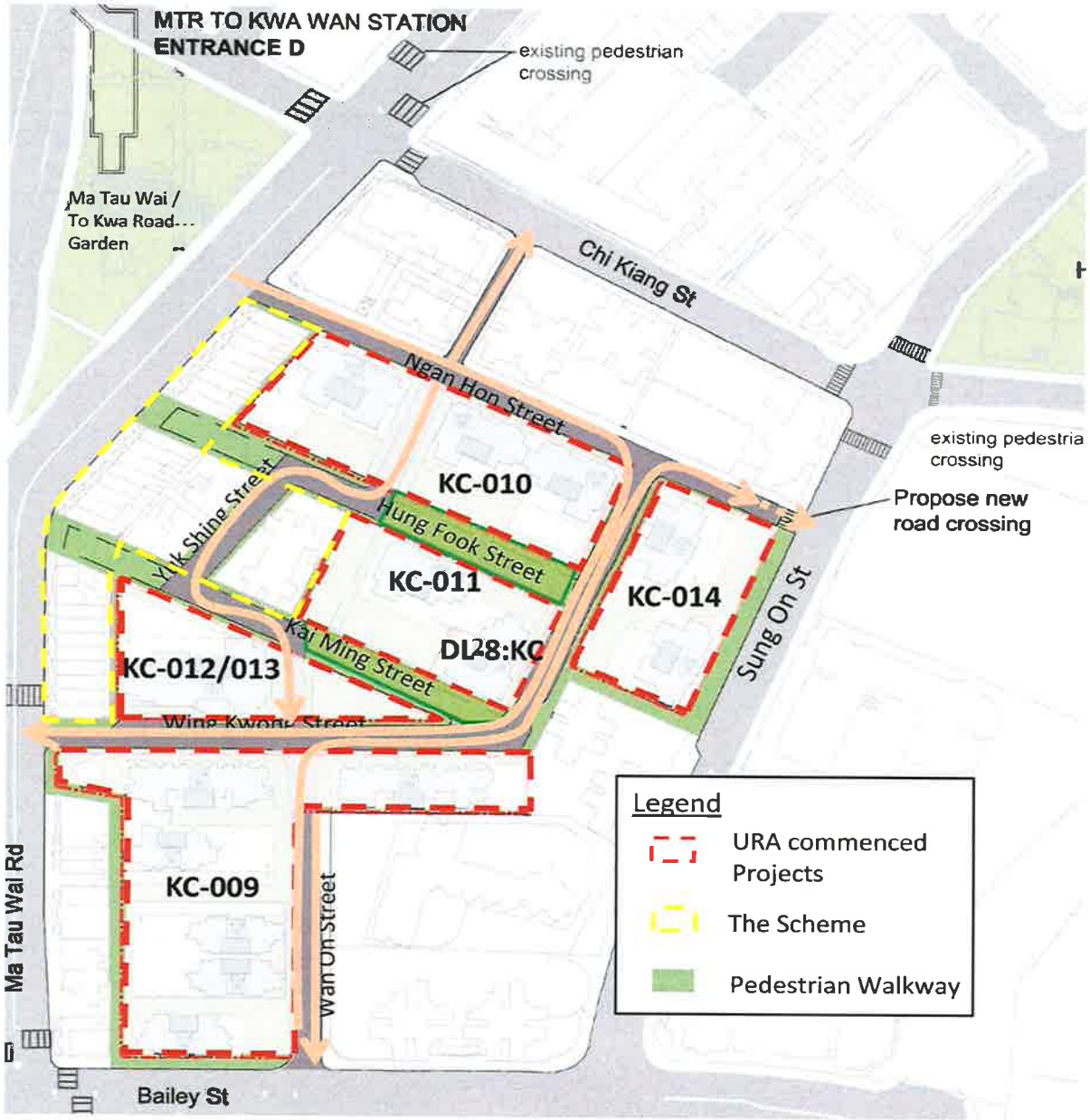
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

URA's Project in the Vicinity

SCALE	1:1000 @ A3	DATE	July 2020
CHECK	KC	DRAWN	CC
JOB No.	IA 19021-KCAA101	DRAWING No.	1-7
		REV	-



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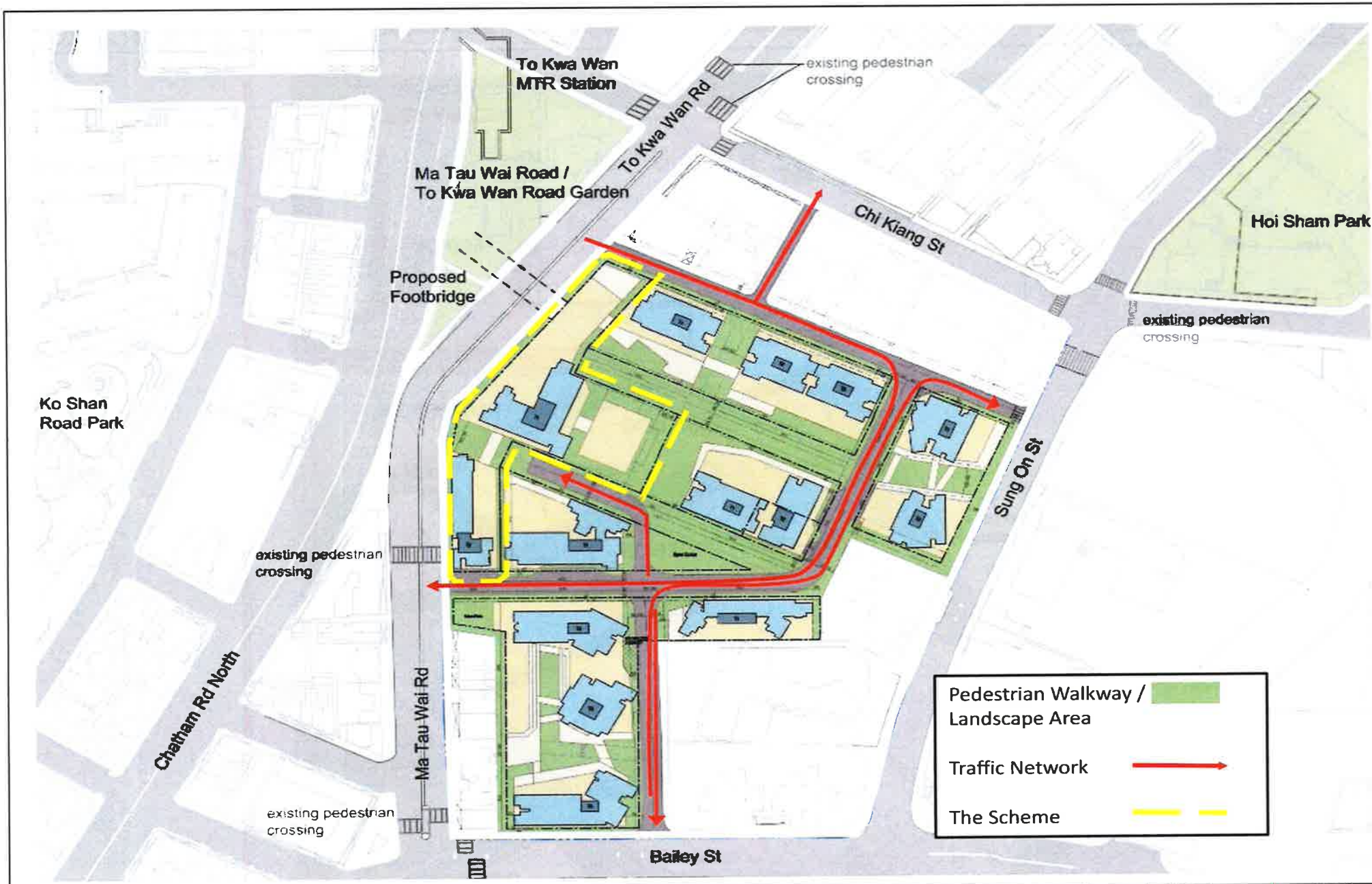
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Future Road Network in the Neighborhood without the Scheme

SCALE	N.T.S.	DATE	Nov-20
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KCAA1-01	FIGURE NO. 1-8	REV. -



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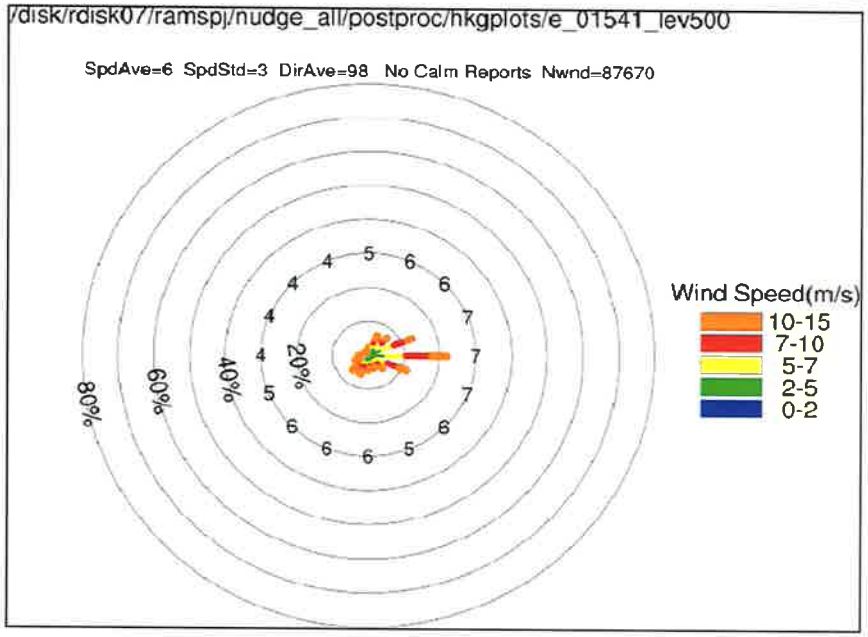
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

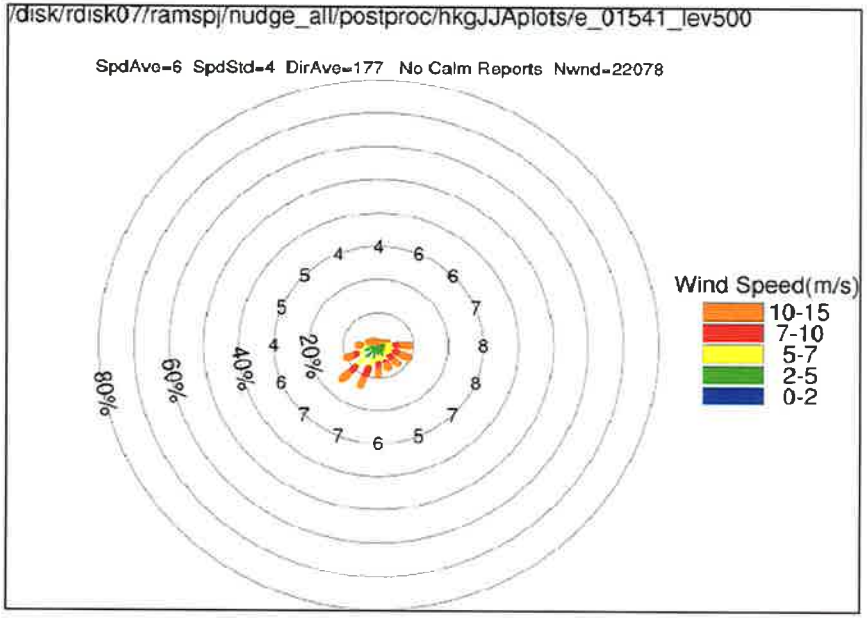
Future Road Network in the Neighborhood with the Scheme

SCALE	N.T.S.	DATE	Nov-20
CHECK	KC	DRAWN	CC
JOB NO.	[illegible]	FIGURE NO.	1-9
REV.	-		

Annual



Summer



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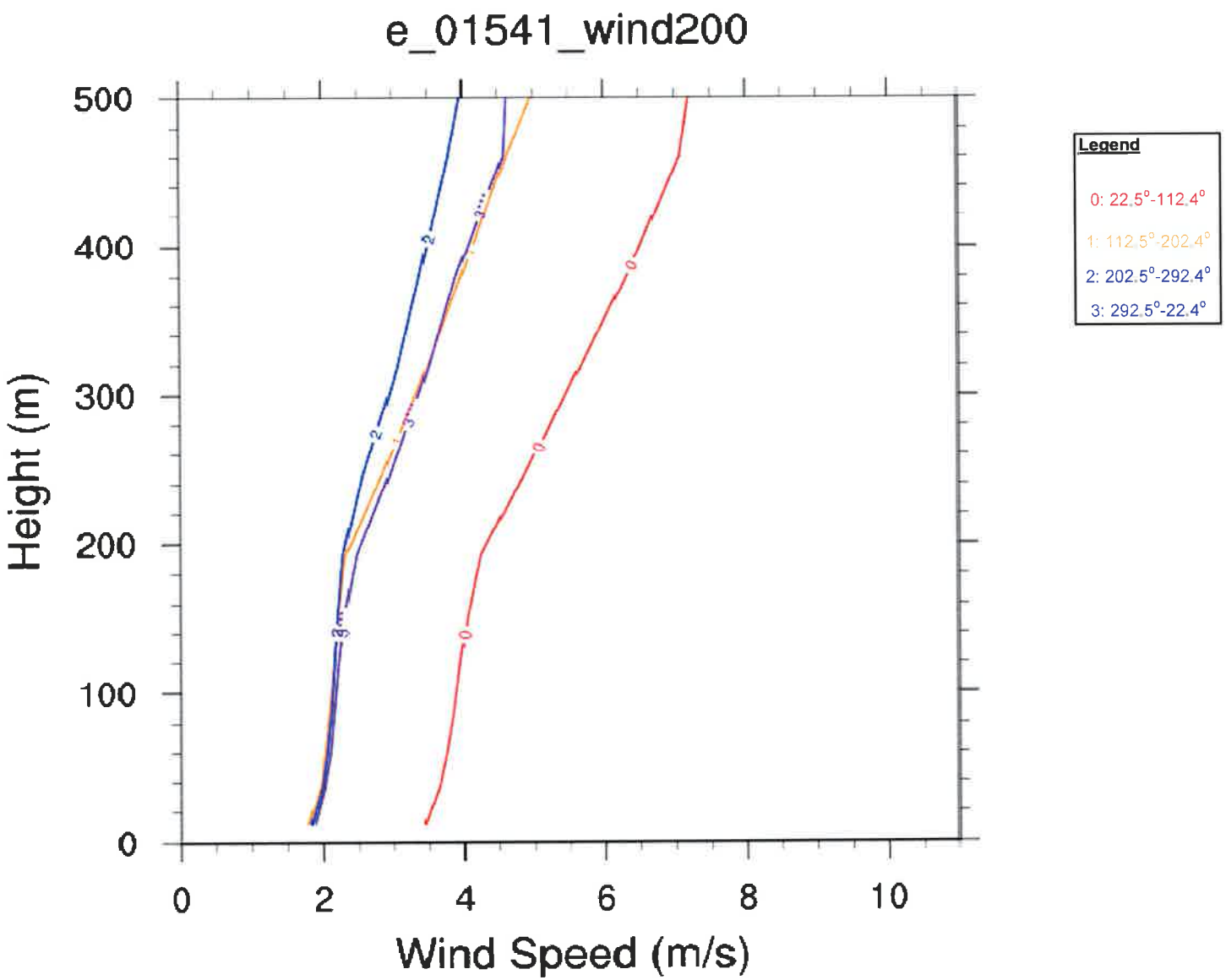
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

The Wind Roses at grid [083,041] from RAMS

SCALE	N.T.S.	DATE	Jul-20
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KC-AA1-01	FIGURE NO.	2-1a
			REV. -



https://www.pland.gov.hk/pland_en/info_serv/site_wind/site_wind/083041.html

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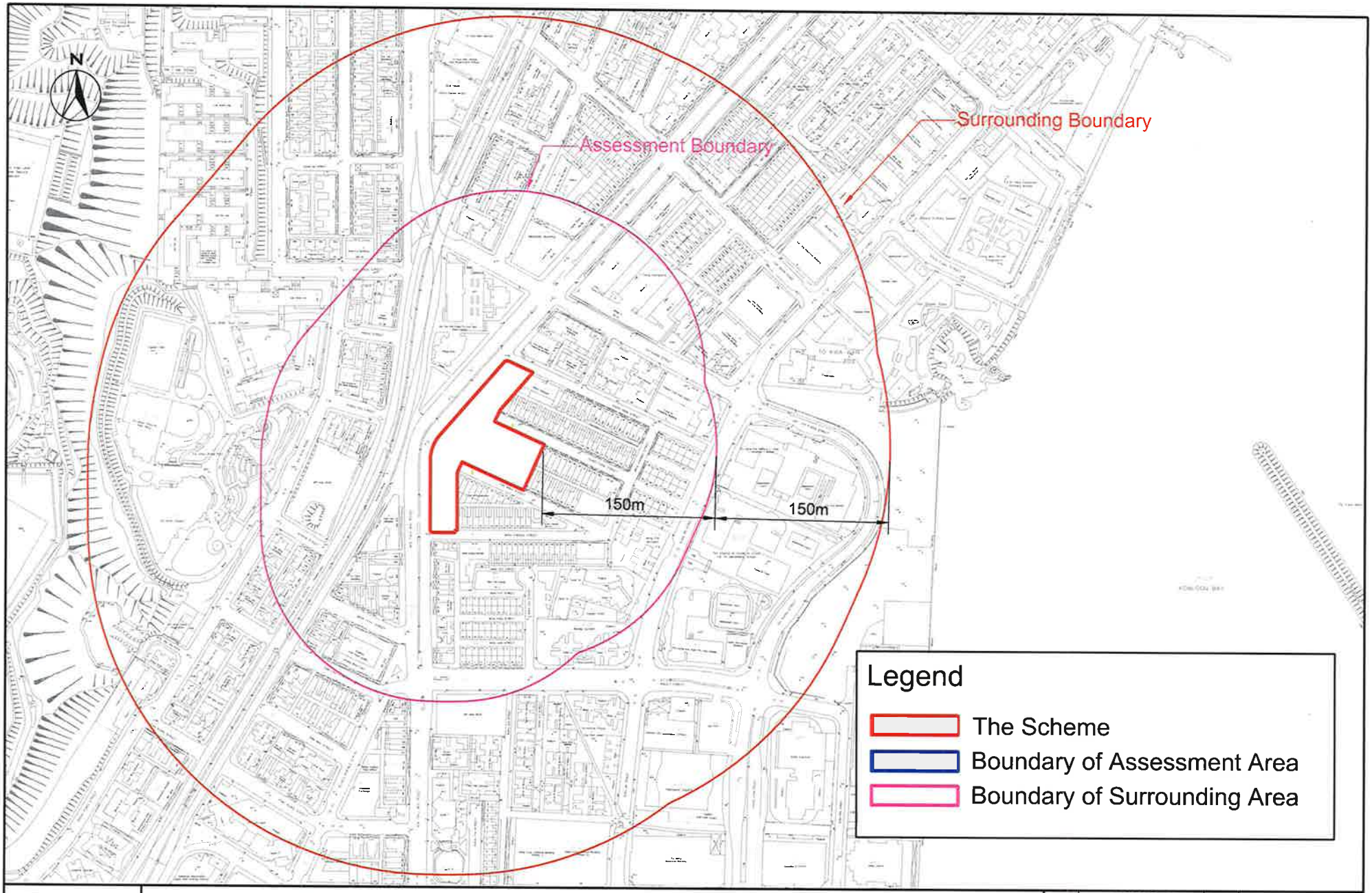
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

The Wind Profile at grid [083,041] from RAMS

SCALE	N.T.S.	DATE	Jul-20
CHECK	KC	DRAWN	CC
JOB NO.	A302/KC-AA1.01	FIGURE NO.	2-1b
			REV. -



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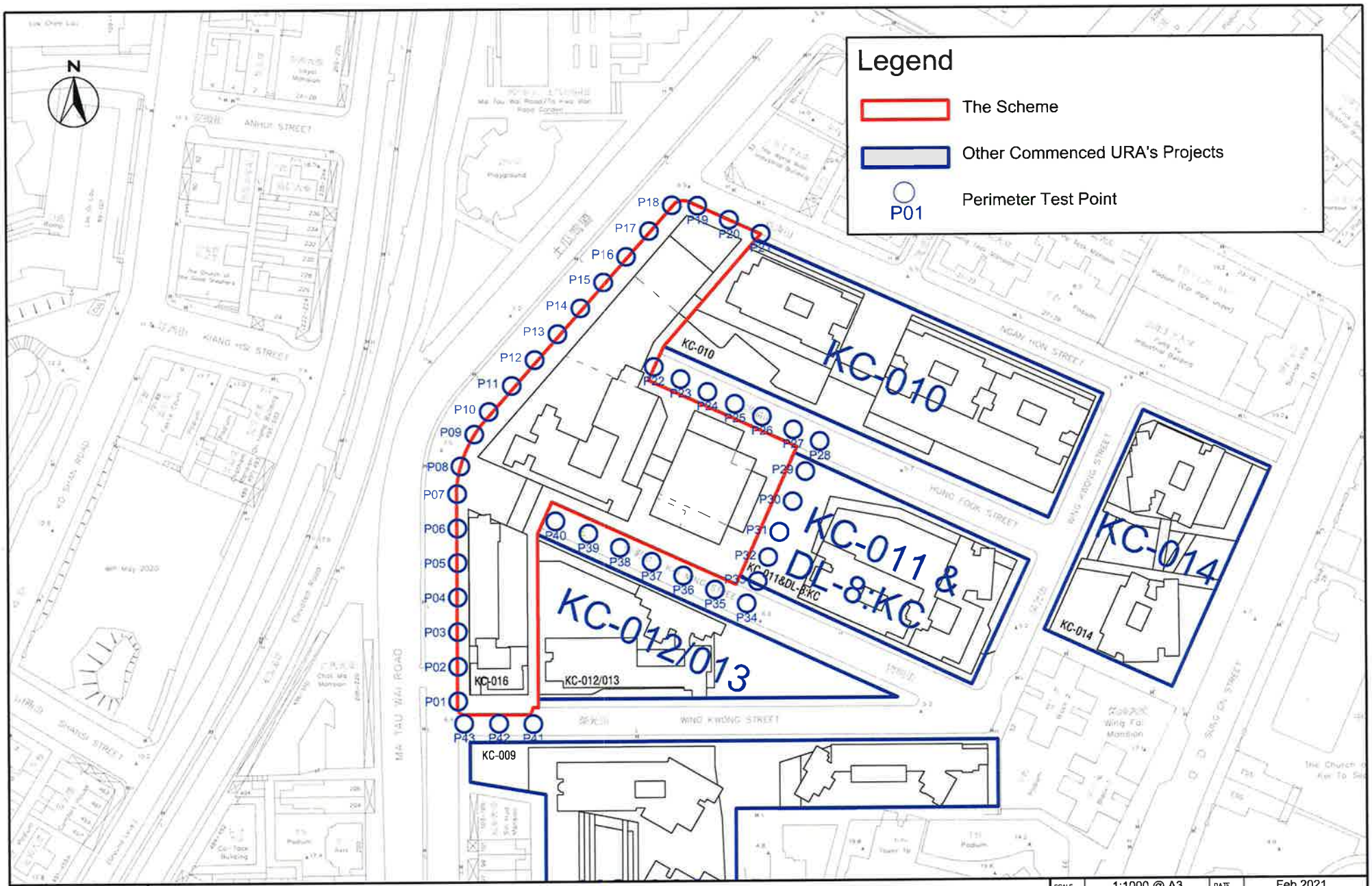
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Assessment Area and Surrounding Area

SCALE	1:3000 @ A3	DATE	July 2020
CHECK	KC	DRAWN	CC
JOB No.	IA 19021-KCAA101	DRAWING No.	3-1
		REV	-



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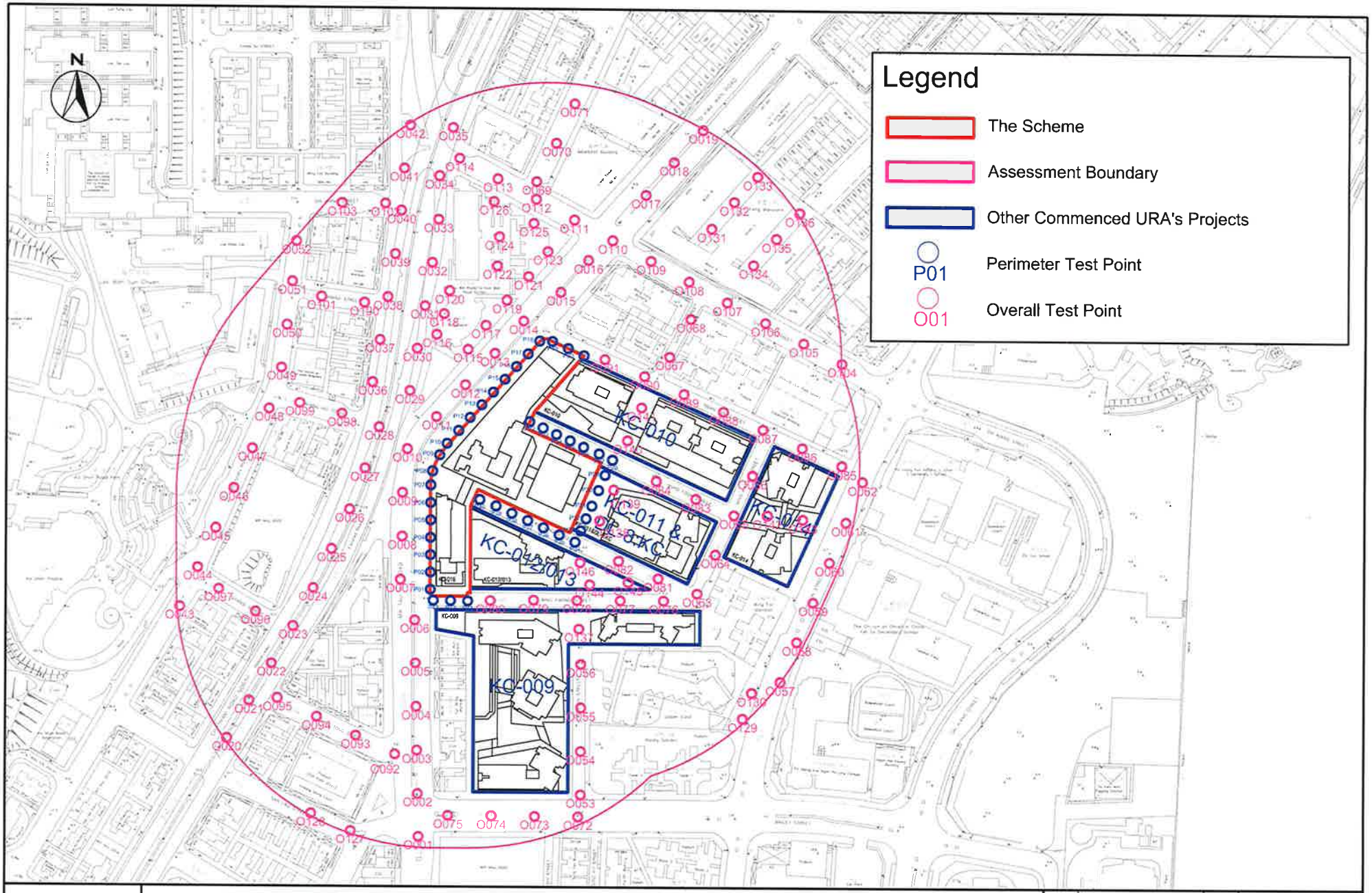
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Perimeter Test Points

SCALE	1:1000 @ A3	DATE	Feb 2021
CHECK	KC	DRAWN	CC
JOB No.	IA 19021-KCAA101	DRAWING No.	3-2a
		REV	-



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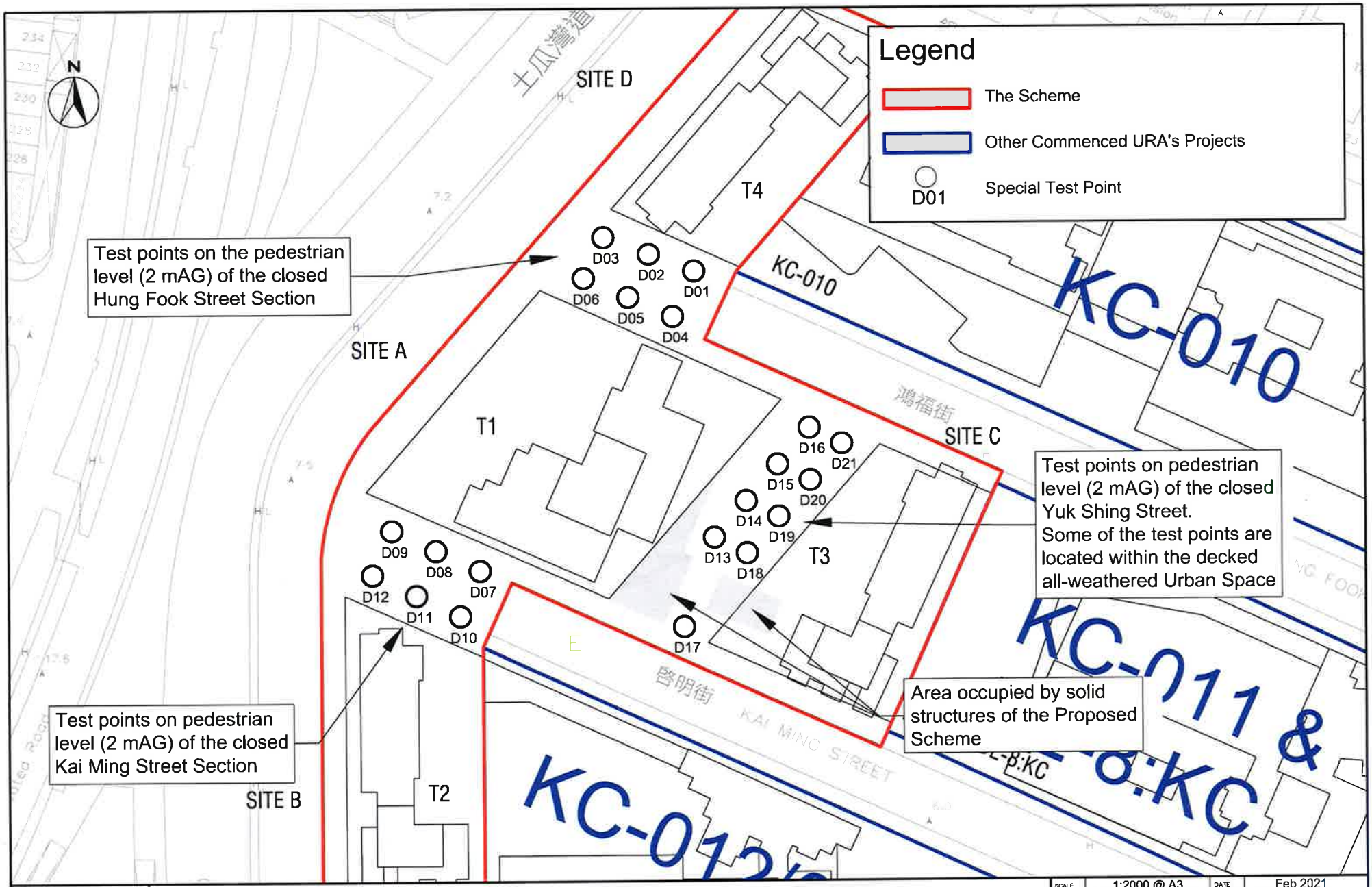
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Overall Test Points

SCALE	1:2000 @ A3	DATE	Feb 2021
CHECK	KC	DRAWN	CC
JOB No	IA 19021-KCAA101	DRAWING No.	3-2b
		REV	-



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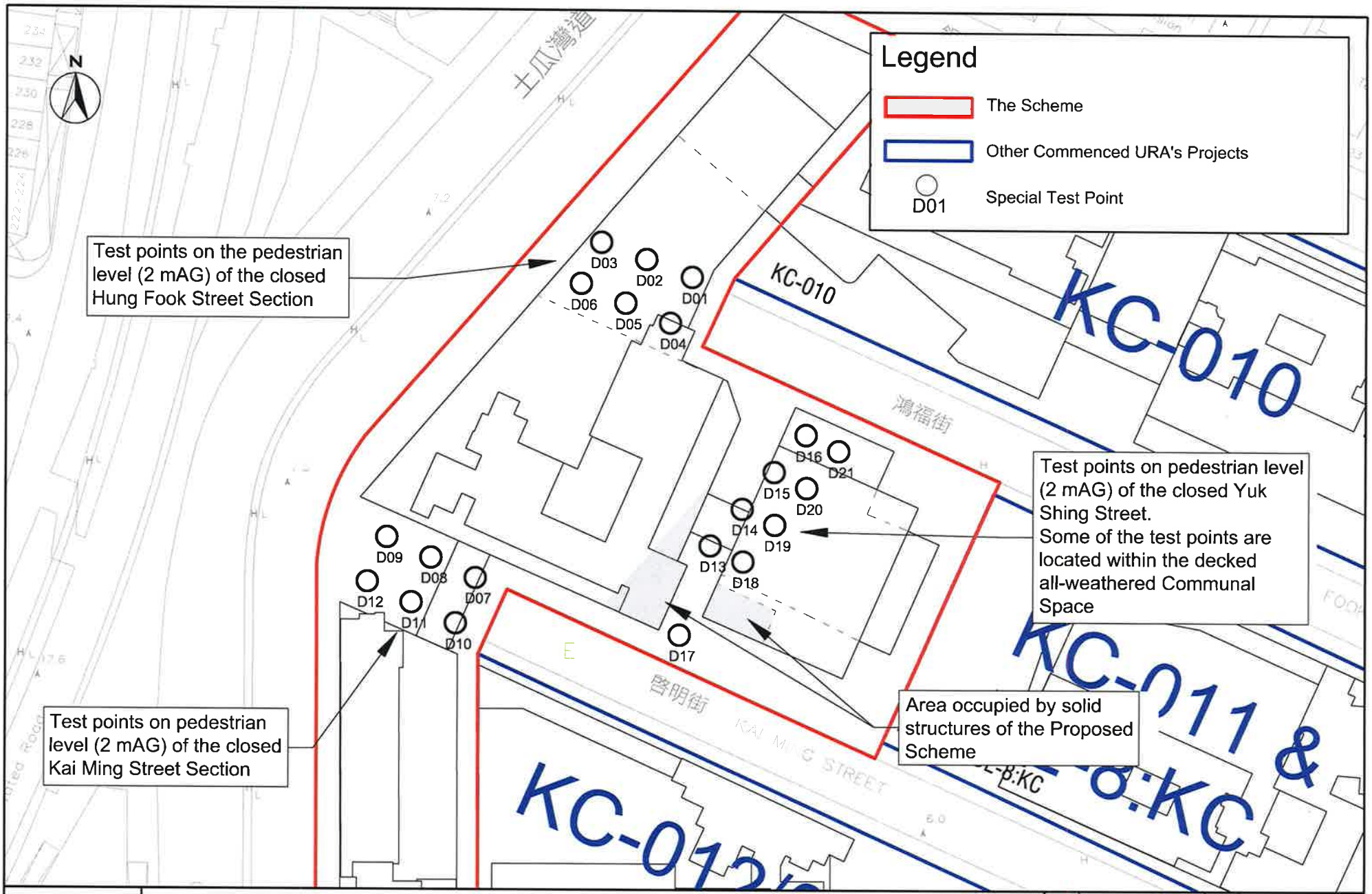
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Special Test Points (Baseline Scheme)

SCALE	1:2000 @ A3	DATE	Feb 2021
CHECK	KC	DRAWN	CC
JOB No.	IA 19021-KCAA101	DRAWING No.	3-3a
		REV	-



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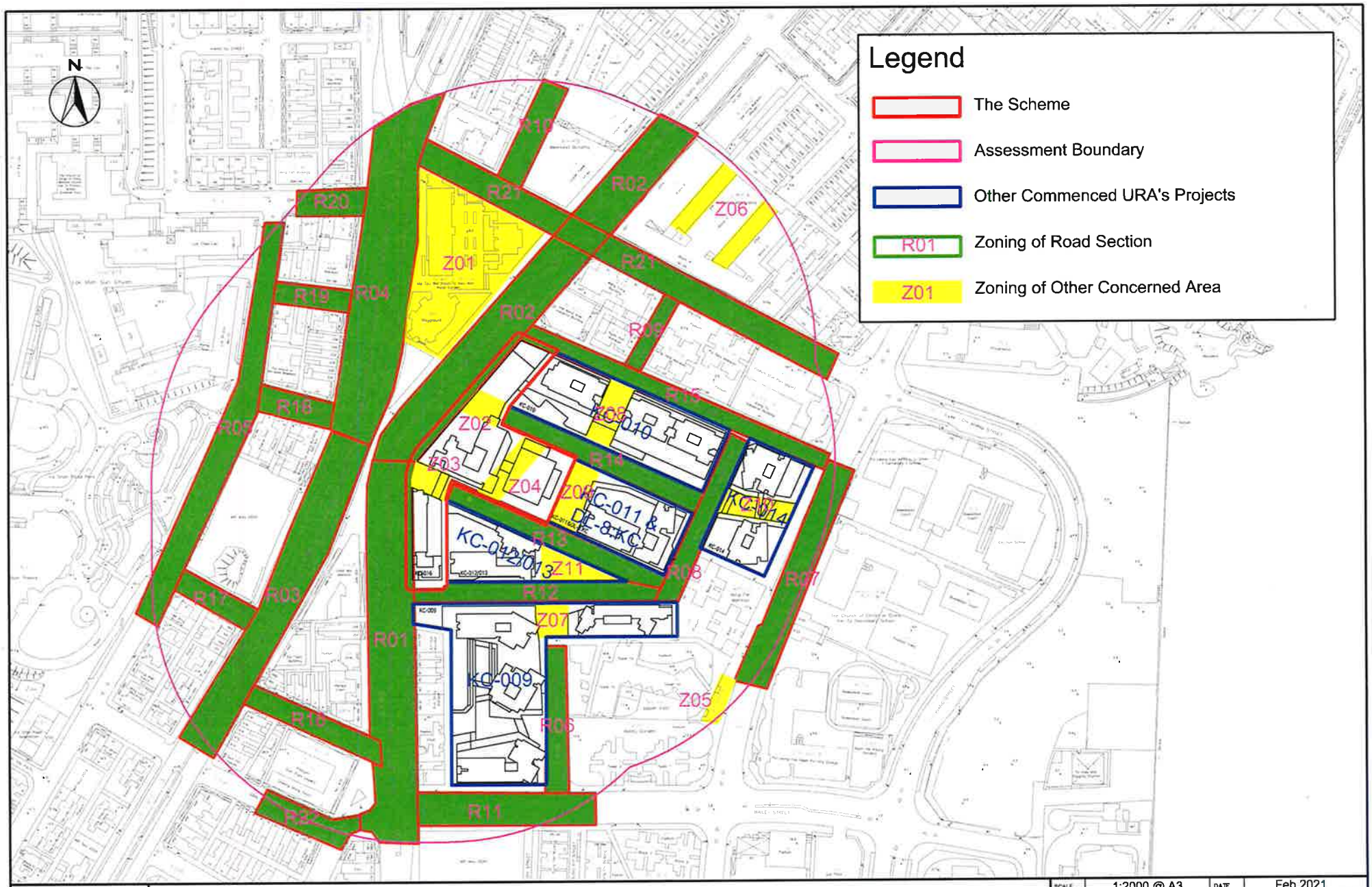
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Special Test Points (Proposed Scheme)

SCALE	1:2000 @ A3	DATE	September 2020
CHECK	KC	DRAWN	CC
JOB No.	IA 19021-KCAA101	DRAWING No.	3-3b
		REV	-



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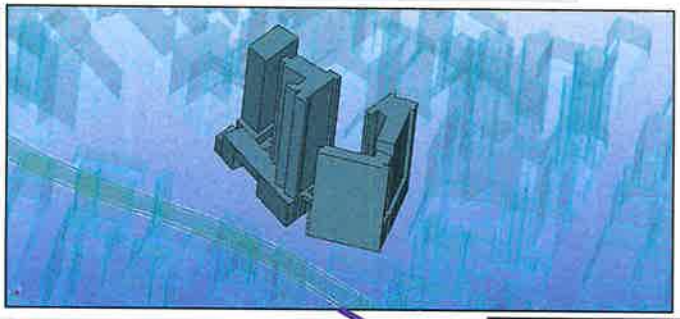
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

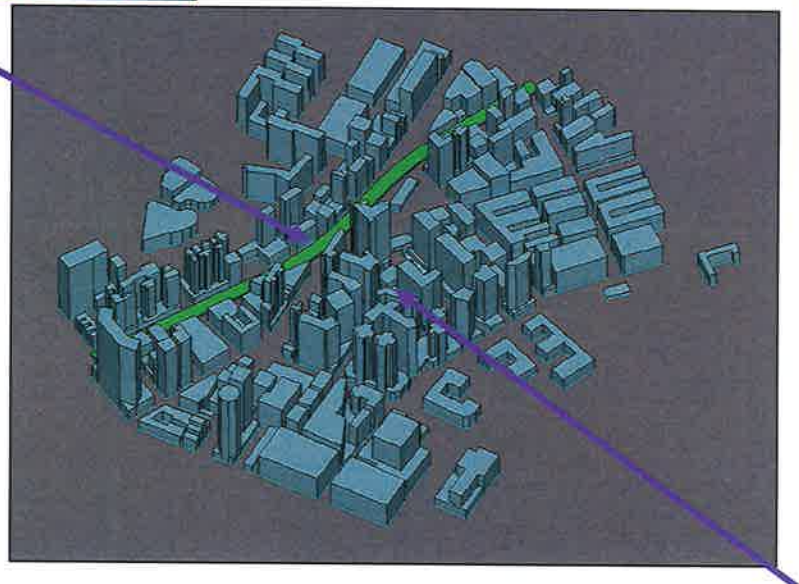
Zoning of Assessment Areas

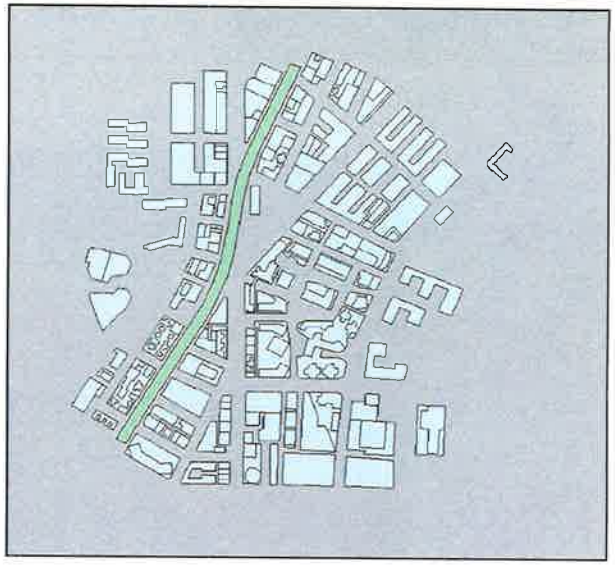
SCALE	1:2000 @ A3	DATE	Feb 2021
CHECK	KC	DRAWN	CC
JOB No.	IA 19021-KCAA101	DRAWING No.	3-4
		REV	-

The Proposed Scheme with two neighborhood commenced developments



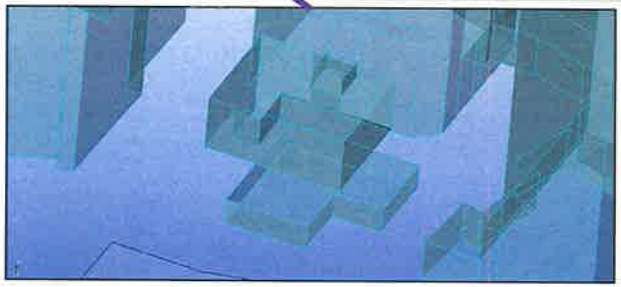
View from West





Top View

The Low Block and the undernearth All-weathered Urban Space



View from East

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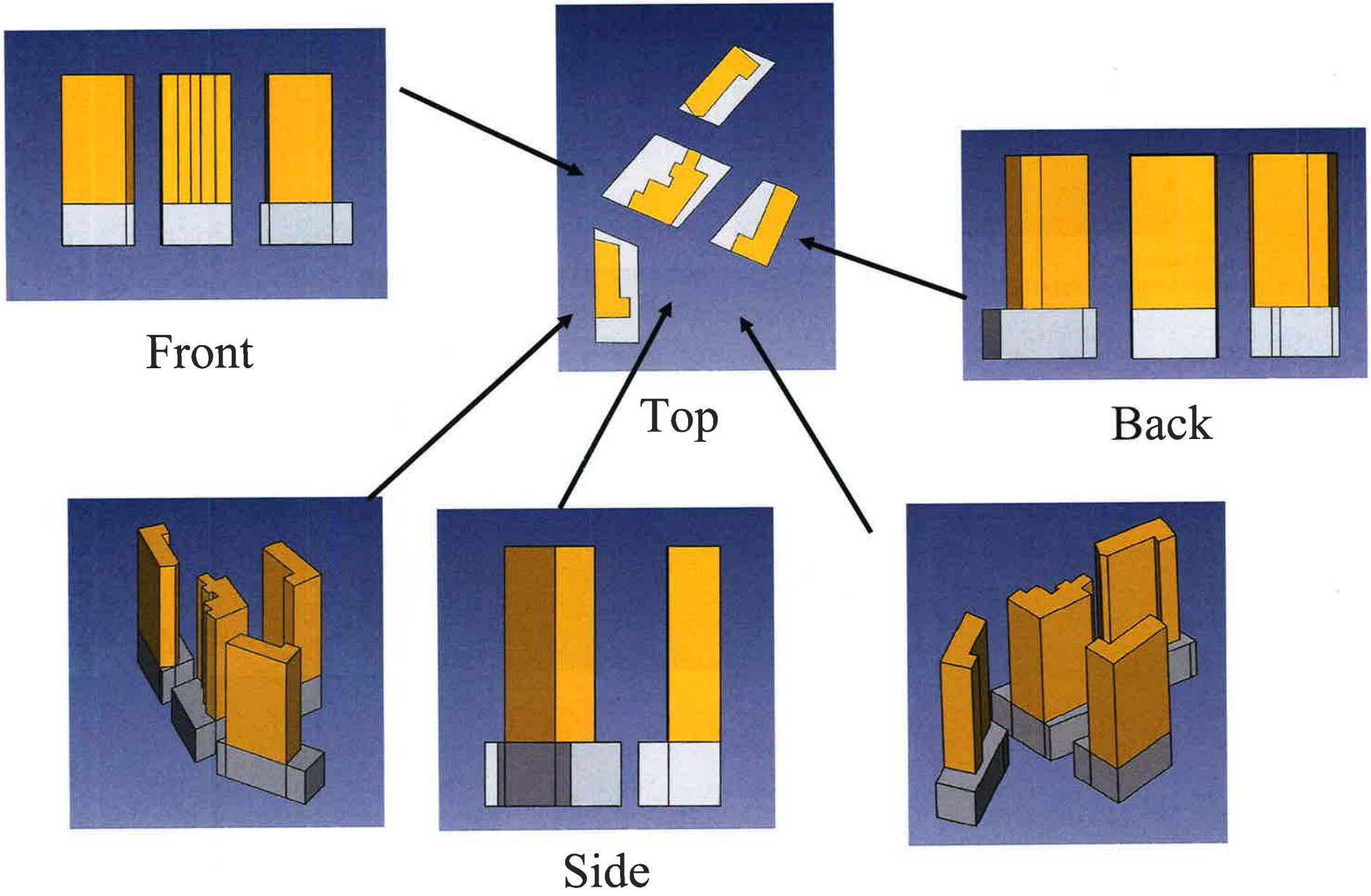
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Buildings Included in the CFD Models

SCALE	N.T.S.	DATE	Jul-20
CHECK	KC	DRAWN	CC
JOB NO.	A9021KC-AA1-01	FIGURE NO.	3-5
			REV. -



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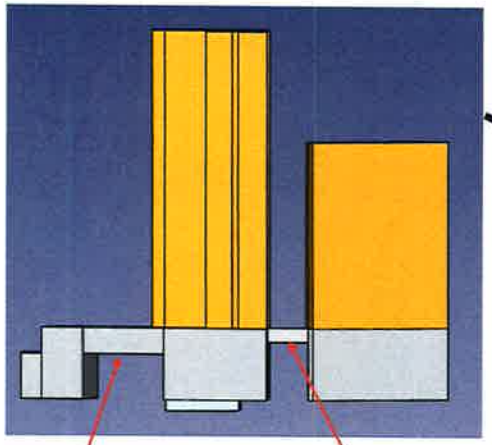
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

3D Model of the Baseline Building (Superstructure) adopted in CFD

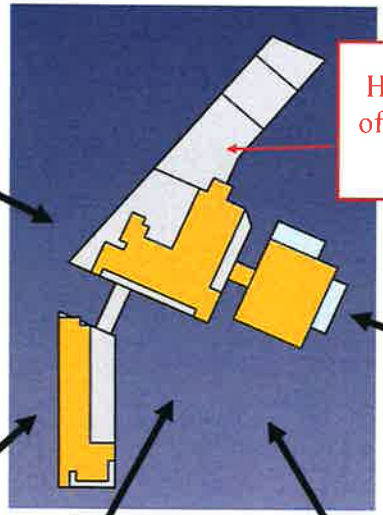
SCALE	N.T.S.	DATE	Jul-20
CHECK	KC	DRAWN	CC
JOB NO.	[illegible]	FIGURE NO. 3-6a	REV. -



Front

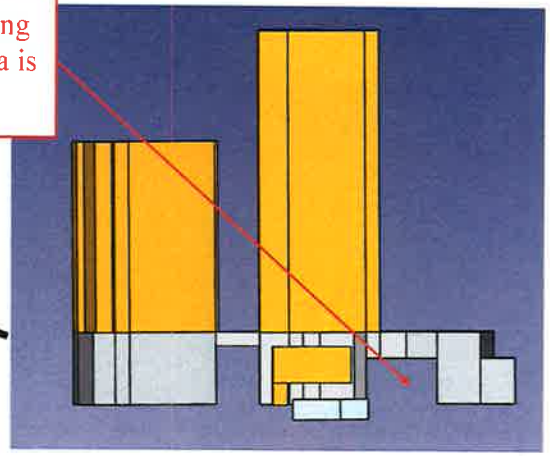
The deck is ~15m above ground

The link bridge is ~20m above ground

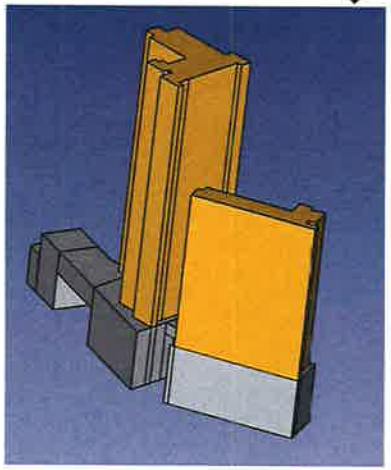


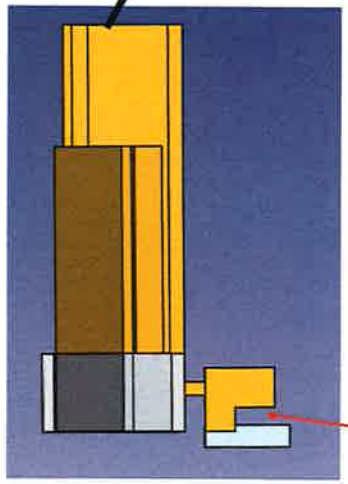
Top

Horizontal opening of the decked area is ~24m-29m

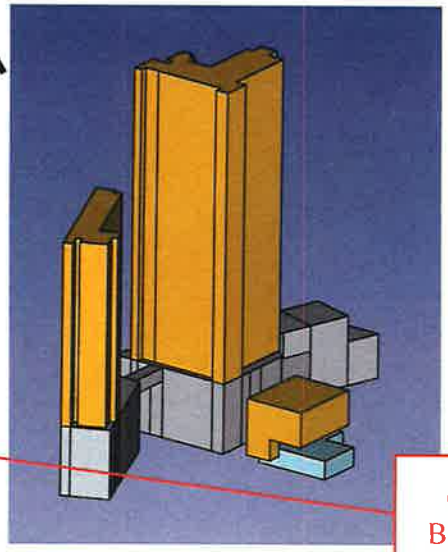


Back





Side



G/F of the Low Block is open area

* The light-blue object underneath the Low Block (short orange building) is part of the All-weathered Urban Space adopted in the model.

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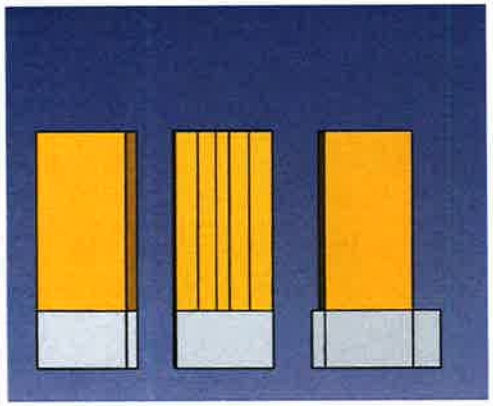
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

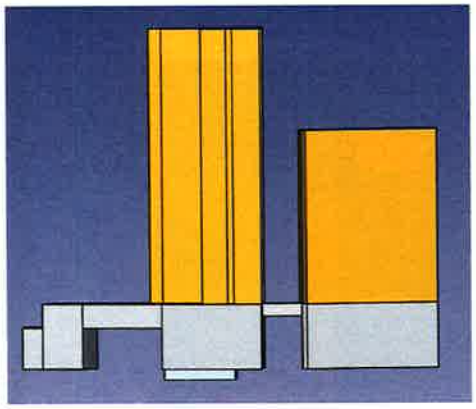
3D Model of the Proposed Building (Superstructure) adopted in CFD

SCALE	N.T.S.	DATE	Jul-20
CHECK	KC	DRAWN	CC
JOB NO.	[illegible]	FIGURE NO.	3-6b
			REV.

Baseline

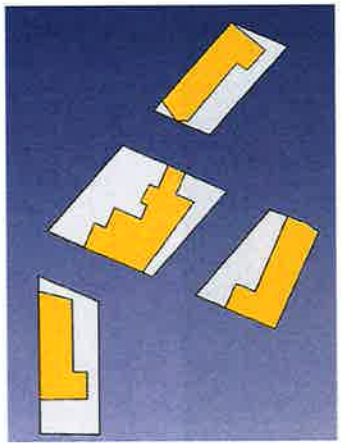


Proposed

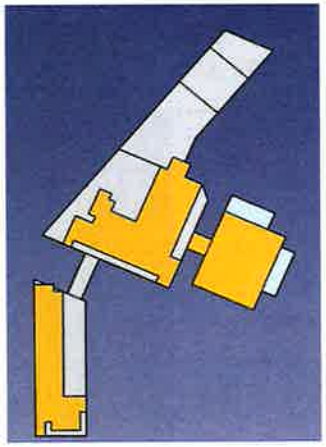


Front

Baseline

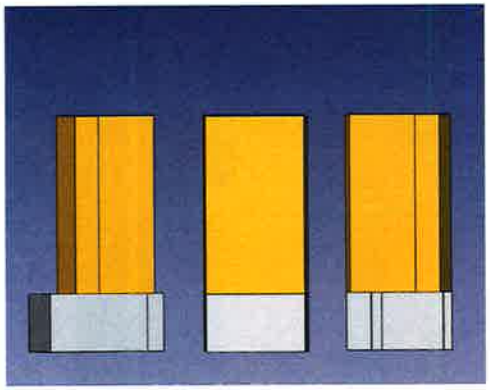


Proposed

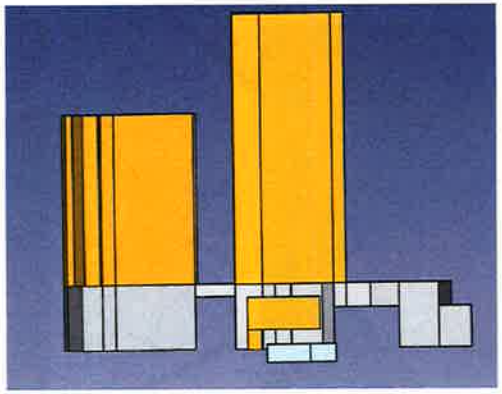


Top

Baseline

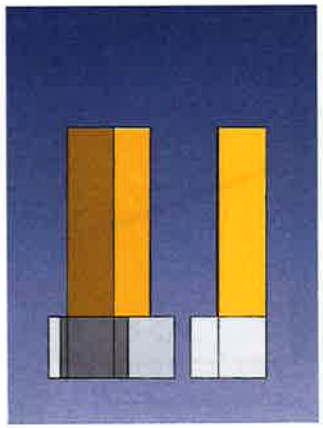


Proposed

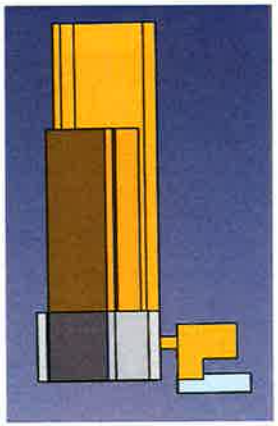


Back

Baseline



Proposed



Side

* The light-blue object underneath the Low Block (short orange building) is part of the All-weathered Urban Space adopted in the model.

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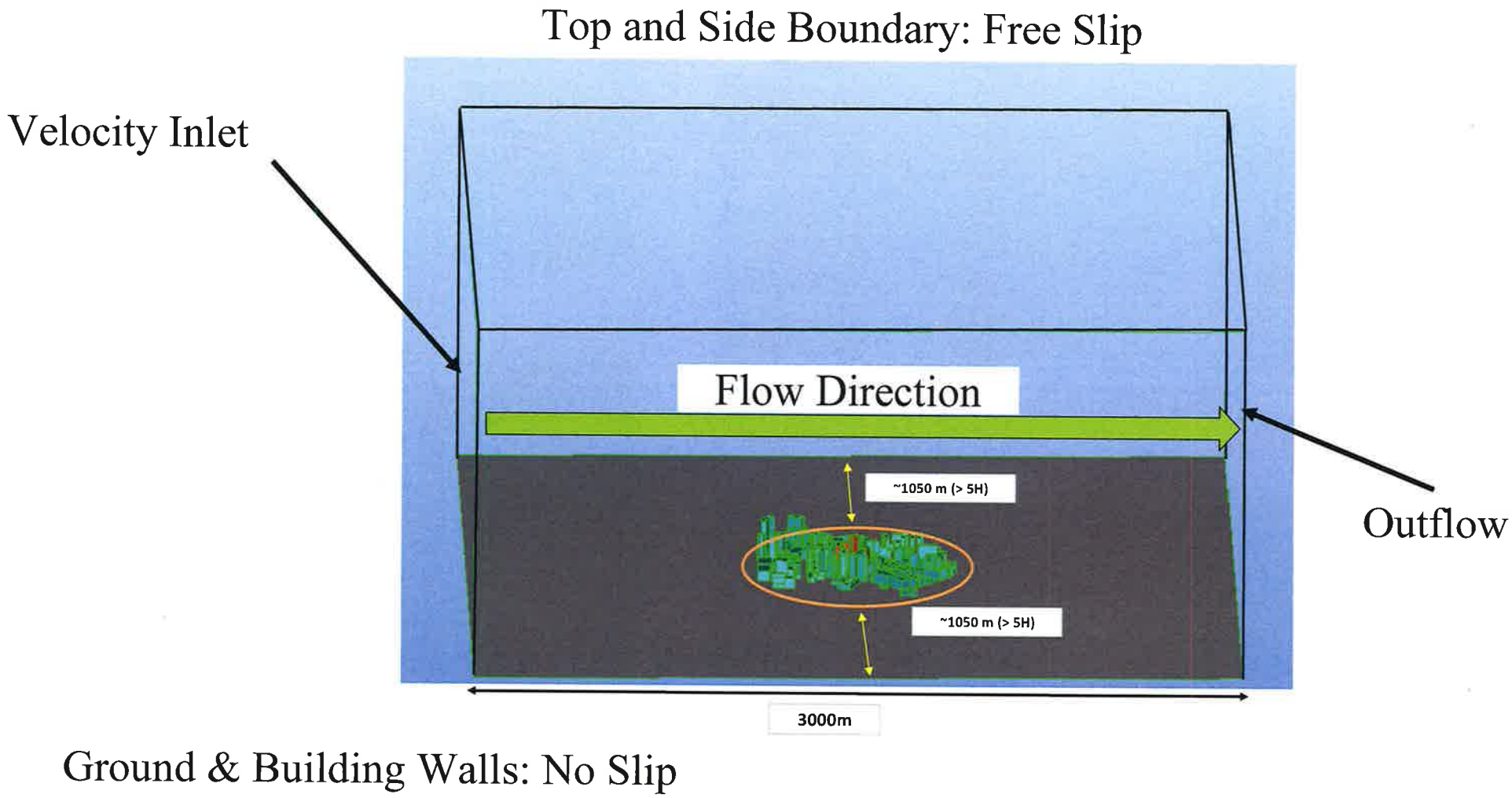
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Comparison between the Baseline and Proposed Model

SCALE	N.T.S.	DATE	Jul-20
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KC-AA1-01	FIGURE NO. 3-7	REV. -



* Setting for 180 deg Wind is adopted in this example
\# Height of Highest building H = 140 m ; 5H = 5 x 140= 700m

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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

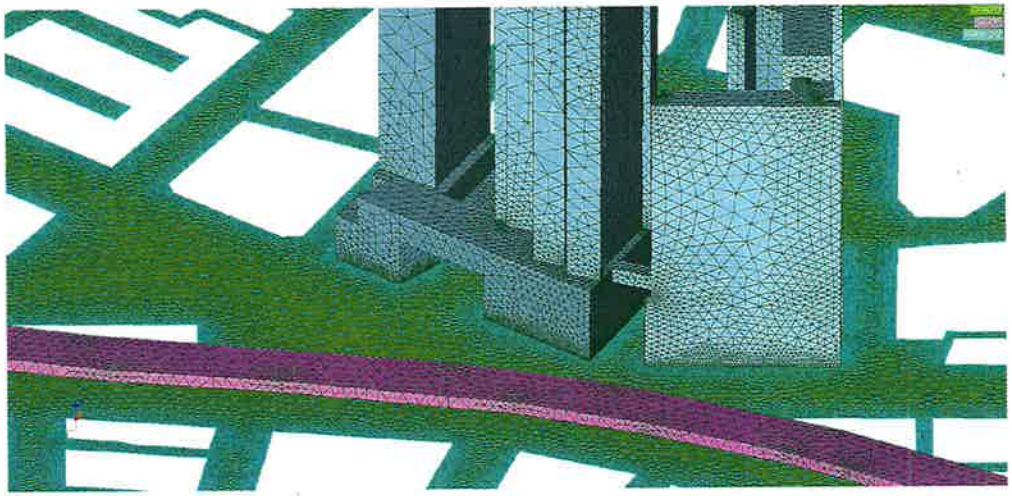
Computational Domain

SCALE	N.T.S.	DATE	Jul-20	
CHECK	KC	DRAWN	CC	
JOB NO.		FIGURE NO.	3-8	REV.

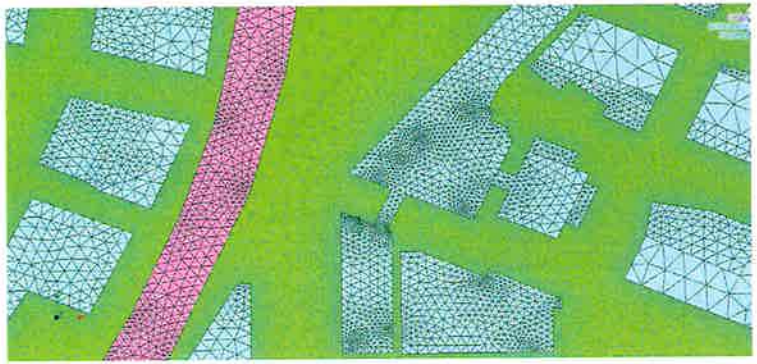
Top



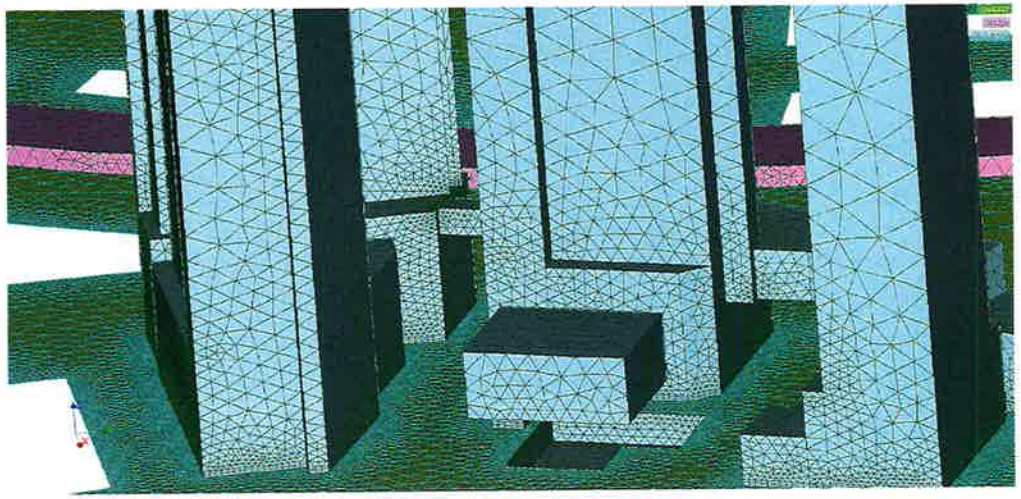
View from West



Near the Site



View from East



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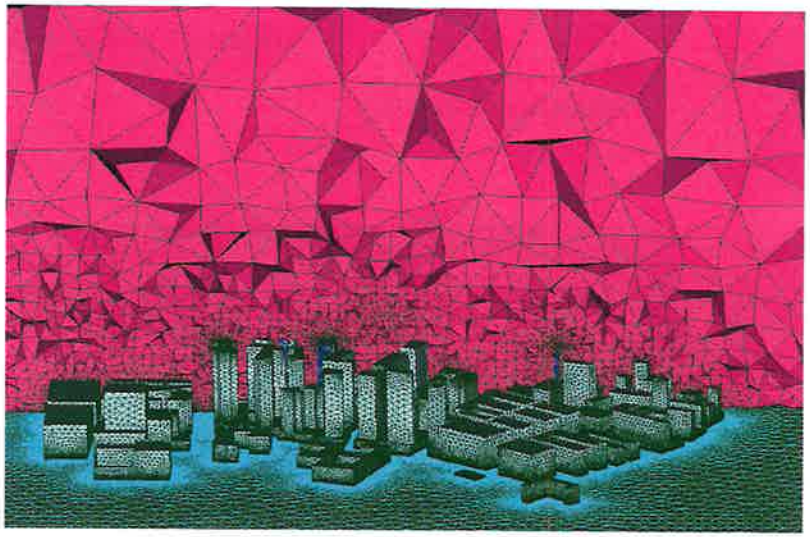
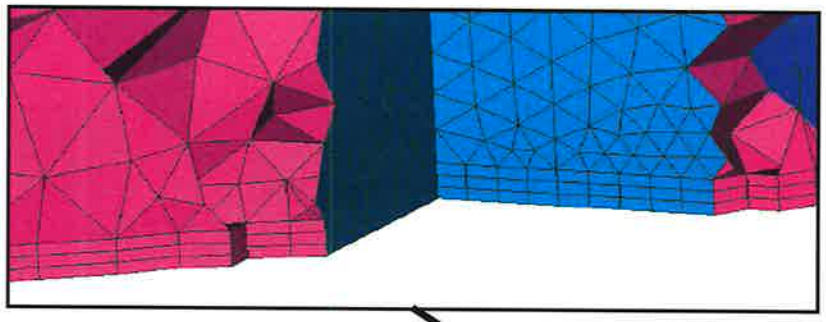
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Meshes on 2D Surfaces

SCALE	N.T.S.	DATE	Jul-20
CHECK	KC	DRAWN	CC
JOB NO.	A9021WC-AA1-01	FIGURE NO. 3-9	REV. -

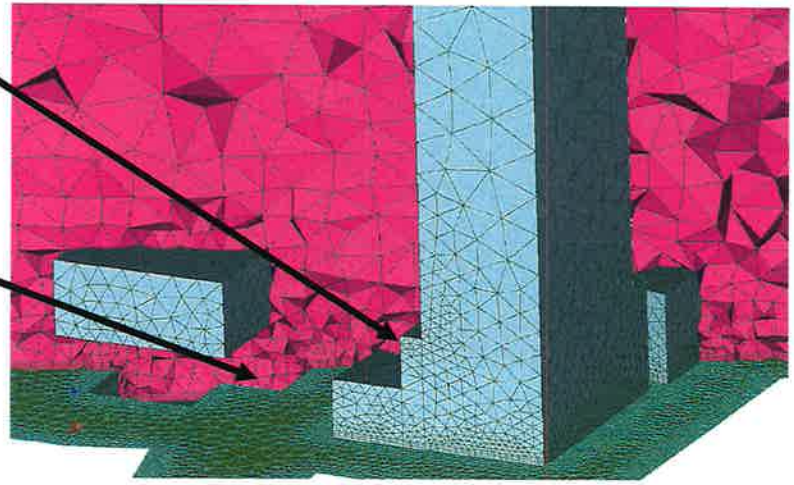
Overview

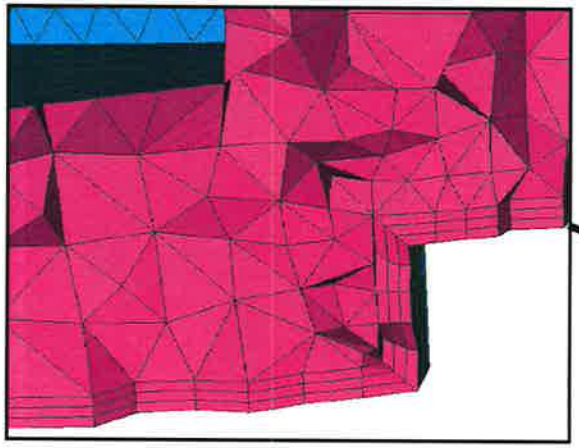




Prism Layers near Ground

Near the Scheme





Prism Layers near Ground

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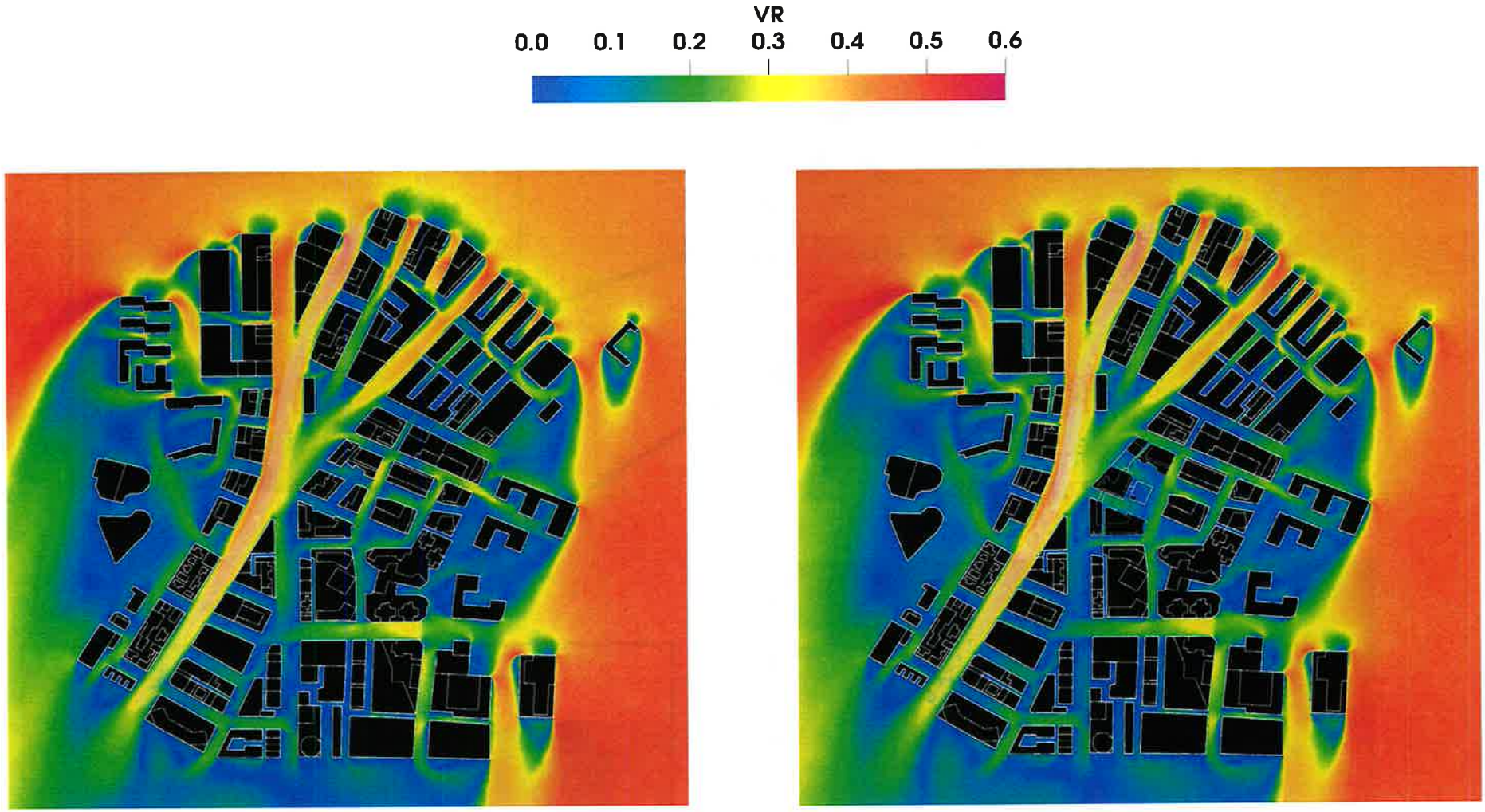
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Meshes on 3D Space

SCALE	N.T.S.	DATE	Jul-20
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KC-AA1-01	FIGURE NO. 3-10	REV. -



Baseline Scheme

Proposed Scheme

022.5 deg Wind Direction (6m/s at 500m)

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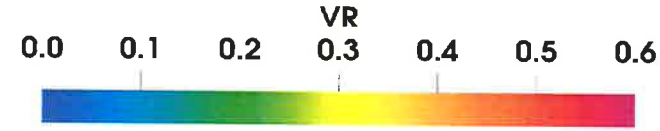
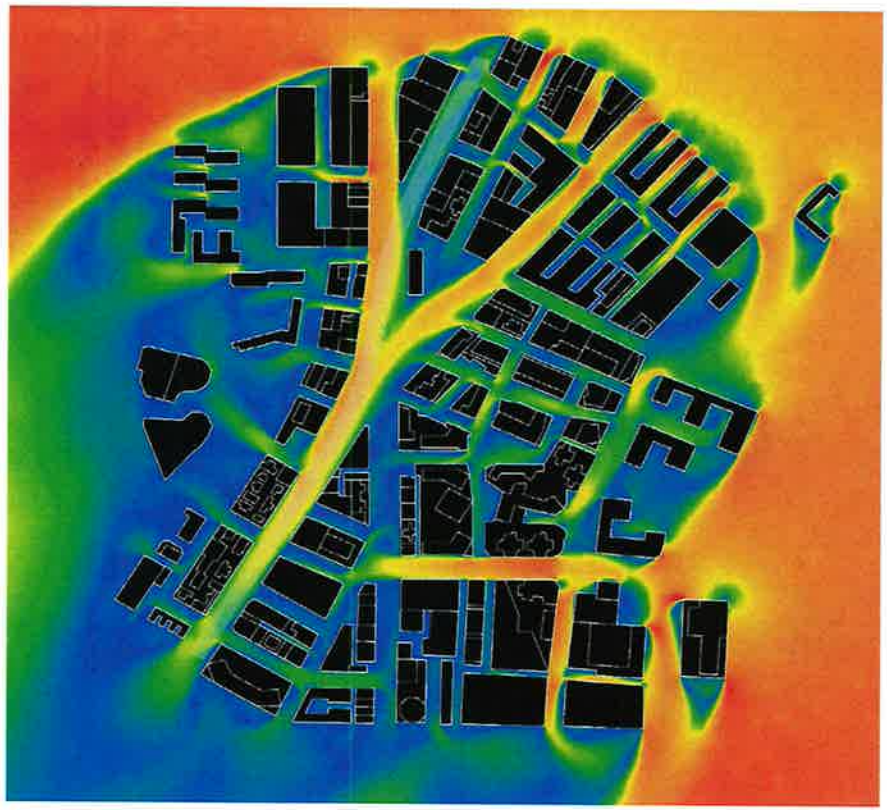
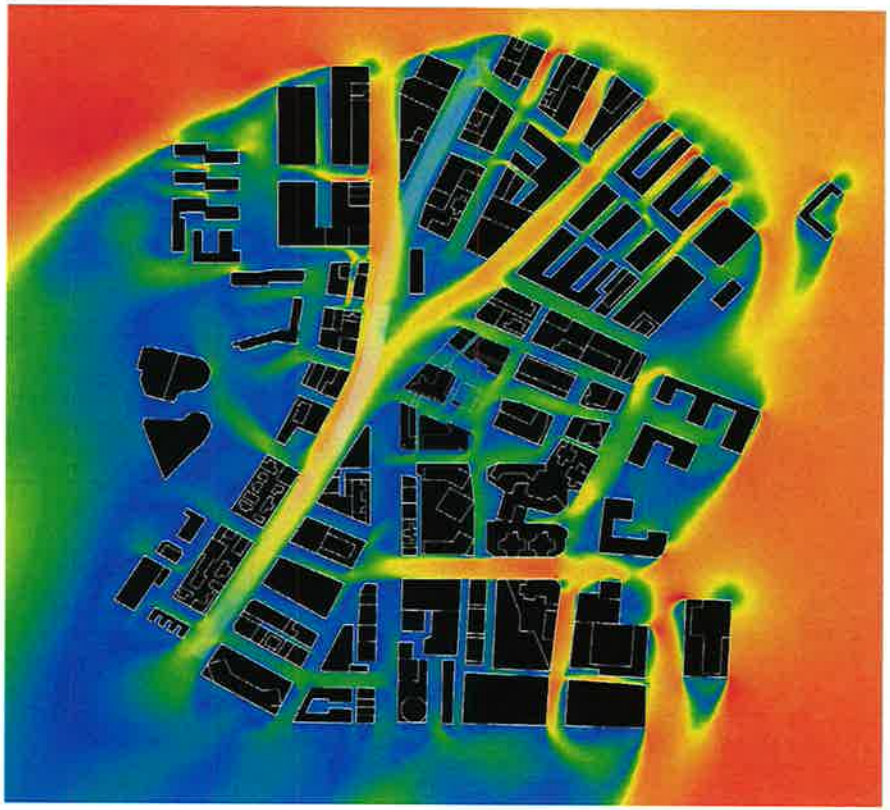
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Contours of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KC-AA1-01	FIGURE NO. 4-1a	REV. -







Baseline Scheme

Proposed Scheme

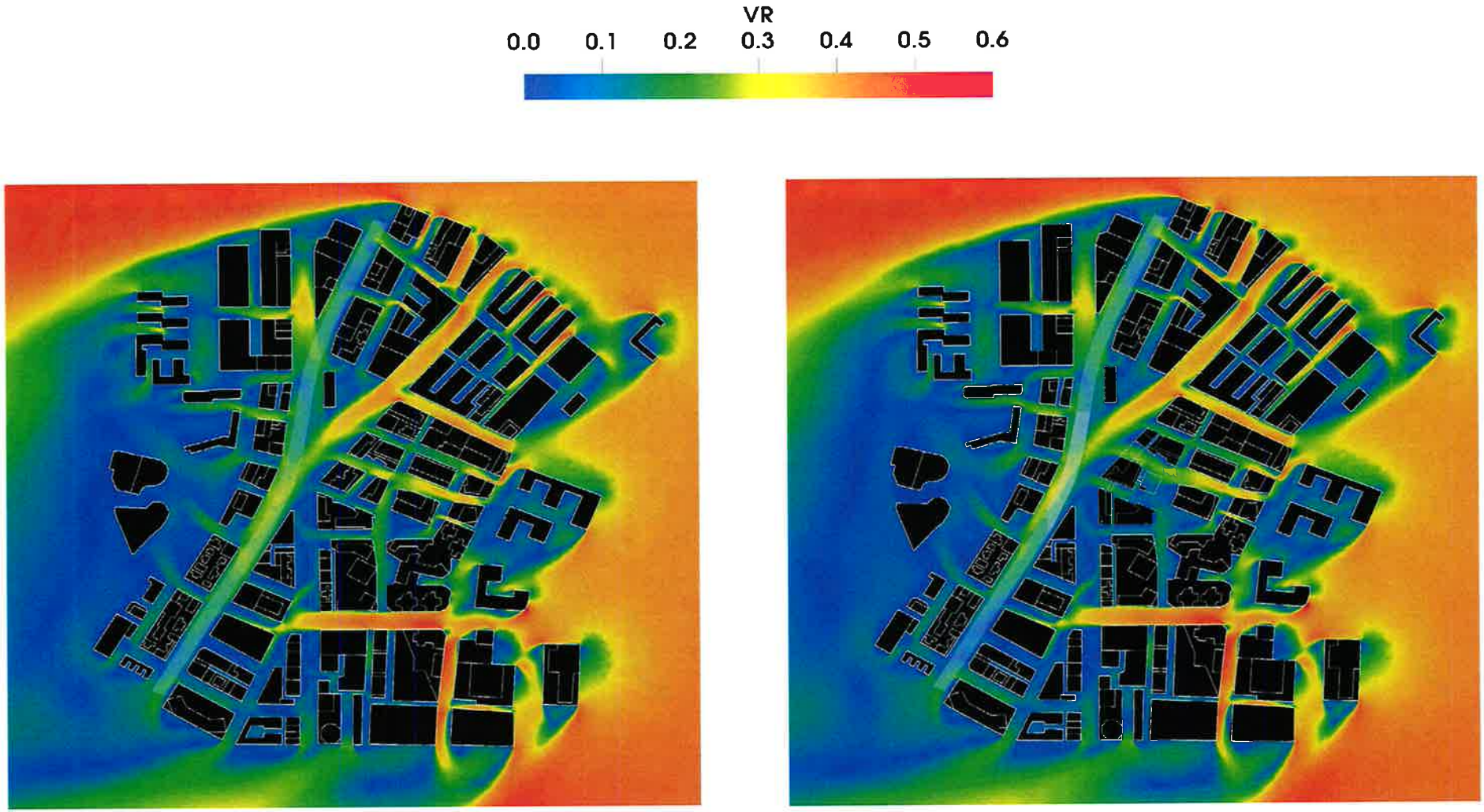
045 deg Wind Direction (6m/s at 500m)

CINOTECH 漢臻 consultants limited

Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Contours of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KC-AA1-01	FIGURE NO. 4-1b	REV. -



Baseline Scheme

Proposed Scheme

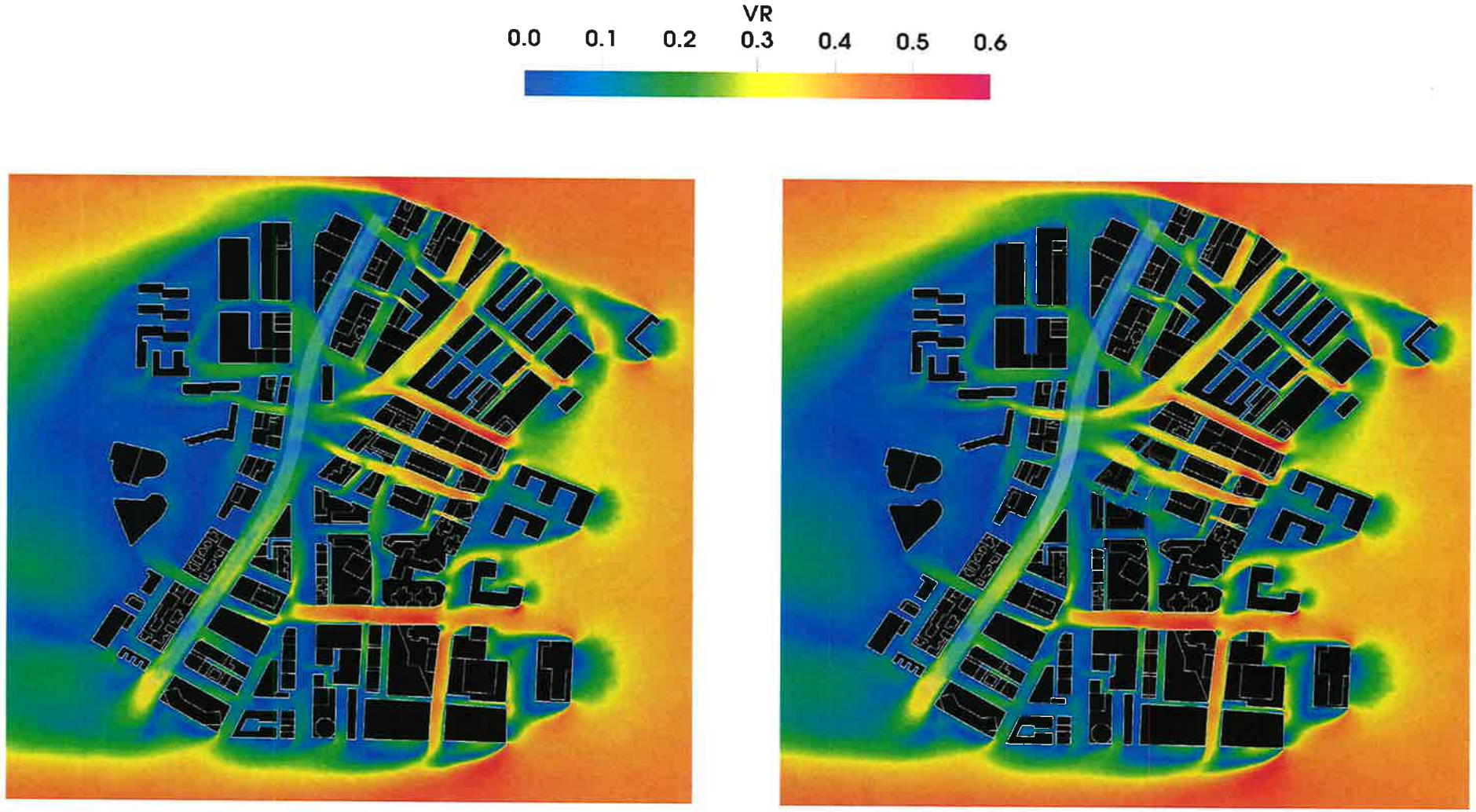
067.5 deg Wind Direction (7m/s at 500m)

CINOTECH consultants limited

Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Contours of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KC/AA1.01	FIGURE NO. 4-1c	REV. -



Baseline Scheme

Proposed Scheme

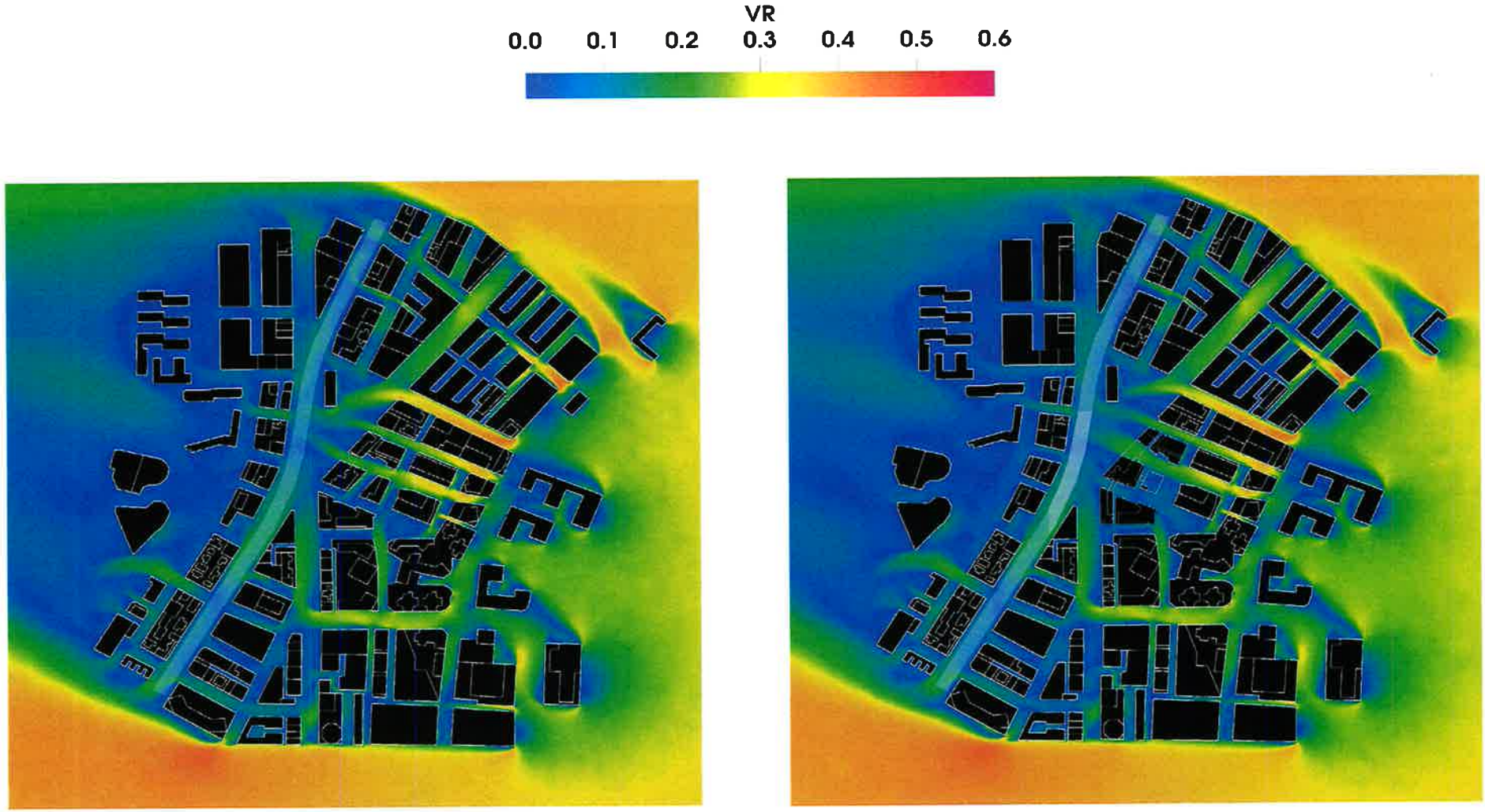
090 deg Wind Direction (7m/s at 500m)

CINOTECH 漢槎 consultants limited

Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Contours of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	A5021/KC-AA1-01	FIGURE NO. 4-1d	REV. -



Baseline Scheme

Proposed Scheme

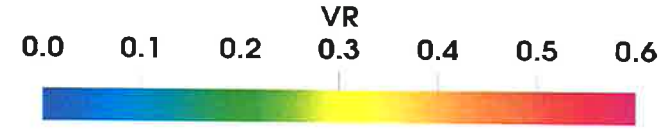
112.5 deg Wind Direction (7m/s at 500m)

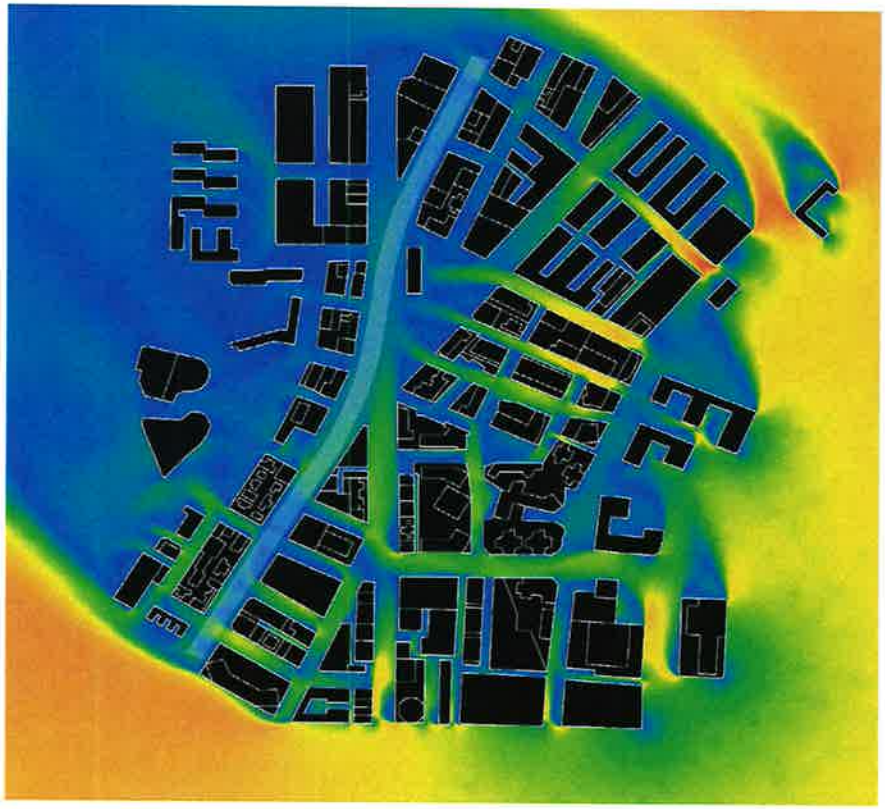
CINOTECH consultants limited

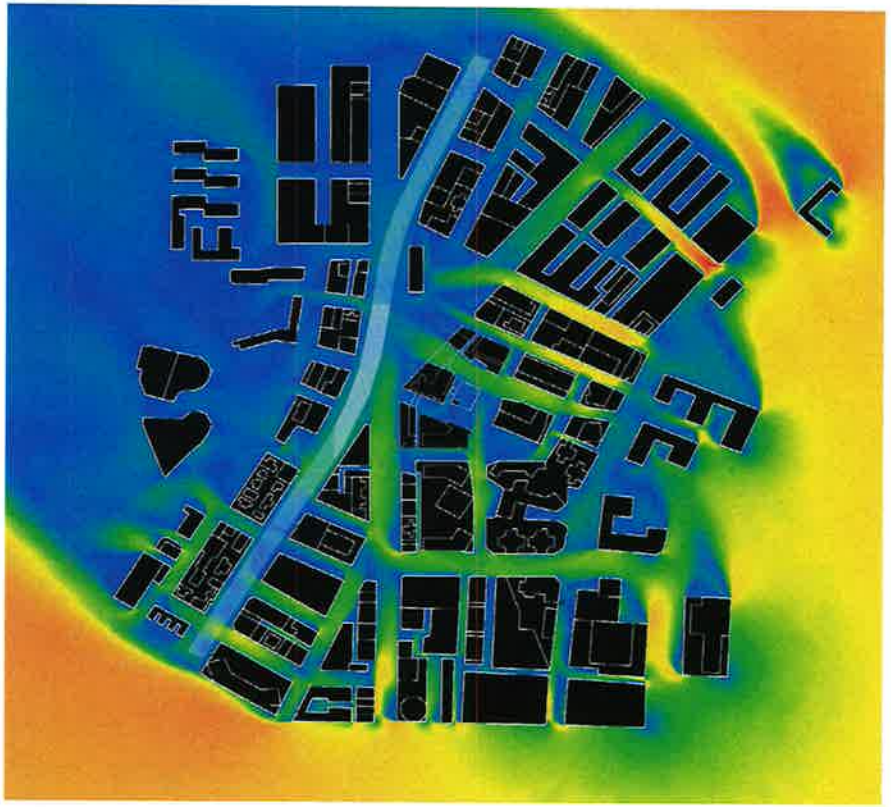
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Contours of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.		FIGURE NO. 4-1e	REV. -







Baseline Scheme

Proposed Scheme

135 deg Wind Direction (6m/s at 500m)

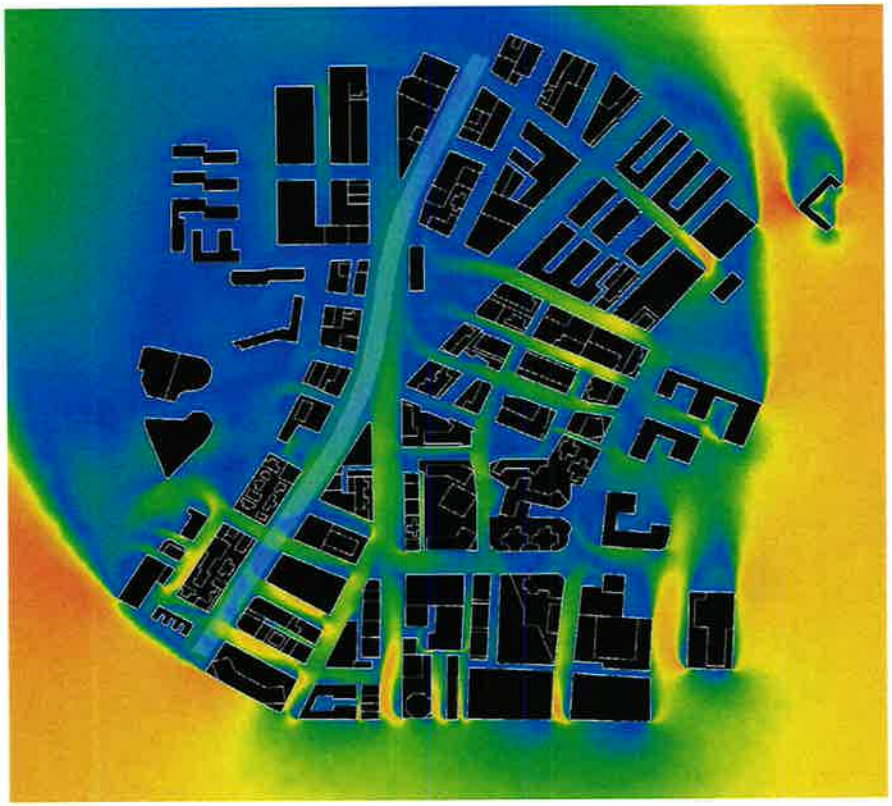
CINOTECH 漢蔡 consultants limited

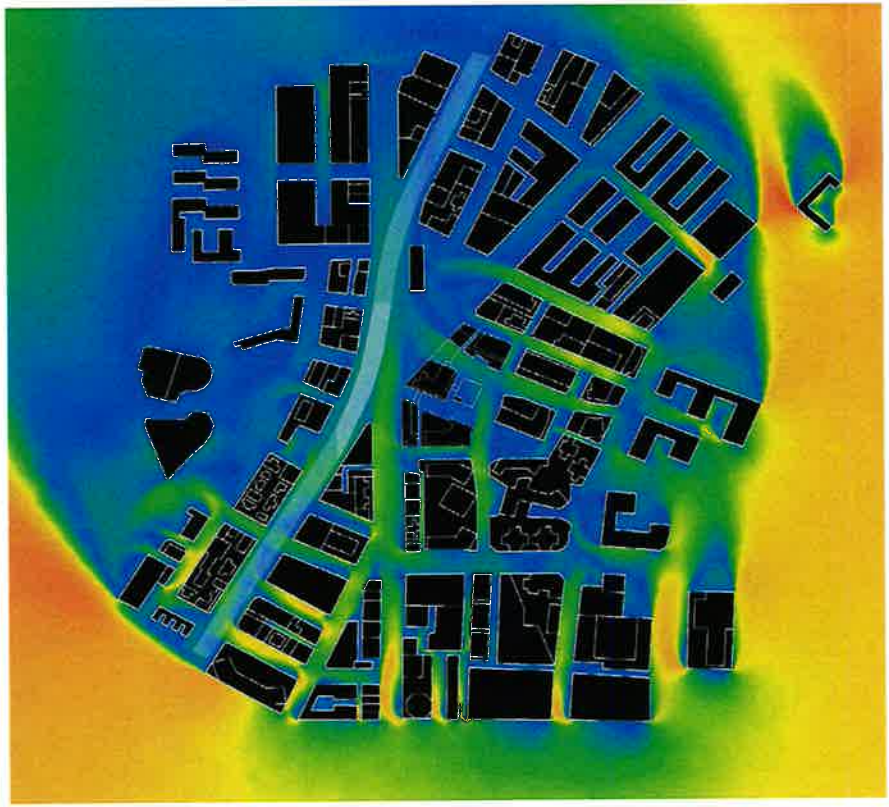
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Contours of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KC AA1-01	FIGURE NO. 4-1f	REV. -







Baseline Scheme

Proposed Scheme

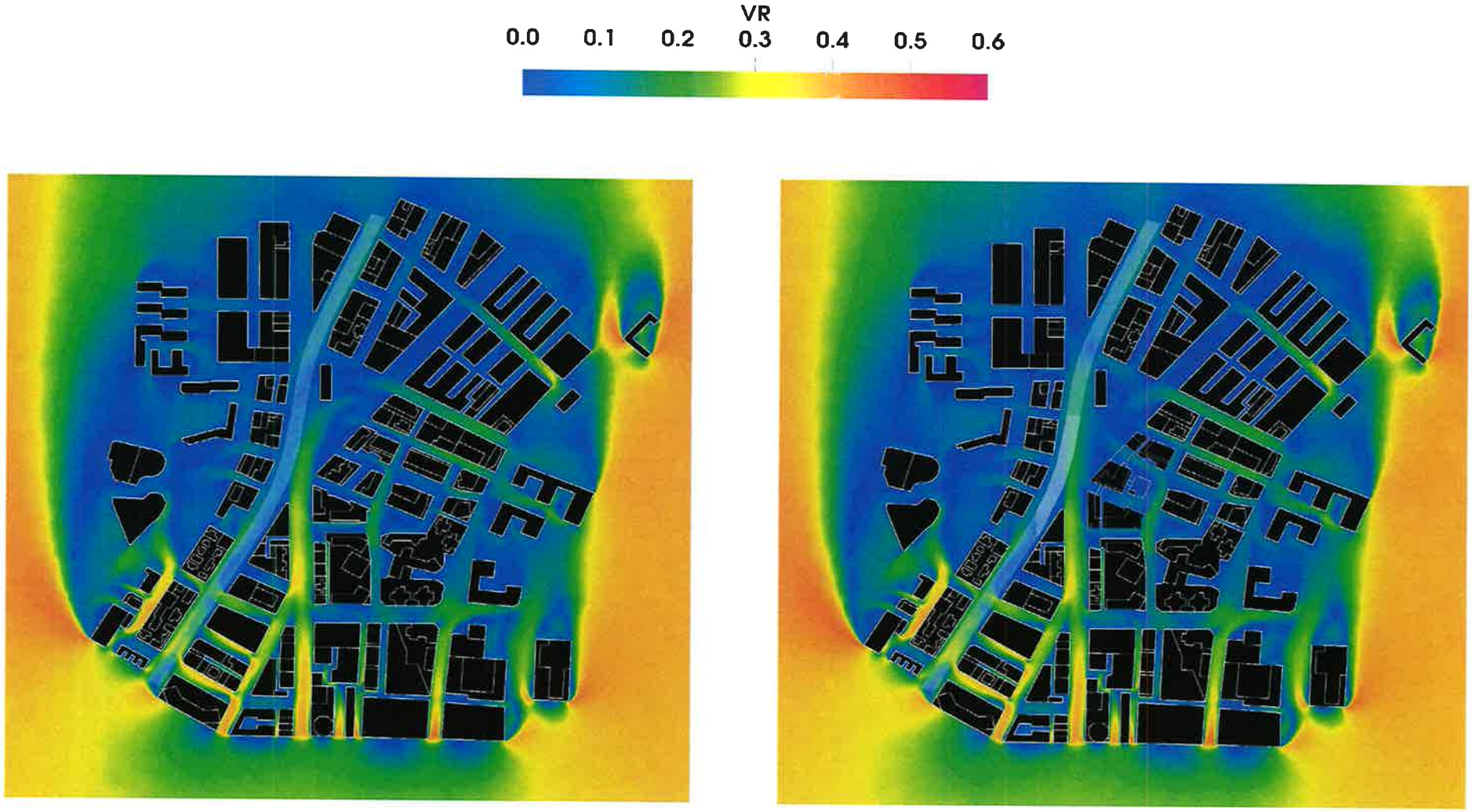
157.5 deg Wind Direction (5m/s at 500m)

CINOTECH consultants limited 漢槎

Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Contours of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KC-AA1-01	FIGURE NO.	4-1g
			REV. -



Baseline Scheme

Proposed Scheme

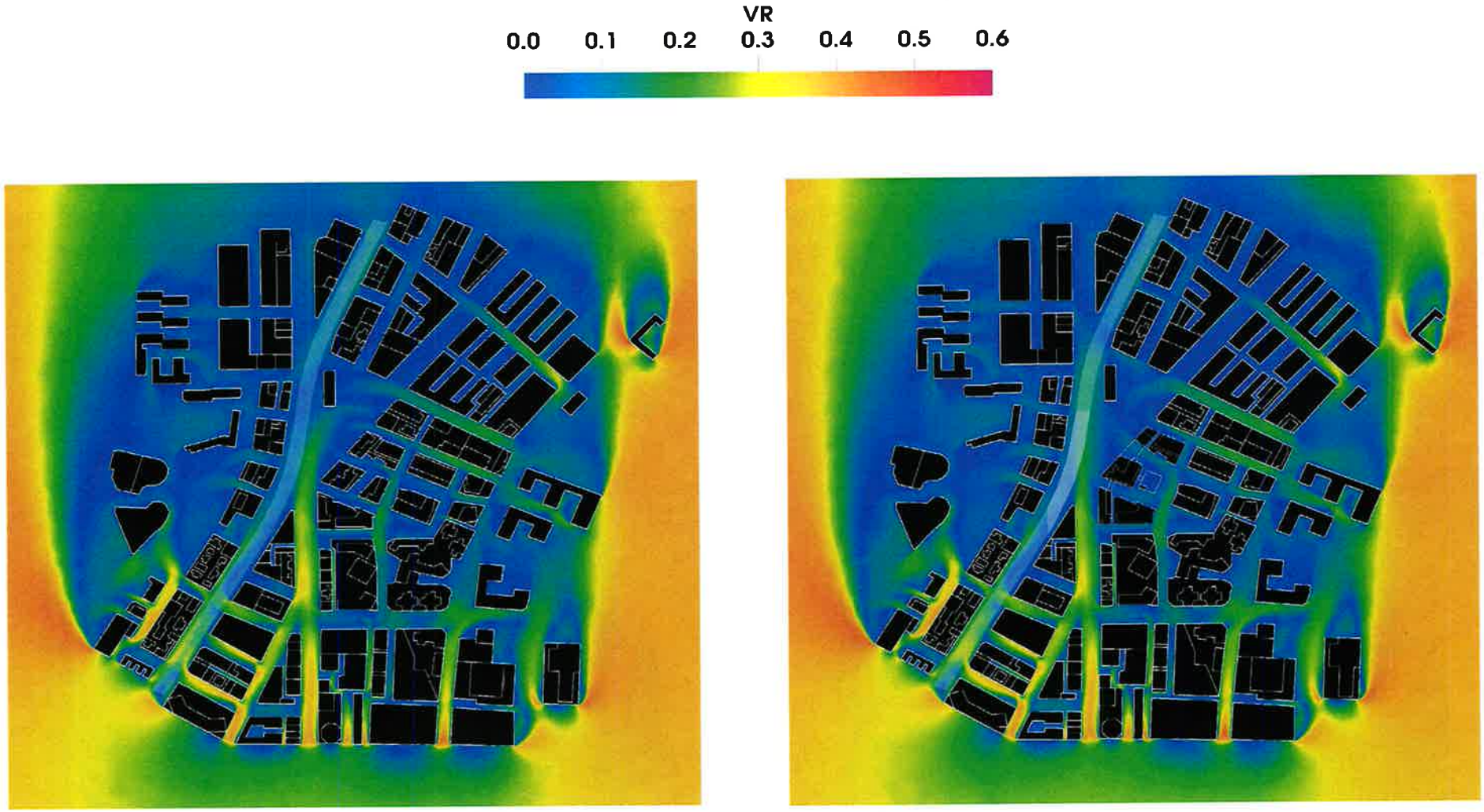
180 deg Wind Direction (5m/s at 500m)

CINOTECH consultants limited

Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Contours of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21	
CHECK	KC	DRAWN	CC	
JOB NO.	A9021/KC-AA1-01	FIGURE NO.	4-1h	REV.
				-



Baseline Scheme

Proposed Scheme

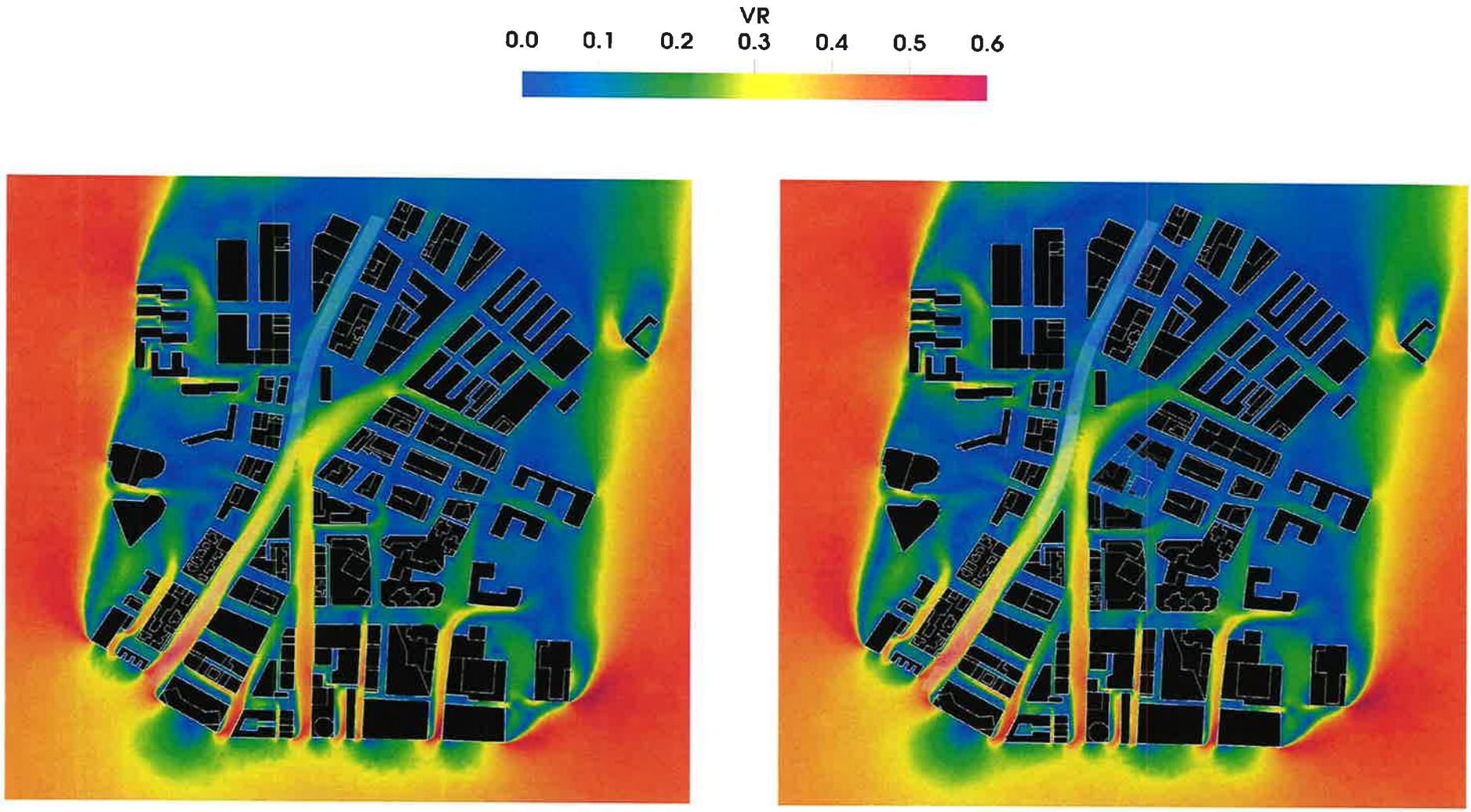
180 deg Wind Direction (6m/s at 500m)

CINOTECH 漢謙 consultants limited

Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Contours of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KC-AA1-01	FIGURE NO. 4-1i	REV. -



Baseline Scheme

Proposed Scheme

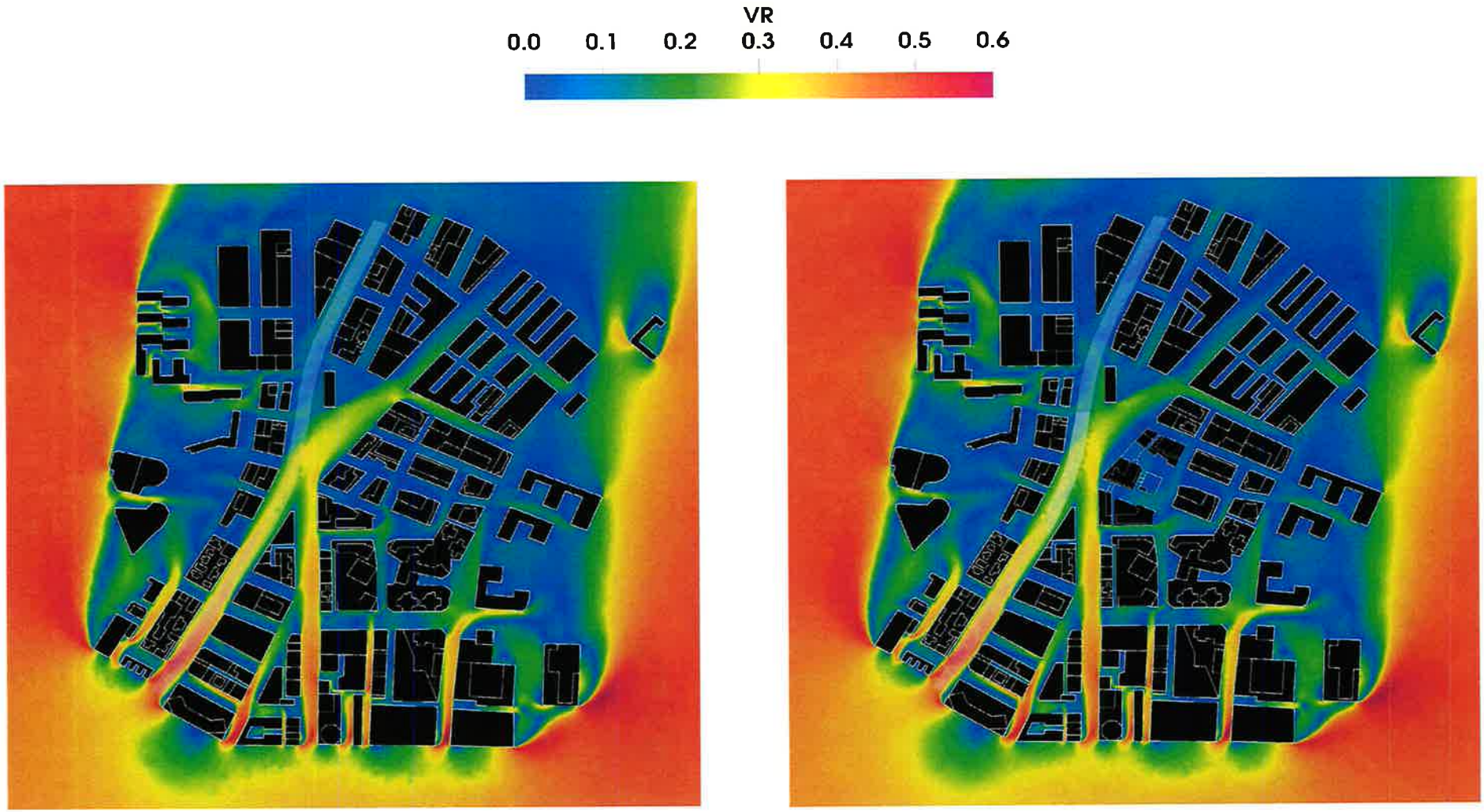
202.5 deg Wind Direction (6m/s at 500m)

CINOTECH 漢疇 consultants limited

Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Contours of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KC-AA1-01	FIGURE NO. 4-1j	REV. -



Baseline Scheme

Proposed Scheme

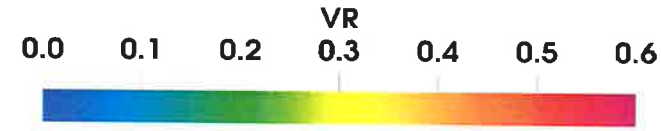
202.5 deg Wind Direction (7m/s at 500m)

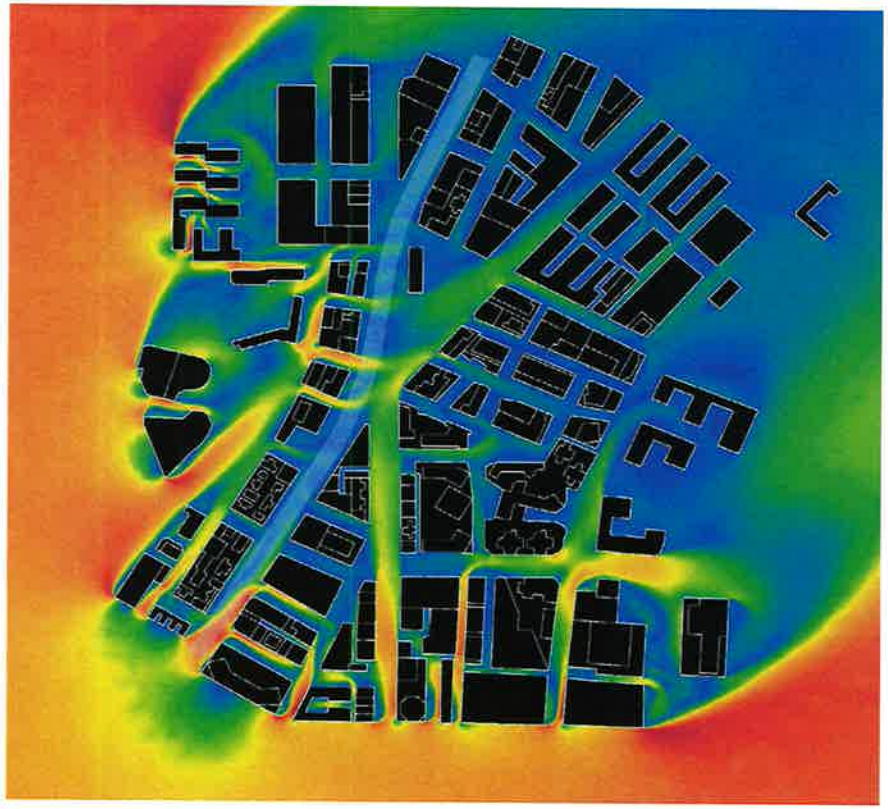
CINOTECH consultants limited

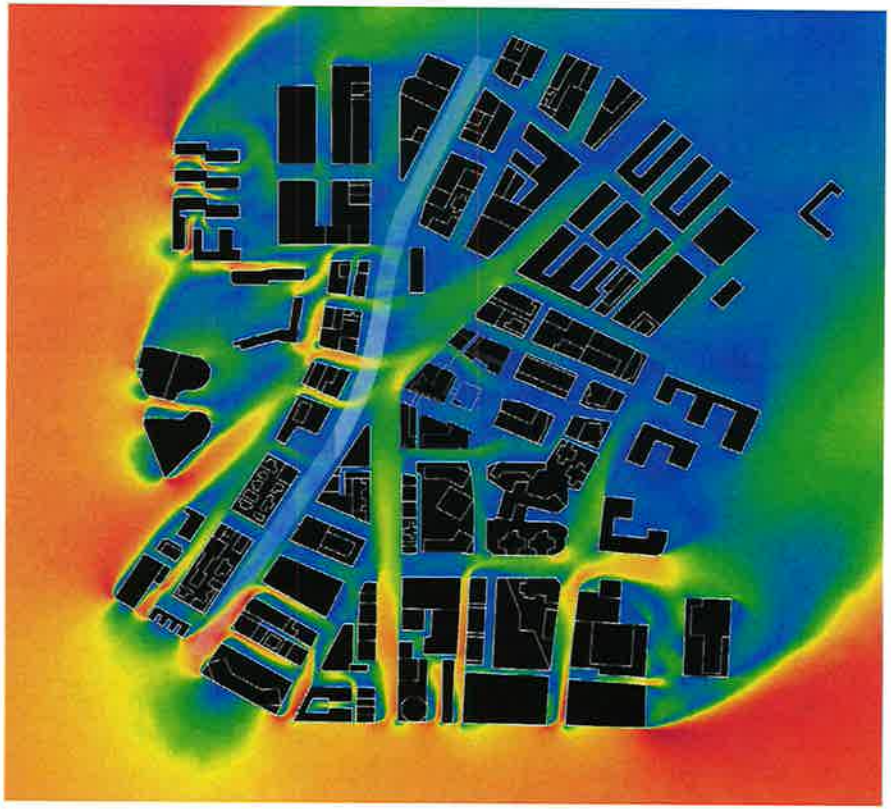
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Contours of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	IA9021/KC-AA1-01	FIGURE NO. 4-1k	REV. -







Baseline Scheme

Proposed Scheme

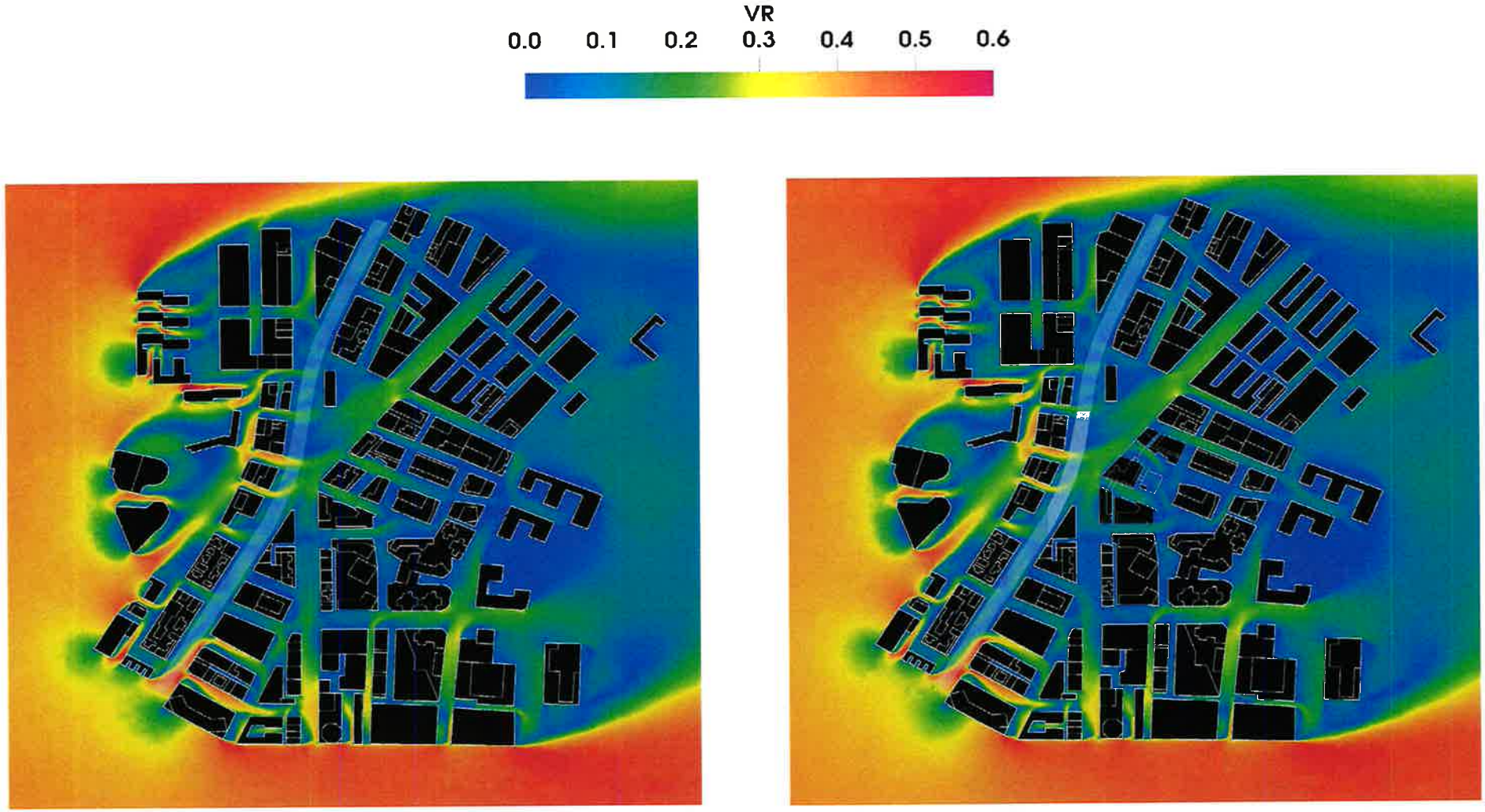
225 deg Wind Direction (6m/s at 500m)

CINOTECH 漢謙 consultants limited

Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Contours of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	A8021WC-AA1-01	FIGURE NO. 4-11	REV. -



Baseline Scheme

Proposed Scheme

247.5 deg Wind Direction (6m/s at 500m)

CINOTECH 漢槎 consultants limited

Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Contours of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KC-AA1-01	FIGURE NO. 4-1m	REV. -







Baseline Scheme

Proposed Scheme

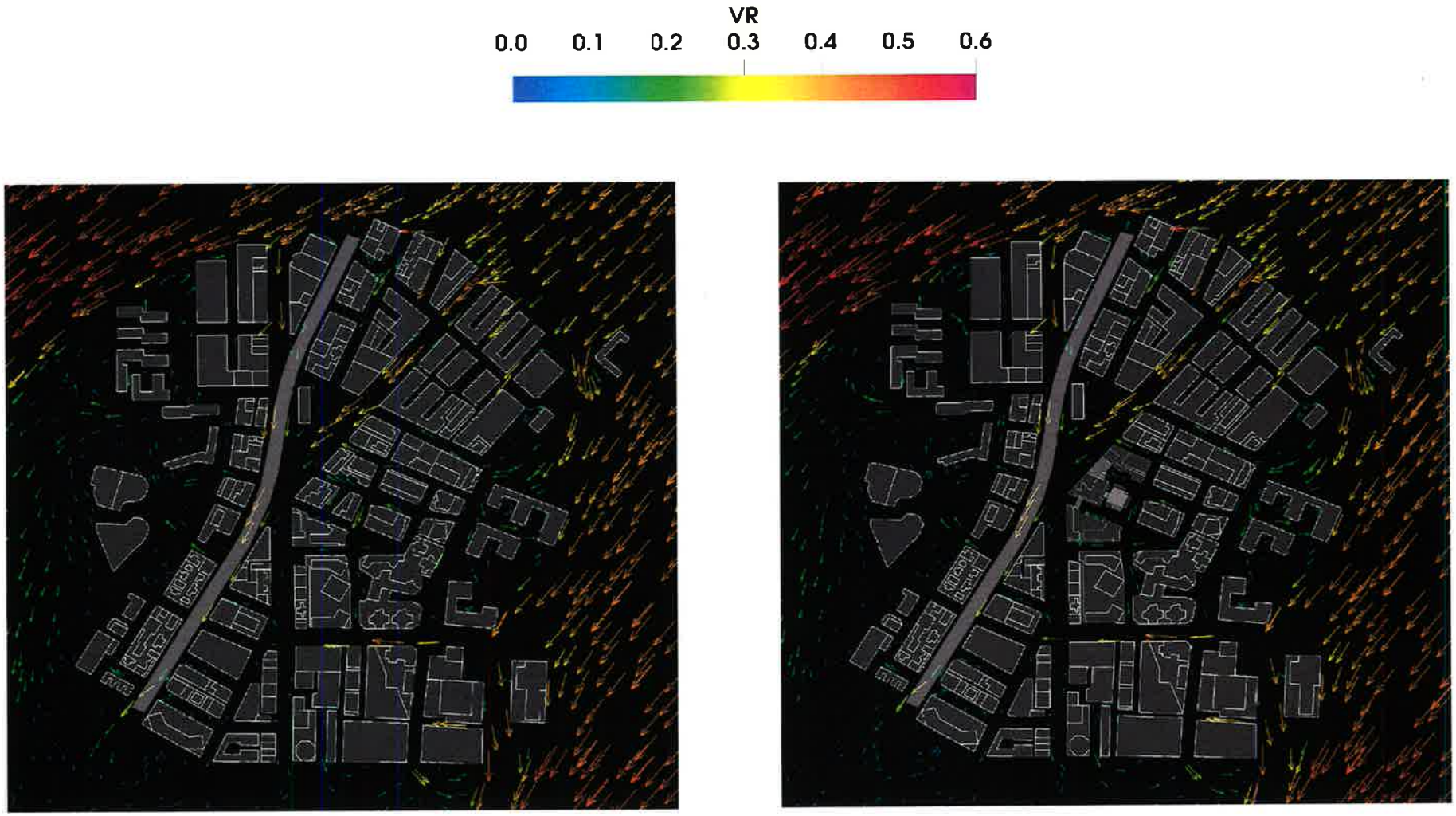
022.5 deg Wind Direction (6m/s at 500m)

CINOTECH 漢槎 consultants limited

AUrban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-AA1-01)

Vector of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	A3021/KC-AA1-01	FIGURE NO. 4-2a	REV. -



Baseline Scheme

Proposed Scheme

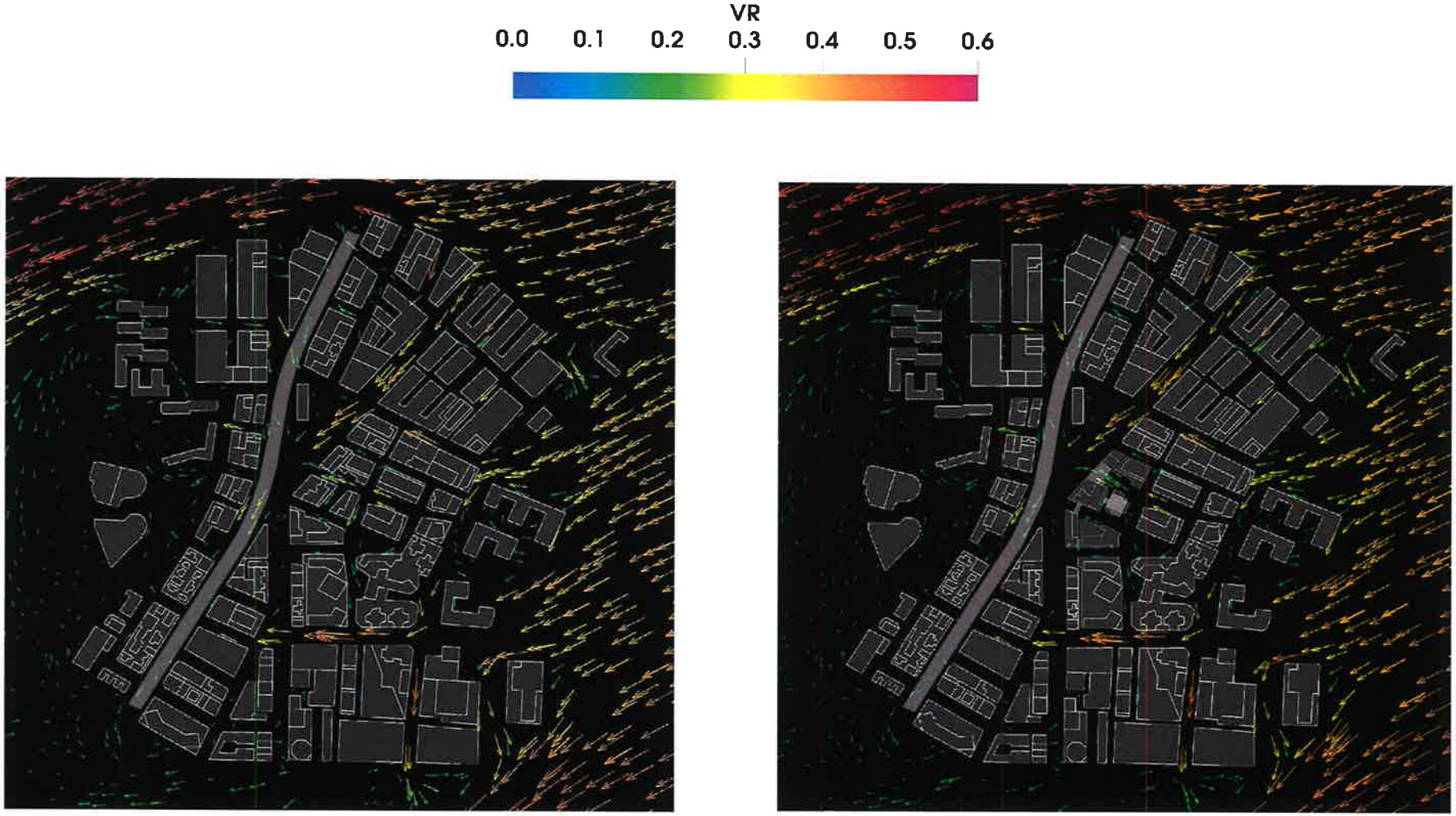
045 deg Wind Direction (6m/s at 500m)

CINOTECH 漢綠 consultants limited

AUrban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-AA1-01)

Vector of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KC-AA1-01	FIGURE NO.	4-2b
			REV. -



Baseline Scheme **Proposed Scheme**

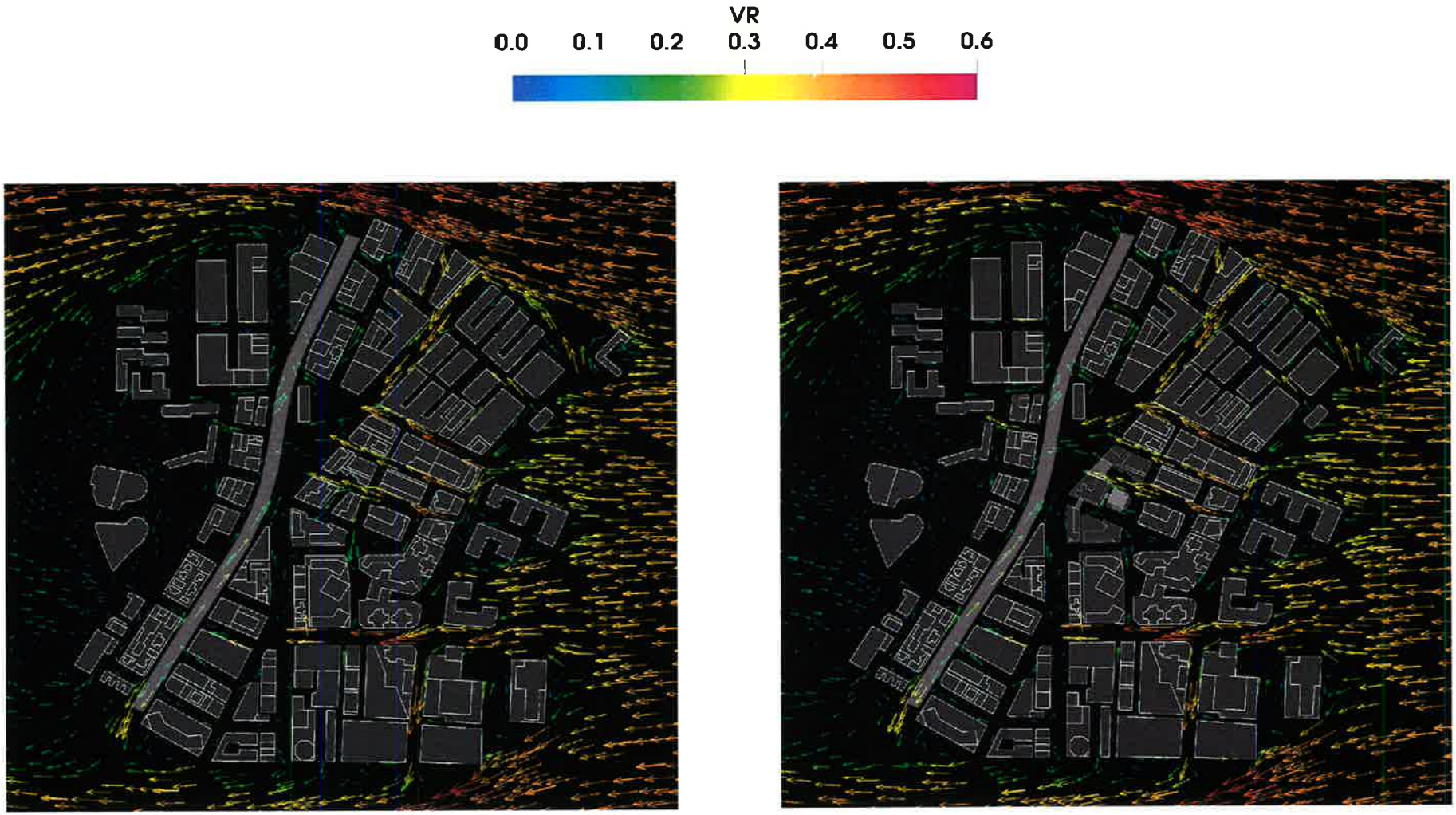
067.5 deg Wind Direction (7m/s at 500m)

CINOTECH consultants limited

AUrban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-AA1-01)

Vector of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	[illegible]	FIGURE NO.	4-2c
REV.	-		



Baseline Scheme

Proposed Scheme

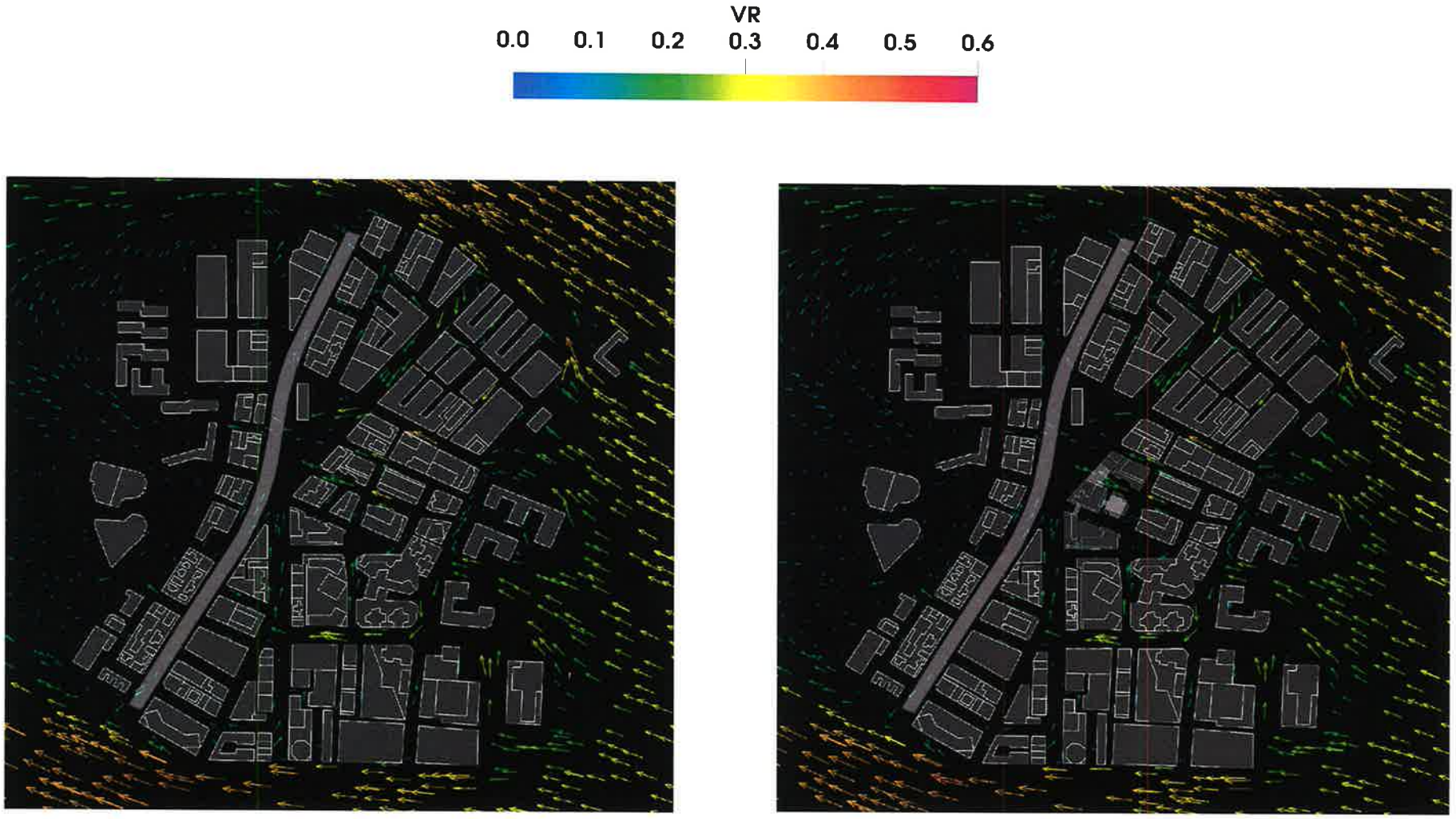
090 deg Wind Direction (7m/s at 500m)

CINOTECH 漢綠 consultants limited

AUrban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-AA1-01)

Vector of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21	
CHECK	KC	DRAWN	CC	
JOB NO.	A9021/KC-AA1-01	FIGURE NO.	4-2d	REV.
				-



Baseline Scheme **Proposed Scheme**

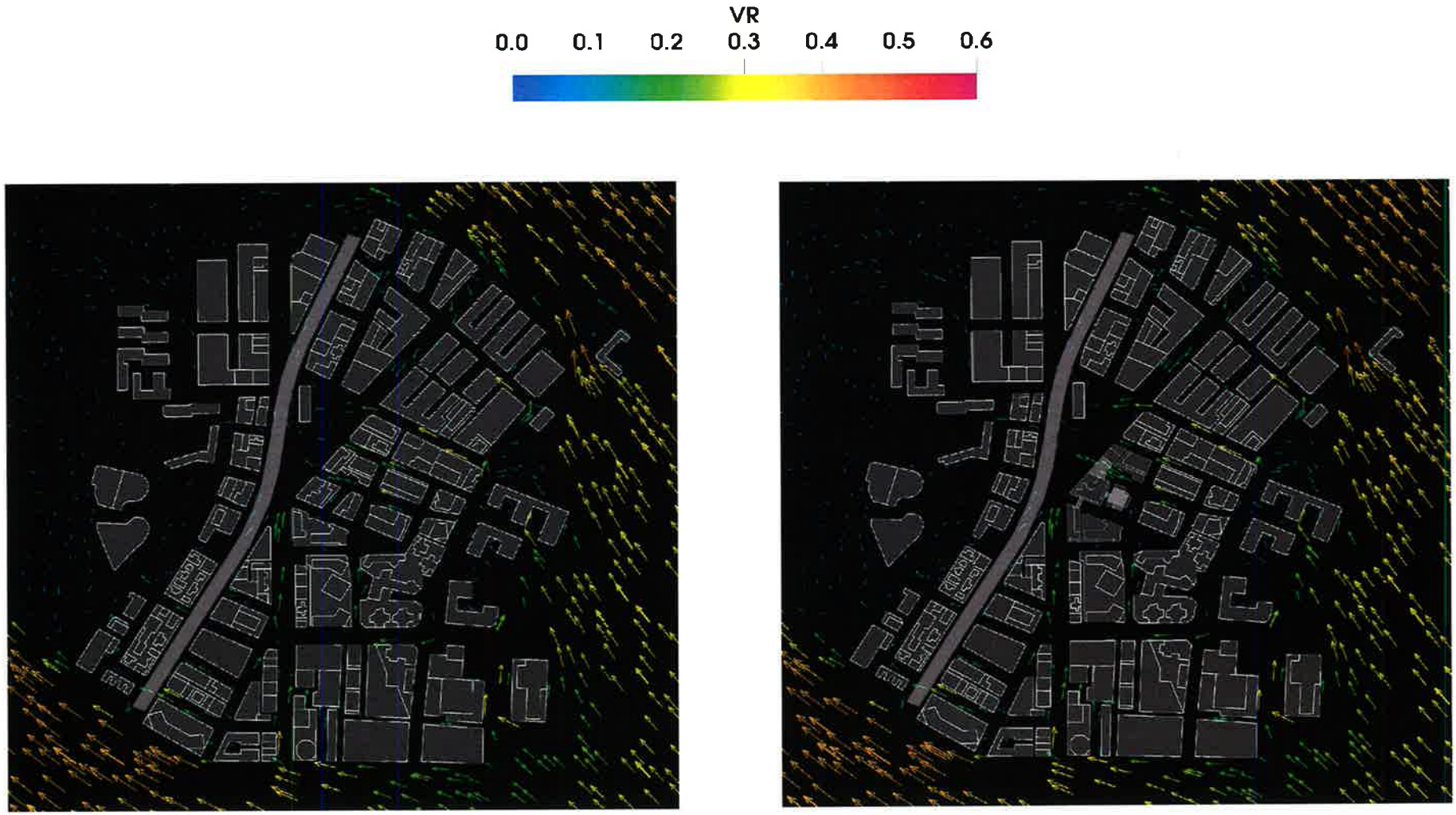
112.5 deg Wind Direction (7m/s at 500m)

CINOTECH 漢騰 consultants limited

AUrban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-AA1-01)

Vector of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21	
CHECK	KC	DRAWN	CC	
JOB NO.	A9021KC-AA1-01	FIGURE NO.	4-2e	REV.
				-



Baseline Scheme

Proposed Scheme

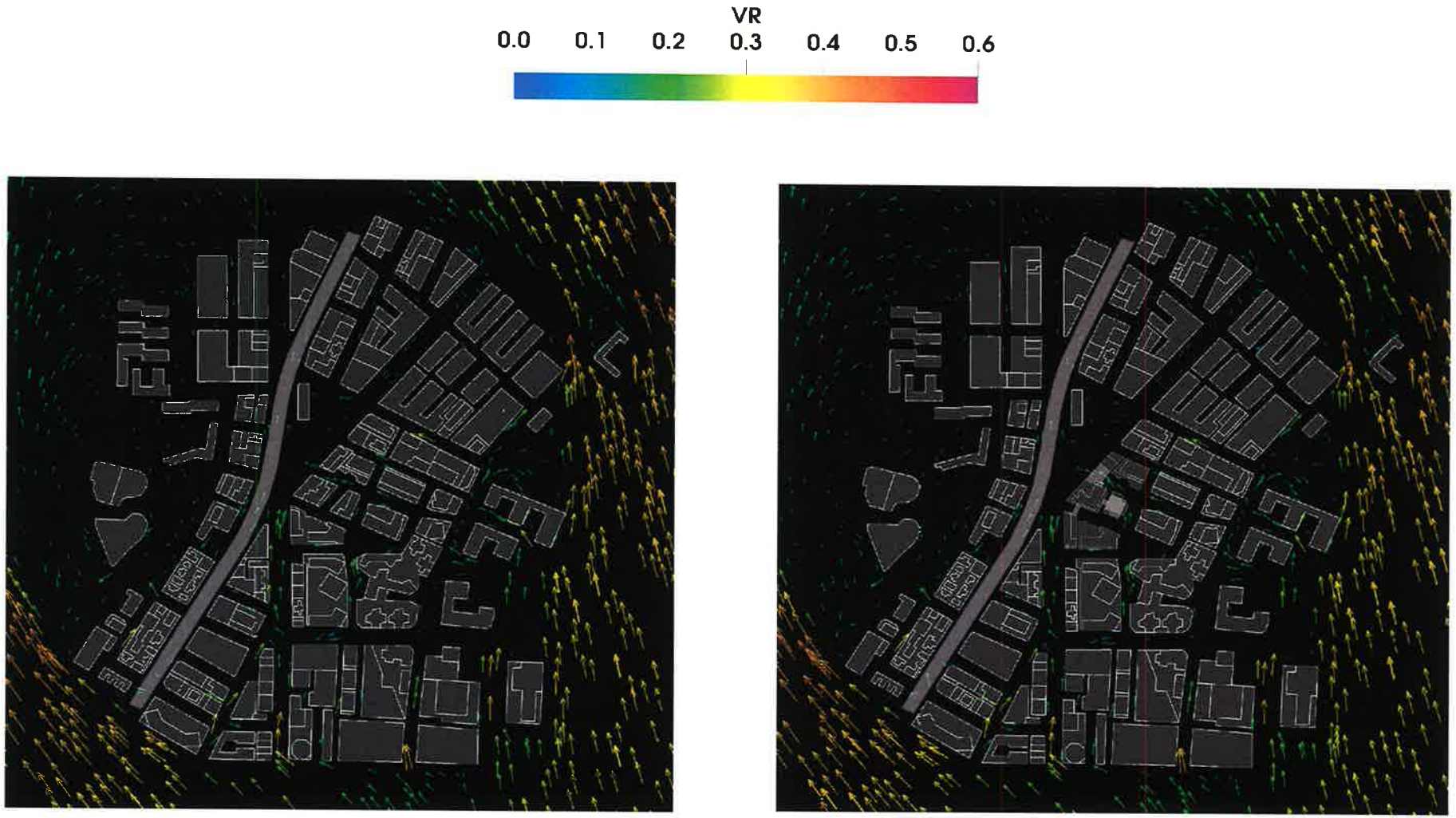
135 deg Wind Direction (6m/s at 500m)

CINOTECH 漢綠 consultants limited

AUrban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-AA1-01)

Vector of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KC-AA1-01	FIGURE NO.	4-2f
			REV. -



Baseline Scheme

Proposed Scheme

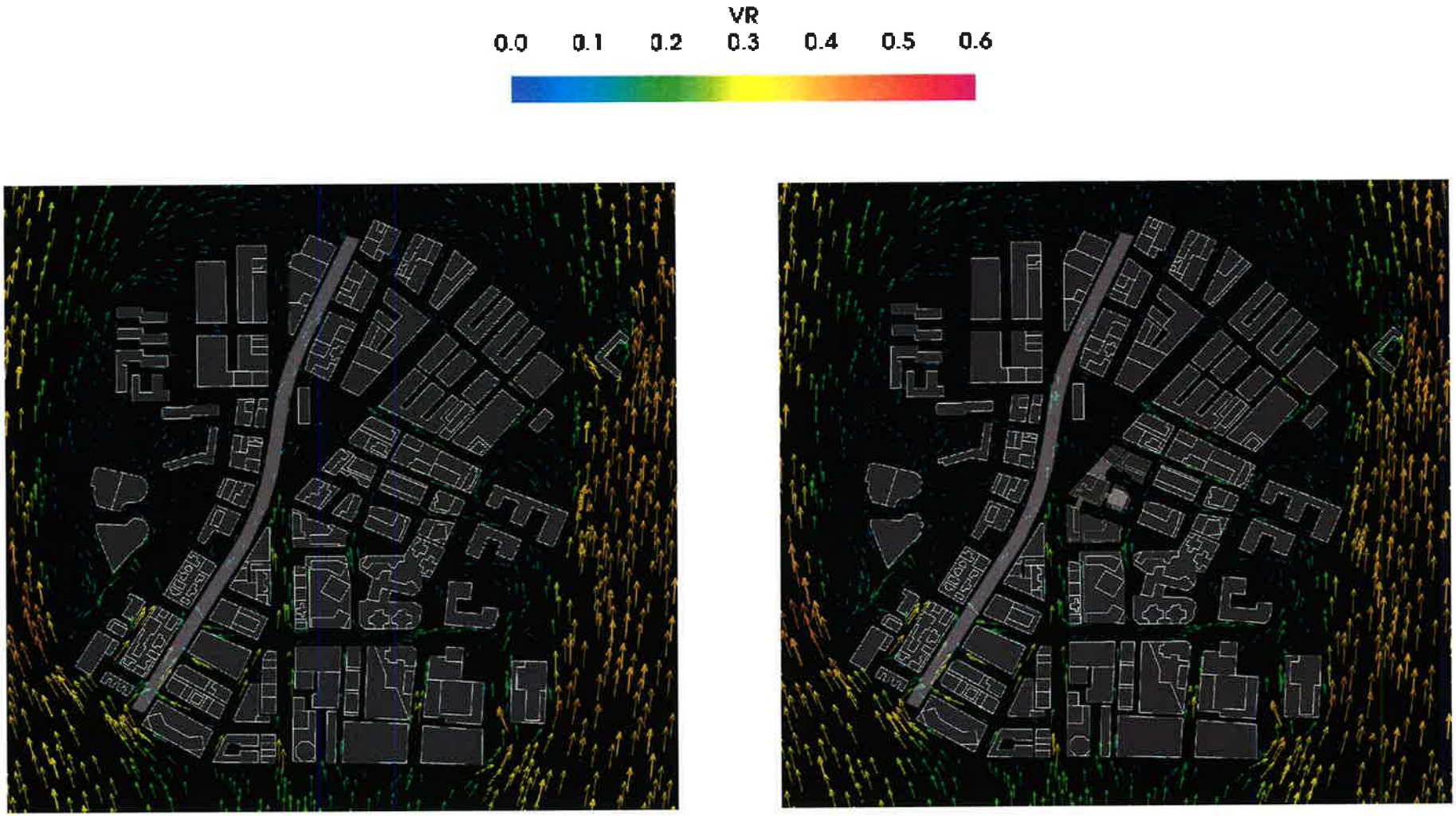
157.5 deg Wind Direction (5m/s at 500m)

CINOTECH consultants limited

AUrban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-AA1-01)

Vector of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21	
CHECK	KC	DRAWN	CC	
JOB NO.	A9021/KC-AA1-01	FIGURE NO.	4-2g	REV.
				-



Baseline Scheme

Proposed Scheme

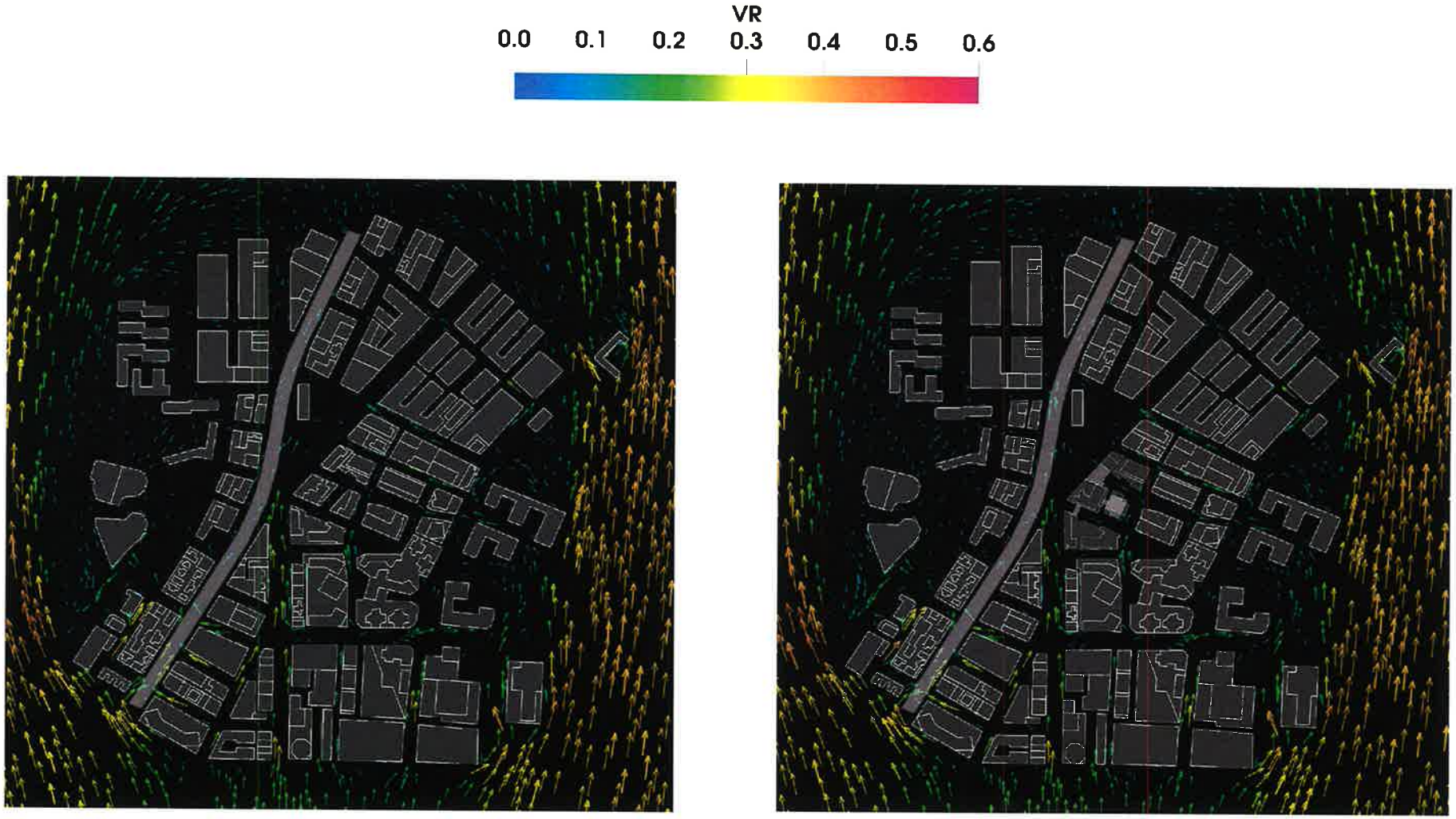
180 deg Wind Direction (5m/s at 500m)

CINOTECH 漢謙 consultants limited

AUrban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-AA1-01)

Vector of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KC-AA1-01	FIGURE NO.	4-2h
			REV. -



Baseline Scheme

Proposed Scheme

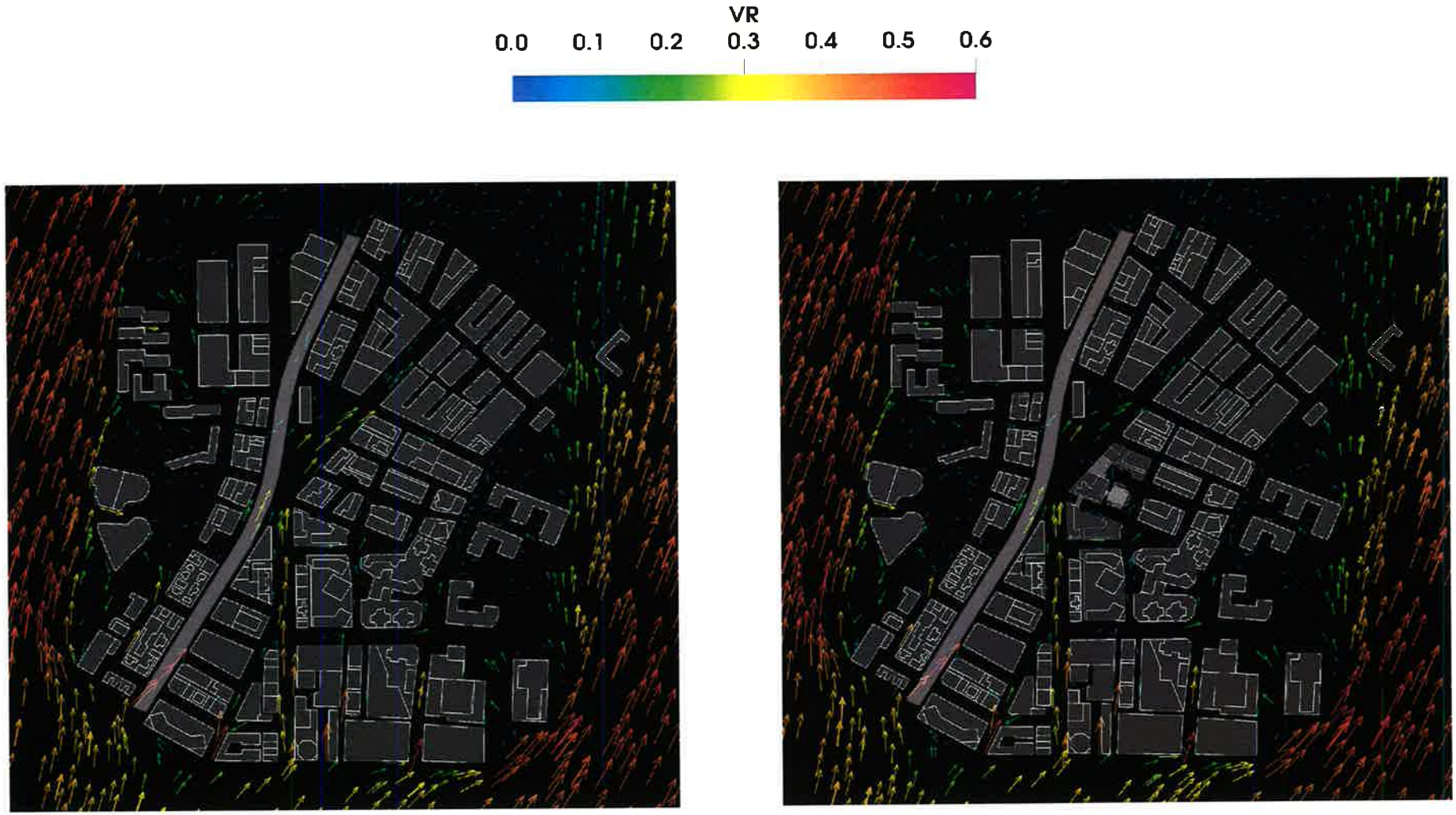
180 deg Wind Direction (6m/s at 500m)

CINOTECH consultants limited

AUrban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-AA1-01)

Vector of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21	
CHECK	KC	DRAWN	CC	
JOB NO.	[illegible]	FIGURE NO.	4-2i	REV. -



Baseline Scheme

Proposed Scheme

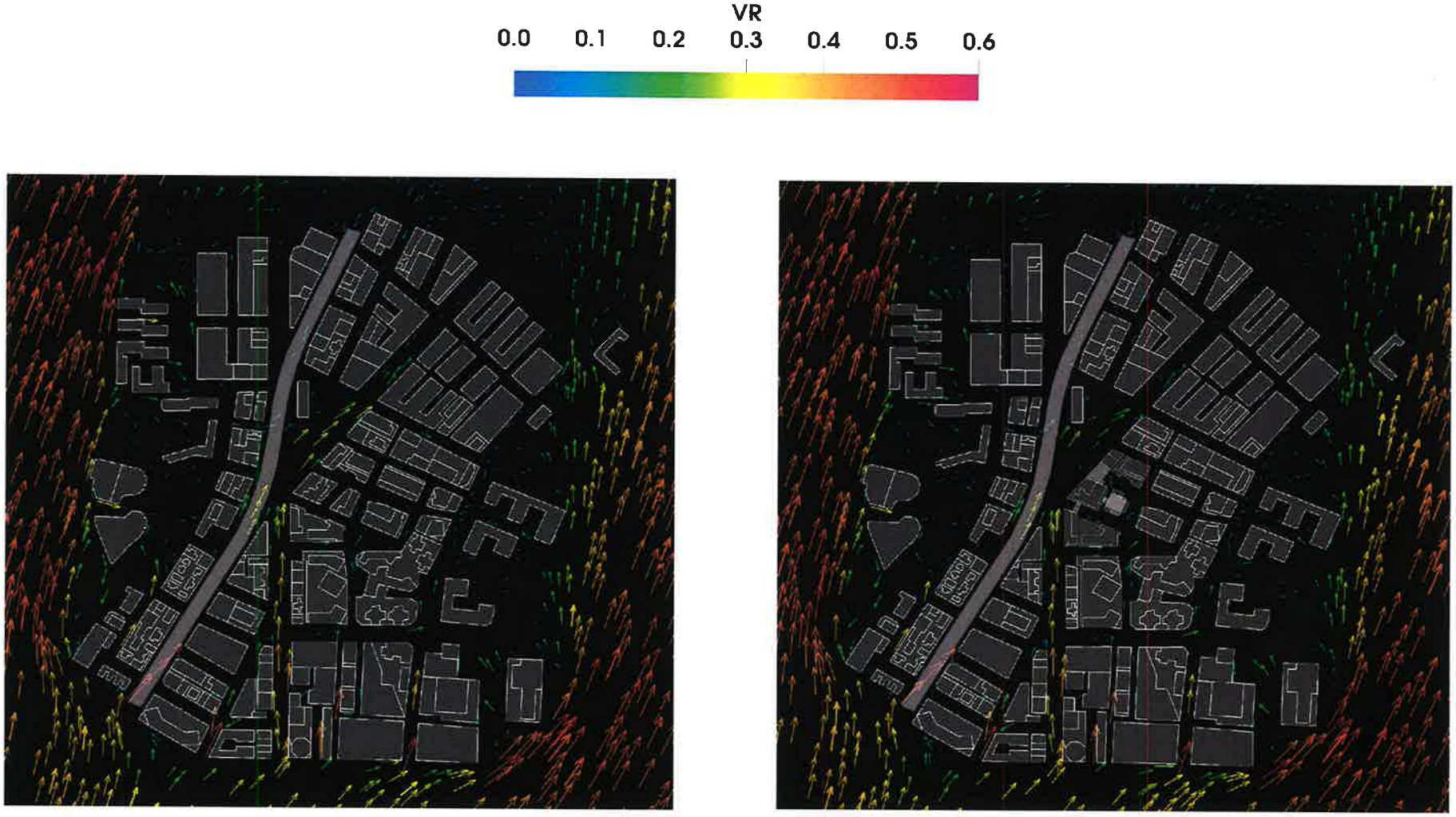
202.5 deg Wind Direction (6m/s at 500m)

CINOTECH 漢雅 consultants limited

AUrban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-AA1-01)

Vector of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	A9021/KC-AA1-01	FIGURE NO. 4-2j	REV. -



Baseline Scheme **Proposed Scheme**

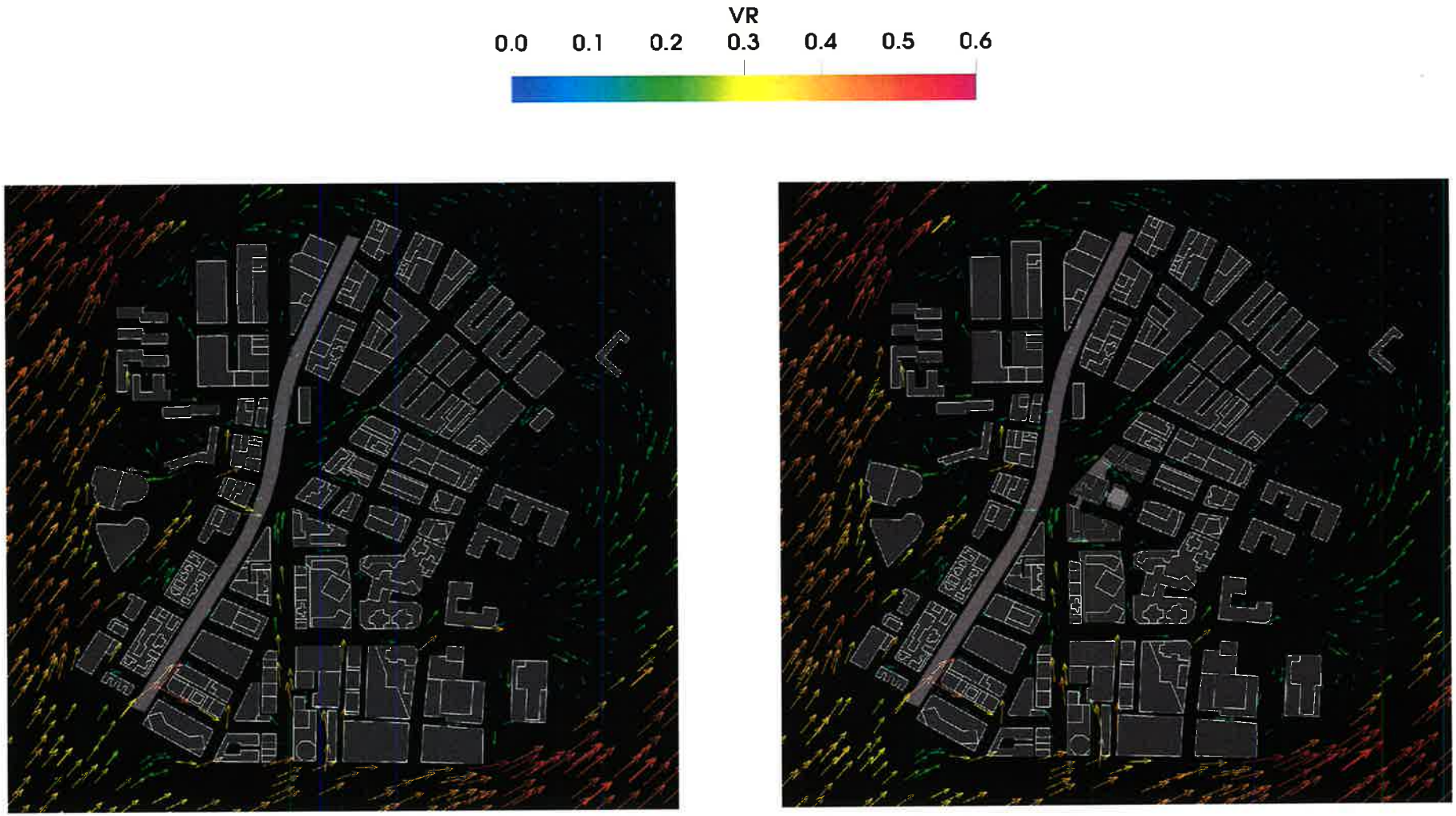
202.5 deg Wind Direction (7m/s at 500m)

CINOTECH consultants limited

AUrban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-AA1-01)

Vector of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	[illegible]	FIGURE NO.	4-2b
			REV. -



Baseline Scheme

Proposed Scheme

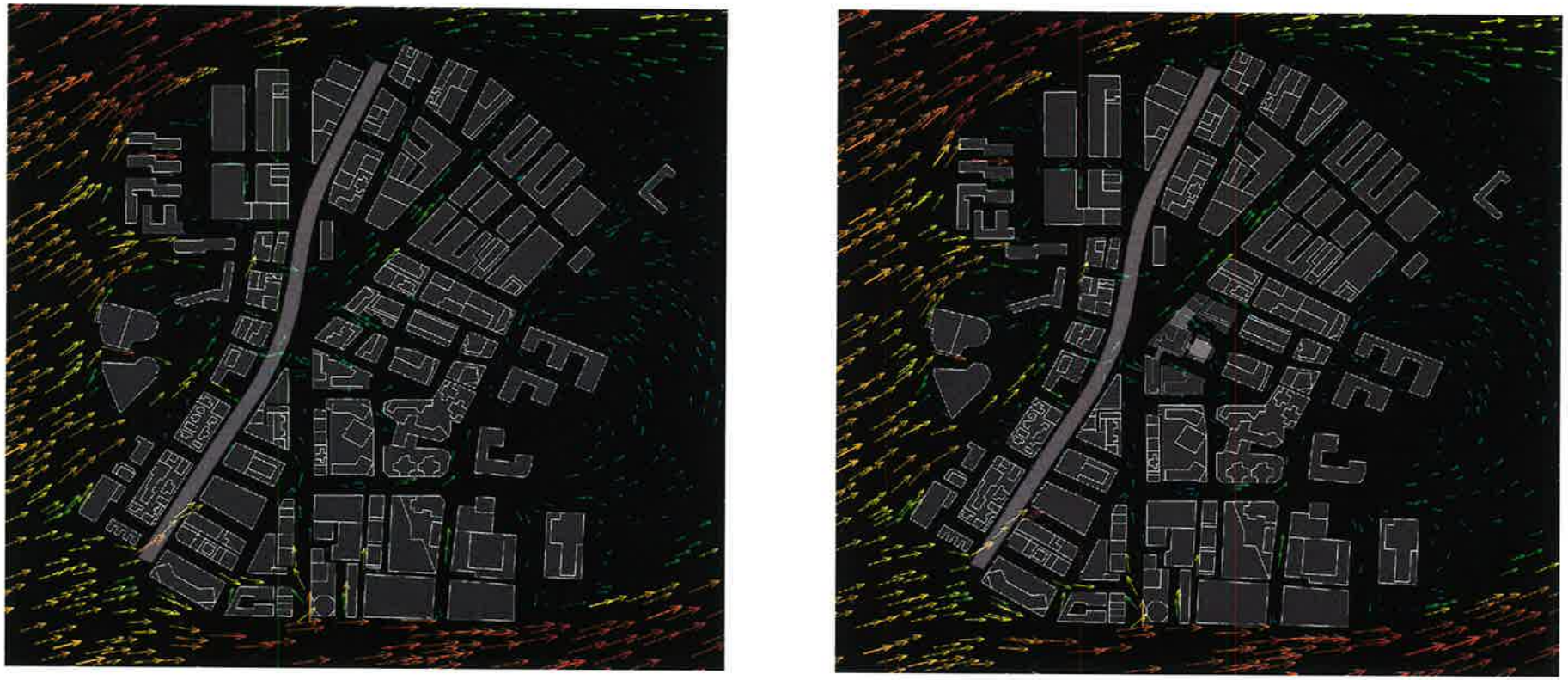
225 deg Wind Direction (6m/s at 500m)

CINOTECH 漢蘇 consultants limited

AUrban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-AA1-01)

Vector of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	[illegible]	FIGURE NO. 4-21	REV. -



Baseline Scheme

Proposed Scheme

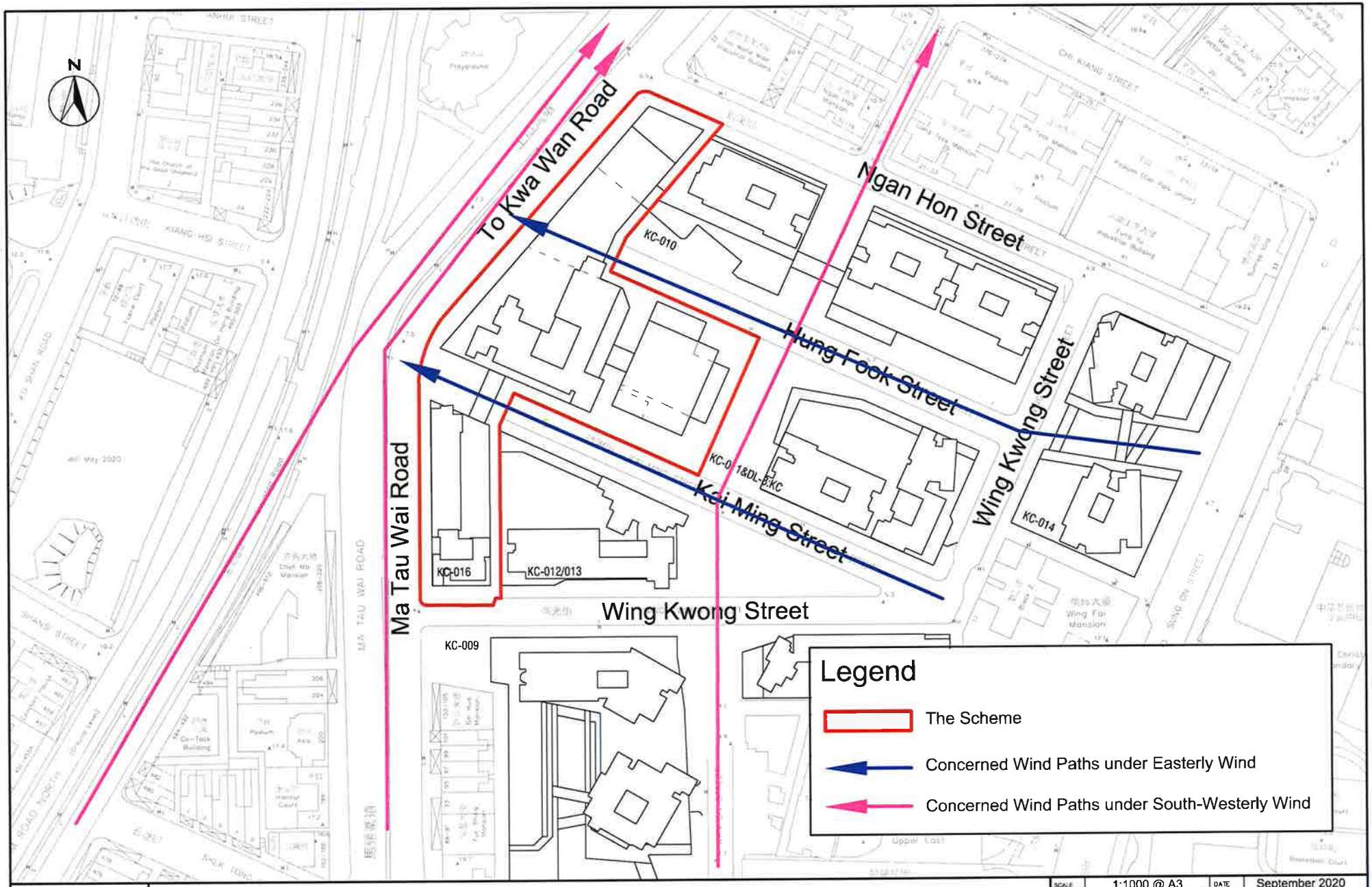
247.5 deg Wind Direction (6m/s at 500m)

CINOTECH 漢臻 consultants limited

AUrban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-AA1-01)

Vector of Wind Velocity Ratio at 2mAG

SCALE	N.T.S.	DATE	Feb-21
CHECK	KC	DRAWN	CC
JOB NO.	[illegible]	FIGURE NO. 4-2m	REV. -

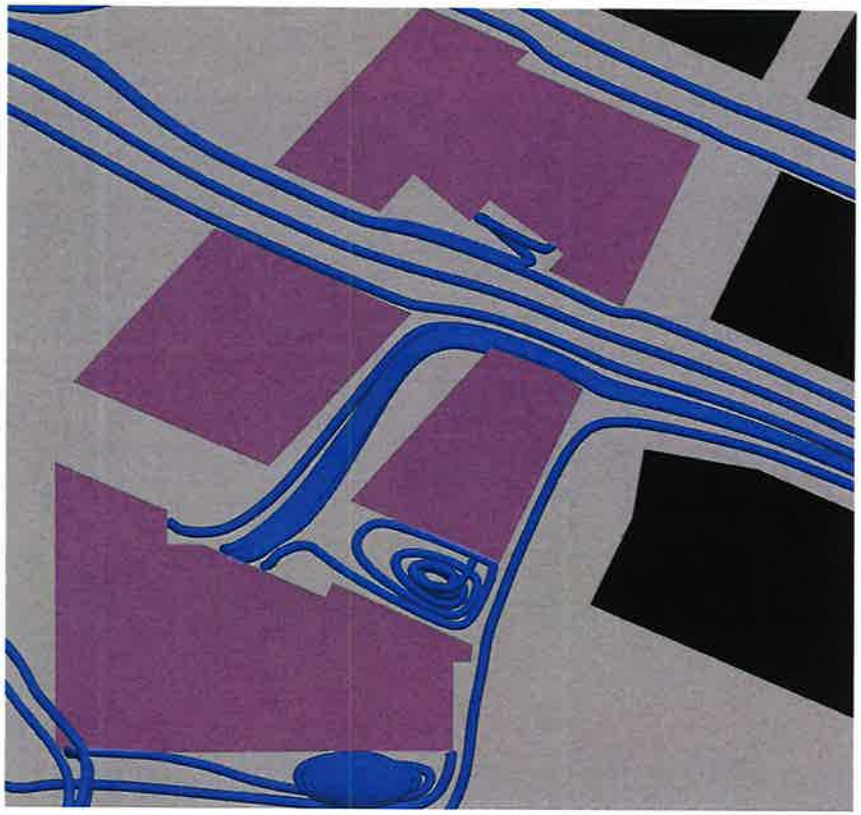


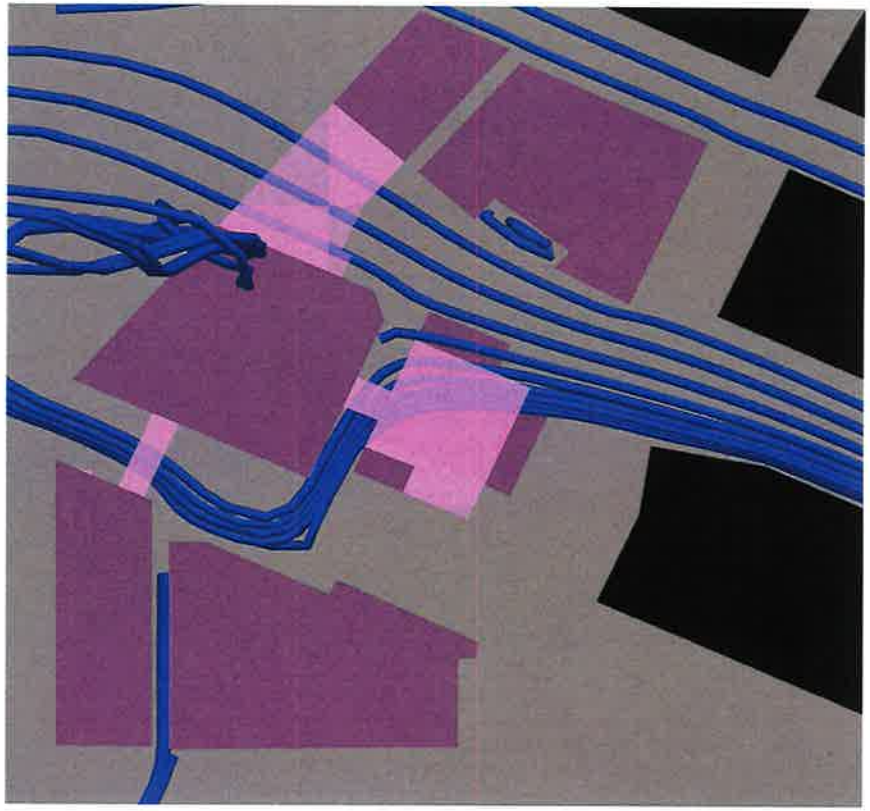
CINOTECH
Cinotech Consultants Limited

Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Concerned Wind Paths

SCALE	1:1000 @ A3	DATE	September 2020
CHECK	KC	DRAWN	CC
JOB NO.	IA 19021-KCAA101	DRAWING No.	4-3
		REV	-





Baseline Scheme **Proposed Scheme**

90 deg Wind Direction

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AUrban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Flow Streamline near the Low Block under 90 deg wind

SCALE	N.T.S.	DATE	Feb-21	
CHECK	KC	DRAWN	CC	
JOB NO.	[illegible]	FIGURE NO.	4-4	REV.
				-

APPENDIX 2-1

Wind Data at grid [83,41] form RAMS

Occurrence Probability at 500m elevation (Annual)

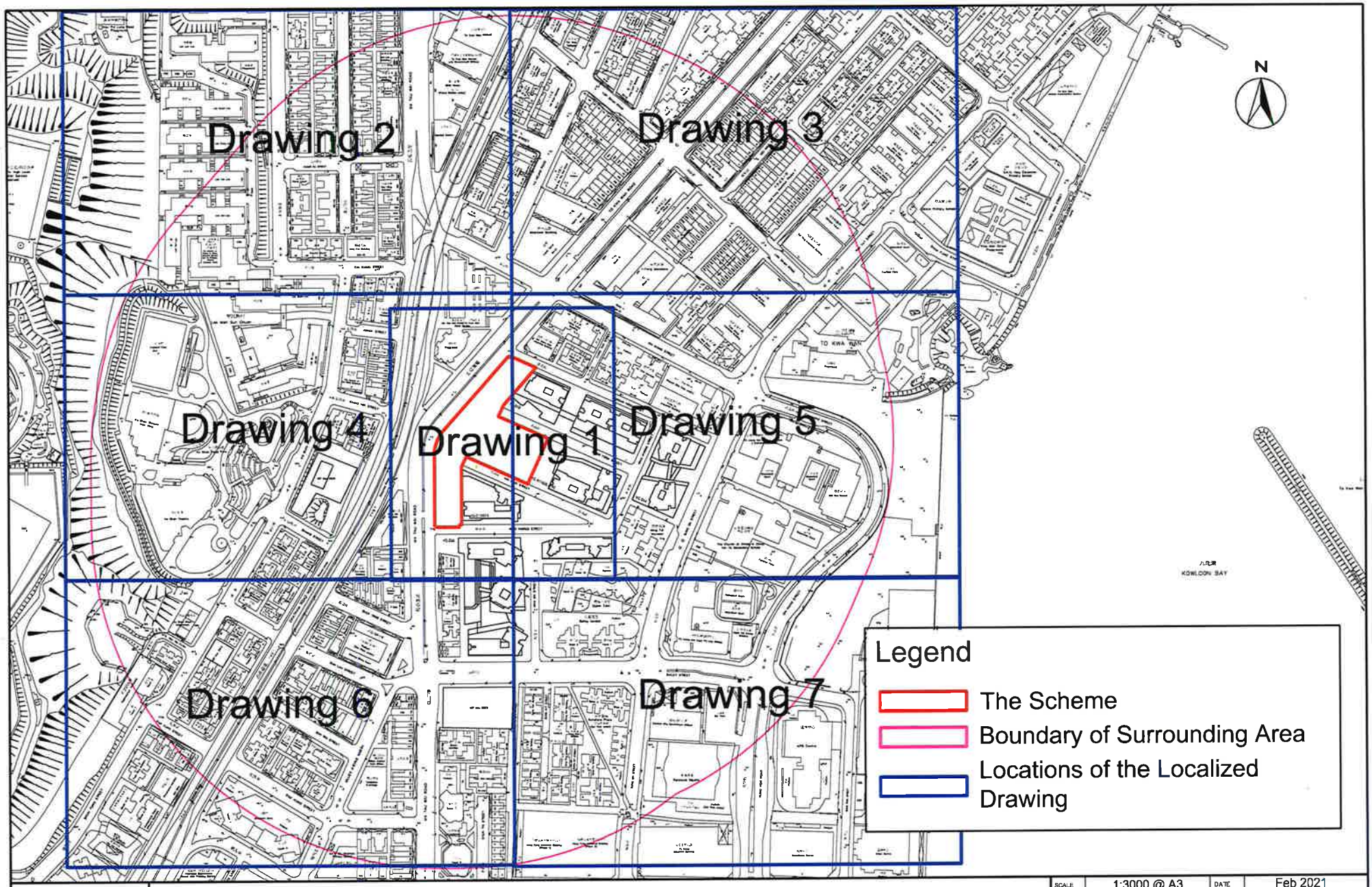
e_01541	Wind_direction	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
V_infinity(m/s)	Sum	0.023	0.064	0.074	0.135	0.222	0.116	0.056	0.041	0.044	0.06	0.062	0.039	0.027	0.015	0.012	0.012
00_to_01	0.021	0.001	0.001	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.001	0.001	0.001
01_to_02	0.053	0.003	0.004	0.005	0.004	0.006	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.002	0.002	0.002
02_to_03	0.086	0.004	0.007	0.009	0.009	0.01	0.005	0.005	0.005	0.005	0.005	0.006	0.005	0.004	0.002	0.002	0.002
03_to_04	0.101	0.004	0.008	0.01	0.013	0.013	0.006	0.005	0.007	0.005	0.006	0.006	0.006	0.005	0.002	0.002	0.002
04_to_05	0.11	0.003	0.007	0.009	0.015	0.019	0.01	0.006	0.007	0.006	0.006	0.007	0.005	0.004	0.002	0.002	0.002
05_to_06	0.121	0.002	0.007	0.009	0.018	0.025	0.015	0.008	0.006	0.005	0.006	0.009	0.004	0.003	0.002	0.002	0.001
06_to_07	0.119	0.002	0.006	0.008	0.018	0.028	0.017	0.007	0.004	0.005	0.007	0.008	0.004	0.002	0.001	0.001	0.001
07_to_08	0.109	0.001	0.005	0.007	0.017	0.028	0.016	0.007	0.003	0.005	0.007	0.006	0.003	0.001	0.001	0.001	0
08_to_09	0.088	0.001	0.005	0.006	0.014	0.025	0.013	0.005	0.002	0.003	0.006	0.004	0.003	0.001	0.001	0	0
09_to_10	0.065	0.001	0.003	0.003	0.01	0.021	0.01	0.003	0.001	0.002	0.004	0.003	0.002	0	0	0	0
10_to_11	0.048	0	0.003	0.002	0.006	0.017	0.008	0.002	0.001	0.001	0.003	0.003	0.001	0	0	0	0
11_to_12	0.029	0	0.002	0.001	0.003	0.011	0.004	0.001	0.001	0.001	0.001	0.002	0.001	0	0	0	0
12_to_13	0.018	0	0.001	0.001	0.002	0.006	0.003	0.001	0	0	0.001	0.001	0	0	0	0	0
13_to_14	0.011	0	0.001	0.001	0.001	0.004	0.002	0	0	0	0.001	0.001	0	0	0	0	0
14_to_15	0.007	0	0.001	0	0.001	0.002	0.001	0	0	0	0	0	0	0	0	0	0
15_to_16	0.005	0	0	0	0.001	0.002	0.001	0	0	0	0	0	0	0	0	0	0
16_to_17	0.003	0	0	0	0	0.001	0	0	0	0	0	0	0	0	0	0	0
17_to_18	0.002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18_to_19	0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19_to_20	0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20_to_21	0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21_to_22	0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22_to_23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23_to_24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Occurrence Probability at 500m elevation (Summer)

e_01541	Wind_direction	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
V_Infinity(m/s)	Sum	0.008	0.011	0.013	0.027	0.093	0.096	0.08	0.073	0.093	0.135	0.149	0.097	0.058	0.029	0.021	0.012
00_to_01	0.023	0.001	0.001	0.001	0.001	0.002	0.001	0.002	0.002	0.001	0.002	0.002	0.001	0.003	0.001	0.001	0.001
01_to_02	0.06	0.002	0.002	0.002	0.003	0.004	0.003	0.005	0.005	0.006	0.007	0.006	0.005	0.006	0.002	0.001	0.002
02_to_03	0.099	0.002	0.002	0.002	0.003	0.006	0.005	0.007	0.01	0.008	0.011	0.014	0.012	0.01	0.003	0.002	0.002
03_to_04	0.107	0.001	0.001	0.001	0.002	0.006	0.006	0.008	0.011	0.009	0.013	0.015	0.014	0.01	0.004	0.002	0.002
04_to_05	0.117	0.001	0.001	0.001	0.003	0.009	0.01	0.008	0.01	0.011	0.013	0.017	0.012	0.011	0.004	0.004	0.002
05_to_06	0.119	0	0	0.001	0.002	0.01	0.012	0.008	0.009	0.011	0.015	0.021	0.012	0.008	0.005	0.004	0.001
06_to_07	0.107	0	0	0.001	0.002	0.01	0.012	0.008	0.007	0.011	0.016	0.019	0.01	0.003	0.004	0.002	0.001
07_to_08	0.098	0.001	0	0.001	0.002	0.009	0.013	0.01	0.005	0.012	0.016	0.014	0.009	0.002	0.002	0.002	0.001
08_to_09	0.073	0	0	0.001	0.002	0.007	0.008	0.007	0.004	0.009	0.012	0.01	0.007	0.002	0.002	0.001	0
09_to_10	0.051	0	0.001	0	0.001	0.007	0.005	0.005	0.003	0.004	0.009	0.008	0.004	0.001	0.001	0.001	0
10_to_11	0.043	0	0	0	0.001	0.006	0.005	0.004	0.002	0.003	0.008	0.008	0.003	0.001	0.001	0	0
11_to_12	0.028	0	0.001	0	0.001	0.004	0.003	0.002	0.002	0.002	0.004	0.006	0.003	0.001	0	0	0
12_to_13	0.02	0	0	0	0.001	0.002	0.004	0.002	0	0.001	0.003	0.004	0.001	0	0	0	0
13_to_14	0.017	0	0	0.001	0.001	0.003	0.003	0.001	0	0.001	0.003	0.003	0.001	0	0	0	0
14_to_15	0.011	0	0	0	0	0.002	0.002	0.001	0	0.001	0.001	0.001	0.001	0	0	0	0
15_to_16	0.008	0	0	0	0.001	0.003	0.001	0	0	0.001	0	0.001	0	0	0	0	0
16_to_17	0.006	0	0	0	0	0.001	0.001	0.001	0	0.001	0.001	0.001	0	0	0	0	0
17_to_18	0.003	0	0	0	0	0.001	0.001	0	0	0	0	0	0	0	0	0	0
18_to_19	0.002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19_to_20	0.002	0	0	0	0	0	0.001	0	0	0	0	0	0	0	0	0	0
20_to_21	0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21_to_22	0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22_to_23	0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23_to_24	0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX 3-1

Adopted Building Height in the Assessment



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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Key Plan

SCALE	1:3000 @ A3	DATE	Feb 2021
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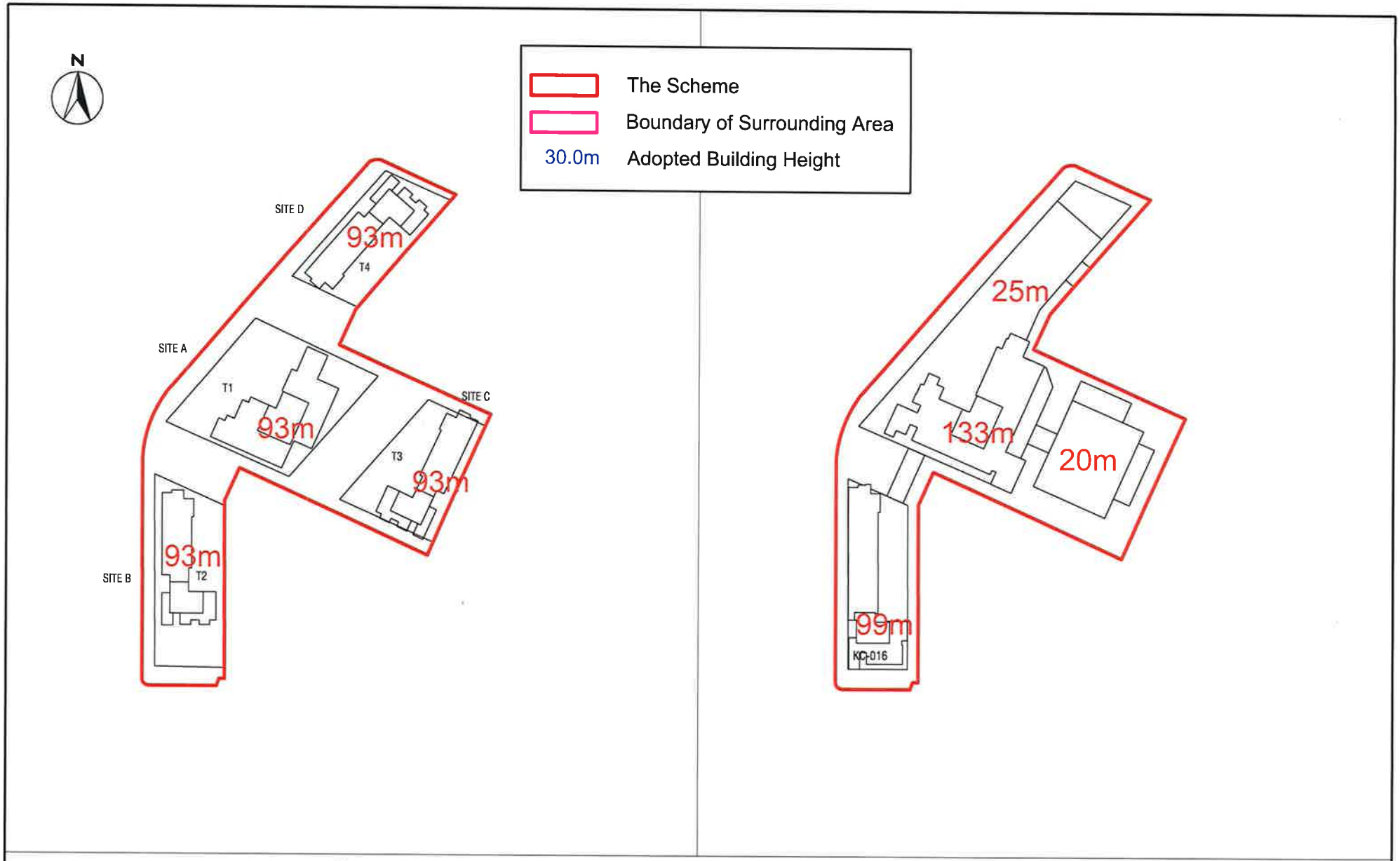
		REV	-



Baseline

Proposed

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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Adopted Building Height in the CFD Model (the Scheme)

SCALE	1:1000 @ A3	DATE	Feb 2021
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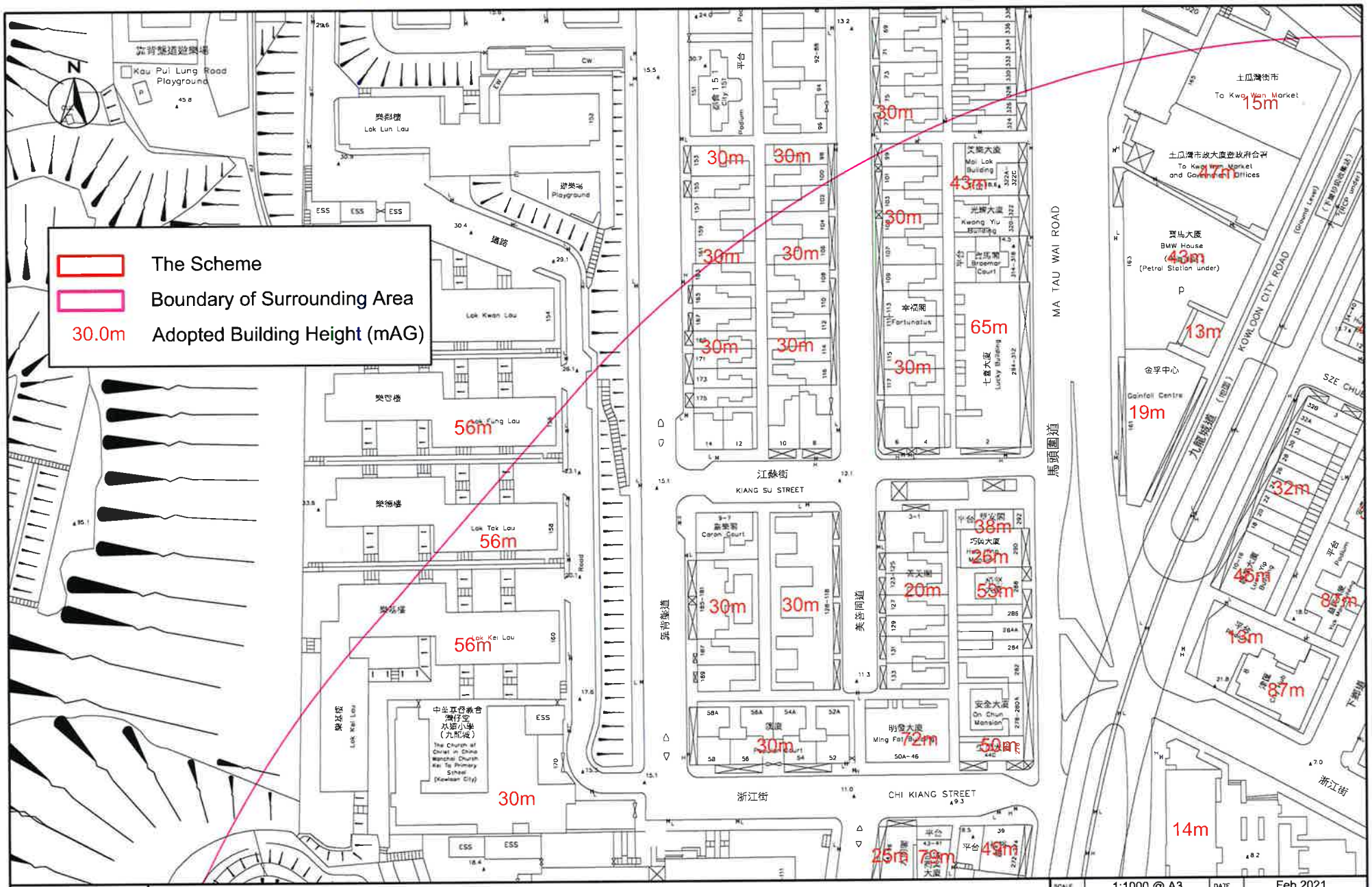
		REV	-



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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Adopted Building Height in the CFD Model (Surrounding)

SCALE	1:1000 @ A3	DATE	Feb 2021
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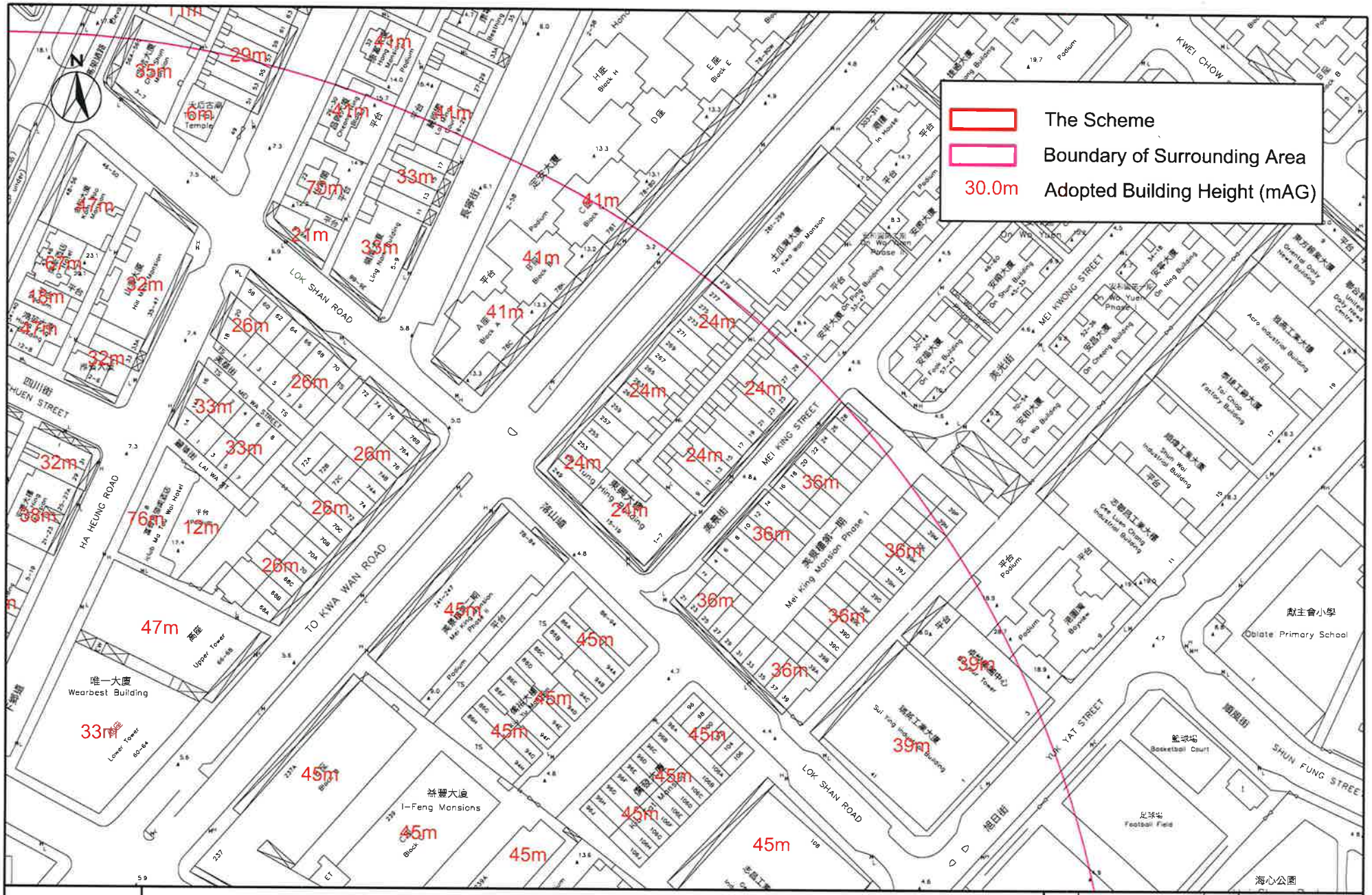
		REV	-



CINOTECH
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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Adopted Building Height in the CFD Model (Surrounding)

SCALE	1:1000 @ A3	DATE	Feb 2021
CHECK	KC	DRAWN	CC
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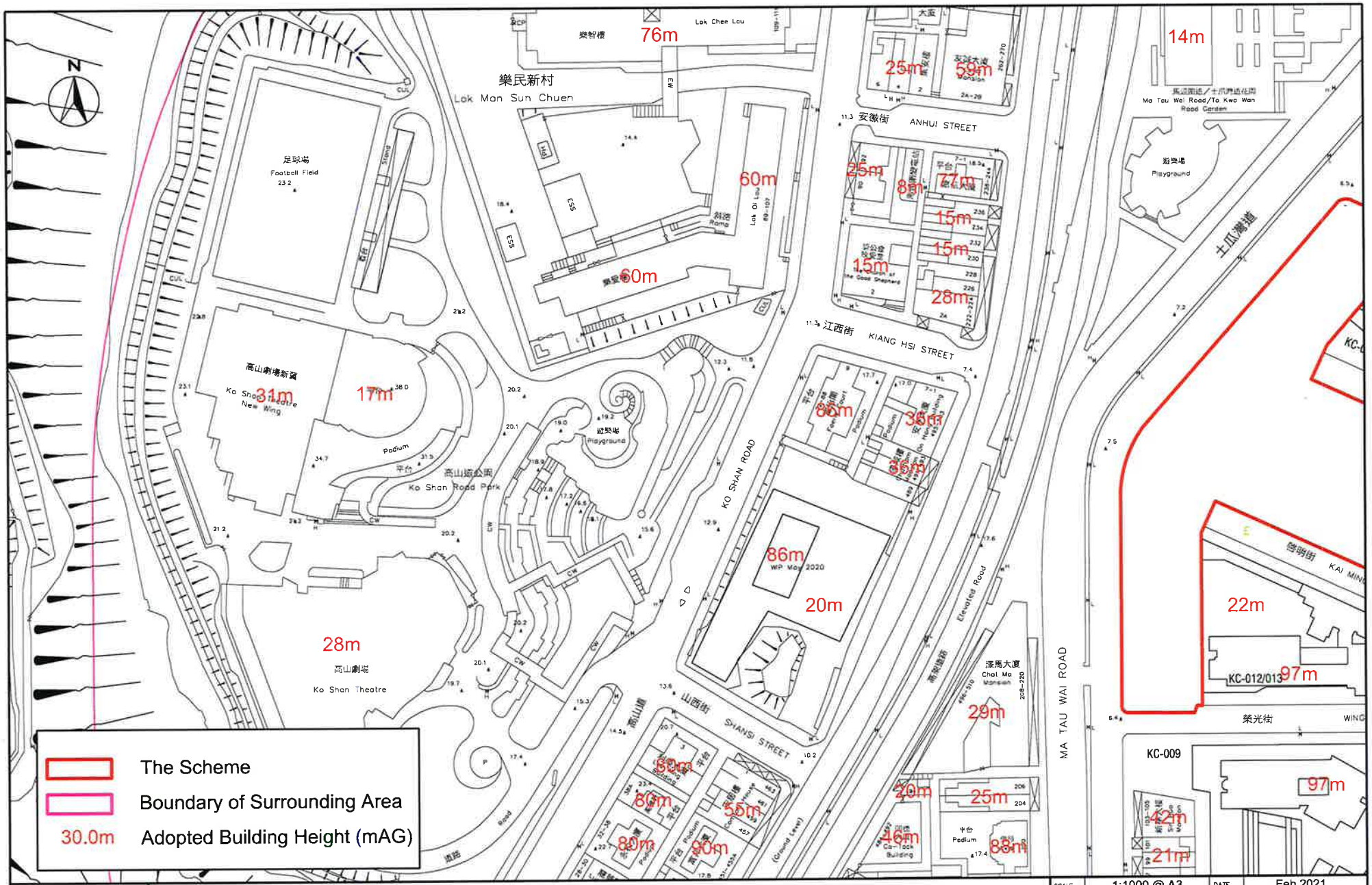
		REV	-



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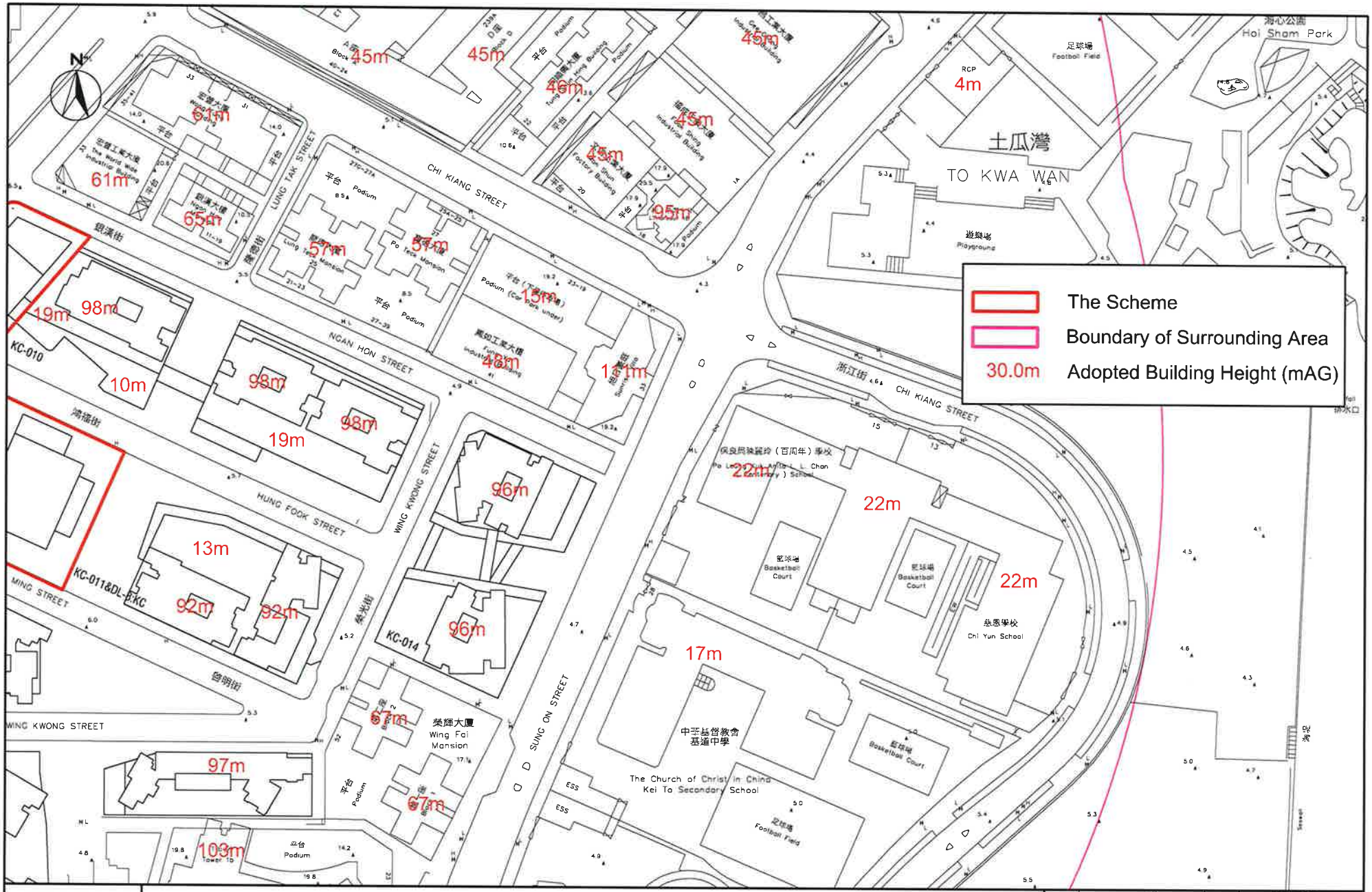
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Adopted Building Height in the CFD Model (Surrounding)

SCALE	1:1000 @ A3	DATE	Feb 2021
CHECK	KC	DRAWN	CC
JOB No.	IA 19021-KCAA101	DRAWING No.	Drawing 4
		REV	-



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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Adopted Building Height in the CFD Model (Surrounding)

SCALE	1:1000 @ A3	DATE	Feb 2021
CHECK	KC	DRAWN	CC
JOB No.	IA 19021-KCAA101	DRAWING No.	Drawing 5
		REV	-



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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Adopted Building Height in the CFD Model (Surrounding)

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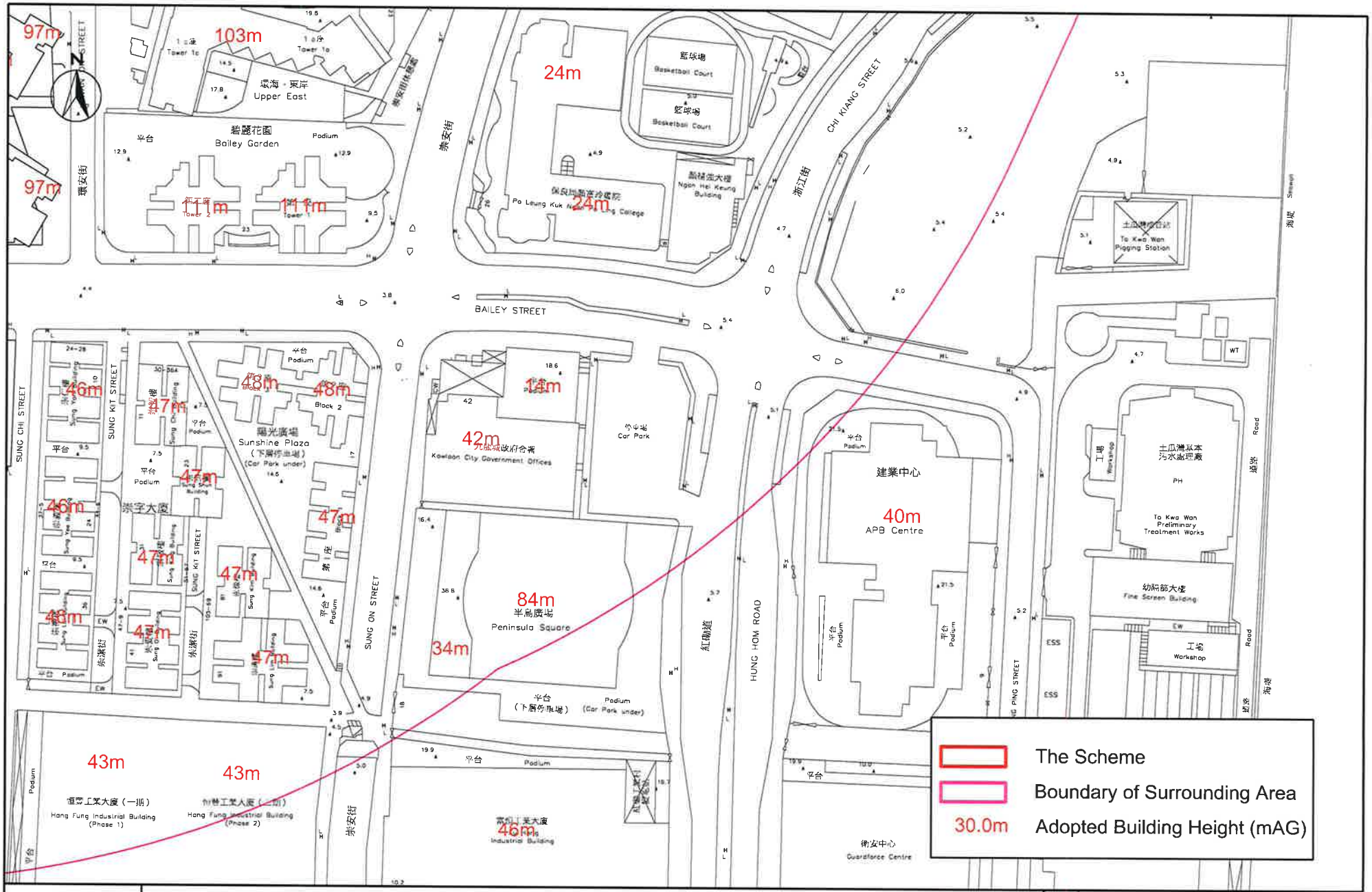
		REV	-



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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Adopted Building Height in the CFD Model (Surrounding)

SCALE	1:1000 @ A3	DATE	Feb 2021
CHECK	KC	DRAWN	CC
JOB No.	IA 19021-KCAA101	DRAWING No.	Drawing 7
		REV	-

APPENDIX 4-1

Detailed Simulated Velocity Ratio

Wind Velocity Ratio, Base Case

Tes Point			Wind direction (Degree)	22.5	45	67.5	90	112.5	135	157.5	180	180	202.5	202.5	225	247.5	Sum	Average (Annual)	Average (Summer)
			Wind direction	NNE	NE	ENE	E	ESE	SE	SSE	S	S	SSW	SSW	SW	WSW			
			Average Wind Speed at 500m elevation	6	6	7	7	7	6	5	5	6	6	7	6	6			
ID	Easting (m)	Northing (m)	Probability (Annual)	6.4%	7.4%	13.5%	22.2%	11.6%	5.6%		4.4%		6.0%		6.2%		83.3%		
			Probability (Summer)				9.3%	9.6%	8.0%	7.3%		9.3%		13.5%	14.9%	9.7%	81.6%		
P01	837385.2	819388.11		0.04	0.11	0.11	0.04	0.12	0.17	0.17	0.16	0.16	0.29	0.29	0.18	0.13		0.11	0.16
P02	837385.2	819398.11		0.05	0.02	0.02	0.07	0.11	0.16	0.06	0.05	0.05	0.30	0.30	0.18	0.12		0.09	0.15
P03	837385.19	819408.11		0.06	0.05	0.04	0.09	0.10	0.15	0.08	0.06	0.06	0.29	0.29	0.18	0.08		0.10	0.14
P04	837385.18	819418.11		0.05	0.07	0.03	0.09	0.09	0.15	0.10	0.09	0.09	0.29	0.29	0.19	0.08		0.10	0.15
P05	837385.18	819428.11		0.04	0.05	0.03	0.08	0.07	0.15	0.11	0.11	0.11	0.29	0.29	0.20	0.12		0.09	0.15
P06	837385.17	819438.11		0.02	0.03	0.04	0.03	0.04	0.14	0.12	0.12	0.12	0.30	0.30	0.23	0.18		0.08	0.16
P07	837385.16	819448.11		0.12	0.11	0.13	0.09	0.03	0.14	0.13	0.14	0.14	0.32	0.32	0.27	0.23		0.13	0.18
P08	837386.15	819456.08		0.21	0.03	0.06	0.03	0.03	0.13	0.12	0.13	0.13	0.32	0.32	0.28	0.20		0.10	0.17
P09	837390.18	819465.33		0.21	0.02	0.05	0.02	0.02	0.04	0.04	0.04	0.04	0.23	0.23	0.30	0.19		0.08	0.13
P10	837394.42	819471.89		0.20	0.03	0.06	0.01	0.01	0.02	0.03	0.03	0.03	0.14	0.14	0.28	0.16		0.07	0.10
P11	837401.06	819479.36		0.18	0.05	0.08	0.06	0.05	0.04	0.04	0.03	0.03	0.12	0.12	0.27	0.15		0.09	0.11
P12	837407.71	819486.83		0.16	0.04	0.04	0.07	0.04	0.03	0.03	0.01	0.01	0.15	0.15	0.27	0.17		0.08	0.11
P13	837414.35	819494.31		0.13	0.19	0.24	0.31	0.21	0.18	0.15	0.05	0.05	0.17	0.17	0.27	0.18		0.22	0.20
P14	837421	819501.78		0.11	0.12	0.14	0.18	0.14	0.11	0.09	0.01	0.02	0.19	0.19	0.22	0.15		0.15	0.15
P15	837427.64	819509.25		0.08	0.08	0.08	0.07	0.04	0.03	0.03	0.02	0.02	0.20	0.20	0.18	0.14		0.08	0.10
P16	837434.29	819516.72		0.04	0.04	0.04	0.08	0.04	0.03	0.03	0.02	0.02	0.20	0.20	0.18	0.16		0.07	0.10
P17	837440.93	819524.2		0.05	0.05	0.05	0.07	0.04	0.03	0.03	0.01	0.02	0.19	0.19	0.18	0.18		0.07	0.11
P18	837447.58	819531.67		0.27	0.29	0.24	0.12	0.07	0.04	0.04	0.06	0.06	0.20	0.20	0.19	0.20		0.16	0.13
P19	837454.95	819531.49		0.26	0.27	0.22	0.24	0.18	0.14	0.09	0.06	0.06	0.09	0.09	0.14	0.14		0.20	0.14
P20	837464.07	819527.39		0.18	0.21	0.18	0.24	0.18	0.14	0.08	0.03	0.03	0.05	0.05	0.06	0.04		0.17	0.10
P21	837473.19	819523.29		0.21	0.27	0.24	0.29	0.20	0.15	0.07	0.02	0.02	0.03	0.03	0.05	0.02		0.20	0.10
P22	837442.08	819484.71		0.14	0.19	0.25	0.30	0.22	0.19	0.15	0.06	0.07	0.05	0.05	0.04	0.17		0.20	0.14
P23	837449.79	819481.13		0.13	0.18	0.24	0.28	0.20	0.17	0.13	0.02	0.02	0.04	0.04	0.09	0.20		0.19	0.13
P24	837457.53	819477.4		0.09	0.19	0.26	0.29	0.21	0.18	0.14	0.03	0.03	0.02	0.02	0.11	0.20		0.19	0.14
P25	837465.44	819473.86		0.07	0.22	0.29	0.33	0.24	0.20	0.15	0.03	0.03	0.01	0.01	0.12	0.19		0.22	0.15
P26	837473.27	819470.2		0.04	0.21	0.30	0.34	0.25	0.21	0.17	0.03	0.03	0.01	0.01	0.13	0.19		0.22	0.16
P27	837482.25	819466.35		0.09	0.21	0.28	0.33	0.25	0.22	0.19	0.10	0.10	0.03	0.04	0.14	0.18		0.23	0.17
P28	837489.89	819462.96		0.28	0.24	0.24	0.30	0.24	0.21	0.16	0.13	0.13	0.06	0.05	0.13	0.16		0.23	0.16
P29	837485.69	819454.24		0.27	0.24	0.15	0.17	0.13	0.12	0.09	0.15	0.15	0.08	0.07	0.03	0.04		0.15	0.09
P30	837481.96	819445.53		0.27	0.28	0.22	0.23	0.13	0.08	0.11	0.14	0.14	0.08	0.08	0.04	0.04		0.18	0.10
P31	837478.18	819436.7		0.25	0.28	0.23	0.24	0.10	0.07	0.13	0.14	0.14	0.08	0.08	0.04	0.05		0.18	0.10
P32	837474.82	819429.37		0.24	0.27	0.24	0.24	0.09	0.08	0.14	0.15	0.14	0.10	0.09	0.02	0.05		0.18	0.10
P33	837471.78	819422.44		0.23	0.26	0.24	0.24	0.08	0.08	0.16	0.15	0.15	0.13	0.13	0.14	0.08		0.19	0.13
P34	837468.53	819415.96		0.21	0.24	0.22	0.24	0.05	0.16	0.20	0.18	0.18	0.02	0.02	0.06	0.11		0.17	0.12
P35	837459.4	819420.04		0.03	0.03	0.04	0.02	0.02	0.05	0.03	0.03	0.03	0.04	0.05	0.07	0.14		0.03	0.05
P36	837450.27	819424.12		0.03	0.03	0.04	0.03	0.02	0.02	0.03	0.02	0.02	0.04	0.04	0.06	0.16		0.03	0.05
P37	837441.14	819428.2		0.02	0.05	0.07	0.04	0.04	0.03	0.06	0.04	0.04	0.02	0.02	0.05	0.17		0.04	0.06
P38	837432.01	819432.28		0.06	0.05	0.05	0.09	0.04	0.07	0.08	0.05	0.05	0.03	0.03	0.05	0.18		0.06	0.07
P39	837422.9	819436.39		0.08	0.19	0.17	0.21	0.14	0.10	0.10	0.05	0.05	0.07	0.06	0.09	0.19		0.15	0.12
P40	837413.43	819440.01		0.10	0.08	0.15	0.06	0.03	0.05	0.09	0.05	0.05	0.09	0.09	0.11	0.19		0.08	0.09
P41	837406.8	819381.48		0.13	0.14	0.13	0.10	0.03	0.07	0.12	0.08	0.08	0.10	0.10	0.10	0.11		0.10	0.09
P42	837396.9	819381.62		0.12	0.14	0.14	0.09	0.02	0.05	0.10	0.07	0.07	0.09	0.09	0.10	0.06		0.09	0.07
P43	837386.86	819381.69		0.06	0.13	0.14	0.06	0.12	0.13	0.09	0.09	0.10	0.30	0.30	0.19	0.08		0.12	0.15
O001	837380.859	819244.2106		0.16	0.18	0.20	0.10	0.03	0.07	0.11	0.25	0.25	0.39	0.39	0.28	0.13		0.16	0.19
O002	837380.34	819269.2052		0.06	0.24	0.28	0.35	0.25	0.25	0.21	0.23	0.23	0.36	0.36	0.27	0.17		0.28	0.27
O003	837379.821	819294.1998		0.13	0.09	0.06	0.03	0.09	0.15	0.17	0.27	0.27	0.37	0.37	0.26	0.14		0.12	0.20

Wind Velocity Ratio, Base Case

Tes Point			Wind direction (Degree)	22.5	45	67.5	90	112.5	135	157.5	180	180	202.5	202.5	225	247.5	Sum	Average (Annual)	Average (Summer)
			Wind direction	NNE	NE	ENE	E	ESE	SE	SSE	S	S	SSW	SSW	SW	WSW			
			Average Wind Speed at 500m elevation	6	6	7	7	7	6	5	5	6	6	7	6	6			
ID	Easting (m)	Northing (m)	Probability (Annual)	6.4%	7.4%	13.5%	22.2%	11.6%	5.6%		4.4%		6.0%		6.2%		83.3%		
			Probability (Summer)				9.3%	9.6%	8.0%	7.3%		9.3%		13.5%	14.9%	9.7%	81.6%		
O004	837379.302	819319.1944		0.15	0.03	0.02	0.10	0.15	0.20	0.20	0.28	0.28	0.37	0.37	0.26	0.11		0.14	0.22
O005	837378.783	819344.1891		0.15	0.02	0.01	0.13	0.16	0.21	0.21	0.27	0.27	0.34	0.34	0.26	0.11		0.14	0.22
O006	837378.264	819369.1837		0.11	0.09	0.05	0.07	0.16	0.21	0.21	0.25	0.25	0.32	0.32	0.24	0.07		0.13	0.20
O007	837369.896	819392.7418		0.18	0.03	0.09	0.08	0.16	0.22	0.24	0.28	0.28	0.23	0.23	0.24	0.12		0.14	0.20
O008	837370.835	819417.7241		0.16	0.02	0.05	0.03	0.12	0.19	0.22	0.26	0.26	0.23	0.23	0.22	0.14		0.11	0.18
O009	837370.909	819442.724		0.29	0.16	0.12	0.12	0.10	0.17	0.21	0.24	0.24	0.24	0.24	0.24	0.16		0.16	0.19
O010	837373.589	819467.5799		0.30	0.27	0.22	0.16	0.10	0.16	0.19	0.21	0.21	0.28	0.28	0.19	0.17		0.20	0.19
O011	837390.264	819486.2061		0.28	0.23	0.22	0.09	0.06	0.08	0.09	0.14	0.14	0.31	0.31	0.24	0.20		0.16	0.17
O012	837406.94	819504.8323		0.27	0.23	0.19	0.24	0.17	0.15	0.12	0.04	0.05	0.29	0.29	0.13	0.09		0.20	0.16
O013	837423.789	819523.3011		0.27	0.31	0.27	0.06	0.05	0.06	0.05	0.04	0.03	0.28	0.28	0.14	0.11		0.15	0.11
O014	837440.301	819542.0725		0.25	0.32	0.30	0.27	0.18	0.15	0.11	0.07	0.06	0.27	0.27	0.18	0.16		0.24	0.18
O015	837461.656	819558.6749		0.22	0.31	0.33	0.04	0.07	0.06	0.05	0.05	0.06	0.25	0.25	0.19	0.19		0.16	0.13
O016	837477.511	819576.9656		0.28	0.36	0.40	0.32	0.27	0.09	0.04	0.05	0.03	0.26	0.26	0.21	0.22		0.29	0.19
O017	837510.498	819614.5403		0.34	0.36	0.36	0.31	0.17	0.11	0.06	0.04	0.03	0.15	0.15	0.17	0.22		0.26	0.16
O018	837526.674	819633.602		0.37	0.39	0.38	0.33	0.19	0.13	0.08	0.02	0.02	0.15	0.14	0.15	0.21		0.27	0.16
O019	837543.246	819652.32		0.37	0.39	0.38	0.34	0.20	0.14	0.08	0.01	0.02	0.14	0.14	0.14	0.20		0.27	0.16
O020	837270.1	819300.7425		0.35	0.32	0.20	0.27	0.08	0.05	0.02	0.05	0.05	0.37	0.37	0.10	0.07		0.21	0.14
O021	837282.895	819322.2203		0.37	0.34	0.23	0.27	0.15	0.06	0.14	0.02	0.02	0.34	0.34	0.08	0.10		0.22	0.15
O022	837295.689	819343.6981		0.39	0.35	0.26	0.25	0.15	0.15	0.17	0.05	0.05	0.33	0.33	0.08	0.11		0.23	0.16
O023	837308.15	819365.3715		0.37	0.33	0.24	0.24	0.17	0.18	0.19	0.08	0.09	0.32	0.32	0.05	0.07		0.23	0.16
O024	837319.598	819387.5962		0.38	0.34	0.26	0.24	0.16	0.16	0.15	0.08	0.08	0.32	0.32	0.02	0.07		0.23	0.15
O025	837330.143	819410.2634		0.39	0.35	0.27	0.22	0.15	0.15	0.13	0.09	0.10	0.31	0.31	0.03	0.08		0.22	0.15
O026	837340.441	819433.0442		0.40	0.36	0.28	0.19	0.14	0.13	0.12	0.08	0.09	0.30	0.30	0.22	0.18		0.23	0.18
O027	837349.184	819456.4655		0.42	0.36	0.26	0.16	0.13	0.12	0.13	0.07	0.07	0.31	0.31	0.08	0.08		0.21	0.14
O028	837357.205	819480.1436		0.41	0.36	0.23	0.11	0.10	0.12	0.14	0.07	0.08	0.29	0.30	0.27	0.24		0.20	0.18
O029	837374.801	819501.2702		0.32	0.30	0.22	0.03	0.04	0.12	0.16	0.14	0.15	0.31	0.31	0.03	0.03		0.14	0.11
O030	837378.969	819525.9203		0.32	0.24	0.13	0.09	0.09	0.11	0.16	0.09	0.11	0.23	0.24	0.03	0.04		0.14	0.11
O031	837383.378	819550.5285		0.34	0.26	0.13	0.16	0.12	0.09	0.14	0.08	0.06	0.12	0.12	0.19	0.16		0.16	0.14
O032	837387.473	819575.1909		0.36	0.27	0.14	0.06	0.06	0.07	0.13	0.06	0.04	0.11	0.11	0.07	0.06		0.12	0.07
O033	837390.977	819599.944		0.37	0.27	0.16	0.14	0.05	0.08	0.12	0.02	0.04	0.05	0.04	0.05	0.05		0.14	0.07
O034	837391.388	819624.9827		0.37	0.28	0.20	0.14	0.07	0.09	0.13	0.07	0.06	0.02	0.03	0.09	0.05		0.15	0.08
O035	837399.077	819652.8457		0.36	0.15	0.18	0.16	0.11	0.07	0.11	0.10	0.10	0.05	0.04	0.02	0.04		0.14	0.07
O036	837353.337	819506.2206		0.40	0.36	0.21	0.08	0.04	0.09	0.13	0.06	0.07	0.05	0.05	0.06	0.02		0.14	0.06
O037	837357.505	819530.8707		0.39	0.34	0.18	0.08	0.08	0.09	0.13	0.04	0.07	0.05	0.05	0.04	0.04		0.14	0.07
O038	837361.914	819555.4789		0.41	0.37	0.21	0.14	0.12	0.10	0.13	0.04	0.02	0.13	0.13	0.26	0.23		0.19	0.15
O039	837366.009	819580.1413		0.42	0.37	0.15	0.13	0.09	0.11	0.13	0.05	0.04	0.06	0.07	0.11	0.11		0.16	0.10
O040	837369.513	819604.8944		0.42	0.39	0.07	0.19	0.14	0.13	0.13	0.09	0.07	0.04	0.04	0.10	0.10		0.17	0.11
O041	837371.141	819629.2418		0.39	0.40	0.17	0.14	0.13	0.12	0.13	0.10	0.10	0.08	0.08	0.03	0.04		0.17	0.09
O042	837374.378	819654.0313		0.38	0.39	0.23	0.17	0.11	0.11	0.12	0.07	0.07	0.10	0.10	0.10	0.09		0.19	0.11
O043	837242.641	819376.451		0.14	0.06	0.04	0.04	0.05	0.05	0.07	0.06	0.06	0.07	0.08	0.20	0.16		0.07	0.10
O044	837252.955	819399.2241		0.21	0.26	0.19	0.06	0.06	0.08	0.08	0.07	0.07	0.08	0.08	0.16	0.19		0.12	0.10
O045	837263.27	819421.9973		0.01	0.05	0.06	0.07	0.04	0.10	0.08	0.06	0.06	0.07	0.07	0.19	0.21		0.07	0.11
O046	837273.584	819444.7704		0.03	0.04	0.05	0.09	0.03	0.05	0.02	0.02	0.02	0.04	0.04	0.24	0.26		0.07	0.11
O047	837284.149	819467.4283		0.07	0.03	0.03	0.12	0.00	0.02	0.02	0.03	0.03	0.02	0.02	0.19	0.22		0.06	0.09
O048	837293.743	819490.5142		0.14	0.20	0.19	0.13	0.05	0.08	0.09	0.11	0.10	0.05	0.05	0.33	0.34		0.14	0.16
O049	837300.772	819514.4239		0.13	0.02	0.07	0.10	0.04	0.05	0.07	0.03	0.03	0.07	0.06	0.37	0.35		0.09	0.15

Wind Velocity Ratio, Base Case

Tes Point			Wind direction (Degree)	22.5	45	67.5	90	112.5	135	157.5	180	180	202.5	202.5	225	247.5	Sum	Average (Annual)	Average (Summer)
			Wind direction	NNE	NE	ENE	E	ESE	SE	SSE	S	S	SSW	SSW	SW	WSW			
			Average Wind Speed at 500m elevation	6	6	7	7	7	6	5	5	6	6	7	6	6			
ID	Easting (m)	Northing (m)	Probability (Annual)	6.4%	7.4%	13.5%	22.2%	11.6%	5.6%		4.4%		6.0%		6.2%		83.3%		
			Probability (Summer)				9.3%	9.6%	8.0%	7.3%		9.3%		13.5%	14.9%	9.7%	81.6%		
O050	837303.759	819539.2447		0.18	0.04	0.03	0.06	0.01	0.03	0.05	0.06	0.06	0.05	0.05	0.34	0.33		0.08	0.13
O051	837306.747	819564.0656		0.22	0.06	0.21	0.19	0.13	0.08	0.01	0.10	0.09	0.14	0.14	0.13	0.10		0.16	0.11
O052	837309.143	819587.0343		0.24	0.16	0.04	0.05	0.02	0.01	0.03	0.06	0.05	0.17	0.17	0.29	0.28		0.09	0.13
O053	837474.355	819268.9614		0.11	0.22	0.21	0.33	0.20	0.17	0.13	0.12	0.12	0.07	0.07	0.22	0.18		0.22	0.18
O054	837474.318	819293.9614		0.14	0.13	0.14	0.19	0.15	0.18	0.16	0.12	0.12	0.11	0.11	0.15	0.03		0.15	0.13
O055	837474.281	819318.9614		0.14	0.14	0.16	0.18	0.21	0.24	0.21	0.13	0.13	0.14	0.14	0.14	0.07		0.17	0.16
O056	837474.244	819343.9613		0.14	0.13	0.17	0.08	0.20	0.22	0.20	0.12	0.12	0.12	0.11	0.10	0.10		0.13	0.13
O057	837589.29	819334.1772		0.11	0.24	0.30	0.30	0.21	0.13	0.03	0.10	0.10	0.17	0.17	0.22	0.15		0.23	0.17
O058	837598.666	819357.3525		0.07	0.24	0.10	0.12	0.15	0.11	0.12	0.10	0.10	0.17	0.17	0.22	0.15		0.14	0.15
O059	837608.042	819380.5278		0.08	0.22	0.08	0.08	0.13	0.11	0.18	0.09	0.09	0.08	0.08	0.15	0.10		0.11	0.11
O060	837617.418	819403.703		0.08	0.19	0.08	0.08	0.15	0.13	0.08	0.05	0.05	0.04	0.04	0.12	0.04		0.10	0.08
O061	837626.794	819426.8783		0.04	0.22	0.06	0.11	0.15	0.09	0.03	0.08	0.08	0.12	0.12	0.11	0.05		0.11	0.09
O062	837636.169	819450.0535		0.29	0.29	0.08	0.16	0.05	0.12	0.12	0.13	0.13	0.07	0.07	0.03	0.10		0.13	0.09
O063	837541.093	819385.3483		0.12	0.10	0.18	0.20	0.18	0.19	0.07	0.05	0.05	0.07	0.07	0.07	0.05		0.15	0.11
O064	837551.648	819408.0108		0.14	0.05	0.24	0.30	0.29	0.22	0.18	0.12	0.12	0.12	0.12	0.02	0.03		0.21	0.15
O065	837562.203	819430.6734		0.23	0.24	0.29	0.37	0.24	0.18	0.18	0.03	0.02	0.07	0.07	0.07	0.07		0.24	0.14
O066	837572.758	819453.3359		0.24	0.09	0.07	0.08	0.03	0.08	0.09	0.05	0.05	0.04	0.05	0.05	0.05		0.08	0.06
O067	837524.718	819521.8224		0.09	0.08	0.14	0.05	0.01	0.03	0.02	0.02	0.03	0.01	0.01	0.05	0.02		0.06	0.03
O068	837536.748	819543.7375		0.12	0.06	0.07	0.05	0.07	0.05	0.05	0.01	0.01	0.02	0.02	0.04	0.03		0.06	0.04
O069	837447.379	819622.0024		0.23	0.14	0.13	0.26	0.14	0.06	0.04	0.05	0.06	0.07	0.07	0.12	0.11		0.16	0.11
O070	837458.684	819644.3002		0.24	0.13	0.07	0.19	0.09	0.02	0.06	0.04	0.03	0.10	0.10	0.08	0.03		0.12	0.08
O071	837469.158	819667.0003		0.21	0.12	0.12	0.19	0.12	0.05	0.04	0.02	0.02	0.09	0.09	0.04	0.09		0.13	0.08
O072	837472.874	819256.1261		0.25	0.39	0.42	0.47	0.26	0.21	0.14	0.11	0.11	0.09	0.09	0.26	0.19		0.33	0.22
O073	837447.874	819256.313		0.25	0.39	0.44	0.50	0.28	0.23	0.10	0.08	0.08	0.03	0.04	0.10	0.09		0.33	0.17
O074	837422.875	819256.5		0.22	0.35	0.42	0.45	0.26	0.22	0.17	0.08	0.08	0.08	0.08	0.10	0.09		0.30	0.17
O075	837397.876	819256.6869		0.18	0.32	0.39	0.41	0.24	0.20	0.19	0.08	0.08	0.09	0.09	0.05	0.08		0.27	0.15
O076	837521.839	819381.0629		0.17	0.18	0.14	0.11	0.06	0.09	0.06	0.05	0.05	0.06	0.06	0.04	0.04		0.11	0.06
O077	837496.839	819381.0994		0.16	0.20	0.05	0.05	0.04	0.02	0.03	0.05	0.05	0.03	0.03	0.03	0.06		0.07	0.04
O078	837471.839	819381.1357		0.10	0.13	0.18	0.19	0.18	0.21	0.21	0.17	0.17	0.17	0.17	0.16	0.14		0.17	0.18
O079	837446.839	819381.172		0.16	0.14	0.08	0.05	0.01	0.02	0.08	0.03	0.03	0.15	0.15	0.17	0.15		0.08	0.09
O080	837421.842	819380.7803		0.14	0.14	0.13	0.09	0.03	0.07	0.12	0.08	0.08	0.14	0.13	0.14	0.13		0.10	0.10
O081	837518.686	819394.0734		0.01	0.12	0.02	0.04	0.03	0.10	0.04	0.04	0.04	0.10	0.10	0.12	0.10		0.06	0.08
O082	837495.773	819404.0735		0.04	0.07	0.04	0.05	0.06	0.09	0.04	0.04	0.04	0.03	0.03	0.09	0.08		0.05	0.06
O083	837540.208	819439.9298		0.18	0.26	0.29	0.35	0.28	0.23	0.19	0.07	0.07	0.01	0.01	0.10	0.10		0.24	0.15
O084	837517.292	819449.9228		0.15	0.22	0.29	0.35	0.28	0.24	0.18	0.05	0.05	0.01	0.01	0.11	0.13		0.24	0.16
O085	837624.242	819459.1058		0.29	0.07	0.19	0.39	0.23	0.19	0.13	0.13	0.13	0.09	0.09	0.02	0.02		0.22	0.14
O086	837601.397	819469.2596		0.23	0.14	0.28	0.45	0.35	0.33	0.29	0.18	0.18	0.09	0.09	0.03	0.04		0.29	0.20
O087	837578.678	819479.6915		0.25	0.17	0.22	0.39	0.31	0.30	0.28	0.18	0.17	0.09	0.09	0.04	0.01		0.26	0.18
O088	837555.858	819489.9032		0.14	0.08	0.18	0.36	0.29	0.30	0.28	0.17	0.17	0.09	0.09	0.04	0.07		0.22	0.18
O089	837533.039	819500.1149		0.08	0.06	0.16	0.34	0.26	0.27	0.24	0.14	0.14	0.09	0.09	0.02	0.11		0.20	0.16
O090	837510.239	819510.3706		0.14	0.13	0.19	0.34	0.25	0.24	0.19	0.09	0.09	0.05	0.03	0.05	0.12		0.21	0.15
O091	837487.249	819520.1919		0.11	0.19	0.12	0.30	0.22	0.20	0.11	0.05	0.05	0.04	0.04	0.04	0.11		0.18	0.12
O092	837367.164	819291.9732		0.16	0.17	0.20	0.20	0.21	0.25	0.24	0.30	0.30	0.22	0.22	0.26	0.13		0.21	0.23
O093	837344.522	819302.5724		0.07	0.06	0.06	0.07	0.02	0.16	0.04	0.08	0.08	0.05	0.05	0.07	0.06		0.07	0.07
O094	837321.88	819313.1717		0.03	0.03	0.02	0.03	0.12	0.14	0.06	0.03	0.03	0.02	0.02	0.10	0.02		0.05	0.06
O095	837299.238	819323.7709		0.30	0.27	0.20	0.23	0.16	0.08	0.06	0.03	0.03	0.09	0.09	0.06	0.11		0.18	0.10

Wind Velocity Ratio, Base Case

Tes Point			Wind direction (Degree)	22.5	45	67.5	90	112.5	135	157.5	180	180	202.5	202.5	225	247.5	Sum	Average (Annual)	Average (Summer)
			Wind direction	NNE	NE	ENE	E	ESE	SE	SSE	S	S	SSW	SSW	SW	WSW			
			Average Wind Speed at 500m elevation	6	6	7	7	7	6	5	5	6	6	7	6	6			
ID	Easting (m)	Northing (m)	Probability (Annual)	6.4%	7.4%	13.5%	22.2%	11.6%	5.6%		4.4%		6.0%		6.2%		83.3%		
			Probability (Summer)				9.3%	9.6%	8.0%	7.3%		9.3%		13.5%	14.9%	9.7%	81.6%		
O096	837286.411	819373.7466		0.09	0.16	0.11	0.02	0.05	0.03	0.06	0.05	0.04	0.03	0.03	0.04	0.17		0.06	0.05
O097	837265.105	819386.8248		0.16	0.22	0.16	0.01	0.02	0.08	0.03	0.03	0.03	0.01	0.01	0.14	0.25		0.08	0.07
O098	837335.68	819487.7377		0.08	0.10	0.05	0.13	0.03	0.01	0.02	0.04	0.03	0.04	0.04	0.36	0.34		0.09	0.14
O099	837311.437	819493.8417		0.10	0.10	0.09	0.03	0.03	0.06	0.09	0.12	0.11	0.05	0.05	0.37	0.32		0.09	0.15
O100	837348.376	819552.1893		0.06	0.10	0.20	0.26	0.18	0.09	0.02	0.02	0.05	0.12	0.12	0.20	0.17		0.17	0.14
O101	837323.599	819555.5178		0.05	0.15	0.24	0.24	0.15	0.06	0.03	0.06	0.05	0.14	0.14	0.03	0.05		0.16	0.09
O102	837360.258	819608.9372		0.37	0.38	0.15	0.15	0.13	0.11	0.08	0.09	0.09	0.08	0.08	0.13	0.12		0.17	0.11
O103	837335.258	819609.054		0.16	0.04	0.20	0.17	0.07	0.05	0.02	0.04	0.02	0.05	0.04	0.07	0.08		0.12	0.07
O104	837624.02	819518.3444		0.18	0.17	0.37	0.51	0.42	0.35	0.29	0.17	0.17	0.09	0.09	0.08	0.09		0.33	0.23
O105	837601.916	819530.0231		0.10	0.16	0.33	0.43	0.36	0.33	0.29	0.18	0.18	0.15	0.15	0.14	0.12		0.29	0.23
O106	837579.811	819541.7017		0.10	0.20	0.37	0.44	0.35	0.31	0.27	0.16	0.16	0.17	0.17	0.13	0.15		0.30	0.23
O107	837557.707	819553.3804		0.04	0.20	0.36	0.42	0.34	0.29	0.25	0.15	0.15	0.19	0.19	0.15	0.17		0.29	0.24
O108	837535.602	819565.059		0.04	0.18	0.33	0.39	0.33	0.27	0.24	0.15	0.15	0.21	0.21	0.15	0.17		0.27	0.23
O109	837513.498	819576.7377		0.08	0.18	0.31	0.36	0.30	0.25	0.23	0.15	0.14	0.24	0.24	0.17	0.18		0.26	0.23
O110	837491.393	819588.4163		0.30	0.34	0.34	0.30	0.25	0.21	0.20	0.13	0.13	0.26	0.26	0.22	0.23		0.28	0.23
O111	837469.289	819600.095		0.06	0.06	0.09	0.11	0.07	0.09	0.12	0.06	0.09	0.06	0.06	0.07	0.11		0.08	0.09
O112	837447.184	819611.7736		0.23	0.13	0.15	0.23	0.13	0.06	0.02	0.03	0.03	0.02	0.02	0.08	0.09		0.15	0.08
O113	837425.08	819623.4523		0.18	0.11	0.14	0.20	0.11	0.03	0.03	0.04	0.04	0.06	0.06	0.07	0.10		0.13	0.08
O114	837402.975	819635.1309		0.33	0.14	0.17	0.18	0.09	0.05	0.06	0.07	0.07	0.08	0.08	0.09	0.09		0.14	0.09
O115	837408.262	819525.5231		0.27	0.34	0.32	0.07	0.04	0.05	0.05	0.09	0.09	0.29	0.29	0.13	0.10		0.17	0.12
O116	837390.196	819534.1032		0.26	0.24	0.15	0.12	0.07	0.10	0.13	0.13	0.14	0.25	0.25	0.06	0.07		0.14	0.12
O117	837418.519	819539.5144		0.27	0.37	0.34	0.21	0.14	0.06	0.05	0.07	0.06	0.29	0.29	0.17	0.15		0.23	0.15
O118	837394.367	819545.9731		0.24	0.16	0.12	0.18	0.12	0.05	0.10	0.11	0.12	0.21	0.21	0.12	0.09		0.15	0.13
O119	837430.566	819553.9937		0.26	0.37	0.35	0.15	0.10	0.10	0.06	0.07	0.08	0.28	0.28	0.19	0.17		0.21	0.15
O120	837397.422	819559.2232		0.25	0.13	0.16	0.18	0.15	0.07	0.08	0.07	0.07	0.12	0.12	0.15	0.12		0.15	0.12
O121	837442.962	819567.5099		0.24	0.35	0.34	0.22	0.19	0.04	0.04	0.09	0.07	0.27	0.27	0.19	0.18		0.23	0.16
O122	837424.948	819573.4898		0.11	0.07	0.06	0.22	0.17	0.05	0.04	0.03	0.02	0.03	0.03	0.03	0.11		0.12	0.08
O123	837454.017	819581.912		0.17	0.29	0.28	0.31	0.22	0.17	0.08	0.04	0.06	0.18	0.18	0.16	0.17		0.24	0.17
O124	837426.073	819590.192		0.14	0.04	0.08	0.05	0.04	0.12	0.07	0.04	0.04	0.07	0.07	0.05	0.04		0.07	0.06
O125	837445.874	819598.0208		0.14	0.07	0.09	0.12	0.07	0.07	0.13	0.04	0.08	0.06	0.06	0.04	0.11		0.09	0.08
O126	837422.941	819610.31		0.07	0.08	0.06	0.11	0.03	0.02	0.07	0.04	0.02	0.07	0.07	0.05	0.07		0.07	0.05
O127	837341.771	819247.4444		0.07	0.26	0.31	0.32	0.13	0.16	0.24	0.26	0.26	0.21	0.21	0.08	0.16		0.23	0.19
O128	837318.869	819257.4693		0.07	0.03	0.07	0.07	0.08	0.09	0.14	0.16	0.16	0.10	0.10	0.09	0.12		0.08	0.10
O129	837567.631	819313.2053		0.04	0.23	0.20	0.25	0.20	0.12	0.07	0.08	0.08	0.13	0.13	0.09	0.08		0.18	0.13
O130	837572.869	819327.8978		0.11	0.30	0.26	0.30	0.23	0.11	0.02	0.07	0.07	0.13	0.13	0.11	0.08		0.22	0.13
O131	837548.595	819595.5367		0.03	0.03	0.01	0.01	0.03	0.05	0.02	0.00	0.00	0.01	0.01	0.01	0.00		0.02	0.02
O132	837561.485	819610.8287		0.10	0.09	0.03	0.03	0.05	0.09	0.02	0.00	0.01	0.01	0.01	0.01	0.00		0.05	0.03
O133	837574.926	819625.6391		0.15	0.12	0.08	0.09	0.07	0.11	0.07	0.02	0.02	0.08	0.08	0.08	0.03		0.09	0.07
O134	837572.729	819574.7931		0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02	0.02	0.01	0.01		0.02	0.01
O135	837585.828	819589.9063		0.01	0.02	0.03	0.02	0.01	0.03	0.03	0.01	0.01	0.05	0.05	0.02	0.01		0.02	0.02
O136	837599.213	819604.7678		0.03	0.07	0.05	0.09	0.02	0.08	0.06	0.04	0.04	0.10	0.10	0.05	0.03		0.06	0.06
O137	837473.041	819364.428		0.17	0.17	0.19	0.15	0.20	0.24	0.24	0.17	0.17	0.15	0.15	0.10	0.08		0.17	0.16
O138	837484.749	819427.112		0.11	0.14	0.15	0.12	0.06	0.08	0.08	0.13	0.13	0.03	0.03	0.02	0.02		0.10	0.06
O139	837492.812	819444.8828		0.16	0.13	0.08	0.05	0.04	0.05	0.01	0.10	0.10	0.02	0.02	0.02	0.01		0.07	0.03
O140	837500.553	819473.0723		0.27	0.24	0.05	0.20	0.15	0.16	0.18	0.09	0.09	0.03	0.03	0.03	0.03		0.14	0.10
O141	837508.579	819492.0595		0.26	0.18	0.05	0.03	0.03	0.03	0.07	0.06	0.06	0.03	0.03	0.03	0.04		0.06	0.04

Wind Velocity Ratio, Base Case

Tes Point			Wind direction (Degree)	22.5	45	67.5	90	112.5	135	157.5	180	180	202.5	202.5	225	247.5	Sum	Average (Annual)	Average (Summer)
			Wind direction	NNE	NE	ENE	E	ESE	SE	SSE	S	S	SSW	SSW	SW	WSW			
			Average Wind Speed at 500m elevation	6	6	7	7	7	6	5	5	6	6	7	6	6			
ID	Easting (m)	Northing (m)	Probability (Annual)	6.4%	7.4%	13.5%	22.2%	11.6%	5.6%		4.4%		6.0%		6.2%		83.3%		
			Probability (Summer)				9.3%	9.6%	8.0%	7.3%		9.3%		13.5%	14.9%	9.7%	81.6%		
O142	837581.487	819430.6818		0.05	0.24	0.35	0.44	0.33	0.25	0.23	0.14	0.14	0.08	0.08	0.08	0.07		0.28	0.19
O143	837601.935	819428.3998		0.07	0.17	0.26	0.32	0.22	0.18	0.17	0.14	0.14	0.11	0.11	0.06	0.06		0.21	0.15
O144	837479.151	819390.3535		0.05	0.08	0.14	0.17	0.05	0.07	0.11	0.12	0.12	0.19	0.19	0.21	0.16		0.13	0.14
O145	837501.333	819391.788		0.09	0.16	0.01	0.04	0.06	0.07	0.03	0.01	0.01	0.05	0.05	0.08	0.08		0.06	0.06
O146	837473.541	819403.0033		0.14	0.16	0.18	0.21	0.11	0.14	0.18	0.17	0.17	0.06	0.05	0.04	0.09		0.15	0.11
D01	837438.96	819490.7		0.08	0.18	0.22	0.26	0.19	0.16	0.13	0.05	0.06	0.04	0.04	0.18	0.18		0.18	0.15
D02	837432.41	819493.16		0.04	0.18	0.22	0.26	0.19	0.16	0.13	0.04	0.05	0.03	0.03	0.16	0.18		0.18	0.14
D03	837425.85	819495.63		0.05	0.19	0.22	0.27	0.19	0.16	0.13	0.04	0.04	0.04	0.04	0.21	0.16		0.18	0.15
D04	837435.83	819484.11		0.10	0.21	0.27	0.32	0.22	0.20	0.16	0.05	0.05	0.05	0.05	0.04	0.12		0.21	0.13
D05	837429.41	819486.89		0.09	0.21	0.26	0.32	0.22	0.20	0.16	0.06	0.06	0.05	0.04	0.07	0.07		0.21	0.13
D06	837422.99	819489.67		0.07	0.21	0.26	0.31	0.22	0.19	0.15	0.05	0.06	0.03	0.02	0.06	0.06		0.20	0.12
D07	837407.87	819447.32		0.08	0.03	0.05	0.04	0.02	0.01	0.08	0.06	0.06	0.07	0.07	0.09	0.19		0.05	0.07
D08	837401.5	819450.23		0.08	0.01	0.07	0.01	0.02	0.01	0.07	0.06	0.06	0.07	0.07	0.08	0.18		0.04	0.06
D09	837395.13	819453.13		0.06	0.01	0.07	0.02	0.02	0.02	0.05	0.04	0.04	0.07	0.07	0.04	0.12		0.04	0.05
D10	837405.01	819440.74		0.11	0.16	0.17	0.15	0.09	0.09	0.07	0.04	0.04	0.07	0.07	0.06	0.14		0.12	0.09
D11	837398.68	819443.73		0.09	0.14	0.15	0.12	0.07	0.06	0.05	0.04	0.04	0.07	0.07	0.02	0.10		0.10	0.06
D12	837392.35	819446.71		0.09	0.12	0.13	0.10	0.04	0.04	0.03	0.02	0.02	0.07	0.07	0.03	0.08		0.08	0.05
D13	837441.69	819452.07		0.05	0.18	0.15	0.21	0.11	0.09	0.04	0.03	0.03	0.04	0.04	0.04	0.04		0.13	0.07
D14	837446.27	819457.37		0.06	0.19	0.15	0.21	0.10	0.08	0.05	0.04	0.04	0.04	0.04	0.05	0.05		0.13	0.07
D15	837450.84	819462.67		0.08	0.19	0.11	0.19	0.08	0.07	0.04	0.04	0.04	0.03	0.03	0.04	0.05		0.12	0.06
D16	837455.42	819467.97		0.07	0.23	0.20	0.23	0.15	0.13	0.05	0.04	0.04	0.03	0.03	0.03	0.06		0.16	0.08
D17	837437.27	819439.17		0.02	0.10	0.05	0.12	0.04	0.01	0.05	0.06	0.06	0.04	0.04	0.06	0.13		0.07	0.06
D18	837446.41	819449.78		0.05	0.06	0.03	0.10	0.02	0.02	0.02	0.01	0.01	0.03	0.04	0.02	0.06		0.05	0.04
D19	837450.98	819455.08		0.06	0.03	0.03	0.09	0.02	0.03	0.03	0.01	0.01	0.03	0.03	0.02	0.04		0.04	0.03
D20	837455.55	819460.38		0.06	0.04	0.03	0.06	0.03	0.03	0.03	0.02	0.02	0.03	0.03	0.02	0.04		0.04	0.03
D21	837460.12	819465.68		0.03	0.10	0.07	0.10	0.06	0.03	0.02	0.02	0.02	0.03	0.03	0.05	0.10		0.07	0.05

Wind Velocity Ratio, Proposed Case

Tes Point			Wind direction (Degree)	22.5	45	67.5	90	112.5	135	157.5	180	180	202.5	202.5	225	247.5	Sum	Average (Annual)	Average (Summer)
			Wind direction	NNE	NE	ENE	E	ESE	SE	SSE	S	S	SSW	SSW	SW	WSW			
			Average Wind Speed at 500m elevation	6	6	7	7	7	6	5	5	6	6	7	6	6			
ID	Easting (m)	Northing (m)	Probability (Annual)	6.4%	7.4%	13.5%	22.2%	11.6%	5.6%		4.4%		6.0%		6.2%		83.3%		
			Probability (Summer)				9.3%	9.6%	8.0%	7.3%		9.3%		13.5%	14.9%	9.7%	81.6%		
P01	837385.2	819388.11		0.05	0.03	0.04	0.06	0.11	0.16	0.17	0.14	0.14	0.28	0.28	0.18	0.13		0.10	0.16
P02	837385.2	819398.11		0.06	0.03	0.03	0.08	0.10	0.14	0.03	0.05	0.05	0.29	0.29	0.19	0.11		0.09	0.14
P03	837385.19	819408.11		0.08	0.02	0.05	0.09	0.08	0.12	0.03	0.05	0.06	0.28	0.28	0.19	0.08		0.10	0.13
P04	837385.18	819418.11		0.08	0.04	0.05	0.09	0.06	0.12	0.06	0.02	0.03	0.28	0.28	0.19	0.08		0.09	0.13
P05	837385.18	819428.11		0.06	0.05	0.03	0.07	0.04	0.12	0.08	0.01	0.01	0.28	0.28	0.20	0.11		0.08	0.13
P06	837385.17	819438.11		0.04	0.05	0.03	0.02	0.02	0.12	0.09	0.01	0.01	0.28	0.28	0.22	0.18		0.07	0.14
P07	837385.16	819448.11		0.15	0.18	0.17	0.13	0.06	0.12	0.10	0.06	0.06	0.30	0.30	0.26	0.22		0.15	0.17
P08	837386.15	819456.08		0.22	0.12	0.18	0.15	0.10	0.11	0.10	0.09	0.09	0.29	0.29	0.28	0.22		0.16	0.18
P09	837390.18	819465.33		0.24	0.02	0.02	0.04	0.03	0.05	0.04	0.08	0.08	0.20	0.20	0.31	0.22		0.08	0.14
P10	837394.42	819471.89		0.24	0.03	0.07	0.03	0.03	0.02	0.04	0.03	0.03	0.08	0.08	0.28	0.18		0.07	0.10
P11	837401.06	819479.36		0.22	0.03	0.07	0.06	0.06	0.08	0.05	0.01	0.01	0.07	0.07	0.26	0.18		0.09	0.11
P12	837407.71	819486.83		0.19	0.08	0.04	0.06	0.02	0.02	0.01	0.02	0.02	0.06	0.06	0.25	0.19		0.07	0.09
P13	837414.35	819494.31		0.15	0.16	0.24	0.29	0.18	0.18	0.12	0.02	0.02	0.05	0.05	0.26	0.20		0.20	0.16
P14	837421	819501.78		0.15	0.09	0.19	0.30	0.19	0.19	0.14	0.07	0.07	0.03	0.03	0.25	0.19		0.20	0.17
P15	837427.64	819509.25		0.13	0.02	0.04	0.25	0.17	0.18	0.16	0.10	0.10	0.04	0.04	0.22	0.17		0.15	0.16
P16	837434.29	819516.72		0.09	0.05	0.03	0.02	0.02	0.02	0.03	0.01	0.01	0.02	0.02	0.19	0.17		0.04	0.07
P17	837440.93	819524.2		0.06	0.06	0.03	0.07	0.05	0.03	0.04	0.01	0.02	0.02	0.02	0.19	0.18		0.06	0.08
P18	837447.58	819531.67		0.26	0.29	0.19	0.23	0.11	0.02	0.04	0.01	0.02	0.02	0.02	0.19	0.18		0.17	0.11
P19	837454.95	819531.49		0.23	0.26	0.17	0.28	0.17	0.10	0.02	0.01	0.02	0.02	0.02	0.14	0.09		0.19	0.10
P20	837464.07	819527.39		0.21	0.25	0.18	0.29	0.18	0.13	0.01	0.02	0.02	0.02	0.02	0.04	0.05		0.18	0.09
P21	837473.19	819523.29		0.19	0.26	0.19	0.29	0.18	0.12	0.03	0.02	0.01	0.01	0.01	0.04	0.08		0.18	0.09
P22	837442.08	819484.71		0.12	0.14	0.26	0.33	0.21	0.21	0.14	0.05	0.06	0.05	0.05	0.03	0.06		0.20	0.12
P23	837449.79	819481.13		0.14	0.12	0.24	0.29	0.19	0.20	0.13	0.05	0.05	0.08	0.08	0.04	0.03		0.19	0.12
P24	837457.53	819477.4		0.12	0.11	0.23	0.28	0.18	0.19	0.12	0.05	0.05	0.06	0.06	0.10	0.09		0.18	0.13
P25	837465.44	819473.86		0.10	0.10	0.24	0.30	0.19	0.20	0.13	0.07	0.07	0.02	0.01	0.13	0.13		0.19	0.14
P26	837473.27	819470.2		0.07	0.11	0.26	0.31	0.21	0.20	0.12	0.09	0.08	0.03	0.03	0.14	0.10		0.20	0.14
P27	837482.25	819466.35		0.03	0.20	0.28	0.33	0.22	0.21	0.12	0.11	0.11	0.05	0.05	0.11	0.06		0.22	0.14
P28	837489.89	819462.96		0.24	0.24	0.26	0.33	0.21	0.21	0.13	0.11	0.11	0.09	0.09	0.08	0.09		0.23	0.15
P29	837485.69	819454.24		0.19	0.24	0.24	0.27	0.12	0.16	0.05	0.13	0.13	0.09	0.09	0.05	0.09		0.19	0.11
P30	837481.96	819445.53		0.16	0.24	0.05	0.04	0.04	0.04	0.08	0.13	0.13	0.09	0.09	0.03	0.08		0.08	0.07
P31	837478.18	819436.7		0.15	0.17	0.05	0.08	0.07	0.09	0.14	0.13	0.13	0.10	0.10	0.07	0.05		0.09	0.09
P32	837474.82	819429.37		0.14	0.17	0.07	0.13	0.08	0.13	0.17	0.14	0.14	0.09	0.09	0.07	0.09		0.11	0.11
P33	837471.78	819422.44		0.13	0.17	0.09	0.13	0.08	0.16	0.18	0.14	0.14	0.09	0.09	0.06	0.10		0.12	0.11
P34	837468.53	819415.96		0.12	0.18	0.12	0.16	0.09	0.17	0.20	0.14	0.14	0.10	0.10	0.06	0.03		0.13	0.11
P35	837459.4	819420.04		0.03	0.13	0.08	0.13	0.08	0.02	0.03	0.06	0.06	0.12	0.12	0.09	0.08		0.10	0.08
P36	837450.27	819424.12		0.10	0.11	0.06	0.10	0.07	0.04	0.04	0.09	0.09	0.12	0.12	0.10	0.12		0.09	0.09
P37	837441.14	819428.2		0.14	0.13	0.08	0.09	0.05	0.01	0.04	0.10	0.10	0.12	0.12	0.09	0.15		0.09	0.09
P38	837432.01	819432.28		0.16	0.11	0.10	0.11	0.04	0.08	0.02	0.08	0.08	0.09	0.09	0.08	0.15		0.10	0.08
P39	837422.9	819436.39		0.16	0.16	0.17	0.06	0.09	0.06	0.03	0.06	0.06	0.05	0.05	0.06	0.16		0.10	0.07
P40	837413.43	819440.01		0.15	0.16	0.16	0.12	0.10	0.05	0.03	0.05	0.05	0.03	0.03	0.04	0.15		0.11	0.07
P41	837406.8	819381.48		0.13	0.15	0.09	0.12	0.07	0.08	0.11	0.07	0.07	0.07	0.07	0.10	0.12		0.10	0.09
P42	837396.9	819381.62		0.16	0.19	0.14	0.03	0.04	0.06	0.10	0.07	0.07	0.06	0.06	0.11	0.10		0.09	0.07
P43	837386.86	819381.69		0.12	0.16	0.11	0.04	0.09	0.13	0.08	0.07	0.07	0.28	0.28	0.20	0.12		0.11	0.14
O001	837380.859	819244.2106		0.10	0.17	0.21	0.08	0.03	0.09	0.13	0.23	0.23	0.37	0.37	0.29	0.11		0.15	0.19
O002	837380.34	819269.2052		0.08	0.22	0.26	0.34	0.27	0.25	0.20	0.20	0.20	0.36	0.36	0.28	0.12		0.27	0.26
O003	837379.821	819294.1998		0.06	0.07	0.06	0.03	0.07	0.15	0.17	0.24	0.23	0.36	0.36	0.28	0.07		0.11	0.19

Wind Velocity Ratio, Proposed Case

Tes Point			Wind direction (Degree)	22.5	45	67.5	90	112.5	135	157.5	180	180	202.5	202.5	225	247.5	Sum	Average (Annual)	Average (Summer)
			Wind direction	NNE	NE	ENE	E	ESE	SE	SSE	S	S	SSW	SSW	SW	WSW			
			Average Wind Speed at 500m elevation	6	6	7	7	7	6	5	5	6	6	7	6	6			
ID	Easting (m)	Northing (m)	Probability (Annual)	6.4%	7.4%	13.5%	22.2%	11.6%	5.6%		4.4%		6.0%		6.2%		83.3%		
			Probability (Summer)				9.3%	9.6%	8.0%	7.3%		9.3%		13.5%	14.9%	9.7%	81.6%		
O004	837379.302	819319.1944		0.07	0.03	0.02	0.10	0.14	0.20	0.19	0.25	0.24	0.36	0.36	0.28	0.05		0.13	0.21
O005	837378.783	819344.1891		0.08	0.04	0.02	0.12	0.15	0.21	0.20	0.23	0.23	0.35	0.35	0.26	0.06		0.14	0.21
O006	837378.264	819369.1837		0.09	0.07	0.05	0.10	0.15	0.21	0.20	0.21	0.21	0.32	0.32	0.25	0.04		0.14	0.19
O007	837369.896	819392.7418		0.05	0.10	0.09	0.13	0.16	0.24	0.24	0.26	0.26	0.25	0.25	0.22	0.12		0.15	0.20
O008	837370.835	819417.7241		0.06	0.06	0.07	0.09	0.12	0.21	0.21	0.23	0.23	0.24	0.24	0.20	0.15		0.12	0.18
O009	837370.909	819442.724		0.30	0.19	0.07	0.08	0.10	0.19	0.20	0.20	0.20	0.24	0.24	0.22	0.16		0.15	0.18
O010	837373.589	819467.5799		0.31	0.26	0.11	0.12	0.10	0.17	0.19	0.18	0.18	0.28	0.28	0.21	0.18		0.17	0.19
O011	837390.264	819486.2061		0.27	0.23	0.18	0.10	0.07	0.09	0.10	0.09	0.09	0.31	0.31	0.27	0.20		0.16	0.17
O012	837406.94	819504.8323		0.24	0.22	0.19	0.28	0.17	0.15	0.09	0.01	0.01	0.18	0.18	0.18	0.17		0.20	0.16
O013	837423.789	819523.3011		0.25	0.26	0.24	0.06	0.04	0.04	0.06	0.05	0.06	0.12	0.12	0.14	0.13		0.13	0.09
O014	837440.301	819542.0725		0.23	0.28	0.29	0.21	0.17	0.10	0.06	0.03	0.02	0.12	0.12	0.17	0.16		0.20	0.13
O015	837461.656	819558.6749		0.22	0.30	0.33	0.22	0.05	0.06	0.06	0.03	0.03	0.13	0.13	0.19	0.19		0.19	0.13
O016	837477.511	819576.9656		0.28	0.36	0.39	0.38	0.17	0.20	0.03	0.11	0.08	0.19	0.19	0.21	0.23		0.29	0.19
O017	837510.498	819614.5403		0.34	0.36	0.35	0.32	0.17	0.13	0.05	0.02	0.02	0.09	0.09	0.18	0.22		0.25	0.15
O018	837526.674	819633.602		0.36	0.38	0.37	0.34	0.20	0.15	0.06	0.02	0.02	0.10	0.10	0.17	0.21		0.27	0.16
O019	837543.246	819652.32		0.36	0.38	0.38	0.34	0.21	0.16	0.07	0.02	0.02	0.11	0.11	0.16	0.20		0.27	0.16
O020	837270.1	819300.7425		0.36	0.31	0.16	0.27	0.09	0.06	0.04	0.06	0.06	0.37	0.38	0.03	0.07		0.20	0.13
O021	837282.895	819322.2203		0.37	0.33	0.18	0.27	0.14	0.08	0.14	0.02	0.02	0.33	0.33	0.04	0.11		0.21	0.15
O022	837295.689	819343.6981		0.37	0.34	0.20	0.24	0.13	0.15	0.17	0.03	0.03	0.31	0.31	0.07	0.09		0.21	0.15
O023	837308.15	819365.3715		0.36	0.31	0.19	0.24	0.16	0.18	0.19	0.07	0.07	0.32	0.32	0.06	0.09		0.22	0.16
O024	837319.598	819387.5962		0.39	0.33	0.19	0.23	0.16	0.16	0.15	0.04	0.05	0.33	0.33	0.02	0.08		0.21	0.15
O025	837330.143	819410.2634		0.40	0.34	0.21	0.21	0.15	0.15	0.13	0.07	0.07	0.30	0.30	0.05	0.08		0.21	0.15
O026	837340.441	819433.0442		0.37	0.36	0.26	0.18	0.12	0.13	0.13	0.07	0.07	0.26	0.26	0.18	0.17		0.21	0.16
O027	837349.184	819456.4655		0.42	0.36	0.29	0.14	0.13	0.12	0.13	0.05	0.05	0.29	0.30	0.06	0.09		0.20	0.13
O028	837357.205	819480.1436		0.41	0.35	0.24	0.06	0.09	0.11	0.13	0.09	0.09	0.30	0.30	0.25	0.19		0.18	0.17
O029	837374.801	819501.2702		0.30	0.31	0.23	0.11	0.04	0.10	0.14	0.17	0.17	0.29	0.29	0.04	0.05		0.16	0.12
O030	837378.969	819525.9203		0.32	0.23	0.13	0.16	0.10	0.10	0.15	0.16	0.15	0.28	0.28	0.03	0.04		0.16	0.13
O031	837383.378	819550.5285		0.31	0.23	0.11	0.25	0.10	0.07	0.13	0.15	0.14	0.17	0.17	0.18	0.16		0.18	0.16
O032	837387.473	819575.1909		0.37	0.26	0.12	0.02	0.08	0.06	0.12	0.14	0.14	0.14	0.14	0.11	0.05		0.12	0.09
O033	837390.977	819599.944		0.37	0.25	0.15	0.11	0.07	0.08	0.11	0.13	0.13	0.14	0.14	0.12	0.07		0.15	0.10
O034	837391.388	819624.9827		0.38	0.27	0.20	0.11	0.07	0.09	0.12	0.11	0.13	0.13	0.13	0.05	0.06		0.15	0.09
O035	837399.077	819652.8457		0.36	0.14	0.17	0.16	0.10	0.10	0.08	0.04	0.03	0.04	0.04	0.09	0.02		0.14	0.08
O036	837353.337	819506.2206		0.39	0.33	0.19	0.16	0.03	0.07	0.13	0.08	0.08	0.11	0.12	0.06	0.03		0.16	0.08
O037	837357.505	819530.8707		0.37	0.32	0.17	0.12	0.08	0.08	0.12	0.11	0.10	0.08	0.08	0.05	0.04		0.15	0.08
O038	837361.914	819555.4789		0.40	0.35	0.20	0.24	0.09	0.10	0.12	0.12	0.12	0.13	0.13	0.25	0.22		0.21	0.17
O039	837366.009	819580.1413		0.41	0.35	0.15	0.14	0.09	0.07	0.13	0.13	0.14	0.01	0.01	0.08	0.10		0.16	0.09
O040	837369.513	819604.8944		0.41	0.38	0.06	0.19	0.14	0.11	0.13	0.13	0.14	0.03	0.03	0.09	0.08		0.17	0.11
O041	837371.141	819629.2418		0.38	0.40	0.17	0.13	0.14	0.10	0.13	0.09	0.12	0.12	0.11	0.07	0.03		0.17	0.10
O042	837374.378	819654.0313		0.37	0.38	0.22	0.17	0.13	0.09	0.13	0.07	0.09	0.11	0.11	0.08	0.08		0.19	0.11
O043	837242.641	819376.451		0.14	0.05	0.04	0.01	0.06	0.06	0.07	0.06	0.06	0.08	0.09	0.17	0.17		0.06	0.09
O044	837252.955	819399.2241		0.21	0.24	0.17	0.04	0.07	0.09	0.09	0.08	0.07	0.09	0.09	0.16	0.14		0.11	0.10
O045	837263.27	819421.9973		0.02	0.05	0.06	0.07	0.06	0.10	0.09	0.06	0.06	0.05	0.05	0.21	0.18		0.07	0.11
O046	837273.584	819444.7704		0.01	0.03	0.03	0.10	0.05	0.08	0.04	0.02	0.02	0.04	0.04	0.25	0.26		0.07	0.11
O047	837284.149	819467.4283		0.04	0.07	0.04	0.13	0.06	0.03	0.03	0.04	0.03	0.03	0.03	0.18	0.23		0.08	0.10
O048	837293.743	819490.5142		0.15	0.24	0.18	0.14	0.08	0.08	0.09	0.11	0.11	0.03	0.03	0.30	0.35		0.15	0.16
O049	837300.772	819514.4239		0.14	0.08	0.11	0.09	0.05	0.06	0.07	0.03	0.04	0.06	0.06	0.34	0.37		0.10	0.15

Wind Velocity Ratio, Proposed Case

Tes Point			Wind direction (Degree)	22.5	45	67.5	90	112.5	135	157.5	180	180	202.5	202.5	225	247.5	Sum	Average (Annual)	Average (Summer)
			Wind direction	NNE	NE	ENE	E	ESE	SE	SSE	S	S	SSW	SSW	SW	WSW			
			Average Wind Speed at 500m elevation	6	6	7	7	7	6	5	5	6	6	7	6	6			
ID	Easting (m)	Northing (m)	Probability (Annual)	6.4%	7.4%	13.5%	22.2%	11.6%	5.6%		4.4%		6.0%		6.2%		83.3%		
			Probability (Summer)				9.3%	9.6%	8.0%	7.3%		9.3%		13.5%	14.9%	9.7%	81.6%		
O050	837303.759	819539.2447		0.18	0.11	0.05	0.04	0.03	0.02	0.06	0.05	0.06	0.04	0.04	0.33	0.33		0.08	0.13
O051	837306.747	819564.0656		0.21	0.15	0.20	0.24	0.12	0.10	0.03	0.08	0.09	0.14	0.14	0.11	0.11		0.17	0.12
O052	837309.143	819587.0343		0.23	0.16	0.04	0.05	0.03	0.02	0.02	0.05	0.06	0.15	0.15	0.29	0.25		0.09	0.13
O053	837474.355	819268.9614		0.10	0.18	0.23	0.33	0.20	0.17	0.11	0.12	0.12	0.17	0.17	0.21	0.17		0.22	0.19
O054	837474.318	819293.9614		0.17	0.15	0.11	0.20	0.15	0.18	0.16	0.11	0.10	0.10	0.10	0.14	0.01		0.15	0.13
O055	837474.281	819318.9614		0.18	0.16	0.12	0.23	0.20	0.23	0.21	0.12	0.12	0.14	0.14	0.15	0.07		0.18	0.16
O056	837474.244	819343.9613		0.18	0.16	0.14	0.21	0.18	0.22	0.19	0.12	0.11	0.12	0.12	0.10	0.08		0.17	0.15
O057	837589.29	819334.1772		0.12	0.28	0.29	0.31	0.21	0.13	0.04	0.10	0.10	0.17	0.17	0.23	0.14		0.24	0.17
O058	837598.666	819357.3525		0.08	0.25	0.11	0.13	0.15	0.10	0.12	0.10	0.10	0.17	0.17	0.22	0.13		0.14	0.15
O059	837608.042	819380.5278		0.09	0.23	0.09	0.09	0.13	0.11	0.18	0.10	0.09	0.09	0.09	0.14	0.09		0.11	0.11
O060	837617.418	819403.703		0.08	0.20	0.09	0.08	0.15	0.13	0.08	0.05	0.05	0.04	0.04	0.11	0.03		0.10	0.08
O061	837626.794	819426.8783		0.06	0.22	0.07	0.10	0.14	0.08	0.03	0.08	0.08	0.11	0.11	0.11	0.07		0.11	0.09
O062	837636.169	819450.0535		0.25	0.29	0.06	0.16	0.05	0.13	0.12	0.14	0.14	0.07	0.07	0.06	0.12		0.13	0.10
O063	837541.093	819385.3483		0.15	0.11	0.17	0.15	0.17	0.18	0.08	0.03	0.03	0.07	0.08	0.08	0.07		0.14	0.10
O064	837551.648	819408.0108		0.16	0.04	0.24	0.32	0.26	0.22	0.18	0.12	0.12	0.11	0.11	0.04	0.11		0.21	0.16
O065	837562.203	819430.6734		0.18	0.23	0.27	0.34	0.23	0.20	0.16	0.06	0.06	0.08	0.08	0.05	0.08		0.23	0.14
O066	837572.758	819453.3359		0.21	0.08	0.05	0.11	0.03	0.08	0.06	0.06	0.06	0.01	0.01	0.02	0.04		0.08	0.05
O067	837524.718	819521.8224		0.04	0.08	0.14	0.08	0.04	0.06	0.03	0.02	0.02	0.02	0.02	0.07	0.08		0.07	0.05
O068	837536.748	819543.7375		0.05	0.07	0.07	0.05	0.04	0.07	0.03	0.02	0.02	0.03	0.03	0.05	0.08		0.05	0.04
O069	837447.379	819622.0024		0.22	0.15	0.12	0.26	0.14	0.06	0.05	0.07	0.07	0.11	0.11	0.11	0.08		0.16	0.11
O070	837458.684	819644.3002		0.23	0.15	0.08	0.16	0.09	0.03	0.06	0.03	0.02	0.13	0.13	0.09	0.11		0.12	0.09
O071	837469.158	819667.0003		0.20	0.14	0.13	0.17	0.13	0.05	0.03	0.02	0.03	0.12	0.12	0.07	0.14		0.13	0.10
O072	837472.874	819256.1261		0.24	0.38	0.41	0.47	0.26	0.21	0.13	0.10	0.10	0.09	0.09	0.26	0.14		0.33	0.21
O073	837447.874	819256.313		0.25	0.38	0.42	0.51	0.28	0.23	0.10	0.08	0.08	0.04	0.03	0.09	0.07		0.32	0.16
O074	837422.875	819256.5		0.22	0.35	0.39	0.45	0.25	0.22	0.14	0.11	0.11	0.13	0.13	0.10	0.09		0.31	0.18
O075	837397.876	819256.6869		0.18	0.31	0.37	0.41	0.23	0.20	0.16	0.11	0.11	0.06	0.06	0.03	0.05		0.27	0.14
O076	837521.839	819381.0629		0.17	0.18	0.16	0.04	0.04	0.06	0.04	0.05	0.06	0.06	0.06	0.05	0.05		0.08	0.05
O077	837496.839	819381.0994		0.16	0.20	0.04	0.07	0.05	0.01	0.01	0.07	0.07	0.08	0.08	0.08	0.01		0.08	0.05
O078	837471.839	819381.1357		0.17	0.16	0.15	0.06	0.13	0.21	0.20	0.17	0.17	0.15	0.15	0.16	0.13		0.13	0.15
O079	837446.839	819381.172		0.13	0.21	0.10	0.10	0.01	0.03	0.06	0.03	0.03	0.13	0.13	0.16	0.13		0.10	0.09
O080	837421.842	819380.7803		0.14	0.15	0.09	0.06	0.04	0.07	0.12	0.07	0.07	0.12	0.12	0.14	0.12		0.09	0.10
O081	837518.686	819394.0734		0.03	0.11	0.06	0.07	0.03	0.07	0.04	0.05	0.05	0.11	0.11	0.13	0.08		0.07	0.08
O082	837495.773	819404.0735		0.06	0.06	0.09	0.15	0.08	0.07	0.03	0.06	0.06	0.11	0.11	0.08	0.04		0.10	0.08
O083	837540.208	819439.9298		0.12	0.24	0.27	0.35	0.25	0.24	0.18	0.07	0.07	0.01	0.01	0.03	0.05		0.23	0.13
O084	837517.292	819449.9228		0.16	0.21	0.28	0.35	0.24	0.25	0.17	0.06	0.06	0.01	0.01	0.02	0.06		0.23	0.13
O085	837624.242	819459.1058		0.25	0.07	0.16	0.40	0.24	0.18	0.12	0.14	0.14	0.07	0.07	0.04	0.11		0.22	0.15
O086	837601.397	819469.2596		0.16	0.14	0.27	0.47	0.35	0.32	0.27	0.20	0.20	0.07	0.07	0.05	0.13		0.28	0.21
O087	837578.678	819479.6915		0.19	0.16	0.21	0.38	0.30	0.31	0.26	0.19	0.19	0.07	0.07	0.04	0.12		0.24	0.18
O088	837555.858	819489.9032		0.10	0.09	0.17	0.35	0.27	0.30	0.26	0.19	0.19	0.06	0.06	0.08	0.15		0.22	0.19
O089	837533.039	819500.1149		0.09	0.07	0.15	0.33	0.25	0.27	0.21	0.15	0.15	0.05	0.05	0.11	0.17		0.20	0.18
O090	837510.239	819510.3706		0.17	0.17	0.20	0.35	0.25	0.25	0.15	0.11	0.11	0.07	0.07	0.11	0.17		0.22	0.17
O091	837487.249	819520.1919		0.17	0.24	0.14	0.33	0.22	0.20	0.07	0.06	0.07	0.03	0.03	0.09	0.14		0.20	0.14
O092	837367.164	819291.9732		0.06	0.18	0.18	0.20	0.21	0.25	0.24	0.30	0.30	0.22	0.22	0.21	0.12		0.20	0.22
O093	837344.522	819302.5724		0.03	0.06	0.07	0.05	0.03	0.12	0.02	0.08	0.07	0.05	0.05	0.06	0.11		0.06	0.07
O094	837321.88	819313.1717		0.02	0.05	0.05	0.02	0.12	0.12	0.08	0.04	0.04	0.03	0.03	0.08	0.08		0.05	0.07
O095	837299.238	819323.7709		0.31	0.25	0.11	0.25	0.16	0.06	0.04	0.02	0.02	0.12	0.11	0.05	0.05		0.17	0.09

Wind Velocity Ratio, Proposed Case

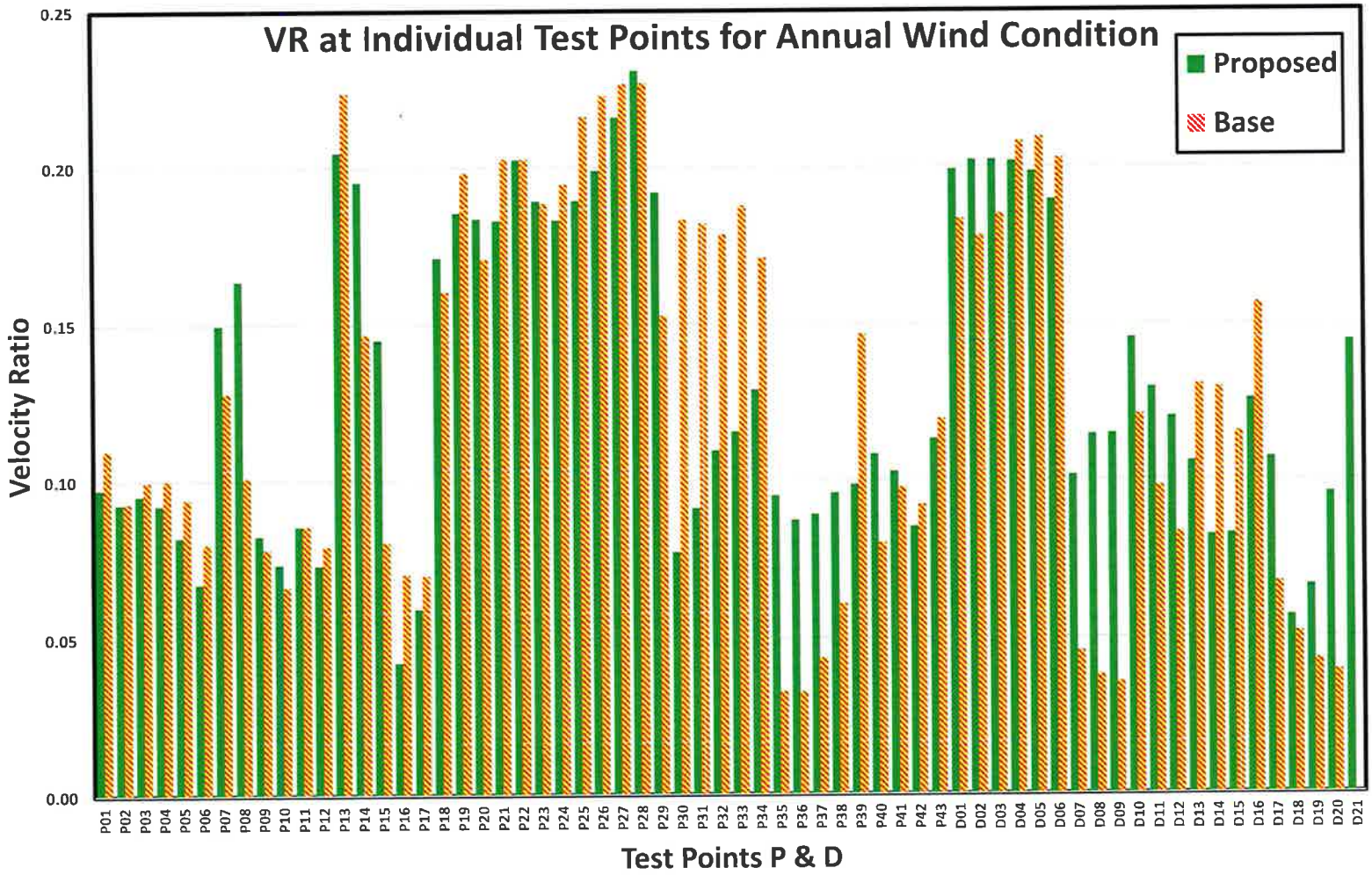
Tes Point			Wind direction (Degree)	22.5	45	67.5	90	112.5	135	157.5	180	180	202.5	202.5	225	247.5	Sum	Average (Annual)	Average (Summer)
			Wind direction	NNE	NE	ENE	E	ESE	SE	SSE	S	S	SSW	SSW	SW	WSW			
			Average Wind Speed at 500m elevation	6	6	7	7	7	6	5	5	6	6	7	6	6			
ID	Easting (m)	Northing (m)	Probability (Annual)	6.4%	7.4%	13.5%	22.2%	11.6%	5.6%		4.4%		6.0%		6.2%		83.3%		
			Probability (Summer)				9.3%	9.6%	8.0%	7.3%		9.3%		13.5%	14.9%	9.7%	81.6%		
O096	837286.411	819373.7466		0.11	0.15	0.12	0.02	0.04	0.05	0.05	0.04	0.04	0.05	0.05	0.09	0.17		0.07	0.07
O097	837265.105	819386.8248		0.16	0.20	0.15	0.01	0.02	0.08	0.03	0.03	0.03	0.02	0.02	0.16	0.26		0.08	0.08
O098	837335.68	819487.7377		0.07	0.09	0.07	0.14	0.06	0.01	0.02	0.04	0.04	0.03	0.03	0.35	0.32		0.10	0.14
O099	837311.437	819493.8417		0.10	0.10	0.07	0.05	0.03	0.06	0.08	0.12	0.12	0.02	0.02	0.37	0.31		0.09	0.14
O100	837348.376	819552.1893		0.07	0.07	0.19	0.34	0.17	0.15	0.02	0.02	0.01	0.12	0.12	0.20	0.17		0.19	0.15
O101	837323.599	819555.5178		0.06	0.07	0.24	0.30	0.13	0.08	0.04	0.07	0.08	0.14	0.14	0.07	0.05		0.17	0.11
O102	837360.258	819608.9372		0.35	0.39	0.15	0.15	0.13	0.09	0.08	0.08	0.07	0.06	0.06	0.12	0.12		0.17	0.10
O103	837335.258	819609.054		0.17	0.14	0.19	0.18	0.08	0.07	0.02	0.01	0.01	0.03	0.03	0.07	0.07		0.13	0.07
O104	837624.02	819518.3444		0.17	0.16	0.36	0.51	0.41	0.35	0.28	0.18	0.18	0.07	0.07	0.10	0.03		0.32	0.22
O105	837601.916	819530.0231		0.09	0.15	0.32	0.43	0.35	0.34	0.28	0.18	0.18	0.12	0.12	0.11	0.08		0.28	0.22
O106	837579.811	819541.7017		0.10	0.20	0.37	0.43	0.35	0.33	0.25	0.17	0.17	0.12	0.12	0.10	0.10		0.29	0.21
O107	837557.707	819553.3804		0.04	0.19	0.36	0.42	0.33	0.31	0.24	0.16	0.16	0.14	0.14	0.12	0.13		0.28	0.22
O108	837535.602	819565.059		0.04	0.17	0.31	0.39	0.31	0.29	0.22	0.16	0.16	0.15	0.15	0.12	0.14		0.26	0.21
O109	837513.498	819576.7377		0.09	0.17	0.30	0.36	0.28	0.27	0.20	0.16	0.15	0.18	0.18	0.14	0.18		0.26	0.21
O110	837491.393	819588.4163		0.30	0.34	0.34	0.33	0.23	0.22	0.17	0.13	0.13	0.20	0.21	0.22	0.24		0.28	0.22
O111	837469.289	819600.095		0.06	0.07	0.08	0.09	0.07	0.07	0.10	0.02	0.05	0.07	0.07	0.08	0.11		0.08	0.08
O112	837447.184	819611.7736		0.22	0.14	0.14	0.23	0.13	0.07	0.03	0.08	0.09	0.07	0.07	0.08	0.06		0.15	0.09
O113	837425.08	819623.4523		0.16	0.10	0.09	0.19	0.10	0.02	0.02	0.11	0.08	0.06	0.06	0.05	0.10		0.12	0.08
O114	837402.975	819635.1309		0.34	0.13	0.15	0.19	0.09	0.06	0.06	0.08	0.08	0.09	0.09	0.06	0.09		0.14	0.09
O115	837408.262	819525.5231		0.25	0.31	0.29	0.15	0.09	0.10	0.11	0.06	0.06	0.26	0.26	0.13	0.12		0.19	0.14
O116	837390.196	819534.1032		0.26	0.23	0.18	0.18	0.08	0.10	0.11	0.11	0.11	0.27	0.28	0.05	0.07		0.17	0.13
O117	837418.519	819539.5144		0.25	0.33	0.33	0.22	0.10	0.03	0.04	0.03	0.02	0.24	0.24	0.16	0.15		0.21	0.13
O118	837394.367	819545.9731		0.25	0.14	0.09	0.25	0.11	0.05	0.10	0.10	0.09	0.25	0.25	0.12	0.09		0.16	0.14
O119	837430.566	819553.9937		0.24	0.34	0.35	0.27	0.10	0.08	0.08	0.03	0.04	0.24	0.24	0.18	0.17		0.23	0.15
O120	837397.422	819559.2232		0.25	0.10	0.12	0.24	0.14	0.07	0.08	0.08	0.08	0.19	0.19	0.14	0.12		0.16	0.14
O121	837442.962	819567.5099		0.24	0.34	0.34	0.32	0.03	0.05	0.03	0.07	0.07	0.25	0.25	0.17	0.17		0.23	0.15
O122	837424.948	819573.4898		0.11	0.07	0.05	0.13	0.10	0.10	0.06	0.05	0.03	0.05	0.05	0.03	0.04		0.09	0.06
O123	837454.017	819581.912		0.17	0.27	0.28	0.28	0.18	0.20	0.05	0.08	0.09	0.18	0.18	0.15	0.16		0.22	0.17
O124	837426.073	819590.192		0.12	0.03	0.09	0.08	0.04	0.09	0.08	0.02	0.04	0.07	0.07	0.03	0.03		0.07	0.05
O125	837445.874	819598.0208		0.15	0.08	0.09	0.12	0.07	0.04	0.11	0.06	0.04	0.07	0.07	0.05	0.04		0.09	0.07
O126	837422.941	819610.31		0.07	0.07	0.02	0.12	0.05	0.02	0.04	0.07	0.05	0.09	0.09	0.04	0.05		0.07	0.06
O127	837341.771	819247.4444		0.13	0.25	0.30	0.31	0.12	0.17	0.24	0.24	0.24	0.19	0.19	0.15	0.13		0.23	0.19
O128	837318.869	819257.4693		0.06	0.04	0.08	0.06	0.08	0.10	0.13	0.17	0.17	0.10	0.10	0.12	0.12		0.08	0.11
O129	837567.631	819313.2053		0.07	0.24	0.20	0.25	0.20	0.13	0.07	0.08	0.08	0.11	0.11	0.13	0.07		0.18	0.13
O130	837572.869	819327.8978		0.12	0.31	0.26	0.31	0.23	0.12	0.03	0.07	0.07	0.11	0.11	0.14	0.07		0.22	0.14
O131	837548.595	819595.5367		0.02	0.04	0.02	0.03	0.02	0.04	0.01	0.01	0.00	0.01	0.01	0.01	0.01		0.02	0.02
O132	837561.485	819610.8287		0.08	0.09	0.05	0.08	0.06	0.09	0.02	0.01	0.01	0.03	0.03	0.03	0.02		0.06	0.04
O133	837574.926	819625.6391		0.13	0.13	0.10	0.09	0.07	0.12	0.06	0.01	0.02	0.07	0.07	0.06	0.04		0.09	0.06
O134	837572.729	819574.7931		0.00	0.01	0.01	0.02	0.00	0.01	0.02	0.01	0.01	0.01	0.01	0.00	0.00		0.01	0.01
O135	837585.828	819589.9063		0.01	0.03	0.01	0.05	0.01	0.06	0.03	0.01	0.01	0.04	0.04	0.01	0.00		0.03	0.02
O136	837599.213	819604.7678		0.03	0.05	0.03	0.06	0.01	0.10	0.07	0.03	0.02	0.09	0.09	0.04	0.01		0.05	0.05
O137	837473.041	819364.428		0.19	0.19	0.17	0.10	0.18	0.24	0.23	0.17	0.17	0.15	0.15	0.11	0.04		0.16	0.15
O138	837484.749	819427.112		0.20	0.06	0.05	0.08	0.06	0.03	0.09	0.16	0.16	0.08	0.08	0.05	0.04		0.08	0.07
O139	837492.812	819444.8828		0.22	0.08	0.04	0.06	0.04	0.03	0.02	0.13	0.13	0.10	0.10	0.07	0.11		0.07	0.07
O140	837500.553	819473.0723		0.25	0.22	0.03	0.20	0.16	0.17	0.17	0.10	0.10	0.08	0.08	0.02	0.07		0.14	0.11
O141	837508.579	819492.0595		0.22	0.17	0.06	0.03	0.03	0.05	0.09	0.07	0.07	0.07	0.07	0.01	0.05		0.07	0.05

Wind Velocity Ratio, Proposed Case

Tes Point			Wind direction (Degree)	22.5	45	67.5	90	112.5	135	157.5	180	180	202.5	202.5	225	247.5	Sum	Average (Annual)	Average (Summer)
			Wind direction	NNE	NE	ENE	E	ESE	SE	SSE	S	S	SSW	SSW	SW	WSW			
			Average Wind Speed at 500m elevation	6	6	7	7	7	6	5	5	6	6	7	6	6			
ID	Easting (m)	Northing (m)	Probability (Annual)	6.4%	7.4%	13.5%	22.2%	11.6%	5.6%		4.4%		6.0%		6.2%		83.3%		
			Probability (Summer)				9.3%	9.6%	8.0%	7.3%		9.3%		13.5%	14.9%	9.7%	81.6%		
O142	837581.487	819430.6818		0.06	0.24	0.34	0.44	0.32	0.26	0.22	0.14	0.14	0.07	0.07	0.02	0.07		0.27	0.17
O143	837601.935	819428.3998		0.06	0.17	0.25	0.31	0.22	0.18	0.17	0.14	0.14	0.09	0.09	0.04	0.09		0.20	0.14
O144	837479.151	819390.3535		0.12	0.10	0.14	0.13	0.04	0.07	0.11	0.13	0.13	0.17	0.17	0.18	0.13		0.12	0.13
O145	837501.333	819391.788		0.06	0.15	0.05	0.11	0.08	0.05	0.03	0.02	0.02	0.11	0.11	0.13	0.06		0.09	0.08
O146	837473.541	819403.0033		0.20	0.18	0.15	0.17	0.07	0.16	0.17	0.17	0.17	0.06	0.06	0.06	0.04		0.14	0.10
D01	837438.96	819490.7		0.09	0.13	0.24	0.33	0.21	0.22	0.16	0.08	0.08	0.05	0.05	0.01	0.06		0.20	0.13
D02	837432.41	819493.16		0.11	0.14	0.25	0.33	0.21	0.22	0.16	0.07	0.07	0.05	0.05	0.02	0.07		0.20	0.13
D03	837425.85	819495.63		0.11	0.13	0.24	0.32	0.21	0.21	0.15	0.06	0.06	0.04	0.04	0.11	0.15		0.20	0.15
D04	837435.83	819484.11		0.15	0.15	0.25	0.33	0.20	0.20	0.12	0.04	0.04	0.04	0.04	0.05	0.06		0.20	0.12
D05	837429.41	819486.89		0.13	0.15	0.24	0.32	0.20	0.19	0.13	0.04	0.04	0.05	0.05	0.05	0.04		0.20	0.12
D06	837422.99	819489.67		0.10	0.15	0.24	0.31	0.19	0.18	0.13	0.04	0.04	0.05	0.05	0.03	0.02		0.19	0.11
D07	837407.87	819447.32		0.15	0.15	0.15	0.11	0.09	0.04	0.04	0.04	0.04	0.05	0.05	0.02	0.16		0.10	0.07
D08	837401.5	819450.23		0.15	0.16	0.17	0.14	0.10	0.04	0.05	0.04	0.04	0.05	0.05	0.02	0.16		0.11	0.07
D09	837395.13	819453.13		0.12	0.16	0.18	0.15	0.10	0.04	0.05	0.05	0.05	0.04	0.04	0.01	0.11		0.11	0.06
D10	837405.01	819440.74		0.16	0.22	0.22	0.18	0.13	0.08	0.05	0.04	0.04	0.05	0.05	0.02	0.10		0.15	0.08
D11	837398.68	819443.73		0.14	0.20	0.20	0.16	0.11	0.06	0.05	0.05	0.05	0.04	0.04	0.01	0.07		0.13	0.06
D12	837392.35	819446.71		0.12	0.18	0.19	0.15	0.09	0.04	0.04	0.05	0.05	0.04	0.04	0.02	0.06		0.12	0.06
D13	837441.69	819452.07		0.01	0.08	0.12	0.17	0.11	0.07	0.01	0.03	0.03	0.10	0.10	0.06	0.05		0.11	0.08
D14	837446.27	819457.37		0.01	0.06	0.08	0.13	0.10	0.05	0.02	0.03	0.03	0.10	0.10	0.04	0.07		0.08	0.07
D15	837450.84	819462.67		0.02	0.08	0.11	0.13	0.07	0.03	0.04	0.03	0.03	0.08	0.08	0.03	0.09		0.08	0.06
D16	837455.42	819467.97		0.12	0.11	0.15	0.20	0.11	0.10	0.07	0.02	0.02	0.06	0.06	0.02	0.08		0.13	0.08
D17	837437.27	819439.17		0.11	0.07	0.10	0.15	0.10	0.09	0.03	0.08	0.08	0.09	0.09	0.09	0.09		0.11	0.09
D18	837446.41	819449.78		0.03	0.08	0.06	0.08	0.07	0.04	0.03	0.02	0.02	0.04	0.04	0.02	0.06		0.06	0.04
D19	837450.98	819455.08		0.01	0.08	0.10	0.11	0.03	0.02	0.01	0.02	0.02	0.03	0.03	0.02	0.07		0.07	0.04
D20	837455.55	819460.38		0.06	0.10	0.15	0.17	0.05	0.04	0.05	0.02	0.02	0.02	0.02	0.01	0.09		0.10	0.05
D21	837460.12	819465.68		0.11	0.13	0.20	0.24	0.12	0.12	0.09	0.02	0.02	0.02	0.02	0.03	0.04		0.14	0.08

Spatial Averaged Velocity Ratio

		Base		Proposed	
		Annual	Summer	Annual	Summer
Overall					
SVR	**Site Air Ventilation Assessment (SVR) (P01-P43)**	0.13	0.12	0.13	0.12
LVR	**Local Air Ventilation Assessment (LVR) (P01-P43, O01-O146)**	0.15	0.13	0.15	0.13
Road Sections					
R01	Ma Tau Wai Road Section connected to To Kwa Wan Road (P01-P08, O001-O009)	0.13	0.18	0.13	0.18
R02	To Kwa Wan Road (P09-P18, O010-O019, O110)	0.17	0.15	0.17	0.14
R03	Chatham Road North (O020-O027)	0.22	0.15	0.21	0.15
R04	Ma Tau Wai Road connected to Chatham Road North (O028-O042)	0.16	0.10	0.16	0.11
R05	Ko Shan Road (O043-O052)	0.09	0.12	0.10	0.12
R06	Wan On Street (O053-O056)	0.17	0.15	0.18	0.16
R07	Sung On Street (O057-O062)	0.14	0.12	0.14	0.12
R08	Wing Kwong Street (O063-O066)	0.17	0.11	0.16	0.11
R09	Lung Tak Street (O067-O068)	0.06	0.03	0.06	0.05
R10	Ha Heung Road (O069-O071)	0.14	0.09	0.14	0.10
R11	Bailey Street (O072-O075)	0.31	0.18	0.31	0.17
R12	Wing Kwong Street (P41-P43, O076-O080)	0.10	0.10	0.10	0.09
R13	Kai Ming Street (P34-P40, O081-O082)	0.08	0.08	0.10	0.08
R14	Hung Fook Street (P22-P28, O083-O084)	0.22	0.15	0.21	0.13
R15	Ngan Hon Street (P19-P21, O085-O091)	0.21	0.15	0.21	0.15
R16	Shek Tong Street (O092-O095)	0.13	0.11	0.12	0.11
R17	Shansi Street (O096-O097)	0.07	0.06	0.08	0.07
R18	Kiang Hsi Street (O098-O099)	0.09	0.14	0.09	0.14
R19	Anhui Street (O102-O103)	0.17	0.12	0.18	0.13
R20	Chi Kiang Street, to the west of Ma Tau Wai Road (O095-O096)	0.14	0.09	0.15	0.08
R21	Chi Kiang Street, to the east of Ma Tau Wai Road (O104-O114)	0.23	0.18	0.22	0.17
R22	San Lau Street (O127-O128)	0.15	0.15	0.16	0.15
Other Concerned Area					
Z01	Ma Tau Wai Road/To Kwa Wan Road Garden (O115-O126)	0.15	0.12	0.16	0.12
Z02	Closed Hung Fook Street Section (D01-D06)	0.19	0.14	0.20	0.12
Z03	Closed Kai Ming Street Section (D07-D12)	0.07	0.06	0.12	0.07
Z04	Closed Yuk Shing Street (D13-D21)	0.09	0.06	0.10	0.07
Z05	Sung On Street Sitting-out Area (O129-O130)	0.20	0.13	0.20	0.13
Z06	Private Open Area I-Feng Mansion (O131-O136)	0.04	0.03	0.04	0.03
Z07	Open Area of KC-009 (O137)	0.17	0.16	0.16	0.15
Z08	Open Area of KC-010 (O140-O141)	0.10	0.07	0.11	0.08
Z09	Open Area of KC-011 & DL-8:KC (P29-P33, O138-O139)	0.15	0.09	0.11	0.09
Z10	Open Area of KC-014 (O142-143)	0.25	0.17	0.24	0.16
Z11	Open Area of KC-012/013 (O144-O146)	0.11	0.10	0.12	0.10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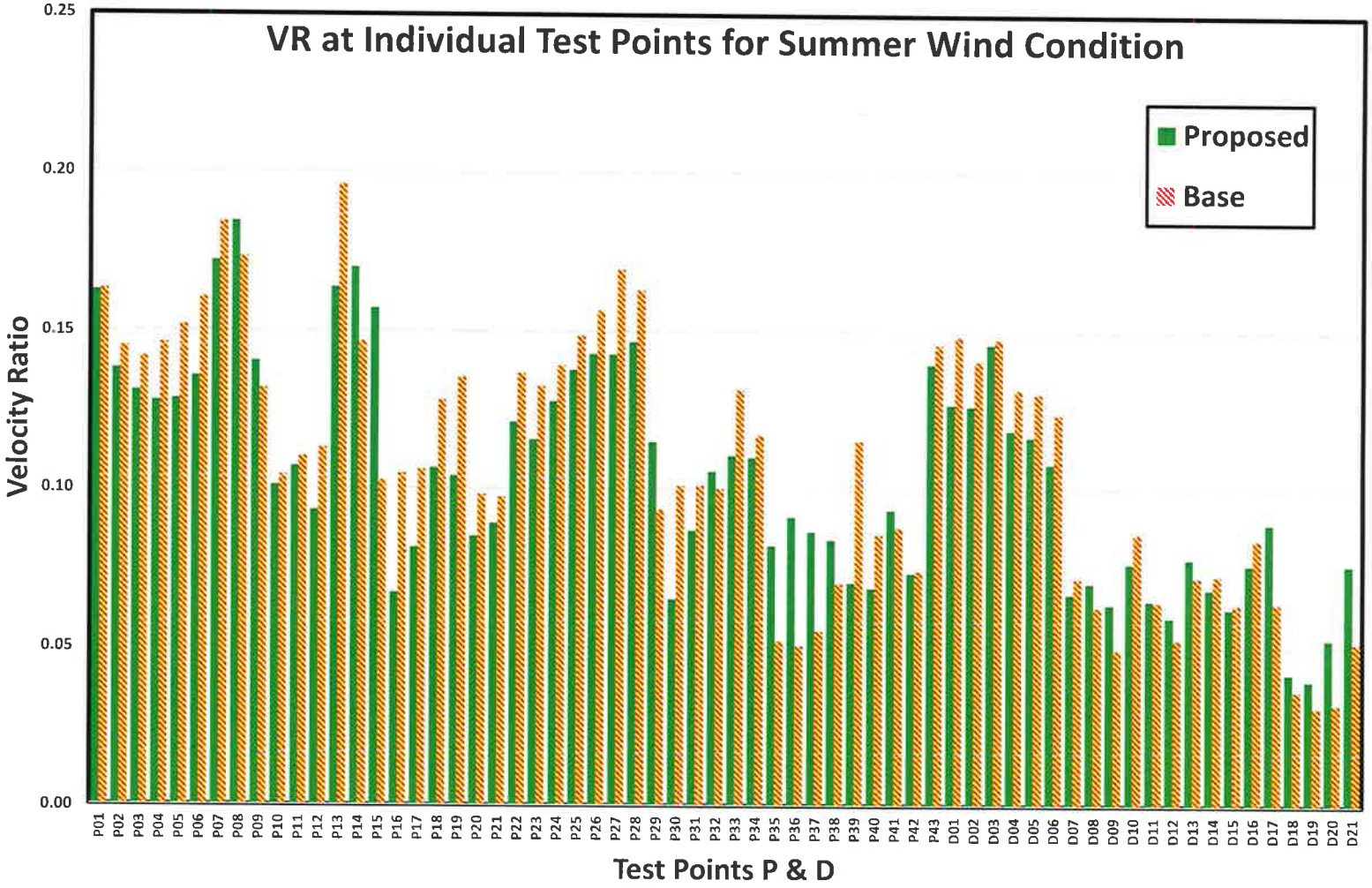
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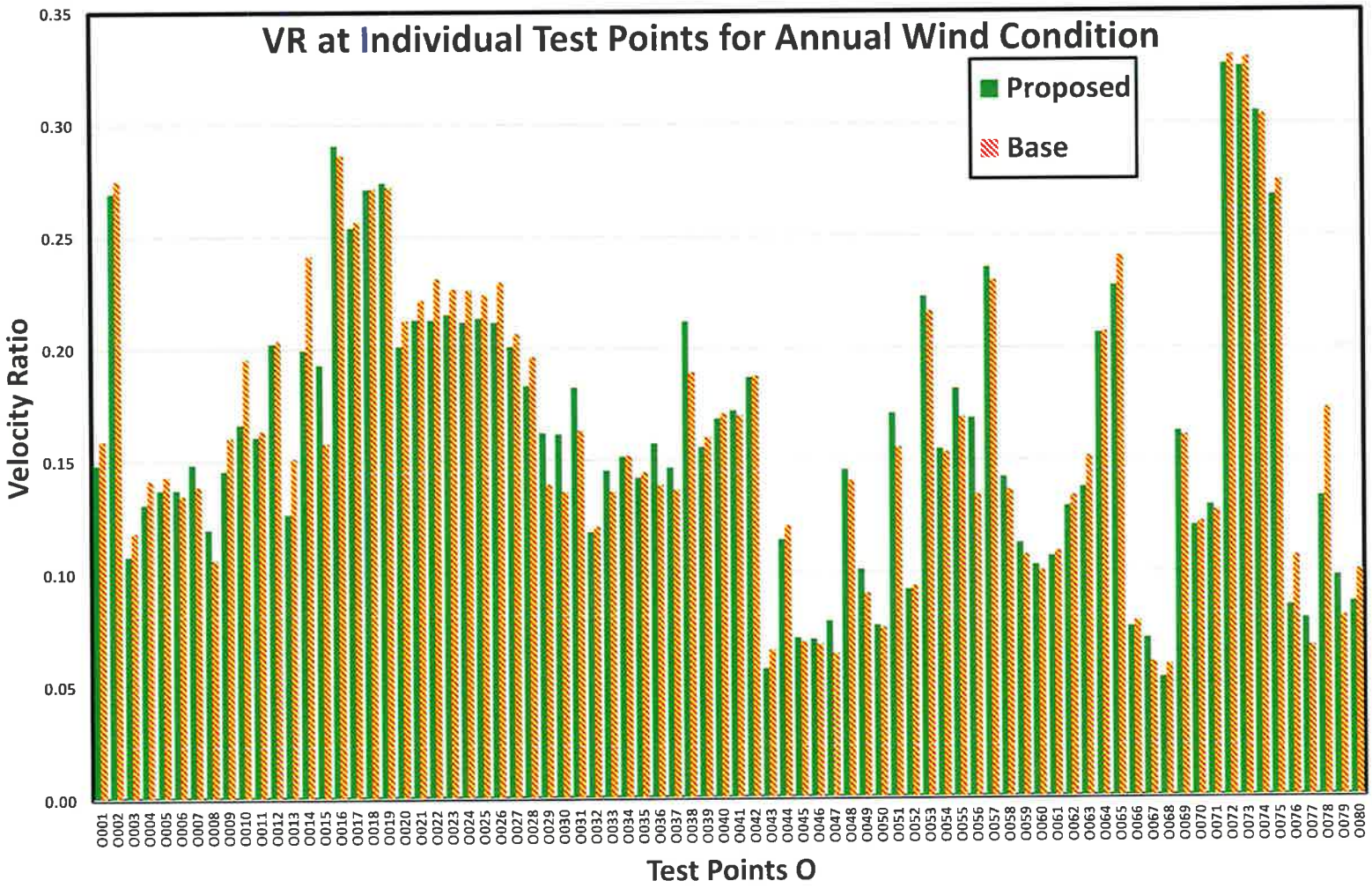
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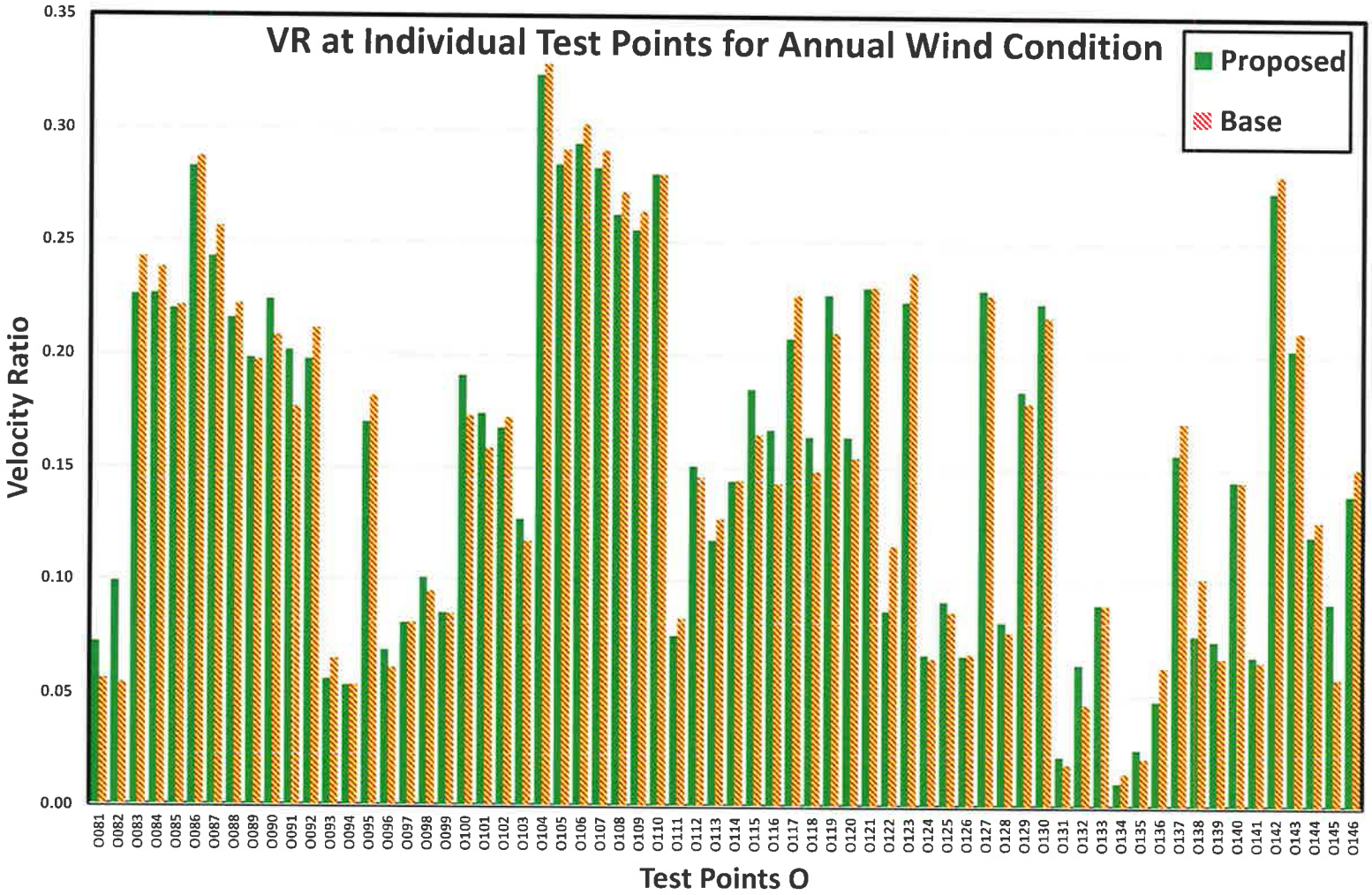
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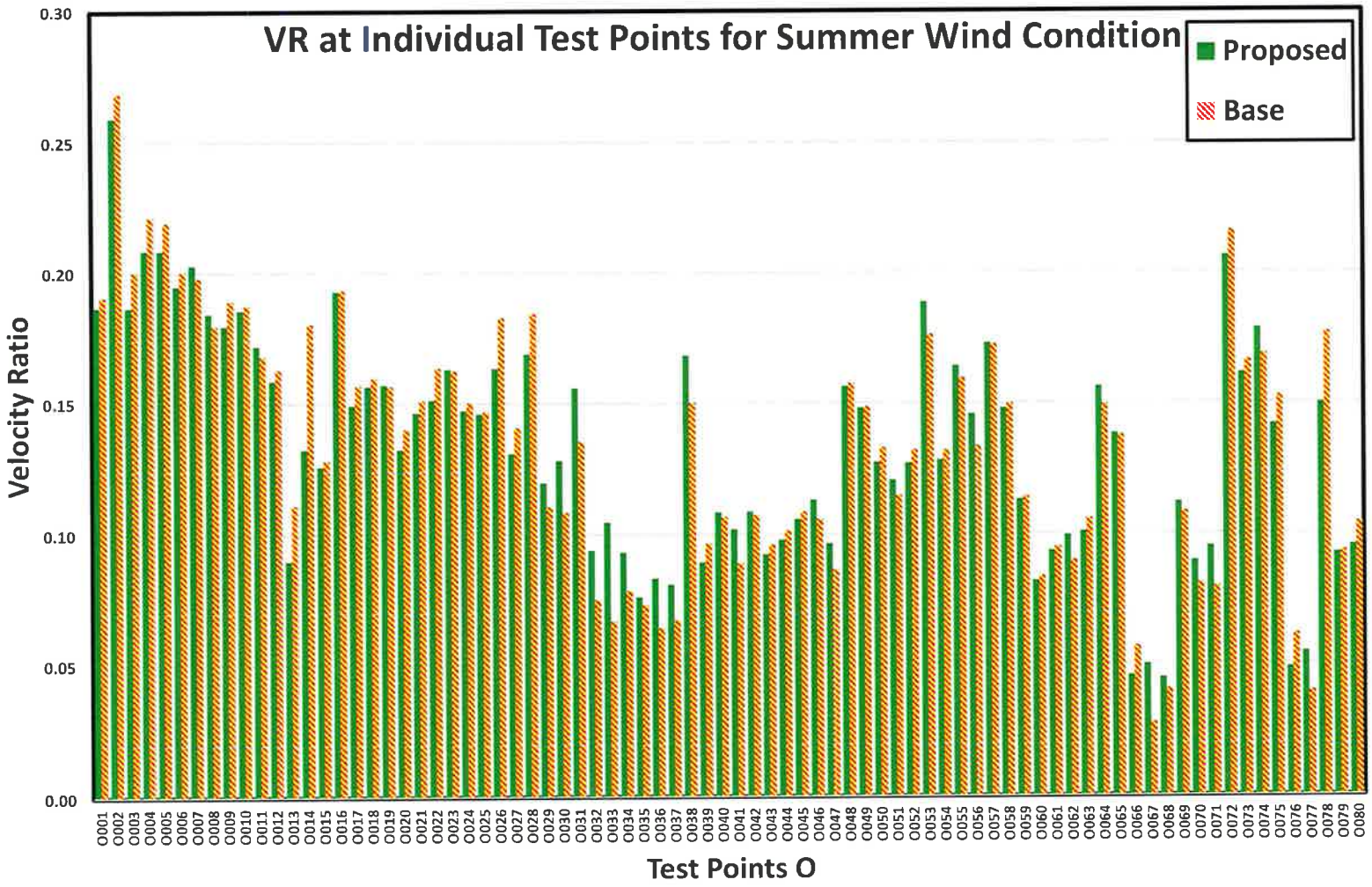
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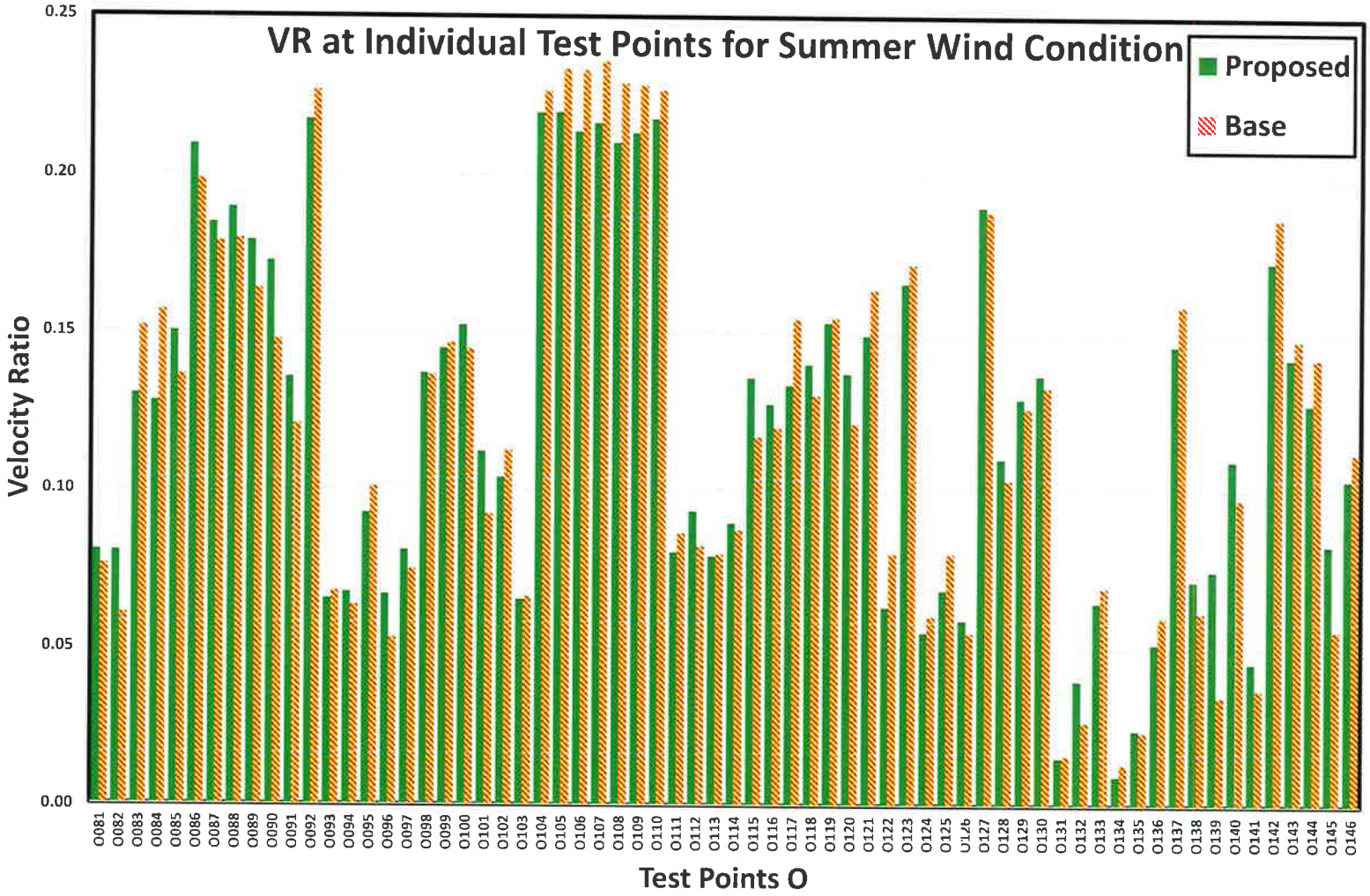
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Appendix 7

Drainage & Sewerage Impact Assessment (DSIA) Report

Urban Renewal Authority
Development Scheme
To Kwa Wan Road / Wing Kwong Street
(KC-016)

Drainage Impact Assessment

(V1.1)

March 2021

Approved By _____

(Project Manager: K.S. Lee)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

CINOTECH accepts no responsibility for changes made to this report by third parties.

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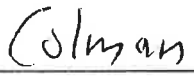
Prepared by	Colman Wong		2 March 2021
Checked by	Karina Chan		2 March 2021

TABLE OF CONTENTS

1 INTRODUCTION 1

1.1 BACKGROUND 1

2 DESCRIPTION OF THE ENVIRONMENT 2

2.1 EXISTING ENVIRONMENT 2
2.2 FUTURE ENVIRONMENT 2

3 DRAINAGE IMPACT ASSESSMENT 4

3.1 CATCHMENT OF THE SCHEME AREA WITHOUT THE SCHEME 4
3.2 CATCHMENT OF THE SCHEME AREA WITH THE SCHEME 4
3.3 THE DRAINAGE SYSTEM 5
3.4 DRAINAGE DISCHARGE FROM THE SCHEME TO PUBLIC DRAINAGE SYSTEM 6

4 CONCLUSION 8

LIST OF TABLES

Table 2-1 Details of Planned Drainage Pipes 3
Table 3-1 Catchment of the Scheme Area without the Scheme 4
Table 3-2 Catchment of the Site (With Project) 4
Table 3-3 Catchments in the Vicinity 5
Table 3-4 Runoff Coefficients 6
Table 3-5 Capacities of Downstream Public Drainage Pipes 6
Table 3-6 Capacities of the Proposed Drainage Pipes 7

LIST OF FIGURES

Figure 1-1 Location Plan of the Scheme
Figure 2-1 URA's Project and DSD's Tunnel Protection Zone in the Vicinity
Figure 2-2 Planned Drainage Pipes Upgrade for the 7 URA Redevelopment Projects
Figure 3-1 Sewerage Catchment Areas in the Vicinity without the Scheme
Figure 3-2 Sewerage Catchment Areas in the Vicinity with the Scheme

LIST OF APPENDICES

Appendix I Notional Plan of the Proposed Scheme
Appendix II Calculation of Drainage Discharge
Appendix III Detailed Calculation of Pipe Capacities
Appendix IV Runoff Contribution in Downstream Pipes

1 INTRODUCTION

1.1 Background

1.1.1 The Urban Renewal Authority (URA) has proposed To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) (the Scheme) under section 25 of the Urban Renewal Authority Ordinance (URAO). This Drainage Impact Assessment (DIA) is to support the submission of a draft Development Scheme Plan (DSP) with its planning proposal to the Town Planning Board (TPB) for consideration.

1.1.2 Cinotech Consultants Limited was commissioned by URA to carry out a Drainage Impact Assessment (DIA) to assess and envisage any potential drainage impact on the implementation of the proposed development of the Scheme and to recommend necessary pipe upgrading/diversion as necessary.

2 DESCRIPTION OF THE ENVIRONMENT

2.1 Existing Environment

2.1.1 The Scheme is broadly bounded by To Kwa Wan Road, Ma Tau Wai Road, Wing Kwong Street, Kai Ming Street, Hung Fook Street and Ngan Hon Street in To Kwa Wan. The scheme area is currently zoned as "Residential (Group A)" (R(A)), with building height restriction of 100 mPD, and the pavement and road sections are shown as "Road" in the Approved Hung Hom Outline Zoning Plan (OZP) No. S/K9/26.

2.1.2 The Site comprises three rows of tenement buildings along Ma Tau Wai Road and To Kwa Wan Road, buildings at Yuk Shing Street, Wong Teck Building, the whole of Yuk Shing Street, and part of the road sections of Hung Fook Street and Kai Ming Street (**Figure 1-1**). The gross site area of the Scheme is about 6,592m^2. The net site area is about 5,548 m^2, subject to site survey and detailed design.

2.1.3 It should be noted that the southern portion of the site is within Drainage Services Department's (DSD) Tunnel Protection Zone of Harbour Area Treatment Scheme (HATS) Stage I sewage tunnels (**Figure 2-1**). According to Environment, Transport and Works Bureau Technical Circular (Works) No. 28/2003, only Government Departments shall follow the procedures set out in the Circular for any works in the vicinity of the sewage tunnels. Any private development work which may cause potential damage to the sewage tunnels are covered by the Buildings Ordinance (Chapter 123) Section 17A, which requires project proponent to submit relevant proposals to the Buildings Department (BD) for approval. Should the draft DSP be approved, the URA/ its future Joint Venture Partner would submit the work proposals to BD for approval during the project implementation.

2.2 Future Environment

2.2.1 The Scheme is part of URA's district-based approach to undertake urban renewal in the area. URA has already commenced 7 URA redevelopment projects in the North-east, East, South-east and South immediate to the Scheme, including KC-009, KC-010, KC-011, DL-8:KC, KC-012, KC-013, and KC-014 (**Figure 2-1**). The 7 projects are anticipated to be completed between 2025 and 2027 according to current programme. Consideration of the future drainage network and discharge would take into account of the 7 URA redevelopment projects and the Scheme.

2.2.2 Although the planned drainage upgrade plan for the neighbourhood area of the Scheme is still in early stage and the design details, including the number of intermediate manholes along the new/upgraded drainage pipe sections, are yet to be confirmed, the following key items are expected to be persisted in the final stage:

- Upgrade and reverse the flow direction of the existing drainage pipes along Wan On Street (between manholes SMH4029465 and SMH4029491) and extended it to the existing manhole (SMH4030352) at Wing Kwong Street.
- Upgrade the existing drainage pipes along Wing Kwong Street and Ngan Hon Street (between manholes SMH4030352 and SSH4004044).

2.2.3 As a result, the stormwater runoff from the 7 URA's Projects and neighbourhood will join at SMH4030871 then discharged through SMH4067830 to Storm Water Special Manhole SSH4004044, which ultimately connected to 3600mm x 1800mm box culvert at Sung On Street. The above key items are shown in **Figure 2-2**.

2.2.4 Based on the latest available information, without the Scheme, the drainage system in the vicinity serving the Scheme Area is also illustrated in **Figure 2-2**. It should be noted that the planned drainage upgrade plan as descripted in **Sections 2.2.2 & 2.2.3** is to support drainage network required as a result of the 7 URA redevelopment projects and the plan is not part of the Scheme. It is anticipated that the planned drainage pipes upgrade plan will proceed for implementation even without the Scheme. Therefore, those key items of the plan will be treated as existing drainage pipes in the calculations of the following assessment.

2.2.5 The planned drainage pipes, i.e. P01 – P13, will cater the stormwater discharge from the Scheme Area. Their details are list in the **Table 2-1**.

Table 2-1 Details of Planned Drainage Pipes

Segment	Upstream Manhole	Downstream Manhole	Upstream Invert Level (mPD)	Downstream Invert Level (mPD)	Length (m)	Diameter (m)
P01	SMH4029348	SMH4029356	5.03	4.51	16.5	0.225
P02	SMH4029356	SMH4029352	4.51	3.90	62.2	0.525
P03	SMH4029352	SMH4030896	3.90	3.25	46.3	0.75
P04	SMH4030896	SMH4030897	3.25	2.94	18.0	0.75
P05	SMH4029321	SMH4029324	5.11	4.50	38.3	0.3
P06	SMH4029324	SMH4029345	4.50	3.80	41.4	0.375
P07	SMH4029345	SMH4030897	3.80	2.94	51.4	0.45
P08	SMH4030897	SMH4030899	2.94	2.16	22.8	0.75
P09	SMH4030899	SMH4030888	2.56	2.29	29.3	1
P10	SMH4029313	SMH4030888	4.92	2.64	127.4	0.525
P11	SMH4030888	SMH4030871	2.29	2.00	22.7	1
P12	SMH4030871	SMH4067829	2.00	1.73	24.4	1.05
P13	SMH4067829	SMH4067830	0.73	0.65	42.0	1.6

3 DRAINAGE IMPACT ASSESSMENT

3.1 Catchment of the Scheme Area without the Scheme

3.1.1 The Site is impermeable due to the concrete pavement. According to the latest available information from URA, the stormwater from the north-western portion of the site will discharge to the existing Manhole SMH4029313 along Hung Fook Street; stormwater from the eastern portion of the site will discharge to the existing Manhole SMH4029324 along Kai Ming Street; and stormwater from the southern portion of the site will discharge to the existing Manhole SMH4029356 Wing Kwong Street (**Figure 3-1**). The catchments in the Scheme Area without the Scheme are listed in **Table 3-1**.

Table 3-1 Catchment of the Scheme Area without the Scheme

Catchment	Description	Area (m^2)
A1a	Site Area - North-western portion	2624.9
A2a	Site Area - Eastern portion	1477.2
A3a	Site Area - Southern portion	1032.5

3.2 Catchment of the Scheme Area with the Scheme

3.2.1 The URA proposes to rezone the scheme area into "R(A)" and redevelop the area for high-density residential development, with commercial uses always permitted on the lowest three floors of a building or in the purpose-designed non-residential portion of a building. Under current notional design, the Scheme proposes to develop two residential towers, one on the north with about 34 storeys (T1) and another on the southern side of about 23 storeys (T2), on top of 5-storey podia which would incorporate GIC/commercial/retail, podium garden and private clubhouse facilities. Besides, a 4-storey low block (the Low Block) is proposed on the eastern side of the site with retail/commercial uses and an all-weathered communal space underneath. The notional plan of the proposed development is shown in **Appendix I**. The notional design is subject to change in detailed design stage. The catchments of the Scheme are listed in **Table 3-2**.

Table 3-2 Catchment of the Site (With Project)

Catchment	Description	Area (m^2)
A1b	Site Area – T1	2665.6
A2b	Site Area – Low Block	1455.1
A3b	Site Area – T2	1033.1

3.2.2 The stormwater from T1 will discharge to the existing Manhole SMH4029313 along Hung Fook Street; stormwater from the Low Block will discharge to the existing Manhole SMH4029324 along Kai Ming Street; and stormwater from the T2 will discharge to the existing Manhole SMH4029356 Wing Kwong Street (**Figure 3-2**).

3.2.3 It should be noted that development of the proposed Scheme involve removing of some existing drainage pipes. Since those drainage pipes only served the Scheme area, no drainage diversion will be required.

3.3 The Drainage System

3.3.1 According to DSD records, the site is not within any of DSD flooding black spots. Although the catchment area is not expected to be increased after the redevelopment, the ratio of stormwater discharge to individual pipe will vary, together with the rainfall increase, the downstream drainage pipes shall be checked for sufficient capacities to cater sewerage discharge.

3.3.2 As stated in **Section 2.2.4**, the future drainage network in the vicinity of the Scheme will be upgraded even without the Scheme, the future drainage network has been served as a based case for this assessment. The catchments in the vicinity are illustrated in **Figures 3-1 & 3-2** and listed in **Table 3-3**.

Table 3-3 Catchments in the Vicinity

Catchment (Development)	Area (m^2)	Catchment (Road Surfaces)	Area (m^2)
B1	1944.5	R1	290.4
B2	2599.4	R2	760.5
C	2926.2	R3	1244.7
D	2464.9	R4	649.4
E1	6014.0	R5	899.3
E2	1305.8	R6	496.4
F	2823.7	R7	741.6
G	1855.7	R8	300.7
H	4065.7	R9	207.6
		R10	202.9
		R11	1747.3
		R12	243.5
		R13	244.5

3.3.3 Stormwater Drainage Manual – Planning, Design and Management", fifth edition, January 2018, (hereafter called "the DSD Manual") prepared by the DSD provides guidelines for the design of the drainage system. According to Table 10 of the DSD Manual, the recommended design return period based on flood levels is 50 years ("main rural catchment drainage channels") for conservative purpose. The runoff coefficients of each zone are summarized in **Table 3-4**.

Table 3-4 Runoff Coefficients

Type of Area	Run-off Coefficient[1]
Paved/Concrete	0.9

Note:
[1] The runoff coefficients are extracted from Section 7.5.2 of "Stormwater Drainage Manual – Planning, Design and Management", fifth edition, January 2018.

3.3.4 A hydraulic calculation has been performed on the peak flows from a 1:50 year rainstorm with rainfall intensity according to the DSD Manual. The volumes of stormwater runoff of each zone are detailed in **Appendix II.**

3.3.5 The runoff from each road surface catchment has been directed to the nearest existing manhole. Whereas the runoff from development are based on the best available information. The hydraulic calculations of the full capacities for the public drainage pipes are summarized in **Table 3-5**. The detailed calculation of the pipe capacity and pipe utilization can be found in **Appendixes III & IV**.

Table 3-5 Capacities of Downstream Public Drainage Pipes

Drainage Pipe	Upstream Manhole no.	Downstream Manhole no.	Full Capacity[1] (L/s)	Peak Flow (L/s)	Usage %	Peak Flow (L/s)	Usage %
				Without the Scheme		With the Scheme	
P01	SMH4029348	SMH4029356	72	21.9	30.3	21.9	30.3
P02	SMH4029356	SMH4029352	386	273.8	70.9	276.0	71.5
P03	SMH4029352	SMH4030896	1190	906.3	76.2	908.3	76.4
P04	SMH4030896	SMH4030897	1318	940.2	71.3	942.1	71.5
P05	SMH4029321	SMH4029324	111	56.8	51.2	56.8	51.2
P06	SMH4029324	SMH4029345	207	188.7	91.0	186.0	89.8
P07	SMH4029345	SMH4030897	335	234.1	69.8	231.5	69.1
P08	SMH4030897	SMH4030899	1859	1443.1	77.6	1442.5	77.6
P09	SMH4030899	SMH4030888	2063	1582.4	76.7	1581.7	76.7
P10	SMH4029313	SMH4030888	522	367.5	70.4	365.9	70.1
P11	SMH4030888	SMH4030871	2427	1949.0	80.3	1947.1	80.2
P12	SMH4030871	SMH4067829	2571	2283.5	88.8	2281.6	88.7
P13	SMH4067829	SMH4067830	3234	2724.9	84.3	2723.1	84.2

Note:
[1] Calculated by Colebrook-White Equation. The detailed calculation is shown in **Appendix III**.
[2] The Full Capacity of upstream pipe UP01 has been add to Discharge of P13 for conservative assessment. The detailed calculation is shown in **Appendix IV**.

3.3.6 From the calculation detailed in **Appendix IV**, the downstream drainage pipes can cater the stormwater discharge and therefore no further upgrade, besides the planned upgrade for the 7 URA projects, is required.

3.4 Drainage Discharge from the Scheme to Public Drainage System

3.4.1 Drainage from T1 will be collected by a new terminal manhole (STMH-01) then discharged via a new 375mm pipe (PP01) to SMH4029313 along Hung Fook Street. Drainage from Low Block will be collected by a new terminal manhole (STMH-02) then discharged via a new 375mm pipe (PP02) to SMH4029324 along Kai Ming Street. Drainage from T2 will be collected by a new terminal manhole (STMH-03) then discharged via a new 375mm pipe (PP03) to SMH4029356 along Wing Kwong Street. All three proposed drainage pipes are having slope of 1.5:100.

Table 3-6 Capacities of the Proposed Drainage Pipes

Drainage Pipe	Upstream Manhole no.	Downstream Manhole no.	Full Capacity[1] (L/s)	Peak Flow (L/s)	Usage %	Peak Flow (L/s)	Usage %
				Without Project		With Project	
PP01	STMH-01	SMH4029313	195.2	--	--	150.4	77.03
PP02	STMH-02	SMH4029324	195.2	--	--	94.2	48.25
PP03	STMH-03	SMH4029356	195.2	--	--	66.9	34.28

Note:
[1] Calculated by Colebrook-White Equation. The detailed calculation is shown in **Appendix III**.
[2] The detailed calculation is shown in **Appendix IV**.

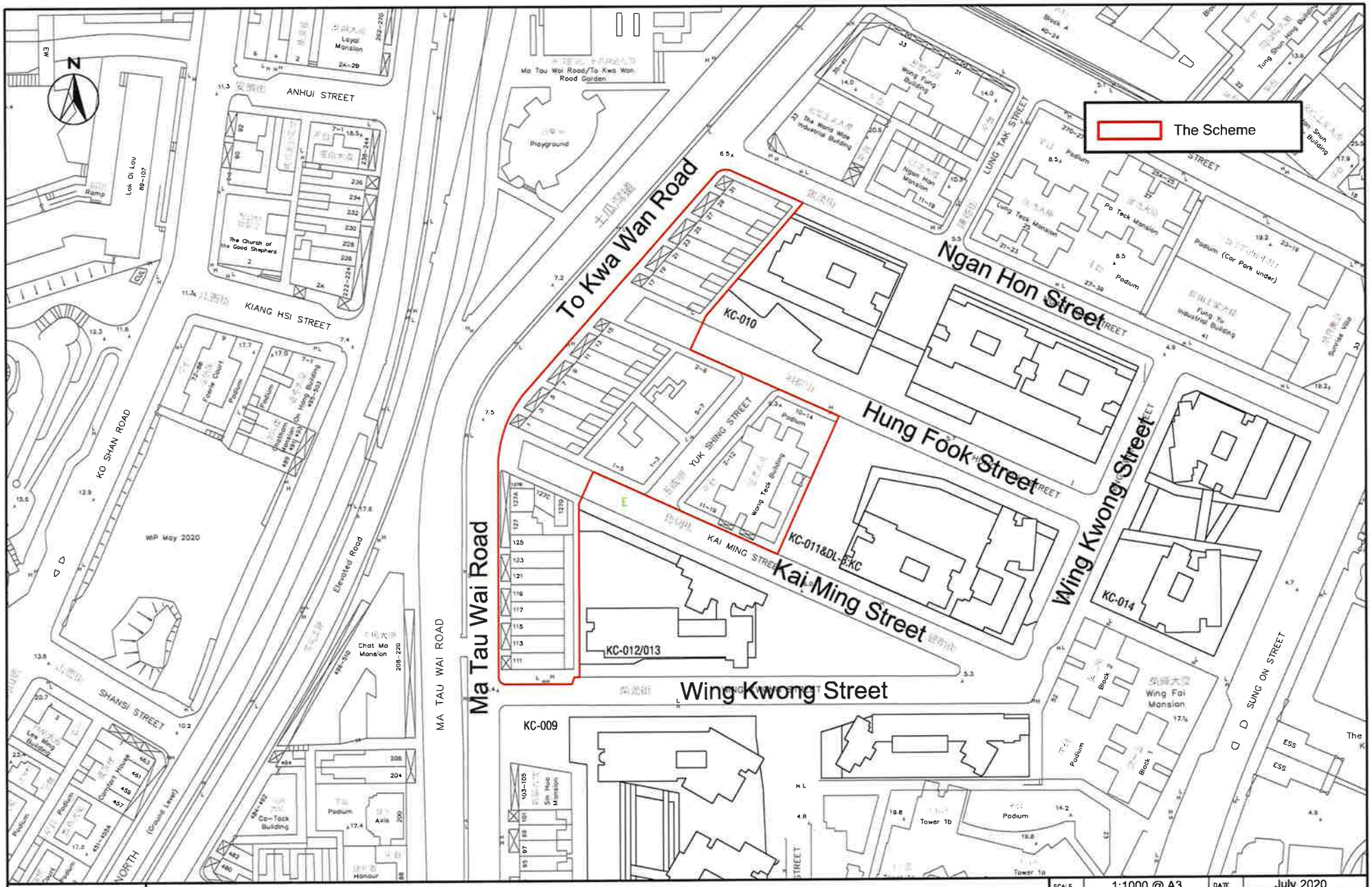
4 CONCLUSION

4.1.1 To Kwa Wan Road / Wing Kwong Street Development Scheme proposes to redevelop into 2 residential towers cum podia providing GIC/retail/commercial/clubhouse and podium garden, and a low block commercial/retail building with an all-weathered communal space underneath.

4.1.2 The peak stormwater discharged from the proposed the Residential Towers (T1 & T2) and the Low Block will be collected by terminal manholes FTMH01 - FTMH03 then discharged through individual new 375mm drainage pipe, with gradient of 1.5:100, to the nearby public drainage manholes. The discharge from three portion of the Scheme will join at public drainage manhole SMH4030888, join the last portion of discharge from other URA's projects at SMH4030871, reach Storm Water Special Manhole SSH4004044, then ultimately discharged to a 3600mm x 1800mm box culvert at Sung On Street.

4.1.3 The assessment results show that the drainage network in the vicinity have sufficient capacity to cater the expected stormwater discharge from the Site and surrounding catchments. Therefore, no drainage pipe upgrade has been proposed and no adverse drainage impact on the public drainage system is expected.

Figures

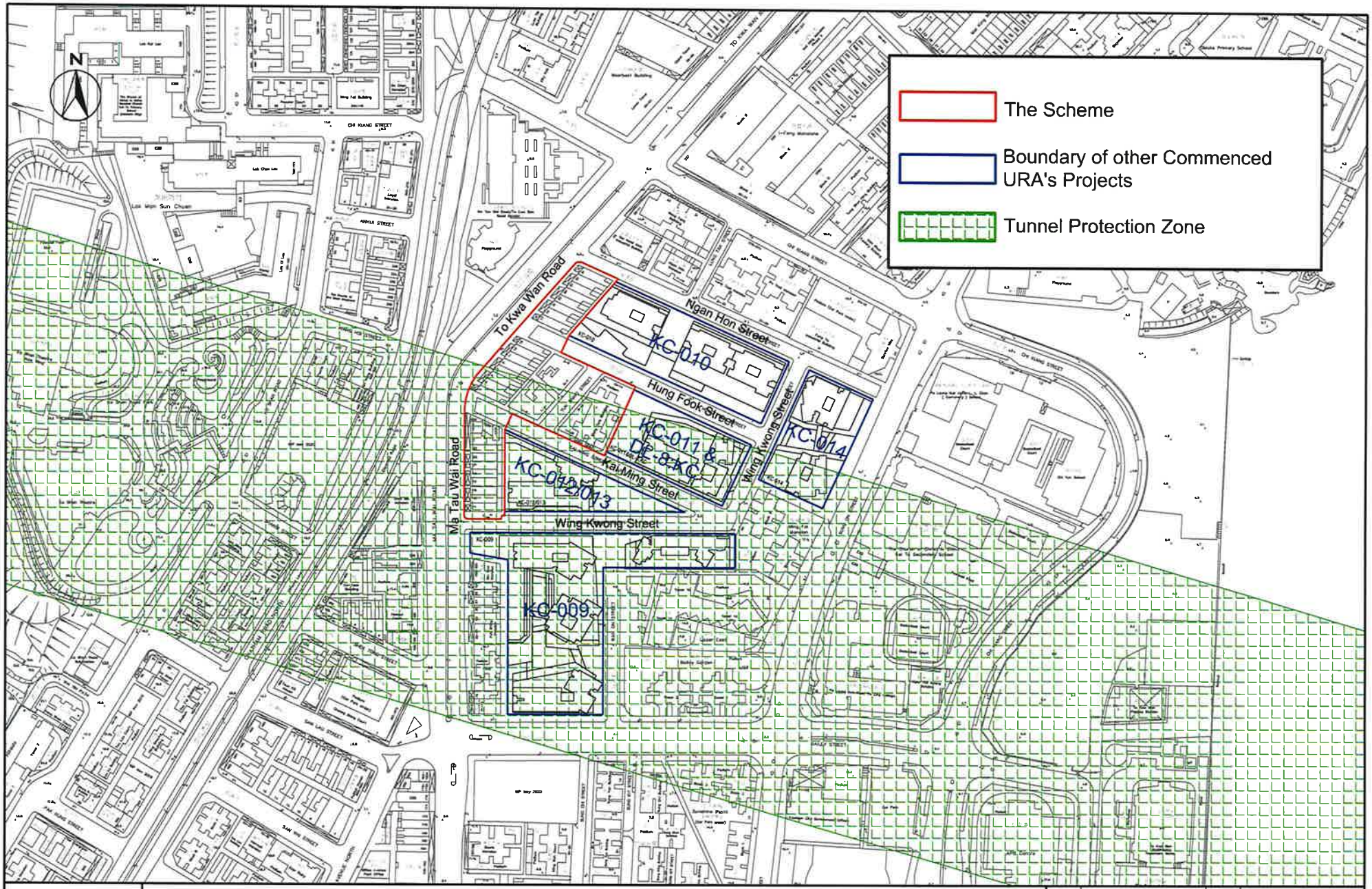


CINOTECH
Cinotech Consultants Limited

Urban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-016)

Location Plan of the Scheme

SCALE	1:1000 @ A3	DATE	July 2020
CHECK	KC	DRAWN	CC
JOB No.	IA 19021-KCAA101	DRAWING No.	1-1
		REV	-



CINOTECH
Cinotech Consultants Limited

Urban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-016)

URA's Projects and DSD's Tunnel Protection Zone in the Vicinity

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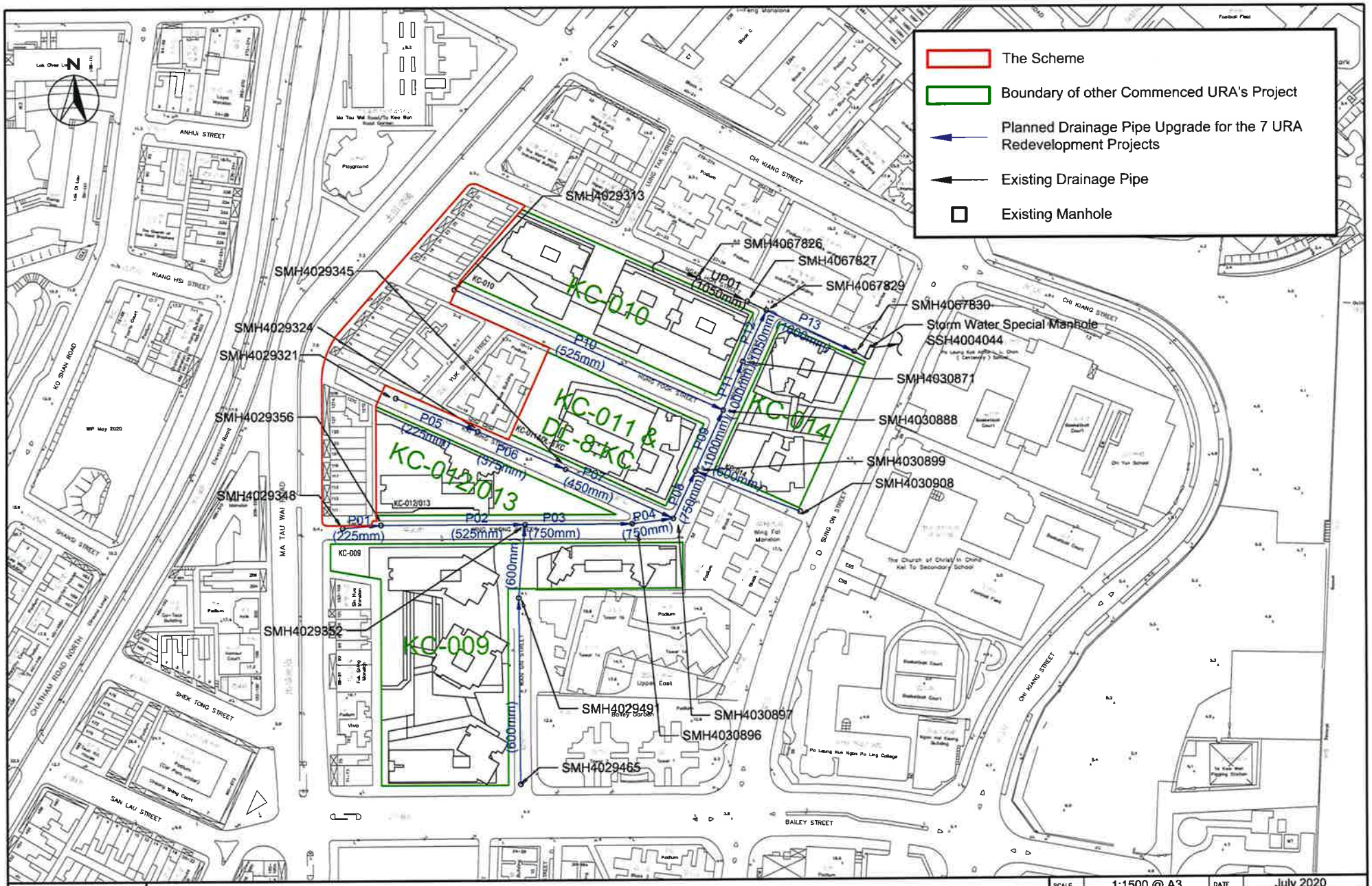
CHECK	KC	DRAWN	CC
JOB No.	IA 19021-KCAA101	DRAWING No.	2-1
		REV	-



CINOTECH
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Urban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-016)

Planned Drainage Pipes Upgrade for the 7 URA Redevelopment Projects

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CHECK	KC	DRAWN	CC
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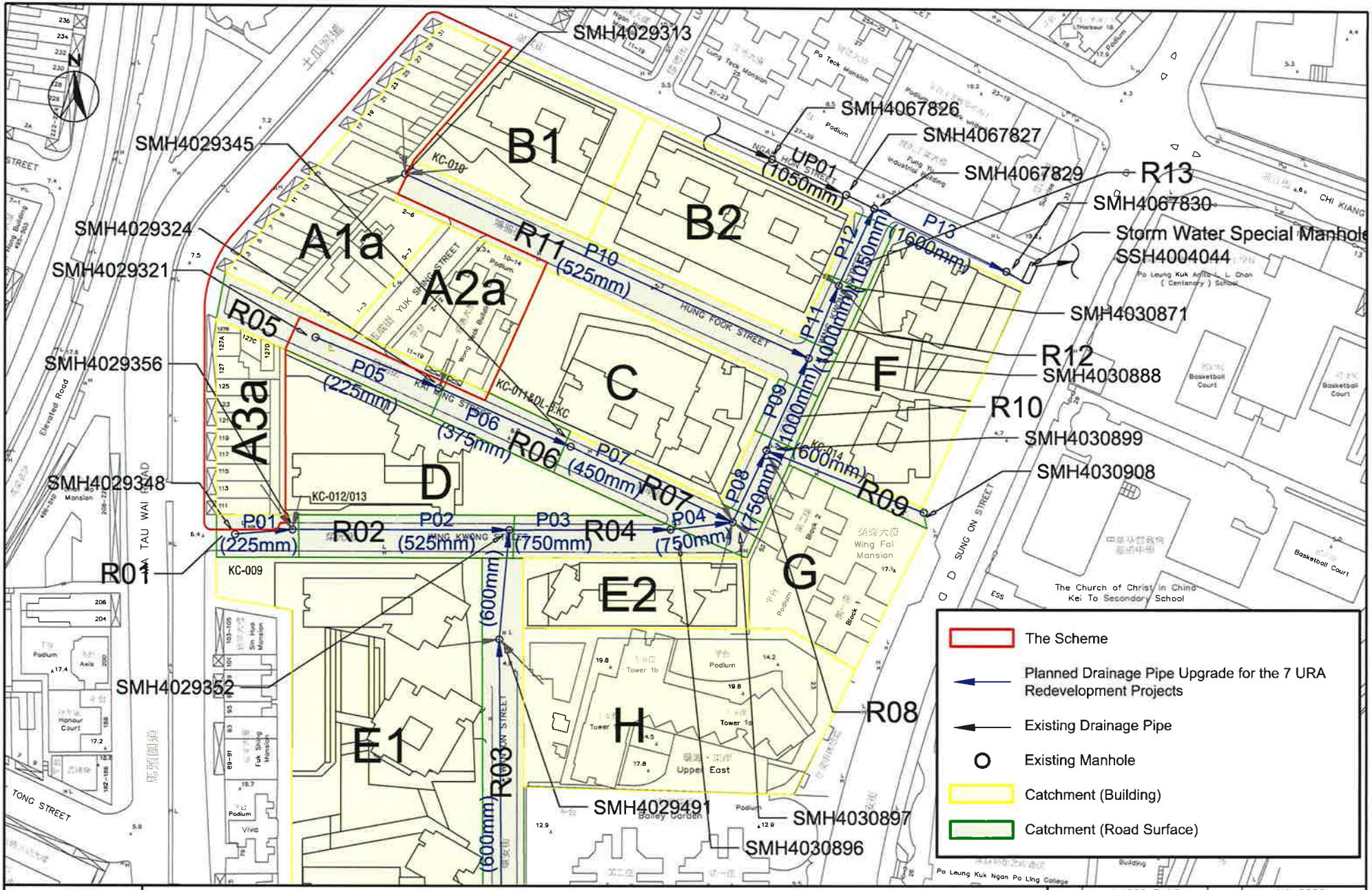
		REV	-



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Urban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-016)

Stormwater Catchment Areas in the Vicinity without the Scheme

SCALE	1:1000 @ A3	DATE	July 2020
CHECK	KC	DRAWN	CC
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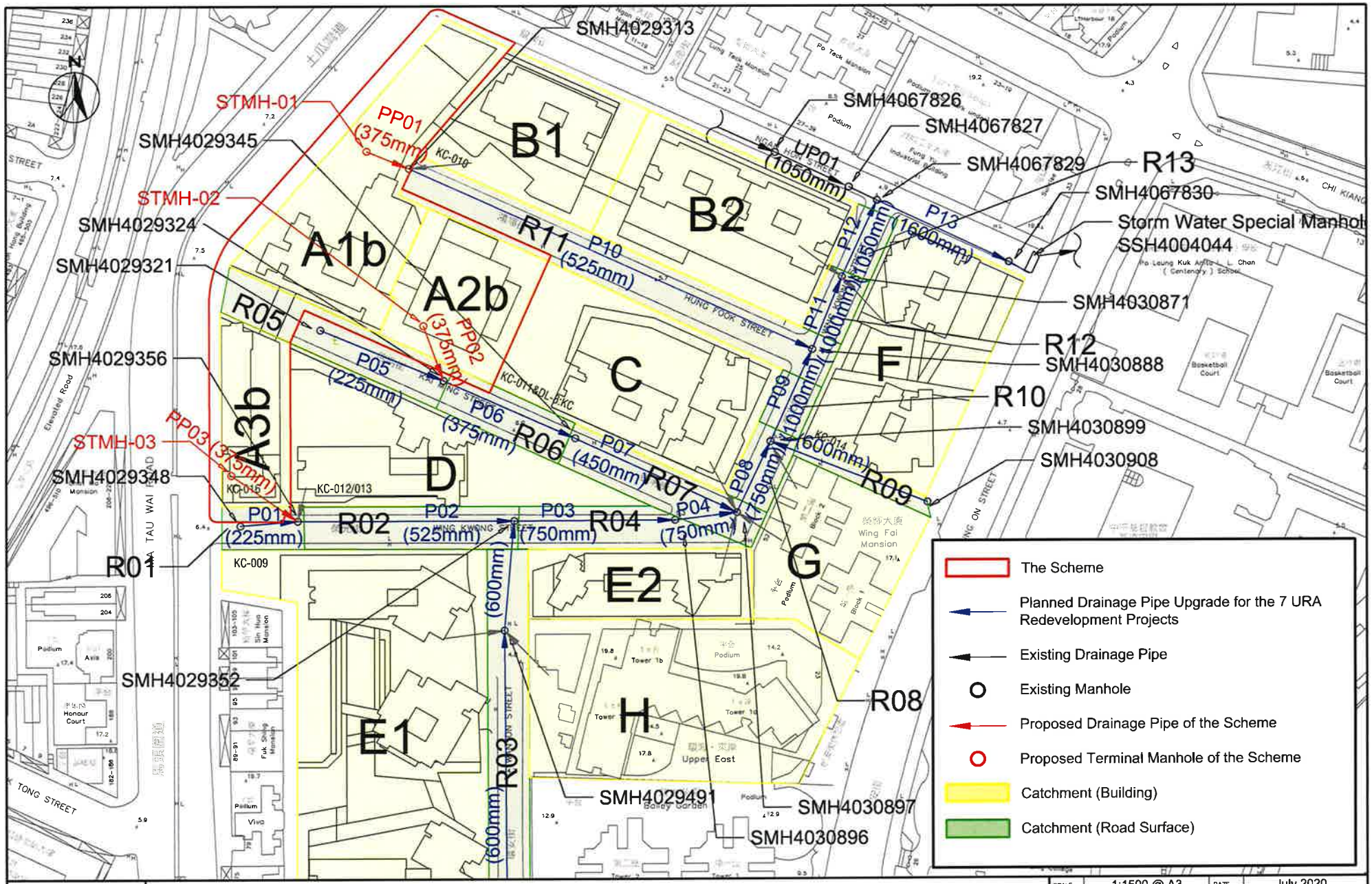
		REV	-



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Urban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-016)

Stormwater Catchment Areas in the Vicinity with the Scheme

SCALE	1:1500 @ A3	DATE	July 2020
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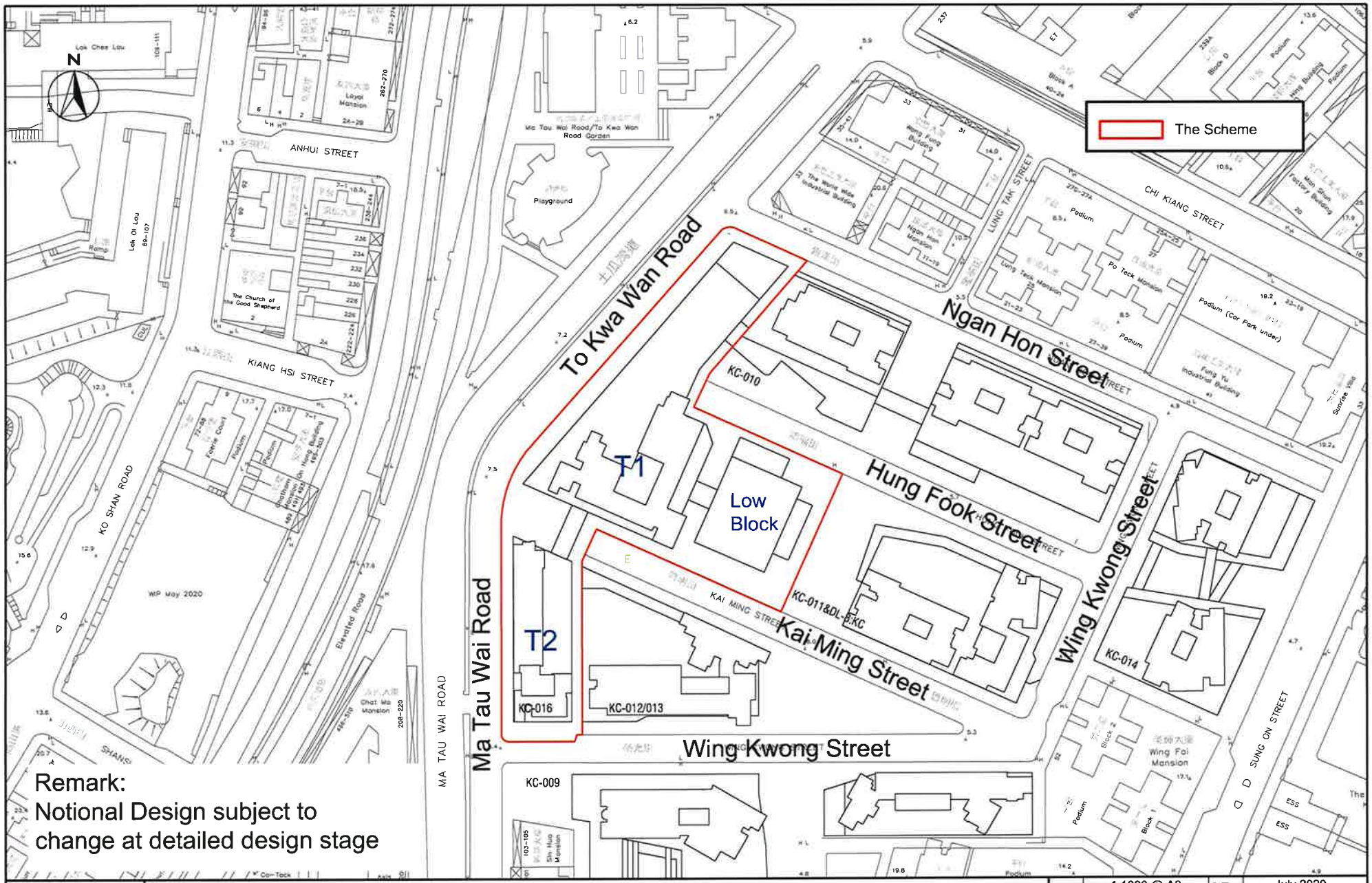
		REV	-

Appendix I

Notional Plan of the Proposed Scheme



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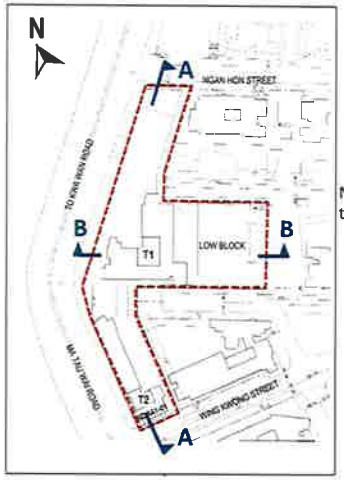
Urban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-016)

Notional Block Plan of the Proposed Scheme

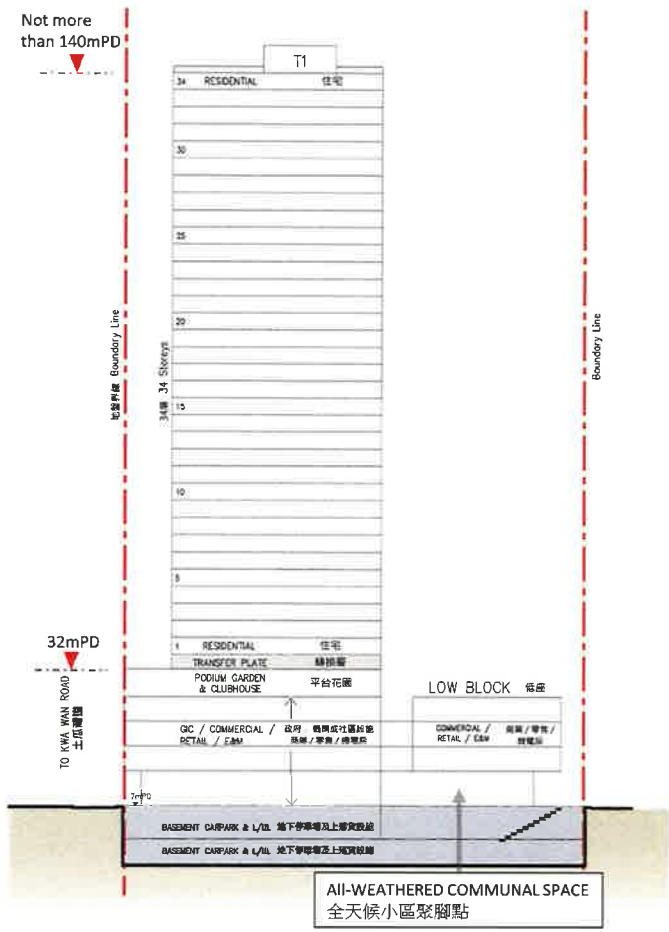
SCALE	1:1000 @ A3	DATE	July 2020
CHECK	TL	DRAWN	CC
JOB No.	IA19021-KCAA101	DRAWING No.	Appendix I
		REV	-

Key Plan



Section A

Section B



Remark:
Notional Design subject to change at detailed design stage

CINOTECH consultants limited

Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Notional Section Plan of the Proposed Scheme

SCALE	N.T.S.	DATE	Dec-20
CHECK	KC	DRAWN	CC
JOB NO.	[illegible]	FIGURE NO. App I	REV. -

Appendix II
Calculation of Drainage Discharge

Appendix II - Calculation of Drainage Discharge

Catchment	Catchment Area (m^2)	Slope (m per 100m)	L (m)	Inlet time, t_0 (min)	Flow Distance to reach the Pipe Section, L_f (m)												
Without Scheme					**P01**	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P10**	**P11**	**P12**	**P13**
A1a	2624.9	0.400	92.0	7.3	--	--	--	--	--	--	--	--	--	0.0	127.4	150.1	174.5
A2a	1477.2	0.400	51.0	4.3	--	--	--	--	--	0.0	41.4	92.8	115.6	--	144.8	167.6	192.0
A3a	1032.5	0.400	60.0	5.2	--	0.0	62.2	108.5	--	--	--	126.5	149.3	--	178.6	201.3	225.7
With Scheme																	
A1b	2665.6	0.400	102.0	8.1	--	--	--	--	--	--	--	--	--	0.0	127.4	150.1	174.5
A2b	1455.1	0.400	54.0	4.5	--	--	--	--	--	0.0	41.4	92.8	115.6	--	144.8	167.6	192.0
A3b	1033.1	0.400	52.0	4.5	--	0.0	62.2	108.5	--	--	--	126.5	149.3	--	178.6	201.3	225.7
Common																	
B1	1944.5	0.400	68.0	5.5	--	--	--	--	--	--	--	--	--	0.0	127.4	150.1	174.5
B2	2599.4	0.400	77.0	6.1	--	--	--	--	--	--	--	--	--	--	--	0.0	24.4
C	2926.2	0.400	85.0	6.6	--	--	--	--	--	--	--	0.0	22.8	--	52.1	74.8	99.2
D	2464.9	0.400	104.0	8.3	--	0.0	62.2	108.5	--	--	--	126.5	149.3	--	178.6	201.3	225.7
E1	6014.0	0.400	118.0	8.6	--	--	32.0	78.3	--	--	--	96.3	119.1	--	148.4	171.1	195.5
E2	1305.8	0.400	67.0	5.7	--	--	--	--	--	--	--	0.0	22.8	--	52.1	74.8	99.2
F	2823.7	0.400	81.0	6.4	--	--	--	--	--	--	--	--	--	--	--	0.0	24.4
G	1855.7	0.400	62.0	5.1	--	--	--	--	--	--	--	--	0.0	--	29.3	52.0	76.4
H	4065.7	0.400	95.0	7.2	--	--	32.0	78.3	--	--	--	96.3	119.1	--	148.4	171.1	195.5
R1	290.4	1.000	24.0	2.0	0.0	0.0	62.2	108.5	--	--	--	126.5	149.3	--	178.6	201.3	225.7
R2	760.5	1.000	62.0	4.6	--	0.0	62.2	108.5	--	--	--	126.5	149.3	--	178.6	201.3	225.7
R3	1244.7	1.000	105.0	7.4	--	--	32.0	78.3	--	--	--	96.3	119.1	--	148.4	171.1	195.5
R4	649.4	1.000	53.0	4.0	--	--	--	0.0	--	--	--	18.0	40.8	--	70.1	92.8	117.2
R5	899.3	1.000	69.0	5.1	--	--	--	--	0.0	0.0	41.4	92.8	115.6	--	144.8	167.6	192.0
R6	496.4	1.000	38.0	3.0	--	--	--	--	--	0.0	41.4	92.8	115.6	--	144.8	167.6	192.0
R7	741.6	1.000	61.0	4.6	--	--	--	--	--	--	0.0	51.4	74.1	--	103.4	126.1	150.5
R8	300.7	1.000	23.0	1.9	--	--	--	--	--	--	--	0.0	22.8	--	52.1	74.8	99.2
R9	207.6	1.000	42.0	3.6	--	--	--	--	--	--	--	--	0.0	--	29.3	52.0	76.4
R10	202.9	1.000	17.0	1.4	--	--	--	--	--	--	--	--	0.0	--	29.3	52.0	76.4
R11	1747.3	1.000	134.0	9.2	--	--	--	--	--	--	--	--	--	0.0	0.0	22.7	47.1
R12	243.5	1.000	20.0	1.7	--	--	--	--	--	--	--	--	--	--	0.0	22.7	47.1
R13	244.5	1.000	20.0	1.7	--	--	--	--	--	--	--	--	--	--	--	0.0	24.4

"--" represent the stormwater will not reach the corresponding Pipe Section
Distance of 0 m represent discharge point(s)

Remarkes:

[1] Flow speed in pipe is assumed to be 2.5 m/s.

[2] Rainfall Intensity is determined by the formula from the fifth edition of DSD Drainage Manual.
Storm constants for 50 years return period of HKO Headquarters are adopted for the calculation.

[3] Runoff coefficient of 0.9 (for paved area) has been adopted in the calculation.

[4] According to the Tables 28 of the Drainage Manual,
the rainfall increases due to climate change from now to year 2041-2060 is 10.4%.

Appendix II - Calculation of Drainage Discharge

Catchment	Catchment Area (m^2)	Slope (m per 100m)	L (m)	Inlet time, t_0 (min)	Flow Time to Reach the Pipe Section, t_f (min) [1]												
Without Scheme					**P01**	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P10**	**P11**	**P12**	**P13**
A1a	2624.9	0.400	92.0	7.3	--	--	--	--	--	--	--	--	--	0.00	0.85	1.00	1.16
A2a	1477.2	0.400	51.0	4.3	--	--	--	--	--	0.00	0.28	0.62	0.77	--	0.97	1.12	1.28
A3a	1032.5	0.400	60.0	5.2	--	0.00	0.41	0.72	--	--	--	0.84	1.00	--	1.19	1.34	1.50
With Scheme																	
A1b	2665.6	0.400	102.0	8.1	--	--	--	--	--	--	--	--	--	0.00	0.85	1.00	1.16
A2b	1455.1	0.400	54.0	4.5	--	--	--	--	--	0.00	0.28	0.62	0.77	--	0.97	1.12	1.28
A3b	1033.1	0.400	52.0	4.5	--	0.00	0.41	0.72	--	--	--	0.84	1.00	--	1.19	1.34	1.50
Common																	
B1	1944.5	0.400	68.0	5.5	--	--	--	--	--	--	--	--	--	0.00	0.85	1.00	1.16
B2	2599.4	0.400	77.0	6.1	--	--	--	--	--	--	--	--	--	--	--	0.00	0.16
C	2926.2	0.400	85.0	6.6	--	--	--	--	--	--	--	0.00	0.15	--	0.35	0.50	0.66
D	2464.9	0.400	104.0	8.3	--	0.00	0.41	0.72	--	--	--	0.84	1.00	--	1.19	1.34	1.50
E1	6014.0	0.400	118.0	8.6	--	--	0.21	0.52	--	--	--	0.64	0.79	--	0.99	1.14	1.30
E2	1305.8	0.400	67.0	5.7	--	--	--	--	--	--	--	0.00	0.15	--	0.35	0.50	0.66
F	2823.7	0.400	81.0	6.4	--	--	--	--	--	--	--	--	--	--	--	0.00	0.16
G	1855.7	0.400	62.0	5.1	--	--	--	--	--	--	--	--	0.00	--	0.20	0.35	0.51
H	4065.7	0.400	95.0	7.2	--	--	0.21	0.52	--	--	--	0.64	0.79	--	0.99	1.14	1.30
R1	290.4	1.000	24.0	2.0	0.00	0.00	0.41	0.72	--	--	--	0.84	1.00	--	1.19	1.34	1.50
R2	760.5	1.000	62.0	4.6	--	0.00	0.41	0.72	--	--	--	0.84	1.00	--	1.19	1.34	1.50
R3	1244.7	1.000	105.0	7.4	--	--	0.21	0.52	--	--	--	0.64	0.79	--	0.99	1.14	1.30
R4	649.4	1.000	53.0	4.0	--	--	--	0.00	--	--	--	0.12	0.27	--	0.47	0.62	0.78
R5	899.3	1.000	69.0	5.1	--	--	--	--	0.00	0.00	0.28	0.62	0.77	--	0.97	1.12	1.28
R6	496.4	1.000	38.0	3.0	--	--	--	--	--	0.00	0.28	0.62	0.77	--	0.97	1.12	1.28
R7	741.6	1.000	61.0	4.6	--	--	--	--	--	--	0.00	0.34	0.49	--	0.69	0.84	1.00
R8	300.7	1.000	23.0	1.9	--	--	--	--	--	--	--	0.00	0.15	--	0.35	0.50	0.66
R9	207.6	1.000	42.0	3.6	--	--	--	--	--	--	--	--	0.00	--	0.20	0.35	0.51
R10	202.9	1.000	17.0	1.4	--	--	--	--	--	--	--	--	0.00	--	0.20	0.35	0.51
R11	1747.3	1.000	134.0	9.2	--	--	--	--	--	--	--	--	--	0.00	0.00	0.15	0.31
R12	243.5	1.000	20.0	1.7	--	--	--	--	--	--	--	--	--	--	0.00	0.15	0.31
R13	244.5	1.000	20.0	1.7	--	--	--	--	--	--	--	--	--	--	--	0.00	0.16

"--" represent the stormwater will not reach the corresponding Pipe Section
Time of 0.0 min represent discharge point(s)

Remarkes:

[1] Flow speed in pipe is assumed to be 2.5 m/s.

[2] Rainfall Intensity is determined by the formula from the fifth edition of DSD Drainage Manual.
Storm constants for 50 years return period of HKO Headquarters are adopted for the calculation.

[3] Runoff coefficient of 0.9 (for paved area) has been adopted in the calculation.

[4] According to the Tables 28 of the Drainage Manual,
the rainfall increases due to climate change from now to year 2041-2060 is 10.4%.

Appendix II - Calculation of Drainage Discharge

Catchment	Catchment Area (m^2)	Slope (m per 100m)	L (m)	Inlet time, t_0 (min)	Rainfall Intensity based on Time of Concentration (mm/hr) [2]												
Without Scheme					**P01**	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P10**	**P11**	**P12**	**P13**
A1a	2624.9	0.400	92.0	7.3	--	--	--	--	--	--	--	--	--	209.6	203.8	202.8	201.8
A2a	1477.2	0.400	51.0	4.3	--	--	--	--	--	237.4	234.2	230.4	228.8	--	226.9	225.4	223.8
A3a	1032.5	0.400	60.0	5.2	--	227.2	223.2	220.4	--	--	--	219.3	218.0	--	216.4	215.1	213.8
With Scheme																	
A1b	2665.6	0.400	102.0	8.1	--	--	--	--	--	--	--	--	--	204.2	199.0	198.1	197.1
A2b	1455.1	0.400	54.0	4.5	--	--	--	--	--	234.4	231.3	227.8	226.3	--	224.4	222.9	221.5
A3b	1033.1	0.400	52.0	4.5	--	234.5	230.0	226.9	--	--	--	225.7	224.2	--	222.4	221.0	219.6
Common																	
B1	1944.5	0.400	68.0	5.5	--	--	--	--	--	--	--	--	--	223.9	216.4	215.2	213.9
B2	2599.4	0.400	77.0	6.1	--	--	--	--	--	--	--	--	--	--	--	218.9	217.6
C	2926.2	0.400	85.0	6.6	--	--	--	--	--	--	--	214.4	213.2	--	211.7	210.5	209.4
D	2464.9	0.400	104.0	8.3	--	202.8	200.2	198.4	--	--	--	197.7	196.8	--	195.7	194.9	194.0
E1	6014.0	0.400	118.0	8.6	--	--	199.6	197.8	--	--	--	197.1	196.2	--	195.1	194.3	193.4
E2	1305.8	0.400	67.0	5.7	--	--	--	--	--	--	--	222.6	221.2	--	219.5	218.2	216.8
F	2823.7	0.400	81.0	6.4	--	--	--	--	--	--	--	--	--	--	--	216.7	215.4
G	1855.7	0.400	62.0	5.1	--	--	--	--	--	--	--	--	228.5	--	226.5	225.1	223.5
H	4065.7	0.400	95.0	7.2	--	--	208.7	206.5	--	--	--	205.7	204.7	--	203.4	202.5	201.4
R1	290.4	1.000	24.0	2.0	273.3	273.3	265.2	259.7	--	--	--	257.7	255.3	--	252.2	250.0	247.7
R2	760.5	1.000	62.0	4.6	--	233.4	228.9	225.8	--	--	--	224.7	223.2	--	221.4	220.1	218.7
R3	1244.7	1.000	105.0	7.4	--	--	206.9	204.8	--	--	--	204.0	203.0	--	201.8	200.9	199.9
R4	649.4	1.000	53.0	4.0	--	--	--	240.5	--	--	--	239.0	237.2	--	234.9	233.2	231.5
R5	899.3	1.000	69.0	5.1	--	--	--	--	228.7	228.7	225.9	222.7	221.3	--	219.6	218.3	216.9
R6	496.4	1.000	38.0	3.0	--	--	--	--	--	255.4	251.2	246.3	244.2	--	241.7	239.8	237.8
R7	741.6	1.000	61.0	4.6	--	--	--	--	--	--	234.1	230.3	228.7	--	226.8	225.3	223.7
R8	300.7	1.000	23.0	1.9	--	--	--	--	--	--	--	275.2	272.0	--	268.1	265.3	262.3
R9	207.6	1.000	42.0	3.6	--	--	--	--	--	--	--	--	246.4	--	243.8	241.8	239.8
R10	202.9	1.000	17.0	1.4	--	--	--	--	--	--	--	--	285.1	--	280.5	277.1	273.6
R11	1747.3	1.000	134.0	9.2	--	--	--	--	--	--	--	--	--	197.3	197.3	196.5	195.5
R12	243.5	1.000	20.0	1.7	--	--	--	--	--	--	--	--	--	--	279.8	276.5	273.0
R13	244.5	1.000	20.0	1.7	--	--	--	--	--	--	--	--	--	--	--	279.8	276.2

The run-off intensity is calculated by the equation in Section 4.3.3 of the Drainage Manual:

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

where i = extreme mean intensity in mm/hr

t_d = duration (in minutes) ($t \leq 240$), time of concentration (t_0+t_f) has been adopted.

a, b, c = storm constants given in Table 3a, 3b, 3c and 3d from the fifth edition of DSD Drainage Manual

a = 451.3 b = 2.46 c = 0.337 for HKO Headquarters

t_0 = inlet time Refer to Section 7.5.2 (d) from the fifth edition of DSD Drainage Manual

t_f = flow time

Remarkes:

[1] Flow speed in pipe is assumed to be 2.5 m/s.

[2] Rainfall Intensity is determined by the formula from the fifth edition of DSD Drainage Manual. Storm constants for 50 years return period of HKO Headquarters are adopted for the calculation.

[3] Runoff coefficient of 0.9 (for paved area) has been adopted in the calculation.

[4] According to the Tables 28 of the Drainage Manual, the rainfall increases due to climate change from now to year 2041-2060 is 10.4%.

Appendix II - Calculation of Drainage Discharge

Catchment	Catchment Area (m^2)	Slope (m per 100m)	L (m)	Inlet time, t_0 (min)	Peak Flow Rate, Q_p (L/s), for individual catchment and pipe combination Assumed 100% Paved Area, Runoff Coeff. = 0.9 With Climate Change Consideration [4]												
Without Scheme					**P01**	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P10**	**P11**	**P12**	**P13**
A1a	2624.9	0.400	92.0	7.3	--	--	--	--	--	--	--	--	--	152.0	147.8	147.0	146.3
A2a	1477.2	0.400	51.0	4.3	--	--	--	--	--	96.8	95.5	94.0	93.4	--	92.6	92.0	91.3
A3a	1032.5	0.400	60.0	5.2	--	64.8	63.6	62.8	--	--	--	62.5	62.2	--	61.7	61.4	61.0
With Scheme																	
A1b	2665.6	0.400	102.0	8.1	--	--	--	--	--	--	--	--	--	150.4	146.5	145.8	145.2
A2b	1455.1	0.400	54.0	4.5	--	--	--	--	--	94.2	93.0	91.5	90.9	--	90.2	89.6	89.0
A3b	1033.1	0.400	52.0	4.5	--	66.9	65.6	64.7	--	--	--	64.4	64.0	--	63.5	63.1	62.7
Common																	
B1	1944.5	0.400	68.0	5.5	--	--	--	--	--	--	--	--	--	120.3	116.3	115.6	114.9
B2	2599.4	0.400	77.0	6.1	--	--	--	--	--	--	--	--	--	--	--	157.2	156.2
C	2926.2	0.400	85.0	6.6	--	--	--	--	--	--	--	173.3	172.3	--	171.1	170.2	169.2
D	2464.9	0.400	104.0	8.3	--	138.1	136.3	135.1	--	--	--	134.6	134.0	--	133.3	132.7	132.1
E1	6014.0	0.400	118.0	8.6	--	--	331.5	328.5	--	--	--	327.4	325.9	--	324.2	322.8	321.4
E2	1305.8	0.400	67.0	5.7	--	--	--	--	--	--	--	80.3	79.8	--	79.2	78.7	78.2
F	2823.7	0.400	81.0	6.4	--	--	--	--	--	--	--	--	--	--	--	169.0	168.0
G	1855.7	0.400	62.0	5.1	--	--	--	--	--	--	--	--	117.1	--	116.1	115.4	114.6
H	4065.7	0.400	95.0	7.2	--	--	234.4	231.9	--	--	--	231.0	229.9	--	228.5	227.4	226.2
R1	290.4	1.000	24.0	2.0	21.9	21.9	21.3	20.8	--	--	--	20.7	20.5	--	20.2	20.1	19.9
R2	760.5	1.000	62.0	4.6	--	49.0	48.1	47.4	--	--	--	47.2	46.9	--	46.5	46.2	45.9
R3	1244.7	1.000	105.0	7.4	--	--	71.1	70.4	--	--	--	70.1	69.8	--	69.4	69.1	68.7
R4	649.4	1.000	53.0	4.0	--	--	--	43.1	--	--	--	42.9	42.5	--	42.1	41.8	41.5
R5	899.3	1.000	69.0	5.1	--	--	--	--	56.8	56.8	56.1	55.3	55.0	--	54.5	54.2	53.9
R6	496.4	1.000	38.0	3.0	--	--	--	--	--	35.0	34.4	33.8	33.5	--	33.1	32.9	32.6
R7	741.6	1.000	61.0	4.6	--	--	--	--	--	--	47.9	47.2	46.9	--	46.5	46.2	45.8
R8	300.7	1.000	23.0	1.9	--	--	--	--	--	--	--	22.9	22.6	--	22.3	22.0	21.8
R9	207.6	1.000	42.0	3.6	--	--	--	--	--	--	--	--	14.1	--	14.0	13.9	13.7
R10	202.9	1.000	17.0	1.4	--	--	--	--	--	--	--	--	16.0	--	15.7	15.5	15.3
R11	1747.3	1.000	134.0	9.2	--	--	--	--	--	--	--	--	--	95.2	95.2	94.8	94.4
R12	243.5	1.000	20.0	1.7	--	--	--	--	--	--	--	--	--	--	18.8	18.6	18.4
R13	244.5	1.000	20.0	1.7	--	--	--	--	--	--	--	--	--	--	--	18.9	18.7

Total Peak Flow (L/s), without the Scheme											
21.9	273.8	906.3	940.2	56.8	188.7	234.1	1443.1	1582.4	367.5	1949.0	2283.5	2270.0
Total Peak Flow (L/s), with the Scheme											
21.9	276.0	908.3	942.1	56.8	186.0	231.5	1442.5	1581.7	365.9	1947.1	2281.6	2268.2

Remark: the upstream flow from UP01 to P13 has not been included

Remarkes:

[1] Flow speed in pipe is assumed to be 2.5 m/s.

[2] Rainfall Intensity is determined by the formula from the fifth edition of DSD Drainage Manual. Storm constants for 50 years return period of HKO Headquarters are adopted for the calculation.

[3] Runoff coefficient of 0.9 (for paved area) has been adopted in the calculation.

[4] According to the Tables 28 of the Drainage Manual, the rainfall increases due to climate change from now to year 2041-2060 is 10.4%.

The Peak Flow, Q_p (L/s), at the downstream pipe is calcaulted by the equation in Section 7.5.2 (a) of the Drainage Manual:

$$Q_p = 0.278CiA/1000$$

where C = runoff coefficient

A = catchment area in m^2

Appendix III

Detailed Calculation of Pipe Capacities

Appendix III - Detailed Calculation of Pipe Capacities

PipeNo.	UpstreamManholeNo.	DownstreamManholeNo.	Upstreaminvertlevel(mP.D.)	Downstreaminvertlevel(mP.D.)	UpstreamCoverlevel(mP.D.)	Length(m)	Diameter(m)	Area(m2)	Hydraulic Radius(m)	Slope	Kinematic Viscosity(m2/s)	Hydraulic PipelineRoughness(m)[1]	Velocity(m/s)	FullCapacity(l/s)
Existing Downsream Pipes (including the Planned Upgrade Pipes for the 7 URA redevelopment projects)														
P01	SMH4029348	SMH4029356	5.03	4.51	6.24	16.5	0.225	0.040	0.056	0.0314	1.14E-06	0.003	1.82	72
P02	SMH4029356	SMH4029352	4.51	3.90	5.99	62.2	0.525	0.216	0.131	0.0098	1.14E-06	0.003	1.78	386
P03	SMH4029352	SMH4030896	3.90	3.25	5.53	46.3	0.75	0.442	0.188	0.0140	1.14E-06	0.003	2.69	1190
P04	SMH4030896	SMH4030897	3.25	2.94	5.19	18.0	0.75	0.442	0.188	0.0172	1.14E-06	0.003	2.98	1318
P05	SMH4029321	SMH4029324	5.11	4.50	6.68	38.3	0.3	0.071	0.075	0.0159	1.14E-06	0.003	1.57	111
P06	SMH4029324	SMH4029345	4.50	3.80	6.16	41.4	0.375	0.110	0.094	0.0169	1.14E-06	0.003	1.88	207
P07	SMH4029345	SMH4030897	3.80	2.94	5.72	51.4	0.45	0.159	0.113	0.0167	1.14E-06	0.003	2.11	335
P08	SMH4030897	SMH4030899	2.94	2.16	5.16	22.8	0.75	0.442	0.188	0.0342	1.14E-06	0.003	4.21	1859
P09	SMH4030899	SMH4030888	2.56	2.29	5.06	29.3	1	0.785	0.250	0.0092	1.14E-06	0.003	2.63	2063
P10	SMH4029313	SMH4030888	4.92	2.64	6.56	127.4	0.525	0.216	0.131	0.0179	1.14E-06	0.003	2.41	522
P11	SMH4030888	SMH4030871	2.29	2.00	5.06	22.7	1	0.785	0.250	0.0128	1.14E-06	0.003	3.09	2427
P12	SMH4030871	SMH4067829	2.00	1.73	5.06	24.4	1.05	0.866	0.263	0.0111	1.14E-06	0.003	2.97	2571
P13	SMH4067829	SMH4067830	0.73	0.65	4.78	42.0	1.6	2.011	0.400	0.0019	1.14E-06	0.003	1.61	3234
Proposed Pipes for the Scheme														
PP01	STMH-01	SMH4029313	TBC	TBC	TBC	TBC	0.375	0.110	0.094	0.015	1.14E-06	0.003	1.77	195
PP02	STMH-02	SMH4029324	TBC	TBC	TBC	TBC	0.375	0.110	0.094	0.015	1.14E-06	0.003	1.77	195
PP03	STMH-03	SMH4029356	TBC	TBC	TBC	TBC	0.375	0.110	0.094	0.015	1.14E-06	0.003	1.77	195
Upstream Pipes														
UP01	SMH4030826	SMH4030827	0.76	0.75	5.15	23.5	1.05	0.866	0.263	0.0004	1.14E-06	0.006	0.53	455

[1] The roughness coefficient for slimed concrete sewer under poor condition is adopted; the ks values are 3mm for velocities greater than 1.2m/s, otherwise 6mm.

Appendix IV

Runoff Contribution in Downstream Pipes

Appendix IV - Runoff Contribution in Downstream Pipes

Pipe No.	Upstream Manhole No.	Downstream Manhole No.	Full Capacity (l/s)	Peak Flow (l/s)	Usage %	Peak Flow (l/s)	Usage %
				Without Project		With Project	
Existing Pipes							
P01	SMH4029348	SMH4029356	72.3	21.9	30.3	21.9	30.3
P02	SMH4029356	SMH4029352	386.1	273.8	70.9	276.0	71.5
P03	SMH4029352	SMH4030896	1189.7	906.3	76.2	908.3	76.4
P04	SMH4030896	SMH4030897	1317.8	940.2	71.3	942.1	71.5
P05	SMH4029321	SMH4029324	111.0	56.8	51.2	56.8	51.2
P06	SMH4029324	SMH4029345	207.3	188.7	91.0	186.0	89.8
P07	SMH4029345	SMH4030897	335.1	234.1	69.8	231.5	69.1
P08	SMH4030897	SMH4030899	1859.0	1443.1	77.6	1442.5	77.6
P09	SMH4030899	SMH4030888	2063.1	1582.4	76.7	1581.7	76.7
P10	SMH4029313	SMH4030888	522.0	367.5	70.4	365.9	70.1
P11	SMH4030888	SMH4030871	2427.5	1949.0	80.3	1947.1	80.2
P12	SMH4030871	SMH4067829	2571.1	2283.5	88.8	2281.6	88.7
P13	SMH4067829	SMH4067830	3234.1	2724.9	84.3	2723.1	84.2
Proposed Pipes							
PP01	STMH-01	SMH4029313	195.2	--	--	150.4	77.03
PP02	STMH-02	SMH4029324	195.2	--	--	94.2	48.25
PP03	STMH-03	SMH4029356	195.2	--	--	66.9	34.28

Note:

The **Full Capacity** of upstream pipe UP01 has been add to Discharge of P13 for conservative assessment.

Urban Renewal Authority
Development Scheme
To Kwa Wan Road / Wing Kwong Street
(KC-016)

Sewerage Impact Assessment

(V2.0)

March 2021

Approved By _____
(Project Manager: K.S. Lee)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

CINOTECH accepts no responsibility for changes made to this report by third parties.

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TABLE OF CONTENTS

1 INTRODUCTION 1

1.1 BACKGROUND 1

2 DESCRIPTION OF THE ENVIRONMENT 2

2.1 EXISTING ENVIRONMENT 2
2.2 FUTURE ENVIRONMENT 2

3 SEWERAGE IMPACT ASSESSMENT 4

3.1 SEWAGE DISCHARGE FROM THE EXISTING BUILDINGS IN THE SCHEME AREA 4
3.2 SEWAGE DISCHARGE FROM THE SCHEME 4
3.3 SEWAGE DISCHARGE FROM THE VICINITY 5
3.4 THE SEWERAGE SYSTEM 5

4 CONCLUSION 8

LIST OF TABLES

Table 2-1 Details of Planned Sewers Related to the Scheme 3
Table 3-1 Sewage Discharge from Existing Buildings in the Scheme Area 4
Table 3-2 Sewage Discharge from the Scheme 5
Table 3-3 Sewage Discharge from Surrounding Catchments 5
Table 3-4 Capacity of Downstream Foul Sewers 6
Table 3-5 Proportion of Peak Flow to Full Capacity (Existing Pipes) 6
Table 3-6 Proportion of Peak Flow to Full Capacity (Proposed Pipes) 7

LIST OF FIGURES

Figure 1-1 Location Plan of the Scheme
Figure 2-1 URA's Project and DSD's Tunnel Protection Zone in the Vicinity
Figure 2-2 Planned Sewer Upgrade for the 7 URA Redevelopment Projects and the Neighborhood
Figure 3-1 Sewage Catchments in the Vicinity without the Scheme
Figure 3-2 Sewage Catchments in the Vicinity with the Scheme

LIST OF APPENDICES

Appendix I Notional Plan of the Proposed Scheme
Appendix IIA Sewage Discharge from the Scheme Area without the Scheme
Appendix IIB Sewage Discharge from the Scheme Area with the Scheme
Appendix IIC Sewage Discharge from Surrounding Catchments
Appendix III Detailed Calculation of Existing Sewage Discharge
Appendix IV Capacity Calculation of Proposed Pipes and Upgraded Pipes

1 INTRODUCTION

1.1 Background

1.1.1 The Urban Renewal Authority (URA) has proposed To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) (the Scheme) under section 25 of the Urban Renewal Authority Ordinance (URAO). This Sewerage Impact Assessment (SIA) is to support the submission of a draft Development Scheme Plan (DSP) with its planning proposal to the Town Planning Board (TPB) for consideration.

1.1.2 Cinotech Consultants Limited was commissioned by URA to carry out a Sewerage Impact Assessment (SIA) to assess and envisage any potential sewerage impact on the implementation of the proposed development of the Scheme and to recommend necessary pipe upgrading/diversion as necessary.

2 DESCRIPTION OF THE ENVIRONMENT

2.1 Existing Environment

2.1.1 The Scheme is broadly bounded by To Kwa Wan Road, Ma Tau Wai Road, Wing Kwong Street, Kai Ming Street, Hung Fook Street and Ngan Hon Street in To Kwa Wan. The scheme area is currently zoned as "Residential (Group A)" (R(A)), with building height restriction of 100 mPD, and the pavement and road sections are shown as "Road" in the Approved Hung Hom Outline Zoning Plan (OZP) No. S/K9/26.

2.1.2 The Site comprises three rows of tenement buildings along Ma Tau Wai Road and To Kwa Wan Road, buildings at Yuk Shing Street, Wong Teck Building, the whole of Yuk Shing Street, and part of the road sections of Hung Fook Street and Kai Ming Street (**Figure 1-1**). The gross site area of the Scheme is about 6,592m^2. The net site area is about 5,548 m^2, subject to site survey and detailed design.

2.1.3 It should be noted that the southern portion of the site is within Drainage Services Department's (DSD) Tunnel Protection Zone of Harbour Area Treatment Scheme (HATS) Stage I sewage tunnels (**Figure 2-1**). According to Environment, Transport and Works Bureau Technical Circular (Works) No. 28/2003, only Government Departments shall follow the procedures set out in the Circular for any works in the vicinity of the sewage tunnels. Any private development work which may cause potential damage to the sewage tunnels are covered by the Buildings Ordinance (Chapter 123) Section 17A, which requires project proponent to submit relevant proposals to the Buildings Department (BD) for approval. Should the draft DSP be approved, the URA/ its future Joint Venture Partner would submit the work proposals to BD for approval during the project implementation.

2.2 Future Environment

2.2.1 The Scheme is part of URA's district-based approach to undertake urban renewal in the area. URA has already commenced 7 URA redevelopment projects in the North-east, East, South-East and South immediate to the Scheme, including KC-009, KC-010, KC-011, DL-8:KC, KC-012, KC-013, and KC-014 (**Figure 2-1**). The 7 projects are anticipated to be completed between 2025 and 2027 according to current programme. As the population intake of the Proposed Scheme (KC-016) is planned to be in year 2032, consideration of the future sewerage network and discharge would take into account of the 7 URA redevelopment projects and the Scheme. The estimated population of the proposed development in the Scheme is about 2,700 persons (see Appendix IIB).

2.2.2 Although the planned sewerage upgrade plan for the neighbourhood area of the Scheme is still in early stage and the design details, including the number of intermediate manholes along the new/upgraded sewer sections, are yet to be confirmed, the following key items are expected to be persisted in the final stage and would be implemented by URA or its assignee:

- Connecting the existing manhole FMH4024471 and FMH4024491 across at Bailey Street by 300mm sewer;
- Upgrade the existing sewer along Wan On Street to 600mm sewer, reverse the flow direction to northward and extended it to a new manhole at Wing Kwong Street (from FM4024491), then join with the existing manhole FMH4025926 at Wing Kwong Street with another 600mm sewer.

- Reverse the flow direction of the sewer between FMH4025889 and FMH4025928 to southward, and adjust the invert level of its upstream sewer, i.e. sewer along Hung Fook Street, to facilitate the modification.

2.2.3 As a result, the sewage discharge from most of the URA's Projects in the area and some amount of sewage from upstream pipes will join at FMH4025928 then discharged through FMH4025770 to 1650mm sewers. The above key items are shown and highlighted in **Figure 2-2**.

2.2.4 Based on the latest available information, without the Scheme, the sewerage system in the vicinity serving the existing buildings of the Scheme area are also illustrated in **Figure 2-2**. It should be noted that the planned sewer upgrade plan as described in **Sections 2.2.2 & 2.2.3** is to support sewerage network required as a result of the 7 URA redevelopment projects and the plan is not part of the Scheme. It is anticipated that the planned sewer upgrade plan will proceed for implementation even without the Scheme. Therefore, those key items of the plan will be treated as existing sewers in the calculations of the following assessment.

2.2.5 Some of the upgraded sewers in the planned sewerage upgrade plan, i.e. PS01, PS02, PS04, PS05 & PS06 will also cater the sewage discharge from the Scheme. Their details are list in the **Table 2-1**.

Table 2-1 Details of Planned Sewers Related to the Scheme

Segment	Upstream Manhole	Downstream Manhole	Upstream Invert Level (mPD)	Downstream Invert Level (mPD)	Length (m)	Diameter (mm)
PS01	FMH4024357	FMH4025889	2.40	1.70	104.2	525
PS02	FMH4025889	FMH4025928	1.70	1.53	25.8	525
PS04	FMH4025922	FMH4025770	1.24	1.20	6.1	675
PS05	FMH4024394	FMH4024387	3.14	2.90	19.7	300
PS06	FMH4024387	FMH4024388	2.90	2.74	15.3	300

3 SEWERAGE IMPACT ASSESSMENT

3.1 Sewage Discharge from the Existing Buildings in the Scheme Area

3.1.1 It is estimated that there are around 836 existing households within the Scheme. With the other URA's future developments in the vicinity, the sewerage from the buildings within the Scheme boundary will be affected.

3.1.2 According to the latest available information from URA, the sewage discharge from the northern portion of the site will discharge to the existing Manhole FMH4024357; while the sewage discharge from the southern portion will remain unchanged, which is discharging to the existing Manhole FMH4024394. The extent of the catchments and their discharge locations without the Scheme are illustrated in **Figure 3-1**. The estimated sewage discharges from the two portions of area of the Scheme are shown in **Figure 3-1** and the flowrate is summarised in **Table 3-1**, and detailed in **Appendix IIA**.

Table 3-1 Sewage Discharge from Existing Buildings in the Scheme Area

Catchment	Flowrate (m^3/day)
Site Area - Northern Portion	372.0
Site Area - Southern Portion	169.8

* The calculation is detailed in **Appendix IIA**.

3.2 Sewage Discharge from the Scheme

3.2.1 The URA proposes to rezone the scheme area into "R(A)" and redevelop the area for high-density residential development, with commercial uses always permitted on the lowest three floors of a building or in the purpose-designed non-residential portion of a building. Under current notional design, the Scheme proposes to develop two residential towers, one on the western side with about 34 storeys (T1) and another on the southern side of about 23 storeys (T2), on top of 5-storey podia which would incorporate GIC/commercial/retail, podium garden and private clubhouse facilities. Besides, a 4-storey low block (the Low Block) is proposed on the eastern side of the site with retail/commercial uses and an all-weathered communal space underneath. There is no swimming pool in the current Scheme. The notional plan of the proposed development is shown in **Appendix I**. The notional design is subject to change in detailed design stage. The estimated sewage discharges from each section of the scheme are summarised in **Table 3-2** and detailed in **Appendix IIB**.

Table 3-2 Sewage Discharge from the Scheme

Catchment	Flowrate (m^3/day)
By Occupant Type	
Residential (T1)	515.2
Residential (T2)	213.8
Retail/Commercial/Club House (Podium of T1)	31.9
Retail/Commercial/Club House (Podium of T2)	8.8
Retail/Commercial (Low Block)	11.8
Restaurants (Podium of T1)	261.9
Restaurants (Podium of T2)	72.5
Restaurants (Low Block)	96.7
G/IC (Podium of T1)	34.6
G/IC (Podium of T2)	16.6
By Building Block	
T1	843.5
T2	311.8
Low Block	108.5

*The calculation is detailed in **Appendix IIB**.

3.2.2 Due to the proposed development of the Scheme, the existing manholes and sewers within the Site will be removed. As those manholes and sewers only serve the Site area, no re-diversion will be required.

3.3 Sewage Discharge from the Vicinity

3.3.1 The surrounding future developments near the Scheme is sectioned into different catchments based on the future sewerage system. The sewage catchment areas in the vicinity are shown in **Figure 3-1**. The estimated sewage discharges from each catchment are summarised in **Table 3-3** and detailed in **Appendix IIC**.

Table 3-3 Sewage Discharge from Surrounding Catchments

Catchment	Flowrate (m^3/day)
A	1243.9
B	426.4
C	496.5
D	195.2
E	769.3
F	516.4

* The calculation is detailed in **Appendix IIC**.

3.4 The Sewerage System

3.4.1 Since the sewage discharge from the Scheme is expected to increase after the redevelopment, the downstream sewers shall be checked for sufficient capacities to cater sewerage discharge.

3.4.2 The capacities of the downstream foul sewer pipe sections (PS 01 – PS 06, **Figure 3-1**) are calculated by Colebrook-White Equation and listed in **Table 3-4**. The detailed calculation is shown in **Table A of Appendix III**.

Table 3-4 Capacity of Downstream Foul Sewers

Pipe Section	Upstream Manhole	Downstream Manhole	Full Capacity (L/s)
PS01*	FMH4024357	FMH4025889	396.6
PS02*	FMH4025889	FMH4025928	392.4
PS03	FMH4025928	FMH4025922	735.1
PS04*	FMH4025922	FMH4025770	756.6
PS05*	FMH4024394	FMH4024387	122.8
PS06*	FMH4024387	FMH4024388	113.4

* Sewer to be upgraded to cater for the proposed developments of URA's 7 redevelopment projects in vicinity of the Scheme. Please refer to **Section 2.2.2** "Planned Sewerage Upgrade Plan" and **Table 2-1** for details.

3.4.3 Summary of the utilization of the sewers with and without the Scheme are shown in **Table 3-5** respectively. The detailed calculation is shown in **Tables B & C of Appendix III**. The sewers are expected to be sufficient to cater the sewage discharge from the proposed development of URA's 7 redevelopment projects in the vicinity of the Scheme.

Table 3-5 Proportion of Peak Flow to Full Capacity (Existing Pipes)

Pipe Section	Full Capacity (L/s)	Without Scheme Scenario		With Scheme Scenario	
		Peak Flow (L/s)	Utilization (%)	Peak Flow (L/s)	Utilization (%)
PS01*	396.6	79.3	20.0%	90.5	22.8%
PS02*	392.4	79.3	20.2%	90.5	23.1%
PS03	735.1	156.5	21.3%	164.0	22.3%
PS04*	756.6	180.4	23.8%	187.9	24.8%
PS05*	122.8	41.4	33.7%	43.9	35.7%
PS06*	113.4	41.4	36.5%	43.9	38.7%

* Sewer to be upgraded to cater for the proposed developments of URA's 7 redevelopment projects in vicinity of the Scheme. Please refer to **Section 2.2.2** "Planned Sewerage Upgrade Plan" and **Table 2-1** for details.

3.4.4 The sewage discharge from the T1 is proposed to be collected by terminal manhole FTMH01 and discharged via proposed Pipe A to Existing manhole FMH4024357; the sewage discharge from the T2 is proposed to be collected by terminal manhole FTMH02 and discharged via proposed Pipe B to Existing manhole FMH4024394; the sewage discharge from the Low Block is proposed to be collected by terminal manhole FTMH03 and discharged via proposed Pipe C to Existing manhole FMH4024357. The diameters of the proposed pipes are 300mm for Pipe A and 225mm for Pipe B & Pipe C. The slopes of all 3 proposed pipes are 1:100. The locations of the proposed manholes and pipes are illustrated in **Figure 3-2**. The proposed new pipes are presented in **Table 3-6** below, the exact location of the new manholes and invert level will subject to future detailed design.

Table 3-6 Proportion of Peak Flow to Full Capacity (Proposed Pipes)

Pipe Section	Full Capacity (L/s)	Peak Flow (L/s)	Utilization (%)
Pipe A	111.0	58.6	52.8%
Pipe B	51.9	21.7	41.7%
Pipe C	51.9	10.0	19.3%

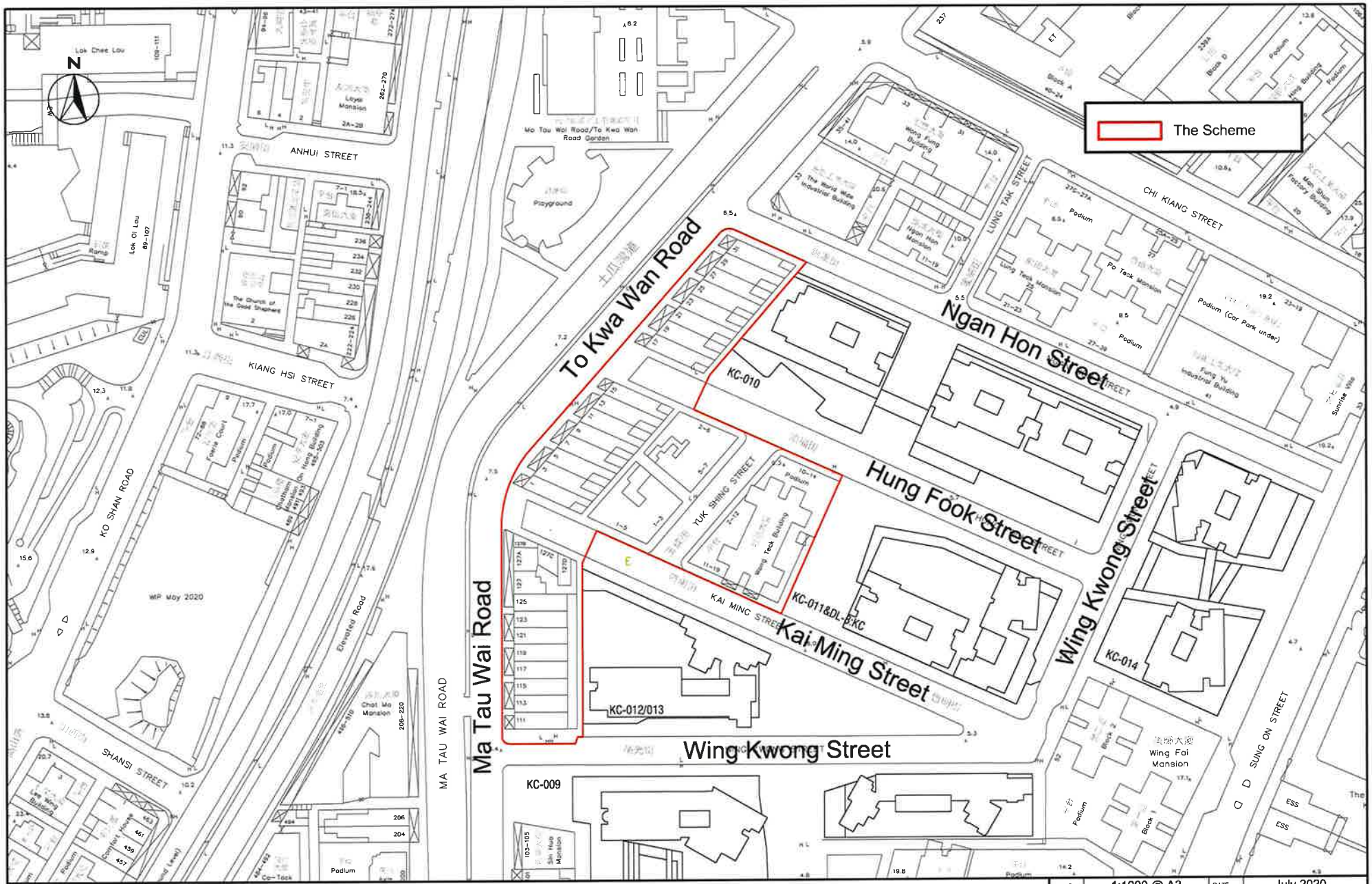
4 CONCLUSION

4.1.1 To Kwa Wan Road / Wing Kwong Street Development Scheme proposes to redevelop into 2 residential towers cum podia providing GIC/retail/commercial/clubhouse and podium garden, and a low block of commercial/retail building with an all-weathered communal space underneath.

4.1.2 The estimated daily sewage discharge from the proposed the Residential Towers (T1 & T2) and the Low Block are 843.5 m^3/day, 311.8 m^3/day and 108.5 m^3/day respectively. The sewage effluent from the proposed T1 & the Low Block will be collected by terminal manholes FTMH01 & FTMH03 and ultimately discharge to the public sewer at manhole FMH4024357. The sewage effluent from the proposed T2 will be collected by terminal manholes FTMH02 and ultimately discharge to the public sewer at manhole FMH4024394. Three (3) new pipes (i.e. Pipe A – Pipe C) are proposed to support the proposed development in the Scheme. The diameters of the proposed pipes are 300mm for Pipe A and 225mm for Pipe B & Pipe C. The slopes of all 3 proposed pipes are 1:100.

4.1.3 With the proposed new sewers to connect with the existing and planned sewerage upgrade plan in the vicinity of the Scheme, the network is considered to have sufficient capacities to cater the expected sewage flows from the proposed development of the Scheme and the surrounding catchments, therefore no sewer upgrade has been proposed and no adverse sewerage impact on the public sewerage system is expected from the proposed development.

Figures



CINOTECH
Cinotech Consultants Limited

Urban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-016)

Location Plan of the Scheme

SCALE	1:1000 @ A3	DATE	July 2020
CHECK	TL	DRAWN	CC
JOB No	IA19021-KCAA101	DRAWING No	1-1
		REV	-



CINOTECH
Cinotech Consultants Limited

Urban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-016)

URA's Projects and DSD's Tunnel Protection Zone in the Vicinity

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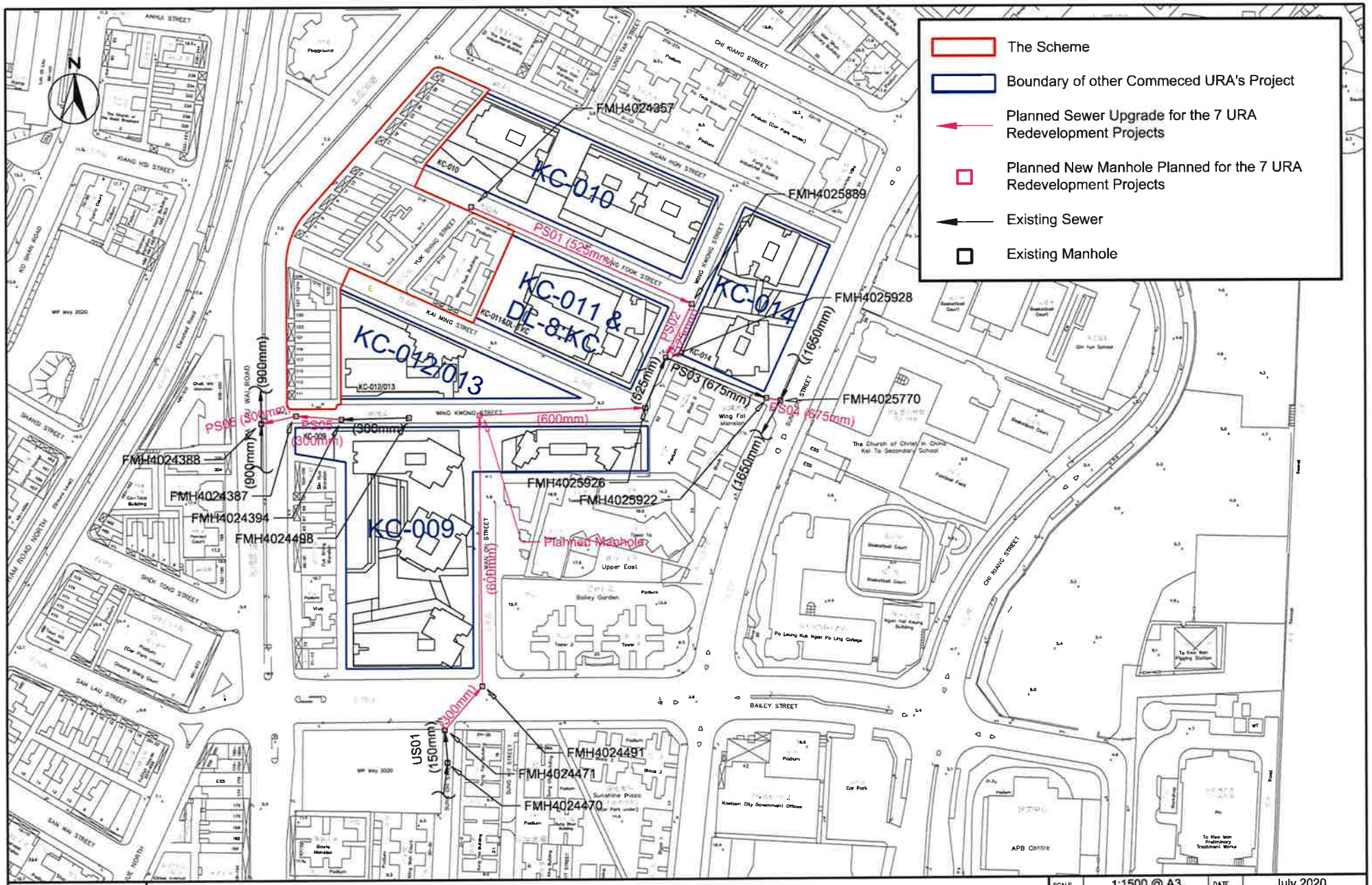
		REV	-



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Urban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-016)

Planned Sewer Upgrade for the 7 URA Redevelopment Projects and the Neighborhood

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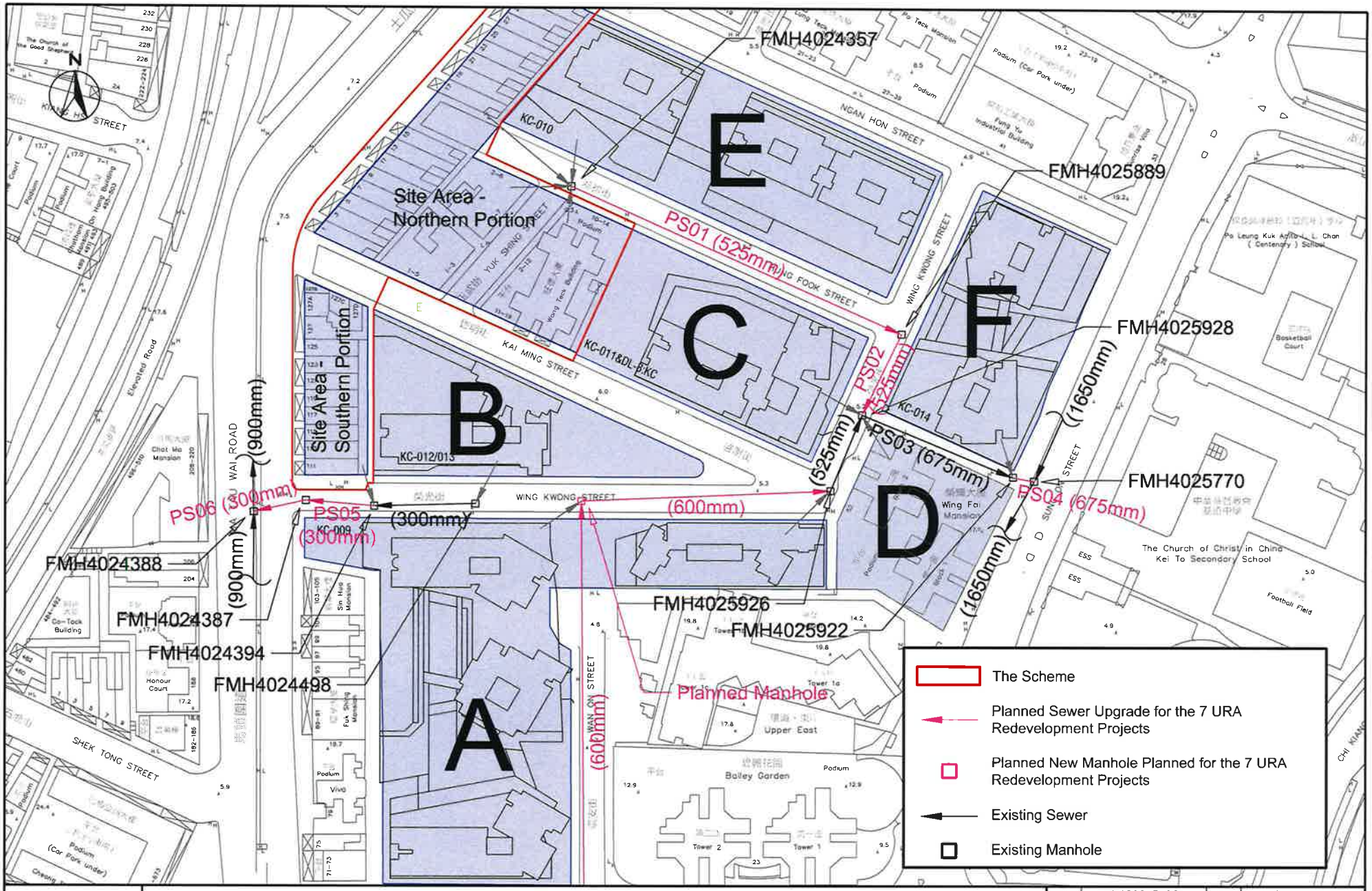

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Urban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-016)

Sewage Catchments in the Vicinity without the Scheme

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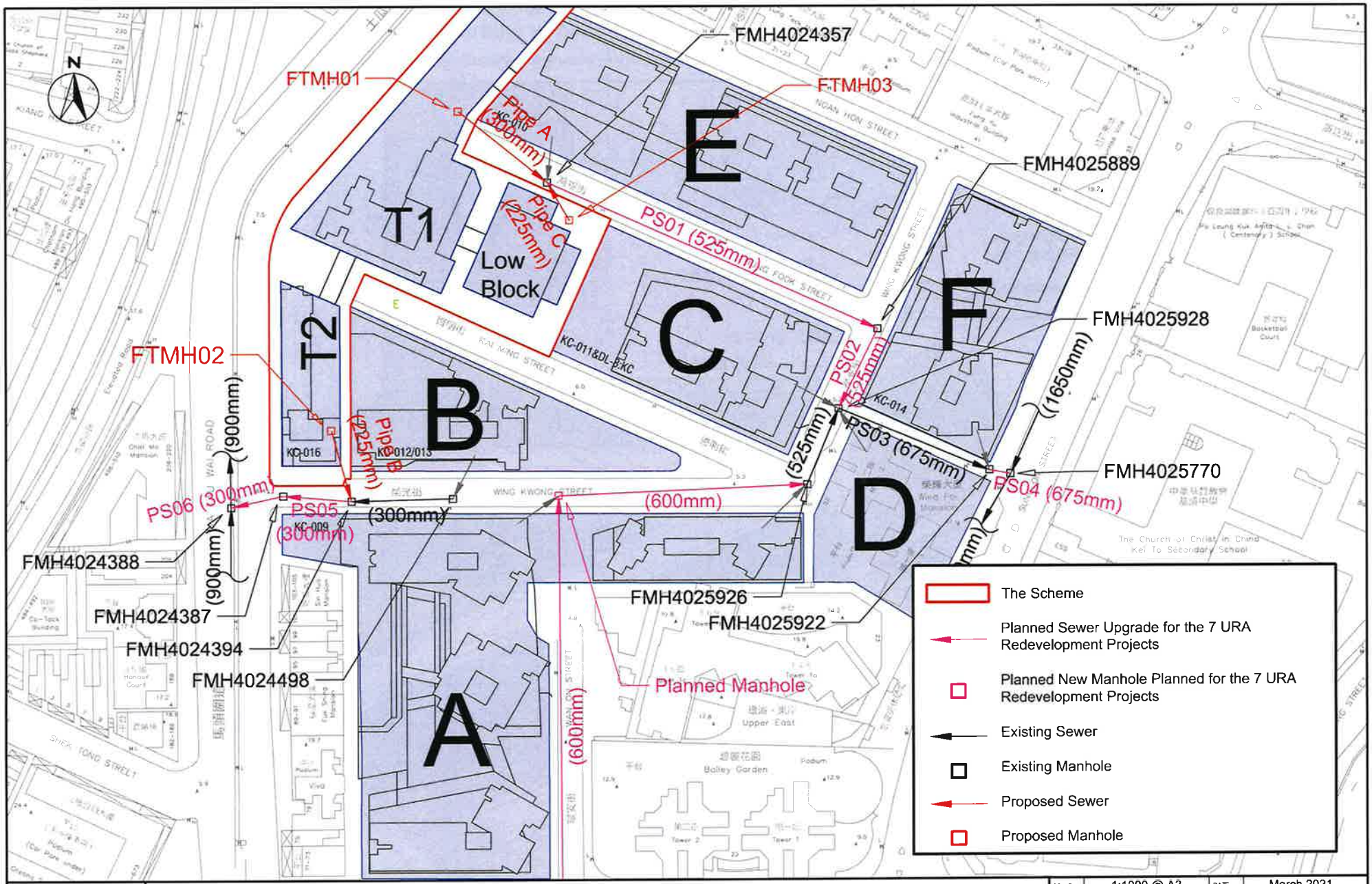
		REV	-



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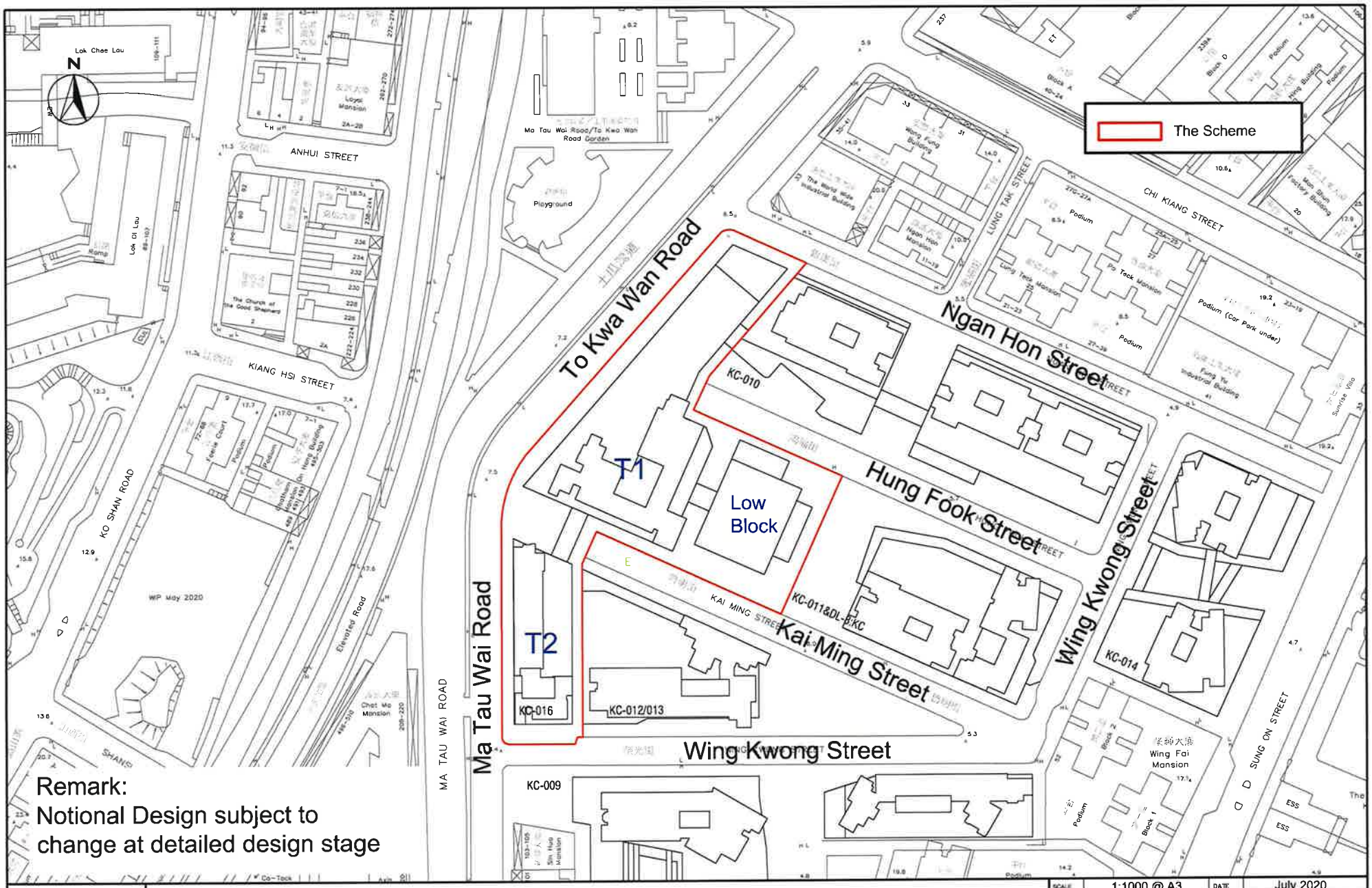
Urban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-016)

Sewage Catchments in the Vicinity with the Scheme

SCALE	1:1000 @ A3	DATE	March 2021
CHECK	TL	DRAWN	CC
JOB No.	IA19021-KCAA101	DRAWING No.	3-2
		REV	-

Appendix I

Notional Plan of the Proposed Scheme



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Urban Renewal Authority Development Scheme To Kwa Wan Road / Wing Kwong Street (KC-016)

Notional Block Plan of the Proposed Scheme

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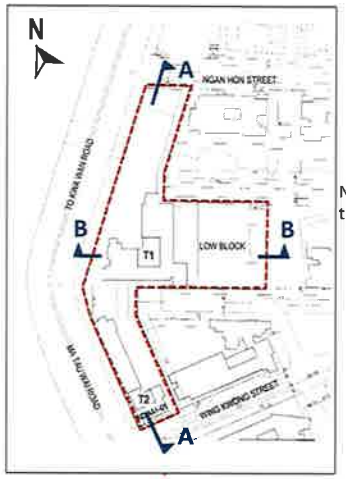
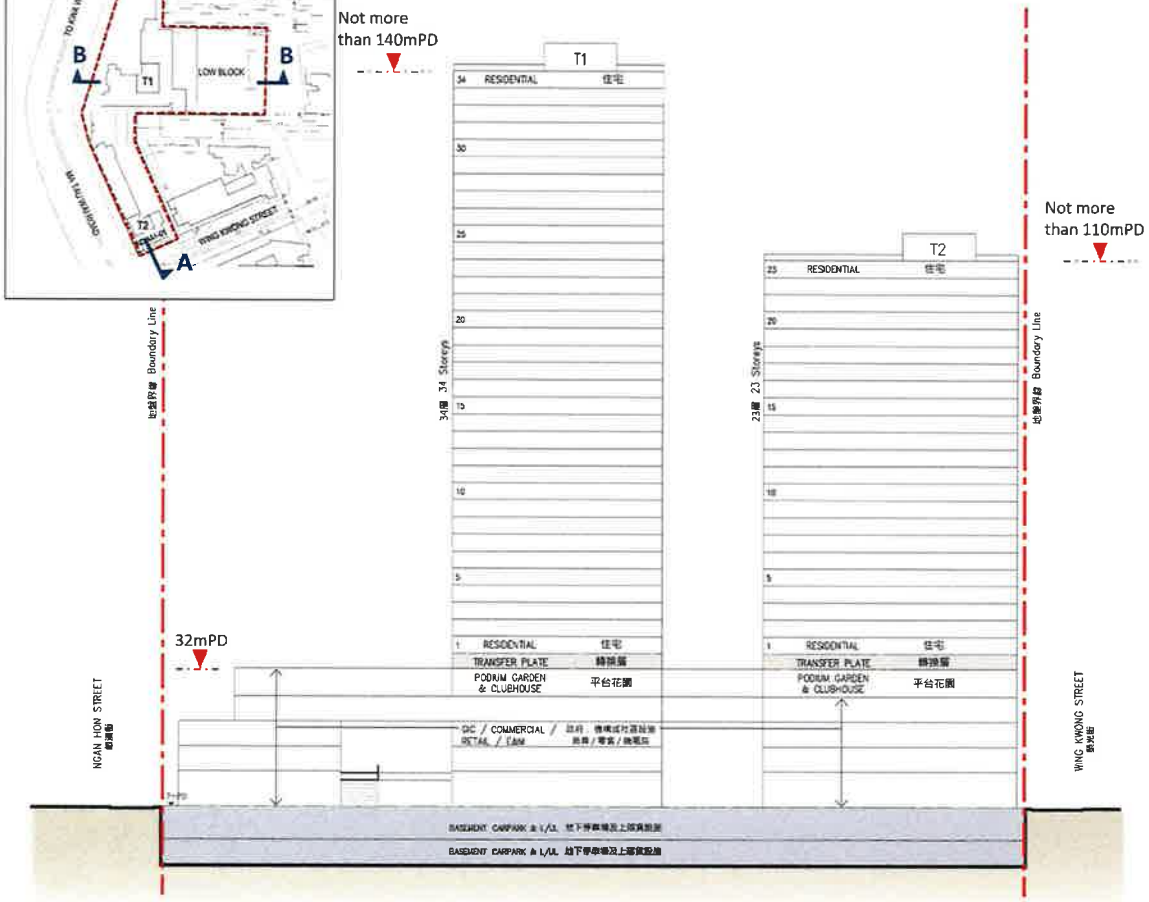
JOB No.	IA19021-KCAA101	DRAWING No.	Appendix I
		REV	-

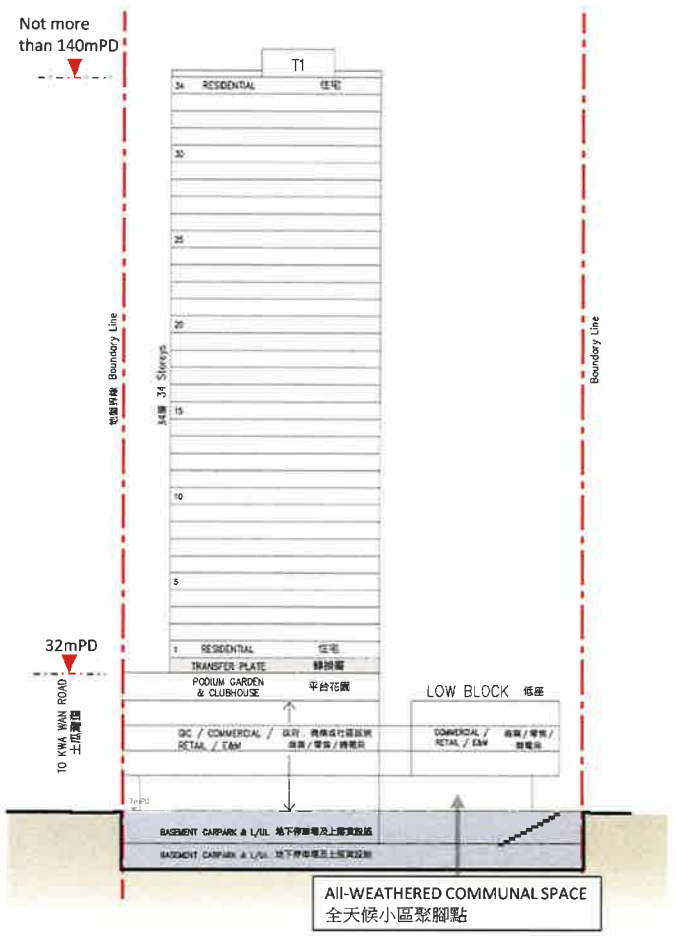
Key Plan



Section A



Section B



Remark:
Notional Design subject to change at detailed design stage

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Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

Notional Section Plan of the Proposed Scheme

SCALE	N.T.S.	DATE	Dec-20	
CHECK	KC	DRAWN	CC	
JOB NO.	IA0021-KCAA101	FIGURE NO.	App I	REV.
				-

Appendix IIA

Sewage Discharge from the Scheme Area without the Scheme

Appendix IIA: Sewage Discharge from the Scheme Area without the Scheme

Table A Estimation of Building Population

Section and Occupant Type	No. of Flat [1]	Non-residential GFA (m^2)	Population Factor		Population	
			No. of person per flat [2]	Residential Population	Worker Density per 100 m^2 [3]	No. of Worker
Residential (Site Area - Northern Portion)	574	-	2.4	1377.6	-	-
Residential (Site Area - Southern Portion)	262	-	2.4	628.8	-	-

Note:

1 - The number of flat is estimated by URA.

2 - The average domestic household size is 2.4 persons for To Kwa Wan South district according to Population By-census 2016.

3 - The worker density for different sections are from Figure 9 of Commercial and Industrial Floor Space Utilization Survey 2005.

Table B Estimation of Building Sewage Flow

Section and Occupant Type	Unit Flow Factors [1] (m^3/day/person)	No. of Occupants	Flow Rate (m^3/day)	Contributing population [2]	Peaking factor [3]	Peak Flow (L/s)
Residential (Site Area - Northern Portion)	0.27	1377.6	372.0	1377.6	6	**25.9**
Residential (Site Area - Southern Portion)	0.27	628.8	169.8	628.8	8	**15.8**

Note:

1 - EPD's Guidelines for Estimating Sewage Flows for Infrastructure Planning defining sewage flow parameter.

2 - The contribution population is Daily Flow Rate (m^3/day) / 0.27 (m^3/day/person)

3 - For facility with existing upstream

-- Peaking Factor of 8 for contributing population < 1,000 ;

-- Peaking Factor of 6 for contributing population 1,000 - 5,000.

are adopted.

The peak flow is the sum of flow rate of each occupant type * peaking factor.

Appendix IIB

Sewage Discharge from the Scheme Area with the Scheme

Appendix IIB: Sewage Discharge from the Scheme Area with the Scheme

Table A Estimation of Building Population

Section and Occupant Type	No. of Flat [1]	Non-residential GFA (m^2)	Population		Staff	
			No. of person per flat [2]	Residential Population	Worker Density per 100 m^2 [3]	No. of Worker
Residential (T1)	636	-	3.0	1908	-	-
Residential (T2)	264	-	3.0	792	-	-
Retail/Commercial/Club House (Podium of T1)	-	3250	-	-	3.5	114
Retail/Commercial/Club House (Podium of T2)	-	900	-	-	3.5	32
Retail/Commercial (Low Block)	-	1200	-	-	3.5	42
Restaurants (Podium of T1)		3250	-	-	5.1	166
Restaurants (Podium of T2)		900	-	-	5.1	46
Restaurants (Low Block)		1200	-	-	5.1	61
G/IC (Podium of T1)	-	3748	-	-	3.3	124
G/IC (Podium of T2)	-	1800	-	-	3.3	59

Note:

1 - Estimated number of flat from the Scheme.

2 - The average domestic household size is 2.4 persons for To Kwa Wan South Constituency Area according to Population By-census 2016. For conservative assessment, 3 person per flat has been adopted.

3 - The worker density for different sections are from Figure 9 of Commercial and Industrial Floor Space Utilization Survey 2005.

4 - The GFA ratio between community area and restaurant area was assumed to 50:50.

Table B Estimation of Building Sewage Flow

Section and Occupant Type	Unit Flow Factors [1] (m^3/day/person)	No. of Occupants (Resident) / Workers (non-Resident)	Flow Rate (m^3/day)	Contributing population [2]	Peaking factor [3]	Peak Flow (L/s)
By Occupant Type						
Residential (T1)	0.27	1908	515.2	-	-	-
Residential (T2)	0.27	792	213.8	-	-	-
Retail/Commercial/Club House (Podium of T1)	0.28	114	31.9	-	-	-
Retail/Commercial/Club House (Podium of T2)	0.28	32	8.8	-	-	-
Retail/Commercial (Low Block)	0.28	42	11.8	-	-	-
Restaurants (Podium of T1)	1.58	166	261.9	-	-	-
Restaurants (Podium of T2)	1.58	46	72.5	-	-	-
Restaurants (Low Block)	1.58	61	96.7			
G/IC (Podium of T1)	0.28	124	34.6	-	-	-
G/IC (Podium of T2)	0.28	59	16.6	-	-	-
By Building Block						
T1	-	-	843.5	3125	6	**58.6**
T2	-	-	311.8	1155	6	**21.7**
Low Block	-	-	108.5	402	8	**10.1**

Note:

1 - EPD's Guidelines for Estimating Sewage Flows for Infrastructure Planning defining sewage flow parameter.

2 - The contribution population is Daily Flow Rate (m^3/day) / 0.27 (m^3/day/person)

3 - For facility with existing upstream

-- Peaking Factor of 8 for contributing population < 1,000 ;

-- Peaking Factor of 6 for contributing population 1,000 - 5,000.

are adopted.

The peak flow is the sum of flow rate of each occupant type * peaking factor.

Appendix IIC

Sewage Flow from Surrounding Catchments

Appendix IIC: Sewage Discharge from Surrounding Catchments

Table A - Estimation of Surrounding Buildings' Occupant

Catchment	Development	Type	No. of Flat	Average Domestic Household Size	Non-Domestic GFA (m^2)	No. of Community Use	Community GFA (m^2) [1]	No. of Retail/Shop	No. of Restaurant	Restaurant GFA (m^2) [1]	No. of Occupants (Resident) / Worker (Non-resident) [2][3][4]				Source
											Resident	Community	Retail/ Shop	Restaurant	
A	URA Project - KC-009	R2/Community/Restaurant	1150	2.4	11105	-	5552.5	-	-	5552.5	2760	183	-	283	URA
B	URA Project - KC-012/013		400		3722	-	1861	-	-	1861	960	61	-	95	
C	URA Project - KC-011&DL-8:KC		460		4418	-	2209	-	-	2209	1104	73	-	113	
D	Wing Fai Mansion	R2/Community/Retail/Restaurant	204		-	2	-	85	1	-	490	10	170	8	Prime Property
E	URA Project - KC-010	R2/Community/Restaurant	713		6843	-	3421.5	-	-	3421.5	1711	113	-	174	URA
F	URA Project - KC-014		500		4285	-	2142.5	-	-	2142.5	1200	71	-	109	

Note:

1 The GFA ratio between community area and restaurant area was assumed to 50:50.

2 The average domestic household size is 2.4 persons for To Kwa Wan South Constituency Area according to Population By-census 2016.

3 According to Commercial and Industrial Floor Space Utilization Survey 2005 - Figure 9, the worker density (per $100m^2$ GFA) of community and restaurant are 3.3 and 5.1 respectively.

4 It is observed that in average, 2 workers in each shop, 5 works in each community, and 8 workers in each restaurant; therefore it is used in the estimation of occupants for Wing Fai Mansion.

Table B - Estimation of Sewage Discharge for Surrounding Buildings

Catchment	Development	Type	Unit Flow Factors [1] (m³/day/person or staff)				Total Daily Flow (m^3/day)
			Resident	Community	Retail/ Shop	Restaurant	
A	URA Project - KC-009	R2/Community/Restaurant	0.270	0.280	-	1.580	1243.9
B	URA Project - KC-012/013		0.270	0.280	-	1.580	426.4
C	URA Project - KC-001&DL-8:KC		0.270	0.280	-	1.580	496.5
D	Wing Fai Mansion	R2/Community/Retail/Resturant	0.270	0.280	0.280	1.580	195.2
E	URA Project - KC-010	R2/Community/Restaurant	0.270	0.280	-	1.580	769.3
F	URA Project - KC-014		0.270	0.280	-	1.580	516.4
Total	-	-	-	-	-	-	3647.8

Note:

1 EPD's Guidelines for Estimating Sewage Flows for Infrastructure Planning defining sewage flow parameter.

Appendix III

Detailed Calculation of Existing Sewage Discharge

Appendix III: Calculation of Existing Pipe Capacity

Table A - Existing Pipe Capacity Calculation

Segment	Upstream Manhole	Downstream Manhole	Upstream Invert Level (mPD)	Downstream Invert Level (mPD)	Length (m)	Diameter (mm)	Diameter (m)	Area (m^2)	Hydraulic Radius (m)	Slope#	Kinematic Viscosity (m^2/s)	Hydraulic Pipeline Roughness (m)*	Velocity (m/s)	Full Capacity (l/s)
PS01	FMH4024357	FMH4025889	2.40	1.70	104.2	525	0.525	0.216	0.13125	0.0067	0.00000114	0.0006	1.83	396.6
PS02	FMH4025889	FMH4025928	1.70	1.53	25.8	525	0.525	0.216	0.13125	0.0066	0.00000114	0.0006	1.81	392.4
PS03	FMH4025928	FMH4025922	1.53	1.24	47.0	675	0.675	0.358	0.16875	0.0062	0.00000114	0.0006	2.05	735.1
PS04	FMH4025922	FMH4025770	1.24	1.20	6.1	675	0.675	0.358	0.16875	0.0065	0.00000114	0.0006	2.11	756.6
PS05	FMH4024394	FMH4024387	3.14	2.90	19.7	300	0.3	0.071	0.075	0.0122	0.00000114	0.0006	1.74	122.8
PS06	FMH4024387	FMH4024388	2.90	2.74	15.3	300	0.3	0.071	0.075	0.0104	0.00000114	0.0006	1.60	113.4
US01	FMH4024470	FMH4024471	2.08	1.93	14.2	150	0.15	0.018	0.0375	0.0106	0.00000114	0.003	0.80	14.1

* Roughness coefficient for slimed clayware sewer under poor condition is adopted; the ks values are 0.6mm for velocities greater than 1.2m/s, otherwise 3mm.

The slope of proposed pipe which is connected between the terminal manhole of the Project and the Public Sewer is assumed to be 1:150. The invert level and the length are subject to the future detail design.

Appendix III

Table B - Proportion of Peak Flow to Full Capacity without the Scheme

Segment	Upstream Manhole	Downstream Manhole	Full Capacity (L/s)	Catchment	Total Daily Flow (m^3/day)[5]	Contribution Population [1]	Peaking Factor [2]	Peak Flow (L/s) [3][5]	Inflow factor [4]	Peak Flow with Inflow factor (L/s)	% of full capacity
PS01	FMH4024357	FMH4025889	396.6	Site Area - Northern Portion + E	1141.3	4227	6	79.3	1.0	79.3	20.0%
PS02	FMH4025889	FMH4025928	392.4	Site Area - Northern Portion + E	1141.3	4227	6	79.3	1.0	79.3	20.2%
PS03	FMH4025928	FMH4025922	735.1	Site Area - Northern Portion + A + C + D + E + US01	3076.9	11396	4	156.5	1.0	156.5	21.3%
PS04	FMH4025922	FMH4025770	756.6	Site Area - Northern Portion + A + C + D + E + F + US01	3593.4	13309	4	180.4	1.0	180.4	23.8%
PS05	FMH4024394	FMH4024387	122.8	Site Area - Southern Portion + B	596.1	2208	6	41.4	1.0	41.4	33.7%
PS06	FMH4024387	FMH4024388	113.4	Site Area - Southern Portion + B	596.1	2208	6	41.4	1.0	41.4	36.5%

Table C - Proportion of Peak Flow to Full Capacity with the Scheme

Segment	Upstream Manhole	Downstream Manhole	Full Capacity (L/s)	Catchment	Total Daily Flow (m^3/day)[5]	Contribution Population [1]	Peaking Factor [2]	Peak Flow (L/s) [3]	Inflow factor [4]	Peak Flow with Inflow factor (L/s)	% of full capacity
PS01	FMH4024357	FMH4025889	396.6	T1 + Low Block + E	1721.3	6375	5	99.6	1.0	99.6	25.1%
PS02	FMH4025889	FMH4025928	392.4	T1 + Low Block + E	1721.3	6375	5	99.6	1.0	99.6	25.4%
PS03	FMH4025928	FMH4025922	735.1	T1 + Low Block + A + C + D + E + US01	3657.0	13544	4	183.4	1.0	183.4	24.9%
PS04	FMH4025922	FMH4025770	756.6	T1 + Low Block + A + C + D + E + F + US01	4173.4	15457	4	207.3	1.0	207.3	27.4%
PS05	FMH4024394	FMH4024387	122.8	T2 + B	738.2	2734	6	51.3	1.0	51.3	41.8%
PS06	FMH4024387	FMH4024388	113.4	T2 + B	738.2	2734	6	51.3	1.0	51.3	45.2%

Note:

1 The contribution population is total flow rate (m^3/day) / 0.27 (m^3/day/person)

2 - Peaking Factor of 8 for contributing population < 1,000 ;
- Peaking Factor of 6 for contributing population 1,000 - 5,000.
- Peaking Factor of 4 for contributing population 10,000 - 50,000.
are adopted.

3 The peak flow is total flow rate of each pipe segment * peaking factor.

4 The catchment inflow factor is 1.0 for Cnetral Kowloon according to EPD's Guidelines for Estimating Sewage Flows Table T-4.

5 The discharge from the upsteam sewer US01 is not included in the daily flow. Instead, the capacity of US01 has been added to Peak flow directly for conservative assessment.

Appendix IV

Capacity Calculation of Proposed Pipes and Upgraded Pipes

Appendix IV: Calculation of Proposed Pipe Capacity

Table A - Proposed Pipe Capacity Calculation

Segment	Upstream Manhole	Downstream Manhole	Upstream Invert Level (mPD)	Downstream Invert Level (mPD)	Length (m)	Diameter (mm)	Diameter (m)	Area (m^2)	Hydraulic Radius (m)	Slope#	Kinematic Viscosity (m^2/s)	Hydraulic Pipeline Roughness (m)*	Velocity (m/s)	Full Capacity (l/s)
Proposed New Sewer														
Pipe A	FTMH01	FMH4024357	-	3.17	--	300	0.3	0.071	0.075	0.0100	0.00000114	0.0006	1.57	111.0
Pipe B	FTMH02	FMH4024394	-	3.14	--	225	0.225	0.040	0.05625	0.0100	0.00000114	0.0006	1.31	51.9
Pipe C	FTMH03	FMH4024357	-	3.17	--	225	0.225	0.040	0.05625	0.0100	0.00000114	0.0006	1.31	51.9

* Roughness coefficient for slimed clayware sewer under poor condition is adopted; the ks values are 0.6mm for velocities greater than 1.2m/s, otherwise 3mm.

The slope of proposed pipe which is connected between the terminal manhole of the Project and the Public Sewer is assumed to be 1:100. The invert level and the length are subject to the future detail design.

Appendix IV

Table B - Proportion of Peak Flow to Full Capacity after Upgrading

Segment	Upstream Manhole	Downstream Manhole	Full Capacity (L/s)	Catchment	Total Daily Flow (m^3/day)[5]	Contribution Population [1]	Peaking Factor [2]	Peak Flow (L/s) [3]	Inflow factor [4]	Peak Flow with Inflow factor (L/s)	% of full capacity
Proposed New Sewer											
Pipe A	FTMH01	FMH4024357	111.0	T1	843.5	3124	6	58.6	1.0	58.6	52.8%
Pipe B	FTMH02	FMH4024394	51.9	T2	311.8	1155	6	21.7	1.0	21.7	41.7%
Pipe C	FTMH03	FMH4024357	51.9	Low Block	108.5	402	8	10.0	1.0	10.0	19.3%

Note:

1 The contribution population is total flow rate (m^3/day) / 0.27 (m^3/day/person)

2 - Peaking Factor of 8 for contributing population < 1,000 ;
- Peaking Factor of 6 for contributing population 1,000 - 5,000.
- Peaking Factor of 4 for contributing population 10,000 - 50,000.
are adopted.

3 The peak flow is total flow rate of each pipe segment * peaking factor.

4 The catchment inflow factor is 1.0 for Cnetral Kowloon according to EPD's Guidelines for Estimating Sewage Flows Table T-4.

5 The discharge from the upsteam sewer US01 is not included in the daily flow. Instead, the capacity of US01 has been added to Peak flow directly for conservative assessment.

Appendix IV

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Proposed New Sewer											
Pipe A	FTMH01	FMH4024357	111.0	T1	843.5	3124	6	58.6	1.0	58.6	52.8%
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Note:

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3 The peak flow is total flow rate of each pipe segment * peaking factor.

4 The catchment inflow factor is 1.0 for Cnetral Kowloon according to EPD's Guidelines for Estimating Sewage Flows Table T-4.

5 The discharge from the upsteam sewer US01 is not included in the daily flow. Instead, the capacity of US01 has been added to Peak flow directly for conservative assessment.

Appendix 8

Water Supply Impact Assessment (WSIA) Report

Urban Renewal Authority
Development Scheme
To Kwa Wan Road / Wing Kwong Street
(KC-016)

Water Supply Impact Assessment Report

(V1.1)

March 2021

Approved By _____
(Project Manager: K.S. Lee)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

CINOTECH accepts no responsibility for changes made to this report by third parties.

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Checked by	Karina Chan		2 March 2021

TABLE OF CONTENTS

1 INTRODUCTION 1

1.1 BACKGROUND 1

2 WATER IMPACT ASSESSMENT 2

2.1 EXISTING FRESHWATER SUPPLY 2
2.2 FRESHWATER SUPPLY IMPACT 2
2.3 EXISTING SALT WATER SUPPLY 2
2.4 SALT WATER SUPPLY IMPACT 2
2.5 CONSTRUCTION AND MAINTENANCE 3

3 CONCLUSION 3

LIST OF FIGURES

Figure 1-1 Location Plan of the Scheme

LIST OF APPENDICES

Appendix 2-1 Fresh Water and Salt Water Mains Record Plans
Appendix 2-2 Detailed Water Demand Calculation

1 INTRODUCTION

1.1 Background

1.1.1 The Urban Renewal Authority (URA) has proposed To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016) (the Scheme) under section 25 of the Urban Renewal Authority Ordinance (URAO). This Water Supply Impact Assessment (WSIA) is to support the submission of a draft Development Scheme Plan (DSP) with its planning proposal to the Town Planning Board (TPB) for consideration.

1.1.2 The Scheme is broadly bounded by To Kwa Wan Road, Ma Tau Wai Road, Wing Kwong Street, Kai Ming Street, Hung Fook Street and Ngan Hon Street. The scheme area is currently zoned as "Residential (Group A)" (R(A)), with building height restriction of 100 mPD, and the pavement and road sections are shown as "Road" in the Approved Hung Hom Outline Zoning Plan No. S/K9/26.

1.1.3 The Scheme comprises three rows of buildings along Ma Tau Wai Road (No. 111-127D odd numbers) and To Kwa Wan Road (No. 1-15 & 17-31 odd numbers), buildings at Yuk Shing Street (No. 1-7 odd numbers), Wong Teck Building (Yuk Shing Street No. 2-12 even numbers), and the whole of Yu Shing Street, part of the road sections of Hung Fook Street and Kai Ming Street. The location of the Scheme is shown in **Figure 1-1**.

1.1.4 The URA proposes to redevelop the scheme area for high-density residential development, with commercial uses always permitted on the lowest three floors of a building or in the purpose-designed non-residential portion of a building. The maximum building height for the Scheme area is proposed to be relaxed from 100mPD to 140mPD.

1.1.5 Under current notional design, the Scheme proposes to develop two residential towers (Tower T1 & T2) on top of podia which would incorporate GIC/commercial/retail, podium garden and private clubhouse facilities, and a low block (the Low Block) with retail/commercial uses with an all weathered communal space underneath. The three road sections within the Scheme will be closed for replanning and restructuring for redevelopment and creation of pedestrian walkways. Notional design is subject to change at detailed design stage.

1.1.6 Cinotech Consultants Limited was commissioned by URA to carry out a Water Supply Impact Assessment (WSIA) to assess and envisage any potential impact on water supply due to implementation of the proposed development of the Scheme.

1.1.7 Enquiry letter has been sent to Water Supplies Department (WSD) for the existing fresh and salt water supply as well as the corresponding current utilise rate in the concerned area. Fresh Water and Salt Water Mains Record Plans, as well as the supply capacity and daily consumption has been provided by WSD (WSD ref: (3) (4) in WSD/K 1601/10/12/2020 TJ (107)).

2 WATER IMPACT ASSESSMENT

2.1 Existing Freshwater Supply

2.1.1 According to the Fresh Water Mains Record Plans and reply letter from Water Supplies Department (WSD), the Site is currently served by Ho Man Tin East Fresh Water Service Reservoir (Ho Man Tin East FWSR) (Capacity 152,000m^3).

2.1.2 The Site is supplied by fresh water mains with 150mm or above from Ma Tau Wai Road, To Kwa Wan Road, Wing Kwong Street, Kai Ming Street, Hung Fook Street, and Ngan Hon Street, with smaller mains within an access alleyway connecting the Site. The concerned fresh water mains have been highlighted in WSD Fresh Water Mains Record Plans in **Appendix 2-1**.

2.2 Freshwater Supply Impact

2.2.1 The calculations for the water demand for the existing and future scenarios and existing spare capacities at different reservoirs are included in **Appendix 2-2**, together with comparisons with the existing supply facilities.

2.2.2 The freshwater demand is expected to increase from 528.00 m^3/day to 666.45 m^3/day (an increase of 138.45 m^3/day, or 0.138 MLD) as a result of the proposed development. However, according to the calculations provided as shown in **Appendix 2-2**, there is substantially greater spare capacity in the service reservoirs serving the Site. The expected increase in demand can therefore be accommodated by the existing main supply facilities.

2.2.3 The detailed connection arrangements for the Site and the local water mains will be reviewed in later stages during the implementation of the Scheme. Local upgrading and/or realignment may be implemented if necessary.

2.3 Existing Salt Water Supply

2.3.1 According to the reply letter from WSD, the Site is currently served by Tai Wan Salt Water Pumping Station (Tai Wan SWPS) (Design Capacity 112.74 mld).

2.3.2 The western portion of the Site is supplied by salt water mains from the Ngan Hon Street, via a 100mm pipe along the access alleyways which connected to the salt water main at Kai Ming Street. The eastern portion of the Site is supplied by a 150mm salt water main connected to water mains at Wing Kwong Street & Kai Ming Street at its two ends. The concerned salt water mains have been highlighted in WSD Salt Water Mains Record Plans in **Appendix 2-1**.

2.4 Salt Water Supply Impact

2.4.1 The salt water demand is expected to increase from 123.20 m^3/day to 158.81 m^3/d (an increase of 35.61 m^3/day, or 0.036 MLD) as a result of the proposed development. However, as shown in **Appendix 2-2**, there is substantially greater spare capacity in the salt water pumping station serving the Site. The expected increase in demand can therefore be accommodated by the existing main supply facilities.

2.4.2 The detailed connection arrangements for the Site and the local water mains will be reviewed in later stages during implementation of the Scheme. Local upgrading and/or realignment may be implemented if necessary.

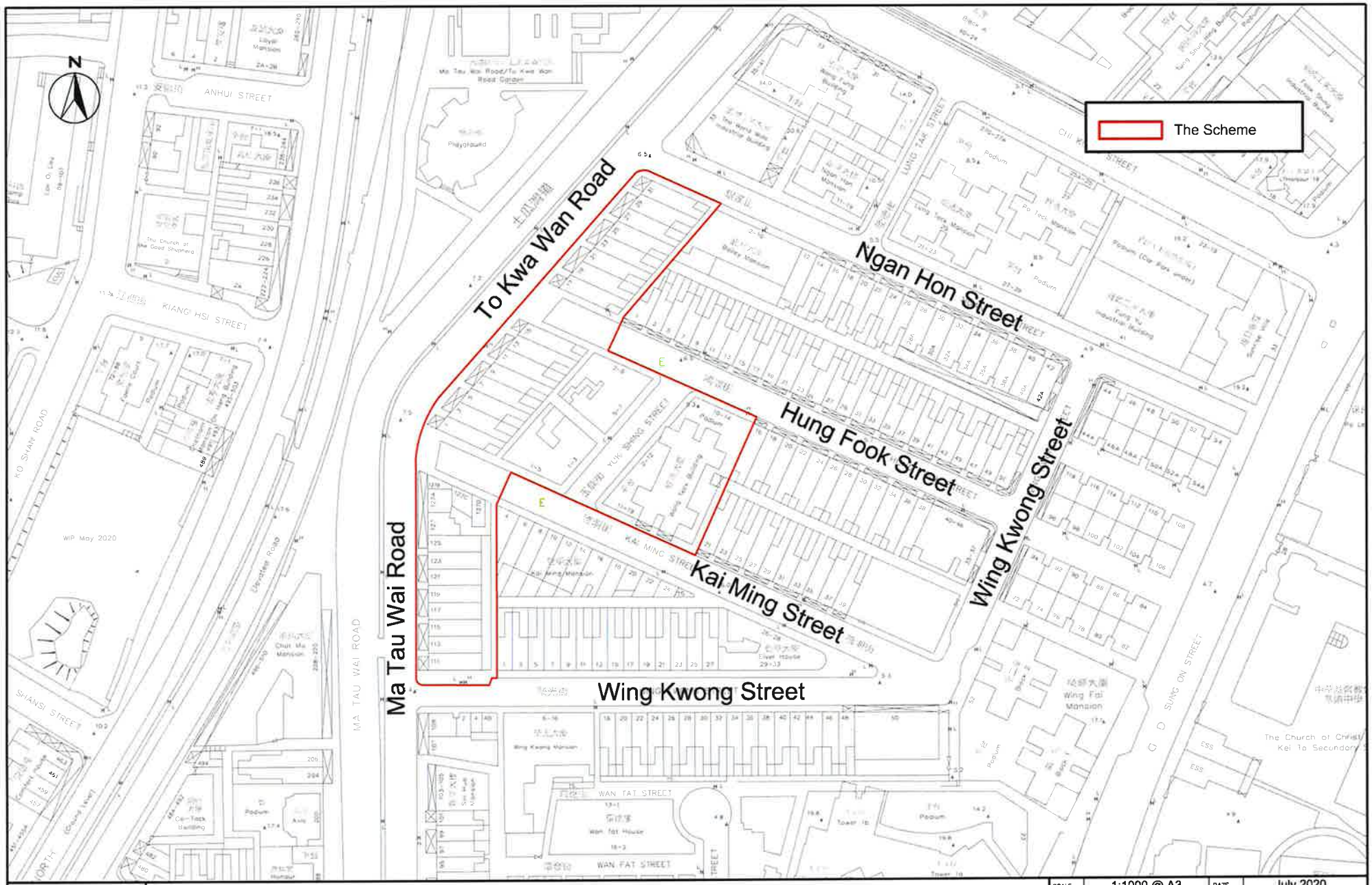
2.5 Construction and Maintenance

2.5.1 Responsibilities for the investigation, design, construction, repair and maintenance of the internal water supply facilities and connection to the main water system(s) will be discussed among URA/its joint venture partners/its assignees and relevant Government departments in detailed design stage.

3 CONCLUSION

3.1.1 The water supply impact due to the proposed development of the Scheme has been reviewed. Although the Scheme at the Site will result in increase in both the fresh and salt water demands, the increases can be accommodated by the existing main supply facilities. Therefore, no adverse water supply impact is anticipated from the proposed development of the Scheme.

FIGURES



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Cinotech Consultants Limited

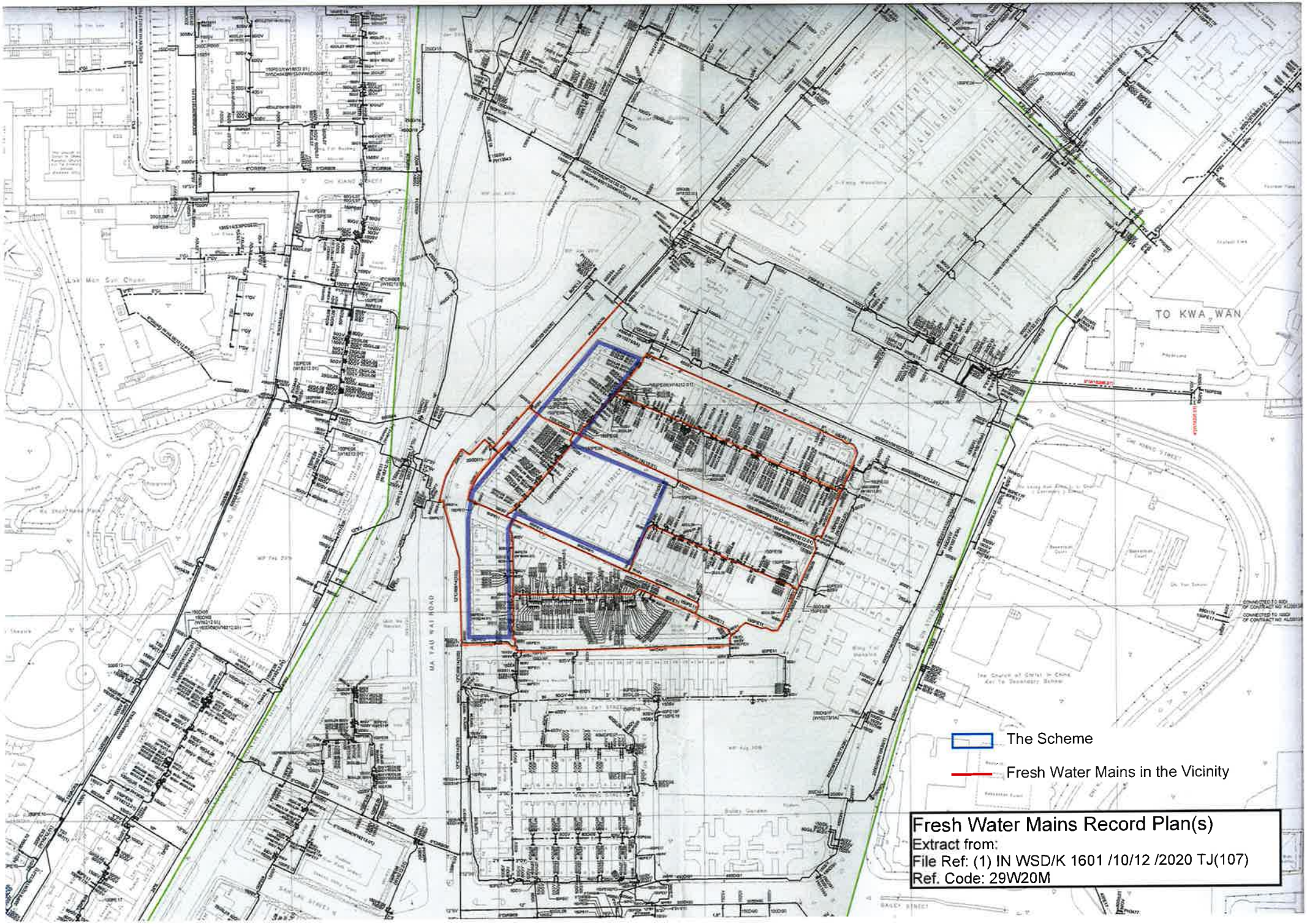
Urban Renewal Authority To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)

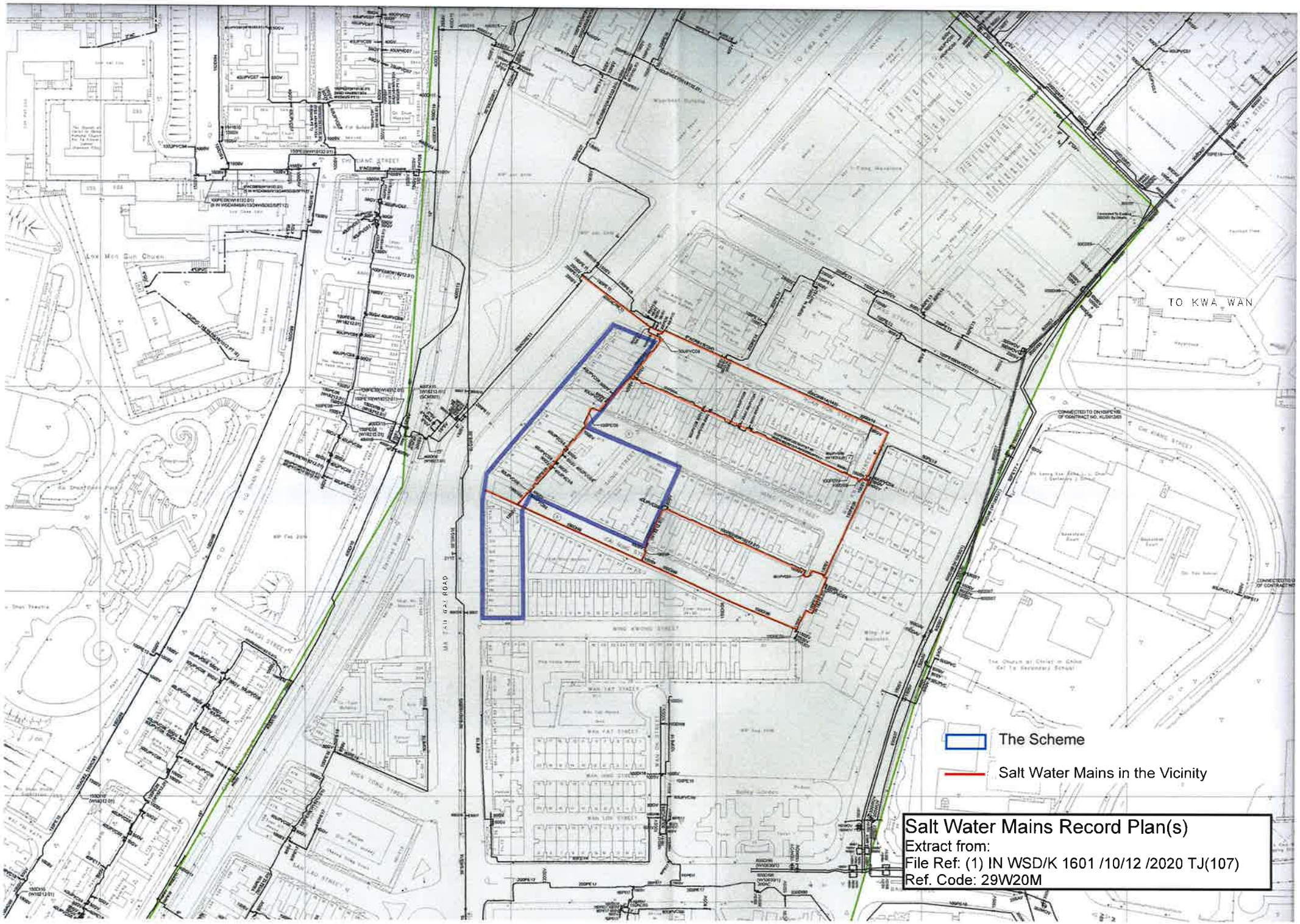
Location Plan of the Scheme

SCALE	1:1000 @ A3	DATE	July 2020
CHECK	KC	DRAWN	CC
JOB No.	IA 19021-KCAA101	DRAWING No.	1-1
		REV	-

APPENDIX 2-1

Fresh Water and Salt Water Mains Record Plans


TO KWA WAN
MA TAU WAI ROAD
The Scheme
Fresh Water Mains in the Vicinity
Fresh Water Mains Record Plan(s)
Extract from:
File Ref: (1) IN WSD/K 1601 /10/12 /2020 TJ(107)
Ref. Code: 29W20M


TO KWA WAN
The Scheme
Salt Water Mains in the Vicinity
Salt Water Mains Record Plan(s)
Extract from:
File Ref: (1) IN WSD/K 1601 /10/12 /2020 TJ(107)
Ref. Code: 29W20M

APPENDIX 2-2

Detailed Water Demand Calculation

Existing Water Demands

Populations (Residiential)

	Units [1]	Popn. [1]	
Existing Households	836	**1,760**	**Persons**

Note [1] - Based on URA's Survey.

Water Demands

Refer to **WSD Departmental Instruction 1309**

Residiential

	Category	Population	Unit Demand Freshwater (m^3/h/d)	Unit Demand Saltwater (m^3/h/d)	Daily Demand Freshwater (m^3/d)	Daily Demand Saltwater (m^3/d)
Residential Accommodation	R2	1,760	0.300	0.070	528.00	123.20

Total

	Daily Demand Freshwater (m^3/d)	Daily Demand Saltwater (m^3/d)
Total	528.00	123.20

Predicted Water Demands

Populations (Residiential)

	Units [1]	PPF [2]	Popn.	
Residential Accommodation (R2)	900	2.4	**2,160**	**Persons**
Management/Club House Staff (Service Trade)			**20**	**Persons**

Note [1] - The development profile is provided by URA based on the latest Scheme.

Note [2] - The average domestic household size is 2.4 persons for To Kwa Wan South Constituency Area according to Population By-census 2016.

Floor Area (Commercial & G/IC)

	UFA (m^2) [1]		UFA (ha)	
Commercial (C/R)	8,322	m^2	8.322	**ha**
Government, Institution/Community (G/IC)	5,548	m^2	5.548	**ha**

Note [1] - The development profile is provided by URA based on the latest Scheme.

Water Demands

Refer to **WSD Departmental Instruction 1309**

Residiential

	Category	Population	Unit Demand Freshwater (m^3/h/d)	Unit Demand Saltwater (m^3/h/d)	Daily Demand Freshwater (m^3/d)	Daily Demand Saltwater (m^3/d)
Residential Accommodation	R2	2,160	0.300	0.070	648.00	151.20
Management/Club House Staff	Service Trade	20	0.035	0.070	0.70	1.40

Commercial & G/IC

	Category	UFA (ha)	Unit Demand Freshwater (m^3/ha/d)	Unit Demand Saltwater (m^3/ha/d)	Daily Demand Freshwater (m^3/d)	Daily Demand Saltwater (m^3/d)
Commercial	C/R	8.3	2	0.700	16.64	5.83
Government, Institution/Community	G/IC	5.5	0.2	0.07	1.11	0.39

Total

	Daily Demand Freshwater (m^3/d)	Daily Demand Saltwater (m^3/d)
Total	666.45	158.81

Summary of Water Demands

Scenario	Daily Demand - Freshwater (m^3/d)	Daily Demand - Saltwater (m^3/d)
Existing	528.00	123.20
Future	666.45	158.81
Increase	138.45	35.61
	0.138 (MLD)	0.036 (MLD)

Freshwater Reservoir Capacity

Reservoir	Capacity (x 1,000 m^3)	Supply Capacity @ Capacity Factor = 0.8 (MLD)	Existing Daily Consumption (MLD)	Spare Capacity (MLD)	Remarks
Ho Man Tin East FWSR	152	190	123	**67**	>> 0.138 MLD Additional Demand from Development

Saltwater Pumping Capacity

Pumping Station	Design Pumping Capacity (MLD)	Existing Daily Consumption (MLD)	Spare Capacity (MLD)	Remarks
Tai Wan SWPS	112.74	82	**31**	>> 0.036 mLD Additional Demand from Development

Appendix 9

Qualitative Risk Assessment (QRA) Report

Prepared by

Ramboll Hong Kong Limited

TO KWA WAN ROAD / WING KWONG STREET DEVELOPMENT SCHEME (KC-016)

QUANTITATIVE RISK ASSESSMENT

Date	**March 2021**
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Signed	
Approved by	**Tony Cheng**
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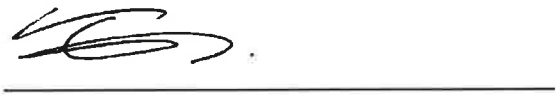
Signed	
Project Reference	**URACBS02EI00**
Document No.	**R7691_v1.2**

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Table of Content

1.0 Introduction 1
1.1 Background 1
1.2 Scope of Work 1
1.3 Hong Kong Planning Standards and Guidelines (HKPSG) 2
1.4 Methodology 2

2.0 Description of LPG Installations 4
2.1 LPG Compound near Lok Man Sun Chuen Block I 4

3.0 The Scheme Data 5
3.1 The Scheme 5
3.2 Study Area 5
3.3 Population Data 5
3.4 Indoor/Outdoor ratio 8
3.5 Source of Ignition 8
3.6 Meteorological Information 9

4.0 Hazard Identification 11
4.1 Properties of LPG 11
4.2 Event Leading to an Accidental LPG Release 11
4.3 Safety Provisions 13
4.4 Outcome of an Accident LPG Release 14
4.5 LPG Release Scenarios Considered 14

5.0 Frequency Assessment 15
5.1 Spontaneous Failure 15
5.2 LPG Road Tanker Unloading Failure 16
5.3 External Event 18
5.4 Failure Frequencies 19
5.5 Event Tree Analysis 23

6.0 Consequence Analysis 24
6.1 Source Term Modelling 24
6.2 Physical Effect Modelling 24
6.3 Hazard Impacts on Offsite Population 25

7.0 Risk Assessment 28
7.1 Results of LPG Compound 28

8.0 Conclusion 30

9.0 References 31

List of Tables

Table 1 Summary of LPG Compound 4
Table 2 Population Data within Study Area in Year 2036 6
Table 3 Temporal Change of Population within a Week 8
Table 4 Day Time Wind Direction Frequency at Kai Tak Automatic Weather Station (Year 2019) 10
Table 5 Night Time Wind Direction Frequency at Kai Tak Automatic Weather Station (Year 2019) 10
Table 6 Representative LPG accidental release scenarios considered 14
Table 7 Failure Rate and Probabilities Adopted 20
Table 8 Failure Frequencies of Scenario Considered for LPG Compound 22
Table 9 Summary of Worst Consequence Distances 26
Table 10 PLL of LPG Compound 28
Table 11 F-N Data 29

List of Figures

Figure 1 Location of the Project Site and Study Area
Figure 2 Societal Risk Guidelines from Hong Kong Planning Standards and Guidelines
Figure 3 Quantitative Risk Assessment Methodology
Figure 4 Population Considered in Base Case
Figure 5 Population Considered in Operation Case
Figure 6 Individual Risk Contours of LPG Compound
Figure 7 Societal Risk Result of LPG Compound

List of Annex

Annex A Details of LPG Installations
Annex B Layout Plan of the Project
Annex C Calculation of Transient Population
Annex D Fault Tree Analysis
Annex E Event Tree Analysis
Annex F Atmospheric Stability Class-Wind Speed Frequencies

1.0 Introduction

1.1 Background

The Urban Renewal Authority (URA) has proposed To Kwa Wan Road / Wing Kwong Street Development Scheme (hereinafter refer as "the Scheme") under section 25 of the Urban Renewal Authority Ordinance (URAO). This Quantitative Risk Assessment (QRA) is to support the submission of a draft Development Scheme Plan (DSP) with its planning proposal to the Town Planning Board (TPB) for consideration.

The Scheme covers an area of about 6,952sq.m., involving 32 residential building blocks. It is broadly bounded by To Kwa Wan Road, Ma Tau Wai Road, Wing Kwong Street, Kai Ming Street, Hung Fook Street, and Ngan Hon Street in To Kwa Wan, as shown in **Figure 1**. The site is currently zoned "Residential (Group A)" ("R(A)") with road and pavement shown as "Road" under the approved Hung Hom Outline Zoning Plan No. S/K9/26.

With the net site area of about 5,548sq.m. (subject to site survey), the proposed total Gross Floor Area ("GFA") is about 55,480sq.m. (Plot Ratio (PR) = 10), of which 41,610sq.m. is for domestic (PR=7.5), 8,322sq.m. for commercial/retail (PR=1.5), and 5,548sq.m. for GIC provision (PR=1) in the Scheme.

The Scheme proposes to rezone the scheme area into "R(A)" in the draft Development Scheme Plan (DSP) for high-density residential development, with commercial uses always permitted on the lowest three floors of a building or in the purpose-designed non-residential portion of a building. The maximum building height for the Scheme area is proposed to be relaxed from 100mPD to 140mPD.

Under current notional design, the Scheme proposes to develop two residential towers, namely T1 on the northern side of the Scheme with 34 residential storeys and T2 on the southern side of the Scheme with 23 residential storeys on top of 5 storeys podia and the Low Block of 4 storeys is located on the eastern side of the Scheme for retail/ commercial uses with an all-weathered communal space underneath. A 2-storey basement ancillary car park will be provided for loading/unloading bays and private car parking spaces. The site is about 160m away from a Liquefied Petroleum Gas (LPG) Compound of Lok Man Sun Chuen (LMSC) that is located near LMSC Block I in the west of the Project. The LPG Compound has a capacity of 3.5 tonnes and are classified as Notifiable Gas Installations (NGIs) under the Gas Safety Ordinance (Cap. 51). A QRA is hence prepared to address the potential risk impact posed by the LPG Compound on the population in the vicinity including the future population after the redevelopment of the Scheme.

1.2 Scope of Work

The scope of this study includes the LPG Compound near Block I of LMSC and is limited by the following criteria:

1. The risks associated with the transport of LPG by road tankers have been restricted to the consideration of their final approach to the LPG storage installation within the LPG Compound;

2. The risk assessment has been limited to those events which have the potential for off-site fatalities.

The objectives are to evaluate the risk levels associated with the LPG Compound to the public, and to determine whether any additional risk mitigation measures are required in the design of the Project.

1.3 Hong Kong Planning Standards and Guidelines (HKPSG)

1.3.1 Hong Kong Risk Guidelines

Chapter 12.4 of the HKPSG [1] stipulates the risk guidelines to determine the acceptability of Potentially Hazardous Installation (PHI) in terms of individual and societal risks. These risk guidelines are also adopted to ascertain whether or not the risk levels posed by the NGI are acceptable.

The individual and societal risk criteria for the risk assessment are described below:

i. Individual Risk: a measure of the frequency at which an individual at a specified distance from the hazardous installations is expected to sustain a specified level of harm from the realization of hazardous incident(s). The maximum level of off-site individual risk causing fatality of a person located 24 hours a day outside the facility of concern should not exceed 1×10^{-5} / year, i.e. 1 in 100,000 per year.

ii. Societal Risk: a measure of the relationship between the frequency of an incident and the number of fatalities that will result. It is typically expressed graphically by an F-N curve showing the cumulative frequency (F) of incidents causing N or more fatalities. The societal risk criteria are presented graphically as in **Figure 2**. There are three regions as described below:

- **Acceptable** where the risk is so low that no action is necessary;
- **Unacceptable** where the risk is so high that they should be reduced regardless of the cost or else the hazardous activity should not be proceeded; and
- **ALARP** where the risk associated with the hazardous activities should be reduced to a level of "As Low As Reasonably Practicable", in which the mitigation measures should be prioritized on the basis of practicality and implementation cost versus the risk reduction achieved.

1.4 Methodology

1.4.1 Overall QRA Approach

A QRA study was conducted in 1996 for the LPG Compound near LMSC Block I (namely "1996 Block I QRA") [2]. A recent QRA study was also conducted in 2017 for the LPG Compound near LMSC Block I as part of Hong Kong Housing Authority's feasibility study on a proposed Subsidised Sale Flats Development at Ko Shan Road (namely "2017 SSF QRA")[3]. Reference has been made to these approved QRA reports.

The general approach to the QRA is represented in **Figure 3**. It follows the Hong Kong Risk Guideline (HKRG) stipulated in Section 4 of Chapter 12 of the HKPSG [1] and the

QRA Methodology for LPG Installations in Hong Kong [4] and the previous approved QRA reports [2][3].

The major phases in QRA include:

i. **Hazard Identification**: Identify hazard scenarios associated with the operation of the LPG Compound, and then determine a set of relevant scenarios to be included in a QRA.

ii. **Frequency Assessment**: Assess the likelihood of occurrence of the identified hazard scenarios.

iii. **Consequence Assessment**: Assess the consequences and impact to the surrounding population.

iv. **Risk Summation and Assessment**: Evaluate the risk level, in terms of individual risk and societal risk. The risks will be compared with the criteria outlined in HKRG to determine their acceptability.

v. **Identification of Mitigation Measures**: Identify and assess practicable and cost-effective risk mitigation measures if necessary. The risks of mitigated cases will then be reassessed to determine the level of risk reduction.

1.4.2 Case to be Considered

The construction of the Scheme is anticipated to be completed in 2032 for population intake and is assumed to be fully occupied in 2036, this study will therefore consider following cases:

- ***Case 1 – Base Case in Year 2036:*** evaluating the risk level in year 2036 without the implementation of the Scheme;
- ***Case 2 – Operation Case in Year 2036***: evaluating the risk level in year 2036 with the operation of the Scheme at full capacity.

2.0 Description of LPG Installations

The LPG Compound, operated by ExxonMobil Hong Kong Limited (Esso), is located near Block I of Lok Man Sun Chuen (LMSC), as indicated in **Figure 1**. The LPG Compound supply LPG as the fuel source in LMSC. As confirmed by Esso, there is no modification to the operation of the LPG Compound since the 1996 Block I QRA study. With reference to the previous reports [2][3], the operation of storage and delivery of LPG at the LPG Compound are summarised in the following sections. Detailed information are included in **Annex A**.

2.1 LPG Compound near Lok Man Sun Chuen Block I

2.1.1 Existing LPG Storage Installation

The LPG Compound is at an elevation of approximately 17.3mPD in the south west of LMSC Block I. As per 1996 Block I QRA [2], the LPG Compound comprises an underground vessel in the east of the site and three explosion proof vaporisers in an enclosed room at the west sides of the site. The underground vessel is of 8.1 kilolitre capacity (equivalent to 3.5 tonnes LPG inventory, taking into account the ullage requirement of not filling more than 80% of the vessel volume) and is stress relieved and 100% radiographed.

2.1.2 LPG Delivery and Transfer

LPG is delivered to the LPG Compound by road tankers with a maximum capacity of the road tanker of about 9 tonnes [3]. Road tankers are assumed to be operated in accordance with the Code of Practice for Hong Kong LPG Industry – Module 3 Handling and Transport of LPG in Bulk by Road [2].

According to 2017 SSF QRA [3], LPG is delivered 4 times per week at maximum, thus 208 annual LPG deliveries are adopted in the study. LPG is dispensed from the tanker into the storage vessel through a flexible hose.

Table 1 Summary of LPG Compound

Parameter	LPG Compound near LMSC Block I
Number of vessels	1
Mounded or Underground	Underground
Design capacity of vessel	8.1 kilolitre
Maximum capacity of vessel	3.5 tonnes
Maximum capacity of LPG road tanker	9 tonne
LPG delivery frequency	208 per year
Duration of unloading operation	10-20 min
Residence time of LPG road tanker	25 min
Number of vaporizers	3

3.0 The Scheme Data

3.1 The Scheme

The proposed development of the Scheme will provide a total of about 900 flats in two residential towers on top of 5 storeys podia which would incorporate GIC/commercial/retail and private clubhouse facilities. In addition, there is another low block (the Low Block) provided with retail/commercial uses and an all-weathered communal space underneath. The Scheme is anticipated to be completed in 2032 for population intake. The preliminary layout of the Scheme is shown in **Annex B**.

3.2 Study Area

The LPG Compound is located in southern corner of LMSC and is about 160m in the west of the Scheme. The study area for the LPG Compound is taken as 200 metres radius from centre of the LPG Compound, as shown in **Figure 1**.

3.3 Population Data

3.3.1 Population in the Vicinity

The population lie within the 200m study areas of the LPG Compound may be impacted by hazardous events arising from the accidental LPG release from the LPG Compound. Population closest to the hazardous installations are most at risk. As the QRA is aimed to assess the off-site risk to life, staff present at the LPG Compound are regarded as voluntary takers of risk and are not considered in this study.

The future population within the study areas is estimated based on information collected from desktop studies and reference to the 2017 SSF QRA[3]. The following information and assumptions are adopted in the estimation:

- 2016 Population By-Census [7] for residential population in LMSC and surrounding street blocks;
- Conservative assumption of zero growth for residential population in Town Planning Unit (TPU) 241 instead of negative growth observed in 2016 Population By-Census [7] and the Projections of Population Distribution 2018 – 2026; and
- Maximum accommodation capacity of school as per Education Bureau's database [9].

The population groups considered in the vicinity of the LPG Compound are illustrated in **Figure 4** and **Figure 5**. The detailed population data is summarised in **Table 2**.

3.3.2 Transient Population

Transient population includes traffic population as well as pedestrians along the road sections. Traffic population can be calculated using the equation below:

$$\text{Traffic Population (ppl)} = \frac{\frac{\text{No. of ppl}}{\text{vehicle}} \times \frac{\text{No. of vehicle}}{\text{hr}}}{\text{Traffic Speed } (^{\text{km}}/_{\text{hr}})} \times \text{Road Section Length (km)}$$

The transient population adopted for this study is summarised in **Table 2** with the detailed calculations provided in **Annex C**.

Table 2 Population Data within Study Area in Year 2036

ID	Population Name	Population Category	Population in Year 2036		Temporal Population Change				Indoor Ratio	Ground Level (+mPD)	Building Height (m)	Remarks
			Base Case	Operation Case	WDD	WDN	WED	WEN				
01	Lok Man Sun Chuen Block I	Residential	1050	1050	25%	100%	70%	100%	95%	14	47	2016 Population By-Census
02	Lok Man Sun Chuen Block H	Residential	1342	1342	25%	100%	70%	100%	95%	14	55	2016 Population By-Census
03	Lok Man Sun Chuen Block A&B	Residential	1257	1257	25%	100%	70%	100%	95%	20	42	2016 Population By-Census
04	Lok Man Sun Chuen Block C&D	Residential	1276	1276	25%	100%	70%	100%	95%	23	44	2016 Population By-Census
05	Residential Buildings (LSBG24123)	Residential	1545	1545	25%	100%	70%	100%	95%	9	35	570 units. Approximated from 2124 people within LSBG24123 as per 2016 Population By-Census
06	Tai Tung Court, Chap On Building, 90-92 Ko Shan Road (LSBG24128)	Residential	91	91	25%	100%	70%	100%	95%	11	22	36 units. Approximated from 1264 people within LSBG24128 as per 2016 Population By-Census
07	Fook Yue Mansion, Loyal Mansion (LSBG24128)	Residential	427	427	25%	100%	70%	100%	95%	8	46	170 units. Approximated from 1264 people within LSBG24128 as per 2016 Population By-Census
08	Kar Shun Building (LSBG24128)	Residential	111	111	25%	100%	70%	100%	95%	8	74	44 units. Approximated from 1264 people within LSBG24128 as per 2016 Population By-Census
09	On Hang Building & Other Residential Buildings (LSBG24128)	Residential	246	246	25%	100%	70%	100%	95%	9	21	98 units. Approximated from 1264 people within LSBG24128 as per 2016 Population By-Census
10	Faerie Court (LSBG24128)	Residential	392	392	25%	100%	70%	100%	95%	12	78	156 units. Approximated from 1264 people within LSBG24128 as per 2016 Population By-Census
11	Hop Shing Commercial Building	Commercial	500	500	100%	10%	20%	0%	95%	11	73	Estimated from floor area
12	Church of Good Shepherd	Kindergarten & Church	326	326	100%	0%	100%	0%	95%	11	10	Church cum Kindergarten. Derived from maximum capacity of classroom. Assume 20 teachers and staffs.
13	Future SSF Development	Residential	1540	1540	25%	100%	70%	100%	95%	12	80	Adopted from QRA for SSF Development at Ko Shan Road, TO Kwa Wan
14	LGBG24132	Residential	1178	1178	25%	100%	70%	100%	95%	15	60	2016 Population By-Census
15	LSGB24303	Residential	1101	1101	25%	100%	70%	100%	95%	17	18	2016 Population By-Census
16	LSBG24301	Residential	1828	1828	25%	100%	70%	100%	95%	9	25	2016 Population By-Census
17	LSBG24401	Residential	2473	2473	25%	100%	70%	100%	95%	7	24	2016 Population By-Census
18	Ko Shan Road Park	Recreational	100	100	40%	10%	100%	10%	0%	9	3	Conservative assumption
19	Ko Shan Theatre	Theatre	1100	1100	20%	10%	100%	10%	95%	20	15	Conservative assumption
20	Ko Shan Theatre (New Wing)	Theatre	1000	1000	20%	10%	100%	10%	95%	30	15	Conservative assumption
21	C.C.C. Wanchai Church Kei To Primary School	School	880	880	100%	0%	10%	0%	90%	17	19	Derived from maximum capacity of classroom. Assume 70 teachers and staffs.

ID	Population Name	Population Category	Population in Year 2036		Temporal Population Change				Indoor Ratio	Ground Level (+mPD)	Building Height (m)	Remarks
			Base Case	Operation Case	WDD	WDN	WED	WEN				
22A	Future URA Development:											
	Residential Buildings	Residential	0	4608	25%	100%	70%	100%	95%	25	115	1491 units. Assume average household size of 2.6 as per the Planning Report plus 15% contingency
	Club House	Club House	0	300	50%	20%	100%	20%	95%	20	5	129 workers estimated in SIA. Assume worker to customer ratio in 1:1. Rounded up to nearest 50.
	Community Facilities	Community	0	60	100%	100%	100%	100%	95%	14	6	17 workers estimated in SIA. Assume worker to visitor ratio in 1:2. Rounded up to nearest 50.
	Retail	Retail	0	700	50%	25%	100%	25%	95%	14	6	348 workers estimated in SIA. Assume worker to customer ratio in 1:1. Rounded up to nearest 50.
22B	Future Public Housing Site:											
	Residential Buildings	Residential	0	2841	25%	100%	70%	100%	95%	27	113	950 units. Assume average household size of 2.6 as per the Planning Report plus 15% contingency
	Community Facilities	Community	0	180	100%	100%	100%	100%	95%	22	5	59 workers estimated in SIA. Assume worker to visitor ratio in 1:2. Rounded up to nearest 10.
	Retail	Retail	0	70	50%	25%	100%	25%	95%	14	8	34 workers estimated in SIA. Assume worker to customer ratio in 1:1. Rounded up to nearest 10.
SC	Proposed Scheme:											Project information:
	Residential Buildings	Residential	0	2484	25%	100%	70%	100%	95%	35	105	900 units. Assume average household size of 2.4 as per the Planning Report plus 15% contingency.
	Club House	Club House	0	150	50%	20%	100%	20%	95%	27	5	GFA of 2080.5 m^2. Assume worker density of 30.3 per m^2 and worker to customer ratio in 1:1. Rounded up to nearest 50.
	Community Facilities	Community	0	550	100%	100%	100%	100%	95%	18	14	GFA of 5548 m^2. Assume worker density of 30.3 per m^2 and worker to visitor ratio in 1:2. Rounded up to nearest 50.
	Retail	Retail	0	600	50%	25%	100%	25%	95%	7	20	GFA of 8322 m^2. Assume worker density of 28.6 per m^2 and worker to customer ratio in 1:1. Rounded up to nearest 50.
R01	Kau Pui Lung Road	Road	101	101	100%	58%	100%	58%	0%	15	1	Refer **Annex C**
R02	Ma Tau Wai Road (NB)	Road	80	80	100%	58%	100%	58%	0%	8	1	Refer **Annex C**
R03	Ma Tau Wai Road (SB)	Road	78	78	100%	58%	100%	58%	0%	8	1	Refer **Annex C**
R04	Ko Shan Road	Road	46	46	100%	58%	100%	58%	0%	11	1	Refer **Annex C**
R05	Anhui Street	Road	6	6	100%	58%	100%	58%	0%	9	1	Refer **Annex C**
R06	Kiang Hsi Street	Road	6	6	100%	58%	100%	58%	0%	9	1	Refer **Annex C**
R07	Shan Si Street	Road	6	6	100%	58%	100%	58%	0%	9	1	Refer **Annex C**
R08	To Kwa Wan Road	Road	94	94	100%	58%	100%	58%	0%	7	1	Refer **Annex C**
R09	East Kowloon Corridor	Road	110	110	100%	58%	100%	58%	0%	18	1	Refer **Annex C**

3.3.3 Temporal Change in Population

To reflect the temporal changes in population within a week, the corresponding population proportion of the time periods are assumed based on observation from site survey and with reference to the 2017 SSF QRA [3] and the approved Environmental Impact Assessment (EIA) report [10].

Day time is defined as 07:00 to 19:00 and night time from 19:00 to 07:00 next day. The temporal changes of different population category are provided in **Table 3**. The detailed temporal changes of population for each population site considered are provided in **Table 2**.

Table 3 Temporal Change of Population within a Week

Category	Time Period			
	Weekday Day (WDD)	Weekday Night (WDN)	Weekend Day (WED)	Weekend Night (WEN)
Club House (1)	50%	20%	100%	20%
Commercial (2)	100%	10%	20%	0%
Community (1)	100%	100%	100%	100%
Kindergarten & Church (2)	100%	0%	100%	0%
Recreational (2)	40%	10%	100%	10%
Residential (2)	25%	100%	70%	100%
Retail (3)	50%	25%	100%	25%
Road (4)	100%	58%	100%	58%
School (2)	100%	0%	10%	0%
Theatre (2)	20%	10%	100%	10%

Note:

(1) Conservative assumption
(2) Reference to 2017 SSF QRA [3]
(3) Reference to South Island Line EIA [10]
*(4) Refer **Annex C***

3.4 Indoor/Outdoor ratio

Building structures can offer some protection from fires for the occupants inside. An indoor ratio of 95% is applied to the population in residential buildings and commercial buildings while the remaining 5% of population is assumed to be outdoor, accounting for outdoor activities and walking pathways. Considering the outdoor activities in school, an indoor ratio of 90% is applied. Passengers in vehicles are also considered as 100% outdoors population although vehicles may provide certain protection.

3.5 Source of Ignition

Flammable gas cloud from an accidental release can be ignited and led to fire or explosion if there are ignition sources present in the close proximity or along the dispersion path

of the cloud. If the gas cloud is diluted outside the flammable concentration range (i.e. below Lower Flammable Limit), or in the absent of ignition sources, no fire hazards will be expected. The energy level, timing, location and ignition effectiveness of ignition sources in the vicinity of the hazardous installations affect the extent of gas cloud dispersion and its potential impacts.

Two types of ignition sources are defined in the PHAST RISK model, including:

- *Population source* which are assigned implicitly to all population groups by SAEFTI to account for human activities such as smoking, cooking and using electrical appliances.

- *Transportation route segments* which are defined for the moving vehicles on roads. The ignition probability of a transportation route segment is calculated form the traffic density, average vehicle speed, vehicle ignition efficiency and total length of the road. The vehicle ignition efficiency for moving vehicles is adopted to be 0.4 per 60 second [11]. Traffic flow and average vehicle speed are included in **Annex C**.

3.6 Meteorological Information

Meteorological conditions affect the consequences of a gas release, in particular wind directions, speeds and stabilities which influence the direction and degree of turbulence of a gas dispersion. Meteorological data from the Kai Tak Automatic Weather Station (Year 2019) was collected from the Hong Kong Observatory and adopted in the consequence modelling to compute the effects of various gas dispersions, fires and explosions. The data are rationalized into a set of weather classes in accordance with the Netherlands Organisation for Applied Scientific Research (TNO) Purple Book [11]. The meteorological data can be expressed in the combinations of wind speeds and Pasquill stability classes. Pasquill classes (A to F) represent the atmospheric turbulence, in which class A being the most turbulent class while class F being the least turbulent class.

The six most dominant sets of wind speed-stability class combination for both day-time and night-time are listed in **Table 4** and **Table 5** respectively. The average ambient temperature adopted in the analysis is 25°C and relative humidity is 80%.

Table 4 Day Time Wind Direction Frequency at Kai Tak Automatic Weather Station (Year 2019)

Direction	Weather Class						Total
	3.5B	2.0D	4.5D	7.0D	3.0E	1.5F	
0 – 30	1.01	0.31	0.38	0.07	0.21	0.99	2.97
30 – 60	1.34	0.35	0.52	0.00	0.45	0.40	3.06
60 – 90	2.26	0.14	0.80	0.17	0.14	0.14	3.65
90 – 120	10.80	0.47	6.86	2.03	0.85	0.31	21.31
120 – 150	16.12	1.25	8.04	0.73	2.05	1.18	29.37
150 – 180	8.25	1.04	1.04	0.00	0.66	1.49	12.47
180 – 210	2.19	0.50	0.14	0.00	0.09	0.21	3.14
210 – 240	2.90	0.42	0.14	0.00	0.09	0.21	3.77
240 – 270	8.98	0.57	1.86	0.07	0.26	0.31	12.05
270 – 300	1.93	0.31	0.50	0.02	0.21	0.28	3.25
300 – 330	1.32	0.31	0.52	0.00	0.26	0.54	2.95
330 – 360	1.11	0.17	0.31	0.00	0.12	0.31	2.00
All	58.23	5.82	21.10	3.09	5.40	6.36	100.00

Table 5 Night Time Wind Direction Frequency at Kai Tak Automatic Weather Station (Year 2019)

Direction	Weather Class						Total
	3.5B	2.0D	4.5D	7.0D	3.0E	1.5F	
0 – 30	0.00	0.00	0.45	0.00	0.71	3.47	4.64
30 – 60	0.00	0.10	0.48	0.00	1.83	2.28	4.69
60 – 90	0.00	0.05	1.45	0.05	0.93	1.05	3.52
90 – 120	0.00	0.07	12.99	1.95	5.57	3.47	24.05
120 – 150	0.00	0.31	9.37	0.57	8.90	9.23	28.38
150 – 180	0.00	0.26	0.29	0.00	2.62	7.30	10.47
180 – 210	0.00	0.07	0.19	0.00	0.95	2.55	3.76
210 – 240	0.00	0.02	0.38	0.00	1.00	2.07	3.47
240 – 270	0.00	0.02	2.71	0.17	1.88	3.78	8.57
270 – 300	0.00	0.00	0.67	0.05	0.40	2.47	3.59
300 – 330	0.00	0.07	0.45	0.00	0.93	1.36	2.81
330 – 360	0.00	0.05	0.29	0.02	0.59	1.09	2.05
All	0.00	1.02	29.72	2.81	26.31	40.14	100.00

4.0 Hazard Identification

4.1 Properties of LPG

LPG supplied in Hong Kong is a pressurized mixture of propane and butane (3:7 in mole ratio). Upon release to the ambient environment, it vaporises and mixes with air, forming a dense flammable gas cloud which tends to flow and disperse closed to the ground. The gas cloud may extend over a long distance until it becomes too diluted or encounters ignition sources.

4.2 Event Leading to an Accidental LPG Release

The main hazard associated with the LPG facilities is an accidental uncontrolled release of LPG resulting in a fire or explosion upon ignition. The initial events leading to an LPG release could be one of the following:

- Spontaneous failure of pressurised LPG equipment due to material / design / construction defect, fatigue, corrosion, erosion, etc.;
- Spontaneous failure of vaporiser;
- Loading failure, i.e. an LPG release occurs as a direct result of the road tanker unloading operation; and
- External events.

4.2.1 LPG Storage Vessel Failure

Failure of the LPG storage vessel includes cold catastrophic failure and partial failure (25mm hole), which may result from:

- Spontaneous failure;
- Loading failure due to overfilling / over-pressurisation of storage vessel; and
- External events, such as earthquake.

Considering the content in vessel varies in time due to consumption and refilling, the vessel is assumed nominally at maximum capacity (i.e. 3.5 tonnes) for 20% of time and at low inventory with 60% of maximum capacity (i.e. 2.1 tonnes) for the rest of the time [5].

4.2.2 LPG Road Tanker Failure

Failure of the LPG road tanker includes cold catastrophic failure and partial failure (25mm hole), which may be resulted from:

- Spontaneous failure; and
- Accidents during unloading caused by collision by another vehicle.

Similar to the case of storage vessel that the content of an LPG road tanker varies with time, road tanker is modelled to have full inventory for 20% of the time and 50% of inventory for the remaining 80% of time.

4.2.3 Pipework Failure

Spontaneous failure of the LPG pipework is possible due to materials defects, corrosion, fatigue and erosion. Most of the LPG pipework is mounted on the concrete floor/structure, which includes the liquid filling pipework for LPG unloading to the LPG storage vessel, the liquid supply line to the vaporisers and the vapour line from the LPG storage vessel to the gas regulators of the gas distribution pipework.

Pipework may fail in an earthquake, and some of the pipework may be subject to failure due to impact of the LPG road tanker.

4.2.4 Flexible Hose and Loading Arm Failure

An accidental release from the flexible hose or loading arm may be caused by:

- Spontaneous failure; and
- Loading failures, including:
    - Misconnection error – an error where the driver / operator fails to properly connect the loading hose / loading arm and the hose / loading arm comes adrift during unloading; and
    - Disconnection error – an error where the driver / operator inadvertently disconnects the hose / loading arm while the valve is still open or has failed open;
    - Road tanker drive-away error – an error where the driver inadvertently drives the LPG road tanker away during unloading;

4.2.5 External Events

An LPG release may occur due to external events and the consequence could be catastrophic failure or leak. The related external events are listed as follows:

- Earthquake;
- Aircraft crash;
- Car crash;
- Landslide;
- Severe environmental events;
- Lightning strike;
- Dropped object;

- Subsidence; and
- External fire.

4.3 Safety Provisions

Various safety provisions are installed in the LPG Compound. These provisions can act in different combinations to prevent or mitigate the hazards due to an accidental LPG release.

4.3.1 Isolation System

The following safety provisions are provided on LPG road tanker and in the LPG Compound to prevent uncontrolled release of LPG:

- **Non-return valve** installed on the liquid inlet pipework can prevent back flow from the LPG storage vessel;
- **Excess flow valves** installed at the LPG road tanker and LPG storage vessel are used to stop the liquid flow when a large release occurs (e.g. guillotine failure of the pipe / hose);
- **Breakaway coupling** is installed to prevent the LPG spillage due to LPG road tanker drive-away while the hose / loading arm is still connected during unloading;
- **Double-check filler valve** is installed at the LPG filling point to prevent the release from the LPG storage vessel. The design of the valve is essentially two non-return valves in series;
- **Pressure relief valves** are installed on the LPG road tanker and LPG storage vessel to protect against excessive pressure build-up due to overfilling or over-heating by fire. The pressure relief valve can prevent the excessive pressure causing leak or catastrophic failure of the LPG road tanker / LPG storage vessel;
- **Manual isolation valves** are installed on the LPG road tanker and pipework for operator / drivers to isolation LPF installations in case of failure or for maintenance operation; and
- **Emergency shutdown (ESD) system** on the LPG road tanker isolates the tanker and stops unloading operation when activated.

4.3.2 Firefight / Fire Protection

The following detection and firefighting systems are implemented in the LPG road tanker and LPG Compound to mitigate the hazards of accidental LPG release:

- **Chartek coating** on the LPG road tanker could give a protection and prevents formation of hot spots for at least 30 minutes in case of jet fire impingement [4].
- **Fire service protection system** includes dry powder fire extinguishers and sand buckets are provided for general firefighting uses. Fire brigade will be available

within a few minutes upon an emergency call in case of fire. BLEVE events could be prevented by effective firefighting measures by the well-trained firefighters.

4.4 Outcome of an Accident LPG Release

The following outcomes may result from an accidental LPG release:

- Jet fire;
- Flash fire;
- Vapour cloud explosion (VCE);
- Fireball; and
- Boiling Liquid Expanding Vapour Explosion (BLEVE).

Potential fire escalation to a BLEVE event is considered if a jet fire impinges on the LPG road tanker over a period of time, causing the formation of hot spots on the LPG road tanker wall and subsequent structural failure. Storage vessel in the LPG Compound is buried underground. Escalation to BLEVE is considered unlikely for the LPG storage vessels.

If there is no ignition source in the LPG vapour cloud or along the migration path of the cloud with the wind, the LPG vapour cloud will dissipate and cause no hazardous impact.

4.5 LPG Release Scenarios Considered

Representative LPG accidental release scenarios considered in this study are summarized in **Table 6.**

Table 6 Representative LPG accidental release scenarios considered

Equipment	Failure Type	Release Type	Potential Hazardous Outcomes
LPG Storage Vessel	Catastrophic failure	Instantaneous	Fireball, flash fire
	Partial failure (leak)	Continuous	Jet fire, flash fire
LPG Road Tanker	Catastrophic failure	Instantaneous	Fireball, flash fire
	Partial failure (leak)	Continuous	Jet fire, flash fire
Vessel Filling Line	Guillotine failure	Continuous	Jet fire, flash fire, BLEVE (1)
Supply Line to Vaporiser	Guillotine failure	Continuous	Jet fire, flash fire, BLEVE (1)
Vaporiser	Guillotine failure (of vaporiser coil)	Continuous	Jet fire, flash fire
Flexible Hose	Guillotine failure	Continuous	Jet fire, flash fire, BLEVE (1)

Note:

(1) BLEVE of LPG road tanker

5.0 Frequency Assessment

A frequency assessment involves analysis of likelihood of LPG containment failure leading to an accidental LPG release and subsequent outcome probabilities. The initiating failure probabilities are estimated from the historical accident statistics, published failure data report, industrial testing results and expert judgment. Base failure frequencies of LPG facilities (vessels, pipework, etc.) are derived from the initiating failure events by applying failure analysis techniques such as fault tree analysis. Occurrences of subsequent hazardous outcomes in an accident are estimated by event tree analysis, taking severity of the release event and surrounding environment into account.

5.1 Spontaneous Failure

5.1.1 LPG storage vessel failure

Storage vessel failure refers to cold catastrophic failure leading to instantaneous release of the inventory or cold partial failure causing a continuous leak. Failure rates of 1.8×10^{-7} per vessel year and 5.0×10^{-6} per vessel year are adopted for cold catastrophic and partial failures respectively [4]. The LPG storage vessel is stress relieved and 100% radiographically examined.

5.1.2 LPG road tanker failure

LPG road tanker can be regarded as a mobile LPG storage vessel. The cold spontaneous failure rate for LPG road tankers is considered to be higher than that for a fixed storage vessel. This is because of the stresses due to vibration during transportation, and cyclic loading associated with filling/unloading of the road tanker. The catastrophic and partial failure probabilities of an LPG road tanker are assumed to be 2.0×10^{-6} and 5.0×10^{-6} per year [4], respectively.

5.1.3 Pipework failure

Failure of LPG pipework can be guillotine failure (full-bore rupture) and partial failure (leak from pipe cracks). The generic guillotine failure rate of LPG pipework is taken as 1.0×10^{-6} per meter per year [4]. Pipework in the LPG Compound are of small diameters which are less than 50mm, leak from pipework is considered insignificant contributors to the overall risk levels. The failure of pipework may result in uncontrolled continuous release of LPG, if and only if, isolation fails, i.e. simultaneous failure of safety equipment (e.g. non-return valve, excess flow valve) and safety actions (e.g. close of manual shut-off valves, activation of ESD system).

5.1.4 Vaporiser failure

LPG from the storage vessel is vaporised in the water-heated coils of the vaporisers. The fluid flowing through the heating coil is of two-phase. Guillotine failure of the coils is conservatively regarded as liquid release. Failure rate of vaporiser is taken as 1.0×10^{-6} per meter per year [4] for the coil failure, giving a failure frequency of 5.0×10^{-6} per year for an average coil length of 5 m.

5.1.5 Flexible hose and loading arm failure

Cold spontaneous failure of flexible hose and loading arm may occur during the road tanker unloading operations. Likelihood of a guillotine failure of flexible hose is taken as

9.0×10^{-8} per hour [4]. Failure rate of loading arm is considered at 10% of that of flexible hose, i.e. 9.0×10^{-9} per hour [4].

5.2 LPG Road Tanker Unloading Failure

5.2.1 Hose misconnection error

A misconnection error may occur if the hose is improperly connected to the filling point, including failure to open manual isolation valves prior to unloading operation. A likelihood of 3.0×10^{-5} per operation [4] is adopted. It is assumed that such error results in hose coming completely apart, leading to a full-bore release.

5.2.2 Hose disconnection error (during tanker unloading)

Hose disconnection error refers to inadvertently disconnecting the filling hose during the unloading operation, which requires a complete disregard of normal operating procedures, as well as the failure to re-tightening the coupling immediately upon loosening it. A gross human error of 2.0×10^{-6} per operation [4] is adopted in this study.

5.2.3 Disconnection with valve open

A release may ensue when the hose is disconnected if isolating valves are left open or fail to close. This event is considered insignificant because it involves failure of a series of safety valves (non-return valve, and double-check filler valve), in additional to failure of the driver and his assistant to close the manual shut-off valve.

5.2.4 Road tanker drive-away error

A drive-away error may occur due to repositioning of the truck during delivery. The outcome of this failure matches that of hose disconnection, i.e. full-bore release. Repositioning during delivery is deemed remote because the road tanker should be parked in a dedicated unloading bay with an implementation of numerous safety measures such as the use of wheel chocks, interlocks on shutters and parking brake. The operators are responsible for monitoring the unloading process during replenishment. Thus, the probability of drive-away error before operation completion is deemed very low and a failure rate of 4.0×10^{-6} per operation [4] is adopted.

5.2.5 Road tanker impact onto LPG facilities

The road tanker may strike the LPG installation during manoeuvring, causing damage to the LPG installation or the road tanker. A likelihood of 1.5×10^{-4} per operation [4] is adopted for this human error.

In view of the slow speed of road tanker during manoeuvring to its unloading bay, a release from the road tanker due to slight impact is considered remote because the road tanker is equipped with side and rear end protection (mechanical barriers & rear protection bumper) for the vessel, fittings, valves and pipework fitted to it.

The probability of damaging the pipework near the loading bay is considered very low in consideration of the low momentum of road tanker manoeuvring in slow speed. The probability of guillotine failure of pipework is assumed as 0.001. Furthermore, pipework close to the unloading bay in the LPG Compound are protected concrete shelf or concrete kerb which further minimise the chance and energy of direct tanker impact on the

pipework. The probability for the concrete shelf / kerb failing to stop the tanker leading to guillotine failure of the pipework is assumed as 0.1. A release of road tanker's LPG content from the damaged pipework could ensue only if the driver neglects his duty to check the pipework integrity and possible leakage before unloading starts.

5.2.6 Road tanker collision during unloading

The LPG road tanker parks in a designated unloading bay inside the LPG Compound, which located at the end of access road / parking area. Given that road tanker must park into the LPG Compound by back-in, the vessel of road tanker is surrounded by fence. The chance of a vehicle having sufficient impact force to damage the fence and the vessel of LPG road tanker inside is deemed remote. Nevertheless, a frequency of 1×10^{-8} per operation for the event of road tanker collided by another vehicle is adopted in accordance to the QRA Methodology for LPG Installations in Hong Kong quoted [4]. Such failure may result to catastrophic rupture a probability of 1×10^{-4} or partial failure at a probability of 1×10^{-3}.

5.2.7 Loading pipework over-pressurisation

In an unloading operation, the operator may make an error that fails to open all valves on the filling line to the storage vessel, which would potentially result in over-pressurization of the loading pipework. This potential scenario is considered under "Misconnection error".

5.2.8 Storage tank overfilling/ over-pressurisation

As usual on-site practice of LPG unloading operation, the vessel should only be filled up to 80% of the total capacity. The filling in progress should be monitored by the operators through the ullage gauge at all time. The possibility of overfilling is deemed low and is taken to be 2.0×10^{-2} per operation [4]. However, even if overfilling occurs, an LPG release due to over-pressurisation will only happen if the following human error or failure of safety provisions take place:

- Operators fail to activate ESD system;
- Failure truck pump over-pressurization protection system; and
- Failure of pressure relief valve on the storage vessel.

The chances of overfilling escalating to catastrophic rupture and partial failure of storage tank are assumed as 0.1 and 0.01, respectively.

5.2.9 Human Error

In case of accidental failure, it is very probable that the onsite staff can rectify the problem before and after any hazard event occurs. Two competent operators are required to be engaged in the unloading process and stayed in close vicinity to the road tanker and the filling point during the unloading. They are suitably trained in unloading operation, first aid, firefighting and emergency response. Nevertheless, they might make errors in a series of operations. The probability is taken as 0.01 for "error in a routine operation where care is required" from "A Guide to Practical Human Reliability Assessment" [12].

Probability of human error becomes much higher under emergency situations when a hazard event occurs. The chance of failure to rectify the problem under extreme stresses is taken to be 0.3 for general rate of errors involving very high stress level [12].

Upon an accidental LPG release during unloading operation, the operators should immediately activate the ESD system on the tanker to terminate the unloading process and close the isolation valves. The human error to start the ESD system under an emergency situation is taken as 0.1 for failure to act correctly at a stressful emergency situation [12].

5.3 External Event

5.3.1 Earthquake

Hong Kong is not located within the seismic belt. According to Hong Kong Observatory, earthquakes occurring in the circum-Pacific seismic belt which passes through Taiwan and Philippines are too far away to affect Hong Kong significantly. Moreover, buildings and infrastructures in Hong Kong are designed to withstand earthquakes up to Modified Mercalli Intensity (MMI) VII. Therefore, it is assumed that MMI VIII is of sufficient intensity to cause damage to specially designed structures. The chance of earthquake occurring at MMI VIII and higher in Hong Kong is very low in comparison with other regions and is estimated to be 1.0×10^{-5} per year [4]. It is assumed that such earthquake may result in vessel leakage and pipework rupture at a probability of 0.01 [13].

5.3.2 Aircraft crash

The LPG Compound is far away from the Hong Kong International Airport with a distance of about 27 km. The frequency of aircraft crash is estimated using the HSE methodology. The frequency of aircraft crash is estimated using the HSE methodology [14] and the estimated number of flights predicted from air traffic statistics between year 2006 and 2019 [15]. The calculated rate of aircraft crash to the LPG Compound is 3.82×10^{-10} per year, which is less than 1.0×10^{-9} per year, and therefore, aircraft crash is not further considered.

5.3.3 Car crash

No entry of unauthorised vehicle is allowed in the LPG Compound. The LPG Compound is fenced from the access road. Only minor car accident might be expected at the site, which is considered to impose negligible threat to the LPG installation. This risk is deemed to be included in the "Road tanker collision during unloading".

5.3.4 Landslide

Landslide may damage the LPG installation. Since there is no slope feature near the LPG store, landslide risk is not further considered.

5.3.5 Severe environmental events

Loss of containment due to severe environmental events such as typhoon or storm surge (large scale tidal wave) is considered unlikely since the LPG vessel is buried underground. The LPG installation is designed safe to withstand the wind load for typhoon. In case of super typhoons observed in recent years, no major loss of containment incident had been reported in the LPG Compound. Moreover, the LPG Compound is fenced by concrete wall,

which prevents trees falling into the Compound to damage the aboveground installations. Therefore, the risk of LPG release due to severe environmental events is deemed unlikely and not further considered in the analysis.

5.3.6 Lightning strike

The frequency of lightning strike on a properly protected building structure is extremely low in Hong Kong. Risk resulting from lightning strike on facilities in the LPG Compound is extremely low as the compound is fitted with lightning rod and surrounded by a number of high-rise buildings. It is deemed lightning strike is remote, therefore not further considered in the analysis.

5.3.7 Dropped object

The LPG Compound is mainly surrounded by Ko Shan Road Park that the chance having dropped object with sufficient weight and velocity to damage the LPG installations is very remote. Windows on LMSC Block I are not facing the LPG Compound and are separated at 10m away from the LPG Compound. The chance of dropped object falling on the installations in the LPG Compound is deemed remote. Therefore, dropped object scenario is not further assessed in the analysis.

5.3.8 Subsidence

Excessive subsidence may lead to failure of the structure and ultimately loss of containment scenario. However, subsidence is usually slow in movement and such movement can be observed and remedial action can be taken in time. Risk from subsidence is therefore deemed remote and not further considered.

5.3.9 External fire

External fire refers to the occurrence of a fire event outside the LPG Compound which may lead to the failure of the LPG facilities. This might occur from minor vehicle accidents on the private access road / outdoor car park, probably involving engine failures (e.g. overheating during hot summer). The resulting fire is usually small, only affecting a few meters around the car, and could be quickly extinguished using fire extinguishers or by the fire brigade. The key facilities inside LPG Compound are further protected by concrete building structures (e.g. the LPG vessel compartment). The risk of escalation of external fire to the LPG facilities is deemed negligible and not further considered.

5.4 Failure Frequencies

Fault Tree Analysis (FTA) was performed based on the initiating events as described above. The analysis derived a number of loss of containment scenarios that will lead to the release of LPG to the atmosphere. The failure rates adopted in the Fault Tree are summarized in **Table 7**. The Fault Trees are listed in **Annex D** and the derived frequencies of loss of containment scenarios are summarized in **Table 8**.

Table 7 Failure Rate and Probabilities Adopted

Item		Failure Rate	Unit	Remark
Spontaneous Failure				
LPG storage vessel failure	Catastrophic	1.8×10^{-7}	per vessel per year	[4]
	Partial	5.0×10^{-6}	per vessel per year	[4]
LPG road tanker failure	Catastrophic	2.0×10^{-6}	per vessel per year	[4]
	Partial	5.0×10^{-6}	per vessel per year	[4]
Pipework failure	Guillotine	1.0×10^{-6}	per metre per year	[4]
Vaporiser failure	Guillotine	1.0×10^{-6}	per metre per year	[4]
Flexible hose failure	Guillotine	9.0×10^{-8}	per hour	[4]
Loading arm failure	Guillotine	9.0×10^{-9}	per hour	[4]
LPG Road Tanker Unloading Failure				
Hose / loading arm misconnection error		3×10^{-5}	per operation	[4]
Hose / loading arm disconnection error		2×10^{-6}	per operation	[4]
Road tanker drive-away		4×10^{-6}	per operation	[4]
Road tanker impact onto LPG installations		1.5×10^{-4}	per operation	[4]
Vehicle impact onto road-tanker		1×10^{-8}	per operation	[4]
Overfilling / over-pressurisation		2×10^{-2}	per operation	[4]
External Event				
Earthquake (above MMI VII)		1×10^{-5}	per year	[4]
Failure of Safety Provision				
Pressure relief valve failure		1×10^{-2}	per demand	[16]
Non-return valve failure		0.013	per demand	[4]
Excess flow valve failure (on vessel)		0.13	per demand	[4]
Excess flow valve failure (on tanker)		0.013	per demand	[4]
Emergency Shutdown (ESD) system fails		1×10^{-4}	per demand	[4]
Tank truck pump overpressure protection system failure		1×10^{-4}	per demand	Assume same as ESD system fails
Breakaway coupling failure		0.013	per demand	[4]
Double-check valve failure		2.6×10^{-3}	per demand	[4]
Human Error				
Fail to close manual valve		0.5	per demand	[4]
Fail to rectify the problem in routine check prior to unloading		0.01	per demand	[12]
Fail to activate ESD system		0.1	per demand	[12]
Fail to rectify the problem (under high stress)		0.3	per demand	[12]

Item		Failure Rate	Unit	Remark
Fire Protection / Fighting System Failure				
Protective fire coating failing to prevent BLEVE		0.1	per demand	[4]
Fire services failing to prevent BLEVE		0.5	per demand	[4]
Failure Probabilities				
Failure of LPG vessel due to overfilling	Catastrophic	0.01		[2][3]
	Partial	0.1		[2][3]
Failure of road tanker due to vehicle impact	Catastrophic	1×10^{-4}		[2][3]
	Partial	1×10^{-3}		[2][3]
Guillotine failure of pipework due to road tanker impact		1×10^{-3}		[3]
Guillotine failure of liquid supply vaporiser coil due to overfilling		0.5		[3]
Guillotine failure of pipework due to earthquake		0.01		[13]

Table 8 Failure Frequencies of Scenario Considered for LPG Compound

Fault Tree	Hazardous Event (Loss of Containment Scenario)		Base Frequency (per year)	Inven-tory Level	Time Fraction	Factored Frequency (per year)	Inven-tory Level	Time Fraction	Factored Frequency (per year)	Event Tree No.
1	Cold Catastrophic Failure of LPG Vessel *(Spontaneous Failure and External Event)*		1.82E-07	100%	0.2	3.60E-08	60%	0.8	1.44E-07	ETA 1
	Cold Catastrophic Failure of LPG Vessel *(Loading Failure)*			100%	1	2.08E-09	60%	0	0	ETA 1
2	Cold Partial Failure of LPG Vessel *(Spontaneous Failure and External Event)*		5.12E-06	100%	0.2	1.02E-06	60%	0.8	4.08E-06	ETA 2
	Cold Partial Failure of LPG Vessel *(Loading Failure)*			100%	1	2.08E-08	60%	0	0	ETA 2
3	Cold Catastrophic Failure of LPG Road Tanker		2.00E-08	100%	0.2	4.00E-09	50%	0.8	1.60E-08	ETA 1
4	Cold Partial Failure of LPG Road Tanker		5.15E-08	100%	0.2	1.03E-08	50%	0.8	4.12E-08	ETA 2
5a	Guillotine Failure of Vessel Filling Line	Release from Vessel	2.69E-07	100%	0.2	5.38E-08	60%	0.8	2.15E-07	ETA 3
5b		Release from Tanker	2.36E-10	100%	0.2	4.72E-11	50%	0.8	1.89E-10	ETA 3
6	Guillotine Failure of Supply Line to Vaporiser		1.13E-06	100%	0.2	2.27E-07	60%	0.8	9.07E-07	ETA 3
7	Failure of Vaporiser *(Spontaneous Failure and External Event)*		1.98E-06	100%	0.2	3.93E-07	60%	0.8	1.57E-06	ETA 5
	Failure of Vaporiser *(Loading Failure)*			100%	1	1.35E-08	60%	0	0	ETA 5
8a	Guillotine Failure of Flexible Hose	Release from Vessel	3.41E-08	100%	0.2	6.81E-09	60%	0.8	2.72E-08	ETA 3
8b		Release from Tanker	1.31E-06	100%	0.2	2.62E-07	50%	0.8	1.05E-06	ETA 3

5.5 Event Tree Analysis

Event tree analysis (ETA) is used to develop the evolution of a failure event from its initial release to the final outcome scenarios, namely, jet fire, flash fire, fireball, etc. It depends on numerous factors such as release type (instantaneous or continuous), ignition sources and probabilities, and degree of congestion. The event tree analysis is outlined in **Annex E**. The event tree adopted for each loss of containment scenario is indicated in **Table 8**.

SAFETI's built-in event trees are used to calculate the frequencies of hazardous outcome scenarios.

5.5.1 Catastrophic Failure of LPG Storage Vessel / Road Tanker

Large releases are assumed to have a probability of 0.9 for immediate ignition [4]. The immediate ignition of instantaneous LPG release from LPG storage vessel / road tanker will result in a fireball as the content will be instantly released to the ambient. In case of underground vessel in LPG Compound, the instantaneous release mass from underground is expected to have little effect and is taken as twice the flash fraction.

A delayed ignition may produce a flash fire or vapour cloud explosion (VCE). A past analysis determined that the maximum overpressure obtained from VCE arising from LPG installations on public housing estates in Hong Kong would be too low to contribute significant structural damage to buildings [4]. Hence a delayed ignition is assumed to be resulted in flash fire only.

5.5.2 Partial Failure of LPG Storage Vessel / Road Tanker

A lower probability of 0.05 is adopted for immediate ignition of partial failure (leak) of LPG storage vessel and road tankers [4]. Immediate ignition of a continuous pressurized release results in a jet fire. Delayed ignition of small release is assumed at a probability of 20%, resulting in a flash fire [4].

5.5.3 Failure of Pipework / Vaporiser / Hose / Loading Arm

The probabilities of immediate ignition and delayed ignition of guillotine failure of pipework, vaporiser, hose and loading arm taken as same as that of partial failure of LPG storage vessel and road tanker.

A jet flame from guillotine failure of aboveground installations may impinge on road tanker leading to BLEVE of tanker over a period of time. The probability of flame impingement from outdoor pipework, hose and loading arm is assumed as 0.01. As the vaporisers are in an enclosed room, the chance of flame impingement from vaporiser to tanker in the adjacent unloading bay is reduced and is assumed as 0.0001.

LPG road tankers are protected by a layer of Chartek coating preventing the formation of hot spots. Credit is given to the passive Chartek coating protection and fire-fighting services in the LPG Compound. The probability of coating failure is assigned as 0.1 [4]. Fire services system is assumed to have a chance of 0.5 [4] being ineffective in preventing a BLEVE.

6.0 Consequence Analysis

The consequence assessment estimates impact of each outcome in the area of concern. The consequence assessment consists of two major parts, namely:

- Source term modelling – to determine the appropriate discharge models to be used for calculation of the release rate, duration and quantity of the release; and
- Physical effect modelling – to determine the gas dispersion, fire and explosion effects zone based on the output of source term modelling.

6.1 Source Term Modelling

LPG is modelled as a mixture of 30% propane and 70% butane. LPG stored in a tank is pressurised to medium pressure to reach an equilibrium state between the liquid and vapour phases, depending on the ambient temperature.

Instantaneous release of the inventory is assumed for the cases of catastrophic failure. Partial failure or full bore rupture of pipework will lead to a continuous release, in which, discharge rate is calculated by SAFETI based on the leak size, release temperature, release pressure, and fluid phase. Duration of continuous discharge is determined by discharge rate and total inventory.

6.2 Physical Effect Modelling

6.2.1 Gas Dispersion

LPG vaporises rapidly and forms a vapour cloud upon release. Fire scenarios of different kinds may be developed in the presence of ignition sources in the proximity of an LPG release. If no ignition source exists, the vapour cloud will disperse downwind and will then be diluted to a concentration below its LFL. In this case, the vapour cloud will become too lean to be ignited and will have no harmful effect.

The dispersion characteristics of the vapour cloud are influenced by meteorological conditions and material properties, such as density. The built-in UDM model in DNV SAFETI is used for modelling the dispersion of unignited vapour cloud following an LPG release. The model takes into account various transition phases, from dense cloud dispersion to buoyant passive gas dispersion, in both instantaneous and continuous releases.

6.2.2 Jet Fire

When flammable fluid stored under pressure releases from an orifice, it will lead to a flame jet (i.e. jet fire) if it is ignited immediately. The flame length is determined from the momentum of the release. If a jet fire impinges on another pressurised LPG storage container, thermal intrusion and heat radiation could boil liquid and induce over-pressurisation and subsequent rupture of the container, causing a BLEVE.

6.2.3 Fireball and BLEVE

Immediate ignition of an instantaneous release of massive inventory inside a pressurised vessel will result in a fireball. A fireball is characterised by its high thermal radiation intensity and short duration time. The principal hazard of fireball arises from thermal

radiation, which is not significantly influenced by weather, wind direction or source of ignition.

A BLEVE occurs as fire escalation event upon integrity failure from fire impingement. It has similar characteristics to a fireball and its physical effects are calculated as a fireball.

6.2.4 Flash Fire

An LPG release, if not ignited immediately, would vaporise and form a vapour cloud around the release source. This cloud would move in the downwind direction, entraining air as it disperses and get diluted. If it gets ignited before it is diluted to below its LFL, a flash fire would result. Major hazards from flash fire are thermal radiation and direct flame contact. Since the flash combustion of a gas cloud normally lasts for a short duration, thermal radiation effect on people near a flash fire is limited.

6.2.5 Thermal Radiation

The major hazard of a jet fire, pool fire or fireball is the flame and the thermal radiation. Persons caught in the flame zone are considered be fatally injured. Persons outside the flame zone are determined by lethal probability using the following Probit equation [11]:

$$Pr = -36.38 + 2.56 \ln Q^{4/3t}$$

where Q is the thermal radiation intensity in W/m^2 and t is the exposure time in seconds.

6.2.6 Vapour Cloud Explosion

If the vapour cloud passes through a congested area (e.g. cluster of pipe racks, a confined space) and be ignited, the confinement will limit the expansion of the burning cloud, causing an explosion and damage to the surroundings by the resulting overpressure. In PHAST RISK, the hazardous effects are modelled by two concentric circular areas corresponding to heavy and light building damage, respectively. Fatality rates for persons outdoors and indoors are determined from the TNO Purple Book [11].

6.3 Hazard Impacts on Offsite Population

6.3.1 Worst Consequence Distance

Population in the vicinity of the LPG Compound can be potentially affected by the hazardous events depending on the consequence distances. The affected distances of different hazardous events are simulated in PHAST RISK and the worst impact distances are summarised in **Table 9**.

Table 9 Summary of Worst Consequence Distances

Hazardous Event	Failure Scenario	Characteristics	Distance (m)
Fireball	Cold Catastrophic Failure of LPG Vessel	Fireball radius Lift off height	36.8 73.7
BLEVE	BLEVE of LPG Road Tanker	Fireball radius Lift off height	58.2 116.3
Jet fire	Guillotine Failure off Supply Line to Vaporiser	Flame length Thermal Radiation at 12.5kW/m^2 (1)	25.9 38.4
Flash fire	Cold Catastrophic Failure of LPG Road Tanker	Flash fire envelop at 100% LFL	281
	Cold Catastrophic Failure of LPG Vessel	Flash fire envelop at 100% LFL	139

Note:

(1) A level of 12.5 kW/m^2 is selected for reporting purpose. According to DNV/Statoil 2001, exposure to 12.5 kW/m^2 radiation for 20 seconds corresponds to 1% fatality.

The worst consequence of flammable vapour cloud resulting from an instantaneous rupture of an LPG road tanker may drift downwind up to 281 m at high wind speeds though the vapour cloud is very likely to be ignited during its migration across ignition sources such as moving vehicles and various human activities. The LPG vapour cloud can reach up to 40m high in close proximity to the LPG Compound and gradually decrease when the vapour cloud drift downwind.

6.3.2 Indoor Protection Factor

Buildings are assumed to offer protection to occupants against fire and allow reduction in duration of exposure due to escape action of individual. In an event of flash fire, humans who are outdoor encompassed by the flash fire would be fatally injured. A fatality rate of unity is assumed for outdoor population, and 90% protection factor is assumed for indoor occupants [4]. In case of fireball event, a protection factor of 50% is assumed for indoor population within fireball radius [4].

6.3.3 Shielding Factor

Shielding factors are assumed to account for protection by the front part of the building or by other buildings from fireball effects [4]. A shielding factor of 0.5 is assigned to those buildings wholly within the fireball diameter and partly inside the fireball diameter, i.e. 117 m of the LPG Compound. Buildings that are outside the fireball or are not in the direct line of sight of the LPG Compound are considered being protected by the buildings in the front.

6.3.4 Height Protection Factor

Population above the cloud height is not exposed to flash fire events. In another term, these population are "protected". The height protection factors to the "protected" population are corresponding to the proportion of building above the top of the cloud [4].

Since the LPG Compound are on gentle slopes, the height difference between the LPG Compound and the offsite population is considered in the height protection factor.

The height protection factor is used as a discount factor to the population of the area to address those who are not affected by the flashfire. It also applies to the jet fire scenario since the flame length of the jet fire is similar and does not exceed the cloud height of flash fire.

7.0 Risk Assessment

Risk summation combines the likelihood and consequence of hazardous event, as well as meteorological data and population in the hazard effect zones, to give a numerical measure of risks around the Station. The risk analysis is conducted by the simulation software – DNV PHAST SAFETI v7.2 developed by DNV and the outcome results are presented in terms of IR contours and SR (as F-N curves or Potential Loss of Life (PLL)). The risk outcomes are compared to the criteria set out in the risk guidelines, as specified in **Section 1.3.1**.

7.1 Results of LPG Compound

7.1.1 Individual Risk Result

The individual risk contours of the LPG Compound are presented **Figure 6**. The offsite individual risk is less than 1×10^{-5} per year and satisfies with the criterion stipulated in the HKRG. The individual risk level decreases as the distance increases from LPG Compound and is less than 1×10^{-9} per year at the Project site.

7.1.2 Societal Risk Result

The societal risk results of the LPG Compound are presented in the form of F-N curve in **Figure 7** with detailed data presented in **Table 11**. The societal risk levels of the LPG Compound of both base case and operation case fall within the acceptable criteria of the HKRG.

The F-N curves of both cases overlap with each other. This implies that the population brought by the Project cause negligible changes to the overall risk level of the LPG Compound.

The Potential Loss of Life (PLL) values of the LPG Compound for both cases are presented in **Table 10**. With the additional population of the Project, the PLL value has no change and is 1.31×10^{-5} no. of fatality per year. The major risk contributing event at the Project is flashfire arising from LPG Vessel and LPG Road Tanker.

Table 10 PLL of LPG Compound

Equipment	Base Case		Operation Case	
	PLL (no. of fatality per year)	% of total PLL	PLL (no. of fatality per year)	% of total PLL
LPG Vessel	9.35E-06	71.6%	9.35E-06	71.6%
LPG Road Tanker	2.08E-06	16.0%	2.08E-06	16.0%
Pipework, Vaporiser, Hose	1.62E-06	12.4%	1.62E-06	12.4%
Total	**1.31E-05**	**100%**	**1.31E-05**	**100%**

Table 11 F-N Data

No. of fatality	Frequency (/year)	
	Case 1 – Base Case in 2036	Case 2 – Operation Case in 2036
1	3.80E-07	3.80E-07
2	3.03E-07	3.03E-07
3	2.83E-07	2.84E-07
4	2.71E-07	2.71E-07
5	2.62E-07	2.62E-07
6	2.53E-07	2.53E-07
8	2.43E-07	2.44E-07
10	2.34E-07	2.34E-07
12	2.29E-07	2.29E-07
15	2.24E-07	2.24E-07
20	2.11E-07	2.11E-07
25	1.61E-07	1.61E-07
30	1.43E-07	1.43E-07
40	1.38E-07	1.38E-07
50	1.30E-07	1.30E-07
60	1.09E-07	1.09E-07
80	4.14E-08	4.14E-08
90	1.82E-08	1.82E-08
100	1.59E-08	1.59E-08
120	7.97E-09	7.97E-09
150	2.67E-09	2.67E-09
200	1.93E-09	1.93E-09
250	9.95E-10	9.95E-10
300	6.69E-10	6.68E-10
400	1.65E-10	1.65E-10
500	8.68E-12	8.52E-12
600	1.41E-12	1.36E-12
800	2.20E-14	2.19E-14

8.0 Conclusion

This QRA has studied the risk impact of the LPG Compound at LMSC to the Scheme and the surrounding population in future years when the Project is completed for population intake.

The results of the study have shown that the individual risk of the LPG Compound is in compliance with the HKRG. The individual risk level at the Project is less than 1×10^{-9} per year for risk posed by the LPG Compound near LMSC Block I in the west.

With the development of the Scheme, the societal risk of the LPG Compound is acceptable, no mitigation measure is required in the Site.

9.0 References

[1] *The Hong Kong Planning Standards and Guidelines*, Planning Department, Hong Kong, 2018

[2] Approved QRA Report – *Quantitative Risk Assessment of 3 LPG Installations: Lok Man Sun Chuen (Block I)*, Housing Society / EMSD, 1996

[3] Approved QRA Report – *Quantitative Risk Assessment for Subsidised Sale Flats (SSF) Development at Ko Shan Road, To Kwa Wan*, Hong Kong Housing Authority, 2017

[4] *Quantitative Risk Assessment Methodology for LPG Installations*, Dr. Alan B. Reeves, Francis C. Minah, Vincent H.K. Chow, Conference on Risk & Safety Management in the Gas Industry, EMSD & HKIE, Hong Kong, 1996

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[13] *Risk of Hazardous Materials Release Following an Earthquake*, Kathleen J. Tierney, Preliminary Paper #152, University of Delaware, Disaster Research Centre, 1990

[14] *The Calculation of Aircraft Crash Risk in the UK*, Health and Safety Executive, United Kingdom, 1997

[15] *Air Traffic Statistics:* https://www.cad.gov.hk/english/statistics.html, The Civil Aviation Department, last accessed 16/07/20

[16] *Loss Prevention in the Process Industries*, Butterworth-Heinemann, United Kingdom, F. Lees, 2005.

Figures

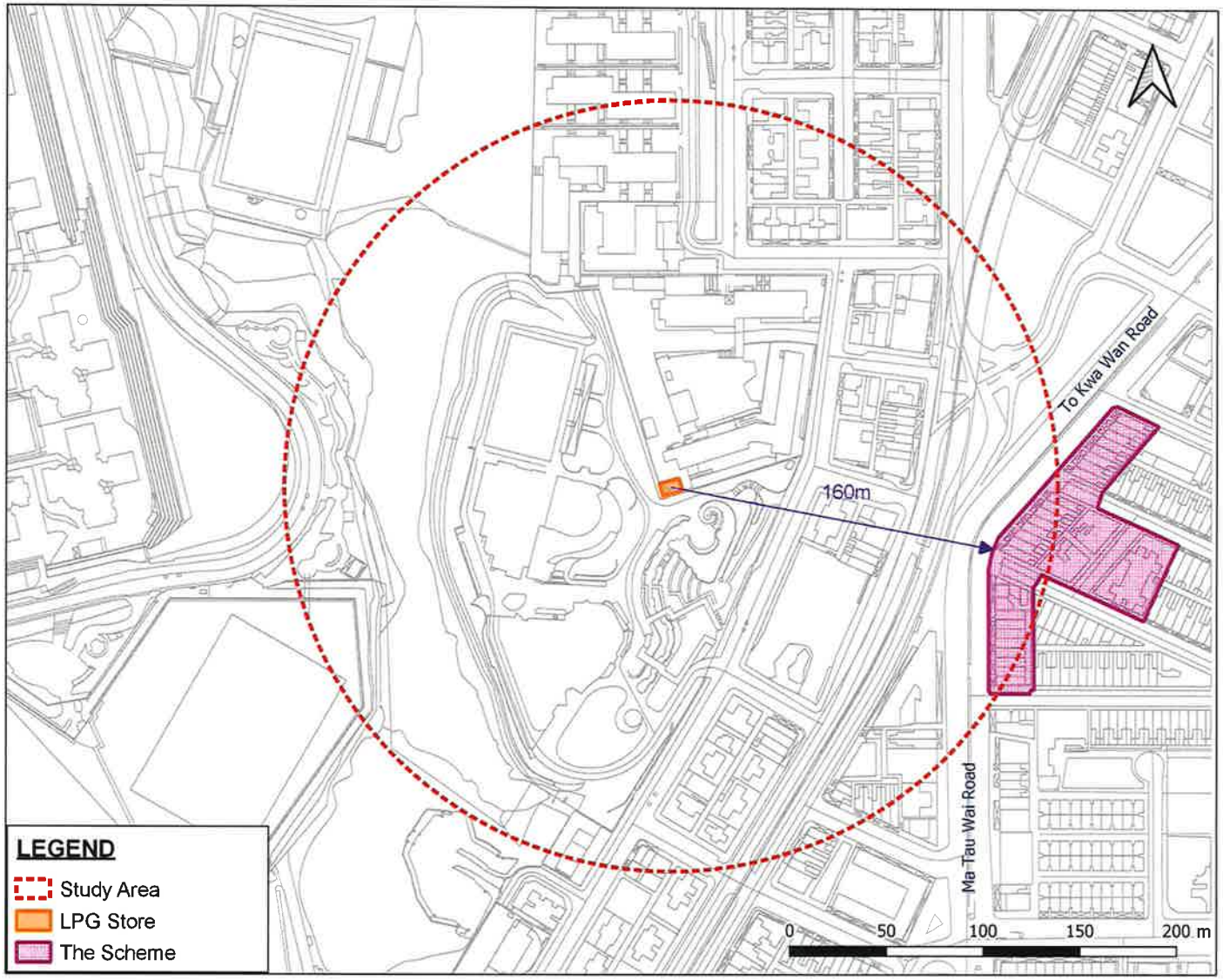


Figure 1 **Location of the Project Site and Study Area**

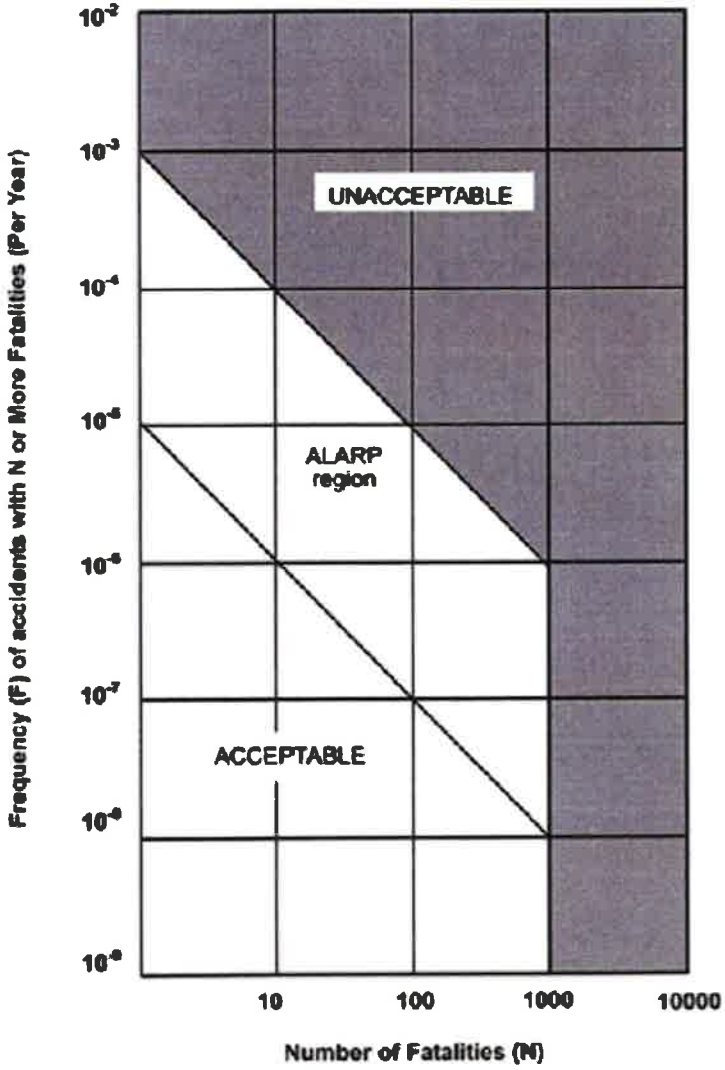


Figure 2 **Societal Risk Guidelines from Hong Kong Planning Standards and Guidelines**

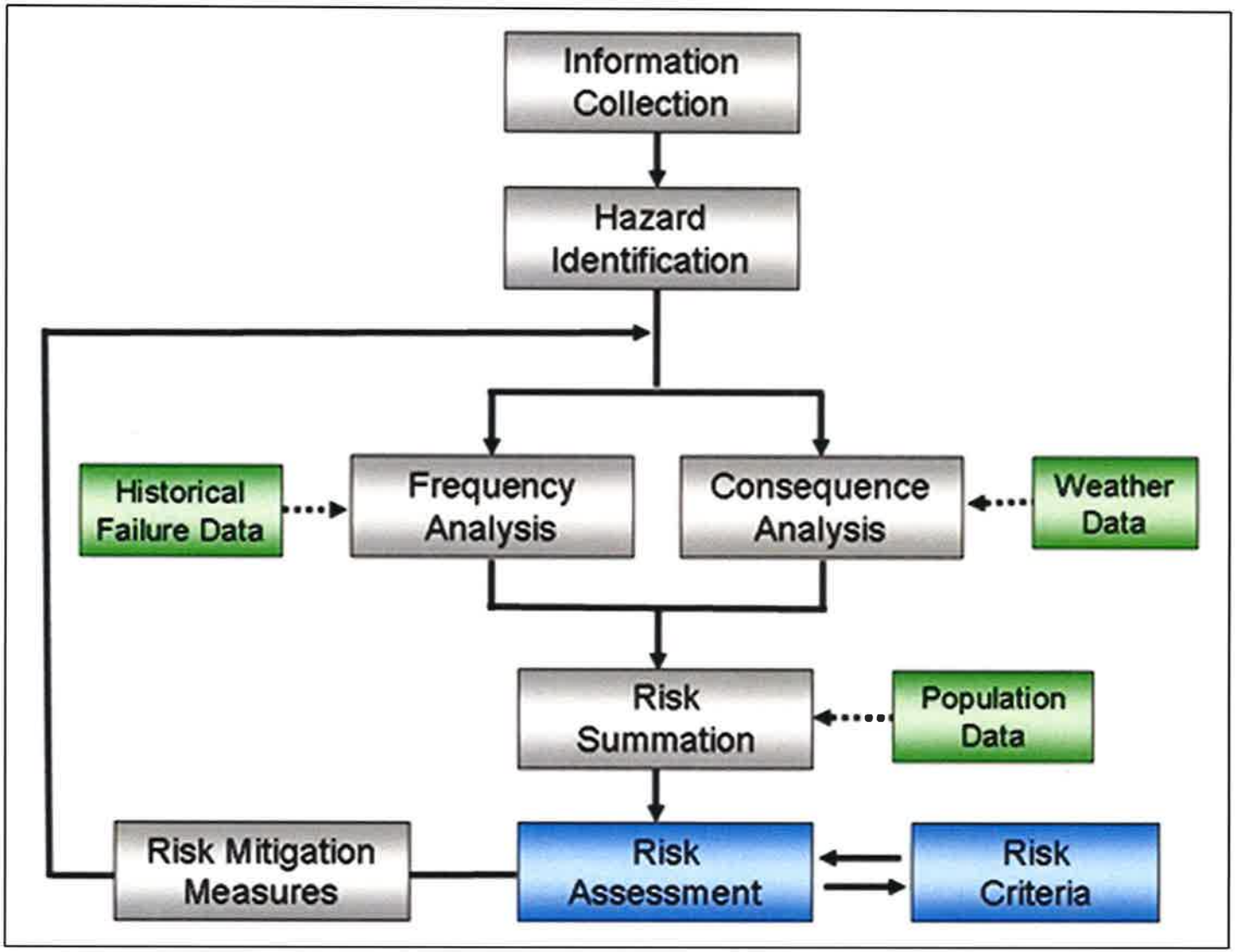


Figure 3 **Quantitative Risk Assessment Methodology**

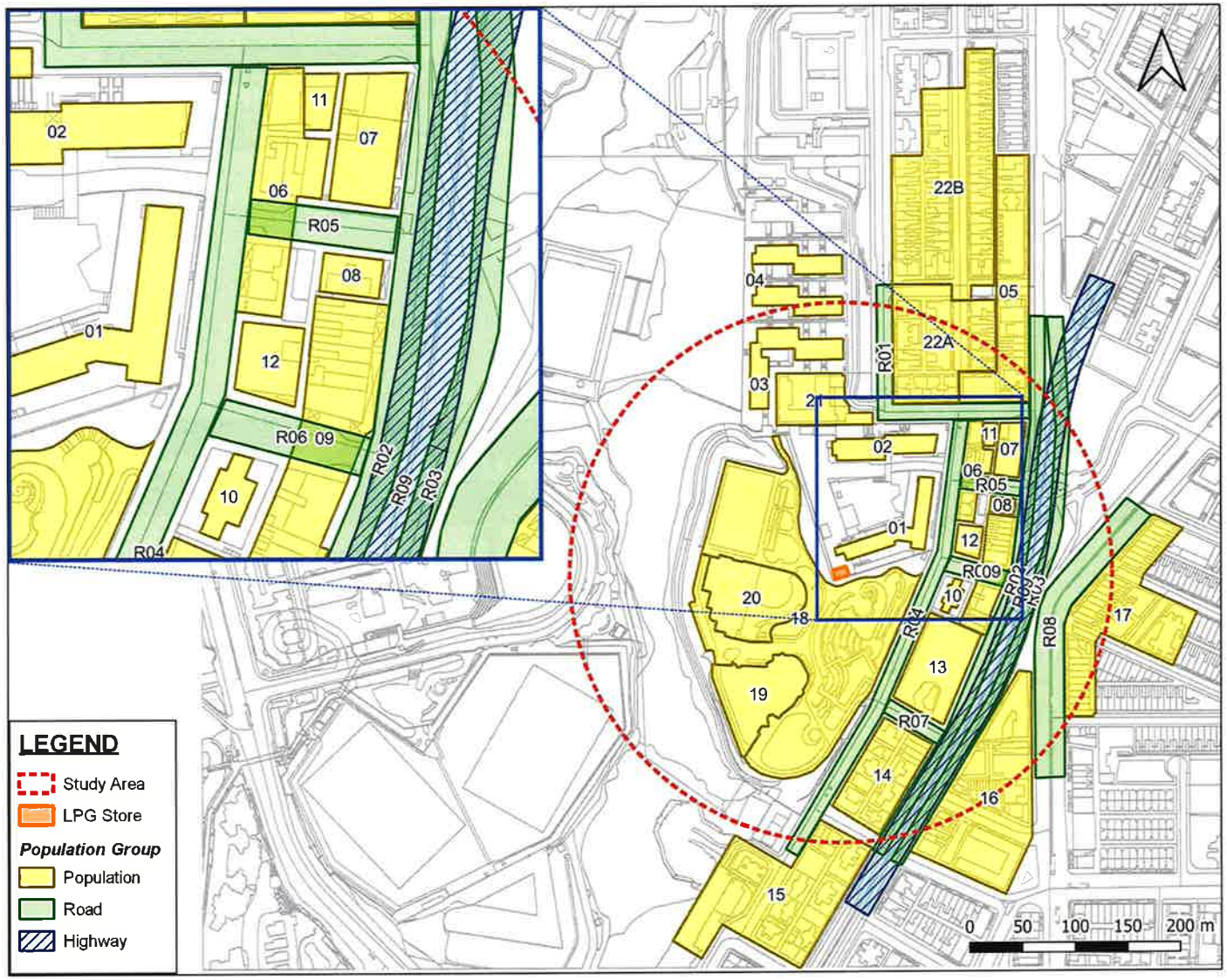


Figure 4 **Population Considered in Base Case**

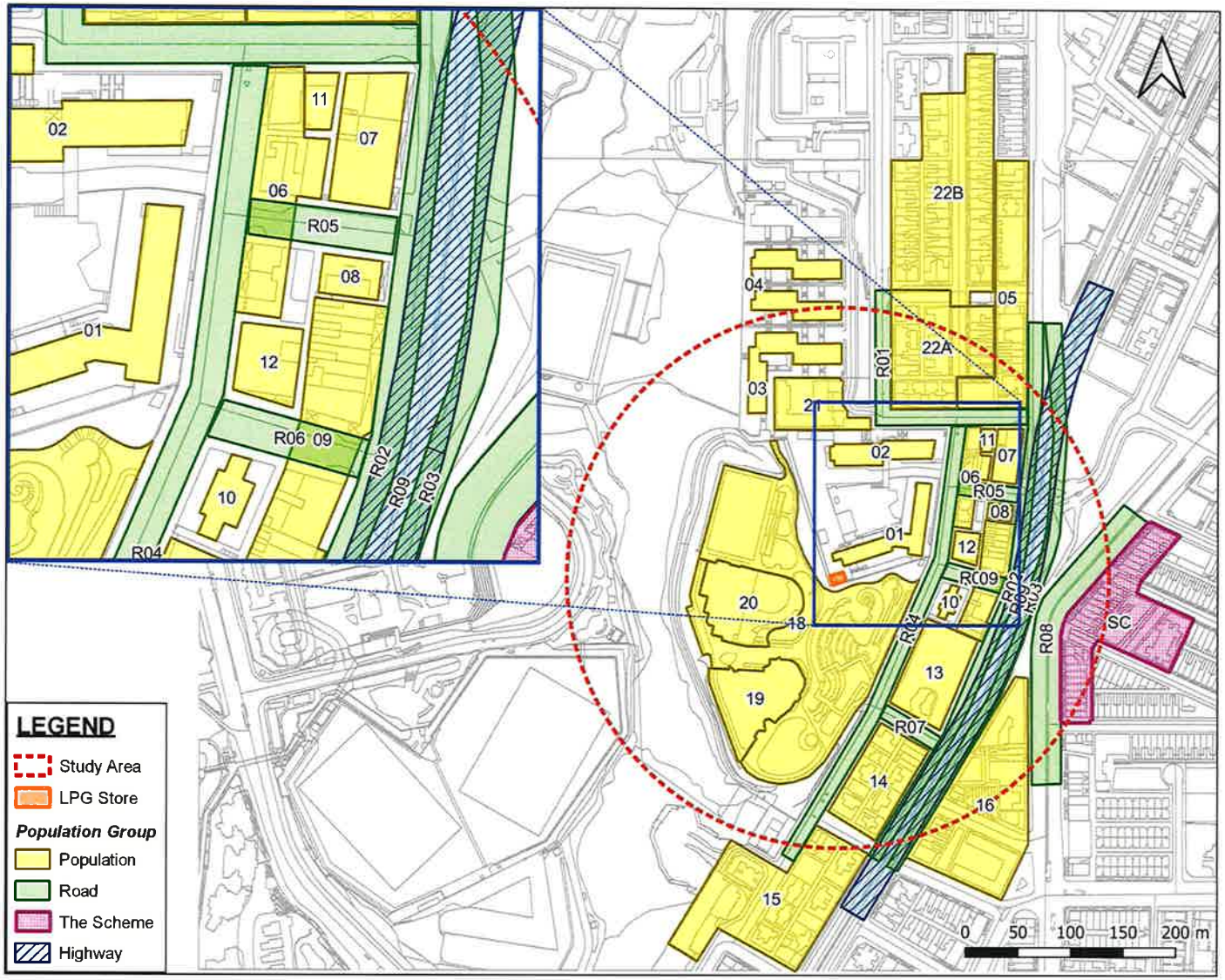


Figure 5 **Population Considered in Operation Case**

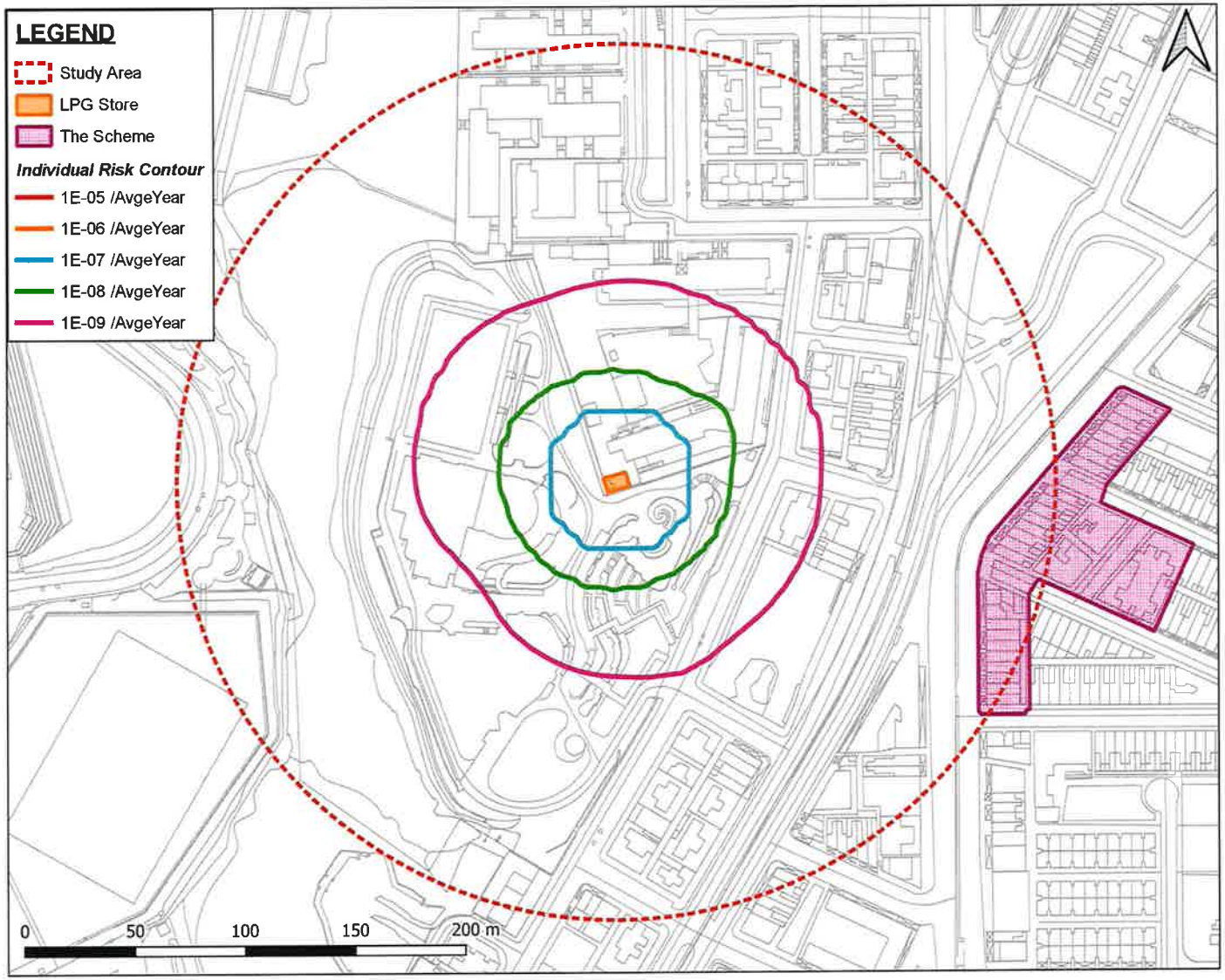


Figure 6 **Individual Risk Contours of LPG Compound**

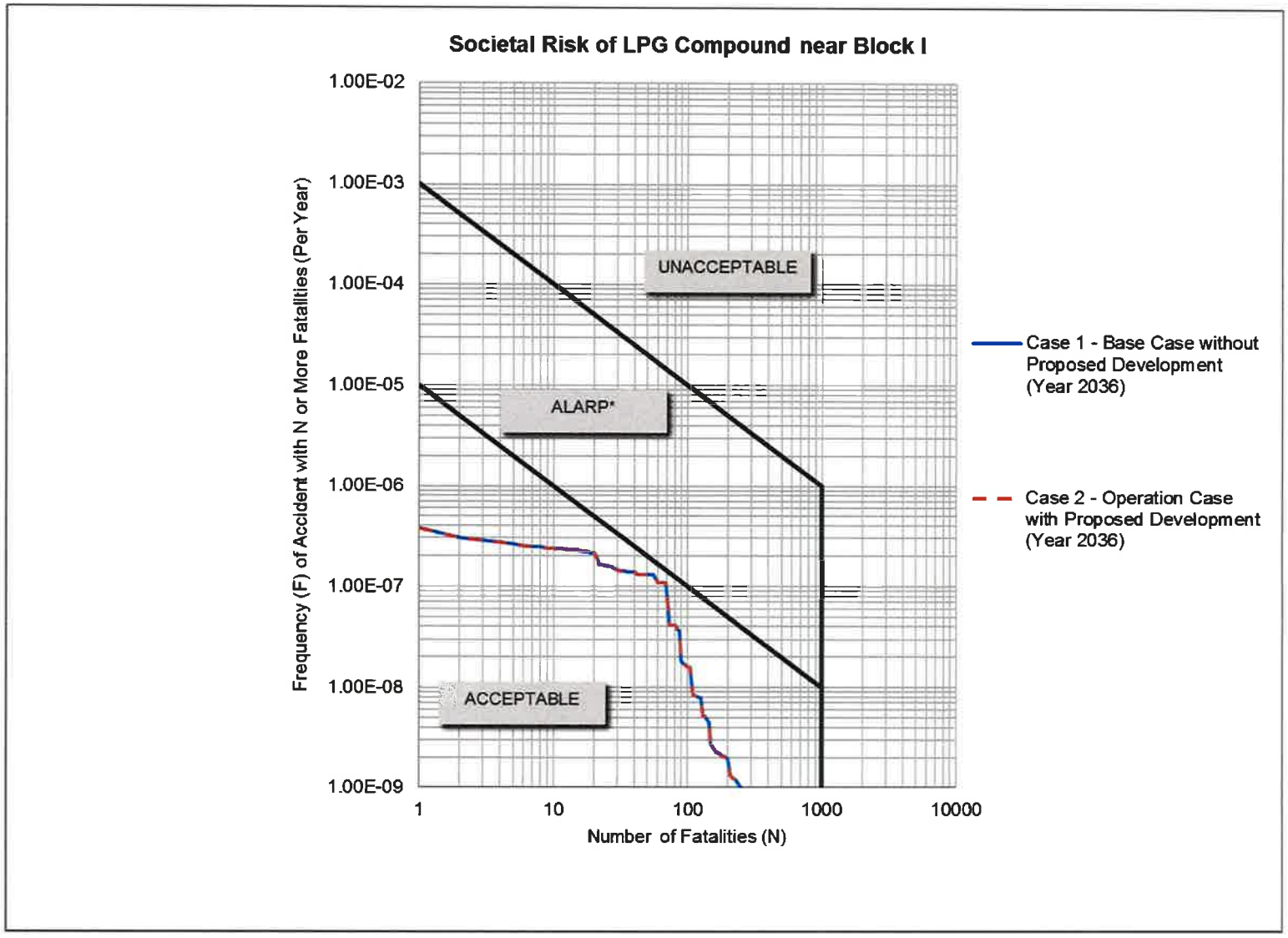


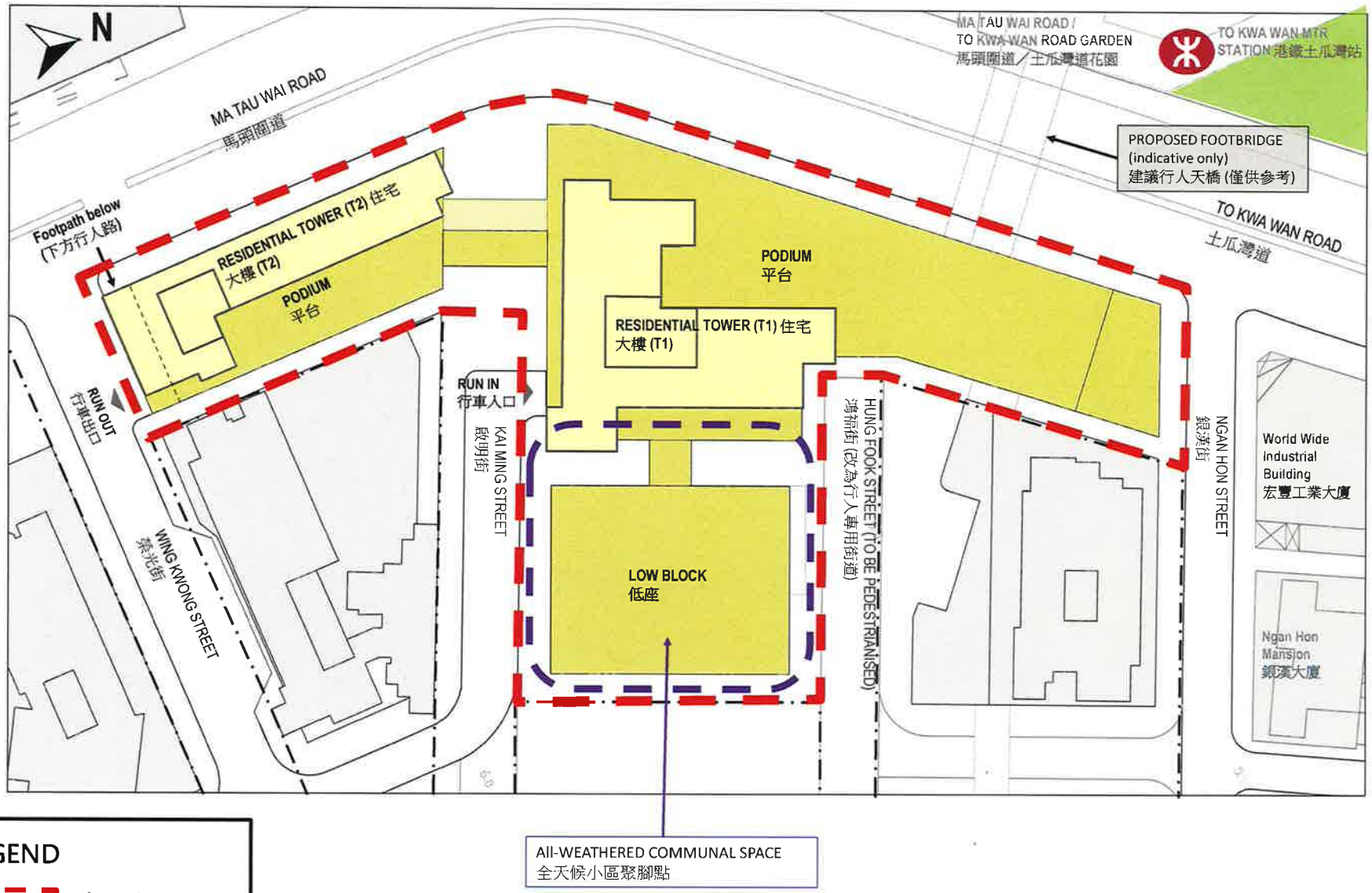
Figure 7 **Societal Risk Result of LPG Compound**

Annex A:
Details of LPG Installations

A1. Information of LPG Compound at Block I

Description	Value	Units
Vessel		
Number of Vessels	1	
Size of Vessel	3.50	te
Radiography Vessel	100	%
Stress Relief Vessel	100	%
Mounded or Below Ground? (M/B)	B	
Safety Devices	Relief valve	
Road Tanker		
Average size of road tankers	19	kL
Delivery Frequency	208	per year
Time required for unloading	10 – 20	min
Road Tanker Resident Time	25	min
Pumping rate	160	L/min
Safety Devices	Manual Isolation, ESD, EFV /Relief valve	
Filling Line to Vessel		
Line Length (from flexible hose to vessel)	5	m
Line Diameter	25	mm
Safety Devices	Double check valve, Relief valve, Pull away coupling, Manual Isolation	
Supply Line to Vaporiser		
Line Length	5.5	m
Line Diameter	40	mm
Safety Devices	Manual Isolation, ESD, EFV	
Vaporiser		
Number of Vaporisers	3	
Size of Vaporiser	200	Kg/h
Coil Length	5	m
Coil Diameter	25	mm
Flexible Hose		
Hose length	45.7	m
Hose Diameter	25	mm

Annex B:
Layout Plan of the Project



LEGEND

The Scheme Area

(Remarks: For indicative purpose only. KC-016 Notional layout subject to detailed design upon DSP approval.)

URA To Kwa Wan Road / Wing Kwong Street Development Scheme (KC-016)	Notional Design – Block Plan	Annex B	Not drawn to scale Mar 2021

Annex C:
Calculation of Transient Population

C1. Estimation of Average Occupancy per Vehicle

The average occupancies of vehicles on roads concerned are estimated from statistics of nearby traffic stations in Annual Traffic Census 2018.

Station No.	3014		4212		4212 (no DD Fr. Bus)		4213	
Vehicle Type	Pro	Ocp	Pro	Ocp	Pro	Ocp	Pro	Ocp
Motor Cycle	2.7	1.0	3.9	1.1	3.9	1.1	4	1.1
Private Car	27.3	1.4	32.3	1.4	32.3	1.4	40.7	1.3
Taxi	25	1.7	22.6	1.9	22.6	1.9	26.6	2.1
Private Light Bus	1.3	1.4	1	4.3	1	4.3	1.1	2.9
Public Light Bus	8.7	8.5	5.7	9.1	5.7	9.1	0.3	7.6
Light Goods Vehicle	15.6	1.5	16.3	1.5	16.3	1.5	17	1.3
M&H Goods Vehicle	2.4	1.5	1.4	1.5	1.4	1.5	4.9	1.2
Non Fr. Bus	2.1	9.6	4.9	18.1	4.9	18.1	2.8	14.0
SD Fr. Bus	0.1	1.0	0.1	1.0	0.1	1.0	0.1	1.0
DD Fr. Bus	14.8	19.0	11.9	31.7			2.6	30.6
Average Occupancy	4.9		6.4		3.0		2.7	

Note:

(1) *Average occupancy* $= \sum(Probability_i \times Occupancy_i)/\sum Probability_i$

C2. Forecasted Traffic Flow from TNIA of the Project

The traffic forecast for TNIA of the Project is adopted as follows:

ID	Road	Index No.	Morning Peak Hour Traffic (veh/hr)	Evening Peak Hour Traffic (veh/hr)
R01	Kau Pui Lung Road	23 & 24	575	570
R02	Ma Tau Wai Road (NB)	15	1365	1330
R03	Ma Tau Wai Road (SB)	16	1285	1170
R04	Ko Shan Road	3 & 4	735	670
R05	Anhui Street	18	15	40
R06	Kiang Hsi Street	17	20	20
R07	Shan Si Street	8	225	160
R08	To Kwa Wan Road	40 & 41	2020	1695
R09	East Kowloon Corridor	21 & 22	5785	5740

C3. Traffic Variation within the Day

The traffic flow variation on all roads within study area is assumed to be same as that on Chatham Road and Ma Tau Wai Road (from San Lau Street to Chi Kiang Street).

Station No.	Road	Ratio of Day-time and Night-time Traffic Flow		Ratio to WDD Traffic Flow	
		Day	Night	Day	Night
4212	Chatham Road and Ma Tau Wai Road (from San Lau Street to Chi Kiang Street)	63%	37%	100%	58%

C4. Calculation of Transient Population

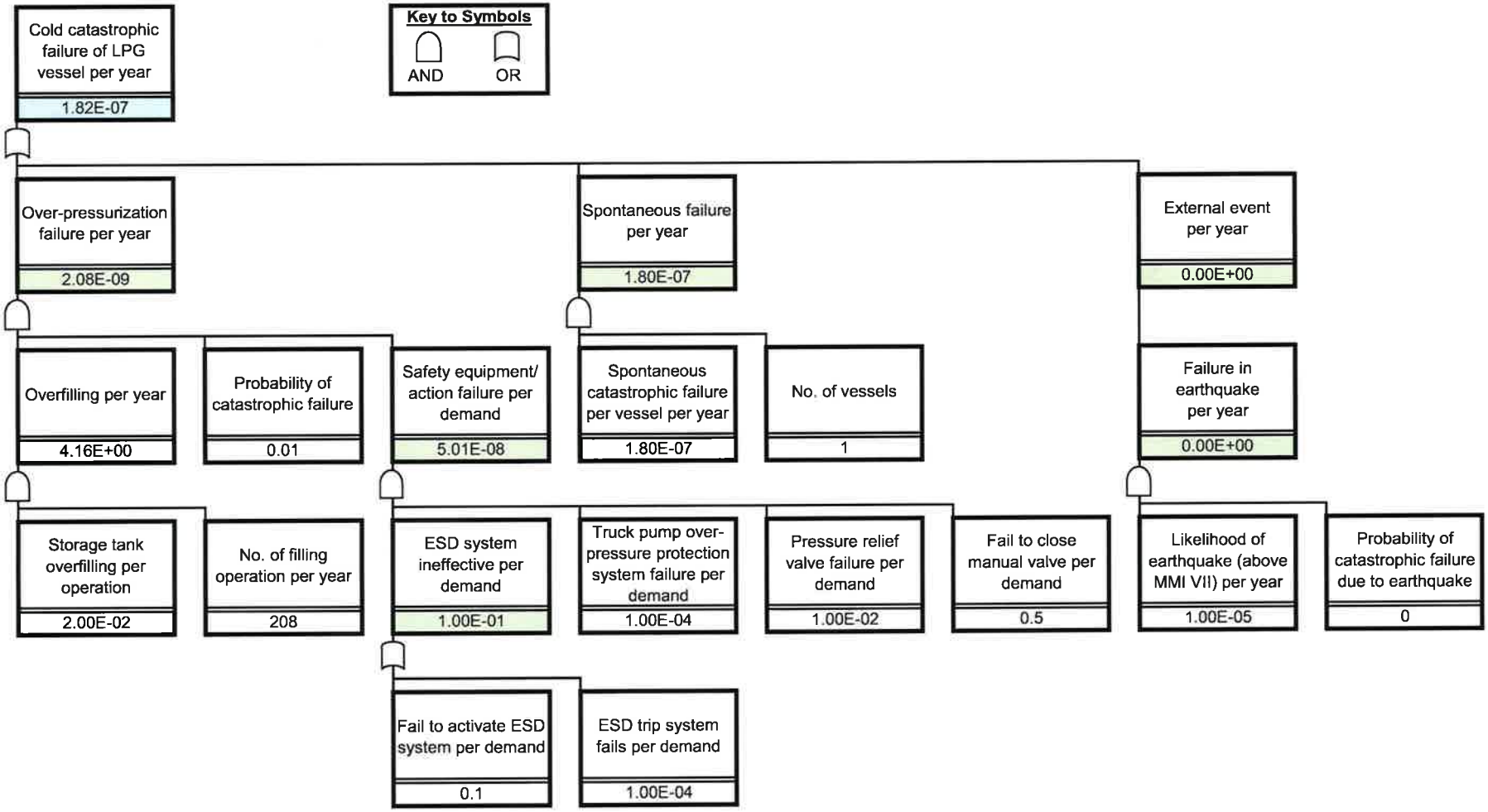
ID	Road Name	Average Occu-pancy	Speed (km/hr)	Road Length (m)	Daytime Traffic Popula-tion	Pedes-trian	Daytime Popula-tion
R01	Kau Pui Lung Road	3.0	50	600	21	80	101
R02	Ma Tau Wai Rd (NB)	6.4	50	340	60	20	80
R03	Ma Tau Wai Rd (SB)	6.4	50	350	58	20	78
R04	Ko Shan Road	3.0	50	350	16	30	46
R05	Anhui Street	3.0	50	50	1	5	6
R06	Kiang Hsi Street	3.0	50	50	1	5	6
R07	Shan Si Street	3.0	50	50	1	5	6
R08	To Kwa Wan Road	4.9	50	220	44	50	94
R09	East Kowloon Corridor	2.7	70	500	110	0	110

Note:

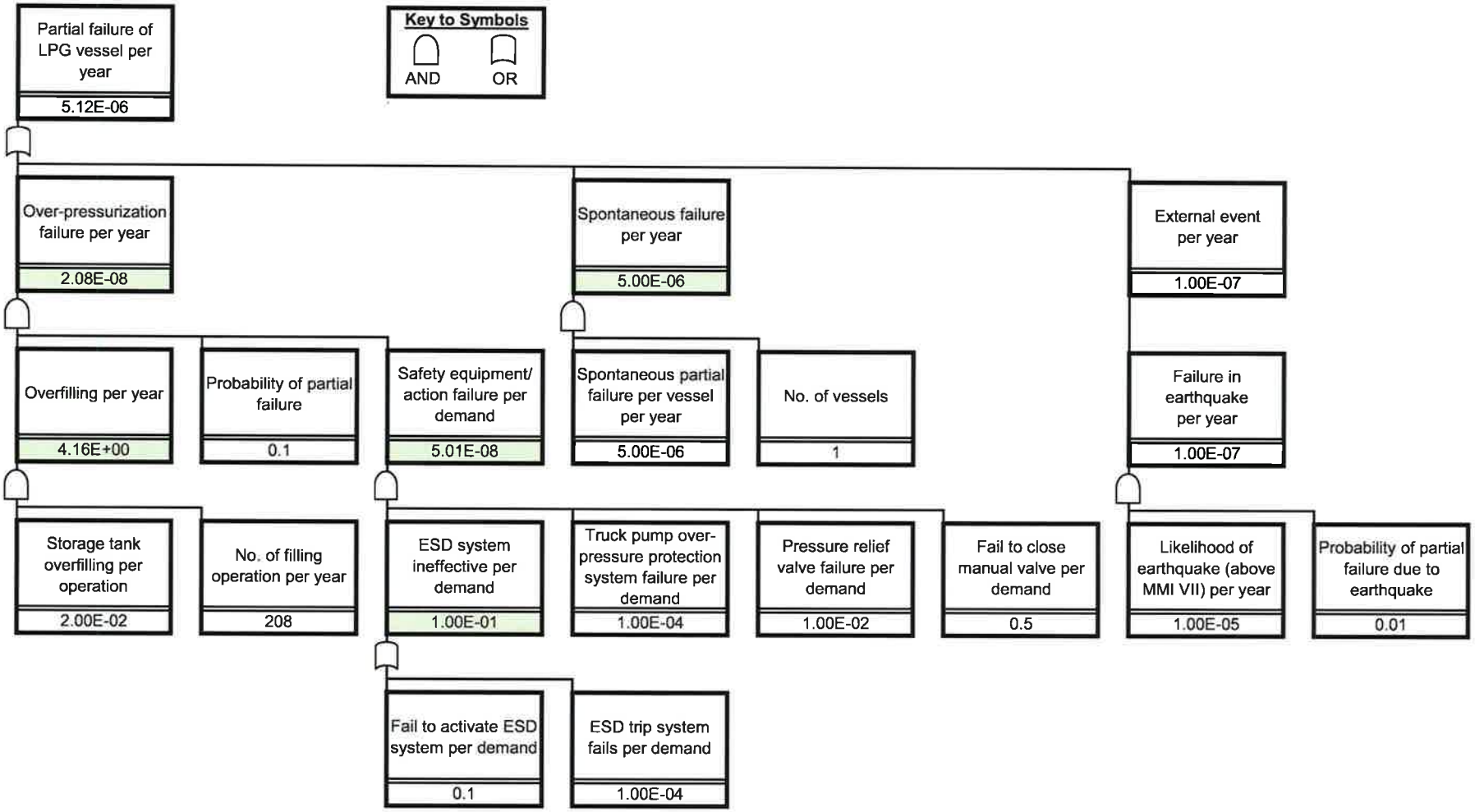
(1) Daytime Traffic Population = Morning Peak Hour Traffic × Average Occupancy × Road Length / Speed

Annex D:
Fault Tree Analysis

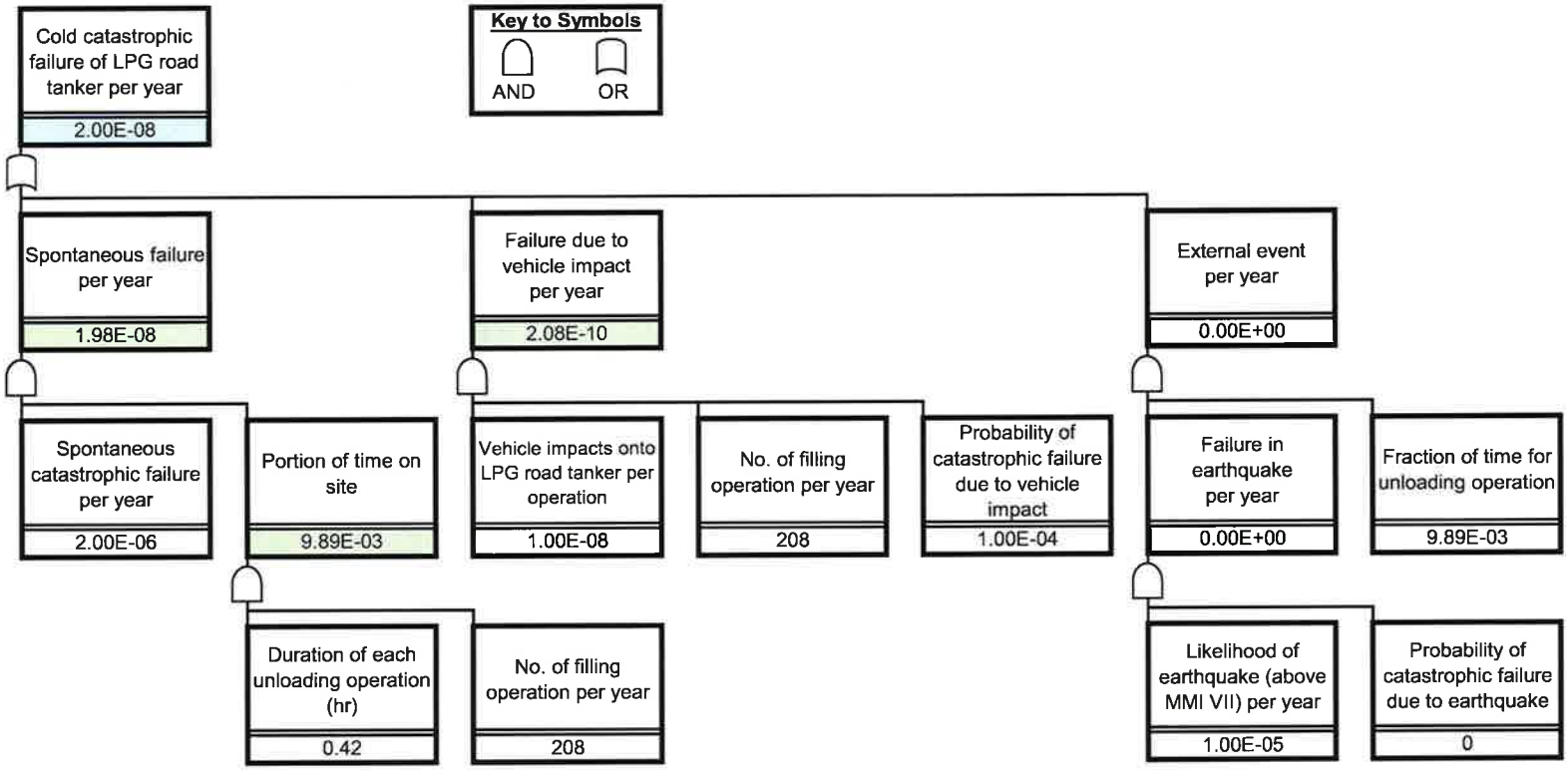
Fault Tree 1 - Cold Catastrophic Failure of LPG Vessel (LPG Compound near Block I)



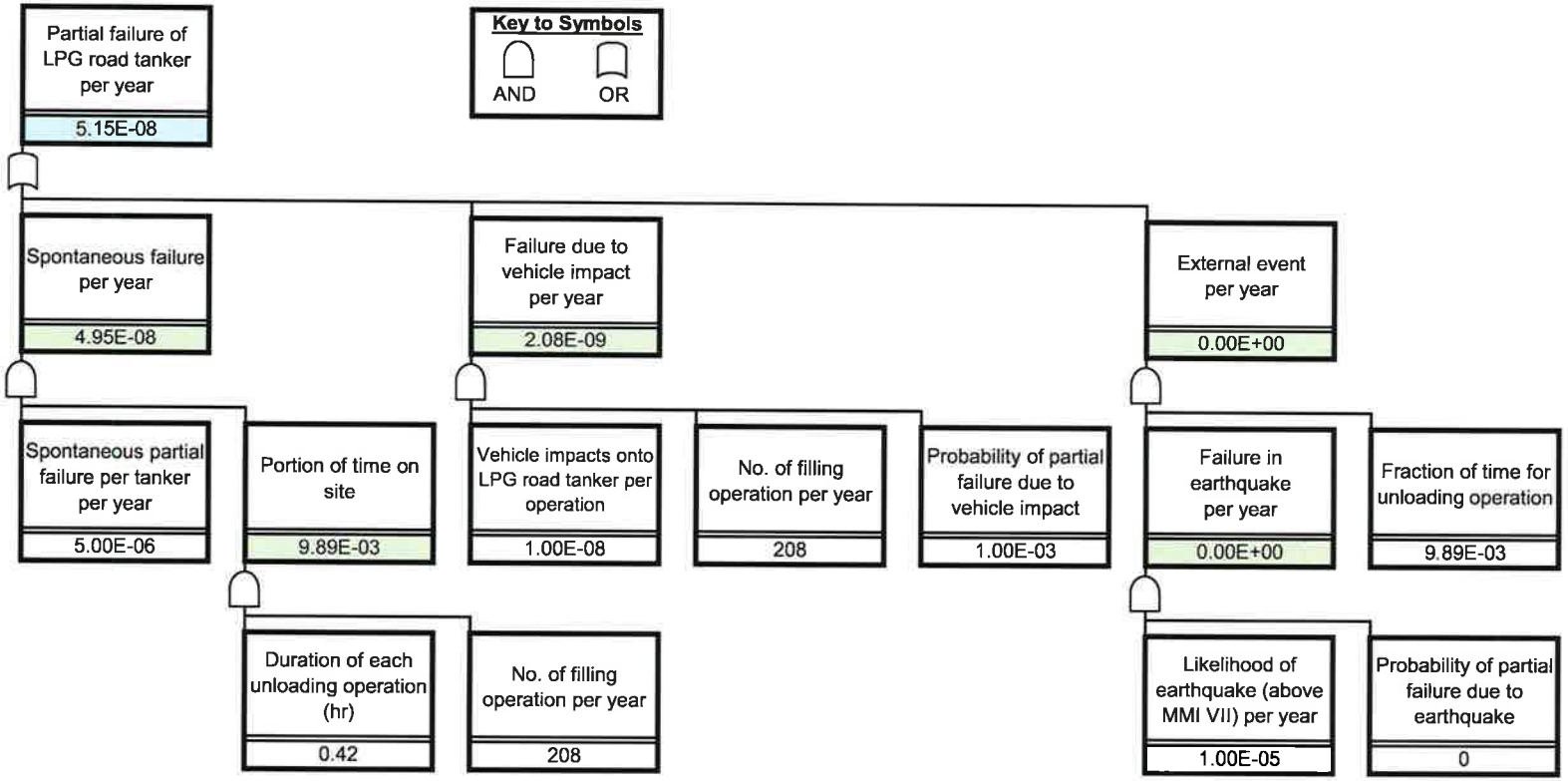
Fault Tree 2 - Cold Partial Failure of LPG Vessel (LPG Compound near Block I)



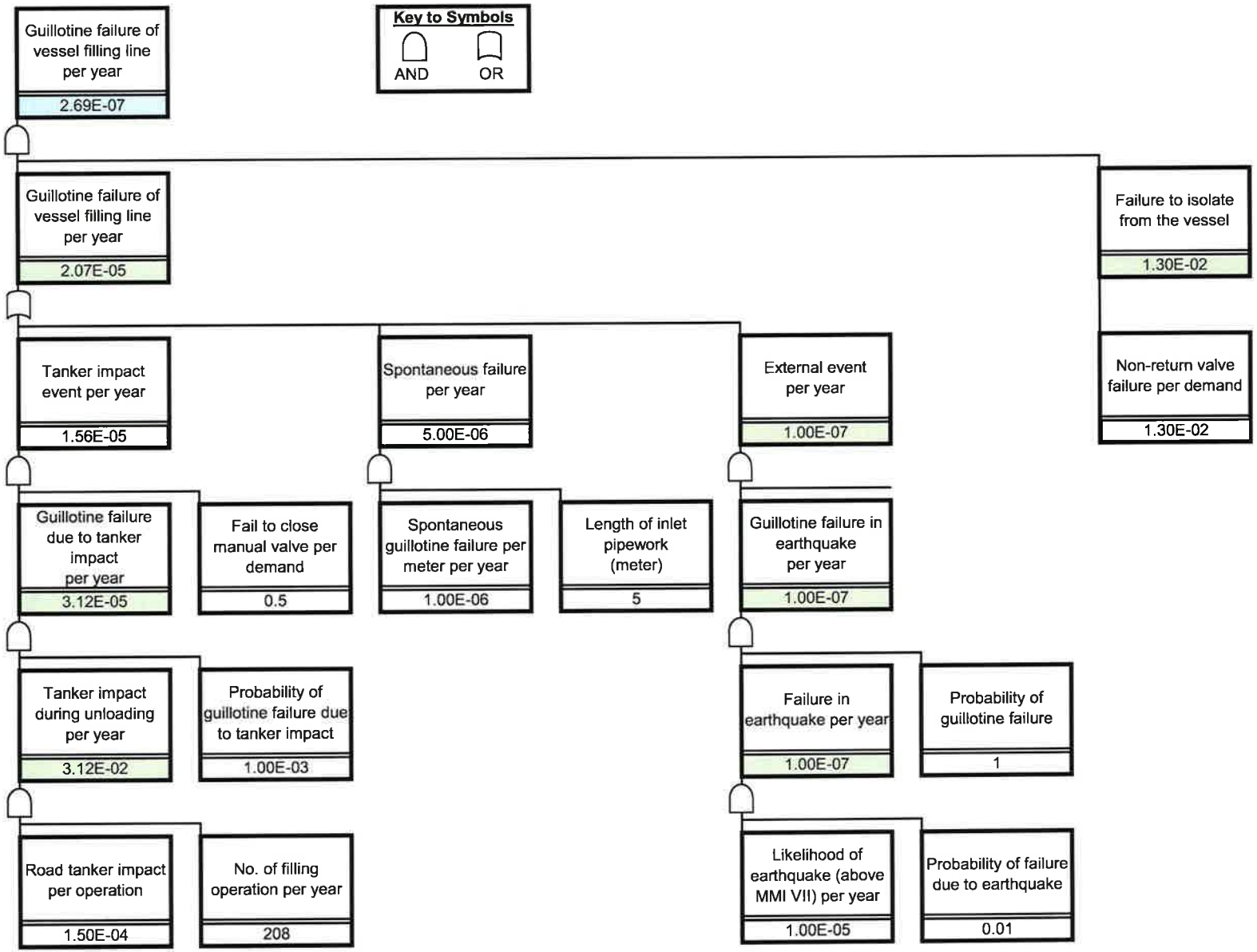
Fault Tree 3 - Cold Catastrophic Failure of LPG Road Tanker (LPG Compound near Block I)



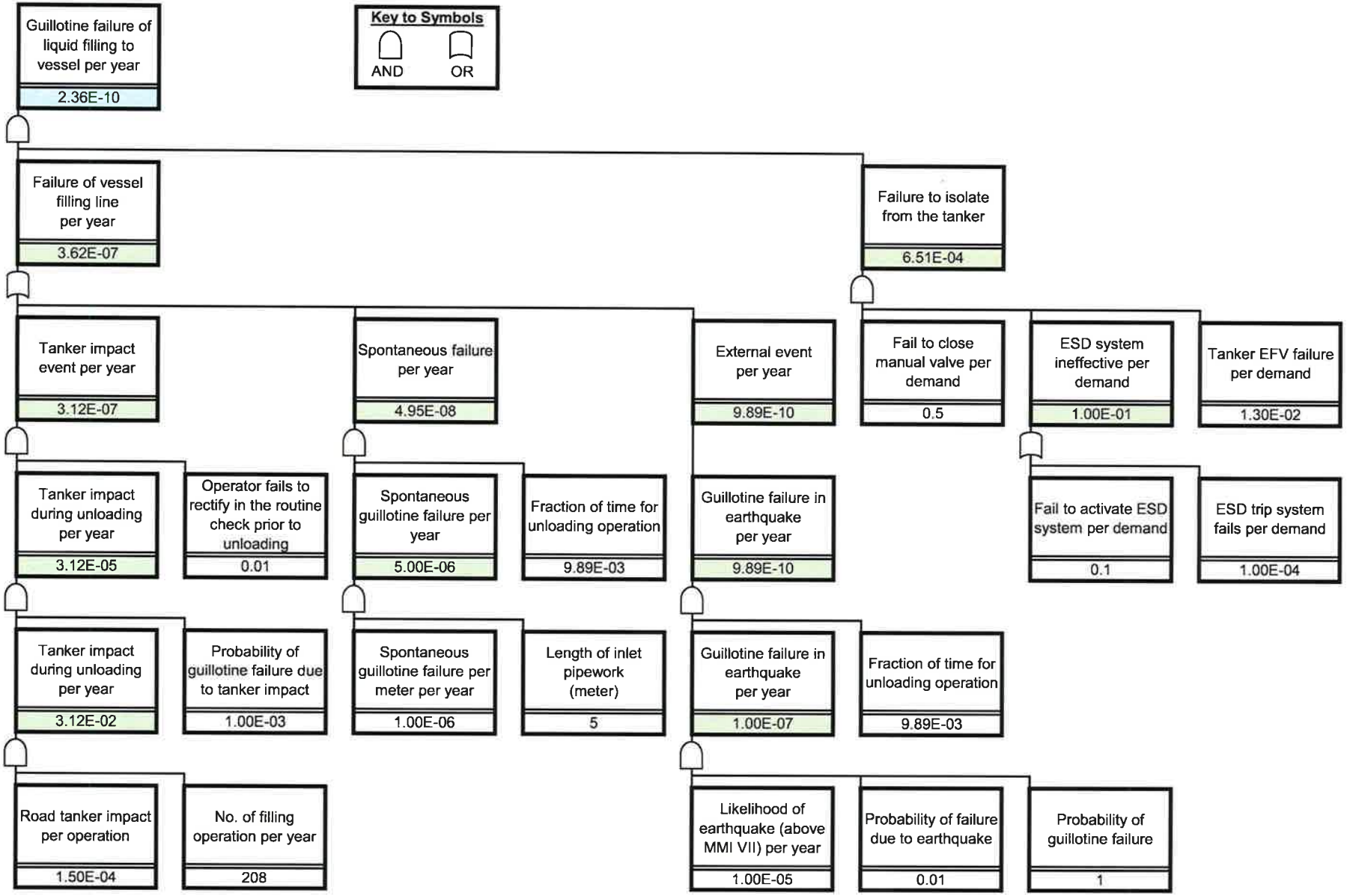
Fault Tree 4 - Cold Partial Failure of LPG Road Tanker (LPG Compound near Block I)



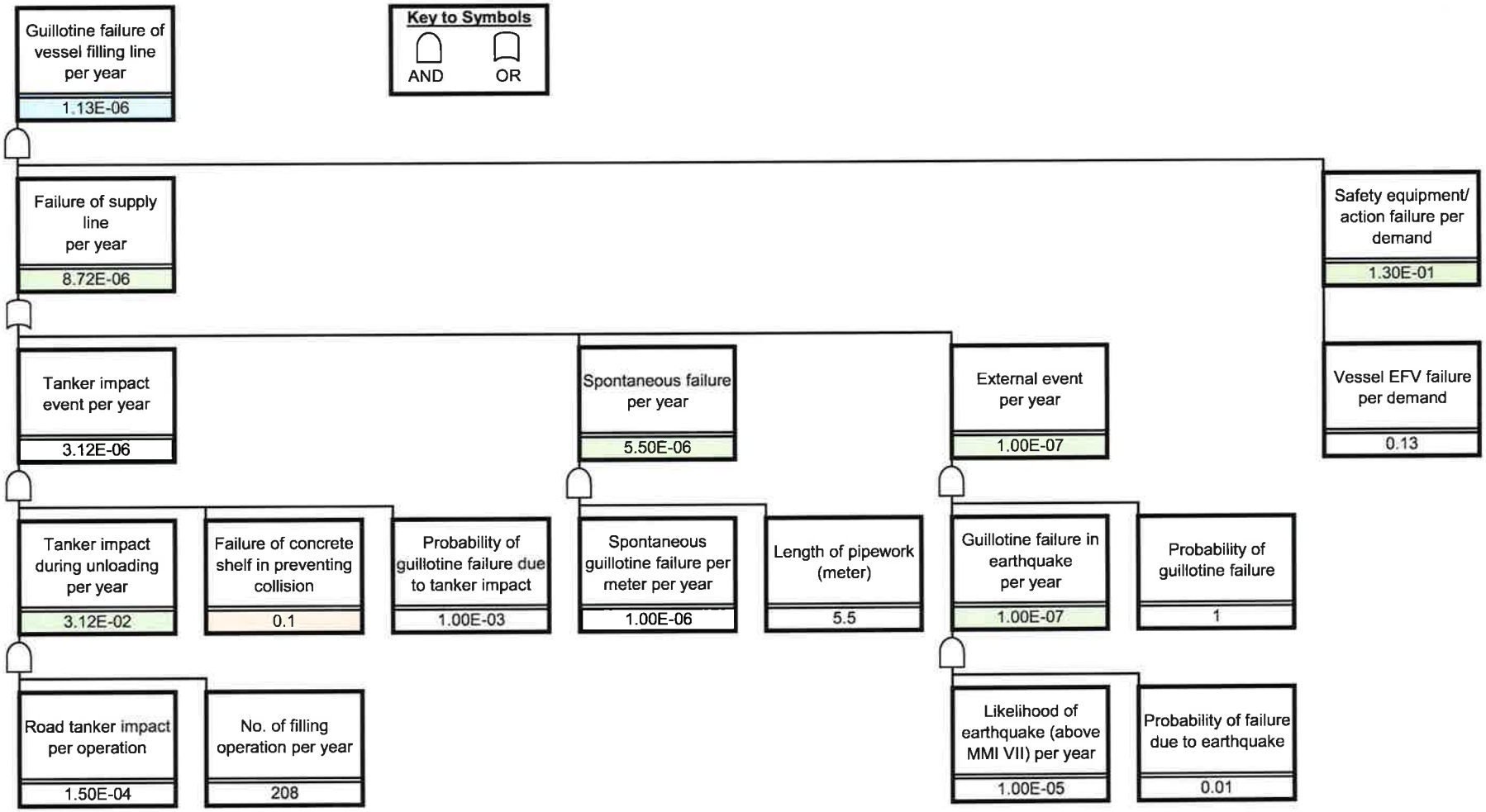
Fault Tree 5a - Guillotine Failure of Vessel Filling Line (Release from Vessel) (LPG Compound near Block I)



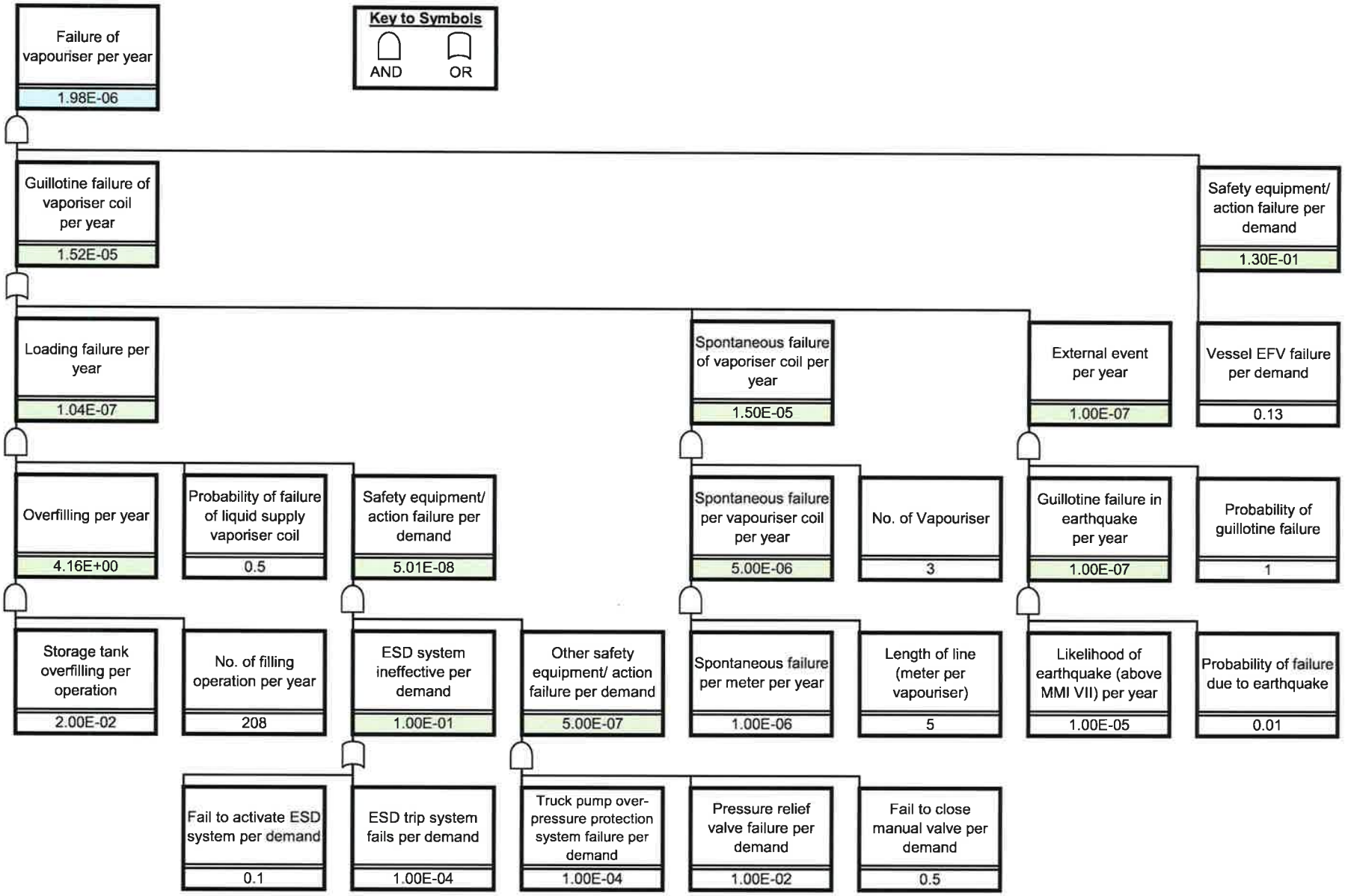
Fault Tree 5b - Guillotine Failure of Vessel Filling Line (Release from Tanker) (LPG Compound near Block I)



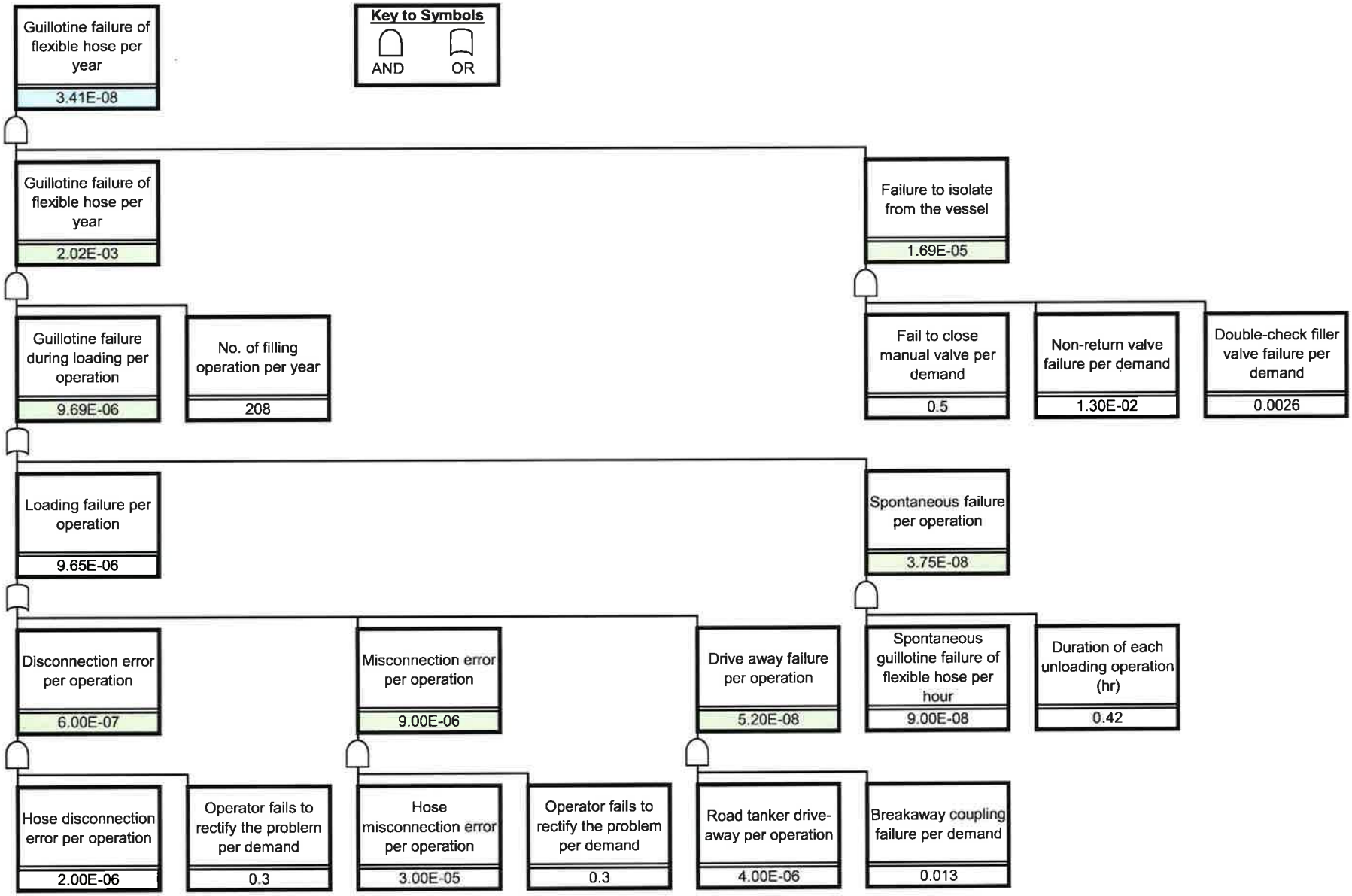
Fault Tree 6 - Guillotine Failure of Supply Line to Vapouriser (LPG Compound near Block I)



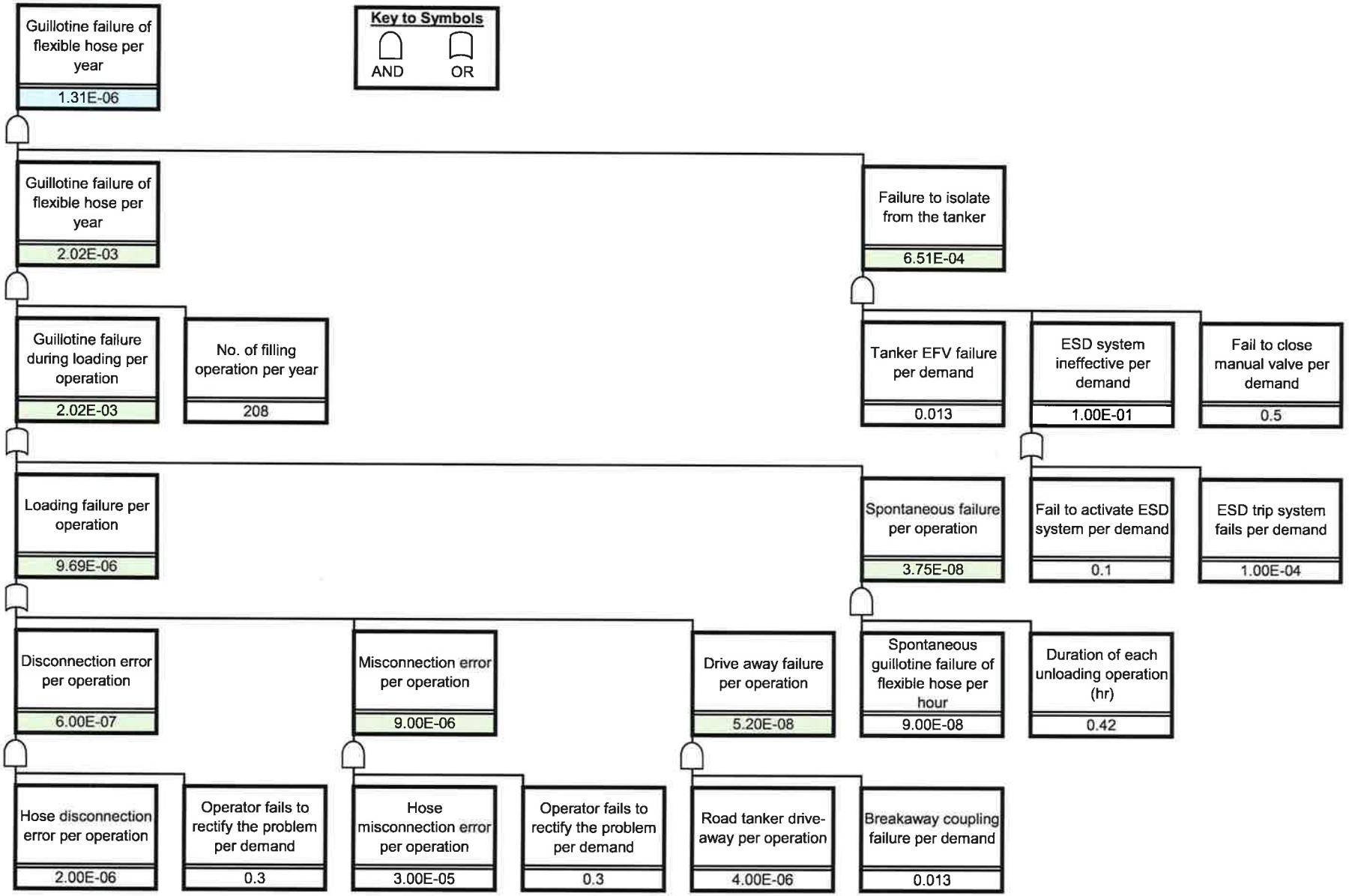
Fault Tree 7 - Failure of Vaporiser (LPG Compound near Block I)



Fault Tree 8a - Guillotine Failure of Flexible Hose (Release from Vessel) (LPG Compound near Block I)



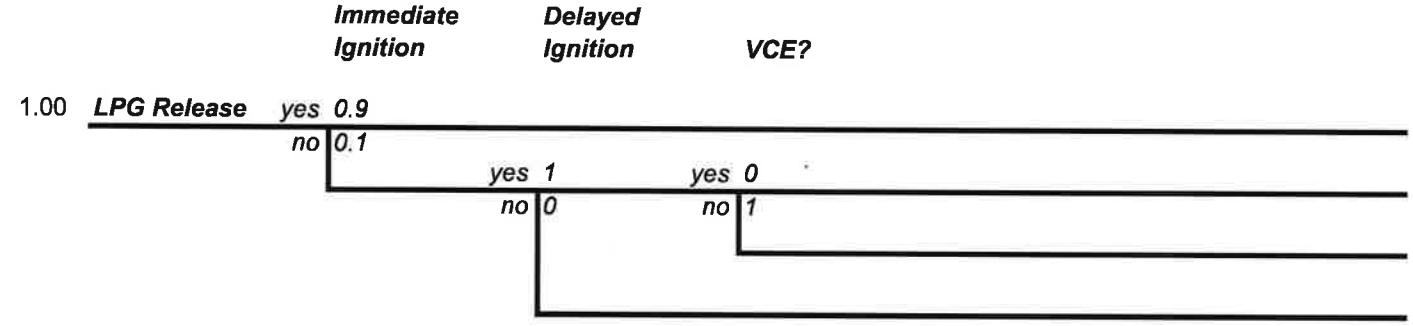
Fault Tree 8b **Guillotine Failure of Flexible Hose (Release from Tanker) (LPG Compound near Block I)**



Annex E:
Event Tree Analysis

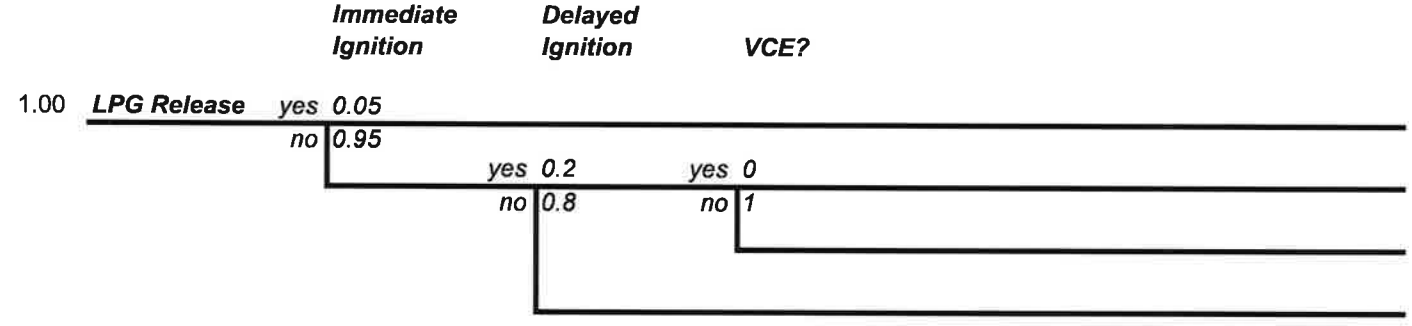
Event Tree Analysis

ETA 1 - LPG Instantaneous Release from Vessel / Road Tanker



Event Outcome	Outcome Probability
Fireball	9.00E-1
VCE	0.00E+0
Flash fire	1.00E-1
Unignited Release	0.00E+0
	1.00

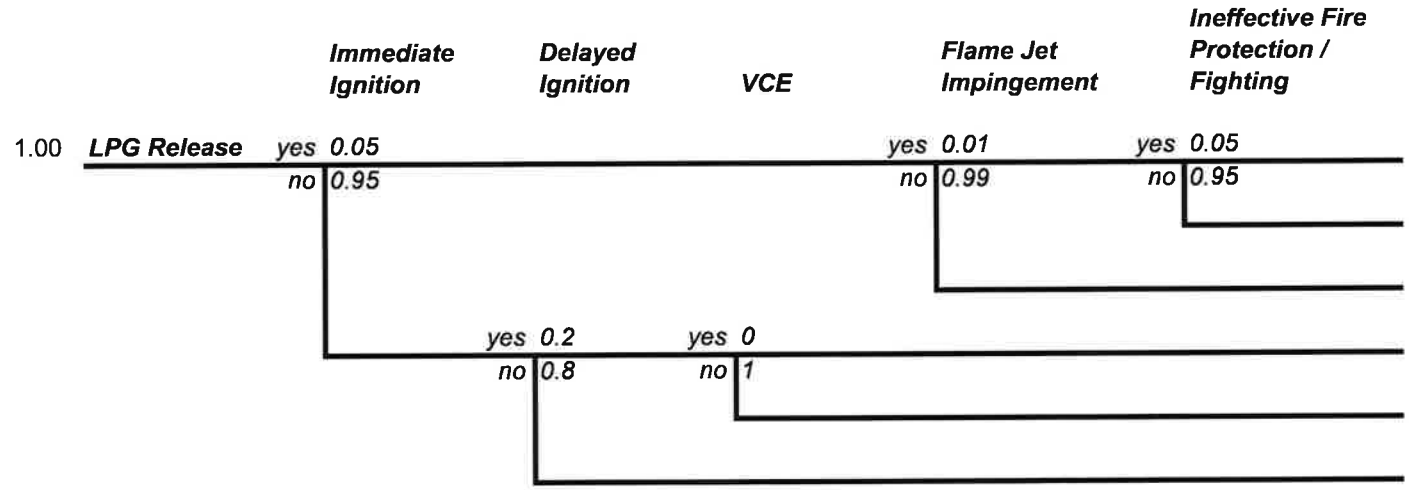
ETA 2 - LPG Continuous Release from Vessel / Road Tanker



Event Outcome	Outcome Probability
Jetfire*	5.00E-2
VCE	0.00E+0
Flash fire	1.90E-1
Unignited Release	7.60E-1
	1.00

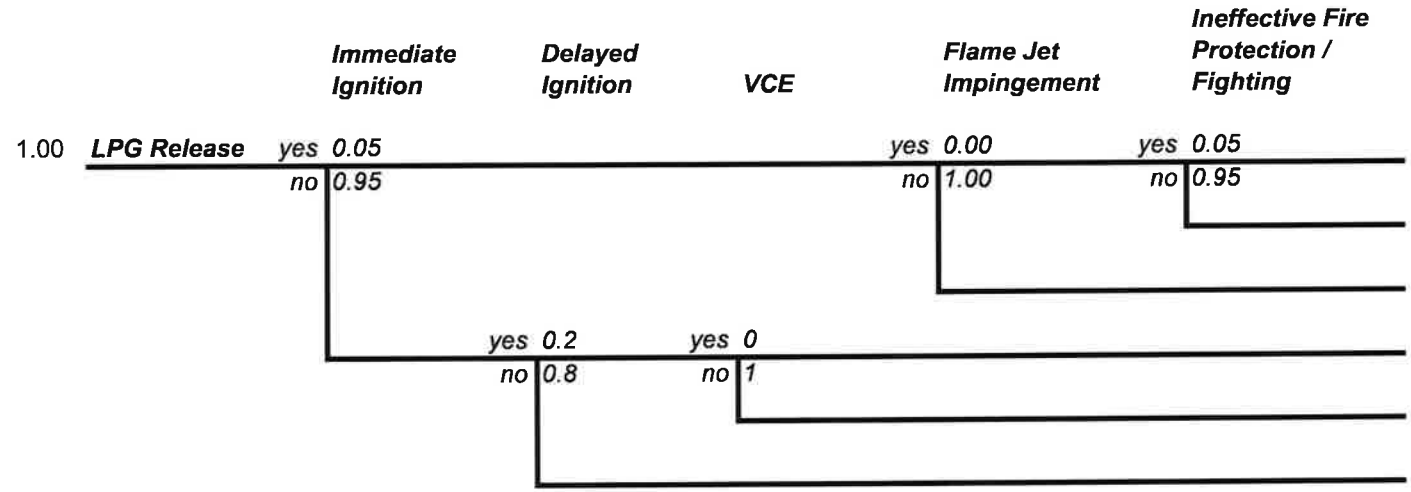
*** Jetfire from underground installations is considered in vertical direction**

ETA 3 - LPG Continuous Release from Outdoor Pipework



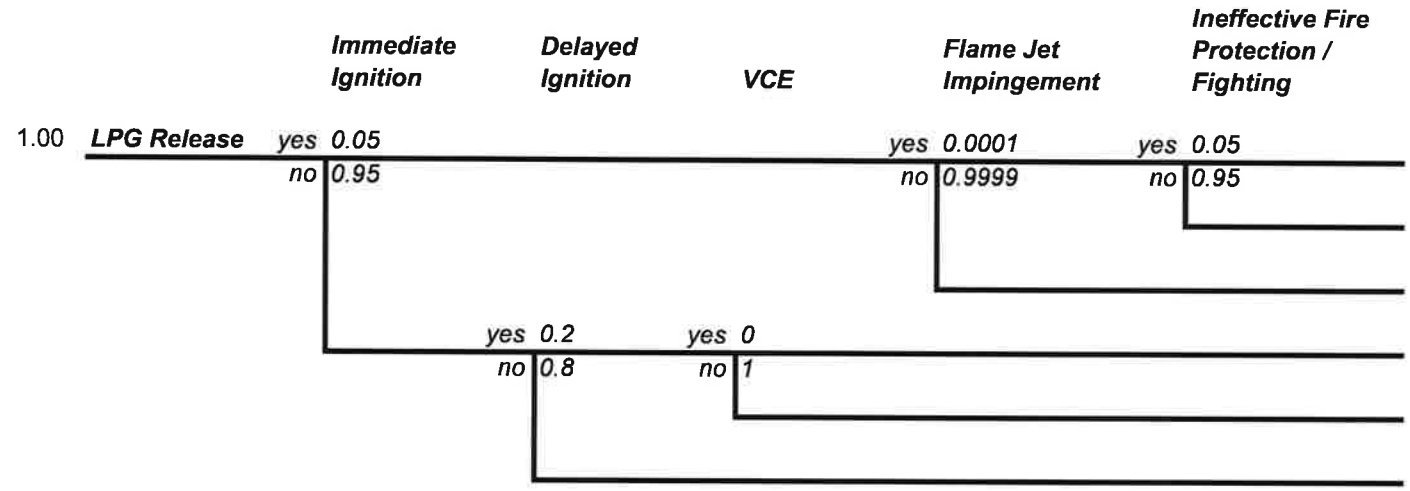
Event Outcome	Outcome Probability
BLEVE	2.50E-5
Jetfire	4.75E-4
Jetfire	4.95E-2
VCE	0.00E+0
Flash fire	1.90E-1
Unignited Release	7.60E-1
	1.00

ETA 4 - LPG Continuous Release from Outdoor Pipework (BLEVE Prevented)



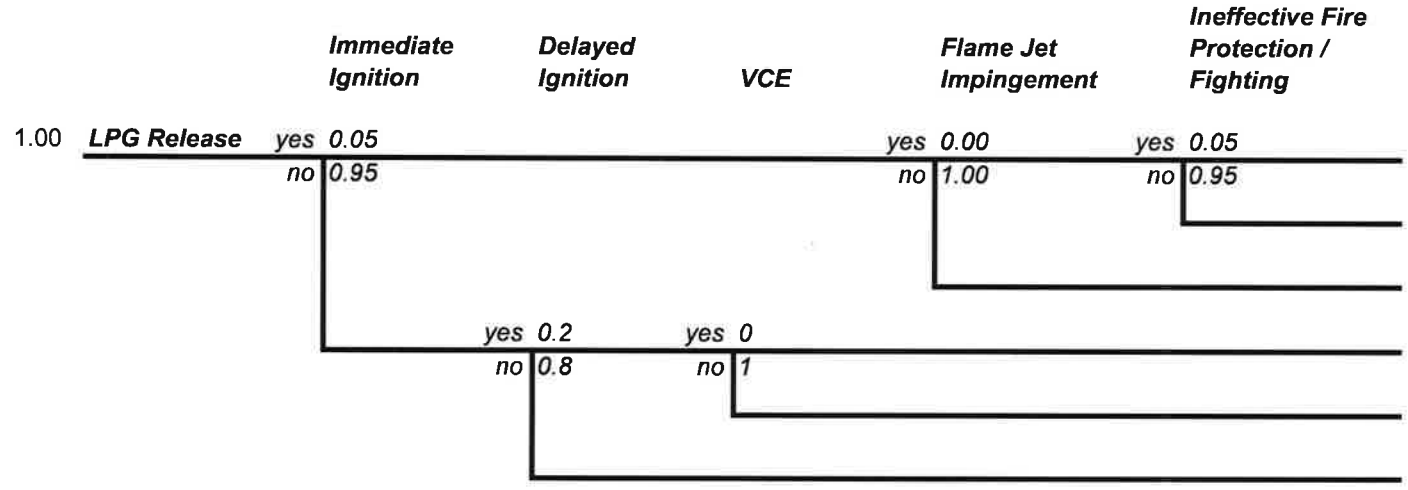
Event Outcome	Outcome Probability
BLEVE	0.00E+0
Jetfire	0.00E+0
Jetfire	5.00E-2
VCE	0.00E+0
Flash fire	1.90E-1
Unignited Release	7.60E-1
	1.00

ETA 5 - LPG Continuous Release from Indoor Pipework



Event Outcome	Outcome Probability
BLEVE	2.5000E-7
Jetfire	4.7500E-6
Jetfire	4.9995E-2
VCE	0.0000E+0
Flash fire	1.9000E-1
Unignited Release	7.6000E-1
	1.00

ETA 6 - LPG Continuous Release from Indoor Pipework (BLEVE Prevented)



Event Outcome	Outcome Probability
BLEVE	0.0000E+0
Jetfire	0.0000E+0
Jetfire	5.0000E-2
VCE	0.0000E+0
Flash fire	1.9000E-1
Unignited Release	7.6000E-1
	1.00

Annex F:
Atmospheric Stability Class-Wind Speed Frequencies

Day Time Atmospheric Stability Class-Wind Speed Frequencies at Kai Tak Automatic Weather Station (Year 2019)

Wind Speed	STABILITY CLASS						Total
	A	B	C	D	E	F	
0-2	5.3%	3.6%	0.0%	4.4%	0.0%	5.6%	18.9%
2-4	3.5%	19.1%	7.3%	12.0%	4.8%	1.3%	47.9%
4-6	0.0%	10.8%	7.6%	10.1%	0.5%	0.0%	29.1%
6-8	0.0%	0.0%	0.7%	3.1%	0.0%	0.0%	3.8%
>8	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.3%
Total	8.8%	33.5%	15.7%	30.0%	5.3%	6.8%	100.0%

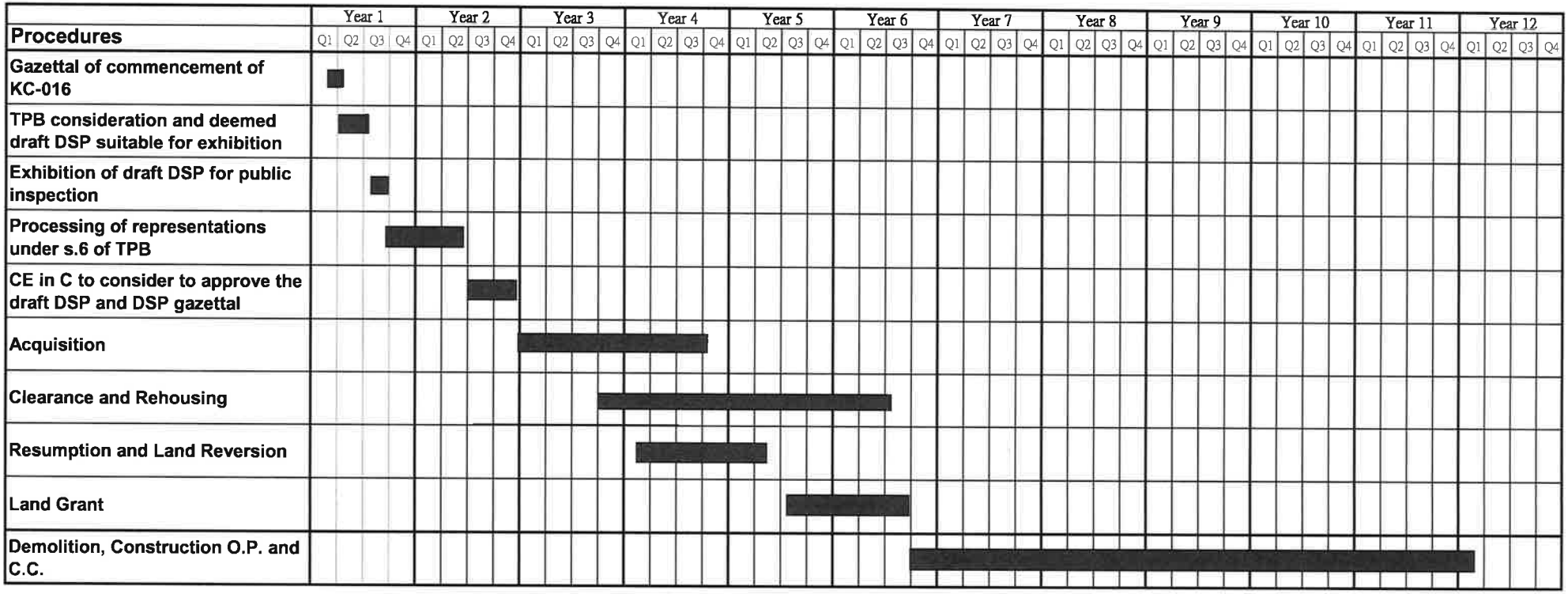
Night Time Atmospheric Stability Class-Wind Speed Frequencies at Kai Tak Automatic Weather Station (Year 2019)

Wind Speed	STABILITY CLASS						Total
	A	B	C	D	E	F	
0-2	0.0%	0.0%	0.0%	0.6%	0.0%	34.0%	34.7%
2-4	0.0%	0.0%	0.0%	15.0%	24.0%	8.1%	47.1%
4-6	0.0%	0.0%	0.0%	13.9%	1.4%	0.0%	15.3%
6-8	0.0%	0.0%	0.0%	2.6%	0.0%	0.0%	2.6%
>8	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.3%
Total	0.0%	0.0%	0.0%	32.5%	25.4%	42.1%	100.0%

Appendix 10

Tentative Implementation Programme

KC-016 URA To Kwa Wan Road / Wing Kwong Street Development Scheme
Tentative Implementation Programme



Appendix 11

Acquisition and Resumption of Affected Properties

Principles Adopted by the Urban Renewal Authority in Property Acquisition (Other than Industrial Properties)

This pamphlet briefly outlines the principles adopted by the Urban Renewal Authority ("URA") in the acquisition of properties (other than industrial properties) affected by URA's urban renewal projects ("URA Projects").

Domestic Properties

1. URA will offer an owner-occupier of domestic property within a URA Project the market value (assessed on vacant possession basis) of the affected property plus an ex-gratia allowance, namely Home Purchase Allowance ("HPA"), for purchase of the affected property. The amount of HPA payable to individual owners is the difference between the value of a notional replacement flat and the market value of the property being acquired. The notional replacement flat is based on a seven-year-old flat of a size similar to the affected property and in the same locality. The notional replacement flat is assumed to be in a comparable quality building, situated in a similar locality in terms of characteristics and accessibility. The notional replacement flat will be situated at the middle floor of a notional building with average orientation, i.e. not facing south or west, and without sea view.

2. "Owner-occupier" here means an owner who occupies the affected property as his/her sole residence. If an owner does not reside in the affected property as his/her sole residence, the occupancy status of the affected property will be treated as "Vacant" and the owner will be offered Supplementary Allowance ("SA") instead of HPA. SA is a percentage of HPA. The criteria for determining whether an owner occupies the affected property as his/her "sole residence" will be determined by URA according to URA's prevailing policy.

3. An owner-occupier will be offered HPA for no more than three properties in a redevelopment project. (Please see **Appendix I** for examples of calculation of HPA and **Appendix II** for HPAs available in different scenarios.)

4. Property used as sole residence by an owner's "immediate family members" will be treated as being occupied by the owner himself/herself as sole residence for the purpose of ascertainment of his/her eligibility for HPA. "Immediate family members" of an owner means parents, children, dependent brothers and sisters, grandparents, grandchildren, step-parents, spouse's parents, and spouse's step-parents.

5. An owner who leaves the affected property vacant will be offered the market value (assessed on vacant possession basis) of the affected property plus SA. In addition, URA will offer an Allowance for Vacant Property ("AVP") to the owner who has (i) left the affected property vacant on the first day of the freezing survey conducted for the relevant URA Project ("FS Date") and thereafter; (ii) accepted URA's initial acquisition offer within the validity period of the offer; and (iii) sold the affected property with vacant possession to URA. AVP is equivalent to 2 times the amount of the Rateable Value of the affected property.

6. An owner who lets the affected property out will be offered the market value (assessed on vacant possession basis) of the affected property plus SA.

7. An owner of tenanted or vacant properties will be offered SA for no more than two properties in a URA Project. (Please see **Appendix I** for examples of calculation of SA and **Appendix II** for different SAs available in different scenarios.)

8. In addition to HPA or SA, URA will offer an Incidental Cost Allowance ("ICA") to owners of domestic properties to assist the owners' payment of removal expenses and expenditure relating to the purchase of a domestic replacement flat and the legal cost incurred in the sale of the affected properties to URA. The actual amount of ICA shall be determined and announced by URA as and when an offer to purchase is made for each individual project.

9. If the amount of necessary and reasonable expenses actually incurred by the owner of a domestic property in selling the affected property to URA (namely legal cost) and purchasing a domestic replacement flat (namely removal cost, stamp duty, agency fee and legal cost) exceeds the amount of ICA offered by URA, the owner may be reimbursed with the difference ("the Expense"). The owner can only submit one single reimbursement claim for each domestic property sold to URA, and must fulfill the following eligibility criteria:

   (a) The owner must have accepted the initial acquisition offer of URA within the validity period of the offer;

   (b) The reimbursement claim must be made within 12 months from the date of execution of assignment of the affected property sold to URA, and the reimbursable amount must be the actual expenses already paid by the owner within 12 months after the property is sold to URA;

   (c) The domestic replacement flat must be located in Hong Kong and must be purchased after the date of issuance of initial acquisition offer by URA; and

   (d) The owner should be the sole registered owner or one of the registered owners of the domestic replacement flat, and his/her interest in the replacement flat must be recorded in the land register.

10. In general, the principles in assessing the reimbursable amount of the Expense as described in Paragraph 9 above are:

   (a) The reimbursable amount for stamp duty should be calculated at the lower rates (Scale 2) of the ad valorem stamp duty payable for a domestic replacement flat;

   (b) The reimbursable amount for real estate agency fee should follow the general market practice but not exceed 1% of the purchase price of the domestic replacement property;

   (c) The reimbursable amounts in both item (a) and item (b) above will be subject to a ceiling to be calculated on the basis of a domestic replacement property with a purchase price of 110% of the total of (i) the market value of the affected property and (ii) the sum of HPA/SA as stipulated in the initial acquisition offer of URA;

(d) URA will only reimburse the Expense which is reasonable, absolutely necessary and actually paid by the owner in relation to the expenses described above;

(e) The owner should provide sufficient documentary evidence for the Expenses submitted in the reimbursement claim; and

(f) URA will consider each reimbursement claim on its own merits, and URA has the sole discretion in determining the amount of the Expenses reimbursable in each case.

11. If a domestic property has been sub-divided into several flats with undivided shares ("sub-divided flat") before the FS date and an owner-occupier of a sub-divided flat elects not to receive the HPA, subject to eligibility criteria and other requirements, such an owner-occupier will be offered re-housing.

12. The HPA or SA may be payable for non-domestic property which has been issued with an occupation permit other than for domestic purpose but nevertheless has been used by the same owner for domestic purpose for a long time (generally about 10 years) in the following situation:

(a) An owner-occupier who has used the affected property for domestic purposes for a long time will be offered market value (assessed on vacant possession basis) of the affected property plus the higher of:

(i) HPA and ICA as a domestic property; and

(ii) the allowance applicable to non-domestic properties (other than Industrial Properties).

(b) An owner of tenanted property which has been occupied for domestic purpose for a long time will be offered market value (assessed on vacant possession basis) of the affected property plus the higher of:

(i) SA and ICA as a domestic property less the Ex-gratia Allowance payable to a domestic tenant; and

(ii) the allowance applicable to non-domestic properties (other than Industrial Properties).

13. For URA Projects which are commenced after the promulgation of the new Urban Renewal Strategy on 24 February 2011:

(a) Subject to the conditions and provisions contained in the "Urban Renewal Authority Flat-for-Flat Pamphlet" ("the Pamphlet"), eligible owner-occupiers of domestic properties in URA Projects, who will be offered HPA, can opt to participate in URA's "Flat-for-Flat" Scheme ("the Scheme"). Please refer to the Pamphlet for details of the Scheme.

(b) Elderly owners of tenanted domestic properties in URA Project may apply for the Elderly Domestic Owner-Landlords Compassionate Allowance ("EDOLCA") in addition to the market values of their properties and SA as described in Paragraph 6 above, subject to the eligibility criteria set by URA. Eligible elderly owners

can apply for EDOLCA after receiving URA's initial acquisition offers. EDOLCA is only payable to eligible elderly owners who have accepted the initial acquisition offers of URA within the validity period of the offer. Please refer to the pamphlet of *"Elderly Domestic Owner-Landlords Compassionate Allowance"* for details of the eligibility criteria and the arrangement.

Non-domestic Properties (Other than Industrial Properties)

14. URA will offer an owner of a non-domestic property (other than industrial property) the market value of the affected property (assessed on vacant possession basis) and an ex-gratia allowance. The amount of the ex-gratia allowance for tenanted or vacant non-domestic property (other than industrial property) is equivalent to 10% of its market value (assessed on vacant possession basis) or one time its Rateable Value, whichever is higher. In addition, URA will offer AVP at 2 times the amount of the Rateable Value of the affected property to the owner who has (i) left the affected property vacant on the FS Date and thereafter; (ii) accepted URA's initial acquisition offer within the validity period of the offer; and (iii) sold the affected property with vacant possession to URA. The amount of ex-gratia allowance for owner-occupied non-domestic property (other than industrial property) is equivalent to 35% of its market value (assessed on vacant possession basis) or 4 times its Rateable Value, whichever is higher. "Owner-occupier" here means an owner who occupies and operates his/her business in the affected property.

15. In addition to the ex-gratia allowance described in Paragraph 14 above, an additional payment of the Ex-gratia Business Allowance ("EGBA") is payable to an owner-occupier of non-domestic property (other than industrial property) who had commenced occupying the premises for business use before the FS Date and have accepted the initial acquisition offer from URA both unconditionally and within the validity period of the offer. The amount of EGBA is directly proportional to the number of years of continuous operation by the owner-occupier as business owner in the affected property. In calculating the total number of years of continuous operation, the last date of the continuous operation is set at 2 years from the date on which URA issues initial acquisition offer to the property owner. The amount of EGBA is payable at a rate of 0.1 times the Rateable Value for each year that the owner-occupier has operated the business as the business owner in the property concerned, subject to a maximum of 30 years. For an incomplete year, the amount of EGBA is calculated on a pro-rata basis to the nearest month. The amount of EGBA is subject to a maximum amount of $700,000 and a minimum amount as described in the table below:

Continuous Operation for	**Minimum Amount of EGBA**
(a) 10 years or less	HK$110,000 (effective from 1 April 2020 and subject to annual review)
(b) More than 10 years (maximum 30 years)	The minimum amount for (a) above plus an additional HK$10,000 for each completed year after 10 years.

In applying for EGBA, an owner-occupier is required to substantiate the period of continuous operation in the property as business owner. The owner-occupier may choose to claim for severance payments payable to his/her employees under the Employment Ordinance (Chapter 57) as an alternative to EGBA.

16. URA will also offer ICA to owners of non-domestic properties (other than industrial property) to assist their payment of expenditure relating to the purchase of a non-domestic replacement property and the legal cost incurred in the sale of the affected properties to URA. The amount of ICA payable is 5% of the market value (assessed on vacant possession basis) of the affected property. Payment of the ICA is subject to the condition that the owner must have accepted the initial acquisition offer of URA within the validity period.

17. If the amount of necessary and reasonable expenses actually incurred by the owner in selling the affected property to URA (namely legal cost) and purchasing a non-domestic replacement property (namely stamp duty, agency fee and legal cost) exceeds the amount of ICA offered by URA, the owner may be reimbursed with the difference ("the Expense for Non-domestic Property"). The owner can only submit one single reimbursement claim for each non-domestic property sold to URA, and must fulfill the following eligibility criteria:

    (a) The owner must have accepted the initial acquisition offer of URA within the validity period of the offer;

    (b) The reimbursement claim must be made within 12 months from the date of execution of assignment of the affected property sold to URA, and the reimbursable amount must be the actual expenses already paid by the owner within 12 months after the property is sold to URA;

    (c) The non-domestic replacement property must be located in Hong Kong and must be purchased after the date of issuance of initial acquisition offer by URA; and

    (d) The owner should be the sole registered owner or one of the registered owners of the non-domestic replacement property, and his/her interest in the replacement property must be recorded in the land register.

18. In general, the principles in assessing the reimbursable amount of the Expense for Non-domestic Property as described in Paragraph 17 above are:

    (a) The reimbursable amount for stamp duty shall be calculated at the lower rates (Scale 2) of the ad valorem stamp duty payable for a non-domestic replacement property;

    (b) The reimbursable amount for real estate agency fee should follow the general market practices but not exceed 1% of the purchase price of the non-domestic replacement property;

    (c) The reimbursable amounts in both item (a) and item (b) above will be subject to a ceiling to be calculated on the basis of a non-domestic replacement property with a purchase price of 110% of the market value of the affected property as stipulated in the initial acquisition offer of URA;

    (d) URA will only reimburse the Expense for Non-domestic Property which is reasonable, absolutely necessary and actually paid by the owner in relation to the expenses described above;

(e) The owner should provide sufficient documentary evidence for the expenses submitted with the reimbursement claim; and

(f) URA will consider each reimbursement claim on its own merits, and URA has the sole discretion in determining the amount of the Expenses for Non-domestic Property reimbursable in each case.

19. An owner-occupier may choose to claim for business loss as an alternative to all the above-mentioned allowances for an affected non-domestic property.

Domestic Properties being used for Non-domestic Purposes

20. If an affected property with an occupation permit for domestic use has been used for non-domestic purpose, the owner-occupier will be offered market value (assessed on vacant possession basis) of the affected property plus the higher of:

(i) the allowances applicable to owner-occupied non-domestic properties (other than industrial properties); and

(ii) SA and ICA for domestic properties.

21. An owner of an affected property with an occupation permit for domestic use being leased out for non-domestic use will be offered market value (assessed on vacant possession basis) of the affected property plus the higher of:

(i) the allowances applicable to tenanted non-domestic properties (other than industrial properties); and

(ii) SA plus ICA for domestic properties less 3 times the Rateable Value of the affected property.

Separate Roof Top Interest (Not ancillary to any Domestic/Non-Domestic Property)

22. The title of the rooftop property must be legal.

23. An owner of a tenanted rooftop property will be offered the market value of the property on an open roof basis (disregarding any illegal structure or any rent passing) plus an ex-gratia allowance at 10% of the said market value.

24. An owner of a vacant rooftop property will be offered the market value of the property on an open roof basis (disregarding any illegal structure) plus an ex-gratia allowance at 10% of the said market value. In addition, URA will offer the owner AVP at 2 times of the Rateable Value of the affected rooftop property if the owner has (i) left the rooftop property vacant on the FS Date and thereafter; and (ii) accepted the initial acquisition offer within the validity period of the offer; and (iii) sold the affected rooftop property with vacant possession to URA.

25. An owner-occupier of a rooftop property will be offered the market value of the property on an open roof basis (disregarding any illegal structure) plus:

(a) rehousing if the owner-occupier fulfills the normal eligibility criteria for public rental housing application of Hong Kong Housing Authority or Hong Kong Housing Society, or

(b) an ex-gratia allowance at 10% of the market value (on open roof basis disregarding any illegal structure) of the property if the owner-occupier is not eligible for re-housing or does not opt for re-housing. In addition, if the owner-occupier has accepted the initial acquisition offer within the validity period of the offer, URA will offer him/her an allowance at 2 times of the Rateable Value of the property.

Buildings in Single Ownership

26. An owner of a building in single ownership will be offered the higher of (a) and (b) below:

(a) The total amount of the existing use values of individual units of the building plus the allowances applicable to the non-domestic units (if any) of the building and the allowances applicable to the domestic units (if any) of the building, as if the building is in multiple ownership.

(b) The redevelopment value of the building (assuming redevelopment of the building on its own) plus:

(i) an ex-gratia allowance at 5% of the redevelopment value; and

(ii) ICA at 5% of the redevelopment value, subject to the condition that an owner must have accepted the initial acquisition offer of URA within the validity period. An owner may claim for reimbursement of the actual expenses in selling the affected building to URA and purchase of a replacement building in accordance with the same criteria and principles described in Paragraphs 17 to 18 above but the replacement property must be a building in single ownership.

Vacant Sites

27. An owner of a vacant site will be offered:

(a) the redevelopment value of the vacant site (assuming redevelopment of the site on its own);

(b) an ex-gratia allowance at 5% of the redevelopment value; and

(c) ICA at 5% of the redevelopment value, subject to the condition that an owner must have accepted the initial acquisition offer of URA within the validity period. An owner may claim for reimbursement of the actual expenses in purchasing a replacement site in accordance with the same criteria and principles as described in paragraphs 17 to 18 above but the replacement property must be a vacant site.

Other General Rules

28. Calculation of the market value of a property is based on the saleable area of the property. The definition of saleable area shall follow the Code of Measuring Practice issued in March 1999 and the Supplement to the Code of Measuring Practice issued in July 2014 by the Hong Kong Institute of Surveyors. Subject always to the owner having good title to the property or any part thereof, area calculations may be based on the boundary of the property as delineated on the assignment plan and the area as measured from the latest relevant building plans approved by the Buildings Department (if any).

29. For the purpose of calculating the value of the notional replacement flat, URA will appoint seven professional surveyor firms to provide the assessments.

30. URA will provide an allowance to the owner, who has employed a professionally qualified surveyor to assess the market value of the affected property (which shall not include any ex-gratia allowance, such as HPA and SA etc.), as a subsidy for the owner's payment of the surveyor's fees for the relevant services. Please refer to the pamphlet of "Allowance for Surveyor's Fees" for details of the arrangement.

31. If an owner only purchased the affected property in the project on/after the FS Date, URA will not pay to such owner any of the above-mentioned HPA, SA, AVP, EDOLCA and any allowances applicable to non-domestic property, separate rooftop interest, single-owned building and vacant site.

32. URA will consider acquiring property from a holder of a valid adverse possessory order granted by the Court in favour of him/her. Depending on the circumstances of individual cases, URA may impose appropriate additional requirements to safeguard the interest of URA when acquiring properties with adverse possessory title.

33. URA will not purchase a structure which is not erected in compliance with the Buildings Ordinance or the terms of the Government lease and no value, compensation or allowance will be paid by URA in respect of such structure.

34. If an owner is found to have given false or misleading information to URA, URA reserves the right to revise its offers and/or take legal action against such owner and/or report the matter to relevant enforcement authorities.

35. URA's acquisition offer is made by reference to the occupancy status of an owner's property on the FS Date and in accordance with the URA's prevailing principles and practice for property acquisition. One of such prevailing principles is that an owner whose property was owner-occupied on the FS Date but is let out at the time URA's acquisition offer is made will only be offered the allowances for the acquisition of the affected property on a tenanted basis.

36. Particularly, URA would draw the attention to owners whose properties had been tenanted out on the FS Date that URA will <u>not</u> make a higher offer to them to acquire their properties in the following situations:

    (a) the properties are subsequently left vacant; or

(b) the owners have entered into new tenancies, whether with the existing tenants or new tenants; or

(c) the owners have subsequently obtained possession and occupied their properties for their own self-use.

37. URA would remind owners that it is an offence for a landlord to unlawfully deprive a tenant of occupation of property or to make an unwarranted demand with menaces with a view to gaining for himself/herself or others or to defraud against URA. URA will report to the enforcement authorities on all cases of suspected criminal offences.

This pamphlet is issued for the purpose of general reference only. The information contained herein is with reference to the principles and practice of the Urban Renewal Authority prevailing at the date of issue of this pamphlet. It shall not constitute any representation on the part of the Urban Renewal Authority or give rise to any expectation whatsoever and shall not be relied on as such. Each case will be considered on its own merits having regard to all factors and circumstances. The terms of acquisition to be offered are subject to the principles and practice of the Urban Renewal Authority prevailing at the time the offer of acquisition is made and are subject to review from time to time as the Urban Renewal Authority shall at its absolute discretion consider appropriate. The Urban Renewal Authority's right to add to, amend or delete the whole or any part of this pamphlet is hereby reserved.

For enquiries, please call URA External Relations Department:
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October 2020

Appendix I

Examples (Domestic Properties)

(Figures are based on assumption and for reference only)

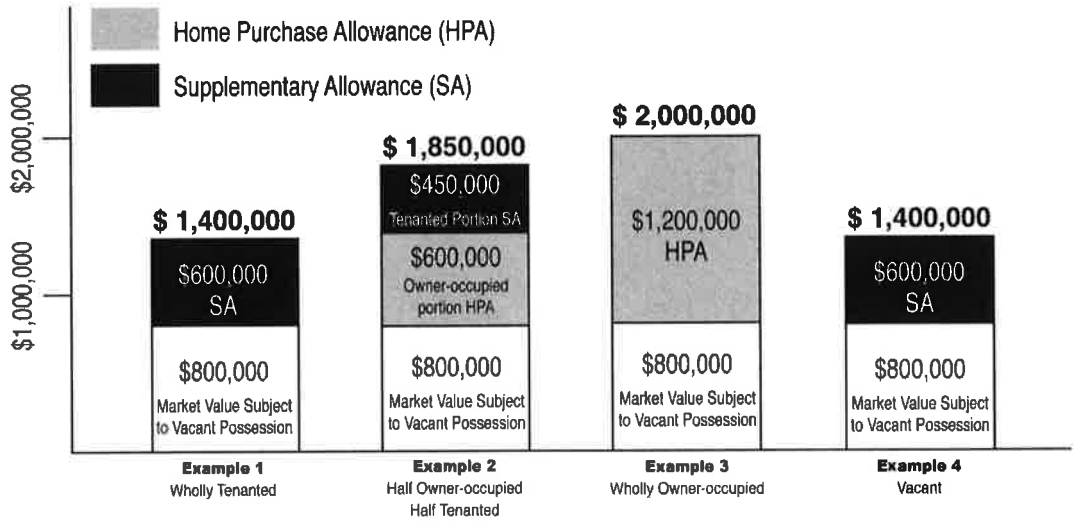
Assuming the market value of a domestic flat on vacant possession (VP) basis is HK$800,000 and the value of a notional replacement flat is HK$2,000,000. The HPA will then be HK$1,200,000.

Example One
An owner of the above domestic flat who lets out the entire flat
This owner will get the market value of his flat (on VP basis) of HK$800,000 and SA of HK$600,000 (HK$1,200,000 x 50%). In total, this owner will receive HK$1,400,000.

Example Two
An owner of the above domestic flat who occupies half of the flat and leases out the other half
This owner will get the market value of his flat (on VP basis) of HK$800,000 and HPA of HK$600,000 for the owner-occupied portion and SA of HK$450,000 (HK$600,000 x 75%) for the tenanted portion. In total, this owner will receive HK$1,850,000.

Example Three
An owner of the above domestic flat who occupies the entire flat for his own use
This owner will get the market value of his flat (on VP basis), which is HK$800,000, plus HPA which is HK$1,200,000. In total, this owner will receive HK$2,000,000.

Example Four
An owner of the above domestic flat who leaves the entire flat vacant
The owner will get the market value of his flat (on VP basis), which is HK$800,000, plus SA of HK$600,000 (HK$1,200,000 x 50%). In total, this owner will receive HK$1,400,000.



Appendix II : Domestic Properties - Diagramatic Illustration of HPA, SA & EUV

One Flat

Occupation Status	HPA	SA	Market Value
1 Owner-occupied	100%		EUV(VP)
2 Partially Owner-occupied & Partially Tenanted	Owner-occupied portion : 100%	Tenanted portion : 75%	EUV(VP)
3 Wholly Tenanted		50%	EUV(VP)
4 Vacant		50%	EUV(VP)

Two Flats

Occupation Status	HPA	SA	Market Value
5 Owner-occupied	100%		EUV(VP)
Owner-occupied	100%		EUV(VP)
6 Owner-occupied	100%		EUV(VP)
Partially Owner-occupied & Partially Tenanted	Owner-occupied portion : 100%	Tenanted portion : 75%	EUV(VP)
7 Owner-occupied	100%		EUV(VP)
Wholly Tenanted		50%	EUV(VP)
8 Partially Owner-occupied & Partially Tenanted	Owner-occupied portion : 100%	Tenanted portion : 75%	EUV(VP)
Partially Owner-occupied & Partially Tenanted	Owner-occupied portion : 100%	Tenanted portion : 75%	EUV(VP)
9 Partially Owner-occupied & Partially Tenanted	Owner-occupied portion : 100%	Tenanted portion : 75%	EUV(VP)
Wholly Tenanted		50%	EUV(VP)
10 Wholly Tenanted		50%	EUV(VP)
Wholly Tenanted		25%	EUV(VP)
11 Vacant		50%	EUV(VP)
Vacant		25%	EUV(VP)

Three Flats

Occupation Status	HPA	SA	Market Value
12 Owner-occupied	100%		EUV(VP)
Owner-occupied	100%		EUV(VP)
Owner-occupied	100%		EUV(VP)
13 Owner-occupied	100%		EUV(VP)
Owner-occupied	100%		EUV(VP)
Partially Owner-occupied & Partially Tenanted	Owner-occupied portion : 100%	Tenanted portion : 75%	EUV(VP)
14 Owner-occupied	100%		EUV(VP)
Partially Owner-occupied & Partially Tenanted	Owner-occupied portion : 100%	Tenanted portion : 75%	EUV(VP)
Partially Owner-occupied & Partially Tenanted	Owner-occupied portion : 100%	Tenanted portion : 75%	EUV(VP)
15 Owner-occupied	100%		EUV(VP)
Partially Owner-occupied & Partially Tenanted	Owner-occupied portion : 100%	Tenanted portion : 75%	EUV(VP)
Wholly Tenanted		50%	EUV(VP)
16 Owner-occupied	100%		EUV(VP)
Owner-occupied	100%		EUV(VP)
Wholly Tenanted		50%	EUV(VP)
17 Owner-occupied	100%		EUV(VP)
Wholly Tenanted		50%	EUV(VP)
Wholly Tenanted		25%	EUV(VP)

Occupation Status	HPA	SA	Market Value
18 Partially Owner-occupied & Partially Tenanted	Owner-occupied portion : 100%	Tenanted portion : 75%	EUV(VP)
Partially Owner-occupied & Partially Tenanted	Owner-occupied portion : 100%	Tenanted portion : 75%	EUV(VP)
Partially Owner-occupied & Partially Tenanted	Owner-occupied portion : 100%	Tenanted portion : 75%	EUV(VP)
19 Partially Owner-occupied & Partially Tenanted	Owner-occupied portion : 100%	Tenanted portion : 75%	EUV(VP)
Partially Owner-occupied & Partially Tenanted	Owner-occupied portion : 100%	Tenanted portion : 75%	EUV(VP)
Wholly Tenanted		50%	EUV(VP)
20 Partially Owner-occupied & Partially Tenanted	Owner-occupied portion : 100%	Tenanted portion : 75%	EUV(VP)
Wholly Tenanted		50%	EUV(VP)
Wholly Tenanted		25%	EUV(VP)
21 Wholly Tenanted		50%	EUV(VP)
Wholly Tenanted		25%	EUV(VP)
Wholly Tenanted			EUV(VP)
22 Vacant		50%	EUV(VP)
Vacant		25%	EUV(VP)
Vacant			EUV(VP)

Abbreviations:

HPA Home Purchase Allowance
SA Supplementary Allowance
EUV Existing Use Value
VP Vacant Possession

Appendix 12

Rehousing and Ex-Gratia Payment Package for Domestic and Non-Domestic Tenants

Principles Adopted by the Urban Renewal Authority for Tenant Re-housing and Ex-gratia Allowance for Projects announced under the Urban Renewal Authority Ordinance (Not applicable to Tenants of Industrial Premises)

This leaflet briefly outlines the current principles and policies adopted by the Urban Renewal Authority ("URA") for providing re-housing and ex-gratia allowance to affected tenants of projects announced by the URA under the Urban Renewal Authority Ordinance ("URAO") (other than tenants of industrial premises).

(A) Re-housing for Domestic Tenants

(I) Public Rental Housing ("PRH")

Re-housing Arrangement

1. Eligible domestic tenants living in acquired properties of the URA will be re-housed in units provided by the Hong Kong Housing Authority ("HKHA") or the Hong Kong Housing Society ("HKHS"). In addition, they may opt for other subsidized housing schemes provided by the HKHA and the HKHS, if available.

Re-housing Eligibility

2. Domestic tenants must have been genuinely living in the properties within the project area continuously before and since the first day of Freezing Survey of the project ("the date of Freezing Survey") conducted by the URA until the date of re-housing offers issued by the URA to the domestic tenants, and have no alternative accommodation during the same period.

3. Domestic tenants must fulfill the prevailing eligibility criteria for PRH of the HKHA and the HKHS.

Re-housing Eligibility of Illegal Rooftop Structure Occupiers

4. Since there is no difference between the illegal rooftop structures within the URA's redevelopment project areas and the illegal rooftop structures in other domestic buildings, the re-housing eligibility of illegal rooftop structure occupiers for PRH of the HKHA is the same as the eligibility criteria adopted by the HKHA in re-housing the illegal rooftop structure occupiers in domestic buildings affected by the enforcement actions taken by the Buildings Department. Therefore, in addition to the general eligibility criteria for PRH of the HKHA, occupiers of illegal rooftop structures have to satisfy that they have been genuinely living in the structures within the project area continuously since two years before the date of Freezing Survey until the date of re-housing offers issued by the

URA to the occupiers, and have no alternative accommodation during the same period, and that the structures were built on or before 1 June 1982 in order to be eligible for PRH of the HKHA.

5. Occupiers of the illegal rooftop structures who can only fulfill the requirement of having been genuinely living in the relevant illegal rooftop structures continuously before and since the date of Freezing Survey until the date of re-housing offers issued by the URA to the occupiers, and have no alternative accommodation during the same period, will be eligible for re-housing in the PRH of the HKHS subject to meeting the eligibility criteria for PRH of the HKHS.

(II) URA Re-housing Block

Re-housing Arrangement

1. Domestic tenants living in URA acquired properties, who due to various reasons are not provided PRH re-housing as described in Part (A)(I) above, may be re-housed in units of Re-housing Block provided by the URA subject to fulfillment of the following eligibility criteria of the URA.

Re-housing Eligibility

2. A tenant and his/her household members must have been genuinely living in the properties within the project area continuously before and since the date of Freezing Survey until the date of re-housing offers issued by the URA to the tenants, and have no alternative accommodation during the same period.

3. All household members of a tenant must be legally residing in Hong Kong without any conditions of stay (excluding a time limit of stay).

4. All household members of a tenant, whether personally or through a company, must not own nor have any interest in any domestic property in Hong Kong.

5. The total monthly income of all household members of a tenant (including a tenant with all household members aged 60 or above) must not exceed 3 times the prevailing PRH maximum income limit of the HKHA for ordinary family applicants according to the tenant's household size. The total net asset of all household members of a tenant (including a tenant with all household members aged 60 or above) must not exceed 84 times the prevailing PRH maximum income limit of the HKHA for ordinary family applicants according to the tenant's household size.

6. Tenants and their household members, who are eligible for registration on the Application for PRH of the HKHA, must make the application accordingly.

7. Allocation of re-housing unit is governed by the prevailing policy of the URA on household composition.

(III) Ex-gratia Removal Allowance

1. Domestic tenants who accept rehousing arrangement will also be offered an ex-gratia removal allowance of an amount equivalent to the prevailing ex-gratia allowance offered by the Lands Department on resumption by the Government ("Government EGA") or the prevailing rates of the Ex-gratia Domestic Removal Allowance of HKHA, whichever is higher.

(IV) Compassionate Re-housing

1. Domestic tenants who do not fulfill the above rehousing eligibility criteria may be re-housed on compassionate grounds if they have genuine hardship arising from factors such as ill health, disability or special family circumstances.

(B) Ex-gratia Allowances

(I) Domestic Tenants

1. According to Landlord and Tenant (Consolidation) Ordinance, domestic tenants are required to move out from the properties and are not entitled to any compensation or forms of payments if their tenancies are terminated and are not renewed. However, for tenants of the URA acquired properties who decline re-housing as described in Part (A) above or who are not provided re-housing due to various reasons and agreed to move out from the properties, the URA will still offer to them an appropriate amount of ex-gratia allowances as described below.

Tenants who commenced occupying the properties before the date of Freezing Survey

2. Subject to the exceptions described in Paragraph 4 of Part (B)(I) below, the URA will offer an ex-gratia allowance to domestic tenants who had commenced occupying the properties under valid tenancies before the date of Freezing Survey. Based on the rateable value of the properties

concerned, the ex-gratia allowance is calculated according to the method as listed in **Table 1** below:

Table 1

Rateable Value ("RV")	Ex-gratia Allowance
1st HK$10,000	9 times RV
2nd HK$10,000	8 times RV
3rd HK$10,000	7 times RV
4th HK$10,000	6 times RV
5th HK$10,000	5 times RV
6th HK$10,000	4 times RV
7th HK$10,000	3 times RV
8th HK$10,000	2 times RV
9th HK$10,000 and above	1 times RV

3. Subject to the exceptions described in Paragraph 4 of Part (B)(I) below, the total amount of ex-gratia allowance is subject to a minimum amount of HK$180,000 (1) for an one-person household and a minimum amount of HK$200,000 (1) for a two-person or larger household.

Note: (1) Effective from 1 April 2020 and subject to annual review

4. The ex-gratia allowance described in Paragraph 2 of Part (B)(I) above and the minimum amount described in Paragraph 3 of Part (B)(I) above do not apply to domestic tenants who, at any time before and since the date of Freezing Survey and until the date of ex-gratia allowance offers issued by the URA to the tenants,

(i) have alternative accommodation; or

(ii) are not genuinely residing in properties within the project.

Domestic tenants who fall under any of these circumstances will be offered an ex-gratia allowance equal to 3 times Government EGA. However, if the tenants are not legal Hong Kong residents holding valid Hong Kong Identity Card ("HKIC"), they will only be offered 2 times Government EGA.

Tenants who commenced occupying the properties on or after the date of Freezing Survey

5. Subject to the exceptions described in Paragraph 6 of Part (B)(I) below, the URA will only offer an ex-gratia allowance equal to 2 times Government EGA to domestic tenants who had commenced occupying the properties under valid tenancies on or after the date of Freezing Survey.

6. The ex-gratia allowance described in Paragraph 5 of Part (B)(I) above does not apply to domestic tenants who,

(i) at any time before and since their occupation of the properties until the date of ex-gratia allowance offers issued by the URA to the tenants,

(a) have alternative accommodation; or
(b) are not genuinely residing in properties within the project; or

(ii) have received from the URA within two years prior to the date of Freezing Survey or at any time after the date of Freezing Survey any of the following allowances or arrangement:

(a) allowances for owners of domestic properties but excluding the incidental cost allowance; or
(b) ex-gratia allowances for domestic tenant being higher than Government EGA; or
(c) Relocation Assistance; or
(d) re-housing; or

(iii) are not legal Hong Kong residents holding valid HKIC.

Domestic tenants who fall under any of these circumstances will only be offered an ex-gratia allowance equal to 1 times Government EGA.

Principal Tenants

7. Subject to the exceptions described in Paragraph 8 of Part (B)(I) below, for principal tenants who had commenced occupying their properties and whose domestic tenancies commenced before the date of Freezing Survey, the URA will offer to them an ex-gratia allowance equal to the ex-gratia allowance described in Paragraph 2 of Part (B)(I) above subject to a minimum amount described in Paragraph 3 of Part (B)(I) above, plus an additional ex-gratia allowance equal to 24 months' profit rent (i.e. rent received from the sub-tenants after deduction of the rent payable by them to their landlords).

8. The ex-gratia allowance and minimum amount described in Paragraph 7 of Part (B)(I) above does not apply to principal tenants who, at any time before and since the date of Freezing Survey and until the date of ex-gratia allowance offers issued by the URA to the tenants,

(i) have alternative accommodation; or
(ii) are not genuinely residing in their properties within the project.

Principal tenants who fall under any of these circumstances will be offered an ex-gratia allowance equal to 3 times Government EGA plus 24 months' profit rent. However, if the principal tenants are not legal Hong Kong

residents holding valid HKIC, they will only be offered 2 times the Government EGA plus 24 months' profit rent.

9. Principal tenants occupying the properties and whose domestic tenancies commenced on or after the date of Freezing Survey will be offered an ex-gratia allowance according to Paragraphs 5 or 6 of Part (B)(I) above, whichever is applicable.

10. For those principal tenants who do not occupy their properties and whose domestic tenancies commenced before the date of Freezing Survey, they will be offered a minimum amount of HK$20,000 (1) or 24 months' profit rent, whichever is the higher. No ex-gratia allowance will be offered to principal tenants whose tenancies commenced on or after the date of Freezing Survey.

Note: (1) Effective from 1 April 2020 and subject to annual review

11. Principal tenants will be offered rental reduction from the URA. Where any sub-tenant surrenders his leased portion to the URA before the principal tenant delivers vacant possession, the rent payable by principal tenant will be reduced accordingly.

(II) Non-domestic Tenants (Other than Tenants of Industrial Premises)

Ex-gratia Allowance

1. According to the Landlord and Tenant (Consolidation) Ordinance, non-domestic tenants are required to move out from their properties and are not entitled to any compensation or other payments if their tenancies are terminated and are not renewed. However, the URA will still offer an ex-gratia allowance equals to 3 times the RV of the affected properties or an ex-gratia allowance equivalent to the prevailing ex-gratia allowance offered by the Lands Department on resumption by the Government, whichever is higher, to non-domestic tenants (other than tenants of industrial premises) who agreed to move out from their properties.

2. In addition to the ex-gratia allowance described in Paragraph 1 of Part (B)(II) above, additional payment of ex-gratia business allowance ("EGBA") is payable to any tenant-operator of non-domestic property (other than tenants of industrial premises) who had commenced occupying their properties for business use before the date of Freezing Survey and have accepted the ex-gratia allowance offer from the URA both unconditionally and within the validity period of the offer and agreed to move out from their properties. The amount of EGBA is directly proportional to the number of years of continuous operation by the tenant-operator as business owner in the property. In calculating the number of

years of continuous operation, the expiry date of continuous operation is 2 years from the date which the URA issues initial acquisition offers to property owners. The amount of EGBA is payable at a rate of 0.1 times the RV for each year, subject to a maximum of 30 years. For an incomplete year, the amount of EGBA is calculated on a pro-rata basis to the nearest month. The amount of EGBA is subject to a maximum amount of $700,000 and a minimum amount as described in **Table 2** below.

Table 2

Continuous Operation for	**Minimum Amount of EGBA**
(a) 10 years or less	HK$110,000 (effective from 1 April 2020 and subject to annual review)
(b) More than 10 years (maximum 30 years)	The minimum amount for (a) above plus an additional HK$10,000 for each completed year after 10 years.

3. In the application for EGBA, the Tenant-operator is required to substantiate the period of continuous operation in the property as business owner. "Tenant-operator" here means a tenant who occupies his property, which is a legal premises, for his own business.

4. A tenant-operator may choose to claim for (i) severance payment (if any) paid to his/her employees under Employment Ordinance (Chapter 57); and (ii) value of an unexpired lease term and professional fee reasonably incurred (if any), as an alternative to the EGBA (if applicable).

5. A tenant-operator may also choose to claim for business loss (including the claims as mentioned in Paragraph 4 of Part (B)(II) above) as an alternative to the two allowances referred to in Paragraphs 1 and 2 of Part (B)(II) above (if applicable).

(C) Payment Arrangement

1. All applicable allowance mentioned above, half will be paid upon the execution of surrender agreement and the remaining half will be paid after the delivery of vacant possession.

(D) Other General Rules

1. Trespassers occupying properties (domestic or non-domestic) in the project, who move in on or after the date of Freezing Survey, will be required to move out without any allowance or re-housing.

2. In cases where the property is occupied for domestic and non-domestic uses simultaneously, the URA will determine whether the tenancy is domestic or non-domestic in accordance with the provisions of the Landlord and Tenant (Consolidation) Ordinance.

3. If tenants (domestic or non-domestic) refuse to accept ex-gratia allowance or re-housing offer or execute surrender documents, the URA will recover vacant possession of their properties in accordance with the laws.

4. Domestic tenants whose tenancy commenced before the date of Freezing Survey and who was requested by their landlord to move out from the affected properties due to the expiry or termination of their tenancies before the URA acquired the affected properties successfully and who are unable to receive the ex-gratia allowances according to Part (B)(I) (the "affected domestic tenants") can apply for the URA's "Domestic Tenant Compassionate Assistance Programme" ("DTCAP"). The affected domestic tenants should submit application to the URA with tenancy agreement, rent receipts, termination notice served by the landlord to the affected domestic tenants and residential proof etc., at least 1 month before moving out from the affected properties, to facilitate the URA to conduct initial assessment on their eligibility of receiving Special Ex-gratia Allowance or Special Re-housing. Amount of the Special Ex-gratia Allowance is equal to the ex-gratia allowance described in Paragraph 2 and Paragraph 3 of Part (B)(I) above.

5. To become eligible for DTCAP, the affected domestic tenants should fulfill the following eligibility criteria:

   (i) they have been genuinely residing with valid tenancy in the affected properties continuously before and since the date of Freezing Survey and have been genuinely residing in the affected properties for at least 6 months continuously before moving out from the affected properties; and
   (ii) they do not have alternative accommodation elsewhere before and since the date of Freezing Survey until their moving out from the affected properties; and
   (iii) they are required to leave the affected properties not because of their breach of tenancy on their part; and
   (iv) after the expiry of their tenancies, they have not refused to renew their tenancies due to unreasonable grounds and circumstances; and
   (v) they have not received any compensation or other payment from their landlords for vacating the affected properties; and
   (vi) they are legal Hong Kong residents holding valid HKIC; and
   (vii) their landlords have not served the termination notice to them before the date of Freezing Survey; and
   (viii) they have registered on the Application for PRH of the HKHA; and

(ix) if Special Re-housing is to be offered, they have to fulfill the eligibility criteria of PRH laid down by the HKHA and/or HKHS or of URA re-housing.

Tenants who moved in on or after the date of Freezing Survey are not eligible for DTCAP.

6. If the affected domestic tenants are eligible for DTCAP, the URA will pay Special Ex-gratia Removal Allowance in advance. The amount is equal to the ex-gratia removal allowance as described in Paragraph 1 of Part (A)(III) above. The pre-paid amount will be deducted from the future payment of Special Ex-gratia Allowance.

After completion of the acquisition or government resumption of the affected properties, the URA will assess the eligibility of the affected domestic tenants in receiving the Special Ex-gratia Allowance or Special Re-housing.

7. Domestic tenants, who undergo the same situation as mentioned in Paragraph 4 of Part (D) above and are not eligible for DTCAP, can apply for the URA's Relocation Assistance. The affected domestic tenants must fulfill the eligibility criteria mentioned in items (i) to (vi) of Paragraph 5 of Part (D) above, and should submit application and provide sufficient evidence to the URA at least 1 month before moving out from the affected properties for URA's verification and assessment.

8. The URA will pay Relocation Assistance to the affected domestic tenants after they have moved out from the affected properties. Affected domestic tenants who have received Relocation Assistance are not eligible to apply for DTCAP described in Paragraph 4 of Part (D) above in the same project.

9. Domestic tenants who opt for receiving any ex-gratia allowance of a total amount more than 1 times the Government EGA (but excluding the 24 months' profit rent) or Relocation Assistance as described in Paragraph 7 of Part (D) above have to agree to give up their rights to public housing assistance for the next 2 years. Such tenants are only allowed to submit fresh applications for PRH and other public housing assistance after the expiry of the 2-years period.

10. Non-domestic tenant-operator (except tenants of industrial premises) whose tenancy commenced before the date of Freezing Survey and who was requested by their landlord to move out from the affected properties due to the expiry or termination of their tenancies before the URA acquired the affected properties successfully and moving out from the affected non-domestic properties after the date of Freezing Survey and who are unable to receive the ex-gratia allowances according to Part (B)(II) (the "affected non-domestic tenants") can apply for the URA's Special EGBA. The amount is equal to EGBA as described in Paragraph 2 of Part (B)(II) above. The affected non-domestic tenants should provide

sufficient evidence of business operation, including tenancy agreements, rental receipts, termination notice served by their landlord and other relevant documents, at least 1 month before moving out from the affected non-domestic properties, to facilitate the URA to conduct initial assessment on their eligibility of receiving Special EGBA.

11. To become eligible for Special EGBA, the affected non-domestic tenants should fulfill the following criteria:

(i) they are operating in a legal premises; and
(ii) they have commenced operating business in the affected properties with valid tenancy continuously before and since the date of Freezing Survey and have been in operation for at least 6 months continuously before moving out from the affected properties; and
(iii) they are required to leave the affected properties not because of his/her breach of tenancy terms; and
(iv) the tenancy is terminated or not renewed by the landlord and they have not terminated the tenancy early at their own will; and
(v) they have received no compensation or other payment from their landlord for vacating the affected properties; and
(vi) after the expiry of the tenancy, they have not refused to renew their tenancy due to unreasonable grounds and circumstances.

After completion of the acquisition or government resumption of the affected properties, the URA will assess the eligibility of the affected non-domestic tenants in receiving the Special EGBA.

12. The URA has drawn to the attention of landlords whose properties had been tenanted out on the date of Freezing Survey that the URA will not consider making a higher offer to them to acquire their properties in the following situations: -

(i) properties being left vacant; or
(ii) landlords entering into new tenancies, whether with the existing tenants or new tenants; or
(iii) landlords occupying their properties for their own use.

13. The URA would remind landlords / tenants that it is an offence for landlords to unlawfully deprive a tenant of occupation of property or to make an unwarranted demand with menaces with a view to gain for himself or others or to defraud against the URA. The URA will report to the enforcement authorities on all cases of suspected criminal offences.

14. The information contained in this leaflet applies to projects announced by the URA under the URAO only (i.e. not applicable to tenants of industrial premises). The URA reserves the right to adopt different policies and procedures for its other projects.

This leaflet is issued for the purpose of general reference only. The information contained herein is with reference to the principles and practice of the Urban Renewal Authority prevailing at the date of issue of this leaflet. It shall not constitute any representation on the part of the Urban Renewal Authority or give rise to any expectation whatsoever and shall not be relied on as such. Each case will be considered on its own merits having regard to all factors and circumstances. The terms of re-housing and/or ex-gratia allowance to be offered are subject to the principles and practice of the Urban Renewal Authority prevailing at the time the offer of re-housing and/or ex-gratia allowance is made and are subject to review from time to time as the Urban Renewal Authority shall at its absolute discretion consider appropriate. The Urban Renewal Authority's right to add to, amend or delete the whole or any part of this leaflet is hereby reserved.

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