
新蒲崗
SAN PO KONG
牛池灣
NGAU CHI WAN
啓德
KAI TAK
九龍灣
KOWLOON BAY
佐敦谷
JORDAN VALLEY
牛頭角
NGAU TAU KOK
秀茂坪
SAU MAU PING
觀塘
KWUN TONG
PRINCE EDWARD ROAD EAST
CHOI HUNG ESTATE
NEW CLEAR WATER BAY ROAD
CLEAR WATER BAY ROAD
CHOI HUNG ROAD
KAI TAK ROAD
KAI CHEUNG ROAD
KAI LOK STREET
LAM WAH STREET
LAM TUNG STREET
SHUN YUET ROAD
SHUN TAK ROAD
CHUN SHUN ROAD
HONG SHUN ROAD
NGAU TAU KOK ROAD
KWUN TONG BYPASS
WANG TUNG STREET
WANG HOI ROAD
WANG CHIU ROAD
WANG TUNG ESTATE
Richland Gardens
Kai Yip Estate
Kai Yiu Court
Kowloon Bay Park
Kowloon Bay Sports Ground
Kowloon Bay Playground
Choi Ying Estate
Choi Hung Road Park
Choi Tsook Estate
Choi Ha Estate
Tak Ko Garden
Ashley Gardens
Ngau Tau Kok Estate
Choi Hung Estate
Ping Shek Estate
Ping Shek Playground
Choi Tak Estate
Cow Wing Road Park
Jordan Valley Park
Jordan Valley Playground
Jordan Valley Swimming Pool
Shun Lee Tsuen Park
Shun Lee Tsuen Playground
Shun Lee Estate
Shun Chi Court
Shun On Estate
Shun Tin Estate
Yau Tong Bay
Yau Tong Bay Typhoon Shelter
Yau Tong Bay Playground
Yau Tong Estate
Yau Tong Centre
Yau Tong Industrial Area
Yau Tong Industrial Area (Phase 1)
Yau Tong Industrial Area (Phase 2)
Yau Tong Industrial Area (Phase 3)
Yau Tong Industrial Area (Phase 4)
Yau Tong Industrial Area (Phase 5)
Yau Tong Industrial Area (Phase 6)
Yau Tong Industrial Area (Phase



圖例
NOTATION

ZONES — 地帶

COMMERCIAL	C	商業
RESIDENTIAL (GROUP A)	R(A)	住宅（甲類）
RESIDENTIAL (GROUP B)	R(B)	住宅（乙類）
GOVERNMENT, INSTITUTION OR COMMUNITY	G/IC	政府、機構或社區
OPEN SPACE	O	休憩用地
OTHER SPECIFIED USES	OU	其他指定用途
GREEN BELT	GB	綠化地帶

COMMUNICATIONS — 交通

RAILWAY AND STATION (UNDERGROUND)	MTR STATION	鐵路及車站（地下）
RAILWAY AND STATION (ELEVATED)	MTR STATION	鐵路及車站（高架）
MAJOR ROAD AND JUNCTION		主要道路及路口
ELEVATED ROAD		高架道路
PEDESTRIAN PRECINCT / STREET		行人專用區或街道

MISCELLANEOUS — 其他

BOUNDARY OF PLANNING SCHEME		規劃範圍界線
BUILDING HEIGHT CONTROL ZONE BOUNDARY		建築物高度管制區界線
MAXIMUM BUILDING HEIGHT (IN METRES ABOVE PRINCIPAL DATUM)	120	最高建築物高度（在主水平基準上若干米）
MAXIMUM BUILDING HEIGHT (IN NUMBER OF STOREYS)	8	最高建築物高度（樓層數目）
PETROL FILLING STATION	P F S	加油站
NON-BUILDING AREA	NBA	非建築用地

土地用途及面積一覽表
SCHEDULE OF USES AND AREAS

USES	大約面積及百分率 APPROXIMATE AREA & % 公頃 HECTARES	% 百分率	用途
COMMERCIAL	7.47	2.19	商業
RESIDENTIAL (GROUP A)	68.30	20.01	住宅（甲類）
RESIDENTIAL (GROUP B)	4.74	1.39	住宅（乙類）
GOVERNMENT, INSTITUTION OR COMMUNITY	47.36	13.88	政府、機構或社區
OPEN SPACE	48.66	14.26	休憩用地
OTHER SPECIFIED USES	40.49	11.86	其他指定用途
GREEN BELT	52.63	15.42	綠化地帶
MAJOR ROAD ETC.	71.61	20.99	主要道路等
TOTAL PLANNING SCHEME AREA	341.26	100.00	規劃範圍總面積

夾附的《註釋》屬這份圖則的一部分，
現經修訂並按照城市規劃條例第5條展示。
THE ATTACHED NOTES ALSO FORM PART OF THIS PLAN AND HAVE BEEN AMENDED FOR EXHIBITION UNDER SECTION 5 OF THE TOWN PLANNING ORDINANCE

核准圖編號 S/K13/30 的修訂
AMENDMENTS TO APPROVED PLAN No. S/K13/30

AMENDMENTS EXHIBITED UNDER SECTION 5 OF THE TOWN PLANNING ORDINANCE	按照城市規劃條例第5條展示的修訂
AMENDMENT ITEM A1	修訂項目A1項
AMENDMENT ITEM A2	修訂項目A2項
AMENDMENT ITEM A3	修訂項目A3項
AMENDMENT ITEM A4	修訂項目A4項
AMENDMENT ITEM A5	修訂項目A5項
AMENDMENT ITEM A6	修訂項目A6項
AMENDMENT ITEM B	修訂項目B項

（參看附表）
(SEE ATTACHED SCHEDULE)

香港城市規劃委員會依據城市規劃條例擬備的牛頭角及九龍灣（九龍規劃區第13及17區）分區計劃大綱圖
TOWN PLANNING ORDINANCE, HONG KONG TOWN PLANNING BOARD
KOWLOON PLANNING AREAS No. 13 & 17 - NGAU TAU KOK & KOWLOON BAY - OUTLINE ZONING PLAN

SCALE 1:5000 比例尺

米 METRES 100 0 200 400 600 800 METRES 米

規劃署遵照城市規劃委員會指示擬備
PREPARED BY THE PLANNING DEPARTMENT UNDER THE DIRECTION OF THE TOWN PLANNING BOARD

圖則編號 PLAN No. **S/K13/30A**

KOWLOON PLANNING AREAS NO. 13 & 17

~~APPROVED~~ *DRAFT* NGAU TAU KOK AND KOWLOON BAY OUTLINE ZONING PLAN NO. S/K13/30*A*

(Being ~~an Approved~~***a Draft*** Plan for the Purposes of the Town Planning 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 junctions, alignment of roads and railway tracks, and boundaries between zones 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 Notes of individual zones:

(a) provision, maintenance or repair of plant nursery, amenity planting, open space, rain shelter, refreshment kiosk, road, bus/rail/public light bus stop or lay-by, cycle track, ~~railway track, railway~~ ***Mass Transit Railway*** station entrance, ***Mass Transit Railway*** ~~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;

(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; and

(c) maintenance or repair of watercourse and grave.

(8) In any area shown as 'Road', all uses or developments except those specified in paragraph (7) above and on-street vehicle park require permission from the Town Planning Board.

(9) 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.

(10) 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.

KOWLOON PLANNING AREAS NO. 13 & 17

~~APPROVED~~ *DRAFT* NGAU TAU KOK AND KOWLOON BAY
OUTLINE ZONING PLAN NO. S/K13/30*A*

Schedule of Uses

	Page
COMMERCIAL	1
RESIDENTIAL (GROUP A)	~~3~~*4*
RESIDENTIAL (GROUP B)	~~7~~*8*
GOVERNMENT, INSTITUTION OR COMMUNITY	~~9~~*10*
OPEN SPACE	~~11~~*12*
OTHER SPECIFIED USES	~~12~~*13*
GREEN BELT	~~27~~*28*

COMMERCIAL

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 Eating Place Educational Institution Exhibition or Convention Hall Government Use (not elsewhere specified) ***Hotel (on land designated "Commercial (2)" only)*** Information Technology and Telecommunications Industries Institutional Use (not elsewhere specified) Library ~~Market~~ Off-course Betting Centre Office Place of Entertainment Place of Recreation, Sports or Culture Private Club Public Clinic Public Convenience Public Transport Terminus or Station Public Utility Installation Public Vehicle Park (excluding container vehicle) Radar, Telecommunications Electronic Microwave Repeater, Television and/or Radio Transmitter Installation Recyclable Collection Centre Religious Institution Research, Design and Development Centre School Shop and Services Social Welfare Facility (excluding those involving residential care) Training Centre Utility Installation for Private Project	Broadcasting, Television and/or Film Studio Cargo Handling and Forwarding Facility Government Refuse Collection Point Hospital Hotel ***(not elsewhere specified)*** Mass Transit Railway Vent Shaft and/or Other Structure above Ground Level other than Entrances Petrol Filling Station Wholesale Trade

(Please see next page)

COMMERCIAL (Cont'd)

Planning Intention

This zone is intended primarily for commercial developments, which may include ***uses such as office,*** shop, services, place of entertainment and eating place~~.~~***, functioning as territorial business/financial centre(s) and regional or district commercial/shopping centre(s). These areas are usually major employment nodes.***

Remarks

(1) ***On land designated "Commercial", no***~~No~~ new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of a maximum plot ratio of 12.0 and the maximum building height~~s~~, in terms of metres above Principal Datum (mPD), as stipulated on the Plan, or the plot ratio and height of the existing building, whichever is the greater.

(2) ***On land designated "Commercial(1)", no new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of a maximum gross floor area (GFA) of 204,600m^2 and the maximum building height, in terms of mPD, as stipulated on the Plan, or the GFA and height of the existing building, whichever is the greater. A public transport interchange as required by the Government shall be provided. A public open space of not less than 6,300m^2, of which not less than 4,400m^2 is at-grade at the southeastern corner of the "Commercial(1)" zone abutting Cheung Yip Street and Kai Fuk Road Flyover, shall be provided.***

(3) ***On land designated "Commercial(2)", no new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of a maximum GFA of 201,400m^2 and the maximum building height, in terms of mPD, as stipulated on the Plan, or the GFA and height of the existing building, whichever is the greater. A public open space of not less than 11,800m^2, of which not less than 8,400m^2 is at-grade at the northern portion of the "Commercial(2)" zone underneath Kai Fuk Road Flyover, shall be provided.***

(4) On land demarcated for a 16m-wide building gap from Lam Wah Street to Lam Lok Street as shown on the Plan, no new development (except minor addition, alteration and/or modification not affecting the building height of the existing building) or redevelopment of an existing building shall exceed the maximum building height restriction of 22mPD.

(Please see next page)

COMMERCIAL (Cont'd)

Remarks (Cont'd)

~~(1)~~**(5)** In determining the ***relevant*** maximum plot ratio***/GFA*** for the purposes of paragraph***s*** (1) ***to (3)*** above, any floor space that is constructed or intended for use solely as car park, loading/unloading bay, plant room and caretaker's office, provided such uses and facilities are ancillary and directly related to the development or redevelopment, may be disregarded.

~~(2)~~**(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***/GFA*** for the building on land to which paragraph***s*** (1) ***to (3)*** 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***/GFA*** specified in paragraph***s*** (1) ***to (3)*** above may thereby be exceeded.

~~(3)~~**(7)** Based on the individual merits of a development or redevelopment proposal, minor relaxation of the development restrictions stated in paragraph***s*** (1) ***to (3)*** above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

~~(4)~~**(8)** Under exceptional circumstances, for developments and/or redevelopments, minor relaxation of the building gap restriction stated in paragraph (~~2~~***4***) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

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 Flat Government Use (not elsewhere specified) House Library Market Place of Recreation, Sports or Culture Public Clinic Public Transport Terminus or Station (excluding open-air terminus or station) ***Public Vehicle Park (excluding container vehicle) (on land designated "Residential (Group A)3" only)*** Residential Institution School (in free-standing purpose-designed building only) Social Welfare Facility Utility Installation for Private Project	Commercial Bathhouse/Massage Establishment Eating Place Educational Institution Exhibition or Convention Hall Government Refuse Collection Point Hospital Hotel Institutional Use (not elsewhere specified) Mass Transit Railway Vent Shaft and/or Other Structure above Ground Level other than Entrances Office Petrol Filling Station Place of Entertainment Private Club Public Convenience Public Transport Terminus or Station (not elsewhere specified) Public Utility Installation Public Vehicle Park (excluding container vehicle) ***(not elsewhere specified)*** 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 an existing building, both excluding floors containing wholly or mainly car parking, loading/unloading bays 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 an existing building.

Remarks

(1) On land designated "Residential (Group A)" ("R(A)")**,** ~~and~~ "R(A)2" ***and "R(A)3"***, 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 (9) and/or (10) 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 land designated "R(A)"**,** ~~and~~ "R(A)2" ***and "R(A)3"***, the maximum plot ratio shall not exceed 9.0 except where the plot ratio is permitted to be exceeded under paragraphs (9) and/or (10) hereof.

(Please see next page)

RESIDENTIAL (GROUP A) (Cont'd)

Remarks (Cont'd)

(3) On land designated "R(A)1", no new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of a maximum domestic plot ratio of 6.0 and a maximum non-domestic plot ratio of 1.0, or the plot ratio of the existing building, whichever is the greater.

(4) For the purposes of paragraphs (1) and (3) 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 plot ratio(s) of 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 paragraphs (1) and (3) 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.

(5) On land designated "R(A)2", an indoor recreation centre shall be provided.

(6) On land designated "R(A)", "R(A)1"~~,~~ ***,*** ~~and~~ "R(A)2" ***and "R(A)3"***, no new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of the maximum building 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.

(7) In determining the relevant maximum plot ratio for the purposes of paragraphs (1) to (3), area of any part of the site that is occupied or intended to be occupied by free-standing purpose-designed buildings (including both developed on ground and on podium level) solely for accommodating Government, institution or community ***(GIC)*** facilities including school(s) as may be required by Government shall be deducted in calculating the relevant site area.

(Please see next page)

RESIDENTIAL (GROUP A) (Cont'd)

Remarks (Cont'd)

(8) In determining the relevant maximum plot ratio for the purposes of paragraphs (1) to (3), any floor space that is constructed or intended for use solely as car park, loading/unloading bay, plant room and 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, may be disregarded. ***On land designated "R(A)3", in determining the relevant maximum plot ratio, any floor space that is constructed or intended for use solely as GIC facilities, as required by the Government may be disregarded.***

(9) Where the permitted plot ratio as defined in Building (Planning) Regulations is permitted to be exceeded in circumstances as set out in Regulation 22(1) or (2) of the said Regulations, the plot ratio for the building on land to which paragraph (1), (2) or (3) 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 paragraphs (1) to (3) above may thereby be exceeded.

(10) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the development restrictions ~~as~~ stated in paragraphs (1) to (3) and (6) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

(11) Under exceptional circumstances, for developments and/or redevelopments, minor relaxation of the non-building area restriction as shown on the Plan may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

RESIDENTIAL (GROUP B)

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

(Please see next page)

RESIDENTIAL (GROUP B) (Cont'd)

Planning Intention

This zone is intended primarily for medium-density residential developments where commercial uses serving the residential neighbourhood may be permitted on application to the Town Planning Board.

Remarks

(1) No new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of a maximum gross floor area ***(GFA)*** of 89,800m^2 and the maximum building height in terms of metres above Principal Datum, as stipulated on the Plan, or the height of the existing building, whichever is the greater.

(2) In determining the maximum ~~gross floor area~~***GFA*** for the purposes of paragraph (1) above, any floor space that is constructed or intended for use solely as car park, loading/unloading bay, plant room and caretaker's office, 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, may be disregarded.

(3) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the development restrictions stated in paragraph (1) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

(4) Under exceptional circumstances, for developments and/or redevelopments, minor relaxation of the non-building area restriction as shown on the Plan may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

GOVERNMENT, INSTITUTION OR COMMUNITY

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 Animal Quarantine Centre (in Government building only) Broadcasting, Television and/or Film Studio Cable Car Route and Terminal Building Eating Place (Canteen, Cooked Food Centre only) Educational Institution Exhibition or Convention Hall Field Study/Education/Visitor Centre Government Refuse Collection Point Government Use (not elsewhere specified) Hospital Institutional Use (not elsewhere specified) Library Market Place of Recreation, Sports or Culture Public Clinic Public Convenience Public Transport Terminus or Station Public Utility Installation Public Vehicle Park (excluding container vehicle) Recyclable Collection Centre Religious Institution Research, Design and Development Centre School Service Reservoir Social Welfare Facility Training Centre Wholesale Trade	Animal Boarding Establishment Animal Quarantine Centre (not elsewhere specified) Columbarium Correctional Institution Crematorium Driving School Eating Place (not elsewhere specified) Flat Funeral Facility Helicopter Landing Pad Helicopter Fuelling Station Holiday Camp Hotel House Mass Transit Railway Vent Shaft and/or Other Structure above Ground Level other than Entrances Off-course Betting Centre Office Petrol Filling Station Place of Entertainment Private Club Radar, Telecommunications Electronic Microwave Repeater, Television and/or Radio Transmitter Installation Refuse Disposal Installation (Refuse Transfer Station only) Residential Institution Sewage Treatment/Screening Plant Shop and Services ***(not elsewhere specified)*** Utility Installation for Private Project Zoo

Planning Intention

This zone is intended primarily for the provision of Government, institution or community facilities serving the needs of the local residents and/or a wider district, region or the territory. It is also intended to provide land for uses directly related to or in support of the work of the Government, organizations providing social services to meet community needs, and other institutional establishments.

(Please see next page)

GOVERNMENT, INSTITUTION OR COMMUNITY (Cont'd)

Remarks

(1) On land designated "Government, Institution or Community" ("G/IC") and "G/IC(1)", no new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of the maximum building height, in terms of number of storeys or metres above Principal Datum ***(mPD)***, as stipulated on the Plan, or the height of the existing building, whichever is the greater.

(2) On land designated "G/IC(2)", no addition, alteration and/or modification to an existing building shall result in a total development in excess of the maximum building height, in terms of number of storeys, as stipulated on the Plan, or the height of the existing building, whichever is the greater. Any addition, alteration and/or modification to (except those minor alteration and/or modification works which are ancillary and directly related to the always permitted uses) the existing historic buildings requires planning permission from the Town Planning Board under section 16 of the Town Planning Ordinance.

(3) In determining the relevant maximum building height in terms of number of storeys for the purposes of paragraphs (1) and (2) above, any basement floor(s) may be disregarded.

(4) On land designated "G/IC(1)", a minimum of 3m-wide non-building area(s) from the lot boundaries abutting Wang Kwong Road and Wang Chiu Road (between Kai Cheung Road and Kai Fuk Road) shall be provided.

(5) On land designated "G/IC(3)", no new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of a maximum domestic gross floor area ***(GFA)*** of 16,500m^2, a maximum non-domestic ~~gross floor area~~***GFA*** of 4,125m^2 and 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.

(6) In determining the maximum ~~gross floor area~~***GFA*** for the purposes of paragraph (5) above, any floor space that is constructed or intended for use solely as car park, loading/unloading bay, plant room and 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, may be disregarded.

(7) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the development restrictions 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.

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

OPEN SPACE

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
Aviary Barbecue Spot Field Study/Education/Visitor Centre Park and Garden Pavilion Pedestrian Area Picnic Area Playground/Playing Field Promenade Public Convenience Sitting Out Area Zoo	Cable Car Route and Terminal Building Eating Place Government Refuse Collection Point Government Use (not elsewhere specified) Holiday Camp Mass Transit Railway Vent Shaft and/or Other Structure above Ground Level other than Entrances Place of Entertainment Place of Recreation, Sports or Culture Private Club Public Transport Terminus or Station Public Utility Installation Public Vehicle Park (excluding container vehicle) Religious Institution Service Reservoir Shop and Services Tent Camping Ground Utility Installation for Private Project

Planning Intention

This zone is intended primarily for the provision of outdoor open-air public space for active and/or passive recreational uses serving the needs of local residents as well as the general public.

Remarks

(1) A minimum of 3m-wide non-building area(s) from the lot boundaries abutting Wang Kwong Road and Wang Chiu Road (between Kai Cheung Road and Kai Fuk Road) shall be provided.

(2) Under exceptional circumstances, for developments and/or redevelopments, minor relaxation of the non-building area restrictions stated in paragraph (1) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

OTHER SPECIFIED USES

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

For "Business" only

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

Ambulance Depot
Commercial Bathhouse/Massage Establishment
Eating Place
Educational Institution
Exhibition or Convention Hall
Government Use (Police Reporting Centre, Post Office only)
Information Technology and Telecommunications Industries
Institutional Use (not elsewhere specified)
Library
Non-polluting Industrial Use (excluding industrial undertakings involving the use/storage of Dangerous Goods [△])
Off-course Betting Centre
Office
Place of Entertainment
Place of Recreation, Sports or Culture
Private Club
Public Clinic
Public Convenience
Public Transport Terminus or Station
Public Utility Installation
Public Vehicle Park (excluding container vehicle)
Radar, Telecommunications Electronic Microwave Repeater, Television and/or Radio Transmitter Installation
Recyclable Collection Centre
Religious Institution
Research, Design and Development Centre
School (excluding free-standing purpose-designed building and kindergarten)
Shop and Services
Training Centre
Utility Installation for Private Project
Broadcasting, Television and/or Film Studio
Cargo Handling and Forwarding Facility
Government Refuse Collection Point
Government Use (not elsewhere specified)
Hotel
Mass Transit Railway Vent Shaft and/or Other Structure above Ground Level other than Entrances
Non-polluting Industrial Use (not elsewhere specified)
Petrol Filling Station
School (not elsewhere specified)
Social Welfare Facility (excluding those involving residential care)
Vehicle Repair Workshop (on land designated "OU(Business)1" only)
Warehouse (excluding Dangerous Goods Godown)
Wholesale Trade

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

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

For "Business" only (Cont'd)

Schedule II: for industrial or industrial-office building [@]

Ambulance Depot
Art Studio (excluding those involving direct provision of services or goods)
Bus Depot
Cargo Handling and Forwarding Facility (not elsewhere specified)
Eating Place (Canteen only)
Government Refuse Collection Point
Government Use (not elsewhere specified)
Information Technology and Telecommunications Industries
Non-polluting Industrial Use (excluding industrial undertakings involving the use/storage of Dangerous Goods [△])
Office (excluding those involving direct provision of customer services or goods)
Public Convenience
Public Transport Terminus or Station
Public Utility Installation
Public Vehicle Park (excluding container vehicle)
Radar, Telecommunications Electronic Microwave Repeater, Television and/or Radio Transmitter Installation
Recyclable Collection Centre
Research, Design and Development Centre
Shop and Services (Motor Vehicle Showroom on ground floor, Service Trades only)
Utility Installation for Private Project
Vehicle Repair Workshop (on land designated "OU(Business)1" only)
Warehouse (excluding Dangerous Goods Godown)

Broadcasting, Television and/or Film Studio
Cargo Handling and Forwarding Facility (Container Freight Station, free-standing purpose-designed Logistics Centre only)
Educational Institution (ground floor only)
Industrial Use (not elsewhere specified)
Mass Transit Railway Vent Shaft and/or Other Structure above Ground Level other than Entrances
Off-course Betting Centre
Office (not elsewhere specified)
Petrol Filling Station
Place of Entertainment (ground floor only)
Place of Recreation, Sports or Culture (not elsewhere specified)
Private Club
Religious Institution (ground floor only)
Shop and Services (not elsewhere specified) (ground floor only except Ancillary Showroom[#] which may be permitted on any floor)
Training Centre
Vehicle Repair Workshop (not elsewhere specified)
Wholesale Trade

In addition, for building without industrial undertakings involving offensive trades or the use/storage of Dangerous Goods [△], the following use is always permitted :

Office

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

For "Business" only (Cont'd)

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

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

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

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

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

For "Business" only (Cont'd)

Planning Intention

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

Remarks

(1) No new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of a maximum plot ratio of 12.0 and the maximum building height, in terms of metres above Principal Datum (mPD), as stipulated on the Plan, or the plot ratio and height of the existing building, whichever is the greater.

(2) A minimum of 3m-wide non-building area(s) from the lot boundaries abutting Wang Kwong Road ~~and~~ Wang Chiu Road (between Kai Cheung Road and Kai Fuk Road) shall be provided.

(3) On land demarcated for a 15m-wide building gap from Lam Hing Street to Lam Wah Street as shown on the Plan, no new development (except minor addition, alteration and/or modification not affecting the building height of the existing building) or redevelopment of an existing building shall exceed the maximum building height restriction of 22mPD.

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

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

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

For "Business" only (Cont'd)

Remarks (Cont'd)

(6) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the development restrictions stated in paragraph (1) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

(7) Under exceptional circumstances, for developments and/or redevelopments, minor relaxation of the non-building area restrictions as shown on the Plan and stated in paragraph (2) above and the building gap restrictions stated in paragraph (3) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

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

For "Railway" only

Railway Mass Transit Railway Station	Government Use (not elsewhere specified) Mass Transit Railway Vent Shaft and/or Other Structure above Ground Level other than Entrances Utility Installation not Ancillary to the Specified Use

Planning Intention

This zone is intended primarily for the provision of land for the open-air railway, the Kowloon Bay Mass Transit Railway (MTR) Station and the associated facilities.

Remarks

(1) No new development except one-storey structure ancillary to the railway and MTR Station shall be permitted.

(2) No addition, alteration and/or modification to or redevelopment of an existing building/structure shall result in a total development and/or redevelopment in excess of the maximum building height, in terms of number of storey(s), as stipulated on the Plan, or the height of the existing building, whichever is the greater.

(3) In determining the relevant maximum number of storey(s) for the purposes of paragraphs (1) and (2) above, any basement floor(s) may be disregarded.

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

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

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

For "Mass Transit Railway Depot with Commercial and Residential Development Above" only

Ambulance Depot
Commercial Bathhouse/Massage Establishment
Eating Place
Educational Institution (in free-standing purpose-designed building, in a commercial building or in the non-domestic part of a commercial/ residential building only)
Exhibition or Convention Hall
Flat
Government Use (not elsewhere specified)
Library
~~Market~~
Mass Transit Railway Depot
Off-course Betting Centre
Office
Place of Entertainment
Place of Recreation, Sports or Culture
Private Club
Public Clinic
Public Convenience
Public Transport Terminus or Station
Public Utility Installation
Public Vehicle Park (excluding container vehicle)
Religious Institution
Residential Institution
School (in free-standing purpose-designed school building, in a commercial building or in the non-domestic part of a commercial/residential building only)
Shop and Services (not elsewhere specified)
Social Welfare Facility
Utility Installation for Private Project
Broadcasting, Television and/or Film Studio
Educational Institution (not elsewhere specified)
Government Refuse Collection Point
Institutional Use (not elsewhere specified)
Mass Transit Railway Vent Shaft and/or Other Structure above Ground Level other than Entrances
Petrol Filling Station
Recyclable Collection Centre
School (not elsewhere specified)
Shop and Services (Motor-vehicle Showroom only)

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

For "Mass Transit Railway Depot with Commercial and Residential Development Above" only (Cont'd)

Planning Intention

This zone is intended primarily for the provision of land for Mass Transit Railway depot together with commercial and residential development above.

Remarks

(1) No new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of a maximum domestic gross floor area ***(GFA)*** of 278,703m^2, a maximum non-domestic ~~gross floor area~~***GFA*** of 177,031m^2 and the maximum building height, in terms of metres above Principal Datum (mPD), as stipulated on the Plan, or the ~~gross floor area~~***GFA*** and height of the existing building, whichever is the greater.

(2) A public transport terminus shall be provided.

(3) On land demarcated for 15m-wide (north-south) and 22m-wide (east-west) building gaps as shown on the Plan, no new development (except minor addition, alteration and/or modification not affecting the building height of the existing building) or redevelopment of an existing building shall exceed the maximum building height restriction of 22mPD.

(4) In determining the relevant maximum ~~gross floor area~~***GFA*** for the purposes of paragraph (1) above, any floor space that is constructed or intended for use solely as car park, loading/unloading bay, plant room and caretaker's office, 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, may be disregarded. Any floor space that is constructed or intended for use solely as public transport facilities, as required by the Government, may also be disregarded.

(5) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the development restrictions stated in paragraph (1) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

(6) Under exceptional circumstances, for developments and/or redevelopments, minor relaxation of the building gap restrictions stated in paragraph (3) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

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

For "Commercial Uses with Public Transport Terminus" only

Ambulance Depot
Commercial Bathhouse/Massage Establishment
Eating Place
Educational Institution
Exhibition or Convention Hall
Government Use (not elsewhere specified)
Information Technology and Telecommunications Industries
Institutional Use (not elsewhere specified)
Library
~~Market~~
Off-course Betting Centre
Office
Place of Entertainment
Place of Recreation, Sports or Culture
Private Club
Public Clinic
Public Convenience
Public Transport Terminus or Station
Public Utility Installation
Public Vehicle Park (excluding container vehicle)
Radar, Telecommunications Electronic Microwave Repeater, Television and/or Radio Transmitter Installation
Recyclable Collection Centre
Religious Institution
Research, Design and Development Centre
School
Shop and Services
Social Welfare Facility (excluding those involving residential care)
Training Centre
Utility Installation for Private Project

Broadcasting, Television and/or Film Studio
Cargo Handling and Forwarding Facility
Government Refuse Collection Point
Hospital
Hotel
Mass Transit Railway Vent Shaft and/or Other Structure above Ground Level other than Entrances
Petrol Filling Station
Wholesale Trade

Planning Intention

This zone is intended primarily for the provision of a commercial development with a public transport terminus.

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

For "Commercial Uses with Public Transport Terminus" only (Cont'd)

Remarks

(1) No new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of a maximum plot ratio of 12.0 and the maximum building height, in terms of metres above Principal Datum (mPD), as stipulated on the Plan, or the plot ratio and height of the existing building, whichever is the greater.

(2) A public transport terminus comprising three bus bays and one green minibus bay shall be provided.

(3) On land demarcated for a 15m-wide building gap from Lam Lok Street to Sheung Yuet Road as shown on the Plan, no new development (except minor addition, alteration and/or modification not affecting the building height of the existing building) or redevelopment of an existing building shall exceed the maximum building height restriction of 22mPD.

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

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

(6) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the development restrictions stated in paragraph (1) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

(7) Under exceptional circumstances, for developments and/or redevelopments, minor relaxation of the building gap restriction stated in paragraph (3) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

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

For "Commercial/Residential Development with Public Car Park and Public Transport Interchange" only

Ambulance Depot
Flat
Government Use (not elsewhere specified)
House
Library
Market
Place of Recreation, Sports or Culture
Public Clinic
Public Transport Terminus or Station (excluding open-air terminus or station)
Public Vehicle Park (excluding container vehicle)
Residential Institution
School (in free-standing purpose-designed building only)
Social Welfare Facility
Utility Installation for Private Project

Commercial Bathhouse/Massage Establishment
Eating Place
Educational Institution
Exhibition or Convention Hall
Government Refuse Collection Point
Hotel
Institutional Use (not elsewhere specified)
Mass Transit Railway Vent Shaft and/or Other Structure above Ground Level other than Entrances
Office
Place of Entertainment
Private Club
Public Convenience
Public Utility Installation
Religious Institution
School (not elsewhere specified)
Shop and Services ***(not elsewhere specified)***
Training Centre

In addition, the following uses are always permitted in the purpose-designed non-residential portion of an existing building, excluding floors containing wholly or mainly car parking, loading/unloading bays 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

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

For "Commercial/Residential Development
with Public Car Park and Public Transport Interchange" only (Cont'd)

Planning Intention

This zone is intended primarily for a residential development with commercial uses, public car park and public transport interchange. Commercial uses are always permitted in the purpose-designed non-residential portion of the commercial and residential building.

Remarks

(1) No new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of a maximum domestic gross floor area ***(GFA)*** of 19,138m^2, a maximum non-domestic ~~gross floor area~~***GFA*** of 13,366m^2 and the maximum building height, in terms of metres above Principal Datum, as stipulated on the Plan, or the height of the existing building, whichever is the greater.

(2) A public car park with 450 parking spaces and a public transport interchange comprising four bus bays, three public light bus and taxi bays and one general vehicle layby shall be provided.

(3) In determining the relevant maximum ~~gross floor area~~***GFA*** for the purposes of paragraph (1) above, any floor space that is constructed or intended for use solely as car park (excluding public car park), loading/unloading bay, plant room and 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, may be disregarded. Any floor space that is constructed or intended for use solely as public transport interchange, as required by the Government, may also be disregarded.

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

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
For "Refuse Transfer Station" only	
Refuse Transfer Station	Eating Place (Canteen only) Industrial Use Government Use (not elsewhere specified) Utility Installation not Ancillary to the Specified Use Warehouse (excluding Dangerous Goods Godown)

Planning Intention

This zone is intended primarily for the provision of a refuse transfer station.

Remarks

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

(2) A minimum of 3m-wide non-building area from the lot boundary abutting Wang Chiu Road shall be provided.

(3) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the building height restriction stated in paragraph (1) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

(4) Under exceptional circumstances, for developments and/or redevelopments, minor relaxation of the non-building area restriction stated in paragraph (2) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

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

For "Petrol Filling Station" only

Petrol Filling Station	Government Use Utility Installation not Ancillary to the Specified Use

Planning Intention

This zone is intended primarily for the provision of petrol filling stations.

Remarks

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

(2) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the building height restriction stated in paragraph (1) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

For "Landscaped Elevated Walkway" only

Landscaped Elevated Walkway Government Use

Planning Intention

This zone is intended primarily for the provision of landscaped elevated walkway to create an enhanced pedestrian environment for connecting pedestrian walkway system in Kowloon Bay Business Area with Kai Tak area.

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
For "Open Lorry Park" only	
Open Public Vehicle Park (lorry only)	Government Use Utility Installation not Ancillary to the Specified Use

Planning Intention

This zone is intended primarily for the provision of an open-air lorry park.

Remarks

No new development except one-storey structure ancillary to the open-air lorry park shall be permitted.

GREEN BELT

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
Agricultural Use Barbecue Spot Government Use (Police Reporting Centre only) Nature Reserve Nature Trail On-Farm Domestic Structure Picnic Area Public Convenience Tent Camping Ground Wild Animals Protection Area	Animal Boarding Establishment Broadcasting, Television and/or Film Studio Cable Car Route and Terminal Building Columbarium (within a Religious Institution or extension of existing Columbarium only) Crematorium (within a Religious Institution or extension of existing Crematorium only) Field Study/Education/Visitor Centre Flat Golf Course Government Refuse Collection Point Government Use (not elsewhere specified) Helicopter Landing Pad Holiday Camp House Mass Transit Railway Vent Shaft and/or Other Structure above Ground Level other than Entrances Petrol Filling Station Place of Recreation, Sports or Culture Public Transport Terminus or Station Public Utility Installation Public Vehicle Park (excluding container vehicle) Radar, Telecommunications Electronic Microwave Repeater, Television and/or Radio Transmitter Installation Religious Institution Residential Institution School Service Reservoir Social Welfare Facility Utility Installation for Private Project Zoo

Planning Intention

The planning intention of this zone is primarily for the conservation of the existing natural environment amid the built-up areas/at the urban fringe, to safeguard it from encroachment by urban type development, and to provide additional outlets for passive recreational activities. There is a general presumption against development within this zone.

Attachment IV of
MPC Paper No. 10/21

KOWLOON PLANNING AREAS NO. 13 & 17

~~APPROVED~~*DRAFT* NGAU TAU KOK AND KOWLOON BAY OUTLINE ZONING PLAN NO. S/K13/30*A*

EXPLANATORY STATEMENT

KOWLOON PLANNING AREAS NO. 13 & 17

~~APPROVED~~*DRAFT* NGAU TAU KOK AND KOWLOON BAY OUTLINE ZONING PLAN NO. S/K13/30*A*

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KOWLOON PLANNING AREAS NO. 13 & 17

~~APPROVED~~*DRAFT* NGAU TAU KOK AND KOWLOON BAY OUTLINE ZONING PLAN NO. S/K13/30*A*

(Being ~~an~~ ***a*** ~~Approved~~***Draft*** Plan for the Purposes of the Town Planning Ordinance)

EXPLANATORY STATEMENT

Note : For the purposes of the Town Planning 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 ~~approved~~ ***draft*** Ngau Tau Kok and Kowloon Bay Outline Zoning Plan (OZP) No. S/K13/30***A***. It reflects the planning intention and objectives of the Town Planning Board (the Board) for the various land use zonings of the Plan.

2. AUTHORITY FOR THE PLAN AND PROCEDURES

2.1 The first statutory plan No. S/K13/1 covering the Ngau Tau Kok and Kowloon Bay areas was gazetted on 22 August 1986 under section 5 of the Town Planning Ordinance (the Ordinance). Since then, the OZP had been amended twice and exhibited for public inspection under section 7 of the Ordinance.

2.2 On 7 March 1989, the then Governor-in-Council considered the draft OZP No. S/K13/4 and agreed to refer the draft OZP to the Board for further consideration and amendment under section 9(1)(c) of the Ordinance. The OZP was subsequently amended seven times and exhibited for public inspection under sections 5 and 7 of the Ordinance.

2.3 On 15 December 1998, the Chief Executive in Council (CE in C), under section 9(1)(a) of the Ordinance, approved the draft OZP, which was subsequently renumbered as S/K13/12. On 11 May 1999, the CE in C referred the approved OZP to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. Since then, the OZP had been amended once and exhibited for public inspection under section 5 of the Ordinance.

2.4 On 28 March 2000, the CE in C, under section 9(1)(a) of the Ordinance, approved the draft OZP, which was subsequently renumbered as S/K13/14. On 10 October 2000, the CE in C referred the approved OZP to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. Since then, the OZP had been amended three times and exhibited for public inspection under sections 5 and 7 of the Ordinance.

2.5 On 25 June 2002, the CE in C, under section 9(1)(a) of the Ordinance, approved the draft OZP, which was subsequently renumbered as S/K13/18. On 26 November 2002, the CE in C referred the approved OZP to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. Since then, the OZP had been amended six times and exhibited for public inspection under sections 5 and 7 of the Ordinance.

2.6 On 12 September 2006, the CE in C, under section 9(1)(a) of the Ordinance, approved the draft Ngau Tau Kok and Kowloon Bay OZP, which was subsequently renumbered as S/K13/25. On 6 July 2010, the CE in C referred the approved Ngau Tau Kok and Kowloon Bay OZP No. S/K13/25 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. ***The OZP was subsequently amended four times and exhibited for public inspection under sections 5 and 7 of the Ordinance.*** ~~The reference back of the OZP was notified in the Gazette on 17 September 2010.~~

~~2.7 On 19 November 2010, the draft Ngau Tau Kok and Kowloon Bay OZP No. S/K13/26, incorporating amendments including the imposition of new building height restrictions for the "Residential (Group A)" ("R(A)"), "Residential (Group B)" ("R(B)"), "Government, Institution or Community" ("G/IC") and its sub-zones, and "Other Specified Uses" ("OU") zones; designation of non-building areas (NBAs) and building gaps within various zones; rezoning of two "G/IC" sites to "G/IC(2)" and "G/IC(3)"; rezoning of the "OU(Mass Transit Railway Comprehensive Development Area)" site and area shown as 'Road' to "OU(Railway)" and "OU(Mass Transit Railway Depot with Commercial and Residential Development Above)", and rezoning of a "G/IC" site to "OU(Commercial/Residential Development with Public Car Park and Public Transport Interchange)"; rezoning of a strip of land spanning over Sheung Yee Road and Kai Fuk Road to "OU(Landscaped Elevated Walkway)"; and other rezoning proposals to reflect as-built conditions and completed/planned developments, was exhibited for public inspection under section 5 of the Ordinance.~~

~~2.8 During the plan exhibition period, a total of 1,304 representations and 1 comment were received. On 27 May 2011 and 1 June 2011, after giving consideration to the representations and comment, the Board decided to partially meet some representations and decided to propose amendments to the draft OZP under section 6B(8) of the Ordinance. On 30 June 2011, the proposed amendments were published for three weeks for further representations. A total of 286 further representations were received. On 3 February 2012, the Board gave consideration to the further representations and decided to amend the OZP by the proposed amendments under section 6F(8) of the Ordinance.~~

~~2.9 On 14 October 2011, the draft Ngau Tau Kok and Kowloon Bay OZP No. S/K13/27, incorporating the amendments to rezone three sites at Tai Yip Street and Wai Yip Street from areas shown as 'Road' to "OU (Business)" zone and a site along Choi Hei Road from "R(A)" to "Open Space" ("O") to reflect as-built conditions and the lot boundaries, were exhibited for public inspection under section 7 of the Ordinance. Upon expiry of the two months exhibition period, a total of 184 representations and 1 comment were received. On 25 May~~

~~2012, after giving consideration to the representations and comment, the Board decided to partially meet some representations and decided to propose amendment to the draft OZP under section 6B(8) of the Ordinance. On 15 June 2012, the amendment was published for three weeks for further representations. No further representation was received. On 13 July 2012, the Board agreed that the OZP should be amended by the proposed amendment under section 6G of the Ordinance.~~

~~2.10 On 11 April 2014, the draft Ngau Tau Kok and Kowloon Bay OZP No. S/K13/28, mainly incorporating the amendments to rezone two sites at Choi Hing Road from "G/IC", an area shown as 'Road' and "Green Belt" ("GB") to "R(A)1"; a site at Choi Wing Road from "G/IC" to "R(A)2"; and a piece of land bounded by Shun Yip Street and Hung Yip Street from an area shown as 'Road' to "OU(Business)" was exhibited for public inspection under section 7 of the Ordinance. Upon expiry of the exhibition period, one representation was received but was subsequently withdrawn.~~

~~2.11 On 13 April 2017, the draft Ngau Tau Kok and Kowloon Bay OZP No. S/K13/29, incorporating mainly the amendments on (i) the rezoning of a site at Wang Chiu Road from "O" to "R(A)"and "G/IC"; (ii) the imposition of revised building height restriction for the "R(A)" zone covering former Kai Tak Mansion site; and (iii) other technical amendments to reflect as built conditions of various sites was exhibited for public inspection under section 7 of the Ordinance. The said revised building height restriction for the "R(A)" zone was imposed after a review pursuant to a previous Court's order in judicial reviews (JRs) in respect of the draft Ngau Tau Kok and Kowloon Bay OZP No. S/K13/26. During the plan exhibition period, a total of 8,459 representations and 63 comments were received. On 15 November 2017, 22 November 2017 and 19 January 2018, after giving consideration to the representations and comments, the Board decided not to uphold the representations.~~

~~2.12 Pursuant to the Court's order on another JR in respect of a representation against building height restrictions, NBA and building gap requirements in various zones introduced in the draft Ngau Tau Kok and Kowloon Bay OZP No. S/K13/26, a more comprehensive review of the development restrictions of the Ngau Tau Kok and Kowloon Bay OZP was conducted by the Planning Department in 2018. On 27 September 2019, after giving reconsideration to the representation, the Board decided to partially meet the representation and propose amendments to the draft Ngau Tau Kok and Kowloon Bay OZP No. S/K13/29 under section 6B(8) of the Ordinance, by deleting the building gap requirement from Lam Fung Street to Sheung Yee Road within "OU(Business)2" zone with revision of the building height restriction for the area concerned. On 18 October 2019, the proposed amendments to the draft OZP were published under section 6C(2) of the Ordinance. During the three-week exhibition period, one further representation was received. Upon consideration of the further representation on 20 December 2019, the Board decided to amend the draft OZP by the proposed amendments under section 6F(8) of the Ordinance. In accordance with section 6H of the Ordinance, the draft OZP should hereafter be read as including the above amendments.~~

2.~~13~~***7*** On 28 April 2020, the CE in C, under section 9 of the Ordinance, approved the

draft Ngau Tau Kok and Kowloon Bay OZP, which was subsequently renumbered as S/K13/30. ~~On 8 May 2020, the approved Ngau Tau Kok and Kowloon Bay OZP No. S/K13/30 (the Plan) was exhibited for public inspection under section 9(5) of the Ordinance.~~ ***On 1 June 2021, the CE in C referred the approved Ngau Tau Kok and Kowloon Bay OZP No. S/K13/30 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. The reference back of the approved OZP was notified in the Gazette on 11 June 2021 under section 12(2) of the Ordinance.***

2.8 On _____ 2021, the draft Ngau Tau Kok and Kowloon Bay OZP No. S/K13/31 (the Plan), incorporating amendments mainly to include the rezoning of the sites to the south of the Kowloon Bay Business Area (KBBA) from "Government, Institution or Community (1)" ("G/IC(1)"), "Other Specified Uses" ("OU") annotated "Business" ("OU(Business)"), "OU" annotated "Refuse Transfer Station" and areas shown as 'Road' to "Commercial (1)" ("C(1)"), "Commercial (2)" ("C(2)"), "Open Space" ("O") and areas shown as 'Road', as well as the rezoning of the existing Yip On Factory Estate site from "OU(Business)" and an area shown as 'Road' to "Residential (Group A)3" ("R(A)3") was exhibited for public inspection under section 5 of the Ordinance.

3. OBJECT OF THE PLAN

3.1 The object of the Plan is to indicate the broad land use zonings and major transport networks so that development and redevelopment of land within the Planning Scheme Area (the Area) can be put under statutory planning control.

3.2 The Plan is to illustrate the broad principles of development and to provide guidance for more detailed planning within the Area. It is a small-scale plan and the transport alignments and boundaries between the land use zones may be subject to minor adjustments as detailed planning proceeds.

3.3 Since the Plan is to show broad land use zonings, there would be situations in which small strips of land not intended for building development purposes and carry no development right under the lease, such as the areas restricted for garden, slope maintenance and access road purposes, are included in the residential zones. The general principle is that such areas should not be taken into account in plot ratio and site coverage calculations. Development within residential zones should be restricted to building lots carrying development right in order to maintain the character and amenity of the Ngau Tau Kok and Kowloon Bay area and not to overload the road network in this area.

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 and in particular zones 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. THE PLANNING SCHEME AREA

5.1 The Area is located in East Kowloon within the Kwun Tong District. It is bounded by New Clear Water Bay Road and Clear Water Bay Road to the north, Kwun Tong By-pass to the west, Shun Yip Street and Chun Wah Road to the south, and Hong Ning Road, Sau Mau Ping Road and Lee On Road to the east. The boundary of the Area is shown in a heavy broken line on the Plan. It covers about 341 hectares of land.

5.2 The Area is divided by Kwun Tong Road into two distinct portions. The land in the west***, which*** was primarily formed by reclaiming Kowloon Bay~~ and~~***,*** is ***known as KBBA, which is*** one of the major employment centres in the main urban area. The Ngau Tau Kok/Jordan Valley area to the east of Kwun Tong Road is hilly and dominated by residential development, particularly public housing estates located at the foothills.

6. POPULATION

Based on the 2016 Population By-census, the population of the Area was estimated by the Planning Department as about 176,900 persons. ~~If the planned uses on the Plan are developed,~~ ***It is estimated that*** the planned population of the Area would be about ~~186,500~~***192,500*** persons.

7. BUILDING HEIGHT RESTRCTIONS IN THE AREA

7.1 In taking forward the Study of Urban Design Guidelines for Hong Kong (2003), proposals for building height restrictions for the Kowloon Bay and Kwun Tong Business Areas have been prepared and put forward for public consultation between May and July 2004. The proposals were generally supported by the community as a means to preserve the views to the ridgelines and to enhance the urban environment. In February 2005, subsequent to the study of "Building Height Restrictions for Kwun Tong and Kowloon Bay Business Areas", building height restrictions for various zones in the ~~Kowloon Bay Business Area (~~KBBA~~)~~, i.e. the area mainly bounded by major roads of Kwun Tong By-pass, Kwun Tong Road, Kai Cheung Road and Shun Yip Street, were incorporated in the draft OZP No. S/K13/22.

7.2 In order to provide better planning control on the development intensity and building height upon development/redevelopment, to address public aspirations for greater certainty and transparency in the statutory planning system and to meet the growing community aspirations for a better living environment, the Kowloon OZPs are subject to revisions to incorporate appropriate building

height restrictions to guide future development/redevelopment. In the absence of building height control, excessively tall buildings may proliferate at random locations and the scale may be out-of-context in the locality, resulting in negative impacts on the visual quality of the Area. In order to prevent excessively tall or out-of-context buildings, to preserve some key urban design attributes such as the public view to the ridgelines and to provide better control on the building heights of developments in the Area, building height restrictions are imposed for all development zones (outside KBBA) on the Plan.

7.3 The Area falls within the view fan of Quarry Bay Park vantage point and partly within the view fan of Hong Kong Convention and Exhibition Centre (HKCEC) New Wing vantage point. In main, the building height restrictions are to preserve the views to the ridgelines of Lion Rock, Tsz Wan Shan and Kowloon Peak, taking into account the Urban Design Guidelines, natural topography, local area context and characteristics, local wind environment, the existing building height profile, the building height of the developments in the adjoining planning areas as well as visual compatibility of building masses in the wider setting. There are ~~eleven~~ ***fourteen*** building height bands varying from 15 metres above Principal Datum (mPD) to 180mPD adopted for the "C", ***"C(1)", "C(2)",*** "R(A)", "R(A)1", "R(A)2", ***"R(A)3",*** "R(B)", "G/IC(1)", "G/IC(3)" and "OU" zones.

7.4 The ~~four~~ ***six*** height bands of 100mPD, 120mPD, ***135mPD,*** 140mPD***, 150mPD*** and 170mPD for the "C", ***"C(1)", "C(2)",*** "OU(Business)" and "OU***"*** ~~(~~***(annotated*** ***"***Commercial Uses with Public Transport Terminus)" ***("OU(Commercial Uses with Public Transport Terminus")*** zones in KBBA are to preserve a minimum of 20% building-free zone of Kowloon Ridgelines from Quarry Bay Park vantage point but allowing punctuation effect at the saddle of Sha Tin Pass and to preserve the distinguished backdrop of Kowloon Peak from HKCEC New Wing vantage point. These height limits would also help to create a discernible townscape, to accentuate a high-rise business node in the southern part of KBBA, to reinforce the business image of the area flanking along Kwun Tong By-pass and Kai Tak, and to avoid extreme height contrast with the adjacent Telford Gardens while allowing greater visual penetration to the Victoria Harbour from the inland area of Ngau Tau Kok. For the southern ~~part~~ ***tip*** of KBBA, a height limit of 100mPD is imposed to conform to the height profile of the Kwun Tong Business Area. The high-rise business cluster of 170mPD in KBBA steps down gradually to the medium-rise residential developments at its fringes including Kai Yip Estate, Richland Gardens and Telford Gardens, which are subject to varying height bands of 60mPD, 80mPD and 100mPD.

7.5 The high-rise cluster of residential developments includes Lower Ngau Tau Kok Estate which is subject to maximum height bands of 100mPD, 120mPD and 140mPD, and the private housing developments along Ngau Tau Kok Road which are subject to a maximum building height of 120mPD. The area to the north of Lower Ngau Tau Kok Estate, which is in close proximity to the Mass Transit Railway (MTR) Kowloon Bay Station, ~~will be~~***is partly being*** redeveloped as East Kowloon Cultural Centre (EKCC) and ***partly has been redeveloped as*** Ngau Tau Kok Park. The proposed EKCC, Ngau Tau Kok Park, together with Lower Ngau Tau Kok Estate and Upper Ngau Tau Kok Estate

(which falls within Kwun Tong (South) OZP), will form a high-rise residential cum civic node in the area and optimise the development potential by capitalising the good accessibility of the MTR Kowloon Bay Station.

7.6 Another high-rise cluster of residential developments can be found on the western platform of Jordan Valley, which is covered by "Planning and Engineering Feasibility Study for Development near Choi Wan Road and Jordan Valley" conducted by the then Civil Engineering Department in 1997 to examine the development potential of the area for residential and GIC purposes. The study recommended preservation of the visual amenity of the Jordan Valley ridgeline and development of high-rise residential buildings (40-storey) on the western platforms at 20mPD, 40mPD and 60mPD, forming a 3-tier height profile against the natural backdrop of the ridgeline. The completed residential developments on the western platform of Jordan Valley including Choi Ha Estate, Choi Ying Estate, ***Choi Hing Court,*** Choi Tak Estate and Choi Fook Estate are subject to maximum height bands of 140mPD, ***150mPD,*** 160mPD and 170mPD. ~~Two sites reserved for a residential development at Choi Hing Road are subject to a maximum building height of 150mPD.~~ The building height bands generally follow the gradually slope-up terrain of the cluster, and descend in the west to the ***former*** Kai Tak Mansion site with a maximum building height of 140mPD, and the ***planned residential development site zoned*** "R(A)" ~~site~~ at Wang Chiu Road with a maximum building height of 120mPD.

7.7 The eastern platform of Jordan Valley near the foothill of Kowloon Peak is currently occupied by Shun Lee Estate, Shun On Estate, Shun Tin Estate, Shun Chi Court and Shun Lee Disciplined Services Quarters. This area should be kept as medium-rise developments with height limits at the level of New Clear Water Bay Road so as to maintain an open vista along the southern side of New Clear Water Bay Road, and preserve the public view and amenity of the area as far as possible.

7.8 Building height restrictions are also imposed for the "G/IC" and its sub-zones, ***as well as*** ~~"OU (Refuse Transfer Station (RTS))" and~~ "OU (Petrol Filling Station***)"*** (***"OU(***PFS)***"***)~~"~~ zones in terms of mPD or number of storeys, which mainly reflect the existing building heights of the developments. Due regard has also been given to the nature of the existing facilities/uses on the sites, the existing development intensity and their respective as-built conditions, and the need to cater for the wide variety of their operational requirements and uses. Unless there are committed proposals for known developments or a need to meet the minimum height requirement, the existing "G/IC" and its sub-zones ***and*** ~~, "OU(RTS)" and~~ "OU(PFS)" sites will broadly be kept to their existing heights to serve as spatial and visual relief to the densely built-up area.

7.9 In general, low-rise GIC developments, normally with a height of not more than 13 storeys, will be subject to building height restrictions in terms of number of storey(s) (excluding basement floor(s)) so as to allow more design flexibility, in particular for GIC facilities with specific functional requirements. However, for GIC developments falling within KBBA and other visually prominent locations and major breathing spaces where more stringent height controls are warranted, and higher developments usually more than 13 storeys, the building

height restrictions are specified in terms of mPD to provide certainty and clarity of the planning intention.

7.10 Within the KBBA, building height restrictions of 15mPD, 40mPD and 60mPD are imposed on sites zoned "G/IC(1)", so as to provide visual relief within a high-rise and high-density environment, to provide diversity of building heights, to avoid significant adverse visual impact to the adjoining residential developments, and for "G/IC(1)" sites in the south-eastern part of KBBA, to maintain visual access to the harbour from the inland area.

7.11 Two Expert Evaluation (EE) on air ventilation assessment (AVA) have been undertaken in 2010 and 2019 to assess the existing wind environment and the likely impact of the proposed building heights of the development sites within the Area on the pedestrian wind environment. The building height restrictions shown on the Plan have taken the findings of the AVA into consideration.

7.12 In general, a minor relaxation clause in respect of building height restrictions is incorporated into the Notes of the Plan in order to provide incentive for developments/redevelopments with planning and design merits. Each application for minor relaxation of building height restriction under section 16 of the Ordinance will be considered on its own merits and the relevant criteria for consideration of such relaxation are as follows:

(a) amalgamating smaller sites for achieving better urban design and local area improvement;

(b) accommodating the bonus plot ratio granted under the Buildings Ordinance in relation to surrender/dedication of land/area for use as public passage/street widening;

(c) providing better streetscape/good quality street level public urban space;

(d) providing separation between buildings to enhance air ventilation and visual permeability;

(e) accommodating building design to address specific site constraints in achieving the permissible plot ratio under the Plan; and

(f) other factors such as the need for tree preservation, innovative building design and planning merits that would bring about improvements to townscape and amenity of the locality, provided that no adverse landscape and visual impacts would be resulted from the innovative building design.

7.13 However, for existing buildings where the building height has already exceeded the maximum building height restrictions in terms of mPD and/or number of storeys as stipulated on the Plan, there is a general presumption against such application for minor relaxation unless under exceptional circumstances.

8. NON-BUILDING AREAS AND BUILDING GAPS

8.1 According to the findings of the AVA, the prevailing wind of the Area comes from the north-easterlies, easterlies and south-easterlies, while the summer winds are mainly easterlies, south-easterlies, southerlies and south-westerlies. The KBBA includes some open spaces and "G/IC" sites whilst the Ngau Tau Kok Valley comprises vast open spaces and green belts, all serve as air ventilation pockets. The Ngau Tau Kok area is adjacent to Kowloon Peak in the north and Tan Shan to the east thus enjoys downhill valley wind towards the lowland adjoining the Victoria Harbour.

8.2 For KBBA, Kai Cheung Road is a main east-west breezeway in the area. Wang Tai Road/Lam Wah Street and Sheung Yuet Road leading from Telford Gardens also form major breezeways bringing wind from the east to the west. The main north-south breezeways in the area include Wang Kwong Road, Wang Chiu Road, Wang Tai Road, Wang Hoi Road, Wai Yip Street, the linear "O" zone extending from Kai Cheung Road in the north to Wang Yuen Street in the south. For Ngau Tau Kok/Jordan Valley area, the main east-west breezeways are New Clear Water Bay Road and Sau Mau Ping Road whereas the main north-south breezeways are Kwun Tong Road and Ngau Tau Kok Road. There are also southwest-northeast breezeways which include the Jordan Valley, Ngau Tau Kok Road, Lee On Road, Shun Chi Street and Shun Lee Tsuen Road. Southeast-northwest breezeways include Ngau Tau Kok Road, Choi Ha Road and Shun On Road.

8.3 The existing open areas in the form of green belts, open space, patches of green slopes and low-rise GIC developments, which are important ventilation pockets in the Area, should be maintained to allow wind penetration. As KBBA is the gateway to sea breeze, it is essential that the "G/IC" and "OU" sites at the waterfront should be maintained as low-rise, i.e. 40mPD or below, to allow permeability of sea breeze to KBBA.

8.4 KBBA is mainly occupied by low-rise to medium-rise industrial and industrial-office buildings with narrow roads. The business area is planned for medium-rise to high-rise commercial and non-polluting industrial buildings (120mPD to 170mPD). Given the maximum building height and the width of the blocks, the negative impact on air ventilation cannot be mitigated unless effective road spacing (measured from building facade-to-facade) is increased from 10m-25m to 30m or beyond. The AVA Study recommends that the urban linear parks and open space should be maintained as well as practical setbacks from the roads and building gaps should be introduced within KBBA, which can improve the permeability of sea breeze towards Kowloon Bay and the overall air ventilation in KBBA.

8.5 As for large-scale medium-rise/high-rise residential developments at the fringes of KBBA and within Ngau Tau Kok/Jordan Valley area, which is a hilly area, there are no significant negative air ventilation impacts due to the abundant provision of open space, green belt and/or low-rise GIC developments in the vicinity. Nevertheless, the layout and disposition of building blocks of the existing/proposed residential developments on certain sites may have some negative impacts on the local air ventilation.

8.6 Taking into account the findings of the AVA Study and other site-specific AVA, the following mitigation measures including NBAs and building gaps have been incorporated into the Plan:

NBAs and building gaps in areas within KBBA

(a) A 5m-wide NBA is designated from the lot boundary of the "~~OU(Business)~~***R(A)3***" zone abutting the eastern side of Wang Mau Street, i.e. ***the existing*** Yip On Factory Estate ***site*** so as to extend the breezeway of the linear open space from Kai Cheung Road southward to Sheung Yee Road upon redevelopment of the lot. This NBA helps to improve the air ventilation in KBBA.

(b) A minimum of 3m-wide NBA is designated from the lot boundaries within the "G/IC(1)", "O"~~,~~ ***and*** "OU(Business)" ~~and "OU(RTS)"~~ zones abutting both sides of Wang Kwong Road and Wang Chiu Road (between Kai Cheung Road and Kai Fuk Road). These NBAs, upon development/redevelopment of the lots, could help improve the effectiveness of the two roads functioning as major breezeways as well as create a pleasant pedestrian environment by allowing street planting on wider pavement in KBBA.

(c) A 15m-wide strip of NBA is designated at the southern boundary of the "G/IC(1)" site for Hongkong Post Central Mail Centre (CMC) at Wang Chin Street. The NBA will serve as an extension of Lam Wah Street to funnel easterlies and sea breeze in KBBA.

(d) A strip of land along Shun Yip Street at the south-eastern periphery of the "OU(Business)" zone at the junction of Wai Yip Street and Shun Yip Street is designated as a NBA to enhance the wind performance at pedestrian level.

(e) Three strips of land within the "C", "OU(Business)" and "OU(Commercial Uses with Public Transport Terminus)" zones from Lam Hing Street to Sheung Yuet Road with widths of 15m and 16m, taking into account the variation of lot boundaries, are demarcated as building gaps where no building shall exceed a maximum building height of 22mPD (the height of the existing bus depot). These building gaps, upon redevelopment of the lots, help to extend the breezeway of Sheung Yee Road and improve wind permeability in KBBA.

NBAs and building gaps in areas outside KBBA

(f) The existing north-eastern vegetated slopes within the "R(A)" zone of Ping Shek Estate is designated as a NBA in order to maintain the existing vegetated slopes, together with the adjacent "GB" zone and Ping Shek Playground, as a green and air ventilation pocket in the area.

(g) The existing slopes at the eastern periphery of the "R(B)" zone of Shun Chi Court is designated as a NBA to preserve the vegetated slopes as an

extension of the "GB" zone and as an air ventilation pocket.

(h) Three strips of lands are demarcated as building gaps within "OU~~(~~ ***annotated "***Mass Transit Railway Depot with Commercial and Residential Development Above~~)~~" ***("OU(Mass Transit Railway Depot with Commercial and Residential Development Above)")*** zone of Telford Gardens. Two 22m-wide building gaps, running in east-west direction where no building shall exceed a maximum building height of 22mPD, could serve as wind corridors connecting air paths of Wang Tai Road and Sheung Yuet Road to Kwun Tong Road. Another 15m-wide building gap runs in north-south direction from Kai Cheung Road to Tai Yip Street where no building shall exceed a maximum building height of 22mPD. The building height of 22mPD is the height of the existing MTR depot. These building gaps are to be provided upon future redevelopment of Telford Gardens.

8.7 The above NBAs and building gaps should be incorporated upon development and redevelopment of the sites. As the designation of NBAs is primarily for the purpose of above ground air ventilation, the NBA requirements will not apply to underground developments. No above ground structure is allowed except for landscape feature, boundary fence/boundary wall that is designed to allow high air porosity, and minor structure for footbridge connection or covered walkway may be allowed. Moreover, minor relaxation clause has been incorporated in the Notes of the relevant zones to allow minor relaxation of the NBA and building gap restrictions as shown on the Plan or stipulated in the Notes of the Plan under exceptional circumstances.

8.8 In general, future developments/redevelopments where podia are allowed are encouraged to provide setback from site boundary, recess the lower floors from key wind corridors, delineate NBAs, and adopt suitable building design measures to minimize any possible adverse impacts, which include small-scale and permeable podium, wider building gaps, and aligning podium edge to the building edge in order to create downwash to reach pedestrian level.

8.9 In addition, the AVA Study recommends layouts for building disposition in major private and public housing and commercial developments of KBBA in the Area for future redevelopment of the sites. The general principles for the building disposition are to reduce obstruction to prevailing winds and maximize open courtyard within the estates as well as open up the wind corridors in KBBA in order to improve air ventilation and permeability in the Area. Reference should be made to the layouts for the building disposition of specific sites recommended in the AVA Study.

8.10 For specific sites including the public housing developments of Ping Shek Estate, Choi Tak Estate, Lower Ngau Tau Kok Estate and a reserved site at Wang Chiu Road, where large-scale development or redevelopment may be possible, detailed AVAs on a site-by-site basis should be undertaken and addressed in the Planning Briefs.

9. LAND USE ZONINGS

9.1 "Commercial" ("C") - Total Area ~~2.42~~***7.47*** ha

9.1.1 This zone is intended primarily for commercial developments, which may include ***uses such as office,*** shop, services, place of entertainment and eating place***, functioning as territorial business/financial centre(s) and regional or district commercial/shopping centre(s). These areas are usually major employment nodes***.

9.1.2 ~~A number of sites at suitable locations~~***There are a total of seven sites*** in ~~Kowloon Bay~~***KBBA*** ~~have been zoned for this purpose~~ ***within this zone***. Within the developments, a range of commercial facilities such as banks, offices, restaurants, fast food shops and retail shops can be provided. ***Hotel use is also allowed within "C(2)" zone.*** Some developments will also incorporate multi-storey car parks for vehicles visiting ~~the Kowloon Bay area~~***KBBA***.

9.1.3 A maximum plot ratio of 12.0 is imposed on the commercial sites ***zoned "C" with due regard to the capacity of the road network of the Area*** ~~so as not to aggravate the existing traffic problems in the Area~~.

9.1.4 The "C(1)" and "C(2)" zones are located at the heart of the Kowloon Bay Action Area (KBAA) which is envisioned to become a hub primarily for commercial uses providing office, hotel, retail and other ancillary facilities, open spaces and public transport facilities. In order to achieve an optimal development intensity and balance the infrastructural constraints particularly the local road network capacity in the Area, a maximum gross floor area (GFA) of 204,600m^2 and 201,400m^2 stipulated for "C(1)" and "C(2)" zones respectively. Out of the maximum GFA of 201,400m^2 for the "C(2)" zone, a maximum GFA of 201,000m^2 is for the commercial development to the south of Kai Fuk Road Flyover and a built-over area of about 400m^2 is for arts, cultural and creative uses which is encouraged to be provided mainly underneath Kai Fuk Road Flyover.

9.1.5 Within the "C(1)" zone, an at-grade public transport interchange (PTI) (with a clear headroom of at least 10m) with openings on northern and southern facades aligned with Wang Tai Road, as required by the Government shall be provided to facilitate air ventilation. A public open space in private development (POSPD) of not less than 6,300m^2 shall be provided, of which not less than 4,400m^2 shall be provided at-grade at the southeastern corner of the "C(1)" zone abutting Cheung Yip Street and Kai Fuk Road Flyover. The said POSPD will be provided in the form of a central plaza as a welcoming entrance to the developments from all directions in order to create synergy with the Cheung Yip Street (proposed to be pedestrianised) for public enjoyment. Commercial uses and ancillary uses underneath the at-grade POSPD at basement level(s) are allowed. Moreover, a NBA of 15m wide in north-south direction aligned with Wang Mau Street within the "C(1)" zone should be provided to

facilitate air ventilation. Besides, the building(s) on the site within "C(1)" zone should be set back from the zoning boundary abutting Sheung Yee Road (from Wang Chiu Road to Wang Mau Street) by 6m and set back from the zoning boundary abutting Kai Fuk Road Flyover by 10m to enhance the pedestrian environment on ground level. Underground developments and elevated walkway are always permitted within the proposed NBA and setback areas.

9.1.6 ***Within the "C(2)" zone, a POSPD of not less than 11,800m^2, of which not less than 8,400m^2 (including a built-over area of about 400m^2 allowing arts, cultural and creative uses as stated in paragraph 9.1.4 above) shall be provided at-grade at the northern portion of the "C(2)" zone mainly underneath Kai Fuk Road Flyover. The at-grade POSPD mainly underneath Kai Fuk Road Flyover serves as a natural extension of the proposed at-grade POSPD within the "C(1)" zone and the POSPD is encouraged to be utilised for arts, cultural and creative uses. Commercial uses and ancillary uses underneath the at-grade POSPD at basement level(s) are allowed. In addition, the section of 25m-wide Cheung Yip Street shown as 'Pedestrian Precinct / Street' within the "C(2)" zone on the Plan, which is proposed to be pedestrianised, will be designated as a NBA with commercial uses and ancillary uses allowed at basement level(s) only, in order to facilitate air ventilation and to provide improved accessibility to the surrounding developments. Besides, the building(s) on the site within the "C(2)" zone should be set back from the southern boundary of the aforesaid at-grade POSPD in "C(2)" zone mainly underneath Kai Fuk Road Flyover and the zoning boundary abutting Wai Yip Street by 10m to allow provision of pavement, greening and emergency vehicular access to the development, and set back from the zoning boundary abutting Hoi Bun Road by 8m to 15m to allow provision of roadside amenity planting and visual buffer to enhance the environment and to preserve the existing trees on site. Underground developments and elevated walkway are always permitted within the proposed NBA and setback areas. The aforesaid NBA and setback requirements of "C(1)" and "C(2)" zones will be specified in the land leases as appropriate. To facilitate better connection between different parts of the commercial developments within KBAA, minor structure for footbridge connection on the aforesaid NBAs and setback areas within "C(1)" and "C(2)" zones may be allowed. In addition, in order to enhance vibrancy, the building(s) within "C(1)" and "C(2)" zones should provide shop frontage along the pedestrianised Cheung Yip Street, Sheung Yee Road, as well as facing the at-grade POSPD underneath the Kai Fuk Road Flyover.***

9.1.7 Developments and redevelopments within the "C" zone ***and the sub-zones*** are subject to maximum building heights from 120mPD to 170mPD as stipulated on the Plan. A 16m-wide building gap, where no building shall exceed a maximum building height of 22mPD, taking into account the lot boundary, is designated on the western boundary of the "C" site to the east of Lam Wah Street Playground to improve air ventilation of the Area. ***To create a building height profile compatible***

with the surrounding context of the skyline of Kowloon East descending from the hinterland to the promenade, a stepped building height profile for KBAA is adopted. The proposed building height descends from 150/120mPD in "C(1)" zone to 135/120mPD in "C(2)" zone to the south. Besides, a strip of area of 35m wide is subject to a maximum building height of 35mPD within the "C(1)" zone, which acts as a low-rise podium of the development for wind penetration. A terracing arrangement of POSPDs at various podium levels is also encouraged to facilitate visual connection with the at-grade open space.

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

9.1.~~5~~**9** To provide design/architectural flexibility, minor relaxation of the development restrictions may be considered by the Board on application under section 16 of the Ordinance. The criteria given in paragraphs 7.12 and 7.13 above would be relevant for the assessment of minor relaxation of building height restrictions. Each application will be considered on its own merits.

9.1.~~6~~**10** However, for any existing building with plot ratio***/GFA*** already exceeding the plot ratio restriction as stipulated in the Notes, there is a general presumption against such application for minor relaxation unless under exceptional circumstances.

9.1.~~.7~~**11** Under exceptional circumstances, for developments and/or redevelopments, minor relaxation of ***NBA/***building gap restriction**s** may be considered by the Board on application under section 16 of the Ordinance.

9.1.12 The GFA controls under "C(1)" and "C(2)" zones are regarded as being stipulated in a "new or amended statutory plan" according to the Joint Practice Note No. 4 "Development Control Parameters Plot Ratio/Gross Floor Area", and shall be subject to the streamlining arrangements stated therein.

9.2 "Residential (Group A)" ("R(A)") - Total Area ~~66.80~~***68.30*** ha

9.2.1 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 an existing building.

9.2.2 Existing public rental housing estates including Lower Ngau Tau Kok Estate, Kai Yip Estate, Ping Shek Estate, Shun Lee Estate, Shun On Estate, Shun Tin Estate, Choi Ha Estate, Choi Fook Estate, Choi Ying

Estate and Choi Tak Estate are within this zone. They are covered by seven height bands of 80mPD, 100mPD, 120mPD, 140mPD, 160mPD, 170mPD and 180mPD. For Ping Shek Estate, a maximum building height of 80mPD is imposed for the western part of the estate, stepping up to 100mPD in the eastern part of the estate while the green slopes at the north-eastern portion of Ping Shek Estate are designated as NBA to maintain air ventilation in the area. Kai Yip Estate is subject to height bands of 80mPD in the north and 100mPD in the south. Choi Ha Estate and Choi Ying Estate are subject to a height band of 140mPD. Western part of Choi Tak Estate is subject to a building height restriction of 160mPD while Choi Fook Estate and eastern part of Choi Tak Estate are subject to a maximum building height of 170mPD. Lower Ngau Tau Kok Estate is subject to three height bands of 100mPD, 120mPD and 140mPD. For the housing estates at the foothill of the Kowloon Peak near New Clear Water Bay Road, Shun Lee Estate is subject to height limits of 170mPD and 180mPD, whereas Shun Tin Estate is 160mPD and 170mPD and Shun On Estate is 180mPD.

9.2.3 A site reserved for public housing development at Wang Chiu Road is subject to a maximum building height of 120mPD. To maintain the connecting air path between Wang Chiu Road and Kwun Tong Road/Lung Cheung Road, a NBA of not less than 25m wide in a north-south direction at the eastern portion shall be provided. Subject to quantitative AVA, a bridge-over structure for recreation facilities/building services may be provided within this NBA. Moreover, podiums and residential towers on the site should be set back from Wang Chiu Road and Kwun Tong Road/the ramp leading to Kwun Tong By-pass by not less than 5m and 20m respectively to allow better wind penetration along these roads. The NBA and setback requirements and any other mitigation measures, such as at-grade ventilation passages, ~~minimized~~ ***minimised*** podium structures and building separation between towers, will be specified in the Planning Brief as appropriate.

9.2.4 ~~Two sites at Choi Hing Road~~ ***The existing Home Ownership Scheme (HOS) development, Choi Hing Court is*** ~~are~~ zoned "R(A)1" ~~for a Home Ownership Scheme (HOS) development~~. This sub-zone is subject to a maximum domestic and non-domestic plot ratio of 6.0 and 1.0 respectively. A building height restriction of 150mPD is imposed to create a stepped building height profile progressively increasing from 150mPD at these sites, to 160mPD and 170mPD at Choi Tak Estate to the south, and up to 190mPD at the peak of the Jordan Valley ridgeline. To enhance the air ventilation of the locality, ***a*** building gap in ~~north-south or~~ northeast-southwest direction ~~shall be~~**is** provided in the central part of the western "R(A)1" zone. A NBA ~~shall be also~~ **is also** provided at the northern part of the eastern "R(A)1" zone to widen the air path along New Clear Water Bay Road. ~~The building gap and NBA requirements above will be included in the Planning Brief of the HOS development.~~

9.2.5 A site at Choi Wing Road for Choi Fook Estate Phase 3 development is zoned "R(A)2" and subject to the same height band of the adjoining

Choi Fook Estate, i.e. 170mPD. An indoor recreation centre and a market shall be provided within this sub-zone.

9.2.6 A site bounded by Wang Yuen Street, Wai Yip Street, Sheung Yee Road and Wang Mau Street (i.e. the existing Yip On Factory Estate site) is zoned "R(A)3" for public housing development subject to a maximum building height of 120mPD. An AVA-EE has been carried out for the site and several mitigation measures, including building separations in north-south and east-west directions have been proposed. As one of the mitigation measures, a 17m-wide NBA in north-south direction aligned with Wang Hoi Road shall be provided within "R(A)3" zone to facilitate air ventilation. A quantitative AVA shall be carried out at the detailed design stage. A Planning Brief setting out the planning parameters and special design requirements (including the building separation requirement) will be prepared to guide the development.

9.2.~~6~~***7*** Within large housing developments, there is a wide range of low-rise free-standing GIC facilities including schools, community halls, children and youth centres, elderly centres, social and welfare centres as well as ancillary facility buildings such as car park, shopping centres and markets serving the residents of the estates. Such low-rise free-standing GIC and ancillary facility buildings should be kept as breathing spaces and visual relief to the building masses. No new addition, alteration and/or modification to or redevelopment of these existing individual free-standing GIC and ancillary facility buildings shall result in a total development and/or redevelopment in excess of the height of the existing building. ***On land designated "R(A)3", any floor space that is constructed or intended for use solely as GIC facilities, as required by the Government, may also be disregarded.*** All public housing estates are governed by Planning Briefs. The layout and design of these GIC and ancillary facility buildings should be comprehensively reviewed with the support of relevant impact assessments on air ventilation and visual aspects upon future redevelopment of the estates.

9.2.~~7~~***8*** Existing Private Sector Participation Scheme development of Richland Gardens and HOS development of Kai Tai Court are subject to a height band of 100mPD. As for existing private residential developments abutting Ngau Tau Kok Road including Amoy Gardens***,*** Tak Bo Garden as well as those in their vicinity, a height band of 120mPD is imposed.

9.2.~~.8~~***9*** In regard to the ~~existing~~ ***former*** low-rise residential development of Kai Tak Mansion, a maximum building height of 140mPD is imposed for the site. An updated EE on AVA was conducted for the Kai Tak Mansion site in 2016 to review the air ventilation impact of the future development at the site. In order to address the potential air ventilation issues, a quantitative AVA is required at the detailed design stage to identify effective mitigation measures, such as NBA/building gap/setback, to facilitate a permeable building design and to minimize adverse air ventilation impact on the surrounding low-rise buildings, in particular the two Grade 1 historic buildings within the site of the

ex-Royal Air Force (RAF) Station (Kai Tak) Officers' Quarters Compound, namely RAF Officers Mess and Annex Block No. 2~~ and the nearby school~~. Such requirement would be considered in the lease modification stage. In addition, the future developer is encouraged to adopt suitable design measures to minimize the visual impact on the surrounding areas and to consult the Antiquities and Monuments Office (AMO) ~~of~~ **under** ~~the Leisure and Cultural Services Department~~***Development Bureau (***~~LCSD~~***DEVB***) on the proposal with reference to its impacts on and compatibility with the adjoining historic buildings.

9.2.~~9~~***10*** In the consideration of the overall transport, environmental and infrastructural constraints, as well as the adequacy in the provision of community facilities envisioned in the Kowloon Density Study Review, completed in early 2002, developments or redevelopments within this zone are subject to specific control on plot ratios except otherwise specified in the Notes, i.e. a maximum plot ratio of 7.5 for a domestic building and a maximum plot ratio of 9.0 for a partly domestic and partly non-domestic building. In calculating the GFAs for the developments/redevelopments, the lands for free-standing purpose-designed buildings that are used solely for accommodating school or other GIC facilities, including those located on ground and on building podium, are not to be taken as parts of the site.

9.2.~~10~~***11*** In the circumstances set out in Regulation 22 of the Building (Planning) Regulations, the above specified maximum plot ratios may be increased by what is permitted to be exceeded under Regulation 22. This is to maintain flexibility for unique circumstances such as dedication of part of a site for road widening or public uses.

9.2.~~11~~***12*** For large housing development sites, it is necessary to provide varying building height profile within the same building height band to avoid wall effect of buildings, add variation to the sites and improve the air ventilation at street level.

9.2.~~12~~***13*** To provide design/architectural flexibility, minor relaxation of the development restrictions may be considered by the Board on application under section 16 of the Ordinance. The criteria given in paragraphs 7.12 and 7.13 above would be relevant for the assessment of minor relaxation of building height restriction. Each application will be considered on its own merits.

9.2.~~13~~***14*** However, for any existing building with plot ratio already exceeding the plot ratio restriction as stipulated in the Notes, there is a general presumption against such application for minor relaxation unless under exceptional circumstances.

9.2.~~14~~***15*** Under exceptional circumstances, for developments and/or redevelopments, minor relaxation of NBA and building gap restrictions may be considered by the Board on application under section 16 of the Ordinance.

9.2.16 The plot ratio control under "R(A)3" zone is regarded as being stipulated in a "new or amended statutory plan" according to the Joint Practice Note No. 4 "Development Control Parameters Plot Ratio/Gross Floor Area", and shall be subject to the streamlining arrangements stated therein.

9.3 "Residential (Group B)" ("R(B)") - Total Area 4.74 ha

9.3.1 This zone is intended primarily for medium-density residential developments where commercial uses serving the residential neighbourhood may be permitted on application to the Board.

9.3.2 Shun Chi Court, a HOS, is the only site zoned for this purpose. This zone is intended for medium-density residential development. Under this zoning, commercial uses are prohibited unless otherwise approved by the Board under the planning permission system. Developments within this zone are subject to a maximum GFA of 89,800m^2. It is also subject to a maximum building height of 170mPD so as to maintain an open vista along the southern side of New Clear Water Bay Road, and preserve the public view and amenities of the area.

9.3.3 The existing green slopes along the eastern boundary of Shun Chi Court are designated as NBA to maintain air ventilation in the area.

9.3.4 To provide design/architectural flexibility, minor relaxation of the development restrictions may be considered by the Board on application under section 16 of the Ordinance. The criteria given in paragraphs 7.12 and 7.13 above would be relevant for the assessment of minor relaxation of building height restriction. Each application will be considered on its own merits.

9.3.5 Under exceptional circumstances, for developments and/or redevelopments, minor relaxation of NBA restriction may be considered by the Board on application under section 16 of the Ordinance.

9.4 "Government, Institution or Community" ("G/IC") - Total Area ~~49.62~~***47.36*** ha

9.4.1 This zone is intended primarily for the provision of GIC facilities serving the needs of the local residents and/or a wider district, region or the territory. It is also intended to provide land for uses directly related to or in support of the work of the Government, organizations providing social services to meet community needs, and other institutional establishments. These low-rise and low-density GIC developments should serve as spatial and visual relief within the high-rise densely built-up urban area.

9.4.2 Major existing developments in this zone, which are mainly located in Ngau Tau Kok/Jordan Valley area, are subject to maximum building height in terms of number of storeys varying from one storey to nine

storeys (excluding basement floor(s)). They include a number of primary and secondary schools, a special school, Jordan Valley Swimming Pool, Shun Lee Tsuen Sports Centre cum Shun Lee Tsuen Park, a fire station, service reservoirs, electricity substations (ESS), and a MTR vent shaft to the northeast of Ping Shek Estate. Sam Shan Kwok Wong Temple to the south of Ping Shek Estate, which is a Grade 3 historic building, is also zoned "G/IC" and subject to a maximum building height of 1 storey. In the Kowloon Bay area, the Kowloon Bay Dry Weather Flow Interceptor Pumping Chamber at Kwun Tong Road is zoned "G/IC" and subject to a maximum building height of 1 storey.

9.4.3 For major planned GIC developments in Ngau Tau Kok/Jordan Valley area, sites are reserved along Choi Hing Road for school developments to meet educational need of the district, as well as service reservoir extension, an ESS and a social welfare facility to serve both the new developments and the wider district. In the Kowloon Bay area, the "G/IC" zone at Wang Chiu Road to the northeast of Richland Gardens is reserved for development of a secondary school, which is subject to a maximum building height of 8 storeys.

9.4.4 "G/IC(1)" sites are mainly located within KBBA subject to three height bands of 15mPD, 40mPD and 60mPD. The existing and planned utility facilities include an ESS and a proposed refuse collection point at Wang Chin Street subject to a building height band of 15mPD.

9.4.5 Major existing "G/IC(1)" developments, which are subject to a building height band of 40mPD, include educational facilities of primary schools, secondary schools near Kai Yip Estate and Richland Gardens and three vocational training centres at Tai Yip Street; Government facilities of Hong Kong Auxiliary Police Force Headquarters at the junction of Wang Chiu Road and Kai Cheung Road, Fire Services Department Kowloon East Divisional Headquarters cum Kowloon Bay Fire Station at Kai Cheung Road, Kowloon East Police Operational Base, Ngau Tau Kok Sub-divisional Police Station and Ngau Tau Kok Ambulance Depot located along Siu Yip Street, a police vehicle pound at the junction of Wang Chiu Road and Sheung Yee Road~~, the motor vehicle examination centres at the junction of Cheung Yip Street and Hoi Bun Road;~~**,** utility facilities of an ESS cum pump house along Wang Kwong Road and a telephone exchange at Siu Yip Street~~;—~~**,** Hongkong Post CMC at the junction of Wang Chin Street and Lam Hing Street~~;~~**,** and the international school at the junction of Wang Kwong Road and Kai Cheung Road. A 15m-wide NBA is designated at the southern boundary of Hongkong Post CMC so as to funnel easterlies and sea breeze to the KBBA.

9.4.6 Existing developments of Kowloon Bay Health Centre and Alice Ho Miu Ling Nethersole Nursing Home and nearby schools at Kai Yan Street/Kai Lai Road, HKU School of Professional and Continuing Education Kowloon East Campus at Wang Hoi Road and Water Supplies Department Kowloon East Regional Building at Wai Yip Street, are also zoned "G/IC(1)" subject to a maximum building height

of 60mPD.

9.4.7 Major planned developments zoned "G/IC(1)" with a building height of 40mPD within KBBA include the proposed Hongkong Post Headquarters near the junction of Wang Chin Street and Wang Kee Street and a proposed religious institution at the junction of Wang Kwong Road and Kai Wah Street.

9.4.8 A minimum of 3m-wide NBA(s) from the lot boundaries zoned "G/IC(1)" abutting Wang Kwong Road and Wang Chiu Road (between Kai Cheung Road to Kai Fuk Road) shall be provided.

9.4.9 The site to the north of Lower Ngau Tau Kok Estate reserved for the proposed EKCC is also zoned "G/IC(1)" and subject to a maximum building height of 40mPD.

9.4.10 Two sites at Kwun Tong Road near Ping Shek Estate are zoned "G/IC(2)". One of the sites is the ~~ex-RAF Station (Kai Tak)~~ Officers' Quarters Compound ***of ex-RAF Station (Kai Tak)*** located at the southeast of Ping Shek Estate, within which there are two Grade 1 historic buildings, namely RAF Officers Mess and Annex Block No. 2. The site is currently occupied by the Academy of Visual Arts of Hong Kong Baptist University and is subject to a maximum building height of 1 to 2 storeys. Another site is located to the north of Kai Yip Estate along Kwun Tong Road, in which the Grade 1 Headquarters Building of ex-RAF Station (Kai Tak) is located within the site. The site is now being occupied by the Caritas Family Crisis Support Centre and is subject to a maximum building height of 2 storeys. In order to preserve the historic buildings in-situ, any addition, alteration and/or modification to (except those minor alteration and/or modification works which are ancillary and directly related to the always permitted uses) the existing historic buildings requires planning permission from the Board. No demolition or redevelopment of the existing historic buildings is allowed.

9.4.11 Cheerful Court, which is a senior citizen residence located at Choi Ha Road, is zoned "G/IC(3)". Development/redevelopment within this zone is subject to a maximum GFA of 16,500m^2 for domestic use and 4,125m^2 for non-domestic use, and a maximum building height of 100mPD to reflect the completed development.

9.4.12 This zoning also covers some of the existing schools, adjacent ball courts, local open space and refuse collection point within public housing estates, which are common facilities shared by the schools and residents of the estates.

9.4.13 Minor relaxation of the development restrictions may be considered by the Board on application under section 16 of the Ordinance. The criteria given in paragraphs 7.12 and 7.13 above would be relevant for the assessment of minor relaxation of building height restriction. Each application will be considered on its own merits.

9.4.14 Under exceptional circumstances, for developments and/or redevelopments, minor relaxation of NBA restrictions may be considered by the Board on application under section 16 of the Ordinance.

9.5 "Open Space" ("O") - Total Area ~~48.33~~***48.66*** ha

9.5.1 This zone is intended primarily for the provision of outdoor open-air public space for active and/or passive recreational uses serving the needs of local residents as well as the general public.

9.5.2 Major existing open space include Ping Shek Playground, Kowloon Bay Playground, Kowloon Bay Park, ***open space at Zero Carbon Building,*** Ngau Tau Kok Park, Jordan Valley Playground, Jordan Valley Park, Shun Lee Tsuen Playground, Shun Lee Tsuen Park, and various parks and sitting-out areas in the Area. ~~The open space bounded by Wang Chiu Road, Lam Fung Street, Sheung Yee Road and Sheung Yuet Road with the Construction Industry Council Zero Carbon Building was completed.~~ In relation to the housing developments at Choi Fook Estate and Choi Ying Estate, two sites to the northeast and northwest of Choi Ha Estate and a site at the junction of Kwun Tong Road and Choi Wan Road have been developed as Choi Wing Road Park, Choi Hei Road Park and Choi Wan Road Sitting-out Area respectively.

9.5.3 There are a number of sites reserved for open spaces. A site is reserved for a district open space at Prince Edward Road East/Kwun Tong Road. Several sites including one bounded by Kai Fuk Road, Sheung Yee Road and Wang Tung Street, one to the north of Wang Tai Road, ~~and~~ one to the north of Wang Mau Street ***and two abutting the western and eastern boundary of the "C(2)" zone*** have also been reserved for local open spaces.

9.5.4 Local open spaces are provided within the public housing estates, HOS developments, private comprehensive residential developments and KBBA to serve the residents and working population in the Area.

9.5.5 A minimum of 3m-wide NBA(s) from the lot boundaries abutting Wang Kwong Road and Wang Chiu Road (between Kai Cheung Road and Kai Fuk Road) shall be provided.

9.5.6 Under exceptional circumstances, for developments and/or redevelopments, minor relaxation of NBA restrictions may be considered by the Board on application under section 16 of the Ordinance.

9.6 "Other Specified Uses" ("OU") - Total Area ~~44.28~~***40.49*** ha

9.6.1 This zoning covers land allocated for specific uses which include Business, Railway, Mass Transit Railway Depot with Commercial and Residential Development Above, Commercial Uses with Public

Transport Terminus, Commercial/Residential Development with Public Car Park and Public Transport Interchange, ~~Refuse Transfer Station,~~ Petrol Filling Station, Landscaped Elevated Walkway and Open Lorry Park.

9.6.2 About ~~22.44~~***20.97*** ha of land is zoned "OU(Business)". This zone is intended primarily for general business uses. A mix of information technology and telecommunications industries, non-polluting industrial, office and other commercial uses are always permitted in new "business" buildings. Less fire hazard-prone office use that would not involve direct provision of customer services or goods to the general public is always permitted in existing industrial or industrial-office (I-O) buildings. To allow provision of vehicle repair workshop at a site at Sheung Yee Road and Wang Tai Road, the site is zoned "OU(Business)1", with 'Vehicle Repair Workshop' as a use always permitted for industrial or industrial-office building, and as a use that requires planning permission for open-air development or for building other than industrial or industrial-office building.

9.6.3 As it is not possible to phase out existing polluting and hazardous industrial uses all at once on lands zoned "OU(Business)", it is necessary to ensure compatibility of the uses within the same industrial or I-O building and in the Kowloon Bay area until the whole area is transformed to cater for the new non-polluting business uses. The setting back of buildings to cater for the future increase in traffic demand may also be required. Development within the "OU(Business)", "OU(Business)1" and "OU(Business)2" zones are subject to a maximum plot ratio of 12.0 and maximum building heights ranging from 100mPD to 170mPD. Reference should also be made to the relevant Town Planning Board Guidelines. To improve air ventilation of KBBA, a minimum of 3m-wide NBA(s) from the lot boundaries of the "OU(Business)" zones abutting Wang Kwong Road and Wang Chiu Road (between Kai Cheung Road and Kai Fuk Road) shall be provided. ~~A 5m-wide NBA from the lot boundary of the "OU(Business)" zone abutting the eastern side of Wang Mau Street is designated.~~ Moreover, a strip of land along the south-eastern boundary of the "OU(Business)" zone at the junction of Wai Yip Street and Shun Yip Street is designated as NBA to enhance the wind performance at pedestrian level. In addition, a 15m-wide building gap (where no building shall exceed the maximum building height of 22mPD) is demarcated within the "OU(Business)" zone from Lam Hing Street to Lam Wah Street.

9.6.4 A site at the junction of Sheung Yuet Road and Wang Kwun Road is zoned "OU(Commercial Uses with Public Transport Terminus)", known as Enterprise Square. The site has been developed as a public transport terminus with commercial uses above. In order to restrain traffic growth which will otherwise overload the existing and planned transport network, developments within this zone are subject to a maximum plot ratio of 12.0 and a maximum building height of 140mPD. A public transport terminus comprising three bus bays and one green minibus bay shall be provided within the zone. A 15m-wide building

gap, where no building shall exceed the maximum building height of 22mPD, is demarcated on the western boundary of the zone from Lam Lok Street to Sheung Yuet Road to improve air ventilation of the Area.

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

~~9.6.6 A site bounded by Wang Chiu Road, Sheung Yee Road, Cheung Yip Street and Kai Fuk Road Flyover is zoned "OU(RTS)". This zone is intended primarily to provide land for the development of a refuse transfer station to facilitate transfer of refuse to the landfill sites in the New Territories, as there is a shortage of landfill sites in the main urban area. The site is subject to a maximum building height of 40mPD and a minimum of 3m wide NBA from the lot boundary abutting Wang Chiu Road shall be provided.~~

9.6.~~7~~**6** Two sites zoned "OU(PFS)" at Kai Fuk Road are intended primarily for the provision of petrol filling stations serving the needs of the local residents as well as the general public. Both sites are subject to a maximum building height of 15mPD.

9.6.~~8~~**7** The open-air railway, MTR Kowloon Bay Station and associated facilities are zoned "OU(~~)~~***" annotated "***Railway~~)~~". Within this zone, a building height restriction of 3 storeys is imposed for the MTR Kowloon Bay Station along Kwun Tong Road, and 1 to 2 storeys as shown on the Plan for the associated facilities such as warehouses, a control tower and a pumping house. No new development except one-storey structure ancillary to the railway and the MTR Station shall be permitted.

9.6.~~9~~**8** The comprehensive development at the MTR Kowloon Bay Depot is zoned "OU(Mass Transit Railway Depot with Commercial and Residential Development Above)". This zone is intended primarily for the provision of land for MTR depot together with commercial and residential development above. The development comprises the MTR depot, two commercial towers including MTR Headquarters Building and a large commercial/residential development known as Telford Gardens and Telford Plaza. Apart from office and shopping facilities, a wide range of community facilities including a recreational club and a cinema are provided to cater for the needs of the residents. The ***UOW College Hong Kong (Kowloon Bay Campus)*** ~~Telford Annex of the Community College of City University of Hong Kong~~ is also accommodated within the development. Developments and redevelopments within this zone are subject to a maximum GFA of 278,703m^2 for domestic use and 177,031m^2 for non-domestic use, and maximum building heights of 60mPD and 100mPD. A public transport terminus shall be provided within this zone. Three building gaps shall be provided within the zone upon redevelopment in order to improve air

ventilation in the area. Two 22m-wide building gaps run parallel to Wang Tai Road and Sheung Yuet Road in east-west direction, and one 15m-wide building gap runs parallel to Tai Yip Street in north-south direction are demarcated, on which no building shall exceed a maximum building height of 22mPD.

9.6.~~10~~**9** A site located to the northeast of Ping Shek Estate along New Clear Water Bay Road is zoned "OU***" annotated "***~~(~~Commercial/Residential Development with Public Car Park and Public Transport Interchange~~)~~". The site is occupied by a residential development with commercial uses known as 8 Clear Water Bay Road, public transport interchange and 'park-and-ride' facility in the podium serving the wider district. It is subject to a maximum GFA of 19,138m^2 for domestic use and 13,366m^2 for non-domestic use, and a maximum building height of 180mPD. A public car park with 450 parking spaces and a public transport interchange comprising four bus bays, three public light bus and taxi bays and one general vehicle layby shall be provided within the zone. Minor relaxation of the number of parking spaces may be considered by the Board on application under section 16 of the Ordinance.

9.6.~~11~~**10** A strip of land spanning over Sheung Yee Road and Kai Fuk Road is zoned "OU***" annotated "***~~(~~Landscaped Elevated Walkway~~)~~". This zone is primarily intended for the provision of landscaped elevated walkway to create an enhanced pedestrian environment for connecting the pedestrian walkway system in KBBA with Kai Tak area.

9.6.~~12~~**11** The open lorry park at Lee On Road is zoned "OU***" annotated "***~~(~~Open Lorry Park~~)~~", intended primarily to provide land for the development of an open-air lorry park. No building structure except one-storey structure ancillary to the open-air lorry park shall be erected within the site.

9.6.~~13~~**12** Minor relaxation of the development restrictions may be considered by the Board on application under section 16 of the Ordinance. The criteria given in paragraphs 7.12 and 7.13 above would be relevant for the assessment of minor relaxation of building height restrictions. Each application will be considered on its own merits.

9.6.~~14~~**13** However, for any existing building with plot ratio/GFA already exceeding the relevant restrictions as stipulated in the Notes, there is a general presumption against such application for minor relaxation unless under exceptional circumstances.

9.6.**14**~~15~~ Under exceptional circumstances, for developments and/or redevelopments, minor relaxation of NBA and building gap restrictions may be considered by the Board on application under section 16 of the Ordinance.

9.7 <u>"Green Belt" ("GB")</u> - Total Area 52.63 ha

9.7.1 The planning intention of this zone is primarily for the conservation of

the existing natural environment amid the built-up areas/at the urban fringe, to safeguard it from encroachment by urban type development, and to provide additional outlets for passive recreational activities. There is a general presumption against development within this zone.

9.7.2 This zoning covers mainly steep hill slopes at the eastern periphery, the slopes created in connection with the formation of development platforms for the housing developments at Choi Tak Estate, Choi Ying Estate and Choi Fook Estate as well as the hill slopes in the eastern part of Jordan Valley. It includes strips of land near Tak Bo Garden and Ping Shek Playground and they are densely vegetated. Hill slopes near Choi Wing Road are also within this zone. These slopes are not suitable for urban type development and will be retained in their natural state. Passive recreational uses may however be possible at certain locations. Development within this zone will be carefully controlled and development proposals will be assessed on individual merits taking into account the relevant Town Planning Board Guidelines.

10. COMMUNICATIONS

10.1 Roads

10.1.1 The Area is linked with other districts mainly by Kwun Tong Road, which is a primary distributor road connecting the Area with Kwun Tong and Cha Kwo Ling to the south and Wong Tai Sin to the north. New Clear Water Bay Road and Clear Water Bay Road run along the northern boundary, connecting the Area with Sai Kung to the east and other parts of Kowloon to the west.

10.1.2 Kwun Tong By-pass runs along the Kowloon Bay area connecting to the Tate's Cairn Tunnel in Diamond Hill, the Eastern Harbour Crossing in Cha Kwo Ling and Tseung Kwan O Tunnel near Lam Tin.

10.1.3 The district distributor road network in the Area consists of Lee On Road, Ngau Tau Kok Road, Wai Yip Street, Wang Chiu Road and Wang Kwong Road. There are many local roads within the Kowloon Bay area. In connection with the newly completed Choi Tak Estate, Choi Ying Estate and Choi Fook Estate, a new road network comprising Choi Wing Road, Choi Hing Road and the extended Choi Ha Road was built to serve the new development while the elevated portion of Choi Ha Road linking the new development to the northbound of Kwun Tong Road provides an alternative link to the existing primary distributor.

10.2 Mass Transit Railway

The Area is well served by the MTR system. MTR Kowloon Bay Station is located at the centre of the Area while Choi Hung Station is at the northern periphery of the Area.

10.3 Public Transport

Apart from the MTR, the Area is served by various modes of public transport including bus and public light bus. A number of bus termini are conveniently located to serve the residential and working population in the Area.

11. UTILITY SERVICES

The Area is well served with water supply, drainage, and sewerage systems as well as electricity, gas and telephone services. Some sewerage and drainage upgrading works are required in the Area in order to cope with the future development.

12. CULTURAL HERITAGE

12.1 ***There are four graded historic buildings in the Area which should be preserved in-situ, namely Headquarters Building of the ex-RAF Station (Kai Tak) (Grade 1)*** ~~The Grade 1 historic buildings of ex-RAF Station (Kai Tak) Headquarters Building~~ to the north of Kai Yip Estate, ***RAF Officers Mess (Grade 1)*** and ***Annex Block No. 2 (Grade 1) of*** ~~the ex-RAF Station (Kai Tak)~~ Officers' Quarters Compound ***of ex-RAF Station (Kai Tak)*** to the southeast of Ping Shek Estate***,*** ~~, which are zoned "G/IC(2)", should be preserved in-situ. Moreover, the Grade 3 historic building of~~ ***and*** Sam Shan Kwok Wong Temple ***(Grade 3)*** adjoining Ping Shek Estate~~, is also worthwhile to be preserved~~. On 19 March 2009, the Antiquities Advisory Board (AAB) released the list of 1,444 historic buildings, in which ~~some~~ ***all of the*** buildings~~/structures~~ within the Area have been accorded gradings~~s~~. The AAB also released a number of new items in addition to the list of 1,444 historic buildings. These items are subject to the grading assessment by the AAB. Details of the list of 1,444 historic buildings and its new items have been uploaded onto the ~~official~~ website of the AAB at http://www.aab.gov.hk.

12.2 Prior consultation with the AMO ***should be made if*** ~~of LCSD is required for~~ any development, redevelopment or rezoning proposals ~~which~~ ***that*** may affect the above ***sites*****/**~~graded~~ historic buildings~~/structures~~, new items***,*** ~~pending grading assessment~~ ***any other historic structures identified*** and their immediate environs.

13. IMPLEMENTATION

13.1 Although existing uses non-conforming to the statutory zonings are tolerated, any material change of use and any other development/redevelopment must be always permitted in terms of the Plan or, if permission is required, in accordance with the permission granted by the Board. The Board has published a set of guidelines for the interpretation of existing use in the urban and new town areas. Any person who intends to claim an "existing use right" should refer to the guidelines and will need to provide sufficient evidence to support his claim. The enforcement of the zonings mainly rests with the Buildings Department, the Lands Department and the various licensing authorities.

13.2 The Plan provides a broad land use framework within which more detailed non-statutory plans for the Area are prepared by the Planning Department. These detailed plans are used as the basis for public works planning and site reservation within Government departments. Disposal of sites is undertaken by the Lands Department. Public works projects are co-ordinated by the Civil Engineering and Development Department in conjunction with the client departments and the works departments, such as the Architectural Services Department and the Highways Department. In the course of implementation of the Plan, the Kwun Tong District Council would also be consulted as appropriate.

13.3 Planning applications to the Board will be assessed on individual merits. In general, the Board, in consideration of the planning applications, will take into account all relevant planning considerations which may include the departmental outline development plans/layout plans and guidelines published by the Board. The outline development plans and layout plans are available for public inspection at the Planning Department. Guidelines published by the Board are available from the Board's website, the Secretariat of the Board and the Technical Services Division of the Planning Department. Application forms and Guidance Notes for planning applications can be downloaded from the Board's website and are available from the Secretariat of the Board and the Technical Services Division and the relevant District Planning Office of the Planning Department. Applications should be supported by such materials as the Board thinks appropriate to enable it to consider the applications.

TOWN PLANNING BOARD
***DECEMBER 2021*~~MAY 2020~~**

Agreement No. CE 4/2014(TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – FEASIBILITY STUDY

TRANSPORT AND TRAFFIC IMPACT ASSESSMENT REPORT (WP NO. 13)

FINAL

September 2021



Development Bureau
The Government of the Hong Kong Special Administrative Region

ARUP

Energizing Kowloon East Office, Development Bureau

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study

Transport and Traffic Impact Assessment Report (WP No. 13)

Agreement No. CE 4/2014 (TP)

Final | September 2021

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

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

Job number 237938

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Acronym

AFCD	Agriculture, Fisheries and Conservation Department
AOI	Area of Influence
AWE	Asia World-Expo
C&D	Construction and demolition
C&I	Commercial & Industrial
CAP	Contamination Assessment Plan
CBD	Core Business District
CE	Chief Executive
CEDD	Civil Engineering and Development Department
CMP	Conceptual Master Plan
DevB	Development Bureau
DIA	Drainage Impact Assessment
DWF	Dry Weather Flow
EFLS	Environmentally Friendly Linkage System
EKEO	Energizing Kowloon East Office
EPD	Environmental Protection Department
FEHD	Food and Environmental Hygiene Department
FSD	Fire Services Department
GFA	Gross Floor Area
GV	Goods Vehicle
HKCEC	Hong Kong Convention and Exhibition Centre
HKPF	Hong Kong Police Force
HKPSG	Hong Kong Planning Standards and Guidelines
HKTDC	Hong Kong Trade Development Council
HyD	Highway Department
IHS	Study on Industrial Heritage of Kowloon East and its Potential for Public Art and Urban Design
JWGSDEP	Joint Working Group on Sustainable Development and Environmental Protection
KBAA	Kowloon Bay Action Area
KBBA Study	KBBA Pedestrian Environment Improvement Feasibility Study
KBBA	Kowloon Bay Business Area
KITEC	Kowloon Bay International Trade & Exhibition Centre
KTAA	Kwun Tong Action Area
KTAC	Kai Tak Approach Channel
KTBA	Kwun Tong Business Area
KTD	Kai Tak Development
KTDC	Kwun Tong District Council
KTIPS	Kwun Tong Intermediate Pumping Station
KTPTW	Kwun Tong Preliminary Treatment Works
KTTS	Kwun Tong Typhoon Shelter
LandsD	Lands Department
LPB	Light Pressure Type B
MSW	Municipal Solid Waste
MTR	Mass Transit Railway
NENT	North East New Territories
NFA	Net Floor Area

NKIL	New Kowloon Inland Lot
NSRs	Noise Sensitive Receivers
ORRC	Organic Resources Recovery Centre
OZP	Outline Zoning Plan
P/S	Pumping Station
PNAP	Practice Notes for Authorised Persons
ProPECC	Practice Notes for Professional Persons
PTIs	Public Transport Interchanges
QRA	Quantitative Risk Assessment
S/R	Service Reservoir
SIA	Sewerage Impact Assessment
TD	Transport Department
THA	Temporary Housing Area
TPEDM	Territorial Population and Employment Data Matrices
VEC	Vehicle Examination Centres
VSR	Visually Sensitive Receiver
WCZs	Water Control Zones
WDO	Waste Disposal Ordinance
WIA	Water Impact Assessment
WKCD	West Kowloon Cultural District
WSD	Water Supplies Department
WTW	Water Treatment Works

1 Introduction

1.1 Study Background

1.1.1.1 Kowloon East is an area comprising the former Kai Tak Airport, Kwun Tong Business Area (KTBA) and Kowloon Bay Business Areas (KBBA). This area witnessed the rapid growth of an important industrial base in the heyday of Hong Kong's manufacturing industry, creating hundreds of thousands of jobs and propelling Hong Kong's prosperity. Following relocation of the Airport to Chek Lap Kok and our manufacturing base to the Mainland, a huge stock of industrial buildings was not being fully utilised. On the other hand, with the continuing boom of Hong Kong's financial and service sectors as well as large numbers of regional headquarters and regional offices of multi-national companies setting their foothold in Hong Kong, the demand for quality offices can no longer be met by our traditional Core Business District (CBD). Some private developers have developed high-grade office buildings and retail centres in Kowloon East. About 1.4 million sqm office floor space have been completed in 2011.

1.1.1.2 In 2001, all industrial land in Kwun Tong and Kowloon Bay was rezoned to "Other Specified Uses (Business)" ("OU(Business)"). The "OU(Business)" zone allows industrial premises to be converted to office use and industrial buildings redeveloped for commercial/office uses. In April 2010, the Government also introduced measures to revitalise industrial buildings in Hong Kong. It is anticipated that, together with the new commercial/office space to be provided in Kai Tak Development (KTD) area, the total commercial/office space in Kowloon East has the potential to increase from the current 2.0 million sqm to 7.0 million sqm in the future. Kowloon East has great potential to evolve into a vibrant premier business district in Hong Kong.

1.1.1.3 In the 2011-12 Policy Address, the Chief Executive (CE) announced that the Government would adopt a visionary, coordinated and integrated approach to expedite the transformation of Kowloon East into an attractive, alternative CBD to support Hong Kong's economic development. Energizing Kowloon East Office (EKEO) was therefore set up in the Development Bureau (DevB) to undertake initiatives of land use review, urban design, improved connectivity and the associated infrastructure

1.1.1.4 The initial proposals for Energizing Kowloon East are formulated under the CBD2 strategy, with main focus on enhancing Connectivity, Branding, Design and Diversity. These proposals are consolidated on the Conceptual Master Plan (CMP) version 2.0 issued on 7 June 2012 and further refinement of the CMP was promulgated in January 2015 (version 4.0) taking on board suggestions during the ongoing public engagement process and new opportunities identified.

1.1.1.5 One of the key tasks of EKEO is to proactively review the development and design options of undeveloped/under-developed Government sites with guidance of the CBD2 strategy. Releasing the development potential of KBAA which is at the core area of Kowloon East, for mixed

development will bring great vibrancy to the region. The Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study (the Study) is therefore commissioned to review, investigate, and produce feasible development options and implementation strategy to optimise the development potential of KBAA in terms of its strategic setting, constraints and opportunities.

1.2 Study Area and Area of Influence

1.2.1.1 The Study Area (**Figure 1.2.1**) covers the existing Government sites in KBAA which include the area currently occupied by Transport Department (TD)'s two Vehicle Examination Centres (VECs), the former Environmental Protection Department (EPD)'s waste recycling centre[1], Highway Departments (HyD)'s maintenance depot, Hong Kong Police Force (HKPF)'s police vehicle pound and the areas of roads, pedestrian walkways, sitting-out area and amenity areas in between. The area is mainly bounded by Sheung Yee Road in the North, Wai Yip Street in the East and the edge of Kwun Tong Bypass and the adjoining amenity areas in the West and South next to KTD. It has an area of about 17 ha including the areas of roads, pedestrian walkways, sitting-out area and amenity areas.

1.2.1.2 The Study Area is mainly zoned for "Government, Institution or Community (1)" ("G/IC(1)"), "Other Specified Uses (Refuse Transfer Station)" ("OU(Refuse Transfer Station)"), "Other Specified Uses (Business)" ("OU(Business)") and "Road" uses.

1.2.1.3 In accordance with Clause 4.2 of the Brief, apart from the Study Area, the Study will also examine the Area of Influence (AOI) and the wider context (**Figure 1.2.1**) in reviewing the development potential of the Study Area. The boundary of the AOI is defined based on the Appendix A of the Brief and is with a radius of 1 km from the centre of the KBAA. Subject to the individual technical aspect, there may be different boundaries and areas for assessment depending on its respective requirements and considerations.

1.3 Purpose of this Report

1.3.1.1 This report is prepared based on the key issues, development constraints and opportunities that are identified in the Baseline Review Report. The purposes of this report include:

- Examine the feasibility of suitable connections between the Study Area and the nearby strategic road network and pedestrian linkage with existing Kowloon Bay and Ngau Tau Kok MTR stations, Kowloon Bay and Kwun Tong Business Areas, Kai Tak Development and Hoi Bun Road waterfront area;
- Examine the carpark supply/demand situation in KE and examine the feasibility of providing a large centralised carpark developed by private developers in the Study Area to meet the demand shortage as far as practicable. In particular, the loss of short term tenancy

[1] The waste recycling center has been demolished in Q1 2021.

(STT) car parks induced by the Kai Tak Development and the proposed developments in the vicinity should be taken into account;
- Propose road network of traffic entry and exit routes to and from the Study Area;
- Consider and liaise with relevant government departments the requirements for new transport infrastructure or improvement works to existing road junctions necessary to accommodate the full implementation of the developments and infrastructure, together with recommendation on the implementation programme;
- Consider and examine the feasibility of accesses for each individual land plots including but not limited to the proposed EFLS depot, integrated waste handling facility, public carpark and such other required facilities in the Study Area;
- Estimate the demand for public transport services and make recommendations on new public transport provisions and facilities, and improvement measures at suitable locations to cater for the estimated demand;
- Formulate a pedestrian strategy as an environmentally friendly transport mode to map out the overall pedestrian network within the Study Area including walkway system, pedestrian facilities, pedestrianized plazas, linkages to public transport interchanges/EFLS station, etc. The proposed pedestrian strategy shall tally with that proposed in the Agreement No. CE 49/2012 (TT) – Kowloon Bay Business Area Pedestrian Environment Improvement – Feasibility Study and Agreement No. CE 57/2013 (TT) – Pedestrian Environment Improvement Scheme for Transformation of Kwun Tong Business Area – Feasibility Study; and
- Carry out broad highway and railway/ EFLS infrastructure study.

1.3.1.2 The Structure of this report is as follows:

- This section is an introduction for this report;
- **Section 2** provides a project description including the study existing transport and traffic conditions and land use budget of the recommended outline development plan (RODP);
- **Section 3** illustrates the technical approach of transport and traffic assessment;
- **Section 4** presents the transport and traffic strategies including the vehicular, pedestrian and public transport strategies;
- **Section 5** proposes the public car park provision including supply / demand analysis and parking demand forecast;
- **Section 6** details the traffic impact assessment results for the road links and junctions;
- Section 7 introduces the traffic review on plot ratio 12 development scenario;
- **Section 8** presents the highway and railway infrastructure assessment results;
- **Section 9** summarizes and concludes the findings.

2 Existing Transport and Traffic Conditions and Project Descriptions

2.1 Existing Transport and Traffic Conditions

2.1.1 Existing Road Network

2.1.1.1 The Study Area is bounded by a number of major road links. A brief description of these major road links is summarised below:

Wai Yip Street

2.1.1.2 The section of Wai Yip Street in the vicinity of the Study Area is a dual-2 / dual-3 road running in a general north-south direction parallel with Kwun Tong Road. The section of Wai Yip Street between Lai Yip Street and Kai Fuk Road is a Primary Distributor while the remaining section is District Distributor. It connects KBBA and KTBA. Slips roads are provided on Wai Yip Street to and from Telford Gardens and Kai Fuk Road. Local roads of KBBA, i.e. Sheung Yee Road and Sheung Yuet Road, intersects with Wai Yip Street with limited access to and from Wai Yip Street northbound only. At the northern end, Wai Yip Street intersects with Kwun Tong Road.

Cheung Yip Street

2.1.1.3 The section of Cheung Yip Street within the Study Area is a single-2 local carriageway running north-south between Sheung Yee Road (westbound) and Hoi Bun Road. South of Hoi Bun Road, Cheung Yip Street runs towards the Kai Tak area and the Kai Tak Cruise Terminal.

Wang Chiu Road

2.1.1.4 Wang Chiu Road is a dual-2 district distributor road running north-south. It is a major transport backbone serving the transforming industrial/commercial area of KBBA. It intersects with Kai Cheung Road in the north, which provides regional access to/from via Kwun Tong Road. To the south, Wang Chiu Road provides slip road access with Kwun Tong Bypass to and from Kwun Tong / Eastern Harbour Crossing.

Hoi Bun Road

2.1.1.5 The section of Hoi Bun Road near the Study Area is a single-2 lane local road running from the southern limit of KBBA towards KTBA along the Kwun Tong Promenade. Currently, there are heavy traffic using this road often as it is one of the favourite routes for lorries.

Kai Fuk Road

2.1.1.6 Kai Fuk Road is an urban trunk road running between Kai Tak Tunnel in the west and Kwun Tong Road in the east. It connects the central Kowloon area with Kowloon Bay and Kwun Tong. It is a dual-3 carriageway in general with slip road access with Kwun Tong Bypass to and from Kwun Tong / Eastern Harbour Crossing, as well as Wai Yip Street. Within the Study Area, Kai Fuk Road is a flyover running through the site.

Sheung Yee Road

2.1.1.7 Sheung Yee Road is a district distributor road running from Sheung Yuet Road to the north and Ngau Tau Kok Road to the east with various configurations. Between Sheung Yuet Road and Lam Fun Street, Sheung Yee Road is a single-3 lane carriageway with 2 southbound lanes, and 1 northbound lane. Between Lam Fung Street and Wang Chiu Road, it is a one-way road with 3 traffic lanes from Lam Fung Street, and widen to 4-lane at its junction with Wang Chiu Road. Between Wang Chiu Road and Wai Yip Street, to the immediate north of the Study Area, Sheung Yee Road splits into two single 1-lane one-way at-grade carriageways sandwiching the Sheung Yee Road flyover to/from Ngau Tau Kok Road over Wai Yip Street and Kwun Tong Road.

Tsui Hing Street

2.1.1.8 Tsui Hing Street is a cul-de-sac local street branching from Cheung Yip Street. It is a single 2-lane carriageway running parallel and below Kai Fuk Road Flyover within the Study Area.

Kwun Tong Road

2.1.1.9 The section of Kwun Tong Road running along the western boundary of the Study Area is a dual-3 primary distributor road running in a north-south direction. It is a key transport corridor linking southeast Kowloon with the central Kowloon area.

Kwun Tong Bypass

2.1.1.10 The section of Kwun Tong Bypass running abuts the Study Area is a dual-3 expressway running along the southern boundary between Kwun Tong / Eastern Harbour Crossing and Diamond Hill / Tate's Cairn Tunnel. It is a key transport corridor linking southeast Kowloon with the New Territories and Hong Kong Island.

Hung Yip Street

2.1.1.11 Hung Yip Street is a cul-de-sac, about 40m long, intersecting Hoi Bun Road southbound only within the Study Area. Currently, it only serves the TD's Kowloon Bay VEC.

Shun Yip Street

2.1.1.12 Shun Yip Street is a single carriageway with 3 traffic lanes. It is one way running from Hoi Bun Road towards Wai Yip Street. With right turn prohibited at the Junction of Wai Yip Street / Lai Yip Street, Shun Yip Street forms part of the key link that connects amongst Lai Yip Street, Wai Yip Street, and Hoi Bun Road.

2.1.2 Existing Pedestrian Condition

2.1.2.1 Pedestrian condition along the existing footpaths in the immediate surrounding area and to the south near the Study Area is generally not an issue because of the low pedestrian activities associated with the current land use at the Study Area in terms of congestion level. However, the pedestrian environment is generally not desirable, with frequent heavy vehicles passed by and illegal parking on Wai Yip Street, Cheung Yip Street and/or Hoi Bun Road on the footpath.

2.1.2.2 At-grade signalised crossings surrounding the Study Area across Sheung Yee Road, Wang Chiu Road and Hoi Bun Road are available critical junctions only. Mid-block crossing on Sheung Yee Road to/from Wang Tai Road, Wang Mau Street and Wang Hoi Rod is restricted by the Sheung Yee Road Flyover; and mid-block crossing on Hoi Bun Road to/from Kai Tak is restricted by Kwun Tong Bypass. There is no at-grade crossing across Wai Yip Street, but can be completed via the two existing footbridges near the northeastern and southeastern corners of the Study Area.

2.1.2.3 To the north of Sheung Yee Road, pedestrian condition generally becomes less comfortable with increased pedestrian flow along the footpath due to the continuous opening of large commercial developments in near the Study Area in KBBA. Heavy pedestrian movements at signal-controlled crossings conflict with the heavy traffic flow at junctions causing heavier congestion on the road network.

2.1.2.4 The major pedestrian connections between the Study Area and the major public transportation nodes including PTI or MTR stations are shown in **Figure 2.1.1**.

2.1.3 Existing Public Transport Services

2.1.3.1 Comprehensive information on public transport services within the Study Area was investigated and details are given below. **Figure 2.1.2** and **Figure 2.1.3** illustrate the public transport service surrounding the Study Area.

Franchised Bus

2.1.3.2 There are over 100 nos. of franchised bus routes operates in the vicinity of the Study Area sandwiched between KBBA and KTBA, as shown in **Table 2.1.1.**

2.1.3.3 A number of bus corridors are identified namely Kwun Tong Road, Wai Yip Street, Wang Chiu Road and Kai Fuk Road. Nearly all bus routes, operate along Kwun Tong Road serving KTBA bypass the eastern edge of KBBA. Whereas, certain number of routes serve the heart of KBBA with stops on Wang Chiu Road, Sheung Yee Road and Sheung Yuet Road while some stop at Kai Fuk Road and 1 no. of routes stops on Wai Yip Street / Hoi Bun Road.

2.1.3.4 Whilst, Kwun Tong Road has the most numbers of franchised bus routes, however, bus stops are located some 600+ m from the eastern Wai Yip Street boundary of the Study Area in terms of walking distance. Hence, these routes on Kwun Tong Road are less attractive to serve the Study Area than those routes currently serving KBBA with stops/termini located some 300-500m north from the western boundary on Wang Chiu Road.

Table 2.1.1 Franchised Bus Routes operating within the Study Area

Route	Operator	Origin & Destination		Headway
Kwun Tong Road / KTBA				
1A	KMB	Sau Mau Ping	Star Ferry	5-10 mins
3D	KMB	Tsz Wan Shan (Central)	Kwun Tong (Yue Man Square)	4-10 mins
5M	KMB	Kai Tak (Tak Long Estate)	Kowloon Bay Railway Station	10-20 mins
5R	KMB	Kai Tak Cruise Terminal	Kwun Tong (Cir.)	30 mins
11B	KMB	Kwun Tong (Tsui Ping Rd)	Kowloon City Ferry	10-20 mins
11C	KMB	Sau Mau Ping (Upper)	Chuk Yuen Estate	15-20 mins
11D	KMB	Lok Fu	Kwun Tong Ferry	20-30 mins
11X	KMB	Sau Mau Ping (Upper)	Hung Hom Railway Station	10-20 mins
13D	KMB	Po Tat Estate	Island Harbourview	15-25 mins
13P	KMB	Po Tat Estate	Lai Kok	AM Peak Only
14	KMB	Lei Yue Mun Lei Yue Mun Estate Bus Terminus	China Ferry	12-20 mins
15	KMB	Ping Tin	Hung Hom Ferry Concourse	10-15 mins
15A	KMB	Ping Tin	Tsz Wan Shan (North)	20-35 mins
15X	KMB	Lam Tin (Kwong Tin Estate)	Hung Hom Railway Station	AM and PM Peak Only
16	KMB	Lam Tin (Kwong Tin Est)	Mong Kok (Park Avenue)	7-20 mins
17	KMB	Kwun Tong (Yue Man Square)	Oi Man	5-20 mins
23M	KMB	Lok Wah	Shun Lee (Cir.)	12-20 mins
38	KMB	Kwai Shing (East)	Ping Tin	5-15 mins
40	KMB	Tsuen Wan (Nina Tower)	Laguna City	12-20 mins
40P	KMB	Shek Wai Kok	Kwun Tong Railway Station	AM Peak Only
42C	KMB	Cheung Hang	Lam Tin Railway Station	5-15 mins
62X	KMB	Tuen Mun Central	Yau Tong Bus Terminus	8-25 mins
69C	KMB	Tin Yan Estate B/T	Kwun Tong Ferry	AM Peak Only
74C	KMB	Kau Lung Hang	Kwun Tong Ferry	AM Peak Only
74D	KMB	Kau Lung Hang	Kwun Tong Ferry	60 mins

Route	Operator	Origin & Destination		Headway
74P	KMB	Kwun Tong Ferry	Tai Po Central	1 per day
74X	KMB	Tai Po Central	Kwun Tong Ferry	4-30 mins
80	KMB	Mei Lam Bus Terminus	Kwun Tong Ferry	5-15 mins
80X	KMB	Chun Shek	Kwun Tong Ferry	6-20 mins
80P	KMB	Hin Keng	Kwun Tong Ferry	AM Peak Only
83A	KMB	Shui Chuen O Bus Terminus	Kwun Tong Ferry	AM and PM Peak Only
83X	KMB	Shui Chuen O Bus Terminus	Kwun Tong Ferry	9-30 mins
88X	KMB	Fo Tan Station	Ping Tin (Cir.)	20-30 mins
89B	KMB	Shatin Wai	Kwun Tong Railway Station	8-20 mins
89C	KMB	Heng On	Kwun Tong (Tsui Ping Rd)	9-20 mins
89D	KMB	Wu Kai Sha Railway Station	Lam Tin Railway Station	5-20 mins
89X	KMB	Shatin Railway Station Bus Terminus	Kwun Tong Railway Station	6-15 mins
89P	KMB	Ma On Shan Town Centre	Lam Tin Railway Station	AM Peak Only
93K	KMB	Po Lam	Mong Kok East Railway Station	15-25 mins
95M	KMB	Tsui Lam	Kwun Tong (Elegance Road)	20-25 mins
98A	KMB	Hang Hau	Ngau Tau Kok (Cir.)	8-20 mins
101	KMB/ NWFB	Kwun Tong (Yue Man Square)	Kennedy Town	3-14 mins
101R	KMB/ NWFB	Happy Valley Race Course	Kwun Tong (Yue Man Square)	Happy Valley Race Day Only
215X	KMB	Lam Tin (Kwong Tin Estate)	Kowloon Railway Station	5-15 mins
234C	KMB	Sham Tseng	Kwun Tong Railway Station	AM Peak Only
258D	KMB	Po Tin	Lam Tin Railway Station	7-20 mins
258P	KMB	Hung Shui Kiu	Lam Tin Railway Station	AM Peak Only
258S	KMB	Shan King	Lam Tin Railway Station	AM Peak Only
259D	KMB	Lung Mun Oasis	Lei Yue Mun Estate PTI	7-25 mins
268C	KMB	Long Ping Railway Station	Kwun Tong Ferry Pier	5-15 mins
269C	KMB	Tin Shui Wai Town Centre	Kwun Tong Ferry Pier	5-15 mins

Route	Operator	Origin & Destination		Headway
277E	KMB	Tin Ping Estate	Lam Tin Railway Station	15-20 mins
277X	KMB	Luen Wo Hui	Lam Tin Railway Station	5-20 mins
277P	KMB	Tin Ping Estate	Lam Tin Railway Station	AM Peak Only
292P	KMB	Sai Kung	Kwun Tong	AM Peak Only
296A	KMB	Sheung Tak	Sheung Tak Bus Terminus	6-12 mins
296C	KMB	Sheung Tak	Sham Shui Po (Tonkin Street)	15-20 mins
296D	KMB	Sheung Tak	Kowloon Railway Station	12-20 mins
606	KMB/CTB	Choi Wan (Fung Shing Street)	Siu Sai Wan (Island Resort)	11-22 mins
606A	KMB/CTB	Choi Wan (Fung Shing Street)	Yiu Tung Estate	AM Peak Only
619	KMB/CTB	Shun Lee	Central (Macau Ferry)	4-25 mins
671	KMB/CTB	Diamond Hill Railway Station	Ap Lei Chau (Lee Lok St)	15-30 mins
889	KMB	Ping Tin	Shatin Race Course	Shatin Race Day Only
N619	KMB/CTB	Shun Lee	Macau Ferry Pier	10-20 mins
X42C	KMB	Cheung Hang	Yau Tong	AM Peak Only
Hoi Bun Road / Wai Yip Street / KBBA				
15A	KMB	Ping Tin	Tsz Wan Shan (North)	20-35 mins
215X	KMB	Lam Tin (Kwong Tin Estate)	Kowloon Railway Station	5-15 mins
Wang Chiu Road / Sheung Yee Road (KBBA)				
5D	KMB	Telford Gardens	Hung Hom (Cir.)	AM and PM Peak Only
13X	KMB	Po Tat	Tsim Sah Tsui East	15-25 mins
15A	KMB	Ping Tin	Tsz Wan Shan	20-35 mins
24	KMB	Kai Yip	Mong Kok (Cir.)	12-20 mins
28B	KMB	Choi Fook	Kai Tak (Kai Ching Estate)	15-20 mins
74A	KMB	Tai Wo	Kai Yip	30-60 mins.
74B	KMB	Kowloon Bay	Tai Po Central	PM Peak Only
107	KMB/CTB	Kowloon Bay	Wah Kwai Estate	7-20 mins.
259X	KMB	Lung Mun Oasis	Kwun Tong Ferry	AM Peak Only

Route	Operator	Origin & Destination		Headway
268P	KMB	Ma Wang Road (Shan Shui House)	Kwun Tong Ferry	3 per day
297	KMB	Hang Hau North B/T (Tseung Kwan O Hospital)	Hung Hom Ferry Concourse B/T	12-25 mins
606	KMB/CTB	Choi Wan (Fung Shing Street)	Siu Sai Wan (Island Resort)	15-25 mins
606A	KMB/CTB	Choi Wan (Fung Shing Street)	Yiu Tung Estate	AM Peak Only
606X	KMB/CTB	Kowloon Bay	Siu Sai Wan (Island Resort)	AM Peak Only
641	KMB/ NWFB	Kai Tak (Kai Ching Estate)	Macau Ferry	15-25 mins
T277	KMB	Sheung Shui B/T	Lam Tin Railway Station B/T	AM Peak Only
Kai Fuk Road (Kowloon Bay) / KBBA				
11X	KMB	Sau Mau Ping (Upper)	Hung Hom Railway Station	10-20 mins
14X	KMB	Yau Tong (Shung Tak Wai)	Tsim Sha Tsui (Circular)	20-30 mins
15X	KMB	Lam Tin (Kwong Tin Est)	Hung Hom Railway Station	AM and PM Peak Only
98D	KMB	Hang Hau North B/T (Tseung Kwan O Hospital)	Tsim Sha Tsui East	7-15 mins
98P	KMB	Hong Sing Garden B/T	Tsim Sha Tsui East	AM and PM Peak Only
101X	KMB/ NWFB	Kennedy Town	Kwun Tong (Yue Man Square)	AM and PM Peak Only
215X	KMB	Lam Tin (Kwong Tin Est)	Kowloon Railway Station	5-15 mins
219X	KMB	Laguna City B/T	Tsim Sha Tsui (Cir.)	12-20 mins
296D	KMB	Sheung Tak	Kowloon Railway Station	12-30 mins
297P	KMB	Hang Hau North B/T (Tseung Kwan O Hospital)	Hung Hom Ferry Concourse B/T	AM Peak Only

Green Mini Bus

2.1.3.5 **Table 2.1.2** summarises the GMB routes serving the Study Area. GMB also play an important role to connect the traffic from other regions to/from the Study Area with connection to the surrounding areas, including bypassing the Ngau Tau Kok and Kowloon Bay MTR Stations. Currently, 7 nos. of GMB routes operate near the Study Area.

Figure 2.1.3 demonstrates the GMB stops and routes serving the Study Area.

Table 2.1.2 GMB routes operating near the Study Area

Route	Origin	Destination	Headway
1	Sai Kung	Kowloon Bay (Telford Gardens)	8 – 20 mins
15	Kowloon Bay (Kai Shing Street)	Kowloon Bay Station (Wai Yip Street)	30 mins
48	Shun Lee Estate	Kowloon Bay (Kowloon bay Public Transport Terminus)	4 - 8 mins
68	Choi Wan Estate	Kowloon Bay (Kowloon bay Public Transport Terminus)	8 - 12 mins
86	Telford Gardens	Kai Tak Cruise Terminal	8 – 20 mins
87	Yau Tong (Ko Yee Estate)	Kowloon Bay (Kai Yan Street)	20 mins
106	Po Lam	Kowloon Bay	7 - 20 mins

Red Mini Bus

2.1.3.6 RMBs are not scheduled services and 3 nos. of RMB routes running within KBBA. **Table 2.1.3** below summarises the RMB services in the Study Area.

Table 2.1.3 RMB routes operating near the Study Area

Origin	Destination
Kowloon Bay	Mong Kok (Sin Tat Plaza)
Kowloon Bay	Chai Wan
Kowloon Bay	Tsuen Wan (Tsuen Wan Market Street)

Taxi Services

2.1.3.7 Near the Study Area, 2 nos. of urban taxi stand and 1 no. of cross harbour taxi stand designated in KBBA near the Study Area on Lam Lok Street outside Nam Fung Commercial Centre, on Wang Chiu Road northbound near Lam Wah Street, and on Wang Tai Road northbound outside Enterprise Square Three respectively. Additional taxi pick-up / drop-off points are located at Lam Fook Street and Lam Hing Street. The locations of these taxi stands and pick up / drop off points are illustrated in **Figure 2.1.3**. In addition, other taxi services are permitted as kerbside activities at many locations within and in the vicinity of the Study Area.

Rail-Based Public Transport Services

2.1.3.8 The Ngau Tau Kok and Kowloon Bay MTR Stations are located to the northeast and southeast from the Study Area. Both stations are some 800m away from the eastern boundary of the Study Area on Wai Yip Street in terms of walking distance, and over 1km from the western boundary on Wang Chiu Road. Both stations are elevated above Kwun Tong Road, as shown in **Figure 2.1.3**.

2.1.3.9 Pedestrian access routes to/from either Ngau Tau Kok MTR Station or Kowloon Bay MTR Station must pass by numbers of grade separated crossing link including the subway across Kwun Tong Road for the

Ngau Tau Kok MTR Station, and the existing footbridges across Wai Yip Street and the podium level of Telford Garden for Kowloon Bay MTR Station. Hence, making the pedestrian linkage to/from the nearest MTR Stations even more inconvenience.

2.1.3.10 Given both MTR Stations are located outside the 500m catchment area (the commonly agreed acceptance walking distance for railway services in Hong Kong), rail-based public service is generally not attractive to the Study Area without strengthened connection, i.e. shuttle services or automated walkway.

2.2 Transport and Traffic Issues

2.2.1 Vehicular related Issues

Limited Connectivity between KBAA and Kwun Tong Bypass

2.2.1.1 Kwun Tong Bypass, a strategic highway, currently parallels the southern boundary of the Study Area with a half-interchange with Wang Chiu Road and Kai Fuk Road immediately south. However, this half-interchange only provides access to/from Kwun Tong / Eastern Harbour Crossing / Tseung Kwan O, while there is no immediate access to/from Diamond Hill / Tate's Cairn Tunnel. Hence, regional access to/from the north of the Study Area via Kwun Tong Bypass must use the interchange in the Choi Hung / Kai Tak area approximately 2km to the north, putting additional regional traffic on the local road network.

Limited Connectivity between KBAA and adjacent district distributors

2.2.1.2 While Wai Yip Street and Kai Fuk Road run along and within the Study Area with capacity to carry regional traffic to/from the Study Area, access to these major roadways are restricted due to junction configuration and grade separation. For instance, Wai Yip Street, running north-south to the east of the Study Area, can only access the Study Area on the northbound direction, and is segregated from the southbound side. Similarly, the Study Area can only be reached from Kai Fuk Road southbound, with no direct connection to the northbound direction towards Kai Tak Tunnel at the southern end of KBAA. Hence, regional traffic must travel through Wang Chiu Road and Kai Cheung Road before reaching the primary distributors for regional access.

Congested traffic condition in KBBA

2.2.1.3 With Wang Chiu Road and Kai Cheung Road being part of the primary access routes to and from the Study Area and to the heart of KBBA, vehicular traffic is very heavy during the peak hours, and congestion is often observed along Wang Chiu Road between Kai Cheung Road and Sheung Yee Road.

Illegal parking in KBBA and KTBA

2.2.1.4 On street illegal parking is a major concern in both KBBA and KTBA. Vehicles are often parked along the kerbsides illegally disrupting the major traffic flow and deteriorate the pedestrian walking environment.

2.2.2 Pedestrian related Issues

Lack of direct connection to Kowloon Bay and Ngau Tau Kok MTR Stations

2.2.2.1 The Ngau Tau Kok and Kowloon Bay MTR Stations are located to the northeast and southeast from the Study Area. Both stations are around 800m away from the eastern boundary of the Study Area on Wai Yip Street in terms of walking distance, and over 1km from the western boundary on Wang Chiu Road respectively.

2.2.2.2 Pedestrian access routes to/from either Ngau Tau Kok MTR Station or Kowloon Bay MTR Station must pass by numbers of grade separated crossing link including the subway across Kwun Tong Road for the Ngau Tau Kok MTR Station, and the existing footbridges across Wai Yip Street and the podium level of Telford Garden for Kowloon Bay MTR Station. Hence, making the pedestrian linkage to/from the nearest MTR Stations even more inconvenient.

2.2.2.3 In addition, walking environment to/from the two MTR stations are not pleasant, especially during the peak hours with heavy commuter movements. The high pedestrian flow often congests the existing footbridge across Wai Yip Street between Sheung Yuet Road and Telford Garden, as well as the podium on Telford Garden and the footpath network near the footbridge.

2.2.2.4 According to the 2017 and 2018 Policy Agendas, travellators would be proposed along Sheung Yee Road. The introduction of travellators would be explored regardless of presence of EFLS.

Undesirable walking environment in and near KBAA

2.2.2.5 Existing footpaths surrounding KBAA and its vicinity are typically 2-3m wide with very low pedestrian activities associated with the current land use. Hence, walking condition in terms congestion level is generally not an issue. However, the walking environment is considerably undesirable, with frequent heavy vehicles traffic passing by and illegal parking on Wai Yip Street, Cheung Yip Street and/or Hoi Bun Road on the footpath.

Segregation of pedestrian connection between KBAA and KBBA

2.2.2.6 Existing Sheung Yee Road Flyover along the northern boundary of the Study Area restrict north-south pedestrian movements on either side of Sheung Yee Road, especially disconnecting the Study Area with Wang Tai Street, Wang Mau Street and Wang Hoi Road. All north-south pedestrian movements must be completed at the at-grade junctions of Sheung Yee Road with Wang Chiu Road, or with Wai Yip Street causing long pedestrian detour disrupting the pedestrian connectivity between KBAA and KBBA.

Disconnection of pedestrian link between KBAA and the Kai Tak Development

2.2.2.7 With the existing Kai Fuk Road Flyover, Kwun Tong Bypass and its existing slip roads bounding the southern perimeter of the Study Area, existing pedestrian link between KBAA/KBBA and the KTD waterfront is very restricted. Currently, the only access is via Cheung Yip Street to the south of Hoi Bun Road. In the future, with the proposed elevated footbridges across Kai Fuk Road, two additional access points could be opened up to the north. Nevertheless, there are only 3 planned access point to KTD, which are approximately 500 – 600m apart. Hence, pedestrian linkages between the waterfront and KBAA/KBBA are limited with potential to further improve.

Walking Distance between KBAA and KTAA

2.2.2.8 KBAA under this Study and KTAA located at the existing Kwun Tung Ferry Pier are currently linked together with Wai Yip Street, and partly by the promenade along Hoi Bun Road. However, the walking distance between KBAA and KTAA is >1.0km and the walking condition of these existing linkages are undesirable, with significant numbers of vehicular access along the routes. In addition, many motor service centres are located on both sides of Wai Yip Street, and occupy one traffic lane for their business use in each bound most of the hours, making the walking environment more unpleasant.

2.2.3 Public Transport Related Issues

Lack of existing public transport service in the close vicinity of KBAA

2.2.3.1 Currently, public transport service in the close vicinity of the Study Area is very limited. Only 2 franchised bus routes and 2 GMB routes operate along Wai Yip Street / Hoi Bun Road. These stops are primarily servicing KTBA and KBBA, and very busy during the peak hours. Hence, there is opportunity to enhance the public transport services in the close vicinity of the Study Area to support the proposed development.

Environmentally Friendly Linkage System (EFLS)

2.2.3.2 Government released the findings and recommendations of the Detailed Feasibility Study (DFS) for the EFLS in end 2020, which reveals that elevated mode system is not a sustainable and pursuable option for the EFLS and suggests implementing a “multi-modal” EFLS including enhancement of public transport services with deployment of electric vehicles, developing a travellators network and provision of greenway and “water taxi” service in KTD area. The KBAA study has allowed flexibility to cater for the needs of public transport under the “multi-modal” EFLS.

2.3 Recommended Outline Development Plan (RODP)

2.3.1 Introduction

2.3.1.1 A Recommended Outline Development Plan (RODP) is formulated taking into account various developments issues, including the developable sites, land use mix, urban design, air ventilation, development scenarios for the EFLS and connectivity (**Figure 2.3.1**).

2.3.1.2 The proposed major land use components under the RODP include:

- Office/ Retail/ Hotel
- Arts, Cultural & Creative (ACC) Use and Technology Use
- Urban Farming/ Food Workshop
- Public Transport Facilities
- Environmentally Friendly Linkage System (EFLS) Depot
- Organic Resources Recovery Centre (ORRC)
- Open Space

2.3.2 Key Development Parameters

2.3.2.1 **Table 2.3.1** set out the key development parameters on individual Lots based on the approach above.

Table 2.3.1a Key Development Parameters on Individual Lots (with rail-based EFLS Scenario)

Lot	Gross Site Area (sq.m.)	Net Site Area (sq.m.)	GFA (sq.m.) (rounded)	Plot Ratio	Building Height Restrictions (mPD)
1	9,500	9,500	Subject to detailed design and feasibility study	N/A	40
2	15,700	15,700	188,000	12	150, 60
3	9,400	9,400	1,200 ^	0.3	9
4	24,200	24,400 ##	244,000 &	10	135, 120,45
5	3,800	3,800	45,535	12	120
6	6,800	6,800	82,044	12	120

^ The GFA of Lot 3 refers to space underneath Kai Fuk Road flyover only.
The site reduction factor of 10% has been removed due to the complex interface and integration between the two building components of EFLS depot and topside development.
& The total GFA has been rounded up from 243,500 sq.m. to 244,000 sq.m.. The elevated pedestrian corridor linking Lot 2 and Lot 4 does not count in the GFA of Lot 4 as no retail shops would be put along the corridor.

Table 2.3.1b Key Development Parameters on Individual Lots (Without rail-based EFLS Scenario)

Lot	Gross Site Area (sq.m.)	Net Site Area (sq.m.)	GFA (sq.m.) (rounded)	Plot Ratio	Building Height Restrictions (mPD)
1	9,500	9,500	Subject to detailed design and feasibility study	N/A	40
2	24,140*	17,000	186,050	11	50, 150
3	8,400	8,400	400 ^	N/A	9
4	25,020**	16,750	183,880	11	120 & 135
5	3,800	3,800	45,540	12	120
6	6,800	6,800	82,040	12	100

+ Site areas are subject to survey. Gross Site Area includes POSPD, amenity area and the pedestrianized area, which are not GFA accountable. However, basement carpark will make use of the gross site area (excluding the POSPDs at Lot 4), including the section of Cheung Yip Street between the two portions of Lot 4. 100% GFA concession is assumed for underground car parks.

* Includes POSPD of about 4 400 m^2 and the section of Cheung Yip Street (between Lots 2 and 5) of about 2 740 m^2.

** Includes POSPDs of about 1 600 m^2 (western portion) and about 1 700 m^2 between eastern portion and Lot 6, amenity areas of 2 140 m^2 and the section of Cheung Yip Street of about 2 830 m^2.

^ The development of Lot 3 is proposed to be carried out by the future developer of Lot 4.

2.3.3 Proposed Land Use Budget

2.3.3.1 The land use budget under with rail-based EFLS and without rail-based EFLS scenarios are tabulated in **Table 2.3.2a and 2.3.2b**. It should be noted that the breakdown has also included the two land sale sites which are assumed to provide about 116 100 m^2 of office GFA and 11,480 m^2 of retail and F&B GFA.

Table 2.3.2a Summary of the Proposed Land Use Mix of RODP (With rail-based EFLS Scenario)

USES	GFA (m^2)	%
Office	**291,000**	58%
Retail/ F&B/ Entertainment/Urban Farming / Food Workshop	**122,200**	24%
Retail	85,500	
F&B	21,100	
Entertainment	10,600	
Urban Farming / Food Workshop	5,000	
Hotel	**74,400**	15%
Arts, Cultural and Creative Uses (ACC)/ Technology (Tech)	**7,700**	2%
Arts workshop, arts studio, exhibition space, gallery, pop-up market, event space, performance venue, other uses related to arts and culture, and creative uses (ACC use)	3,200	
IT Start-up Co-working Space/Business Incubator/ Resource Centre (Tech use)	4,500	
Transport Facilities	**4,000**	1%

USES	**GFA (m^2)**	**%**
Total	**499,300**	**100.00%**
EFLS Depot cum Station	**61,000**	
Total (Including EFLS Depot cum Station)	**560,300**	

Remarks: The GFA of the two sold sites (i.e. Lots 5 and 6) are included. Based on the latest building plans approved in 2018, about 116,110 sq.m. of office GFA and 11,500 sq.m. of retail and F&B GFA are provided at the two sites.

Table 2.3.2b Summary of the Proposed Land Use Mix of RODP (Without rail-based EFLS Scenario)

USES	**GFA**	**%**
Office	**291,490**	59%
Retail/ F&B/ Entertainment/Urban Farming / Food Workshop[2]	**122,220**	25%
Hotel	**74,400**	14%
Arts, Cultural and Creative Uses (ACC)/ Technology (Tech)	**5,400**	1%
Arts workshop, arts studio, exhibition space, gallery, pop-up market, event space, performance venue, other uses related to arts and culture, and creative uses (ACC use)	2,400	
IT Start-up Co-working Space/Business Incubator/ Resource Centre (Tech use)	3,000	
Transport Facilities	**4,400**	1%
Total	**497,910**	**100.00%**

Remarks: The GFA of the two sold sites (i.e. Lots 5 and 6) are included. Based on the latest building plans approved in 2018, about 116,100 m^2. of office GFA and 11,480 m^2 of retail and F&B GFA are provided at the two sites.

2.3.3.2 The proposal under **Table 2.3.2a** is based on the EFLS (Elevated Green Transport Mode Scenario) presumably taking up the largest building bulk for EFLS. The assumption for depot-related GFA hypothesized by the study consultants varies by scenarios: (1) EFLS (Elevated Green Transport Mode Scenario) 61,000 m^2; and (2) Non-EFLS scenario 4,400 m^2 reserved for other transport facilities.

2.3.4 Broad Estimation of Employment Size

2.3.4.1 Employment opportunities by land uses are derived by applying the worker density by land uses on the GFA data. Upon completion, the Preferred Option is anticipated to create in total of about 22,000 employment opportunities including those that might be generated from the EFLS station/depot under planning. **Table 2.3.3** summaries the estimated employment opportunities.

Table 2.3.3 Employment Opportunities by Uses

USES	With rail-based EFLS Scenario	Without rail-based EFLS Scenario
Office[1]	14,550	14,575
Retail/F&B/Entertainment[2]/ Urban Farming/ Food Workshop[3]	5,860	5,961
Hotel[4]	1,190	1,190
Arts, Creative & Cultural (ACC) / Technology (Tech)**Error! Bookmark not defined.**	180	123
Transport Facilities[6]	10	11
Depot[6]	100	--
Total	21,890	21,860

Note

[1] According to HK2030 Study WP 46, employment density for CBD office is assumed to be 1 worker per 20sqm.

[2] Retail, F&B and Entertainment are assumed to be General Business Use. According to HKPSG, employment density is assumed to be 1 worker per 20-25sqm for General Business Use.

[3] The employment density for urban farm is assumed to be 1 per 50 sq.m. by making reference to AFCD Iveggie which employs 5 employees for an area of about 250 sq.m.. (http://www.iveggie.com.hk/index.php/tw/investment

[4] As local employment density for hotel is not available, the assumption adopted by the UK government is therefore applied. It is assumed that for 4-5 Star Hotels, the ratio between hotel staff and number of rooms should be 1 hotel staff per 1.25 rooms (*https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/378203/employ-den.pdf*)

[5] According to Annex 6 and 7 of the Economic Impact of Developing the West Kowloon Cultural District Technical Paper (Financial Secretary's Office, 2007), the Performing Arts Facilities will create 4,275 direct employment opportunities. And the total GFA for these Performing Arts Facilities is of about 188,895 sq.m.. The employment density for cultural and creative facilities is therefore assumed to be 1 worker per 44 sq.m..

[6] For EFLS, the estimated number of employment opportunities is subject to the patronage, headway and size of the depot, etc., which include staffs for operations, maintenance and supporting staffs.

2.4 Tentative Implementation Programme

2.4.1.1 The details of the implementation year will be provided in the WP No. 25 Implementation Strategy, Cost and Revenue Estimate and Development Programme.

3 Technical Approach of Transport and Traffic Assessment

3.1 Area of Influence

3.1.1.1 The proposed development, as well as the Area of Influence, are shown in **Figure 1.2.1**.

3.2 Overall Modelling Approach

3.2.1 Upper Tier Strategic Transport Model (STM)

3.2.1.1 As for transport and traffic modelling, a traditional two-tier transport modelling structure was proposed and adopted to produce traffic forecast based on planning parameters, potential highway and railway infrastructure within close proximity to the Study Area.

3.2.1.2 STM has been adopted in this Study which translates land use assumptions, socio-economic data, transport and policy assumptions into strategic transport demand. STM is used for estimating broad district-to-district traffic demand and the performance of the strategic road/ transit network. The structure and development of the STM adopts the traditional 4-stage model hierarchy and is compatible with TD's Comprehensive Transport Study (CTS) Model.

3.2.1.3 Adopting this STM would ensure compatibility with current government studies and would allow factors affecting global travel behaviour such as economic growth to be taken into account. The STM produces trip matrices for the base and future years based on demographic and socio-economic data such as population, employment and income etc., through which this traditional four-stage STM reflects trip generation/attraction, modal split, trip distribution, and trip assignment throughout the territory. The STM also offers the advantage of being able to reflect the traffic impacts especially the mode choice caused by changes of fundamental assumptions such as the demographic, socio-economic and infrastructures. It is hence recommended to adopt this model as the basis, and updated using the latest available planning data, planned and committed new infrastructures and local developments in the Area of Influence (AOI) for this study.

3.2.1.4 The Territorial Population and Employment Data Matrix (TPEDM) prepared by PlanD serves as the major input to the STM. The latest version is the 2014-based dataset. In view of the latest available territorial traffic and transport data from the Annual Traffic Census (ATC) are updated to year 2014. The base year STM is developed and validated to the traffic condition in year 2014. The latest planning data provided by EKEO in Kowloon Bay and Kwun Tong in March 2019 on top of 2014-based TPEDM was also incorporated.

3.2.2 Lower Tier Local Area Traffic Model (LATM)

3.2.2.1 LATM will be further developed to simulate road-based traffic at local district level for facilitating the traffic impact assessment. The STM will provide cordoned traffic matrices as inputs to the LATM for defining its boundary conditions and broad district-to-district traffic movements. The LATM will adopt the same mechanism as TD's Base District Traffic Model (BDTM).

3.2.2.2 The LATM adopts a more localized and comprehensive transport model network that has taken account of parameters that are not well-presented in the upper tier model, such as traffic signal data, weaving movements and ingress/egress. The LATM will be validated to the traffic conditions in year 2014 as the base year.

3.2.2.3 Future year forecast will be projected from the validated STM and LATM, by incorporating the planning data forecast into the model. Year 2031 had been adopted for the assessment. Three forecast scenarios will be assessed in this Study:

- Year 2031 Reference Case
- Year 2031 Design Case (Without rail-based EFLS scenario)
- Year 2031 Design Case (With rail-based EFLS scenario)

3.2.3 Pedestrian Model

3.2.3.1 The pedestrian demand forecast approach has adopted an assignment model form which comprises the pedestrian network and the pedestrian demand matrix. The model was validated to base year observed pedestrian traffic counts undertaken at the key walkways so as to simulate the observed level of service of the pedestrian network system.

Pedestrian Network Development

3.2.3.2 The pedestrian network has covered the below types of walk links:

- major walkways/ footbridges/ subways
- access and through path via the popular premises
- crossings at signalised/ priority junctions
- upstairs/ downstairs/ up-ramp/ down-ramp/ escalators

3.2.3.3 The pedestrian network was developed by coding these walk links connecting each other within the Study Area. The link attributes include link length (distance), link width, link type which could allow the pedestrian model to assess the capacity and the change of walking speed against the pedestrian flow.

3.2.3.4 In order to better simulate the peak hour pedestrian traffic conditions on the key footpaths, footbridges and subways within the Study Area, the pedestrian zone system has been critically reviewed with respect to the main pedestrian corridors, building ingress/egress, locations of bus stops, MTR stations, future potential EFLS stations, and etc. The building blocks in the Study Area were therefore appropriately aggregated into pedestrian zones defined to ensure an appropriate level

of details could be achieved in which the peak hour pedestrian trips produced by building block by land use would be properly assigned onto the pedestrian network.

3.2.3.5 **Diagram 3.1** below shows the pedestrian network and zoning defined in the pedestrian model.

Diagram 3.1 Pedestrian Network and Zoning



Pedestrian Demand Matrix Development

3.2.3.6 The base year pedestrian demand matrices were developed for the AM, and PM peak hours. The matrices development involves the trip ends estimation and distribution process. The trip ends were calculated based on the landuse type of each building associated with the corresponding trip rate, and the passenger demands at the MTR stations and bus stops along Kwun Tong Road. The estimated trip ends were then be aggregated to the adopted model zoning system.

3.2.3.7 The adopted trip rates by land use are tabulated in **Table 3.2.1** below.

Table 3.2.1 Adopted AM and PM Peak Pedestrian Trip Rates

Landuse	Units	AM Peak	PM Peak
		2-way	2-way
Office	ped/hr/100m^2 GFA	3.17	2.23
Retail + Office	ped/hr/100m^2 GFA	0.79	2.24
Industrial	ped/hr/100m^2 GFA	0.71	0.80
Hotel	ped/hr/rm	0.71	0.71

3.2.3.8 The distribution of the pedestrian trips was derived from Arup's in-house database, which is largely based on the results obtained from the pedestrian opinion survey conducted in 2014 covering the area of KTBA. More than 700 interviews were conducted and over 70% successful records were collected. Questions were posed relating to the public's willingness to walk in KTBA in terms of walking time. The

pedestrian trip length distribution was therefore derived for the development of pedestrian origin-destination matrices. Matrix furnessing was carried out to match with the estimated zonal trip ends.

3.2.3.9 Similar to traffic forecasts, the pedestrian forecasts will also be done for the following scenarios:

- Year 2031 Reference Case
- Year 2031 Design Case (Without rail-based EFLS scenario)
- Year 2031 Design Case (With rail-based EFLS scenario)

3.3 Model Input Assumptions

3.3.1 Territorial Planning Assumptions

3.3.1.1 The population assumptions obtained from the latest version of 2014-based Territorial Population and Employment Data Matrices (TPEDM) is adopted for this assignment. On top of the population and employment data from 2014-based TPEDM, planning assumptions from relevant studies in the vicinity as well as the latest planning data provided by EKEO in Kowloon Bay and Kwun Tong in March 2019 on top of 2014-based TPEDM were incorporated.

3.3.2 Land-use Planning Development in the Vicinity of KBAA

3.3.2.1 As advised by Architectural Services Department, the New Acute Kai Tak Hospital will be developed in the South Apron of KTD Area. It will be a new major acute hospital with a total of 2,400 beds (including 2,100 in-patient and 300 day beds). Considering its close proximity to the Study Area, it should be incorporated into the development of traffic forecast at local level.

3.3.2.2 Applying the traffic generation rates in Traffic Generation Survey 2006 (TGS 2006), which is shown in **Table 3.3.2**, the calculated traffic generation for Kai Tak Hospital is presented in **Table 3.3.3**.

Table 3.3.2 Adopted Traffic Generation Rates for the Kai Tak Hospital

Land-use	Unit	AM Peak		PM Peak	
		Generation Rate	Attraction Rate	Generation Rate	Attraction Rate
Hospital	pcu/hr/bed	0.2064	0.2551	0.2328	0.1788

Table 3.3.3 Traffic Generation for the Kai Tak Hospital (in units of PCU/hr)

Land-use	Unit	AM Peak		PM Peak	
		Generation	Attraction	Generation	Attraction
Hospital	pcu/hr	495	612	559	429

3.3.2.3 In additional the planned Kwun Tong Community Green Station and the Hongkong Post Headquarters Building at Wang Chin Street will also be available at design year 2031. Development parameters had been advised by CEDD and the traffic and pedestrian flows generated by above had also been incorporated into assessment.

3.3.3 Planned Road Network in the Vicinity of Kowloon East (KE)

3.3.3.1 The proposed highway infrastructures assumed to be in place in the respective future years in the vicinity of KE are shown in **Table 3.3.4**.

Table 3.3.4 Future Year Highway Infrastructure Assumptions in the Vicinity of Kowloon East (KE)

Year 2021 (In addition to 2016 Road Network)	Configuration
Proposed Road Improvement Works in West Kowloon Reclamation Development – Phase 1	Add slip roads (1 lane)
Year 2026 and beyond (In addition to 2021 Road Network)	**Configuration**
Route 6 (formerly Route 11) – Central Kowloon Route	D3
Route 6 (formerly Route 11) – Trunk Road T2 (Kai Tak – Cha Kwo Ling Link).	D2
Route 6 (formerly Route 11) – Tseung Kwan O – Lam Tin Tunnel	D2

3.4 Base Year Model Validation

3.4.1 Model Validation of STM

3.4.1.1 As the STM was developed based on year 2014-based TPEDM. the model was validated to the observed data obtained from 2014 Annual Traffic Census (ATC) traffic count for Daily, AM and PM peak hour traffic in PCU/hr (by direction) at the following screenlines:

- Cross Harbour;
- Kowloon External;
- ATC Screenline AA; and
- ATC Screenline KK.

3.4.1.2 A set of validation criteria is established to ensure the STM model can reasonably replicate the existing traffic conditions with respect to the planning data and transport infrastructure. The details are given in the table below.

Table 3.4.1a Modal Validation Guidelines for Vehicular Traffic at Selected Screenlines for STM Model

Type	Max Error	
	1-way	2-way
Daily Total Vehicles	-	8%
AM Peak Total Vehicles	±15%	±10%
AM Peak Car	±25%	±15%
AM Peak Taxi	±25%	±15%
AM Peak GV	±25%	±15%
PM Peak Total Vehicles	±15%	±10%
PM Peak Car	±25%	±15%
PM Peak Taxi	±25%	±15%
PM Peak GV	±25%	±15%

3.4.1.3 Highway screenline summary of STM are shown in following tables. The comparisons indicate that the model validation criteria are satisfied.

Table 3.4.1b Daily Traffic Validation Results at Highway Screenline

Screenline	2-way Daily Traffic in pcus		
	Observed	Modelled	Mod/Obs
Cross Harbour Tunnels	311,400	303,100	0.97
Kowloon External Cordon	887,300	909,800	1.03
A-A	637,500	590,300	0.93
K-K	448,500	434,600	0.97

Table 3.4.1c Peak Hour Traffic Validation Results at Highway Screenline

Screenline	Direction	Traffic Volume in pcus					
		AM Peak Hour			PM Peak Hour		
		Observed	Modelled	Mod/Obs	Observed	Modelled	Mod/Obs
Car							
Cross Harbour Screenline	NB	3,600	3,200	0.90	5,000	4,600	0.90
	SB	4,000	3,900	0.96	4,500	4,200	0.92
	2-way	**7,600**	**7,100**	0.93	**9,600**	**8,700**	**0.91**
Kowloon External Cordon	NB	7,500	7,800	1.05	11,400	12,400	1.09
	SB	12,300	13,600	1.11	10,700	11,100	1.03
	2-way	**19,700**	**21,500**	1.09	**22,100**	**23,400**	**1.06**
Screenline A-A	EB	5,600	5,900	1.05	8,300	8,300	1.00
	WB	6,100	6,200	1.01	7,700	7,000	0.92
	2-way	**11,700**	**12,100**	1.03	**15,900**	**15,300**	**0.96**
Screenline K-K	EB	4,800	5,400	1.13	5,800	5,400	0.93
	WB	4,500	4,800	1.05	6,500	6,500	1.00
	2-way	**9,300**	**10,200**	1.09	**12,300**	**11,800**	**0.97**
Taxi							
Cross Harbour Screenline	NB	1,300	1,300	1.01	1,200	1,100	0.89
	SB	1,600	1,400	0.86	1,600	1,500	0.97
	2-way	**3,000**	**2,800**	0.93	**4,200**	**4,400**	**1.04**
Kowloon External Cordon	NB	3,200	3,000	0.95	2,800	2,600	0.95
	SB	4,400	4,400	1.00	2,900	2,700	0.92
	2-way	**7,600**	**7,500**	0.98	**5,700**	**5,300**	**0.93**
Screenline A-A	EB	3,900	3,600	0.93	4,200	4,400	1.04
	WB	3,700	3,300	0.88	3,900	3,900	0.99
	2-way	**7,600**	**6,900**	0.91	**8,100**	**8,200**	**1.02**
Screenline K-K	EB	2,400	2,600	1.08	2,000	2,000	1.02
	WB	2,200	2,300	1.01	2,100	2,000	0.96
	2-way	**4,700**	**4,900**	1.05	**4,000**	**4,000**	**0.99**

Screenline	Direction	Traffic Volume in pcus					
		AM Peak Hour			PM Peak Hour		
		Observed	Modelled	Mod/Obs	Observed	Modelled	Mod/Obs
GV							
Cross Harbour Screenline	NB	1,600	1,600	1.04	2,200	1,900	0.89
	SB	3,000	2,500	0.86	1,100	1,100	0.96
	2-way	**4,500**	**4,200**	0.92	**3,300**	**3,000**	**0.91**
Kowloon External Cordon	NB	8,700	8,900	1.02	9,800	10,000	1.03
	SB	12,500	13,500	1.08	7,700	8,600	1.12
	2-way	**21,200**	**22,300**	1.05	**17,400**	**18,600**	**1.07**
Screenline A-A	EB	4,600	4,500	0.97	4,000	3,600	0.91
	WB	4,700	4,900	1.06	3,800	3,400	0.89
	2-way	**9,300**	**9,400**	1.01	**7,800**	**7,000**	**0.90**
Screenline K-K	EB	4,100	4,000	0.97	3,200	3,000	0.94
	WB	4,300	3,600	0.85	3,300	2,900	0.88
	2-way	**8,400**	**7,700**	**0.91**	**6,500**	**5,900**	**0.91**
Total							
Cross Harbour Screenline	NB	8,100	7,600	0.94	10,100	9,600	0.95
	SB	10,500	9,700	0.92	8,400	7,900	0.94
	2-way	**18,600**	**17,300**	0.93	**18,500**	**17,500**	**0.95**
Kowloon External Cordon	NB	23,900	23,300	0.97	28,100	29,100	1.04
	SB	34,800	36,700	1.05	24,900	25,600	1.03
	2-way	**58,700**	**60,000**	1.02	**53,000**	**54,700**	**1.03**
Screenline A-A	EB	18,500	17,300	0.94	19,600	19,100	0.97
	WB	18,500	17,800	0.96	18,400	17,300	0.94
	2-way	**37,000**	**35,100**	0.95	**38,000**	**36,400**	**0.96**
Screenline K-K	EB	14,500	14,800	1.02	13,400	12,600	0.94
	WB	14,200	13,300	0.94	14,200	13,600	0.96
	2-way	**28,700**	**28,100**	**0.98**	**27,600**	**26,200**	**0.95**

Table 3.4.1d Summary of STM Model Highway Validation Results

Type	Max Error		Satisfying Criteria?	
	1-way	2-way	1-way	2-way
Daily Total Vehicles	-	3%	-	√
AM Peak Total Vehicles	8%	7%	√	√
AM Peak Car	13%	9%	√	√
AM Peak Taxi	14%	9%	√	√
AM Peak GV	15%	9%	√	√
PM Peak Total Vehicles	6%	5%	√	√
PM Peak Car	10%	9%	√	√
PM Peak Taxi	11%	7%	√	√
PM Peak GV	12%	10%	√	√

3.4.1.4 The two-tier modelling approach is adopted in this Study to develop a 2nd tier LATM for traffic impact assessment, in which the strategic sector-to-sector traffic demand is fed from the 1st tier STM. The validation of STM is therefore to ensure a reliable platform of cordoning the district traffic demand matrix for the development of LATM. The validation criteria of the STM would follow the similar guidelines as for LATM as shown in **Table 3.4.3**. The validation target is 10% for screenline.

3.4.1.5 As ATC traffic data is presented in number of vehicles, it is converted to pcu for comparison with the model result. The adopted pcu factor is

shown in **Table 3.4.2**. Since the vehicle classification in ATC is different from the STM, they are grouped into private vehicles, goods vehicles and public transport services, which are the vehicle classification adopted for LATM. The vehicle classification for ATC, STM and LATM is also shown in **Table 3.4.2** below.

Table 3.4.2 Vehicle Types and PCU Factors Summary

ATC	STM	LATM	PCU Factor for ATC user class
Motorcycle	Car	PV	0.75
Private Car			1
Taxi	Taxi		1
Private Light Bus	Special Purpose Bus		1.5
Non Franchised Bus			2
Light Goods Vehicle	Light Vehicle	GV	1.4
	Light Goods Vehicle		
Medium Goods Vehicle/ Heavy Goods Vehicle	Medium Goods Vehicle		2.25
	Heavy Goods Vehicle		
	Tractor Unit		
Public Light Bus	Public Light Bus	PT	1.5
Franchised Bus Single Deck	Bus		2.5
Franchised Bus Double Deck			

3.4.2 Model Validation of LATM

3.4.2.1 Local traffic impact assessments were evaluated using the LATM. Given that the local traffic impacts introduced by the Study should mainly affect local highways in Kwun Tong area, therefore local area modelling was focused in Kwun Tong district.

3.4.2.2 The Base Year LATM was validated to the traffic conditions of a normal weekday in year 2014. The validation guidelines are presented in **Table 3.4.3** below.

Table 3.4.3 Validation Guidelines

Validation Criteria	Validation Target
1. Total Screenline Flows	100% within ± 10%
2. Major Road Links	85% within ± 10% 100% within ± 20%
3. Key Junctions (Entry / Exit arm)	GEH 6 or less on 70% of links GEH 7 or less on 80% of links GEH 10 or less on 100% of links

3.4.2.3 The GEH statistic is a modified chi-square test of the form:

$$\sqrt{\frac{(v2-v1)^2}{0.5*(v1+v2)}}$$

V1 and V2 are the observed and modelled flows on a specific link. This is used in order to reflect importance of a difference based on the total volume on a link. If percentages alone are examined then there is a risk of very large percentage differences in small flow volumes appearing important when they are not. Use of the GEH statistic is designed to remove this risk by reducing the significance of relatively large (percentage) differences between two small numbers. (For example an absolute difference of 100 pcu/hr gives a big percentage difference if the flows are of the order of 100 pcu/hr but would be unimportant for 1,000 pcu/hr). In general, a GEH statistic of less than 6.0 or 7.0 is considered adequate and less than 3.0 is very good.

3.4.2.4 The observed traffic data was collected by on-site survey count. The validation results at each cordon point are summarised in **Table 3.4.4** and the statistic is shown in **Table 3.4.5**. The results indicate that the differences at each cordon point and major road links are all within 10%. The screenlines also show that the model has good validation as links are within 10%.

Table 3.4.4 External Cordon Points Validation Summary

Link	Bound	Total Vehicles (PV+GV+PT[1])					
		AM Peak Hour			PM Peak Hour		
		Observed (A)	Modeled (B)	(B)/(A)	Observed (A)	Modeled (B)	(B)/(A)
External Cordon 1 – Inbound							
Clear Water Bay Rd W/B	Inbound	1,648	1,644	100%	1,046	1,044	100%
Po Lam Rd W/B	Inbound	1,277	1,272	100%	742	739	100%
Tsueng Kwan O Tunnel W/B	Inbound	3,994	4,001	100%	3,565	3,569	100%
	Total	**6,918**	**6,917**	**100%**	**5,354**	**5,353**	**100%**
External Cordon 1 – Outbound							
Clear Water Bay Rd E/B	Outbound	944	931	99%	1,078	1,064	99%
Po Lam Rd E/B	Outbound	559	533	95%	657	650	99%
Tsueng Kwan O Tunnel E/B	Outbound	2,941	2,935	100%	4,384	4,379	100%
	Total	**4,444**	**4,400**	**99%**	**6,118**	**6,092**	**99%**
External Cordon 2 – Inbound							
Eastern Harbour Tunnel N/B	Inbound	3,485	3,463	99%	4,128	4,113	100%
	Total	**3,485**	**3,463**	**99%**	**4,128**	**4,113**	**99%**
External Cordon 2 – Outbound							
Eastern Harbour Tunnel S/B	Outbound	4,049	3,957	98%	3,788	3,734	99%
	Total	**4,049**	**3,957**	**98%**	**3,788**	**3,734**	**99%**
External Cordon 3 – Inbound							
Po Kong Vallage Rd E/B	Inbound	594	587	99%	464	461	99%
Fung Tak Rd E/B	Inbound	389	386	99%	284	280	99%
Tai Hom Rd E/B	Inbound	794	794	100%	907	907	100%
Tai Hom Rd W/B	Inbound	235	232	99%	207	205	99%
Lung Cheung Rd E/B	Inbound	3,462	3,400	98%	3,445	3,410	99%
Choi Hung Rd E/B	Inbound	603	599	99%	620	618	100%
Prince Edward Rd East E/B	Inbound	5,029	4,989	99%	4,639	4,617	100%
Eastern Rd & Kai Shing Rd E/B	Inbound	766	749	98%	321	313	98%
Kai Tak Tunnel E/B	Inbound	2,080	2,051	99%	1,901	1,882	99%
	Total	**13,952**	**13,785**	**99%**	**12,789**	**12,695**	**99%**
External Cordon 3 – Outbound							
Po Kong Vallage Rd W/B	Outbound	416	396	95%	389	372	96%
Fung Tak Rd W/B	Outbound	719	714	99%	720	685	95%
Lung Cheung Rd W/B	Outbound	4,790	4,608	96%	5,128	4,954	97%
Choi Hung Rd W/B	Outbound	1,405	1,375	98%	1,530	1,503	98%
Prince Edward Rd East W/B	Outbound	4,260	4,199	99%	4,130	4,024	97%
Eastern Rd & Kai Shing Rd W/B	Outbound	275	272	99%	496	459	93%
Kai Tak Tunnel W/B	Outbound	2,529	2,468	98%	2,210	2,169	98%

Link	Bound	Total Vehicles (PV+GV+PT[1])					
		AM Peak Hour			PM Peak Hour		
		Observed (A)	Modeled (B)	(B)/(A)	Observed (A)	Modeled (B)	(B)/(A)
	Total	**14,394**	**14,031**	**97%**	**14,603**	**14,166**	**97%**
External Cordon – Inbound							
Tate's Cairn Tunnel S/B	Inbound	3,973	3,941	99%	2,647	2,639	100%
	Total	**3,973**	**3,941**	**99%**	**2,647**	**2,639**	**100%**
External Cordon – Outbound							
Tate's Cairn Tunnel N/B	Outbound	2,552	2,567	101%	3,513	3,466	99%
	Total	**2,552**	**2,567**	**101%**	**3,513**	**3,466**	**99%**
Screenline 1 – Eastbound							
Hung To Rd EB	Eastbound	426	428	100%	320	325	102%
Wai Yip St EB	Eastbound	1,235	1,144	93%	963	998	104%
Hoi Bun Rd EB	Eastbound	355	350	99%	300	305	102%
	Total	**2,016**	**1,921**	**95%**	**1,583**	**1,628**	**103%**
Screenline 1 – Westbound							
How Ming St WB	Westbound	1,030	1,013	98%	779	769	99%
Wai Yip St WB	Westbound	783	676	86%	1,176	1,123	95%
Hoi Bun Rd WB	Westbound	429	384	89%	524	526	100%
	Total	**2,242**	**2,073**	**92%**	**2,479**	**2,417**	**98%**
Screenline 2 – Northbound							
Lai Yip St NB	Northbound	435	434	100%	535	589	110%
How Ming St NB	Northbound	651	625	96%	505	498	99%
Tsun Yip St NB	Northbound	745	646	87%	469	499	106%
Wai Fat St NB	Northbound	445	460	103%	638	631	99%
	Total	**2,276**	**2,165**	**95%**	**2,146**	**2,218**	**103%**
Screenline 2 – Southbound							
Lai Yip St SB	Southbound	914	919	101%	665	662	100%
Hoi Yuen Road SB	Southbound	1,247	1,130	91%	1,481	1,596	108%
	Total	**2,160**	**2,049**	**95%**	**2,146**	**2,259**	**105%**
Screenline 3 – Eastbound							
Wai Yip St EB	Eastbound	1,591	1,613	101%	1,548	1,548	100%
Hoi Bun Rd EB	Eastbound	403	387	96%	458	482	105%
	Total	**1,993**	**2,000**	**100%**	**2,005**	**2,030**	**101%**
Screenline 3 – Westbound							
Tai Yip St WB	Westbound	395	395	100%	325	315	97%
Wai Yip St WB	Westbound	978	918	94%	1,552	1,553	100%
Hoi Bun Rd WB	Westbound	381	351	92%	401	394	98%
	Total	**1,753**	**1,665**	**95%**	**2,278**	**2,263**	**99%**

Note: 1 – Observed road-based public transport flows.

Table 3.4.5 Statistics of Screenline Flows Validation Summary

Validation Target	Percentage of Screenline Flows and Major Road Links Flows	
	AM Peak Total (PV + GV + PT)	PM Peak Total (PV + GV + PT)
Screenlines		
100% within ± 10%	100%	100%
Major Road Links		
85% within ± 10%	100%	100%
100% within ± 20%	100%	100%

3.4.2.5 Additionally, the validation of key junctions was undertaken for entry/ exit flows on each arm separately and the result is summarized in **Table 3.4.6** and **Table 3.4.7**.

Table 3.4.6 Key Junction Validation Results

Location	Movement	AM Peak Model			PM Peak Model		
		Observed	Modeled	GEH	Observed	Modeled	GEH
Junction 1 - Lai Yip Street/ Wai Yip Street - ENTRY ARM							
Wai Yip Street	EB	1,820	1,769	1	1,810	1,725	2
Lai Yip Street	NB	265	243	1	245	152	7
Wai Yip Street	WB	605	622	1	1,065	1,186	4
Lai Yip Street	SB	890	831	2	690	668	1
	Total	**3,580**	**3,464**	**2**	**3,810**	**3,731**	**1**
Junction 1 - Lai Yip Street/ Wai Yip Street - EXIT ARM							
Wai Yip Street	WB	690	727	1	1,130	1,193	2
Lai Yip Street	SB	670	599	3	550	618	3
Wai Yip Street	EB	1,865	1,837	1	1,525	1,286	6
Lai Yip Street	NB	355	306	3	605	627	1
	Total	**3,580**	**3,469**	**2**	**3,810**	**3,724**	**1**
Junction 2 - Hoi Bun Road/ Lai Yip Street - ENTRY ARM							
Hoi Bun Road	EB	165	155	1	145	142	0
Hoi Bun Road	WB	475	487	1	465	392	4
Lai Yip Street	SB	670	608	2	555	604	2
	Total	**1,310**	**1,250**	**2**	**1,165**	**1,139**	**1**
Junction 2 - Hoi Bun Road/ Lai Yip Street - EXIT ARM							
Hoi Bun Road	WB	740	716	1	755	816	2
Hoi Bun Road	EB	310	262	3	205	148	4
Lai Yip Street	NB	260	243	1	205	166	3
	Total	**1,310**	**1,221**	**2**	**1,165**	**1,131**	**1**
Junction 3 - Wai Yip Street / Shun Yip Street - ENTRY ARM							
Wai Yip Street	WB	595	590	0	1,045	1,079	1

Wai Yip Street	EB	1,585	1,613	1	1,435	1,536	3
Shun Yip Street	NB	595	587	0	710	655	2
	Total	**2,775**	**2,791**	**0**	**3,190**	**3,270**	**1**
Junction 3 - Wai Yip Street / Shun Yip Street - EXIT ARM							
Wai Yip Street	WB	905	915	0	1,570	1,553	0
Wai Yip Street	EB	1,870	1,874	0	1,620	1,758	3
	Total	**5,550**	**5,580**	**0**	**6,380**	**6,582**	**3**
Junction 4 - Shun Yip Street/ Hoi Bun Road - ENTRY ARM							
Hoi Bun Road	EB	385	377	0	470	482	1
Hoi Bun Road	WB	725	722	0	830	795	1
	Total	**6,660**	**6,679**	**0**	**7,680**	**7,858**	**2**
Junction 4 - Shun Yip Street/ Hoi Bun Road - EXIT ARM							
Hoi Bun Road	WB	345	333	1	390	376	1
Hoi Bun Road	EB	175	183	1	200	199	0
Shun Yip Street	NB	590	583	0	710	662	2
	Total	**1,110**	**1,100**	**0**	**1,300**	**1,238**	**2**
Junction 5 - Wang Chiu Road/ Hoi Bun Road/ Cheung Yip Street - ENTRY ARM							
Wang Chiu Road	EB	325	331	0	425	353	4
Cheung Yip Street	NB	450	422	1	560	511	2
Hoi Bun Road	WB	135	80	5	135	78	6
Cheung Yip Street	SB	50	37	2	50	20	5
	Total	**960**	**871**	**3**	**1,170**	**962**	**6**
Junction 5 - Wang Chiu Road/ Hoi Bun Road/ Cheung Yip Street - EXIT ARM							
Wang Chiu Road	WB	275	186	6	265	212	3
Cheung Yip Street	SB	85	70	2	225	155	5
Hoi Bun Road	EB	410	419	0	600	524	3
Cheung Yip Street	NB	190	168	2	80	100	2
	Total	**960**	**842**	**4**	**1,170**	**991**	**5**
Junction 6 - Wang Chiu Road/ Sheung Yee Road - ENTRY ARM							
Sheung Yee Road	EB	1,035	1,064	1	880	1,062	6
Wang Chiu Road	NB	1,085	917	5	900	735	6
Sheung Yee Road	WB	275	265	1	280	282	0
Wang Chiu Road	SB	385	448	3	395	499	5
	Total	**2,780**	**2,694**	**2**	**2,455**	**2,578**	**2**
Junction 6 - Wang Chiu Road/ Sheung Yee Road - EXIT ARM							
Wang Chiu Road	SB	775	795	1	705	868	6
Sheung Yee Road	EB	1215	1,195	1	935	990	2
Wang Chiu Road	NB	790	645	5	815	709	4
	Total	**2,780**	**2,635**	**3**	**2,455**	**2,566**	**2**
Junction 7 - Wang Tai Road / Sheung Yee Road - ENTRY ARM							

Sheung Yee Road	EB	1,200	1,196	0	665	584	3
Wai Tai Road	SB	170	185	1	205	206	0
	Total	**4,150**	**4,016**	**2**	**3,325**	**3,356**	**1**
Junction 7 - Wang Tai Road / Sheung Yee Road - EXIT ARM							
Sheung Yee Road	EB	1,050	935	4	700	722	1
Wai Tai Road	NB	320	321	0	170	172	0
	Total	**5,520**	**5,272**	**3**	**4,195**	**4,250**	**1**
Junction 8 - Wang Chiu Road/ Lam Fung Street - ENTRY ARM							
Wang Chiu Road	NB	755	649	4	815	686	5
Wang Chiu Road	SB	565	610	2	530	653	5
	Total	**6,840**	**6,532**	**4**	**5,540**	**5,589**	**1**
Junction 8 - Wang Chiu Road/ Lam Fung Street - EXIT ARM							
Lam Fung Street	WB	350	293	3	365	352	1
Wang Chiu Road	SB	385	471	4	400	519	6
Lam Fung Street	EB	245	241	0	200	139	5
Wang Chiu Road	NB	340	190	9	380	298	4
	Total	**1,320**	**1,196**	**3**	**1,345**	**1,309**	**1**
Junction 9 - Wang Chiu Road/ Sheung Yuet Road - ENTRY ARM							
Sheung Yuet Road	EB	325	223	6	330	370	2
Wang Chiu Road	NB	330	206	8	375	288	5
Sheung Yuet Road	WB	305	273	2	325	376	3
Wang Chiu Road	SB	1,040	1,126	3	920	799	4
	Total	**2,000**	**1,827**	**4**	**1,950**	**1,833**	**3**
Junction 9 - Wang Chiu Road/ Sheung Yuet Road - EXIT ARM							
Sheung Yuet Road	WB	750	564	7	710	614	4
Wang Chiu Road	SB	575	611	1	530	667	6
Sheung Yuet Road	EB	345	349	0	350	336	1
Wang Chiu Road	NB	330	308	1	360	322	2
	Total	**2,000**	**1,831**	**4**	**1,950**	**1,938**	**0**
Junction 10 - Wang Chiu Road/ Lam Hing Street - ENTRY ARM							
Lam Hing Street	EB	185	242	4	265	311	3
Wang Chiu Road	NB	345	308	2	360	323	2
Lam Hing Street	WB	265	219	3	325	347	1
Wang Chiu Road	SB	1,310	1,431	3	1,115	1,102	0
	Total	**2,105**	**2,200**	**2**	**2,065**	**2,083**	**0**
Junction 10 - Wang Chiu Road/ Lam Hing Street - EXIT ARM							
Lam Hing Street	WB	205	167	3	230	245	1
Wang Chiu Road	SB	1025	1,123	3	920	819	3
Lam Hing Street	EB	445	422	1	390	440	2
Wang Chiu Road	NB	430	475	2	525	563	2

	Total	**2,105**	**2,187**	**2**	**2,065**	**2,067**	**0**
Junction 11 - Kai Cheung Road/ Wang Chiu Road - ENTRY ARM							
Kai Cheung Road	EB	745	631	4	935	907	1
Wang Chiu Road	NB	425	505	4	535	567	1
Kai Cheung Road	WB	2,725	2,484	5	2,480	2,428	1
Wang Chiu Road	SB	760	930	6	700	682	1
	Total	**4,655**	**4,550**	**2**	**4,650**	**4,583**	**1**
Junction 11 - Kai Cheung Road/ Wang Chiu Road - EXIT ARM							
Kai Cheung Road	WB	1,250	1,195	2	1,170	1,233	2
Wang Chiu Road	SB	1,375	1,457	2	1,090	1,078	0
Kai Cheung Road	EB	1,490	1,437	1	1,805	1,840	1
Wang Chiu Road	NB	540	466	3	585	513	3
	Total	**4,655**	**4,555**	**1**	**4,650**	**4,665**	**0**

Table 3.4.7 Key Junction Validation Summary

Validation Target	**Percentage of Key Junction Entry/Exit Flows**	
	AM Peak Total (PV + GV + PT)	**PM Peak Total (PV + GV + PT)**
70% Witin GEH 6	95%	97%
80% Witin GEH 7	96%	100%
100% Witin GEH 10	100%	100%

3.4.2.6 The results show that key junctions are well validated as the validation criteria for GEH 6, 7 and 10. As demonstrated in the screenline, major road link and junction validation summaries, the LATM was developed satisfactorily in replicating the existing traffic flow pattern and show high degree of agreement between the modelled flows and observed traffic data.

3.4.3 Pedestrian Model Validation

3.4.3.1 The initial pedestrian OD matrices were then refined and updated in the model validation process by pedestrian path review and adjustment of pedestrian distribution pattern.

3.4.3.2 The assignment process mainly consider pedestrian trips with route choice based on the walk time required for using different pedestrian facilities (for example, at-grade footpaths, crossings with delay, elevated footbridges and underground subways with extra walk time using staircases or escalators). The OD pedestrian trips were fine-tuned in this process in order to match with the base year observed pedestrian counts on the key walk links identified.[2]

3.4.3.3 The model validation results for AM/ PM peaks at each survey point are presented in **Diagram 3.1** and **Diagram 3.2**. Linear regression analysis was carried out by plotting the validated model flows against

[2] An average delay of 0.67 and 0.5 minutes for the pedestrian links are derived from the In-house junction survey database.

the observed pedestrian flows. The R-square values for both AM and PM models indicate that the modelled pedestrian flows fit the observed data with a high goodness of fit.

Diagram 3.1 Base Year Pedestrian Model Validation Results (AM Peak)

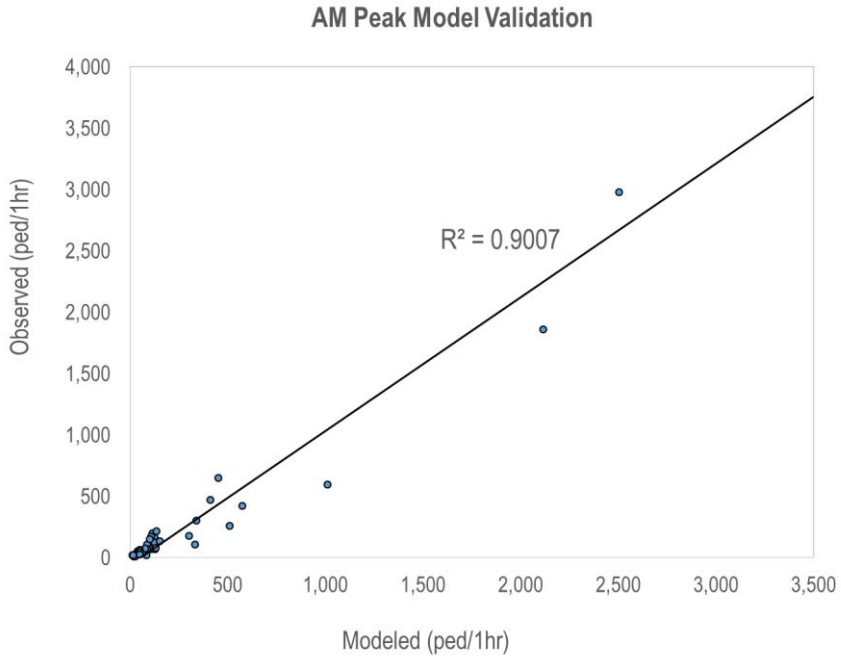
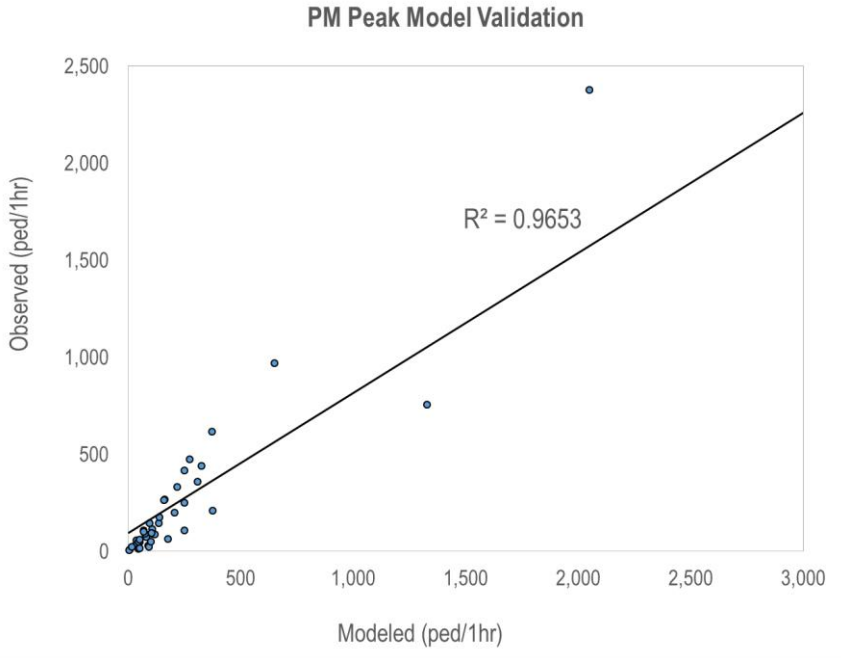


Diagram 3.2 Base Year Pedestrian Model Validation Results (PM Peak)



3.4.3.4 In addition, GEH, a form of the Chi-squared statistics adopted in BDTM validation for link flows at screenlines, is also employed to assess the validation result of the pedestrian flows at key walkways. It is revealed that GEH 10 or less could be achieved on 100% of the pedestrian link

flows, which indicates that the validation result of the key walkways is satisfactory. Details are illustrated in **Table 3.4.8** below.

Table 3.4.8 Key Walkways Validation Summary

Validation Target	Percentage of Key Walkway Flows	
	AM Peak Total	PM Peak Total
70% Within GEH 6	88%	78%
80% Within GEH 7	90%	88%
100% Within GEH 10	100%	100%

3.5 Trip Generation by Proposed Development

3.5.1 Proposed Land Use Budget

3.5.1.1 With the total GFA (excluding Lot 1 for ORRC) of 560,300 sqm. of the RODP, the broad land use budget is tabulated in **Table 3.5.1**.

Table 3.5.1 Proposed Breakdown of GFA of RODP

Land Use	GFA (sqm)	
	With rail-based EFLS Scenario	Without rail-based EFLS Scenario
Office	291,000	291,490
Retail/ F&B/ Entertainment	122,200	122,220
Hotel	74,400	74,400
Arts, Cultural & Creative Use	3,200	2,400
Technology Use	4,500	3,000
Transport Facilities	4,000	4,400
Sub-Total	**499,300**	**497,910**
EFLS Depot cum Station	61,000	-
Total (Including Depot)	**560,300**	**497,910**

3.5.2 Traffic Generation

3.5.2.1 Based on the proposed land use budget for RODP, the induced trip rate and the corresponding trips generated are tabulated in **Table 3.5.2 & 3.5.3**.

Table 3.5.2 Adopted Trip Rate for Proposed Land Use

Land Use	Unit	AM Peak Hour		PM Peak Hour	
		Generation	Attraction	Generation	Attraction
Office (1)	pcu/hr/100 sqm GFA	0.1703	0.2452	0.1573	0.1175
Retail (1)	pcu/hr/100 sqm GFA	0.2296	0.2434	0.3100	0.3563
Hotel Room (1)	pcu/hr/guest room	0.1329	0.1457	0.1290	0.1546

Notes:
1. Trip Rate source from TPDM Volume 1 Appendix, trip rate of Office, Retail / Shopping Complex (Office +Retail) and Hotel are adopted

Table 3.5.3a Trips Generated by Proposed RODP (With rail-based EFLS Scenario)

Land Use	GFA (sqm) /Nos. of guest room	AM Peak Hour (pcu/hr)		PM Peak Hour (pcu/hr)	
		Generation	Attraction	Generation	Attraction
Proposed Office Hub					
Office (1)	298,700 sqm	509	732	470	351
Retail	122,200 sqm	281	297	379	435
Hotel Room	1,428 rooms	190	208	184	221
Total		**980**	**1,237**	**1,033**	**1,007**

Notes:
1. The office GFA refers to the summation of Office + Arts, Cultural, Creative & Technology.

Table 3.5.3b Trips Generated by Proposed RODP (Without rail-based EFLS Scenario)

Land Use	GFA (sqm) /Nos. of guest room	AM Peak Hour (pcu/hr)		PM Peak Hour (pcu/hr)	
		Generation	Attraction	Generation	Attraction
Proposed Office Hub					
Office (1)	296,890 sqm	506	728	467	349
Retail	122,200 sqm	281	297	379	435
Hotel Room	1,428 rooms	190	208	184	221
Total		**977**	**1,233**	**1,030**	**1,005**

Notes:
1. The office GFA refers to the summation of Office + Arts, Cultural, Creative & Technology.

3.5.3 Pedestrian Generation

3.5.3.1 The pedestrian trip generation by the proposed development was estimated based on the pedestrian trip rates shown in **Table 3.5.4**. The pedestrian trip rates were obtained by pedestrian surveys conducted by the KTBA/KBBA and other relevant studies. These trip rates were also applied to other developments within the Study Area during the development of pedestrian model.

Table 3.5.4 Adopted Pedestrian Trip Rates for proposed KBAA development

Landuse	Units	AM Peak	PM Peak
		2-way	2-way
Office	ped/hr/100m^2 GFA	3.17	2.23
Retail + Office	ped/hr/100m^2 GFA	0.79	2.24
Hotel	ped/hr/rm	0.71	0.71

3.5.3.2 Based on the above trip rates, the calculated pedestrian demand for the proposed KBAA development are as below:

Table 3.5.5a Calculated Peak Hour Pedestrian Generation for proposed KBAA development (With rail-based EFLS Scenario) (ped/hr)

Landuse	GFA (sqm) /Nos. of guest room	AM Peak	PM Peak
		2-way	2-way
Office [(1)]	298,700 m^2	9,469	6,661
Retail	122,200 m^2	965	2,737
Hotel Room	1,428 rooms	1,014	1,014
Total		**11,448**	**10,412**

Notes:
1. The office GFA refers to the summation of Office + Arts, Cultural, Creative & Technology.

Table 3.5.5b Calculated Peak Hour Pedestrian Generation for proposed KBAA development (Without rail-based EFLS Scenario) (ped/hr)

Landuse	GFA (sqm) /Nos. of guest room	AM Peak	PM Peak
		2-way	2-way
Office [(1)]	296,890 m^2	9,411	6,621
Retail	122,200 m^2	966	2,738
Hotel Room	1,428 rooms	1,014	1,014
Total		**11,391**	**10,373**

Notes:
1. The office GFA refers to the summation of Office + Arts, Cultural, Creative & Technology.

3.6 Traffic/Pedestrian Forecasts Development

3.6.1 Traffic Forecasts

3.6.1.1 Based on the aforesaid modelling assumptions, the design year transport and traffic forecasts were developed in the STM. The cordoned matrices from STM will then provide inputs to LATM for establishing traffic forecasts in a more localized context. The outputs from LATM were then used for subsequent traffic capacity assessments.

3.6.1.2 The traffic model would consider, in particular, future change in traffic demand and road network due to the following developments/infrastructures in suitable assessment scenarios:

- KBBA/ KTBA/ KTD development and the recommended traffic improvement schemes (under ***all*** scenarios)
- KBAA development (i.e. the subject development) and the recommended traffic schemes: e.g. Cheung Yip Street closure (under ***design*** scenario only)
- Proposed EFLS (under ***with rail-based EFLS*** scenario only)

3.6.2 Pedestrian Forecasts

3.6.2.1 The base year validated model were then applied to the projection of future pedestrian demand. The trip ends were estimated by the change of landuse type of the buildings, while the growth of the passenger demand at bus stops and MTR stations was extracted from the 1st tier transport model. The distribution of the pedestrian trips by different landuse types is estimated with reference to the base year validated matrices, from which the future zonal trip ends are converted to an OD matrix accordingly. The level of service (LOS) of the key walkways would then be assessed based on the assignment result of the future year pedestrian model.

3.6.2.2 The pedestrian model would consider, in particular, future change in pedestrian demand and pedestrian network due to the following developments/infrastructures in suitable assessment scenarios:

- KBBA/ KTBA/ KTD development and the recommended pedestrian improvement schemes (under ***all*** scenarios)
- KBAA development (i.e. the subject development) and the recommended pedestrian schemes, including the proposed footbridges and travellator (along Sheung Yee Road, connecting to the Siu Yip Street footbridge) (under ***design*** scenarios only)
- Proposed EFLS and the associated pedestrian connection (under ***with rail-based EFLS*** scenario only)

4 Transport and Traffic Strategies

4.1 Objectives

4.1.1.1 Taking into account the baseline study on the transport and traffic conditions and key traffic and transport issues in the immediate vicinity of the KBAA developments, a series of traffic and transport strategy is established.

4.1.1.2 Specifically, the following guiding principles on transport and land use planning are set:

- To foster a more sustainable transport system which is highly responsive to the opportunities of the future highway and transport infrastructure and to the traffic constrains of local road network;
- To adopt an integrated approach to land use and transportation which maximizes the efficiency and effectiveness of the new road and transport infrastructure, creating an efficient, sustainable and vibrant development area for people to live, work and play in;
- To encourage the use of public transport including promotion of the use of rail modes or other green modes of transport;
- To integrate with a comprehensive pedestrian network to minimise the reliance on road-based transport.

4.2 Vehicular Strategy

4.2.1 Vehicular Access

4.2.1.1 The vehicular accesses should be designed to provide fast and convenient connection to local road network and highway road network. To provide sufficient and essential linkage with minimal potential impact, the major vehicular accesses to/ from the development are proposed to be located at ground level, while underground vehicular connections between Lots 2, 4 (western portion) and 4 (eastern portion) will be provided to facilitate a better utilisation of access among different sites.

4.2.1.2 The locations of proposed vehicular accesses are illustrated in **Figure 4.2.1** and summarized as below.

1) Lot 1: at grade right-in-right-out access at Sheung Yee Road
2) Lot 2: at grade left-in-left-out access at Sheung Yee Road (for the green transport hub)
3) Lot 2: at grade left-in-left-out access at Wang Chiu Road (for private development)
4) Lot 4 (western portion): at grade left-in-left-out access at Wang Chiu Road
5) Lot 4 (eastern portion): at grade left-in-left-out access at Hoi Bun Road

Vehicular access at Wang Chiu Road

4.2.1.3 As illustrated in **Figure 4.2.2** and **4.2.2-2**, the proposed vehicular access to Lot 2 at Wang Chiu Road would keep 45m clearance from the adjoining junction, and provide sufficient visibility of 60m on the direction of approaching traffic, which fulfils the recommendation of run-ins in TPDM. In addition, widening of the southbound carriageway of Wang Chiu Road is proposed in response to 3 right-turning lanes of Sheung Yee Road eastbound, so as to provide an additional traffic lane for facilitating the access of proposed development. Results of swept path analysis are shown in **Figure 4.2.2-2-sp1** and **4.2.2-2-sp2** for both ingress and egress of proposed access at Lot 2. Taking into consideration the potential impact towards traffic to Kwun Tong and Kwun Tong Bypass by proposed vehicular access at Lot 2, widening of carriageway is recommended for the road section of Wang Chiu Road from Sheung Yee Road to proposed run-in/ out at Lot 2. The new nearside lane at Wang Chiu Road southbound would mainly serve in and out traffic of Lot 2, which could minimize the adverse traffic impact imposed by vehicles entering / leaving Lot 2 to other traffic along Wang Chiu Road. The proposed improvement for the junction of Sheung Yee Road/ Wang Chiu Road is detailed in **Section 4.2.3**.

4.2.1.4 We noted TD concerns on the design of this access. The loading/ unloading and carpark vehicles would share the same access ramp under the preliminary design at current feasibility study stage. About 150m queuing length would be provided between the Lot 2 access and entrance gate at B2 would be provided. More details of the queuing arrangement would be investigated in building plan stage. In addition, employment of traffic warden to provide guidance for ingress / egress vehicles could be one of possible traffic management measures to regulate the weaving traffic at the nearside lane.

4.2.1.5 Considering the potential influence towards the junction of Sheung Yee Road/ Wang Chiu Road, sufficient queuing area would be provided within the lot area, to avoid queuing of arriving vehicles along Wang Chiu Road carriageway. While close liaison and supervision through traffic management by the future developer would be carried out to ensure the implementation of appropriate traffic management measures. The necessary devices or installations could be presented in future building plan submission, which will be circulated to TD.

4.2.1.6 In addition, an alternative scheme for the junction layout recommended in KTD Rethink II Study has been investigated, which is shown in **Figure 4.2.2-3**. With 2 right-turning lanes of Sheung Yee Road, the junction performance would slightly be affected and the results are summarized in **Table 4.2.1** as below,

Table 4.2.1 Junction Performance of Sheung Yee Road/ Wang Chiu Road in Year 2031 (Design Case)

	Proposed Scheme (3 right-turning lane)		Alternative Scheme (2 right-turning lane)	
	AM Peak	PM Peak	AM Peak	PM Peak
RC%	7%	7%	1%	2%

4.2.1.7 As the junction is able to achieve positive R.C. under the alternative scheme, which is considered as a feasible option for facilitating the proposed development access.

4.2.1.8 For the proposed vehicular access to Lot 4 (western portion), existing piers of Kwun Tong Bypass has taken into account as part of the site constraints. As recommended in TPDM, proposed vehicular access would keep a clearance of 45m from adjoining junction and provide visibility of 60m on the direction of approaching traffic. Proposed location of the vehicular access to Lot 4 (western portion) is illustrated in **Figure 4.2.3**. Results of swept path analysis are shown in **Figure 4.2.3-sp1** and **4.2.3-sp2** for both ingress and egress of proposed access at Lot 4. Internal vehicular access to connect the basement carparks of Lot 2 and Lot 4 is proposed. Further arrangement would be investigated in later stage of the study.

4.2.2 Proposed Closure of Cheung Yip Street, Tsui Hing Street and Hung Yip Street

4.2.2.1 Aiming at creating a pedestrian-only environment within the Study Area, the section of Cheung Yip Street between Sheung Yee Road and Hoi Bun Road together with Tsui Hing Street is proposed to be closed for pedestrianization, by keeping major vehicular circulation/ access in the periphery of the Study Area. The section of Cheung Yip Street within Lot 4 will be utilized for the EFLS depot cum station development, and Tsui Hing Street will be included partially in Lot 3 and partially in Lot 4. In addition, the existing Hung Yip Street which is currently a cul-de-sac between Lots 4 (eastern portion) and 6 will be closed and rezoned for open space use.

4.2.2.2 To minimize the potential impact towards outbound traffic from proximate hospital clusters (i.e. the HK Children's Hospital and the New Acute Hospital) to Kwun Tong Bypass, the section of Cheung Cheung Yip Street under proposed pedestrianization could be opened to ambulance and other emergency vehicles in case of emergency. Besides that, comparable alternative routes through Wang Chiu Road and Hoi Bun Road are available for other outbound traffic to Sheung Yee Road, as well as all the inbound traffic from Wai Yip Street, minimal impact towards traffic circulation is expected.

4.2.2.3 According to CEDD's KTD Rethink II study, additional traffic lanes are proposed to allow left-turns from Hoi Bun Road, Wang Chiu Road and northbound of Cheung Yip Street, with changes on road markings associated. Subject to the constraints posed by existing structures, the improvement scheme taken on board from Rethink II study has been further reviewed and the left-turn flare lane from Wang Chiu Road to Cheung Yip Street is proposed to be removed.

4.2.2.4 In light of the traffic flows provided by KTD Rethink II study, it has been noted that the traffic demand left turning from Wang Chiu Road to Cheung Yip Street is relatively insignificant. Therefore, the proposed flare lane is not a necessary provision, and the junction performance is still attaining an acceptable level under the revised layout. **Figure 4.2.4** shows the revised junction layout for ***reference*** scenario without proposed pedestrianization.

4.2.2.5 As proposed under KBAA study, modification to CEDD's scheme is required to facilitate the pedestrianization of Cheung Yip Street section between Sheung Yee Road and Hoi Bun Road. The location of proposed closure of Cheung Yip Street, Tsui Hing Street and Hung Yip Street is illustrated in **Figure 4.2.5**, while the proposed layout of junction Hoi Bun Road/ Cheung Yip Street is shown in **Figure 4.2.6**. It is suggested that CEDD/ HyD would be works agent for the improvement scheme. The latest junction layout from CEDD has been incorporated and corresponding road network assumption will be taken in the ***design*** scenarios.

4.2.2.6 In addition, an alternative scheme for half pedestrianization of Cheung Yip Street has been explored. New access road aligning beneath Kai Fuk Flyover is proposed to connect Cheung Yip Street with Wai Yip Street, and the upper half of Cheung Yip Street would be closed for pedestrianization. The proposed layout is illustrated in **Figure 4.2.7**.

4.2.2.7 However, because of the reduction on area for pedestrianization in the alternative scheme, scaling down of proposed landscape works and ACC uses would then be required. Considering the influence on promotion of walkability and pedestrian connectivity, this alternative scheme is therefore less preferable compared to full pedestrianization scheme.

Sensitivity Test – Impact to Road Junction Cheung Yip Street/ Hoi Bun Road by Cheung Yip Street Pedestrianization

4.2.2.8 With regard to the assessment results from relevant traffic studies of adjoining area, a sensitivity test by adopting the findings in KTD Rethink II was conducted to verify the impact of proposed road closure.

4.2.2.9 It is noted that an improvement scheme at the junction of Hoi Bun Road/ Cheung Yip Street was proposed subject to the assessment result from KTD Rethink II Study. To incorporate with the proposed pedestrianization, the original arrangement of cross junction would be changed into a T-junction. The proposed slip road from Wang Chiu Road eastbound to Cheung Yip Street under Rethink 2 Study is no longer required. In addition, the method of control of junction can be simplified from 4 stages to 3 stages. Relevant changes of road markings are made. The junction layout is revised and illustrated in **Figure 4.2.6**.

4.2.2.10 A sensitivity test has been conducted to examine the junction performance at Cheung Yip Street/ Hoi Bun Road before and after the implementation of the pedestrianization proposal in Year 2031, as well as the half pedestrianization scheme. With regard to the traffic flows based on the traffic model of Rethink 2, **Table 4.2.2** illustrates the assessed junction performance of Hoi Bun Road/ Cheung Yip Street under all proposed scenarios. In accordance with the assessment result, the said junction would not be affected by proposed full

pedestrianization of Cheung Yip Street. Therefore, the scheme is considered compatible with Rethink 2.

Table 4.2.2 Junction Performance of Hoi Bun Road/ Cheung Yip Street under sensitivity test

Year 2031	Without Pedestrianization		With Full Pedestrianization		With Half Pedestrianization	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
RC%	9%	25%	10%	25%	10%	18%

*Traffic flows from KTD Rethink II study have been adopted for the assessment

4.2.2.11 Additional survey has also been arranged for the case of cruise landing peak with double berth at Kai Tak Cruise Terminal on 12 October 2018 as a sensitivity test. The survey is conducted between 0700 – 2100 and the critical peak period is identified as 1745 – 1845.

4.2.2.12 Corresponding assessment result in year 2031 by incorporating the potential double berthing impact are summarized in **Table 4.2.3** as below, where the proposed Cheung Yip Street pedestrianization has also been taken into account.

Table 4.2.3 Junction Performance of Hoi Bun Road/ Cheung Yip Street under sensitivity test of double berth at Cruise Terminal

Year 2031	With Double Berth at Cruise Terminal	
	AM Peak	PM Peak
RC%	25%	40%

4.3 Pedestrian Strategy

4.3.1 Walkway Design

4.3.1.1 As discussed in *Working Paper 3 – Baseline Review*, it has been identified the Ngau Tau Kok and Kowloon Bay MTR Stations are located to the northeast and southeast from the Study Area. However, both stations are approximately 800m away from the eastern boundary of the Study Area on Wai Yip Street in terms of walking distance, and over 1km from the western boundary on Wang Chiu Road. Currently, the pedestrian access routes to/from either Ngau Tau Kok or Kowloon Bay MTR Station must pass by a number of grade separated crossing link including the subway across Kwun Tong Road for the Ngau Tau Kok MTR Station, and the existing footbridges across Wai Yip Street and the podium level of Telford Garden for Kowloon Bay MTR Station. The pedestrian linkage to/from the nearest MTR Stations makes the walking environment inconvenient for pedestrians. (**Figure 2.1.1**)

4.3.1.2 The current walking environment is considerably undesirable, with frequent heavy vehicles traffic passing by and illegal parking on Wai Yip Street, Cheung Yip Street and/or Hoi Bun Road on the footpath. Existing Sheung Yee Road Flyover along the northern boundary of the Study Area restrict north-south pedestrian movements on either side of Sheung Yee Road, especially disconnecting the Study Area with Wang Tai Street, Wang Mau Street and Wang Hoi Road. The north-south pedestrian movements are not completed. The existing Kai Fuk Road Flyover, Kwun Tong Bypass and its existing slip roads bounding the southern perimeter of the Study Area, existing pedestrian link between KBAA/KBBA and the KTD waterfront are very restricted as the only access is via Cheung Yip Street to the south of Hoi Bun Road. In the future, with the two proposed elevated footbridges across Kai Fuk Road, two additional access points could be opened up to the north. Nevertheless, there are only 3 planned access points to KTD, which are approximately 500m – 600m apart. Hence, pedestrian linkages between the waterfront and KBAA/KBBA are limited with potential to further improve.

4.3.2 Proposed Pedestrian Corridors

4.3.2.1 As identified previously, the Study Area is distant from nearby MTR stations and the adjacent walking environment is considered undesirable. Therefore, the need for direct, comfortable and convenient pedestrian linkages to the nearby MTR stations as well as adjacent areas is crucial to the success of the future developments for KBAA. Numerous pedestrian connections are recommended and illustrated in **Figure 4.3.1**.

4.3.2.2 The major components, implementation agent, as well as tentative completion schedule of the proposed pedestrian corridors are summarized in **Table 4.3.1** as below.

Table 4.3.1 Proposed Pedestrian Corridors

Corridors	Components	Implementation Agent	Tentative Completion Year
Corridor A	Proposed pedestrian subway through the Kwun Tong Inland Lot (KTIL) No. 761	HyD	2026
Corridor B	Extend the existing footbridge near WSD Kowloon East Regional Building across Wai Yip Street to the podium level of KBAA Lot 5	Lot 5 Developer	Completed
Corridor C	New footbridge connecting Telford Plaza to NTK DPS Redevelopment	NTK DPS Developer	2027
Corridor C	New Footbridge across Wai Yip Street	HyD	2023
Corridor C	New footbridge (cum Travellator) connecting Wai Yip Street and KBAA Lot 2	CEDD	2027
Corridor D	New footbridge connecting future possible EFLS KBAA station adjacent to Billion Centre and KBAA Lot 1	No longer pursued	No longer pursued
Corridor E	New footbridge connecting amenity area and KBAA Lot 4	No longer pursued	No longer pursued
Corridor E	New footbridge connecting Lot 2 to the public footpath outside Lot 1 across Wang Chiu Road	Lot 2 Developer	2028
Corridor E	New footbridge connecting amenity area and hospital cluster	CEDD	2024/2025 (subject to NAH development programme)
Corridor F	Nil	-	-

Pedestrian Corridor A – Ngau Tau Kok MTR Station

4.3.2.3 Vertical connection such as in the form of escalators are proposed to connect the podium of KBAA with the existing footpath along Wai Yip Street. Seizing the redevelopment opportunity of adjacent buildings, the section of footpath between KBAA and Hoi Bun Road Park connected will be upgraded with more greening to provide a comfortable and leisure walking environment. Hoi Bun Road Park and Ngau Tau Kok MTR station can be connected through the proposed pedestrian subway crossing "Kwun Tung Inland Lot (KTIL) 761" (International Trade Tower) and one from "KTIL 761 crossing Wai Yip Street connected to

Hoi Bun Park. The above would form a direct pedestrian corridor connecting KBAA and MTR Ngau Tau Kok Station.

Pedestrian Corridor B – Northern Kowloon Bay

4.3.2.4 The existing footbridge near former WSD Kowloon East Regional Building across Wai Yip Street to the podium level of KBAA Lot 5 is extended to provide pedestrian linkage to northern Kowloon Bay. It also further connects to Upper Ngau Tau Kok Estate to the West via the existing pedestrian facilities along Wai Yip Street, Tai Yip Lane, Hong Tak Road and Kwun Tong Road.

4.3.2.5 Possibility of setting up a direct elevated pedestrian linkage connecting KBAA and Ngau Tau Kok residential area along Sheung Yee Road has been explored. Based on initial investigations, the establishment of a direct footbridge connection would require modification to existing footbridge along Sheung Yee Road. As the footbridge crosses the operating MTR railway and workshop area, minimum 7.0m headroom must be provided and thus the level of the footbridge extension will be a far above from ground level which will decrease its attractiveness for pedestrians. Land resumption would be required for footbridge's support as a separate structure. Relevant gradient constraints such as desired maximum gradient of 8.3%, absolute maximum gradient of 10.0% and 2.0m landings per every vertical interval of not more than 3.5m, etc. would also need to be overcome. In this regard, the current at-grade pedestrian link along Tai Yip Lane and Hong Tak Road is adopted.

Pedestrian Corridor C – Central Kowloon Bay

4.3.2.6 Footbridge is proposed from KBAA across Sheung Yee Road to Siu Yip Street for further connection to Telford Garden and Kowloon Bay Railway Station based on the KBBA Pedestrian Environment Improvement Feasibility Study. Another connection between KBAA and the existing footbridge near Sunshine Kowloon Bay Cargo Centre across Wai Yip Street will also be provided to facilitate the linkage which can be further connected to the proposed elevated walkway system to the central Kowloon Bay.

4.3.2.7 In view of the overloading of existing footbridge connecting Telford Plaza near Sheung Yuet Road, it is recommended to construct a new footbridge at Siu Yip Street across Wai Yip Street to relieve the situation. The said footbridge, although outside the Study Area boundary, could also serve as an enhanced connection from MTR Kowloon Bay Station to KBAA. Given the anticipated intake of office workers upon completion of commercial developments in KBAA Lot 5 and 6 by Year 2019 (the sites were sold in 2015), there is pressing need to improve pedestrian connectivity from MTR Kowloon Bay Station to KBAA. There is also possibility of extending the alignment to reach KBAA Lot 2 via another footbridge along Sheung Yee Road.

4.3.2.8 The proposed pedestrian connection from Siu Yip Street to KBAA will be sub-divided into 2 sections. Section A will connect Siu Yip Street to across the other side of Wai Yip Street, which is under investigation by HyD. Section B will further connect Section A to KBAA. Apart from enhancing connection between KBAA and MTR Kowloon Bay Station, Section A will also help to relieve the congestion condition at the

existing footbridge connecting Telford Plaza and Sheung Yuet Road. Therefore, this section is proposed to be constructed by Government. For Section B, the existing footpath at Wai Yip Street and Sheung Yee Road will be able to cater the anticipated pedestrian flow with KBAA and so this section will be optional from pedestrian flow point of view.

Pedestrian Corridor D – Possible EFLS Station

4.3.2.9 A footbridge was proposed to connect KBAA across Sheung Yee Road and also serve as a pedestrian linkage to the EFLS KBBA station adjacent to Billion Centre. The DFS has revealed that the elevated mode of EFLS will not be pursued. Therefore, pedestrian corridor D will no longer be followed taking into account of the final recommendation of DFS.

Pedestrian Corridor E – Hong Kong Children's Hospital and New Acute Hospital

4.3.2.10 Taking opportunity to enhance and enliven the amenity area beneath the Kwun Tong Bypass given the anticipated increasing pedestrian flow between KBAA and hospital. A Footbridge is proposed to connect the amenity area to podium of the New Acute Hospital. Another footbridge is proposed to connect the amenity area with KBAA, and the location of the bridge at KBAA side is changed from linking Lot 4 to Lot 2.

Pedestrian Corridor F – Future Kai Tak Development

4.3.2.11 At the road junction of Hoi Bun Road and Cheung Yip Street, existing at grade crossings will be enhanced and utilized for connection between KBAA and Cheung Yip Street for further linkage with KTD.

4.3.3 Proposed Footbridge across Wai Yip Street near Siu Yip Street

4.3.3.1 To improve the connectivity between MTR Kowloon Bay Station and KBAA developments, a continuous elevated walkway is proposed to connect Telford Plaza Phase II and KBAA Lot 2, it would be comprised with the following sections:

a) Footbridge across Tai Yip Street connecting Telford Plaza Phase II and Ngau Tau Kok District Police Station redevelopment

b) Internal walkway at Ngau Tau Kok District Police Station redevelopment

c) HyD footbridge across Wai Yip Street connecting Ngau Tau Kok District Police Station redevelopment

d) Footbridge along Sheung Yee Road connecting HyD footbridge (i.e. item d) and KBAA Lot 2

4.3.3.2 Regarding item c) above, it is anticipated the existing footbridge connecting Telford Plaza across Wai Yip Street near Sheung Yuet Road will be overcrowded in coming years and there are strong requests from the local community and the Kwun Tong District Council to improve the situation. In this view, it is recommended a public footbridge should be provided across Wai Yip Street near Siu Yip Street. The Project

Definition Statement regarding the proposed footbridge across Wai Yip Street near Siu Yip Street is shown in **Appendix A**.

4.3.3.3 The total length of this elevated walkway would be about 350m (i.e. about 5-minute walking time) while the proposed Sheung Yee Road footbridge would constitute about 200m and there exists imminent need to strengthen the pedestrian connectivity and improve pedestrian comfort at this section. It is anticipated the pedestrian flow would exceed 6,000 ppl/hr and 5,000 ppl/hr in AM and PM peak respectively under without rail-based EFLS scenario in year 2031. To serve such high pedestrian demand, travellators would be proposed at the footbridge section along Sheung Yee Road to further extend the usual 5-mintue walking distance from the MTR station and this is also in line with the proposed initiatives to promote walking/ enhance walkability under the 2017 and 2018 Policy Agendas.

4.4 Public Transport Strategy

4.4.1 Public Transport Demand

4.4.1.1 The assessments discussed below are based on the patronage forecasts of the strategic transport model. The purpose is to establish the requirements from the subjective patronage demands. It should be understood that the final operation plan of transport provision is subject to other considerations.

4.4.1.2 The projected transport demand of the KBAA developments by different transport modes is estimated by the validated STM as mentioned in previous sections. The forecast of modal share of PT trips generated by KBAA developments is illustrated in **Table 4.4.1**.

4.4.1.3 The proposed EFLS at Kai Tak (details discussed in **Section 4.4.2** and **Section 6.3.1**) plays an important role in the mode choice of passengers. With the proposed EFLS, it could be seen that the mode share of other road-based PT mode drops from 43% to 37%.

Table 4.4.1 Forecast Modal Split of PT Trips induced by KBAA developments

Public Transport Mode[(1)]	Transfer Mode	Daily Person Trips (Without rail-based EFLS)	Daily Person Trips (With rail-based EFLS)
(1) Rail	Direct	30%	15%
	Interchange with (2)	0%	14%
	Interchange with (3)	27%	26%
(2) EFLS	Direct	0%	7%
	Interchange with (3)	0%	1%
(3) Bus/ Minibus/ Free Shuttle Services	Direct	43%	37%
Total		**100%**	**100%**

Notes:
1. In view of a range of interchange options among different transport modes available to passengers, the "preferred mode" concept was applied in presenting the modal split results. i.e. Those taking a trip by rail mode followed by *any* other transport mode are taken as rail trips. Similarly, those taking a trip by EFLS followed by bus/minibus (but not rail) are taken as EFLS trips. The remaining (i.e. bus/minibus only trips) are taken as Bus/Minibus trips. This concept is in accordance to the approach adopted by TD's CTS Model.
2. The daily patronage of EFLS in 2031 is assumed 200,000 as advised by "Working Paper on the Recommended EFLS Network Option N4B" of Agreement No. CE 42/2009(TT) Kai Tak Environmentally Friendly Linkage System – Feasibility Study

4.4.1.4 With the above modal split assumptions and pedestrian trip generation estimated in previous text, the calculated demand for road-based PT during peak hours are presented below:

Table 4.4.2 Estimate of Road-based PT (Bus+GMB) demand induced by KBAA development

Item	Without rail-based EFLS		With rail-based EFLS	
	AM Peak	PM Peak	AM Peak	PM Peak
	2-way	2-way	2-way	2-way
Total Ped Trip (ped/hr) (From Table 3.5.5) = (a)	11,391	10,373	11,448	10,412
Road-based PT demand % (From Table 4.4.1) = (b)	70%	70%	63%	63%
Mechanised Trip %(1) = (c)	100%	100%	100%	100%
Calculated Road-Based PT demand (pax/hr) = (a) * (b) * (c)	**7,974**	**7,261**	**7,212**	**6,560**

Notes:
1. Conservative assumption in terms of estimation of public transport demand

4.4.1.5 Based on the above assessment made via conservative assumption, the calculated PT demand (road-based) at the most critical scenario (AM Peak with rail-based EFLS) would be 7,974 two-way per hour. As part of the public transport strategy to deal with this anticipated PT demand, a green transport hub located in Lot 2 is proposed and details are discussed in ***Section 4.4.3***.

4.4.2 Planned EFLS Connecting Ngau Tau Kok, Kai Tak and Kwun Tong

4.4.2.1 The proposed EFLS connecting Ngau Tau Kok, Kai Tak and Kwun Tong will provide convenient short-haul public transport access to/from the KTD development, as well as serve the strategic function as feeder transport mode linking the KTD developments to surrounding railway stations. Based on the latest alignment recommended under the detailed feasibility study, the proposed EFLS will interchange with existing Kwun Tong Line (at Ngau Tau Kok Station) as well as the future SCL (to be available in design year). An EFLS station is proposed along with the system depot to be located at the Study Area. These assumptions will be undertaken in the transport/traffic/pedestrian forecasting for this TTIA.

4.4.2.2 It is expected that the planned EFLS could relieve the demand on road-based public transport induced by proposed KBAA development (as shown in **Table 4.4.2**).

4.4.3 Green Transport Hub in Lot 2

4.4.3.1 To cope with the anticipated PT demand discussed in ***Section 4.4.1*** and further enhance the connectivity of KBAA, it is proposed to introduce a green transport hub to serve green public transport mode (e.g. hybrid bus, electric bus). It will provide road-based PT connections to nearby rail stations (e.g. SCL Kai Tak Station, EKL Choi Wan Station etc.) and inter-districts (e.g. KTD, Kowloon City, San Po Kong, Hammer Hill etc.). It should be noted that the preliminary proposals will be subject to discussions between TD and public transport operators as well as

other related departments in later detail design stages. The preliminary layout of green transport hub for ***With rail-based EFLS Scenario*** and ***Without rail-based EFLS Scenario*** are illustrated in **Figure 4.4.1a** and **4.4.1b** respectively. Besides, under without rail-based EFLS scenario, area is reserved for the flexibility on provision of additional transport facility to complement the connectivity of EFLS.

4.4.3.2 The analysis of PT demand and provision estimations is tabulated in **Table 4.4.3**. The peak demand / supply ratio is below 1.0 showing that the proposed public transport provision can cater the demand. In addition, considering a wide range of road-based public transport options available as discussed in **Table 2.1.1**, it is considered that the estimated road-based PT demand could be afforded by existing public transport services together with the proposed green transport hub.

Table 4.4.3 Estimated Road-based PT Demand and Provision Estimations

Item	With *rail-based* EFLS		Without *rail-based* EFLS	
	AM Peak	**PM Peak**	**AM Peak**	**PM Peak**
Estimated Road-based PT demand	7,212	6,560	7,974	7,261
Proposed no. of bus routes at the PTI	6		8	
Average capacity of bus	102 people per bus (85% of full bus [120 persons] capacity)			
Average hourly frequency of each route	12 (5 min headway)			
Morning peak person trip provision by Bus	7,344		9,792	
Peak Demand / Supply Ratio	**0.98**	**0.89**	**0.81**	**0.74**

4.4.3.3 It is also assumed that the proposed green transport hub will be connected to different land lots of KBAA developments via internal pedestrian facilities within the site. As such, the majority of pedestrian trips heading to the proposed green transport hub will not need to make use of at-grade roadside footpaths. The pedestrian impact assessment based on such assumption will be presented in ***Section 6.5*** of the text.

5 Parking Provision in KBAA

5.1.1.1 The matter was further raised at the EKE Steering Committee meeting held on 14 March 2018. It was agreed at the meeting that higher end requirement would apply to the retail portion, while that for office would be maintained at lower end + 20% as put in CPLD paper. In view of anticipated demand, it was also proposed to adopt medium provision for motor-cycles and higher end provision of carparking spaces and L/UL bays for hotel use.

5.1.1.2 For parking and servicing facilities provision, the parking and loading / unloading (L/UL) provision requirement in the Hong Kong Planning Standards and Guidelines (HKPSG) to support the proposed KBAA developments are estimated based on the Office Hub option, while night-time shared use of L/UL spaces for GV parking is subject to the permission of Lands Department. The car park provision of Lots 2, 3, 4 and Lots 5 & 6 for ***Without rail-based EFLS Scenario*** are summarized in **Table 5.1.1, 5.1.2, 5.1.3** and **5.1.4** respectively.

Table 5.1.1 Proposed Ancillary Parking for Lot 2

Proposed Development	Facility	HKPSG Standards	Provision of Ancillary Parking#,@	Shared Ancillary Parking at Night Time
Office (97,720 sq.m.)	Car Parking	For the first 15,000 sq.m. GFA, 1 car space per 150-200 sq.m. GFA; Above 15,000 sq.m. GFA, 1 car space per 200-300 sq.m. GFA	351-384 nos. ^ (lower end to lower end + 20% of HKPSG Standard)	Nil
	L/UL Bays *	1 loading/unloading bay for goods vehicles for every 2,000 to 3,000 sq.m. or part thereof, of gross floor area	21 nos. LGV 12 nos. HGV Total: 33 nos. (lower end of HKPSG Standard)	11 nos. LGV 6 nos. HGV Total: 17 nos.
	Taxi / PV Lay-by	For sites of at least 5,000 sq.m. net site area, 1 picking up/ setting down lay-by for taxis and private cars for every 20,000 sq.m., or part thereof, of gross floor area	5 nos. (HKPSG Standard)	Nil
	Motor-cycle	7.5% of total provision for private cars	29 nos.^ (mid-range of HKPSG Standard)	Nil
Retail (55,130 sq.m.)	Car Parking	1 car park space per 200-300 sq.m. GFA	276 nos. ^ (higher end of HKPSG Standard)	Nil
	L/UL Bays *	1 loading/unloading bay for good vehicles for every 800 to 1,200 sq.m. or part thereof, of gross floor area	30 nos. LGV 16 nos. HGV Total: 46 nos. (lower end of HKPSG Standard)	15 nos. LGV 8 nos. HGV Total: 23 nos
	Motor-cycle	7.5% of total provision for private cars	21 nos. ^ (mid-range of HKPSG Standard)	Nil

Proposed Development	Facility	HKPSG Standards	Provision of Ancillary Parking#,@	Shared Ancillary Parking at Night Time
Hotel[3] (28,800 sq.m.) cum 1,500 sq.m. conference and banquet facilities + 546 rooms	Car Parking	1 car parking space per 100 rooms 0.5-1 car space per 200 sq.m. GFA of conference and banquet facilities	14 nos. ^ (higher end of HKPSG Standard)	Nil
	L/UL Bays *	Loading/unloading bays for goods vehicles: 0.5-1 goods vehicle bay per 100 rooms.	2 nos. LGV 1 nos. HGV Total: 3 nos. (lower end of HKPSG Standard)	Nil
	Taxi / PV Lay-by	2 lay-bys for hotel with less than 300 rooms 3 lay-bys for hotel with more than 300 rooms and less than 600 rooms 4 lay-bys for hotel with more than 600 rooms	3 nos. (HKPSG Standard)	Nil
	Single Deck Tour Bus Lay-by	1 lay-by for hotel with less than 300 rooms 2-3 lay-bys for hotel with more than 300 rooms and less than 900 rooms 3 lay-bys for hotel with more than 900 rooms	2 - 3 nos. (HKPSG Standard)	Nil
	Motor-cycle	7.5% of total provision for private cars	2 nos. ^ (mid-range of HKPSG Standard)	Nil

Remarks:

The ratio of carparking provision was agreed with TD in EKEO steering committee meeting in March 2018

@ 75% of the L/UL bays is proposed to be shared for public use in the night-time to cater for the demand for night time parking

* Split between LGV/HGV is 65%/35% based on the requirements under HKPSG

^ Ancillary carparking spaces could be available for public use

[3] It is assumed about 1,500 sq.m. will be used for conference and banquet facilities and the average size of hotel room is 50 sq.m..

Table 5.1.2 Proposed Ancillary Parking for Lot 3

Proposed Development	Facility	HKPSG Standards	Provision of Ancillary Parking#,@	Shared Ancillary Parking at Night Time
Office[4] (400 sq.m.)	Car Parking	For the first 15,000 sq.m. GFA, 1 car space per 150-200 sq.m. GFA; Above 15,000 sq.m. GFA, 1 car space per 200-300 sq.m. GFA	2-3 nos. ^ (lower end to lower end + 20% of HKPSG Standard)	Nil
	L/UL Bays *	1 loading/unloading bay for goods vehicles for every 2,000 to 3,000 sq.m. or part thereof, of gross floor area	1 nos. HGV Total: 1 nos. (lower end of HKPSG Standard)	1 nos. HGV Total: 1 nos.
	Taxi / PV Lay-by	For sites of at least 5,000 sq.m. net site area, 1 picking up/ setting down lay-by for taxis and private cars for every 20,000 sq.m., or part thereof, of gross floor area	Nil	Nil
	Motor-cycle	7.5% of total provision for private cars	1 nos.^ (mid-range of HKPSG Standard)	Nil

Remarks:

The ratio of carparking provision was agreed with TD in EKEO steering committee meeting in March 2018

@ 75% of the L/UL bays is proposed to be shared for public use in the night-time to cater for the demand for night time parking

* Split between LGV/HGV is 65%/35% based on the requirements under HKPSG

^ Ancillary carparking spaces could be available for public use

[4] The office GFA refers to the C&C uses of 400 sq.m.

Table 5.1.3 Proposed Ancillary Parking for Lot 4

Proposed Development	Facility	HKPSG Standards	Provision of Ancillary Parking#,@	Shared Ancillary Parking at Night Time
Office (82,670 sq.m.)	Car Parking	For the first 15,000 sq.m. GFA, 1 car space per 150-200 sq.m. GFA; Above 15,000 sq.m. GFA, 1 car space per 200-300 sq.m. GFA	301 - 329 nos. ^ (lower end to lower end + 20% of HKPSG Standard)	Nil
	L/UL Bays *	1 loading/unloading bay for goods vehicles for every 2,000 to 3,000 sq.m. or part thereof, of gross floor area	18 nos. LGV 10 nos. HGV Total: 28 nos. (lower end of HKPSG Standard)	9 nos. LGV 5 nos. HGV Total: 14 nos.
	Taxi / PV Lay-by	For sites of at least 5,000 sq.m. net site area, 1 picking up/ setting down lay-by for taxis and private cars for every 20,000 sq.m., or part thereof, of gross floor area	5 nos. (HKPSG Standard)	Nil
	Motor-cycle	7.5% of total provision for private cars	25 nos. ^ (mid-range of HKPSG Standard)	Nil
Retail (55,610 sq.m.)	Car Parking	1 car park space per 200-300 sq.m. GFA	279 nos. ^ (higher end of HKPSG Standard)	Nil
	L/UL Bays *	1 loading/unloading bay for good vehicles for every 800 to 1,200 sq.m. or part thereof, of gross floor area	31 nos. LGV 16 nos. HGV Total: 47 nos. (lower end of HKPSG Standard)	16 nos. LGV 8 nos. HGV Total: 24 nos.
	Motor-cycle	7.5% of total provision for private cars	21 nos. ^ (mid-range of HKPSG Standard)	Nil
Hotel[5] (45,600 sq.m.) cum 1,500 sq.m. conference and banquet facilities + 882 rooms	Car Parking	1 car parking space per 100 rooms 0.5-1 car space per 200 sq.m. GFA of conference and banquet facilities	17 nos. ^ (higher end of HKPSG Standard)	Nil
	L/UL Bays *	Loading/unloading bays for goods vehicles: 0.5-1 goods vehicle bay per 100 rooms.	3 nos. LGV 2 nos. HGV Total: 5 nos. (lower end of HKPSG Standard)	Nil
	Taxi / PV Lay-by	2 lay-bys for hotel with less than 300 rooms 3 lay-bys for hotel with more than 300 rooms and less than 600 rooms	4 nos. (HKPSG Standard)	Nil

[5] It is assumed about 1,500 sq.m. will be used for conference and banquet facilities and the average size of hotel room is 50 sq.m..

Proposed Development	Facility	HKPSG Standards	Provision of Ancillary Parking#,@	Shared Ancillary Parking at Night Time
		4 lay-bys for hotel with more than 600 rooms		
	Single Deck Tour Bus Lay-by	1 lay-by for hotel with less than 300 rooms 2-3 lay-bys for hotel with more than 300 rooms and less than 900 rooms 3 lay-bys for hotel with more than 900 rooms	2-3 nos. (HKPSG Standard)	Nil
	Motor-cycle	7.5% of total provision for private cars	2 nos. ^ (mid-range of HKPSG Standard)	Nil

Remarks:

The ratio of carparking provision was agreed with TD in EKEO steering committee meeting in March 2018

@ 75% of the L/UL bays is proposed to be shared for public use in the night-time to cater for the demand for night time parking

* Split between LGV/HGV is 65%/35% based on the requirements under HKPSG

^ Ancillary carparking spaces could be available for public use

Table 5.1.4 Proposed Ancillary Parking for Lots 5 & 6

Development	Facility	Calculation as stipulated in the Approved GBP of NKIL 6313 and NKIL6512	Provision of Ancillary Parking as stipulated in the Approved GBP of NKIL 6313 and NKIL6512[+]
Office (116,100 sq.m.)	Car Parking	For the first 15,000 sq.m. GFA, 1 car space per 150 sq.m. GFA; Above 15,000 sq.m. GFA, 1 car space per 200 sq.m. GFA	602 nos. ^
	L/UL Bays	1 loading/unloading bay for goods vehicles for every 2,000 sq.m. or part thereof, of gross floor area	37 nos. LGV 20 nos. HGV Total: 57 nos.
	Motor-cycle	10% of total provision for private cars	61 nos. ^
Retail (11,480 sq.m.)	Car Parking	1 car park space per 200 sq.m. GFA	56 nos. ^
	L/UL Bays	1 loading/unloading bay for good vehicles for every 800 sq.m. or part thereof, of gross floor area	10 nos. LGV 5 nos. HGV Total: 15 nos.
	Motor-cycle	10% of total provision for private cars	6 nos. ^

Remarks:

^ Ancillary carparking spaces could be available for public use

[+] Provision of ancillary parking is made reference to the latest approved GBP of NKIL 6313 and NKIL6512

6 Traffic Impact Assessment

6.1 Base Year Traffic Assessment

6.1.1.1 To appreciate the existing vehicular traffic conditions in the Study Area, performance assessments were undertaken. The road links and junctions for assessment are tabulated in **Table 6.1.1** and **Table 6.1.2** respectively, and are illustrated in **Figure 6.1.1** for their location index. The junction calculation sheets and traffic flow diagrams are shown in **Appendix B** and **Appendix C** respectively.

Table 6.1.1 Road Links for Assessment

Road Links		Road Type	Number of Lanes
L1	Wai Yip Street	DD	D3
L2	Wang Chiu Road between Sheung Yee Road and Lam Fung Street	DD	S4
L3	Hoi Bun Road	LD	D2
L4	Kai Fuk Road	UT	D3
L5	Sheung Yee Road	DD	D2 (Vary)
L6	Shun Yip Street	LD	S3 (One-way Northbound)
L7	Wang Chiu Road between Sheung Yee Road and Cheung Yip Street	DD	D2 (Vary)

Table 6.1.2 Road Junctions for Assessment

Junction		Control
J1	Wai Yip Street/ Lai Yip Street	Signalized
J2	Hoi Bun Road/ Lai Yip Street	Signalized
J3	Wai Yip Street/ Shun Yip Street	Signalized
J4	Hoi Bun Road/ Shun Yip Street	Signalized
J5	Hoi Bun Road/ Cheung Yip Street	Signalized
J6	Wang Chiu Road/ Sheung Yee Road	Signalized
J7	Wang Tai Road/ Sheung Yee Road	Priority
J8	Lam Fung Street/ Wang Chiu Road	Signalized
J9	Sheung Yuet Road/ Wang Chiu Road	Signalized
J10	Lam Hing Street/ Wang Chiu Road	Signalized
J11	Kai Cheung Road/ Wang Chiu Road	Signalized

6.1.1.2 The 2014 peak hour flows in pcu/hr of the above road network and their link performance are shown in **Table 6.1.3** below. Volume to Capacity (V/C) Ratio indicates the proportion of peak hour traffic flow to the capacity of a road link. A higher VC ratio of a road indicates a heavy usage of the road link in concern, inter alia.

6.1.1.3 Considering the future developments in KE are mainly office (>40% of total GFA) which operate only during weekdays, the traffic flow during weekdays will be higher than that during weekends. In total, the traffic flow during weekdays will be also higher and thus it is considered more conservative to adopt normal weekday for assessment.

Table 6.1.3 Existing Year 2014 Road Link Assessment

Road Links		Road Type	Capacity[1]	Direction	Flow[3] (pcu/hr)		V/C Ratio[2]	
					AM Peak	PM Peak	AM Peak	PM Peak
L1	Wai Yip Street	DD	4,175	SEB	1,300	1,200	0.31	0.29
				NWB	800	1,100	0.19	0.26
L2	Wang Chiu Road between Sheung Yee Road and Lam Fung Street	DD	2,500	SB	400	400	0.16	0.16
				NB	800	800	0.32	0.32
L3	Hoi Bun Road	LD	1,825	SEB	400	500	0.22	0.27
				NWB	300	400	0.16	0.22
L4	Kai Fuk Road	UT	6,000	EB	600	600	0.10	0.10
				WB	800	900	0.13	0.15
L5	Sheung Yee Road	DD	2,800	EB	1,200	700	0.43	0.25
				WB	300	300	0.11	0.11
L6	Shun Yip Street	LD	3,375	NEB	600	700	0.18	0.21
L7	Wang Chiu Road between Sheung Yee Road and Cheung Yip Street	DD	3,050	SEB	800	700	0.26	0.23
				NWB	1,100	900	0.36	0.30

Note:
1. Road capacity is defined in accordance to STM Model;
2. A v/c ratio is normally used to reflect traffic situation during peak hours. A v/c ratio below 1.0 is considered acceptable. A v/c ratio above 1.0 indicates the onset of mild congestion and a v/c ratio between 1.0 and 1.2 would indicate a manageable degree of congestion. A v/c ratio above 1.2 indicates the onset of more serious congestion. A v/c ratio greater than 1.00 is shaded;
3. The figures are rounded to nearest 100 pcu/hr.

6.1.1.4 The results indicate that all the assessed road links are currently operating at satisfactory level under design capacity.

6.1.1.5 The assessment results of road junctions are shown in **Table 6.1.4**.

Table 6.1.4 Existing Year 2014 Junctions Assessment

Junction		RC / DFC[1, 2]	
		AM Peak	PM Peak
J1	Wai Yip Street/ Lai Yip Street	21%	24%
J2	Hoi Bun Road/ Lai Yip Street	>50%	>50%
J3	Wai Yip Street/ Shun Yip Street	>50%	>50%
J4	Hoi Bun Road/ Shun Yip Street	>50%	>50%
J5	Hoi Bun Road/ Cheung Yip Street	>50%	>50%
J6	Wang Chiu Road/ Sheung Yee Road	>50%	>50%
J7	Wang Tai Road/ Sheung Yee Road	0.30	0.30
J8	Lam Fung Street/ Wang Chiu Road	>50%	>50%
J9	Sheung Yuet Road/ Wang Chiu Road	>50%	>50%
J10	Lam Hing Street/ Wang Chiu Road	>50%	>50%

Junction		RC / DFC[1, 2]	
		AM Peak	PM Peak
J11	Kai Cheung Road/ Wang Chiu Road	19%	23%

Note:
1. RC denotes Reserve Capacity in %, DFC denotes Design/Flow Capacity Ratio
2. For junction condition based on calculated RC/ DFC value,
   - RC>15% or DFC<0.85: fair to satisfactory physical junction condition and no persisting traffic congestion is expected;
   - RC=<15% or DFC=>0.85: unstable but acceptable traffic condition which traffic congestion may occur.

6.1.1.6 The results indicate that all the assessed road junctions are currently operating at satisfactory level in base year 2014.

6.2 Base Year Pedestrian Assessment

6.2.1 Pedestrian traffic count surveys were carried out in July 2014 of the Study area. The pedestrian surveys were conducted for the AM/ PM periods: 0730 – 0930hrs and 1630 – 1930hrs.

6.2.2 Based on our on-site observation, the pedestrian counts among all the surveyed locations for the weekday peak periods were generally much higher than that of the weekend peak periods. Therefore, weekday peak periods were chosen to represent the critical peaks for the Study Area for carrying out the pedestrian traffic count surveys.

6.2.3 Pedestrian traffic count surveys were carried out at each of the key locations shown in **Table 6.2.1**, and also illustrated in **Figure 6.1.2** for the location index.

Table 6.2.1 Locations for Pedestrian Traffic Count Survey

Walkway ID	Location
P1	Footpath of Lai Yip Street, between Hung To Road and Wai Yip Street, near Cheung Fai Industrial Building
P2	Footpath of Lai Yip Street, between Hoi Bun Road and Wai Yip Street, near C-BONS International Centre
P3	Footpath of Lai Yip Street, between Hoi Bun Road and Wai Yip Street, near Lai Yip Street Cooked Food Hawker Bazaar
P4	Footpath of Lai Yip Street, between Hung To Road and Wai Yip Street, near Chen Yip Industrial Building
P5	Footpath of Hoi Bun Road, between Lai Yip Street and How Ming Street
P6	Footpath of Hoi Bun Road, facing Lai Yip Street
P7	Footpath of Hoi Bun Road, between Lai Yip Street and Shun Yip Street
P8	Footpath of Wai Yip Street, between Shun Yip Street and Tai Yip Street, near Prosperity Industrial Building
P9	Footpath of Wai Yip Street, between Shun Yip Street and Tai Yip Street, near Manulife Tower
P10	Footpath of Shun Yip Street, between Wai Yip Street and Hoi Bun Road, near Manulife Tower
P11	Footpath of Shun Yip Street, between Wai Yip Street and Hoi Bun Road
P12	Footpath of Wai Yip Street, between Shun Yip Street and Sheung Yee Road

Walkway ID	Location
P13	Footpath of Wai Yip Street, between Shun Yip Street and Sheung Yee Road, near Unify Commercial Industrial Building
P14	Footpath of Hoi Bun Road, between Shun Yip Street and Lai Yip Street, near Manulife Tower
P15	Footpath of Hoi Bun Road, between Shun Yip Street and Lai Yip Street, near Kwun Tong Promenade
P16	Footpath of Hoi Bun Road, between Shun Yip Street and Cheung Yip Street, near Kowloon Godown
P17	Footpath of Hoi Bun Road, between Shun Yip Street and Cheung Yip Street
P18	Footpath of Siu Yip Street, between Wai Yip Street and Tai Yip Street near Ngau Tau Kok Ambulance Depot
P19	Footpath of Wai Yip Street, between Sheung Yee Road and Kai Fuk Road
P20	Footpath of Sheung Yee Road, between Cheung Yip Street and Wai Yip Street
P21	Footpath of Cheung Yip Street, between Sheung Yee Road and Tsui Hing Street
P22	Footpath of Cheung Yip Street, between Sheung Yee Road and Tsui Hing Street, near Kowloon Bay Waste Recycling Centre
P23	Footpath of Sheung Yee Road, between Cheung Yip Street and Wang Mau Street, near Kowloon Bay Waste Recycling Centre
P24	Footpath of Sheung Yee Road, between Wang Hoi Road and Wang Mau Street, near Yip On Factory Estate Block 2
P25	Footpath of Wang Hoi Road, between Sheung Yee Road and Wang Yuen Street, near Yip On Factory Estate Block 2
P26	Footpath of Wang Hoi Road, between Sheung Yee Road and Wang Yuen Street, near Yip On Factory Estate Block 1
P27	Footpath of Wai Yip Street, between Sheung Yee Road and Wang Hoi Road, near Yip On Factory Estate Block 1
P28	Footpath of Wai Yip Street, between Sheung Yuet and Sheung Yee Road, near Yip On Factory Estate Block 1
P29	Footpath of Sheung Yee Road, between Wang Chiu Road and Wang Tai Road, near Kowloon Bay Waste Recycling Centre
P30	Footpath of Wang Chiu Road, between Sheung Yee Road and Kai Fuk Road, near Kowloon Bay Waste Recycling Centre
P31	Footpath of Wang Chiu Road, between Sheung Yee Road and Kai Fuk Road
P32	Footpath of Sheung Yee Road, between Wang Chiu Road and Kai Fuk Road
P33	Footpath of Sheung Yee Road, between Wang Chiu Road and Kai Fuk Road, near MegaBox
P34	Footpath of Wang Chiu Road, between Sheung Yee Road and Lam Fung Street, near MegaBox
P35	Footpath of Wang Chiu Road, between Sheung Yee Road and Lam Fung Street, near Enterprise Square III
P36	Footpath of Sheung Yee Road, between Wang Chiu Road and Wang Tai Road, near Enterprise Square III
P37	Footpath of Siu Yip Street, between Wai Yip Street and Tai Yip Street near Ngau Tau Kok Police Station
P38	Footpath of Wai Yip Street, between Sheung Yuet and Sheung Yee Road, near Ngau Tau Kok Ambulance Depot

Walkway ID	Location
B1	Footbridge across Wai Yip Street, between Kai Fuk Road and Shun Yip Street
B2	Footbridge across Wai Yip Street, between Sheung Yee Road and Kai Fuk Road
B3	Footbridge across Wang Chiu Road, between Sheung Yee Road and Kai Fuk Road
B4	Footbridge connect Telford Plaza and Wai Yip Street
PB1	Proposed footbridge across Wai Yip Street between Sheung Yuet Road and Sheung Yee Road
S1	Subway connect MTR Ngau Tau Kok Station Exit B
PS1	Proposed Subway connect northeast of KTIL 761 and MTR NTK Station
PS2	Proposed Subway connect southwest of KTIL 761 and Hoi Bun Road Park

6.2.4 The observed peak pedestrian flow was used for the LOS assessment based on Transport Planning and Design Manual Volume 6 Section 10.4.2.3 (ix). A brief description of the LOS conditions and its associated colour code is presented in **Table 6.2.2**.

Table 6.2.2 Definition of Level of Service (LOS) and associated colour codes

LOS	Ped. Flow Rate (ped/min/m)	Description
A	<=16	Pedestrians basically move in desired paths without altering their movements in response to other pedestrians. Walking speeds are freely selected, and conflicts between pedestrians are unlikely.
B	16 – 23	Sufficient space is provided for pedestrians to freely select their walking speeds, to bypass other pedestrians and to avoid crossing conflicts with others. At this level, pedestrians begin to be aware of other pedestrians and to respond to their presence in the selection of walking paths.
C	23 – 33	Sufficient space is available to select normal walking speeds and to bypass other pedestrians primarily in unidirectional stream. Where reverse direction or crossing movement exit, minor conflicts will occur, and speed and volume will be somewhat lower.
D	33 – 49	Freedom to select individual walking speeds and bypass other pedestrians is restricted. Where crossing or reverse-flow movements exist, the probability of conflicts is high and its avoidance requires changes of speeds and position. The LOS provides reasonable fluid flow; however considerable friction and interactions between pedestrians are likely to occur.
E	49 – 75	Virtually, all pedestrians would have their normal walking speeds restricted. At the lower range of this LOS, forward movement is possible only be shuffling. Space is insufficient to pass over slower pedestrians. Cross-and reverse-movement are possible only with extreme difficulties. Design volumes approach the limit of walking capacity with resulting stoppages and interruptions to flow.
F	>75	Walking speeds are severely restricted. Forward progress is made only by shuffling. There are frequent and unavoidable conflicts with other pedestrians. Cross-and reverse-movements are virtually impossible. Flow is sporadic and unstable. Space is more characteristics of queued pedestrians than of moving pedestrian streams.

6.2.5 The result of the survey shows the AM/ PM peak hours are identified as: 0800-0900 and 1800-1900 respectively. Weekend surveys on pedestrian conditions were also conducted; however, it was found that the pedestrian flows were more significant in weekdays. Therefore the weekday peak periods are presented in this working paper.

6.2.6 The walkway Level of Service (LOS) conditions were assessed based on Transport Planning and Design Manual (TPDM). The LOS is primarily based on the density of people in a given space and has six levels. It is calculated as number of pedestrians/ minute/ metre. The number of metres is based on the actual width of the walkway minus the dead width on the either side.

6.2.7 The **Table 6.2.3** summarizes all the observed AM/ PM peak flows in footpaths, footbridges, and subways.

Table 6.2.3 Level of Service in AM and PM Peaks - Base Year 2014

Walkway ID	Actual Width (m)	Effective Width (m)	Peak Hour Pedestrian Flow (ped/hr) (2-way)		Peak Hour Pedestrian Flow Rate (ped/min/m) (2-way)		LOS	
			AM	PM	AM	PM	AM	PM
Footpath								
P1	3.5	2.5	2,500	2,250	16.7	15.0	B	A
P2	5.0	4.0	2,100	400	8.8	1.7	A	A
P3	3.7	2.7	550	150	3.4	0.9	A	A
P4	3.6	2.6	400	300	2.6	1.9	A	A
P5	5.9	4.9	1,000	1,350	3.4	4.6	A	A
P6	3.6	2.6	100	100	0.6	0.6	A	A
P7	3.1	2.1	150	100	1.2	0.8	A	A
P8	3.7	2.7	350	150	2.2	0.9	A	A
P9	3.7	2.7	500	200	3.1	1.2	A	A
P10	3.2	2.2	100	50	0.8	0.4	A	A
P11	2.1	1.1	50	50	0.8	0.8	A	A
P12	3.9	2.9	100	50	0.6	0.3	A	A
P13	3.9	2.9	350	250	2.0	1.4	A	A
P14	2.4	1.4	50	200	0.6	2.4	A	A
P15	2.4	1.4	50	100	0.6	1.2	A	A
P16	2.7	1.7	100	100	1.0	1.0	A	A
P17	4.4	3.4	100	100	0.5	0.5	A	A
P18	2.4	1.4	300	250	3.6	3.0	A	A
P19	3.3	2.3	50	100	0.4	0.7	A	A
P20	3.9	2.9	100	50	0.6	0.3	A	A
P21	3.5	2.5	150	100	1.0	0.7	A	A
P22	3.1	2.1	50	50	0.4	0.4	A	A

Walkway ID	Actual Width (m)	Effective Width (m)	Peak Hour Pedestrian Flow (ped/hr) (2-way)		Peak Hour Pedestrian Flow Rate (ped/min/m) (2-way)		LOS	
			AM	PM	AM	PM	AM	PM
P23	2.5	1.5	50	100	0.6	1.1	A	A
P24	2.7	1.7	150	350	1.5	3.4	A	A
P25	2.7	1.7	50	50	0.5	0.5	A	A
P26	2.8	1.8	50	50	0.5	0.5	A	A
P27	4.5	3.5	150	350	0.7	1.7	A	A
P28	4.5	3.5	150	250	0.7	1.2	A	A
P29	2.7	1.7	50	150	0.5	1.5	A	A
P30	2.9	1.9	50	50	0.4	0.4	A	A
P31	1.9	0.9	100	200	1.9	3.7	A	A
P32	3.3	2.3	50	50	0.4	0.4	A	A
P33	5.1	4.1	50	50	0.2	0.2	A	A
P34	4.1	3.1	50	100	0.3	0.5	A	A
P35	3.2	2.2	50	150	0.4	1.1	A	A
P36	3.6	2.6	150	100	1.0	0.6	A	A
P37	2.5	1.5	200	150	2.2	1.7	A	A
P38	4.5	3.5	100	100	0.5	0.5	A	A
Footbridge								
B1	4.9	3.9	450	650	1.9	2.8	A	A
B2	3.5	2.5	100	250	0.7	1.7	A	A
B3	3.0	2.0	50	50	0.4	0.4	A	A
B4	5.3	4.3	10,050	10,550	39.0	40.9	D	D
Subway								
S1	6.7	5.7	7,850	2,050	23.0	6.0	B	A

Note:
1. The two-way AM/ PM peak hour pedestrian flows are rounded to the nearest 50.
2. Actual width in meters is based on-site measurement.
3. The peak hour flow rate can be obtained by using the formula: Peak Hour Flow Rate (Ped/min/m) = Peak Hour Flow (Ped/hr)/ 60/ Effective width (m).
4. LOS has been calculated based on effective width, by generally assuming 0.5m lateral clearance on both sides

6.2.8 As shown above, all the assessed footpaths in the vicinity of the subject site are operating under acceptable Levels of Service in base year 2014.

6.3 Major Future Transport Infrastructure in the Vicinity

6.3.1 Elevated Walkway System (EWS) proposed under KBBA Study

6.3.1.1 As aforementioned, currently pedestrian environment within KBBA north of the Study Area is considerably uncomfortable and congested at the existing narrow footpaths and footbridges. In anticipation of increasing supply of offices and commercial buildings in the future, better pedestrian facilities will be demanded in the transformation process. Some private developers took the initiative to plan and design a covered EWS approximately 550m long that links up the Kowloon Bay MTR Station, Telford Garden, Exchange Tower, One Kowloon, Enterprise Square Five (Megabox), Enterprise Square Three and Manhattan Place[6]. The EWS is launched by the Government under the policy of "Facilitating Provision of Pedestrian Links by the Private Sector". This EWS provides great opportunity for potential connection between the Study Area, Enterprise Square Three and/or Manhattan Place in the future across Sheung Yee Road. Possible integration with KBAA will be explored.

6.3.2 Central Kowloon Route

6.3.2.1 Central Kowloon Route (CKR) is a committed dual 3-lane trunk road in Central Kowloon. It will be 4.7km long running from Yau Ma Tei Interchange with West Kowloon Highway in the west, and the road network in KTD and Kowloon Bay in East Kowloon via the proposed Kai Tak Interchange at the eastern end of CKR and its slip roads which including direct connection to Kai Fuk Road leading to and from the Study Area providing great regional accessibility with Western and Central Kowloon. The project is assumed in place in the year 2026.

6.3.3 Trunk Road T2

6.3.3.1 The Trunk Road T2 is a planned dual 2-lane trunk road running from the committed CKR at the proposed Kai Tak Interchange in KTD area to the planned Tseung Kwan O – Lam Tin Tunnel (TKO-LTT) adjacent to the Eastern Harbour Crossing. Trunk Road T2 will link up CKR and TKO-LTT forming the potential Route 6 as part of the strategic road network providing an east-west express link between West Kowloon, Kai Tak, and Tseung Kwan O, enhancing the regional connectivity between the Study Area with Tseung Kwan O, Hong Kong Island and beyond. As advised by Civil Engineering and Development Department, the Trunk Road T2 would be assumed in place in year 2026.

6.3.4 Pedestrian Environment Improvements in KBBA

6.3.4.1 Under the KBBA Pedestrian Environment Improvement – Feasibility Study (Agreement No. CE 49/2012(TT)), short, medium and long term measures have been suggested for 3 key areas and 17 individual

[6] Some private developers have withdrawn their applications for constructing the footbridges under the EWS proposal in early 2021. The government will keep in view the demand for these footbridges in considering the appropriate timing for their implementation if the private developers decide not to construct the EWS footbridges. The assumption of EWS being in place in design year 2031 adopted under the Study is considered appropriate. Notwithstanding the above, it is understood that the government intends to initiate a study to review the pedestrian flow and forecast in Kowloon East (including Kowloon Bay Business Area and Kwun Tong Business Area) and the Study will commence when resources are available.

locations in KBBA. A comprehensive pedestrian linkage network with 7 pedestrian links is also introduced as the medium to long term proposal. The proposed at-grade linkage systems "Green Spine" and "Green Link", and grade-separated pedestrian links "Siu Yip Street Link" and "Tai Yip Street Link" will directly link KBAA with the rest of the Kowloon Bay area.

6.3.4.2 The proposed "Green Spine" will mainly be a "car-free" pedestrian linkages. The north-south component of the "Green Spine" will run between Kai Cheung Road and Sheung Yee Road parallel to Wang Hoi Road, generally following the existing sitting out area in Kowloon Bay, and extending onto Wang Mau Street. The east-west component of the "Green Spine" will run along Lam Wah Street between the north-south section to Wang Kwun Road, passing through the Lam Wah Street Playground, then extend towards Wang Chin Street / KITEC where it intersects with the proposed "Green Link". Opportunity to further extend the "Green Spine" northward from the Lam Wah Street Playground towards the existing footbridge across Kai Cheung Road by providing an at-grade passageway through the Kowloon Motor Bus Depot at Lam Wah Street upon redevelopment was also proposed.

6.3.4.3 The proposed "Green Link" will extend from north to south linking-up the major open spaces, new developments, and points of interest within KBBA (e.g. KITEC, MegaBox, and the Study Area.) The "Green Link" aims to make use of the various G/IC sites at Wang Chin Street and Wang Kee Street to provide wider and more spacious footpath for future greening and streetscape, guiding pedestrian movements thorough the future open spaces along the linkage. The proposed "Green Link" will also intersect with one of the potential EFLS stations located at the southern end of Wang Kwong Road.

6.3.4.4 In the vicinity of the Study Area, the proposed Siu Yip Street Link is to provide a grade-separated pedestrian link along Siu Yip Street crossing Wai Yip Street and extending to Sheung Yee Road, in a wish to match with the future development of KBAA. Proposed Tai Yip Street Link will facelift the existing Sheung Yee Road Footbridge to facilitate more pedestrian use and better link with KBAA. Another proposal of signalising the junction of Siu Yip Street/ Tai Yip Street will subject to the future development of KBAA. The study is substantially completed in 2016. The KBAA could connect with the above-mentioned pedestrian network in Kowloon Bay to strengthen its pedestrian connectivity with the surrounding area.

6.3.4.5 The proposed pedestrian improvement schemes at Kowloon Bay are illustrated in **Figure 6.3.1**.

6.4 Future Year Traffic Assessment

6.4.1 Assessment Scenarios

6.4.1.1 To evaluate the associated traffic impact likely to be induced by the proposed development, three scenarios were analysed and compared. The three scenarios are Reference Scenario (without the proposed development and EFLS implementation), Design Scenario (with the proposed development but without rail-based EFLS implementation)

and Design Scenario (with the proposed development and rail-based EFLS implementation) in Year 2031, respectively. Year 2031 has been adopted for the assessment.

Scenario 1 (2031 Reference)

- 2031 Reference Case (2031 Background Traffic Flows including generated/attracted traffic related to other developments in the vicinity without rail-based EFLS)

Scenario 2 (2031 Design without rail-based EFLS Scenario)

- 2031 Design Case (Traffic flows from 2031 Reference Case without rail-based EFLS + generated/attracted traffic related to the proposed development)

Scenario 3 (2031 Design with rail-based EFLS Scenario)

- 2031 Design Case (Traffic flows from 2031 Reference Case + with rail-based EFLS + generated/attracted traffic related to the proposed development)

6.4.2 Assessment of Road Links in Year 2031

6.4.2.1 In order to assess the impact of the development to the road network, the road link Volume to Capacity (V/C) Ratio are assessed for above-mentioned two scenarios. The year 2031 peak hour link flow assessment is shown in **Table 6.4.1**.

Table 6.4.1 Design Year 2031 Road Link Assessment (Without rail-based EFLS Scenarios)

Road Links		Road Type	Capacity[1]	Direction	2031 Reference				2031 Design			
					Flow[3] (pcu/hr)		V/C Ratio[2]		Flow[3] (pcu/hr)		V/C Ratio[2]	
					AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
L1	Wai Yip Street	DD	4,175	SEB	1,900	1,600	0.46	0.38	2,000	1,700	0.48	0.41
				NWB	1,400	1,300	0.34	0.31	1,800	1,600	0.43	0.38
L2	Wang Chiu Road between Sheung Yee Road and Lam Fung Street	DD	2,500	SB	700	700	0.28	0.28	800	800	0.32	0.32
				NB	1,000	1,100	0.40	0.44	1,200	1,200	0.48	0.48
L3	Hoi Bun Road	LD	1,825	SEB	800	700	0.44	0.38	1,100	1,100	0.60	0.60
				NWB	800	700	0.44	0.38	900	800	0.49	0.44
L4	Kai Fuk Road	UT	6,000	EB	1,700	1,300	0.28	0.22	1,800	1,400	0.30	0.23
				WB	1,300	1,600	0.22	0.27	1,600	1,900	0.27	0.32
L5	Sheung Yee Road	DD	2,800	EB	1,600	1,400	0.57	0.50	1,600	1,500	0.57	0.54
				WB	500	600	0.18	0.21	700	900	0.25	0.32
L6	Shun Yip Street	LD	3,375	NEB	700	700	0.21	0.21	1,000	1,000	0.30	0.30
L7	Wang Chiu Road between Sheung Yee Road and Cheung Yip Street	DD	3,050	SEB	1,100	1,200	0.36	0.39	1,700	1,700	0.56	0.56
				NWB	1,500	1,300	0.49	0.43	1,500	1,400	0.49	0.46

Note:
1. Road capacity is defined in accordance to STM Model;
2. A v/c ratio is normally used to reflect traffic situation during peak hours. A v/c ratio below 1.0 is considered acceptable. A v/c ratio above 1.0 indicates the onset of mild congestion and a v/c ratio between 1.0 and 1.2 would indicate a manageable degree of congestion. A v/c ratio above 1.2 indicates the onset of more serious congestion. A v/c ratio greater than 1.00 is shaded;
3. The figures are rounded to nearest 100 pcu/hr.

6.4.2.2 The results indicate that all the assessed road links are currently operating at satisfactory level under design capacity. No improvement measures will be proposed at this stage.

6.4.2.3 For the westbound of Sheung Yee Road, the V/C ratio of the design scenarios is lower than that of reference scenarios. This is mainly due to change in vehicular route choice induced by the ***proposed closure of Cheung Yip Street*** for section between Sheung Yee Road and Hoi Bun Road assumed in the design scenarios.

6.4.2.4 The same analysis has also been carried out and presented in **Table 6.1.4.** It is found that the rail-based EFLS (conforming scheme) will not induce observable traffic impacts on the road links in the vicinity of the subject site.

Table 6.4.2 Design Year 2031 Road Link Assessment (With rail-based EFLS Scenario)

Road Links		Road Type	Capacity[1]	Direction	2031 Design			
					Flow (pcu/hr)		V/C Ratio[2]	
					AM Peak	PM Peak	AM Peak	PM Peak
L1	Wai Yip Street	DD	4,175	SEB	1,900	1,700	0.46	0.41
				NWB	1,800	1,600	0.43	0.38
L2	Wang Chiu Road between Sheung Yee Road and Lam Fung Street	DD	2,500	SB	800	800	0.32	0.32
				NB	1,200	1,200	0.48	0.48
L3	Hoi Bun Road	LD	1,825	SEB	1,100	1,100	0.60	0.60
				NWB	900	800	0.49	0.44
L4	Kai Fuk Road	PD	6,000	EB	1,800	1,400	0.30	0.23
				WB	1,600	1,900	0.27	0.32
L5	Sheung Yee Road	DD	2,800	EB	1,600	1,500	0.57	0.54
				WB	700	800	0.25	0.29
L6	Shun Yip Street	LD	3,375	NEB	1,000	1,000	0.30	0.30
L7	Wang Chiu Road between Sheung Yee Road and Cheung Yip Street	DD	3,050	SEB	1,700	1,700	0.56	0.56
				NWB	1,500	1,400	0.49	0.46

6.4.3 Assessment of Road Junctions in Year 2031

6.4.3.1 In addition to link flow assessment, junction performance for the above-mentioned scenarios are undertaken to assess the traffic impact induced by the development. The assessment results of road junctions are shown in **Table 6.4.3**.

Table 6.4.3 Road Junctions for Assessment

Junction		2031 Reference		2031 Design		2031 Design (With rail-based EFLS)	
		RC / DFC[1, 2]		RC / DFC[1, 2]		RC / DFC[1, 2]	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
J1	Wai Yip Street/ Lai Yip Street	16%	41%	11%	28%	11%	28%
J2	Hoi Bun Road/ Lai Yip Street	41%	39%	28%	31%	29%	33%
J3	Wai Yip Street/ Shun Yip Street	33%	48%	17%	27%	18%	28%
J4	Hoi Bun Road/ Shun Yip Street	24%	32%	-9%	-6%	-8%	-5%
J5[3]	Hoi Bun Road/ Cheung Yip Street	36%	57%	25%	43%	26%	44%

Junction		2031 Reference		2031 Design		2031 Design (With rail-based EFLS)	
		RC / DFC[1, 2]		RC / DFC[1, 2]		RC / DFC[1, 2]	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
J6	Wang Chiu Road/ Sheung Yee Road	25%	22%	7%	7%	7%	7%
J7	Wang Tai Road/ Sheung Yee Road	0.54	0.47	0.56	0.48	0.56	0.48
J8	Lam Fung Street/ Wang Chiu Road	60%	50%	43%	36%	44%	37%
J9	Sheung Yuet Road/ Wang Chiu Road	-4%	2%	-8%	-2%	-8%	-2%
J10	Lam Hing Street/ Wang Chiu Road	13%	6%	13%	6%	13%	7%
J11	Kai Cheung Road/ Wang Chiu Road	13%	9%	6%	6%	6%	6%

Note:
1. RC denotes Reserve Capacity in %, DFC denotes Design/Flow Capacity Ratio
2. For junction condition based on calculated RC/ DFC value,
   - RC>15% or DFC<0.85: fair to satisfactory physical junction condition and no persisting traffic congestion is expected;
   - RC=<15% or DFC=>0.85: unstable but acceptable traffic condition which traffic congestion may occur.
3. Cheung Yip Street pedestrianization as discussed in **Paragraph 4.2.2.9** has been considered in 2031 Design Case (without and with EFLS).

6.4.3.2 From the above summary of junction performance, it is identified that J4, J6, J9, J10 and J11 will operate close to or over their capacity. Junction improvement schemes are proposed and further elaborated in **Section 6.4.4**.

6.4.3.3 The estimated queue length at assessed junctions for ***reference*** and ***design (with improvement)*** scenario are illustrated in **Figure 6.4.1** and summarized in **Table 6.4.4** as below.

Table 6.4.4 Estimated Queue Length by Junction Arm

Junction Arm		2031 Reference		2031 Design	
		Est. Queue Length (m)		Est. Queue Length (m)	
		AM Peak	PM Peak	AM Peak	PM Peak
J1	Lai Yip Street NB	26	34	35	39
	Lai Yip Street SB	73	59	77	60
	Wai Yip Street EB	80	66	84	73
	Wai Yip Street WB	47	53	51	58
J2	Hoi Bun Road EB	42	40	52	43
	Hoi Bun Road WB	39	44	51	54
	Lai Yip Street SB	55	52	60	53
J3	Wai Yip Street EB	68	61	78	71

Junction Arm		2031 Reference		2031 Design	
		Est. Queue Length (m)		Est. Queue Length (m)	
		AM Peak	PM Peak	AM Peak	PM Peak
	Wai Yip Street WB	39	48	49	58
	Shun Yip Street NB	40	40	61	61
J4[1]	Hoi Bun Road WB	70	66	56	60
	Hoi Bun Road EB	57	51	72	71
J5[2]	Wang Chiu Road EB	51	47	71	58
	Cheung Yip Street NB	29	36	38	40
	Hoi Bun Road WB	66	58	72	63
	Cheung Yip Street SB	4	9	-	-
J6[1]	Wang Chiu Road NB	71	71	72	71
	Sheung Yee Road EB	46	44	56	52
	Wang Chiu Road SB	43	46	49	51
	Sheung Yee Road WB	38	44	50	55
J7	Wang Tai Road SB	21	15	22	16
J8	Wang Chui Road NB	50	52	55	57
	Wang Chui Road SB	57	61	64	67
J9[1]	Wang Chui Road SB	98	62	55	57
	Wang Chui Road NB	152	127	97	98
	Sheung Yuet Road WB	96	83	62	70
	Sheung Yuet Road EB	71	58	57	50
J10[1]	Wang Chui Road NB	19	28	20	30
	Wang Chui Road SB	89	97	86	88
	Lam Hing Street WB	52	70	62	81
	Lam Hing Street EB	77	101	52	54
J11[1]	Kai Cheung Road EB	73	76	74	76
	Kai Cheung Road WB	86	91	94	85
	Wang Chui Road SB	107	74	101	88
	Wang Chui Road NB	46	60	56	62

Note:
1. Junction improvement schemes have been considered in 2031 Design Case.
2. Cheung Yip Street pedestrianization as discussed in **Paragraph 4.2.2.9** has been considered in 2031 Design Case.

6.4.3.4 The 2031 traffic condition had been assessed based on several junction improvement assumptions proposed by relevant studies in the vicinity (including KBBA, KTBA and KTD Rethink II studies). The improvement assumptions are discussed in **Section 6.4.4**. With the aforesaid improvement assumptions, all junctions will be operating within capacity under all scenarios. As no significant changes on queue length have been observed between the ***reference*** and ***design*** scenarios, the traffic generated and attracted by the proposed development is

anticipated to induce minimal traffic impact towards the junction operation.

6.4.3.5 The results also indicate that the rail-based EFLS will induce only negligible traffic impact in terms of junction performance. The major impact of the EFLS will be better reflected by a change in modal-choice pattern as discussed in **Section 4.4.**

6.4.4 Improvement Works for Assessed Junctions

6.4.4.1 A number of junction improvement schemes were proposed to enhance the walking environment / traffic conditions under KTBA (including KTBA – NTK Portion), KBBA and KTD Rethink II studies and listed below. The details are presented in **Appendix D**.

- Wai Yip Street/ Lai Yip Street
- Lai Yip Street/ Hoi Bun Road
- Wai Yip Street/ Shun Yip Street
- Wang Chiu Road/ Sheung Yee Road*(1)*
- Lam Fung Street/ Wang Chiu Road
- Sheung Yuet Road/ Wang Chiu Road*(1)*
- Lam Hing Street/ Wang Chiu Road*(1)*
- Kai Cheung Road/ Wang Chiu Road*(1)*

Note:

(1) Schemes recommended by other studies had been modified to optimize the junction performance by incorporating the anticipated traffic flow, which will be discussed below.

6.4.4.2 Subject to the proposed modification under this study, **Table 6.4.5** summarized the latest implementation arrangement for the improvement works. The target completion year as well as implementation agents of the proposed improvement works shown in **Table 6.4.5** were endorsed by the CPLD on 22 Sept 2020. Subject to availability of government resources, these improvement works will be implemented as soon as possible.

Table 6.4.5 Proposed Improvement Works with Updated Implementation Arrangement

Junction	Implementation Agent	Targeted Implementation Schedule
J4	HyD	• In place before completion of the commercial development in Lot 2 (i.e. 2028).
J5	CEDD	• The first phase is being implemented and targeted for completion in end 2021 to early 2022. • The second phase improvement works completion would be subsequent to pedestrianization of Cheung Yip Street in 2029.
J6	CEDD	• The proposed road works that falls outside the PVDEC to be completed before 2027. • The remaining road works that encroaches upon the PVDEC site to be completed before completion of the commercial development in Lot 4 (i.e. 2029), subject to availability of that portion of the PVDEC site.
J9	CEDD	• In place before completion of the commercial development in Lot 2 (i.e. 2028).

J10	HyD	• In place before completion of the commercial development in Lot 2 (i.e. 2028).
J11	HyD	• In place before completion of the commercial development in Lot 2 (i.e. 2028).

6.4.4.3 To improve the junction performance, scheme recommended by other studies had been reviewed and further modified. **Paragraphs 6.4.4.4** to **6.4.4.12** discuss the junction improvement scheme and **Table 6.4.6** summarises the result of junction assessment with improvement scheme implemented.

J4 - Hoi Bun Road/ Shun Yip Street

6.4.4.4 The method of control of J4 is proposed to optimize in order to match the traffic flow pattern. The existing share lane of Hoi Bun Road northbound is proposed to segregate, while share lane is proposed at Hoi Bun Road southbound. The layout with proposed improvement is shown in **Figure 6.4.2**.

J6 - Wang Chiu Road/ Sheung Yee Road

6.4.4.5 In CEDD's KTD Rethink II study, setting back of existing kerbs are proposed in order to provide additional left turn lane from Sheung Yee Road westbound to Wang Chiu Road southbound, and additional right turn lane from Sheung Yee Road eastbound to Wang Chiu Road southbound.

6.4.4.6 Further improvement works are proposed in KBAA by optimizing the road markings and reducing the inter-green time between vehicular phases by 4 seconds. An additional lane for Wang Chiu Road northbound is also proposed. The layout with proposed improvement is shown in **Figure 6.4.3**.

J9 - Sheung Yuet Road/ Wang Chiu Road

6.4.4.7 In CEDD's KTD Rethink II study, the carriageway at Wang Chiu Road southbound approach is proposed to be widened to provide additional lane. The additional lane is proposed to be lengthened in KBAA such that it can be functioned as a full traffic lane. The layout with proposed improvement is shown in **Figure 6.4.4**.

J10 - Lam Hing Street/ Wang Chiu Road

6.4.4.8 In CEDD's KTD Rethink II study, the carriageway at Wang Chiu Road southbound approach is proposed to be widened to provide additional lane.

6.4.4.9 Further improvement works are proposed in KBAA by widening Lam Hing Street eastbound approach to provide additional lane. The layout with proposed improvement is shown in **Figure 6.4.5**.

J11 - Kai Cheung Road/ Wang Chiu Road

6.4.4.10 In CEDD's KTD Rethink II study, additional left-turn lane and right-turn lane from Kai Cheung Road (westbound approach to junction) is proposed. Exclusive left-turn lane from Kai Cheung Road (eastbound

approach to junction) is also introduced. The road markings and pedestrian crossings are re-arranged accordingly.

6.4.4.11 Further improvement works are proposed in KBAA by extending the additional left-turn lane from Kai Cheung Road (westbound approach to junction) aforementioned. Further widening of Wang Chiu Road southbound and northbound (outside DCH Building) is also proposed. The layout with proposed improvement is shown in **Figure 6.4.6**.

Table 6.4.2 Junction Performance after Implementation of Improvement Scheme

Junction		2031 Design		2031 Design (With rail-based EFLS)	
		RC / DFC[1, 2]		RC / DFC[1, 2]	
		AM Peak	PM Peak	AM Peak	PM Peak
J4	Hoi Bun Road/ Shun Yip Street	25%	24%	26%	25%
J6	Wang Chiu Road/ Sheung Yee Road	12%	11%	13%	12%
J9	Sheung Yuet Road/ Wang Chiu Road	11%	11%	11%	12%
J10	Lam Hing Street/ Wang Chiu Road	25%	18%	25%	19%
J11	Kai Cheung Road/ Wang Chiu Road	8%	10%	8%	11%

Note:
3. RC denotes Reserve Capacity in %, DFC denotes Design/Flow Capacity Ratio
4. For junction condition based on calculated RC/ DFC value,
   - RC>15% or DFC<0.85: fair to satisfactory physical junction condition and no persisting traffic congestion is expected;
   - RC=<15% or DFC=>0.85: unstable but acceptable traffic condition which traffic congestion may occur.

6.5 Future Year Pedestrian Assessment

6.5.1 Assessment Scenarios

6.5.1.1 To evaluate the associated pedestrian impact likely to be induced by the proposed development, with suitable consideration given to the possible change in pedestrian networks, three scenarios were analyzed and compared. The three scenarios are Reference Scenario (without the proposed development), Design Scenario (with the proposed developments, without rail-based EFLS) and Design Scenario (with the proposed developments, with rail-based EFLS) in Year 2031, respectively. Year 2031 has been adopted for the assessment.

Scenario 1 (2031 Reference)

- 2031 Reference Case (2031 Background Pedestrian Flows including generated/attracted pedestrian flow related to other developments in the vicinity without rail-based EFLS)

Scenario 2 (2031 Design without rail-based EFLS)

- 2031 Design Case (Pedestrian flows from 2031 Reference Case without rail-based EFLS + generated/attracted pedestrian flow related to the proposed development)

Scenario 3 (2031 Design with rail-based EFLS)

- 2031 Design Case (Pedestrian flow from 2031 Reference Case with rail-based EFLS + generated/attracted pedestrian flow related to the proposed development)

6.5.2 Assessment Results

6.5.2.1 In terms of pedestrian conditions, we have utilized our in-house pedestrian model to forecast the future situation. Based on the results obtained from pedestrian model, a forecast AM/ PM peak flows and Level of Service (LOS) assessment for footpaths and footbridges/subways under 3 scenarios are presented in **Table 6.5.1**, **Table 6.5.2** and **Table 6.5.3** respectively.

Table 6.5.1 Level of Service in AM and PM Peaks - Year 2031 (Reference Scenario)

Walkway ID	Actual Width (m)	Effective Width (m)	Peak Hour Pedestrian Flow (ped/hr) (2-way)		Peak Hour Pedestrian Flow Rate (ped/min/m) (2-way)		LOS	
			AM	PM	AM	PM	AM	PM
Footpath								
P1	3.5	2.5	1,450	850	9.7	5.7	A	A
P2	5	4	2,100	500	8.8	2.1	A	A
P3	3.7	2.7	700	450	4.3	2.8	A	A
P4	3.6	2.6	900	650	5.8	4.2	A	A
P5	5.9	4.9	1,050	1,800	3.6	6.1	A	A
P6	3.6	2.6	100	150	0.6	1.0	A	A
P7	3.1	2.1	350	300	2.8	2.4	A	A
P8	3.7	2.7	700	500	4.3	3.1	A	A
P9	3.7	2.7	800	600	4.9	3.7	A	A
P10	3.2	2.2	100	50	0.8	0.4	A	A
P11	2.1	1.1	50	50	0.8	0.8	A	A
P12	3.9	2.9	400	450	2.3	2.6	A	A
P13	3.9	2.9	600	600	3.4	3.4	A	A
P14	2.4	1.4	250	300	3.0	3.6	A	A
P15	2.4	1.4	100	150	1.2	1.8	A	A
P16	2.7	1.7	100	100	1.0	1.0	A	A
P17	4.4	3.4	350	350	1.7	1.7	A	A
P18	2.4	1.4	600	500	7.1	6.0	A	A

Walkway ID	Actual Width (m)	Effective Width (m)	Peak Hour Pedestrian Flow (ped/hr) (2-way)		Peak Hour Pedestrian Flow Rate (ped/min/m) (2-way)		LOS	
			AM	PM	AM	PM	AM	PM
P19	3.3	2.3	150	150	1.1	1.1	A	A
P20	3.9	2.9	200	250	1.1	1.4	A	A
P21	3.5	2.5	150	100	1.0	0.7	A	A
P22	3.1	2.1	250	200	2.0	1.6	A	A
P23	2.5	1.5	250	250	2.8	2.8	A	A
P24	2.7	1.7	50	350	0.5	3.4	A	A
P25	2.7	1.7	50	100	0.5	1.0	A	A
P26	2.8	1.8	150	400	1.4	3.7	A	A
P27	4.5	3.5	250	750	1.2	3.6	A	A
P28	4.5	3.5	150	250	0.7	1.2	A	A
P29	2.7	1.7	650	1,050	6.4	10.3	A	A
P30	2.9	1.9	50	50	0.4	0.4	A	A
P31	1.9	0.9	50	200	0.9	3.7	A	A
P32	3.3	2.3	50	50	0.4	0.4	A	A
P33	5.1	4.1	200	200	0.8	0.8	A	A
P34	4.1	3.1	550	800	3.0	4.3	A	A
P35	3.2	2.2	450	500	3.4	3.8	A	A
P36	3.6	2.6	200	250	1.3	1.6	A	A
P37	5.5	4.5	700	600	7.8	6.7	A	A
P38	4.5	3.5	100	100	0.5	0.5	A	A
Footbridge								
B1	4.9	3.9	500	700	2.1	3.0	A	A
B2	3.5	2.5	150	250	1.0	1.7	A	A
B3	3	2	100	300	0.8	2.5	A	A
B4	5.3	4.3	8,500	7,700	32.9	29.8	C	C
PB1	5	4	5,400	4,350	22.5	18.1	B	B
Subway								
S1	6.7	5.7	7,500	3,900	21.9	11.4	B	A
PS1	4.5	3.5	2,300	1,000	8.5	3.7	A	A
PS2	4	3	750	350	2.8	1.3	A	A

Note:
1. The two-way AM/ PM peak hour pedestrian flows are rounded to the nearest 50.
2. Actual width in meters is based on-site measurement.
3. The peak hour flow rate can be obtained by using the formula: Peak Hour Flow Rate (Ped/min/m) = Peak Hour Flow (Ped/hr)/ 60/ Effective width (m)
4. LOS has been calculated based on effective width, by generally assuming 0.5m lateral clearance on both sides.

Table 6.5.2 Level of Service in AM and PM Peaks - Year 2031 (Design Scenario)

Walkway ID	Actual Width (m)	Effective Width (m)	Peak Hour Pedestrian Flow (ped/hr) (2-way)		Peak Hour Pedestrian Flow Rate (ped/min/m) (2-way)		LOS	
			AM	PM	AM	PM	AM	PM
Footpath								
P1	3.5	2.5	1,900	1,250	12.7	8.3	A	A
P2	5	4	2,100	500	8.8	2.1	A	A
P3	3.7	2.7	700	450	4.3	2.8	A	A
P4	3.6	2.6	900	650	5.8	4.2	A	A
P5	5.9	4.9	1,150	1,850	3.9	6.3	A	A
P6	3.6	2.6	200	200	1.3	1.3	A	A
P7	3.1	2.1	450	350	3.6	2.8	A	A
P8	3.7	2.7	1,750	1,450	10.8	9.0	A	A
P9	3.7	2.7	2,650	2,250	16.4	13.9	B	A
P10	3.2	2.2	100	50	0.8	0.4	A	A
P11	2.1	1.1	500	450	7.6	6.8	A	A
P12	3.9	2.9	2,850	2,700	16.4	15.5	B	A
P13	3.9	2.9	700	650	4.0	3.7	A	A
P14	2.4	1.4	350	350	4.2	4.2	A	A
P15	2.4	1.4	200	200	2.4	2.4	A	A
P16	2.7	1.7	100	100	1.0	1.0	A	A
P17	4.4	3.4	950	900	4.7	4.4	A	A
P18	2.4	1.4	750	650	8.9	7.7	A	A
P19	3.3	2.3	250	250	1.8	1.8	A	A
P20	3.9	2.9	550	550	3.2	3.2	A	A
P21	3.5	2.5	150	100	1.0	0.7	A	A
P22	3.1	2.1	250	200	2.0	1.6	A	A
P23	2.5	1.5	250	250	2.8	2.8	A	A
P24	2.7	1.7	50	350	0.5	3.4	A	A
P25	2.7	1.7	50	100	0.5	1.0	A	A
P26	2.8	1.8	150	400	1.4	3.7	A	A
P27	4.5	3.5	250	750	1.2	3.6	A	A
P28	4.5	3.5	550	650	2.6	3.1	A	A
P29	2.7	1.7	650	1,050	6.4	10.3	A	A
P30	2.9	1.9	50	50	0.4	0.4	A	A
P31	1.9	0.9	50	200	0.9	3.7	A	A

Walkway ID	Actual Width (m)	Effective Width (m)	Peak Hour Pedestrian Flow (ped/hr) (2-way)		Peak Hour Pedestrian Flow Rate (ped/min/m) (2-way)		LOS	
			AM	PM	AM	PM	AM	PM
P32	3.3	2.3	50	50	0.4	0.4	A	A
P33	5.1	4.1	200	200	0.8	0.8	A	A
P34	4.1	3.1	550	800	3.0	4.3	A	A
P35	3.2	2.2	450	500	3.4	3.8	A	A
P36	3.6	2.6	200	250	1.3	1.6	A	A
P37	5.5	4.5	700	600	7.8	6.7	A	A
P38	4.5	3.5	250	250	1.2	1.2	A	A
Footbridge								
B1	4.9	3.9	900	1,050	3.8	4.5	A	A
B2	3.5	2.5	300	350	2.0	2.3	A	A
B3	3	2	100	300	0.8	2.5	A	A
B4	5.3	4.3	8,500	7,500	32.9	29.1	C	C
PB1	5	4	7,750	6,550	32.3	27.3	C	C
Subway								
S1	6.7	5.7	10,550	6,700	30.8	19.6	C	B
PS1	4.5	3.5	4,900	3,350	18.1	12.4	B	A
PS2	4	3	1,600	1,150	5.9	4.3	A	A

Note:
1. The two-way AM/ PM peak hour pedestrian flows are rounded to the nearest 50.
2. Actual width in meters is based on-site measurement.
3. The peak hour flow rate can be obtained by using the formula: Peak Hour Flow Rate (Ped/min/m) = Peak Hour Flow (Ped/hr) / 60/ Effective width (m).
4. LOS has been calculated based on effective width, by generally assuming 0.5m lateral clearance on both sides.
5. This scenario included footpath widening scheme Siu Yip Street between section of Tai Yip Street and Wai Yip Street. Please refer to **Section 4.3.3**.

Table 6.5.3 Level of Service in AM and PM Peaks - Design Year 2031 with rail-based EFLS

Walkway ID	Actual Width (m)	Effective Width (m)	Peak Hour Pedestrian Flow (ped/hr) (2-way)		Peak Hour Pedestrian Flow Rate (ped/min/m) (2-way)		LOS	
			AM	PM	AM	PM	AM	PM
Footpath								
P1	3.5	2.5	1,900	1,250	12.7	8.3	A	A
P2	5	4	2,100	500	8.8	2.1	A	A
P3	3.7	2.7	700	450	4.3	2.8	A	A
P4	3.6	2.6	900	650	5.8	4.2	A	A
P5	5.9	4.9	1,100	1,800	3.7	6.1	A	A
P6	3.6	2.6	200	200	1.3	1.3	A	A
P7	3.1	2.1	450	350	3.6	2.8	A	A
P8	3.7	2.7	1,650	1,350	10.2	8.3	A	A
P9	3.7	2.7	2,300	1,950	14.2	12.0	A	A
P10	3.2	2.2	100	50	0.8	0.4	A	A
P11	2.1	1.1	450	400	6.8	6.1	A	A
P12	3.9	2.9	2,450	2,350	14.1	13.5	A	A
P13	3.9	2.9	700	650	4.0	3.7	A	A
P14	2.4	1.4	350	350	4.2	4.2	A	A
P15	2.4	1.4	200	200	2.4	2.4	A	A
P16	2.7	1.7	100	100	1.0	1.0	A	A
P17	4.4	3.4	900	850	4.4	4.2	A	A
P18	2.4	1.4	750	650	8.9	7.7	A	A
P19	3.3	2.3	200	200	1.4	1.4	A	A
P20	3.9	2.9	350	400	2.0	2.3	A	A
P21	3.5	2.5	150	100	1.0	0.7	A	A
P22	3.1	2.1	250	200	2.0	1.6	A	A
P23	2.5	1.5	250	250	2.8	2.8	A	A
P24	2.7	1.7	50	350	0.5	3.4	A	A
P25	2.7	1.7	50	100	0.5	1.0	A	A
P26	2.8	1.8	150	400	1.4	3.7	A	A
P27	4.5	3.5	250	750	1.2	3.6	A	A
P28	4.5	3.5	300	450	1.4	2.1	A	A
P29	2.7	1.7	650	1,050	6.4	10.3	A	A
P30	2.9	1.9	50	50	0.4	0.4	A	A
P31	1.9	0.9	50	200	0.9	3.7	A	A
P32	3.3	2.3	50	50	0.4	0.4	A	A

Walkway ID	Actual Width (m)	Effective Width (m)	Peak Hour Pedestrian Flow (ped/hr) (2-way)		Peak Hour Pedestrian Flow Rate (ped/min/m) (2-way)		LOS	
			AM	PM	AM	PM	AM	PM
P33	5.1	4.1	200	200	0.8	0.8	A	A
P34	4.1	3.1	550	800	3.0	4.3	A	A
P35	3.2	2.2	450	500	3.4	3.8	A	A
P36	3.6	2.6	200	250	1.3	1.6	A	A
P37	5.5	4.5	650	550	7.2	6.1	A	A
P38	4.5	3.5	250	250	1.2	1.2	A	A
Footbridge								
B1	4.9	3.9	900	1,050	3.8	4.5	A	A
B2	3.5	2.5	300	350	2.0	2.3	A	A
B3	3	2	100	300	0.8	2.5	A	A
B4	5.3	4.3	7,350	6,500	28.5	25.2	C	C
PB1	5	4	6,700	5,600	27.9	23.3	C	C
Subway								
S1	6.7	5.7	10,050	6,250	29.4	18.3	C	B
PS1	4.5	3.5	4,450	2,950	16.5	10.9	B	A
PS2	4	3	1,250	850	4.6	3.1	A	A

Note:
1. The two-way AM/ PM peak hour pedestrian flows are rounded to the nearest 50.
2. Actual width in meters is based on-site measurement.
3. The peak hour flow rate can be obtained by using the formula: Peak Hour Flow Rate (Ped/min/m) = Peak Hour Flow (Ped/hr) / 60/ Effective width (m).
4. LOS has been calculated based on effective width, by generally assuming 0.5m lateral clearance on both sides.
5. This scenario included footpath widening scheme Siu Yip Street between section of Tai Yip Street and Wai Yip Street and proposed internal walkway across Siu Yip Street connect Telford Plaza II Shopping mall and Wai Yip Street.

6.5.2.2 Comparing the results between **Table 6.5.1** and **Table 6.5.2**, it could be seen that the pedestrian impacts induced by proposed KBAA on the assessed pedestrian facilities are considered acceptable. All assessed pedestrian facilities will still operate under acceptable Levels of Services.

6.5.2.3 As shown in **Table 6.5.3**, it is estimated that the performance of most of the assessed pedestrian facilities would be improved. This is likely due to the reduction in number of walk trips/reduction in average walk journey length resulted from the improved public transport connectivity between developments in Kowloon Bay and the Kowloon Bay railway station.

7 Review on PR12 (without rail-based EFLS) Scenario

7.1.1.1 A development scenario with plot ratio 12 for Lots 2 and 4 have been explored. Under this scenario, the total developable GFA will be increased from 497,910 sqm to 533,580 sqm. A RODP under this scenario has been derived and the parking provision and traffic impact under this scenario has been evaluated. The assessment indicate that commercial developments with PR 12 for Lots 2 and 4 are technically feasible from traffic point of view with further junction improvement works in place. Details of the plot ratio 12 (without rail-based EFLS) scenario including RODP, breakdown of GFA, revised parking provision and traffic impact assessment are at **Annex A**.

8 Review on Highway Infrastructure

8.1 Proposed Pedestrian Corridors

8.1.1.1 Pedestrian Corridor A connects from the southeast of KBAA toward the Ngau Tau Kok area via existing footpath along Wai Yip Street. Access to KBAA are provided from Lot 4 (eastern portion) using the existing footbridge KF38 connection across Wai Yip Street. Proposed footbridge structure requires demolishing of KF38 existing stairs for direct connection into Lot 4 (eastern portion) building. The implementation of the proposed footbridge between Lot 6 and KF38 plus Lot 4 would be under private initiative. To the east near Lai Yip Street, pedestrian subway connecting Hoi Bun Road Park, Lot 761 and existing subway linking MTR Ngau Tau Kok Station is proposed. A schematic layout is shown in **Figure 7.1.1**.

8.1.1.2 Pedestrian Corridor B connects between KBAA and Upper Ngau Tau Kok Estate. Investigation has been undertaken for a proposed direct footbridge connection between KBAA and Upper Ngau Tau Kok Estate. Based on initial investigations, the establishment of a direct footbridge connection would require modification to existing footbridge along Sheung Yee Road. As the footbridge crosses the operating MTR railway and workshop area, minimum 7.0m headroom must be provided and thus the level of the footbridge extension will be at about 20mPD, adjacent to Sheung Yee Road Flyover. Alternatively, an at-grade pedestrian crossing is proposed at Tai Yip Lane near Tai Yip Street under the KTBA study which would be more convenient for pedestrian connection from Ngau Tau Kok area to KBAA. The schematic layout is shown at **Figure 7.1.2.**

8.1.1.3 Pedestrian Corridor C connects toward Kowloon Bay MTR station and the commercial vicinity north of KBAA. Elevated pedestrian crossing over Sheung Yee Road will be landing at Wang Mau Street. Additional landing and vertical connection could be incorporated at Wai Yip Street / Sheung Yee Road Junction for better accessibility to KBAA via the pedestrianized Cheung Yip Street at grade level. It should be noted the at-grade connection along Siu Yip Lane already exists and would further connect to the proposed footbridge across Wai Yip Street. The internal circulation walkway within the Ngau Tau Kok Police Station potential redevelopment site is a long-term proposal. The schematic layout is shown at **Figure 7.1.3.** The DFS proposes to provide an elevated walkway of about 230-metre long at Sheung Yee Road to connect KBAA and the future footbridge across Wai Yip Street near Siu Yip Street, and further to Kowloon Bay MTR Station.

8.1.1.4 Pedestrian Corridor D was proposed along Kai Fuk Road from Lot 1 crossing the off ramp to Sheung Yee Road as shown in **Figure 7.1.4.** This pedestrian corridor will no longer be pursued taking into account the recommendation of the DFS.

8.1.1.5 The Pedestrian Corridor E crosses under the existing Kwun Tong Bypass via at grade footpath. The proposed ending point of elevated connection would be the podium garden of the New Acute Hospital. Implementation would be subject to discussion with Highways Department and/or Hospital Authority.

8.1.1.6 Pedestrian Corridor F connects from the southeast of KBAA toward the South Apron Corner. Pedestrians can travel from Lot 4's at-grade pedestrian crossings at Cheung Yip Street or the improved pedestrian crossings at Shun Yip Street under KTBA study. The schematic layout is shown at **Figure 7.1.5**. This pedestrian crossing has completed in 2018.

9 Summary and Conclusion

9.1 Summary

9.1.1.1 The existing Government sites in KBAA are proposed to be converted into various developments comprising hotel, retail, and office land uses. In accordance to the Study brief, this Study shall assess the transport and traffic impacts of development schemes on the transport infrastructure/ networks (including both roads and pedestrian networks), the adequacy of the capacity of the existing and planned transport system, and the requirements for new road and pedestrian connections, capacity improvements or enhancement and for new public transport facilities and services arising out of the proposed developments and infrastructure. This report (TTIA) had been prepared to present the findings of above analyses.

9.1.1.2 Based on the initial review, several transport/traffic issues had been identified. This includes some shortfalls on traffic/pedestrian connectivity as well as provision of parking spaces within the area. In response to these issues, several traffic/pedestrian strategies to serve the KBAA site had been proposed and presented in the text.

9.1.1.3 The analysis findings reveal that all assessed junctions and road links are operating within capacity in base year (2014). The same conclusion follows for pedestrian capacity assessments.

9.1.1.4 A traditional two-tier transport modelling structure was adopted to produce traffic forecast based on planning parameters, potential highway and railway infrastructure within close proximity to the Study Area. The transport/traffic models had been well-validated to produce robust traffic forecasts within the AOI. Pedestrian model was also developed and validated based on similar approach.

9.1.1.5 Based on the traffic forecasts, the analysis findings reveal that all assessed junctions and road links will be operating within capacity with or without the proposed KBAA developments under the scenario without rail-based Environmental Friendly Linkage System (EFLS), except J4, J6, J9, J10 and J11. Mitigation measures, further to the junction improvement previously proposed under other study, had been proposed. Pedestrian capacity assessments show that all pedestrian link will be operating within capacity based on the pedestrian forecasts.

9.1.1.6 The public transport demand induced by KBAA development had also been estimated based on a conservative approach. It is anticipated that the estimated public transport demand could be well served by a proposed transport hub located in Lot 2 of the KBAA site together with existing public transport services.

9.1.1.7 To fully utilize the ancillary L/UL bays, it is proposed to release **75%** of the L/UL bays is proposed to be shared for public use in the night-time to cater for the demand for night time parking. The concept of shared use is agreeable to TD in principle. The proportion of shared L/UL bay for public use in night-time is endorsed by the CPLD.

9.1.1.8 A review has also been undertaken to ascertain the technical feasibility of increasing the plot ratio for Lots 2 and 4 from 11 to 12. The results

indicate that with further improvement works for J9 and adjustment on hotel GFA proportion, the increase of plot ratio for Lots 2 and 4 is feasible from traffic viewpoint.

9.2 Conclusion

9.2.1.1 Based on the transport and traffic analysis, the proposed KBAA developments (under both PR11 and PR12 scenarios) will not have insurmountable impact to the adjacent road network while appropriate improvement measures have been proposed as necessary.

Figures

Legend

Study Area

Area of Influence

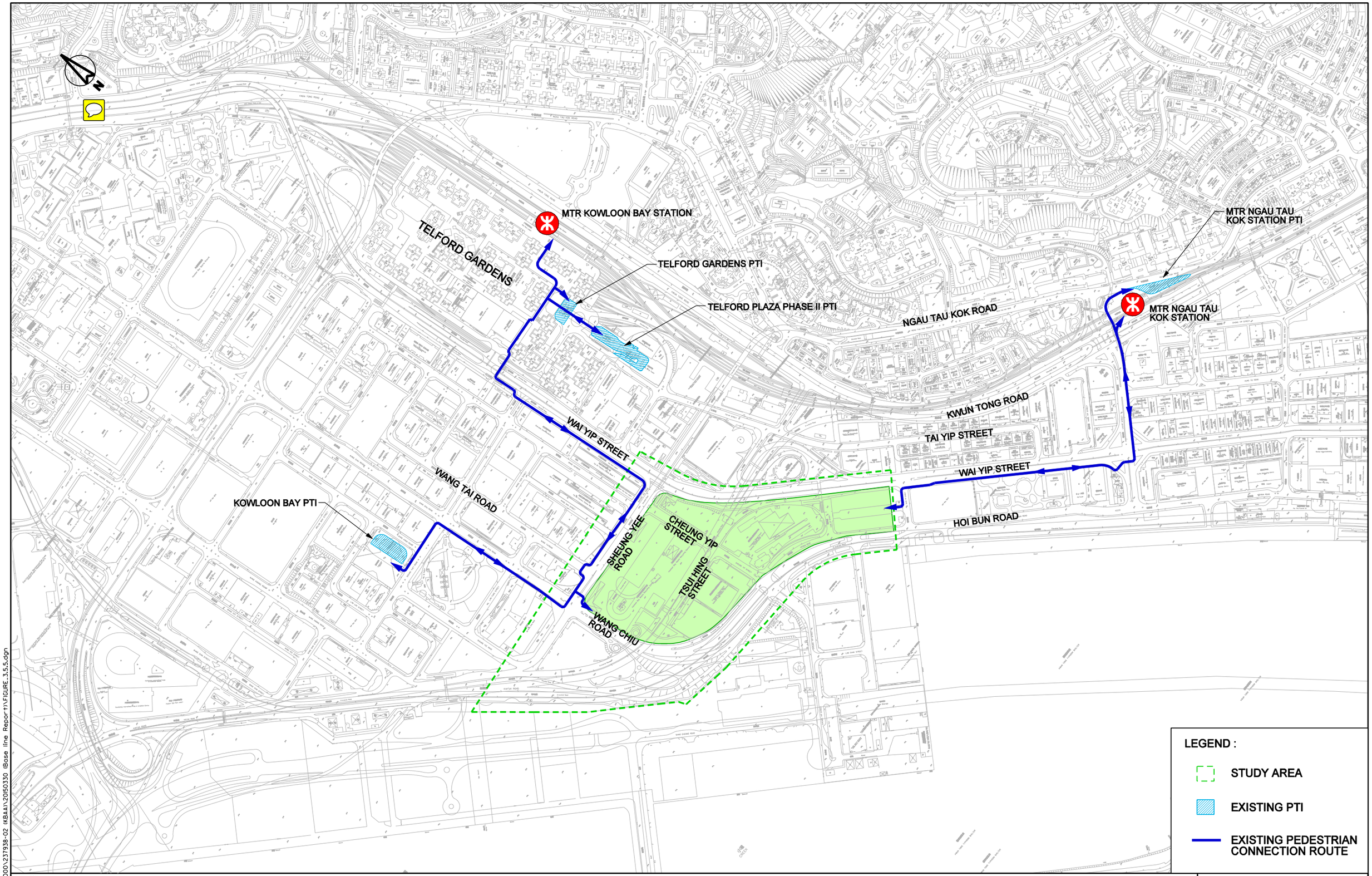
Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST – FEASIBILITY STUDY

FIGURE 1.2.1

Date	Scale	Drawing Title
Mar 2016	Not to scale	Study Area of KBAA and Area of Influence
Drawn	Job No.	
KKIC	CE 4/2014 (TP)	

ARUP



PRINTED BY: KH Cheuk 3/30/2015 5:49:50 PM
FILENAME: M:\Drawing\230000\237938-02 (KBAA)\20150330 (Base line Report)\FIGURE_3.5.5.dgn

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

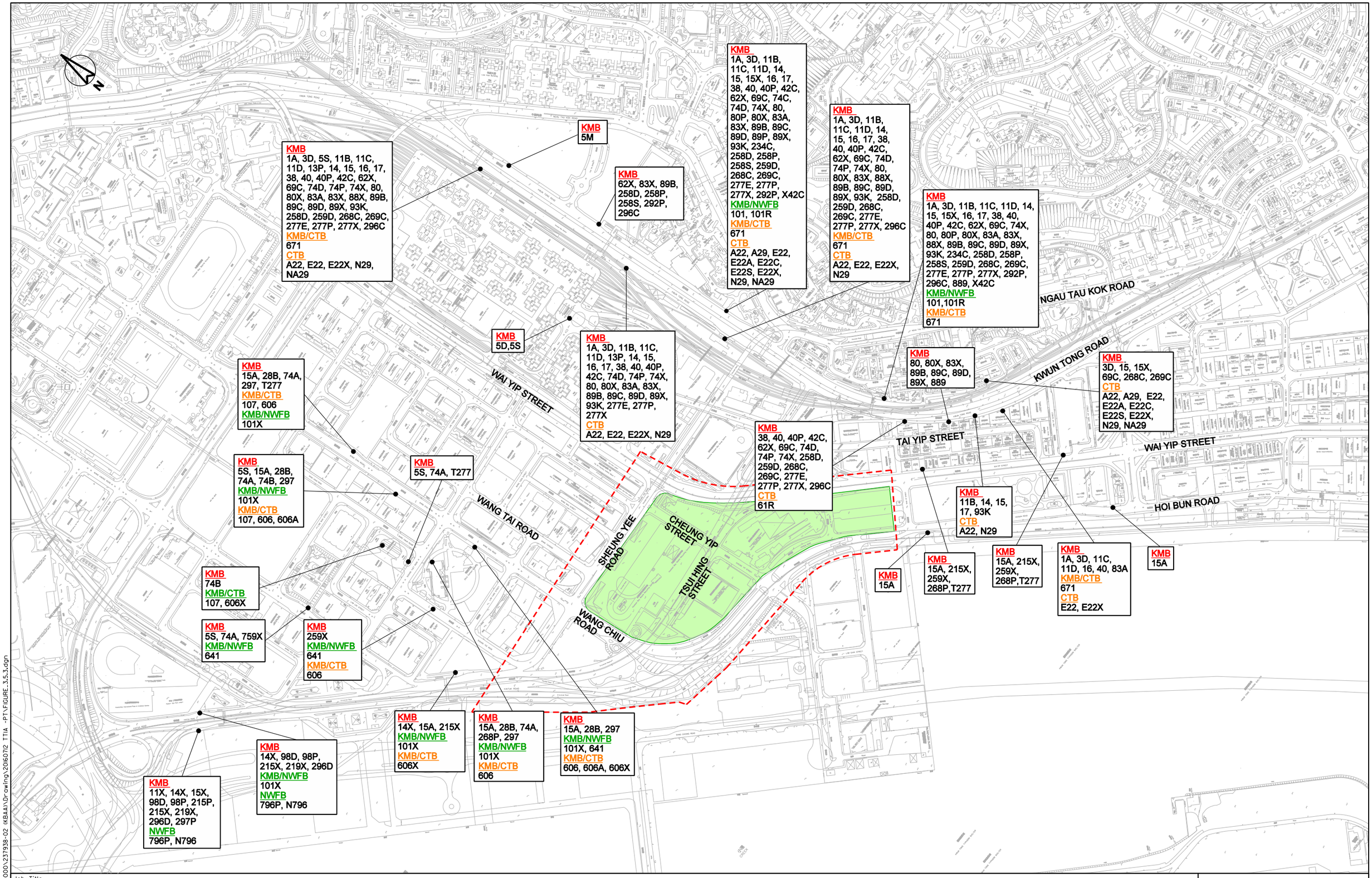
FIGURE 2.1.1

Date	Scale
MAR 15	1:6000
Drawn	Job No.
KHC	237938

Drawing Title

EXISTING PEDESTRIAN CONNECTION BETWEEN KBAA AND MAJOR PUBLIC TRANSPORTATION NODES

ARUP



Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 2.1.2

Date	Scale	Drawing Title
MAR 15	1:6000	EXISTING PUBLIC TRANSPORT PROVISION IN THE VICINITY OF THE STUDY AREA (1)
Drawn	Job No.	
KHC	237938	

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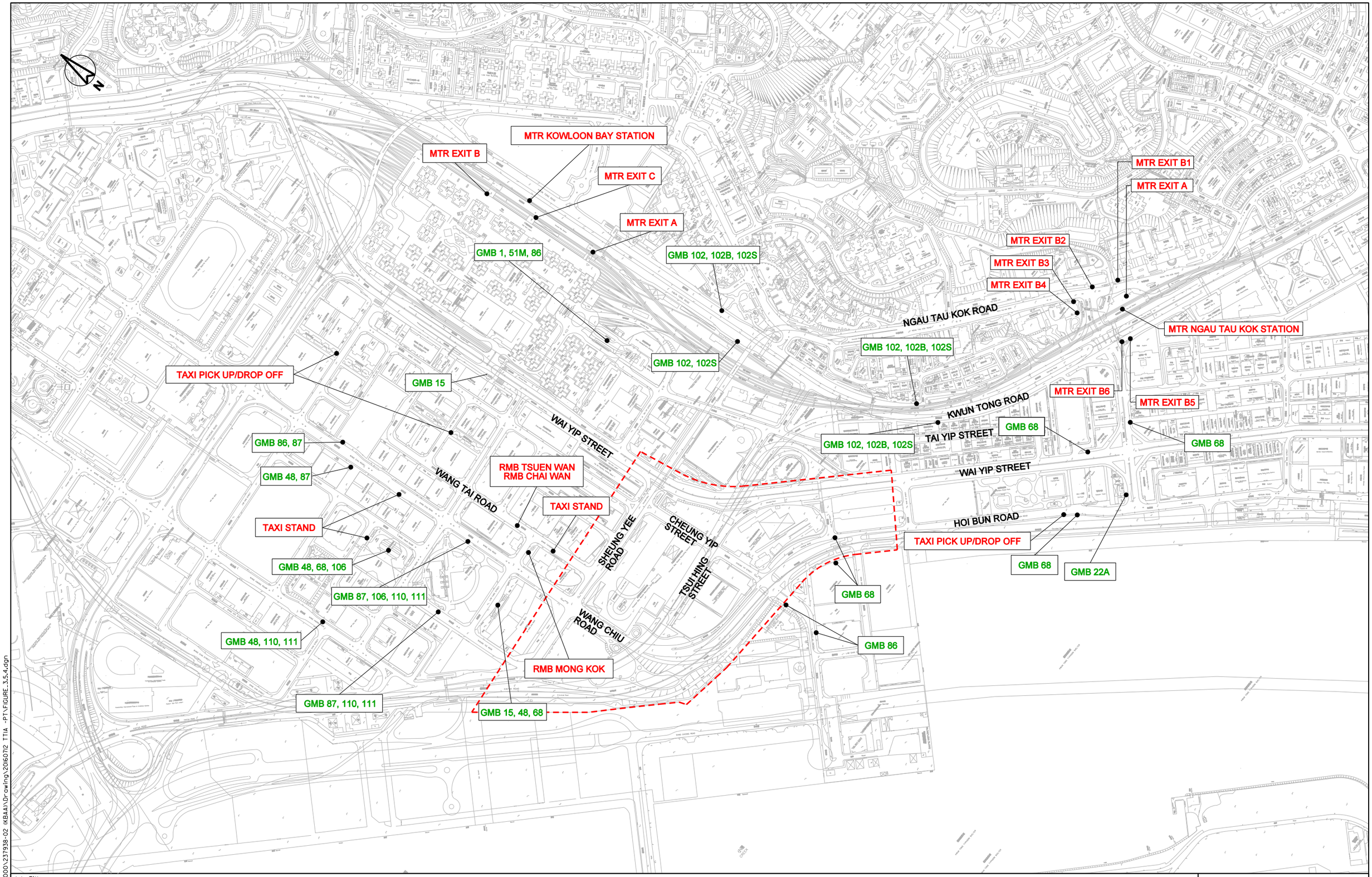
PRINTED BY: HKGTRA009 7/2/2016 6:06:39 PM
FILENAME: M:\Drawing\230000\237938-02 (KBAA)\Drawing\20160712 TTIA -PT\FIGURE_3.5_3.dgn



Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 2.1.3

Date	Scale	Drawing Title
MAR 15	1:6000	EXISTING PUBLIC TRANSPORT PROVISION IN THE VICINITY OF THE STUDY AREA (2)
Drawn	Job No.	
KHC	237938	

ARUP

PRINTED BY: HKGTRA009 7/12/2016 6:05:00 PM
FILENAME: M:\Drawing\230000\237938-02 (KBAA\Drawing\20160712 TTIA -PT\FIGURE 3.5.4.dgn

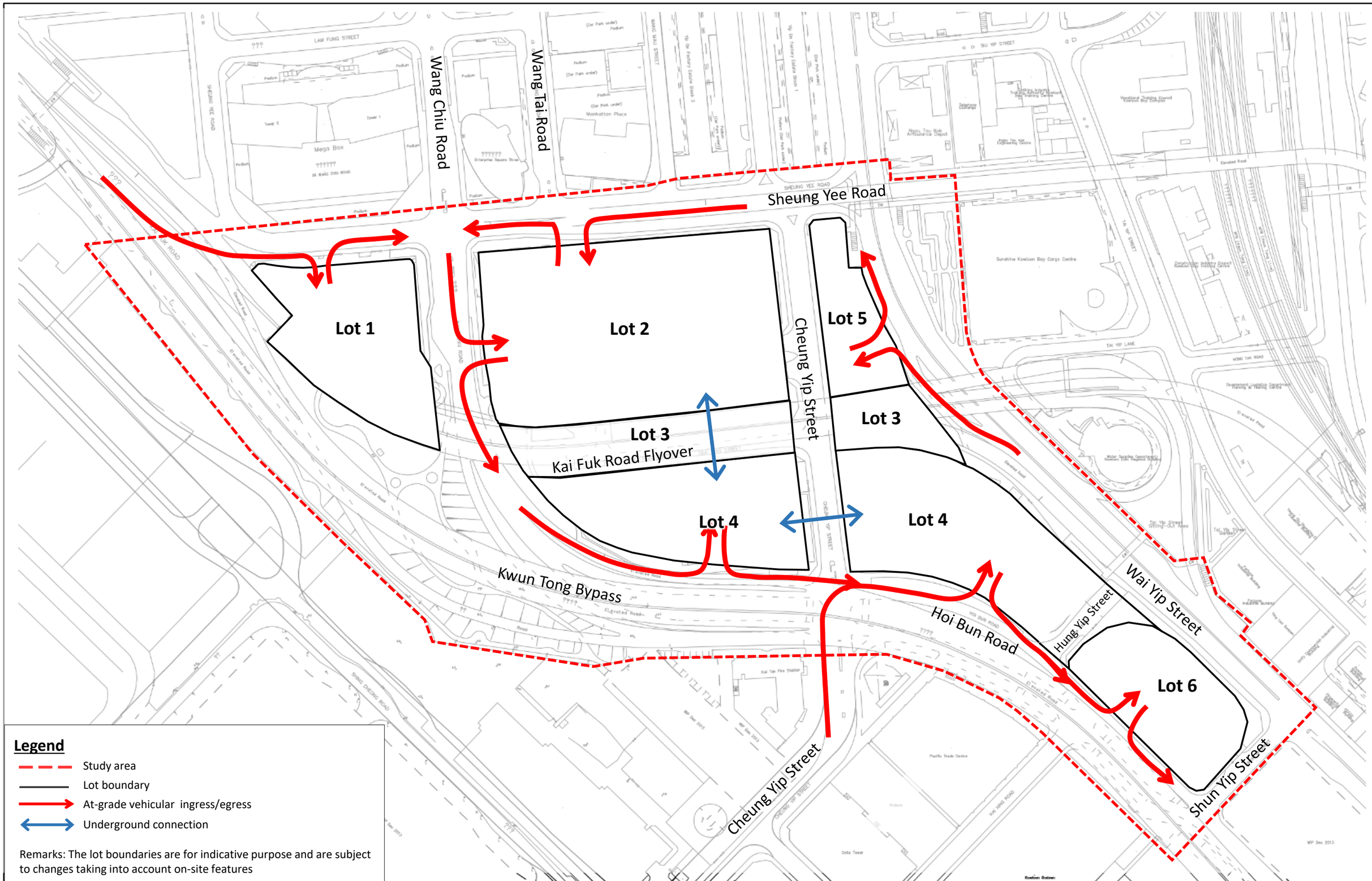


Job Title
AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST – FEASIBILITY STUDY

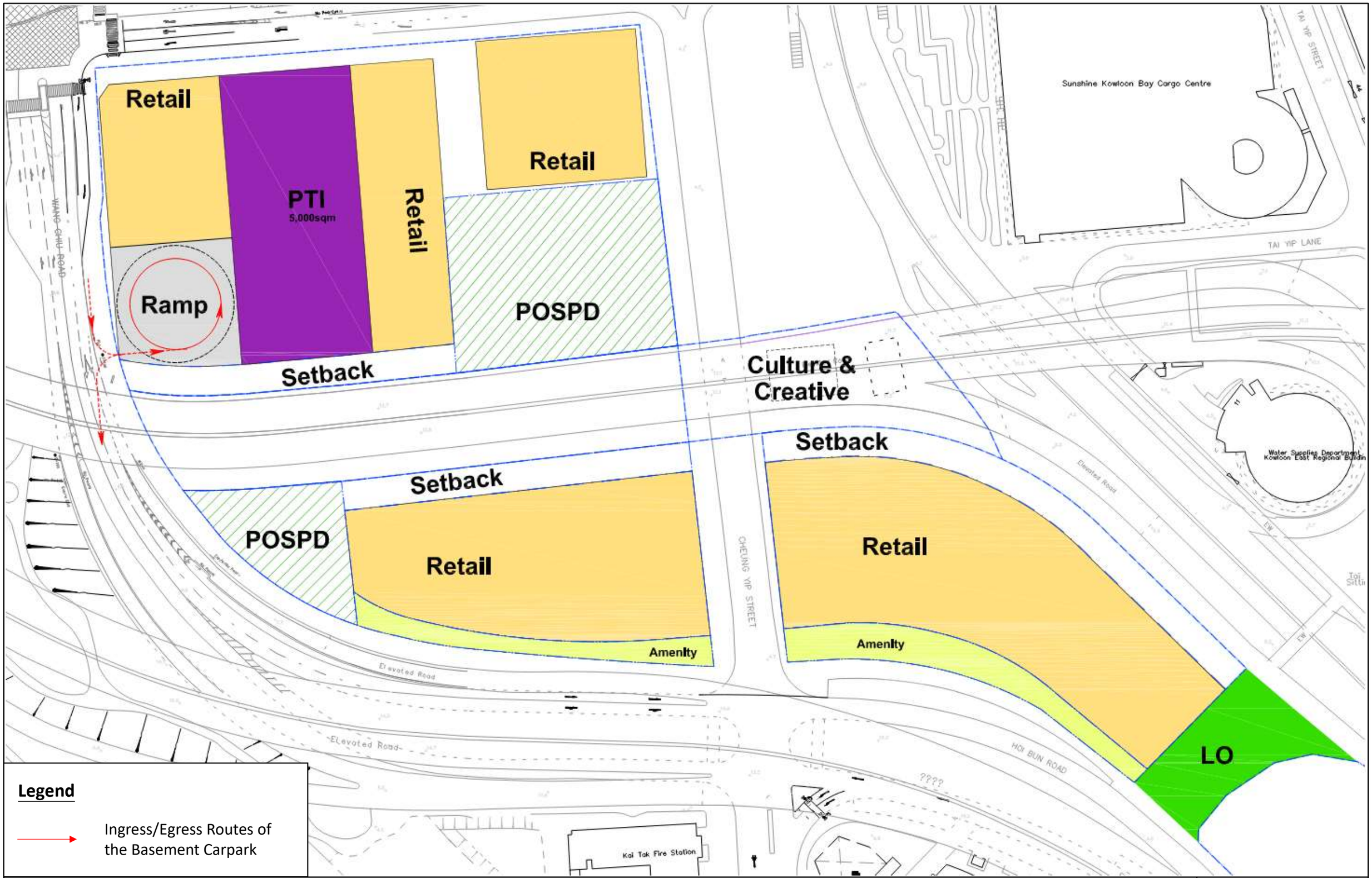
FIGURE 2.3.1

Date	Scale	Drawing Title
Mar 2016	Not to scale	Recommended Outline Development Plan (RODP) under PR 11 Scernario
Drawn	Job No.	
KKIC	CE 4/2014 (TP)	

ARUP



Job Title: AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST – FEASIBILITY STUDY		FIGURE 4.2.1
Date: July 2020	Scale: Not to scale	Drawing Title: Proposed Vehicular Accesses of KBAA
Drawn: KKIC	Job No.: CE 4/2014 (TP)	ARUP



Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST – FEASIBILITY STUDY

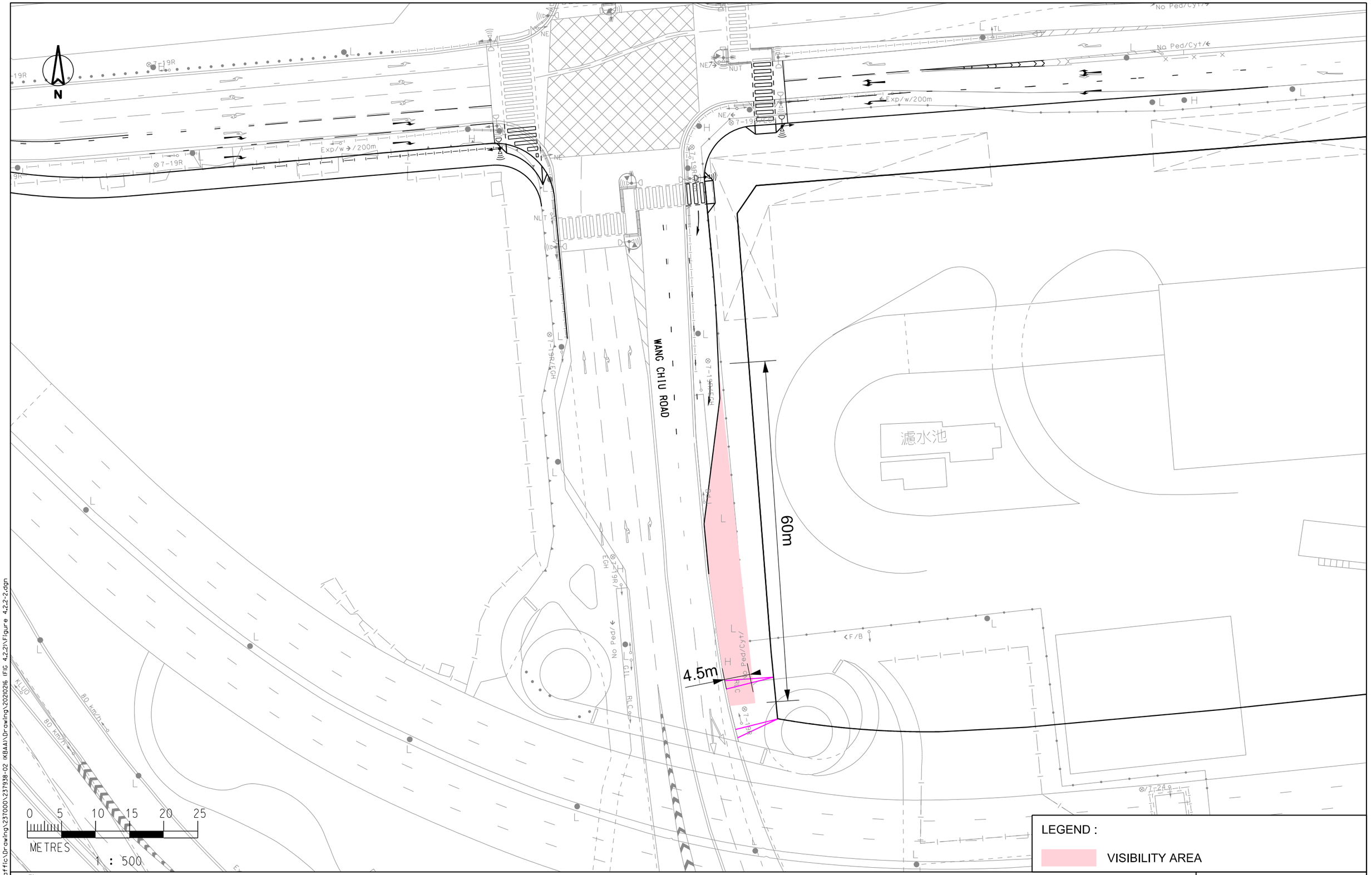
FIGURE 4.2.2

Date	Scale
Mar 2016	Not to scale
Drawn	Job No.
KKIC	CE 4/2014 (TP)

Drawing Title

RODP: Schematic Floorplan G/F under PR 11 Scenario

ARUP



LEGEND :

VISIBILITY AREA

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 4.2.2-2

Date	Scale	Drawing Title
JUN 18	1:500@A3	PROPOSED VEHICULAR ACCESS OF KBAA LOT 2
Drawn	Job No.	
WTL	237938	

ARUP

PRINTED BY: KH Cheuk 17/2/2021 10:28:25
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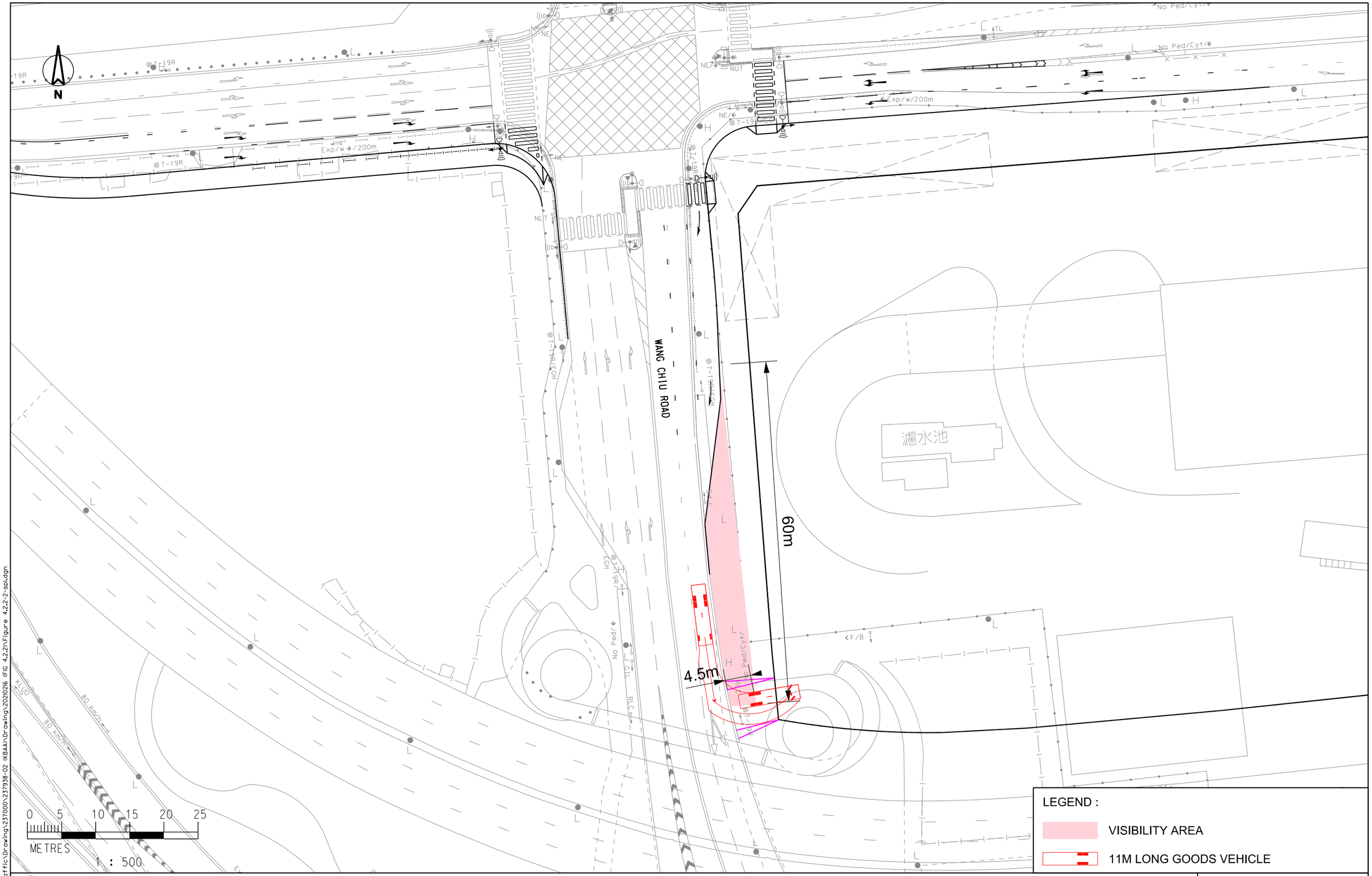


Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 4.2.2-2-SP1

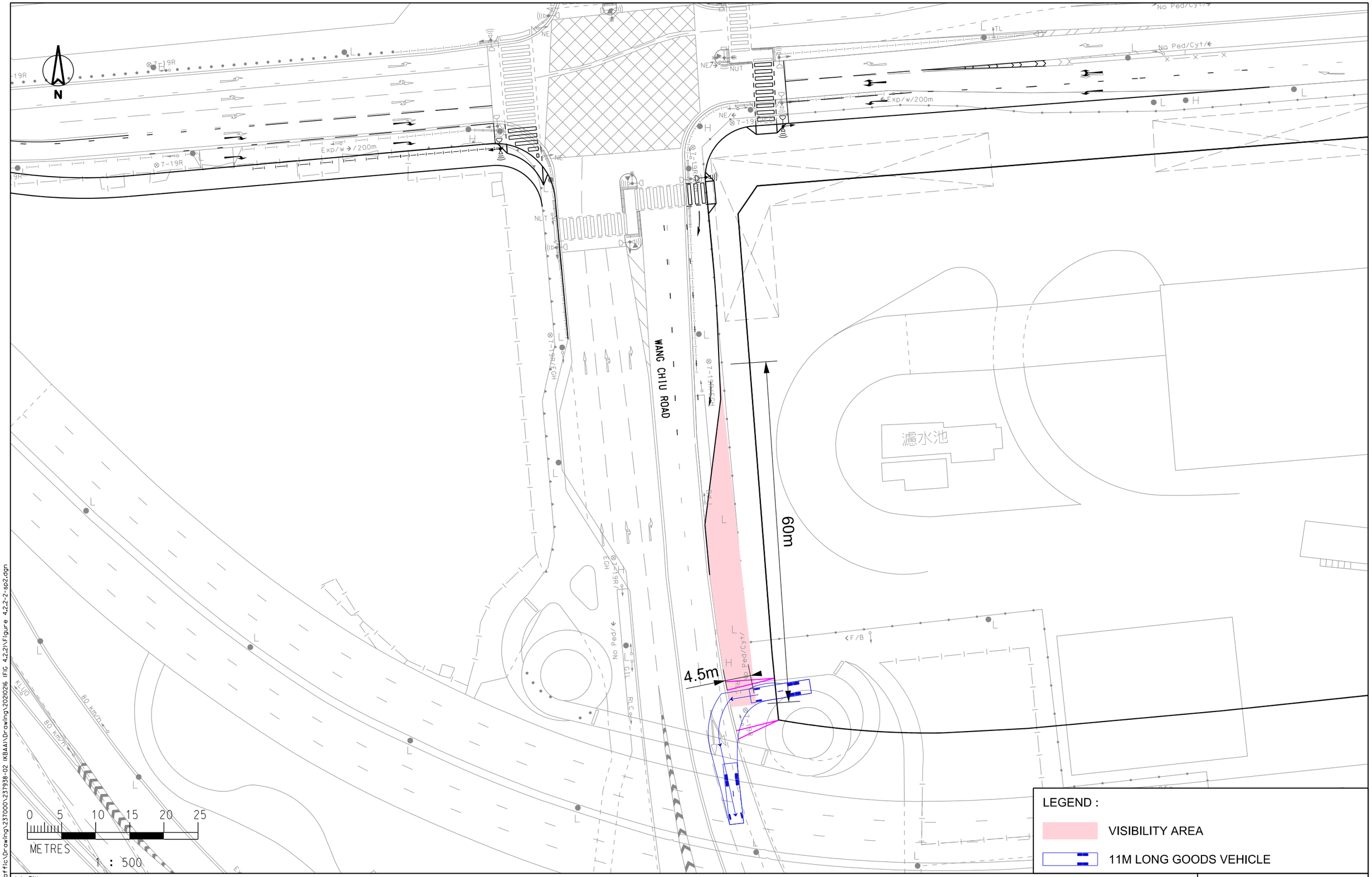
Date	Scale
JUN 18	1:500@A3
Drawn	Job No.
WTL	237938

Drawing Title

INGRESS OF PROPOSED VEHICULAR ACCESS OF KBAA LOT 2

ARUP

PRINTED BY: KH Cheuk 17/2/2021 10:30:13
FILENAME: \\hkgnts69\Traffic\Drawing\237000\237938-02 (KBAA)\Drawing\20210216 (FIG 4.2.2)\Figure 4.2.2-2-sp1.dgn



Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 4.2.2-2-SP2

Date	Scale	Drawing Title
JUN 18	1:500@A3	EGRESS OF PROPOSED VEHICULAR ACCESS OF KBAA LOT 2
Drawn	Job No.	
WTL	237938	

ARUP

PRINTED BY: KH CheuK 17/2/2021 10:31:48
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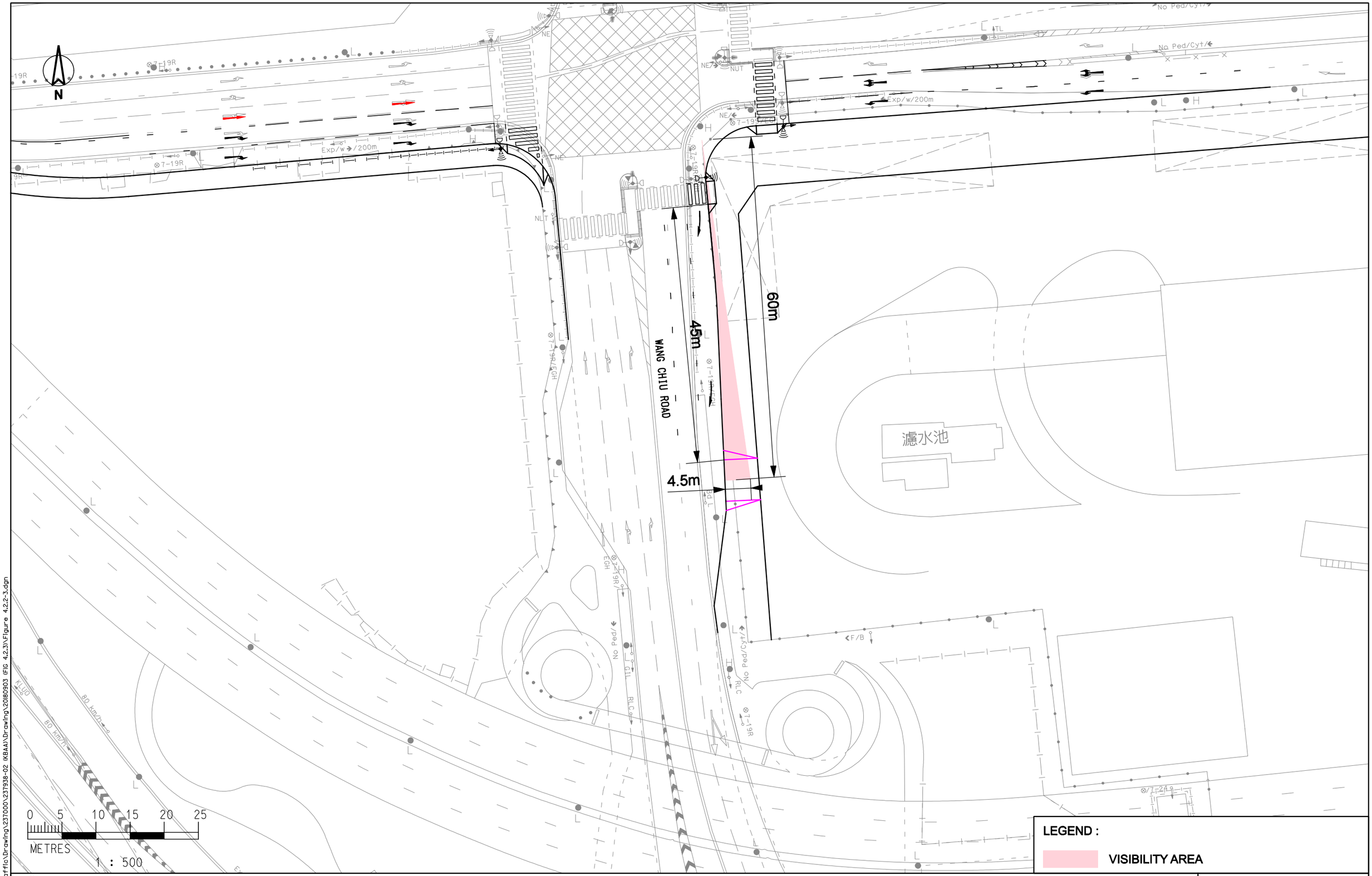

LEGEND :

VISIBILITY AREA

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 4.2.2-3

Date	Scale	Drawing Title
JUN 18	1:500@A3	PROPOSED VEHICULAR ACCESS OF KBAA LOT 2 (ALTERNATIVE SCHEME)
Drawn	Job No.	
WTL	237938	

ARUP

PRINTED BY: wing-tung.lam 19/9/2018 4:20:53 PM
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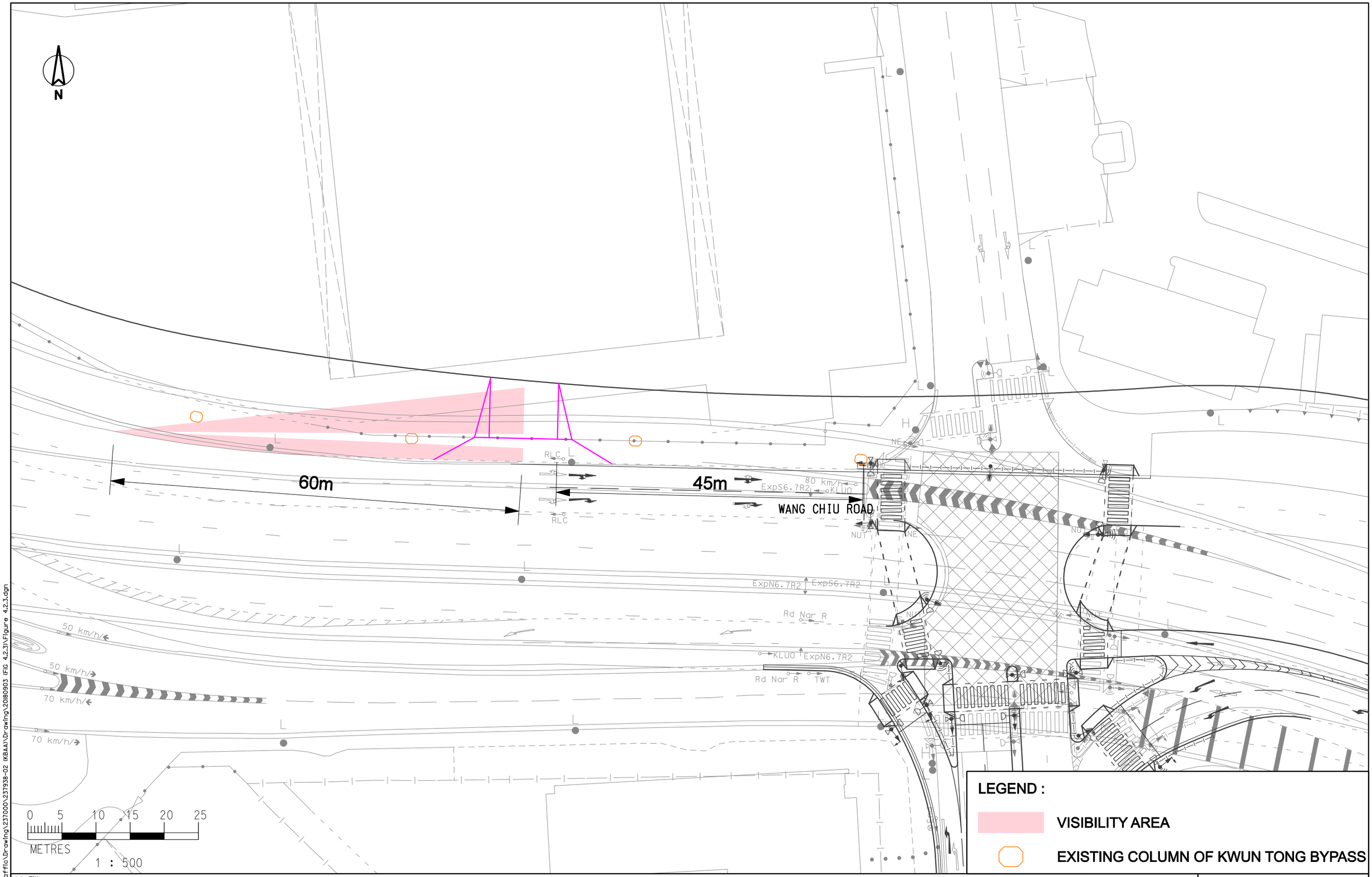

LEGEND :

VISIBILITY AREA

EXISTING COLUMN OF KWUN TONG BYPASS

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 4.2.3

Date	Scale	Drawing Title
JUN 18	1:500@A3	PROPOSED VEHICULAR ACCESS OF KBAA LOT 4 (WESTERN PORTION)
Drawn	Job No.	
WTL	237938	

ARUP

PRINTED BY: wing-tungla 27/7/2018 15:03:03 PM
FILENAME: \\hkgnts69\Traffic\Drawing\237000\237938-02 (KBAA)\Drawing\20180903 (FIG 4.2.3)\Figure 4.2.3.dgn

N

60m

45m

RLC

WANG CHIU ROAD

80 km/h

KLUO

ExpS6.7R2

ExpN6.7R2

Rd Nar R

TWT

NUT

NE

50 km/h

70 km/h

0 5 10 15 20 25

METRES

1 : 500

LEGEND :

VISIBILITY AREA

EXISTING COLUMN OF KWUN TONG BYPASS

11M LONG GOODS VEHICLE

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 4.2.3-SP1

Date	Scale	Drawing Title
JUN 18	1:500@A3	INGRESS OF PROPOSED VEHICULAR ACCESS OF KBAA LOT 4 (WESTERN PORTION)
Drawn	Job No.	
WTL	237938	

ARUP

PRINTED BY: wing-tung.lo 27/4/2018 3:33:25 PM
FILENAME: M:\Drawing\237000\237938-02 (KBAA)\Drawing\20180903 (FIG 4.2.3)\Figure 4.2.3-SP1.dgn

N

60m

45m

WANG CHIU ROAD

80 km/h

ExpS6.7R2

KLUO

ExpN6.7R2

Rd Nar R

TWT

NUT

NE

RLC

50 km/h

70 km/h

0 5 10 15 20 25

METRES

1 : 500

LEGEND :

- VISIBILITY AREA
- EXISTING COLUMN OF KWUN TONG BYPASS
- 11M LONG GOODS VEHICLE

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 4.2.3-SP2

Date	Scale
JUN 18	1:500@A3
Drawn	Job No.
WTL	237938

Drawing Title

EGRESS OF PROPOSED VEHICULAR ACCESS OF KBAA LOT 4 (WESTERN PORTION)

ARUP

PRINTED BY: wing-tung.lau 19/4/2018 3:32:07 PM
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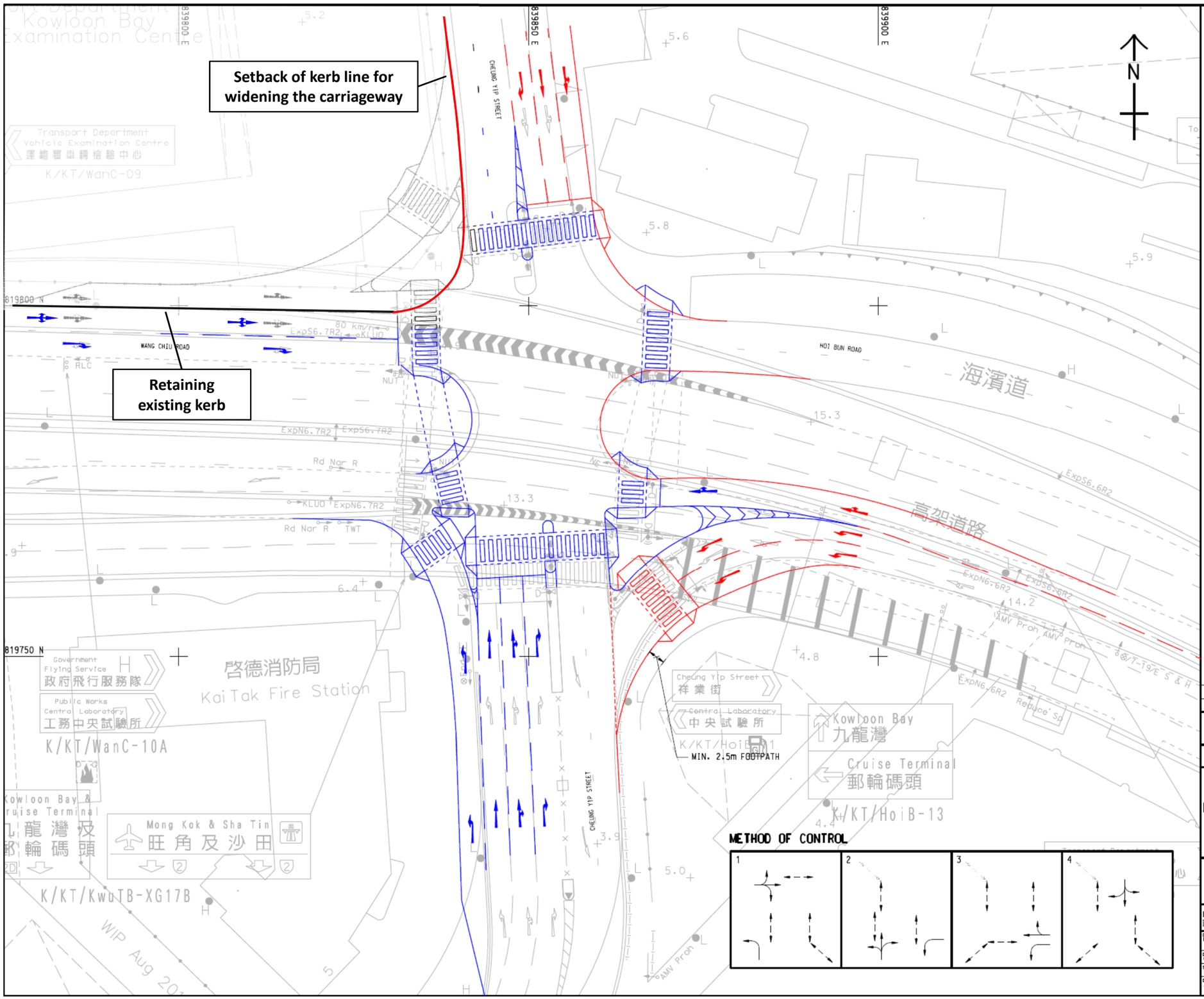
Appendix K9.3



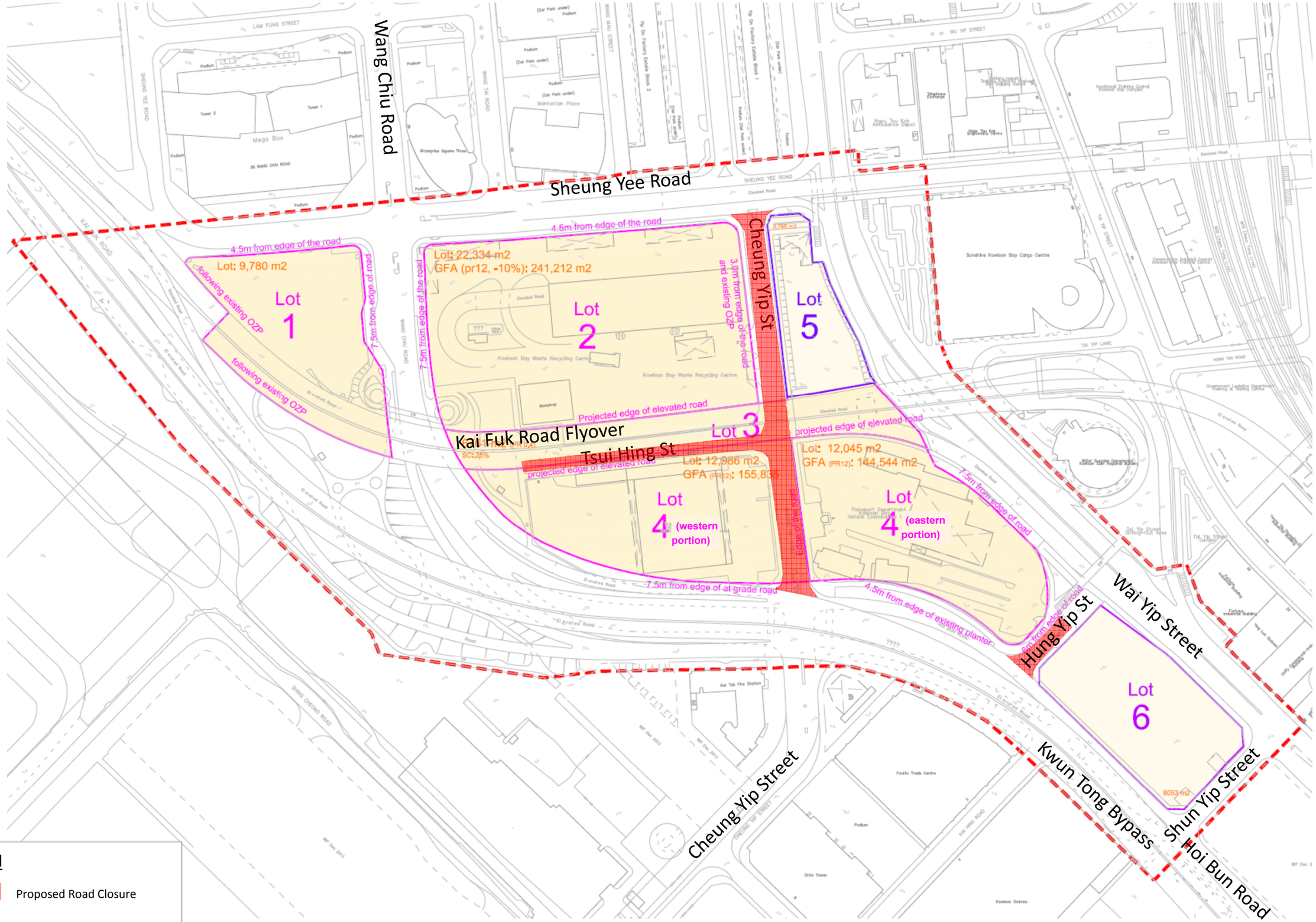
Job Title

AGREEMENT NO. CE 4/2014 (TP) AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST – FEASIBILITY STUDY

FIGURE 4.2.4

Date	Scale	Drawing Title
Mar 2018	Not to scale	Junction Layout of Cheung Yip Street / Hoi Bun Road under CEDD's Kai Tak Rethink II study
Drawn	Job No.	
KKIC	CE 4/2014 (TP)	

ARUP



Legend

Proposed Road Closure

Job Title	AGREEMENT NO. CE 4/2014 (TP) AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST – FEASIBILITY STUDY
Date: Mar 2016	Scale: Not to scale
Drawn: KKIC	Job No.: CE 4/2014 (TP)
Drawing Title	Proposed Closure of Cheung Yip Street, Tsui Hing Street and Hung Yip Street for Pedestrianization

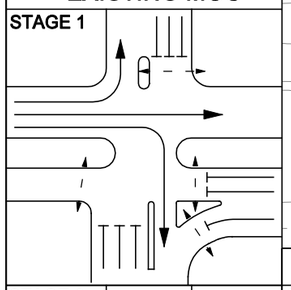
FIGURE 4.2.5

ARUP

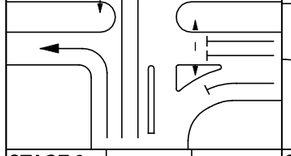
DETAIL ARRANGEMENT ON PEDESTRIANISATION OF CHEUNG YIP STREET SHALL BE FURTHER INVESTIGATED IN LATER STAGE

EXISTING MOC

STAGE 1



STAGE 2



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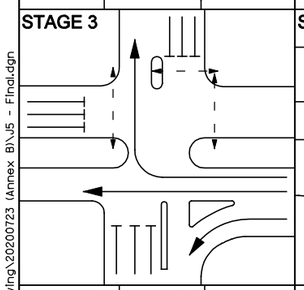

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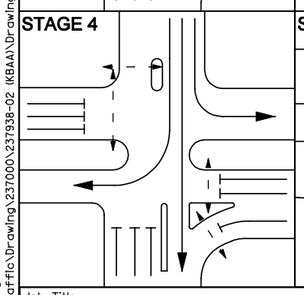
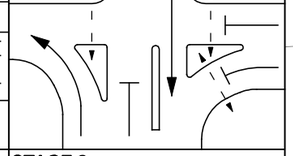


PROPOSED MOC

STAGE 1



STAGE 2



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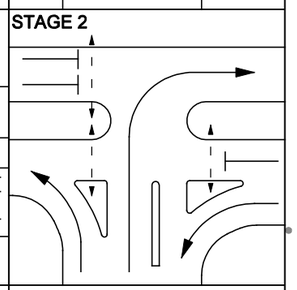
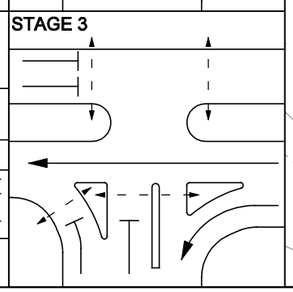


STAGE 4



LEGEND

- FINAL ROAD LAYOUT
- FINAL ROAD MARKING

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 4.2.6

Date	Scale	Drawing Title
MAY 18	1:500@A3	PROPOSED JUNCTION LAYOUT - HOI BUN ROAD / CHEUNG YIP STREET (J5)
Drawn: WTL	Job No.: 237938	

ARUP

PRINTED BY: wai-shing.wong 6/5/2020 10:25:06
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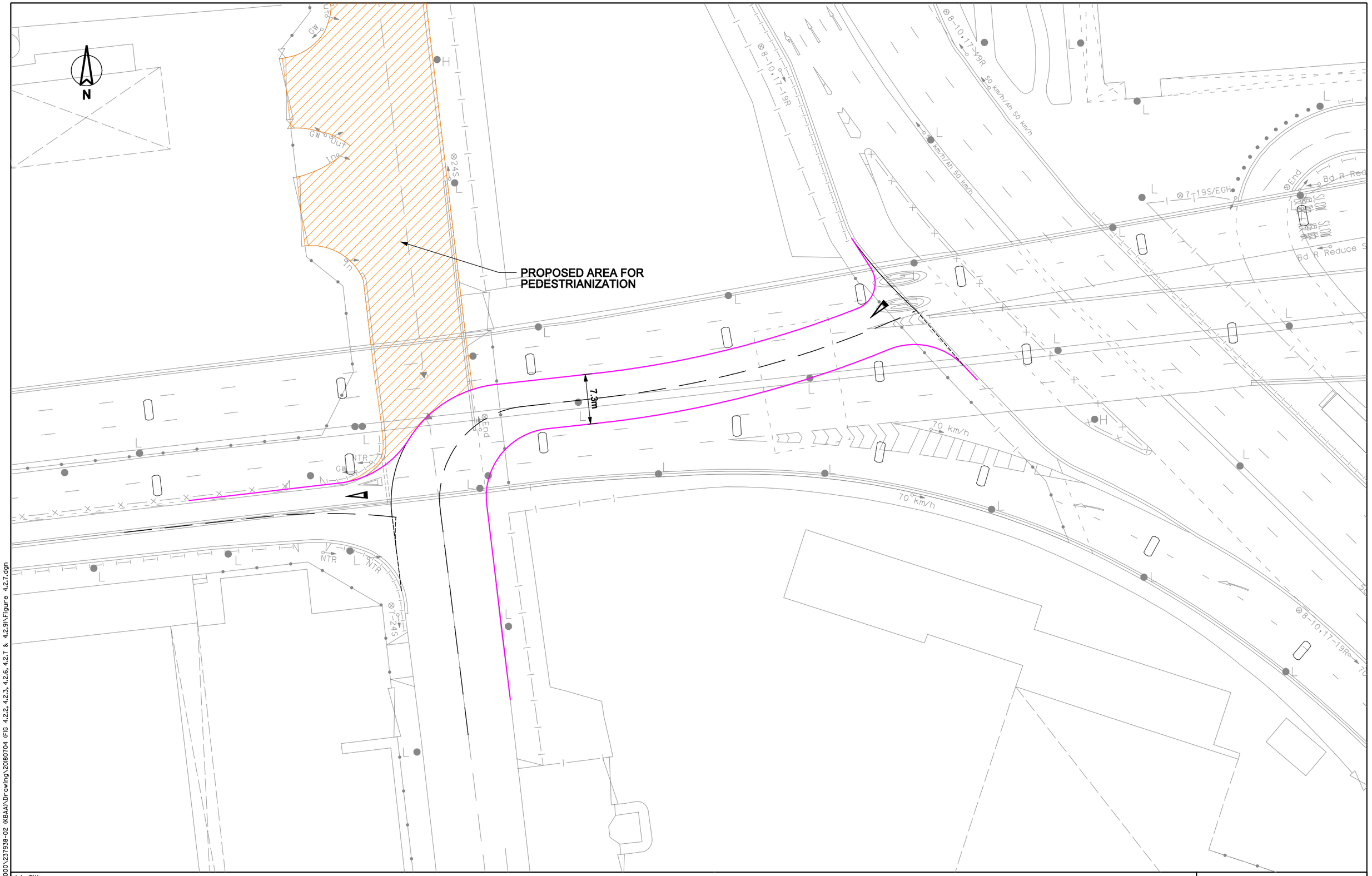


Job Title

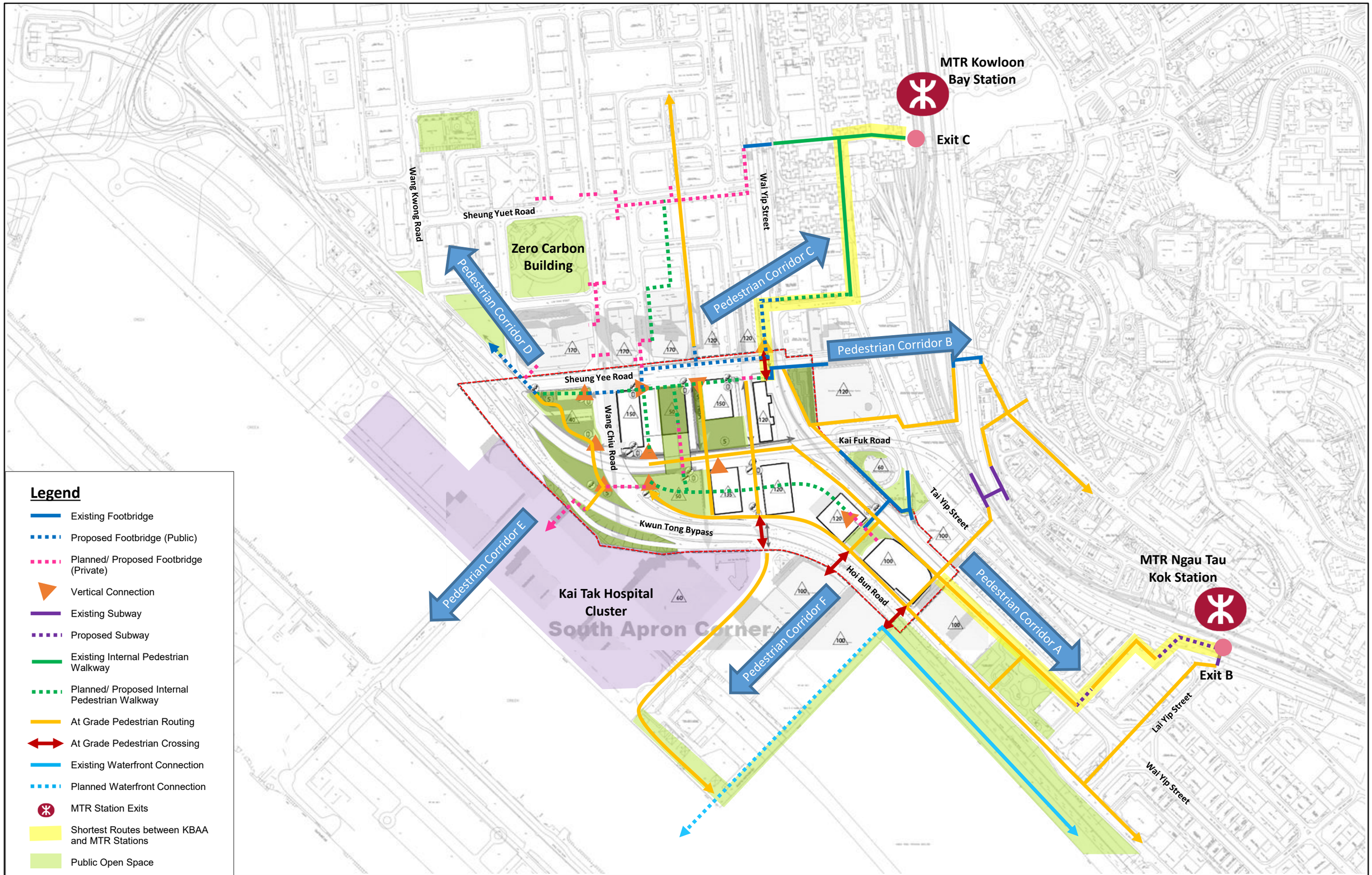
AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 4.2.7

Date	Scale	Drawing Title
MAR 18	1:500@A3	PROPOSED HALF CLOSURE OF CHEUNG YIP STREET
Drawn	Job No.	
WLAC	237938	

ARUP

PRINTED BY: wing-tung.lam 12:06:33 PM 3/4/2018
FILENAME: M:\Drawing\237000\237938-02 (KBAA)\Drawing\20180704 (FIG 4.2.2, 4.2.3, 4.2.6, 4.2.7 & 4.2.9)\Figure 4.2.7.dgn



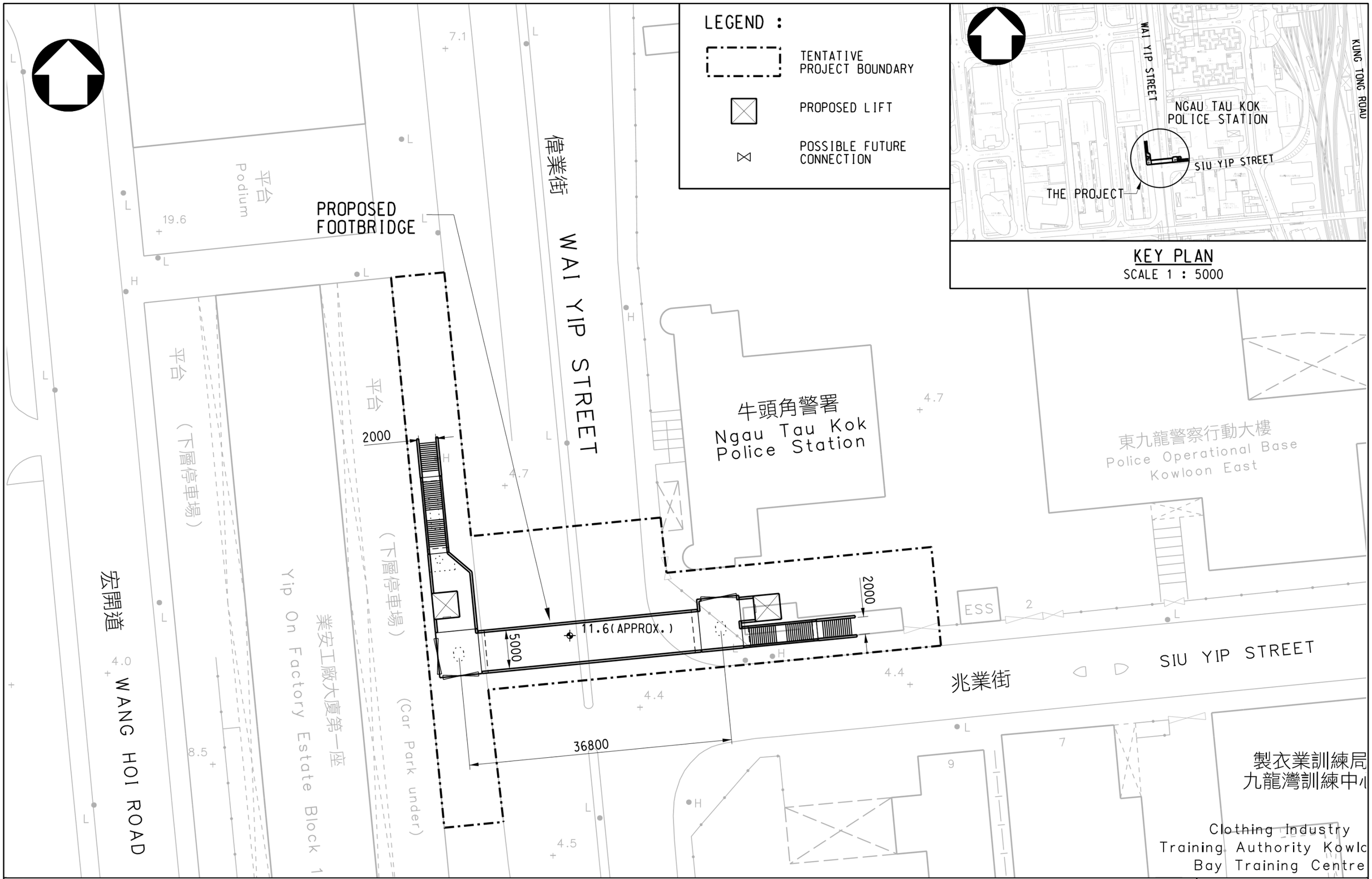
Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST – FEASIBILITY STUDY

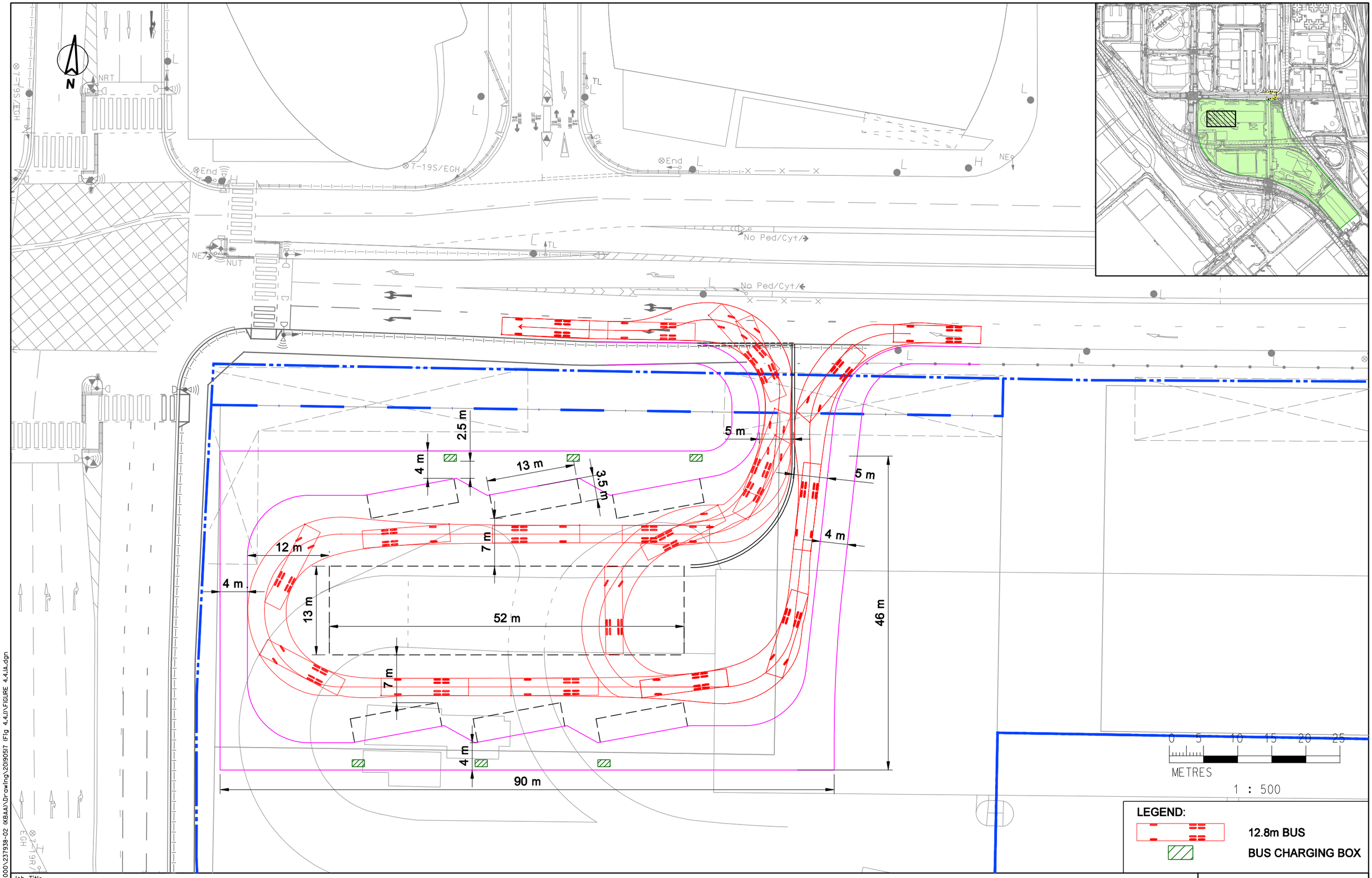
FIGURE 4.3.1

Date	Scale	Drawing Title
Mar 2016	Not to scale	Pedestrian Network and Physical Connections
Drawn	Job No.	
KKIC	CE 4/2014 (TP)	

ARUP



Job Title: AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST – FEASIBILITY STUDY			FIGURE 4.3.2
Date: Sep 2018	Scale: Not to scale	Drawing Title: Proposed Footbridge at Siu Yip Street	ARUP
Drawn: CL	Job No.: CE 4/2014 (TP)		



Job Title

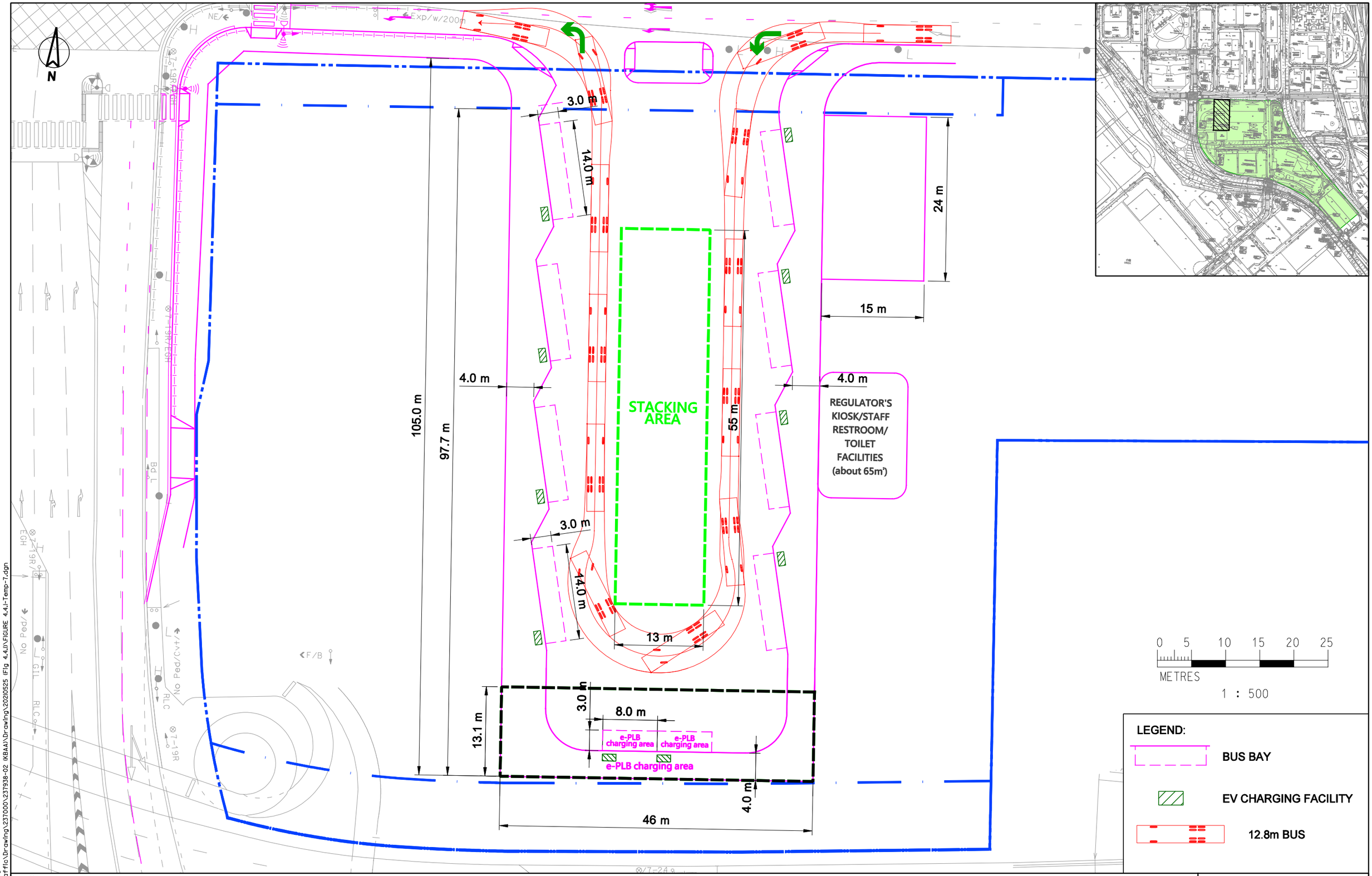
AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 4.4.1A

Date	Scale	Drawing Title
MAY 19	1:500 @ A3	PRELIMINARY LAYOUT OF PROPOSED GREEN TRANSPORT HUB (with rail-based EFLS scenario)
Drawn	Job No.	
WTL	237938	

ARUP

PRINTED BY: wing-tung.lam 17/7/2019 6:38:46 PM
FILENAME: M:\Drawing\237000\237938-02 (KBAA)\Drawing\20190517 (Fig 4.4)\FIGURE 4.4.1A.dgn



PRINTED BY: wai-shing.wong 26/05/2021 12:05:25
FILENAME: \\hkgnts69\Traffic\Drawing\237000\237938-02 (KBAA)\Drawing\20210525 (Fig 4.4.1)\FIGURE 4.4.1-Temp-T.dgn

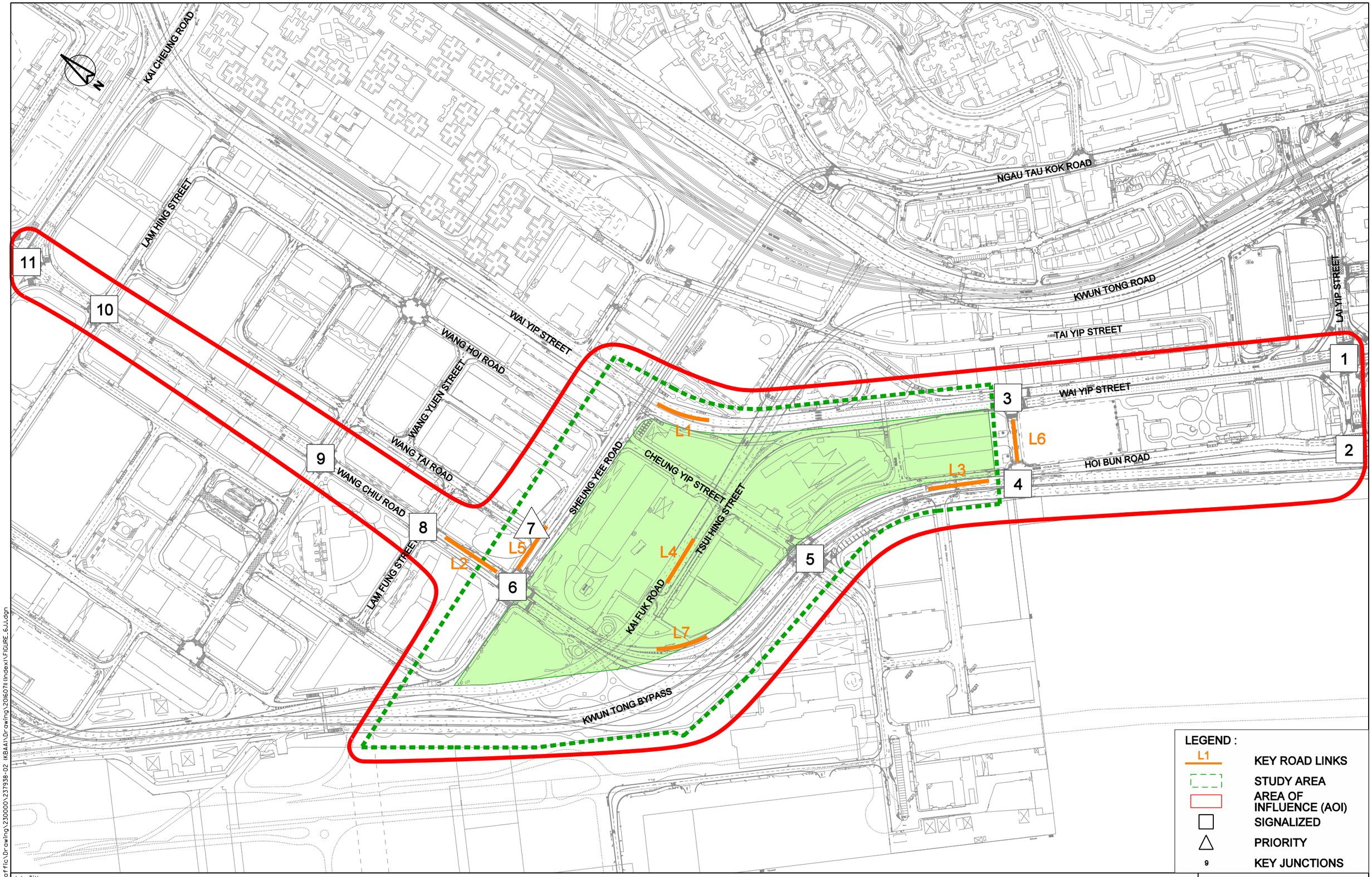
Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 4.4.1B

Date	Scale	Drawing Title
25MAY21	1:500@A3	PRELIMINARY LAYOUT OF PROPOSED GREEN TRANSPORT HUB (without rail-based EFLS scenario)
Drawn: WSTW	Job No.: 237938	

ARUP



Job Title

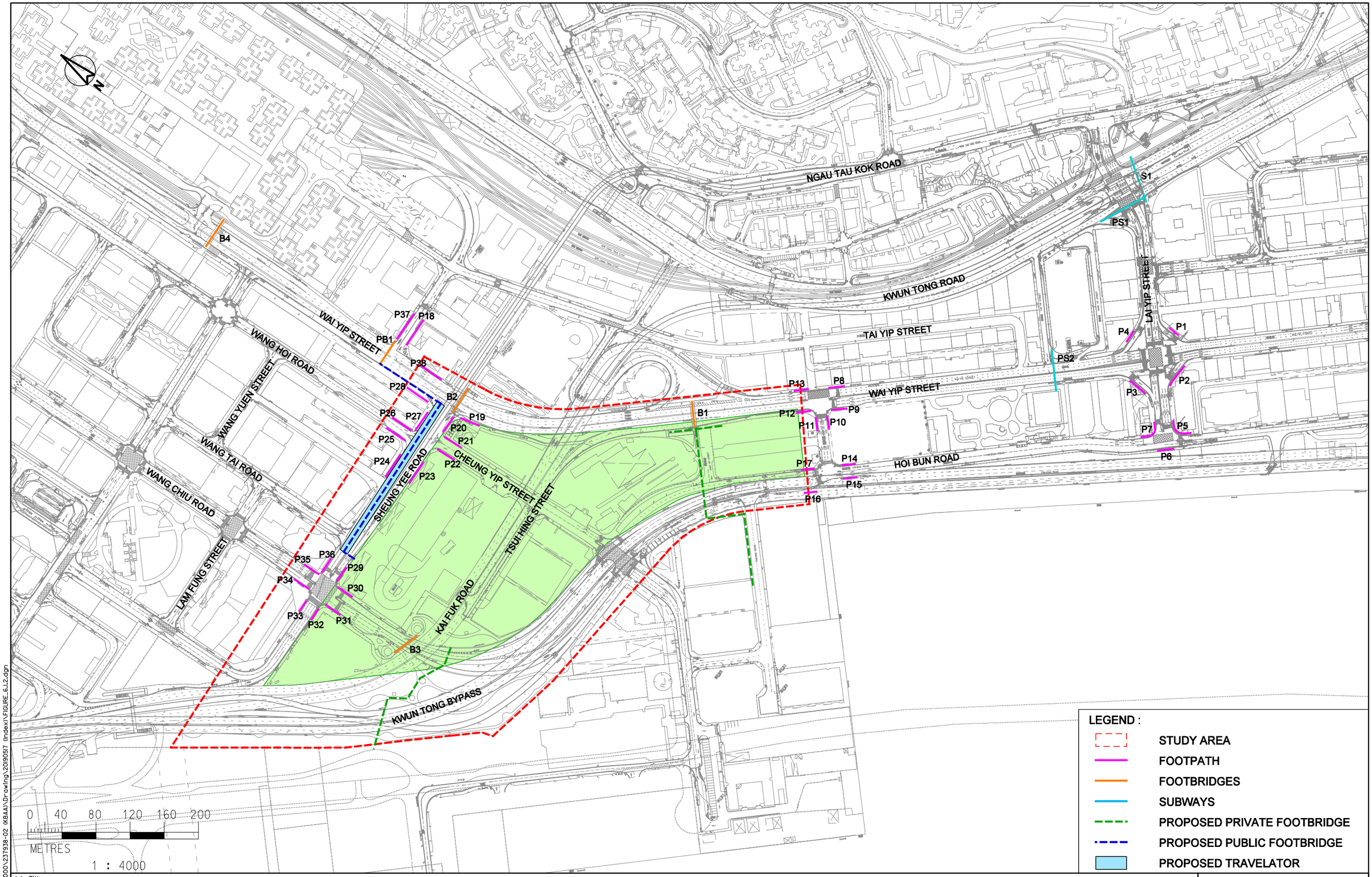
AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 6.1.1

Date	Scale	Drawing Title
JUL 16	1:4000@A3	LOCATIONS OF MAJOR ROAD LINKS AND CRTICIAL JUNCTION IN THE VINCINITY OF THE STUDY AREA
Drawn	Job No.	
WTL	237938	

ARUP

PRINTED BY: wing-tung.lam 4:31:57 PM
FILENAME: \\hkgnts69\Traffic\Drawing\230000\237938-02 (KBAA)\Drawing\20160711(Index)\FIGURE_6.1.1.dgn



LEGEND :

- STUDY AREA
- FOOTPATH
- FOOTBRIDGES
- SUBWAYS
- PROPOSED PRIVATE FOOTBRIDGE
- PROPOSED PUBLIC FOOTBRIDGE
- PROPOSED TRAVELATOR

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 6.1.2

Date	Scale
MAY 19	1:4000 @ A3
Drawn	Job No.
WTL	237938

Drawing Title

INDEX FOR FOOTPATHS, FOOTBRIDGES AND SUBWAYS

ARUP

PRINTED BY: wing-tung.lam 15/7/2019 6:28:02 PM
FILENAME: M:\Drawing\237000\237938-02 (KBAA)\Drawing\20190517 (Index)\FIGURE_6.1.2.dgn

圖例 LEGEND

綠色走廊 Green Spine

綠色連線 Green Link

北啟德線 Northern Kai Tak Link

南啟德線 Southern Kai Tak Link

德福淘大線 Telford Amoy Link

兆業街線 Siu Yip Street Link

大業街線 Tai Yip Street Link

研究範圍 Study Area

已刊憲並取得授權的行人天橋系統
Gazetted and Authorized Elevated Walkway System

現有行人天橋
Existing Footbridge

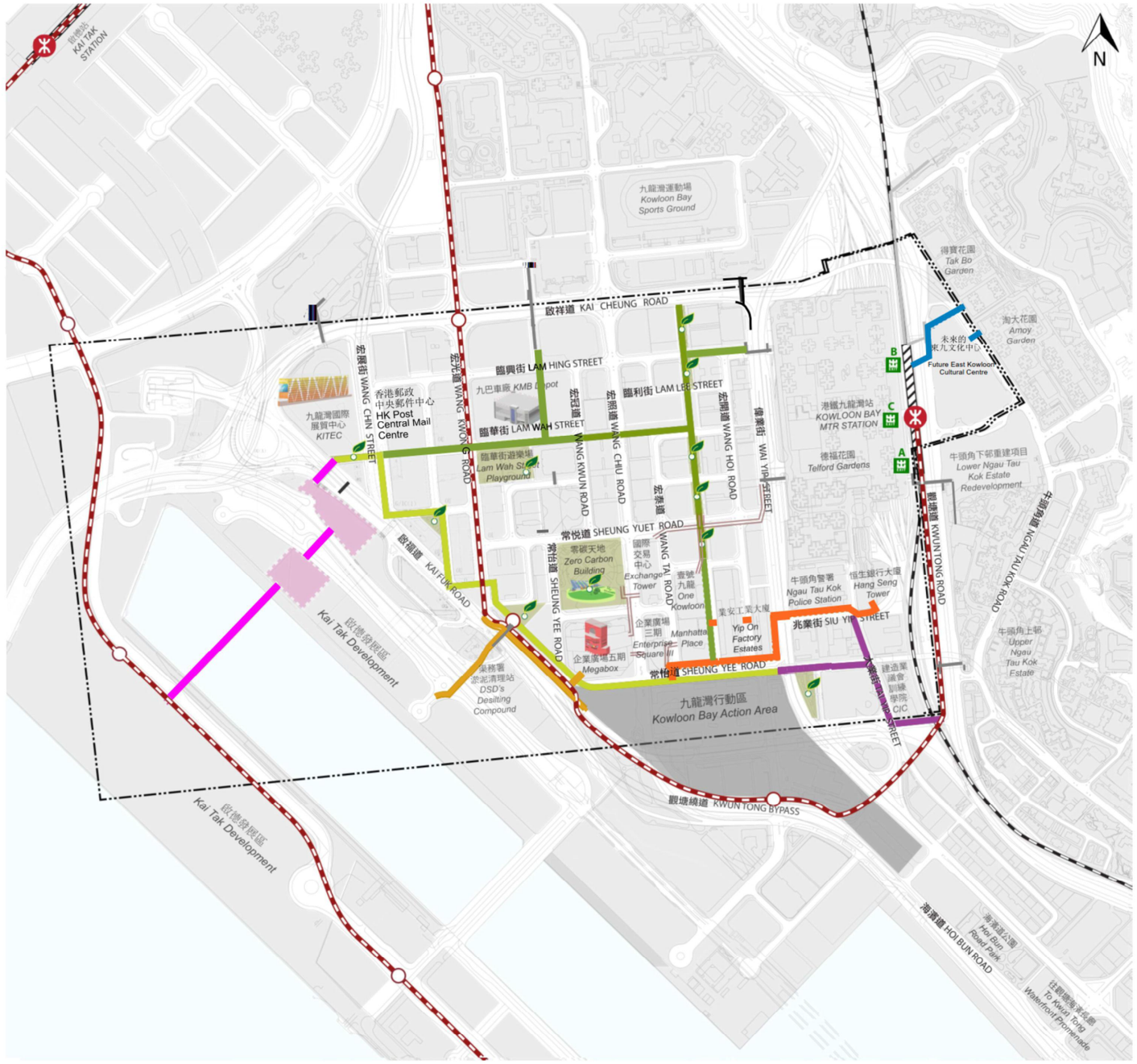
現有行人隧道
Existing Subway

擬議的環保連接系統
Proposed Environmentally Friendly Linkage System

港鐵觀塘線
MTR Kwun Tong Line

綠化地帶
Green Areas

其他未來發展
Future Developments (By Others)



AGREEMENT NO. CE49/2012 (TT)
KOWLOON BAY BUSINESS AREA PEDESTRIAN ENVIRONMENT IMPROVEMENT - FEASIBILITY STUDY

建議的行人連接
PROPOSED PEDESTRIAN LINKS

AECOM
FIGURE 2

Job Title
AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST – FEASIBILITY STUDY

FIGURE 6.3.1

Date	Scale	Drawing Title
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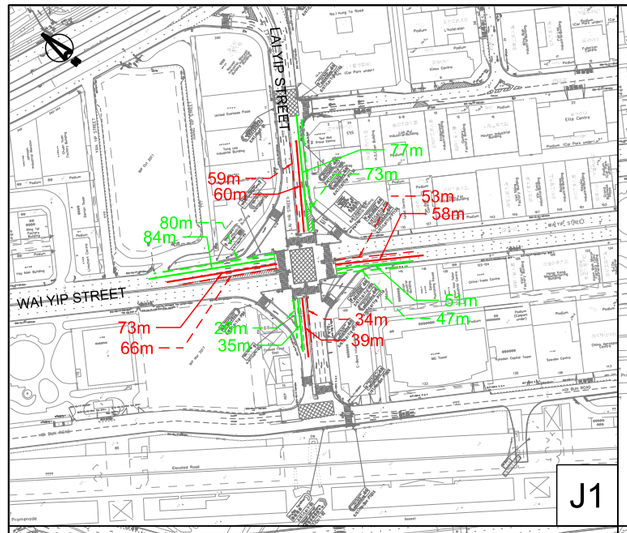
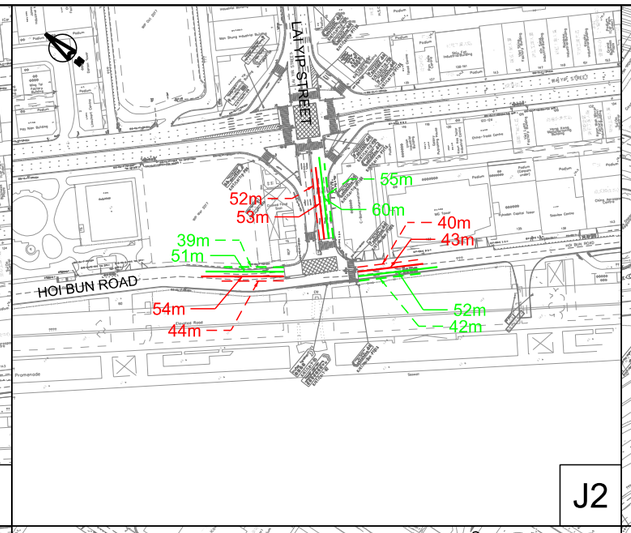
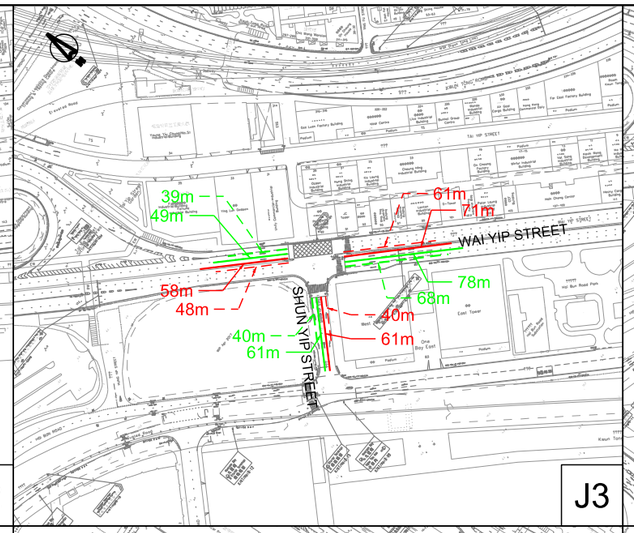
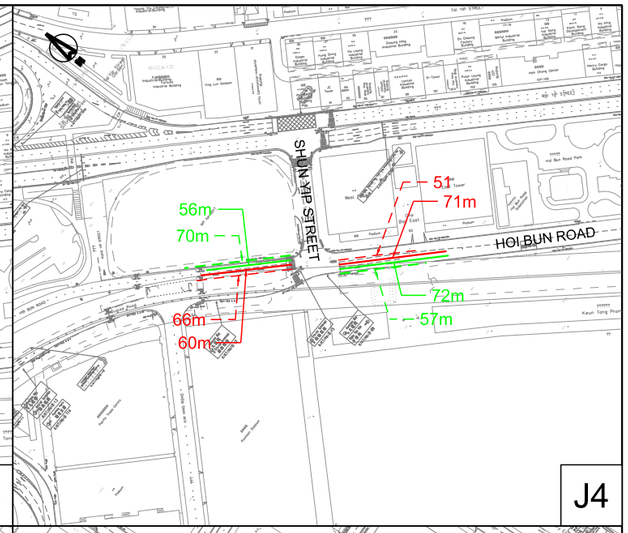
Drawn	Job No.	
KKIC	CE 4/2014 (TP)	

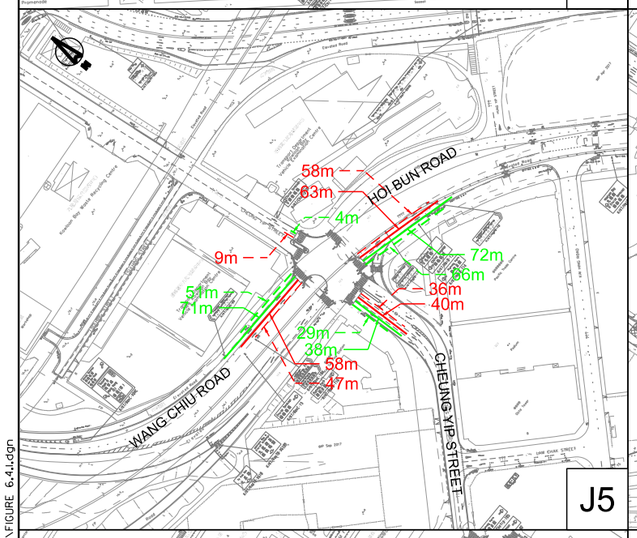
ARUP

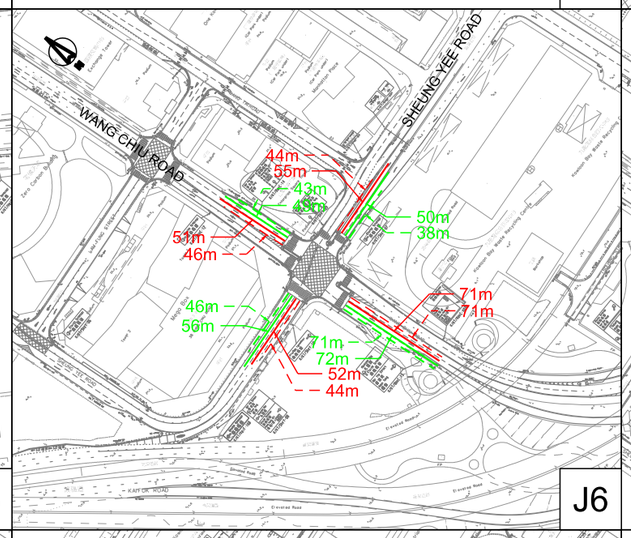


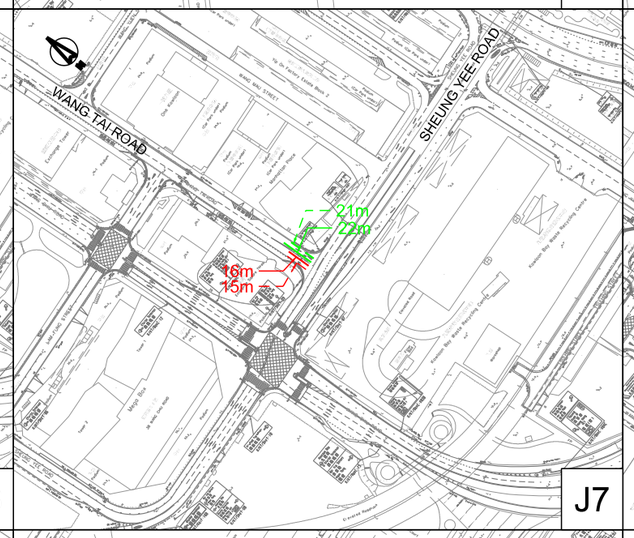


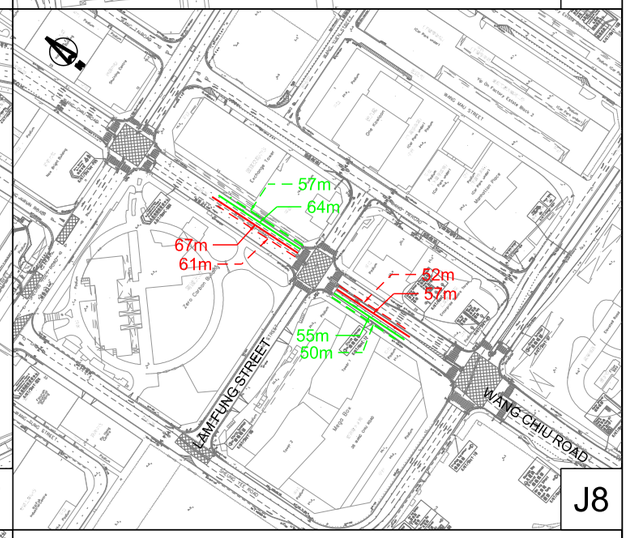


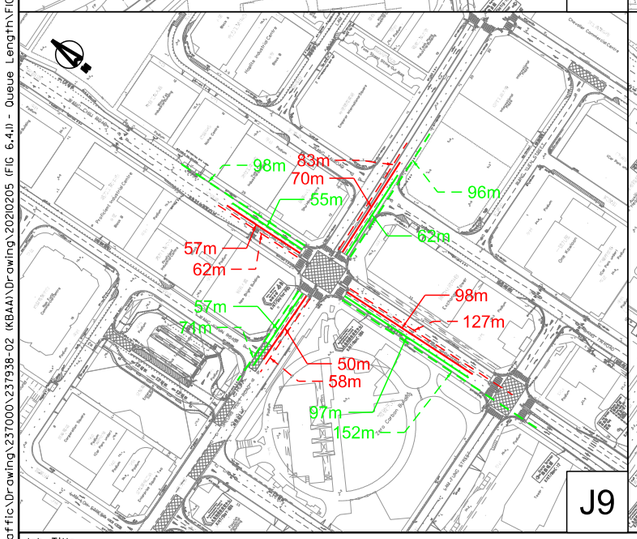


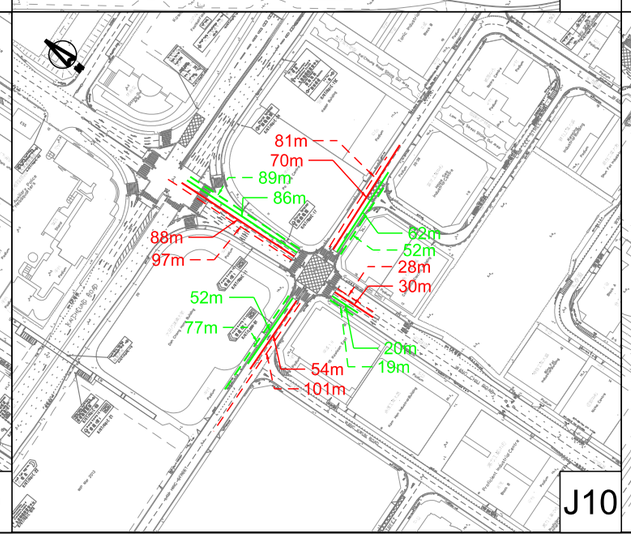


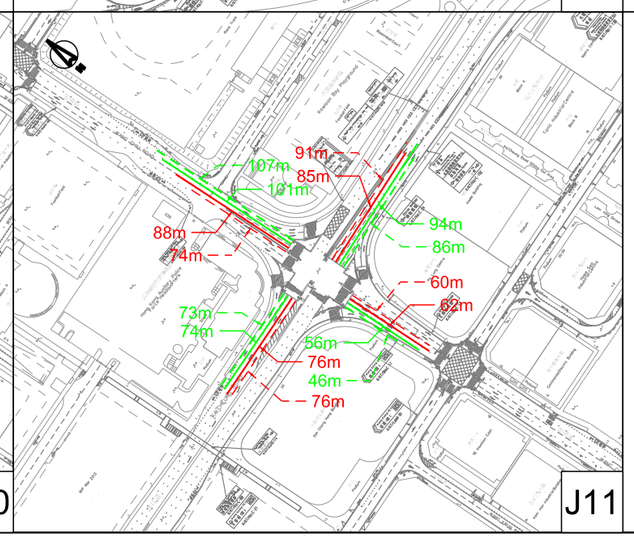












LEGEND :

- ESTIMATED QUEUE LENGTH FOR DESIGN CASE (AM)
- ESTIMATED QUEUE LENGTH FOR DESIGN CASE (PM)
- ESTIMATED QUEUE LENGTH FOR REFERENCE CASE (AM)
- ESTIMATED QUEUE LENGTH FOR REFERENCE CASE (PM)

0 40 80 120 160 200
METRES
1 : 4000

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 6.4.1

Date	Scale	Drawing Title
SEP 18	1:4000 @ A3	ESTIMATED QUEUE LENGTH AT KEY JUNCTIONS IN YEAR 2031
Drawn	Job No.	
WTL	237938	

ARUP

PRINTED BY: KH Cheuk 9/2/2021 17:51:12
FILENAME: \\hkgnts69\Traffic\Drawing\237000\237938-02 (KBAA)\Drawing\20210205 (FIG 6.4.1) - Queue Length\FIGURE 6.4.1.dgn

N

順業街

SHUN YIP STREET

西座
West Tower

平台
Podium

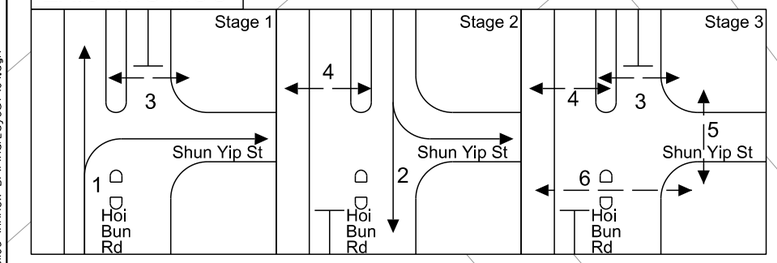
東座
East Tower

One Bay East

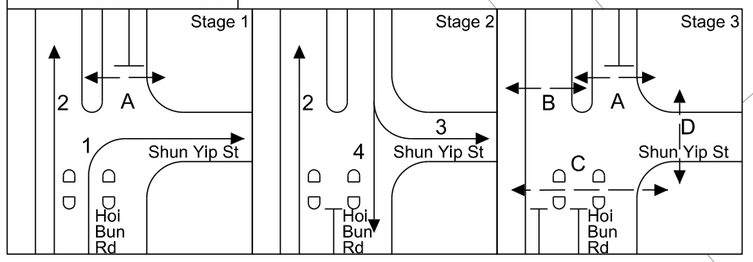
永英工業大廈
Wing Ying Industrial Building

榮記工業大廈
Chilcott Industrial Building

EXISTING MOC



PROPOSED MOC



METRES 0 5 10 15 20 25

1 : 500

LEGEND

PROPOSED IMPROVEMENT WORKS

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 6.4.2

Date 20MAR20 | Scale 1:500 @ A3 | Drawn WSTW | Job No. 237938

Drawing Title

PROPOSED JUNCTION IMPROVEMENT AT J4 - HOI BUN ROAD / SHUN YIP STREET

ARUP

PRINTED BY: KH Cheuk 13/11/2020 15:42:40
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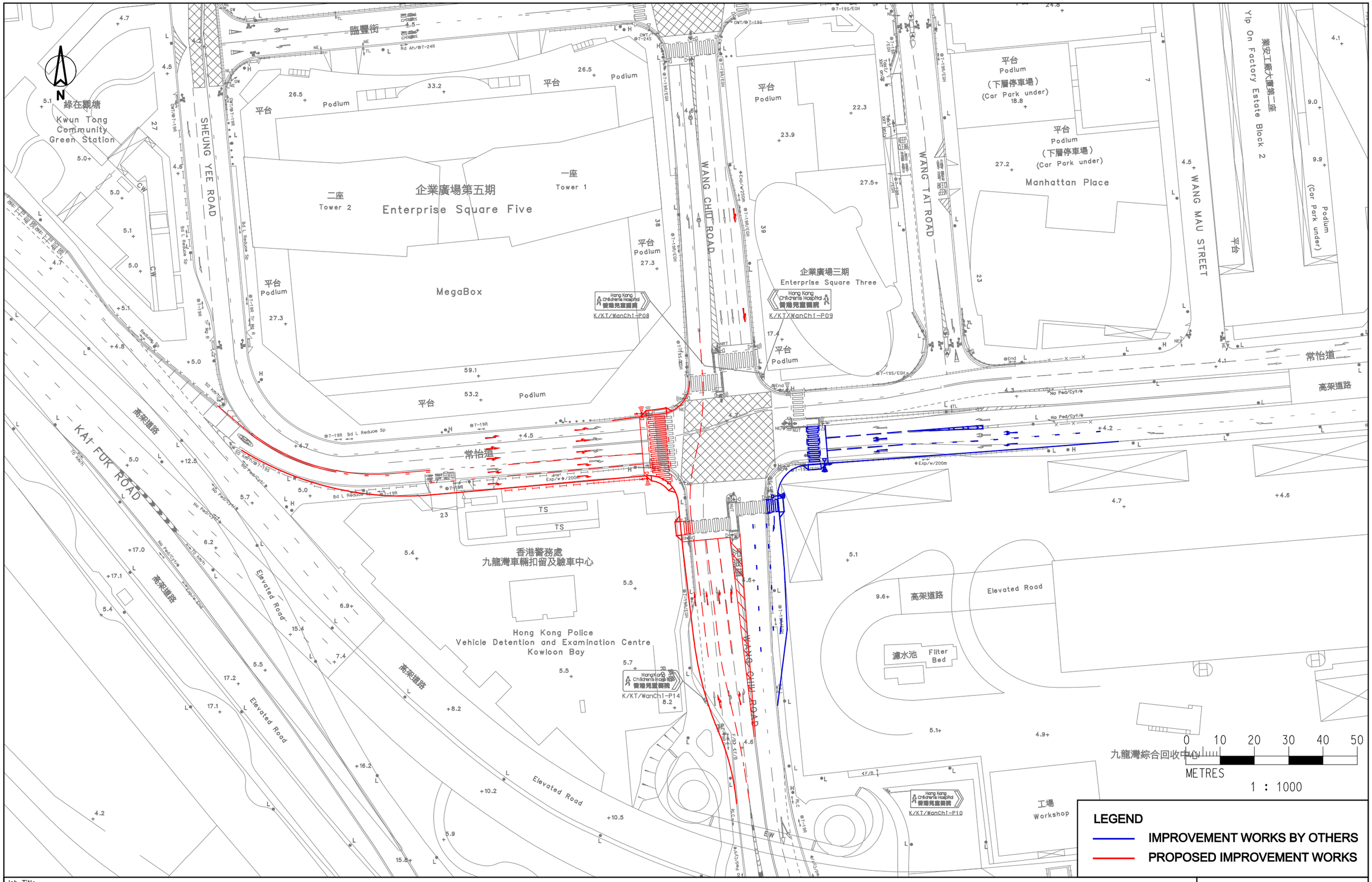

LEGEND

- IMPROVEMENT WORKS BY OTHERS
- PROPOSED IMPROVEMENT WORKS

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 6.4.3

Date	Scale
26MAY20	1:1000@A3
Drawn	Job No.
KPHW	237938

Drawing Title

PROPOSED JUNCTION IMPROVEMENT AT J6 - WANG CHIU ROAD / SHEUNG YEE ROAD

ARUP

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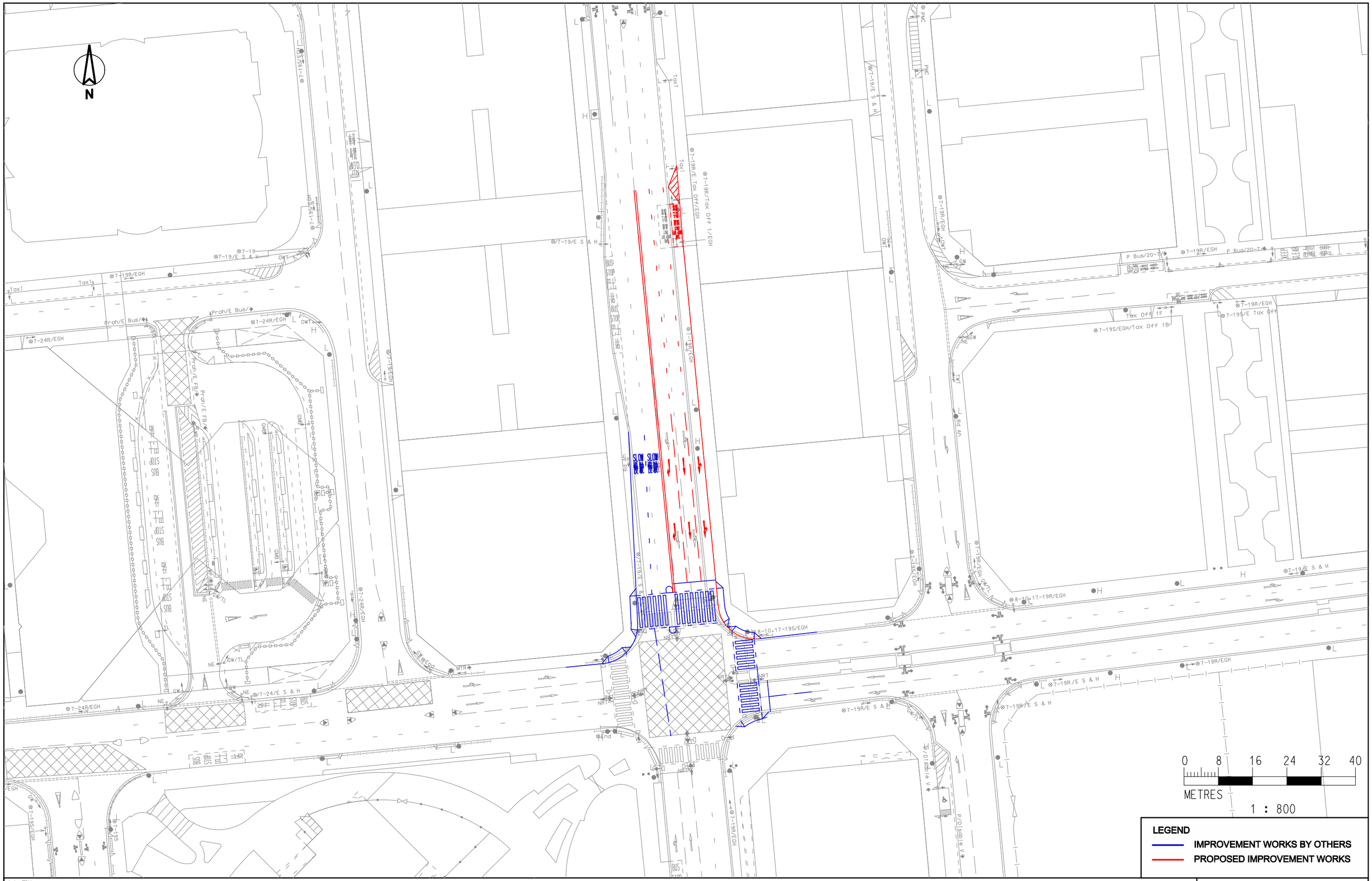

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 6.4.4

Date	Scale	Drawing Title
23JUL20	1:800@A3	PROPOSED JUNCTION IMPROVEMENT AT J9 - SHEUNG YUET ROAD / WANG CHIU ROAD
Drawn	Job No.	
WSTW	237938	

ARUP

PRINTED BY: $USER$ $TIME$
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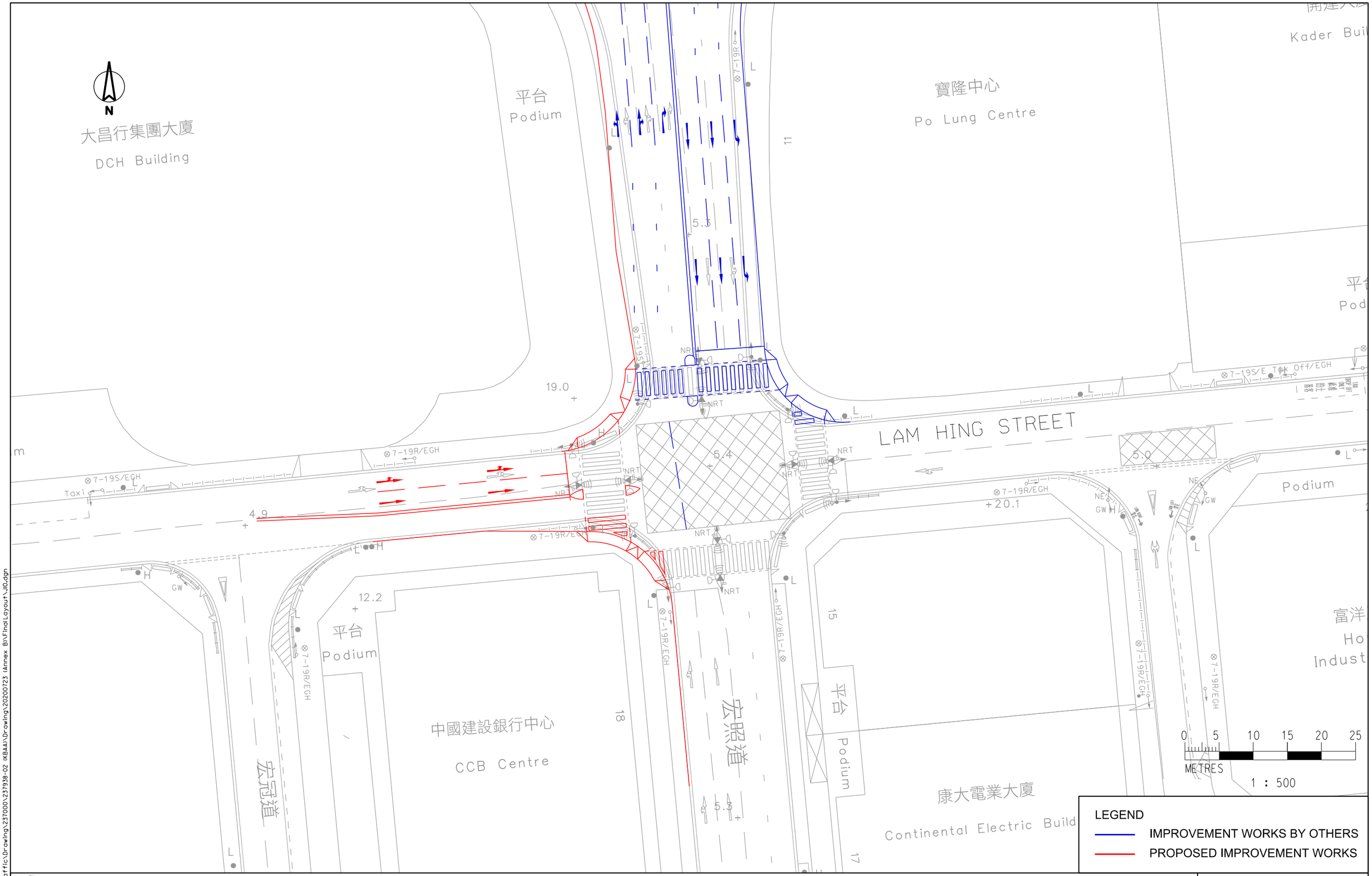

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 6.4.5

Date	Scale	Drawing Title
13FEB20	1:500@A3	PROPOSED JUNCTION IMPROVEMENT AT J10 - LAM HING STREET / WANG CHIU ROAD
Drawn	Job No.	
WSTW	237938	

ARUP

PRINTED By: KH Cheuk 29/9/2020 17:9:07
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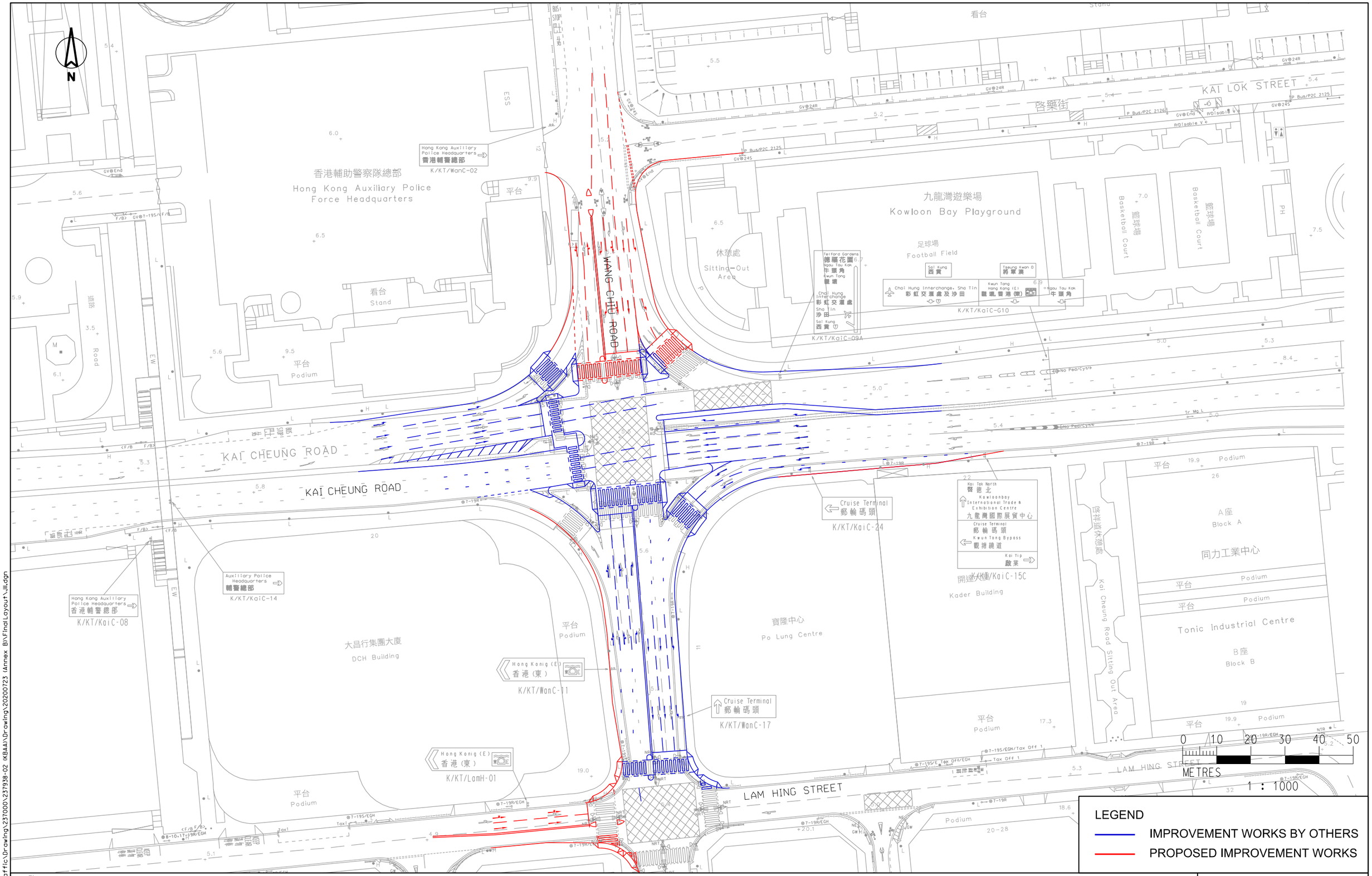

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE 6.4.6

Date	Scale	Drawing Title
06NOV19	1:1000@A3	PROPOSED JUNCTION IMPROVEMENT AT J10 - LAM HING STREET / WANG CHIU ROAD AND J11 - KAI CHEUNG ROAD / WANG CHIU ROAD
Drawn: WSTW	Job No.: 237938	

ARUP

PRINTED BY: KH CheuK 29/9/2020 17:54:12
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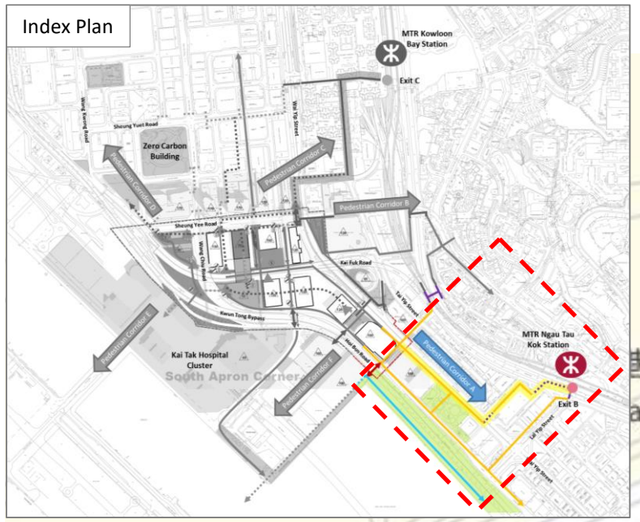
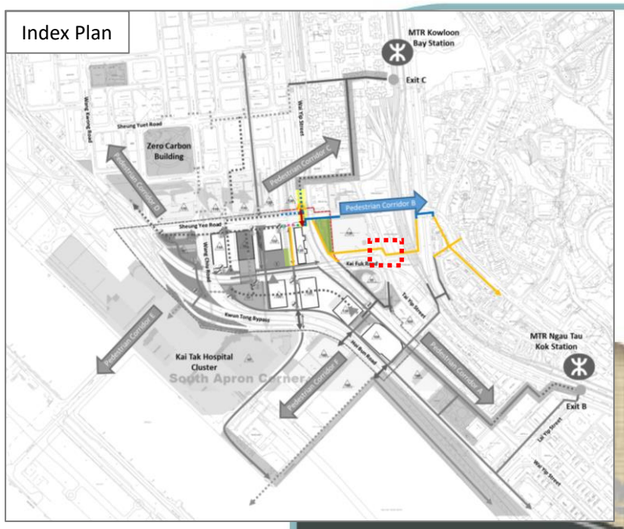
Index Plan





Source: Pedestrian Environment Improvement Scheme for Transformation of Kwun Tong Business Area – Feasibility Study; Stage 3 Public Engagement Digest

Job Title: AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST – FEASIBILITY STUDY			FIGURE 7.1.1
Date: Mar 2016	Scale: Not to scale	Drawing Title: Proposed pedestrian subway connecting Hoi Bun Road Park and MTR Ngau Tau Kok Station along Pedestrian Corridor A	ARUP
Drawn: KKIC	Job No.: CE 4/2014 (TP)		



Source: Pedestrian Environment Improvement Scheme for Transformation of Kwun Tong Business Area – Feasibility Study; Stage 3 Public Engagement Digest

Job Title: AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST – FEASIBILITY STUDY		FIGURE 7.1.2
Date: Mar 2016	Scale: Not to scale	Drawing Title: Proposed at-grade pedestrian crossing at Tai Yip Lane near Tai Yip Lane along Pedestrian Corridor B
Drawn: KKIC	Job No.: CE 4/2014 (TP)	ARUP



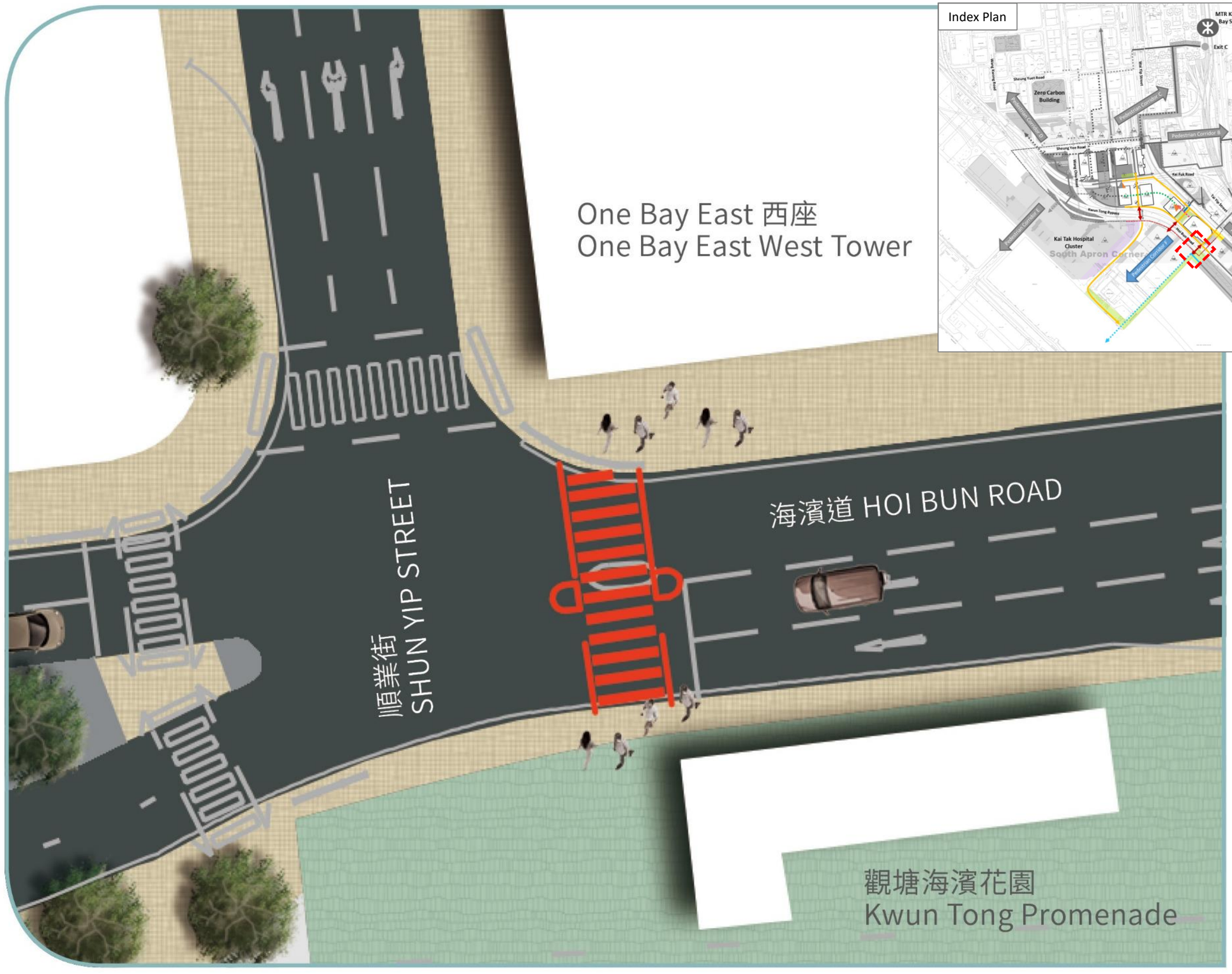
Source: Kowloon Bay Business Area Pedestrian Environment Improvement Feasibility Study; Stage 3 Public Engagement Digest

Job Title: AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST – FEASIBILITY STUDY			FIGURE 7.1.3
Date: Mar 2016	Scale: Not to scale	Drawing Title: Pedestrian Corridor C – Proposed Siu Yip Link Connection	ARUP
Drawn: KKIC	Job No.: CE 4/2014 (TP)		



Source: Kowloon Bay Business Area Pedestrian Environment Improvement Feasibility Study; Stage 3 Public Engagement Digest

Job Title: AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST – FEASIBILITY STUDY		FIGURE 7.1.4
Date: Mar 2016	Scale: Not to scale	Drawing Title: Pedestrian Corridor D – Proposed Northern Kai Tak Link Connection
Drawn: KKIC	Job No.: CE 4/2014 (TP)	ARUP



Source: Pedestrian Environment Improvement Scheme for Transformation of Kwun Tong Business Area – Feasibility Study; Stage 3 Public Engagement Digest

Job Title: AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST – FEASIBILITY STUDY		FIGURE 7.1.5
Date: Mar 2016	Scale: Not to scale	Drawing Title: Proposed Crossing Enhancement at Hoi Bun Road / Shun Yip Street along Pedestrian Corridor F
Drawn: KKIC	Job No.: CE 4/2014 (TP)	ARUP

Appendix A

Project Definition Statement for the Proposed Footbridge near Ngau Tau Kok Police Statin and Associated Road Works

To: Director of Highways

Project Definition Statement for the
Proposed Footbridge near Ngau Tau Kok Police Station
and Associated Road Works

Please complete a Technical Feasibility Statement (TFS) for the "Proposed Footbridge near Ngau Tau Kok (NTK) Police Station and Associated Road Works" (the Project) in accordance with Financial Circular No. 4/2012.

1. Policy Objective

1.1 It was announced in the 2011-12 Policy Address that the Government will adopt a visionary, coordinated and integrated approach to expedite the transformation of Kowloon East into an attractive Core Business District to support Hong Kong's economic development. The Government further advocated the sustainability concept of "walkability" in Kowloon East through improving connectivity and enhancing the pedestrian environment.

1.2 To achieve the above objectives, the Energizing Kowloon East Office (EKEO) commissioned CE 49/2012(TT) – Kowloon Bay Business Area (KBBA) Pedestrian Environment Improvement – Feasibility Study (the KBBA Study) to review and assess the pedestrian and traffic environment, investigate and produce feasible proposals illustrated with schemes and drawings to enhance pedestrian connectivity and vehicular traffic in Kowloon Bay. A comprehensive network of pedestrian links was formulated for KBBA.

1.3 EKEO has also commissioned another consultancy study, CE 4/2014(TP) – Planning and Engineering Study for the Development at Kowloon Bay Action Area (KBAA) of Kowloon East – Feasibility Study (the KBAA Study) to review, investigate, and produce feasible development options and implementation strategy to optimise the development potential of KBAA in terms of its strategic setting, constraints and opportunities. The Preliminary Outline Development Plan for KBAA endorsed by the Committee on Planning and Land Development on 10 March 2016 is shown in **Annex 1.**

1.4 The Project includes a proposed footbridge connecting the footpaths on both sides of Wai Yip Street, which forms part of the Siu Yip Street Link proposed under the KBBA Study (**Annex 2**) to enhance pedestrian linkage between MTR Kowloon Bay Station and KBBA.

1.5 The MTR Corporation Limited recently indicated their latest alignment preference for the section of the proposed Siu Yip Street Link spanning across Tai Yip Street. The latest alignment can provide a more direct connection between Telford Plaza II and the future development on the NTK Police Station site. Besides, the alignment along Sheung Yee Road has been revised after a recent review under the KBAA Study. The latest proposed Siu Yip Street Link is shown in **Annex 3** for reference, but it will not affect that section of the link covered by the Project.

2. Source of Policy Approval

2.1 As set out in the Legislative Council Panel on Development Paper No. CB(1)797/11-12(03), EKEO is tasked to carry out improvements to the pedestrian connections in Kowloon Bay, among others, to facilitate the urban regeneration of Kowloon East.

2.2 In the 2015 Policy Address and the 2017 Policy Agenda, it was stated that the Government implements the concept of a "walkable" Kowloon East in the Kowloon Bay and Kwun Tong Business Areas to improve the pedestrian environment.

3. Justification for the Project

3.1 In view of the rapid transformation of KBBA, the pedestrian flow between MTR Kowloon Bay Station and KBBA is increasing. In particular, the existing footbridge connecting Telford Plaza across Wai Yip Street near Sheung Yuet Road (the existing footbridge) is already over-crowded. There are very strong requests from the local community and the Kwun Tong District Council to improve the situation. There is an imminent need to provide an additional footbridge across Wai Yip Street so as to ease the overcrowded situation, particularly during the AM and PM peaks.

3.2 The 2014 and forecast pedestrian flows and the level of service (LOS) for the existing footbridge referred in paragraph 3.1 are summarized in the table below:

	Effective Width (m)	**Pedestrian flow (2-way) (ped/hr)**			**Level of Service (LOS)**		
		2014 Base	**2021**	**2031**	**2014 Base**	**2021**	**2031**
AM	4.3	10,050	11,900	17,700	D	E	F
PM		10,550	11,000	14,100	D	E	E

3.3 The LOS of the existing footbridge was D in both AM and PM peaks in 2014. It is anticipated the LOS will deteriorate to E in both AM and PM peaks in 2021 and therefore there is an urgent need to complete the Project by 2021. In addition, taking into account the current transformation of KBBA and new developments in KBAA, the LOS would be further worsened to F and E in AM peak and PM peak respectively in 2031 if the Project is not implemented.

3.4 The KBAA Study reviewed the performance of the existing footbridge under two forecast scenarios, i.e. with/without the implementation of the Project, based on the latest development proposal in KBAA. The forecast pedestrian flows and the LOS in 2021 and 2031 for the existing footbridge under the two scenarios are summarized as follows:

	Effective Width (m)	Pedestrian flow (2-way) (ped/hr) and LOS for the existing footbridge				
		2014	2021		2031	
		Base	Without the implementation of the Project	With the implementation of the Project	Without the implementation of the Project	With the implementation of the Project
AM	4.3	10,050 D	11,900 E	8,300 D	17,700 F	13,000 E
PM		10,550 D	11,000 E	8,000 D	14,100 E	10,350 D

3.5 Assuming the Project to be in place in 2021, it is forecasted that the LOS of the existing footbridge in 2021 will be improved from E to D at both AM and PM peaks at least. The LOS of the existing footbridge is expected to improve from F to E at AM peak and from E to D at PM peak in 2031.

3.6 The forecast pedestrian flows and the LOS in 2021 and 2031 for the proposed footbridge, which has not yet taken into account the future redevelopment of the NTK Police Station site, are also summarized as follows:

	Effective Width (m)	Pedestrian flow (2-way) (ped/hr) and LOS for the proposed footbridge	
		2021	2031
AM	4.0	3,600 B	4,700 C
PM		3,400 B	3,750 B

Note : The future redevelopment of the NTK Police Station site has not yet been taken into account.

3.7 It is anticipated that, the proposed developments in KBAA will be completed by phases from 2019 to 2026 – Lots 5 and 6 in 2019/20, Lot 2 in 2022/23 and Lot 4 in 2026 (**Annex 1**). As advised by the Architectural Services Department (ArchSD), the demolition works of the NTK Police Station will commence in the second half of 2020 for completion in the fourth quarter of 2021 tentatively. Presumably, the site will be released to the Lands Department (LandsD) in 2022 for disposal. If we opt for requiring the private developer to construct the proposed footbridge together with an internal walkway and another footbridge across Siu Yip Street to Telford Plaza, it is anticipated the developer will take about 4 to 5 years to complete the new development in 2026 or 2027. Compared with the anticipated completion by 2023 (or earlier, if can be fast-tracked) through a PWP item with the Highways Department as the works agent, the Project will be delayed for at least 3 years if it is to be implemented by the developer. As the proposed footbridge is to serve the dual purpose of diverting the pedestrian flow from the existing footbridge to the north and improving the pedestrian connectivity to KBAA, any delay to the Project will adversely affect the pedestrians in the area and attract critics and complaints from the public.

3.8 In addition, we also propose to modify the existing pedestrian crossing facilities at Tai Yip street under the Project to facilitate proper barrier-free access from Telford Plaza II to the proposed footbridge.

4. Target Date for the Project to Come into Operation

4.1 The programme of implementation should take into account the complexity of the Project as well as the impacts on traffic and the local community during construction.

4.2 The TFS should be completed on time to enable bidding for funding for the Project in the 2017 RAE.

4.3 Due to the imminent need for the improvement of pedestrian connectivity, there is a need to fast-track the Project as far as practicable to improve the overcrowded condition at the existing footbridge. The anticipated completion of the Project should be by 2023 at the latest.

5. Description of Project Scope

5.1 The Scope of the Project comprises:-

(a) construction of a footbridge with a clear width of 5m and about 30m in length across Wai Yip Street and connecting the footpaths adjoining the NTK Police

Station site on the eastern side and Yip On Factory Estate on the western side;

(b) provision of a staircase with a clear width of 2m connecting item (a) above to the eastern side of Wai Yip Street. It would likely be located within the existing NTK Police Station site and ArchSD would need to be consulted on the arrangement for early demolition of the affected structure on that part of the site;

(c) provision of a staircase with a clear width of 2m connecting item (a) above with the footpath on the western side of Wai Yip Street adjoining Yip On Factory Estate;

(d) provision of barrier-free access facilities at the two staircases under items (b) and (c) above according to the prevailing standards;

(e) provision of connection points at the proposed footbridge for future connections with the NTK Police Station site and the Yip On Factory Estate site;

(f) modify the existing drop kerb at Tai Yip street next to NTK Police Station and add a drop kerb near the entrance of Telford Plaza II to facilitate proper barrier-free access to the proposed footbridge; and

(g) associated road works, drainage works, diversions of water mains, stormwater drains, sewerage and utilities, landscape works, street improvement/beautification works, street lighting works and signage, environmental mitigation measures and temporary traffic arrangement during the construction of the Project.

5.2 The preliminary layout of the Project is shown in **Annex 4**.

6. Special Requirements

6.1 The existing two-way traffic on Wai Yip Street should be maintained throughout the construction stage. The existing vegetation on the western side of Wai Yip Street is expected to be affected during the construction of the Project. Reprovision of the vegetation may be required.

6.2 A clear width of not less than 2m should be maintained for the at-grade footpaths on the eastern and western sides of the footbridge throughout the construction stage.

6.3 The TFS for the Project should address the needs of disabled persons (including wheelchair users) for using the proposed footbridge and provide barrier-free access facilities according to the prevailing standards.

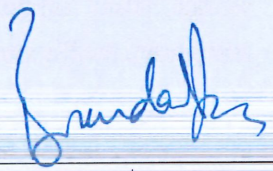
6.4 The detailed design of the proposed footbridge should take into account aesthetic and architectural considerations. Energy-efficient and green features including landscaping along the footbridge should be considered.

6.5 Each of the two staircases should be designed as a stand-alone structure to allow for any possible subsequent demolition of the staircases, in case it is considered necessary, without affecting the main footbridge structure.

6.6 The staircase and related barrier-free access facilities on the eastern side would likely be located within the existing NTK Police Station site. Liaison with LandsD to partly handover the Police Station site should be carried out as necessary. Close liaison with ArchSD for early demolition of the structure on the concerned part of the site would also be needed so that such requirement could be timely incorporated by ArchSD into the demolition works which is anticipated to be commenced in the second half of 2020.

6.7 Interfacing issues with the NTK Police Station and Yip On Factory Estate in the vicinity should be considered.

6.8 Close liaison with the Police and the Transport Department during the course of the Project should also be maintained.



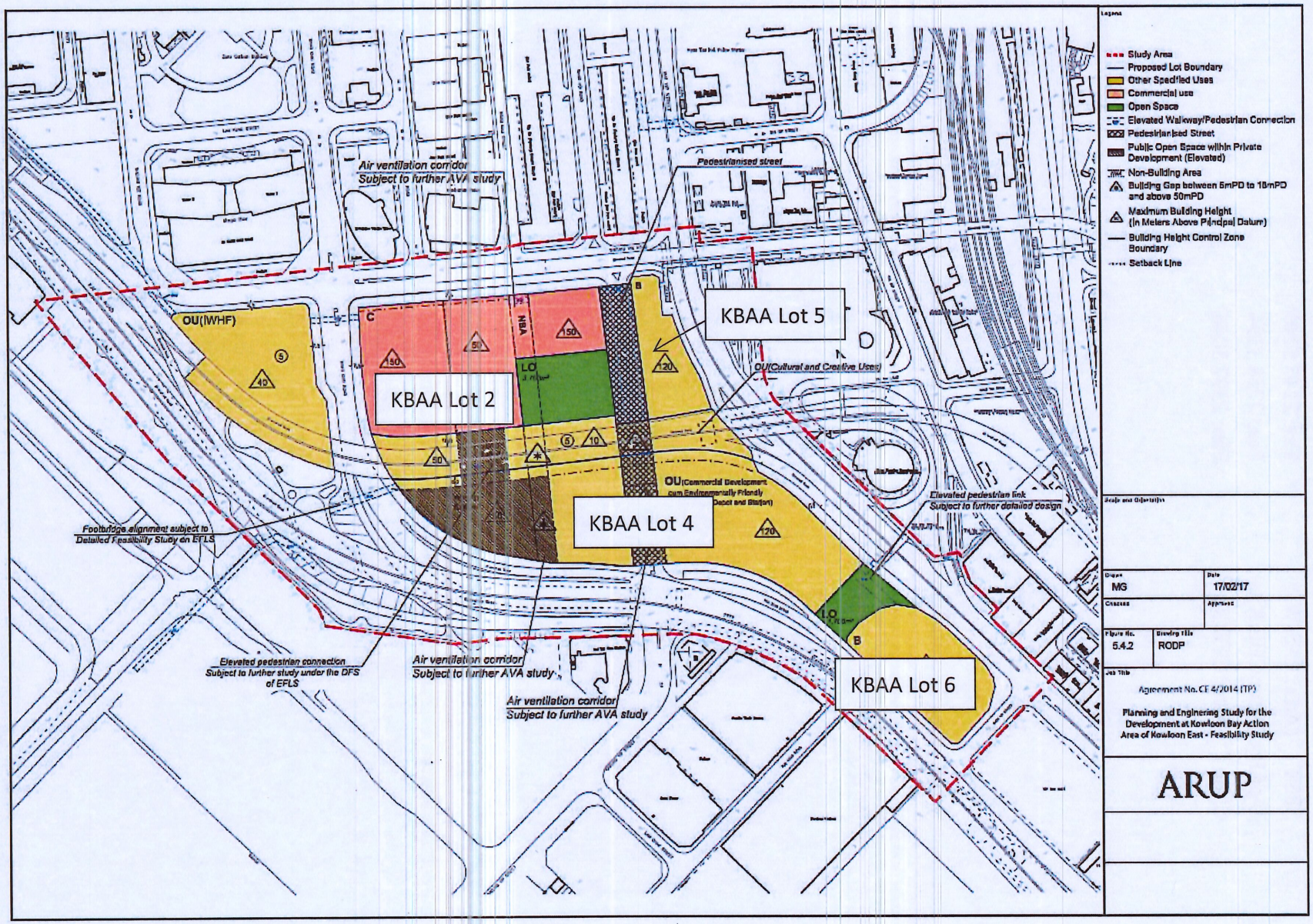
Name:	(Brenda Au)
Title:	Head of Energizing Kowloon East Office
Policy Bureau:	Development Bureau
Contact Tel:	3904 1728
Date:	30 March 2017

Enclosures

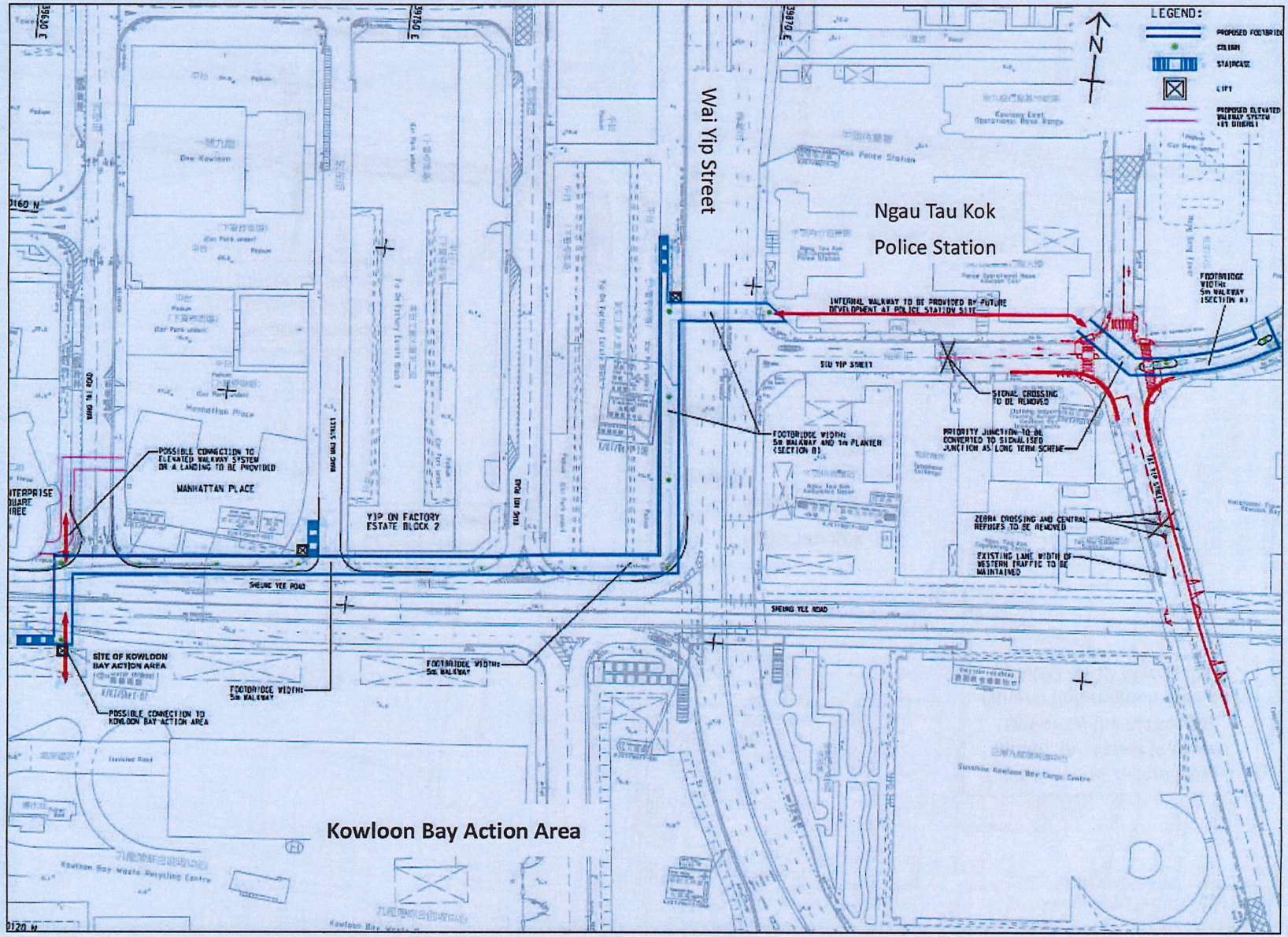
Annex 1	Development of KBAA
Annex 2	Siu Yip Street Link Proposal
Annex 3	Latest proposed modifications to the Siu Yip Street Link
Annex 4	Preliminary Layout of the Project

cc.	SDEV	(Attn: CAS(W)4)	Fax: 2810 5034
	SFST	(Attn: PAS(W))	Fax: 2147 5240
	D of Hy	(Attn: CHE/K)	Fax: 2758 3394
	C for T	(Attn: CTE/K)	Fax: 2397 8046

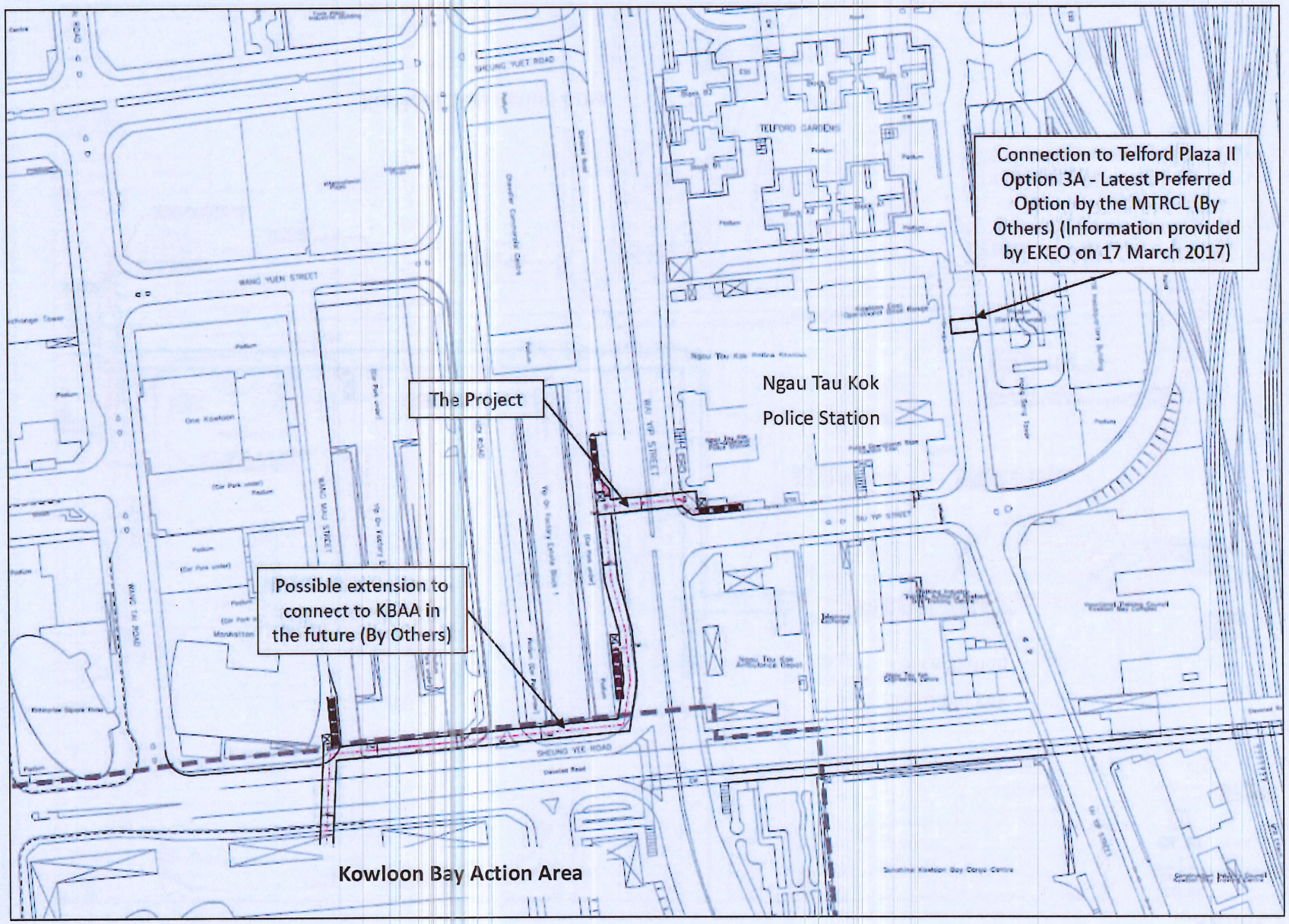
Annex 1

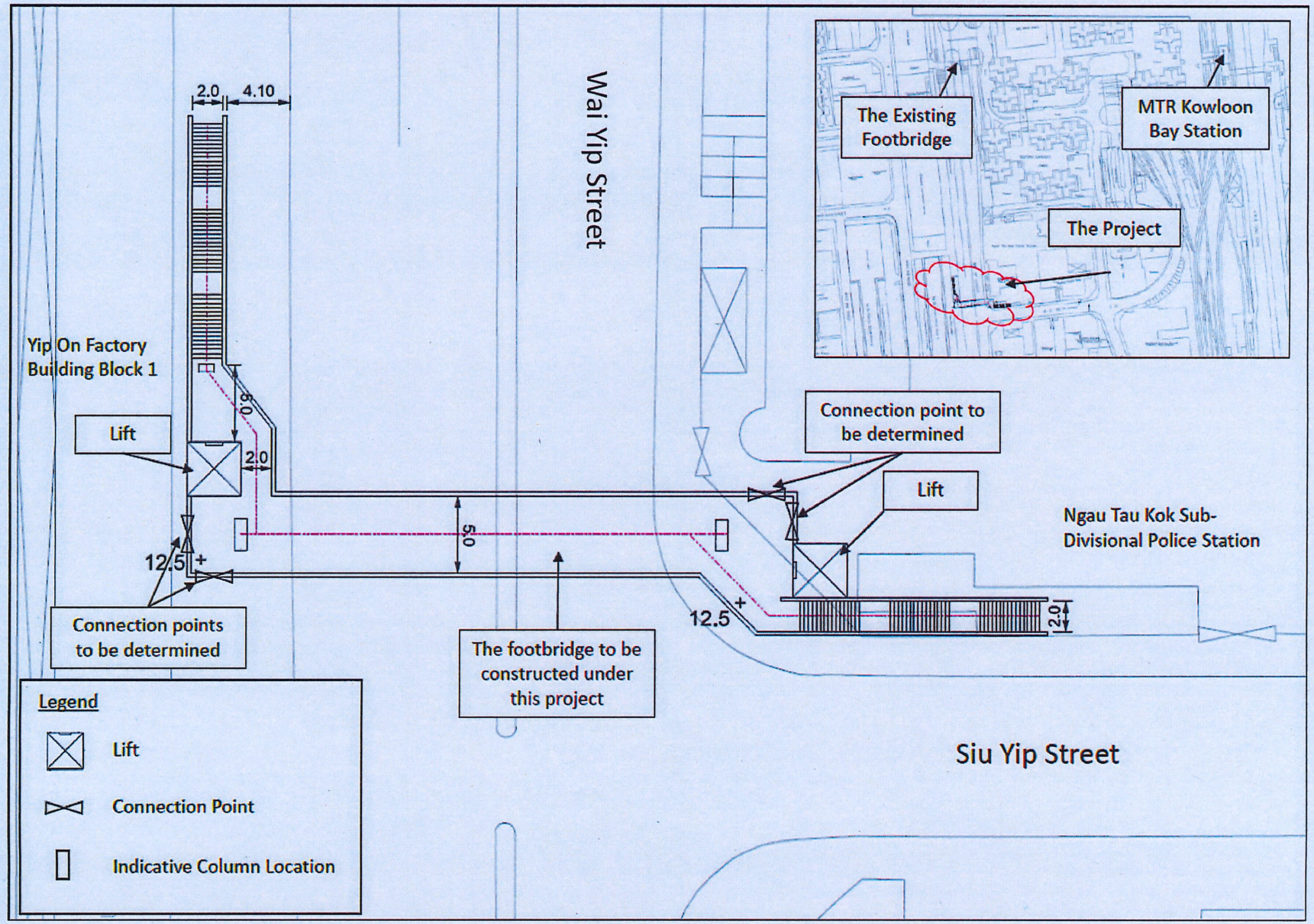

KBAA Lot 2
KBAA Lot 4
KBAA Lot 5
KBAA Lot 6
OU(IWHF)
OU(Cultural and Creative Uses)
OU(Commercial Development cum Environmentally Friendly Depot and Station)
Air ventilation corridor Subject to further AVA study
Pedestrianised street
Elevated pedestrian link Subject to further detailed design
Footbridge alignment subject to Detailed Feasibility Study on EFLS
Elevated pedestrian connection Subject to further study under the DFS of EFLS
Air ventilation corridor Subject to further AVA study
Air ventilation corridor Subject to further AVA study
Legend
Study Area
Proposed Lot Boundary
Other Specified Uses
Commercial use
Open Space
Elevated Walkway/Pedestrian Connection
Pedestrianised Street
Public Open Space within Private Development (Elevated)
Non-Building Area
Building Gap between 5mPD to 15mPD and above 50mPD
Maximum Building Height (in Meters Above Principal Datum)
Building Height Control Zone Boundary
Setback Line
Drawn MG
Date 17/02/17
Figure No. 5.4.2
Drawing Title RODP
Agreement No. CE 4/2014 (TP)
Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
ARUP

Annex 2


Wai Yip Street
Ngau Tau Kok
Police Station
Kowloon Bay Action Area
LEGEND:
N
WAI YIP STREET
SHEUNG YEE ROAD
MANHATTAN PLACE
YIP ON FACTORY ESTATE BLOCK 2
SITE OF KOWLOON BAY ACTION AREA
POSSIBLE CONNECTION TO ELEVATED WALKWAY SYSTEM OR A LANDING TO BE PROVIDED
POSSIBLE CONNECTION TO KOWLOON BAY ACTION AREA
FOOTBRIDGE WIDTH: 5m WALKWAY
FOOTBRIDGE WIDTH: 5m WALKWAY AND 1m PLANTER (SECTION B)
INTERNAL WALKWAY TO BE PROVIDED BY FUTURE DEVELOPMENT AT POLICE STATION SITE
SIGNAL CROSSING TO BE REMOVED
PRIORITY JUNCTION TO BE CONVERTED TO SIGNALISED JUNCTION AS LONG TERM SCHEME
FOOTBRIDGE WIDTH: 5m WALKWAY (SECTION A)
ZEBRA CROSSING AND CENTRAL REFUGES TO BE REMOVED
EXISTING LANE WIDTH OF WESTERN TRAFFIC TO BE MAINTAINED

Annex 3


Connection to Telford Plaza II Option 3A - Latest Preferred Option by the MTRCL (By Others) (Information provided by EKEO on 17 March 2017)
The Project
Ngau Tau Kok Police Station
Possible extension to connect to KBAA in the future (By Others)
Kowloon Bay Action Area


2.0
4.10
Wai Yip Street
The Existing Footbridge
MTR Kowloon Bay Station
The Project
Yip On Factory Building Block 1
Lift
8.0
2.0
Connection point to be determined
Lift
Ngau Tau Kok Sub-Divisional Police Station
5.0
12.5
12.5
2.0
Connection points to be determined
The footbridge to be constructed under this project
Siu Yip Street
Legend
Lift
Connection Point
Indicative Column Location

Appendix B

Junction Calculation Sheets

ARUP

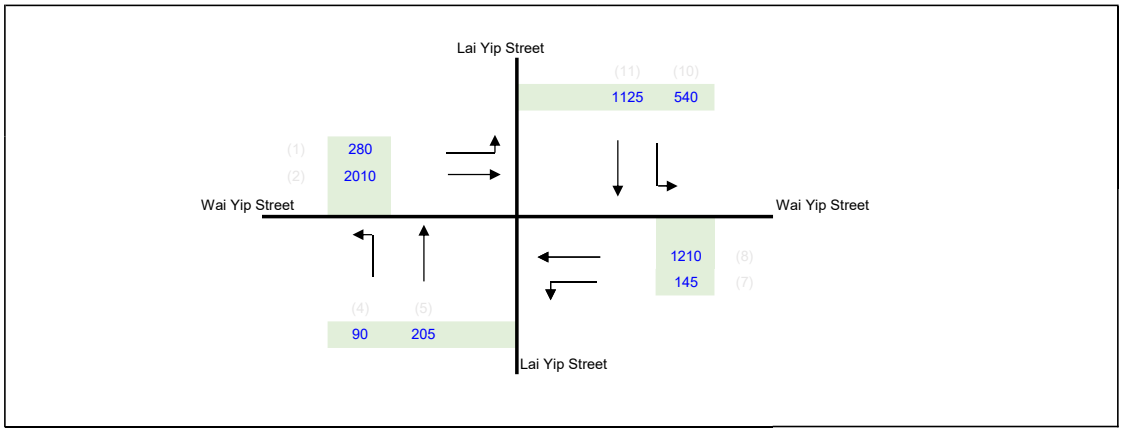
TRAFFIC SIGNAL CALCULATION

PROJECT NO:

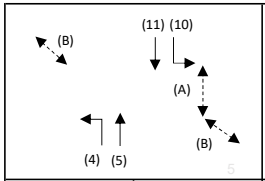
Wai Yip Street / Lai Yip Street

DATE :

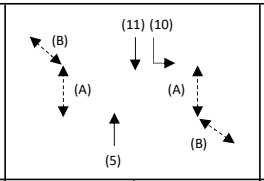
FILENAME :



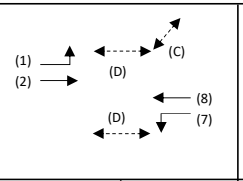
No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	118 sec
Sum(y)		Y =	0.645
Loss time		L =	20 sec
Total Flow		=	5605 pcu
Co	= (1.5*L+5)/(1-Y)	=	98.5 sec
Cm	= L/(1-Y)	=	56.3 sec
Yult		=	0.750
R.C.ult	= (Yult-Y)/Y*100%	=	16.3 %
Cp	= 0.9*L/(0.9-Y)	=	70.5 sec
Ymax	= 1-L/C	=	0.831
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	16.0 % (Optimized)



STAGE 1 | INT=



STAGE 2 | INT= 13



STAGE 3 | INT= 9

STAGE 4 | INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	15	13	6	11	24	6	11	OK
B	5	5	3	5	12	3	5	OK
C	5	5	1	5	27	1	5	OK
D	13	11	5	10	50	5	10	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				20				
4	1	3.50	IV	1	15		N	1965	90			90	1.00	1786			1786	0.050			8	8	0.776	17
5	1,2	3.50	III	1				2105		205		205	0.00	2105			2105	0.097	0.270		15	41	0.280	26
10	1,2	3.50	IV	1	20		N	1965	540			540	1.00	1828		170	1998	0.270		5	41	41	0.776	69
11	1,2	3.50	VII	2				4210		1125		1125	0.00	4210			4210	0.267			41	41	0.767	72
1,2	3	3.50	II	1	20		N	1965	280	434		714	0.39	1909			1909	0.374	0.374		57	57	0.776	73
2	3	3.50	I	2				4210		1576		1576	0.00	4210			4210	0.374			57	57	0.776	80
7,8	3	3.50	II	1	20		N	1965	145	279		424	0.34	1916			1916	0.221			34	57	0.459	43
8	3	3.50	I	2				4210		931		931	0.00	4210			4210	0.221			34	57	0.459	47

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP

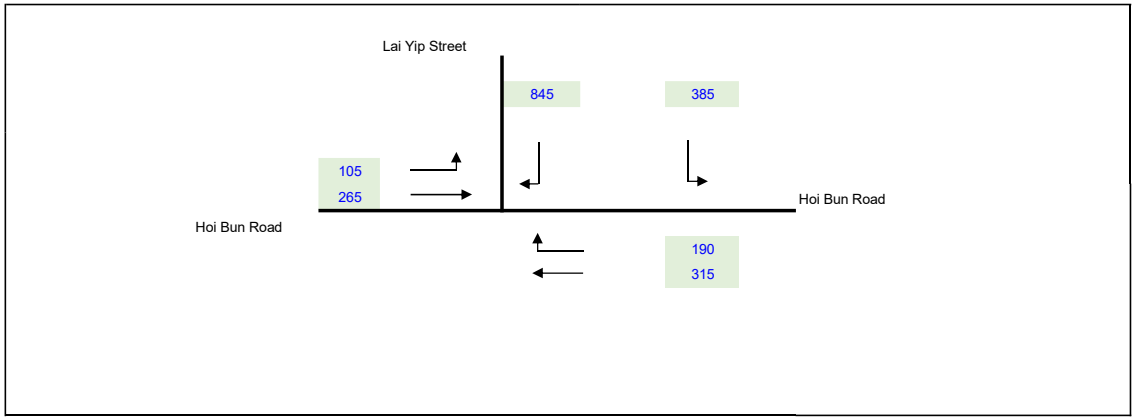
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

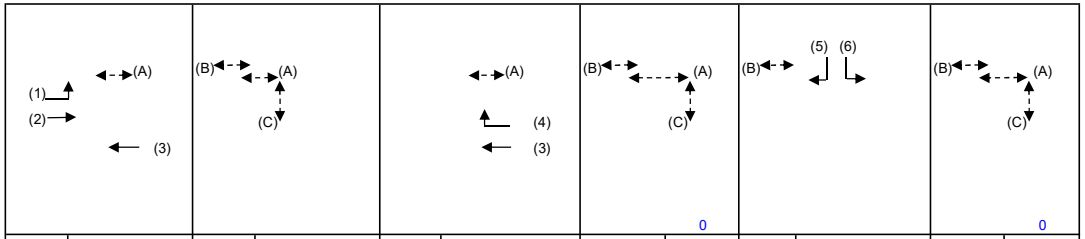
Lai Yip Street / Hoi Bun Road

DATE : 4-Nov-20

FILENAME :



No. of stages per cycle		N =	5
No. of stage using for calculation		N =	3
Cycle time		C =	118 sec
Sum(y)		Y =	0.439
Loss time		L =	37 sec
Total Flow		=	2105 pcu
Co	= (1.5*L+5)/(1-Y)	=	107.8 sec
Cm	= L/(1-Y)	=	65.9 sec
Yult		=	0.623
R.C.ult	= (Yult-Y)/Y*100%	=	41.9 %
Cp	= 0.9*L/(0.9-Y)	=	72.2 sec
Ymax	= 1-L/C	=	0.686
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	40.8 % (Optimized)



STAGE 1	INT= 8	STAGE 2	INT= 0	STAGE 3	INT= 5	STAGE 4	INT=	STAGE 5	INT= 7	STAGE 6	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	10	5	3	8	9	3	8	OK
B	5	5	10	5	5	10	5	OK
C	7	6	4	5	11	4	5	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				17				
1	1	3.50	I	1	15		N	1965	105			105	1.00	1786			1786	0.059			11	23	0.298	17
2	1	3.50	I	1				2105		265		265	0.00	2105			2105	0.126	0.126		23	23	0.639	42
3	1,3	3.50	II, III	1			N	1965		315		315	0.00	1965			1965	0.160			30	43	0.438	39
4	3	3.50	III	1	20			2105			190	190	1.00	1958			1958	0.097	0.097		18	18	0.639	32
5	5	3.50	IV	2	20			4210			845	845	1.00	3916			3916	0.216	0.216		40	40	0.639	55
6	5	3.50	IV	1	15		N	1965	385			385	1.00	1786			1786	0.216			40	40	0.638	50
																	Stage 2 Pedestrian Loss Time			20	(Demand Dependent. Assumed always Called.)			
																	Stage 4 Pedestrian Loss Time				(Demand Dependent. Assumed always Skipped.)			
																	Stage 6 Pedestrian Loss Time				(Demand Dependent. Assumed always Skipped.)			

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP

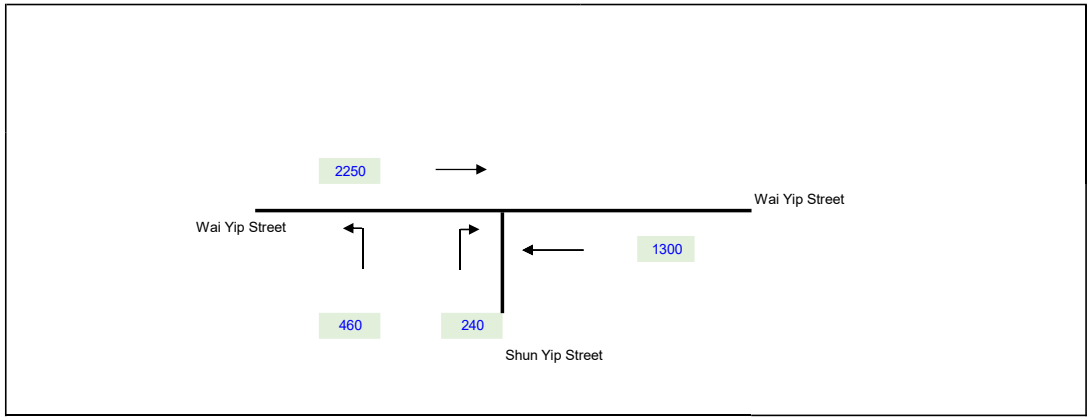
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

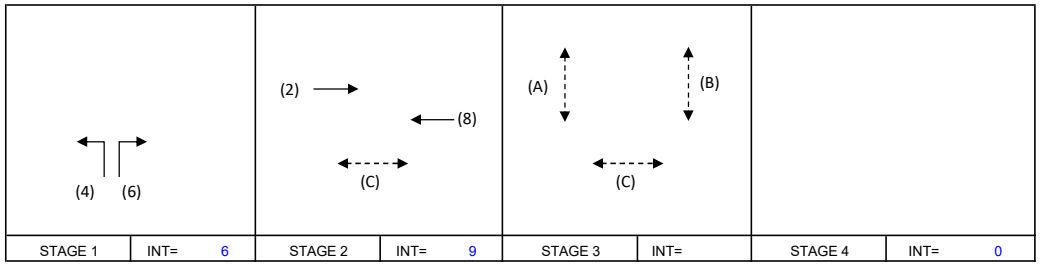
Wai Yip Street / Shun Yip Street

DATE : 4-Nov-20

FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	118 sec
Sum(y)		Y =	0.488
Loss time		L =	33 sec
Total Flow		=	4250 pcu
Co	= (1.5*L+5)/(1-Y)	=	106.5 sec
Cm	= L/(1-Y)	=	64.5 sec
Yult		=	0.653
R.C.ult	= (Yult-Y)/Y*100%	=	33.7 %
Cp	= 0.9*L/(0.9-Y)	=	72.1 sec
Ymax	= 1-L/C	=	0.720
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	32.8 % (Optimized)



STAGE 1	INT= 6	STAGE 2	INT= 9	STAGE 3	INT=	STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	11	10	2	8	78	2	8	OK
B	11	10	2	8	10	2	8	OK
C	10	5	2	8	10	2	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				13				
2	2	3.50	I	3			N	6175		2250		2250	0.00	6175			6175	0.364	0.364		63	63	0.678	68
8	2	3.50	II	3			N	6175		1300		1300	0.00	6175			6175	0.211			37	63	0.391	39
4	1	3.50	III	1	15		N	1965	221			221	1.00	1786			1786	0.124	0.124		22	22	0.678	36
4,6	1	3.50	III	1	30			2105	239		9	248	1.00	2005			2005	0.124			22	22	0.678	40
6	1	3.50	III	1	30		N	1965			231	231	1.00	1871			1871	0.123			21	22	0.676	37
																	Stage 3 Pedestrian Loss Time			20				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP

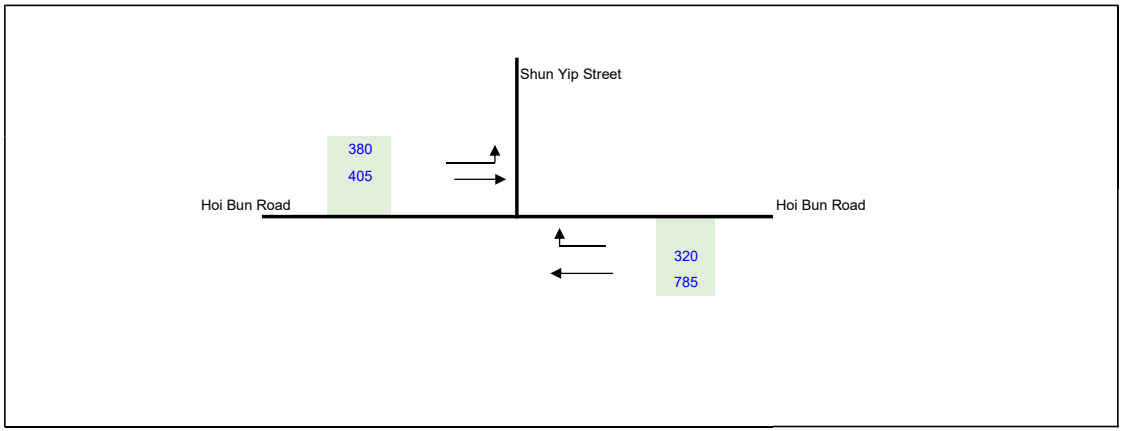
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

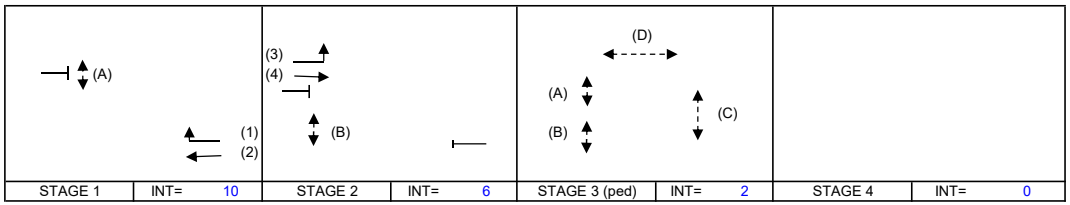
Wai Yip Street / Hoi Bun Road

DATE : 4-Nov-20

FILENAME :



No. of stages per cycle		N =	2
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.488
Loss time		L =	39 sec
Total Flow		=	1890 pcu
Co	= (1.5*L+5)/(1-Y)	=	124.1 sec
Cm	= L/(1-Y)	=	76.2 sec
Yult		=	0.608
R.C.ult	= (Yult-Y)/Y*100%	=	24.4 %
Cp	= 0.9*L/(0.9-Y)	=	85.2 sec
Ymax	= 1-L/C	=	0.675
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	24.4 % (Optimized)



STAGE 1	INT= 10	STAGE 2	INT= 6	STAGE 3 (ped)	INT= 2	STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	0	6	70	0	6	OK
B	7	5	3	6	56	3	6	OK
C	7	6	3	5	15	3	5	OK
D	10	6	5	12	6	5	12	OK

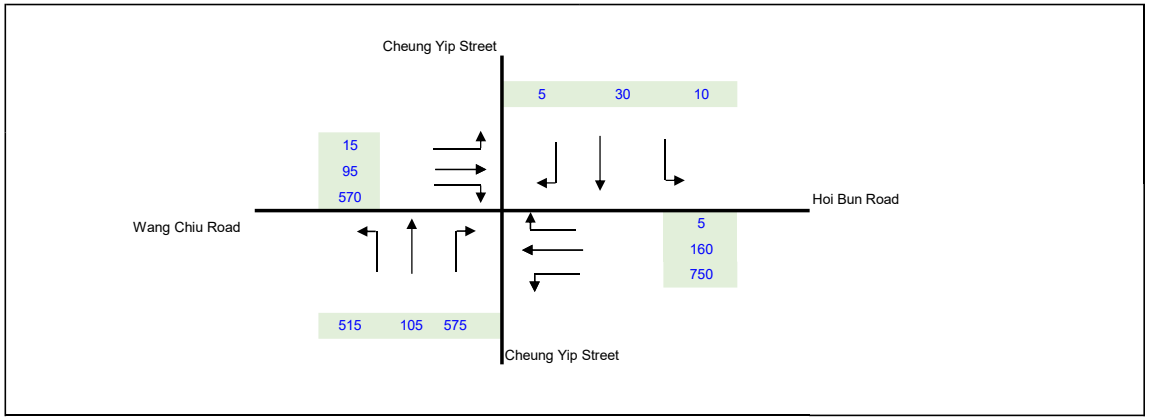
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
1,2	1	3.50	I	1	30			2105		244	320	564	0.57	2047			2047	0.276	0.276		46	46	0.723	70
2	1	3.50	I	1			N	1965		541		541	0.00	1965			1965	0.275			46	46	0.723	67
3	2	3.50	II	1	15		N	1965	380			380	1.00	1786			1786	0.213	0.213		35	35	0.723	54
3,4	2	3.50	II	1	20			2105		405		405	0.00	2105			2105	0.192			32	35	0.654	57
																		Pedestrian Stage 3		23				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

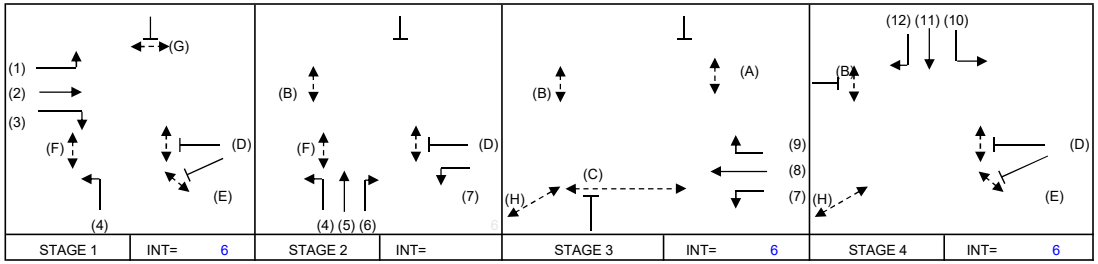
ARUP | TRAFFIC SIGNAL CALCULATION

PROJECT NO:

Cheung Yip Street / Hoi Bun Road | DATE : | FILENAME :



No. of stages per cycle	N =	4	
No. of stage using for calculation	N =	3	
Cycle time	C =	118	sec
Sum(y)	Y =	0.554	
Loss time	L =	19	sec
Total Flow	=	2835	pcu
Co = (1.5*L+5)/(1-Y)	=	75.1	sec
Cm = L/(1-Y)	=	42.6	sec
Yult	=	0.758	
R.C.ult = (Yult-Y)/Y*100%	=	36.8	%
Cp = 0.9*L/(0.9-Y)	=	49.4	sec
Ymax = 1-L/C	=	0.839	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	36.4	% (Optimized)



STAGE 1	INT= 6	STAGE 2	INT=	STAGE 3	INT= 6	STAGE 4	INT= 6

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	6	6	39	6	6	OK
B	7	5	2	6	146	2	6	OK
C	11	10	0	8	43	0	8	OK
D	5	5	1	5	133	1	5	OK
E	7	5	1	6	132	1	6	OK
F	5	5	4	5	28	4	5	OK
G	10	5	1	8	116	1	8	OK
H	7	5	1	6	12	1	6	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				15				
1,2,3	1	3.50	I	1	15		N	1965	15	95	215	325	0.71	1835			1835	0.177	0.177		32	32	0.660	47
3	1	3.50	I	1	30			2105			355	355	1.00	2005			2005	0.177			32	32	0.660	51
4	1,2	3.50	II	1	15		N	1965	515			515	1.00	1786			1786	0.288			52	84	0.404	29
5,6	2	3.50	II	2	35			4210		105	351	456	0.77	4076			4076	0.112			20	46	0.284	27
6	2	3.50	II	1	30			2105			224	224	1.00	2005			2005	0.112			20	46	0.284	27
7	2,3	3.50	III	1	15		N	1965	750			750	1.00	1786		260	2046	0.367	0.367		66	66	0.660	66
8,9	3	3.50	III	1	30			2105		160	5	165	0.03	2102			2102	0.079			14	14	0.660	29
10,11	4	3.50	III	1	15		N	1965	10	9		19	0.53	1867			1867	0.010	0.010	4	2	6	0.206	4
11	4	3.50	III	1	30			2105		21		21	0.00	2105			2105	0.010			2	6	0.202	4
12	4	3.50	III	1	30			2105			5	5	1.00	2005			2005	0.002			0	6	0.051	1

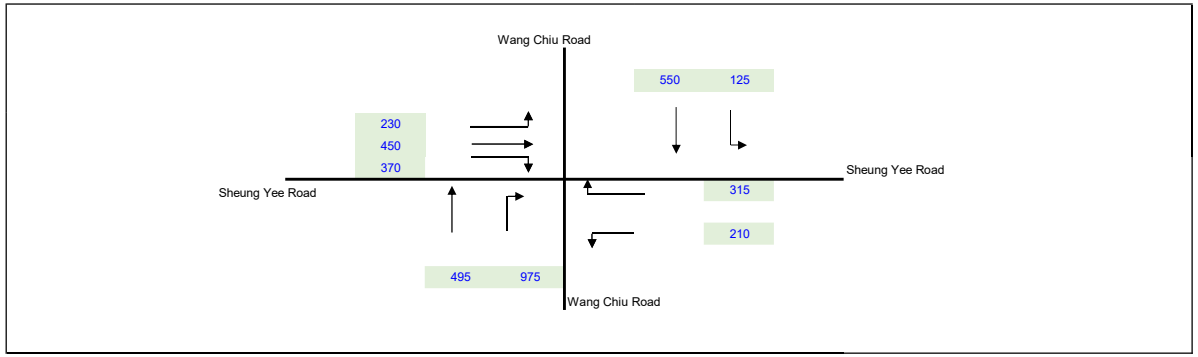
NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS | TRAFFIC SIGNAL CALCULATION

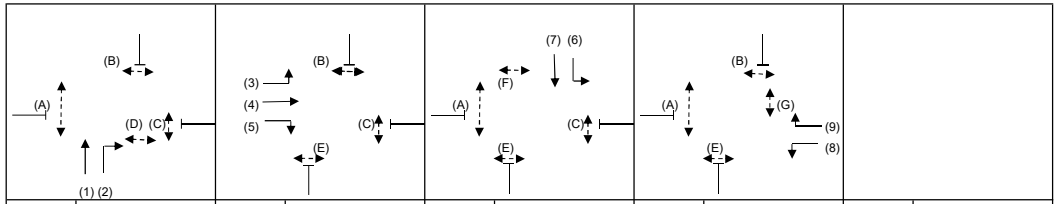
PROJECT NO: 237938

Wang Chiu Road / Sheung Yee Road

DATE : 4-Nov-20 | FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	120 sec
Sum(y)		Y =	0.563
Loss time		L =	26 sec
Total Flow		=	3720 pcu
Co	= (1.5*L+5)/(1-Y)	=	100.7 sec
Cm	= L/(1-Y)	=	59.5 sec
Yult		=	1.005
R.C.ult	= (Yult-Y)/Y*100%	=	78.5 %
Cp	= 0.9*L/(0.9-Y)	=	69.5 sec
Ymax	= 1-L/C	=	0.783
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	25.2 %

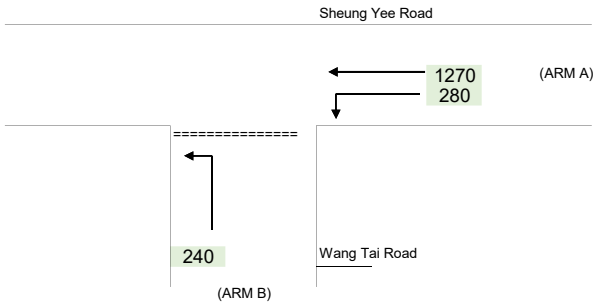


Stage 1	Int =	5	Stage 2	Int =	8	Stage 3	Int =	8	Stage 4	Int =	9	Stage 5	Int =	0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	16	7	2	13	79	2	13	OK
B	10	5	2	8	84	2	8	OK
C	10	5	2	8	87	2	8	OK
D	10	5	8	8	29	8	8	OK
E	10	5	3	8	64	3	8	OK
F	7	5	6	6	14	6	6	OK
G	7	5	6	6	11	6	6	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				26				
1	1	3.50	I	1			N	1965		482		482	0.00	1965			1965	0.245	0.245		41	41	0.718	69
1, 2	1	3.50	I	1	35			2105		13	483	496	0.97	2021			2021	0.245			41	41	0.719	71
2	1	3.50	I	1	30			2105			492	492	1.00	2005			2005	0.245			41	41	0.719	71
3	2	3.50	II	1	15		N	1965	203			203	1.00	1786			1786	0.114	0.114		19	19	0.717	40
3,4	2	3.50	II	1	18			2105	27	210		237	0.11	2085			2085	0.114			19	19	0.717	46
4	2	3.50	II	1	35			2105		240		240	0.00	2105			2105	0.114			19	19	0.719	46
5	2	3.50	II	2	30		N	4070			370	370	1.00	3876			3876	0.095			16	19	0.602	31
6,7	3	3.50	III	1	15		N	1965	125	81		206	0.61	1853			1853	0.111	0.111		19	19	0.718	41
7	3	3.50	III	2				4210		469		469	0.00	4210			4210	0.111			19	19	0.719	43
8	4	3.50	IV	1	15		N	1965	164			164	1.00	1786			1786	0.092	0.092		15	15	0.715	35
8,9	4	3.50	III	1	15			2105	46		130	176	1.00	1914			1914	0.092			15	15	0.717	37
9	4	3.50	IV	1	30			2105			185	185	1.00	2005			2005	0.092			15	15	0.719	38

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		Project No. : 237938	
Wang Tak Road / Sheung Yee Road		DATE : 4-Nov-20	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.90	(metres)
W cr	=	0	(metres)
q a-b	=	280	(pcu/hr)
q a-c	=	1270	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	6.20	(metres)
Vl b-a	=	45	(metres)
Vr b-a	=	45	(metres)
Vr b-c	=	50	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	240	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.574
E	=	1.162
F	=	0.586
Y	=	0.727

THE CAPACITY OF MOVEMENT :

Q b-a	=	150
Q b-c	=	441
Q c-b	=	196
Q b-ac	=	441

TOTAL FLOW = 1790 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

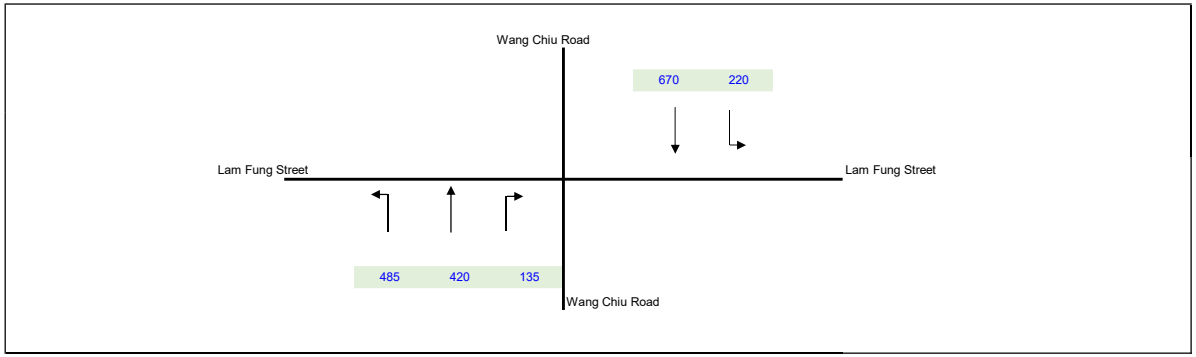
DFC b-a	=	0.0000
DFC b-c	=	0.5442
DFC c-b	=	0.0000
DFC b-ac	=	0.5442

CRITICAL DFC = 0.54

OVE ARUP & PARTNERS | TRAFFIC SIGNAL CALCULATION

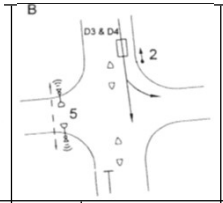
PROJECT NO: 237938

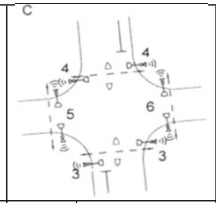
Wang Chiu Road / Lam Fung Road | DATE : 4-Nov-20 | FILENAME:



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.402
Loss time		L =	34 sec
Total Flow		=	1930 pcu
Co	= (1.5*L+5)/(1-Y)	=	93.6 sec
Cm	= L/(1-Y)	=	56.9 sec
Yult		=	0.945
R.C.ult	= (Yult-Y)/Y*100%	=	135.1 %
Cp	= 0.9*L/(0.9-Y)	=	61.4 sec
Ymax	= 1-L/C	=	0.717
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	60.4 %







Stage 1	Int = 5	Stage 2	Int = 9	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

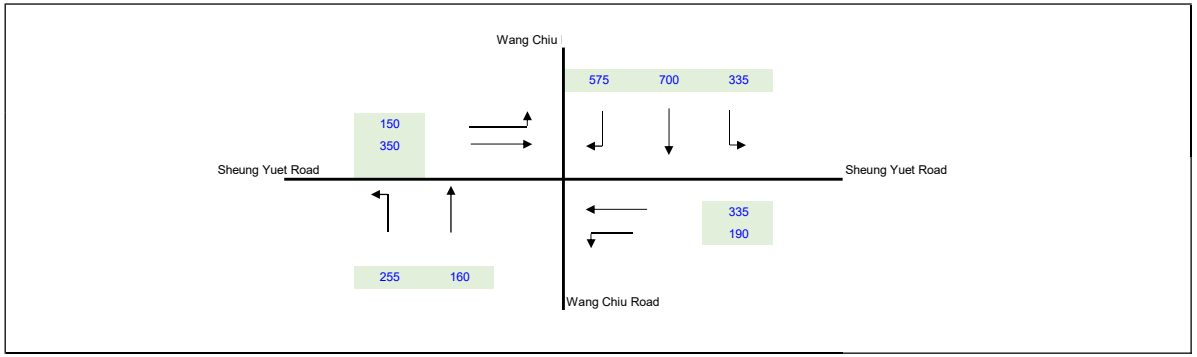
Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	11	10	4	8	10	4	8	OK
4	8	7	0	5	17	0	5	OK
5	9	5	6	8	64	6	8	OK
6	9	5	2	8	12	2	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1	1	3.50	I	1	15		N	1965	317			317	1.00	1786			1786	0.177	0.178		38	38	0.560	43
1,2	1	3.50	I	1	18			2105	168	192		360	0.47	2026			2026	0.178			38	38	0.561	49
2,3	1	3.50	I	1	18			2105		228	135	363	0.37	2042			2042	0.178			38	38	0.561	50
4,5	2	3.50	II	1	15		N	1965	220	198		418	0.53	1867			1867	0.224	0.224		48	48	0.560	50
5	2	3.50	II	1				2105		472		472	0.00	2105			2105	0.224			48	48	0.561	57
																	Stage 3 Pedestrian Stage			22				

OVE ARUP & PARTNERS | TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

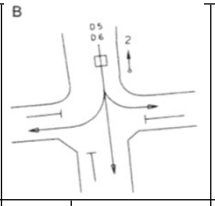
Wang Chiu Road / Sheung Yuet Road | DATE : 4-Nov-20 | FILENAME:



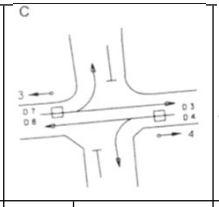
No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	140 sec
Sum(y)		Y =	0.662
Loss time		L =	41 sec
Total Flow		=	3050 pcu
Co	= (1.5*L+5)/(1-Y)	=	196.9 sec
Cm	= L/(1-Y)	=	121.4 sec
Yult		=	0.893
R.C.ult	= (Yult-Y)/Y*100%	=	34.8 %
Cp	= 0.9*L/(0.9-Y)	=	155.2 sec
Ymax	= 1-L/C	=	0.707
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	-3.9 %



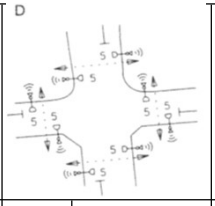
Stage 1 | Int = 6



Stage 2 | Int = 7



Stage 3 | Int = 9



Stage 4 | Int =

Stage 5 | Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	3	9	10	3	9	OK

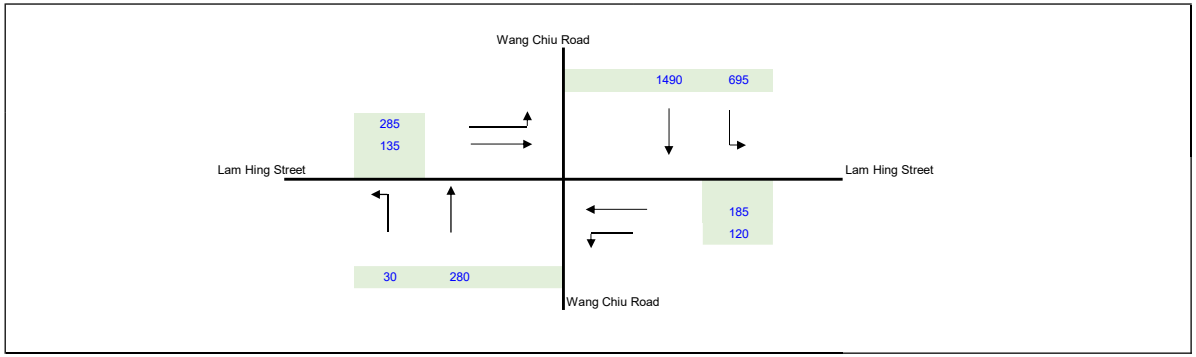
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				19				
4,5	1	3.50	I	1	15		N	1965	255	0		255	1.00	1786			1786	0.143	0.143		21	21	0.937	98
5	1	3.50	I	1				2105		160		160	0.00	2105			2105	0.076			11	21	0.499	32
10,11	2	3.50	I	1	15		N	1965	335	389		724	0.46	1878			1878	0.385	0.386		58	58	0.936	129
11,12	2	3.50	II	1	20			2105		311	575	886	0.65	2007		290	2297	0.386			58	58	0.937	152
7,8	3	3.50	II	1	15		N	1965	190	54		244	0.78	1823			1823	0.134	0.134		20	20	0.937	92
8	3	3.50	II	1				2105		281		281	0.00	2105			2105	0.133			20	20	0.934	96
1,2	3	3.50	II	1	15		N	1965	150	84		234	0.64	1847			1847	0.127			19	20	0.887	65
2	3	3.50	III	1				2105		266		266	0.00	2105			2105	0.126			19	20	0.884	71
																	Stage 4 Pedestrian Stage			22				

OVE ARUP & PARTNERS | TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

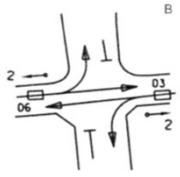
Wang Chiu Road / Lam Hing Road

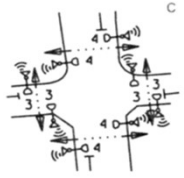
DATE : 4-Nov-20 | FILENAME:



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	140 sec
Sum(y)		Y =	0.608
Loss time		L =	33 sec
Total Flow		=	3220 pcu
Co	= (1.5*L+5)/(1-Y)	=	139.1 sec
Cm	= L/(1-Y)	=	84.2 sec
Yult		=	0.953
R.C.ult	= (Yult-Y)/Y*100%	=	56.6 %
Cp	= 0.9*L/(0.9-Y)	=	101.7 sec
Ymax	= 1-L/C	=	0.764
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	13.1 %







Stage 1	Int = 6	Stage 2	Int = 8	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

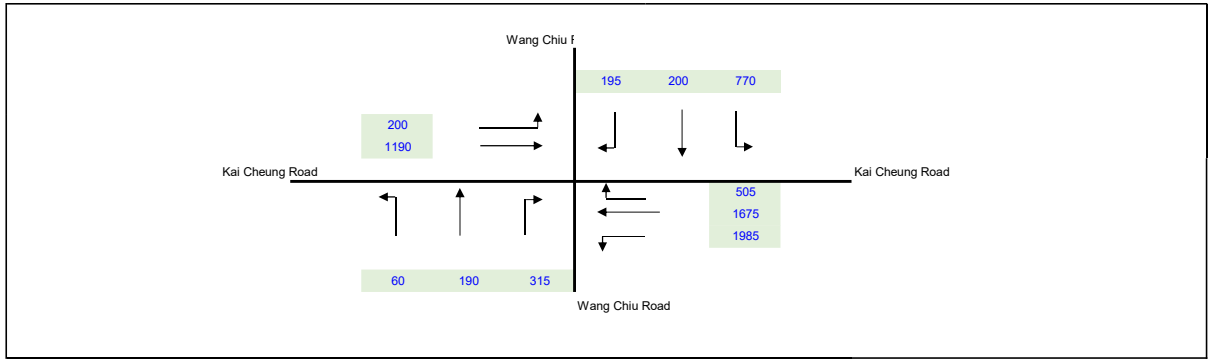
Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	5	5	3	5	13	3	5	OK
4	11	10	3	8	10	3	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1,2	1	3.50	I	1	15		N	1965	30	118		148	0.20	1926			1926	0.077	0.389		14	68	0.157	18
2	1	3.50	I	1				2105		162		162	0.00	2105			2105	0.077			14	68	0.157	19
4	1	3.50	I	1	15		N	1965	695			695	1.00	1786			1786	0.389			68	68	0.796	89
5	1	3.50	I	2				4210		1490		1490	0.00	4210			4210	0.354			62	68	0.724	89
3	2	4.00	II	1	15		N	2015	120	185		305	0.39	1939			1939	0.157	0.219		28	39	0.571	52
6	2	4.00	II	1	20		N	2015	285	135		420	0.68	1917			1917	0.219			39	39	0.796	77
																	Stage 3 Pedestrian Stage			21				

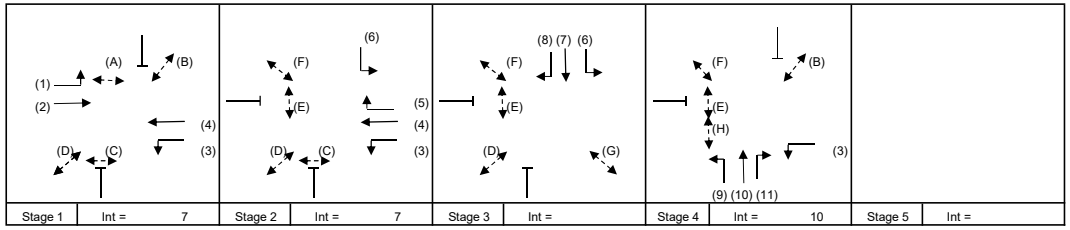
OVE ARUP & PARTNERS | TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

Wang Chiu Road / Kai Cheung Road | DATE : 4-Nov-20 | FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	140 sec
Sum(y)		Y =	0.678
Loss time		L =	21 sec
Total Flow		=	7285 pcu
Co	= (1.5*L+5)/(1-Y)	=	113.5 sec
Cm	= L/(1-Y)	=	65.3 sec
Yult		=	1.043
R.C.ult	= (Yult-Y)/Y*100%	=	53.7 %
Cp	= 0.9*L/(0.9-Y)	=	85.3 sec
Ymax	= 1-L/C	=	0.850
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	12.8 %

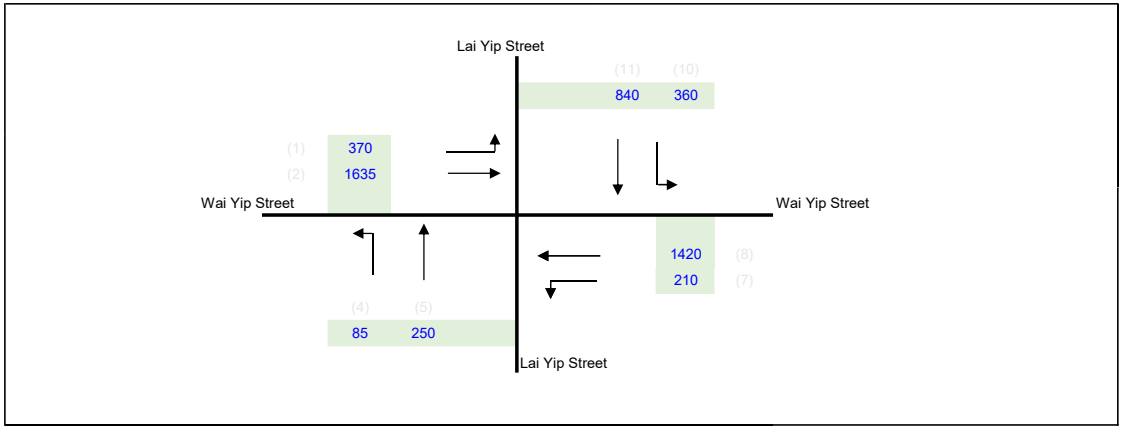


Stage 1	Int = 7	Stage 2	Int = 7	Stage 3	Int =	Stage 4	Int = 10	Stage 5	Int =

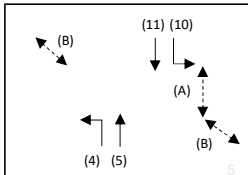
Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	8	7	3	5	31	3	5	OK
B	7	5	3	6	107	3	6	OK
C	11	10	2	8	80	2	8	OK
D	4	5	2	5	107	2	5	OK
E	10	5	2	8	91	2	8	OK
F	4	5	2	5	94	2	5	OK
G	7	5	3	6	15	3	6	OK
H	10	5	4	8	14	4	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				21				
1	1	3.50	I	1	25		N	1965	200			200	1.00	1854			1854	0.108	0.188		19	33	0.457	36
2	1	3.50	I	3				6315		1190		1190	0.00	6315			6315	0.188			33	33	0.798	73
3	1,2,4	3.50	I	2	25		N	4070	1985			1985	1.00	3840			3840	0.517			91	112	0.646	46
4	1,2	3.50	II	3				6315		1675		1675	0.00	6315			6315	0.265			47	86	0.430	50
5	2	3.50	II	1	20			2105			505	505	1.00	1958			1958	0.258			45	45	0.798	86
6	2,3	3.50	II	1	25		N	1965	770			770	1.00	1854		100	1954	0.394	0.394		69	69	0.798	97
7	3	3.50	II	1				2105		200		200	0.00	2105			2105	0.095			17	13	1.032	96
7,8	3	3.50	III	1	25			2105		0	195	195	1.00	1986			1986	0.098			17	13	1.066	107
9,10	4	3.50	III	1	25		N	1965	60	124		184	0.33	1927			1927	0.095	0.096		17	17	0.795	44
10,11	4	3.50	III	1	25			2105		66	128	194	0.66	2025			2025	0.096			17	17	0.798	46
11	4	3.50	III	1	20			2105			187	187	1.00	1958			1958	0.095			17	17	0.795	44

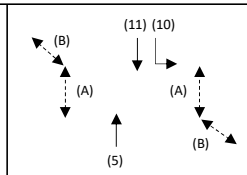
ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO:	
Wai Yip Street / Lai Yip Street		DATE :	FILENAME :



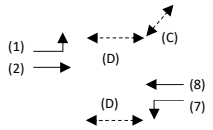
No. of stages per cycle	N =	3
No. of stage using for calculation	N =	2
Cycle time	C =	118 sec
Sum(y)	Y =	0.529
Loss time	L =	20 sec
Total Flow	=	5170 pcu
Co = (1.5*L+5)/(1-Y)	=	74.3 sec
Cm = L/(1-Y)	=	42.4 sec
Yult	=	0.750
R.C.ult = (Yult-Y)/Y*100%	=	41.8 %
Cp = 0.9*L/(0.9-Y)	=	48.5 sec
Ymax = 1-L/C	=	0.831
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	41.4 % (Optimized)



STAGE 1 INT= 5



STAGE 2 INT= 13



STAGE 3 INT= 9

STAGE 4 INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	15	13	6	11	19	6	11	OK
B	5	5	3	5	13	3	5	OK
C	5	5	1	5	37	1	5	OK
D	13	11	5	10	54	5	10	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				20				
4	1	3.50	IV	1	15		N	1965	85			85	1.00	1786			1786	0.048			9	9	0.637	15
5	1,2	3.50	III	1				2105		250		250	0.00	2105			2105	0.119	0.200		22	37	0.379	34
10	1,2	3.50	IV	1	20		N	1965	360			360	1.00	1828		170	1998	0.180		5	33	37	0.575	49
11	1,2	3.50	VII	2				4210		840		840	0.00	4210			4210	0.200			37	37	0.637	57
1,2	3	3.50	II	1	20		N	1965	370	249		619	0.60	1881			1881	0.329	0.329		61	61	0.636	59
2	3	3.50	I	2				4210		1386		1386	0.00	4210			4210	0.329			61	61	0.637	66
7,8	3	3.50	II	1	20		N	1965	210	298		508	0.41	1906			1906	0.267			49	61	0.515	48
8	3	3.50	I	2				4210		1122		1122	0.00	4210			4210	0.267			49	61	0.515	53

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP

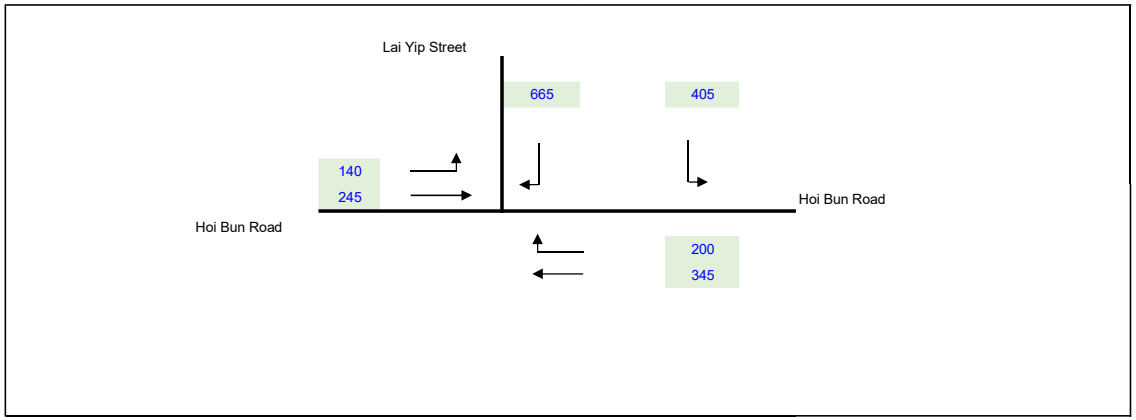
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

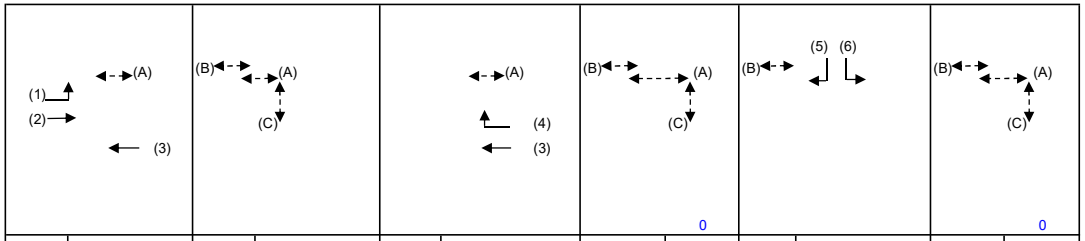
Lai Yip Street / Hoi Bun Road

DATE : 4-Nov-20

FILENAME :



No. of stages per cycle		N =	5
No. of stage using for calculation		N =	3
Cycle time		C =	118 sec
Sum(y)		Y =	0.445
Loss time		L =	37 sec
Total Flow		=	2000 pcu
Co	= (1.5*L+5)/(1-Y)	=	109.1 sec
Cm	= L/(1-Y)	=	66.7 sec
Yult		=	0.623
R.C.ult	= (Yult-Y)/Y*100%	=	39.8 %
Cp	= 0.9*L/(0.9-Y)	=	73.2 sec
Ymax	= 1-L/C	=	0.686
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	38.8 % (Optimized)



STAGE 1	INT= 8	STAGE 2	INT= 0	STAGE 3	INT= 5	STAGE 4	INT=	STAGE 5	INT= 7	STAGE 6	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	10	5	3	8	9	3	8	OK
B	5	5	10	5	5	10	5	OK
C	7	6	4	5	11	4	5	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				17				
1	1	3.50	I	1	15		N	1965	140			140	1.00	1786			1786	0.078			14	21	0.437	23
2	1	3.50	I	1				2105		245		245	0.00	2105			2105	0.116	0.116		21	21	0.649	40
3	1,3	3.50	II, III	1			N	1965		345		345	0.00	1965			1965	0.176			32	42	0.496	44
4	3	3.50	III	1	20			2105			200	200	1.00	1958			1958	0.102	0.102		19	19	0.649	33
5	5	3.50	IV	2	20			4210			665	665	1.00	3916			3916	0.170	0.227		31	41	0.486	43
6	5	3.50	IV	1	15		N	1965	405			405	1.00	1786			1786	0.227			41	41	0.649	52
																	Stage 2 Pedestrian Loss Time			20	(Demand Dependent. Assumed always Called.)			
																	Stage 4 Pedestrian Loss Time				(Demand Dependent. Assumed always Skipped.)			
																	Stage 6 Pedestrian Loss Time				(Demand Dependent. Assumed always Skipped.)			

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP

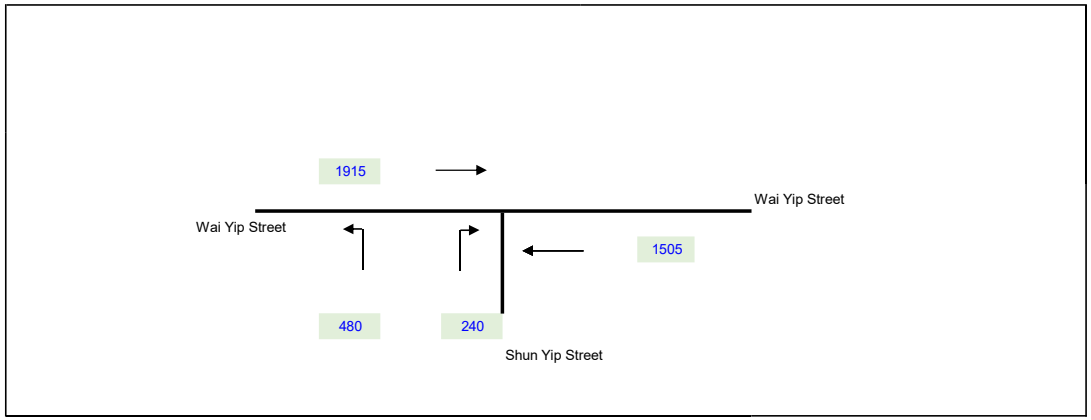
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

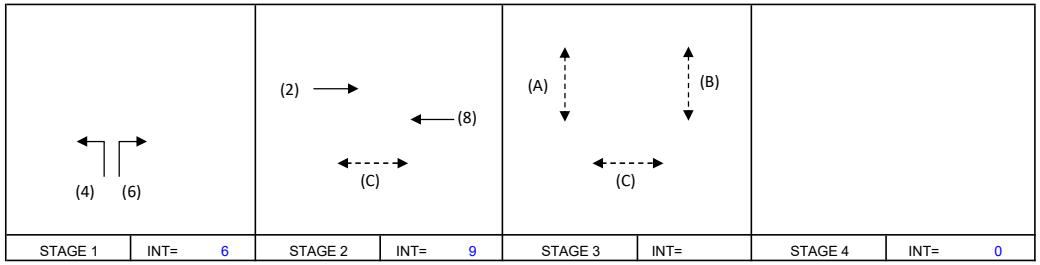
Wai Yip Street / Shun Yip Street

DATE : 4-Nov-20

FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	118 sec
Sum(y)		Y =	0.437
Loss time		L =	33 sec
Total Flow		=	4140 pcu
Co	= (1.5*L+5)/(1-Y)	=	96.9 sec
Cm	= L/(1-Y)	=	58.6 sec
Yult		=	0.653
R.C.ult	= (Yult-Y)/Y*100%	=	49.2 %
Cp	= 0.9*L/(0.9-Y)	=	64.2 sec
Ymax	= 1-L/C	=	0.720
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	48.2 % (Optimized)



STAGE 1	INT= 6	STAGE 2	INT= 9	STAGE 3	INT=	STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	11	10	2	8	75	2	8	OK
B	11	10	2	8	10	2	8	OK
C	10	5	2	8	10	2	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				13				
2	2	3.50	I	3			N	6175		1915		1915	0.00	6175			6175	0.310	0.310		60	60	0.607	61
8	2	3.50	II	3			N	6175		1505		1505	0.00	6175			6175	0.244			47	60	0.477	48
4	1	3.50	III	1	15		N	1965	227			227	1.00	1786			1786	0.127	0.127		25	25	0.607	35
4,6	1	3.50	III	1	30			2105	253		2	255	1.00	2005			2005	0.127			25	25	0.607	40
6	1	3.50	III	1	30		N	1965			238	238	1.00	1871			1871	0.127			25	25	0.607	37
																	Stage 3 Pedestrian Loss Time			20				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP

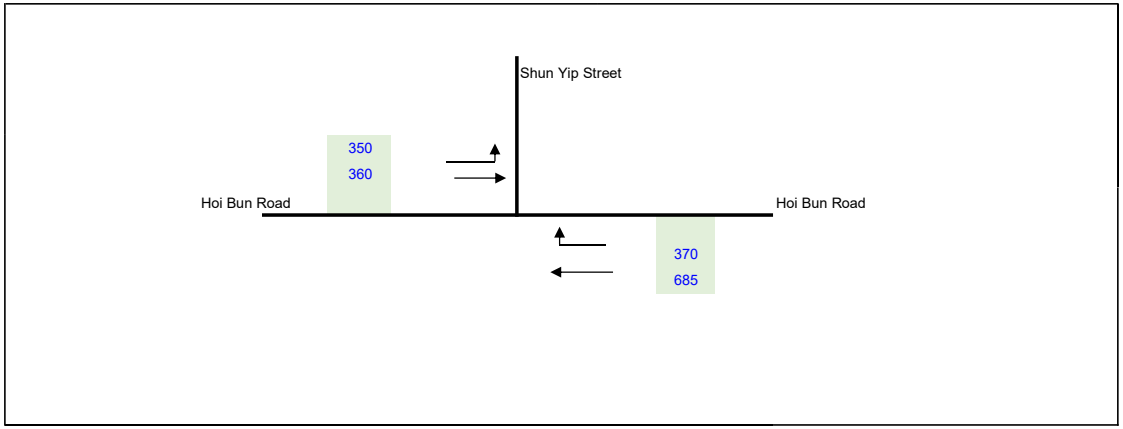
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

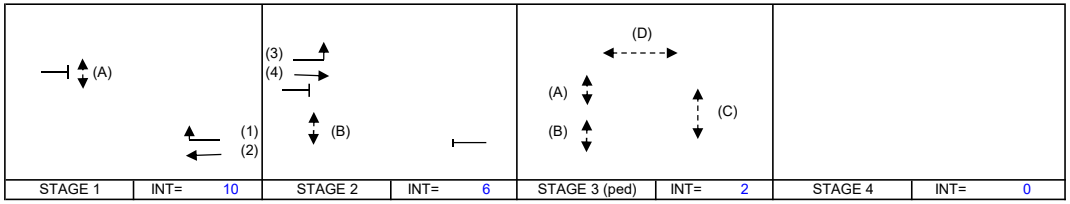
Wai Yip Street / Hoi Bun Road

DATE : 4-Nov-20

FILENAME :



No. of stages per cycle		N =	2
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.460
Loss time		L =	39 sec
Total Flow		=	1765 pcu
Co	= (1.5*L+5)/(1-Y)	=	117.6 sec
Cm	= L/(1-Y)	=	72.2 sec
Yult		=	0.608
R.C.ult	= (Yult-Y)/Y*100%	=	32.1 %
Cp	= 0.9*L/(0.9-Y)	=	79.7 sec
Ymax	= 1-L/C	=	0.675
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	32.1 % (Optimized)



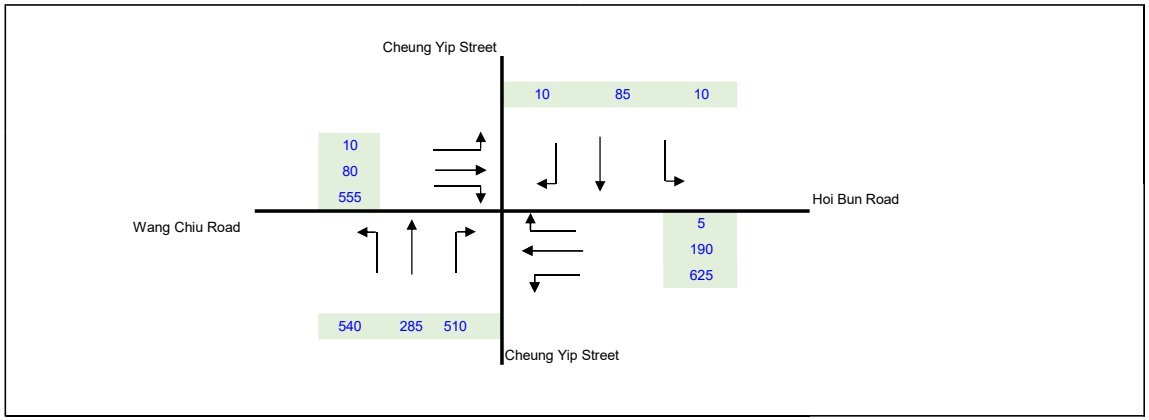
STAGE 1	INT= 10	STAGE 2	INT= 6	STAGE 3 (ped)	INT= 2	STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	0	6	70	0	6	OK
B	7	5	3	6	56	3	6	OK
C	7	6	3	5	15	3	5	OK
D	10	6	5	12	6	5	12	OK

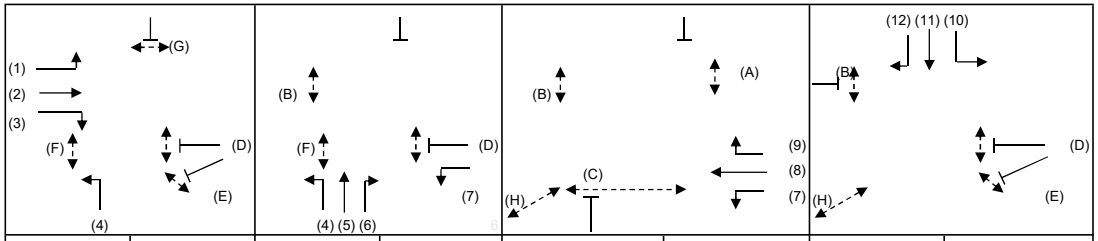
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
1,2	1	3.50	I	1	30			2105		167	370	537	0.69	2035			2035	0.264	0.264		46	46	0.681	66
2	1	3.50	I	1			N	1965		518		518	0.00	1965			1965	0.264			46	46	0.680	63
3	2	3.50	II	1	15		N	1965	350			350	1.00	1786			1786	0.196	0.196		35	35	0.681	50
3,4	2	3.50	II	1	20			2105		360		360	0.00	2105			2105	0.171			30	35	0.595	51
																		Pedestrian Stage 3		23				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO:	
Cheung Yip Street / Hoi Bun Road		DATE :	FILENAME :



No. of stages per cycle	N =	4	
No. of stage using for calculation	N =	3	
Cycle time	C =	118	sec
Sum(y)	Y =	0.495	
Loss time	L =	16	sec
Total Flow	=	2905	pcu
Co = (1.5*L+5)/(1-Y)	=	57.4	sec
Cm = L/(1-Y)	=	31.7	sec
Yult	=	0.780	
R.C.ult = (Yult-Y)/Y*100%	=	57.7	%
Cp = 0.9*L/(0.9-Y)	=	35.5	sec
Ymax = 1-L/C	=	0.864	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	57.3	% (Optimized)



STAGE 1	INT= 6	STAGE 2	INT=	STAGE 3	INT= 6	STAGE 4	INT= 6

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	6	6	31	6	6	OK
B	7	5	2	6	137	2	6	OK
C	11	10	0	8	35	0	8	OK
D	5	5	1	5	136	1	5	OK
E	7	5	1	6	135	1	6	OK
F	5	5	4	5	31	4	5	OK
G	10	5	1	8	114	1	8	OK
H	7	5	1	6	17	1	6	OK

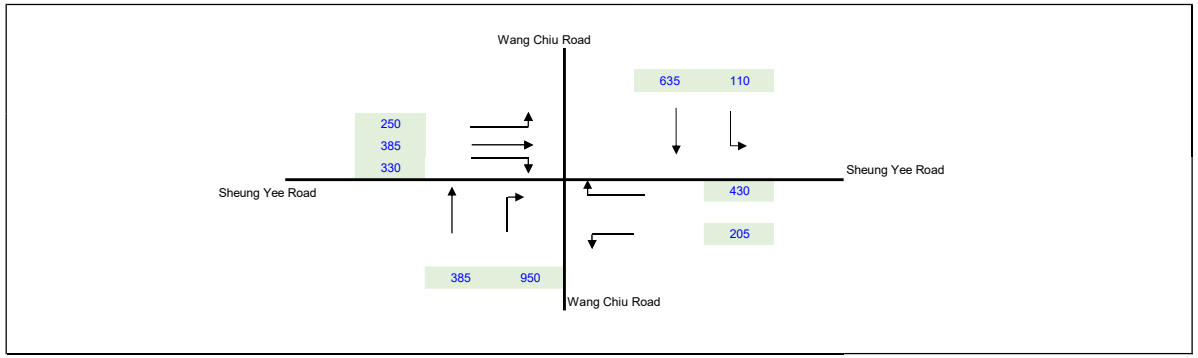
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				15				
1,2,3	1	3.50	I	1	15		N	1965	10	80	218	308	0.74	1830			1830	0.168	0.168		35	35	0.572	43
3	1	3.50	I	1	30			2105			337	337	1.00	2005			2005	0.168			35	35	0.571	47
4	1,2	3.50	II	1	15		N	1965	540			540	1.00	1786			1786	0.302			62	79	0.452	35
5,6	2	3.50	II	2	35			4210		285	250	535	0.47	4127			4127	0.130			27	38	0.400	36
6	2	3.50	II	1	30			2105			260	260	1.00	2005			2005	0.130			27	38	0.400	35
7	2,3	3.50	III	1	15		N	1965	625			625	1.00	1786		280	2066	0.302	0.302		62	62	0.572	58
8,9	3	3.50	III	1	30			2105		190	5	195	0.03	2102			2102	0.093			19	19	0.572	32
10,11	4	3.50	III	1	15		N	1965	10	35		45	0.22	1922			1922	0.023	0.024	1	5	6	0.468	8
11	4	3.50	III	1	30			2105		50		50	0.00	2105			2105	0.024			5	6	0.475	9
12	4	3.50	III	1	30			2105			10	10	1.00	2005			2005	0.005			1	6	0.100	2

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

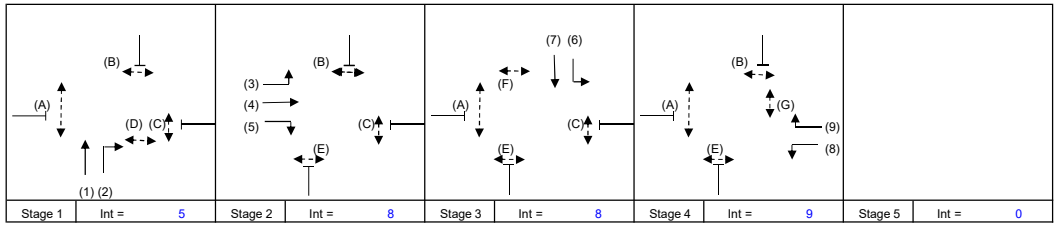
OVE ARUP & PARTNERS | TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

Wang Chiu Road / Sheung Yee Road | DATE : 4-Nov-20 | FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	120 sec
Sum(y)		Y =	0.578
Loss time		L =	26 sec
Total Flow		=	3680 pcu
Co	= (1.5*L+5)/(1-Y)	=	104.2 sec
Cm	= L/(1-Y)	=	61.6 sec
Yult		=	1.005
R.C.ult	= (Yult-Y)/Y*100%	=	74.0 %
Cp	= 0.9*L/(0.9-Y)	=	72.6 sec
Ymax	= 1-L/C	=	0.783
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	22.1 %

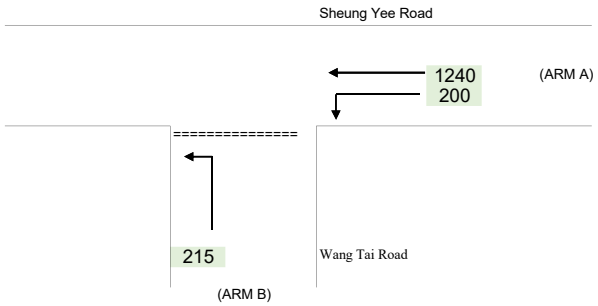


Stage 1	Int = 5	Stage 2	Int = 8	Stage 3	Int = 8	Stage 4	Int = 9	Stage 5	Int = 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	16	7	2	13	81	2	13	OK
B	10	5	2	8	83	2	8	OK
C	10	5	2	8	84	2	8	OK
D	10	5	8	8	26	8	8	OK
E	10	5	3	8	67	3	8	OK
F	7	5	6	6	15	6	6	OK
G	7	5	6	6	14	6	6	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				26				
1	1	3.50	I	1			N	1965		385		385	0.00	1965			1965	0.196	0.236		32	38	0.611	52
1, 2	1	3.50	I	1	35			2105		0	477	477	1.00	2018			2018	0.236			38	38	0.737	71
2	1	3.50	I	1	30			2105			473	473	1.00	2005			2005	0.236			38	38	0.736	70
3	2	3.50	II	1	15		N	1965	191			191	1.00	1786			1786	0.107	0.107		17	17	0.737	39
3,4	2	3.50	II	1	18			2105	59	161		220	0.27	2059			2059	0.107			17	17	0.737	44
4	2	3.50	II	1	35			2105		224		224	0.00	2105			2105	0.106			17	17	0.734	44
5	2	3.50	II	2	30		N	4070			330	330	1.00	3876			3876	0.085			14	17	0.587	28
6,7	3	3.50	III	1	15		N	1965	110	120		230	0.48	1875			1875	0.123	0.123		20	20	0.737	44
7	3	3.50	III	2				4210		515		515	0.00	4210			4210	0.122			20	20	0.735	46
8	4	3.50	IV	1	15		N	1965	198			198	1.00	1786			1786	0.111	0.112		18	18	0.731	40
8,9	4	3.50	III	1	15			2105	7		206	213	1.00	1914			1914	0.111			18	18	0.735	42
9	4	3.50	IV	1	30			2105			224	224	1.00	2005			2005	0.112			18	18	0.737	44

OVE ARUP & PARTNERS	PRIORITY JUNCTION CALCULATION		
		Project No. : 237938	
Wang Tak Road / Sheung Yee Road		DATE : 4-Nov-20	FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.90	(metres)
W cr	=	0	(metres)
q a-b	=	200	(pcu/hr)
q a-c	=	1240	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	6.20	(metres)
Vl b-a	=	45	(metres)
Vr b-a	=	45	(metres)
Vr b-c	=	50	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	215	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.574
E	=	1.162
F	=	0.586
Y	=	0.727

THE CAPACITY OF MOVEMENT :

Q b-a	=	159
Q b-c	=	460
Q c-b	=	213
Q b-ac	=	460

TOTAL FLOW = 1655 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.4674
DFC c-b	=	0.0000
DFC b-ac	=	0.4674

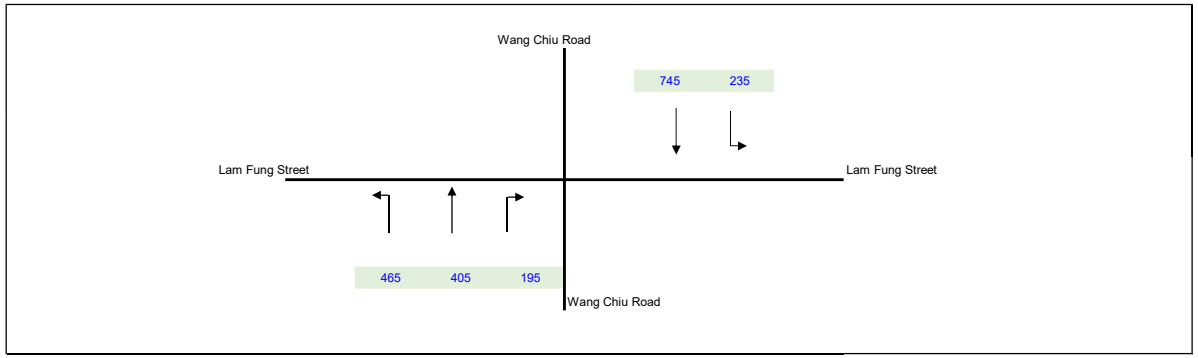
CRITICAL DFC = 0.47

OVE ARUP & PARTNERS | TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

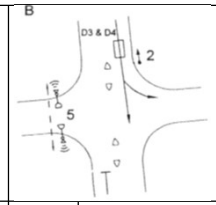
Wang Chiu Road / Lam Fung Road

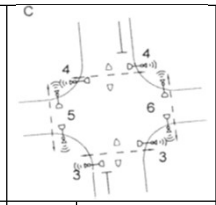
DATE : 4-Nov-20 | FILENAME:



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.429
Loss time		L =	34 sec
Total Flow		=	2045 pcu
Co	= (1.5*L+5)/(1-Y)	=	98.1 sec
Cm	= L/(1-Y)	=	59.6 sec
Yult		=	0.945
R.C.ult	= (Yult-Y)/Y*100%	=	120.2 %
Cp	= 0.9*L/(0.9-Y)	=	65.0 sec
Ymax	= 1-L/C	=	0.717
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	50.3 %







Stage 1	Int = 5	Stage 2	Int = 9	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	11	10	4	8	10	4	8	OK
4	8	7	0	5	17	0	5	OK
5	9	5	6	8	65	6	8	OK
6	9	5	2	8	12	2	8	OK

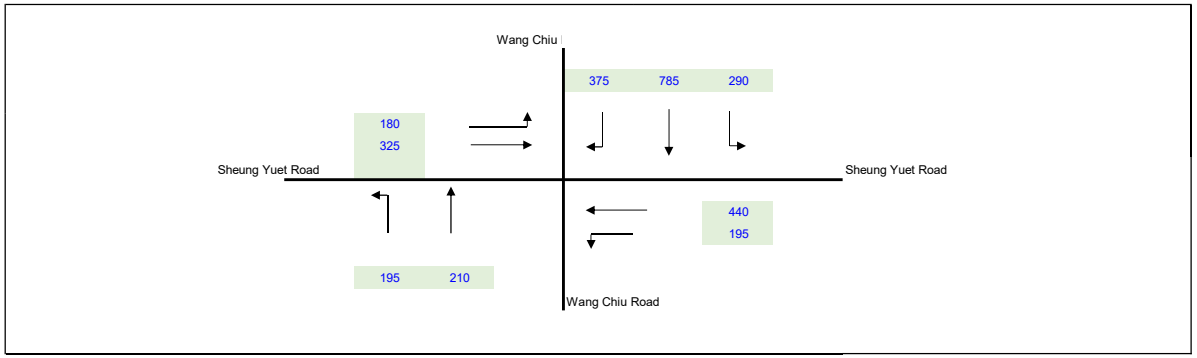
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1	1	3.50	I	1	15		N	1965	325			325	1.00	1786			1786	0.182	0.183		36	37	0.597	45
1,2	1	3.50	I	1	18			2105	140	232		372	0.38	2041			2041	0.182			37	37	0.598	52
2,3	1	3.50	I	1	18			2105		173	195	368	0.53	2016			2016	0.183			37	37	0.599	51
4,5	2	3.50	II	1	15		N	1965	235	226		461	0.51	1870			1870	0.247	0.247		49	49	0.599	54
5	2	3.50	II	1				2105		519		519	0.00	2105			2105	0.247			49	49	0.599	61
																	Stage 3 Pedestrian Stage			22				

OVE ARUP & PARTNERS | TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

Wang Chiu Road / Sheung Yuet Road

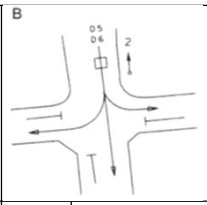
DATE : 4-Nov-20 | FILENAME:



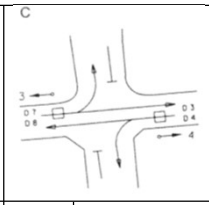
No. of stages per cycle	N =	4	
No. of stage using for calculation	N =	3	
Cycle time	C =	140	sec
Sum(y)	Y =	0.626	
Loss time	L =	41	sec
Total Flow	=	2995	pcu
Co = (1.5*L+5)/(1-Y)	=	177.8	sec
Cm = L/(1-Y)	=	109.6	sec
Yult	=	0.893	
R.C.ult = (Yult-Y)/Y*100%	=	42.6	%
Cp = 0.9*L/(0.9-Y)	=	134.6	sec
Ymax = 1-L/C	=	0.707	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	1.7	%



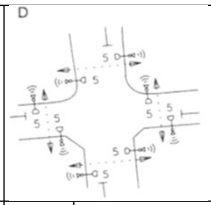
Stage 1 | Int = 6



Stage 2 | Int = 7



Stage 3 | Int = 9



Stage 4 | Int =

Stage 5 | Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	3	9	10	3	9	OK

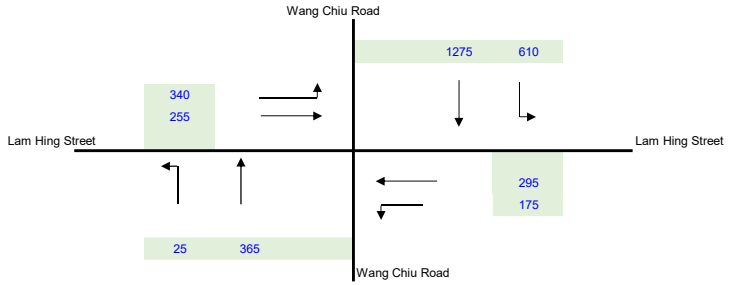
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				19				
4,5	1	3.50	I	1	15		N	1965	195	24		219	0.89	1804			1804	0.121	0.121		19	19	0.885	62
5	1	3.50	I	1				2105		186		186	0.00	2105			2105	0.088			14	19	0.644	37
10,11	2	3.50	I	1	15		N	1965	290	356		646	0.45	1881			1881	0.344	0.344		54	54	0.885	110
11,12	2	3.50	II	1	20			2105		429	375	804	0.47	2034		310	2344	0.343			54	54	0.884	127
7,8	3	3.50	II	1	15		N	1965	195	101		296	0.66	1844			1844	0.161	0.161		25	25	0.882	75
8	3	3.50	II	1				2105		339		339	0.00	2105			2105	0.161			25	25	0.885	83
1,2	3	3.50	II	1	15		N	1965	180	55		235	0.77	1825			1825	0.129			20	25	0.708	51
2	3	3.50	III	1				2105		270		270	0.00	2105			2105	0.128			20	25	0.705	58
																	Stage 4 Pedestrian Stage			22				

OVE ARUP & PARTNERS | TRAFFIC SIGNAL CALCULATION

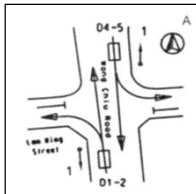
PROJECT NO: 237938

Wang Chiu Road / Lam Hing Road

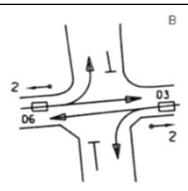
DATE : 4-Nov-20 | FILENAME:



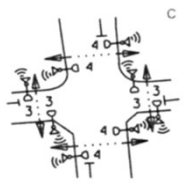
No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	140 sec
Sum(y)		Y =	0.649
Loss time		L =	33 sec
Total Flow		=	3340 pcu
Co	= (1.5*L+5)/(1-Y)	=	155.5 sec
Cm	= L/(1-Y)	=	94.1 sec
Yult		=	0.953
R.C.ult	= (Yult-Y)/Y*100%	=	46.7 %
Cp	= 0.9*L/(0.9-Y)	=	118.5 sec
Ymax	= 1-L/C	=	0.764
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	5.9 %



Stage 1 | Int = 6



Stage 2 | Int = 8



Stage 3 | Int =

Stage 4 | Int =

Stage 5 | Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	5	5	3	5	13	3	5	OK
4	11	10	3	8	10	3	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1,2	1	3.50	I	1	15		N	1965	25	162		187	0.13	1939			1939	0.096	0.341		16	56	0.240	26
2	1	3.50	I	1				2105		203		203	0.00	2105			2105	0.096			16	56	0.240	28
4	1	3.50	I	1	15		N	1965	610			610	1.00	1786			1786	0.341			56	56	0.850	97
5	1	3.50	I	2				4210		1275		1275	0.00	4210			4210	0.303			50	56	0.754	89
3	2	4.00	II	1	15		N	2015	175	295		470	0.37	1943			1943	0.242	0.308		40	51	0.668	70
6	2	4.00	II	1	20		N	2015	340	255		595	0.57	1932			1932	0.308			51	51	0.850	101
																	Stage 3 Pedestrian Stage			21				

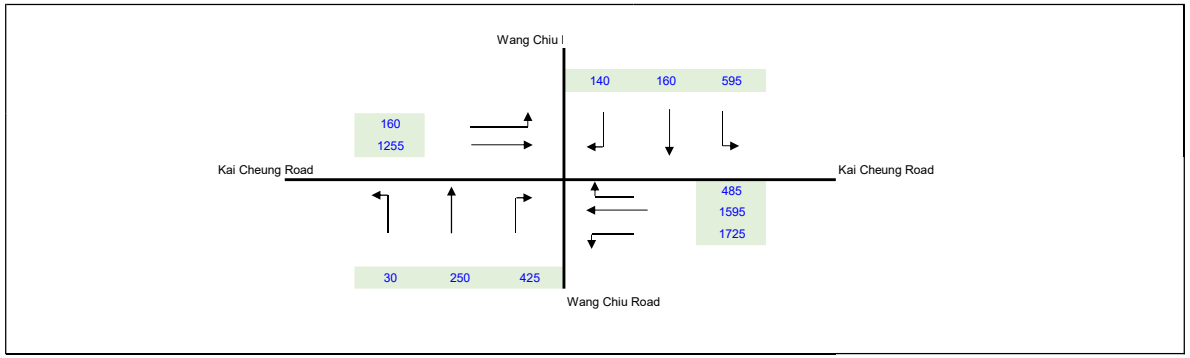
OVE ARUP & PARTNERS | TRAFFIC SIGNAL CALCULATION

Wang Chiu Road / Kai Cheung Road

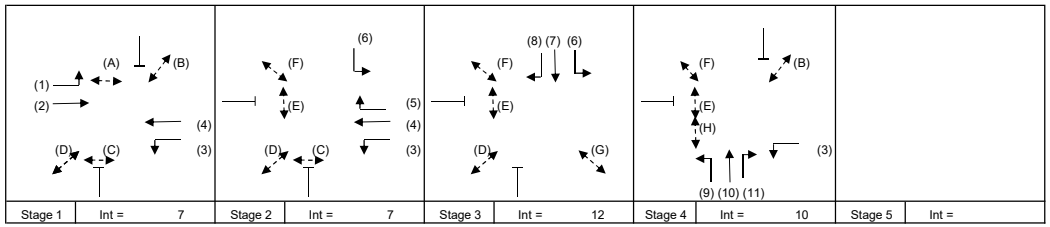
PROJECT NO: 237938

DATE : 4-Nov-20

FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	140 sec
Sum(y)		Y =	0.639
Loss time		L =	32 sec
Total Flow		=	6820 pcu
Co	= (1.5*L+5)/(1-Y)	=	146.9 sec
Cm	= L/(1-Y)	=	88.7 sec
Yult		=	0.960
R.C.ult	= (Yult-Y)/Y*100%	=	50.2 %
Cp	= 0.9*L/(0.9-Y)	=	110.5 sec
Ymax	= 1-L/C	=	0.771
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	8.6 %

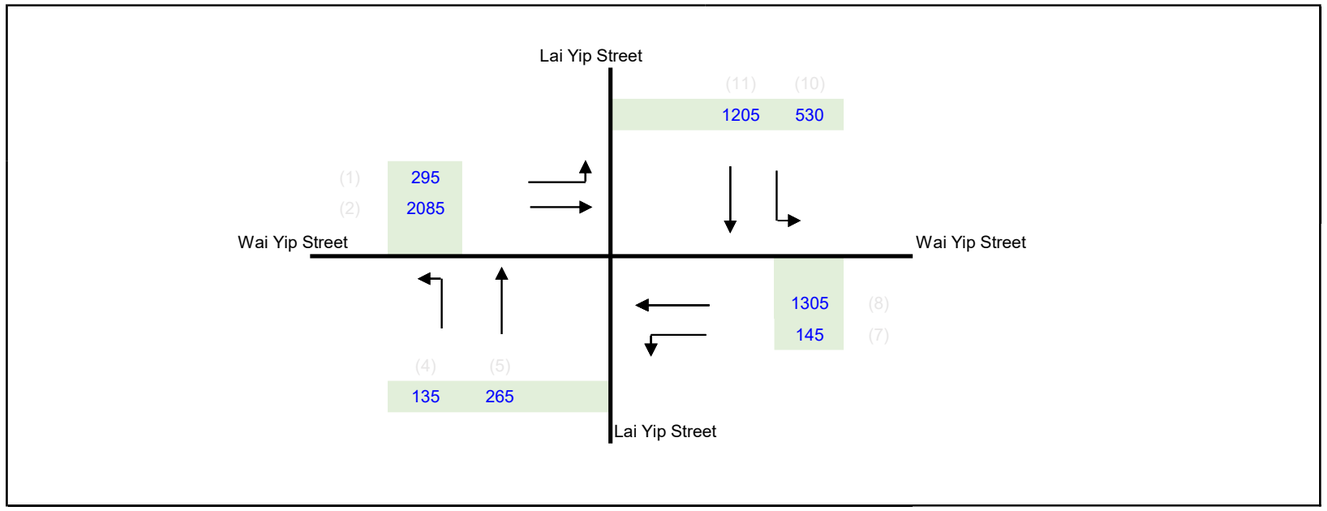


Stage 1	Int =	7	Stage 2	Int =	7	Stage 3	Int =	12	Stage 4	Int =	10	Stage 5	Int =

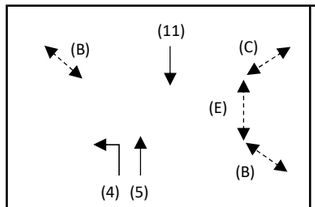
Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG		Green Time Provided (s) SG	Delay	FG		Check
A	8	7	3	5		32	3	5		OK
B	7	5	3	6		108	3	6		OK
C	11	10	2	8		77	2	8		OK
D	4	5	2	5		104	2	5		OK
E	10	5	2	8		90	2	8		OK
F	4	5	2	5		93	2	5		OK
G	7	5	3	6		14	3	6		OK
H	10	5	4	8		17	4	8		OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				32				
1	1	3.50	I	1	25		N	1965	160			160	1.00	1854			1854	0.086	0.199		15	34	0.360	28
2	1	3.50	I	3				6315		1255		1255	0.00	6315			6315	0.199			34	34	0.829	76
3	1,2,4	3.50	I	2	25		N	4070	1725			1725	1.00	3840			3840	0.449			76	113	0.559	39
4	1,2	3.50	II	3				6315		1595		1595	0.00	6315			6315	0.253			43	83	0.424	50
5	2	3.50	II	1	20			2105			485	485	1.00	1958			1958	0.248	0.248		42	42	0.829	91
6	2,3	3.50	II	1	25		N	1965	595			595	1.00	1854		110	1964	0.303			51	65	0.650	74
7	3	3.50	II	1				2105		154		154	0.00	2105			2105	0.073	0.073		12	12	0.827	45
7,8	3	3.50	III	1	25			2105		6	140	146	0.96	1990			1990	0.073			12	12	0.829	43
9,10	4	3.50	III	1	25		N	1965	30	203		233	0.13	1950			1950	0.119	0.119		20	20	0.829	59
10,11	4	3.50	III	1	25			2105		47	192	239	0.80	2008			2008	0.119			20	20	0.825	60
11	4	3.50	III	1	20			2105			233	233	1.00	1958			1958	0.119			20	20	0.825	59

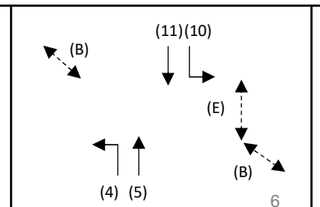
ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO:	
Wai Yip Street / Lai Yip Street	2031	DATE :	FILENAME :



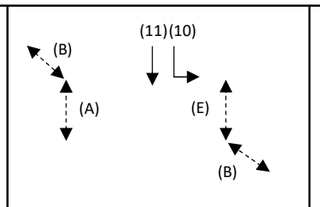
No. of stages per cycle		N =	4	
No. of stage using for calculation		N =	2	
Cycle time		C =	118	sec
Sum(y)		Y =	0.676	
Loss time		L =	20	sec
Total Flow		=	5965	pcu
Co	= (1.5*L+5)/(1-Y)	=	107.9	sec
Cm	= L/(1-Y)	=	61.6	sec
Yult		=	0.750	
R.C.ult	= (Yult-Y)/Y*100%	=	11.0	%
Cp	= 0.9*L/(0.9-Y)	=	80.2	sec
Ymax	= 1-L/C	=	0.831	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	10.6	% (Optimized)



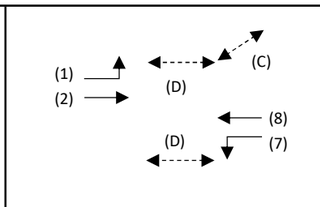
STAGE 1 INT=



STAGE 2 INT=



STAGE 3 INT= 13



STAGE 4 INT= 9

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	14	12	6	10	12	6	10	OK
B	5	5	3	5	46	3	5	OK
C	6	5	1	5	87	1	5	OK
D	13	11	5	10	49	5	10	OK
E	12	10	6	9	39	6	9	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				20				
4,5	1,2	3.50	III	1	15		N	1965	135	51		186	0.73	1832			1832	0.102			15	20	0.614	31
5	1,2	3.50	III	1				2105		214		214	0.00	2105			2105	0.102			15	20	0.614	35
10	2,3	3.50	IV	1	20		N	1965	530			530	1.00	1828		190	2018	0.263		6	38	38	0.813	71
11	1,2,3	3.50	V	2				4210		1205		1205	0.00	4210			4210	0.286	0.286	14	42	42	0.813	77
1,2	4	3.50	I	1	20		N	1965	295	446		741	0.40	1908			1908	0.388	0.389		56	56	0.811	76
2	4	3.50	I	2				4210		1639		1639	0.00	4210			4210	0.389			56	56	0.813	84
7,8	4	3.50	II	1	20		N	1965	145	309		454	0.32	1919			1919	0.237			34	56	0.494	47
8	4	3.50	II	2				4210		996		996	0.00	4210			4210	0.237			34	56	0.494	51

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

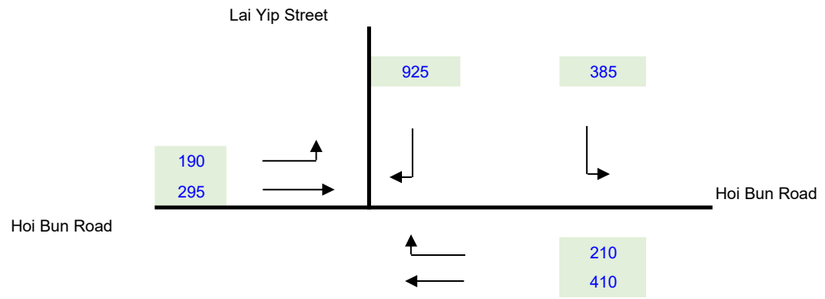
ARUP — TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

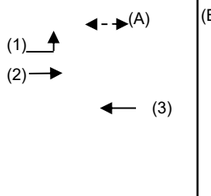
Lai Yip Street / Hoi Bun Road

DATE : 5-Feb-21

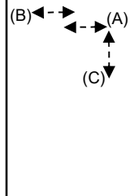
FILENAME :



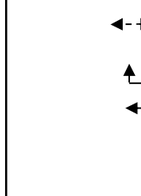
No. of stages per cycle		N =	5
No. of stage using for calculation		N =	3
Cycle time		C =	118 sec
Sum(y)		Y =	0.484
Loss time		L =	37 sec
Total Flow		=	2415 pcu
Co	= (1.5*L+5)/(1-Y)	=	117.2 sec
Cm	= L/(1-Y)	=	71.6 sec
Yult		=	0.623
R.C.ult	= (Yult-Y)/Y*100%	=	28.7 %
Cp	= 0.9*L/(0.9-Y)	=	80.0 sec
Ymax	= 1-L/C	=	0.686
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	27.8 % (Optimized)



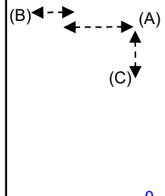
STAGE 1 INT= 8



STAGE 2 INT= 0



STAGE 3 INT= 5



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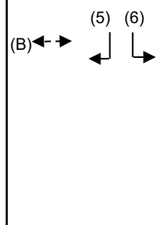
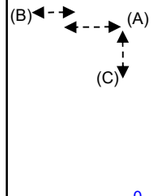
STAGE 4 INT=



STAGE 5 INT= 7



0

STAGE 6 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	10	5	3	8	9	3	8	OK
B	5	5	10	5	5	10	5	OK
C	7	6	4	5	11	4	5	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				17				
1	1	3.50	I	1	15		N	1965	190			190	1.00	1786			1786	0.106			18	23	0.535	30
2	1	3.50	I	1				2105		295		295	0.00	2105			2105	0.140	0.140		23	23	0.704	52
3	1,3	3.50	II, III	1			N	1965		410		410	0.00	1965			1965	0.209			35	43	0.567	51
4	3	3.50	III	1	20			2105			210	210	1.00	1958			1958	0.107	0.107		18	18	0.704	41
5	5	3.50	IV	2	20			4210			925	925	1.00	3916			3916	0.236	0.236		40	40	0.704	60
6	5	3.50	IV	1	15		N	1965	385			385	1.00	1786			1786	0.216			36	40	0.643	50
																	Stage 2 Pedestrian Loss Time			20	(Demand Dependent. Assumed always Called.)			
																	Stage 4 Pedestrian Loss Time				(Demand Dependent. Assumed always Skipped.)			
																	Stage 6 Pedestrian Loss Time				(Demand Dependent. Assumed always Skipped.)			

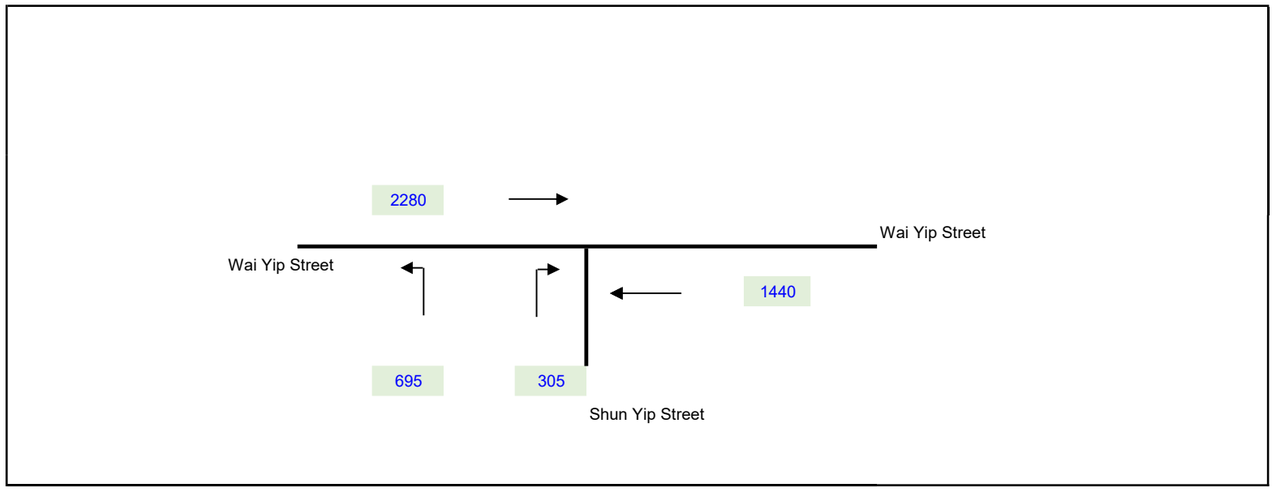
NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP — TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

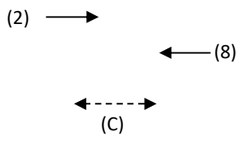
Wai Yip Street / Shun Yip Street

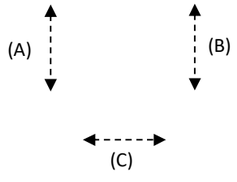
DATE : 5-Feb-21 FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	118 sec
Sum(y)		Y =	0.553
Loss time		L =	33 sec
Total Flow		=	4720 pcu
Co	= (1.5*L+5)/(1-Y)	=	121.9 sec
Cm	= L/(1-Y)	=	73.8 sec
Yult		=	0.653
R.C.ult	= (Yult-Y)/Y*100%	=	18.0 %
Cp	= 0.9*L/(0.9-Y)	=	85.6 sec
Ymax	= 1-L/C	=	0.720
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	17.3 % (Optimized)







STAGE 1	INT= 6	STAGE 2	INT= 9	STAGE 3	INT=	STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	2	9	71	2	9	OK
B	12	10	2	8	10	2	8	OK
C	10	5	2	8	10	2	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				13				
2	2	3.50	I	3			N	6175		2280		2280	0.00	6175			6175	0.369	0.369		57	57	0.767	78
8	2	3.50	II	3			N	6175		1440		1440	0.00	6175			6175	0.233			36	57	0.485	49
4	1	3.50	III	1	15		N	1965	328			328	1.00	1786			1786	0.184	0.184		28	28	0.767	55
4,6	1	3.50	III	1	30			2105	367		0	367	1.00	2005			2005	0.183			28	28	0.765	61
6	1	3.50	III	1	30		N	1965			305	305	1.00	1871			1871	0.163			25	28	0.681	46
																	Stage 3 Pedestrian Loss Time			20				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP

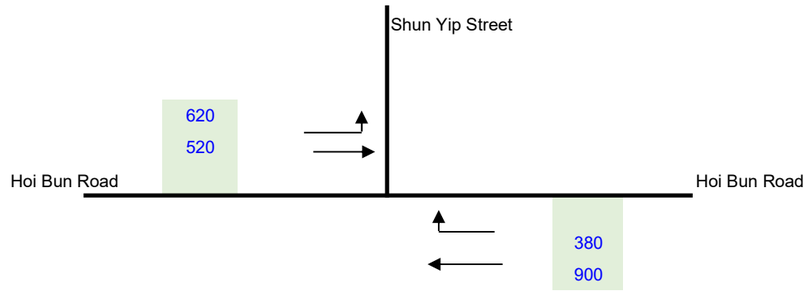
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

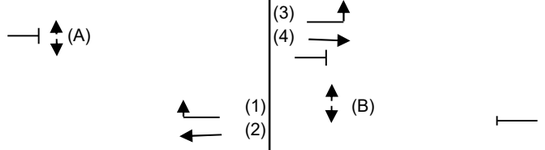
Shun Yip Street / Hoi Bun Road

DATE : 5-Feb-21

FILENAME :

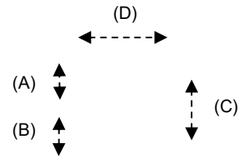


No. of stages per cycle	N =	2
No. of stage using for calculation	N =	2
Cycle time	C =	120 sec
Sum(y)	Y =	0.666
Loss time	L =	39 sec
Total Flow	=	2420 pcu
Co = (1.5*L+5)/(1-Y)	=	190.3 sec
Cm = L/(1-Y)	=	116.9 sec
Yult	=	0.608
R.C.ult = (Yult-Y)/Y*100%	=	-8.8 %
Cp = 0.9*L/(0.9-Y)	=	150.2 sec
Ymax = 1-L/C	=	0.675
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	-8.8 % (Optimized)



STAGE 1 INT= 10

STAGE 2 INT= 6



STAGE 3 (ped) INT= 2

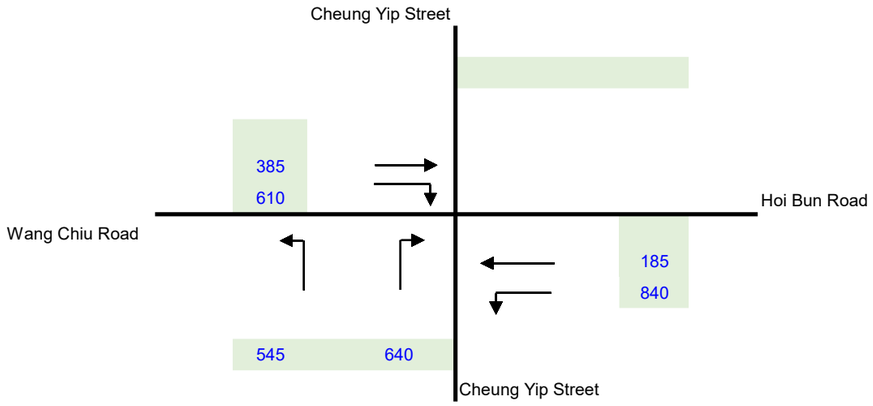
STAGE 4 INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	0	6	63	0	6	OK
B	7	5	3	6	63	3	6	OK
C	7	6	3	5	15	3	5	OK
D	10	6	5	12	6	5	12	OK

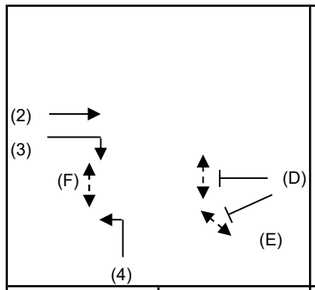
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
1,2	1	3.50	I	1	30			2105		273	380	653	0.58	2045			2045	0.319	0.319		39	39	0.987	276
2	1	3.50	I	1			N	1965		627		627	0.00	1965			1965	0.319			39	39	0.987	264
3	2	3.50	II	1	15		N	1965	620			620	1.00	1786			1786	0.347	0.347		42	42	0.987	267
3,4	2	3.50	II	1	20			2105		520		520	0.00	2105			2105	0.247			30	42	0.703	67
																		Pedestrian Stage 3		23				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

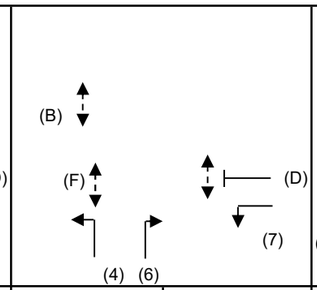
ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Cheung Yip Street / Hoi Bun Road		DATE : 5-Feb-21	FILENAME :



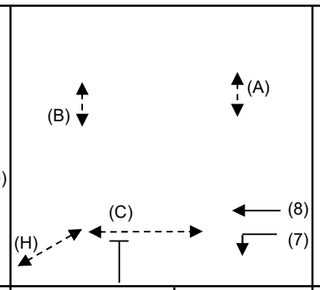
No. of stages per cycle		N =	3	
No. of stage using for calculation		N =	2	
Cycle time		C =	118	sec
Sum(y)		Y =	0.660	
Loss time		L =	10	sec
Total Flow		=	3205	pcu
Co	= (1.5*L+5)/(1-Y)	=	58.9	sec
Cm	= L/(1-Y)	=	29.4	sec
Yult		=	0.825	
R.C.ult	= (Yult-Y)/Y*100%	=	24.9	%
Cp	= 0.9*L/(0.9-Y)	=	37.6	sec
Ymax	= 1-L/C	=	0.915	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	24.7	% (Optimized)



STAGE 1 INT= 6



STAGE 2 INT=



STAGE 3 INT= 6

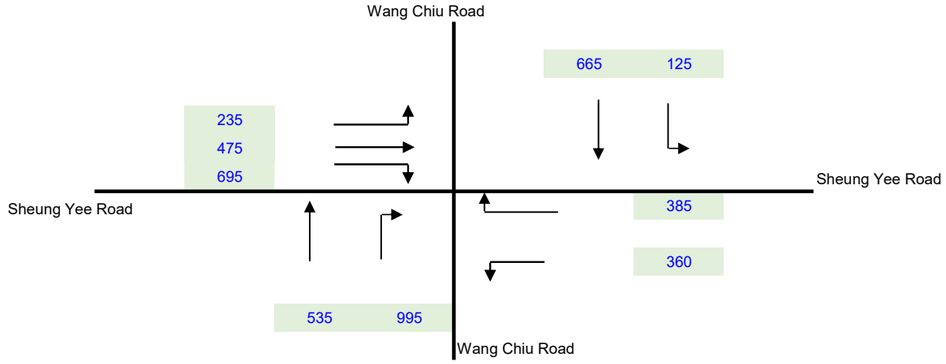
STAGE 4 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	6	6	7	6	6	OK
B	11	5	2	9	61	2	9	OK
C	11	10	0	8	11	0	8	OK
D	5	5	1	5	93	1	5	OK
E	7	5	1	6	39	1	6	OK
F	5	5	4	5	90	4	5	OK
H	5	5	1	5	13	1	5	OK

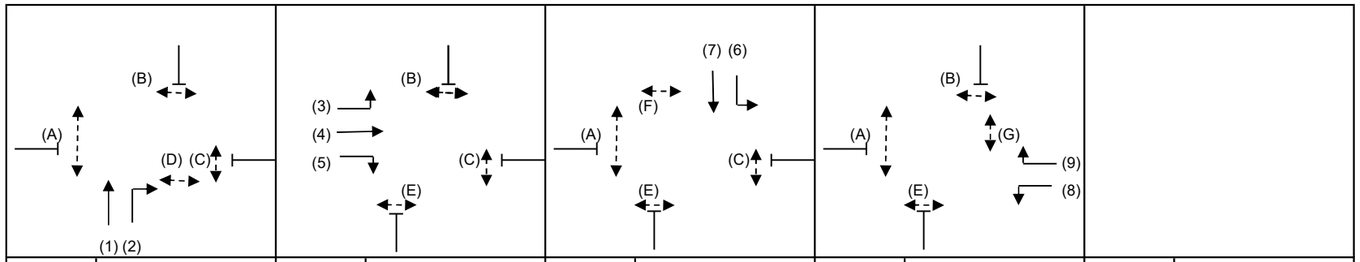
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				10				
2,3	1	3.50	I	1	35		N	1965		385	105	490	0.21	1947			1947	0.252	0.252		41	41	0.721	69
3	1	3.50	I	1	30			2105			505	505	1.00	2005			2005	0.252			41	41	0.722	71
4	1,2	3.50	II	1	15		N	1965	545			545	1.00	1786			1786	0.305			50	94	0.385	22
6	2	3.50	II	2	30			4210			640	640	1.00	4010			4010	0.160			26	47	0.397	38
7	2,3	3.50	III	1	15		N	1965	840			840	1.00	1786		270	2056	0.408	0.408		67	67	0.722	72
8	3	3.50	III	1	30			2105		185		185	0.00	2105			2105	0.088			14	14	0.722	38

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Wang Chiu Road / Sheung Yee Road		DATE : 5-Feb-21	FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	120 sec
Sum(y)		Y =	0.662
Loss time		L =	26 sec
Total Flow		=	4470 pcu
Co	= (1.5*L+5)/(1-Y)	=	130.2 sec
Cm	= L/(1-Y)	=	76.9 sec
Yult		=	1.005
R.C.ult	= (Yult-Y)/Y*100%	=	51.8 %
Cp	= 0.9*L/(0.9-Y)	=	98.3 sec
Ymax	= 1-L/C	=	0.783
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	6.5 %



Stage 1	Int = 5	Stage 2	Int = 8	Stage 3	Int = 8	Stage 4	Int = 9	Stage 5	Int = 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	16	7	2	13	77	2	13	OK
B	10	5	2	8	85	2	8	OK
C	10	5	2	8	83	2	8	OK
D	10	5	8	8	24	8	8	OK
E	10	5	3	8	69	3	8	OK
F	7	5	6	6	13	6	6	OK
G	7	5	6	6	15	6	6	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				26				
1	1	3.50	I	1			N	1965		501		501	0.00	1965			1965	0.255	0.255		36	36	0.843	82
1,2	1	3.50	I	1	35			2105		34	483	517	0.93	2024			2024	0.255			36	36	0.845	84
2	1	3.50	I	1	30			2105			512	512	1.00	2005			2005	0.255			36	36	0.845	83
3	2	3.50	II	1	15		N	1965	235			235	1.00	1786			1786	0.132	0.146		19	21	0.764	45
3,4	2	3.50	II	1	18			2105	0	306		306	0.00	2105			2105	0.145			21	21	0.844	63
4,5	2	3.50	II	1	35			2105		169	131	300	0.44	2066			2066	0.145			21	21	0.843	62
5	2	3.50	II	2	30		N	4070			564	564	1.00	3876			3876	0.146			21	21	0.845	53
6,7	3	3.50	III	1	15		N	1965	125	118		243	0.51	1869			1869	0.130	0.130		18	18	0.845	53
7	3	3.50	III	2				4210		547		547	0.00	4210			4210	0.130			18	18	0.844	52
8	4	3.50	IV	1	15		N	1965	234			234	1.00	1786			1786	0.131	0.131		19	19	0.845	52
8,9	4	3.50	III	1	15			2105	126		124	250	1.00	1914			1914	0.131			19	19	0.845	54
9	4	3.50	IV	1	30			2105			261	261	1.00	2005			2005	0.130			18	19	0.840	56

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

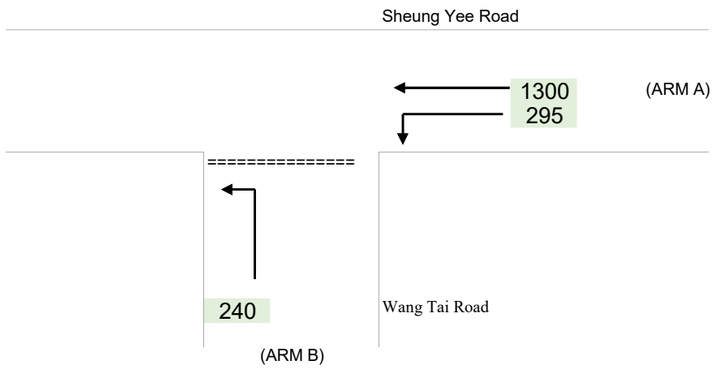
PRIORITY JUNCTION CALCULATION

Project No. : 237938

Wang Tak Road / Sheung Yee Road

DATE : 5-Feb-21

FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.90	(metres)
W cr	=	0	(metres)
q a-b	=	295	(pcu/hr)
q a-c	=	1300	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	6.20	(metres)
Vl b-a	=	45	(metres)
Vr b-a	=	45	(metres)
Vr b-c	=	50	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	240	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.574
E	=	1.162
F	=	0.586
Y	=	0.727

THE CAPACITY OF MOVEMENT :

Q b-a	=	145
Q b-c	=	430
Q c-b	=	189
Q b-ac	=	430

TOTAL FLOW = 1835 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.5581
DFC c-b	=	0.0000
DFC b-ac	=	0.5581

CRITICAL DFC = 0.56

OVE ARUP & PARTNERS

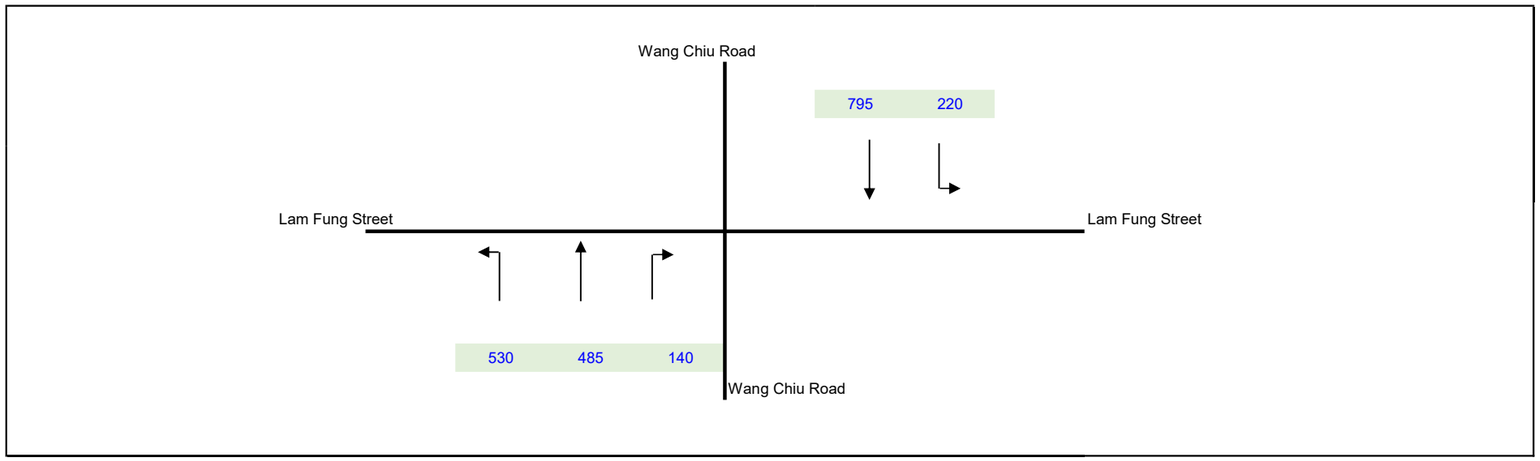
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

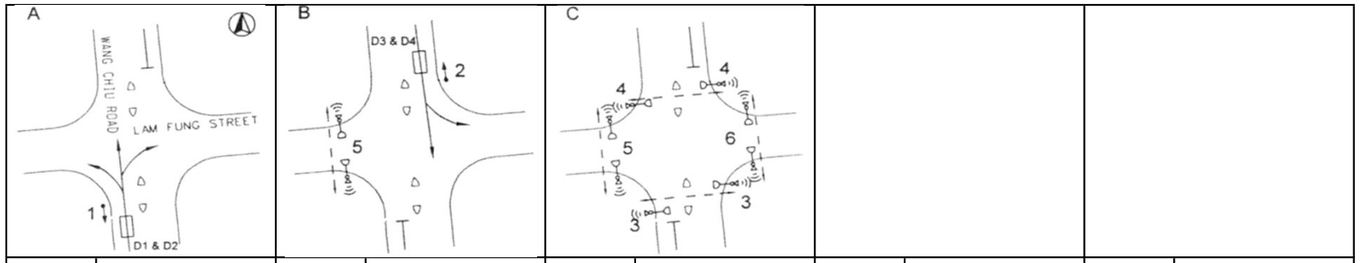
Wang Chiu Road / Lam Fung Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.452
Loss time		L =	34 sec
Total Flow		=	2170 pcu
Co	= (1.5*L+5)/(1-Y)	=	102.2 sec
Cm	= L/(1-Y)	=	62.0 sec
Yult		=	0.945
R.C.ult	= (Yult-Y)/Y*100%	=	109.1 %
Cp	= 0.9*L/(0.9-Y)	=	68.3 sec
Ymax	= 1-L/C	=	0.717
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	42.7 %



Stage 1	Int = 5	Stage 2	Int = 9	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	11	10	4	8	10	4	8	OK
4	8	7	0	5	17	0	5	OK
5	9	5	6	8	65	6	8	OK
6	9	5	2	8	12	2	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1	1	3.50	I	1	15		N	1965	352			352	1.00	1786			1786	0.197	0.197		37	37	0.631	48
1,2	1	3.50	I	1	18			2105	178	222		400	0.45	2030			2030	0.197			37	37	0.631	55
2,3	1	3.50	I	1	18			2105		263	140	403	0.35	2046			2046	0.197			37	37	0.630	55
4,5	2	3.50	II	1	15		N	1965	220	259		479	0.46	1879			1879	0.255	0.255		49	49	0.631	57
5	2	3.50	II	1				2105		536		536	0.00	2105			2105	0.255			48	49	0.630	64
																	Stage 3 Pedestrian Stage			22				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

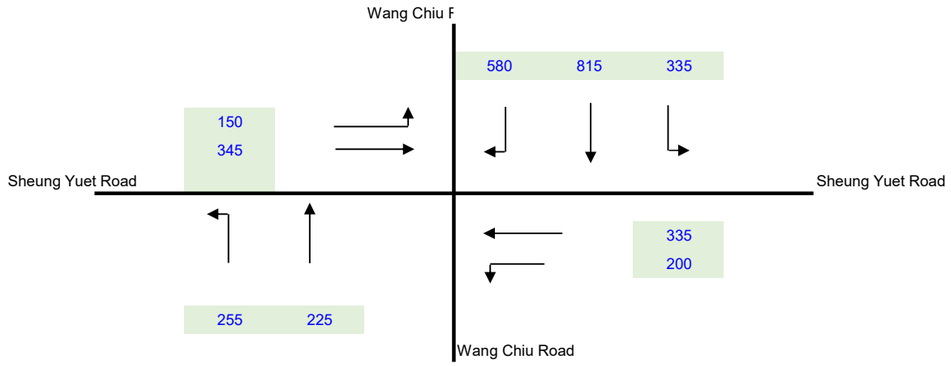
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

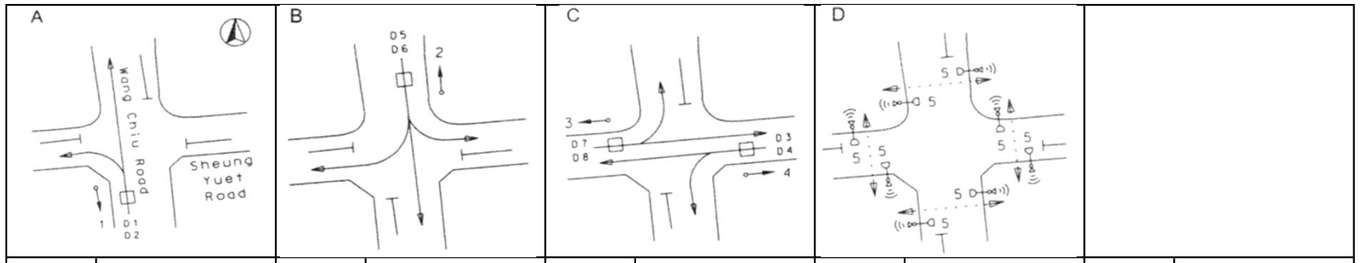
Wang Chiu Road / Sheung Yuet Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	140 sec
Sum(y)		Y =	0.693
Loss time		L =	41 sec
Total Flow		=	3240 pcu
Co	= (1.5*L+5)/(1-Y)	=	216.9 sec
Cm	= L/(1-Y)	=	133.8 sec
Yult		=	0.893
R.C.ult	= (Yult-Y)/Y*100%	=	28.7 %
Cp	= 0.9*L/(0.9-Y)	=	178.7 sec
Ymax	= 1-L/C	=	0.707
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	-8.2 %



Stage 1	Int = 6	Stage 2	Int = 7	Stage 3	Int = 9	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	3	9	10	3	9	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				19				
4,5	1	3.50	I	1	15		N	1965	255	0		255	1.00	1786			1786	0.143	0.143		20	20	0.981	219
5	1	3.50	I	1				2105		225		225	0.00	2105			2105	0.107			15	20	0.734	51
10,11	2	3.50	I	1	15		N	1965	335	445		780	0.43	1884			1884	0.414	0.414		59	59	0.980	257
11,12	2	3.50	II	1	20			2105		370	580	950	0.61	2013		280	2293	0.414			59	59	0.981	283
7,8	3	3.50	II	1	15		N	1965	200	48		248	0.81	1818			1818	0.136	0.136		19	19	0.981	219
8	3	3.50	II	1				2105		287		287	0.00	2105			2105	0.136			19	19	0.980	223
1,2	3	3.50	II	1	15		N	1965	150	81		231	0.65	1845			1845	0.125			18	19	0.900	67
2	3	3.50	III	1				2105		264		264	0.00	2105			2105	0.125			18	19	0.902	73
																	Stage 4 Pedestrian Stage			22				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

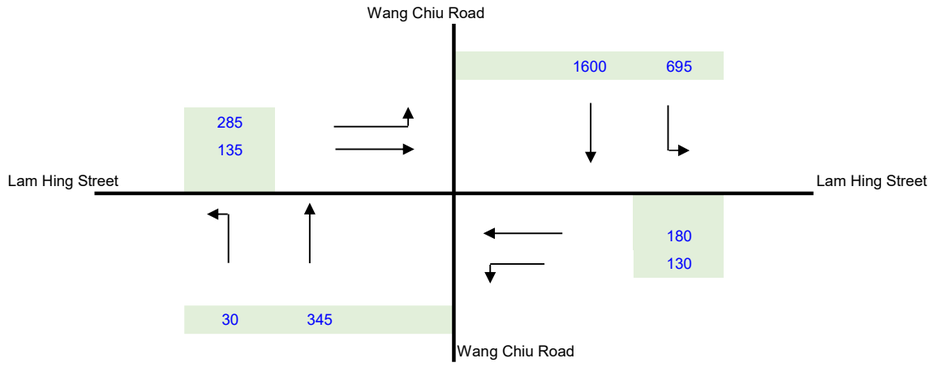
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

Wang Chiu Road / Lam Hing Road

DATE : 5-Feb-21

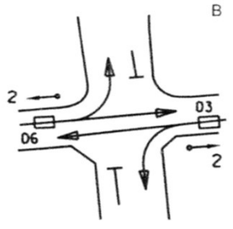
FILENAME:



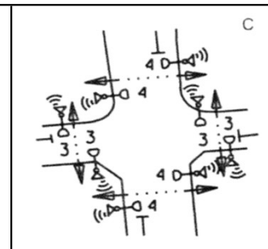
No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	140 sec
Sum(y)		Y =	0.608
Loss time		L =	33 sec
Total Flow		=	3400 pcu
Co	= (1.5*L+5)/(1-Y)	=	139.1 sec
Cm	= L/(1-Y)	=	84.2 sec
Yult		=	0.953
R.C.ult	= (Yult-Y)/Y*100%	=	56.6 %
Cp	= 0.9*L/(0.9-Y)	=	101.7 sec
Ymax	= 1-L/C	=	0.764
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	13.1 %



Stage 1 Int = 6



Stage 2 Int = 8



Stage 3 Int =

Stage 4 Int =

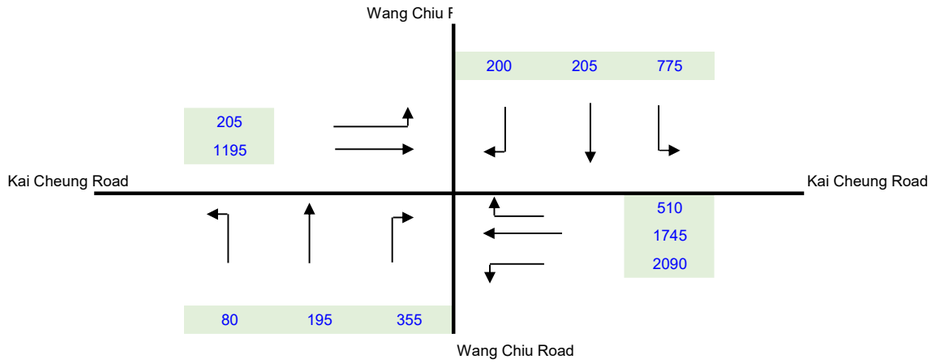
Stage 5 Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	5	5	3	5	13	3	5	OK
4	11	10	3	8	10	3	8	OK

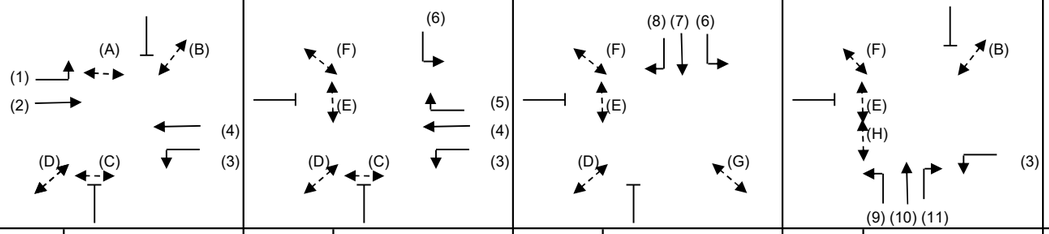
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1,2	1	3.50	I	1	15		N	1965	30	155		185	0.16	1934			1934	0.096	0.389		17	68	0.196	22
2	1	3.50	I	1				2105		190		190	0.00	2105			2105	0.090			16	68	0.185	23
4	1	3.50	I	1	15		N	1965	695			695	1.00	1786			1786	0.389			68	68	0.796	89
5	1	3.50	I	2				4210		1600		1600	0.00	4210			4210	0.380			67	68	0.777	95
3	2	4.00	II	1	15		N	2015	130	180		310	0.42	1934			1934	0.160	0.219		28	39	0.582	52
6	2	4.00	II	1	20		N	2015	285	135		420	0.68	1917			1917	0.219			39	39	0.796	77
																	Stage 3 Pedestrian Stage			21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Wang Chiu Road / Kai Cheung Road		DATE : 5-Feb-21	FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	140 sec
Sum(y)		Y =	0.658
Loss time		L =	32 sec
Total Flow		=	7555 pcu
Co	= (1.5*L+5)/(1-Y)	=	154.8 sec
Cm	= L/(1-Y)	=	93.5 sec
Yult		=	0.960
R.C.ult	= (Yult-Y)/Y*100%	=	46.0 %
Cp	= 0.9*L/(0.9-Y)	=	118.8 sec
Ymax	= 1-L/C	=	0.771
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	5.6 %



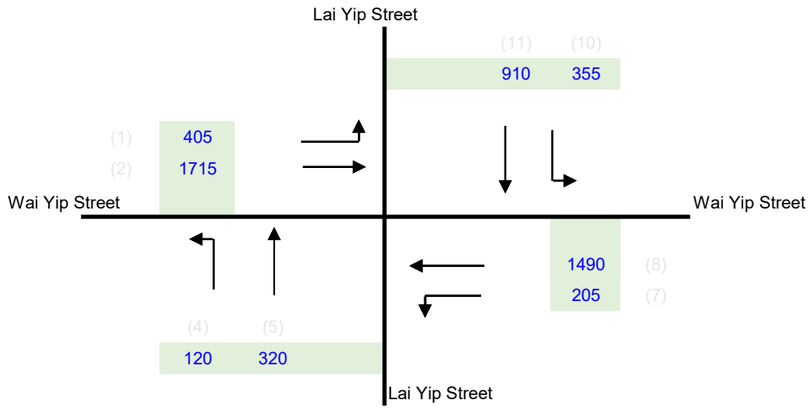
Stage 1	Int = 7	Stage 2	Int = 7	Stage 3	Int = 12	Stage 4	Int = 10	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	8	7	3	5	29	3	5	OK
B	7	5	3	6	103	3	6	OK
C	11	10	2	8	76	2	8	OK
D	4	5	2	5	106	2	5	OK
E	10	5	2	8	93	2	8	OK
F	4	5	2	5	96	2	5	OK
G	7	5	3	6	19	3	6	OK
H	10	5	4	8	15	4	8	OK

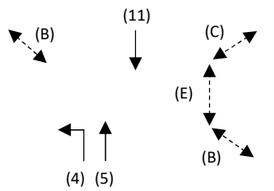
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				32				
1	1	3.50	I	1	25		N	1965	205			205	1.00	1854			1854	0.111	0.189		18	31	0.498	37
2	1	3.50	I	3				6315		1195		1195	0.00	6315			6315	0.189			31	31	0.852	74
3	1,2,4	3.50	I	2	25		N	4070	2090			2090	1.00	3840			3840	0.544			89	108	0.703	55
4	1,2	3.50	II	3				6315		1745		1745	0.00	6315			6315	0.276			45	82	0.473	56
5	2	3.50	II	1	20			2105			510	510	1.00	1958			1958	0.260	0.260		43	43	0.852	95
6	2,3	3.50	II	1	25		N	1965	775			775	1.00	1854		100	1954	0.397			65	70	0.790	96
7	3	3.50	II	1				2105		205		205	0.00	2105			2105	0.097	0.101		16	17	0.824	54
7,8	3	3.50	III	1	25			2105		0	200	200	1.00	1986			1986	0.101			17	17	0.852	53
9,10	4	3.50	III	1	25		N	1965	80	124		204	0.39	1920			1920	0.106	0.107		17	18	0.845	54
10,11	4	3.50	III	1	25			2105		71	145	216	0.67	2023			2023	0.107			18	18	0.849	56
11	4	3.50	III	1	20			2105			210	210	1.00	1958			1958	0.107			18	18	0.852	55

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

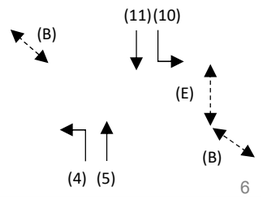
ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO:	
Wai Yip Street / Lai Yip Street	2031	DATE :	FILENAME :



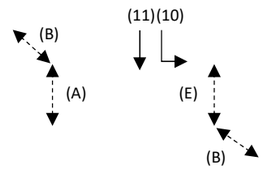
No. of stages per cycle	N =	4	
No. of stage using for calculation	N =	2	
Cycle time	C =	118	sec
Sum(y)	Y =	0.459	
Loss time	L =	41	sec
Total Flow	=	5520	pcu
Co = (1.5*L+5)/(1-Y)	=	123.0	sec
Cm = L/(1-Y)	=	75.8	sec
Yult	=	0.593	
R.C.ult = (Yult-Y)/Y*100%	=	29.0	%
Cp = 0.9*L/(0.9-Y)	=	83.8	sec
Ymax = 1-L/C	=	0.653	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	27.8	% (Optimized)



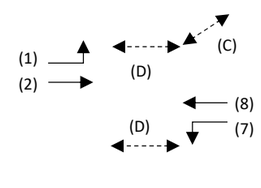
STAGE 1 INT=



STAGE 2 INT= 6



STAGE 3 INT=



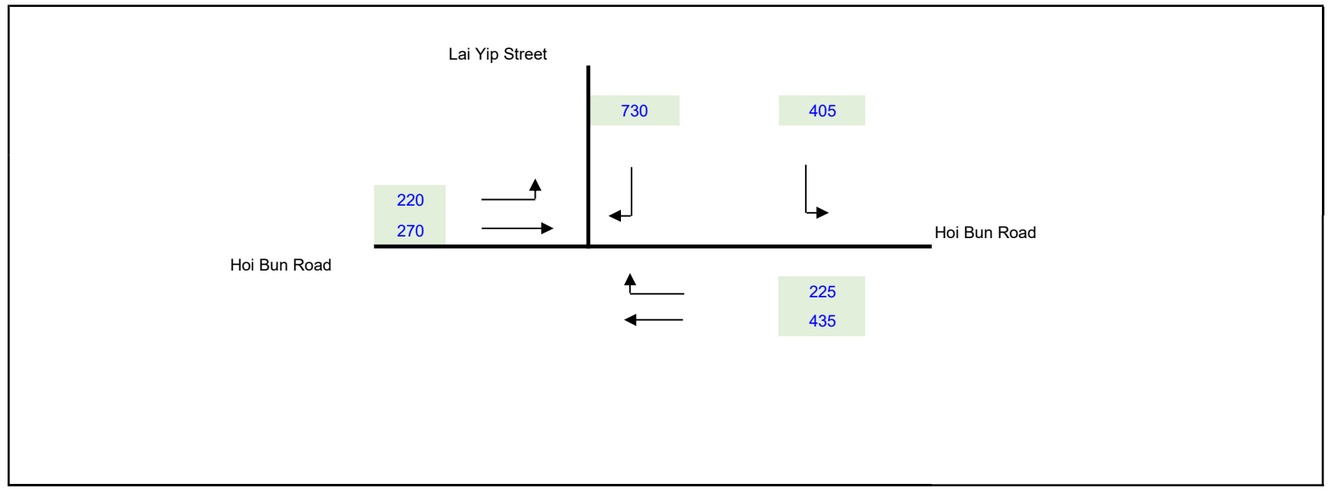
STAGE 4 INT= 9

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	14	12	6	10	12	6	10	OK
B	5	5	3	5	30	3	5	OK
C	6	5	1	5	74	1	5	OK
D	13	11	5	10	51	5	10	OK
E	12	10	6	9	23	6	9	OK

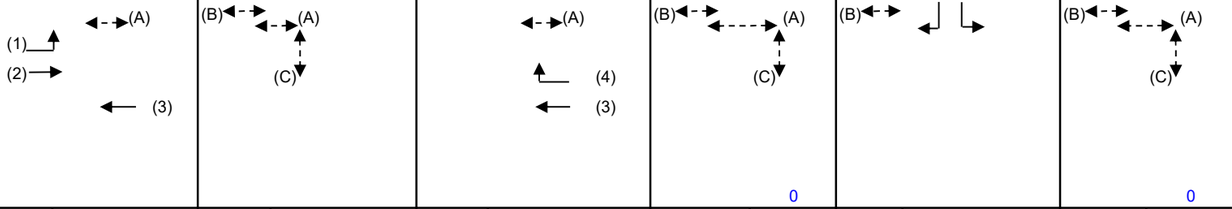
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				13				
4,5	1,2	3.50	III	1	15		N	1965	120	86		206	0.58	1857			1857	0.111	0.111		19	19	0.703	34
5	1,2	3.50	III	1				2105		234		234	0.00	2105			2105	0.111			19	19	0.704	39
10	2,3	3.50	IV	1	20		N	1965	355			355	1.00	1828		260	2088	0.170		6	28	28	0.704	53
11	1,2,3	3.50	V	2				4210		910		910	0.00	4210			4210	0.216		13	36	39	0.660	60
1,2	4	3.50	I	1	20		N	1965	405	249		654	0.62	1878			1878	0.348	0.348		58	58	0.704	65
2	4	3.50	I	2				4210		1466		1466	0.00	4210			4210	0.348			58	58	0.704	73
7,8	4	3.50	II	1	20		N	1965	205	324		529	0.39	1910			1910	0.277			46	58	0.560	53
8	4	3.50	II	2				4210		1166		1166	0.00	4210			4210	0.277			46	58	0.560	58
																			Stage 3	28				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Lai Yip Street / Hoi Bun Road		DATE : 5-Feb-21	FILENAME :



No. of stages per cycle	N =	5	
No. of stage using for calculation	N =	3	
Cycle time	C =	118	sec
Sum(y)	Y =	0.470	
Loss time	L =	37	sec
Total Flow	=	2285	pcu
Co = (1.5*L+5)/(1-Y)	=	114.1	sec
Cm = L/(1-Y)	=	69.8	sec
Yult	=	0.623	
R.C.ult = (Yult-Y)/Y*100%	=	32.5	%
Cp = 0.9*L/(0.9-Y)	=	77.4	sec
Ymax = 1-L/C	=	0.686	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	31.5	% (Optimized)



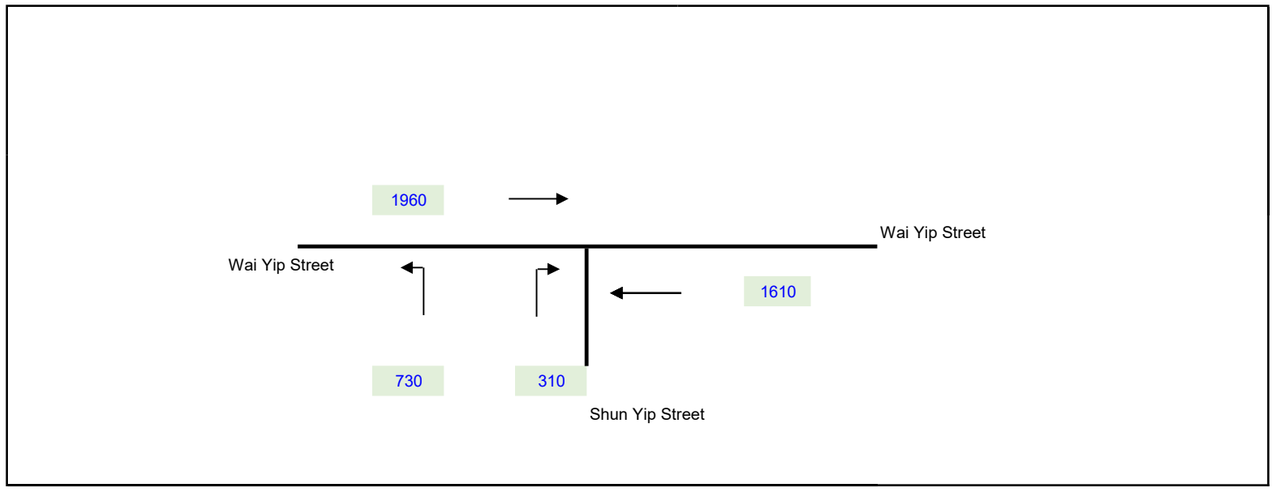
STAGE 1	INT= 8	STAGE 2	INT= 0	STAGE 3	INT= 5	STAGE 4	INT=	STAGE 5	INT= 7	STAGE 6	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	10	5	3	8	9	3	8	OK
B	5	5	10	5	5	10	5	OK
C	7	6	4	5	11	4	5	OK

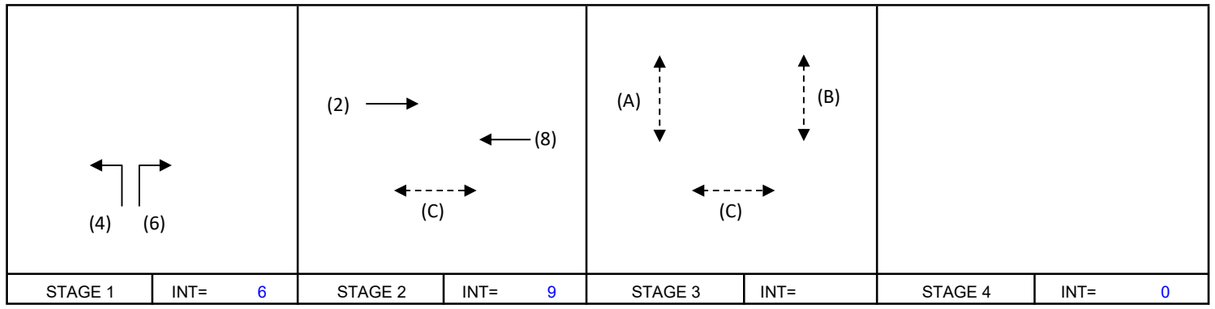
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				17				
1	1	3.50	I	1	15		N	1965	220			220	1.00	1786			1786	0.123			21	22	0.657	35
2	1	3.50	I	1				2105		270		270	0.00	2105			2105	0.128	0.128		22	22	0.685	43
3	1,3	3.50	II, III	1			N	1965		435		435	0.00	1965			1965	0.221			38	44	0.595	54
4	3	3.50	III	1	20			2105			225	225	1.00	1958			1958	0.115	0.115		20	20	0.685	37
5	5	3.50	IV	2	20			4210			730	730	1.00	3916			3916	0.186	0.227		32	39	0.563	48
6	5	3.50	IV	1	15		N	1965	405			405	1.00	1786			1786	0.227			39	39	0.685	53
																	Stage 2 Pedestrian Loss Time			20	(Demand Dependent. Assumed always Called.)			
																	Stage 4 Pedestrian Loss Time				(Demand Dependent. Assumed always Skipped.)			
																	Stage 6 Pedestrian Loss Time				(Demand Dependent. Assumed always Skipped.)			

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Wai Yip Street / Shun Yip Street		DATE : 5-Feb-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	118 sec
Sum(y)		Y =	0.510
Loss time		L =	33 sec
Total Flow		=	4610 pcu
Co	= (1.5*L+5)/(1-Y)	=	111.2 sec
Cm	= L/(1-Y)	=	67.3 sec
Yult		=	0.653
R.C.ult	= (Yult-Y)/Y*100%	=	27.9 %
Cp	= 0.9*L/(0.9-Y)	=	76.1 sec
Ymax	= 1-L/C	=	0.720
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	27.1 % (Optimized)



STAGE 1	INT= 6	STAGE 2	INT= 9	STAGE 3	INT=	STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	2	9	67	2	9	OK
B	12	10	2	8	10	2	8	OK
C	10	5	2	8	10	2	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				13				
2	2	3.50	I	3			N	6175		1960		1960	0.00	6175			6175	0.317	0.317		53	53	0.708	71
8	2	3.50	II	3			N	6175		1610		1610	0.00	6175			6175	0.261			43	53	0.582	58
4	1	3.50	III	1	15		N	1965	344			344	1.00	1786			1786	0.193	0.193		32	32	0.708	55
4,6	1	3.50	III	1	30			2105	386		0	386	1.00	2005			2005	0.193			32	32	0.708	61
6	1	3.50	III	1	30		N	1965			310	310	1.00	1871			1871	0.166			28	32	0.609	44
																	Stage 3 Pedestrian Loss Time			20				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

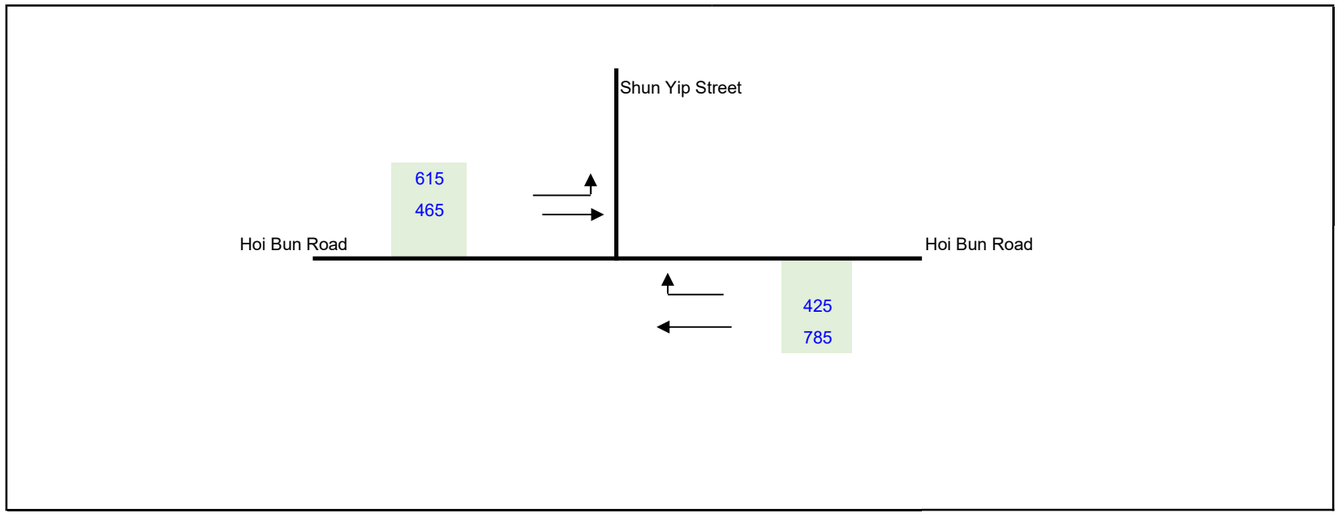
ARUP — TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

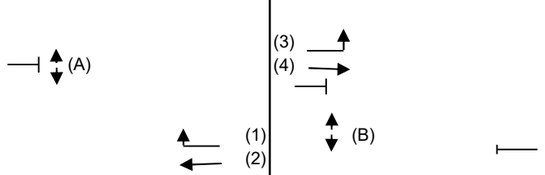
Shun Yip Street / Hoi Bun Road

DATE : 5-Feb-21

FILENAME :

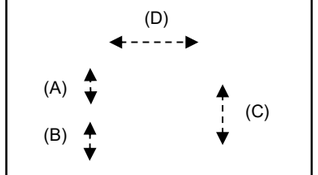


No. of stages per cycle		N =	2
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.647
Loss time		L =	39 sec
Total Flow		=	2290 pcu
Co	= (1.5*L+5)/(1-Y)	=	179.9 sec
Cm	= L/(1-Y)	=	110.5 sec
Yult		=	0.608
R.C.ult	= (Yult-Y)/Y*100%	=	-6.1 %
Cp	= 0.9*L/(0.9-Y)	=	138.7 sec
Ymax	= 1-L/C	=	0.675
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	-6.1 % (Optimized)



STAGE 1	INT= 10

STAGE 2	INT= 6



STAGE 3 (ped)	INT= 2

STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	0	6	62	0	6	OK
B	7	5	3	6	64	3	6	OK
C	7	6	3	5	15	3	5	OK
D	10	6	5	12	6	5	12	OK

7 8

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
1,2	1	3.50	I	1	30			2105		191	425	616	0.69	2035			2035	0.303	0.303		38	38	0.959	112
2	1	3.50	I	1			N	1965		594		594	0.00	1965			1965	0.302			38	38	0.957	107
3	2	3.50	II	1	15		N	1965	615			615	1.00	1786			1786	0.344	0.344		43	43	0.959	104
4	2	3.50	II	1	20			2105		465		465	0.00	2105			2105	0.221			28	43	0.615	60
																		Pedestrian Stage 3		23				

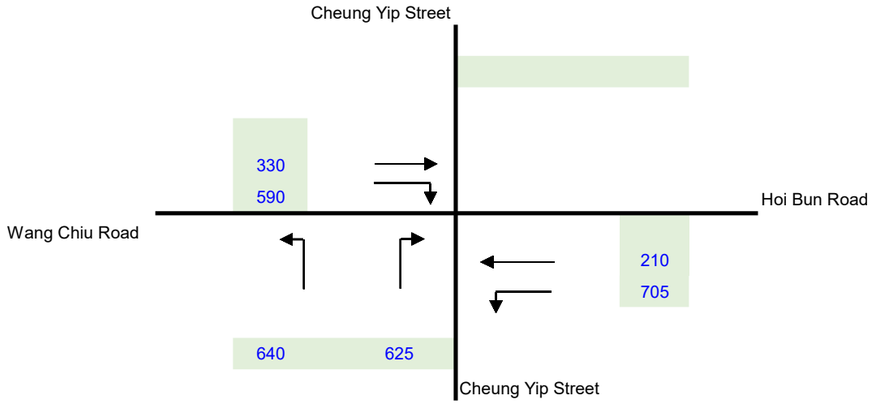
NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP — TRAFFIC SIGNAL CALCULATION

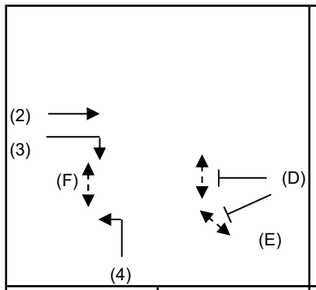
PROJECT NO: 237938

Cheung Yip Street / Hoi Bun Road

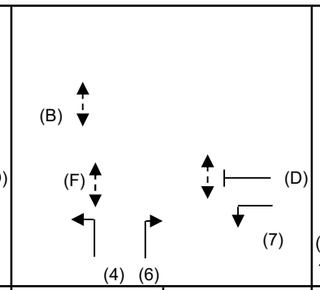
DATE : 5-Feb-21 FILENAME :



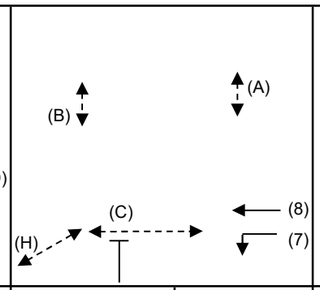
No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	118 sec
Sum(y)		Y =	0.576
Loss time		L =	10 sec
Total Flow		=	3100 pcu
Co	= (1.5*L+5)/(1-Y)	=	47.2 sec
Cm	= L/(1-Y)	=	23.6 sec
Yult		=	0.825
R.C.ult	= (Yult-Y)/Y*100%	=	43.2 %
Cp	= 0.9*L/(0.9-Y)	=	27.8 sec
Ymax	= 1-L/C	=	0.915
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	43.0 % (Optimized)



STAGE 1 INT= 6



STAGE 2 INT=



STAGE 3 INT= 6

STAGE 4 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	6	6	12	6	6	OK
B	11	5	2	9	58	2	9	OK
C	11	10	0	8	16	0	8	OK
D	5	5	1	5	88	1	5	OK
E	7	5	1	6	42	1	6	OK
F	5	5	4	5	85	4	5	OK
H	5	5	1	5	18	1	5	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				10				
2,3	1	3.50	I	1	35		N	1965		330	123	453	0.27	1942			1942	0.233	0.233		44	44	0.629	56
3	1	3.50	I	1	30			2105			467	467	1.00	2005			2005	0.233			44	44	0.629	58
4	1,2	3.50	II	1	15		N	1965	640			640	1.00	1786			1786	0.358			67	89	0.473	31
6	2	3.50	II	2	30			4210			625	625	1.00	4010			4010	0.156			29	41	0.453	40
7	2,3	3.50	III	1	15		N	1965	705			705	1.00	1786		270	2056	0.343	0.343		64	64	0.629	63
8	3	3.50	III	1	30			2105		210		210	0.00	2105			2105	0.100			19	19	0.629	35

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

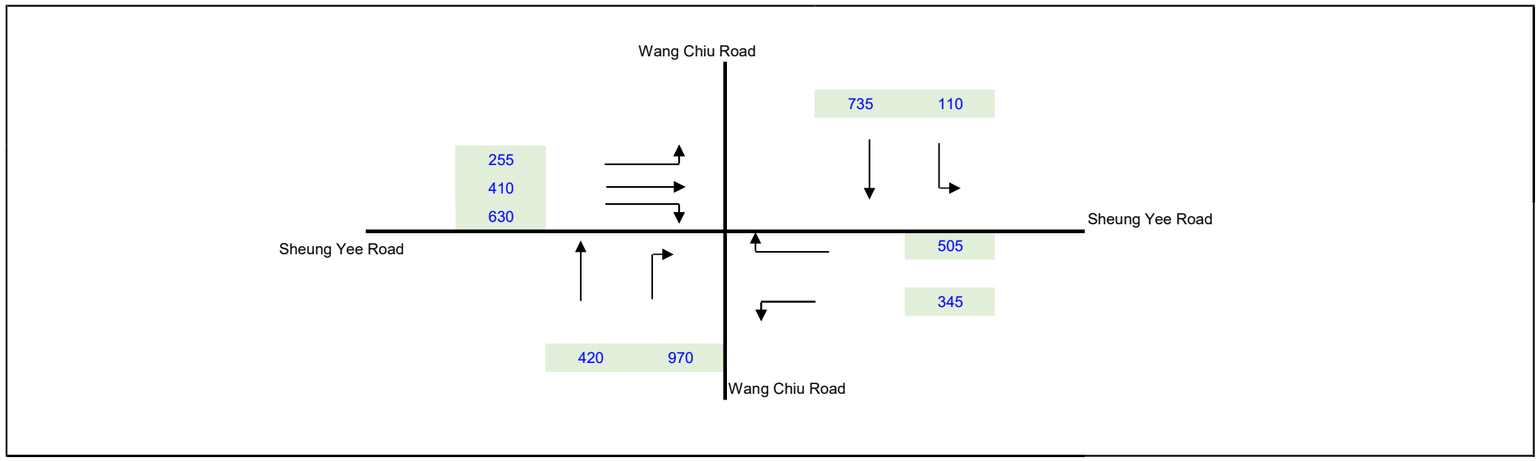
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

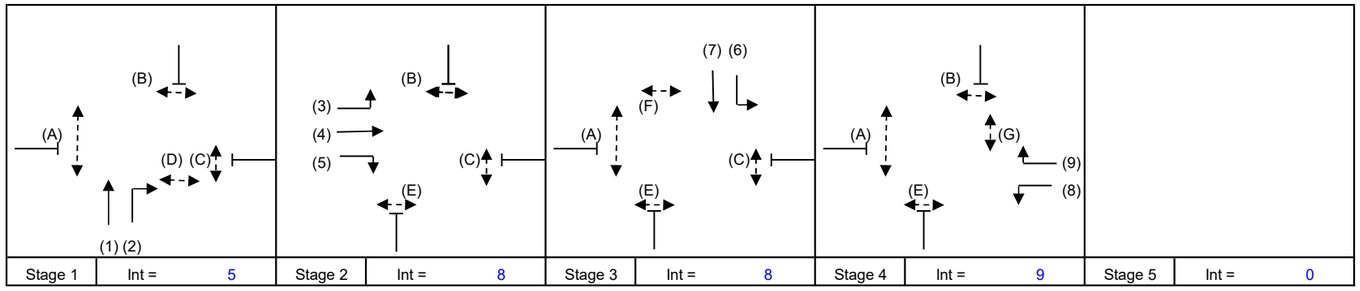
Wang Chiu Road / Sheung Yee Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	120 sec
Sum(y)		Y =	0.661
Loss time		L =	26 sec
Total Flow		=	4380 pcu
Co	= (1.5*L+5)/(1-Y)	=	130.0 sec
Cm	= L/(1-Y)	=	76.8 sec
Yult		=	1.005
R.C.ult	= (Yult-Y)/Y*100%	=	51.9 %
Cp	= 0.9*L/(0.9-Y)	=	98.1 sec
Ymax	= 1-L/C	=	0.783
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	6.6 %



Stage 1	Int = 5	Stage 2	Int = 8	Stage 3	Int = 8	Stage 4	Int = 9	Stage 5	Int = 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	16	7	2	13	79	2	13	OK
B	10	5	2	8	83	2	8	OK
C	10	5	2	8	81	2	8	OK
D	10	5	8	8	22	8	8	OK
E	10	5	3	8	71	3	8	OK
F	7	5	6	6	15	6	6	OK
G	7	5	6	6	17	6	6	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				26				
1	1	3.50	I	1			N	1965		420		420	0.00	1965			1965	0.214	0.241		30	34	0.748	66
1,2	1	3.50	I	1	35			2105		0	487	487	1.00	2018			2018	0.241			34	34	0.844	82
2	1	3.50	I	1	30			2105			483	483	1.00	2005			2005	0.241			34	34	0.843	81
3	2	3.50	II	1	15		N	1965	236			236	1.00	1786			1786	0.132	0.132		19	19	0.844	52
3,4	2	3.50	II	1	18			2105	19	257		276	0.07	2093			2093	0.132			19	19	0.843	59
4,5	2	3.50	II	1	35			2105		153	119	272	0.44	2066			2066	0.132			19	19	0.841	58
5	2	3.50	II	2	30		N	4070			511	511	1.00	3876			3876	0.132			19	19	0.843	49
6,7	3	3.50	III	1	15		N	1965	110	152		262	0.42	1886			1886	0.139	0.139		20	20	0.844	56
7	3	3.50	III	2				4210		583		583	0.00	4210			4210	0.138			20	20	0.842	55
8	4	3.50	IV	1	15		N	1965	266			266	1.00	1786			1786	0.149	0.149		21	21	0.843	56
8,9	4	3.50	III	1	15			2105	79		206	285	1.00	1914			1914	0.149			21	21	0.843	59
9	4	3.50	IV	1	30			2105			299	299	1.00	2005			2005	0.149			21	21	0.844	61

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

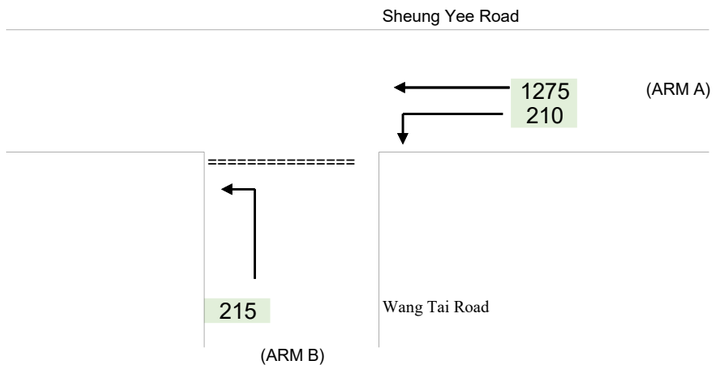
PRIORITY JUNCTION CALCULATION

Project No. : 237938

Wang Tak Road / Sheung Yee Road

DATE : 5-Feb-21

FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.90	(metres)
W cr	=	0	(metres)
q a-b	=	210	(pcu/hr)
q a-c	=	1275	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	6.20	(metres)
Vl b-a	=	45	(metres)
Vr b-a	=	45	(metres)
Vr b-c	=	50	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	215	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.574
E	=	1.162
F	=	0.586
Y	=	0.727

THE CAPACITY OF MOVEMENT :

Q b-a	=	153
Q b-c	=	448
Q c-b	=	206
Q b-ac	=	448

TOTAL FLOW = 1700 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.4799
DFC c-b	=	0.0000
DFC b-ac	=	0.4799

CRITICAL DFC = 0.48

OVE ARUP & PARTNERS

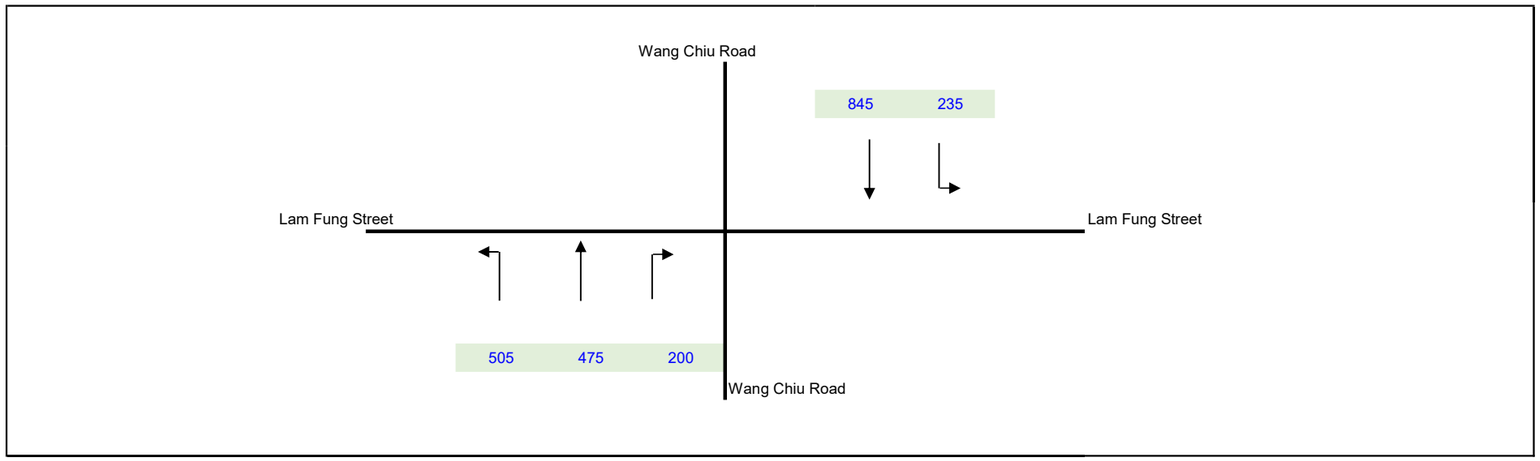
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

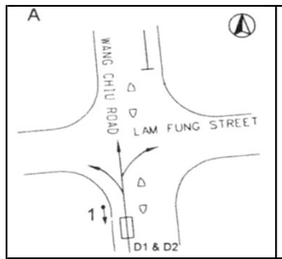
Wang Chiu Road / Lam Fung Road

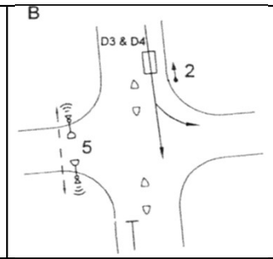
DATE : 5-Feb-21

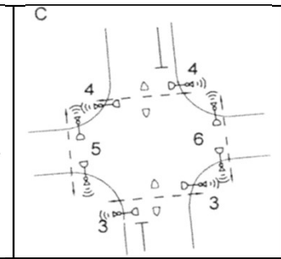
FILENAME:



No. of stages per cycle	N =	3
No. of stage using for calculation	N =	2
Cycle time	C =	120 sec
Sum(y)	Y =	0.473
Loss time	L =	34 sec
Total Flow	=	2260 pcu
Co = (1.5*L+5)/(1-Y)	=	106.3 sec
Cm = L/(1-Y)	=	64.5 sec
Yult	=	0.945
R.C.ult = (Yult-Y)/Y*100%	=	99.8 %
Cp = 0.9*L/(0.9-Y)	=	71.7 sec
Ymax = 1-L/C	=	0.717
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	36.4 %







Stage 1	Int = 5	Stage 2	Int = 9	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	11	10	4	8	10	4	8	OK
4	8	7	0	5	17	0	5	OK
5	9	5	6	8	65	6	8	OK
6	9	5	2	8	12	2	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1	1	3.50	I	1	15		N	1965	360			360	1.00	1786			1786	0.202	0.202		37	37	0.659	50
1,2	1	3.50	I	1	18			2105	145	267		412	0.35	2045			2045	0.201			37	37	0.659	57
2,3	1	3.50	I	1	18			2105		208	200	408	0.49	2022			2022	0.202			37	37	0.660	57
4,5	2	3.50	II	1	15		N	1965	235	274		509	0.46	1878			1878	0.271	0.271		49	49	0.659	60
5	2	3.50	II	1				2105		571		571	0.00	2105			2105	0.271			49	49	0.660	67
																	Stage 3 Pedestrian Stage			22				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

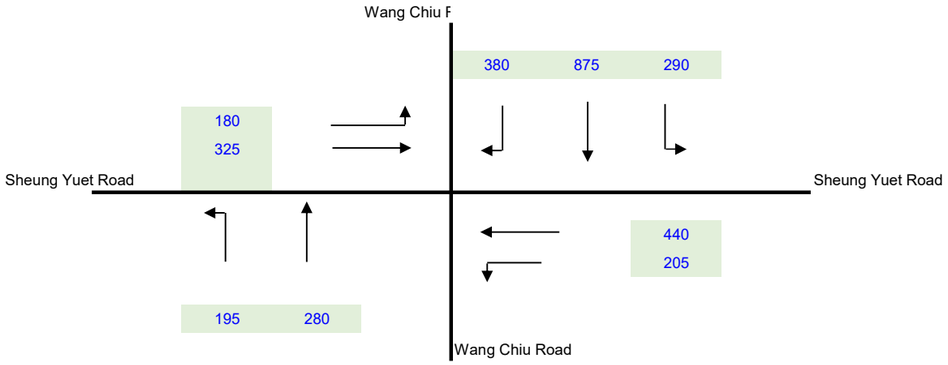
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

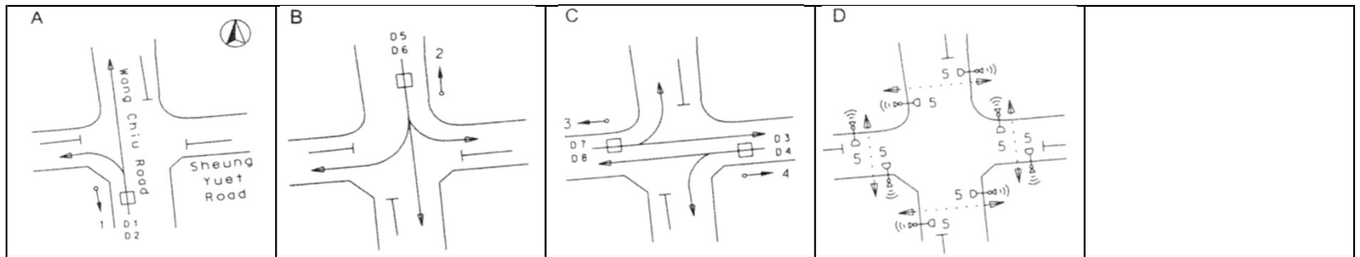
Wang Chiu Road / Sheung Yuet Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle	N =	4
No. of stage using for calculation	N =	3
Cycle time	C =	140 sec
Sum(y)	Y =	0.651
Loss time	L =	41 sec
Total Flow	=	3170 pcu
Co = (1.5*L+5)/(1-Y)	=	190.6 sec
Cm = L/(1-Y)	=	117.5 sec
Yult	=	0.893
R.C.ult = (Yult-Y)/Y*100%	=	37.1 %
Cp = 0.9*L/(0.9-Y)	=	148.3 sec
Ymax = 1-L/C	=	0.707
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	-2.3 %



Stage 1	Int = 6	Stage 2	Int = 7	Stage 3	Int = 9	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	3	9	10	3	9	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				19				
4,5	1	3.50	I	1	15		N	1965	195	24		219	0.89	1804			1804	0.121	0.122		18	18	0.919	78
5	1	3.50	I	1				2105		256		256	0.00	2105			2105	0.122			18	18	0.921	85
10,11	2	3.50	I	1	15		N	1965	290	400		690	0.42	1886			1886	0.366	0.366		56	56	0.921	121
11,12	2	3.50	II	1	20			2105		475	380	855	0.44	2037		300	2337	0.366			56	56	0.921	144
7,8	3	3.50	II	1	15		N	1965	205	96		301	0.68	1840			1840	0.164	0.164		25	25	0.921	88
8	3	3.50	II	1				2105		344		344	0.00	2105			2105	0.163			25	25	0.920	94
1,2	3	3.50	II	1	15		N	1965	180	55		235	0.77	1825			1825	0.129			20	25	0.725	51
2	3	3.50	III	1				2105		270		270	0.00	2105			2105	0.128			20	25	0.722	58
																	Stage 4 Pedestrian Stage			22				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

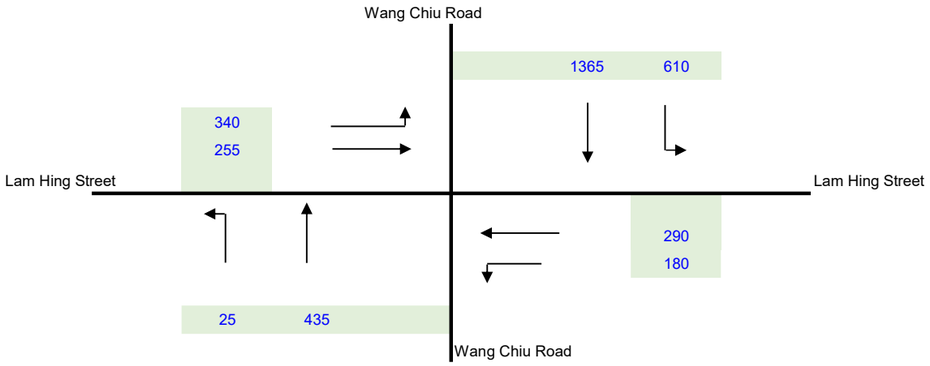
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

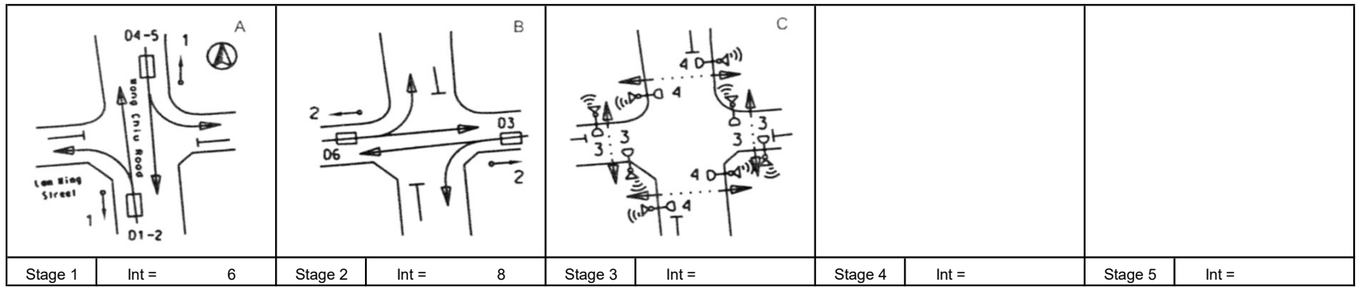
Wang Chiu Road / Lam Hing Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	140 sec
Sum(y)		Y =	0.649
Loss time		L =	33 sec
Total Flow		=	3500 pcu
Co	= (1.5*L+5)/(1-Y)	=	155.5 sec
Cm	= L/(1-Y)	=	94.1 sec
Yult		=	0.953
R.C.ult	= (Yult-Y)/Y*100%	=	46.7 %
Cp	= 0.9*L/(0.9-Y)	=	118.5 sec
Ymax	= 1-L/C	=	0.764
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	5.9 %



Stage 1	Int = 6	Stage 2	Int = 8	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	5	5	3	5	13	3	5	OK
4	11	10	3	8	10	3	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1,2	1	3.50	I	1	15		N	1965	25	201		226	0.11	1944			1944	0.116	0.341		19	56	0.289	32
2	1	3.50	I	1				2105		234		234	0.00	2105			2105	0.111			18	56	0.277	33
4	1	3.50	I	1	15		N	1965	610			610	1.00	1786			1786	0.341			56	56	0.850	97
5	1	3.50	I	2				4210		1365		1365	0.00	4210			4210	0.324			53	56	0.807	98
3	2	4.00	II	1	15		N	2015	180	290		470	0.38	1941			1941	0.242	0.308		40	51	0.668	70
6	2	4.00	II	1	20		N	2015	340	255		595	0.57	1932			1932	0.308			51	51	0.850	101
																	Stage 3 Pedestrian Stage			21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

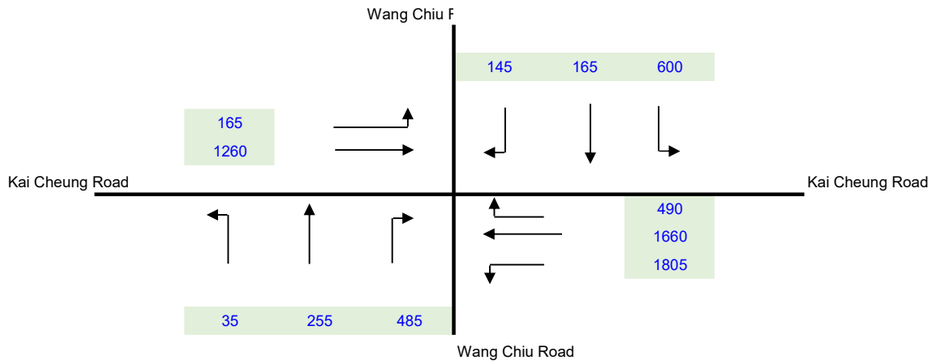
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

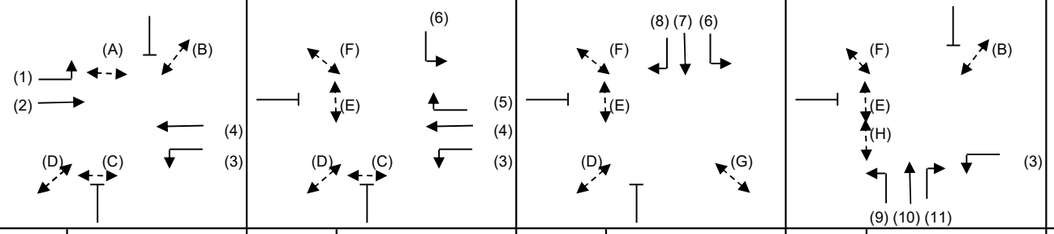
Wang Chiu Road / Kai Cheung Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	140 sec
Sum(y)		Y =	0.657
Loss time		L =	32 sec
Total Flow		=	7065 pcu
Co	= (1.5*L+5)/(1-Y)	=	154.5 sec
Cm	= L/(1-Y)	=	93.3 sec
Yult		=	0.960
R.C.ult	= (Yult-Y)/Y*100%	=	46.1 %
Cp	= 0.9*L/(0.9-Y)	=	118.5 sec
Ymax	= 1-L/C	=	0.771
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	5.7 %



Stage 1	Int = 7	Stage 2	Int = 7	Stage 3	Int = 12	Stage 4	Int = 10	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	8	7	3	5	31	3	5	OK
B	7	5	3	6	108	3	6	OK
C	11	10	2	8	76	2	8	OK
D	4	5	2	5	102	2	5	OK
E	10	5	2	8	91	2	8	OK
F	4	5	2	5	94	2	5	OK
G	7	5	3	6	14	3	6	OK
H	10	5	4	8	19	4	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				32				
1	1	3.50	I	1	25		N	1965	165			165	1.00	1854			1854	0.089	0.200		15	33	0.380	29
2	1	3.50	I	3				6315		1260		1260	0.00	6315			6315	0.200			33	33	0.852	77
3	1,2,4	3.50	I	2	25		N	4070	1805			1805	1.00	3840			3840	0.470			77	113	0.585	41
4	1,2	3.50	II	3				6315		1660		1660	0.00	6315			6315	0.263			43	82	0.449	54
5	2	3.50	II	1	20			2105			490	490	1.00	1958			1958	0.250	0.250		41	41	0.852	93
6	2,3	3.50	II	1	25		N	1965	600			600	1.00	1854		110	1964	0.306			50	65	0.662	75
7	3	3.50	II	1				2105		159		159	0.00	2105			2105	0.076	0.076		12	12	0.848	46
7,8	3	3.50	III	1	25			2105		6	145	151	0.96	1990			1990	0.076			12	12	0.852	44
9,10	4	3.50	III	1	25		N	1965	35	221		256	0.14	1949			1949	0.131	0.131		22	22	0.852	63
10,11	4	3.50	III	1	25			2105		34	228	262	0.87	2001			2001	0.131			22	22	0.849	64
11	4	3.50	III	1	20			2105			257	257	1.00	1958			1958	0.131			22	22	0.851	63

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

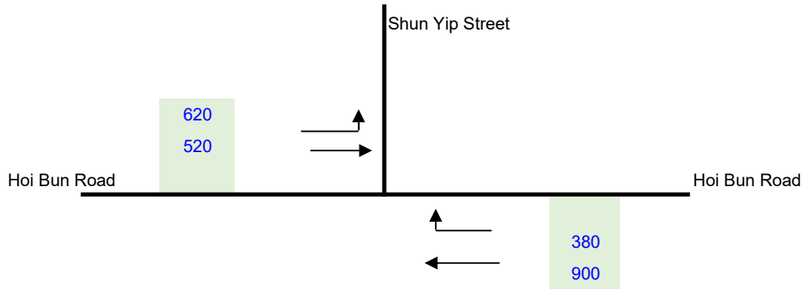
ARUP — TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

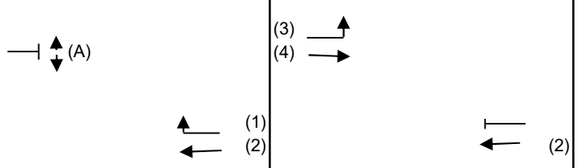
Shun Yip Street / Hoi Bun Road

DATE : 5-Feb-21

FILENAME :



No. of stages per cycle		N =	2
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.485
Loss time		L =	39 sec
Total Flow		=	2420 pcu
Co	= (1.5*L+5)/(1-Y)	=	123.2 sec
Cm	= L/(1-Y)	=	75.7 sec
Yult		=	0.608
R.C.ult	= (Yult-Y)/Y*100%	=	25.4 %
Cp	= 0.9*L/(0.9-Y)	=	84.5 sec
Ymax	= 1-L/C	=	0.675
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	25.4 % (Optimized)



STAGE 1	INT= 10	STAGE 2	INT= 6	STAGE 3 (ped)	INT= 2	STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	0	6	56	0	6	OK
B	7	5	3	6	14	3	6	OK
C	11.5	10	3	8	12	3	8	OK
D	10	6	5	12	6	5	12	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
1	1	3.50	I	1	30			2105			380	380	1.00	2005			2005	0.190	0.190		32	32	0.718	56
2	1,2	3.50	I	1			N	1965		900		900	0.00	1965			1965	0.458			77	85	0.647	53
3	2	3.50	II	1	15		N	1965	527			527	1.00	1786			1786	0.295	0.295		49	49	0.718	62
3,4	2	3.50	II	1	20			2105	93	520		613	0.15	2081			2081	0.295			49	49	0.717	72
																		Pedestrian Stage 3		23				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

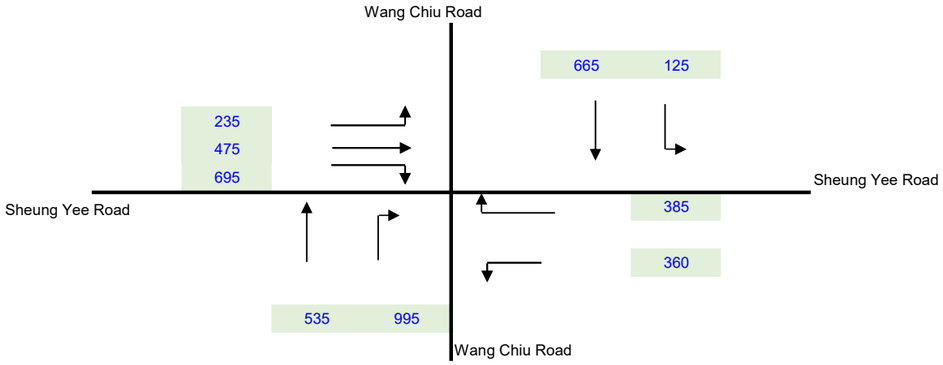
TRAFFIC SIGNAL CALCULATION

Wang Chiu Road / Sheung Yee Road

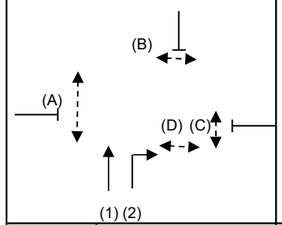
PROJECT NO: 237938

DATE : 5-Feb-21

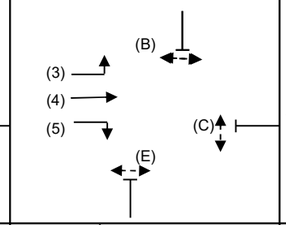
FILENAME:



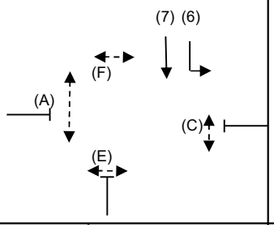
No. of stages per cycle	N =	4	
No. of stage using for calculation	N =	4	
Cycle time	C =	120	sec
Sum(y)	Y =	0.655	
Loss time	L =	22	sec
Total Flow	=	4470	pcu
Co = (1.5*L+5)/(1-Y)	=	110.0	sec
Cm = L/(1-Y)	=	63.7	sec
Yult	=	1.035	
R.C.ult = (Yult-Y)/Y*100%	=	58.1	%
Cp = 0.9*L/(0.9-Y)	=	80.7	sec
Ymax = 1-L/C	=	0.817	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	12.3	%



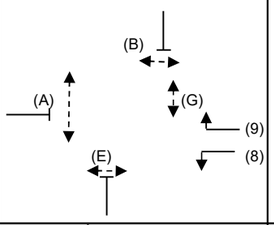
Stage 1 Int = 7



Stage 2 Int = 6



Stage 3 Int = 6



Stage 4 Int = 7

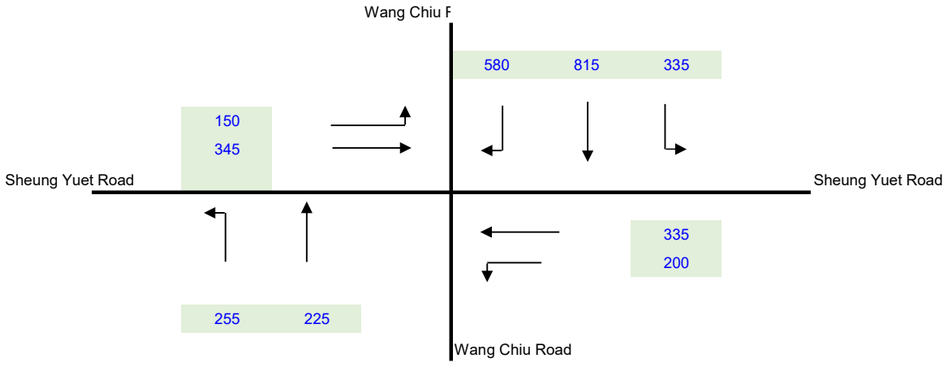
Stage 5 Int = 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	16	7	2	13	78	2	13	OK
B	10	5	2	8	86	2	8	OK
C	10	5	2	8	84	2	8	OK
D	10	5	8	8	27	8	8	OK
E	10	5	3	8	66	3	8	OK
F	7	5	6	6	12	6	6	OK
G	7	5	6	6	14	6	6	OK

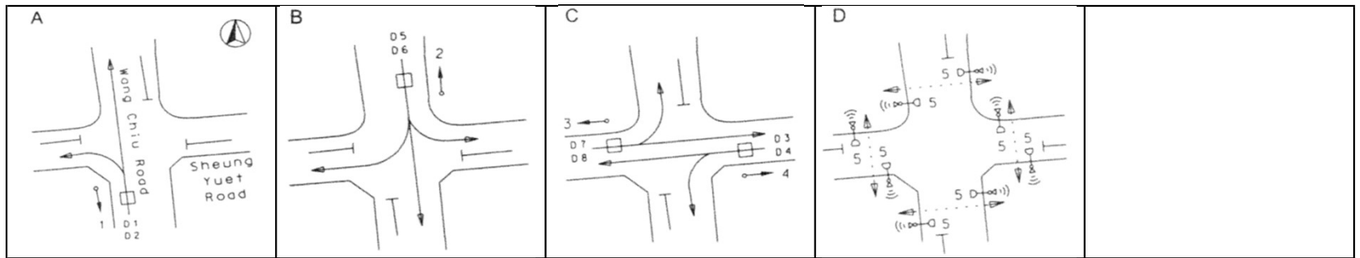
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
1	1	3.50	I	2			N	4070		535		535	0.00	4070			4070	0.131	0.248		20	37	0.425	37
2	1	3.50	I	2	30			4210			995	995	1.00	4010			4010	0.248			37	37	0.802	72
3	2	3.50	II	1	15		N	1965	235			235	1.00	1786			1786	0.132	0.146		20	22	0.725	44
3,4	2	3.50	II	1	18			2105	0	306		306	0.00	2105			2105	0.145			22	22	0.801	56
4,5	2	3.50	II	1	35			2105		169	131	300	0.44	2066			2066	0.145			22	22	0.800	55
5	2	3.50	II	2	30		N	4070			564	564	1.00	3876			3876	0.146			22	22	0.802	49
6,7	3	3.50	III	1	15		N	1965	125	118		243	0.51	1869			1869	0.130	0.130		19	19	0.802	47
7	3	3.50	III	2				4210		547		547	0.00	4210			4210	0.130			19	19	0.801	49
8	4	3.50	IV	1	15		N	1965	234			234	1.00	1786			1786	0.131	0.131		20	20	0.802	45
8,9	4	3.50	III	1	15			2105	126		124	250	1.00	1914			1914	0.131			20	20	0.802	48
9	4	3.50	IV	1	30			2105			261	261	1.00	2005			2005	0.130			19	20	0.797	50

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Wang Chiu Road / Sheung Yuet Road		DATE : 5-Feb-21	FILENAME:



No. of stages per cycle	N =	4	
No. of stage using for calculation	N =	3	
Cycle time	C =	140	sec
Sum(y)	Y =	0.575	
Loss time	L =	41	sec
Total Flow	=	3240	pcu
Co = (1.5*L+5)/(1-Y)	=	156.6	sec
Cm = L/(1-Y)	=	96.5	sec
Yult	=	0.893	
R.C.ult = (Yult-Y)/Y*100%	=	55.1	%
Cp = 0.9*L/(0.9-Y)	=	113.7	sec
Ymax = 1-L/C	=	0.707	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	10.6	%



Stage 1	Int = 6	Stage 2	Int = 7	Stage 3	Int = 9	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	3	9	10	3	9	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				19				
4,5	1	3.50	I	1	15		N	1965	255	0		255	1.00	1786			1786	0.143	0.143		25	25	0.814	55
5	1	3.50	I	1	15			2105	0	225		225	0.00	2105			2105	0.107			18	25	0.609	43
10,11	2	3.50	I	1	15		N	1965	335	203		538	0.62	1850			1850	0.291	0.296		50	51	0.799	86
11	2	3.50	I	1				2105		612		612	0.00	2105			2105	0.291			50	51	0.799	97
12	2	3.50	II	1	20			2105			580	580	1.00	1958			1958	0.296			51	51	0.814	92
7,8	3	3.50	II	1	15		N	1965	200	48		248	0.81	1818			1818	0.136	0.136		23	23	0.814	54
8	3	3.50	II	1				2105		287		287	0.00	2105			2105	0.136			23	23	0.813	62
1,2	3	3.50	II	1	15		N	1965	150	81		231	0.65	1845			1845	0.125			22	23	0.747	51
2	3	3.50	III	1				2105		264		264	0.00	2105			2105	0.125			22	23	0.748	57
																	Stage 4 Pedestrian Stage			22				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

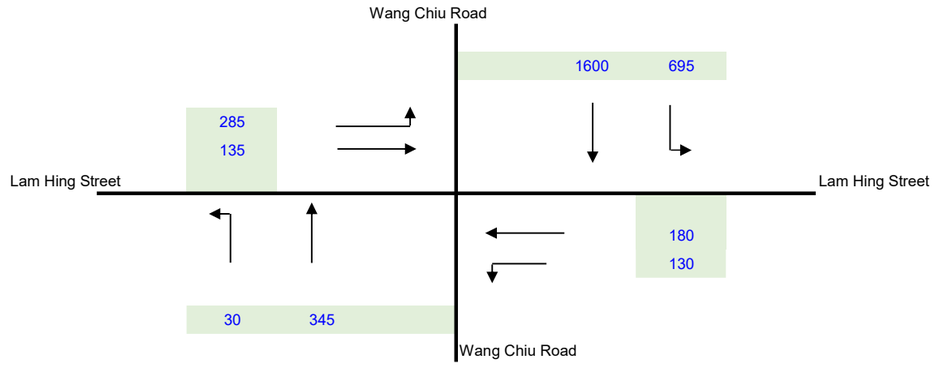
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

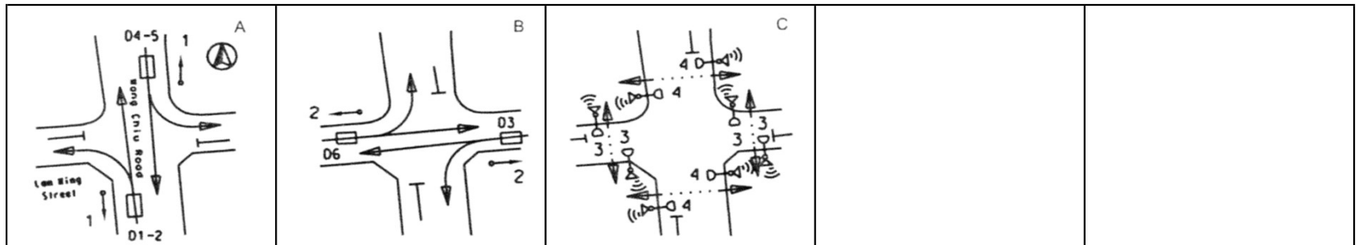
Wang Chiu Road / Lam Hing Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle	N =	3
No. of stage using for calculation	N =	2
Cycle time	C =	140 sec
Sum(y)	Y =	0.549
Loss time	L =	33 sec
Total Flow	=	3400 pcu
Co = (1.5*L+5)/(1-Y)	=	120.9 sec
Cm = L/(1-Y)	=	73.2 sec
Yult	=	0.953
R.C.ult = (Yult-Y)/Y*100%	=	73.4 %
Cp = 0.9*L/(0.9-Y)	=	84.7 sec
Ymax = 1-L/C	=	0.764
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	25.2 %



Stage 1	Int = 6	Stage 2	Int = 8	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	5	5	3	5	13	3	5	OK
4	11	10	3	8	10	3	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1,2	1	3.50	I	1	15		N	1965	30	155		185	0.16	1934			1934	0.096	0.389		19	76	0.177	20
2	1	3.50	I	1				2105		190		190	0.00	2105			2105	0.090			18	76	0.167	20
4	1	3.50	I	1	15		N	1965	695			695	1.00	1786			1786	0.389			76	76	0.719	74
5	1	3.50	I	2				4210		1600		1600	0.00	4210			4210	0.380			74	76	0.702	86
3	2	4.00	II	1	15		N	2015	130	180		310	0.42	1934			1934	0.160	0.160		31	31	0.719	62
6a	2	4.00	II	1	20		N	2015	285			285	1.00	1874			1874	0.152			30	31	0.682	52
6b	2	4.00	II	1			N	2015		135		135	0.00	2015			2015	0.067			13	31	0.300	24
																	Stage 3 Pedestrian Stage			21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

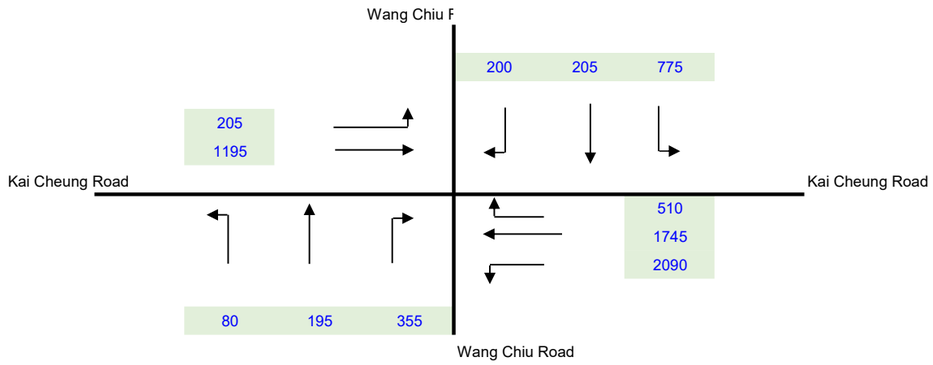
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

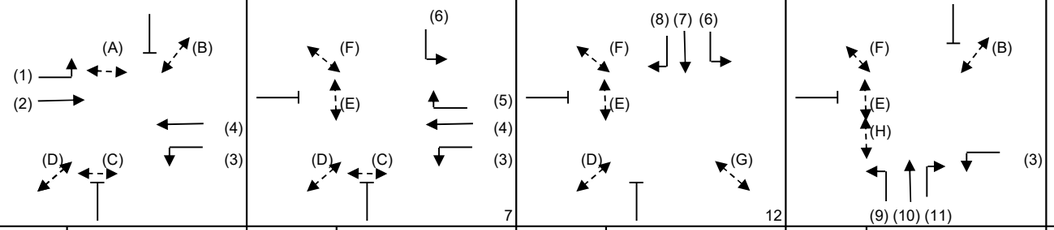
Wang Chiu Road / Kai Cheung Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	140 sec
Sum(y)		Y =	0.691
Loss time		L =	24 sec
Total Flow		=	7555 pcu
Co	= (1.5*L+5)/(1-Y)	=	132.7 sec
Cm	= L/(1-Y)	=	77.7 sec
Yult		=	1.020
R.C.ult	= (Yult-Y)/Y*100%	=	47.6 %
Cp	= 0.9*L/(0.9-Y)	=	103.4 sec
Ymax	= 1-L/C	=	0.829
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	7.9 %



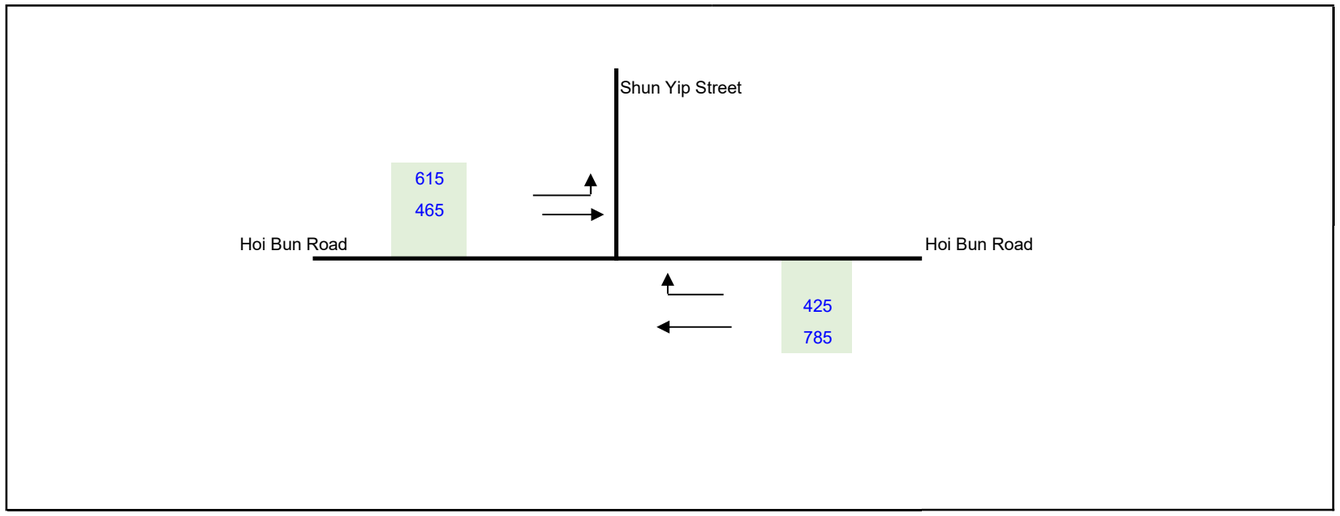
Stage 1	Int = 7	Stage 2	Int =	Stage 3	Int = 10	Stage 4	Int = 10	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	8	7	3	5	30	3	5	OK
B	7	5	3	6	98	3	6	OK
C	11	10	2	8	77	2	8	OK
D	4	5	2	5	105	2	5	OK
E	10	5	2	8	91	2	8	OK
F	4	5	2	5	94	2	5	OK
G	7	5	3	6	16	3	6	OK
H	10	5	4	8	15	4	8	OK

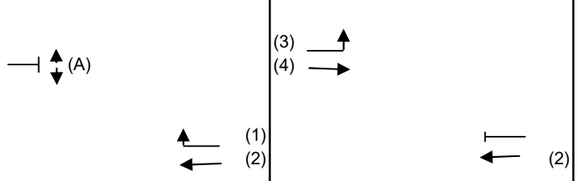
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				24				
1	1	3.50	I	1	25		N	1965	205			205	1.00	1854			1854	0.111	0.189		19	32	0.487	37
2	1	3.50	I	3				6315		1195		1195	0.00	6315			6315	0.189			32	32	0.834	74
3	1,2,4	3.50	I	2	25		N	4070	2090			2090	1.00	3840			3840	0.544			91	103	0.736	64
4	1,2	3.50	II	2				4210		1745		1745	0.00	4210		380	4590	0.380			64	76	0.696	92
5	2	3.50	II	1	20			2105			510	510	1.00	1958			1958	0.260			44	44	0.834	94
6	2,3	3.50	II	1	25		N	1965	775			775	1.00	1854		110	1964	0.395	0.395		66	66	0.834	101
7	3	3.50	II	1				2105		139		139	0.00	2105			2105	0.066			11	14	0.684	35
7.8	3	3.50	III	1	30			2105		66	69	135	0.51	2053			2053	0.066			11	14	0.681	28
8	3	3.50	III	1	25			2105			131	131	1.00	1986			1986	0.066			11	14	0.683	34
9,10	4	3.50	III	1	25		N	1965	80	124		204	0.39	1920			1920	0.106	0.107		18	18	0.826	53
10,11	4	3.50	III	1	25			2105		71	145	216	0.67	2023			2023	0.107			18	18	0.830	56
11	4	3.50	III	1	20			2105			210	210	1.00	1958			1958	0.107			18	18	0.834	55

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Shun Yip Street / Hoi Bun Road		DATE : 5-Feb-21	FILENAME :

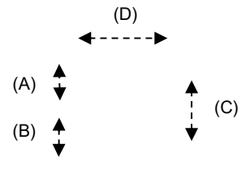


No. of stages per cycle		N =	2
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.492
Loss time		L =	39 sec
Total Flow		=	2290 pcu
Co	= (1.5*L+5)/(1-Y)	=	125.0 sec
Cm	= L/(1-Y)	=	76.8 sec
Yult		=	0.608
R.C.ult	= (Yult-Y)/Y*100%	=	23.5 %
Cp	= 0.9*L/(0.9-Y)	=	86.0 sec
Ymax	= 1-L/C	=	0.675
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	23.5 % (Optimized)



STAGE 1 INT= 10

STAGE 2 INT= 6



STAGE 3 (ped) INT= 2

STAGE 4 INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	0	6	59	0	6	OK
B	7	5	3	6	14	3	6	OK
C	11.5	10	3	8	12	3	8	OK
D	10	6	5	12	6	5	12	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
1	1	3.50	I	1	30			2105			425	425	1.00	2005			2005	0.212	0.212		35	35	0.729	60
2	1,2	3.50	I	1			N	1965		785		785	0.00	1965			1965	0.399			66	85	0.564	46
3	2	3.50	II	1	15		N	1965	500			500	1.00	1786			1786	0.280	0.280		46	46	0.729	62
3,4	2	3.50	II	1	20			2105	115	465		580	0.20	2074			2074	0.280			46	46	0.728	71
																		Pedestrian Stage 3		23				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

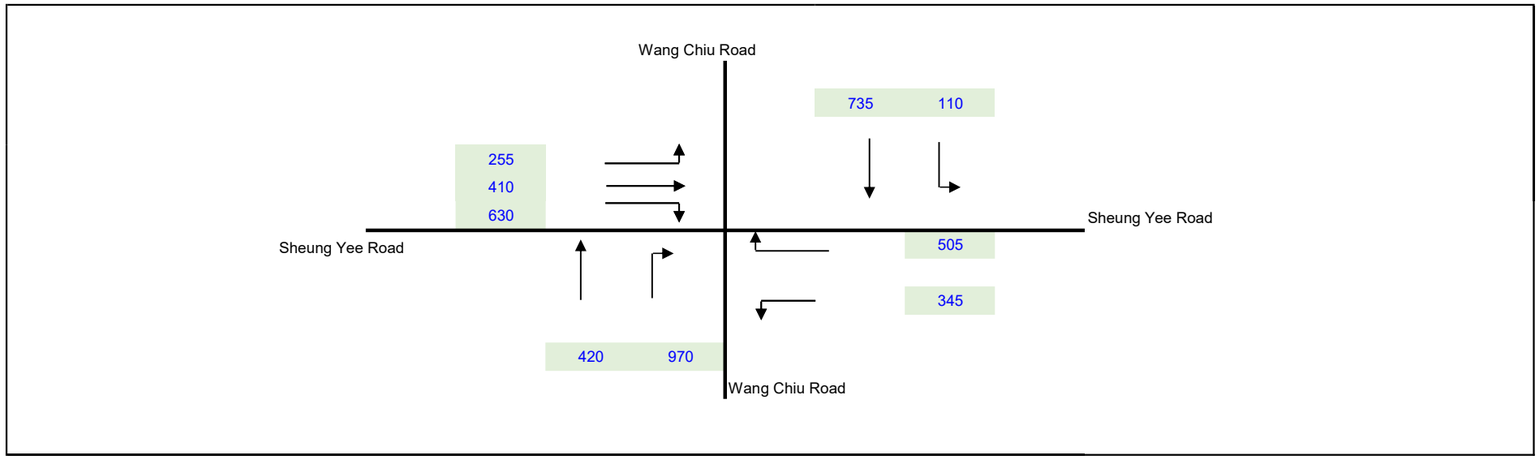
OVE ARUP & PARTNERS

TRAFFIC SIGNAL CALCULATION

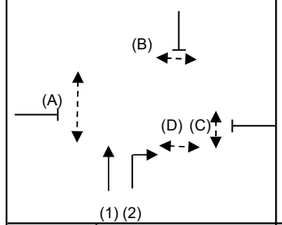
PROJECT NO: 237938

Wang Chiu Road / Sheung Yee Road

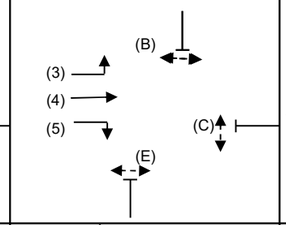
DATE : 5-Feb-21 FILENAME:



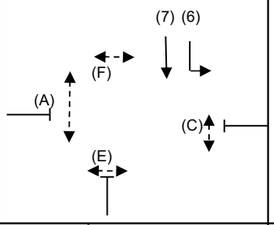
No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	120 sec
Sum(y)		Y =	0.662
Loss time		L =	22 sec
Total Flow		=	4380 pcu
Co	= (1.5*L+5)/(1-Y)	=	112.4 sec
Cm	= L/(1-Y)	=	65.1 sec
Yult		=	1.035
R.C.ult	= (Yult-Y)/Y*100%	=	56.4 %
Cp	= 0.9*L/(0.9-Y)	=	83.1 sec
Ymax	= 1-L/C	=	0.817
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	11.0 %



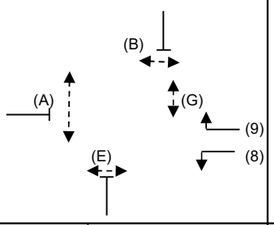
Stage 1 Int = 7



Stage 2 Int = 6



Stage 3 Int = 6



Stage 4 Int = 7

Stage 5 Int = 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	16	7	2	13	80	2	13	OK
B	10	5	2	8	84	2	8	OK
C	10	5	2	8	82	2	8	OK
D	10	5	8	8	26	8	8	OK
E	10	5	3	8	67	3	8	OK
F	7	5	6	6	14	6	6	OK
G	7	5	6	6	16	6	6	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
1	1	3.50	I	2			N	4070		420		420	0.00	4070			4070	0.103	0.242		15	36	0.346	29
2	1	3.50	I	2	30			4210			970	970	1.00	4010			4010	0.242			36	36	0.810	71
3	2	3.50	II	1	15		N	1965	235			235	1.00	1786			1786	0.132	0.132		19	20	0.807	45
3,4	2	3.50	II	1	18			2105	20	256		276	0.07	2092			2092	0.132			20	20	0.809	52
4,5	2	3.50	II	1	35			2105		154	118	272	0.43	2067			2067	0.132			19	20	0.808	52
5	2	3.50	II	2	30		N	4070			512	512	1.00	3876			3876	0.132			20	20	0.810	46
6,7	3	3.50	III	1	15		N	1965	110	151		261	0.42	1886			1886	0.138	0.139		20	21	0.809	49
7	3	3.50	III	2				4210		584		584	0.00	4210			4210	0.139			21	21	0.810	51
8	4	3.50	IV	1	15		N	1965	266			266	1.00	1786			1786	0.149	0.149		22	22	0.809	49
8,9	4	3.50	III	1	15			2105	79		206	285	1.00	1914			1914	0.149			22	22	0.809	53
9	4	3.50	IV	1	30			2105			299	299	1.00	2005			2005	0.149			22	22	0.810	55

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

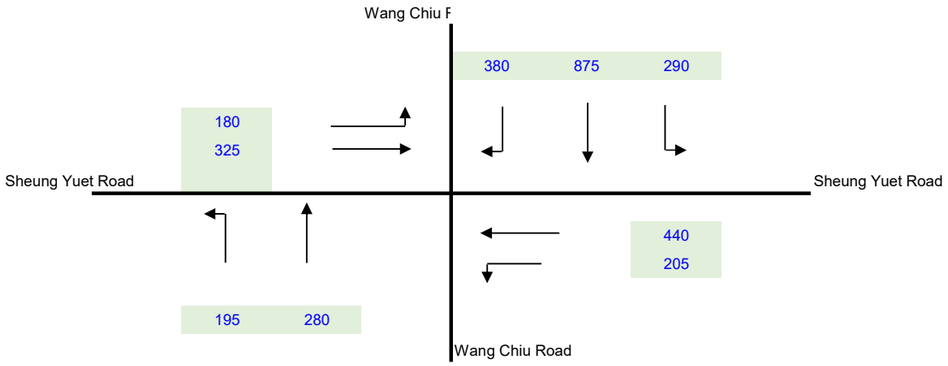
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

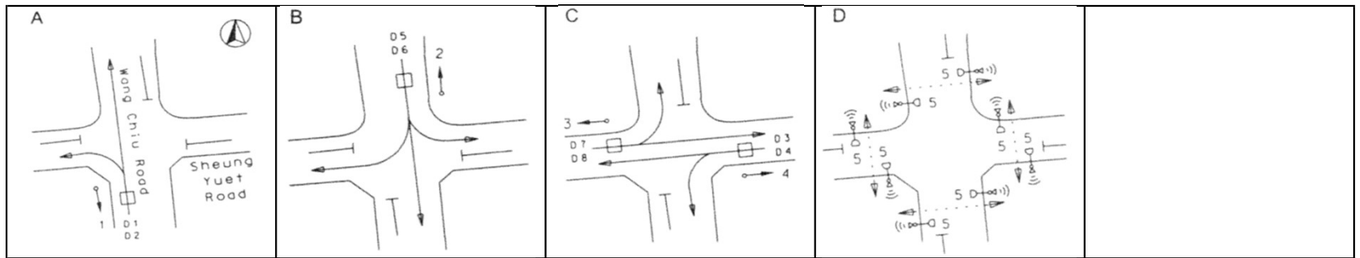
Wang Chiu Road / Sheung Yuet Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle	N =	4
No. of stage using for calculation	N =	3
Cycle time	C =	140 sec
Sum(y)	Y =	0.579
Loss time	L =	40 sec
Total Flow	=	3170 pcu
Co = (1.5*L+5)/(1-Y)	=	154.3 sec
Cm = L/(1-Y)	=	95.0 sec
Yult	=	0.900
R.C.ult = (Yult-Y)/Y*100%	=	55.5 %
Cp = 0.9*L/(0.9-Y)	=	112.1 sec
Ymax = 1-L/C	=	0.714
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	11.1 %



Stage 1	Int = 6	Stage 2	Int = 7	Stage 3	Int = 8	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	3	9	10	3	9	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				18				
4,5	1	3.50	I	1	15		N	1965	195	24		219	0.89	1804			1804	0.121	0.122		21	21	0.809	49
5	1	3.50	I	1				2105		256		256	0.00	2105			2105	0.122			21	21	0.810	57
10,11	2	3.50	I	1	15		N	1965	290	257		547	0.53	1866			1866	0.293	0.294		51	51	0.809	87
11	2	3.50	I	1				2105		618		618	0.00	2105			2105	0.294			51	51	0.810	98
12	2	3.50	II	1	20			2105			380	380	1.00	1958			1958	0.194			34	51	0.536	57
7,8	3	3.50	II	1	15		N	1965	205	96		301	0.68	1840			1840	0.164	0.164		28	28	0.810	62
8	3	3.50	II	1				2105		344		344	0.00	2105			2105	0.163			28	28	0.809	70
1,2	3	3.50	II	1	15		N	1965	180	55		235	0.77	1825			1825	0.129			22	28	0.638	44
2	3	3.50	III	1				2105		270		270	0.00	2105			2105	0.128			22	28	0.635	50
																	Stage 4 Pedestrian Stage			22				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

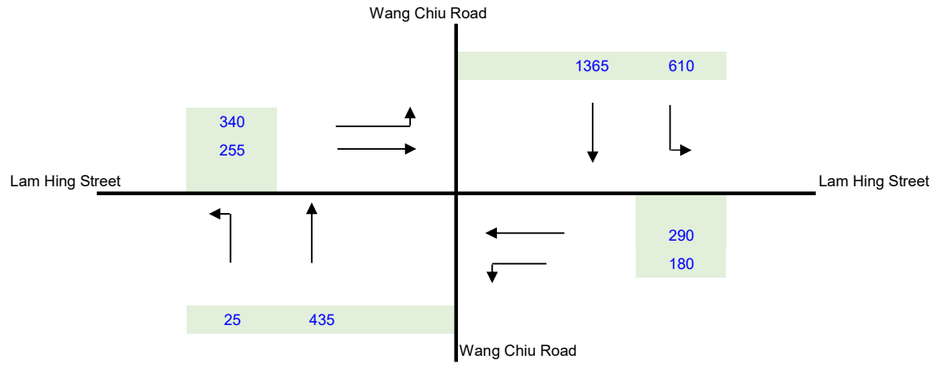
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

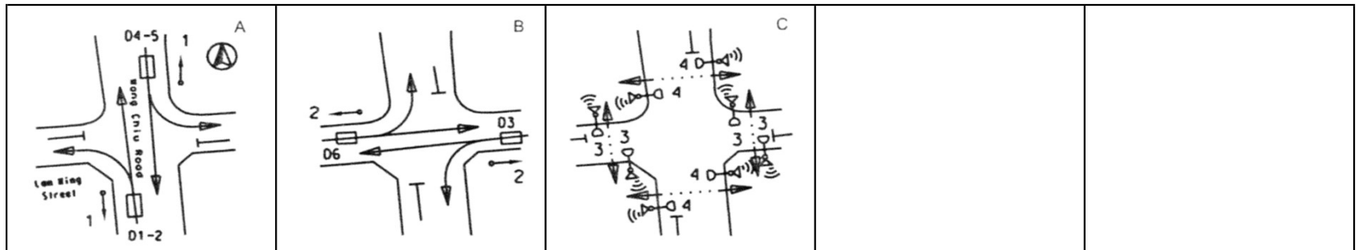
Wang Chiu Road / Lam Hing Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle	N =	3
No. of stage using for calculation	N =	2
Cycle time	C =	140 sec
Sum(y)	Y =	0.584
Loss time	L =	33 sec
Total Flow	=	3500 pcu
Co = (1.5*L+5)/(1-Y)	=	130.9 sec
Cm = L/(1-Y)	=	79.3 sec
Yult	=	0.953
R.C.ult = (Yult-Y)/Y*100%	=	63.2 %
Cp = 0.9*L/(0.9-Y)	=	93.9 sec
Ymax = 1-L/C	=	0.764
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	17.9 %



Stage 1	Int = 6	Stage 2	Int = 8	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	5	5	3	5	13	3	5	OK
4	11	10	3	8	10	3	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1,2	1	3.50	I	1	15		N	1965	25	201		226	0.11	1944			1944	0.116	0.341		21	63	0.260	29
2	1	3.50	I	1				2105		234		234	0.00	2105			2105	0.111			20	63	0.249	30
4	1	3.50	I	1	15		N	1965	610			610	1.00	1786			1786	0.341			63	63	0.764	85
5	1	3.50	I	2				4210		1365		1365	0.00	4210			4210	0.324			59	63	0.725	88
3	2	4.00	II	1	15		N	2015	180	290		470	0.38	1941			1941	0.242	0.242		44	44	0.764	81
6a	2	4.00	II	1	20		N	2015	340			340	1.00	1874			1874	0.181			33	44	0.572	54
6b	2	4.00	II	1			N	2015		255		255	0.00	2015			2015	0.127			23	44	0.399	41
																	Stage 3 Pedestrian Stage			21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

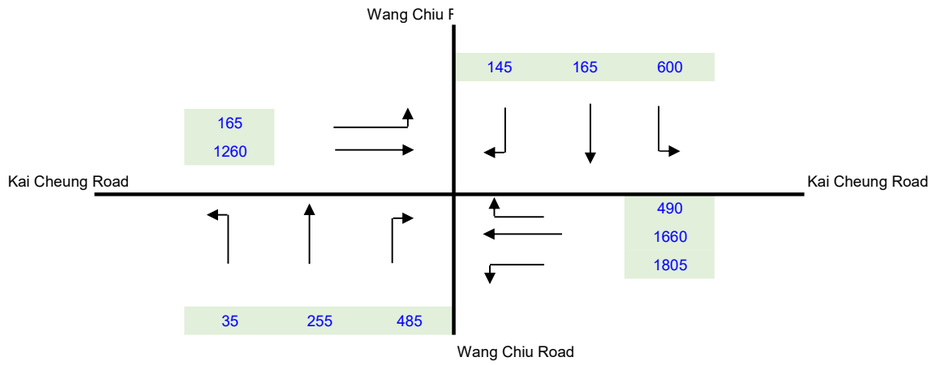
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

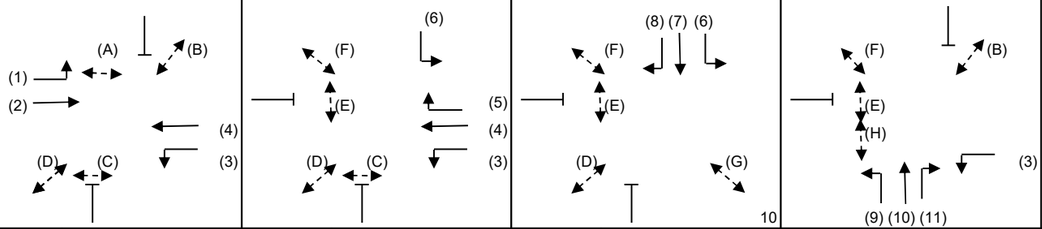
Wang Chiu Road / Kai Cheung Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle	N =	4	
No. of stage using for calculation	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	0.632	
Loss time	L =	32	sec
Total Flow	=	7065	pcu
Co = (1.5*L+5)/(1-Y)	=	143.9	sec
Cm = L/(1-Y)	=	86.9	sec
Yult	=	0.960	
R.C.ult = (Yult-Y)/Y*100%	=	52.0	%
Cp = 0.9*L/(0.9-Y)	=	107.3	sec
Ymax = 1-L/C	=	0.771	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	9.9	%



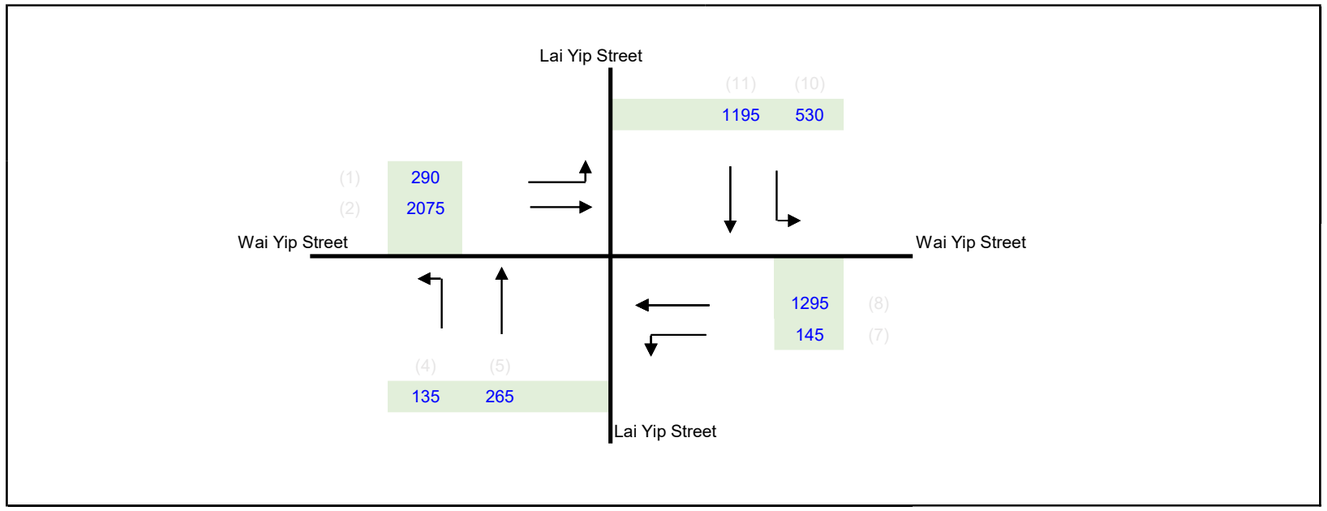
Stage 1	Int = 7	Stage 2	Int = 7	Stage 3	Int = 12	Stage 4	Int = 10	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	8	7	3	5	32	3	5	OK
B	7	5	3	6	111	3	6	OK
C	11	10	2	8	72	2	8	OK
D	4	5	2	5	93	2	5	OK
E	10	5	2	8	81	2	8	OK
F	4	5	2	5	84	2	5	OK
G	7	5	3	6	9	3	6	OK
H	10	5	4	8	19	4	8	OK

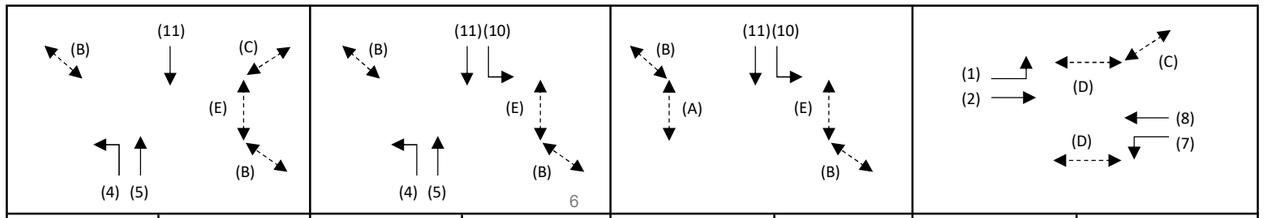
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				32				
1	1	3.50	I	1	25		N	1965	165			165	1.00	1854			1854	0.089	0.200		15	34	0.365	29
2	1	3.50	I	3				6315		1260		1260	0.00	6315			6315	0.200			34	34	0.819	76
3	1,2,4	3.50	I	2	25		N	4070	1805			1805	1.00	3840			3840	0.470			80	116	0.566	36
4	1,2	3.50	II	2				4210		1660		1660	0.00	4210		340	4550	0.365			62	85	0.602	76
5	2	3.50	II	1	20			2105			490	490	1.00	1958			1958	0.250	0.250		43	43	0.819	85
6	2,3	3.50	II	1	25		N	1965	600			600	1.00	1854		120	1974	0.304			52	58	0.728	88
7	3	3.50	II	1				2105		106		106	0.00	2105			2105	0.050	0.050		9	9	0.817	35
7.8	3	3.50	III	1	30			2105		59	45	104	0.43	2060			2060	0.050			9	9	0.819	35
8	3	3.50	III	1	25			2105			100	100	1.00	1986			1986	0.050			9	9	0.817	34
9,10	4	3.50	III	1	25		N	1965	35	221		256	0.14	1949			1949	0.131	0.131		22	22	0.819	62
10,11	4	3.50	III	1	25			2105		34	228	262	0.87	2001			2001	0.131			22	22	0.816	57
11	4	3.50	III	1	20			2105			257	257	1.00	1958			1958	0.131			22	22	0.818	62

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO:	
Wai Yip Street / Lai Yip Street	2031	DATE :	FILENAME :



No. of stages per cycle		N =	4	
No. of stage using for calculation		N =	2	
Cycle time		C =	118	sec
Sum(y)		Y =	0.670	
Loss time		L =	20	sec
Total Flow		=	5930	pcu
Co	= (1.5*L+5)/(1-Y)	=	106.2	sec
Cm	= L/(1-Y)	=	60.7	sec
Yult		=	0.750	
R.C.ult	= (Yult-Y)/Y*100%	=	11.9	%
Cp	= 0.9*L/(0.9-Y)	=	78.4	sec
Ymax	= 1-L/C	=	0.831	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	11.5	% (Optimized)



STAGE 1	INT=	STAGE 2	INT=	STAGE 3	INT= 13	STAGE 4	INT= 9

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	14	12	6	10	12	6	10	OK
B	5	5	3	5	45	3	5	OK
C	6	5	1	5	88	1	5	OK
D	13	11	5	10	50	5	10	OK
E	12	10	6	9	38	6	9	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				20				
4,5	1,2	3.50	III	1	15		N	1965	135	51		186	0.73	1832			1832	0.102			15	19	0.615	31
5	1,2	3.50	III	1				2105		214		214	0.00	2105			2105	0.102			15	19	0.616	35
10	2,3	3.50	IV	1	20		N	1965	530			530	1.00	1828		190	2018	0.263		6	38	38	0.807	70
11	1,2,3	3.50	V	2				4210		1195		1195	0.00	4210			4210	0.284	0.284	14	41	41	0.807	76
1,2	4	3.50	I	1	20		N	1965	290	448		738	0.39	1909			1909	0.387	0.387		57	57	0.807	76
2	4	3.50	I	2				4210		1627		1627	0.00	4210			4210	0.386			56	57	0.807	83
7,8	4	3.50	II	1	20		N	1965	145	306		451	0.32	1919			1919	0.235			34	57	0.491	46
8	4	3.50	II	2				4210		989		989	0.00	4210			4210	0.235			34	57	0.491	51

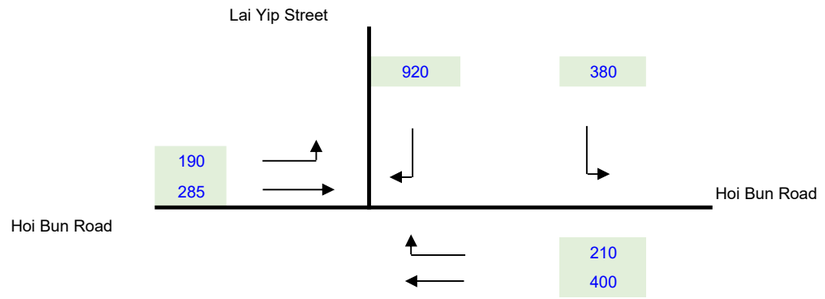
NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP — TRAFFIC SIGNAL CALCULATION

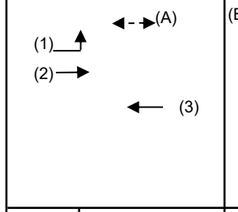
PROJECT NO: 237938

Lai Yip Street / Hoi Bun Road

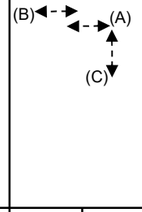
DATE : 5-Feb-21 FILENAME :



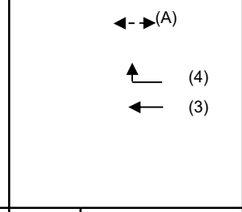
No. of stages per cycle		N =	5
No. of stage using for calculation		N =	3
Cycle time		C =	118 sec
Sum(y)		Y =	0.478
Loss time		L =	37 sec
Total Flow		=	2385 pcu
Co	= (1.5*L+5)/(1-Y)	=	115.8 sec
Cm	= L/(1-Y)	=	70.8 sec
Yult		=	0.623
R.C.ult	= (Yult-Y)/Y*100%	=	30.4 %
Cp	= 0.9*L/(0.9-Y)	=	78.8 sec
Ymax	= 1-L/C	=	0.686
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	29.4 % (Optimized)



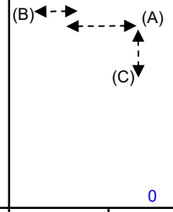
STAGE 1 INT= 8



STAGE 2 INT= 0

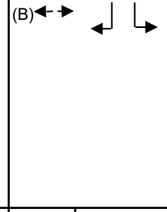


STAGE 3 INT= 5

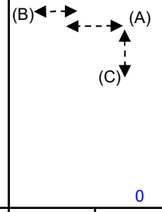


0

STAGE 4 INT=



STAGE 5 INT= 7



0

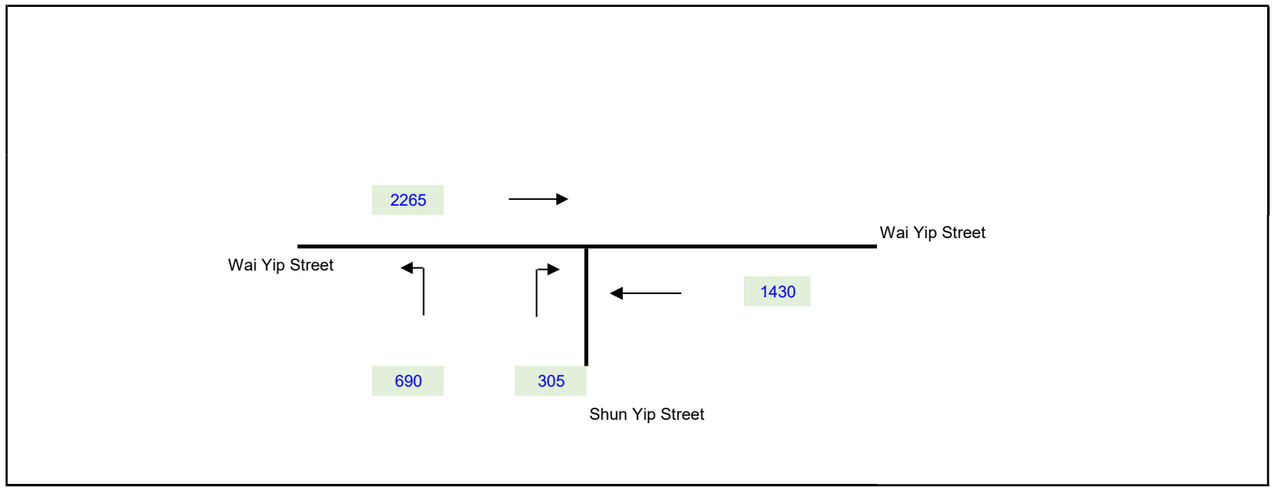
STAGE 6 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	10	5	3	8	9	3	8	OK
B	5	5	10	5	5	10	5	OK
C	7	6	4	5	11	4	5	OK

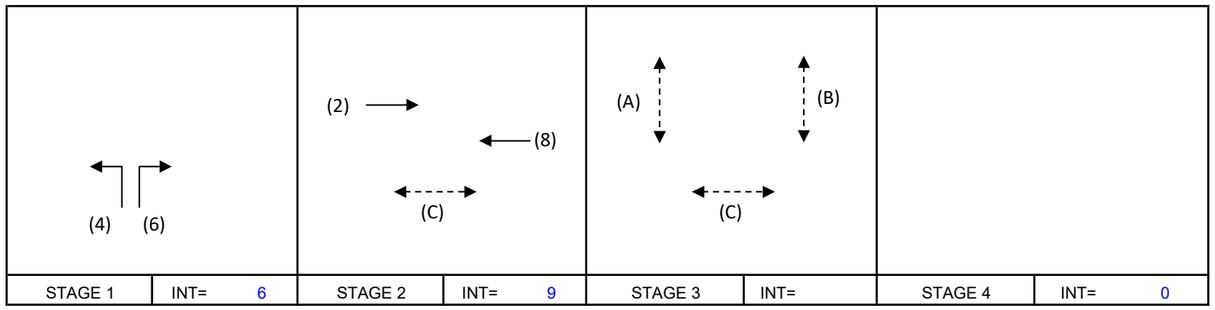
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				17				
1	1	3.50	I	1	15		N	1965	190			190	1.00	1786			1786	0.106			18	23	0.547	30
2	1	3.50	I	1				2105		285		285	0.00	2105			2105	0.135	0.135		23	23	0.696	51
3	1,3	3.50	II, III	1			N	1965		400		400	0.00	1965			1965	0.204			35	43	0.557	50
4	3	3.50	III	1	20			2105			210	210	1.00	1958			1958	0.107	0.107		18	18	0.696	41
5	5	3.50	IV	2	20			4210			920	920	1.00	3916			3916	0.235	0.235		40	40	0.696	60
6	5	3.50	IV	1	15		N	1965	380			380	1.00	1786			1786	0.213			36	40	0.630	49
																	Stage 2 Pedestrian Loss Time			20	(Demand Dependent. Assumed always Called.)			
																	Stage 4 Pedestrian Loss Time				(Demand Dependent. Assumed always Skipped.)			
																	Stage 6 Pedestrian Loss Time				(Demand Dependent. Assumed always Skipped.)			

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Wai Yip Street / Shun Yip Street		DATE : 5-Feb-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	118 sec
Sum(y)		Y =	0.549
Loss time		L =	33 sec
Total Flow		=	4690 pcu
Co	= (1.5*L+5)/(1-Y)	=	120.8 sec
Cm	= L/(1-Y)	=	73.1 sec
Yult		=	0.653
R.C.ult	= (Yult-Y)/Y*100%	=	18.9 %
Cp	= 0.9*L/(0.9-Y)	=	84.6 sec
Ymax	= 1-L/C	=	0.720
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	18.1 % (Optimized)



STAGE 1	INT= 6	STAGE 2	INT= 9	STAGE 3	INT=	STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	2	9	71	2	9	OK
B	12	10	2	8	10	2	8	OK
C	10	5	2	8	10	2	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				13				
2	2	3.50	I	3			N	6175		2265		2265	0.00	6175			6175	0.367	0.367		57	57	0.762	77
8	2	3.50	II	3			N	6175		1430		1430	0.00	6175			6175	0.232			36	57	0.481	49
4	1	3.50	III	1	15		N	1965	325			325	1.00	1786			1786	0.182	0.182		28	28	0.761	55
4,6	1	3.50	III	1	30			2105	365		0	365	1.00	2005			2005	0.182			28	28	0.762	61
6	1	3.50	III	1	30		N	1965			305	305	1.00	1871			1871	0.163			25	28	0.682	46
																	Stage 3 Pedestrian Loss Time			20				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP

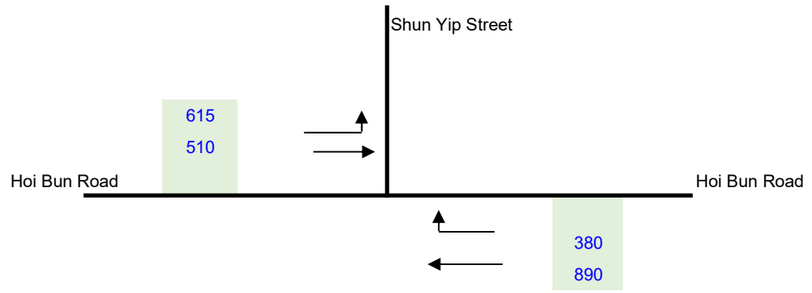
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

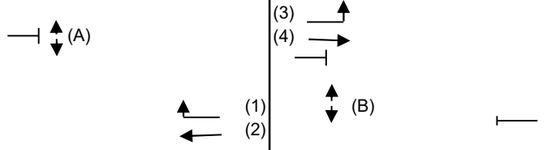
Shun Yip Street / Hoi Bun Road

DATE : 5-Feb-21

FILENAME :

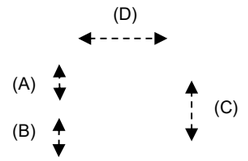


No. of stages per cycle		N =	2
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.661
Loss time		L =	39 sec
Total Flow		=	2395 pcu
Co	= (1.5*L+5)/(1-Y)	=	187.4 sec
Cm	= L/(1-Y)	=	115.1 sec
Yult		=	0.608
R.C.ult	= (Yult-Y)/Y*100%	=	-8.1 %
Cp	= 0.9*L/(0.9-Y)	=	146.9 sec
Ymax	= 1-L/C	=	0.675
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	-8.1 % (Optimized)



STAGE 1 INT= 10

STAGE 2 INT= 6



STAGE 3 (ped) INT= 2

STAGE 4 INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	0	6	63	0	6	OK
B	7	5	3	6	63	3	6	OK
C	7	6	3	5	15	3	5	OK
D	10	6	5	12	6	5	12	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
1,2	1	3.50	I	1	30			2105		268	380	648	0.59	2045			2045	0.317	0.317		39	39	0.979	188
2	1	3.50	I	1			N	1965		622		622	0.00	1965			1965	0.317			39	39	0.978	178
3	2	3.50	II	1	15		N	1965	615			615	1.00	1786			1786	0.344	0.344		42	42	0.979	179
3,4	2	3.50	II	1	20			2105		510		510	0.00	2105			2105	0.242			30	42	0.689	66
																		Pedestrian Stage 3		23				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP

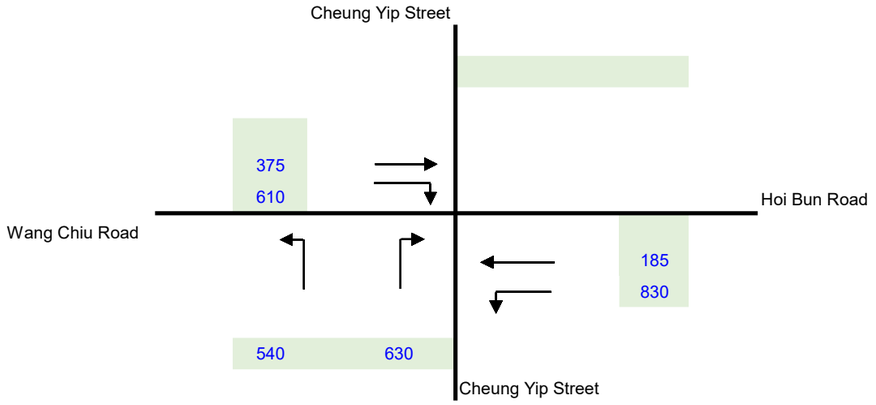
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

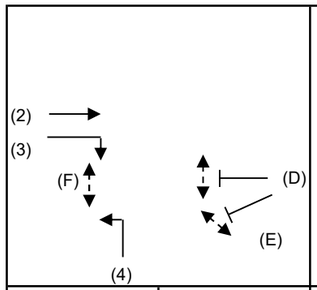
Cheung Yip Street / Hoi Bun Road

DATE : 5-Feb-21

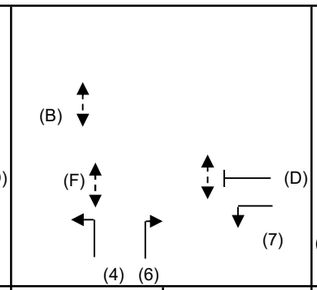
FILENAME :



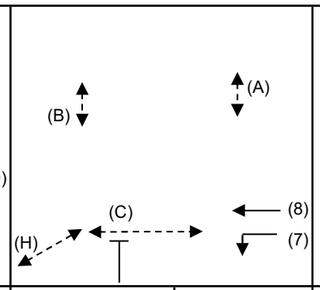
No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	118 sec
Sum(y)		Y =	0.653
Loss time		L =	10 sec
Total Flow		=	3170 pcu
Co	= (1.5*L+5)/(1-Y)	=	57.6 sec
Cm	= L/(1-Y)	=	28.8 sec
Yult		=	0.825
R.C.ult	= (Yult-Y)/Y*100%	=	26.3 %
Cp	= 0.9*L/(0.9-Y)	=	36.4 sec
Ymax	= 1-L/C	=	0.915
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	26.1 % (Optimized)



STAGE 1 INT= 6



STAGE 2 INT=



STAGE 3 INT= 6

STAGE 4 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	6	6	8	6	6	OK
B	11	5	2	9	61	2	9	OK
C	11	10	0	8	12	0	8	OK
D	5	5	1	5	92	1	5	OK
E	7	5	1	6	39	1	6	OK
F	5	5	4	5	89	4	5	OK
H	5	5	1	5	14	1	5	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				10				
2,3	1	3.50	I	1	35		N	1965		375	110	485	0.23	1946			1946	0.249	0.249		41	41	0.713	68
3	1	3.50	I	1	30			2105			500	500	1.00	2005			2005	0.249			41	41	0.713	70
4	1,2	3.50	II	1	15		N	1965	540			540	1.00	1786			1786	0.302			50	93	0.382	22
6	2	3.50	II	2	30			4210			630	630	1.00	4010			4010	0.157			26	47	0.393	37
7	2,3	3.50	III	1	15		N	1965	830			830	1.00	1786		270	2056	0.404	0.404		67	67	0.713	71
8	3	3.50	III	1	30			2105		185		185	0.00	2105			2105	0.088			15	15	0.713	38

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

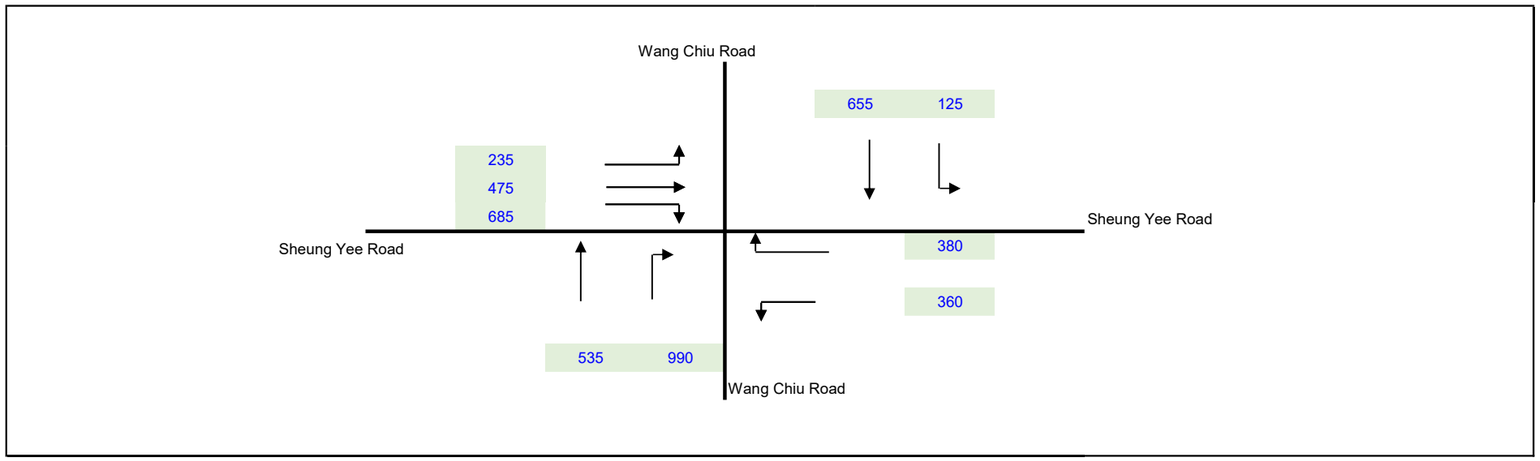
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

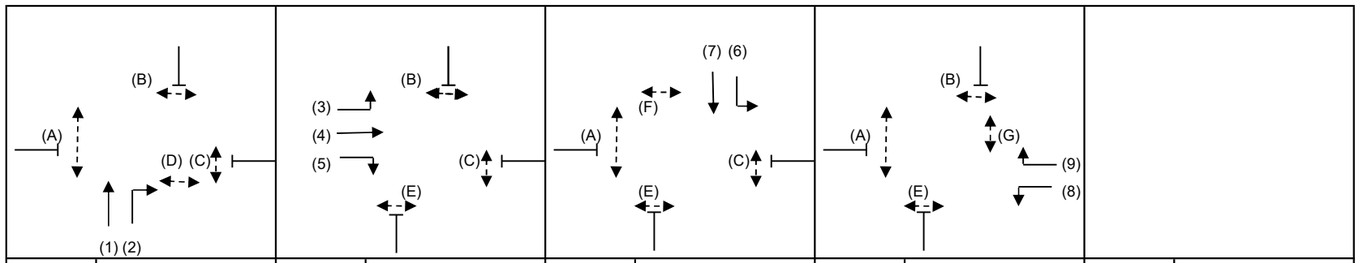
Wang Chiu Road / Sheung Yee Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	120 sec
Sum(y)		Y =	0.657
Loss time		L =	26 sec
Total Flow		=	4440 pcu
Co	= (1.5*L+5)/(1-Y)	=	128.4 sec
Cm	= L/(1-Y)	=	75.9 sec
Yult		=	1.005
R.C.ult	= (Yult-Y)/Y*100%	=	52.9 %
Cp	= 0.9*L/(0.9-Y)	=	96.4 sec
Ymax	= 1-L/C	=	0.783
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	7.3 %



Stage 1	Int = 5	Stage 2	Int = 8	Stage 3	Int = 8	Stage 4	Int = 9	Stage 5	Int = 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	16	7	2	13	77	2	13	OK
B	10	5	2	8	85	2	8	OK
C	10	5	2	8	83	2	8	OK
D	10	5	8	8	24	8	8	OK
E	10	5	3	8	69	3	8	OK
F	7	5	6	6	13	6	6	OK
G	7	5	6	6	15	6	6	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				26				
1	1	3.50	I	1			N	1965		500		500	0.00	1965			1965	0.254	0.254		36	36	0.839	82
1,2	1	3.50	I	1	35			2105		35	480	515	0.93	2024			2024	0.254			36	36	0.839	84
2	1	3.50	I	1	30			2105			510	510	1.00	2005			2005	0.254			36	36	0.839	83
3	2	3.50	II	1	15		N	1965	235			235	1.00	1786			1786	0.132	0.144		19	21	0.764	45
3,4	2	3.50	II	1	18			2105	0	304		304	0.00	2105			2105	0.144			21	21	0.839	62
4,5	2	3.50	II	1	35			2105		171	127	298	0.43	2067			2067	0.144			21	21	0.837	61
5	2	3.50	II	2	30		N	4070			558	558	1.00	3876			3876	0.144			21	21	0.836	52
6,7	3	3.50	III	1	15		N	1965	125	115		240	0.52	1868			1868	0.128	0.128		18	18	0.839	53
7	3	3.50	III	2				4210		540		540	0.00	4210			4210	0.128			18	18	0.838	52
8	4	3.50	IV	1	15		N	1965	232			232	1.00	1786			1786	0.130	0.130		19	19	0.839	51
8,9	4	3.50	III	1	15			2105	128		120	248	1.00	1914			1914	0.130			19	19	0.838	54
9	4	3.50	IV	1	30			2105			260	260	1.00	2005			2005	0.130			19	19	0.838	56

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

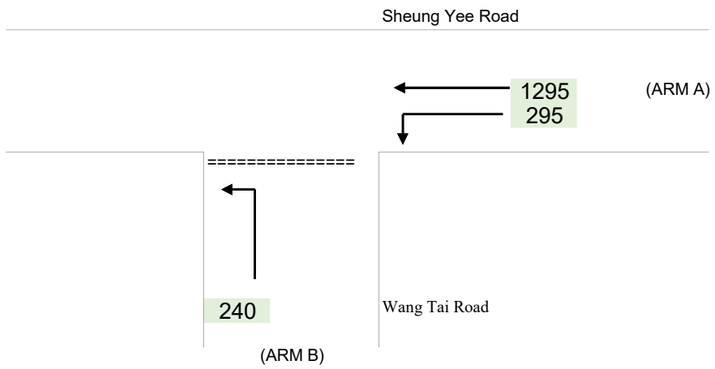
PRIORITY JUNCTION CALCULATION

Project No. : 237938

Wang Tak Road / Sheung Yee Road

DATE : 5-Feb-21

FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.90	(metres)
W cr	=	0	(metres)
q a-b	=	295	(pcu/hr)
q a-c	=	1295	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	6.20	(metres)
Vl b-a	=	45	(metres)
Vr b-a	=	45	(metres)
Vr b-c	=	50	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	240	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.574
E	=	1.162
F	=	0.586
Y	=	0.727

THE CAPACITY OF MOVEMENT :

Q b-a	=	145
Q b-c	=	431
Q c-b	=	190
Q b-ac	=	431

TOTAL FLOW = 1830 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

DFC b-a	=	0.0000
DFC b-c	=	0.5568
DFC c-b	=	0.0000
DFC b-ac	=	0.5568

CRITICAL DFC = 0.56

OVE ARUP & PARTNERS

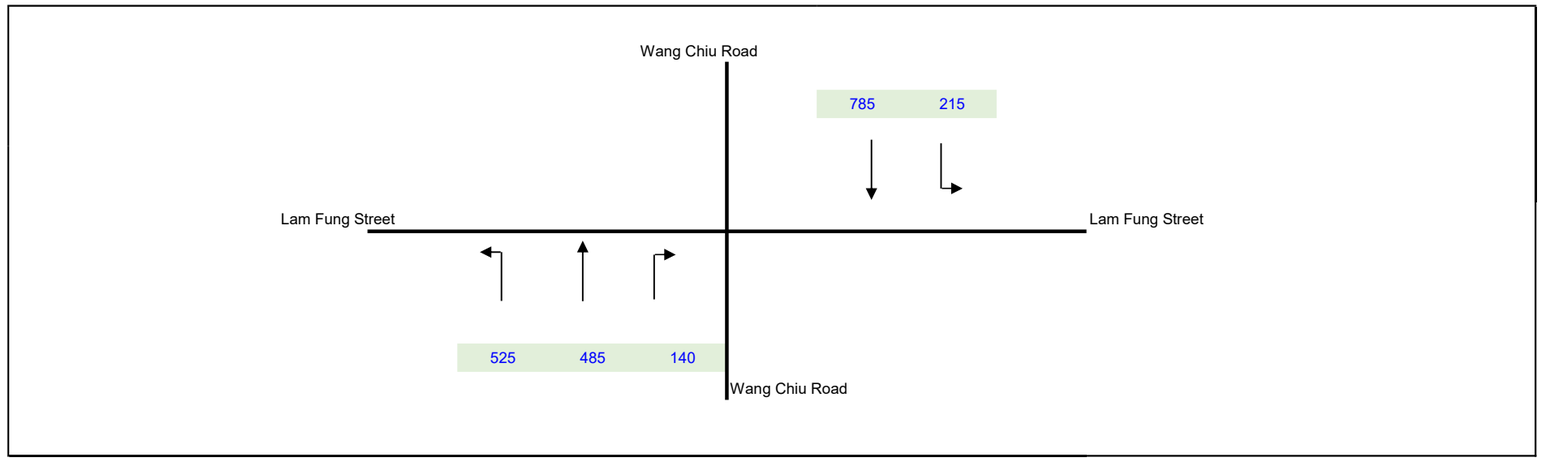
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

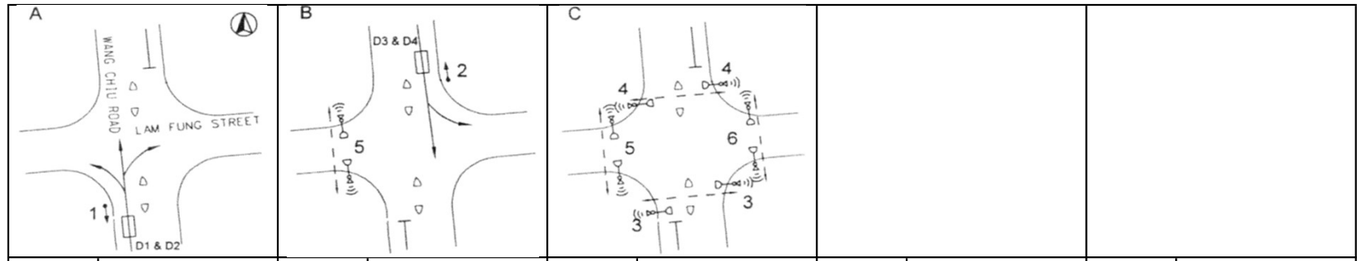
Wang Chiu Road / Lam Fung Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle	N =	3
No. of stage using for calculation	N =	2
Cycle time	C =	120 sec
Sum(y)	Y =	0.448
Loss time	L =	34 sec
Total Flow	=	2150 pcu
Co = (1.5*L+5)/(1-Y)	=	101.4 sec
Cm = L/(1-Y)	=	61.6 sec
Yult	=	0.945
R.C.ult = (Yult-Y)/Y*100%	=	111.1 %
Cp = 0.9*L/(0.9-Y)	=	67.6 sec
Ymax = 1-L/C	=	0.717
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	44.1 %



Stage 1	Int = 5	Stage 2	Int = 9	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	11	10	4	8	10	4	8	OK
4	8	7	0	5	17	0	5	OK
5	9	5	6	8	64	6	8	OK
6	9	5	2	8	12	2	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1	1	3.50	I	1	15		N	1965	350			350	1.00	1786			1786	0.196	0.196		38	38	0.623	48
1,2	1	3.50	I	1	18			2105	175	224		399	0.44	2031			2031	0.196			38	38	0.625	55
2,3	1	3.50	I	1	18			2105		261	140	401	0.35	2045			2045	0.196			38	38	0.623	55
4,5	2	3.50	II	1	15		N	1965	215	257		472	0.46	1879			1879	0.251	0.251		48	48	0.625	56
5	2	3.50	II	1				2105		528		528	0.00	2105			2105	0.251			48	48	0.624	63
																	Stage 3 Pedestrian Stage			22				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

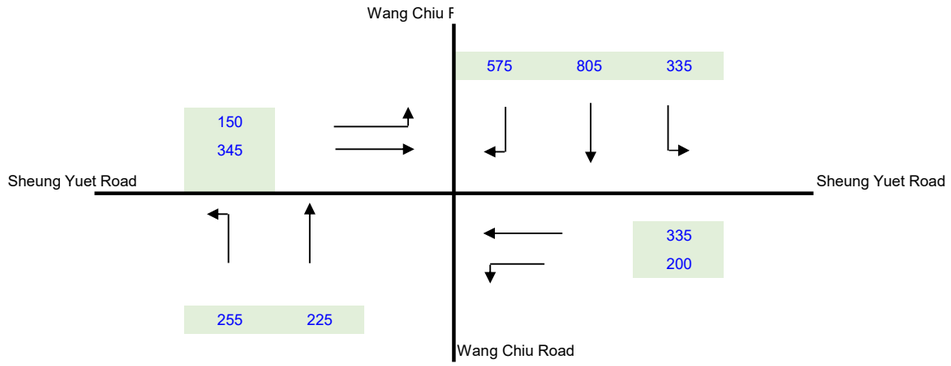
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

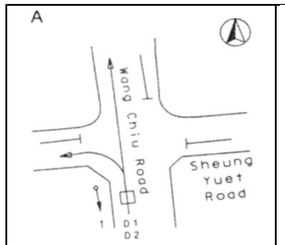
Wang Chiu Road / Sheung Yuet Road

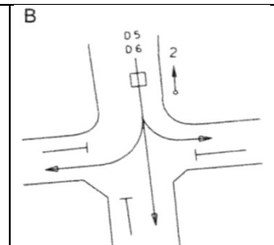
DATE : 5-Feb-21

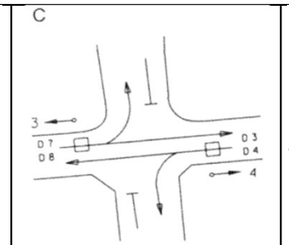
FILENAME:

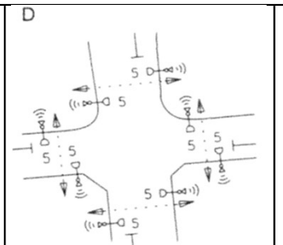


No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	140 sec
Sum(y)		Y =	0.690
Loss time		L =	41 sec
Total Flow		=	3225 pcu
Co	= (1.5*L+5)/(1-Y)	=	214.5 sec
Cm	= L/(1-Y)	=	132.2 sec
Yult		=	0.893
R.C.ult	= (Yult-Y)/Y*100%	=	29.4 %
Cp	= 0.9*L/(0.9-Y)	=	175.7 sec
Ymax	= 1-L/C	=	0.707
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	-7.8 %









Stage 1	Int = 6	Stage 2	Int = 7	Stage 3	Int = 9	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	3	9	10	3	9	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				19				
4,5	1	3.50	I	1	15		N	1965	255	0		255	1.00	1786			1786	0.143	0.143		20	20	0.976	187
5	1	3.50	I	1				2105		225		225	0.00	2105			2105	0.107			15	20	0.731	51
10,11	2	3.50	I	1	15		N	1965	335	438		773	0.43	1883			1883	0.410	0.411		59	59	0.975	221
11,12	2	3.50	II	1	20			2105		367	575	942	0.61	2013		280	2293	0.411			59	59	0.976	245
7,8	3	3.50	II	1	15		N	1965	200	48		248	0.81	1818			1818	0.136	0.136		20	20	0.976	187
8	3	3.50	II	1				2105		287		287	0.00	2105			2105	0.136			20	20	0.975	192
1,2	3	3.50	II	1	15		N	1965	150	81		231	0.65	1845			1845	0.125			18	20	0.896	65
2	3	3.50	III	1				2105		264		264	0.00	2105			2105	0.125			18	20	0.897	71
																	Stage 4 Pedestrian Stage			22				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

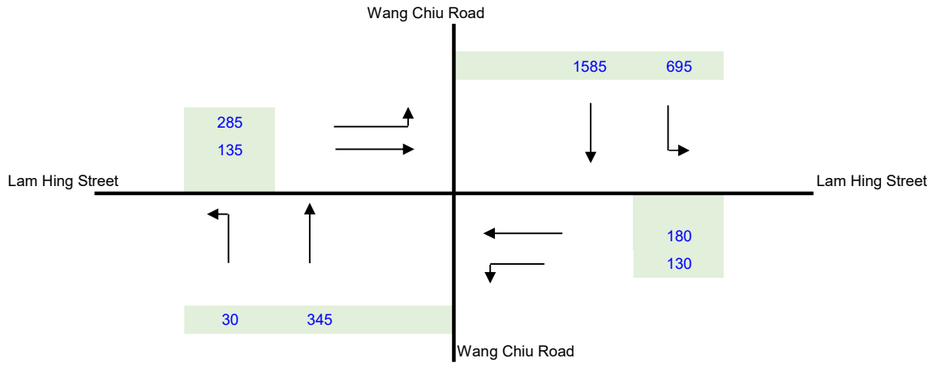
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

Wang Chiu Road / Lam Hing Road

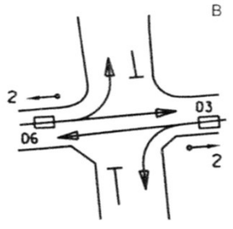
DATE : 5-Feb-21

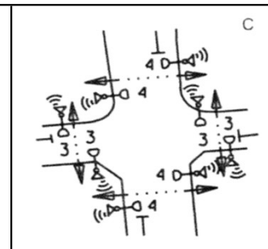
FILENAME:



No. of stages per cycle	N =	3	
No. of stage using for calculation	N =	2	
Cycle time	C =	140	sec
Sum(y)	Y =	0.608	
Loss time	L =	33	sec
Total Flow	=	3385	pcu
Co = (1.5*L+5)/(1-Y)	=	139.1	sec
Cm = L/(1-Y)	=	84.2	sec
Yult	=	0.953	
R.C.ult = (Yult-Y)/Y*100%	=	56.6	%
Cp = 0.9*L/(0.9-Y)	=	101.7	sec
Ymax = 1-L/C	=	0.764	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	13.1	%







Stage 1	Int = 6	Stage 2	Int = 8	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	5	5	3	5	13	3	5	OK
4	11	10	3	8	10	3	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1,2	1	3.50	I	1	15		N	1965	30	150		180	0.17	1933			1933	0.093	0.389		16	68	0.190	21
2	1	3.50	I	1				2105		195		195	0.00	2105			2105	0.093			16	68	0.189	23
4	1	3.50	I	1	15		N	1965	695			695	1.00	1786			1786	0.389			68	68	0.796	89
5	1	3.50	I	2				4210		1585		1585	0.00	4210			4210	0.376			66	68	0.770	94
3	2	4.00	II	1	15		N	2015	130	180		310	0.42	1934			1934	0.160	0.219		28	39	0.582	52
6	2	4.00	II	1	20		N	2015	285	135		420	0.68	1917			1917	0.219			39	39	0.796	77
																	Stage 3 Pedestrian Stage			21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

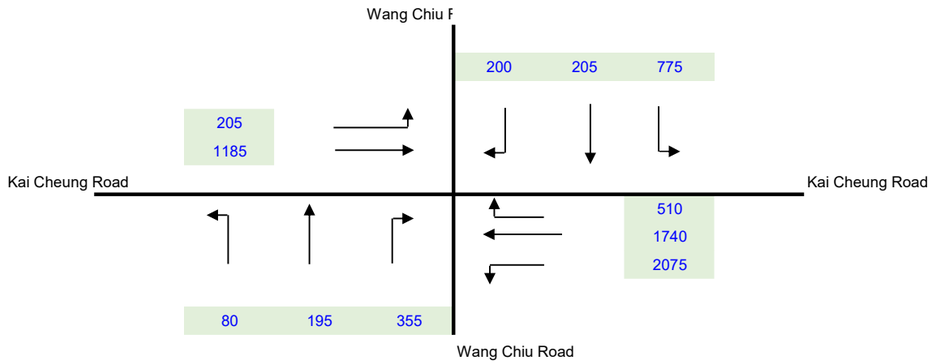
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

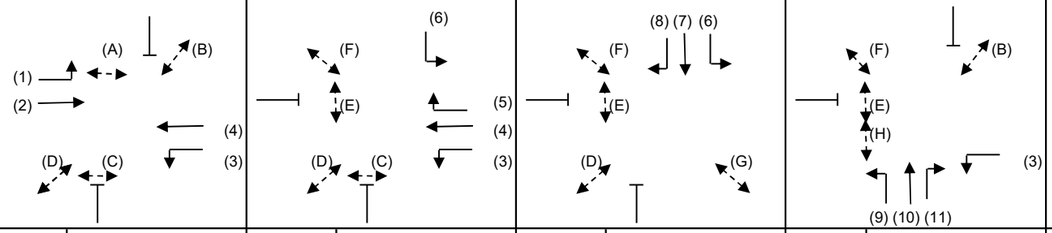
Wang Chiu Road / Kai Cheung Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle	N =	4	
No. of stage using for calculation	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	0.656	
Loss time	L =	32	sec
Total Flow	=	7525	pcu
Co = (1.5*L+5)/(1-Y)	=	154.1	sec
Cm = L/(1-Y)	=	93.0	sec
Yult	=	0.960	
R.C.ult = (Yult-Y)/Y*100%	=	46.3	%
Cp = 0.9*L/(0.9-Y)	=	118.1	sec
Ymax = 1-L/C	=	0.771	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	5.8	%



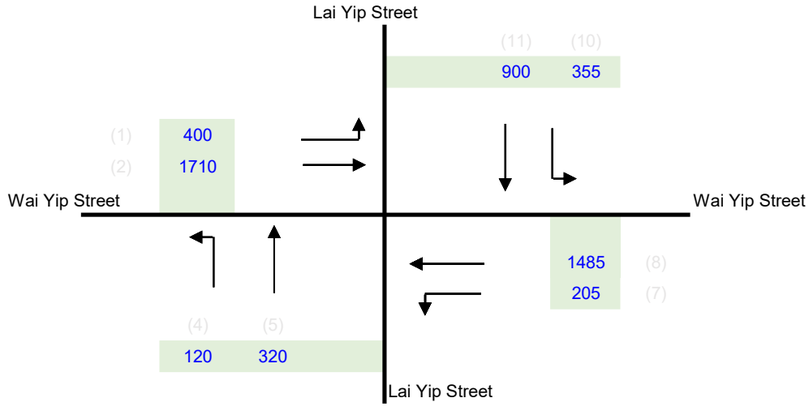
Stage 1	Int = 7	Stage 2	Int = 7	Stage 3	Int = 12	Stage 4	Int = 10	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	8	7	3	5	29	3	5	OK
B	7	5	3	6	103	3	6	OK
C	11	10	2	8	76	2	8	OK
D	4	5	2	5	106	2	5	OK
E	10	5	2	8	93	2	8	OK
F	4	5	2	5	96	2	5	OK
G	7	5	3	6	19	3	6	OK
H	10	5	4	8	15	4	8	OK

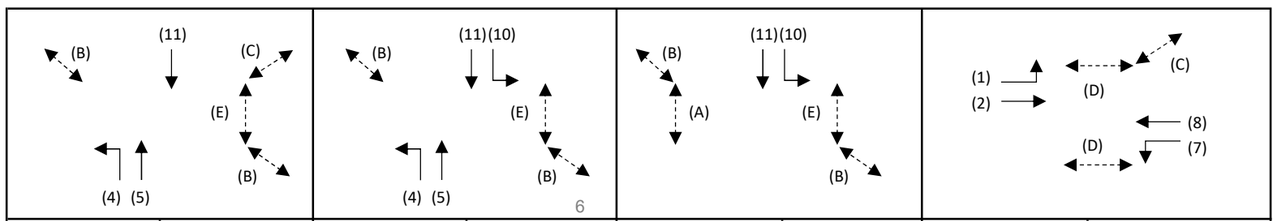
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				32				
1	1	3.50	I	1	25		N	1965	205			205	1.00	1854			1854	0.111	0.188		18	31	0.501	37
2	1	3.50	I	3				6315		1185		1185	0.00	6315			6315	0.188			31	31	0.850	74
3	1,2,4	3.50	I	2	25		N	4070	2075			2075	1.00	3840			3840	0.540			89	108	0.698	55
4	1,2	3.50	II	3				6315		1740		1740	0.00	6315			6315	0.276			45	82	0.472	56
5	2	3.50	II	1	20			2105			510	510	1.00	1958			1958	0.260	0.260		43	43	0.850	95
6	2,3	3.50	II	1	25		N	1965	775			775	1.00	1854		100	1954	0.397			65	70	0.788	96
7	3	3.50	II	1				2105		205		205	0.00	2105			2105	0.097	0.101		16	17	0.822	54
7,8	3	3.50	III	1	25			2105		0	200	200	1.00	1986			1986	0.101			17	17	0.850	53
9,10	4	3.50	III	1	25		N	1965	80	124		204	0.39	1920			1920	0.106	0.107		17	18	0.843	54
10,11	4	3.50	III	1	25			2105		71	145	216	0.67	2023			2023	0.107			18	18	0.846	56
11	4	3.50	III	1	20			2105			210	210	1.00	1958			1958	0.107			18	18	0.850	55

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO:	
Wai Yip Street / Lai Yip Street	2031	DATE :	FILENAME :



No. of stages per cycle	N =	4	
No. of stage using for calculation	N =	2	
Cycle time	C =	118	sec
Sum(y)	Y =	0.458	
Loss time	L =	41	sec
Total Flow	=	5495	pcu
Co = (1.5*L+5)/(1-Y)	=	122.6	sec
Cm = L/(1-Y)	=	75.6	sec
Yult	=	0.593	
R.C.ult = (Yult-Y)/Y*100%	=	29.4	%
Cp = 0.9*L/(0.9-Y)	=	83.4	sec
Ymax = 1-L/C	=	0.653	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	28.3	% (Optimized)



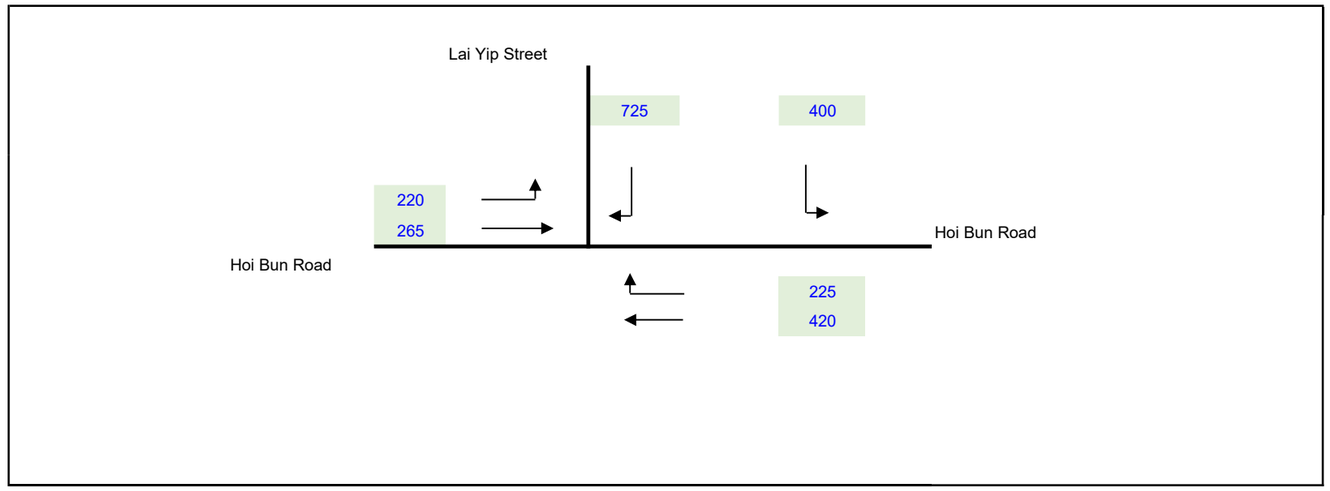
STAGE 1	INT=	STAGE 2	INT= 6	STAGE 3	INT=	STAGE 4	INT= 9

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	14	12	6	10	12	6	10	OK
B	5	5	3	5	30	3	5	OK
C	6	5	1	5	74	1	5	OK
D	13	11	5	10	51	5	10	OK
E	12	10	6	9	23	6	9	OK

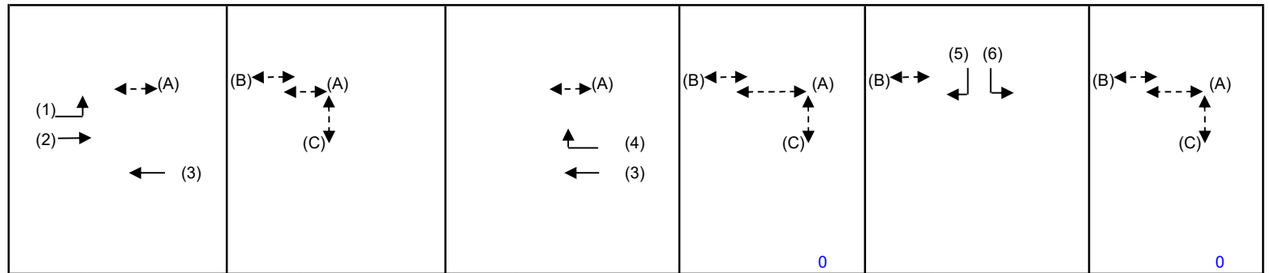
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				13				
4,5	1,2	3.50	III	1	15		N	1965	120	86		206	0.58	1857			1857	0.111	0.111		19	19	0.700	34
5	1,2	3.50	III	1				2105		234		234	0.00	2105			2105	0.111			19	19	0.701	39
10	2,3	3.50	IV	1	20		N	1965	355			355	1.00	1828		260	2088	0.170		6	29	29	0.701	53
11	1,2,3	3.50	V	2				4210		900		900	0.00	4210			4210	0.214		13	36	39	0.652	59
1,2	4	3.50	I	1	20		N	1965	400	251		651	0.61	1878			1878	0.347	0.347		58	58	0.701	65
2	4	3.50	I	2				4210		1459		1459	0.00	4210			4210	0.347			58	58	0.701	73
7,8	4	3.50	II	1	20		N	1965	205	322		527	0.39	1909			1909	0.276			46	58	0.559	52
8	4	3.50	II	2				4210		1163		1163	0.00	4210			4210	0.276			46	58	0.559	58
																			Stage 3	28				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Lai Yip Street / Hoi Bun Road		DATE : 5-Feb-21	FILENAME :



No. of stages per cycle		N =	5
No. of stage using for calculation		N =	3
Cycle time		C =	118 sec
Sum(y)		Y =	0.465
Loss time		L =	37 sec
Total Flow		=	2255 pcu
Co	= (1.5*L+5)/(1-Y)	=	113.0 sec
Cm	= L/(1-Y)	=	69.1 sec
Yult		=	0.623
R.C.ult	= (Yult-Y)/Y*100%	=	34.0 %
Cp	= 0.9*L/(0.9-Y)	=	76.5 sec
Ymax	= 1-L/C	=	0.686
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	32.9 % (Optimized)



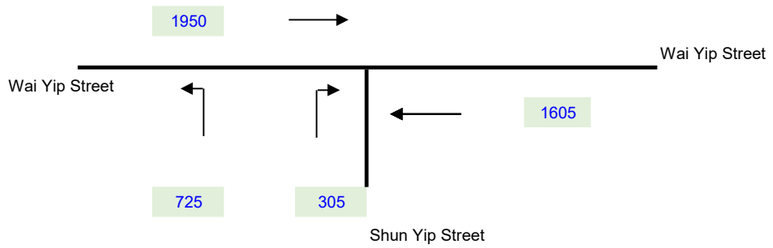
STAGE 1	INT= 8	STAGE 2	INT= 0	STAGE 3	INT= 5	STAGE 4	INT= 0	STAGE 5	INT= 7	STAGE 6	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	10	5	3	8	9	3	8	OK
B	5	5	10	5	5	10	5	OK
C	7	6	4	5	11	4	5	OK

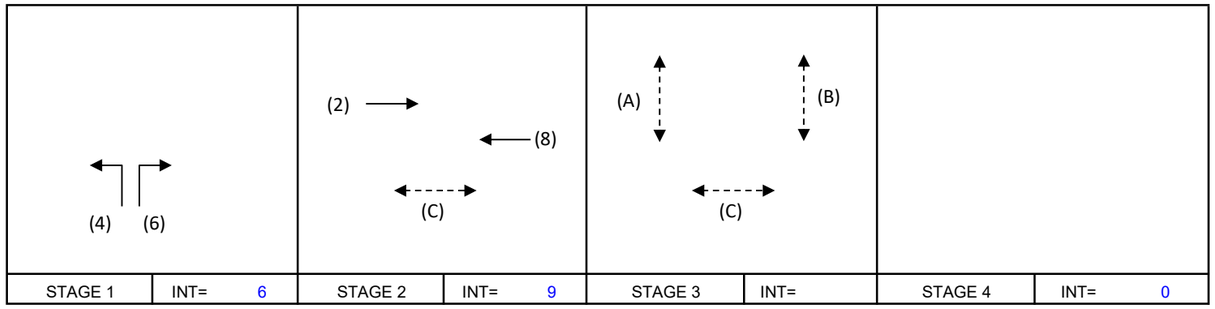
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				17				
1	1	3.50	I	1	15		N	1965	220			220	1.00	1786			1786	0.123			21	22	0.662	35
2	1	3.50	I	1				2105		265		265	0.00	2105			2105	0.126	0.126		22	22	0.677	42
3	1,3	3.50	II, III	1			N	1965		420		420	0.00	1965			1965	0.214			37	44	0.574	52
4	3	3.50	III	1	20			2105			225	225	1.00	1958			1958	0.115	0.115		20	20	0.677	37
5	5	3.50	IV	2	20			4210			725	725	1.00	3916			3916	0.185	0.224		32	39	0.560	48
6	5	3.50	IV	1	15		N	1965	400			400	1.00	1786			1786	0.224			39	39	0.677	53
																	Stage 2 Pedestrian Loss Time			20	(Demand Dependent. Assumed always Called.)			
																	Stage 4 Pedestrian Loss Time				(Demand Dependent. Assumed always Skipped.)			
																	Stage 6 Pedestrian Loss Time				(Demand Dependent. Assumed always Skipped.)			

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Wai Yip Street / Shun Yip Street		DATE : 5-Feb-21	FILENAME :



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	118 sec
Sum(y)		Y =	0.507
Loss time		L =	33 sec
Total Flow		=	4585 pcu
Co	= (1.5*L+5)/(1-Y)	=	110.6 sec
Cm	= L/(1-Y)	=	67.0 sec
Yult		=	0.653
R.C.ult	= (Yult-Y)/Y*100%	=	28.6 %
Cp	= 0.9*L/(0.9-Y)	=	75.6 sec
Ymax	= 1-L/C	=	0.720
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	27.8 % (Optimized)



STAGE 1	INT= 6	STAGE 2	INT= 9	STAGE 3	INT=	STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	2	9	67	2	9	OK
B	12	10	2	8	10	2	8	OK
C	10	5	2	8	10	2	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				13				
2	2	3.50	I	3			N	6175		1950		1950	0.00	6175			6175	0.316	0.316		53	53	0.704	71
8	2	3.50	II	3			N	6175		1605		1605	0.00	6175			6175	0.260			44	53	0.580	58
4	1	3.50	III	1	15		N	1965	342			342	1.00	1786			1786	0.191	0.191		32	32	0.704	55
4,6	1	3.50	III	1	30			2105	383		0	383	1.00	2005			2005	0.191			32	32	0.703	61
6	1	3.50	III	1	30		N	1965			305	305	1.00	1871			1871	0.163			27	32	0.599	44
																	Stage 3 Pedestrian Loss Time			20				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

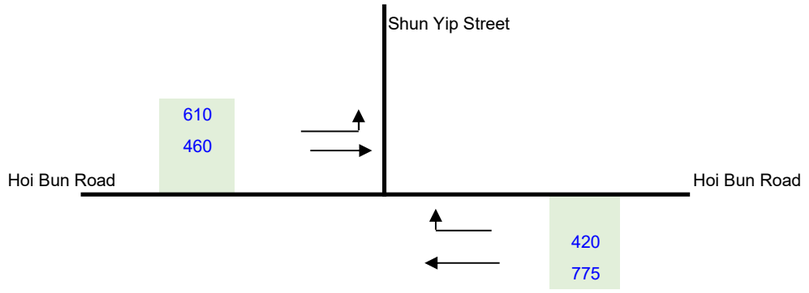
ARUP — TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

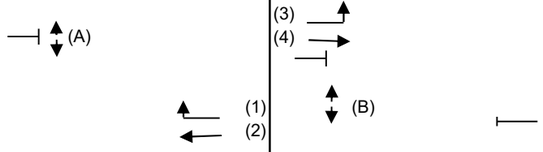
Shun Yip Street / Hoi Bun Road

DATE : 5-Feb-21

FILENAME :



No. of stages per cycle		N =	2
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.640
Loss time		L =	39 sec
Total Flow		=	2265 pcu
Co	= (1.5*L+5)/(1-Y)	=	176.5 sec
Cm	= L/(1-Y)	=	108.4 sec
Yult		=	0.608
R.C.ult	= (Yult-Y)/Y*100%	=	-5.1 %
Cp	= 0.9*L/(0.9-Y)	=	135.1 sec
Ymax	= 1-L/C	=	0.675
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	-5.1 % (Optimized)



STAGE 1	INT= 10	STAGE 2	INT= 6	STAGE 3 (ped)	INT= 2	STAGE 4	INT= 0

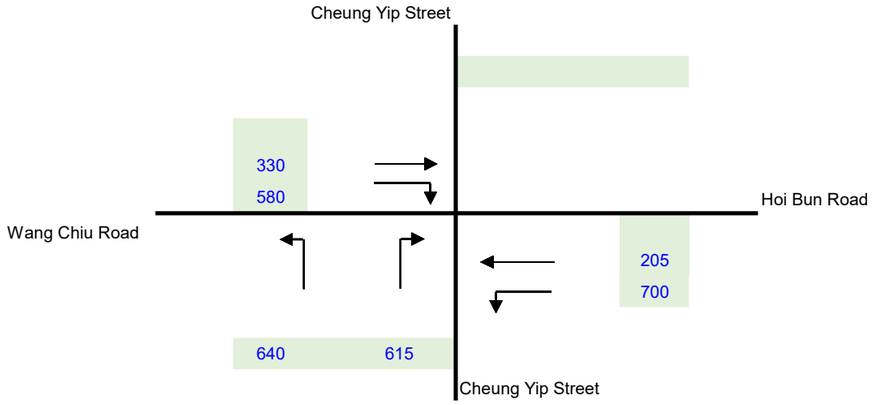
Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	0	6	62	0	6	OK
B	7	5	3	6	64	3	6	OK
C	7	6	3	5	15	3	5	OK
D	10	6	5	12	6	5	12	OK

7 8

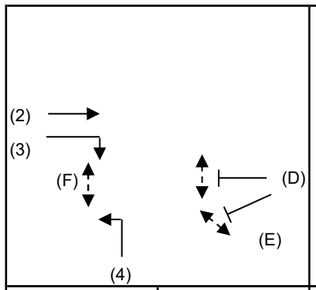
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
1,2	1	3.50	I	1	30			2105		188	420	608	0.69	2035			2035	0.299	0.299		38	38	0.949	97
2	1	3.50	I	1			N	1965		587		587	0.00	1965			1965	0.299			38	38	0.948	94
3	2	3.50	II	1	15		N	1965	610			610	1.00	1786			1786	0.341	0.341		43	43	0.949	89
4	2	3.50	II	1	20			2105		460		460	0.00	2105			2105	0.219			28	43	0.607	59
																		Pedestrian Stage 3		23				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

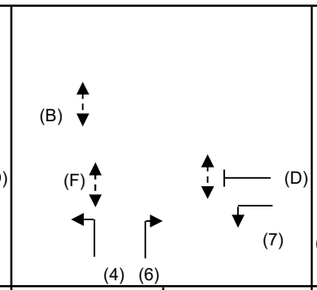
ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Cheung Yip Street / Hoi Bun Road		DATE : 5-Feb-21	FILENAME :



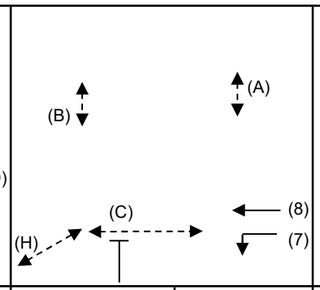
No. of stages per cycle		N =	3	
No. of stage using for calculation		N =	2	
Cycle time		C =	118	sec
Sum(y)		Y =	0.571	
Loss time		L =	10	sec
Total Flow		=	3070	pcu
Co	= (1.5*L+5)/(1-Y)	=	46.6	sec
Cm	= L/(1-Y)	=	23.3	sec
Yult		=	0.825	
R.C.ult	= (Yult-Y)/Y*100%	=	44.5	%
Cp	= 0.9*L/(0.9-Y)	=	27.4	sec
Ymax	= 1-L/C	=	0.915	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	44.3	% (Optimized)



STAGE 1 INT= 6



STAGE 2 INT=



STAGE 3 INT= 6

STAGE 4 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	6	6	11	6	6	OK
B	11	5	2	9	58	2	9	OK
C	11	10	0	8	15	0	8	OK
D	5	5	1	5	89	1	5	OK
E	7	5	1	6	42	1	6	OK
F	5	5	4	5	86	4	5	OK
H	5	5	1	5	17	1	5	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				10				
2,3	1	3.50	I	1	35		N	1965		330	118	448	0.26	1943			1943	0.231	0.231		44	44	0.624	56
3	1	3.50	I	1	30			2105			462	462	1.00	2005			2005	0.230			44	44	0.624	57
4	1,2	3.50	II	1	15		N	1965	640			640	1.00	1786			1786	0.358			68	90	0.472	30
6	2	3.50	II	2	30			4210			615	615	1.00	4010			4010	0.153			29	41	0.442	39
7	2,3	3.50	III	1	15		N	1965	700			700	1.00	1786		270	2056	0.340	0.340		64	64	0.624	63
8	3	3.50	III	1	30			2105		205		205	0.00	2105			2105	0.097			18	18	0.624	34

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

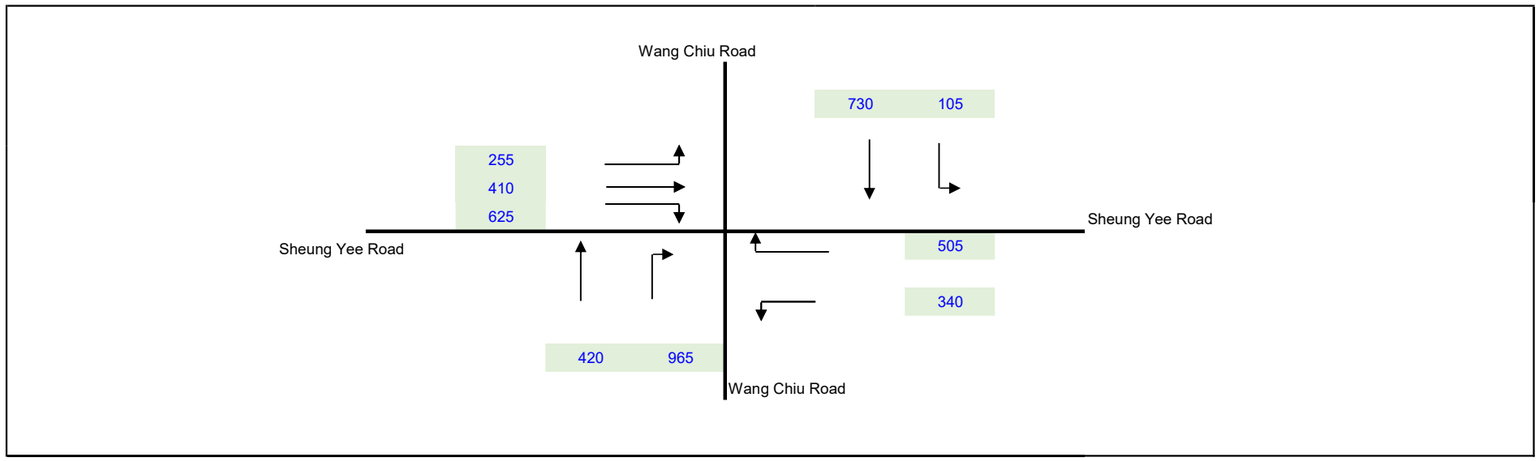
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

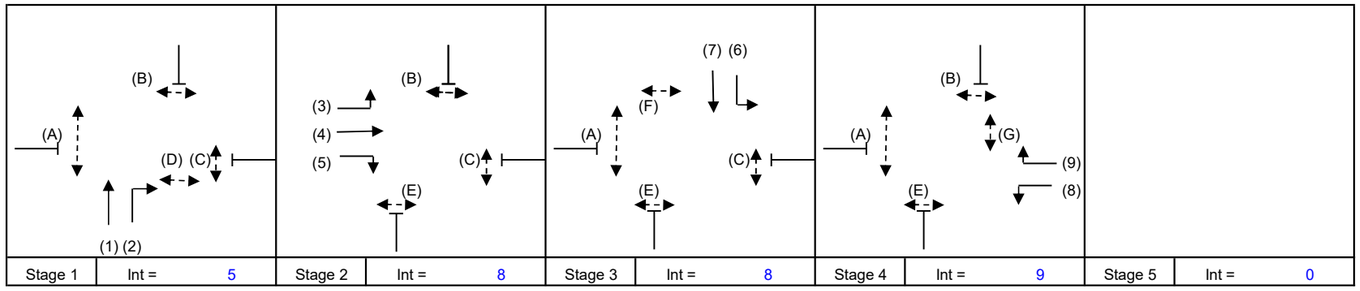
Wang Chiu Road / Sheung Yee Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	120 sec
Sum(y)		Y =	0.657
Loss time		L =	26 sec
Total Flow		=	4355 pcu
Co	= (1.5*L+5)/(1-Y)	=	128.3 sec
Cm	= L/(1-Y)	=	75.8 sec
Yult		=	1.005
R.C.ult	= (Yult-Y)/Y*100%	=	53.0 %
Cp	= 0.9*L/(0.9-Y)	=	96.3 sec
Ymax	= 1-L/C	=	0.783
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	7.3 %



Stage 1	Int = 5	Stage 2	Int = 8	Stage 3	Int = 8	Stage 4	Int = 9	Stage 5	Int = 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	16	7	2	13	79	2	13	OK
B	10	5	2	8	83	2	8	OK
C	10	5	2	8	81	2	8	OK
D	10	5	8	8	22	8	8	OK
E	10	5	3	8	71	3	8	OK
F	7	5	6	6	15	6	6	OK
G	7	5	6	6	17	6	6	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				26				
1	1	3.50	I	1			N	1965		420		420	0.00	1965			1965	0.214	0.240		31	34	0.747	66
1,2	1	3.50	I	1	35			2105		0	484	484	1.00	2018			2018	0.240			34	34	0.838	81
2	1	3.50	I	1	30			2105			481	481	1.00	2005			2005	0.240			34	34	0.839	81
3	2	3.50	II	1	15		N	1965	235			235	1.00	1786			1786	0.132	0.132		19	19	0.838	52
3,4	2	3.50	II	1	18			2105	20	255		275	0.07	2092			2092	0.131			19	19	0.838	58
4,5	2	3.50	II	1	35			2105		155	117	272	0.43	2067			2067	0.132			19	19	0.839	58
5	2	3.50	II	2	30		N	4070			508	508	1.00	3876			3876	0.131			19	19	0.835	49
6,7	3	3.50	III	1	15		N	1965	105	153		258	0.41	1888			1888	0.137	0.137		20	20	0.836	55
7	3	3.50	III	2				4210		577		577	0.00	4210			4210	0.137			20	20	0.839	54
8	4	3.50	IV	1	15		N	1965	264			264	1.00	1786			1786	0.148	0.148		21	21	0.835	55
8,9	4	3.50	III	1	15			2105	76		208	284	1.00	1914			1914	0.148			21	21	0.839	59
9	4	3.50	IV	1	30			2105			297	297	1.00	2005			2005	0.148			21	21	0.837	61

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

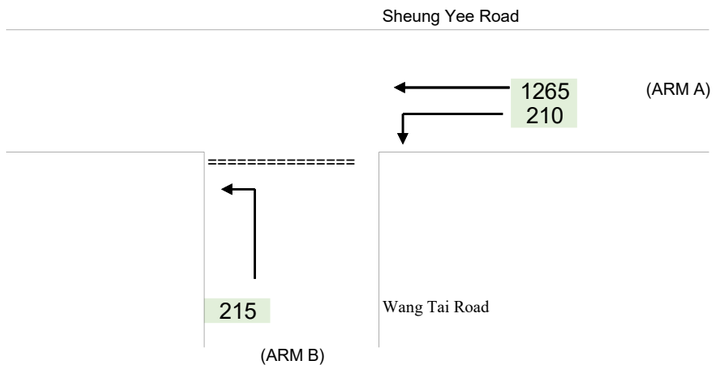
PRIORITY JUNCTION CALCULATION

Project No. : 237938

Wang Tak Road / Sheung Yee Road

DATE : 5-Feb-21

FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.90	(metres)
W cr	=	0	(metres)
q a-b	=	210	(pcu/hr)
q a-c	=	1265	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	6.20	(metres)
Vl b-a	=	45	(metres)
Vr b-a	=	45	(metres)
Vr b-c	=	50	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	215	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.574
E	=	1.162
F	=	0.586
Y	=	0.727

THE CAPACITY OF MOVEMENT :

Q b-a	=	155
Q b-c	=	451
Q c-b	=	208
Q b-ac	=	451

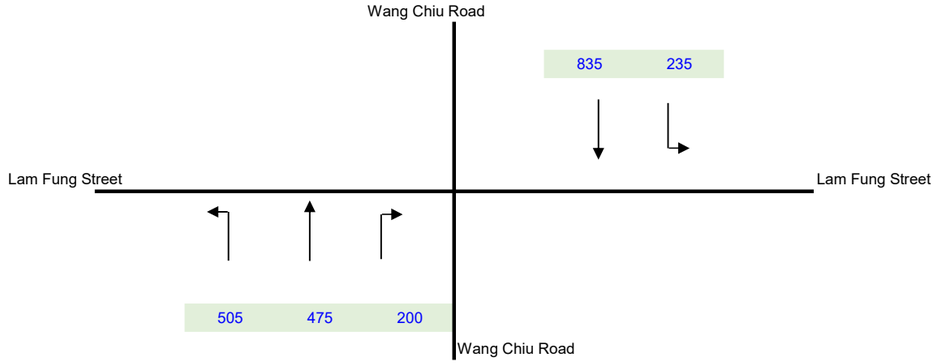
TOTAL FLOW = 1690 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

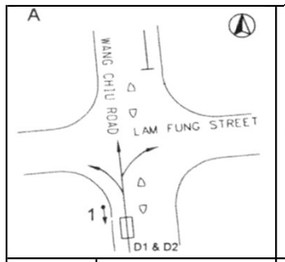
DFC b-a	=	0.0000
DFC b-c	=	0.4767
DFC c-b	=	0.0000
DFC b-ac	=	0.4767

CRITICAL DFC = 0.48

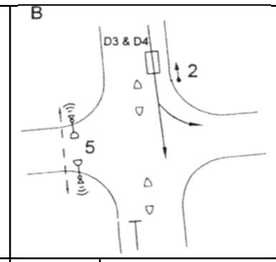
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Wang Chiu Road / Lam Fung Road		DATE : 5-Feb-21	FILENAME:



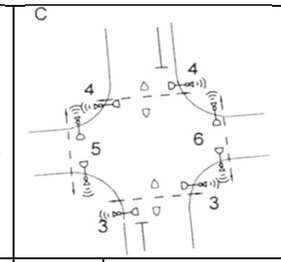
No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.471
Loss time		L =	34 sec
Total Flow		=	2250 pcu
Co	= (1.5*L+5)/(1-Y)	=	105.8 sec
Cm	= L/(1-Y)	=	64.2 sec
Yult		=	0.945
R.C.ult	= (Yult-Y)/Y*100%	=	100.8 %
Cp	= 0.9*L/(0.9-Y)	=	71.3 sec
Ymax	= 1-L/C	=	0.717
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	37.1 %



Stage 1	Int = 5



Stage 2	Int = 9



Stage 3	Int =

Stage 4	Int =

Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	11	10	4	8	10	4	8	OK
4	8	7	0	5	17	0	5	OK
5	9	5	6	8	65	6	8	OK
6	9	5	2	8	12	2	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1	1	3.50	I	1	15		N	1965	360			360	1.00	1786			1786	0.202	0.202		37	37	0.656	50
1,2	1	3.50	I	1	18			2105	145	267		412	0.35	2045			2045	0.201			37	37	0.656	57
2,3	1	3.50	I	1	18			2105		208	200	408	0.49	2022			2022	0.202			37	37	0.657	57
4,5	2	3.50	II	1	15		N	1965	235	269		504	0.47	1877			1877	0.268	0.269		49	49	0.656	60
5	2	3.50	II	1				2105		566		566	0.00	2105			2105	0.269			49	49	0.657	67
																	Stage 3 Pedestrian Stage			22				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

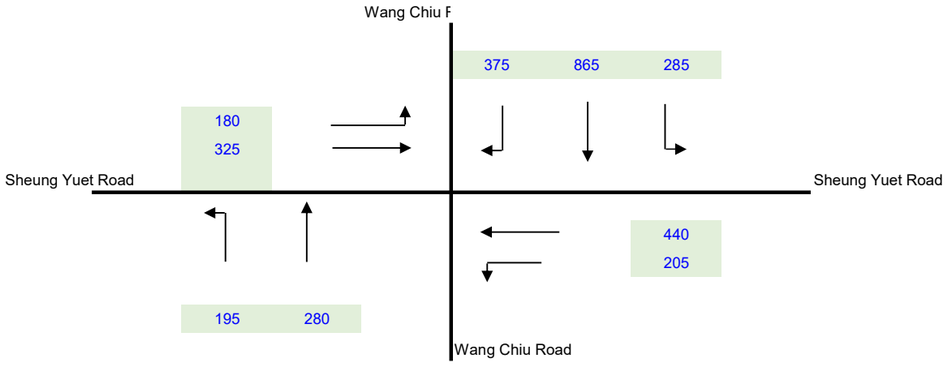
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

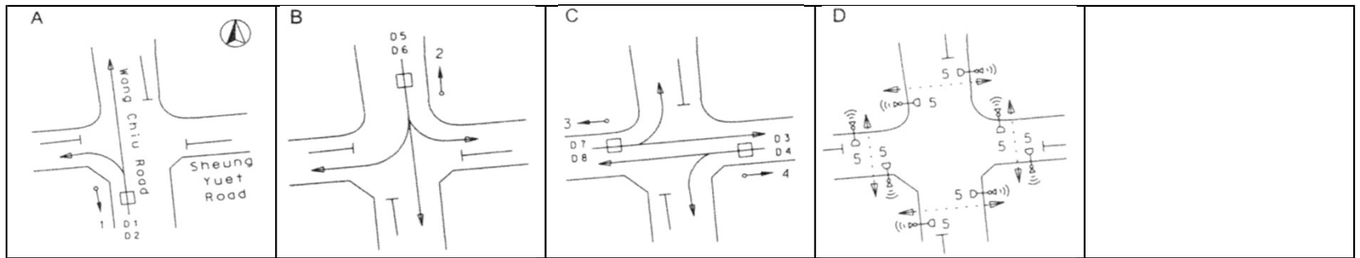
Wang Chiu Road / Sheung Yuet Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	140 sec
Sum(y)		Y =	0.646
Loss time		L =	41 sec
Total Flow		=	3150 pcu
Co	= (1.5*L+5)/(1-Y)	=	188.0 sec
Cm	= L/(1-Y)	=	115.9 sec
Yult		=	0.893
R.C.ult	= (Yult-Y)/Y*100%	=	38.1 %
Cp	= 0.9*L/(0.9-Y)	=	145.5 sec
Ymax	= 1-L/C	=	0.707
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	-1.5 %



Stage 1	Int = 6	Stage 2	Int = 7	Stage 3	Int = 9	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	3	9	10	3	9	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				19				
4,5	1	3.50	I	1	15		N	1965	195	24		219	0.89	1804			1804	0.121	0.122		19	19	0.912	75
5	1	3.50	I	1				2105		256		256	0.00	2105			2105	0.122			19	19	0.914	82
10,11	2	3.50	I	1	15		N	1965	285	396		681	0.42	1886			1886	0.361	0.361		55	55	0.914	120
11,12	2	3.50	II	1	20			2105		469	375	844	0.44	2037		300	2337	0.361			55	55	0.914	137
7,8	3	3.50	II	1	15		N	1965	205	96		301	0.68	1840			1840	0.164	0.164		25	25	0.914	85
8	3	3.50	II	1				2105		344		344	0.00	2105			2105	0.163			25	25	0.913	91
1,2	3	3.50	II	1	15		N	1965	180	55		235	0.77	1825			1825	0.129			20	25	0.719	51
2	3	3.50	III	1				2105		270		270	0.00	2105			2105	0.128			20	25	0.717	58
																	Stage 4 Pedestrian Stage			22				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

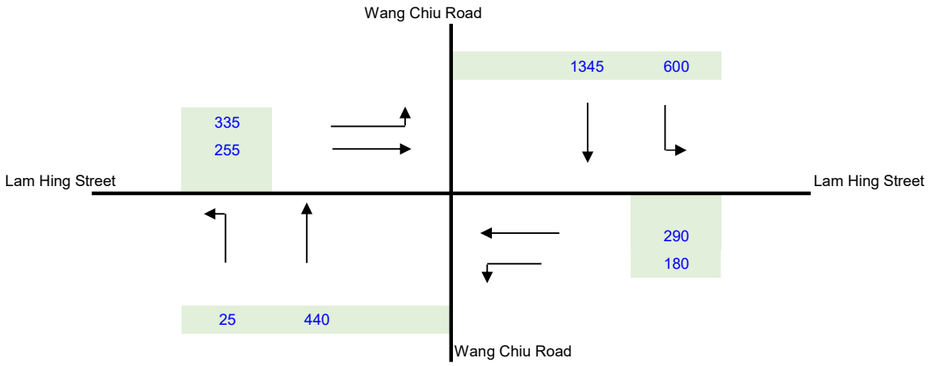
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

Wang Chiu Road / Lam Hing Road

DATE : 5-Feb-21

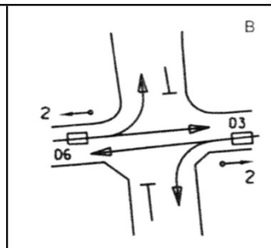
FILENAME:



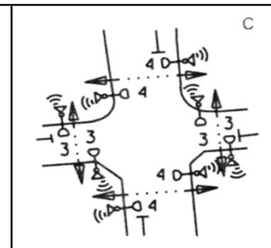
No. of stages per cycle	N =	3
No. of stage using for calculation	N =	2
Cycle time	C =	140 sec
Sum(y)	Y =	0.641
Loss time	L =	33 sec
Total Flow	=	3470 pcu
Co = (1.5*L+5)/(1-Y)	=	151.9 sec
Cm = L/(1-Y)	=	92.0 sec
Yult	=	0.953
R.C.ult = (Yult-Y)/Y*100%	=	48.6 %
Cp = 0.9*L/(0.9-Y)	=	114.7 sec
Ymax = 1-L/C	=	0.764
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	7.3 %



Stage 1 Int = 6



Stage 2 Int = 8



Stage 3 Int =

Stage 4 Int =

Stage 5 Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	5	5	3	5	13	3	5	OK
4	11	10	3	8	10	3	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1,2	1	3.50	I	1	15		N	1965	25	198		223	0.11	1943			1943	0.115	0.336		19	56	0.287	31
2	1	3.50	I	1				2105		242		242	0.00	2105			2105	0.115			19	56	0.287	34
4	1	3.50	I	1	15		N	1965	600			600	1.00	1786			1786	0.336			56	56	0.839	96
5	1	3.50	I	2				4210		1345		1345	0.00	4210			4210	0.319			53	56	0.798	97
3	2	4.00	II	1	15		N	2015	180	290		470	0.38	1941			1941	0.242	0.305		40	51	0.666	70
6	2	4.00	II	1	20		N	2015	335	255		590	0.57	1933			1933	0.305			51	51	0.839	100
																	Stage 3 Pedestrian Stage			21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

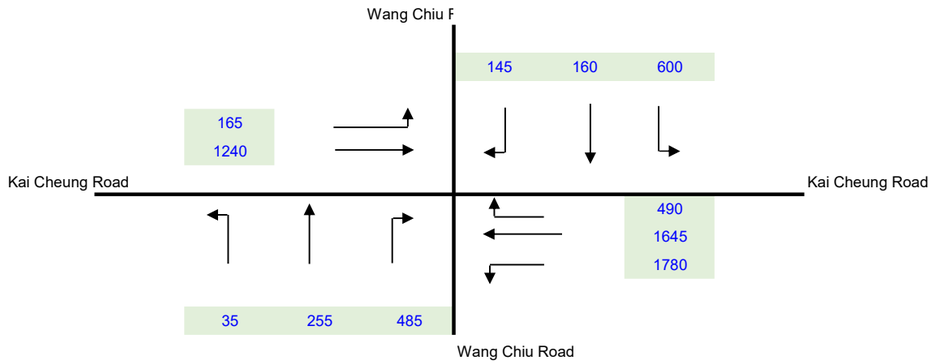
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

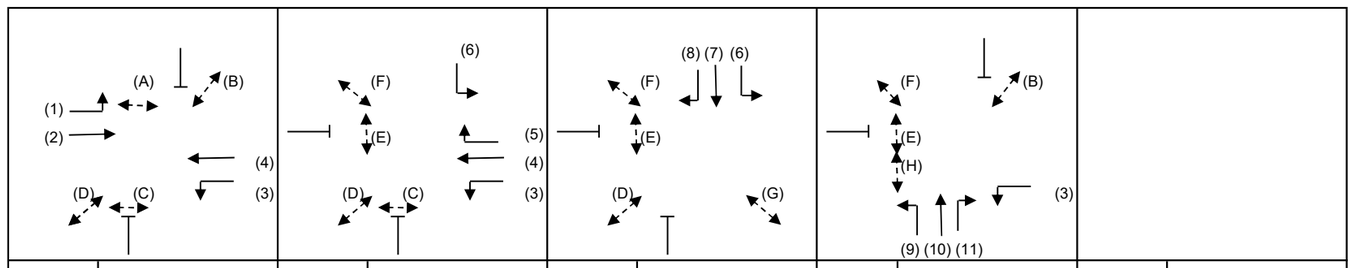
Wang Chiu Road / Kai Cheung Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle	N =	4	
No. of stage using for calculation	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	0.653	
Loss time	L =	32	sec
Total Flow	=	7000	pcu
Co = (1.5*L+5)/(1-Y)	=	152.5	sec
Cm = L/(1-Y)	=	92.1	sec
Yult	=	0.960	
R.C.ult = (Yult-Y)/Y*100%	=	47.1	%
Cp = 0.9*L/(0.9-Y)	=	116.4	sec
Ymax = 1-L/C	=	0.771	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	6.4	%



Stage 1	Int = 7	Stage 2	Int = 7	Stage 3	Int = 12	Stage 4	Int = 10	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	8	7	3	5	30	3	5	OK
B	7	5	3	6	108	3	6	OK
C	11	10	2	8	76	2	8	OK
D	4	5	2	5	102	2	5	OK
E	10	5	2	8	92	2	8	OK
F	4	5	2	5	95	2	5	OK
G	7	5	3	6	14	3	6	OK
H	10	5	4	8	19	4	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				32				
1	1	3.50	I	1	25		N	1965	165			165	1.00	1854			1854	0.089	0.196		15	32	0.383	30
2	1	3.50	I	3				6315		1240		1240	0.00	6315			6315	0.196			32	32	0.846	76
3	1,2,4	3.50	I	2	25		N	4070	1780			1780	1.00	3840			3840	0.464			77	113	0.576	41
4	1,2	3.50	II	3				6315		1645		1645	0.00	6315			6315	0.260			43	82	0.445	53
5	2	3.50	II	1	20			2105			490	490	1.00	1958			1958	0.250	0.250		41	41	0.846	93
6	2,3	3.50	II	1	25		N	1965	600			600	1.00	1854		110	1964	0.306			51	65	0.660	75
7	3	3.50	II	1				2105		157		157	0.00	2105			2105	0.075	0.075		12	12	0.846	45
7,8	3	3.50	III	1	25			2105		3	145	148	0.98	1988			1988	0.074			12	12	0.844	43
9,10	4	3.50	III	1	25		N	1965	35	221		256	0.14	1949			1949	0.131	0.131		22	22	0.846	62
10,11	4	3.50	III	1	25			2105		34	228	262	0.87	2001			2001	0.131			22	22	0.843	64
11	4	3.50	III	1	20			2105			257	257	1.00	1958			1958	0.131			22	22	0.845	63

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

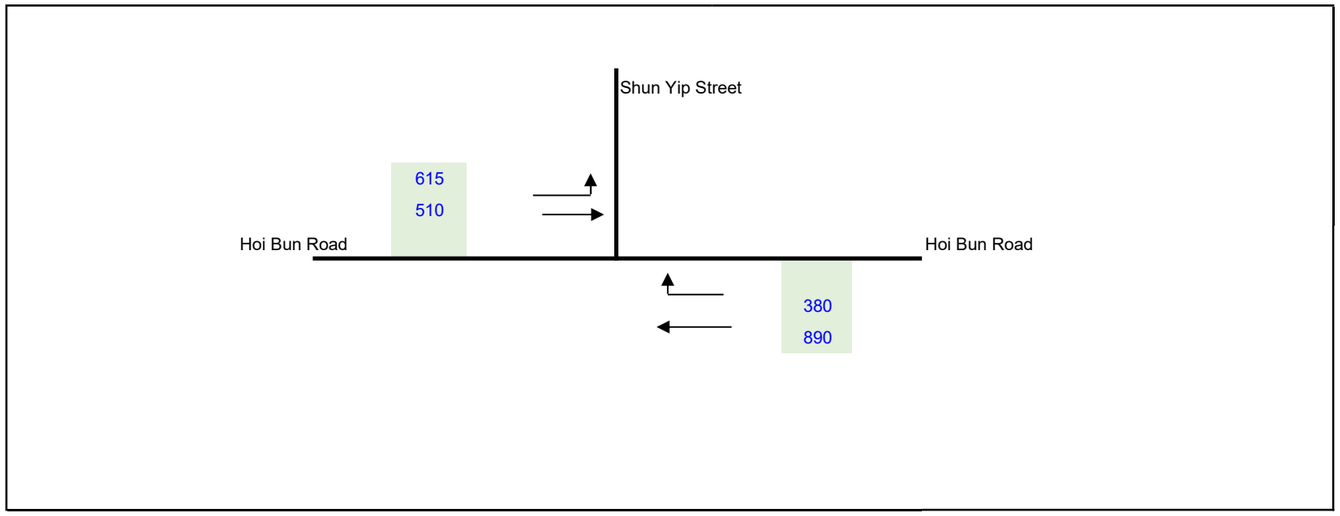
ARUP — TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

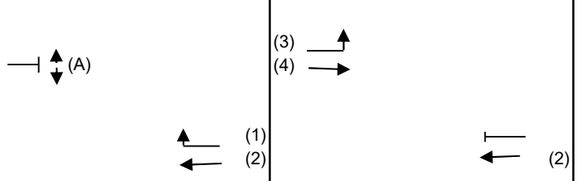
Shun Yip Street / Hoi Bun Road

DATE : 5-Feb-21

FILENAME :



No. of stages per cycle		N =	2
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.481
Loss time		L =	39 sec
Total Flow		=	2395 pcu
Co	= (1.5*L+5)/(1-Y)	=	122.3 sec
Cm	= L/(1-Y)	=	75.1 sec
Yult		=	0.608
R.C.ult	= (Yult-Y)/Y*100%	=	26.4 %
Cp	= 0.9*L/(0.9-Y)	=	83.7 sec
Ymax	= 1-L/C	=	0.675
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	26.4 % (Optimized)



STAGE 1	INT= 10	STAGE 2	INT= 6	STAGE 3 (ped)	INT= 2	STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	0	6	56	0	6	OK
B	7	5	3	6	14	3	6	OK
C	11.5	10	3	8	12	3	8	OK
D	10	6	5	12	6	5	12	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
1	1	3.50	I	1	30			2105			380	380	1.00	2005			2005	0.190	0.190		32	32	0.712	56
2	1,2	3.50	I	1			N	1965		890		890	0.00	1965			1965	0.453			76	85	0.639	52
3	2	3.50	II	1	15		N	1965	520			520	1.00	1786			1786	0.291	0.291		49	49	0.712	61
3,4	2	3.50	II	1	20			2105	95	510		605	0.16	2080			2080	0.291			49	49	0.711	72
																		Pedestrian Stage 3		23				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

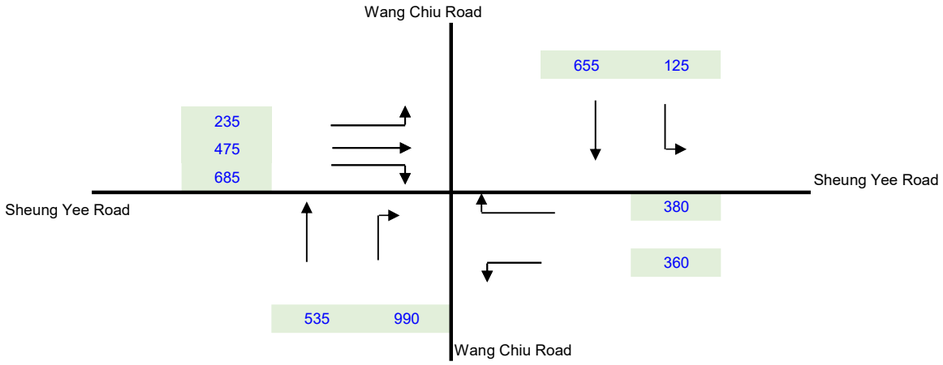
TRAFFIC SIGNAL CALCULATION

Wang Chiu Road / Sheung Yee Road

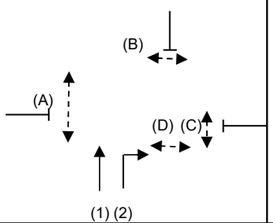
PROJECT NO: 237938

DATE : 5-Feb-21

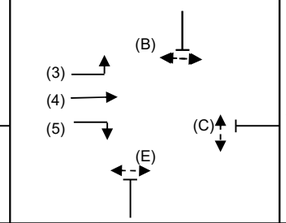
FILENAME:



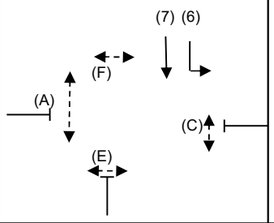
No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	120 sec
Sum(y)		Y =	0.651
Loss time		L =	22 sec
Total Flow		=	4440 pcu
Co	= (1.5*L+5)/(1-Y)	=	109.0 sec
Cm	= L/(1-Y)	=	63.1 sec
Yult		=	1.035
R.C.ult	= (Yult-Y)/Y*100%	=	58.9 %
Cp	= 0.9*L/(0.9-Y)	=	79.6 sec
Ymax	= 1-L/C	=	0.817
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	12.9 %



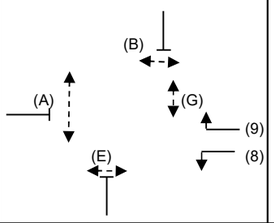
Stage 1 Int = 7



Stage 2 Int = 6



Stage 3 Int = 6



Stage 4 Int = 7

Stage 5 Int = 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	16	7	2	13	78	2	13	OK
B	10	5	2	8	85	2	8	OK
C	10	5	2	8	84	2	8	OK
D	10	5	8	8	27	8	8	OK
E	10	5	3	8	66	3	8	OK
F	7	5	6	6	13	6	6	OK
G	7	5	6	6	14	6	6	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
1	1	3.50	I	2			N	4070		535		535	0.00	4070			4070	0.131	0.247		20	37	0.425	37
2	1	3.50	I	2	30			4210			990	990	1.00	4010			4010	0.247			37	37	0.797	71
3	2	3.50	II	1	15		N	1965	235			235	1.00	1786			1786	0.132	0.144		20	22	0.726	44
3,4	2	3.50	II	1	18			2105	0	304		304	0.00	2105			2105	0.144			22	22	0.797	56
4,5	2	3.50	II	1	35			2105		171	127	298	0.43	2067			2067	0.144			22	22	0.796	55
5	2	3.50	II	2	30		N	4070			558	558	1.00	3876			3876	0.144			22	22	0.795	49
6,7	3	3.50	III	1	15		N	1965	125	118		243	0.51	1869			1869	0.130	0.130		20	20	0.797	47
7	3	3.50	III	2				4210		537		537	0.00	4210			4210	0.128			19	20	0.782	48
8	4	3.50	IV	1	15		N	1965	232			232	1.00	1786			1786	0.130	0.130		20	20	0.797	45
8,9	4	3.50	III	1	15			2105	128		120	248	1.00	1914			1914	0.130			20	20	0.797	48
9	4	3.50	IV	1	30			2105			260	260	1.00	2005			2005	0.130			20	20	0.796	50

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

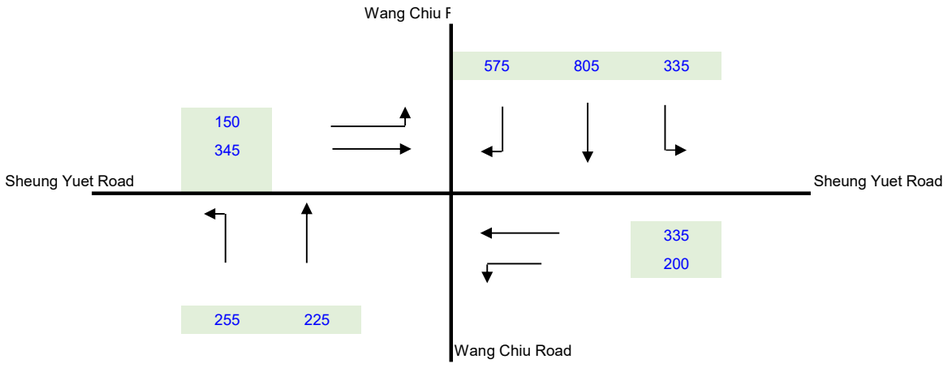
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

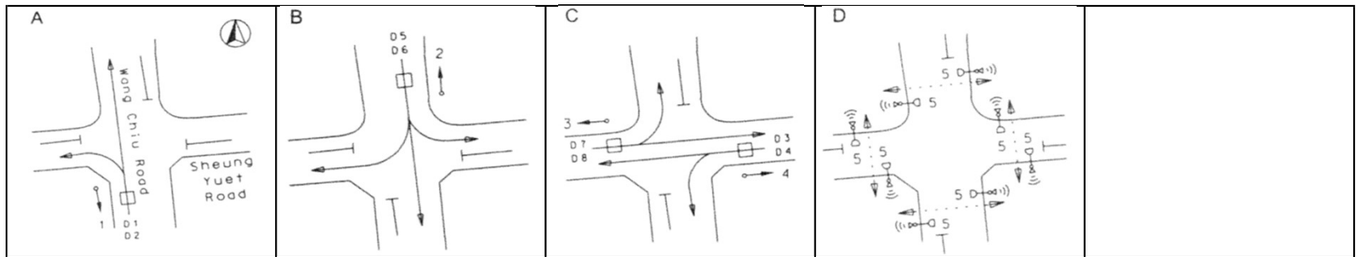
Wang Chiu Road / Sheung Yuet Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle	N =	4
No. of stage using for calculation	N =	3
Cycle time	C =	140 sec
Sum(y)	Y =	0.573
Loss time	L =	41 sec
Total Flow	=	3225 pcu
Co = (1.5*L+5)/(1-Y)	=	155.7 sec
Cm = L/(1-Y)	=	96.0 sec
Yult	=	0.893
R.C.ult = (Yult-Y)/Y*100%	=	55.8 %
Cp = 0.9*L/(0.9-Y)	=	112.8 sec
Ymax = 1-L/C	=	0.707
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	11.1 %



Stage 1	Int = 6	Stage 2	Int = 7	Stage 3	Int = 9	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	3	9	10	3	9	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				19				
4,5	1	3.50	I	1	15		N	1965	255	0		255	1.00	1786			1786	0.143	0.143		25	25	0.810	55
5	1	3.50	I	1	15			2105		225		225	0.00	2105			2105	0.107			18	25	0.607	43
10,11	2	3.50	I	1	15		N	1965	335	198		533	0.63	1849			1849	0.288	0.294		50	51	0.795	85
11	2	3.50	I	1				2105		607		607	0.00	2105			2105	0.288			50	51	0.795	96
12	2	3.50	II	1	20			2105			575	575	1.00	1958			1958	0.294			51	51	0.810	92
7,8	3	3.50	II	1	15		N	1965	200	48		248	0.81	1818			1818	0.136	0.136		24	24	0.810	54
8	3	3.50	II	1				2105		287		287	0.00	2105			2105	0.136			24	24	0.810	62
1,2	3	3.50	II	1	15		N	1965	150	81		231	0.65	1845			1845	0.125			22	24	0.744	51
2	3	3.50	III	1				2105		264		264	0.00	2105			2105	0.125			22	24	0.745	57
																	Stage 4 Pedestrian Stage			22				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

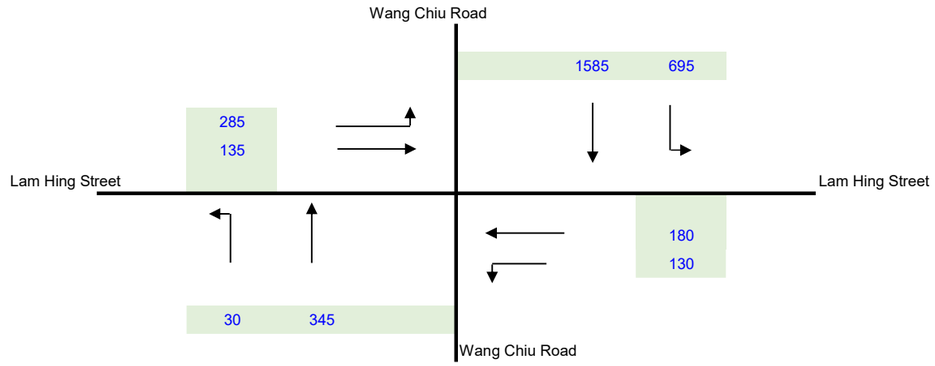
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

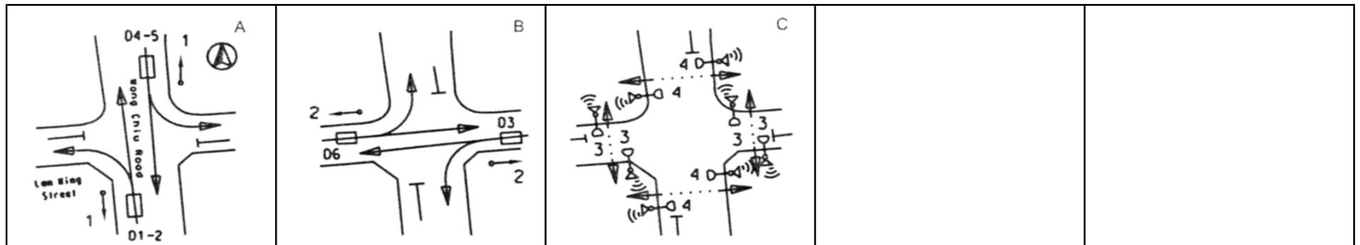
Wang Chiu Road / Lam Hing Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle	N =	3
No. of stage using for calculation	N =	2
Cycle time	C =	140 sec
Sum(y)	Y =	0.549
Loss time	L =	33 sec
Total Flow	=	3385 pcu
Co = (1.5*L+5)/(1-Y)	=	120.9 sec
Cm = L/(1-Y)	=	73.2 sec
Yult	=	0.953
R.C.ult = (Yult-Y)/Y*100%	=	73.4 %
Cp = 0.9*L/(0.9-Y)	=	84.7 sec
Ymax = 1-L/C	=	0.764
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	25.2 %



Stage 1	Int = 6	Stage 2	Int = 8	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	5	5	3	5	13	3	5	OK
4	11	10	3	8	10	3	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1,2	1	3.50	I	1	15		N	1965	30	150		180	0.17	1933			1933	0.093	0.389		18	76	0.172	19
2	1	3.50	I	1				2105		195		195	0.00	2105			2105	0.093			18	76	0.171	21
4	1	3.50	I	1	15		N	1965	695			695	1.00	1786			1786	0.389			76	76	0.719	74
5	1	3.50	I	2				4210		1585		1585	0.00	4210			4210	0.376			73	76	0.696	85
3	2	4.00	II	1	15		N	2015	130	180		310	0.42	1934			1934	0.160	0.160		31	31	0.719	62
6a	2	4.00	II	1	20		N	2015	285			285	1.00	1874			1874	0.152			30	31	0.682	52
6b	2	4.00	II	1			N	2015		135		135	0.00	2015			2015	0.067			13	31	0.300	24
																	Stage 3 Pedestrian Stage			21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

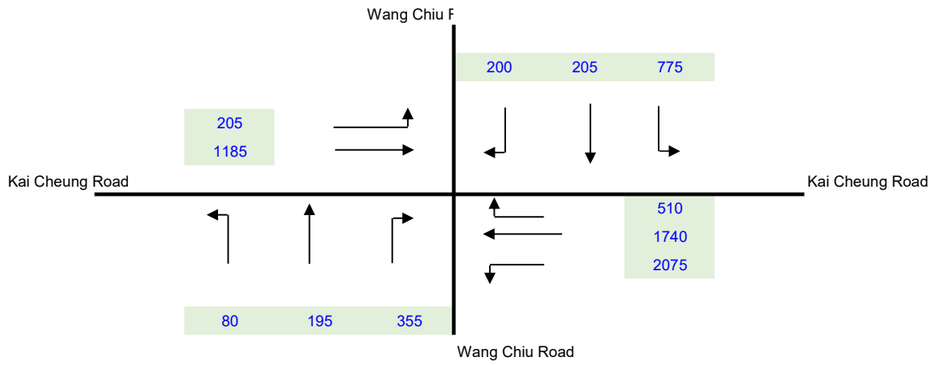
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

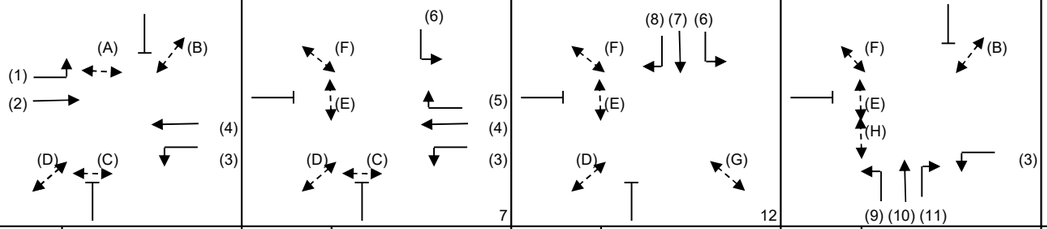
Wang Chiu Road / Kai Cheung Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	140 sec
Sum(y)		Y =	0.690
Loss time		L =	24 sec
Total Flow		=	7525 pcu
Co	= (1.5*L+5)/(1-Y)	=	132.1 sec
Cm	= L/(1-Y)	=	77.3 sec
Yult		=	1.020
R.C.ult	= (Yult-Y)/Y*100%	=	47.9 %
Cp	= 0.9*L/(0.9-Y)	=	102.6 sec
Ymax	= 1-L/C	=	0.829
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	8.1 %



Stage 1	Int = 7	Stage 2	Int =	Stage 3	Int = 10	Stage 4	Int = 10	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	8	7	3	5	30	3	5	OK
B	7	5	3	6	98	3	6	OK
C	11	10	2	8	77	2	8	OK
D	4	5	2	5	105	2	5	OK
E	10	5	2	8	91	2	8	OK
F	4	5	2	5	94	2	5	OK
G	7	5	3	6	16	3	6	OK
H	10	5	4	8	15	4	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				24				
1	1	3.50	I	1	25		N	1965	205			205	1.00	1854			1854	0.111	0.188		19	32	0.490	37
2	1	3.50	I	3				6315		1185		1185	0.00	6315			6315	0.188			32	32	0.832	73
3	1,2,4	3.50	I	2	25		N	4070	2075			2075	1.00	3840			3840	0.540			91	103	0.732	63
4	1,2	3.50	II	2				4210		1740		1740	0.00	4210		380	4590	0.379			64	76	0.695	92
5	2	3.50	II	1	20			2105			510	510	1.00	1958			1958	0.260			44	44	0.832	94
6	2,3	3.50	II	1	25		N	1965	775			775	1.00	1854		110	1964	0.395	0.395		66	66	0.832	101
7	3	3.50	II	1				2105		139		139	0.00	2105			2105	0.066			11	14	0.681	29
7.8	3	3.50	III	1	30			2105		66	69	135	0.51	2053			2053	0.066			11	14	0.678	28
8	3	3.50	III	1	25			2105			131	131	1.00	1986			1986	0.066			11	14	0.680	28
9,10	4	3.50	III	1	25		N	1965	80	124		204	0.39	1920			1920	0.106	0.107		18	18	0.825	53
10,11	4	3.50	III	1	25			2105		71	145	216	0.67	2023			2023	0.107			18	18	0.828	56
11	4	3.50	III	1	20			2105			210	210	1.00	1958			1958	0.107			18	18	0.832	55

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

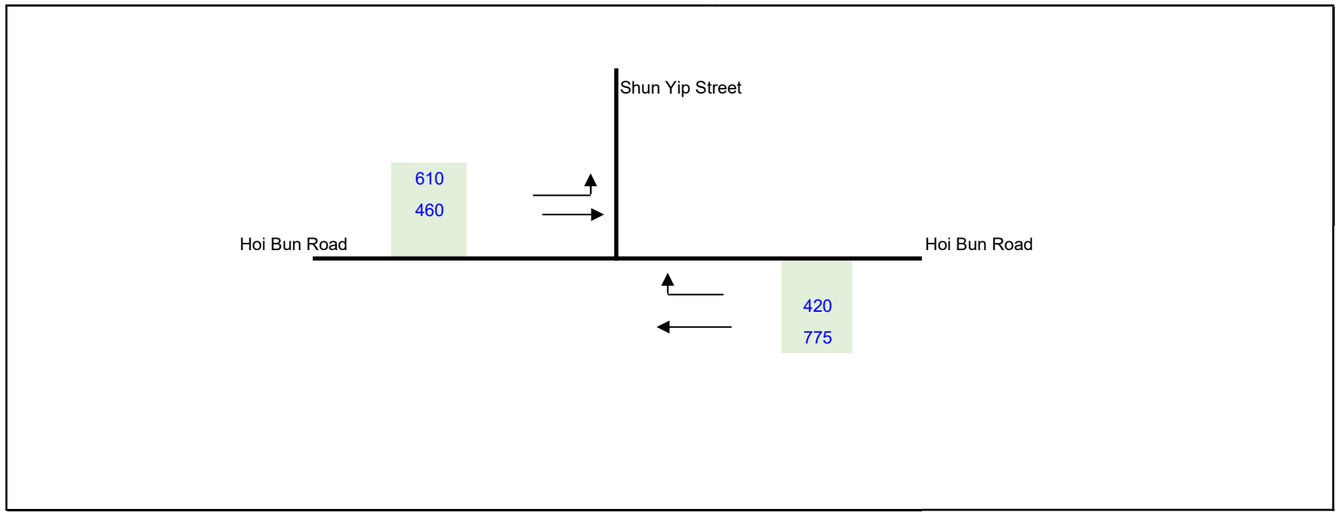
ARUP — TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

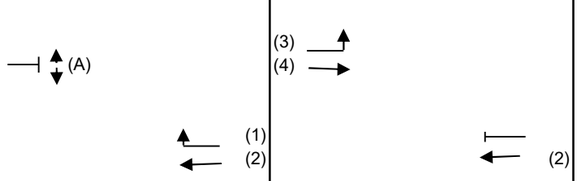
Shun Yip Street / Hoi Bun Road

DATE : 5-Feb-21

FILENAME :



No. of stages per cycle		N =	2
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.487
Loss time		L =	39 sec
Total Flow		=	2265 pcu
Co	= (1.5*L+5)/(1-Y)	=	123.7 sec
Cm	= L/(1-Y)	=	76.0 sec
Yult		=	0.608
R.C.ult	= (Yult-Y)/Y*100%	=	24.8 %
Cp	= 0.9*L/(0.9-Y)	=	84.9 sec
Ymax	= 1-L/C	=	0.675
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	24.8 % (Optimized)



STAGE 1	INT= 10	STAGE 2	INT= 6	STAGE 3 (ped)	INT= 2	STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	0	6	59	0	6	OK
B	7	5	3	6	14	3	6	OK
C	11.5	10	3	8	12	3	8	OK
D	10	6	5	12	6	5	12	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
1	1	3.50	I	1	30			2105			420	420	1.00	2005			2005	0.210	0.210		35	35	0.721	60
2	1,2	3.50	I	1			N	1965		775		775	0.00	1965			1965	0.394			66	85	0.557	45
3	2	3.50	II	1	15		N	1965	495			495	1.00	1786			1786	0.277	0.277		46	46	0.721	61
3,4	2	3.50	II	1	20			2105	115	460		575	0.20	2074			2074	0.277			46	46	0.721	71
																		Pedestrian Stage 3		23				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

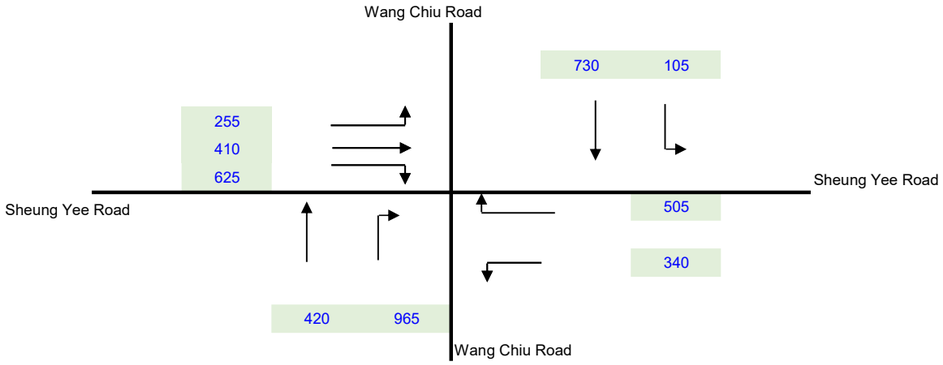
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

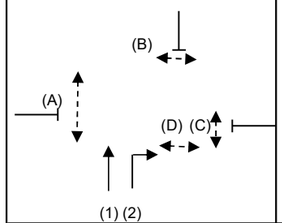
Wang Chiu Road / Sheung Yee Road

DATE : 5-Feb-21

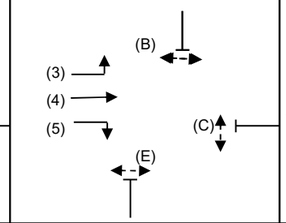
FILENAME:



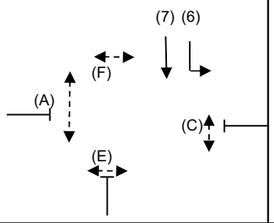
No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	120 sec
Sum(y)		Y =	0.658
Loss time		L =	22 sec
Total Flow		=	4355 pcu
Co	= (1.5*L+5)/(1-Y)	=	111.0 sec
Cm	= L/(1-Y)	=	64.3 sec
Yult		=	1.035
R.C.ult	= (Yult-Y)/Y*100%	=	57.4 %
Cp	= 0.9*L/(0.9-Y)	=	81.7 sec
Ymax	= 1-L/C	=	0.817
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	11.7 %



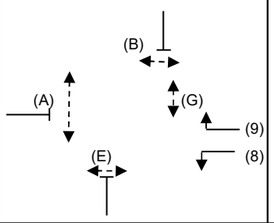
Stage 1 Int = 7



Stage 2 Int = 6



Stage 3 Int = 6



Stage 4 Int = 7

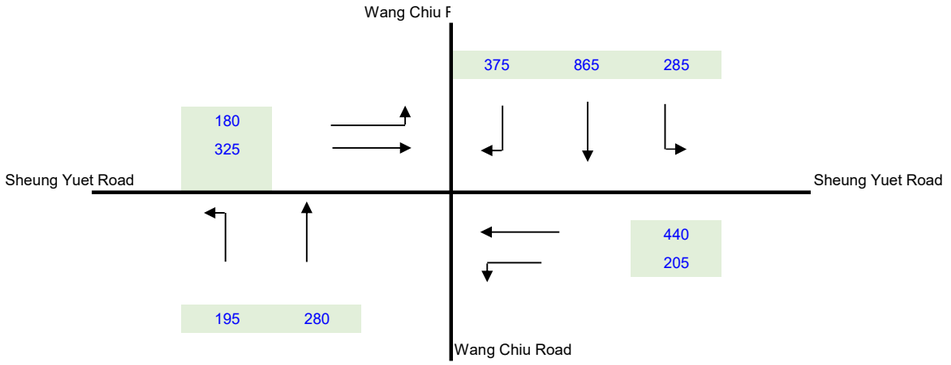
Stage 5 Int = 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	16	7	2	13	80	2	13	OK
B	10	5	2	8	85	2	8	OK
C	10	5	2	8	82	2	8	OK
D	10	5	8	8	26	8	8	OK
E	10	5	3	8	67	3	8	OK
F	7	5	6	6	13	6	6	OK
G	7	5	6	6	16	6	6	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
1	1	3.50	I	2			N	4070		420		420	0.00	4070			4070	0.103	0.241		15	36	0.345	29
2	1	3.50	I	2	30			4210			965	965	1.00	4010			4010	0.241			36	36	0.805	71
3	2	3.50	II	1	15		N	1965	235			235	1.00	1786			1786	0.132	0.132		20	20	0.805	45
3,4	2	3.50	II	1	18			2105	20	255		275	0.07	2092			2092	0.131			20	20	0.804	52
4,5	2	3.50	II	1	35			2105		155	117	272	0.43	2067			2067	0.132			20	20	0.805	52
5	2	3.50	II	2	30		N	4070			508	508	1.00	3876			3876	0.131			20	20	0.802	45
6,7	3	3.50	III	1	15		N	1965	105	153		258	0.41	1888			1888	0.137	0.137		20	20	0.803	49
7	3	3.50	III	2				4210		577		577	0.00	4210			4210	0.137			20	20	0.805	51
8	4	3.50	IV	1	15		N	1965	264			264	1.00	1786			1786	0.148	0.148		22	22	0.802	49
8,9	4	3.50	III	1	15			2105	76		208	284	1.00	1914			1914	0.148			22	22	0.805	52
9	4	3.50	IV	1	30			2105			297	297	1.00	2005			2005	0.148			22	22	0.804	54

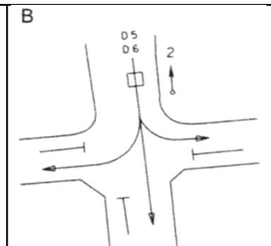
NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

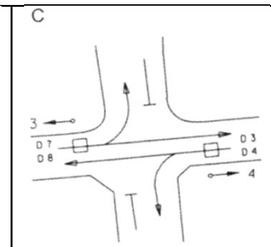
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Wang Chiu Road / Sheung Yuet Road		DATE : 5-Feb-21	FILENAME:

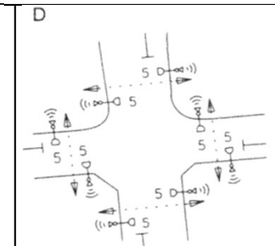


No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	140 sec
Sum(y)		Y =	0.575
Loss time		L =	40 sec
Total Flow		=	3150 pcu
Co	= (1.5*L+5)/(1-Y)	=	152.9 sec
Cm	= L/(1-Y)	=	94.1 sec
Yult		=	0.900
R.C.ult	= (Yult-Y)/Y*100%	=	56.5 %
Cp	= 0.9*L/(0.9-Y)	=	110.8 sec
Ymax	= 1-L/C	=	0.714
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	11.8 %









Stage 1	Int = 6	Stage 2	Int = 7	Stage 3	Int = 8	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	3	9	10	3	9	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				18				
4,5	1	3.50	I	1	15		N	1965	195	24		219	0.89	1804			1804	0.121	0.122		21	21	0.803	49
5	1	3.50	I	1				2105		256		256	0.00	2105			2105	0.122			21	21	0.805	57
10,11	2	3.50	I	1	15		N	1965	285	255		540	0.53	1866			1866	0.289	0.290		50	50	0.804	87
11	2	3.50	I	1				2105		610		610	0.00	2105			2105	0.290			50	50	0.805	97
12	2	3.50	II	1	20			2105			375	375	1.00	1958			1958	0.192			33	50	0.532	56
7,8	3	3.50	II	1	15		N	1965	205	96		301	0.68	1840			1840	0.164	0.164		28	28	0.805	62
8	3	3.50	II	1				2105		344		344	0.00	2105			2105	0.163			28	28	0.804	70
1,2	3	3.50	II	1	15		N	1965	180	55		235	0.77	1825			1825	0.129			22	28	0.633	44
2	3	3.50	III	1				2105		270		270	0.00	2105			2105	0.128			22	28	0.631	50
																	Stage 4 Pedestrian Stage			22				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

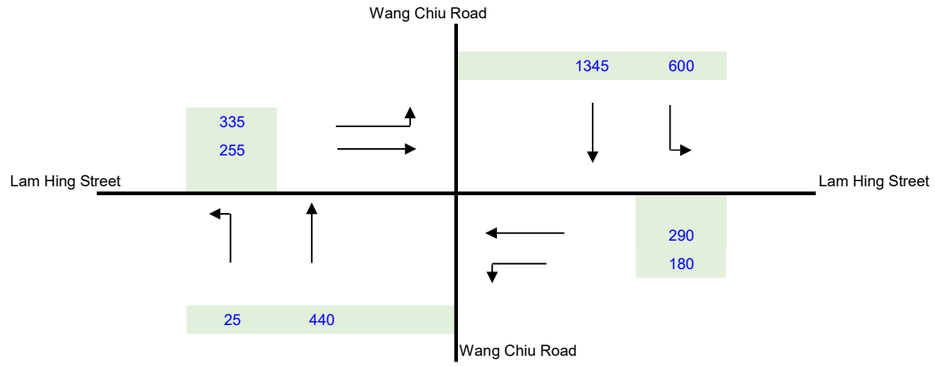
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

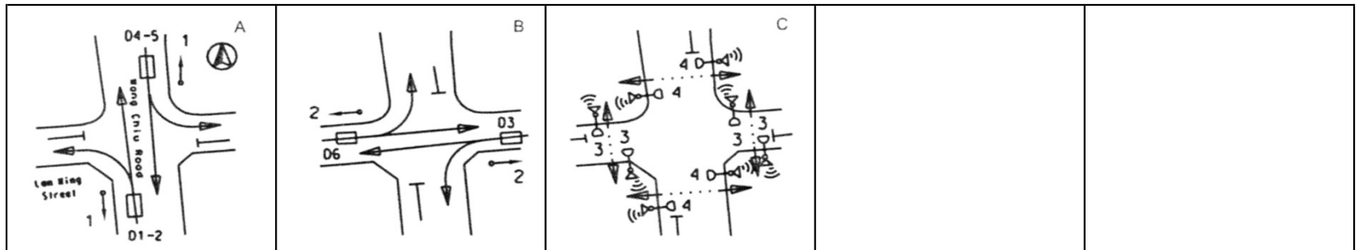
Wang Chiu Road / Lam Hing Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle	N =	3
No. of stage using for calculation	N =	2
Cycle time	C =	140 sec
Sum(y)	Y =	0.578
Loss time	L =	33 sec
Total Flow	=	3470 pcu
Co = (1.5*L+5)/(1-Y)	=	129.2 sec
Cm = L/(1-Y)	=	78.2 sec
Yult	=	0.953
R.C.ult = (Yult-Y)/Y*100%	=	64.8 %
Cp = 0.9*L/(0.9-Y)	=	92.3 sec
Ymax = 1-L/C	=	0.764
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	19.0 %



Stage 1	Int = 6	Stage 2	Int = 8	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	5	5	3	5	13	3	5	OK
4	11	10	3	8	10	3	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1,2	1	3.50	I	1	15		N	1965	25	198		223	0.11	1943			1943	0.115	0.336		21	62	0.258	29
2	1	3.50	I	1				2105		242		242	0.00	2105			2105	0.115			21	62	0.259	31
4	1	3.50	I	1	15		N	1965	600			600	1.00	1786			1786	0.336			62	62	0.756	84
5	1	3.50	I	2				4210		1345		1345	0.00	4210			4210	0.319			59	62	0.719	87
3	2	4.00	II	1	15		N	2015	180	290		470	0.38	1941			1941	0.242	0.242		45	45	0.756	81
6a	2	4.00	II	1	20		N	2015	335			335	1.00	1874			1874	0.179			33	45	0.558	53
6b	2	4.00	II	1			N	2015		255		255	0.00	2015			2015	0.127			23	45	0.395	40
																	Stage 3 Pedestrian Stage			21				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

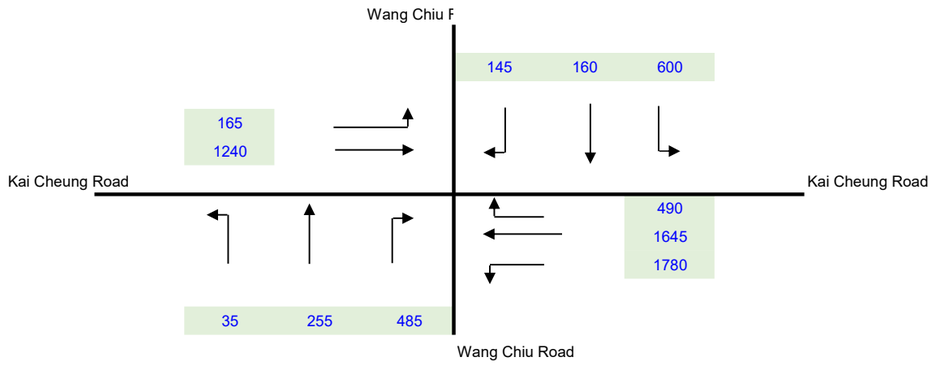
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

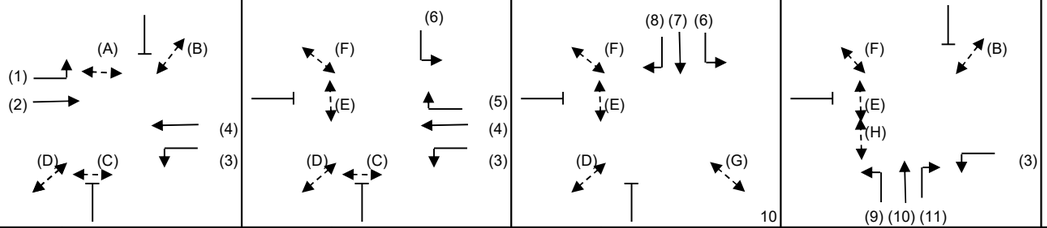
Wang Chiu Road / Kai Cheung Road

DATE : 5-Feb-21

FILENAME:



No. of stages per cycle	N =	4	
No. of stage using for calculation	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	0.628	
Loss time	L =	32	sec
Total Flow	=	7000	pcu
Co = (1.5*L+5)/(1-Y)	=	142.4	sec
Cm = L/(1-Y)	=	86.0	sec
Yult	=	0.960	
R.C.ult = (Yult-Y)/Y*100%	=	52.9	%
Cp = 0.9*L/(0.9-Y)	=	105.8	sec
Ymax = 1-L/C	=	0.771	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	10.6	%



Stage 1	Int = 7	Stage 2	Int = 7	Stage 3	Int = 12	Stage 4	Int = 10	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	8	7	3	5	32	3	5	OK
B	7	5	3	6	111	3	6	OK
C	11	10	2	8	72	2	8	OK
D	4	5	2	5	92	2	5	OK
E	10	5	2	8	81	2	8	OK
F	4	5	2	5	84	2	5	OK
G	7	5	3	6	9	3	6	OK
H	10	5	4	8	20	4	8	OK

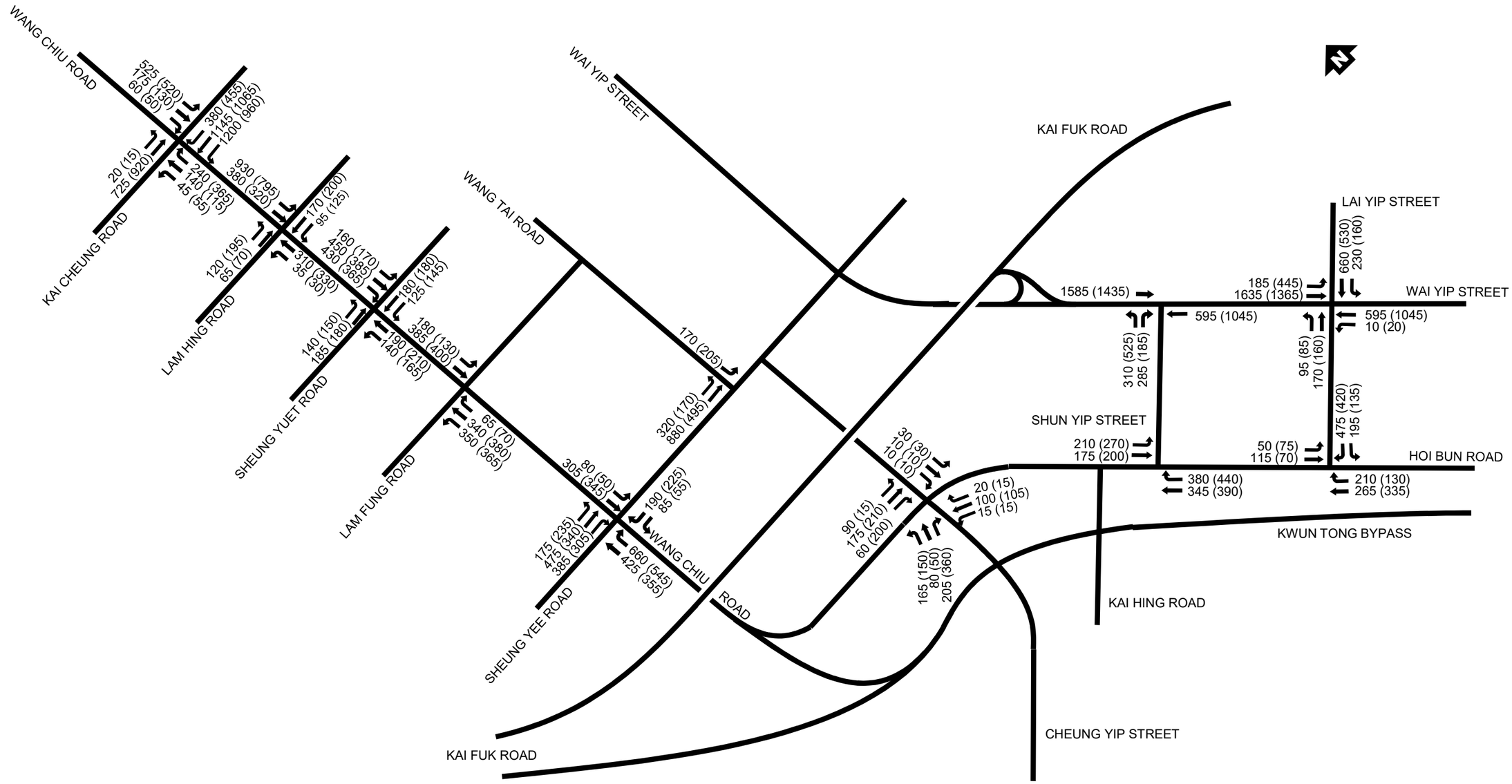
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				32				
1	1	3.50	I	1	25		N	1965	165			165	1.00	1854			1854	0.089	0.196		15	34	0.369	29
2	1	3.50	I	3				6315		1240		1240	0.00	6315			6315	0.196			34	34	0.814	75
3	1,2,4	3.50	I	2	25		N	4070	1780			1780	1.00	3840			3840	0.464			80	116	0.557	35
4	1,2	3.50	II	2				4210		1645		1645	0.00	4210		340	4550	0.362			62	85	0.597	76
5	2	3.50	II	1	20			2105			490	490	1.00	1958			1958	0.250	0.250		43	43	0.814	85
6	2,3	3.50	II	1	25		N	1965	600			600	1.00	1854		120	1974	0.304			52	59	0.726	87
7	3	3.50	II	1				2105		104		104	0.00	2105			2105	0.049	0.050		8	9	0.807	29
7.8	3	3.50	III	1	30			2105		56	46	102	0.45	2059			2059	0.050			9	9	0.809	28
8	3	3.50	III	1	25			2105			99	99	1.00	1986			1986	0.050			9	9	0.814	34
9,10	4	3.50	III	1	25		N	1965	35	221		256	0.14	1949			1949	0.131	0.131		23	23	0.814	56
10,11	4	3.50	III	1	25			2105		34	228	262	0.87	2001			2001	0.131			23	23	0.811	57
11	4	3.50	III	1	20			2105			257	257	1.00	1958			1958	0.131			23	23	0.813	56

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

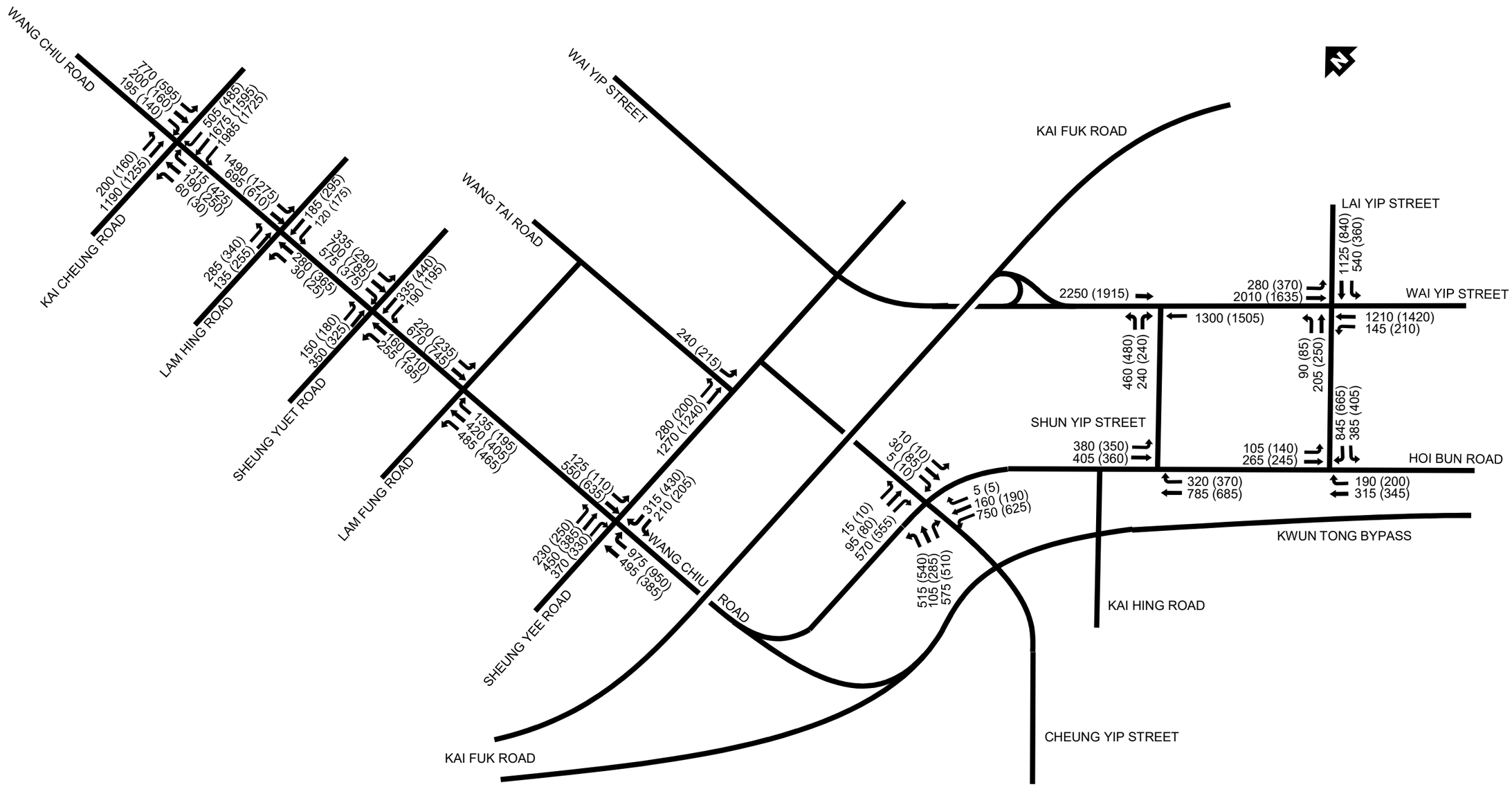
Appendix C

Flow Diagram

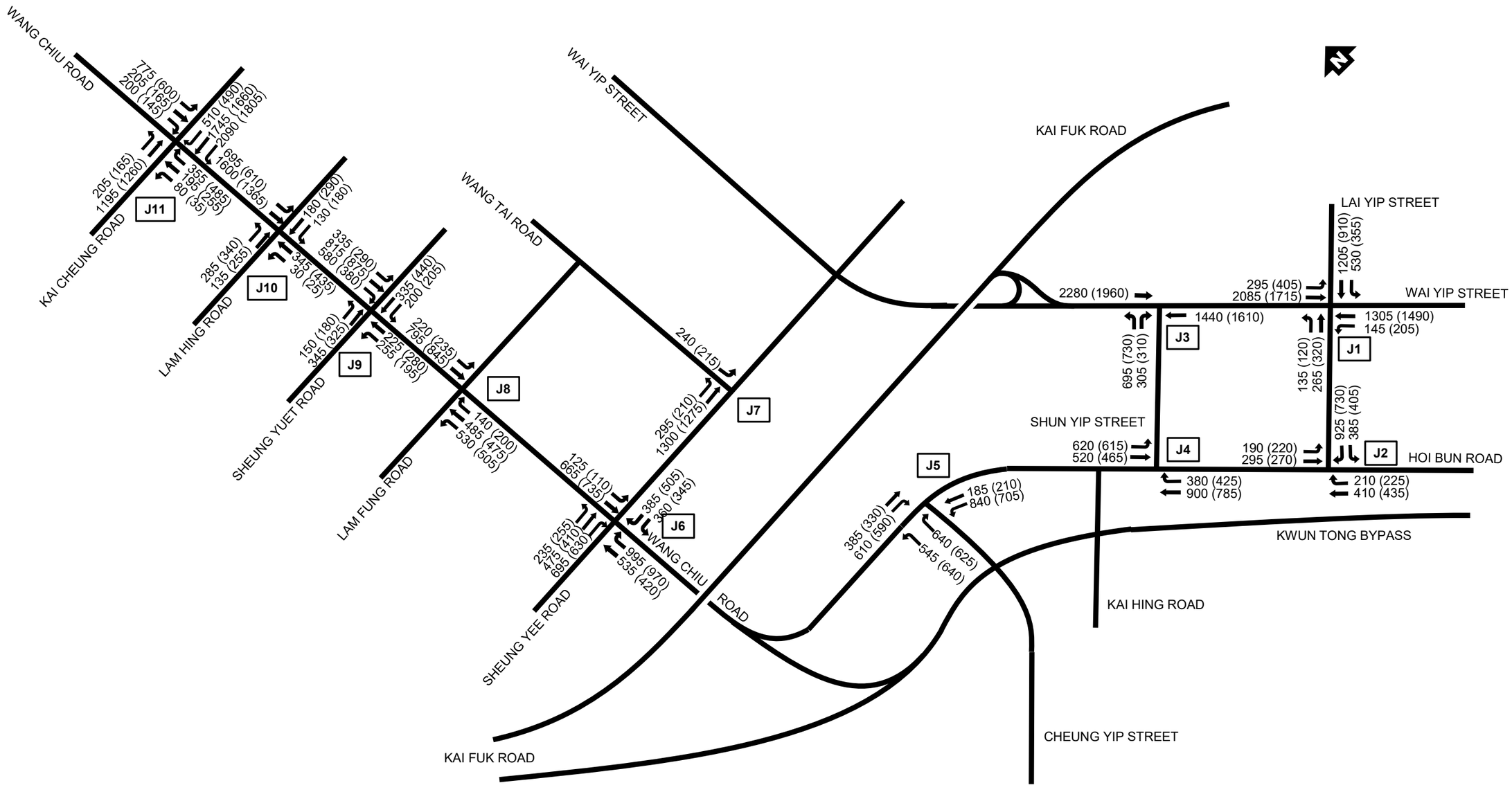
2014 Base Case Traffic Flows (pcu/hr)



2031 Reference Case Traffic Flows (pcu/hr)



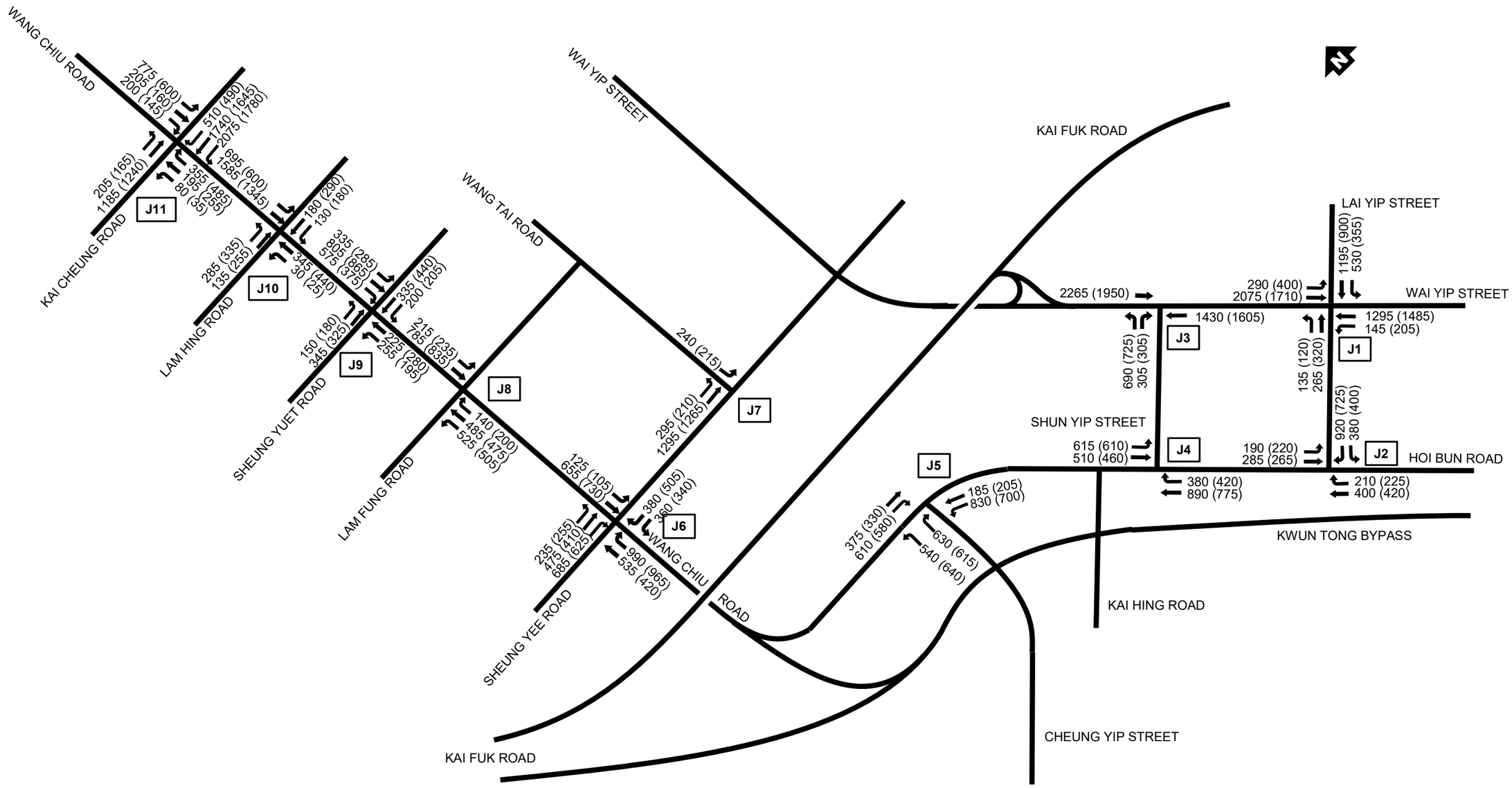
2031 (Design Case) Forecasted Traffic Flows (pcu/hr)



LEGEND:

AM PEAK HOUR PCU
(PM PEAK HOUR PCU)

2031 (Design Case) Forecasted Traffic Flows (pcu/hr)



LEGEND:

AM PEAK HOUR PCU
(PM PEAK HOUR PCU)

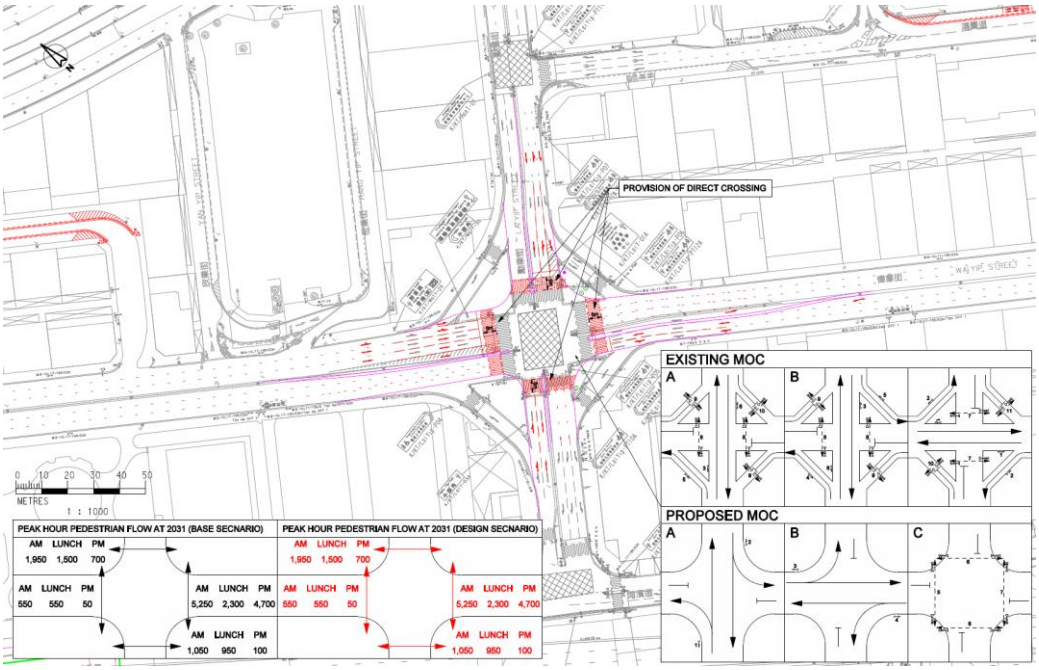
Appendix D

Junction Improvements Proposed under KTBA, KBBA and KTD Rethink II Studies

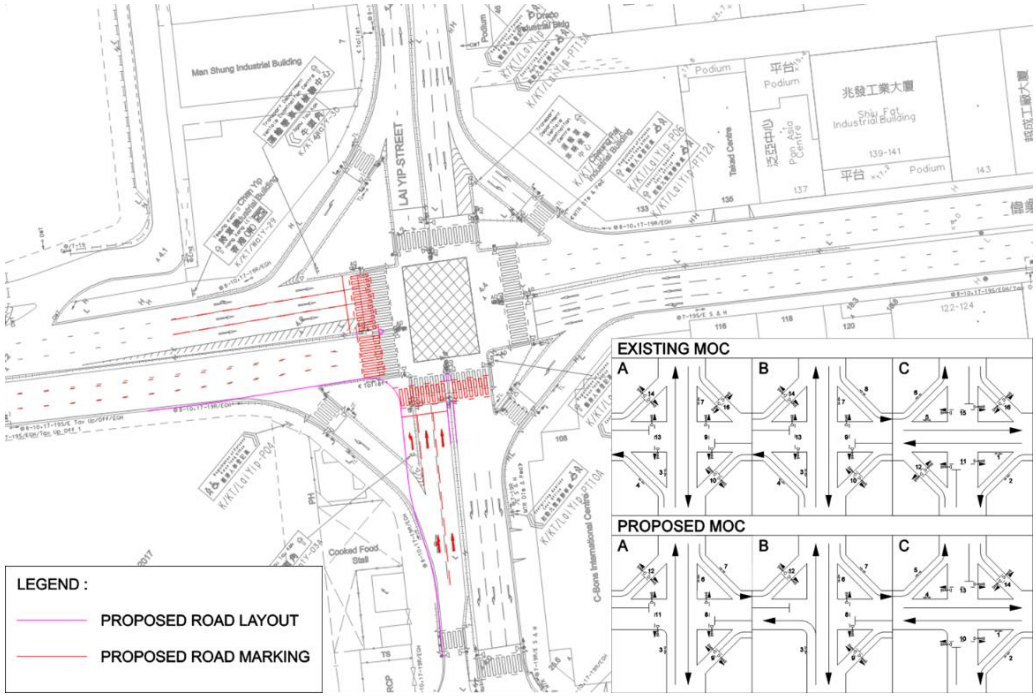
Appendix D – Junction Improvements proposed under KTBA, KBBA and KTD Rethink II Studies

Improvement Works for Wai Yip Street / Lai Yip Street (J1)

The junction of Lai Yip Street / Wai Yip Street is a diamond-shaped and the pedestrian crossings are divided into 3 stages and cause indirect routings which is undesirable. It is recommended to simplify the junction layout to improve the crossing connections.

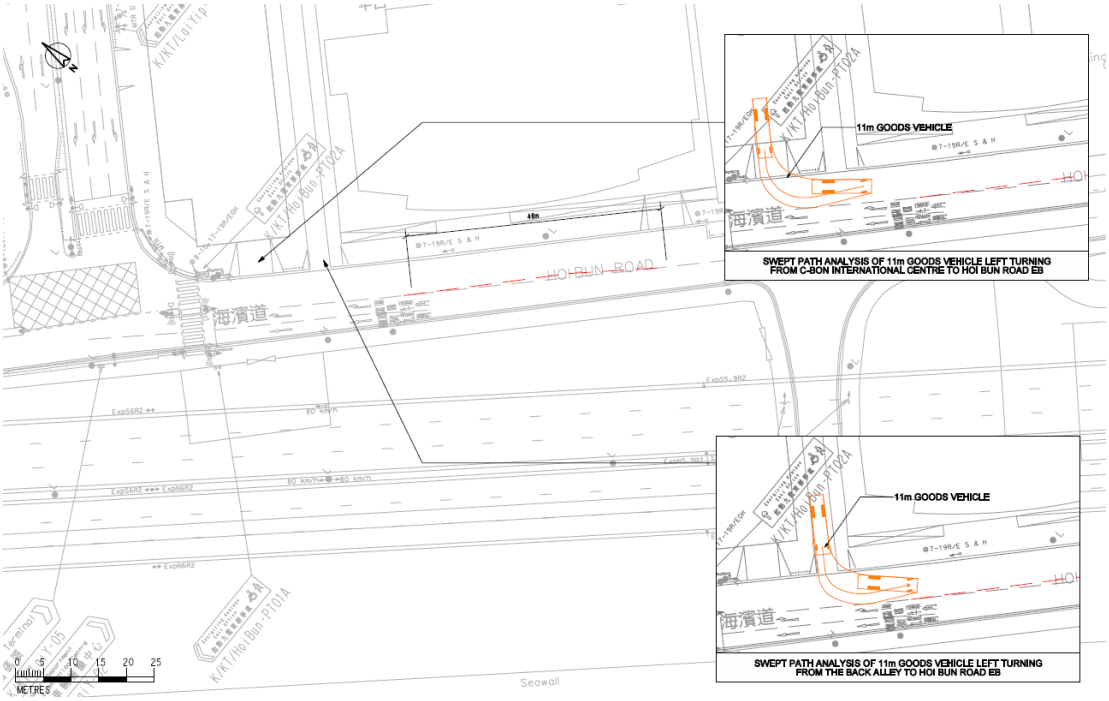


Subject to the onward discussions with TD and EKEO, concerns were raised on the junction performance for closing all 4 slip roads. The proposed scheme was further modified as below to retain a better performance level by minimizing the influence on vehicular traffic.



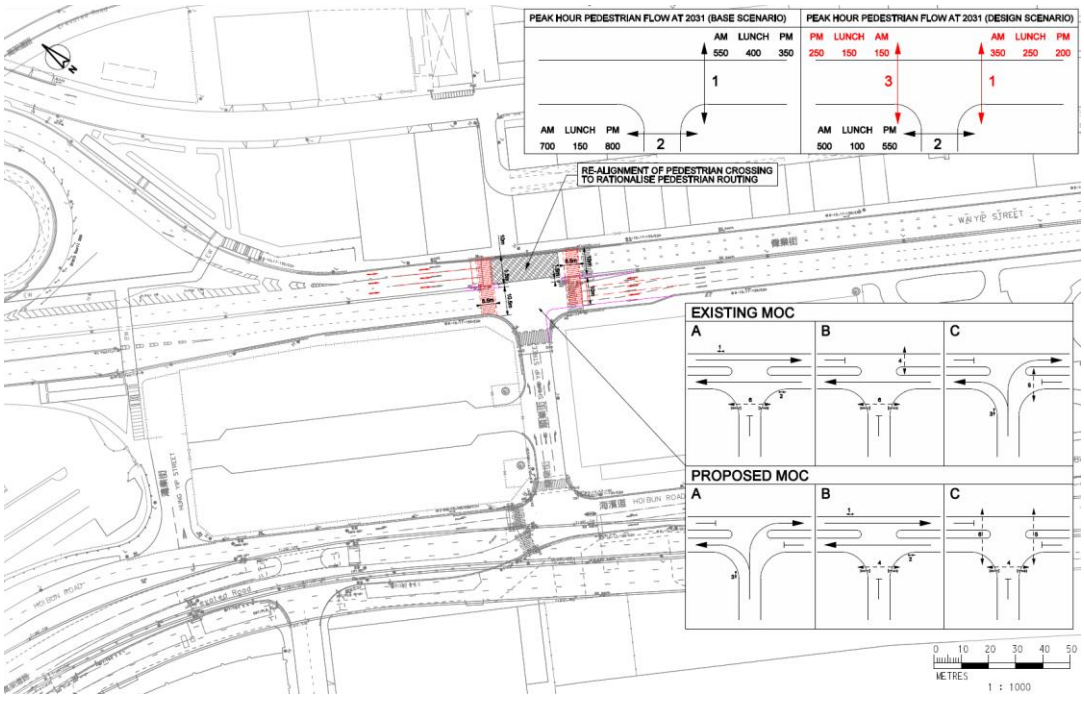
Improvement Works for Lai Yip Street / Hoi Bun Road (J2)

The proposed junction improvement works for J/O Lai Yip Street/Hoi Bun Road involve modification of lane markings to provide more vehicular queuing spaces. The scheme is completed recently.



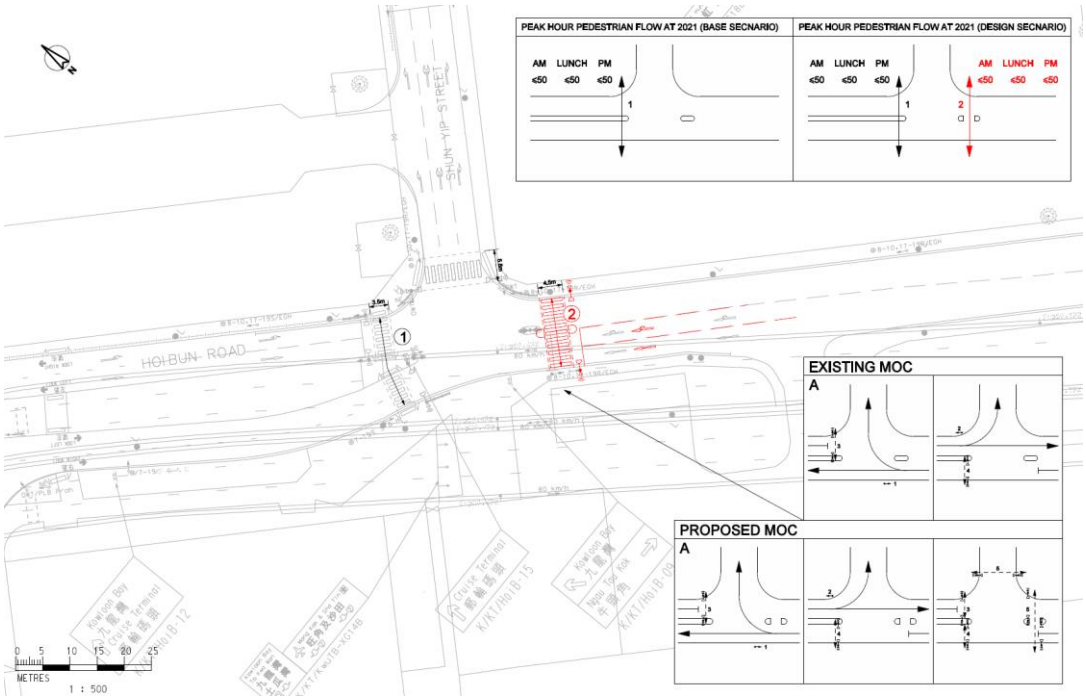
Improvement Works for Wai Yip Street/ Shun Yip Street (J3)

The proposed junction improvement works for J/O Wai Yip Street/Shun Yip Street involve changing the existing pedestrian crossing across Wai Yip Street into a straight-crossing, addition of another pedestrian crossing across Wai Yip Street, as well as kerb/traffic lane modification works.



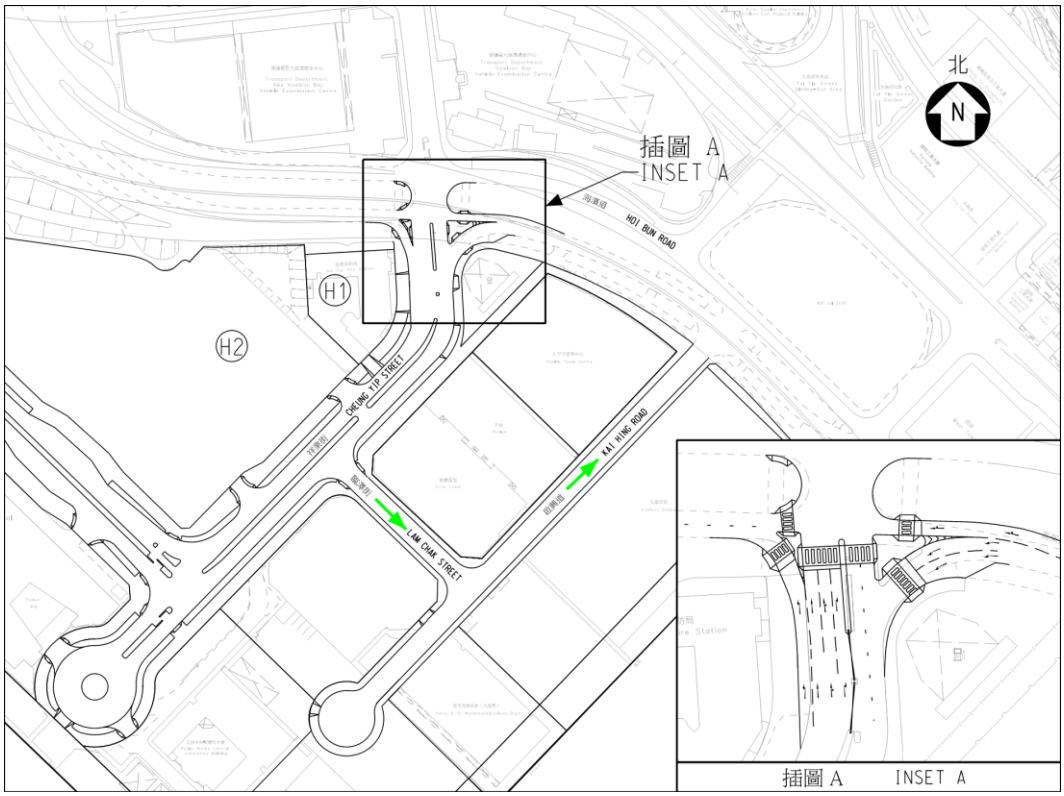
Improvement Works for Hoi Bun Road/ Shun Yip Street (J4)

The proposed junction improvement works for J/O Hoi Bun Road/ Shun Yip Street involve introduction of an additional pedestrian crossing across Hoi Bun Road.



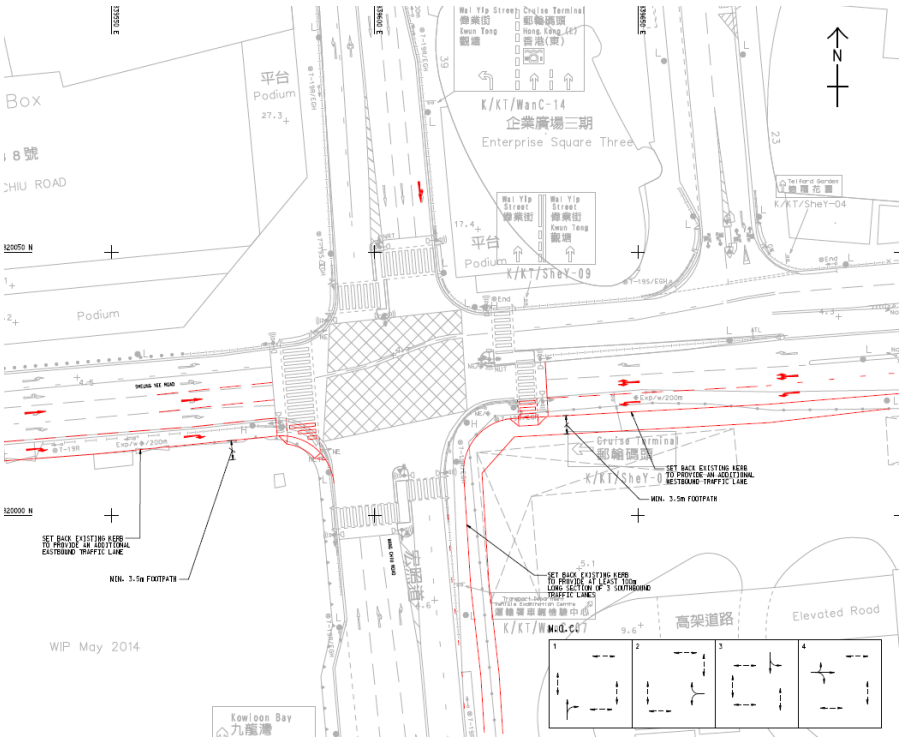
Improvement Works for Hoi Bun Road/ Cheung Yip Street (J5)

The proposed junction improvement works involve the addition of traffic lanes along both bounds of Cheung Yip Street and Hoi Bun Road. The road markings will also be re-arranged to suit the anticipated traffic flows. Following figure shows the latest scheme from CEDD.



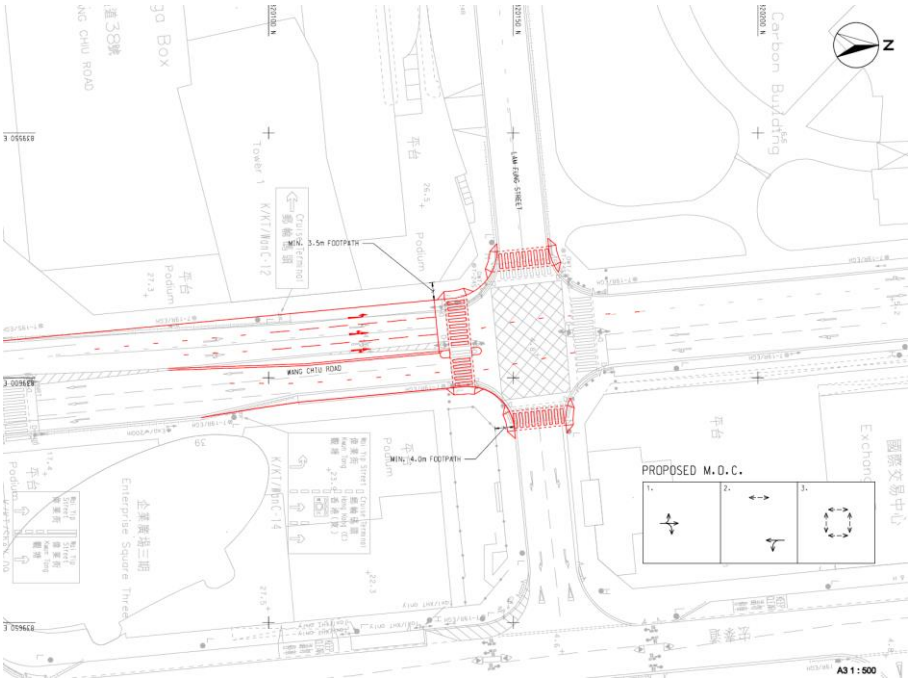
Improvement Works for Wang Chiu Road/ Sheung Yee Road (J6)

The proposed junction improvement works involve the addition of traffic lanes along both bounds Sheung Yee Road to facilitate the turning movements. The road markings will also be re-arranged to suit the anticipated traffic flows. The original Scheme recommended in earlier stage had been slightly modified to allow smoother manoeuvring at the receiving lanes of Wang Chiu Road (SB) considering its close proximity to a diverging road section.



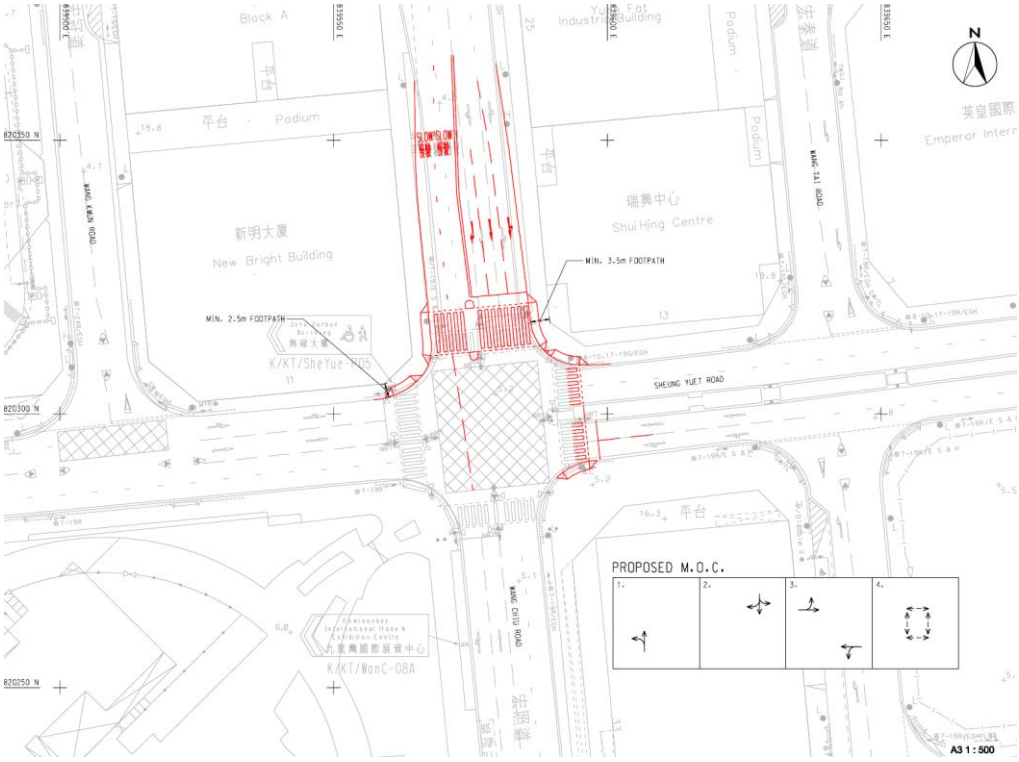
Improvement Works for Lam Fung Street/ Wang Chiu Road (J8)

The proposed junction improvement works for J/O Lam Fung Street/ Wang Chiu Road involve introduction of addition of a traffic lane at the northbound approach of Wang Chiu Road and road marking re-arrangement to optimize the junction performance.



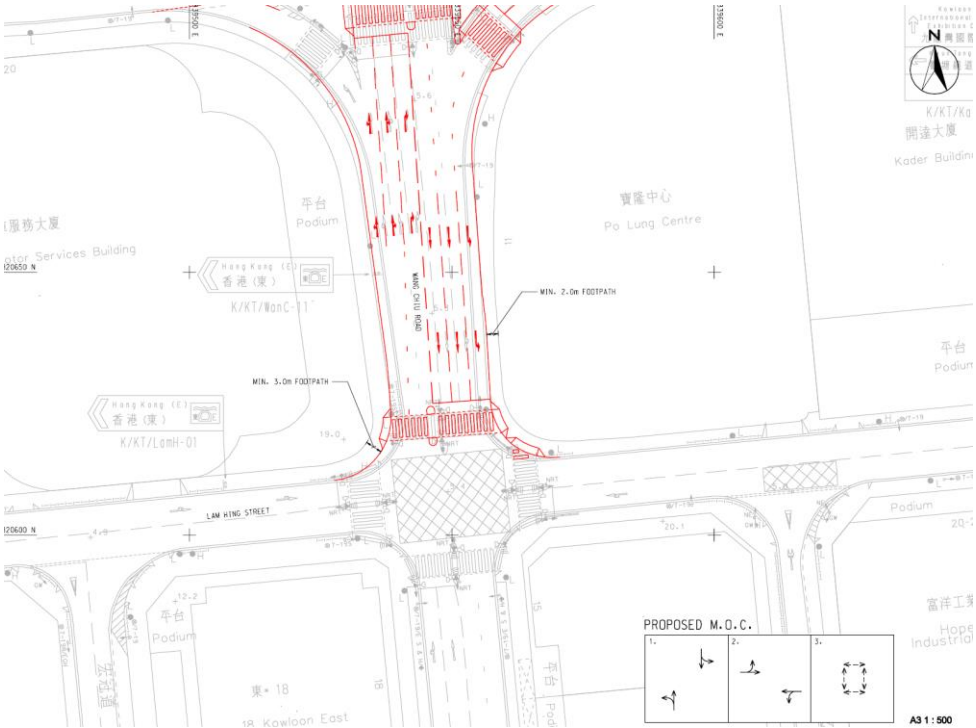
Improvement Works for Sheung Yuet Road/ Wang Chiu Road (J9)

The proposed junction improvement works for J/O Sheung Yuet Road/ Wang Chiu Road involve introduction of addition of a traffic lane at the southbound approach of Wang Chiu Road and road marking re-arrangement to optimize the junction performance.



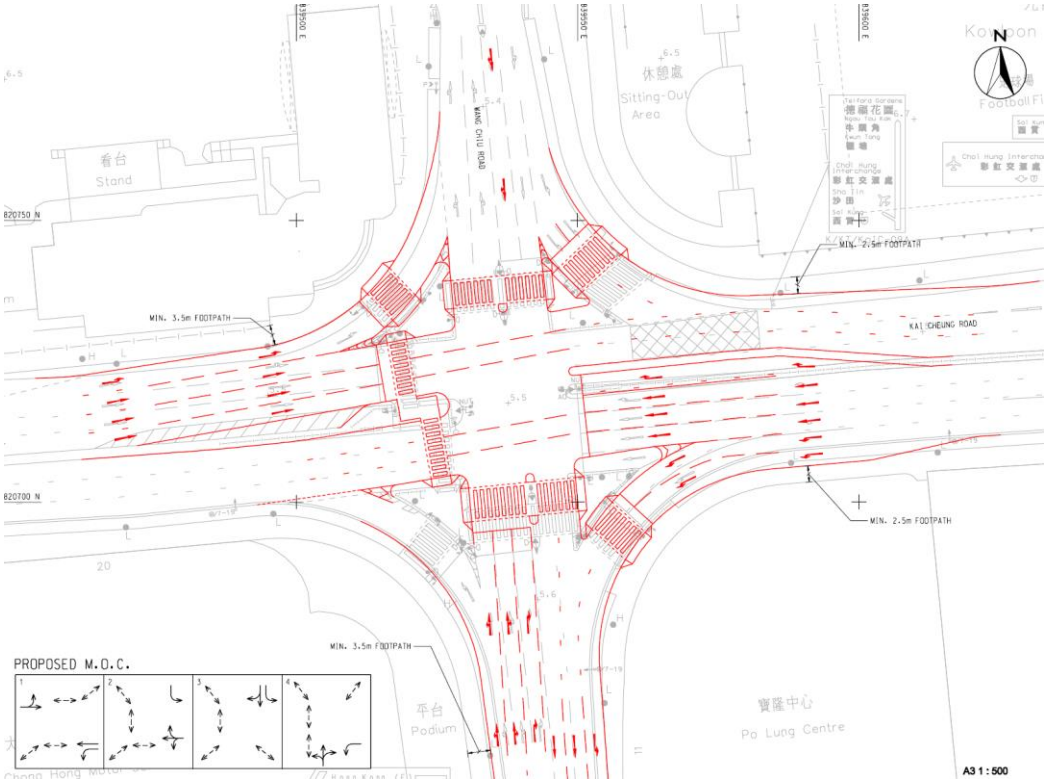
Improvement Works for Lam Hing Street/ Wang Chiu Road (J10)

The proposed junction improvement works for J/O Lam Hing Street/ Wang Chiu Road involve introduction of additional traffic lane at the southbound approach of Wang Chiu Road and road marking re-arrangement to optimize the junction performance.



Improvement Works for Kai Cheung Road/ Wang Chiu Road (J11)

The proposed junction improvement works for J/O Wang Chiu Road/ Kai Cheung Road involves additional left-turn lane and right-turn lane from Kai Cheung Road (westbound approach to junction), introduction of exclusive left-turn lane from Kai Cheung Road (eastbound approach to junction), as well as re-arrangement on road markings and pedestrian crossings.



Annex A

Traffic Review on PR 12 (without rail-based EFLS) Scenario

1 Introduction

1.1 Trip Generation of KBAA under PR12

1.1.1 Background

1.1.1.1 This annex serves to demonstrate a development with plot ratio (PR) 12 in KBAA is feasible from traffic viewpoint. The annex will present the GFA distribution, the trip generation, the future year traffic assessment, the parking provision and additional junction improvement works under the PR12 scenario.

1.1.2 Proposed Land Use Budget

1.1.2.1 The revised RODP under PR12 (without rail-based EFLS) scenario is in **Figure A** . With the total GFA (excluding Lot 1 for ORRC) of 533,580 sq.m. of the RODP, the proposed breakdown of GFA under the PR12 scenario is tabulated in **Table 1.1.1**.

Table 1.1.1 Proposed Breakdown of GFA under PR12 scenario

Land Use	GFA (sq.m)
Office	391,080
Retail/ F&B/ Entertainment	122,220
Hotel	14,880
Arts, Cultural & Creative Use	400
Transport Facilities	5,000
Total	533,580

1.1.3 Traffic Generation

1.1.3.1 Based on the proposed GFA breakdown in **Table 1.1.1**, the induced trip rate and the corresponding trips generated are tabulated in **Table 1.1.2 & 1.1.3**.

Table 1.1.2 Adopted Trip Rate for Proposed Land Use

Land Use	Unit	AM Peak Hour		PM Peak Hour	
		Generation	Attraction	Generation	Attraction
Office (1)	pcu/hr/100 sq.m GFA	0.1703	0.2452	0.1573	0.1175
Retail (1)	pcu/hr/100 sq.m GFA	0.2296	0.2434	0.3100	0.3563
Hotel Room (1)	pcu/hr/guest room	0.1329	0.1457	0.1290	0.1546

Notes:

1. Trip Rate source from TPDM Volume 1 Appendix, trip rate of Office, Retail / Shopping Complex (Office +Retail) and Hotel are adopted

Table 1.1.3 Trips Generated by Proposed Development

Land Use	GFA (sq.m) /Nos. of guest room	AM Peak Hour (pcu/hr)		PM Peak Hour (pcu/hr)	
		Generation	Attraction	Generation	Attraction
Office (1)	391,480 sq.m	667	960	616	460
Retail	122,220 sq.m	281	297	379	435
Hotel Room (2)	268 rooms	36	39	35	41
Total		**984**	**1,296**	**1,030**	**936**

Notes:

1. The office GFA refers to the summation of Office + Arts, Cultural& Creative.
2. It is assumed about 1,500 sq.m. will be used for conference and banquet facilities and the average size of hotel room is 50 sq.m..

2 Parking Provision in KBAA under PR12

2.1.1.1 It was agreed at the EKE Steering Committee meeting held on 14 March 2018 that higher end requirement would apply to the retail portion, while that for office would be maintained at lower end + 20%. In view of anticipated demand, it was also proposed to adopt mid-range provision for motor-cycles and higher end provision of carparking spaces and L/UL bays for hotel use. 75% of L/UL bays is proposed to be shared for public use except the bays for hotel use due to its operational reasons. The car park provision of Lot 2, 3, 4 and Lot 5 & 6 are summarized in **Table 2.1.1, 2.1.2, 2.1.3** and **2.1.4** respectively. It should be noted that there is no change in ingress/egress arrangements for the development sites under PR12 scenario.

Table 2.1.1 Proposed Ancillary Parking for Lot 2

Proposed Development	Facility	HKPSG Standards	Provision of Ancillary Parking#,@	Shared Ancillary Parking at Night Time
Office (144,470 sq.m.)	Car Parking	For the first 15,000 sq.m. GFA, 1 car space per 150-200 sq.m. GFA; Above 15,000 sq.m. GFA, 1 car space per 200-300 sq.m. GFA	507 -556 nos. ^ (lower end to lower end + 20% of HKPSG Standard)	Nil
	L/UL Bays *	1 loading/unloading bay for goods vehicles for every 2,000 to 3,000 sq.m. or part thereof, of gross floor area	32 nos. LGV 17 nos. HGV Total: 49 nos. (lower end of HKPSG Standard)	16 nos. LGV 9 nos. HGV Total: 25 nos.
	Taxi / PV Lay-by	For sites of at least 5,000 sq.m. net site area, 1 picking up/ setting down lay-by for taxis and private cars for every 20,000 sq.m., or part thereof, of gross floor area	8 nos. (HKPSG Standard)	Nil
	Motor-cycle	7.5% of total provision for private cars	42 nos.^ (mid-range of HKPSG Standard)	Nil
Retail (55,130 sq.m.)	Car Parking	1 car park space per 200-300 sq.m. GFA	276 nos. ^ (higher end of HKPSG Standard)	Nil
	L/UL Bays *	1 loading/unloading bay for good vehicles for every 800 to 1,200 sq.m. or part thereof, of gross floor area	30 nos. LGV 16 nos. HGV Total: 46 nos. (lower end of HKPSG Standard)	15 nos. LGV 8 nos. HGV Total: 23 nos.
	Motor-cycle	7.5% of total provision for private cars	21 nos. ^ (mid-range of HKPSG Standard)	Nil

Remarks:

The ratio of carparking provision was agreed with TD at the EKE steering committee meeting in March 2018

@ 75% of the L/UL bays is proposed to be shared for public use in the night-time to cater for the demand for night time parking except the bays for hotel use due to its operational reasons
* Split between LGV/HGV is 65%/35% based on the requirements under HKPSG
^ Ancillary carparking spaces could be available for public use

Table 2.1.2 Proposed Ancillary Parking for Lot 3

Proposed Development	Facility	HKPSG Standards	Provision of Ancillary Parking#,@	Shared Ancillary Parking at Night Time
Office[1] (400 sq.m.)	Car Parking	For the first 15,000 sq.m. GFA, 1 car space per 150-200 sq.m. GFA; Above 15,000 sq.m. GFA, 1 car space per 200-300 sq.m. GFA	2-3 nos. ^ (lower end + 20% of HKPSG Standard)	Nil
	L/UL Bays *	1 loading/unloading bay for goods vehicles for every 2,000 to 3,000 sq.m. or part thereof, of gross floor area	1 nos. HGV Total: 1 nos. (lower end of HKPSG Standard)	1 nos. HGV Total: 1 nos.
	Taxi / PV Lay-by	For sites of at least 5,000 sq.m. net site area, 1 picking up/ setting down lay-by for taxis and private cars for every 20,000 sq.m., or part thereof, of gross floor area	Nil	Nil
	Motor-cycle	7.5% of total provision for private cars	1 nos.^ (mid-range of HKPSG Standard)	Nil

Remarks:
The ratio of carparking provision was agreed with TD at the EKE steering committee meeting in March 2018
@ 75% of the L/UL bays is proposed to be shared for public use in the night-time to cater for the demand for night time parking except the bays for hotel use due to its operational reasons
* Split between LGV/HGV is 65%/35% based on the requirements under HKPSG
^ Ancillary carparking spaces could be available for public use

[1] The office GFA refers to the C&C uses of 400 sq.m.

Table 2.1.3 Proposed Ancillary Parking for Lot 4

Proposed Development	Facility	HKPSG Standards	Provision of Ancillary Parking#,@	Shared Ancillary Parking at Night Time
Office (130,510 sq.m.)	Car Parking	For the first 15,000 sq.m. GFA, 1 car space per 150-200 sq.m. GFA; Above 15,000 sq.m. GFA, 1 car space per 200-300 sq.m. GFA	461-505 nos. ^ (lower end to lower end + 20% of HKPSG Standard)	Nil
	L/UL Bays *	1 loading/unloading bay for goods vehicles for every 2,000 to 3,000 sq.m. or part thereof, of gross floor area	29 nos. LGV 15 nos. HGV Total: 44 nos. (lower end of HKPSG Standard)	15 nos. LGV 8 nos. HGV Total: 23 nos.
	Taxi / PV Lay-by	For sites of at least 5,000 sq.m. net site area, 1 picking up/ setting down lay-by for taxis and private cars for every 20,000 sq.m., or part thereof, of gross floor area	7 nos. (HKPSG Standard)	Nil
	Motor-cycle	7.5% of total provision for private cars	38 nos. ^ (mid-range of HKPSG Standard)	Nil
Retail (55,610 sq.m.)	Car Parking	1 car park space per 200-300 sq.m. GFA	279 nos. ^ (higher end of HKPSG Standard)	Nil
	L/UL Bays *	1 loading/unloading bay for good vehicles for every 800 to 1,200 sq.m. or part thereof, of gross floor area	31 nos. LGV 16 nos. HGV Total: 47 nos. (lower end of HKPSG Standard)	16 nos. LGV 8 nos. HGV Total: 24 nos.
	Motor-cycle	7.5% of total provision for private cars	21 nos. ^ (mid-range of HKPSG Standard)	Nil
Hotel[2] (14,880 sq.m.) cum 1,500 sq.m. conference and banquet facilities + 268 rooms	Car Parking	1 car parking space per 100 rooms 0.5-1 car space per 200 sq.m. GFA of conference and banquet facilities	11 nos. ^ (higher end of HKPSG Standard)	Nil
	L/UL Bays *	Loading/unloading bays for goods vehicles: 0.5-1 goods vehicle bay per 100 rooms.	1 nos. LGV 1 nos. HGV Total: 2 nos. (lower end of HKPSG Standard)	Nil
	Taxi / PV Lay-by	2 lay-bys for hotel with less than 300 rooms 3 lay-bys for hotel with more than 300 rooms and less than 600 rooms	2 nos. (HKPSG Standard)	Nil

[2] It is assumed about 1,500 sq.m. will be used for conference and banquet facilities and the average size of hotel room is 50 sq.m..

Proposed Development	Facility	HKPSG Standards	Provision of Ancillary Parking#,@	Shared Ancillary Parking at Night Time
		4 lay-bys for hotel with more than 600 rooms		
	Single Deck Tour Bus Lay-by	1 lay-by for hotel with less than 300 rooms 2-3 lay-bys for hotel with more than 300 rooms and less than 900 rooms 3 lay-bys for hotel with more than 900 rooms	1 nos. (HKPSG Standard)	Nil
	Motor-cycle	7.5% of total provision for private cars	1 nos. ^ (mid-range of HKPSG Standard)	Nil

Remarks:

The ratio of carparking provision was agreed with TD at the EKE steering committee meeting in March 2018

@ 75% of the L/UL bays is proposed to be shared for public use in the night-time to cater for the demand for night time parking except the bays for hotel use due to its operational reasons

* Split between LGV/HGV is 65%/35% based on the requirements under HKPSG

^ Ancillary carparking spaces could be available for public use

Table 2.1.4 Proposed Ancillary Parking for Lots 5 & 6

Development	Facility	Calculation as stipulated in the Approved GBP of NKIL 6313 and NKIL6512	Provision of Ancillary Parking as stipulated in the Approved GBP of NKIL 6313 and NKIL6512[+]
Office (116,100 sq.m.)	Car Parking	For the first 15,000 sq.m. GFA, 1 car space per 150 sq.m. GFA; Above 15,000 sq.m. GFA, 1 car space per 200 sq.m. GFA	602 nos. ^
	L/UL Bays	1 loading/unloading bay for goods vehicles for every 2,000 sq.m. or part thereof, of gross floor area	37 nos. LGV 20 nos. HGV Total: 57 nos.
	Motor-cycle	10% of total provision for private cars	61 nos. ^
Retail (11,480 sq.m.)	Car Parking	1 car park space per 200 sq.m. GFA	56 nos. ^
	L/UL Bays	1 loading/unloading bay for good vehicles for every 800 sq.m. or part thereof, of gross floor area	10 nos. LGV 5 nos. HGV Total: 15 nos.
	Motor-cycle	10% of total provision for private cars	6 nos. ^

Remarks:

^ Ancillary carparking spaces could be available for public use

[+] Provision of ancillary parking is made reference to the latest approved GBP of NKIL 6313 and NKIL6512

3 Traffic Impact Assessment under PR12

3.1 Future Year Traffic Assessment

3.1.1 Assessment of Road Links in Year 2031

3.1.1.1 In order to assess the impact of the development to the road network, the road link Volume to Capacity (V/C) Ratio shown in **Figure B** are assessed. The year 2031 peak hour link flow assessment is shown in **Table 3.1.1**. The junction calculation sheets are shown in **Attachment A.**

Table 3.1.1 Design Year 2031 Road Link Assessment

Road Links		Road Type	Capacity[1]	Direction	2031 Reference				2031 Design			
					Flow[3] (pcu/hr)		V/C Ratio[2]		Flow[3] (pcu/hr)		V/C Ratio[2]	
					AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
L1	Wai Yip Street	DD	4,175	SEB	1,900	1,600	0.46	0.38	2,000	1,700	0.48	0.41
				NWB	1,400	1,300	0.34	0.31	1,800	1,600	0.43	0.38
L2	Wang Chiu Road between Sheung Yee Road and Lam Fung Street	DD	2,500	SB	700	700	0.28	0.28	800	800	0.32	0.32
				NB	1,000	1,100	0.40	0.44	1,200	1,200	0.48	0.48
L3	Hoi Bun Road	LD	1,825	SEB	800	700	0.44	0.38	1,100	1,100	0.60	0.60
				NWB	800	700	0.44	0.38	900	800	0.49	0.44
L4	Kai Fuk Road	UT	6,000	EB	1,700	1,300	0.28	0.22	1,800	1,400	0.30	0.23
				WB	1,300	1,600	0.22	0.27	1,600	1,900	0.27	0.32
L5	Sheung Yee Road	DD	2,800	EB	1,600	1,400	0.57	0.50	1,600	1,500	0.57	0.54
				WB	500	600	0.18	0.21	700	900	0.25	0.32
L6	Shun Yip Street	LD	3,375	NEB	700	700	0.21	0.21	1,000	1,000	0.30	0.30
L7	Wang Chiu Road between Sheung Yee Road and Cheung Yip Street	DD	3,050	SEB	1,100	1,200	0.36	0.39	1,800	1,700	0.59	0.56
				NWB	1,500	1,300	0.49	0.43	1,500	1,400	0.49	0.46

Note:
1. Road capacity is defined in accordance to STM Model;
2. A v/c ratio is normally used to reflect traffic situation during peak hours. A v/c ratio below 1.0 is considered acceptable. A v/c ratio above 1.0 indicates the onset of mild congestion and a v/c ratio between 1.0 and 1.2 would indicate a manageable degree of congestion. A v/c ratio above 1.2 indicates the onset of more serious congestion. A v/c ratio greater than 1.00 is shaded;
3. The figures are rounded to nearest 100 pcu/hr.

3.1.1.2 The results indicate that all the assessed road links are currently operating at satisfactory level under design capacity. No improvement measures will be proposed at this stage.

3.1.2 Assessment of Road Junctions in Year 2031

3.1.2.1 In addition to link flow assessment, performance of junction shown in **Figure B** are undertaken to assess the traffic impact induced by the development. The assessment results of road junctions are shown in **Table 3.1.2**. The flow diagram of road junctions is shown in **Attachment B**.

Table 3.1.2 Road Junctions for Assessment

Junction		2031 Reference		2031 Design	
		RC / DFC[1, 2]		RC / DFC[1, 2]	
		AM Peak	PM Peak	AM Peak	PM Peak
J1	Wai Yip Street/ Lai Yip Street	16%	41%	11%	28%
J2	Hoi Bun Road/ Lai Yip Street	41%	39%	28%	32%
J3	Wai Yip Street/ Shun Yip Street	33%	48%	13%	23%
J4	Hoi Bun Road/ Shun Yip Street	24%	32%	-9%	-6%
J5[3]	Hoi Bun Road/ Cheung Yip Street	36%	57%	25%	43%
J6	Wang Chiu Road/ Sheung Yee Road	25%	22%	5%	8%
J7	Wang Tai Road/ Sheung Yee Road	0.54	0.47	0.56	0.48
J8	Lam Fung Street/ Wang Chiu Road	60%	50%	39%	41%
J9	Sheung Yuet Road/ Wang Chiu Road	-4%	2%	-10%	0%
J10	Lam Hing Street/ Wang Chiu Road	13%	6%	13%	6%
J11	Kai Cheung Road/ Wang Chiu Road	13%	9%	6%	6%

Note:
1. RC denotes Reserve Capacity in %, DFC denotes Design/Flow Capacity Ratio
2. For junction condition based on calculated RC/ DFC value,
   - RC>15% or DFC<0.85: fair to satisfactory physical junction condition and no persisting traffic congestion is expected;
   - RC=<15% or DFC=>0.85: unstable but acceptable traffic condition which traffic congestion may occur.
3. Cheung Yip Street pedestrianization has been considered in 2031 Design Case.

3.1.2.2 From the above summary of junction performance, it is identified that J4, J6, J9, J10 and J11 will operate close to or over their capacity. To improve the junction performance of these junctions, improvement schemes shown in **Figures C to G** have been proposed and the assessment results are shown in **Table 3.1.3**. The target completion year as well as implementation agents of the proposed improvement works remain the same as that stated in the main report (**Table 6.4.5** refers).

Table 3.1.3 Junction Performance after Implementation of Improvement Scheme

Junction		2031 Design		2031 Design (With Improvement)	
		RC / DFC[1, 2]		RC / DFC[1, 2]	
		AM Peak	PM Peak	AM Peak	PM Peak
J4	Hoi Bun Road/ Shun Yip Street	-9%	-6%	25%	24%
J6	Wang Chiu Road/ Sheung Yee Road	5%	8%	11%	13%
J9	Sheung Yuet Road/ Wang Chiu Road	-10%	0%	15%	16%
J10	Lam Hing Street/ Wang Chiu Road	13%	6%	25%	18%
J11	Kai Cheung Road/ Wang Chiu Road	6%	6%	8%	10%

3.1.2.3 Further to the proposed full traffic lane at Wang Chiu Road southbound approach under PR11 scenario, an additional short lane at Wang Chiu Road **N/B** is proposed as shown in **Figure E**. The road widening works will make use of the existing planters on both sides of southern arm of the junction. There is no reduction on the footpath width and hence no impact towards LOS at the concerned footpath section is anticipated. CEDD will be the works agent for the additional improvement work at this junction and the target completion date is no later than 2028 to be in place before completion of the commercial development in Lot 2.

3.1.2.4 Yet, the improvement scheme will reduce the holding area for the pedestrian crossing at southern arm of the junction. The assessment of the holding area is as follows.

3.1.2.5 Pedestrian flow data has been extracted from Agreement No. CE 49/2012(TT) – Kowloon Bay Business Area Pedestrian Environment Improvement – Feasibility Study (KBBA Study) that there is 1,300 ped/hr (2-way) on the western footpath of Wang Chiu Road southern arm and 1,200 ped/hr (2-way) on the southern footpath of Sheung Yuet Road western arm.

3.1.2.6 It is anticipated that there will be portion of flow overlapped between the pedestrian flows at these two footpath sections. Taking a conservative approach, it is assumed that the two pedestrian flows are independent of each other and all of the pedestrians will need to cross the road. An additional 20% buffer is introduced to the pedestrian flow to cater the peak flow as conservative approach. The sensitivity test is summarised in **Table 3.1.4** below.

Table 3.1.4 Junction Performance after Implementation of Improvement Scheme

Total Pedestrian Flow (ped/hr) (2-way)	No of cycle for J9 in 1 hour	No of Pedestrian Waiting for Crossing (with 20% additional buffer)	Holding Area Required (sq.m.)
2500	25	120	24

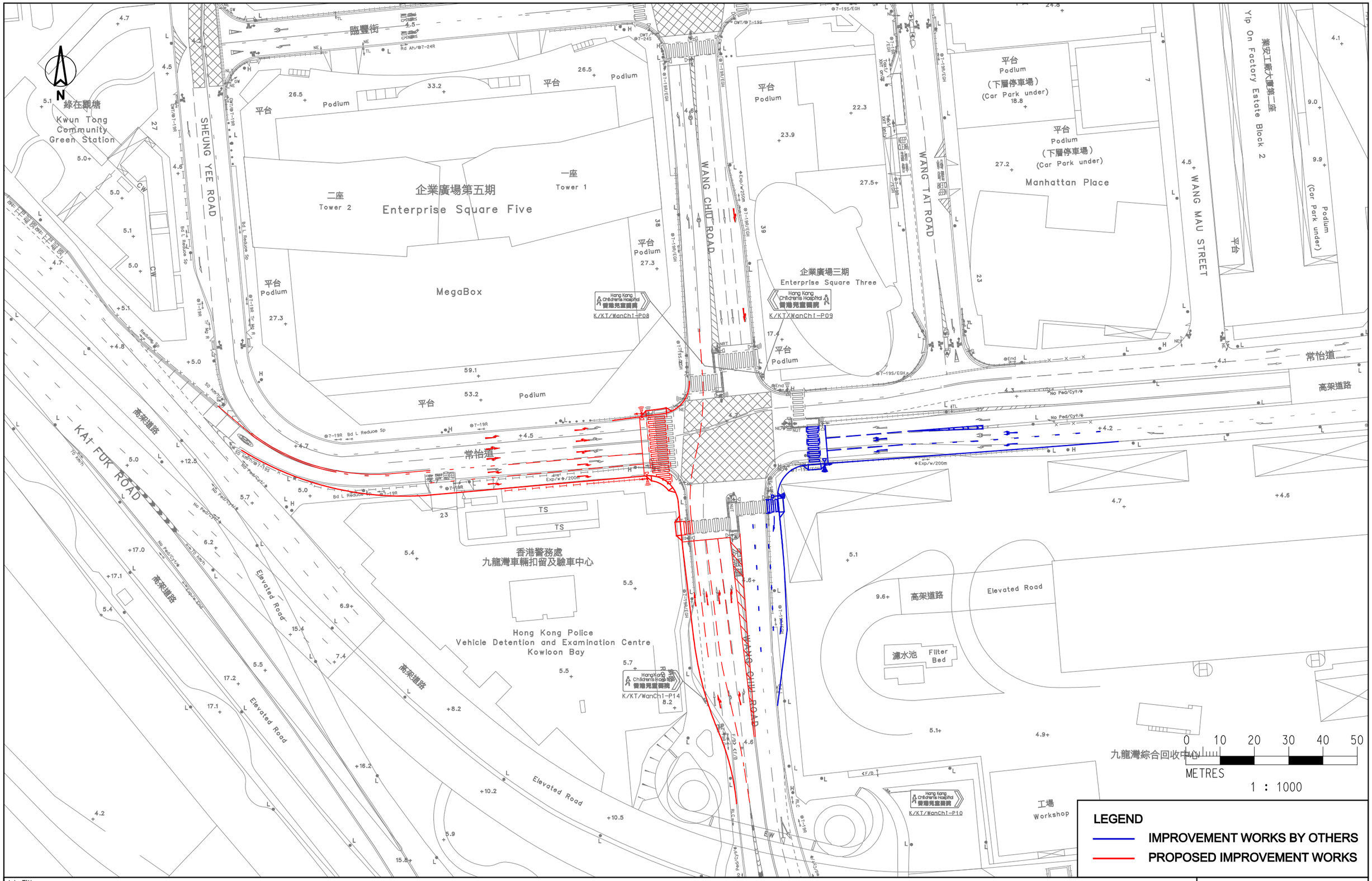
Note:
1. According to TPDM Volume 4 Clause 3.2.6.2, 0.2 sq.m./person should be provided for holding area.

3.1.2.7 As shown in **Figure H**, the holding area after proposed junction improvement is 30.4 sq.m., which is sufficient to cater the required 24 sq.m.. It is concluded that no adverse impact will be induced to the pedestrian environment under this junction improvement scheme.

3.1.2.8 While the above assessment has demonstrated that the reduced holding area will be sufficient for the pedestrian, another pedestrian flow survey and forecast will be carried out before the implementation of the proposed improvement works to ensure the forecast result under this Study remains valid[3].

[3] The proposed junction improvement works for J6 and J9 will be implemented by CEDD under 'Agreement No. 77/2020 (HY) – Enhancing Connectivity near MTR Kwun Tong Station and near Kowloon Bay Action Area – Investigation, Design and Construction'. CEDD will conduct traffic survey for these two junctions under the IDC Study.

Figures



LEGEND

- IMPROVEMENT WORKS BY OTHERS
- PROPOSED IMPROVEMENT WORKS

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE D

Date	Scale
26MAY20	1:1000@A3
Drawn	Job No.
KPHW	237938

Drawing Title

PROPOSED JUNCTION IMPROVEMENT AT J6 - WANG CHIU ROAD / SHEUNG YEE ROAD

ARUP

PRINTED BY: $USER$ $DATE$ $TIME$
FILENAME: $FILE$



Legend

- Study Area
- Other Specified Uses
- Commercial
- Open Space
- Amenity Area
- ew Elevated Walkway
- Pedestrianized Street
- NBA Non-Building Area
- 50 Maximum Building Height (In Meters Above Principal Datum)
- 5 Proposed Site Formation Level (in Metres above Principal Datum)
- Building Height Control Zone Boundary
- Setback Line

Scale and Orientation

N 0 20 40 60 80 100m

Drawn	Date
Checked	Approved

Figure No.: FIGURE A

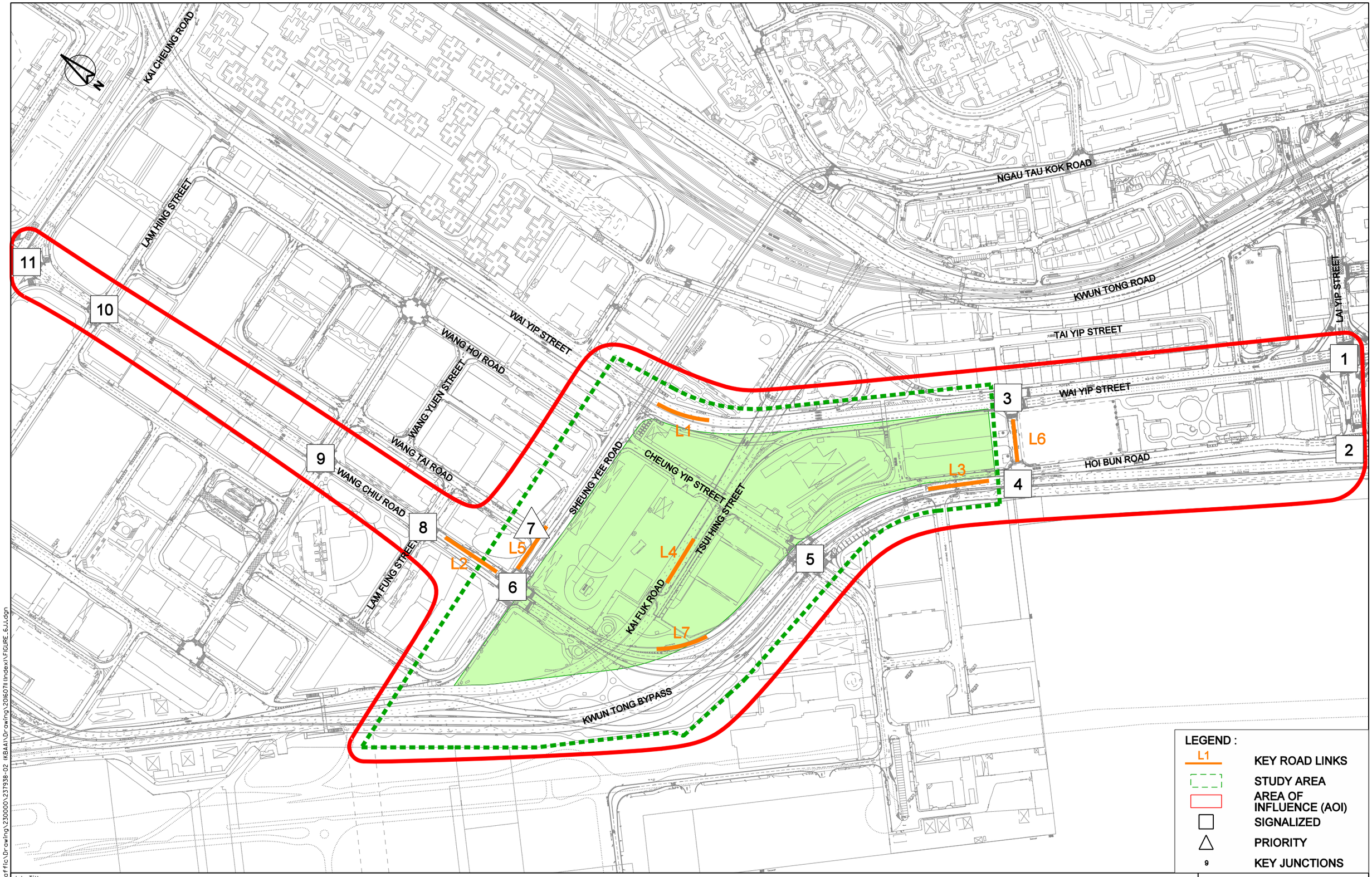
Drawing Title: Recommended Outline Development Plan (RODP)

Job Title

Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study

ARUP



PRINTED BY: wing-tung.dai 3/2016 4:3:57 PM
FILENAME: \\hkgnts69\Traffic\Drawing\230000\237938-02 (KBAA)\Drawing\20160711index\FIGURE_6.1.dgn

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE B

Date	Scale	Drawing Title
JUL 16	1:4000@A3	LOCATIONS OF MAJOR ROAD LINKS AND CRTICIAL JUNCTION IN THE VINCINITY OF THE STUDY AREA
Drawn: WTL	Job No.: 237938	

ARUP

N

順業街

SHUN YIP STREET

西座
West Tower

平台
Podium

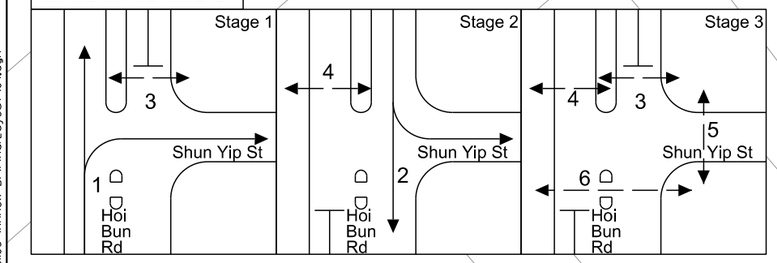
東座
East Tower

One Bay East

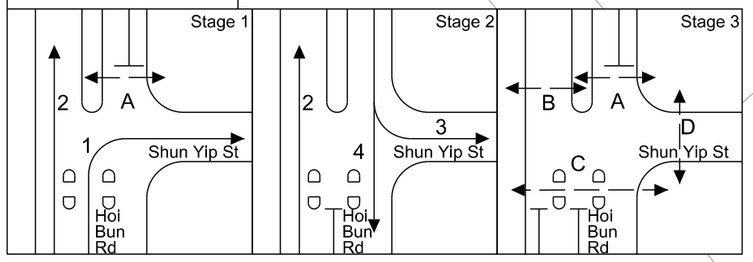
永英工業大廈
Wing Ying Industrial Building

榮記工業大廈
Chilcott Industrial Building

EXISTING MOC



PROPOSED MOC



METRES 0 5 10 15 20 25

1 : 500

LEGEND

PROPOSED IMPROVEMENT WORKS

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE C

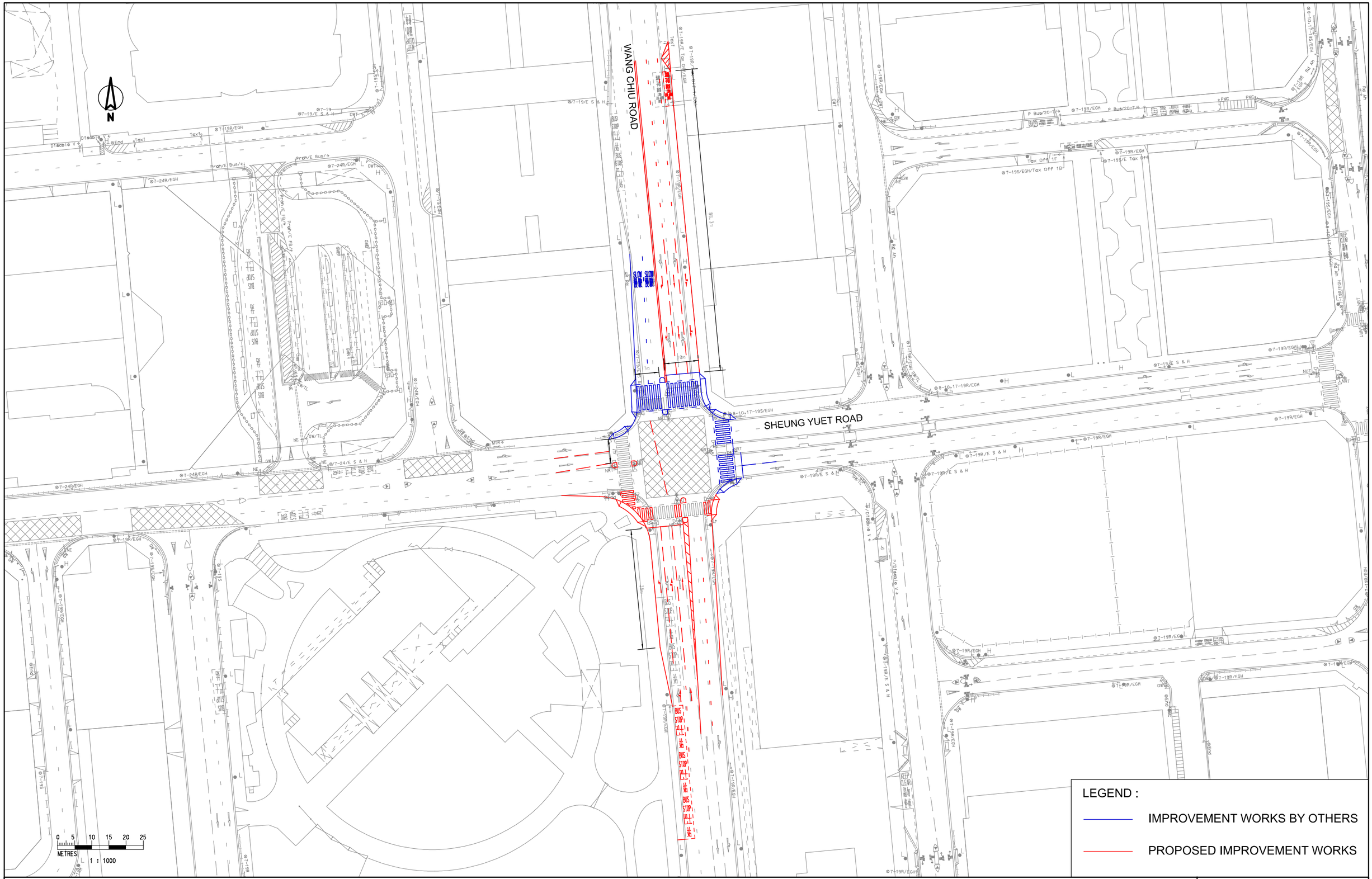
Date 20MAR20 | Scale 1:500 @ A3 | Drawn WSTW | Job No. 237938

Drawing Title

PROPOSED JUNCTION IMPROVEMENT AT J4 - HOI BUN ROAD / SHUN YIP STREET

ARUP

PRINTED BY: KH Cheuk 13/11/2020 15:42:40
FILENAME: \\hkgnts69\Traffic\Drawing\237000\237938-02 (KBAA1\Drawing\20201106 (Annex B\FinalLayout\J4.dgn



Job Title

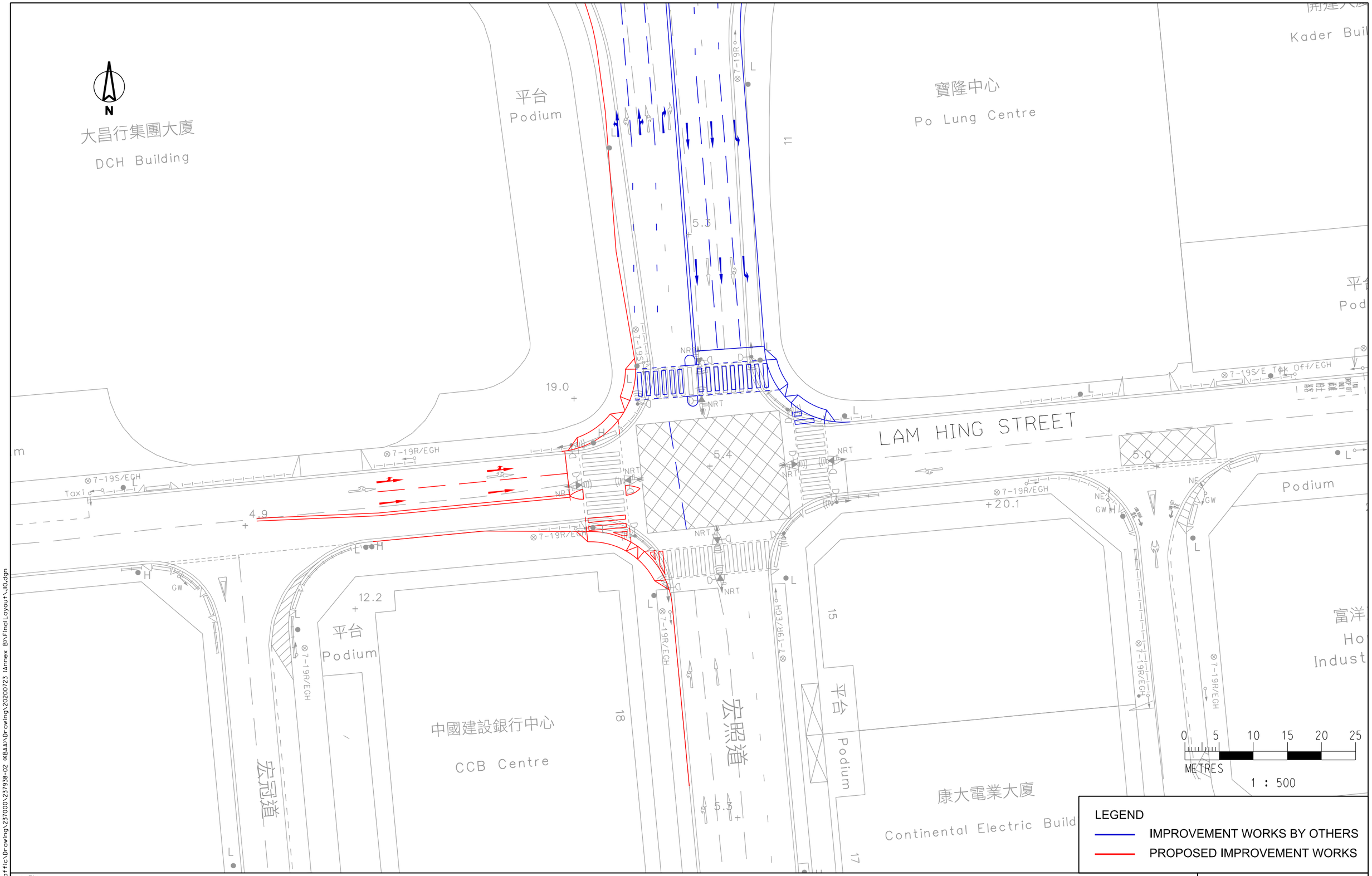
AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE E

Date	Scale	Drawing Title
22FEB21	1:1000	PROPOSED IMPROVEMENT SCHEME TO J9 - WANG CHIU ROAD / SHEUNG YUET ROAD
Drawn: WSTW	Job No.: 237938	

ARUP

PRINTED BY: $USER$ $DATE$ $TIME$
FILENAME: $FILE$



LEGEND

IMPROVEMENT WORKS BY OTHERS

PROPOSED IMPROVEMENT WORKS

Job Title

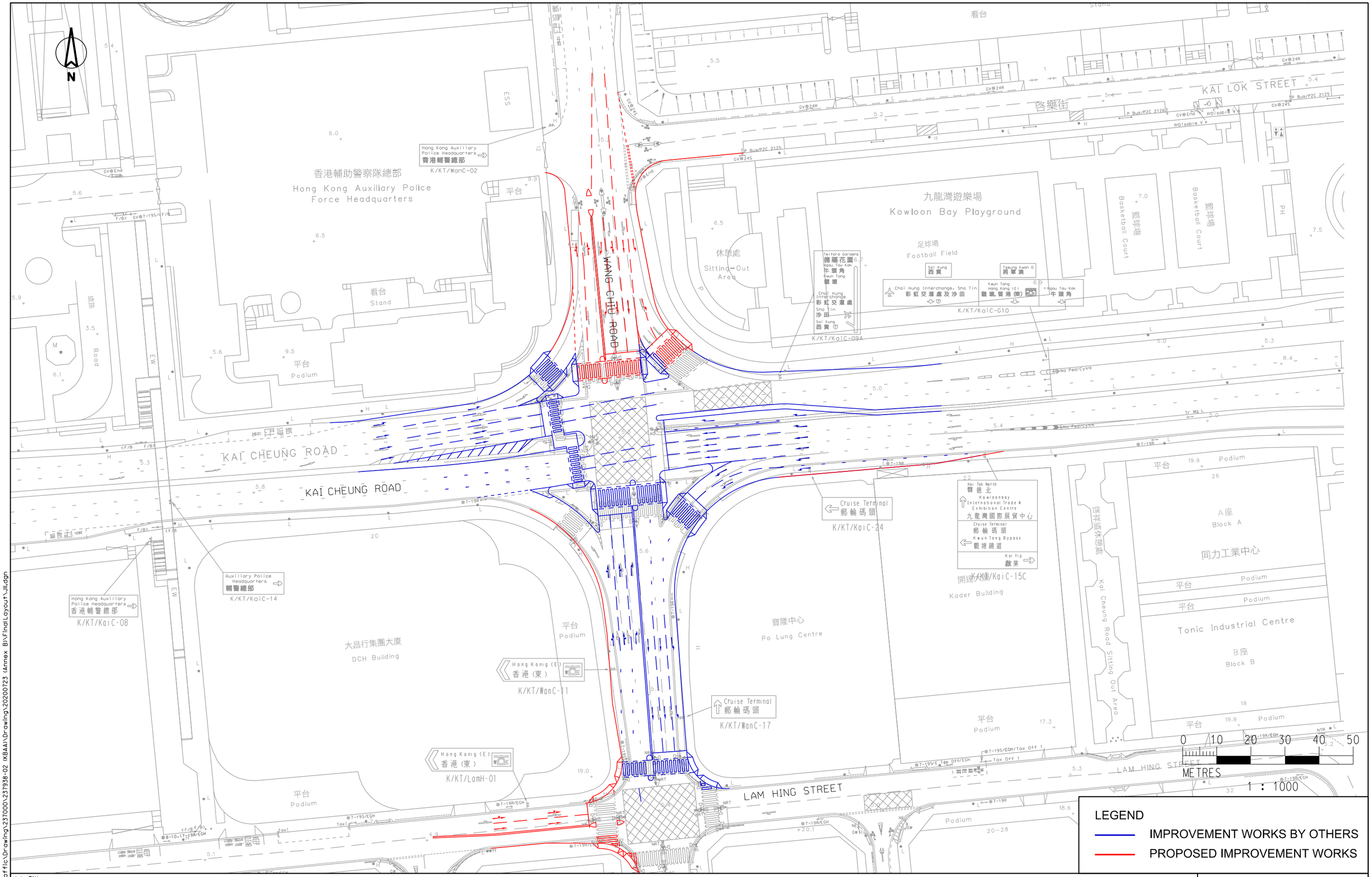
AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE F

Date	Scale	Drawing Title
13FEB20	1:500@A3	PROPOSED JUNCTION IMPROVEMENT AT J10 - LAM HING STREET / WANG CHIU ROAD
Drawn	Job No.	
WSTW	237938	

ARUP

PRINTED By: KH Cheuk 29/9/2020 17:9:07
FILENAME: \\hkgnts69\Traffic\Drawing\237000\237938-02 (KBAA)\Drawing\20200723 (Annex B)\FinalLayout\J10.dgn



Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE G

Date	Scale
06NOV19	1:1000@A3
Drawn	Job No.
WSTW	237938

Drawing Title

PROPOSED JUNCTION IMPROVEMENT AT J10 - LAM HING STREET / WANG CHIU ROAD AND J11 - KAI CHEUNG ROAD / WANG CHIU ROAD

ARUP

PRINTED BY: KH CheuK 29/9/2020 17:54:12
FILENAME: \\hkgnts69\Traffic\Drawing\237000\237938-02 (KBAAI\Drawing\20200723 (Annex B\FinalLayout\JLL.dgn

WANG CHIU ROAD

SHEUNG YUET ROAD

30.4 sq.m

N

0 5 10 15 20 25
METRES
1 : 1000

LEGEND :

IMPROVEMENT WORKS BY OTHERS

PROPOSED IMPROVEMENT WORKS

Job Title

AGREEMENT NO. CE 4/2014 (TP) PLANNING AND ENGINEERING STUDY FOR THE DEVELOPMENT AT KOWLOON BAY ACTION AREA OF KOWLOON EAST - FEASIBILITY STUDY

FIGURE H

Date	Scale	Drawing Title
22FEB21	1:1000	PROPOSED IMPROVEMENT SCHEME TO J9 - WANG CHIU ROAD / SHEUNG YUET ROAD
Drawn: WSTW	Job No.: 237938	

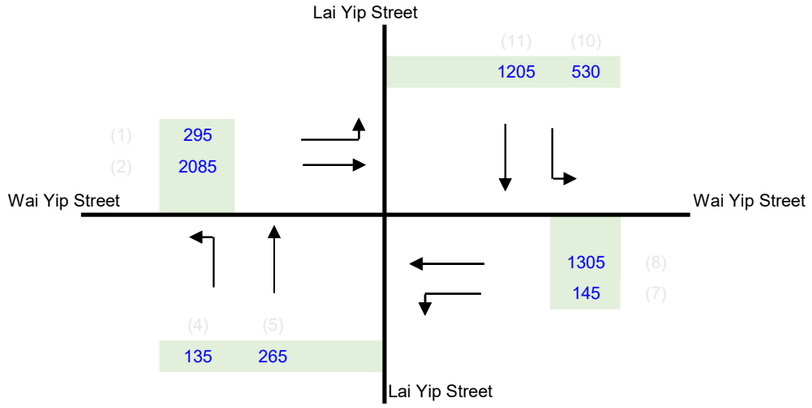
ARUP

PRINTED BY: $USER$ $DATE$ $TIME$
FILENAME: $FILE$

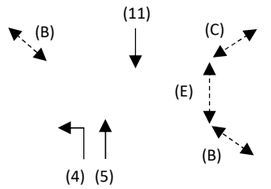
Attachment A

Junction Calculation Sheets

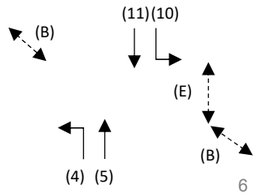
ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO:	
Wai Yip Street / Lai Yip Street	2031	DATE :	FILENAME :



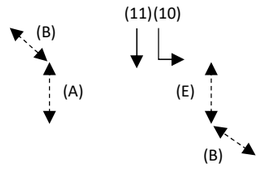
No. of stages per cycle	N =	4	
No. of stage using for calculation	N =	2	
Cycle time	C =	118	sec
Sum(y)	Y =	0.676	
Loss time	L =	20	sec
Total Flow	=	5965	pcu
Co = (1.5*L+5)/(1-Y)	=	107.9	sec
Cm = L/(1-Y)	=	61.6	sec
Yult	=	0.750	
R.C.ult = (Yult-Y)/Y*100%	=	11.0	%
Cp = 0.9*L/(0.9-Y)	=	80.2	sec
Ymax = 1-L/C	=	0.831	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	10.6	% (Optimized)



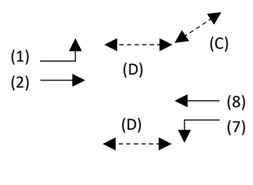
STAGE 1 INT=



STAGE 2 INT=



STAGE 3 INT= 13



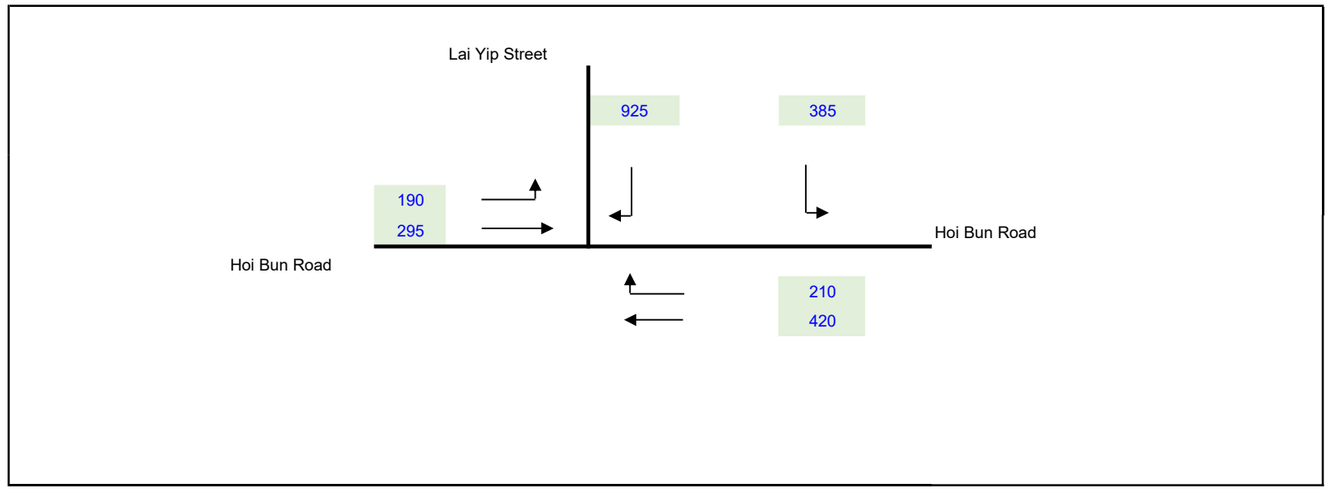
STAGE 4 INT= 9

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	14	12	6	10	12	6	10	OK
B	5	5	3	5	46	3	5	OK
C	6	5	1	5	87	1	5	OK
D	13	11	5	10	49	5	10	OK
E	12	10	6	9	39	6	9	OK

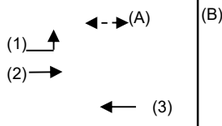
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				20				
4,5	1,2	3.50	III	1	15		N	1965	135	51		186	0.73	1832			1832	0.102			15	20	0.614	31
5	1,2	3.50	III	1				2105		214		214	0.00	2105			2105	0.102			15	20	0.614	35
10	2,3	3.50	IV	1	20		N	1965	530			530	1.00	1828		190	2018	0.263		6	38	38	0.813	71
11	1,2,3	3.50	V	2				4210		1205		1205	0.00	4210			4210	0.286	0.286	13	42	42	0.813	77
1,2	4	3.50	I	1	20		N	1965	295	446		741	0.40	1908			1908	0.388	0.389		56	56	0.811	76
2	4	3.50	I	2				4210		1639		1639	0.00	4210			4210	0.389			56	56	0.813	84
7,8	4	3.50	II	1	20		N	1965	145	309		454	0.32	1919			1919	0.237			34	56	0.494	47
8	4	3.50	II	2				4210		996		996	0.00	4210			4210	0.237			34	56	0.494	51

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

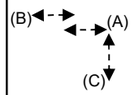
ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Lai Yip Street / Hoi Bun Road		DATE : 29-Apr-21	FILENAME :



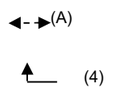
No. of stages per cycle		N =	5
No. of stage using for calculation		N =	3
Cycle time		C =	118 sec
Sum(y)		Y =	0.484
Loss time		L =	37 sec
Total Flow		=	2425 pcu
Co	= (1.5*L+5)/(1-Y)	=	117.2 sec
Cm	= L/(1-Y)	=	71.6 sec
Yult		=	0.623
R.C.ult	= (Yult-Y)/Y*100%	=	28.7 %
Cp	= 0.9*L/(0.9-Y)	=	80.0 sec
Ymax	= 1-L/C	=	0.686
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	27.8 % (Optimized)



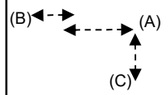
STAGE 1	INT= 8



STAGE 2	INT= 0



STAGE 3	INT= 5



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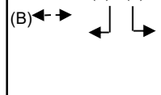
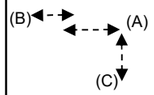
STAGE 4	INT=



STAGE 5	INT= 7



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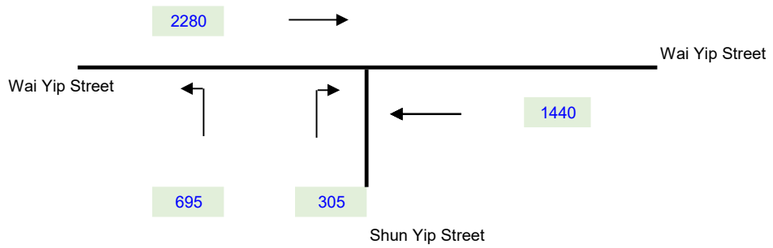
STAGE 6	INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	10	5	3	8	9	3	8	OK
B	5	5	10	5	5	10	5	OK
C	7	6	4	5	11	4	5	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				17				
1	1	3.50	I	1	15		N	1965	190			190	1.00	1786			1786	0.106			18	23	0.535	30
2	1	3.50	I	1				2105		295		295	0.00	2105			2105	0.140	0.140		23	23	0.704	52
3	1,3	3.50	II, III	1			N	1965		420		420	0.00	1965			1965	0.214			36	43	0.581	52
4	3	3.50	III	1	20			2105			210	210	1.00	1958			1958	0.107	0.107		18	18	0.704	41
5	5	3.50	IV	2	20			4210			925	925	1.00	3916			3916	0.236	0.236		40	40	0.704	60
6	5	3.50	IV	1	15		N	1965	385			385	1.00	1786			1786	0.216			36	40	0.643	50
																	Stage 2 Pedestrian Loss Time			20	(Demand Dependent. Assumed always Called.)			
																	Stage 4 Pedestrian Loss Time				(Demand Dependent. Assumed always Skipped.)			
																	Stage 6 Pedestrian Loss Time				(Demand Dependent. Assumed always Skipped.)			

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

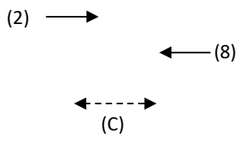
ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Wai Yip Street / Shun Yip Street		DATE : 29-Apr-21	FILENAME :



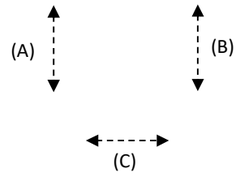
No. of stages per cycle		N =	3	
No. of stage using for calculation		N =	2	
Cycle time		C =	108	sec
Sum(y)		Y =	0.553	
Loss time		L =	33	sec
Total Flow		=	4720	pcu
Co	= (1.5*L+5)/(1-Y)	=	121.9	sec
Cm	= L/(1-Y)	=	73.8	sec
Yult		=	0.653	
R.C.ult	= (Yult-Y)/Y*100%	=	18.0	%
Cp	= 0.9*L/(0.9-Y)	=	85.6	sec
Ymax	= 1-L/C	=	0.694	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	13.1	% (Optimized)



STAGE 1	INT= 6



STAGE 2	INT= 9



STAGE 3	INT=

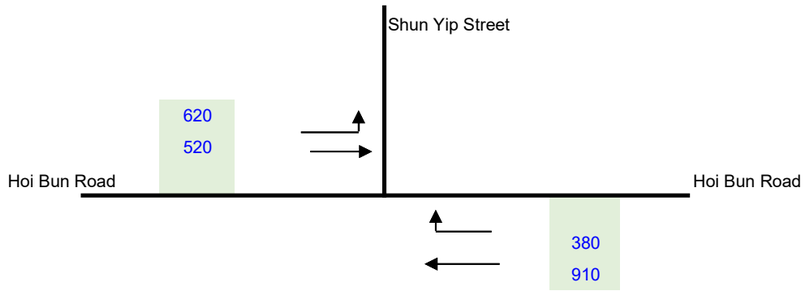
STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	2	9	64	2	9	OK
B	12	10	2	8	10	2	8	OK
C	10	5	2	8	10	2	8	OK

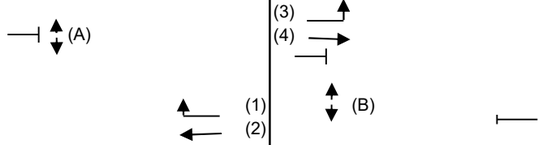
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				13				
2	2	3.50	I	3			N	6175		2280		2280	0.00	6175			6175	0.369	0.369		50	50	0.796	73
8	2	3.50	II	3			N	6175		1440		1440	0.00	6175			6175	0.233			32	50	0.503	46
4	1	3.50	III	1	15		N	1965	328			328	1.00	1786			1786	0.184	0.184		25	25	0.796	51
4,6	1	3.50	III	1	30			2105	367		0	367	1.00	2005			2005	0.183			25	25	0.794	57
6	1	3.50	III	1	30		N	1965			305	305	1.00	1871			1871	0.163			22	25	0.707	48
																	Stage 3 Pedestrian Loss Time			20				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Shun Yip Street / Hoi Bun Road		DATE : 29-Apr-21	FILENAME :

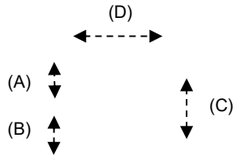


No. of stages per cycle		N =	2
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.669
Loss time		L =	39 sec
Total Flow		=	2430 pcu
Co	= (1.5*L+5)/(1-Y)	=	192.0 sec
Cm	= L/(1-Y)	=	117.9 sec
Yult		=	0.608
R.C.ult	= (Yult-Y)/Y*100%	=	-9.2 %
Cp	= 0.9*L/(0.9-Y)	=	152.1 sec
Ymax	= 1-L/C	=	0.675
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	-9.2 % (Optimized)



STAGE 1	INT= 10

STAGE 2	INT= 6



STAGE 3 (ped)	INT= 2

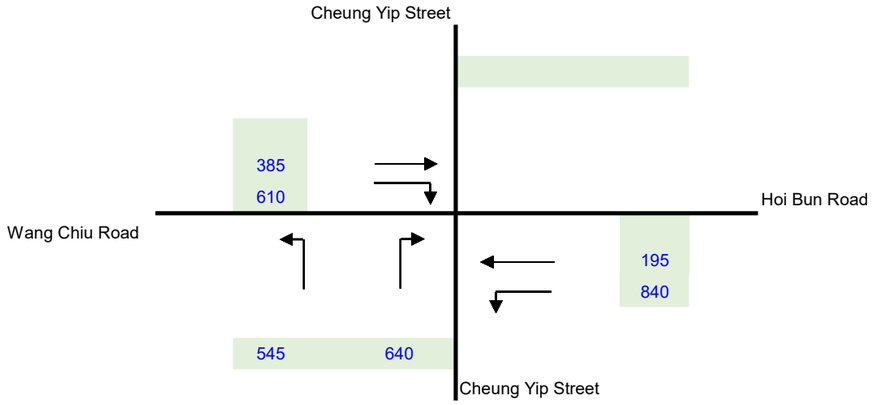
STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	0	6	63	0	6	OK
B	7	5	3	6	63	3	6	OK
C	7	6	3	5	15	3	5	OK
D	10	6	5	12	6	5	12	OK

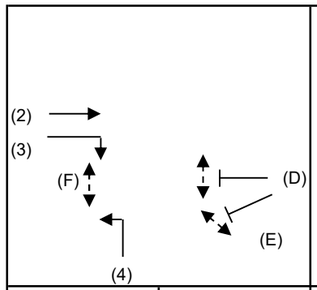
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
1,2	1	3.50	I	1	30			2105		277	380	657	0.58	2046			2046	0.321	0.322		39	39	0.988	301
2	1	3.50	I	1			N	1965		633		633	0.00	1965			1965	0.322			39	39	0.991	390
3	2	3.50	II	1	15		N	1965	620			620	1.00	1786			1786	0.347	0.347		42	42	0.991	384
3,4	2	3.50	II	1	20			2105		520		520	0.00	2105			2105	0.247			30	42	0.706	68
																		Pedestrian Stage 3		23				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

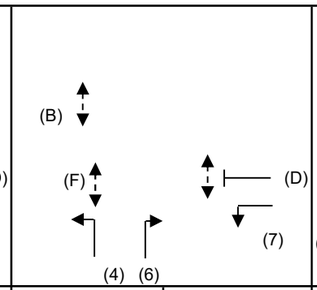
ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Cheung Yip Street / Hoi Bun Road		DATE : 29-Apr-21	FILENAME :



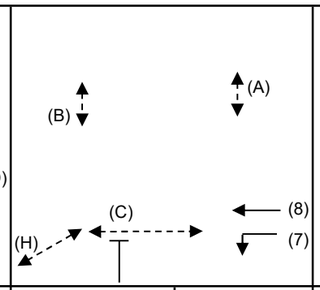
No. of stages per cycle		N =	3	
No. of stage using for calculation		N =	2	
Cycle time		C =	108	sec
Sum(y)		Y =	0.655	
Loss time		L =	10	sec
Total Flow		=	3215	pcu
Co	= (1.5*L+5)/(1-Y)	=	57.9	sec
Cm	= L/(1-Y)	=	28.9	sec
Yult		=	0.825	
R.C.ult	= (Yult-Y)/Y*100%	=	26.0	%
Cp	= 0.9*L/(0.9-Y)	=	36.7	sec
Ymax	= 1-L/C	=	0.907	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	24.8	% (Optimized)



STAGE 1 INT= 6



STAGE 2 INT=



STAGE 3 INT= 6

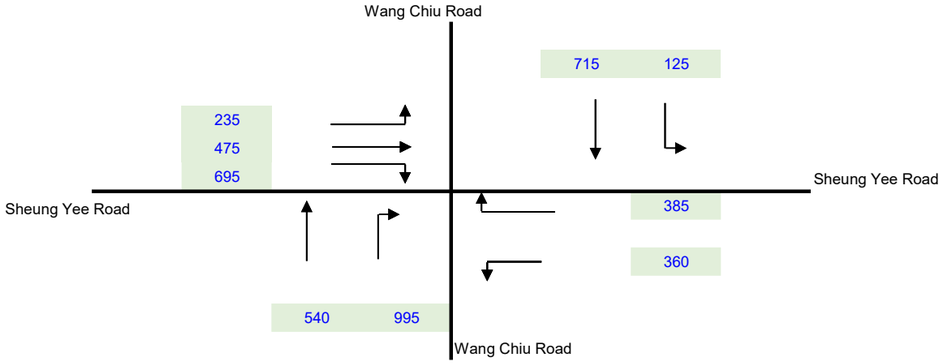
STAGE 4 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	6	6	7	6	6	OK
B	11	5	2	9	54	2	9	OK
C	11	10	0	8	11	0	8	OK
D	5	5	1	5	83	1	5	OK
E	7	5	1	6	36	1	6	OK
F	5	5	4	5	80	4	5	OK
H	5	5	1	5	13	1	5	OK

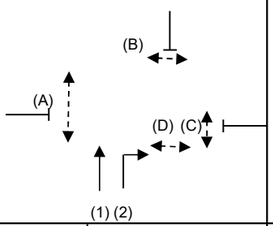
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				10				
2,3	1	3.50	I	1	35		N	1965		385	105	490	0.21	1947			1947	0.252	0.252		38	38	0.721	63
3	1	3.50	I	1	30			2105			505	505	1.00	2005			2005	0.252			38	38	0.721	65
4	1,2	3.50	II	1	15		N	1965	545			545	1.00	1786			1786	0.305			46	84	0.392	22
6	2	3.50	II	2	30			4210			640	640	1.00	4010			4010	0.160			24	41	0.416	36
7	2,3	3.50	III	1	15		N	1965	840			840	1.00	1786		300	2086	0.403	0.403		60	60	0.721	67
8	3	3.50	III	1	30			2105		195		195	0.00	2105			2105	0.093			14	14	0.721	37

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

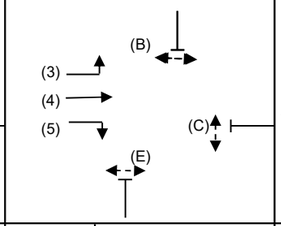
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Wang Chiu Road / Sheung Yee Road		DATE : 29-Apr-21	FILENAME:



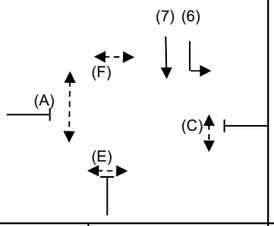
No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	120 sec
Sum(y)		Y =	0.672
Loss time		L =	26 sec
Total Flow		=	4525 pcu
Co	= (1.5*L+5)/(1-Y)	=	134.3 sec
Cm	= L/(1-Y)	=	79.4 sec
Yult		=	1.005
R.C.ult	= (Yult-Y)/Y*100%	=	49.4 %
Cp	= 0.9*L/(0.9-Y)	=	102.8 sec
Ymax	= 1-L/C	=	0.783
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	4.8 %



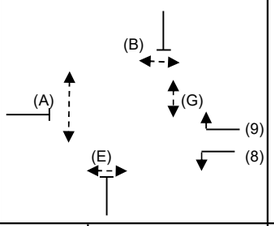
Stage 1	Int = 5



Stage 2	Int = 8



Stage 3	Int = 8



Stage 4	Int = 9

Stage 5	Int = 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	16	7	2	13	78	2	13	OK
B	10	5	2	8	84	2	8	OK
C	10	5	2	8	84	2	8	OK
D	10	5	8	8	24	8	8	OK
E	10	5	3	8	69	3	8	OK
F	7	5	6	6	14	6	6	OK
G	7	5	6	6	14	6	6	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				26				
1	1	3.50	I	1			N	1965		501		501	0.00	1965			1965	0.255	0.258		36	36	0.849	82
1,2	1	3.50	I	1	35			2105		39	483	522	0.93	2025			2025	0.258			36	36	0.858	85
2	1	3.50	I	1	30			2105			512	512	1.00	2005			2005	0.255			36	36	0.850	84
3	2	3.50	II	1	15		N	1965	235			235	1.00	1786			1786	0.132	0.146		18	20	0.776	45
3,4	2	3.50	II	1	18			2105	0	306		306	0.00	2105			2105	0.145			20	20	0.858	63
4,5	2	3.50	II	1	35			2105		169	131	300	0.44	2066			2066	0.145			20	20	0.857	62
5	2	3.50	II	2	30		N	4070			564	564	1.00	3876			3876	0.146			20	20	0.858	53
6,7	3	3.50	III	1	15		N	1965	125	134		259	0.48	1875			1875	0.138	0.138		19	19	0.858	55
7	3	3.50	III	2				4210		581		581	0.00	4210			4210	0.138			19	19	0.857	55
8	4	3.50	IV	1	15		N	1965	234			234	1.00	1786			1786	0.131	0.131		18	18	0.858	52
8,9	4	3.50	III	1	15			2105	126		124	250	1.00	1914			1914	0.131			18	18	0.858	54
9	4	3.50	IV	1	30			2105			261	261	1.00	2005			2005	0.130			18	18	0.853	56

OVE ARUP & PARTNERS

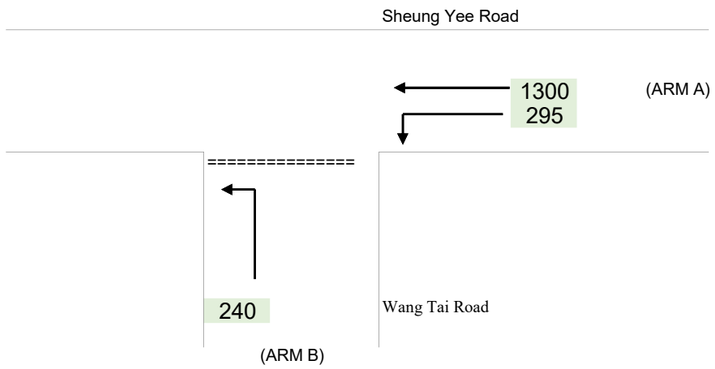
PRIORITY JUNCTION CALCULATION

Project No. : 237938

Wang Tak Road / Sheung Yee Road

DATE : 29-Apr-21

FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.90	(metres)
W cr	=	0	(metres)
q a-b	=	295	(pcu/hr)
q a-c	=	1300	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	6.20	(metres)
Vl b-a	=	45	(metres)
Vr b-a	=	45	(metres)
Vr b-c	=	50	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	240	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.574
E	=	1.162
F	=	0.586
Y	=	0.727

THE CAPACITY OF MOVEMENT :

Q b-a	=	145
Q b-c	=	430
Q c-b	=	189
Q b-ac	=	430

TOTAL FLOW = 1835 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

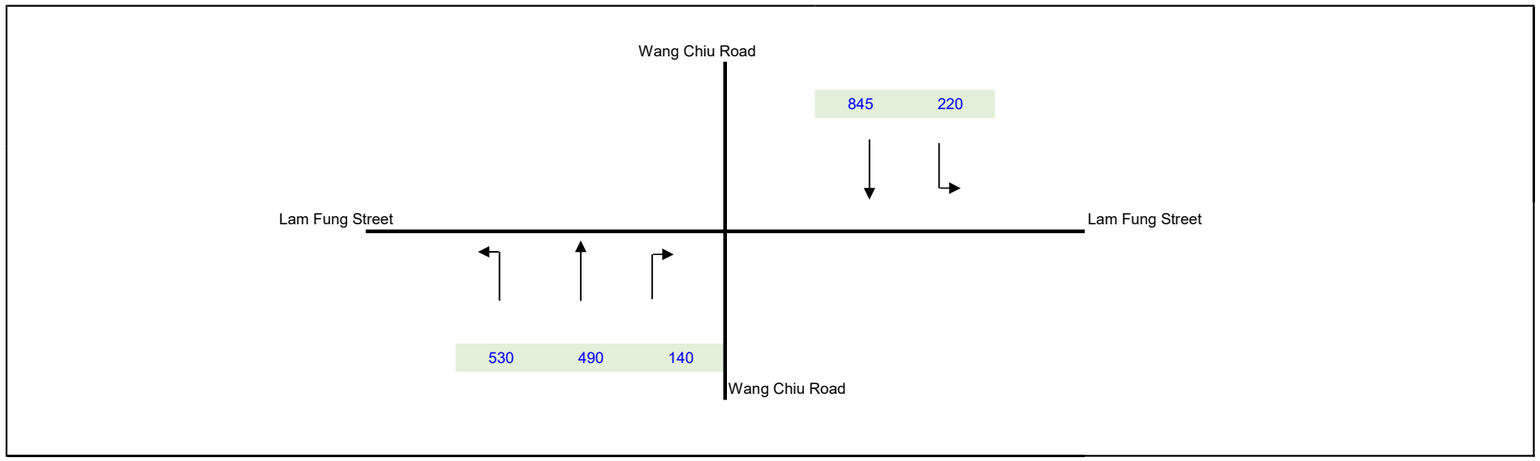
DFC b-a	=	0.0000
DFC b-c	=	0.5581
DFC c-b	=	0.0000
DFC b-ac	=	0.5581

CRITICAL DFC = 0.56

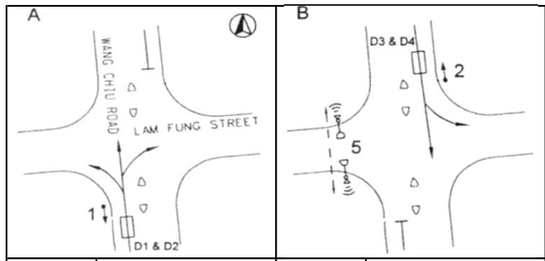
OVE ARUP & PARTNERS | TRAFFIC SIGNAL CALCULATION

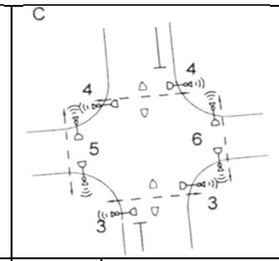
PROJECT NO: 237938

Wang Chiu Road / Lam Fung Road | DATE : 29-Apr-21 | FILENAME:



No. of stages per cycle	N =	3
No. of stage using for calculation	N =	2
Cycle time	C =	120 sec
Sum(y)	Y =	0.466
Loss time	L =	34 sec
Total Flow	=	2225 pcu
Co = (1.5*L+5)/(1-Y)	=	104.8 sec
Cm = L/(1-Y)	=	63.6 sec
Yult	=	0.945
R.C.ult = (Yult-Y)/Y*100%	=	102.9 %
Cp = 0.9*L/(0.9-Y)	=	70.5 sec
Ymax = 1-L/C	=	0.717
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	38.5 %



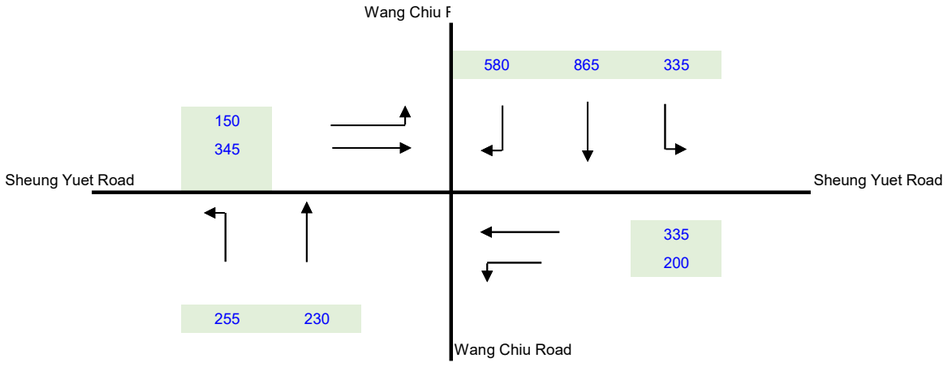


Stage 1	Int = 5	Stage 2	Int = 9	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

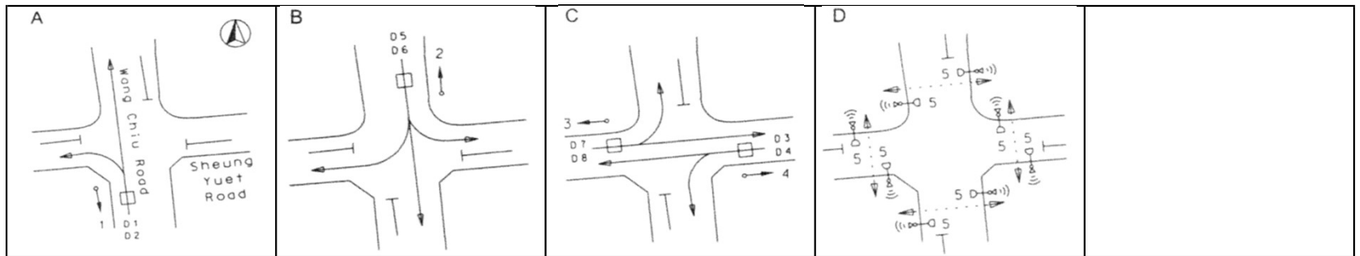
Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	11	10	4	8	10	4	8	OK
4	8	7	0	5	17	0	5	OK
5	9	5	6	8	65	6	8	OK
6	9	5	2	8	12	2	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1	1	3.50	I	1	15		N	1965	353			353	1.00	1786			1786	0.198	0.198		36	37	0.649	49
1,2	1	3.50	I	1	18			2105	177	225		402	0.44	2030			2030	0.198			37	37	0.650	56
2,3	1	3.50	I	1	18			2105		265	140	405	0.35	2046			2046	0.198			37	37	0.650	56
4,5	2	3.50	II	1	15		N	1965	220	284		504	0.44	1883			1883	0.268	0.268		49	49	0.650	59
5	2	3.50	II	1				2105		561		561	0.00	2105			2105	0.267			49	49	0.647	66
																	Stage 3 Pedestrian Stage			22				

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Wang Chiu Road / Sheung Yuet Road		DATE : 29-Apr-21	FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	140 sec
Sum(y)		Y =	0.705
Loss time		L =	41 sec
Total Flow		=	3295 pcu
Co	= (1.5*L+5)/(1-Y)	=	225.7 sec
Cm	= L/(1-Y)	=	139.1 sec
Yult		=	0.893
R.C.ult	= (Yult-Y)/Y*100%	=	26.5 %
Cp	= 0.9*L/(0.9-Y)	=	189.6 sec
Ymax	= 1-L/C	=	0.707
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	-9.8 %



Stage 1	Int = 6	Stage 2	Int = 7	Stage 3	Int = 9	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	3	9	10	3	9	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				19				
4,5	1	3.50	I	1	15		N	1965	255	0		255	1.00	1786			1786	0.143	0.143		20	20	0.997	1249
5	1	3.50	I	1				2105		230		230	0.00	2105			2105	0.109			15	20	0.763	52
10,11	2	3.50	I	1	15		N	1965	335	469		804	0.42	1886			1886	0.426	0.426		60	60	0.997	1308
11,12	2	3.50	II	1	20			2105		396	580	976	0.59	2015		280	2295	0.425			60	60	0.995	771
7,8	3	3.50	II	1	15		N	1965	200	48		248	0.81	1818			1818	0.136	0.136		19	19	0.997	1249
8	3	3.50	II	1				2105		287		287	0.00	2105			2105	0.136			19	19	0.997	1121
1,2	3	3.50	II	1	15		N	1965	150	81		231	0.65	1845			1845	0.125			18	19	0.916	78
2	3	3.50	III	1				2105		264		264	0.00	2105			2105	0.125			18	19	0.917	85
																	Stage 4 Pedestrian Stage			22				

OVE ARUP & PARTNERS

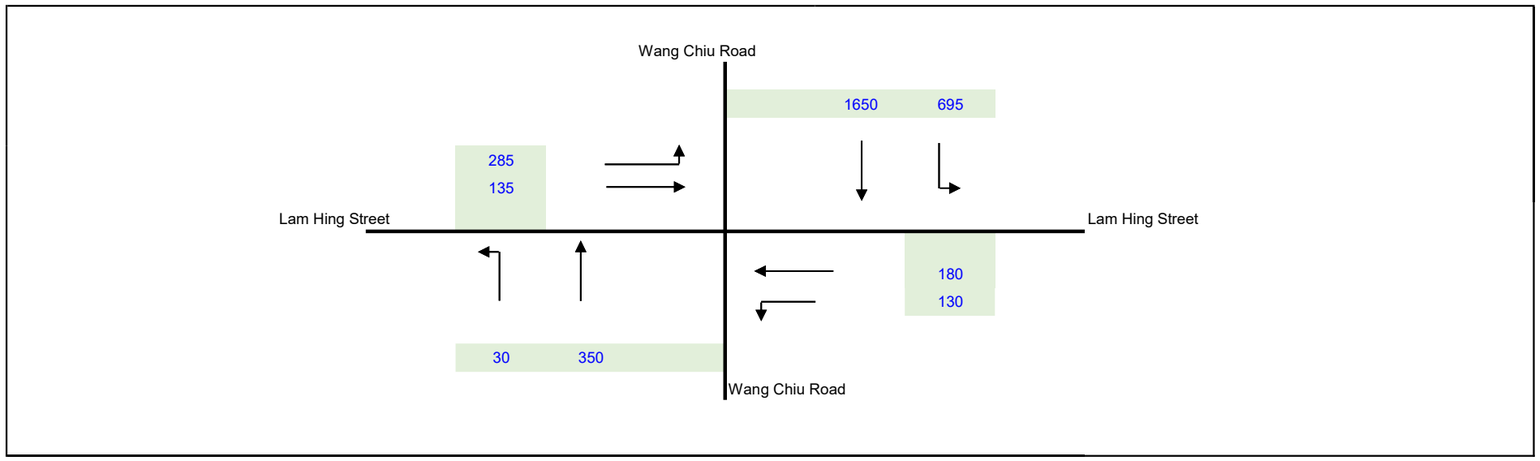
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

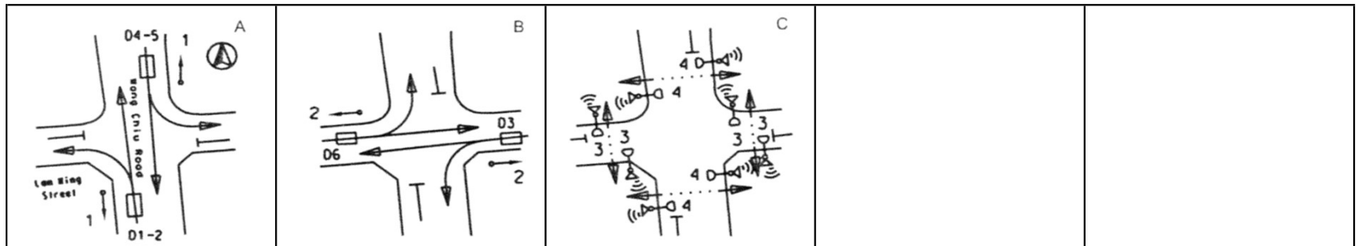
Wang Chiu Road / Lam Hing Road

DATE : 29-Apr-21

FILENAME:



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	140 sec
Sum(y)		Y =	0.611
Loss time		L =	33 sec
Total Flow		=	3455 pcu
Co	= (1.5*L+5)/(1-Y)	=	140.1 sec
Cm	= L/(1-Y)	=	84.8 sec
Yult		=	0.953
R.C.ult	= (Yult-Y)/Y*100%	=	55.9 %
Cp	= 0.9*L/(0.9-Y)	=	102.8 sec
Ymax	= 1-L/C	=	0.764
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	12.6 %



Stage 1	Int = 6	Stage 2	Int = 8	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	5	5	3	5	13	3	5	OK
4	11	10	3	8	10	3	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1,2	1	3.50	I	1	15		N	1965	30	157		187	0.16	1934			1934	0.097	0.392		17	69	0.197	22
2	1	3.50	I	1				2105		193		193	0.00	2105			2105	0.092			16	69	0.187	23
4	1	3.50	I	1	15		N	1965	695			695	1.00	1786			1786	0.389			68	69	0.794	89
5	1	3.50	I	2				4210		1650		1650	0.00	4210			4210	0.392			69	69	0.799	98
3	2	4.00	II	1	15		N	2015	130	180		310	0.42	1934			1934	0.160	0.219		28	38	0.585	53
6	2	4.00	II	1	20		N	2015	285	135		420	0.68	1917			1917	0.219			38	38	0.799	77
																	Stage 3 Pedestrian Stage			21				

OVE ARUP & PARTNERS

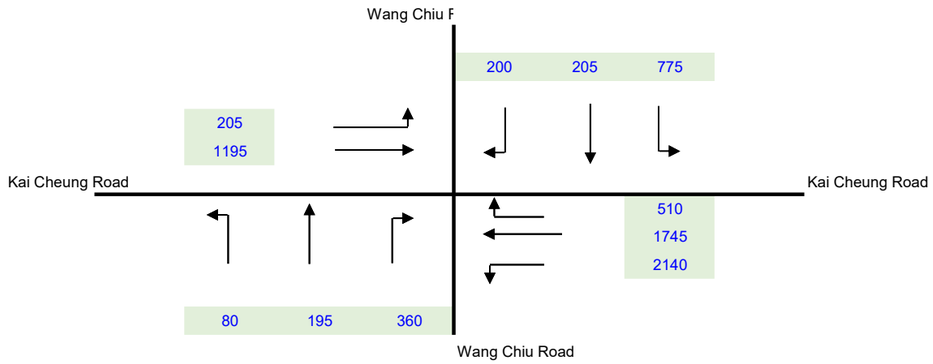
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

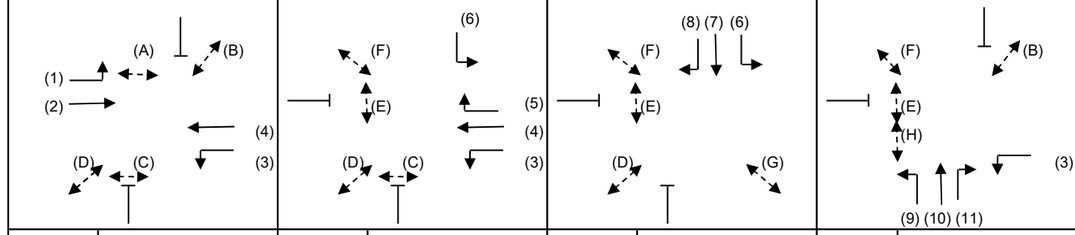
Wang Chiu Road / Kai Cheung Road

DATE : 29-Apr-21

FILENAME:



No. of stages per cycle	N =	4	
No. of stage using for calculation	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	0.658	
Loss time	L =	32	sec
Total Flow	=	7610	pcu
Co = (1.5*L+5)/(1-Y)	=	155.1	sec
Cm = L/(1-Y)	=	93.6	sec
Yult	=	0.960	
R.C.ult = (Yult-Y)/Y*100%	=	45.9	%
Cp = 0.9*L/(0.9-Y)	=	119.1	sec
Ymax = 1-L/C	=	0.771	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	5.5	%

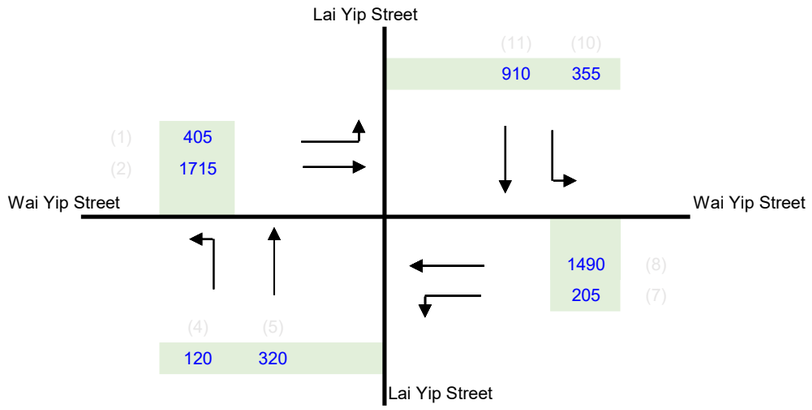


Stage 1	Int = 7	Stage 2	Int = 7	Stage 3	Int = 12	Stage 4	Int = 10	Stage 5	Int =

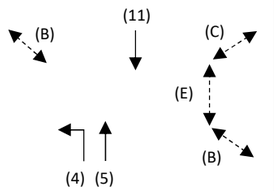
Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	8	7	3	5	29	3	5	OK
B	7	5	3	6	103	3	6	OK
C	11	10	2	8	76	2	8	OK
D	4	5	2	5	106	2	5	OK
E	10	5	2	8	93	2	8	OK
F	4	5	2	5	96	2	5	OK
G	7	5	3	6	19	3	6	OK
H	10	5	4	8	15	4	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				32				
1	1	3.50	I	1	25		N	1965	205			205	1.00	1854			1854	0.111	0.189		18	31	0.499	37
2	1	3.50	I	3				6315		1195		1195	0.00	6315			6315	0.189			31	31	0.853	74
3	1,2,4	3.50	I	2	25		N	4070	2140			2140	1.00	3840			3840	0.557			91	108	0.719	56
4	1,2	3.50	II	3				6315		1745		1745	0.00	6315			6315	0.276			45	82	0.473	56
5	2	3.50	II	1	20			2105			510	510	1.00	1958			1958	0.260	0.260		43	43	0.853	95
6	2,3	3.50	II	1	25		N	1965	775			775	1.00	1854		100	1954	0.397			65	70	0.790	96
7	3	3.50	II	1				2105		205		205	0.00	2105			2105	0.097	0.101		16	17	0.825	54
7,8	3	3.50	III	1	25			2105		0	200	200	1.00	1986			1986	0.101			17	17	0.853	53
9,10	4	3.50	III	1	25		N	1965	80	126		206	0.39	1920			1920	0.107	0.108		18	18	0.849	54
10,11	4	3.50	III	1	25			2105		69	149	218	0.68	2022			2022	0.108			18	18	0.853	56
11	4	3.50	III	1	20			2105			211	211	1.00	1958			1958	0.108			18	18	0.853	55

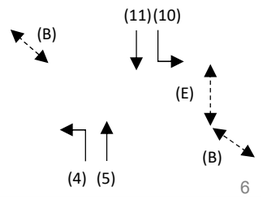
ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO:	
Wai Yip Street / Lai Yip Street	2031	DATE :	FILENAME :



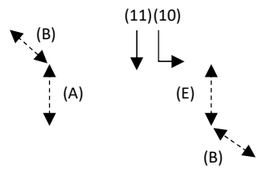
No. of stages per cycle	N =	4	
No. of stage using for calculation	N =	2	
Cycle time	C =	118	sec
Sum(y)	Y =	0.459	
Loss time	L =	41	sec
Total Flow	=	5520	pcu
Co = (1.5*L+5)/(1-Y)	=	123.0	sec
Cm = L/(1-Y)	=	75.8	sec
Yult	=	0.593	
R.C.ult = (Yult-Y)/Y*100%	=	29.0	%
Cp = 0.9*L/(0.9-Y)	=	83.8	sec
Ymax = 1-L/C	=	0.653	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	27.8	% (Optimized)



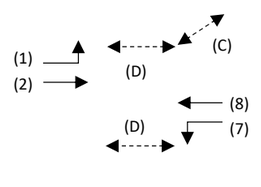
STAGE 1 INT=



STAGE 2 INT= 6



STAGE 3 INT=



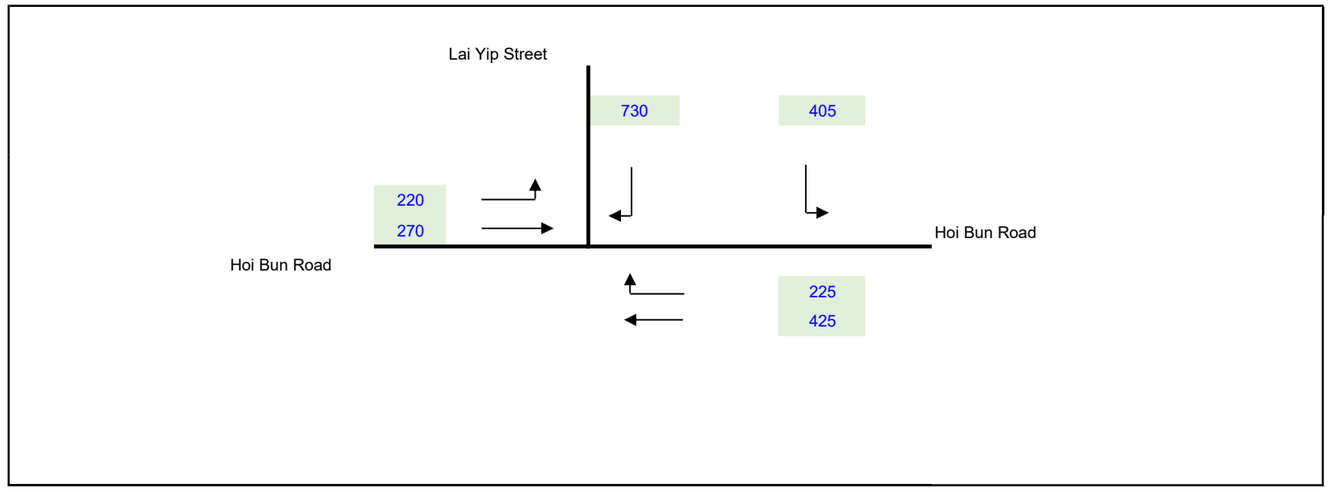
STAGE 4 INT= 9

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	14	12	6	10	12	6	10	OK
B	5	5	3	5	30	3	5	OK
C	6	5	1	5	74	1	5	OK
D	13	11	5	10	51	5	10	OK
E	12	10	6	9	23	6	9	OK

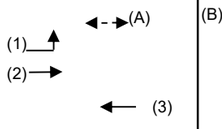
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				13				
4,5	1,2	3.50	III	1	15		N	1965	120	86		206	0.58	1857			1857	0.111	0.111		19	19	0.703	34
5	1,2	3.50	III	1				2105		234		234	0.00	2105			2105	0.111			19	19	0.704	39
10	2,3	3.50	IV	1	20		N	1965	355			355	1.00	1828		260	2088	0.170		6	28	28	0.704	53
11	1,2,3	3.50	V	2				4210		910		910	0.00	4210			4210	0.216		13	36	39	0.660	60
1,2	4	3.50	I	1	20		N	1965	405	249		654	0.62	1878			1878	0.348	0.348		58	58	0.704	65
2	4	3.50	I	2				4210		1466		1466	0.00	4210			4210	0.348			58	58	0.704	73
7,8	4	3.50	II	1	20		N	1965	205	324		529	0.39	1910			1910	0.277			46	58	0.560	53
8	4	3.50	II	2				4210		1166		1166	0.00	4210			4210	0.277			46	58	0.560	58
																			Stage 3	28				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

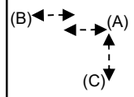
ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Lai Yip Street / Hoi Bun Road		DATE : 29-Apr-21	FILENAME :



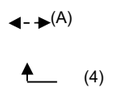
No. of stages per cycle	N =	5	
No. of stage using for calculation	N =	3	
Cycle time	C =	118	sec
Sum(y)	Y =	0.470	
Loss time	L =	37	sec
Total Flow	=	2275	pcu
Co = (1.5*L+5)/(1-Y)	=	114.1	sec
Cm = L/(1-Y)	=	69.8	sec
Yult	=	0.623	
R.C.ult = (Yult-Y)/Y*100%	=	32.5	%
Cp = 0.9*L/(0.9-Y)	=	77.4	sec
Ymax = 1-L/C	=	0.686	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	31.5	% (Optimized)



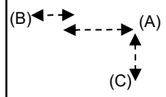
STAGE 1 INT= 8



STAGE 2 INT= 0



STAGE 3 INT= 5



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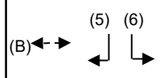
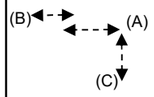
STAGE 4 INT=



STAGE 5 INT= 7



0

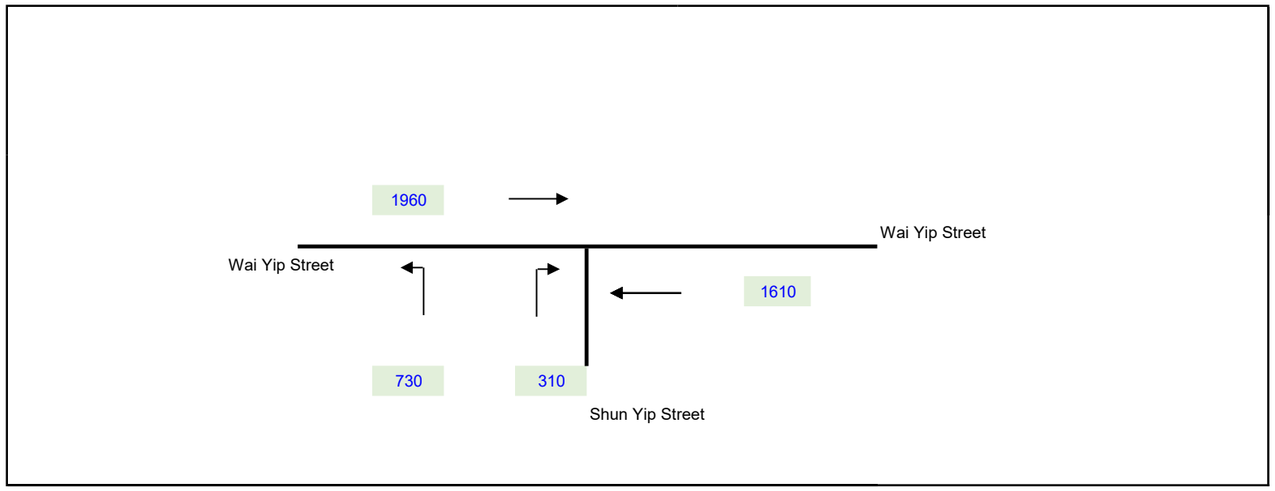
STAGE 6 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	10	5	3	8	9	3	8	OK
B	5	5	10	5	5	10	5	OK
C	7	6	4	5	11	4	5	OK

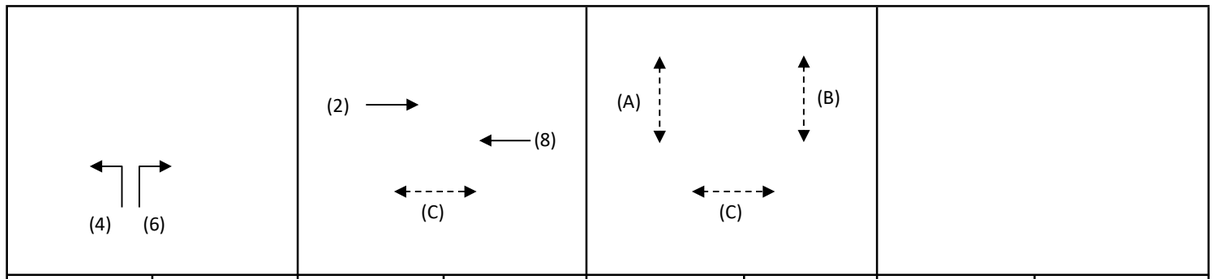
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				17				
1	1	3.50	I	1	15		N	1965	220			220	1.00	1786			1786	0.123			21	22	0.657	35
2	1	3.50	I	1				2105		270		270	0.00	2105			2105	0.128	0.128		22	22	0.685	43
3	1,3	3.50	II, III	1			N	1965		425		425	0.00	1965			1965	0.216			37	44	0.581	52
4	3	3.50	III	1	20			2105			225	225	1.00	1958			1958	0.115	0.115		20	20	0.685	37
5	5	3.50	IV	2	20			4210			730	730	1.00	3916			3916	0.186	0.227		32	39	0.563	48
6	5	3.50	IV	1	15		N	1965	405			405	1.00	1786			1786	0.227			39	39	0.685	53
																	Stage 2 Pedestrian Loss Time			20	(Demand Dependent. Assumed always Called.)			
																	Stage 4 Pedestrian Loss Time				(Demand Dependent. Assumed always Skipped.)			
																	Stage 6 Pedestrian Loss Time				(Demand Dependent. Assumed always Skipped.)			

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Wai Yip Street / Shun Yip Street		DATE : 29-Apr-21	FILENAME :



No. of stages per cycle		N =	3	
No. of stage using for calculation		N =	2	
Cycle time		C =	108	sec
Sum(y)		Y =	0.510	
Loss time		L =	33	sec
Total Flow		=	4610	pcu
Co	= (1.5*L+5)/(1-Y)	=	111.2	sec
Cm	= L/(1-Y)	=	67.3	sec
Yult		=	0.653	
R.C.ult	= (Yult-Y)/Y*100%	=	27.9	%
Cp	= 0.9*L/(0.9-Y)	=	76.1	sec
Ymax	= 1-L/C	=	0.694	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	22.6	% (Optimized)



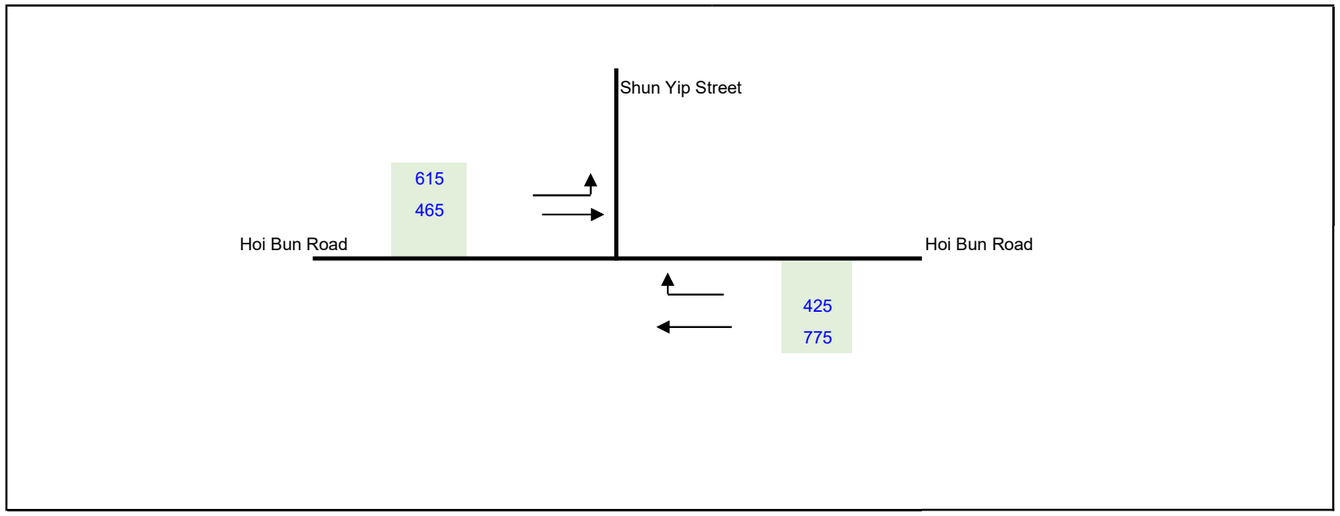
STAGE 1	INT= 6	STAGE 2	INT= 9	STAGE 3	INT=	STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	2	9	61	2	9	OK
B	12	10	2	8	10	2	8	OK
C	10	5	2	8	10	2	8	OK

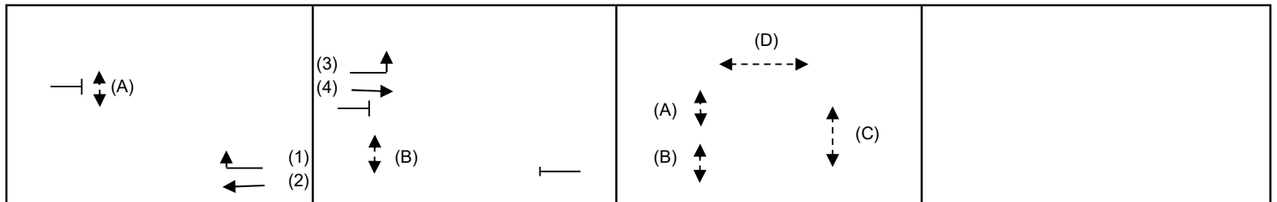
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				13				
2	2	3.50	I	3			N	6175		1960		1960	0.00	6175			6175	0.317	0.317		47	47	0.734	67
8	2	3.50	II	3			N	6175		1610		1610	0.00	6175			6175	0.261			38	47	0.603	55
4	1	3.50	III	1	15		N	1965	344			344	1.00	1786			1786	0.193	0.193		28	28	0.734	52
4,6	1	3.50	III	1	30			2105	386		0	386	1.00	2005			2005	0.193			28	28	0.734	57
6	1	3.50	III	1	30		N	1965			310	310	1.00	1871			1871	0.166			24	28	0.632	41
																	Stage 3 Pedestrian Loss Time			20				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Shun Yip Street / Hoi Bun Road		DATE : 29-Apr-21	FILENAME :



No. of stages per cycle		N =	2
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.645
Loss time		L =	39 sec
Total Flow		=	2280 pcu
Co	= (1.5*L+5)/(1-Y)	=	178.6 sec
Cm	= L/(1-Y)	=	109.7 sec
Yult		=	0.608
R.C.ult	= (Yult-Y)/Y*100%	=	-5.7 %
Cp	= 0.9*L/(0.9-Y)	=	137.4 sec
Ymax	= 1-L/C	=	0.675
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	-5.7 % (Optimized)



STAGE 1	INT= 10	STAGE 2	INT= 6	STAGE 3 (ped)	INT= 2	STAGE 4	INT= 0

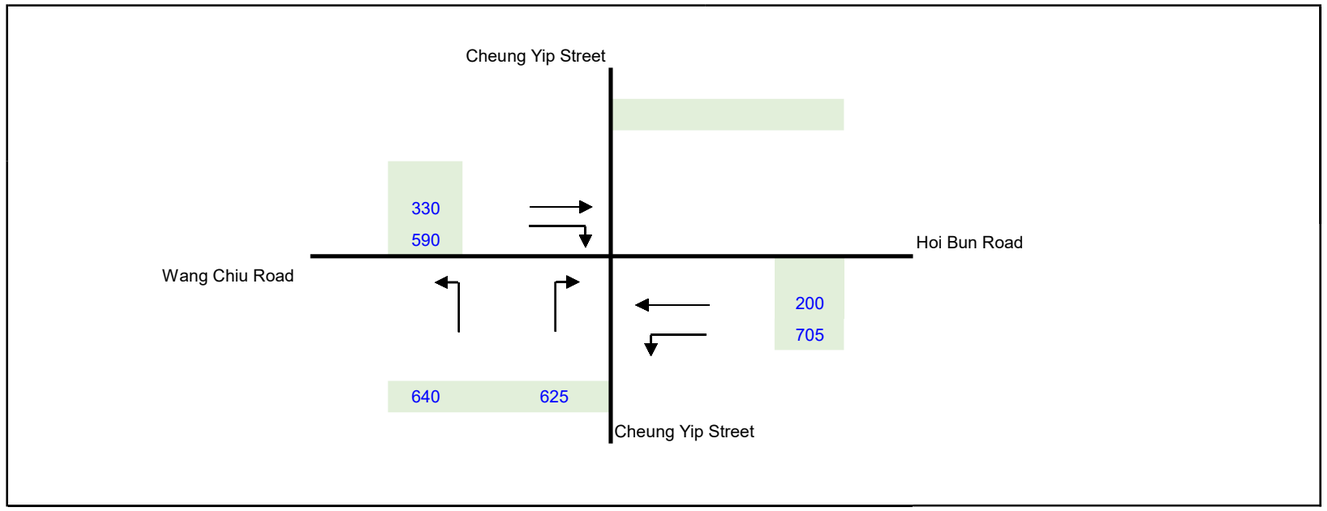
Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	0	6	62	0	6	OK
B	7	5	3	6	64	3	6	OK
C	7	6	3	5	15	3	5	OK
D	10	6	5	12	6	5	12	OK

7 8

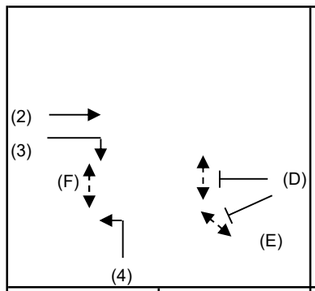
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
1,2	1	3.50	I	1	30			2105		185	425	610	0.70	2034			2034	0.300	0.300		38	38	0.954	104
2	1	3.50	I	1			N	1965		590		590	0.00	1965			1965	0.300			38	38	0.955	103
3	2	3.50	II	1	15		N	1965	615			615	1.00	1786			1786	0.344	0.344		43	43	0.955	98
4	2	3.50	II	1	20			2105		465		465	0.00	2105			2105	0.221			28	43	0.613	59
																		Pedestrian Stage 3		23				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

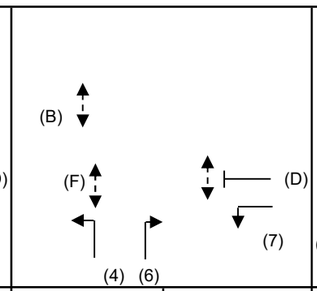
ARUP	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Cheung Yip Street / Hoi Bun Road		DATE : 29-Apr-21	FILENAME :



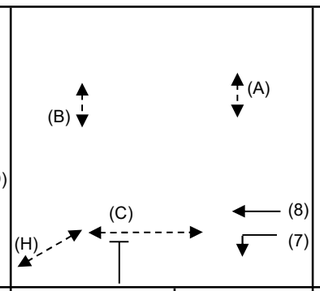
No. of stages per cycle		N =	3	
No. of stage using for calculation		N =	2	
Cycle time		C =	108	sec
Sum(y)		Y =	0.570	
Loss time		L =	10	sec
Total Flow		=	3090	pcu
Co	= (1.5*L+5)/(1-Y)	=	46.5	sec
Cm	= L/(1-Y)	=	23.2	sec
Yult		=	0.825	
R.C.ult	= (Yult-Y)/Y*100%	=	44.9	%
Cp	= 0.9*L/(0.9-Y)	=	27.2	sec
Ymax	= 1-L/C	=	0.907	
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	43.4	% (Optimized)



STAGE 1 INT= 6



STAGE 2 INT=



STAGE 3 INT= 6

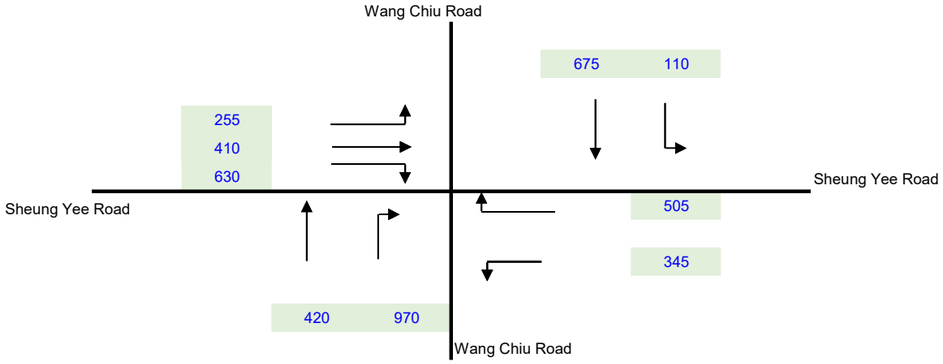
STAGE 4 INT=

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	6	6	9	6	6	OK
B	11	5	2	9	52	2	9	OK
C	11	10	0	8	13	0	8	OK
D	5	5	1	5	81	1	5	OK
E	7	5	1	6	38	1	6	OK
F	5	5	4	5	78	4	5	OK
H	5	5	1	5	15	1	5	OK

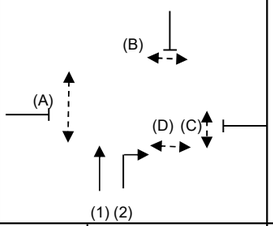
Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				10				
2,3	1	3.50	I	1	35		N	1965		330	123	453	0.27	1942			1942	0.233	0.233		40	40	0.628	51
3	1	3.50	I	1	30			2105			467	467	1.00	2005			2005	0.233			40	40	0.627	53
4	1,2	3.50	II	1	15		N	1965	640			640	1.00	1786			1786	0.358			62	82	0.474	28
6	2	3.50	II	2	30			4210			625	625	1.00	4010			4010	0.156			27	37	0.461	37
7	2,3	3.50	III	1	15		N	1965	705			705	1.00	1786		310	2096	0.336	0.336		58	58	0.628	59
8	3	3.50	III	1	30			2105		200		200	0.00	2105			2105	0.095			16	16	0.628	31

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

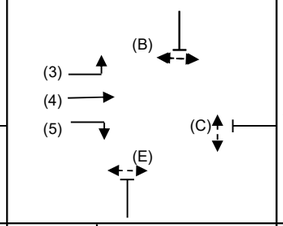
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Wang Chiu Road / Sheung Yee Road		DATE : 29-Apr-21	FILENAME:



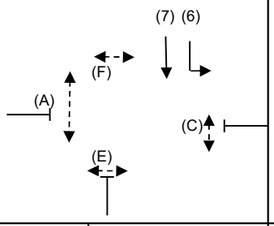
No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	120 sec
Sum(y)		Y =	0.652
Loss time		L =	26 sec
Total Flow		=	4320 pcu
Co	= (1.5*L+5)/(1-Y)	=	126.4 sec
Cm	= L/(1-Y)	=	74.7 sec
Yult		=	1.005
R.C.ult	= (Yult-Y)/Y*100%	=	54.2 %
Cp	= 0.9*L/(0.9-Y)	=	94.3 sec
Ymax	= 1-L/C	=	0.783
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	8.2 %



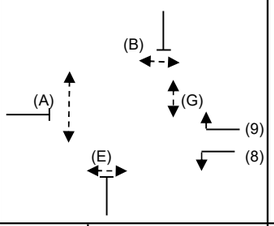
Stage 1	Int = 5



Stage 2	Int = 8



Stage 3	Int = 8



Stage 4	Int = 9

Stage 5	Int = 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	16	7	2	13	79	2	13	OK
B	10	5	2	8	84	2	8	OK
C	10	5	2	8	80	2	8	OK
D	10	5	8	8	23	8	8	OK
E	10	5	3	8	70	3	8	OK
F	7	5	6	6	14	6	6	OK
G	7	5	6	6	18	6	6	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				26				
1	1	3.50	I	1			N	1965		420		420	0.00	1965			1965	0.214	0.241		31	35	0.737	66
1,2	1	3.50	I	1	35			2105		0	487	487	1.00	2018			2018	0.241			35	35	0.832	81
2	1	3.50	I	1	30			2105			483	483	1.00	2005			2005	0.241			35	35	0.831	81
3	2	3.50	II	1	15		N	1965	236			236	1.00	1786			1786	0.132	0.132		19	19	0.832	52
3,4	2	3.50	II	1	18			2105	19	257		276	0.07	2093			2093	0.132			19	19	0.831	58
4,5	2	3.50	II	1	35			2105		153	119	272	0.44	2066			2066	0.132			19	19	0.829	58
5	2	3.50	II	2	30		N	4070			511	511	1.00	3876			3876	0.132			19	19	0.830	49
6,7	3	3.50	III	1	15		N	1965	110	133		243	0.45	1880			1880	0.129	0.129		19	19	0.832	53
7	3	3.50	III	2				4210		542		542	0.00	4210			4210	0.129			19	19	0.829	52
8	4	3.50	IV	1	15		N	1965	266			266	1.00	1786			1786	0.149	0.149		21	22	0.831	56
8,9	4	3.50	III	1	15			2105	79		206	285	1.00	1914			1914	0.149			21	22	0.831	59
9	4	3.50	IV	1	30			2105			299	299	1.00	2005			2005	0.149			22	22	0.832	61

OVE ARUP & PARTNERS

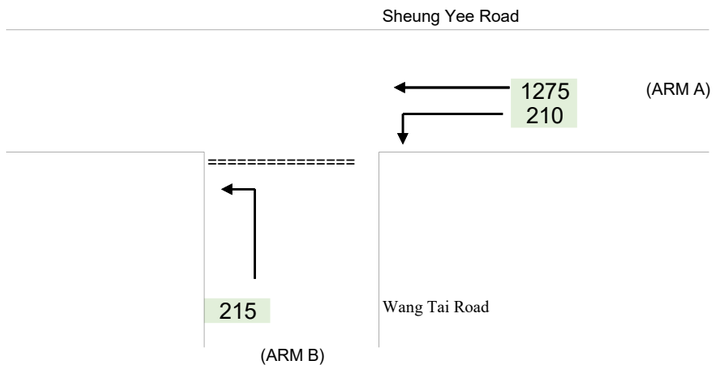
PRIORITY JUNCTION CALCULATION

Project No. : 237938

Wang Tak Road / Sheung Yee Road

DATE : 29-Apr-21

FILENAME :



NOTES : (GEOMETRIC INPUT DATA)

W	=	MAJOR ROAD WIDTH
W cr	=	CENTRAL RESERVE WIDTH
W b-a	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-a
W b-c	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM b-c
W c-b	=	LANE WIDTH AVAILABLE TO VEHICLE WAITING IN STREAM c-b
Vl b-a	=	VISIBILITY TO THE LEFT FOR VEHICLES WAITING IN STREAM b-a
Vr b-a	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-a
Vr b-c	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM b-c
Vr c-b	=	VISIBILITY TO THE RIGHT FOR VEHICLES WAITING IN STREAM c-b
D	=	STREAM-SPECIFIC B-A
E	=	STREAM-SPECIFIC B-C
F	=	STREAM-SPECIFIC C-B
Y	=	(1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.90	(metres)
W cr	=	0	(metres)
q a-b	=	210	(pcu/hr)
q a-c	=	1275	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	0.00	(metres)
Vr c-b	=	0	(metres)
q c-a	=	0	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	0.00	(metres)
W b-c	=	6.20	(metres)
Vl b-a	=	45	(metres)
Vr b-a	=	45	(metres)
Vr b-c	=	50	(metres)
q b-a	=	0	(pcu/hr)
q b-c	=	215	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.574
E	=	1.162
F	=	0.586
Y	=	0.727

THE CAPACITY OF MOVEMENT :

Q b-a	=	153
Q b-c	=	448
Q c-b	=	206
Q b-ac	=	448

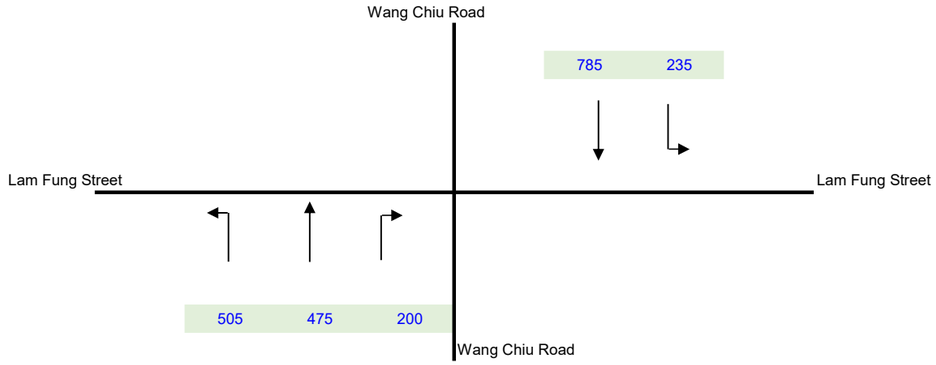
TOTAL FLOW = 1700 (PCU/HR)

COMPARISION OF DESIGN FLOW TO CAPACITY:

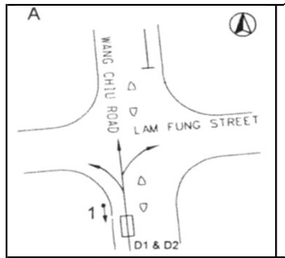
DFC b-a	=	0.0000
DFC b-c	=	0.4799
DFC c-b	=	0.0000
DFC b-ac	=	0.4799

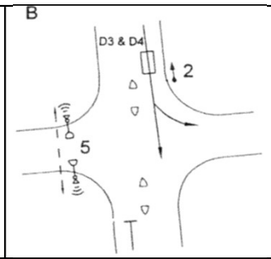
CRITICAL DFC = 0.48

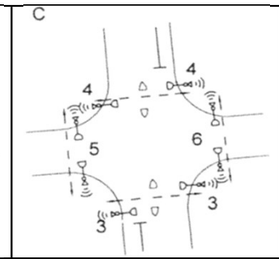
OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Wang Chiu Road / Lam Fung Road		DATE : 29-Apr-21	FILENAME:



No. of stages per cycle	N =	3
No. of stage using for calculation	N =	2
Cycle time	C =	120 sec
Sum(y)	Y =	0.458
Loss time	L =	34 sec
Total Flow	=	2200 pcu
Co = (1.5*L+5)/(1-Y)	=	103.4 sec
Cm = L/(1-Y)	=	62.8 sec
Yult	=	0.945
R.C.ult = (Yult-Y)/Y*100%	=	106.1 %
Cp = 0.9*L/(0.9-Y)	=	69.3 sec
Ymax = 1-L/C	=	0.717
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	40.7 %





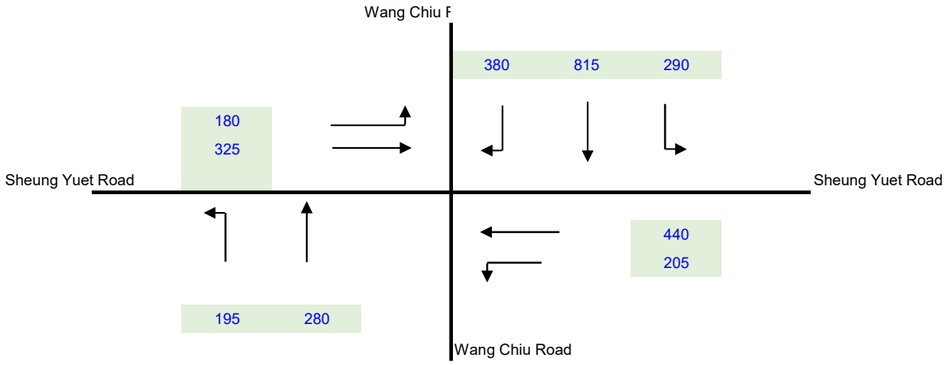


Stage 1	Int = 5	Stage 2	Int = 9	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

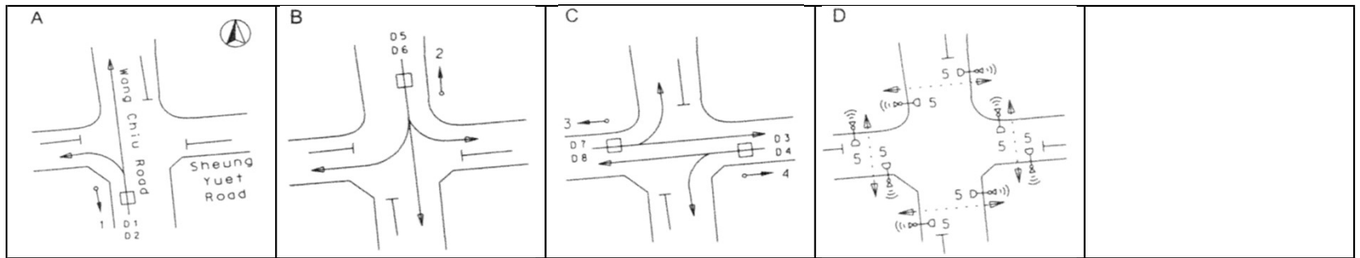
Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	11	10	4	8	10	4	8	OK
4	8	7	0	5	17	0	5	OK
5	9	5	6	8	64	6	8	OK
6	9	5	2	8	12	2	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1	1	3.50	I	1	15		N	1965	360			360	1.00	1786			1786	0.202	0.202		38	38	0.639	49
1,2	1	3.50	I	1	18			2105	145	267		412	0.35	2045			2045	0.201			38	38	0.639	56
2,3	1	3.50	I	1	18			2105		208	200	408	0.49	2022			2022	0.202			38	38	0.640	56
4,5	2	3.50	II	1	15		N	1965	235	246		481	0.49	1873			1873	0.257	0.257		48	48	0.640	58
5	2	3.50	II	1				2105		539		539	0.00	2105			2105	0.256			48	48	0.638	65
																	Stage 3 Pedestrian Stage			22				

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Wang Chiu Road / Sheung Yuet Road		DATE : 29-Apr-21	FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	140 sec
Sum(y)		Y =	0.637
Loss time		L =	41 sec
Total Flow		=	3110 pcu
Co	= (1.5*L+5)/(1-Y)	=	183.1 sec
Cm	= L/(1-Y)	=	112.9 sec
Yult		=	0.893
R.C.ult	= (Yult-Y)/Y*100%	=	40.1 %
Cp	= 0.9*L/(0.9-Y)	=	140.2 sec
Ymax	= 1-L/C	=	0.707
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	-0.1 %



Stage 1	Int = 6	Stage 2	Int = 7	Stage 3	Int = 9	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	12	10	3	9	10	3	9	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				19				
4,5	1	3.50	I	1	15		N	1965	195	24		219	0.89	1804			1804	0.121	0.122		19	19	0.899	65
5	1	3.50	I	1				2105		256		256	0.00	2105			2105	0.122			19	19	0.901	71
10,11	2	3.50	I	1	15		N	1965	290	372		662	0.44	1883			1883	0.352	0.352		55	55	0.901	112
11,12	2	3.50	II	1	20			2105		443	380	823	0.46	2035		310	2345	0.351			55	55	0.899	135
7,8	3	3.50	II	1	15		N	1965	205	96		301	0.68	1840			1840	0.164	0.164		25	25	0.901	75
8	3	3.50	II	1				2105		344		344	0.00	2105			2105	0.163			25	25	0.900	84
1,2	3	3.50	II	1	15		N	1965	180	55		235	0.77	1825			1825	0.129			20	25	0.709	51
2	3	3.50	III	1				2105		270		270	0.00	2105			2105	0.128			20	25	0.706	58
																	Stage 4 Pedestrian Stage			22				

OVE ARUP & PARTNERS

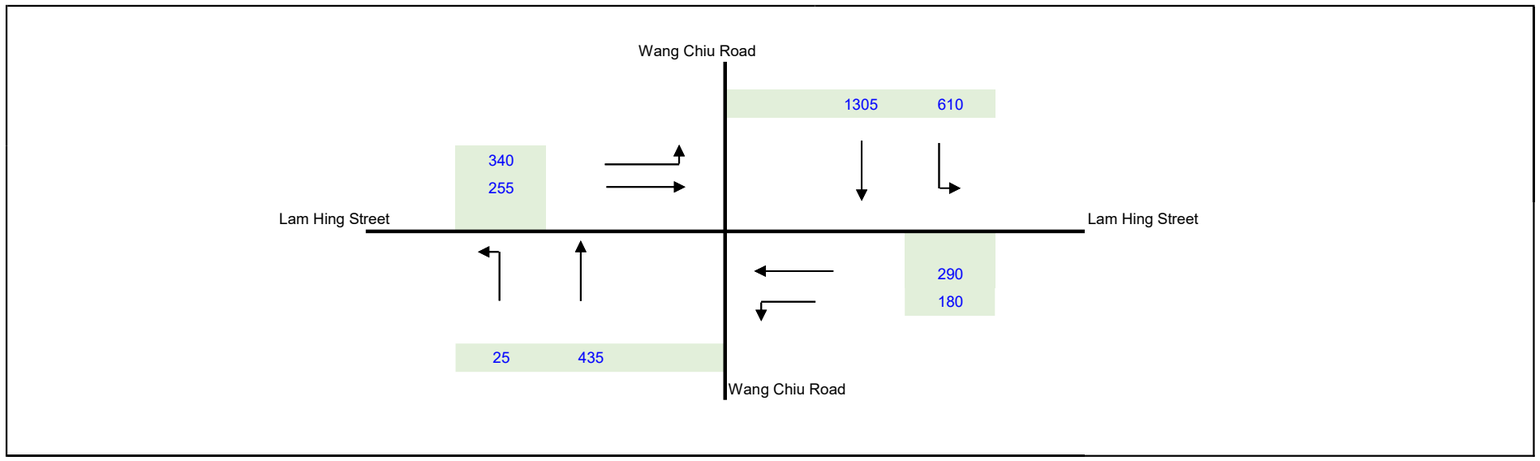
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

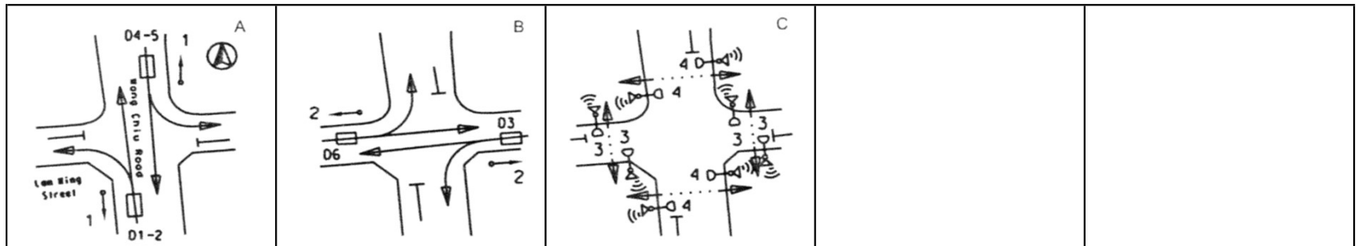
Wang Chiu Road / Lam Hing Road

DATE : 29-Apr-21

FILENAME:



No. of stages per cycle		N =	3
No. of stage using for calculation		N =	2
Cycle time		C =	140 sec
Sum(y)		Y =	0.649
Loss time		L =	33 sec
Total Flow		=	3440 pcu
Co	= (1.5*L+5)/(1-Y)	=	155.5 sec
Cm	= L/(1-Y)	=	94.1 sec
Yult		=	0.953
R.C.ult	= (Yult-Y)/Y*100%	=	46.7 %
Cp	= 0.9*L/(0.9-Y)	=	118.5 sec
Ymax	= 1-L/C	=	0.764
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	5.9 %



Stage 1	Int = 6	Stage 2	Int = 8	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	5	5	3	5	13	3	5	OK
4	11	10	3	8	10	3	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1,2	1	3.50	I	1	15		N	1965	25	201		226	0.11	1944			1944	0.116	0.341		19	56	0.289	32
2	1	3.50	I	1				2105		234		234	0.00	2105			2105	0.111			18	56	0.277	33
4	1	3.50	I	1	15		N	1965	610			610	1.00	1786			1786	0.341			56	56	0.850	97
5	1	3.50	I	2				4210		1305		1305	0.00	4210			4210	0.310			51	56	0.771	91
3	2	4.00	II	1	15		N	2015	180	290		470	0.38	1941			1941	0.242	0.308		40	51	0.668	70
6	2	4.00	II	1	20		N	2015	340	255		595	0.57	1932			1932	0.308			51	51	0.850	101
																	Stage 3 Pedestrian Stage			21				

OVE ARUP & PARTNERS

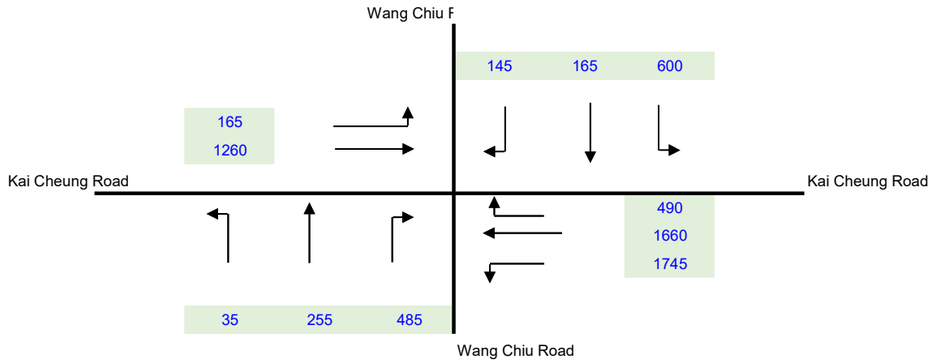
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

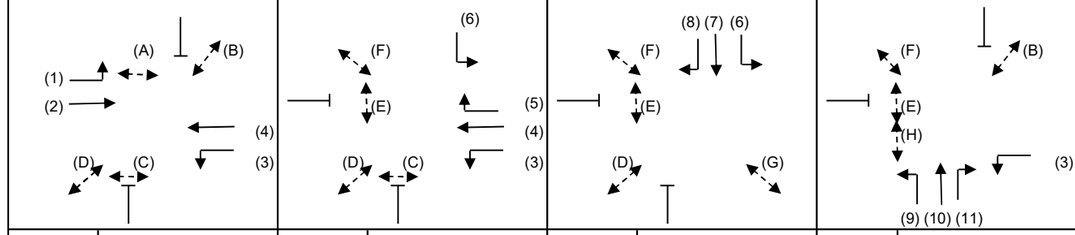
Wang Chiu Road / Kai Cheung Road

DATE : 29-Apr-21

FILENAME:



No. of stages per cycle	N =	4	
No. of stage using for calculation	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	0.657	
Loss time	L =	32	sec
Total Flow	=	7005	pcu
Co = (1.5*L+5)/(1-Y)	=	154.5	sec
Cm = L/(1-Y)	=	93.3	sec
Yult	=	0.960	
R.C.ult = (Yult-Y)/Y*100%	=	46.1	%
Cp = 0.9*L/(0.9-Y)	=	118.5	sec
Ymax = 1-L/C	=	0.771	
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	5.7	%



Stage 1	Int =	7	Stage 2	Int =	7	Stage 3	Int =	12	Stage 4	Int =	10	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	8	7	3	5	31	3	5	OK
B	7	5	3	6	108	3	6	OK
C	11	10	2	8	76	2	8	OK
D	4	5	2	5	102	2	5	OK
E	10	5	2	8	91	2	8	OK
F	4	5	2	5	94	2	5	OK
G	7	5	3	6	14	3	6	OK
H	10	5	4	8	19	4	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				32				
1	1	3.50	I	1	25		N	1965	165			165	1.00	1854			1854	0.089	0.200		15	33	0.380	29
2	1	3.50	I	3				6315		1260		1260	0.00	6315			6315	0.200			33	33	0.852	77
3	1,2,4	3.50	I	2	25		N	4070	1745			1745	1.00	3840			3840	0.454			75	113	0.565	40
4	1,2	3.50	II	3				6315		1660		1660	0.00	6315			6315	0.263			43	82	0.449	54
5	2	3.50	II	1	20			2105			490	490	1.00	1958			1958	0.250	0.250		41	41	0.852	93
6	2,3	3.50	II	1	25		N	1965	600			600	1.00	1854		110	1964	0.306			50	65	0.662	75
7	3	3.50	II	1				2105		159		159	0.00	2105			2105	0.076	0.076		12	12	0.848	46
7,8	3	3.50	III	1	25			2105		6	145	151	0.96	1990			1990	0.076			12	12	0.852	44
9,10	4	3.50	III	1	25		N	1965	35	221		256	0.14	1949			1949	0.131	0.131		22	22	0.852	63
10,11	4	3.50	III	1	25			2105		34	228	262	0.87	2001			2001	0.131			22	22	0.849	64
11	4	3.50	III	1	20			2105			257	257	1.00	1958			1958	0.131			22	22	0.851	63

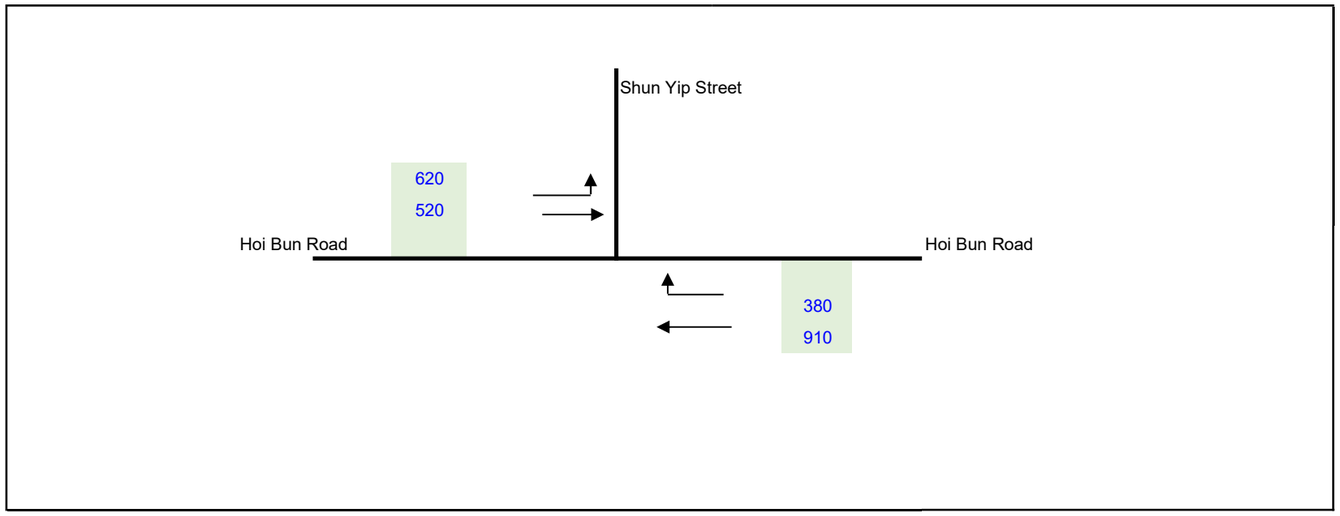
ARUP — TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

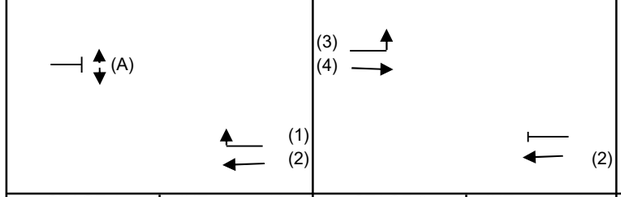
Shun Yip Street / Hoi Bun Road

DATE : 29-Apr-21

FILENAME :

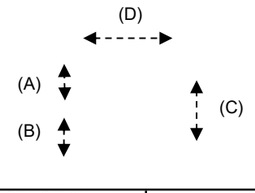


No. of stages per cycle		N =	2
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.485
Loss time		L =	39 sec
Total Flow		=	2430 pcu
Co	= (1.5*L+5)/(1-Y)	=	123.2 sec
Cm	= L/(1-Y)	=	75.7 sec
Yult		=	0.608
R.C.ult	= (Yult-Y)/Y*100%	=	25.4 %
Cp	= 0.9*L/(0.9-Y)	=	84.5 sec
Ymax	= 1-L/C	=	0.675
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	25.4 % (Optimized)



STAGE 1	INT= 10

STAGE 2	INT= 6



STAGE 3 (ped)	INT= 2

STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	0	6	56	0	6	OK
B	7	5	3	6	14	3	6	OK
C	11.5	10	3	8	12	3	8	OK
D	10	6	5	12	6	5	12	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
1	1	3.50	I	1	30			2105			380	380	1.00	2005			2005	0.190	0.190		32	32	0.718	56
2	1,2	3.50	I	1			N	1965		910		910	0.00	1965			1965	0.463			77	85	0.654	53
3	2	3.50	II	1	15		N	1965	527			527	1.00	1786			1786	0.295	0.295		49	49	0.718	62
3,4	2	3.50	II	1	20			2105	93	520		613	0.15	2081			2081	0.295			49	49	0.717	72
																		Pedestrian Stage 3		23				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

OVE ARUP & PARTNERS

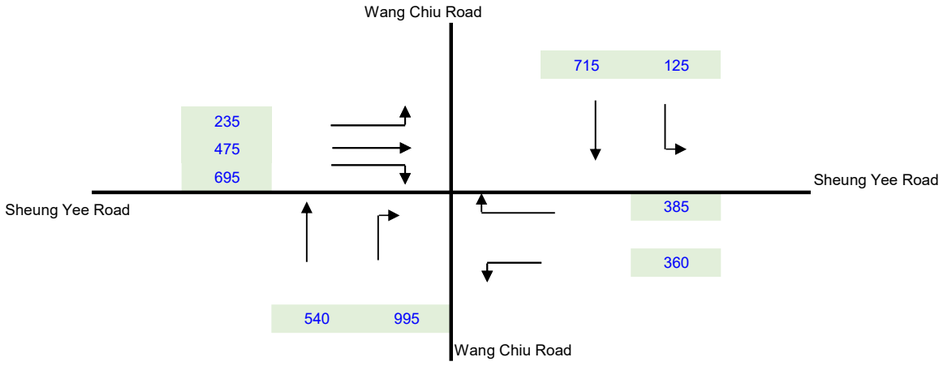
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

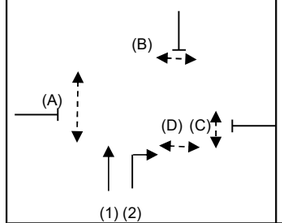
Wang Chiu Road / Sheung Yee Road

DATE : 29-Apr-21

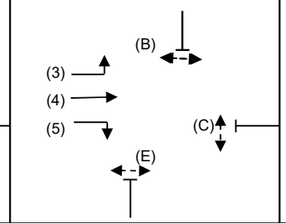
FILENAME:



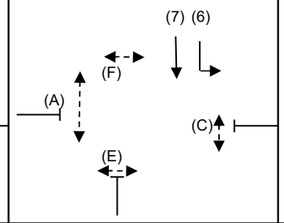
No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	120 sec
Sum(y)		Y =	0.663
Loss time		L =	22 sec
Total Flow		=	4525 pcu
Co	= (1.5*L+5)/(1-Y)	=	112.7 sec
Cm	= L/(1-Y)	=	65.2 sec
Yult		=	1.035
R.C.ult	= (Yult-Y)/Y*100%	=	56.2 %
Cp	= 0.9*L/(0.9-Y)	=	83.5 sec
Ymax	= 1-L/C	=	0.817
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	10.9 %



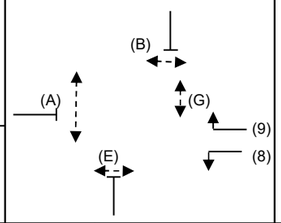
Stage 1 | Int = 7



Stage 2 | Int = 6



Stage 3 | Int = 6



Stage 4 | Int = 7

Stage 5 | Int = 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	16	7	2	13	78	2	13	OK
B	10	5	2	8	85	2	8	OK
C	10	5	2	8	85	2	8	OK
D	10	5	8	8	27	8	8	OK
E	10	5	3	8	66	3	8	OK
F	7	5	6	6	13	6	6	OK
G	7	5	6	6	13	6	6	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
1	1	3.50	I	2			N	4070		540		540	0.00	4070			4070	0.133	0.248		20	37	0.434	37
2	1	3.50	I	2	30			4210			995	995	1.00	4010			4010	0.248			37	37	0.812	72
3	2	3.50	II	1	15		N	1965	235			235	1.00	1786			1786	0.132	0.146		19	22	0.734	45
3,4	2	3.50	II	1	18			2105	0	306		306	0.00	2105			2105	0.145			21	22	0.811	56
4,5	2	3.50	II	1	35			2105		169	131	300	0.44	2066			2066	0.145			21	22	0.810	55
5	2	3.50	II	2	30		N	4070			564	564	1.00	3876			3876	0.146			22	22	0.812	49
6,7	3	3.50	III	1	15		N	1965	125	134		259	0.48	1875			1875	0.138	0.138		20	20	0.812	49
7	3	3.50	III	2				4210		581		581	0.00	4210			4210	0.138			20	20	0.811	51
8	4	3.50	IV	1	15		N	1965	234			234	1.00	1786			1786	0.131	0.131		19	19	0.812	45
8,9	4	3.50	III	1	15			2105	126		124	250	1.00	1914			1914	0.131			19	19	0.812	48
9	4	3.50	IV	1	30			2105			261	261	1.00	2005			2005	0.130			19	19	0.807	50

OVE ARUP & PARTNERS

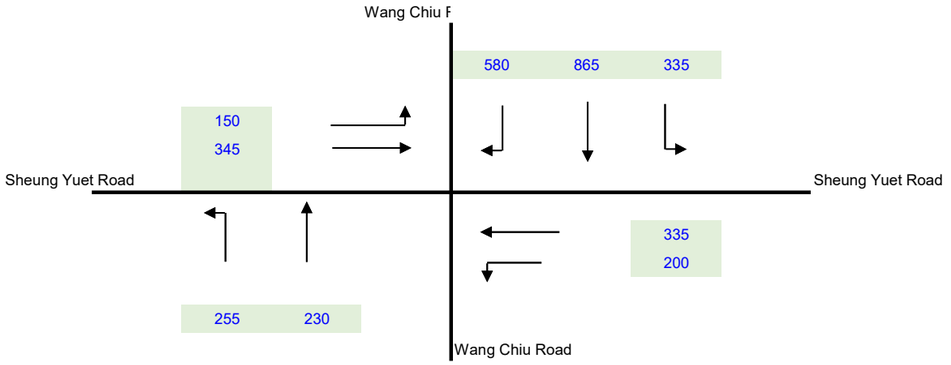
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

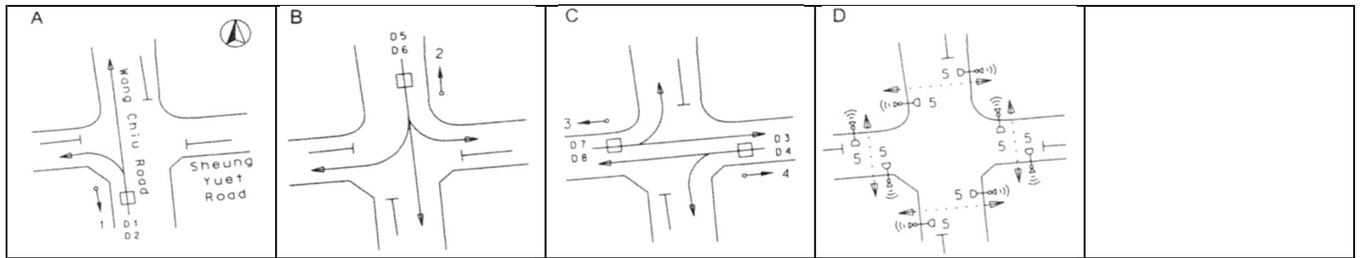
Wang Chiu Road / Sheung Yuet Road

DATE : 29-Apr-21

FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	140 sec
Sum(y)		Y =	0.539
Loss time		L =	44 sec
Total Flow		=	3295 pcu
Co	= (1.5*L+5)/(1-Y)	=	153.9 sec
Cm	= L/(1-Y)	=	95.4 sec
Yult		=	0.870
R.C.ult	= (Yult-Y)/Y*100%	=	61.5 %
Cp	= 0.9*L/(0.9-Y)	=	109.6 sec
Ymax	= 1-L/C	=	0.686
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	14.6 %



Stage 1	Int = 6	Stage 2	Int = 7	Stage 3	Int = 9	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	14	12	3	10	12	3	10	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				19				
4,5	1	3.50	I	1	15		N	1965	255	32		287	0.89	1805		1200	3005	0.096	0.096		17	17	0.785	65
5	1	3.20	I	1				2075		198		198	0.00	2075			2075	0.095			17	17	0.785	47
10,11	2	3.30	I	1	15		N	1945	335	228		563	0.60	1836			1836	0.307	0.307		55	55	0.785	86
11	2	3.30	I	1				2085		637		637	0.00	2085			2085	0.306			54	55	0.782	97
12	2	3.30	II	1	20			2085			580	580	1.00	1940			1940	0.299			53	55	0.766	88
7,8	3	3.50	II	1	15		N	1965	200	48		248	0.81	1818			1818	0.136	0.136		24	24	0.785	54
8	3	3.50	II	1				2105		287		287	0.00	2105			2105	0.136			24	24	0.785	61
1,2	3	3.50	II	1	15		N	1965	150	81		231	0.65	1845			1845	0.125			22	24	0.721	51
2	3	3.50	III	1				2105		264		264	0.00	2105			2105	0.125			22	24	0.722	57
																	Stage 4 Pedestrian Stage			25				

OVE ARUP & PARTNERS

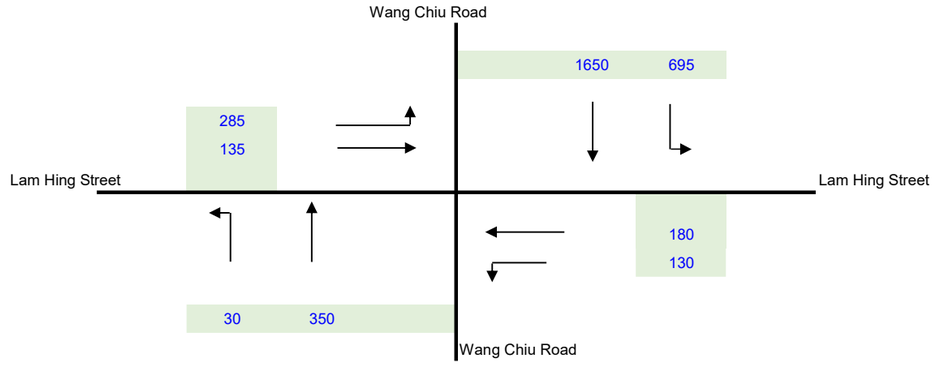
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

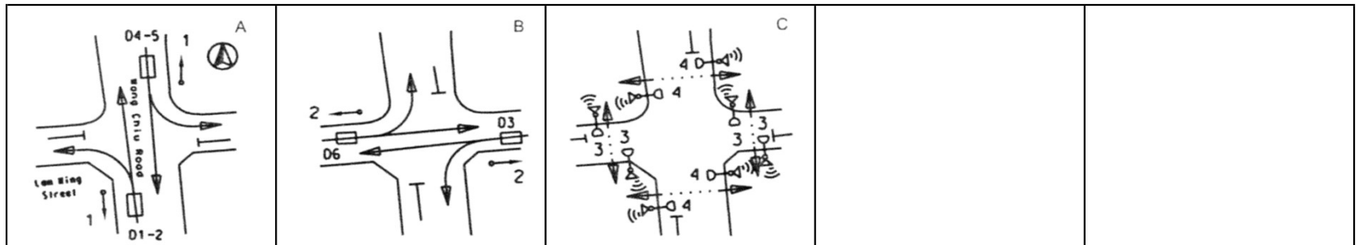
Wang Chiu Road / Lam Hing Road

DATE : 29-Apr-21

FILENAME:



No. of stages per cycle	N =	3
No. of stage using for calculation	N =	2
Cycle time	C =	140 sec
Sum(y)	Y =	0.552
Loss time	L =	33 sec
Total Flow	=	3455 pcu
Co = (1.5*L+5)/(1-Y)	=	121.7 sec
Cm = L/(1-Y)	=	73.7 sec
Yult	=	0.953
R.C.ult = (Yult-Y)/Y*100%	=	72.5 %
Cp = 0.9*L/(0.9-Y)	=	85.4 sec
Ymax = 1-L/C	=	0.764
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	24.6 %



Stage 1	Int = 6	Stage 2	Int = 8	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	5	5	3	5	13	3	5	OK
4	11	10	3	8	10	3	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1,2	1	3.50	I	1	15		N	1965	30	157		187	0.16	1934			1934	0.097	0.392		19	76	0.178	20
2	1	3.50	I	1				2105		193		193	0.00	2105			2105	0.092			18	76	0.169	21
4	1	3.50	I	1	15		N	1965	695			695	1.00	1786			1786	0.389			75	76	0.717	74
5	1	3.50	I	2				4210		1650		1650	0.00	4210			4210	0.392			76	76	0.723	88
3	2	4.00	II	1	15		N	2015	130	180		310	0.42	1934			1934	0.160	0.160		31	31	0.723	62
6a	2	4.00	II	1	20		N	2015	285			285	1.00	1874			1874	0.152			29	31	0.685	52
6b	2	4.00	II	1			N	2015		135		135	0.00	2015			2015	0.067			13	31	0.302	25
																	Stage 3 Pedestrian Stage			21				

OVE ARUP & PARTNERS

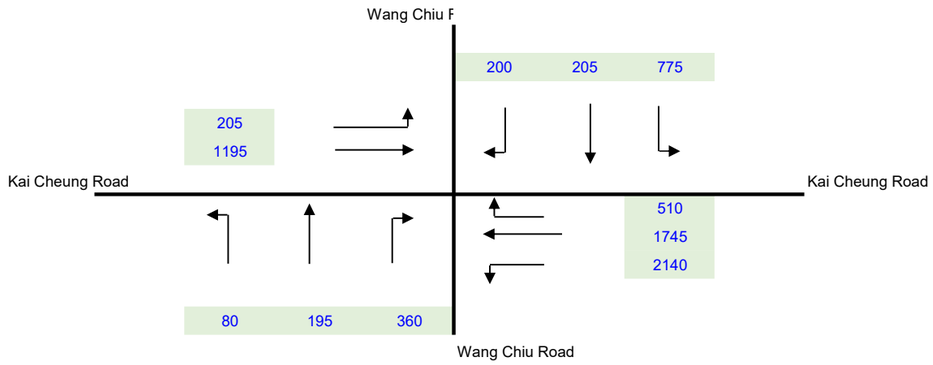
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

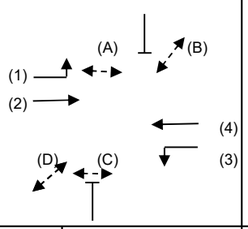
Wang Chiu Road / Kai Cheung Road

DATE : 29-Apr-21

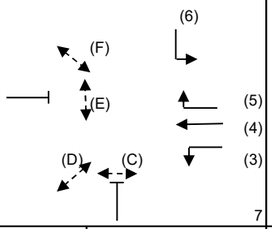
FILENAME:



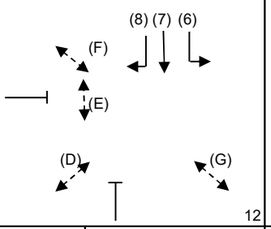
No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	140 sec
Sum(y)		Y =	0.692
Loss time		L =	24 sec
Total Flow		=	7610 pcu
Co	= (1.5*L+5)/(1-Y)	=	133.0 sec
Cm	= L/(1-Y)	=	77.8 sec
Yult		=	1.020
R.C.ult	= (Yult-Y)/Y*100%	=	47.5 %
Cp	= 0.9*L/(0.9-Y)	=	103.7 sec
Ymax	= 1-L/C	=	0.829
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	7.8 %



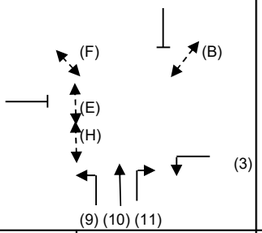
Stage 1 | Int = 7



Stage 2 | Int =



Stage 3 | Int = 10



Stage 4 | Int = 10

Stage 5 | Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	8	7	3	5	30	3	5	OK
B	7	5	3	6	98	3	6	OK
C	11	10	2	8	77	2	8	OK
D	4	5	2	5	105	2	5	OK
E	10	5	2	8	91	2	8	OK
F	4	5	2	5	94	2	5	OK
G	7	5	3	6	16	3	6	OK
H	10	5	4	8	15	4	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				24				
1	1	3.50	I	1	25		N	1965	205			205	1.00	1854			1854	0.111	0.189		19	32	0.488	37
2	1	3.50	I	3				6315		1195		1195	0.00	6315			6315	0.189			32	32	0.835	74
3	1,2,4	3.50	I	2	25		N	4070	2140			2140	1.00	3840			3840	0.557			93	103	0.754	65
4	1,2	3.50	II	2				4210		1745		1745	0.00	4210		380	4590	0.380			64	76	0.697	92
5	2	3.50	II	1	20			2105			510	510	1.00	1958			1958	0.260			44	44	0.835	94
6	2,3	3.50	II	1	25		N	1965	775			775	1.00	1854		110	1964	0.395	0.395		66	66	0.835	101
7	3	3.50	II	1				2105		139		139	0.00	2105			2105	0.066			11	14	0.685	35
7.8	3	3.50	III	1	30			2105		66	69	135	0.51	2053			2053	0.066			11	14	0.682	28
8	3	3.50	III	1	25			2105			131	131	1.00	1986			1986	0.066			11	14	0.684	34
9,10	4	3.50	III	1	25		N	1965	80	126		206	0.39	1920			1920	0.107	0.108		18	18	0.831	54
10,11	4	3.50	III	1	25			2105		69	149	218	0.68	2022			2022	0.108			18	18	0.835	56
11	4	3.50	III	1	20			2105			211	211	1.00	1958			1958	0.108			18	18	0.834	55

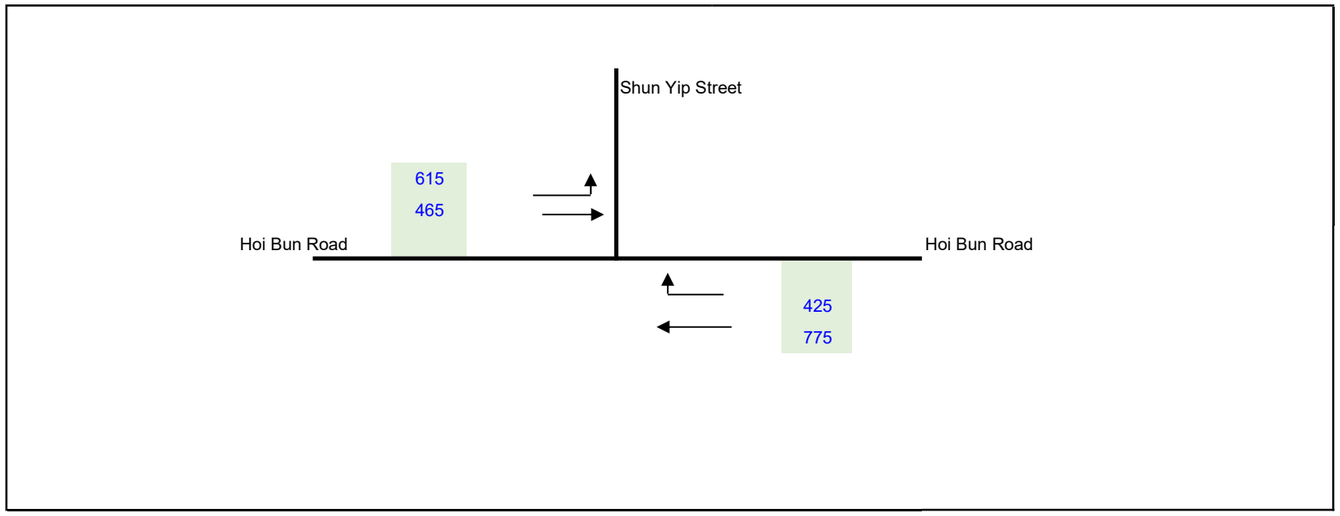
ARUP — TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

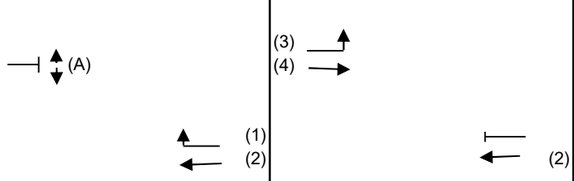
Shun Yip Street / Hoi Bun Road

DATE : 29-Apr-21

FILENAME :



No. of stages per cycle		N =	2
No. of stage using for calculation		N =	2
Cycle time		C =	120 sec
Sum(y)		Y =	0.492
Loss time		L =	39 sec
Total Flow		=	2280 pcu
Co	= (1.5*L+5)/(1-Y)	=	125.0 sec
Cm	= L/(1-Y)	=	76.8 sec
Yult		=	0.608
R.C.ult	= (Yult-Y)/Y*100%	=	23.5 %
Cp	= 0.9*L/(0.9-Y)	=	86.0 sec
Ymax	= 1-L/C	=	0.675
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	23.5 % (Optimized)



STAGE 1	INT= 10	STAGE 2	INT= 6	STAGE 3 (ped)	INT= 2	STAGE 4	INT= 0

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	7	5	0	6	59	0	6	OK
B	7	5	3	6	14	3	6	OK
C	11.5	10	3	8	12	3	8	OK
D	10	6	5	12	6	5	12	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradien %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				16				
1	1	3.50	I	1	30			2105			425	425	1.00	2005			2005	0.212	0.212		35	35	0.729	60
2	1,2	3.50	I	1			N	1965		775		775	0.00	1965			1965	0.394			65	85	0.557	45
3	2	3.50	II	1	15		N	1965	500			500	1.00	1786			1786	0.280	0.280		46	46	0.729	62
3,4	2	3.50	II	1	20			2105	115	465		580	0.20	2074			2074	0.280			46	46	0.728	71
																		Pedestrian Stage 3		23				

NOTE : 'O - OPPOSING TRAFFIC N - NEAR SIDE LANE SG - STEADY GREEN FG - FLASHING GREEN PEDESTRIAN WALKING SPEED = 1.2m/s QUEUING LENGTH = AVERAGE QUEUE * 6m

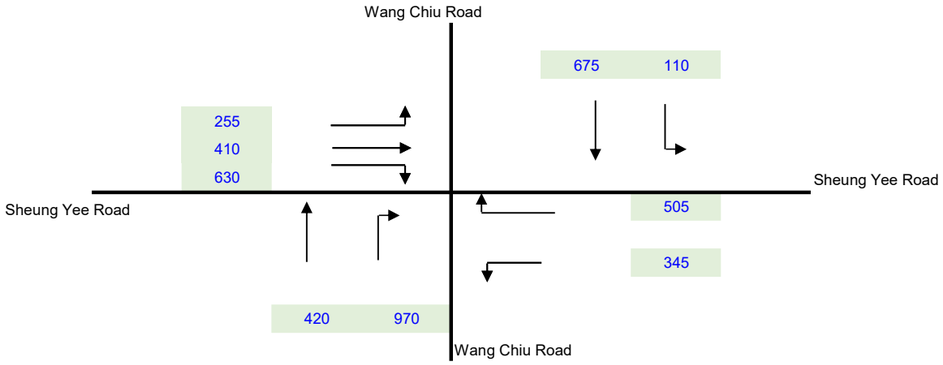
OVE ARUP & PARTNERS

TRAFFIC SIGNAL CALCULATION

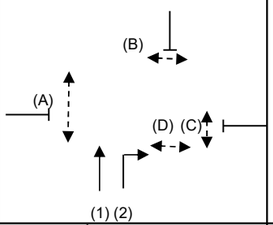
PROJECT NO: 237938

Wang Chiu Road / Sheung Yee Road

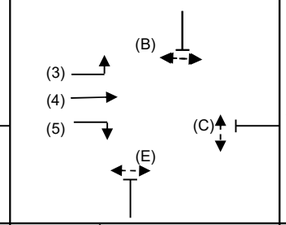
DATE : 29-Apr-21 FILENAME:



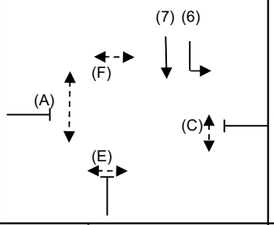
No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	120 sec
Sum(y)		Y =	0.652
Loss time		L =	22 sec
Total Flow		=	4320 pcu
Co	= (1.5*L+5)/(1-Y)	=	109.3 sec
Cm	= L/(1-Y)	=	63.3 sec
Yult		=	1.035
R.C.ult	= (Yult-Y)/Y*100%	=	58.6 %
Cp	= 0.9*L/(0.9-Y)	=	80.0 sec
Ymax	= 1-L/C	=	0.817
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	12.7 %



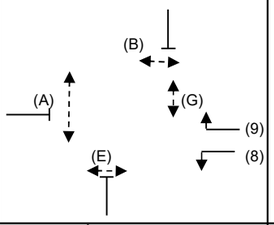
Stage 1	Int =	7



Stage 2	Int =	6



Stage 3	Int =	6



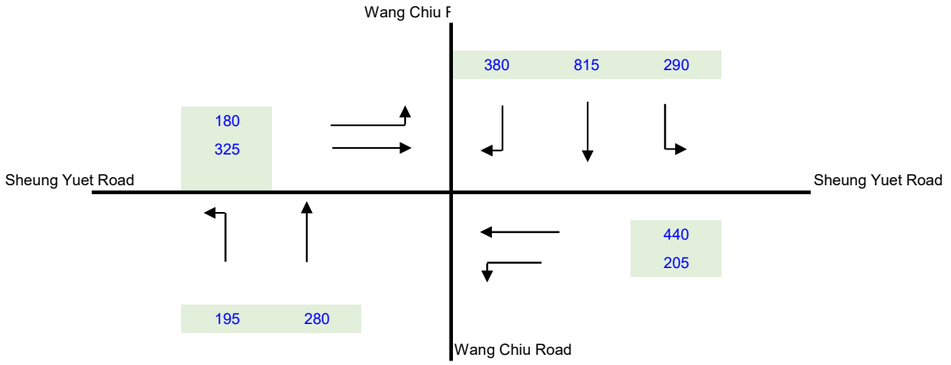
Stage 4	Int =	7

Stage 5	Int =	0

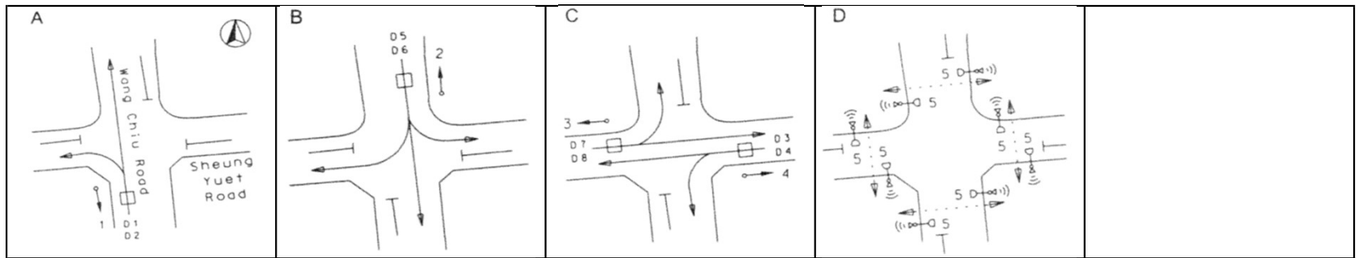
Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	16	7	2	13	80	2	13	OK
B	10	5	2	8	86	2	8	OK
C	10	5	2	8	82	2	8	OK
D	10	5	8	8	26	8	8	OK
E	10	5	3	8	67	3	8	OK
F	7	5	6	6	12	6	6	OK
G	7	5	6	6	16	6	6	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				22				
1	1	3.50	I	2			N	4070		420		420	0.00	4070			4070	0.103	0.242		16	36	0.341	29
2	1	3.50	I	2	30			4210			970	970	1.00	4010			4010	0.242			36	36	0.799	71
3	2	3.50	II	1	15		N	1965	236			236	1.00	1786			1786	0.132	0.132		20	20	0.799	45
3,4	2	3.50	II	1	18			2105	19	257		276	0.07	2093			2093	0.132			20	20	0.797	52
4,5	2	3.50	II	1	35			2105		153	119	272	0.44	2066			2066	0.132			20	20	0.796	51
5	2	3.50	II	2	30		N	4070			511	511	1.00	3876			3876	0.132			20	20	0.797	46
6,7	3	3.50	III	1	15		N	1965	110	133		243	0.45	1880			1880	0.129	0.129		19	19	0.799	47
7	3	3.50	III	2				4210		542		542	0.00	4210			4210	0.129			19	19	0.796	48
8	4	3.50	IV	1	15		N	1965	266			266	1.00	1786			1786	0.149	0.149		22	22	0.798	49
8,9	4	3.50	III	1	15			2105	79		206	285	1.00	1914			1914	0.149			22	22	0.798	52
9	4	3.50	IV	1	30			2105			299	299	1.00	2005			2005	0.149			22	22	0.799	55

OVE ARUP & PARTNERS	TRAFFIC SIGNAL CALCULATION		
		PROJECT NO: 237938	
Wang Chiu Road / Sheung Yuet Road		DATE : 29-Apr-21	FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	3
Cycle time		C =	140 sec
Sum(y)		Y =	0.538
Loss time		L =	43 sec
Total Flow		=	3110 pcu
Co	= (1.5*L+5)/(1-Y)	=	150.6 sec
Cm	= L/(1-Y)	=	93.1 sec
Yult		=	0.878
R.C.ult	= (Yult-Y)/Y*100%	=	63.0 %
Cp	= 0.9*L/(0.9-Y)	=	107.0 sec
Ymax	= 1-L/C	=	0.693
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	15.8 %



Stage 1	Int = 6	Stage 2	Int = 7	Stage 3	Int = 8	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	14	12	3	10	12	3	10	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				18				
4,5	1	3.50	I	1	15		N	1965	195	87		282	0.69	1838		1200	3038	0.093	0.093		17	17	0.775	64
5	1	3.20	I	1				2075		193		193	0.00	2075			2075	0.093			17	17	0.777	46
10,11	2	3.30	I	1	15		N	1945	290	229		519	0.56	1842			1842	0.282	0.282		51	51	0.777	83
11	2	3.30	I	1				2085		586		586	0.00	2085			2085	0.281			51	51	0.775	93
12	2	3.30	II	1	20			2085			380	380	1.00	1940			1940	0.196			35	51	0.540	57
7,8	3	3.50	II	1	15		N	1965	205	96		301	0.68	1840			1840	0.164	0.164		29	29	0.777	61
8	3	3.50	II	1				2105		344		344	0.00	2105			2105	0.163			29	29	0.776	69
1,2	3	3.50	II	1	15		N	1965	180	55		235	0.77	1825			1825	0.129			23	29	0.611	43
2	3	3.50	III	1				2105		270		270	0.00	2105			2105	0.128			23	29	0.609	50
																	Stage 4 Pedestrian Stage			25				

OVE ARUP & PARTNERS

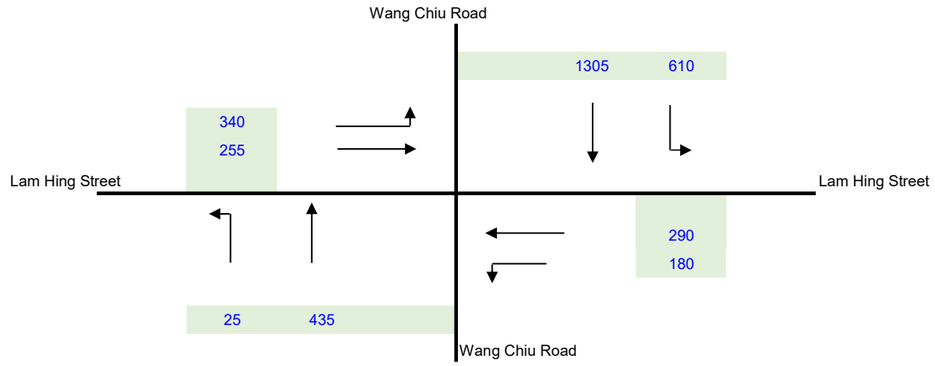
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

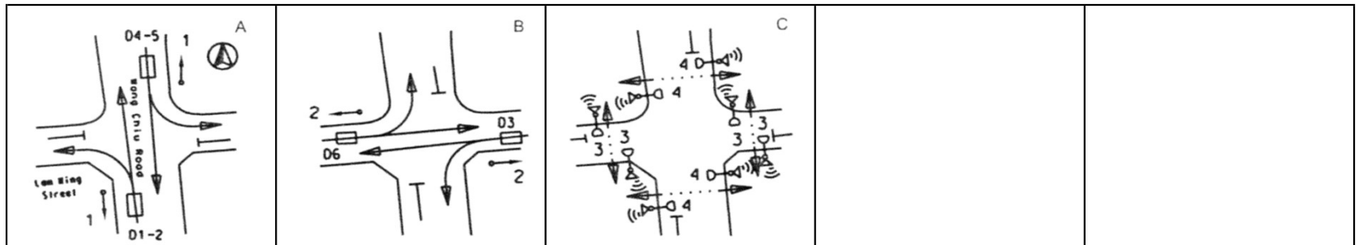
Wang Chiu Road / Lam Hing Road

DATE : 29-Apr-21

FILENAME:



No. of stages per cycle	N =	3
No. of stage using for calculation	N =	2
Cycle time	C =	140 sec
Sum(y)	Y =	0.584
Loss time	L =	33 sec
Total Flow	=	3440 pcu
Co = (1.5*L+5)/(1-Y)	=	130.9 sec
Cm = L/(1-Y)	=	79.3 sec
Yult	=	0.953
R.C.ult = (Yult-Y)/Y*100%	=	63.2 %
Cp = 0.9*L/(0.9-Y)	=	93.9 sec
Ymax = 1-L/C	=	0.764
R.C.(C) = (0.9*Ymax-Y)/Y*100%	=	17.9 %



Stage 1	Int = 6	Stage 2	Int = 8	Stage 3	Int =	Stage 4	Int =	Stage 5	Int =

Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
3	5	5	3	5	13	3	5	OK
4	11	10	3	8	10	3	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				12				
1,2	1	3.50	I	1	15		N	1965	25	201		226	0.11	1944			1944	0.116	0.341		21	63	0.260	29
2	1	3.50	I	1				2105		234		234	0.00	2105			2105	0.111			20	63	0.249	30
4	1	3.50	I	1	15		N	1965	610			610	1.00	1786			1786	0.341			63	63	0.764	85
5	1	3.50	I	2				4210		1305		1305	0.00	4210			4210	0.310			57	63	0.693	84
3	2	4.00	II	1	15		N	2015	180	290		470	0.38	1941			1941	0.242	0.242		44	44	0.764	81
6a	2	4.00	II	1	20		N	2015	340			340	1.00	1874			1874	0.181			33	44	0.572	54
6b	2	4.00	II	1			N	2015		255		255	0.00	2015			2015	0.127			23	44	0.399	41
																	Stage 3 Pedestrian Stage			21				

OVE ARUP & PARTNERS

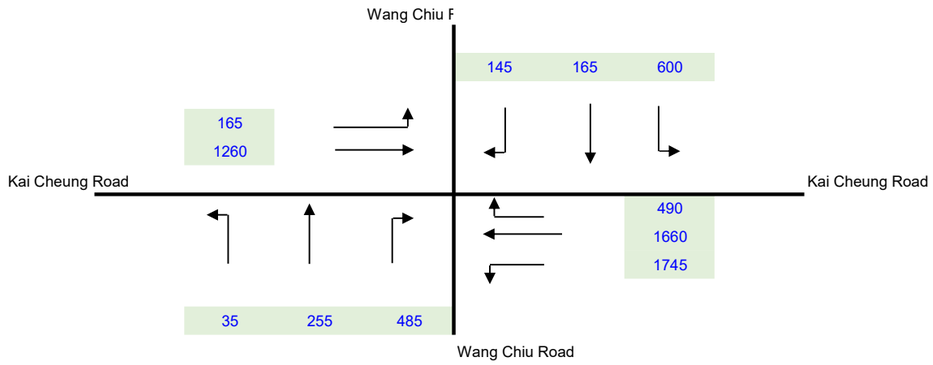
TRAFFIC SIGNAL CALCULATION

PROJECT NO: 237938

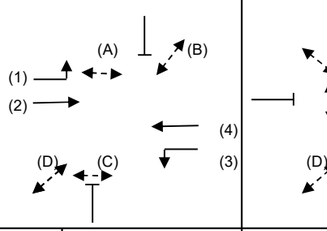
Wang Chiu Road / Kai Cheung Road

DATE : 29-Apr-21

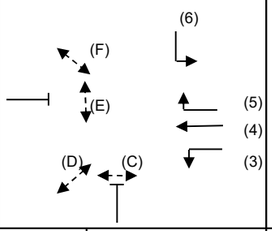
FILENAME:



No. of stages per cycle		N =	4
No. of stage using for calculation		N =	4
Cycle time		C =	140 sec
Sum(y)		Y =	0.632
Loss time		L =	32 sec
Total Flow		=	7005 pcu
Co	= (1.5*L+5)/(1-Y)	=	144.0 sec
Cm	= L/(1-Y)	=	87.0 sec
Yult		=	0.960
R.C.ult	= (Yult-Y)/Y*100%	=	51.9 %
Cp	= 0.9*L/(0.9-Y)	=	107.5 sec
Ymax	= 1-L/C	=	0.771
R.C.(C)	= (0.9*Ymax-Y)/Y*100%	=	9.9 %



Stage 1 | Int = 7



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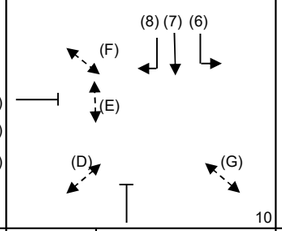
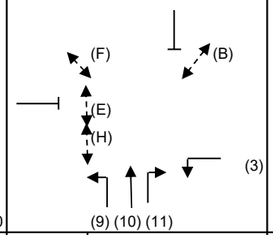


Stage 3 | Int = 12



Stage 4 | Int = 10

Stage 5 | Int =

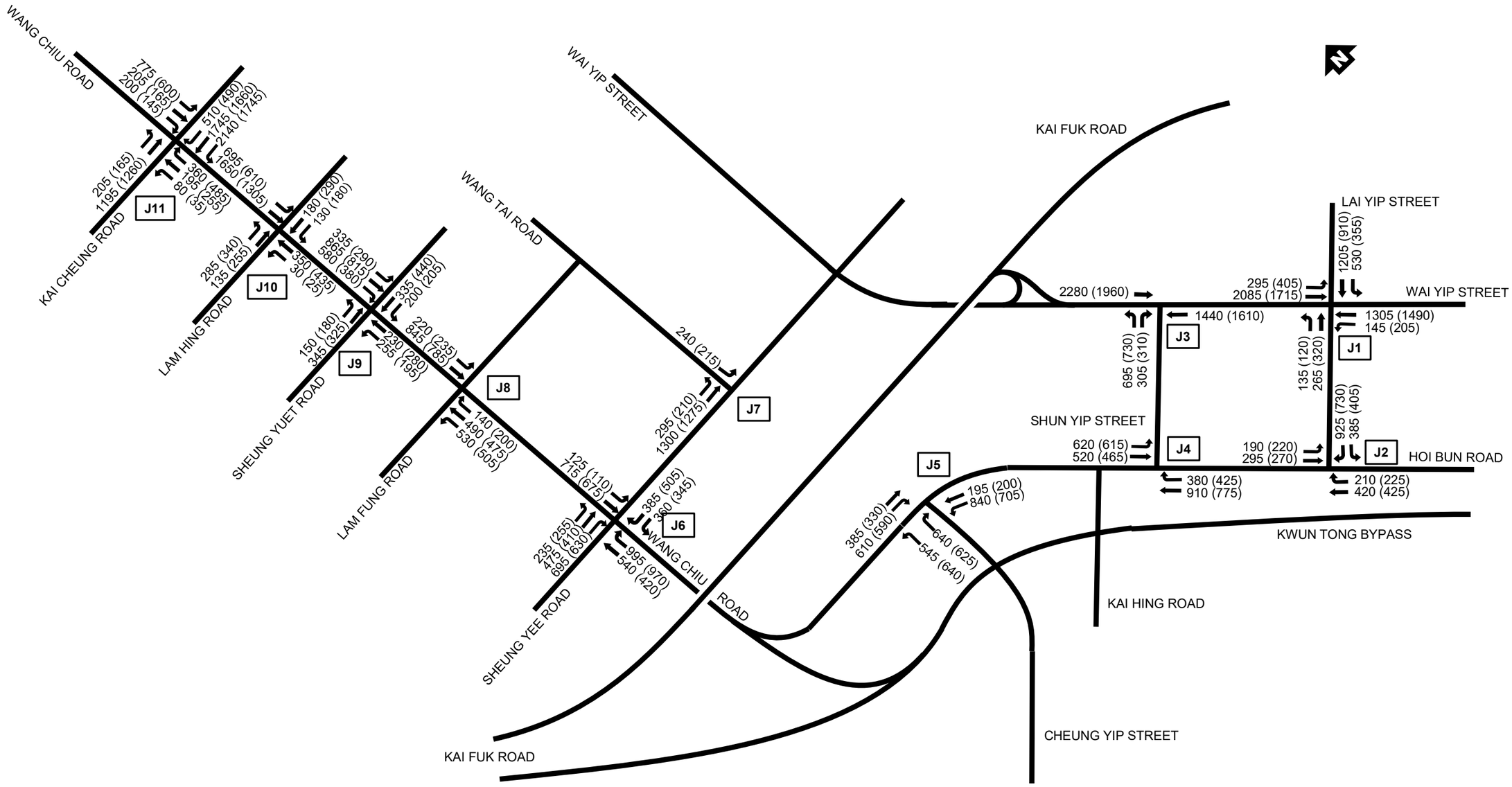
Pedestrian Phase	Width (m)	Green Time Required (s) SG	Delay	FG	Green Time Provided (s) SG	Delay	FG	Check
A	8	7	3	5	32	3	5	OK
B	7	5	3	6	111	3	6	OK
C	11	10	2	8	72	2	8	OK
D	4	5	2	5	92	2	5	OK
E	10	5	2	8	81	2	8	OK
F	4	5	2	5	84	2	5	OK
G	7	5	3	6	9	3	6	OK
H	10	5	4	8	20	4	8	OK

Move-ment	Stage	Lane Width m.	Phase	No. of lane	Radius m.	O	N	Straight-Ahead Sat. Flow	m Left pcu/h	m Straight pcu/h	m Right pcu/h	Total FLow pcu/h	Proportion of Turning Vehicles	Sat. Flow pcu/h	Uphill Gradient %	Short lane Effect pcu/h	Revised Sat. Flow pcu/h	y	Greater y	L sec	g (required) sec	g (input) sec	Degree of Saturation X	Queuing Length m.
																				32				
1	1	3.50	I	1	25		N	1965	165			165	1.00	1854			1854	0.089	0.200		15	34	0.365	29
2	1	3.50	I	3				6315		1260		1260	0.00	6315			6315	0.200			34	34	0.819	76
3	1,2,4	3.50	I	2	25		N	4070	1745			1745	1.00	3840			3840	0.454			78	116	0.547	34
4	1,2	3.50	II	2				4210		1660		1660	0.00	4210		340	4550	0.365			62	85	0.602	76
5	2	3.50	II	1	20			2105			490	490	1.00	1958			1958	0.250	0.250		43	43	0.819	85
6	2,3	3.50	II	1	25		N	1965	600			600	1.00	1854		120	1974	0.304			52	58	0.729	88
7	3	3.50	II	1				2105		106		106	0.00	2105			2105	0.050	0.050		9	9	0.817	35
7.8	3	3.50	III	1	30			2105		59	45	104	0.43	2060			2060	0.050			9	9	0.819	35
8	3	3.50	III	1	25			2105			100	100	1.00	1986			1986	0.050			9	9	0.817	34
9,10	4	3.50	III	1	25		N	1965	35	220		255	0.14	1949			1949	0.131	0.132		22	23	0.814	56
10,11	4	3.50	III	1	25			2105		35	227	262	0.87	2001			2001	0.131			22	23	0.814	57
11	4	3.50	III	1	20			2105			258	258	1.00	1958			1958	0.132			23	23	0.819	63

Attachment B

Flow Diagram

2031 (Design Case) Forecasted Traffic Flows (pcu/hr)



LEGEND:

AM PEAK HOUR PCU
(PM PEAK HOUR PCU)

Agreement No. CE 4/2014(TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – FEASIBILITY STUDY

Additional Service – Non-EFLS Scenario
VISUAL IMPACT ASSESSMENT (VIA)

Final

July 2021



Development Bureau
The Government of the Hong Kong Special Administrative Region

ARUP

Energizing Kowloon East Offices, Development Bureau

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study

Additional Service – Non- EFLS Scenario Visual Impact Assessment

Agreement No. CE 4/2014 (TP)

Final | July 2021

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

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

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Abbreviations and Acronyms

"CBD"	Central Business District
"CMP"	Conceptual Master Plan
"DevB"	Development Bureau
"EFLS"	Environmentally Friendly Linkage System
"EKEO"	Energizing Kowloon East Office
"HKPF"	Hong Kong Police Force
"HyD"	Highway Departments
"KBAA"	Kowloon Bay Action Area
"KBBA"	Kowloon Bay Business Areas
"KTD"	Kai Tak Development
"TD"	Transport Department
"VEC"	Vehicle Examination Centres
"VSRs"	Visually Sensitive Receivers
"ZVI"	Zone of Visual Influence

1 Introduction

1.1 Study Background

1.1.1 Kowloon East is an area comprising the former Kai Tak Airport, Kwun Tong Business Area (KTBA) and Kowloon Bay Business Areas (KBBA). This area witnessed the rapid growth of an important industrial base in the heyday of Hong Kong's manufacturing industry, creating hundreds of thousands of jobs and propelling Hong Kong's prosperity. Following relocation of the Airport to Chek Lap Kok and our manufacturing base to the Mainland, a huge stock of industrial buildings was not being fully utilised. On the other hand, with the continuing boom of Hong Kong's financial and service sectors as well as large numbers of regional headquarters and regional offices of multi-national companies setting their foothold in Hong Kong, the demand for quality offices can no longer be met by our traditional Central Business District (CBD). Some private developers have developed high-grade office buildings and retail centres in Kowloon East. About 2.5 million sqm office floor space have been completed in 2017.

1.1.2 In 2001, all industrial land in Kwun Tong and Kowloon Bay was rezoned to "Other Specified Uses (Business)" ("OU(Business)"). The "OU(Business)" zone allows industrial premises to be converted to office use and industrial buildings redeveloped for commercial/ office uses. In April 2010, the Government also introduced measures to revitalise industrial buildings in Hong Kong. It is anticipated that, together with the new commercial/ office space to be provided in Kai Tak Development (KTD) area, the total commercial/ office space in Kowloon East has a potential to increase from the current 2.9 million sqm to another additional 4.1 million sqm in future, bringing a total supply of about 7.0 million sqm in the district. Kowloon East has great potential to evolve into a vibrant premier business district in Hong Kong.

1.1.3 In the 2011-12 Policy Address, the Chief Executive (CE) announced that the Government would adopt a visionary, coordinated and integrated approach to expedite the transformation of Kowloon East into an attractive, alternative CBD to support Hong Kong's economic development. Energizing Kowloon East Office (EKEO) was therefore set up in the Development Bureau (DevB) to undertake initiatives of land use review, urban design, improved connectivity and the associated infrastructure.

1.1.4 The initial proposals for Energizing Kowloon East were formulated under the CBD2 strategy, with main focus on enhancing Connectivity, Branding, Design and Diversity. These proposals were consolidated on the Conceptual Master Plan (CMP) version 2.0 issued on 7 June 2012 and further refinement of the CMP was promulgated in January 2015 (version 4.0) taking on board suggestions during the ongoing public engagement process and new

opportunities identified. The latest CMP 5.0 was promulgated in November 2016, focusing on 5 issues, including Walkability and Mobility, Green CBD, Smart City, Socio-economic Vibrancy, and the Spirit of Creation.

1.1.5 One of the key tasks of EKEO is to proactively review the development and design options of undeveloped/under-developed Government sites with guidance of the CBD2 strategy. Releasing the development potential of Kowloon Bay Action Area (KBAA) which is at the core area of Kowloon East, for mixed development will bring great vibrancy to the region. The Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study (the Study) is therefore commissioned to review, investigate, and produce feasible development options and implementation strategy to optimise the development potential of KBAA in terms of its strategic setting, constraints and opportunities.

1.2 Study Area and Area of Influence

1.2.1 The Study Site covers the existing Government sites in KBAA which include the area currently occupied by Transport Department (TD)'s two Vehicle Examination Centres (VECs), Environmental Protection Department (EPD)'s waste recycling centre[1] , Highway Departments (HyD)'s maintenance depot, Hong Kong Police Force (HKPF)'s police vehicle pound and the areas of roads, pedestrian walkways, sitting-out area and amenity areas in between. The area is mainly bounded by Sheung Yee Road in the North, Wai Yip Street in the East and the edge of Kwun Tong Bypass and the adjoining amenity areas in the West and South next to KTD. It has an area of about 17 ha including the areas of roads, pedestrian walkways, sitting-out area and amenity areas (**Figure 1.1** refers).

1.2.2 The Study Area is mainly zoned for "Government, Institution or Community (1)" ("G/IC(1)"), "Other Specified Uses (Refuse Transfer Station)" ("OU(Refuse Transfer Station)"), "Other Specified Uses (Business)" ("OU(Business)") and "Road" uses.

1.2.2.1 The Study Area is divided into six development sites, namely Lots 1 to 6 (**Figure 1.1** refers). The Kai Fuk Road flyover (Lot 3) literally bisected KBAA into the northern and southern portion. The northern cluster consists of the highway maintenance depot (part of area underneath the Flyover at Lot 3), a police vehicle detention and examination centre (Lot 1) and was previously occupied the former waste recycling centre (Lot 2), whereas the southern cluster by two vehicle examination centres (VECs) (Lot 4). Within KBAA, two lots zoned "OU(Business)" namely the New Kowloon Inland Lots (NKILs) 6512 (Lot 6) and 6313 (Lot 5) were sold in January and May 2015 and the respective commercial development has been completed in 2019.

[1] The waste recycling center has been demolished in Q1 2021

1.3 Purpose of this Report

1.3.1 The purpose of this Report is to assess the potential visual impacts arising from the proposed development at KBAA in accordance with the prevailing regulations and guidelines. The visual baseline reviews the condition of existing visual character, planning and development control framework, the visual amenity and visually sensitive receivers (VSRs). The assessment identifies potential visual impacts that would occur during the construction and operational phases of the proposed development at KBAA under the non-EFLS scenario, recommends visual mitigation measures to alleviate the impacts; and identifies residual effects apparent after mitigation.

1.4 Structure of this Report

1.4.1 The structure of this Report is as below:

Section	Title	Aims
1	Introduction	Introduces the project background and objectives of this report
2	Description of RODP	Summarizes key development parameters and considerations for the RODP
3	Visual Impact Assessment	Presents the standards and guidelines, baseline conditions, assessment methodology, impact assessment and mitigation measures that may be required for visual impact
4	Conclusion	Summarizes the findings and concludes the overall visual acceptability of the project

2 Recommended Outline Development Plan

2.1 Key Development Parameters

2.1.1

The Non-EFLS scenario has taken into consideration the efficient use of land resources, quality urban design within the bounds of the infrastructure capacities. In line with the development intensity in the "OU(B)" zone and Kowloon Bay as well as the anticipated decrease in hotel's demands in the coming years, the proposed plot ratio of the Non-EFLS scenario has been reviewed by converting portion of the proposed hotel development into office development. **Figure 2.1** shows the recommended outline development plan. The key development parameters are presented in **Table 2.1.1** and the indicative massing is presented in **Figure 2.2**.

Table 2.1.1 Key Development Parameters on Individual Lots

Lot	Gross Site Area (m2) (about)	Net Site Area (m2) (about)	GFA (m2) (about)	Plot Ratio	BH (mPD)
1	9,500	9,500	subject to detailed design and feasibility study	N/A	40
2*	24,140	17,000	204,600	12.0	120 & 150
3	8,400	8,400	400	N/A	9
4**	25,020	16,750	201,000	12.0	120 & 135
5	3,800	3,800	45,540	12.0	120
6	6,800	6,800	82,040	12.0	100
Total (excluding Lots 1 & 3)		44,350	533,180	N/A	-
TOTAL (excluding Lot 1)		52,750	533,580	N/A	-

Notes:

* Includes POSPD of about 4,400m^2 and the section of Cheung Yip Street (between Lots 2 and 5) of about 2,740m2

** Includes POSPDs of about 1,600m^2 (western portion) and about 1,700m2 between eastern portion and Lot 6, amenity areas of 2,140m^2 and the section of Cheung Yip Street of about 2,830m^2

2.2 Proposed Land Use Budget

2.2.1

The land use budget is tabulated in **Table 2.2.1**.

Table 2.2.1 Summary of the Proposed Land Use Mix of RODP

USES	GFA	%
Office	391,080	73%
Retail/ F&B/ Entertainment/ Urban Farming / Food Workshop	122,220	23%
Hotel	14,880	2%
Arts, Cultural and Creative	400	0.07%

Transport Facilities	5,000	0.93%
Total	533,580	100.0%

Remarks: The GFA of the two sold sites (i.e. Lots 5 and 6) are included. Based on the latest building plans, about 11 6,110 m2 of office GFA and 11,480 m2 of retail and F&B GFA are provided at the two sites.

3 Visual Impact Assessment

3.1 Introduction

3.1.1 The aim of this section is to present the assessment of potential visual impacts by the proposed development at Kowloon Bay Action Area (KBAA) under non-EFLS scenario. The baseline reviews the visual elements and identifies public viewing points (VPs). The assessment appraises the degree of visual change by the proposed development on the identified public viewers, recommends mitigation measures to alleviate the impacts. This section also outlines any cumulative visual impacts arising from the proposed developments and other concurrent projects. The BH of proposed KBAA development is generally in line with the existing and planned OZP-compliant BH profile of the surrounding area. The visual resources from the surrounding context would not be adversely affected. To better illustrate the relationship among existing buildings, KBAA development and planned development of the surrounding areas, the building silhouettes of the surrounding planned development in compliance with BH restriction are depicted on the photomontages, while the KBAA development is shown in shaded blockings.

3.2 Standards and Guidelines

3.2.1 The following standards and guidelines are applicable to the evaluation of visual impact associated with development planning in Hong Kong:

- Town Planning Board (TPB) PG-NO.41 – Guidelines on Submission of Visual Impact Assessment for Planning Applications to the Town Planning Board;
- Town Planning Ordinance (Cap 131); and
- Hong Kong Planning Standards and Guidelines (Chapter 4, 10, 11 and 12);
- DEVB TCW No. 2/2012 – Allocation of Space for Quality Greening on Roads;
- DEVB – Public Open Space in Private Developments Design and Management Guidelines (Jan. 2011); and
- Building Department, APP-152 – Sustainable Building Design Guidelines.

3.3 Visual Assessment Methodology

3.3.1 The visual impact assessment (VIA) has been prepared in accordance with TPB PG-NO.41. The assessment area for VIA is expected to cover the area of visual influence within which the Project is pronouncedly visible from key sensitive viewers.

Identification of Zone of Visual Influence (ZVI)

3.3.2 The visual assessment area is defined by the ZVI which is expected to cover the fields of views from all sensitive viewers in direct sight of the proposed development. The ZVI is determined having regard to the size of the proposed development, the distance of the development and its potential visibility from the selected viewing points, and the actual site and surrounding topographical conditions by ground inspection.

3.3.3 The ZVI of the Project is identified through a combination of detailed field surveys, desktop study and review of aerial photographs.

Viewing Points (VPs)

3.3.4 The VPs for the VIA are identified within the ZVI, which are identified from key strategic and popular local vantage points. They include key pedestrian nodes, popular areas used by the public or tourists for outdoor activities, recreation, rest, sitting-out, leisure, walking, sight-seeing, and prominent travel routes where travellers' visual attention may be caught by the proposed development.

3.3.5 The assessment of sensitivity of the public viewers from the VPs can be qualitatively graded as high, medium or low, taking into account the activity of the viewers, the duration and distance over which the proposed development would remain visible, and the public perception of value attached to the views being assessed. Thus, the VPs and their sensitivity can be broadly categorised as follows:

High Sensitivity	The VP is highly sensitive to any changes in the viewing experience – e.g. Residential properties where the principle view is of the development site, formalised public viewpoints or designed landscape vistas.
Medium Sensitivity	The VP is moderately sensitive to any changes in the viewing experience – e.g. Outdoor workers, office workers, recreational users, residential properties where the secondary view is of the development.

Low Sensitivity	The VP is slightly sensitive to any changes in the viewing experience – e.g. People travelling through the landscape (by private/public motorised transport).

Appraisal of Visual Changes

3.3.6 The effects of visual changes on the assessment area and sensitive public viewers from the VPs are appraised, taking into account the following aspects:

- Visual Composition;
- Visual Obstruction;
- Effect on Public Viewers; and
- Effect on Visual Resources.

3.3.7 The effects of the visual changes can be graded qualitatively in terms of magnitude as large, intermediate, small, and negligible.

Identification of Potential Visual Mitigation Measures

3.3.8 Identification of potential mitigation measures, alternative design, and/ or alignment, and/ or construction methodologies that will make the project more compatible with its landscape setting. Alternative design, and/ or alignment, and/ or construction methodologies that will avoid or reduce visual impacts are considered before adopting other mitigation measures. It would incorporate a number of specific planning or design principles and concepts to alleviate adverse visual impacts at the outset.

3.3.9 Mitigation measures are considered for both construction and operational phases to prevent or minimise unavoidable adverse impacts and/ or generate beneficial long-term impacts.

Conclusion

3.3.10 The conclusion evaluates the overall visual impact of the proposed development, taking into account the sensitivity of the key public viewers from the VPs, visual resources and visual amenities likely to be affected, the magnitude, extent and duration of impact and any resultant improvement or degradation in the visual quality and character of the surrounding area, and the planning intention and known planned developments of the area.

3.4 Visual Baseline Condition

Zone of Visual Influence (ZVI)

3.4.1 The visual assessment area is defined by the ZVI which is expected to cover the fields of views from all sensitive viewers in direct sight of the proposed development. The ZVI is generally the viewshed formed by natural/ manmade features such as ridgelines, built form or areas of woodland/ large trees. The ZVI may contain areas, which are fully visible, partly visible and non-visible from the project. This is achieved by site visit and desk-top study of topographic maps and photographs, and preparation of cross-sections to determine visibility of the project from various locations.

3.4.2 The ZVI for proposed development extends along the waterfront areas in Kwun Tong, Kai Tak Development Area, and Hung Hom, to the waterfront on the northern side of Hong Kong Island. The location of the Study Area provides the opportunity for long distance views from other waterfront locations around Victoria Harbour. Its proximity to Kai Tak Cruise Terminal and Kai Tak runway with planned waterfront promenades warrant views from these amenities. Key visual receptors within the ZVI include occupational receptors nearby such as the Hong Kong Children's Hospital and the Planned Kai Tak Acute Hospital of which the former is under construction, residential receptors at Telford Gardens and at hillside locations in the eastern part such as the Upper Ngau Tau Kok Estate. Other key receptors include users of transportation infrastructure corridors such as the Kwun Tong Bypass and Island Eastern Corridor, recreational receptors on waterfront locations such as Kwun Tong Promenade, Kai Tak Waterfront Promenade, Zero Carbon Building, Hoi Sham Park and Quarry Bay Park. In addition, Kowloon Bay Sports Ground represents the sensitive public viewers from key strategic and popular local vantage points, therefore it is considered as one of the recreational receptors. In terms of the available viewing distances, views typically extend some 0.2km north, some 0.3km east, some 3.2 km south and some 1.4km west.

3.4.3 The ZVI is mapped on **Figure 3.1** and the photographs presented in **Figures 3.2a to 3.2h** demonstrate the components which make up the existing visual amenity.

Viewing Points

3.4.4 Within the ZVI, fifteen View Points (VP) are identified and categorized into four types: Residential (RES), Occupational (OC), Recreational (REC) and Vehicular (VEC). The location of all the VPs is presented in **Figure 3.1**. Views of respective VPs are presented in **Figures 3.2a** to **3.2h**.

RES1 – Upper Ngau Tau Kok Estate (Figures 3.1 and 3.2a)

3.4.5 Upper Ngau Tau Kok Estate is located at around 295m from the closest boundary of the Study Area. The existing view towards the proposed development consists of comprehensive urban buildings and road infrastructures in the foreground. Some high-rise commercial and low-rise institutional buildings form the background. The key viewers of this VP are mainly residents of Upper Ngau Tau Kok Estate, which have a long duration of view. Taking into account the above, the visual sensitivity of the public views from this VP is graded as 'High'.

RES2 – Telfold Gardens (Figures 3.1 and 3.2a)

3.4.6 Telfold Gardens is about 240m from the Study Area. This VP is located at the public podium of the residential development. The existing view towards the proposed development is characterised and largely blocked by the industrial estates in Kowloon Bay. A limited section of ridgeline of foothills in Hong Kong Island can be seen in the background. The key viewers of this VP are mainly residents in Telfold Gardens and nearby residential developments, which have a relatively long duration of view. Given the above, the visual sensitivity from this VP is graded as 'High'.

RES3 – Grand Waterfront (Figures 3.1 and 3.2b)

3.4.7 The residential buildings of Grand Waterfront is located approx. 1310m away from the Study Area. This VP experiences a view of open sea water in the foreground and mainly dominated by the high-density urban development of Kowloon Bay area in the background, including the proposed development. Residents of this VP will pay more attention to the visual amenity and a long duration of view. Taking into the account, the visual sensitivity from this VP is graded as 'High'.

RES4 – Laguna Verde (Figures 3.1 and 3.2b)

3.4.8 This VP is located at the waterfront promenade, which is about 1920m from the Study Area. The general view of this VP is characterised by the open sea and shoreline in the foreground, the urban development of Kowloon Bay can be seen in a far distance as well as the ridgeline of foothills in Kowloon East. The key public viewers of this VP are mainly residents of Laguna Verde, which will pay attention to the visual amenity. Given the above, the visual sensitivity from this VP is graded as 'High'.

OC1 – Hong Kong Children's Hospital and the Planned Kai Tak Acute Hospital (Figures 3.1 and 3.2c)

3.4.9 The location of two hospitals is about 110m from the Study Area in the west. The future occupational users at this VP will have a view of the proposed development in the foreground as well as the traffic corridor of Kwun Tong Bypass. High-rise commercial buildings and sky scape form the background. Given the workers and in-patients at the hospital will only have a short duration of view at this location, and their major activities do not relate to recreation, rest nor sight-seeing, the visual sensitivity from this VP is graded as 'Medium'.

OC2 – Harbourside HQ (Figures 3.1 and 3.2c)

3.4.10 Harbourside HQ is located about 125m from the Study Area. This VP is selected to represent the public view of the occupants of this commercial building, which have a view comprising low-rise institutional facilities in the foreground and other high-rise commercial buildings in the middle distance. The development of Ngau Tau Kok forms the background of this view. As the viewers are not public members but mainly workers, who would pay more attention on their work activities but not on recreation, rest, nor sight-seeing, the visual sensitivity from this VP is gradated as 'Medium'.

REC1 – Quarry Bay Park (Figures 3.1 and 3.2d)

3.4.11 Quarry Bay Park is located about 3150m away from the Study Area. This existing view towards the proposed development is characterised by the open sea of Victoria Harbor. The urban development in Kowloon East and the ridgeline of foothills form the background. The public viewers of this VP is mainly visitors to the park for recreational purpose, which have a medium duration of view. Given the above, the visual sensitivity from this VP is graded as 'Medium'.

REC2 – Hoi Sham Park (Figures 3.1 and 3.2d)

3.4.12 Hoi Sham Park is located about 1640m from the Study Area. The visitors to this park for recreational purpose generally experience a public view of open sea water in the foreground, high-rise commercial buildings and the ridgeline of foothills in Kowloon East in the background. In the same case as REC1, the visual sensitivity from this VP is graded as 'Medium'.

REC3 – Kwun Tong Waterfront Promenade (Figures 3.1 and 3.2e)

3.4.13 This VP is located at the public space of Kwun Tong Waterfront Promenade, which is about 710m from the Study Area. The view from this VP primarily comprises the waterfront in the foreground and several high-rise commercial buildings backdrop. As the promenade users are engaged in recreational and/ or leisure activities, the visual sensitivity is graded as 'Medium'.

REC4 – Kai Tak Waterfront Promenade (Planned) (Figures 3.1 and 3.2e)

3.4.14 This planned promenade is located about 420m from the Study Area at the old Kai Tak runway. The existing view towards the proposed development mainly comprises the high-rise commercial buildings in Kowloon Bay area. Similar to REC3, the visual sensitivity of the public viewers of this VP is graded as 'Medium'.

REC5 – Kai Tak Runway Park (Figures 3.1 and 3.2f)

3.4.15 The visitors to the Kai Tak Runway Park will have a view of the proposed development at about 1250m from the Study Area. They have alternative views towards the Kowloon East across the water channel. In the same case as REC4, the visual sensitivity form this VP is graded as 'Medium'.

REC6 – Zero Carbon Building (Figures 3.1 and 3.2f)

3.4.16 Zero Carbon Building is located about 130m to the Study Area. The existing view of this VP is largely blocked by the existing commercial buildings in the foreground. The VP represents the public visiting this institutional building and they are engaged in recreational activities, which have alternative views to the surrounding development. Given the above, the visual sensitivity from this VP is graded as 'Medium'.

REC7 – Kowloon Bay Sports Ground (Figures 3.1 and 3.2g)

3.4.17 The recreational users of this sports ground will have a view of the proposed development at about 810m away. The existing view is largely blocked by the industrial estates and roadside planting. Considering the medium duration of view of the public viewers, the visual sensitivity is graded as 'Medium'.

VEH1 – Hoi Bun Road (Figures 3.1 and 3.2g)

3.4.18 Hoi Bun Road is one of the traffic roads close to the Study Area at about 350m viewing distance. Drivers and passengers travelling along the road are transient receivers who will have a very quick view to the proposed development as they pass by. The existing view is primarily dominated by the transport infrastructures and office buildings. The proposed development is partly blocked by these factors. Given the above, the visual sensitivity from the VP is graded as 'Low'.

VEH2 – Island Eastern Corridor (Figures 3.1 and 3.2h)

3.4.19 As one of the transportation corridors of Hong Kong Island, Island Eastern Corridor is located about 3080m from the Study Area. The public viewers are mainly drivers and passengers of vehicles travelling along this corridor, who are transient receivers that have a very quick view to the proposed development as they pass by. The existing view is primarily characterised by the open sea of Victoria Harbour in the foreground and urban development

with the ridgeline of foothills in Kowloon East in the background. Given the above, the visual sensitivity from the VP is graded as 'Low'.

Identification of Visual Resources

3.4.20 The visual outlook is shaped by the combined composition of all the visual elements which come into sight of the viewers. On review of the current condition, the assessment area is dominated by five major visual elements (refer to **Figure 3.1**):

- The southern extent of the assessment area is largely dominated by the open water of Kwun Tong Typhoon Shelter, Kowloon Bay and Victoria Harbour. The water body and its associated shoreline will form the visual foreground to the viewers facing to the proposed development from the south and west. It is anticipated that the water body and its coastline will provide an aesthetic effect to the viewers.
- Another visually dominating element is the transportation corridor in Kwun Tong and Hong Kong Island, which comprises the Kwun Tong Bypass and Island Eastern Corridor. This present transport infrastructure will form a visual obstruction to the viewers with the assessment area, which may partially block the views to the proposed development for some VPs.
- The mountains and their associated ridgelines in Kowloon East and Hong Kong Island are also important visual features, which enhance the visual experience of the public viewers.
- A number of medium-rise industrial estates and their associated facilities at the north of the assessment area also detract the visual value and amenity of the assessment area. Given their industrial appearance, these developments are often in high-density with a limited coverage of open space and greening area. This being said, the proposed development and its associated landscape and greening measures are expected to improve the visual amenity of the assessment area.
- Some parts of northern and eastern assessment area are also occupied by several high-rise commercial buildings. These include but not limited to, the existing Enterprise Square Phase III & V (approx. +170mPD), Manhattan Place (approx. +170mPD), Harbourside HQ (approx. +136mPD) and Citi Tower at One Bay East (approx. +100mPD). These buildings will have some obstruction on some VPs to the proposed development. On the other hand, the development in the Study Area will be compatible with these existing features.

3.5 Minimisation of Adverse Visual Impacts

3.5.1 Since the project planning stage, many factors should be considered to avoid, reduce and help compensate for the potential landscape and visual impact of the development area. The proposed layout, scale, massing and height profile of the preferred option has undergone numerous design iterations to

investigate the capacity of the receiving landscape in terms of potential visual impacts and respond to the existing site constraints.

Building Height Profile

3.5.2 The stepped building height profile is generated to ensure the proposed building bulk and massing corresponds with surrounding building heights and massing, the intended building height level varies from 120mPD to 150mPD. The proposed and existing building height profile are presented in **Figure 2.2**. The maximum building height of the proposed structures varies from the lowest of +20mPD (i.e. the Retail/F&B/Entertainment/Urban Farming/Food Workshop) to the highest of +150mPD (Office), which is compatible to the surrounding intended building height in Kowloon Bay area (from 50 mPD to +170mPD).

Development Permeability

3.5.3 Due consideration has been given to development bulk reduction, building orientation, disposition and building form to enhance visual interest and create a more spacious pedestrian environment with measures such as multi-layered elevated open spaces arrangement, stepped building height, non-building area, setbacks, etc.

Retain View Corridors

3.5.4 To enhance the visual permeability, the proposed development has retained the significant visual corridors through the project site. The facade would be broken up by the corridors with buffer planting to ameliorate potential visual impact. Further consideration could also be given in the detail facade and landscape design to enhance visual interest.

Provision of Public Open Spaces

3.5.5 Public open spaces are proposed on the ground and elevated podiums to provide recreational area for the local community. Amenity planting will have a high coverage of these open spaces to create visual amenities for the future users. The open space will provide pedestrians friendly entrance to the developments on all four directions, as well as providing visual relief along the pedestrianized Cheung Yip Street.

3.6 Visual Mitigation Measures

3.6.1 The proposed mitigation measures for the proposed development during construction and operation are summarised in **Table 3.6.1 and Table 3.6.2** respectively. At the planning stage, measures to minimise the degree of visual impact should be considered with priority given to avoidance of impacts. Moreover, mitigation works for both stages should be implemented as early as possible. Please refer the locations of the proposed operational mitigation measures in **Figure 3.3**.

Table 3.6.1 Proposed Visual Mitigation Measures in Construction Phase

ID No.	Visual Mitigation Measures
CM1	Optimisation of Construction Areas & Providing Temporary Landscape on Temporary Construction Construction areas' control shall be enforced, where possible, to ensure that the visual impacts arising from the construction activities are minimised. It includes reduction of the extent of working areas and temporary works areas, management on storing and using the construction equipment and materials, and consideration of detailed schedules to shorten the construction period. Temporary landscape treatments are considered to be adopted such as applying hydro-seeding on temporary stockpiles and reclamation areas to alleviate the potential visual impacts.
CM2	Site Hoarding Construction site hoarding should be erected around the site to screen pedestrian level views from public viewers. Hoarding design should consider greening measures such as colour variations or plantation to improve its visual appearance.
CM3	Advanced Tree Planting Advanced tree planting works would help to reduce the visual impacts and also to mitigate the effects of construction, such as tall screen/ buffer trees and shrubs should be planted to screen proposed buildings and other structures where appropriate.
CM4	Construction Light Control Day and night-time lighting should be controlled to minimize glare and light spill from construction works. Shrouded or directional lighting should be considered where appropriate as a general good practice/ construction measure.

Table 3.6.2 Proposed Visual Mitigation Measures in Operational Phase

ID No.	Visual Mitigation Measures
OM1	Maximise the Greening Provision in Proposed Development and the Associated Infrastructures The implementation of rooftop greening or vertical greening, as where practicable to enhance the cityscape and alleviate visual impacts of new development should be considered. Climbing plants should be considered to grow up vertical surfaces such as greening facade of building blocks, viaduct piers or noise barriers.
OM2	Landscape Integration and Screen Planting Planting should be provided within or adjoining the road development where possible to provide visual interest and assist in reducing visibility of building facades; in addition, pedestrian areas should consider amenity planting. Wider landscape planting should reflect the scale and maturity of the landscape setting and provide landscape and visual buffers. Planting should include a diverse mix of species and forms of native trees, ground cover and climbing plants.
OM3	Aesthetic Landscape and Architectural Treatment around/ on New Buildings All new buildings and above ground structures shall be sensitively designed to ensure that suitable landscape and architectural design is applied to be compatible with the surroundings.
OM4	Operational Light Control Day and night-time lighting should be controlled during operation to minimise glare and light spill from the proposed development/ infrastructure; therefore, recessive or directional down lighting is recommended for the development.

3.7 Appraisal of Visual Changes

3.7.1 The effects of visual changes on the identified VPs by the proposed development are described as in **Table 3.7.1**, and existing views from these VPs are shown in **Figures 3.2a to 3.2h**.

3.7.2 Photomontages are created for the six (6) selected VPs by combining the existing views with the proposed development to assess the changes in visual context, hoping to provide a three-dimensional representation of the intended built environment. Comparison of the views from the selected VPs before and after the proposed development is shown in **Figures 3.4a to 3.10b**.

Table 3.7.1 Appraisal of Visual Changes on VPs

VPs	Visual Composition	Visual Obstruction	Effect on Public Viewers	Effect on Visual Resources
RES1 – Upper Ngau Tau Kok Estate (With Photomontages shown in Figures 3.4a and 3.4b) (Approx. Distance: 295m)	• As shown in **Figure 3.2a,** the view from Upper Ngau Tau Kok Estate is dominated by the street traffic, elevated road structures and residential/ commercial complex buildings in Kowloon Bay area. • The skyline is outlined by the commercial and institutional buildings in Kowloon Bay area.	• The proposed buildings will obstruct part of the skyline in this view (see **Figure 3.4a and Figure 3.4b**).	• The proposed high-rise buildings will introduce a medium scale development to the existing view. • The view to the skyline from the public viewers will be partially intercepted by the new development and partially blocked by the existing commerical buildings, including Manhattan Place (see **Figure 3.4a** and **Figure 3.4b**). • To avoid the creation of wall effect, a visual corridor has been introduced to improve the visual permeability of the development. (see **Figure 3.4a** and **Figure 3.4b**). • Based on the above, the effect of visual change is qualitatively graded as 'Intermediate'.	• No major visual resources are found within the view of this VP (see **Figure 3.4a and Figure 3.4b**). • The effect on visual resources is considered to be 'Negligible'.
RES2 – Telford Gardens (Approx. Distance: 240m)	• As shown in **Figure 3.2a,** the view of this VP comprises the low-rise/ middle-rise industrial developments such as Sunshine Kowloon Bay Cargo Centre and Pacific Trade Centre. A small portion of foothill in Hong Kong Island can be visible through the	• The Proposed Development will largely block the view to the skyview and foothill in the background (see **Figure 3.2a** for visual illustration).	• The Proposed Developemnt will reduce the openness of this viewing point and generate a potential wall effect to this view due to the developments in a close viewing distance (see **Figure 3.2a**).	• The foothill in the background accounts for the major visual resource of the viewing point. The Proposed Development will largely obstruct the viewers from viewing the foothill.

VPs	Visual Composition	Visual Obstruction	Effect on Public Viewers	Effect on Visual Resources
	building gap along Wai Yip Street.		• Given the large scale of development in the view, the effect of visual changes is qualitatively graded as 'Large'.	• Based on the above, the effect on visual resources is considered to be **'**Substantially adverse'.
RES3 – Grand Waterfront (Approx. Distance: 1310m)	• As shown in **Figure 3.2b,** the view from this VP is dominated by open water and various urban developments in Kowloon Bay area. The ridgeline in Kowloon East forms the background of this view. • The skyline is outlined by the high-rise residential/ commercial buildings and the ridgeline in Kowloon East.	• The proposed buildings will partially block the skyline and view to the residential buildings in the background (see **Figure 3.2b** for visual illustration).	• The proposed high-rise buildings will generate a potential wall effect to this view due to a medium scale of development in the view. The proposed visual corridor and mitigation measures cannot help to reduce this effect (see **Figure 3.2b**). • Taking into account the above, the effect of visual changes is qualitatively graded as 'Intermediate'.	• The ridgeline and open water are the major visual resource of this viewing point. It is anticipated that the Proposed Development will only block a small portion of skyline formed by the residential buildings. The visual resources to the public viewers will experience no changes. • Therefore, the effect on visual resources is considered to be 'Negligible'.
RES4 – Laguna Verde (With Photomontages shown in Figures 3.5a and 3.5b) (Approx. Distance: 1920m)	• As shown in **Figure 3.2b,** the view frm Laguna Verde comprises the various urban developments, open water of Kowloon Bay and the ridgeline in Kowloon East. • The skyline is outlined by the high-rise commercial buildings and the ridgeline in Kowloon East.	• The proposed buildings will partially block the skyline, a small portion of the ridgeline and view to the residential building in the background (see **Figure 3.5a** and **Figure 3.5b** for photomontages).	• Considering the proposed development compatible with the existing urban environment (similar building height with adjacent buildings), the visual character to the public viewers is considered to be similar (see **Figure 3.5a and Figure 3.5b**). • The proposed high-rise buildings will introduce a medium scale of development to the existing view	• The ridgeline and open water accounts for the major visual resource of this viewing point. • Only a small portion of the ridgeline in Kowloon East will be intercepted by the propsoed development. Other visual resources will remain unchange (see **Figure 3.5a** and **Figure 3.5b**).

VPs	Visual Composition	Visual Obstruction	Effect on Public Viewers	Effect on Visual Resources
			(see **Figure 3.4a** and **Figure 3.4b**). • The effect of visual changes is therefore qualitatively graded as 'Intermediate'.	• The effect on visual resources is considered to be 'Slightly adverse'.
OC1 – Hong Kong Children's Hospital and the Planned Kai Tak Acute Hospital (Approx. Distance: 110m)	• As shown in **Figure 3.2c,** the existing view from this VP is dominated by the transport corridor of Kwun Tong Bypass and high-rise commerical buildings.	• The residential buildings in the background and the skyview will be largely intercepted by the Proposed Development (see **Figure 3.2c** for visual illustration).	• The Proposed Development will introduce a line of high-rise buildings to the public viewers at this VP, which will generate a potential wall effect to this view due to the developments in a close viewing distance (see **Figure 3.2c**). • The visual openness from this VP will be largely affected. The mitigation measures may not be able to alleviate such large visual impacts. • Based on the above, the effect of visual changes is graded as 'Large'.	• No major visual resources are found within the view of this VP. • Therefore, the effect on visual resources is considered to be 'Negligible'.
OC2 – Harbourside HQ (Approx. Distance: 125m)	• As shown in **Figure 3.2c,** the existing view from this VP is dominated by the low-rise urban developments and the transport corridor. • The ridgeline of foothills forms half of the background of this view.	• The Proposed Development will largely block the skyline, ridgeline and comercial/ residential buidlings in the background (see **Figure 3.2c** for visual illustration).	• The view to the ridgeline from the public viewers will be intercepted by the Proposed Development (see **Figure 3.2c**). • To avoid the creation of wall effect, a visual corridor has been introduced to provide better	• The ridgeline in background is the major visual resource of this viewing point, which will be partially intercepted by the Proposed Development (see **Figure 3.2c**). • A visual corridor has been introduced to provide better

VPs	Visual Composition	Visual Obstruction	Effect on Public Viewers	Effect on Visual Resources
			viewing connection to the background. • The proposed high-rise buildings will be partially blocked by the existing buildings, and only a medium scale of development can be visible in the view. • Thus, the effect of visual changes is qualitatively graded as 'Intermediate'.	viewing connection to the mountains backdrop. • Based on the above, the effect on visual resources is considered to be 'Moderately adverse'.
REC1 – Quarry Bay Park (With Photomontages shown in Figures 3.6a and 3.6b) (Approx. Distance: 3150m)	• As shown in **Figure 3.2d,** the view from this VP is dominated by open water and urban development in Kowloon East. • The continuous ridgeline of foothills in Kowloon East forms the background of this view.	• The residential buildings in the background will be blocked by the Proposed Development (see **Figure 3.6a and Figure 3.6b** for photomontages).	• The proposed development height is similar with the adjacent commerical buildings (approx. 120mPD to 150mPD), the proposed development will be compatible with the existing urban environment (see **Figure 3.6a and Figure 3.6b**). • To avoid the creation of wall effect, the proposed development has introduced a series of visual corridor and stepped building height, which will help to improve the visual permeability of the development (see **Figure 3.6a and Figure 3.6b**). • Considering with the far viewing distance, only a small scale of the Proposed Development will be visible.	• The ridgeline and open water are the major visual resource of this viewing point. • A minor portion of the "20% Building Free Zone" will be slightly intercepted by the highest building (+150mPD) of the proposed development, yet it is visually embeded in the taller buildings at the background, including Manhattan Place, Enterprise Square III and V. The proposed buildings in KBAA would not encroach the ridgeline and the proposed KBAA will be visually compatible with the surrounding urban context (see **Figure 3.6a and Figure 3.6b**). • Visual corridors have been introduced to provide better

VPs	Visual Composition	Visual Obstruction	Effect on Public Viewers	Effect on Visual Resources
			• Thus, the effect of visual change is therefore qualitatively graded as 'Small'.	viewing connection to the mountains backdrop . • Therefore, the effect on visual resources is considered to be 'Slightly adverse'.
REC2 – Hoi Sham Park (Approx. Distance: 1640m)	• As shown in **Figure 3.2d,** the existing view from this VP is dominated by the open sea water and the urban developments in the foreground. The ridgeline of mountains in Kowloon Bay forms the background of this view. • The skyline is outlined by the high-rise residential/ commercial buildings and the ridgeline in Kowloon East.	• The proposed buildings will partially block the ridgeline and views to the residential buildings in the background (see **Figure 3.2d** for visual illustration).	• Similar to the description for **RES3**, the effect of visual changes is qualitatively graded as 'Intermediate'.	• The ridgeline and open water are the major visual resource of this viewing point. The Proposed Development will partially intercept the visual access to a small portion of ridgeline in the background (see **Figure 3.2d**). • Therefore, the effect on visual resources is considered to be 'Slightly adverse'.
REC3 – Kwun Tong Promenade (With Photomontages shown in Figures 3.7a and 3.7b) (Approx. Distance: 710m)	• As shown in **Figure 3.2e,** the view from this VP is dominated by the open water, the transporation corridor and public space of Kwun Tong Promenade. • The skyline is outlined by the high-rise residential/ commercial buildings.	• The proposed buildings will block a small portion of the skyline and the views to the commercial buildings in the background (see **Figure 3.7a and Figure 3.7b** for photomontages).	• The proposed development will introduce a cluster of buildings with similar building height and mass to the surrounding development. The visual character to the public viewers will be similar (see **Figure 3.7a and Figure 3.7b**). • Taking into account the above, the effect of visual changes is qualitatively graded as 'Small'.	• The open water and transporation corridor are the major visual resource of this viewing point. The Proposed Development will not cause any change of these resources. • Therefore, the effect on visual resources is considered to be 'Negligble'.

VPs	Visual Composition	Visual Obstruction	Effect on Public Viewers	Effect on Visual Resources
REC4 – Kai Tak Waterfront Promenade (With Photomontages shown in Figures 3.8a and 3.8b) (Approx. 420m)	• As shown in **Figure 3.2e**, the view from this VP is dominated by the urban development in Kowloon Bay, such as high-rise commercial buildings, medium-rise industrial estates and residential buildings. • The ridgeline of foothills in Kowloon East forms the background of this view. • The skyline is outlined by the high-rise residential/ commercial buildings and the ridgeline in Kowloon East.	• The Proposed Development will obstruct part of the skyline and views to the residential buildings in the background (see **Figure 3.8a and Figure 3.8b** for photomontages).	• The view to the skyline will be partially intercepted by a line of proposed buildings, which will generate a potential wall effect due to the developments in a close viewing distance and visual corridor not visible (see **Figure 3.8a and Figure 3.8b**). • Mitigation Measures may not be able to alleviate the wall effect from the proposed development. • Thus, the effect of visual changes is qualitatively graded as 'Large'.	• The ridgeline and open water account for the major visual resource of this viewing point. • The proposed buildings will block a small portion of ridgeline in the background (see **Figure 3.8a and Figure 3.8b**). • Therefore, the effect on visual resources to public viewers is considered to be 'Slightly adverse'.
REC5 – Kai Tak Runway Park (With Photomontages shown in Figures 3.9a and 3.9b) (Approx. Distance: 1250m)	• As shown in **Figure 3.2f**, the view from this VP is dominated by open water of Kwun Tong Typhoon Shelter and urban development along the shoreline. • The ridgeline of foothills in Kowloon East forms the background.	• A small portion of the skyline and ridgeline of foothillls will be blocked by the Proposed Development (see **Figure 3.9a and Figure 3.9b** for photomontages).	• The visual access to the ridgeline in the background will be partially intercepted by the Proposed Development (see **Figure 3.9a and Figure 3.9b**). • To avoid the creation of wall effect, the Proposed Development has introduced a series of visual corridor, which will help to improve the visual permeability of the development (see **Figure 3.9a and Figure 3.9b**). • The proposed building height are similar to the adjacent commerical buildings (see	• The ridgeline and open water account for the major visual resource of this viewing point. • With a portion of the mountain backdrop affected/ interupted by the proposed development (see **Figure 3.9a and Figure 3.9b**), the effect on visual resources is considered to be 'Moderately adverse'.

VPs	Visual Composition	Visual Obstruction	Effect on Public Viewers	Effect on Visual Resources
			Figure 3.9a and Figure 3.9b), which are considered to be compatible with surrounding developments. The visual character to the public viewers will be similar. • Given the above, the effect of visual changes is qualitatively graded as 'Small**'.**	
REC6 – Zero Carbon Building (Approx. Distance: 130m)	• As shown in **Figure 3.2f**, the existing view from this VP is dominated by the commericial buildings such as Manhattan Place and Enterprise Square.	• The visual openness will be slightly affected due to the proposed development will form as the part of the visual backdrop. (see **Figure 3.2f** for visual illustration).	• Given the view from the public viewers to the Proposed Development is blocked by the existing commerical buildings, only a small scale of buildings will be visible. • The effect of visual changes is qualitatively graded as 'Small'.	• No major visual resources are found within the view. • Therefore, the effect on visual resources is considered to be 'Negligible'.
REC7 – Kowloon Bay Sports Ground (With Photomontages shown in Figures 3.10a and 3.10b) (Approx. Distance: 810m)	• As shown in **Figure 3.2g**, the existing view from this VP is dominated by the medium-rise industrial estates in the foreground. • A small portion of foothills in Hong Kong Island is visible from the existing building gap formed by the sitting-out areas.	• A small portion of the skyline will be blocked by the Proposed Development (see **Figure 3.10a and Figure 3.10b** for photomontage).	• The proposed development has introduced a visual corridor along the Wang Mau Street in order to improve the visual permeability of the development. • The top portion of the propsoed high-rise building will be visible from this VP. • Therefore, the effect of change is graded as 'Small'.	• The ridgeline accounts for the major visual resource of this viewing point. • Since the Proposed Development will have no obstruction on this resource, the effect on visual resources is considered to be 'Negligible'.

VPs	Visual Composition	Visual Obstruction	Effect on Public Viewers	Effect on Visual Resources
VEH1 – Hoi Bun Road (Approx. Distance: 350m)	• As shown in **Figure 3.2g**, the existing view from this VP is dominated by the transport corridor and urban developments. • The skyline is outlined by the high-rise commercial buildings in Kowloon Bay area.	• A small portion of the skyline in the background will be intercepted by the Proposed Development (see **Figure 3.2g** for visual illustration).	• The proposed development will introduce a cluster of buildings with similar building height to the adjacent commercial buildings, the visual character of the public viewers will be similar. • Due to the blockage of existing buildings and transportation corridor, only a medium scale of developments would be visible. • Thus, the effect of visual changes is qualitatively graded as 'Intermediate'.	• The transporation corridor as Kwun Tong Bypass is the major visual resource for this VP. • Since the proposed development will not block the view to this resource, the effect on visual resources is considered to be 'Negligible'.
VEH2 – Island Eastern Corridor (Approx. Distance: 3080m)	• As shown in **Figure 3.2h**, the view from this VP is dominated by open water and urban developments in Kowloon East. • The continuous ridgeline in Kowloon East forms the background of this view.	• Similar to the description for REC1, only the residential developments in the background will be partially blocked by the Proposed Development (see **Figure 3.2h** for visual illustration).	• Similar to the appraisal of **REC1**, the effect of visual change is therefore qualitatively graded as 'Small'.	• The ridgeline and open water account for the major visual resource of this viewing point. • Similar to the appraisal of **REC1**, the effect on visual resources is considered to be 'Negligible'.

4 Conclusion

4.1.1 Fifteen (15) public viewing points (VPs) located within the assessment area have been selected for visual impact assessment. Given the results from the appraisal of visual changes, effects on public viewers of VPs are considered as below:

- Large visual changes (3 VPs): 'Telford Gardens (RES2)', 'the Hong Kong Children's Hospital and the Planned Kai Tak Acute Hospital (OC1), and 'Kai Tak Waterfront Promenade (REC4)';
- Intermediate visual changes (6 VPs): 'Upper Ngau Tau Kok Estate (RES1)', 'Grand Waterfront (RES3)', 'Laguna Verde (RES4)', 'Harbourside HQ (OC2)', 'Hoi Sham Park (REC2)' and 'Hoi Bun Road (VEH1)'; and
- Small visual changes (6 VPs): 'Quarry Bay Park (REC1)' , 'Kwun Tong Promenade (REC3)' , 'Kai Tak Runway Park (REC5)', 'Zero Carbon Building (REC6)', 'Kowloon Bay Sports Ground (REC7)' and 'Island Eastern Corridor (VEH2)'

4.1.2 The Proposed Development will introduce a cluster of mixed-use high-rise buildings (approx. 120mPD to 150mPD) with associated structures to the Study Area. Based on the project nature, adverse visual impacts on the public viewers surrounding the Study Area can be identified as the loss of visual openness and blockage of views to the skylines outlined by the existing buildings. From these public viewers, the proximity development and its building bulk will largely block their views to the backdrop of urban forms in Kowloon Bay Area, in particular for REC2, REC4 and OC1. Although the proposed development has adapted a series of visual corridors to improve visual permeability, recommended mitigation measures are also proposed, the adverse impacts on those public viewers cannot be mitigated effectively due to such a significant visual change.

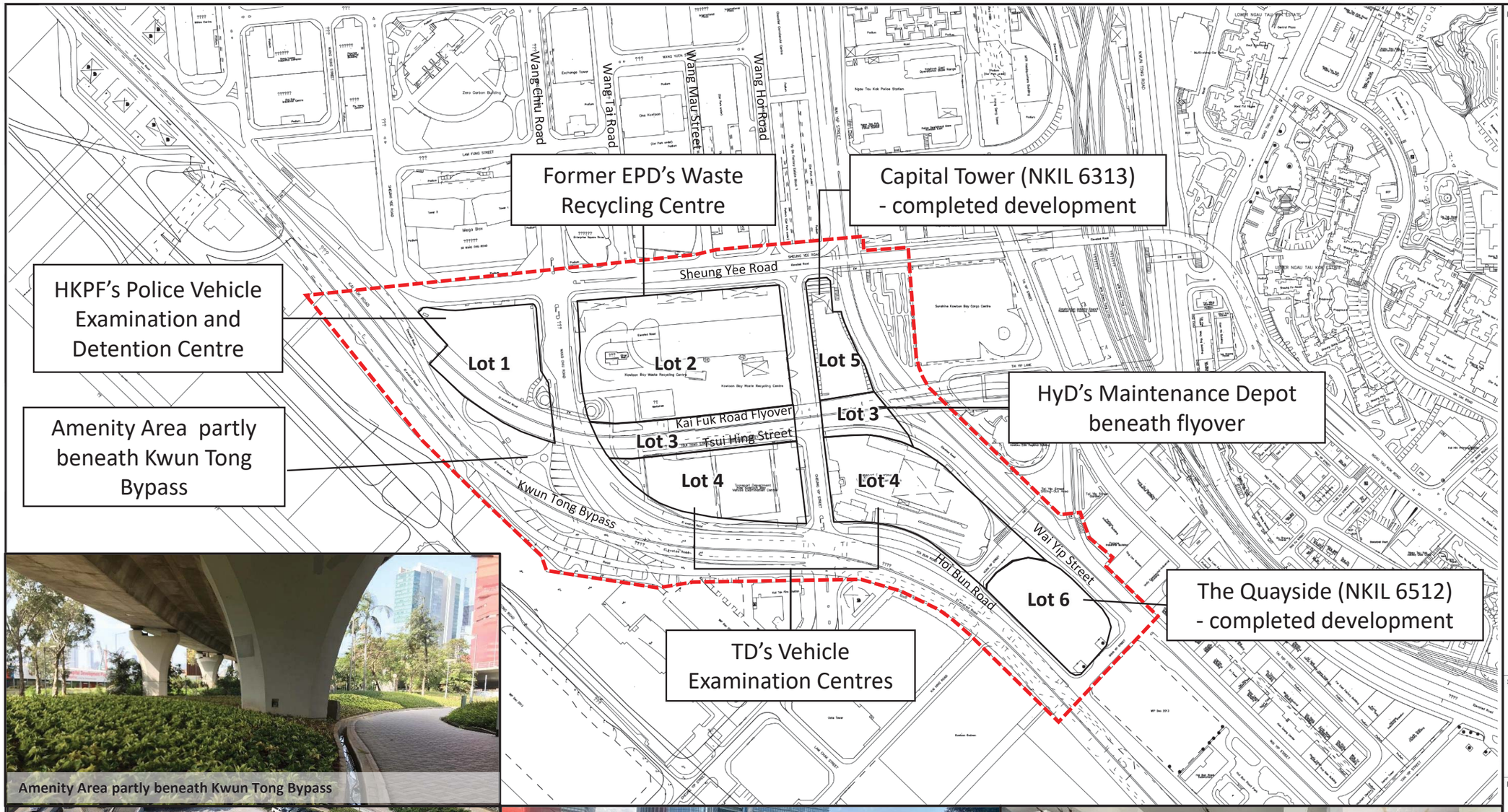
4.1.3 For these public viewers from the waterfront locations along Victoria Harbour, visual impacts would be generated due to the visual intrusion and obstruction on the views to the ridgelines of natural hillsides in Kowloon East. To avoid the creation of wall effect and provide better visual connection to the mountains backdrop, a stepped building height profile with retained view corridors is provided by the development. However, since these viewers looking at the proposed buildings from different angles in a medium to long viewing distance, these visual corridors cannot take effect to reduce visual impacts.

4.1.4 The ridgeline of mountains in Kowloon East and open water of Victoria Harbour are the major visual resources for the identified public viewers. These two important resources can only be all visible for these VPs along the waterfront looking at the Study Area from west and south, including RES3, RES4, REC1, REC2, REC5 and VEH2. Based on the findings of visual impact assessment, the proposed development have remained most views to open water and transportation corridor. Nevertheless, the proposed high-rise

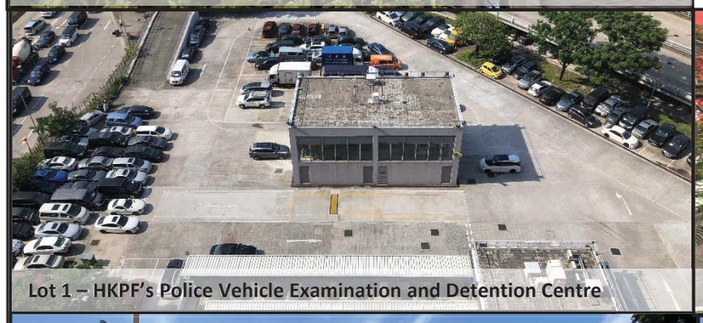
buildings will inevitably have moderate adverse impacts on the public's long-distance views of the ridgelines due to the visual obstruction, and these VPs include REC1 and REC5.

4.1.5 Although the recommended mitigation measures will not be able to fully mitigate for such significant visual change, the proposed building height and massing are similar with the adjacent commercial buildings. The tallest proposed building in KBAA is of 150mPD, which is lower than the existing adjacent buildings of Enterprise Square III, V and Manhattan Place and remain generally in line with the existing BH profile. It is considered that the proposed development will not result in significant transformation of the existing visual character. Thus, the proposed development is considered to be visually acceptable with the surrounding landscape and urban setting from the public viewers. As such, potential adverse visual impacts would be slight to moderate at most VPs after implementing mitigation measures.

Figures



Amenity Area partly beneath Kwun Tong Bypass


Lot 1 – HKPF's Police Vehicle Examination and Detention Centre


Lot 2 – Former EPD's Waste Recycling Centre


Lot 3 – HyD's Maintenance Depot beneath flyover


Lot 4a – TD's Vehicle Examination Centre


Lot 4b – TD's Vehicle Examination Centre


Lot 5 – Capital Tower



Lot 6 – The Quayside

Legend

Study Area

Scale and Orientation

N

0 100 200 300 400m

Drawn	Date
LL	14 April 2020
Checked	Approved
LL	WL

1.1 Development Sites of KBAA

Job Title

Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessment Report

ARUP



Legend

- Study Area
- Other Specified Uses
- Commercial
- Local Open Space (LO) Regional Open Space (DO)
- Amenity Area
- Elevated Walkway
- Pedestrianized Street
- Non-Building Area
- Maximum Building Height (in Meters above Principal Datum)
- Proposed Site Formation Level (in Meters above Principal Datum)
- Building Height Control Zone Boundary
- Setback Line

Scale and Orientation

N

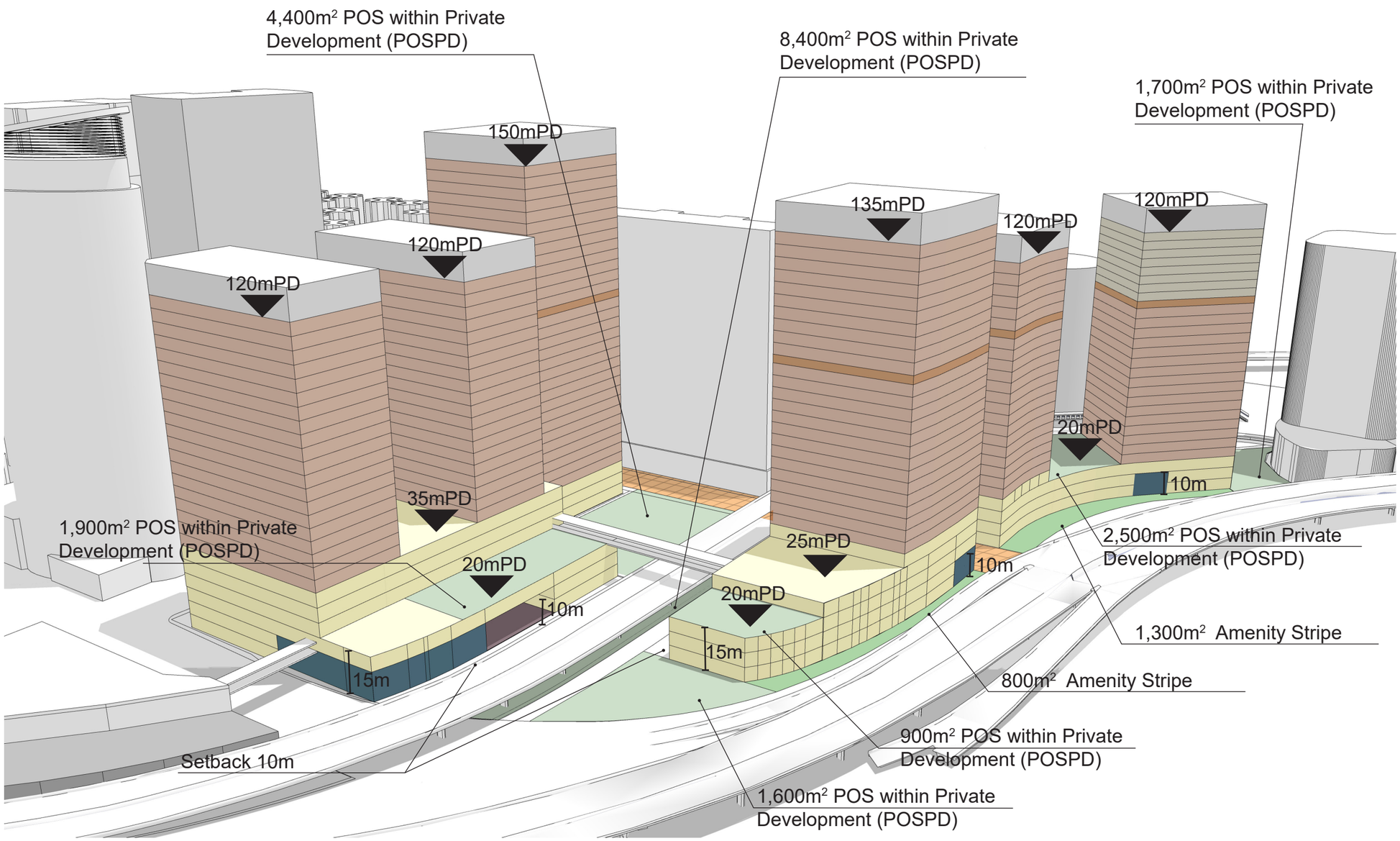
0 20 40 60 80m

Drawn	Date
JL	15 June 2020
Checked	Approved
LL	WL

2.1 Recommended Outline Development Plan

Agreement No. CE 4/2014 (TP) Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study

ARUP



Lot 2:

144,470m²		Office
55,130 m²		Retail/ F&B/ Entertainment/ Urban Farming/ Food workshop
5,000 m²		Transport facilities
-		Access to basement parking
204,600 m² (About)		Total (PR12)

Lot 4:

130,510 m²		Office
55,610 m²		Retail / F&B / Entertainment/ Urban Farming / Food workshop
14,880 m²		Hotel
-		Access to basement parking
201,000 m² (About)		Total (PR12)

Lot 3: 400 m² ACC

Others (non-GFA accountable):
- Pedestrianized Street
- POS within Private Development (POSPD)
- Amenity Strip
- Refuge Floor
- Rooftop M&E Structures/Transfer Plate

Legend

Scale and Orientation

Drawn	Date: April 2021
Checked	Approved

Figure No.: 2.2

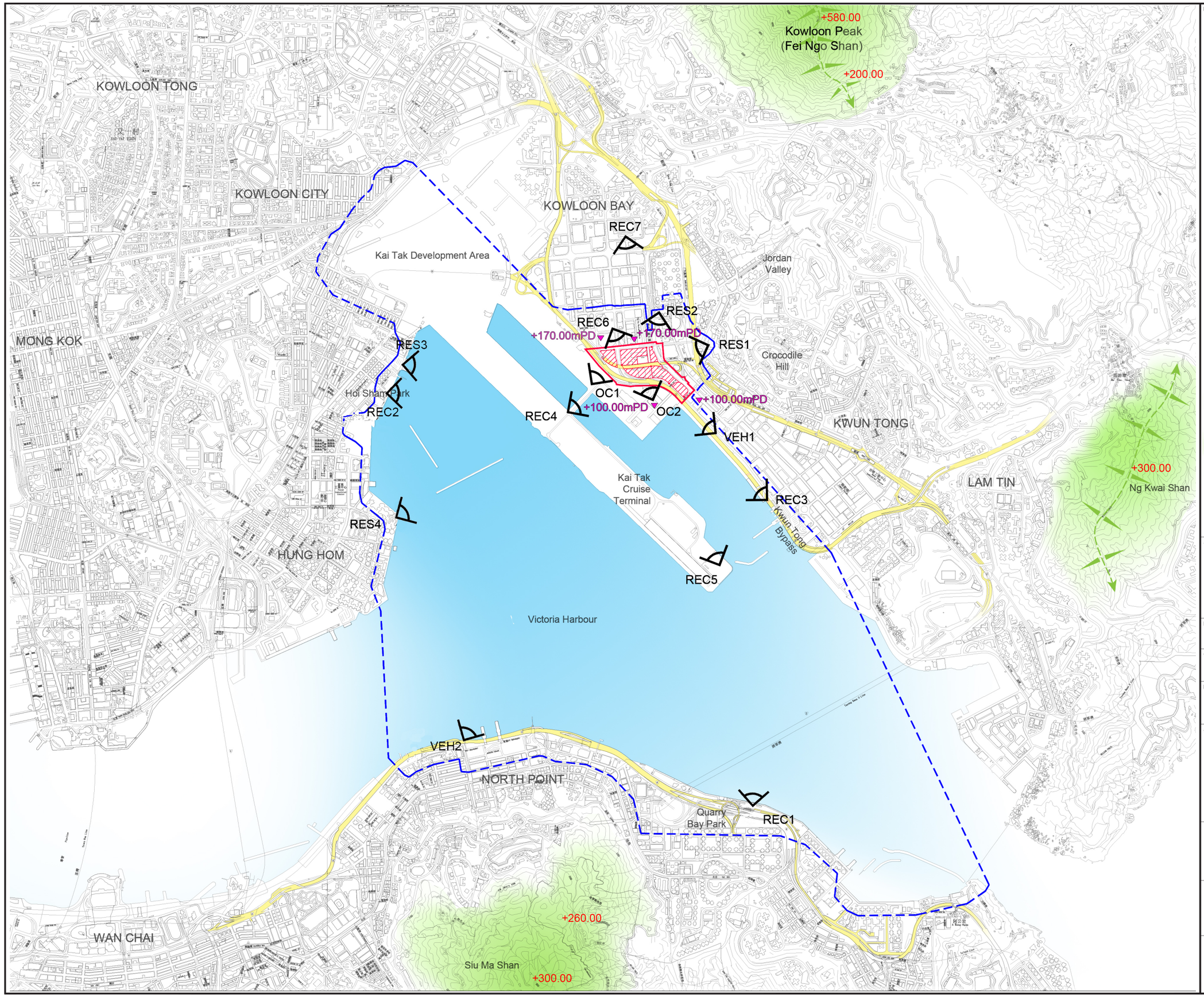
Drawing Title: Indicative Massing

Job Title

Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study

ARUP



Legend

- Study Area
- Proposed Lot Boundary
- Zone of Visual Influence (ZVI)
- Ridgeline
- Mountains
- Water Body
- Transport Corridor
- +0.00mPD — Surrounding Building Height
- Viewing Points

Residential VSRs

RES1 Upper Ngau Tau Kok Estate
RES2 Telford Gardens
RES3 Grand Waterfront
RES4 Laguna Verde

Occupational VSRs

OC1 Hong Kong Children's Hospital and the Planned Kai Tak Acute Hospital
OC2 Harbourside HQ

Recreational VSRs

REC1 Quarry Bay Park
REC2 Hoi Sham Park
REC3 Kwun Tong Waterfront
REC4 Kai Tak Waterfront Promenade (Planned)
REC5 Kai Tak Runway Park
REC6 Zero Carbon Building
REC7 Kowloon Bay Sports Ground

Vehicular VSRs

VEH1 Hoi Bun Road
VEH2 Island Eastern Corridor

Scale and Orientation

N

0 200 400 500 800m

1:25,000 on A3

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

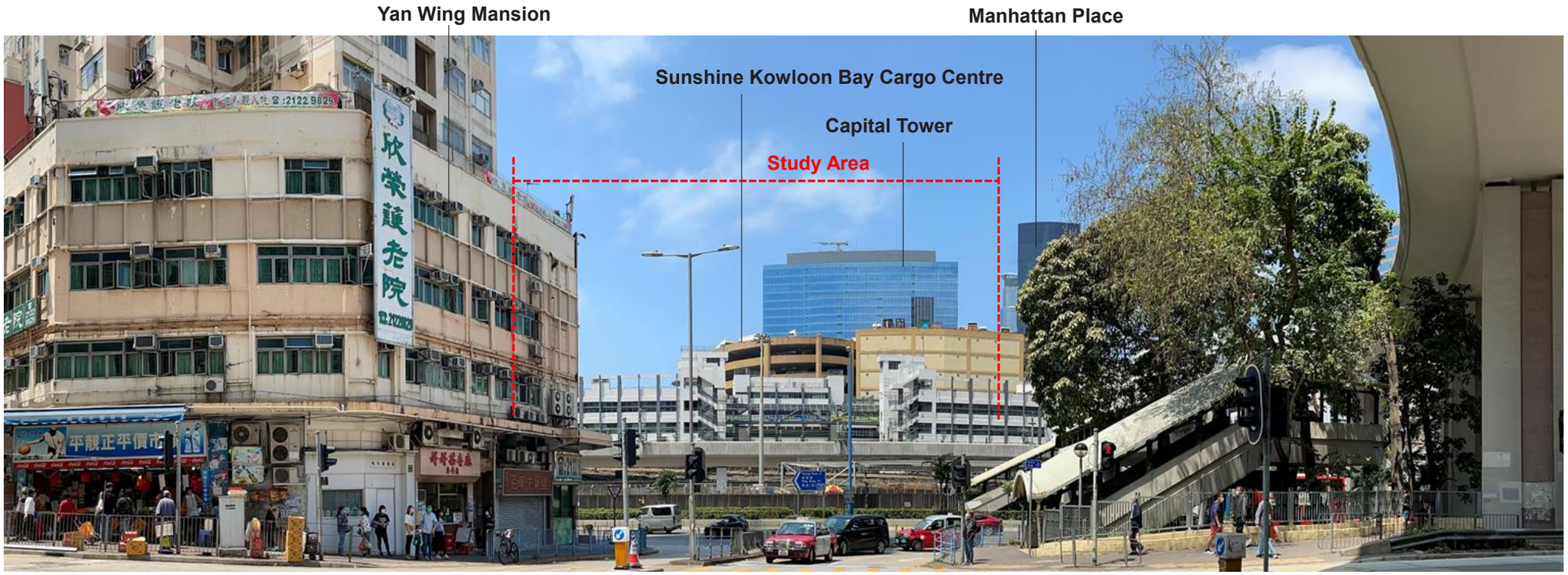
Figure No.	Drawing Title
3.1	Viewing Points and Visual Elements Plan

Job Title

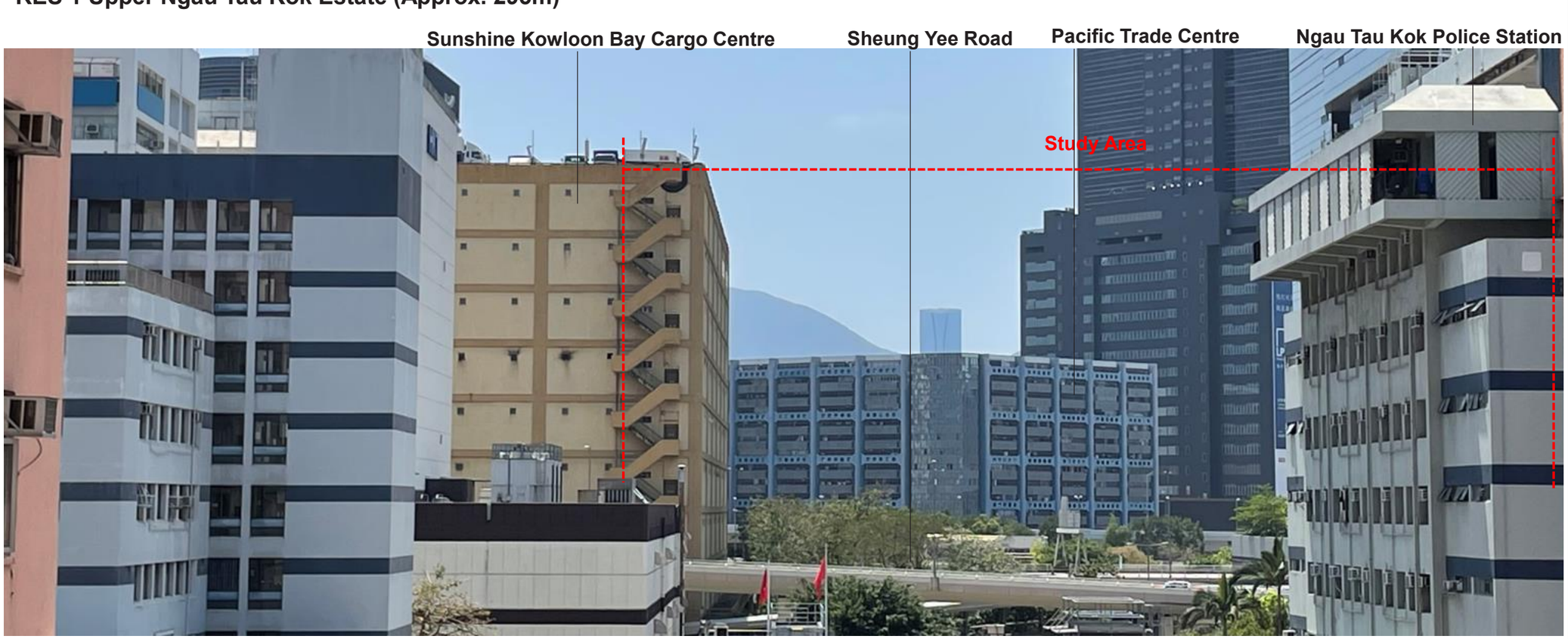
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



RES 1 Upper Ngau Tau Kok Estate (Approx. 295m)



RES 2 Telford Gardens (Approx.240m)

Scale and Orientation

NTS

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

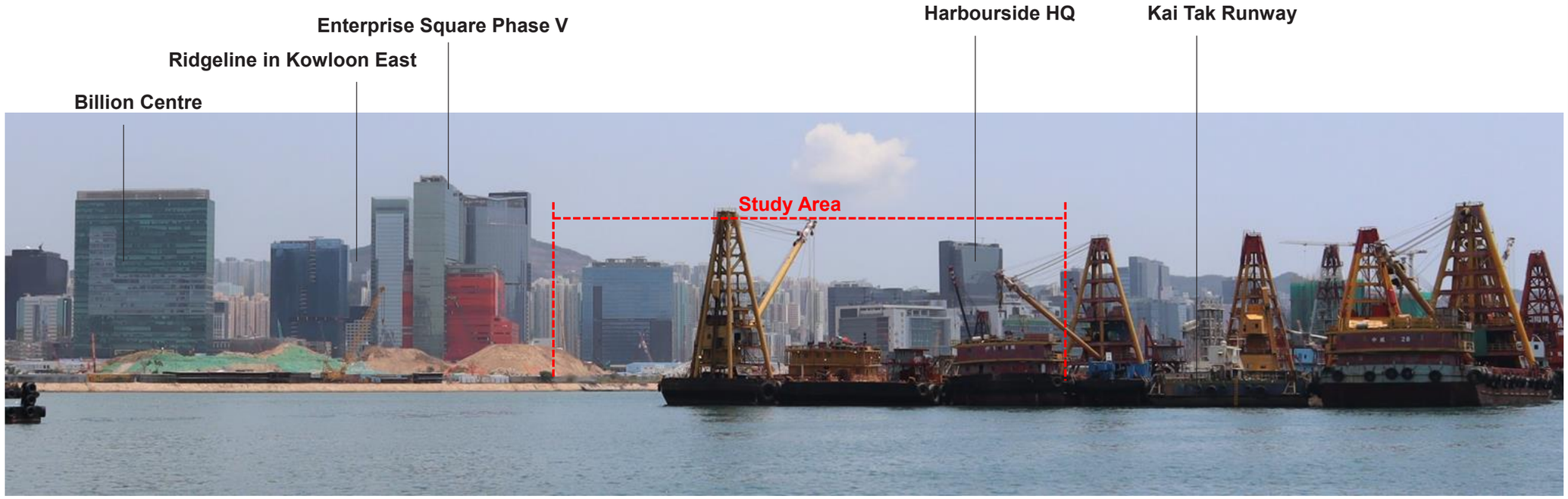
Figure No.	Drawing Title
3.2a	Views of Visually Sensitive Receivers (Page 1 of 8)

Job Title

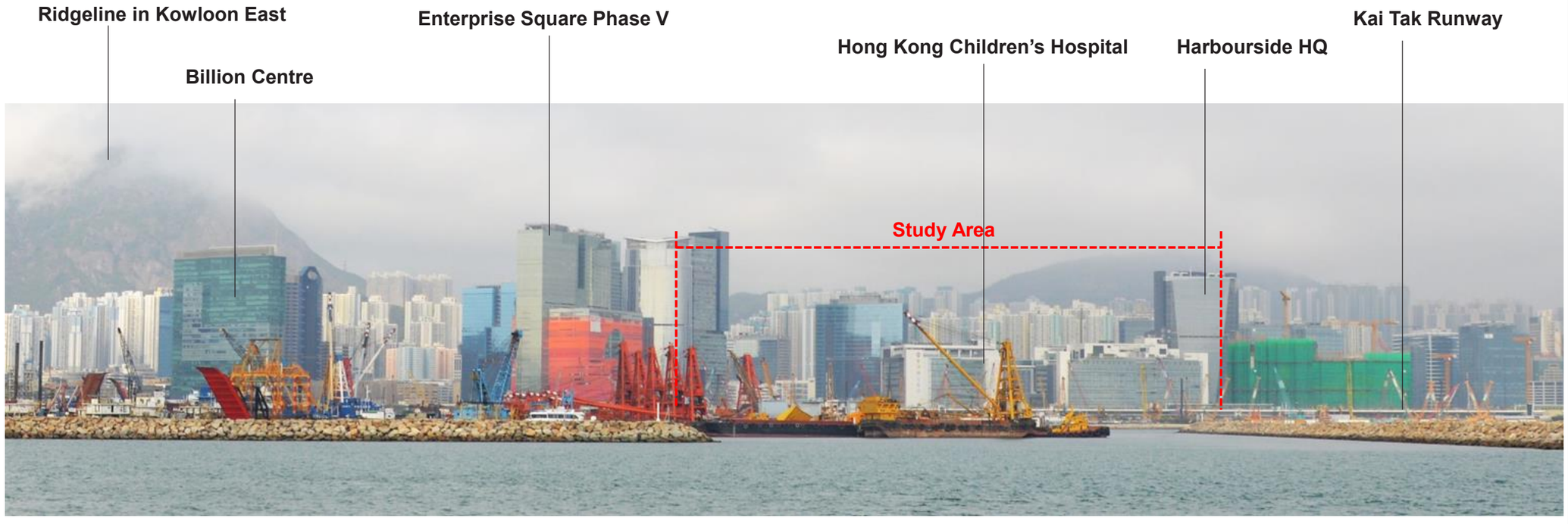
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



RES 3 Grand Waterfront (Approx. 1310m)



RES 4 Laguna Verde (Approx. 1920m)

Scale and Orientation

NTS

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

Figure No. 3.2b

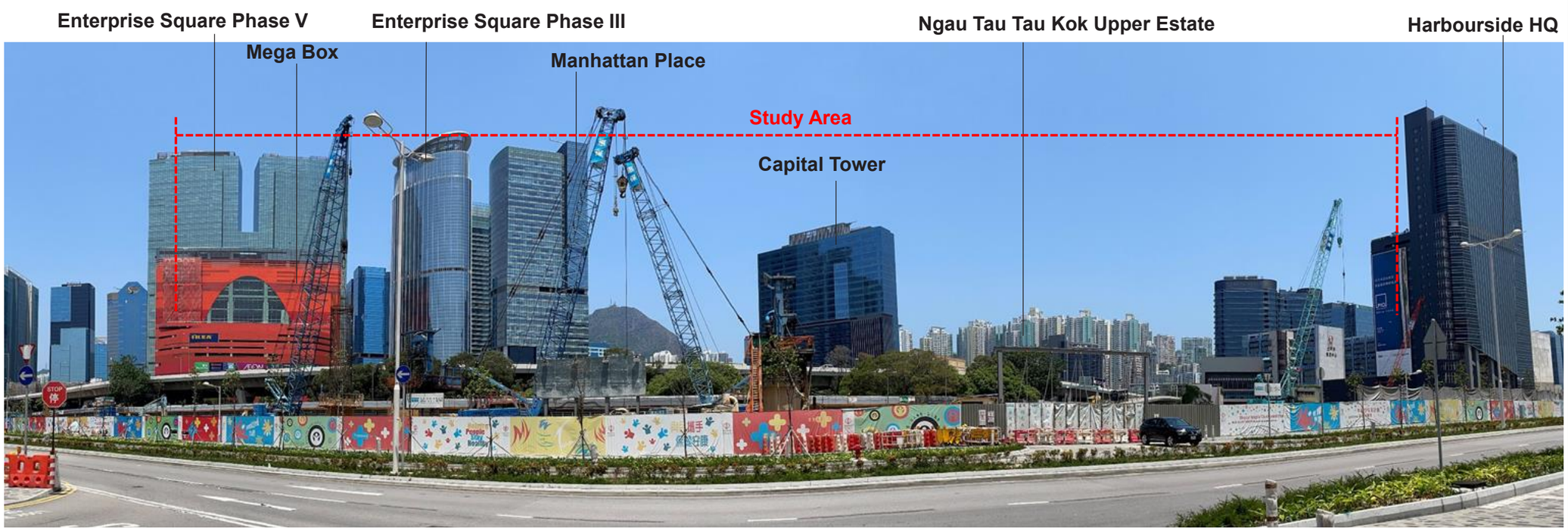
Drawing Title: Views of Visually Sensitive Receivers (Page 2 of 8)

Job Title

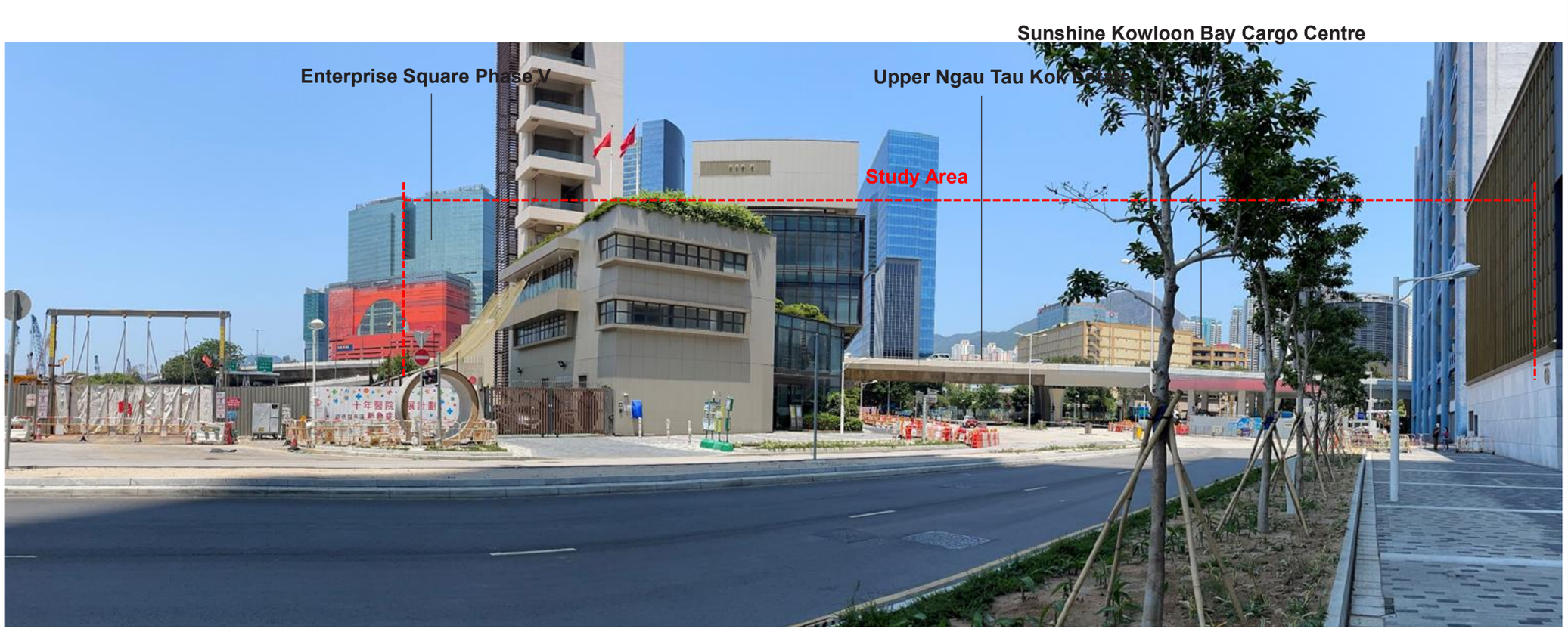
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



OC 1 Hong Kong Children's Hospital and the Planned Kai Tak Acute Hospital (Approx. 110m)



OC 2 Harbourside HQ (Approx. 125m)

Scale and Orientation

NTS

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

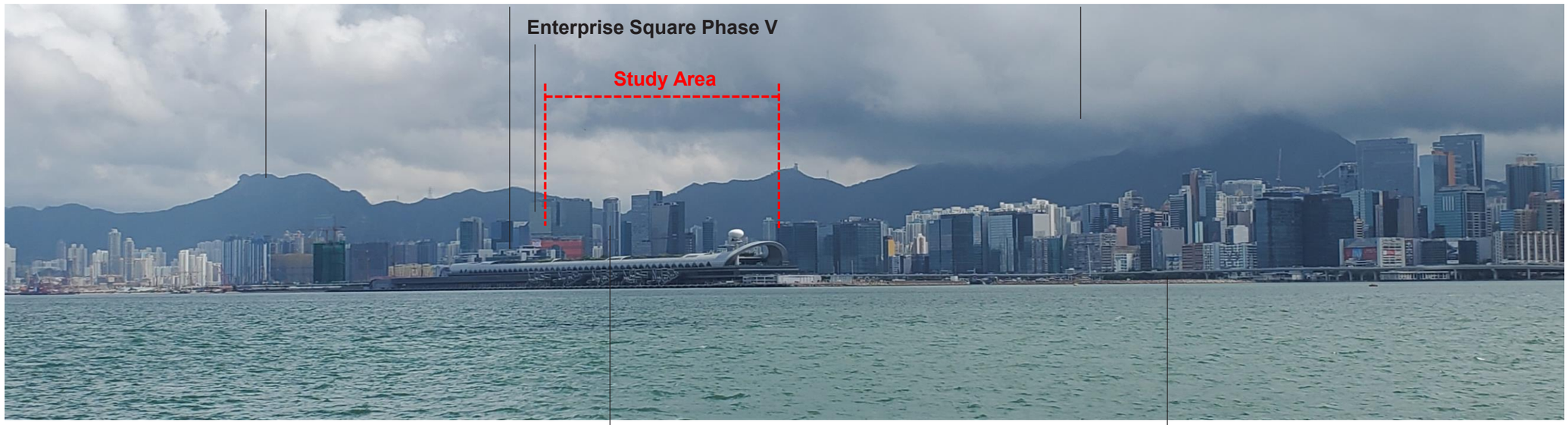
Figure No.	Drawing Title
3.2c	Views of Visually Sensitive Receivers (Page 3 of 8)

Job Title

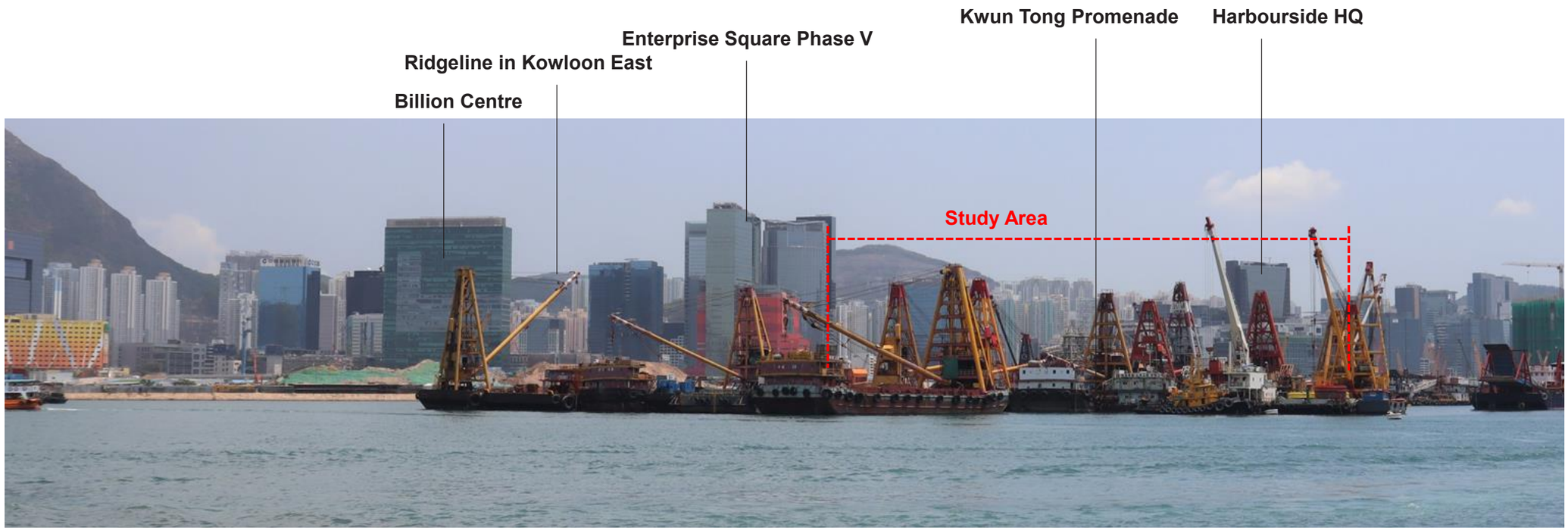
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



REC 1 Quarry Bay Park (Approx. 3150m)



REC 2 Hoi Sham Park (Approx.1640m)

Scale and Orientation

NTS

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

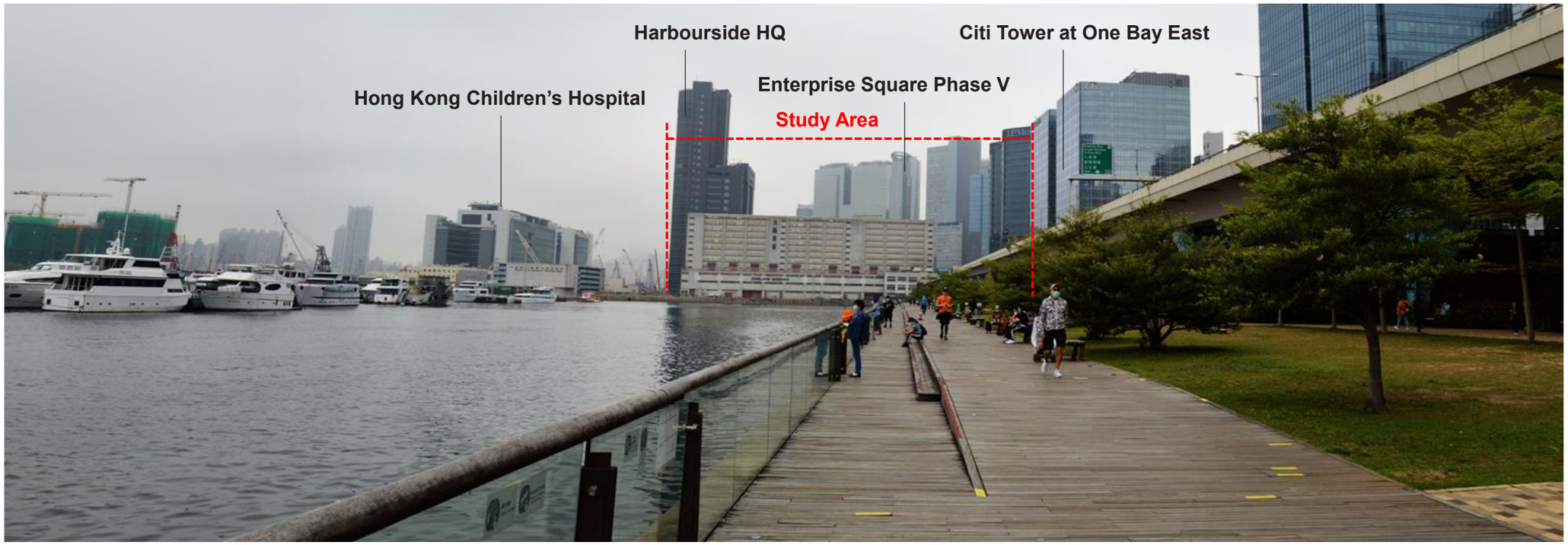
Figure No.	Drawing Title
3.2d	Views of Visually Sensitive Receivers (Page 4 of 8)

Job Title

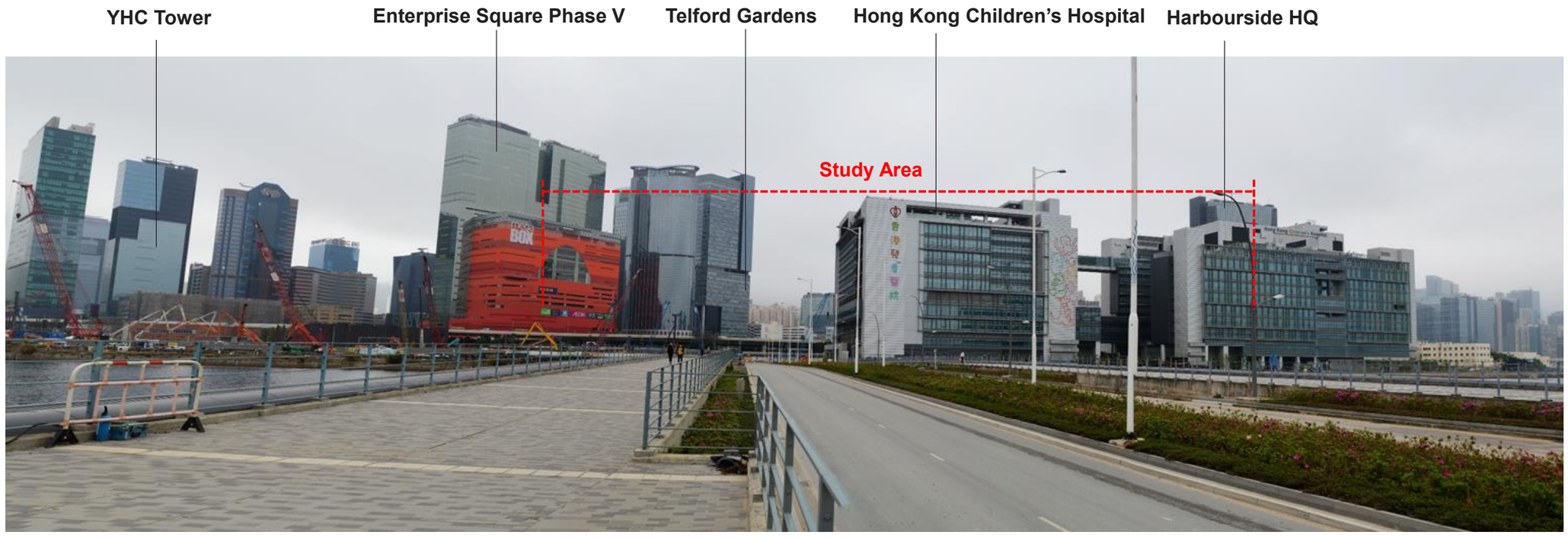
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



REC 3 Kwun Tong Promenade (Approx. 710m)



REC 4 Kai Tak Waterfront Promenade (Planned) (Approx.420m)

Scale and Orientation

NTS

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

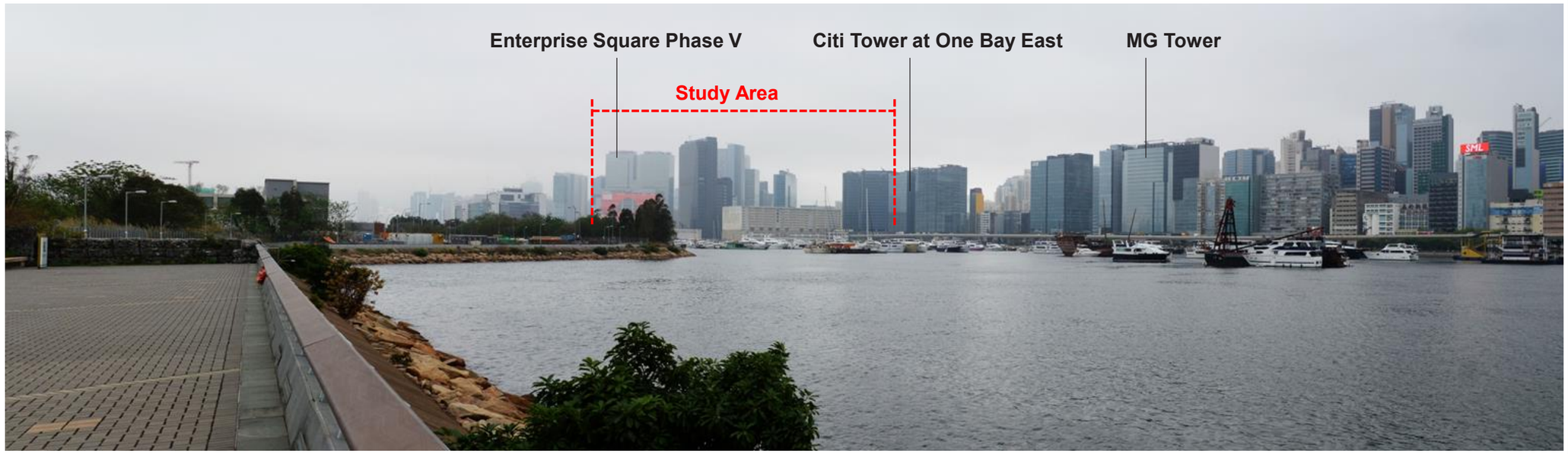
Figure No.	Drawing Title
3.2e	Views of Visually Sensitive Receivers (Page 5 of 8)

Job Title

Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



REC 5 Kai Tai Runway Park (Approx. 1250m)



REC 6 Zero Carbon Building (Approx. 130m)

Scale and Orientation

NTS

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

Figure No.	Drawing Title
3.2f	Views of Visually Sensitive Receivers (Page 6 of 8)

Job Title

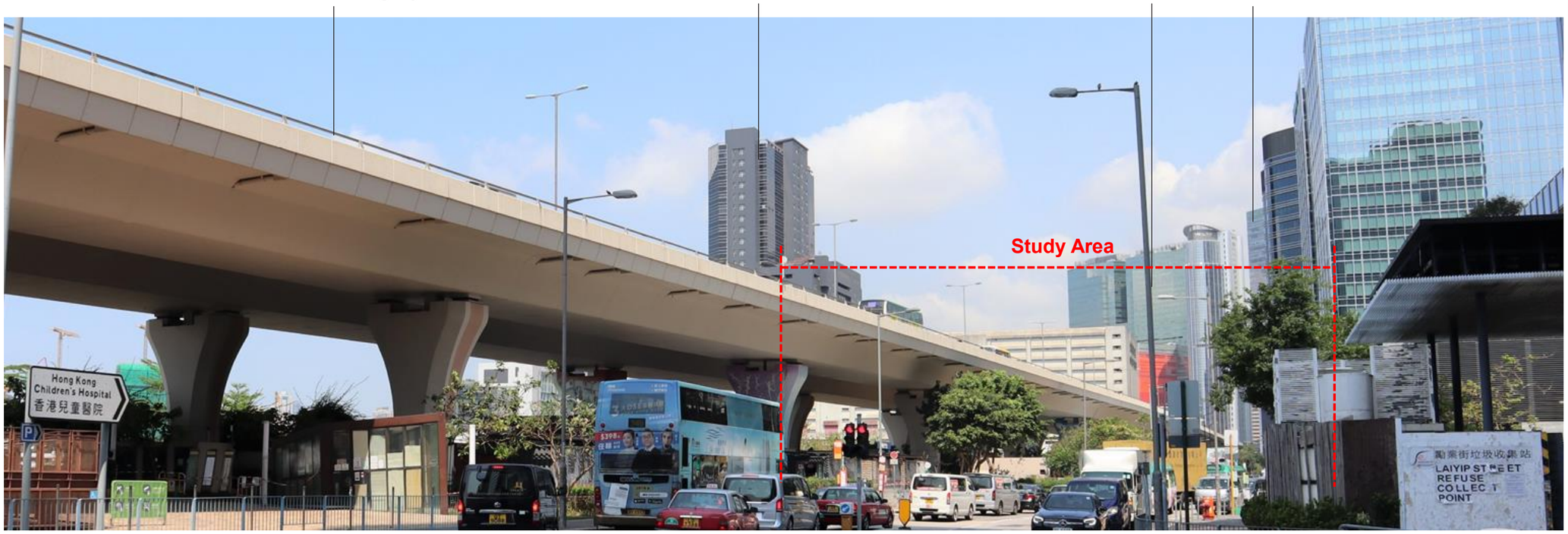
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



REC 7 Kowloon Bay Sports Ground (Approx. 810m)



VEH 1 Hoi Bun Road (Approx. 350m)

Scale and Orientation

NTS

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

Figure No. 3.2g

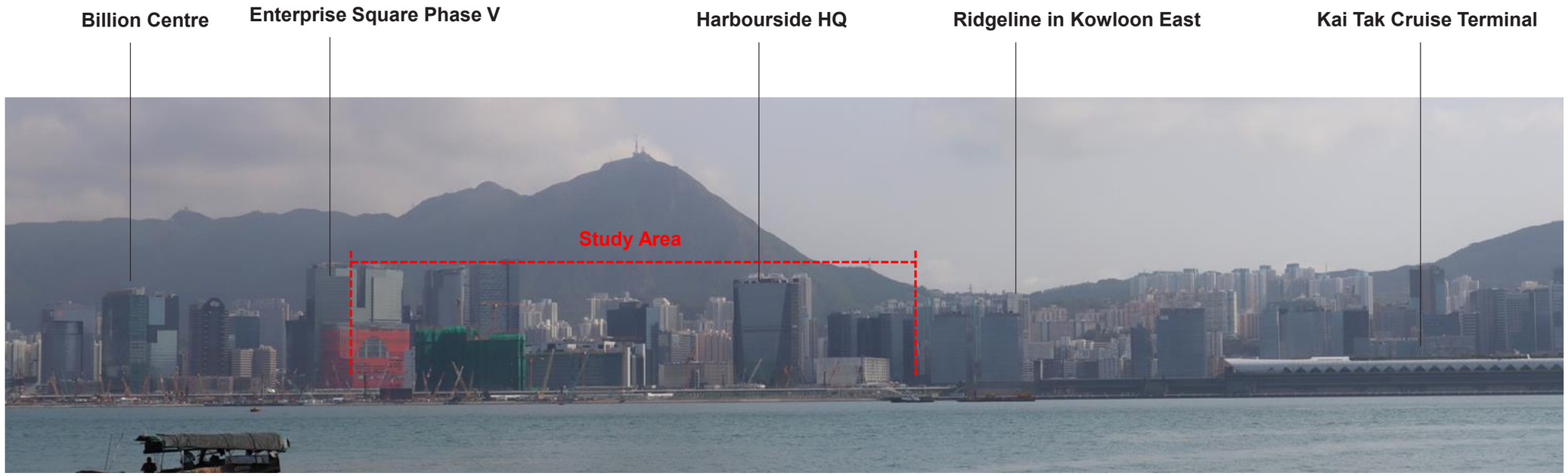
Drawing Title: Views of Visually Sensitive Receivers (Page 7 of 8)

Job Title

Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



VEH 2 Island Eastern Corridor (Approx. 3080m)

Scale and Orientation

NTS

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

Figure No.	Drawing Title
3.2h	Views of Visually Sensitive Receivers (Page 8 of 8)

Job Title

Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



- Study Area
- 1 Central Plaza
- 2 Extended Green Spine
- 3 Elevated Garden
- 4 Podium Plaza
- 5 Cultural and Creative Passage
- 6 Pedestrianized Cheung Yip Street
- 7 Ground Garden
- 8 Terrace Garden
- 9 Sky Plaza
- 10 Landscape Garden
- 11 Hung Yip Plaza
- 12 Amenity Area
- 13 Reserve Education Garden
- 14 Education Centre with Landscaped Deck Above
- Rooftop Greening
- Visual Corridor

Mitigation Measures (Operational Phases)

OM1	Maximise the Greening Provision in Proposed Development and the Associated Infrastructures
OM2	Landscape Integration and Screen Planting
OM3	Aesthetic Landscape and Architectural Treatment around/ on New Buildings
OM4	Operational Light Control

Drawn: RH	Date: MAR 2021
Checked: CY	Approved:

Figure No. 3.3

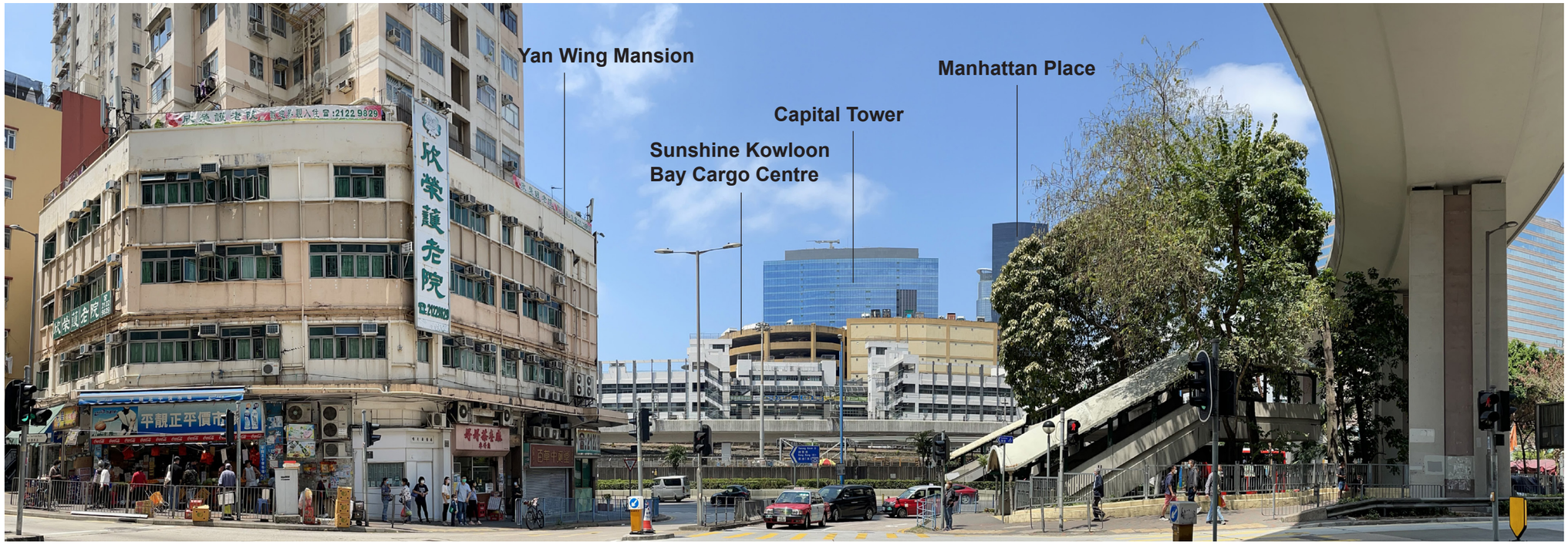
Drawing Title: Preliminary Landscape Master Plan (with Mitigation Measures)

Job Title

Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



RES1 Upper Ngau Tau Kok Estate - Existing View



RES1 Upper Ngau Tau Kok Estate - Photomontage (Without mitigation at Day 1)

NOTES:

Sample photomontages have been generated to provide a preliminary idea on the scale and extent of the proposed development. These images will be subject to change and are for illustrative purposes only. Built form demonstrates scale and massing only, it does not represent architecural design, finishes or any other related detailed design components.

Proposed Development Sites (Lots 1-4)

Scale and Orientation

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

Figure No.	Drawing Title
3.4a	VSR Photomontage - RES1 Upper Ngau Tau Kok Estate (Existing view & View of without Mitigation)

Job Title

Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



RES1 Upper Ngau Tau Kok Estate - Photomontage (With mitigation at Day 1)



RES1 Upper Ngau Tau Kok Estate - Photomontage (With mitigation at Year 10)

NOTES:

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Proposed Development Sites (Lots 1-4)

Scale and Orientation

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

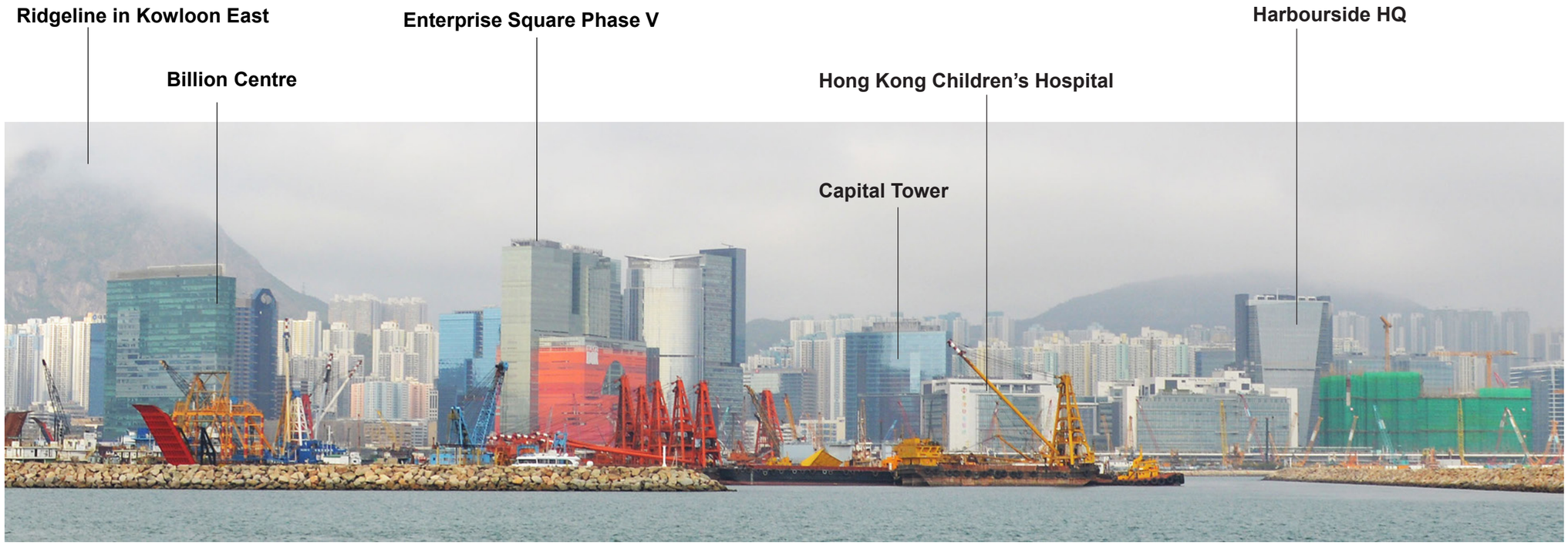
Figure No.	Drawing Title
3.4b	VSR Photomontage - RES1 Upper Ngau Tau Kok Estate (Views of Day1 & Year10 with Mitigation)

Job Title

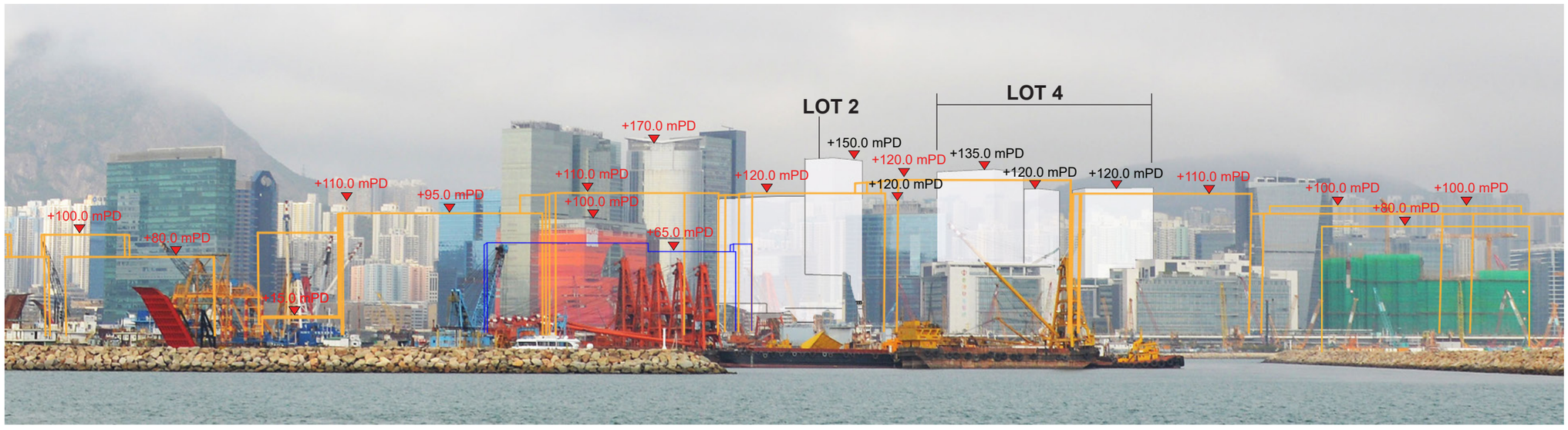
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



RES4 Laguna Verde - Existing View



RES4 Laguna Verde - Photomontage (Without mitigation at Day 1)

NOTES:

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Proposed Development Sites (Lots 1-4)

Kai Tak Acute Hospital (Planned)

Kai Tak Development Area

Scale and Orientation

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

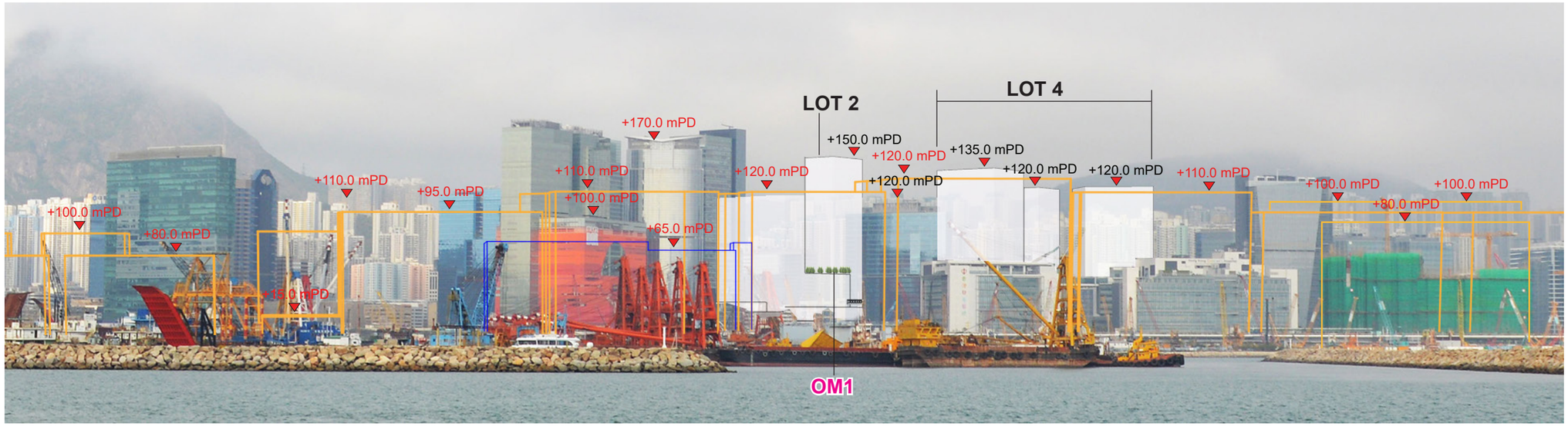
Figure No.	Drawing Title
3.5a	VSR Photomontage - RES4 Laguna Verde (Existing view & View of without Mitigation)

Job Title

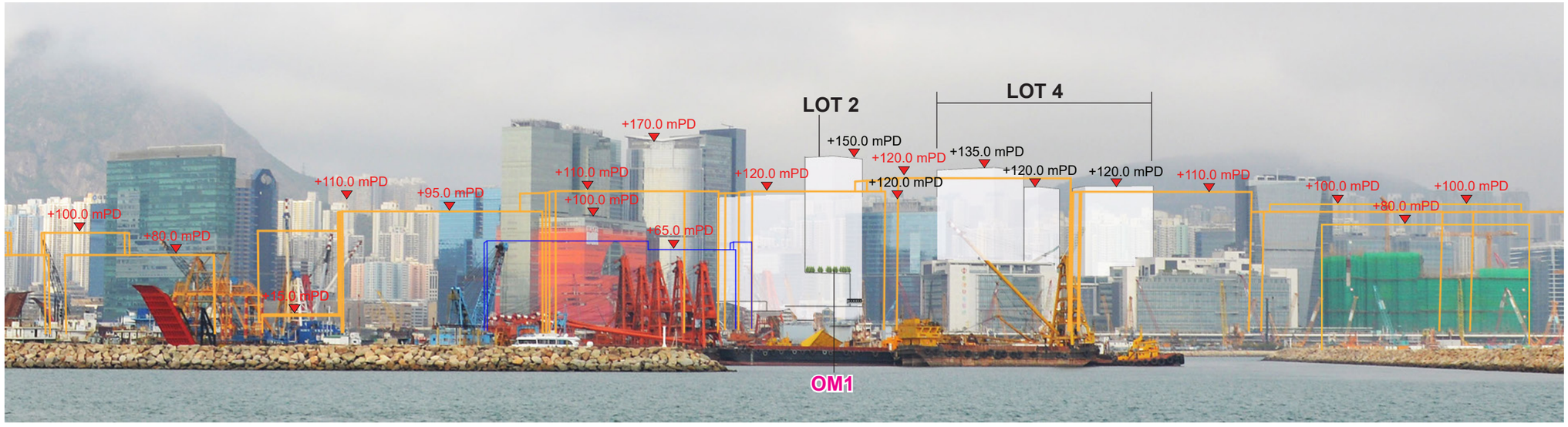
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



RES4 Laguna Verde - Photomontage (With mitigation at Day 1)



RES4 Laguna Verde - Photomontage (With mitigation at Year 10)

NOTES:

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Proposed Development Sites (Lots 1-4)

Kai Tak Acute Hospital (Planned)

Kai Tak Development Area

Mitigation Measures (Operational Phases)	
OM1	Maximise the Greening Provision in Proposed Development and the Associated Infrastructures
OM2	Landscape Integration and Screen Planting
OM3	Aesthetic Landscape and Architectural Treatment around/ on New Buildings
OM4	Operational Light Control

Scale and Orientation

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

Figure No. 3.5b

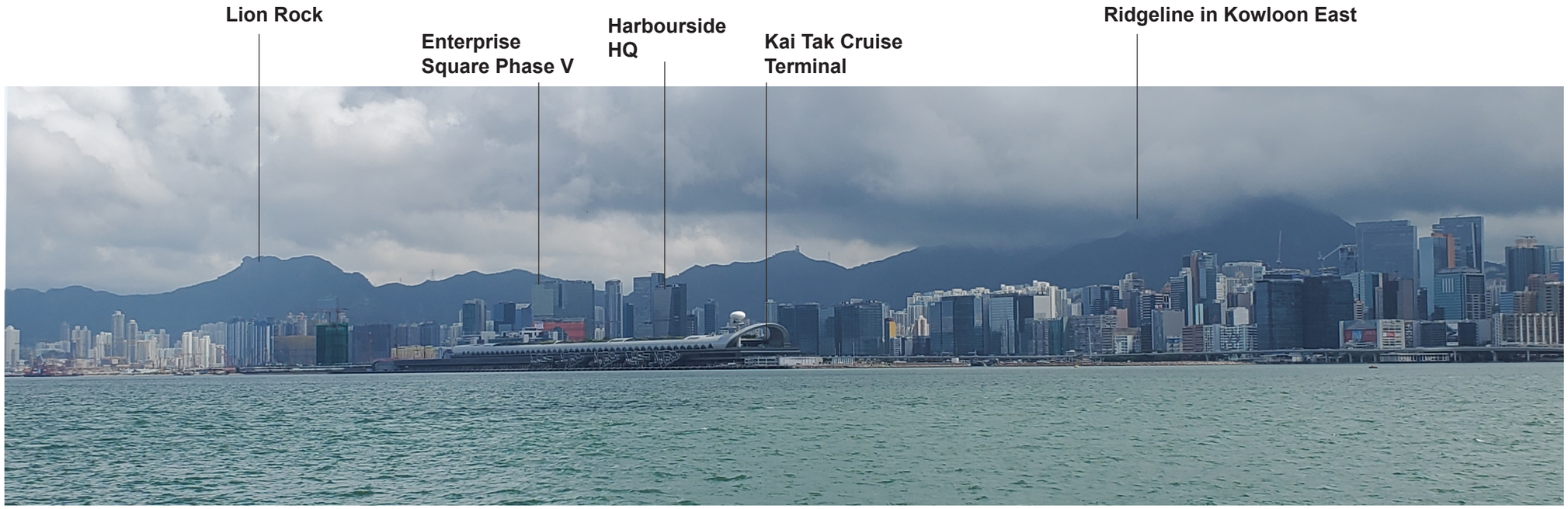
Drawing Title
VSR Photomontage -
RES4 Laguna Verde
(Views of Day1 & Year10 with Mitigation)

Job Title

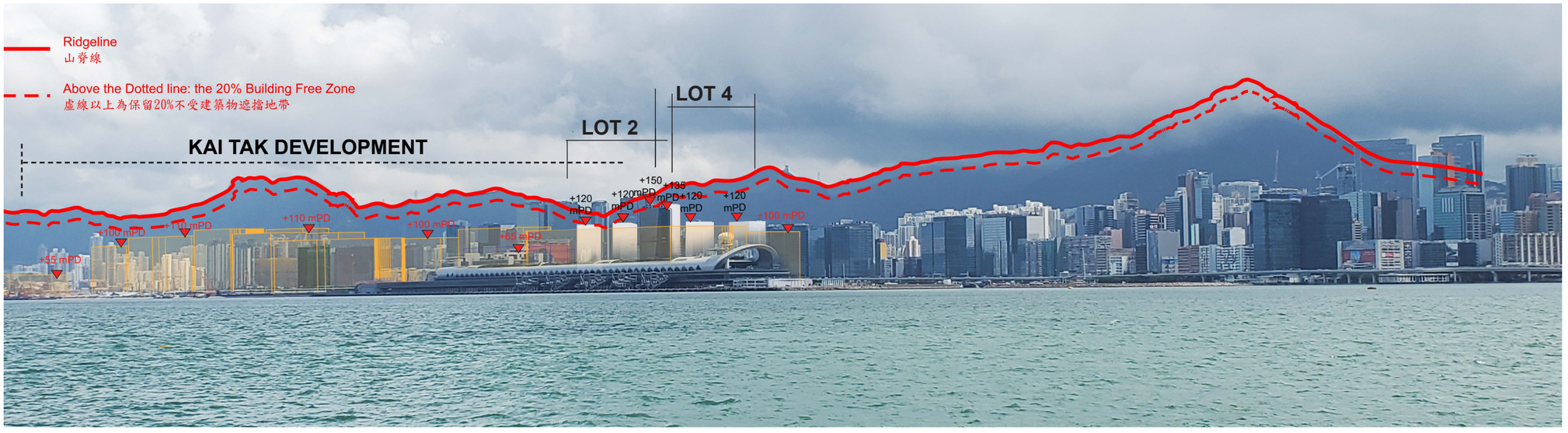
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



REC1 Quarry Bay Park - Existing View



REC1 Quarry Bay Park - Photomontage (Without mitigation at Day 1)

NOTES:

Sample photomontages have been generated to provide a preliminary idea on the scale and extent of the proposed development. These images will be subject to change and are for illustrative purposes only. Built form demonstrates scale and massing only, it does not represent architecural design, finishes or any other related detailed design components.

Proposed Development Sites (Lots 1-4)

Kai Tak Acute Hospital (Planned)

Kai Tak Development Area

Scale and Orientation

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

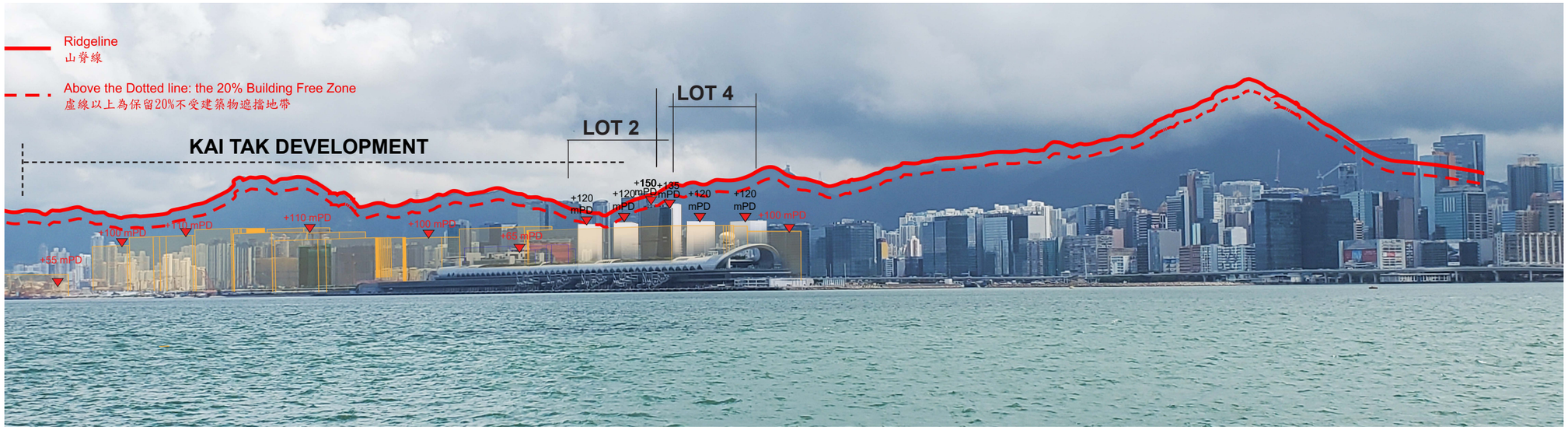
Figure No.	Drawing Title
3.6a	VSR Photomontage - REC1 Quarry Bay Park (Existing view & View of without Mitigation)

Job Title

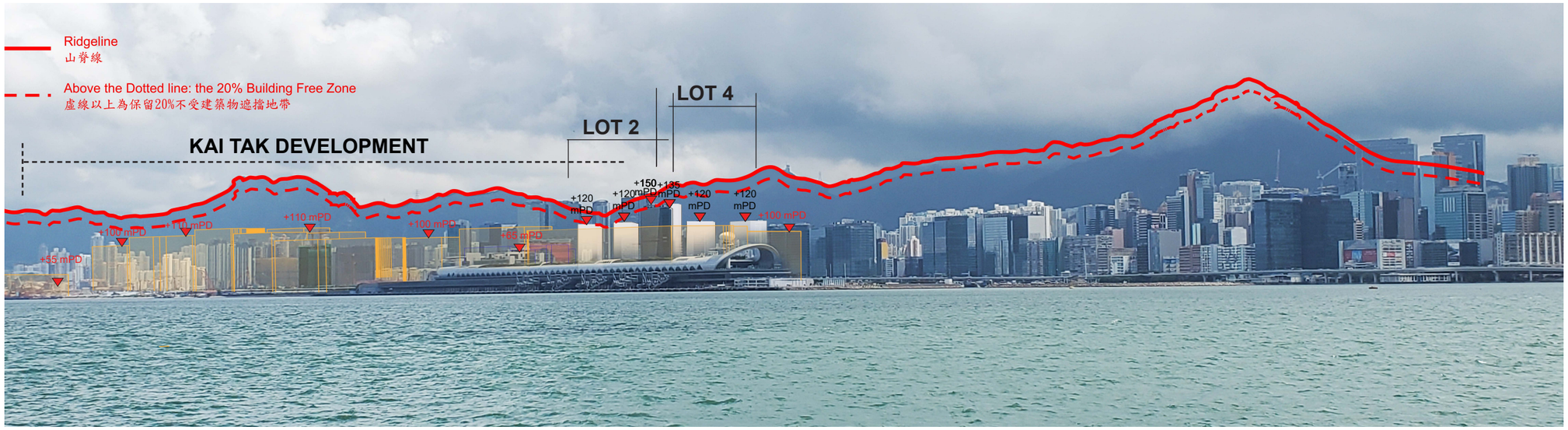
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



REC1 Quarry Bay Park - Photomontage (With mitigation at Day 1)



REC1 Quarry Bay Park - Photomontage (With mitigation at Year 10)

NOTES:

Sample photomontages have been generated to provide a preliminary idea on the scale and extent of the proposed development. These images will be subject to change and are for illustrative purposes only. Built form demonstrates scale and massing only, it does not represent architecural design, finishes or any other related detailed design components.

Proposed Development Sites (Lots 1-4)

Kai Tak Acute Hospital (Planned)

Kai Tak Development Area

Scale and Orientation

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

Figure No.	Drawing Title
3.6b	VSR Photomontage - REC1 Quarry Bay Park (Views of Day1 & Year10 with Mitigation)

Job Title

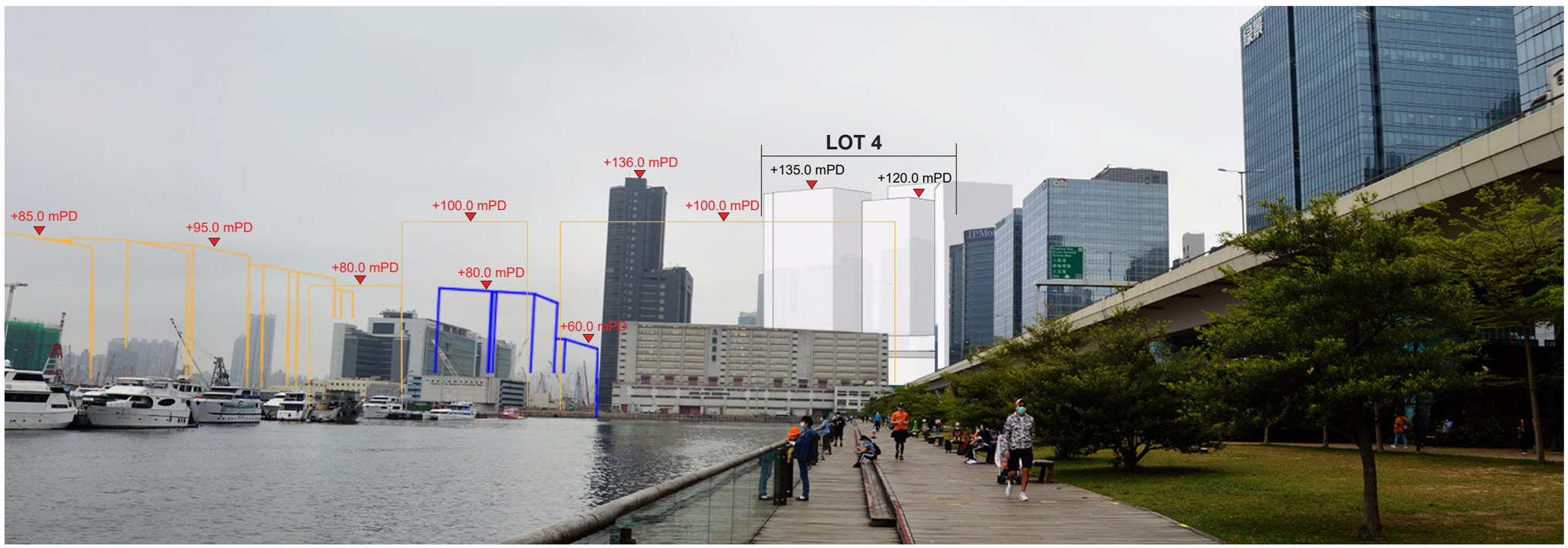
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



REC3 Kwun Tong Promenade - Existing View



REC3 Kwun Tong Promenade - Photomontage (Without mitigation at Day 1)

NOTES:

Sample photomontages have been generated to provide a preliminary idea on the scale and extent of the proposed development. These images will be subject to change and are for illustrative purposes only. Built form demonstrates scale and massing only, it does not represent architecural design, finishes or any other related detailed design components.

Proposed Development Sites (Lots 1-4)

Kai Tak Acute Hospital (Planned)

Kai Tak Development Area

Scale and Orientation

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

Figure No. 3.7a

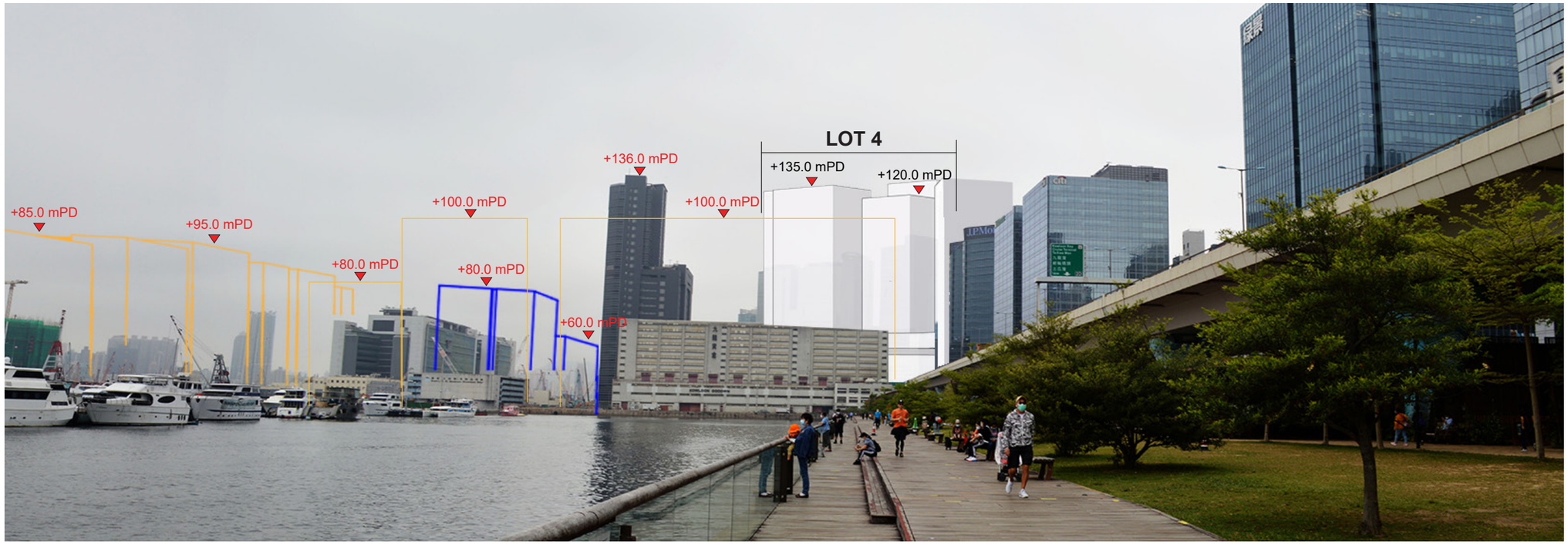
Drawing Title
VSR Photomontage -
REC3 Kwun Tong Promenade
(Existing view & View of without Mitigation)

Job Title

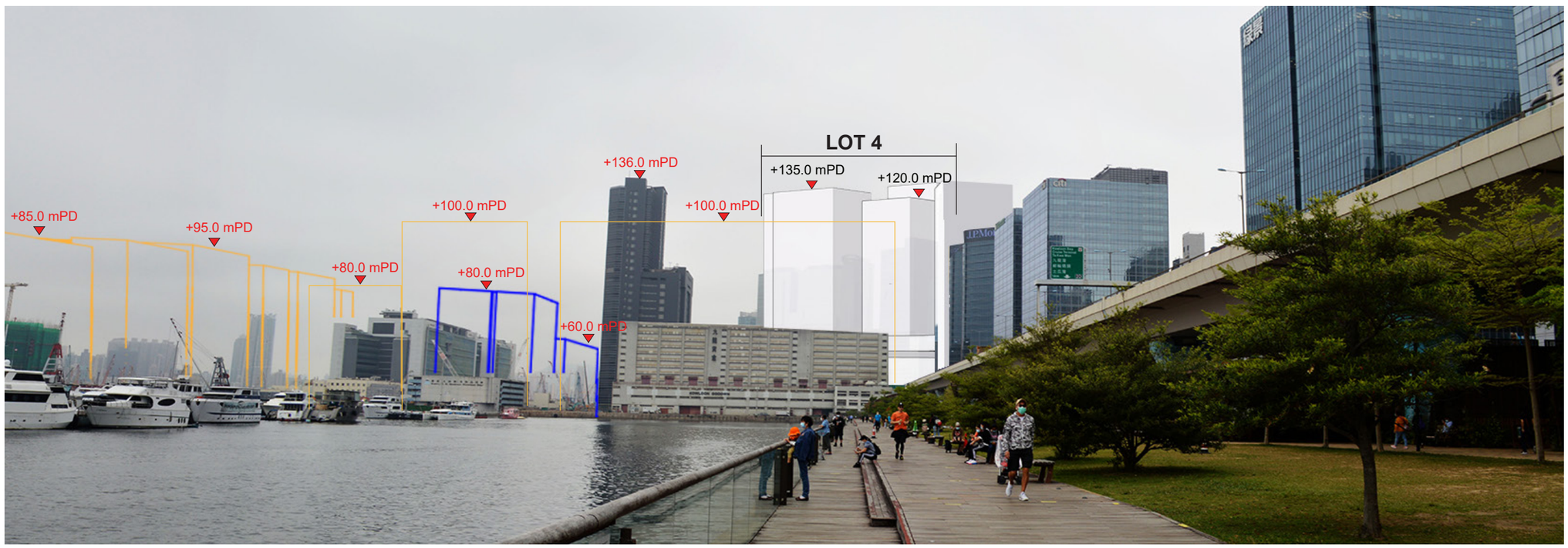
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



REC3 Kwun Tong Promenade - Photomontage (With mitigation at Day 1)



REC3 Kwun Tong Promenade - Photomontage (With mitigation at Year 10)

NOTES:

Sample photomontages have been generated to provide a preliminary idea on the scale and extent of the proposed development. These images will be subject to change and are for illustrative purposes only. Built form demonstrates scale and massing only, it does not represent architecural design, finishes or any other related detailed design components.

Proposed Development Sites (Lots 1-4)

Kai Tak Acute Hospital (Planned)

Kai Tak Development Area

Scale and Orientation

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

Figure No. 3.7b

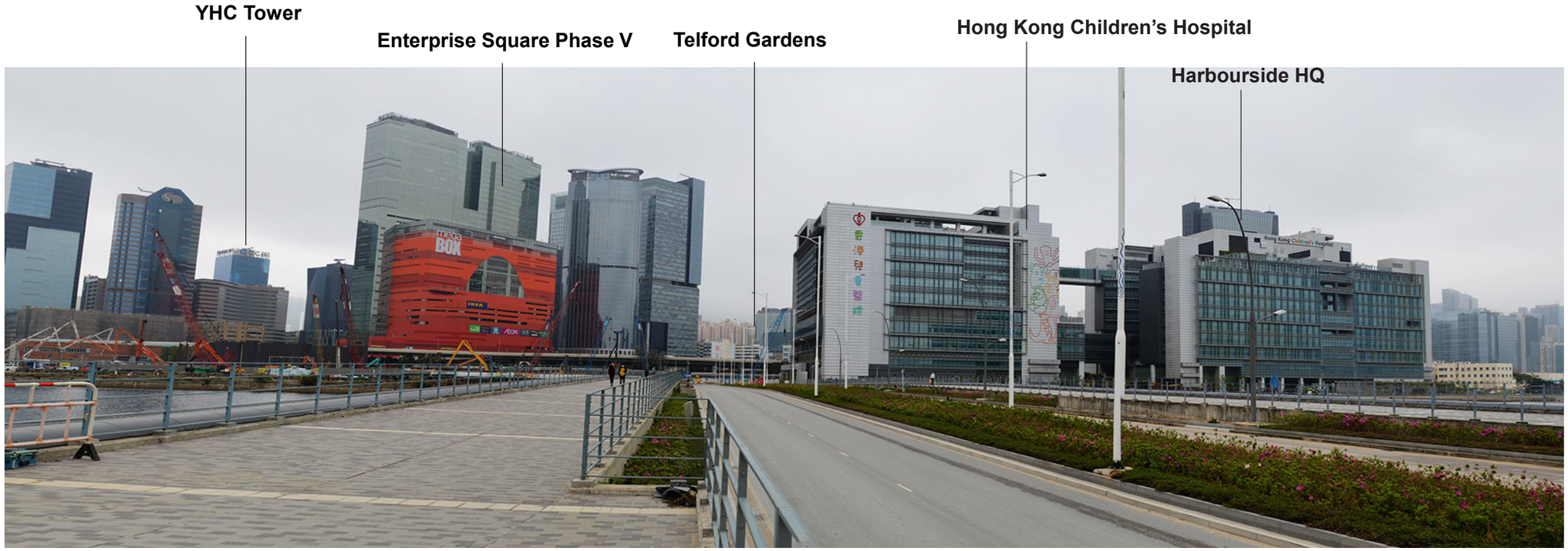
Drawing Title
VSR Photomontage -
REC3 Kwun Tong Promenade
(Views of Day1 & Year10 with Mitigation)

Job Title

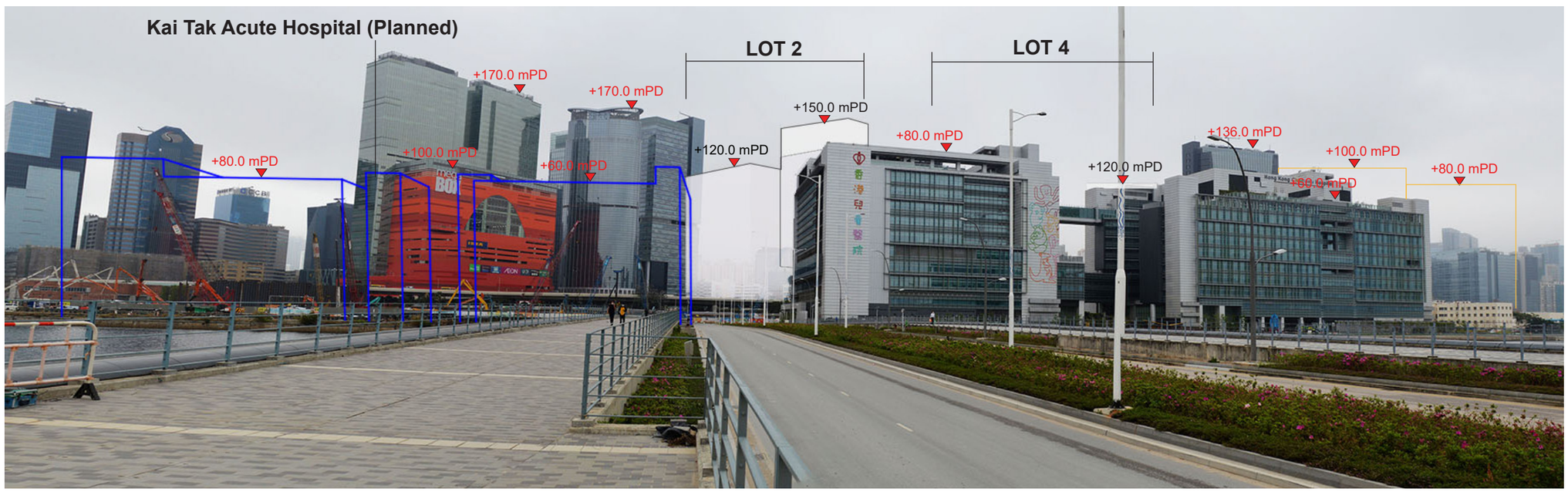
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



REC4 Kai Tak Waterfront - Existing View



REC4 Kai Tak Waterfront - Photomontage (Without mitigation at Day 1)

NOTES:

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Proposed Development Sites (Lots 1-4)

Kai Tak Acute Hospital (Planned)

Kai Tak Development Area

Scale and Orientation

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

Figure No. 3.8a

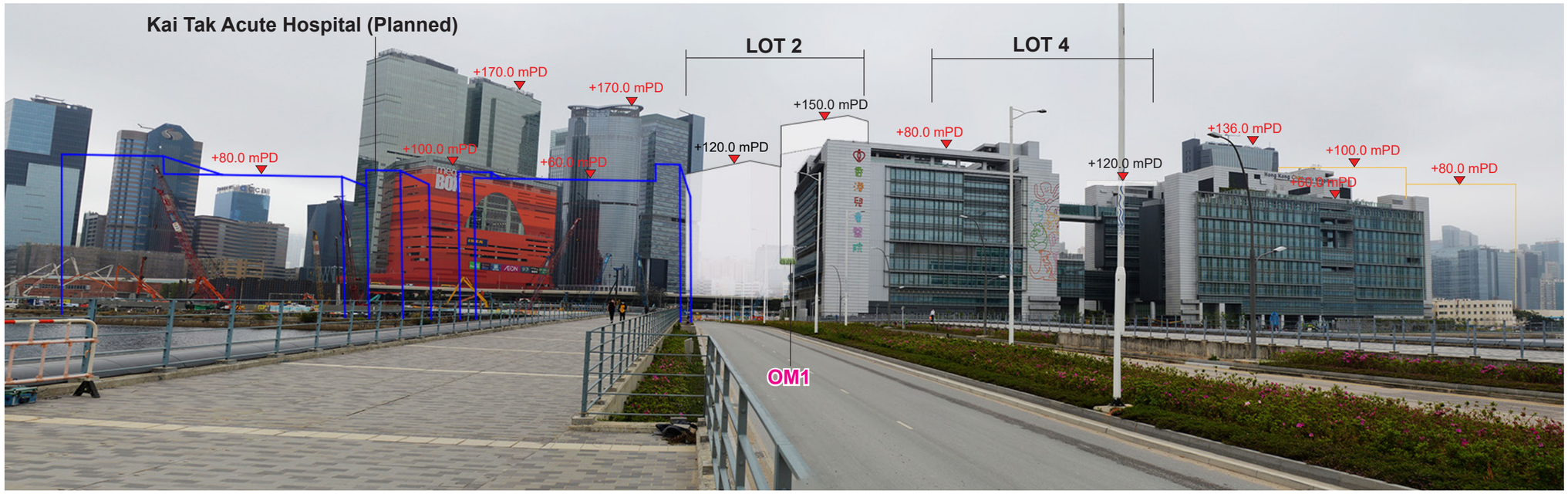
Drawing Title
VSR Photomontage -
REC4 Kai Tak Waterfront
(Existing view & View of without Mitigation)

Job Title

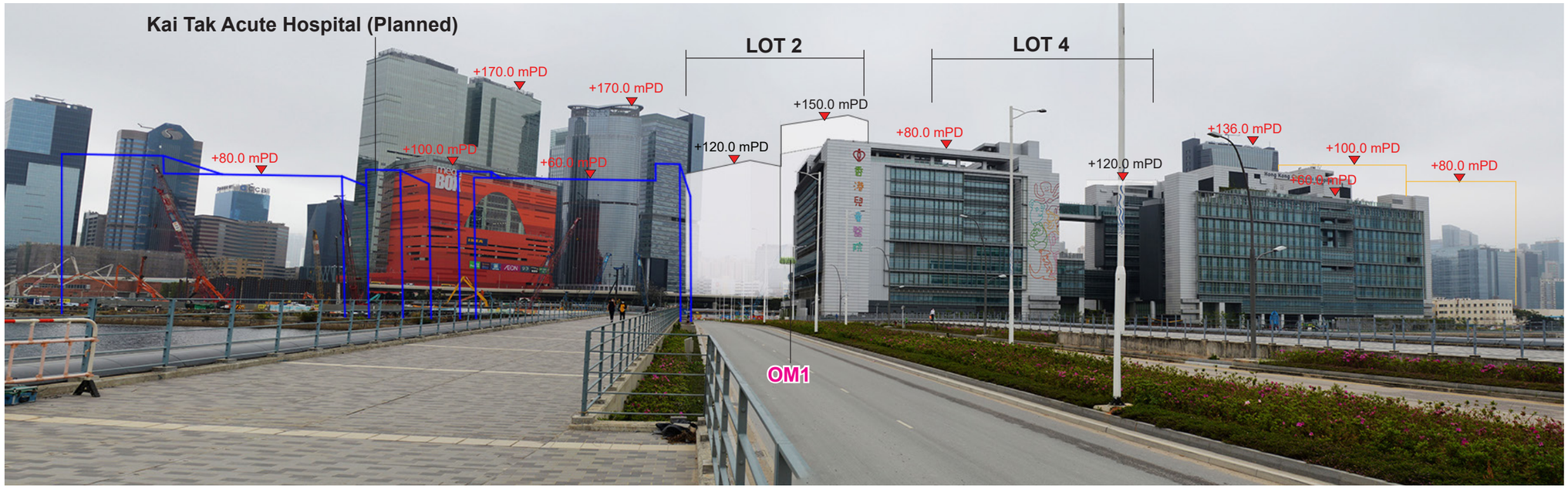
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



REC4 Kai Tak Waterfront - Photomontage (With mitigation at Day 1)



REC4 Kai Tak Waterfront - Photomontage (With mitigation at Year 10)

NOTES:

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Proposed Development Sites (Lots 1-4)

Kai Tak Acute Hospital (Planned)

Kai Tak Development Area

Mitigation Measures (Operational Phases)	
OM1	Maximise the Greening Provision in Proposed Development and the Associated Infrastructures
OM2	Landscape Integration and Screen Planting
OM3	Aesthetic Landscape and Architectural Treatment around/ on New Buildings
OM4	Operational Light Control

Scale and Orientation

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

Figure No. 3.8b

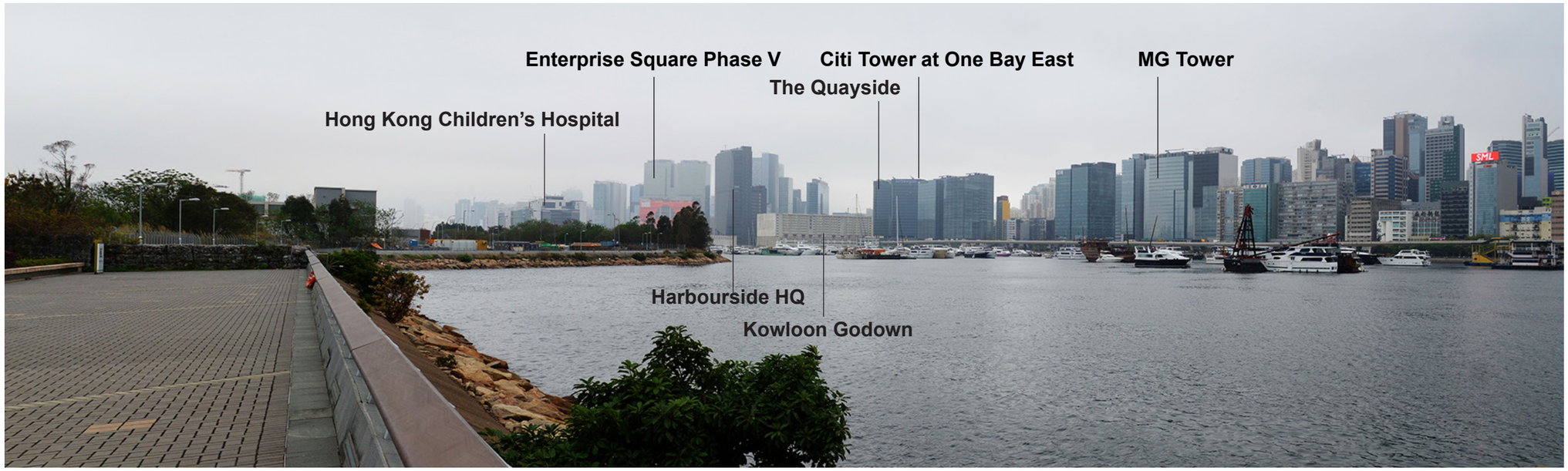
Drawing Title
VSR Photomontage -
REC4 Kai Tak Waterfront
(Views of Day1 & Year10 with Mitigation)

Job Title

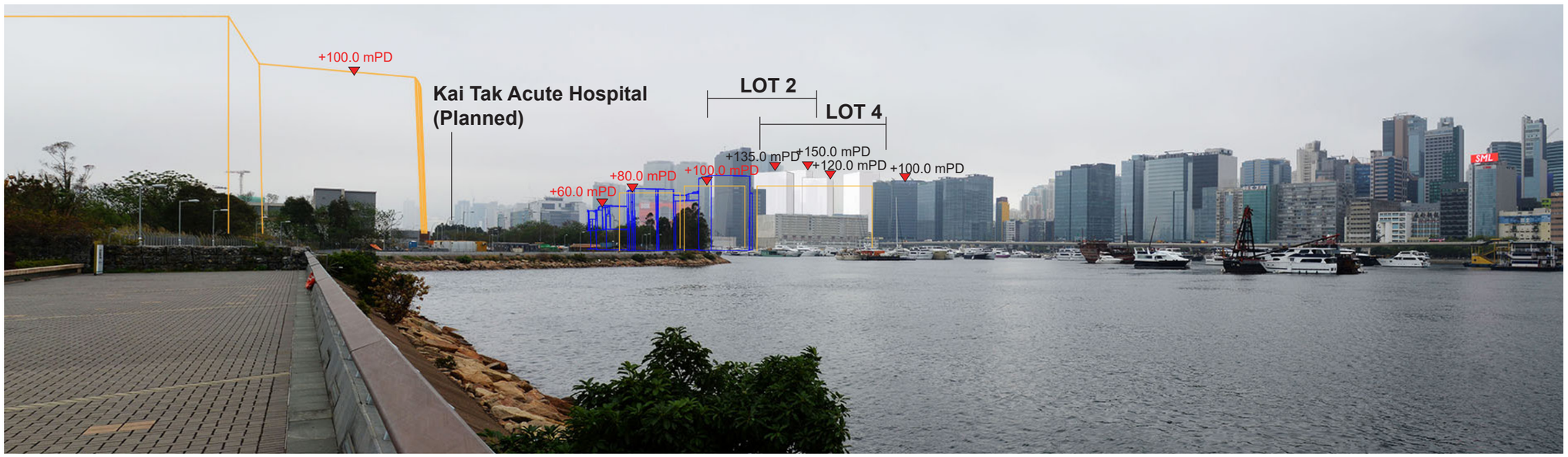
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



REC5 Kai Tak Runway Park - Existing View



REC5 Kai Tak Runway Park - Photomontage (Without mitigation at Day 1)

NOTES:

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Proposed Development Sites (Lots 1-4)

Kai Tak Acute Hospital (Planned)

Kai Tak Development Area

Scale and Orientation

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

Figure No. 3.9a

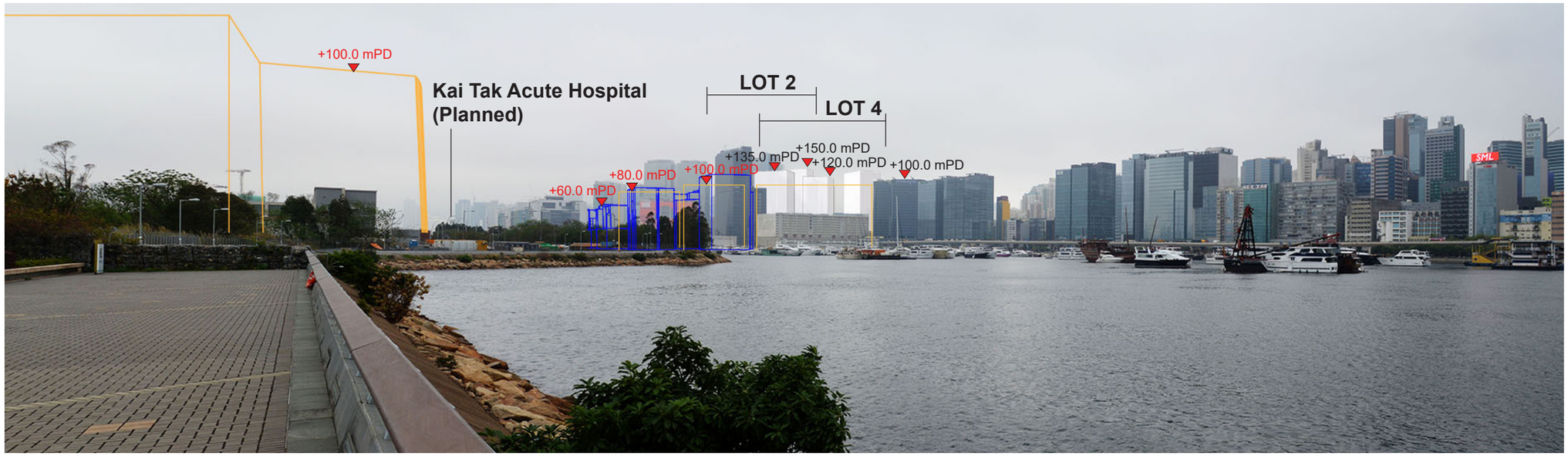
Drawing Title
VSR Photomontage -
REC5 Kai Tak Runway Park
(Existing view & View of without Mitigation)

Job Title

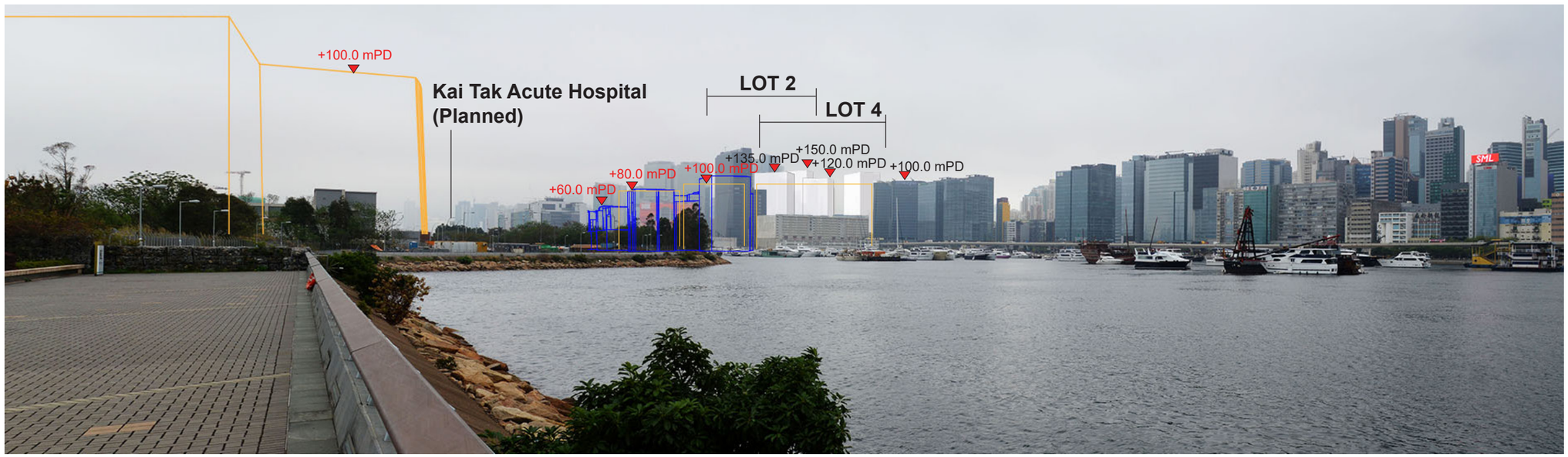
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



REC5 Kai Tak Runway Park - Photomontage (With mitigation at Day 1)



REC5 Kai Tak Runway Park - Photomontage (With mitigation at Year 10)

NOTES:

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Proposed Development Sites (Lots 1-4)

Kai Tak Acute Hospital (Planned)

Kai Tak Development Area

Scale and Orientation

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

Figure No.	Drawing Title
3.9b	VSR Photomontage - REC5 Kai Tak Runway Park (Views of Day1 & Year10 with Mitigation)

Job Title

Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



REC7 Kowloon Bay Sports Ground - Existing View

REC7 Kowloon Bay Sports Ground - Photomontage (Without mitigation at Day 1)

NOTES:

Sample photomontages have been generated to provide a preliminary idea on the scale and extent of the proposed development. These images will be subject to change and are for illustrative purposes only. Built form demonstrates scale and massing only, it does not represent architecural design, finishes or any other related detailed design components.

Proposed Development Sites (Lots 1-4)

Scale and Orientation

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

Figure No.	Drawing Title
3.10a	VSR Photomontage - REC7 Kowloon Bay Sports Ground (Existing view & View of without Mitigation)

Job Title

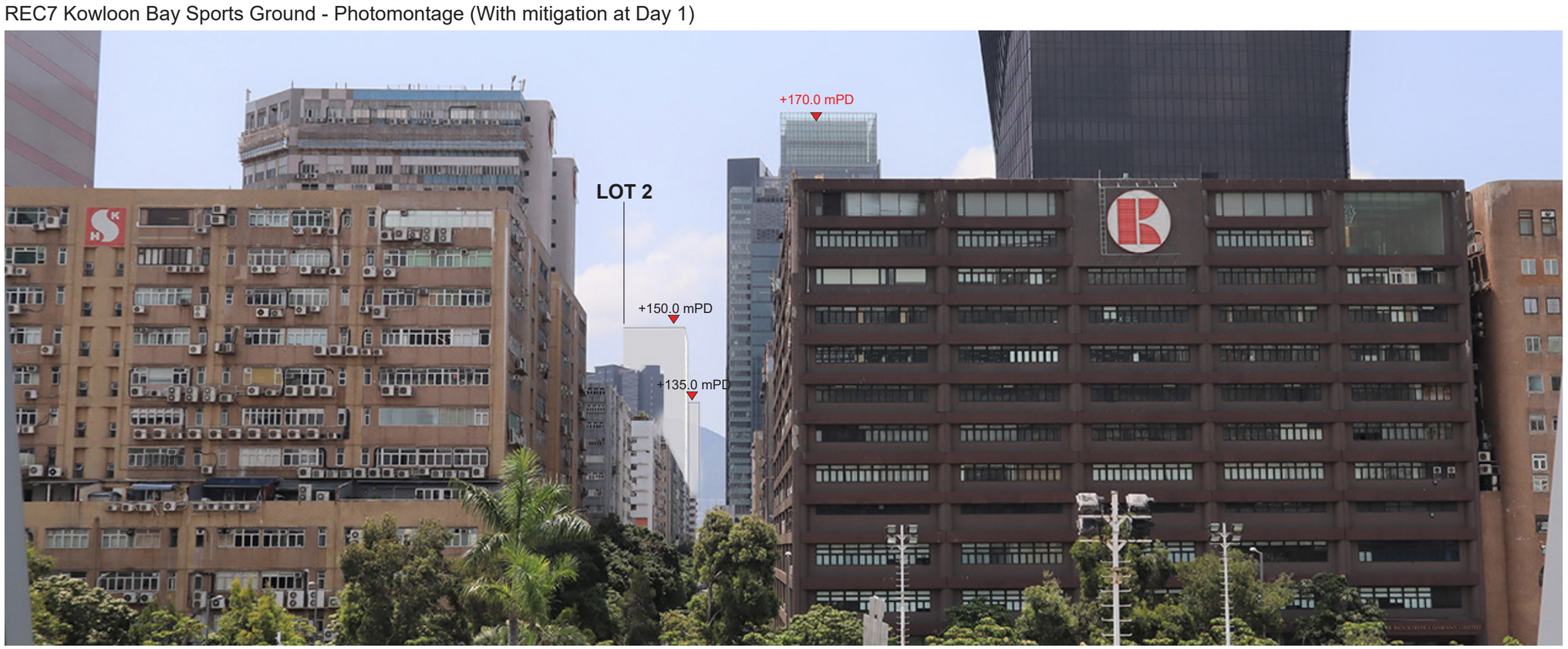
Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP



REC7 Kowloon Bay Sports Ground - Photomontage (With mitigation at Day 1)



REC7 Kowloon Bay Sports Ground - Photomontage (With mitigation at Year 10)

NOTES:

Sample photomontages have been generated to provide a preliminary idea on the scale and extent of the proposed development. These images will be subject to change and are for illustrative purposes only. Built form demonstrates scale and massing only, it does not represent architecural design, finishes or any other related detailed design components.

Proposed Development Sites (Lots 1-4)

Scale and Orientation

Drawn	Date
RH	MAR 2021
Checked	Approved
CY	

Figure No.	Drawing Title
3.10b	VSR Photomontage - REC7 Kowloon Bay Sports Ground (Views of Day1 & Year10 with Mitigation)

Job Title

Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Visual Impact Assessnebt Report (WP No.17)

ARUP

5 Tree Survey

5.1 Background

5.1.1.1 The Tree Survey was conducted in January 2018 to cover all the existing trees which may be affected by the proposed development schemes within the Study Area.

5.1.1.2 The Study Area is mainly bounded by Sheung Yee Road in the North, Wai Yip Street in the East and the edge of Kwun Tong Bypass and the adjoining amenity areas in the West and South next to KTD. It has an area of about 17 ha including the areas of roads, pedestrian walkways, sitting-out area and amenity areas with trees and vegetation (see **Appendix A**).

5.2 Survey Methodology

5.2.1.1 The Broad Brush Tree Survey is carried out for all existing trees with trunk base situated within the survey areas in the project. In accordance with Development Bureau Technical Circular (Works) (DEVB TC(W)) No. 4/2020, all existing trees with a trunk diameter of 95mm or more at a height of 1.3m above ground level are included in the survey. The trees are grouped together for the survey based on the aboveground features, e.g. fencing, boundary wall and footpath/ road. Each tree group is assigned with a unique tree group reference number (in a systematic system).

5.2.1.2 Where practical, all trees in the tree groups were surveyed at certain reasonable distances where the tree species were identifiable. The number and amount of each tree species in the same tree groups were then counted as far as possible, or estimated where trees were inaccessible. The following information was recorded and provided in ranges for each tree species in the tree groups:

- height;
- crown spread;
- trunk diameter (measured 1.3 metre from the ground);
- assessment of tree form (good / fair / poor);
- assessment of tree health (good / fair / poor).

5.2.1.3 Where applicable, the following information was provided as remarks for each tree groups, if:

- there are trees included in the Register of Old and Valuable Trees promulgated under ETWB TC(W) 5/2020;
- there are trees potentially registrable in accordance with the criteria as set out in ETWB TC(W) 5/2020;
- there are trees belonging to species which are protected under local legislations, including the Forests and Countryside Ordinance (Cap. 96) and the Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586);

- there are trees belonging to species which are included in the latest edition of the publication 'Rare and Precious Plants of Hong Kong' issued by AFCD;
- there are trees which have special importance due to special attributes such as protected status; rarity; age over 100 years, outstanding size or form; and cultural or historical significance, etc.

5.2.1.4 Photographic records are taken on site to show the general overall view of the tree groups.

5.2.1.5 In preparing this Tree Survey Report, references for tree survey methodology and evaluation of surveyed tree were made based on the following technical circulars, practice notes and publications:

- DEVB TC(W) No. 4/2020 – Tree Preservation;
- DEVB TC(W) No. 6/2015 – Maintenance of Vegetation and Hard Landscape Features;
- Environment, Transport and Works Bureau Technical Circular (Works) (ETWB TC(W)) 5/2020– Registration of Old and Valuable Trees, and Guidelines for their Preservation;
- Agriculture, Fisheries and Conservation Department (AFCD), Conservation Branch, Nature Conservation Practice Note No. 02/ June 2006 – Measurement of Diameter at Breast Height (DBH);
- AFCD – Check List of Hong Kong Plants 2012;
- Hu, Q., et al. 2003. Rare and Precious Plants of Hong Kong, AFCD, Hong Kong;
- LCSD's Register of Old and Valuable Trees;
- IUCN Red List of Threatened Species Version 2015.1.

5.3 Tree Group Survey Criteria

5.3.1.1 Each identified tree group was assigned a tree group reference number and surveyed individually in accordance with the tree group survey assessment criteria listed in **Table 5.3**.

Table 5.3 Tree Group Survey Criteria

Tree Survey Assessment Criteria		**Explanation**
Tree Group Reference No.		The unique tree group reference number (in a systematic system).
Estimated No. of Trees		Estimated quantity of trees within the tree group
Density		The estimated no. of trees per meter square
Scientific name		Scientific name of the surveyed tree.
Common Chinese name		Chinese common name of the surveyed tree.
Species origin		The origin (native/exotic) of the species of the surveyed tree.
Size of tree	Range of height (m)	The range of tree height of the surveyed tree species within the tree group from the ground level to the top branch.
	Range of crown spread (m)	The range of spread (diameter of canopy) of the surveyed tree species within the tree group.
	Range of DBH (mm)	The range of tree diameter of the surveyed tree species within the tree group in accordance with AFCD Nature Conservation Branch Practice Note. No. 02.
Evaluation criteria	General Health condition	Relative grading of the health condition (Good/ Fair/ Poor) of the surveyed tree is evaluated. Good: Trees in good health condition without signs of visible defects and with good structural integrity. Fair: Trees of reasonable form and with few or no visible defects of health problems. Poor: Trees in poor health conditions (e.g. suffered from severe stress, disease, insect/pest infection, thin foliage density cover or dieback of canopy).
	General Form	Relative grading of the tree form (Good/ Fair/ Poor) of the surveyed tree is evaluated. Good: Trees with balanced form, upright trunk and a good crown spread. Fair: Trees of reasonable form and crown spread. Poor: Trees with unbalanced form, canopy lopsided, serious leaning trunk or crooked tree trunk.

5.4 Tree Survey Findings

5.4.1.1 The survey area was demarcated into 17 tree groups. Please refer to **Appendix A** for the location of each tree groups.

Tree Group 1 (about 80 nos. of trees):

5.4.1.2 Tree Group 1 is located at the Wai Yip Street/ Sheung Yee Road Sitting-out Area with lush tree and shrub planting. The dominate tree species include *Bauhinia variegata, Macaranga tanarius var. tomentosa, Tabebuia chrysantha, Phoenix loureiroi* and *Dypsis lutescens*. Most of the trees are semi-mature, some of the tree showed minor dead branches in the crown and pruning wounds on the stems, despite this the tree group were generally in fair health condition and form.

Tree Group 2 (about 5 nos. of trees):

5.4.1.3 There are 2 young Schefflera actinophylla and 3 *Phoenix loureiroi* found under Sheung Yee Road Flyover. Some trees were showing some broken branches, waterspouts and leaning, the overall health condition and form is considered to be fair due to its limited minor defects.

Tree Group 3 (about 35 nos. of trees):

5.4.1.4 Tree Group 3 refers to the street planting along Sheung Yee Road. Tree species mainly consist of Michelia x alba, Plumeria rubra, Eucalyptus robusta, Bauhinia x blakeana, Senna surattensis, Ficus microcarpa and Terminalia mantaly. Most of the trees are semi-mature, some of the trees demonstrated a little damage on the branches and stems, the tree were generally in fair health condition and form.

Tree Group 4 (about 20 nos. of trees):

5.4.1.5 Tree Group 4 is located at Kowloon Bay Police Vehicle Detention and Examination Centre. Tree species include *Macaranga tanarius var. tomentosa, Acacia confuse, Ficus virens, Morus alba* and *Melia azedarach*. The tree group are generally of semi-mature to mature size, some of trees were showing broken branches and scar on the trunks, the tree group were generally considered to be in fair health condition and form.

Tree Group 5 (about 37 nos. of trees):

5.4.1.6 Tree Group 5 is located on the landscaped area at the eastern part of the site. Tree species mainly consist of *Acacia confusa, Ficus virens, Caryota maxima, Dypsis lutescens,* and *Melaleuca cajuputi*. Most of the trees are well mature, some of the tree demonstrated a little damage or defects such as bending on the branches, broken branches, pruning wounds on the stem, wilting leaves and leaning, the tree were generally considered to be in fair health condition and form.

Tree Group 6 (about 18 nos. of trees):

5.4.1.7 Tree Group 6 refers to the man-made slope near Wang Chiu Road. Species consists of Acacia confuse, Melia azedarach, Aleurites moluccana, Macaranga tanarius var. tomentosa, Melaleuca cajuputi, Bauhinia variegate and Bauhinia x blakeana. The tree group are generally of mature size. Some trees were showing minor dead

branches in the crown, scar on the trunks, waterspouts and leaning, the overall health condition and form is considered to be fair.

Tree Group 7 (about 60 nos. of trees):

5.4.1.8 Tree Group 7 is located under Kwun Tong Bypass. Tree species mainly include *Acacia confuse, Bauhinia x blakeana, Caryota maxima* and *Melaleuca cajuputi*. Most of the trees are well mature, some of the trees demonstrated a little damage on the branches and stems, the tree were generally in fair health condition and form.

Tree Group 8 (about 5 nos. of trees):

5.4.1.9 There are 3 semi-mature *Syzygium jambos* and 2 *Ravenala madagascariensis* are found at the southern boundary of the site, which is near Kai Tak Fire Station. The tree group demonstrated a damage or defects such as fungi, wilting leaves, dead branches and leaning, the overall health condition and form is considered to be poor.

Tree Group 9 (about 73 nos. of trees):

5.4.1.10 Tree Group 9 refers to the street planting at the south-western boundary. Tree species mainly consists of *Cinnamomum camphora, Acacia confuse, Melia azedarach, Bauhinia x blakeana* and *Bombax ceiba*. Most of the trees are well mature, some of the tree showed bending on the branches, broken branches and pruning wounds on the stems, despite this the tree group were generally in fair health condition and form.

Tree Group 10 (about 32 nos. of trees):

5.4.1.11 Tree Group 10 refers to the street planting along Wang Chiu Road and the landscaped area at the western part of the former Kowloon Bay Waste Recycling Centre. Tree species mainly include *Aleurites moluccana, Acacia confuse* and *Melaleuca cajuputi*. The tree group are generally of semi-mature to mature size, some trees showed dead branches in the crown, waterspouts and leaning, the overall health condition and form is considered to be fair due to its limited minor defects.

Tree Group 11 (about 21 nos. of trees):

5.4.1.12 Tree Group 11 refers to the landscaped area at the western part of the former New Kowloon Bay Vehicle Examination Centre. Tree species mainly consist of *Melaleuca cajuputi*, *Macaranga tanarius var. tomentosa* and *Aleurites moluccana*. Most of the trees are semi-mature, some trees were showing pruning wounds on the stems and waterspouts, the tree group were generally considered to be in fair health condition and form.

Tree Group 12 (about 16 nos. of trees):

5.4.1.13 Tree Group 12 refers to the roadside planting at Wang Chiu Road. Species consists of *Melaleuca cajuputi*, *Trachycarpus fortune, Phoenix loureiroi* and *Caryota maxima*. The tree group are generally of semi-mature to mature size, some of the trees demonstrated a little damage on the branches and stems, the trees were generally in fair health condition and form.

Tree Group 13 (about 5 nos. of trees):

5.4.1.14 Tree Group 13 refers to the roadside planting along Hoi Bun Road. Tree species consist of *Melaleuca cajuputi*, *Caryota maxima* and *Phoenix loureiroi*. The tree group are generally of semi-mature to mature size, some of trees were showing minor dead branches in the crown, the tree group were generally considered to be in fair health condition and form.

Tree Group 14 (about 19 nos. of trees):

5.4.1.15 Tree Group 14 is located on Cheung Yip Street near the former Kowloon Bay Waste Recycling Centre. Species include *Ficus microcarpa* and *Ficus elastic*. The tree group are generally of well mature size, some trees were showing some broken branches, waterspouts and unbalanced form, the overall health condition and form is considered to be fair due to its limited minor defects.

Tree Group 15 (about 16 nos. of trees):

5.4.1.16 Tree Group 15 refers to the street planting at Cheung Yip Street near the former New Kowloon Bay Vehicle Examination Centre. Tree species include *Ficus microcarpa, Macaranga tanarius var. tomentosa, Ficus elastic* and *Casuarina equisetifolia*. Most of the trees are well mature, some of the tree demonstrated a little damage or defects such as bending on the branches, scar on the branches, wilting leaves and leaning, the tree were generally considered to be in fair health condition and form.

Tree Group 16 (about 55 nos. of trees):

5.4.1.17 Tree Group 16 refers to the tree planting at the former Kowloon Bay Motor Vehicle Examination Centre. Species mainly include *Melaleuca cajuputi*, *Macaranga tanarius var. tomentosa* and *Aleurites moluccana*. Most of the trees are well mature, some trees were showing dead branches in the crown, pruning wounds on the stems, wilting leaves and waterspouts, the overall health condition and form is considered to be fair.

Tree Group 17 (about 4 nos. of trees):

5.4.1.18 There are 4 *Aleurites moluccana* found along Wai Yip Street near Ying Lun Godown, the trees are well mature and without signs of visible defects during the tree survey. The tree group were generally in good health condition and form.

5.5 Conclusion

5.5.1.1 About 500 trees were found within the Surveyed Area, consisting of 30 identified tree species. They are mostly exotic and common species with fair health condition and tree form. No registered Old and Valuable Trees (OVT) were recorded during the tree survey.

5.5.1.2 The indicative locations of the tree groups are marked on the Tree Survey Plan in **Appendix A**. The site photos of the tree survey are shown in **Appendix B**. Results of the surveyed tree group information

and characteristics are presented in the Tree Group Survey Schedule in **Appendix C**.

5.6 Tree Preservation Proposal

Proposed Treatment of Trees

Trees to be retained

5.6.1.1 The development consists of a variety of development lots each requiring its own tree preservation proposal, which would be conducted separately during the detailed design stage later.

5.6.1.2 This assessment has been divided to assess the broad-brush treatment into each individual lot. The protection measures to be taken to minimize disturbance to the retained and transplanted tree are described below.

5.6.1.3 In terms of tree preservation, the Contractor shall comply with the clauses as stipulated in the following Codes/ Specifications/ Technical Circulars relating to Landscape Works and Tree Preservation for the Project:

- Architectural Service Department (ArchSD) – General Specification for Building 2012 Edition;
- Development Bureau Technical Circular (Works) No.4/2020 – Tree Preservation;
- Development Bureau Technical Circular (Works) No.6/2015 – Maintenance of Vegetation and Hard Landscape Features;
- Environment, Transport and Works Bureau Technical Circular (Works) No.11/ 2004 – Cyber Manual for Greening; and
- Guidelines on Tree Transplanting from Greening, Landscape and Tree Management Section of Development Bureau.

5.6.1.4 In terms of tree protection measures, the following guidelines shall be followed to protect existing trees during construction:

(a) Before the commencement of construction works, the Contractor shall erect, secure, maintain and replace tree protection measures including temporary protection fence and tree tags, if required or upon to Architects' instruction, for all preserved trees as shown in the tree plans.

(b) The Contractor shall remove the tree protective fence from the Development Site upon sectional completion of all construction works and related tree works, or earlier if so directed by the Supervising Officer (SO). The Contractor shall not remove or relocate the temporary protective fencing or enter the area enclosed by the temporary protective fencing without prior agreement of the SO.

(c) Without the prior approval of the SO, the Contractor shall not carry out excavation or trenching within the Tree Protection Zone (TPZ) of the preserved trees. The Contractor shall obtain the agreement

from the SO to the detailed locations and extent of the excavation work. Temporary tree protection measures shall be required for preserved trees upon Architects' instruction during the construction works.

(d) Extent of TPZ for the retained and transplanted trees determined by the extent of existing crowns.

(e) Height of temporary green plastic mesh fencing shall be a minimum of 1000mm in height fixed on fencing pins.

(f) Fencing pins shall be strong and appropriate for receiving the mesh. Fencing will be erected prior to the commencement of construction activity and removed the cessation of construction activity.

(g) The alignment of the temporary protective fencing can be circular, square rectangular or any shape so long as the fencing does not encroach on the TPZ. Sand bags shall be put alongside of the fence to avoid runoff from construction activities.

(h) A sealable opening shall be provided to the temporary protective fencing to allow entry for carrying out the necessary arboricultural works or maintenance works to the tree or any other approved works within the TPZ.

(i) A warning notice guarding against unauthorised operations within the fenced area shall be erected on the temporary protective fencing.

Trees to be affected

5.6.1.5 The tree assessment has identified tree groups within specific confines. Several of these tree groups, e.g. Tree Groups 3, 4 and 10, are unavoidably affected by the development proposal, primarily located in lot 1 and lot 2.

5.6.1.6 Tree Group 4 is unavoidably affected by the development of the ORRC on lot 1. Large (potentially) underground development within the narrow constraints of the site boundary, will interfere with the preservation of the trees within Tree Group 4. Further feasibility study would be conducted and detailed assessment of each individual tree would be carried out to determine the potential of transplanting some of the trees.

5.6.1.7 For the tree groups that are affected directly by the development proposal, these tree groups would be compensated within the study boundary and contribute to a sustainable and green development. Some of the trees would be retained in-situ (by provision of at-grade POSPD and amenity area/setback area in lots 2 and 4) or transplanted within the study boundary as far as possible.

Tree compensation – Part of Tree Group 3

5.6.1.8 Trees of this group would be affected by the alignment of the proposed pedestrian footbridge along Sheung Yee Road, in between the crossings with Wang Mau Street and Wang Hoi Road. Due to the narrow sidewalk along Sheung Yee Road and the close proximity of the Yip-On Factory Estate Block 2, the alignment of the pedestrian footbridge cannot avoid affecting these trees.

5.6.1.9 The total DBH of this selection of 15 trees within the Tree Group 3, has been calculated as the median of the DBH-range (200mm - 300mm) within the tree group, equal to 250mm. Therefore, the total DBH calculated for compensation of this selection of trees is 3,750mm.

Tree Compensation – Group 4

5.6.1.10 Some trees are inevitably in conflict with the proposed development on lot 1. Due to technical constraints in relation to the underground and potentially above ground space required for the construction of ORRC, the trees within Tree Group 4 may need to be compensated. Some of the trees within this group may potentially be transplanted. For this assessment, the worst-case scenario of felling all 20 trees has been taken into account.

5.6.1.11 The total DBH of the entire tree group has been calculated as taking the median of the DBH-range (250mm – 500mm) within the group, equal to 375mm. Therefore, the total DBH calculated for compensation of this Tree Group equals to 7,500mm.

Tree Compensation – Group 10

5.6.1.12 Despite Lot 2 development would have 10m setback from the lot boundary to the south, assuming the worst-case scenario, some trees might be in conflict with the proposed development on lot 2. Some of the trees within this group may need to be compensated and some potentially be transplanted. For this assessment, the worst-case scenario of felling all 32 trees has been taken into account.

5.6.1.13 The total DBH of the entire tree group has been calculated as taking the median of the DBH-range (150mm – 400mm) within the group, equal to 275mm. Therefore, the total DBH calculated for compensation of this Tree Group equals to 8,800mm

5.6.1.14 In view of the above, a table of recommendation on tree compensation is summarized below in **Table 5.6.1**.

Table 5.6.1 Summary of Tree Compensation Requirement

Affected Tree Group	Affected by	Average DBH (mm)	Total DBH to compensate (mm)
3	Sheung Yee Road Footbridge connecting to lot 2 development	250	3,750
4	Lot 1 - ORRC	375	7,500
10	Lot 2 Development	275	8,800
Total			**20,050**

5.6.2 Tree Compensation Proposal

5.6.2.1 Around 200 new heavy standard trees (75mm to 90mm DBH) with a total DBH of 20,160mm would be planted on street level and podium levels to compensate for the total DBH of 20,050mm of the felled trees.

The ratio of the total DBH of compensation trees to that of the felled trees is equal or more than 1:1, hence fulfilling the requirement that the ratio of the quantity and quality, the total DBH of compensation trees to those of the felled trees should be no less than 1:1.

5.6.2.2 Emphasis is placed on locating compensation trees in and directly around the development lot, reducing the impact on phased planning of the entire development. Therefore, the trees and its compensation DBH of lot 2 and the footbridge are compensated in the direct vicinity of Lot 2.

5.6.2.3 The compensation for Lot 1 (public development) is focussed on the provision of compensatory trees on public land.

5.6.2.4 According to the DEVB TCW No.6/2015, it is proposed that the future maintenance responsibility of the compensatory trees under this Project should rest on the Project Proponent/ LCSD except tree group 3 along Sheung Yee Road. The trees abutting Yip On Flattered Factory fall under the vesting order of Housing Authority (HA). The need of tree compensation would be determined by a vetting committee of HA which would relay such requirement to CEDD (i.e. the implementation agent of the proposed footbridge).

5.6.2.5 According to the Landscape Standards and Guidelines of LCSD, the planting area for new trees would have a minimum soil depth of 2,000mm for large tree species and 1,500mm for small and medium tree species.

5.6.2.6 The proposed species for compensatory plantings are included but not limited to the following **Table 5.6.2**.

Table 5.6.2 Proposed Planting Species of Compensatory Planting

Botanical Name	Chinese Name	Size	Spacing	Quantity
Bauhinia variegata	宮粉羊蹄甲	75mm DBH Heavy Standard	5 M	24
Tabebuia argentea	銀鱗金鈴木	75mm DBH Heavy Standard	5 M	18
Cinnamomum burmannii	陰香	90mm DBH Heavy Standard	6 M	67
Bombax ceiba	木棉	90mm DBH Heavy Standard	6 M	59
Tabebuia chrysantha	黃花風鈴木	90mm DBH Heavy Standard	6 M	34
Terminalia mantaly	細葉欖仁	90mm DBH Heavy Standard	6 M	29

5.6.2.7 The planting works shall make reference to the requirements as stipulated in the General Specification for Building 2007 Edition – Section 25. The area underneath all retained, transplanted and compensatory trees would be planted with shrubs or groundcovers.

6 Landscape Manual

6.1 Structural Loading for Top of Transfer Plate Planting Areas

6.1.1.1 For the planting areas located on podium levels, there will be a loading allowance of 23Kpa (1,200mm soil depth excluding drainage layer) for tree planting. The minimum soil depth requirements for shrubs (600mm) and lawn (300mm) and their corresponding loading allowance will also be followed.

6.2 Drainage and Irrigation Systems for Soft Landscape

6.2.1.1 Drainage will be adequate and in compliance with relevant regulations. Irrigation of all soft landscape areas throughout the scheme will be carried out manually, with water points provided in accessible areas at maximum 40m intervals ensuring adequate and sufficient irrigation to cover all planting areas. It should be noted that greening has been proposed at the elevated walkway along Hoi Yuen Road and as such required sufficient elevated irrigation points.

6.2.1.2 Since the proposed soft landscape areas, including green connection and public pocket spaces, are in close proximity to the adjacent footpath, special attention needs to be paid to ensure the irrigation systems do not cause nuisance to the passing pedestrians.

6.3 Vehicular Access For Landscape Maintenance

6.3.1.1 The developer will ensure that the management and maintenance of the landscaped area would be undertaken in a sustainable manner. A summary of Soft Landscape Maintenance Operations is shown as follows:

- Watering
- Weeding
- Litter and rubbish removal
- Shrub and ground cover and hedge pruning.
- Tree pruning
- Grass cutting
- Grass area coring and top dressing
- Fertilising
- Forking cover
- Securing / replacing stakes and tree ties
- Firming up
- Mulching

- Pest control
- Replacement of defective plant materials

6.4 Landscape Reinstatement Proposal

Reinstatement

6.4.1.1 Unless otherwise permitted by the Engineer, areas affected by site clearance shall be reinstated as stated in Clause AN1.2.04(2) to (5).

6.4.1.2 Fine fill material shall be deposited and compacted in voids that are left in the ground.

6.4.1.3 Holes that are left in structures and pavements shall be made good using material similar to that in the adjoining area.

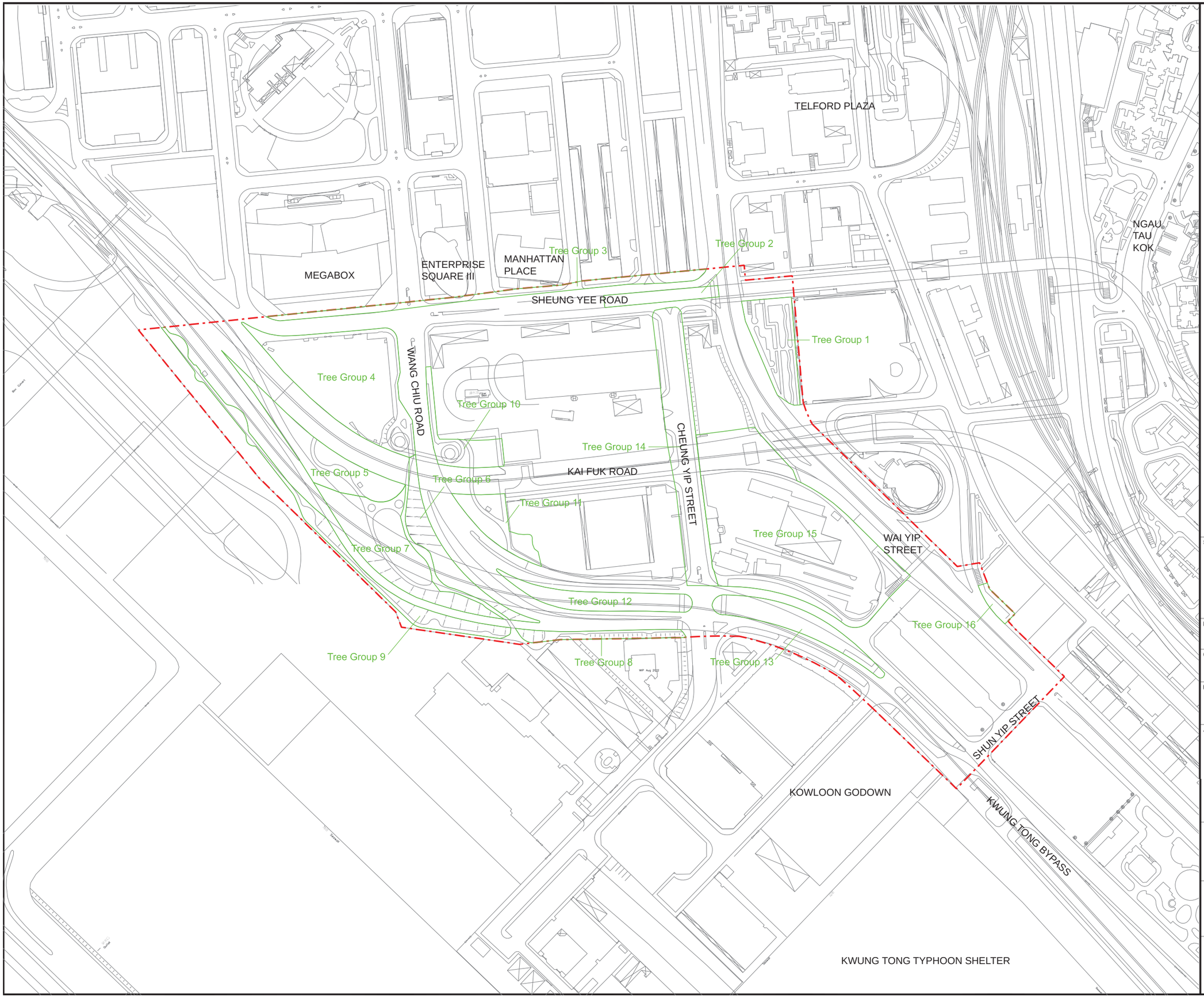
6.4.1.4 The ends of fences, walls, structures, utilities and other items shall be made good in such a manner that the affected parts will not corrode or deteriorate, and will remain stable.

6.4.1.5 Straining posts shall be fixed at the end of strained fences that have been cut, and the fences shall be restrained.

6.4.1.6 Any other reinstatement works necessary to bring the damaged plants to their original condition before occurrence of the damage, as directed by the Engineer.

Appendix A

Tree Survey Plan



Legend

- Study Area
- Existing Tree Group

Scale and Orientation

N

0 30 60 90 120m

1:3000 on A3

Drawn	Date
RH	MAR 2018
Checked	**Approved**
CY	KL

Figure No.	Drawing Title
TSP_01	Tree Survey Plan

Job Title

Agreement No. CE4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Tree Survey Report (WP No.24)

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Appendix B

Tree Assessment Schedule

Tree Survey Schedule

Development at Kowloon Bay Action Area of Kowloon East

Prepared by RH

Field Study was conducted in FEB 2018

Group Tree Survey Schedule

Tree Group Reference No.	Estimated No. of Trees	Density (Estimated No. of Trees/m²)	Main Tree Species			Size of Tree			General Health Condition (Good/ Fair/ Poor)	General Form (Good/ Fair/ Poor)
			Scientific Name	Common Chinese Name	Species Origin	Range of Height (m)	Range of Crown Spread (m)	Range of DBH (mm)		
Tree Group 1	80	0.03	*Tabebuia chrysantha*	黃花風鈴木	Exotic	4-8	5-7	200-400	Good-Fair	Good-Fair
			Bauhinia variegata	宮粉羊蹄甲	Exotic					
			Plumeria rubra	雞蛋花	Exotic					
			Macaranga tanarius var. tomentosa	血桐	Native					
			Dimocarpus longan	龍眼	Exotic					
			Ailanthus fordii	福氏臭椿	Native					
			Dypsis lutescens	散尾葵	Exotic					
			Phoenix loureiroi	刺葵	Native					
			Morus alba	桑樹	Native					
Tree Group 2	5	0.005	*Schefflera actinophylla*	輻葉鵝掌柴	Exotic	3-5	5	150-200	Fair-Poor	Fair-Poor
			Phoenix loureiroi	刺葵	Native					
Tree Group 3	35	0.02	*Michelia x alba*	白蘭	Exotic	4-8	4-6	200-300	Good-Fair	Good-Fair
			Plumeria rubra	雞蛋花	Exotic					
			Eucalyptus robusta	大葉桉	Exotic					
			Leucaena leucocephala	銀合歡	Exotic					
			Bauhinia x blakeana	洋紫荊	Native					
			Cinnamomum camphora	樟	Native					
			Senna surattensis	黃槐決明	Exotic					
			Ficus microcarpa	細葉榕	Native					
			Terminalia mantaly	小葉欖仁	Exotic					
Tree Group 4	20	0.002	*Macaranga tanarius var. tomentosa*	血桐	Native	5-18	5-12	250-500	Good-Fair	Good-Fair
			Acacia confusa	台灣相思	Exotic					
			Ficus virens	大葉榕	Native					
			Morus alba	桑樹	Native					
			Melia azedarach	苦楝	Exotic					
Tree Group 5	37	0.01	*Acacia confusa*	台灣相思	Exotic	5-12	6-10	180-500	Fair	Fair-Poor
			Ficus virens	大葉榕	Native					
			Delonix regia	鳳凰木	Exotic					
			Caryota maxima	魚尾葵	Exotic					
			Dypsis lutescens	散尾葵	Exotic					
			Melaleuca cajuputi	白千層	Exotic					
			Trachycarpus fortunei	棕櫚	Exotic					
Tree Group 6	18	0.008	*Acacia confusa*	台灣相思	Exotic	5-12	4-15	180-550	Fair	Fair-Poor
			Melia azedarach	苦楝	Exotic					
			Aleurites moluccana	石栗	Exotic					
			Macaranga tanarius var. tomentosa	血桐	Native					
			Melaleuca cajuputi	白千層	Exotic					
			Bauhinia variegata	宮粉羊蹄甲	Exotic					
			Bauhinia x blakeana	洋紫荊	Native					
Tree Group 7	60	0.01	*Trachycarpus fortunei*	棕櫚	Exotic	5-12	6-10	200-500	Fair	Fair-Poor
			Acacia confusa	台灣相思	Exotic					
			Bauhinia x blakeana	洋紫荊	Native					
			Caryota maxima	魚尾葵	Exotic					
			Melaleuca cajuputi	白千層	Exotic					
			Lagerstroemia speciosa	大花紫薇	Exotic					

Tree Group Reference No.	Estimated No. of Trees	Density (Estimated No. of Trees/m²)	Main Tree Species			Size of Tree			General Health Condition (Good/ Fair/ Poor)	General Form (Good/ Fair/ Poor)
			Scientific Name	Common Chinese Name	Species Origin	Range of Height (m)	Range of Crown Spread (m)	Range of DBH (mm)		
Tree Group 8	5	0.004	*Syzygium jambos*	蒲桃	Exotic	4-7	5-8	200-400	Poor	Poor
			Ravenala madagascariensis	旅人蕉	Exotic					
Tree Group 9	73	0.02	*Cinnamomum camphora*	樟	Native	5-12	5-10	200-400	Fair	Fair
			Acacia confusa	台灣相思	Exotic					
			Melia azedarach	苦楝	Exotic					
			Bauhinia x blakeana	洋紫荊	Native					
			Schefflera actinophylla	輻葉鵝掌柴	Exotic					
			Melaleuca cajuputi	白千層	Exotic					
			Phoenix loureiroi	刺葵	Native					
			Bombax ceiba	木棉	Exotic					
Tree Group 10	32	0.02	*Aleurites moluccana*	石栗	Exotic	4-12	5-10	150-400	Fair	Fair
			Delonix regia	鳳凰木	Exotic					
			Phoenix loureiroi	刺葵	Native					
			Trachycarpus fortunei	棕櫚	Exotic					
			Acacia confusa	台灣相思	Exotic					
			Melaleuca cajuputi	白千層	Exotic					
Tree Group 11	21	0.01	*Acacia confusa*	台灣相思	Exotic	4-12	5-10	200-500	Fair	Fair
			Melaleuca cajuputi	白千層	Exotic					
			Macaranga tanarius var. tomentosa	血桐	Native					
			Schefflera actinophylla	輻葉鵝掌柴	Exotic					
			Cinnamomum camphora	樟	Native					
			Aleurites moluccana	石栗	Exotic					
			Phoenix loureiroi	刺葵	Native					
Tree Group 12	16	0.007	*Phoenix loureiroi*	刺葵	Native	4-12	5-8	200-400	Fair	Fair
			Caryota maxima	魚尾葵	Exotic					
			Trachycarpus fortunei	棕櫚	Exotic					
			Melaleuca cajuputi	白千層	Exotic					
Tree Group 13	5	0.002	*Phoenix loureiroi*	刺葵	Native	6-12	6-10	300-800	Fair	Fair
			Caryota maxima	魚尾葵	Exotic					
			Melaleuca cajuputi	白千層	Exotic					
Tree Group 14	35	0.006	*Ficus microcarpa*	細葉榕	Native	6-12	6-10	400-800	Fair	Fair
			Macaranga tanarius var. tomentosa	血桐	Native					
			Ficus elastica	印度榕	Exotic					
			Casuarina equisetifolia	木麻黃	Exotic					
Tree Group 15	55	0.003	*Melaleuca cajuputi*	白千層	Exotic	8-12	6-10	200-300	Fair	Fair
			Macaranga tanarius var. tomentosa	血桐	Native					
			Phoenix loureiroi	刺葵	Native					
			Aleurites moluccana	石栗	Exotic					
			Acacia confusa	台灣相思	Exotic					
			Ficus microcarpa	細葉榕	Native					
			Plumeria rubra	雞蛋花	Exotic					
Tree Group 16	4	0.01	*Aleurites moluccana*	石栗	Exotic	8-15	3-5	300-400	Fair	Good-Fair

SUMMARY: Total number of trees surveyed = 501 nos.

Appendix C

Tree Photos Record



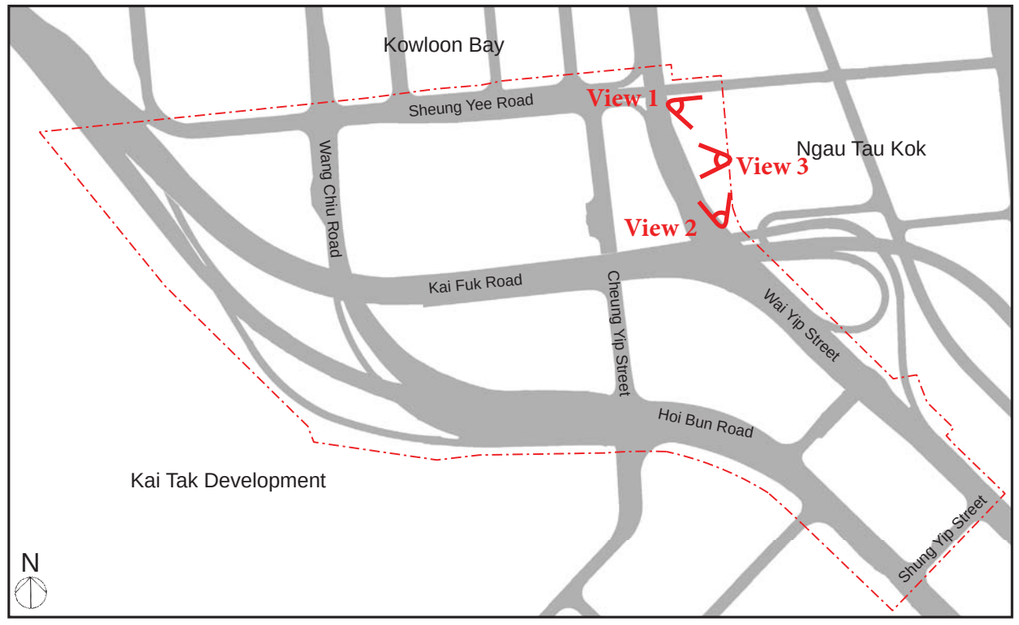
View 1



View 2



View 3



Reference Plan

Scale and Orientation

Drawn	Date
RH	MAR 2018
Checked	**Approved**
CY	KL

Figure No. TP_01

Drawing Title: Tree Photo Records - Tree Group 1

Job Title

Agreement No. CE4/2014 (TP)

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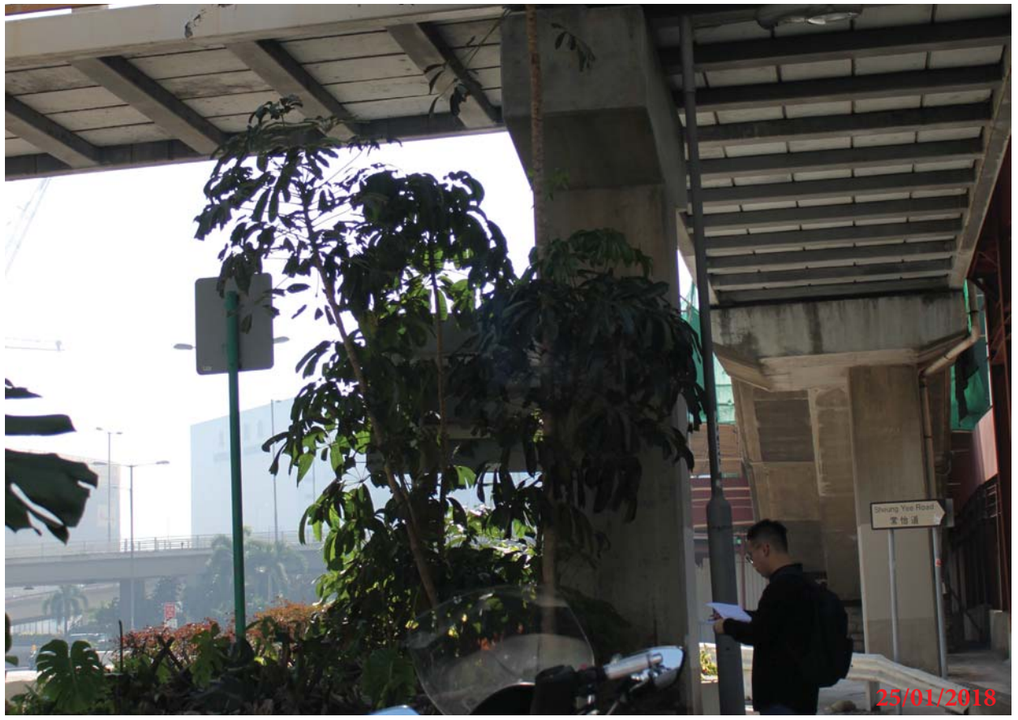
Tree Survey Report (WP No.24)

ARUP



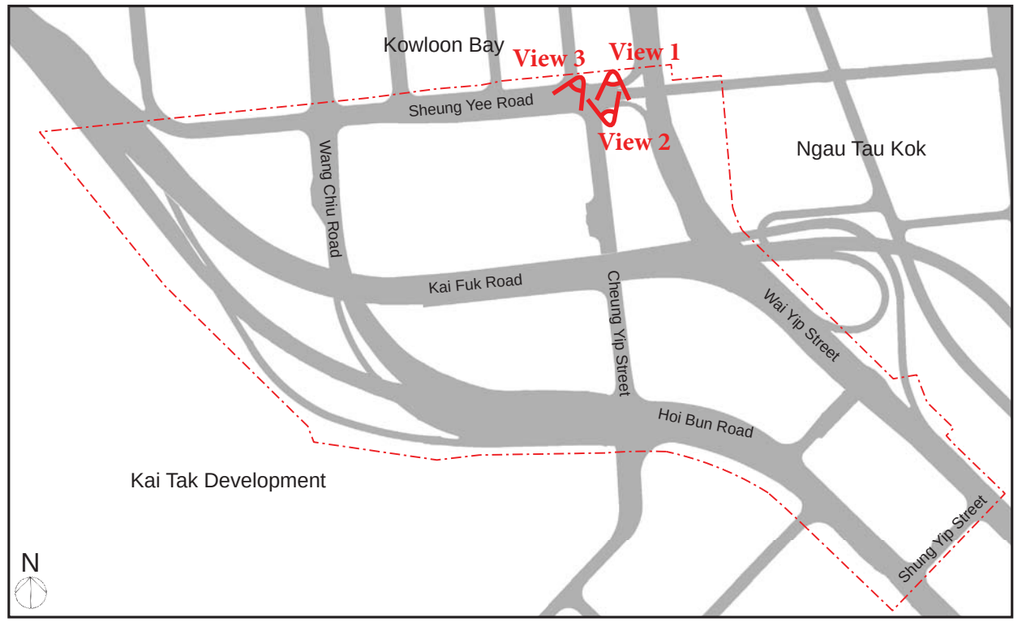
View 1



View 2



View 3



Reference Plan

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CY	KL

Figure No.	Drawing Title
TP_02	Tree Photo Records - Tree Group 2

Job Title

Agreement No. CE4/2014 (TP)

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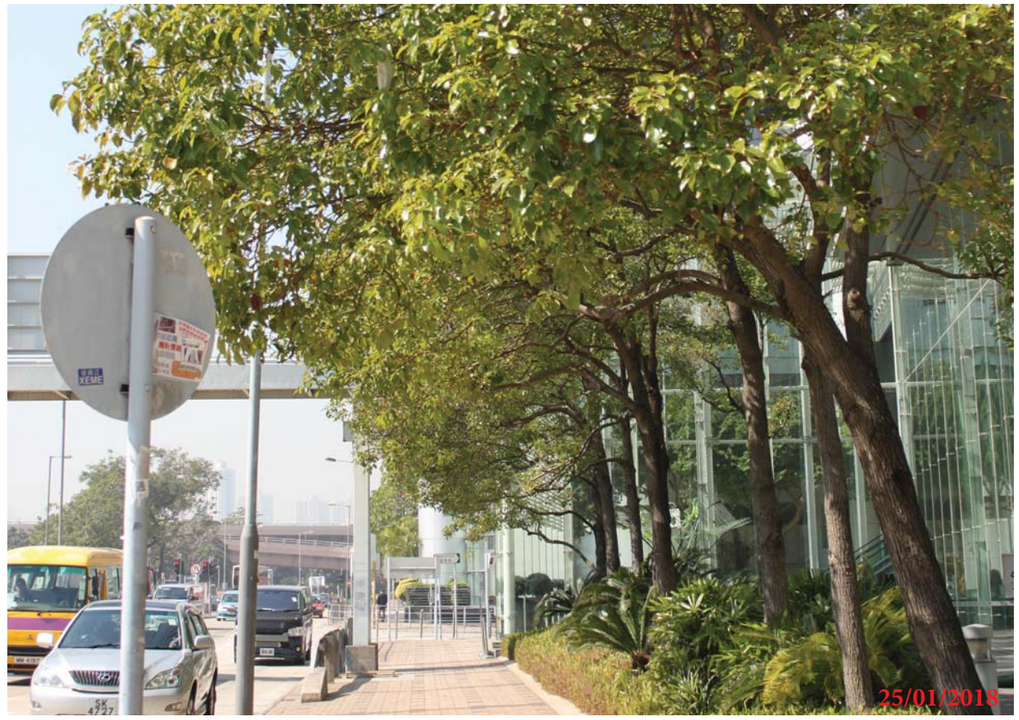

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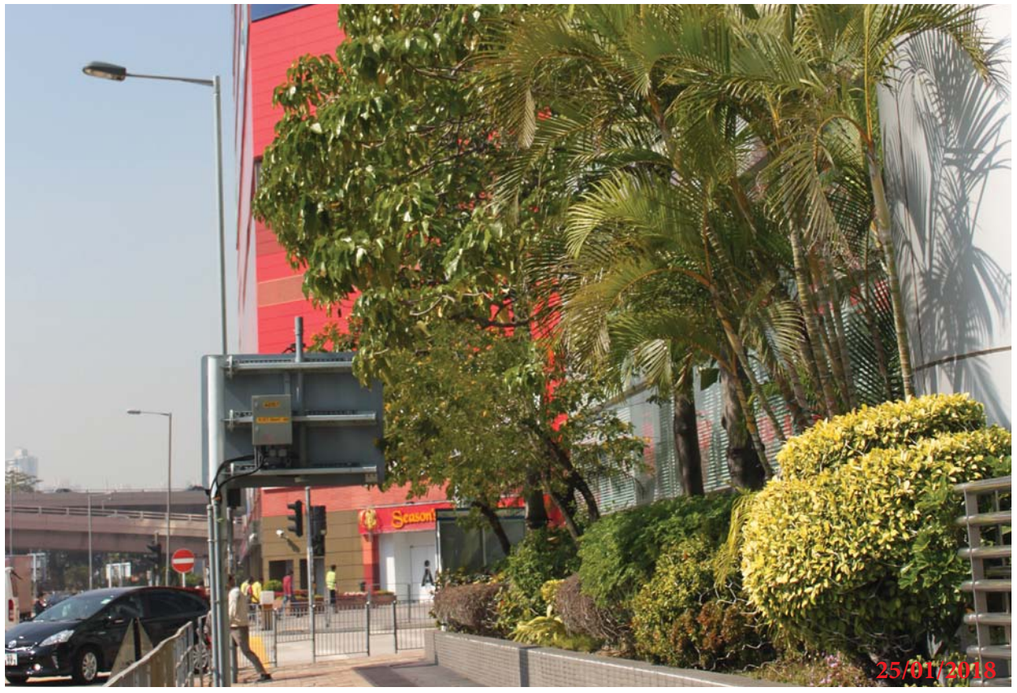

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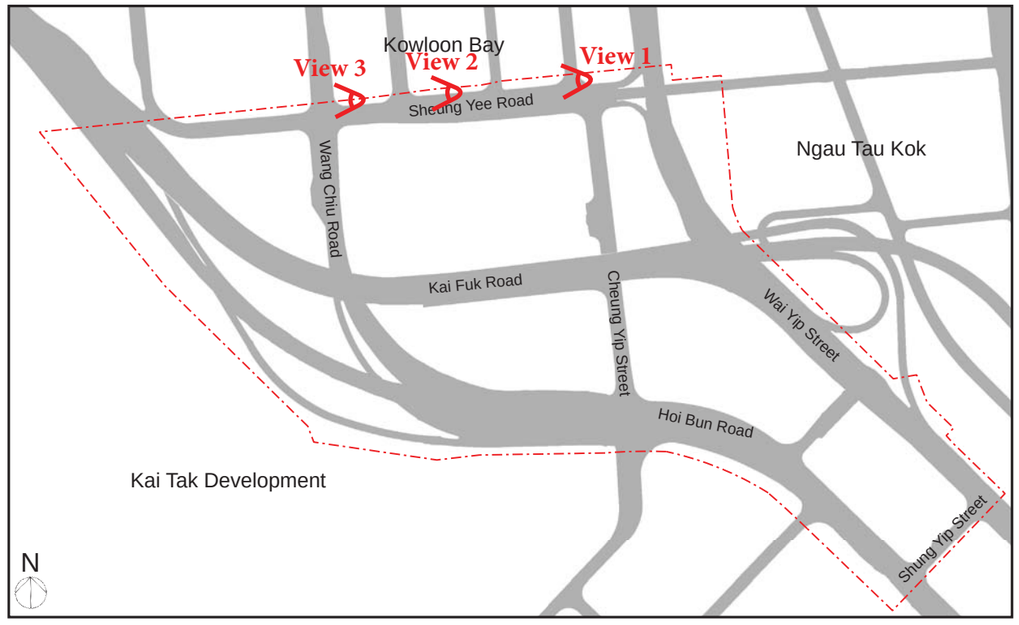

Reference Plan

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Figure No. TP_03

Drawing Title: Tree Photo Records - Tree Group 3

Job Title

Agreement No. CE4/2014 (TP)

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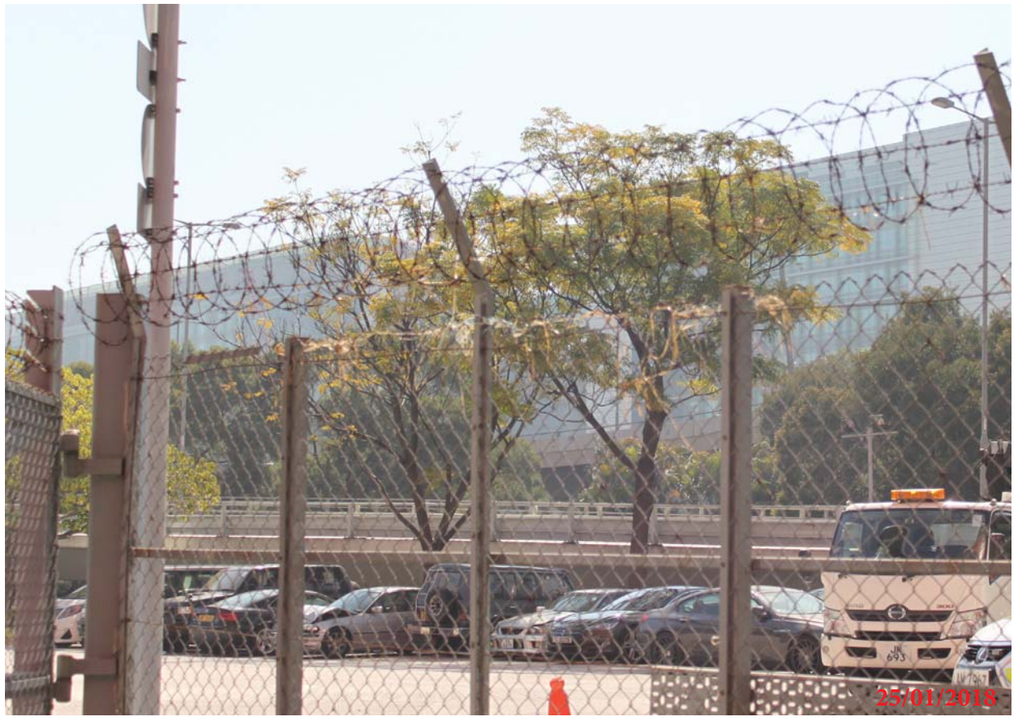
Tree Survey Report (WP No.24)

ARUP



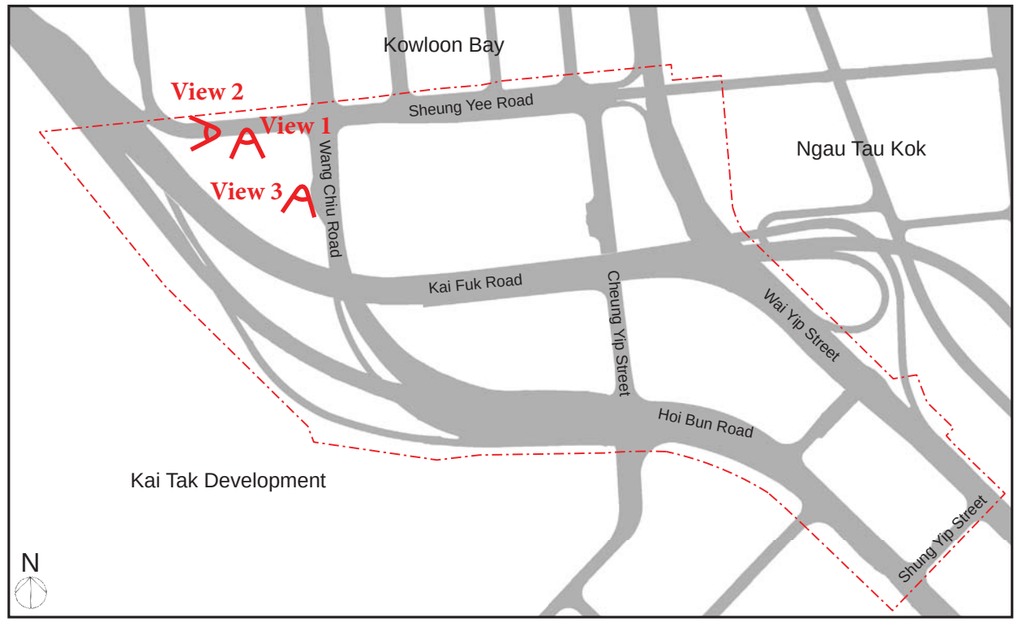
View 1



View 2



View 3



Reference Plan

Scale and Orientation

Drawn	Date
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CY	KL

Figure No.	Drawing Title
TP_04	Tree Photo Records - Tree Group 4

Job Title

Agreement No. CE4/2014 (TP)

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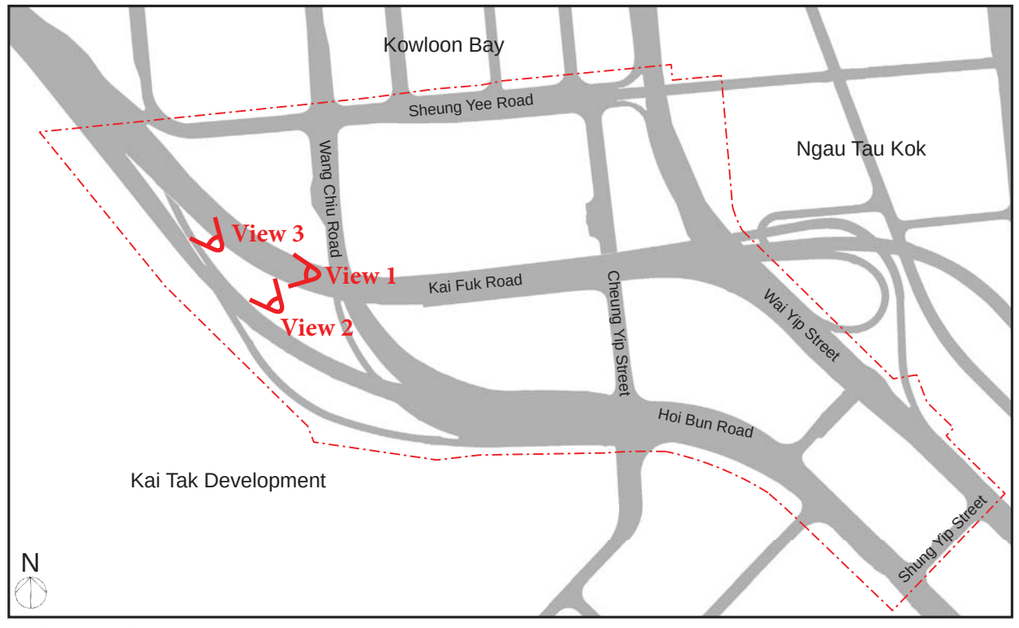
View 1



View 2



View 3



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CY	KL

Figure No.	Drawing Title
TP_05	Tree Photo Records - Tree Group 5

Job Title

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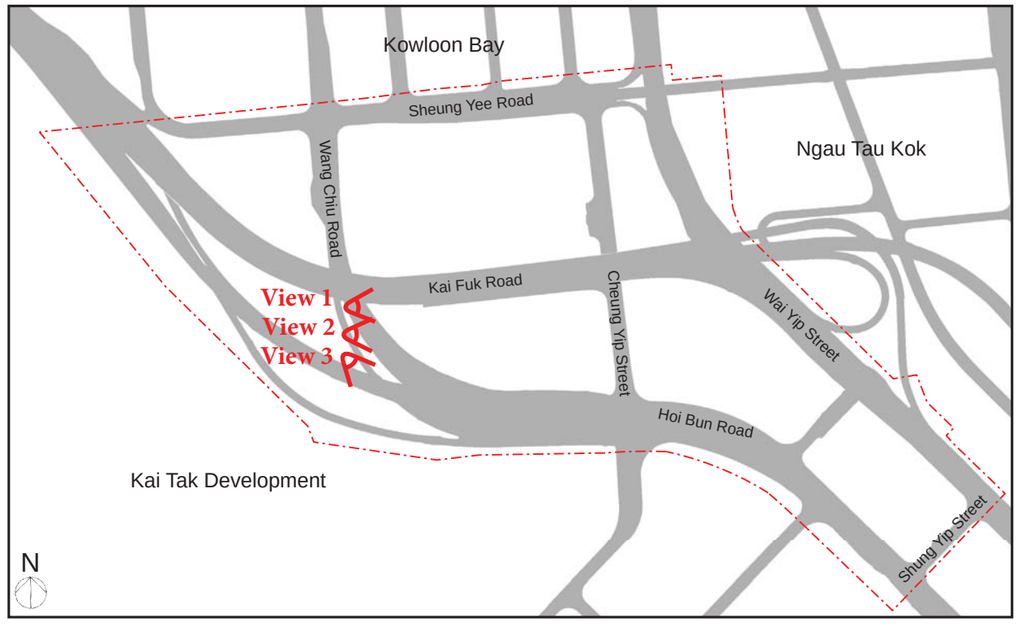
View 1



View 2



View 3



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CY	KL

Figure No. TP_06

Drawing Title: Tree Photo Records - Tree Group 6

Job Title

Agreement No. CE4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Tree Survey Report (WP No.24)

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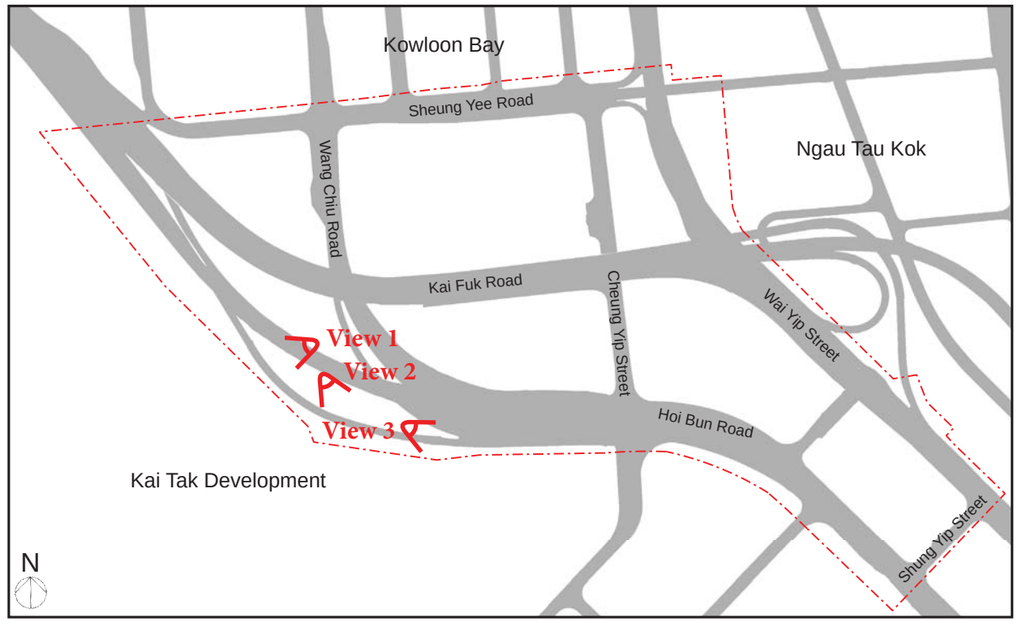
View 1



View 2



View 3



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Checked	**Approved**
CY	KL

Figure No.	Drawing Title
TP_07	Tree Photo Records - Tree Group 7

Job Title

Agreement No. CE4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Tree Survey Report (WP No.24)

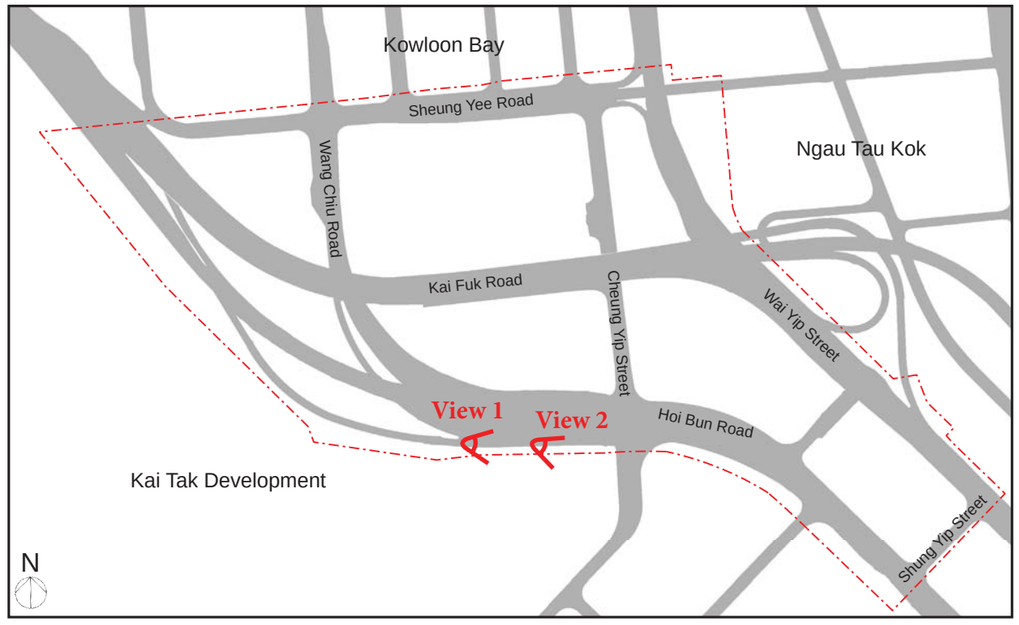
ARUP



View 1



View 2



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Drawn	Date
RH	MAR 2018
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CY	KL

Figure No.	Drawing Title
TP_08	Tree Photo Records - Tree Group 8

Job Title

Agreement No. CE4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Tree Survey Report (WP No.24)

ARUP



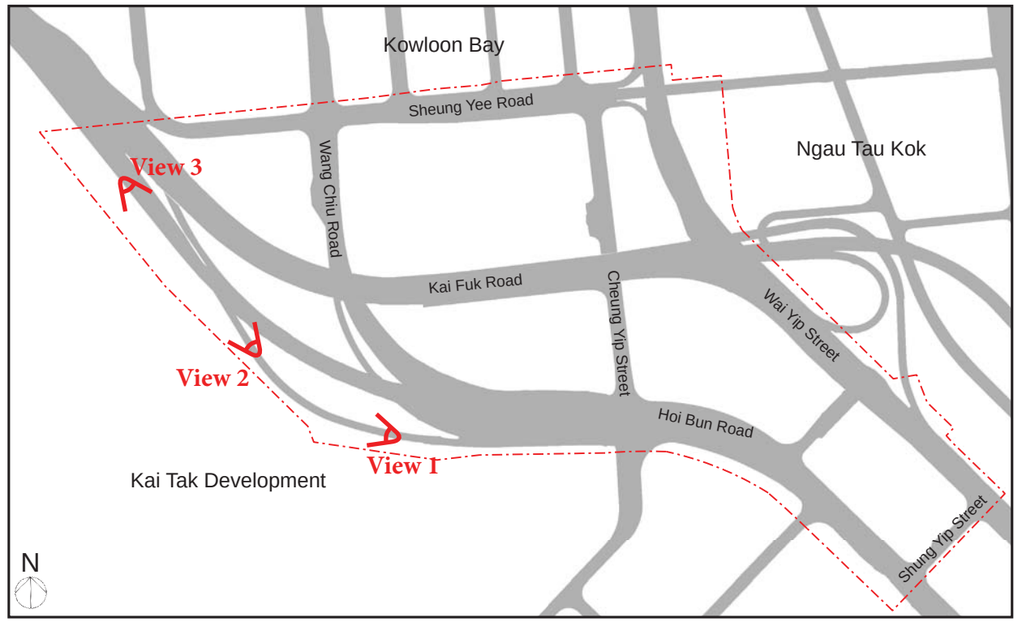
View 1



View 2



View 3



Reference Plan

Scale and Orientation

Drawn	Date
RH	MAR 2018
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CY	KL

Figure No.	Drawing Title
TP_09	Tree Photo Records - Tree Group 9

Job Title

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Tree Survey Report (WP No.24)

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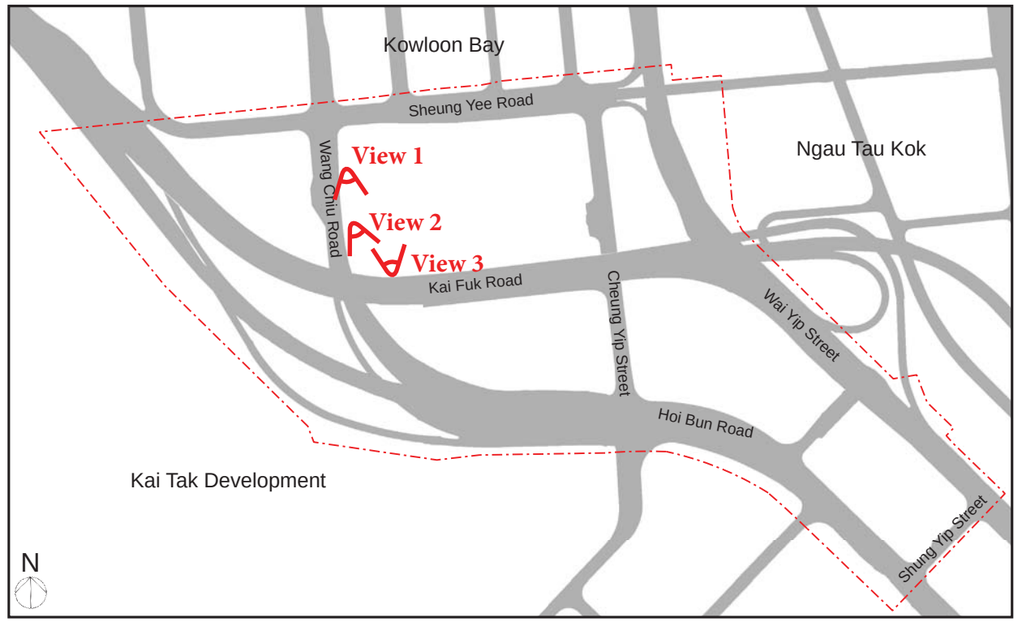
View 1



View 2



View 3



Reference Plan

Scale and Orientation

Drawn	Date
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CY	KL

Figure No.	Drawing Title
TP_10	Tree Photo Records - Tree Group 10

Job Title

Agreement No. CE4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Tree Survey Report (WP No.24)

ARUP



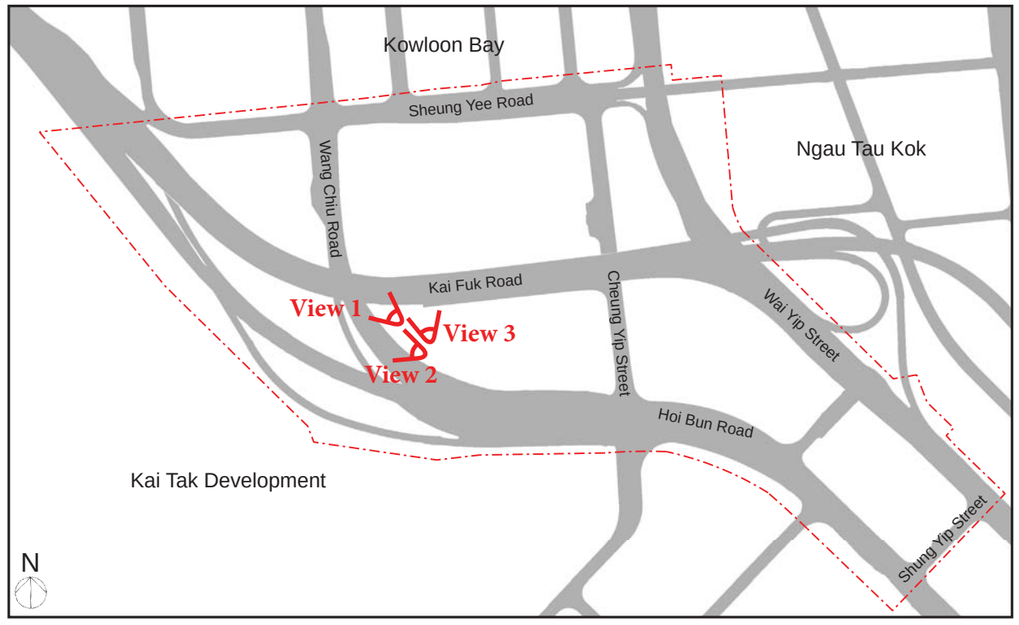
View 1



View 2



View 3



Reference Plan

Scale and Orientation

Drawn	Date
RH	MAR 2018
Checked	**Approved**
CY	KL

Figure No.	Drawing Title
TP_11	Tree Photo Records - Tree Group 11

Job Title

Agreement No. CE4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Tree Survey Report (WP No.24)

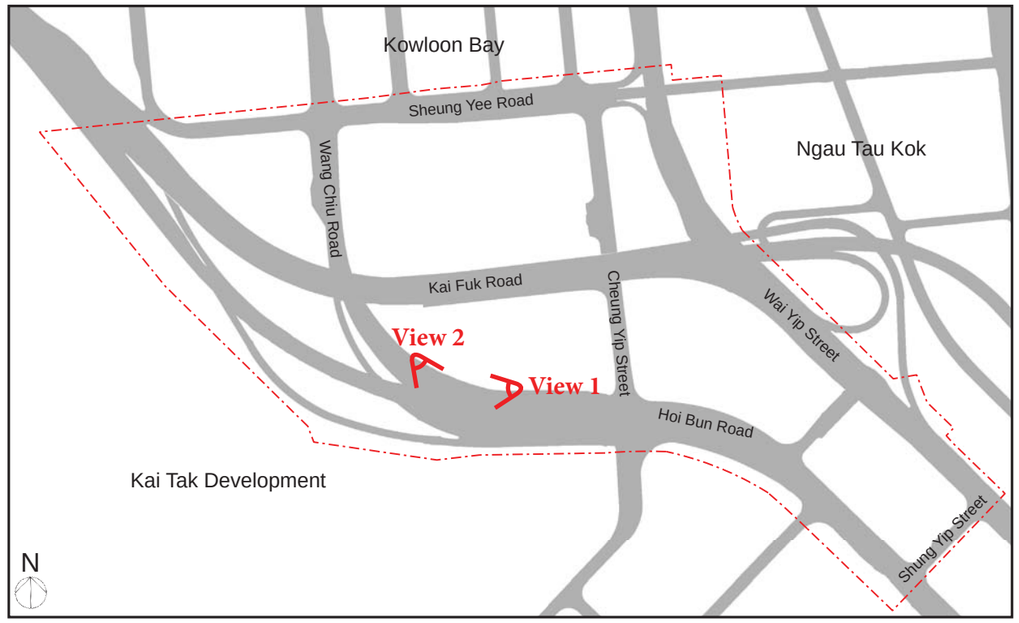
ARUP



View 1



View 2



Reference Plan

Scale and Orientation

Drawn	Date
RH	MAR 2018
Checked	**Approved**
CY	KL

Figure No.	Drawing Title
TP_12	Tree Photo Records - Tree Group 12

Job Title

Agreement No. CE4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Tree Survey Report (WP No.24)

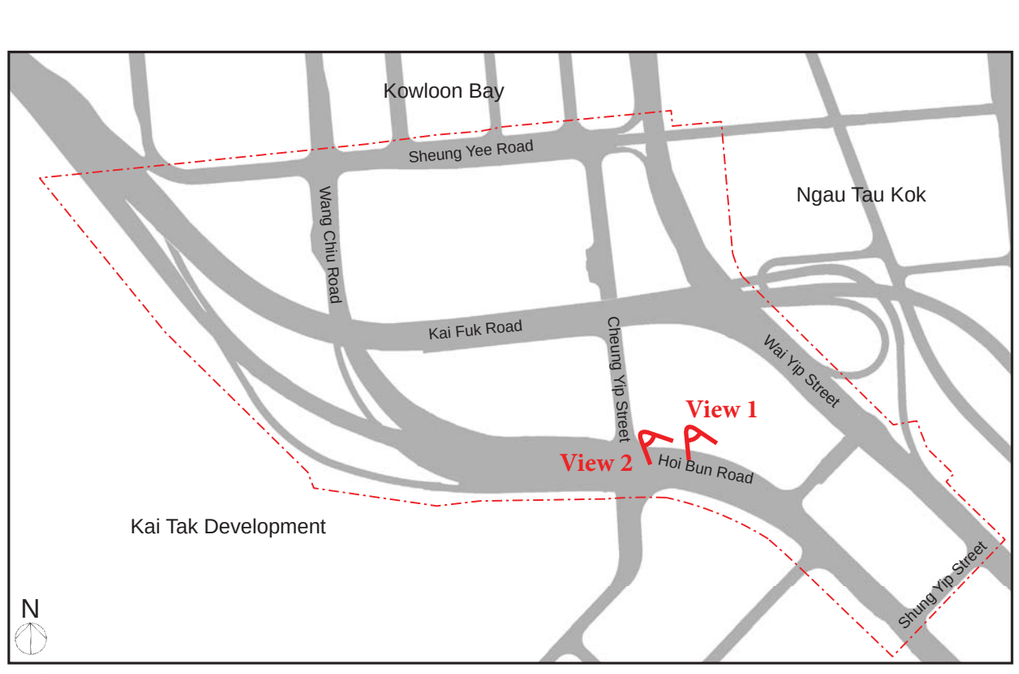
ARUP



View 1



View 2



Reference Plan

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RH	MAR 2018
Checked	**Approved**
CY	KL

Figure No. TP_13

Drawing Title: Tree Photo Records - Tree Group 13

Job Title

Agreement No. CE4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Tree Survey Report (WP No.24)

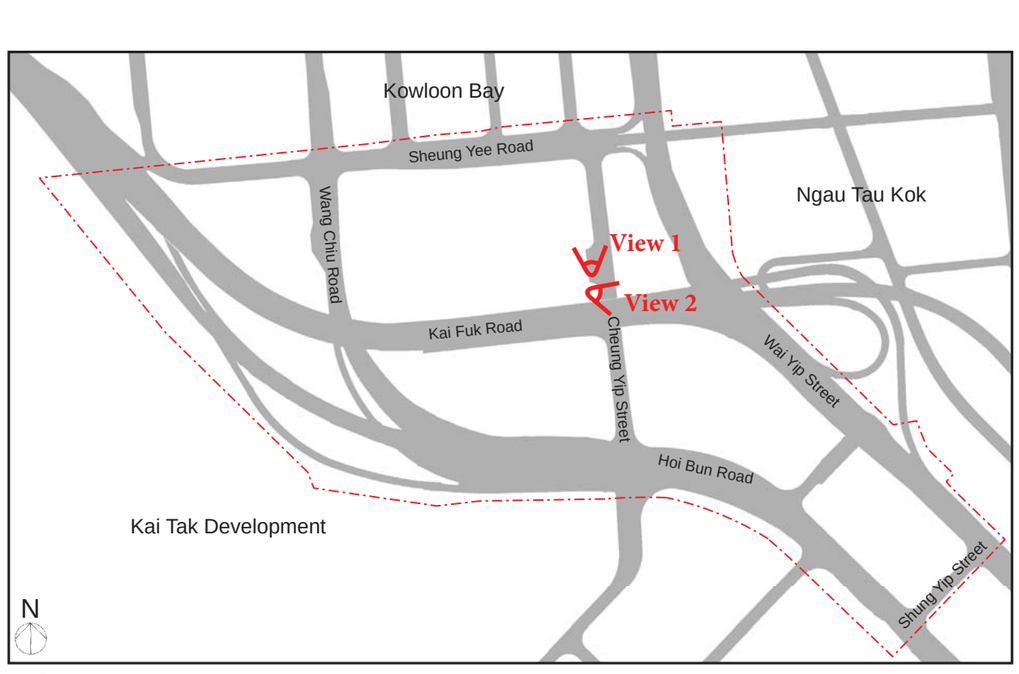
ARUP



View 1



View 2



Reference Plan

Scale and Orientation

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RH	MAR 2018
Checked	**Approved**
CY	KL

Figure No. TP_14

Drawing Title: Tree Photo Records - Tree Group 14

Job Title

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Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Tree Survey Report (WP No.24)

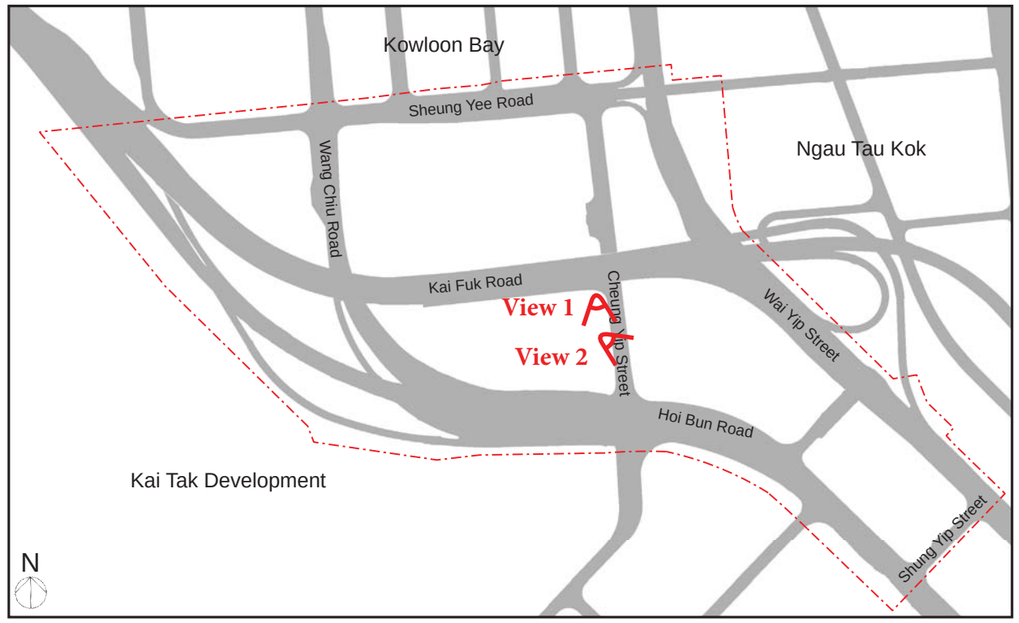
ARUP



View 1



View 2



Reference Plan

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RH	MAR 2018
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CY	KL

Figure No.	Drawing Title
TP_15	Tree Photo Records - Tree Group 15

Job Title

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Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Tree Survey Report (WP No.24)

ARUP



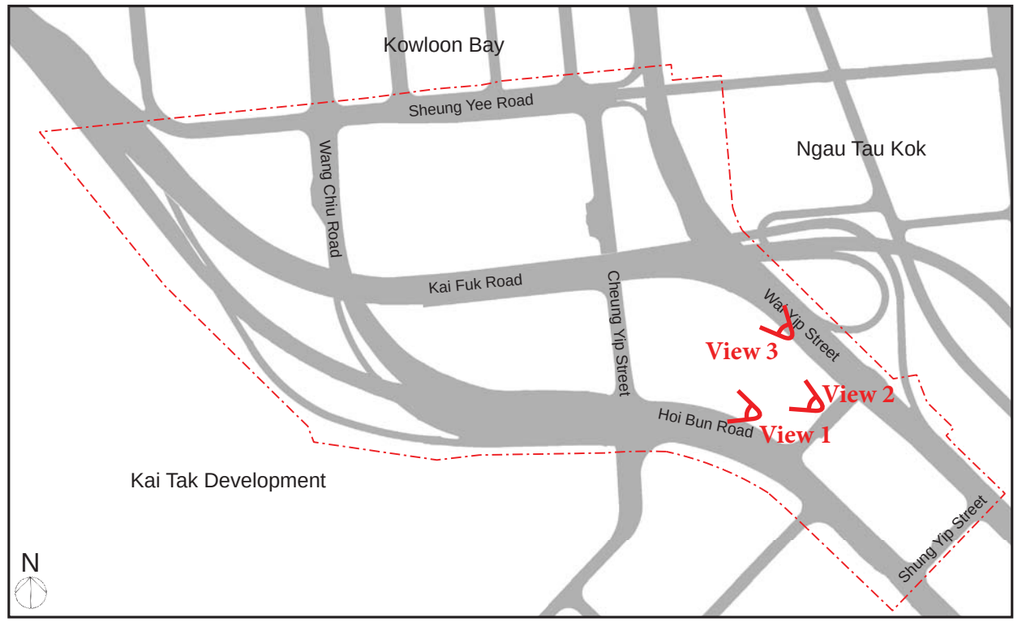
View 1



View 2



View 3



Reference Plan

Scale and Orientation

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RH	MAR 2018
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CY	KL

Figure No.	Drawing Title
TP_16	Tree Photo Records - Tree Group 16

Job Title

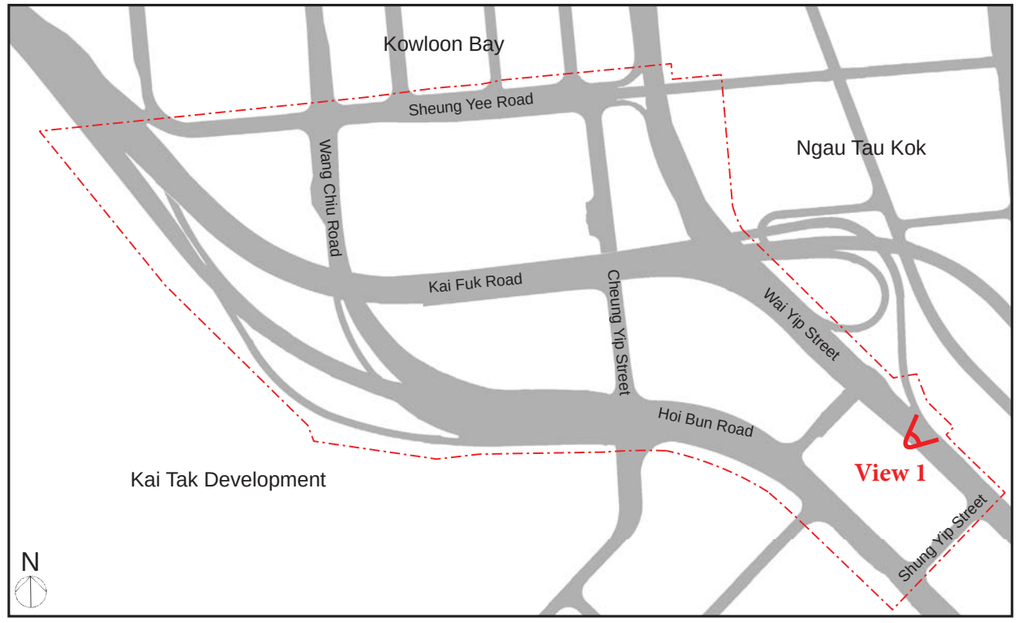
Agreement No. CE4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Tree Survey Report (WP No.24)

ARUP



View 1



Reference Plan

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Checked: CY	Approved: KL

Figure No.: TP_17

Drawing Title: Tree Photo Records - Tree Group 17

Job Title

Agreement No. CE4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study
Tree Survey Report (WP No.24)

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Agreement No. CE 4/2014(TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – FEASIBILITY STUDY

Additional Service -- Non-EFLS Scenario
Air Ventilation Assessment (AVA)

Version
June 2021



Development Bureau
The Government of the Hong Kong Special Administrative Region

ARUP

Energizing Kowloon East Office, Development Bureau

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study

Air Ventilation Assessment - Initial Study

Agreement No. CE 4/2014 (TP)

Final | June 2021

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

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

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Appendices

Appendix A	Vertical wind profiles of studied wind directions
Appendix B	Contour Plots of Velocity Ratio (VR)
Appendix C	Vector Plots of Velocity Ratio (VR)
Appendix D	Velocity Ratio (VR) of Test Points

Acronym

EFLS	Environmentally Friendly Linkage System
EPD	Environmental Protection Department
HKPF	Hong Kong Police Force
HyD	Highway Department
KBAA	Kowloon Bay Action Area
KTD	Kai Tak Development
NKIL	New Kowloon Inland Lot
OZP	Outline Zoning Plan
PTIs	Public Transport Interchanges
TD	Transport Department
VEC	Vehicle Examination Centres
WSD	Water Supplies Department

1 Introduction

1.1 Objectives of the AVA Study

1.1.1.1 The aim of this section is to present the ventilation impact of the proposed Draft Recommended Outline Development Plan (RODP) Scheme for non-EFLS scenario of the Study Area against the Outline Zoning Plan (OZP) compliant scheme. An AVA Initial Study is conducted by using Computational Fluid Dynamics (CFD) techniques. It aims to achieve the following tasks:

- Initially assesses the characteristics of the wind availability of the site;
- Gives a general pattern and a rough quantitative estimate of the wind performance at the pedestrian level reported using Wind Velocity Ratio (VR);
- Identify good design features and problematic areas, if any, and recommend mitigation measures

2 Study Area

2.1 Characteristics of Study Site and its Surrounding Area

2.1.1.1 The Study Site (Figure 1) covers the existing Government sites in KBAA which include the area currently occupied by Transport Department (TD)'s two Vehicle Examination Centres (VECs), Environmental Protection Department (EPD)'s waste recycling centre[1], Highway Departments (HyD)'s maintenance depot, Hong Kong Police Force (HKPF)'s police vehicle pound and the areas of roads, pedestrian walkways, sitting-out area and amenity areas in between. The area is mainly bounded by Sheung Yee Road in the North, Wai Yip Street in the East and the edge of Kwun Tong Bypass and the adjoining amenity areas in the West and South next to KTD. It has an area of about 17 ha including the areas of roads, pedestrian walkways, sitting-out area and amenity areas.

2.1.1.2 The Study Site is mainly zoned for "Government, Institution or Community (1)" ("G/IC(1)"), "Other Specified Uses (Refuse Transfer Station)" ("OU(Refuse Transfer Station)"), "Other Specified Uses (Business)" ("OU(Business)") and "Road" uses.

2.1.1.3 Various commercial development to the north of the Study Site. Two extensive residential developments (such as Telford Gardens, Upper Ngau Tau Kok Estate and Lower Ngau Tau Kok Estate) are situated to the further north east of the Study Site. Some industrial buildings are location to the immediate southeast of the Study Site.

2.1.1.4 Various planned and committed developments are located in south apron which is to the southwest to northwest side of the Study Site.

2.1.1.5 The location of Study Site and its surrounding areas are shown in Figure 1. The Study Site is divided into 6 lots as shown in Figure 2.

[1] The waste recycling center has been demolished in Q1 2021



Figure 1 Study Site and its surroundings

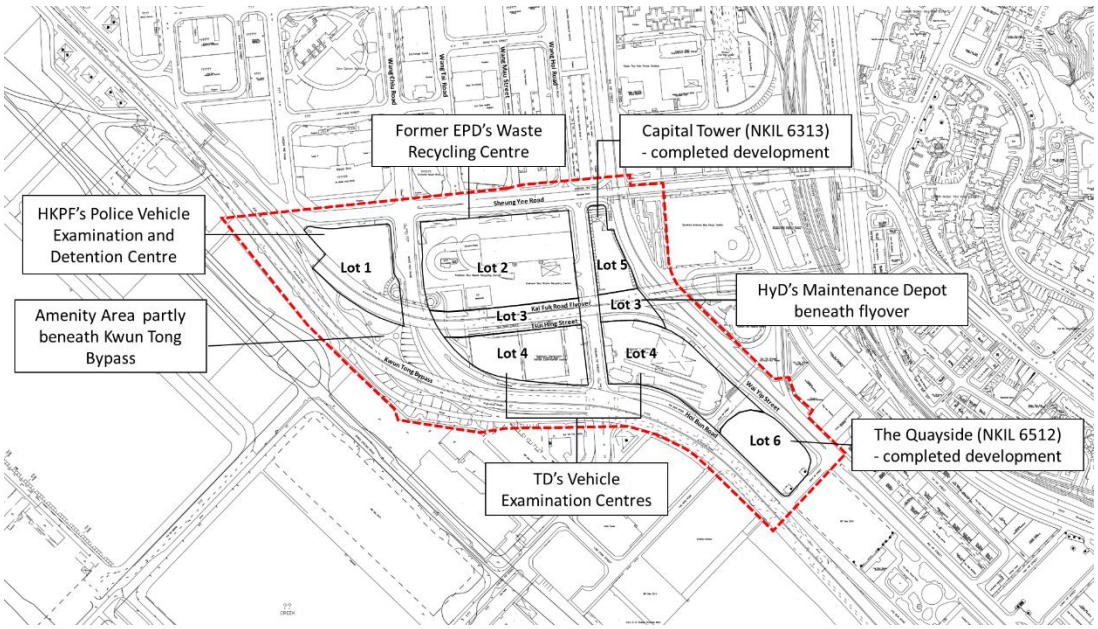


Figure 2 Lots within Study Site

2.2 Studied Schemes

2.2.1.1 Two schemes, namely Baseline Scheme and Non-EFLS Scenario, are studied under the AVA Initial Study. Each Scheme is briefly described in following sub-sections.

2.2.2 Baseline Scheme

2.2.2.1 The Baseline Scheme is an OZP-compliant scheme, which is assumed in compliance with the building height restrictions under the OZP with building height up to the maximum the building height of the corresponding lots.

2.2.2.2 The master layout plan of the Baseline Scheme with the maximum building height is shown in Figure 3. The directional views of the Baseline Scheme are shown in Figure 4 through Figure 7.

2.2.2.3 A viaduct for the Environmentally Friendly Linkage System (EFLS) has been included in the Baseline Scheme to assume a worst-case scenario.

2.2.3 Non-EFLS Scenario

2.2.3.1 The DFS suggested to implement a "multi-modal" EFLS in Kowloon East to complementarily enhance the connectivity in the area. Under the multi-modal EFLS proposal, no viaducts and depot are required in KBAA. However, according to methodology stated in *AVA Technical Circular* [1], the alignment of EFLS outside the Study Site has been reserved so that the surrounding buildings under the Non-EFLS Scenario would tally with that under the Baseline Scheme.

2.2.3.2 As the EFLS viaduct is elevated above ground and have massing insignificant as compared with the buildings in the Study Area, its impact to the pedestrian wind environment would be minimal and would not affect the simulation result for comparison of the overall ventilation performance of the two schemes.

2.2.3.3 The Non-EFLS scenario has taken into consideration the efficient use of land resources, quality urban design within the bounds of the infrastructure capacities. In line with the development intensity in the "OU(B)" zone and Kowloon Bay, the proposed plot ratio of the Non-EFLS scenario has been reviewed. The key development parameters are presented in Table 1 and the RODP is presented in **Figure 8.**

Lot	**PR**	**BH (mPD)**
1	N/A	40
2	12.0	120 & 150
3	N/A	9
4	12.0	120 & 135
5	12.0	120
6	12.0	100

2.2.3.4 Under the Non-EFLS Scenario, the "Non-Building Area (NBA)" at Lot 2, minimized building footprint in Lot 3 and Lot 4 as well as an at grade open space provided at the western corner of Lot 4 (western portion) are proposed as enhancement features from AVA point of view. The building forms in Lot 5 and Lot 6 remain the same for both schemes to reflect the as-built conditions. The changes made on Non-EFLS Scenario comparing to Baseline Scheme are summarized as below:

Lot 2

- Setback of 6m from lot northern lot boundary in the western part;
- 15m wide NBA provided extending from Wang Mau Street for wind penetration;
- The maximum building height increased to 120mPD in the western part with a low-rise podium of+35mPD for wind penetration.
- Public Transport Interchange (PTI) with openings on northern and southern facades aligned with Wang Tai Road;
- Setback of 10m from Kai Fuk Road Flyover in the western part;
- 4,300m^2 open space provided in the south-eastern part of Lot 2.

Lot 3

- Minimized building footprint are proposed between Lot 2 and Lot 4 under Kai Fuk Road Flyover.

Lot 4

- Maximum building height increased to 135mPD (western portion) and 120mPD (eastern portion) in Lot 4 respectively;
- Maximum building height between Tower 2 and Tower 3 at Lot 4 are reduced to 20mPD;
- Reduced building footprint with at-grade open space (1,600m^2) provided in the western part of Lot 4;
- Additional 10m setback from Hung Yip Street;
- Setback of 10m from Kai Fuk Road Flyover in Lot 4;
- Additional amenity areas along the southern boundary of the Lot 4 reserved to allow provision of roadside planting, act as a buffer from Kwun Tong Bypass and to preserve the existing trees

2.2.3.5 The master layout plan of the Non-EFLS Scenario with the maximum building height is shown in Figure 8. The directional views of the Non-EFLS Scenario are shown in Figure 9 through Figure 12.

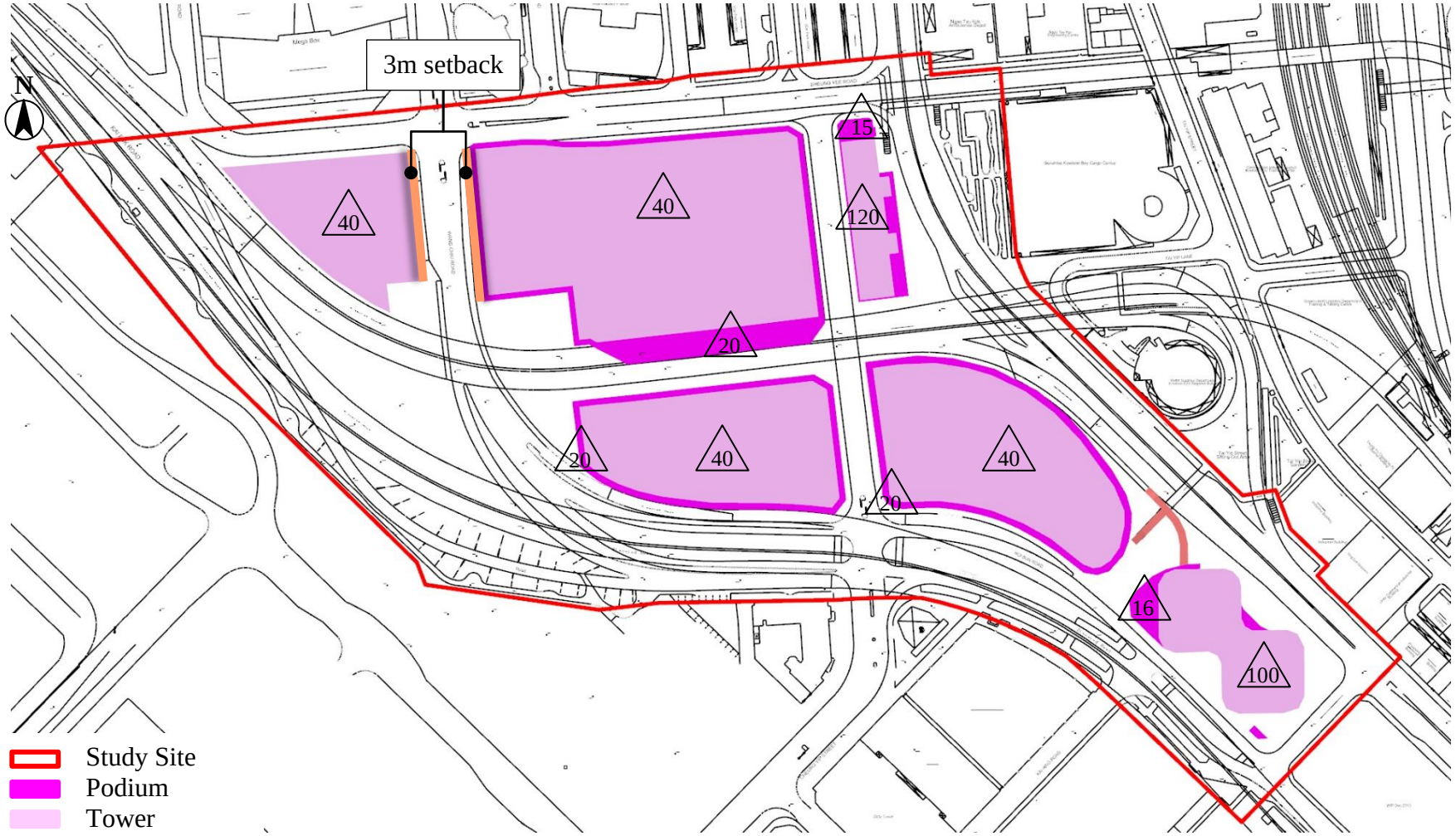


Figure 3 Baseline Scheme

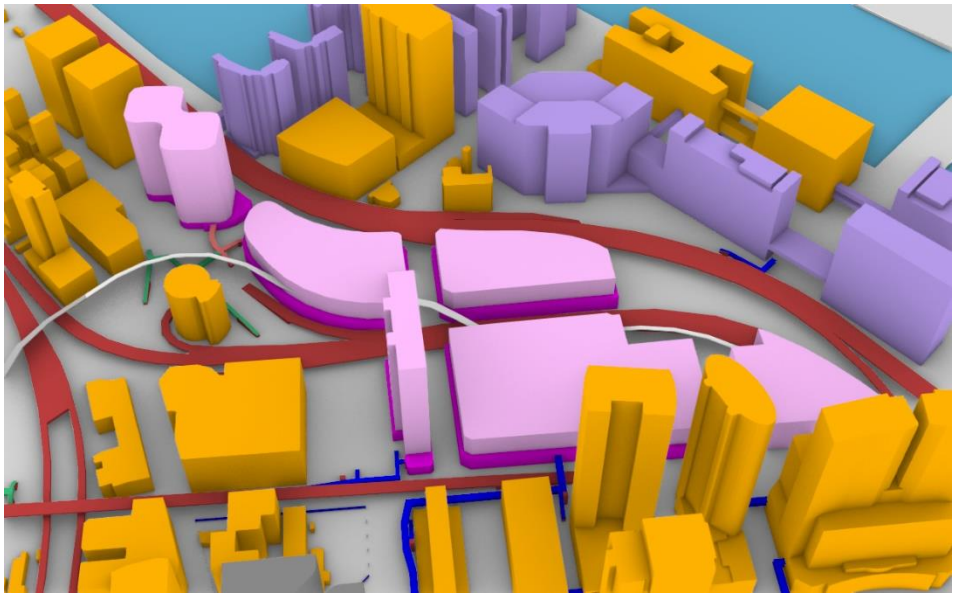


Figure 4 Northerly View of Baseline Scheme

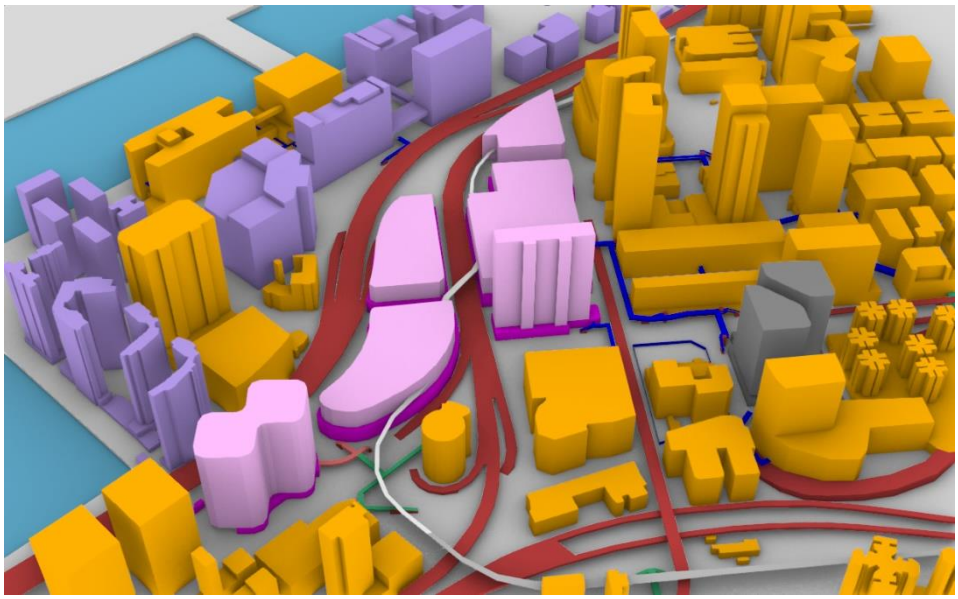


Figure 5 Easterly View of Baseline Scheme

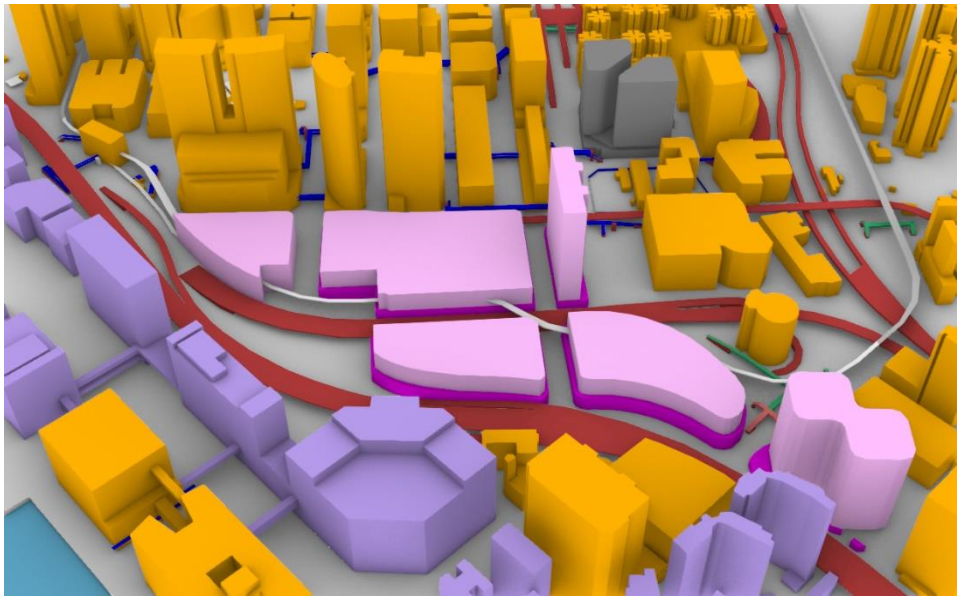


Figure 6 Southerly View of Baseline Scheme

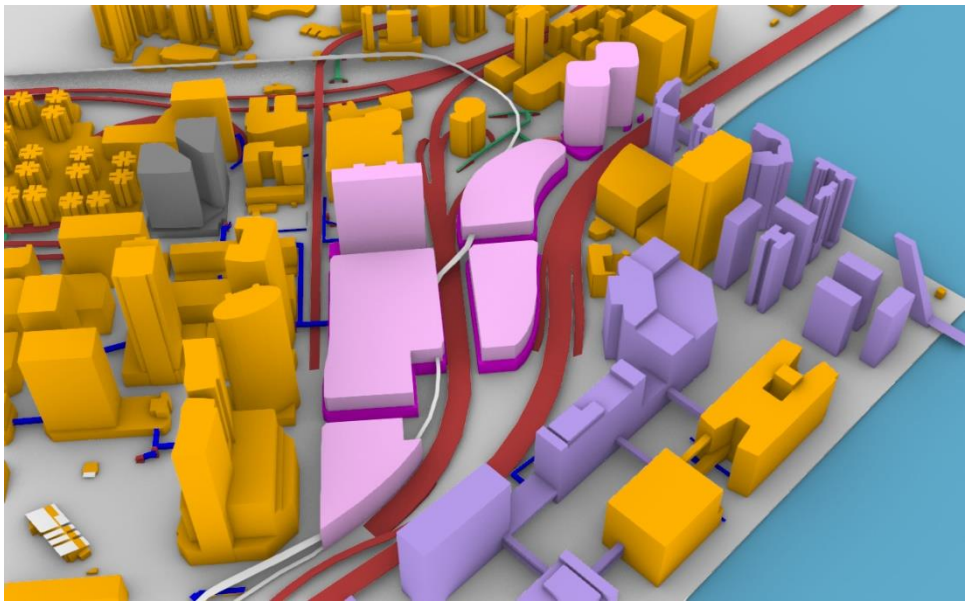


Figure 7 Westerly View of Baseline Scheme

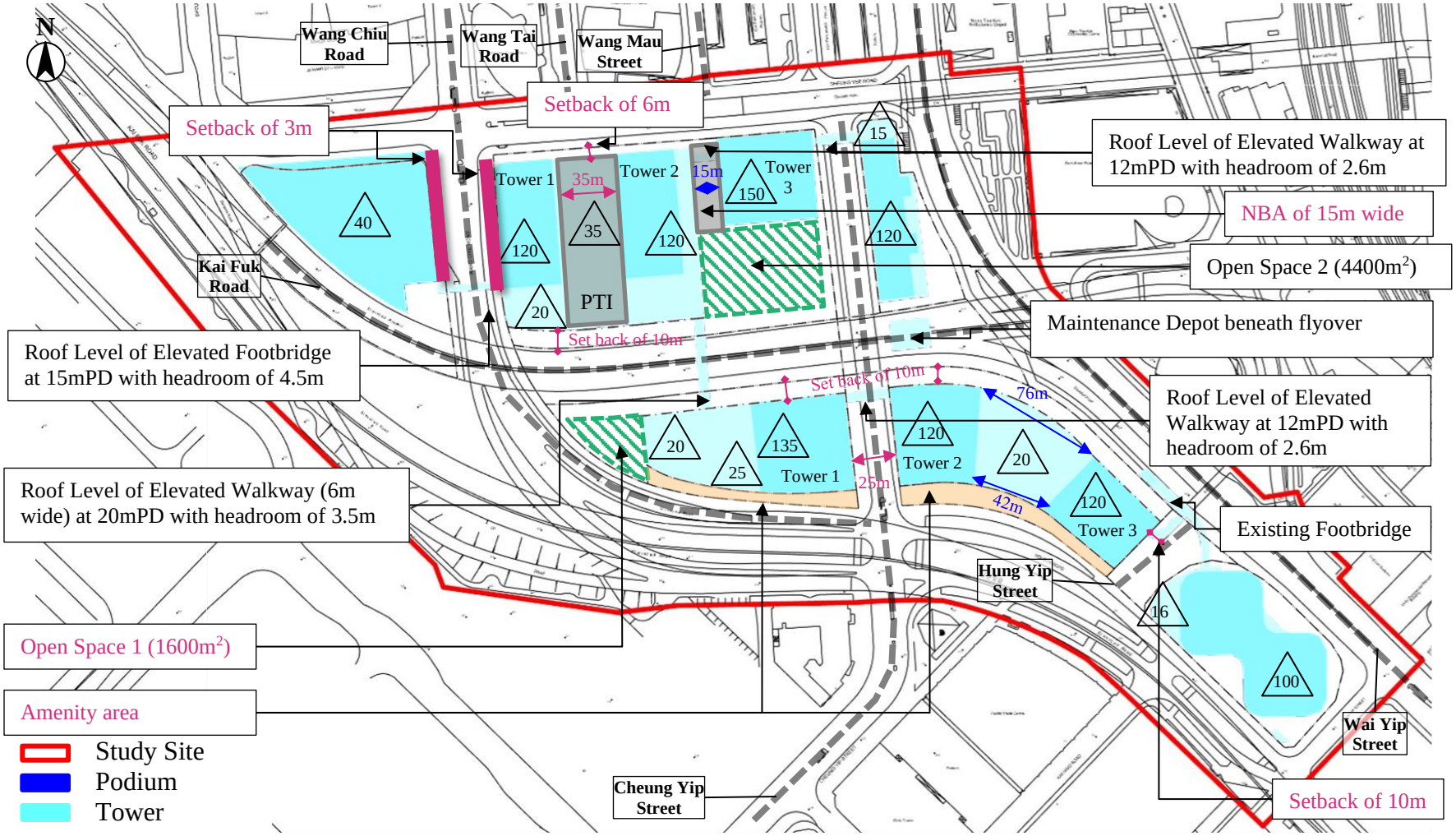


Figure 8 Non-EFLS Scenario

Remarks: 5mPD is assumed as the site formation level

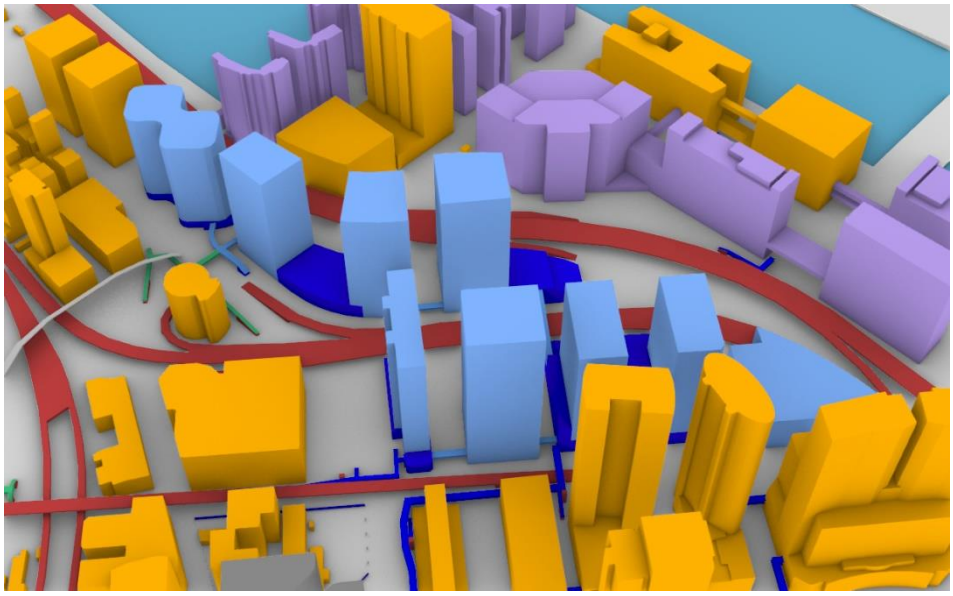


Figure 9 Northerly View of Non-EFLS Scenario



Figure 10 Easterly View of Non-EFLS Scenario

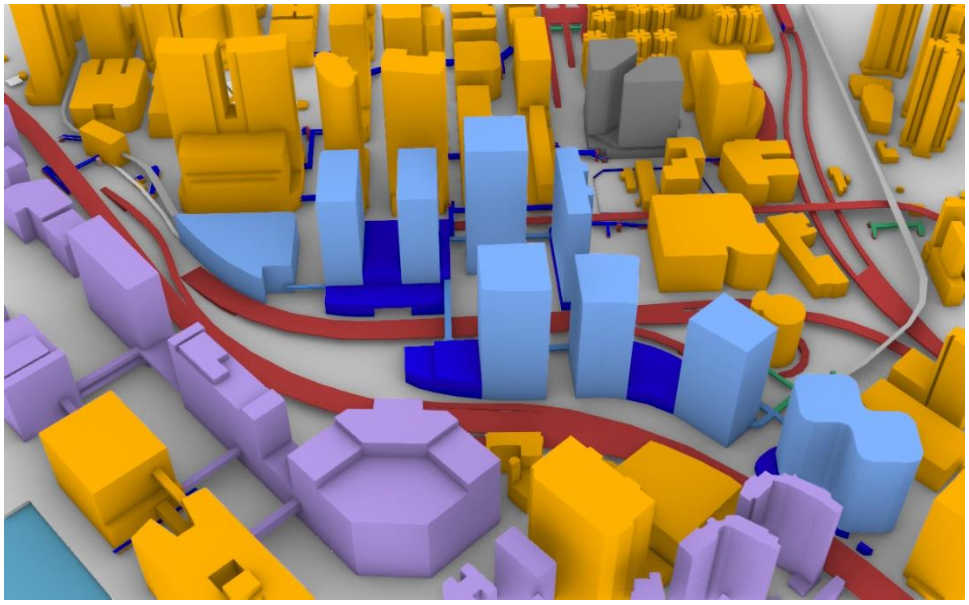


Figure 11 Southerly View of Non-EFLS Scenario

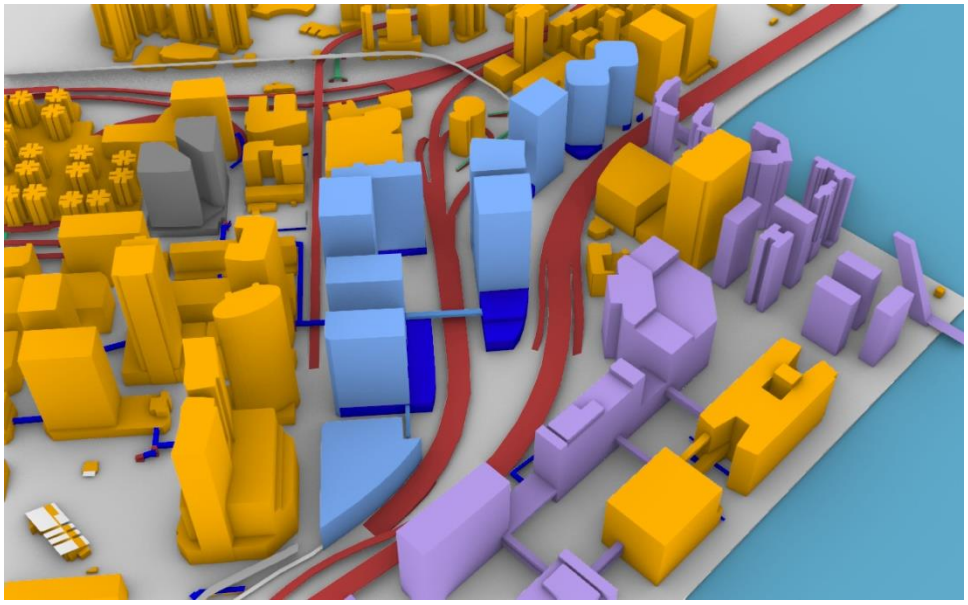


Figure 12 Westerly View of Non-EFLS Scenario

3 Methodology

3.1.1.1 As per the *AVA Technical Circular* [1], at least 75% of the time in a typical reference year (frequency of occurrence) would be studied under both annual and summer wind conditions in the AVA Initial Study by using a Computational Fluid Dynamics (CFD) modelling technique. Since the CFD approach is adopted for the present project's AVA, this criterion together with the following points of consideration needs to be applied to the methodology.

3.2 Wind Availability Data

3.2.1.1 As per the *AVA Technical Circular*, pre-dominant wind directions which in total should exceed 75% of time in a typical reference year would be selected in the AVA-IS. The wind data obtained from Site Wind Availability Study (SWAS) undertaken in WP No. 8 would be fed to the study.

3.2.1.2 According to the wind tunnel data of SWAS at 500mPD (Figure 13), the annual prevailing wind would be composed of 8 wind directions: North, North-northeast, Northeast, East-northeast, East, East-southeast, South and Southwest, totalling 81.8% in annual frequency of occurrence (Table 1).

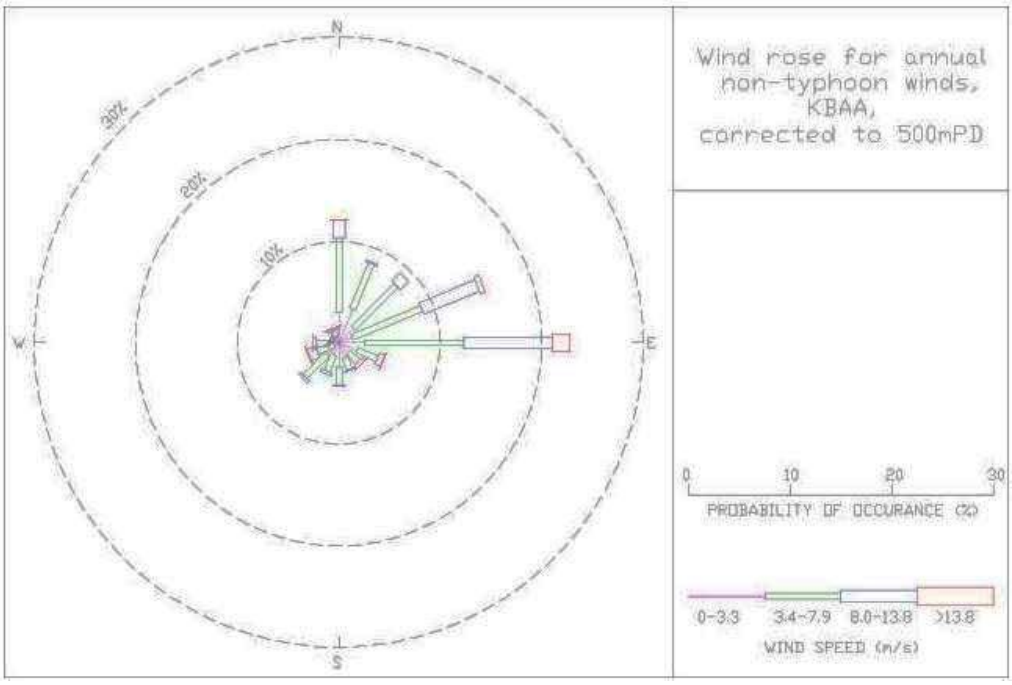


Figure 13 Wind rose for annual wind condition at 500mPD

Table 1 Annual Wind Frequency

Wind Direction	NNE	NE	ENE	E	ESE	SE	SSE	S	
Wind Frequency	8.6%	9.1%	15.3%	22.8%	4.7%	3.1%	2.9%	4.3%	
Wind Direction	SSW	SW	WSW	W	WNW	NW	NNW	N	Sum of Selected
Wind Frequency	3.3%	4.9%	3.2%	2.5%	1.0%	0.6%	1.5%	12.1%	81.8%

**** The wind frequency showing in red colour represents the selected winds for the CFD simulation.***

3.2.1.3 Meanwhile by another set of wind data of the SWAS (Figure 14), the summer prevailing wind would be composed of 9 wind directions: East, East-southeast, Southeast, South-southeast, South, South-southwest, Southwest, West-southwest and West, totalling 83.7% in summer frequency of occurrence (Table 2).

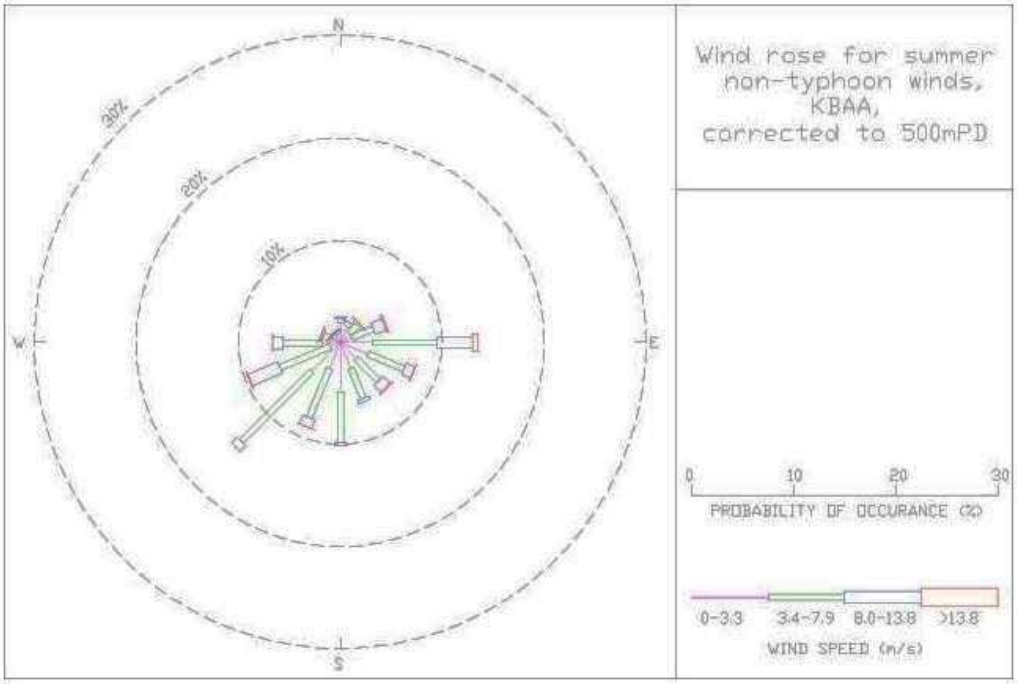


Figure 14 Wind rose for summer wind condition at 500mPD

Table 2 Summer Wind Frequency

Wind Direction	NNE	NE	ENE	E	ESE	SE	SSE	S	
Wind Frequency	2.2%	2.6%	4.8%	13.5%	7.7%	6.4%	6.2%	10.1%	
Wind Direction	SSW	SW	WSW	W	WNW	NW	NNW	N	SUM of Selected
Wind Frequency	8.9%	14.5%	9.7%	6.7%	2.0%	1.1%	1.2%	2.5%	83.7%

** The wind frequency showing in red colour represents the selected winds for the CFD simulation*

3.3 Wind Profiles

3.3.1.1 Deduced by the SWAS in Working Paper No. 8, the profiles of normalised mean wind speed for all 16 wind directions are shown overleaf as shown Figure 15.

3.3.1.2 Upon the SWAS of the Study Site, the exact vertical wind profile is adopted at 10m or above. For those unavailable wind profile below 10m, the n-value of 0.35 is assumed as the surrounding is considered as medium- to high-rise development. The vertical profile of ENE and SW are shown in Figure 16 and Figure 17 respectively for example. Vertical wind profiles of all wind directions to be studied shall refer to Appendix A of this Report.

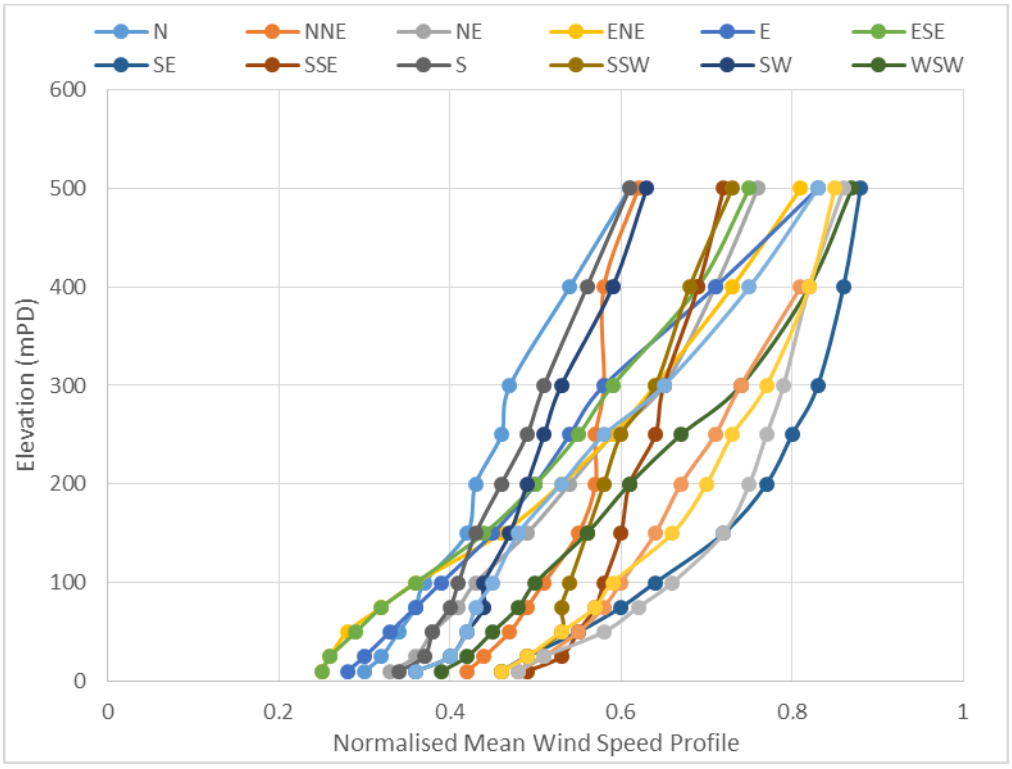


Figure 15 Normalised mean wind speed profile measured in 16 directions

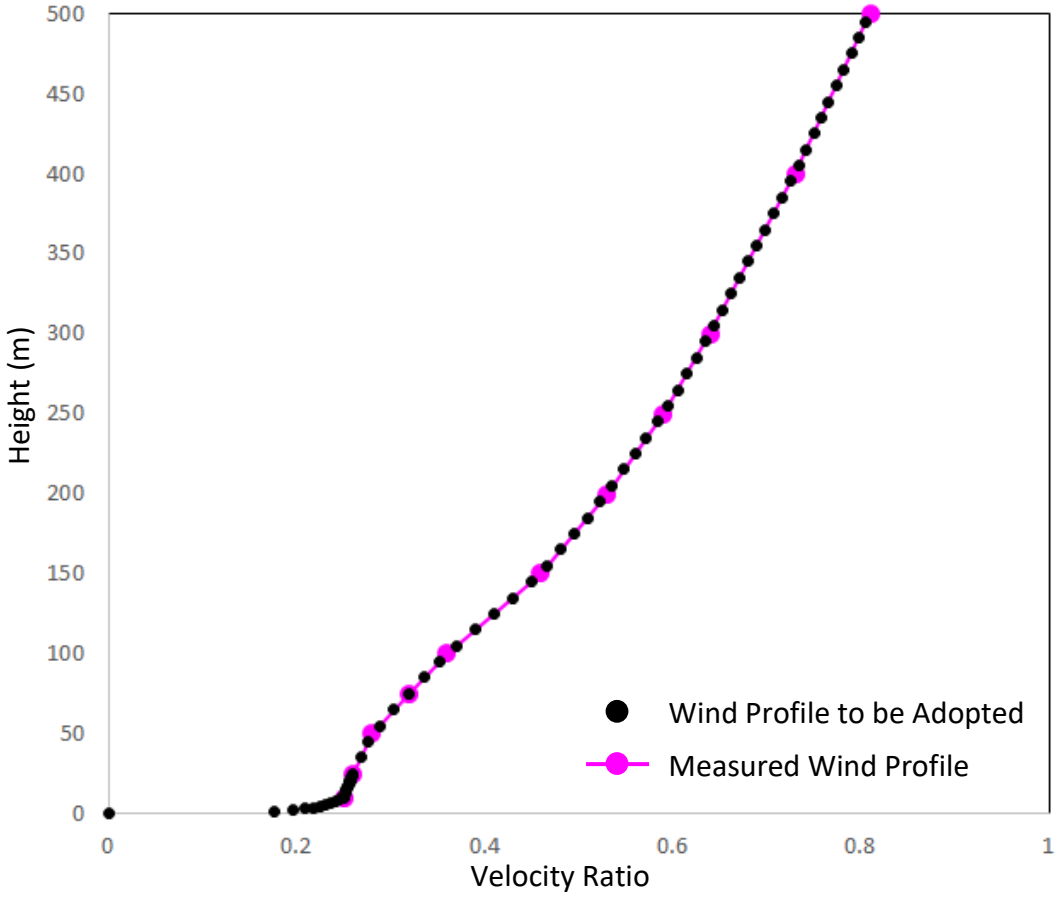


Figure 16 Vertical Wind Profile of ENE Wind

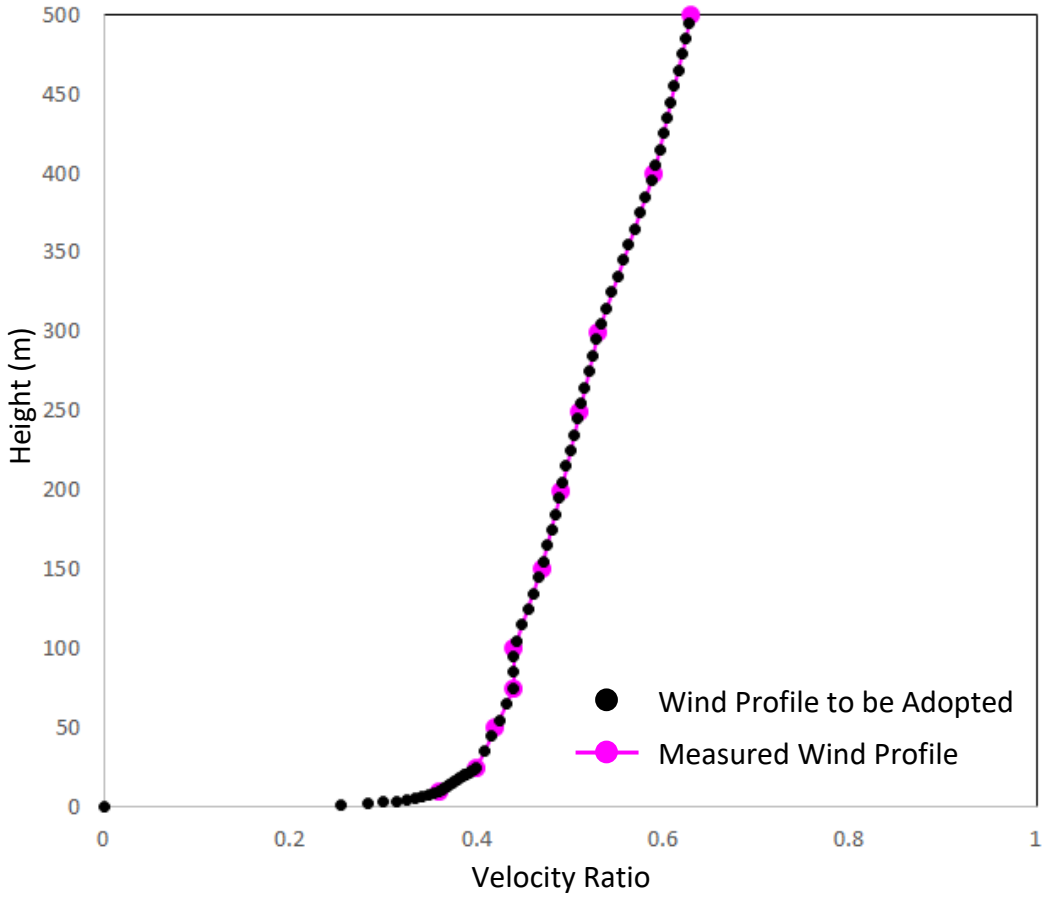


Figure 17 Vertical Wind Profile of SW Wind

3.4 Technical Details of CFD Simulations

3.4.1.1 The Air Ventilation Assessment (AVA) methodology for the Study as stipulated in the *AVA Technical Circular* is used for this study. The following sections describe the details of the methodology.

3.4.2 Assessment and Surrounding Areas

3.4.2.1 As briefed earlier in the Section, the maximum building height in the Draft RODP is around 145m from the ground. The value of *H* is desirably enlarged to 200, so that the 1*H* Assessment Area could enclose parts of the waterfront on the west coast of Kowloon Bay (facing the runway of Kai Tak Area) as well as the Kai Tak Hospital Cluster be built. The 2*H* Surrounding Area is therefore extended to 400m from the Site Area of KBAA to include in the CFD model major neighbouring buildings in Kowloon Bay and parts of Ngau Tau Kok as shown in Figure 18.

3.4.2.2 All noise barriers, elevated structures (i.e. Kwun Tong Bypass, Kai Fuk Road etc.) and planned/ planned/ committed developments (details may refer to Section 3.4.3) within the Surrounding Area is included.

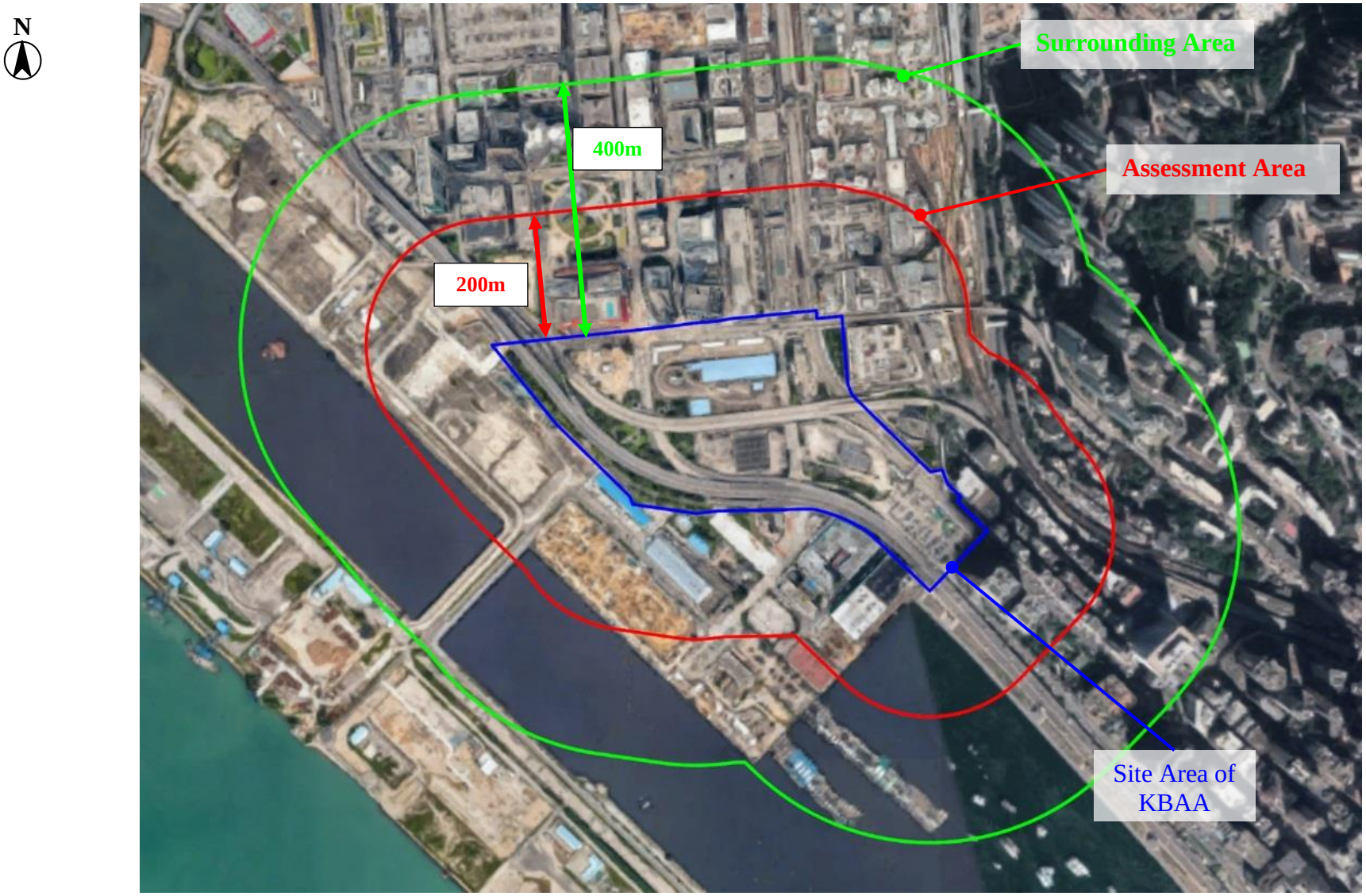


Figure 18 Site Area (blue), 1*H* Assessment Area (red) and 2*H* Surrounding Area (green) based on extended *H* = 200m (max. *H* in Draft RODP: 145m)

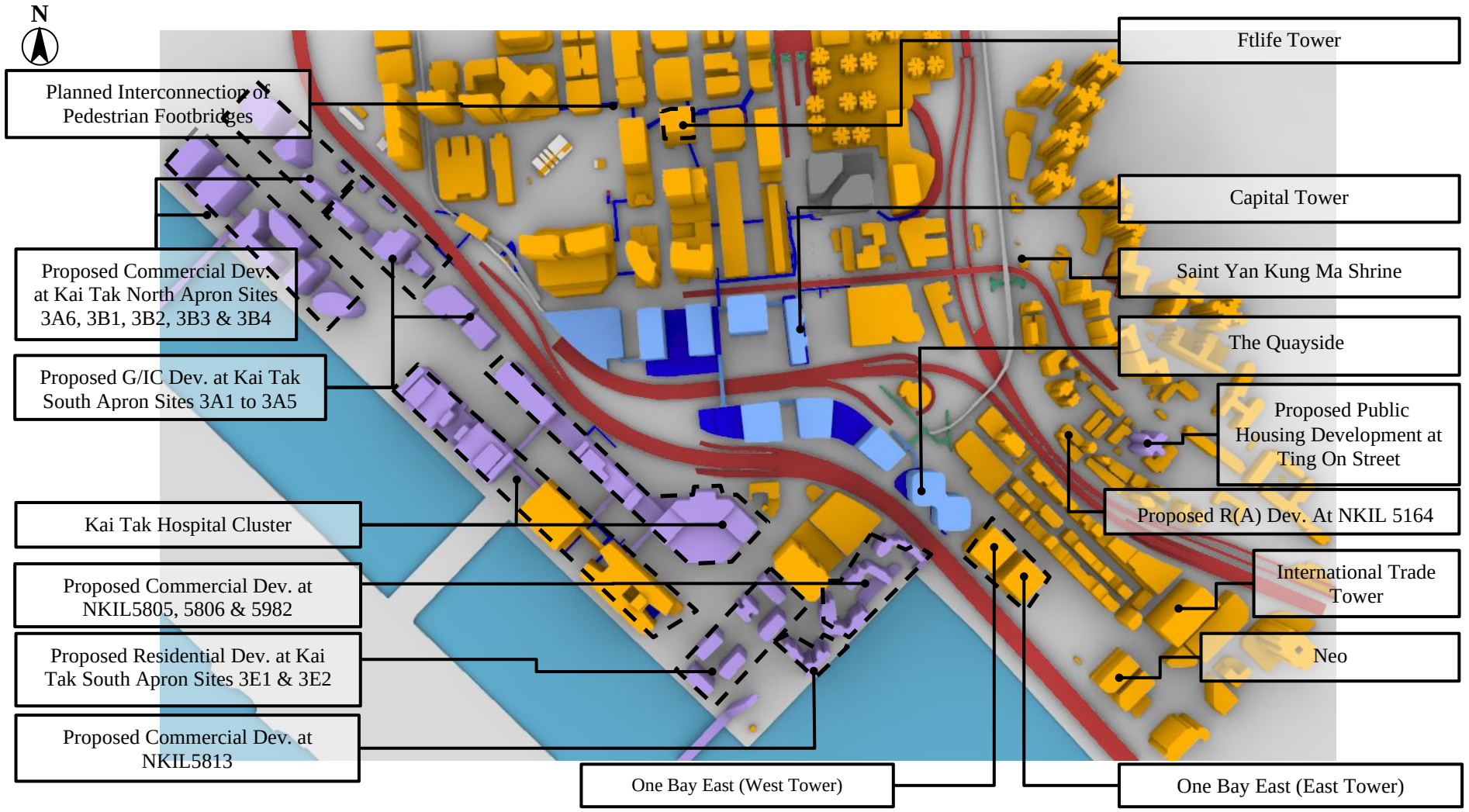


Figure 19 Proposed/ Planned/ Committed Developments (purple), elevated highways/ railways (brown), existing elevated walkway (green shapes) and planned elevated walkway (blue shapes), possible EFLS alignment (dash line) within Surrounding Area and Potential Redevelopment (indicative only, may not be pursued) (grey)

3.4.3 Identified Proposed / Committed / Planned Developments

3.4.3.1 With collaboration with PlanD and BD, the following list of committed or planned developments within the Surrounding Area are incorporated into the 3D model.

- Proposed Commercial Development at NKIL5805, 5806 & 5982
- Proposed Commercial Development at NKIL5813
- Commercial Development at NKIL6269
- Office Dev. at NKIL6311 (Hong Kong Pacific Tower)
- Capital Tower at NKIL 6313
- Planned Interconnection of Pedestrian Footbridges Kowloon Bay
- Kai Tak South Apron
- Proposed Re-development of Ngau Tau Kok Police Station (indicative only, may not be pursued)

3.4.3.2 Other than the planned/ proposed/ committed buildings, there are various proposed elevated walkways within the Surrounding Area. These planned/ committed/ proposed developments and proposed elevated walkways are highlighted in Figure 19, respectively. The size of computational domain is 4600m x 5800m x 3000m as shown in Figure 20 while the four directional views of the 3D model are shown in Figure 20 to Figure 24.

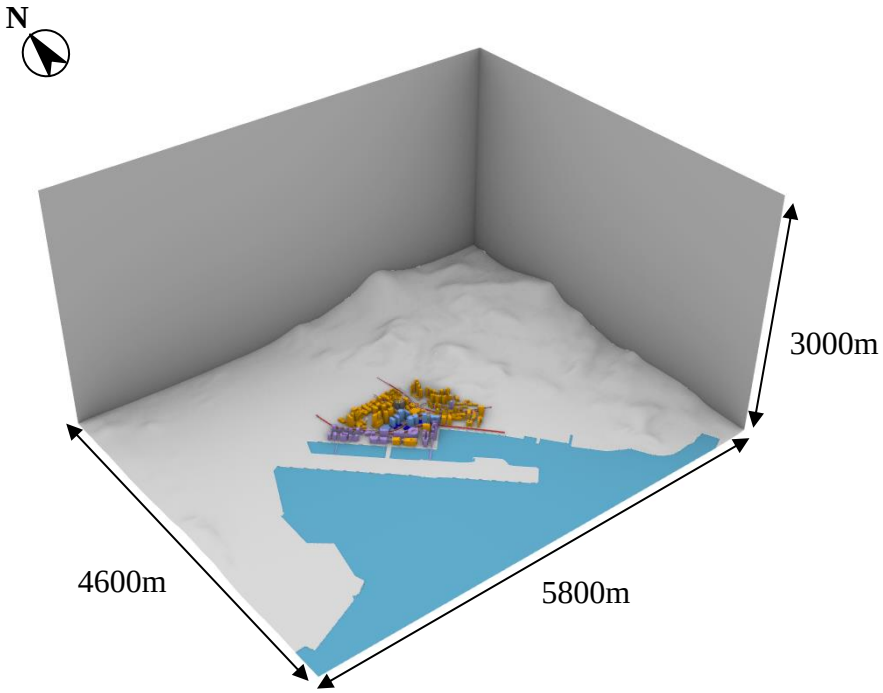


Figure 20 Overview of 3D model

3.4.4 Views on the 3D model

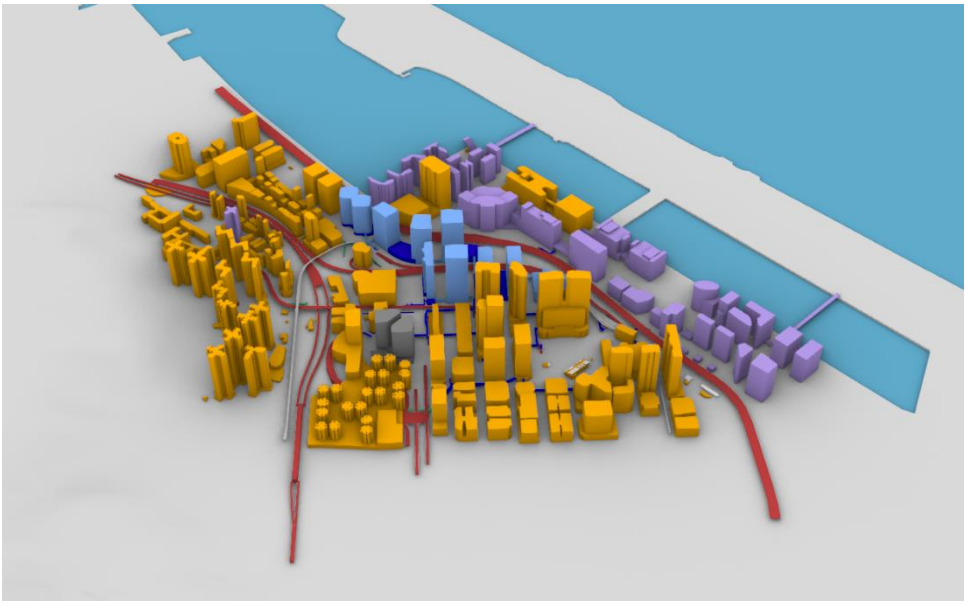


Figure 21 Northern view on the Surrounding Area

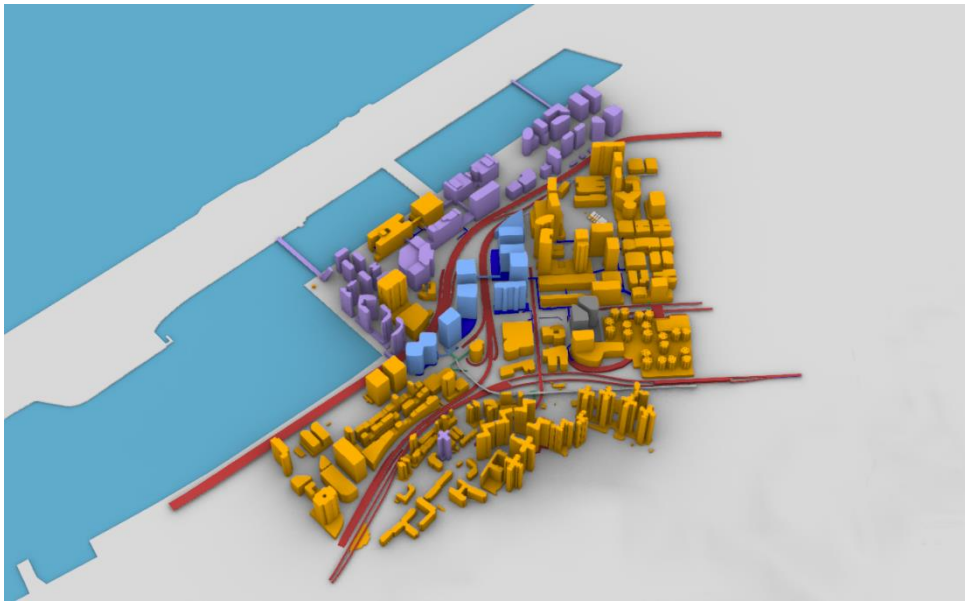


Figure 22 Eastern view on the Surrounding Area

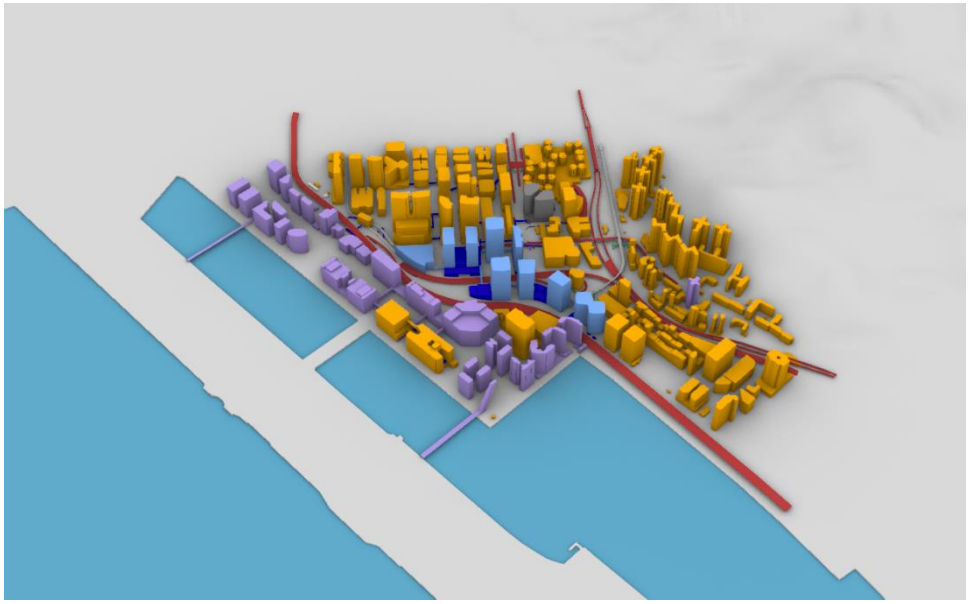


Figure 23 Southern view on the Surrounding Area

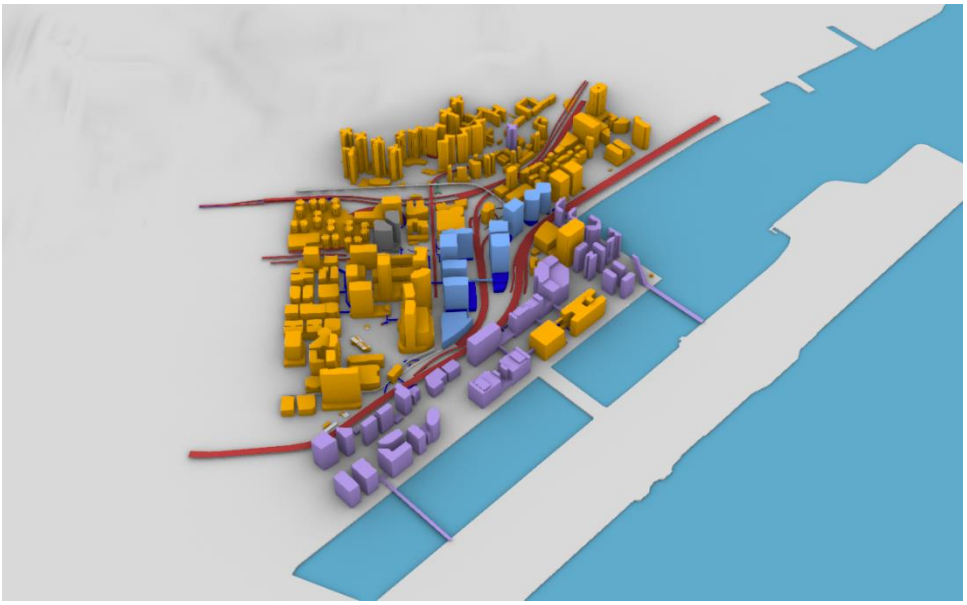


Figure 24 Western view on the Surrounding Area

3.5 Assessment Tools

3.5.1.1 Computational Fluid Dynamics (CFD) technique is utilized for the AVA Initial Study. A well-recognised commercial CFD package ANSYS ICEM-CFD and STAR-CCM+ is used, where both software is widely used in the industry for AVA studies. With the use of three-dimensional CFD method, the local airflow distribution can be visualised in detail. The air velocity distribution within the flow domain, being affected by the site-specific design and the surrounding buildings, is simulated under the prevailing wind conditions in a year

3.5.2 Mesh Setup

3.5.2.1 Body-fitted unstructured grid technique is used to fit the geometry to reflect the complexity of the development geometry. A prism layer of 3m above ground (totally 6 layers and each layer is 0.5m) is incorporated in the meshing to better capture the approaching wind as shown in Figure 25. The expansion ratio is 1.3 while the maximum blockage ratio is 3%.

3.5.2.2 Finer grid system was applied to the most concerned area based on preliminary judgement, while coarse grid system was applied to the area of surrounding buildings for better computational performance while maintaining satisfactory result. The mesh for the computational model is shown in Figure 26.

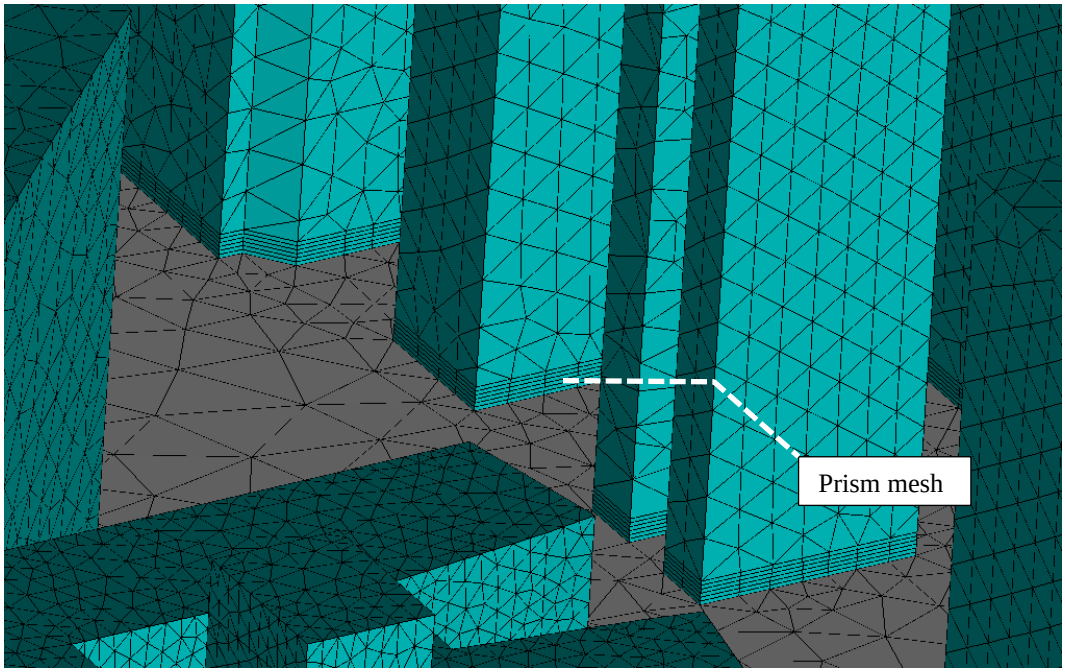


Figure 25 Prism mesh near the pedestrian level

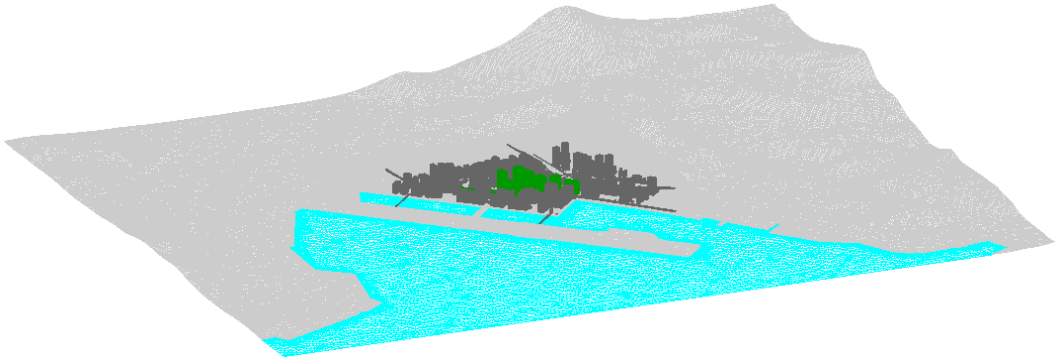


Figure 26 Mesh of the computational model

3.5.3 Turbulence Model

3.5.3.1 As highlighted in recent academic and industrial research literatures by CFD practitioners, the widely used standard k - ε turbulence model technique may not adequately model the effects of large scale turbulence around buildings and ignores the wind gusts leading to the relatively poor prediction in the recirculation regions around building. Therefore, in this CFD simulation, realizable $k-\varepsilon$ turbulence modelling method was applied. This technique provides more accurate representation of the levels of turbulence that can be expected in an urban environment.

3.5.4 Calculation Method

3.5.4.1 The Segregated Flow model solves the flow equations in a segregated manner. The linkage between the momentum and continuity equations adopted the predictor-corrector approach. A collocated variable arrangement and a *Rhie*-and-*Chow*-type pressure-velocity coupling

combined with a SIMPLE-type algorithm. A higher order differencing scheme is applied to discretize the governing equations. The convergence criterion is set to 0.0005 on mass conservation. The calculation will repeat until the solution satisfies this convergence criterion.

3.5.4.2 The prevailing wind direction are set to inlet boundary of the model with wind profile as detailed in Section 3.3. The downwind boundary is set to pressure with value of atmospheric pressure. The top and side boundaries are set to symmetry. In addition, to eliminate the boundary effects, the model domain is built beyond the Surrounding Area as required in the Technical Circular.

3.5.5 Summary

3.5.5.1 Since there is no internationally recognized guideline or standard on using CFD for outdoor urban scale studies, reference was made to other CFD guidelines on different wind flow aspects to suggest a study approach for current study. The detail parameters are summarized in Table 3.

Table 3 Detail parameters to be adopted in the CFD model

	CFD Model
Program Tool	STAR-CCM+
Physical Model Scale	1:1 to real environment
Model details	Only include Topography, Buildings blocks, Streets with major elevated structures (footbridges and flyovers). No landscape is included.
Domain	Includes building information within the domain Lateral, Inflow & Outflow: approximately 5*H*
Assessment Area	≥ 1*H* area
Surrounding building Area	≥ 2*H* area
Grid Expansion Ratio	The grid should satisfy the grid resolution requirement with maximum expansion ratio = 1.3
Prismatic layer	Prism layers must cover the pedestrian level up to 3m from ground, each layer with 0.5m spacing.
Inflow boundary Condition	Incoming wind profile as measured from the wind data of Site Wind Availability Study of the Study Site
Outflow boundary	Pressure boundary condition with dynamic pressure equal to zero
Wall boundary condition	Logarithmic law boundary
Turbulence model	Realizable k-ε model
Solving algorithms	*Rhie* and *Chow* SIMPLE for momentum equation Realisable *k- ε* for turbulence solver Hybrid model for all other equations
Grid expansion ratio	1.3
Blockage ratio	< 3%
Convergence criteria	Below $0.5x10^{-3}$

3.6 AVA Indicators

3.6.1.1 The wind speed information at pedestrian level (2m above ground) is acquired to determine the Wind Velocity Ratio (VR) as stipulated in the *AVA Technical Circular* [1] and as defined as follows:

$$VR = \frac{V_p}{V_\infty} \qquad \text{(Eq.2)}$$

where V_p is the wind speed at the pedestrian height (2m above ground) and V_∞ is the wind velocity at the top of the boundary layer (defined as the height where wind is unaffected by urban roughness below [1] and determined by the topographical studies).

3.6.2 Assessment Parameters

Measurement is taken in the following areas within the "Assessment Area":

- Along the project site boundary (defined as "Perimeter" test-points), such that the Site-Spatial Average Velocity Ratio (*SVR*) can be determined (as per the *AVA Technical Circular* [1]),
- Throughout the Assessment Area other than the perimeter test-points (defined as "Overall" Test-points), such that the Local Spatial Average Velocity Ratio (LVR) can be determined by taking an average of all overall and perimeter test-points (as per the *AVA Technical Circular* [1])

Table 4 Terminology of the AVA Initial Study

Terminology	Description
Velocity Ratio (VR)	The velocity ratio (VR) represents the ratio of the air velocity at the measurement position to the value at the reference points.
Site spatial average velocity ratio (SVR)	The SVR represent the average VR of all perimeter test points at the site boundary which identified in the report.
Local spatial average velocity ratio (LVR)	The LVR represent the average VR of all points, i.e. perimeter and overall test points at the site boundary which identified in the report.

3.6.2.1 The higher the value of VR, the less is the impact due to buildings on wind availability.

3.6.2.2 The Average VR is defined as the weighted average VR with respect to the percentage of occurrence of all considered wind directions. This gives a general idea of the ventilation performance at the considered location at both annual and summer wind condition.

3.7 Test Points for Site and Local Ventilation Assessment

3.7.1.1 As per the *AVA Technical Circular* [1], three types of test point – Perimeter test point and Overall test point are adopted to assess the wind performance. For those areas within the Assessment Area, Special test point is used. These test points are allocated evenly as per the requirement stated in the *AVA Technical Circular* [1].

3.7.2 Perimeter Test Points

3.7.2.1 There is a total of 50 perimeter test-points distributed along the site boundary of KBAA.

3.7.3 Overall Test Points

3.7.3.1 There are 164 overall test-points located along all accessible streets, open spaces such as parks, waterfront promenades and open areas underneath flyovers. Together with some of the perimeter test-points, they are grouped to form focus areas — present or planned to be developed — within the Assessment Area.

3.7.4 Special Test Points

3.7.4.1 Special test-points are allocated along the promenade and within the Study Site where there are publicly accessible open areas. Under Baseline Scheme 57 special test points are allocated at 2m above the ground level. Under Non-EFLS Scenario, 72 special test points are allocated at 2m above the ground level, including those located along the NBA and open spaces at ground level; while another 15 special test points are allocated at 2m above the landscape deck.

3.7.4.2 Since some of the roadside areas over or underneath those flyovers of Kwun Tong Bypass, Kai Fuk Road and Sheung Yee Road are not accessible to pedestrians, test points would not be located at these places. Figure 19 show the identified focus areas, the building models and the proposed locations of test points.

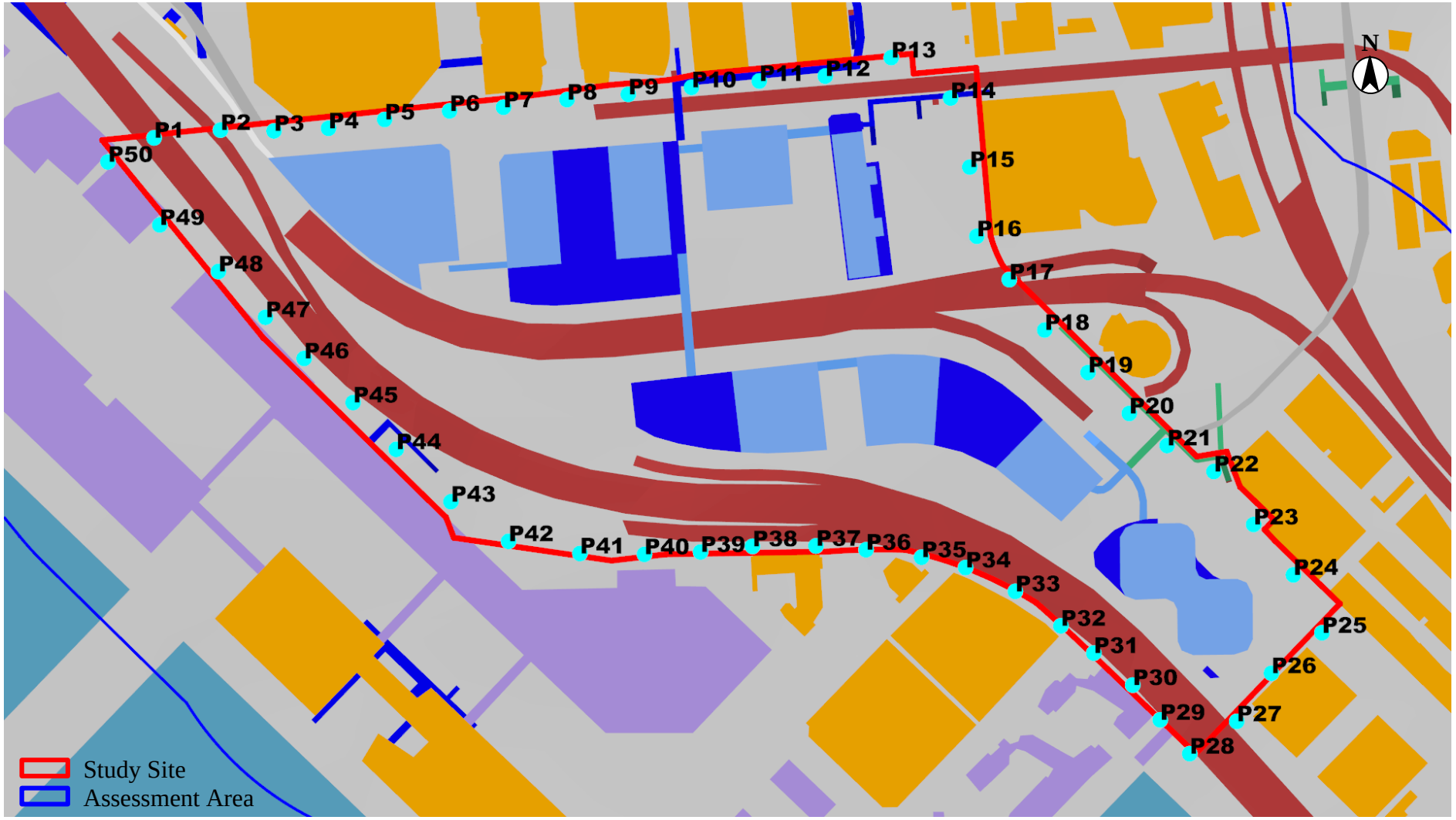


Figure 27 Locations of Perimeter Test Points



Figure 28 Demarcation of zones to show the locations of Overall Test Points and Special Test Points

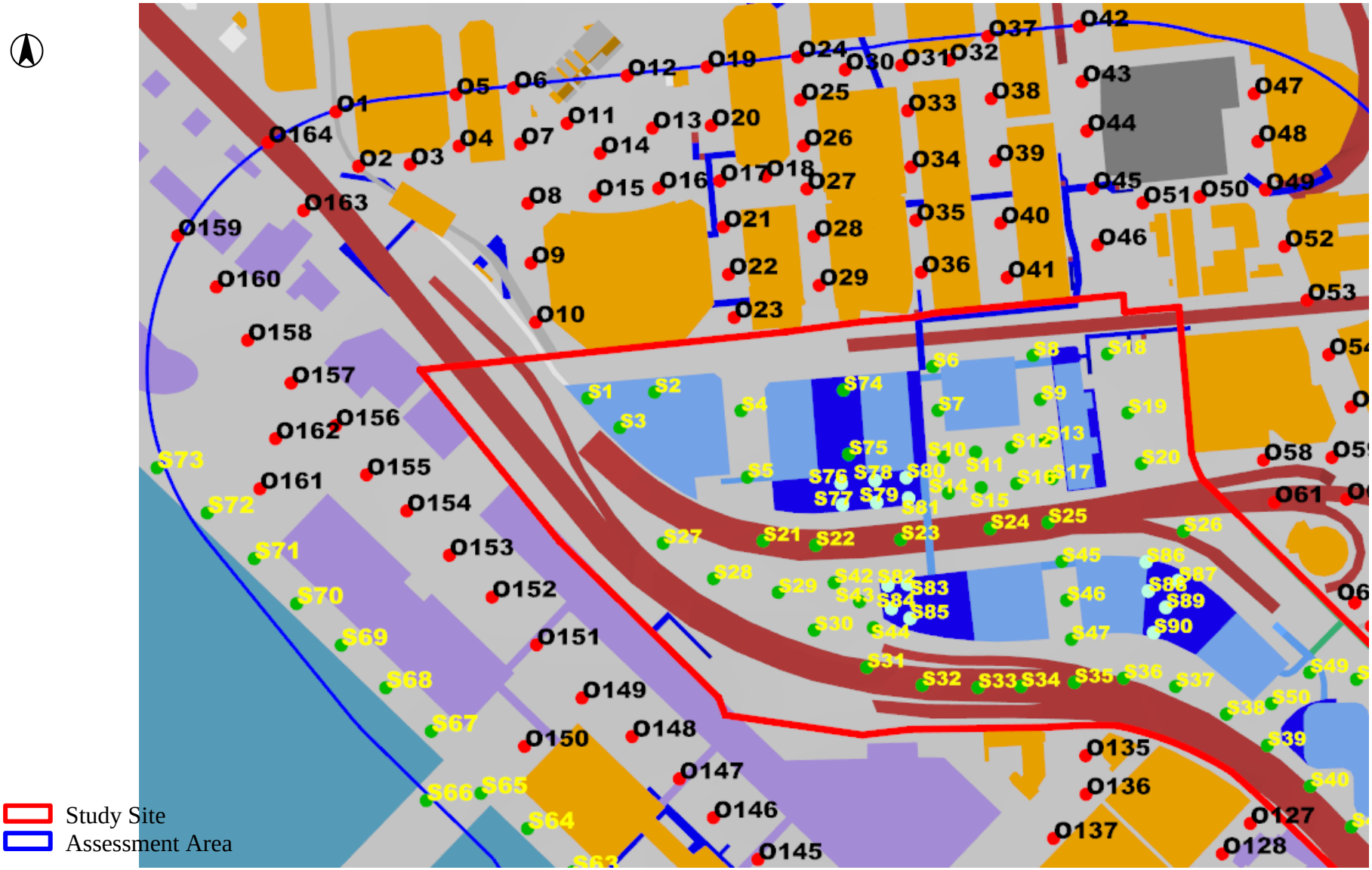


Figure 29 Locations of Overall Test Points in Zone 1

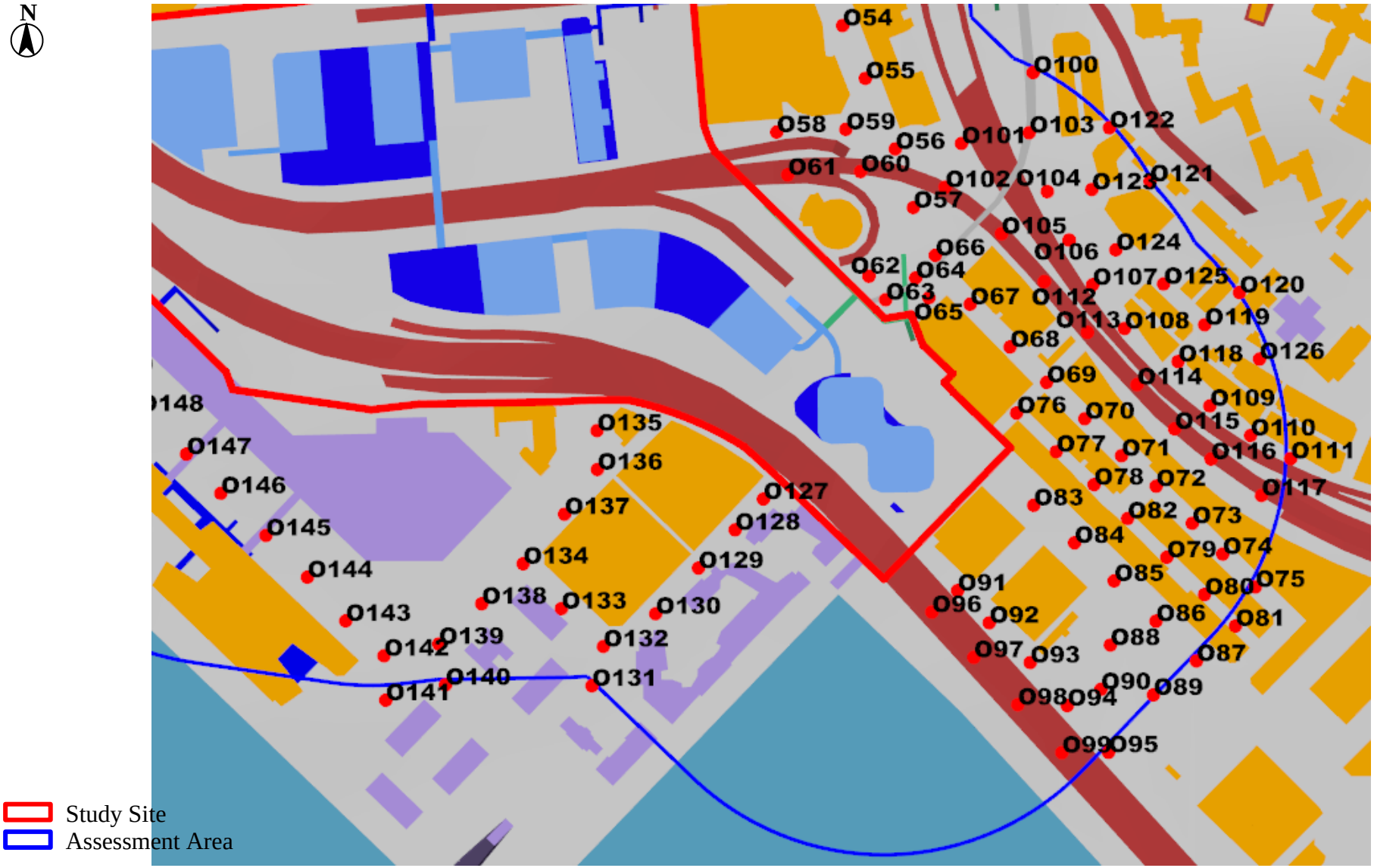


Figure 30 Locations of Overall Test Points in Zone 2

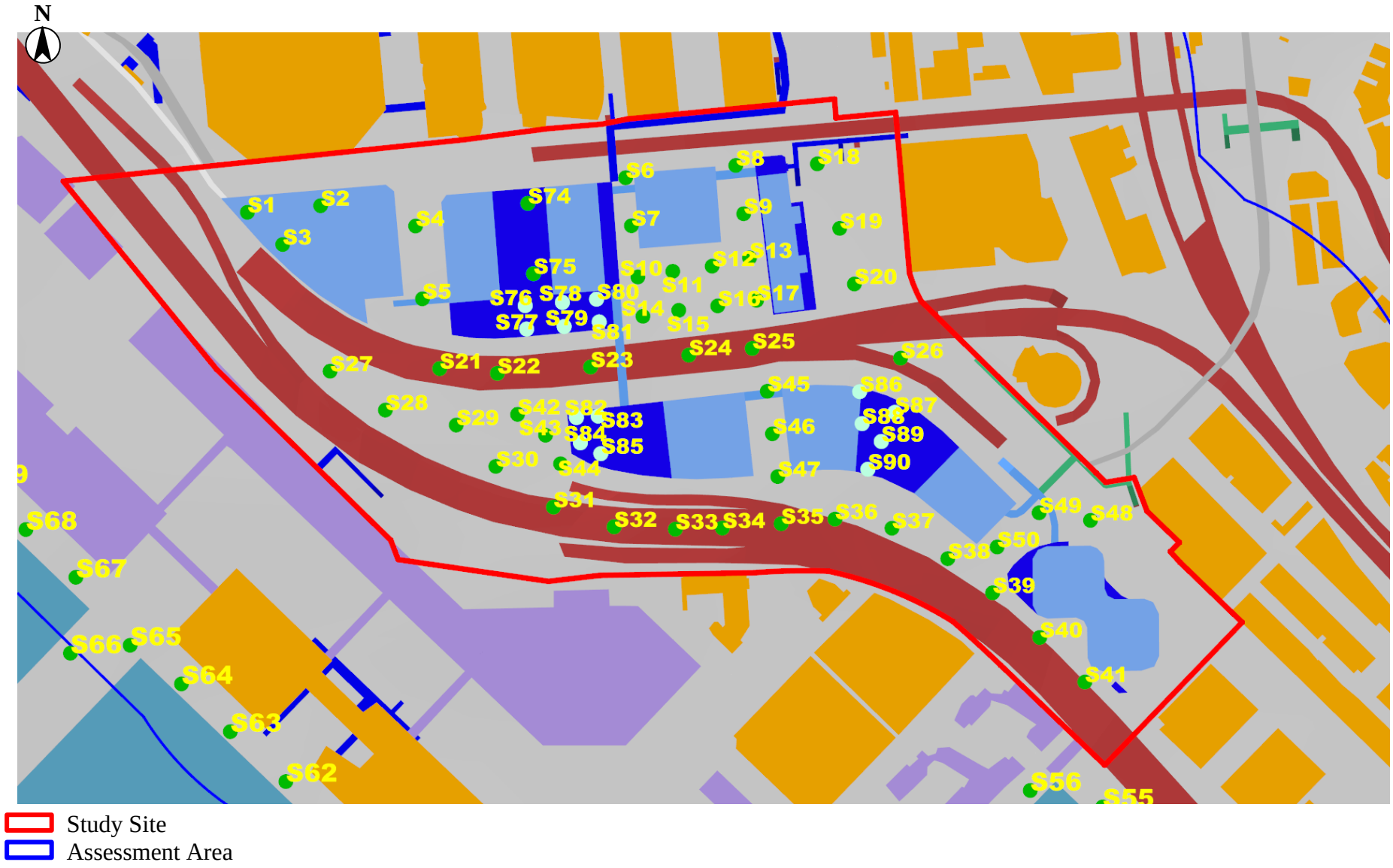


Figure 31 Locations of Special Test Points at Ground Level (Dark Green Dots) and Above Podium Level (Light Green Dots) within Sites

4 Results and Discussion

4.1 Overview

4.1.1.1 The contour plots and vector plots of all studied wind directions are presented in Appendices B and C, respectively.

4.2 Overall Pattern of Ventilation Performance under Annual Wind Condition

4.2.1.1 The overall wind performance of Baseline and Non-EFLS Scenario under annual wind condition is shown in Figure 32 and Figure 33, respectively.

4.2.1.2 Given the annual prevailing winds mainly come from northeast quadrant, the study site would be located at the leeward side of existing/planned development. Hence, the ventilation performance would be similar between the two schemes with some variation at localized areas.

4.2.1.3 With more significant height difference between the Baseline Scheme and those development in south apron, downwash effect would take place such that the ventilation performance at the open space between Kai Tak Acute Hospital and Study Site (oval in Figure 32) would be relatively higher under Baseline Scheme.

4.2.1.4 Non-EFLS Scenario Scheme with taller building height would cast wind shadow over its southwest area. Therefore, the wind environment to the southwest of Study Site (such the planned developments near the promenade, Kai Tak Acute Hospital and Kai Tak Children's Hospital) under Non-EFLS Scenario would be slightly calmer than that under Baseline Scheme.

4.2.1.5 Although overall wind environment to the northeast of the Study Site would be very similar between schemes, the wind environment at the Ngau Tau Kok Telephone Exchange, Hung Yip Street and southern part of Wai Yip Street would be slightly enhanced under Non-EFLS Scenario due to stronger downwash effect by taller towers in the eastern part of Study Site.

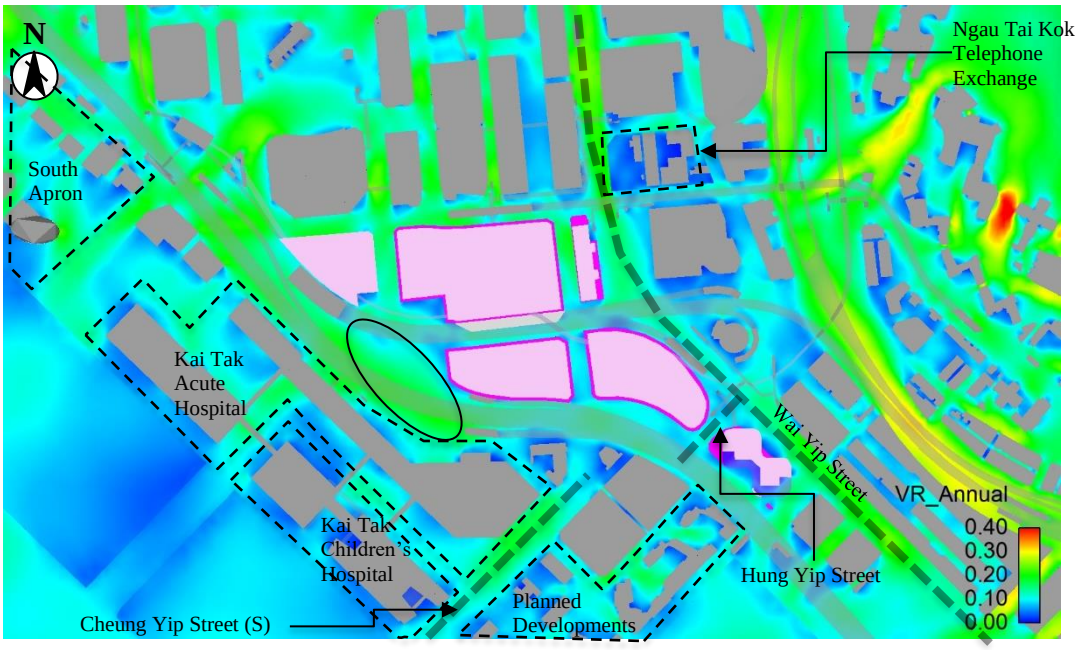


Figure 32 Contour plot of annual weighted VR under Baseline Scheme

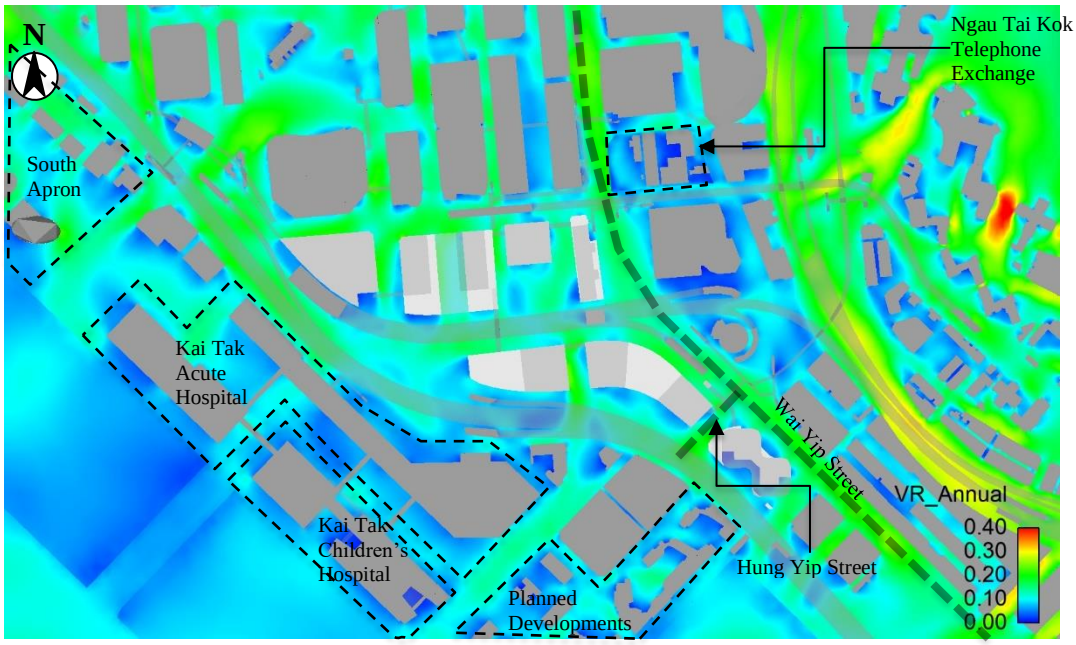


Figure 33 Contour plot of annual weighted VR undertfr Non-EFLS Scenario

4.3 Overall Pattern of Ventilation Performance under Summer Wind Condition

4.3.1.1 The overall wind performance of Baseline and Non-EFLS Scenario under summer wind condition is shown in Figure 34 and Figure 35, respectively.

4.3.1.2 The overall wind performance under summer wind condition would be relatively windier than that under annual wind condition as the prevailing summer wind comes from southwest quadrant which is open sea.

4.3.1.3 One of the prevailing wind directions is E wind that would lead to relatively more significant downwash under Non-EFLS Scenario than that under Baseline Scheme. While other dominant wind comes from SW quadrant and the Non-EFLS Scenario would slightly limit the wind penetration to areas to north of Sheung Yee Road (S).

4.3.1.4 To the north of Sheung Yee Road (S), the wind environment would be relatively calmer under Non-EFLS Scenario than that under Baseline Scheme. Although various proposed developments to the southwest of Study Site are taller than Baseline Scheme, the higher permeability above Baseline Scheme would allow the wind in the leeward side of these taller buildings to recover slightly and to be captured by those existing developments to the north of Sheung Yee Road (S), such as Manhattan Place, Enterprise Square III. As a result, the wind performance to the north of Sheung Yee Road (S) would be relatively higher under Baseline Scheme.

4.3.1.5 Taller towers in Lot 4 would capture the high-level wind which would enhance the wind environment at the open space between Kai Tak Acute Hospital and Study Site (oval in Figure 35) under Non-EFLS Scenario.

4.3.1.6 The wide tower separation in Lot 4 would allow summer prevailing wind as well as the wind downwashed by towers in Lot 4 to penetrate through and serve the leeward side, such as Wai Yip Street, Tai Yip Street Garden under Non-EFLS Scenario.

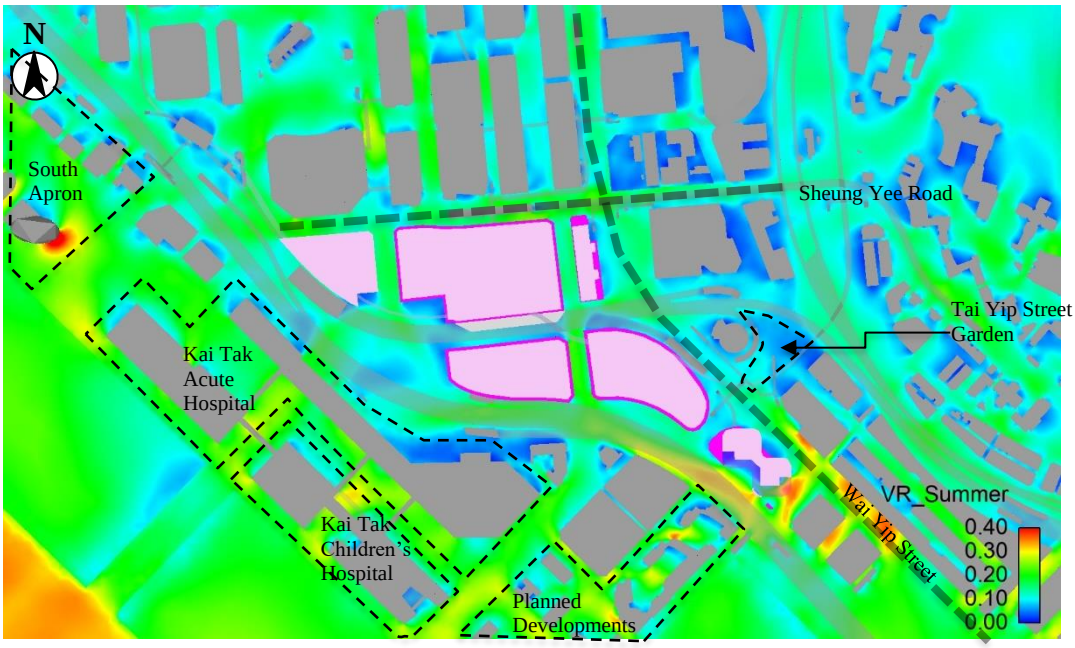


Figure 34 Contour plot of summer weighted VR under Baseline Scheme

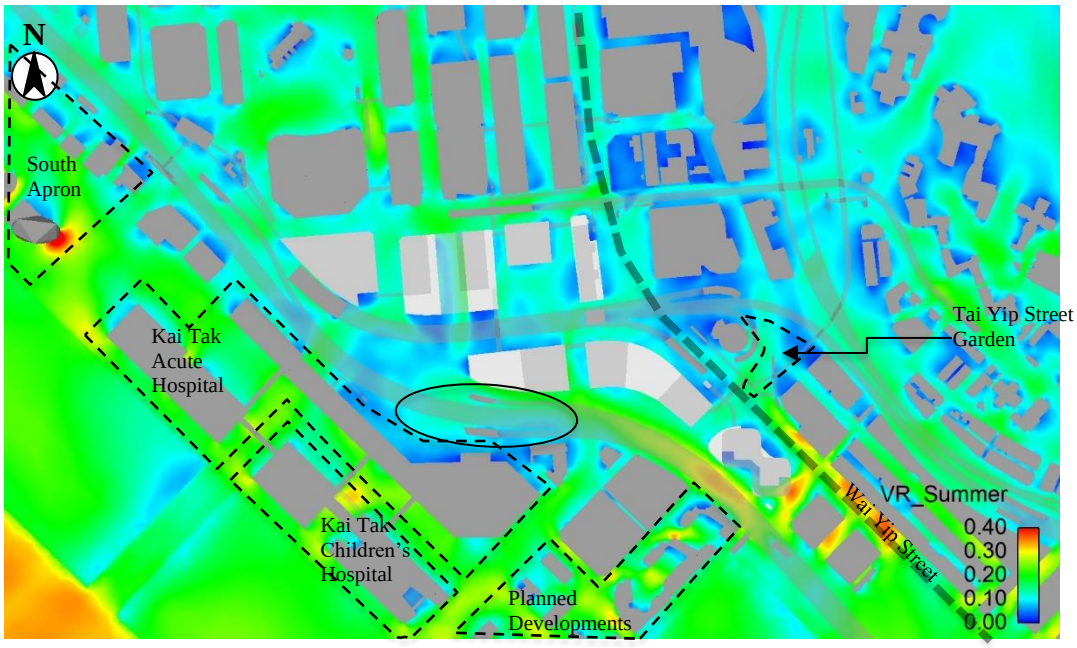


Figure 35 Contour plot of summer weighted VR under Non-EFLS Scenario

4.4 Directional Analysis

4.4.1 N Wind

4.4.1.1 The wind performances of Baseline Scheme and Non-EFLS Scenario under N wind are shown in Figure 36 and Figure 37 respectively.

4.4.1.2 The wind environment was found to be similar between two schemes. The incoming wind would travel along the railway. The presence of open space near CIC Zero Carbon Building (ZCB) would allow the incoming wind to be further distributed towards the surrounding area. The towers of MegaBox would capture the incoming mid- to high-level wind which would further ventilate and enhance the wind environment of its leeward area.

4.4.1.3 Under Proposed Scheme, the open facades in the PTI of Lot 2, aligned with Wang Tai Street running N-S direction, would allow the incoming wind to penetrate through Lot 2 and serve the area underneath Kai Fuk Road Flyover. With the NBA and wider building separation along Cheung Yip Street (N) running in N-S direction connecting to Sheung Yee Road (S) under Non-EFLS Scenario, the incoming wind would travel through and serve the Open Space in Lot 2 and space underneath Kai Fuk Road Flyover.

4.4.1.4 Wider separation between Lots 4 and 6 (where Hung Yip Street locates) under Non-EFLS Scenario would also allow incoming wind to penetrate through and serve the road section of Kung Tong By-Pass near Pacific Trade Centre where relatively higher VR was observed.

4.4.1.5 The generally taller building height under Non-EFLS Scenario would reduce the wind permeability at higher level, which would limit the air movement. The higher-level wind would tend not to enter the study site but to be diverted to travel around Non-EFLS Scenario. Together with the completed Lot 5 and Lot 6, larger wake zone would be created at and near the Non-EFLS Scenario, which would divert the incoming wind to travel more towards eastern and western direction. Hence, more wind would be pushed to reach the façade of Yan Wing Mansion from Kwun Tong Road to ventilate Ngau Tau Kok Road.

4.4.1.6 In addition, with lower building height under Baseline Scheme, more higher-level wind would tend to enter the study site, which would be captured by facades of Lot 6 under Baseline Scheme to ventilate southern part of Wai Yip Street, where the VR would be slightly higher.

4.4.1.7 The curved podium in Lot 4 under Non-EFLS Scenario would divert some of the incoming wind to travel eastwards along the podium facades and reach Tai Yip Street Garden. Together with the setback of the Lot 4 which create wider building separation along Wai Yip Street, more wind would reach Tai Yip Street Garden while limit the incoming wind travelling down Wai Yip Street and entering Tai Yip Street from Kwun Tong Road. Hence, the VR at Tai Yip Street Garden would be slightly enhanced while the VR along Tai Yip Street would be slightly affected.

4.4.1.8 However, with taller towers in Lot 4 under Non-EFLS Scenario, wind shadow would be casted over southeastern part the surrounding area, where various planned developments, Pacific Trade Centre and Octa Tower located and the wind environment herein would be calmer than that under Baseline Scheme.

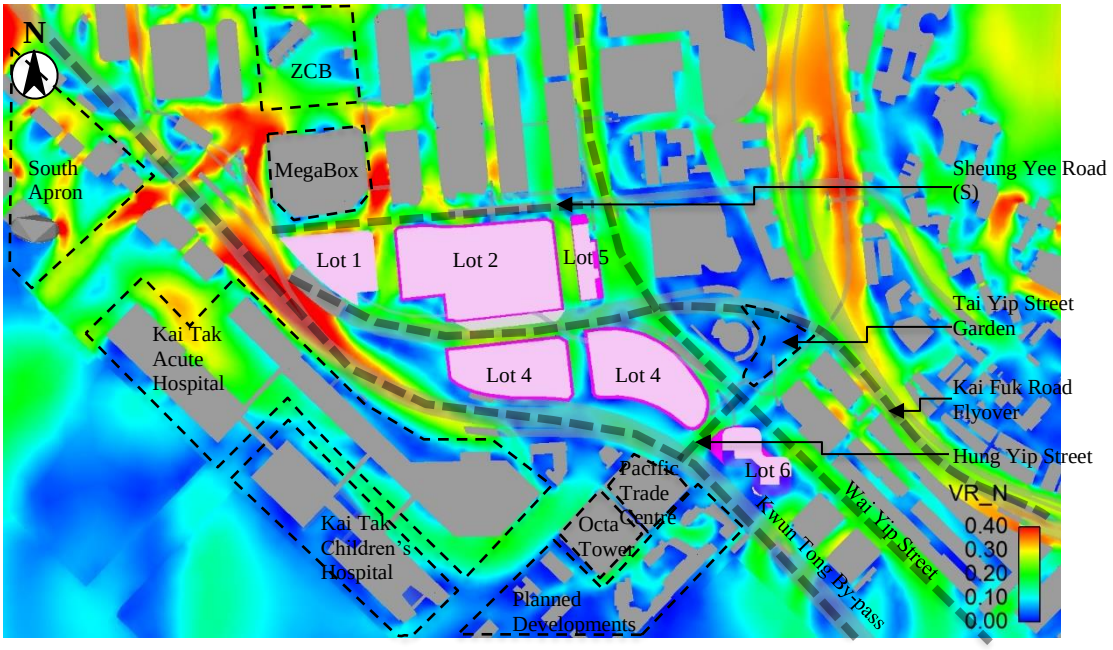


Figure 36 Contour plot of VR of Baseline Scheme under N wind

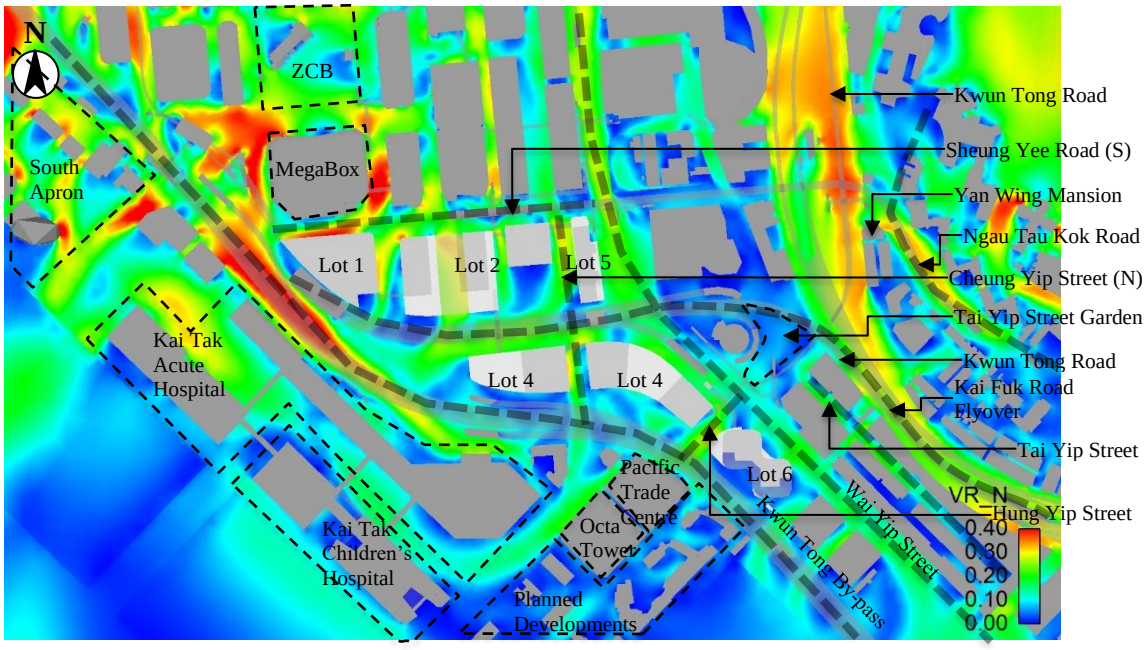


Figure 37 Contour plot of VR of Non-EFLS Scenario under N wind

4.4.2 NNE Wind

4.4.2.1 The wind performance of Baseline and Non-EFLS Scenario under NNE wind are shown in Figure 38 and Figure 39 respectively.

4.4.2.2 The general wind environment was found to be similar between the two schemes with the incoming wind travelling along the Railway and Wai Yip Street. As the Upper and Lower Ngau Tau Kok Estates are on the windward side, these estates are found to have higher VR than those on the leeward area.

4.4.2.3 In the presence of taller towers under Non-EFLS Scenario, the permeability at mid- to high-level would be reduced which would affect the wind distribution on leeward side, as well as minor change on the windward side. For example, a spot with relatively higher VR under Baseline Scheme was found to the west of Redevelopment of Ngau Tau Kok Police Station. The taller tower in the eastern part of Lot 2 under Non-EFLS Scenario would limit the incoming wind skimming over Telford Gardens towards the open sea area. Therefore, less wind would flow towards Study Site. Instead, the wind would be diverted to flow along the Railway. Hence, the wind environment along Railway would be slightly enhanced under Non-EFLS Scenario than that under Baseline Scheme.

4.4.2.4 Another example would be, under the Non-EFLS Scenario, the taller towers in Lot 4 would capture and downwash mid and high level incoming wind to pedestrian level, which would flow along Hung Yip Street, as well as towards the southern portion of Wai Yip Street, therefore higher VR in these locations would be observed. In Baseline Scheme, the height difference between the eastern portion of Lot 4 and the Pacific Trade Centre would allow incoming wind to flow over Lot 4 and be downwashed by the Pacific Trade Centre to the pedestrian level, therefore a relative higher VR would be observed at a localised portion of Kwun Tong By-pass.

4.4.2.5 The incoming wind would travel along the streets running in N-S direction and reach the Study Site. Since Baseline Scheme has lower building height than its adjacent developments, the incoming wind would skim over the Study Site and be downwashed by Kai Tak Acute Hospital. As a result, the wind performance at the open space between Study Site and Kai Tak Acute Hospital (black oval in Figure 38) would be relatively higher under Baseline Scheme.

4.4.2.6 In contrary, Non-EFLS Scenario would have taller towers than its surrounding developments, the incoming wind would be captured by the towers in Lot 2 of Non-EFLS Scenario, which would enhance the wind environment of Open Space 2 in Lot 2 (pink rectangle in Figure 39), which would then reach travel across the area under Kai Fuk Flyover and reach open space to the west side of Lot 4 (white triangle in Figure 39).

4.4.2.7 The provision of building separation of 25m along Cheung Yip Street (N) running in N-S direction across Lot 4 under Non-EFLS Scenario would allow the incoming wind to travel through which would enhance the wind environment on their immediate leeward areas, such as

Cheung Yip Street (S). However, as the towers in Lot 4 would be taller under Non-EFLS Scenario than those in Baseline Scheme, the incoming wind would be limited such that the wind environment near Kai Tak Children's Hospital, planned developments and Octa Tower would be calmer than those under Baseline Scheme.

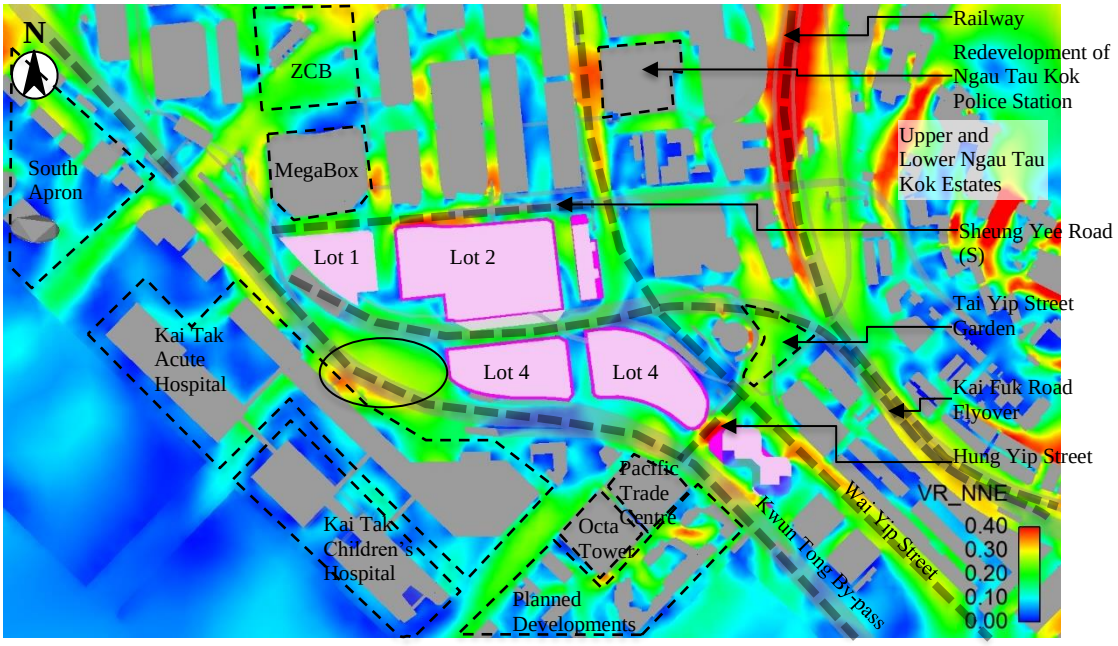


Figure 38 Contour plot of VR of Baseline Scheme under NNE wind

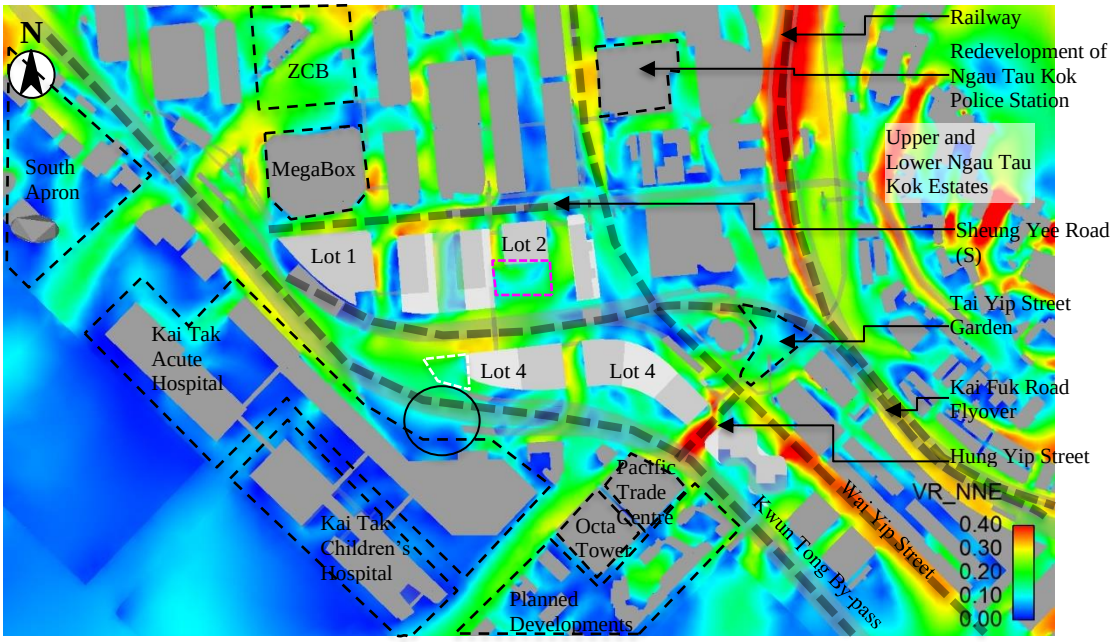


Figure 39 Contour plot of VR of Non-EFLS Scenario under NNE wind

4.4.3 NE Wind

4.4.3.1 The wind performance of Baseline and Non-EFLS Scenario under NE wind are shown in Figure 40 and Figure 41 respectively.

4.4.3.2 Similar to NNE wind, the general wind environment was found to be similar between two schemes with the incoming wind traveling along the Railway and Wai Yip Street. Upper and Lower Ngau Tau Kok Estates at windward side are found to have higher VR than those on the leeward area.

4.4.3.3 With taller towers in eastern portion of Lot 4 of Non-EFLS Scenario, the NE wind would be downwashed by the towers and travel northwards along Wai Yip Street, towards Lot 3 underneath Kai Fuk Road Flyover or around eastern portion of Lot 4 to reach Cheung Yip Street (N); some downwashed wind would also travel towards the southern portion of Wai Yip Street. Hence, the VR at some areas near eastern portion of Lot 4 along Wai Yip Street, under Kai Fuk Road Flyover and Cheung Yip Street (N) would be enhanced. However, such downwashed wind would limit the incoming wind traveling southwards from the north of Wai Yip Street. Wind performance at the windward side along Wai Yip Street would be affected and slightly lower VR in the northern part of Wai Yip Street would be observed under Non-EFLS Scenario.

4.4.3.4 Under Baseline Scheme, the building height of bulks in Lots 2 and 4 would be lower than those under Non-EFLS Scenario. The incoming wind would therefore skim over the Study Site and be captured by Kai Tak Acute Hospital. As a result, the wind performance at the open space to the west of the western portion of Lot 4 would be relatively higher under Baseline Scheme (black oval area in Figure 40).

4.4.3.5 In contrary, taller towers in Lot 2 under Non-EFLS Scenario would capture the mid- to high- level wind towards pedestrian level of Sheung Yee Road (S) where higher VR was observed under Non-EFLS Scenario.

4.4.3.6 The provision of the NBA, wider building separation along Cheung Yip Street (N), as well as building separation between the western and eastern portion of Lot 2, would allow the incoming wind to serve the Open Space 2 in Lot 2 (pink rectangle in Figure 41). Joining the stream of air downwashed by Tower 2 at the eastern portion of Lot 4, the wind would travel under Kai Fuk Road Flyover and subsequently reach KBAA Open Space 1, where the VR would be observed to be higher within study site under Non-EFLS Scenario (black oval area in Figure 41).

4.4.3.7 The wind environment near Kai Tak Children's Hospital, planned development, Octa Tower and Pacific Trade Centre would be calmer under Non-EFLS Scenario as these developments would fall into the wind shadow of the Non-EFLS Scenario.

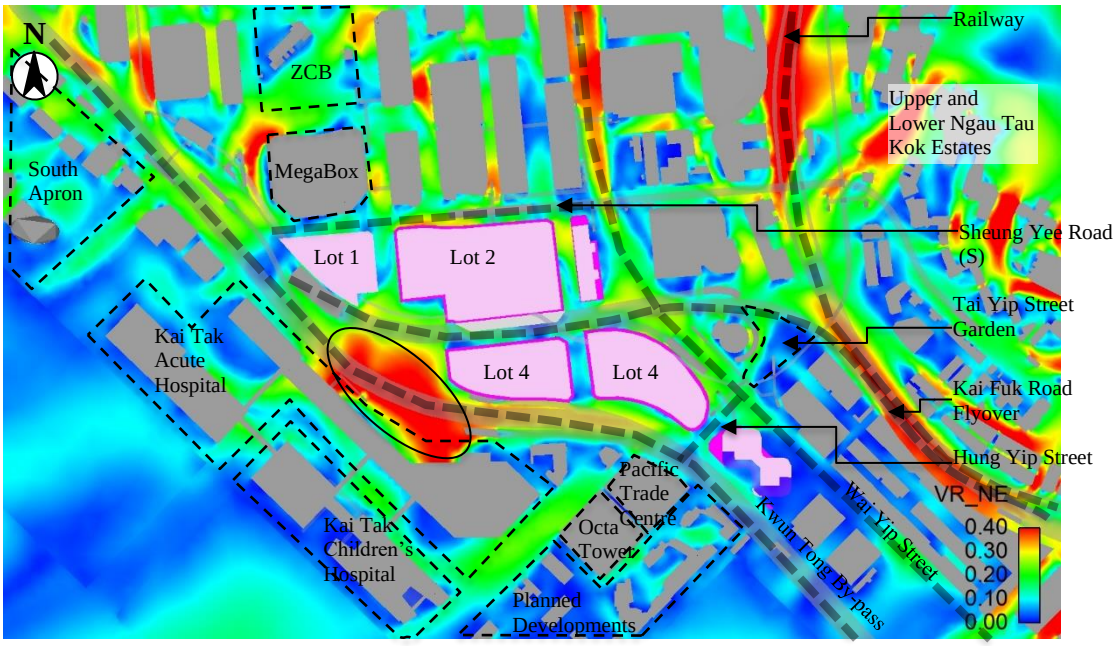


Figure 40 Contour plot of VR of Baseline Scheme under NE wind

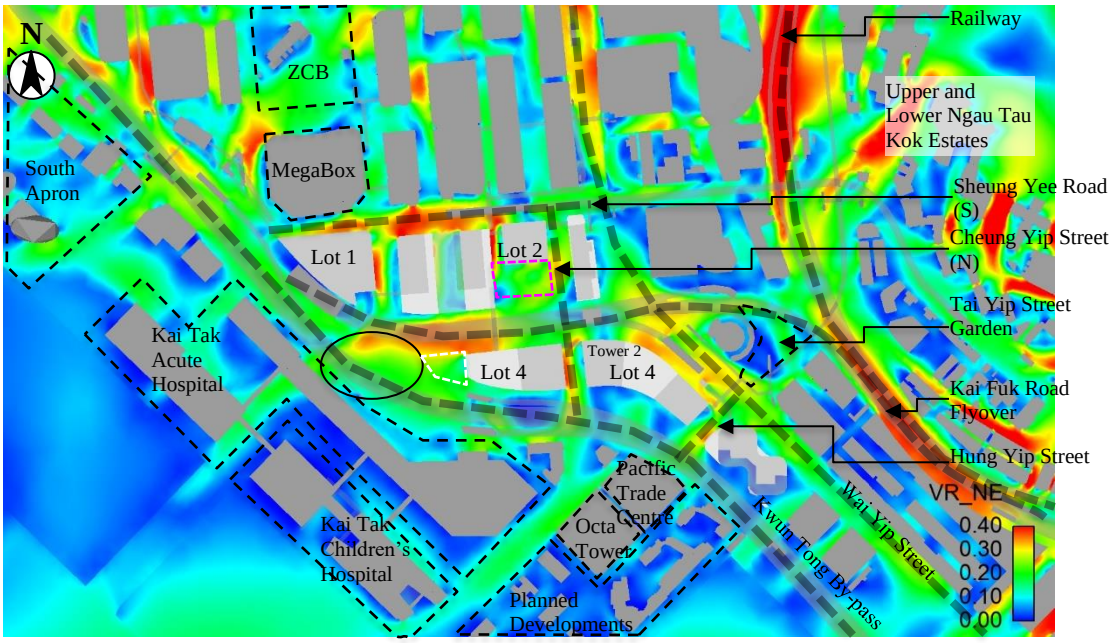


Figure 41 Contour plot of VR of Non-EFLS Scenario under NE wind

4.4.4 ENE Wind

4.4.4.1 The wind performance of Baseline and Non-EFLS Scenario under ENE wind are shown in Figure 42 and Figure 43 respectively.

4.4.4.2 The general wind environment was found to be similar between two schemes. Existing Upper and Lower Ngau Tau Kok Estates would cast wind shadow over the area to the east of the Railway. Therefore, the incoming wind would flow towards the wind shadow casted by Upper and Lower Ngau Tau Kok Estates from both northerly and southerly along the Railway. Such opposite flow of approaching winds would limit the penetration of downwashed wind by the towers of Upper and Lower Ngau Tau Kok Estates towards the Study Site. Therefore, the wind environment near Study Site would be slightly calmer than those wind directions discussed in previous sections.

4.4.4.3 Additionally, since there are various high-rise developments in the northern area of Study Site, more significant building height difference would capture more high-level wind towards pedestrian level. Therefore, various spots with higher VR was observed under both schemes, such as Chevalier Commercial Centre, One Kowloon and MegaBox. The downwashed wind would then flow along the streets running in E-W direction towards leeward area, particularly Sheung Yee Road (S).

4.4.4.4 The incoming wind from Wai Yip Street would continue to travel along Wai Yip Street under both schemes. With the setback of both tower and podium in eastern portion of Lot 4 from north-eastern boundary, wider building separation and higher permeability would be provided along Wai Yip Street near eastern portion of Lot 4 and Hung Yip Street. Hence, more wind would travel along Wai Yip Street and slightly higher VR would be observed along Wai Yip Street near eastern portion of Lot 4 and Hung Yip Street under Non-EFLS Scenario.

4.4.4.5 Taller towers in eastern portion of Lot 4 under Non-EFLS Scenario would capture more high-level wind towards southern part of Wai Yip Street. The longer and more streamlined facades would divert the downwashed wind to travel further along Wai Yip Street. Therefore, the wind environment near eastern portion of Lot 4 and 6 would be enhanced. Besides, the orientation and the building separation of towers in the eastern portion of Lot 4 would divert the incoming towards Cheung Yip Street (S). As a result, the wind environment at Cheung Yip Street (S) would be enhanced than that under Baseline Scheme.

4.4.4.6 In addition, the provision of setback in Lot 2 under Non-EFLS Scenario would favour penetration of the downwashed wind such that the wind environment in the central part of Sheung Yee Road (S) would be slightly enhanced under Non-EFLS Scenario. Due to the open facades design in PTI of Lot 2 under Non-EFLS Scenario, the incoming wind would continue to flow through and reach KBAA Open Space 1, where the VR would be slightly enhanced.

4.4.4.7 On the other hand, under Baseline Scheme, the continuous façade at Lot 2 would allow the wind coming from Sheung Yee Road (S) to continue westwards to near the northern portion of Lot 1, whereas under Non-

EFLS Scenario a portion of wind coming from Sheung Yee Road (S) would be diverted through the open façade at Lot 2 PTI. Therefore, the VR would be slightly higher at Sheung Yee Road (S) near Lot 1 under Baseline Scheme.

4.4.4.8 Taller towers in Non-EFLS Scenario would cast wind shadow over Kai Tak Hospital Clusters (i.e. Kai Tak Acute Hospital and Kai Tak Children's Hospital). Therefore, the wind environment of these 2 proposed hospitals would be calmer under Non-EFLS Scenario than that under Baseline Scheme.

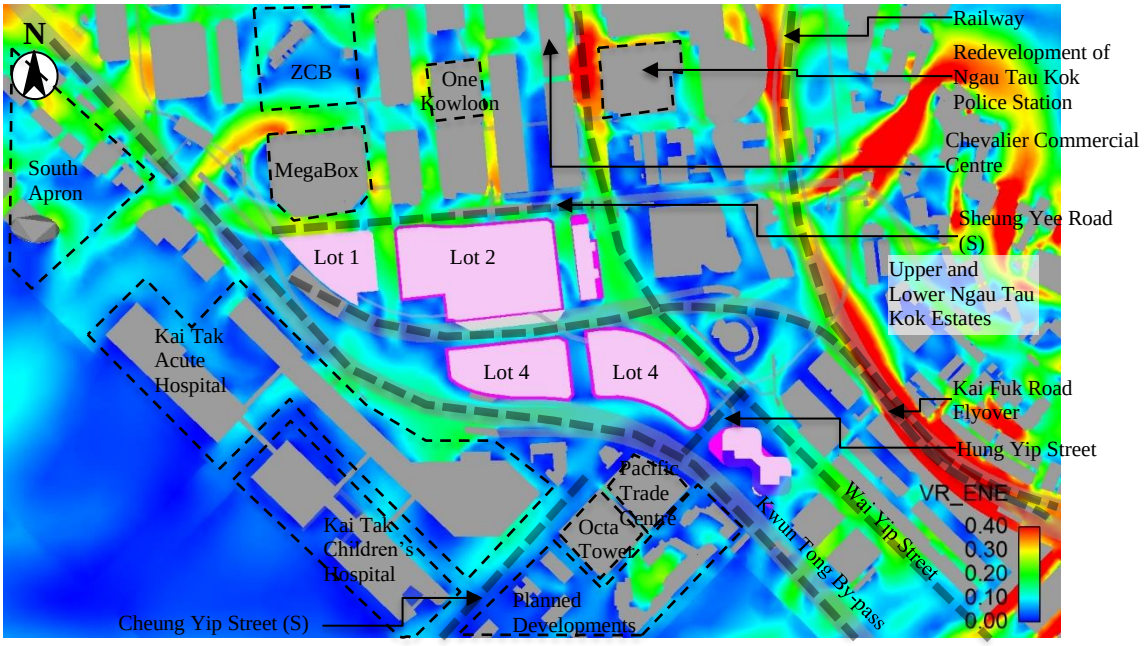


Figure 42 Contour plot of VR of Baseline Scheme under ENE wind

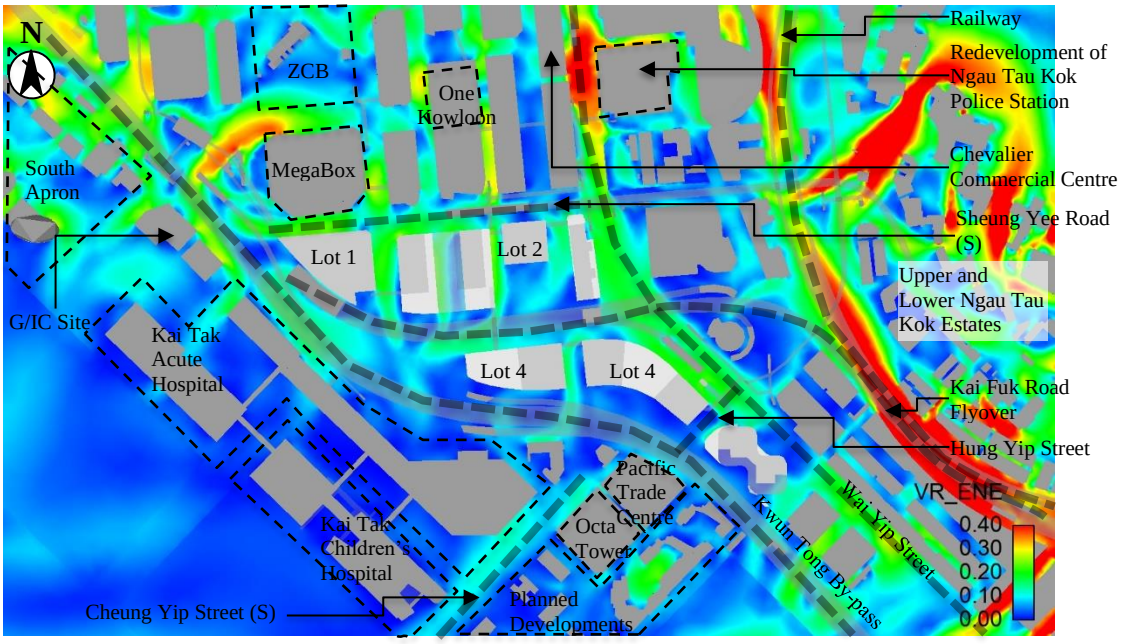


Figure 43 Contour plot of VR of Non-EFLS Scenario under ENE wind

4.4.5 E Wind

4.4.5.1 The wind performance of Baseline Scheme and Non-EFLS Scenario under E wind is presented in Figure 44 and Figure 45 respectively.

4.4.5.2 The wind environment near Upper and Lower Ngau Tau Kok Estates was found to be similar between schemes which is dominated by the domestic towers of these estates. However, with the blockage effect of the towers of these estates, the wind environment of the Assessment Area would be even calmer than those wind directions discussed in previous sections. Nevertheless, the downwash effect due to taller towers under Non-EFLS Scenario would lead to different wind performance near Wai Yip Street, as well as the leeward area, as compared to Baseline Scheme.

4.4.5.3 The generally lower building height within study site under Baseline Scheme would allow the higher-level easterly wind to skim over and reach the south apron area (illustrated by white arrow in Figure 44). In contrary, the tall buildings in Lot 4 under Non-EFLS Scenario, together with Lot 5 would limit the higher-level wind from traveling westwards but more northwards (illustrated by white arrow in Figure 45), blocking the downwash effect induced at several high-rise buildings to the north of Sheung Yee Road (S), such as Manhattan Place, Enterprise Square III. As a result, lower VR would be observed herein in area to the north of Sheung Yee Road (S) and the stream of air diverted by Non-EFLS Scenario would reach the façade of high-rise Billion Centre where the wind would be downwashed, ventilating the Sheung Yuet Road and open space in CIC Zero Carbon Building (ZCB) while limiting the air coming down the Wang Kwong Road.

4.4.5.4 Although some high-level wind would be captured by the tower in Lot 5 under both schemes, another stream of high-level wind captured by the taller towers in Eastern portion of Lot 4 under Non-EFLS Scenario would merge with the aforementioned downwashed wind. As a result, the wind environment at Wai Yip Street would be enhanced under Non-EFLS Scenario.

4.4.5.5 Besides, Sheung Yee Road (S) and Kai Fuk Road Flyover are wider with the provision of setbacks from Lots 2 and 4 under Non-EFLS Scenario, which would favour wind penetration. The wind downwashed by Eastern portion of Lot 4 would travel around the facades and reach Kwun Tong By-pass through widened Cheung Yip Street and Hung Yip Street, where the VR would be higher under KBAA (non-EFLS Scenario).

4.4.5.6 The stepped height profile between Lot 4 would allow additional downwash effect with which the high level wind to be captured by the western portion of Lot 4 and further diverted towards the Open Space 2 in Lot 2 (pink rectangular area in Figure 45) and Cheung Yip Road (N). As a result, the height profile of Non-EFLS Scenario would promote the air movement and the VR near the eastern and southern part of the site boundary would be slightly enhanced under Non-EFLS Scenario.

4.4.5.7 Since Non-EFLS Scenario is generally taller than the Baseline Scheme, the wind shadow casted over the proposed Kai Tak Hospital Cluster and at Kwun Tong By-pass to the west of study site would be larger and lightly lower VR would be observed herein.

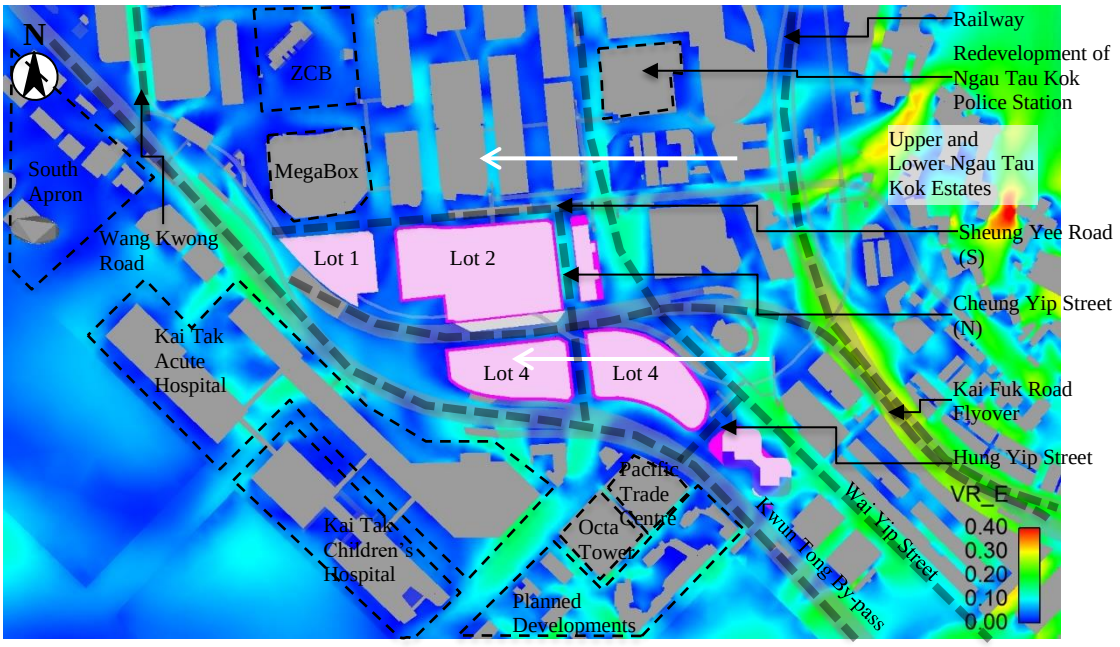


Figure 44 Contour plot of VR of Baseline Scheme under E wind

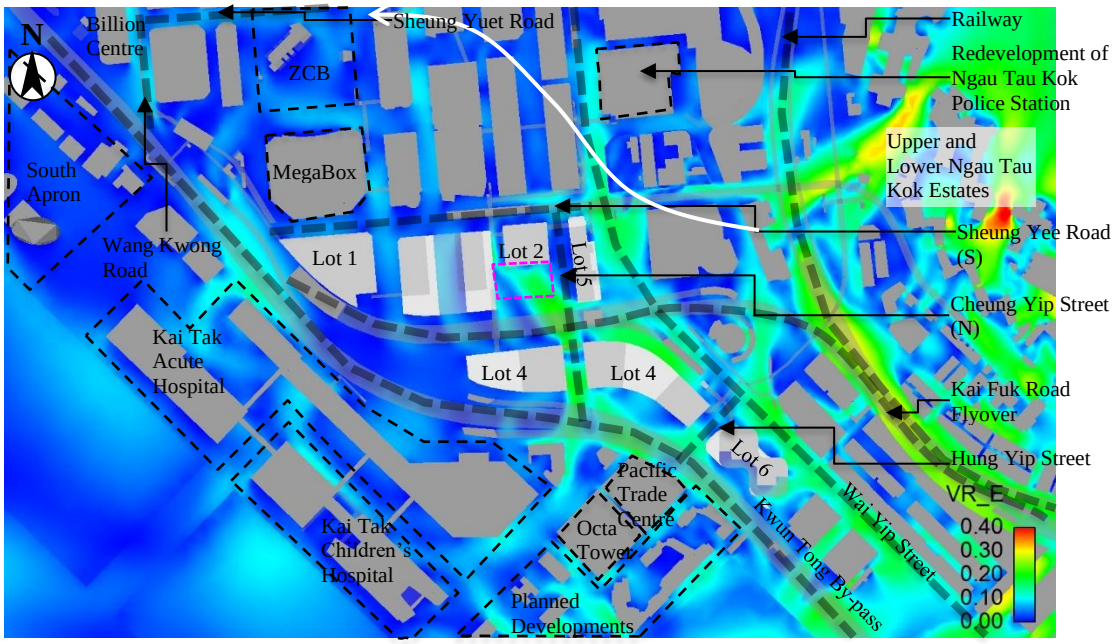


Figure 45 Contour plot of VR of Non-EFLS Scenario under E wind

4.4.6 ESE Wind

4.4.6.1 The wind performance of Baseline and Non-EFLS Scenario under ESE wind is presented in Figure 46 and Figure 47 respectively.

4.4.6.2 The general wind environment was found to be similar between schemes. The incoming wind would travel along road network running in N-S direction towards the leeward area.

4.4.6.3 Baseline Scheme would be located within the wind shadow area of surrounding buildings and the wind environment be relatively calm in general. On the other hand, taller towers in Non-EFLS Scenario would capture the mid- to high-level incoming wind to alleviate the wind shadow casted within study site by surrounding developments (such as Pacific Trade Centre and Octa Tower) and enhance the wind environment at Kwun Tong By-pass.

4.4.6.4 The height difference between the tower in eastern part of Lot 2 and the tower in Lot 5 under Non-EFLS Scenario would result in downwash effect which would enhance the wind environment of the Open Space 2 in Lot 2 (pink rectangular area in Figure 46).

4.4.6.5 Since the height of bulks in Baseline Scheme is generally shorter than those towers under Non-EFLS Scenario, the incoming wind would skim over the Study Site and reattach to pedestrian level in South Apron where relatively higher VR was observed. On the other hand, taller towers under Non-EFLS Scenario (in particularly the tower in eastern part of Lot 2) would divert the incoming wind toward north through Wang tai Road. As a result, downwash effect would be induced near Enterprise Square III and Exchange Tower. The wind would then subsequently reach CIC (Zero Carbon Building (ZCB) achieving relatively higher VR than that under Baseline Scheme, while wind shadow would be casted over South Apron area.

4.4.6.6 In addition, height difference would be created under Baseline Scheme between Lot 2 and 4, and their northern surroundings, such as Manhattan Place and Megabox, therefore downwash effect would be induced by the south-eastern façades of the northern surroundings, which would enhance the VR along Wang Mau Street to the west of Yip On Factory Estate Block 2, as well as the portion of Sheung Yee Road (S) to the north of Lot 1. On the other hand, high-rise towers in Lot 4 and under Non-EFLS Scenario would create a larger wake zone over the leeward side. Meanwhile, higher level wind would be capture by the façade of Lot 2 as discussed in Section 4.4.6.4 above, casting a wind shadow area near Yip On Factory Estate Block 2. Therefore, the latter area would be calmer under Non-EFLS Scenario.

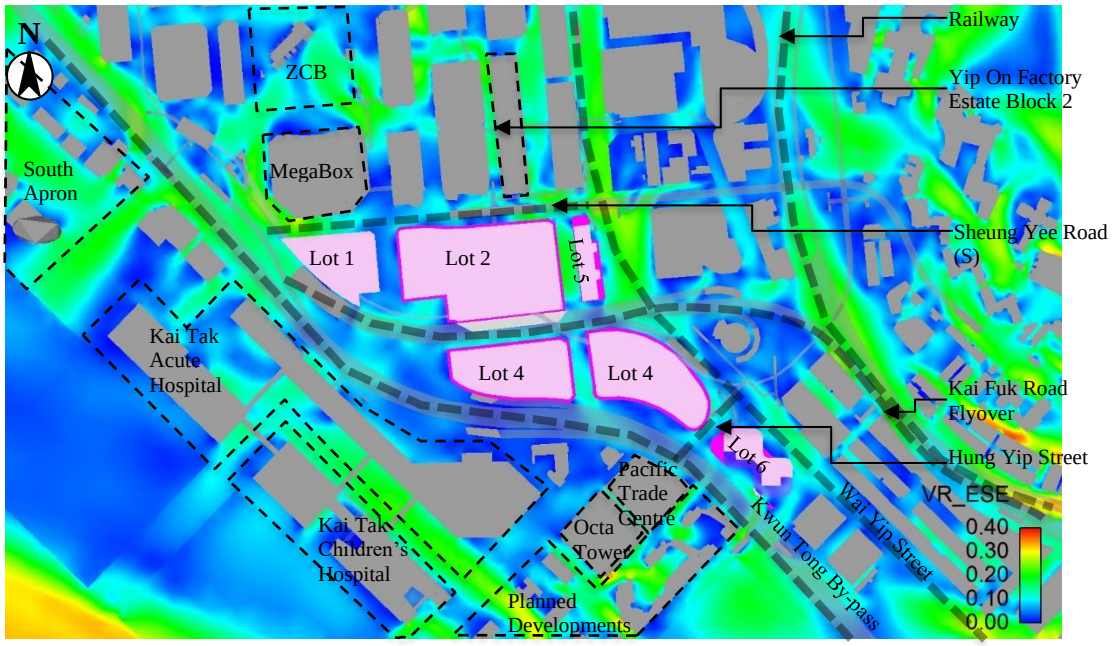


Figure 46 Contour plot of VR of Baseline Scheme under ESE wind

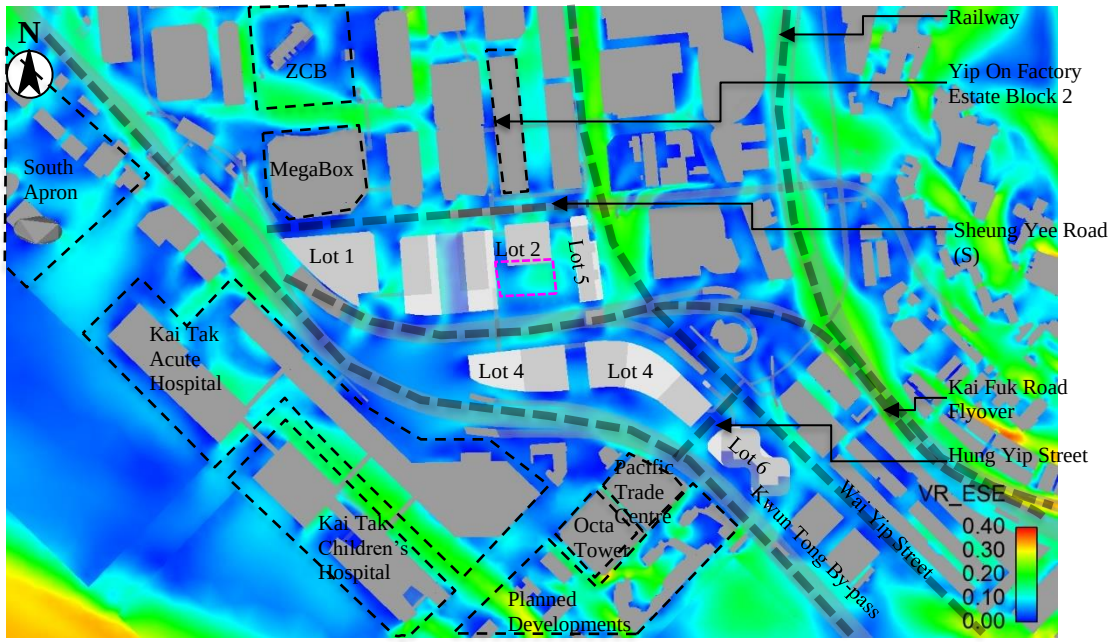


Figure 47 Contour plot of VR of Non-EFLS Scenario under ESE wind

4.4.7 SE Wind

4.4.7.1 The wind performance of Baseline and Non-EFLS Scenario under SE wind are shown in Figure 48 and Figure 49 respectively.

4.4.7.2 The general wind environment was found to be similar between two schemes, especially to the southwest of Kai Tak Hospital Cluster and the east of Railway as these areas fall outside the influence of the Study Site.

4.4.7.3 The tower in Lot 6 would split the incoming wind which would divert the incoming wind to travel around Lot 6. The diverted wind would subsequently be captured by the Pacific Trade Centre. As a result, localized area with relatively higher VR were found near Pacific Trade Centre. As the bulks under Baseline Scheme are lower than its surrounding development, the wind diverted by Lot 6 would tend to skim over eastern portion of Lot 4 of Baseline Scheme to reach the southern and eastern façade of Lot 5, illustrated by black solid arrows in Figure 48. Hence, more wind would be downwashed by the façades of Lot 5 and continue to flow northwards and southwards along Wai Yip Street, where higher VR would be observed.

4.4.7.4 With taller towers in eastern portion of Lot 4 than that in Lot 6 under Non-EFLS Scenario, downwash effect would take place which would further enhance the wind environment to the immediate south of the Study Site, at the amenity area of eastern portion of Lot 4, near Kwun Tong By-pass. On the other hand, taller towers in eastern portion of Lot 4 would shield the split wind flowing towards Lot 5 and Wai Yip Street. As a result, the wind environment at Lot 5 and Wai Yip Street would be calmer under Non-EFLS Scenario.

4.4.7.5 Height difference of 30m between the tower in eastern part of Lot 2 and the tower in eastern portion of Lot 4 under Non-EFLS Scenario would allow downwash effect to take place which would enhance ventilation performance at the open space of Lot 2 (pink rectangle area in Figure 48). The downwashed wind would then reach the Lot 3 underneath Kai Fuk Road.

4.4.7.6 With the lower building height in Lot 2 and 4 under Baseline Scheme, the incoming wind would be captured by tall buildings, such as MegaBox, Enterprise Square III, Manhattan Place and Lot 5. The wind would then be downwashed to ventilate the open space in CIC Zero Carbon Building (ZCB)/Wang Chiu Road, Wang Tai Road, Wang Mau Road and Wai Yip Street respectively. Higher VR would be observed in area to the north of Sheung Yee Road (S) under Baseline Scheme.

4.4.7.7 On contrary, area to the north of Sheung Yee Road (S) would fall into the wind shadow of tall towers under Non-EFLS Scenario. Limited downwash effect would still be observed near the Enterprise Square III and Manhattan Place due to the relative lower tower in Lot 2 to alleviate the wind shadow created at Sheung Yee Road (S), the wind environment to the north of Sheung Yee Road (S) would be generally calmer than that under Baseline Scheme.

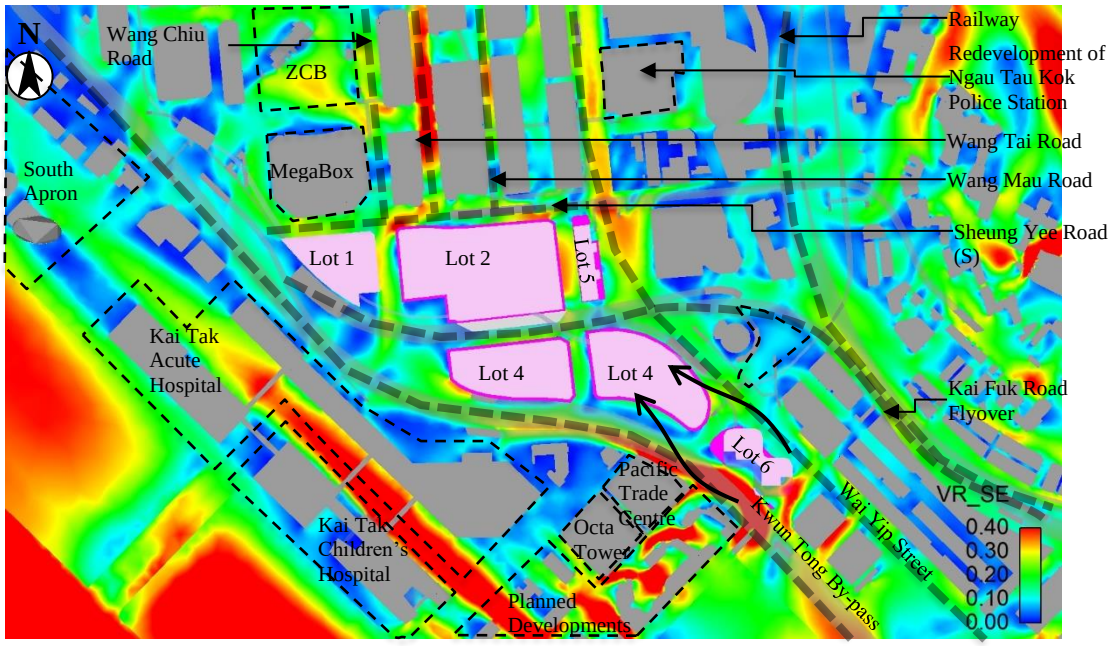


Figure 48 Contour plot of VR of Baseline Scheme under SE wind

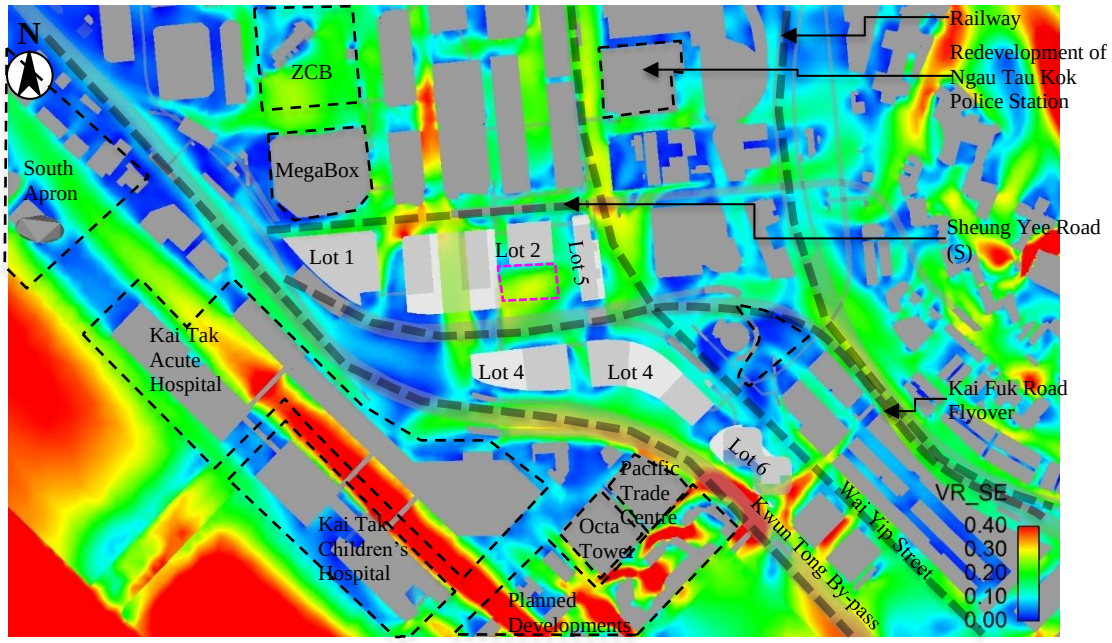


Figure 49 Contour plot of VR of Non-EFLS Scenario under SE wind

4.4.8 SSE Wind

4.4.8.1 The wind performance of Baseline and Non-EFLS Scenario under SSE wind are shown in Figure 50 and Figure 51 respectively.

4.4.8.2 The general wind environment to the southwest of Kai Tak Hospital Cluster and the east of Wai Yip Street was found to be similar between two schemes as these areas fall outside the influence of the Study Site.

4.4.8.3 The tower in Lot 6 and Pacific Trade Centre would induce downwash effect and relatively higher VR were found near these two towers. The setback from southern boundary of Lot 4 under Non-EFLS Scenario would divert the downwashed wind towards the Open Space 3 in Lot 4 and KBAA Open Space 1 to the south of Lot 1 and subsequently through the building separation between Lot 1 and Lot 2.

4.4.8.4 A stream of air would travel through the relatively lower building clusters near Tai Yip Street and downwashed by WSD Kowloon Bay office building. With shorter building height in Lot 4 under Baseline Scheme, the downwashed wind would tend to flow towards eastern portion of Lot 4 and it would be easier for the wind to re-attach to ground in Tai Yip Street Garden, where higher VR would be resulted. In contrary, the tall building in Lot 4 under Non-EFLS Scenario would limit the wind to pass through hence the VR at Tai Yip Street Garden would be lower.

4.4.8.5 On the other hand, in both schemes the said downwashed wind at WSD Kowloon Bay Office would flow westwards towards Lot 3 under the Kai Fuk Road Flyover. In the Non-EFLS Scenario, the wind would be limited by the maintenance depot in Lot 3, therefore a relatively lower VR would be observed in the eastern portion of Lot 3 and the portion of Cheung Yip Street (N) between Lot 2 and 5 as compared to Baseline Scheme; in Baseline Scheme, wind could continue to flow westwards relatively freely along Lot 3, a portion of which would be diverted northwards along Cheung Yip Street (N).

4.4.8.6 With the tall building height in Lot 2 and Lot 4 under Non-EFLS Scenario, the higher-level wind would be diverted westwards as compared to Baseline Scheme. As result, the wind would be captured by MegaBox and reach the pedestrian level of Sheung Yee Road (S), where the VR would be slightly enhanced. The step height difference between the podium in Lot 2 and the Enterprise Square III would result in the downwashed wind to travel through the open façade at the Lot 2 PTI, which would then reach the Open Space 3 in Lot 4, further enhancing the ventilation performance within the site area.

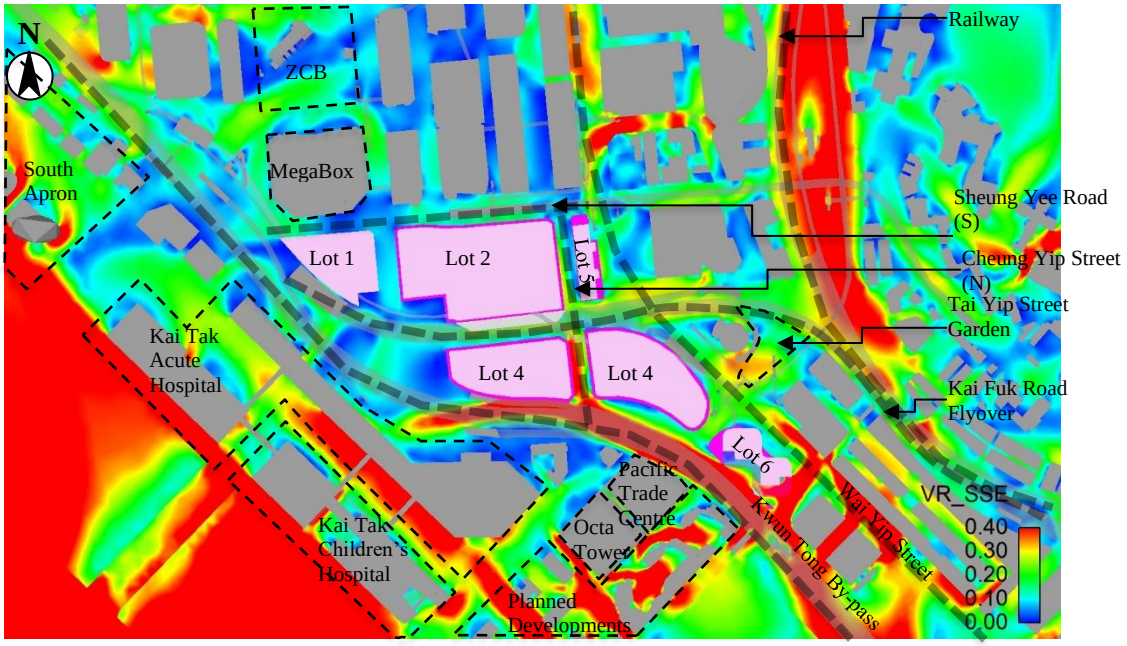


Figure 50 Contour plot of VR of Baseline Scheme under SSE wind

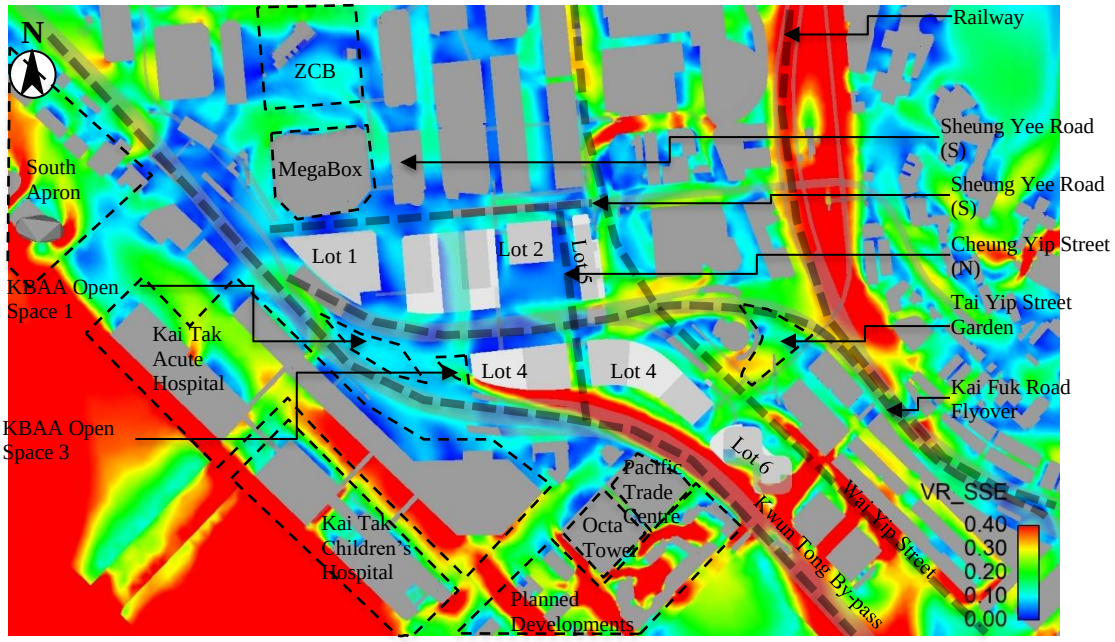


Figure 51 Contour plot of VR of Non-EFLS Scenario under SSE wind

4.4.9 S Wind

4.4.9.1 The wind performance of Baseline and Non-EFLS Scenario under S wind are shown in Figure 52 and Figure 53 respectively.

4.4.9.2 The wind environment to the southwest of Kai Tak Hospital Cluster and the east of Wai Yip Street was found to be similar between two schemes as these areas fall outside the influential zone of the Study Site.

4.4.9.3 Although the taller towers in Lot 2 and 4 under Non-EFLS Scenario would limit the penetration of incoming wind towards the area to the north of Sheung Yee Road (S), the provision of NBA and wider building separation along Cheung Yip Street (N) running in N-S direction, open façade at PTI in Lot 2 and setback of Lot 2 and 4 from Kai Fuk Road Flyover would help to enhance the permeability at pedestrian level.

4.4.9.4 The height difference between the towers in Lot 4 under Non-EFLS Scenario and surrounding developments on the windward side would favour downwash to take place. In addition, the wider building separation and setback provided by amenity area in Lot 4 would provide wider wind entrance and allow the wind from Kwun Tong By-pass as well as the downwashed wind to reach the leeward side. Then wind entering through the building separation would be downwashed and diverted by the southern facades of Lot 5 and reach Wai-Yip Street Sitting Area, where the VR would be higher than that under Baseline Scheme.

4.4.9.5 Besides, the setback provided by the amenity area and reduced facades length facing south in western portion of Lot 4 would divert the incoming wind from Kwun Tong By-pass to serve the Open Space 3 to the west of western portion of Lot 4 and Kai Tak Acute Hospital, as highlighted in black circled area in Figure 53.

4.4.9.6 In addition to the shielding effect imposed by those taller towers under Non-EFLS Scenario, the downwash effect by the height difference among the developments along Sheung Yee Road (S) would be reduced under Non-EFLS Scenario as the height difference becomes smaller than that under Baseline Scheme. Therefore, the area to the north of Sheung Yee Road (S) would be slightly calmer under Non-EFLS Scenario generally.

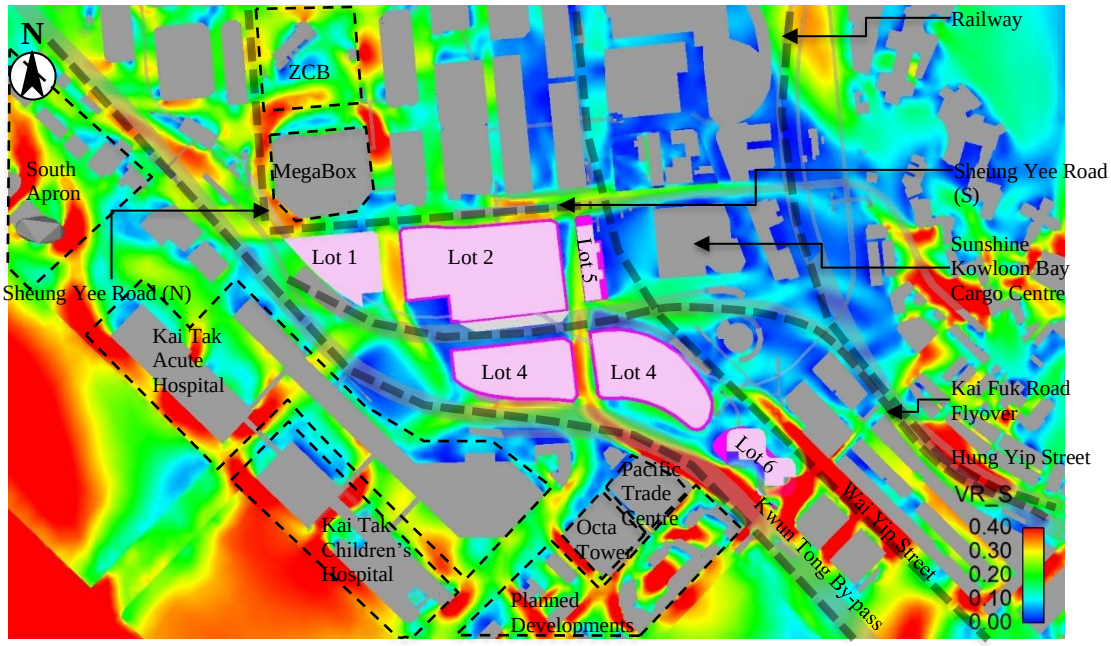


Figure 52 Contour plot of VR of Baseline Scheme under S wind

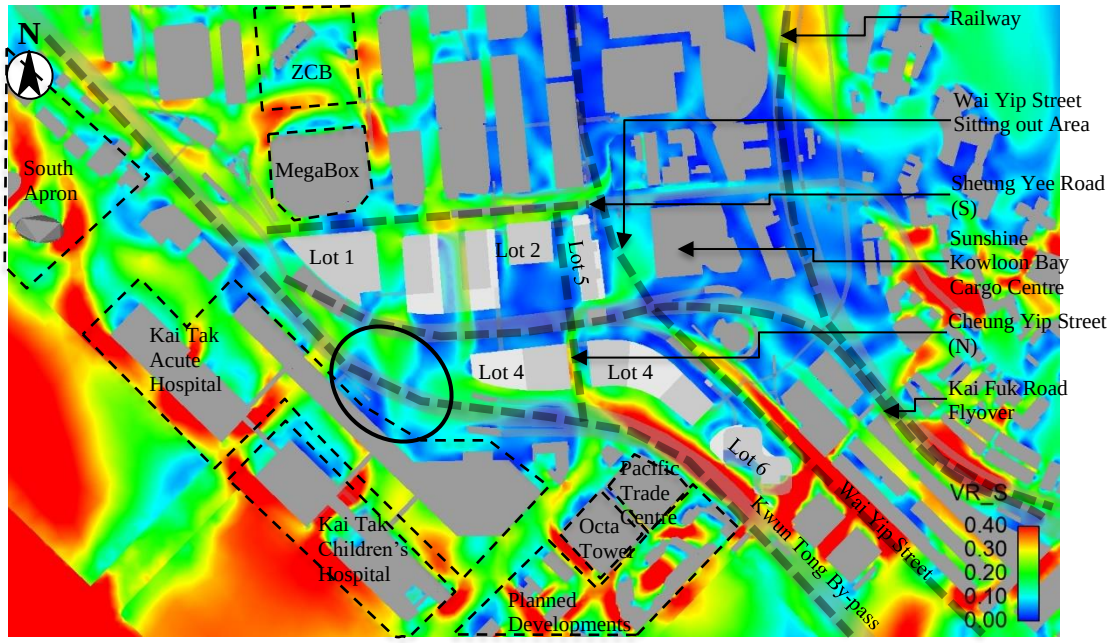


Figure 53 Contour plot of VR of Non-EFLS Scenario under S wind

4.4.10 SSW Wind

4.4.10.1 The wind performance of Baseline and Non-EFLS Scenario under SSW wind are shown in Figure 54 and Figure 55 respectively.

4.4.10.2 The wind performance would be similar under both schemes apart from those to the east of Wai Yip Street, which is located on the leeward side.

4.4.10.3 Under both schemes, the wind would enter the site through the building separation in Kai Tak Acute Hospital, Cheung Yip Street (S) and waterfront of Kwun Tong By-pass. The stream of air coming from waterfront near Kwun Tong By-pass would be downwashed and diverted by the façade of Lot 6 to travel along Kwun Tong By-pass towards west and through Hung Yip Street to reach Wai Yip Street.

4.4.10.4 Under Non-EFLS Scenario, the height difference between Kai Tak Acute Hospital and western portion of Lot 4 would induce downwash effect near the southern boundary of study site, which would enhance the VR along the boundary and near Kai Tak Acute Hospital, highlighted in black circled area in Figure 55. However, such downwash effect would limit the stream of air coming from Cheung Yip Street (S). The downwashed wind would continue to travel around the façade of Lot 4 to serve the Open Space 3 in western portion of Lot 4 and through the building separation between Lot 1 and Lot 2 to reach Sheung Yee Road (S), illustrated by black arrow in Figure 55.

4.4.10.5 On contrary, Baseline Scheme would be located within the wind shadow area of Kai Tak Acute Hospital. The stream of air coming from Cheung Yip Street (S) would continue to penetrate through Cheung Yip Street (N) and the VR at the southern part of Cheung Yip Street (N) would be higher. The height difference between Lot 4 and Lot 5 would induce additional downwash effect and allow the higher-level wind to be captured to reach areas near the Sunshine Kowloon Bay Cargo Centre and area under Kai Fuk Road Flyover, illustrated by black arrow in Figure 54.

4.4.10.6 With the height difference between Kai Tak Acute Hospital and Lot 2 of Non-EFLS Scenario, downwash effect would be induced at the southern facades of towers in Lot 2. Consequently, the wind environment at Open Space 2 in Lot 2 (pink rectangle in Figure 55) and Wang Hoi Road would be enhanced.

4.4.10.7 On the contrary, under Baseline Scheme, the incoming wind would skim over Lot 2 and reach the leeward side of the study area and downwash effect would occur at areas further down to the northeast of the study site, such as VTC Youth College, highlighted in black circled area in Figure 54.

4.4.10.8 On the other hand, with taller bulks under Non-EFLS Scenario, the wind environment in hinterland (particularly the area to the east of Wai Yip Street and along the northern portion Railway in the red circled area) would be relatively calmer as compared to that under Baseline Scheme.

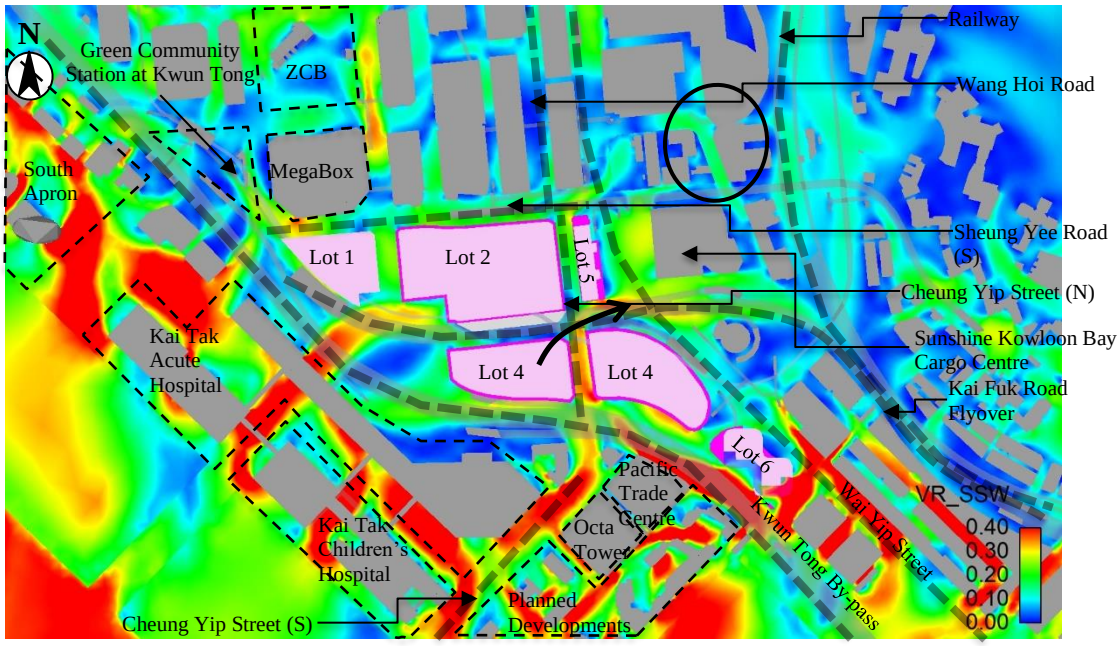


Figure 54 Contour plot of VR of Baseline Scheme under SSW wind

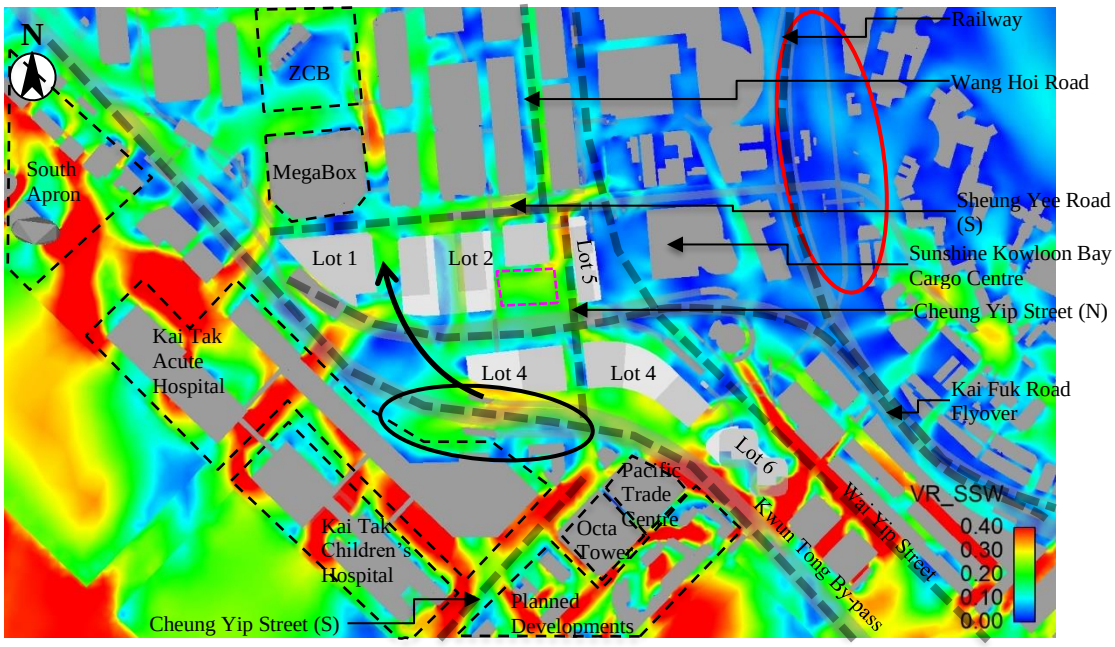


Figure 55 Contour plot of VR of Non-EFLS Scenario under SSW wind

4.4.11 SW Wind

4.4.11.1 The contour plots of Baseline and Non-EFLS Scenario under SW wind are shown in Figure 56 and Figure 57 respectively.

4.4.11.2 Although the developments near seashore (such as Kai Tak Acute Hospital and Kai Tak Children's Hospital) would limit the wind penetration towards the hinterland, downwash effect due to height difference between developments would enhance the wind environment at the leeward area. The wake zone due to those planned developments, Pacific Trade Centre and Octa Tower near seashore would introduce a stream of downwashed wind captured by these towers to flow along Kwun Tong By-pass and reach the Study Site.

4.4.11.3 With the taller building height in Lot 4 under Non-EFLS Scenario, the mid- and high-level wind would be downwashed towards pedestrian level underneath Kwun Tong By-pass. Such downwashed wind would limit another stream of wind captured by the tower in Lot 6 flowing from the south bound of Kwun Tong By-pass. Hence, the VR along the southern boundary of Non-EFLS Scenario would be lower than that under Baseline Scheme.

4.4.11.4 On the other hand, the towers in eastern portion of Lot 4 under Non-EFLS Scenario would divert the incoming wind towards the separation between eastern portion of Lot 4 & 6 and Hung Yip Street which would then ventilate Tai Yip Street Garden, where the VR would be slightly enhanced. A portion of the said wind would continue along Tai Yip Street towards north, ventilating a part of Tai Yip Street at the leeward side, especially that adjacent to Sunshine Kowloon Bay Cargo Centre as highlighted in black circled area in Figure 57.

4.4.11.5 With lower building height under Baseline Scheme, higher permeability would be provided at mid- to high-level within the study site, which would promote air movement. Hence, the wind would be promoted to skim over Lots 2 and 4 of Baseline Scheme and diverted by Lot 5. The ventilation performance near Lot 5, such as Cheung Yip Street (N) and Tai Yip Lane, would be slightly higher. Moreover, the height difference between Baseline Scheme and surrounding buildings along Sheung Yee Road (S) would also induce downwash effect at the Enterprise Square III and Manhattan Place, which would subsequently flow towards Sheung Yee Road (S), Wang Chiu Road, Wang Tai Road and through the building separation between Lot 1 and Lot 2. Higher VR would be observed herein.

4.4.11.6 Taller towers in Lots 2 and 4 of Non-EFLS Scenario would cast wind shadow over their leeward area (such as the area to the immediate east of the northern portion of Wai Yip Street) so that the wind environment would be slightly calmer than that under Baseline Scheme.

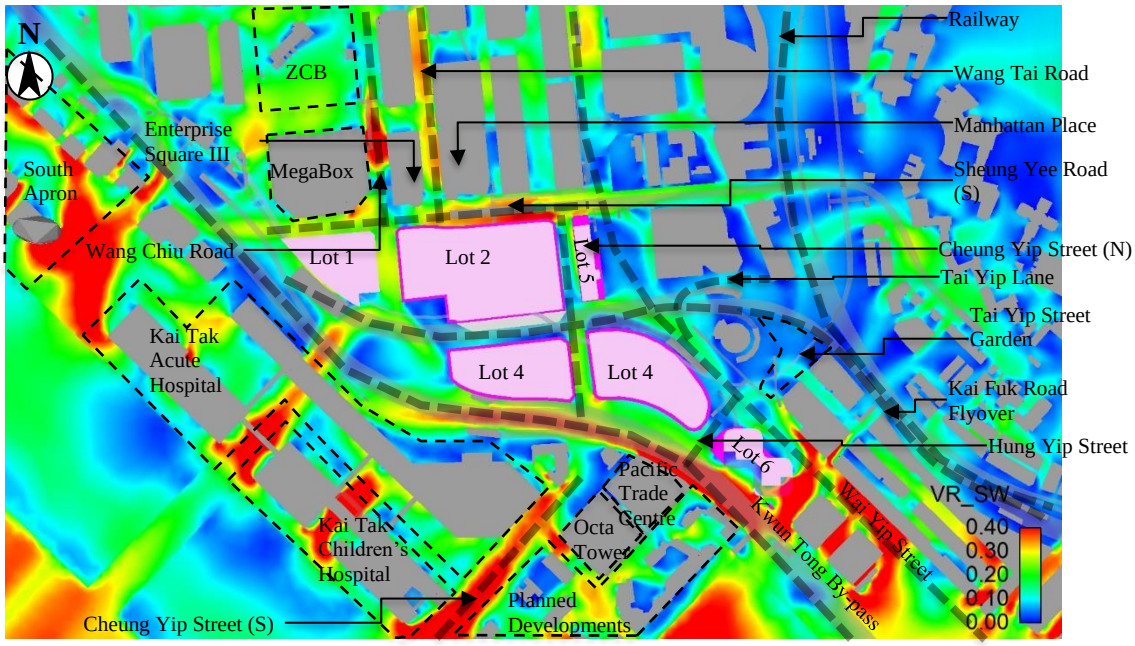


Figure 56 Contour plot of VR of Baseline Scheme under SW wind

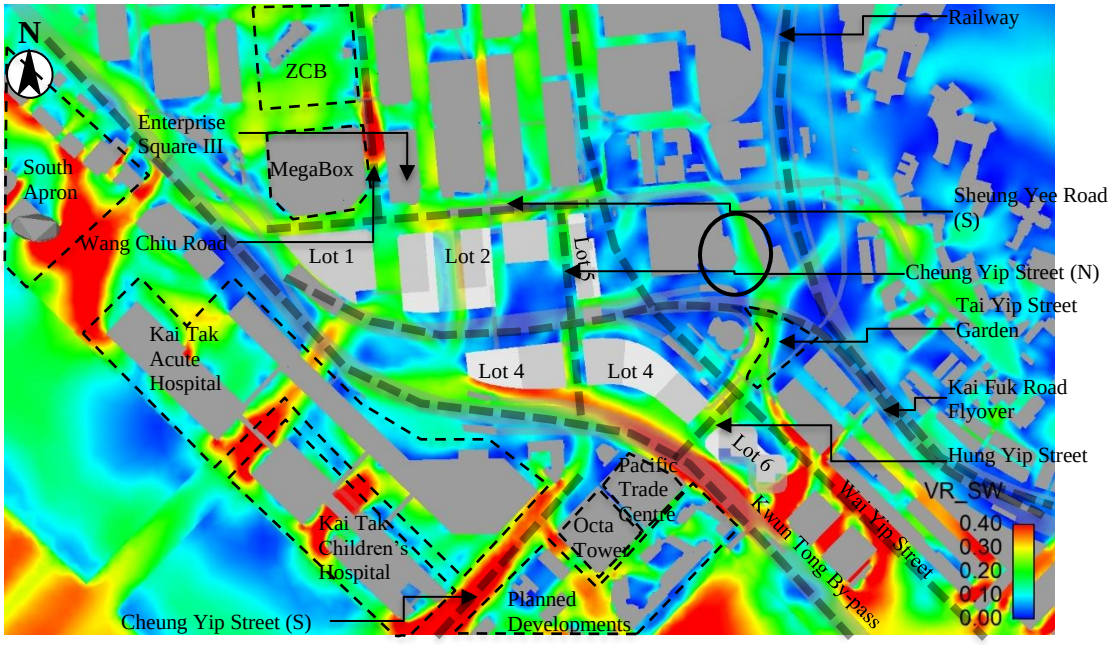


Figure 57 Contour plot of VR of Non-EFLS Scenario under SW wind

4.4.12 WSW Wind

4.4.12.1 The contour plots of Baseline and Non-EFLS Scenario under WSW wind are shown in Figure 58 and Figure 59 respectively.

4.4.12.2 Similar to the wind environment under SW wind, the developments near sea shore (such as Kai Tak Acute Hospital and Kai Tak Children's Hospital) would limit the wind penetration towards the hinterland. The wind environment of the area to the north of Sheung Yee Road (S) would be generally enhanced comparing to other areas due to downwash effect of the taller buildings in this area.

4.4.12.3 With lower building height under Baseline Scheme, the mid- to high-level wind would skim over Lots 2 and 4 of Study Site. With the step height profile among Lots 2, 4 and 5, downwash effect would be resulted, which would enhance the wind performance along Cheung Yip Street (N).

4.4.12.4 On the other hand, the incoming wind would be captured by the taller tower in the western part of Lot 2 under Non-EFLS Scenario and subsequently distributed towards Sheung Yee Road (S), the wake zone of Kai Tak Acute Hospital and the space underneath Kai Fuk Road Flyover, where relatively higher VR was observed, illustrated by black arrow in Figure 59. Such wind stream would limit another stream of incoming wind coming from Shing Fung Road. Consequently, the wind environment at a localised portion of area under the Kai Fuk Road Flyover south to Lot 2 would be calmer under Non-EFLS Scenario.

4.4.12.5 Meanwhile, the taller towers in Lot 2 under Non-EFLS Scenario Scheme would limit the incoming wind to be captured by the tower in Lot 5 such that the downwashed wind towards Cheung Yip Street (N) would be reduced under Non-EFLS Scenario. However, some higher-level wind would be able to reach the façade of the tower at Lot 2 due to the wide entrance provided by podium of Lot 2 and Lot 4. The wind downwashed by western façade of the tower at Lot 2 would help to enhance the VR at the Open Space 2 in Lot 2, the area under the Kai Fuk Road Flyover and a localised area of Cheung Yip Street (N).

4.4.12.6 In addition, the wind environment to the east of Railway would fall into the wind shadow of the taller towers under Non-EFLS Scenario, whereas under Baseline Scheme, incoming mid and high level wind could be downwashed by high-rise buildings in the red circled area in Figure 58, resulting in a relatively higher VR.

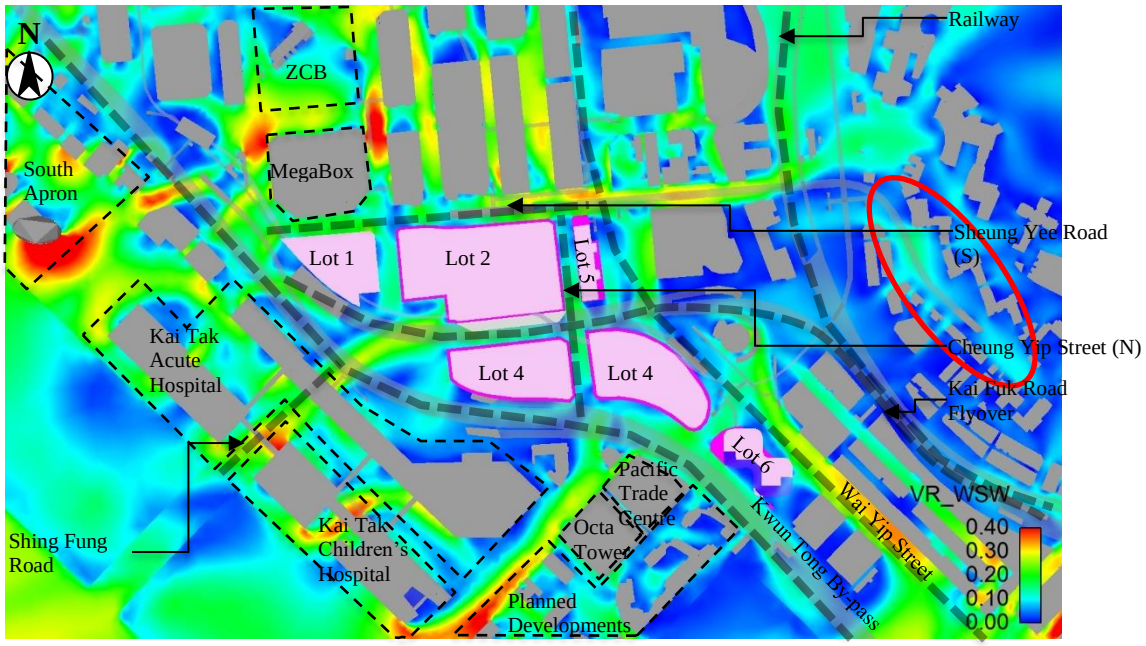


Figure 58 Contour plot of VR of Baseline Scheme under WSW wind

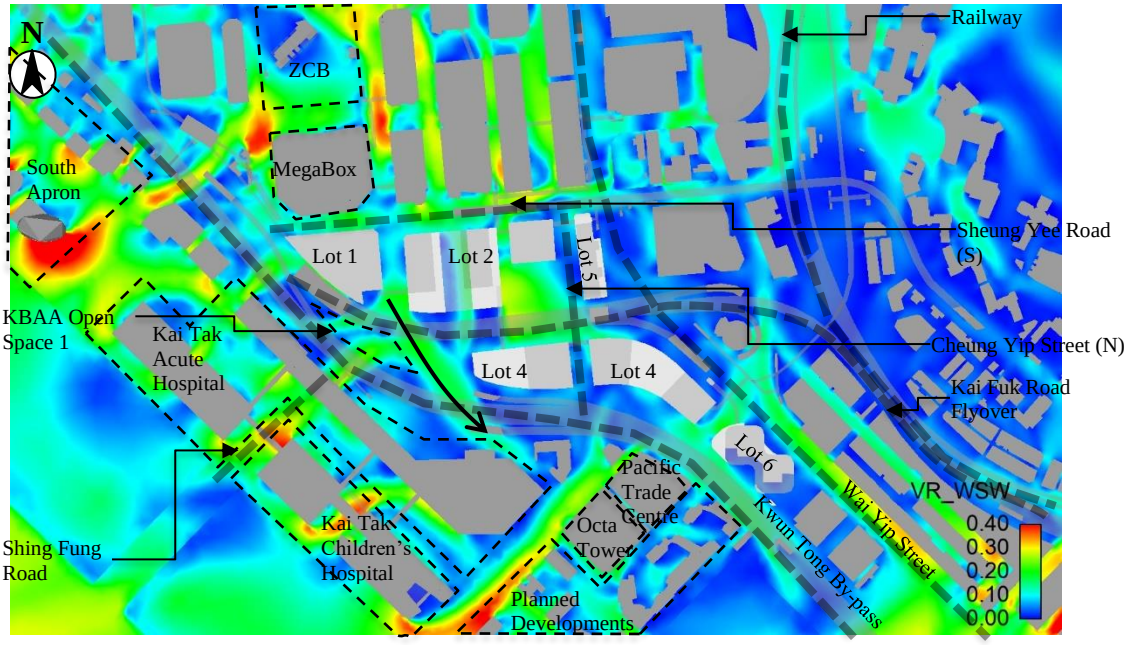


Figure 59 Contour plot of VR of Non-EFLS Scenario under WSW wind

4.4.13 W Wind

4.4.13.1 The contour plots of Baseline and Non-EFLS Scenario under W wind are shown in Figure 60 and Figure 61 respectively.

4.4.13.2 Similar to the wind environment under SW and WSW winds, the developments near sea shore (such as Kai Tak Acute Hospital and Kai Tak Children's Hospital) would limit the wind penetration towards the hinterland. The wind environment at hinterland (such as Upper and Lower Ngau Tau Kok Estate) would be enhanced due to downwash effect by the domestic blocks of these estates.

4.4.13.3 Although Sheung Yee Road (S) generally aligns with W wind, the wind penetration would be limited under Baseline Scheme given the width of the street. Therefore, setback of Lot 2 under Non-EFLS Scenario Scheme would favour wind penetration towards Sheung Yee Road (S) and enhance the wind environment in the hinterland.

4.4.13.4 Additionally, with the increased height under Non-EFLS Scenario, downwash effect would be observed at the western facades of tower in Lot 2, western portion of Lot 4 and Lot 5 under Non-EFLS Scenario. The tower in the western part of Lot 2 would capture the incoming wind to enhance the wind environment at adjacent areas. The downwashed wind would travel through the widened separation between Lot 1 and Lot 2 to reach further enhance the ventilation performance at Sheung Yee Road (S), KBAA Open Space 1 and the southern boundary of study site.

4.4.13.5 Meanwhile, setback from Kai Fuk Flyover leading to wider separation between Lots 2 and 4 would facilitate wind penetration. The downwashed wind captured by the towers in eastern part of Lot 2, eastern portion of Lot 4, and Lot 5 of Non-EFLS Scenario would ventilate the space underneath Kai Fuk Road Flyover and the Open Space 2 in Lot 2.

4.4.13.6 In contrary, Baseline Scheme would be located within the wind shadow area of Kai Tak Acute Hospital. With the large footprint of Lot 2 and western portion of Lot 4, the VR within the site area would be generally calmer as compared with Non-EFLS Scenario. However, the height difference between the surrounding buildings (such as MegaBox and Enterprise Square III) and the Baseline Scheme would be larger than that under Non-EFLS Scenario. Larger height difference would induce more significant downwash effect at some localized area to the north of Sheung Yee Road (S).

4.4.13.7 The greater height difference between Lots 2 and 5 under Baseline Scheme would also capture more wind skimming over Lots 1 and 2, which would subsequently be channelled through the narrower building separation along the longer façade in Lot 2 and would result in a relatively higher wind performance at adjacent streets (such as Cheung Yip Street (N)).

4.4.13.8 Height difference between eastern portion of Lot 4 and Lot 6 would allow the high-level wind to skim over the lower-rise building in Baseline Scheme and ventilate the space under Kwun Tong By-pass near Lot 6.

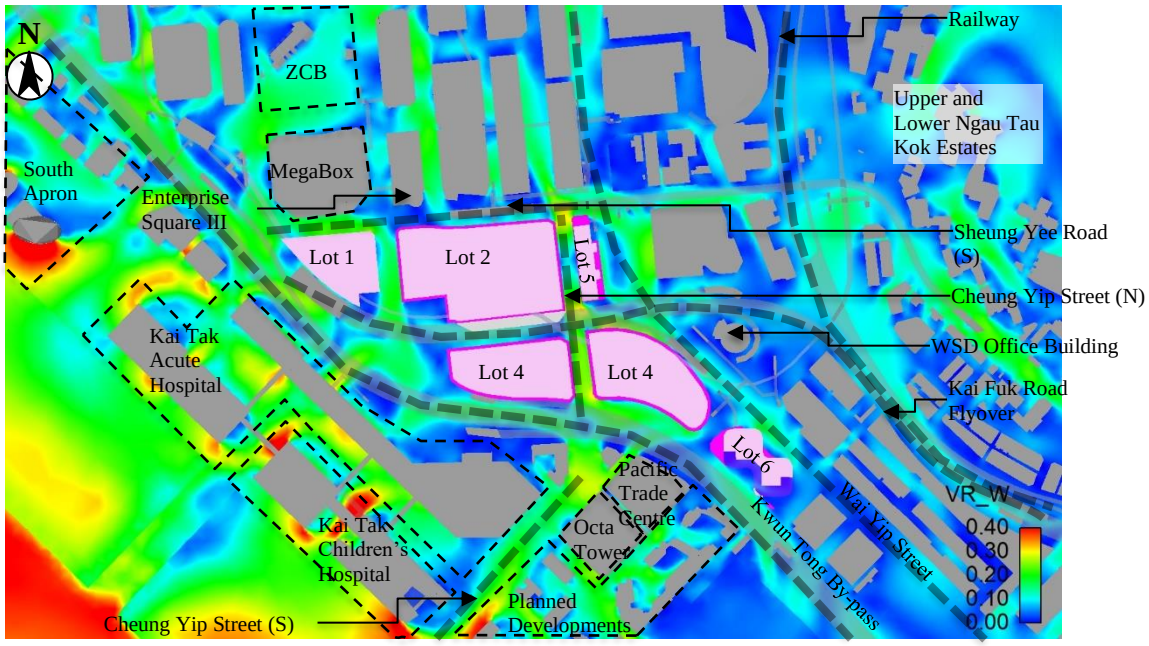


Figure 60 Contour plot of VR of Baseline Scheme under W wind

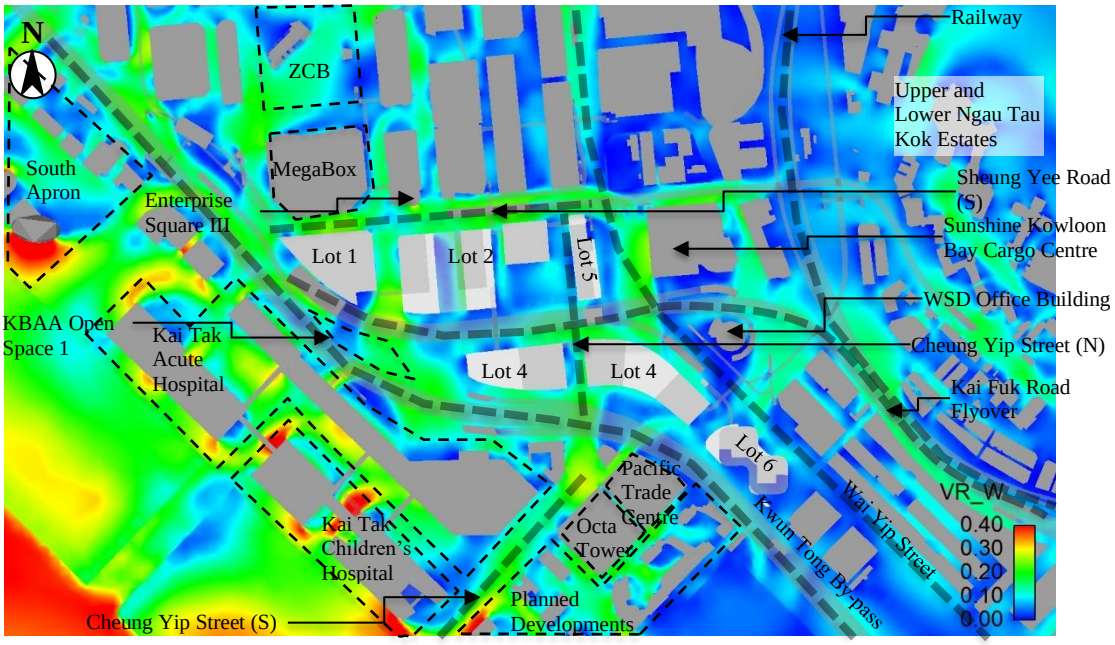


Figure 61 Contour plot of VR of Non-EFLS Scenario under W wind

4.5 SVR and LVR

4.5.1.1 The average Velocity Ratios of all test points are determined and extracted. The results of all test points are presented in the Appendix D. According to the *AVA Technical Circular*, the Velocity Ratio at each test point is assessed and the SVR and the LVR under the prevailing winds are determined and reported to assess the impact of the Non-EFLS Scenario to the wind environment in compared to the Baseline Scheme. The SVR and LVR value of the test points are summarized as follows.

4.5.2 Annual Wind Condition

4.5.2.1 The SVR and LVR under annual condition are summarized in Table 5. The results indicate that both schemes would achieve similar ventilation performance within the Assessment Area and around the boundary of the Study Site.

Table 5 Annual SVR and LVR for Baseline and Non-EFLS Scenarios

	Baseline Scheme	Non-EFLS Scenario
SVR	0.13	0.13
LVR	0.13	0.13

4.5.2.2 Since the annual prevailing winds are ENE and E winds such that the Study Site is on the leeward side of most of existing development in Kowloon Bay, the ventilation impact due to the Non-EFLS Scenario on the Assessment Area would be limited to those on leeward side (such as Kai Tak Acute Hospital).

4.5.2.3 Given low-rise developments are located on the NE part of the Study Site, significant downwash would take place due to larger height difference than that under Baseline Scheme. As a result, Perimeter Test Points located near the northern and southern boundary would obtain slightly a higher VR under Non-EFLS Scenario.

4.5.3 Summer Wind Condition

4.5.3.1 The SVR and LVR under summer condition are summarized in Table 6. The results indicate that Baseline Scheme achieved slightly enhanced ventilation performance near the site boundary and both schemes achieved similar ventilation performance within the overall local surrounding area under summer condition.

Table 6 Summer SVR and LVR for Baseline and Non-EFLS Scenarios

	Baseline Scheme	Non-EFLS Scenario
SVR	0.16	0.15
LVR	0.16	0.16

4.5.3.2 The summer prevailing wind directions are E, SSW and SW winds that the Study Site would be on the windward side of most of existing developments in Kowloon Bay.

4.5.3.3 Generally shorter bulks under Baseline Scheme would lead to larger building height difference that would favour downwash effect by those existing developments near the Study Site Boundary. As a result, the wind performance along the site boundary would be slightly higher under Baseline Scheme.

4.5.3.4 Although taller towers of Non-EFLS Scenario would cast wind shadow over the Assessment Area in the leeward side, the downwash effect induced by these towers together with several wind enhancement features would help the wind penetration within the Assessment Area, which would help to alleviate the wind shadow created by Non-EFLS Scenario.

4.6 Focus Area

4.6.1.1 There are 44 number of focus areas identified within the Assessment Area and Study Site as shown in Figure 62 and Figure 63 respectively. The corresponding test points indices for each identified focus area is tabulated in Table 7.

Table 7 Focus Area and their corresponding test points

No.	Focus Area	Corresponding Test Point
1	CIC Zero Carbon Building	O11-O14
2	KBAA Open Space 1	S27-S28
3	Tai Yip St. Garden	O64-O65
4	Tai Yip Street Sitting-out Area	O62-O63
5	Hoi Bun Road Park	O88-O90
6	Wang Kwong Rd	O1-O2, O163
7	Wang Tung St	O2-O5
8	Sheung Yee Rd (N)	O6-O10
9	Sheung Yee Rd (S)	P2-P13
10	Lam Fung St	O8, O15-O18
11	Wang Chiu Rd	P6, O17, O19-O23,S4-S5,S21, S29-S35
12	Wang Tai Rd	P8, O24-O29
13	Wang Mau St	P10, O31, O33-O36
14	Wang Hoi Rd	O37-O41
15	Wang Yuen St	O30-O32
16	Siu Yip St	O49-O51
17	Wai Yip St	P13, P18-P25, O42-O46, O83-O87, S18-S20, S26
18	Tsui Hing Street	S21-S25
19	Cheung Yip St (N)	S8-S9, S13, S17, S25, S35, S45-S47, P36, O135-O136
20	Hoi Bun Road (beside and underneath Kwun Tong Bypass)	S35-S41, P27, O91-O95
21	Hung Yip St	S49-S50, P21, P33
22	Tai Yip St (N)	O47-O49, O52-O57
23	Tai Yip Ln	O58-O59, P17-P1

No.	Focus Area	Corresponding Test Point
24	Hong Tak Rd	O56, O101, O103
25	Kwun Tong Rd	O100, O103-O104, O106-O108, O113-O117
26	Ting On St	O119, O122-P126
27	Ting Yip St	O120-O121, O123
28	Ting Fu St	O109-O111, O118-O119
29	Tai Yip St (S)	O66-O75
30	Back Alley	O76-O82
31	Shing Fung Rd	O149-O150, SG65-SG66
32	Shing Cheong Rd (Rd D4 & T2)	O142-O149, O151-O160
33	Cheung Yip St (S)	O134, O137-O141
34	Lam Chak St	O132-O134
35	Kai Hing Rd	O127-O131
36	Hoi Bun Rd Promenade	P28, O96-O99, S51-S55
37	Promenade outside K/22/11 & K/22/13	S56-S59
38	Promenade outside Kai Tak Hospital Cluster	S60-S73
39	Building Separation 1 (extending from Wang Mau St)	S6-S7, S10, S14
40	KBAA Open Space 3	S42-S44
41	KBAA Landscape Deck 1	S86-S90
42	KBAA Open Space 2	S10-S12, S14-S16
43	KBAA Landscape Deck 2	S82-S85
44	KBAA Landscape Deck 3	S76-S81

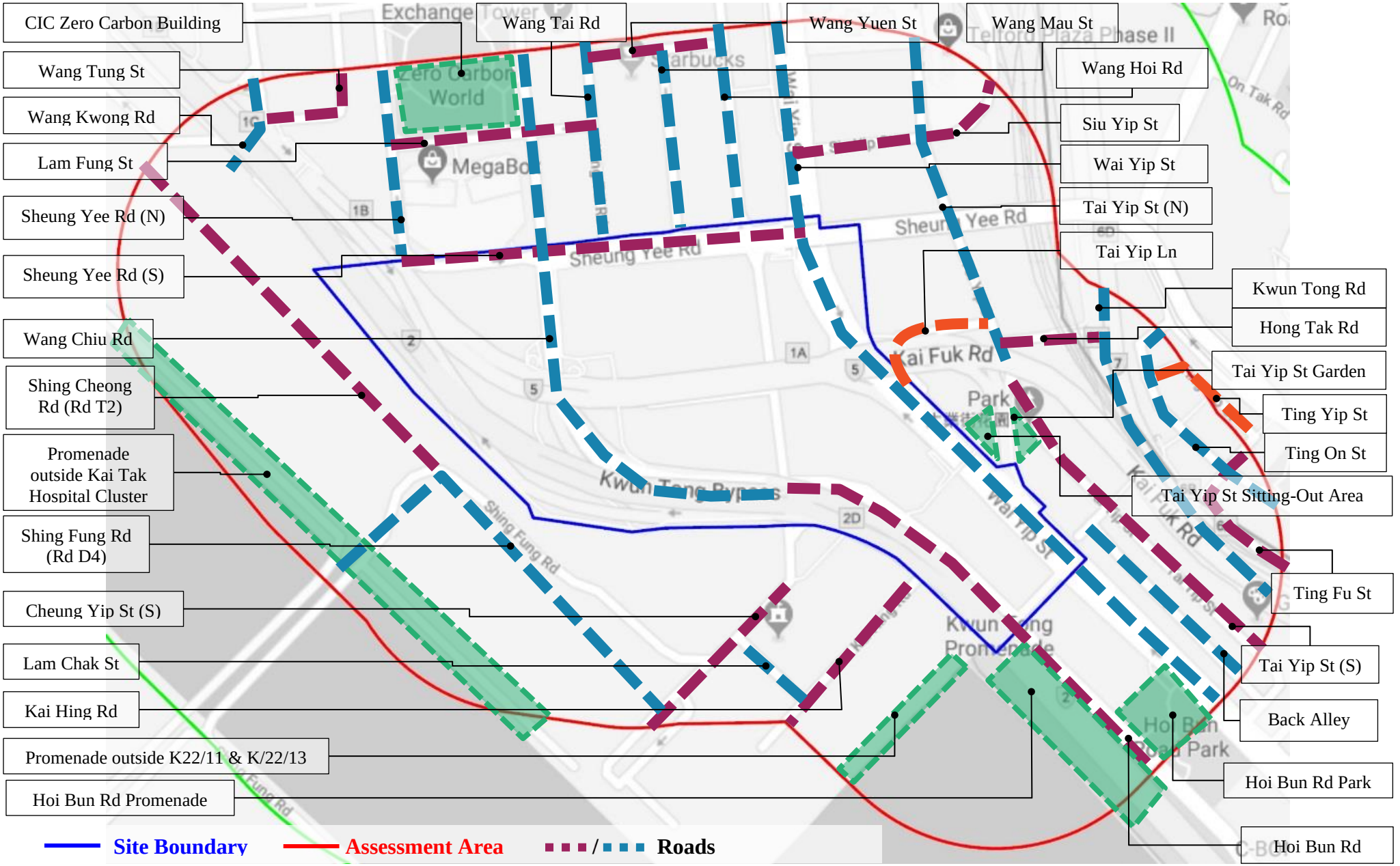


Figure 62 Focus Areas in Outside Study Site

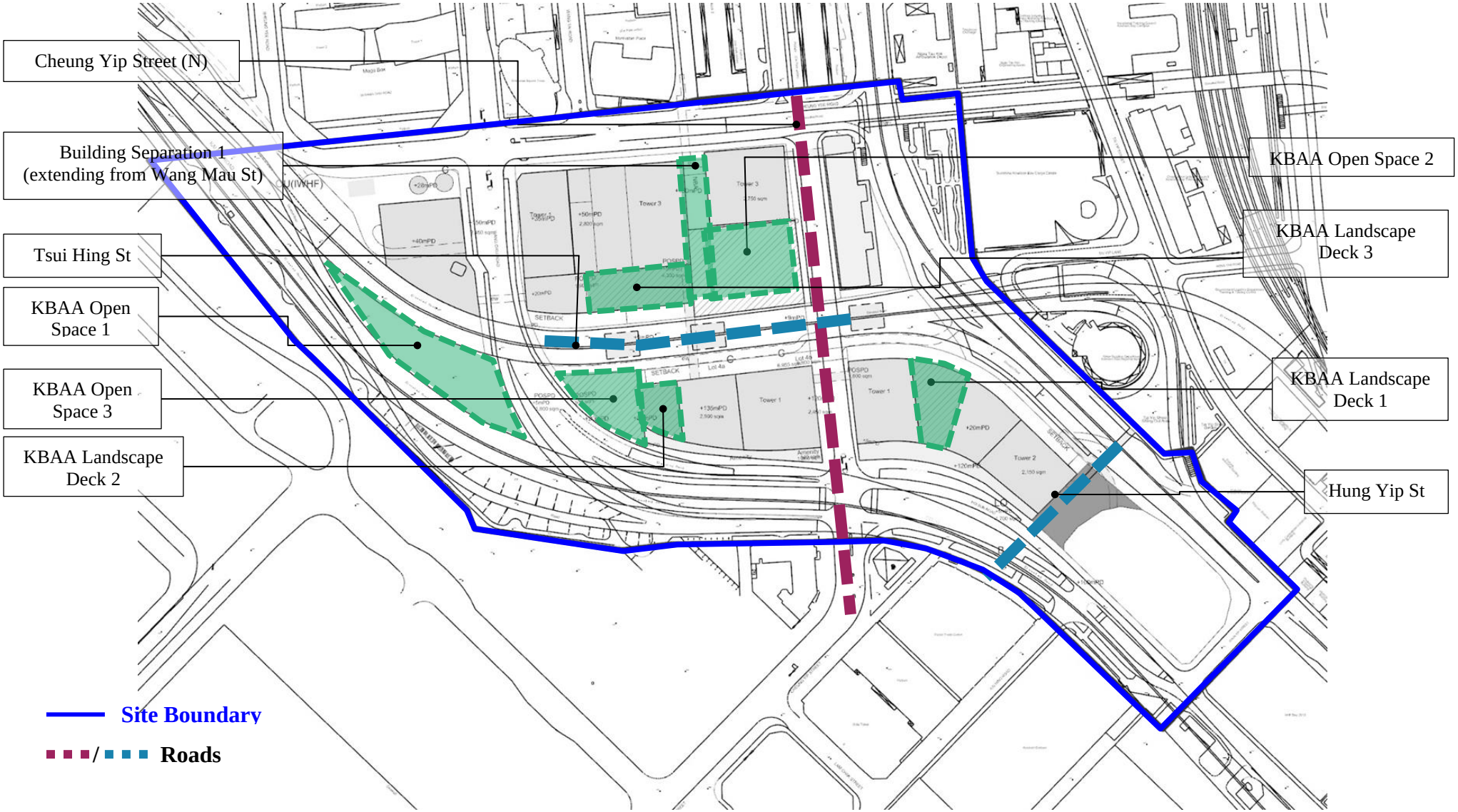


Figure 63 Focus Areas in Within Study Site

4.6.2 Assessment Area Under Annual Wind Condition

4.6.2.1 The SAVR of each focus area under annual wind condition is presented in Table 8. The focus area with ±0.02 or more than that under Baseline Scheme are highlighted in Table 8 for easy reference.

Table 8 SAVR for each Focus Area under Annual Wind Condition

	Focus Areas	Baseline Scheme	Non-EFLS Scenario
1	CIC Zero Carbon Building	0.12	0.13
2	KBAA Open Space 1	0.16	0.12
3	Tai Yip Street Garden	0.07	0.07
4	Tai Yip Street Sitting-out Area	0.11	0.12
5	Hoi Bun Road Park	0.12	0.13
6	Wang Kwong Road	0.17	0.17
7	Wang Tung Street	0.12	0.12
8	Sheung Yee Road (N)	0.16	0.16
9	Sheung Yee Road (S)	0.15	0.14
10	Lam Fung Street	0.16	0.16
11	Wang Chiu Road	0.15	0.13
12	Wang Tai Road	0.17	0.16
13	Wang Mau Street	0.18	0.16
14	Wang Hoi Road	0.10	0.10
15	Wang Yuen Street	0.12	0.10
16	Siu Yip Street	0.12	0.12
17	Wai Yip Street	0.18	0.19
18	Kai Fuk Road (under flyover)	0.11	0.12
19	Cheung Yip Street (N)	0.11	0.12
20	Hoi Bun Road	0.11	0.13
21	Hung Yip Street	0.11	0.16
22	Tai Yip Street (N)	0.11	0.10
23	Tai Yip Lane	0.10	0.08
24	Hong Tai Road	0.16	0.16
25	Kwun Tong Road	0.26	0.26
26	Ting On Street	0.13	0.14
27	Ting Yip Street	0.08	0.09
28	Ting Fu Street	0.21	0.21
29	Tai Yip Street (S)	0.10	0.10
30	Back Alley	0.10	0.09
31	Shing Fung Road (Road D4)	0.08	0.08
32	Shing Cheong Road (Road D4&T2)	0.11	0.10
33	Cheung Yip Street (S)	0.11	0.12
34	Lam Chak Street	0.13	0.12

	Focus Areas	Baseline Scheme	Non-EFLS Scenario
35	Kai Hing Road	0.10	0.09
36	Hoi Bun Road Promenade	0.10	0.09
37	Promenade outside K22/11&K/22/13	0.09	0.08
38	Promenade outside Kai Tak Hospital Cluster	0.08	0.08
39	Building Separation 1 (extending from Wang Mau Street)	-	0.12
40	KBAA Open Space 3	-	0.10
41	KBAA Landscape Deck 1	-	0.14
42	KBAA Open Space 2	-	0.12
43	KBAA Landscape Deck 2	-	0.10
44	KBAA Landscape Deck 3	-	0.07

4.6.2.2 Upon the discussion presented in the Section 4.4, taller building height of Non-EFLS Scenario would predominately cast wind shadow over its leeward areas (such as Wang Chiu Road, Shing Cheong Road, Hoi Bun Road, Lam Chak Street, etc.).

4.6.2.3 The tower in Lot 5 would capture the incoming wind from NE quadrant which would enhance the wind environment at pedestrian level at its vicinity under both schemes.

4.6.2.4 In the presence of taller towers under Non-EFLS Scenario, the permeability at mid- to high-level would be reduced which would affect the wind distribution on leeward side, as well as minor change on the windward side. The wind downwashed by taller towers under Non-EFLS Scenario would limit the wind from windward side under NNE, NE wind condition. Hence, lower VR would be observed at Wang Mau Street, Wang Chiu Street, Wang Yuen Street.

4.6.2.5 The shielding effect by the towers in Lot 2 under of Non-EFLS Scenario would have limited the wind downwashed by Kai Tak Acute Hospital, where the downwashed wind would flow towards KBAA Open Space 1 to the south of Lot 1. As a result, the wind environment at KBAA Open Space 1 would be calmer under of Non-EFLS Scenario.

4.6.2.6 However, wider separation between Lots 4 and 6 (i.e. Hung Yip Street) under of Non-EFLS Scenario would favour wind penetration towards Hung Yip Street under N, NNE and NE winds. The wind would subsequently reach Hoi Bun Road located further to the leeward side.

4.6.3 Assessment Area Under Summer Wind Condition

4.6.3.1 The SAVR of each focus area under summer wind condition is presented in Table 9. The focus area with ±0.02 or more than that under Baseline Scheme are highlighted in Table 9 for easy reference.

Table 9 SAVR for each Focus Area under Summer Wind Condition

	Focus Area	Baseline Scheme	Non-EFLS Scenario
1	CIC Zero Carbon Building	0.14	0.15
2	KBAA Open Space 1	0.13	0.12
3	Tai Yip Street Garden	0.07	0.08
4	Tai Yip Street Sitting-out Area	0.11	0.16
5	Hoi Bun Road Park	0.21	0.22
6	Wang Kwong Road	0.15	0.13
7	Wang Tung Street	0.11	0.12
8	Sheung Yee Road (N)	0.16	0.16
9	Sheung Yee Road (S)	0.17	0.15
10	Lam Fung Street	0.17	0.18
11	Wang Chiu Road	0.17	0.15
12	Wang Tai Road	0.19	0.18
13	Wang Mau Street	0.15	0.14
14	Wang Hoi Road	0.12	0.13
15	Wang Yuen Street	0.10	0.11
16	Siu Yip Street	0.11	0.11
17	Wai Yip Street	0.17	0.18
18	Kai Fuk Road (under flyover)	0.15	0.11
19	Cheung Yip Street (N)	0.16	0.13
20	Hoi Bun Road	0.20	0.23
21	Hung Yip Street	0.16	0.16
22	Tai Yip Street (N)	0.10	0.10
23	Tai Yip Lane	0.11	0.07
24	Hong Tai Road	0.11	0.11
25	Kwun Tong Road	0.14	0.14
26	Ting On Street	0.12	0.12
27	Ting Yip Street	0.11	0.12
28	Ting Fu Street	0.14	0.14
29	Tai Yip Street (S)	0.16	0.18
30	Back Alley	0.11	0.12
31	Shing Fung Road (Road D4)	0.18	0.18
32	Shing Cheong Road (Road D4&T2)	0.20	0.21
33	Cheung Yip Street (S)	0.20	0.20
34	Lam Chak Street	0.20	0.21
35	Kai Hing Road	0.18	0.18

	Focus Area	Baseline Scheme	Non-EFLS Scenario
36	Hoi Bun Road Promenade	0.17	0.18
37	Promenade outside K22/11&K/22/13	0.16	0.17
38	Promenade outside Kai Tak Hospital Cluster	0.20	0.21
39	Building Separation 1 (extending from Wang Mau Street)	-	0.13
40	KBAA Open Space 3	-	0.12
41	KBAA Landscape Deck 1	-	0.15
42	KBAA Open Space 2	-	0.12
43	KBAA Landscape Deck 2	-	0.05
44	KBAA Landscape Deck 3	-	0.08

4.6.3.2 Under summer wind condition, the prevailing wind comes from SW quadrant; a wind shadow would be casted by the Non-EFLS Scenario over area to the northeast of the Non-EFLS Scenario. As a result, focus areas located in the leeward side, such as Tai Yip Lane, would achieve a lower VR under Non-EFLS Scenario than that under Baseline Scheme.

4.6.3.3 Although setback in Lot 2 from Sheung Yee Road (S) under Non-EFLS Scenario would facilitate W wind penetration, the presence of tall towers within Study Site would limit wind penetration under other wind directions. Therefore, the wind performance at Sheung Yee Road (S) would not be significantly enhanced under Non-EFLS Scenario.

4.6.3.4 In contrary, shorter bulks under Baseline Scheme would have more significant building height differences from the adjacent developments. As a result, incoming wind skimming over Baseline Scheme would be captured by the taller developments (such as MegaBox, Enterprise Square III, One Kowloon, Manhattan Place and Exchange Tower etc.) at vicinity that enhance the wind environment at Sheung Yee Road (S), Wang Tai Road, Wang Mau Street.

4.6.3.5 Nevertheless, the wider building separation between two towers in eastern portion of Lot 4 under Non-EFLS Scenario would be beneficial for wind penetration and divert the wind downwashed by the taller towards to reach the leeward side. The VR at Tai Yip Street Garden, Tai Yip Street Sitting-out Area and Tai Yip Street (S) would be enhanced.

5 Conclusion

5.1.1 Overview

5.1.1.1 An Air Ventilation Assessment (AVA) Initial Study was conducted to assess the ventilation performance of Non-EFLS Scenario of the Study Area, which is currently occupied by TD's two VECs, EPD's waste recycling centre, HyD's maintenance depot, HKPF's police vehicle pound and the areas of roads, pedestrian walkways, sitting-out area and amenity areas in between, in accordance with the AVA Technical Circular No. 1/06, "*Environment, Transport and Works Bureau - Technical Circular No. 1/06*" issued on 19th July 2006 and "*Annex A of Technical Circular - Technical Guide for Air Ventilation Assessment for Development in Hong Kong*".

5.1.1.2 Both Baseline and Non-EFLS Scenario were assessed by using Computational Fluid Dynamics (CFD) techniques. A series of CFD simulations using realizable k–ε turbulence model were performed under both annual and summer wind conditions with reference to the methodology for AVA Initial Study as stipulated in the *AVA Technical Circular*. For the annual wind condition, N, NNE, NE, ENE, E, ESE, S and SW winds were selected which give total wind frequency of 81.8% over a year; while E, ESE, SE, SSE, S, SSW, SW, WSW and W winds are selected which gives total wind frequency of 83.7% in summer months.

5.1.1.3 The Velocity Ratio (*VR*) as proposed by the *AVA Technical Circular* was employed to assess the ventilation performance under Non-EFLS Scenario and its impact to the surroundings in compared to the Baseline Scheme.

5.1.1.4 There were 50 perimeter test points and 164 overall test points (with aid of another 87 special test points under Non-EFLS Scenario and 57 special test points under Baseline Scheme to assess the identified focus area within Study Area) to be evenly allocated within the Assessment Area to assess the local and overall wind performance under both annual and summer wind conditions.

5.1.2 Under annual wind condition

5.1.2.1 Under annual wind condition, similar SVR and LVR would be achieved under both schemes.

	Annual Wind Condition	
	Baseline Scheme	Non-EFLS Scenario
SVR	0.13	0.13
LVR	0.13	0.13

5.1.2.2 Under NE quadrant prevailing wind, while a portion of wind would reach the study site flowing atop adjacent low- and mid-rise surroundings, high-rise surroundings to the further northeast of the Development, such as the Upper and Lower Ngau Tau Kok Estates, would limit the wind penetration from the NE quadrant and dominate the wind environment of both schemes. Therefore, the overall ventilation performance of both schemes would be similar.

5.1.2.3 Although taller towers under Non-EFLS Scenario would cast wind shadow at the leeward side along the southern boundary, with stronger downwash effect under Non-EFLS Scenario, the wind environment at upwind location would be slightly enhanced and lead to similar SVR as Baseline Scheme.

5.1.3 Under summer wind condition

5.1.3.1 Under summer wind condition, Non-EFLS Scenario would obtain slightly lower SVR by 0.01 and similar LVR as the Baseline Scheme.

5.1.3.2 With the prevailing winds coming from SW quadrant, the planned/ committed/ proposed developments near Kai Tak Hospital Cluster would predominantly limit the penetration of wind from SW quadrant. The overall ventilation performance would be similar under both schemes.

5.1.3.3 Instead, shorter bulks under Baseline Scheme would allow the SW winds to skim over and to be downwashed by adjacent taller developments along Sheung Yip Road. Therefore, the wind performance along the northern boundary of Baseline scheme would be slightly higher.

5.1.3.4 Taller towers in Non-EFLS Scenario would capture the high-level wind which would enhance the wind environment at the open space between Kai Tak Acute Hospital and Study Site and near the southern boundary under Non-EFLS Scenario while the wind environment to the north of Sheung Yee Road (S) would be calmer under Non-EFLS Scenario.

5.1.3.5 In addition, under Non-EFLS Scenario, the wider tower separation and setback in eastern portion of Lot 4 would allow SW wind to reach the leeward side with slightly enhanced VR in Tai Yip Street Garden and Tai Yip Sitting-out Area.

	Summer Wind Condition	
	Baseline Scheme	Non-EFLS Scenario
SVR	0.16	0.15
LVR	0.16	0.16

6 Reference

[1] Housing, Planning and Lands Bureau and Environment, Transport a& Works Bureau, Technical Circular No.1/06 Air Ventilation Assessment and its Annex A – Technical Guide for Air Ventilation Assessment for Developments in Hong Kong, dated 19th July, 2006.

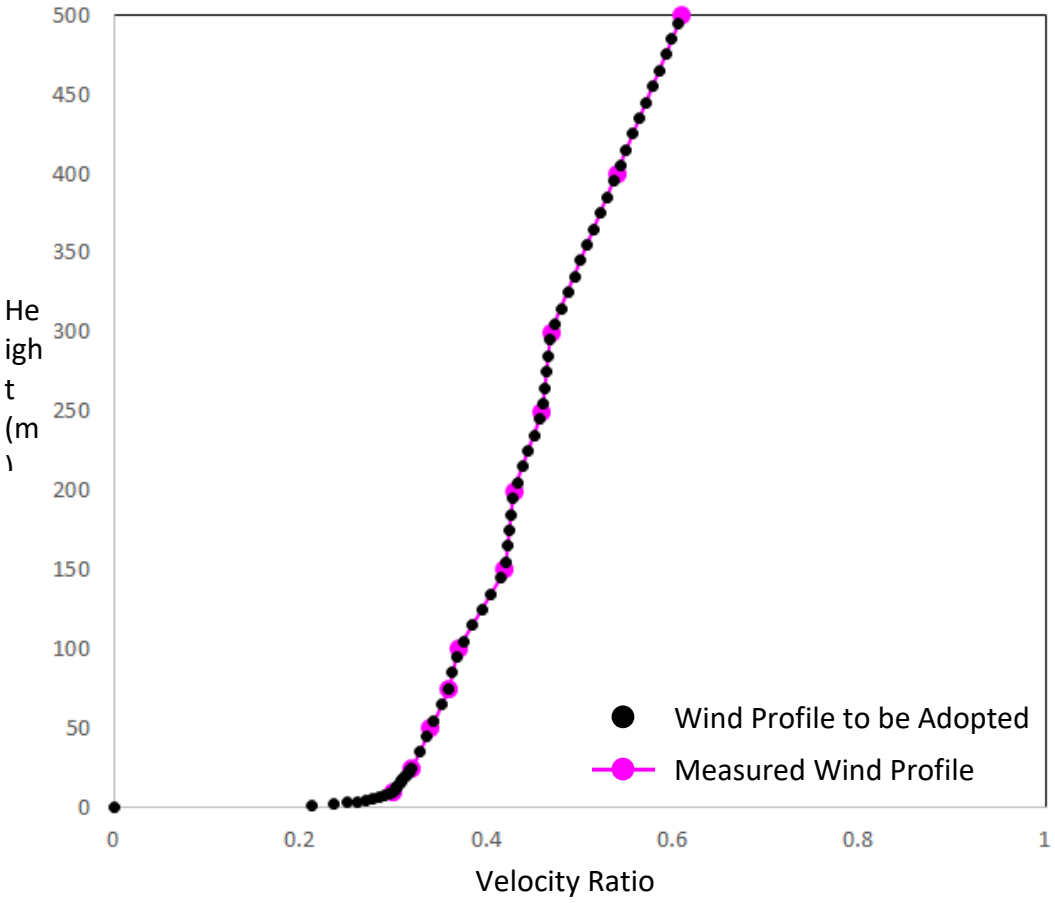
Appendix A

Vertical Wind Profile of Studied Wind Directions

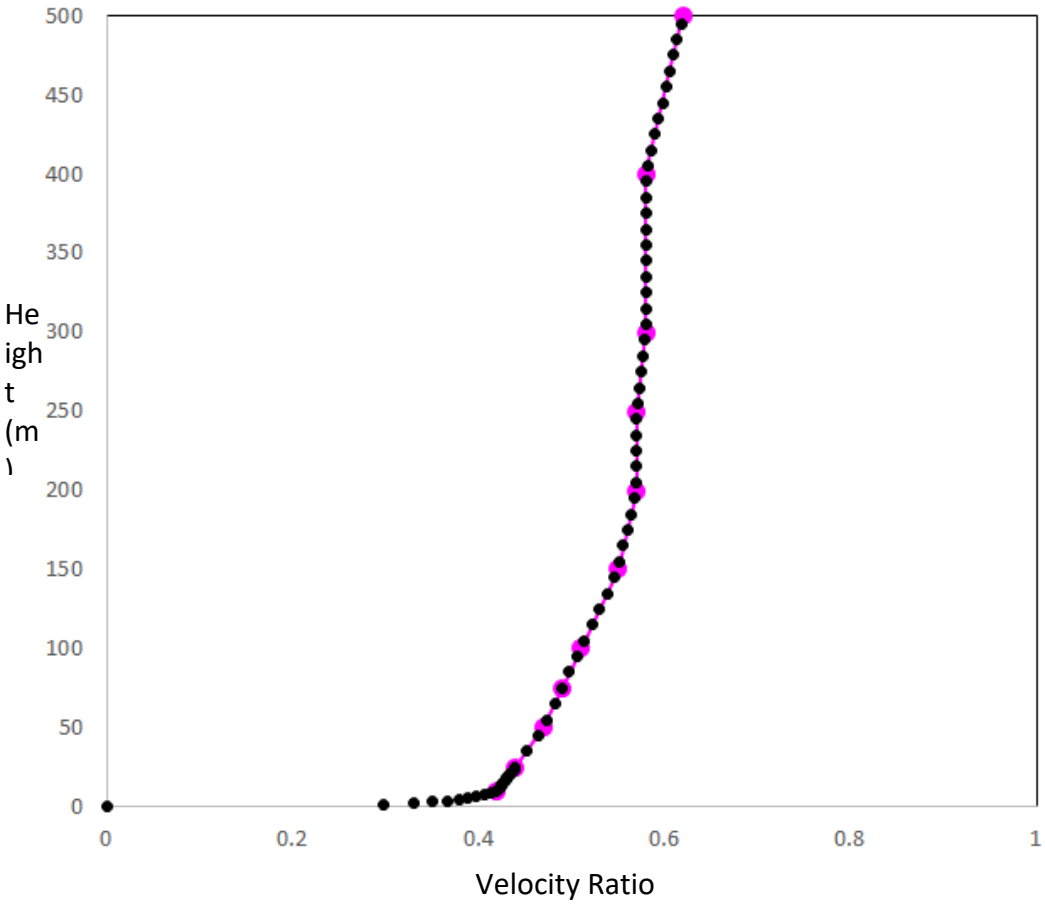
Contents

A1	**N Wind**	**1**
A2	**NNE Wind**	**2**
A3	**NE Wind**	**3**
A4	**ENE Wind**	**4**
A5	**E Wind**	**5**
A6	**ESE Wind**	**6**
A7	**SE Wind**	**7**
A8	**SSE Wind**	**8**
A9	**S Wind**	**9**
A10	**SSW Wind**	**10**
A11	**SW Wind**	**11**
A12	**WSW Wind**	**12**
A13	**W Wind**	**13**

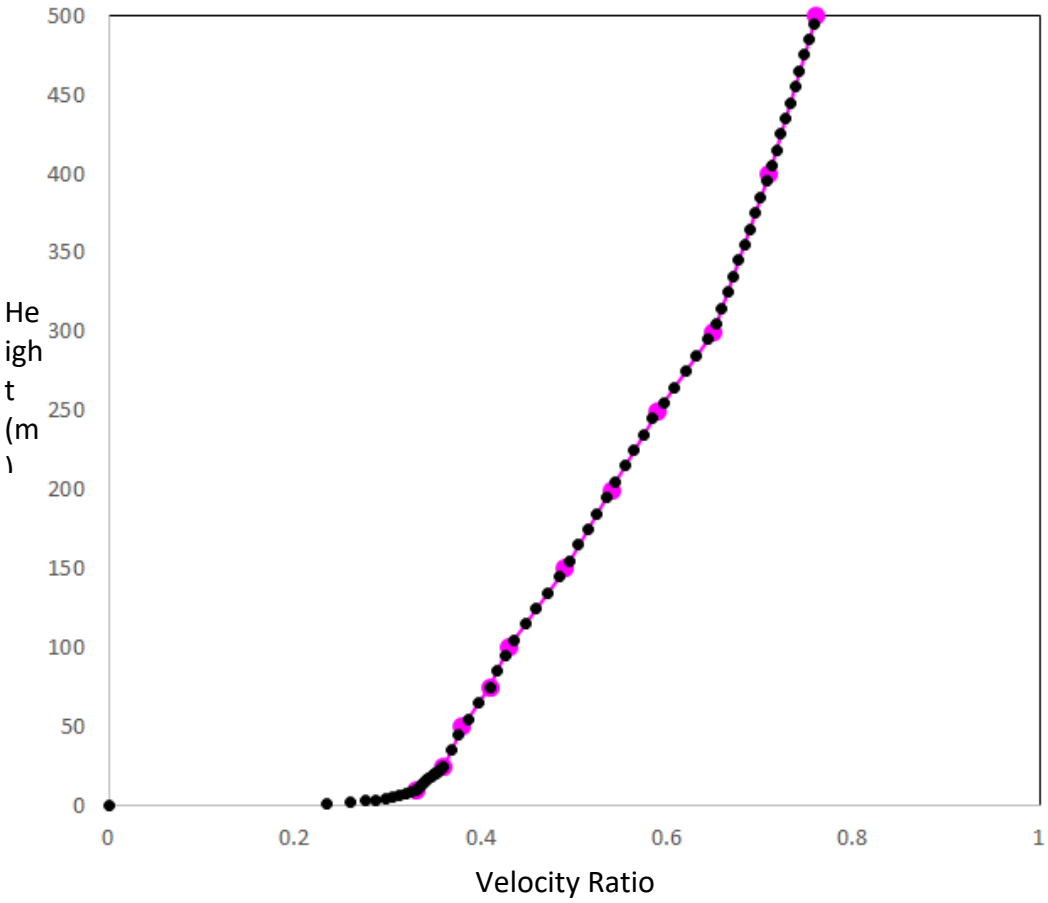
A1 N Wind


500
450
400
350
300
250
200
150
100
50
0
0
0.2
0.4
0.6
0.8
1
Velocity Ratio
Wind Profile to be Adopted
Measured Wind Profile

A2 NNE Wind


500
450
400
350
300
250
200
150
100
50
0
Height (m)
0
0.2
0.4
0.6
0.8
1
Velocity Ratio

A3 NE Wind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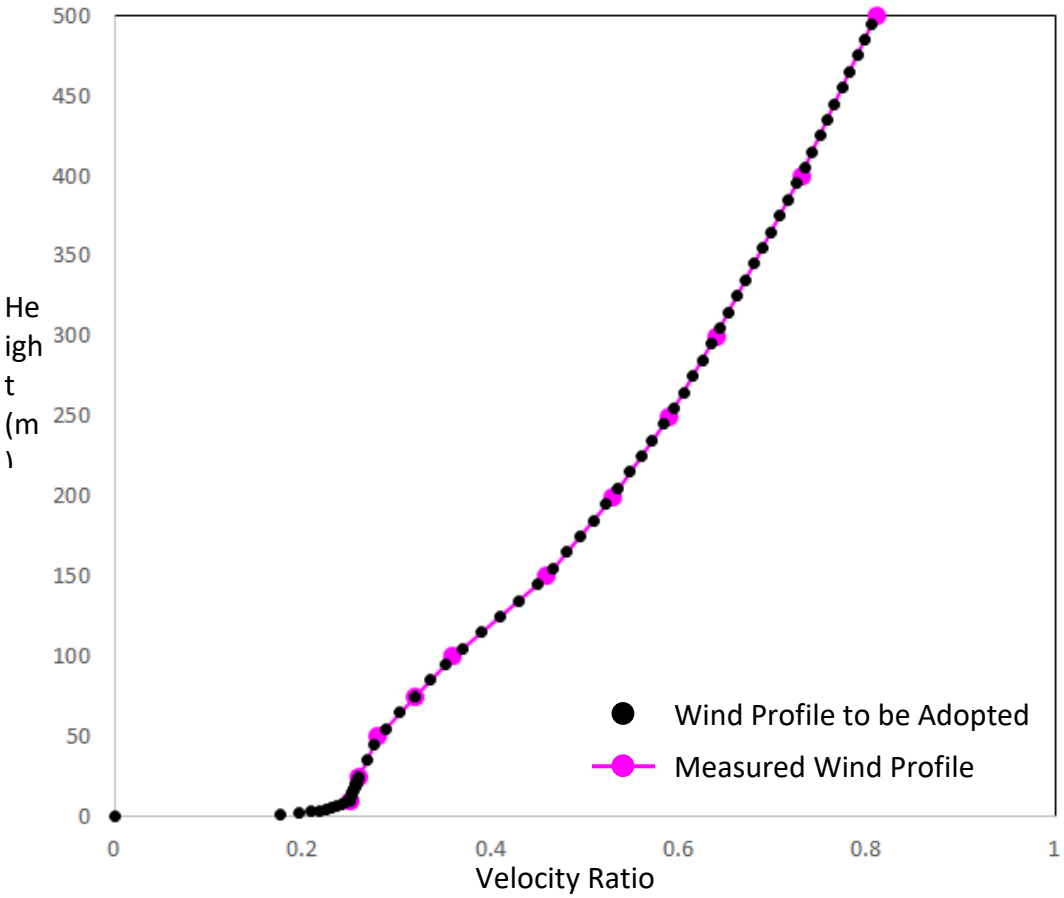
450
400
350
300
250
200
150
100
50
0
0
0.2
0.4
0.6
0.8
1
Velocity Ratio

A4 ENE Wind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450
400
350
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50
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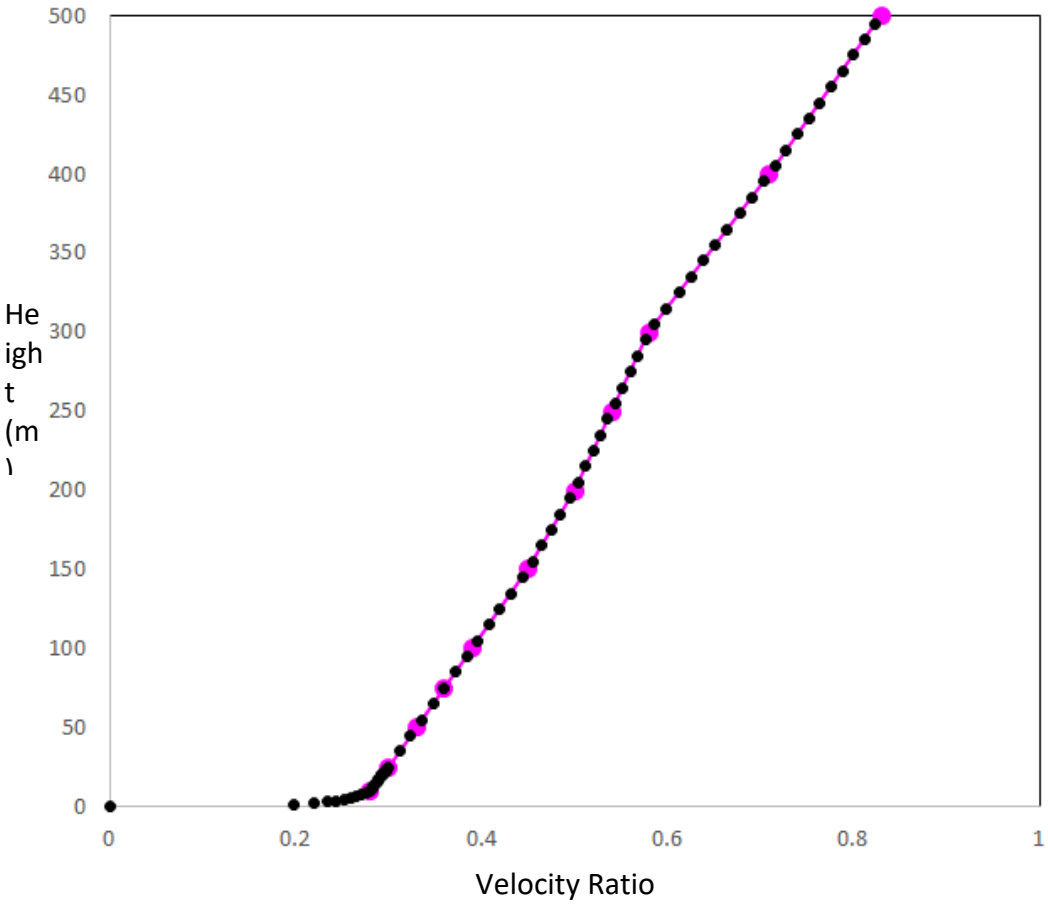
0.4
0.6
0.8
1
Velocity Ratio
Wind Profile to be Adopted
Measured Wind Profile

A5 E Wind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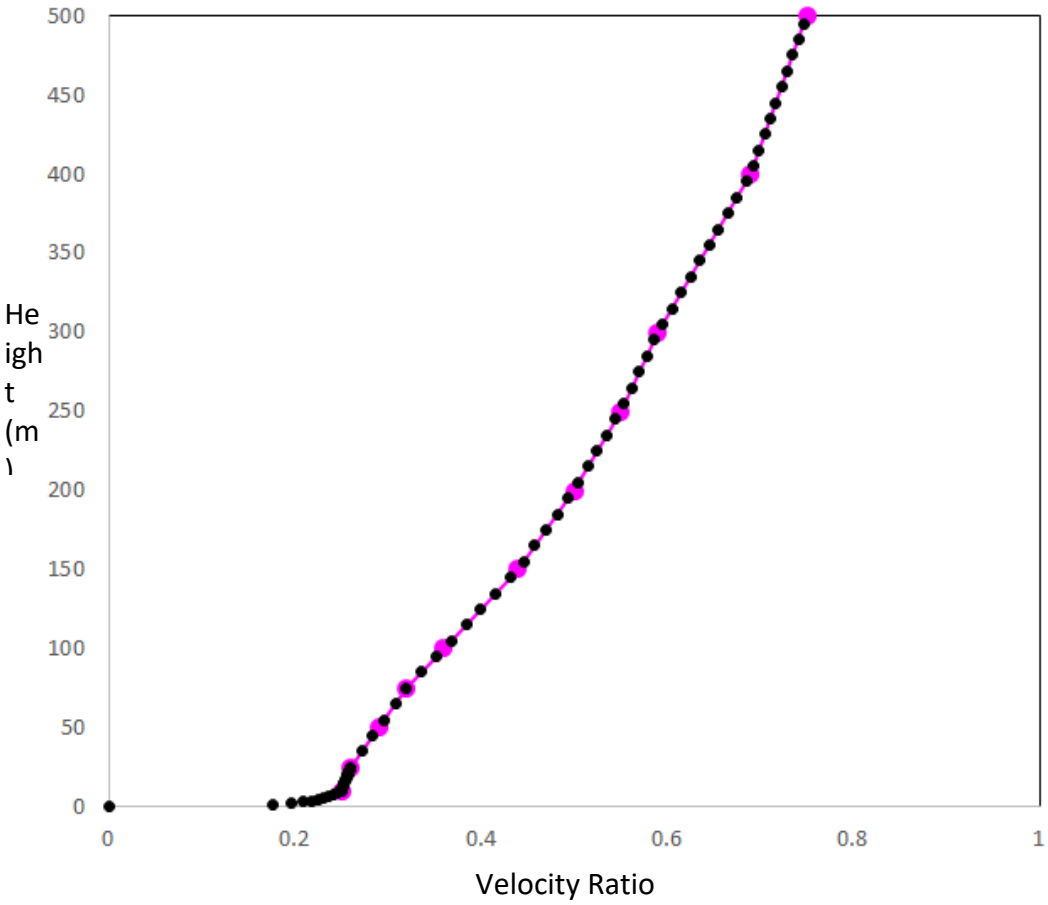
0.6
0.8
1
Velocity Ratio

A6 ESE Wind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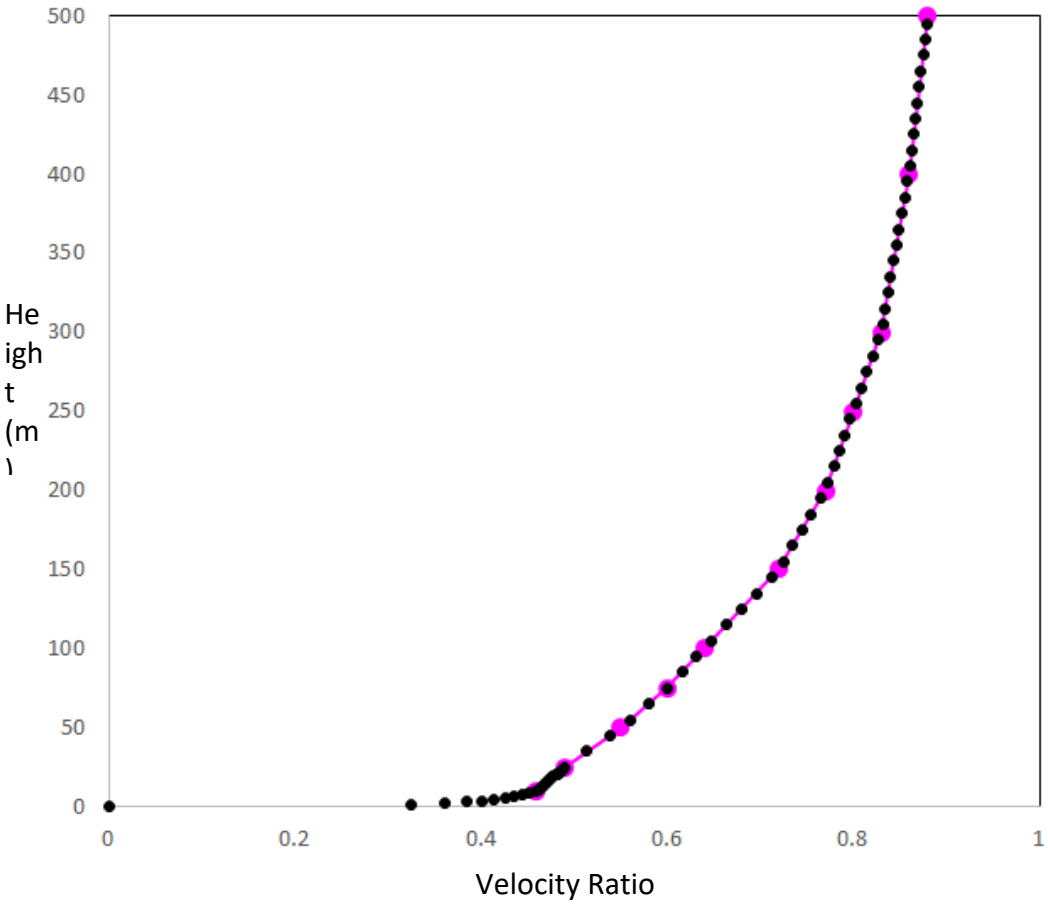
1
Velocity Ratio

A7 SE Wind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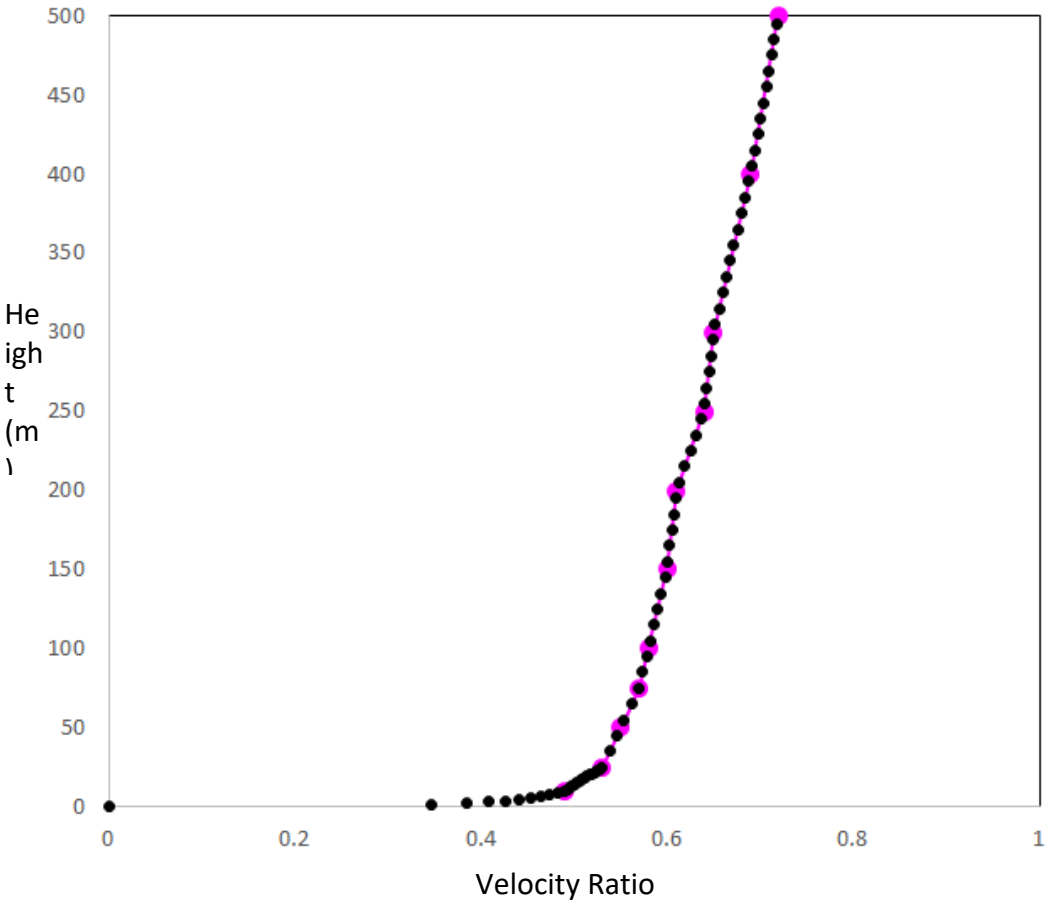
Velocity Ratio

A8 SSE Wind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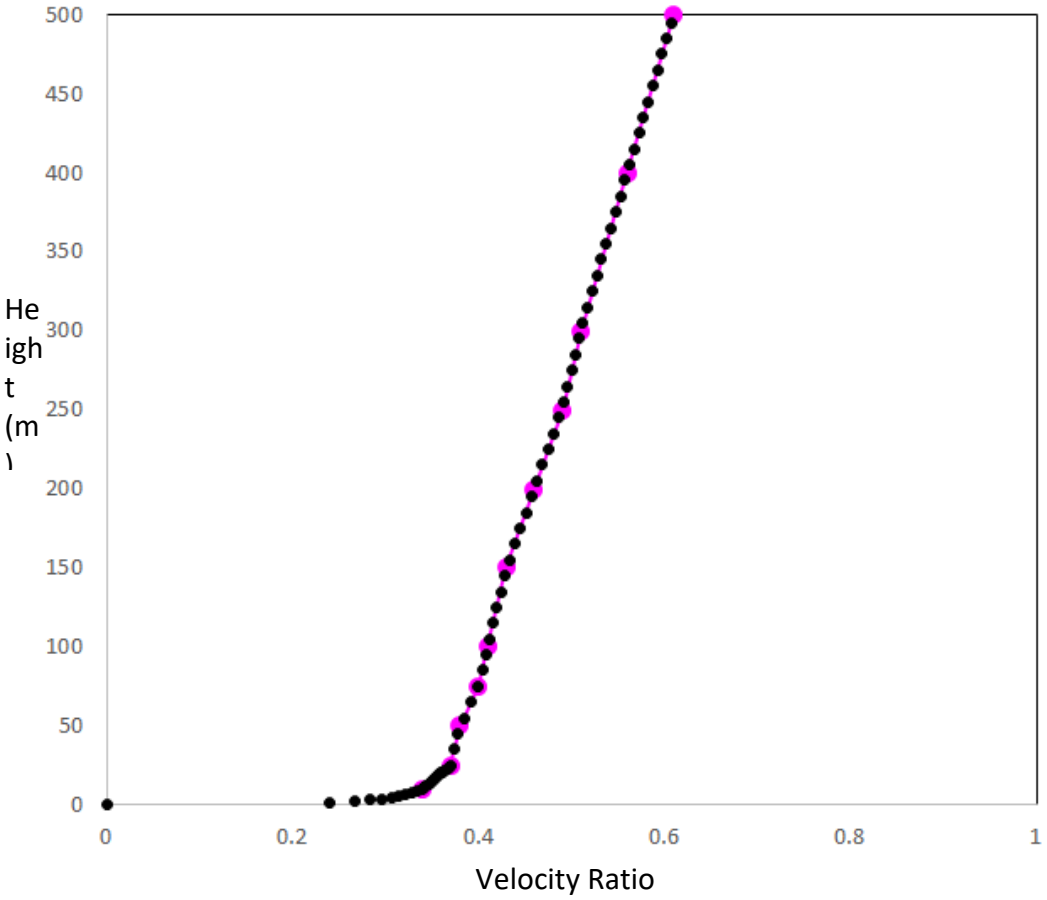
1
Velocity Ratio

A9 S Wind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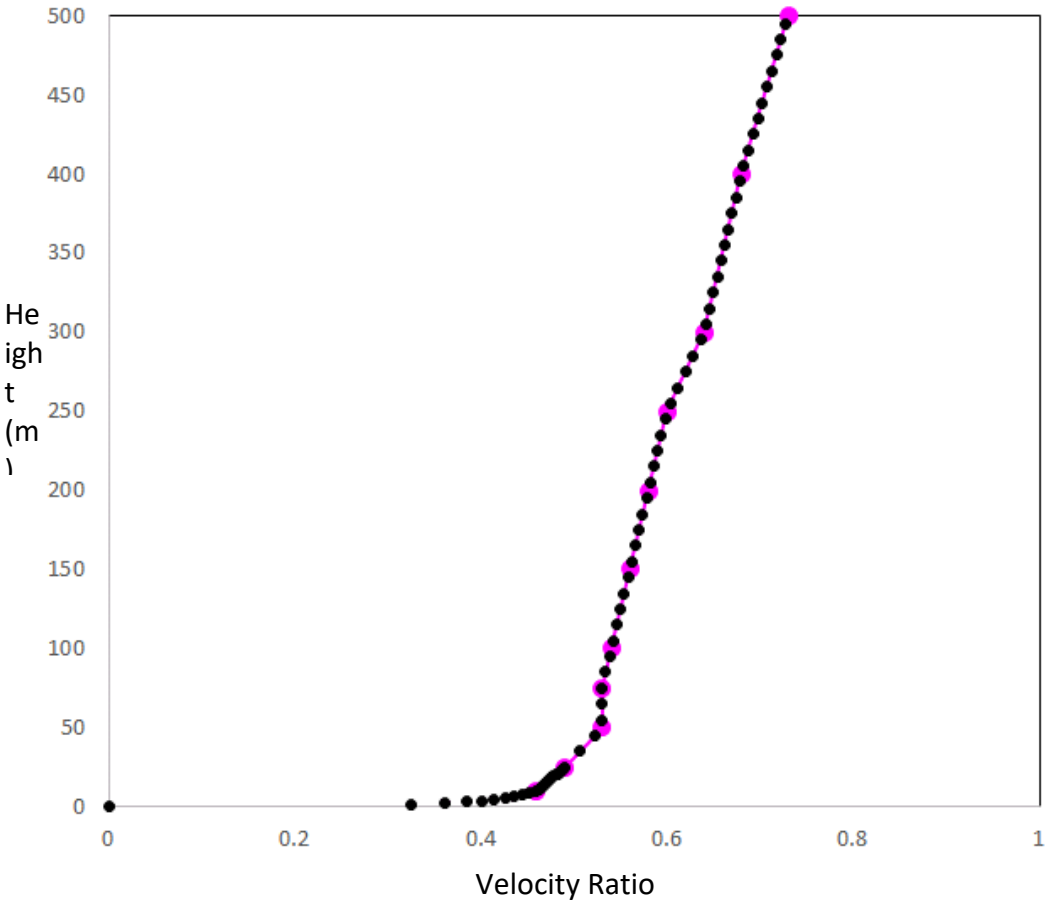
Velocity Ratio

A10 SSW Wind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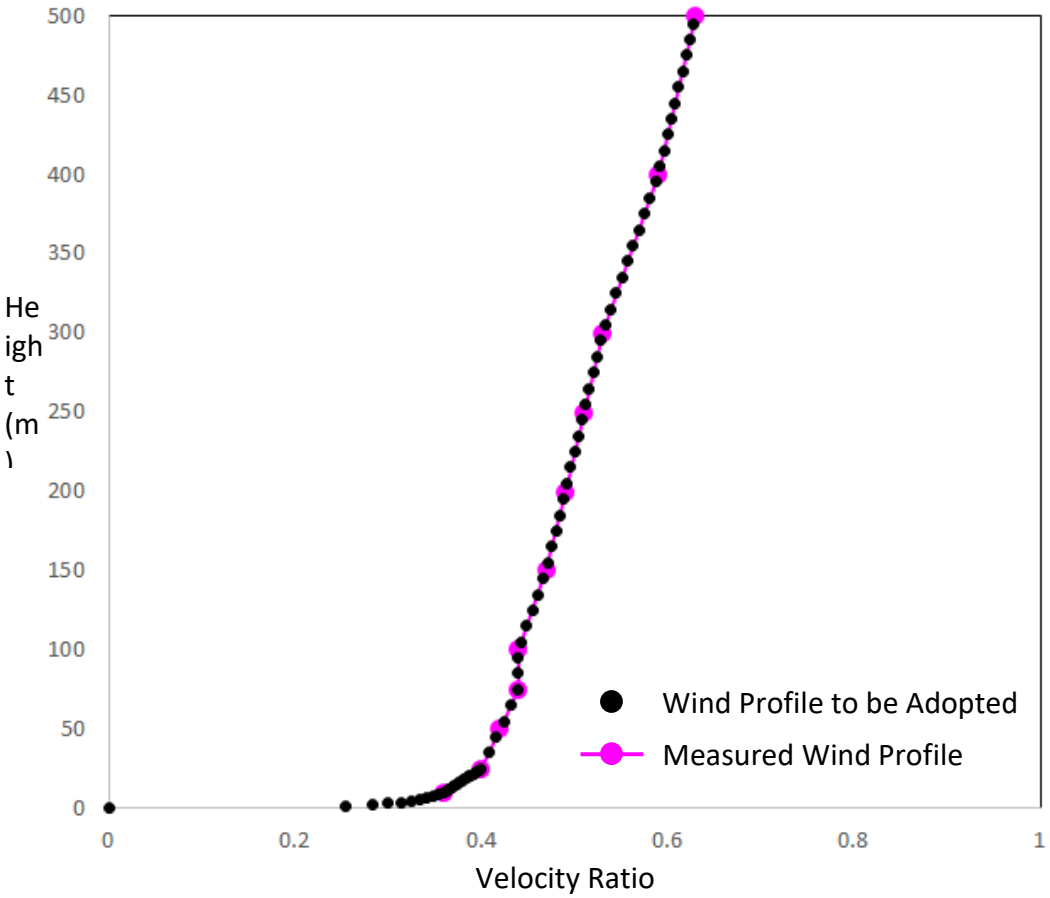
0.8
1
Velocity Ratio

A11 SW Wind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150
100
50
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0.6
0.8
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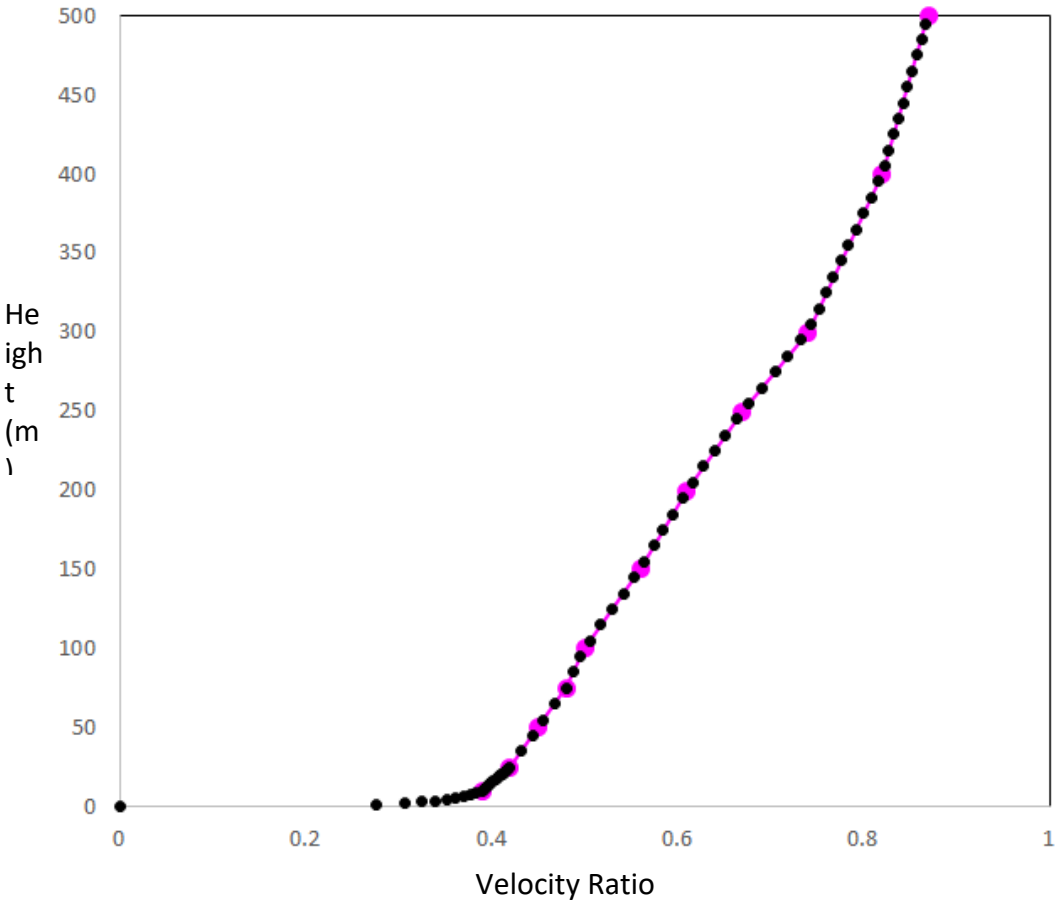
Velocity Ratio
Wind Profile to be Adopted
Measured Wind Profile

A12 WSW Wind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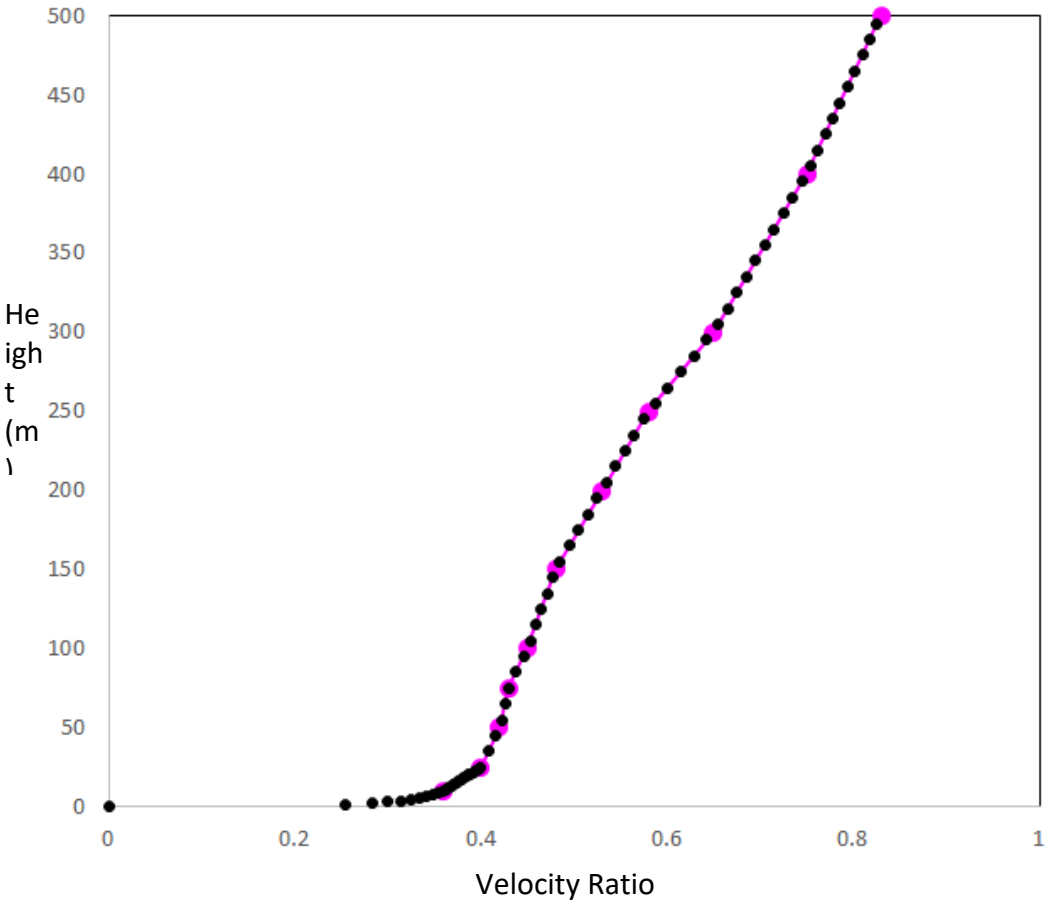
0.2
0.4
0.6
0.8
1
Velocity Ratio

A13 W Wind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300
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200
150
100
50
0
0
0.2
0.4
0.6
0.8
1
Velocity Ratio

Appendix B

Contour Plots of Velocity Ratio (VR)

Contents

B1 Baseline Scheme 1

B2 Non-EFLS Scenario 9

B1 Baseline Scheme

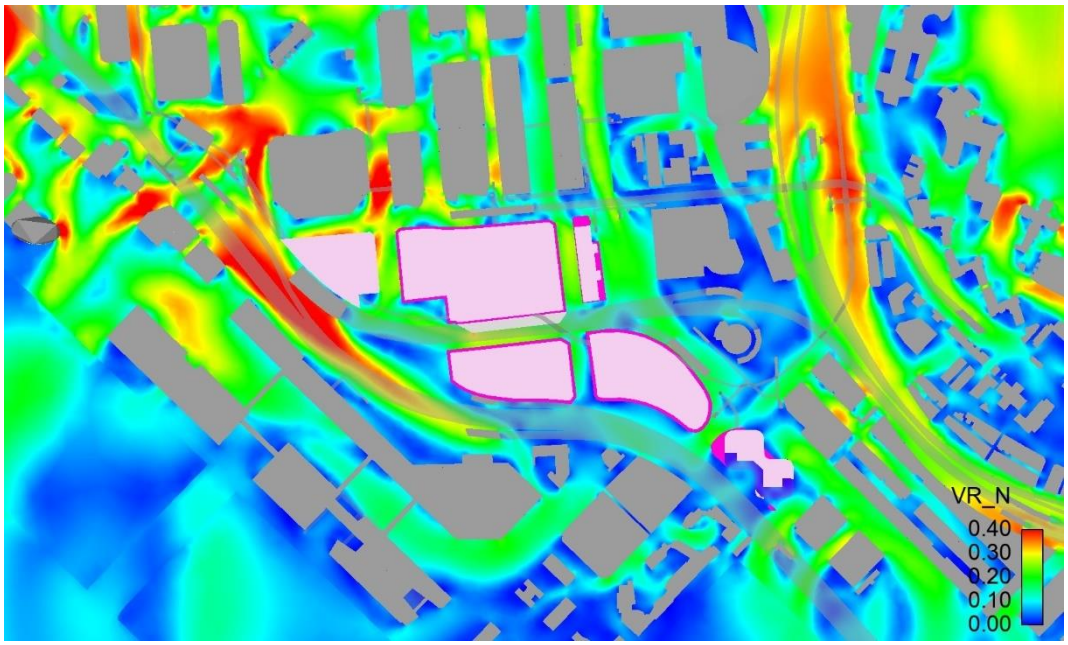

Figure 1 Contour Plots under N wind

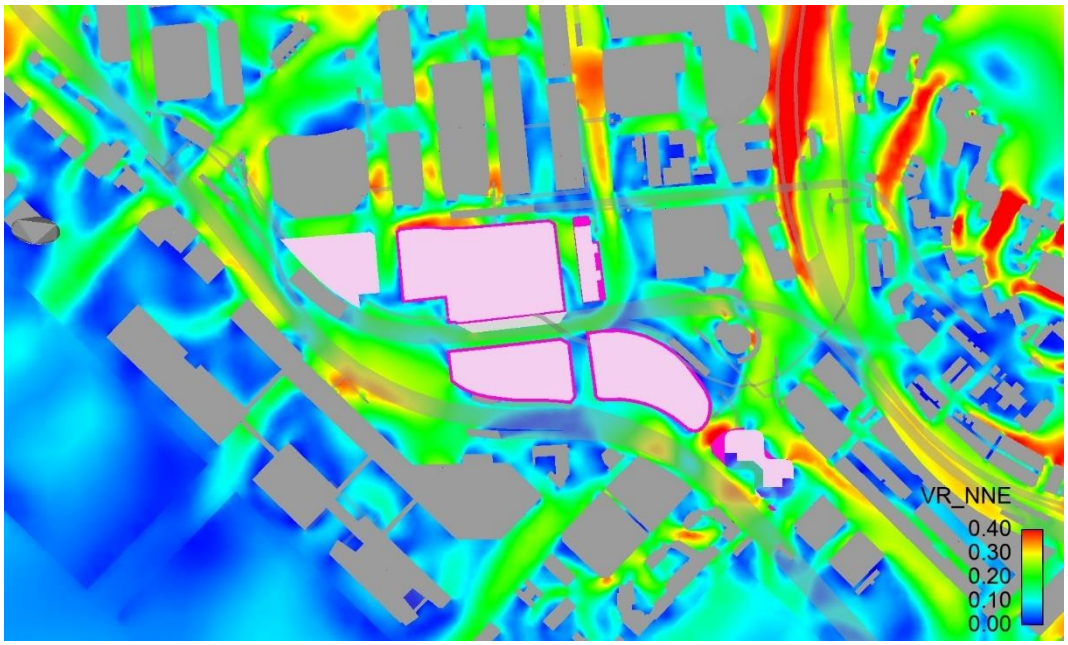

Figure 2 Contour Plots under NNE wind

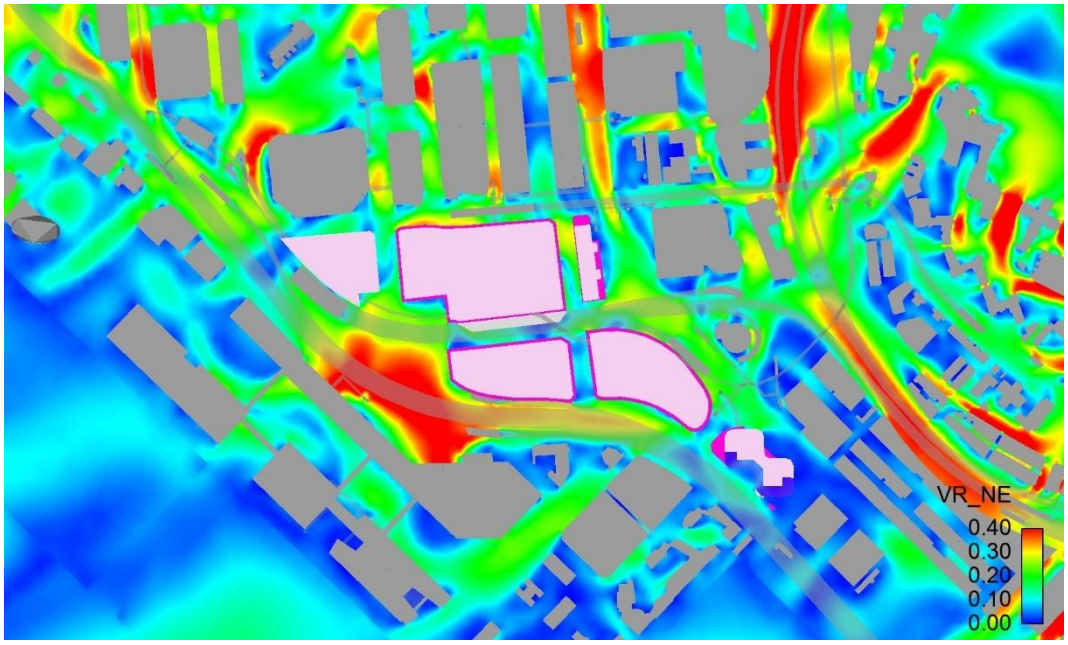

Figure 3 Contour Plots under NE wind

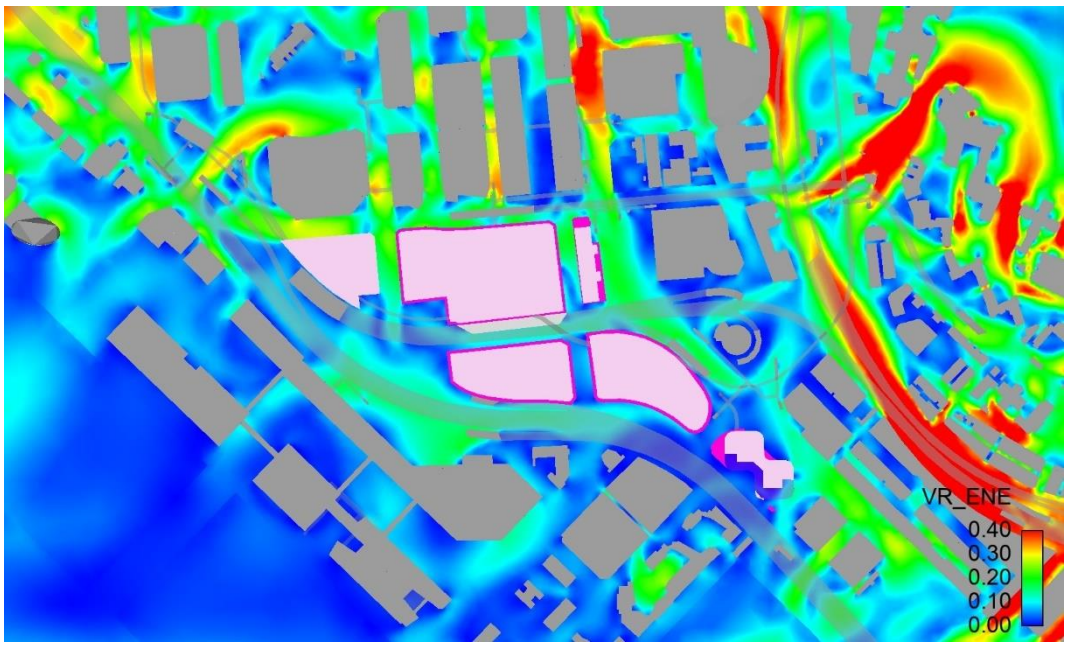

Figure 4 Contour Plots under ENE wind

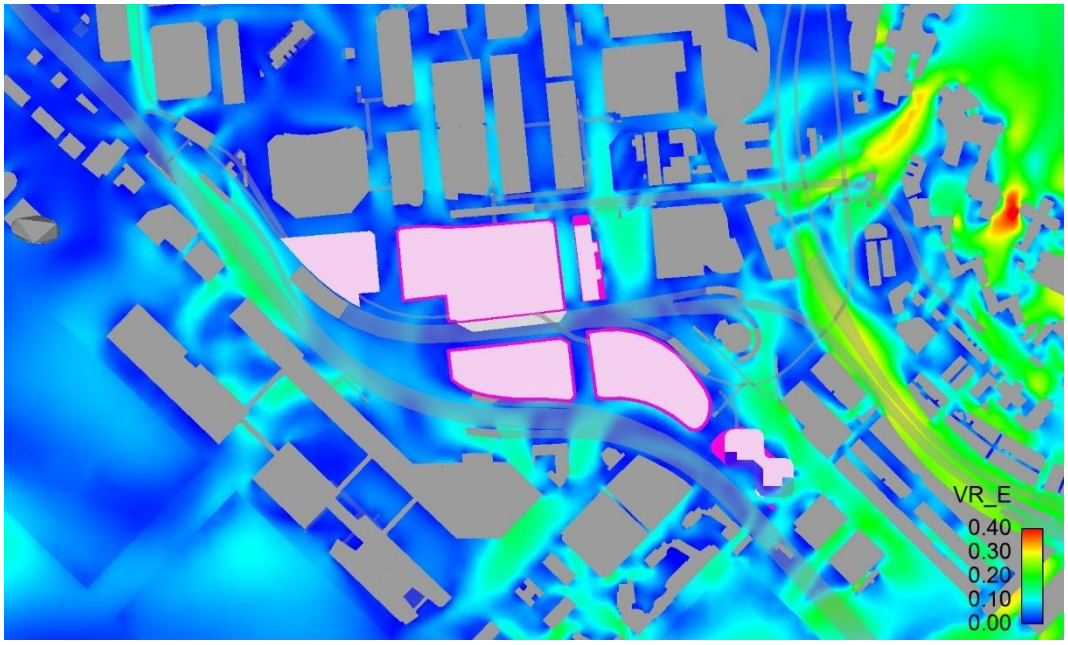

Figure 5 Contour Plots under E wind

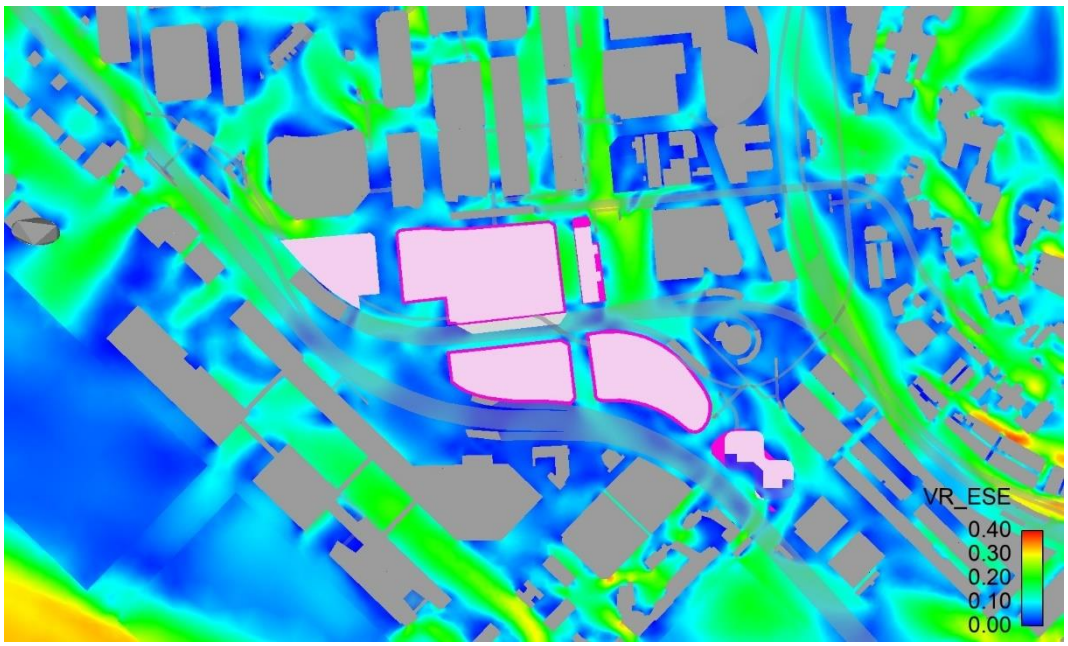

Figure 6 Contour Plots under ESE wind

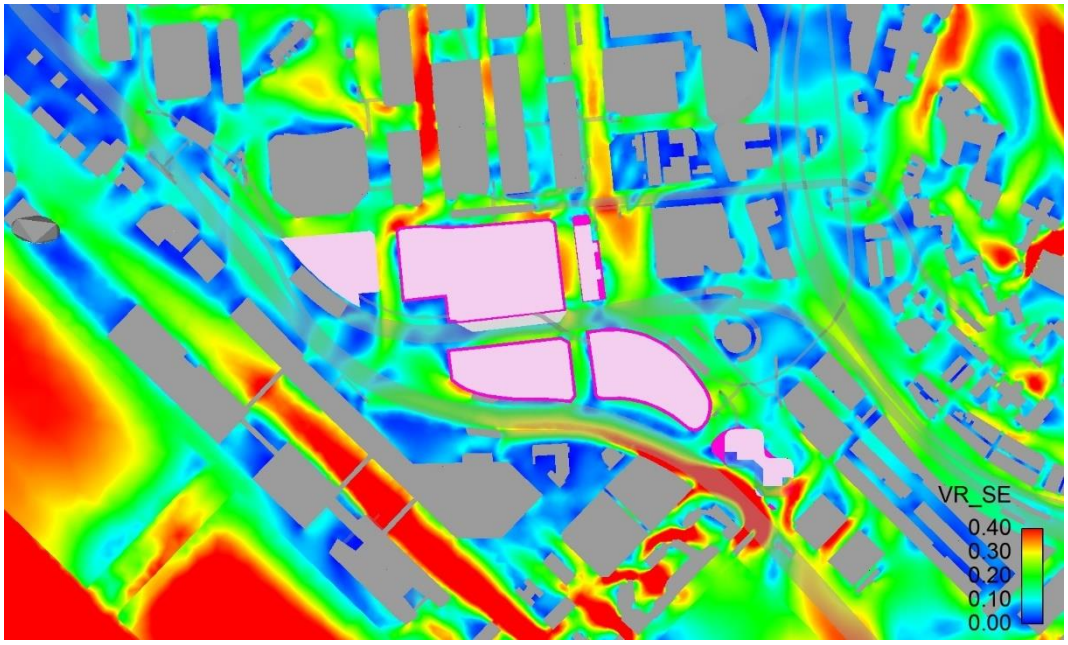

Figure 7 Contour Plots under SE wind

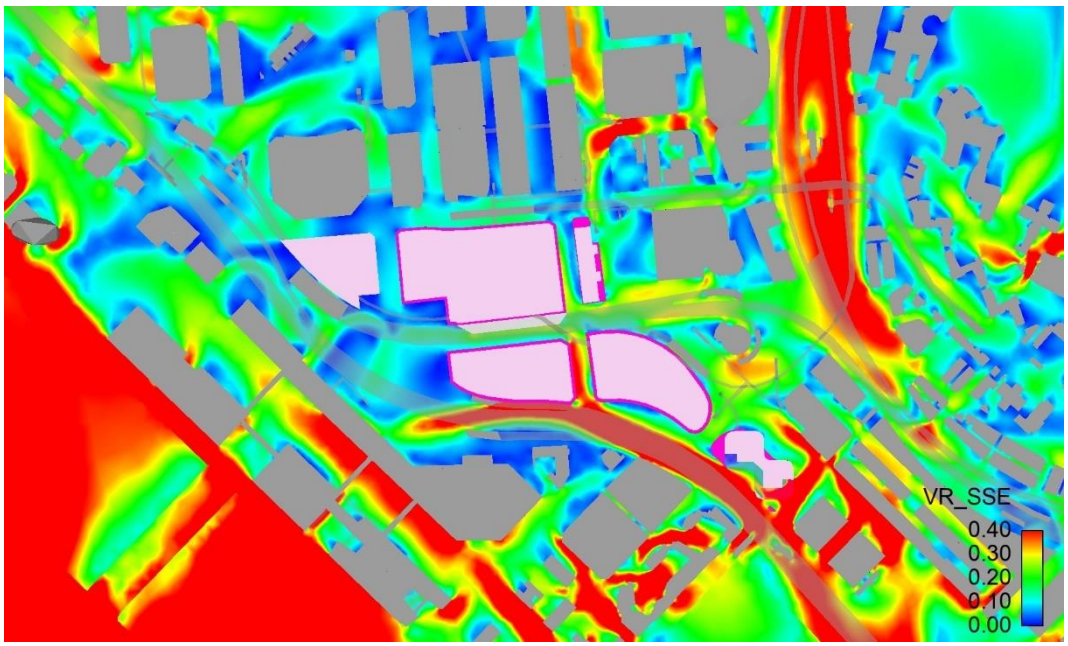

Figure 8 Contour Plots under SSE wind

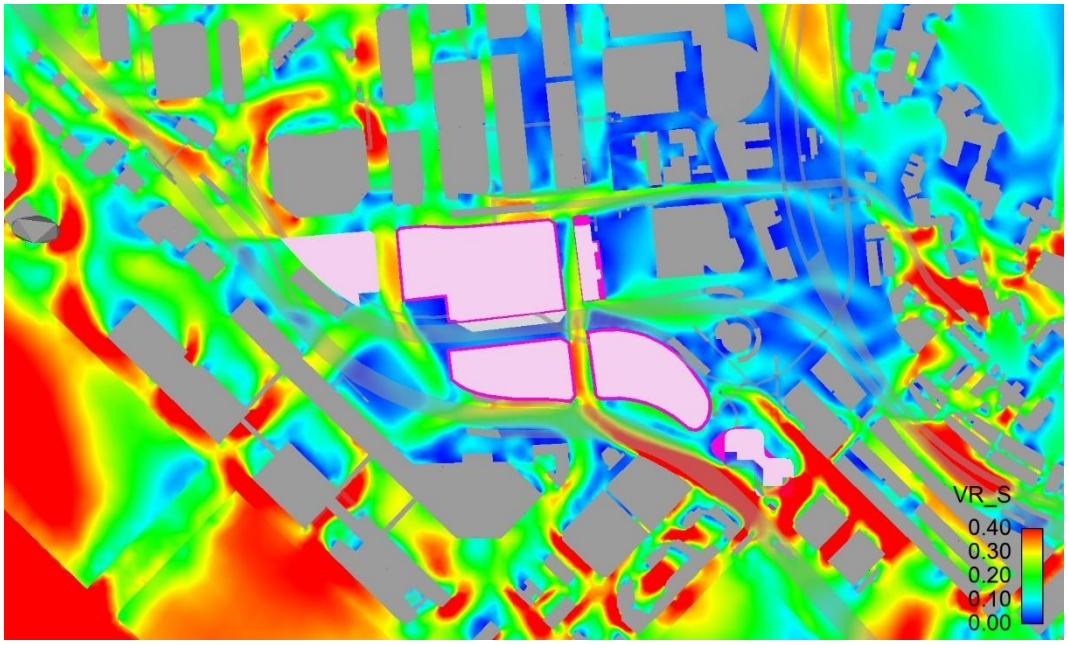

Figure 9 Contour Plots under S wind

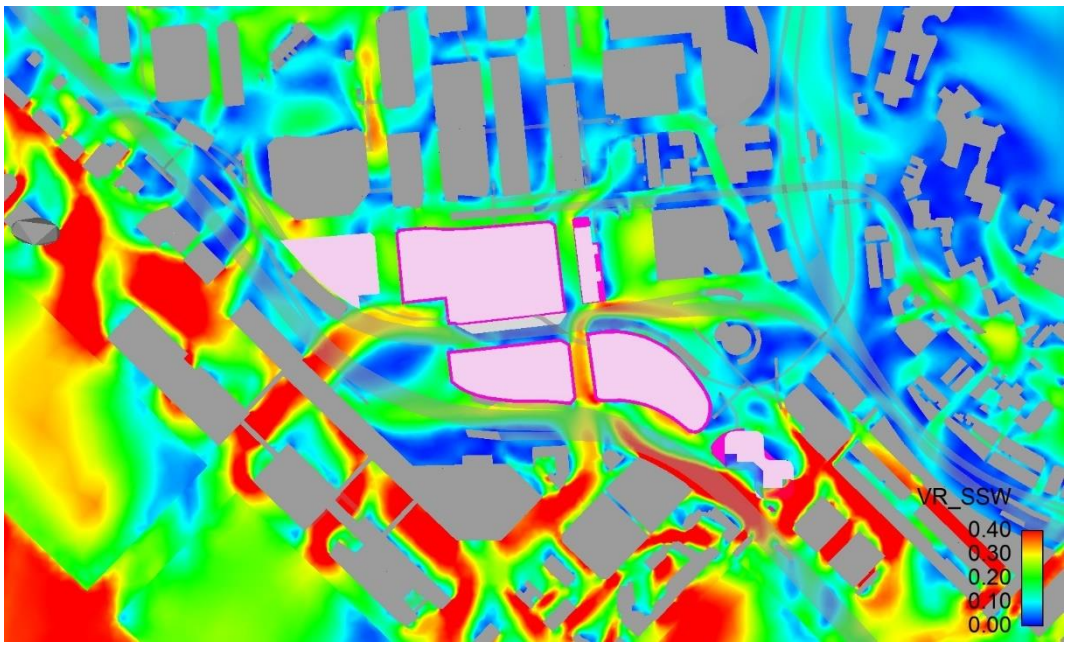

Figure 10 Contour Plots under SSW wind

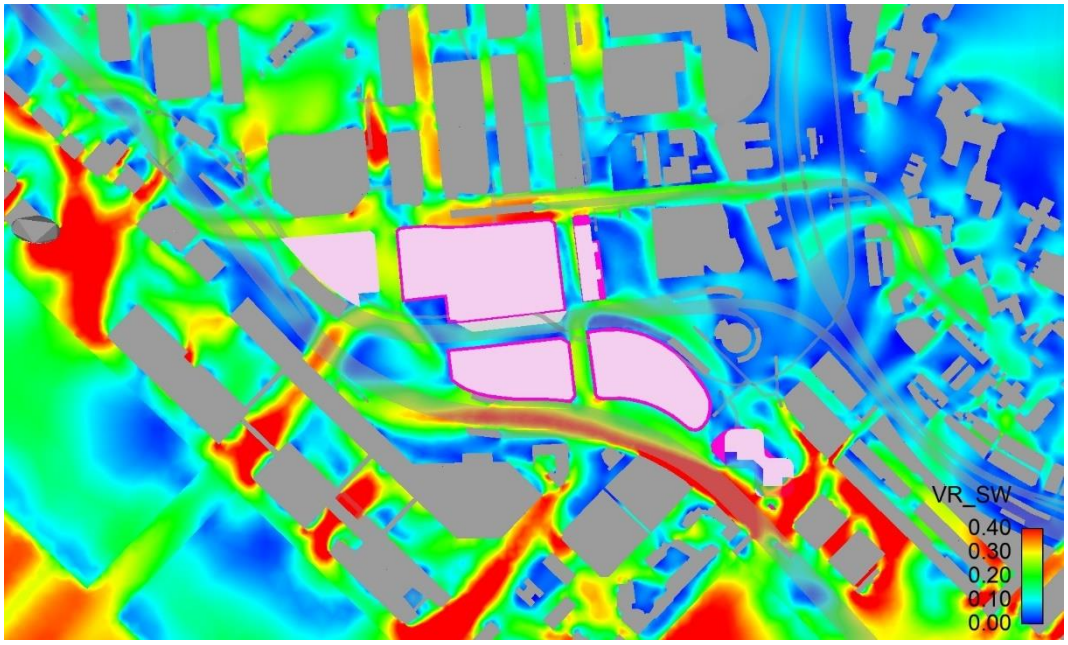

Figure 11 Contour Plots under SW wind

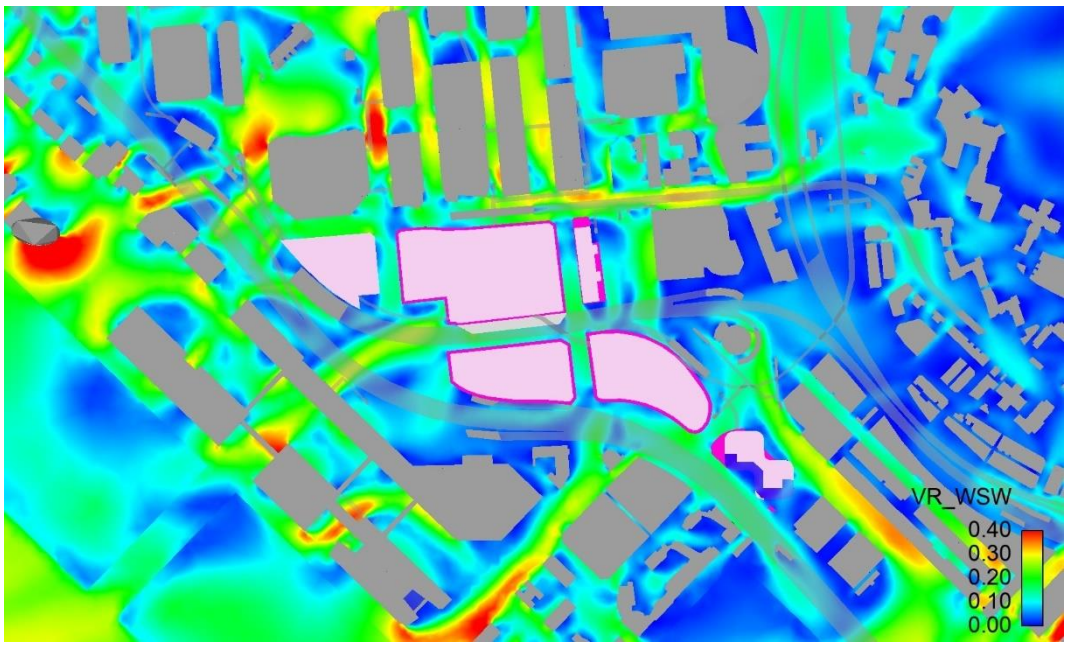

Figure 12 Contour Plots under WSW wind

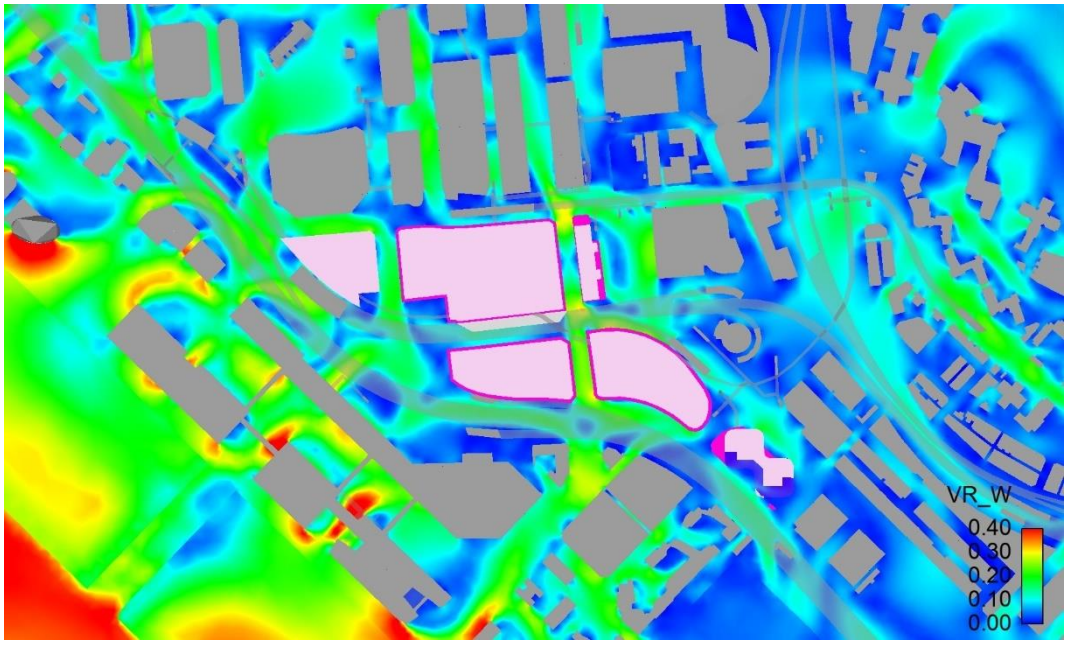

Figure 13 Contour Plots under W wind

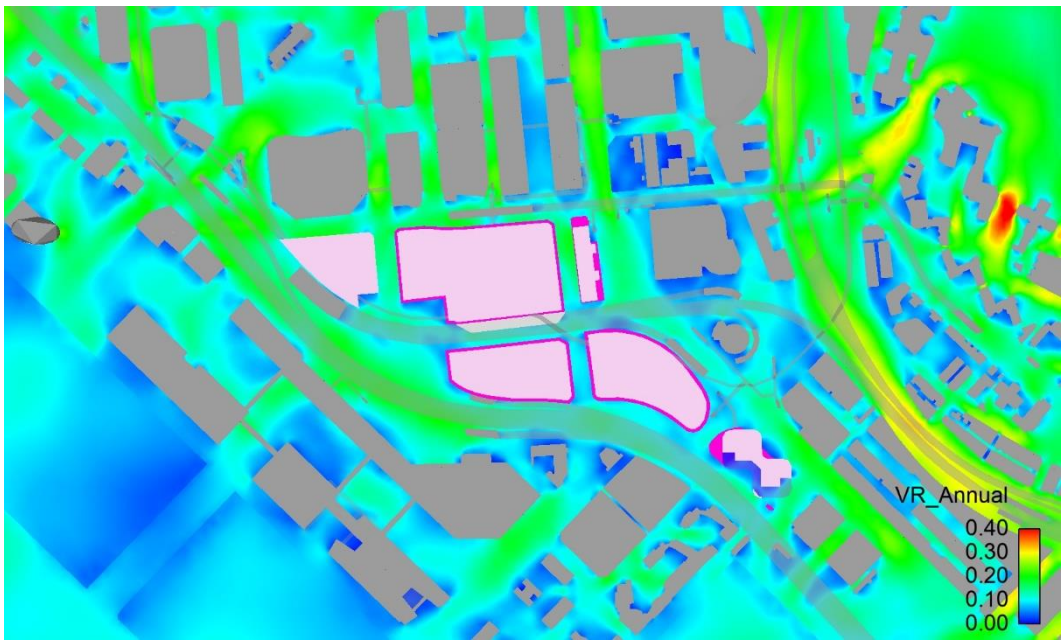

Figure 14 Contour Plots under Annual Condition

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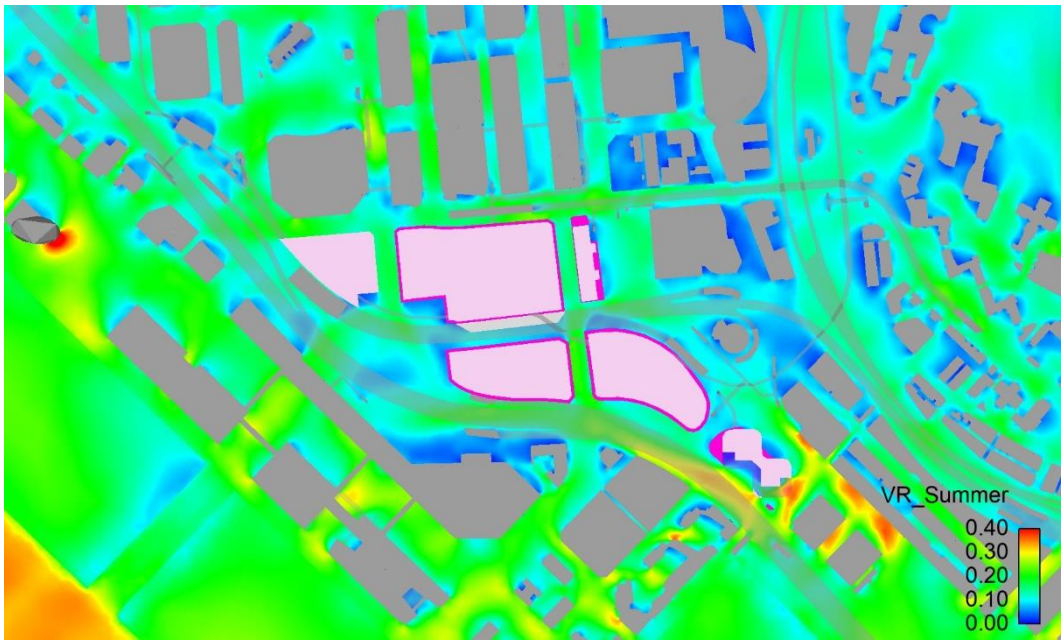


Figure 15 Contour Plots under Summer Condition

B2 Non-EFLS Scenario

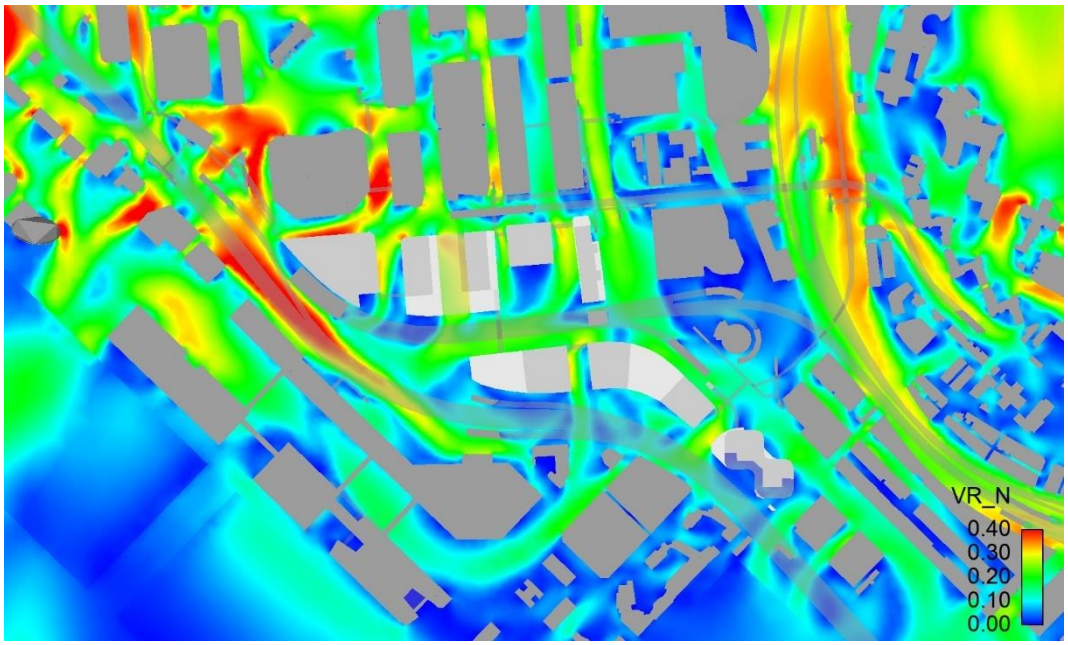


Figure 16 Contour Plots under N wind

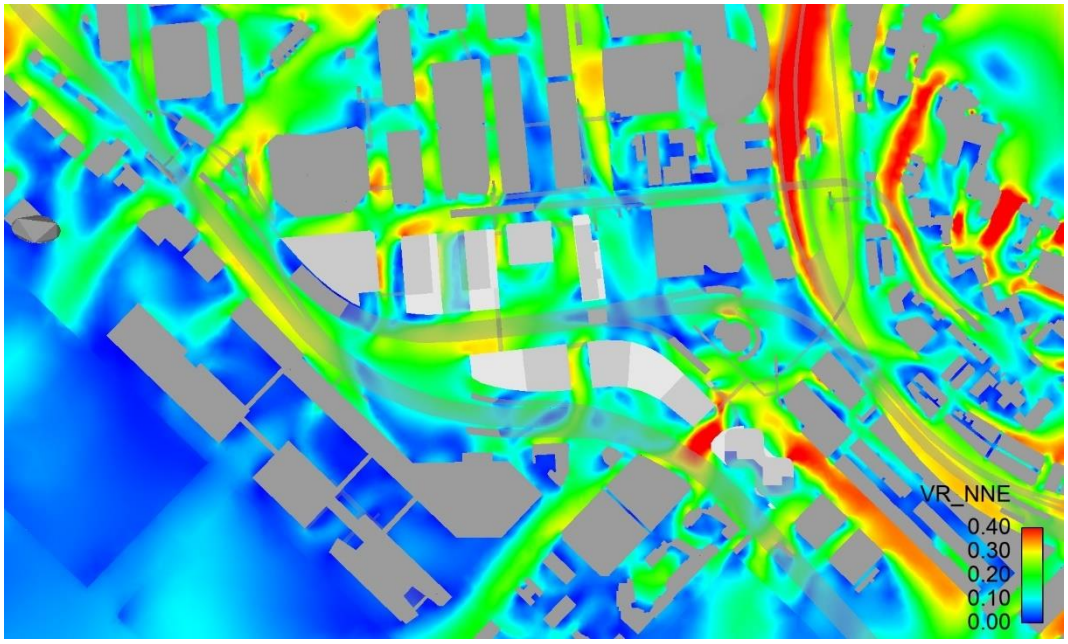
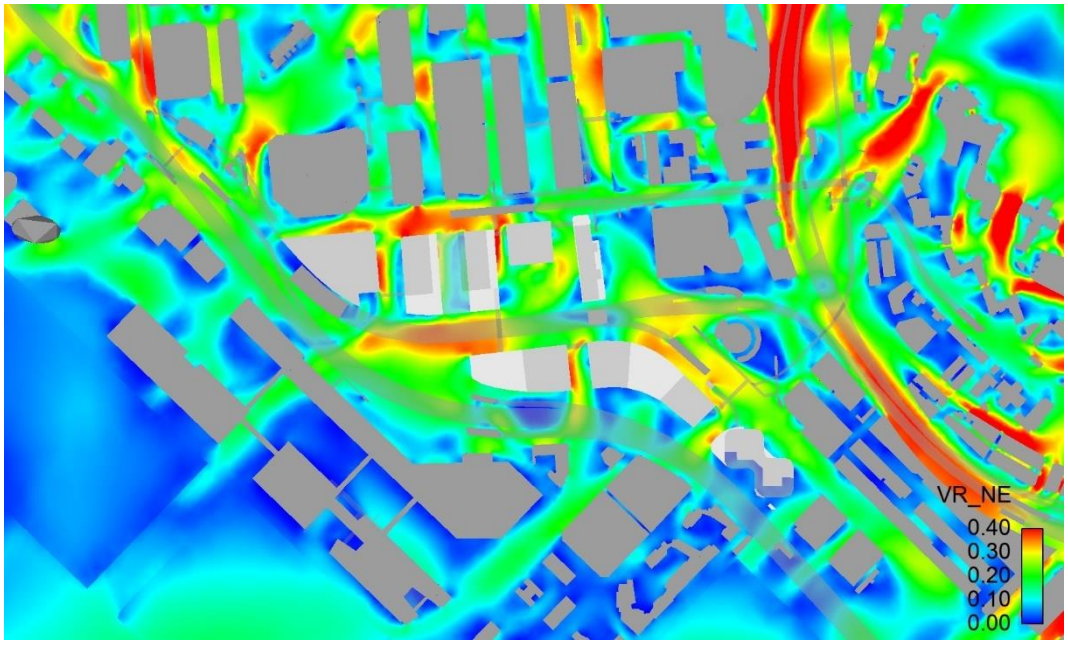


Figure 17 Contour Plots under NNE wind



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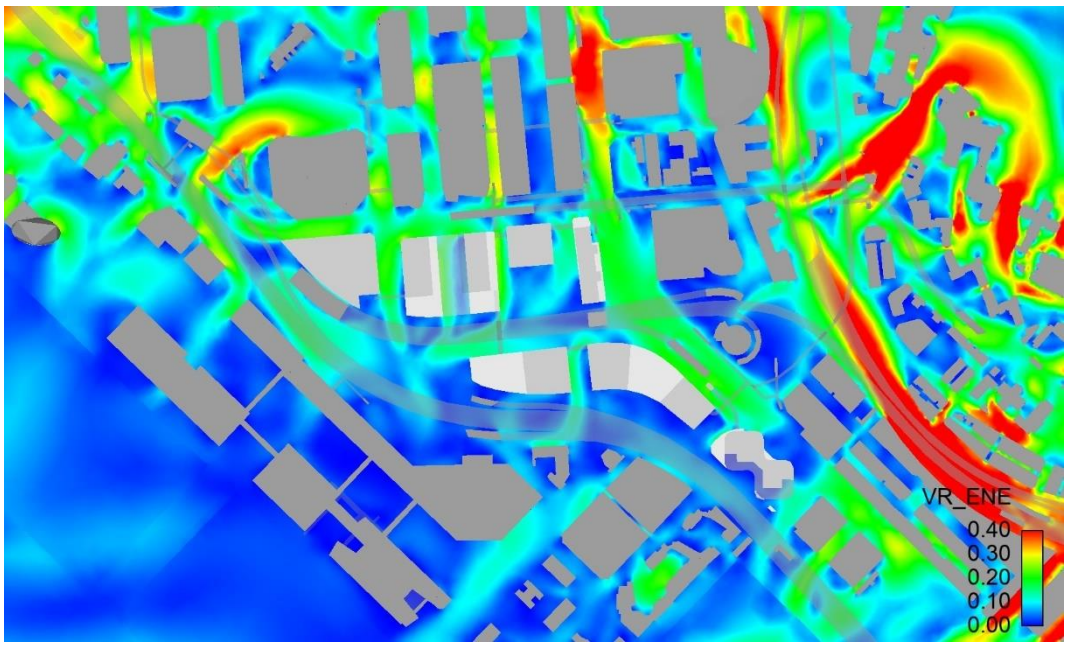

Figure 19 Contour Plots under ENE wind

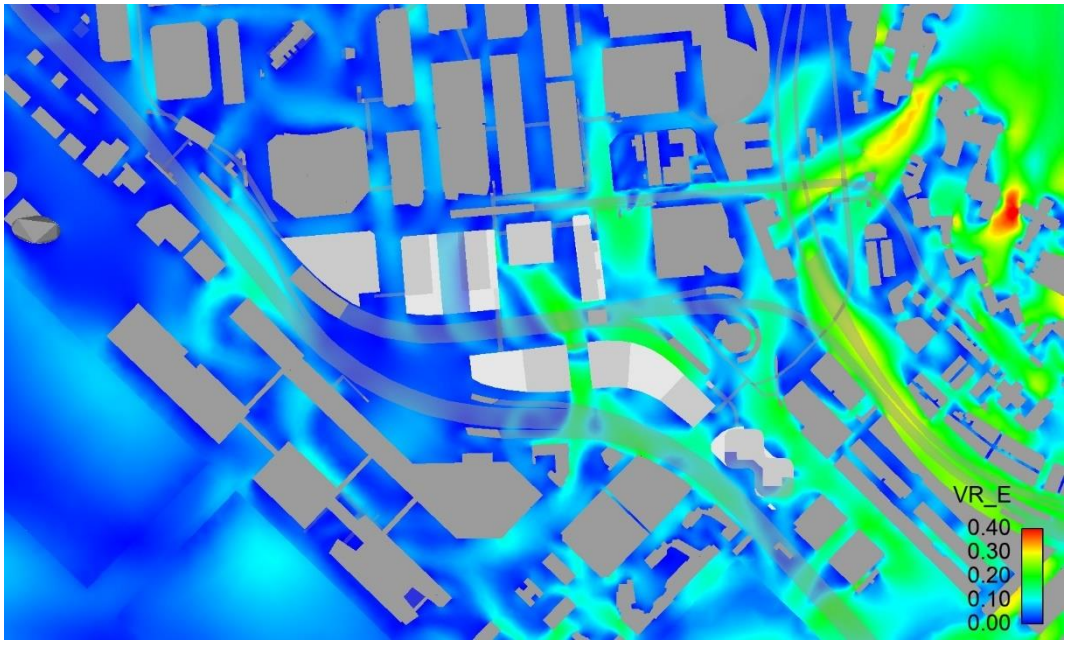

Figure 20 Contour Plots under E wind

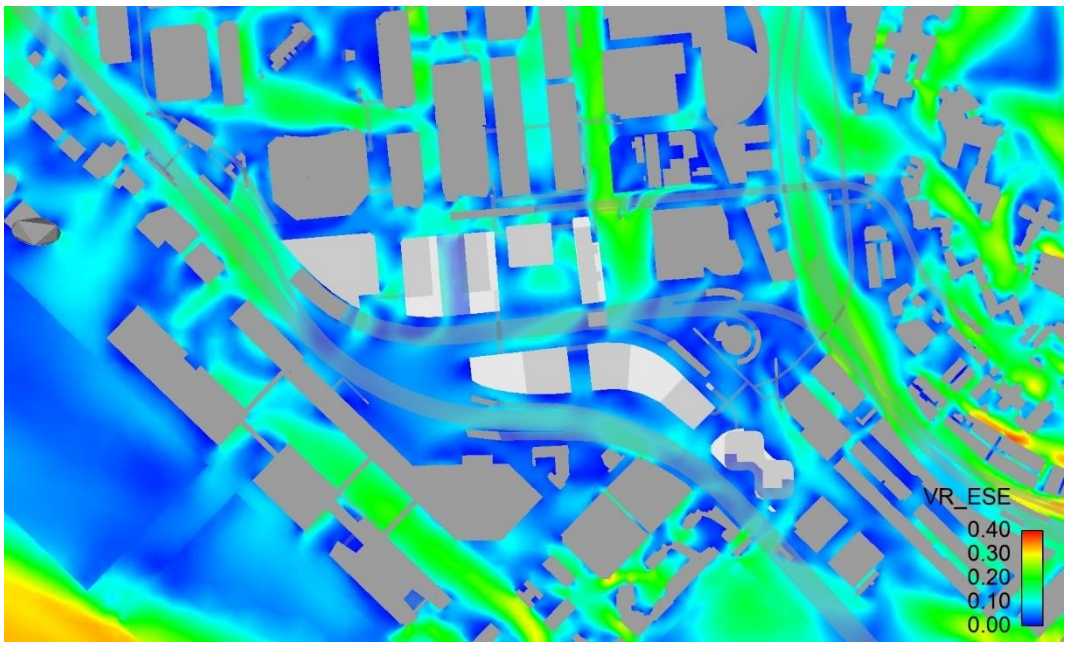

Figure 21 Contour Plots under ESE wind

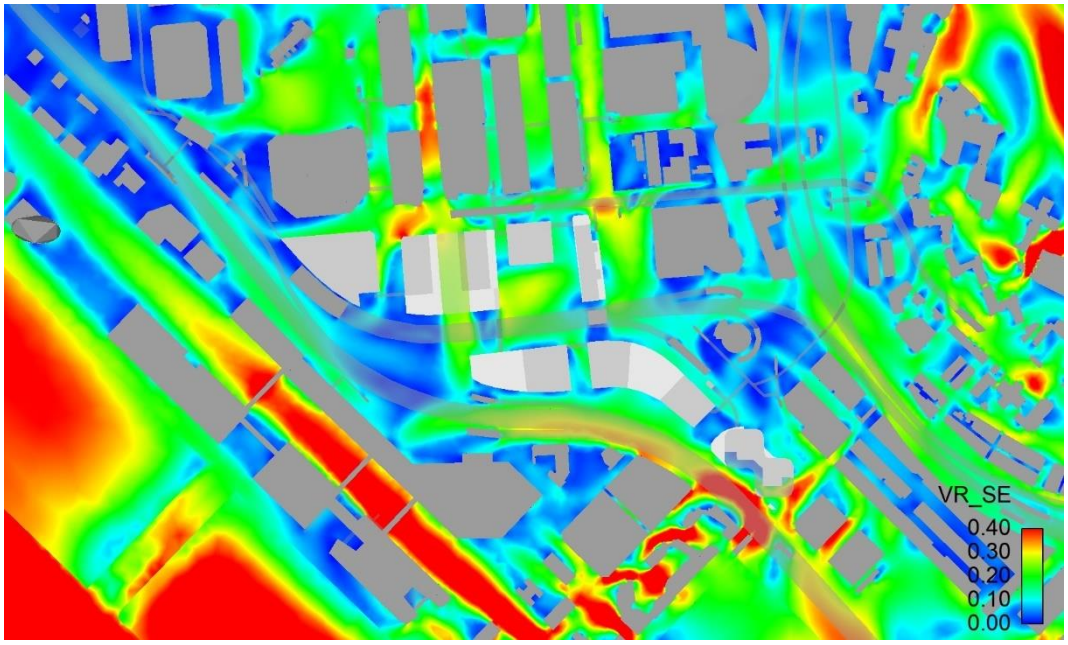

Figure 22 Contour Plots under SE wind

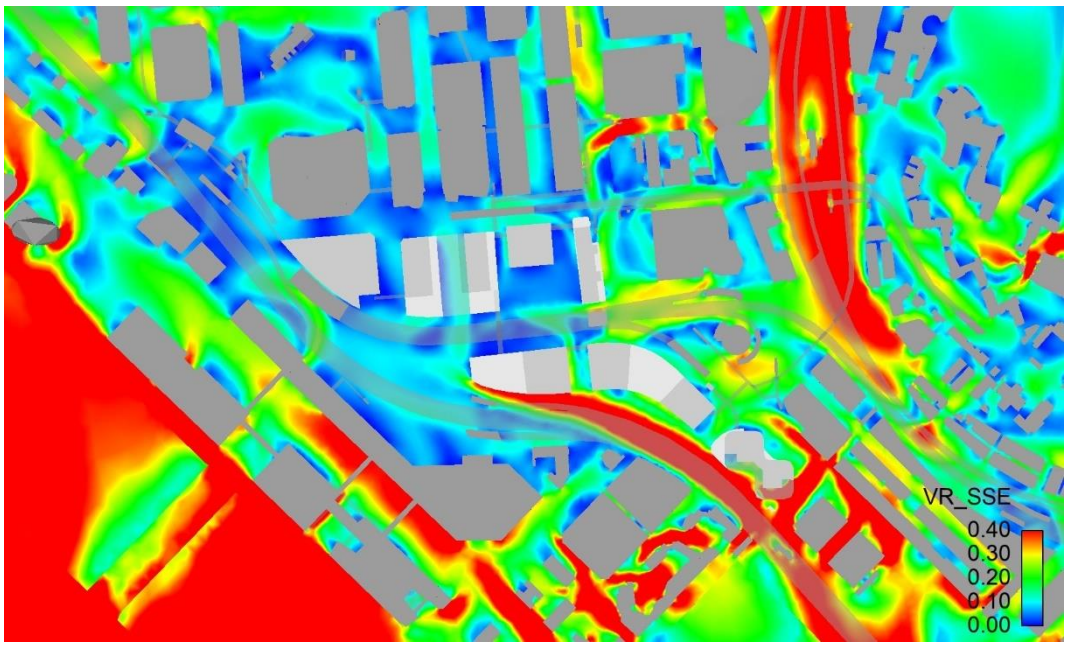

Figure 23 Contour Plots under SSE wind

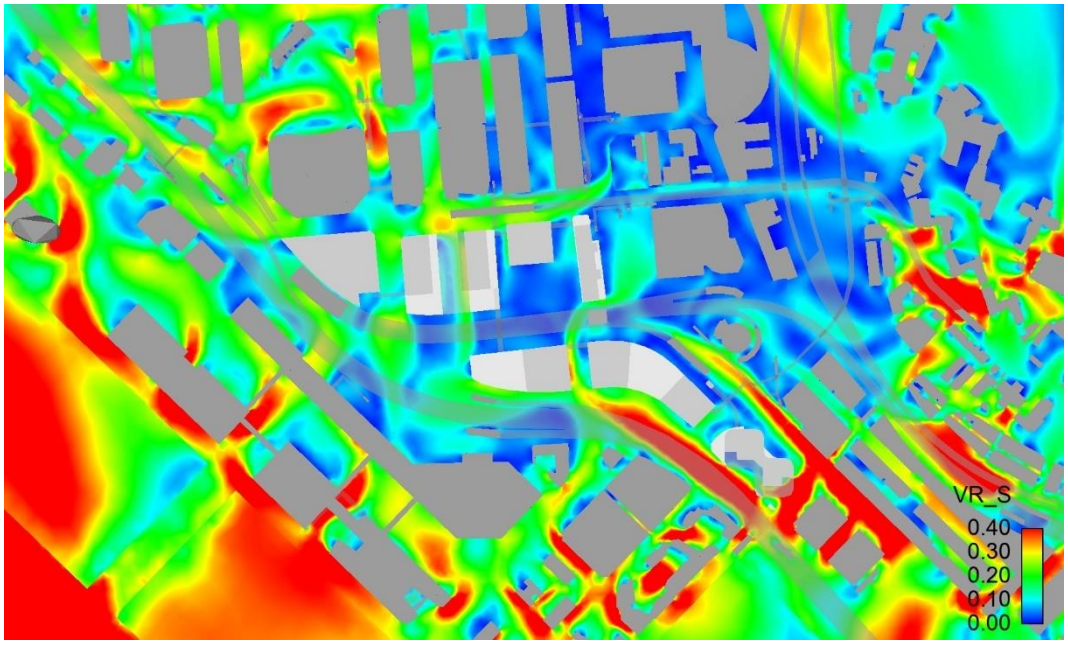

Figure 24 Contour Plots under S wind

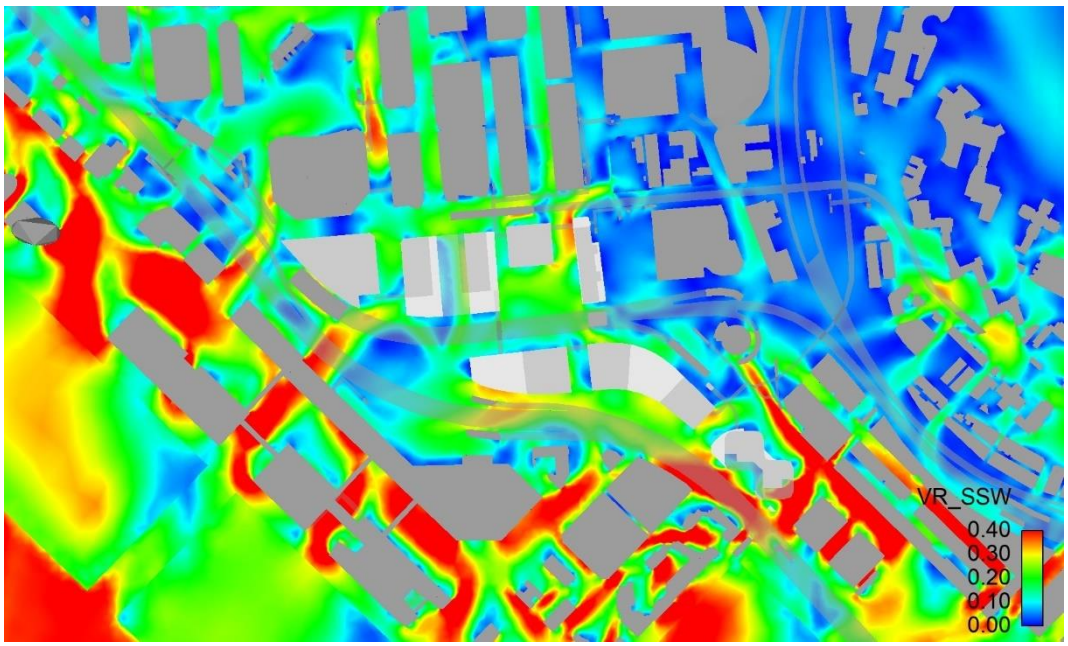

Figure 25 Contour Plots under SSW wind

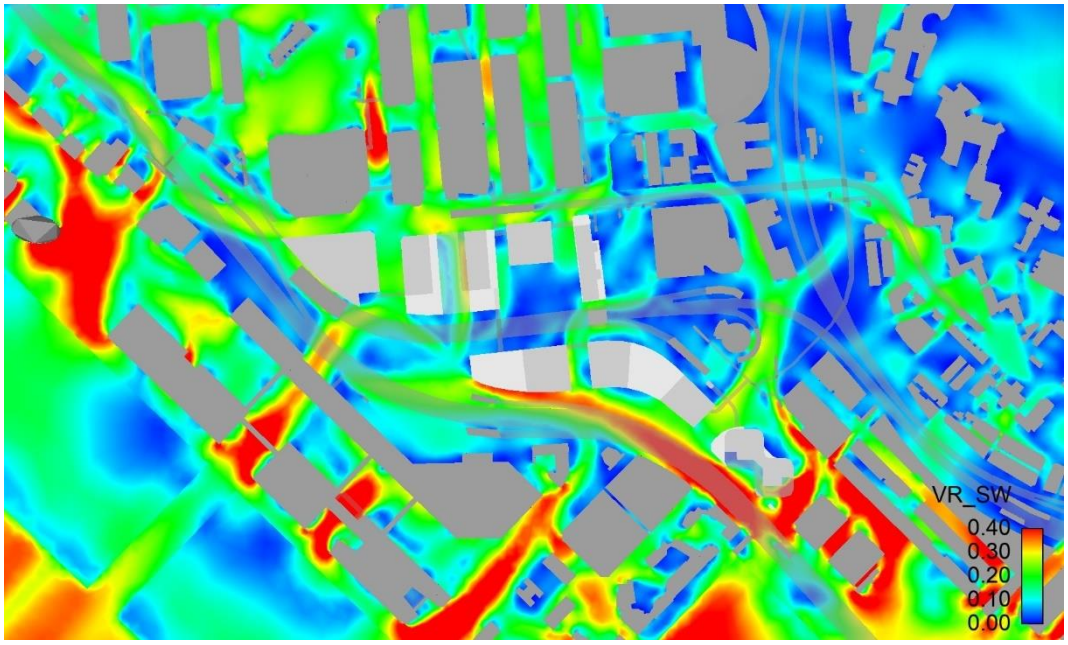

Figure 26 Contour Plots under SW wind

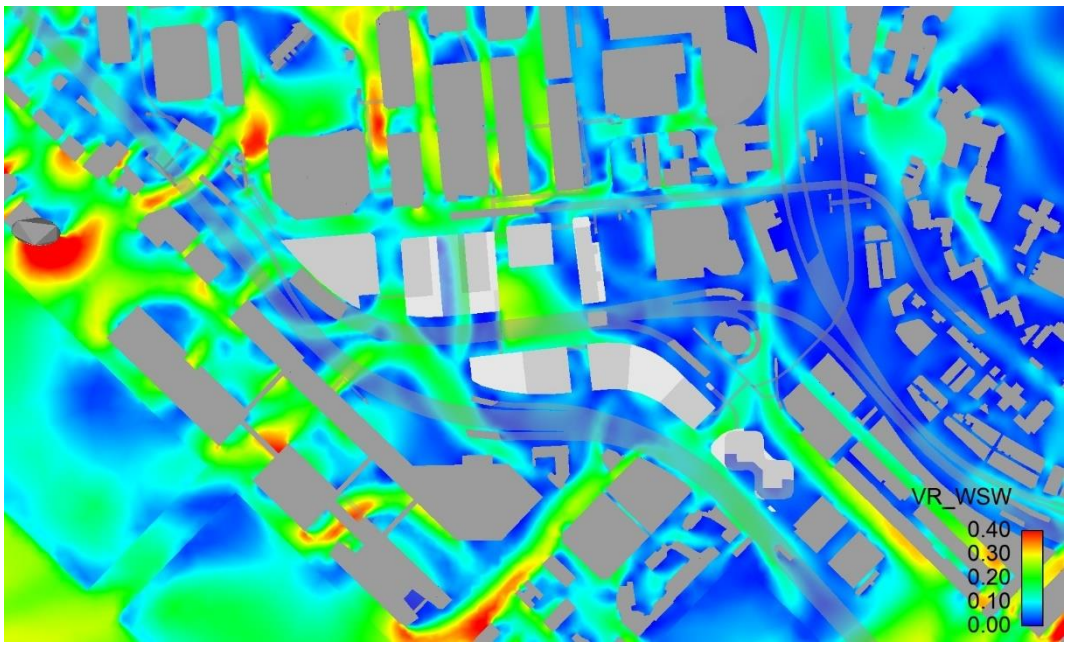

Figure 27 Contour Plots under WSW wind

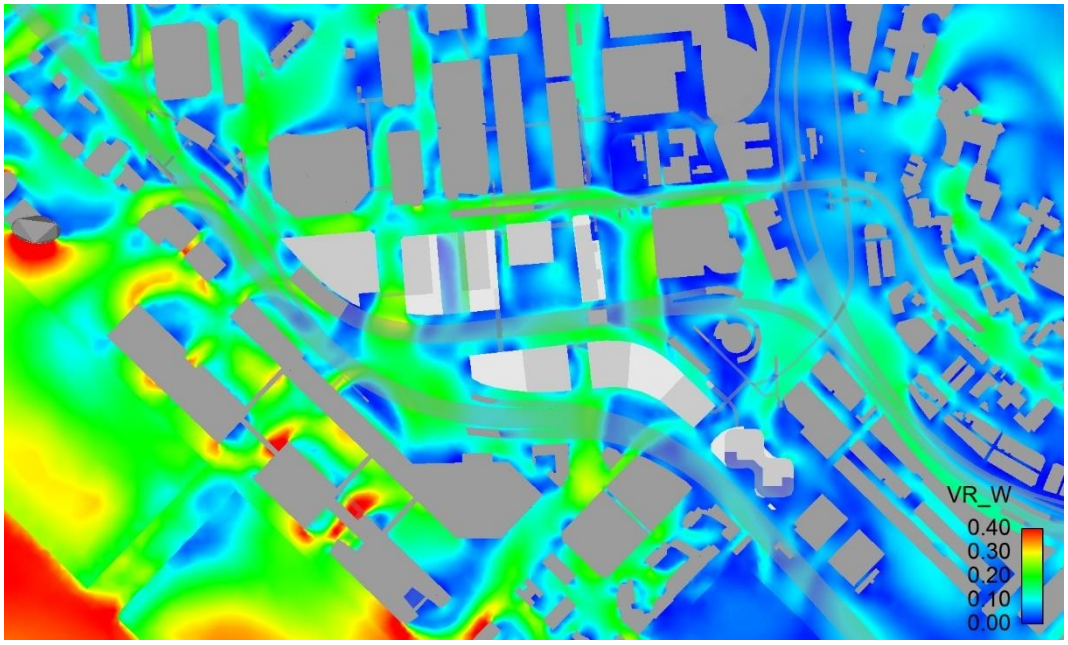

Figure 28 Contour Plots under W wind

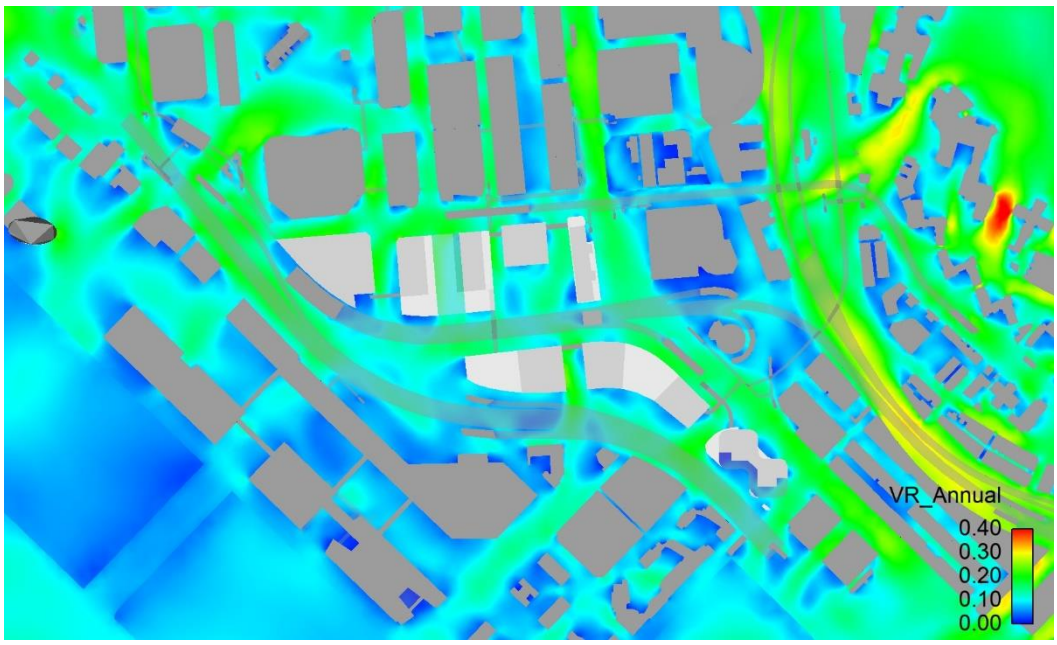

Figure 29 Contour Plots under Annual Condition

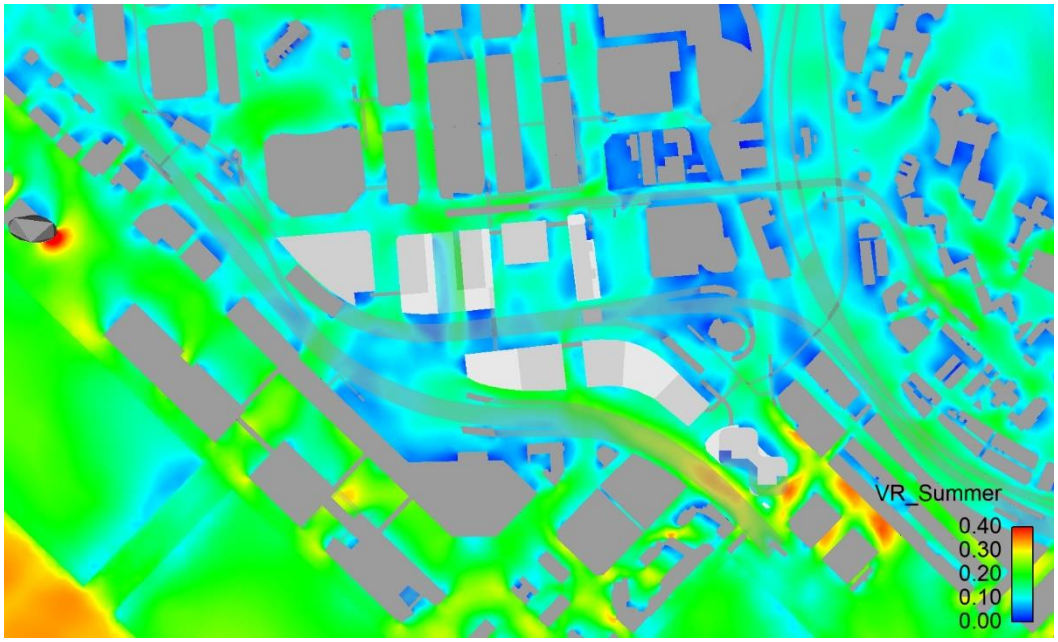

Figure 30 Contour Plots under Summer Condition

Appendix C

Vector Plots of Velocity Ratio (VR)

Contents

C1 Baseline Scheme 1

C2 Non-EFLS Scenario 8

C1 Baseline Scheme

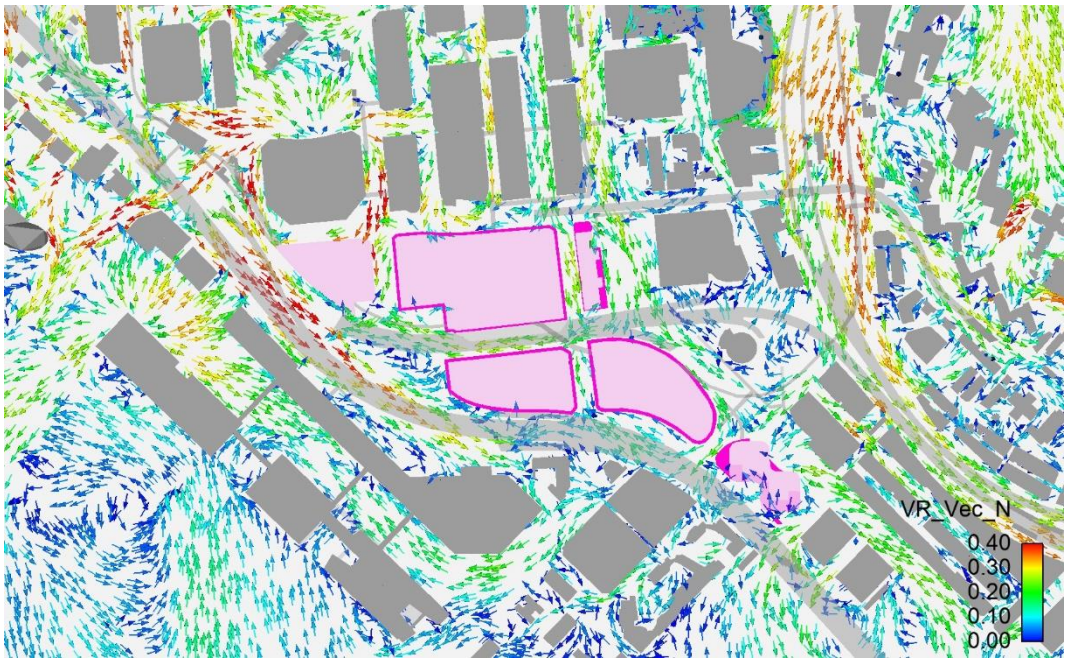

Figure 1 Vector Plot under N wind

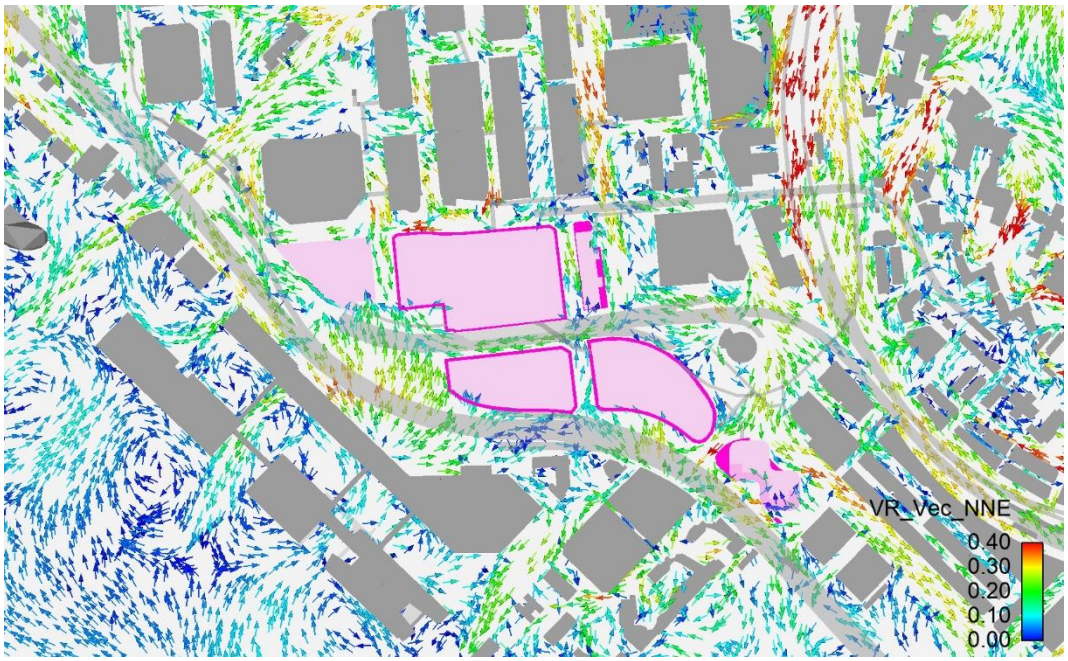

Figure 2 Vector Plot under NNE wind

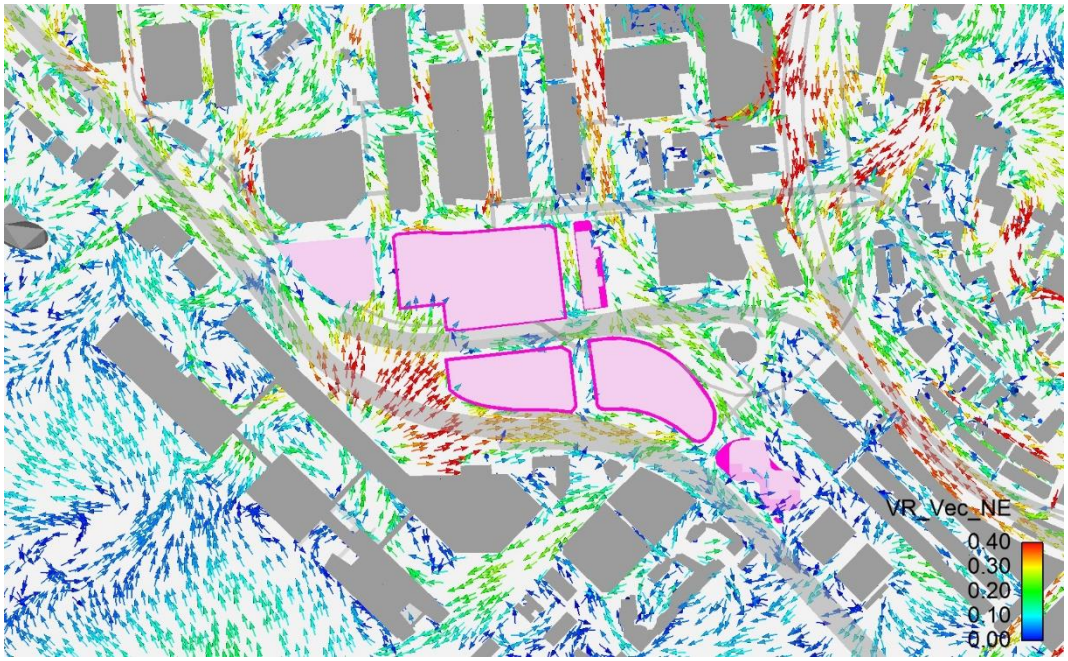

Figure 3 Vector Plot under NE wind

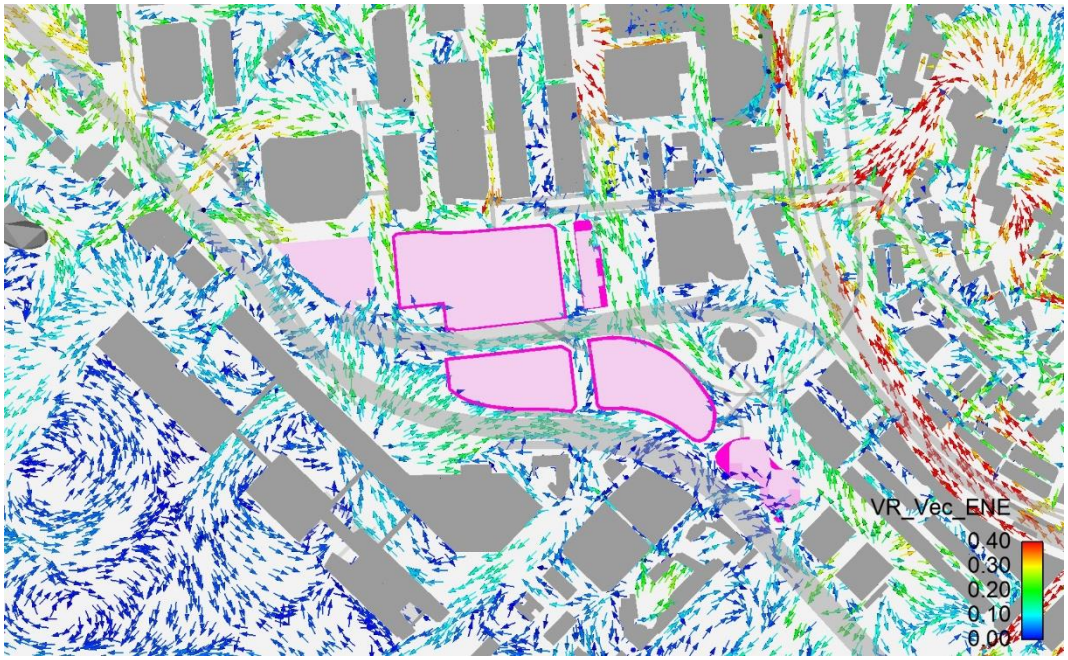

Figure 4 Vector Plot under ENE wind

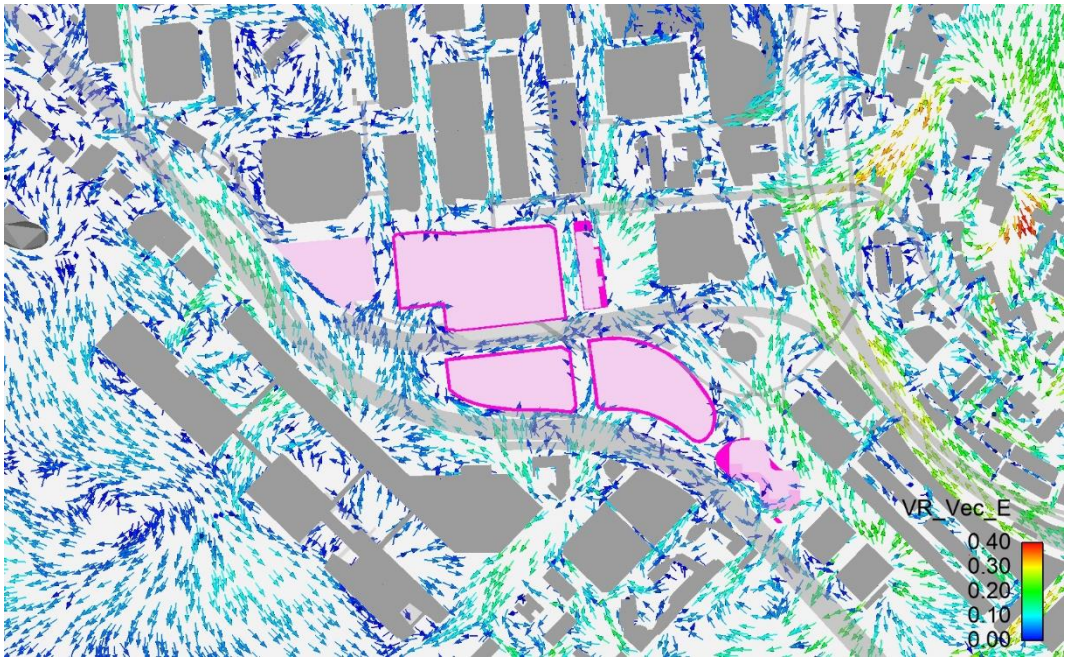

Figure 5 Vector Plot under E wind

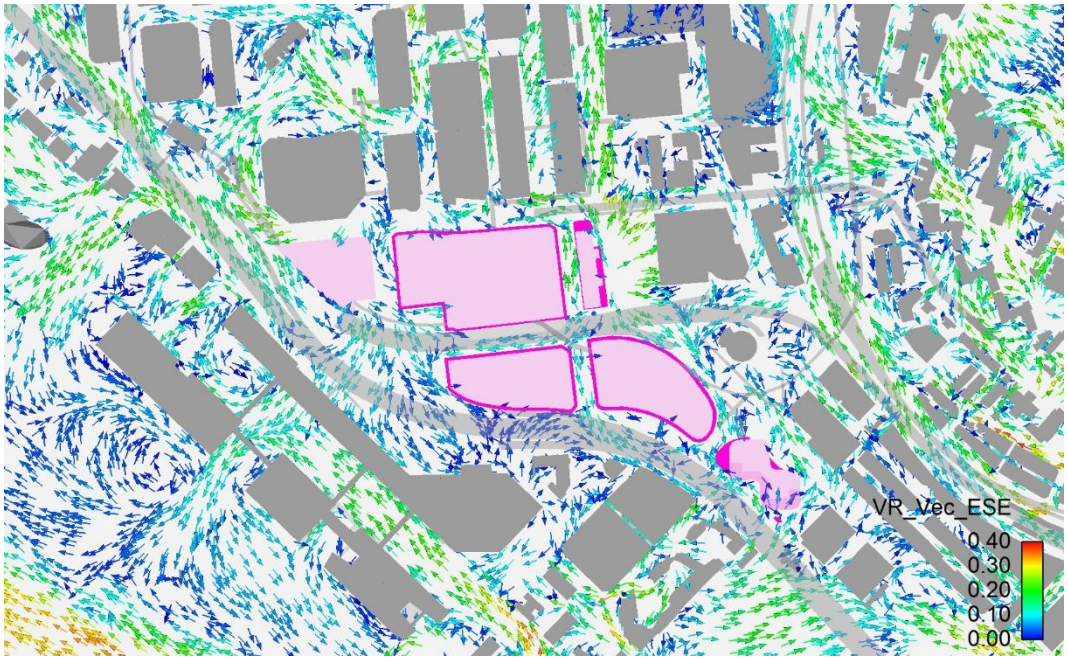

Figure 6 Vector Plot under ESE wind

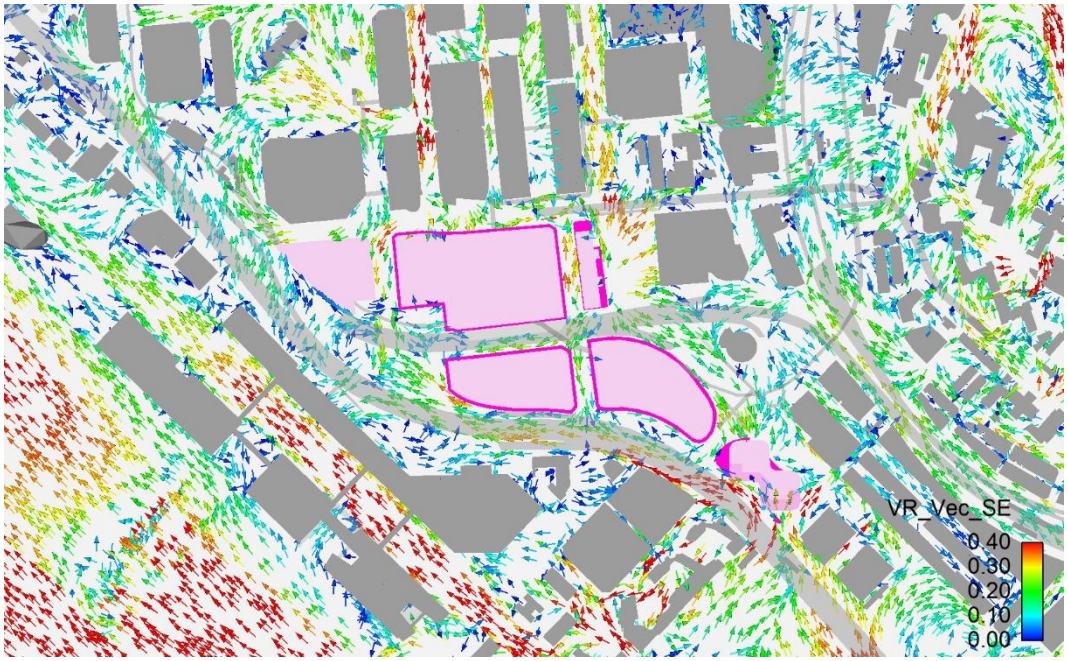

Figure 7 Vector Plot under SE wind

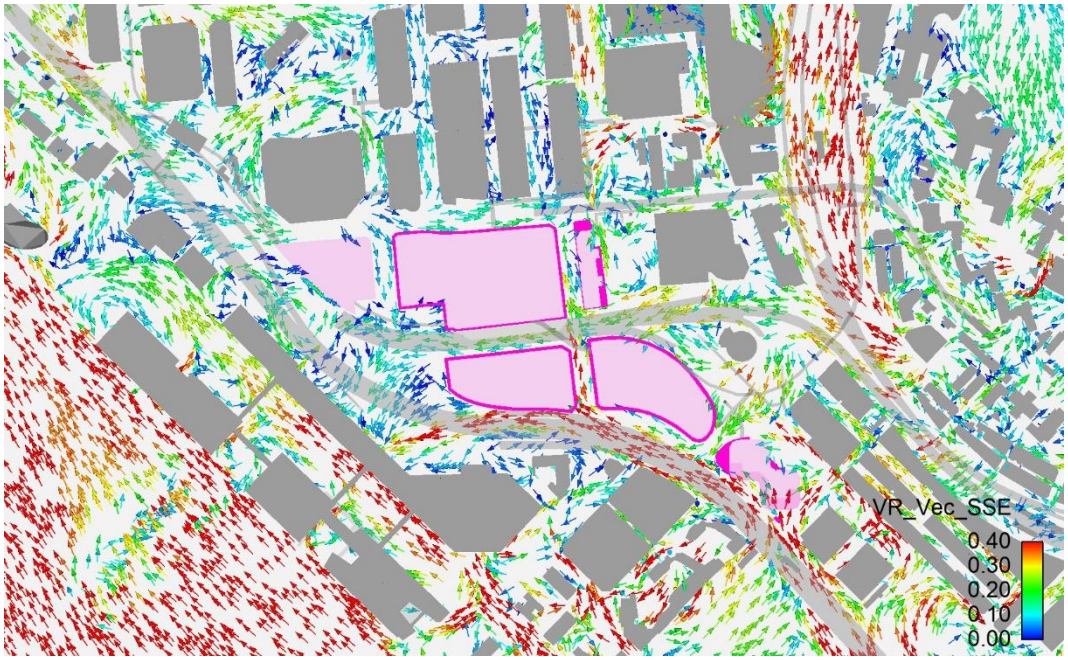

Figure 8 Vector Plot under SSE wind

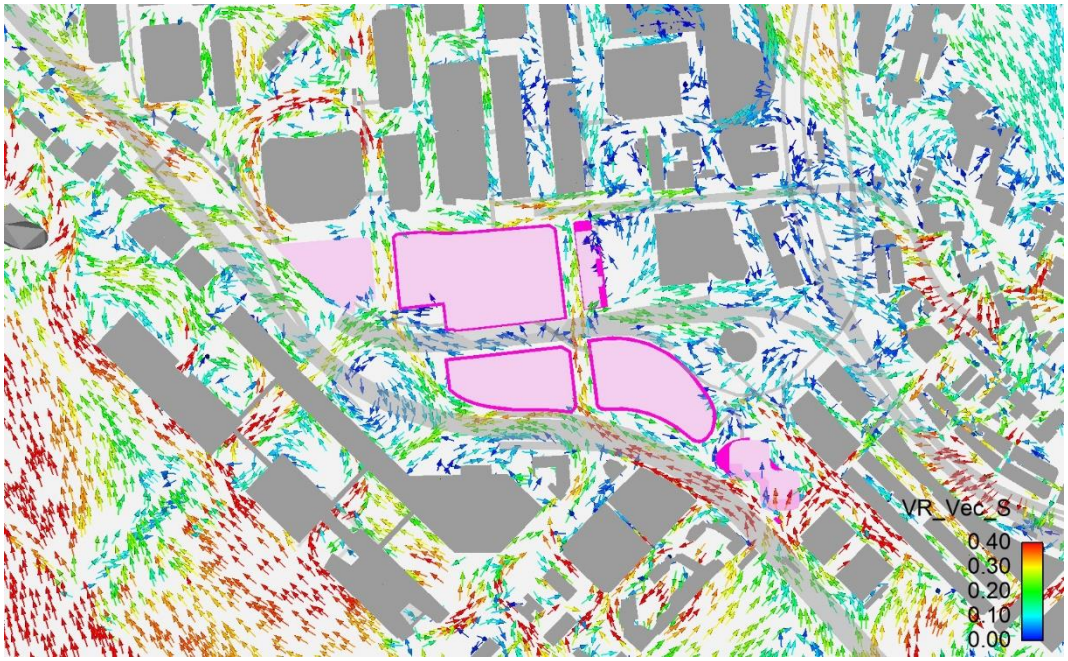

Figure 9 Vector Plot under S wind

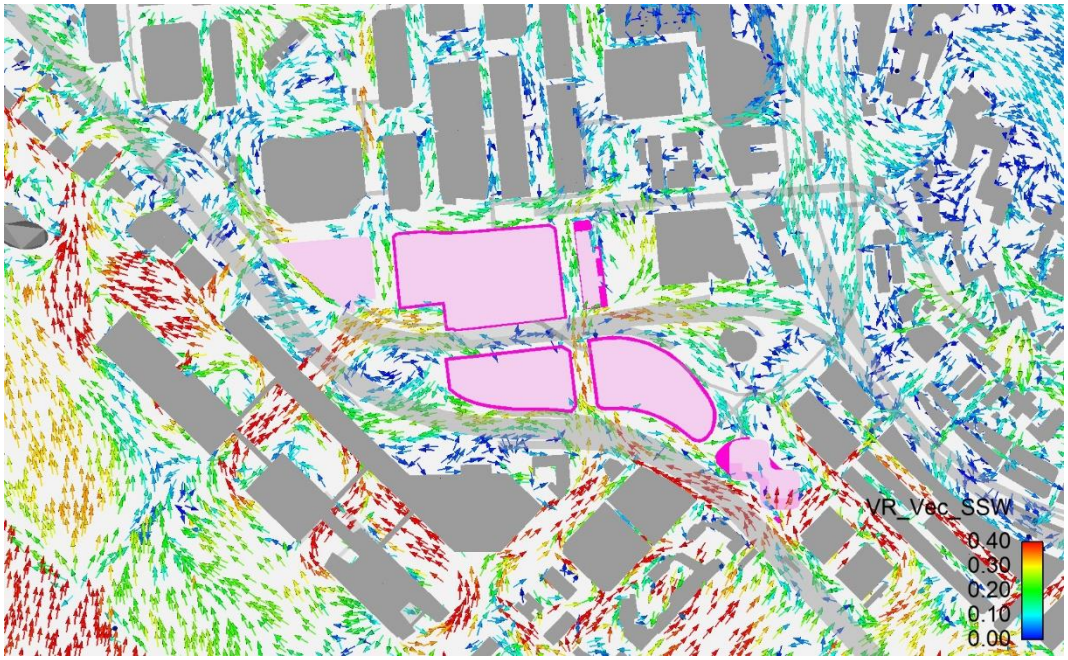

Figure 10 Vector Plot under SSW wind

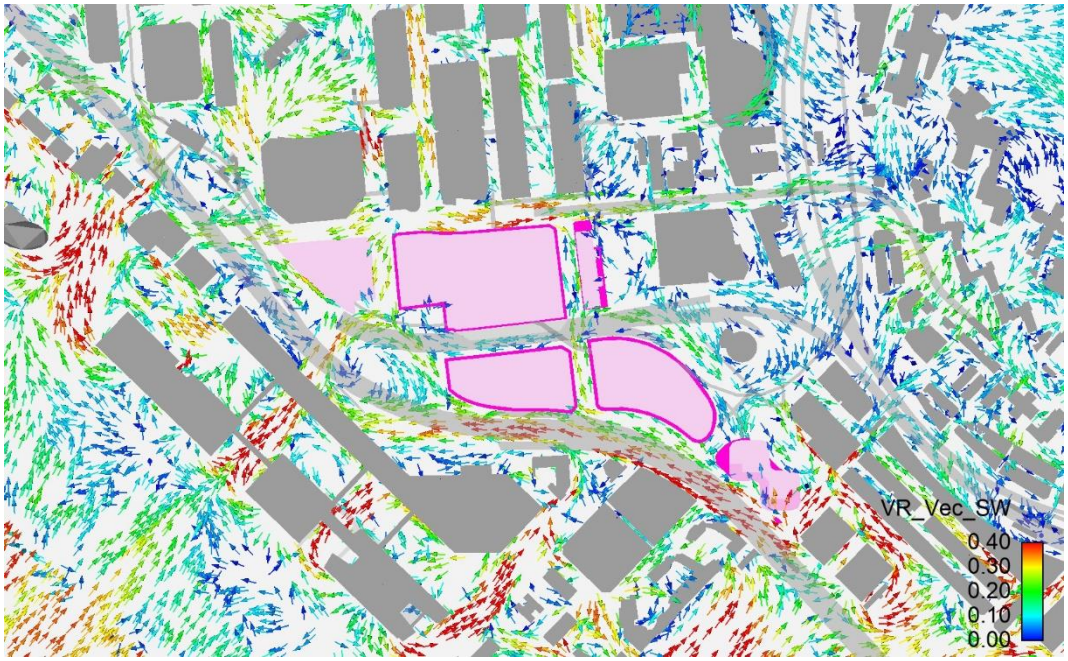

Figure 11 Vector Plot under SW wind



Figure 12 Vector Plot under WSW wind

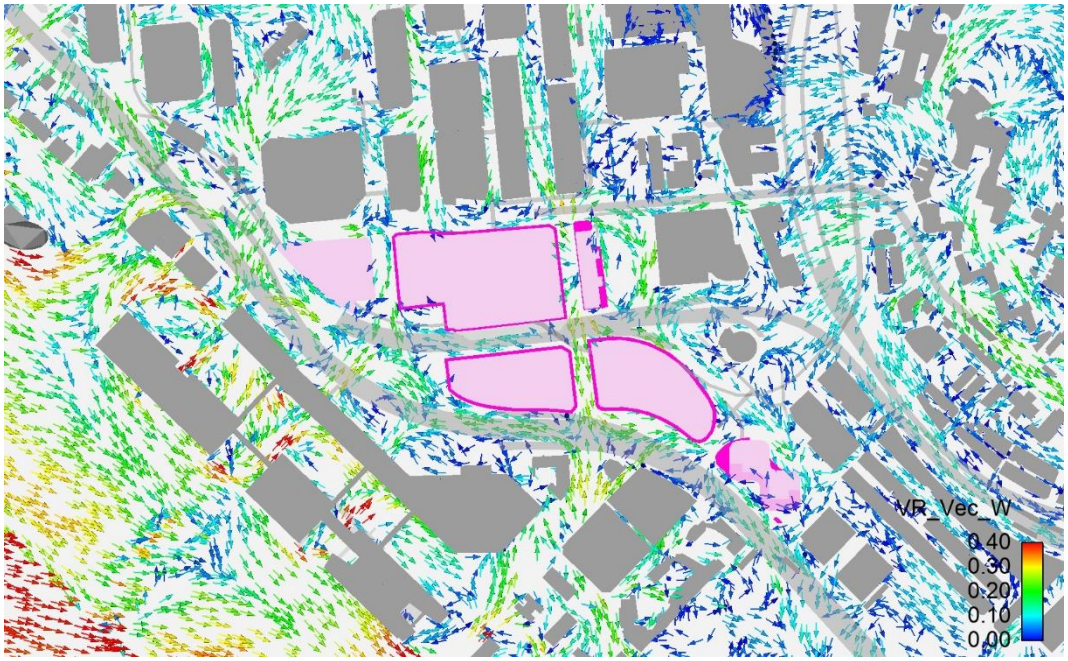

Figure 13 Vector Plot under W wind

C2 Non-EFLS Scenario

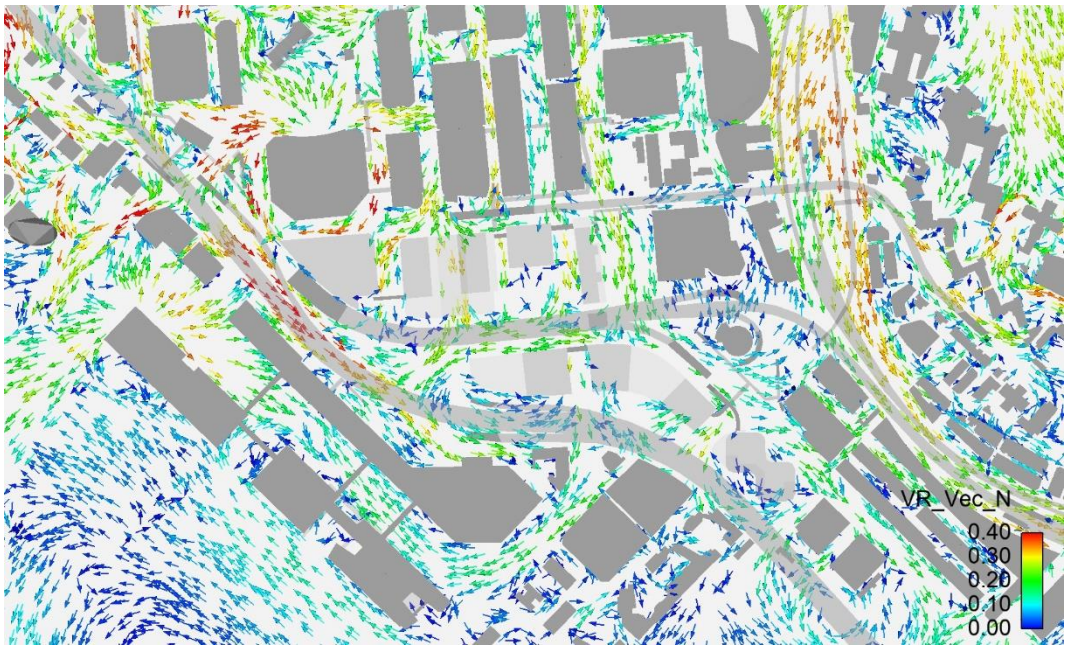

Figure 14 Vector Plot under N wind

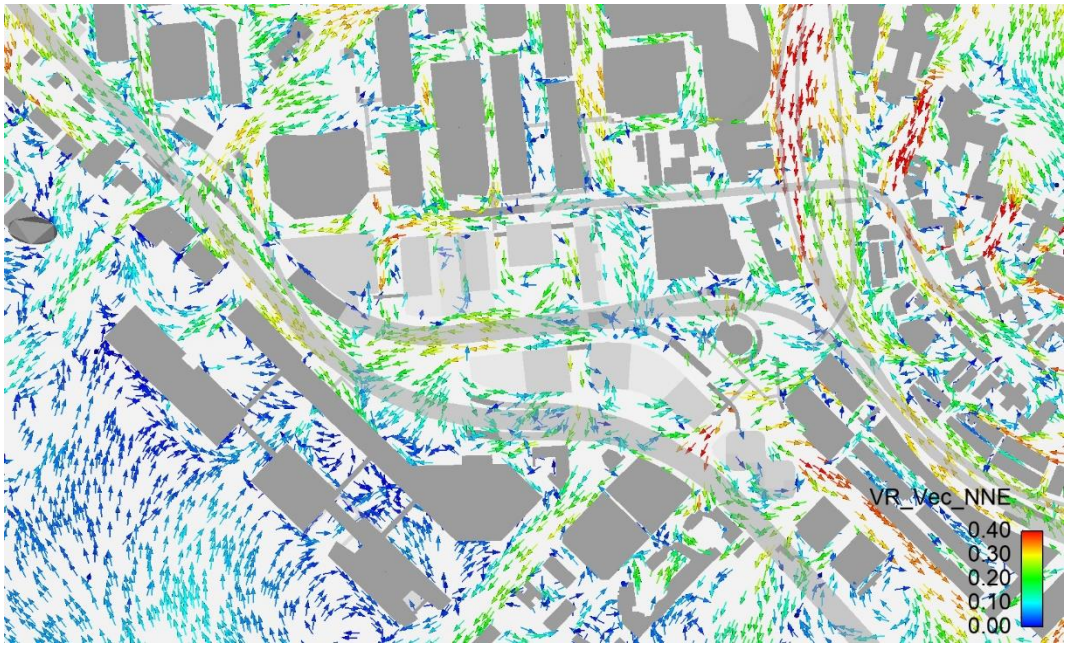

Figure 15 Vector Plot under NNE wind

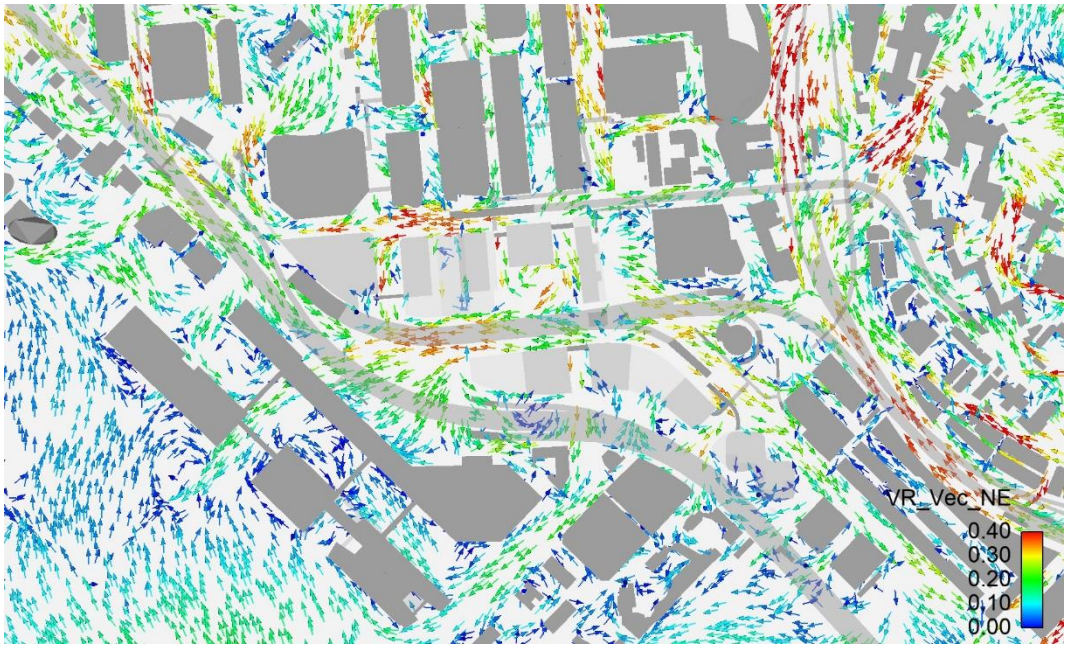

Figure 16 Vector Plot under NE wind

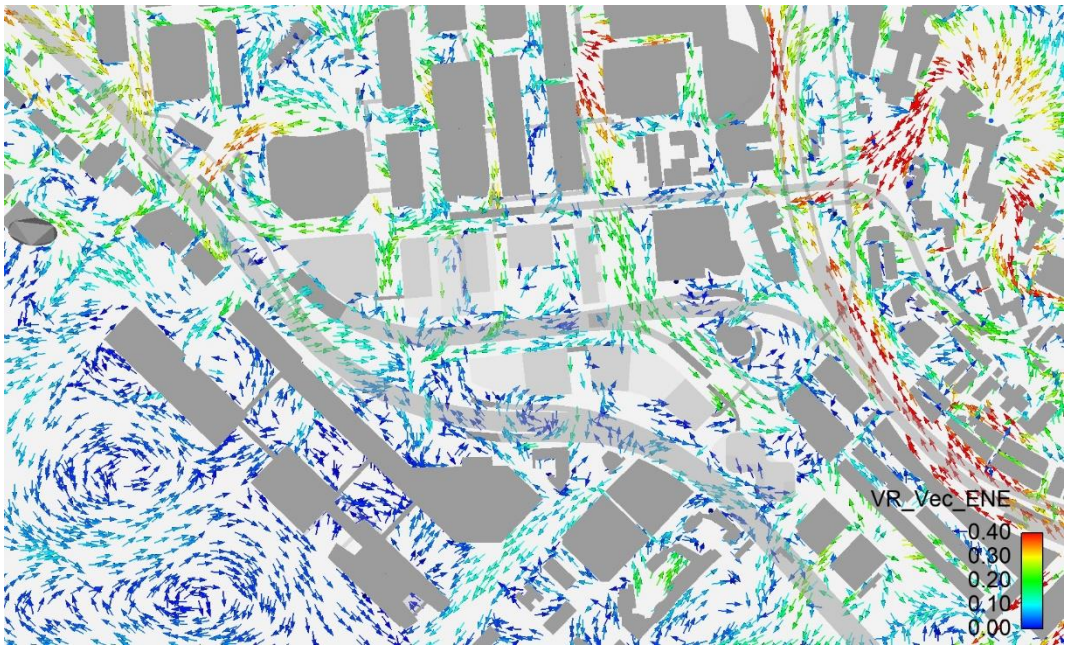

Figure 17 Vector Plot under ENE wind

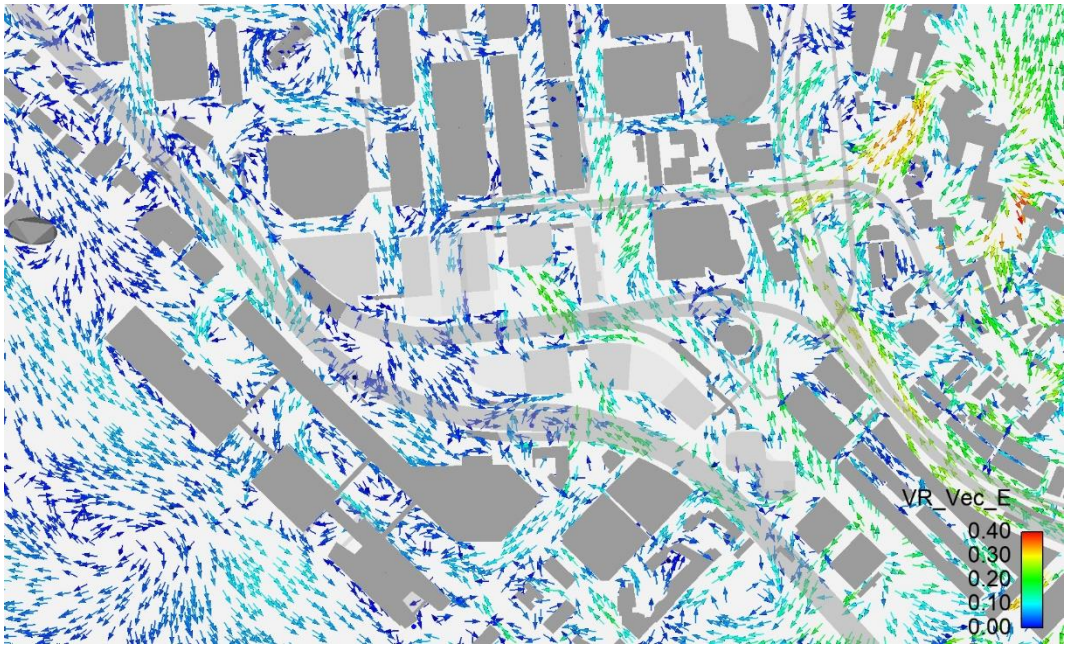

Figure 18 Vector Plot under E wind

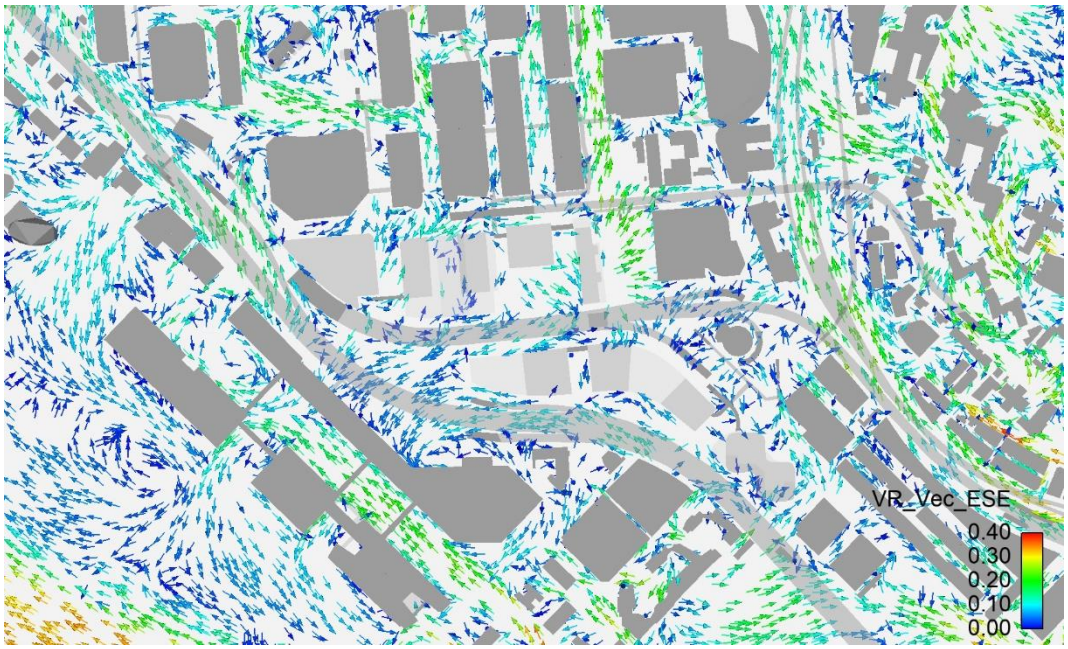

Figure 19 Vector Plot under ESE wind

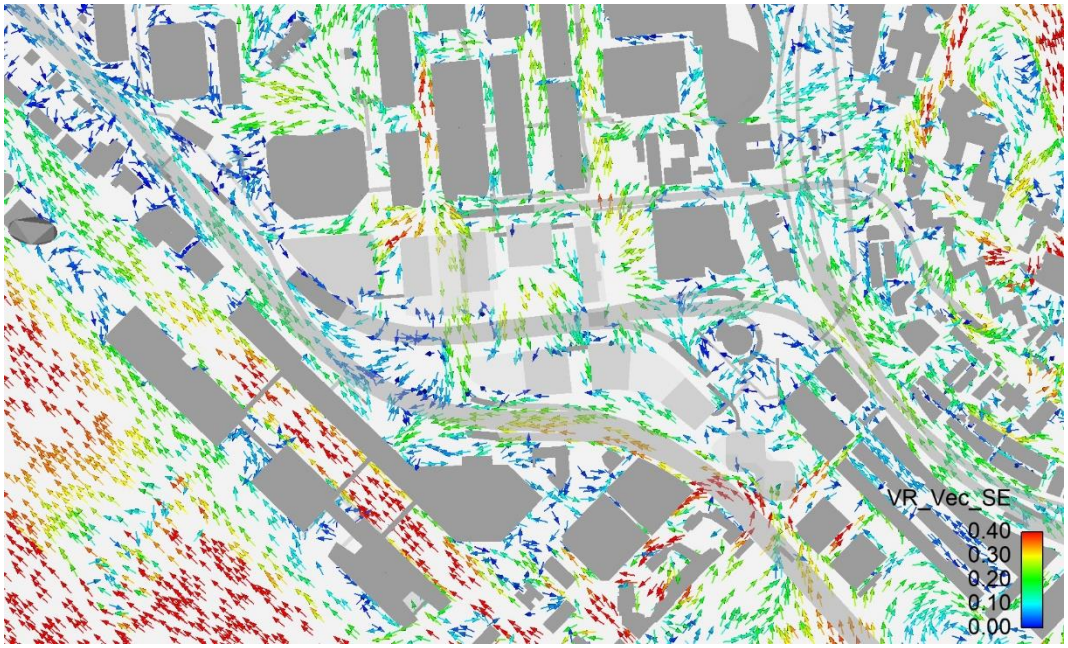

Figure 20 Vector Plot under SE wind

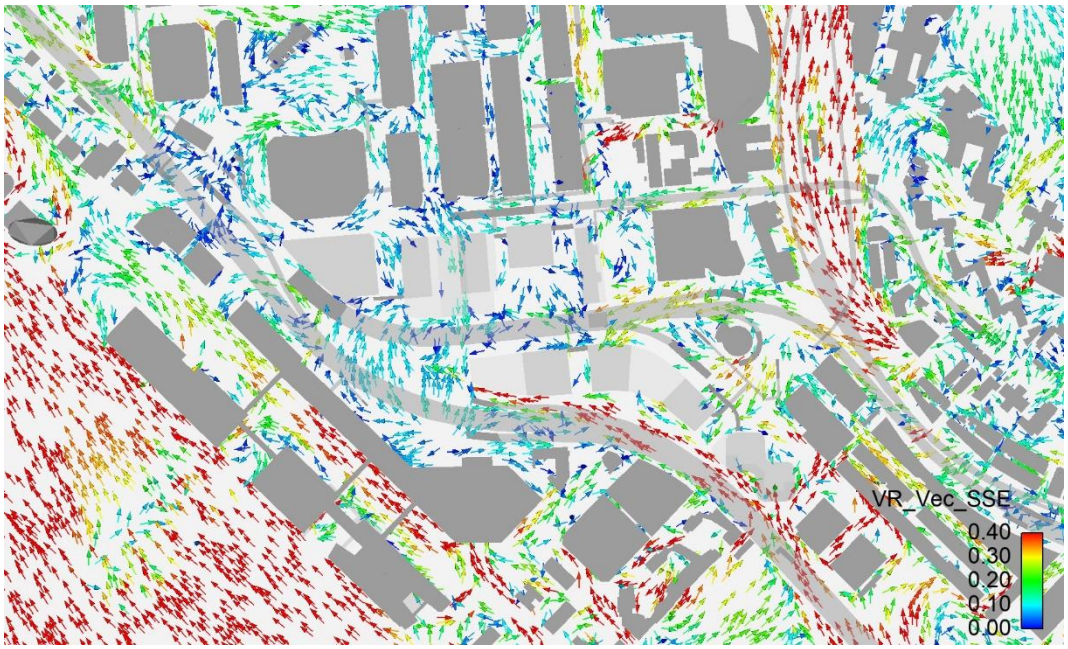

Figure 21 Vector Plot under SSE wind

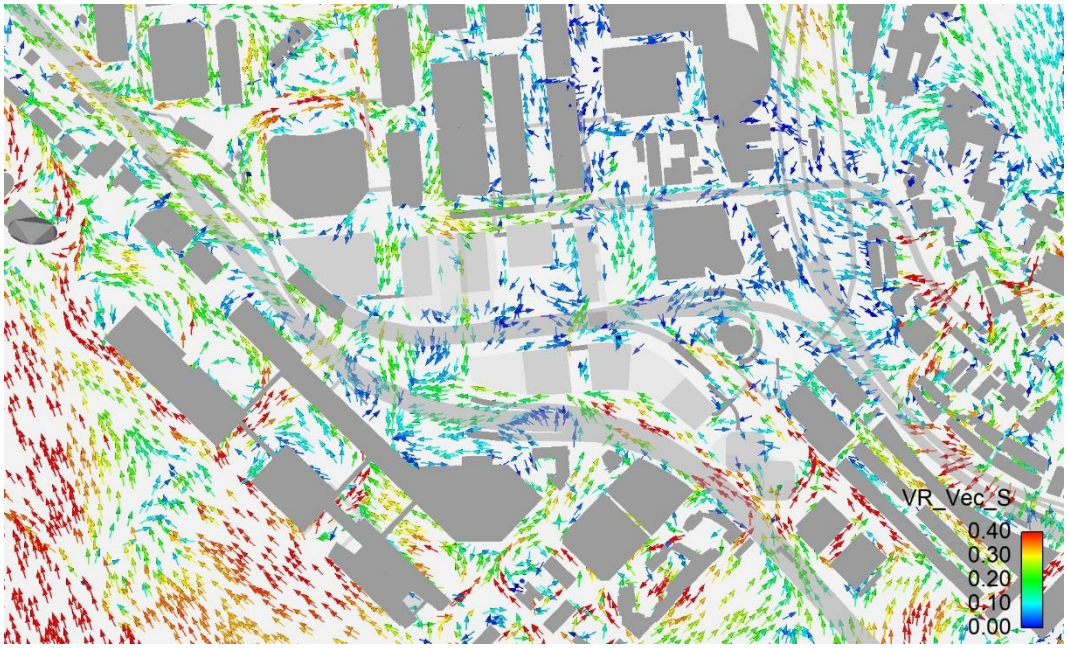

Figure 22 Vector Plot under S wind

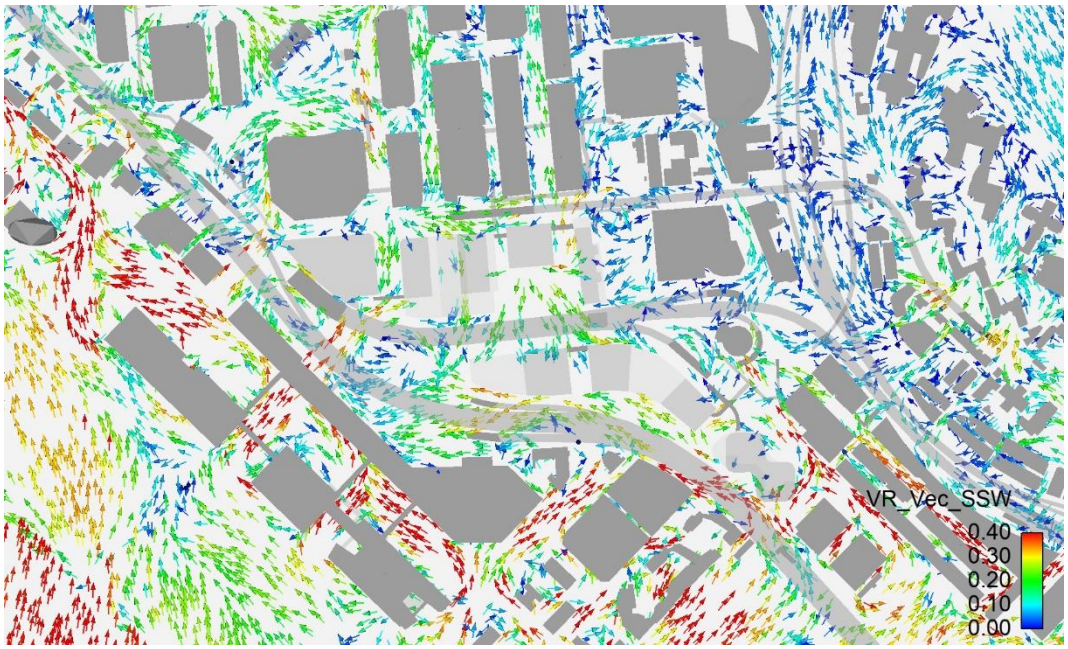

Figure 23 Vector Plot under SSW wind

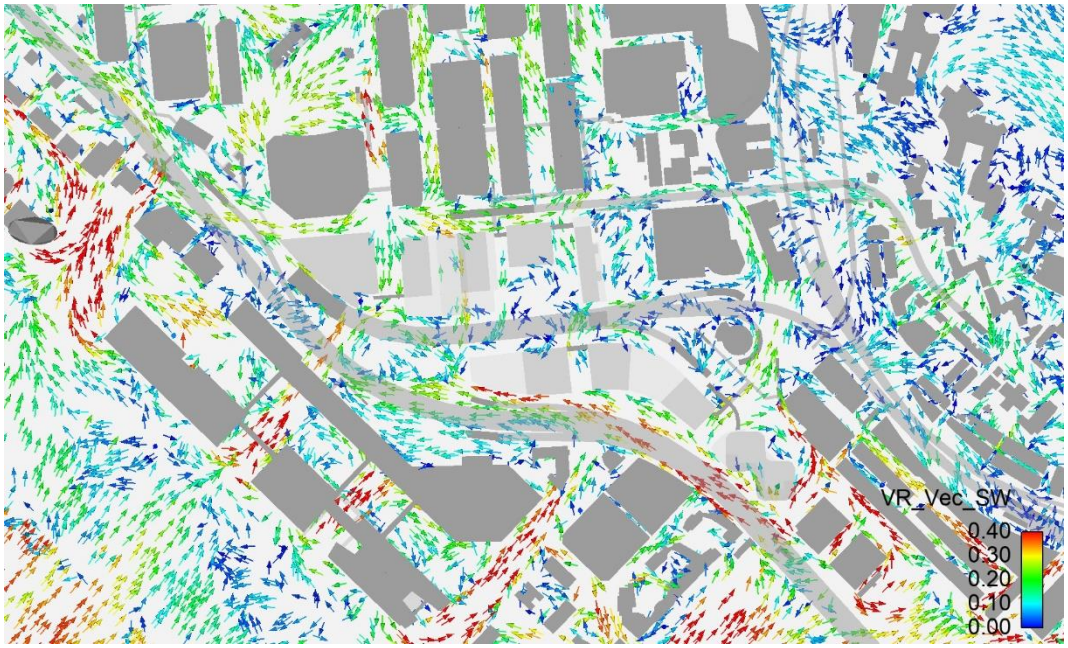

Figure 24 Vector Plot under SW wind

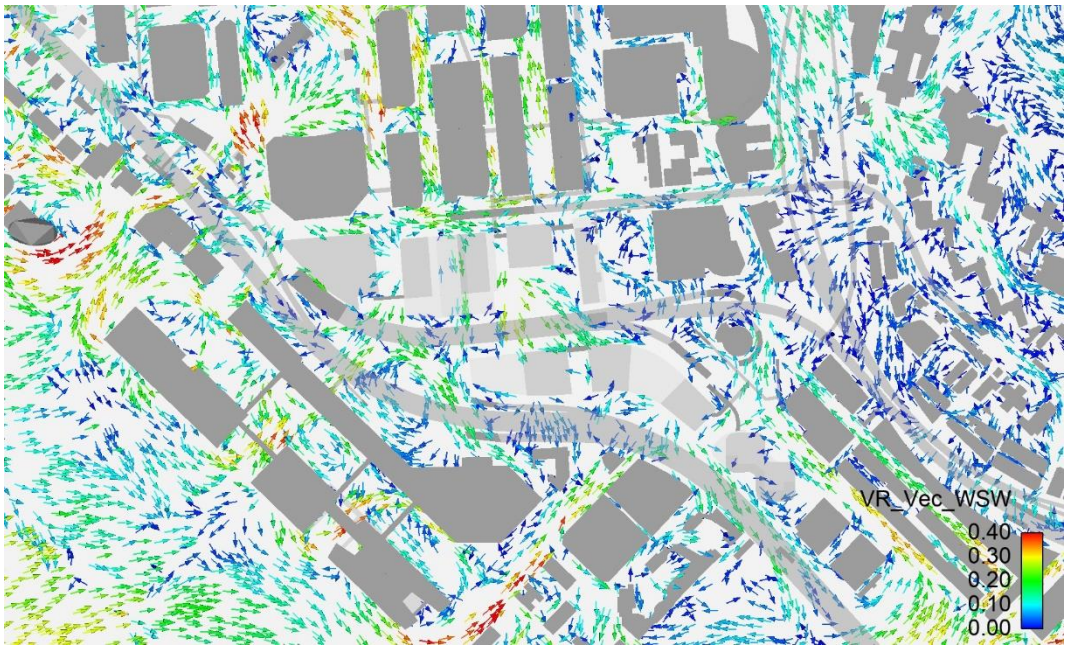

Figure 25 Vector Plot under WSW wind

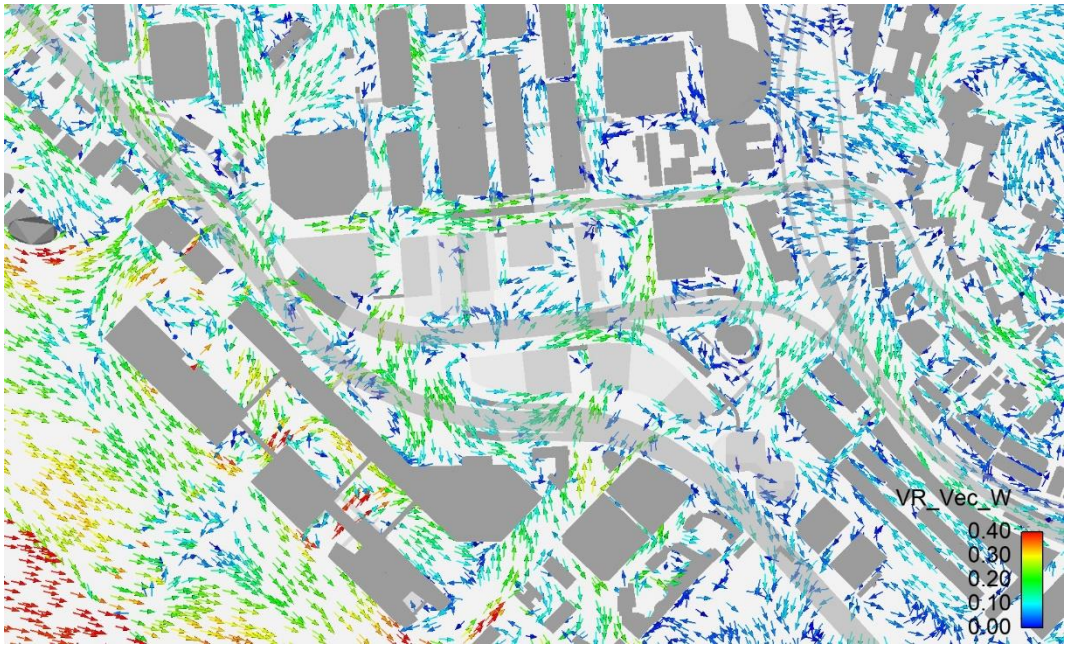

Figure 26 Vector Plot under W wind

Appendix D

Velocity Ratio (VR) at Test Points

Contents

D1 Baseline Scheme 1

D2 Non-EFLS Scenario 8

D1 Baseline Scheme

Table 1 Velocity Ratio (VR) at Perimeter Test Points

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
P1	0.26	0.25	0.08	0.16	0.17	0.10	0.08	0.27	0.08	0.25	0.27	0.16	0.32
P2	0.14	0.23	0.23	0.12	0.15	0.13	0.14	0.28	0.24	0.27	0.18	0.20	0.33
P3	0.12	0.19	0.26	0.03	0.23	0.23	0.16	0.35	0.30	0.25	0.17	0.15	0.11
P4	0.22	0.05	0.27	0.04	0.21	0.25	0.11	0.24	0.29	0.27	0.18	0.20	0.13
P5	0.21	0.13	0.22	0.04	0.10	0.19	0.02	0.11	0.15	0.27	0.18	0.19	0.17
P6	0.19	0.15	0.18	0.05	0.07	0.17	0.06	0.12	0.11	0.28	0.12	0.06	0.37
P7	0.12	0.10	0.08	0.02	0.06	0.30	0.08	0.12	0.13	0.10	0.08	0.04	0.20
P8	0.15	0.14	0.11	0.07	0.10	0.29	0.10	0.19	0.18	0.25	0.13	0.11	0.26
P9	0.24	0.24	0.17	0.04	0.11	0.22	0.13	0.09	0.15	0.31	0.16	0.02	0.22
P10	0.25	0.27	0.28	0.07	0.12	0.24	0.15	0.34	0.14	0.33	0.25	0.10	0.20
P11	0.09	0.13	0.01	0.06	0.17	0.10	0.11	0.28	0.18	0.34	0.32	0.02	0.11
P12	0.06	0.06	0.02	0.03	0.13	0.06	0.05	0.23	0.18	0.27	0.32	0.16	0.04
P13	0.31	0.33	0.23	0.12	0.23	0.32	0.07	0.17	0.20	0.14	0.26	0.10	0.26
P14	0.10	0.09	0.07	0.10	0.17	0.26	0.10	0.04	0.23	0.12	0.13	0.15	0.14
P15	0.09	0.07	0.02	0.09	0.15	0.21	0.09	0.08	0.29	0.14	0.22	0.23	0.13
P16	0.09	0.17	0.09	0.06	0.13	0.19	0.16	0.10	0.18	0.10	0.21	0.20	0.17
P17	0.17	0.25	0.10	0.04	0.08	0.14	0.26	0.17	0.29	0.13	0.02	0.12	0.07
P18	0.17	0.24	0.13	0.06	0.12	0.19	0.08	0.13	0.19	0.17	0.05	0.05	0.08
P19	0.07	0.24	0.14	0.08	0.04	0.17	0.17	0.04	0.12	0.14	0.07	0.07	0.13
P20	0.04	0.19	0.15	0.09	0.03	0.18	0.32	0.11	0.09	0.06	0.12	0.07	0.12
P21	0.25	0.18	0.08	0.14	0.09	0.16	0.26	0.12	0.12	0.11	0.13	0.08	0.06
P22	0.22	0.06	0.12	0.18	0.12	0.06	0.06	0.14	0.22	0.18	0.24	0.08	0.15
P23	0.21	0.10	0.14	0.18	0.15	0.21	0.47	0.53	0.44	0.38	0.24	0.08	0.12
P24	0.34	0.08	0.13	0.13	0.12	0.23	0.44	0.52	0.46	0.41	0.29	0.04	0.23
P25	0.24	0.03	0.20	0.15	0.10	0.08	0.18	0.44	0.21	0.17	0.28	0.03	0.20
P26	0.16	0.03	0.05	0.07	0.03	0.10	0.13	0.23	0.36	0.38	0.02	0.07	0.17
P27	0.22	0.06	0.10	0.09	0.06	0.31	0.53	0.42	0.39	0.41	0.10	0.10	0.26
P28	0.16	0.07	0.08	0.07	0.17	0.30	0.18	0.20	0.24	0.28	0.09	0.12	0.21
P29	0.17	0.07	0.04	0.12	0.22	0.57	0.57	0.47	0.42	0.17	0.11	0.10	0.10
P30	0.25	0.04	0.02	0.05	0.10	0.05	0.09	0.13	0.12	0.45	0.15	0.12	0.07
P31	0.21	0.08	0.04	0.04	0.06	0.25	0.17	0.30	0.38	0.41	0.12	0.06	0.09
P32	0.20	0.07	0.01	0.02	0.03	0.29	0.29	0.44	0.49	0.44	0.15	0.03	0.08
P33	0.22	0.12	0.02	0.01	0.10	0.46	0.51	0.55	0.55	0.48	0.14	0.03	0.08
P34	0.27	0.16	0.01	0.05	0.07	0.44	0.51	0.49	0.48	0.43	0.19	0.04	0.14
P35	0.19	0.08	0.02	0.04	0.08	0.32	0.26	0.22	0.14	0.34	0.09	0.01	0.09
P36	0.06	0.12	0.07	0.12	0.05	0.09	0.07	0.08	0.33	0.24	0.18	0.16	0.05
P37	0.07	0.08	0.02	0.03	0.03	0.06	0.05	0.05	0.07	0.14	0.02	0.09	0.03
P38	0.11	0.16	0.04	0.03	0.03	0.10	0.05	0.02	0.06	0.07	0.04	0.01	0.05

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
P39	0.14	0.15	0.04	0.12	0.03	0.16	0.05	0.08	0.04	0.08	0.04	0.04	0.14
P40	0.09	0.18	0.08	0.11	0.03	0.10	0.06	0.10	0.02	0.05	0.06	0.01	0.18
P41	0.18	0.40	0.16	0.06	0.03	0.06	0.09	0.02	0.02	0.06	0.06	0.05	0.09
P42	0.15	0.30	0.11	0.05	0.06	0.04	0.22	0.18	0.04	0.07	0.08	0.09	0.02
P43	0.15	0.17	0.06	0.04	0.07	0.04	0.08	0.09	0.17	0.23	0.12	0.08	0.06
P44	0.32	0.37	0.15	0.11	0.07	0.09	0.07	0.09	0.13	0.22	0.06	0.07	0.05
P45	0.27	0.33	0.11	0.07	0.11	0.07	0.03	0.28	0.37	0.31	0.14	0.08	0.14
P46	0.07	0.19	0.06	0.07	0.05	0.04	0.06	0.13	0.07	0.02	0.08	0.13	0.22
P47	0.26	0.13	0.05	0.12	0.10	0.07	0.16	0.16	0.12	0.05	0.10	0.09	0.23
P48	0.27	0.13	0.03	0.16	0.16	0.09	0.05	0.09	0.05	0.03	0.07	0.08	0.18
P49	0.02	0.09	0.05	0.06	0.06	0.03	0.21	0.20	0.37	0.05	0.05	0.04	0.06
P50	0.09	0.05	0.05	0.08	0.15	0.03	0.01	0.14	0.19	0.12	0.11	0.26	0.27

Table 2 Velocity Ratio (VR) at Overall Test Points

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
O1	0.24	0.39	0.33	0.13	0.06	0.12	0.32	0.30	0.25	0.07	0.10	0.18	0.30
O2	0.09	0.30	0.19	0.10	0.14	0.12	0.10	0.27	0.04	0.21	0.06	0.22	0.14
O3	0.09	0.10	0.08	0.08	0.05	0.04	0.12	0.27	0.06	0.11	0.06	0.10	0.25
O4	0.08	0.20	0.13	0.04	0.03	0.06	0.03	0.11	0.18	0.10	0.04	0.10	0.05
O5	0.12	0.27	0.16	0.05	0.01	0.01	0.07	0.21	0.20	0.24	0.04	0.16	0.12
O6	0.14	0.14	0.10	0.00	0.04	0.13	0.03	0.31	0.19	0.15	0.17	0.06	0.23
O7	0.16	0.18	0.09	0.02	0.05	0.19	0.05	0.12	0.07	0.27	0.29	0.14	0.21
O8	0.26	0.35	0.34	0.03	0.16	0.11	0.21	0.35	0.08	0.32	0.36	0.21	0.39
O9	0.29	0.26	0.05	0.02	0.18	0.17	0.17	0.34	0.04	0.16	0.26	0.12	0.38
O10	0.24	0.29	0.08	0.02	0.25	0.21	0.14	0.33	0.26	0.08	0.20	0.18	0.36
O11	0.23	0.18	0.05	0.02	0.12	0.28	0.06	0.09	0.07	0.20	0.19	0.14	0.23
O12	0.22	0.18	0.07	0.02	0.15	0.23	0.06	0.11	0.10	0.16	0.11	0.12	0.12
O13	0.18	0.12	0.08	0.03	0.17	0.27	0.15	0.20	0.05	0.22	0.17	0.13	0.14
O14	0.19	0.19	0.14	0.03	0.07	0.27	0.19	0.37	0.12	0.25	0.24	0.15	0.22
O15	0.10	0.23	0.27	0.03	0.03	0.07	0.11	0.08	0.16	0.25	0.27	0.14	0.22
O16	0.04	0.10	0.20	0.06	0.04	0.13	0.05	0.14	0.11	0.19	0.22	0.11	0.16
O17	0.08	0.11	0.08	0.02	0.20	0.26	0.16	0.39	0.34	0.36	0.42	0.07	0.34
O18	0.14	0.16	0.10	0.03	0.13	0.23	0.07	0.18	0.12	0.24	0.13	0.12	0.28
O19	0.11	0.28	0.15	0.05	0.04	0.26	0.09	0.39	0.31	0.11	0.22	0.09	0.19
O20	0.13	0.09	0.05	0.04	0.17	0.26	0.09	0.25	0.33	0.27	0.22	0.06	0.15
O21	0.11	0.19	0.13	0.04	0.12	0.19	0.20	0.43	0.33	0.45	0.38	0.10	0.24
O22	0.34	0.31	0.28	0.07	0.03	0.04	0.14	0.23	0.15	0.26	0.17	0.10	0.42
O23	0.31	0.28	0.28	0.08	0.04	0.13	0.05	0.06	0.05	0.16	0.12	0.05	0.42
O24	0.10	0.11	0.15	0.02	0.06	0.37	0.07	0.23	0.14	0.33	0.25	0.19	0.19
O25	0.24	0.30	0.26	0.09	0.22	0.41	0.07	0.25	0.12	0.35	0.31	0.21	0.11
O26	0.32	0.41	0.28	0.10	0.16	0.49	0.06	0.18	0.11	0.33	0.28	0.14	0.07
O27	0.16	0.18	0.14	0.08	0.11	0.44	0.08	0.14	0.04	0.32	0.31	0.20	0.21
O28	0.23	0.24	0.11	0.09	0.06	0.40	0.12	0.18	0.12	0.32	0.29	0.21	0.13

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
O29	0.32	0.25	0.23	0.09	0.04	0.21	0.12	0.21	0.19	0.31	0.23	0.16	0.26
O30	0.18	0.18	0.05	0.03	0.15	0.20	0.04	0.12	0.10	0.10	0.04	0.10	0.14
O31	0.17	0.15	0.18	0.04	0.14	0.27	0.04	0.12	0.10	0.16	0.23	0.07	0.28
O32	0.23	0.21	0.17	0.06	0.06	0.08	0.06	0.06	0.11	0.16	0.14	0.04	0.05
O33	0.11	0.12	0.22	0.05	0.22	0.35	0.06	0.25	0.15	0.25	0.29	0.07	0.30
O34	0.26	0.24	0.23	0.06	0.15	0.30	0.01	0.21	0.12	0.21	0.29	0.15	0.29
O35	0.21	0.23	0.30	0.09	0.15	0.24	0.02	0.12	0.03	0.03	0.23	0.08	0.23
O36	0.33	0.33	0.32	0.09	0.11	0.05	0.07	0.14	0.11	0.11	0.29	0.17	0.33
O37	0.16	0.19	0.12	0.04	0.18	0.28	0.17	0.09	0.16	0.16	0.24	0.06	0.18
O38	0.15	0.14	0.15	0.02	0.16	0.23	0.14	0.03	0.11	0.19	0.25	0.04	0.19
O39	0.10	0.07	0.04	0.03	0.13	0.15	0.02	0.01	0.04	0.18	0.29	0.10	0.15
O40	0.07	0.09	0.01	0.05	0.13	0.14	0.03	0.06	0.03	0.13	0.32	0.12	0.17
O41	0.13	0.16	0.02	0.03	0.05	0.07	0.04	0.02	0.11	0.13	0.21	0.19	0.20
O42	0.28	0.38	0.33	0.08	0.19	0.29	0.30	0.11	0.23	0.31	0.01	0.14	0.27
O43	0.34	0.39	0.41	0.06	0.20	0.31	0.29	0.10	0.19	0.29	0.05	0.10	0.25
O44	0.37	0.39	0.41	0.09	0.22	0.34	0.35	0.08	0.07	0.15	0.10	0.08	0.21
O45	0.32	0.34	0.34	0.09	0.20	0.29	0.14	0.13	0.07	0.13	0.16	0.08	0.22
O46	0.34	0.35	0.27	0.11	0.23	0.32	0.31	0.08	0.07	0.06	0.13	0.01	0.24
O47	0.18	0.18	0.18	0.04	0.05	0.08	0.11	0.03	0.09	0.16	0.16	0.04	0.13
O48	0.18	0.13	0.18	0.05	0.09	0.15	0.23	0.03	0.11	0.17	0.18	0.05	0.15
O49	0.17	0.26	0.15	0.07	0.07	0.16	0.28	0.03	0.14	0.15	0.18	0.06	0.14
O50	0.26	0.33	0.14	0.05	0.06	0.17	0.28	0.04	0.12	0.14	0.14	0.03	0.19
O51	0.19	0.22	0.06	0.03	0.05	0.18	0.48	0.03	0.05	0.05	0.14	0.04	0.11
O52	0.08	0.17	0.03	0.03	0.06	0.08	0.18	0.02	0.16	0.11	0.19	0.10	0.18
O53	0.13	0.28	0.09	0.09	0.08	0.04	0.16	0.18	0.17	0.20	0.25	0.08	0.13
O54	0.15	0.17	0.11	0.01	0.10	0.12	0.06	0.04	0.09	0.01	0.02	0.04	0.03
O55	0.30	0.32	0.09	0.05	0.11	0.13	0.10	0.02	0.04	0.05	0.03	0.03	0.01
O56	0.28	0.13	0.11	0.07	0.14	0.17	0.19	0.10	0.14	0.07	0.08	0.04	0.07
O57	0.24	0.03	0.09	0.10	0.04	0.09	0.18	0.05	0.06	0.06	0.07	0.08	0.07
O58	0.08	0.15	0.03	0.05	0.12	0.08	0.31	0.13	0.23	0.07	0.01	0.10	0.01
O59	0.20	0.16	0.07	0.07	0.06	0.13	0.10	0.09	0.19	0.09	0.02	0.06	0.02
O60	0.19	0.16	0.10	0.12	0.08	0.11	0.17	0.12	0.20	0.07	0.08	0.04	0.09
O61	0.24	0.09	0.06	0.03	0.05	0.06	0.30	0.14	0.24	0.10	0.06	0.08	0.08
O62	0.26	0.16	0.05	0.12	0.05	0.12	0.33	0.10	0.02	0.05	0.19	0.04	0.02
O63	0.26	0.04	0.11	0.15	0.04	0.10	0.26	0.05	0.10	0.08	0.24	0.04	0.05
O64	0.20	0.08	0.11	0.03	0.05	0.07	0.23	0.07	0.06	0.05	0.09	0.04	0.06
O65	0.06	0.01	0.04	0.02	0.02	0.04	0.20	0.07	0.14	0.03	0.04	0.05	0.18
O66	0.15	0.07	0.10	0.05	0.08	0.04	0.16	0.05	0.09	0.06	0.07	0.05	0.12
O67	0.23	0.10	0.01	0.02	0.14	0.16	0.06	0.06	0.05	0.13	0.14	0.03	0.15
O68	0.03	0.03	0.01	0.11	0.14	0.17	0.22	0.16	0.04	0.13	0.14	0.06	0.33
O69	0.17	0.06	0.08	0.06	0.10	0.10	0.27	0.17	0.21	0.14	0.13	0.07	0.21
O70	0.05	0.03	0.02	0.03	0.04	0.11	0.31	0.27	0.33	0.19	0.14	0.09	0.21
O71	0.02	0.07	0.04	0.03	0.01	0.09	0.30	0.30	0.37	0.22	0.16	0.10	0.18

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
O72	0.08	0.09	0.11	0.07	0.05	0.07	0.30	0.33	0.40	0.27	0.18	0.09	0.13
O73	0.08	0.08	0.08	0.05	0.03	0.04	0.26	0.32	0.40	0.28	0.21	0.06	0.10
O74	0.08	0.06	0.02	0.12	0.09	0.03	0.24	0.29	0.43	0.31	0.24	0.01	0.09
O75	0.09	0.10	0.06	0.16	0.14	0.05	0.24	0.27	0.47	0.37	0.31	0.01	0.08
O76	0.14	0.04	0.08	0.05	0.08	0.08	0.18	0.19	0.23	0.21	0.03	0.08	0.06
O77	0.03	0.04	0.11	0.07	0.08	0.10	0.30	0.06	0.13	0.07	0.06	0.03	0.08
O78	0.06	0.05	0.08	0.01	0.03	0.08	0.35	0.12	0.15	0.09	0.04	0.01	0.11
O79	0.19	0.03	0.23	0.14	0.15	0.05	0.15	0.24	0.21	0.23	0.10	0.04	0.06
O80	0.20	0.12	0.19	0.12	0.13	0.03	0.08	0.27	0.08	0.08	0.16	0.09	0.01
O81	0.16	0.10	0.15	0.11	0.12	0.02	0.13	0.19	0.13	0.08	0.04	0.05	0.01
O82	0.15	0.06	0.07	0.04	0.06	0.05	0.28	0.09	0.14	0.16	0.01	0.02	0.05
O83	0.25	0.04	0.24	0.15	0.06	0.19	0.47	0.53	0.42	0.43	0.29	0.03	0.19
O84	0.25	0.10	0.22	0.20	0.05	0.20	0.56	0.57	0.52	0.48	0.32	0.02	0.20
O85	0.28	0.20	0.27	0.17	0.07	0.14	0.35	0.37	0.35	0.38	0.32	0.07	0.23
O86	0.28	0.14	0.11	0.12	0.06	0.16	0.27	0.13	0.07	0.09	0.26	0.09	0.23
O87	0.28	0.06	0.08	0.09	0.12	0.19	0.28	0.31	0.19	0.22	0.10	0.08	0.17
O88	0.05	0.10	0.12	0.11	0.11	0.19	0.30	0.27	0.33	0.32	0.14	0.07	0.06
O89	0.08	0.05	0.09	0.08	0.18	0.11	0.23	0.37	0.24	0.21	0.25	0.06	0.15
O90	0.06	0.07	0.09	0.10	0.09	0.14	0.32	0.32	0.30	0.33	0.19	0.03	0.07
O91	0.05	0.05	0.10	0.07	0.05	0.26	0.31	0.19	0.15	0.13	0.08	0.04	0.11
O92	0.05	0.02	0.08	0.04	0.12	0.27	0.36	0.24	0.16	0.22	0.04	0.05	0.03
O93	0.09	0.04	0.11	0.13	0.12	0.25	0.20	0.11	0.21	0.37	0.03	0.06	0.07
O94	0.09	0.08	0.07	0.13	0.03	0.28	0.34	0.31	0.28	0.31	0.16	0.08	0.12
O95	0.04	0.05	0.09	0.05	0.07	0.08	0.45	0.39	0.30	0.28	0.28	0.09	0.05
O96	0.06	0.08	0.07	0.06	0.13	0.24	0.38	0.21	0.08	0.12	0.08	0.06	0.08
O97	0.03	0.02	0.09	0.09	0.11	0.32	0.41	0.15	0.10	0.03	0.09	0.08	0.06
O98	0.07	0.10	0.15	0.17	0.06	0.34	0.37	0.17	0.19	0.21	0.04	0.09	0.07
O99	0.07	0.04	0.04	0.09	0.06	0.36	0.41	0.33	0.23	0.25	0.24	0.12	0.07
O100	0.26	0.12	0.21	0.09	0.02	0.05	0.35	0.03	0.12	0.05	0.02	0.10	0.35
O101	0.34	0.21	0.15	0.19	0.18	0.17	0.28	0.05	0.06	0.08	0.06	0.10	0.21
O102	0.17	0.13	0.08	0.04	0.06	0.12	0.24	0.09	0.15	0.08	0.08	0.08	0.04
O103	0.26	0.16	0.23	0.08	0.14	0.15	0.46	0.08	0.11	0.05	0.03	0.10	0.34
O104	0.22	0.20	0.39	0.19	0.20	0.23	0.43	0.02	0.05	0.02	0.06	0.10	0.33
O105	0.05	0.22	0.18	0.23	0.22	0.23	0.32	0.10	0.07	0.01	0.07	0.07	0.14
O106	0.16	0.26	0.42	0.27	0.21	0.18	0.34	0.02	0.01	0.08	0.05	0.11	0.31
O107	0.24	0.32	0.43	0.26	0.19	0.18	0.33	0.10	0.05	0.07	0.02	0.11	0.30
O108	0.26	0.33	0.46	0.27	0.19	0.23	0.19	0.05	0.02	0.06	0.02	0.13	0.29
O109	0.25	0.18	0.44	0.19	0.18	0.18	0.20	0.42	0.02	0.10	0.05	0.01	0.15
O110	0.27	0.15	0.39	0.20	0.22	0.21	0.16	0.38	0.03	0.04	0.06	0.03	0.18
O111	0.25	0.16	0.41	0.20	0.20	0.22	0.06	0.29	0.04	0.03	0.08	0.03	0.21
O112	0.11	0.30	0.24	0.22	0.16	0.22	0.27	0.08	0.05	0.05	0.03	0.10	0.25
O113	0.30	0.38	0.43	0.28	0.22	0.27	0.15	0.14	0.09	0.05	0.02	0.09	0.24
O114	0.31	0.40	0.46	0.27	0.16	0.24	0.37	0.35	0.09	0.09	0.04	0.11	0.25

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
O115	0.31	0.38	0.43	0.24	0.09	0.19	0.22	0.36	0.10	0.17	0.05	0.11	0.24
O116	0.32	0.39	0.44	0.25	0.08	0.17	0.17	0.40	0.02	0.08	0.05	0.12	0.25
O117	0.31	0.37	0.44	0.25	0.11	0.15	0.09	0.30	0.03	0.02	0.09	0.11	0.30
O118	0.19	0.09	0.37	0.16	0.13	0.13	0.23	0.21	0.16	0.16	0.03	0.07	0.05
O119	0.13	0.30	0.23	0.10	0.16	0.15	0.28	0.31	0.11	0.07	0.03	0.05	0.10
O120	0.11	0.11	0.17	0.11	0.17	0.14	0.19	0.31	0.11	0.08	0.03	0.04	0.07
O121	0.03	0.06	0.03	0.06	0.09	0.08	0.22	0.17	0.12	0.16	0.07	0.06	0.09
O122	0.13	0.05	0.06	0.04	0.03	0.09	0.10	0.28	0.13	0.19	0.11	0.13	0.04
O123	0.11	0.03	0.04	0.06	0.08	0.12	0.33	0.06	0.06	0.08	0.02	0.11	0.04
O124	0.10	0.19	0.10	0.11	0.09	0.16	0.31	0.11	0.04	0.01	0.02	0.09	0.09
O125	0.08	0.29	0.13	0.09	0.17	0.16	0.22	0.19	0.05	0.10	0.01	0.05	0.09
O126	0.30	0.42	0.37	0.23	0.33	0.29	0.09	0.24	0.10	0.09	0.04	0.03	0.05
O127	0.08	0.07	0.06	0.04	0.10	0.13	0.20	0.19	0.12	0.15	0.09	0.07	0.05
O128	0.09	0.06	0.05	0.09	0.14	0.09	0.07	0.16	0.09	0.14	0.05	0.07	0.07
O129	0.21	0.10	0.02	0.09	0.07	0.56	0.61	0.23	0.42	0.13	0.07	0.20	0.09
O130	0.17	0.12	0.08	0.10	0.22	0.34	0.26	0.23	0.22	0.27	0.08	0.20	0.13
O131	0.12	0.03	0.07	0.12	0.16	0.44	0.31	0.16	0.37	0.31	0.15	0.15	0.01
O132	0.24	0.05	0.07	0.08	0.17	0.28	0.39	0.34	0.38	0.33	0.08	0.21	0.10
O133	0.17	0.04	0.07	0.11	0.18	0.16	0.22	0.31	0.13	0.15	0.06	0.18	0.08
O134	0.23	0.22	0.06	0.08	0.07	0.17	0.14	0.31	0.16	0.34	0.30	0.10	0.13
O135	0.06	0.06	0.07	0.10	0.03	0.05	0.04	0.09	0.31	0.05	0.17	0.23	0.07
O136	0.14	0.17	0.06	0.05	0.06	0.05	0.12	0.04	0.33	0.06	0.25	0.28	0.10
O137	0.20	0.22	0.05	0.09	0.06	0.03	0.05	0.06	0.30	0.04	0.26	0.15	0.15
O138	0.23	0.19	0.06	0.10	0.05	0.19	0.22	0.13	0.15	0.17	0.34	0.19	0.11
O139	0.23	0.16	0.03	0.12	0.25	0.32	0.58	0.29	0.28	0.40	0.33	0.23	0.04
O140	0.10	0.06	0.03	0.06	0.22	0.53	0.44	0.11	0.13	0.17	0.21	0.21	0.05
O141	0.16	0.06	0.02	0.05	0.04	0.05	0.16	0.11	0.31	0.49	0.38	0.23	0.05
O142	0.08	0.14	0.07	0.09	0.14	0.47	0.38	0.40	0.49	0.43	0.08	0.06	0.05
O143	0.11	0.15	0.07	0.05	0.16	0.49	0.31	0.38	0.30	0.12	0.06	0.06	0.07
O144	0.07	0.10	0.06	0.05	0.19	0.48	0.30	0.34	0.37	0.18	0.09	0.12	0.15
O145	0.11	0.15	0.08	0.04	0.20	0.49	0.29	0.28	0.37	0.09	0.08	0.14	0.16
O146	0.12	0.22	0.07	0.06	0.20	0.48	0.29	0.19	0.22	0.41	0.30	0.38	0.15
O147	0.08	0.15	0.05	0.03	0.17	0.47	0.36	0.23	0.34	0.11	0.07	0.11	0.14
O148	0.03	0.10	0.02	0.02	0.16	0.42	0.33	0.11	0.13	0.09	0.11	0.09	0.15
O149	0.06	0.10	0.03	0.05	0.12	0.37	0.29	0.07	0.14	0.28	0.30	0.34	0.08
O150	0.05	0.11	0.03	0.07	0.03	0.03	0.13	0.10	0.15	0.44	0.23	0.30	0.03
O151	0.16	0.22	0.09	0.12	0.13	0.40	0.27	0.36	0.30	0.11	0.21	0.26	0.20
O152	0.03	0.03	0.05	0.06	0.05	0.34	0.19	0.10	0.18	0.18	0.12	0.26	0.24
O153	0.06	0.05	0.06	0.05	0.10	0.30	0.20	0.12	0.34	0.26	0.21	0.23	0.28
O154	0.06	0.11	0.07	0.11	0.14	0.27	0.26	0.26	0.51	0.30	0.04	0.09	0.33
O155	0.05	0.13	0.06	0.06	0.06	0.26	0.19	0.22	0.50	0.16	0.18	0.24	0.31
O156	0.07	0.10	0.08	0.08	0.02	0.19	0.19	0.28	0.42	0.13	0.17	0.21	0.16
O157	0.20	0.16	0.14	0.04	0.19	0.13	0.03	0.11	0.31	0.38	0.20	0.19	0.22

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
O158	0.04	0.10	0.08	0.01	0.14	0.11	0.12	0.21	0.50	0.41	0.26	0.07	0.11
O159	0.06	0.14	0.12	0.02	0.16	0.12	0.20	0.25	0.34	0.25	0.23	0.16	0.15
O160	0.16	0.12	0.04	0.02	0.17	0.15	0.16	0.25	0.39	0.40	0.28	0.14	0.33
O161	0.02	0.07	0.08	0.07	0.06	0.07	0.10	0.19	0.38	0.45	0.30	0.16	0.10
O162	0.04	0.03	0.07	0.05	0.10	0.15	0.14	0.15	0.22	0.42	0.24	0.19	0.09
O163	0.09	0.06	0.12	0.07	0.08	0.05	0.22	0.35	0.29	0.03	0.09	0.16	0.31
O164	0.14	0.15	0.20	0.01	0.11	0.03	0.24	0.25	0.13	0.18	0.14	0.16	0.10

Table 3 Velocity Ratio (VR) at Special Test Points

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
S1	-	-	-	-	-	-	-	-	-	-	-	-	-
S2	-	-	-	-	-	-	-	-	-	-	-	-	-
S3	-	-	-	-	-	-	-	-	-	-	-	-	-
S4	0.22	0.13	0.20	0.02	0.06	0.25	0.08	0.32	0.25	0.28	0.12	0.16	0.23
S5	0.07	0.21	0.13	0.04	0.06	0.25	0.10	0.31	0.13	0.24	0.15	0.19	0.23
S6	-	-	-	-	-	-	-	-	-	-	-	-	-
S7	-	-	-	-	-	-	-	-	-	-	-	-	-
S8	0.17	0.22	0.13	0.07	0.09	0.15	0.06	0.08	0.21	0.28	0.08	0.29	0.20
S9	0.24	0.27	0.18	0.10	0.18	0.31	0.11	0.12	0.20	0.06	0.09	0.15	0.27
S10	-	-	-	-	-	-	-	-	-	-	-	-	-
S11	-	-	-	-	-	-	-	-	-	-	-	-	-
S12	-	-	-	-	-	-	-	-	-	-	-	-	-
S13	0.10	0.08	0.07	0.10	0.18	0.32	0.13	0.22	0.16	0.06	0.13	0.12	0.25
S14	-	-	-	-	-	-	-	-	-	-	-	-	-
S15	-	-	-	-	-	-	-	-	-	-	-	-	-
S16	-	-	-	-	-	-	-	-	-	-	-	-	-
S17	0.05	0.09	0.04	0.08	0.14	0.26	0.19	0.27	0.09	0.06	0.16	0.21	0.22
S18	0.26	0.20	0.15	0.12	0.22	0.33	0.14	0.02	0.14	0.05	0.06	0.16	0.15
S19	0.21	0.15	0.17	0.12	0.19	0.30	0.06	0.04	0.20	0.07	0.09	0.04	0.21
S20	0.14	0.26	0.18	0.10	0.20	0.27	0.23	0.10	0.23	0.08	0.06	0.08	0.19
S21	0.15	0.25	0.09	0.05	0.10	0.17	0.11	0.25	0.21	0.23	0.25	0.16	0.13
S22	0.17	0.14	0.09	0.01	0.03	0.05	0.17	0.05	0.21	0.08	0.16	0.10	0.23
S23	-	-	-	-	-	-	-	-	-	-	-	-	-
S24	-	-	-	-	-	-	-	-	-	-	-	-	-
S25	0.14	0.15	0.11	0.03	0.07	0.21	0.16	0.33	0.31	0.21	0.16	0.25	0.12
S26	0.04	0.24	0.17	0.02	0.11	0.19	0.14	0.10	0.07	0.11	0.13	0.16	0.16
S27	0.22	0.26	0.09	0.07	0.05	0.09	0.08	0.24	0.37	0.34	0.06	0.05	0.36
S28	0.26	0.37	0.10	0.06	0.08	0.12	0.08	0.03	0.07	0.05	0.28	0.21	0.24
S29	0.24	0.38	0.09	0.07	0.05	0.16	0.08	0.13	0.03	0.10	0.08	0.16	0.07
S30	0.25	0.39	0.13	0.07	0.04	0.20	0.04	0.16	0.16	0.11	0.10	0.08	0.12
S31	0.16	0.33	0.13	0.08	0.04	0.20	0.27	0.23	0.25	0.29	0.04	0.17	0.13
S32	0.10	0.34	0.15	0.09	0.01	0.26	0.33	0.21	0.17	0.40	0.08	0.16	0.10
S33	0.02	0.32	0.14	0.06	0.03	0.28	0.22	0.17	0.12	0.39	0.08	0.17	0.08

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
S34	0.03	0.31	0.14	0.04	0.03	0.28	0.29	0.19	0.17	0.39	0.06	0.17	0.09
S35	0.08	0.32	0.12	0.09	0.08	0.15	0.54	0.32	0.29	0.27	0.09	0.11	0.09
S36	0.12	0.28	0.11	0.08	0.07	0.06	0.37	0.13	0.28	0.20	0.09	0.22	0.11
S37	0.21	0.26	0.06	0.02	0.03	0.05	0.20	0.10	0.21	0.20	0.12	0.18	0.10
S38	0.18	0.14	0.02	0.02	0.08	0.04	0.25	0.07	0.22	0.23	0.19	0.13	0.10
S39	0.24	0.11	0.04	0.02	0.07	0.08	0.39	0.17	0.09	0.20	0.15	0.06	0.14
S40	0.31	0.13	0.06	0.05	0.08	0.51	0.60	0.49	0.49	0.39	0.16	0.14	0.06
S41	0.31	0.13	0.03	0.08	0.11	0.49	0.55	0.46	0.48	0.40	0.15	0.16	0.02
S42	-	-	-	-	-	-	-	-	-	-	-	-	-
S43	-	-	-	-	-	-	-	-	-	-	-	-	-
S44	-	-	-	-	-	-	-	-	-	-	-	-	-
S45	0.05	0.06	0.06	0.03	0.08	0.20	0.29	0.32	0.33	0.24	0.16	0.25	0.14
S46	0.09	0.09	0.07	0.02	0.10	0.20	0.34	0.32	0.34	0.25	0.13	0.24	0.13
S47	0.13	0.06	0.04	0.05	0.11	0.16	0.36	0.31	0.35	0.25	0.07	0.25	0.09
S48	0.15	0.18	0.05	0.13	0.06	0.15	0.25	0.11	0.09	0.09	0.07	0.12	0.11
S49	0.18	0.13	0.06	0.04	0.10	0.21	0.24	0.03	0.08	0.09	0.15	0.03	0.06
S50	0.33	0.06	0.04	0.01	0.09	0.12	0.22	0.12	0.12	0.13	0.11	0.09	0.20
S51	0.13	0.02	0.03	0.06	0.08	0.36	0.51	0.33	0.25	0.23	0.27	0.08	0.02
S52	0.06	0.06	0.03	0.10	0.06	0.36	0.48	0.22	0.23	0.27	0.19	0.06	0.07
S53	0.08	0.03	0.11	0.17	0.10	0.32	0.40	0.20	0.14	0.18	0.08	0.07	0.07
S54	0.14	0.08	0.20	0.14	0.15	0.22	0.16	0.19	0.09	0.09	0.11	0.10	0.15
S55	0.15	0.06	0.08	0.08	0.18	0.17	0.11	0.12	0.18	0.22	0.03	0.07	0.19
S56	0.14	0.07	0.03	0.13	0.13	0.23	0.30	0.28	0.27	0.23	0.05	0.06	0.09
S57	0.09	0.06	0.07	0.10	0.12	0.24	0.33	0.36	0.40	0.16	0.05	0.08	0.02
S58	0.07	0.05	0.07	0.06	0.06	0.17	0.20	0.33	0.37	0.07	0.01	0.02	0.01
S59	0.08	0.05	0.03	0.08	0.09	0.18	0.17	0.25	0.30	0.13	0.05	0.05	0.01
S60	0.05	0.06	0.01	0.03	0.05	0.04	0.42	0.34	0.20	0.16	0.18	0.29	0.05
S61	0.05	0.04	0.01	0.05	0.07	0.03	0.47	0.40	0.25	0.19	0.09	0.24	0.04
S62	0.05	0.05	0.02	0.07	0.07	0.08	0.53	0.47	0.39	0.33	0.08	0.20	0.06
S63	0.05	0.02	0.04	0.06	0.07	0.08	0.47	0.35	0.12	0.16	0.22	0.27	0.03
S64	0.02	0.02	0.03	0.04	0.09	0.13	0.52	0.40	0.28	0.18	0.14	0.17	0.05
S65	0.11	0.03	0.04	0.09	0.07	0.17	0.54	0.40	0.28	0.19	0.08	0.05	0.08
S66	0.04	0.07	0.02	0.04	0.09	0.29	0.34	0.19	0.09	0.15	0.09	0.15	0.11
S67	0.04	0.10	0.00	0.03	0.04	0.17	0.53	0.31	0.13	0.19	0.19	0.28	0.07
S68	0.05	0.07	0.02	0.03	0.06	0.19	0.56	0.41	0.28	0.11	0.05	0.21	0.10
S69	0.04	0.07	0.03	0.03	0.06	0.20	0.47	0.31	0.13	0.08	0.17	0.25	0.11
S70	0.03	0.05	0.03	0.03	0.04	0.23	0.52	0.35	0.19	0.17	0.17	0.19	0.03
S71	0.06	0.05	0.07	0.08	0.02	0.23	0.56	0.45	0.46	0.38	0.24	0.09	0.24
S72	0.09	0.04	0.09	0.07	0.11	0.24	0.54	0.40	0.43	0.32	0.16	0.15	0.14
S73	0.09	0.10	0.02	0.04	0.14	0.25	0.55	0.26	0.34	0.29	0.32	0.30	0.15

D2 Non-EFLS Scenario

Table 4 Velocity Ratio (VR) at Perimeter Test Points

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
P1	0.27	0.23	0.15	0.10	0.18	0.15	0.03	0.25	0.12	0.15	0.07	0.14	0.32
P2	0.18	0.12	0.21	0.09	0.17	0.11	0.09	0.29	0.14	0.29	0.13	0.16	0.33
P3	0.11	0.09	0.16	0.04	0.02	0.04	0.09	0.25	0.15	0.27	0.13	0.14	0.13
P4	0.21	0.10	0.21	0.06	0.01	0.07	0.04	0.15	0.12	0.26	0.13	0.21	0.11
P5	0.24	0.18	0.20	0.05	0.02	0.12	0.05	0.03	0.01	0.22	0.19	0.22	0.17
P6	0.20	0.18	0.15	0.06	0.07	0.19	0.07	0.13	0.12	0.18	0.12	0.18	0.32
P7	0.11	0.29	0.06	0.01	0.09	0.31	0.04	0.06	0.12	0.16	0.16	0.12	0.12
P8	0.20	0.31	0.09	0.05	0.11	0.26	0.08	0.27	0.17	0.23	0.17	0.18	0.25
P9	0.19	0.29	0.13	0.04	0.11	0.18	0.06	0.22	0.22	0.21	0.19	0.22	0.12
P10	0.15	0.15	0.23	0.06	0.07	0.15	0.15	0.25	0.26	0.20	0.26	0.23	0.22
P11	0.03	0.11	0.06	0.10	0.09	0.20	0.10	0.22	0.23	0.20	0.30	0.22	0.13
P12	0.09	0.20	0.03	0.08	0.03	0.17	0.05	0.18	0.21	0.20	0.14	0.19	0.07
P13	0.15	0.15	0.22	0.15	0.22	0.29	0.05	0.18	0.27	0.22	0.18	0.07	0.26
P14	0.05	0.08	0.07	0.13	0.16	0.20	0.09	0.10	0.10	0.12	0.09	0.17	0.12
P15	0.07	0.06	0.09	0.12	0.14	0.17	0.12	0.10	0.06	0.03	0.10	0.24	0.13
P16	0.11	0.21	0.16	0.11	0.12	0.16	0.17	0.12	0.08	0.12	0.07	0.23	0.16
P17	0.08	0.30	0.16	0.11	0.07	0.08	0.27	0.02	0.09	0.05	0.06	0.03	0.04
P18	0.11	0.30	0.17	0.12	0.02	0.12	0.05	0.04	0.13	0.06	0.03	0.05	0.02
P19	0.14	0.29	0.18	0.10	0.04	0.02	0.15	0.28	0.09	0.10	0.07	0.03	0.08
P20	0.23	0.30	0.17	0.07	0.06	0.08	0.31	0.34	0.05	0.08	0.07	0.01	0.13
P21	0.27	0.29	0.15	0.12	0.02	0.03	0.25	0.37	0.09	0.24	0.13	0.10	0.13
P22	0.21	0.21	0.08	0.19	0.11	0.09	0.09	0.23	0.42	0.29	0.17	0.15	0.09
P23	0.25	0.17	0.04	0.18	0.13	0.20	0.45	0.53	0.52	0.45	0.19	0.05	0.13
P24	0.38	0.21	0.05	0.14	0.10	0.19	0.45	0.53	0.47	0.37	0.24	0.06	0.19
P25	0.35	0.17	0.17	0.16	0.10	0.09	0.17	0.49	0.34	0.23	0.19	0.06	0.18
P26	0.24	0.16	0.12	0.08	0.04	0.13	0.14	0.26	0.37	0.40	0.04	0.05	0.15
P27	0.26	0.13	0.11	0.07	0.09	0.30	0.53	0.42	0.38	0.43	0.10	0.09	0.16
P28	0.29	0.15	0.11	0.09	0.15	0.32	0.19	0.20	0.24	0.29	0.11	0.12	0.15
P29	0.17	0.07	0.04	0.08	0.20	0.57	0.57	0.45	0.43	0.19	0.13	0.11	0.05
P30	0.21	0.10	0.02	0.12	0.04	0.06	0.13	0.11	0.12	0.43	0.16	0.10	0.10
P31	0.13	0.07	0.08	0.14	0.03	0.32	0.19	0.21	0.38	0.36	0.11	0.05	0.11
P32	0.25	0.13	0.07	0.14	0.05	0.24	0.21	0.23	0.48	0.40	0.14	0.02	0.13
P33	0.27	0.17	0.10	0.07	0.05	0.32	0.27	0.19	0.41	0.39	0.12	0.05	0.17
P34	0.16	0.12	0.07	0.19	0.13	0.36	0.20	0.05	0.19	0.28	0.14	0.04	0.14
P35	0.11	0.11	0.06	0.16	0.11	0.29	0.06	0.19	0.12	0.12	0.05	0.05	0.12
P36	0.14	0.10	0.02	0.11	0.03	0.18	0.03	0.23	0.25	0.15	0.12	0.22	0.10
P37	0.19	0.15	0.09	0.11	0.02	0.21	0.12	0.05	0.09	0.05	0.03	0.13	0.06
P38	0.24	0.24	0.12	0.10	0.02	0.16	0.14	0.08	0.18	0.12	0.02	0.12	0.13
P39	0.13	0.14	0.08	0.06	0.03	0.15	0.12	0.06	0.07	0.08	0.11	0.15	0.20

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
P40	0.11	0.21	0.02	0.04	0.03	0.08	0.08	0.11	0.18	0.10	0.11	0.12	0.23
P41	0.03	0.04	0.01	0.05	0.04	0.06	0.03	0.11	0.19	0.13	0.04	0.10	0.23
P42	0.03	0.07	0.02	0.07	0.04	0.14	0.07	0.05	0.13	0.10	0.07	0.11	0.07
P43	0.06	0.08	0.06	0.05	0.03	0.09	0.03	0.02	0.11	0.10	0.12	0.08	0.16
P44	0.20	0.11	0.07	0.04	0.03	0.16	0.06	0.08	0.12	0.03	0.04	0.05	0.07
P45	0.25	0.22	0.12	0.05	0.07	0.17	0.06	0.26	0.36	0.30	0.09	0.09	0.14
P46	0.28	0.07	0.13	0.05	0.06	0.14	0.08	0.08	0.14	0.06	0.02	0.17	0.25
P47	0.29	0.09	0.09	0.08	0.09	0.16	0.15	0.17	0.19	0.07	0.11	0.15	0.25
P48	0.26	0.10	0.06	0.13	0.16	0.17	0.07	0.04	0.12	0.06	0.05	0.08	0.18
P49	0.04	0.05	0.08	0.05	0.06	0.07	0.04	0.14	0.41	0.02	0.09	0.03	0.06
P50	0.09	0.01	0.07	0.04	0.12	0.03	0.06	0.10	0.19	0.08	0.20	0.28	0.22

Table 5 Velocity Ratio (VR) at Overall Test Points

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
O1	0.23	0.38	0.32	0.09	0.06	0.04	0.30	0.26	0.23	0.07	0.06	0.18	0.29
O2	0.16	0.28	0.17	0.07	0.07	0.07	0.14	0.29	0.06	0.18	0.08	0.24	0.18
O3	0.09	0.13	0.08	0.04	0.09	0.08	0.08	0.30	0.06	0.07	0.10	0.10	0.28
O4	0.11	0.24	0.14	0.02	0.05	0.03	0.07	0.11	0.17	0.19	0.08	0.11	0.05
O5	0.13	0.27	0.16	0.01	0.07	0.03	0.09	0.24	0.22	0.25	0.12	0.15	0.12
O6	0.16	0.12	0.07	0.04	0.18	0.17	0.04	0.31	0.18	0.16	0.17	0.16	0.22
O7	0.15	0.22	0.09	0.05	0.14	0.15	0.04	0.13	0.06	0.28	0.32	0.22	0.20
O8	0.29	0.34	0.35	0.02	0.04	0.14	0.19	0.35	0.19	0.30	0.41	0.23	0.39
O9	0.30	0.20	0.04	0.03	0.05	0.01	0.15	0.29	0.15	0.14	0.19	0.14	0.36
O10	0.26	0.18	0.14	0.02	0.07	0.03	0.12	0.29	0.26	0.16	0.11	0.18	0.34
O11	0.25	0.19	0.07	0.03	0.13	0.28	0.07	0.10	0.08	0.24	0.13	0.16	0.23
O12	0.23	0.15	0.08	0.04	0.07	0.20	0.08	0.22	0.05	0.22	0.06	0.15	0.12
O13	0.16	0.13	0.07	0.04	0.06	0.21	0.13	0.17	0.08	0.24	0.14	0.11	0.14
O14	0.22	0.19	0.14	0.07	0.18	0.28	0.09	0.39	0.18	0.28	0.18	0.16	0.23
O15	0.16	0.18	0.25	0.05	0.13	0.25	0.16	0.10	0.23	0.28	0.21	0.09	0.21
O16	0.11	0.10	0.18	0.08	0.17	0.19	0.11	0.11	0.13	0.19	0.18	0.05	0.16
O17	0.07	0.10	0.06	0.06	0.17	0.20	0.12	0.39	0.39	0.46	0.38	0.07	0.33
O18	0.10	0.13	0.10	0.03	0.15	0.12	0.06	0.19	0.12	0.20	0.11	0.12	0.27
O19	0.09	0.27	0.16	0.02	0.02	0.23	0.03	0.36	0.32	0.13	0.28	0.09	0.19
O20	0.11	0.10	0.05	0.03	0.07	0.23	0.06	0.32	0.34	0.36	0.33	0.02	0.16
O21	0.10	0.13	0.12	0.04	0.04	0.12	0.15	0.39	0.38	0.48	0.34	0.13	0.24
O22	0.34	0.20	0.25	0.08	0.06	0.21	0.09	0.20	0.19	0.25	0.17	0.15	0.40
O23	0.29	0.14	0.24	0.09	0.09	0.22	0.03	0.09	0.11	0.13	0.08	0.15	0.39
O24	0.12	0.15	0.15	0.03	0.06	0.17	0.11	0.22	0.17	0.26	0.29	0.15	0.19
O25	0.25	0.33	0.27	0.09	0.21	0.21	0.12	0.24	0.17	0.27	0.30	0.21	0.11
O26	0.34	0.37	0.29	0.10	0.18	0.42	0.14	0.21	0.14	0.26	0.28	0.12	0.08
O27	0.20	0.20	0.14	0.08	0.11	0.40	0.14	0.07	0.18	0.24	0.30	0.16	0.21
O28	0.26	0.11	0.08	0.08	0.14	0.35	0.14	0.14	0.23	0.26	0.30	0.09	0.13
O29	0.27	0.11	0.16	0.07	0.09	0.22	0.06	0.24	0.23	0.28	0.26	0.07	0.27

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
O30	0.18	0.11	0.05	0.03	0.12	0.15	0.05	0.08	0.09	0.10	0.06	0.08	0.13
O31	0.17	0.18	0.16	0.04	0.12	0.20	0.08	0.12	0.08	0.27	0.20	0.10	0.27
O32	0.12	0.07	0.15	0.02	0.09	0.18	0.04	0.06	0.08	0.20	0.12	0.07	0.04
O33	0.10	0.09	0.20	0.05	0.14	0.13	0.03	0.20	0.09	0.36	0.26	0.03	0.29
O34	0.23	0.18	0.22	0.06	0.04	0.15	0.05	0.16	0.12	0.27	0.24	0.06	0.28
O35	0.17	0.18	0.28	0.05	0.04	0.17	0.05	0.05	0.10	0.24	0.24	0.04	0.21
O36	0.26	0.17	0.28	0.01	0.08	0.18	0.04	0.04	0.15	0.23	0.32	0.09	0.32
O37	0.18	0.20	0.09	0.04	0.17	0.29	0.14	0.04	0.17	0.26	0.19	0.02	0.16
O38	0.14	0.16	0.12	0.05	0.15	0.26	0.12	0.08	0.16	0.24	0.23	0.05	0.17
O39	0.08	0.09	0.04	0.04	0.12	0.24	0.07	0.05	0.19	0.20	0.26	0.08	0.11
O40	0.04	0.12	0.04	0.05	0.12	0.21	0.09	0.05	0.17	0.19	0.25	0.09	0.14
O41	0.06	0.12	0.05	0.04	0.08	0.10	0.08	0.08	0.21	0.17	0.06	0.04	0.18
O42	0.25	0.34	0.32	0.03	0.22	0.26	0.25	0.02	0.05	0.23	0.08	0.14	0.27
O43	0.29	0.33	0.40	0.10	0.22	0.28	0.25	0.03	0.03	0.23	0.08	0.11	0.24
O44	0.32	0.34	0.40	0.12	0.24	0.29	0.32	0.02	0.06	0.16	0.07	0.10	0.21
O45	0.30	0.31	0.34	0.11	0.22	0.23	0.09	0.02	0.11	0.15	0.12	0.09	0.23
O46	0.28	0.28	0.27	0.14	0.23	0.30	0.15	0.03	0.02	0.03	0.02	0.05	0.25
O47	0.18	0.18	0.17	0.05	0.07	0.08	0.06	0.07	0.04	0.08	0.13	0.03	0.12
O48	0.18	0.12	0.18	0.06	0.11	0.14	0.26	0.09	0.06	0.08	0.14	0.02	0.14
O49	0.15	0.27	0.15	0.07	0.09	0.14	0.30	0.05	0.06	0.15	0.16	0.03	0.15
O50	0.25	0.35	0.13	0.07	0.08	0.18	0.29	0.05	0.04	0.16	0.11	0.03	0.19
O51	0.17	0.22	0.06	0.03	0.04	0.21	0.49	0.07	0.09	0.09	0.11	0.02	0.09
O52	0.10	0.20	0.02	0.04	0.02	0.08	0.08	0.06	0.08	0.06	0.14	0.04	0.17
O53	0.11	0.15	0.08	0.14	0.04	0.10	0.15	0.10	0.10	0.13	0.07	0.17	0.11
O54	0.13	0.08	0.09	0.03	0.04	0.13	0.10	0.03	0.12	0.17	0.04	0.07	0.03
O55	0.19	0.13	0.11	0.09	0.07	0.12	0.11	0.04	0.14	0.21	0.07	0.14	0.02
O56	0.11	0.09	0.13	0.12	0.10	0.17	0.21	0.05	0.05	0.20	0.09	0.11	0.05
O57	0.10	0.16	0.04	0.12	0.04	0.03	0.19	0.06	0.06	0.19	0.05	0.14	0.07
O58	0.03	0.04	0.04	0.02	0.08	0.10	0.34	0.08	0.01	0.06	0.03	0.02	0.04
O59	0.04	0.05	0.08	0.04	0.03	0.13	0.08	0.04	0.08	0.08	0.04	0.12	0.02
O60	0.20	0.26	0.09	0.12	0.05	0.14	0.21	0.10	0.10	0.02	0.03	0.13	0.07
O61	0.17	0.27	0.01	0.01	0.03	0.11	0.32	0.08	0.04	0.03	0.04	0.07	0.07
O62	0.17	0.05	0.04	0.12	0.06	0.05	0.33	0.03	0.35	0.27	0.13	0.09	0.11
O63	0.23	0.24	0.09	0.16	0.09	0.05	0.26	0.05	0.33	0.17	0.17	0.12	0.11
O64	0.17	0.03	0.03	0.03	0.05	0.11	0.24	0.11	0.18	0.13	0.10	0.15	0.07
O65	0.25	0.19	0.10	0.02	0.03	0.04	0.23	0.05	0.04	0.02	0.03	0.14	0.04
O66	0.15	0.19	0.05	0.05	0.06	0.06	0.16	0.06	0.16	0.05	0.09	0.15	0.04
O67	0.14	0.08	0.04	0.02	0.13	0.15	0.13	0.15	0.26	0.09	0.13	0.06	0.13
O68	0.03	0.02	0.01	0.10	0.12	0.14	0.22	0.21	0.11	0.11	0.15	0.10	0.19
O69	0.18	0.06	0.07	0.06	0.10	0.08	0.28	0.21	0.22	0.15	0.16	0.11	0.20
O70	0.12	0.02	0.02	0.03	0.03	0.08	0.32	0.29	0.35	0.27	0.16	0.02	0.19
O71	0.10	0.05	0.03	0.03	0.01	0.08	0.31	0.31	0.38	0.31	0.18	0.10	0.17
O72	0.08	0.08	0.10	0.07	0.05	0.08	0.32	0.35	0.41	0.35	0.19	0.12	0.14

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
O73	0.02	0.08	0.09	0.05	0.04	0.04	0.27	0.34	0.42	0.35	0.22	0.11	0.10
O74	0.05	0.06	0.03	0.13	0.10	0.03	0.25	0.32	0.46	0.38	0.26	0.10	0.06
O75	0.08	0.08	0.06	0.17	0.15	0.05	0.25	0.30	0.51	0.43	0.33	0.07	0.04
O76	0.13	0.03	0.08	0.05	0.05	0.20	0.21	0.22	0.24	0.29	0.04	0.09	0.15
O77	0.08	0.01	0.10	0.07	0.07	0.09	0.30	0.08	0.13	0.07	0.03	0.06	0.03
O78	0.03	0.03	0.06	0.02	0.02	0.08	0.36	0.13	0.16	0.11	0.04	0.09	0.01
O79	0.05	0.08	0.23	0.14	0.15	0.04	0.15	0.14	0.24	0.24	0.13	0.12	0.01
O80	0.20	0.09	0.19	0.13	0.14	0.02	0.08	0.26	0.05	0.09	0.17	0.11	0.06
O81	0.15	0.09	0.15	0.11	0.13	0.03	0.14	0.19	0.11	0.07	0.05	0.07	0.07
O82	0.04	0.08	0.07	0.05	0.06	0.04	0.29	0.04	0.15	0.16	0.04	0.09	0.02
O83	0.35	0.17	0.23	0.16	0.07	0.20	0.50	0.59	0.54	0.48	0.23	0.02	0.17
O84	0.33	0.17	0.23	0.21	0.05	0.20	0.60	0.61	0.59	0.53	0.27	0.06	0.15
O85	0.35	0.25	0.28	0.18	0.06	0.15	0.36	0.39	0.38	0.41	0.28	0.09	0.18
O86	0.34	0.26	0.12	0.14	0.08	0.17	0.28	0.14	0.11	0.10	0.26	0.10	0.16
O87	0.33	0.18	0.08	0.10	0.12	0.21	0.30	0.33	0.18	0.24	0.12	0.10	0.06
O88	0.07	0.08	0.13	0.12	0.12	0.20	0.31	0.28	0.33	0.33	0.12	0.06	0.05
O89	0.18	0.10	0.09	0.09	0.19	0.12	0.24	0.39	0.26	0.22	0.27	0.04	0.14
O90	0.07	0.09	0.09	0.11	0.08	0.14	0.34	0.34	0.34	0.35	0.19	0.04	0.03
O91	0.10	0.07	0.12	0.07	0.05	0.27	0.32	0.19	0.08	0.15	0.09	0.05	0.08
O92	0.09	0.05	0.10	0.04	0.12	0.28	0.38	0.24	0.21	0.24	0.05	0.05	0.03
O93	0.07	0.08	0.12	0.13	0.13	0.25	0.21	0.10	0.30	0.39	0.06	0.07	0.09
O94	0.09	0.13	0.07	0.15	0.04	0.28	0.36	0.32	0.33	0.33	0.16	0.10	0.09
O95	0.15	0.10	0.10	0.08	0.08	0.08	0.47	0.41	0.32	0.30	0.29	0.10	0.10
O96	0.11	0.06	0.07	0.06	0.12	0.25	0.41	0.22	0.11	0.14	0.08	0.06	0.05
O97	0.08	0.05	0.06	0.07	0.12	0.34	0.44	0.15	0.06	0.04	0.02	0.04	0.04
O98	0.06	0.13	0.16	0.19	0.07	0.35	0.40	0.17	0.22	0.22	0.08	0.11	0.07
O99	0.12	0.16	0.03	0.12	0.05	0.38	0.44	0.35	0.23	0.28	0.26	0.10	0.04
O100	0.25	0.11	0.20	0.13	0.02	0.04	0.38	0.03	0.05	0.06	0.03	0.05	0.33
O101	0.32	0.14	0.18	0.20	0.20	0.21	0.32	0.05	0.08	0.03	0.04	0.08	0.20
O102	0.05	0.09	0.10	0.04	0.03	0.09	0.27	0.11	0.03	0.04	0.04	0.16	0.07
O103	0.26	0.17	0.27	0.06	0.15	0.16	0.48	0.04	0.06	0.02	0.02	0.08	0.33
O104	0.25	0.18	0.40	0.20	0.23	0.24	0.45	0.06	0.04	0.02	0.01	0.14	0.33
O105	0.12	0.20	0.17	0.24	0.23	0.22	0.34	0.09	0.07	0.06	0.01	0.08	0.15
O106	0.26	0.26	0.42	0.28	0.24	0.19	0.36	0.02	0.02	0.08	0.04	0.16	0.31
O107	0.18	0.32	0.43	0.26	0.20	0.19	0.36	0.12	0.10	0.09	0.03	0.16	0.30
O108	0.21	0.34	0.45	0.28	0.19	0.23	0.21	0.05	0.03	0.08	0.02	0.14	0.31
O109	0.24	0.17	0.44	0.19	0.18	0.17	0.20	0.42	0.02	0.12	0.04	0.03	0.15
O110	0.26	0.12	0.39	0.20	0.22	0.20	0.16	0.38	0.03	0.05	0.07	0.02	0.18
O111	0.25	0.15	0.41	0.20	0.20	0.20	0.06	0.30	0.05	0.03	0.07	0.01	0.21
O112	0.08	0.31	0.23	0.23	0.18	0.21	0.29	0.08	0.06	0.05	0.03	0.13	0.24
O113	0.29	0.38	0.42	0.29	0.24	0.27	0.16	0.14	0.08	0.09	0.03	0.16	0.23
O114	0.31	0.39	0.45	0.28	0.16	0.24	0.38	0.34	0.07	0.09	0.06	0.15	0.25
O115	0.31	0.37	0.43	0.25	0.09	0.20	0.22	0.36	0.10	0.16	0.05	0.14	0.23

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
O116	0.32	0.38	0.44	0.26	0.09	0.18	0.17	0.42	0.08	0.08	0.06	0.13	0.23
O117	0.31	0.36	0.43	0.26	0.11	0.16	0.10	0.32	0.11	0.03	0.09	0.14	0.28
O118	0.17	0.09	0.37	0.16	0.14	0.14	0.24	0.19	0.17	0.15	0.03	0.07	0.04
O119	0.12	0.29	0.23	0.11	0.15	0.13	0.29	0.31	0.10	0.04	0.04	0.11	0.07
O120	0.08	0.10	0.16	0.11	0.18	0.14	0.21	0.31	0.15	0.08	0.04	0.03	0.07
O121	0.07	0.06	0.03	0.06	0.09	0.10	0.24	0.19	0.19	0.17	0.03	0.09	0.12
O122	0.15	0.03	0.06	0.04	0.04	0.09	0.11	0.29	0.15	0.17	0.04	0.07	0.05
O123	0.10	0.03	0.05	0.06	0.08	0.14	0.35	0.07	0.08	0.07	0.03	0.08	0.05
O124	0.26	0.22	0.10	0.12	0.09	0.16	0.33	0.12	0.03	0.09	0.02	0.12	0.11
O125	0.04	0.29	0.13	0.11	0.16	0.13	0.23	0.20	0.04	0.08	0.01	0.11	0.09
O126	0.27	0.42	0.37	0.23	0.34	0.28	0.10	0.26	0.08	0.10	0.04	0.09	0.03
O127	0.21	0.10	0.05	0.07	0.09	0.24	0.20	0.15	0.11	0.10	0.09	0.04	0.09
O128	0.14	0.08	0.05	0.10	0.13	0.11	0.08	0.11	0.08	0.14	0.06	0.12	0.05
O129	0.05	0.07	0.07	0.08	0.05	0.57	0.67	0.30	0.42	0.17	0.06	0.20	0.06
O130	0.09	0.07	0.06	0.08	0.21	0.35	0.29	0.23	0.32	0.28	0.09	0.21	0.03
O131	0.09	0.06	0.06	0.11	0.16	0.46	0.32	0.15	0.39	0.35	0.14	0.14	0.10
O132	0.04	0.04	0.09	0.08	0.16	0.29	0.42	0.36	0.40	0.37	0.09	0.17	0.06
O133	0.03	0.03	0.07	0.10	0.18	0.17	0.24	0.33	0.14	0.20	0.06	0.18	0.03
O134	0.27	0.19	0.07	0.06	0.08	0.17	0.14	0.32	0.17	0.34	0.30	0.10	0.18
O135	0.10	0.07	0.02	0.03	0.02	0.04	0.12	0.24	0.29	0.14	0.15	0.25	0.07
O136	0.19	0.14	0.11	0.05	0.06	0.07	0.14	0.18	0.38	0.08	0.26	0.30	0.16
O137	0.27	0.20	0.12	0.08	0.08	0.05	0.03	0.06	0.31	0.03	0.26	0.15	0.21
O138	0.24	0.16	0.07	0.04	0.05	0.20	0.23	0.14	0.15	0.26	0.34	0.18	0.12
O139	0.24	0.15	0.06	0.04	0.25	0.33	0.61	0.31	0.29	0.45	0.33	0.22	0.04
O140	0.12	0.07	0.03	0.08	0.22	0.55	0.45	0.12	0.14	0.16	0.22	0.22	0.05
O141	0.18	0.07	0.07	0.02	0.04	0.05	0.17	0.12	0.32	0.51	0.39	0.22	0.03
O142	0.06	0.12	0.11	0.04	0.15	0.49	0.39	0.41	0.50	0.42	0.08	0.06	0.05
O143	0.04	0.09	0.04	0.03	0.17	0.50	0.31	0.39	0.29	0.12	0.06	0.07	0.10
O144	0.06	0.11	0.05	0.05	0.20	0.49	0.30	0.35	0.37	0.08	0.09	0.13	0.14
O145	0.05	0.10	0.03	0.05	0.21	0.50	0.30	0.29	0.38	0.10	0.06	0.15	0.16
O146	0.06	0.08	0.03	0.04	0.21	0.50	0.30	0.19	0.22	0.42	0.32	0.38	0.16
O147	0.01	0.03	0.01	0.03	0.18	0.49	0.37	0.23	0.35	0.11	0.07	0.13	0.16
O148	0.02	0.03	0.01	0.04	0.17	0.45	0.34	0.12	0.13	0.09	0.11	0.12	0.05
O149	0.04	0.03	0.04	0.08	0.15	0.41	0.30	0.07	0.15	0.29	0.30	0.34	0.11
O150	0.07	0.04	0.04	0.06	0.04	0.06	0.13	0.10	0.15	0.44	0.24	0.30	0.03
O151	0.03	0.18	0.05	0.02	0.12	0.45	0.30	0.38	0.33	0.11	0.23	0.26	0.19
O152	0.05	0.05	0.01	0.08	0.07	0.37	0.22	0.10	0.19	0.17	0.14	0.26	0.24
O153	0.08	0.13	0.07	0.09	0.10	0.34	0.22	0.12	0.35	0.26	0.19	0.24	0.27
O154	0.07	0.07	0.05	0.05	0.14	0.31	0.28	0.28	0.52	0.32	0.05	0.10	0.32
O155	0.07	0.15	0.08	0.05	0.04	0.29	0.22	0.23	0.51	0.26	0.20	0.24	0.31
O156	0.08	0.15	0.11	0.03	0.04	0.26	0.22	0.32	0.45	0.11	0.17	0.22	0.15
O157	0.18	0.12	0.12	0.02	0.10	0.24	0.13	0.15	0.33	0.39	0.20	0.20	0.21
O158	0.03	0.10	0.08	0.03	0.11	0.22	0.11	0.23	0.50	0.41	0.27	0.07	0.12

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
O159	0.06	0.13	0.12	0.04	0.03	0.18	0.26	0.26	0.33	0.25	0.24	0.17	0.15
O160	0.17	0.06	0.03	0.03	0.06	0.20	0.20	0.28	0.43	0.42	0.29	0.14	0.33
O161	0.05	0.05	0.07	0.02	0.09	0.07	0.12	0.20	0.39	0.47	0.31	0.17	0.10
O162	0.07	0.16	0.10	0.02	0.10	0.10	0.10	0.15	0.22	0.43	0.25	0.20	0.09
O163	0.14	0.08	0.14	0.03	0.14	0.06	0.22	0.27	0.28	0.06	0.07	0.17	0.29
O164	0.17	0.06	0.20	0.03	0.14	0.10	0.21	0.31	0.11	0.08	0.13	0.17	0.09

Table 6 Velocity Ratio (VR) at Special Test Points

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
S1	-	-	-	-	-	-	-	-	-	-	-	-	-
S2	-	-	-	-	-	-	-	-	-	-	-	-	-
S3	-	-	-	-	-	-	-	-	-	-	-	-	-
S4	0.25	0.29	0.22	0.07	0.09	0.23	0.08	0.23	0.23	0.18	0.11	0.17	0.29
S5	0.14	0.23	0.18	0.04	0.15	0.03	0.01	0.12	0.05	0.20	0.20	0.26	0.09
S6	0.26	0.32	0.17	0.02	0.10	0.21	0.11	0.20	0.19	0.16	0.21	0.16	0.26
S7	0.19	0.16	0.14	0.04	0.05	0.13	0.13	0.15	0.13	0.14	0.09	0.17	0.25
S8	0.20	0.21	0.12	0.06	0.05	0.12	0.10	0.03	0.30	0.16	0.08	0.06	0.24
S9	0.24	0.24	0.15	0.03	0.14	0.13	0.04	0.11	0.32	0.18	0.06	0.07	0.29
S10	0.13	0.14	0.12	0.05	0.08	0.24	0.07	0.09	0.26	0.12	0.27	0.11	0.18
S11	0.14	0.23	0.08	0.16	0.12	0.27	0.06	0.04	0.25	0.06	0.20	0.06	0.03
S12	0.12	0.25	0.08	0.13	0.14	0.26	0.06	0.06	0.28	0.06	0.10	0.11	0.07
S13	0.24	0.28	0.12	0.04	0.08	0.18	0.05	0.06	0.18	0.11	0.02	0.07	0.26
S14	0.17	0.12	0.08	0.07	0.05	0.29	0.05	0.03	0.17	0.09	0.28	0.07	0.12
S15	0.19	0.26	0.08	0.11	0.06	0.29	0.05	0.05	0.19	0.03	0.24	0.05	0.05
S16	0.20	0.27	0.11	0.21	0.08	0.23	0.06	0.05	0.23	0.04	0.15	0.07	0.16
S17	0.07	0.07	0.02	0.03	0.07	0.10	0.04	0.02	0.21	0.05	0.05	0.08	0.08
S18	0.11	0.09	0.18	0.16	0.21	0.31	0.20	0.08	0.07	0.07	0.02	0.10	0.23
S19	0.16	0.17	0.19	0.16	0.20	0.26	0.07	0.14	0.06	0.10	0.02	0.07	0.24
S20	0.13	0.24	0.19	0.09	0.16	0.22	0.25	0.19	0.07	0.05	0.06	0.14	0.22
S21	0.22	0.33	0.16	0.07	0.04	0.04	0.10	0.24	0.04	0.13	0.16	0.26	0.03
S22	0.29	0.38	0.03	0.02	0.09	0.05	0.01	0.03	0.14	0.12	0.03	0.05	0.06
S23	0.30	0.35	0.17	0.03	0.06	0.05	0.05	0.02	0.13	0.05	0.03	0.07	0.22
S24	0.22	0.23	0.08	0.03	0.11	0.21	0.07	0.02	0.17	0.02	0.23	0.13	0.22
S25	0.06	0.10	0.02	0.20	0.11	0.13	0.06	0.14	0.19	0.13	0.15	0.14	0.08
S26	0.05	0.30	0.18	0.11	0.04	0.13	0.27	0.14	0.03	0.04	0.05	0.20	0.16
S27	0.19	0.20	0.13	0.01	0.05	0.09	0.09	0.22	0.36	0.33	0.10	0.05	0.16
S28	0.22	0.31	0.11	0.01	0.05	0.08	0.10	0.12	0.06	0.03	0.24	0.13	0.10
S29	0.20	0.25	0.09	0.03	0.07	0.07	0.10	0.14	0.07	0.08	0.15	0.17	0.16
S30	0.15	0.21	0.06	0.04	0.06	0.04	0.08	0.15	0.16	0.26	0.14	0.21	0.09
S31	0.17	0.21	0.03	0.02	0.08	0.15	0.11	0.17	0.22	0.21	0.18	0.16	0.11
S32	0.11	0.24	0.07	0.03	0.10	0.27	0.07	0.14	0.35	0.11	0.02	0.12	0.11
S33	0.14	0.01	0.02	0.02	0.10	0.30	0.06	0.04	0.25	0.11	0.04	0.14	0.07
S34	0.04	0.05	0.04	0.02	0.11	0.31	0.11	0.02	0.16	0.18	0.06	0.17	0.09

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
S35	0.16	0.25	0.06	0.13	0.10	0.27	0.40	0.19	0.28	0.31	0.04	0.23	0.14
S36	0.15	0.07	0.06	0.16	0.09	0.22	0.55	0.42	0.25	0.38	0.05	0.04	0.11
S37	0.14	0.18	0.06	0.07	0.06	0.20	0.45	0.40	0.24	0.31	0.06	0.05	0.15
S38	0.18	0.10	0.05	0.13	0.11	0.20	0.47	0.37	0.24	0.30	0.14	0.08	0.06
S39	0.41	0.26	0.05	0.14	0.10	0.27	0.59	0.43	0.37	0.33	0.14	0.10	0.23
S40	0.15	0.06	0.07	0.09	0.05	0.40	0.65	0.53	0.39	0.45	0.16	0.10	0.04
S41	0.11	0.07	0.06	0.05	0.03	0.46	0.55	0.45	0.46	0.40	0.15	0.08	0.10
S42	0.25	0.30	0.12	0.03	0.06	0.08	0.10	0.06	0.15	0.11	0.11	0.08	0.23
S43	0.14	0.17	0.04	0.03	0.02	0.22	0.14	0.11	0.12	0.11	0.11	0.09	0.06
S44	0.16	0.20	0.04	0.03	0.06	0.18	0.19	0.23	0.28	0.28	0.10	0.10	0.09
S45	0.30	0.35	0.16	0.16	0.03	0.16	0.05	0.06	0.08	0.15	0.14	0.08	0.31
S46	0.19	0.19	0.06	0.13	0.06	0.14	0.07	0.07	0.07	0.06	0.06	0.10	0.09
S47	0.24	0.23	0.08	0.19	0.07	0.05	0.32	0.34	0.25	0.29	0.05	0.17	0.11
S48	0.27	0.22	0.15	0.15	0.05	0.07	0.26	0.11	0.16	0.16	0.06	0.10	0.11
S49	0.19	0.25	0.18	0.07	0.09	0.14	0.20	0.10	0.27	0.30	0.15	0.04	0.16
S50	0.40	0.23	0.04	0.12	0.07	0.07	0.09	0.11	0.22	0.18	0.12	0.05	0.24
S51	0.09	0.07	0.04	0.08	0.08	0.38	0.55	0.35	0.27	0.26	0.29	0.07	0.03
S52	0.06	0.13	0.03	0.13	0.07	0.39	0.52	0.22	0.25	0.29	0.19	0.08	0.06
S53	0.08	0.05	0.13	0.19	0.11	0.34	0.44	0.22	0.05	0.20	0.03	0.05	0.07
S54	0.13	0.06	0.19	0.14	0.15	0.23	0.22	0.21	0.14	0.10	0.12	0.09	0.11
S55	0.24	0.05	0.10	0.07	0.18	0.19	0.12	0.12	0.19	0.25	0.01	0.11	0.14
S56	0.12	0.06	0.03	0.11	0.15	0.24	0.32	0.29	0.29	0.24	0.07	0.07	0.05
S57	0.09	0.07	0.07	0.12	0.12	0.26	0.35	0.38	0.42	0.14	0.05	0.08	0.02
S58	0.05	0.09	0.06	0.03	0.09	0.18	0.21	0.35	0.40	0.03	0.03	0.02	0.04
S59	0.05	0.07	0.04	0.03	0.08	0.18	0.17	0.26	0.31	0.13	0.06	0.05	0.04
S60	0.02	0.13	0.02	0.04	0.05	0.03	0.42	0.35	0.20	0.16	0.18	0.30	0.12
S61	0.02	0.10	0.03	0.03	0.07	0.03	0.46	0.40	0.25	0.19	0.08	0.24	0.11
S62	0.03	0.09	0.03	0.06	0.07	0.06	0.52	0.47	0.39	0.33	0.08	0.20	0.11
S63	0.03	0.03	0.03	0.05	0.08	0.10	0.47	0.35	0.12	0.16	0.22	0.27	0.12
S64	0.02	0.03	0.02	0.04	0.09	0.15	0.51	0.40	0.28	0.18	0.14	0.18	0.12
S65	0.06	0.03	0.01	0.08	0.08	0.18	0.54	0.40	0.28	0.18	0.08	0.07	0.11
S66	0.05	0.11	0.02	0.04	0.06	0.29	0.34	0.19	0.11	0.14	0.09	0.16	0.07
S67	0.04	0.04	0.04	0.03	0.03	0.19	0.53	0.32	0.13	0.19	0.19	0.28	0.07
S68	0.05	0.02	0.04	0.04	0.06	0.22	0.57	0.41	0.29	0.11	0.05	0.21	0.08
S69	0.02	0.06	0.06	0.05	0.06	0.22	0.49	0.32	0.15	0.08	0.17	0.26	0.08
S70	0.01	0.04	0.01	0.06	0.06	0.26	0.54	0.37	0.20	0.17	0.17	0.19	0.03
S71	0.01	0.07	0.04	0.07	0.08	0.26	0.59	0.46	0.47	0.38	0.25	0.09	0.25
S72	0.14	0.07	0.07	0.05	0.08	0.27	0.57	0.41	0.45	0.33	0.16	0.15	0.16
S73	0.07	0.06	0.03	0.05	0.07	0.29	0.56	0.27	0.35	0.29	0.33	0.30	0.12
S74	0.20	0.20	0.17	0.08	0.08	0.31	0.13	0.14	0.12	0.14	0.10	0.08	0.34
S75	0.09	0.09	0.11	0.08	0.06	0.27	0.11	0.05	0.06	0.07	0.05	0.02	0.27
S76	0.10	0.15	0.01	0.05	0.12	0.09	0.02	0.20	0.16	0.04	0.07	0.06	0.17
S77	0.14	0.18	0.01	0.05	0.14	0.14	0.01	0.20	0.16	0.07	0.08	0.07	0.16

	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	N
S78	0.05	0.15	0.01	0.04	0.10	0.03	0.02	0.18	0.13	0.05	0.07	0.05	0.08
S79	0.15	0.20	0.03	0.05	0.11	0.15	0.03	0.19	0.13	0.09	0.06	0.10	0.10
S80	0.04	0.06	0.02	0.02	0.06	0.03	0.01	0.14	0.05	0.07	0.03	0.05	0.02
S81	0.10	0.16	0.01	0.03	0.07	0.17	0.02	0.18	0.06	0.12	0.02	0.10	0.04
S82	0.25	0.29	0.12	0.02	0.03	0.03	0.04	0.02	0.09	0.07	0.08	0.08	0.14
S83	0.20	0.25	0.05	0.02	0.03	0.06	0.03	0.02	0.06	0.07	0.07	0.07	0.10
S84	0.27	0.33	0.08	0.01	0.05	0.07	0.02	0.03	0.08	0.06	0.06	0.11	0.14
S85	0.22	0.25	0.02	0.01	0.04	0.07	0.03	0.02	0.06	0.05	0.05	0.15	0.04
S86	0.21	0.13	0.08	0.07	0.04	0.05	0.35	0.37	0.24	0.05	0.04	0.02	0.17
S87	0.07	0.33	0.15	0.18	0.12	0.11	0.24	0.03	0.15	0.17	0.08	0.03	0.23
S88	0.10	0.11	0.05	0.13	0.10	0.11	0.30	0.37	0.28	0.07	0.05	0.01	0.10
S89	0.16	0.06	0.04	0.18	0.13	0.16	0.25	0.28	0.37	0.20	0.08	0.04	0.22
S90	0.26	0.08	0.07	0.20	0.15	0.19	0.23	0.28	0.36	0.27	0.08	0.09	0.20

Attachment Ve of
MPC Paper No. 10/21

Agreement No. CE 4/2014(TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – FEASIBILITY STUDY

Additional Service – Without Rail-Based EFLS Scenario
Review of Environmental Assessment (EA)

FINAL

August 2021



Development Bureau
The Government of the Hong Kong Special Administrative Region

ARUP

Energizing Kowloon East Office, Development Bureau

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study

Additional Service - Without Rail-Based EFLS Scenario
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Agreement No. CE 4/2014 (TP)Agreement No. CE 4/2014 (TP)

Final | August 2021

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

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

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Acronym

EKEO	Energizing Kowloon East Office
EPD	Environmental Protection Department
GFA	Gross Floor Area
HKPSG	Hong Kong Planning Standards and Guidelines
KBAA	Kowloon Bay Action Area
KE	Kowloon East
KTD	Kai Tak Development
ORRC	Organic Resources Recovery Centre

1 Introduction

1.1 Study Background

1.1.1.1 Kowloon East (KE) is an area comprising the former Kai Tak Airport, Kwun Tong Business Area (KTBA) and Kowloon Bay Business Areas (KBBA). This area witnessed the rapid growth of an important industrial base in the heyday of Hong Kong's manufacturing industry, creating hundreds of thousands of jobs and propelling Hong Kong's prosperity. Following relocation of the Airport to Chek Lap Kok and our manufacturing base to the Mainland, a huge stock of industrial buildings was not being fully utilised. On the other hand, with the continuing boom of Hong Kong's financial and service sectors as well as large numbers of regional headquarters and regional offices of multi-national companies setting their foothold in Hong Kong, the demand for quality offices can no longer be met by our traditional Central Business District (CBD). Some private developers have developed high-grade office buildings and retail centres in KE. About 1.4 million m^2 office floor space have been completed in 2011.

1.1.1.2 In 2001, all industrial land in Kwun Tong and Kowloon Bay was rezoned to "Other Specified Uses (Business)" ("OU(Business)"). The "OU(Business)" zone allows industrial premises to be converted to office use and industrial buildings redeveloped for commercial/office uses. In April 2010, the Government also introduced measures to revitalise industrial buildings in Hong Kong. It is anticipated that, together with the new commercial/office space to be provided in Kai Tak Development (KTD) area, the total commercial/office space in Kowloon East has the potential to increase from the current 2.0 million sqm to 7.0 million sqm in the future. Kowloon East has great potential to evolve into a vibrant premier business district in Hong Kong.

1.1.1.3 In the 2011-12 Policy Address, the Chief Executive (CE) announced that the Government would adopt a visionary, coordinated and integrated approach to expedite the transformation of KE into an attractive, alternative CBD to support Hong Kong's economic development. Energizing Kowloon East Office (EKEO) was therefore set up in the Development Bureau (DevB) to undertake initiatives of land use review, urban design, improved connectivity and the associated infrastructure

1.1.1.4 The initial proposals for Energizing Kowloon East were formulated under the CBD2 strategy, with main focus on enhancing Connectivity, Branding, Design and Diversity. These proposals were consolidated on the Conceptual Master Plan (CMP) version 2.0 issued on 7 June 2012 and further refinement of the CMP was promulgated in January 2015 (version 4.0) taking on board suggestions during the ongoing public engagement process and new opportunities identified. The latest CMP 5.0 was promulgated in November 2016, focusing on 5 issues, including Walkability and Mobility, Green CBD, Smart City, Socio-economic Vibrancy, and the Spirit of Creation.

1.1.1.5 One of the key tasks of EKEO is to proactively review the development and design options of undeveloped/under-developed Government sites

with guidance of the CBD2 strategy. Releasing the development potential of KBAA which is at the core area of KE, for mixed development will bring great vibrancy to the region. The Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study (the Study) is therefore commissioned to review, investigate, and produce feasible development options and implementation strategy to optimise the development potential of KBAA in terms of its strategic setting, constraints and opportunities.

1.2 Study Area

1.2.1.1 The Study Site (**Figure 1.2.1**) covers the existing Government sites in KBAA which include the area currently occupied by Transport Department (TD)'s two Vehicle Examination Centres (VECs), the former Environmental Protection Department (EPD)'s waste recycling centre[1], Highway Departments (HyD)'s maintenance depot, Hong Kong Police Force (HKPF)'s police vehicle pound and the areas of roads, pedestrian walkways, sitting-out area and amenity areas in between. The area is mainly bounded by Sheung Yee Road in the North, Wai Yip Street in the East and the edge of Kwun Tong Bypass and the adjoining amenity areas in the West and South next to KTD. It has an area of about 17 ha including the areas of roads, pedestrian walkways, sitting-out area and amenity areas.

1.2.1.2 The Study Area is mainly zoned for "Government, Institution or Community (1)" ("G/IC(1)"), "Other Specified Uses (Refuse Transfer Station)" ("OU(Refuse Transfer Station)"), "Other Specified Uses (Business)" ("OU(Business)") and "Road" uses.

1.2.1.3 The Study Area is divided into six development sites, namely Lots 1 to 6 (**Figure 1.2.2**). The Kai Fuk Road flyover (Lot 3) literally bisected KBAA into the northern and southern portion. The northern cluster consists of the highway maintenance depot (part of area underneath the Flyover at Lot 3), a police vehicle detention and examination centre (Lot 1) and was previously occupied the former waste recycling centre (Lot 2), whereas the southern cluster by two vehicle examination centres (VECs) (Lot 4). Within KBAA, two lots zoned "OU(Business)" namely the New Kowloon Inland Lots (NKILs) 6512 (Lot 6) and 6313 (Lot 5) were sold in January and May 2015 and the respective commercial development has been completed in 2019.

1.3 Purpose of this Report

1.3.1.1 The proposed plot ratio of the without rail-based EFLS scenario has been reviewed by converting portion of the proposed hotel development into office development and increase PR from 11 to 12 to optimise the development potential. The purpose of this report is to review the impacts on various environmental aspects in the without rail-based EFLS scenario of the PR12 scheme.

[1] The waste recycling centre has been demolished in Q1 2021

2 Recommended Outline Development Plan (RODP)

2.1 Introduction

2.1.1.1 The without rail-based EFLS Scenario has taken into consideration the efficient use of land resources, quality urban design within the bounds of the infrastructure capacities. In line with the development intensity in the "OU(B)" zone and Kowloon Bay as well as the anticipated decrease in hotel's demands in the coming years, the proposed plot ratio of the without rail-based EFLS scenario has been reviewed by converting portion of the proposed hotel development into office development. The proposed plot ratio has been increased from 11 to 12. **Figure 2.1.1** shows the recommended outline development plan.

2.2 Key Development Parameters and Proposed Land Use Budget

2.2.1 Key Development Parameters

2.2.1.1 **Table 2.2.1** set out the key development parameters on individual Lots based on the approach above.

Table 2.2.1 Key Development Parameters on Individual Lots

Lot	Gross Site Area (m^2) (about)	Net Site Area (m^2) (about)	GFA (m^2) (about)	Plot Ratio
1	9,500	9,500	subject to detailed design and feasibility study	N/A
2*	24,140	17,000	204,600	12.0
3	8,400	8,400	400	N/A
4**	25,020	16,750	201,000	12.0
5	3,800	3,800	45,540	12.0
6	6,800	6,800	82,040	12.0
Total (excluding Lots 1 & 3)		**44,350**	**533,180**	N/A
TOTAL (excluding Lot 1)		**52,750**	**533,580**	N/A

Notes:

* Includes POSPD of about 4,400m^2 and the section of Cheung Yip Street (between Lots 2 and 5) of about 2,740m^2

** Includes POSPDs of about 1,600m^2 (western portion) and about 1,700m^2 between eastern portion and Lot 6, amenity areas of 2,140m^2 and the section of Cheung Yip Street of about 2,830m^2

2.2.2 Proposed Land Use Budget

2.2.2.1 The land use budget is tabulated in Table 2.2.2

Table 2.2.2 Summary of the Proposed Land Use Mix of RODP

USES	GFA	%
Office	391,080	73.3%
Retail/ F&B/ Entertainment/ Urban Farming/ Food Workshop	122,220	22.9%
Hotel	14,880	2.8%

USES	GFA	%
Arts, Cultural and Creative	400	0.1%
Transport Facilities	5,000	0.9%
Total	**533,580**	**100.0%**

Remarks: The GFA of the two sold sites (i.e. Lots 5 and 6) are included. Based on the latest building plans, about 116,110 m^2 of office GFA and 11,480 m^2 of retail and F&B GFA are provided at the two sites.

2.2.3 Broad Estimation of Employment Size

2.2.3.1 Employment opportunities by land uses are derived by applying the worker density by land uses on the GFA data. Upon completion, the Preferred Option is anticipated to create in total of about 26,000 employment opportunities. **Table 2.2.3** summaries the estimated employment opportunities.

Table 2.2.3 Employment Opportunities by Uses under Preferred Option

USES	Preferred Option
Office[1]	19,554
Retail/ F&B/ Entertainment/ Urban Farming/ Food Workshop[2]	6,111
Hotel[3]	239
Arts, Cultural and Creative[4]	10
Transport Facilities[5]	10
Total	**25,924**

Notes:

[1] According to HK2030 Study WP 46, employment density for CBD office is assumed to be 1 worker per 20sqm.

[2] Retail, F&B and Entertainment, Urban Farming and Food Workshop are assumed to be General Business Use. According to HKPSG, employment density is assumed to be 1 worker per 20-25sqm for General Business Use.

[3] As local employment density for hotel is not available, the assumption adopted by the UK government is therefore applied. It is assumed that for 4-5 Star Hotels, the ratio between hotel staff and number of rooms should be 1 hotel staff per 1.25 rooms. (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/378203/employ-den.pdf)

[4] According to Annex 6 and 7 of the Economic Impact of Developing the West Kowloon Cultural District Technical Paper (Financial Secretary's Office, 2007), the Performing Arts Facilities will create 4,275 direct employment opportunities. And the total GFA for these Performing Arts Facilities is of about 188,895sqm. The employment density for cultural and creative facilities is therefore assumed to be 1 worker per 44sqm.

[5] For the proposed PTI, the estimated number of employment opportunities is minimal at around 10 supporting staff.

3 Environmental Assessment

3.1 Introduction

3.1.1.1 Under the without rail-based EFLS scenario with adjustment of plot ratio for both Lot 2 and Lot 4 from 11 to 12, as the total GFA is similar, impacts on various environmental aspects including water quality, sewerage, waste management implications etc. are very alike as in the with rail-based EFLS scenario and are elaborated below.

3.1.2 Air Quality

Construction Phase

3.1.2.1 Potential dust impact would be generated from the open site erosion, excavation, material handling, truck movement, road works etc. during construction phase. Under the without rail-based EFLS scenario, the site area assigned for development of the EFLS depot under the with rail-based EFLS scenario would be assigned for commercial development. Since the scale and type of construction works involved would be similar for both with and without rail-based EFLS scenarios, it is anticipated that the dust impact assessment results for the with rail-based EFLS scenario are also applicable for the without rail-based EFLS scenario in which adverse residual air quality impact during construction phase is not anticipated given frequent watering on all worksites. Detailed assessment related to the construction of ORRC would be conducted at later stage under a separate EIA study. With the adjustment of plot ratio for both Lot 2 and Lot 4 from 11 to 12 for the without rail-based EFLS scenario, as the net site area remains unchanged and the scale and type of construction works involved remains similar, it is anticipated that the dust impact assessment results for the with rail-based EFLS scenario are still applicable in which adverse residual air quality impact during construction phase is not anticipated given frequent watering on all worksites.

Operational Phase

3.1.2.2 Potential air quality impact during operational phase would be due to the vehicular emission from nearby roads and the project induced traffic, industrial emissions from existing sources as well as the proposed ORRC (subject to further details from the future project proponent). Under the without rail-based EFLS scenario, transportation methods, such as automated vehicles/ travellators, would be used, subject to other further considerations. Since the amount of traffic on nearby roads as well as the project induced traffic would be similar for both with and without rail-based EFLS scenarios, and the use of automated vehicles/ travellators would have minimal additional impacts on air quality at or in the vicinity of the Study Area, it is anticipated that the operational air quality impact assessment results for the with rail-based EFLS scenario are also applicable for the without rail-based EFLS scenario in which air quality impact during operational phase would likely be minimised given sufficient setback in accordance with HKPSG could be provided, whereas impacts from operation of the ORRC could only be concluded after detailed assessment to be conducted at later stage by the future operator under a separate EIA study. With the adjustment of plot ratio

for both Lot 2 and Lot 4 from 11 to 12 for the without rail-based EFLS scenario, there will be changes in forecast traffic flows on nearby roads. Nevertheless, the changes, which involve both increase and reduce of forecast peak traffic flows on nearby roads, are limited to about 60 or less vehicles per hour and insignificant as compared with the forecast traffic flows for the original without rail-based EFLS scenario. It is thus anticipated that the operational air quality impact assessment results for the with rail-based EFLS scenario are still applicable in which air quality impact during operational phase would likely be minimised given sufficient setback in accordance with HKPSG could be provided.

3.1.3 Noise

Construction Phase

3.1.3.1 Potential noise impact during construction phase would be due to the operation of Powered Mechanical Equipment (PME) for construction works. Under the without rail-based EFLS scenario, the site area assigned for development of the EFLS depot under the with rail-based EFLS scenario would be assigned for commercial development. Since the scale and type of construction works involved would be similar for both with and without rail-based EFLS scenarios, it is anticipated that the construction noise impact assessment results for the with rail-based EFLS scenario are also applicable for the without rail-based EFLS scenario in which adverse construction noise impact during construction phase is not anticipated with good site management practices and implementation of appropriate mitigation measures. Detailed assessment related to the construction of ORRC would be conducted at later stage under a separate EIA study. With the adjustment of plot ratio for both Lot 2 and Lot 4 from 11 to 12 for the without rail-based EFLS scenario, as the net site area remains unchanged and the scale and type of construction works involved remains similar, it is anticipated that the construction noise impact assessment results for the with rail-based EFLS scenario are still applicable in which adverse construction noise impact during construction phase is not anticipated with good site management practices and implementation of appropriate mitigation measures.

Operational Phase

3.1.3.2 Similar to the with rail-based EFLS scenario, given the existing noise climate in the vicinity of the Project site are dominated by road traffic noise generated from nearby major roads, and any potential noise sources arising from this Project will likely be screened by the adjacent existing industrial building and the project would not induce significant change in traffic, adverse traffic noise and fixed noise impact on existing noise sensitive uses is not anticipated under the without rail-based EFLS scenario. Nevertheless, at-source mitigation measures in form of enclosure, silencer and acoustic louver would be applied to the fixed plant noise sources of the proposed developments (e.g. proposed ORRC, cooling system at planned buildings etc.) where necessary to ensure compliance of relevant HKPSG criteria. In addition, central air-conditioning would likely be provided to all the planned uses (including the Hong Kong Children's Hospital) and these uses would no longer be relied on opened windows for ventilation. For the planned buildings

(e.g. offices, hotels, etc.) in the Study Area, they would also be central air-conditioned and would not rely on opened windows for ventilation. No adverse noise impact on the proposed development is also anticipated under the without rail-based EFLS scenario. With the adjustment of plot ratio for both Lot 2 and Lot 4 from 11 to 12 for the without rail-based EFLS scenario, there will be changes in forecast traffic flows on nearby roads. Nevertheless, the changes, which involve both increase and reduce of forecast peak traffic flows on nearby roads, are limited to about 60 or less vehicles per hour and insignificant as compared with the forecast traffic flows for the original without rail-based EFLS scenario. It is thus anticipated that the operational noise impact assessment results for the with rail-based EFLS scenario are still applicable in which adverse traffic noise and fixed noise impact on existing noise sensitive uses is not anticipated, and adverse noise impact on the proposed development is also not anticipated.

3.1.4 Water Quality

3.1.4.1 Potential water pollution sources during the construction and operational phase of the proposed development in the Study Area are identified, including construction site run off and sewage generated from development, surface runoff from the development and wastewater generation from the proposed Food Waste Treatment Plant (subject to further review). With the implementation of the good site practices as stipulated in ProPECC PN1/94 during the construction phase as well as provision of sewerage system and following of guidelines and practices as given in the ProPECC PN 5/93 for the operational phase, water quality impact arise from the proposed development during the construction and operational phases is not anticipated under both with and without rail-based EFLS scenarios with the adjustment of plot ratio for both Lot 2 and Lot 4 from 11 to 12.

3.1.5 Sewerage and Sewage Treatment Implication

3.1.5.1 There will be no adverse impact on the existing branch sewerage systems arising from the proposed development under both with and without rail-based EFLS scenarios with the adjustment of plot ratio for both Lot 2 and Lot 4 from 11 to 12.

3.1.5.2 The impact on the existing trunk sewer and sewerage infrastructures will be assessed under the KTD Technical Study and Upgrading of Kwun Tong Preliminary Treatment Works – Investigation, Design and Construction.

3.1.6 Waste Management Implication

Construction Phase

3.1.6.1 Construction activities during the construction phase would generate a variety of wastes including C&D materials, chemical waste and general refuse. The quantities of wastes would be subject to the construction methods and works details to be proposed by the future Contractor / project proponent. Hence, the future Contractor / project proponent would be responsible for the detailed waste assessment. With the implementation of proper and appropriate mitigation measures during

construction phase, potential impact due to waste generation is not anticipated under both with and without rail-based EFLS scenarios with the adjustment of plot ratio for both Lot 2 and Lot 4 from 11 to 12.

Operational Phase

3.1.6.2 Major wastes arising from the Project during the operational phase would be commercial wastes, such as papers, plastics, ferrous and non-ferrous metals etc. under both with and without rail-based EFLS scenarios. With the commencement of the ORRC, the wastes arising from the Project would be well-managed. Hence, potential impact due to waste generation from the proposed development is not anticipated under both with and without rail-based EFLS scenarios with the adjustment of plot ratio for both Lot 2 and Lot 4 from 11 to 12.

3.1.7 Cultural Heritage

3.1.7.1 As the Project Site is located on a reclaimed land, no impact on cultural heritage is therefore anticipated under both with and without rail-based EFLS scenarios with the adjustment of plot ratio for both Lot 2 and Lot 4 from 11 to 12.

3.1.8 Land Contamination

3.1.8.1 The potential contaminated areas within the Project Site under with and without rail-based EFLS scenarios are the same. These potential contaminated areas include sites KB-1 (Police Vehicle Examination and Detention Centre (PVEDC)), KB-2 (Kowloon Bay Waste Recycling Centre), KB-4 (Transport Department New Kowloon Bay Vehicle Examination Centre) and KB-5 (Transport Department Kowloon Bay Vehicle Examination Centre). Land contamination assessment including desktop review, site surveys and environmental Site Investigation (SI) has been conducted for site which has been resumed.

3.1.8.2 A revised Contamination Assessment Plan (CAP) for Site KB-2 (Kowloon Bay Recycling Centre) was approved in March 2017 to update the scope of land contamination assessment for Site KB-2, and the environmental SI works for Site KB-2 were subsequently conducted. From the Contamination Assessment Report (CAR) for KB-2 approved in July 2017, testing results for the soil samples and groundwater samples collected were below the values of "Urban Residential RBRGs". For the electrical sub-station in Site KB-2 and the 2 disused underground diesel tanks, soil and groundwater sampling at 3 respective boreholes were conducted in 2019. From the supplementary CAR for KB-2 approved in October 2019, testing results for the soil samples and groundwater samples collected at the 3 remaining boreholes were also below the values of "Urban Residential RBRGs". Based on the analytical results of the soil and groundwater samples collected for Site KB-2, remediation of soil and groundwater at the Site KB-2 is not required.

3.1.8.3 Site surveys for Site KB-1 (PVEDC) were conducted in March 2016 and January 2020 after the commencement of operation of the PVEDC. Potential sources and signs of contamination were identified in both site visit and review of historical information. A supplementary CAP for

Site KB-1 was submitted to EPD in January 2020 and was approved in January 2021. However, in order to review the latest site conditions for any further signs of contamination, a site re-appraisal would be carried out by the future Contractor / project proponent to determine the potential of land contamination. Findings of such further site survey at the PVEDC would be presented in the updated supplementary CAP. Upon approval of the supplementary CAP for KB-1, and completion of the SI works (including those proposed in the approved CAP for KB-4 and KB-5, and if any, those to be proposed in the supplementary CAP for KB-1), a CAR (for KB-1, KB-4 and KB-5) would be prepared by the future Contractor / project proponent of the development site to present findings of the SI works. If contamination has been identified, a Remediation Assessment Plan (RAP) (for KB-1, KB-4 and KB-5) would be prepared by the future Contractor / project proponent to recommend specific remediation measures. Upon completion of the remediation works, if any, a Remediation Report (RR) (for KB-1, KB-4 and KB-5) would also be prepared by the future Contractor / project proponent to demonstrate that the clean-up works are adequate. The CAR, RAP and RR would be submitted to EPD for approval prior to commencement of any construction /development works.

3.1.9 Landscape and Visual

3.1.9.1 The adverse impacts would be generated from the demolition of existing buildings and structures, removal of existing trees and vegetation within the planting areas, loss and disturbance on some open space areas. Since most of the building layouts are proposed on the existing urbanised areas, no significant adverse impacts are anticipated. After the implementation of the mitigation measures including setbacks, tree preservation, tree transplanting and compensatory planting, adverse impacts from the loss of trees and vegetation can be mitigated.

3.1.9.2 The proposed development would alter the existing industrial urban landscape to a comprehensive urban landscape area. In visual aspect, taking into consideration the preliminary appraisal of visual change, the Proposed Development is expected to generate adverse visual impacts on most Viewing Points (VPs), in particular those adjacent VPs such as Upper Ngau Tau Kok Estate and Telford Gardens, and the Hong Kong Children's Hospital and Kai Tak New Acute Hospital (Planned).

3.1.9.3 However, with mitigation measures to compensate for the loss of landscape resources mentioned above, and providing several public open spaces and greening areas for needs of local community to replace the existing industrial features, it may be considered as effective in reducing the visual and landscape impacts in operational stage. And such transformation from industrial to commercial may be more compatible in visual character with the surrounding urban townscape.

3.1.10 Potential Schedule 2 Designated Projects under EIAO

3.1.10.1 Based on the current layout, the following Project may constitute a Schedule 2 Designated Project under the EIAO and an EIA would be required:

- Proposed ORRC comprising a food waste treatment plant and educational centre, etc. situates within Lot 1 [under Schedule 2, Part I, Item G.4]

3.1.10.2 The project proponents of ORRC would be responsible in preparing the submission under EIAO. The project proponent is reminded that for future EIA submission under EIAO, reference should be made to EIAO GN No.8/2010 for preparation of LIA.

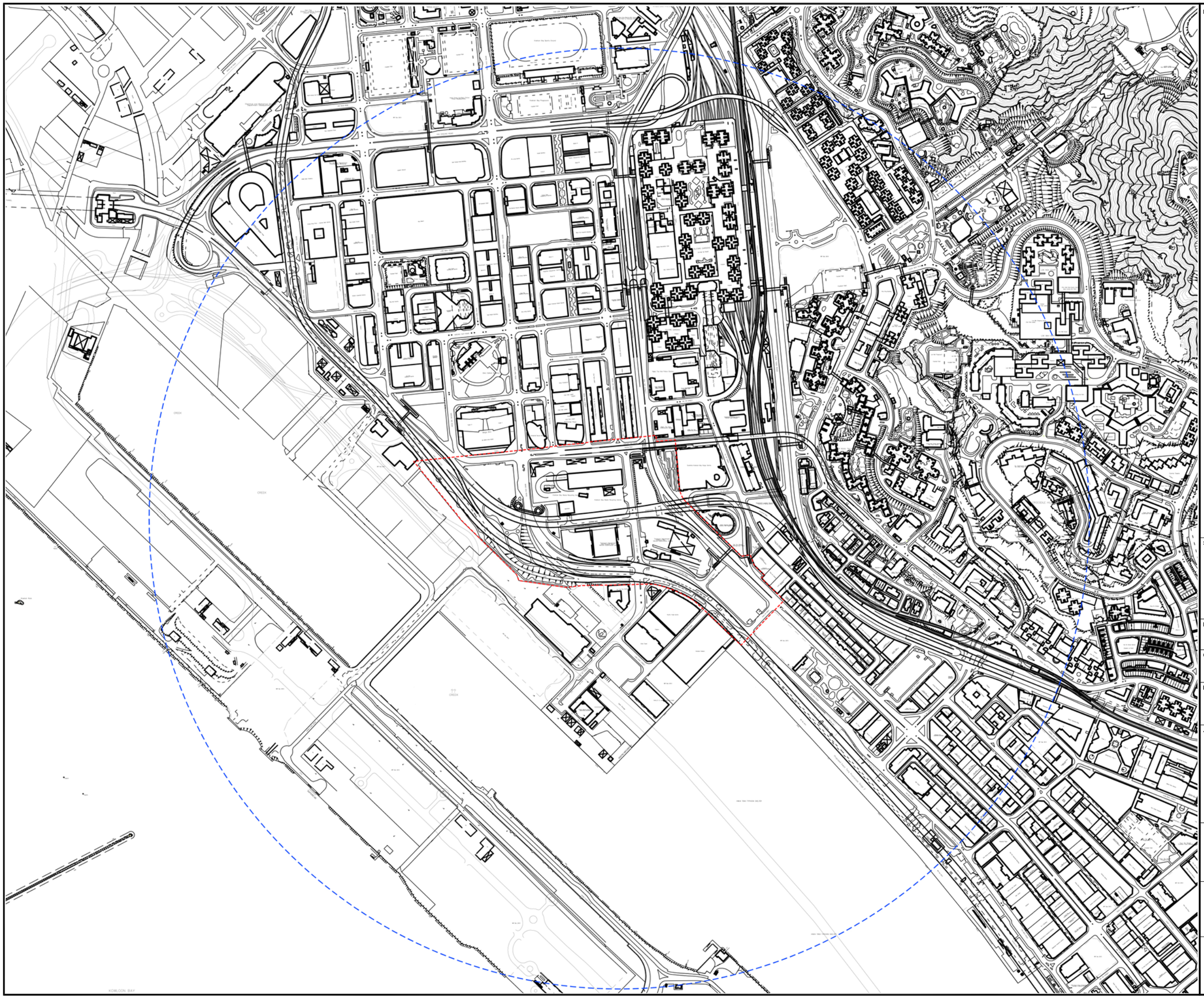
3.1.11 Environmental Implication due to the Proposed Junction Improvement

3.1.11.1 For the potential environmental implication due to the proposed junction improvements which were proposed under the development of KBAA. With this regard, a technical note has been prepared to assess and determine whether there would be adverse environmental impacts caused by the proposed junction improvement works and to evaluate if the environmental impacts due to the proposed junction improvement works on the exempted Designated Projects are adverse that would constitute a material change under the EIAO (**Appendix A** refers). It is concluded that no adverse environmental impacts caused by the proposed junction improvement works are anticipated, and no adverse environmental impacts due to the proposed junction improvement works on the exempted Designated Projects that would constitute a material change under the EIAO.

4 Conclusion

4.1.1.1 Based on the review findings of the impacts on various environmental aspects in the without rail-based EFLS scenario of the PR12 scheme, it is expected that the findings would be similar to that in the without rail-based EFLS scenario of the PR11 scheme and that no adverse environmental impacts are anticipated with the implementation of the proposed mitigation measures.

Figures



Legend

Study Area

Area of Influence

Scale and Orientation

N

0 100 200 300 400m

1:7,500 on A3

Drawn	Date
MG	June 2015
Checked	Approved

Figure No.	Drawing Title
1.2.1	Study Area and Area of Influence

Job Title

Agreement No. CE 4/2014 (TP)

Planning and Enginering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study

ARUP

Former EPD's Waste Recycling Centre

Capital Tower (NKIL 6313)
- completed development

HKPF's Police Vehicle Examination and Detention Centre

HyD's Maintenance Depot beneath flyover

Amenity Area partly beneath Kwun Tong Bypass

The Quayside (NKIL 6512)
- completed development

TD's Vehicle Examination Centres

Wang Chiu Road
Wang Tai Road
Wang Mau Street
Wang Hor Road
Sheung Yee Road
Kai Fuk Road Flyover
Tsui Hing Street
Kwun Tong Bypass
Hoi Bun Road
Wai Yip Street
Lot 1
Lot 2
Lot 3
Lot 4
Lot 5
Lot 6

Legend
Study Area

Scale and Orientation
N
0 100 200 300 400m

Drawn	Date
LL	14 April 2020
Checked	Approved
LL	WL

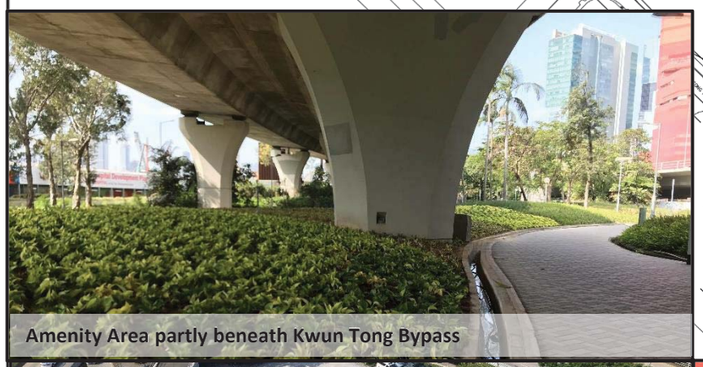
1.2.2 Development Sites of KBAA

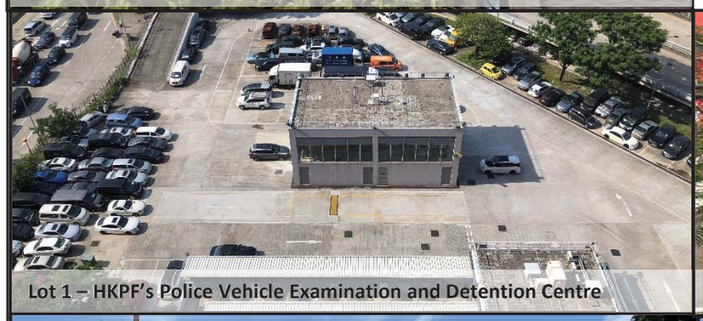
Job Title

Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study

ARUP


Amenity Area partly beneath Kwun Tong Bypass


Lot 1 – HKPF's Police Vehicle Examination and Detention Centre

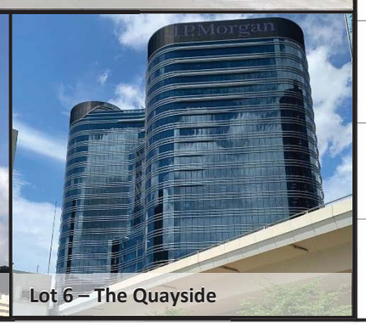

Lot 2 – Former EPD's Waste Recycling Centre


Lot 3 – HyD's Maintenance Depot beneath flyover


Lot 4a – TD's Vehicle Examination Centre


Lot 4b – TD's Vehicle Examination Centre


Lot 5 – Capital Tower



Lot 6 – The Quayside



Legend

- Study Area
- Other Specified Uses
- Commercial
- Local Open Space (LO) Regional Open Space (DO)
- Amenity Area
- Elevated Walkway
- Pedestrianized Street
- Non-Building Area
- Maximum Building Height (in Meters above Principal Datum)
- Proposed Site Formation Level (in Meters above Principal Datum)
- Building Height Control Zone Boundary
- Setback Line

Scale and Orientation

N

0 20 40 60 80m

Drawn	Date
JL	15 June 2020
Checked	Approved
LL	WL

2.1.1 Recommended Outline Development Plan

Agreement No. CE 4/2014 (TP) Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study

ARUP

Appendix A

Technical Note for Environmental Review for Junction Improvement Works

Agreement No. CE 4/2014(TP)

Planning and Engineering Study for the Development at

Kowloon Bay Action Area of Kowloon East – FEASIBILITY STUDY

TECHNICAL NOTE FOR ENVIRONMENTAL REVIEW FOR JUNCTION IMPROVEMENT WORKS

DRAFT REV.4

July 2021



Development Bureau
The Government of the Hong Kong Special Administrative Region

ARUP

Energizing Kowloon East Office, Development Bureau

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study

Technical Note for Environmental Review for Junction Improvement Works

237938

Revised | July 2021

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

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

Job number 237938

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Appendices

Appendix 1.1

Locations of the Reviewed Road Junctions

Appendix 2.1

Junction Improvement Works at J4 to J6, J9 to J11

Appendix 3.1

Correspondence with TD

1 INTRODUCTION

1.1 Study Background

1.1.1.1 Kowloon East (KE) is an area comprising the former Kai Tak Airport, Kwun Tong Business Area (KTBA) and Kowloon Bay Business Areas (KBBA). This area witnessed the rapid growth of an important industrial base in the heyday of Hong Kong's manufacturing industry, creating hundreds of thousands of jobs and propelling Hong Kong's prosperity. Following relocation of the Airport to Chek Lap Kok and our manufacturing base to the Mainland, a huge stock of industrial buildings was not being fully utilised. On the other hand, with the continuing boom of Hong Kong's financial and service sectors as well as large numbers of regional headquarters and regional offices of multi-national companies setting their foothold in Hong Kong, the demand for quality offices can no longer be met by our traditional Central Business District (CBD). Some private developers have developed high-grade office buildings and retail centres in KE. About 1.4 million m^2 office floor space have been completed in 2011.

1.1.1.2 In 2001, all industrial land in Kwun Tong and Kowloon Bay was rezoned to "Other Specified Uses (Business)" ("OU(Business)"). The "OU(Business)" zone allows industrial premises to be converted to office use and industrial buildings redeveloped for commercial/office uses. In April 2010, the Government also introduced measures to revitalise industrial buildings in Hong Kong. It is anticipated that, together with the new commercial/office space to be provided in Kai Tak Development (KTD) area, the total commercial/office space in KE has the potential to increase from 1.8 million m^2 to 7.0 million m^2 in the future, which is roughly equal to twice the existing office floor space in Central, our traditional CBD. KE has great potential to evolve into a vibrant premier business district in Hong Kong.

1.1.1.3 In the 2011-12 Policy Address, the Chief Executive announced that the Government would adopt a visionary, coordinated and integrated approach to expedite the transformation of KE into an attractive, alternative CBD to support Hong Kong's economic development. Energizing Kowloon East Office (EKEO) was therefore set up in the Development Bureau (DevB) to undertake initiatives of land use review, urban design, improved connectivity and the associated infrastructure

1.1.1.4 The initial proposals for Energizing KE are formulated under the CBD^2 strategy, with main focus on enhancing Connectivity, Branding, Design and Diversity. These proposals are consolidated on the Conceptual Master Plan (CMP) version 2.0 issued on 7 June 2012 and further refinement of the CMP was promulgated in November 2016 (version 5.0) taking on board suggestions during the ongoing public engagement process and new opportunities identified.

1.1.1.5 One of the key tasks of EKEO is to proactively review the development and design options of undeveloped/under-developed Government sites with guidance of the CBD strategy. Releasing the development

potential of Kowloon Bay Action Area (KBAA) which is at the core area of KE, for mixed development will bring great vibrancy to the region. The Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study (the Study) is therefore commissioned to review, investigate, and produce feasible development options and implementation strategy to optimise the development potential of KBAA in terms of its strategic setting, constraints and opportunities.

1.2 The Need of this Technical Note

1.2.1.1 Under the Study, eleven junctions have been reviewed to see if any improvement works would need to be conducted to cater for the traffic generated due to the development of KBAA or natural traffic growth in wider area of influence (AOI). These eleven reviewed junctions and their requirements for improvement works are summarized in **Table 1.1** below. Locations of the eleven reviewed junctions are shown in **Appendix 1.1**.

Table 1.1: Summary of the reviewed junctions and their requirements for improvement works

Junction No.	Junction [1]	Require Improvement Works?	Reasons for Improvement	Involve Designated Projects (DPs)/ Exempted DPs?
J1	Wai Yip Street/ Lai Yip Street	No	-	-
J2	Hoi Bun Road/ Lai Yip Street	No	-	-
J3	Wai Yip Street/ Shun Yip Street	No	-	-
J4	Hoi Bun Road (LD)/ Shun Yip Street (LD)	Yes	Due to development of KBAA	No (involve local distributor road only)
J5	Hoi Bun Road (LD)/ Cheung Yip Street (LD)	Yes	Due to development of KBAA	No (involve local distributor road only)
J6	Wang Chiu Road (LD)/ Sheung Yee Road (LD)	Yes	Due to development of KBAA	No (involve local distributor road only)
J7	Wang Tai Road/ Sheung Yee Road	No	-	-
J8	Lam Fung Street/ Wang Chiu Road	No	-	-
J9	Sheung Yuet Road (LD)/ Wang Chiu Road (DD)	Yes	Due to natural traffic growth in wider AOI	Yes (involve district distributor road)
J10	Lam Hing Street (LD)/ Wang Chiu Road (DD)	Yes	Due to natural traffic growth in wider AOI	Yes (involve district distributor road)
J11	Kai Cheung Road (DD)/ Wang Chiu Road (DD)	Yes	Due to natural traffic growth in wider AOI	Yes (involve district distributor road)

Notes:

[1] LD – Local Distributor; DD – District Distributor. The road classification is based on the latest Traffic Census (i.e. Annual Traffic Census 2018) published by Transport Department.

1.2.1.2 As shown in **Table 1.1**, only six out of eleven of these junctions require improvement works. Among the six junctions which require

improvement works, improvement works are required for three junctions (i.e. J4 to J6) due to the development of KBAA and involved local distributor (LD) road only, while improvement works are required for the remaining three junctions (i.e. J9 to J11) due to natural traffic growth in wider area of AOI and involve district distributor (DD) road.

1.2.1.3 The proposed junction improvement works involved modification of existing junctions/ roads only and do not involve construction of new junction/ road. The proposed junction improvement works can be categorized into two parts:

- Part 1 - Junction improvement works (i.e. J9 to J11) involved DD roads which are exempted Designated Projects (DPs) under the Environmental Impact Assessment Ordinance (EIAO) and were in place before the EIAO came into operation on 1 April 1998;
- Part 2 – Junction improvement works (i.e. J4 to J6) involved LD roads only which do not fall into the category of Item A.1 of Schedule 2 of EIAO and do not constitute a DP under EIAO.

1.2.1.4 With respect to the proposed junction improvement works of Part 1 as mentioned above, there is a need to prepare a Technical Note to ascertain whether the proposed junction improvement works (i.e. J9 to J11) would constitute a material change under the EIAO.

1.2.1.5 Material changes to exempted projects require environmental permits (EPs) under the EIAO. With reference to Section 6.1 of the Technical Memorandum to the EIAO (EIAO-TM), the material change shall refer to significant changes only. An environmental impact is considered to be adverse if any factor listed in Annex 3 applies and the criteria in Annexes 4 to 10 may be violated. As a general rule, changes under the following circumstances are regarded as material changes:

a) a change to physical alignment, layout or design of the project causing an environmental impact likely to affect existing or planned community, ecologically important areas or sites of cultural heritage;

b) a physical change resulting in an increase in the extent of reclamation or dredging affecting water flow or quality likely to affect ecologically important areas, or disrupting sites of cultural heritage;

c) an increase in pollution emissions or discharges or waste generation likely to violate guidelines or criteria in this technical memorandum without mitigation measures in place;

d) an increase in throughput or scale of the project leading to physical additions or alterations that are likely to violate the guidelines or criteria in this technical memorandum without mitigation measures in place; or

e) a change resulting in physical works that are likely to affect a rare, endangered or protected species, or an important ecological habitat, or a site of cultural heritage.

1.2.1.6 In addition, the EIAO Guidance Note No. 12/2010 states that the following road improvement works would not cause significant change of noise impact on a nearby Noise Sensitive Receiver (NSR) given that the designed capacity of the concerned road section will not be affected and the distance between the alignment of the main carriageway and the nearby NSR will not be significantly reduced by the project:

- Improvement of road auxiliaries, e.g. parapet wall, road repair and maintenance work;
- Addition of a lay-by;
- Improvement of a road junction.

1.3 Purposes of this Technical Note

1.3.1.1 The purposes of this Technical Note are to:

- Assess and determine whether there would be adverse environmental impacts caused by the proposed junction improvement works; and
- Evaluate if the environmental impacts due to the proposed junction improvement works on the exempted DP are adverse that would constitute a material change under the EIAO.

2 PROJECT DESCRIPTION

2.1 Part 1 – Junction Improvement Works Involving Roads which are Exempted DPs

2.1.1.1 As mentioned in **Section 1.2**, junction improvement works at J9 to J11 involved DD roads which are exempted DP under the EIAO. Improvement works would need to be conducted at these junctions to cater for the traffic generated due to the natural traffic growth in wider AOI. Details of the junction improvement works at J9 to J11 are provided in **Table 2.1** below and shown in **Appendix 2.1**.

Table 2.1: Details of the junction improvement works at J9 to J11

Junction No.	Junction [1]	Length of Road Section Involved in the Proposed Works / Concerned Road Section / Whole Road	Scope of Proposed Works	Issue to be Solved by the Proposed Works
J9	Sheung Yuet Road (LD)/ Wang Chiu Road (DD)	• ~100m/~280m/~1.9km along the section of Wang Chiu Rd S/B between Sheung Yuet Rd and Lam Hing St • ~40m/~280m/~1.9km along the section of Wang Chiu Rd N/B between Sheung Yuet Rd and Lam Hing St • ~50m/~120m/~1.9km along the section of Wang Chiu Rd N/B between Sheung Yuet Rd and Lam Fung St • ~50m/~120m/~1.9km along the section of Wang Chiu Rd S/B between Sheung Yuet Rd and Lam Fung St	• Relocation of three traffic islands along Wang Chiu Rd and Sheung Yuet Rd • Realignment of drop kerb at Sheung Yuet Rd eastern and western arm • Sections of Wang Chiu Rd S/B of ~100m and Wang Chiu Rd N/B of ~40m between Sheung Yuet Rd and Lam Hing St will be modified to provide one additional lane • Sections of Wang Chiu Rd S/B of ~50m and Wang Chiu Rd N/B of ~50m between Sheung Yuet Rd and Lam Fung St will be modified to provide one additional lane	• To facilitate the straight-ahead flow of Wang Chiu Rd S/B • To facilitate the left turn flow of Wang Chiu Rd N/B
J10	Lam Hing Street (LD)/ Wang Chiu Road (DD)	• ~20m at the intersection between Wang Chiu Rd N/B and Lam Hing St W/B	• For the junction turning from Wang Chiu Rd N/B to Lam Hing St W/B, kerb line of ~20m will be recessed by ~2m • Relocation of one traffic island along Lam Hing St	• To facilitate the left turn flow of Lam Hing St E/B

Junction No.	Junction [1]	Length of Road Section Involved in the Proposed Works / Concerned Road Section / Whole Road	Scope of Proposed Works	Issue to be Solved by the Proposed Works
J11	Kai Cheung Road (DD)/ Wang Chiu Road (DD)	• ~70m/~70m/~1.9km along the section of Wang Chiu Rd N/B between Lam Hing St and Kai Cheung Rd • ~50m/~50m/~1.9m along the section of Wang Chiu Rd N/B and S/B between Kai Lok St and Kai Cheung Rd • ~80m/~180m/~1.3km along the section of Kai Cheung Rd W/B between Wang Chiu Rd and Wai Yip St	• For the junction turning from Wang Chiu Rd N/B to Kai Cheung Rd W/B, a section of Wang Chiu Rd N/B of ~70m will be modified to provide one additional lane • For the junction turning from Wang Chiu Rd S/B to Kai Cheung Rd W/B, a section of Wang Chiu Rd N/B and S/B of ~50m will be modified to provide one additional lane • For the junction turning from Kai Cheung Rd W/B to Wang Chiu Rd S/B, a section of Kai Cheung Rd W/B of ~80m will be modified to provide one additional lane • Relocation of two traffic islands along Wang Chiu Rd	• To facilitate the left turn flow of Wang Chiu Rd N/B • To facilitate the right turn flow of Wang Chiu Rd S/B • To facilitate the left turn flow of Kai Cheung Rd W/B

Notes:

[1] LD – Local Distributor; DD – District Distributor.

2.2 Part 2 – Junction Improvement Works which Involved LD Roads only

2.2.1.1 As mentioned in **Section 1.2**, junction improvement works at J4 to J6 involved LD roads only. Improvement works would need to be conducted at these junctions to cater for the traffic generated due to the development of KBAA. Details of the junction improvement works at J4 to J6 are provided in **Table 2.2** below and shown in **Appendix 2.1**.

Table 2.2: Details of the junction improvement works at J4 to J6

Junction No.	Junction [1]	Length of Road Section Involved in the Proposed Works / Concerned Road Section / Whole Road	Scope of Proposed Works	Issue to be Solved by the Proposed Works
J4	Hoi Bun Road (LD)/ Shun	• ~20m/~370m/~1.3km along the section	• Kerb line of ~20m will be recessed by less than	• To allow split phase at Hoi Bun

Junction No.	Junction [1]	Length of Road Section Involved in the Proposed Works / Concerned Road Section / Whole Road	Scope of Proposed Works	Issue to be Solved by the Proposed Works
	Yip Street (LD)	of Hoi Bun Rd S/B between Lai Yip St and Shun Yip St	2m along Hoi Bun Rd S/B • Relocation of one traffic island along Hoi Bun Rd • Provision of one new traffic island along Hoi Bun Rd	Rd N/B which facilitate the straight-ahead flow of Hoi Bun Rd N/B
J5	Hoi Bun Road (LD)/ Cheung Yip Street (LD)	• N/A	• Enlargement of a traffic island and central median along Cheung Yip St	• To modify improvement works to be conducted by others in order to accommodate the proposed pedestrianisation
J6	Wang Chiu Road (LD)/ Sheung Yee Road (LD)	• ~90m/~230m/~660 m along the section of Sheung Yee Rd E/B between Wang Chiu Rd and Lam Fung St • ~80m/~400m/~1.9m along the section of Wang Chiu Rd N/B between Sheung Yee Rd and Cheung Yip St • ~60m/~400m/~1.9m along the section of Wang Chiu Rd S/B between Sheung Yee Rd and Cheung Yip St	• Relocation of drop kerb at Sheung Yee Rd western arm • For the junction turning from Sheung Yee Rd E/B to Wang Chiu Rd S/B, a section of Sheung Yee Rd E/B of ~ 90m will be modified • For the junction turning from Wang Chiu Rd N/B to Sheung Yee Rd E/B, a section of Wang Chiu Rd N/B of ~80m will be modified • For the junction turning from Sheung Yee Rd W/B to Wang Chiu Rd S/B, a section of Wang Chiu Rd S/B of ~60m will be modified	• To facilitate the right turn flow of Sheung Yee Rd E/B • To facilitate the right turn flow of Wang Chiu Rd N/B • To facilitate the straight-ahead flow of Wang Chiu Rd S/B

Notes:

[1] LD – Local Distributor; DD – District Distributor.

3 EVALUATION OF ENVIRONMENTAL IMPACTS

3.1 Part 1 – Junction Improvement Works Involving Roads which are Exempted DPs

3.1.1.1 Junction improvement works at J9 to J11 involved DD roads which are exempted DP under the EIAO. Improvement works would need to be conducted at these junctions to cater for the traffic generated due to the natural traffic growth in wider AOI.

Junction Improvement Works at J9

General

3.1.1.2 As mentioned in **Table 2.1**, the junction improvement works at J9 involve relocating three traffic islands along Wang Chiu Road and Sheung Yuet Road, realigning drop kerb at Sheung Yuet Road eastern and western arm, modifying sections of Wang Chiu Road S/B and N/B between Sheung Yuet Road and Lam Hing Street to provide one additional lane to facilitate the straight-ahead flow of Wang Chiu Road S/B as well as modifying sections of Wang Chiu Road S/B and N/B between Sheung Yuet Road and Lam Fung Street to provide one additional lane to facilitate the left turn flow of Wang Chiu Road N/B. Only relatively short sections of Wang Chiu Road S/B (i.e. ~100m in length between Sheung Yuet Road and Lam Hing Street and ~50m in length between Sheung Yuet Road and Lam Fung Street) and Wang Chiu Road N/B (i.e. ~40m in length between Sheung Yuet Road and Lam Hing Street and ~50m in length between Sheung Yuet Road and Lam Fung Street) are involved in the proposed works as compared with the concerned road section between Sheung Yuet Road and Lam Hing Street (i.e. ~280m in length between Sheung Yuet Road and Lam Hing Street and ~120m in length between Sheung Yuet Road and Lam Fung Street) and whole Wang Chiu Road (i.e. ~1.9km in length). The works are proposed to enhance local junction performance and thus will not affect the design capacity of the involved roads (i.e. Wang Chiu Road and Sheung Yuet Road) as confirmed by traffic consultant.

Noise

3.1.1.3 In accordance with the EIAO Guidance Note No. 12/2010, the junction improvement works that do not change the designed capacity of concerned road section and not significantly reduced the distance between the alignment of the main carriageway and the nearby NSR would not cause significant change. As mentioned above, the works will not affect the design capacity of the involved roads (i.e. Wang Chiu Road and Sheung Yuet Road). In addition, the buildings adjacent to J9 involve non-noise sensitive commercial buildings (e.g. Centre Parc, Shui Hing Centre and Exchange Tower) which are equipped with central air-conditioning and do not rely on openable windows for ventilation as well as non-noise sensitive industrial buildings (e.g. Proficient Industrial Centre and Yuen Fat Industrial Building). The NSR nearest to J9 is Telford Gardens which is located at ~280m away.

The distance between the alignment of the main carriageway and the nearby NSR will not be significantly reduced after the junction improvement works. Therefore, it is anticipated that the junction improvement works at J9 would not cause material changes from noise perspective.

Air Quality

3.1.1.4 The concerned ASRs in vicinity of the junction improvement works at J9 are Centre Parc, Shui Hing Centre, Yuen Fat Industrial Building, First Group Centre, Exchange Tower and Zero Carbon Park. **Table 3.1** summarizes the compliance of the buffer distances between the concerned roads and ASRs with the HKPSG requirements at J9 after the proposed improvement.

Table 3.1: Compliance of buffer distances between the concerned roads and ASRs with the HKPSG requirements at J9 after the proposed improvement

Concerned Road	Concerned ASR	HKPSG Requirement (m) [1]	Buffer Distance Comply with HKPSG Requirement after the Proposed Improvement?
Sheung Yuet Road (LD)	Centre Parc	>5	- [2]
	Shui Hing Centre	>5	- [2]
	Exchange Tower	>5	- [2]
	Zero Carbon Park	>5	Yes
Wang Chiu Road (DD)	Shui Hing Centre	>10	Yes [3]
	Centre Parc	>10	- [4]
	Exchange Tower	>10	- [4]
	Zero Carbon Park	>10	Yes
	Yuen Fat Industrial Building	>10	Yes [5]
	First Group Centre	>10	Yes [5]

Notes:

[1] In accordance with Table 3.1 of the HKPSG, >5m buffer distance from LD road is required for active and passive recreational uses, while >10m buffer distance from DD road is required for active and passive recreational uses.

[2] The junction improvement works will not change the buffer distances between the road and concerned ASRs.

[3] Refer to **Section 3.1.1.7** for details.

[4] Refer to **Section 3.1.1.8** for details.

[5] Refer to **Section 3.1.1.9** for details.

3.1.1.5 The junction improvement works at J9 along Sheung Yuet Road will not change the buffer distances between the road and some concerned ASRs (i.e. Centre Parc, Shui Hing Centre and Exchange Tower). However, the junction improvement works at J9 along Sheung Yuet Road will change the buffer distance between the road and Zero Carbon Park, which is one of the concerned ASRs. The buffer distance between the road and Zero Carbon Park after the junction improvement works will comply with the HKPSG requirement (i.e. >5m).

3.1.1.6 The junction improvement works at J9 along Wang Chiu Road will change the buffer distances between the road and the concerned ASRs

(i.e. Shui Hing Centre, Yuen Fat Industrial Building, First Group Centre, Centre Parc, Exchange Tower, Zero Carbon Park).

3.1.1.7 For Shui Hing Centre, there is a S.16 application (No. A/K13/320) for the proposed minor relaxation of plot ratio and building height restrictions for permitted office use at Shui Hing Centre. It is understood that due consideration of the HKPSG requirement will be given by the owner of Shui Hing Centre. In addition, EKEO will provide comments to Lands Department (LandsD) when they process the lease modification application to advise the owner that the redevelopment design/ proposal of the building should take into account the proposed junction improvement works and provide sufficient buffer distance from the new road kerb to comply with the HKPSG requirement (i.e. >10m).

3.1.1.8 For Centre Parc and Exchange Tower, it is equipped with central air-conditioning. Locations of fresh air intake could not be identified based on the publicly available building plans and site survey. Nevertheless, no apparent fresh air intake locations were identified during the site survey at the building façade facing the concerned road sections.

3.1.1.9 For Yuen Fat Industrial Building and First Group Centre, most flats of both buildings were observed to be equipped with split-type air-conditioning and window type air-conditioning with most of the windows closed. It should be noted that the Government introduced the Industrial Building (IB) Revitalization Scheme in April 2010 to encourage owners to undertake wholesale conversion for, or redevelop, their IBs to cope with the economic restructuring in Hong Kong. By the close of the six-year scheme in March 2016, 133 applications were approved in which majority of the applications were in the Kowloon East district. After reviewing the effectiveness of the IB Revitalization Scheme, the Chief Executive announced in her 2018 Policy Address that the IB Revitalization Scheme would be reactivated to optimize utilization of the existing industrial stock and make better use of valuable land resources. As part of the KBBA in the Kowloon East district, it is expected that the concerned IBs (i.e. Yuen Fat Industrial Building and First Group Centre) will be revitalized in the future, possibly under the IB Revitalization Scheme. EKEO will provide comments to the owners of the concerned IBs (i.e. Yuen Fat Industrial Building and First Group Centre) to ensure any future redevelopment of the buildings will take into account the proposed junction improvement works and provide sufficient buffer distance from the new road kerb to comply with the HKPSG requirement (i.e. >10m).

3.1.1.10 For Zero Carbon Park, the buffer distance between the concerned road sections and Zero Carbon Park after the junction improvement works will comply with the HKPSG requirement (i.e. >10m).

3.1.1.11 The junction improvement works at J9 will enhance the local junction performance and thus reducing traffic congestion along the concerned section of Wang Chiu Road and Sheung Yuet Road. The reduce in traffic congestion will lead to increase in average vehicular traffic speed, especially during peak hours, and thus lower the vehicular emission along the concerned road sections. Therefore, it is anticipated that the

junction improvement works at J9 would not cause material changes from air quality perspective.

Other Environmental Aspects

3.1.1.12 As J9 is located in urban and developed area with very high level of human disturbance, and the proposed works are located mainly within the footprint of the existing road infrastructure, it is anticipated that the junction improvement works at J9 would not cause material changes from ecological perspective.

3.1.1.13 Some trees in the roadside planters along the concerned section of Wang Chiu Road S/B and N/B would be felled by Civil Engineering and Development Department (CEDD) due to the proposed works. Nevertheless, the trees to be felled are common species with low conservation value, and they will be compensated accordingly. Tree removal application and compensatory planting proposal will be submitted by responsible party at later stage. It is anticipated that the junction improvement works at J9 would not cause material changes from landscape perspective.

3.1.1.14 As the junction improvement works at J9 are minor and localized in scale, it is anticipated that the proposed works at J9 will have insignificant impact on the visual characteristic of the whole area and thus would not cause material changes from visual perspective.

3.1.1.15 It is anticipated that the junction improvement works at J9 would not cause material changes from other environmental aspects.

Junction Improvement Works at J10

General

3.1.1.16 As mentioned in **Table 2.1**, the junction improvement works at J10 involve modifying a kerb and relocating one traffic island along Lam Hing Street to facilitate the left turn flow of Lam Hing Street E/B. Only a relatively short section of kerb (i.e. ~20m in length) is involved in the proposed works, and the kerb will only be recessed by ~2m after the proposed works. The works are proposed to enhance local junction performance and thus will not affect the design capacity of the involved roads (i.e. Wang Chiu Road and Lam Hing Street) as confirmed by traffic consultant.

Noise

3.1.1.17 In accordance with the EIAO Guidance Note No. 12/2010, the junction improvement works that do not change the designed capacity of concerned road section and not significantly reduced the distance between the alignment of the main carriageway and the nearby NSR would not cause significant change. As mentioned above, the works will not affect the design capacity of the involved roads (i.e. Wang Chiu Road and Lam Hing Street). In addition, the buildings adjacent to J10 involve non-noise sensitive commercial buildings (e.g. CCB Centre and Golden Harvest Building) which are equipped with central air-conditioning and do not rely on openable windows for ventilation as well as non-noise sensitive industrial buildings (e.g. Continental Industrial Building). The NSR nearest to J10 is Telford Gardens which

is located at ~300m away. The distance between the alignment of the main carriageway and the nearby NSR will not be significantly reduced after the junction improvement works. Therefore, it is anticipated that the junction improvement works at J10 would not cause material changes from noise perspective.

Air Quality

3.1.1.18 The concerned Air Sensitive Receivers (ASRs) in vicinity of the junction improvement works at J10 are DCH Building and CCB Centre. **Table 3.2** summarizes the compliance of the buffer distances between the concerned roads and ASRs with the HKPSG requirements at J10 after the proposed improvement.

Table 3.2: Compliance of buffer distances between the concerned roads and ASRs with the HKPSG requirements at J10 after the proposed improvement

Concerned Road	Concerned ASR	HKPSG Requirement (m) [1]	Buffer Distance Comply with HKPSG Requirement after the Proposed Improvement?
Lam Hing Street (LD)	DCH Building	>5	- [2]
	CCB Centre	>5	Yes [3]
Wang Chiu Road (DD)	DCH Building	>10	Yes [4]

Notes:

[1] In accordance with Table 3.1 of the HKPSG, >5m buffer distance from LD road is required for active and passive recreational uses, while >10m buffer distance from DD road is required for active and passive recreational uses.

[2] The junction improvement works will not change the buffer distance between the road and concerned ASR.

[3] This ASR is equipped with central air-conditioning. Location of the fresh air intake is identified based on the publicly available building plans.

[4] Refer to **Section 3.1.1.18** for details.

3.1.1.19 The junction improvement works at J10 along Lam Hing Street will not change the buffer distance between the road and DCH Building, which is one of the concerned ASRs. However, the junction improvement works at J10 along Lam Hing Street will change the buffer distance between the road and CCB Centre, which is one of the concerned ASRs. For CCB Centre, it is equipped with central air-conditioning. Buffer distance is measured from the location of fresh air intake identified on the publicly available building plans. The buffer distance between the road and CCB Centre complies with that required by the HKPSG (i.e. >5m).

3.1.1.20 The junction improvement works at J10 along Wang Chiu Road will change the buffer distance between the road and DCH Building, which is one of the concerned ASRs. For DCH Building, there is a S.16 application (No. A/K13/318) for the proposed minor relaxation of plot ratio and building height restrictions for permitted office use at DCH Building. It is understood that due consideration of the HKPSG requirement will be given by the owner of DCH Building. In addition, EKEO will provide comments to LandsD when they process the lease modification application to advise the owner that the redevelopment design/ proposal of the building will take into account the proposed junction improvement works and provide sufficient buffer distance

from the new road kerb to comply with the HKPSG requirement (i.e. >10m).

3.1.1.21 The junction improvement works at J10 will enhance the local junction performance and thus reducing traffic congestion along the concerned section of Wang Chiu Road and Lam Hing Street. The reduce in traffic congestion will lead to increase in average vehicular traffic speed, especially during peak hours, and thus lower the vehicular emission along the concerned road sections. Therefore, it is anticipated that the junction improvement works at J10 would not cause material changes from air quality perspective.

Other Environmental Aspects

3.1.1.22 As J10 is located in urban and developed area with very high level of human disturbance, and the proposed works are located mainly within the footprint of the existing road infrastructure, it is anticipated that the junction improvement works at J10 would not cause material changes from ecological perspective.

3.1.1.23 Since no trees will be felled/ transplanted due to the junction improvement works at J10, it is anticipated that the junction improvement works at J10 would not cause material changes from landscape perspective.

3.1.1.24 As the junction improvement works at J10 are minor and localized in scale, it is anticipated that the proposed works at J10 will have insignificant impact on the visual characteristic of the whole area and thus would not cause material changes from visual perspective.

3.1.1.25 It is anticipated that the junction improvement works at J10 would not cause material changes from other environmental aspects.

Junction Improvement Works at J11

General

3.1.1.26 As mentioned in **Table 2.1**, the junction improvement works at J11 involve modifying two sections of Wang Chiu Road, a section of Kai Cheung Road W/B as well as relocating two traffic islands along Wang Chiu Road to facilitate the left turn flow of Wang Chiu Road N/B, right turn flow of Wang Chiu Road S/B and left turn flow of Kai Cheung Road W/B. Only a relatively short section of Kai Cheung Road W/B (i.e. ~80m in length) is involved in the proposed works as compared with the concerned road section between Wang Chiu Road and Wai Yip Street (i.e. ~180m in length) and whole Kai Cheung Road (i.e. ~1.3km in length). Only relatively short sections of Wang Chiu Road (i.e. ~70m in length between Lam Hing Street and Kai Cheung Road and ~ 50m in length between Kai Lok Street and Kai Cheung Road) are involved in the proposed works as compared with the whole Wang Chiu Road (i.e. ~1.9km in length). The works are proposed to enhance local junction performance and thus will not affect the design capacity of the involved

roads (i.e. Wang Chiu Road and Kai Cheung Road) as confirmed by traffic consultant.

Noise

3.1.1.27 In accordance with the EIAO Guidance Note No. 12/2010, the junction improvement works that do not change the designed capacity of concerned road section and not significantly reduced the distance between the alignment of the main carriageway and the nearby NSR would not cause significant change. As mentioned above, the works will not affect the design capacity of the involved roads (i.e. Wang Chiu Road and Lam Hing Street). In addition, the buildings adjacent to J11 involve non-noise sensitive commercial buildings (e.g. DCH Building) and government buildings (e.g. Hong Kong Auxiliary Police Force Headquarters) which are equipped with central air-conditioning and do not rely on openable windows for ventilation as well as non-noise sensitive industrial buildings (e.g. Po Lung Centre). The NSR nearest to J11 is Buddhist Chi King Primary School which is located at ~185m away. The distance between the alignment of the main carriageway and the nearby NSR will not be significantly reduced after the junction improvement works. Therefore, it is anticipated that the junction improvement works at J11 would not cause material changes from noise perspective.

Air Quality

3.1.1.28 The concerned ASRs in vicinity of the junction improvement works at J11 are Po Lung Centre, Hong Kong Auxiliary Police Force Headquarters and Kowloon Bay Playground. **Table 3.3** summarizes the compliance of the buffer distances between the concerned roads and ASRs with the HKPSG requirements at J11 after the proposed improvement.

Table 3.3: Compliance of buffer distances between the concerned roads and ASRs with the HKPSG requirements at J11 after the proposed improvement

Concerned Road	Concerned ASR	HKPSG Requirement (m) [1]	Buffer Distance Comply with HKPSG Requirement after the Proposed Improvement?
Kai Cheung Road (DD)	Po Lung Centre	>10	Yes [2]
Wang Chiu Road (DD)	Hong Kong Auxiliary Police Force Headquarters	>10	- [3]
	Kowloon Bay Playground	>10	Yes

Notes:

[1] In accordance with Table 3.1 of the HKPSG, >10m buffer distance from DD road is required for active and passive recreational uses.

[2] Refer to **Section 3.1.1.27** for details.

[3] Refer to **Section 3.1.1.29** for details.

3.1.1.29 The junction improvement works at J11 along Kai Cheung Road will change the buffer distance between the road and Po Lung Centre, which is one of the concerned ASRs. For Po Lung Centre, most flats of the building were observed to be equipped with split-type air-conditioning

and window type air-conditioning with most of the windows closed. It should be noted that the Government introduced the IB Revitalization Scheme in April 2010 to encourage owners to undertake wholesale conversion for, or redevelop, their IBs to cope with the economic restructuring in Hong Kong. By the close of the six-year scheme in March 2016, 133 applications were approved in which majority of the applications were in the Kowloon East district. After reviewing the effectiveness of the IB Revitalization Scheme, the Chief Executive announced in her 2018 Policy Address that the IB Revitalization Scheme would be reactivated to optimize utilization of the existing industrial stock and make better use of valuable land resources. As part of the KBBA in the Kowloon East district, it is expected that the concerned IB (i.e. Po Lung Centre) will be revitalized in the future, possibly under the IB Revitalization Scheme. EKEO will provide comments to the owner of the concerned IB (i.e. Po Lung Centre) to ensure any future redevelopment of the buildings will take into account the proposed junction improvement works and provide sufficient buffer distance from the new road kerb to comply with the HKPSG requirement (i.e. >10m).

3.1.1.30 The junction improvement works at J11 along Wang Chiu Road will also change the buffer distance between the road and Kowloon Bay Playground, which is one of the concerned ASRs. The buffer distance between the road and Kowloon Bay Playground after the junction improvement works will comply with the HKPSG requirement (i.e. >10m).

3.1.1.31 The junction improvement works at J11 along Wang Chiu Road will change the buffer distance between the road and Hong Kong Auxiliary Police Force Headquarters, which is one of the concerned ASRs. For Hong Kong Auxiliary Police Force Headquarters, it is equipped with central air-conditioning. There are no publicly available building plans. No apparent fresh air intake location was identified during the site survey at the building façade facing the concerned road.

3.1.1.32 The junction improvement works at J11 will enhance the local junction performance and thus reducing traffic congestion along the concerned section of Wang Chiu Road and Kai Cheung Road. The reduce in traffic congestion will lead to increase in average vehicular traffic speed, especially during peak hours, and thus lower the vehicular emission along the concerned road sections. Therefore, it is anticipated that the junction improvement works at J11 would not cause material changes from air quality perspective.

Other Environmental Aspects

3.1.1.33 As J11 is located in urban and developed area with very high level of human disturbance, and the proposed works are located mainly within the footprint of the existing road infrastructure, it is anticipated that the junction improvement works at J11 would not cause material changes from ecological perspective.

3.1.1.34 Some trees in the roadside planters along the concerned sections of Wang Chiu Road and Kai Cheung Road would be felled by Highways Department (HyD), who is the implementation agent of the proposed

works at J11, due to the proposed works. Nevertheless, the trees to be felled are common species with low conservation value, and they will be compensated accordingly. Tree removal application and compensatory planting proposal will be submitted by responsible party at later stage. It is anticipated that the junction improvement works at J11 would not cause material changes from landscape perspective.

3.1.1.35 As the junction improvement works at J11 are minor and localized in scale, it is anticipated that the proposed works at J11 will have insignificant impact on the visual characteristic of the whole area and thus would not cause material changes from visual perspective.

3.1.1.36 It is anticipated that the junction improvement works at J11 would not cause material changes from other environmental aspects.

3.2 Part 2 – Junction Improvement Works which Involved LD Roads only

3.2.1.1 Junction improvement works at J4 to J6 involved LD roads only. Improvement works would need to be conducted at these junctions to cater for the traffic generated due to the development of KBAA.

Junction Improvement Works at J4

General

3.2.1.2 As mentioned in **Table 2.2**, the junction improvement works at J4 involve modifying a kerb, relocating one traffic island along Hoi Bun Road and providing one new traffic island along Hoi Bun Road to allow split phase at Hoi Bun Road N/B which facilitate the straight-ahead flow of Hoi Bun Road N/B. Only a relatively short section of kerb (i.e. ~20m in length) is involved in the proposed works, and the kerb will only be recessed by less than 2m after the proposed works. The works are proposed to enhance local junction performance and thus will not affect the design capacity of the involved roads (i.e. Hoi Bun Road and Shun Yip Street) as confirmed by traffic consultant.

Noise

3.2.1.3 As mentioned above, the works will not affect the design capacity of the involved roads (i.e. Hoi Bun Road and Shun Yip Street). In addition, the buildings adjacent to J4 involve non-noise sensitive commercial buildings (e.g. The Quayside and One Bay East) which are equipped with central air-conditioning and do not rely on openable windows for ventilation as well as non-noise sensitive industrial buildings (e.g. Kowloon Godown). The NSR nearest to J4 is On Cheung House which is located at ~210m away. The distance between the alignment of the main carriageway and the nearby NSR will not be significantly reduced after the junction improvement works. Therefore, it is anticipated that the junction improvement works at J4 would not cause adverse noise impacts.

Air Quality

3.2.1.4 The concerned ASR in vicinity of the junction improvement works at J4 is Manulife Tower. **Table 3.4** summarizes the compliance of the

buffer distances between the concerned roads and ASRs with the HKPSG requirements at J4 after the proposed improvement.

Table 3.4: Compliance of buffer distances between the concerned roads and ASRs with the HKPSG requirements at J4 after the proposed improvement

Concerned Road	Concerned ASR	HKPSG Requirement (m) [1]	Buffer Distance Comply with HKPSG Requirement after the Proposed Improvement?
Kai Cheung Road (DD)	Manulife Tower	>5	Yes [2]
Wang Chiu Road (DD)	Manulife Tower	>5	- [3]

Notes:

[1] In accordance with Table 3.1 of the HKPSG, >5m buffer distance from LD road is required for active and passive recreational uses.

[2] This ASR is equipped with central air-conditioning. Location of the fresh air intake is identified based on the publicly available building plans.

[3] The junction improvement works will not change the buffer distance between the road and concerned ASR.

3.2.1.5 The junction improvement works at J4 along Kai Cheung Road will change the buffer distance between the road and Manulife Tower, which is the concerned ASR. For Manulife Tower, it is equipped with central air-conditioning. Buffer distance is measured from the location of fresh air intake identified on the publicly available building plans. The buffer distance between the road and Manulife Tower complies with that required by the HKPSG (i.e. >5m).

3.2.1.6 The junction improvement works at J4 along Wang Chiu Road will not change the buffer distance between the road and Manulife Tower, which is the concerned ASR.

3.2.1.7 The junction improvement works at J4 will enhance the local junction performance and thus reducing traffic congestion along the concerned section of Hoi Bun Road and Shun Yip Street. The reduce in traffic congestion will lead to increase in average vehicular traffic speed, especially during peak hours, and thus lower the vehicular emission along the concerned road sections. Therefore, it is anticipated that the junction improvement works at J4 would not cause adverse air quality impacts.

Other Environmental Aspects

3.2.1.8 As J4 is located in urban and developed area with very high level of human disturbance, and the proposed works are located mainly within the footprint of the existing road infrastructure, it is anticipated that the junction improvement works at J4 would not cause adverse ecological impacts.

3.2.1.9 As the junction improvement works at J4 are minor and localized in scale, it is anticipated that the proposed works at J4 will have

insignificant impact on the visual characteristic of the whole area and thus would not cause adverse visual impacts.

3.2.1.10 It is anticipated that the junction improvement works at J4 would not cause adverse impacts from other environmental aspects.

Junction Improvement Works at J5

General

3.2.1.11 As mentioned in **Table 2.2**, the junction improvement works at J5 involve enlarging a traffic island and central median along Cheung Yip Street based on the improvement works to be conducted by others in order to accommodate the proposed pedestrianization. The proposed works will not affect the design capacity of the involved roads (i.e. Hoi Bun Road and Cheung Yip Street) as confirmed by traffic consultant.

Noise

3.2.1.12 As mentioned above, the works will not affect the design capacity of the involved roads (i.e. Hoi Bun Road and Cheung Yip Street). In addition, the buildings adjacent to J5 involve non-noise sensitive government buildings (e.g. Kai Tak Fire Station) which are equipped with central air-conditioning and do not rely on openable windows for ventilation as well as non-noise sensitive industrial buildings (e.g. Pacific Trade Centre). The NSR nearest to J5 is Construction Industry Council Kowloon Bay Training Centre which is located at ~290m away. The distance between the alignment of the main carriageway and the nearby NSR will not be significantly reduced after the junction improvement works. Therefore, it is anticipated that the junction improvement works at J5 would not cause adverse noise impacts.

Air Quality

3.2.1.13 The concerned ASRs in vicinity of the junction improvement works at J5 are Kai Tak Fire Station and Pacific Trade Centre. **Table 3.5** summarizes the compliance of the buffer distances between the concerned roads and ASRs with the HKPSG requirements at J5 after the proposed improvement.

Table 3.5: Compliance of buffer distances between the concerned roads and ASRs with the HKPSG requirements at J5 after the proposed improvement

Concerned Road	Concerned ASR	HKPSG Requirement (m) [1]	Buffer Distance Comply with HKPSG Requirement after the Proposed Improvement?
Hoi Bun Road (LD)	Kai Tak Fire Station	>5	- [2]
	Pacific Trade Centre	>5	- [2]
Cheung Yip Street (LD)	Kai Tak Fire Station	>5	- [2]
	Pacific Trade Centre	>5	- [2]

Notes:

[1] In accordance with Table 3.1 of the HKPSG, >5m buffer distance from LD road is required for active and passive recreational uses.

[2] The junction improvement works will not change the buffer distances between the roads and concerned ASRs.

3.2.1.14 The junction improvement works at J5 along both Hoi Bun Road and Cheung Yip Street will not change the buffer distances between the roads and the concerned ASRs.

3.2.1.15 The junction improvement works at J5 are for accommodating the proposed pedestrianization only and will have limited impact on the traffic along the concerned section of Hoi Bun Road and Cheung Yip Street. Therefore, it is anticipated that the junction improvement works at J5 would not cause adverse air quality impacts.

Other Environmental Aspects

3.2.1.16 As J5 is located in urban and developed area with very high level of human disturbance, and the proposed works are located mainly within the footprint of the existing road infrastructure, it is anticipated that the junction improvement works at J5 would not cause adverse ecological impacts.

3.2.1.17 As the junction improvement works at J5 are minor and localized in scale, it is anticipated that the proposed works at J5 will have insignificant impact on the visual characteristic of the whole area and thus would not cause adverse visual impacts.

3.2.1.18 It is anticipated that the junction improvement works at J5 would not cause adverse impacts from other environmental aspects.

Junction Improvement Works at J6

General

3.2.1.19 As mentioned in **Table 2.2**, the junction improvement works at J6 involve modifying sections of Sheung Yee Road E/B, Wang Chiu Road N/B and S/B as well as relocating a drop kerb at Sheung Yee Road western arm to facilitate the right turn flow of Sheung Yee Road E/B, right turn flow of Wang Chiu Road N/B and straight-ahead flow of Wang Chiu Road S/B. Only relatively short sections of Sheung Yee Road E/B (i.e. ~90m in length), Wang Chiu Road N/B (i.e. ~80m in length) and Wang Chiu Road S/B (i.e. ~60m in length) are involved in the proposed works as compared with the concerned road section of Sheung Yee Road E/B between Wang Chiu Road and Lam Fung Street (i.e. ~230m in length) and Wang Chiu Road N/B and S/B between Sheung Yee Road and Cheung Yip Street (i.e. ~400m in length) as well as the whole Sheung Yee Road (i.e. ~660m in length) and Wang Chiu Road (i.e. ~1.9km in length). The works are proposed to enhance local junction performance and thus will not affect the design capacity of the involved roads (i.e. Wang Chiu Road and Sheung Yee Road) as confirmed by traffic consultant.

Noise

3.2.1.20 As mentioned above, the works will not affect the design capacity of the involved roads (i.e. Wang Chiu Road and Sheung Yee Road). In addition, the buildings adjacent to J6 involve non-noise sensitive commercial and retail buildings (e.g. Megabox and Enterprise Square) which are equipped with central air-conditioning and do not rely on openable windows for ventilation as well as non-noise sensitive government facilities (e.g. Hong Kong Police Vehicle Detention and

Examination Centre). The NSR nearest to J6 is Clothing Industry Training Authority Kowloon Bay Training Centre which is located at ~370m away. The distance between the alignment of the main carriageway and the nearby NSR will not be significantly reduced after the junction improvement works. Therefore, it is anticipated that the junction improvement works at J6 would not cause adverse noise impacts.

Air Quality

3.2.1.21 The concerned ASRs in vicinity of the junction improvement works at J6 are the administration building of the planned Organic Resource Recovery Centre (ORRC) within KBAA, planned commercial uses within KBAA as well as Megabox. **Table 3.6** summarizes the compliance of the buffer distances between the concerned roads and ASRs with the HKPSG requirements at J6 after the proposed improvement.

Table 3.6: Compliance of buffer distances between the concerned roads and ASRs with the HKPSG requirements at J6 after the proposed improvement

Concerned Road	Concerned ASR	HKPSG Requirement (m) [1]	Buffer Distance Comply with HKPSG Requirement after the Proposed Improvement?
Sheung Yee Road (LD)	Megabox	>5	- [2]
	Administration building of the planned ORRC within KBAA	>5	Yes [3]
Wang Chiu Road (LD)	Planned commercial uses within KBAA	>5	Yes [3]
	Administration building of the planned ORRC within KBAA	>5	Yes [3]

Notes:

[1] In accordance with Table 3.1 of the HKPSG, >5m buffer distance from LD road is required for active and passive recreational uses.

[2] The junction improvement works will not change the buffer distance between the road and concerned ASR.

[3] Refer to **Section 3.1.1.22** for details.

3.2.1.22 The junction improvement works at J6 along Sheung Yee Road will not change the buffer distance between the road and Megabox, which is one of the concerned ASRs. In addition, buffer distances will be provided between the concern roads (i.e. Sheung Yee Road and Wang Chiu Road) and the planned concerned ASRs (i.e. Administration building of the planned ORRC within KBAA and planned commercial uses within KBAA) to comply with the HKPSG requirement (i.e. >5m).

3.2.1.23 The junction improvement works at J6 will enhance the local junction performance and thus reducing traffic congestion along the concerned section of Wang Chiu Road and Sheung Yee Road. The reduce in traffic congestion will lead to increase in average vehicular traffic speed, especially during peak hours, and thus lower the vehicular emission along the concerned road sections. Therefore, it is anticipated that the

junction improvement works at J6 would not cause adverse air quality impacts.

Other Environmental Aspects

3.2.1.24 As J6 is located in urban and developed area with very high level of human disturbance, and the proposed works are located mainly within the footprint of the existing road infrastructure, it is anticipated that the junction improvement works at J6 would not cause adverse ecological impacts.

3.2.1.25 As the junction improvement works at J6 are minor and localized in scale, it is anticipated that the proposed works at J6 will have insignificant impact on the visual characteristic of the whole area and thus would not cause adverse visual impacts.

3.2.1.26 It is anticipated that the junction improvement works at J6 would not cause adverse impacts from other environmental aspects.

4 CONCLUSION

4.1.1.1 Under the Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study (the Study), eleven junctions have been reviewed to see if any improvement works would need to be conducted to cater for the traffic generated due to the development of Kowloon Bay Action Area (KBAA) or natural traffic growth in wider area of influence (AOI).

4.1.1.2 Only six out of these junctions require improvement works. Among the six junctions which require improvement works, improvement works are required for three junctions (i.e. J4 to J6) due to the development of KBAA and involved local distributor (LD) road only, while improvement works are required for the remaining three junctions (i.e. J9 to J11) due to natural traffic growth in wider area of AOI and involve district distributor (DD) road.

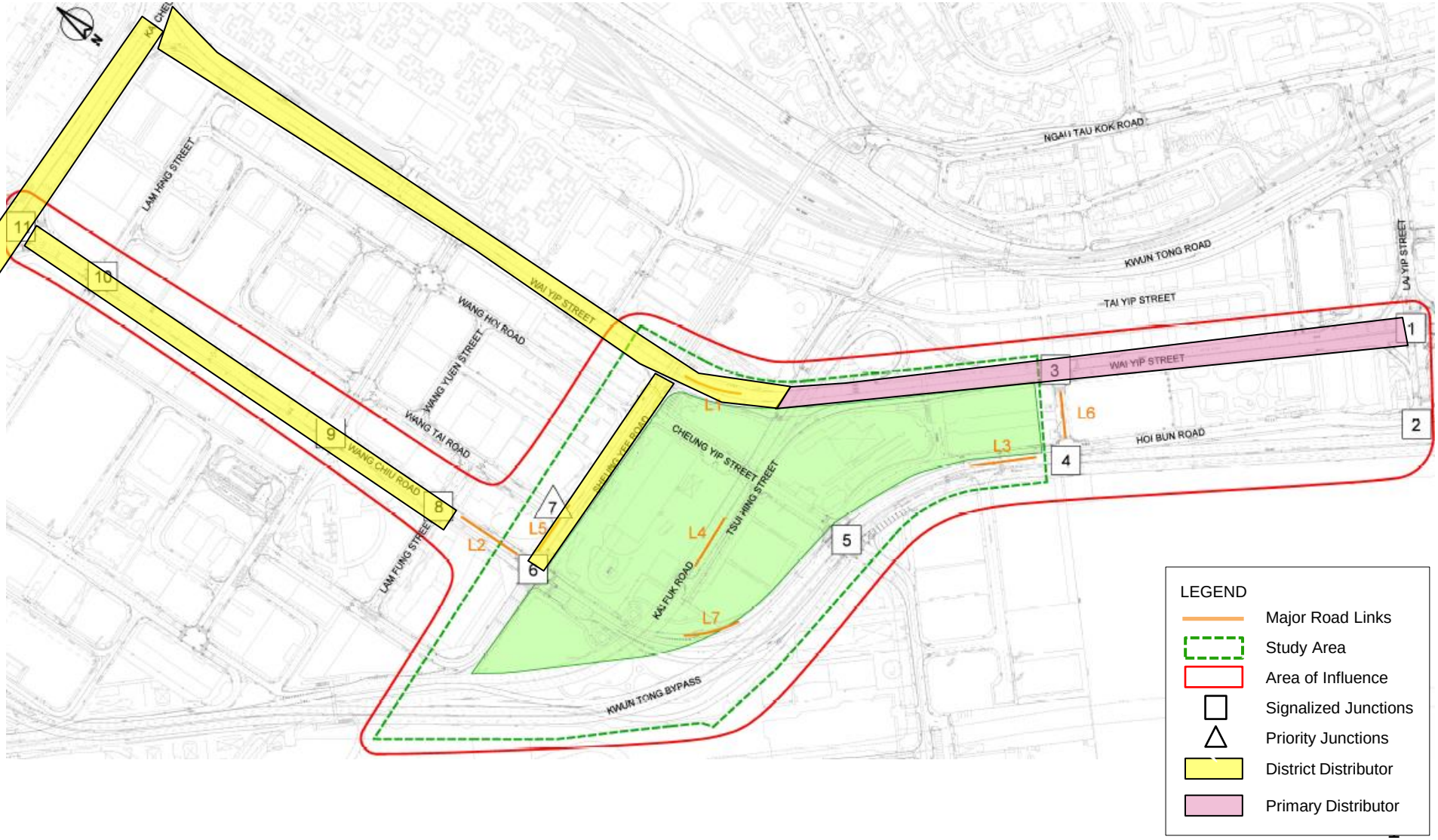
4.1.1.3 The junction improvement works at J9 to J11 involved DD roads which are exempted Designated Projects (DPs) under the Environmental Impact Assessment Ordinance (EIAO) and were in place before the EIAO came into operation on 1 April 1998. On the other hand, the junction improvement works at J4 to J6 involved LD roads only which do not fall into the category of Item A.1 of Schedule 2 of EIAO and do not constitute a DP under EIAO.

4.1.1.4 Based on the evaluation in **Section 3**, the junction improvement works at J4 to J6, J9 to J11 will not affect the design capacity of the involved roads and not significantly reduced the distance between the alignment of the main carriageway and the nearby Noise Sensitive Receivers (NSRs). In addition, the buffer distances between the concerned roads and Air Sensitive Receivers (ASRs) after the junction improvement works will comply with the Hong Kong Planning Standards and Guidelines (HKPSG) requirements. Furthermore, these junction improvement works will enhance the local junction performance and thus reducing traffic congestion and eventually lower the vehicular emission along the concerned road sections. Last but not least, the proposed works are minor and localized in scale and will have insignificant impacts from other environmental aspects including ecology, landscape and visual. Hence, it is concluded that no adverse environmental impacts caused by the proposed junction improvement works are anticipated, and no adverse environmental impacts due to the proposed junction improvement works on the exempted DP that would constitute a material change under the EIAO.

Appendix 1.1

Locations of the Reviewed Road Junctions

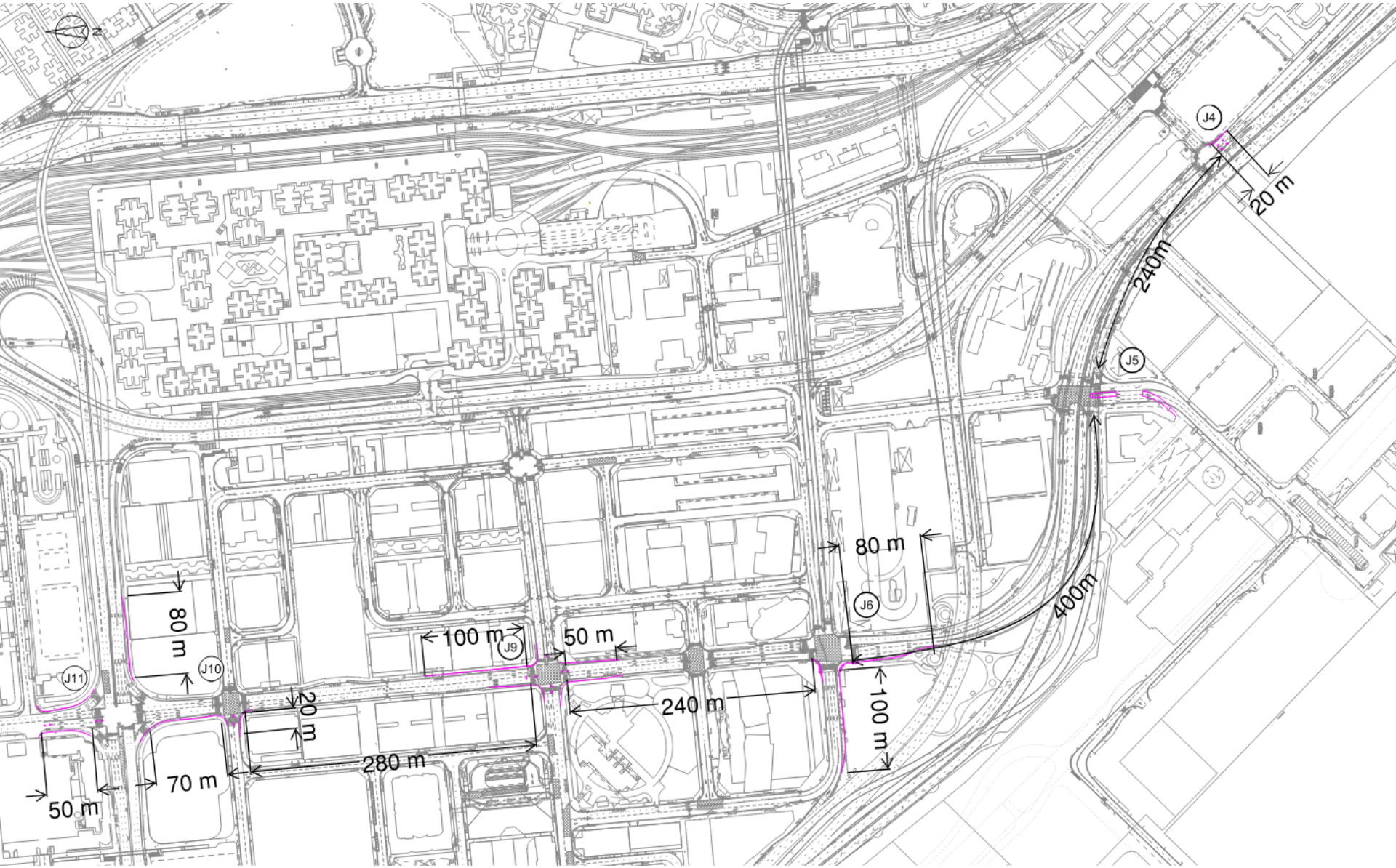
Appendix 1.1 - Locations of the Reviewed Road Junctions



Appendix 2.1

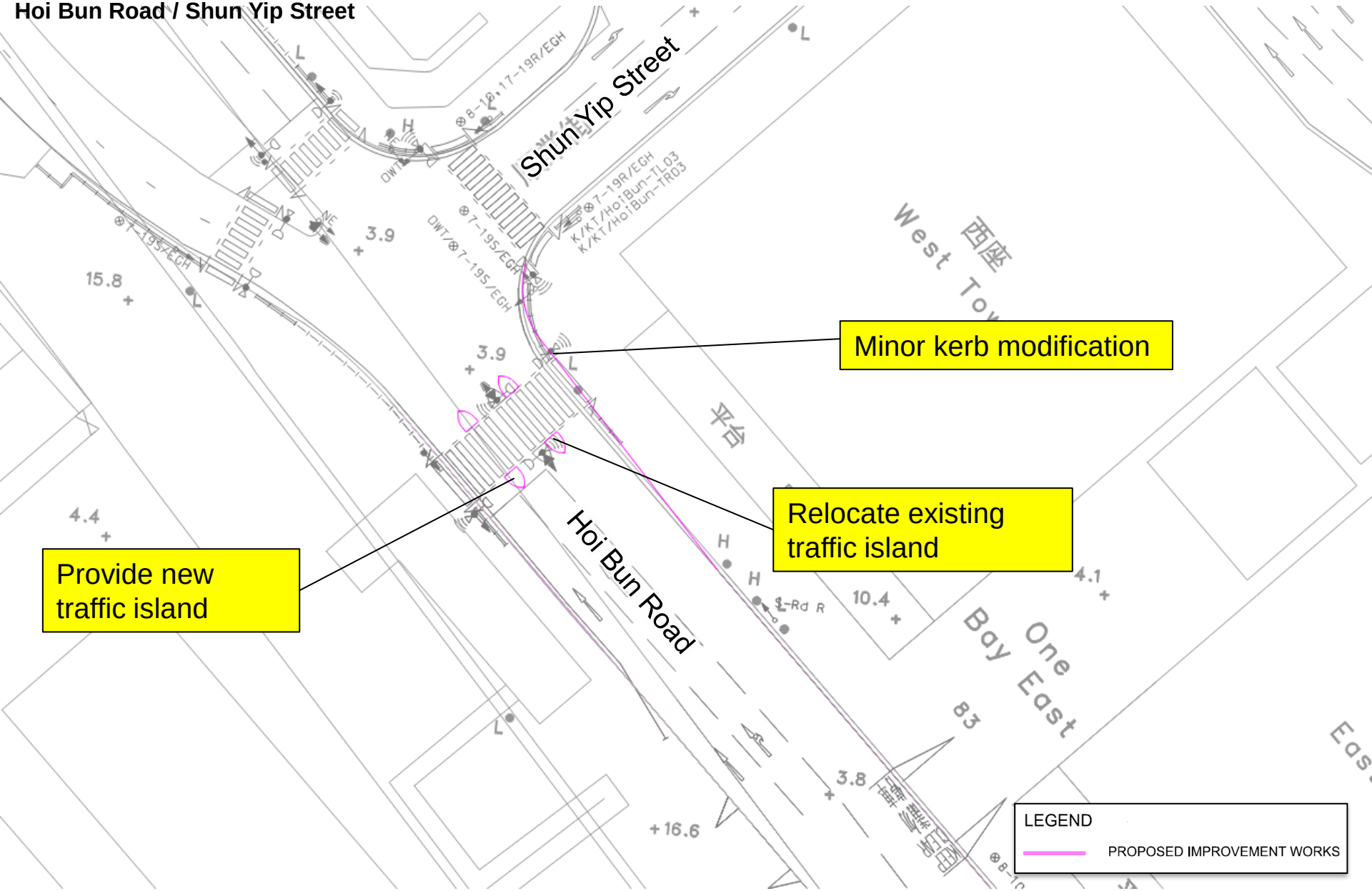
Junction Improvement Works at J4 to J6, J9 to J11

Appendix 2.1 - Overview of Improvement Works

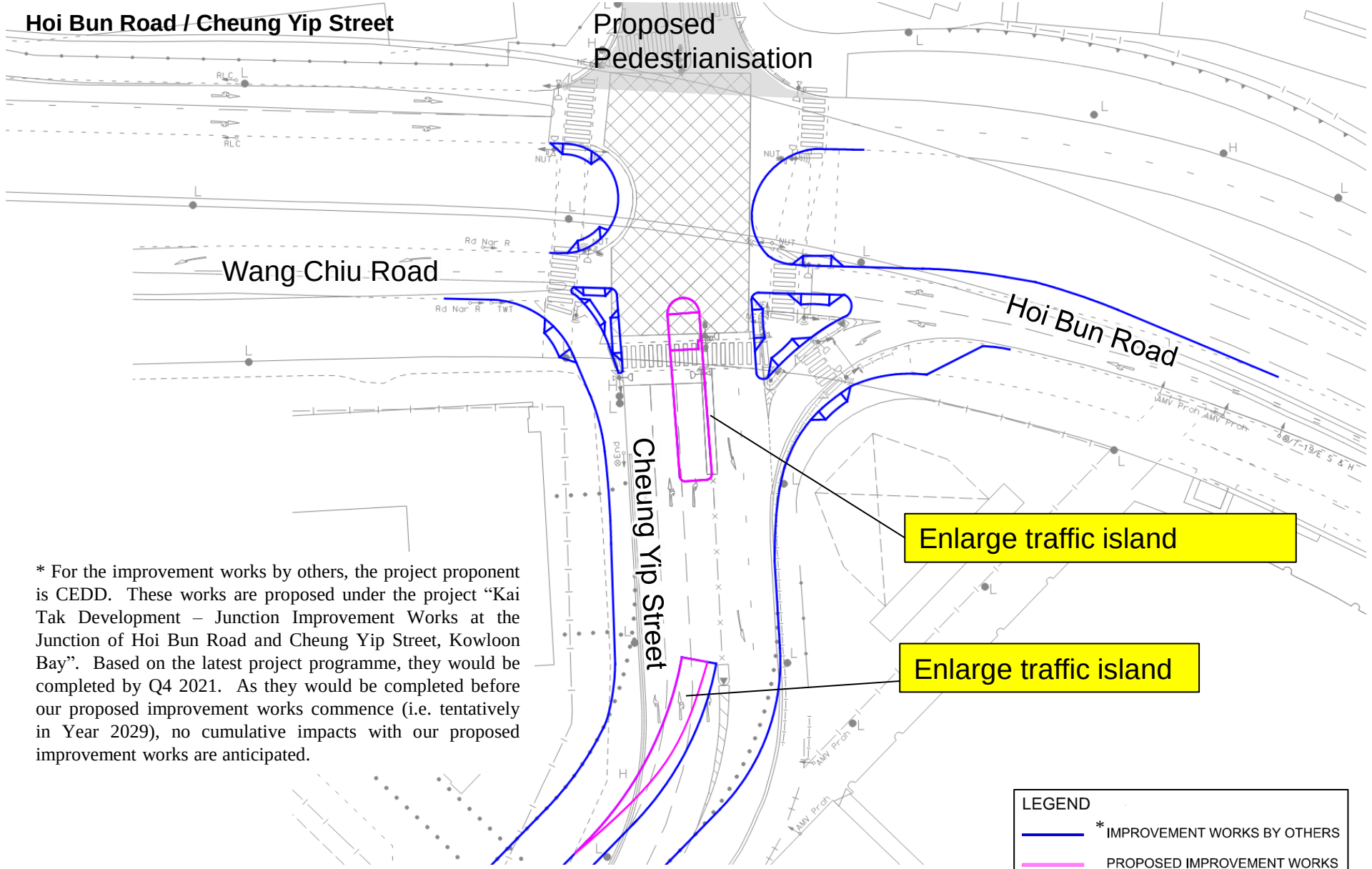


Appendix 2.1 - Proposed Junction Improvements - J4

Hoi Bun Road / Shun Yip Street



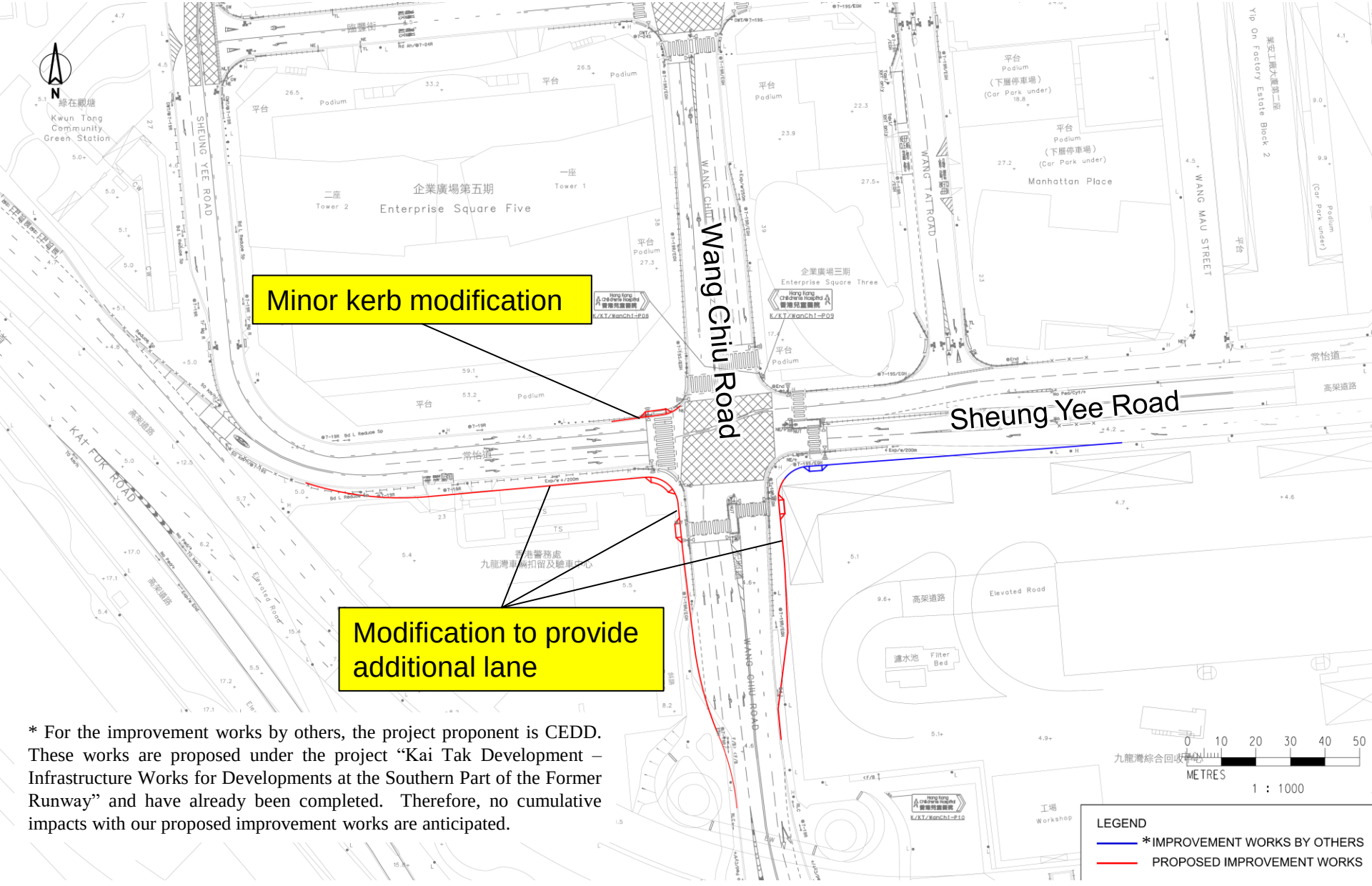
Appendix 2.1 - Proposed Junction Improvements – J5



* For the improvement works by others, the project proponent is CEDD. These works are proposed under the project "Kai Tak Development – Junction Improvement Works at the Junction of Hoi Bun Road and Cheung Yip Street, Kowloon Bay". Based on the latest project programme, they would be completed by Q4 2021. As they would be completed before our proposed improvement works commence (i.e. tentatively in Year 2029), no cumulative impacts with our proposed improvement works are anticipated.

Appendix 2.1 - Proposed Junction Improvements – J6

Wang Chiu Road/Sheung Yee Road

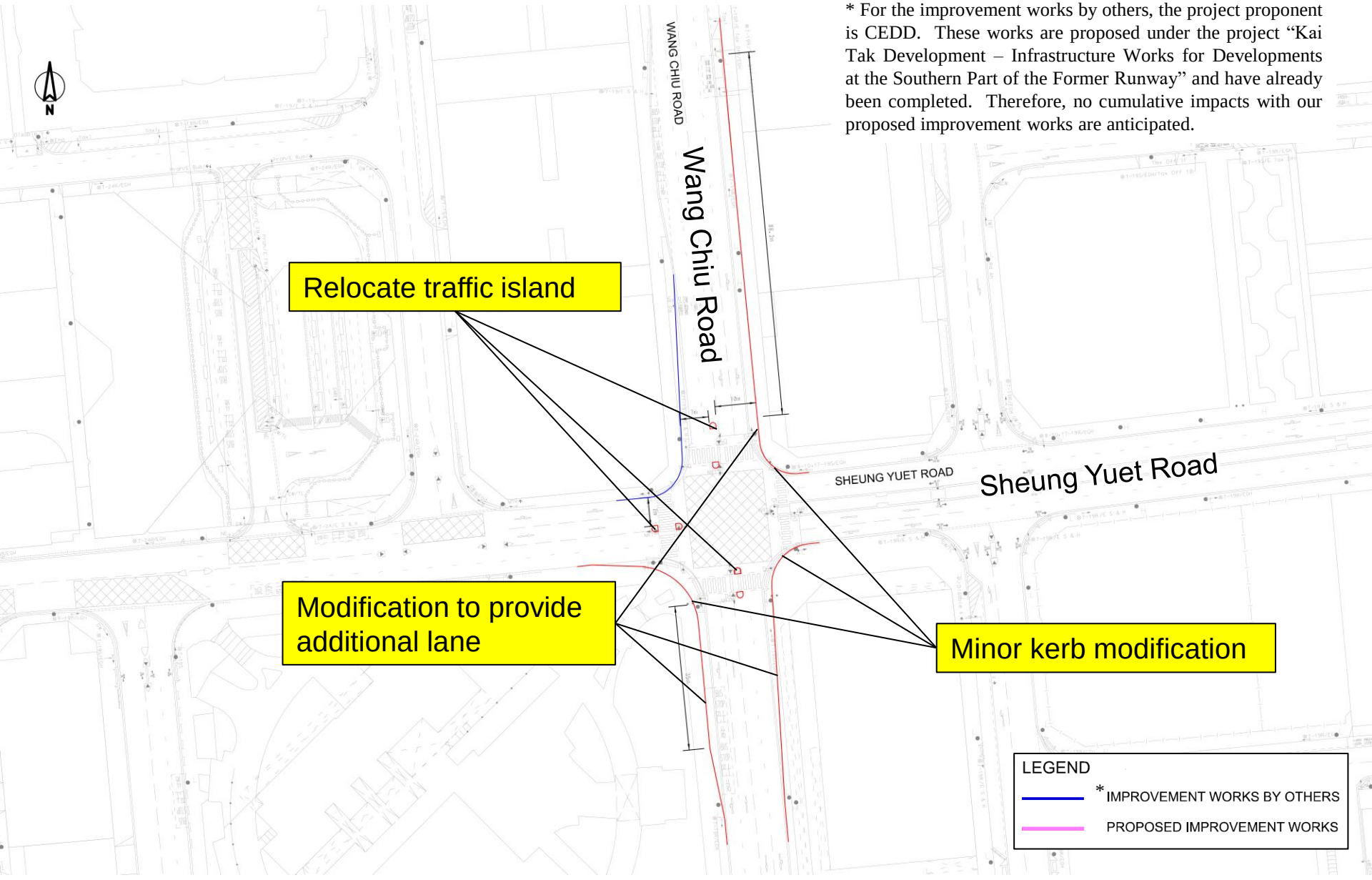


* For the improvement works by others, the project proponent is CEDD. These works are proposed under the project "Kai Tak Development – Infrastructure Works for Developments at the Southern Part of the Former Runway" and have already been completed. Therefore, no cumulative impacts with our proposed improvement works are anticipated.

Appendix 2.1 - Proposed Junction Improvements – J9

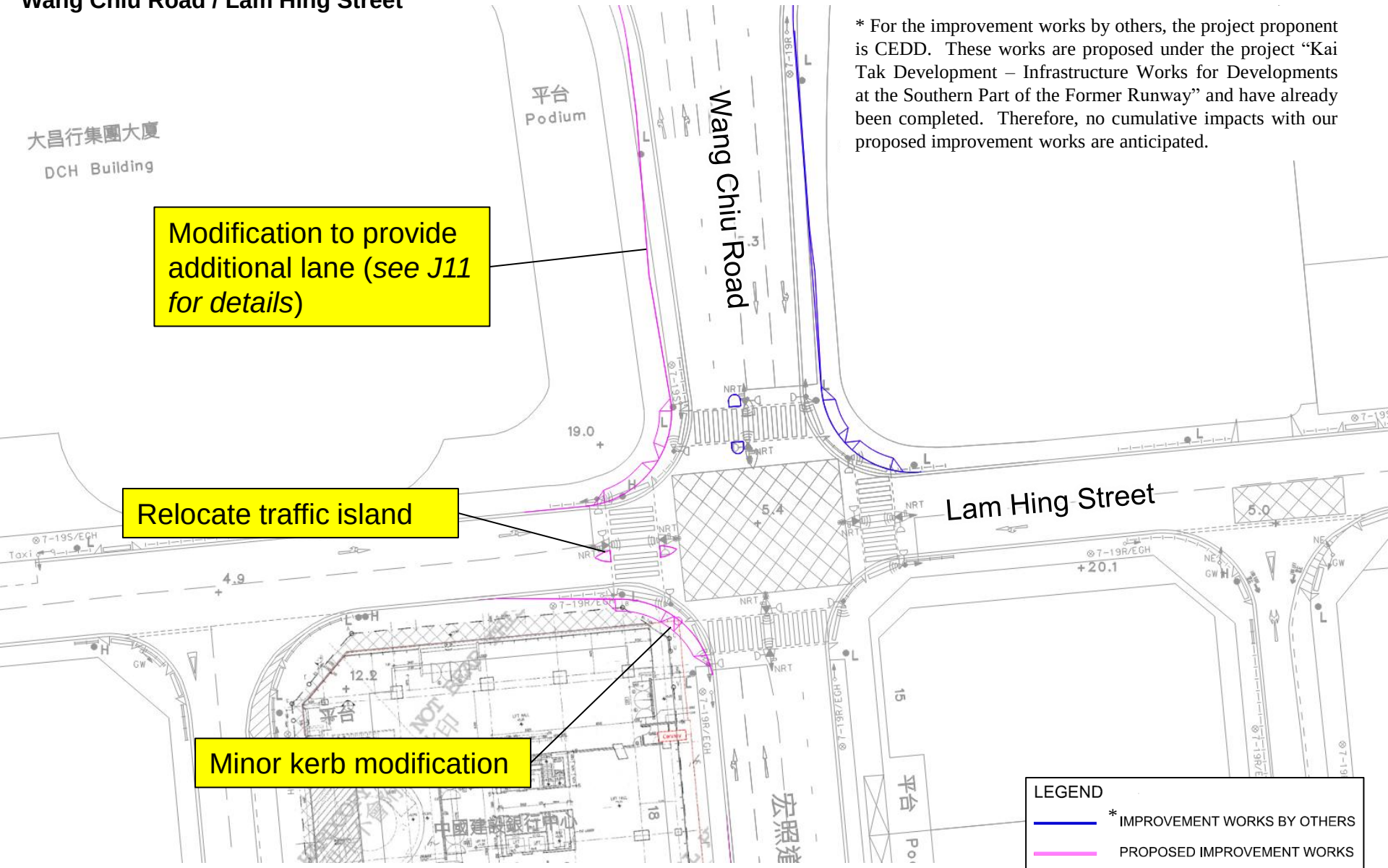
Wang Chiu Road / Sheung Yuet Road

* For the improvement works by others, the project proponent is CEDD. These works are proposed under the project "Kai Tak Development – Infrastructure Works for Developments at the Southern Part of the Former Runway" and have already been completed. Therefore, no cumulative impacts with our proposed improvement works are anticipated.



Appendix 2.1 - Proposed Junction Improvements – J10

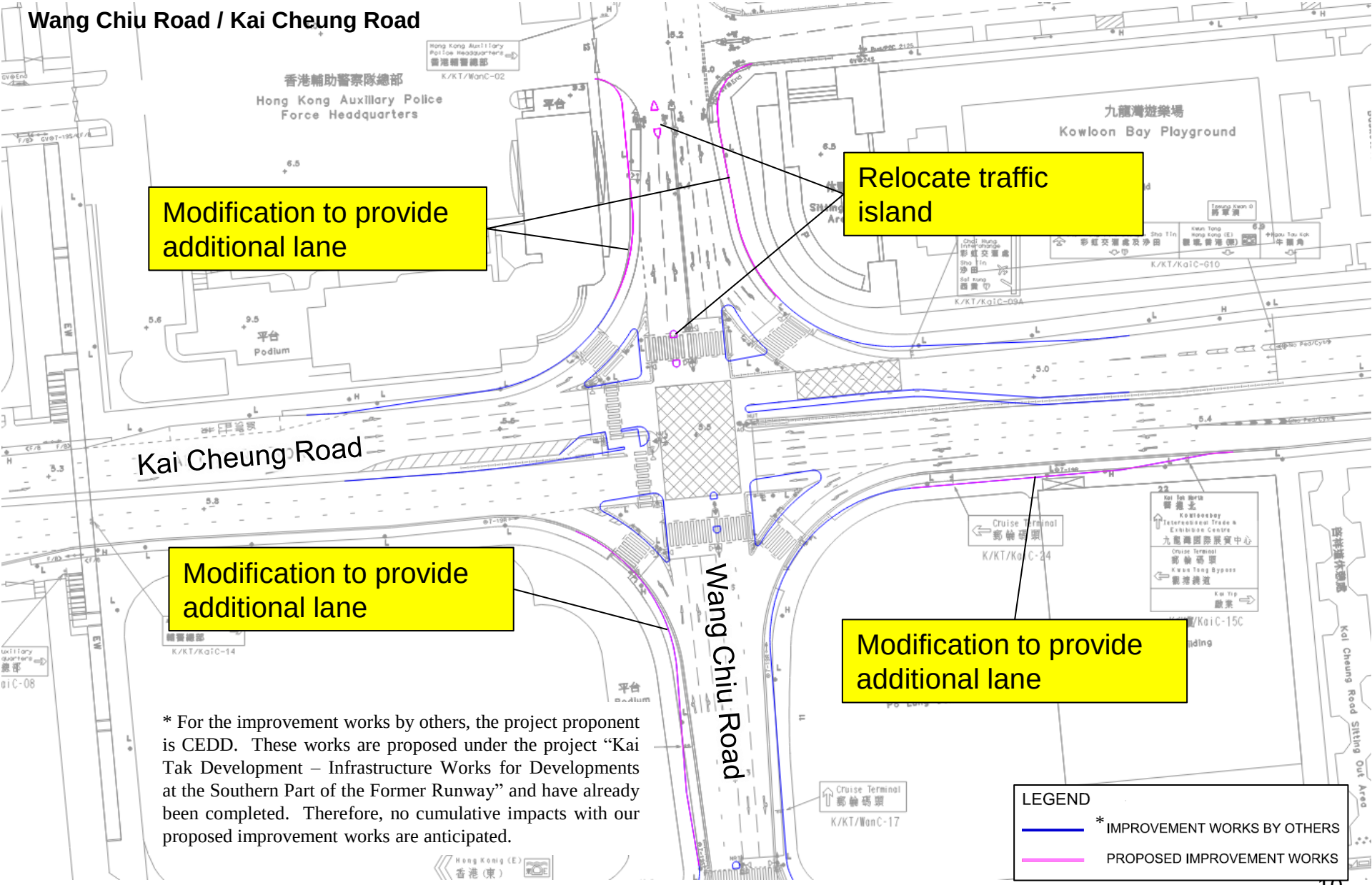
Wang Chiu Road / Lam Hing Street



* For the improvement works by others, the project proponent is CEDD. These works are proposed under the project "Kai Tak Development – Infrastructure Works for Developments at the Southern Part of the Former Runway" and have already been completed. Therefore, no cumulative impacts with our proposed improvement works are anticipated.

Appendix 2.1 - Proposed Junction Improvements – J11

Wang Chiu Road / Kai Cheung Road



* For the improvement works by others, the project proponent is CEDD. These works are proposed under the project "Kai Tak Development – Infrastructure Works for Developments at the Southern Part of the Former Runway" and have already been completed. Therefore, no cumulative impacts with our proposed improvement works are anticipated.

Appendix 3.1

Correspondence with TD

From: Marco HY TAI
To: Hope Chen
Cc: kelvinchan@devb.gov.hk
Subject: RE: 轉寄: Re: 轉寄: RE: [External] Re: Agreement No. CE4/2014 (TP) - Technical Note for the junction improvement works [Filed 28 Jul 2021 15:00]
Date: Wednesday, July 28, 2021 2:59:31 PM

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Dear Hope,

My viewpoint made via email on 15/12/2020 is still valid taking into account the updated J9 improvement works under PR12 scenario. Thanks.

Best Regards,
Marco H Y TAI
E/EKE, TEK/TD
Tel: 2399 2711

From: Hope Chen <hope.chen@arup.com>
To: Marco HY TAI <marcotai@td.gov.hk>
Cc: Wai-Lam Lee <wai-lam.lee@arup.com>, "kelvinchan@devb.gov.hk" <kelvinchan@devb.gov.hk>, "carolcheuk@devb.gov.hk" <carolcheuk@devb.gov.hk>, Ada KY YAU <adakyyau@td.gov.hk>, Tommy Chan <tommy.chan@arup.com>, Timmy Wong <Timmy.Wong@arup.com>, Martin Yu <martin.yu@arup.com>
Date: 26/07/2021 11:30 AM
Subject: RE: 轉寄: Re: 轉寄: RE: [External] Re: Agreement No. CE4/2014 (TP) - Technical Note for the junction improvement works

---

Dear Marco,

Further to your previous acceptance that the overall capacity of the concerned roads (Wang Chiu Rd and Kai Cheung RD) will not be affected by the junction improvement works (J9, J10, J11) (attachment A refers), we have updated the table below to incorporate the additional proposed improvement works at J9 under PR12 scenario which has also been included in the TTIA submitted to you on 28 May 2021. Please note that there is no change in the conclusion as it is drawn based on comparison of the length of provision of junction flare lane or local kerb line recess against the overall length of the District Distributor. In view of the relatively short section to be modified including the additional improvement works at J9, the overall design capacity of those District Distributors is considered not affected.

We would be grateful for your acceptance on our conclusion in the last column that for all listed District Distributors with junction improvement scheme, the overall design capacity of those involved roads would not be changed after the proposed junction modification works taken place.

Junction	Road Sections classified as District Distributor with junction modification works	A Comparison of the Length of the Road Section within the junction modification works / Whole Road Length	Details of Junction Modification Works	Implications on the overall design capacity of the involved roads
J9 – Sheung Yuet Road / Wang Chiu Road	1) Section of **Wang Chiu Rd** between Sheung Yuet Rd and Lam Hing St 2) Section of **Wang Chiu Rd** between Sheung Yuet Rd and Lam Fung St	1) ~100m/~1.9km (Wang Chiu Rd between Sheung Yuet Rd and Lam Hing St) 2) ~40m/~1.9km (Wang Chiu Rd between Sheung Yuet Rd and Lam Hing St) 3) ~50m/~1.9km (Wang Chiu Rd between Sheung Yuet Rd and Lam Fung St) 4) ~50m/~1.9km (Wang Chiu Rd between Sheung Yuet Rd and Lam Fung St)	1) Relocation of three traffic islands along Wang Chiu Rd and Sheung Yuet Rd 2) Sections of Wang Chiu Rd S/B of ~100m and Wang Chiu Rd N/B of ~40m will be modified to provide one additional junction flare lane 3) Sections of Wang Chiu Rd S/B of ~50m and Wang Chiu Rd N/B of ~50m will be modified to provide one additional junction flare lane	The extent of works is localized at the junction (~100m out of ~1.9km, ~40m out of ~1.9km, ~50m out of ~1.9km and ~50m out of ~1.9km at Wang Chiu Road). The overall design capacity of Wang Chiu Road **is therefore not affected**.
J10 – Lam Hing Street / Wang Chiu Road	1) Section of **Wang Chiu Rd** between Sheung Yuet Rd and Lam Hing St	1) ~20m/~1.9km (Wang Chiu Rd)	1) For the junction turning from Wang Chiu Rd N/B to Lam Hing St W/B, kerb line of ~20m will be recessed by ~2m 2) Relocation of one traffic island along Lam Hing St	The extent of scheme is localized at the junction (~20m out of ~1.9km at Wang Chiu Road). The overall design capacity of Wang Chiu Road and Lam Hing Street **is therefore not affected**.
J11 – Kai Cheung Road / Wang Chiu Road	1) Section of **Wang Chiu Rd** between Lam Hing St and Kai Cheung Rd 2) Section of **Kai Cheung Rd** between Wang Chiu Rd and Wai Yip St	1) ~70m/~1.9km (Wang Chiu Rd) 2) ~80m/~1.3km (Kai Cheung Rd)	1) For the junction turning from Wang Chiu Rd N/B to Kai Cheung Rd W/B, a section of Wang Chiu Rd N/B of ~70m will be modified to provide one additional junction flare lane 2) For the junction turning from Kai Cheung Rd W/B to Wang Chiu Rd S/B, a section of Kai Cheung Rd W/B of ~80m will be modified to provide one additional junction flare lane	The extent of scheme is localized at the junction (~70m out of ~1.9km at Wang Chiu Road; ~80m out of ~1.3km at Kai Cheung Road). The overall design capacity of Wang Chiu Road and Kai Cheung Road **is therefore not affected**.

Should you have any queries, please do not hesitate to contact our Mr. Tommy Chan at 2268 3282 or the undersigned.

Best regards,

Hope Chen
Assistant Town Planner

Arup
Level 5 Festival Walk 80 Tat Chee Avenue Kowloon Tong Kowloon Hong Kong
t +852 2528 3031 **d** +852 2908 4388

f +852 2268 3956

www.arup.com

Dear Alice,

I note from your email and tele conversation that 3 junctions (J9, J10, J11) are involved for the EIAO clarification.

Please note that TD has no comment on your viewpoint that the overall capacity of the concerned roads (Wang Chiu Rd and Kai Cheung RD) will not be affected by the junction improvement works.

Best Regards,
Marco H Y TAI
E/EKE, TEK/TD
Tel: 2399 2711

----- 轉寄人 Marco HY TAI/TD/HKSARG 時間 12/15/2020 上午08:19 -----

From: Alice Yeung <Alice.Yeung@arup.com>
To: Marco HY TAI <marcotai@td.gov.hk>
Cc: Chung Hin CHAN <chunghinchan@td.gov.hk>, "kelvinchan@devb.gov.hk" <kelvinchan@devb.gov.hk>, Martin Yu <martin.yu@arup.com>, Timmy Wong <Timmy.Wong@arup.com>, Tommy Chan <tommy.chan@arup.com>, Wai-Lam Lee <wai-lam.lee@arup.com>, Hope Chen <hope.chen@arup.com>
Date: 03/12/2020 14:19
Subject: RE: [External] Re: Agreement No. CE4/2014 (TP) - Technical Note for the junction improvement works

---

Dear Marco,

Further to our communication with EPD, we would like to clarify that the concern of EIAO requirements are those road corridors which are classified as District Distributor where the proposed junction modification works are located. We have therefore update the table below to show 3 junctions where the District Distributor are connected to:

We would be grateful for your acceptance on our conclusion in the last column that for all listed District Distributors with junction improvement scheme, the overall design capacity of those involved roads would not be changed after the proposed junction modification works taken place.

The conclusion is drawn based on comparison of the length of provision of junction flare lane or local kerb line recess against the overall length of the District Distributor.

In view of the relatively short section to be modified, the overall design capacity of those District Distributors is considered not affected.

Junction	**Road Sections classified as District Distributor with junction modification works**	**A Comparison of the Length of the Road Section within the junction modification works / Whole Road Length**	**Details of Junction Modification Works**	**Implications on the overall design capacity of the involved roads**		
J9 – Sheung Yuet Road / Wang Chiu Road	1) Section of **Wang Chiu Rd** between Sheung Yuet Rd and Lam Hing S	t	1)	~100m/~1.9km (Wang Chiu Rd) 2) ~40m/~1.9km (Wang Chiu Rd)	1) Relocation of one traffic island along Wang Chiu Rd 2) Sections of Wang Chiu Rd S/B of ~100m and Wang Chiu Rd N/B of ~40m will be modified to provide one additional junction flare lane	The extent of works is localized at the junction (~100m out of ~1.9km and ~40m out of ~1.9km at Wang Chiu Road). The overall design capacity of Wang Chiu Road **is therefore not affected**.
J10 – Lam Hing Street / Wang Chiu Road	1) Section of **Wang Chiu Rd** between Sheung Yuet Rd and Lam Hing	St		1) ~20m/~1.9km (Wang Chiu Rd)	1) For the junction turning from Wang Chiu Rd N/B to Lam Hing St W/B, kerb line of ~20m will be recessed by ~2m 2) Relocation of one traffic island along Lam Hing St	The extent of scheme is localized at the junction (~20m out of ~1.9km at Wang Chiu Road). The overall design capacity of Wang Chiu Road and Lam Hing Street **is therefore not affected**
.						
J						
11 – Kai Cheung Road / Wang Chiu Road	1) Section of **Wang Chiu Rd** between Lam Hing St and Kai Cheung Rd 2) Section of **Kai Cheung Rd** between Wang Chiu Rd and Wai Yip St	1) ~70m/~1.9km (Wang Chiu Rd) 2) ~80m/~1.3km (Kai Cheung Rd)	1) For the junction turning from Wang Chiu Rd N/B to Kai Cheung Rd W/B, a section of Wang Chiu Rd N/B of ~70m will be modified to provide one additional junction flare lane 2) For the junction turning from Kai Cheung Rd W/B to Wang Chiu Rd S/B, a section of Kai Cheung Rd W/B of ~80m will be modified to provide one additional junction flare lane	The extent of scheme is localized at the junction (~70m out of ~1.9km at Wang Chiu Road; ~80m out of ~1.3km at Kai Cheung Road). The overall design capacity of Wang Chiu Road and Kai Cheung Road **is therefore not affected**.		

Should you have any queries, please do not hesitate to contact our Mr. Tommy Chan at 2268 3282 or the undersigned.

Thanks and Regards,
Alice Yeung
Assistant Town Planner | Planning

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f +852 2268 3956
www.arup.com

Electronic mail messages entering and leaving Arup business systems are scanned for viruses and acceptability of content.[attachment "Attachment A- Correspondence with TD.pdf" deleted by Marco HY TAI/TD/HKSARG]

Hope Chen

From: Hope Chen
Sent: Friday, December 18, 2020 11:09 AM
To: Hope Chen
Subject: FW: 轉寄: Re: 轉寄: RE: [External] Re: Agreement No. CE4/2014 (TP) - Technical Note for the junction improvement works

From: Marco HY TAI/TD/HKSARG@TD
To: Alice.Yeung@arup.com
Cc: Chung Hin CHAN/TD/HKSARG@TD, Kelvin KC CHAN/DEVB/HKSARG@DEVB, LUKE KING HEI CHU/CEDD/HKSARG@CEDD
Date: 15/12/2020 16:51
Subject: 轉寄: Re: 轉寄: RE: [External] Re: Agreement No. CE4/2014 (TP) - Technical Note for the junction improvement works

---

Dear Alice,

I note from your email and tele conversation that 3 junctions (J9, J10, J11) are involved for the EIAO clarification.

Please note that TD has no comment on your viewpoint that the overall capacity of the concerned roads (Wang Chiu Rd and Kai Cheung RD) will not be affected by the junction improvement works.

Best Regards,
Marco H Y TAI
E/EKE, TEK/TD
Tel: 2399 2711

----- 轉寄人 Marco HY TAI/TD/HKSARG 時間 12/15/2020 上午08:19 -----

From: Alice Yeung <Alice.Yeung@arup.com>
To: Marco HY TAI <marcotai@td.gov.hk>
Cc: Chung Hin CHAN <chunghinchan@td.gov.hk>, "kelvinchan@devb.gov.hk" <kelvinchan@devb.gov.hk>, Martin Yu <martin.yu@arup.com>, Timmy Wong <Timmy.Wong@arup.com>, Tommy Chan <tommy.chan@arup.com>, Wai-Lam Lee <wai-lam.lee@arup.com>, Hope Chen <hope.chen@arup.com>
Date: 03/12/2020 14:19
Subject: RE: [External] Re: Agreement No. CE4/2014 (TP) - Technical Note for the junction improvement works

---

Dear Marco,

Further to our communication with EPD, we would like to clarify that the concern of EIAO requirements are those road corridors which are classified as District Distributor where the proposed junction modification works are located. We have therefore update the table below to show 3 junctions where the District Distributor are connected to:

We would be grateful for your acceptance on our conclusion in the last column that for all listed District Distributors with junction improvement scheme, the overall design capacity of those involved roads would not be changed after the proposed junction modification works taken place.

The conclusion is drawn based on comparison of the length of provision of junction flare lane or local kerb line recess against the overall length of the District Distributor.

In view of the relatively short section to be modified, the overall design capacity of those District Distributors is considered not affected.

Junction	**Road Sections classified as District Distributor**	**A Comparison of the Length of the Road Section within the**	**Details of Junction Modification Works**	**Implications on the overall design capacity of the involved roads**		

	with junction modification works	junction modification works / Whole Road Length				
J9 – Sheung Yuet Road / Wang Chiu Road	1) Section of **Wang Chiu Rd** between Sheung Yuet Rd and Lam Hing S	t	1)	~100m/~1.9km (Wang Chiu Rd) 2) ~40m/~1.9km (Wang Chiu Rd)	1) Relocation of one traffic island along Wang Chiu Rd 2) Sections of Wang Chiu Rd S/B of ~100m and Wang Chiu Rd N/B of ~40m will be modified to provide one additional junction flare lane	The extent of works is localized at the junction (~100m out of ~1.9km and ~40m out of ~1.9km at Wang Chiu Road). The overall design capacity of Wang Chiu Road **is therefore not affected**.
J10 – Lam Hing Street / Wang Chiu Road	1) Section of **Wang Chiu Rd** between Sheung Yuet Rd and Lam Hing	St		1) ~20m/~1.9km (Wang Chiu Rd)	1) For the junction turning from Wang Chiu Rd N/B to Lam Hing St W/B, kerb line of ~20m will be recessed by ~2m 2) Relocation of one traffic island along Lam Hing St	The extent of scheme is localized at the junction (~20m out of ~1.9km at Wang Chiu Road). The overall design capacity of Wang Chiu Road and Lam Hing Street **is therefore not affected**
.						
J						
11 – Kai Cheung Road / Wang Chiu Road	1) Section of **Wang Chiu Rd** between Lam Hing St and Kai Cheung Rd 2) Section of **Kai Cheung Rd** between Wang Chiu Rd and Wai Yip St	1) ~70m/~1.9km (Wang Chiu Rd) 2) ~80m/~1.3km (Kai Cheung Rd)	1) For the junction turning from Wang Chiu Rd N/B to Kai Cheung Rd W/B, a section of Wang Chiu Rd N/B of ~70m will be modified to provide one additional junction flare lane 2) For the junction turning from Kai Cheung Rd W/B to Wang Chiu Rd S/B, a section of Kai Cheung Rd W/B of ~80m will be modified to provide one additional junction flare lane	The extent of scheme is localized at the junction (~70m out of ~1.9km at Wang Chiu Road; ~80m out of ~1.3km at Kai Cheung Road). The overall design capacity of Wang Chiu Road and Kai Cheung Road **is therefore not affected**.		

Should you have any queries, please do not hesitate to contact our Mr. Tommy Chan at 2268 3282 or the undersigned.

Thanks and Regards,
Alice Yeung
Assistant Town Planner | Planning

Arup
Level 5 Festival Walk 80 Tat Chee Avenue Kowloon Tong Kowloon Hong Kong
t +852 2528 3031 **d**+852 2268 3984

Appendix B

Correspondence with AMO

From:	vwkchang@amo.gov.hk
To:	Hope Chen
Cc:	ahmyue@amo.gov.hk; rmkma; gmccheng@amo.gov.hk; kyau@amo.gov.hk; kelvinchan@devb.gov.hk; wwschow@amo.gov.hk
Subject:	Fw: Agreement No. CE4/2014 (TP) Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study: Additional Service- Without rail-based EFLS scenario: Review of EA [Filed 26 Oct 2021 10:26]
Date:	Tuesday, October 26, 2021 10:24:59 AM

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Dear Hope,

I refer to your email dated 20.10.2021 to AMO regarding the **Review of Environmental Assessment** of the captioned study.

Please be informed that the Antiquities and Monuments Office ("AMO") has no comment on the submission from heritage conservation viewpoint.

Please feel free to contact me should you have any questions. Thank you.

Regards,
Vickie Chang
HO(7)
AMO
Tel: 3910 6634

----- Forwarded by Susanna LK SIU/AMO/DEVB/HKSARG on 20/10/2021 18:44 -----

From: Hope Chen <hope.chen@arup.com>
To: slksiu <slksiu@amo.gov.hk>, "jpkwong@pland.gov.hk" <jpkwong@pland.gov.hk>
Cc: "carolcheuk@devb.gov.hk" <carolcheuk@devb.gov.hk>, "jennyyltsang@epd.gov.hk" <jennyyltsang@epd.gov.hk>, "kelvinchan@devb.gov.hk" <kelvinchan@devb.gov.hk>, "jcnleung@pland.gov.hk" <jcnleung@pland.gov.hk>, "kelvinchan@devb.gov.hk" <kelvinchan@devb.gov.hk>, Wai-Lam Lee <wai-lam.lee@arup.com>, "wlchan@pland.gov.hk" <wlchan@pland.gov.hk>, "wlwong@pland.gov.hk" <wlwong@pland.gov.hk>
Date: 20/10/2021 16:20
Subject: RE: Agreement No. CE4/2014 (TP) Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study: Additional Service- Without rail-based EFLS scenario: Review of EA

Dear Sir/Madam,

I refer to our submission of Review of Environmental Assessment for without rail-based EFLS Development Scheme (PR12) for captioned study.

As advised by the Metro Assessment Group of EPD, we are hereby pleased to enclose the report for your comments on Cultural Heritage and Landscape and Visual impacts.

The report and RtoC can be downloaded in the below link:
https://arupapc-my.sharepoint.com/:f:/g/personal/hope_chen_arup_com/EoSRu-R3PIVBgMte7KFHr5gBFlJuyret-jaURKmCTPUgAQ?e=qulXLx

We would be grateful if you would send us your comments or nil reply on or before **27 Oct 2021** and copy to the Energizing Kowloon East Office (Attention: Mr. Kelvin Chan at kelvinchan@devb.gov.hk).

Should you have any queries, please do not hesitate to contact us.

Best regards,

Hope Chen
Assistant Town Planner

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From: cmyau@epd.gov.hk <cmyau@epd.gov.hk>
Sent: Tuesday, September 14, 2021 5:17 PM
To: Hope Chen <hope.chen@arup.com>
Cc: carolcheuk@devb.gov.hk; jennyyltsang@epd.gov.hk; kelvinchan@devb.gov.hk; Martin Yu <martin.yu@arup.com>; Wai-Lam Lee <wai-lam.lee@arup.com>
Subject: RE: Agreement No. CE4/2014 (TP) Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study: Additional Service- Without rail-based EFLS scenario: Review of EA [Filed 25 Sep 2021 09:06]

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Appendix C

Correspondence with PlanD

From: jpkwong@pland.gov.hk
To: Hope Chen
Cc: carolcheuk@devb.gov.hk; jennyyltsang@epd.gov.hk; kelvinchan@devb.gov.hk; Wai-Lam Lee
Subject: Re: Agreement No. CE4/2014 (TP) Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study: Additional Service- Without rail-based EFLS scenario: Review of EA
Date: Tuesday, November 2, 2021 4:55:06 PM

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Dear Hope,

I refer to the EA Review Report of the captioned study (para. 3.1.9 - Landscape and Visual (p.9)).

Our minor comments (with UD&L Section's comments incorporated) are as follows:

- Please consider revising Line 4 to read as "**However,** with mitigation measures... it may be considered as effective in reducing the **visual and** landscape impacts in operation stage.".
-

Please pass us a final version of EA Review Report for onward MPC paper submission. Thanks.

Regards,
Jeffrey Wong
TP/K9, KDPO, PlanD
Tel: 2231 4978

From: Hope Chen <hope.chen@arup.com>
To: slksiu <slksiu@amo.gov.hk>, "jpkwong@pland.gov.hk" <jpkwong@pland.gov.hk>
Cc: "carolcheuk@devb.gov.hk" <carolcheuk@devb.gov.hk>, "jennyyltsang@epd.gov.hk" <jennyyltsang@epd.gov.hk>, "kelvinchan@devb.gov.hk" <kelvinchan@devb.gov.hk>, "jcnleung@pland.gov.hk" <jcnleung@pland.gov.hk>, "kelvinchan@devb.gov.hk" <kelvinchan@devb.gov.hk>, Wai-Lam Lee <wai-lam.lee@arup.com>, "wlchan@pland.gov.hk" <wlchan@pland.gov.hk>, "wlwong@pland.gov.hk" <wlwong@pland.gov.hk>
Date: 20/10/2021 16:21
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Best regards,

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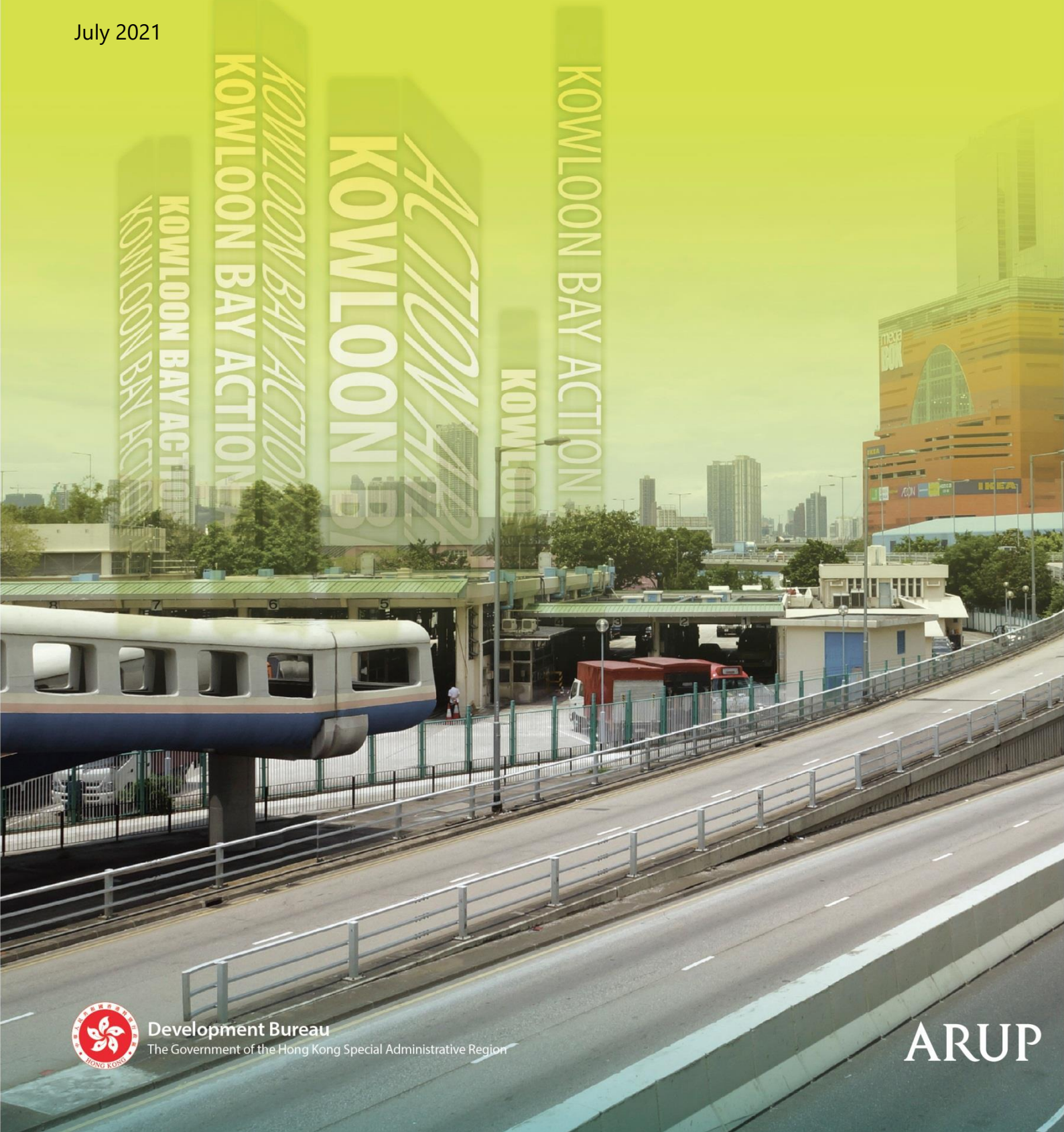
Agreement No. CE 4/2014(TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – FEASIBILITY STUDY

Additional Service – Non-EFLS Scenario
Drainage Impact Assessment (DIA)

FINAL

July 2021



Development Bureau
The Government of the Hong Kong Special Administrative Region

ARUP

Energizing Kowloon East Office, Development Bureau

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study

Additional Service -- Non- EFLS Scenario Drainage Impact Assessment (DIA)

Agreement No. CE 4/2014 (TP)

Final | July 2021

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

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

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ARUP

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Acronym

DN	Nominal Diameter
DSD	Drainage Services Department
EKEO	Energizing Kowloon East Office
EPD	Environmental Protection Department
GFA	Gross Floor Area
HKPSG	Hong Kong Planning Standards and Guidelines
HyD	Highway Department
KBAA	Kowloon Bay Action Area
KBBA	Kowloon Bay Business Area
KE	Kowloon East
KTD	Kai Tak Development

1 Introduction

1.1 Study Background

1.1.1.1 Kowloon East (KE) is an area comprising the former Kai Tak Airport, Kwun Tong Business Area (KTBA) and Kowloon Bay Business Areas (KBBA). This area witnessed the rapid growth of an important industrial base in the heyday of Hong Kong's manufacturing industry, creating hundreds of thousands of jobs and propelling Hong Kong's prosperity. Following relocation of the Airport to Chek Lap Kok and our manufacturing base to the Mainland, a huge stock of industrial buildings was not being fully utilised. On the other hand, with the continuing boom of Hong Kong's financial and service sectors as well as large numbers of regional headquarters and regional offices of multi-national companies setting their foothold in Hong Kong, the demand for quality offices can no longer be met by our traditional Central Business District (CBD). Some private developers have developed high-grade office buildings and retail centres in KE. About 1.4 million m^2 office floor space have been completed in 2011.

1.1.1.2 In 2001, all industrial land in Kwun Tong and Kowloon Bay was rezoned to "Other Specified Uses (Business)" ("OU(Business)"). The "OU(Business)" zone allows industrial premises to be converted to office use and industrial buildings redeveloped for commercial/office uses. In April 2010, the Government also introduced measures to revitalise industrial buildings in Hong Kong. It is anticipated that, together with the new commercial/office space to be provided in Kai Tak Development (KTD) area, the total commercial/office space in Kowloon East has the potential to increase from the current 2.0 million sqm to 7.0 million sqm in the future. Kowloon East has great potential to evolve into a vibrant premier business district in Hong Kong.

1.1.1.3 In the 2011-12 Policy Address, the Chief Executive (CE) announced that the Government would adopt a visionary, coordinated and integrated approach to expedite the transformation of KE into an attractive, alternative CBD to support Hong Kong's economic development. Energizing Kowloon East Office (EKEO) was therefore set up in the Development Bureau (DevB) to undertake initiatives of land use review, urban design, improved connectivity and the associated infrastructure

1.1.1.4 The initial proposals for Energizing Kowloon East were formulated under the CBD^2 strategy, with main focus on enhancing Connectivity, Branding, Design and Diversity. These proposals were consolidated on the Conceptual Master Plan (CMP) version 2.0 issued on 7 June 2012 and further refinement of the CMP was promulgated in January 2015 (version 4.0) taking on board suggestions during the ongoing public engagement process and new opportunities identified. The latest CMP 5.0 was promulgated in November 2016, focusing on 5 issues, including Walkability and Mobility, Green CBD, Smart City, Socio-economic Vibrancy, and the Spirit of Creation.

1.1.1.5 One of the key tasks of EKEO is to proactively review the development and design options of undeveloped/under-developed Government sites

with guidance of the CBD[2] strategy. Releasing the development potential of KBAA which is at the core area of KE, for mixed development will bring great vibrancy to the region. The Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study (the Study) is therefore commissioned to review, investigate, and produce feasible development options and implementation strategy to optimise the development potential of KBAA in terms of its strategic setting, constraints and opportunities.

1.2 Study Area

1.2.1.1 The Study Site (**Figure 1.2.1**) covers the existing Government sites in KBAA which include the area currently occupied by Transport Department (TD)'s two Vehicle Examination Centres (VECs), the former Environmental Protection Department (EPD)'s waste recycling centre[1], Highway Departments (HyD)'s maintenance depot, Hong Kong Police Force (HKPF)'s police vehicle pound and the areas of roads, pedestrian walkways, sitting-out area and amenity areas in between. The area is mainly bounded by Sheung Yee Road in the North, Wai Yip Street in the East and the edge of Kwun Tong Bypass and the adjoining amenity areas in the West and South next to KTD. It has an area of about 17 ha including the areas of roads, pedestrian walkways, sitting-out area and amenity areas.

1.2.1.2 The Study Area is mainly zoned for "Government, Institution or Community (1)" ("G/IC(1)"), "Other Specified Uses (Refuse Transfer Station)" ("OU(Refuse Transfer Station)"), "Other Specified Uses (Business)" ("OU(Business)") and "Road" uses.

1.2.1.3 The Study Area is divided into six development sites, namely Lots 1 to 6 (**Figure 1.2.2**). The Kai Fuk Road flyover (Lot 3) literally bisected KBAA into the northern and southern portion. The northern cluster consists of the highway maintenance depot (part of area underneath the Flyover at Lot 3), a police vehicle detention and examination centre (Lot 1) and was previously occupied the former waste recycling centre (Lot 2), whereas the southern cluster by two vehicle examination centres (VECs) (Lot 4). Within KBAA, two lots zoned "OU(Business)" namely the New Kowloon Inland Lots (NKILs) 6512 (Lot 6) and 6313 (Lot 5) were sold in January and May 2015 and the respective commercial development has been completed in 2019.

1.3 Purpose of this Report

1.3.1.1 The purposes of this report include:

- to take cognisance of the existing, committed and planned developments which may have bearing on the development;
- to assess the existing flooding susceptibility;
- to identify the changes to the existing drainage characteristics and potential drainage impacts arising from the proposed development;

[1] The waste recycling center has been demolished in Q1 2021

- to assess the flooding susceptibility of the proposed development;
- to work out the requirements for drainage mitigation and/or improvement/upgrading measures;
- carry out schematic design of the drainage system arising from the development including carrying out all necessary hydraulic analysis to substantiate the proposed scheme;

1.3.1.2 The Structure of this report is as follows:

- This section is an introduction for this report;
- **Section 2** presents the key data of the revised outline development plans (RODP) on which the impact assessments is based;
- **Section 3** assess the impacts on existing and planned storm drain systems due to the development and formulate corresponding mitigation measures;
- **Section 4** conclusion.

2 Recommended Outline Development Plan (RODP)

2.1 Introduction

2.1.1.1 The Non-EFLS scenario has taken into consideration the efficient use of land resources, quality urban design within the bounds of the infrastructure capacities. In line with the development intensity in the "OU(B)" zone and Kowloon Bay as well as the anticipated decrease in hotel's demands in the coming years, the proposed plot ratio of the Non-EFLS scenario has been reviewed by converting portion of the proposed hotel development into office development. **Figure 2.1.1** shows the recommended outline development plan.

2.2 Key Development Parameters and Proposed Land Use Budget

2.2.1 Key Development Parameters

2.2.1.1 **Table 2.2.1** set out the key development parameters on individual Lots based on the approach above.

Table 2.2.1 Key Development Parameters on Individual Lots

Lot	Gross Site Area (m^2) (about)	Net Site Area (m^2) (about)	GFA (m^2) (about)	Plot Ratio
1	9,500	9,500	subject to detailed design and feasibility study	N/A
2*	24,140	17,000	204,600	12.0
3	8,400	8,400	400	N/A
4**	25,020	16,750	201,000	12.0
5	3,800	3,800	45,540	12.0
6	6,800	6,800	82,040	12.0
Total (excluding Lots 1 & 3)		**44,350**	**533,180**	N/A
TOTAL (excluding Lot 1)		**52,750**	**533,580**	N/A

Notes:

* Includes POSPD of about 4,400m^2 and the section of Cheung Yip Street (between Lots 2 and 5) of about 2,740m^2

** Includes POSPDs of about 1,600m^2 (western portion) and about 1,700m^2 between eastern portion and Lot 6, amenity areas of 2,140m^2 and the section of Cheung Yip Street of about 2,830m^2

2.2.2 Proposed Land Use Budget

2.2.2.1 The land use budget is tabulated in Table 2.2.2

Table 2.2.2 Summary of the Proposed Land Use Mix of RODP

USES	GFA	%
Office	391,080	73.3%
Retail/ F&B/ Entertainment/ Urban Farming/ Food Workshop	122,220	22.9%
Hotel	14,880	2.8%
Arts, Cultural and Creative	400	0.1%

USES	GFA	%
Transport Facilities	5,000	0.9%
Total	**533,580**	**100.0%**

Remarks: The GFA of the two sold sites (i.e. Lots 5 and 6) are included. Based on the latest building plans, about 116,110 m^2 of office GFA and 11,480 m^2 of retail and F&B GFA are provided at the two sites.

2.2.3 Broad Estimation of Employment Size

2.2.3.1 Employment opportunities by land uses are derived by applying the worker density by land uses on the GFA data. Upon completion, the Preferred Option is anticipated to create in total of about 25,900 employment opportunities. **Table 2.2.3** summaries the estimated employment opportunities.

Table 2.2.3 Employment Opportunities by Uses under Preferred Option

USES	Preferred Option
Office[1]	19,554
Retail/ F&B/ Entertainment/ Urban Farming/ Food Workshop[2 6]	6,111
Hotel[3]	239
Arts, Cultural and Creative[4]	10
Transport Facilities[5]	10
Total	**25,924**

Notes:

[1] According to HK2030 Study WP 46, employment density for CBD office is assumed to be 1 worker per 20sqm.

[2] Retail, F&B, Entertainment, Urban Farming and Food Workshop are assumed to be General Business Use. According to HKPSG, employment density is assumed to be 1 worker per 20-25sqm for General Business Use.

[3] As local employment density for hotel is not available, the assumption adopted by the UK government is therefore applied. It is assumed that for 4-5 Star Hotels, the ratio between hotel staff and number of rooms should be 1 hotel staff per 1.25 rooms. (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/378203/employ-den.pdf)

[4] According to Annex 6 and 7 of the Economic Impact of Developing the West Kowloon Cultural District Technical Paper (Financial Secretary's Office, 2007), the Performing Arts Facilities will create 4,275 direct employment opportunities. And the total GFA for these Performing Arts Facilities is of about 188,895sqm. The employment density for cultural and creative facilities is therefore assumed to be 1 worker per 44sqm.

[5] For the proposed PTI, the estimated number of employment opportunities is minimal at around 10 supporting staff.

[6] The employment density for urban farm is assumed to be 1 per 50m2 by making reference to AFCD Iveggie which employs 5 employees for an area of about 250sqm. (http://www.iveggie.com.hk/index.php/tw/investment)

3 Drainage Impact Assessment

3.1 Introduction

3.1.1.1 Liaison with Drainage Services Department (DSD) has been made to obtain relevant information, a list of data/information obtained is shown in **Table 3.1.1** below.

Table 3.1.1 Existing Drainage Information

Item No.	Information	Source of Information	Date
1	DSD drainage record plan	DSD/MS	29 Aug 2014
2	Agreement No. CE 29/2002(DS) –Drainage Improvement in East Kowloon (Packages A & C Hydraulic Models)	DSD/LD	18 Sep 2014

3.2 Design Assumptions and Parameters

3.2.1.1 The drainage impacts arising from the proposed development is assessed with reference to the following information:

- Existing and planned developments within the catchment serving the proposed development, including areas upstream of the development such as Kai Shan hillside, and developments between the project site and the point of discharge to existing networks including local villages and roadways.
- Development parameters shown in **Section 2**;
- Hong Kong Drainage Services Department – Stormwater Drainage Manual (SDM) for Planning, Design and Management, January 2018;
- Agreement No. CE 29/2002(DS) – Drainage Improvement in East Kowloon (Packages A & C); and
- Agreement No. CE22/2011(DS) – Review of Drainage Master Plan in East Kowloon (EK DMPR) – Feasibility Study

3.2.1.2 The following rainfall runoff parameters are adopted in this study:

- Runoff coefficients = 0.90 for paved and roof surfaces;
- Runoff coefficients = 0.30 for permeable surface.

3.2.1.3 Colebrook-White equation is applied for pipe hydraulic analysis. The design roughness coefficients (Ks) for existing pipeline system is 1.5mm. The design roughness coefficients (Ks) for proposed pipeline system is also 1.5mm in consideration of its reduced hydraulic performance in future due to degradation of material.

3.2.1.4 According to SDM Clause 9.3, *10% reduction in flow area* is allowed in hydraulic analysis to take into account the effects to flow capacity due to materials deposited on the bed.

3.2.1.5 The increase in rainfall intensity and sea level due to climate change to be adopted in accordance with Table 28 of SDM is shown in **Table 3.1.2**. The scenario of up to mid 21st century is adopted for this DIA.

Table 3.1.2 Climate Change Projections

Scenario	Rainfall Increase (%)	Sea Level Rise (m)
Mid 21st Century (2041-2060)	10.4	0.23
End 21st Century (2081-2100)	13.8	0.49

3.3 Existing Drainage Characteristic and Drainage System

3.3.1 Existing Drainage Basin Characteristic

3.3.1.1 The proposed development is located within the East Kowloon (EK) drainage basins EK4 and EK5 (see **Drawing No. 237938/SD/001 for** demarcation of EK4 and EK5). The general characteristics of drainage basins are shown in the **Table 3.1.3** below.

3.3.1.2 The EK4 basin is urbanised area which has been fully developed and/or paved and no major planned development within the basin is identified. The whole EK5 basin consisted of urbanised catchment with paved surface and some hilly rural upland, no major planned development within the basin is identified.

Table 3.1.3 Drainage Basin Characteristic

Drainage Basin	Area (hectares)	Catchment properties	Existing Trunk Drainage system
EK4	62	Urbanised area	Runoff of the urban area discharges into the existing urban networks. The catchment is mainly served by a 1800mm diameter drain, single cell 3.0m (W) x 1.9m (H) and 2.4m (W) x 3.8m (H) box culvert and 3 cells 1.3m (W) x 1.6m (H) box culvert.
EK5	577	Urbanised lower catchments with paved surface and some hilly rural upland area	Runoff from the upland area would be discharged locally into urban upstream networks. Runoff of the urban area together with the collected flow from upland discharges into sea via 7 cells 4.12m (W) x 3.8m (H) box culvert.

3.3.2 Existing Study Area Characteristic

3.3.2.1 The average ground level of the existing Study Area is about +5.0mPD. In general, the existing areas are grading away from the site and no local low-lying areas are identified.

3.3.2.2 EK4 site area is located within EK4 basin and the existing site area is fully paved. The remaining part of the development, EK5 site area is located at the downstream end of EK5 basin (5.98 km^2) and the existing site area is paved.

3.3.3 Existing Drainage System and Condition

3.3.3.1 The branch network and major stormwater drainage systems adjacent to the Study Area are identified, see **Table 3.1.4** below and **Drawing Nos. 237938/SD/011 & 012.**

Table 3.1.4 Existing Stormwater Drainage System Adjacent to the Site Area

Sub-Catchment	Branch Network	Major Network	Outfall
EK4 Site Area	DN450 – DN675 Pipelines along Cheung Yip Street [10 year or lower] DN300 – DN450 Pipelines along Wang Chiu Road (eastbound) [20 year or lower] DN450 – DN600 Pipelines along Hoi Bun Road (eastbound) [20 year or lower] DN225 Pipelines along Hung Yip Street [less than 2 year]	DN1050 and DN1125 Pipelines along Shun Yip Street [200 year] DN825 – DN1200 Pipelines along Hoi Bun Road (westbound) [200 year]	DN1500 Pipe [200 year]
EK5 Site Area	DN225 – DN675 Pipelines along Tsui Hing Street DN450 – DN1350 along Wang Chiu Road (northbound) DN600 – DN1200 Pipelines along Sheung Yee Road and within Kowloon Bay Waste Recycling Centre	DN750 – DN1200 along Wang Chiu Road (southbound) DN1200 – DN1500 Pipeline along Sheung Yee Road and Kai Fuk Road DN900 – DN1200 along Wai Yip Street	7 cells 4120 (W) x 3800 (H) Box Culvert

Remark: Text in bracket indicates the existing performance of the storm drains within the EK4 Site Area as extracted from the performance drawing under EKDI.

EK4 Site Area Catchment

3.3.3.2 The branch networks mainly collect runoff from existing EK4 site area and road surface runoff and discharge to the DN1125 pipeline along Shun Yip Street and it discharges downstream to DN1500 outfall pipe. The major drainage system along Shun Yip Street is serving the whole EK4 Basin with a catchment area of about 62 hectares. The DN1500 outfall pipe is located at the end of Shun Yip Street near Kowloon Godown Building.

EK5 Site Area Catchment

3.3.3.3 The stormwater pipeline along Sheung Yee Road and Kai Fuk Road collects runoff from existing EK5 site area and discharge to a 7 cells 4120 (W) x 3800 (H) outfall box culvert. The 7 cells box culvert currently serving the whole EK5 Basin with a total area of 577 hectares approximately. The box culvert as an urban drainage trunk system have a 200-year flood protection standard.

3.3.3.4 The Study Area is located at the downstream end of both EK4 and EK5 drainage catchments and the proposed drainage system will interface with the trunk drainage systems which serves the whole drainage catchments.

3.3.4 Existing Flooding Susceptibility – EK4 Catchment

3.3.4.1 According to DSD's Stormwater Drainage Manual, the existing drainage system in the vicinity of the Study Area are classified as "Urban Drainage Branch System" and should have a flood protection level of 50-year.

3.3.4.2 According to the EKDI, the flood protection levels of the existing drainage system in EK4 catchment are identified in **Table 3.1.4** and the relevant performance drawings are extracted as **Figure 3.1.1** below. It is noted that the existing DN1500 outfall pipe to which the runoff from the proposed development sites would be conveyed has 200-year flood protection level. Moreover, the findings of the EK DMPR have shown that the existing EK4 catchment is mainly served by a DN1800 drain, 3m (W) x 1.9m (H), 2.4m (W) x 3.8m (H) and 3 cells 1.3m (W) x 1.6 (H) box culverts with an overall flood protection level ranged from 10 years to 200 years.

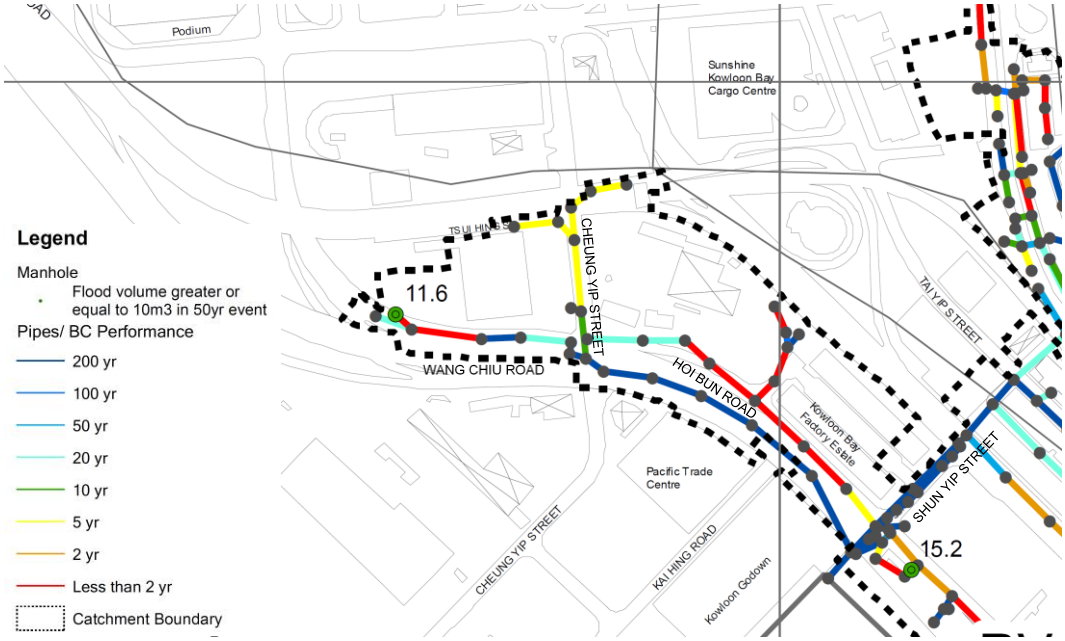


Figure 3.1.1 EK4 Catchment – Hydraulic Performance

3.3.4.3 It was identified that the existing branch drainage systems, which serves the EK4 Site Area, generally have a flood protection level of 20-year or lower. Nevertheless, no upgrading works were planned for these sub-standard branch drainage systems.

3.3.5 Existing Flooding Susceptibility – EK5 Catchment

3.3.5.1 Preliminary hydraulic assessment on the existing branch drainage systems has been performed and presented in **Appendix B**.

3.3.5.2 According to the preliminary hydraulic assessment, it is identified that the branch drainage systems have a flood protection level lower than 50-year.

3.4 Changes on Drainage Characteristic

3.4.1.1 The potential changes on the drainage characteristics arising from the proposed development are listed as follows.

3.4.2 Changes in land use and surface runoff characteristics

3.4.2.1 The existing land uses of the Study Area are police vehicle pound, EPD's Waste Recycling Centre, Vehicle Examination Centers and unoccupied land, which are fully paved area. With the proposed development, most of the rainfall will be captured in the building rooftop and discharge to the drainage system via building drainage system. Although public open space and landscapes will be provided under the proposed development, for conservative purpose, it is assumed that the proposed development are fully paved area. In this connection, the surface runoff characteristics is unchanged to the existing condition.

3.4.3 Delineation of the drainage sub-catchments

3.4.3.1 To maximize the flexibility of the proposed development, the existing drainage systems which pass through the Study Area may be diverted along the boundaries. Moreover, the proposed building arrangement (e.g. A landscaped deck is proposed on top of the podium of Lot 2 and Lot 4 (western portion) and it is located above the existing Kai Fuk Road flyover) will change the sub-catchment delineation for EK4 and EK5 site areas. In this connection, it is expected that the drainage sub-catchments within the site area will be connected to the downstream of the same pipeline and therefore the sub-catchment areas contributed to the existing drainage systems would be changed. The delineation of sub-catchments is presented in **Appendix A.**

3.4.4 Timing of peak runoff from the Study Area

3.4.4.1 The proposed building arrangement and proposed drainage system will potentially affect the time of peak runoff from the Study Area to the existing drainage system. For the trunk drainage system which serves the whole EK4 / EK5 Drainage Basin, there will be no impact on its time of concentration as the Study Area is located at the downstream end of the Basin.

3.5 Potential Drainage Impact and Proposed Drainage System

3.5.1.1 As mentioned in **Para. 3.4**, it is expected that the changes arising from the proposed development would not cause adverse drainage impact on the existing major drainage system. However, it was identified under the EKDI that the existing branch drainage systems in the vicinity of the Study Area generally have a flood protection level of 20-year or lower and no upgrading works had been planned for these sub-standard drainage systems. Hence, upgrading/diversion of existing branch drainage systems is necessary to meet the DSD's flood protection standard. Preliminary hydraulic assessment on the existing drainage systems has been performed and presented in **Appendix B**. The potential drainage impact and corresponding proposed mitigation measures are presented below to minimize the impact on the existing drainage systems as well as the proposed drainage system attributed to the surcharged existing branch drainage system. Layout plans of the

proposed drainage systems are shown in **Drawing Nos. 237938/SD/011 & 012.**

3.5.2 Upgrading Existing Drainage System – EK4 catchment

3.5.2.1 Given that the existing branch drainage system along Cheung Yip Street (Southern Section) will be modified as it is within the Lot 4 area, it is proposed to upgrade it to serve both the Lot 4 (western portion) and Lot 4 (eastern portion) areas.

3.5.2.2 It is proposed to upgrade the DN450 – DN600 pipelines along Hoi Bun Road (eastbound) to DN750 and DN825 pipelines to cater for the Lot 4 (western portion) area upon development.

3.5.3 Upgrading Existing Drainage System – EK5 catchment

3.5.3.1 It is proposed to upgrade sections of the existing branch drainage systems to meet the 50-year flood protection level to serve Lot 1, Lot 2, Lot 3 and Lot 4 areas. An existing section of the storm drains along Wai Yip Street adjacent to Lot 5 is also shown to have inadequate capacity to handle 50-year flow. Detailed hydraulic calculations showing the proposed upgrading works shall be referred to **Appendix B.**

3.5.3.2 Existing DN375 to DN1050 pipeline within Kowloon Bay Waste Recycling Centre (Lot 2) is proposed to be demolished to allow the flexibility of the future development land use allocation.

3.5.4 Diversion / Modification of Existing Drainage Systems

3.5.4.1 Existing DN450 to DN675 pipelines along Cheung Yip Street (Southern Section) is currently collecting runoff from Kai Fuk Flyover, Tsui Hing Street and along Cheung Yip Street (Southern Section). As the Southern section of Cheung Yip Street will be transformed into open space under the proposed RODP, the corresponding drainage system will be modified from gully system to landscape drainage system.

3.5.4.2 DN225 pipelines along Hung Yip Street is currently collecting runoff from Hung Yip Street. Under proposed RODP, Hung Yip Street will be transformed into open space, it is proposed that the existing drainage system will be modified / demolished to allow the flexibility of the land use. It is proposed to divert some of the catchment of Lot 4 (eastern portion) to the downstream storm drains along Hoi Bun Road (eastbound).

3.5.5 Green and sustainable building design

3.5.5.1 The proposed building design emphasizes green and sustainable appearance of the development. Moreover, to in line with the standard requirements for new land sale sites in KE, green building design and higher greening ratio (i.e. an overall minimum greening requirement of 30% of the site area after excluding the at-grade POSPD area, and specifically minimum 20% to be provided at the pedestrian zone and at least 20% of the roof area) would be included in the lease condition for Lots 2 and 4. A Master Landscape Plan had also been developed, in which large-scale planting areas are proposed. The green and

sustainable building design and landscaping could effectively reduce the surface runoff and hence relieve the hydraulic impact on the existing drainage systems.

3.5.6 Summary

Table 3.5.1 Mitigation Measures of Existing Stormwater Drainage System

Sub-Catchment	Drainage Network		Proposed Mitigation Measures
EK4 Catchment	Branch	DN450 – DN675 Pipelines along Cheung Yip Street	Upgrade to DN675 to DN1050
		DN300 – DN450 Pipelines along Wang Chiu Road (eastbound)	N/A
		DN450 – DN600 Pipelines along Hoi Bun Road (eastbound)	Upgrade to DN750 to DN825
		DN225 Pipelines along Hung Yip Street	N/A
	Major	DN1050 and DN1125 Pipelines along Shun Yip Street	N/A
		DN825 Pipeline along Hoi Bun Road (westbound)	Upgrade to DN1050
EK5 Catchment	Branch	DN225 – DN675 Pipelines along Tsui Hing Street	N/A
		DN450 – DN1350 along Wang Chiu Road (northbound)	Upgrade to DN600 to DN900
		DN600 – DN1200 Pipelines along Sheung Yee Road and Pipeline within Kowloon Bay Waste Recycling Centre	Pipeline within Kowloon Bay Waste Recycling Centre (Lot 2) to be demolished Upgrade to DN1350
		DN900 – DN1200 Pipelines along Wai Yip Street	Upgrade to DN1200
		Other branch drainage system	To be upgraded

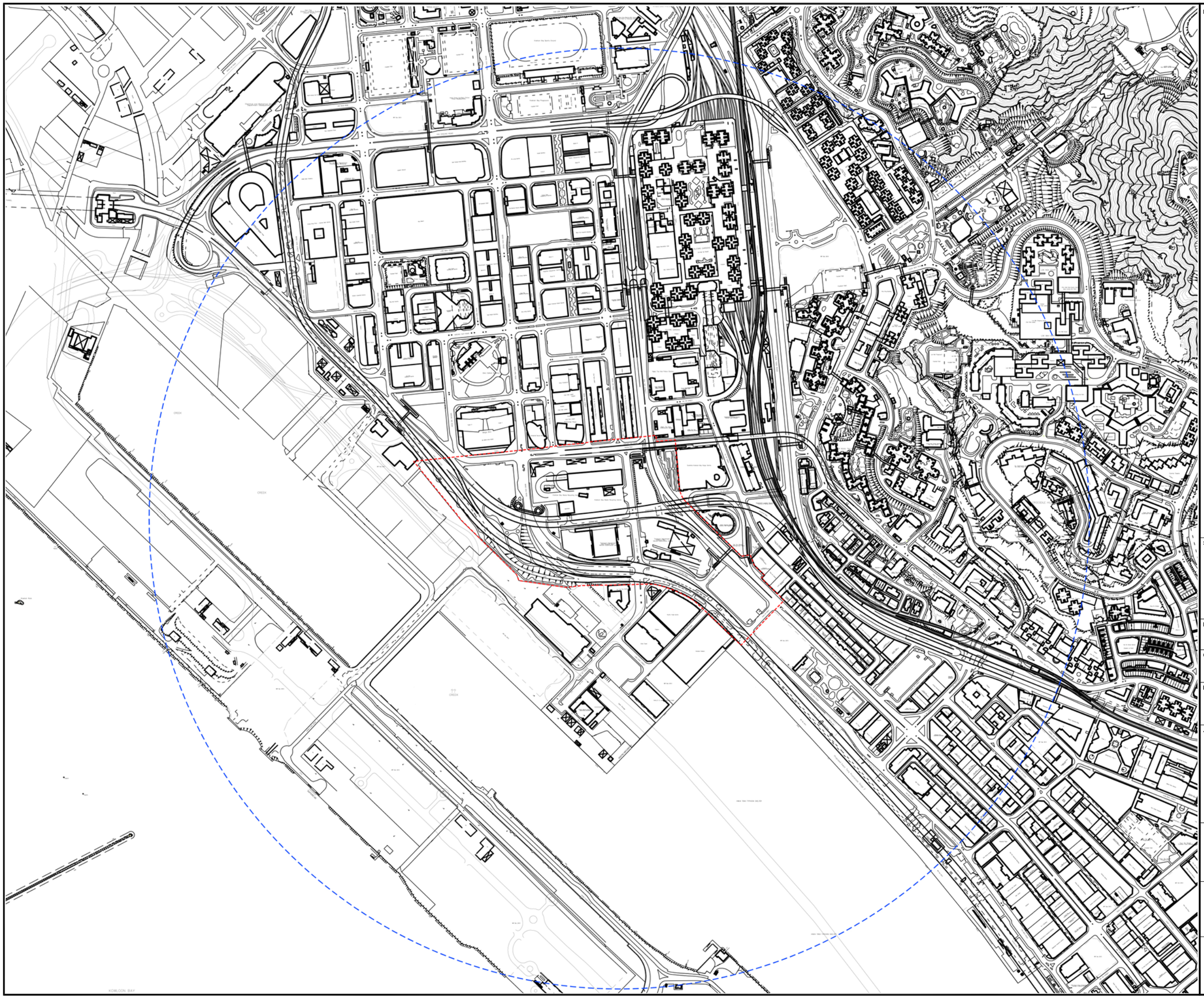
4 Conclusion

4.1.1.1 It is expected that the changes arising from the proposed development would not cause adverse drainage impact on the existing major drainage system as existing site areas are paved. However, the existing branch drainage systems in the vicinity of the Study Area generally have a flood protection level of 20-year or lower and no upgrading works were planned for these sub-standard drainage systems. It is proposed to upgrade the existing branch drainage systems to meet the DSD's flood protection standard to serve the proposed development.

4.1.1.2 To maximize the flexibility of proposed development, it is proposed to divert / modify the existing drainage systems which pass through the Study Area.

4.1.1.3 To relieve the pressure on the drainage system due to development in the area in face of climate change, incorporation of "resilience" measures and blue-green elements could be considered in the building design stage for enhancing the adaptive capacity of the drainage system, such as ground reprofiling, raising the entrance levels, using demountable flood barriers, use of boundary wall/planters, promoting infiltration, providing temporary storage etc.

Figures



Legend

Study Area

Area of Influence

Scale and Orientation

N

0 100 200 300 400m

1:7,500 on A3

Drawn	Date
MG	June 2015
Checked	Approved

Figure No.	Drawing Title
1.2.1	Study Area and Area of Influence

Job Title

Agreement No. CE 4/2014 (TP)

Planning and Enginering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study

ARUP

Former EPD's Waste Recycling Centre

Capital Tower (NKIL 6313)
- completed development

HKPF's Police Vehicle Examination and Detention Centre

HyD's Maintenance Depot beneath flyover

Amenity Area partly beneath Kwun Tong Bypass

The Quayside (NKIL 6512)
- completed development

TD's Vehicle Examination Centres

Wang Chiu Road
Wang Tai Road
Wang Mau Street
Wang Hor Road
Sheung Yee Road
Kai Fuk Road Flyover
Tsui Hing Street
Kwun Tong Bypass
Hoi Bun Road
Wai Yip Street
Lot 1
Lot 2
Lot 3
Lot 4
Lot 5
Lot 6

Legend
Study Area

Scale and Orientation
N
0 100 200 300 400m

Drawn	Date
LL	14 April 2020
Checked	Approved
LL	WL

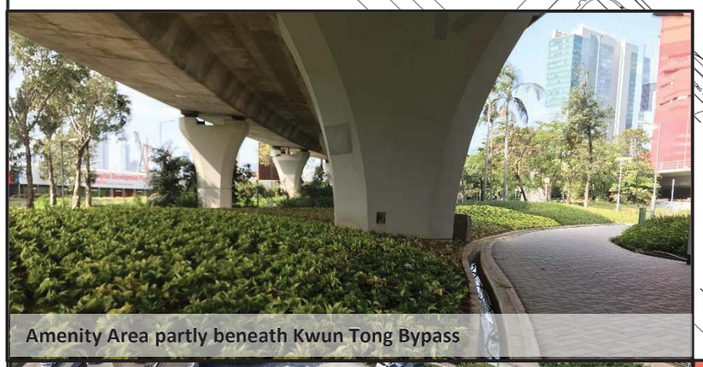
1.2.2 Development Sites of KBAA

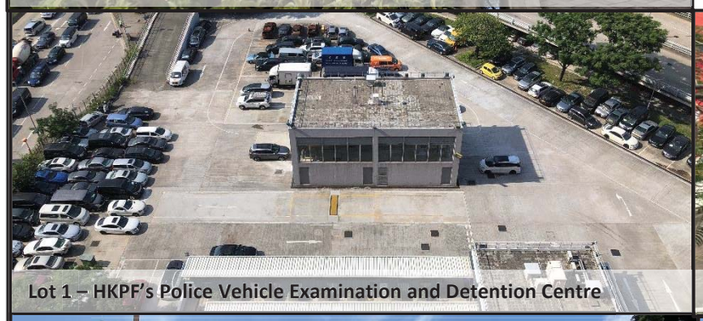
Job Title

Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study

ARUP


Amenity Area partly beneath Kwun Tong Bypass


Lot 1 – HKPF's Police Vehicle Examination and Detention Centre

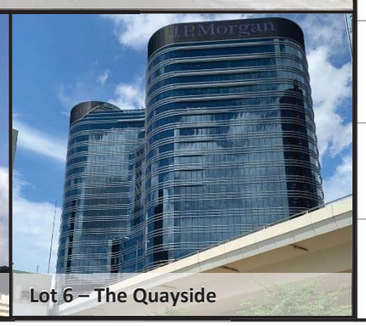

Lot 2 – Former EPD's Waste Recycling Centre


Lot 3 – HyD's Maintenance Depot beneath flyover


Lot 4a – TD's Vehicle Examination Centre


Lot 4b – TD's Vehicle Examination Centre


Lot 5 – Capital Tower



Lot 6 – The Quayside



Legend

- Study Area
- Proposed Lot Boundary
- Other Specified Uses
- Commercial use
- District Open Space / Local Open Space
- Amenity
- Elevated Walkway
- Pedestrianized Street
- Non-Building Area
- Maximum Building Height (In Meters Above Principal Datum)
- Proposed Site Formation Level (In Metres above Principal Datum)
- Building Height Control Zone Boundary
- Setback Line

Scale and Orientation

N

0 20 40 60 80m

Drawn	Date
Checked	Approved

Figure No. 2.3.1

Drawing Title: Recommended Outline Development Plan

Job Title

Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study

ARUP

Drawings

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N

839500 E

840000 E

820000 N

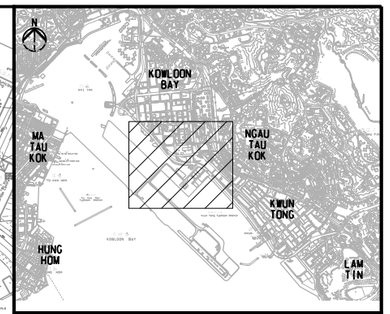
819500 N

EK5

EK4

EXISTING 7 CELLS
4120(W) x 3800(H)
BOX CULVERT

EXISTING
1500mm OUTFALL



KEY PLAN

LEGEND:

EK4	EAST KOWLOON DRAINAGE MASTER PLAN (EKDMP) CATCHMENT NAME
.....	EKDMP CATCHMENT BOUNDARY
▨	STUDY AREA

Rev	Description	By	Date
A	DRAFT WP8	LTT	JUN15

Consultant

ARUP

Project title

Agreement No. CE 4/2014 (TP)
Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East Feasibility Study

Drawing title

EXISTING DRAINAGE CATCHMENT PLAN

Drawing no.			Rev.
237938/SD/001			A
Drawn: JL	Date: JUN/2015	Checked: KK	Approved: CC
Scale: 1:2000 @ A1, 1:4000 @ A3		Status: PRELIMINARY	

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839200 E | 839400 E | 839600 E | 839800 E

820000 N | 819800 N | 819600 N

N

EXISTING 7 CELLS
4120(W) x 3800(H)
BOX CULVERT

Lot no. 1

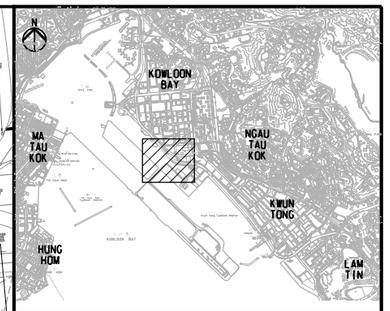
Lot no. 2

Lot no. 3

Lot no. 4a

MATCH LINE

FOR CONTINUATION,
SEE DWG 237938/SD/012



KEY PLAN

LEGEND:

- STUDY AREA
- STORMWATER MANHOLE
- CATCHPIT
- GULLY SUMP / GULLY
- TAPPING POINT
- EXISTING STORMWATER PIPE
- ABANDONED PIPE
- EXISTING DRAINAGE RESERVE
- EXISTING BOX CULVERT
- EXISTING PIPE TO BE ABANDONED
- PROPOSED DIA. 1350 STORMWATER DRAINAGE PIPE (UPGRADE EXISTING DIA. 1050 PIPE)

Rev	Description	By	Date
C	FINAL DIA	CK	JUN21
B	DRAFT DIA	LTT	SEP15
A	DRAFT WP8	LTT	JUN15

Consultant

ARUP

Project title

Agreement No. CE 4/2014 (TP)
Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East Feasibility Study

Drawing title

EXISTING, PLANNED AND PROPOSED DRAINAGE SYSTEM

(SHEET 1 OF 2)

Drawing no.	Rev.
237938/SD/011	B

Drawn	Date	Checked	Approved
JL	JUN/2015	KK	CC

Scale 1:1000 @ A1
1:2000 @ A3

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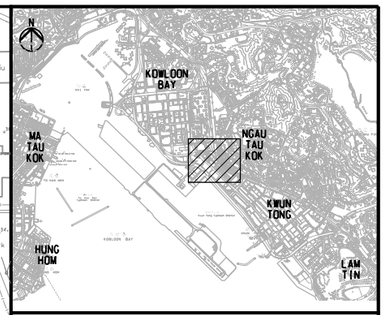

KEY PLAN

LEGEND:

- STUDY AREA
- STORMWATER MANHOLE
- CATCHPIT
- GULLY SUMP / GULLY
- TAPPING POINT
- 525 — EXISTING STORMWATER PIPE
- ABANDONED PIPE
- EXISTING DRAINAGE RESERVE
- EXISTING BOX CULVERT
- EXISTING PIPE TO BE ABANDONED
- 1350 (1050) — PROPOSED DIA. 1350 STORMWATER DRAINAGE PIPE (UPGRADE EXISTING DIA. 1050 PIPE)

Rev	Description	By	Date
C	FINAL DIA	CK	JUN21
B	DRAFT DIA	LTT	SEP15
A	DRAFT WP8	LTT	JUN15

Consultant

ARUP

Project title

Agreement No. CE 4/2014 (TP) Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East Feasibility Study

Drawing title

EXISTING, PLANNED AND PROPOSED DRAINAGE SYSTEM

(SHEET 2 OF 2)

Drawing no.		Rev.
237938/SD/012		B
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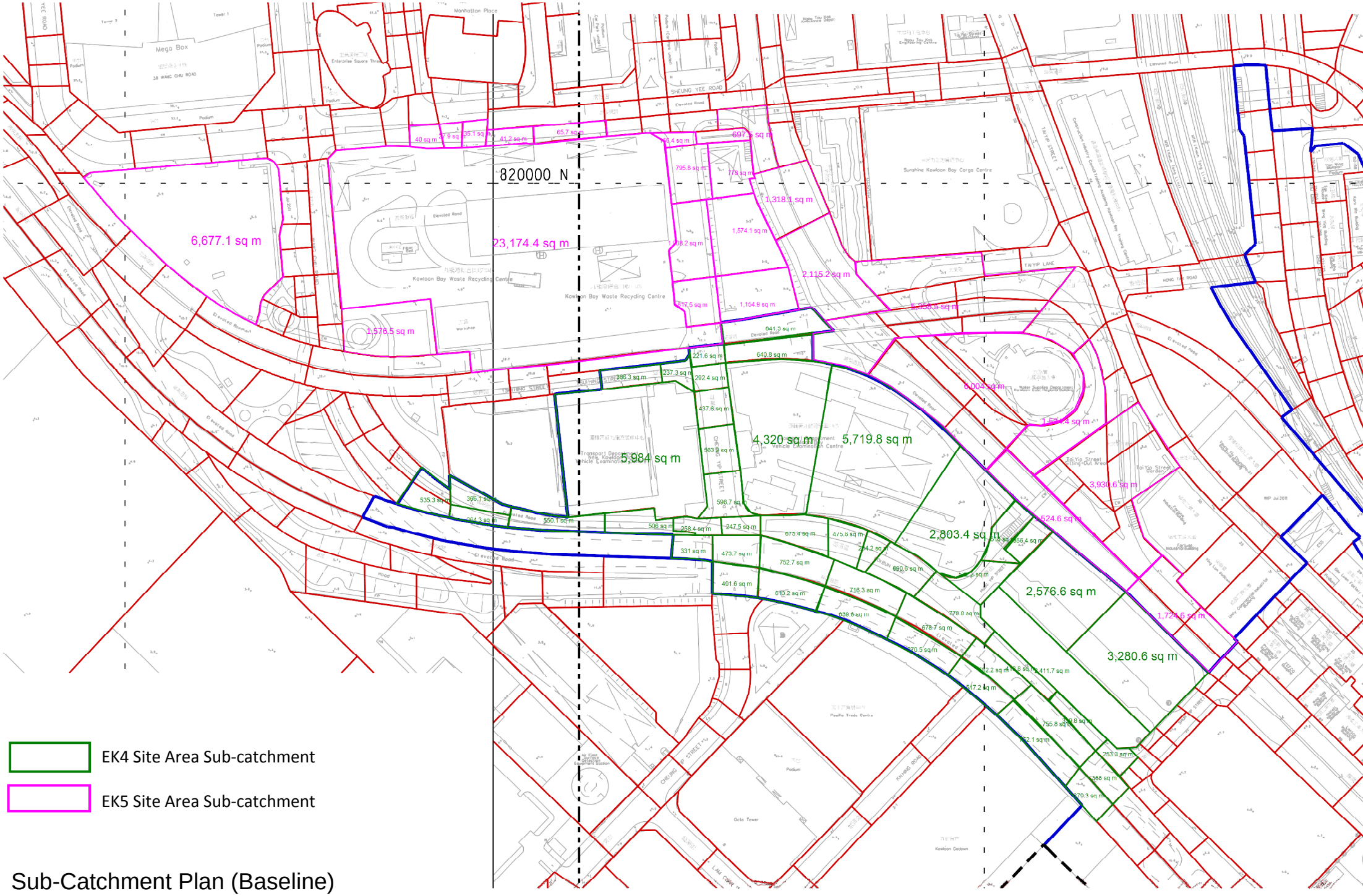
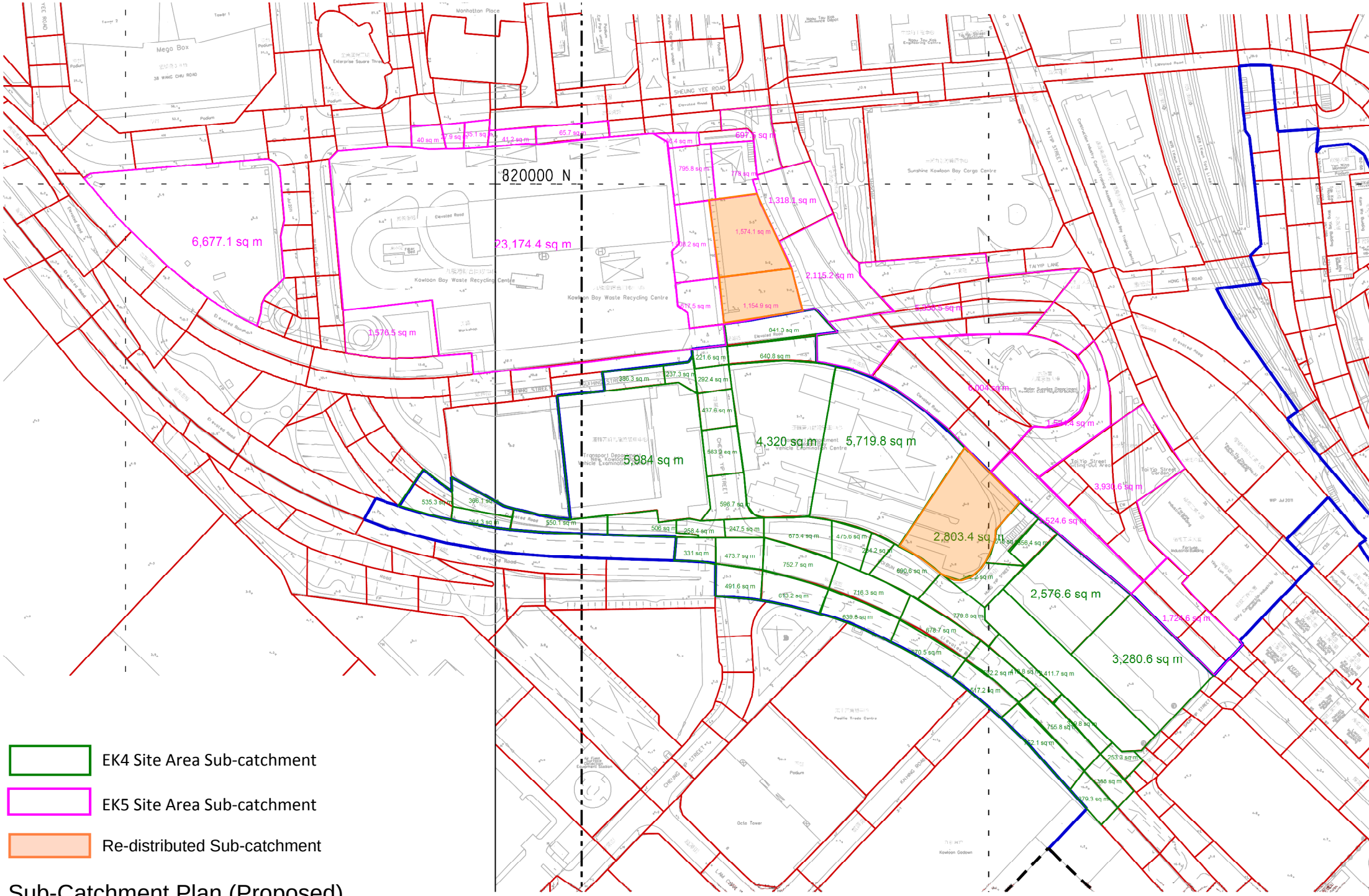
Appendices

Appendix A

Catchment Delineation



Sub-Catchment Plan (Baseline)



Sub-Catchment Plan (Proposed)

Subcatchment Data and Discharge Schedule

9-Jun-21

EK4 Catchment

Area (m2)	Description	Effective Catchment Area	Existing Discharge Point	Proposed Discharge Point
366	Wang Chiu Rd	329	4048726	4048726
536	Wang Chiu Rd	482	4048727	4048727
264	Wang Chiu Rd	238	4048728	4048728
550	Wang Chiu Rd	495	4048729	4048729
506	Wang Chiu Rd	455	4048730	4048730
259	Wang Chiu Rd	233	4048731	4048731
331	Wang Chiu Rd	298	4048732	4048732
474	Wang Chiu Rd	427	4048743	4048743
492	Wang Chiu Rd	442	4048744	4048744
753	Hoi Bun Rd	677	4048745	4048745
613	Hoi Bun Rd	552	4048745	4048745
716	Hoi Bun Rd	645	4048746	4048746
640	Hoi Bun Rd	576	4048746	4048746
679	Hoi Bun Rd	611	4048747	4048747
571	Hoi Bun Rd	513	4048747	4048747
532	Hoi Bun Rd	479	4048748	4048748
517	Hoi Bun Rd	465	4048748	4048748
756	Hoi Bun Rd	680	4048765	4048765
752	Hoi Bun Rd	677	4048765	4048765
388	Hoi Bun Rd	349	4048765	4048765
379	Hoi Bun Rd	341	4048765	4048765
842	Between Lot 3&4b	758	4048735	4048735
641	Between Lot 3&4b	577	4048738	4048738
222	Cheung Yip St	200	4048738	4048738
386	Tsui Hing St	348	4048733	4048733
237	Tsui Hing St	213	4048734	4048734
292	Cheung Yip St	263	4048739	4048739
438	Cheung Yip St	394	4048742	4048742
563	Cheung Yip St	507	4048742	4048742
597	Cheung Yip St	537	4048742	4048742
5,984	Lot 4a	5,386	4048741	4048741
247	Hoi Bun Rd	223	4048766	4048766
675	Hoi Bun Rd	608	4048767	4048767
476	Hoi Bun Rd	428	4048768	4048768
234	Hoi Bun Rd	211	4048769	4048769
691	Hoi Bun Rd	622	4048770	4048770
780	Hoi Bun Rd	702	4048776	4048776
419	Hoi Bun Rd	377	4048777	4048777
340	Hoi Bun Rd	306	4048778	4048778
253	Hoi Bun Rd	228	4048785	4048785
356	Hung Yip Street	321	4048771	4048771
518	Hung Yip Street	466	4048772	4048772
522	Hung Yip Street	470	4048775	4048775
4,320	Lot 4b	3,888	4048742	4048742
3,000	Lot 4b	2,700	4048770	4048770
2,720	Lot 4b	2,448	4048770	4048770
2,800	Lot 4b	2,520	4048774	4048776

EK5 Catchment

Area (m2)	Description	Effective Catchment Area	Existing Discharge Point	Proposed Discharge Point
1,155	Lot 3	1,040	4048505	4048507
618	Cheung Yip St	556	4048505	4048505
1,574	Lot 3	1,417	4048506	4048507
1,008	Cheung Yip St	907	4048506	4048506
796	Cheung Yip St	716	4048507	4048507
778	Lot 3	700	4048503	4048503
166	Cheung Yip St	150	4048508	4048508
20,504	Lot 2	18,453	4048625	4048625
3,000	Lot 2	2,700	4048627	4048627
66	Sheung Yee St	59	4048627	4048627
41	Sheung Yee St	37	4048628	4048628
35	Sheung Yee St	32	4048629	4048629
28	Sheung Yee St	25	4048630	4048630
40	Sheung Yee St	36	4048631	4048631
6,677	Lot 1	6,009	4048577	4048577
1,265	Wang Chiu Rd	1,139	4048585	4048585
1,206	Wang Chiu Rd	1,085	4048585	4048585
820	Wang Chiu Rd	738	4048585	4048585
848	Wang Chiu Rd	763	4048585	4048585
261	Wang Chiu Rd	235	4048585	4048585
281	Wang Chiu Rd	253	4048585	4048585
139	Wang Chiu Rd	125	4048585	4048585
262	Wang Chiu Rd	236	4048585	4048585
139	Wang Chiu Rd	125	4048586	4048586
276	Wang Chiu Rd	248	4048590	4048590
262	Wang Chiu Rd	236	4048590	4048590
306	Wang Chiu Rd	275	4077780	4077780
274	Wang Chiu Rd	247	4048587	4048587
338	Wang Chiu Rd	304	4048588	4048588
3,892	Lot 4	3,503	4048603	4048603
1,442	Lot 4	1,298	4048603	4048603
1,420	Wang Chiu Rd	1,278	4048603	4048603
630	Wang Chiu Rd	567	4048603	4048603
173	Wang Chiu Rd	156	4048603	4048603
223	Wang Chiu Rd	201	4048603	4048603
287	Wang Chiu Rd	258	4048603	4048603
341	Wang Chiu Rd	307	4048603	4048603
267	Wang Chiu Rd	240	4048603	4048603
578	Lot 3	520	4048614	4048614
324	Lot 3	292	4048614	4048614
396	Lot 3	356	4048614	4048614
638	Lot 3	574	4048614	4048614
903	Lot 3	813	4048614	4048614
1,142	Lot 3	1,028	4048614	4048614
1,577	Lot 2	1,419	4048614	4048614
200	Wang Chiu Rd	180	4048615	4048615
405	Wang Chiu Rd	365	4048616	4048616
874	Wang Chiu Rd	787	4048617	4048617
182	Wang Chiu Rd	164	4048618	4048618
8,703	Wai Yip Street	7,833	4048441	4048441
6,004	Wai Yip Street	5,404	4048457	4048457
7,473	Wai Yip Street	6,726	4048458	4048458
2,015	Wai Yip Street	1,814	4048459	4048459

Modification of existing subcatchment

Appendix B

Storm Drain Hydraulic Assessment

ARUP	Job No.	Sheet No.	Rev.
	237938		
	Member/Location		
Job Title: Planning and Engineering Study - KBAA	Drg. Ref.		
Calculation: Design Assumptions - Stormwater Drainage	Made by: CK	Date: 06/2021	Chd.: YL

Flow Estimation

Design Flow = CiA

Runoff Coefficient C

paved	0.90
grassland	0.30

	For Checking Existing System	For Proposed System	
Design Return Periods	50	50	yrs
a	451.3	451.3	
b	2.46	2.46	
c	0.337	0.337	

Inlet Time

Urban	3.0	min
Natural	5.0	min

Climate Change Effect

	Rainfall Increase (%)	Sea Level Rise (m)
Mid 21st Century	10.4	0.23
End 21st Century	13.8	0.49

Hydrology

The inlet time of natural catchment is estimated by the Brandsby William's Equation as per SDM Section 7.5.2

$$t_0 = \frac{0.14465L}{H^{0.2}A^{0.1}}$$

Hydraulic Assessment

Full-bore Capacity = VA

Colebrook-White Equation from Section 8.3.1 & Table 12 of SDM for circular pipes

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

Roughness Coefficient (Ks)	Existing	1.5	mm
	Proposed	1.5	mm

Manning's Equation from Section 8.3.1 & Table 12 of SDM for channels & box culverts

$$\overline{V} = \frac{R^{1/6}}{n}\sqrt{RS_f}$$

Roughness Coefficient (n) For Concrete Lined Channel = 0.016

ARUP

Job No.	Sheet No.	Rev.
237938		

Member/Location

Drg. Ref.

Job Title: Planning and Engineering Study - KBAA

Calculation: Hydraulic Assessment of Existing Drainage System - Existing Flow

Made by: CK | Date: 06/2021 | Chd.: YL

Design Rainfall Return Period 50 yr

With climate change effect up to mid 21st century

Text in dark red Data extracted from EK Model

EK4 Site Area

Drainage System									Pipe/Channel/BC														Pipeworks Design					
																							Velocity		Capacity			
Description	US MH No.	DS MH No.	USGL (mPD)	DSGL (mPD)	USIL (mPD)	DSIL (mPD)	USCL (mPD)	DSCL (mPD)	Length (m)	Type (UC/Pipe /BC/RC)	Diameter of Pipe/Channel (mm)	Gradient (1 in)	Area (m^2)	Perimeter (m)	Hydraulic Radius (m)	Existing / Proposed	Roughness Coefficient (mm, For Pipe only)	Additional Effective Catchment Area (m^2)	Cumulative Effective Catchment Area (m^2)	t_{in} (min)	t_f (min)	t_c (min)	Intensity (mm/hr)	Full-bore (m/s)	Check for Pipe (1~4m/s)	Peak Runoff (m^3/s)	Full-bore Capacity (m^3/s)	Utilization Ratio	Check (<100%)
Ex. Storm Drain along Cheung Yip Street	4048735	4048736	4.99	5.05	3.50	3.40	1.04	1.65	28	Pipe	450	280	0.159	1.41	0.113	Existing	1.5	758	758	3.00	0.43	3.43	274.04	1.08	OK	0.058	0.154	37%	OK
	4048736	4048738	5.05	5.00	3.39	3.31	1.21	1.69	20	Pipe	450	250	0.159	1.41	0.113	Existing	1.5	0	758	3.43	0.29	3.73	269.60	1.14	OK	0.057	0.163	35%	OK
	4048738	4048739	5.00	5.00	3.31	3.15	1.24	1.85	26	Pipe	450	163	0.159	1.41	0.113	Existing	1.5	777	1,535	3.73	0.31	4.03	265.25	1.41	OK	0.113	0.202	56%	OK
	4048733	4048734	4.96	4.83	3.50	3.11	1.01	1.72	35	Pipe	450	90	0.159	1.41	0.113	Existing	1.5	348	348	4.03	0.31	4.34	261.16	1.91	OK	0.025	0.273	9%	OK
	4048734	4048739	4.83	4.70	3.26	3.22	0.97	1.48	18	Pipe	600	450	0.283	1.88	0.150	Existing	1.5	213	561	4.34	0.29	4.63	257.46	1.02	OK	0.040	0.260	15%	OK
	4048739	4048742	4.70	4.63	3.22	3.09	0.88	1.54	55	Pipe	600	423	0.283	1.88	0.150	Existing	1.5	263	2,359	4.63	0.87	5.50	247.60	1.05	OK	0.162	0.268	61%	OK
	4048741	4048742	4.63	4.63	3.60	3.57	0.58	1.06	8	Pipe	450	267	0.159	1.41	0.113	Existing	1.5	5,386	5,386	5.50	0.12	5.62	246.35	1.10	OK	0.369	0.158	233%	NOT OK
	4048742	4048743	4.63	4.72	3.02	2.85	0.94	1.87	38	Pipe	675	224	0.358	2.12	0.169	Existing	1.5	5,326	13,070	5.62	0.41	6.03	242.32	1.56	OK	0.880	0.503	175%	NOT OK
Ex. Storm Drain along Wang Chiu Road	4048726	4048728	5.50	5.15	4.31	3.75	0.89	1.40	30	Pipe	300	54	0.071	0.94	0.075	Existing	1.5	329	329	3.00	0.26	3.26	276.76	1.90	OK	0.025	0.121	21%	OK
	4048727	4048728	5.65	5.15	4.21	4.17	1.14	0.98	30	Pipe	300	752	0.071	0.94	0.075	Existing	1.5	482	482	3.00	1.00	4.00	265.71	0.50	NOT OK	0.036	0.032	111%	NOT OK
	4048728	4048729	5.15	5.91	3.76	3.56	1.02	2.35	54	Pipe	375	270	0.110	1.18	0.094	Existing	1.5	238	1,050	4.00	0.92	4.92	254.01	0.97	NOT OK	0.074	0.097	76%	OK
	4048729	4048730	5.91	4.95	3.54	3.22	2.00	1.73	30	Pipe	375	94	0.110	1.18	0.094	Existing	1.5	495	1,545	4.92	0.30	5.22	250.60	1.66	OK	0.108	0.165	65%	OK
	4048730	4048731	4.95	4.64	3.20	3.02	1.38	1.62	40	Pipe	375	222	0.110	1.18	0.094	Existing	1.5	455	2,000	5.22	0.62	5.85	244.13	1.07	OK	0.136	0.107	127%	NOT OK
	4048731	4048732	4.64	5.41	3.02	2.91	1.17	2.50	8	Pipe	450	73	0.159	1.41	0.113	Existing	1.5	233	2,233	5.85	0.06	5.91	243.50	2.12	OK	0.151	0.303	50%	OK
	4048732	4048743	5.41	4.72	2.91	2.87	2.05	1.85	13	Pipe	450	325	0.159	1.41	0.113	Existing	1.5	298	2,531	5.91	0.22	6.13	241.41	1.00	NOT OK	0.170	0.143	119%	NOT OK
Ex. Storm Drain along Hoi Bun Road (Westbound)	4048743	4048744	4.72	4.68	2.85	2.82	1.05	1.86	17	Pipe	825	567	0.535	2.59	0.206	Existing	1.5	427	16,028	6.13	0.25	6.38	239.05	1.11	OK	1.064	0.536	199%	NOT OK
	4048744	4048745	4.68	5.00	2.81	2.59	0.82	2.41	38	Pipe	1050	173	0.866	3.30	0.263	Existing	1.5	442	16,470	6.38	0.27	6.65	236.64	2.35	OK	1.083	1.833	59%	OK
	4048745	4048746	5.00	4.92	2.57	2.39	1.38	2.53	40	Pipe	1050	222	0.866	3.30	0.263	Existing	1.5	1,229	17,700	6.65	0.32	6.97	233.89	2.07	OK	1.150	1.616	71%	OK
	4048746	4048747	4.92	4.30	2.38	2.12	1.49	2.18	47	Pipe	1050	181	0.866	3.30	0.263	Existing	1.5	1,220	18,920	6.97	0.34	7.31	231.11	2.30	OK	1.215	1.792	68%	OK
	4048747	4048748	4.30	4.10	2.11	1.78	1.14	2.32	61	Pipe	1050	185	0.866	3.30	0.263	Existing	1.5	1,124	20,044	7.31	0.45	7.76	227.65	2.27	OK	1.268	1.772	72%	OK
	4048748	4048765	4.10	4.12	1.78	1.22	1.12	2.90	62	Pipe	1200	111	1.131	3.77	0.300	Existing	1.5	944	20,989	7.76	0.32	8.08	225.28	3.20	OK	1.313	3.253	40%	OK
Ex. Storm Drain along Hung Yip Street	4048771	4048774	5.35	4.84	3.61	3.40	1.52	1.44	14	Pipe	225	67	0.040	0.71	0.056	Existing	1.5	321	321	3.00	0.17	3.17	278.37	1.41	OK	0.025	0.050	49%	OK
	4048772	4048773	5.41	5.35	4.31	3.60	0.88	1.75	22	Pipe	225	31	0.040	0.71	0.056	Existing	1.5	466	466	2.00	0.18	2.18	297.10	2.07	OK	0.038	0.074	52%	OK
	4048773	4048774	5.35	4.84	3.60	3.40	1.53	1.44	12	Pipe	225	60	0.040	0.71	0.056	Existing	1.5	0	466	2.18	0.13	2.31	294.24	1.48	OK	0.038	0.053	72%	OK
	4048774	4048775	4.84	4.26	3.40	2.92	1.22	1.34	28	Pipe	225	58	0.040	0.71	0.056	Existing	1.5	2,520	3,307	3.17	0.31	3.48	273.38	1.50	OK	0.251	0.054	466%	NOT OK
	4048775	4048776	4.26	4.13	2.92	2.76	1.12	1.37	21	Pipe	225	131	0.040	0.71	0.056	Existing	1.5	470	3,777	3.48	0.35	3.83	268.16	1.00	OK	0.281	0.036	785%	NOT OK
Ex. Storm Drain along Hoi Bun Road (Eastbound) and Shun Yip Street	4048766	4048767	4.61	4.40	2.83	2.70	1.33	1.70	43	Pipe	450	331	0.159	1.41	0.113	Existing	1.5	223	223	3.00	0.72	3.72	269.63	0.99	NOT OK	0.017	0.142	12%	OK
	4048767	4048768	4.40	4.18	2.70	2.62	1.25	1.56	33	Pipe	450	413	0.159	1.41	0.113	Existing	1.5	608	831	3.72	0.62	4.34	261.08	0.89	NOT OK	0.060	0.127	48%	OK
	4048768	4048769	4.18	4.17	2.62	2.56	1.11	1.61	12	Pipe	450	200	0.159	1.41	0.113	Existing	1.5	428	1,259	4.34	0.16	4.50	259.08	1.27	OK	0.091	0.182	50%	OK
	4048769	4048770	4.17	4.17	2.56	2.54	1.16	1.63	13	Pipe	450	650	0.159	1.41	0.113	Existing	1.5	211	1,469	4.50	0.31	4.81	255.33	0.70	NOT OK	0.104	0.101	103%	NOT OK
	4048770	4048776	4.17	4.13	2.54	2.44	1.18	1.69	47	Pipe	450	470	0.159	1.41	0.113	Existing	1.5	5,770	5,770	4.81	0.94	5.75	245.04	0.83	NOT OK	0.393	0.119	331%	NOT OK
	4048776	4048777	4.13	3.98	2.44	2.15	1.09	1.83	52	Pipe	600	179	0.283	1.88	0.150	Existing	1.5	702	10,248	5.75	0.54	6.29	239.88	1.62	OK	0.683	0.412	166%	NOT OK
	4048777	4048778	3.98	3.92	2.15	1.68	1.23	2.24	46	Pipe	600	98	0.283	1.88	0.150	Existing	1.5	377	10,625	6.29	0.35	6.64	236.74	2.19	OK	0.699	0.558	125%	NOT OK
	4048778	4048785	3.92	3.87	1.68	1.30	1.64	2.57	37	Pipe	600	97	0.283	1.88	0.150	Existing	1.5	306	10,931	6.64	0.28	6.92	234.33	2.20	OK	0.712	0.560	127%	NOT OK

ARUP

Job No.	Sheet No.	Rev.
237938		

Member/Location

Drg. Ref.

Job Title: Planning and Engineering Study - KBAA

Calculation: Hydraulic Assessment of Existing Drainage System - Existing Flow

Made by: CK | Date: 06/2021 | Chd.: YL

Design Rainfall Return Period 50 yr Text in dark red Data extracted from EK Model

With climate change effect up to mid 21st century

EK5 Site Area

Drainage System									Pipe/Channel/BC														Pipeworks Design					
																							Velocity		Capacity			
Description	US MH No.	DS MH No.	USGL (mPD)	DSGL (mPD)	USIL (mPD)	DSIL (mPD)	USCL (mPD)	DSCL (mPD)	Length (m)	Type (UC/Pipe /BC/RC)	Diameter of Pipe/Channel (mm)	Gradient (1 in)	Area (m^2)	Perimeter (m)	Hydraulic Radius (m)	Existing / Proposed	Roughness Coefficient (mm, For Pipe only)	Additional Effective Catchment Area (m^2)	Cumulative Effective Catchment Area (m^2)	t_{in} (min)	t_f (min)	t_c (min)	Intensity (mm/hr)	Full-bore (m/s)	Check for Pipe (1~4m/s)	Peak Runoff (m^3/s)	Full-bore Capacity (m^3/s)	Utilization Ratio	Check (<100%)
Lot 1	4048577	4048638	4.50	4.42	2.98	2.84	1.30	1.58	21	Pipe	225	156	0.040	0.71	0.056	Existing	1.5	6,009	6,009	3.00	0.38	3.38	274.88	0.92	NOT OK	0.459	0.033	1395%	NOT OK
	4048585	4048586	4.55	4.43	2.93	2.61	1.17	1.82	31	Pipe	450	97	0.159	1.41	0.113	Existing	1.5	4,574	4,574	3.00	0.28	3.28	276.46	1.83	OK	0.351	0.262	134%	NOT OK
	4048586	4048590	4.43	4.50	2.46	2.35	1.37	2.15	22	Pipe	600	200	0.283	1.88	0.150	Existing	1.5	125	4,699	3.28	0.24	3.52	272.69	1.53	OK	0.356	0.390	91%	OK
	4048590	4077780	4.50	4.51	2.35	2.30	1.55	2.21	7	Pipe	600	140	0.283	1.88	0.150	Existing	1.5	484	5,183	3.52	0.06	3.58	271.71	1.83	OK	0.391	0.467	84%	OK
	4077780	4048587	4.51	4.52	2.30	2.19	1.61	2.33	12	Pipe	600	109	0.283	1.88	0.150	Existing	1.5	275	5,459	3.58	0.10	3.68	270.27	2.08	OK	0.410	0.529	78%	OK
	4048587	4048588	4.52	4.68	2.19	2.11	1.73	2.57	9	Pipe	600	113	0.283	1.88	0.150	Existing	1.5	247	5,705	3.68	0.07	3.75	269.19	2.05	OK	0.427	0.521	82%	OK
	4048588	4048636	4.68	4.67	1.20	1.19	2.13	3.48	16	Pipe	1350	1600	1.431	4.24	0.338	Existing	1.5	304	6,009	3.75	0.30	4.05	265.01	0.90	NOT OK	0.442	1.161	38%	OK
Lot 2	4048625	4048631	4.80	4.30	1.99	1.94	1.76	2.36	24	Pipe	1050	480	0.866	3.30	0.263	Existing	1.5	18,453	18,453	4.00	0.28	4.28	261.87	1.41	OK	1.342	1.098	122%	NOT OK
	4048627	4048628	4.80	4.50	2.58	2.52	1.62	1.98	24	Pipe	600	400	0.283	1.88	0.150	Existing	1.5	2,759	2,759	3.00	0.37	3.37	275.05	1.08	OK	0.211	0.275	77%	OK
	4048628	4048629	4.50	4.10	2.37	2.30	1.38	1.80	29	Pipe	750	414	0.442	2.36	0.188	Existing	1.5	37	2,796	3.37	0.39	3.76	269.05	1.23	OK	0.209	0.488	43%	OK
	4048629	4048630	4.10	4.10	2.30	2.26	1.05	1.84	13	Pipe	750	325	0.442	2.36	0.188	Existing	1.5	32	2,828	3.76	0.16	3.92	266.81	1.39	OK	0.210	0.551	38%	OK
	4048630	4048631	4.10	4.10	2.26	2.24	1.09	1.86	4.5	Pipe	750	225	0.442	2.36	0.188	Existing	1.5	25	2,853	3.92	0.05	3.97	266.18	1.67	OK	0.211	0.662	32%	OK
Lot 3	4048505	4048506	4.80	4.50	3.33	3.00	1.10	1.50	40	Pipe	375	123	0.110	1.18	0.094	Existing	1.5	1,595	1,595	3.00	0.46	3.46	273.61	1.45	OK	0.121	0.144	84%	OK
	4048506	4048507	4.50	4.10	3.00	2.60	1.05	1.50	50	Pipe	450	125	0.159	1.41	0.113	Existing	1.5	2,324	3,919	3.46	0.52	3.98	266.00	1.61	OK	0.290	0.231	125%	NOT OK
	4048507	4048508	4.10	4.10	2.60	2.51	1.05	1.59	11	Pipe	450	122	0.159	1.41	0.113	Existing	1.5	716	4,636	3.98	0.11	4.09	264.46	1.63	OK	0.341	0.234	146%	NOT OK
	4048508	4048509	4.10	4.10	2.50	2.41	1.15	1.69	9.5	Pipe	450	106	0.159	1.41	0.113	Existing	1.5	150	4,785	4.09	0.09	4.18	263.24	1.76	OK	0.350	0.251	139%	NOT OK
Lot 3 & 4	4048603	4048614	4.26	4.32	2.46	2.35	1.05	1.97	45	Pipe	750	409	0.442	2.36	0.188	Existing	1.5	7,808	7,808	4.18	0.61	4.79	255.59	1.23	OK	0.554	0.491	113%	NOT OK
	4048614	4048615	4.32	4.28	1.87	1.83	1.25	2.45	22	Pipe	1200	550	1.131	3.77	0.300	Existing	1.5	5,002	12,810	4.79	0.26	5.04	252.61	1.43	OK	0.899	1.457	62%	OK
	4048615	4048616	4.28	4.48	1.83	1.74	1.25	2.74	45	Pipe	1200	500	1.131	3.77	0.300	Existing	1.5	180	12,990	5.04	0.50	5.54	247.18	1.50	OK	0.892	1.528	58%	OK
	4048616	4077782	4.48	4.46	1.74	1.70	1.54	2.76	18	Pipe	1200	450	1.131	3.77	0.300	Existing	1.5	365	13,354	5.54	0.19	5.73	245.24	1.58	OK	0.910	1.611	56%	OK
	4077782	4077783	4.46	4.48	1.70	1.66	1.56	2.82	12	Pipe	1200	300	1.131	3.77	0.300	Existing	1.5	0	13,354	5.73	0.10	5.84	244.21	1.94	OK	0.906	1.974	46%	OK
	4077783	4048617	4.48	4.60	1.66	1.63	1.62	2.97	14	Pipe	1200	467	1.131	3.77	0.300	Existing	1.5	0	13,354	5.84	0.15	5.99	242.74	1.55	OK	0.900	1.582	57%	OK
	4048617	4048618	4.60	4.52	1.63	1.40	1.77	3.12	7	Pipe	1200	30	1.131	3.77	0.300	Existing	1.5	787	14,141	5.99	0.02	6.01	242.55	6.10	NOT OK	0.953	6.210	15%	OK
	4048618	4048619	4.52	4.65	1.40	1.27	2.52	3.38	5	Pipe	600	38	0.283	1.88	0.150	Existing	1.5	164	14,305	6.01	0.02	6.03	242.33	3.50	OK	0.963	1.783	54%	OK
	4048619	4048635	4.65	4.66	1.27	1.25	2.18	3.41	6	Pipe	1200	300	1.131	3.77	0.300	Existing	1.5	0	14,305	6.03	0.05	6.08	241.83	1.94	OK	0.961	1.974	49%	OK
Lot 5	4048441	4048457	4.47	4.47	2.18	2.11	1.39	2.36	45	Pipe	900	643	0.636	2.83	0.225	Existing	1.5	7,833	7,833	3.00	0.68	3.68	270.29	1.10	OK	0.588	0.632	93%	OK
	4048457	4048458	4.47	4.30	2.11	1.90	1.46	2.40	45	Pipe	900	214	0.636	2.83	0.225	Existing	1.5	5,404	13,236	3.68	0.39	4.07	264.72	1.92	OK	0.973	1.097	89%	OK
	4048458	4048459	4.30	4.28	1.90	1.81	1.50	2.47	50	Pipe	900	556	0.636	2.83	0.225	Existing	1.5	6,726	19,962	4.07	0.70	4.77	255.77	1.19	OK	1.418	0.680	209%	NOT OK
	4048459	4048462	4.28	4.28	1.68	1.55	1.40	2.73	63	Pipe	1200	485	1.131	3.77	0.300	Existing	1.5	1,814	21,776	4.77	0.69	5.46	248.05	1.52	OK	1.500	1.552	97%	OK

ARUP

Job No.	Sheet No.	Rev.
237938		

Member/Location

Job Title: Planning and Engineering Study - KBAA

Drg. Ref.

Calculation: Hydraulic Assessment of Proposed Drainage System - Proposed Flow

Made by: CK | Date: 06/2021 | Chd.: YL

Design Rainfall Return Period 50 yr — Text in dark red: Data extracted from EK Model

With climate change effect up to mid 21st century — Upgrading of existing drainage system

EK4 Site Area

Drainage System									Pipe/Channel/BC														Pipeworks Design					
																							Velocity		Capacity			
Description	US MH No.	DS MH No.	USGL (mPD)	DSGL (mPD)	USIL (mPD)	DSIL (mPD)	USCL (mPD)	DSCL (mPD)	Length (m)	Type (UC/Pipe /BC/RC)	Diameter of Pipe/Channel (mm)	Gradient (1 in)	Area (m^2)	Perimeter (m)	Hydraulic Radius (m)	Existing / Proposed	Roughness Coefficient (mm, For Pipe only)	Additional Effective Catchment Area (m^2)	Cumulative Effective Catchment Area (m^2)	t_{in} (min)	t_f (min)	t_c (min)	Intensity (mm/hr)	Full-bore (m/s)	Check for Pipe (1~4m/s)	Peak Runoff (m^3/s)	Full-bore Capacity (m^3/s)	Utilization Ratio	Check (<100%)
Ex. Storm Drain along Cheung Yip Street	4048735	4048736	4.99	5.05	3.50	3.40	1.04	1.65	28	Pipe	450	280	0.159	1.41	0.113	Existing	1.5	758	758	3.00	0.43	3.43	274.04	1.08	OK	0.058	0.154	37%	OK
	4048736	4048738	5.05	5.00	3.39	3.31	1.21	1.69	20	Pipe	450	250	0.159	1.41	0.113	Existing	1.5	0	758	3.43	0.29	3.73	269.60	1.14	OK	0.057	0.163	35%	OK
	4048738	4048739	5.00	5.00	3.31	3.15	1.24	1.85	26	Pipe	450	163	0.159	1.41	0.113	Existing	1.5	777	1,535	3.73	0.31	4.03	265.25	1.41	OK	0.113	0.202	56%	OK
	4048733	4048734	4.96	4.83	3.50	3.11	1.01	1.72	35	Pipe	450	90	0.159	1.41	0.113	Existing	1.5	348	348	4.03	0.31	4.34	261.16	1.91	OK	0.025	0.273	9%	OK
	4048734	4048739	4.83	4.70	3.26	3.22	0.97	1.48	18	Pipe	600	450	0.283	1.88	0.150	Existing	1.5	213	561	4.34	0.29	4.63	257.46	1.02	OK	0.040	0.260	15%	OK
	4048739	4048742	4.70	4.63	3.22	3.09	0.88	1.54	55	Pipe	600	423	0.283	1.88	0.150	Existing	1.5	263	2,359	4.63	0.87	5.50	247.60	1.05	OK	0.162	0.268	61%	OK
	4048741	4048742	4.63	4.63	3.60	3.57	0.36	1.06	8	Pipe	675	267	0.358	2.12	0.169	Proposed	1.5	5,386	5,386	5.50	0.09	5.60	246.63	1.43	OK	0.369	0.461	80%	OK
	4048742	4048743	4.63	4.72	3.02	2.85	0.56	1.87	38	Pipe	1050	224	0.866	3.30	0.263	Proposed	1.5	5,326	13,070	5.60	0.31	5.90	243.55	2.07	OK	0.884	1.611	55%	OK
Ex. Storm Drain along Wang Chiu Road	4048726	4048728	5.50	5.15	4.31	3.75	0.89	1.40	30	Pipe	300	54	0.071	0.94	0.075	Existing	1.5	329	329	3.00	0.26	3.26	276.76	1.90	OK	0.025	0.121	21%	OK
	4048727	4048728	5.65	5.15	4.21	4.17	1.14	0.98	30	Pipe	300	752	0.071	0.94	0.075	Existing	1.5	482	482	3.00	1.00	4.00	265.71	0.50	NOT OK	0.036	0.032	111%	NOT OK
	4048728	4048729	5.15	5.91	3.76	3.56	1.02	2.35	54	Pipe	375	270	0.110	1.18	0.094	Existing	1.5	238	1,050	4.00	0.92	4.92	254.01	0.97	NOT OK	0.074	0.097	76%	OK
	4048729	4048730	5.91	4.95	3.54	3.22	2.00	1.73	30	Pipe	375	94	0.110	1.18	0.094	Existing	1.5	495	1,545	4.92	0.30	5.22	250.60	1.66	OK	0.108	0.165	65%	OK
	4048730	4048731	4.95	4.64	3.20	3.02	1.38	1.62	40	Pipe	375	222	0.110	1.18	0.094	Existing	1.5	455	2,000	5.22	0.62	5.85	244.13	1.07	OK	0.136	0.107	127%	NOT OK
	4048731	4048732	4.64	5.41	3.02	2.91	1.17	2.50	8	Pipe	450	73	0.159	1.41	0.113	Existing	1.5	233	2,233	5.85	0.06	5.91	243.50	2.12	OK	0.151	0.303	50%	OK
	4048732	4048743	5.41	4.72	2.91	2.87	2.05	1.85	13	Pipe	450	325	0.159	1.41	0.113	Existing	1.5	298	2,531	5.91	0.22	6.13	241.41	1.00	NOT OK	0.170	0.143	119%	NOT OK
Ex. Storm Drain along Hoi Bun Road (Westbound)	4048743	4048744	4.72	4.68	2.85	2.81	0.82	1.87	17	Pipe	1050	425	0.866	3.30	0.263	Proposed	1.5	427	16,028	6.13	0.19	6.31	239.65	1.50	OK	1.067	1.167	91%	OK
	4048744	4048745	4.68	5.00	2.81	2.59	0.82	2.41	38	Pipe	1050	173	0.866	3.30	0.263	Existing	1.5	442	16,470	6.31	0.27	6.58	237.22	2.35	OK	1.085	1.833	59%	OK
	4048745	4048746	5.00	4.92	2.57	2.39	1.38	2.53	40	Pipe	1050	222	0.866	3.30	0.263	Existing	1.5	1,229	17,700	6.58	0.32	6.91	234.44	2.07	OK	1.153	1.616	71%	OK
	4048746	4048747	4.92	4.30	2.38	2.12	1.49	2.18	47	Pipe	1050	181	0.866	3.30	0.263	Existing	1.5	1,220	18,920	6.91	0.34	7.25	231.63	2.30	OK	1.217	1.792	68%	OK
	4048747	4048748	4.30	4.10	2.11	1.78	1.14	2.32	61	Pipe	1050	185	0.866	3.30	0.263	Existing	1.5	1,124	20,044	7.25	0.45	7.69	228.15	2.27	OK	1.270	1.772	72%	OK
	4048748	4048765	4.10	4.12	1.78	1.22	1.12	2.90	62	Pipe	1200	111	1.131	3.77	0.300	Existing	1.5	944	20,989	7.69	0.32	8.02	225.75	3.20	OK	1.316	3.253	40%	OK
Ex. Storm Drain along Hung Yip Street	4048771	4048774	5.35	4.84	3.61	3.40	1.52	1.44	14	Pipe	225	67	0.040	0.71	0.056	Existing	1.5	321	321	3.00	0.17	3.17	278.37	1.41	OK	0.025	0.050	49%	OK
	4048772	4048773	5.41	5.35	4.31	3.60	0.88	1.75	22	Pipe	225	31	0.040	0.71	0.056	Existing	1.5	466	466	2.00	0.18	2.18	297.10	2.07	OK	0.038	0.074	52%	OK
	4048773	4048774	5.35	4.84	3.60	3.40	1.53	1.44	12	Pipe	225	60	0.040	0.71	0.056	Existing	1.5	0	466	2.18	0.13	2.31	294.24	1.48	OK	0.038	0.053	72%	OK
	4048774	4048775	4.84	4.26	3.40	2.92	1.22	1.34	28	Pipe	225	58	0.040	0.71	0.056	Existing	1.5	0	787	3.17	0.31	3.48	273.38	1.50	OK	0.060	0.054	111%	NOT OK
	4048775	4048776	4.26	4.13	2.92	2.76	1.12	1.37	21	Pipe	225	131	0.040	0.71	0.056	Existing	1.5	470	1,257	3.48	0.35	3.83	268.16	1.00	OK	0.094	0.036	261%	NOT OK
Ex. Storm Drain along Hoi Bun Road (Eastbound) and Shun Yip Street	4048766	4048767	4.61	4.40	2.83	2.70	1.33	1.70	43	Pipe	450	331	0.159	1.41	0.113	Existing	1.5	223	223	3.00	0.72	3.72	269.63	0.99	NOT OK	0.017	0.142	12%	OK
	4048767	4048768	4.40	4.18	2.70	2.62	1.25	1.56	33	Pipe	450	413	0.159	1.41	0.113	Existing	1.5	608	831	3.72	0.62	4.34	261.08	0.89	NOT OK	0.060	0.127	48%	OK
	4048768	4048769	4.18	4.17	2.62	2.56	1.11	1.61	12	Pipe	450	200	0.159	1.41	0.113	Existing	1.5	428	1,259	4.34	0.16	4.50	259.08	1.27	OK	0.091	0.182	50%	OK
	4048769	4048770	4.17	4.17	2.56	2.54	1.16	1.63	13	Pipe	450	650	0.159	1.41	0.113	Existing	1.5	211	1,469	4.50	0.31	4.81	255.33	0.70	NOT OK	0.104	0.101	103%	NOT OK
	4048770	4048776	4.17	4.13	2.04	1.94	1.38	2.19	47	Pipe	750	470	0.442	2.36	0.188	Proposed	1.5	5,770	5,770	4.81	0.68	5.49	247.75	1.15	OK	0.397	0.458	87%	OK
	4048776	4048777	4.13	3.98	1.94	1.75	1.37	2.23	52	Pipe	825	274	0.535	2.59	0.206	Proposed	1.5	3,222	10,248	5.49	0.54	6.03	242.32	1.60	OK	0.690	0.772	89%	OK
	4048777	4048778	3.98	3.92	1.75	1.48	1.41	2.44	46	Pipe	825	170	0.535	2.59	0.206	Proposed	1.5	377	10,625	6.03	0.38	6.41	238.80	2.03	OK	0.705	0.979	72%	OK
	4048778	4048785	3.92	3.87	1.48	1.30	1.62	2.57	37	Pipe	825	206	0.535	2.59	0.206	Proposed	1.5	306	10,931	6.41	0.33	6.74	235.85	1.85	OK	0.716	0.891	80%	OK

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Job No.	Sheet No.	Rev.
237938		

Member/Location

Drg. Ref.

Job Title: Planning and Engineering Study - KBAA

Calculation: Hydraulic Assessment of Proposed Drainage System - Proposed Flow

Made by: CK | Date: 06/2021 | Chd.: YL

Design Rainfall Return Period 50 yr — Text in dark red: Data extracted from EK Model

With climate change effect up to mid 21st century — Upgrading of existing drainage system

EK5 Site Area

Drainage System									Pipe/Channel/BC														Pipeworks Design					
																							Velocity		Capacity			
Description	US MH No.	DS MH No.	USGL (mPD)	DSGL (mPD)	USIL (mPD)	DSIL (mPD)	USCL (mPD)	DSCL (mPD)	Length (m)	Type (UC/Pipe /BC/RC)	Diameter of Pipe/Channel (mm)	Gradient (1 in)	Area (m^2)	Perimeter (m)	Hydraulic Radius (m)	Existing / Proposed	Roughness Coefficient (mm, For Pipe only)	Additional Effective Catchment Area (m^2)	Cumulative Effective Catchment Area (m^2)	t_{in} (min)	t_f (min)	t_c (min)	Intensity (mm/hr)	Full-bore (m/s)	Check for Pipe (1~4m/s)	Peak Runoff (m^3/s)	Full-bore Capacity (m^3/s)	Utilization Ratio	Check (<100%)
Lot 1	4048577	4048638	4.50	4.42	2.45	2.35	1.30	2.07	21	Pipe	750	210	0.442	2.36	0.188	Proposed	1.5	6,009	6,009	3.00	0.20	3.20	277.75	1.72	OK	0.464	0.686	68%	OK
	4048585	4048586	4.55	4.43	2.93	2.61	1.02	1.82	31	Pipe	600	97	0.283	1.88	0.150	Proposed	1.5	4,574	4,574	3.00	0.23	3.23	277.24	2.20	OK	0.352	0.561	63%	OK
	4048586	4048590	4.43	4.50	2.46	2.35	1.37	2.15	22	Pipe	600	200	0.283	1.88	0.150	Existing	1.5	125	4,699	3.23	0.24	3.47	273.42	1.53	OK	0.357	0.390	91%	OK
	4048590	4077780	4.50	4.51	2.35	2.30	1.55	2.21	7	Pipe	600	140	0.283	1.88	0.150	Existing	1.5	484	5,183	3.47	0.06	3.54	272.44	1.83	OK	0.392	0.467	84%	OK
	4077780	4048587	4.51	4.52	2.30	2.19	1.61	2.33	12	Pipe	600	109	0.283	1.88	0.150	Existing	1.5	275	5,459	3.54	0.10	3.63	270.98	2.08	OK	0.411	0.529	78%	OK
	4048587	4048588	4.52	4.68	2.19	2.11	1.73	2.57	9	Pipe	600	113	0.283	1.88	0.150	Existing	1.5	247	5,705	3.63	0.07	3.71	269.89	2.05	OK	0.428	0.521	82%	OK
	4048588	4048636	4.68	4.67	1.20	1.19	2.13	3.48	16	Pipe	1350	1600	1.431	4.24	0.338	Existing	1.5	304	6,009	3.71	0.30	4.00	265.66	0.90	NOT OK	0.443	1.161	38%	OK
Lot 2	4048625	4048631	4.80	4.30	1.99	1.94	1.46	2.36	24	Pipe	1350	480	1.431	4.24	0.338	Proposed	1.5	18,453	18,453	4.00	0.24	4.24	262.42	1.65	OK	1.345	2.125	63%	OK
	4048627	4048628	4.80	4.50	2.58	2.52	1.62	1.98	24	Pipe	600	400	0.283	1.88	0.150	Existing	1.5	2,759	2,759	3.00	0.37	3.37	275.05	1.08	OK	0.211	0.275	77%	OK
	4048628	4048629	4.50	4.10	2.37	2.30	1.38	1.80	29	Pipe	750	414	0.442	2.36	0.188	Existing	1.5	37	2,796	3.37	0.39	3.76	269.05	1.23	OK	0.209	0.488	43%	OK
	4048629	4048630	4.10	4.10	2.30	2.26	1.05	1.84	13	Pipe	750	325	0.442	2.36	0.188	Existing	1.5	32	2,828	3.76	0.16	3.92	266.81	1.39	OK	0.210	0.551	38%	OK
	4048630	4048631	4.10	4.10	2.26	2.24	1.09	1.86	4.5	Pipe	750	225	0.442	2.36	0.188	Existing	1.5	25	2,853	3.92	0.05	3.97	266.18	1.67	OK	0.211	0.662	32%	OK
Lot 3	4048505	4048506	4.80	4.50	3.33	3.00	1.10	1.50	40	Pipe	375	123	0.110	1.18	0.094	Existing	1.5	556	556	3.00	0.46	3.46	273.61	1.45	OK	0.042	0.144	29%	OK
	4048506	4048507	4.50	4.10	3.00	2.60	1.05	1.50	50	Pipe	450	125	0.159	1.41	0.113	Existing	1.5	907	1,463	3.46	0.52	3.98	266.00	1.61	OK	0.108	0.231	47%	OK
	4048507	4048508	4.10	4.10	2.60	2.51	0.90	1.59	11	Pipe	600	122	0.283	1.88	0.150	Proposed	1.5	3,172	4,636	3.98	0.09	4.07	264.72	1.96	OK	0.341	0.499	68%	OK
	4048508	4048509	4.10	4.10	2.50	2.41	1.00	1.69	9.5	Pipe	600	106	0.283	1.88	0.150	Proposed	1.5	150	4,785	4.07	0.07	4.15	263.70	2.11	OK	0.351	0.537	65%	OK
Lot 3 & 4	4048603	4048614	4.26	4.32	2.46	2.35	0.90	1.97	45	Pipe	900	409	0.636	2.83	0.225	Proposed	1.5	7,808	7,808	4.15	0.54	4.69	256.79	1.39	OK	0.557	0.793	70%	OK
	4048614	4048615	4.32	4.28	1.87	1.83	1.25	2.45	22	Pipe	1200	550	1.131	3.77	0.300	Existing	1.5	5,002	12,810	4.69	0.26	4.94	253.76	1.43	OK	0.903	1.457	62%	OK
	4048615	4048616	4.28	4.48	1.83	1.74	1.25	2.74	45	Pipe	1200	500	1.131	3.77	0.300	Existing	1.5	180	12,990	4.94	0.50	5.44	248.24	1.50	OK	0.896	1.528	59%	OK
	4048616	4077782	4.48	4.46	1.74	1.70	1.54	2.76	18	Pipe	1200	450	1.131	3.77	0.300	Existing	1.5	365	13,354	5.44	0.19	5.63	246.26	1.58	OK	0.914	1.611	57%	OK
	4077782	4077783	4.46	4.48	1.70	1.66	1.56	2.82	12	Pipe	1200	300	1.131	3.77	0.300	Existing	1.5	0	13,354	5.63	0.10	5.74	245.22	1.94	OK	0.910	1.974	46%	OK
	4077783	4048617	4.48	4.60	1.66	1.63	1.62	2.97	14	Pipe	1200	467	1.131	3.77	0.300	Existing	1.5	0	13,354	5.74	0.15	5.89	243.72	1.55	OK	0.904	1.582	57%	OK
	4048617	4048618	4.60	4.52	1.63	1.40	1.77	3.12	7	Pipe	1200	30	1.131	3.77	0.300	Existing	1.5	787	14,141	5.89	0.02	5.91	243.53	6.10	NOT OK	0.957	6.210	15%	OK
	4048618	4048619	4.52	4.65	1.40	1.27	2.52	3.38	5	Pipe	600	38	0.283	1.88	0.150	Existing	1.5	164	14,305	5.91	0.02	5.93	243.30	3.50	OK	0.967	1.783	54%	OK
	4048619	4048635	4.65	4.66	1.27	1.25	2.18	3.41	6	Pipe	1200	300	1.131	3.77	0.300	Existing	1.5	0	14,305	5.93	0.05	5.98	242.80	1.94	OK	0.965	1.974	49%	OK
Lot 5	4048441	4048457	4.47	4.47	2.18	2.11	1.39	2.36	45	Pipe	900	643	0.636	2.83	0.225	Existing	1.5	7,833	7,833	3.00	0.68	3.68	270.29	1.10	OK	0.588	0.632	93%	OK
	4048457	4048458	4.47	4.30	2.11	1.90	1.46	2.40	45	Pipe	900	214	0.636	2.83	0.225	Existing	1.5	5,404	13,236	3.68	0.39	4.07	264.72	1.92	OK	0.973	1.097	89%	OK
	4048458	4048459	4.30	4.28	1.90	1.81	1.20	2.47	50	Pipe	1200	556	1.131	3.77	0.300	Proposed	1.5	6,726	19,962	4.07	0.59	4.66	257.18	1.42	OK	1.426	1.449	98%	OK
	4048459	4048462	4.28	4.28	1.68	1.55	1.40	2.73	63	Pipe	1200	485	1.131	3.77	0.300	Existing	1.5	1,814	21,776	4.66	0.69	5.34	249.29	1.52	OK	1.508	1.552	97%	OK

Agreement No. CE 4/2014(TP)

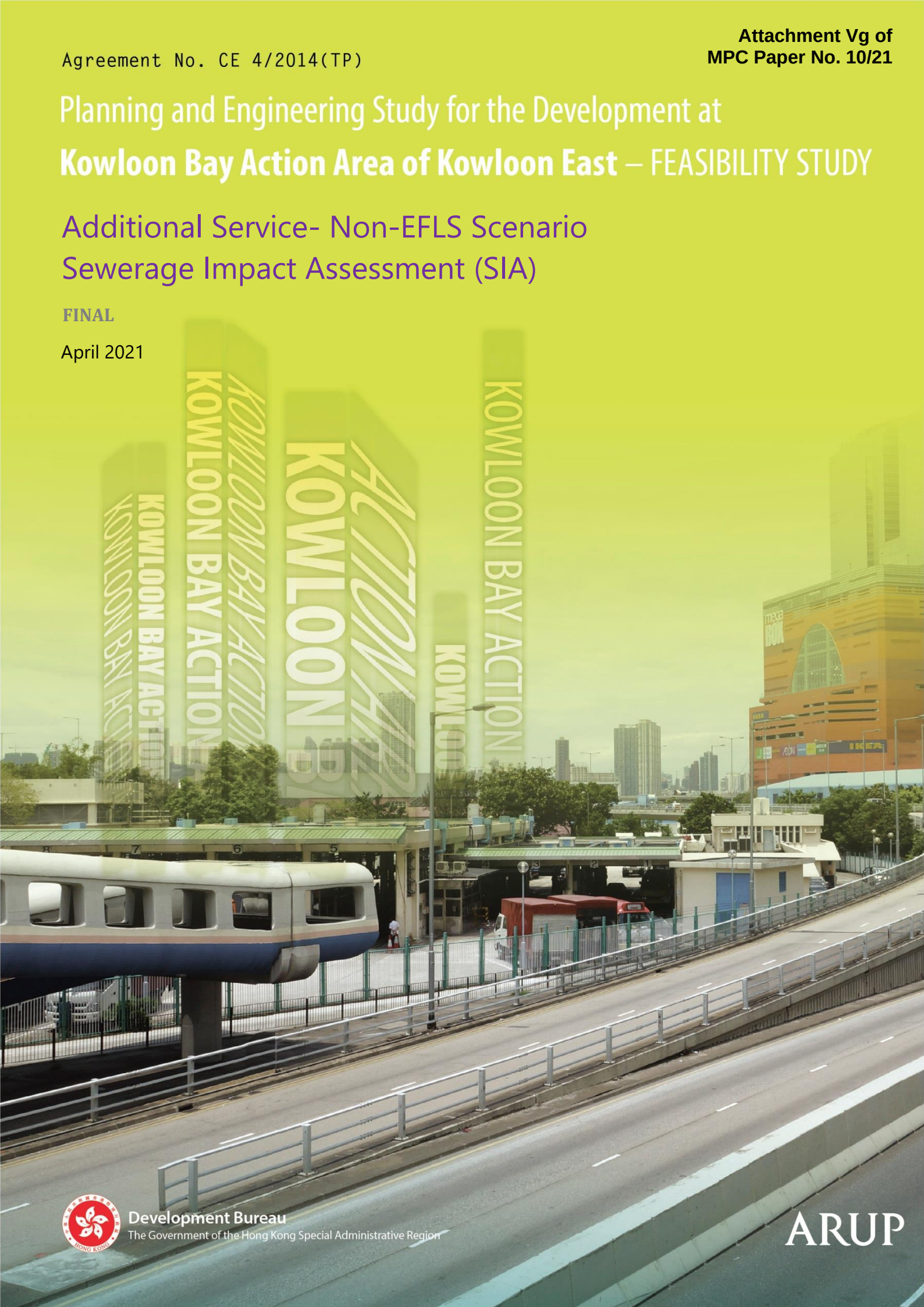
Attachment Vg of MPC Paper No. 10/21

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – FEASIBILITY STUDY

Additional Service- Non-EFLS Scenario Sewerage Impact Assessment (SIA)

FINAL

April 2021



Development Bureau
The Government of the Hong Kong Special Administrative Region

ARUP

Energizing Kowloon East Office, Development Bureau

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study

Additional Service -- Non- EFLS Scenario Sewerage Impact Assessment (SIA)

Agreement No. CE 4/2014 (TP)

Final | April 2021

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

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

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ARUP

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Appendices

Appendix A Sewage Flow Estimation
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Figures

Figure 1.2.1 Study Area and Area of Influence
Figure 1.2.2 Development Sites of KBAA
Figure 2.1.1 Recommended Outline Development Plan
Figure 3.2.1 Existing Trunk Sewer along Hoi Bun Road (in-text)

Drawings

Drawing No. 237938/FS/001 PDZ Zones within Kwun Tong PTW Catchments For Ultimate Scenario
Drawing No. 237938/FS/011 Existing, Planned and Proposed Sewerage System (Sheet 1 of 2)
Drawing No. 237938/FS/012 Existing, Planned and Proposed Sewerage System (Sheet 2 of 2)

Acronym

ACC	Arts, Cultural and Creative
DN	Nominal Diameter
DIA	Drainage Impact Assessment
DSD	Drainage Services Department
EKEO	Energizing Kowloon East Office
EPD	Environmental Protection Department
GFA	Gross Floor Area
HKPSG	Hong Kong Planning Standards and Guidelines
HyD	Highway Department
ORRC	Organic Resources Recovery Centre
KBAA	Kowloon Bay Action Area
KBBA	Kowloon Bay Business Area
KE	Kowloon East
KTD	Kai Tak Development
KTIPS	Kwun Tong Intermediate Pumping Station
KTPTW	Kwun Tong Preliminary Treatment Works
SIA	Sewerage Impact Assessment

1 Introduction

1.1 Study Background

1.1.1.1 Kowloon East (KE) is an area comprising the former Kai Tak Airport, Kwun Tong Business Area (KTBA) and Kowloon Bay Business Areas (KBBA). This area witnessed the rapid growth of an important industrial base in the heyday of Hong Kong's manufacturing industry, creating hundreds of thousands of jobs and propelling Hong Kong's prosperity. Following relocation of the Airport to Chek Lap Kok and our manufacturing base to the Mainland, a huge stock of industrial buildings was not being fully utilised. On the other hand, with the continuing boom of Hong Kong's financial and service sectors as well as large numbers of regional headquarters and regional offices of multi-national companies setting their foothold in Hong Kong, the demand for quality offices can no longer be met by our traditional Central Business District (CBD). Some private developers have developed high-grade office buildings and retail centres in KE. About 1.4 million m^2 office floor space have been completed in 2011.

1.1.1.2 In 2001, all industrial land in Kwun Tong and Kowloon Bay was rezoned to "Other Specified Uses (Business)" ("OU(Business)"). The "OU(Business)" zone allows industrial premises to be converted to office use and industrial buildings redeveloped for commercial/office uses. In April 2010, the Government also introduced measures to revitalise industrial buildings in Hong Kong. It is anticipated that, together with the new commercial/office space to be provided in Kai Tak Development (KTD) area, the total commercial/office space in Kowloon East has the potential to increase from the current 2.0 million sqm to 7.0 million sqm in the future. Kowloon East has great potential to evolve into a vibrant premier business district in Hong Kong.

1.1.1.3 In the 2011-12 Policy Address, the Chief Executive (CE) announced that the Government would adopt a visionary, coordinated and integrated approach to expedite the transformation of KE into an attractive, alternative CBD to support Hong Kong's economic development. Energizing Kowloon East Office (EKEO) was therefore set up in the Development Bureau (DevB) to undertake initiatives of land use review, urban design, improved connectivity and the associated infrastructure

1.1.1.4 The initial proposals for Energizing Kowloon East are formulated under the CBD^2 strategy, with main focus on enhancing Connectivity, Branding, Design and Diversity. These proposals are consolidated on the Conceptual Master Plan (CMP) version 2.0 issued on 7 June 2012 and further refinement of the CMP was promulgated in January 2015 (version 4.0) taking on board suggestions during the ongoing public engagement process and new opportunities identified.

1.1.1.5 One of the key tasks of EKEO is to proactively review the development and design options of undeveloped/under-developed Government sites with guidance of the CBD^2 strategy. Releasing the development

potential of KBAA which is at the core area of KE, for mixed development will bring great vibrancy to the region. The Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study (the Study) is therefore commissioned to review, investigate, and produce feasible development options and implementation strategy to optimise the development potential of KBAA in terms of its strategic setting, constraints and opportunities.

1.2 Study Area

1.2.1.1 The Study Area (**Figure 1.2.1**) covers the existing Government sites in KBAA which include the area currently occupied by Transport Department (TD)'s two Vehicle Examination Centres (VECs), Environmental Protection Department (EPD)'s waste recycling centre[1], Highway Departments (HyD)'s maintenance depot, Hong Kong Police Force (HKPF)'s proposed police vehicle pound and the areas of roads, pedestrian walkways, sitting-out area and amenity areas in between. The area is mainly bounded by Sheung Yee Road in the North, Wai Yip Street in the East and the edge of Kwun Tong Bypass and the adjoining amenity areas in the West and South next to KTD. It has an area of about 17 ha including the areas of roads, pedestrian walkways, sitting-out area and amenity areas.

1.2.1.2 The Study Area is mainly zoned for "Government, Institution or Community (1)" ("G/IC(1)"), "Other Specified Uses (Refuse Transfer Station)" ("OU(Refuse Transfer Station)"), "Other Specified Uses (Business)" ("OU(Business)") and "Road" uses.

1.2.1.3 The Study Area is divided into six development sites, namely Lots 1 to 6 (**Figure 1.2.2**). The Kai Fuk Road flyover (Lot 3) literally bisected KBAA into the northern and southern portion. The northern cluster consists of the highway maintenance depot (part of area underneath the Flyover at Lot 3), a police vehicle detention and examination centre (Lot 1) and was previously occupied the former waste recycling centre (Lot 2), whereas the southern cluster by two vehicle examination centres (VECs) (Lot 4). Within KBAA, two lots zoned "OU(Business)" namely the New Kowloon Inland Lots (NKILs) 6512 (Lot 6) and 6313 (Lot 5) were sold in January and May 2015 and the respective commercial development has been completed in 2019.

1.3 Purpose of this Report

1.3.1.1 The purposes of this report include:

- to take cognisance of the existing, committed and planned developments which may have bearing on the development;
- to derive the sewage flow and load projection arising from the developments in the Study Area;
- to assess the likely impacts of the proposed developments on the existing sewerage system including sewage treatment plant, public

[1] The waste recycling center has been demolished in Q1 2021

sewer system and disposal facilities and the requirements for capacity improvements and the extent of impact;

- to carry out schematic design of the sewer arising from the development including carrying out all necessary hydraulic analysis to substantiate the proposed sewer scheme;
- to formulate sewerage connection points and details for the proposed developments to illustrate the hydraulic feasibility of the proposed connection points;
- to formulate and recommend suitable mitigation measures including necessary improvement/upgrading/diversion works to existing and planned sewerage systems for the proposed developments;
- to enable an agreement in principle to be reached with DSD and EPD in respect of mitigation and protection schemes, diversion schemes, re-provisioning works and/or modifications of facilities for incorporation in design and during construction of the development.

1.3.1.2 The Structure of this report is as follows:

- This section is an introduction for this report;
- **Section 2** presents the key data of the revised outline development plans (RODP) on which the impact assessments is based;
- **Section 3** Assesses the impacts on existing and planned sewerage systems due to the development and recommends the corresponding mitigation measures;
- **Section 4** conclusion.

2 Recommended Outline Development Plan (RODP)

2.1 Introduction

2.1.1.1 The Non-EFLS scenario has taken into consideration the efficient use of land resources, quality urban design within the bounds of the infrastructure capacities. In line with the development intensity in the "OU(B)" zone and Kowloon Bay as well as the anticipated decrease in hotel's demands in the coming years, the proposed plot ratio of the Non-EFLS scenario has been reviewed by converting portion of the proposed hotel development into office development. **Figure 2.1.1** shows the recommended outline development plan.

2.2 Key Development Parameters and Proposed Land Use Budget

2.2.1 Key Development Parameters

2.2.1.1 **Table 2.2.1** set out the key development parameters on individual Lots based on the approach above.

Table 2.2.1 Key Development Parameters on Individual Lots

Lot	Gross Site Area (m^2) (about)	Net Site Area (m^2) (about)	GFA (m^2) (about)	Plot Ratio
1	9,500	9,500	subject to detailed design and feasibility study	N/A
2*	24,140	17,000	204,600	12.0
3	8,400	8,400	400	N/A
4**	25,020	16,750	201,000	12.0
5	3,800	3,800	45,540	12.0
6	6,800	6,800	82,040	12.0
Total (excluding Lots 1 & 3)		**44,350**	**533,180**	N/A
TOTAL (excluding Lot 1)		**52,750**	**533,580**	N/A

Notes:

* Includes POSPD of about 4,400m^2 and the section of Cheung Yip Street (between Lots 2 and 5) of about 2,740m^2

** Includes POSPDs of about 1,600m^2 (western portion) and about 1,700m^2 between eastern portion and Lot 6, amenity areas of 2,140m^2 and the section of Cheung Yip Street of about 2,830m^2

2.2.2 Proposed Land Use Budget

2.2.2.1 The land use budget is tabulated in **Table 2.2.2**.

Table 2.2.2 Summary of the Proposed Land Use Mix of RODP

USES	GFA	%
Office	391,080	73.3%
Retail/ F&B/ Entertainment/ Urban Farming/ Food Workshop	122,220	22.9%
Hotel	14,880	2.8%

USES	GFA	%
Arts, Cultural and Creative	400	0.1%
Transport Facilities	5,000	0.9%
Total	**533,580**	**100.0%**

Remarks: The GFA of the two sold sites (i.e. Lots 5 and 6) are included. Based on the latest building plans, about 116,110 m^2 of office GFA and 11,480 m^2 of retail and F&B GFA are provided at the two sites.

2.2.3 Broad Estimation of Employment Size

2.2.3.1 Employment opportunities by land uses are derived by applying the worker density by land uses on the GFA data. Upon completion, the Preferred Option is anticipated to create in total of about 25,900 employment opportunities. **Table 2.2.3** summaries the estimated employment opportunities.

Table 2.2.3 Employment Opportunities by Uses under Preferred Option

USES	Preferred Option
Office[1]	19,554
Retail/ F&B/ Entertainment/ Urban Farming/ Food Workshop[2 6]	6,111
Hotel[3]	239
Arts, Cultural and Creative[4]	10
Transport Facilities[5]	10
Total	**25,924**

Notes:

[1] According to HK2030 Study WP 46, employment density for CBD office is assumed to be 1 worker per 20sqm.

[2] Retail, F&B, Entertainment, Urban Farming and Food Workshop are assumed to be General Business Use. According to HKPSG, employment density is assumed to be 1 worker per 20-25sqm for General Business Use.

[3] As local employment density for hotel is not available, the assumption adopted by the UK government is therefore applied. It is assumed that for 4-5 Star Hotels, the ratio between hotel staff and number of rooms should be 1 hotel staff per 1.25 rooms. (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/378203/employ-den.pdf)

[4] According to Annex 6 and 7 of the Economic Impact of Developing the West Kowloon Cultural District Technical Paper (Financial Secretary's Office, 2007), the Performing Arts Facilities will create 4,275 direct employment opportunities. And the total GFA for these Performing Arts Facilities is of about 188,895sqm. The employment density for cultural and creative facilities is therefore assumed to be 1 worker per 44sqm.

[5] For the proposed PTI, the estimated number of employment opportunities is minimal at around 10 supporting staff.

[6] The employment density for urban farm is assumed to be 1 per 50m2 by making reference to AFCD Iveggie which employs 5 employees for an area of about 250sqm. (http://www.iveggie.com.hk/index.php/tw/investment)

3 Sewerage Impact Assessment

3.1 Introduction

3.1.1 Introduction

3.1.1.1 Liaison with DSD and EPD has been made to obtain relevant information, a list of data/information obtained is shown in **Table 3.1.1** below.

Table 3.1.1 Existing Sewerage Information

Item No.	Information	Source of Information	Date
1	DSD sewerage record plan	DSD/MS	29 Aug 2014
2	Agreement No. CE 25/98 Review of Central and East Kowloon Sewerage Master Plans Final Report (hereafter called C&EK SMP Review)	EPD/SIG	8 Oct 2014
3	Agreement No. CE 61/2006 (DS) Upgrading of Central and East Kowloon Sewerage – Investigation, Design and Construction Preliminary Design Report (hereafter called C&EK IDC)	DSD/CM	24 Sep 2014
4	Agreement No. CE 35/2006 (CE) Kai Tak Development Engineering Study cum Design and Construction of Advance Works – Investigation, Design and Construction Final Sewerage Impact Assessment Report (May 2008)	CEDD	N/A
5	Agreement No. CE 35/2006 (CE) Kai Tak Development Engineering Study cum Design and Construction of Advance Works – Investigation, Design and Construction Technical Study on Increasing the Development Density in Kai Tak Infrastructure Review Report (Final) Rev.1 Aug 2014	CEDD	22 Oct 2014
6	Agreement No. CE5/2008(DS) Upgrading of Kwun Tong Preliminary Treatment Works – Feasibility Study Final Report	EPD/SIG	8 Oct 2014
7	Agreement No. CE 47/2013 (DS) Upgrading of Kwun Tong Preliminary Treatment Works – Investigation, Design and Construction	EPD/SIG	27 Nov 2015

3.2 Design Assumptions and Parameters

3.2.1.1 The sewage flow estimation, assessment and evaluation of impacts are based on the following established principals and guidelines of Hong Kong:

- EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning No.: EPD/TP 1/05 (GESF)

- Hong Kong Planning Standards and Guidelines (HKPSG).
- Drainage Services Department Sewerage Manual, Third Edition, May 2013

3.2.1.2 The estimate of sewage demands for the proposed development is based on the latest development parameters shown in **Section 2** above.

3.2.2 Unit Flow Factors

3.2.2.1 For proposed residential development, a unit flow factor (UFF) of 0.19m^3/person/day is used to estimate sewage flow according to Table T-1 of the GESF.

3.2.2.2 For schools, a UFF of 0.04m^3/person/day is used to estimate sewage flow for students according to Table T-2 of the GESF. The recommended UFF have taken into account the trend of full time education which is appropriate for future planning purposes.

3.2.2.3 For social welfare facilities, a UFF of 0.28m^3/person/day is used to estimate for sewage flow based on the J11 type of commercial activities according to Table T-2 of the GESF.

3.2.2.4 For commercial areas (retail/market/other non-domestic uses including RCP), a UFF of 0.28m^3/person/day comprising 0.05m^3/person/day for flushing and 0.23m^3/person/day for fresh water is used to estimate sewage flows according to Table T-2 of the GESF.

3.2.2.5 In particular, the UFFs adopted for the specific commercial activities include 0.08m^3/person/day for office, 1.58m^3/person/day for F&B and hotel, 0.28m^3/person/day for entertainment and ACC use and 0.18m^3/person/day for transport facilities in accordance with Table T-2 of the GESF.

3.2.3 Peaking Factors

3.2.3.1 The peaking factors to cater for seasonal/diurnal flow variations, and infiltration and inflow due to storm events are made reference to EPD's GESF and shown in **Table 3.2.1**.

Table 3.2.1 Peaking Factors for Various Population Ranges

Population Range	Peaking Factor (Including Stormwater Allowance) for Facility with Existing Upstream Sewerage	Peaking Factor (Excluding Stormwater Allowance) for Facility with Existing Upstream Sewerage
Sewers		
< 1,000	8	6
1,000 – 5,000	6	5
5,000 – 10,000	5	4
10,000 – 50,000	4	3
> 50,000	Max ($7.3/N^{0.15}$, 2.4) [1]	Max ($6/N^{0.175}$, 1.6) [1]
Sewage Treatment Works, Preliminary Treatment Works and Pumping Stations		
< 10,000	4	3
10,000 – 25,000	3.5	2.5
25,000 – 50,000	3	2
> 50,000	Max ($3.9/N^{0.065}$, 2.4) [1]	Max ($2.6/N^{0.065}$, 1.6) [1]

[1] – N = Contributing population in thousands

3.2.3.2 With consideration of the reduced hydraulic performance due to the deterioration of sewer pipes with time, peaking factors (including stormwater allowance) is adopted in this Study.

3.2.4 Hydraulic Analysis

3.2.4.1 Colebrook-White equation is applied for pipe hydraulic analysis. The design roughness coefficients (Ks) for existing pipeline system is 3.0mm (Slimed sewer, clayware, under poor condition). The design roughness coefficients (Ks) for proposed pipeline system is also 3.0mm in consideration of its reduced hydraulic performance in future due to degradation of material.

3.2.4.2 Hydraulic analysis using hydraulic software InfoWorks ICM 4.0.0.8004, which based on the hydraulic model from "Agreement No. CE61/2006(DS) Upgrading of Central and East Kowloon Sewerage – Investigation, Design and Construction", has been conducted to assess impact on the existing sewerage network.

3.3 Existing and Interface Sewerage System

3.3.1 Existing Sewerage Catchment

3.3.1.1 The proposed development is located within PDZ-454 Zone nos. 112, 307 & 308. The existing zonings of the Study Area is mainly for "G/IC(1)", "OU(Refuse Transfer Station)", "OU(Business)" and "Roads". The Study Area is currently occupied by TD's two Vehicle Examination Centres (VECs), EPD's waste recycling centre[2], HyD's maintenance depot, HKPF's proposed police vehicle pound and the areas of roads, pedestrian walkways, sitting-out area and amenity areas in between.

[2] The waste recycling center has been demolished in Q1 2021

3.3.2 Interface Projects / Studies for East Kowloon Sewerage System

C&EK SMP Review

3.3.2.1 The Review of Central and East Kowloon Sewerage Master Plans (the C&EK SMP Review) was completed in August 2003 and recommended upgrading of existing sewerage facilities as well as provision of new sewerage facilities to collect and convey sewage within the Central and East Kowloon areas to cater for the planned and forecast developments and population changes.

C&EK IDC

3.3.2.2 Atkins China Ltd (ACL) has been commissioned by DSD to undertake the Investigation, Design and Construction for Upgrading of Central and East Kowloon Sewerage.

3.3.2.3 Latest construction drawings have been obtained to identify the planned / completed sewerage upgrading works in the vicinity of the Study Area.

KTD – Sewerage Impact Assessment

3.3.2.4 Under this Study, AECOM conducted a sewerage impact assessment (SIA) to assess the impacts on the existing sewerage systems in the vicinity of the Kai Tak area arising from the proposed development within KTD. The SIA recommended appropriate mitigation measures and new sewerage network within KTD.

3.3.2.5 Sewage flow projection for Year 2016, Year 2030 and Ultimate Scenarios and corresponding hydraulic assessment on existing sewerage systems, including Trunk Sewers along Hoi Bun Road, Kwun Tong Intermediate Pumping Station (KTIPS) and Kwun Tong Preliminary Treatment Works (KTPTW) was conducted.

KTD – Technical Study on Increasing the Development Density in Kai Tak

3.3.2.6 Following the KTD SIA, AECOM conducted a technical study to identify and address possible implications due to the corresponding increase in the development density of the KTD Area, in particular on the aspects of urban, townscape and landscape design, transport and traffic, infrastructure requirements (including drainage, sewerage and fresh/salt water supply) and environmental impacts.

3.3.2.7 Under the said study, the latest planning data Territorial Population and Employment Data Matrix (TPEDM) 2011-based provided by PlanD is adopted for conducting the sewage flow projection for sewerage catchments outside KTD area. The 2011-based TPEDM has taken into account the Conceptual Master Plan 2.0 prepared by EKEO in June 2012.

3.3.2.8 Reference will be made on the said study for the projected sewage flow in the trunk sewerage systems which interface with this proposed development under different design scenarios. Since this KTD Technical Study is still in progress, close liaison with corresponding government department will be maintained to ensure latest information are obtained.

Upgrading of KTPTW

3.3.2.9 Black & Veatch Hong Kong Limited (B&V) has been commissioned by DSD from 2014 to undertake the Investigation, Design and Construction for Upgrading of Upgrading of Kwun Tong Preliminary Treatment Works.

3.3.2.10 Latest updated KBAA development parameters has been circulated to DSD for their incorporation into their studies.

3.3.3 Existing and Planned Sewerage System

3.3.3.1 The Study Area is located within Northern East Kowloon Sewerage Catchment. The Study Area is currently served by urban sewerage pipelines system and discharge to an existing trunk sewer along Hoi Bun Road, which conveys the sewage flows from upstream catchment to KTIPS and eventually discharge to KTPTW.

3.3.3.2 The branch network and major sewerage systems adjacent to the Study Area are identified, see **Table 3.3.1** below and **Drawing Nos. 237938/FS/011 & 012**. According to the latest information (C&EK SMP Review), the hydraulic performance of the existing sewerage systems under ultimate scenario is also identified in **Table 3.3.1** below.

Table 3.3.1 Existing Sewerage System Adjacent to the Site Area

Location	Sewerage System	Downstream Sewerage System
Along Sheung Yee Road	DN1350 Pipeline [No surcharge]	Trunk Sewer - 2500 x 2300 Sewerage Box Culvert along Wang Chiu Road and Hoi Bun Road
Along Sheung Yee Road	DN450 – DN750 Pipeline [No surcharge]	
Along Wang Chiu Road	DN1650 Pipeline (and branch connections) [No surcharge]	
Across Cheung Yip Street / Hoi Bun Road Junction	DN225 Pipeline [No surcharge]	
Along Wai Yip Street	DN300 – 375 Pipeline [Surcharged by flow / depth]	
Along Shun Yip Street	DN1350 Pipeline [No surcharge]	
Along Hoi Bun Road	DN1350 Pipeline [No surcharge]	

Trunk Sewer along Wang Chiu Road and Hoi Bun Road

3.3.3.3 The trunk sewer is in a form of single box culvert with size of 2500mm x 2300mm to 3000mm x 2300mm until the junction of Hoi Bun Road and Lai Yip Street, and becomes a dual box culvert with both cells totally separate. The additional cell of the trunk sewer serves three Dry Weather flow (DWF) interceptors which collect foul water from the heavily polluted storm drains in the KTBA. Based on the latest flow projections as presented in the KTD Technical Study, the existing trunk

sewer along Hoi Bun Road will be under a surcharge condition in ultimate scenarios. However, the 1m freeboard requirement can generally be met. No upgrading works was planned for the trunk sewer.

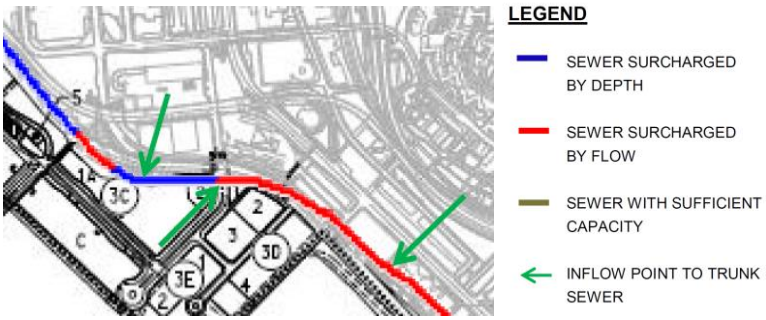


Figure 3.2.1 Existing Trunk Sewer along Hoi Bun Road

Kwun Tong Intermediate Pumping Station (KTIPS)

3.3.3.4 KTIPS is located at Kei Yip Street near Kwun Tong Public Pier. There are 5 screw pumps (4 duty and 1 standby) inside the KTIPS with capacity of 2,300 l/s for each pump, i.e. the existing capacity of KTIPS is 9.2 m3/s. KTIPS discharge sewage to the box culvert leading to KTPTW. According to the Final Infrastructure Review Report for Kai Tak Hospital dated January 2015, the latest projected peak flow of KTIPS would be 9.51 m^3/s, which is in excess of the design capacity of KTIPS (9.20 m^3/s). Under KTD Study, it is recommended to upgrade the pumping station by replacement of the gearbox to cater for the additional flow.

Kwun Tong Preliminary Treatment Works (KTPTW)

3.3.3.5 There are five duty pumps in the inlet pumping station, each with a nominal capacity of 2.36 m3/s. The existing plant capacity of KTPTW is 10.93 m3/s, obtained with three mechanically raked coarse screens, five duty pumps, three duty fine screens and four duty detritors.

3.3.3.6 To cope with the forecast increase in sewage flow from the new developments in East Kowloon, Kai Tak and Anderson Road Developments, DSD's Contract No. DE/2017/01 Upgrading of Kwun Tong Preliminary Treatment Works recommended to upgrade the peak capacity of KTPTW to 13.13m^3/s by year 2022 to cater for the projected sewage flows under ultimate scenario. Based on the KTD Technical Study, the projected flow (taken into account the EKEO's Conceptual Master Plan 2.0) is lower than the planned capacity of KTPTW.

3.3.3.7 Furthermore, Agreement No. CE 47/2013 (DS) Upgrading of Kwun Tong Preliminary Treatment Works – Investigation, Design and Construction will conduct detailed study on the sewage flow projection at KTPTW which will adopt the TPEDM 2011-based data (which take into account the EKEO's Conceptual Master Plan 2.0). The latest projected peak flow to KTPTW and corresponding upgrading capacity is subject to review under this Study. Latest information is being obtained from EPD and DSD.

3.4 Potential Sewerage Impact and Proposed Sewerage System

3.4.1 Sewage Flow Estimation

3.4.1.1 With reference to EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning No.: EPD/TP 1/05, sewage flow estimation for the proposed development is provided in **Appendix A** and summarized in the **Table 3.4.1** below.

Table 3.4.1 Estimated Sewage Flow from Proposed Development

Proposed Development - Lot	Estimated Sewage Flow [1] (ADWF, m3/day)	Estimated Sewage Flow [1] (ADWF, l/s)
Lot 1 – ORRC (previously called 'Integrated Waste Handling Facility')	304	3.51
Lot 2 – Comprehensive Development	2,463	28.50
Lot 3 – Open Space and ACC Uses	3	0.04
Lot 4 – Comprehensive Development	2,881	33.35
Lot 5 (NKIL 6313) – Commercial	261	3.02
Lot 6 (NKIL 6512) – Commercial	489	5.66
Total	**6,401**	**74.09**

[1] With 20% allowance

Table 3.4.2 Sewage Discharge Schedule of Proposed Development

Location	Sewerage System	Sewerage Catchment from Proposed Development
Along Sheung Yee Road	DN1350 Pipeline	Lot 1
Along Wang Chiu Road	DN1650 Pipeline (and branch connections)	Lot 1, Lot 2, Lot 3, Lot 4 (western portion)
Along Wai Yip Street	DN300 – 375 Pipeline	Lot 4 (eastern portion), Lot 5, Lot 6
Along Shun Yip Street	DN1350 Pipeline	Lot 4 (eastern portion), Lot 5, Lot 6
Along Hoi Bun Road	DN1350 Pipeline	Lot 4 (eastern portion), Lot 5, Lot 6

3.4.2 Potential Sewerage Impact – Branch Sewerage Systems

3.4.2.1 Sewerage hydraulic model under C&EK SMP Review was obtained to facilitate the impact assessment on existing sewerage systems arising from the proposed development. In the C&EK SMP hydraulic model, KBAA development has been incorporated. However, the development parameters of KBAA are not up-to-date. The C&EK SMP hydraulic model is acted as the Baseline Scenario. Under the Proposed Scenario, KBAA developments parameters and point of connection to the existing sewerage system have been updated and the hydraulic performance of the existing sewerage system are assessed.

3.4.2.2 InfoWorks ICM has been utilized for performing the preliminary sewerage impact assessment, the hydraulic model is attached in **Appendix B**. The water levels between Baseline Scenario and Proposed

Scenario are compared in the **Table 3.4.3** below. It can be observed that all nodes comply with DSD's freeboard requirement of 1.0m and generally the impacts on water level is around 2%. The proposed sewerage discharge points and sewerage systems are shown in **Drawing Nos. 237938/FS/011 & 012**.

Table 3.4.3 Water Levels Comparison between Baseline and Proposed Scenarios

Sewers	Model Node No.	DSD's Feature ID	Water Level – Baseline (mPD)	Freeboard – Baseline (m)	Water Level – Proposed (mPD)	Freeboard – Proposed (m)	Freeboard Difference (m)	Freeboard Difference (%)
DN1350 to DN1650 Along Sheung Yee Road and Wang Chiu Road	HK39196702	FGJ4003722	0.49	4.51	0.50	4.50	0.013	0.29%
	HK39196707	FMH4036405	0.5	4.66	0.52	4.64	0.015	0.32%
	HK39196801	FMH4036404	1.22	5.30	1.23	5.29	0.010	0.19%
	HK39196802	FMH4036403	1.26	3.54	1.29	3.51	0.034	0.96%
	HK39196803	FMH4036402	1.3	3.49	1.33	3.46	0.032	0.92%
	HK39196804	FMH4036409	2.18	2.57	2.23	2.52	0.048	1.87%
	HK39196805	FMH4036408	2.46	2.24	2.51	2.19	0.046	2.05%
	HK39196901	FMH4036401	1.33	3.12	1.36	3.09	0.030	0.96%
	HK39196902	FMH4036410	1.33	2.87	1.41	2.79	0.078	2.72%
	HK39205001	FMH4036386	1.42	3.08	1.43	3.07	0.010	0.33%
	HK39205002	FMH4036388	3.32	1.38	3.32	1.38	0.000	0.00%
	HK39206001	FMH4036400	1.40	3.3	1.41	3.29	0.013	0.39%
	HK39206002	FMH4036387	1.40	3.25	1.41	3.24	0.013	0.40%
	KBAA-ORRC	-	2.23	2.42	1.41	2.99	0.013	0.43%
	NEK151_01	-	1.40	3.00	2.26	2.39	0.006	0.25%
DN300 to DN375 Along Wai Yip Street	HK39198901	FMH4036462	3.23	1.41	3.24	1.40	0.009	0.64%
	HK39198902	FMH4036461	3.35	1.59	3.36	1.58	0.012	0.76%
	KF02A116	FMH4043164	3.21	1.43	3.22	1.42	0.010	0.70%
	KF02A117	FMH4042644	3.04	1.60	3.05	1.59	0.010	0.63%
	KF02A118	FMH4042645	2.77	2.23	2.78	2.22	0.011	0.49%
	KF02A119	FMH4042646	2.70	2.60	2.71	2.59	0.013	0.50%
	KF02A120	FMH4042647	2.5	2.92	2.56	2.86	0.061	2.09%
	KF02A121	FMH4042648	2.03	3.39	2.08	3.34	0.054	1.59%
	KF02A122	FMH4042649	1.98	3.44	2.03	3.39	0.055	1.60%
	KF02A123	FMH4042650	1.81	3.66	1.86	3.61	0.055	1.50%
	KF02A124	FMH4042651	1.58	3.82	1.66	3.74	0.074	1.94%
	KF02A125	FMH4042652	1.54	3.46	1.61	3.40	0.067	1.94%
	KF02A126	FMH4042653	1.44	3.56	1.51	3.49	0.073	2.05%
	KF02A127	FMH4042654	1.05	3.79	1.10	3.74	0.056	1.48%
	KF02A128	FMH4042655	0.74	3.67	0.78	3.63	0.043	1.17%
	KF02A129	FMH4042656	0.52	3.74	0.56	3.70	0.040	1.07%
	KF02X168	FMH4042657	0.46	3.57	0.48	3.56	0.019	0.53%
DN1350 Along Shun Yip Street	KF02X168	FMH4042657	0.46	3.57	0.48	3.56	0.019	0.53%
	KF02X169	FMH4042658	0.44	3.47	0.45	3.46	0.018	0.52%
	KF02X170	FMH4042659	0.39	3.46	0.41	3.44	0.018	0.52%
	KF02X171	FMH4042660	0.35	3.47	0.37	3.45	0.017	0.49%
	KF02X172	FMH4042661	0.32	3.53	0.33	3.52	0.016	0.45%
DN1350 Along Hoi Bun Road	BOX01	FGJ4003680	-0.01	4.16	0.01	4.14	0.015	0.36%
	KF02X172	FMH4042661	0.32	3.53	0.33	3.52	0.016	0.45%
	KF02X173	FMH4042662	0.23	3.66	0.25	3.64	0.015	0.41%
	KF02X174	FMH4042663	0.13	3.96	0.14	3.95	0.013	0.33%
	KF02X175	FMH4042664	0.00	4.35	0.02	4.33	0.016	0.37%

3.4.3 Potential Sewerage Impact – Trunk Sewer and Sewerage Infrastructures

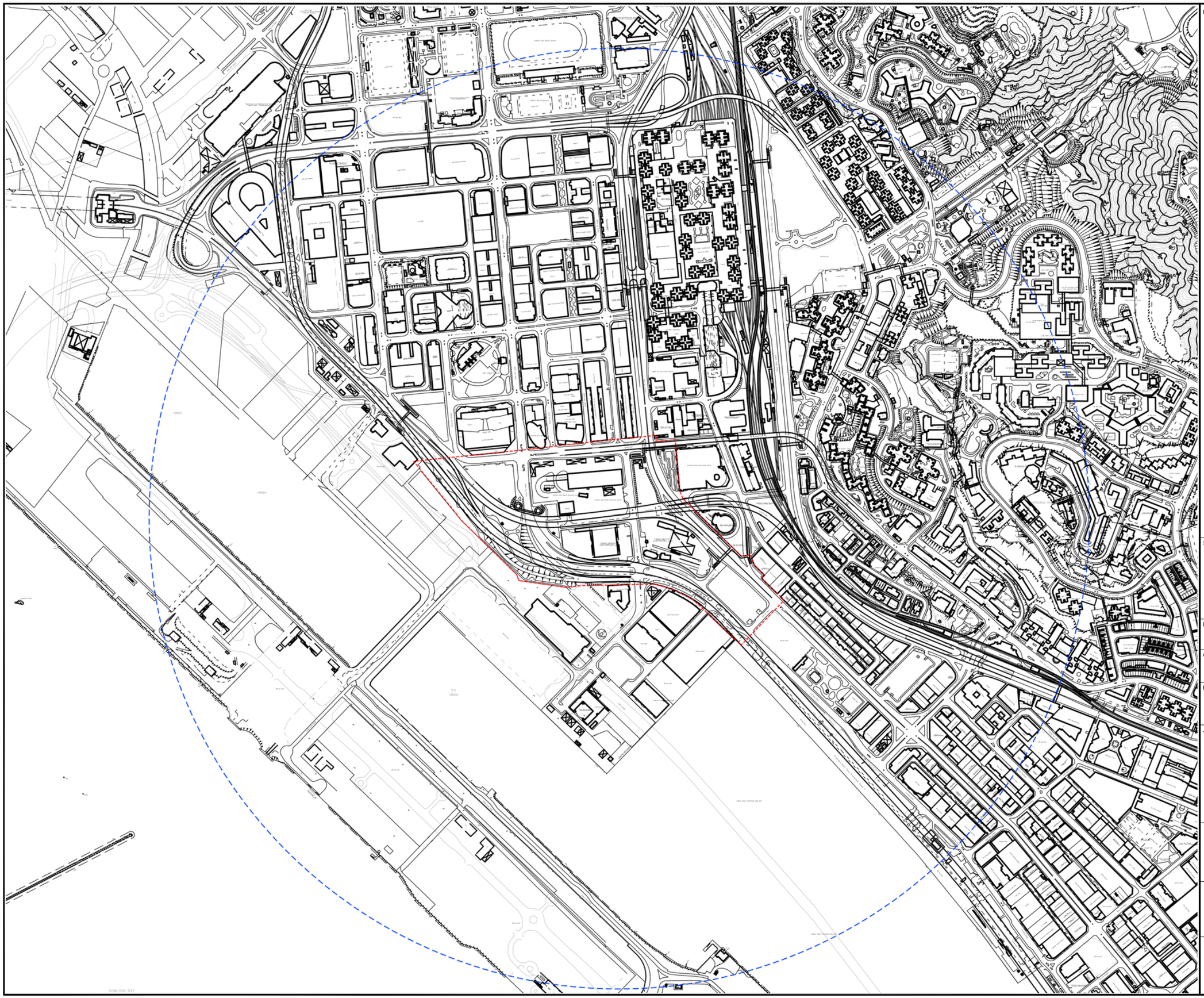
3.4.3.1 As mentioned in **Para. 3.3.3**, the KTD Technical Study and Upgrading of Kwun Tong Preliminary Treatment Works – Investigation, Design and Construction are conducting detailed study on the sewage flow projection at the Trunk Sewer in Hoi Bun Road, KTIPS and KTPTW which adopted the TPEDM 2011-based data (which had taken into account the EKEO's Conceptual Master Plan 2.0). Impact assessments and the corresponding mitigation measures will be presented in the above studies. Nevertheless, liaison with the corresponding government department and consultants will be continued to ensure the latest RODP development parameters are reflected in the above studies.

4 Conclusion

4.1.1.1 There will be no adverse impact on the existing branch sewerage systems arising from the proposed development as generally the water levels at the sewers rise by around 2% only and the sewerage systems comply with DSD's freeboard requirement of 1.0m. No upgrading works on the existing branch sewerage system is required.

4.1.1.2 The impact on the existing trunk sewer and sewerage infrastructures will be assessed under the KTD Technical Study and Upgrading of Kwun Tong Preliminary Treatment Works – Investigation, Design and Construction. Liaison with the corresponding government department and consultants will be continued to ensure latest KBAA RODP development parameters are reflected in the above studies.

Figures



Legend

Study Area

Area of Influence

Scale and Orientation

N

0 100 200 300 400m

1:7,500 on A3

Drawn	Date
MG	June 2015
Checked	Approved

Figure No.	Drawing Title
1.2.1	Study Area and Area of Influence

Job Title

Agreement No. CE 4/2014 (TP)

Planning and Enginering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study

ARUP

Former EPD's Waste Recycling Centre

Capital Tower (NKIL 6313)
- completed development

HKPF's Police Vehicle Examination and Detention Centre

HyD's Maintenance Depot beneath flyover

Amenity Area partly beneath Kwun Tong Bypass

The Quayside (NKIL 6512)
- completed development

TD's Vehicle Examination Centres

Wang Chiu Road
Wang Tai Road
Wang Mau Street
Wang Hor Road
Sheung Yee Road
Kai Fuk Road Flyover
Tsui Hing Street
Kwun Tong Bypass
Hoi Bun Road
Wai Yip Street
Lot 1
Lot 2
Lot 3
Lot 4
Lot 5
Lot 6

Legend
Study Area

Scale and Orientation
N
0 100 200 300 400m

Drawn	Date
LL	14 April 2020
Checked	Approved
LL	WL

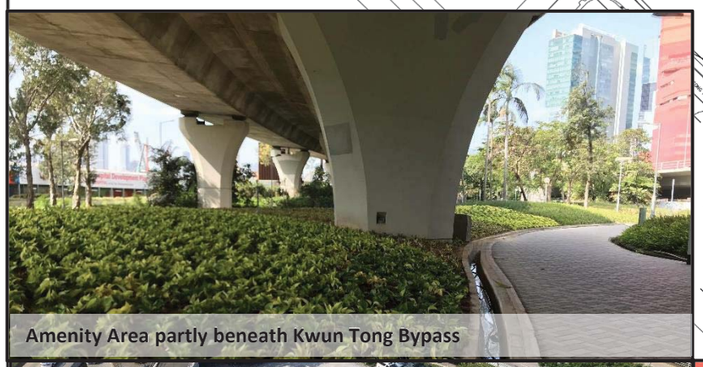
1.2.2 Development Sites of KBAA

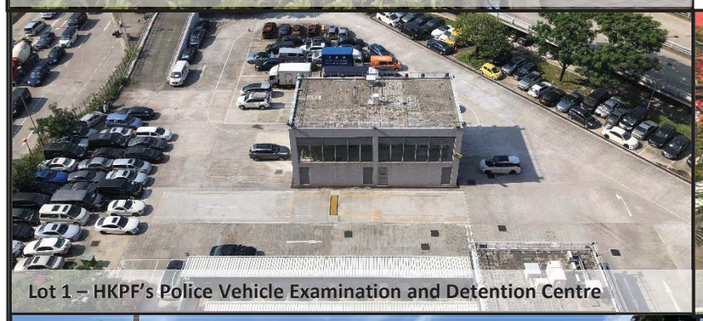
Job Title

Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study

ARUP


Amenity Area partly beneath Kwun Tong Bypass


Lot 1 – HKPF's Police Vehicle Examination and Detention Centre

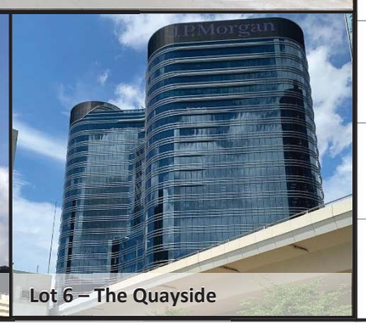

Lot 2 – Former EPD's Waste Recycling Centre


Lot 3 – HyD's Maintenance Depot beneath flyover


Lot 4a – TD's Vehicle Examination Centre


Lot 4b – TD's Vehicle Examination Centre


Lot 5 – Capital Tower



Lot 6 – The Quayside



Legend

- Study Area
- Other Specified Uses
- Commercial
- Open Space
- Amenity Area
- ew — Elevated Walkway
- Pedestrianized Street
- NBA — Non-Building Area
- 50 — Maximum Building Height (In Meters Above Principal Datum)
- 5 — Proposed Site Formation Level (in Metres above Principal Datum)
- Building Height Control Zone Boundary
- Setback Line

Scale and Orientation

N

0 20 40 60 80m

Drawn	Date: April 2021
Checked	Approved

Figure No. 2.1.1

Drawing Title: Recommended Outline Development Plan

Job Title

Agreement No. CE 4/2014 (TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East - Feasibility Study

ARUP

Drawings

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N

LEGEND:

- SEWERAGE CATCHEMENT OF KTPTW
- SEWERAGE TREATMENT WORKS
- 254 — PDZ 454 ZONES (TPEDM-2011 BASED)
- STUDY AREA

TO KWA WAN PRELIMINARY TREATMENT WORKS (TKWPTW)

KWUN TONG PRELIMINARY TREATMENT WORKS (KTPTW)

Rev	Description	By	Date
A	DRAFT WP8	LTT	JUN15

Consultant

ARUP

Project title

Agreement No. CE 4/2014 (TP) Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East Feasibility Study

Drawing title

PDZ ZONES WITHIN KWUN TONG PTW CATCHMENTS FOR ULTIMATE SCENARIO

Drawing no.		Rev.
237938/FS/001		A
Drawn: JL	Date: JUN/2015	Checked: KK	Approved: CC
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839200 E
839400 E
839600 E
839800 E
820000 N
819800 N
819600 N

EXISTING 7 CELLS
4120(W) x 3800(H)
BOX CULVERT

SEWERAGE SYSTEM FOR ORRC

Lot no. 1

Lot no. 2

LOT 2 INTERNAL SEWERAGE SYSTEM TO BE CONNECTED TO EXISTING SEWER

Lot no. 3

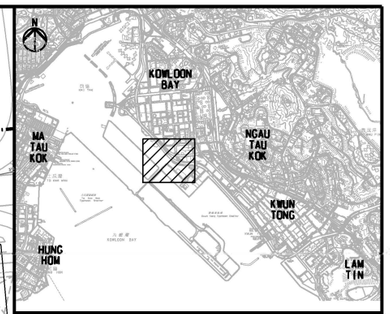
Lot no. 4

Lot 4 (western portion) INTERNAL SEWERAGE SYSTEM TO BE CONNECTED TO EXISTING SEWER

Lot 4 (western portion) INTERNAL SEWERAGE SYSTEM TO BE CONNECTED TO EXISTING SEWER

FOR CONTINUATION SEE DRG 237938/FS/012

MATCH LINE



KEY PLAN

LEGEND:

- STUDY AREA
- SEWER MANHOLE
- TAPPING POINT
- EXISTING SEWER PIPE (325)
- ABANDONED PIPE
- EXISTING RISING MAIN (RM)
- EXISTING VACCUM SEWER (VS)
- EXISTING DRAINAGE RESERVE
- EXISTING BOX CULVERT
- PROPOSED SEWER PIPE WITH MANHOLE (225)

Rev	Description	By	Date
A	DRAFT WP8	LTT	JUN15

Consultant

ARUP

Project title

Agreement No. CE 4/2014 (TP)
Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East Feasibility Study

Drawing title

EXISTING, PLANNED AND PROPOSED SEWERAGE SYSTEM

(SHEET 1 OF 2)

Drawing no.	Rev.
237938/FS/011	A

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N

840000 E

840200 E

840400 E

820000 N

819800 N

819600 N

FUTURE SEWER PIPE FROM COMMERCIAL DEVELOPMENT TO BE CONNECTED TO THE EXISTING SEWER

Lot no. 5

SEWERAGE SYSTEM FOR LOT 4 (EASTERN PORTION)

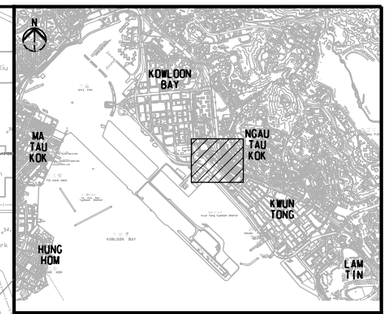
Lot no. 4

Lot no. 6

FUTURE SEWER PIPE FROM COMMERCIAL DEVELOPMENT TO BE CONENCTED TO THE EXISTING SEWER

FOR CONTINUATION SEE DRG. 237938/FS/011

MATCH LINE



KEY PLAN

LEGEND:

- STUDY AREA
- SEWER MANHOLE
- TAPPING POINT
- 325 — EXISTING SEWER PIPE
- ABANDONED PIPE
- RM — EXISTING RISING MAIN
- VS — EXISTING VACCUM SEWER
- EXISTING DRAINAGE RESERVE
- EXISTING BOX CULVERT
- 225 — PROPOSED SEWER PIPE WITH MANHOLE

Rev	Description	By	Date
A	DRAFT WP8	LTT	JUN15

Consultant

ARUP

Project title

Agreement No. CE 4/2014 (TP) Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East Feasibility Study

Drawing title

EXISTING, PLANNED AND PROPOSED SEWERAGE SYSTEM

(SHEET 2 OF 2)

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Appendices

Appendix A

Sewage Flow Estimation

ARUP	Job No. 237938	Sheet No.	Rev.
	Member/Location		
Job Title: P&E Study for the Development at KBAA	Drg. Ref.		
Calculation: Design Parameter for Sewage Flow Estimation	Made by: CK	Date: 04/2021	Chd.

Table 1 - Unit Flow Factors

Development Type	Type	Unit	Unit Flow Factor (m^3/d)
Domestic [1]			
Public Rental	-	person	0.19
Private	R1	person	0.19
Private	R2	person	0.27
Private	R3	person	0.37
Private	R4	person	0.37
Traditional village	-	person	0.15
Modern Village	-	person	0.27
Temporary and non-domestic	-	person	0.15
Commerical [1]			
Maufacturing	J1	Employee	0.53
Electricity Gas & Water	J2	Employee	0.33
Transport, Storage & Communication	J3	Employee	0.18
Wholesale & Retail	J4	Employee	0.28
Import & Export	J5	Employee	0.08
Finance, Insurance, Real Estate & Business Services	J6	Employee	0.08
Agriculture & Fishing	J7	Employee	0.08
Mining & Quarrying	J8	Employee	0.08
Construction	J9	Employee	0.23
Restaurants & Hotels	J10	Employee	1.58
Community, Social & Personal Services	J11	Employee	0.28
Public Administration	J12	Employee	0.08
Government and Community	J12	Employee	0.08
Office	J6	Employee	0.08
Hotel	J10	Employee	1.58
Hotel - Guest [2]	-	-	0
Others [3]			
Institution	Primary, Secondary & Tertiary	Student	0.04
Government and Community	J12	Employee	0.08

Notes:
(1) The unit flow factors for domestic, commercial employment and school are according to Table T-1 and Table T-2 of GESF of EPD.
(2) UFF of Hotel Guest has been counted in the UFF of Hotel Employee.
(3) The unit flow factors for visitor is made reference to according to Table 3-4 of "Wastewater Engineering Treatment and Reuse" published by Matcalf & Eddy.

ARUP	Job No. 237938	Sheet No.	Rev.
	Member/Location		
Job Title: P&E Study for the Development at KBAA	Drg. Ref.		
Calculation: Design Parameter for Sewage Flow Estimation	Made by: CK	Date: 04/2021	Chd.

Table 2 - Peaking Factors

Population Range	Peaking Factor (including stormwater allowance) for facility with existing upstream sewerage	Peaking Factor (excluding stormwater allowance) for facility with new upstream sewerage
(a) For sewers		
<1,000	8	6
1,000 - 5,000	6	5
5,000 - 10,000	5	4
10,000 - 50,000	4	3
>50,000	Max (7.3 / $N^{0.15}$,2.4)	Max (6 / $N^{0.175}$,1.6)
(b) Sewage Treatment Works, Preliminary Treatment Works and Pumping Stations		
<10,000	4	3
10,000 - 25,000	3.5	2.5
25,000 - 50,000	3	2
>50,000	Max (3.9 / $N^{0.065}$,2.4)	Max (2.6 / $N^{0.065}$,1.6)

Notes:
(1) The peaking factors are according to Table T-5 of GESF of EPD.
(2) N is the contributing population in thousands.
According to Clause 12.1 of EPD's GESF, the contributing population is defined below:
Contribution Population = Calculated total average flow (m^3/day) / 0.27 (m^3/person/day)

Hydraulic Assessment

Calculate by Colebrook-White Equation

$$V = -\sqrt{(8gDS)}\log\left(\frac{ks}{3.7D} + \frac{2.51v}{D\sqrt{(2gDS)}}\right)$$

where ks is equivalent roughness with value equals 1.5mm for existing sewers.
v is kinematic viscosity of fluid = 1.14 x 10-6 m^2/s and g is the gravity = 9.81m/s^2
V is the velocity, D is the diameter of the sewer and S is the gradient of the sewer.

Roughness Coefficient (ks)

New Pipe (Concrete Pipe)	3 mm (As a conservative approach)
Existing Pipe (Concrete pipe under poor condition)	3 mm

Calculate by Manning'sEquation

$$V = \frac{R^{2/3}s^{1/2}}{n}$$

where
V = mean velocity (m/s)
s = hydraulic gradient (energy loss per unit length)
n = Manning"s roughness coefficient
R = hydraulic radius (m)

Manning's Roughness Coefficient (n)	0.012 Good condition
	0.015 Fair condition

Sewage Flow Estimation – KBAA Lot 1 - Organic Resources Recovery Centre (ORRC)

Wastewater Generation	**Estimated Wastewater flow**	**Reference Source**
Liquors and Leachates from Wastes (to WWTP) include the followings • Liquor derived during the compression of waste in WCV's and held in tanks fitted to WCV's • Liquor held within the collection vehicle body derived from the compaction of waste • Water from the washing down of tipping area, waste hoppers and live floors, containers and transport parking areas • Liquor collection in the tipping areas • Vehicle and container washing water emanating from within the facility • Discharges from any workshop/maintenance areas • Assume vehicle washing water will be directed to a wash water recycling unit as similar to all other transfer station, maximum wastewater generated shall be 1 m^3/day	13 m^3/day	NWNT RTS Current Design. The current WWTP at NWNT RTS has sufficient capacity.
Potentially Contaminated Surface Water by Accidental Spillage: • From experiences of other transfer station in Hong Kong, the wastewater flow is less than 2.0 m^3/day • To accommodate first flush storm flows an allowance of 15 m^3 has been allocated for treatment	15 m^3/day	
Surface Water • Assume all the storm water will discharge to public surface system via grease and oil interceptor	Nil	
Foul Sewage • The wastewater and sewage resulting from the users of the Admin Office & Education Centre	5 m^3/day	
Food waste digestion • Wastewater generator during the process based on loading of 100 tons per day	220 m^3/day	
Total	253 m^3/day	

ARUP	Job No.	Sheet No.	Rev.
	237938		
	Member/Location		
Job Title: P&E Study for the Development at KBAA	Drg. Ref.		
Calculation: Estimation of Sewage Flow for RODP	Made by: CK	Date: 04/2021	Chd.

LAND USE MIX

Lot No.	Proposed Land Use	Office GFA (m^2)	Retail GFA (m^2)	F&B GFA (m^2)	Entertainment GFA (m^2)	Hotel GFA (m^2)	ACC Use GFA (m^2)	Transport Facilities GFA (m^2)	Total GFA (m^2)
Lot 1	ORRC	-			-	-	-	-	-
Lot 2	Comprehensive Development	144,470	38,171	10,906	5,453	-	-	5,000	204,000
Lot 3	Open Space and ACC uses	-	-	-	-	-	400	-	400
Lot 4	Comprehensive Development	130,510	38,927	11,122	5,561	14,880	-	-	201,000
Lot 5	Commercial	42,000	3,540	-	-	-	-	-	45,540
Lot 6	Commercial	74,100	7,940	-	-	-	-	-	82,040
Total		**391,080**	**88,578**	**22,028**	**11,014**	**14,880**	**400**	**5,000**	**532,980**

ASSUMED EMPLOYMENT OPPORTUNITIES (1)

	Office	General Business Use	ACC	Urban Farm	MICE	Industrial	Transport Facilities
1 worker / GFA (m^2)	20	20	40	50	98	35	440

EMPLOYMENT NO. AND SEWAGE FLOW ESTIMATION

Lot No.	Proposed Land Use	Office J6 UFF= 0.08		Retail J4 UFF= 0.28		F&B J10 UFF= 1.58		Entertainment J4 UFF= 0.28		Hotel J10 UFF= 1.58		ACC Use J11 UFF= 0.28		Transport Facilities J3 UFF= 0.18		Total Employee	Total Flow (2) ADWF	
		Employee	Flow (m3/d)	Employee	Flow (m3/d)	Employee	Flow (m3/d)	Employee	Flow (m3/d)	Employee	Flow (m3/d)	Employee	Flow (m3/d)	Employee	Flow (m3/d)		(m3/d)	(l/s)
Lot 1	ORRC	-	-					-	-	-	-	-	-	-	-	-	304	3.51389
Lot 2	Comprehensive Development	7,224	578	1,909	534	545	862	273	76	-	-	-	-	11	2	9,961	2,463	28.50327
Lot 3	Open Space and ACCuses	-	-	-	-	-	-	-	-	-	-	10	3	-	-	10	3	0.03889
Lot 4 (4a & 4b)	Comprehensive Development	6,526	522	1,946	545	556	879	278	78	239	378	-	-	-	-	9,545	2,881	33.34982
Lot 5 (NKIL 6313)	Commercial	2,100	168	177	50	-	-	-	-	-	-	-	-	-	-	2,277	261	3.02167
Lot 6 (NKIL 6512)	Commercial	3,705	296	397	111	-	-	-	-	-	-	-	-	-	-	4,102	489	5.66056
Total		**19,554**	**1,564**	**4,429**	**1,240**	**1,101**	**1,740**	**551**	**154**	**239**	**378**	**10**	**3**	**11**	**2**	**25,895**	**6,401**	**74.08809**

Notes
(1) Employment opportunities by land use were derived by applying the worker density by land use on the GFA data. Assumptions refer to WP No.6 Section 5.7.1.1.
(2) With 20% allowance

Appendix B

Hydraulic Model

(Please refer to a separate icmt file for reviewing the hydraulic model)

Attachment Vh of
MPC Paper No. 10/21

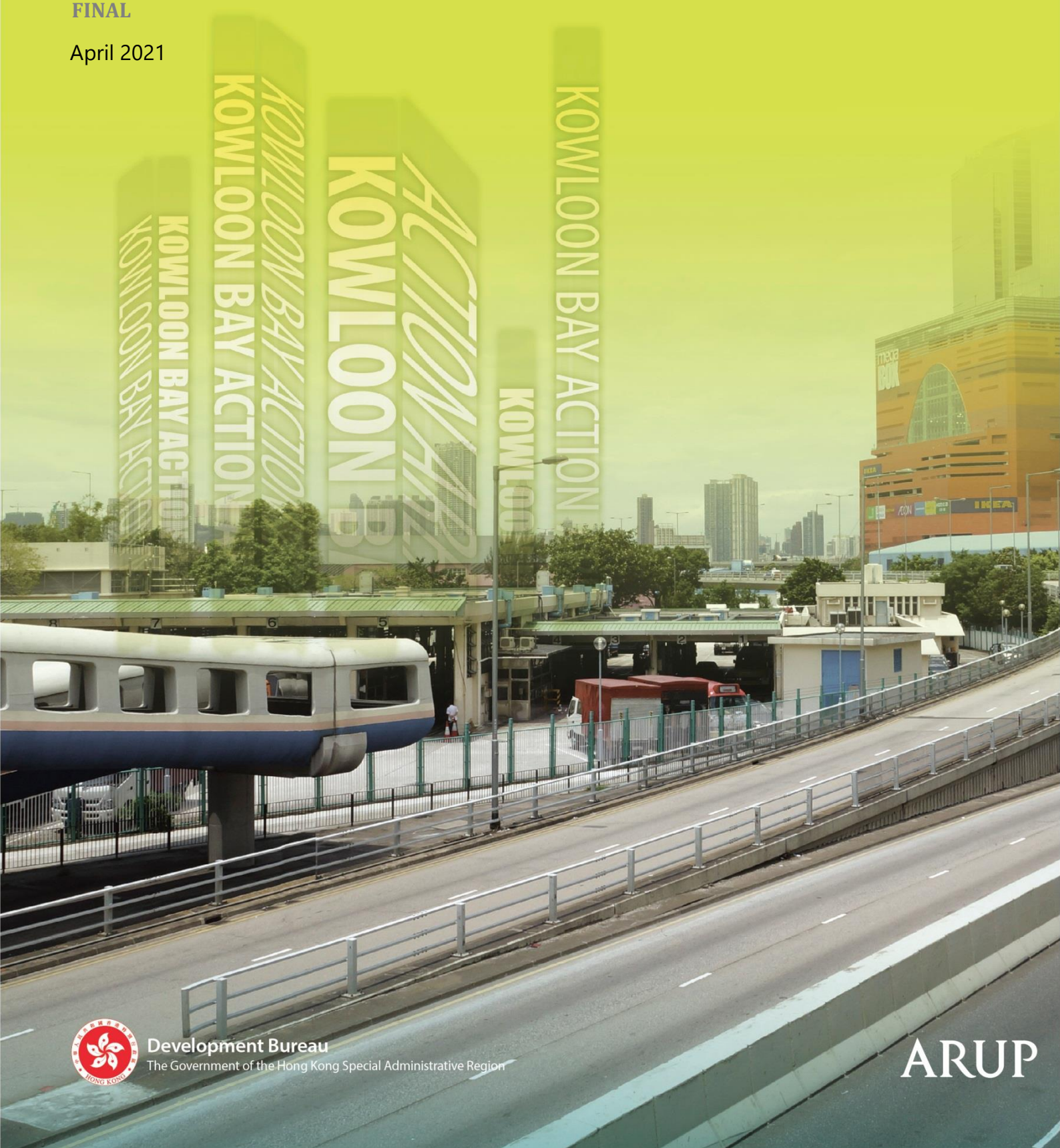
Agreement No. CE 4/2014(TP)

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – FEASIBILITY STUDY

Additional Service- Non-EFLS Scenario
Water Supply Impact Assessment (WSIA)

FINAL

April 2021



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Energizing Kowloon East Office, Development Bureau

Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study

Additional Service -- Non- EFLS Scenario Water Supply Impact Assessment (WSIA)

Agreement No. CE 4/2014 (TP)

Final | April 2021

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

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

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Kowloon Tong
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Hong Kong
www.arup.com

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1.2 Study Area 2
1.3 Purpose of this Report 2

2 Recommended Outline Development Plan (RODP) 4

2.1 Introduction 4
2.2 Key Development Parameters and Proposed Land Use Budget 4

3 Water Supply Impact Assessment 6

3.1 Introduction 6
3.2 Methodology and Design Criteria 6
3.3 Existing and Planned Water Supply System 8
3.4 Potential Water Supply Impact and Proposed Water Supply Systems 9

4 Conclusion 12

Appendices

Appendix A Water Demand Estimation

Figures

Figure 1.2.1 Study Area and Area of Influence
Figure 1.2.2 Development Sites of KBAA
Figure 2.1.1 Preliminary Outline Development Plan (PODP)

Drawings

Drawing No. 237938/FW/001 Existing and Planned Fresh Water Supply System
Drawing No. 237938/SW/001 Existing and Planned Salt Water Supply System

Acronym

DN	Nominal Diameter
EKEO	Energizing Kowloon East Office
EPD	Environmental Protection Department
FSD	Fire Service Department
GFA	Gross Floor Area
HKPSG	Hong Kong Planning Standards and Guidelines
HyD	Highway Department
KBAA	Kowloon Bay Action Area
KBBA Study	KBBA Pedestrian Environment Improvement Feasibility Study
KBBA	Kowloon Bay Business Area
KE	Kowloon East
KTD	Kai Tak Development
ORRC	Organic Resources Recovery Centre
WSD	Water Supplies Department
WTW	Water Treatment Works

1 Introduction

1.1 Study Background

1.1.1.1 Kowloon East (KE) is an area comprising the former Kai Tak Airport, Kwun Tong Business Area (KTBA) and Kowloon Bay Business Areas (KBBA). This area witnessed the rapid growth of an important industrial base in the heyday of Hong Kong's manufacturing industry, creating hundreds of thousands of jobs and propelling Hong Kong's prosperity. Following relocation of the Airport to Chek Lap Kok and our manufacturing base to the Mainland, a huge stock of industrial buildings was not being fully utilised. On the other hand, with the continuing boom of Hong Kong's financial and service sectors as well as large numbers of regional headquarters and regional offices of multi-national companies setting their foothold in Hong Kong, the demand for quality offices can no longer be met by our traditional Central Business District (CBD). Some private developers have developed high-grade office buildings and retail centres in KE. About 1.4 million m^2 office floor space have been completed in 2011.

1.1.1.2 In 2001, all industrial land in Kwun Tong and Kowloon Bay was rezoned to "Other Specified Uses (Business)" ("OU(Business)"). The "OU(Business)" zone allows industrial premises to be converted to office use and industrial buildings redeveloped for commercial/office uses. In April 2010, the Government also introduced measures to revitalise industrial buildings in Hong Kong. It is anticipated that, together with the new commercial/office space to be provided in Kai Tak Development (KTD) area, the total commercial/office space in Kowloon East has the potential to increase from the current 2.0 million sqm to 7.0 million sqm in the future. Kowloon East has great potential to evolve into a vibrant premier business district in Hong Kong.

1.1.1.3 In the 2011-12 Policy Address, the Chief Executive (CE) announced that the Government would adopt a visionary, coordinated and integrated approach to expedite the transformation of KE into an attractive, alternative CBD to support Hong Kong's economic development. Energizing Kowloon East Office (EKEO) was therefore set up in the Development Bureau (DevB) to undertake initiatives of land use review, urban design, improved connectivity and the associated infrastructure

1.1.1.4 The initial proposals for Energizing Kowloon East were formulated under the CBD^2 strategy, with main focus on enhancing Connectivity, Branding, Design and Diversity. These proposals were consolidated on the Conceptual Master Plan (CMP) version 2.0 issued on 7 June 2012 and further refinement of the CMP was promulgated in January 2015 (version 4.0) taking on board suggestions during the ongoing public engagement process and new opportunities identified. The latest CMP 5.0 was promulgated in November 2016, focusing on 5 issues, including Walkability and Mobility, Green CBD, Smart City, Socio-economic Vibrancy, and the Spirit of Creation.

1.1.1.5 One of the key tasks of EKEO is to proactively review the development and design options of undeveloped/under-developed Government sites with guidance of the CBD[2] strategy. Releasing the development potential of KBAA which is at the core area of KE, for mixed development will bring great vibrancy to the region. The Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study (the Study) is therefore commissioned to review, investigate, and produce feasible development options and implementation strategy to optimise the development potential of KBAA in terms of its strategic setting, constraints and opportunities.

1.2 Study Area

1.2.1.1 The Study Area (**Figure 1.2.1**) covers the existing Government sites in KBAA which include the area currently occupied by Transport Department (TD)'s two Vehicle Examination Centres (VECs), Environmental Protection Department (EPD)'s waste recycling centre[1], Highway Departments (HyD)'s maintenance depot, Hong Kong Police Force (HKPF)'s proposed police vehicle pound and the areas of roads, pedestrian walkways, sitting-out area and amenity areas in between. The area is mainly bounded by Sheung Yee Road in the North, Wai Yip Street in the East and the edge of Kwun Tong Bypass and the adjoining amenity areas in the West and South next to KTD. It has an area of about 17 ha including the areas of roads, pedestrian walkways, sitting-out area and amenity areas.

1.2.1.2 The Study Area is mainly zoned for "Government, Institution or Community (1)" ("G/IC(1)"), "Other Specified Uses (Refuse Transfer Station)" ("OU(Refuse Transfer Station)"), "Other Specified Uses (Business)" ("OU(Business)") and "Road" uses.

1.2.1.3 The Study Area is divided into six development sites, namely Lots 1 to 6 (**Figure 1.2.2**). The Kai Fuk Road flyover (Lot 3) literally bisected KBAA into the northern and southern portion. The northern cluster consists of the highway maintenance depot (part of area underneath the Flyover at Lot 3), a police vehicle detention and examination centre (Lot 1) and was previously occupied the former waste recycling centre (Lot 2), whereas the southern cluster by two vehicle examination centres (VECs) (Lot 4). Within KBAA, two lots zoned "OU(Business)" namely the New Kowloon Inland Lots (NKILs) 6512 (Lot 6) and 6313 (Lot 5) were sold in January and May 2015 and the respective commercial development has been completed in 2019.

1.3 Purpose of this Report

1.3.1.1 The purposes of this report include:

- to take cognisance of the existing and proposed studies and projects which may have bearing on the development;
- to assess the water demands for the developments;

[1] The waste recycling center has been demolished in Q1 2021

- to assess the impacts on water infrastructures arising from the development;
- to propose and design the water supply scheme arising from the development including carrying out all necessary hydraulic analysis to substantiate the proposed water supply scheme;
- to ensure that the interfaces with the works facilities are properly resolved, and that adequate mitigation and protection measures are practically developed for construction and operation phases of the developments and incorporated for future development into the detailed design;
- to formulate and recommend suitable protection schemes and measures and/or diversion schemes and arrangements to protect the works facilities, and minimise the disturbance to the normal operation of the facilities during both construction and operation stages;
- to enable an agreement in principle to be reached with WSD in respect of mitigation and protection schemes, diversion schemes, re-provisioning works and/or modifications of facilities for incorporation in design and during construction of the development.

1.3.1.2 The Structure of this report is as follows:

- This section is an introduction for this report;
- **Section 2** presents the key data of the revised outline development plans (RODP) on which the impact assessments is based;
- **Section 3** Assesses the impacts on existing and planned water supply systems due to the development and recommends the corresponding mitigation measures;
- **Section 4** conclusion.

2 Recommended Outline Development Plan (RODP)

2.1 Introduction

2.1.1.1 The Non-EFLS scenario has taken into consideration the efficient use of land resources, quality urban design within the bounds of the infrastructure capacities. In line with the development intensity in the "OU(B)" zone and Kowloon Bay as well as the anticipated decrease in hotel's demands in the coming years, the proposed plot ratio of the Non-EFLS scenario has been reviewed by converting portion of the proposed hotel development into office development. **Figure 2.1.1** shows the recommended outline development plan.

2.2 Key Development Parameters and Proposed Land Use Budget

2.2.1 Key Development Parameters

2.2.1.1 **Table 2.2.1** set out the key development parameters on individual Lots based on the approach above.

Table 2.2.1 Key Development Parameters on Individual Lots

Lot	Gross Site Area (m^2) (about)	Net Site Area (m^2) (about)	GFA (m^2) (about)	Plot Ratio
1	9,500	9,500	subject to detailed design and feasibility study	N/A
2*	24,140	17,000	204,600	12.0
3	8,400	8,400	400	N/A
4**	25,020	16,750	201,000	12.0
5	3,800	3,800	45,540	12.0
6	6,800	6,800	82,040	12.0
Total (excluding Lots 1 & 3)		**44,350**	**533,180**	N/A
TOTAL (excluding Lot 1)		**52,750**	**533,580**	N/A

Notes:

* Includes POSPD of about 4,400m^2 and the section of Cheung Yip Street (between Lots 2 and 5) of about 2,740m^2

** Includes POSPDs of about 1,600m^2 (western portion) and about 1,700m^2 between eastern portion and Lot 6, amenity areas of 2,140m^2 and the section of Cheung Yip Street of about 2,830m^2

2.2.2 Proposed Land Use Budget

2.2.2.1 The land use budget is tabulated in **Table 2.2.2**.

Table 2.2.2 Summary of the Proposed Land Use Mix of RODP

USES	GFA	%
Office	391,080	73.3%
Retail/ F&B/ Entertainment/ Urban Farming/ Food Workshop	122,220	22.9%
Hotel	14,880	2.8%

USES	GFA	%
Arts, Cultural and Creative	400	0.1%
Transport Facilities	5,000	0.9%
Total	**533,580**	**100.0%**

Remarks: The GFA of the two sold sites (i.e. Lots 5 and 6) are included. Based on the latest building plans, about 116,110 m^2 of office GFA and 11,480 m^2 of retail and F&B GFA are provided at the two sites.

2.2.3 Broad Estimation of Employment Size

2.2.3.1 Employment opportunities by land uses are derived by applying the worker density by land uses on the GFA data. Upon completion, the Preferred Option is anticipated to create in total of about 25,900 employment opportunities. **Table 2.2.3** summaries the estimated employment opportunities.

Table 2.2.3 Employment Opportunities by Uses under Preferred Option

USES	Preferred Option
Office[1]	19,554
Retail/ F&B/ Entertainment/ Urban Farming/ Food Workshop[2 6]	6,111
Hotel[3]	239
Arts, Cultural and Creative[4]	10
Transport Facilities[5]	10
Total	**25,924**

Notes:

[1] According to HK2030 Study WP 46, employment density for CBD office is assumed to be 1 worker per 20sqm.

[2] Retail, F&B, Entertainment, Urban Farming, and Food Workshop are assumed to be General Business Use. According to HKPSG, employment density is assumed to be 1 worker per 20-25sqm for General Business Use.

[3] As local employment density for hotel is not available, the assumption adopted by the UK government is therefore applied. It is assumed that for 4-5 Star Hotels, the ratio between hotel staff and number of rooms should be 1 hotel staff per 1.25 rooms. (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/378203/employ-den.pdf)

[4] According to Annex 6 and 7 of the Economic Impact of Developing the West Kowloon Cultural District Technical Paper (Financial Secretary's Office, 2007), the Performing Arts Facilities will create 4,275 direct employment opportunities. And the total GFA for these Performing Arts Facilities is of about 188,895sqm. The employment density for cultural and creative facilities is therefore assumed to be 1 worker per 44sqm.

[5] For the proposed PTI, the estimated number of employment opportunities is minimal at around 10 supporting staff.

[6] The employment density for urban farm is assumed to be 1 per 50m2 by making reference to AFCD Iveggie which employs 5 employees for an area of about 250sqm. (http://www.iveggie.com.hk/index.php/tw/investment)

3 Water Supply Impact Assessment

3.1 Introduction

3.1.1.1 Liaison with WSD has been conducted to obtain the record plan, WSD planning reports. The more relevant information obtained are listed in **Table 3.1.1** below.

Table 3.1.1 Existing Water Supply Information

Item No.	Information	Source of Information	Date
1	WSD record plan	WSD	22 Sep 2014
2	Planned Fresh Water Supply System for Kai Tak Development – WSD Sketch No.90196/7	WSD	25 Aug 2014
3	Consumption records of Fresh and Salt Water Service Reservoirs	WSD	6 Mar 2015

3.1.1.2 There is no existing hydraulic model available to facilitate the assessment of the capacities of the existing water supply systems in East Kowloon (including Water Treatment Works (WTW), Primary Service Reservoir, Reservoirs, Trunk Mains and Distribution Mains).

3.2 Methodology and Design Criteria

3.2.1 Design Guidelines

3.2.1.1 The water demand estimation, assessment and evaluation of impacts are based on the following established principals and guidelines of Hong Kong:

- EPD Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning No.: EPD/TP 1/05 (GESF)
- Hong Kong Planning Standards and Guidelines, August 2011 (HKPSG).
- WSD Departmental Instruction (DI) No. 1309
- Fire Service Department (FSD) Codes of Practice for Minimum Fire Service Installations and Equipment and Inspection, Testing and Maintenance of Installations and Equipment (April 2012 revision)

3.2.1.2 The estimate of water demands for the proposed development is based on the latest development parameters shown in **Section 2** above.

3.2.2 Hydraulic Analysis

3.2.2.1 The existing fresh water trunk system is modelled under the following conditions:

Demand for fresh and flushing water = 1.5 x MDD (Mean Daily Demand)

3.2.2.2 The proposed fresh water distribution system is modelled under the following conditions:

Service Reservoir Water Level = (TWL – IL)/2

Demand for fresh water = 3 x MDD (Mean Daily Demand)

Demand for flushing water = 2 x MDD (Mean Daily Demand)

3.2.2.3 Internal diameter of the water mains is used for hydraulic analysis. **Table 3.2.1** shows the nominal diameter and corresponding internal diameter for the common pipe sizes.

Table 3.2.1: Internal Diameter for Pipes

Nominal Diameter (mm)	**Internal Diameter (mm)**	
	Fresh Water Mains	**Salt Water Mains**
2000	1976	1932
1800	1776	1732
1600	1576	1532
1400	1379	1335
1200	1182	1150
1000	981	945
900	882	847
800	784	750
700	682	648
600	586	567
550	536	536
525	510	510
500	485	485
450	424	424
400	382	382
375	358	358
350	334	334
300	282	282
250	233	233
200	189	189
150	138	138
100	95	95
80	80	80
50	50	50
40	40	40
25	25	25
20	20	20

3.2.2.4 To cater for bend losses, the pipe length is factored by:

a) For urban areas = 1.2

b) For rural areas = 1.1

3.2.2.5 The pipeline headloss is calculated based on Hazen-Williams equation. The corresponding roughness coefficient is shown in **Table 3.2.2.**

Table 3.2.2: Hazen-Williams Roughness Coefficients

Water Main	Pipe Diameter (mm)	Roughness Coefficient
Fresh	< DN600	110
	≥ DN600	120
TMF	All	90

3.2.2.6 The design criteria for fresh water main and salt water main will follow design criteria under DI 1309. The system should meet the criteria as shown in **Table 3.2.3** below.

Table 3.2.3: Design Criteria for Fresh Water Main and Salt Water Main for Proposed Development

Minimum Residual Head (m)		Velocity of Distribution Pipeline - Peak Flow Condition (m/s)	
Fresh Water Main	Salt Water Main	Minimum	Maximum
20	15	0.9	3

3.3 Existing and Planned Water Supply System

3.3.1 Fresh Water Supply System

3.3.1.1 The nearby existing and planned fresh water supply systems are identified and layout are shown in **Drawing No. 237938/FW/001.**

3.3.1.2 Based on the WSD record plan, the existing Study Area is within the supply zone of Ngau Chi Wan Fresh Water Service Reservoir (NCW FWS/R). The existing Study Area is currently served by DN600 fresh water mains distributed from NCW FWS/R.

Ngau Chi Wan Fresh Water Service Reservoir (NCW FWS/R)

3.3.1.3 The existing NCW FWS/R has a storage capacity of 54,383 m^3, with top water level at 90.0 mPD and invert level at 82.6 mPD. The reservoir is supplied by a DN900 trunk main from Pak Kong WTW. According to the consumption record of NCS FWS/R as provided by WSD, the maximum average consumption rate among year 2013/2014 is about 20,200 m^3/day, which is far lower than the capacity of NCW FWS/R.

Kai Tak Development

3.3.1.4 According to the Kai Tak Development (KTD) Study, it is noted that a new Jordan Valley Fresh Water Service Reservoir (JV FWS/R) will be constructed by year 2021, to supplement existing Diamond Hill No.2 Fresh Water Service Reservoir (DH#2FWS/R) to supply fresh water to the KTD.

3.3.2 Salt Water Supply System

3.3.2.1 The nearby existing and planned Salt water supply systems are identified and layout are shown in **Drawing No. 237938/SW/001**.

3.3.2.2 The existing Study Area is located within the supply zone of Cha Kwo Ling Salt Water Pumping Station (CKL SWP/S), Jordan Valley SW S/R and Ma Yau Tong Salt Water Service Reservoir. The Jordan Valley SW S/R is supplied by a DN1200 trunk main from Cha Kwo Ling SW P/S. The DN1200 trunk main serves as a supply and distribution main in the balancing tank system. There is a major branch with a size of DN300 from the DN1200 trunk main, serves as a distribution main to supply salt water for the existing site area.

Cha Kwo Ling Salt Water Pumping Station (CKL SWP/S)

3.3.2.3 The existing design capacity of the pumping station is 104.6 MLD while its reliable capacity is 127.6 MLD. According to WSD record, the actual salt water output is 83.6 MLD, which is about 80% of its design capacity.

Jordan Valley Salt Water Service Reservoir (JV SWS/R)

3.3.2.4 The existing JV SWS/R has a storage capacity of 75,000 m3, with top water level at 75.0 mPD and invert level at 68.6 mPD. The reservoir is supplied by a DN1200 trunk main from Cha Kwo Ling SW P/S. Based on the record plans, the SWS/R is a balancing tank to provide storage to balance demand fluctuations during the days.

Trunk Main / Distribution Main Network

3.3.2.5 The DN1200 trunk main serves as a supply and distribution main in the balancing tank system. There is a major branch with a size of DN300 from the DN1200 trunk main to supply salt water for the existing site area. The DN300 branch mainly serves as a distribution main.

Kai Tak Development

3.3.2.6 As advised by WSD, salt water to KTD would be supplied from Cha Kwo Ling Salt Water Pumping Station and Tai Wan Salt Water Pumping Station at two stages. Cha Kwo Ling Salt Water Pumping Station is currently supplying salt water for the Advance Works of KTD while Tai Wan Annex Salt Water Pumping Station was not yelt constructed. Besides, no planned salt water mains would be laid near the Study Area. There is no interface between KTD and this proposed development regarding the salt water supply.

3.4 Potential Water Supply Impact and Proposed Water Supply Systems

3.4.1 Water Demand Estimation for Proposed Development

3.4.1.1 With reference to WSD DI No. 1309, the water demand breakdown for the proposed development is provided in **Appendix A** and summarized in the **Table 3.4.1** below.

Table 3.4.1 Estimated Water Demand from Proposed Development

Proposed Development - Lot	Estimated Fresh Water Mean Daily Demand (m3/day)	Estimated Salt Water Mean Daily Demand (m3/day)
Lot 1 – ORRC (previously called 'Integrated Waste Handling Facility') (1)	248	5
Lot 2 – Comprehensive Development	742	555
Lot 3 – Open Space and ACC Uses	2	1
Lot 4 – Comprehensive Development	915	590
Lot 5 (NKIL 6313) – Commercial	97	117
Lot 6 (NKIL 6512) – Commercial	187	213
Total	**2,190**	**1,481**
Total (with 20% allowance)	**2,628**	**1,777**

(1) Water demand of ORRC is calculated based on the sewage flow estimation, assuming sewage discharge from office to be "Salt Water Demand" while other sewage discharges are "Fresh Water Demand".

3.4.2 Fresh Water Supply

3.4.2.1 The estimated fresh water demand is about 2,630 m^3/day, and the corresponding required reservoir capacity is 75% of mean daily demand (MDD) which is 1,973m^3, about 4% of the capacity of existing NCW FWS/R only. Although there is no information on the existing water demand and future demand projection for supply zone of NCW FWS/R, large scale developments (KTD, Anderson Road, Anderson Road Quarry) in East Kowloon would be supported by other service reservoirs, and hence it is expected that there would be no significant increase in fresh water demand for NCS FWS/R. Given that the current utilization rate of NCW FWS/R is rather low (28%), there would be no adverse impact arising from the proposed development on the NCW FWS/R.

3.4.2.2 Peak fresh water demand of the proposed development is about 3 x MDD = 92 l/s. It is proposed to construct a DN350 water main and connect to the existing DN600 fresh water main at junction of Wang Chiu Road and Sheung Yee Road. According to the KTD Final Water Supply Impact Assessment Report (Issue 3), the residual head at the connection point is 65m, which is adequate for the proposed development.

3.4.3 Salt Water Supply

3.4.3.1 The estimated salt water demand is about 1,780 m^3/day, about 1.7% of the capacity of CKL SWP/S. According to WSD Planning Road No. 5/2001, the projected salt water demand within CKL SWP/S supply zone is about 100 MLD in later stage. With the Anderson Road Quarry Development (10MLD) and the proposed development, the total salt

water demand within CKL SWP/S supply zone will be 111.5 MLD approximately in later stage which is lower than its reliable capacity of 127.6 MLD.

3.4.3.2 The capacity required of salt water service reservoir is 25% of MDD which is 445 m^3, about 0.6% of the capacity of JV SWS/R only. In light of the above, it is considered that salt water demand arising from this proposed development would not cause adverse impact on the CKL SWP/S and JV SWS/R.

3.4.3.3 Peak salt water demand of the proposed development is about 2 x MDD = 41.2 l/s. It is proposed to construct a DN200 water main and connect to the existing DN300 salt water main at Wang Chiu Road.

4 Conclusion

4.1.1.1 For fresh water supply system, there is no adverse impacts on NCW FWS/R arising from the proposed development. It is proposed to construct a DN350 water main and connect to the existing DN600 fresh water main at junction of Wang Chiu Road and Sheung Yee Road to supply fresh water for the proposed development.

4.1.1.2 For salt water supply system, there is no adverse impacts on CKL SWP/S. It is proposed to construct a DN200 water main and connect to the existing DN300 salt water main at Wang Chiu Road.

Drawings

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PLANNED INLET OF JVFWSR AT LUNG CHEUNG ROAD NEAR HAMMER HILL ROAD

NGAU CHI WAN FRESH WATER SERVICE RESERVOIR (NCWFWSR)

PLANNED INLET OF JVFWSR AT KWUN TONG ROAD

PLANNED JORDAN VALLEY FRESH WATER SERVICE RESERVOIR (JVFWSR)

PLANNED OUTLET OF JVFWSR

CONNECT TO KAI TAK WATER SUPPLY SYSTEM

Ø900
Ø1000
Ø700
Ø600
Ø450

LEGEND:

- PLANNED FRESH WATER MAIN
- EXISTING FRESH WATER DISTRIBUTION MAIN
- STUDY AREA

Rev	Description	By	Date
A	DRAFT WP8	LTT	JUN15

Consultant

ARUP

Project title

Agreement No. CE 4/2014 (TP)
Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East Feasibility Study

Drawing title

EXISTING AND PLANNED FRESH WATER SUPPLY SYSTEM

Drawing no.	Rev.
237938/FW/001	A

Drawn	Date	Checked	Approved
JL	JUN/2015	KK	CC

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1:10000 @ A3

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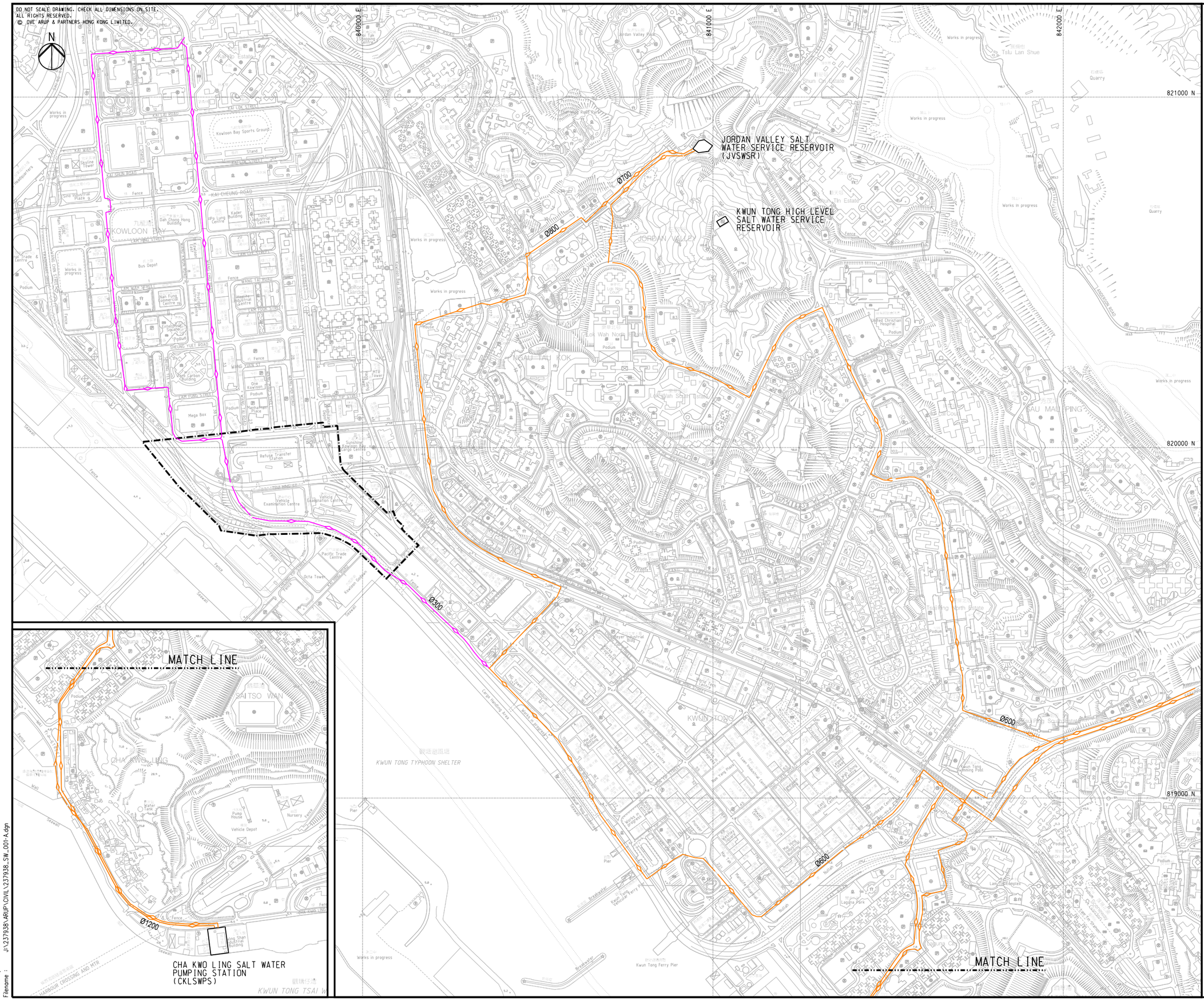

LEGEND:

- EXISTING SALT WATER TRUNK MAIN
- EXISTING SALT WATER MAJOR BRANCH MAIN
- STUDY BOUNDARY

Rev	Description	By	Date
A	DRAFT WP8	LTT	JUN15

Consultant

ARUP

Project title

Agreement No. CE 4/2014 (TP) Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East Feasibility Study

Drawing title

EXISTING AND PLANNED SALT WATER SUPPLY SYSTEM

Drawing no.			Rev.
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Appendices

Appendix A

Water Demand Estimation

ARUP	Job No.	Sheet No.	Rev.
	237938		
	Member/Location		
Job Title: P&E Study for the Development at KBAA	Drg. Ref.		
Calculation: Design Parameter for Water Demand Estimation	Made by: CK	Date: 03/2021	Chd.

Table 1 - Unit Daily Demand

Development Type	Type	Unit Demand Fresh Water	Unit Demand Flushing Water	Unit	Remarks
Commerical					
Commercial	General	0.210	0.070	m^3/head/day	
Office	-	0.030	0.050	m^3/head/day	(2)
Hotel	-	0.800	0.288	m^3/head/day	(3),(4)
Transport	J3	0.110	0.070	m^3/head/day	
Retail	J4	0.190	0.070	m^3/head/day	
Service Trades					(1)
For Residential Area		0.035	-	m^3/head/day	
Others					
Irrigation	-	0.01	-	m^3/m^2/day	

Notes:
(1) The unit daily demand is according to Table 1 and Table 2 of WSD DI No. 1309.
(2) According to the consumption rate in EPD's GESF App III (4)(d)
(3) Hotel's employment assumption: For 4-5 Star Hotels, 1 hotel staff per 1.25 rooms
(https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/378203/employ-den.pdf)
(4) Unit demand reference to Kai Tak Development project

ARUP	Job No.	Sheet No.	Rev.
	237938		
	Member/Location		
Job Title: P&E Study for the Development at KBAA	Drg. Ref.		
Calculation: Estimation of Water Demand of RODP	Made by: CK	Date: 04/2021	Chd.

LAND USE MIX

Lot No.	Proposed Land Use	Office GFA (m^2)	Retail/ F&B/ Entertainment GFA (m^2)	Hotel GFA (m^2)	ACC&T Use/Urban Farming/Food Workshop GFA (m^2)	Transport Facilities GFA (m^2)	Total GFA (m^2)
Lot 1	IWHF	-	-	-	-	-	-
Lot 2	Comprehensive Development	144,470	55,130	-	-	5,000	204,600
Lot 3	Open Space and ACC uses	-	-	-	400	-	400
Lot 4	Comprehensive Development	130,510	55,610	14,880	-	-	201,000
Lot 5	Commercial	42,000	3,540	-	-	-	45,540
Lot 6	Commercial	74,100	7,940	-	-	-	82,040
Total		**391,080**	**122,220**	**14,880**	**400**	**5,000**	**533,580**

ASSUMED EMPLOYMENT OPPORTUNITIES (1)

	Office	General Business Use	ACC	Urban Farm	MICE	Industrial	Transport Facilities
1 worker / GFA (m^2)	20	20	40	50	98	35	440

EMPLOYMENT NO. AND WATER DEMAND ESTIMATION

Lot No.	Proposed Land Use	Office			Retail/ F&B/ Entertainment			Hotel			ACC&T Use/Urban Farming/Food Workshop			Transport Facilities			Others		Total Employee	Total Demand	
		Office			Retail			Hotel			Commercial			Transport							
		UD =	0.03	0.05	UD =	0.19	0.07	UD =	0.8	0.288	UD =	0.21	0.07	UD =	0.11	0.07					
		Employee	FW (m^3/d)	FLW (m^3/d)	Employee	FW (m^3/d)	FLW (m^3/d)	Employee	FW (m^3/d)	FLW (m^3/d)	Employee	FW (m^3/d)	FLW (m^3/d)	Employee	FW (m^3/d)	FLW (m^3/d)	FW (m^3/d)	FLW (m^3/d)		FW (m^3/d)	FLW (m^3/d)
Lot 1	IWHF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	248	5	-	248	5
Lot 2	Comprehensive Development	7,224	217	361	2,757	524	193	-	-	-	-	-	-	11	1	1	-	-	9,991	742	555
Lot 3	Open Space and ACC uses	-	-	-	-	-	-	-	-	-	10	2	1	-	-	-	-	-	10	2	1
Lot 4	Comprehensive Development	6,526	195.77	326	2,781	528	195	239	191	69	-	-	-	-	-	-	-	-	9,545	915	590
Lot 5	Commercial	2,100	63	105	177	34	12	-	-	-	-	-	-	-	-	-	-	-	2,277	97	117
Lot 6	Commercial	3,705	111	185	397	75	28	-	-	-	-	-	-	-	-	-	-	-	4,102	187	213
Total		**19,554**	**587**	**978**	**6,111**	**1,161**	**428**	**239**	**191**	**69**	**10**	**2**	**1**	**11**	**1**	**1**	**248**	**5**	**25,925**	**2,190**	**1,481**
																			With 20% Allowance	**2,628**	**1,777**

Notes
(1) Employment opportunities by land use were derived by applying the worker density by land use on the GFA data. Assumptions refer to WP No.6 Section 5.7.1.1.

Summary of Assessments for Proposed Public Housing Development at Yip On Factory Estate Site, Kowloon Bay

Background

1. In the 2019 Policy Address, the Chief Executive invited the Housing Authority (HA) to explore the feasibility of redeveloping its factory estates for public housing use. The HA has completed the relevant study, and announced on 24 May 2021 the study result and the clearance arrangements for the affected tenants. The study concluded that four sites, including Yip On Factory Estate, were technically feasible for housing development and will proceed with rezoning process of these sites for residential purpose.

2. The Yip On Factory Estate site and part of Wang Hoi Road (the Site) is bounded by Wai Yip Street, Wang Yuen Street, Wang Mau Street and Sheung Yee Road and has land area of about 1.5 ha **(Plan 1)**. According to the approved Ngau Tau Kok and Kowloon Bay Outline Zoning Plan No. S/K13/30 (OZP), the Site is zoned "Other Specified Uses (Business)" ("OU(B)") including an area shown as 'Road'. According to the OZP, a 5m-wide non-building Area (NBA) from the lot boundary abutting the eastern side of Wang Mau Street shall be provided within the "OU(B)" zone to improve the air ventilation in the Kowloon Bay Business Area (KBBA).

3. To facilitate the proposed public housing development based on the feasibility study, the Government will initiate rezoning of the Site for residential use with stipulation of a maximum plot ratio of 7.5 for a domestic building or 9.0 for a building that is partly domestic and partly non-domestic, and a maximum building height of about 120mPD.

Development Proposal

4. The Site will be redeveloped to provide about 2,200 public housing units for a design population of about 6,000. The proposed development scheme **(Plan 2)** consists of four domestic blocks with about 32 to 35 domestic floors. Each block is atop of a 4 to 6-storey non-domestic podium with facilities such as welfare facilities, ancillary car park, other non-domestic facilities, etc., subject to detailed design. The maximum building height is 120mPD with site formation level at about 4.5mPD. Details of landscape treatments and tree preservation are in **Annex 1**. The proposed welfare facilities as advised by the Social Welfare Department

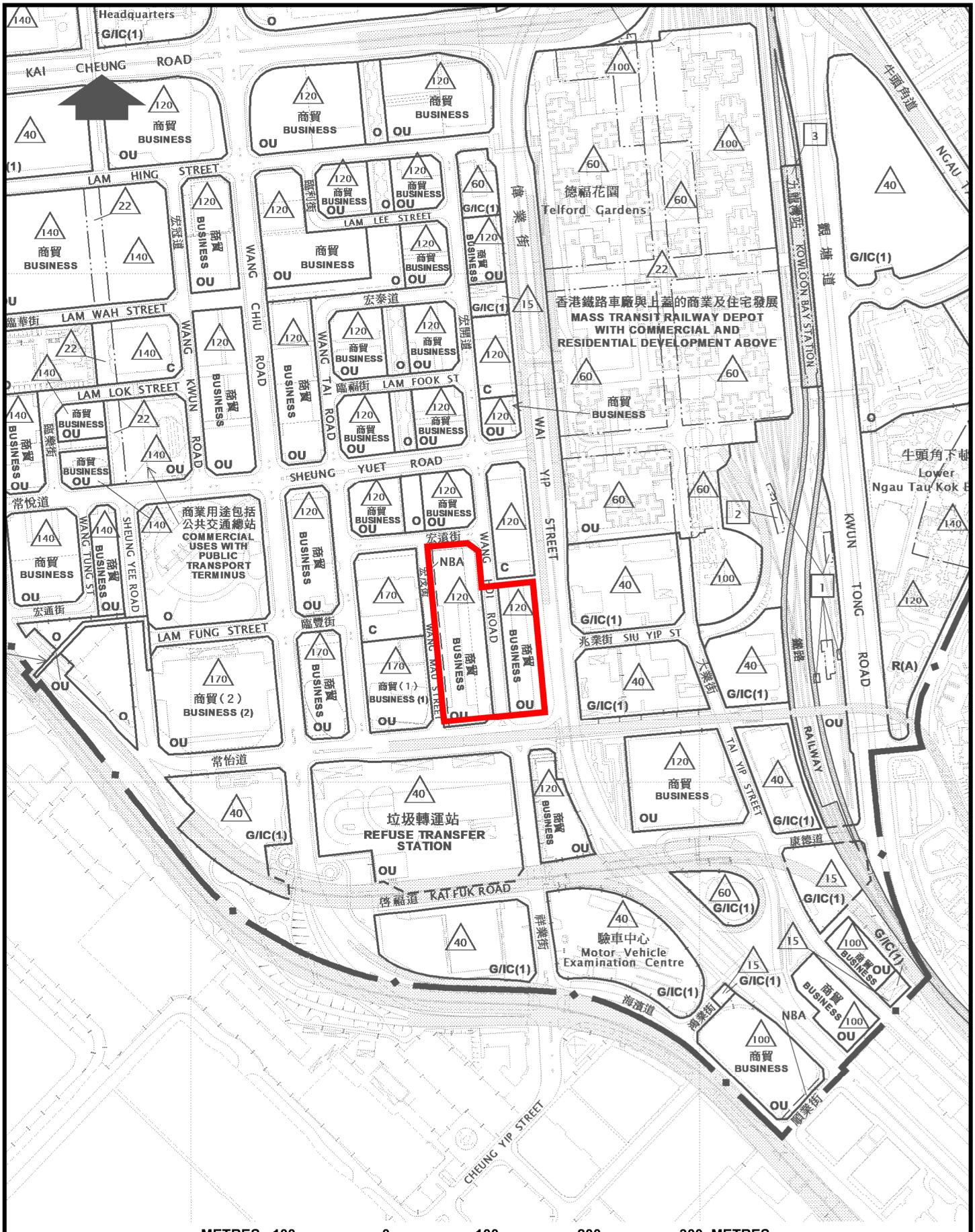
include a Neighbourhood Elderly Centre (NEC) sub-base, a Residential Care Home for the Elderly (RCHE) cum Day Care Unit (DCU), Home Care Services (HCS) for Frail Elderly Persons, an office base of On-site Pre-school Rehabilitation Services, a Supported Hostel for Mentally Handicapped Persons, and a Supported Hostel for Ex-mentally Ill Persons, the actual provision is subject to detailed design.

Technical Studies

5. Technical studies relating to traffic, sewerage, waterworks, environmental, air ventilation and visual aspects have been conducted to demonstrate that the proposed development is technically feasible as well as to support the rezoning proposal from "OU(B)" and 'Road' to residential use. The relevant technical findings are in **Annexes 2 to 4**.

Attachments

Plan 1	Location Plan
Plan 2	Indicative Master Layout Plan
Annex 1	Landscape Treatments and Tree Preservation
Annex 2	Summary of Technical Assessments (Traffic Impact Assessment, Sewerage Impact Assessment, Waterworks Impact Assessment and Environmental Assessment Study)
Annex 3	Air Ventilation Assessment – Expert Evaluation
Annex 4	Visual Appraisal



YIP ON FACTORY ESTATE, KOWLOON BAY

HOUSING DEPARTMENT
PLANNING SECTIONS

PLAN 1

DATE : 17. 9. 2021

BASE EXTRACTED FROM OZP No. S/K13/30

21_0605KLN_OZP

International Plaza

Chevalier Commercial Centre

WANG YUEN STREET

WANG HOI ROAD

Elevated Road

TELFORD GARDENS

N

Podium
(Car Park under)

B1

A2

A1

Road

Kowloon East
Operational Base Range

Ngau Tau Kok Police Station

Police Operational Base
Kowloon East

ESS

SIU YIP STREET

WAI YIP STREET

CHANGE TOWER

ONE KOWLOON

WANG TAI ROAD

MAU STREET

MAHATTEN PLACE

RPRISE SQUARE III

5M-WIDE NBA

BLOCK C
+120.0
34 DOMESTIC STOREYS

+85.0
21 DOMESTIC STOREYS

+26.4
5 STOREYS NON-DOMESTIC FACILITIES

+86.0
21 DOMESTIC STOREYS

BLOCK A
+120.0
35 DOMESTIC STOREYS

+22.5
4 STOREYS NON-DOMESTIC FACILITIES

BLOCK D
+120.0
34 DOMESTIC STOREYS

+26.1
5 STOREYS NON-DOMESTIC FACILITIES

+31.2
BLOCK B
+120.0
32 DOMESTIC STOREYS

6 STOREYS NON-DOMESTIC FACILITIES

PROPOSED ELEVATED WALKWAY TO BE CONSTRUCTED BY CEDD/ HyD

Ngau Tau Kok Ambulance Depot

Telephone Exchange

Ngau Tau Kok Engineering Centre

Clothing Indus
Training Autho
Kowloon Bay
Training Centr

SHEUNG YEE ROAD

Elevated Road

Elevated Road

PROPOSED CONNECTION TO KBAA

Ramp

Ramp

PH

EW

CW

Sitting Out Area

ET

LEGEND:

- SITE BOUNDARY
- DOMESTIC BLOCKS
- NON-DOMESTIC FACILITIES
- 5M WIDE NBA
- FUTURE ELEVATED WALKWAY CONSTRUCTED BY CEDD/ HYD (ALIGNMENT IS INDICATIVE ONLY AND SUBJECT TO DETAILED DESIGN)

REVISIONS

NO	DESCRIPTION AND DATE	INITIAL AND DESIGNATION DWN	CKD	AUTH

	NAME AND DESIGNATION	INITIAL	DATE
AUTHORISED		ORIGINAL SIGNED	05/20
CHECKED		ORIGINAL SIGNED	05/20
		ORIGINAL SIGNED	05/20
		ORIGINAL SIGNED	05/20
DRAWN		ORIGINAL SIGNED	05/20

DATE OF ISSUE:

PROJECT
REDEVELOPMENT AT
YIP ON FACTORY ESTATE

DRAWING TITLE
MASTER LAYOUT PLAN
(INCLUDING WANG HOI ROAD)

SCALE

DRAWING NO.
KT30RR/MLP-2/01

SOURCE

ICU NO.

AutoCAD 2000 A1 594 x 841

HOUSING DEPARTMENT

COPY FOR
C.E. OTHERS:
B.S.E. G.E.
IOW/COW RLE / OFFICE
R.E. Q.S.
Contractor Architect

COUNTERCHECKED

Proposed Public Housing Development at Yip On Factory Estate Site, Kowloon Bay

Landscape Treatments and Tree Preservation

1. The Site is characterized as Industrial Urban Landscape under Landscape Character Map of Hong Kong promulgated by Planning Department. The existing topography is generally flat with a row of existing trees located along Wang Hoi Road. One mature tree in the Site was identified and is proposed to be retained and protected. As the Site is currently dedicated to industrial use with only limited landscape provision, it is considered that the proposed development with removal of most of the existing trees shall not impose significant landscape impact on the local neighbourhood in terms of landscape character.
   `

2. There are **22** existing trees identified within the site boundary. The condition of these trees is mostly Poor and Fair, with Low to Medium amenity value. A tree survey was conducted in 4 November 2020. Tree Survey and Treatment Plan **(Enclosure 1)**, Tree Assessment Schedule **(Enclosure 2)** and Tree Photos **(Enclosure 3)** are attached for reference.

3. According to the Tree Survey, no rare or protected species listed under *Cap. 96, Cap. 586 or Champion Trees in Urban Hong Kong* were found within the Site. Additionally, no "Old and Valuable Tree" nor "Tree of precious or rare species" stipulated under DEVB TC(W) No. 5/2020 were identified within the Site.

4. With consideration of the proposed development, **1** mature tree is proposed to be retained, whereas **21** trees (4,923mm aggregated diameter at breast height (DBH)) will be inevitably affected by the proposed development and are recommended to be felled. Those trees recommended to be felled are all common species in Hong Kong dominated by *Aleurites moluccana*. The form, health and structural condition of these trees are mostly poor to average. All of these trees are grown in a restricted environment (i.e. narrow raised planter) which limited the root ball size, transplanting of these trees are considered uneconomical due to low survival rate.

5. The proposal is sought to preserve valuable landscape resources, such as mature trees with major visual interest as far as practicable. The building footprint has been dedicatedly amended to preserve **1 mature tree on site** (FYO-T0016). With the endeavor to protect the valuable landscape resource as such, it is believed that there

should be no significant landscape impact on the surrounding area.

6. To compensate for the felling of 21 trees with **4,923**mm aggregated DBH, and to achieve a compensation ratio of not less than 1:1 in terms of quantity, a minimum of **21** heavy-standard trees (95mm diameter at DBH minimum) will be planted and maintained by the HA upon completion of the development to compensate the loss of greenery in the locale. Tree species of greater longevity, higher amenity value which can be enjoyed by the general public (i.e. trees with seasonal flowers and foliage) will be planted at an optimum spacing for growth. Compensatory planting plan is attached in **Enclosure 4**.

7. The conceptual landscape plan is in **Enclosure 4**. Local open space of not less than 6,000m^2 (i.e. 1m^2 per person in accordance with the Hong Kong Planning Standards and Guidelines (HKPSG)) would be provided **(Enclosure 5)**, landscape sections across the development to demonstrate the spatial quality of the proposed local open space, the relationship with buildings and the surrounding and the landscape treatment at various levels can be found in **Enclosure 6**. The proposed development will provide at least 20% green coverage and aim to achieve 30% subject to individual site characteristics and constraints.

8. Various landscape elements have been adopted as follows:

a. Landscape at Access/Local Open Space

A welcoming landscape garden at the access near Wai Yip Street with extensive planting is proposed to create a sensational experience which is absent in the surrounding environment. The local open space adjacent to Sheung Yee Road will be framed by the signature existing tree (FYO-T0016), with an expansive canopy - the big ficus tree will become the identity of the Site while serving as a shelter for users to enjoy in the proposed children's play area underneath, while other users can meanwhile be intrigued by the lively and youthful encounters upon their visits. Variety of plant materials including those with seasonal flowers and foliage will be proposed to further elevate the experience throughout different times of the year. Landscape garden on accessible podium will also be provided with a vibrant mix of suitable plant species with recreational facilities for the enjoyment of future residents. The provision of local open space in the proposed public housing development based on HKPSG is intended for the enjoyment of residents.

b. Landscape Corridor in Pedestrian Environment

Extensive greening will be provided alongside the access road. Roadside trees and shrubs with optimal height will be proposed on two sides of the access road as far as practicable, to create a sense of pedestrian street-like landscape, as a mean to achieve traffic separation in the proposed development while maintaining a high level of traffic efficiency.

c. Peripheral Planting and Boundary Treatment

On ground level, ornamental shrubs will be proposed in the east facing side so that to create a more buoyant streetscape to the pedestrian. Meanwhile, vertical greening on the east and west facing building frontages and hanging plant or shrubs planting will be proposed along the elevation of the building (Detail refers to **Enclosure 7**), which will become a major eye catcher. The overall landscape value is considered to be enhanced after completion of the proposed development.

Attachments

Enclosure 1	Tree Survey and Treatment Plan
Enclosure 2	Tree Assessment Schedule
Enclosure 3	Tree Photos
Enclosure 4	Conceptual Landscape Layout Plan
Enclosure 5	Local Open Space Provision
Enclosure 6	Landscape Sections
Enclosure 7	Vertical Green Details

LEGEND:

TREE TO BE FELL

TREE TO BE RETAINED

N

WANG HOI ROAD

WANG MAU STREET

WAI YIP STREET

5M BREEZEWAY

NON-BUILDING AREA

FYO–T0051

FYO–T0002

FYO–T0003

FYO–T0004

FYO–T0005

FYO–T0006

FYO–T0007

FYO–T0008

FYO–T0009

BLOCK C
+120.0
34 DOMESTIC
STOREYS

+26.4

WELFARE CARPARK

EVA / DRIVEWAY

D. L/UL

D. L/UL

NON-D. L/UL

NON-D. L/UL

FYO–T0010

BLOCK A
+120.0
35 DOMESTIC
STOREYS

+22.5

D. L/UL

D. L/UL

NON-D. L/UL

NON-D. L/UL

NON-D. L/UL

NON-D. L/UL

TO COVERED CARPARK

FYO–T0011

EVA

FYO–T0046

+4.5

TO COVERED CARPARK

D. L/UL

D. L/UL

D. L/UL

D. L/UL

TO COVERED CARPARK

FYO–T0013

FYO–T0043

FYO–T0014

FYO–T0042

FYO–T0041

BLOCK D
+120.0
34 DOMESTIC
STOREYS

+26.1

+31.2

BLOCK B
+120.0
32 DOMESTIC
STOREYS

5M BREEZEWAY

FYO–T0016

FYO–T0050

FYO–T0040

FYO–T0018

FYO–T0039

PROP
ELEV
WALK
CONS
CEDD

PROPOSED PUBLIC HOUSING DEVELOPMENT
AT YIP ON FACTORY ESTATE SITE, KOWLOON BAY

TREE SURVEY AND TREATMENT PLAN

ENCLOSURE 1

DRAWING NO.

SCALE 1:500

DATE **NOV 2021**

房屋署
HOUSING DEPARTMENT

Tree Assessment Schedule [1]

Project Title: Proposed Public Housing Development at Yip On Factory Estate Site, Kowloon Bay

Date of Tree Survey: 11/4/2020

Surveyed by : EMD 2020 Tree Inventory - HA

ENCLOSURE 2

Tree No.[2]	Species[3]		Measurements			Amenity value[5]	Form	Health condition	Structural condition	Suitability for transplanting[6]		Conservation Status[8]	Recommendation	Maintenance department to provide comments on TPRP[9]		Additional Remarks[10]
	Scientific name	Chinese name	Height (m)	DBH[4] (mm)	crown spread (m)	(high(H)/ medium(M) /low(L))	(Good (G) / Average (A) / Poor (P))			(high(H)/medium(M)/low(L))	Remarks[7]		(retain /transplant/ remove)	Before	After	
FYO-T0002	Aleurites moluccana	石栗	13	370	6	M	A	A	A	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0003	Aleurites moluccana	石栗	8	320	5	M	A	A	A	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0004	Aleurites moluccana	石栗	7	240	4	M	A	A	A	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0005	Aleurites moluccana	石栗	8	330	5	M	A	A	A	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0006	Aleurites moluccana	石栗	8	260	6	M	A	A	A	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0007	Aleurites moluccana	石栗	7	190	4	M	A	A	A	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0008	Aleurites moluccana	石栗	9	315	4	M	A	A	A	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0009	Aleurites moluccana	石栗	9	330	5	M	A	A	A	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0010	Aleurites moluccana	石栗	7	205	3	M	A	A	A	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0011	Aleurites moluccana	石栗	7	220	3	M	A	A	A	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0013	Aleurites moluccana	石栗	7	190	3	L	P	A	P	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0014	Aleurites moluccana	石栗	7	300	3	M	A	A	A	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0016	Ficus virens var. sublanceolata	大葉榕(黃葛樹)	13	850	11	M	A	A	A	L		N/A	Retain	N/A	N/A	RAISED PLANTER
FYO-T0018	Ficus microcarpa	榕樹(細葉榕)	7	500	6	M	P	A	P	L		N/A	Remove	N/A	N/A	KERB PLANTER
FYO-T0039	Michelia x alba	白蘭	8	220	3	L	P	A	P	L		N/A	Remove	N/A	N/A	KERB PLANTER
FYO-T0040	Phoenix roebelenii	日本葵(軟葉刺葵)	3	110	1	M	P	A	P	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0041	Phoenix roebelenii	日本葵(軟葉刺葵)	3	100	2	L	P	A	P	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0042	Bridelia tomentosa	土蜜樹(逼迫仔)	6	140	3	M	P	A	P	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0043	Phoenix roebelenii	日本葵(軟葉刺葵)	3	100	1	M	A	A	A	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0046	Dimocarpus longan	龍眼	4	156	3	L	P	A	P	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0050	Mangifera indica	芒果	8	141	3	M	A	A	A	L		N/A	Remove	N/A	N/A	RAISED PLANTER
FYO-T0051	Ficus microcarpa	榕樹(細葉榕)	4	186	3	M	A	A	A	L		N/A	Remove	N/A	N/A	KERB PLANTER

Tree No.[2]	Species[3]		Measurements			Amenity value[5]	Form	Health condition	Structural condition	Suitability for transplanting[6]		Conservation Status[8]	Recommendation	Maintenance department to provide comments on TPRP[9]		Additional Remarks[10]
	Scientific name	Chinese name	Height (m)	DBH[4] (mm)	crown spread (m)	(high(H)/ medium(M) /low(L))	(Good (G) / Average (A) / Poor (P))			(high(H)/medium(M)/low(L))	Remarks[7]		(retain /transplant/ remove)	Before	After	

Prepared By : _____

Date : 11/4/2020

1 For large-scale infrastructure works projects, such as site formation works and advance infrastructure works for new town development, tree group survey can be adopted subject to the justification(s) provided.

2 Tree(s) in the Register of Old and Valuable Trees should be highlighted with their registration numbers.

3 Guidance on proper use of scientific name of plants is given in the Agriculture, Fisheries and Conservation Department's Nature Conservation Practice Note No. 3, which can be viewed at AFCD's web page *http://www.afcd.gov.hk/english/conservation/con_tech/files/common/NCPC_No.03_The_use_of_plant_names_rev_2008_2.pdf).*

4 DBH of a tree refers to its diameter at breast height (i.e. measured at 1.3 m above ground level). Guidance on DBH measurement is given in the Agriculture, Fisheries and Conservation Department's Nature Conservation Practice Note No. 2, which can be viewed at AFCD's web page: *(http://www.afcd.gov.hk/english/conservation/con_tech/files/common/NCPN_No.02_measurement_of_DBH_ver.2006.pdf).*

5 Amenity value of a tree should be assessed by its functional values for shade, seasonal interest, screening, reduction of pollution and noise and also itsfung shui significance, and classified into the following categories.
High (H): important trees which should be retained by adjusting the design layout accordingly.
Medium (M): trees that are desirable to be retained in order to create a pleasant environment, which includes healthy specimens of lesser importance than "High" trees.
Low(L): trees that are dead, dying or potentially hazardous and should be removed.

6 Assessment shall take into account conditions of an individual tree at the time of survey (including health, structure, age and root conditions), site conditions (including topography and accessibility), and intrinsic characters of tree species (survival rate aftertransplanting)

7 Major determining factors outlined in para. 8(a) - 8(f) of DEVB TC(W) No.4/2020 for the rating on suitability for transplanting:
(a) low amenity value;
(b) poor health, structure or form;
(c) irrecoverable form after transplanting (e.g. transplanting requires substantial crown and root pruning);
(d) low chance of survival upon transplanting;
(e) undesirable species (e.g. *Leucaena leucocephala* which is an invasive, exotic and self-seeding tree); or
(f) tree grown under poor condition which have limited the formation of proper rootball necessary for transplanting.

8 State the rarity and protection status of the species.

9 Refer to paragraphs 35 and 36 of the Circular. (DEVB TC(W) No. 4/2020)

10 Any additional information deemed necessary for consideration of the proposed management recommendation.



FYO-T0002.JPG



FYO-T0003.JPG



FYO-T0004.JPG



FYO-T0005.JPG



FYO-T0006.JPG



FYO-T0007.JPG



FYO-T0008.JPG



FYO-T0009.JPG



FYO-T0010.JPG



FYO-T0011.JPG



FYO-T0013.JPG



FYO-T0014.JPG



FYO-T0016.JPG



FYO-T0016_2.png



FYO-T0018.JPG



FYO-T0039.JPG



FYO-T0040.JPG



FYO-T0041.JPG



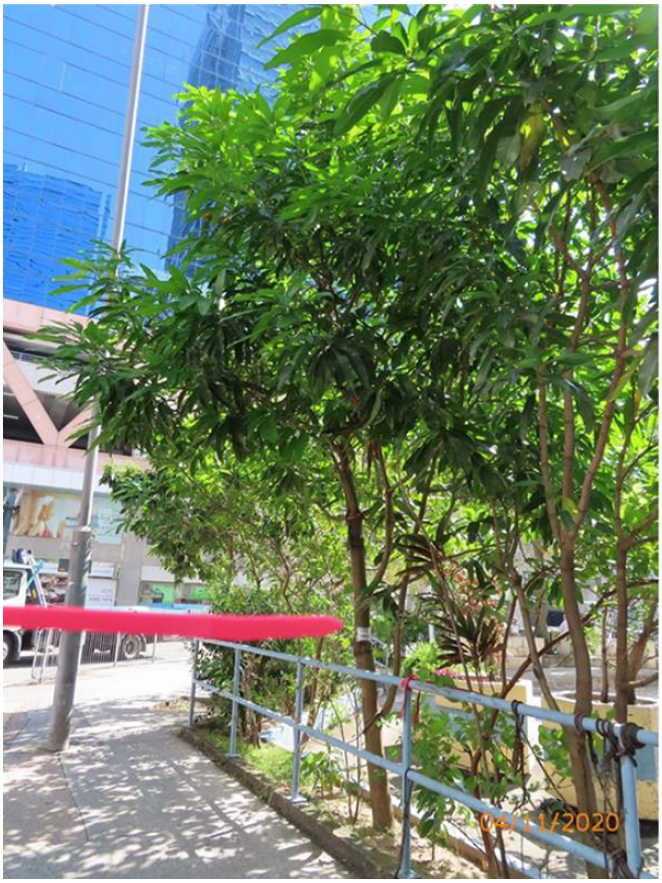
FYO-T0042.JPG



FYO-T0043.JPG



FYO-T0046.JPG



FYO-T0050.JPG



FYO-T0051.JPG

LEGEND:

- BENCHES
- COMPENSATORY AND NEW TREE PLANTINGS
- EXISTING TREE TO BE RETAINED
- PLANTING AREA (AT GRADE)
- PLANTING AREA (PODIUM EDGE)
- PLANTING AREA (PODIUM/ROOF)
- VERTICAL GREEN (3.5m HEIGHT)
- 1 CHILDREN'S PLAY AREA (CPA)
- 2 ENTRANCE LANDSCAPE GARDEN
- 3 LANDSCAPE CORRIDOR
- 4 PERIPHERAL PLANTING / BOUNDARY LANDSCAPE TREATMENTS
- 5 PODIUM LANDSCAPE GARDEN

NOTE:
INDICATIVE LAYOUT ONLY,
SUBJECT TO CHANGE IN DETAILED DESIGN STAGE

N

4.8

5M BREEZEWAY

BLOCK C
+120.0
34 DOMESTIC STOREYS

+26.4

WANG HOI ROAD

WELFARE CARPARK

EVA / DRIVEWAY

D. L/UL
D. L/UL
NON-D. L/UL
NON-D. L/UL

BLOCK A
+120.0
35 DOMESTIC STOREYS

+22.5

D. L/UL
D. L/UL
NON-D. L/UL
NON-D. L/UL
NON-D. L/UL
NON-D. L/UL

WANG MAU STREET

NON-BUILDING AREA

TO COVERED CARPARK

EVA / DRIVEWAY

+4.5

D. L/UL
D. L/UL
D. L/UL
D. L/UL

TO COVERED CARPARK

TO COVERED CARPARK

BLOCK D
+120.0
34 DOMESTIC STOREYS

+26.1

+31.2

BLOCK B
+120.0
32 DOMESTIC STOREYS

FYO–T0016

WAI YIP STREET

PROP
ELEV
WALK
CONS
CEDD

5M BREEZEWAY

PROPOSED PUBLIC HOUSING DEVELOPMENT
AT YIP ON FACTORY ESTATE SITE, KOWLOON BAY

CONCEPTUAL LANDSCAPE LAYOUT PLAN

ENCLOSURE 4

DRAWING NO.

SCALE 1:500

DATE **NOV 2021**

房屋署
HOUSING DEPARTMENT

LEGEND:

LOCAL OPEN SPACE
(NOT LESS THAN 6,000 SQM)

NON-BUILDING AREA

N

+4.8

5M BREEZEWAY

BLOCK C
+120.0
34 DOMESTIC
STOREYS

+26.4

WANG HOI ROAD

WELFARE
CARPARK

EVA /
DRIVEWAY

D. L/UL
D. L/UL
NON-D. L/UL
NON-D. L/UL

BLOCK A
+120.0
35 DOMESTIC
STOREYS

+22.5

D. L/UL
D. L/UL
NON-D. L/UL
NON-D. L/UL
NON-D. L/UL
NON-D. L/UL

WAI YIP STREET

WANG MAU STREET

NON-BUILDING AREA

TO
COVERED
CARPARK

EVA / DRIVEWAY

+4.5

D. L/UL
D. L/UL
D. L/UL
D. L/UL

TO
COVERED
CARPARK

TO
COVERED
CARPARK

BLOCK D
+120.0
34 DOMESTIC
STOREYS

+26.1

+31.2

BLOCK B
+120.0
32 DOMESTIC
STOREYS

5M BREEZEWAY

PROP
ELEV
WALK
CONS
CEDD

PROPOSED PUBLIC HOUSING DEVELOPMENT
AT YIP ON FACTORY ESTATE SITE, KOWLOON BAY

LOCAL OPEN SPACE PROVISION

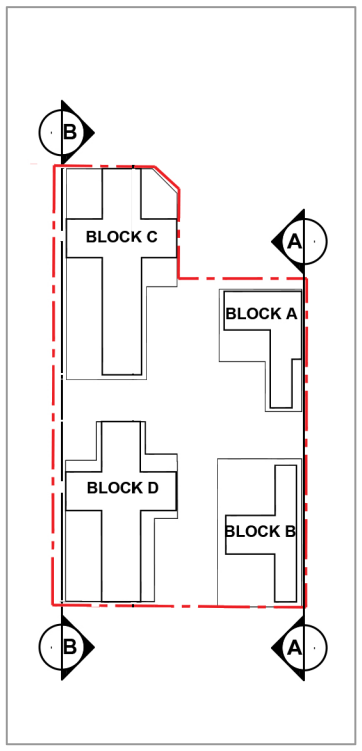
ENCLOSURE 5

DRAWING NO.

SCALE
1:500

DATE
NOV 2021

房屋署
HOUSING DEPARTMENT



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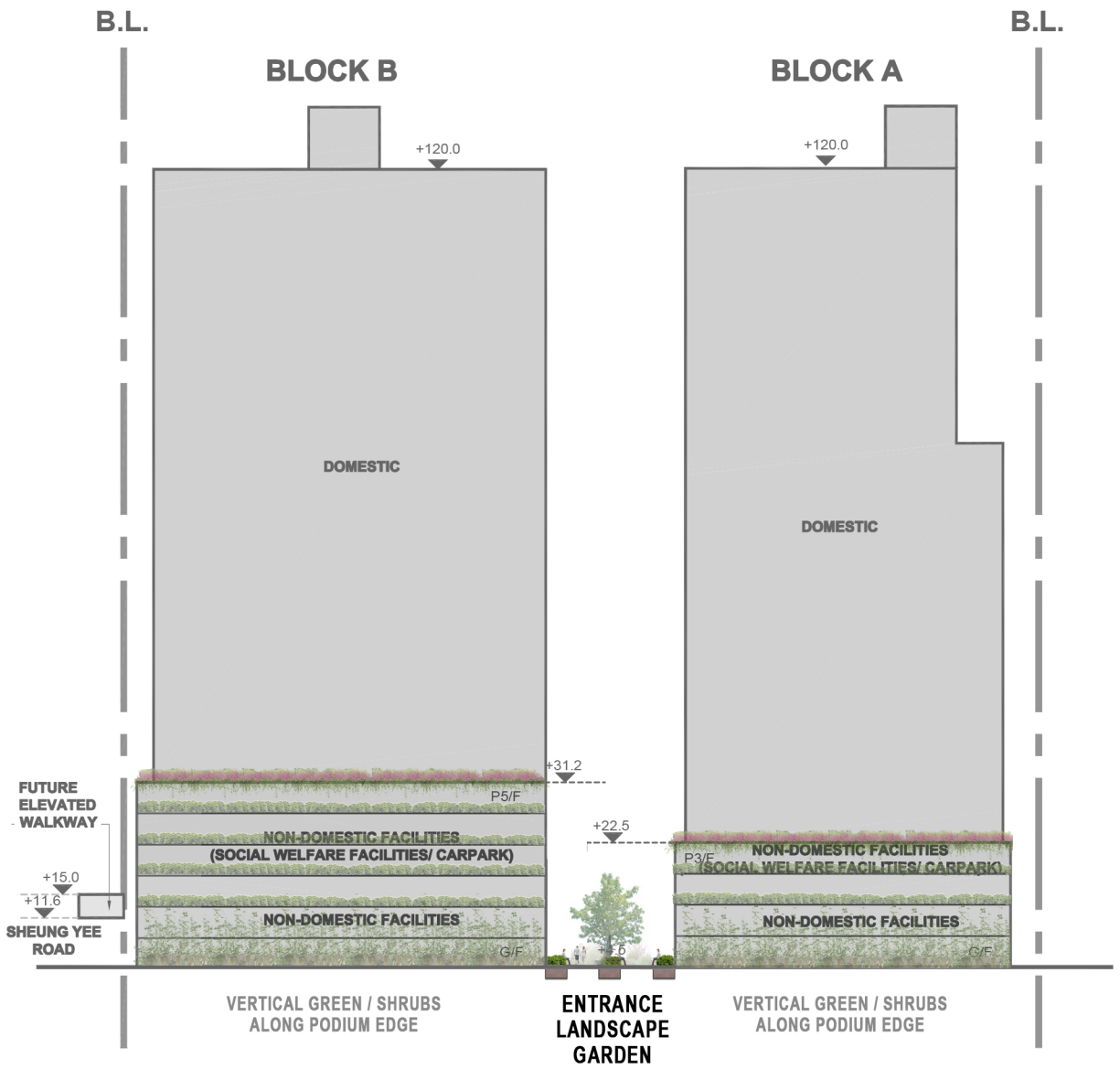
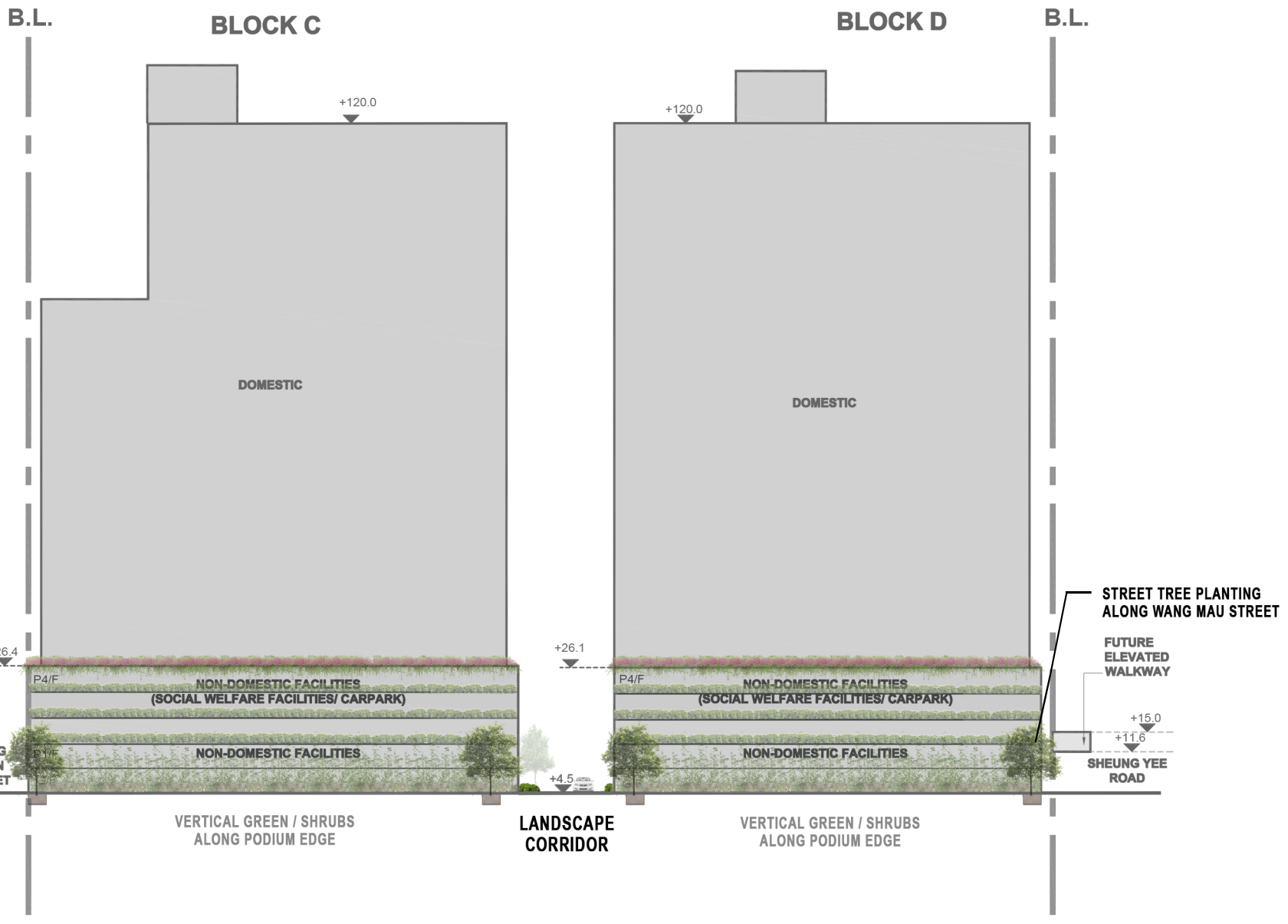


SECTION A-A



SECTION B-B

PROPOSED PUBLIC HOUSING DEVELOPMENT
AT YIP ON FACTORY ESTATE SITE, KOWLOON BAY

LANDSCAPE SECTIONS

ENCLOSURE 6

DRAWING NO.

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DATE **NOV 2021**

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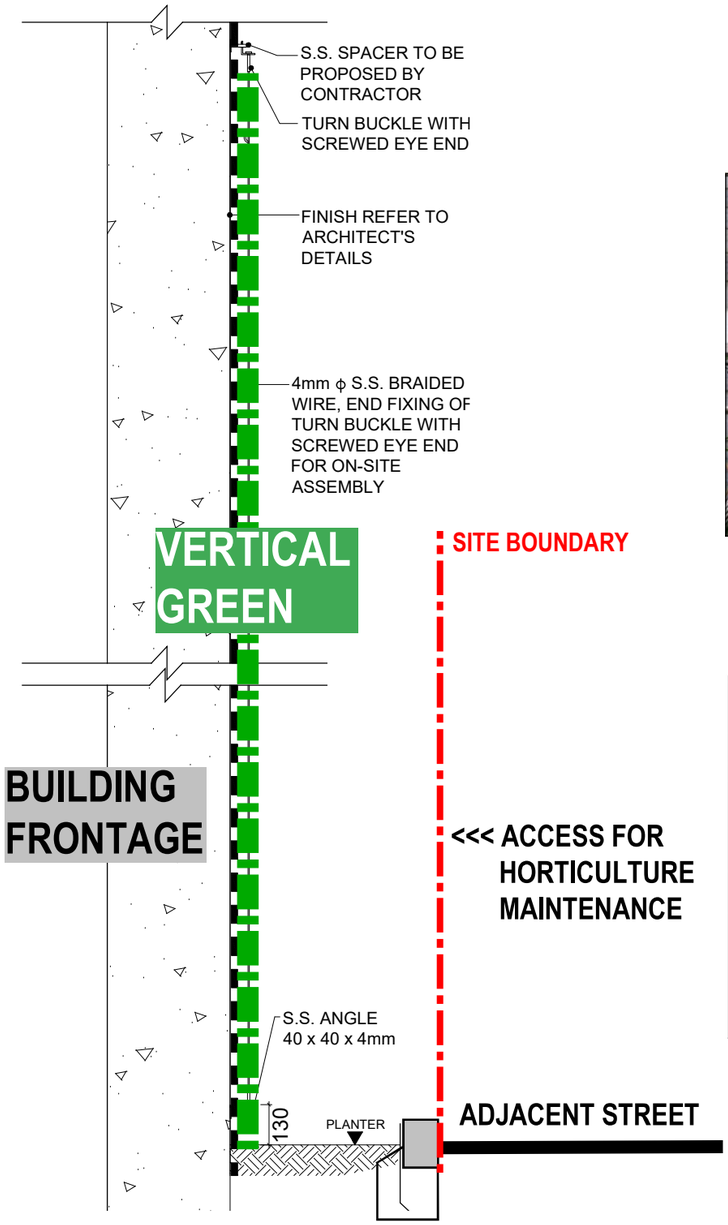
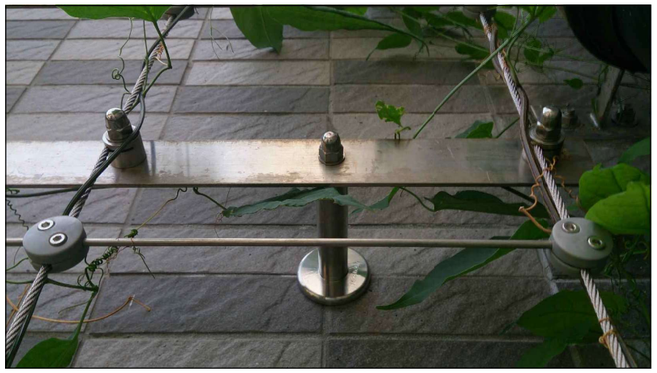
HOUSING DEPARTMENT

INDICATIVE ONLY
SUBJECT TO CHANGE IN DETAILED DESIGN STAGE



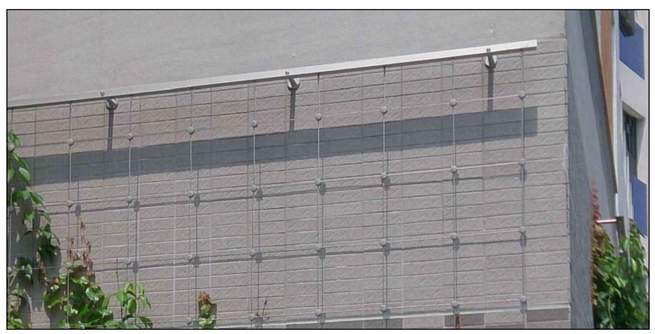
TYPICAL SECTION FOR VERTICAL GREENING



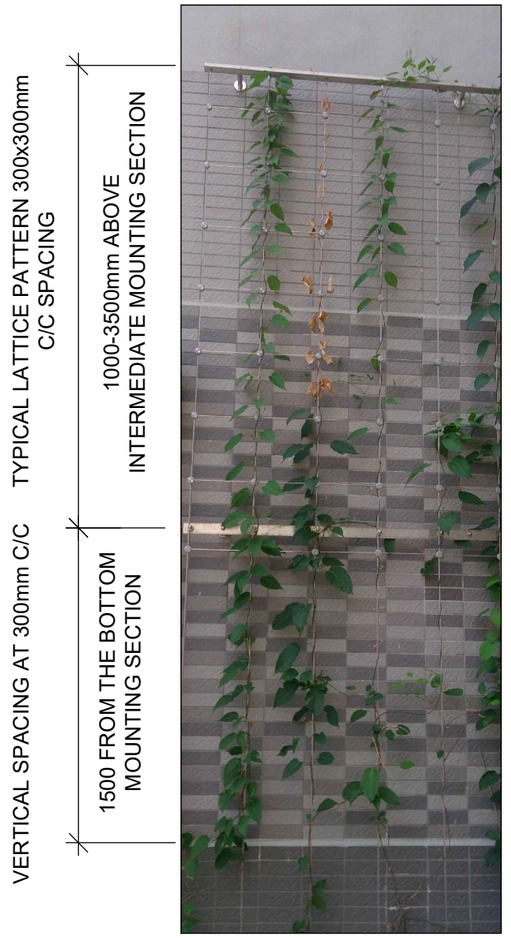
REFERENCE PHOTO OF INTERMEDIATE MOUNTING SECTION



REFERENCE PHOTO OF BOTTOM MOUNTING SECTION
WITH EXTERNEALTHREAD END



REFERENCE PHOTO OF TOP MOUNTING SECTION





REFERENCE PHOTO OF
INTERMEDIATE MOUNTING SECTION
AND ADJUSTABLE CROSS CLAMP

NOTES

1.THIS DRAWING IS FOR DESIGN INTENT ONLY.

2.ALL PHOTOS ARE FOR REFERENCE ONLY.

3.THE CABLE SYSTEM SHOULD BE DESIGN AND BUILD BY CONTRACTOR. THE SYSTEM SHOULD BE APPROVED BY CM PRIOR TO ORDERING.

4.ALL STAINLESS STEEL MATERIAL GRADE SHALL BE 316.

5.ALL DIMENSIONS ARE IN MILLIMETERS.

REVISIONS

NO	DESCRIPTION AND DATE	INITIAL AND DESIGNATION DWN	CKD	AUTH

	NAME AND DESIGNATION	INITIAL	DATE
AUTHORISED			
CHECKED			
DRAWN			

PROJECT

DRAWING TITLE
VERTICAL GREEN DETAIL

SCALE AS SHOWN

DRAWING NO

SOURCE

ICU NO.

AUTOCAD 2000 A3 420 X 297

Annex 2

Hong Kong Housing Authority

Public Housing Development at Yip On Factory Estate

Summary of Technical Assessments
(TIA, SIA, WWIA and EAS)

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1. INTRODUCTION

1.1. Background

1.1.1. AECOM was commissioned by the Hong Kong Housing Authority (HKHA), under Term Engineering Consultancy Services 2018 – 2020 to carry out the civil engineering consultancy services for the proposed public housing redevelopment at the Yip On Factory Estate in Kowloon Bay (the Redevelopment).

1.2. Scope of the Project

1.2.1. The objective of the project is to enable the Housing Department to have the continual service of the Consultants in undertaking various types of assignments at any time during the 24-month term in 2018 – 2020. These assignments include:

- Sewerage Impact Assessment,
- Water Works Impact Assessment,
- Traffic Impact Assessment, and
- Environmental Assessment Study

1.2.2. This report is the Executive Summary of Technical Assessments on the proposed public housing development at Yip On Factory Estate.

2. SUBJECT SITE AND ITS SURROUNDING CONTEXT

2.1. Subject Site and Its Surrounding Area

2.1.1. The proposed Redevelopment Site is located at Yip On Factory Estate in Kowloon Bay and part of Wang Hoi Road, to the east of One Kowloon and the southwest of the Chevalier Commercial Centre. **Figure 4.1** shows the location of the Site.

2.1.2. For technical assessment purpose, the domestic and non-domestic plot ratio are assumed as 7.5 and 1.5. The tentative number of flats provided would be 2,592* with design population of about 7,258* (Remark* : some buffer has been reserved for technical assessment purpose). The completion year for the proposed development is 2031 tentatively.

2.2. Statutory Planning Context

2.2.1. The site currently falls within an area zoned “Other Specified Use (Business)” and an area shown as ‘Road’ on the approved Ngau Tau Kok and Kowloon Bay Outline Zoning Plan No. S/K13/30.

2.3. Site Accessibility

2.3.1. The proposed Redevelopment Site is located at Yip On Factory Estate in Kowloon Bay and part of Wang Hoi Road, to the east of One Kowloon and the southwest of the Chevalier Commercial Centre.

2.3.2. The nearest railway station is Kowloon Bay MTR station which is located within 500m from the Site. Also, there is a bus terminus located underneath the Enterprise Square. The franchised bus and GMB routes operating near the proposed Redevelopment are listed below.

Transport type	Route
Franchised Bus	11X
Franchised Bus	13X
Franchised Bus	14X
Franchised Bus	15A
Franchised Bus	15X
Franchised Bus	22
Franchised Bus	22M
Franchised Bus	24 (Special Departure)
Franchised Bus	28
Franchised Bus	28B
Franchised Bus	33
Franchised Bus	38P
Franchised Bus	74A
Franchised Bus	74B
Franchised Bus	80A
Franchised Bus	98D
Franchised Bus	98P
Franchised Bus	101X
Franchised Bus	107
Franchised Bus	213X
Franchised Bus	215X
Franchised Bus	219X
Franchised Bus	224X
Franchised Bus	234D
Franchised Bus	258X

Franchised Bus	259X
Franchised Bus	268P
Franchised Bus	269S
Franchised Bus	292P
Franchised Bus	296D
Franchised Bus	296P
Franchised Bus	297
Franchised Bus	297P
Franchised Bus	302
Franchised Bus	606
Franchised Bus	606X
Franchised Bus	608
Franchised Bus	641
Franchised Bus	796E
Franchised Bus	E22S
Franchised Bus	T74
Franchised Bus	T277
Franchised Bus	X89D
GMB	15
GMB	48
GMB	62S
GMB	68
GMB	69
GMB	86
GMB	87
GMB	89B
GMB	106
GMB	110
GMB	110A
GMB	111

3. PROPOSED DEVELOPMENT SCHEME

3.1. Preliminary Development Layout

3.1.1. Four domestic blocks of 120mPD with Block A of 35 domestic storeys, Block B of 32 domestic storeys, Block C of 34 domestic storeys and Block D of 34 domestic storeys each atop of a 4 to 6 storey (about 22.5 to 31.2mPD) with facilities such as social welfare facilities, ancillary carpark, etc., subject to detailed design. The total GFA assumed is about 135,000sqm. Six nos. of social welfare facilities, tentatively including the following: (i) a Neighbourhood Elderly Centre sub-base; (ii) a Residential Care Home for the Elderly cum Day Care Unit; (iii) Home Care Services for Frail Elderly Persons; (iv) an office base of On-site Pre-school Rehabilitation Services; (v) a Supported Hostel for Mentally Handicapped Persons; and (vi) a Supported Hostel for Ex-mentally Ill Persons. A section of Wang Hoi Road is proposed to be closed. In order to provide an alternative route for the traffic from Sheung Yee Road to Wai Yip Street in case there is traffic congestion at Wai Yip Street, Wang Mau Street is proposed to be rerouted from one-way southbound to northbound as indicated in **Figure 4.1**.

3.1.2. Traffic improvement works have been proposed based on the traffic impact assessment in this study. They include the improvement works to Junction Kai Cheung Road / Wang Kwong Road and Hoi Bun Road/ Cheung Yip Street as indicated in **Figure 4.2** and **Figure 4.3**. The findings of the traffic impact assessment for the development are detailed in Section 4 below.

3.1.3. There are junctions proposed to be improved by other studies, including:

- J1 – Kai Cheung Road / Wang Kwong Road (by KBAA)
- J2 – Kai Cheung Road / Wang Chiu Road (by KBAA)
- J3 – Lam Hing Street / Wang Kwong Road (by KBAA)
- J4 – Lam Hing Street / Wang Chiu Road (by KBAA)
- J9 – Sheung Yee Road / Wang Chiu Road (by KBAA)
- J15 – Wang Chiu Road / Lam Fung Street (by KBAA)
- J16 – Hoi Bun Road / Cheung Yip Street (by Kai Tak Development)
- J21 – Wai Yip Street / Shun Yip Street (by KTBA)
- J22 – Hoi Bun Road / Shun Yip Street (by KTBA)
- J24 – Wai Yip Street / Lai Yip Street (by KTBA)
- J26 - Kwun Tong Road / Lai Yip Street (by KTBA)

3.1.4. Technical assessments conducted have demonstrated that the proposed development is feasible from traffic and transport, environmental, sewerage and water works perspectives. The findings of these assessment have confirmed that the proposed development would not cause insurmountable problems. The findings of the technical assessments for the developments are detailed in Sections 4 to 7 below.

4. PRELIMINARY TRAFFIC IMPACT ASSESSMENT

4.1. Introduction

4.1.1. This assessment aims to assess the adequacy of the existing transport infrastructure and networks and to forecast new provisions or improvement works required to support the proposed development.

4.1.2. The study area covers the major junctions along Kai Cheung Road, Sheung Yuet Road, Wang Kwong Road, Wang Chiu Road, Kai Wah Street, Wang Hoi Road, Wang Yuen Street, Sheung Yee Road, Hoi Bun Road, Wai Yip Street and Lai Yip Street.

4.2. Approach and Methodology of the TIA

Area of Influence (AOI)

4.2.1. The agreed Area of Influence (AOI) for assessment under this study is shown in **Figure 4.1**, which covers a total of 26 key junctions as listed in **Table 4.1** below

Table 4.1 Identified Existing Key Junctions with Junction Performance

No.	Junction	Control	Performance(1)	
			AM	PM
J1	Kai Cheung Road / Wang Kwong Road	Signal	21%	17%
J2	Kai Cheung Road / Wang Chiu Road	Signal	>50%	20%
J3	Lam Hing Street / Wang Kwong Road	Signal	31%	49%
J4	Lam Hing Street / Wang Chiu Road	Signal	45%	>50%
J5	Sheung Yuet Road / Wang Hoi Road	Signal	>50%	>50%
J6	Wang Yuen Street / Wang Tai Road	Priority	0.30	0.34
J7	Wang Yuen Street / Wang Mau Street	Priority	0.07	0.05
J8	Wang Yuen Street / Wang Hoi Road	Priority	0.21	0.24
J9	Sheung Yee Road / Wang Chiu Road	Signal	20%	16%
J10	Sheung Yee Road / Wang Tai Road	Priority	0.28	0.20
J11	Sheung Yee Road / Wang Mau Street	Priority	0.12	0.10
J12	Sheung Yee Road / Wang Hoi Road	Priority	0.35	0.29
J13	Sheung Yuet Road / Wang Kwong Road	Signal	>50%	42%
J14	Sheung Yuet Road / Wang Chiu Road	Signal	47%	>50%
J15	Wang Chiu Road / Lam Fung Street	Signal	36%	40%
J16	Hoi Bun Road / Cheung Yip Street	Signal	39%	>50%
J17	Shing Kai Road / Muk On Street	Signal	27%	29%
J18	Kai Shing Street / Kai Wah Street	Signal	38%	>50%
J19	Kai Wah Street / Wang Kwong Road	Signal	31%	39%
J20	Kai Hing Road / Hoi Bun Road	Priority	0.21	0.10
J21	Wai Yip Street / Shun Yip Street	Signal	>50%	>50%
J22	Shun Yip Street / Hoi Bun Road	Signal	>50%	>50%
J23	Hoi Bun Road / Lai Yip Street	Signal	>50%	>50%
J24	Wai Yip Street / Lai Yip Street	Signal	31%	>50%
J25	Hung To Road / Lai Yip Street	Signal	>50%	>50%
J26	Kwun Tong Road / Lai Yip Street	Signal	>50%	48%

Note:
(1) Figures shown represent 'Reserve Capacity' (RC) for signal controlled junctions and 'Design Flow to Capacity' (DFC) ratio for the priority controlled junctions.

Traffic Survey and Existing Junction Capacity Assessment

4.2.2. Classified traffic counts were undertaken on a typical weekday in late September 2020, during the periods 0700-1000 and 1600-1900 hours. The morning and evening peak hours were found to be 0900-1000 and 1730-1830 respectively.

4.2.3. However, it is understood that the traffic condition during the outbreak of coronavirus COVID-19 in the Territory may not reflect the normal traffic characteristics. As per the discussion with Transport Department (TD), the assessment should use the historical traffic flow with a projection factor. In order to further estimate the normal traffic condition, historical traffic data from relevant discussion paper and Annual Traffic Census (ATC) were adopted to estimate the year 2020 existing flow under normal circumstances.

Overview of Modelling Approach

4.2.4. The planned year of completion for the Redevelopment is 2031 and the design years are set at 2031 and 2036 (i.e. the planned completion and 5 years after the planned completion of the Redevelopment).

4.2.5. The developments in the vicinity have been considered in traffic forecasts, including the following:

- Kowloon Bay Action Area
- Kowloon Bay Business Area
- Kai Tak Development
- Kwun Tong Action Area
- Kwun Tong Business Area

4.2.6. The main purpose of establishing a transport demand model for the Project is to estimate the traffic activities within the AOI and to determine the demand and requirement of the transport infrastructure/facilities. Thus, it is important to establish a transport demand model which incorporates the agreed planning data and assumptions including the demographic & land use data, socio-economic characteristics, highway infrastructure and railway network assumptions, etc.

4.2.7. To produce robust traffic forecasts that would be responsive to dynamic changes in future land use and infrastructure development, a sub-regional traffic model was used to produce the traffic forecast. The latest 2015-based District Traffic Model (BDTM) developed by the Transport Department (TD) was used as a prime basis of the sub-regional traffic model. For this Study, BDTM "K2" which covered Kowloon East such as Kowloon City, Kowloon Bay and Kwun Tong area was adopted.

4.2.8. The latest BDTM was validated to base year 2015 and adopted 2014-based Territorial Population and Employment Data Matrix (TPEDM). The sub-regional local area traffic model (LATM) was developed based on the 2015-based BDTM and validated to replicate the latest traffic conditions during peak hours within the AOI according to BDTM's validation criteria.

4.3. Traffic Impact Assessment

4.3.1. The operational performance of junctions and pedestrian facilities have been assessed based on the traffic forecast produced according to the procedures outlined in TPDM under both Reference (without the Redevelopment) and Design (with the Redevelopment) scenarios at the design years. Junction performance will be indicated in terms of Reserve Capacity (RC) for signalized junctions and Design Flow-to-Capacity (DFC) Ratio for roundabout/priority junctions.

Junction Operational Assessment

4.3.2. Junction operational assessment has been carried out at key junctions for the years 2031 and 2036 Reference and Design scenarios. The results of different assessment scenarios are shown in **Table 4.2**.and **Table 4.3**

Table 4.2 Junction Capacity Assessment Results in Year 2031

No.	Junction	Control	Performance[1] [2]			
			Reference Case		Design Case	
			AM	PM	AM	PM
J1	Kai Cheung Road / Wang Kwong Road	Signal	17%	13%	16%	13%
J2	Kai Cheung Road / Wang Chiu Road	Signal	20%	13%	19%	13%
J3	Lam Hing Street / Wang Kwong Road	Signal	31%	35%	30%	36%
J4	Lam Hing Street / Wang Chiu Road	Signal	16%	15%	15%	14%
J5	Sheung Yuet Road / Wang Hoi Road	Signal	40%	>50%	36%	49%
J6	Wang Yuen Street / Wang Tai Road	Priority	0.27	0.33	0.77	0.71
J7	Wang Yuen Street / Wang Mau Street	Priority	0.06	0.04	0.33	0.32
J8	Wang Yuen Street / Wang Hoi Road	Priority	0.26	0.28	0.59	0.48
J9	Sheung Yee Road / Wang Chiu Road	Signal	17%	14%	17%	13%
J10	Sheung Yee Road / Wang Tai Road	Priority	0.40	0.40	0.66	0.59
J11	Sheung Yee Road / Wang Mau Street	Priority	0.10	0.11	-	-
J12	Sheung Yee Road / Wang Hoi Road	Priority	0.24	0.24	-	-
J13	Sheung Yuet Road / Wang Kwong Road	Signal	33%	30%	33%	29%
J14	Sheung Yuet Road / Wang Chiu Road	Signal	30%	31%	28%	28%
J15	Wang Chiu Road / Lam Fung Street	Signal	50%	47%	48%	46%
J16	Hoi Bun Road / Cheung Yip Street	Signal	13%	15%	13%	14%
J17	Shing Kai Road / Muk On Street	Signal	26%	17%	26%	17%
J18	Kai Shing Street / Kai Wah Street[3]	Signal	19%	25%	19%	22%
J19	Kai Wah Street / Wang Kwong Road	Signal	14%	20%	14%	18%
J20	Kai Hing Road / Hoi Bun Road	Signal	22%	19%	22%	17%
J21	Wai Yip Street / Shun Yip Street	Signal	32%	46%	31%	45%
J22	Shun Yip Street / Hoi Bun Road	Signal	12%	45%	12%	42%
J23	Hoi Bun Road / Lai Yip Street	Signal	12%	15%	13%	15%
J24	Wai Yip Street / Lai Yip Street	Signal	23%	>50%	23%	>50%
J25	Hung To Road / Lai Yip Street	Signal	>50%	>50%	>50%	>50%
J26	Kwun Tong Road / Lai Yip Street	Signal	>50%	32%	>50%	32%

Note:
(1) Figures shown represent 'Reserve Capacity' (RC) for signal controlled junctions and 'Design Flow to Capacity' (DFC) ratio for the priority controlled junctions.
(2) The junction improvement schemes proposed by other studies are taken into consideration in the assessment.
(3) Assessment is based on cycle time 105 seconds.

Table 4.3 Junction Capacity Assessment Results in Year 2036

No.	Junction	Control	Performance[1] [2]			
			Reference Case		Design Case	
			AM	PM	AM	PM
J1	Kai Cheung Road / Wang Kwong Road	Signal	15%	10%	14%	11%
J2	Kai Cheung Road / Wang Chiu Road	Signal	17%	11%	17%	11%
J3	Lam Hing Street / Wang Kwong Road	Signal	26%	32%	27%	32%
J4	Lam Hing Street / Wang Chiu Road	Signal	12%	13%	11%	11%
J5	Sheung Yuet Road / Wang Hoi Road	Signal	37%	>50%	33%	47%
J6	Wang Yuen Street / Wang Tai Road	Priority	0.28	0.34	0.79	0.73
J7	Wang Yuen Street / Wang Mau Street	Priority	0.07	0.05	0.35	0.34
J8	Wang Yuen Street / Wang Hoi Road	Priority	0.26	0.29	0.60	0.51
J9	Sheung Yee Road / Wang Chiu Road	Signal	14%	11%	14%	10%
J10	Sheung Yee Road / Wang Tai Road	Priority	0.41	0.41	0.67	0.62
J11	Sheung Yee Road / Wang Mau Street	Priority	0.10	0.12	-	-
J12	Sheung Yee Road / Wang Hoi Road	Priority	0.25	0.24	-	-
J13	Sheung Yuet Road / Wang Kwong Road	Signal	31%	26%	30%	25%

No.	Junction	Control	Performance(1) (2)			
			Reference Case		Design Case	
			AM	PM	AM	PM
J14	Sheung Yuet Road / Wang Chiu Road	Signal	26%	28%	25%	25%
J15	Wang Chiu Road / Lam Fung Street	Signal	46%	43%	45%	42%
J16	Hoi Bun Road / Cheung Yip Street	Signal	10%	11%	10%	11%
J17	Shing Kai Road / Muk On Street	Signal	23%	13%	23%	13%
J18	Kai Shing Street / Kai Wah Street(3)	Signal	16%	21%	16%	19%
J19	Kai Wah Street / Wang Kwong Road	Signal	11%	16%	11%	15%
J20	Kai Hing Road / Hoi Bun Road	Signal	19%	15%	19%	15%
J21	Wai Yip Street / Shun Yip Street	Signal	29%	43%	28%	40%
J22	Shun Yip Street / Hoi Bun Road	Signal	10%	41%	10%	38%
J23	Hoi Bun Road / Lai Yip Street	Signal	10%	12%	11%	12%
J24	Wai Yip Street / Lai Yip Street	Signal	20%	>50%	20%	>50%
J25	Hung To Road / Lai Yip Street	Signal	>50%	>50%	>50%	>50%
J26	Kwun Tong Road / Lai Yip Street	Signal	49%	29%	50%	29%

Note:
(1) Figures shown represent 'Reserve Capacity' (RC) for signal controlled junctions and 'Design Flow to Capacity' (DFC) ratio for the priority controlled junctions.
(2) The junction improvement schemes proposed by other studies are taken into consideration in the assessment.
(3) Assessment is based on cycle time 105 seconds.

4.3.3. As shown in **Table 4.2** and **Table 4.3**, all the assessed junctions will be operating with acceptable capacity in Year 2031 and 2036.

Improvement works for J1

4.3.4. For J1 (Kai Cheung Road / Wang Kwong Road), it is far away from Yip On Factory Estate Redevelopment. As revealed from the assessment, only small amount of traffic generated from the proposed redevelopment would pass through this junction. Nevertheless, in order to improve this junction, it is proposed to the improvement works as shown in **Figure 4.2**. It is suggested that the proposed junction improvement works should be carried out by the relevant government departments (i.e. TD and HyD) or the future development / infrastructure projects which would have further impact on the junction reserved capacity.

Improvement works for J16

4.3.5. HD would keep liaising with EKEO regarding the implementation timing of junction improvement works at J16 (Hoi Bun Road/ Cheung Yip Street) for better project coordination. Besides, HD commits to review and implement necessary further junction improvement works at J16 (Hoi Bun Road/ Cheung Yip Street) as shown in **Figure 4.3** taking into account the final design layout of junction improvement works at J16 to be implemented by CEDD. In case, there is any change of proposed junction improvement works at J16, HD would submit to TD for agreement prior to implementation.

Pedestrian Assessment

4.3.6. The background pedestrian flows are made reference to KBAA study and Agreement Reference No. WQ/087/17 The Technical Study on the Ngau Tau Kok Divisional Police Station Site at Siu Yip Street in Kowloon East for Commercial Development under EKEO (NTKDPS). The pedestrian trips would be assumed use all footpaths around the Site to public transport facilities. Taking the estimated pedestrian trips generated from the Redevelopment into consideration, the assessment results for proposed Scheme are presented in **Table 4.4** and **Table 4.5**.

Table 4.4 Walkway Assessment for Year 2031 – Design Case

No.	Road	Clear Width of Footpath (m)	Two-way pedestrian flow (ped/hour)		Level of Service	
			AM Peak	PM Peak	AM Peak	PM Peak
PL1	Wang Yuen Street	2.7	1,810	1,400	B	B
PL2	Wang Mau Street	3.5	630	700	A	A
PL3	Sheung Yee Road (near Yip On Factory Block 2)	6.3	330	860	A	A
PL4	Wang Hoi Road (near Yip On Factory Block 2)	2.6	140	210	A	A
PL5	Access Road (between Chevalier Centre and Yip On Factory Block 1)	6.5	270	330	A	A
PL7	Sheung Yee Road (near Yip On Factory Block 1)	4.5	330	860	A	A
PL8	Wai Yip Street	7.5	1,000	1,230	A	A
PL9	Wai Yip Street elevated walkway	5	6,500	5,430	C	C

Note:
(1) The peak hour flow rate can be obtained by using the formula: Peak Hour Flow Rate (Ped/min/m) = Peak Hour Flow (Ped/hr)* 1.2/ 60/ Effective width (m), where a surge factor of 1.2 is applied to. account for the peak within the peak hour.
(2) LOS has been calculated based on effective width, by generally assuming 0.5m lateral clearance on both sides.

Table 4.5 Walkway Assessment for Year 2036 – Design Case

No.	Road	Clear Width of Footpath (m)	Two-way pedestrian flow (ped/hour)		Level of Service	
			AM Peak	PM Peak	AM Peak	PM Peak
PL1	Wang Yuen Street	2.7	1,850	1,430	B	B
PL2	Wang Mau Street	3.5	630	710	A	A
PL3	Sheung Yee Road (near Yip On Factory Block 2)	6.3	340	880	A	A
PL4	Wang Hoi Road (near Yip On Factory Block 2)	2.6	140	210	A	A
PL5	Access Road (between Chevalier Centre and Yip On Factory Block 1)	6.5	280	330	A	A
PL7	Sheung Yee Road (near Yip On Factory Block 1)	4.5	340	880	A	A
PL8	Wai Yip Street	7.5	1,000	1,240	A	A
PL9	Wai Yip Street elevated walkway	5	6,650	5,550	C	C

Note:
(1) The peak hour flow rate can be obtained by using the formula: Peak Hour Flow Rate (Ped/min/m) = Peak Hour Flow (Ped/hr)* 1.2/ 60/ Effective width (m), where a surge factor of 1.2 is applied to. account for the peak within the peak hour.
(2) LOS has been calculated based on effective width, by generally assuming 0.5m lateral clearance on both sides.

4.3.7. As shown in the **Table 4.4 and Table 4.5**, the footpaths in the vicinity of the Redevelopment would be operating satisfactorily in 2031 and 2036.

4.4. Summary

4.4.1. Traffic impact assessment has been carried out for design year 2031 and 2036. Traffic generation and attraction for the subject site were estimated using trip rates provided in the TPDM.

4.4.2. Development type with Subsidised Sale Flats is assumed for the impact assessment as a conservative approach and for the allowance of design flexibility. Less development traffic generation and attraction would be induced if the development type is Public Rental Housing and hence less traffic impact to the adjacent road network.

4.4.3. For J1 (Kai Cheung Road / Wang Kwong Road), it is far away from Yip On Factory Estate Redevelopment. As revealed from the assessment, only small amount of traffic generated from the proposed redevelopment would pass through this junction. Nevertheless, in order to improve this junction, improvement works are proposed. It is suggested that the proposed junction improvement works should be carried out by the relevant government departments (i.e. TD and HyD) or the future development / infrastructure projects which would have further impact on the junction reserved capacity.

4.4.4. HD would keep liaising with EKEO regarding the implementation timing of junction improvement works at J16 (Hoi Bun Road/ Cheung Yip Street) for better project coordination. Besides, HD commits to review and implement necessary further junction improvement works at J16 (Hoi Bun Road/ Cheung Yip Street) as stated in this TIA report taking into account the final design layout of junction improvement works at J16 to be implemented by CEDD. In case, there is any change of proposed junction improvement works at J16, HD would submit to TD for agreement prior to implementation.

4.4.5. For proposed development Scheme with closure of a section of Wang Hoi Road, the traffic implication would be minimal.

4.4.6. in general, the performance of the footpaths in the vicinity of the Redevelopment would be satisfactory in 2031 and 2036.

4.4.7. In conclusion, the TIA study has demonstrated that the proposed redevelopment would have manageable impact to the adjacent road network while appropriate improvement measures have been proposed as necessary. The conclusion therefore is that the proposed redevelopment is acceptable from the traffic point of view.

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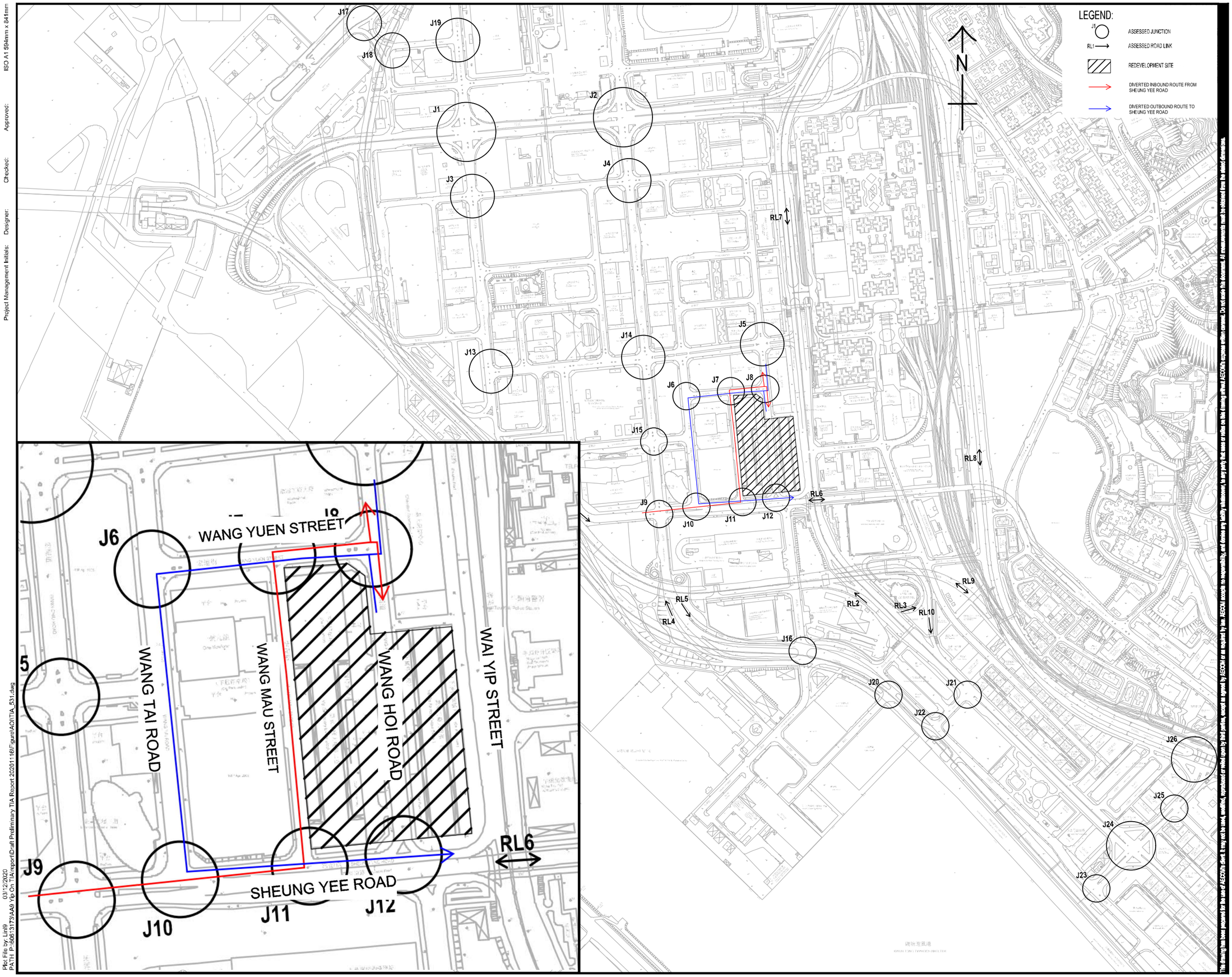

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03/12/2020

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TECHNICAL STUDIES IN KOWLOON BAY AREA

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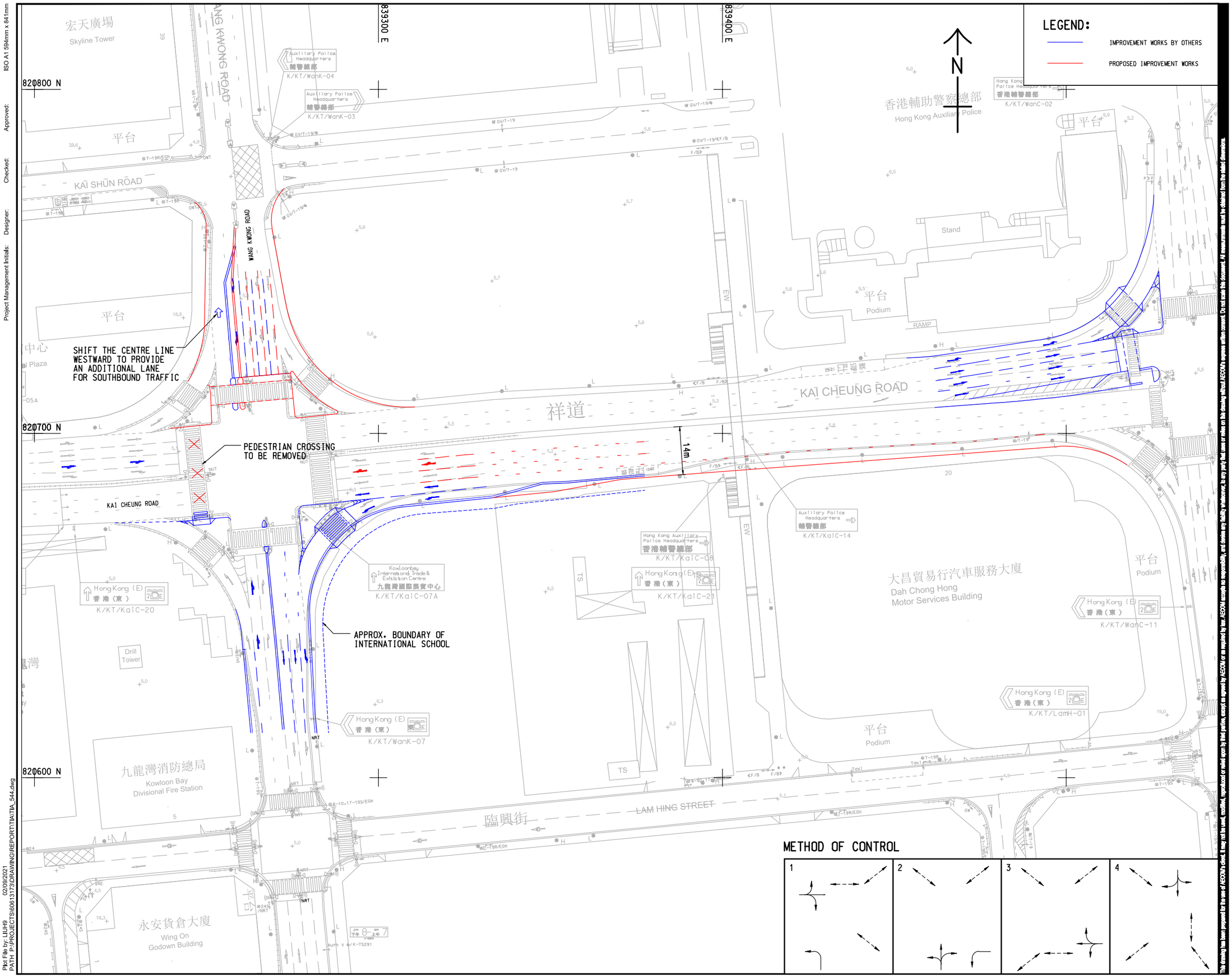
AGREEMENT NO.

SHEET TITLE

PROPOSED JUNCTIONS AND ROAD LINKS FOR ASSESSMENT IN AOI

SHEET NUMBER

60613173/TIA/FIGURE 4.1



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PROJECT NO. 60613173

AGREEMENT NO. CB 20180308

SHEET TITLE

LAYOUT OF PROPOSED JUNCTION IMPROVEMENT SCHEMES FOR J1

SHEET NUMBER

60613173/TIA/FIGURE 4.2

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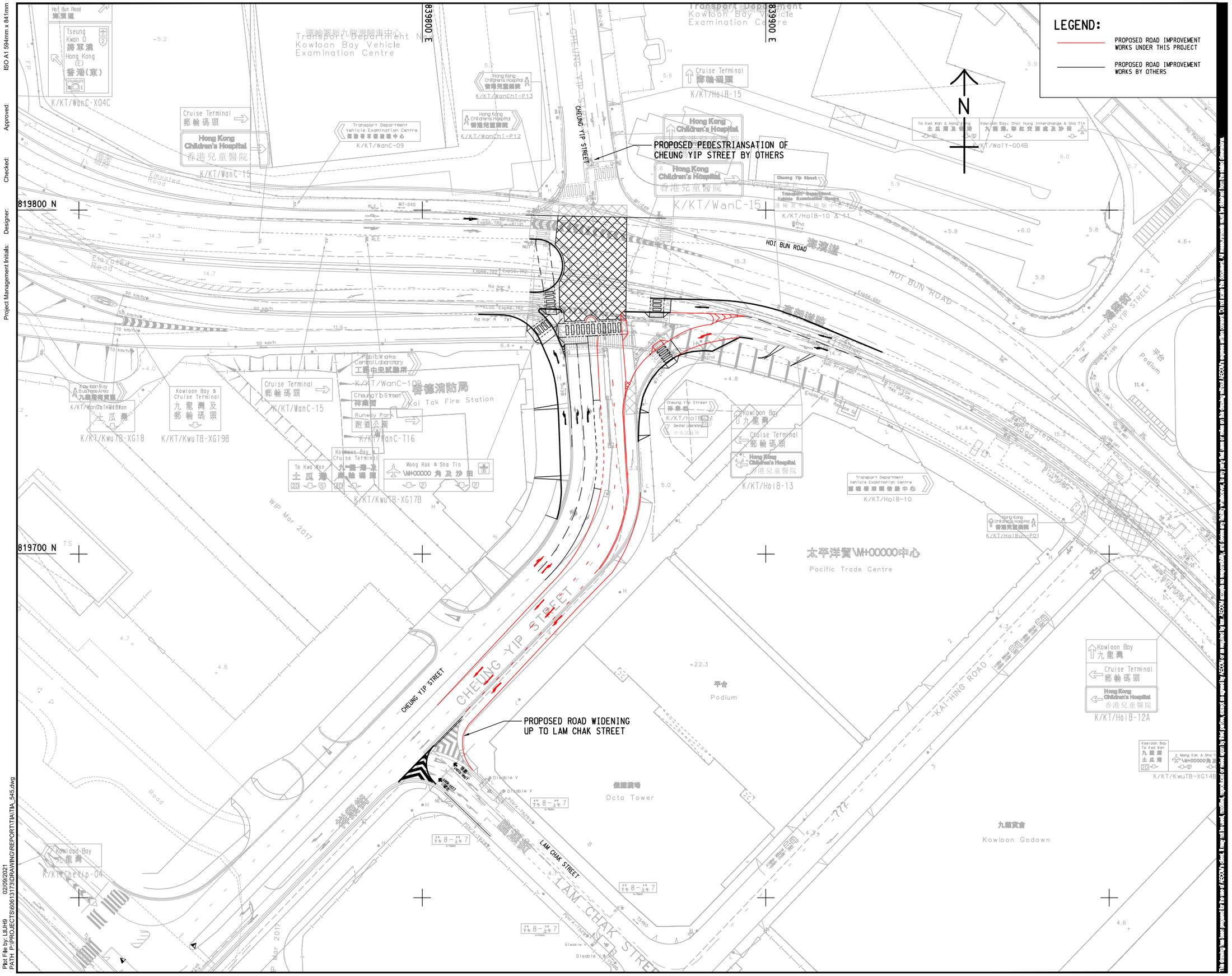

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KEY PLAN

PROJECT NO. 60613173

AGREEMENT NO. CB 20180308

SHEET TITLE

LAYOUT OF PROPOSED JUNCTION IMPROVEMENT SCHEMES FOR J16

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60613173/TIA/FIGURE 4.3

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5. PRELIMINARY SEWERAGE IMPACT ASSESSMENT

5.1. Introduction

5.1.1. The Sewerage Impact Assessment (SIA) intend to introduce a methodical and systematic approach to identify, assess and mitigate potential adverse sewerage impacts, and develop an optimum drainage scheme to support the proposed development and infrastructure works.

5.1.2. Findings and recommendations of the SIA are presented in the Sewerage Impact Assessment Report. A summary of the assessment is presented in sections below.

5.2. Existing Sewerage System

5.2.1. Based on the DSD drainage record, there are existing 600 mm dia and 2 x 225 mm dia. gravity sewers identified along Sheung Yee Road. Kwun Tung Intermediate Sewage Pumping Station (KTIPS) and upgraded Kwun Tong Preliminary Treatment Works (KTPTW) are located at the further downstream of the mentioned sewers.

5.3. Potential Sewerage Impacts

5.3.1. The additional peak wet weather flow, which is the difference between the post-project scenario and pre-project scenario is roughly 0.093m^3/s. It is demonstrated that the additional sewage flow generated from the proposed development is within the spare capacity of both KTIPS and the upgraded KTPTW. The location of sewers connecting to the subject site is shown in **Figure 5.1** and **Figure 5.2**.

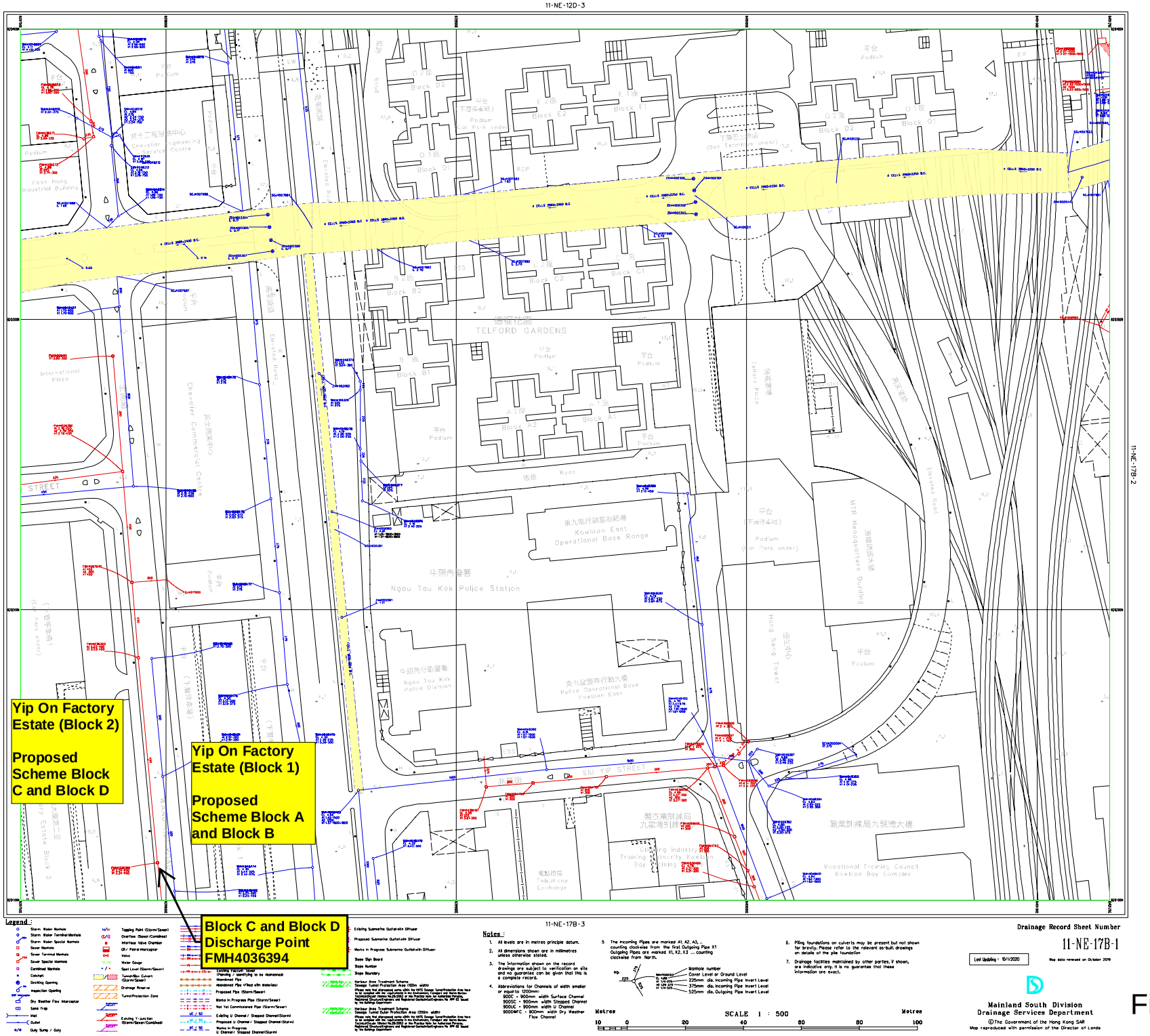
5.4. Conclusion

5.4.1. Sewerage impact assessment on the existing sewerage system is carried out to assess the impact arising from the proposed housing development at existing Yip On Factory Estate.

5.4.2. Hydraulic checking on the downstream sewers was conducted and the results revealed that the downstream sewers should have enough capacity to take up the additional sewage flow from the proposed housing development.

5.4.3. Capacity performance of KTIPS and upgraded KTPTW were also reviewed. Reference was made to the Project Profile for Proposed Upgrading of Kwun Tong Preliminary Treatment Works and Section 16 (Sewerage and Sewage Treatment Implications) of the approved Kai Tak Development EIA Report. It is demonstrated that the additional sewage flow generated from the proposed development is within the spare capacity of both KTIPS and the upgraded KTPTW.

5.4.4. Thus, the concerned sewerage network has sufficient capacity to cater for the additional sewage flow from the proposed development. Therefore, no mitigation measure is needed.


11-NE-12D-3
11-NE-17A-2
11-NE-17B-2
11-NE-17B-3
TELFORD GARDENS
Ngau Tau Kok Police Station
Kowloon East Operational Base Range
Police Operational Base Kowloon East
Ngau Tau Kok Police Division
Chevalier Commercial Centre
Chevalier Engineering Service Centre
Fook Hong Industrial Building
International Plaza
Telford Plaza
MTR Headquarters Building
Hang Seng Tower
Vocational Training Council Kowloon Bay Complex
Telephone Exchange
Yip On Factory Estate (Block 2)
Proposed Scheme Block C and Block D
Yip On Factory Estate (Block 1)
Proposed Scheme Block A and Block B
Block C and Block D Discharge Point FMH4036394
Legend :
Notes :
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Drainage Record Sheet Number
11-NE-17B-1
Mainland South Division
Drainage Services Department
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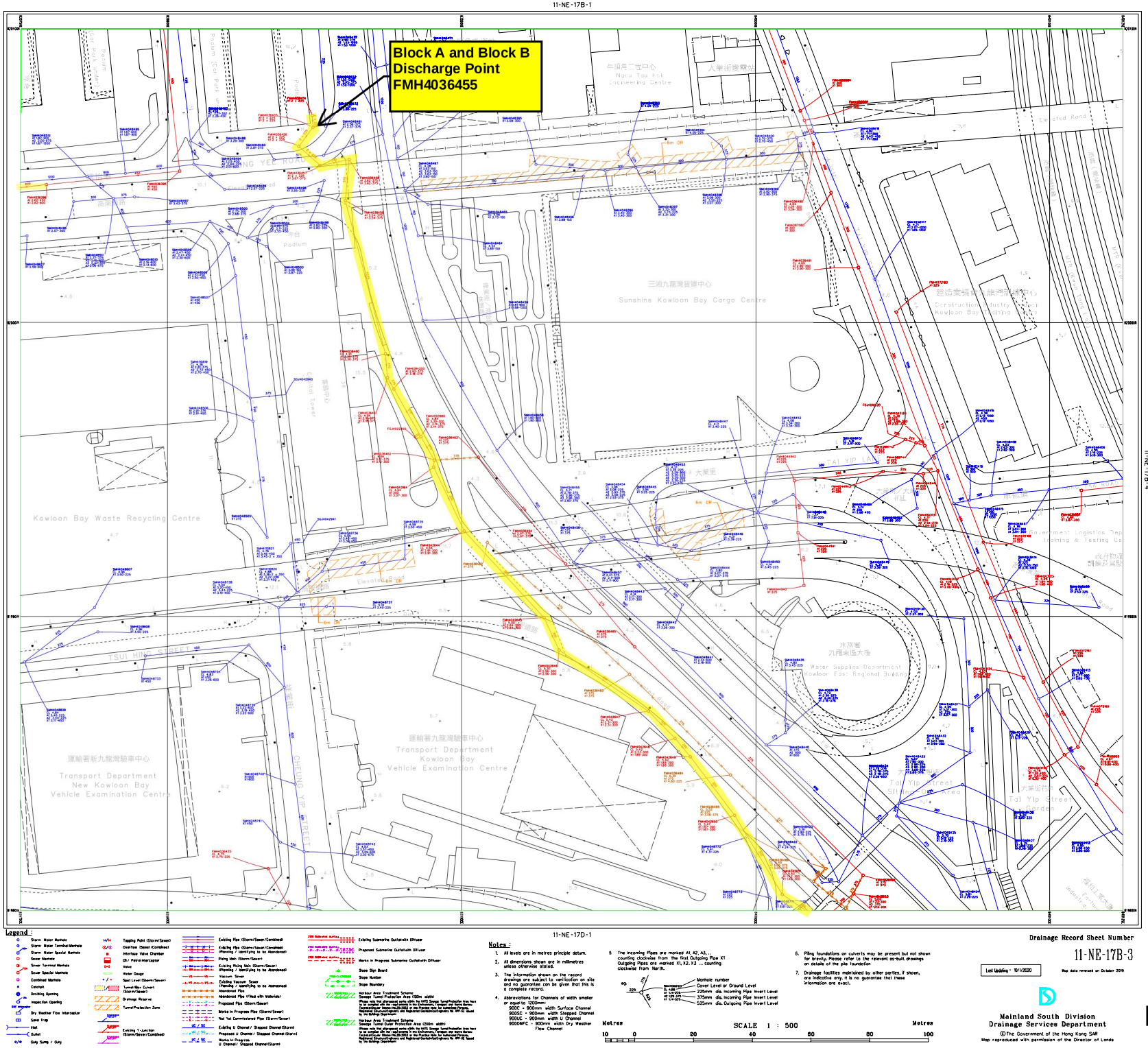
Figure 5.1


11-NE-17B-1
Block A and Block B
Discharge Point
FMH4036455
11-NE-17A-4
11-NE-17B-4
11-NE-17D-1
Kowloon Bay Waste Recycling Centre
Sunshine Kowloon Bay Cargo Centre
Transport Department
New Kowloon Bay
Vehicle Examination Centre
Transport Department
Kowloon Bay
Vehicle Examination Centre
Water Supplies Department
Kowloon East Regional Building
Tai Yip Street
Sitting Out Area
Tai Yip Street
Garden
Elevated Road
TSUI HING STREET
CHEUNG YIP STREET
Legend :
Notes :
1. All levels are in metres principle datum.
2. All dimensions shown are in millimetres unless otherwise stated.
3. The information shown on the record drawings are subject to verification on site and no guarantee can be given that this is a complete record.
4. Abbreviations for Channels of width smaller or equal to 1200mm:
900C - 900mm width Surface Channel
900SC - 900mm width Stepped Channel
900UC - 900mm width U Channel
900DWFC - 900mm width Dry Weather Flow Channel
5. The incoming Pipes are marked A1, A2, A3, ... counting clockwise from the first Outgoing Pipe X1 Outgoing Pipes are marked X1, X2, X3 ... counting clockwise from North.
6. Piling foundations on culverts may be present but not shown for brevity. Please refer to the relevant as-built drawings on details of the pile foundation
7. Drainage facilities maintained by other parties, if shown, are indicative only. It is no guarantee that these information are exact.
Drainage Record Sheet Number
11-NE-17B-3
Last Updating : 10/1/2020
Map data renewed on October 2019
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Drainage Services Department
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Metres
10 0 20 40 60 80 100

Figure 5.2

6. PRELIMINARY WATER WORKS IMAPCT ASSESSMENT

6.1. Introduction

6.1.1. The preliminary Water Works Impact Assessment (WWIA) aims to assess the water demands, ascertain adequacy of waterworks facilities to support the proposed development, assess any existing waterworks facilities which would be affected by the works of the proposed development and proposed modification / diversion works /layout where necessary.

6.1.2. Findings and recommendations of the WWIA are presented in Water Works Impact Assessment Report. A summary of the assessment is presented in sections below.

6.2. Existing Water Supply System

6.2.1. Yip On Factory Estate is located with the fresh water supply zone of Ngau Chi Wan Fresh Water Service Reservoir (NCWFWSR). The capacity of the reservoir is 54,383 m^3. For salt water supply, the redevelopment site is within Ma Yau Tong Salt Water Service Reservoir (MYTSWSR), Jordan Valley Salt Water Service Reservoir (JVSWSR) and Yau Tong Salt Water Service Reservoir (YTSWSR) supply zone via Cha Kwo Ling Salt Water Pumping Station. The capacity of MYTSWSR, JVSWSR and YTSWSR is 4,989 m^3, 7,500 m^3 and 2574 m^3 respectively.

6.2.2. This redevelopment site is situated at built-up areas. As revealed by Watermains Record Plans, there are following existing watermains around the site.

- 400mm fresh water mains along Wai Yip Street
- 200mm fresh water mains along Wai Yip Street
- 400mm salt water mains along Wai Yip Street
- 150mm fresh water mains along Wang Hoi Road
- 200mm fresh water mains along Sheung Yee Road
- 150mm salt water mains along Sheung Yee Road

6.3. Potential Water Supply Impacts

6.3.1. The estimation of fresh water demand is 2300 m^3/day, and the estimated salt water demand is 650 m^3/day.

6.3.2. According to the information from WSD, the capacity of NCWFWSR was found to be 54,383 m^3 which could serve a supply zone with mean daily demand of 72,510 m^3/day (i.e., interconnected supply zones with capacity of service reservoirs equals to 75% of the mean daily demand). WSD advised that the existing fresh water demand supplied to the supply zone of NCWFWSR is about 14,500 m^3/day. On this basis, the spare capacity of NCWFWSR is therefore about 42,611 m^3/day.

6.3.3. The total fresh water demand is 2300 m^3/day. The spare capacity of NCWFWSR is found to be adequate to serve the demand of the proposed redevelopment at Yip On Factory Estate.

6.3.4. The estimated salt water demand is 650 m^3/day. According to the information from WSD, the salt water supply to Yip On Factory Estate is from MYTSWSR, JVSWSR and YTSWSR supply zone via Cha Kwo Ling Salt Water Pumping Station. The total capacity of MYTSWSR, JVSWSR and YTSWSR is 15,063m^3 which could cater for mean daily demand of 60,252 m^3/day (capacity of service reservoirs equals to 25% of the mean daily demand).

As the water consumption data is not available, whether the anticipated salt water demand can be catered is subject to the updated supply planning and the spare capacities from WSD. The location of freshwater / saltwater mains connecting to the subject site is shown in **Figure 6.1**.

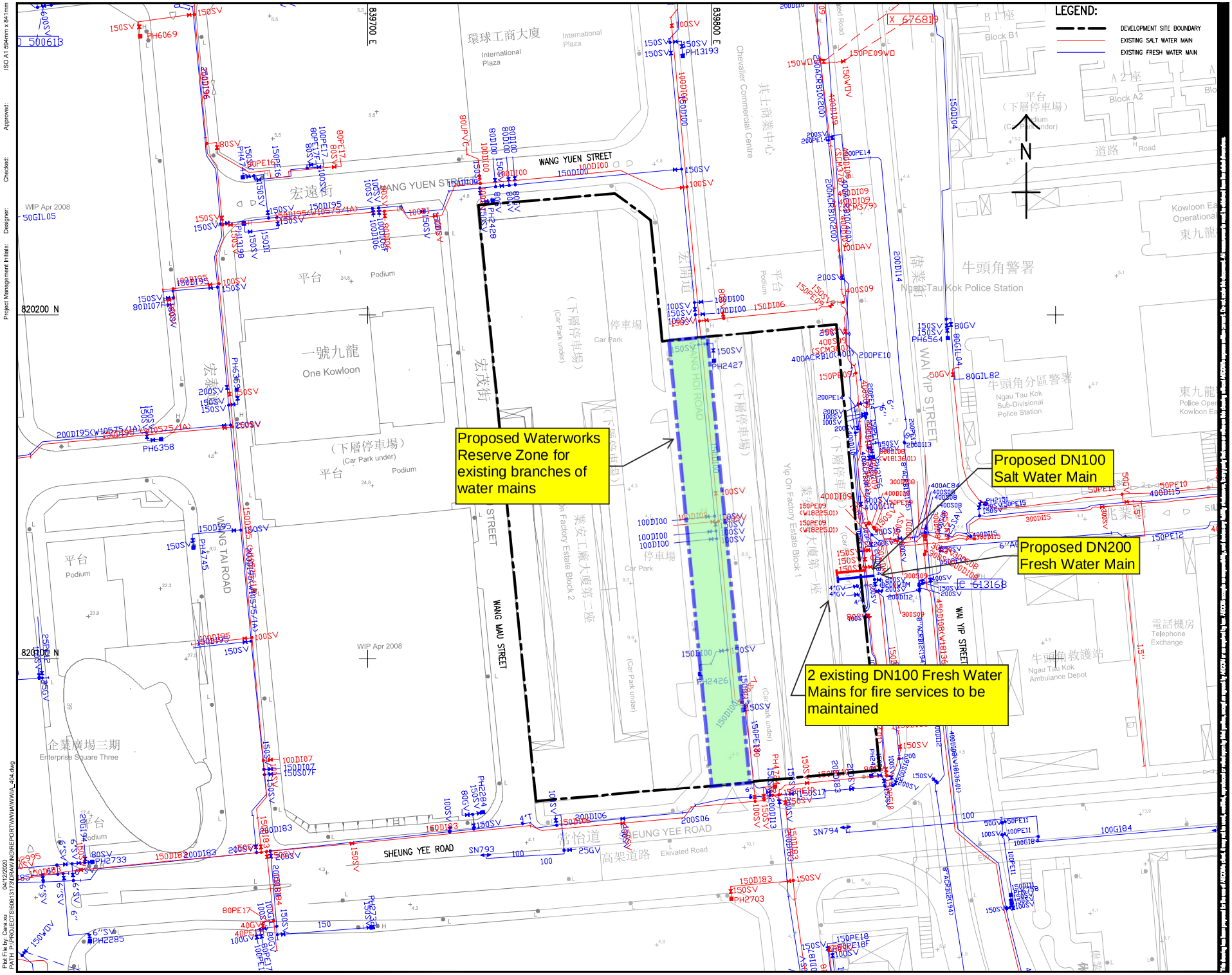
6.4. Conclusion

6.4.1. Water works impact assessment on the existing fresh water and salt water supply system is carried out to assess the impact arising from the proposed housing development at existing Yip On Factory Estate.

6.4.2. The estimation of fresh water demand is 2300 m^3/day, and the estimated salt water demand is 650 m^3/day.

6.4.3. The spare capacity of NCWFWSR is found to be adequate to serve the demand of the proposed redevelopment at Yip On Factory Estate. Whether the anticipated salt water demand can be catered is subject to the updated supply planning and the spare capacities from WSD.

6.4.4. To conclude, the redevelopment under the proposed scheme is technically feasible from water supply perspective.



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60613173

AGREEMENT NO.
CB 20180308

SHEET TITLE
PROPOSED WATER MAIN ARRANGEMENT

SHEET NUMBER
Figure 6.1

7. ENVIRONMENTAL ASSESSMENT STUDY

7.1. General

7.1.1. The Environmental Assessment Study Report has been prepared to provide an assessment and evaluation of the environmental impacts associated with the Proposed Development, including: Air Quality, Road Traffic Noise, Fixed Noise, Land Contamination and Waste Management Implication.

7.2. Identification of Potential Designated Projects under the EIAO

7.2.1. The Proposed Development will accommodate a population of about 7,258 after full occupation and the total area of the Site is approximately 1.5 ha. The project is not classified as a designated project (DP) under Schedule 3 of the Environmental Impact Assessment Ordinance (EIAO).

7.2.2. The Proposed Development will not fall partly or wholly in an existing nor gazetted proposed country park, special area, conservation area, existing nor gazetted proposed marine park, marine reserve, site of cultural heritage, and site of special scientific interest (SSSI). The project is not classified as a DP under Category Q.1, Schedule 2 to the EIAO.

7.2.3. There are no other designated project (DP) elements identified or other material change to existing/exempted DP(s) under the EIAO.

7.3. Air Quality Impact Assessment

Assessment Scope and Criteria

7.3.1. The air quality impact assessment was conducted in accordance with the requirements in Annex 4 and Annex 12 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) and Air Pollution Control Ordinance (APCO). The assessment area for Air Quality Impact Assessment (AQIA) is defined by a distance of 500m from the boundary of the Proposed Development during operation phase.

Air Sensitive Receivers

7.3.2. The representative Air Sensitive Receivers (ASRs) from the Proposed Development have been identified and summarized in **Table 7.1**. The locations of these ASRs are shown in **Figure 7.1**.

Table 7.1 Representative Air Sensitive Receivers of the Proposed Development

ASRs	Description	Floor Level
A01-A39	Assessment Points on Site Boundary	1.5mAG-120 mAG
A40-A76	Assessment Points with 5m setback from Site Boundary	1.5mAG-120 mAG

Impact Identification and Evaluation

7.3.3. During operation phase, the key air pollution sources are expected to be vehicular emissions from the nearby road traffic, portal & ventilation Building emissions from Road T2 Tunnel; and industrial emissions from identified chimneys within the 500m AQIA Assessment Area. Background pollutant concentration was also included in the calculation on cumulative air quality impact.

7.3.4. Quantitative assessment was conducted on major pollutants, including Nitrogen Dioxide (NO_2), Respirable Suspended Particulates (RSP/PM_{10}) and Fine Suspended Particulates (FSP/$PM_{2.5}$).

7.3.5. The assessment results on predicting cumulative air quality impacts concluded that with the exception of annual average NO_2 concentrations, the predicted concentrations of the key air pollutants (RSP, FSP, and hourly NO_2) at all ASRs would comply with the respective AQOs in Year 2031 (Initial Operation Year). Non-compliance of the AQO of annual average NO_2 was predicted at various assessment points at 1.5 and 5m above ground. While there's full compliance of annual average NO_2 from 10mAG and above.

7.3.6. The predicted cumulative results are summarized in **Table 7.2** below.

Table 7.2 Summary of Predicted Cumulative Concentrations on ASRs during Operation Phase in Year 2031

	Pollutant **Concentration** ($\mu g/m^3$)					
	NO_2		PM_{10}		$PM_{2.5}$	
	19th Highest Hourly	Annual	10th Highest Daily	Annual	10th Highest Daily	Annual
Range on Cumulative Results	116-150	21-51	77-78	34-35	58	24-25
AQO-2014	200	40	100	50	75	35
AQO-2022	Yes	Yes	Yes	Yes	Yes	Yes
Compliance	Yes	Yes	Yes	Yes	Yes	Yes

7.3.7. With reference to the building layout of the proposed scheme, the first residential floor level for all building blocks are all located at above 10mAG (i.e. +14.5mPD). Therefore, adverse air quality impact is not anticipated at all residential floors.

7.3.8. In addition, it is also recommended that all fresh air intake points of other Air Sensitive Use should not be planned within the exceedance areas shown in **Figure 7.2**. With the implementation of the proposed mitigation measures, adverse air quality impact at the Subject Site is not expected.

Conclusion

7.3.9. Potential cumulative air quality impact has been assessed. No exceedance of AQOs of hourly NO_2, RSP and FSP would occur at the residential area of the proposed development. The only exceedance observed is the annual NO_2 concentration, exceedance areas of the Subject Site are also identified. However, with proper building design, adverse air quality impact would not be anticipated.

7.4. Noise Impact Assessment

Assessment Scope and Criteria

7.4.1. The Noise Impact Assessment was conducted in accordance with the requirements in Chapter 9 of the Hong Kong Planning Standards and Guidelines (HKPSG), Technical Memorandum for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites (IND-TM), Noise Control Ordinance (NCO). The assessment area for Noise Impact Assessment is defined by a distance of 300m from the boundary of the Proposed Development during operation phase.

7.4.2. Road Traffic Noise and Fixed Noise have been assessed and presented below.

Noise Assessment Points

7.4.3. The representative Noise Assessment Points (NAPs) of the Proposed Development have been identified and summarized and listed in **Table 7.3**. The locations of NAPs for road traffic noise and fixed noise impact assessments are shown in **Figures 7.3** to **Figure 7.7.**

Table 7.3 Representative Noise Assessment Points of the Proposed Development

NAPs	Description	Assessment Floor Level
Road Traffic Noise		
BA_01_1 to BA_05_1	Proposed Block A	1/F-23/F
BA_06_1 to BA_13_1	Proposed Block A	1/F-35/F
BB_01_1 to BA_12_1	Proposed Block B	1/F-32/F
BC_01_1 to BC_05_2	Proposed Block C	1/F-21/F
BC_06_1 to BC_30_1	Proposed Block C	1/F-34/F
BD_01_1 to BD_26_1	Proposed Block D	1/F-34/F
Fixed Noise		
BA_01_2	Proposed Block A	1/F-23/F
BC_03_2 BC_05_2	Proposed Block C	1/F-21/F
BC_06_1 BC_11_1 BC_14_2 BC_15_1	Proposed Block C	1/F-34/F
BD_02_1 BD_13_1	Proposed Block D	1/F-34/F

Impact Identification and Evaluation – Road Traffic Noise

7.4.4. The road traffic noise impact on the Proposed Development has been predicted based on the latest layout given. Quantitative assessment was evaluated and the unmitigated results are presented in **Table 7.4** below.

7.4.5. For the residential blocks of Proposed Development, noise exceedance of up to 77 dB(A) at Block A, 74dB(A) at Block B, as well as 76dB(A) at Block D was predicted. There was no noise exceedance at Block C.

Table 7.4 Summary of Road Traffic Noise Results (Unmitigated)

Predicted Noise Level	Block A	Block B	Block C	Block D
Range on Results, $L_{10(1\text{-}Hour)}$, dB(A)	36-77	35-74	38-69	41-76
Criteria, $L_{10(1\text{-}Hour)}$, dB(A)	70	70	70	70
Compliance	**No**	**No**	**Yes**	**No**

Impact Identification and Evaluation – Fixed Noise

7.4.6. Existing fixed noise sources (e.g. chillers, cooling towers, louvers, etc.) within 300m study area were identified. On-site noise measurement and desktop review were prepared to assess the potential noise impact from the identified fixed noise sources to the Proposed Development. Based on the latest design of the Proposed Development, there are no proposed fixed noise sources within the development. Quantitative assessment was conducted and the results are presented in **Table 7.5** below.

7.4.7. The assessment results show that all the representative NAPs would comply with both day-time, evening-time and night-time noise criteria as stipulated in HKPSG. Therefore, no adverse noise impact from the existing fixed noise sources is expected.

Table 7.5 Summary of Fixed Noise Results

Period	NAPs	Max. Predicted Noise Level, $L_{Aeq(30mins)}$, dB(A)	Criteria, $L_{Aeq(30mins)}$, dB(A)	Compliance
Day and Evening (0700 – 2300 hours)	BA_01_2	65	70	Y
	BC_03_2	64	70	Y
	BC_05_2	65	70	Y
	BC_06_1	60	70	Y
	BC_11_1	69	70	Y
	BC_14_2	68	70	Y
	BC_15_1	68	70	Y
	BD_02_1	66	70	Y
	BD_05_2	65	70	Y
	BD_13_1	58	70	Y
Night (2300 – 0700 hours)	BA_01_2	52	60	Y
	BC_03_2	52	60	Y
	BC_05_2	N/A [1]	60	N/A
	BC_06_1	54	60	Y
	BC_11_1	54	60	Y
	BC_14_2	51	60	Y
	BC_15_1	51	60	Y
	BD_02_1	50	60	Y
	BD_05_2	54	60	Y
	BD_13_1	56	60	Y

Note:
[1] No noise source within angle of view of NSR BC_05_2 will have night-time operation.

Mitigation Measures – Road Traffic Noise

7.4.8. Mitigation measures for Road Traffic Noise are required as some of the NAPs exceed the criteria.

7.4.9. For residential blocks of Proposed Development, acoustic windows and fixed windows at affected units of Block A, Block B and Block D would be recommended. The maximum predicted noise level after mitigation in both Residential Block A, Block B and Block D are 70 dB(A).

7.4.10. Mitigated road traffic noise levels are summarized in **Table 7.6** below.

Table 7.6 Summary of Road Traffic Noise Results (Mitigated)

Predicted Noise Level	Block A	Block B	Block C	Block D
Range on Results, $L_{10(1\text{-}Hour)}$, dB(A)	36-70	35-70	38-69	41-70
Criteria, $L_{10(1\text{-}Hour)}$, dB(A)	70	70	70	70
Compliance	**Yes**	**Yes**	**Yes**	**Yes**

Mitigation Measures – Fixed Noise

7.4.11. As no adverse fixed noise impact during operation phase is anticipated, no mitigation measure would be required.

Conclusion

7.4.12. Based on the quantitative results of road traffic noise impact, mitigation measures such as acoustic windows and fixed windows at affected units of Block A, Block B and Block D would be recommended; or provided with air-conditioning system alternatively in the detailed design stage.

7.4.13. Based on the quantitative results of fixed noise impact, the predicted noise levels at representative NSRs would comply the noise criteria as stipulated in the HKPSG. No mitigation measures is required.

7.5. Land Contamination Impact Assessment

Assessment Scope and Criteria

7.5.1. Land contamination assessment has been conducted to identify the potential land contamination impacts due to the past and present land uses of the Subject site to the future occupants of the proposed development. The relevant environmental guidelines and standards for land contamination assessment include the following:

- Guidance Note for Contaminated Land Assessment and Remediation (Guidance Note)
- Practice Guide for Investigation and Remediation of Contaminated Land (Practice Guide)
- Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management (Guidance Manual)

Assessment Methodology

7.5.2. The land contamination assessment was carried out in the form of site appraisal and includes desktop study and site walkover.

Impact Identification and Evaluation

7.5.3. Based on the findings of the site appraisal, potential sources of contamination were identified within the Subject Site. 4 factory units areas, 3 chemical storage areas, 5 transformer units and 1 emergency generator were identified with potential contaminating activities. Given the scale of operations of these potential contamination sources and that the factory estate was paved by intact concrete, contamination extent, if any, are anticipated to be localized.

Recommendations

7.5.4. As some areas within the Subject Site were inaccessible for site inspection, further site walkover is recommended to be carried out within the Subject Site to assess the inaccessible areas and to confirm any change in site activities since this report. Findings of the site appraisal and further site walkover would need to be documented in the CAP for the agreement of EPD prior to carrying out any SI works.

7.5.5. SI works would need to be carried out according to EPD agreed CAP. Following the completion of the SI works, CAR will be prepared to present the findings of the intrusive SI and laboratory analytical results. If land contamination is identified, RAP, discussing the appropriate remedial methods for the identified contamination, will also need to be submitted to EPD for agreement.

7.5.6. Upon completion of the remediation works (if necessary), RR will be prepared and submitted to EPD to demonstrate that the remediation works are adequate and are carried out in accordance with the approved CAR and RAP. No construction works, other than the remediation works and above ground demolition works, within identified location of contamination, will be carried out before the approval of RR by EPD.

Conclusion

7.5.7. Land contamination assessment has been conducted to identify the potential land contamination impacts due to the past and present land uses of the Subject site to the future occupants of the proposed development. The land contamination assessment was carried out in the form of site appraisal and includes desktop study and site walkover. Based on the findings of the site appraisal, potential sources of contamination were identified within the Subject Site. Given the scale of operations of these potential contamination sources and that the factory estate was paved by intact concrete, contamination extent, if any, are

anticipated to be localized. As some areas within the Subject Site were inaccessible for site inspection, it is recommended to conduct further land contamination assessment and, if contamination identified, remediation works according to EPD's prevailing guidelines at a later stage of the project. No construction works (other than aboveground demolition works) of contaminated site should be carried out prior to the remediation works and EPD's approval of the associated Remediation Report (RR). Any soil/groundwater contamination would be identified and properly treated prior to the commencement of construction works within the Subject Site if the recommended further assessment and remediation works were implemented. Land contamination impacts are therefore considered not insurmountable to the future occupants.

7.6. Waste Management Implication

Assessment Scope and Criteria

7.6.1. Solid wastes that are likely to be generated during the construction and operation stage of the proposed development. The major bulk of solid waste arising from the proposed development will be domestic waste. Waste collection and disposal are covered by the Waste Disposal Ordinance (Cap. 354) (WDO).

Impact Identification and Evaluation

7.6.2. Solid wastes that are likely to be generated during the construction and operation stage of the proposed development.

7.6.3. During the construction stage, waste would be generated from the construction and demolition (C&D) materials from the construction works, general refuse from the workforce, as well as the Chemical waste from any maintenance of construction plant and equipment. Provided that the identified waste arising from the construction stage are handled, transported and disposed of using approved methods and that the recommended good site practices are adhered to, adverse environmental impacts are not anticipated.

7.6.4. During the operation phase, the majority of solid waste arising from the proposed development will be domestic waste. Waste disposed from the proposed development will be collected and delivered to the designated refuse transfer station or landfill site for disposal by waste collector to be engaged by the operator. Recycling to be conducted prior to landfill disposal of general refuse. Therefore, adverse environmental impact would not be anticipated.

Conclusion

7.6.5. Wastes generated by the Project mainly includes construction and demolition (C&D) material generated from project construction works as well as general refuse from the workforce and chemical waste from the maintenance of construction plant and equipment. During operational phase of the Project, the major solid wastes are municipal wastes generated from the occupants of the buildings. Waste generated from the proposed development will be collected and delivered to the designated refuse transfer station or landfill site for disposal by waste collector to be engaged by the operator. Adverse environmental impact would not be anticipated with respect to solid waste management.

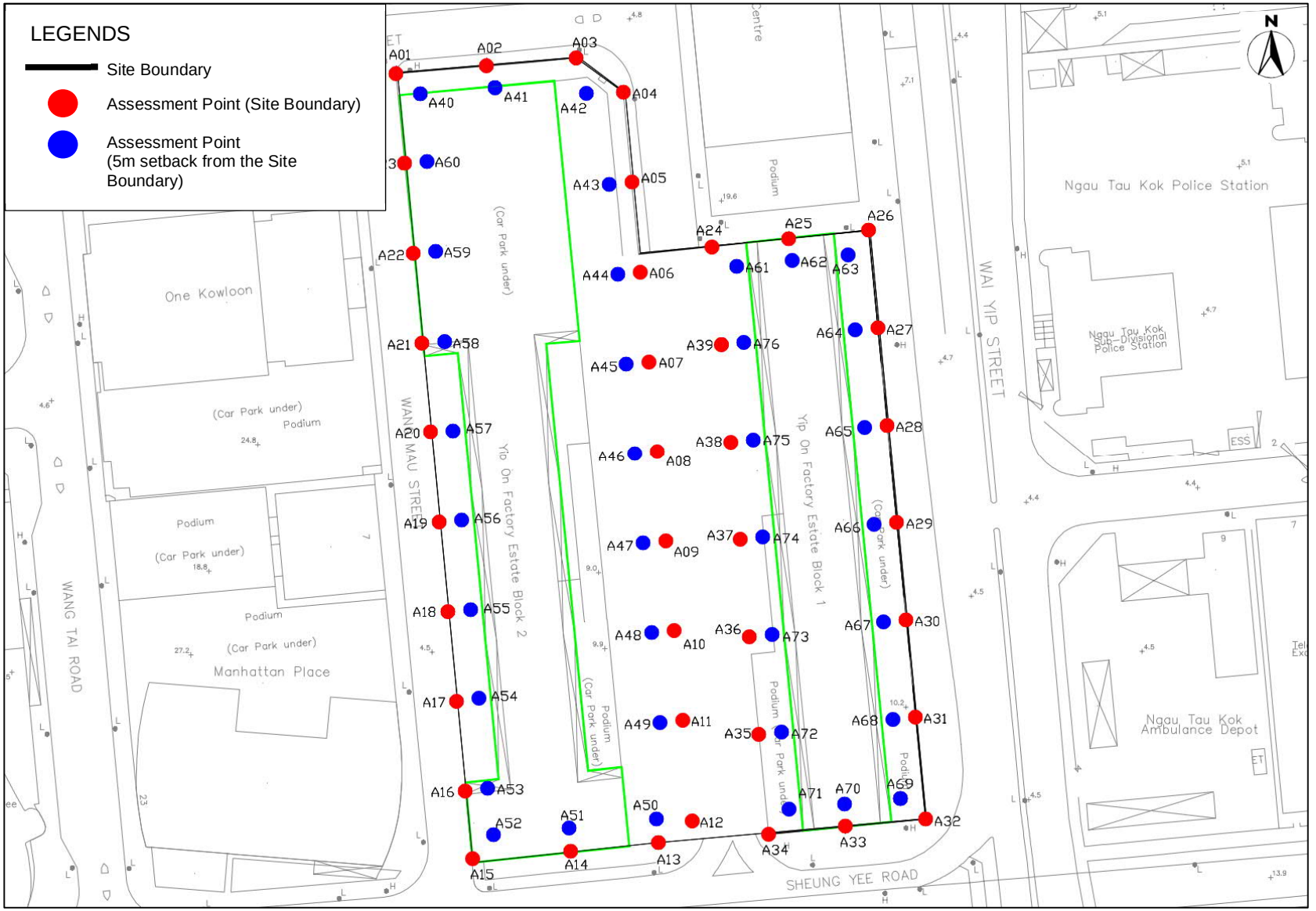
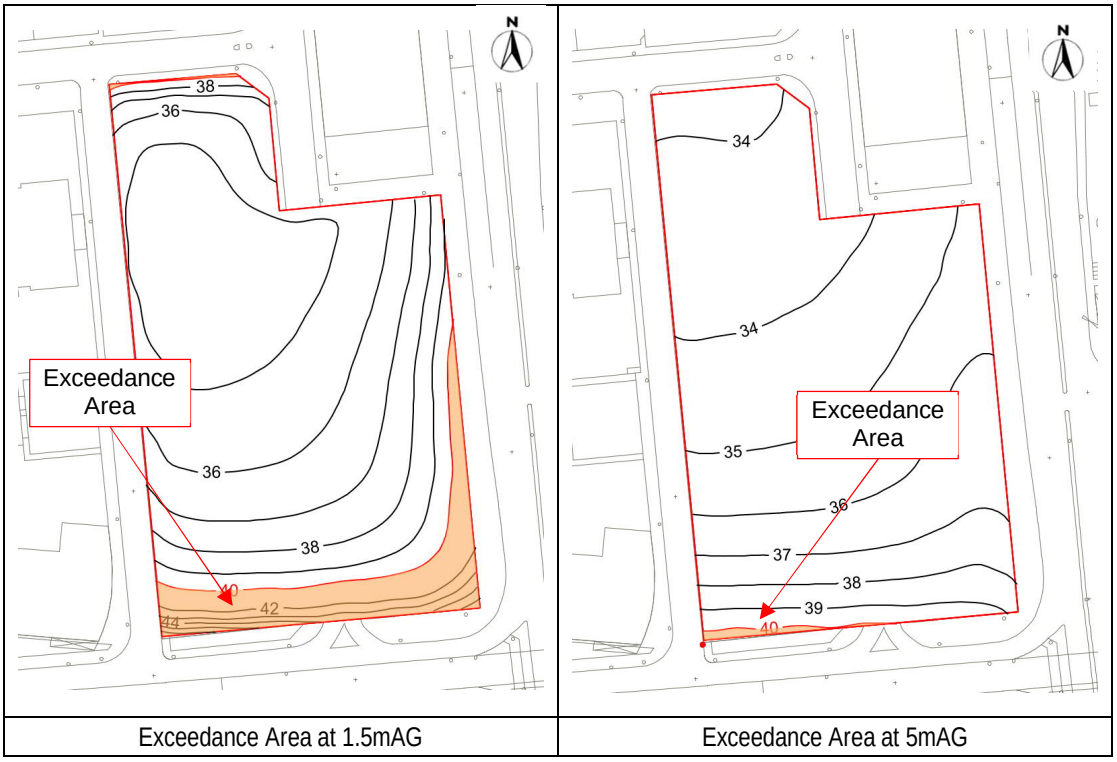
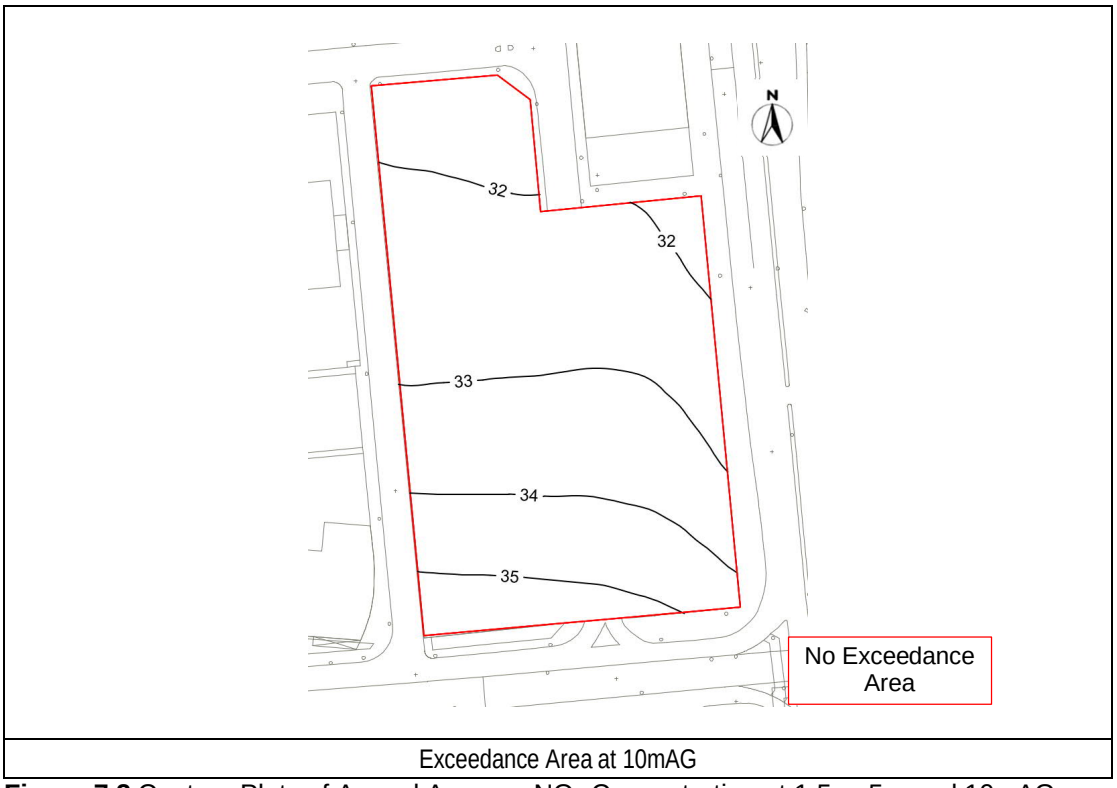


Figure 7.1 Locations of Air Quality Impact Assessment Points



Exceedance Area at 1.5mAG | Exceedance Area at 5mAG



Exceedance Area at 10mAG

Figure 7.2 Contour Plots of Annual Average NO_2 Concentration at 1.5m, 5m and 10mAG.

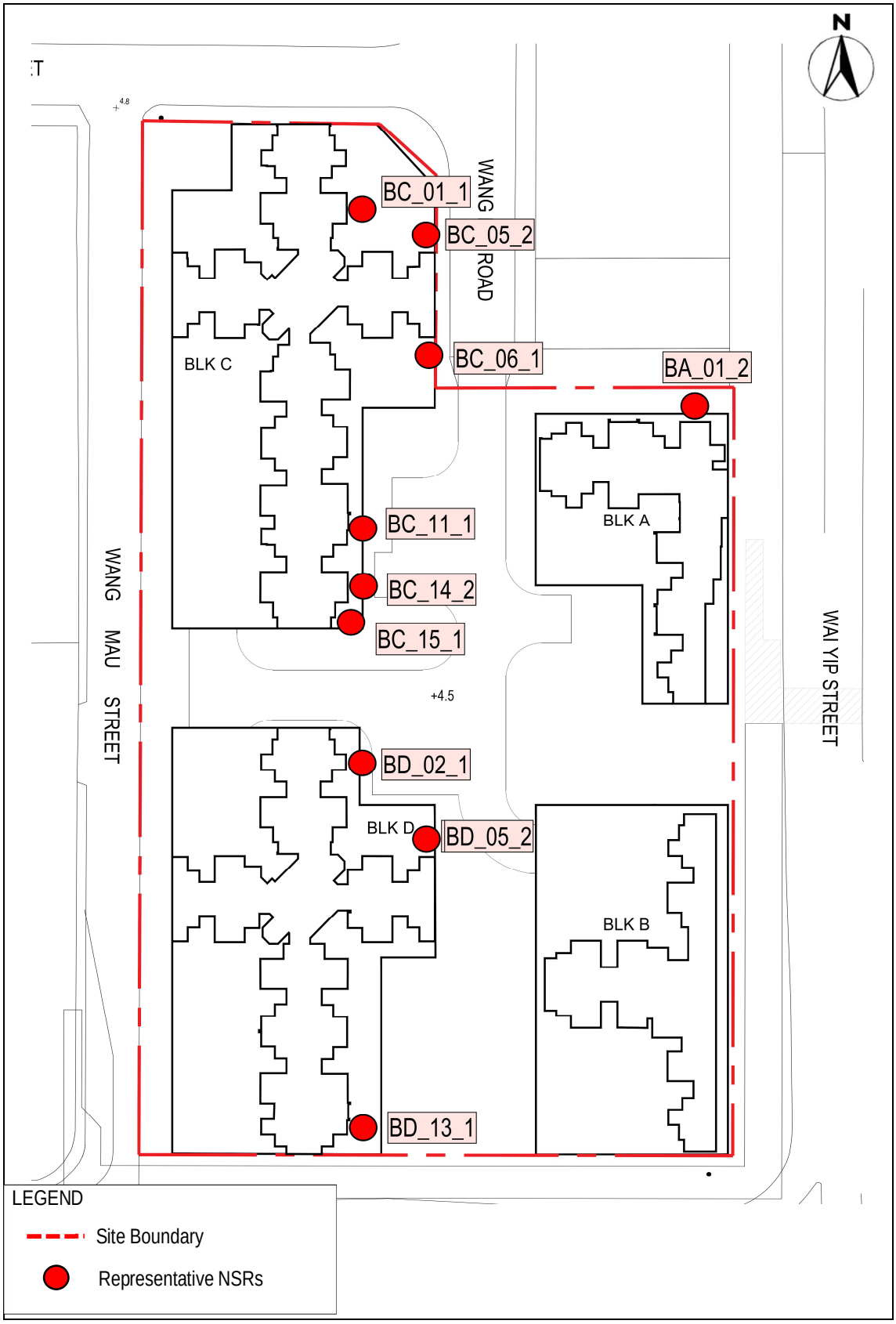


Figure 7.3 Representative NSRs for Fixed Plant Noise Impact Assessment

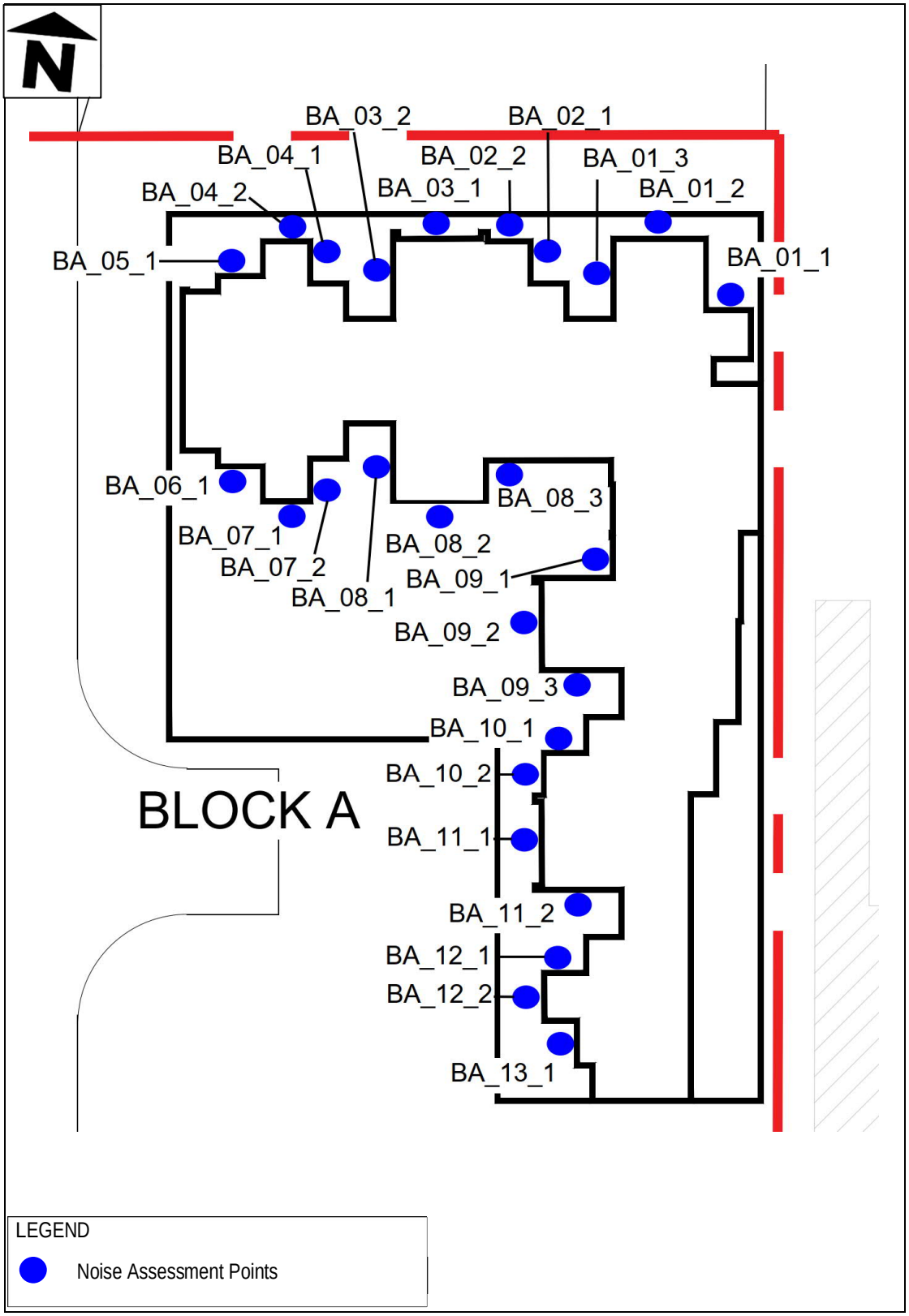


Figure 7.4 Location of NAPs for Traffic Noise Impact Assessment (Block A)

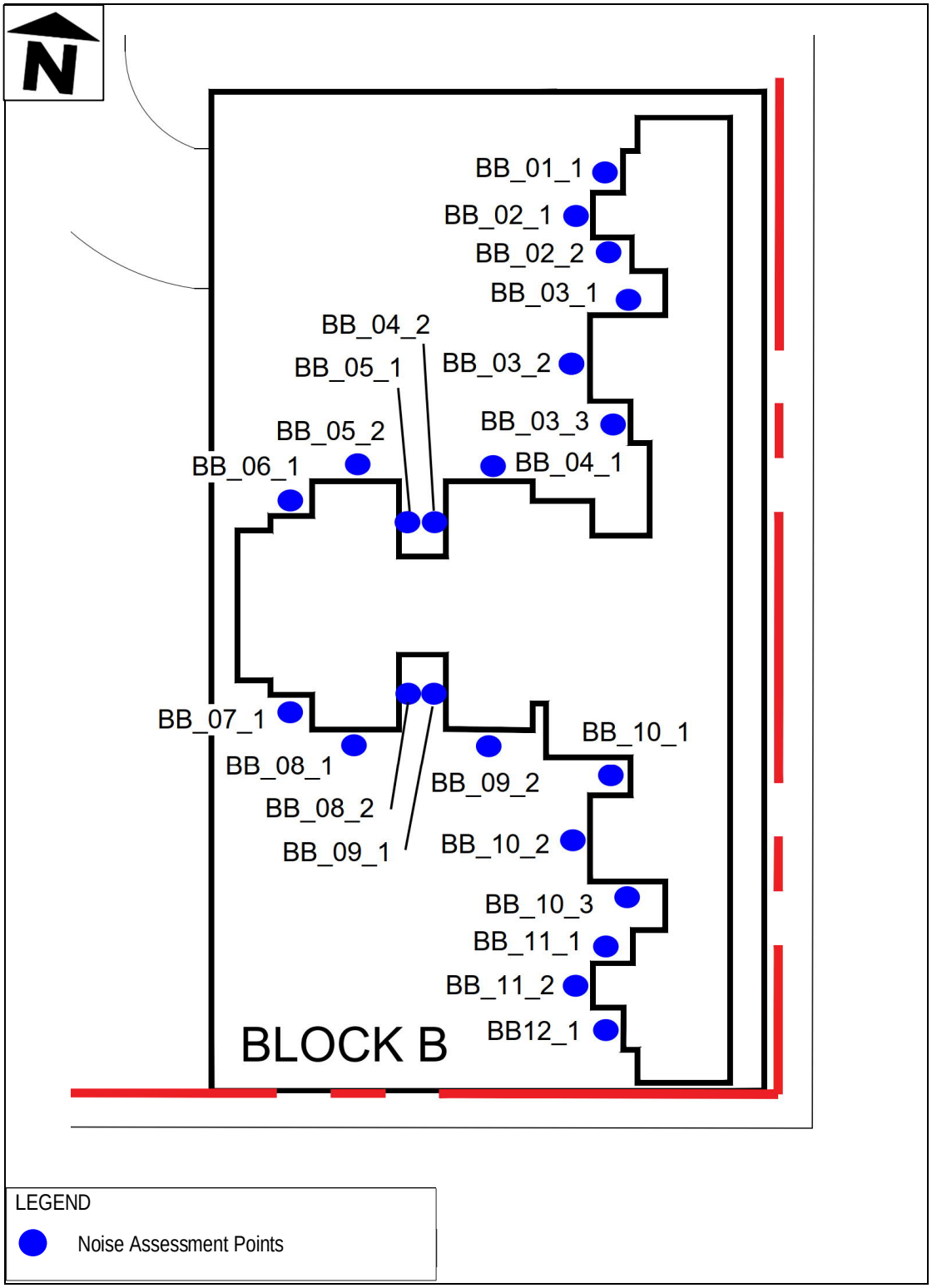


Figure 7.5 Location of NAPs for Traffic Noise Impact Assessment (Block B)

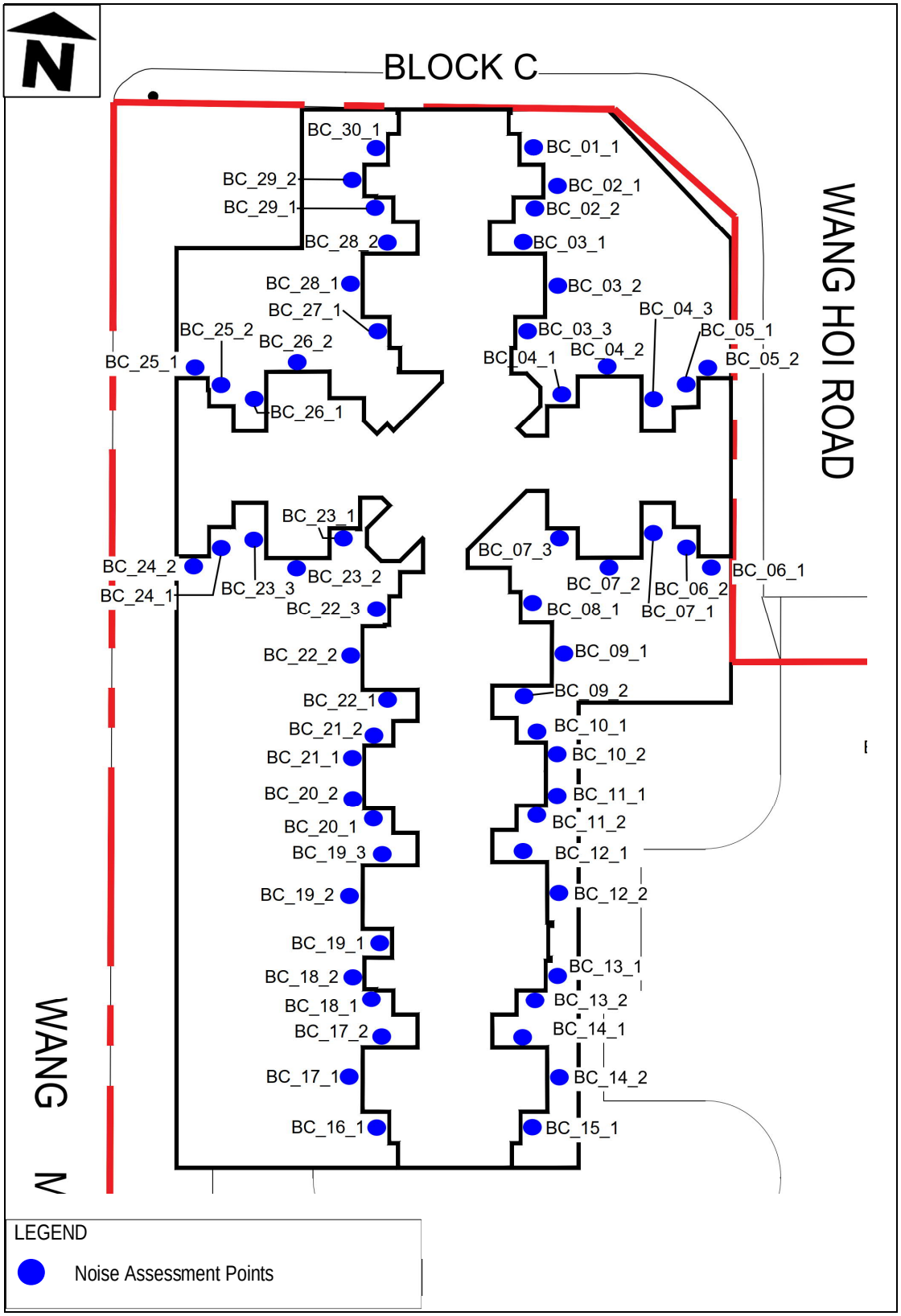


Figure 7.6 Location of NAPs for Traffic Noise Impact Assessment (Block C)

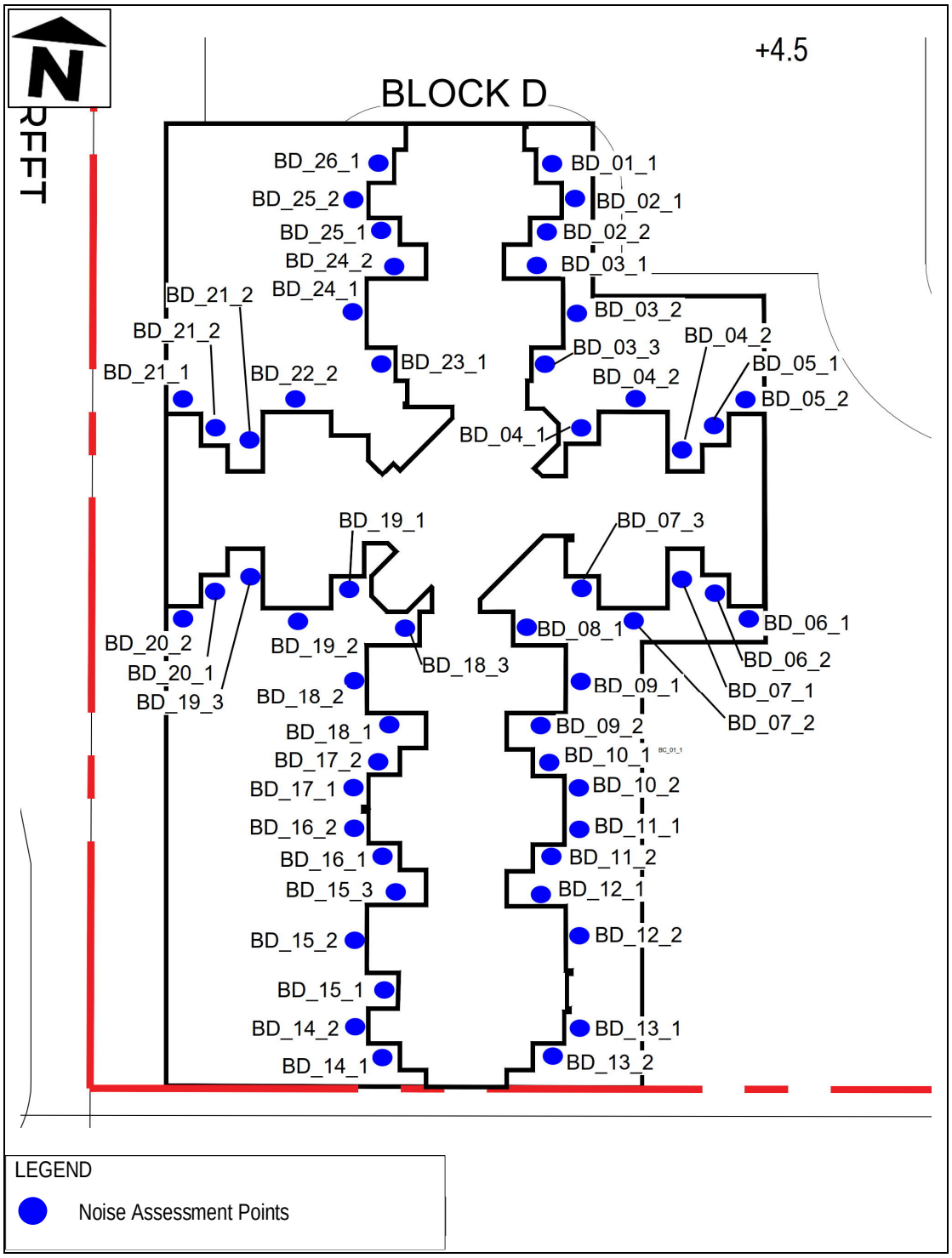


Figure 7.7 Location of NAPs for Traffic Noise Impact Assessment (Block D)

8. CONCLUSION

8.1.1. In conclusion, various technical assessments have demonstrated the feasibility of the proposed public housing development at Yip On Factory Estate Site with incorporation of the appropriate mitigation measures identified.

AIR VENTILATION ASSESSMENT
EXPERT EVALUATION

FOR

REDEVELOPMENT OF
YIP ON FACTORY ESTATE

02 December 2021

Ref No: RT20287-CFD-12

Submitted to:

Hong Kong Housing Authority

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Project:	Air Ventilation Assessment Expert Evaluation for Redevelopment of Yip On Factory Estate
Report No.:	RT20287-CFD-12

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3	29/12/2020	Response to Comment	EC	CC	YS
4	28/05/2021	Response to Comment	EC	CC	YS
5	04/06/2021	Response to Comment	EC	CC	YS
6	09/06/2021	Response to Comment	EC	CC	YS
7	14/07/2021	Response to Comment	EC	CC	YS
8	06/08/2021	Response to Comment	EC	CC	YS
9	25/08/2021	Response to Comment	EC	CC	YS
10	14/09/2021	Response to Comment	EC	CC	YS
11	04/11/2021	Response to Comment	EC	CC	YS
12	02/12/2021	Response to Comment	EC	CC	YS

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- We disclaim any responsibility to the client and others in respect of any matters outside the project scope.
- This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies upon the report at their own risk.

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

BeeXergy Consulting Limited (BXG) was commissioned by Hong Kong Housing Authority (HKHA) of the Hong Kong Special Administrative Region to undertake an Air Ventilation Assessment (AVA) – Expert Evaluation (EE) for the Redevelopment of Yip On Factory Estate located at Kowloon Bay Business Area.

The Project Site is located at the Kowloon Bay Business Area, which is currently zoned as "Other Specified Use (Business)" ("OU(B)") and an area shown as "Road" on the approved Ngau Tau Kok and Kowloon Bay Outline Zoning Plan No. S/K13/30 (the OZP). HKHA is exploring the feasibility of redeveloping the individual flatted factory estates, currently residing in the Project Site, for public housing development.

In order to assess if any potential adverse air ventilation impacts might be induced on the surrounding pedestrian wind environment due to the redevelopment, a site-specific AVA-EE has been conducted in support of the rezoning proposal at the Project Site from "OU(B)" and an area shown as "Road" to "Residential (Group A)" ("R(A)").

In conducting this AVA-EE, the following previous AVA studies related to the Project have been made reference to:

- Term Consultancy For Expert Evaluation on Air Ventilation Assessment (PLN AVA 2015) for an Instructed Project for Ngau Tau Kok and Kowloon Bay Planning Area (Jan 2019)
- Term Consultancy For Expert Evaluation and Advisory Services on Air Ventilation Assessment Services under Agreement No. PLNQ 35/2009 – Expert Evaluation and Advisory Report for Proposed Amendments to Ngau Tau Kok and Kowloon Bay Outline Zoning Plan (Nov 2010)
- Kai Tak Development Comprehensive Planning and Engineering – Stage 1 Planning Review. AVA Study for Draft PODP (Mar 2007)

1.2 STUDY OBJECTIVES

The objectives of this study are to (i) review the existing wind environment of the Project Site and its surroundings and (ii) assess qualitatively the potential air ventilation impacts of the proposed scheme and its baseline scheme (i.e. OZP Compliant Scheme) on the surroundings using the methodology of AVA, based on the "Housing Planning and Lands Bureau – Technical Circular No. 1/06, Environment, Transport and Works Bureau – Technical Circular No. 1/06" issued on 19th July 2006 (the Technical Circular) and *"Technical Guide for Air Ventilation Assessment for Development in Hong Kong – Annex A"* (the Technical Guide) of the Technical Circular.

1.3 STUDY TASKS

The major task of this study is to carry out an AVA-EE based on the characteristics of the site wind availability data and qualitative assessment of the wind performance under both schemes. The AVA-EE will also cover the following tasks:

- Review the existing wind environment of the Project Site;
- Assess qualitatively the potential air ventilation impacts of the proposed scheme and its baseline scheme (i.e. OZP Compliant Scheme) on the pedestrian wind environment at Project Site;
- Identify major breezeway(s), air-path(s) & problematic area(s);
- Identify if there are any wind stagnation and wind amplification causing uncomfortable and unsafe wind environment; and
- Recommend if any further study is necessary.

2 SITE CHARACTERISITICS

2.1 PROJECT SITE AND ITS SURROUNDING AREAS

The site area of the Project Site is approximately 1.5 ha and is located within the Kowloon Bay Business Area (KBBA). The site is currently occupied by two industrial buildings (i.e. Yip On Factory Estate Blocks 1 & 2) with a building height of approximately 40mPD.

According to the OZP, the Project Site is currently zoned “OU(B)” and an area shown as “Road” and surrounded by developments zoned “OU”, open spaces zoned “O”, commercial buildings zoned “C” and government, institution or community developments zoned “G/IC”.

To the north and northwest of the Project Site lies a cluster of industrial and commercial developments including: International Plaza, Chevalier Commercial Centre and FTLife Tower with a building height of approximately 45mPD, 81mPD and 120mPD respectively.

To the northeast of the Project Site across Wai Yip Street lies Telford Gardens with a building height up to approximately 100mPD.

To the east of the Project Site across Wai Yip Street lies the “G/IC” developments of Ngau Tau Kok Division Police Station and Ngau Tau Kok Ambulance Depot. The building height for the aforementioned developments are approximately 37mPD and 11mPD respectively.

To the south of the Project Site across Sheung Yee Road lies the commercial development of Capital Tower with a building height of approximately 120mPD as well as the planned developments within the Kowloon Bay Action Area as referenced from “Agreement No. CE 4/2014 (TP) – Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study”. The planned developments are proposed with a maximum building height up to 150mPD.

To the west of the Project Site lies a cluster of commercial developments including: Manhattan Place, One Kowloon, Enterprise Square III and Exchange Tower with a building height of approximately 173mPD, 161mPD, 164mPD and 126mPD respectively.

Figure 1 shows an overview of the Project Site and its surroundings. Figure 2 shows a view of the Project Site and its surroundings as shown on the OZP. The maximum building height for the existing developments in the vicinity of the Project Site are listed out in Table 1.

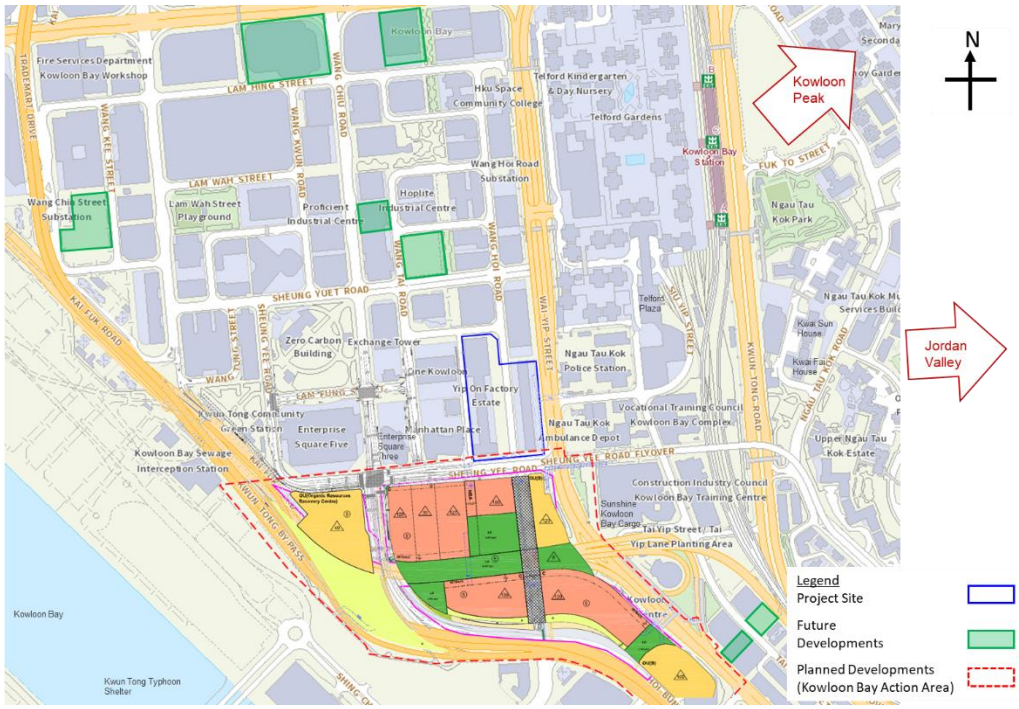


Figure 1 Overview of the Project Site and its Surroundings

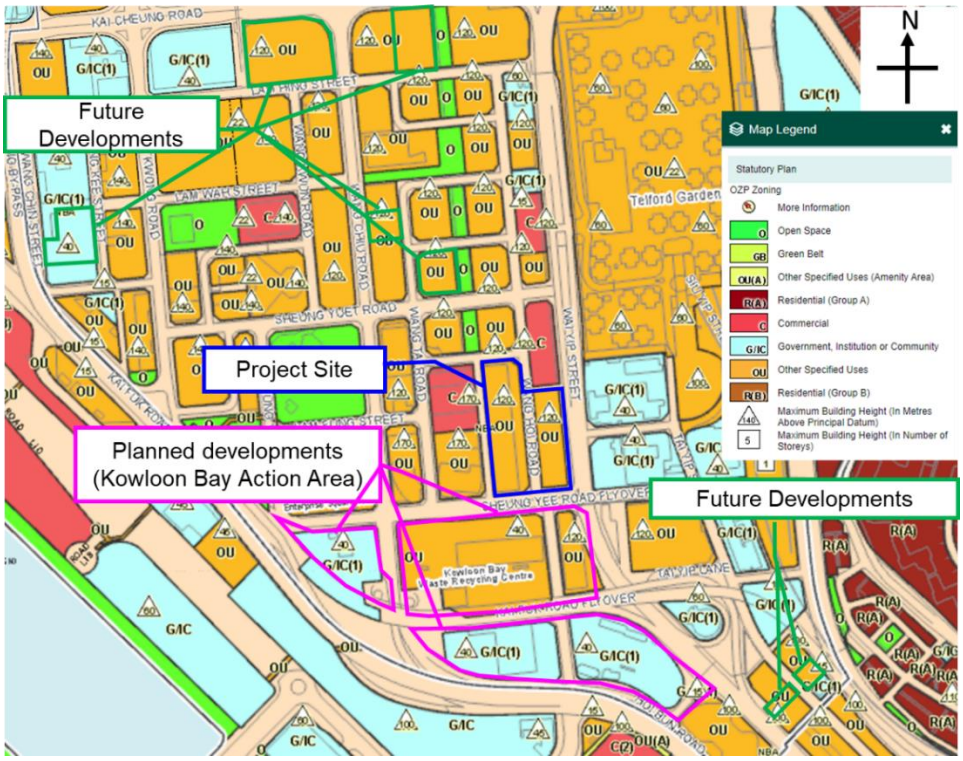


Figure 2 View of the Project Site and its Surroundings as shown on the OZP
(Source: Town Planning Board)

Table 1 Existing/Planned Developments around the Project Site

Name of Existing Development	Building Height (mPD)
Ngau Tau Kok Police Station	37
Ngau Tau Kok Ambulance Depot	11
Telford Plaza Phase II	Up to 100
Planned Developments (Kowloon Bay Action Area)[1]	Up to 150
Manhattan Place	173
One Kowloon	161
Enterprise Square III	164
Exchange Tower	126
International Plaza	45
Chevalier Commercial Centre	81
FTLife Tower	120
Capital Tower	120
Sunshine Kowloon Bay Cargo Centre	50
Future Development (NKIL 5948, 7 Wang Tai Road)	120
Future Development (NKIL 5893, 14 Wang Tai Road)	120
Future Development (NKIL 5595, 33 Tai Yip Street)	Relaxed to 109.9mPD *(approved under Planning Application No. A/K13/316)*

[1] Reference to "Plan 7 – Master Urban Design Plan" of Agreement No. CE4/2014(TP) Planning and Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East – Feasibility Study", ARUP, 2020

Future Development **(GLA-NK838, Hong Kong Post's Headquarters, Wang Chin Street**	40
Future Development **(NKIL 5593, 32 Tai Yip Street)**	100
Future Development **(NKIL 5851, 22 Kai Cheung Road)**	120
Future Development **(NKILs 5848 & 5849, 20 Kai Cheung Road)**	Relaxed to 128.2mPD (*approved under Planning Application No. A/K13/318)*

(As of 3.11.2020)

2.2 STUDIED SCENARIOS

2.2.1 Existing Condition

As mentioned in Section 2.1, the site is currently occupied by two industrial buildings (i.e. Yip On Factory Estate Blocks 1 & 2) with a building height of approximately 40mPD.

Figure 3 shows the existing site plan of the Project Site.



Figure 3 Layout of Existing Condition

2.2.2 Baseline Scheme

The Baseline Scheme represents an OZP compliant scheme with a plot ratio of 12 and building height of 120mPD and comprises of two office towers namely Tower A and B.

The eastern portion of the Project Site consists of one office tower, namely Tower A, with a building height of approximately 120mPD. Tower A sits atop a 2-storey retail podium. Similarly, the western portion of the Project Site also consists of one office tower, namely Tower B, with a building height of approximately 120mPD. Tower B also sits atop a 2-storey retail podium.

According to the OZP, a 5m-wide non-building area (NBA) is designated at the western portion of the Project Site abutting the eastern side of Wan Mau Street so as to extend the breezeway of the liner open space from Kai Cheung Road southward to Sheung Yee Road.

Figures 4 and 5 show the layout plan and section drawings of the Baseline Scheme respectively.

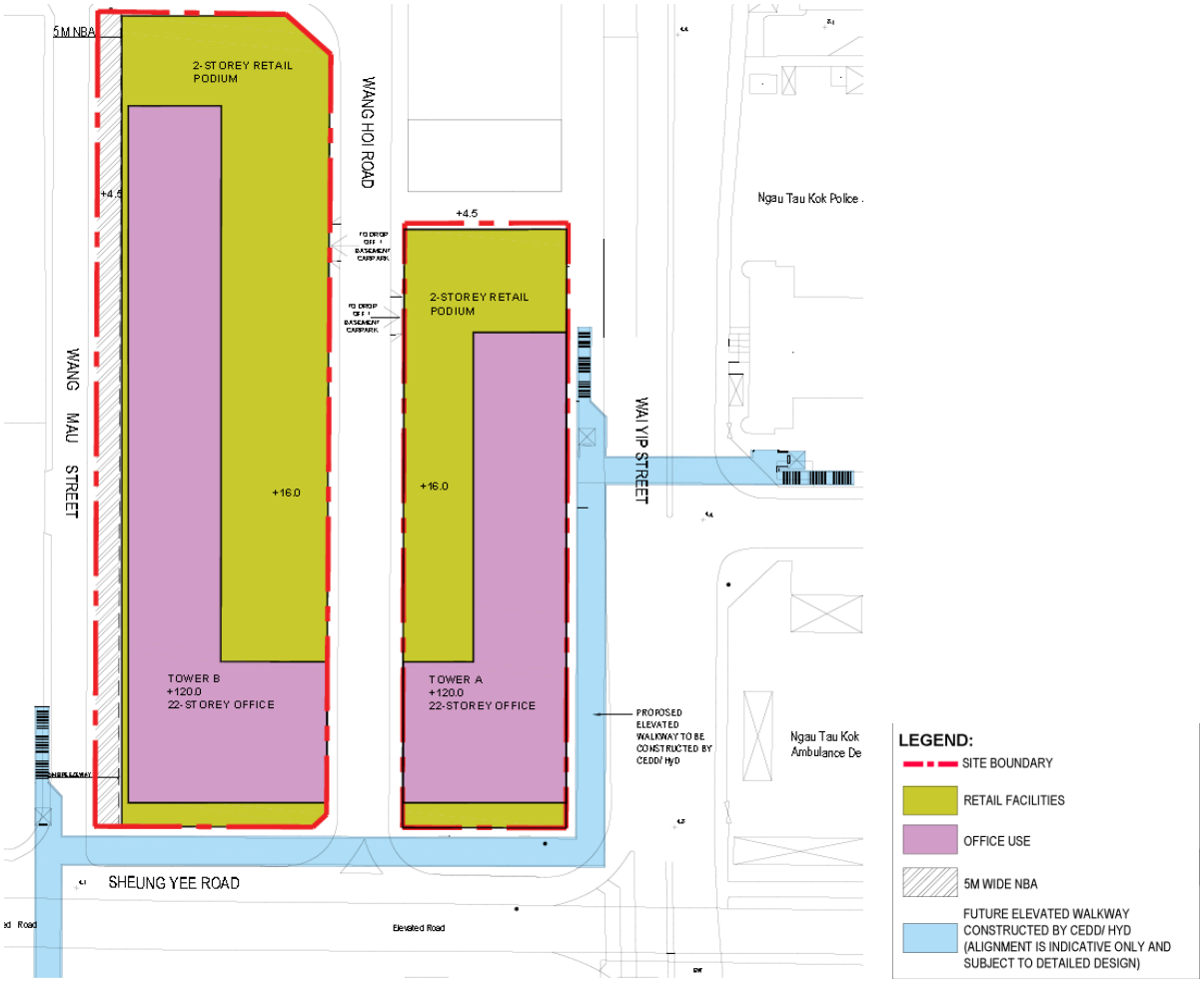


Figure 4 Master Layout Plan of the Baseline Scheme

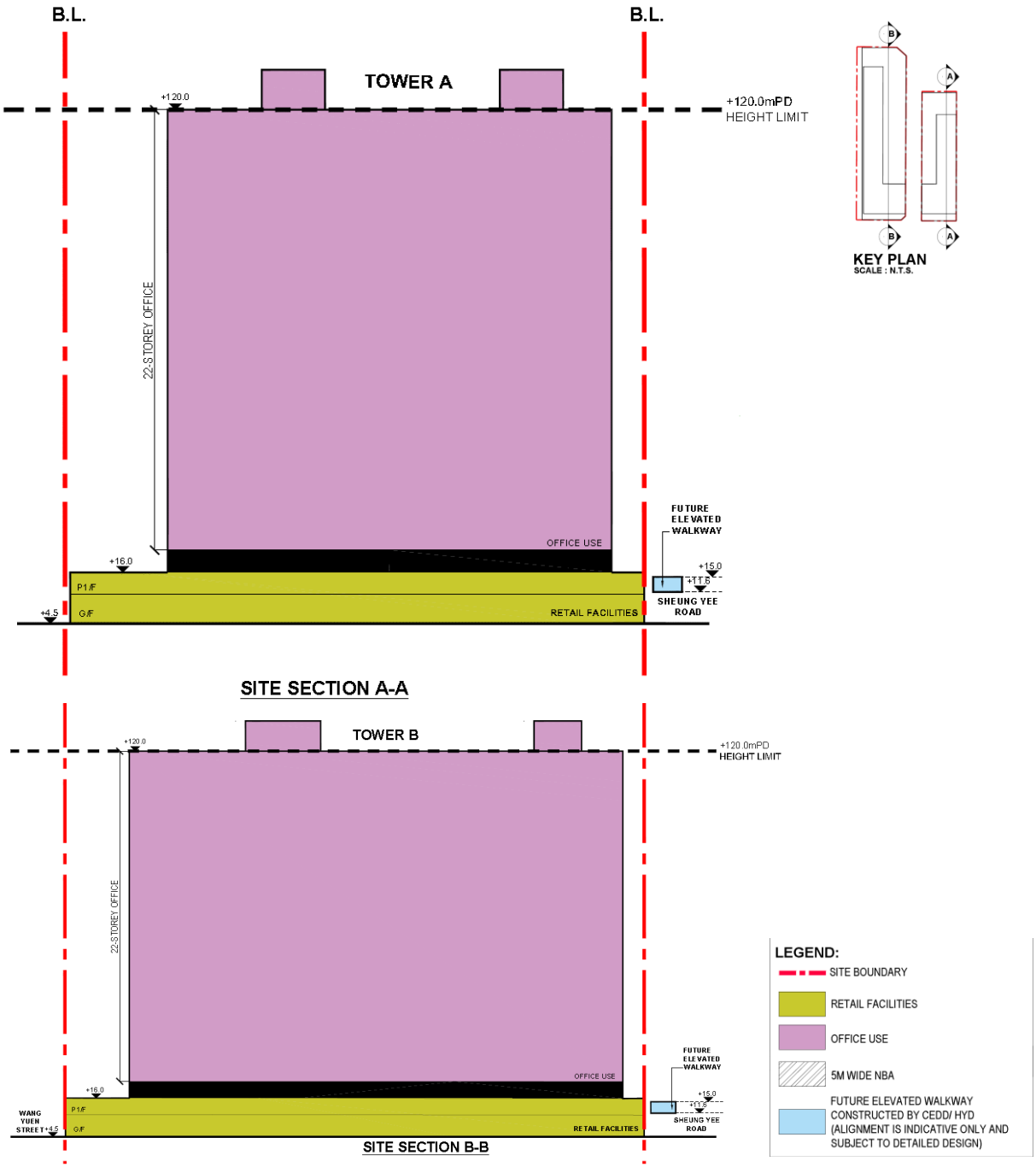


Figure 5 Section Drawings of the Baseline Scheme

2.2.3 Proposed Scheme

The Proposed Scheme comprises of four residential towers namely Blocks A to D.

The eastern portion of the Project Site (Blocks A and B) consists of two residential towers with a building height of approximately 120mPD. Block A and Block B sits atop 4-storey and 6-storey non-domestic facilities respectively.

The western portion of the Project Site (Blocks C and D) accommodates two residential towers with a building height of approximately 120mPD. Block C and Block D both sits atop 5-storey non-domestic facilities.

As Client requirements, design brief, etc. are not yet confirmed / endorsed, types and full extent of social welfare facilities, non-domestic facilities as well as the domestic accommodation are subject to revision.

According to the OZP, a 5m-wide non-building area (NBA) is designated at the western portion of the Project Site abutting the eastern side of Wan Mau Street so as to extend the breezeway of the liner open space from Kai Cheung Road southward to Sheung Yee Road.

The Proposed Scheme includes a portion of Wang Hoi Road between Yip On Factory Estate Blocks 1 and 2 for incorporation into the development site for plot ratio calculation, better planning and to increase housing supply. As compared to the scenario of adopting the existing site boundary of Yip On Factory Estate segregated by Wang Hoi Road, the Proposed Scheme will provide more flats while respecting the urban fabric and the north-south visual and wind corridor along the pedestrianized Cheung Yip Street proposed under the Planning, Urban Design and Preliminary Engineering Study for the Development at Kowloon Bay Action Area of Kowloon East. More landscaped area as greenery for residents' enjoyment is also provided with minimal extents of circulation area to car parking spaces, L/UL bays and EVA in the Proposed Scheme. The Proposed Scheme would achieve better and comprehensive planning as one single site, increase flat supply, enhancement of connectivity and walkability within the site and offer more flexibility in building design and layout. Partial closure of Wang Hoi Road would not have adverse impact on the elevated pedestrian walkways proposed by Energizing Kowloon East Office (EKEO).

Figures 6 and 7 show the layout plan and section drawings of the Proposed Scheme respectively.

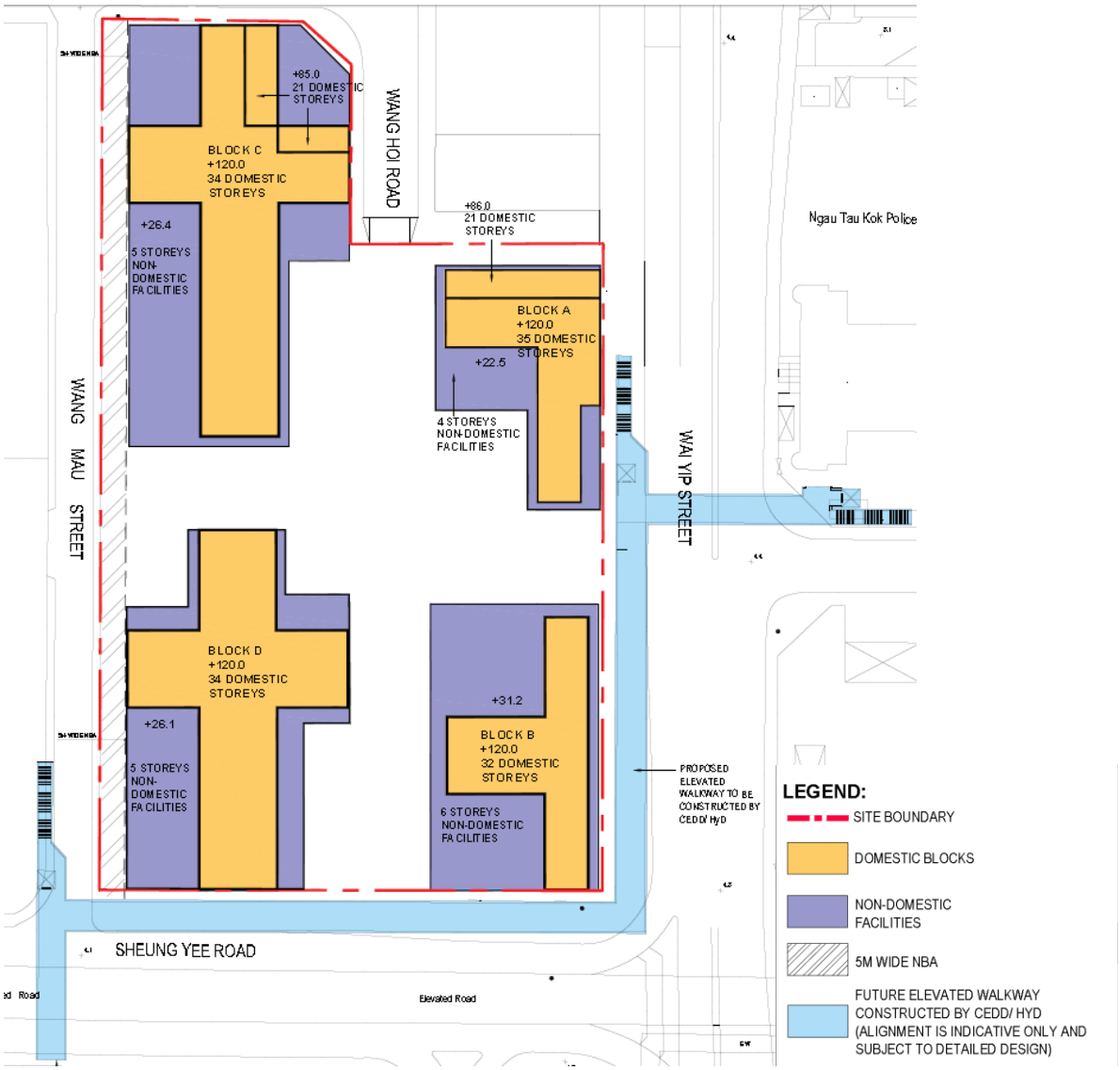


Figure 6 Master Layout Plan of the Proposed Scheme

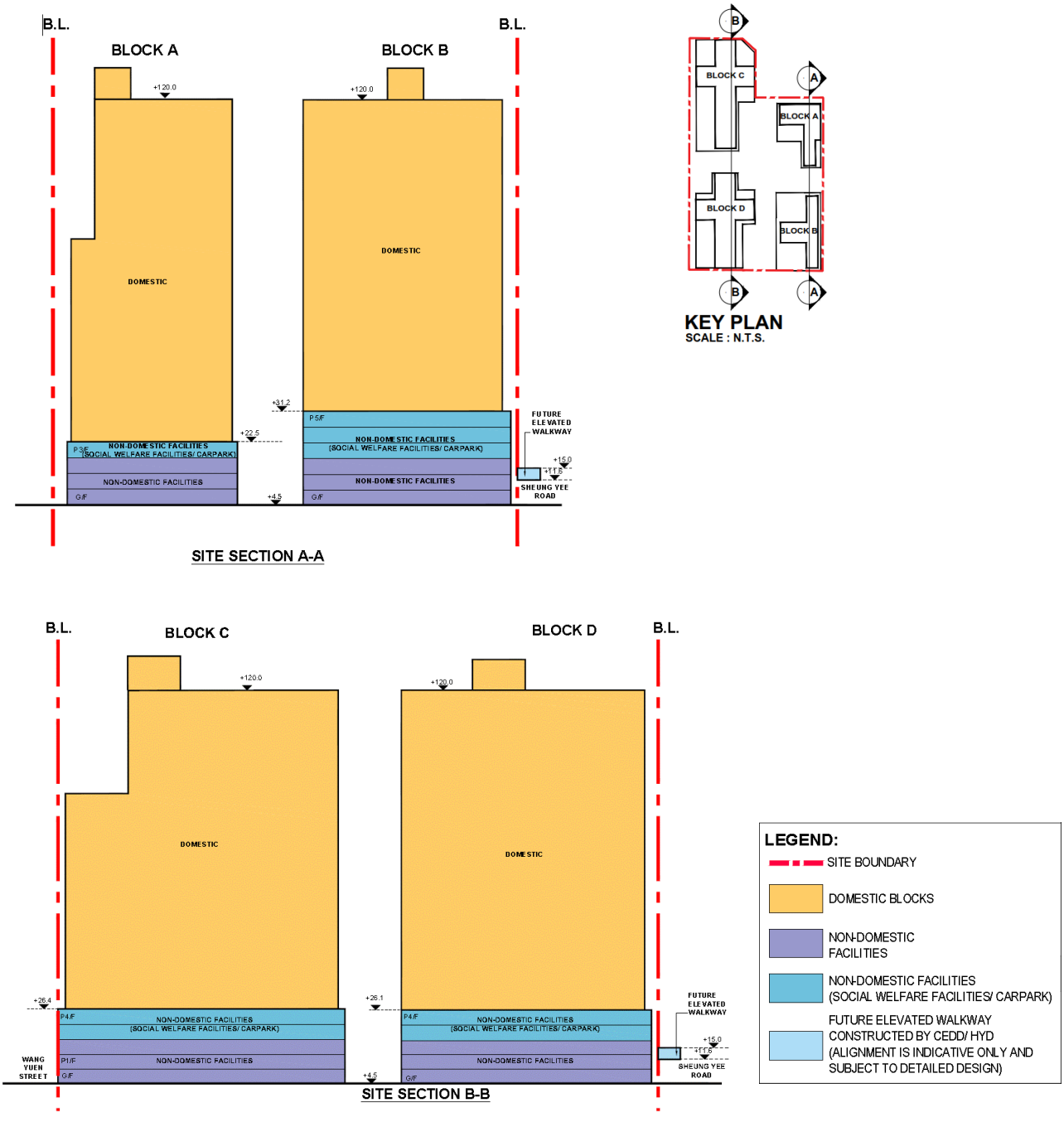


Figure 7 Section Drawings of the Proposed Scheme

2.2.4 Good Design Features in the Proposed Scheme

Chapter 11 of “Hong Kong Planning Standards and Guideline” on Air Ventilation was referenced in order to determine the good design features in the Proposed Scheme from an air ventilation standpoint.

The following good design features of the Proposed Scheme are identified:

- Two building separations along the East-West axis, namely 17m between Blocks C and D & 19m between Blocks A and B
- The building separation of 17m between Block A and Block C which also connects to Wang Hoi Road
- Around 5m-wide NBA at the western portion of the Project Site abutting the eastern side of Wan Mau Street

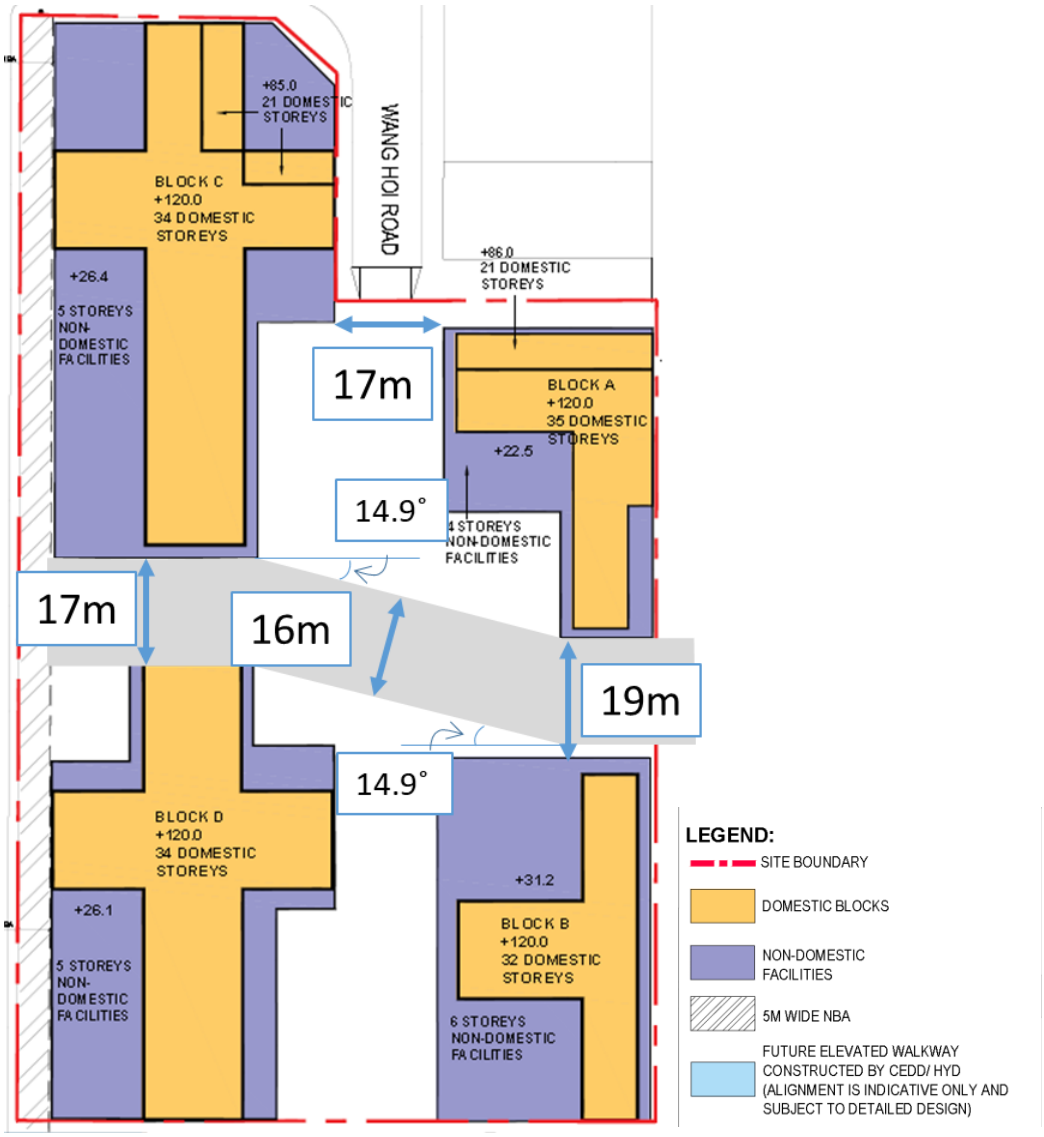


Figure 8 Building Separations along E-W Axis and N-S Axis in the Proposed Scheme[2]

[2] "The degree of change and the effective width of the building separation are subject to change in detail design stage (the max degree of change is 15 degree and the minimum width of building separation is 15m)."

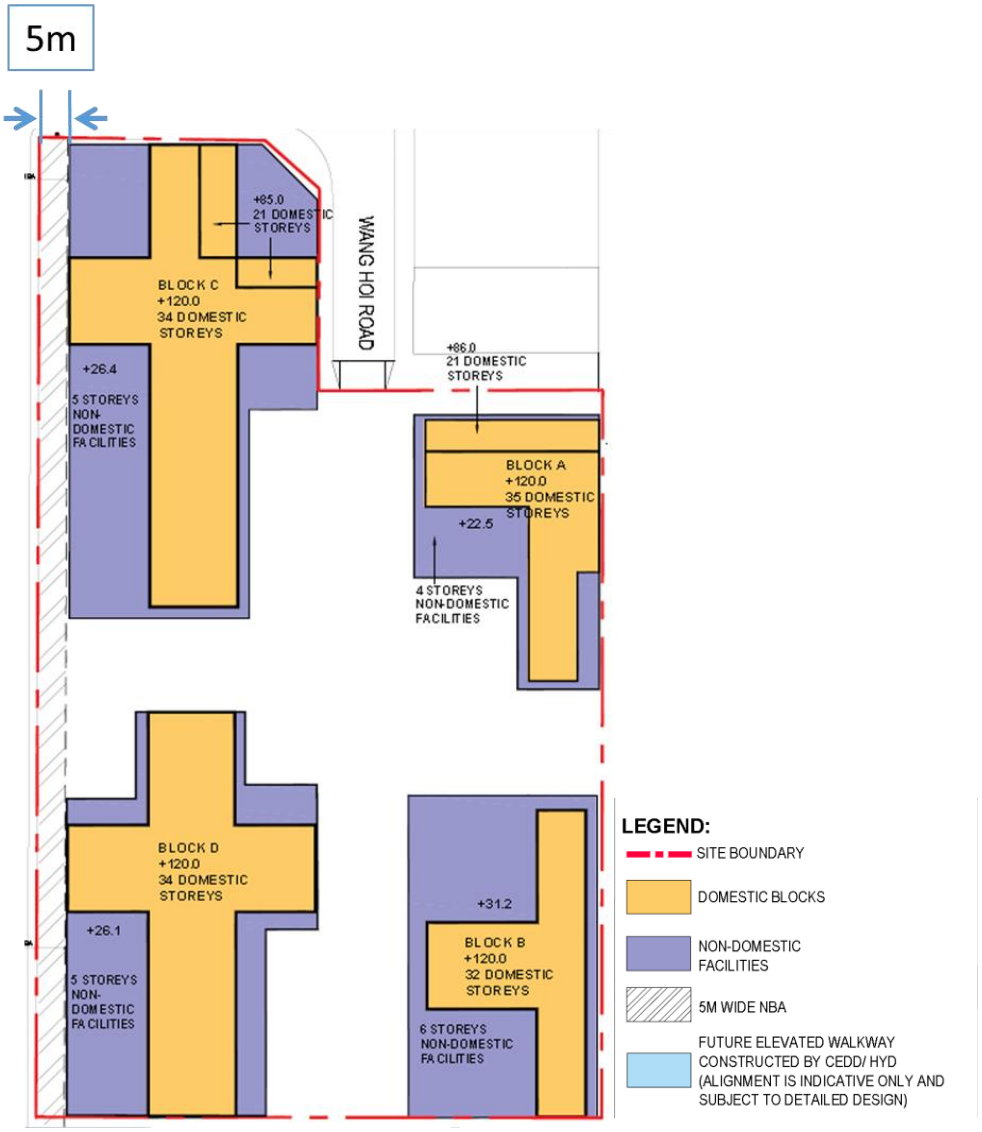


Figure 9 Non-Building Area in the Proposed Scheme

3 SITE WIND AVAILABILITY

The characteristic of the site wind availability should be identified in order to investigate the wind performance of the Project Site. Site wind availability data could be used for assessing the wind characteristics in terms of the magnitude and frequency of approaching wind from each wind direction. In this study, the simulated Regional Atmospheric Modelling System (RAMS) wind data from PlanD has been used for the quantitative assessment.

3.1 RAMS WIND DATA

City University of Hong Kong (CityU) utilized the meso-scale numerical model Regional Atmospheric Modeling System (RAMS) to produce site wind availability data for Hong Kong and is available at Planning Department's database[3]. Based on the archived dataset, wind statistics and wind roses for each 0.5km×0.5km grid box at different height levels could be extracted. Simulated data at grid (X088, Y042) corresponds to the location of the Project Site and both annual and summer wind conditions at 200m above ground are referenced in this study. The location of grid (X088, Y042) is shown in Figure 10. The extracted wind roses shows that north easterly wind dominate under the annual wind condition while south westerly wind dominate under the summer wind condition. Figure 11 and Figure 12 shows the annual and summer wind roses at 200m above ground level for grid (X088, Y042) respectively.

[3] http://www.pland.gov.hk/pland_en/info_serv/site_wind/site_wind/index.html

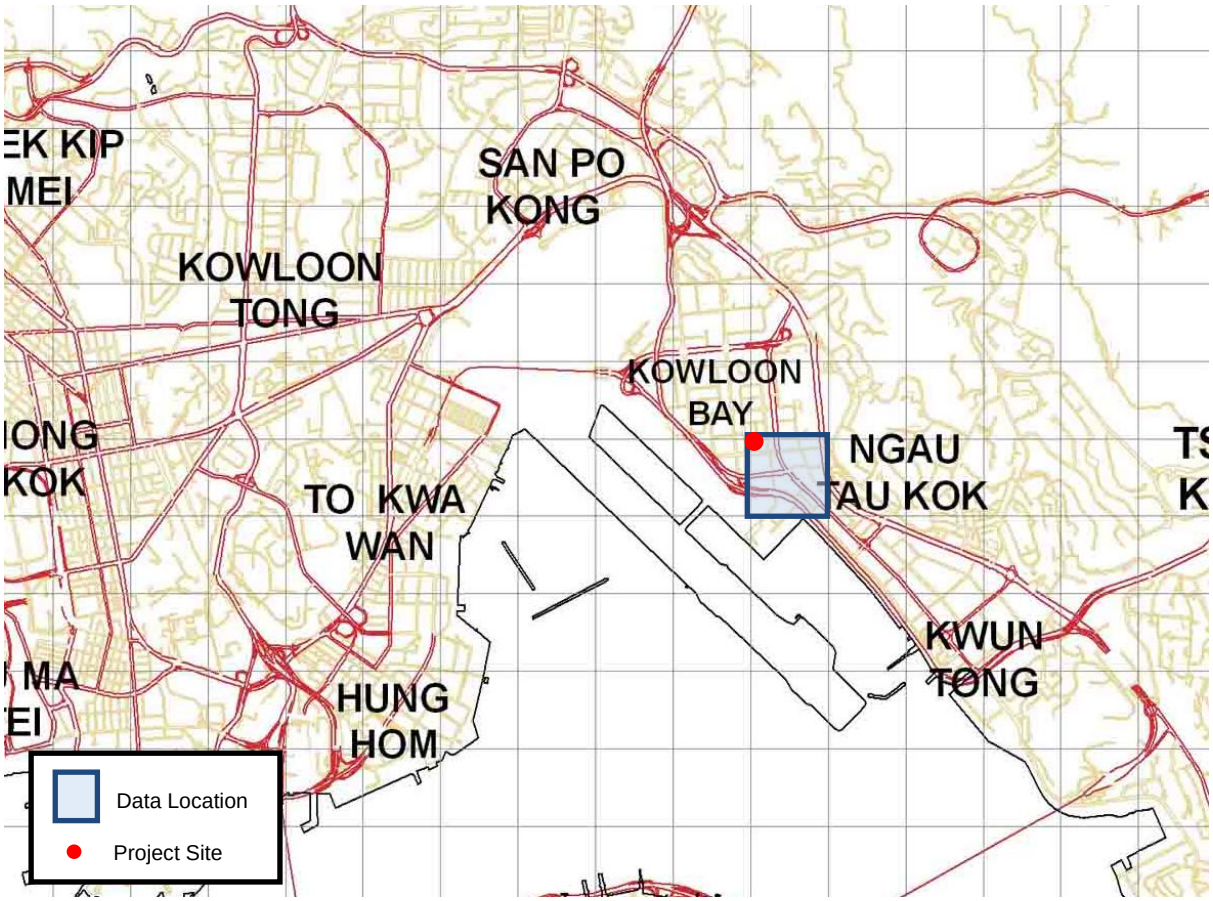


Figure 10 Location of the Selected RAMS Wind Data - Grid (X088, Y042)

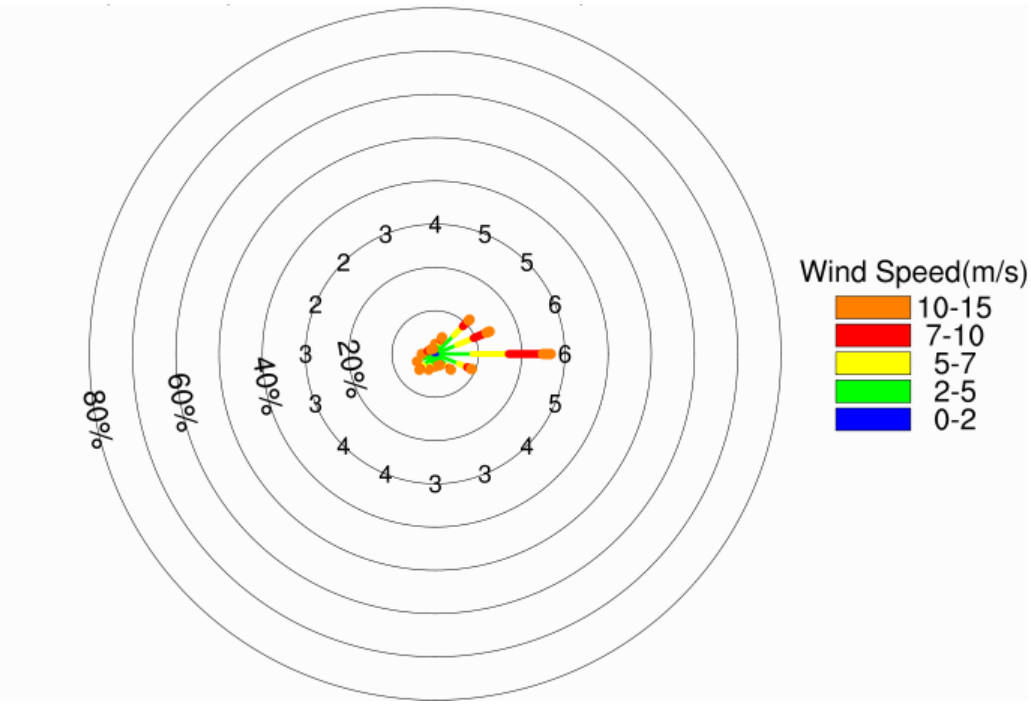


Figure 11 Annual Wind Rose at 200m - Grid (X088, Y042)

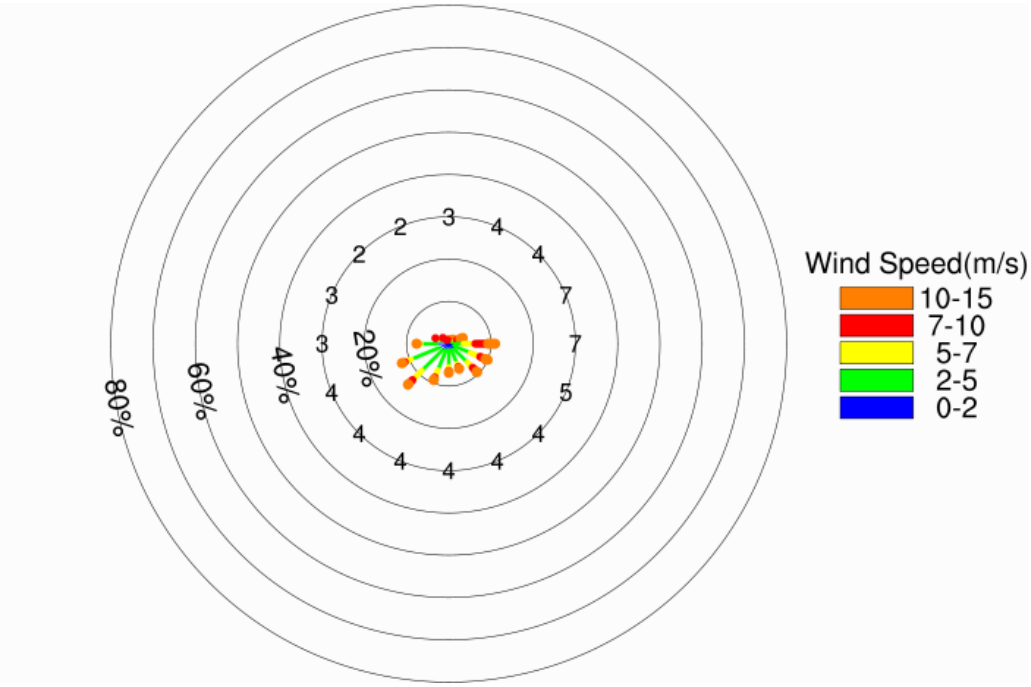


Figure 12 Summer Wind Rose at 200m - Grid (X088, Y042)

The extracted wind roses show that the north easterlies dominate under the annual wind condition whilst south-westerlies dominate under the summer wind condition.

Table 2 Prevailing Wind Frequency of the Project Site by RAMS Wind Data

Prevailing Wind	**Annual**			**Summer**			
Wind Direction	NE	ENE	E	E	ESE	SW	WSW
Wind Frequency	11.3%	13.7%	26.8%	11.1%	10.1%	13.7%	12.0%

According to the RAMS wind data of the Project Site, NE, ENE and E winds contribute to 11.3%, 13.7% and 26.8% of the annual wind frequency respectively while E, ESE, SW and WSW winds contribute to 11.1%, 10.1%, 13.7% and 12.0% of the summer wind frequency respectively.

Hence, NE, ENE and E winds are identified as the annual prevailing wind direction while E, ESE, SW and WSW winds are identified as the summer prevailing wind direction for the Project Site.

3.2 SITE WIND AVAILABILITY FOR CURRENT STUDY

RAMS wind data which indicate the prevailing wind directions have been studied and are tabulated in Table 3.

Since the RAMS wind data is obtained at the location of the Project Site, RAMS wind data would be adopted as the basis of study for the Project Site. Table 3 is a summary of the prevailing wind directions for the Project Site.

Table 3 Prevailing Wind Directions of the Project Site

Prevailing Wind Direction	**RAMS Wind Data**
Annual	NE, ENE, E
Summer	E, ESE,SW, WSW

4 EXISTING WIND ENVIRONMENT

As identified in the Section 3, the Project Site enjoy abundant north-easterly and easterly annual wind via Wai Yip Street, Wang Hoi Road and Sheung Yee Road whereas south-westerly summer wind consists of sea breeze coming from Kwun Tong Typhoon Shelter and Kowloon Bay.

Wai Yip Street and Sheung Yee Road acts as the main wind corridors to bring annual north-easterly and easterly wind to the Project Site respectively. The high-rise building clusters (i.e. Telford Gardens, Kwai Sun House and Kwai Fai House of Lower Ngau Tau Kok Estate, Hang Seng Tower, MTR Headquarters Building and Telford Plaza Phase II) to the north-east and east of the Project Site may act as a wind barrier and block a portion of annual wind towards the Project Site.

In contrast, summer south-westerly winds mainly consist of sea breeze coming from Kwun Tong Typhoon Shelter and Kowloon Bay. The existing and planned high-rise building clusters (i.e. the existing Capital Tower and Planned Developments – Kowloon Bay Action Area) along the waterfront may act as a wind barrier and block a portion of summer wind to the Project Site. However, it is expected the incoming summer wind would enter the Project Site through Sheung Yee Road, Cheung Yip Street and Lam Fung Street.

A detailed qualitative analysis on the existing wind environment is presented in Section 5. Figure 13 shows the annual and summer air paths for the Project Site as referenced to the Expert Evaluation on Air Ventilation Assessment for Air Ventilation Assessment by Expert Evaluation for the Ngau Tau Kok and Kowloon Bay Planning Area (2015).

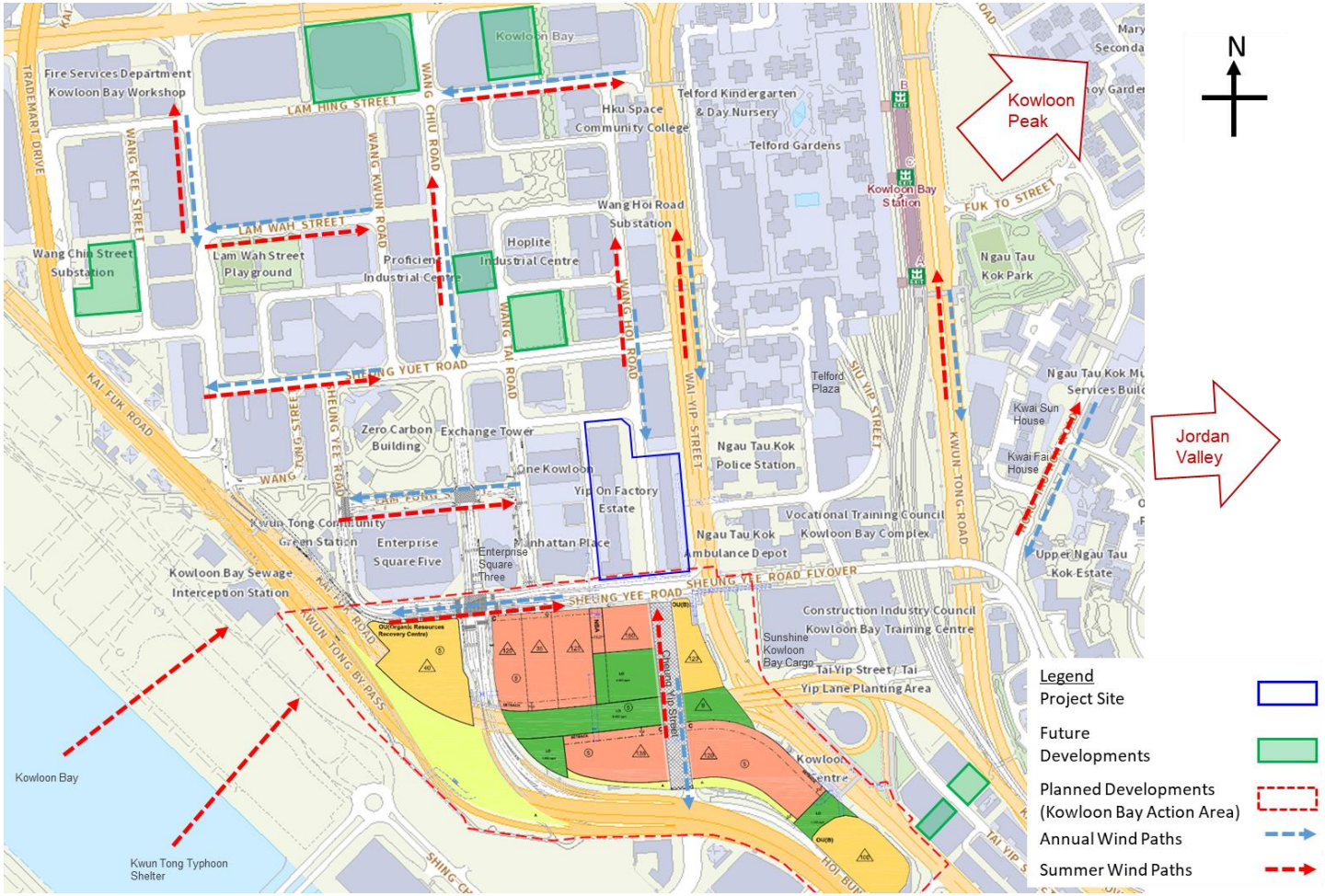


Figure 13 Existing Air Paths around the Project Area

5 QUALITATIVE ANALYSIS OF THE EXISTING CONDITION, BASELINE SCHEME AND PROPOSED SCHEME

The following section presents the qualitative analysis of the existing wind environment, Baseline Scheme and Proposed Scheme under annual and summer prevailing wind directions.

5.1 NE WIND

The cluster of residential buildings at Telford Gardens is located at the northeast is anticipated to weaken the incoming NE wind from the Kowloon Peak. The mid-level NE wind is expected to skim over the existing developments across Wai Yip Street (i.e. Telford Plaza, Ngau Tau Kok Police Station and Ngau Tau Kok Ambulance Depot) to reach the Project Site (Red Arrows in Figure 14).

In the Existing Condition, the mid-level NE wind is expected to skim over the existing Yip On Factory Estate Block 1 and Block 2. The high-rise buildings: One Kowloon and Manhattan Place at the immediate west of the Project Site would capture a portion of the incoming mid-level NE wind and create downwash to ventilate Wang Mau Street (Blue Arrows (1) & (2) in Figure 14). Nonetheless, a portion of the incoming mid-level NE wind will pass through the building separation between One Kowloon and Manhattan Place to continue flowing along Lam Fung Street (Red Arrow (1) in Figure 14).

In the Baseline Scheme, the high-rise nature of Tower A and B are expected to obstruct mid-level NE wind to the downwind regions of One Kowloon, Manhattan Place and Wang Mau Street. A portion of mid-level NE wind is expected to be downwashed towards Wang Hoi Road by Tower B (Blue Arrow (1) in Figure 15) whilst a portion of incoming mid-level NE wind would be downwashed to Wai Yip Street by Tower A (Blue Arrows (2) in Figure 15).

In the Proposed Scheme, it is anticipated that the mid-level NE wind would reach the center of the Project Site via the 19m-wide building separation between Blocks A and B (Red Arrow (1) in Figure 16) to improve the ventilation performance within the Project Site. A portion of mid-level NE wind is expected to be downwashed towards Wai Yip Street by Tower B (Blue Arrow (2) in Figure 16).

It is expected the good design feature in the Proposed Scheme (i.e. 19m-wide building separation between Blocks A and B) is effective wind mitigation measures to improve the ventilation performance within the Project Site when compared with the Baseline Scheme.

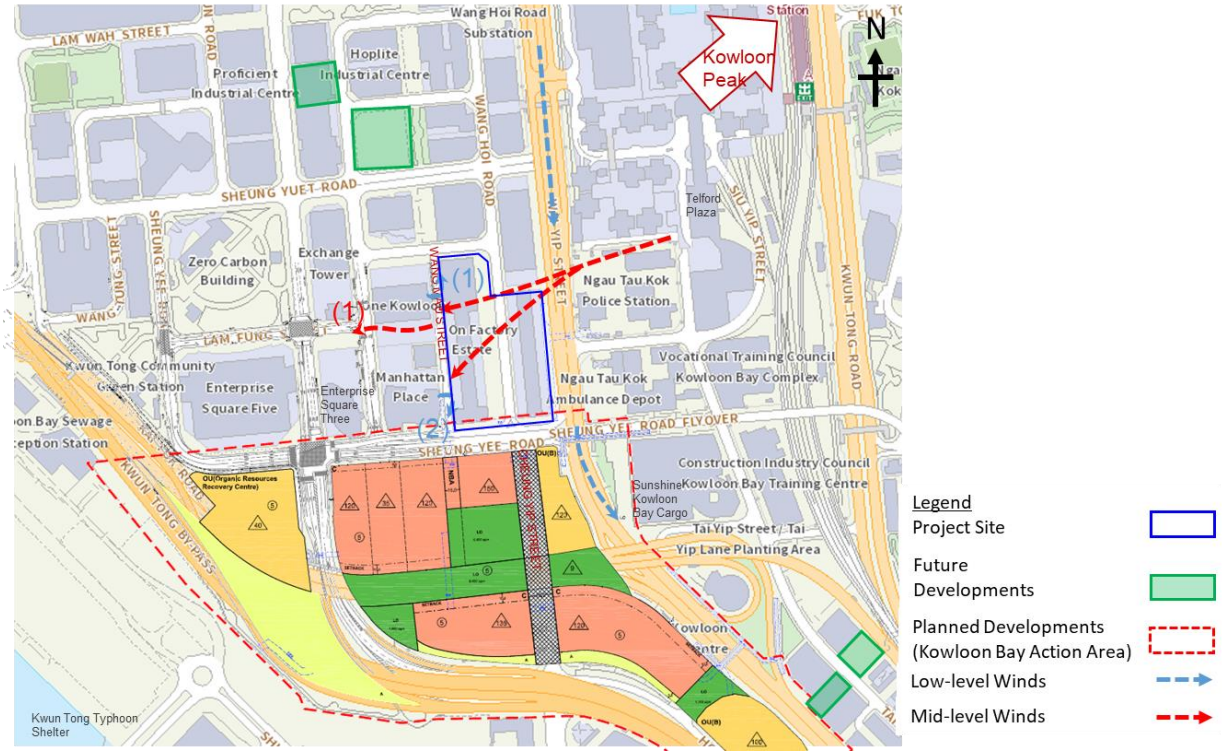


Figure 14 Major Air Paths under Existing Condition (NE Wind)

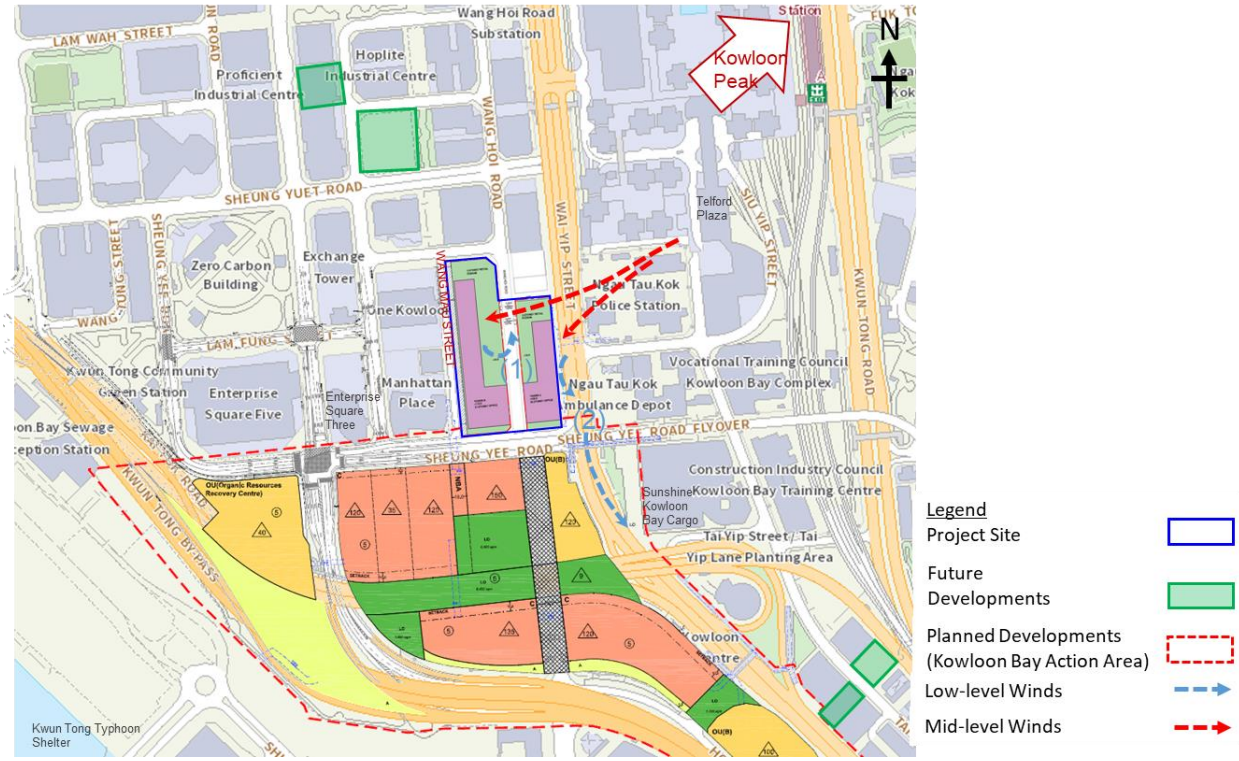


Figure 15 Major Air Paths under Baseline Scheme (NE Wind)

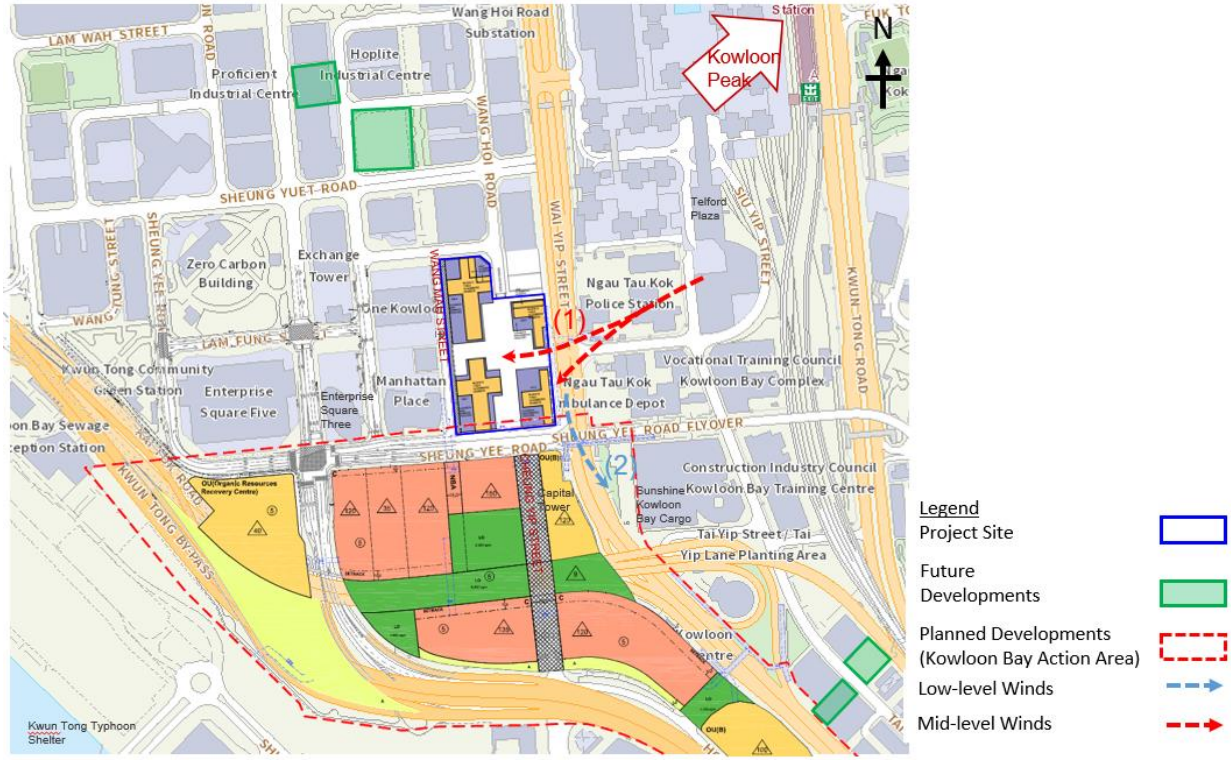


Figure 16 Major Air Paths under Proposed Scheme (NE Wind)

5.2 ENE AND E WINDS

ENE and E winds are major annual prevailing winds. Sheung Yee Road would act as the major air path for incoming mid-level ENE and E winds from Jordan Valley and is expected to skim over the building cluster at the east such as Ngau Tau Kok Ambulance Depot and Ngau Tau Kok Police Station to reach the Project Site (Red Arrows (1) in Figure 17). Low-level ENE and E winds will travel along Siu Yip Street to reach the eastern portion of the Subject Site.

In the Existing Condition, mid-level ENE and E winds are expected to skim over the existing Yip On Factory Estate Block 1 and Block 2. The high-rise buildings: One Kowloon and Manhattan Place at the immediate west of the Project Site would create downwash to ventilate Wang Mau Street (Blue Arrow (1) & (2) in Figure 17). Nonetheless, a portion of the incoming mid-level ENE and E winds will pass through the building separation between One Kowloon and Manhattan Place to continue flowing along Lam Fung Street (Red Arrow (2) in Figure 17). In addition, urban canyon effect would be induced at the region between Block 1 and Block 2 within the Project Site (Blue Arrow (3) in Figure 17).

In the Baseline Scheme, Tower A is expected to downwash the ENE and E winds towards the north (i.e. along Wai Yip Street) (Blue Arrow (1) in Figure 18) or towards the south (i.e. towards Sheung Yee Road) (Blue Arrow (2) in Figure 18). A portion of the incoming mid-level ENE and E winds is expected to enter the Project Site via the building separation between Tower A and Chevalier Commercial Centre to ventilate the region within the Project Site via downwash created by Tower B (Blue Arrow (3) in Figure 18).

In the Proposed Scheme, it is anticipated that low-level ENE and E winds from Siu Yip Street would reach the center of the Project Site via the 19m-wide building separation between Blocks A and B (Blue Arrow (1) in Figure 19) to improve the ventilation performance within the Project Site. The 17m-wide building separation between the Blocks C and D would allow the low-level ENE and E winds to reach Wang Mau Street (Blue Arrows (2) in Figure 19). In addition, a portion of mid-level ENE and E winds would be downwashed towards the north by Block A (i.e. along Wai Yip Street) (Blue Arrow (3) in Figure 19) or towards the south by Block B (i.e. towards Sheung Yee Road) (Blue Arrow (4) in Figure 19).

It is expected the good design features in the Proposed Scheme (i.e. 19m-wide building separation between Blocks A and B and 17m-wide building separation between the proposed Blocks C and D) are effective wind mitigation measures to facilitate wind penetration through the site towards the downwind regions when compared with the Baseline Scheme.

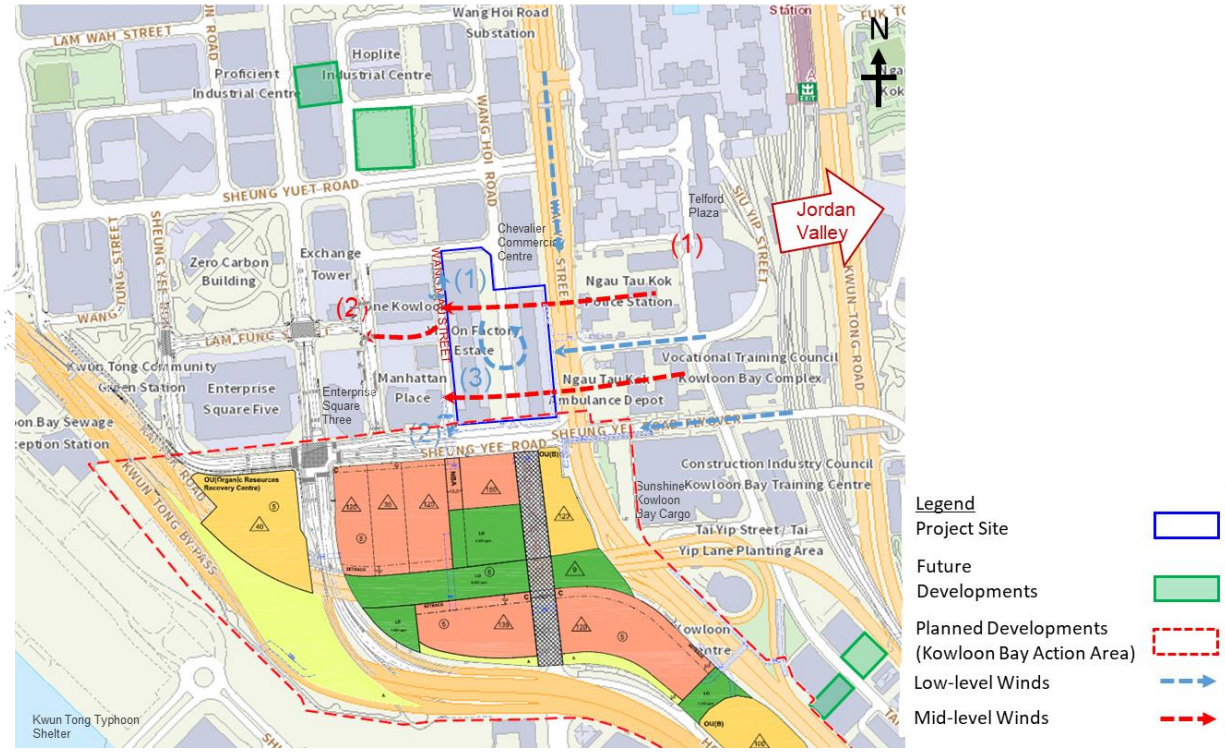


Figure 17 Major Air Paths under Existing Condition (ENE and E Winds)

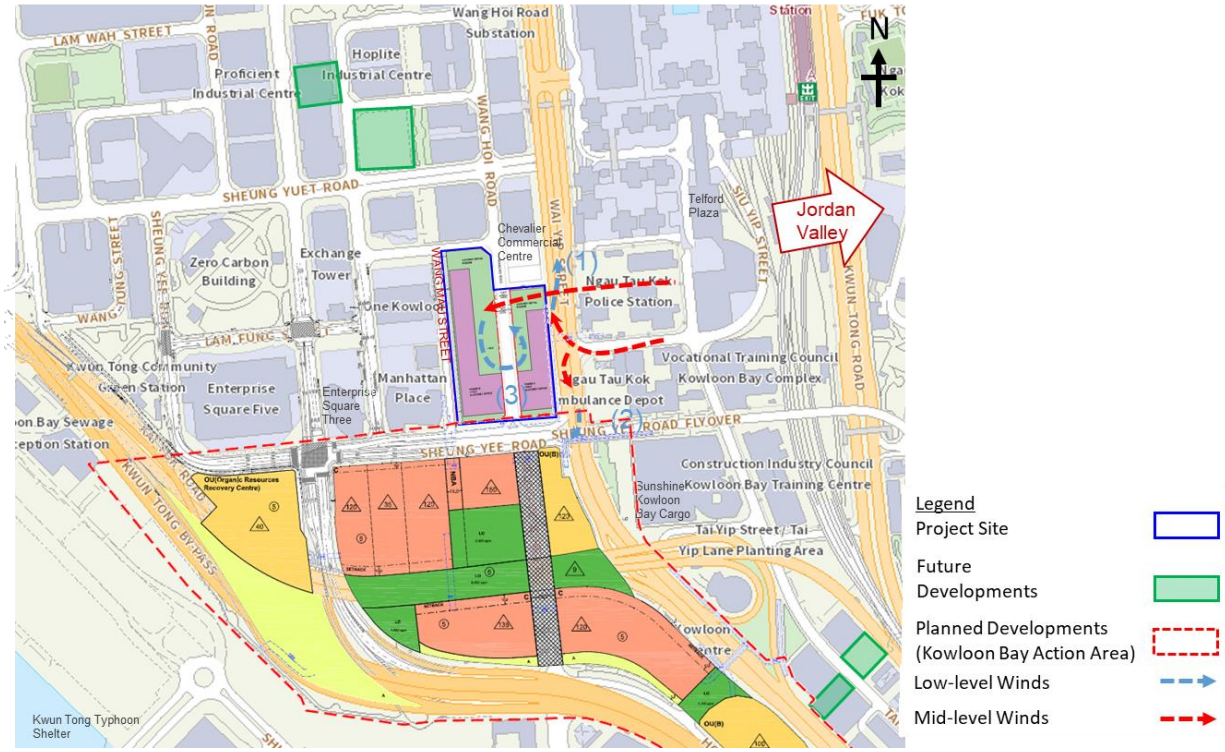


Figure 18 Major Air Paths under Baseline Scheme (ENE and E Winds)

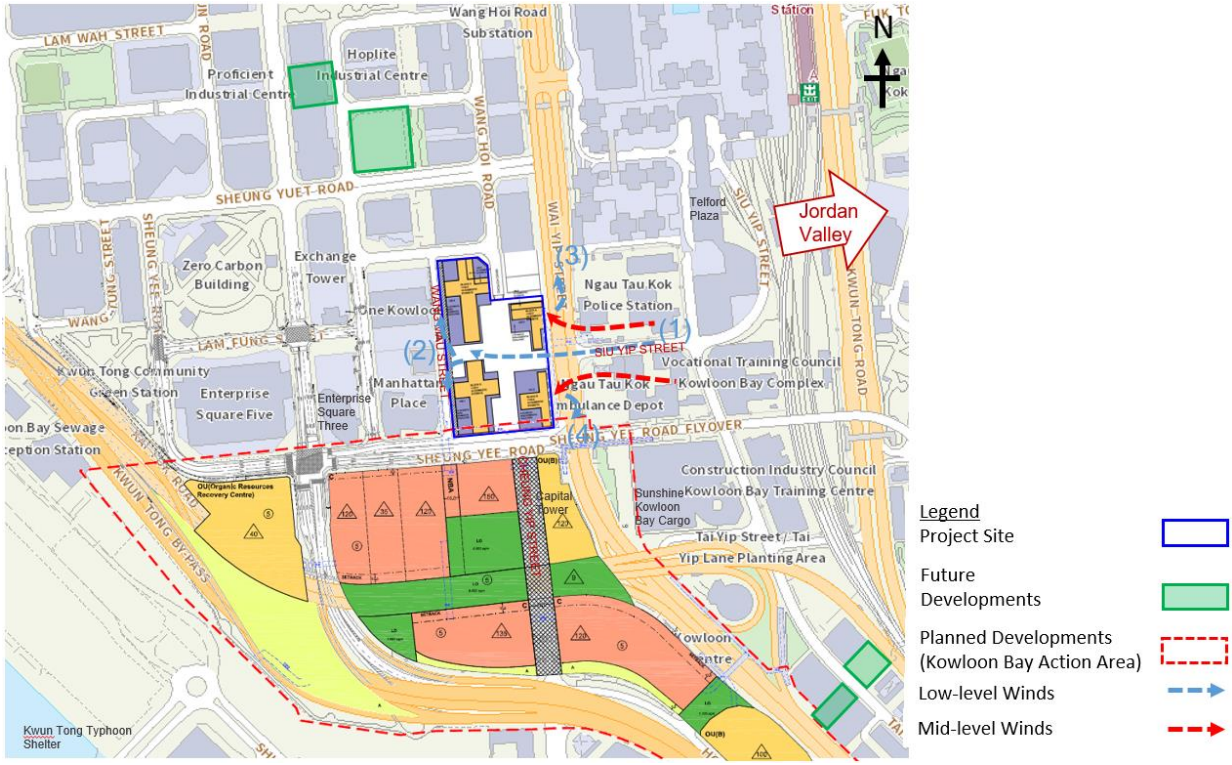


Figure 19 Major Air Paths under Proposed Scheme (ENE and E Winds)

5.3 ESE WIND

The mid-level incoming ESE wind would skim over the existing developments at the east-southeast of the Project Site (i.e. Sunshine Kowloon bay Cargo and Construction Industry Council Kowloon Bay Training Centre) (Red Arrows (1) in Figure 20).

In the Existing Condition, the mid-level ESE wind is expected to skim over the existing Yip On Factory Estate Block 1 and Block 2. The high-rise buildings: One Kowloon and Manhattan Place at the immediate west of the Project Site would create downwash to ventilate Wang Mau Street (Blue Arrow (1) and (2) in Figure 20). Nonetheless, a portion of the incoming mid-level ESE winds will pass through the building separation between One Kowloon and Manhattan Place to continue flowing along Lam Fung Street (Red Arrow (1) in Figure 20). In addition, urban canyon effect would be induced at the region between Block 1 and Block 2 within the Project Site (Blue Arrow (3) in Figure 20).

In the Baseline Scheme, the covered carpark and non-domestic facilities under Block B is expected to channelize low-level ESE wind from Wai Yip Street towards to the north whilst a minor portion of low-level ESE wind is expected to be deflected towards the west along Sheung Yee Road. Tower A would also create downwash to ventilate Wai Yip Street (Blue Arrow (1) in Figure 21).

In the Proposed Scheme, the 2-storey retail podium under Tower A is expected to channelize low-level ESE wind from Wai Yip Street towards to the north whilst a minor portion of low-level ESE wind is expected to be deflected towards the west along Sheung Yee Road. It is anticipated that mid-level ESE wind would enter the center of the Project Site via the 19m-wide building separation between Blocks A and B (Red Arrow (1) in Figure 22). In addition, the 17m-wide building separation between the Blocks C and D would allow the mid-level ESW wind to reach Wang Mau Street and Lam Fung Street (Red Arrow (2) in Figure 22).

It is expected the good design features in the Proposed Scheme (i.e. 19m-wide building separation between Blocks A and B and 17m-wide building separation between the proposed Blocks C and D) are effective wind mitigation measures to facilitate wind penetration through the site towards the downwind regions when compared with the Baseline Scheme.

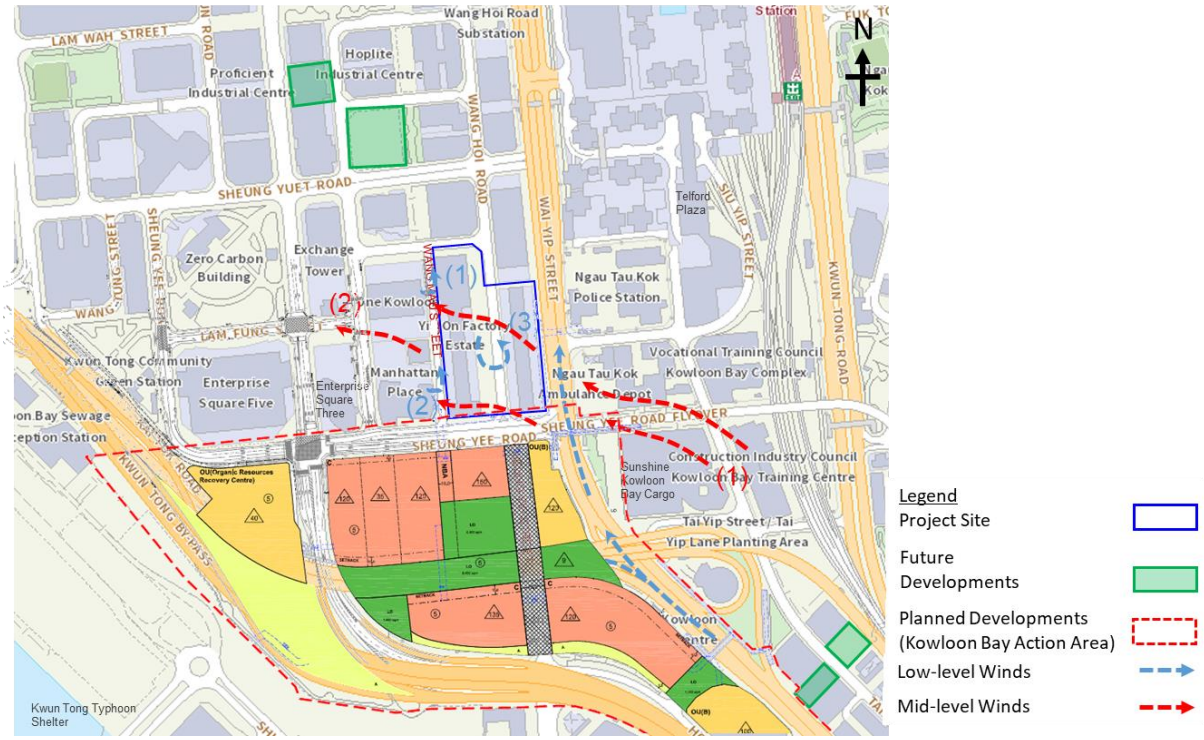


Figure 20 Major Air Paths under Existing Condition (ESE Wind)

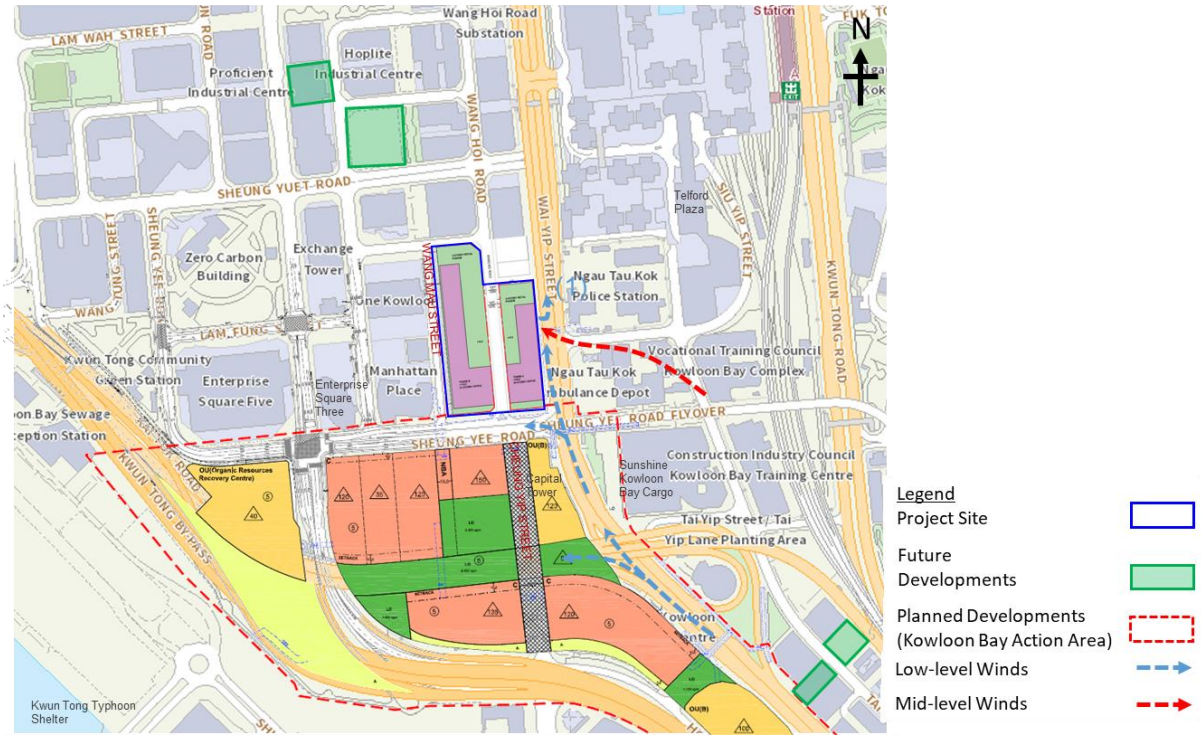


Figure 21 Major Air Paths under Baseline Scheme (ESE Wind)

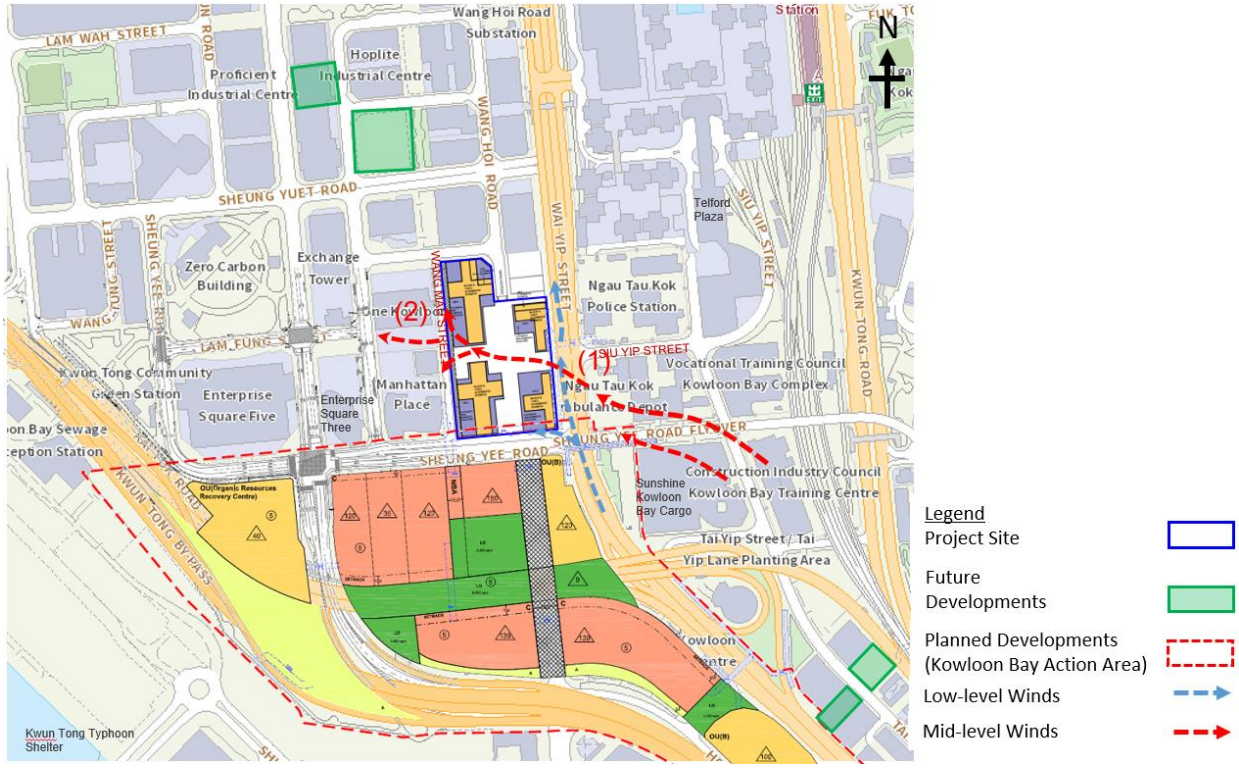


Figure 22 Major Air Paths under Proposed Scheme (ESE Wind)

5.4 SW AND WSW WIND

SW and WSW winds are major prevailing summer winds for the Project Site. The incoming SW and WSW winds comes from the sea – Kowloon Bay.

In the Existing Condition, the planned developments in Kowloon Bay Action Area, located to the southwest of the Project Site, is expected to hinder a portion of the SW and WSW winds. Nonetheless, the majority of the low-level SW and WSW winds are anticipated to reach Sheung Yuet Road via the open spaces of Zero Carbon Building or the southern boundary of the Project Site via Sheung Yee Road. Mid-level SW and WSW winds are expected to reach Wang Mau Street and Wang Hoi Road via the proposed NBA at Kowloon Bay Action Area and Cheung Yip Street respectively (Red Arrows (1) in Figure 23).

In the Baseline Scheme, Tower B is expected to block mid-level SW and WSW winds travelling along Lam Fung Street hence preventing it from reaching the Project Site and the downwind regions. Tower B is also expected to create downwash thus improving the ventilation along Wang Mau Street (Blue Arrow (1) in Figure 24). The 5m-wide NBA at the western portion of the Project Site abutting the eastern side of Wan Mau Street is expected to allow more SW and WSW winds to travel along Wang Mau Street to reach the downwind regions in the north.

In the Proposed Scheme, a portion of mid-level SW and WSW winds are expected to skim over the podium between One Kowloon and Manhattan Place along the existing air path at Lam Fung Street. The mid-level SW and WSW winds are expected to penetrate through the 17m-wide building separation between Blocks C and D and 19m-wide building separation between Block A and B and continue flowing towards Siu Yip Street (Red Arrow (1) in Figure 25).

It is expected the good design features in the Proposed Scheme (i.e. 19m-wide building separation between Blocks A and B and 17m-wide building separation between the proposed Blocks C and D) are effective wind mitigation measures to facilitate wind penetration through the site towards the downwind regions when compared with the Baseline Scheme.

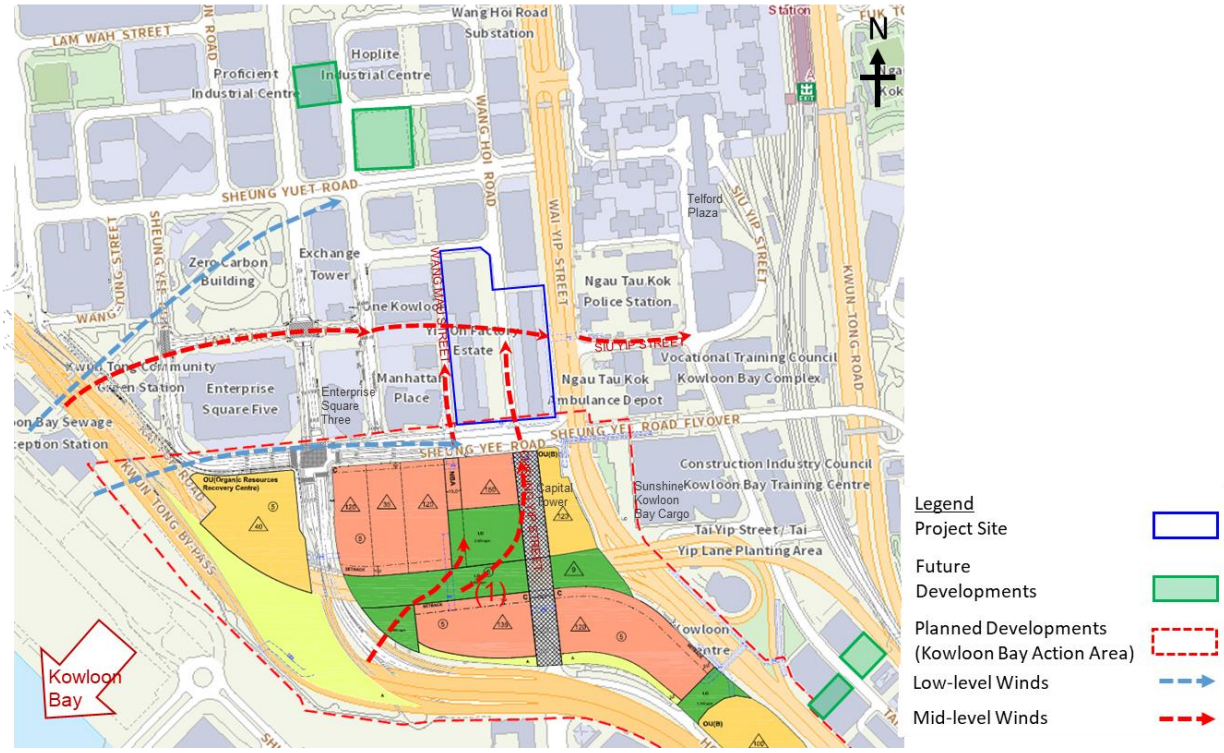


Figure 23 Major Air Paths under Existing Condition (SW & WSW Wind)

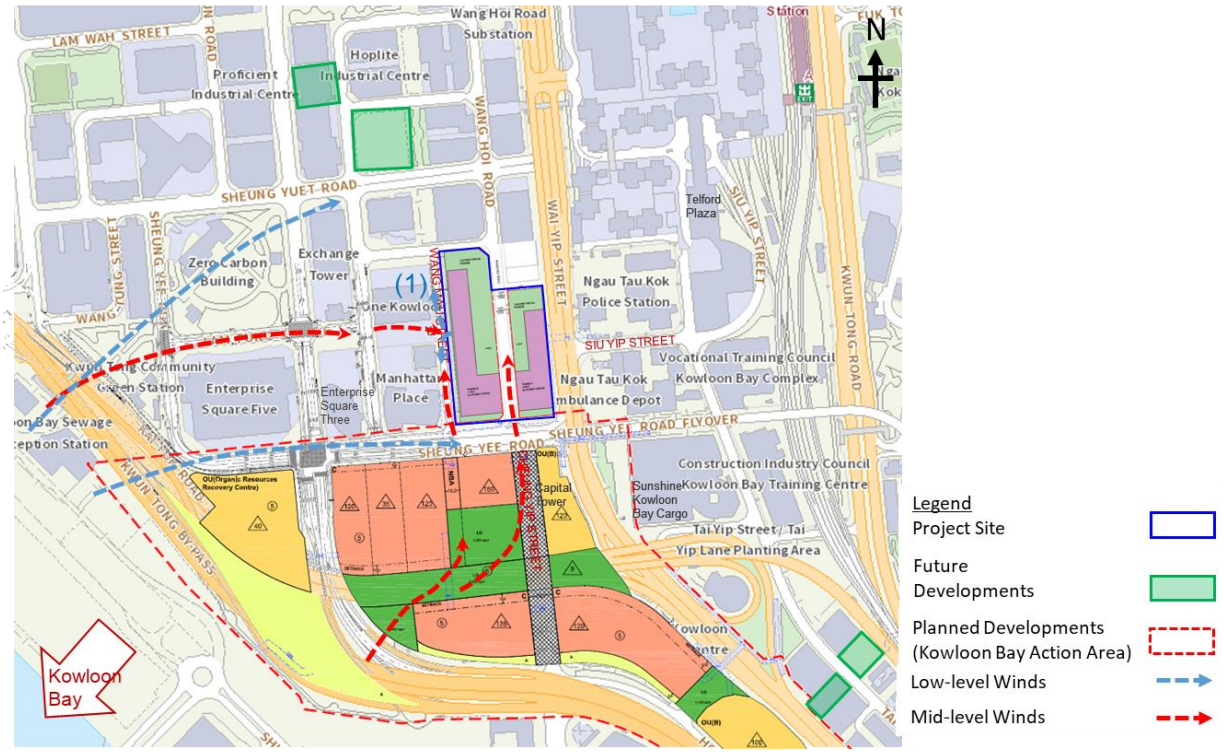


Figure 24 Major Air Paths under Baseline Scheme (SW & WSW Wind)

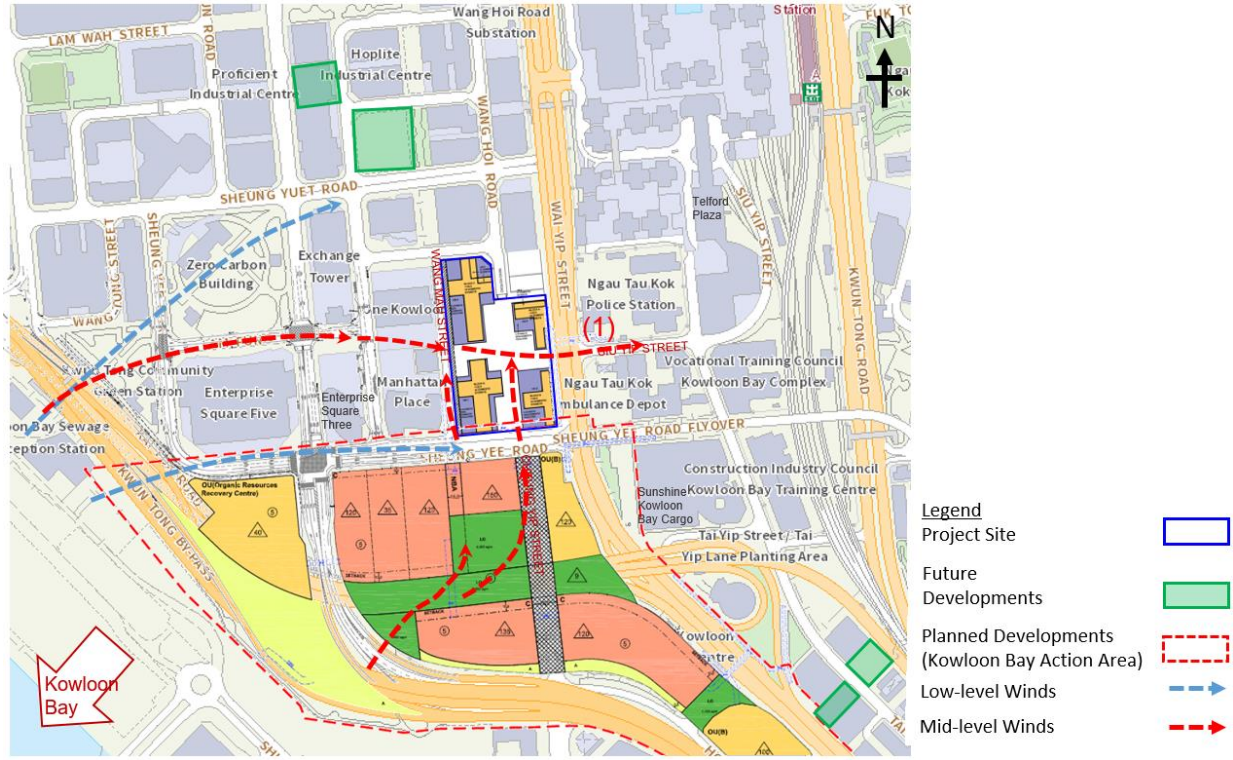


Figure 25 Major Air Paths under Proposed Scheme (SW & WSW Wind)

6 CONCLUSION

An AVA-EE was conducted for the Redevelopment at Yip On Factory Estate. The objectives of this study are to (i) review the existing wind environment of the Project Site and its surroundings and (ii) assess qualitatively the potential air ventilation impacts under the Baseline and Proposed Scheme of the Project Site.

According to the site wind availability analysis, the annual prevailing wind comes from NE, ENE and E directions and the summer prevailing wind is from E, ESE, SW and WSW directions.

The existing condition of the Project Site consists of two industrial buildings namely Yip On Factory Estate Block 1 &2 with a building height of approximately 40mPD. Due to the low rise nature of the existing condition, annual and summer mid-level prevailing winds are expected to skim over the Project Site to the downwind regions. Consequently, downwash effect is not expected in the existing condition. The elongated nature of the two industrial buildings are expected to create an urban canyon effect under certain prevailing wind directions.

For the Baseline Scheme and Proposed Scheme, both schemes adopt a building height of 120mPD but the Baseline Scheme adopts relatively longer building façade for the office towers. In comparison with the Baseline Scheme, it is anticipated that the Proposed Scheme would not create significant adverse air ventilation impact to the surroundings by introducing various good design features to facilitate wind penetration through the Project Site and to minimize the air ventilation impact induced by the Proposed Scheme to the downwind regions. The various good design features incorporated in the Proposed Scheme are listed below:

- Around 5m-wide NBA at the western portion of the Project Site abutting the eastern side of Wan Mau Street
- Around 19m-wide building separation between Blocks A and B
- Around 17m-wide building separation between Blocks C and D
- Around 17m-wide building separation between Blocks A and C

Therefore, no significant adverse air ventilation impact to the Project Site and surroundings is anticipated.

Visual Appraisal for the Proposed Public Housing Development at Yip On Factory Estate Site, Kowloon Bay

1 Purpose

1.1 This Visual Appraisal (VA) is to examine the possible visual effect of the proposed public housing development at the Yip On Factory Estate Site so as to facilitate the rezoning of the site from "Other Specified Use (Business)" ("OU(B)") and an area shown as 'Road' to "Residential (Group A)" ("R(A)") on the approved Ngau Tau Kok and Kowloon Bay Outline Zoning Plan No. S/K13/30 (OZP).

2 Methodology

2.1 The methodology of this VA is set out below.

(a) Identification of the visual context and character within the wider contexts of the Kowloon Bay area;

(b) Illustration of the visual impact of the proposed public housing site in respective areas by using computer-generated photomontages with the indicative layout of the proposed public housing development;

(c) Identification and selection of the viewing points to facilitate assessing the visual impact of the proposed public housing site. The viewing points should be easily accessible and popular to the public and/or tourists and be able to demonstrate the visual impact of the proposed housing sites on the adjacent areas. Important views from special landmarks, valued landscape features, ridgelines, etc should be assessed where possible.; and

(d) Identification of the scale of the development in the proposed public housing site. Using computer-generated photomontages to illustrate the visual impact and their significance from the viewing points. Providing visual appraisal by evaluating the overall visual impact of the proposed public housing development.

3 The Proposed Development

3.1 The proposed public housing site at Yip On Factory Estate **(Plan 1)** is a flat land, bounded by Wai Yip Street, Wang Hoi Road, Wang Yuen Street, Wang Mau Street and Sheung Yee Road. The site is currently zoned "OU(B)" and an area shown as 'Road'. The area zoned "OU(B)" is subject to a maximum plot ratio of 12 and a maximum building height of 120mPD. As indicated on the OZP, a 5m-wide Non-building Area (NBA) from the lot boundary abutting the eastern side of Wang Mau Street shall be provided within the "OU(B)" zone to improve the air ventilation in the Kowloon Bay Business Area (KBBA).

3.2 To the north and west of the proposed public housing site are office buildings ranging from about 45mPD to about 173mPD. To the south of the site is an office building, the Capital Tower, of about 120mPD, and the Kowloon Bay Waste Recycling Centre under demolition which forms part of the Kowloon Bay Action Area (KBAA) for proposed commercial buildings ranging from about 120mPD to about 150mPD. To the east of the site across Wai Yip Street is the Ngau Tau Kok Police Station of about 37mPD and the Ngau Tau Kok Ambulance Depot of about 46mPD.

3.3 The proposed scheme includes a portion of Wang Hoi Road between Yip On Factory Estate Blocks 1 and 2 for incorporation into the development site for plot ratio calculation, better planning and to increase housing supply. As compared to the scenario of adopting the existing site boundary of Yip On Factory Estate segregated by Wang Hoi Road, the proposed scheme will provide more flats while respecting the urban fabric and the north-south visual and wind corridor along the pedestrianized Cheung Yip Street proposed under the Planning, Urban Design and Preliminary Engineering Study for the Development at KBAA of Kowloon East. No building is proposed at the partially closed Wang Hoi Road and therefore would not induce any visual impact. More landscaped area at the area as greenery for residents' enjoyment is also provided with minimal extents of circulation area to car parking spaces, L/UL bays and EVA in the proposed scheme to enhance pedestrian connectivity and walkability. The proposed scheme would achieve better and comprehensive planning as one single site, increase flat supply, enhancement of connectivity and walkability within the site and offer more flexibility in building design and layout. Partial closure of Wang Hoi Road would not have adverse impact on the elevated pedestrian walkways proposed by EKEO as it would not affect the proposed alignment of the elevated pedestrian walkways.

3.4 The proposed development parameters are summarized as follows:

Development Site Area	About 1.5ha
Maximum Plot Ratio	Domestic - 7.5 Non-domestic - 1.5
Maximum Building Height	120mPD

Note: The indicative layout and sections of the proposed scheme are in **Appendices A** and **B** for reference only and are subject to change in detailed design stage. As the client requirements, design briefs, etc are not yet confirmed/endorsed, full extent of building bulk as well as the domestic/non-domestic accommodations are subject to revision.

3.5 The site is currently occupied by the Yip On Factory Estate with two building blocks under the Hong Kong Housing Authority and part of Wang Hoi Road, which is a public road.

3.6 To demonstrate the proposed development would not induce any significant visual impact, an OZP compliant scheme with two office towers atop retail podium is also outlined in the photomontages **(Plans 4 to 8)** in dotted line for comparison. The parameters of the OZP compliant scheme are summarized as follows:

Development Site Area	About 1.31ha
Maximum Plot Ratio	Non-domestic – 12
Maximum Building Height	120mPD

Note: The indicative layout and sections of the OZP compliant scheme are in **Appendices C** and **D** for reference only.

4 Visual Appraisal

4.1 Six viewing points (VP) have been selected from the north, northeast, northwest, south and southeast of the subject site **(Plans 2 and 3)** with a distance ranging from 60m to 3,550m. They represent the views from key public open spaces in the vicinity, strategic viewing point, or from pedestrian nodes accessible by the public.

4.1.1 VP1 is at Wai Yip Street/Sheung Yee Road Sitting-out Area which is a small and narrow public open space with some benches located to the southeast of the subject site (from the SE of the site in a distance of about 65m). It is observed that this sitting-out area is only visited by leisure users occasionally and not considered as a popular public open space, this VP is considered to have **low** sensitivity.

4.1.2 VP2 is near the junction of Cheung Yip Street and Sheung Yee Road (from the S of the site in a distance of about 60m) since Cheung Yip Street is proposed to be pedestrianized under the "Planning and Engineering Study for the Development at KBAA of Kowloon East – Feasibility Study". As it is expected that the proposed pedestrianized street will be used by the public in the future and will facilitate pedestrian movements among different destinations in the future KBAA, this VP is considered to have **high** sensitivity.

4.1.3 VP3 is the Zero Carbon Park (from NW of the site in a distance of about 210m) which is a large public open space in the Kowloon Bay easily accessible and popular with the locals. This VP is considered to have **high** sensitivity.

4.1.4 VP4 is Lam Fook Street Sitting-out Area (from N of the site in a distance of about 90m) which is a small and narrow public open space with some benches located to the north of the site. As there are some visitors and leisure users in this sitting-out area, this VP is considered to have **medium** sensitivity.

4.1.5 VP5 is the footbridge across Wai Yip Street (from NE of the site in a distance of about 190m) which is popular and frequently accessed by locals. As the public who pass by this VP is transient in nature, this VP considered to have **low** sensitivity.

4.1.6 VP6 is Quarry Bay Park (from SE of the site in a distance of about 3,550m) which is a strategic viewing point mentioned in the Hong Kong Planning Standards and Guidelines. The subject site falls within the view fan of this VP. As this VP is very far away from the subject site, it is considered to have **low** sensitivity.

4.2 Six photomontages have been prepared to illustrate the visual effect of the proposed public housing development **(Plans 4 to 9)** from the above VPs:

VP1- Wai Yip Street/Sheung Yee Road Sitting-out Area (Plan 4)

4.2.1 **Visual composition:** The existing view is dominated by an existing footbridge and various high-rise office/commercial buildings, i.e. Capital Tower, Enterprise Square Three, Manhattan Place, One Kowloon, Ftlife Tower and Chevalier Commercial Centre, in the foreground and partial sky view in the background. The proposed public housing development would be partially screened off by the proposed elevated walkway surrounding the immediate east and south of the site and the existing footbridge. Given the existing high-rise office/commercial buildings in the surroundings, the proposed development would not be considered incompatible with the overall built environment with regard to height, scale and disposition.

4.2.2 **Visual obstruction:** The existing partial sky view would be blocked by the proposed scheme. Visual enhancement measures to minimize the visual impact, such as facade treatment and landscaping, should be explored at the detailed design stage.

4.2.3 **Effect on public viewers:** While part of the existing partial sky view would be largely blocked by the proposed scheme, with some visual enhancement by landscaping along the façade of the proposed scheme, the effect of the visual change is large. Building mass and bulk facing Sheung Yee Road are designed with narrow wings in Blocks B and D while the elevation fronting Wai Yip Street is breaking up by landscaped area between Blocks A and B with partial set back in Block A to avoid wall effect. Details would be further enhanced at design stage.

4.2.4 **Effect on visual resources:** The proposed scheme will largely block the sky view. Visual enhancement measures to minimize the visual impact, such as facade treatment and landscaping, should be explored at the detailed design stage.

4.2.5 Based on the above and the low sensitivity at this VP, a **moderately adverse** visual impact will be resulted.

VP2 - Near junction of Cheung Yip Street and Sheung Yee Road (Plan 5)

4.2.6 **Visual composition:** The existing view is dominated by the Sheung Yee Road Flyover and various high-rise office/commercial buildings, i.e. Manhattan Place, One Kowloon, Ftlife Tower and Chevalier Commercial Centre, and partial sky view in the background. The proposed public housing development would be partially screened off by the future developments of KBAA on the left side, the proposed elevated walkway along the southern boundary of the subject site and Sheung Yee Road Flyover. Given the existing high-rise office/commercial buildings in the surroundings, the proposed development would not be considered incompatible with the overall built environment with regard to height, scale and disposition.

4.2.7 **Visual obstruction:** Although the existing sky view would be partially blocked by the proposed scheme, the visual corridor along the future pedestrianized Cheung Yip Street would be respected by retaining the sky view along Wang Hoi Road. Visual enhancement measures to soften the building mass, such as facade treatment and landscaping, should be explored at the detailed design stage.

4.2.8 **Effect on public viewers:** While part of the existing sky view would be blocked by the proposed scheme, with some visual enhancement by landscaping along the façade of the proposed scheme, the effect of the visual change is moderate. Building mass and bulk facing Sheung Yee Road are designed with narrow wings in Blocks B and D with set back along the proposed elevated walkway in the southern boundary. Details could be further enhanced at design stage.

4.2.9 **Effect on visual resources:** While the proposed scheme will partially block the sky view in the background, it will respect the visual corridor along the future pedestrianized Cheung Yip Street and partially maintain the existing sky view. Visual enhancement measures to soften the building mass, such as facade treatment and landscaping, should be explored at the detailed design stage.

4.2.10 Based on the above, a **moderately adverse** visual impact will be resulted.

VP3 - Zero Carbon Park (Plan 6)

4.2.11 **Visual composition:** The existing view is dominated by the landscaping of the Zero Carbon Park in the foreground and various high-rise office/commercial buildings, i.e. Exchange Tower, One Kowloon, Manhattan Place, Enterprise Square Three and Enterprise Square Five, and partial sky view in the background. The proposed public housing development would be largely screened off by existing office/commercial buildings in the surroundings.

4.2.12 **Visual obstruction:** There is a slight reduction of visual openness between the gap of One Kowloon and Manhattan Place under the proposed scheme.

4.2.13 **Effect on public viewers:** The proposed development would blend into the overall built environment and the proposed developments in KBAA in terms of building height and bulk and read as part of the high-rise neighbourhood. The effect of the visual change is slight.

4.2.14 **Effect on visual resources:** The proposed scheme would not affect the view to the existing landscaping of the Zero Carbon Park in the foreground. There would be a slight reduction of sky view in the background between the gap of One Kowloon and Manhattan Place but is considered to be an insignificant harm to the visual amenity.

4.2.15 Based on the above, a **slightly adverse** visual impact will be resulted.

VP4 - Lam Fook Street Sitting-out Area (Plan 7)

4.2.16 **Visual composition:** The existing view is dominated by the industrial/commercial buildings, i.e. Chevalier Commercial Centre, International Plaza and One Kowloon, in the foreground and partial sky view in the background. The proposed public housing development would be largely screened off by the International Plaza resulting in mainly upper portion of the northern elevation of Block C could be readily visible and a portion of the western wing of Block D could be seen in a rather distant view. The proposed

development together with the proposed developments in KBAA would be viewed as a continuation of the existing developments and in keeping with the massing, height and characters in the locality.

4.2.17 **Visual obstruction:** The proposed scheme would slightly reduce the visual openness between existing industrial/commercial buildings, i.e. Chevalier Commercial Centre, International Plaza and One Kowloon, but it does not adversely affect the visual permeability.

4.2.18 **Effect on public viewers:** The proposed development would blend into the overall environment including the future developments of KBAA and the effect of the visual change is slight. Building height and bulk are read as part of the high-rise neighbourhood.

4.2.19 **Effect on visual resources:** Although the proposed scheme would slightly reduce the sky view in the background between existing industrial/commercial buildings, i.e. Chevalier Commercial Centre, International Plaza and One Kowloon, it would not warrant negative impact on the overall quality and character of the local industrial/commercial area character. The redevelopment of the subject site with appropriate design measures such as greening would improve the quality of the streetscape.

4.2.20 Based on the above, a **slightly adverse** visual impact will be resulted.

VP5 - Footbridge across Wai Yip Street (Plan 8)

4.2.21 **Visual composition:** The existing view is dominated by Wai Yip Street, elevated roads in the foreground and various high-rise office/commercial buildings, i.e. Capital Tower, Chevalier Commercial Centre and Chevalier Engineering Service Centre, residential buildings, i.e. Telford Gardens, and partial sky view in the background. The proposed public housing development would be largely screened off by the Chevalier Commercial Centre. The proposed development would be viewed as a continuation of the existing developments along Wai Yip Street.

4.2.22 **Visual obstruction:** The proposed scheme would slightly reduce the visual openness between existing office/commercial buildings, i.e. Capital Tower and Chevalier Commercial Centre, that sky view between these two buildings would be partially intercepted.

4.2.23 **Effect on public viewers:** The proposed development would blend into the overall environment including the future developments of KBAA and the effect of the visual change is slight. Building height and bulk are read as part of the high-rise neighbourhood.

4.2.24 **Effect on visual resources:** The proposed scheme would slightly reduce the sky view in the background between existing office/commercial buildings. The condition, quality and character of the area would not be adversely affected.

4.2.25 Based on the above, a **slightly adverse** visual impact will be resulted.

VP6 - Quarry Bay Park (Plan 9)

4.2.26 **Visual composition:** This view is the panoramic view of the Victoria Harbour with developments in Kowloon East, the ridgeline of Tate's Cairn and the sky view in the background. The proposed public housing development is screened off by existing buildings in the surroundings and the future developments of KBAA fronting nearer the Victoria Harbour and hardly visible from this VP.

4.2.27 **Visual obstruction:** The proposed scheme would not obstruct the view from this VP as it is screened off by existing buildings in the surroundings and the future developments of KBAA. The existing panoramic view of the ridgeline and sky view is uninterrupted.

4.2.28 **Effect on public viewers:** The proposed scheme is not visible from this VP and the effect of visual change is negligible.

4.2.29 **Effect on visual resources:** The proposed public housing development is screened off

by existing buildings in the surroundings and the future developments of KBAA. It would not affect any visual resources particularly the characters of the Victoria Harbour, the built environment in Kowloon East, the ridgeline and sky view.

4.2.30 Based on the above, the visual impact is **negligible**.

4.3 The proposed development would reduce visual openness at some viewing points. However, the overall development would not create significant visual incompatibility with the surrounding buildings. Visual enhancement measures to minimize the visual impact, such as facade treatment and landscaping, should be explored at the detailed design stage.

5 Conclusion

5.1 Photomontages to illustrate the possible visual impact of the proposed public housing development are shown in **Plans 4 to 9**. The proposed maximum building height of the site is about 120mPD. When viewing from the selected viewpoints, part of the proposed development would be screened off and some may be seen as a continuation of the existing buildings with similar development intensity in the district.

5.2 Based on the visual appraisal, VP1 to VP5, the visual openness would be partially reduced with different levels of visual blockage. However, the proposed development would be viewed as a continuation of the existing developments and would not be considered incompatible with the overall built environment in the surroundings. In comparison with the OZP compliant scheme, i.e. "OU(B)" with building height restriction of 120mPD, the effect of visual changes caused by the proposed development, in terms of visual composition, obstruction of visual resources and effect on public viewers, is similar. The table below summarizes the overall visual impact caused by the proposed scheme.

Viewpoints Assessed	**Visual Sensitivity**	**Resultant Visual Impact**
VP1: Wai Yip Street/Sheung Yee Road Sitting-out Area	Low	Moderately adverse

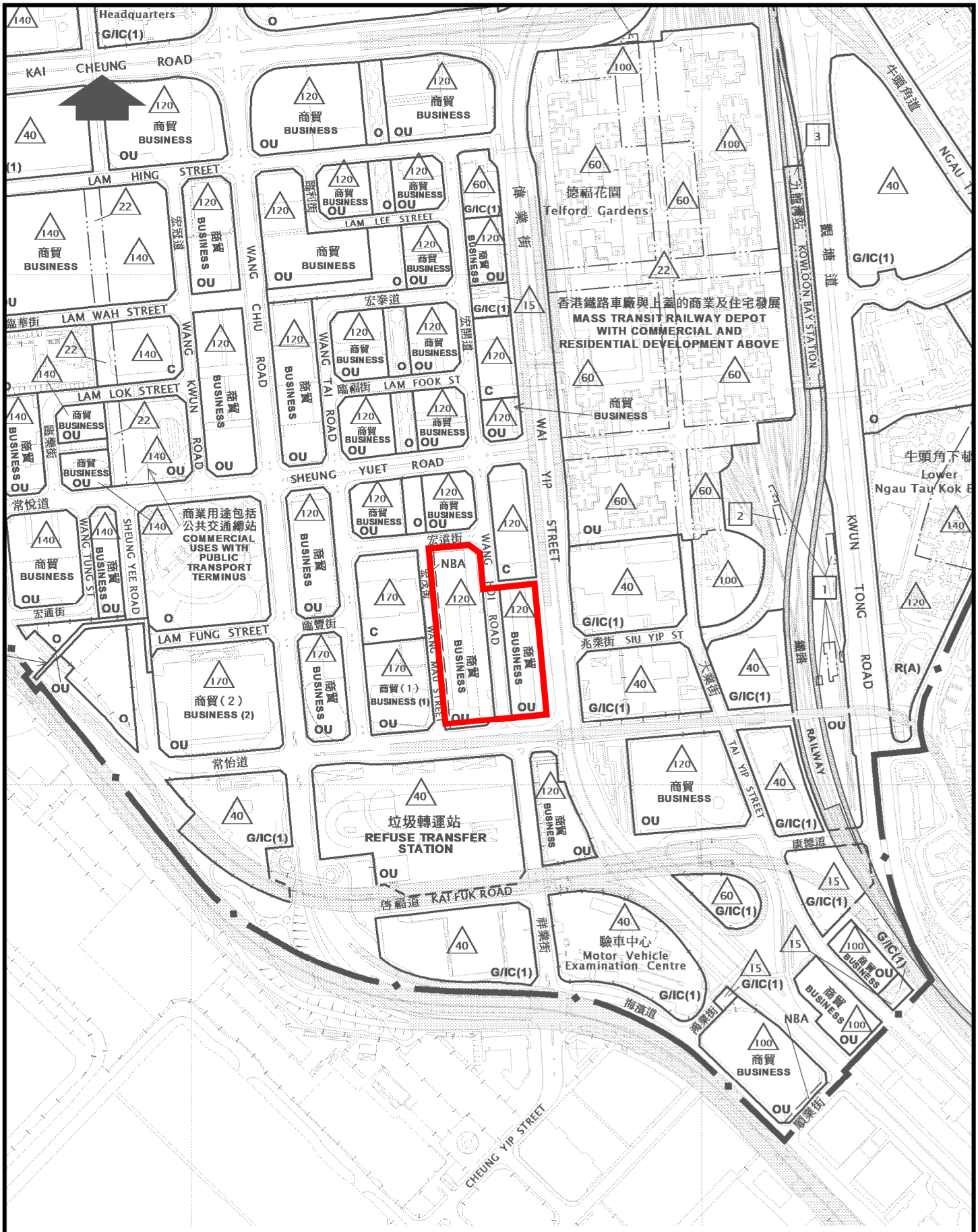
Viewpoints Assessed	Visual Sensitivity	Resultant Visual Impact
VP2: Near junction of Cheung Yip Street and Sheung Yee Road	Medium	Moderately adverse
VP3: Zero Carbon Park	High	Slightly adverse
VP4: Lam Fook Street Sitting-out Area	Medium	Slightly adverse
VP5: Footbridge across Wai Yip Street	Low	Slightly adverse
VP6: Quarry Bay Park	Low	Negligible

5.3 In order to optimize the development intensity, high-rise housing blocks in the subject site are inevitably necessary. In order to enhance the visual amenity of the proposed public housing development, HD would explore various design measures, such as facade treatment and landscaping, in detailed design stage. In short, visual interest will be considered to be incorporated into the proposed building outlook including podium façade to enhance the visual quality of the proposed public housing development and taking into account of the intended urban design character of KBAA as far as practicable. After adopting the sensitive design/mitigation measures such as the aforementioned façade treatment and landscaping, the residual visual impact of the proposed scheme is considered to be acceptable.

Attachments

Plan 1	Location Plan
Plan 2	Location of Viewing Points 1 to 5
Plan 3	Location of Viewing Point 6
Plan 4	Viewing Point 1 – Wai Yip Street/Sheung Yee Road Sitting-out Area
Plan 5	Viewing Point 2 – Near Junction of Cheung Yip Street and Sheung Yee Road
Plan 6	Viewing Point 3 – Zero Carbon Park
Plan 7	Viewing Point 4 – Lam Fook Street Sitting-out Area
Plan 8	Viewing Point 5 – Footbridge across Wai Yip Street
Plan 9	Viewing Point 6 – Quarry Bay Park

Appendix A	Proposed Scheme – Indicative Layout (For reference only)
Appendix B	Proposed Scheme – Indicative Sections (For reference only)
Appendix C	OZP Compliant Scheme – Indicative Layout (For reference only)
Appendix D	OZP Compliant Scheme – Indicative Sections (For reference only)



YIP ON FACTORY ESTATE, KOWLOON BAY

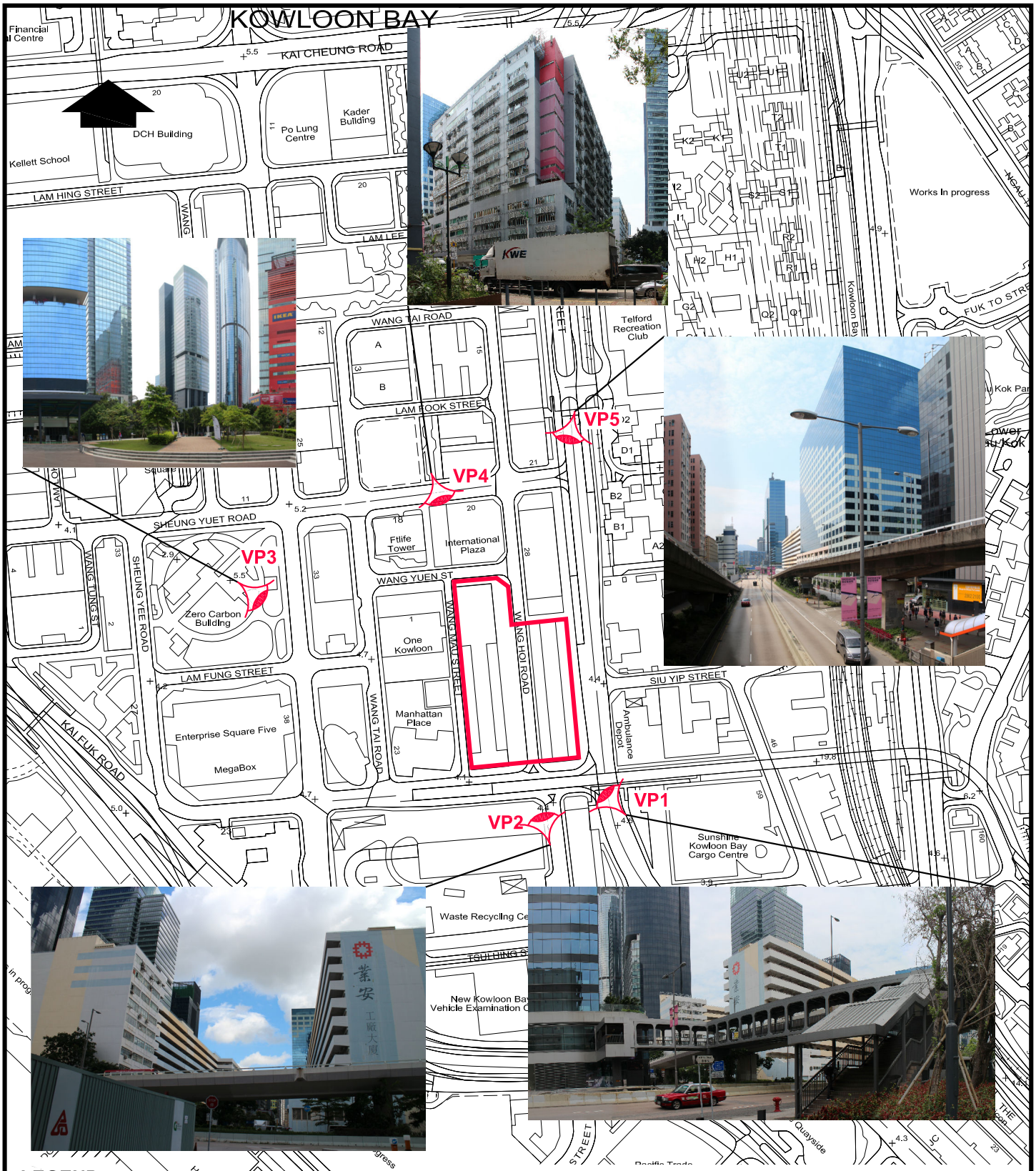
HOUSING DEPARTMENT
PLANNING SECTIONS

PLAN 1

DATE :
19. 11. 2021

BASE EXTRACTED FROM OZP No. S/K13/30

21_0746KLN_OZP



LEGEND:

SUBJECT SITE

VIEWING POINTS

VIEWING POINTS LOCATION

VP1 WAI YIP STREET/ SHEUNG YEE ROAD SITTING-OUT AREA
VP2 NEAR JUNCTION OF CHEUNG YIP STREET AND SHEUNG YEE ROAD
VP3 ZERO CARBON PARK
VP4 LAM FOOK STREET SITTING-OUT AREA
VP5 FOOTBRIDGE ACROSS WAI YIP STREET

METRES 100 0 100 200 300 METRES

LOCATION OF VIEWING POINTS 1 TO 5

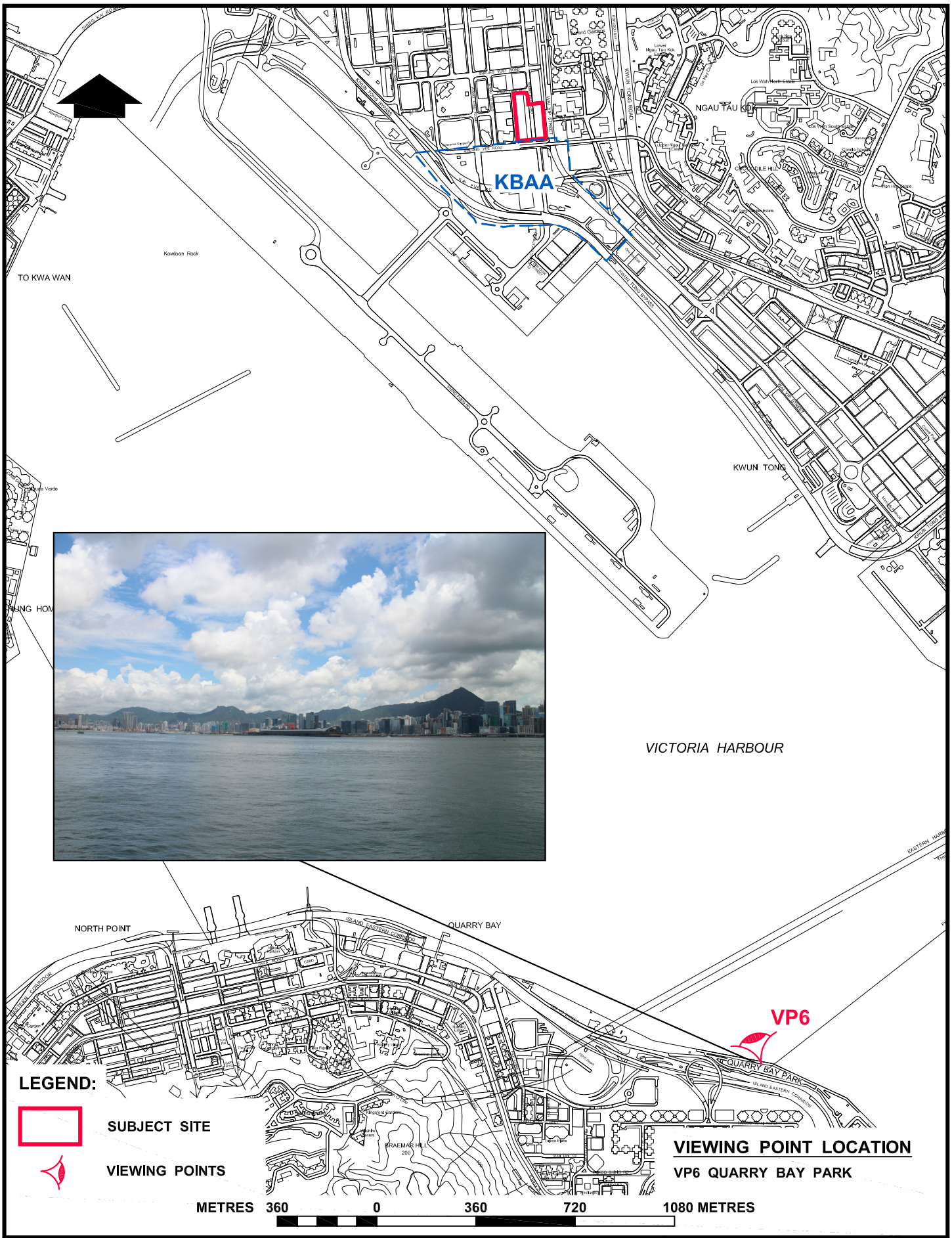
HOUSING DEPARTMENT
PLANNING SECTIONS

PLAN 2

DATE :
19. 11. 2021

BASE EXTRACTED FROM SHT. No. 11-NE-C

21_0746KLN



LOCATION OF VIEWING POINT 6

HOUSING DEPARTMENT
PLANNING SECTIONS

PLAN 3

DATE :
19. 11. 2021

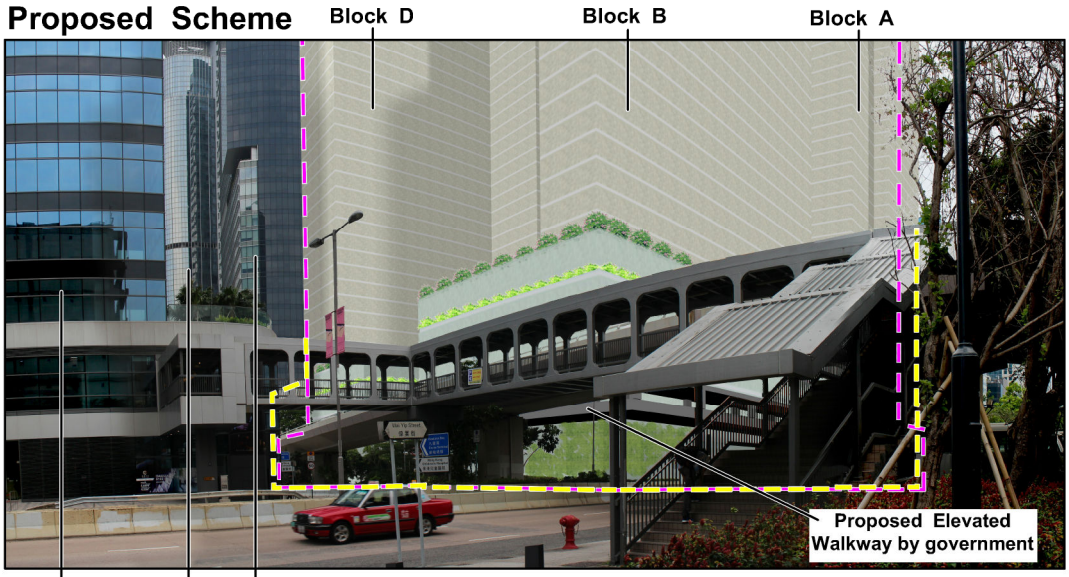
BASE EXTRACTED FROM SHT. No. 11-NE

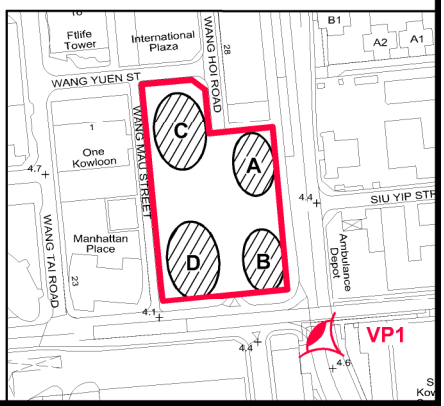
21_0746KLN_2

Existing View



Proposed Scheme





LEGEND:

PORTION OF PROPOSED SCHEME BLOCKED BY EXISTING / COMMITTED DEVELOPMENTS

OZP COMPLIANT SCHEME

Note: Landscape treatment subject to change in detail design stage

PHOTOMONTAGE AT VIEWING POINT 1 (VIEW FROM WAI YIP STREET / SHEUNG YEE ROAD SITTING-OUT AREA)

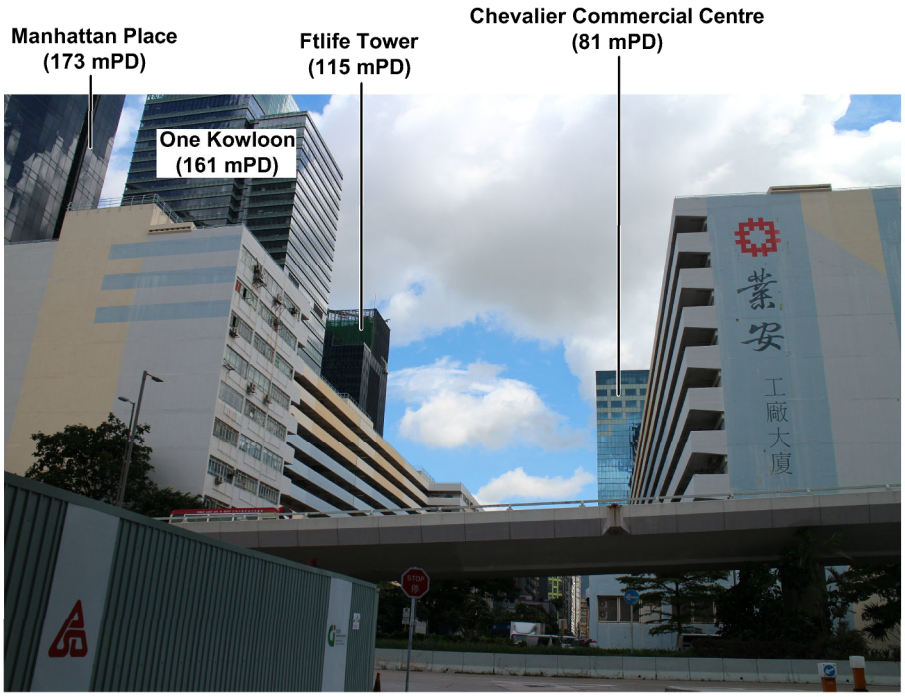
HOUSING DEPARTMENT
PLANNING SECTIONS

PLAN 4

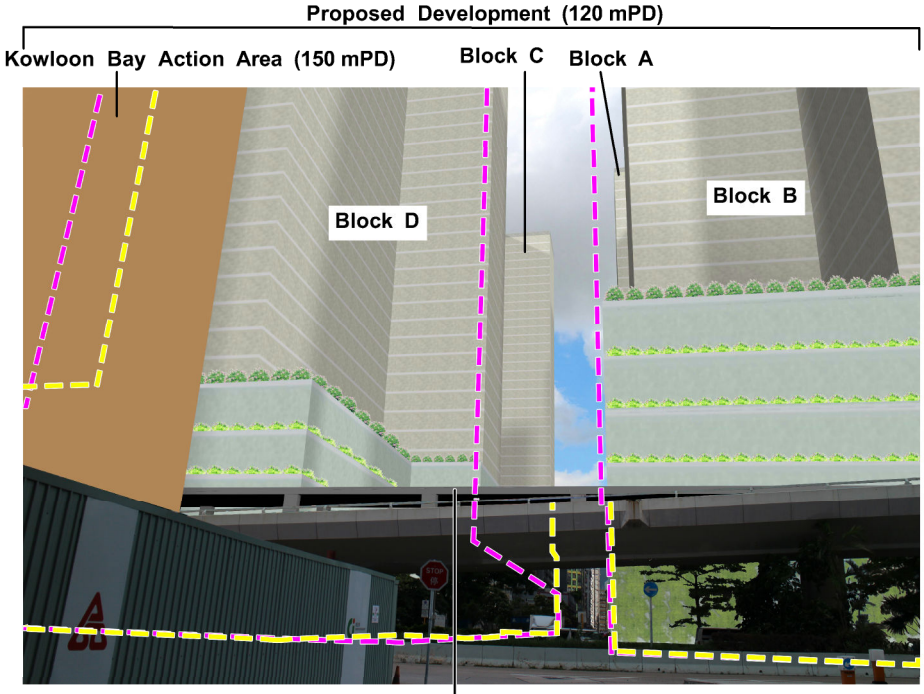
DATE :
22. 11. 2021

21_0746KLN_VP1

Existing View



Proposed Scheme

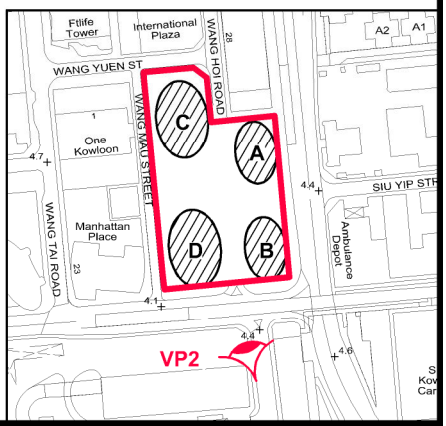


LEGEND:

PORTION OF PROPOSED SCHEME BLOCKED BY EXISTING / COMMITTED DEVELOPMENTS

OZP COMPLIANT SCHEME

Note: Landscape treatment subject to change in detail design stage



PHOTOMONTAGE AT VIEWING POINT 2 (VIEW FROM NEAR JUNCTION OF CHEUNG YIP STREET AND SHEUNG YEE ROAD)

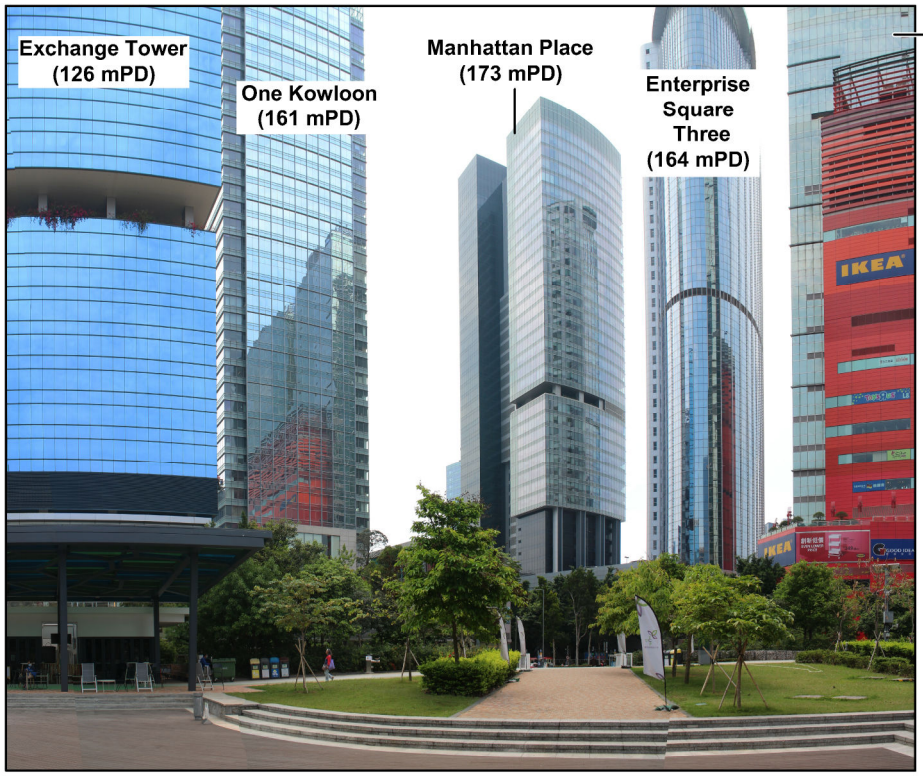
HOUSING DEPARTMENT
PLANNING SECTIONS

PLAN 5

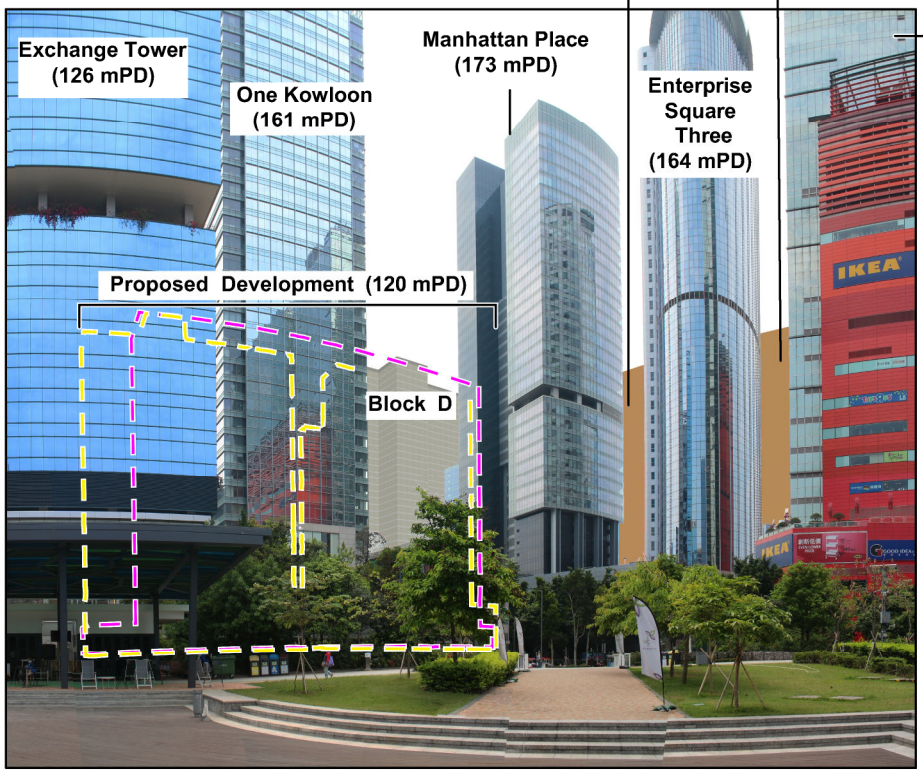
DATE :
22. 11. 2021

21_0746KLN_VP2

Existing View



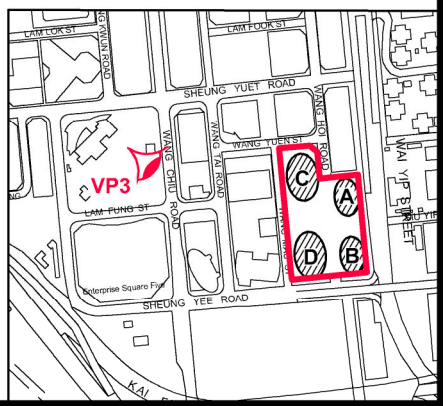
Proposed Scheme



LEGEND:

PORTION OF PROPOSED SCHEME BLOCKED BY EXISTING / COMMITTED DEVELOPMENTS

OZP COMPLIANT SCHEME



PHOTOMONTAGE AT VIEWING POINT 3 (VIEW FROM ZERO CARBON PARK)

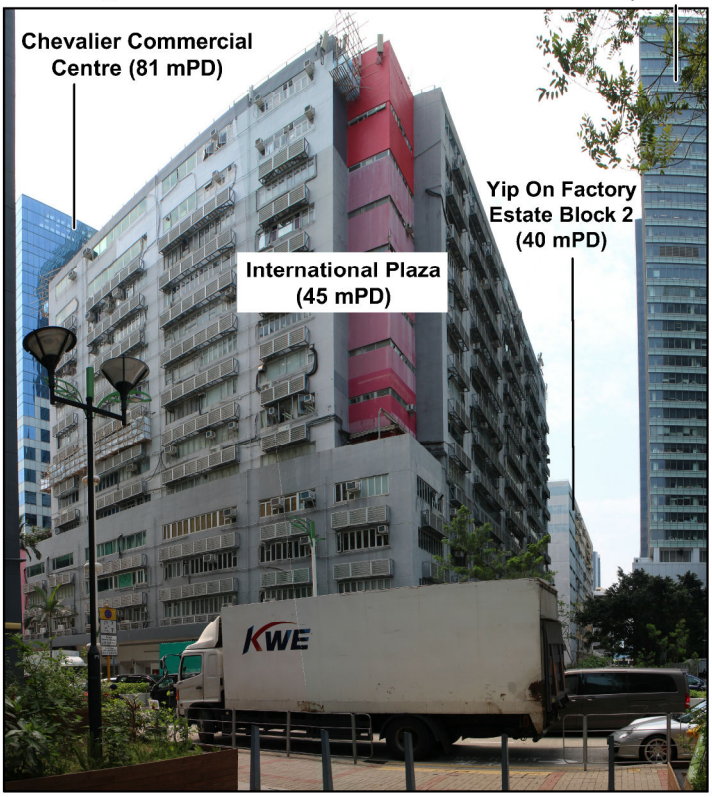
HOUSING DEPARTMENT
PLANNING SECTIONS

PLAN 6

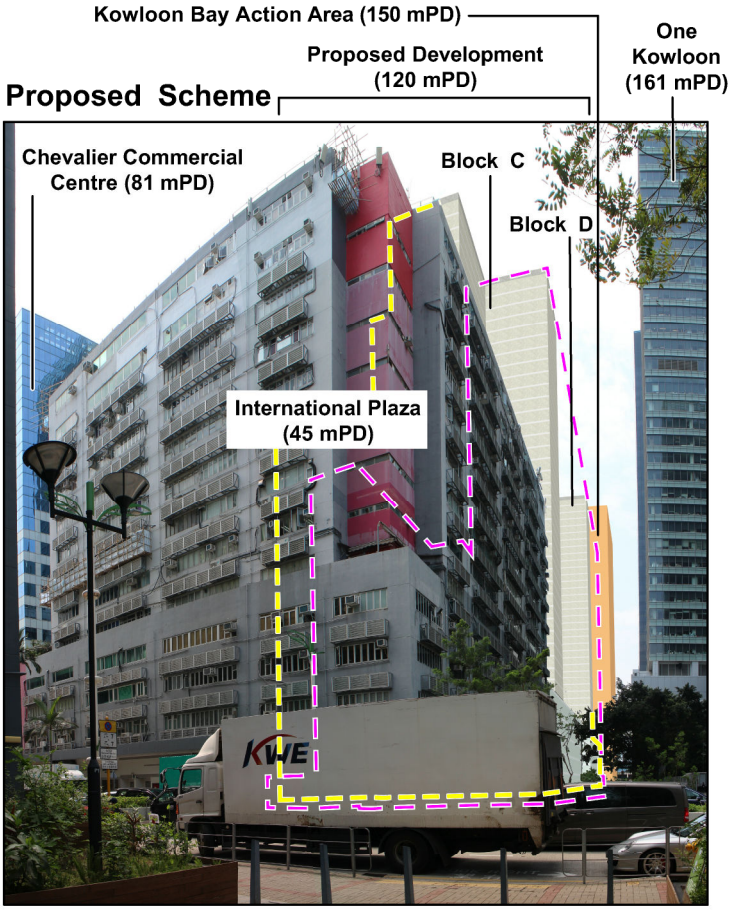
DATE :
22. 11. 2021

21_0746KLN_VP3

Existing View



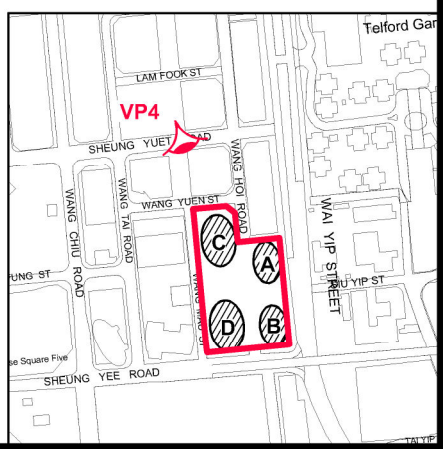
Proposed Scheme



LEGEND:

PORTION OF PROPOSED SCHEME BLOCKED BY EXISTING / COMMITTED DEVELOPMENTS

OZP COMPLIANT SCHEME



PHOTOMONTAGE AT VIEWING POINT 4 (VIEW FROM LAM FOOK STREET SITTING-OUT AREA)

HOUSING DEPARTMENT
PLANNING SECTIONS

PLAN 7

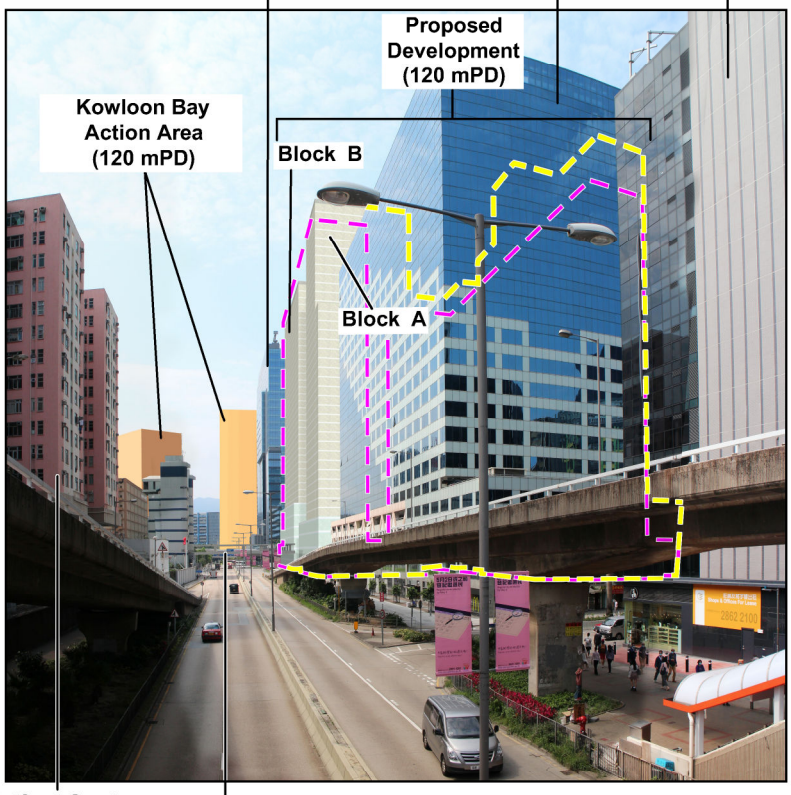
DATE : 22. 11. 2021

21_0746KLN_VP4

Existing View



Proposed Scheme



LEGEND:

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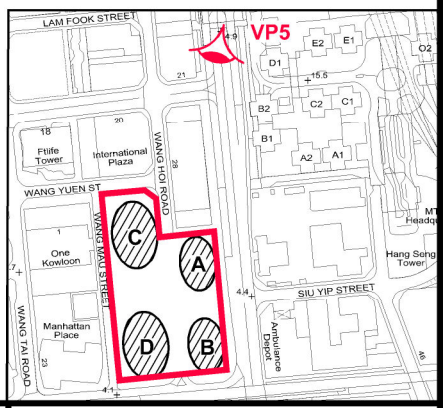
OZP COMPLIANT SCHEME



PHOTOMONTAGE AT VIEWING POINT 5 (VIEW FROM FOOTBRIDGE ACROSS WAI YIP STREET)

HOUSING DEPARTMENT
PLANNING SECTIONS

PLAN 8

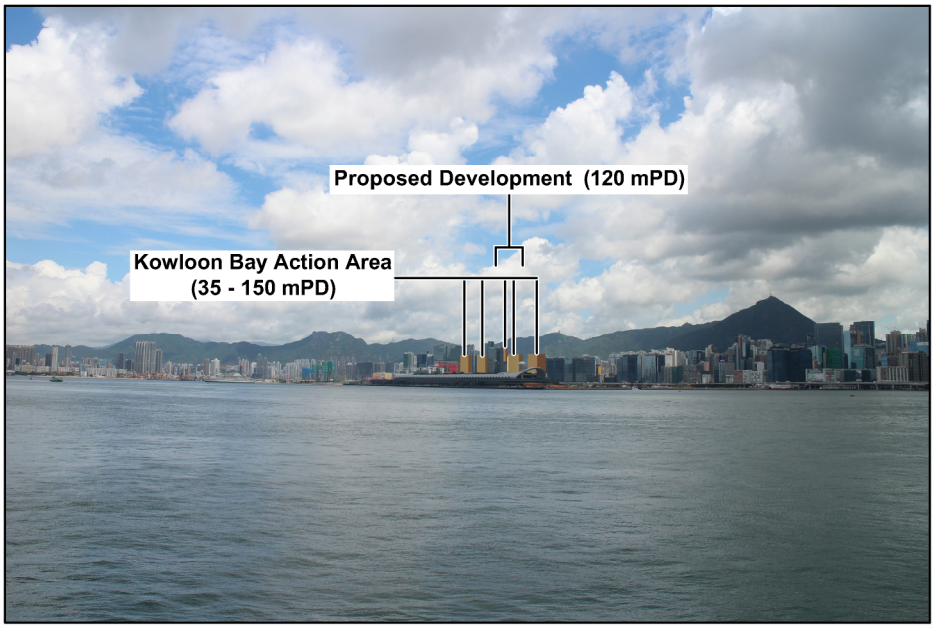
DATE :
22. 11. 2021

21_0746KLN_VP5

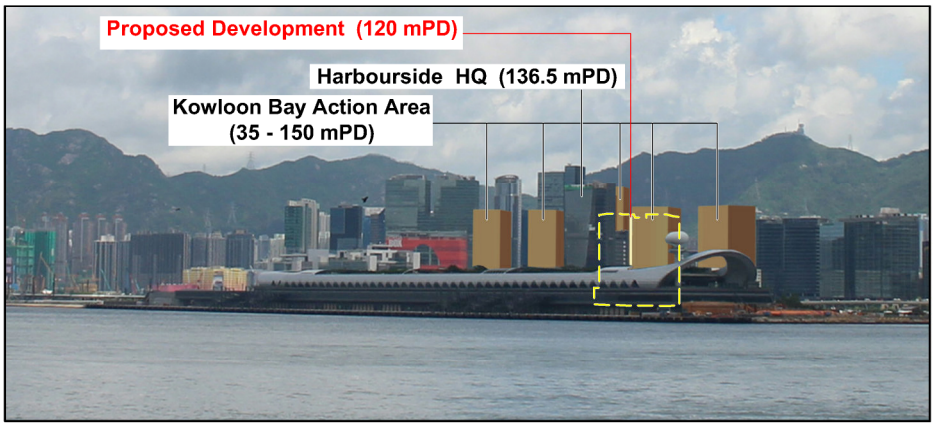
Existing View



Proposed Scheme

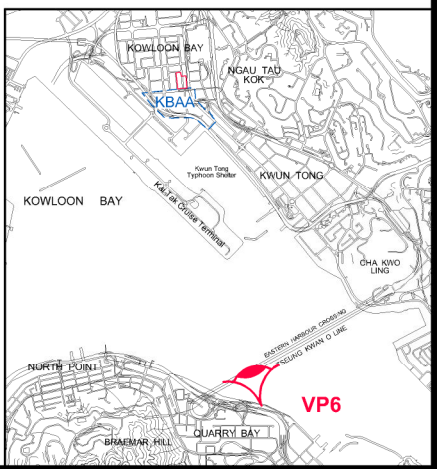


Proposed Scheme (Zoom in)



LEGEND:

PORTION OF PROPOSED SCHEME BLOCKED BY EXISTING / COMMITTED DEVELOPMENTS



PHOTOMONTAGE AT VIEWING POINT 6 (VIEW FROM QUARRY BAY PARK)

HOUSING DEPARTMENT
PLANNING SECTIONS

PLAN 9

DATE :
30. 11. 2021

21_0746KLN_VP6

International Plaza

Chevalier Commercial Centre

WANG YUEN STREET

WANG HOI ROAD

WANG TAI ROAD

WANG MAU STREET

WAI YIP STREET

SIU YIP STREET

SHEUNG YEE ROAD

TELFORD GARDENS

Podium
(Car Park under)

B1

A2

A1

Road

Kowloon East
Operational Base Range

Ngau Tau Kok Police Station

Police Operational Base
Kowloon East

ESS

Clothing Indus
Training Autho
Kowloon Bay
Training Centr

Telephone
Exchange

Ngau Tau Kok
Ambulance Depot

Ngau Tau Kok
Engineering Centre

ET

ONE KOWLOON

MAHATTEN PLACE

CHANGE TOWER

RPRISE SQUARE III

5M-WIDE NBA

BLOCK C
+120.0
34 DOMESTIC STOREYS

+85.0
21 DOMESTIC STOREYS

+26.4
5 STOREYS NON-DOMESTIC FACILITIES

+86.0
21 DOMESTIC STOREYS

BLOCK A
+120.0
35 DOMESTIC STOREYS

+22.5
4 STOREYS NON-DOMESTIC FACILITIES

BLOCK D
+120.0
34 DOMESTIC STOREYS

+26.1
5 STOREYS NON-DOMESTIC FACILITIES

+31.2
BLOCK B
+120.0
32 DOMESTIC STOREYS

6 STOREYS NON-DOMESTIC FACILITIES

PROPOSED ELEVATED WALKWAY TO BE CONSTRUCTED BY CEDD/ HyD

PROPOSED CONNECTION TO KBAA

Elevated Road

Elevated Road

Ramp

Ramp

Sitting Out Area

EW

CW

LEGEND:

- SITE BOUNDARY
- DOMESTIC BLOCKS
- NON-DOMESTIC FACILITIES
- 5M WIDE NBA
- FUTURE ELEVATED WALKWAY CONSTRUCTED BY CEDD/ HYD (ALIGNMENT IS INDICATIVE ONLY AND SUBJECT TO DETAILED DESIGN)

REVISIONS

NO	DESCRIPTION AND DATE	INITIAL AND DESIGNATION DWN	CKD	AUTH

	NAME AND DESIGNATION	INITIAL	DATE
AUTHORISED		ORIGINAL SIGNED	05/20
CHECKED		ORIGINAL SIGNED	05/20
		ORIGINAL SIGNED	05/20
		ORIGINAL SIGNED	05/20
DRAWN		ORIGINAL SIGNED	05/20

DATE OF ISSUE:

PROJECT
REDEVELOPMENT AT
YIP ON FACTORY ESTATE

DRAWING TITLE
MASTER LAYOUT PLAN
(INCLUDING WANG HOI ROAD)

SCALE

DRAWING NO.
KT30RR/MLP-2/01

SOURCE

ICU NO.

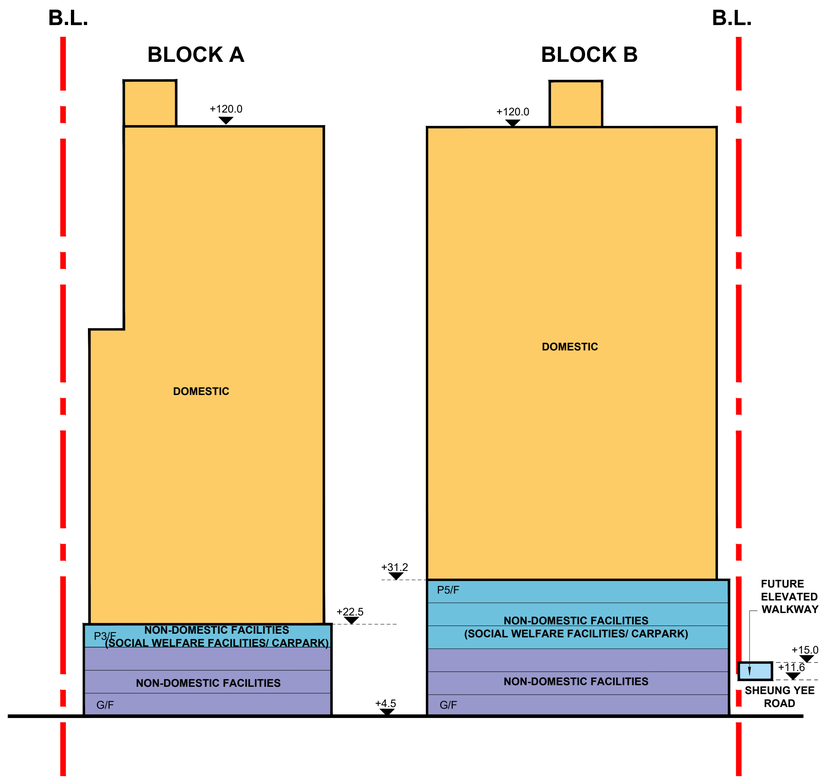
AutoCAD 2000 A1 594 x 841

HOUSING DEPARTMENT

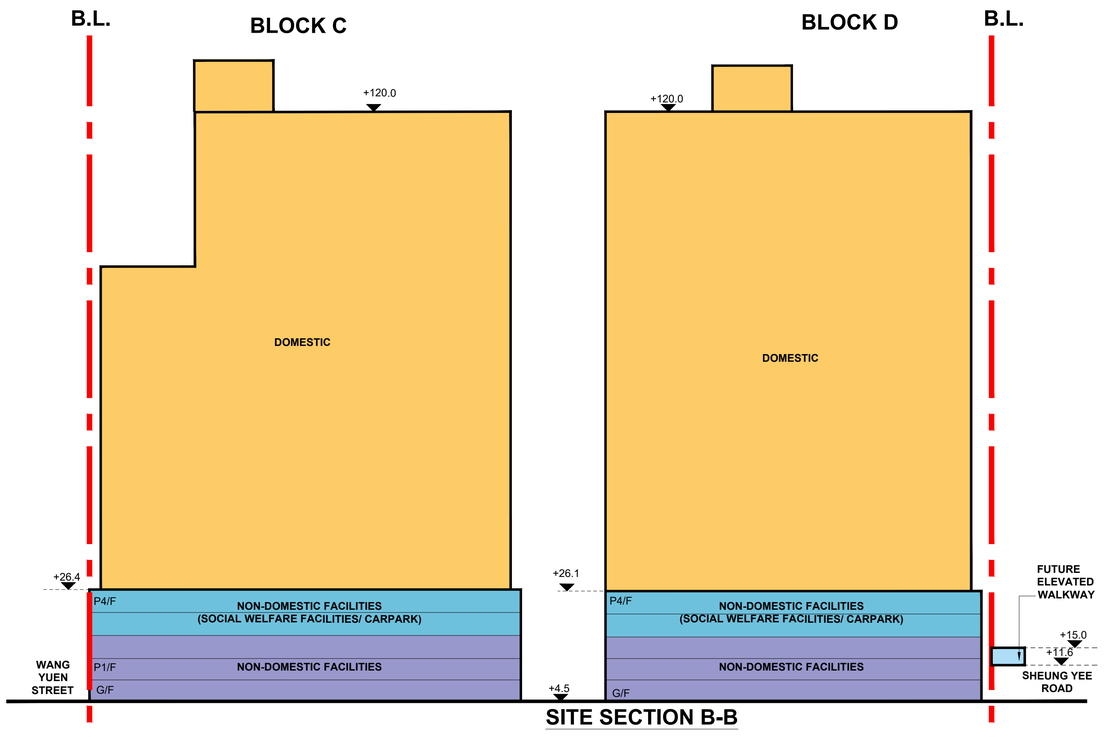
C.E. OTHERS:
B.S.E. G.E.
IOW/COW RLE / OFFICE
R.E. Q.S.
Contractor Architect

COPY FOR

COUNTERCHECKED



SITE SECTION A-A



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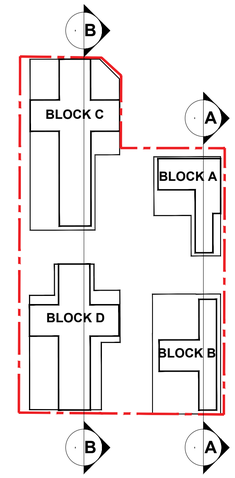


KEY PLAN
SCALE : N.T.S.

LEGEND:

- SITE BOUNDARY
- DOMESTIC BLOCKS
- NON-DOMESTIC FACILITIES
- NON-DOMESTIC FACILITIES (SOCIAL WELFARE FACILITIES/ CARPARK)
- FUTURE ELEVATED WALKWAY CONSTRUCTED BY CEDD/ HYD (ALIGNMENT IS INDICATIVE ONLY AND SUBJECT TO DETAILED DESIGN)

REVISIONS

NO	DESCRIPTION AND DATE	INITIAL AND DESIGNATION DWN	CKD	AUTH

	NAME AND DESIGNATION	INITIAL	DATE
AUTHORISED		ORIGINAL SIGNED	05/20
CHECKED		ORIGINAL SIGNED	05/20
		ORIGINAL SIGNED	05/20
		ORIGINAL SIGNED	05/20
DRAWN		ORIGINAL SIGNED	05/20

DATE OF ISSUE :

PROJECT
REDEVELOPMENT AT
YIP ON FACTORY ESTATE

DRAWING TITLE
SECTIONS
(INCLUDING WANG HOI ROAD)

SCALE

DRAWING NO.
KT30RR/MLP-2/02

SOURCE

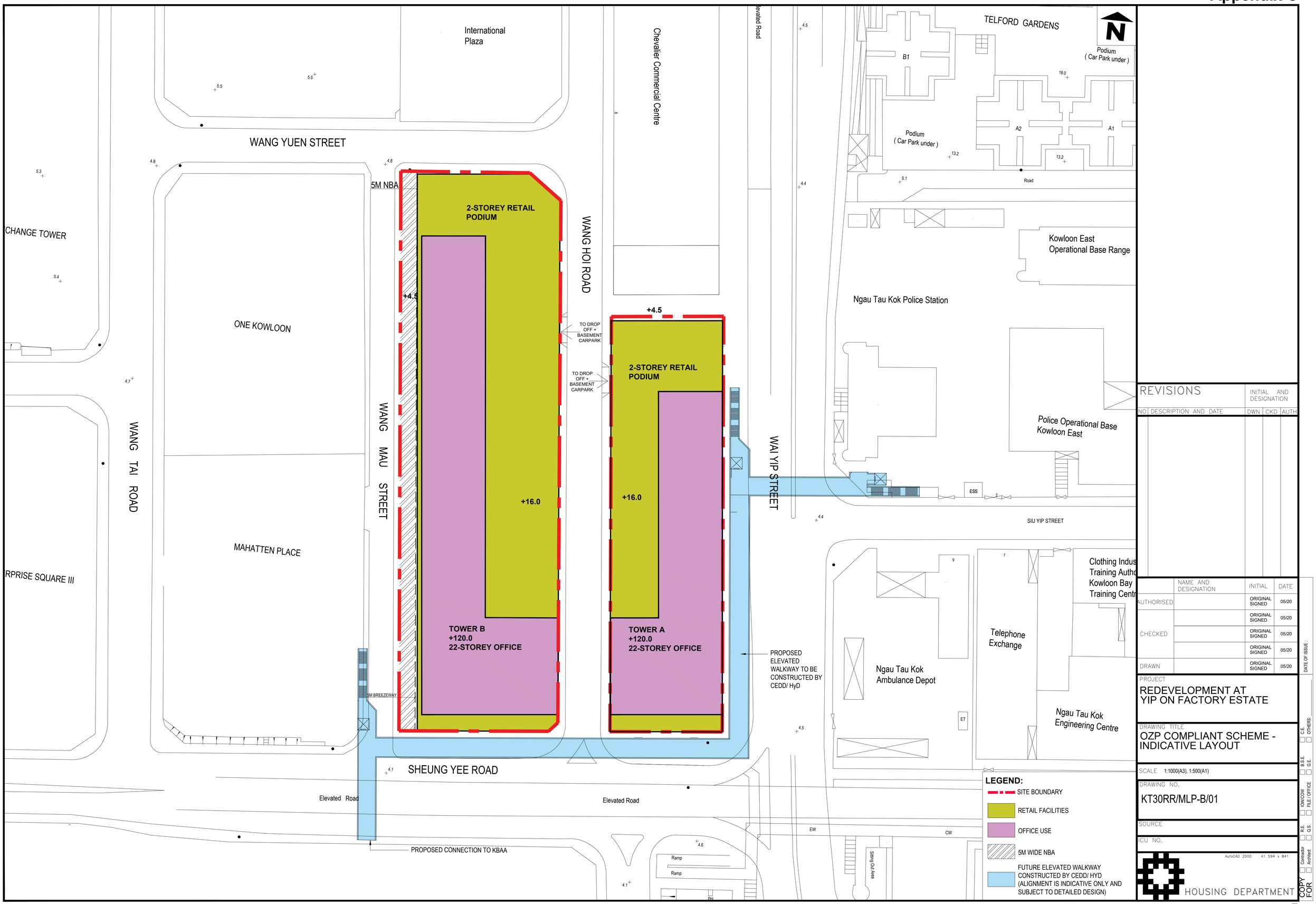
ICU NO.

AutoCAD 2000 A1 594 x 841

HOUSING DEPARTMENT

COPY FOR
Contractor
Architect
R.E.
Q.S.
IOW/COW
FILE / OFFICE
B.S.E.
G.E.
C.E.
OTHERS:

COUNTERCHECKED



REVISIONS		INITIAL AND DESIGNATION	
NO	DESCRIPTION AND DATE	DWN	CKD	AUTH

	NAME AND DESIGNATION	INITIAL	DATE
AUTHORISED		ORIGINAL SIGNED	05/20
CHECKED		ORIGINAL SIGNED	05/20
		ORIGINAL SIGNED	05/20
		ORIGINAL SIGNED	05/20
DRAWN		ORIGINAL SIGNED	05/20

PROJECT
REDEVELOPMENT AT YIP ON FACTORY ESTATE

DRAWING TITLE
OZP COMPLIANT SCHEME - INDICATIVE LAYOUT

SCALE 1:1000(A3), 1:500(A1)

DRAWING NO.
KT30RR/MLP-B/01

SOURCE

ICU NO.

AutoCAD 2000 A1 594 x 841

HOUSING DEPARTMENT

DATE OF ISSUE:
C.E. OTHERS:
B.S.E. G.E.
IOW/COW RLE / OFFICE
R.E. G.S.
Contractor Architect
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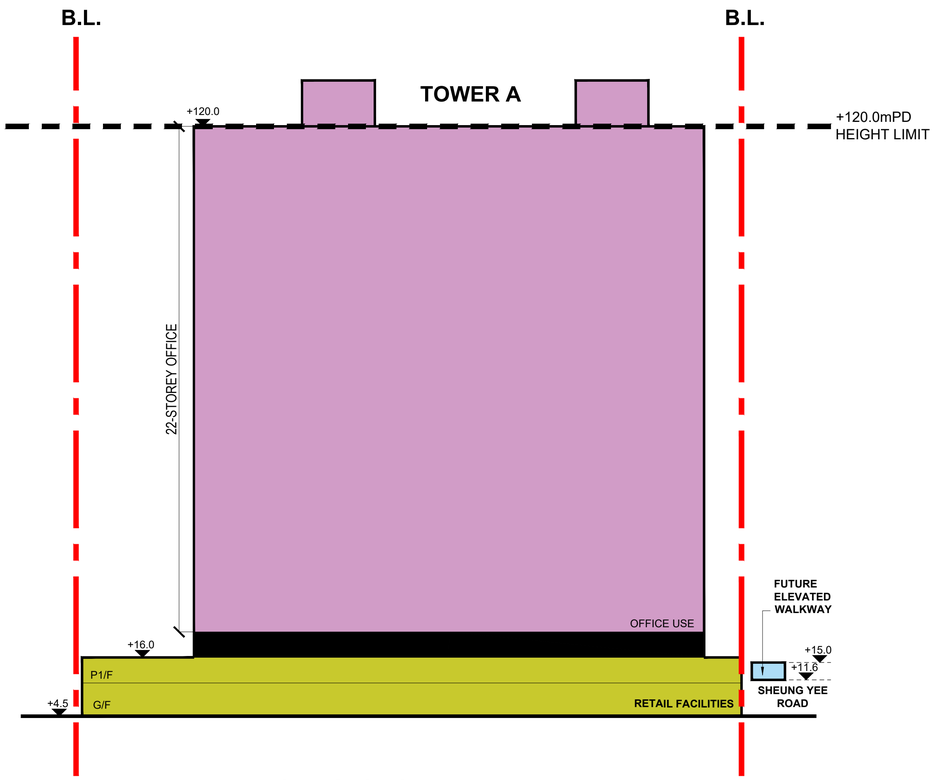
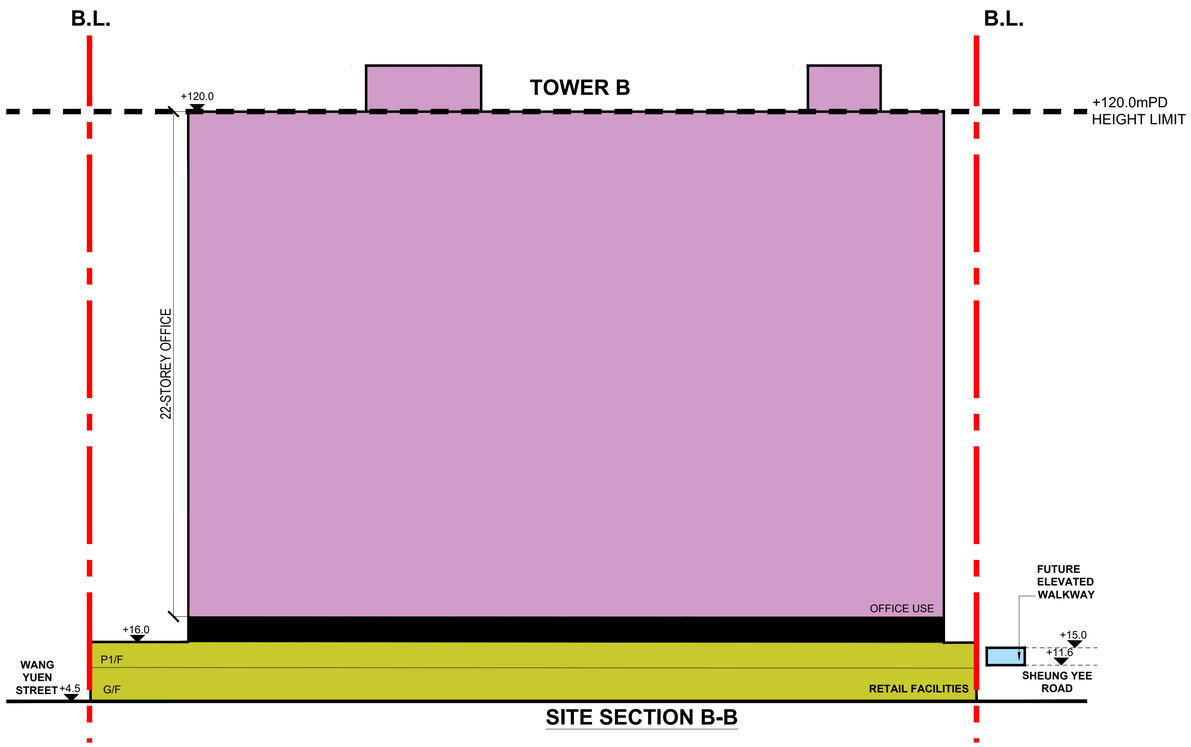
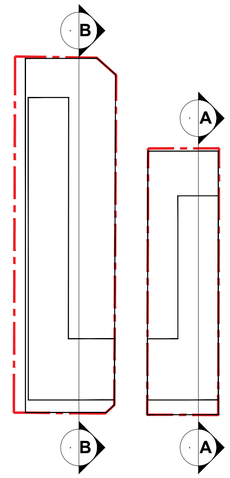


SITE SECTION A-A



SITE SECTION B-B



KEY PLAN
SCALE : N.T.S.

LEGEND:

- SITE BOUNDARY
- RETAIL FACILITIES
- OFFICE USE
- E & M USE
- FUTURE ELEVATED WALKWAY CONSTRUCTED BY CEDD/ HYD (ALIGNMENT IS INDICATIVE ONLY AND SUBJECT TO DETAILED DESIGN)

REVISIONS

NO	DESCRIPTION AND DATE	INITIAL AND DESIGNATION DWN	CKD	AUTH

	NAME AND DESIGNATION	INITIAL	DATE
AUTHORISED		ORIGINAL SIGNED	05/20
CHECKED		ORIGINAL SIGNED	05/20
		ORIGINAL SIGNED	05/20
		ORIGINAL SIGNED	05/20
DRAWN		ORIGINAL SIGNED	05/20

PROJECT
REDEVELOPMENT AT
YIP ON FACTORY ESTATE

DRAWING TITLE
OZP COMPLIANT SCHEME - INDICATIVE SECTIONS

SCALE 1:1200(A3), 1:600(A1)

DRAWING NO.
KT30RR/MLP-B/02

SOURCE

ICU NO.

AutoCAD 2000 A1 594 x 841

HOUSING DEPARTMENT

DATE OF ISSUE : C.E. OTHERS B.S.E. G.E. ION/COW FILE/ OFFICE R.E. Q.S. Contractor Architect COPY FOR

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Provision of Major Community Facilities and Open Space in Ngau Tau Kok & Kowloon Bay (K13)

Type of Facilities	Hong Kong Planning Standards and Guidelines (HKPSG)	HKPSG Requirement (based on planned population)	Provision		Surplus/ Shortfall (against planned provision)
			Existing Provision	Planned Provision (including Existing Provision)	
District Open Space	10 ha per 100,000 persons[#]	18.65 ha	30.42	42.05	+23.40
Local Open Space	10 ha per 100,000 persons[#]	18.65 ha	29.79	35.01	+16.36
Secondary School	1 whole-day classroom for 40 persons aged 12-17	233 classrooms	272	302	+69
Primary School	1 whole-day classroom for 25.5 persons aged 6-11	271 classrooms	284	284	+13
Kindergarten/ Nursery	34 classrooms for 1,000 children aged 3 to under 6	85 classrooms	109	124	+39
District Police Station	1 per 200,000 to 500,000 persons	0	0	0	0
Divisional Police Station	1 per 100,000 to 200,000 persons	0	0	0	+0
Hospital	5.5 beds per 1,000 persons[^]	1,058 beds	0	0	-1,058
Clinic/Health Centre	1 per 100,000 persons	1	2	2	+1
Magistracy (with 8 courtrooms)	1 per 660,000 persons	0	0	0	0
Child Care Centre	100 aided places per 25,000 persons[#@]	746	103	291	-455
Integrated Children and Youth Services Centre	1 for 12,000 persons aged 6-24[#]	2	4	4	+2

Type of Facilities	Hong Kong Planning Standards and Guidelines (HKPSG)	HKPSG Requirement (based on planned population)	Provision		Surplus/ Shortfall (against planned provision)
			Existing Provision	Planned Provision (including Existing Provision)	
Integrated Family Services Centre	1 for 100,000 to 150,000 persons[#]	1	2	2	+1
District Elderly Community Centres	One in each new development area with a population of around 170,000 or above[#]	N.A.	2	2	N.A.
Neighbourhood Elderly Centres	One in a cluster of new and redeveloped housing areas with a population of 15,000 to 20,000 persons, including both public and private housing[#]	N.A.	7	7	N.A.
Community Care Services (CCS) Facilities	17.2 subsidised places per 1,000 elderly persons aged 65 or above[#*@]	1,063 places	594	644	-419
Residential Care Homes for the Elderly	21.3 subsidised beds per 1,000 elderly persons aged 65 or above[#@]	1,316 beds	853	1063	-253
Library	1 district library for every 200,000 persons[π]	0	1	1	+1
Sports Centre	1 per 50,000 to 65,000 persons[#]	2	2	3	+1
Sports Ground/ Sport Complex	1 per 200,000 to 250,000 persons[#]	0	1	1	+1
Swimming Pool Complex – standard	1 complex per 287,000 persons[#]	0	0	0	0

Note:

Facilities and open space figures of OZP No. S/K13/30 are included.

The planned resident population is about 186,600. If including transients, the overall planned population is about 192,500. All population figures have been adjusted to the nearest hundred.

\# The requirements exclude planned population of transients.

^ The provision of hospital beds is to be assessed by the Hospital Authority on a regional basis.

* Consisting of 40% centre-based CCS and 60% home-based CCS.

@ This is a long-term goal and the actual provision would be subject to the consideration of the Social Welfare Department in the planning and development process as appropriate.

π Small libraries are counted towards meeting the HKPSG requirement.

DECEMBER 2021

第六屆觀塘區議會
第十三次全會會議記錄

日期: 2021 年 9 月 9 日(星期四)
時間: 上午 9 時 35 分至下午 12 時 55 分
地點: 九龍觀塘觀塘道 392 號創紀之城 6 期 20 樓 05-07 室
觀塘民政事務處會議室

出席者	出席時間	離席時間
柯創盛先生, MH (主席)	上午九時三十五分	下午十二時五十五分
呂東孩先生, MH (副主席)	上午九時三十五分	下午十二時五十五分
陳耀雄先生, MH	上午九時三十九分	下午十二時五十五分
張培剛先生	上午九時三十九分	下午十二時五十五分
符碧珍女士, MH	上午九時三十五分	下午十二時五十五分
許有為先生	上午九時三十五分	下午十二時五十五分
簡銘東先生, MH	上午九時三十五分	下午十二時五十五分
黎寶桂女士	上午九時三十五分	下午十二時四十六分
林　瑋先生	上午九時五十八分	下午十二時五十五分
梁騰丰先生	上午九時三十五分	下午十二時四十六分
梁翊婷女士	上午九時三十六分	下午十二時五十分
顏汶羽先生	上午九時三十五分	下午十二時五十五分
龐智笙先生	上午九時三十五分	下午十二時五十五分
潘任惠珍女士, BBS, MH	上午九時三十五分	下午十二時五十五分
蘇冠聰先生	上午九時三十五分	下午十二時五十五分
譚肇卓先生	上午九時三十五分	下午十二時五十五分
謝淑珍女士	上午九時三十五分	下午十二時五十五分

列席者	職　銜
謝凌駿先生, JP	觀塘民政事務專員
蔡姿嫻女士	觀塘民政事務助理專員(1)
沈思穎女士	觀塘民政事務助理專員(2)
蒲理正總警司	警務處觀塘區指揮官
王素芬女士	警務處觀塘區警民關係主任
譚文海先生	警務處秀茂坪區警民關係主任
林世榮先生	土木工程拓展署總工程師/東 2
廖健威先生	運輸署總運輸主任/九龍 2
嚴家豪先生	房屋署物業管理總經理(東九龍)

楊煥明先生	食物環境衞生署觀塘區衞生總督察 2
蘇陽峯先生	食物環境衞生署觀塘區高級衞生督察(潔淨及防治蟲鼠)2
顧國麗女士	社會福利署觀塘區福利專員
鄧穎思女士	康樂及文化事務署觀塘區康樂事務經理
葉慧明女士	觀塘民政事務處高級聯絡主任(1)
梁燕屏女士	觀塘民政事務處高級聯絡主任(2)
陳開明先生	觀塘民政事務處高級聯絡主任(3)
周德心女士	觀塘民政事務處高級行政主任(地區管理)
陳朗騫先生	觀塘民政事務處一級行政主任(區議會)

秘書	職　銜
周立根先生	觀塘民政事務處高級行政主任(區議會)

應邀出席者	職　銜	
景國祥先生	起動九龍東副專員	**議項 III-V**
陳家智先生	起動九龍東辦事處高級地方營造經理(規劃)	
黃宏鼎先生	房屋署高級建築師(14)	
葉慧敏女士	房屋署高級規劃師(9)	
李文光先生	房屋署高級土木工程師(3)	
李淑芬女士	房屋署高級房屋事務經理(東九龍二)	**議項 IV**
羅灝銘先生	房屋署建築師(T302)	
吳醉怡女士	房屋署規劃師(30)	
伍雋立先生	房屋署土木工程師(36)	
馮志慧女士	規劃署署理九龍規劃專員	
陳偉霖先生	規劃署署理高級城市規劃師/九龍 4	
黃保傑先生	規劃署城市規劃師/九龍 9	
李偉臨先生	奧雅納工程顧問助理董事(規劃)	
鄧思威先生	奧雅納工程顧問助理董事(交通)	

主席歡迎各位議員和政府部門代表出席第六屆觀塘區議會第十三次全會會議。

議項 I－通過第六屆觀塘區議會第十一次會議記錄

2. 委員並無提出其他意見，第十一次會議記錄獲得通過。

議項II－重組觀塘區議會屬下各個常務委員會、建議職權範圍和會議時間表及推選各個常務委員會的主席及副主席
(觀塘區議會文件第26/2021號)

3. 秘書介紹文件。

4. 大會通過有關文件。

議項III－九龍灣行動區發展規劃及工程可行性研究－建議發展大綱圖
(觀塘區議會文件第 27/2021 號)

5. 主席歡迎發展局起動九龍東副專員景國祥先生、起動九龍東辦事處高級地方營造經理(規劃)陳家智先生、房屋署高級建築師(14)黃宏鼎先生、房屋署建築師(T302)羅灝銘先生、房屋署高級土木工程師(3)李文光先生、房屋署土木工程師(36)伍雋立先生、房屋署高級規劃師(9)葉慧敏女士、房屋署規劃師(30)吳醉怡女士、規劃署署理九龍規劃專員馮志慧女士、規劃署署理高級城市規劃師/九龍 4 陳偉霖先生、規劃署城市規劃師/九龍 9 黃保傑先生、奧雅納工程顧問（下稱「顧問公司」）助理董事(規劃)李偉臨先生、及顧問公司助理董事(交通)鄧思威先生出席是次會議。以上部門及顧問公司代表將一同參與議項 III 至 V 的會議。

6. 起動九龍東副專員及顧問公司代表介紹文件。

7. 議員提出的意見及查詢如下：

7.1 潘任惠珍議員表示九龍灣行動區屬觀塘區內重點發展項目之一，從大綱圖可見利用不少空置及廢棄用地發展，落成後一定十分美觀。惟她質疑處方未有考慮項目對附近交通的影響，她表示會前曾向運輸署表達，現時市民對九龍灣的交通情況怨聲載道。她指出九龍灣 MegaBox 商場落成後，已為德福廣場的交通帶來災難性影響，每當有大型活動時，該處交通嚴重阻塞。此外，啟德郵輪碼頭落成之後，但凡有大型活動舉行時，九龍灣的交通同樣不勝負荷。她指由於疫情關係，近來很多活動無法舉行，使交通情況似乎有所好轉。惟經濟活動復甦後，啟德郵輪碼頭恢復郵輪停泊，啟德醫院地盤陸續動工，加上有不少市民在附近上班，德福廣場平台的交通將首當其衝。她表示文件只提及一條連接德福廣場的行人天橋，她查詢部門有否考慮其他前往港鐵站的方法。她批評政府的做法，經常以為更改路

口及交通燈時間便能應對項目對交通造成的影響。九龍灣已經難以負荷現有人流及車流，如將來九龍灣行動區和啟德醫院等建成，以及九龍灣業安工廠大廈重建為公營房屋後，必定無法應付額外的人流及車流。她指處方應解決人車爭路及交通問題，否則情況將慘不忍睹。她對地區發展表示支持，惟必須完善附近的交通配套，避免為現在及將來入住的市民帶來不便。

7.2 顏汶羽議員查詢(i)綠色交通樞紐的充電設施是否只容許巴士及小巴充電，或是會開放予其他電動車使用。他表示不同做法對評估車流量帶來不同影響；(ii)處方會否考慮引入智慧停車場；(iii)文件內指地段 3 用地有 400 平方米的室內空間作藝術、文化及創意產業用途，並查詢此地段由哪個部門負責管理，及會否連同地段 2 及地段 4 一併由私人發展商管理；(iv)文件亦指九龍灣行動區內的 24 小時行人專用區由兩個私人發展商負責，他查詢私人發展商之間如何協調管理及設計等問題；及(v)連接九龍灣港鐵站的行人天橋位於業安工廠大廈附近，他查詢行人天橋是否與重建業安工廠大廈為公營房屋的議項有關。他指行人天橋的項目已提出多年，此項目會否如單軌列車一樣不了了之，或以此行人天橋遊說議員支持文件，抑或政府真的有決心推展工程。如政府決定興建，他希望處方提供工程時間表。他指處方早前提出的中、短期建議已陸續推行，惟興建行人天橋至今仍遙遙無期，他請處方先交代會否興建及興建的時間，才討論其他相關交通改動安排。他表示處方迅速推行發展項目，惟關於交通的改善安排只流於研究文件及討論層面，從未見真正落實。

7.3 譚肇卓議員關注(i)為配合智慧城市的發展，除了智能水錶外，智慧燈柱能否於九龍灣行動區應用；(ii)九龍灣行動區預計於 2029 年大致建成，而政府計劃於 2034 年停止登記燃油車輛，他期望九龍灣行動區的停車場成為電動車停車場的模範，包括充電設施的比率、充電速度及便利程度。他請處方作長遠策劃，以配合香港電動車配套的發展。在這方面，他擔心九龍灣行動區的電動車充電設備如大型商場一樣寥寥可數，希望處方配合政府的長遠環保規劃。另外，他指深水埗現時已計劃興建智慧停車場，他認為九龍灣行動區屬第二個核心商業區，如果連智慧停車場也無法容納會甚為落後，他希望處方的規劃能追上 2029 年或 2030 年的科技發展。他擔心沿用固有的規劃方法導致車位不足，令等候泊車的車龍出現。他以 MegaBox 商場和九龍灣國際展貿中心 E-Max 為例，電動車輪候充電設備常常大排長龍，導致常怡道交通擠塞。他請處方仔細研究解決方案，否則項目建築物落成後，而附近交通配套又無法配合，會

導致九龍灣交通情況進一步惡化；及(iii)地段3用地內提供最多400平方米的室內空間作藝術、文化及創意產業用途，他表示觀塘區議會五年前曾反對處方將「反轉天橋底行動」交予相關團體管理，指會問題叢生，導致項目最後成為爛攤子，他促請處方肩負管理九龍灣行動區的文化空間的責任，切勿撒手不管。現時距離九龍灣行動區落成尚餘七年，他請處方改善管理安排，屆時不論交由非牟利機構或商界管理，處方必須承擔監管的角色，否則只會在同一問題重蹈覆轍。

7.4 簡銘東議員表示一座甲級寫字樓足以容納數千人，文件指九龍灣行動區內多數地段劃為辦公室用途，他對未來的交通情況表示擔憂。他指現時常怡道已十分擠塞，因此請處方研究經常怡道以外的道路前往九龍灣作為改道安排。他表示現時 MegaBox 商場位於常怡道的路口交通嚴重擠塞，屆時更多商業大廈落成後，情況將不堪設想。他指數年前的規劃圖曾提出此位置會興建單軌列車，惟至今杳無音訊，他擔心無法疏導人流，現有前往德福廣場的道路實難以容納龐大數量的行人，他認為處方必須研究解決方案。另外，他亦關注電動車發展，並指現時已出現電動車充電設備不足的問題。政府提出15年後需全面淘汰燃油車輛，屆時電動車所佔市場比率將會更高。他指既然九龍灣行動區內尚未興建任何建築物，他請處方長遠規劃用地。他指處方提出的方案不應過度包裝，必須能夠實行。另外，他表示觀塘區從工業區轉型成商貿區的的過程中，缺乏大型貨車及旅遊巴的停泊位，他請處方規劃時須預留車位讓大型貨車於晚上停泊，避免違例泊車出現。

8. 起動九龍東副專員感謝議員的建議，並綜合回覆如下：

8.1 九龍灣行動區的行人連接設施及交通安排：處方一直聯同其他部門進行短、中及長期的交通改善措施，預期未來交通情況可得以改善。短期改善措施方面，路政署會繼續進行多項小型工程改善交通，如鄰近 MegaBox 商場宏照道的北行車線，將會進行工程，移除路旁的花槽及擴闊馬路，並增加一條左轉行車線以紓緩交通擠塞；中長期改善措施方面，九龍灣交通擠塞問題部分源於有車輛借道觀塘區前往其他地區，就此，T2 主幹路、中九龍幹線將於 2025/26 年落成，將軍澳居民將能經由將軍澳藍田隧道（下稱「將藍隧道」）連接 T2 主幹路直接前往其他地區。處方參考 2018 年立法會文件，指出通過大型道路建設，能改善部分區內路面交通情況，如文件中提到祥業街及海濱道路口的交通問題。當 2026 年主要道路建設項目

落成並分流現時借道九龍灣及觀塘的車輛後，將來的交通情況有望得到顯著改善。處方明白改善工作不能停止，並會與相關部門一起持續監察情況。

8.2 橫跨偉業街的行人天橋工程：處方同意工程已籌備多年，現時已調整舊牛頭角警署的圍牆，以騰出空間興建橫跨偉業街的行人天橋。行人天橋正進行詳細設計，處方將儘快落實設計細節，然後進行刊憲及向立法會申請撥款的程序，以期儘快興建行人天橋。

8.3 連接常怡道及橫跨偉業街行人天橋的自動行人道：該自動行人道將接駁九龍灣行動區，屬疏導九龍灣港鐵站德福廣場二期人流的方案之一，而土木工程拓展署已聘請顧問公司就自動行人道進行詳細設計。處方指出一直就九龍灣興建行人連接系統進行研究，並持續與附近的發展商商討如何加強聯繫，完善行人連接系統。現時建議的架空自動行人道將沿常怡道及偉業街興建，以九龍灣行動區為中心點，連接九龍灣港鐵站及區內其他地點，市民可根據自身需要使用接駁系統前往不同目的地。

8.4 智慧停車場：處方同意議員的意見，表示處方會給予發展商彈性發展智慧泊車系統。另外，處方指已預留足夠的停泊位置予大型貨車，並於晚上開放大部分上落貨的位置予公眾停泊，希望紓緩區內違例泊車的情況。

9. 顧問公司的回覆如下：

9.1 改善行車環境措施：九龍灣行動區會使用「多元組合」模式的環保連接系統改善區內交通連接，並通過短期路口改善工程及長遠措施包括興建 T2 主幹路、中九龍幹線及將藍隧道等改善行車環境。

9.2 可持續行人網絡：單靠改善行車交通並非可持續的改善方法，強調必須推展可持續的行人網絡。顧問公司建議於九龍灣行動區完善行人網絡，措施包括興建行人天橋及設置自動行人道以提升效率。

9.3 充電設備及智慧停車場：運輸署現時在六個地點作為自動泊車系統試點並汲取試點的經驗，日後九龍灣行動區有彈性提供自動泊車系統。另外，顧問公司指停車場必須按政府要求提供足夠的充電設備及基建設施。

10. 起動九龍東辦事處高級地方營造經理(規劃)就地段 3 的藝術、文化及創意產業用途空間及行人專用區的管理問題的回覆如下：

10.1 根據現時建議，該處將由地段 4 的發展商負責設計、興建及管理，並與其合作的團體共同管理。處方知悉議員對該處未來管理方面的意見，認為可就不同的管理模式再作考慮。

10.2 至於行人專用區的管理問題，由於預計地段 2 將比地段 4 較早出售，處方建議行人專用區於地段 4 完工後(預計於 2029 年)一併落成，兩個發展商需協調興建時間表及使用統一的設計。處方建議要求發展商提交設計予將來成立的設計審批小組，審視其公共空間及行人專用區的設計，確保設計一體化。公共空間及行人專用區將交由兩個發展商分別管理，當局會持續監察其管理情況。

11. 議員的跟進提問如下：

11.1 蘇冠聰議員指出部門的回覆未能解答某些問題：(i)發展區的工作人口雖未必一定需要使用集體運輸，可使用行人接駁設施，但部門未解釋接駁設施的走線；交通總匯處的巴士亦有同樣問題；(ii)雖然以地理位置來說，步行前往該地方距離很短，然而實際上該處每日都出現擠塞的問題。區議會早前曾實地統計由德福花園接駁到德福大廈的現有政府天橋於最繁忙時段的人流，數量非常大。現時新增的行動區會令該區的工作人口大幅上升，再加上居住的人口，人流必定增加不少。部門文件的圖則顯示有部分天橋將由私人發展商興建，他詢問那些天橋是否已落實。若文件中標明了這些天橋，但最終私人發展商沒有興建，政府會有何打算；雖然政府或會提供優惠予私人發展商，但以往亦推出過類似優惠卻無法吸引發展商興建；(iii)如沒有這些私人發展商興建的接駁天橋，市民便會全都集中使用現時的通道，惟改變路口會影響交通，亦會收窄行人道，故他詢問部門如何確保道路足夠寬闊讓行人穿梭；及(iv)希望顧問公司清楚解釋在沒有新天橋的情況下如何分流行人，以及交通總匯處的安排。

11.2 顏汶羽議員(i) 指出「起動九龍東」計劃作為智慧九龍東項目，亦是政府於智慧城市發展的先導項目，但六個自動泊車系統的計劃中都沒有包括九龍東，他不解其原因；(ii)反對地段 3 的休憩用地，特別是 400 平方米室內空間交由地段 4 的發展商處理，希望此地段能由政府自行管理，同時剔除室內空間。他認為如果地段 4 的

商業機構日後認為需要作藝術文化創意產業用途，自然會在自己的地段內完成，故他不認為地段 3 需專門提供 400 平方米予地段 4 的發展商；及(iii)查詢橫過偉業街的行人天橋何時能建成，是否於此項目之前便能落成天橋，還是與過往一樣，完成興建所有地段後才開始動工；他認為在交通運輸的安排未處理好的情況下，既然這是「起動九龍東」九龍灣行動區的研究項目，希望政府能認真處理比較前期的項目，先將行人天橋建好，然後才發展地段 2、地段 3 及地段 4。

11.3 張培剛議員(i)表示智慧停車場在某些地區正作為試點，運輸署吸收經驗後將來亦可能於九龍灣行動區建智慧停車場。現時的停車位規劃是 1 500 多個，查詢如將來有機會作智慧停車場，是否能提高這些停車位的數目，因為以他的理解，智慧停車場的停車位數目應該比傳統停車位數目多；(ii)詢問部門的規劃評估，如對於路口的改善、交通改善等，是按現時的行動區，還是會檢視整個觀塘區作評估。他認為此計劃約需時十年才會完成，但這十年內觀塘的發展不會停止，會帶來不少人流，如果每次都只是評估個別項目內的地方，累積起來便會出現交通問題，舉例行動區附近的啟德跑道正大興土木，將帶來不少人流量，他詢問部門會否一併計算這些人流量。

11.4 譚肇卓議員(i)不同意將地段 3 交予發展商或商業機構處理，認為政府會難以監管；若然著重香港文化產業的發展，應交由政府部門處理，才能提供一個更好的場地予文化工作者使用；(ii)指出不少議員都已經歷幾屆區議會，見證區內單軌列車未能落實，以及擬興建天橋遲遲未能落成，故希望本次建議發展大綱圖上能作出更改。他指出若部門不與發展商商討興建天橋的事宜，而無法提供天橋接駁的話，議員很難與市民交代，並會對此規劃持保留意見。

11.5 潘任惠珍議員表示已服務德福花園四十年，在這四十年間見證整個九龍灣的發展，從交通開始改變、人流開始多的時候已經在討論政府的長遠規劃，但政府已「走數」十多年，而「起動九龍東」規劃於 2012 年展開，但在種種固定框架下他們亦無計可施，只能作小修小補，例如 Megabox 往德福的天橋便沒有下文；單軌列車已商議好各個站的走線，結果還是未能落實。香港標誌性的啟德遊輪碼頭現況讓大家清楚預視無法解決交通問題時的後果。她補充若相關改善措施未能落實，她會反對計劃。

12. 起動九龍東副專員的回應如下：

12.1 關於「智慧城市」：現時「起動九龍東」政策涵蓋新蒲崗，其中一個項目是以「一地多用」形式重置四美街運動場，並在地下空間提供智能泊車系統，而該項目更是香港首個垂直升降的泊車系統，現正進行標書技術評估。至於應否將此系統應用在九龍灣行動區上，處方表示需參考運輸署和其他部門的意見及智能泊車系統試點的成效。若有需要在現時行動區的 1 500 多個車位以上提供更多車位，而智能泊車系統試點評估為正面，行動區是有條件增加車位的。

12.2 關於車輛充電的問題：正如剛才顧問公司提到一定會要求發展商提供充電配套，將來行動區的發展一定有能力滿足車輛充電的需求。公共交通交匯處的充電裝置是供公共交通車輛使用，而停車場內則會有其他供私人車輛充電的裝置。

12.3 關於公共交通交匯處：部門表示交匯處會提供小巴及公共巴士服務。除了現有的路線外，運輸署會因應情況調整班次及增加路線以配合市民所需。運輸署已加緊籌備不同的路線，當有更詳盡資料時會再向區議會解說。

12.4 關於路面評估的問題：處方表示並非只會評估單一項目，當進行每一個新項目都會檢視現有的評估，再顧及新要求的情況。

13. 顧問公司代表補充他們所進行的交通評估並不局限於行動區的範圍內，而是涵蓋了啟德及觀塘區，顧問公司亦參考規劃署的未來人口及就業數據去作整體評估。顧問研究指出，在作出評估後，預計在 2031 年部分路口會出現擠塞情況，故提出一系列的交通改善措施。這些措施不是只在行動區內，而是會沿著宏照道、海濱道作出改善措施以應付將來的交通需求。

14. 起動九龍東副專員的補充如下：

14.1 關於行人天橋系統的規劃及實行：橫跨偉業街的行人天橋正進行詳細設計，預計能在行動區發展完工前建成。此外，處方亦計劃在行動區完成前，先完成連接常怡道的天橋系統；並持續與附近的發展商商討如何加強聯繫，以完善行人連接系統。

14.2 關於文化藝術創意地段的管理問題：處方表示該地段分為行人專

用區及天橋下方。部門會要求將來的發展商按私人發展項目公共空間守則進行管理。政府亦不會因此而忽視監管的責任，正如剛才所說，部門會就文化藝術創意空間不同的管理模式再作考慮。然而，由於該地段接連周邊的商業項目，處方希望擬議的文化藝術創意空間能與周邊的商業發展形成協同效應，從而提升行動區的吸引力和活力。

15. 主席表示議員對整個發展項目有保留，因為除了交通、泊車、智慧城市安排，以致休憩空間的管理，大家都提出了不少意見，而這些意見正是觀塘區長期以來對於「起動九龍東」計劃的關注點。區議會是一個重要的諮詢架構，主席期望相關部門能針對這些問題作整理，並回應議員的意見。

議項 IV－重建九龍灣業安工廠大廈作公營房屋發展計劃
(觀塘區議會文件第 28/2021 號)

16. 主席歡迎房屋署高級房屋事務經理(東九龍二)李淑芬女士出席會議。

17. 房屋署高級建築師(14)及房屋署建築師(T302)介紹文件（包括宏開道及宏茂街的擬建道路工程）及進行匯報。

18.就有關議項，議員提出的意見及查詢如下：

18.1 潘任惠珍議員問及於 2023 年展開將提供約 2 200 個單位的發展項目之確切入伙時間表。當提及規劃上的問題，她表示議員們均擔憂相關交通安排。該公營屋邨鄰近德福花園及其士商業中心附近之天橋，她相信 6 000 多名新住戶會為德福廣場帶來不少商機，惟同時也可能為附近住戶帶來災難性的影響。她冀望房屋署能作詳細的規劃，包括日常生活上的配套設施，並就四座大廈的樓層數目作回覆。

18.2 呂東孫副主席認為現時業安工廠大廈仍有很多租戶，根據運輸及房屋局的報告所指，大廈的出租率高於九成。他表示這些租戶經營多年，希望相關部門能恰當處理有關賠償及安置方面的安排。另外，於計劃實施後將有近 6 000 名居民入住，惟他認為周邊缺乏生活及商業上的配套設施。他指出署方要考量交通安排及生活設施配套等事宜，使居民安居樂業。

18.3 林瑋議員表示能目睹公營房屋的落實該是件值得高興的事情，惟他關注以下事宜：(i)大廈本身的商戶的安置問題；(ii)有關行動區及公營房屋的發展，他詢問是次公營房屋發展計劃中，署方預計提供的車位數量；(iii)他問及運輸署是否曾提交詳細的數據，確定該地段的交通能應付新住戶的需求，並指出 6 000 名居民是為數不少的數字；及(iv)他認為在發展公營房屋時，房屋署須「落地」作考量，並將評估放眼未來，而非只著眼於現況。他指出署方可於不同方面增設配套，惟部門卻選擇原地踏步。他強調計劃必須以方便及使附近居民生活舒適為主，否則此決策只會對居民造成長遠的痛苦。他提及觀塘區內山上新發展的區域就是反面例子。

18.4 譚肇卓議員同意署方須優先處理有關安置的事宜。他也表示公屋住戶中三人家庭的最高入息限額為 24,410 元，詢問署方以此收入，居民能於附近哪處買菜。他認為該區包括德福等地方為中央商務區，附近大量優質設施配套林立，憂心基層市民將要如何處理日常生活的問題。他指出署方須考量居民收入與附近配套檔次是否相符，並於設計、配套及交通的層面上多加考慮，包括居民入住後有否足夠基層配套等。

18.5 顏汶羽議員提及發展項目位於九龍灣商貿區與港鐵站之間的重要位置。他冀望社會福利署（下稱「社署」）就將於該處設立的社會福利設施配套作回覆。另外，他提及觀塘區幼兒照顧服務的需求相當緊張，尤其是觀塘西的服務嚴重不足。他了解部門已於宏照道的發展計劃中預留社會福利設施去興建幼兒中心，惟他也冀望能於此項目中增設相關的服務，以紓緩每日來往九龍灣商貿區的在職家庭之需要，使他們的小朋友能暫時託管於社會福利設施內。

18.6 蘇冠聰議員明白署方要透過文件完成諮詢。他提及交通與人口的問題：(i)他預計項目落成後每天會額外有近千人要經集體運輸或附近的交通工具於繁忙時段進出。他指現時經天橋前往商貿區上班的人數已非常多，但署方反而安排新住戶作「逆流」出入；(ii)他相信在不影響交通的情況下，區議會絕對歡迎是次計劃，並指出區議會能做的會儘量做。他表示觀塘區已「插針」式興建不少樓宇。惟此項目直至現階段為止，議員們發現了不少問題，並向部門反映，奈何署方卻選擇一意孤行；(iii)他表示已通過上次之會議記錄要求撤回此設計及清拆業安工廠大廈的決定。他重申如果計劃是具有協助性質或確保住戶能尊嚴地居住的情況下，區議會不會反對有關項目。無奈署方在此規劃中，並沒妥善規劃新增的人口如何通達至集體運

輸處；(iv)他以牛頭角街市為例，指出於新樓宇落成後該街市應處於翻新及重建階段，他詢問署方居民應於何處買菜。他表示署方在進行房屋發展規劃時，應考量如何能「自給自足」。他認為每個屋邨至少也需要一個濕貨街市，使基層居民也能購買食物和日常用品；及(v)他重申在處理現有業戶的安排時，部門現時仍沒有一個妥善的解決方法。如署方堅持半步不讓，就算項目能於此會議獲得通過，他對於房屋署能否具體實施計劃一事存疑。他要求主席將區議會的訊息明確地告知部門。

19. 房屋署高級建築師(14)回應如下：

19.1 業安工業大廈的重建計劃：重建計劃當中包括改劃、清拆、打樁及上蓋工程等，預計將於 2031 年或之前完成。四幢樓宇的高度均不會高於主水平基準 120 米，而落成後的住宅部分將有 33 層的高度。署方會繼續深化有關設計，或會再作調整。

19.2 有關車位的事宜：房委會是根據《香港規劃標準與準則》的泊車設施比例提供所需的車位數量。按照初步估計，項目將提供約 200 個車位。

19.3 關於配套方面的查詢：房委會是根據《香港規劃標準與準則》，在規劃公營房屋項目時，會視乎項目的規模及附近設施的供應，並諮詢相關部門，再釐訂合適的配套安排。

19.4 濕貨街市的詢問：區內有不同類型的街市，例如牛頭角街市、啟業市場及樂華街市等。根據房委會的可行性研究評估，並沒有計劃於此項目提供商業或零售設施。署方會參考公營房屋之規模、人口及鄰近現有的配套設施，再決定是否需要增設街市或其他相關店舖。

19.5 幼兒照顧服務方面：房委會在規劃公營房屋時，會根據現行機制，諮詢相關部門／機構及持份者的意見，在項目內提供合適的社會福利設施。現初步建議提供六種不同的社會福利設施。房委會會適時與相關部門聯絡，就增設社會福利配套的安排作出商討。

20. 房屋署高級土木工程師(3)表示房委會已就業安工業大廈重建計劃進行了交通影響評估，同時亦已考慮周邊的發展項目及其所建議之道路改善工程，當中包括九龍灣行動區發展、中九龍幹線等工程。評估報告顯示，當相關道路改善工程完成後，預計擬建公營房屋發展不會為附近交通帶來不良

影響。另外，行人連接設施方面，評估亦考慮了九龍灣行動區發展所建議的行人改善設施，包括近兆業街橫跨偉業街的行人天橋。預計該改善設施完成後，足夠應付擬建公營房屋的發展。

21. 房屋署高級房屋事務經理(東九龍二)就房委會提供予受影響租戶/暫准證持有人的清空方面回應如下：

21.1 部門將會向受影響之租戶/暫准證持有人提供特惠津貼，包括 15 個月的租金或暫准費(不包括差餉)的特惠津貼。受影響之租戶/暫准證持有人也可申請提前發放 70%的特惠津貼，以便他們用於提早規劃或搬遷等的支出。

21.2 房屋署也安排有意繼續租用工廠的租戶/暫准證持有人以投標方式租用晉昇工廠大廈或開泰工廠大廈繼續經營。若果租戶/暫准證持有人最終沒有投標或未能中標，房屋署將會以一個標準單位(每 25 平方米)可獲 25,400 元發放一筆過款項。此外，如租戶/暫准證持有人不打算租用晉昇工廠大廈或開泰工廠大廈，並能於 2022 年 2 月底或之前遷出並交還單位，署方會經「早鳥優惠」的津貼計劃，向每戶額外發放一筆為數 100,000 元的款項。

21.3 她表示有關的清空方案下發放的特惠津貼安排，是希望能提供協助予受影響之廠戶，並幫助他們計劃或安排搬遷時所需之費用。

22. 社會福利署觀塘區福利專員表示針對幼兒中心服務之規劃，署方是根據每 2 萬 5 千新增人口裡有 100 個幼兒中心服務名額作標準。

23. 主席認為就此議項，議員仍有不少意見，因此開放第二輪討論如下：

23.1 張培剛議員認為署方須尊重觀塘區議會之意見，並指署方提供之數據並沒有實際的參考價值，甚至存在誤導成分。他預計如只依賴署方所提供之數字，入住後的問題將會是慘不忍睹。房屋署表示項目將提供共 200 個車位，他欲了解更準確的數據，並提及以下之參考數字：(i)安泰邨現時共有 8 000 個住宅單位，而貨車、私家車及電單車的所有車位數目僅有約 300 個，私家車佔了當中的 200 個；(ii)他以安泰邨有 8 000 個單位卻只有約 300 個車位為例質疑署方，此項目總共提供 2 200 個單位卻竟能提供 200 個車位；及(iii)秀茂坪邨剛新建的秀潤樓有 200 個住宅單位，惟其所提供之車位數量卻是屈指可數。因此他不理解署方是如何按照《香港規劃標

準與準則》去計算出不同單位與車位之間的比例。另外，他也關注有關街市的問題，並質疑居民如何跟從部門的建議，由項目位處地點乘搭交通工具至樂華街市。

23.2 簡銘東議員強調署方是因不熟悉區情才需諮詢區議會，議會的存在價值就是讓議員們補充部門的知識盲點。他認為：(i)部門不應只紙上談兵，並要求房屋署親自嘗試由業安工廠大廈步行至樂華街市、啟業市場及牛頭角街市；(ii)他強調部門須考慮從市民的生活角度出發及探討其於入住後的情況，並且在區議會給予相關意見後再去商討合適之解決辦法。住宅鄰近商貿區或工業區的例子並非鳳毛麟角，柴灣等地也有同類的情況。惟他表示九龍灣行動區不包括德福花園等私人樓宇在內，卻只有重建業安後的一幢住宅大廈。因此，他認為部門須充分考慮市民日後如何在此地生活；及(iii)他強調部門須優先處理衣、食、住、行等方面之事宜。

23.3 林瑋議員查詢以下事項：(i)他詢問有關車位的準則規劃是否有所修改，如屬實，能否於安達臣，包括安泰及安達等地增設相應的車位數量；(ii)他也關注街市事宜。他認為署方未必了解區內的情況，惟他指出興建公屋並非是一個嶄新的規劃，房屋署是否曾就此提出意見。他對於部門建議居民前往啟業市場及樂華街市買菜感到匪夷所思，認為署方須設身處地作思考，避免將好事變成市民怨聲載道之話題；及(iii)他重申興建公屋並非是一年半載的規劃，但署方就配套設施的回應卻甚為「離地」。他同時提到安達臣區的車位及交通等問題。

23.4 譚肇卓議員提議：(i)邀請房屋署代表作實地考察，研究由業安工廠大廈步行至樂華街市需時多久，並邀請傳媒陪同，由市民大眾判斷建議居民往樂華街市買菜的合理性；(ii)他認為房屋署的回應與起動九龍東部門的回應自相矛盾，前者表示發展將不會影響附近之交通，惟後者卻預估 2031 年將有交通擠塞的問題。他希望顧問公司回應此項目是否如房屋署所言不會影響整體的交通情況，兩者的回應有矛盾使他感到困惑；(iii)他冀望房屋署能回應並接納有關建議，並表示對於部門回應步行至樂華街市買菜之建議感到始料不及。如署方將落實有關計劃，他倡議加設較基層的商戶。他重申希望房屋署以較「貼地」的手法去處理 6 000 名新住戶的生活問題。

23.5 龐智笙議員指出：(i)由九龍灣行動區至業安工業大廈的兩個討論

議項，各政府部門各自為政的情況是顯而易見；(ii)當區彌足珍貴的道路用地確是「買少見少」，對於政府未來要將業安工業大廈重建作公屋的規劃，他認為部門應好好利用該地盤去疏導區內的交通、車場及行人天橋等接駁問題。他也表示該地盤於未來的發展中可擔任中心樞紐的角色；(iii)據他消化文件內容所得，行動區的接駁規劃與業安重建計劃並無直接關係。業安規劃只是單純提供社區設施及停車場的設備，惟沒有提及居民進出的詳情。他重申議員十分關注在增加 6 000 名新住戶後，九龍灣上下班時段的人流擠迫問題。他詢問顧問公司在參考了此項目的數據後，能否確認在交通流量規劃方面的數字並無計算錯誤；及(iv)針對業安的重建工程，他認為部門須作周全的考慮，利用低層位置設立交通交匯處去解決交通問題。他認為區內現時的交通未必能負荷未來周邊的發展。他認為文件未能詳盡交代政府在此方面的規劃，並希望部門再作回應。

24. 房屋署高級規劃師(9)就車位及街市事宜作補充回應如下：

24.1 關於車位方面：是次項目的可行性研究已採用了《香港規劃標準與準則》內最新的泊車比例，如私家車的車位是以約 1：9 的比例提供。是次項目的私家車車位約有 220 個，其他車位如每幢大廈也額外增加了 5 個訪客車位。因此，相比以往落成的屋邨如安達及安泰邨，車位的比例已有所提升。

24.2 街市及其他零售設施：在規劃項目時，房委會已考慮項目的規模、人口及附近有否相關的零售設施，包括街市及商場等因素，並會就財政上的可行性及零售設施的適切性作考量。此項目初步計劃，現時並沒有考慮提供商業及零售設施，包括街市。居民如需購置日常生活的基本所需品，可考慮附近德福廣場或 Megabox 商場內的超市。另外，市民亦可經天橋及商場步行至牛頭角街市購物，因此，預期現有配套設施將能滿足將來居民的基本需要。

25. 房屋署高級土木工程師(3)就交通事宜作補充回應如下：

25.1 房委會在進行交通影響評估時，已考慮周邊的發展項目及其所建議的道路改善工程。評估顯示，當相關的道路改善工程完成後，預計擬建公營房屋發展不會為附近交通帶來不良影響。

25.2 交通影響評估報告亦顯示，附近的交通配套除了九龍灣地鐵站外，

鄰近宏照道亦有相應的巴士路線前往港島區及荃灣等地，應付居民出行需要。

26. 房屋署高級房屋事務經理(東九龍二)回應主席有關賠償方面的提問，表示直至此刻並無新的進展，有關資料已在剛才匯報。

27. 主席表示觀塘區內的市民及在席議員高度關注是次的發展項目，並作總結如下：

27.1 對於項目落成後的社區設施配套及福利設施的安排，議員也提供了不同的意見。如建議房屋署於樓宇的低層增設基層商店去解決市民之基本需要。另外，部門也應該重新評估是否需設立合適的社會福利設施，包括課餘託管等服務；

27.2 關於泊車位的情況，署方也應根據最新的《香港規劃標準與準則》作安排；

27.3 關於交通網絡配套的事宜，冀望新興建的四幢住宅樓宇不會加重現時區內的交通負荷；

27.4 現時大廈內租戶安置及賠償的問題；

27.5 他希望在席部門就以上四點再作跟進；及

27.6 他認為署方應作較「貼地」之研究，並重申部門回應有關街市購物的查詢並不理想，同時建議署方應先試驗及體驗後再來區議會作交代。否則，部門將給予人政府不能掌握市民意願之觀感。

28. 蘇冠聰議員希望部門重新修正文件後，在下次會議上再次遞交項目後作新一輪諮詢。否則如通過此文件，部門或會認為區議會支持是次項目，並落入萬劫不復之地。

29. 主席表示應根據議事規程備悉有關文件，惟他也認為各位議員之意見也提供重要的方向。因此他建議署方就其意見作出回覆。如有必要，區議會或會邀請部門出席區議會屬下的事務委員會再作深入的討論。他冀望署方繼續與議員交流，並期待部門作出相應的跟進。

議項 V－《牛頭角及九龍灣分區計劃大綱核准圖編號 S/K13/30》擬議修訂項目

(觀塘區議會文件第 29/2021 號)

30. 規劃署署理九龍規劃專員及規劃署署理高級城市規劃師/九龍 4 介紹文件。

31. 就有關議項，議員及主席提出的意見及查詢如下：

31.1 張培剛議員查詢地段 2 的垃圾轉運站搬遷後的新位置。

31.2 顏汶羽議員要求文件中 3.4 項，地段 3（建議改劃為「商業(2)」地帶）繼續保留作「政府、機構及社區」用途，令有關休憩用地可由政府管理及興建。

31.3 譚肇卓議員表示希望秘書處或議會歸納各同事就前幾個議程的意見並交予城市規劃委員會（下稱「城規會」），例如天橋接駁、改劃後購物設施配套問題及地段 3 的問題等。

31.4 蘇冠聰議員贊成譚肇卓議員的意見，因早前討論了很多與這項規劃有關的事宜，若現時通過規劃，或在區議會上有任何意向，或會影響部門修正計劃的意欲。他指出若城規會及區議會均同意這項修訂，便不會再修正，故議會應備悉建議，而非贊成建議。他認為可要求有關房屋發展規劃提供街市，令房屋署了解有關需要。

31.5 呂東孫副主席表示早前的兩個議題都有充分的討論，委員表達了很多意見。他表示同意譚肇卓議員意見，歸納前兩個議題的意見。

32. 規劃署署理九龍規劃專員回應查詢如下：

32.1 垃圾轉運站：有關設施已拆卸並遷到小蠔灣。

32.2 地段 3 規劃：剛才起動九龍東辦事處的同事已解釋，雖然地段會交由私人發展商建設及營運，但政府會通過一些協議，向將來的發展商作出監管。同時建議在大綱圖的《註釋》上列明必須在地段 3 位置提供不少於 8 400 平方米的公眾休憩用地，相關要求具有法定效力。

33. 主席表示很多議員關心發展局如何就公共空間的管理做到監管的角色。五年前，地區已非常關心有關現時起動九龍東的場地管理監管及將來的安排。他詢問發展局將來監督相關團體營運公共空間的具體措施，包括若相關團體作出一些不合規的安排會怎樣處理等。

34. 起動九龍東副專員回應指管理私人發展的公共休憩空間或行人路方面，政府現時有一套有效的機制管理私人發展的公共休憩空間。發展商需按照《私人發展公眾休憩空間設計及管理指引》管理公共休憩空間，例如一些可以讓市民停留的空間，發展商必需讓大眾可以自由進入及方便到達，亦可在該處舉辦非商業及慈善活動，並需要在不阻礙大眾使用及通過該空間的情況下，讓發展商或其他非牟利機構使用。另外，處方先前提到的管理協議，將建議為一個有法律效力的協議，以規管負責管理該空間的承辦團體。在最壞的情況下，若團體違反協議，政府可收回該地方。處方期望透過持續的監察及協調，可以讓市民能有效地享用該公共空間，以滿足大眾的不同需要。

35. 譚肇卓議員表示部門不應過濾剛才他與顏汶羽議員對地段 3 的意見。

36. 規劃署署理九龍規劃專員回應指理解委員對地段 3 公眾休憩空間營運及管理的關注，會與起動九龍東辦事處商討，是否能在協議上儘量讓政府監管的程度更緊密，以釋除大家的疑慮。

37. 譚肇卓議員表示希望他與顏汶羽議員的意見可以向城規會反映。

38. 規劃署署理九龍規劃專員回應指會向城規會反映議員的意見及相關部門的回應。

39. 顏汶羽議員表示他並非關心政府部門該如何監管私人發展商管理地段 3 及相關協議的法律效力。他清楚表達反對修訂，地段 3 應繼續保留作為「政府、機構及社區」用途，由政府興建、管理及營運這個休憩用地。

40. 主席表示委員表達了不同的關注，區議會是一個諮詢組織，就區內市民及議員關心的項目向政府提出意見。而議項 III 至 V 互有關連，在席的發展局、房屋署及規劃署的同事都一直在席上聽取大家的意見。他希望起動九龍東副專員於會後透過秘書處提供《私人發展公眾休憩空間設計及管理指引》的資料，讓大家更掌握指引的安排。

41. 起動九龍東副專員表示可以提供資料。

(會後備註：秘書處已於 9 月 23 日向議員傳閱，由起動九龍東辦事處提供的《私人發展公眾休憩空間設計及管理指引》。)

42. 主席表示就今天的三個議項，除會議記錄轉發予城規會外，亦會綜合大家的意見，以區議會的名義發信予城規會，表達對議項 III 至 V 的意見。希望在席的政府部門就同事所關注的項目，將資料反映予相關政策局或部門。

(會後備註：秘書處已於 10 月 6 日發出有關信件。)

議項 VI－觀塘區 2021/22 年度核心部門工作計劃半年度進度報告
(觀塘區議會文件第 30/2021 號)

附件一：土木工程拓展署

43. 土木工程拓展署總工程師/東 2 介紹文件。

44. 就有關議項，議員提出的意見及查詢如下：

44.1 呂東孫副主席表示就將藍隧道進行的爆破工程，收到很多茶果嶺村居民反映對其生活影響非常大。有一單位天花石屎剝落，屋主因此弄傷了腿。另一個案則有磚塊從牆身剝落。居民認為可能與爆破工程產生的震盪有關。他希望署方與承辦商能密切溝通，加強監管施工程序，減低工程的聲浪及震盪。

(會後備註：由於將藍隧道的爆破工作已於早前完成，居民所指的爆破工程可能與 T2 隧道有關，已向該工程團隊反映跟進。)

44.2 張培剛議員關心區內的連接設施。早前區議員參觀曉光街至曉明街山坡的扶手電梯。雖然扶手電梯得到居民讚賞，但電梯某些位置很快已經開始損壞。他要求署方認真監察電梯質量，特別是位於露天位置的扶手電梯，以免日後要經常維修。

45. 土木工程拓展署總工程師/東 2 感謝議員的意見，並作綜合回覆如下：

45.1 關於將藍隧道爆破工程：署方會依照規章進行，住戶如果發現家居懷疑因為爆破工程而受到影響，可與署方的社區聯絡小組聯絡。署方會派員到受影響的單位勘察。如確認問題存在，署方會正面處

觀 塘 區 議 會
九龍觀塘觀塘道 392 號創紀之城 6 期 20 樓 05-07 室
觀塘民政事務處
傳真：2174 6765
2152 2015

KWUN TONG DISTRICT COUNCIL
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392 Kwun Tong Road,
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Fax: 2174 6765
2152 2015

檔　　號 Our Ref. HAD KTDC 13/25/1 Pt.5
來函檔號 Your Ref.

致： 香港渣華道 333 號
北角政府合署 15 樓
城市規劃委員會秘書處

敬啟者：

有關九龍灣行動區發展計劃及業安工廠大廈重建計劃的意見

有關九龍灣行動區的發展計劃及業安工廠大廈重建計劃，發展局的起動九龍東辦事處、房屋署及規劃署分別向觀塘區議會遞交文件，及後出席 2021 年 9 月 9 日的觀塘區議會第十三次全會會議，向議員介紹上述計劃的最新規劃及發展。就有關議題，議員於會議上提出的意見如下：

(i) 九龍灣商貿區的道路交通本已非常擠塞，議員憂慮如在九龍灣行動區一帶發展大型商業項目，以及重建業安工廠大廈作公營房屋發展後，將大幅增加該區域的行人和交通流量，致使交通擠塞的問題更趨嚴重。

(ii) 現時來往九龍灣商貿區及九龍灣地鐵站的人流龐大，以致連接兩個地點的行人通道十分擁擠，途經的德福廣場也經常出現人流過多的情況，影響了該處居民的生活。如果推展上述兩項發展計劃，將進一步增加來往九龍灣商貿區及九龍灣地鐵站的人流，以致該處人流過多的情況更為惡化。

(iii) 議員關注九龍灣行動區內建議的多條行人天橋和通道的落成時間，當中部份行人天橋計劃由私人發展商興建和管理，致使相關工程增加不確定性。議員憂慮如該等連接行人的設施未能如期落成，將為該區大幅增加的居住和工作人口帶來不便。

(iv) 根據九龍灣行動區的發展計劃，如將地段 3 及 4 更改為商業用途，當中地段 3 中部份土地將劃作為藝術、文化及創意產業用途，並由私人發展商管理。議員憂慮私人發展商或其他非政府機構，未能妥善管理該地點作藝術、文化及創意產業用途，認

為由政府部門管理作相關用途更為合適。有部份議員更因此反對將地段 3 改劃為商業用途。

(v) 議員關注九龍灣行動區內的綠色交通樞紐，會否提供充電設施，供巴士及小巴以外的車輛使用。此外，議員也關注九龍灣行動區內會否提供智能停車場及智能燈柱，以及其他環保設施。

(vi) 議員建議九龍灣行動區內應設有可供大型車輛如貨車或旅遊車夜間停泊的停車場或停車位，以改善當區車輛違泊的情況。

(vii) 議員認為如政府落實重建業安工廠大廈以興建公營房屋，須妥善安排該工廠大廈現有租戶的賠償問題。此外，議員也要求相關部門詳細規劃該處的生活和社福等設施以及交通配套，以滿足將來遷至該處的居民的基本生活需要。

(viii) 議員關注九龍灣行動區內應增加能夠提供托兒服務的社福設施，為在該區居住和工作的人口提供相關服務。

如有查詢，請致電 2171 7443 與觀塘區議會秘書周立根先生聯絡。

觀塘區議會秘書 周立根

2021 年 10 月 6 日

副本送：

起動九龍東專員 張綺薇女士, JP
(傳真號碼：3904 1161)
規劃署署理九龍規劃專員 馮志慧女士
(傳真號碼：2894 9502)
房屋署高級建築師(14) 黃宏鼎先生
(傳真號碼：2129 3488)

規劃署

香港北角渣華道三百三十三號
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Planning Department

North Point Government Offices
333 Java Road, North Point,
Hong Kong

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電話號碼	Tel. No. :	2231 4964
傳真機號碼	Fax No. :	2894 9502

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九龍觀塘道392號
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觀塘區議會秘書
周立根先生

周先生：

有關九龍灣行動區發展計劃及業安工廠大廈重建計劃的意見

謝謝觀塘區議會於2021年9月9日在會議上表達對題述事宜的意見。閣下於2021年10月6日致城市規劃委員會（城規會）秘書處的來函已轉交至本處作跟進。就上述信件中所提及就九龍灣行動區發展計劃及業安工廠大廈重建計劃的意見及關注，經諮詢發展局起動九龍東辦事處及房屋署後，現謹綜合回覆如下：

（一）九龍灣行動區發展計劃

道路交通

九龍灣行動區（行動區）研究進行了詳細交通影響評估。在行動區研究建議的交通改善措施完成後，行動區發展所帶來的交通流量不會對當區的道路網絡及交通情況造成不可接受的負面影響。行動區研究建議在六個區內路口（包括海濱道/順業街、祥業街/海濱道、常怡道及宏照道、常悅道/宏照道、宏照道/臨興街及宏照道/啟翔道）進行包括修改交通燈號控制及擴闊路面等的改善工程。

起動九龍東辦事處已分別委託土木工程拓展署及路政署落實行動區研究建議的道路改善工程，並會爭取在行動區內商業發展完成前完成相關的改善工程。土木工程拓展署及路政署在落實

相關改善工程時將會提出臨時交通措施，以減低工程對交通造成的影響，工程期間會盡量維持現有交通車流。

行人連接

為加強九龍灣行動區與九龍灣鐵路站的行人聯繫，行動區研究建議行動區將來的發展商須提供新的行人天橋橫跨常怡道，以連接九龍灣現有及擬議行人網絡（包括現有橫跨偉業街的兩條行人天橋，以及擬議沿常怡道及偉業街附有自動行人輸送帶的行人天橋）。將來公眾可由擬議的常怡道行人天橋經橫跨偉業街的新行人天橋到達德福廣場及九龍灣港鐵站。此外，為改善九龍灣行動區與海濱的行人聯繫，行動區研究建議在行動區南面的美化市容地帶興建行人天橋，通過啟德新急症醫院平台，以連接海濱一帶。立法會財務委員會已在今年七月就該行人天橋批出撥款，土木工程拓展署預計將於今年十二月開展工程。

就行人天橋落實方面的關注，將來的發展商須按地契條款要求興建已規劃的行人天橋，相關部門可在地契條款上訂明行人天橋的落成時間。

啟福道天橋下（即地段3）的藝術、文化及創意空間

起動九龍東辦事處理解公眾對啟福道天橋底擬議的文化、藝術及創意空間管理方面的關注，會對不同的管理模式再作考慮。

至於行動區研究所建議由發展商興建及管理的模式，本意是推動附近的商業發展與天橋底的藝術創意活動產生協同效應，在九龍灣行動區內建立朝氣蓬勃和多元化的公共空間。發展商須按照發展局公佈的《私人發展公眾休憩空間設計及管理指引》管理發展項目內的公共空間（包括最多400平方米的藝術、文化及創意室內空間），政府同時可與發展商訂下協議，規定發展商依照當局要求做好管理角色。

充電設施及泊車位

地段2擬議的綠色交通樞紐（即公共交通交滙處）將提供充電設備給巴士及小巴使用。而行動區內發展的附屬停車場亦需要提供足夠的充電設備及基建設施以滿足公眾對電動車輛充電的需

求，相關充電設備的詳細要求將會在擬備地契條款階段釐定。

就智慧泊車系統方面，發展商在附屬停車場提供自動泊車系統應是可行的，但當局不建議強制規定。此外，行動區研究已預留充足的泊車位置予大型貨車，晚上亦會開放部分上落貨車位作泊車用途，以紓緩當區違例泊車的情況。

社福設施

九龍灣行動區主要建議作商業/辦公室用途。儘管行動區研究沒有為政府、機構或社區用途預留空間，但已在規劃上留有彈性，於行動區的擬議商業用途地帶作政府、機構或社區用途，在分區計劃大綱圖上屬於經常准許用途。起動九龍東辦事處就收到的公眾意見，會進一步在地契條款擬備階段考慮在行動區內提供包括托兒服務等社福設施的可行性。

（二）業安工廠大廈重建計劃

道路交通

香港房屋委員會（房委會）已就重建九龍灣業安工廠大廈作公營房屋發展計劃進行交通影響評估。根據評估結果，並考慮了周邊其他的發展項目（如九龍灣行動區等）及其建議的道路改善工程，預計建議的道路工程完成後，擬建公營房屋發展計劃將不會對鄰近道路帶來不可接受的交通影響。此外，房委會會於工程期間實施臨時交通安排，亦會對工程車輛實施適當的管制措施，以減低對鄰近道路交通的影響。

行人連接

上述交通影響評估預計九龍灣行動區發展計劃所建議的行人改善設施，包括近兆業街橫跨偉業街的行人天橋完成後，附近的行人連接設施足夠應付擬建的公營房屋發展。

為受影響的租戶提供的一系列安排

行政長官在《2019年施政報告》中邀請房委會研究重建轄下的工廠大廈作公營房屋用途，房委會已完成有關研究，並通過重

建四個工廠大廈，當中包括九龍灣的業安工廠大廈，以發展公營房屋。房委會轄下工廠大廈以商業原則營運，租戶以三年定期租約形式租用。根據租約，房委會有權在給予租戶三個月通知後終止租約，而租戶在法律上或合約上並無權獲得遷置或任何形式的補償。但房委會的既定做法是會提早通知受重建／清拆計劃影響的租戶，讓他們早作計劃，並提供特惠津貼等，以協助他們搬遷。在參考以往的做法和當前情況後，房委會已通過及公布向受重建計劃影響的租戶提供一系列安排。

除給予受影響租戶18個月通知期，讓他們於2022年11月30日或以前遷出單位外，房委會亦向受影響租戶發放特惠津貼，金額為15個月的租金或暫准證費，並按公布清拆計劃當日（即2021年5月24日）於有關租約或暫准證內訂明的租金或暫准證費計算。

有意繼續經營的受影響租戶可選擇參與局限性投標，優先競投房委會餘下兩個工廠大廈，即晉昇工廠大廈及開泰工廠大廈的空置單位，並享有三個月免租期。選擇不租用或未能成功租用房委會餘下兩個工廠大廈單位的受影響租戶可獲發放一筆過款項，金額以每個25平方米的標準單位25,400元計算。

考慮到同時清拆四個工廠大廈會有較多租戶受影響，而房委會餘下兩個工廠大廈的空置單位供應有限，房委會在是次清拆計劃中亦首次作出特別安排，為租戶提供「早鳥優惠」。不租用房委會餘下兩個工廠大廈單位，並提早在公布清拆計劃當日起計九個月內（即2022年2月底或以前）遷出及交還單位的受影響租戶，會獲得額外發放一筆100,000元的「早鳥優惠」，以鼓勵他們及早在私人市場物色合適的地方或作出其他計劃。

房委會相信有關安排可為受影響租戶提供一定的協助，並會繼續與受影響租戶保持緊密聯繫，適時回應他們的查詢和關注事項。

<u>擬建公營房屋的配套設施</u>

就重建後公營房屋居民的生活方面，房委會在規劃新建公營房屋發展項目時，會考慮擬建項目的規模、鄰近商場及零售設施的供應等因素、並會衡量有關設施在營運和財政上的可行性及適切性等。房委會須平衡居民對不同設施的需要，包括零售、停車

場和福利設施等。項目現時毗鄰有各式各樣的零售及餐飲設施，可以照顧居民的日常基本需要。經考慮到區議會的意見後，房委會會於詳細設計階段研究於項目內提供適量的零售設施。

社福設施方面，房委會在規劃新的公營房屋項目時，會根據現行機制，並諮詢相關部門／機構及其他持份者包括區議會的意見，在項目內提供合適的社會福利設施。初步建議提供的社會福利設施包括長者鄰舍中心分處、安老院舍暨長者日間護理單位、體弱長者家居照顧服務隊、到校學前康復服務隊、弱智人士輔助宿舍及精神病康復者輔助宿舍。房委會會適時與不同相關部門聯絡就增設社會福利配套的安排作出商討。

交通配套方面，交通影響評估結果顯示，發展項目附近現時已有足夠公共運輸設施，包括位於宏照道沿途的巴士站、九龍灣港鐵站。此外，位於九龍灣行動區內的擬議公共交通交滙處，亦可照顧居民的交通出行需要。

感謝區議會提出的寶貴意見及關注。同時，閣下來函將會夾附於有關《牛頭角及九龍灣分區計劃大綱核准圖編號S/K13/30》擬議修訂項目的城規會文件，相關意見連同其他公眾意見將會交由城規會都會規劃小組委員會一併考慮。

規劃署
署理九龍規劃專員

（陳偉霖先生 代行）

2021 年 11 月 5 日

副本送：

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