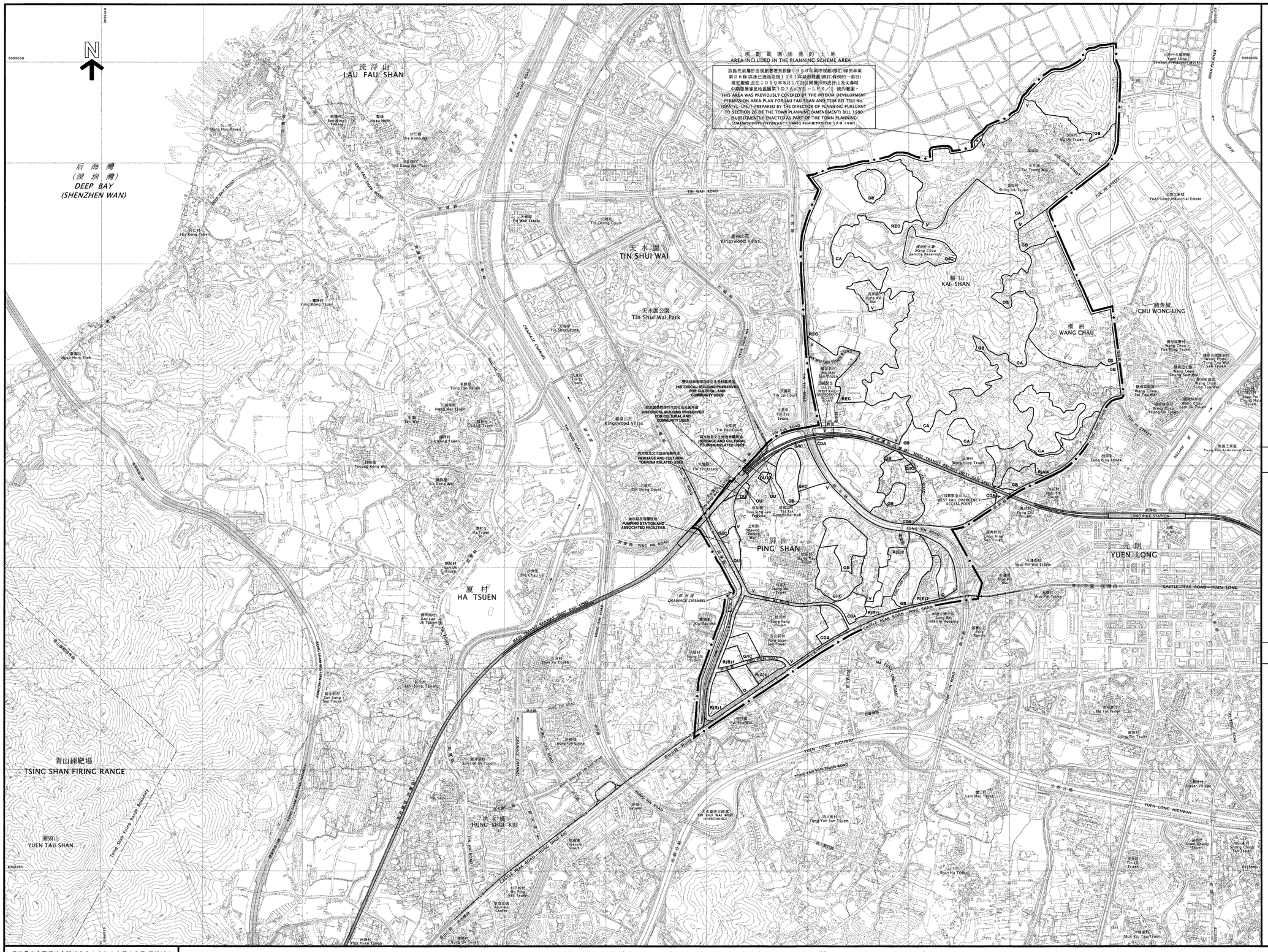
N
836500N
819500E
后海灣
(深圳灣)
DEEP BAY
(SHENZHEN WAN)
流浮山
LAU FAU SHAN
天水圍
TIN SHUI WAI
天水圍公園
Tin Shui Wai Park
Kingswood Villas
DRAINAGE CHANNEL
TIN WAH ROAD
TIN SHUI ROAD
TIN HANG ROAD
TIN YIP ROAD
TIN YUET ROAD
TIN YAU ROAD
TIN CHUNG COURT
TIN WAH ESTATE
TIN LAI COURT
TIN YAU COURT
TIN YIU ESTATE
TIN SHUI ESTATE
Nam Hom Shek
Tung Tau Tsuen
Hong Mei Tsuen
Sha Kong Wai
Sha Kong Tsuen
Sha Kong Wai Tsuen
Fung Kong Tsuen
Shi Kong Tsuen
Tsuqwa Kong Wai
Sa Kong Wai
Shi Kong Wai Tsuen
Kau Lee Uk Tsuen
Shi Kong Tsuen
Shi Chau Lei
San Uk Tsuen
Ha Tsuen
San Hi Tsuen
San Sham Tsuen
Shek Kong Tsuen
Chung Sik Tsuen
Yick Yuen Tsuen
Ping Ha Tsuen
Ping Ha Estate
Ping Shan Tsuen
Shung Ching Court
Shung Ching Estate
Shung Ching Garden
Shung Ching Building
Shung Ching Street
Shung Ching Road
Shung Ching Middle School
Shung Ching Primary School
Shung Ching Kindergarten
Shung Ching Nursery School
Shung Ching Tsuen
Shung Ching Tsuen Tsuen
Shung Ching Tsuen Wai
Shung Ching Tsuen Wai Tsuen
Shung Ching Tsuen Tsuen

該區先前屬於由規劃署署長根據１９９０年城市規劃（修訂）條例草案第２６條(其後已通過成為１９９１年城市規劃（修訂）條例的一部份)規定擬備，並在１９９０年８月１７日公開展示的流浮山及先鋒隊中期發展審批地區圖第ＩＤＰＡ／ＹＬ－ＬＦＳ／１號的範圍。
THIS AREA WAS PREVIOUSLY COVERED BY THE INTERIM DEVELOPMENT PERMISSION AREA PLAN FOR LAU FAU SHAN AND TSIM BEI TSUI No. IDPA/YL-LFS/1 PREPARED BY THE DIRECTOR OF PLANNING PURSUANT TO SECTION 26 OF THE TOWN PLANNING (AMENDMENT) BILL 1990 (SUBSEQUENTLY ENACTED AS PART OF THE TOWN PLANNING (AMENDMENT) ORDINANCE 1991) EXHIBITED ON 17.8.1990.

圖例
NOTATION

ZONES 地帶

COMPREHENSIVE DEVELOPMENT AREA	CDA	綜合發展區
RESIDENTIAL (GROUP A)	R(A)	住宅（甲類）
RESIDENTIAL (GROUP B)	R(B)	住宅（乙類）
RESIDENTIAL (GROUP E)	R(E)	住宅（戊類）
VILLAGE TYPE DEVELOPMENT	V	鄉村式發展
OPEN STORAGE	OS	露天貯物
GOVERNMENT, INSTITUTION OR COMMUNITY	G/IC	政府、機構或社區
OPEN SPACE	O	休憩用地
RECREATION	REC	康樂
OTHER SPECIFIED USES	OU	其他指定用途
GREEN BELT	GB	綠化地帶
CONSERVATION AREA	CA	自然保育區

COMMUNICATIONS 交通

RAILWAY AND STATION (ELEVATED)	鐵路及車站（高架）
LIGHT RAIL	輕鐵
MAJOR ROAD AND JUNCTION	主要道路及路口
ELEVATED ROAD	高架道路

MISCELLANEOUS 其他

BOUNDARY OF PLANNING SCHEME	規劃範圍界線

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
COMPREHENSIVE DEVELOPMENT AREA	25.09	7.05	綜合發展區
RESIDENTIAL (GROUP A)	28.23	7.93	住宅（甲類）
RESIDENTIAL (GROUP B)	3.91	1.10	住宅（乙類）
RESIDENTIAL (GROUP E)	4.54	1.28	住宅（戊類）
VILLAGE TYPE DEVELOPMENT	86.08	24.19	鄉村式發展
OPEN STORAGE	13.14	3.69	露天貯物
GOVERNMENT, INSTITUTION OR COMMUNITY	13.25	3.72	政府、機構或社區
OPEN SPACE	3.46	0.97	休憩用地
RECREATION	27.41	7.70	康樂
OTHER SPECIFIED USES	1.68	0.47	其他指定用途
GREEN BELT	55.32	15.55	綠化地帶
CONSERVATION AREA	70.23	19.74	自然保育區
DRAINAGE CHANNEL	0.48	0.13	排水道
RAILWAY	0.95	0.27	鐵路
MAJOR ROAD ETC.	22.05	6.21	主要道路等
TOTAL PLANNING SCHEME AREA	355.82	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/YL-PS/18 的修訂
AMENDMENTS TO APPROVED PLAN No. S/YL-PS/18

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 A	修訂項目Ａ項
AMENDMENT ITEM B	修訂項目Ｂ項
AMENDMENT ITEM C	修訂項目Ｃ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屏山分區計劃大綱圖
TOWN PLANNING ORDINANCE, HONG KONG TOWN PLANNING BOARD
PING SHAN - OUTLINE ZONING PLAN

SCALE 1:7 500 比例尺

米 METRES 200 0 200 400 600 800 1 000 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/YL-PS/18A

Attachment III of
RNTPC Paper No. 3/21

~~APPROVED~~ *DRAFT* PING SHAN OUTLINE ZONING PLAN NO. S/YL-PS/18*A*

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

NOTES

(N.B. These form a 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) No action is required to make the use of any land or building which was in existence immediately before the first publication in the Gazette of the notice of the Lau Fau Shan and Tsim Bei Tsui Interim Development Permission Area (IDPA) Plan/draft Ping Shan Development Permission Area (DPA) Plan conform to this Plan, provided such use has continued since it came into existence. Any material change of such use or any other development (except minor alteration and/or modification to the development of the land or building in respect of such use which is always permitted) must be always permitted in terms of the Plan or in accordance with a permission granted by the Town Planning Board.

(4) A use or development of any land or building permitted under an earlier draft or approved plan including Lau Fau Shan and Tsim Bei Tsui IDPA Plan/draft Ping Shan DPA Plan for the area and effected or undertaken during the effective period of that plan is always permitted under this Plan. Any material change of such use or any other development (except minor alteration and/or modification to the completed development of the land or building which is always permitted) must be always permitted in terms of the Plan or in accordance with a permission granted by the Town Planning Board.

(5) Except to the extent that paragraph (3) or (4) applies, any use or development falling within the boundaries of the Plan and also within the boundaries of the Lau Fau Shan and Tsim Bei Tsui IDPA Plan/draft Ping Shan DPA Plan, unless always permitted in terms of the Plan, shall not be undertaken or continued on or after the date of the first publication in the Gazette of the notice of the Lau Fau Shan and Tsim Bei Tsui IDPA Plan/draft Ping Shan DPA Plan without permission from the Town Planning Board.

(6) 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.

(7) Road junctions, alignment of roads and railway tracks, and boundaries between zones may be subject to minor adjustments as detailed planning proceeds.

(8) The following uses or developments are always permitted on land falling within the boundaries of the Plan except (a) where the uses or developments are specified in Column 2 of the Notes of individual zones or (b) as provided in paragraph (9) in relation to areas zoned "Conservation Area":

(a) maintenance, repair or demolition of a building;

(b) provision, maintenance or repair of plant nursery, amenity planting, open space, rain shelter, refreshment kiosk, footpath, bus/public light bus/light rail stop or lay-by, cycle track, taxi rank, public utility pipeline, electricity mast, lamp pole, telephone booth, telecommunications radio base station, automatic teller machine and shrine;

(c) maintenance or repair of road, railway track, watercourse, nullah, sewer and drain;

(d) geotechnical works, local public works, road works, sewerage works, drainage works, environmental improvement works, marine related facilities and waterworks (excluding works on service reservoir) and such other public works co-ordinated or implemented by Government;

(e) rebuilding of New Territories Exempted House;

(f) replacement of an existing domestic building, i.e. a domestic building which was in existence on the date of the first publication in the Gazette of the notice of the Lau Fau Shan and Tsim Bei Tsui IDPA Plan/draft Ping Shan DPA Plan, by a New Territories Exempted House; and

(g) provision, maintenance or repair of a grave of an indigenous New Territories villager or a locally based fisherman and his family members for which permission has been obtained from Government.

(9) In areas zoned "Conservation Area",

(a) the following uses or developments are always permitted:

(i) maintenance or repair of plant nursery, amenity planting, sitting out area, rain shelter, refreshment kiosk, road, watercourse, nullah, public utility pipeline, electricity mast, lamp pole, telephone booth, shrine and grave;

(ii) 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

(iii) provision of amenity planting by Government; and

(b) the following uses or developments require permission from the Town Planning Board:

provision of plant nursery, amenity planting (other than by Government), sitting out area, rain shelter, refreshment kiosk, footpath, public utility pipeline, electricity mast, lamp pole, telephone booth and shrine.

(10) In any area shown as 'Road', all uses or developments except those specified in paragraphs (8)(a) to (8)(d) and (8)(g) above and those specified below require permission from the Town Planning Board:

road, toll plaza, on-street vehicle park, railway station and railway track.

(11) (a) Except in areas zoned "Conservation Area", temporary use or development of any land or building not exceeding a period of two months is always permitted provided that no site formation (filling or excavation) is carried out and that the use or development is a use or development specified below:

structures for carnivals, fairs, film shooting on locations, festival celebrations, religious functions or sports events.

(b) Except as otherwise provided in paragraph (11)(a), and subject to temporary uses for open storage and port back-up purposes which are prohibited in areas zoned "Conservation Area", temporary use or development of any land or building not exceeding a period of three years requires permission from the Town Planning Board. Notwithstanding that the use or development is not provided for in terms of the Plan, the Town Planning Board may grant permission, with or without conditions, for a maximum period of three years, or refuse to grant permission.

(c) Temporary use or development of land or building exceeding three years requires permission from the Town Planning Board in accordance with the terms of the Plan.

(12) 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.

(13) In these Notes, unless the context otherwise requires or unless as expressly provided below, terms used in the Notes shall have the meanings as assigned under section 1A of the Town Planning Ordinance.

"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.

"New Territories Exempted House" means a domestic building other than a guesthouse or a hotel; or a building primarily used for habitation, other than a guesthouse or a hotel, the ground floor of which may be used as 'Shop and Services' or 'Eating Place', the building works in respect of which are exempted by a certificate of exemption under Part III of the Buildings Ordinance (Application to the New Territories) Ordinance (Cap. 121).

~~APPROVED~~ ***DRAFT*** PING SHAN OUTLINE ZONING PLAN NO. S/YL-PS/18***A***

SCHEDULE OF USES

	Page
COMPREHENSIVE DEVELOPMENT AREA	1
RESIDENTIAL (GROUP A)	5
RESIDENTIAL (GROUP B)	~~7~~***8***
RESIDENTIAL (GROUP E)	~~9~~***10***
VILLAGE TYPE DEVELOPMENT	~~11~~***12***
OPEN STORAGE	~~13~~***14***
GOVERNMENT, INSTITUTION OR COMMUNITY	~~14~~***15***
OPEN SPACE	~~15~~***16***
RECREATION	~~16~~***17***
GREEN BELT	~~18~~***19***
CONSERVATION AREA	~~20~~***21***
OTHER SPECIFIED USES	~~21~~***22***

COMPREHENSIVE DEVELOPMENT AREA

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 Flat Government Refuse Collection Point Government Use (not elsewhere specified) Hospital Hotel House (other than rebuilding of New Territories Exempted House or replacement of existing domestic building by New Territories Exempted House permitted under the covering Notes) Information Technology and Telecommunications Industries Institutional Use (not elsewhere specified) Library ~~Market~~ 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 Research, Design and Development Centre Residential Institution School Shop and Services Social Welfare Facility Training Centre Utility Installation for Private Project

(Please see next page)

COMPREHENSIVE DEVELOPMENT AREA (Cont'd)

Planning Intention

This zone is intended for comprehensive development/redevelopment of the area for residential use with commercial, open space and other supporting facilities. The zoning is to facilitate appropriate planning control over the development mix, scale, design and layout of development, taking account of various environmental, traffic, infrastructure and other constraints.

Remarks

(a) Pursuant to section 4A(2) of the Town Planning Ordinance, and except as otherwise expressly provided that it is not required by the Town Planning Board, an applicant for permission for development on land designated "Comprehensive Development Area" ("CDA") shall prepare a Master Layout Plan for the approval of the Town Planning Board and include therein the following information:

(i) the area of the proposed land uses, the nature, position, dimensions, and heights of all buildings to be erected in the area;

(ii) the proposed total site area and gross floor area for various uses, total number of flats and flat size, where applicable;

(iii) the details and extent of Government, institution or community (GIC) and recreational facilities, public transport and parking facilities, and open space to be provided within the area;

(iv) the alignment, widths and levels of any roads proposed to be constructed within the area;

(v) the landscape and urban design proposals within the area;

(vi) programmes of development in detail;

(vii) an environmental assessment report to examine any possible environmental problems that may be caused to or by the proposed development during and after construction and the proposed mitigation measures to tackle them;

(viii) a drainage and sewerage impact assessment report to examine any possible drainage and sewerage problems that may be caused by the proposed development and the proposed mitigation measures to tackle them;

(ix) a traffic impact assessment report to examine any possible traffic problems that may be caused by the proposed development and the proposed mitigation measures to tackle them; and

(x) such other information as may be required by the Town Planning Board.

(Please see next page)

COMPREHENSIVE DEVELOPMENT AREA (Cont'd)

Remarks (Cont'd)

(b) The Master Layout Plan should be supported by an explanatory statement which contains an adequate explanation of the development proposal, including such information as land tenure, relevant lease conditions, existing conditions of the site, the character of the site in relation to the surrounding areas, principles of layout design, major development parameters, design population, types of GIC facilities, and recreational and open space facilities.

(c) 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 plot ratio (PR) and the maximum building height specified below:

Location of "CDAs"	Maximum PR	Maximum Building Height
The "CDA" to the south-east of Tong Fong Tsuen and west of the junction of Ping Ha Road and Castle Peak Road	A total PR of 1.0	5 storeys including car park
The "CDA" to the north-east of the junction of Ping Ha Road and Castle Peak Road	A total PR of 1.0	5 storeys including car park
The "CDA" to the north-east of Long Tin Road	A total PR of 0.4	3 storeys including car park
The "CDA" to the west of Yung Yuen Road and north of Long Tin Road	A total PR of 0.4	3 storeys including car park
The "CDA" to the north-west of Long Ping Road	A total PR of 0.4	3 storeys including car park

(d) The achievement of the maximum PRs is subject to the satisfactory demonstration to the Town Planning Board that a proposed development has taken account of the capacities of infrastructure and other environmental constraints on the site.

(Please see next page)

COMPREHENSIVE DEVELOPMENT AREA (Cont'd)

Remarks (Cont'd)

(e) In determining the maximum PR for the purposes of paragraph (c) 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.

(f) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the PR and building height restrictions stated in paragraph (c) 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 "R(A)4", "R(A)5" and "R(A)6" only)*** Religious Institution (Ancestral Hall only) Residential Institution Rural Committee/Village Office 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) 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 (not elsewhere specified) School (not elsewhere specified) Shop and Services ***(not elsewhere specified)*** Training Centre
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	

(Please see next page)

RESIDENTIAL (GROUP A) (Cont'd)

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. For the "Residential (Group A) 4" zone, the planning intention is for public housing development.

Remarks

(a) On land designated "Residential (Group A) 1", no new development, or addition, alteration and/or modification to or redevelopment of an existing building (except development or redevelopment to the use annotated with #) shall result in a total development and/or redevelopment in excess of a maximum plot ratio of 2.66, a maximum site coverage of 66.6% and a maximum building height of 5 storeys (15m) including car park, or the plot ratio, site coverage and height of the building which was in existence on the date of the first publication in the Gazette of the notice of the draft development permission area plan, whichever is the greater. The lowest three floors could be used for commercial and car parking purposes which could have a maximum site coverage of 100%.

(b) On land designated "Residential (Group A) 4", 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 6 and a maximum building height of 135mPD***, or the plot ratio and height of the existing building, whichever is the greater***. ~~In determining the maximum plot ratio, the 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 facilities including school(s) as may be required by the Government shall be deducted from calculation of the site area.~~

(c) On land designated "Residential (Group A) 5", 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 6.5 and a maximum building height of 135mPD, or the plot ratio and height of the existing building, whichever is the greater.

(d) On land designated "Residential (Group A) 6", 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 6.7 and a maximum building height of 160mPD, or the plot ratio and height of the existing building, whichever is the greater.

(Please see next page)

RESIDENTIAL (GROUP A) (Cont'd)

Remarks (Cont'd)

(e) ***In determining the maximum plot ratio for the purposes of paragraphs (b) to (d) above, the 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 facilities including school(s) as may be required by the Government shall be deducted from calculation of the site area.***

(f) ***In determining the maximum plot ratio for the purposes of paragraphs (b) to (d), any floor space that is constructed or intended for use solely as public vehicle parks, public transport facilities and Government, institution or community facilities, as required by the Government, may be disregarded.***

~~(c)~~***(g)*** In determining the maximum plot ratio and site coverage for the purposes of paragraphs (a) ~~and (b)~~ ***to (d)*** 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.

~~(d)~~***(h)*** Based on the individual merits of a development or redevelopment proposal, minor relaxation of the plot ratio, site coverage and building height restrictions stated in paragraphs (a) ~~and (b)~~ ***to (d)*** above 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~~ 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 Rural Committee /Village Office School (not elsewhere specified) Shop and Services Social Welfare Facility Training Centre

Planning Intention

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

(Please see next page)

RESIDENTIAL (GROUP B) (Cont'd)

Remarks

(a) On land designated "Residential (Group B) 1", no new development, or addition, alteration and/or modification to or redevelopment of an existing building (except development or redevelopment to the use annotated with #) shall result in a total development and/or redevelopment in excess of a maximum plot ratio of 1, a maximum site coverage of 40% and a maximum building height of 5 storeys (15m) including car park, or the plot ratio, site coverage and height of the building which was in existence on the date of the first publication in the Gazette of the notice of the draft development permission area plan, whichever is the greater.

(b) In determining the maximum plot ratio and site coverage for the purposes of paragraph (a) 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.

(c) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the plot ratio, site coverage and building height restrictions stated in paragraph (a) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

RESIDENTIAL (GROUP E)

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

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

Ambulance Depot
Government Use (Police Reporting Centre, Post Office only)
Rural Committee/Village Office
Utility Installation for Private Project

Eating Place
Educational Institution
Flat
Government Refuse Collection Point
Government Use (not elsewhere specified)
House (other than rebuilding of New Territories Exempted House or replacement of existing domestic building by New Territories Exempted House permitted under the covering Notes)
Institutional Use (not elsewhere specified)
Library
~~Market~~
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
Residential Institution
School
Shop and Services
Social Welfare Facility
Training Centre

(Please see next page)

RESIDENTIAL (GROUP E) (Cont'd)

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

Schedule II: for existing industrial development

Eating Place (Canteen only)
Government Refuse Collection Point
Government Use (not elsewhere specified)
Public Utility Installation
Recyclable Collection Centre
Rural Workshop
Utility Installation for Private Project
Warehouse (excluding Dangerous Goods Godown)
Office
Petrol Filling Station
Public Convenience
Public Vehicle Park (excluding container vehicle)
Shop and Services (ground floor only)
Vehicle Repair Workshop
Wholesale Trade

Planning Intention

This zone is intended primarily for phasing out of existing industrial uses through redevelopment for residential use on application to the Town Planning Board. Whilst existing industrial uses will be tolerated, new industrial developments are not permitted in order to avoid perpetuation of industrial/residential interface problem.

Remarks

(a) On land designated "Residential (Group E) 2", no new development shall exceed a maximum plot ratio of 0.6 and a maximum building height of 5 storeys including car park.

(b) No addition, alteration and/or modification to or redevelopment of an existing building (except redevelopment to 'New Territories Exempted House') shall exceed the plot ratio and building height restrictions stated in paragraph (a) above, or the plot ratio, site coverage and height of the building which was in existence on the date of the first publication in the Gazette of the notice of the draft development permission area plan, whichever is the greater, subject to redevelopment to the plot ratio in the latter restriction shall be permitted only if the existing building is a domestic building.

(c) In determining the maximum plot ratio for the purposes of paragraph (a) 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.

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

VILLAGE TYPE DEVELOPMENT

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 Government Use (Police Reporting Centre, Post Office only) House (New Territories Exempted House only) On-Farm Domestic Structure Religious Institution (Ancestral Hall only) Rural Committee /Village Office	Burial Ground Eating Place Flat Government Refuse Collection Point Government Use (not elsewhere specified) # House (not elsewhere specified) Institutional Use (not elsewhere specified) # ~~Market~~ Petrol Filling Station 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 (not elsewhere specified) # Residential Institution # School # Shop and Services Social Welfare Facility # Utility Installation for Private Project

In addition, the following uses are always permitted on the ground floor of a New Territories Exempted House:
Eating Place Library School Shop and Services

(Please see next page)

VILLAGE TYPE DEVELOPMENT (Cont'd)

Planning Intention

The planning intention of this zone is to reflect existing recognized and other villages, and to provide land considered suitable for village expansion and reprovisioning of village houses affected by Government projects. Land within this zone is primarily intended for development of Small Houses by indigenous villagers. It is also intended to concentrate village type development within this zone for a more orderly development pattern, efficient use of land and provision of infrastructures and services. Selected commercial and community uses serving the needs of the villagers and in support of the village development are always permitted on the ground floor of a New Territories Exempted House. Other commercial, community and recreational uses may be permitted on application to the Town Planning Board.

Remarks

(a) No new development, or addition, alteration and/or modification to or redevelopment of an existing building (except development or redevelopment to those annotated with #) shall result in a total development and/or redevelopment in excess of a maximum building height of 3 storeys (8.23m) or the height of the building which was in existence on the date of the first publication in the Gazette of the notice of the Lau Fau Shan and Tsim Bei Tsui Interim Development Permission Area Plan/draft Ping Shan Development Permission Area Plan, whichever is the greater.

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

(c) Any filling of land/pond or excavation of land, including that to effect a change of use to any of those specified in Columns 1 and 2 above or the uses or developments always permitted under the covering Notes (except public works co-ordinated or implemented by Government, and maintenance, repair or rebuilding works), shall not be undertaken or continued on or after the date of the first publication in the Gazette of the notice of the Lau Fau Shan and Tsim Bei Tsui Interim Development Permission Area Plan/draft Ping Shan Development Permission Area Plan without the permission from the Town Planning Board under section 16 of the Town Planning Ordinance.

OPEN STORAGE

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	Cargo Handling and Forwarding Facility
Eating Place (Canteen only)	Cement Manufacturing
Government Refuse Collection Point	Asphalt Plant/Concrete Batching Plant
Government Use (not elsewhere specified)	Container Storage/Repair Yard
On-Farm Domestic Structure	Container Vehicle Park/Container Vehicle Repair Yard
Open Storage (not elsewhere specified)	Dangerous Goods Godown
Public Convenience	Eating Place (not elsewhere specified)
Public Utility Installation	Industrial Use (not elsewhere specified)
Public Vehicle Park (excluding container vehicle)	Open Storage of Cement/Sand
Rural Workshop	Open Storage of Chemical Products/Dangerous Goods
Shop and Services (Service Trades only)	Petrol Filling Station
Utility Installation for Private Project	Shop and Services (not elsewhere specified)
Vehicle Repair Workshop	Vehicle Stripping/Breaking Yard
Warehouse (excluding Dangerous Goods Godown)	Wholesale Trade

Planning Intention

This zone is intended primarily for the provision of land for appropriate open storage uses and to regularize the already haphazard proliferation of open storage uses. It provides for the orderly development of land for open storage uses that cannot be accommodated in conventional godown premises.

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 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 Rural Committee /Village Office 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) Firing Range Flat Funeral Facility Helicopter Fuelling Station Helicopter Landing Pad Holiday Camp Hotel House (other than rebuilding of New Territories Exempted House or replacement of existing domestic building by New Territories Exempted House permitted under the covering Notes) 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.

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 Public Convenience Sitting Out Area Zoo	Eating Place Government Refuse Collection Point Government Use (not elsewhere specified) Holiday Camp 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.

RECREATION

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 Field Study /Education/Visitor Centre Government Use (Police Reporting Centre only) Holiday Camp On-Farm Domestic Structure Picnic Area Place of Recreation, Sports or Culture Public Convenience Rural Committee /Village Office Tent Camping Ground	Animal Boarding Establishment Broadcasting, Television and/or Film Studio Cable Car Route and Terminal Building Eating Place Flat Golf Course Government Refuse Collection Point Government Use (not elsewhere specified) Helicopter Landing Pad Hotel House (other than rebuilding of New Territories Exempted House or replacement of existing domestic building by New Territories Exempted House permitted under the covering Notes) Place of Entertainment Private Club Public Utility Installation Public Vehicle Park (excluding container vehicle) Religious Institution Residential Institution Shop and Services Theme Park Utility Installation for Private Project Zoo

Planning Intention

This zone is intended primarily for recreational developments for the use of the general public. It encourages the development of active and/or passive recreation and tourism/eco-tourism. Uses in support of the recreational developments may be permitted subject to planning permission.

Remarks

(a) No residential development (except 'New Territories Exempted House') shall result in a total development in excess of a maximum plot ratio of 0.2 and a maximum building height of 2 storeys (6m).

(Please see next page)

RECREATION (Cont'd)

Remarks (Cont'd)

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

(c) Any filling of land/pond or excavation of land, including that to effect a change of use to any of those specified in Columns 1 and 2 above or the uses or developments always permitted under the covering Notes (except public works co-ordinated or implemented by Government, and maintenance, repair or rebuilding works), shall not be undertaken or continued on or after the date of the first publication in the Gazette of the notice of the draft development permission area plan without the permission from the Town Planning Board under section 16 of the Town Planning Ordinance.

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 Burial Ground 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 Firing Range Flat Golf Course Government Refuse Collection Point Government Use (not elsewhere specified) Helicopter Landing Pad Holiday Camp House (other than rebuilding of New Territories Exempted House or replacement of existing domestic building by New Territories Exempted House permitted under the covering Notes) 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 Rural Committee/Village Office School Service Reservoir Social Welfare Facility Utility Installation for Private Project Zoo

(Please see next page)

GREEN BELT (Cont'd)

Planning Intention

The planning intention of this zone is primarily for defining the limits of urban and sub-urban development areas by natural features and to contain urban sprawl as well as to provide passive recreational outlets. There is a general presumption against development within this zone.

Remarks

Any filling or excavation of land, including that to effect a change of use to any of those specified in Columns 1 and 2 above or the uses or developments always permitted under the covering Notes (except public works co-ordinated or implemented by Government, and maintenance, repair or rebuilding works), shall not be undertaken or continued on or after the date of the first publication in the Gazette of the notice of the draft development permission area plan without the permission from the Town Planning Board under section 16 of the Town Planning Ordinance.

CONSERVATION AREA

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 (other than Plant Nursery) Nature Reserve Nature Trail On-Farm Domestic Structure Picnic Area Wild Animals Protection Area	Barbecue Spot Field Study/Education/Visitor Centre Government Refuse Collection Point Government Use (not elsewhere specified) Holiday Camp House (Redevelopment only) Public Convenience Public Utility Installation Radar, Telecommunications Electronic Microwave Repeater, Television and/or Radio Transmitter Installation Tent Camping Ground Utility Installation for Private Project

Planning Intention

This zoning is intended to protect and retain the existing natural landscape, ecological or topographical features of the area for conservation, educational and research purposes.

There is a general presumption against development in this zone. In general, only developments that are needed to support the conservation of the existing natural landscape or scenic quality of the area or are essential infrastructure project with overriding public interest may be permitted.

Remarks

(a) No redevelopment, including alteration and/or modification, of an existing house shall result in a total redevelopment in excess of the plot ratio, site coverage and height of the house which was in existence on the date of the first publication in the Gazette of the notice of the draft development permission area plan.

(b) Any filling of land/pond or excavation of land, including that to effect a change of use to any of those specified in Columns 1 and 2 above or the uses or developments always permitted under the covering Notes ***(except public works co-ordinated or implemented by Government, and maintenance, repair or rebuilding works)***, shall not be undertaken or continued on or after the date of the first publication in the Gazette of the notice of the draft development permission area plan without the permission from the Town Planning Board under section 16 of the Town Planning Ordinance.

OTHER SPECIFIED USES

For "Heritage and Cultural Tourism Related Uses" Only

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
	Eating Place Educational Institution Exhibition or Convention Hall Field Study/Education/Visitor Centre Government Use (not elsewhere specified) Hotel House (rebuilding of New Territories Exempted House only) Institutional Use (not elsewhere specified) Library ~~Market~~ Office Place of Entertainment Place of Recreation, Sports or Culture Private Club Public Convenience Public Utility Installation Public Vehicle Park (excluding container vehicle) Religious Institution Rural Committee/Village Office School Shop and Services Social Welfare Facility Training Centre Utility Installation for Private Project

Planning Intention

This zone is intended primarily to facilitate provision of heritage and cultural tourism related facilities or uses that are complementary to the Tsui Sing Lau Pagoda and Tat Tak Communal Hall as heritage attractions and visually compatible with the historical buildings.

Remarks

(a) An applicant for permission for development on land designated "Other Specified Uses" annotated "Heritage and Cultural Tourism Related Uses" shall prepare a layout plan for the zone and other documents showing the following information for the consideration of the Town Planning Board:

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

For "Heritage and Cultural Tourism Related Uses" Only

Remarks (Cont'd)

(i) the area of proposed land uses, the nature, position, dimensions, and heights of all buildings to be erected in the area;

(ii) the proposed total site area and gross floor area for various uses and facilities;

(iii) the details and extent of the Government, institution or community (GIC) and recreational facilities, public transport and parking facilities, and open space to be provided within the area;

(iv) the alignment, widths and levels of any roads proposed to be constructed within the area;

(v) the landscape and design proposals within the area;

(vi) the details and programme of supply of utilities and infrastructure to meet the need of the proposed development;

(vii) a heritage impact assessment to examine any possible heritage problems that may be caused by the proposed development and the proposed mitigation measures to tackle them;

(viii) a visual impact assessment to examine any possible visual problems that may be caused by the proposed development and the proposed mitigation measures to tackle them;

(ix) a traffic impact assessment report to examine any possible traffic problems that may be caused by the proposed development and the proposed mitigation measures to tackle them; and

(x) such other information as may be required by the Town Planning Board.

(b) The layout plan should be supported by an explanatory statement which contains an adequate explanation of the development proposal, including such information as land tenure, relevant lease conditions, existing conditions of the site, the character of the site in relation to the surrounding areas, principles of layout design, major development parameters, and types of GIC and other facilities.

(c) 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 0.4 and a maximum building height of 10mPD, or the plot ratio and height of the existing building, whichever is the greater.

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

For "Heritage and Cultural Tourism Related Uses" Only

Remarks (Cont'd)

(d) In determining the maximum plot ratio for the purposes of paragraph (c) 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.

(e) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the plot ratio and building height restrictions stated in paragraph (c) 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)

For "Historical Building Preserved for Cultural and Community Uses" Only

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
Exhibition or Convention Hall Field Study/Education/Visitor Centre Library Rural Committee/Village Office	Government Use (not elsewhere specified) Institutional Use (not elsewhere specified) Place of Recreation, Sports or Culture Religious Institution School Social Welfare Facility

Planning Intention

This zone is intended to preserve the Tsui Sing Lau Pagoda and Tat Tak Communal Hall as heritage attractions with the provision of cultural and community facilities for the enjoyment of the public.

Remarks

(a) Any addition, alteration and/or modification to the existing building (except restoration works co-ordinated or implemented by Government and those minor alteration and/or modification works which are ancillary and directly related to the always permitted uses or the existing buildings) requires permission from the Town Planning Board under section 16 of the Town Planning Ordinance.

(b) No addition, alteration and/or modification to the existing building shall result in a total development in excess of the maximum building height specified below, or the height of the existing building, whichever is the greater.

Site	Maximum Building Height
Tsui Sing Lau Pagoda	3 storeys
Tat Tak Communal Hall	1 storey

(c) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the building height restriction stated in paragraph (b) 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)

For "Pumping Station and Associated Facilities" only

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
As Specified on the Plan	Government Use (not elsewhere specified) Utility Installation not ancillary to the Specified Use

Planning Intention

This zone is intended primarily for the provision of pumping station, flood pond and associated facilities.

Attachment IV of
RNTPC Paper No. 3/21

~~APPROVED~~ *DRAFT* PING SHAN OUTLINE ZONING PLAN NO. S/YL-PS/18*A*

EXPLANATORY STATEMENT

~~APPROVED~~ ***DRAFT*** PING SHAN OUTLINE ZONING PLAN NO. S/YL-PS/18***A***

EXPLANATORY STATEMENT

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~~APPROVED~~ *DRAFT* PING SHAN OUTLINE ZONING PLAN NO. S/YL-PS/18*A*

(Being ~~an Approved~~ ***a 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*** Ping Shan Outline Zoning Plan (OZP) No. S/YL-PS/18***A***. It reflects the planning intention and objectives of the Town Planning Board (the Board) for various land-use zonings of the Plan.

2. AUTHORITY FOR THE PLAN AND PROCEDURE

2.1 Other than a site to the north of Shing Uk Tsuen which was previously included in the Lau Fau Shan and Tsim Bei Tsui Interim Development Permission Area (IDPA) Plan and was excised from the draft Lau Fau Shan and Tsim Bei Tsui OZP for inclusion into the Ping Shan OZP, the land covering the existing planning scheme area of Ping Shan was previously included in the Ping Shan Development Permission Area (DPA) Plan.

2.2 On 18 June 1993, the draft Ping Shan DPA Plan No. DPA/YL-PS/1 was exhibited for public inspection under section 5 of the Town Planning Ordinance (the Ordinance). On 28 May 1996, the then Governor in Council under section 9(1)(a) of the Ordinance approved the draft Ping Shan DPA Plan which was renumbered as DPA/YL-PS/2.

2.3 On 13 March 1995, under the power delegated by the then Governor, the then Secretary for Planning, Environment and Lands directed the Board, under section 3(1)(a) of the Ordinance, to prepare an OZP for the Ping Shan area.

2.4 On 14 June 1996, the draft Ping Shan OZP No. S/YL-PS/1 was exhibited for public inspection under section 5 of the Ordinance. The draft OZP was later amended and exhibited three times under section 7 of the Ordinance to reflect the changing circumstances.

2.5 On 22 February 2000, the Chief Executive in Council (CE in C), under section 9(1)(a) of the Ordinance, approved the draft Ping Shan OZP, which was renumbered as S/YL-PS/5. ***On 20 February 2001, the CE in C referred the approved Ping Shan OZP No. S/YL-PS/5 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. The OZP was later amended and exhibited twice under section 7 of the Ordinance to reflect the changing circumstances.***

~~2.6 On 20 February 2001, the CE in C referred the approved Ping Shan OZP No. S/YL-PS/5 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance.~~

~~2.7 On 30 March 2001, the draft Ping Shan OZP No. S/YL-PS/6 was exhibited for public inspection under section 5 of the Ordinance. The draft OZP was later amended and exhibited twice under section 7 of the Ordinance to reflect the changing circumstances.~~

2.~~8~~***6*** On 1 April 2003, the CE in C, under section 9(1)(a) of the Ordinance, approved the draft Ping Shan OZP, which was subsequently renumbered as S/YL-PS/9. ***On 8 July 2003, the CE in C referred the approved Ping Shan OZP No. S/YL-PS/9 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. The OZP was subsequently amended and exhibited for public inspection under section 5 of the Ordinance.***

~~2.9 On 8 July 2003, the CE in C referred the approved Ping Shan OZP No. S/YL-PS/9 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance.~~

~~2.10 On 26 March 2004, the draft Ping Shan OZP No. S/YL-PS/10 was exhibited for public inspection under section 5 of the Ordinance.~~

2.~~11~~***7*** On 1 February 2005, the CE in C, under section 9(1)(a) of the Ordinance, approved the draft Ping Shan OZP, which was subsequently renumbered as S/YL-PS/11. ***On 1 June 2010, the CE in C referred the approved Ping Shan OZP No. S/YL-PS/11 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. The OZP was later amended twice and exhibited under section 5 or 7 of the Ordinance to reflect the changing circumstances.***

~~2.12 On 1 June 2010, the CE in C referred the approved Ping Shan OZP No. S/YL-PS/11 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. The draft OZP was later amended twice and exhibited under section 5 or 7 of the Ordinance to reflect the changing circumstances.~~

2.~~13~~***8*** On 8 May 2012, the CE in C, under section 9(1)(a) of the Ordinance, approved the draft Ping Shan OZP, which was subsequently re-numbered as S/YL-PS/14. ***On 11 March 2014, the CE in C referred the approved Ping Shan OZP No. S/YL-PS/14 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. The OZP was subsequently amended and exhibited for public inspection under section 5 of the Ordinance.***

~~2.14 On 11 March 2014, the CE in C referred the approved Ping Shan OZP No. S/YL-PS/14 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance.~~

~~2.15 On 31 October 2014, the draft Ping Shan OZP No. S/YL-PS/15 was exhibited for public inspection under section 5 of the Ordinance.~~

2.~~16~~***9*** On 2 June 2015, the CE in C, under section 9(1)(a) of the Ordinance, approved

the draft Ping Shan OZP, which was subsequently renumbered as S/YL-PS/16. ~~On 12 June 2015, the approved Ping Shan OZP No. S/YL-PS/16 was exhibited for public inspection under section 9(5) of the Ordinance.~~ ***On 6 December 2016, the CE in C referred the approved OZP No. S/YL-PS/16 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. The OZP was subsequently amended and exhibited for public inspection under section 5 of the Ordinance.***

~~2.17 On 6 December 2016, the CE in C referred the approved OZP No. S/YL-PS/16 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. The reference back of the OZP was notified in the Gazette on 16 December 2016 under section 12(2) of the Ordinance.~~

~~2.18 On 26 May 2017, the draft OZP No. S/YL-PS/17 was exhibited for public inspection under section 5 of the Ordinance. The amendments on the Plan mainly involved the excision of the central and western parts from the planning scheme area for incorporation into the draft Hung Shui Kiu and Ha Tsuen OZP No. S/HSK/1 and the excision of the western-most part from the planning scheme area for incorporation into the draft Ha Tsuen Fringe OZP No. S/YL-HTF/11. During the two-month exhibition period, a total of 2 valid representations were received. On 25 August 2017, the representations were published for three weeks for public comments and a total of 3 valid comments on the representations (comments) were received. On 17 April 2018, the Chief Executive, under section 8(2) of the Ordinance, agreed to extend the statutory time limit for the Board to submit the draft OZP to the CE in C for approval for a period of six months. After giving considerations to the representation and comments, the Board on 25 May 2018 decided not to propose any amendment to the draft OZP to meet the representations.~~

2.~~19~~***10*** On 16 October 2018, the CE in C, under section 9(1)(a) of the Ordinance, approved the draft Ping Shan OZP, which was subsequently renumbered as S/YL-PS/18. On 26 October 2018, the approved Ping Shan OZP No. S/YL-PS/18 ~~(the Plan)~~ was exhibited for public inspection under section 9(5) of the Ordinance.

2.11 On 9 July 2019, the CE in C referred the approved Ping Shan OZP No. S/YL-PS/18 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. The reference back of the OZP was notified in the Gazette on 19 July 2019 under section 12(2) of the Ordinance.

2.12 On xx xx 2021, the draft OZP No. S/YL-PS/19 (the Plan), incorporating amendments mainly to rezone two sites in Wang Chau and Ping Shan north from "Green Belt" ("GB") and "Open Storage" ("OS") to "Residential (Group A)5" ("R(A)5") and from "Recreation" ("REC") to "Residential (Group A)6" ("R(A)6") respectively for public housing developments, and corresponding amendments to the Notes of the Plan, 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 the transport networks for the Ping Shan area so that development and redevelopment within the area can be put under statutory planning control. It also provides the planning framework for preparing more detailed non-statutory plans which form the basis for public works planning and site reservation for various uses.

3.2 The Plan is to illustrate the broad principles of development and control. 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 cases that 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 Area and not to overload the road network in this Area.

3.4 The boundary of the Area is delineated having regard to physical and topographical features such as road, drainage channel and hills. Therefore, the Area boundary does not necessarily follow the Heung boundaries which are used for administration purpose only. Also, the name of the Plan is to follow that of the geographical area and has no implications on development rights, particularly Small House applications.

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 Planning Scheme Area (the Area) measures about 355.82 ha. It is located in the western part of the North West New Territories (NWNT). It is bounded

by the Tin Shui Wai New Town and the Hung Shui Kiu***/ Ha Tsuen*** New Development Area (NDA) in the west, Castle Peak Road in the south, Yuen Long New Town in the east and the fish ponds in Lau Fau Shan and Tsim Bei Tsui in the north. The boundary of the Area is shown by a heavy broken line on the Plan.

5.2 The Area is divided into two portions by Long Tin Road. The portion to the south-west of Long Tin Road consists mostly of low-lying flat land and a few wooded hills near existing villages. To the north-east of Long Tin Road are a group of knolls known as Kai Shan and the foothills and lowlands adjoining the Tin Shui Wai New Town to the west and the Yuen Long New Town to the east and south-east. The Area is mainly occupied by village settlements, vegetated hillslopes and industrial workshops. Major residential developments mainly concentrate to the north of Long Tin Road and along Castle Peak Road.

5.3 In recognition of the traditional burial rights of the indigenous villagers, some burial grounds have been preserved near the existing recognized villages.

6. POPULATION

6.1 Based on the 2016 Population by-census, the population of the Area was estimated by the Planning Department as about 10,150 persons. The population concentrates in and around ten recognized villages.

6.2 It is estimated that the total planned population would be about ~~25,800~~ ***83,775*** persons.

7. OPPORTUNITIES AND CONSTRAINTS

7.1 Opportunities

7.1.1 The completion of the Light Rail (LR), Long Tin Road, Yuen Long Highway, Route 3 and the West Rail (WR) have improved the accessibility of the Area. Apart from the LR network which extends to Tin Shui Wai New Town, the WR passes through the Area, with Tin Shui Wai Station located to the immediate south of Tin Shui Wai New Town. All these transport facilities, together with the provision of adequate infrastructure and supporting facilities in the proposed Hung Shui Kiu***/ Ha Tsuen*** NDA have increased the development potential of the Area.

7.1.2 Most of the agricultural land in Ping Shan has been converted for vehicle park, open storage and workshop uses. Opportunities would be identified for environmental upgrading of the existing vehicle parks, open storages and workshops in the Area. One possible way is through up-zoning of these sites to provide incentives for redevelopment and environmental upgrading.

7.2 Constraints

7.2.1 The WR is expected to pose constraints to the nearby developments in terms of access and environmental impact. Mitigation measures will be required when nearby development proceeds. Land uses designated on the OZP have to take into account the railway alignment as far as possible.

7.2.2 Areas adjoining Tin Shui Wai New Town along Ping Ha Road, Tin Fuk Road and Tin Tsz Road are located in the flood plain and flooding is evident. Development in such areas would need to incorporate drainage improvement works based on findings of drainage impact assessments.

7.2.3 There are ten recognized villages in the Area. Sufficient land has to be reserved for meeting the Small House demand as well as future expansion of these villages.

7.2.4 The potential areas for sub-urban development in Ping Shan are confined to the lowlands. The Kai Shan area is more suitable for conservation and recreational uses. In particular, the northern part of Kai Shan is within the Wetland Buffer Area of which the intention is to prevent development that would have a negative off-site disturbance impact on the ecological value of fish ponds in Deep Bay.

8. GENERAL PLANNING INTENTION

8.1 A large portion of the rural area in Ping Shan has been subjected to "urban transition" uses such as vehicle park, open storage, godown and workshop uses. With improvement in accessibility, these areas have potential in the long run for more comprehensive and orderly sub-urban development. As such, the general planning intentions for Ping Shan area are:

(a) to encourage upgrading of the environment through comprehensively planned developments;

(b) to allow developments compatible with the surroundings where basic infrastructure has been planned or made available;

(c) to reserve sufficient land for village expansion;

(d) to protect historical and cultural heritage sites; and

(e) to conserve the natural landscape of the upland areas.

8.2 The areas along Castle Peak Road and the LR Corridor would be subject to traffic noise impact and the implementation of appropriate noise mitigation measures, such as the use of screening structures and self-protective building layout and design, to keep the environmental impacts within the established standards and guidelines is required.

8.3 In the designation of various zones in the Plan, considerations have been given to the natural environment, physical landform, existing settlements, land status, availability of infrastructure, local development pressures, Territorial Development Strategy Review and North West New Territories (Yuen Long District) Development Statements Study (NWNT DSS) under the NWNT Development Strategy Review. Other than the above, buildings and places of historical and archaeological interest would be preserved in the Area as far as possible.

9. LAND-USE ZONINGS

9.1 Comprehensive Development Area ("CDA") : Total Area : 25.09 ha

9.1.1 This zone is intended for comprehensive development/redevelopment of the area for residential use with commercial, open space and other supporting facilities. It is to facilitate appropriate planning control over the development mix, scale, design and layout of development, taking account of various environmental, traffic, infrastructure and other constraints. Although existing uses are tolerated, pursuant to section 4A(1) of the Ordinance, any development/redevelopment on sites under this zoning requires planning permission under section 16 of the Ordinance. Pursuant to section 4A(2) of the Ordinance, and except as otherwise expressly provided that it is not required by the Board, the applicant should prepare a Master Layout Plan (MLP) together with information specified in the Notes. The approved MLP shall be made available for public inspection in the Land Registry pursuant to section 4A(3) of the Ordinance.

9.1.2 Five areas are zoned "CDA". Two of them are located on the north side of Castle Peak Road at the junction with Ping Ha Road. They are currently occupied by light manufacturing factories, godowns and a few residential houses. The intention of these two "CDA" sites is to encourage the phasing out of the existing industrial uses by redevelopment to residential uses. An area bounded by Long Tin Road, Long Ping Road, and the WR viaduct are divided into three "CDA" sites. The "CDA" site at the central part of the area mainly consists of clusters of residential dwellings. The eastern and western "CDA" sites of the area are occupied by temporary structures, vehicle parks, open storage yards, and workshops intermixed with scattered residential dwellings in a degraded or disorderly condition. The intention of these three "CDA" sites is to facilitate comprehensive upgrading of the area for low-rise low-density development.

9.1.3 The maximum plot ratio (PR) and building height for the "CDA" sites are specified as follows:

Location of "CDA" sites	Maximum PR	Maximum Building Height

Location of "CDA" sites	Maximum PR	Maximum Building Height
The "CDA" to the south-east of Tong Fong Tsuen and west of the junction of Ping Ha Road and Castle Peak Road	1.0	5 storeys including car park
The "CDA" to the north-east of the junction of Ping Ha Road and Castle Peak Road	1.0	5 storeys including car park
The "CDA" to the north-east of Long Tin Road	0.4	3 storeys including car park
The "CDA" to the west of Yung Yuen Road and north of Long Tin Road	0.4	3 storeys including car park
The "CDA" to the north-west of Long Ping Road	0.4	3 storeys including car park

9.1.4 For the three "CDA" zones, bounded by Long Tin Road, Long Ping Road and the WR viaduct, a maximum plot ratio of 0.4 and a maximum height of 3 storeys (including car park) are designated in view of the existing environmental and infrastructure constraints. However, given their strategic location between the Tin Shui Wai and Yuen Long New Towns, a higher development intensity could be considered through the rezoning procedure subject to demonstration by further technical assessments that the currently identified constraints can be overcome. Moreover, the CDA sites are subject to adverse traffic noise, railway noise and industrial noise impacts. The building design of new developments/redevelopments should incorporate environmental mitigation measures, including self-protecting building layout design with no direct line of sight to the above-mentioned noise sources, noise barriers and adequate separation, where appropriate, to meet all relevant criteria under the Hong Kong Planning Standards and Guidelines. Planning briefs will be prepared to guide the developments.

9.1.5 To provide flexibility for innovative design adapted to the characteristics of particular sites, minor relaxation of the plot ratio and building height restrictions may be considered by the Board through the planning permission system. Each proposal will be considered on its individual merits.

9.2 Residential (Group A) ("R(A)") : Total Area : ~~6.91~~ ***28.23*** ha

9.2.1 Land zoned "R(A)" is intended primarily for high-density residential developments. Under this zoning, 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. There are ~~two~~ ***four*** sub-areas within this zone:

~~(a)~~ Residential (Group A) 1 ("R(A)1") : Total Area : 1.24 ha

(a) An area north of Castle Peak Road near Ping Shan San Tsuen is designated for "R(A)1" use. It is intended for residential development with commercial facilities. Development within this zone is restricted to a maximum plot ratio of 2.66, a maximum site coverage of 66.6% and a maximum building height of 5 storeys (15m) including car park. The lowest three floors could be used for commercial and car parking uses which could have a maximum site coverage of 100%.

~~(b)~~ Residential (Group A) 4 ("R(A)4") : Total Area : 5.67 ha

(b) The "R(A)4" zone to the west of Long Ping Estate in Wang Chau is intended for public housing development. Government, institution or community (GIC) facilities, including school(s) and local open space will be provided within the site. The area is subject to a maximum plot ratio of 6 and a maximum building height of 135mPD. ~~In determining the maximum plot ratio, the 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 GIC facilities including school(s) as may be required by the Government shall be deducted from calculation of the site area.~~

Residential (Group A)5 ("R(A)5") : Total Area : 12.09 ha

(c) The "R(A)5" zone to the east of Kai Shan is intended for public housing development. GIC facilities, including school(s), and local open space will be provided within the site. The area is subject to a maximum plot ratio of 6.5 and a maximum building height of 135mPD.

Residential (Group A)6 ("R(A)6") : Total Area : 9.23 ha

(d) The "R(A)6" zone to the west of Kai Shan is intended for public housing development. GIC facilities and local open space will be provided within the site. The area is subject to a maximum plot ratio of 6.7 and a maximum building height of 160mPD.

9.2.2 For "R(A)4", "R(A)5" and "R(A)6" sub-areas, in determining the maximum plot ratio of the development and/or redevelopments, any floor space that is constructed or intended for use solely as public vehicle parks, public transport facilities and GIC facilities, as required by the Government, may be disregarded to facilitate the provision of these facilities. To facilitate the provision of public vehicle parking spaces to meet local demand, 'public vehicle park (excluding container vehicle)' use is always permitted within the sub-areas. An Air Ventilation Assessment – Expert Evaluation (AVA-EE) has been carried out for the sites. It is found that design measures, including building separations and setbacks, would alleviate the potential air ventilation impacts on the surrounding wind environment. A quantitative AVA shall be carried out at the detailed design stage. Requirements of the design measures and quantitative AVA shall be incorporated in the planning briefs for implementation as appropriate. Planning briefs setting out the planning parameters and the design requirements of public housing development at these zones will be provided to guide the future development.

~~9.2.2~~***9.2.3*** To provide flexibility for innovative design adapted to the characteristics of particular sites, minor relaxation of the plot ratio, site coverage and building height restrictions may be considered by the Board through the planning permission system. Each proposal will be considered on its individual merits.

~~9.2.3~~***9.2.4*** However, for any existing building with plot ratio, site coverage and building height already exceeding the plot ratio, site coverage and building height restrictions as shown on the Notes of the Plan, there is a general presumption against such application for minor relaxation except under exceptional circumstances.

9.3 Residential (Group B) ("R(B)") : Total Area : 3.91 ha

9.3.1 Land zoned "R(B)" is primarily intended for sub-urban medium-density residential developments in rural areas where commercial uses serving the residential neighbourhood may be permitted on application to the Board.

9.3.2 Three areas are zoned "R(B)1". Two of them are in Ping Shan South near Ping Shan San Tsuen. The third area is located to the north of Castle Peak Road and to the west of Yung Yuen Road. Development in this zone will be restricted to a maximum plot ratio of 1, a maximum site coverage of 40% and a maximum building height of 5 storeys (15m) including car park.

9.3.3 To provide flexibility for innovative design adapted to the characteristics of particular sites, minor relaxation of the plot ratio, site coverage and building height restrictions may be considered by the Board through the planning permission system. Each proposal will be considered on its individual merits.

9.3.4 However, for any existing building with plot ratio, site coverage and building height already exceeding the plot ratio, site coverage and building height restrictions as shown on the Notes of the Plan, there is a general presumption against such application for minor relaxation except under exceptional circumstances.

9.4 Residential (Group E) ("R(E)"): Total Area : 4.54 ha

9.4.1 This zone is intended primarily for phasing out of existing industrial uses through redevelopment for residential use on application to the Board. Whilst existing industrial uses will be tolerated, new industrial developments are not permitted in order to avoid perpetuation of industrial/residential (I/R) interface problem.

9.4.2 Since it may not be possible to phase out all the industrial uses at once, it is important to ensure that the residential development will be environmentally acceptable and not subject to I/R interface problems. The applicant will be required to submit adequate information to demonstrate that the new development will be environmentally acceptable, and suitable mitigation measures, if required, will be implemented to address the potential I/R interface problems. In addition, the applicant will have to prove to the Board that the proposed development would have no or minimal adverse impact on the area in terms of environmental quality, land-use compatibility, infrastructural provision and traffic requirement.

9.4.3 Two areas are zoned "Residential (Group E)2". One of these areas is to the west of Yung Yuen Road. Another area is near the interchange junction of Long Tin Road and Castle Peak Road. Development in this zone will be restricted to a maximum plot ratio of 0.6 and a maximum building height of 5 storeys including car park.

9.4.4 To provide flexibility for innovative design adapted to the characteristics of particular sites, minor relaxation of the plot ratio and building height restrictions may be considered by the Board through the planning permission system. Each proposal will be considered on its individual merits.

9.4.5 However, for any existing building with plot ratio and building height already exceeding the plot ratio and building height restrictions as shown on the Notes of the Plan, there is a general presumption against such application for minor relaxation except under exceptional circumstances.

9.5 Village Type Development ("V") : Total Area : 86.08 ha

9.5.1 The planning intention of this zone is to reflect existing recognized and other villages, and to provide land considered suitable for village expansion and reprovisioning of village houses affected by Government

projects. Land within this zone is primarily intended for development of Small Houses by indigenous villagers. It is also intended to concentrate village type development within this zone for a more orderly development pattern, efficient use of land and provision of infrastructures and services. Selected commercial and community uses serving the needs of the villagers and in support of the village development are always permitted on the ground floor of a New Territories Exempted House. Other commercial, community and recreational uses may be permitted on application to the Board.

9.5.2 In recognition of the development rights of the indigenous villagers, the ten recognized villages within the Area including Ng Uk Tsuen, Shing Uk Tsuen, Tai Tseng Wai, Fung Ka Wai, Ha Mei San Tsuen, Ping Shan San Tsuen, Tong Fong Tsuen, Sheung Cheung Wai, Hang Mei Tsuen and Hang Tau Tsuen and their expansion areas are zoned "V".

9.5.3 The "V" zone includes a site to the north of Shing Uk Tsuen which was excised from the ~~draft~~ Lau Fau Shan and Tsim Bei Tsui OZP.

9.5.4 The boundaries of the "V" zones are drawn up having regard to the existing settlements, village 'environs', topography, site constraints, the anticipated Small House demand for the next ten years and the provision of public services. Village expansion areas and other infrastructural improvements will be guided by detailed layout plans where applicable.

9.5.5 Any proposed village type development adjacent to industrial establishments/zones should also provide necessary mitigation measures to minimize the I/R interface problems.

9.5.6 To provide flexibility for innovative design adapted to the characteristics of particular sites, minor relaxation of building height restrictions may be considered by the Board through the planning permission system. Each proposal will be considered on its individual merits.

9.5.7 However, for any existing building with building height already exceeding the building height restrictions as shown on the Notes of the Plan, there is a general presumption against such application for minor relaxation except under exceptional circumstances.

9.6 Open Storage ("OS") : Total Area : ~~19.32~~ ***13.14*** ha

9.6.1 This zone is intended primarily for the provision of land for appropriate open storage uses and to regularize the already haphazard proliferation of open storage uses. It provides for the orderly development of land for open storage uses that cannot be accommodated in conventional godown premises.

9.6.2 Specified open storage uses such as container storage, vehicle stripping/breaking yard and storage of dangerous goods, which may cause environmental nuisance, safety hazards or transport problems

require permission from the Board. Development proposals for such purposes have to clearly demonstrate that they would have no adverse environmental, drainage, traffic and other impacts on the surrounding areas. Other open storage uses (not elsewhere specified), such as storage of agricultural products, construction materials (except open storage of cement/sand) and equipment, which will unlikely cause adverse environmental, drainage or transport problems, are always permitted.

9.6.3 The area to the south-west of Yuen Long Industrial Estate at Wang Chau is zoned "OS". It is mostly occupied by open storage of container vehicles. Any further development of similar uses in the area will be expected to provide mitigation measures to prevent environmental degradation.

9.7 Government, Institution or Community ("G/IC") : Total Area : ~~12.73~~ ***13.25*** ha

9.7.1 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.

9.7.2 Land zoned "G/IC" in the Area includes the Wang Chau Service Reservoir, the Old Ping Shan Police Station (Ping Shan Tang Clan Gallery), electricity substations for railways, the Ping Shan Tin Shui Wai Leisure and Cultural Building, ***a proposed floodwater pumping station, a proposed floodwater retention tank, a proposed sewage pumping station*** and the existing and proposed schools.

9.8 Open Space ("O") : Total Area : 3.46 ha

9.8.1 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.

9.8.2 Land zoned for open space use is found in the south-west of Ping Shan San Tsuen along Castle Peak Road and north-west of the junction of Castle Peak Road and Long Tin Road. Besides providing recreational opportunities for the public, the open space sites also serve as a buffer between residential uses and other incompatible uses e.g. industrial and open storage uses. Additional open spaces will be provided within the residential sites and the "CDA" zones.

9.9 Recreation ("REC") : Total Area : ~~37.17~~ ***27.41*** ha

9.9.1 This zone is intended primarily for recreational developments for the use of the general public. It encourages the development of active and/or passive recreation and tourism/eco-tourism. Uses in support of

the recreational developments may be permitted subject to planning permission.

9.9.2 Under this zoning, residential development which should be ancillary to recreational use may be permitted on application to the Board. The development intensity should be in line with the rural setting and therefore shall not result in a total development in excess of a maximum plot ratio of 0.2 and a maximum building height of 2 storeys (6m). Generally, the applicant has to demonstrate to the Board that the proposed development would have no or minimal adverse effects on the environment and infrastructure provision.

9.9.3 In achieving the planning objective to encourage compatible recreation activities in the Area, the area north of ~~Ha Mei San Tsuen~~***Fung Ka Wai*** between Kai Shan and Tin Shui Wai New Town is zoned "REC".

9.9.4 To provide flexibility for innovative design adapted to the characteristics of particular sites, minor relaxation of the plot ratio and building height restrictions may be considered by the Board through the planning permission system. Each proposal will be considered on its individual merits.

9.9.5 However, for any existing building with plot ratio and building height already exceeding the plot ratio and building height restrictions as shown on the Notes of the Plan, there is a general presumption against such application for minor relaxation except under exceptional circumstances.

9.10 Green Belt ("GB") : Total Area : ~~61.24~~ ***55.32*** ha

9.10.1 The planning intention of this zone is primarily for defining the limits of urban and sub-urban development areas by natural features and to contain urban sprawl, as well as to provide passive recreational outlets. There is a general presumption against development within this zone. However, limited developments may be permitted with or without conditions on application to the Board, and each application will be considered on its individual merits taking into account the relevant Town Planning Board Guidelines.

9.10.2 The "GB" zones in the Area cover the vegetated knolls to the west of the Yuen Long Sewerage Treatment Works, the foothills and lowlands to the south of Kai Shan, the vegetated knolls to the east, south and west of Long Tin Road and a strip of land underneath and to the north of the West Rail viaduct near Yung Yuen Road.

9.11 Conservation Area ("CA") : Total Area : 70.23 ha

9.11.1 This zoning is intended to protect and retain the existing natural landscape, ecological or topographical features of the area for

conservation, educational and research purposes. There is a general presumption against development in this zone.

9.11.2 In general, only developments that are needed to support the conservation of the existing natural landscape or scenic quality of the area or are essential infrastructure project with overriding public interest may be permitted. Uses related to conservation purposes such as nature reserve and nature trail are permitted as of right. Only a selective range of uses such as public convenience and tent camping ground which would have insignificant impact on the environment and infrastructural provision may be permitted with or without conditions on application to the Board.

9.11.3 Areas under this zoning comprise the hilly areas of Kai Shan. They also include the permitted burial grounds.

9.12 Other Specified Uses ("OU") : Total Area :1.68 ha

9.12.1 This zone covers land annotated for the following specific uses:

Historical Building Preserved for Cultural and Community Uses

9.12.2 The Tsui Sing Lau Pagoda and Tat Tak Communal Hall, which are declared monuments, are included in this zone. The planning intention is to preserve the Tsui Sing Lau Pagoda and Tat Tak Communal Hall as heritage attractions with the provision of cultural and community facilities for the enjoyment of the public. Developments within this zone are subject to maximum height of 3 storeys and 1 storey for Tsui Sing Lau Pagoda and Tat Tak Communal Hall respectively. Any addition, alteration and/or modification to the existing buildings (except restoration works co-ordinated or implemented by Government and those minor alteration and/or modification works which are ancillary and directly related to the always permitted uses or the existing buildings) requires permission from the Board.

Heritage and Cultural Tourism Related Uses

9.12.3 Two pieces of land around the Tsui Sing Lau Pagoda (about 3,180 m^2) and in front of the Tat Tak Communal Hall (about 1,783 m^2) are under this zone. The planning intention is to facilitate provision of heritage and cultural tourism related facilities or uses that are complementary to the Tsui Sing Lau Pagoda and Tat Tak Communal Hall as heritage attractions and encourage compatible developments around the historic buildings. Developments in this zone are subject to a maximum plot ratio of 0.4 and a maximum building height of 10mPD. It is also the intention of this zone that any proposed development shall cover the whole zone. Any developments or redevelopments are required to prepare a layout plan for approval of the Board. The planning application should demonstrate the nature and scale of the proposed use/development would be compatible with the heritage setting of the

historic buildings in terms of building height and design, and that the proposed developments would be sustainable in heritage, visual and traffic terms. Heritage, visual and traffic impact assessments should be undertaken to address any possible heritage, visual and traffic problems. Necessary landscape and design measures should also be provided to minimize any adverse impacts on the historical buildings.

9.12.4 To provide flexibility for innovative design adapted to the characteristics of particular sites, minor relaxation of the plot ratio and building height restrictions may be considered by the Board through the planning permission system. Each proposal will be considered on its individual merits.

9.12.5 However, for any existing building with plot ratio and building height already exceeding the plot ratio and building height restrictions as shown on the Notes of the Plan, there is a general presumption against such application for minor relaxation except under exceptional circumstances.

Pumping Station and Associated Facilities

9.12.6 This zone covers the existing Sheung Cheung Wai First and Second Floodwater Pumping Stations and the associated flood pond which are used for preventing flooding in the villages.

10. COMMUNICATIONS

10.1 Roads and Railways

10.1.1 The Area is mainly served by Castle Peak Road, Yuen Long Highway and the LR network. It is connected to the Deep Bay area and Tin Shui Wai New Town by Long Tin Road and Ping Ha Road. With the completion of Route 3, the accessibility of the Area has been greatly improved.

10.1.2 The WR provides a sub-regional passenger link connecting the NWNT to the urban areas. It provides a domestic passenger line from Hung Hom, Kowloon to Tuen Mun via East Tsim Sha Tsui, Austin, Nam Cheong, Mei Foo, Tsuen Wan West, Kam Sheung Road, Yuen Long, Long Ping, Tin Shui Wai and Siu Hong.

10.1.3 A cycling entry/exit hub ***is*** ~~would be~~ provided at an area to the north of the WR viaduct near WR Tin Shui Wai Station as a part of the comprehensive cycle track system connecting NWNT with North East New Territories. The cycling entry/exit hub ~~will~~ provide***s*** facilities including information board, cycle parking spaces, toilets, cycle rental kiosk, food kiosk, first aid kiosk, practicing area, sitting-out area and planting areas. ~~The proposed cycling hub has been authorized under the Roads (Works, Use and Compensation) Ordinance.~~

10.2 Public Transport

The Area is at present served by road- and rail-based public transport including LR, buses, minibuses and taxis linking to Tin Shui Wai New Town in the north, Hung Shui Kiu***/ Ha Tsuen*** NDA in the west, and Yuen Long New Town in the east.

11. UTILITY SERVICES

11.1 Water Supply

Wang Chau Service Reservoir is located in the Area. The existing water treatment works capacity available in the NWNT will soon be fully committed. Further treatment works capacity, if required, would be made available from the future extension to Ngau Tam Mei Water Treatment Works. Extension of water supply system will be required if there is a substantial increase in the future water demand arising from development proposals for large residential developments.

11.2 Sewerage and Sewage Treatment

The Area has been served by sewerage network along public carriageway and some areas in the Area are not served by sewerage network. ~~Although a large part of the Area has been served by sewerage network, some areas within the Area are still not served by the sewerage network.~~ Stringent effluent treatment and discharge standards are required to meet and on-site sewage treatment and disposal facilities are still required in these unsewered areas in the interim period before connection can be made to Government sewers. As such, future development proposals in the Ping Shan area would need to demonstrate that they have satisfactory arrangements for on-site sewage treatment and disposal facilities and for connection with the public sewerage network when it is available.

11.3 Electricity

The Area has long been supplied with electricity. It is anticipated that there will not be any problem in the provision of electricity supply to the Area.

11.4 Gas

Gas mains have been laid from Ping Ha Road via Hung Tin Road to Castle Peak Road. Piped gas supply is made available in the Area.

12. CULTURAL HERITAGE

12.1 Within the boundary of the Area, there are five declared monuments namely the Tang Ancestral Hall, Yu Kiu Ancestral Hall, Yan Tun Kong Study Hall, Tsui

Sing Lau Pagoda, and Tat Tak Communal Hall, a number of graded historic buildings of the list of 1,444 historic buildings, as well as Sheung Cheung Wai Site of Archaeological Interest. ~~All of the above declared monuments, graded historic buildings and site of archaeological interest are worthy of preservation. The Antiquities Advisory Board (AAB) also released a list of new items in addition to the list of 1,444 historic buildings. These items are subject to grading assessment by the AAB. Details of the list of 1,444 historic buildings and the new items have been uploaded onto the website of the AAB at http://www.aab.gov.hk.~~ ***The Antiquities Advisory Board (AAB) released the list of 1,444 historic buildings, and accorded grading to some buildings/structures. There are also a number of new items in addition to the list of 1,444 historic buildings which*** **are** ***subject to grading assessment by the AAB. Details of the list of 1,444 historic buildings and new items for grading assessment have been uploaded onto the official website of the AAB at http://www.aab.gov.hk. Besides the list of 1,444 historic buildings, there is also a list of new items pending for grading. Several areas of archaeological potential near Ng Uk Tsuen, Tai Tseng Wai and Shing Uk Tsuen, Wang Chau and Kai Shan identified by the Final Technical Report No. 3G (TR-3G) Preferred Option and Technical Assessment – Environmental Impact Assessment Report for Planning and Engineering Study for the Public Housing Site and Yuen Long Industrial Estate Extension at Wang Chau are situated within the Area.***

12.2 Prior consultation with the Antiquities and Monuments Office (AMO) of the ~~Leisure and Cultural Services Department~~ ***Development Bureau*** should be ~~made~~ ***sought*** if any ***works,*** development, redevelopment or rezoning proposal might affect the above declared monuments, graded historic buildings, new items, site of archaeological interest***, areas of archaeological potential identified*** and their immediate environs. ***If disturbance to the site of archaeological interest (SAI) is unavoidable, prior agreement with AMO should be made on any measures for the protection of the SAI. For example, whether detailed Archaeological Impact Assessment (AIA) is required. The AIA*** ~~An assessment~~ shall ~~be conducted to~~ evaluate the archaeological impact imposed by the proposed works ~~if there is any development within the site of archaeological interest~~. If necessary, a ~~professional~~ ***qualified*** archaeologist shall be engaged to apply for a licence from the Antiquities Authority under the Antiquities and Monuments Ordinance (Cap. 53) for an archaeological field investigation***. A proposal of the AIA shall be submitted to AMO for agreement prior to applying for the licence. Subject to the findings of the AIA, appropriate mitigation measures shall be fully implemented by the project proponent in consultation with AMO.***~~to evaluate whether the proposed works is acceptable from an archaeological preservation point of view and propose appropriate mitigation measures in prior agreement with the AMO.~~

12.3 Besides, AMO should be alerted if there are any buildings / structures both at grade and underground which were built on or before 1969 identified within the Area. Consultation with the Commissioner for Heritage's Office (CHO) and AMO should be made if any declared monuments, graded historic buildings / structures as well as items to be graded and any other historic structures identified would be affected.

13. IMPLEMENTATION

13.1 The Plan provides a broad land-use framework for development control and implementation of planning proposals. More detailed plans will be prepared as a basis for public works planning and private developments.

13.2 At present, there is no overall programme for the provision of infrastructure within the Area. The implementation process will be in stages and may stretch over a long period depending on the availability of resources. It will be undertaken through the participation of both the public and private sectors.

13.3 The provision of infrastructure, e.g. road widening and laying of services, will be implemented through the Public Works Programme and the Local Public Works Improvement Programmes as and when resources are available. Private developments will be effected principally through private sector initiatives to develop or redevelop their properties in accordance with the zoned uses indicated on the Plan, provided that their proposals have met the Government requirements.

14. PLANNING CONTROL

14.1 The types of permitted developments and uses within the Area are listed in the Notes to the Plan. Unless otherwise specified, all building, engineering and other operations incidental to and all uses directly related and ancillary to the permitted developments and uses within the same zone are always permitted and no separate permission is required.

14.2 Uses of land or building which were in existence immediately before the first publication in the Gazette of the notice of the Lau Fau Shan and Tsim Bei Tsui IDPA Plan/draft Ping Shan DPA Plan and which are not in compliance with the terms of the Plan may have adverse impact on the environment, drainage and traffic of the area. Although no action is required to make such use conform to the Plan, any material change of such use or any other development (except minor alteration and/or modification to the development of the land or building in respect of such use which is always permitted) must be always permitted in terms of the Plan or, if permission is required, in accordance with a permission granted by the Board. The Board will consider these applications on their individual merits. Those alteration and/or modification works which may lead to an environmental improvement or upgrading to the Area may be considered favourably by the Board.

14.3 Planning applications to the Board will be assessed on individual merits. In general, the Board, in considering the planning applications, will take into account all relevant planning considerations which may include the departmental outline development plans and layout plans, and the guidelines published by the Board. The outline development plans and the 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.

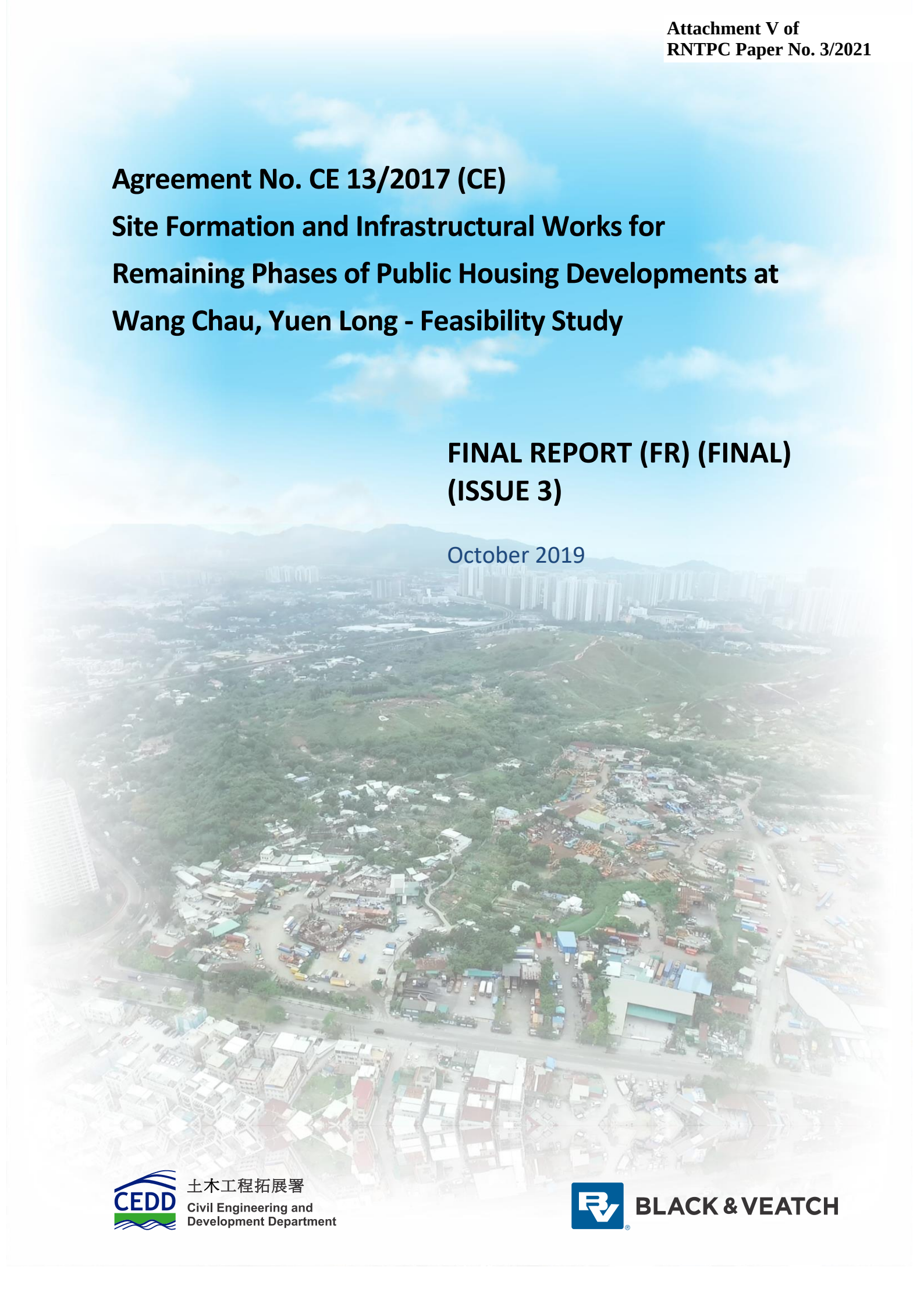
14.4 Any development, other than those referred to in paragraph 14.1 above or in conformity with this Plan or with the permission of the Board, undertaken or continued on or after 18 June 1993 on land included in a plan of the Ping Shan DPA or on or after 17 August 1990 on land included in a plan of the Lau Fau Shan and Tsim Bei Tsui IDPA, may be subject to enforcement proceedings under the Ordinance. Any filling of pond/land and excavation of land in relevant zoning referred to in the Notes of relevant zone without the permission from the Board may also be subject to enforcement proceedings.

TOWN PLANNING BOARD
~~OCTOBER 2018~~ ***APRIL 2021***

Agreement No. CE 13/2017 (CE)
Site Formation and Infrastructural Works for Remaining Phases of Public Housing Developments at Wang Chau, Yuen Long - Feasibility Study

FINAL REPORT (FR) (FINAL) (ISSUE 3)

October 2019



土木工程拓展署
Civil Engineering and Development Department

BLACK & VEATCH

Agreement No. CE 13/2017 (CE)

Site Formation and Infrastructural Works for Remaining Phases of Public Housing Developments at Wang Chau, Yuen Long – Feasibility Study

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Final Report (FR) (Final)

196587/B&V/050/Issue 3

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October 2019

DOCUMENT CONTROL	**Agreement No. CE 13/2017 (CE)**	No: **196587/B&V/050**
AMENDMENT RECORD	**Site Formation and Infrastructural Works for Remaining Phases of Public Housing Developments at Wang Chau, Yuen Long – Feasibility Study**	Prepared by: **B&V**
Final Report (FR) (Final)	Client: CEDD	Initial: [redacted]
		Date: **October 2019**

Pages	Date	Issue No	Description	Initials
All	April 2019	1	Issue to CEDD for comment	[redacted]
All	April 2019	2	Issue to CEDD for comment	
All	October 2019	3	Issue to CEDD for record and retention	

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	Name	Signature	Date
Prepared	[redacted]		October 2019
Checked			October 2019
Reviewed			October 2019
Authorised			October 2019

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1 INTRODUCTION

1.1 Project Background

1.1.1 Black & Veatch Hong Kong Limited (B&V) was commissioned by Civil Engineering and Development Department (CEDD) to examine the technical feasibility and sustainability of remaining phases of public housing developments at Wang Chau (the Assignment), location of which is shown on **Figure 196587/B&V/GEN/002**.

1.1.2 The proposed site (the Site) was identified by the Government as part of the prevailing Government's policy to increase land supply to meet public demand. The Site is located at the western flank of Shan Pui Alluvial Valley, bounded by Fuk Hi Street to the east and Kai Shan to the west, the planned Yuen Long Industrial Estate Extension (YLIEE) to the north and a number of natural hillsides to the south. Generally, the Site is a relatively flat terrain with a gentle gradient of 2% sloping from +3.9 mPD at the southeast near Long Ping Road/Fuk Hi Street to +15.8 mPD at the west near Kai Shan. Currently, the Site is zoned 'Green Belt' (GB) and 'Open Storage' (OS) on the approved Ping Shan OZP No. S/YL-PS/18, as shown in **Figure 196587/B&V/OZP/001**, and is occupied by open storage, vehicle parks, farmland, fallow land, grassland, rural residential dwellings and temporary structures.

1.1.3 The Assignment is to confirm the feasibility of the development and infrastructure works by undertaking a series of technical assessments so as to support the proposed zoning amendment of land use. Both cost-effectiveness and technical feasibility of the Development would be considered in formulating proposed works, mitigation measures and implementation programme for potential phased population intake. Subject to findings of the Assignment, an investigation, design and construction consultancy may be commissioned to implement the final recommended site formation and infrastructure works.

1.1.4 "The Development" means collectively the developments proposed in an optimal scheme for the proposed public housing, Government/Institutional and Community (G/IC), schools within the Site, re-provision of any existing structures/facilities therein, and the associated site formation and infrastructure works, which comprise the following (subject to findings and recommendations from other technical assessments):

a) Site formation works including slope cutting and earth filling works, as well as geotechnical works and earth retaining structures;

b) Works for land decontamination;

c) Road works (including construction of new roads, footpaths, cycle tracks, existing road improvements, provision of new junctions, etc.);

d) Sewerage infrastructure works (including network of gravity sewers and/or sewage pumping station and associated rising mains, etc.);

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e) Drainage infrastructure works (including stormwater drainage network, surface drains, improvement to existing drainage channel and construction of drainage box culvert);

f) Environmental mitigation measures; and

g) Other infrastructure works including water supply and utility services connections (by respective agencies or utility undertakings).

1.2 Objective of this Report

1.2.1 The purpose of this Final Report is to:

a) Provide a summary of the overall Assignment;

b) Set out key findings, proposals and recommendations of the Assignment;

c) Present the approach, methodology and results of the technical assessments; and

d) Proposes the implementation strategy and framework, including cost estimation, recommendation on implementation and phasing for the Infrastructure works.

1.2.2 The structure of the report is as follows:

- Section 1 introduces the project background, the main tasks and purpose of this report.
- Section 2 discusses the latest development proposal in the Development;
- Section 3 summarises the findings in the Traffic and Transport Impact Assessment (TTIA);
- Section 4 summarises the findings in the Preliminary Drainage Impact Assessment (DIA);
- Section 5 summarises the findings in the Preliminary Sewerage Impact Assessment (SIA);
- Section 6 summarises the findings in the Preliminary Water Supply Impact Assessment (WSIA);
- Section 7 summarises the findings in the Preliminary Utilities Impact Study Report;
- Section 8 summarises the findings in the Preliminary Geotechnical Assessment;

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- Section 9 summarises the findings in the Preliminary Site Formation Assessment;
- Section 10 summarises the findings in the Preliminary Environmental Review;
- Section 11 summarises the findings in the Landscape and Visual Impact Assessment;
- Section 12 summarises the findings in the Land Contamination Assessment;
- Section 13 summarises the findings in the Preliminary Air Ventilation Assessment;
- Section 14 summarises the findings in the Preliminary Land Requirement Study;
- Section 15 summarises the findings in the Preliminary Sustainability Assessment;
- Section 16 presents the Cost Estimation, Phasing, Programme, Implementation Mechanisms; and
- Section 17 provides the conclusion to the report.

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2 LATEST DEVELOPMENT PROPOSAL

2.1 Option Generation

2.1.1 In the Option Generation, Evaluation and Preliminary Assessments under the Assignment, a set of guiding principles were established to address key constraints of the Site identified in the Baseline Review. Three development layout options have been formulated and compared against a set of evaluation criteria in different aspects including planning, land requirements, engineering and infrastructure, environment, economics and social aspects. An Optimal Scheme was chosen and carried forward for further analysis and assessments. The optimal scheme is shown in **Figure 196587/B&V/OPT/003**.

2.2 Development Layout

2.2.1 The Site will be rezoned for public housing development with 13 residential blocks (10 blocks with 40 domestic storeys and 3 blocks with 42 domestic storeys with building height at approximately +121.1 mPD to +130.7 mPD) to provide 13,000 flats, which are subject to review in the detailed design stage. The public housing development will be supported by retail facilities, community facilities, car park (around 23 m high at +30.5 mPD), Public Transport Interchange (PTI) (around 10 m high at +14.5 mPD to +16.5 mPD), kindergarten and two primary schools (around 20 m high at +26.5 mPD).

2.2.2 The preliminary development parameters are summarized in **Table 2.1**.

Table 2.1 – Preliminary Development Parameters

	Development Parameters
Total Site Area	12.04 ha
Net Site Area for Public Housing	10.83 ha
Maximum Permitted Domestic Plot Ratio (PR)	6.0
Maximum Permitted Non-domestic Plot Ratio (PR)	0.5
Maximum Building Height	135 mPD
Total Flat Production	13,000 Flats
Average Flat Size	50 m2
Person Per Flat	2.8
Design Population	36,400
Retail	12,972 m2 GFA
Community Facilities	1,296 m2 GFA
Public Transport Interchange	5,290 m2 GFA
Above-ground carpark	30,000 m2 GFA
Kindergarten	26 Classrooms
School Provision	Two 24-Classroom Primary Schools (25.5 Students per class)
Target Population Intake	2033

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3 PRELIMINARY TRAFFIC AND TRANSPORT IMPACT ASSESSMENT (TTIA)

3.1 Introduction

3.1.1 The objectives of the Preliminary Traffic and Transport Impact Assessment (TTIA) include the following:

- To conduct a comprehensive review of the traffic and transport data and carry out assessments to appraise the existing traffic condition within the Area of Influence (AOI);
- To present the methodology of traffic forecast and predict the future demand for traffic and public transport arising from the Development in design scenarios;
- To investigate different road schemes for both of internal and external road network to the Development; and
- To assess the traffic implication in different design scenarios and formulate mitigation measure / improvement schemes within the AOI.

3.1.2 Findings and recommendations of the TTIA are presented in Preliminary Traffic and Transport Impact Assessment Report. A summary of the assessment is presented in the sections below.

3.2 Traffic Impacts

3.2.1 Traffic to be generated from the Development will cause an increase in junction flows and link flows. To cater for the additional trips, the operational performance of critical junctions and road links should be reviewed and junction improvement schemes should be proposed if necessary. Also, the Development will generate significant demand on other modes of transportation including pedestrian and public transportation. Pedestrian connectivity and capacity of transportation facilities should be addressed.

3.3 Methodologies

Existing Traffic Condition

3.3.1 In order to assess the traffic and transport impact arising from the Development, an AOI has been established and agreed with the Transport Department. A traffic survey in the form of manual classified counts were carried out during the periods from 0730 to 0930 and from 1700 to 1900 of a typical weekday in September of 2017 to determine the existing traffic demand within the AOI during peak periods. The locations of the surveyed junctions / links are illustrated in **Figure 196587/B&V/TTIA/101**.

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3.3.2 Existing operational performance of key junctions were assessed by calculating the reserve capacity (RC) for signal-controlled junctions, and the ratio of flow to capacity (RFC) for priority junctions and roundabouts.

Design Year

3.3.3 The Development is targeted for population intake by year 2033. In order to assess the impact of the traffic in relation to the Development on the local road network, it is necessary to forecast the traffic flows for year 2036, which is 3 years upon the target population intake.

Traffic Model Methodology for Base Year Model

3.3.4 Transport Department's 2008-based Base District Traffic Model (BDTM) "NTW1" covering Yuen Long and Tin Shui Wai is adopted for the Study. The NTW1 year 2016 traffic model are cordoned off and fine tuned to produce a Local Area Model (LAM) for providing traffic flows within the agreed AOI to improve the efficiency of modelling run time.

3.3.5 The base year and future year local area models for weekday AM & PM peaks using the latest 2014-based Territorial Population and Employment Data Matrices (TPEDM) planning assumption released by the Planning Department in March 2017 are developed for providing traffic forecast for traffic impact assessment.

3.3.6 As the current 2008-based BDTM NTW1 model are not developed based on the latest 2014-based TPEDM planning assumptions, in-house Strategic Model, MVCTS, are adopted to provide strategic traffic forecast and cordoned matrices for the LAM. MVCTS model is validated and updated using the latest 2014-based TPEDM, 2014 Annual Traffic Census flows, highway and railway network development programme, port and airport throughput assumptions, toll assumptions, and economic forecast indicators.

Development Traffic Generation

3.3.7 Trip generation rates for the Development are referenced to the Transport Planning & Design Manual (TPDM) Volume 1 Chapter 3 Annex D Traffic Generation and Attraction Rates.

Traffic Model Methodology for Future Design Year

3.3.8 Similar to base year model development, MVCTS for future years adopted the latest 2014-based TPEDM planning data. Cordon matrices are provided by MVCTS for building up the initial matrices for future year LAM.

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3.4 Traffic Impact Assessment

3.4.1 A TIA has been carried out to identify critical issues and recommend any associated traffic improvement schemes. The key junctions and major road links under this assessment are shown in **Figure 196587/B&V/TTIA/101**.

Assessment of Major Junctions

3.4.2 The operational performance of the identified critical junctions are assessed for Design Year 2036. The results are summarized in **Table 3.1.**

Table 3.1 – Junctions Performance in Design Year 2036

Ref.	Junction	Method of Control	RC/RFC(1)			
			2036 Reference Case		2036 Design Case	
			AM Peak	PM Peak	AM Peak	PM Peak
J1	Fuk Hi Street / Long Ping Road	Signal	67%	95%	-5%	27%
J2	Long Ping Road / Long Ping Estate Bus Terminus	Priority	1.11	0.99	1.52	1.20
J3	Long Ping Road / Fung Chi Road	Signal	24%	40%	-7%	9%
J4	Fung Chi Road / Wang Tat Road	Signal	15%	13%	-4%	11%
J5	Wang Tat Road / Ma Wang Road / Ma Miu Road	Signal	69%	77%	62%	71%
J6	Shui Pin Wai Interchange	Signal	55%	54%	30%	26%
J7	Castle Peak Road-Ping Shan / Long Tin Road / Ma Wang Road / Wang Tat Road	Signal	46%	52%	40%	48%
J9	Fuk Hi Street / Wang Lok Street	Signal	35%	28%	-10%	-8%
J10	Wang Lok Street / Wang Tat Road/ Long Yip Street / Yuen Long On Lok Road / Ma Wang Road	Signal	43%	48%	16%	18%
J11	Po Yip Street / Long Yip Street / Yuen Long On Lok Road	Signal	30%	41%	16%	30%
J12	Castle Peak Road-Yuen Long / Long Yat Road / Long Lok Road	Signal	32%	38%	25%	33%
J13	Pok Oi Interchange	Roundabout	0.92	0.92	0.97	0.97
J14	Fuk Hi Street / Proposed Development Access	Signal	-	-	22%	59%
J15	Fuk Hi Street / Proposed PTI	Priority	-	-	0.33	0.32

Note: (1) RC = Reserve Capacity, RFC = Ratio of Flow to Capacity

3.4.3 The assessment results indicate that all the critical junctions would be operated within their capacities (i.e. RC >0% and RFC <1.0) except 5 junctions including J1 – Fuk Hi Street / Long Ping Road, J2 – Long Ping Road / Long Ping Estate Bus Terminus, J3 – Long Ping Road / Fung Chi Road, J4 – Fung Chi Road / Wang Tat Road and J9 – Fuk Hi Street / Wang Lok Street would be operated over their capacities and J13 – Pok Oi Interchange would be operated near its capacity in Design Year 2036.

Assessment of Road Links

3.4.4 The operational performance of the identified road links are assessed for Design Year 2036. The results are summarized in **Table 3.2**.

Table 3.2 – Road Links Performance in Design Year 2036

Ref.	Road	Dir.	Capacity[1] (pcu/hr)	2036 Reference Case				2036 Design Case			
				Traffic Flow (pcu/hr)		V/C Ratio		Traffic Flow (pcu/hr)		V/C Ratio	
				AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
L1	Fuk Hi Street	EB	2,800	500	540	0.18	0.19	775	710	0.28	0.25
		WB	2,800	740	775	0.26	0.28	975	1,020	0.35	0.36
L2	Long Ping Road	NB	2,800	1,030	905	0.37	0.32	1,245	1,095	0.44	0.39
		SB	2,800	795	725	0.28	0.26	1,590	1,230	0.57	0.44
L3	Wang Lok Street	NB	2,800	725	735	0.26	0.26	1,030	930	0.37	0.33
		SB	2,800	795	685	0.28	0.24	1,005	905	0.36	0.32
L4	Fung Chi Road	NB	2,800	585	580	0.21	0.21	800	600	0.29	0.21
		SB	2,800	425	295	0.15	0.11	460	315	0.16	0.11
L5	Wang Tat Road	EB	2,800	1,100	1,235	0.39	0.44	1,155	1,290	0.41	0.46
L6	Ma Wang Road	WB	4,450	985	1,190	0.22	0.27	1,185	1,205	0.27	0.27
L7	Long Tin Road (West of Shui Pin Wai Interchange)	EB	5,700	2,620	2,480	0.46	0.44	2,705	2,555	0.47	0.45
		WB	5,700	2,145	2,695	0.38	0.47	2,245	2,755	0.39	0.48
L8	Long Tin Road (North of Tong Yan San Tsuen Interchange)	NB	5,700	3,805	3,450	0.67	0.61	4,190	3,680	0.74	0.65
		SB	5,700	2,870	3,160	0.50	0.55	3,205	3,450	0.56	0.61
L9	Long Yip Street	EB	2,800	1,260	1,305	0.45	0.47	1,535	1,470	0.55	0.53
L10	Yuen Long On Lok Road	WB	4,450	1,235	1,285	0.28	0.29	1,420	1,475	0.32	0.33
L11	Castle Peak Road – Yuen Long	EB	3,200	1,670	1,840	0.52	0.58	1,710	1,860	0.53	0.58
		WB	3,200	1,480	1,475	0.46	0.46	1,525	1,490	0.48	0.47
L12	Castle Peak Road – Ping Shan	EB	3,200	3,105	2,925	0.97	0.91	3,340	3,060	1.04	0.96
		WB	3,200	2,470	3,120	0.77	0.98	2,640	3,290	0.83	1.03
L13	Yuen Long Highway (North of Pok Oi Interchange)	NB	6,100	7,280	6,360	0.89	0.78	7,515	6,495	0.92	0.79
		SB	6,100	5,515	6,185	0.90	1.01	5,655	6,315	0.93	1.04
L14	Yuen Long Highway (Between Pok Oi Interchange and Shap Pat Heung Interchange)	NB	4,000	4,115	4,060	1.03	1.02	4,135	4,060	1.03	1.02
		SB	4,000	4,220	3,630	1.06	0.91	4,220	3,630	1.06	0.91
L15	Yuen Long Highway (Between Shap Pat Heung Interchange and Tong Yan San Tsuen Interchange)	EB	6,100	5,725	4,960	0.94	0.81	5,725	4,960	0.94	0.81
		WB	6,100	5,240	5,105	0.86	0.84	5,260	5,105	0.86	0.84
L16	Yuen Long Highway (West of Tong Yan San Tsuen Interchange)	EB	6,100	5,535	5,565	0.91	0.91	5,850	5,855	0.96	0.96
		WB	6,100	6,180	5,610	1.01	0.92	6,565	5,840	1.08	0.96

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Ref.	Road	Dir.	Capacity(1) (pcu/hr)	2036 Reference Case				2036 Design Case			
				Traffic Flow (pcu/hr)		V/C Ratio		Traffic Flow (pcu/hr)		V/C Ratio	
				AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
L17	Slip road from Long Tin Road (SB) to Yuen Long Highway (EB)	-	1,800	1,695	1,155	0.94	0.64	1,695	1,155	0.94	0.64
L18	Slip road from Long Tin Road (SB) to Yuen Long Highway (WB)	-	3,600	1,840	1,815	0.51	0.50	2,120	2,045	0.59	0.57
L19	Slip road from Yuen Long Highway (EB) to Long Tin Road (NB)	-	3,600	1,785	1,855	0.50	0.52	2,095	2,145	0.58	0.60
L20	Slip road from Yuen Long Highway (WB) to Long Tin Road (NB)	-	1,800	1,555	1,730	0.86	0.96	1,580	1,730	0.88	0.96

Note: (1) Road link capacity was made reference to Table 6.2, Technical Report of Restructuring and Enhancement of the CTS-3 Model – Feasibility Study

3.4.5 The assessment results show that all the above road links will still be operated within capacity (i.e. V/C ratios below 1.0.) in design year 2036 except 4 road links including L12 – Castle Peak Road – Ping Shan, L13 - Yuen Long Highway (North of Pok Oi Interchange), L14 - Yuen Long Highway (Between Pok Oi Interchange and Shap Pat Heung Interchange) and L16 - Yuen Long Highway (West of Tong Yan San Tsuen Interchange), which would operate with V/C ratio between 1.0 and 1.1, meaning that the road sections are slightly overloaded, but heavy congestions and long traffic queues would not be expected. The road sections will experience some delay with reduced traffic speed at peak periods, which is commonly seen at the strategic roads in some urban areas, but it will still be manageable.

Footpaths and Crossings in the Vicinity of the Site

3.4.6 It is anticipated that majority of the pedestrian demands in the peak hours are related to the public transport mode, which include rail and non-rail trips to/from the Development. According to the operational assessment result, all footpaths and crossings would be operated with ample capacities in design year 2036 after population intake of the Development.

Provision of Public Transport Facilities / Services

3.4.7 Based on the MVCTS Public Transport Model, **Table 3.3** summarises Design Year 2036 AM (Completion year + 3 years) peak boardings (i.e. outbound direction) on the bus services (including Bus mode and Bus-to-Rail mode) together with the estimated number of bus routes required.

Table 3.3 – Proposed Bus Service

Scenario	Site	Population	2036 AM Peak Outbound Direction Public Transport Demand(1) (patronage/hr)	Required Bus Trips(2) (bus/hr)	Required Bus Routes(3)
1	Northern and Southern Portions	36,400	3,640	40	6

Note:
(1) According to MVCTS Public Transport Model, a public transport trip rate of 0.1 patronage/hr/population was adopted
(2) Based on an occupancy of 90 passengers per bus (70% of full bus capacity [130 passengers])
(3) Based on maximum frequency of 8 minutes for each bus routes

Construction Traffic Impact Assessment

3.4.8 Considering the construction sequence and schedule, Year 2029 is identified as the critical construction stage with respect to the peak construction traffic generated. Refer to the construction activities during the peak construction period, around 144 trucks per day or 45 pcu/hr would be generated from and attracted to the site. Therefore, traffic forecasts are developed for Design Year 2029.

3.4.9 The operational performance of the identified critical junctions and road links are assessed for Design Year 2029. The results are summarized in **Table 3.4** and **Table 3.5** respectively.

Table 3.4 – Junctions Performance in Design Year 2029

Ref.	Junction	Method of Control	RC/RFC(1)			
			2029 Reference Case		2029 Design Case	
			AM Peak	PM Peak	AM Peak	PM Peak
J1	Fuk Hi Street / Long Ping Road	Signal	69%	100%	61%	89%
J2	Long Ping Road / Long Ping Estate Bus Terminus	Priority	1.08	0.97	1.10	0.99
J3	Long Ping Road / Fung Chi Road	Signal	27%	43%	23%	37%
J4	Fung Chi Road / Wang Tat Road	Signal	18%	18%	18%	18%
J5	Wang Tat Road / Ma Wang Road / Ma Miu Road	Signal	74%	86%	74%	86%
J6	Shui Pin Wai Interchange	Signal	62%	60%	59%	56%
J7	Castle Peak Road-Ping Shan / Long Tin Road / Ma Wang Road / Wang Tat Road	Signal	50%	60%	50%	60%
J9	Fuk Hi Street / Wang Lok Street	Signal	38%	29%	38%	29%
J10	Wang Lok Street / Wang Tat Road/ Long Yip Street / Yuen Long On Lok Road / Ma Wang Road	Signal	46%	53%	46%	53%
J11	Po Yip Street / Long Yip Street / Yuen Long On Lok Road	Signal	31%	46%	31%	46%
J12	Castle Peak Road-Yuen Long / Long Yat Road / Long Lok Road	Signal	37%	41%	37%	41%
J13	Pok Oi Interchange	Roundabout	0.88	0.84	0.88	0.84
J14	Fuk Hi Street / Proposed Development Access	Signal	-	-	93%	>100%

Note: (1) RC = Reserve Capacity, RFC = Ratio of Flow to Capacity

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3.4.10 The assessment results indicate that all the critical junctions would be operated within their capacities (i.e. RC >0% and RFC <1.0) except J2 – Long Ping Road / Long Ping Estate Bus Terminus would be operated near its capacities in Design Year 2029.

Table 3.5 – Road Links Performance in Design Year 2029

Ref.	Road	Dir.	Capacity(1) (pcu/hr)	2029 Reference Case				2029 Design Case			
				Traffic Flow (pcu/hr)		V/C Ratio		Traffic Flow (pcu/hr)		V/C Ratio	
				AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
L1	Fuk Hi Street	EB	2,800	490	530	0.18	0.19	490	530	0.18	0.19
		WB	2,800	725	760	0.26	0.27	725	760	0.26	0.27
L2	Long Ping Road	NB	2,800	1,015	885	0.36	0.32	1,015	885	0.36	0.32
		SB	2,800	780	710	0.28	0.25	780	710	0.28	0.25
L3	Wang Lok Street	NB	2,800	715	725	0.26	0.26	715	725	0.26	0.26
		SB	2,800	775	670	0.28	0.24	775	670	0.28	0.24
L4	Fung Chi Road	NB	2,800	565	560	0.20	0.20	565	560	0.20	0.20
		SB	2,800	410	285	0.15	0.10	410	285	0.15	0.10
L5	Wang Tat Road	EB	2,800	1,070	1,160	0.38	0.41	1,070	1,160	0.38	0.41
L6	Ma Wang Road	WB	4,450	970	1,160	0.22	0.26	970	1,160	0.22	0.26
L7	Long Tin Road (West of Shui Pin Wai Interchange)	EB	5,700	2,555	2,390	0.45	0.42	2,555	2,390	0.45	0.42
		WB	5,700	2,100	2,640	0.37	0.46	2,100	2,640	0.37	0.46
L8	Long Tin Road (North of Tong Yan San Tsuen Interchange)	NB	5,700	3,745	3,400	0.66	0.60	3,790	3,445	0.66	0.60
		SB	5,700	2,840	3,095	0.50	0.54	2,885	3,140	0.51	0.55
L9	Long Yip Street	EB	2,800	1,240	1,240	0.44	0.44	1,240	1,240	0.44	0.44
L10	Yuen Long On Lok Road	WB	4,450	1,220	1,245	0.27	0.28	1,220	1,245	0.27	0.28
L11	Castle Peak Road – Yuen Long	EB	3,200	1,620	1,765	0.51	0.55	1,620	1,765	0.51	0.55
		WB	3,200	1,445	1,410	0.45	0.44	1,445	1,410	0.45	0.44
L12	Castle Peak Road – Ping Shan	EB	3,200	3,020	2,850	0.94	0.89	3,020	2,850	0.94	0.89
		WB	3,200	2,405	3,050	0.75	0.95	2,405	3,050	0.75	0.95
L13	Yuen Long Highway (North of Pok Oi Interchange)	NB	6,100	7,070	6,180	0.86	0.75	7,070	6,180	0.86	0.75
		SB	6,100	5,370	6,005	0.88	0.98	5,370	6,005	0.88	0.98
L14	Yuen Long Highway (Between Pok Oi Interchange and Shap Pat Heung Interchange)	NB	4,000	4,015	3,970	1.00	0.99	4,015	3,970	1.00	0.99
		SB	4,000	4,090	3,520	1.02	0.88	4,090	3,520	1.02	0.88
L15	Yuen Long Highway (Between Shap Pat Heung Interchange and Tong Yan San Tsuen Interchange)	EB	6,100	5,570	4,860	0.91	0.80	5,570	4,860	0.91	0.80
		WB	6,100	5,115	4,970	0.84	0.81	5,115	4,970	0.84	0.81
L16	Yuen Long Highway (West of Tong Yan San Tsuen Interchange)	EB	6,100	5,410	5,470	0.89	0.90	5,455	5,515	0.89	0.90
		WB	6,100	6,035	5,480	0.99	0.90	6,080	5,525	1.00	0.91

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Ref.	Road	Dir.	Capacity(1) (pcu/hr)	2029 Reference Case				2029 Design Case			
				Traffic Flow (pcu/hr)		V/C Ratio		Traffic Flow (pcu/hr)		V/C Ratio	
				AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
L17	Slip road from Long Tin Road (SB) to Yuen Long Highway (EB)	-	1,800	1,655	1,135	0.92	0.63	1,655	1,135	0.92	0.63
L18	Slip road from Long Tin Road (SB) to Yuen Long Highway (WB)	-	1,800	1,820	1,800	1.01	1.00	1,865	1,845	1.04	1.03
L19	Slip road from Yuen Long Highway (EB) to Long Tin Road (NB)	-	1,800	1,765	1,840	0.98	1.02	1,810	1,885	1.01	1.05
L20	Slip road from Yuen Long Highway (WB) to Long Tin Road (NB)	-	1,800	1,525	1,705	0.85	0.95	1,525	1,705	0.85	0.95

Note: (1) Road link capacity was made reference to Table 6.2, Technical Report of Restructuring and Enhancement of the CTS-3 Model – Feasibility Study

3.4.11 The results indicate that all the above road links will still operate within capacity (i.e. V/C ratios below 1.0.) in design year 2029 except L14 - Yuen Long Highway (Between Pok Oi Interchange and Shap Pat Heung Interchange), L16 - Yuen Long Highway (West of Tong Yan San Tsuen Interchange), L18 - Slip road from Long Tin Road (SB) to Yuen Long Highway (WB) and L19 - Slip road from Yuen Long Highway (EB) to Long Tin Road (NB), with V/C ratio slightly over 1.0. V/C ratio between 1.0 and 1.1 means that the road sections are slightly overloaded, but heavy congestions and long traffic queues would not be expected. The road sections will experience some delay with reduced traffic speed at particular peak period, which is commonly seen at the strategic roads in some urban areas, but it will still be manageable.

3.5 Mitigation Measures

Road Junction

3.5.1 To alleviate the future traffic condition for J1, it is proposed to widen the traffic lane at Fuk Hi Street southbound from 2 lanes to 3 lanes to provide one "turn right" traffic lanes, one "straight-ahead and turn right" and one "straight-ahead" traffic lane as illustrated in **Figure 196587/B&V/TTIA/102**. **Figure 196587/B&V/TTIA/103** shows the road arrangement on Fuk Hi Street including the junction configuration at J1, J14 and J15.

3.5.2 To ease the capacity of J2, the junction is proposed to alter from existing priority-controlled junction to signalized-controlled junction. It is proposed to provide two "straight-ahead" lanes at Long Ping Road northbound and southbound and provide one "turn left and turn right" traffic lane at the exit of Long Ping Estate Bus Terminus as illustrated in **Figure 196587/B&V/TTIA/104**.

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3.5.3 To improve the junction performance of J3, it is proposed to modify the planned 4 stages method of control to the proposed 5 stages method of control with split phase of east-west traffic movements as illustrated in **Figure 196587/B&V/TTIA/105**.

3.5.4 For J4, it is proposed to widen the traffic lane at Fung Chi Road southbound to provide one addition "straight-ahead" traffic lane, as illustrated in **Figure 196587/B&V/TTIA/106**. To accommodate the additional lane, it is proposed to terminate the existing cycle track aside the widened road section to minimize the impact to the existing cyclist and pedestrian.

3.5.5 To relieve the condition of J9, it is proposed to widen the existing Wang Lok Street northbound to provide one full "turn left" traffic lane as illustrated in **Figure 196587/B&V/TTIA/107**.

3.5.6 Given that the junction capacity of J13 has approached its design capacity in the reference case and the Development will not be in place until 2033, it is considered that the proposed improvement scheme of J13 should be carried out by other project proponents before 2033 to improve the performance. To improve the junction performance, it is proposed to provide an exclusive left turn lane at Castle Peak Road – Yuen Long westbound by reducing one westbound approaching lane and one southbound receiving lane as illustrated in **Figure 196587/B&V/TTIA/108**. In additional, it is also proposed to widen the southbound approaching lanes to provide more space for the southbound traffic.

3.5.7 With the improvement measures, the operational performance at junctions J1, J2, J3, J4, J9, J13 have been reassessed and the results are summarized in **Table 3.6**. The junctions mentioned above would operate within their capacity in Design Year 2036.

Table 3.6 – Junction Performance under Proposed Improvement Schemes in Design Year 2036

Ref.	Junction	Method of Control	RC/RFC(1)			
			2036 Reference Case		2036 Design Case	
			AM Peak	PM Peak	AM Peak	PM Peak
J1	Fuk Hi Street / Long Ping Road (refer to Figure 196587/B&V/TTIA/102)	Signal	>100%	>100%	23%	38%
J2	Long Ping Road / Long Ping Estate Bus Terminus (refer to Figure 196587/B&V/TTIA/104)	Signal	41%	48%	18%	27%
J3	Long Ping Road / Fung Chi Road (refer to Figure 196587/B&V/TTIA/105)	Signal	30%	37%	15%	21%
J4	Fung Chi Road / Wang Tat Road (refer to Figure 196587/B&V/TTIA/106)	Signal	51%	50%	32%	48%

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Ref.	Junction	Method of Control	RC/RFC(1)			
			2036 Reference Case		2036 Design Case	
			AM Peak	PM Peak	AM Peak	PM Peak
J9	Fuk Hi Street / Wang Lok Street (refer to Figure 196587/B&V/TTIA/107)	Signal	72%	70%	19%	26%
J13	Pok Oi Interchange (refer to Figure 196587/B&V/TTIA/108)	Roundabout	0.63	0.78	0.71	0.85

Note: (1) RC = Reserve Capacity, RFC = Ratio of Flow to Capacity

Public Transportation

3.5.8 Based on the estimated public transport demand, an off-street bus terminus with sawtooth bus bay design is proposed to provide a minimum of 6 bus bays and 12 stacking spaces subject to actual bus service route planning at the later stage. Apart from the provided bus bays, the provision of one GMB bay and one Urban taxi bay and one New Territories taxi bay at the PTI are recommended to provide comprehensive coverage of the public transport services for the Development. The preliminary layout of the PTI is illustrated in **Figure 196587/B&V/TTIA/109**.

3.5.9 Based on the standard design of 6 ppl per sq.m for rail transport, it is estimated that an approximate 2,075 passengers per hour generated from the Development would induce only marginal increase of the maximum hourly passenger flow during the AM peak at the West Rail Line.

Improvement Schemes under Construction Stage

Long Ping Road / Long Ping Estate Bus Terminus (J2)

3.5.10 The junction is proposed to alter from existing priority-controlled junction to signalized-controlled junction. It is proposed to provide two "straight-ahead" lanes at Long Ping Road northbound and southbound and provide one "turn left and turn right" traffic lane at the exit of Long Ping Estate Bus Terminus as illustrated in **Figure 196587/B&V/TTIA/104**.

3.5.11 With the improvement measures, the junction performance during construction design year 2029 were reassessed with the proposed improvement schemes and the results are summarized in **Table 3.7**.

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Table 3.7 – Junction Performance under Proposed Improvement Schemes in Design Year 2029

Ref.	Junction	Method of Control	RC/RFC(1)			
			2029 Reference Case		2029 Design Case	
			AM Peak	PM Peak	AM Peak	PM Peak
J2	Long Ping Road / Long Ping Estate Bus Terminus (refer to Figure 196587/B&V/TTIA/104)	Signal	44%	51%	41%	48%

Note: (1) RC = Reserve Capacity, RFC = Ratio of Flow to Capacity

3.5.12 With the proposed improvement schemes under construction stage, J2 – Long Ping Road / Long Ping Estate Bus Terminus would operate within its capacity in Design Year 2029.

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4 PRELIMINARY DRAINAGE IMPACT ASSESSMENT (DIA)

4.1 Introduction

4.1.1 The objective of the Preliminary Drainage Impact Assessment (DIA) is to:

- Review the drainage master plan for Yuen Long area, relevant drainage studies and the existing and planned drainage networks in the vicinity of the Development;
- Assess the potential drainage impacts arising from the Development taking into account the climate change effect;
- Study and recommend feasible and environmental-friendly schemes for necessary drainage diversion;
- Recommend all necessary measures for proper stormwater conveyance and to mitigate adverse drainage impacts arising from the Development during both construction and operational phases; and
- and carry out schematic design of the proposed improvement schemes and measures.

4.1.2 Findings and recommendation of the DIA are presented in Preliminary Drainage Impact Assessment Report. A summary of the assessment is presented in the sections below.

4.2 Methodologies

Technical Approach

4.2.1 InfoWorks ICM Version 6.0 has been adopted for assessing the potential drainage impact arising from the Development and verifying the effectiveness of the proposed mitigation measures under the Assignment.

4.2.2 Drainage record plans, as-built drawings, topographic information, and site inspection have been used in examining the adequacy of the drainage system when developing the hydraulic model.

4.2.3 The software has the benefit of being able to model unsteady, gradually varied flow in looped network with flat or reverse gradients where the direction of flow may reverse. It is therefore well-suited for modelling of lowland, flat areas in the study area where the pipes have minimal gradients and are subject to tidal intrusion or backwater effects from the main river channels.

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Assessment Criteria

4.2.4 According to the 5th edition of Stormwater Drainage Manual (SDM), a 50-year design return period with a minimum of 300 mm freeboard is recommended for the design and checking of urban drainage branch system. Furthermore, a 200-year design return period is adopted for checking the adequacy of the urban drainage trunk system.

Determination of Flood Level Combinations

4.2.5 The design criteria for flood level depend on a combination of rainstorm events and tidal level, as well as the catchment characteristics. With reference to the SDM, the determination of the flood level is provided in **Table 4.1**.

Table 4.1 – Determination of Flood Level in the Fluvial-Tidal Zone

Flood Level Return Period	Case A	Case B
50-yr	50-yr rain + 10-yr sea level	10-yr rain + 50-yr sea level
200-yr	200-yr rain + 10-yr sea level	10-yr rain + 200-yr sea level

4.3 Existing and Planned Drainage System

4.3.1 There are no existing drainage pipes within the Site. To the east of the Site, there are existing storm drains with diameters ranging from 450 mm to 1,200 mm running south along Fuk Hi Street. To the south of the Site, there are also existing storm drains with diameters ranging from 450 mm to 1,800 mm running east along Long Ping Road.

4.3.2 At the junction between Long Ping Road and Fuk Hi Street, the existing storm drains discharge to a downstream twin-cell 2.0 m (H) by 3.5 m (W) box culverts running underneath Fuk Hi Street and Wang Lok Street, which further discharges to Yuen Long Nullah.

4.3.3 There are some watercourses at Kai Shan, which is situated at the western part of the Site. The surface runoff from Kai Shan is conveyed from the hillside to the existing drainage system adjacent to the Site.

4.3.4 There are two major planned drainage improvement works in the vicinity of the Site, namely Yuen Long Barrage Scheme (YLBS) and the drainage works proposed under Wang Chau Phase 1 Development.

4.4 Potential Drainage Impacts and Proposed Drainage Schemes

4.4.1 All watercourses within the Site would be removed during site formation works. The dry weather flow in these watercourses, as well as the excess runoff from Kai Shan Catchment, would be diverted to a proposed single-cell box culvert of 3.5 m (W) × 2.0 m (H) within the Site. This proposed single-cell box culvert would also replace

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the major section of the existing ditch to the immediate east of the Site and connect to the existing twin-cell 3.5 m (W) x 2.0 m (H) box culvert underneath the junction of Long Ping Road and Fuk Hi Street. Moreover, the remaining section of the existing ditch would be replaced by a proposed 900 mm diameter pipe with connection at the proposed single-cell box culvert. For more development flexibility, the alignment of the proposed box culvert will be reviewed and adjusted if necessary during the detailed design stage.

4.4.2 Surface runoff from hillsides to the west and south of the Site will be collected by proposed peripheral drains including U-channels of size ranging from 600 to 750 mm.

4.4.3 The change in land use from unpaved to paved surface would potentially increase the amount of runoff entering into the stormwater drainage system. **Table 4.2** presents the change in paving condition of the Site under the baseline and the proposed scenario. The change in the surface characteristics would lead to an overall increase in peak runoff generated from the associated sub-catchments which currently comprise woodland, grassland, agricultural land, slopes, squatters and brownfield operations.

Table 4.2 – Change in Paving Condition of the Site

	Baseline Scenario		**Proposed Scenario(1)**	
	Paved Area (m^2)	**Unpaved Area (m^2)**	**Paved Area (m^2)**	**Unpaved Area (m^2)**
Housing Site	67,367	41,038	75,884	32,522(1)
School & Access Road	8,538	3,466	12,005	0
Proposed Footpath Along Southern Boundary of the Site	269	945	1,214	0
Total	76,174	45,449	89,103	32,522

Note:
(1) 30% green coverage of the housing site (area: 108,405 m^2) is assumed in accordance with Chapter 4, Hong Kong Planning Standards and Guidelines.

Drainage Conditions under Baseline Scenario (with Yuen Long Barrage)

4.4.4 Based on the results of the hydraulic model, the YLBS would improve the hydraulic performance of the drainage system along Fuk Hi Street and Long Ping Road under both 50 and 200 year return periods. However, it is noted that the entrance of the Site will be flooded due to inadequate discharge capacity of the existing watercourse within the Site. Moreover, several segments of Fuk Hi Street and Long Ping Road are prone to flooding due to two major reasons: (i) road segments are low-lying together with relatively high downstream water level and (ii) inadequate capacity of some local drainage pipes.

Drainage Conditions under Proposed Scenario (with Yuen Long Barrage)

4.4.5 As mentioned in Para. 4.4.1, the existing stream inside the Site and the ditch to the east of the Site would be replaced by the proposed single-cell 3.5 m (W) × 2.0 m (H)

box culvert, and hence the associated flood risk within the Site would be mitigated.

4.4.6 It is noted that some local areas at Fuk Hi Street and Long Ping Road are still prone to flooding after commissioning of the YLBS. One of the local flooding areas is located to the east of the Site at Fuk Hi Street. As the major cause of this flooding issue is the inadequate capacity of the existing 300–450 mm diameter pipes along the southbound of Fuk Hi Street, it is proposed to upgrade these existing pipes to 1,500 mm diameter, which is anticipated to be carried out under other project. It is noted that some other local areas at Fuk Hi Street and Long Ping Road are prone to flooding under Case A of 200-year return period. In order to avoid any adverse drainage impacts imposed on these problematic areas during the peak flow period, it is proposed to collect and store the additional runoff arising from the Development in a proposed storage tank with size of approximately 1,360 m^3 underneath the proposed public access road. The exact location of the proposed storage tank is subject to further review in the later design stage. The layout of the proposed drainage works are shown in **Figure 196587/B&V/DIA/105.**

4.4.7 Based on the modelling results, the main trunk system (1,200 mm dia. pipe and twin-cell 2.0 m (H) by 3.5 m (W) box culvert along Fuk Hi Street from node ID SMH1031687 to Yuen Long Nullah) will have freeboard more than 300 mm under Cases 50A, 50B and 200B. The maximum flood depth at the representative points after implementation of the proposed mitigation measures are summarised in **Table 4.3** and **Table 4.4**. Table 4.4 indicates that the maximum flood depth at all representative points under Case 200A will be reduced after mitigation, no adverse impact is anticipated.

Table 4.3 – Maximum Flood Depths after Mitigation (with YLBS; 50-year Return Period)

	50-yr Case A			50-yr Case B		
Node ID	Max. Flood Depth Before Mitigation (m)(1)	Max. Flood Depth After Mitigation (m)(1)	Freeboard > 300 mm	Max. Flood Depth Before Mitigation (m)(1)	Max. Flood Depth After Mitigation (m)(1)	Freeboard > 300 mm
OJ-20344704	-2.291	-2.264	OK	-2.784	-2.728	OK
OJ-20345814	-1.471	-1.451	OK	-1.935	-1.884	OK
OJ-20346607	-1.43	-1.419	OK	-1.719	-1.702	OK
OJ-20346701	-0.428	-0.416	OK	-0.843	-0.824	OK
OJ-20346702	-2.293	-2.293	OK	-2.304	-2.304	OK
OJ-20347506	-0.484	-0.478	OK	-0.693	-0.689	OK
OJ-20347507	-1.257	-1.25	OK	-1.529	-1.523	OK
OJ-342407A	-1.198	-1.151	OK	-2.007	-1.964	OK
OJ-344708B	-0.761	-0.714	OK	-1.394	-1.342	OK
OJ-345703B	-0.388	-0.873	OK	-0.891	-1.036	OK
OJ-345815A	-2.426	-2.411	OK	-2.82	-2.78	OK
OJ-345905A	1.223	-0.286	OK(2)	0.969	-0.817	OK
OJ-H1027047	-1.468	-1.456	OK	-1.831	-1.803	OK

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Node ID	50-yr Case A			50-yr Case B		
	Max. Flood Depth Before Mitigation (m)(1)	Max. Flood Depth After Mitigation (m)(1)	Freeboard > 300 mm	Max. Flood Depth Before Mitigation (m)(1)	Max. Flood Depth After Mitigation (m)(1)	Freeboard > 300 mm
PH1-1	-1.772	-1.789	OK	-4.15	-4.15	OK
SMH1031684	-0.47	-0.466	OK	-0.943	-0.92	OK
SMH1031687	-0.528	-0.536	OK	-1.005	-1.001	OK
SMH4031681	-0.52	-0.509	OK	-0.989	-0.954	OK

Note:
(1) Positive flood depth indicates an occurrence of flooding.
(2) As flooding is originially occurred at this node, the freeboard at this node after mitigation is considered acceptable.

Table 4.4 – Maximum Flood Depths after Mitigation (with YLBS; 200-year Return Period)

Node ID	200-yr Case A			200-yr Case B		
	Max. Flood Depth Before Mitigation (m)(1)	Max. Flood Depth After Mitigation (m)(1)	Change in Max. Flood Depth (m)	Max. Flood Depth Before Mitigation (m)(1)	Max. Flood Depth After Mitigation (m)(1)	Flood Depth < 0
OJ-20344704	-1.328	-1.424	-0.096	-2.266	-2.208	OK
OJ-20345814	-0.518	-0.605	-0.087	-1.432	-1.379	OK
OJ-20346607	-0.593	-0.614	-0.021	-1.256	-1.242	OK
OJ-20346701	0.273	0.27	-0.003	-0.419	-0.399	OK
OJ-20346702	-1.739	-1.74	-0.001	-2.302	-2.302	OK
OJ-20347506	0.099	0.098	-0.001	-0.385	-0.382	OK
OJ-20347507	-0.425	-0.434	-0.009	-1.036	-1.031	OK
OJ-342407A	-0.21	-0.214	-0.004	-1.492	-1.432	OK
OJ-344708B	0.208	0.177	-0.031	-0.862	-0.798	OK
OJ-345703B	0.256	-0.163	-0.419	-0.552	-1.036	OK
OJ-345815A	-1.504	-1.572	-0.068	-2.337	-2.298	OK
OJ-345905A	1.743	0.494	-1.249	1.043	-0.281	OK
OJ-H1027047	-0.614	-0.615	-0.001	-1.355	-1.333	OK
PH1-1	-0.962	-0.98	-0.018	-1.613	-1.6	OK
SMH1031684	0.476	0.375	-0.101	-0.446	-0.409	OK
SMH1031687	0.412	0.31	-0.102	-0.512	-0.486	OK
SMH4031681	0.427	0.326	-0.101	-0.49	-0.446	OK

Note:
(1) Positive flood depth indicates an occurrence of flooding.

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Drainage Conditions under Baseline Scenario (without the Yuen Long Barrage)

4.4.8 In the absence of the YLBS, Fuk Hi Street and Long Ping Road is prone to significant flooding in both 50-year and 200-year return periods due to the inadequate capacity of the drainage system and significant backwater effect arising from the high water level at Yuen Long Nullah.

Drainage Conditions under Proposed Scenario (without the Yuen Long Barrage)

4.4.9 As the drainage system along Fuk Hi Street and Long Ping Road is already at capacity in the baseline condition, it is proposed to collect and store the additional runoff arising from the Development in the proposed storage tank with size of approximately 3,900 m^3 underneath the proposed access road in order to avoid worsening the hydraulic performance of the downstream drainage system. The exact location of the proposed storage tank is subject to further review in the later design stages. The layout of the proposed drainage works are shown in **Figure 196587/B&V/DIA/106.**

4.4.10 **Table 4.5** and **Table 4.6**, which summarise the maximum flood depth at the representative points after proposed mitigation, indicate that no adverse impact will be induced by the Development.

Table 4.5 – Maximum Flood Depths after Mitigation (without YLBS; 50-year Return Period)

Node ID	50-yr Case A			50-yr Case B		
	Max. Flood Depth Before Mitigation (m)(1)	Max. Flood Depth After Mitigation (m)(1)	Change in Max. Flood Depth (m)	Max. Flood Depth Before Mitigation (m)(1)	Max. Flood Depth After Mitigation (m)(1)	Change in Max. Flood Depth (m)
OJ-20344704	-0.847	-0.934	-0.087	-0.74	-0.793	-0.053
OJ-20345814	-0.024	-0.115	-0.091	0.099	0.043	-0.056
OJ-20346607	0.042	0.021	-0.021	0.316	0.303	-0.013
OJ-20346701	0.708	0.703	-0.005	0.885	0.882	-0.003
OJ-20346702	-1.21	-1.211	-0.001	-1.019	-1.02	-0.001
OJ-20347506	0.56	0.559	-0.001	0.756	0.755	-0.001
OJ-20347507	0.24	0.232	-0.008	0.548	0.543	-0.005
OJ-342407A	-0.029	-0.03	-0.001	-0.117	-0.116	0.001(2)
OJ-344708B	0.573	0.542	-0.031	0.604	0.587	-0.017
OJ-345703B	0.486	0.215	-0.271	0.458	0.283	-0.175
OJ-345815A	-0.965	-1.032	-0.067	-0.793	-0.834	-0.041
OJ-345905A	1.76	0.913	-0.847	1.577	1.04	-0.537
OJ-H1027047	-0.031	-0.04	-0.009	0.179	0.172	-0.007
PH1-1	-0.314	-0.333	-0.019	-0.033	-0.046	-0.013
SMH1031684	0.936	0.851	-0.085	1.052	0.998	-0.054
SMH1031687	0.86	0.772	-0.088	0.97	0.915	-0.055

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Node ID	50-yr Case A			50-yr Case B		
	Max. Flood Depth Before Mitigation (m)(1)	Max. Flood Depth After Mitigation (m)(1)	Change in Max. Flood Depth (m)	Max. Flood Depth Before Mitigation (m)(1)	Max. Flood Depth After Mitigation (m)(1)	Change in Max. Flood Depth (m)
SMH4031681	0.9	0.813	-0.087	1.02	0.966	-0.054

Note:
(1) Positive flood depth indicates an occurrence of flooding.
(2) As no flooding is occurred at this node, minimal increase in water level is considered acceptable.

Table 4.6 – Maximum Flood Depths after Mitigation (without YLBS; 200-year Return Period)

Node ID	200-yr Case A			200-yr Case B		
	Max. Flood Depth Before Mitigation (m)(1)	Max. Flood Depth After Mitigation (m)(1)	Change in Max. Flood Depth (m)	Max. Flood Depth Before Mitigation (m)(1)	Max. Flood Depth After Mitigation (m)(1)	Change in Max. Flood Depth (m)
OJ-20344704	-0.239	-0.297	-0.058	-0.058	-0.115	-0.057
OJ-20345814	0.588	0.534	-0.054	0.79	0.73	-0.06
OJ-20346607	0.666	0.65	-0.016	1.053	1.038	-0.015
OJ-20346701	1.279	1.27	-0.009	1.587	1.584	-0.003
OJ-20346702	-0.647	-0.652	-0.005	-0.32	-0.321	-0.001
OJ-20347506	1.147	1.147	0	1.437	1.431	-0.006
OJ-20347507	0.867	0.86	-0.007	1.295	1.288	-0.007
OJ-342407A	0.213	0.205	-0.008	0.166	0.166	0
OJ-344708B	1.032	0.98	-0.052	1.134	1.105	-0.029
OJ-345703B	0.942	0.693	-0.249	0.922	0.838	-0.084
OJ-345815A	-0.351	-0.392	-0.041	-0.087	-0.132	-0.045
OJ-345905A	2.441	1.508	-0.933	2.055	1.709	-0.346
OJ-H1027047	0.541	0.52	-0.021	0.869	0.857	-0.012
PH1-1	0.31	0.297	-0.013	0.705	0.69	-0.015
SMH1031684	1.55	1.471	-0.079	1.743	1.682	-0.061
SMH1031687	1.474	1.384	-0.09	1.658	1.595	-0.063
SMH4031681	1.512	1.452	-0.06	1.71	1.651	-0.059

Note:
(1) Positive flood depth indicates an occurrence of flooding.

4.5 Summary and Recommendation

Summary

4.5.1 The hydraulic assessment indicates that the Development would not induce adverse drainage impact upon commissioning of the following proposed drainage works:-

(i) Construction of peripheral U-channels with size ranging from 600 to 750 mm;

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(ii) Construction of a new 900 mm diameter pipe for replacement of part of the existing ditch adjacent to the Site;

(iii) Construction of a single-cell 3.5m (W) × 2.0m (H) box culvert within the Site and running underneath a segment of footpath along Fuk Hi Street for proper conveyance of runoff from Kai Shan Catchment;

(iv) Upgrading of existing stormwater pipes along the southbound of Fuk Hi Street from 300–450 mm to 1,500 mm diameter (under other project); and

(v) Construction of a stormwater storage tank within the Site for temporary storage of the additional runoff induced by the Development.

Recommendation and Follow-up Actions

4.5.2 Close coordination with utility undertakers is recommended to be carried out during the detailed design stage so as to confirm the necessary utility diversion and lowering works. In addition, sufficient time shall be allowed in the construction programme to accommodate the utility works.

4.5.3 Drainage reserves within the Site are required for proper maintenance of the drainage pipes and box culvert to be handed over to the Drainage Services Department (DSD). Details of drainage reserves including the location, width etc. will be further discussed among relevant departments.

4.5.4 It is suggested to install sand traps at the inlet of the drainage pipes and box culverts to minimise blockage and the associated maintenance requirements.

4.5.5 In view that the proposed drainage mitigation measures at this feasibility stage is schematic in nature, it is recommended that the modelling assumptions (including but not limited to the siltation condition of the existing network) and the proposed scheme (including but not limited to weir design, connection location of the discharge pipe, necessity of spare capacity of the flood storage facility) shall be reviewed and a detailed hydraulic assessment (including a flood extent map, if necessary) shall be provided in the subsequent stages of the Development when the site formation scheme, building layout and the programme of interfacing projects (i.e. the YLBS) are confirmed. Furthermore, alternative schemes, such as construction of a separate drainage system to discharge runoff from Kai Shan and the Development directly to Yuen Long Nullah, can be considered to take advantage of the improved downstream drainage conditions from the YLBS during the subsequent stages of the Development.

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5 PRELIMINARY SEWERAGE IMPACT ASSESSMENT (SIA)

5.1 Introduction

5.1.1 The objective of the Preliminary Sewerage Impact Assessment (SIA) is to:

- Review and summarize the latest information relevant to the SIA;
- Examine the existing and planned sewerage facilities in the region;
- Discuss the approach, methodology, assumptions and parameters adopted in the SIA;
- Formulate feasible sewage disposal and treatment scheme with schematic design for the Development; and
- Define the scope of upgrading work as appropriate for mitigating sewerage impact arising from the Development.

5.1.2 Findings and recommendation of the SIA are presented in Preliminary Sewerage Impact Assessment Report. A summary of the assessment is presented in the sections below.

5.2 Methodologies

5.2.1 The assessment is undertaken in accordance with the following standards, Code of Practice and Design Manuals:-

- Environmental Protection Department (EPD)'s "Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning" (GESF);
- DSD's Sewerage Manual (Part 1) – Key Planning Issues and Gravity Collection System; and
- DSD's Sewerage Manual (Part 2) – Pumping Stations and Rising Mains.

5.2.2 InfoWorks ICM Version 6.0.2 is adopted to prepare a sewerage model for checking the hydraulic performance of the concerned sewers. The hydraulic model is checked against the latest record plans, as-built and construction drawings obtained from DSD.

5.2.3 The sewerage system is designed to cater for the Development based on flows estimated from the proposed population and employment figures. The proposed sewers are designed to provide sufficient capacities to accommodate peak flow without surcharge and to fulfill the following criteria:

- Velocity – The sewers shall be sized to achieve a self-cleansing velocity of 1 m/s at full bore flow. The maximum velocity at full bore flow shall be limited to 3 m/s;

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- Freeboard – A minimum free board of 1 m and no overflow occurs at flow rate of 1.15 times peak flow shall be achieved;
- Gradient – The sewers shall be laid to follow the ground profile wherever possible, but at all times a gradient steep enough to satisfy the minimum velocity criteria given above shall be maintained; and
- Cover – A minimum pipe cover of 0.9 m and 0.45 m will be adopted for pipes in carriageway and footpath respectively as far as possible.

5.2.4 To account for the effect of sedimentation, a 10% reduction in flow area is adopted in the SIA.

5.3 Existing and Planned Sewerage System

5.3.1 The Development is located within the Yuen Long Sewerage Catchment, which is served by the Yuen Long Sewage Treatment Works (YLSTW). The existing treatment capacity of the YLSTW is approximately 70,000 m^3/day.

5.3.2 According to DSD's drainage record plan, the Site is currently served with no sewage discharge. The nearest sewerage network from the Site comprises two gravity sewers: a sewer with 300 – 1,800 mm diameter runs towards the north direction along Fuk Hi Street, transversing Yuen Long Industrial Estate (YLIE) and eventually connecting to the YLSTW; the other sewer with 450 mm diameter runs towards south direction along Fuk Hi Street. A plan showing all existing sewerage facilities in the vicinity of the Site is presented in **Figure 196587/B&V/SIA/001**.

5.3.3 DSD is currently implementing the proposed upgrading works of the Yuen Long Effluent Polishing Plant (YLEPP) in order to upgrade the treatment level of YLSTW from secondary to tertiary and upgrade the treatment capacity to 150,000 m^3/day to cope with the future sewage flows in the sewage catchment.

5.4 Sewerage Impact

5.4.1 The Development comprises residential flats with supporting retail facilities and schools. Sewage generated from the Development is categorized into four sources: Residential, which consists of the sewage generated from the residents of the public housing development; students and teachers of the proposed schools; visitors and employees of the community facilities; and patrons of retail facilities.

5.4.2 The total ADWF generated from the Development is estimated to be 7,642 m^3/day. The breakdown of the sewage generation from the Development is shown in **Table 5.1**.

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Table 5-1 – Estimation of Sewage Generated from the Development

Sewage Type	Quantity	Unit
Residential		
Design population	36,400	
Unit flow factor	0.19	m^3/person/day
ADWF	**6,916**	**m^3/day**
School		
Design student population	1974	
Unit flow factor for students	0.04	m^3/person/day
ADWF for students	**79**	**m^3/day**
Design teaching staff No.	172	
Unit flow factor for teaching staffs	0.28	m^3/employee/day
ADWF for teaching staffs	**48**	**m^3/day**
Community Facility		
Design population	43	
Unit flow factor	0.28	m^3/employee/day
ADWF	**12**	**m^3/day**
Retail		
Design population (other commercial activities)	227	
Unit flow factor (other commercial activities)	0.28	m^3/employee/day
ADWF for other commercial activities	**64**	**m^3/day**
Design population (catering services)	331	
Unit flow factor (catering services)	1.58	m^3/employee/day
ADWF for catering services	**523**	**m^3/day**
Total		
ADWF from the Development	**7,642**	**m^3/day**

5.4.3 The additional sewage generation will have an impact to the existing / planned sewage treatment works and sewerage network.

Potential Impacts to Existing / Planned Sewage Treatment Works

5.4.4 As the DSD is currently implementing the proposed upgrading works of the YLEPP, the treatment capacity of the YLSTW will be upgraded to 150,000 m^3/day and it is anticipated that the upgrading works of the YLSTW will be completed prior to the population intake of the Development. As advised by the EPD, according to the latest design of the YLEPP, there is sufficient spare capacity in the YLEPP to cater for the sewage generated from the Development.

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Potential Impacts to Existing / Planned Sewerage Network

5.4.5 New sewers are required to collect the sewage from the Development to the nearest sewerage network. In addition, according to the results of the hydraulic assessment, the capacities of the existing 300 - 900 mm diameter gravity sewers will be insufficient to cater for the additional sewage arising from the Development.

5.5 Mitigation Measures

5.5.1 The proposed sewage scheme would collect sewage by the internal sewerage system and discharged to a proposed terminal manhole, which is located near the entrance of the Site. Sewage collected at the proposed terminal manhole will be conveyed via the proposed 750 mm diameter sewer to the public sewerage system along Fuk Hi Street and eventually discharged at the YLSTW for treatment and disposal.

5.5.2 To ensure that the public sewerage system has adequate level, capacity and performance, it is proposed to upgrade the existing gravity sewers from 300 - 900 mm diameter to 1,050 – 1,200 mm diameters with new gradients. The length of the proposed upgrading works is approximately 1,050 m.

5.5.3 The proposed sewerage scheme including the recommended upgrading works is shown in **Figure 196587/B&V/SIA/102**.

5.5.4 According to the results of the hydraulic assessment, the upgraded sewerage system will have adequate capacity to cater for the accumulated sewage flow from the Development.

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6 PRELIMINARY WATER SUPPLY IMPACT ASSESSMENT (WSIA)

6.1 Introduction

6.1.1 The objective of the Preliminary Water Supply Impact Assessment (WSIA) is to:

- Assess the existing capacity of the fresh water and salt water supply facilities;
- Discuss the assumptions and parameters adopted in the WSIA;
- Estimate fresh water and flushing water demands of the Development;
- Identify needs for provision of any new waterworks, reserves and other improvement works to meet the water demand of the Development;
- Identify any mitigation and protective measures to cope with the Development; and
- Protect waterworks facilities and keep minimum disturbance to their normal operation during construction and operational stage of the Development.

6.1.2 Findings and recommendation of the WSIA are presented in Preliminary Water Supply Impact Assessment Report. A summary of the assessment is presented in the sections below.

6.2 Methodologies

Technical Approach

6.2.1 The estimate of the fresh and flushing water demands for the Development is based on the latest development parameters identified in Baseline Review Report under the Assignment. The estimates are calculated with reference to the unit water demands as recommended under the Water Supplies Department (WSD)'s Departmental Instruction (DI) No. 1309 and the "Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning" published by EPD.

6.2.2 The water supply impact assessment is undertaken in accordance with the following standards, Code of Practice and Design Manuals:-

- Civil Engineering Design Manual (WSD);
- EDP's Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning;
- Manual of Mainlaying Practice (2012 Edition); and
- WSD's Departmental Instruction (DI) No. 1309.

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Design Criteria

6.2.3 Two scenarios (scenarios A and B) are considered in the hydraulic analysis as shown in **Table 6.1**.

Table 6.1 – Scenarios to be considered in Hydraulic Analysis

Scenario	Water Demand	Description
A	Existing + the Development	Daily Operation (Without Fire-Fighting)
B	Existing + the Development	With Fire-Fighting

6.2.4 In accordance with the WSD's DI 1309, the design criteria of the proposed fresh and flushing water supply systems in the two scenarios are presented in **Table 6.2**.

Table 6.2 – Design Criteria for Fresh Water Mains and Flushing Water Mains for the Development

Scenario	Design Peak Flow in Distribution Main (m^3/day)	Minimum Residual Head (m)			Maximum Velocity (m/s)
		Fresh Water(1)	Flushing Water	Fire Location	
A	• Fresh water – 3 x Mean Daily Demand • Flushing water – 2 x Mean Daily Demand	20	15	-	3
B	• Fresh water – 1 x Mean Daily Demand • Flushing water – 1 x Mean Daily Demand			17	3

Note:
(1) In accordance with the WSD's instruction of 26 June 2017, fresh water supply infrastructure for new developments should be planned for a minimum residual head of 20m with immediate effect, except for village supplies and situations where such reduction would adversely affect the supply to the adjacent existing buildings / developments which have been designed for a residual head of 30m.

6.3 Existing and Planned Water Supply Facilities and Services

Existing Fresh Water Supply Facilities

6.3.1 The Site is located at the boundaries of supply zones between the Wang Chau Fresh Water Service Reservoir (WCFW S/R) and the Ngau Tam Mei Fresh Water Primary Service Reservoir (NTMFW PS/R). The fresh water supply for the existing area within the Site is presently fed by the WCFW S/R via a network of trunk mains and distribution mains. The key waterworks and fresh water supply zones are shown in **Figure 196587/B&V/WSIA/001**. The alignments of the existing water mains are shown in **Figure 196587/B&V/WSIA/002**.

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6.3.2 The existing information of the WCFW S/R is summarized in **Table 6.3**.

Table 6.3 – Existing Information of WCFW S/R

Service Reservoir	Capacity (m^3)	Top Water Level (mPD)	Invert Level (mPD)
WCFW S/R	58,790	67.0	60.81

Existing Salt Water Supply Facilities

6.3.3 The rural residential dwellers and brownfield operators within the Site are currently using fresh water for flushing. The Site is not covered by any salt water supply.

6.3.4 As shown in **Figure 196857/B&V/WSIA/003,** the Site is located in close proximity to the salt water supply zone served by the existing Tan Kwai Tsuen Salt Water Service Reservoir (TKTSW S/R) which is sourced from Lok On Pai Salt Water Pumping Station (LOPSW P/S). However, there are barely any spare capacities in the existing or planned salt water supply system to cater for the additional flushing water demand arising from the Development.

Planned Water Supply Facilities

6.3.5 WSD plans to expand Ngau Tam Mei Water Treatment Works (NTM WTW) from 230 MLD to 450 MLD. As the Site is located within the distribution zone of NTM WTW and Au Tau Water Treatment Works (AT WTW). It is expected that it can cater for additional water demand arising from new developments in Yuen Long, including the Development.

6.3.6 As proposed under Wang Chau Phase 1 Development, a DN600 fresh water main would be constructed along Fuk Hi Street and Long Ping Road. It is understood that both the fresh and flushing water demands from the Wang Chau Phase 1 Development would be taken up by WCFW S/R and NTM WTW. The proposed waterworks under Wang Chau Phase 1 Development are shown in **Figure 196857/B&V/WSIA/002.**

6.4 Water Demand of the Development

6.4.1 In accordance with the WSD DI No. 1309 and information from the WSD, the unit demands for fresh water and flushing water are summarized in **Table 6.4** and **Table 6.5**, respectively.

Table 6.4 – Summary of Fresh Water Unit Demand

Consumer Class	Residential	Services Trades	Other	Unit
Public Housing (PH)	230	40	-	l/h/d
Residential (R1)	230	40	-	l/h/d
School	-	-	25	l/h/d
Irrigation	-	-	100	m^3/ha/d

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Table 6.5 – Summary of Flushing Water Unit Demand

Consumer Class	Residential	Services Trades	Other	Unit
Public Housing (PH)	70	-	-	l/h/d
Residential (R1)	70	-	-	l/h/d
School	-	-	25	l/h/d

6.4.2 Based on the Development parameters presented in **Table 2.1**, the estimated average water demands arising from the Development are summarized in **Table 6.6**.

Table 6.6 – Summary of Ultimate Daily Water Demand from the Development

Fresh Water Demand in 2033 (m^3/day)	Flushing Water Demand in 2033 (m^3/day)	Total Fresh and Flushing Water Demand in 2033 (m^3/day)
11,039	2,826	13,864

6.4.3 The additional demands will have impact to existing/planned fresh water and flushing water supply system.

6.5 Total Water Demand

6.5.1 The total water demand from all known existing and planned interfacing developments as well as the Development within the WCFW S/R supply zones in 2033 is summarized in **Table 6.7**.

Table 6.7 – Summary of Total Water Demand in Year 2033

Water Treatment Works (WTW)	Fresh Water Service Reservoirs (FW S/R)	Total Fresh Water Demand (m^3/day)	Total Flushing Water Demand in 2033 (m^3/day)	Total Fresh and Flushing Water Demand in 2033 (m^3/day)
NTM WTW	WCFW S/R	47,517	6,429	53,947

6.6 Impact on Existing and Planned Waterworks Facilities

Impacts to Existing and Planned Fresh Water Supply System

6.6.1 The fresh water demand from the Development is estimated to be 11.0 MLD. It is anticipated that the impact on the NTM WTW arising from the Development is insignificant. With the planned expansion of the NTM WTW from 230 MLD to 450 MLD and availability of water surplus at the AT WTW, the existing WCFW S/R are considered to be capable for catering for the additional water demands from the Development.

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6.6.2 A capacity assessment was conducted to evaluate the impacts on the WCFW S/R. Results of the assessment are shown in **Table 6.8**.

Table 6.8 – Summary of Capacity Assessment of Existing Fresh Water Facilities

	WCFW S/R
Existing Capacity (m^3)	58,790
Required Capacity for existing and planned interfacing developments as well as the Development within WCFW S/R supply zone in 2033 (m^3)	53,947 x 0.8 = 43,158(1)

Note:
(1) Capacity of FW S/R = 0.8 MDD (FW+TMF) referring to WSD's DI No. 1309

Impacts to Existing and Planned Flushing Water Supply System

6.6.3 As mentioned in Section 6.3, there is no spare capacity on the salt water supply system from Lok On Pai and Tan Kwai Tsuen to cater for the additional flushing water demand arising from the Development.

6.7 Mitigation Measures

Fresh Water Supply Scheme

6.7.1 It is proposed to upgrade an existing distribution main along Fuk Shun Street from sizes of DN600 to DN900 in order to cater for the water demands in the existing water supply zone and the Development.

6.7.2 The fresh water supply for the Site would be fed by proposed DN900 fresh water mains along Fuk Shun Street and planned DN600 water mains along Fuk Hi Street under Wang Chau Phase 1 Development. To serve buildings in the Development, a DN600 fresh water main is proposed along the access road within the Site. The proposed waterworks for fresh water supply are shown in **Figure 196587/B&V/WSIA/004.**

6.7.3 Hydraulic analysis has been carried out for the proposed water supply scheme. Under daily operation scenario (Scenario A) and fire-fighting scenario (Scenario B), it is anticipated that the proposed water supply system could meet the required design criteria.

Flushing Water Supply Scheme

6.7.4 In order to provide sufficient flushing water for the Development, the following available sources for flushing are explored.

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Treated Sewage Effluent (TSE) – Possibly from the Planned YLEPP

6.7.5 Upon liaison with the DSD, it is noted that there would be TSE supply to the Development from the planned YLEPP. However, the programme for the supply of TSE to the Development from the planned YLEPP is still under investigation. Close liaison with the DSD on the availability of TSE for the Development is required in the subsequent stages of the Development.

Salt Water (SW) – From the Salt Water Supply System in Yuen Long

6.7.6 As discussed above, the LOPSW P/S does not have sufficient spare capacity to convey salt water to the Site. Upgrading works of pump to provide an additional pumping capacity of 0.04 m^3/s[(1)] in the LOPSW P/S would be required for the provision of salt water for flushing use.

Temporary Mains Water for Flushing (TMF) – From NTM WTW and WCFW S/R

6.7.7 The option for supply flushing water by TMF is also considered. However, in order to safeguard the precious fresh water and minimise fresh water consumption as far as practicable, TMF will only be considered as a last resort measure for limited duration in unlikely event.

Evaluation of three options

6.7.8 Concerning the environmental and economic considerations, TSE is recommended as the flushing medium due to the lower unit life-cycle costs. However, since the programme for the supply of TSE has not been confirmed, the use of salt water is recommended as an interim measure for the Development at this stage. Should there be more updated information in flushing water supply availability, adopting TSE as the flushing medium will be further reviewed in the investigation phase of the project before proceeding into detailed design stage.

6.7.9 In view of the insufficient spare capacity of the LOPSW P/S to serve the additional flushing water demand generated by the Development, salt water supply via pump upgrade in LOPSW P/S and provision of a new DN300 salt water main from the existing DN400 salt water main along Long Ping Road to the Site are required for supplying flushing water to the Development. The details of the proposed salt water mains are shown in **Figure 196587/B&V/WSIA/004**.

Smart Water Initiatives and Automatic Meter Readings

6.7.10 The provision of Smart Water Initiatives and Automatic Meter Readings will be investigated in the subsequent stages of the Development.

(1) Additional Capacity of the Pumping Station Required = 1.2 x MDD (Flushing Demand)

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6.8 Summary

6.8.1 Subject to further review, the latest development parameters of the Development are assumed and adopted, and the updated water supply records have been collected and reviewed in the WSIA. WCFW S/R is expected to have sufficient spare capacity to meet additional fresh water demand arisen by the Development. In addition, the NTM WTW's planned capacity would be sufficient to accommodate the additional demand from the Development.

6.8.2 It is proposed to serve the Development through an upgraded DN900 fresh water main along Fuk Shun Street, planned DN600 fresh water main to be constructed under Wang Chau Phase 1 Development along Fuk Hi Street and DN600 fresh water main along the new public road within the Site. It is anticipated that the proposed water supply system would be viable from the hydraulic point of view.

6.8.3 TSE is recommended as the flushing medium due to the lower unit life-cycle costs. However, since the programme for the supply of TSE has not been confirmed, the use of salt water is recommended as an interim measure for the Development at this stage. In view of the insufficient spare capacity of LOPSW P/S to serve the additional flushing water demand generated by the Development, salt water supply via pump upgrade in LOPSW P/S and provision of a new DN300 salt water main from the existing DN400 salt water main along Long Ping Road to the Site are required for supplying flushing water to the Development. While there is no committed programme for the supply of TSE to the Site from the planned YLEPP, close liaison with DSD on the availability of TSE for the Development is required in the subsequent stages of the Development. In the unlikely event of both TSE and salt water will not be available for the Development, TMF will be considered as a last measure for a limited duration.

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7 PRELIMINARY UTILTIIES IMPACT STUDY

7.1 Introduction

7.1.1 The objective of the Preliminary Utilities Impact Study (UIS) is to identify the existing and planned capacity of electricity supply, gas supply, telephone service system and street lighting.

7.1.2 Findings and recommendation of the UIS are presented in the Preliminary Utilities Impact Study Report. A summary of various aspects of the review are presented in the sections below.

7.2 Utilities Impact

7.2.1 The increase of population arising from the Development may pose the need to upgrade existing utilities. Utilities required for assessment for the Development include power supply, highway lighting, gas supply and telecommunication services.

7.3 General Requirements for Utility Installation

7.3.1 For the purpose of planning and study, the general requirement for utilities installation as stipulated in the Hong Kong Planning Standards and Guidelines (HKPSG) and the Highways Department Technical Circular 3/90 are referred to. The minimum cover and separation requirements for various utility installations are summarized in **Table 7.1**.

Table 7.1 – General Requirement for Underground Utility Installation

Common Utility	Minimum Cover		Separation from Other Utilities & Planting
	Footpath / Areas without Vehicular Traffic	Road / Areas with Vehicular Traffic	
CLP cables -132 kV -11 kV	1,000 mm 750 mm	1,200 mm 900 mm	Working clearance of 300 mm from other utilities for 132kV cables and 150 mm from other utilities for 11 kV cables (1m working clearance between 132kV and 11kV)
HKCGC pipes -Low pressure -Intermediate pressure	700 mm 1,000 mm	1,100 mm 1,100 mm	Working clearance of 600 mm for steel gas pipes, 300 mm for other gas pipes

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Common Utility	Minimum Cover		Separation from Other Utilities & Planting
	Footpath / Areas without Vehicular Traffic	Road / Areas with Vehicular Traffic	
PCCW cables HGC cables HKBN cables Wharf T&T cables NWT cables CTV cables	450 mm 450 mm 450 mm 450 mm 450 mm 450 mm	900 mm 900 mm 900 mm 900 mm 900 mm 900 mm	Working clearance of 300mm from other utilities or as required by the service provider

7.4 Analysis and Findings

Impacts to Existing and Planned Electricity Supply Network

7.4.1 The CLP Power Hong Kong Limited (CLP) is consulted regarding their existing transmission and distribution networks in the vicinity of the Site. Existing 11 kV transmission cables are identified along Fuk Hi Street and Long Ping Road. Some 11 kV transmission cables are in the Site supplying electricity to the existing dwellings. Diversion of the existing transmission cables is therefore required. The arrangement will be further liaised with CLP at a later stage.

7.4.2 As advised by the CLP, the existing substation within the area currently has a reserved capacity of less than 2 MVA, which is unable to meet the power demand of the Development. The CLP indicated that a new 132 kV substation with a site area of approximately 32m x 62m is required partly to support the Development. The additional load demand from the Development is 68.3 MVA, which is about 46% of the ultimate capacity (150 MVA) of a standard 132 kV substation. A separate site search exercise would be conducted by the CLP to identify suitable site for the new substation.

7.4.3 It is expected that the electricity transmission cables which connect from the new 132kV substation to the Site will be installed by the CLP in order to supply electricity for the Development. The exact alignment and arrangement of power supply will be further discussed and determined by the CLP at a later stage.

Impacts to Existing and Planned Gas Supply Network

7.4.4 For gas supply, the Hong Kong and China Gas Company Limited (HKCGC) has been consulted. Currently there are no existing gas mains within the Site. In the vicinity of the Site, there are 200-250 mm dia. underground low pressure gas mains running along Long Ping Road, Fuk Hi Street and Fung Chi Road. In addition, there are 315 mm dia. underground medium pressure gas mains running along Fuk Wang Street, Long Ping Road and Fuk Hi Street.

7.4.5 As advised by the HKCGC, a series of upgrading works is proposed to be implemented. These upgrading works include upgrading of the Au Tau Offtake

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Station, installation of about 1 km of medium pressure gas main along Castle Peak Road and installation of a new offtake station at Tin Shui Wai. Upon the completion of the proposed upgrading works, there will be sufficient gas supply to the Site.

7.4.6 The exact implementation programme of the upgrading works as well as the alignment and gas supply arrangement will be further discussed and determined with the HKCGC at a later stage.

Impacts to Existing and Planned Telecommunication Network

7.4.7 Telecommunication companies including providers of telephone, broadband and television services are consulted. Information on the existing and planned cable networks within and in the vicinity of the Site is obtained.

7.4.8 HKT and HGC have telecommunication service feeds running within the Site and adjacent to the Site at Fuk Hi Street and Long Ping Road. HKBN an HKC have service feeds running along Long Ping Road. These existing cables are all laid underground. The cable diversion works and actual connection points would be further liaised with the telecom services providers at a later stage.

7.4.9 Given the availability of existing telecommunication services near the Site, it is expected that any proposed telecommunication networks within the Site will be connected to the existing networks nearby.

7.4.10 The exact alignment and arrangement of telecommunication service will be further discussed and determined by telecommunication service providers at a later stage.

Impacts to Existing and Planned Street Lighting Network

7.4.11 New street lights will be required along the public roads within the Site including those for Emergency Vehicle Access (EVA) purpose. The space requirements for the cables and pillar boxes are achievable for incorporation into the Development.

7.4.12 Details and alignment of the proposed street lighting along the public road to be maintained by HyD shall be agreed with HyD Lighting Division at a later stage.

7.4.13 The exact street lighting arrangement will be further discussed and determined by street lighting providers at a later stage.

Potential Hazardous Installations

7.4.14 There are no potential hazardous installations within or in the vicinity of the Site.

Summary

7.4.15 There are no insurmountable problems for supply of utilities to the Development.

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8 PRELIMINARY GEOTECHNICAL ASSESSMENT

8.1 Introduction

8.1.1 The objective of the Preliminary Geotechnical Assessment (GA) is to:

- Identify all potentially significant ground and geotechnical engineering constraints associated with the Development and essential Infrastructures;
- Recommend solutions to the ground and geotechnical engineering constraints and confirm the technical and economic feasibility of the Development; and
- Investigate any natural terrain hazards that might affect the existing structures.

8.1.2 Findings and recommendation of the GA are presented in the Preliminary Geotechnical Assessment Report. A summary of the assessment is presented in the sections below.

8.2 Geological Conditions

8.2.1 The solid geology of the Site consists of meta-siltstones and sandstones of the Mai Po Member of Lok Ma Chau Formation (Cmp). Fault bounded subcrops of marble from Yuen Long Formation are located to the southeast of the Site. The Site is generally underlain by terraced alluvium (clay and gravelly sand) and debris flow deposits (unsorted sand, gravel, cobbles and boulders; clay/silt matrix.).

8.2.2 The Site falls within Scheduled Area No. 2, which is an area of complex geology where karst features such as an uneven upper surface and dissolution cavities are known to occur within a potential marble stratum. Considering the identified marble in the surrounding area, and the limited ground investigation (GI) record within the Site, the presence of marble bedrock layer is anticipated.

8.2.3 According to the available Ground Investigation (GI) reports, the Site is underlain by a layer of fill (various from 0.5 m to 4.5 m thick), alluvium (various from 2 m to 13.5 m thick) and completely to highly decomposed meta-sedimentary rock (various from 13 m to 56 m thick). Bedrock is encountered at a depth varying from about 20 m to beyond 60 m below ground. In view of the limited available GI data and high variation in bedrock level, adequate site-specific GI are required in order to establish a reliable ground model. The location of the existing GI stations, site specific GI station and inferred geological profiles of the Site are illustrated in **Figures 196587/B&V/PGA/008 and 196587/B&V/PGA/009**, respectively.

8.2.4 A GI was conducted to investigate the geological profiles of the Site. The location of the GI is shown in **Figure 196587/B&V/PGA/019**, and the site-specific GI result is present in **Table 8.1**.

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Table 8.1 – Summary of Site Specific GI result

No.	Ground Level (mPD)	Rock head (mPD)	End of Hole (mPD)	Fill Thick-ness (m)	ALL Thick-ness (m)	CD Rock Thick-ness (m)	HD Rock Thick-ness (m)	MD Rock or above (mPD)
DH4	4.6	-59.01	-80.56	1.4	14	8	40.11	-59.01 to -80.6

8.3 Groundwater Regime

8.3.1 Existing groundwater monitoring records from relevant vertical drillholes were retrieved and inspected. It is found that the highest groundwater level in the vicinity of the Site were +4.94 mPD (i.e. 6.15 mbgl in drillhole WC-AD07 under Report No. 63534).

8.3.2 It is anticipated that groundwater seepage may be encountered during site formation and infrastructure works. Shoring or properly designed excavation with lateral support system will be required to maintain stability of the trenches or working pits. Dewatering and working pits may also be necessary.

8.4 Preliminary Geotechnical Assessment

Geotechnical Appraisal Related to Man-made Features

8.4.1 A review of existing slopes and retaining walls within and in the vicinity to the Site that may affect or be affected by the Development is carried out.

8.4.2 Guidance given in the Geotechnical Engineering Office Technical Guidance Note No. 15 (TGN 15) regarding the travel angle of landslide debris and the crest influence zones for slopes and retaining walls are adopted for determining if any geotechnical feature will affect or will be affected by the proposed woks. The crest influence zone is taken as the feature height. If the proposed works at toe of a feature is within the extreme travel distance of the potential landslide debris of the feature, the failure of the feature is considered to be affecting the proposed works and shall be considered in the geotechnical assessment.

8.4.3 A registered man-made feature (Feature No. 6NW-B/R 88) is identified within the boundary of the Site, which is shown in **Figure 196587/B&V/PGA/002**. Regarding the registered man-made features in close proximity to the Site (Feature Nos. 6NW-B/C 103, 6NW-B/C 104, 6NW-B/C 105 and 6NW-B/C 122), with the assessment of the extreme travel distance of the potential landslide debris of the features, it is considered that any failure of the concerned man-made features will unlikely affect the Development.

8.4.4 After a series of site visit to accessible areas, it is found that there are no non-registered geotechnical features within or in the vicinity of the Site which would potentially be affected by / affect the Development. Further site visit should

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be conducted after land resumption so as to confirm the presence of non-registered geotechnical features.

Geotechnical Consideration and Geotechnical Constraints

8.4.5 When more information from ground investigation are available, a settlement analysis shall be carried out. Should the results indicated an unfavorable time frame or degree of settlement, removal of the fill and alluvium layer is one of the options during site formation works so as to prevent settlement due to degradation of non-inert materials and increase of surcharge. The quantities of fill removal will be determined when more information from site-specific GI works are available. Apart from fill removal, in-situ ground improvement such as surcharging, stone columns, deep cement mixing and vertical drains should also be considered at a later stage.

8.4.6 The provision for adjusting the proposed site formation and infrastructure works to cope with any possible constraints should be reviewed at a later stage when more site investigation are carried out.

8.4.7 According to the topographic map and site reconnaissance, a watercourse running through the Site is observed. Temporary drainage system should be constructed to discharge the surface runoff from the Site during site formation works. Temporary surface protection of the Site should also be provided to prevent surface erosion. The existing natural streams within the Site will be demolished during the formation of building platforms. Change in land use from unpaved to paved surface will increase the amount of runoff entering into the drainage system. Change in formation level and cross-fall in the Site will also alter the overland flow pattern and discharge point into the drainage system resulting in modification of the catchment plan. The surface runoff after the completion of the site formation works will be collected by the proposed drainage system and discharged to the existing drainage system downstream.

Feasibility of the Infrastructure

8.4.8 From the current available information, no adverse geological and geotechnical features are observed. It is considered that the Development is feasible from geotechnical point of view, subject to further review when more comprehensive GI information can be obtained at a later stage of the Development.

8.5 Natural Terrain Hazards Study (NTHS)

8.5.1 The potential risk from landslides on natural hillsides will inevitably increase as the Development encroaches into areas adjacent to natural hillsides. The objective of NTHS is to identify any natural terrain hazards that could affect an existing or a proposed development and to enable a decision to be reached so as to ascertain whether any potential risk to the site can be mitigated.

8.5.2 According to the GEO Report No. 138, hillside catchments potentially posing natural terrain hazards to the Site are classified into Channelized Depression (CD),

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Topographic Depression (TD) and Open Hillslope (OH) catchments. The classification of catchments has been undertaken based on a review of the catchment characteristics (i.e. topography, drainage/debris concentration, discharge outlet, debris path and potential hazard models), Light Detection and Ranging (LiDAR) data, aerial photographs as well as field reconnaissance observations.

Initial Screening

8.5.3 An initial screening to determine the need for a NTHS is carried out in accordance with Annex GC28 A5 of GEO Circular No. 28 (GEO, 2013) and GEO Report No. 138 (GEO, 2016). Six numbers of catchments (Catchments A to F) are identified as shown in **Figure 196587/B&V/PGA/012** and may have potential to pose natural terrain hazards to the Site. The initial screening results are presented in **Table 8.2**.

Table 8.2 – Initial Screening for NTHS

Catchment	Proposed Facility	Inclusion Guidelines		Need for further screening [Satisfying (1) AND (2) => Yes; otherwise => No]
		(1) Group 1, 2 or 3 Facility [Table 1, GEO Report No. 138]	(2) Presence of an undisturbed 'hillside' sloping at more than 15° within 100m horizontally upslope of the facility	
A	Residential Buildings	Group 1	Yes	Yes
B			Yes	Yes
C			Yes	Yes
D			Yes	Yes
E			Yes	Yes
F			Yes	Yes

"In-principle Objection Criteria" Screening and "Alert Criteria" Screening

8.5.4 Further to the initial screening exercise, two sets of technical criteria, "In-principle Objection Criteria" and the "Alert Criteria", for screening of sites in respect of natural terrain hazards have been carried out.

8.5.5 In line with the current practice, GEO would object in-principle to proposals for the zoning and disposal of a site that falls under this criterial. The six identified catchments (Catchments A, B, C, D, E and F) were reviewed and angles of elevations were between 15° and 35° which fall outside the "In-principle Objection Criteria" of the GEO Report No. 138.

8.5.6 The result of "Alert Criteria" screening is presented in **Table 8.3** and **Figure 196587/B&V/PGA/013**. It is considered that four numbers of catchment (Catchments A, C, D and F) satisfy the "Alert Criteria" of the GEO Report No. 138.

Table 8.3 – "Alert Criteria" Screening for NTHS

Section	Angular Elevation > 20°	50m of Ground Sloping at >15°	Alert Criteria Met?
A	Y	Y	Y
B	N	Y	N
C	Y	Y	Y
D	Y	Y	Y
E	N	N	N
F	Y	Y	Y

8.5.7 Although four numbers of catchment satisfy the Alert Criteria, section 2.3.6 of GEO Report No. 138 (Second Edition) presented the special considerations for dealing with planar hillside catchments. It states that the requirement for a NTHS would not be imposed on new development sites if all the following principles are met as shown in **Table 8.4**.

Table 8.4 – Special Considerations for Dealing with Planar Hillside Catchments

Criteria	Catchment			
	A	C	D	F
The hillside catchment(s) directly overlooking the site is planar in nature, i.e. devoid of topographic depressions or drainage lines.	Y	Y	Y	Y
The natural hillside overlooking the subject site has an angular elevation of ,25° (i.e. the first criterion regarding angular elevation of the Alert Criteria is relaxed from 20° to 25°); the second criterion regarding ground slope angle remains unchanged.	Y	Y	Y	Y
There are no recent ENTLI records and reported landslide incidents within and in the immediate vicinity of the hillside catchments.	Y	Y	Y	Y
There are no Class A and B relict ENTLI records within and in the immediate vicinity of the hillside catchment(s);	Y	Y	Y	Y
There are no obvious sign of distress (e.g. tension crack) within and in the immediate vicinity of the hillside catchment(s) from API or vantage point observations; and	Y	Y	Y	Y

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Criteria	Catchment			
	A	C	D	F
There are no obvious signs of boulder fall hazard or evidence of severe surface erosion within and in the immediate vicinity of the hillside from a review of aerial photographs. An example would be to see if there are any recent boulder falls on the hillslope by reviewing different years of aerial photos (e.g. year 1963) for baseline and recent years for latest conditions). This review also serves to supplement the landslide records of recent years not yet covered by the ENTLI.	Y	Y	Y	Y

8.5.8 Based on the geomorphological characteristics of the catchments, the landslide history and the significance of the landslide hazards in each catchment, the Development is not subjected to a significant risk of natural terrain hazards. Hence, further NTHS is not required for the Site.

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9 PRELIMINARY SITE FORMATION ASSESSMENT

9.1 Introduction

9.1.1 The objective of the Preliminary Site Formation Assessment (SFA) is to recommend the most suitable formation level, profile and design for the Development.

9.1.2 Findings and recommendation of the SFA are presented in Preliminary Site Formation Assessment Report. A summary of the assessment is presented in the sections below.

9.2 Site Formation Design Considerations and Constraints

9.2.1 A balanced cut and fill approach is adopted as far as practicable in designing the proposed site formation level to minimise the export/import of fill materials. This could reduce construction cost due to import or disposal of fill materials and minimise any possible dust emission.

9.2.2 The site formation scheme should be designed to take into account the existing topography and geological conditions so as to avoid excessive cut and fill and minimise the extent and scale of retaining structures. Where necessary, retaining structures should be kept less than 8 m high to avoid the use of bored pile wall system, which is considered less cost-effective than typical L-shaped retaining wall.

9.2.3 Considering the drainage impact under the worst-case scenario (without the YLBS), the maximum water level in the proposed box culvert at the western end of the proposed public access road is approximately +6.5 mPD. The site formation should be designed to avoid flooding risks within the Site and allow sufficient fall of the internal drains for discharging the site runoff to the proposed box culvert by gravity, while still provide enough flexibility to adjust the site level at later stages if the YLBS by DSD is able to match the population intake year of 2033 as anticipated under its tentative implementation programme.

9.2.4 It is noted that the YLIEE will be located to the immediate north of the Site and there is an interface with site levels along the northern boundary of the Site. In view that the implementation programme of the YLIEE is uncertain, the site formation scheme shall avoid permanent retaining structures along the northern boundary so as to minimize potential future abortive works.

9.2.5 In addition to the above, the site formation levels should be designed to ensure high compatibility with the proposed sewerage, waterworks, road and other infrastructure designs.

9.2.6 The Site is generally located at low-lying flood plain which implies that the ground water level is generally high. Over drawdown of groundwater during excavation should be avoided as it may induce ground settlement of the surrounding areas, collapse of cavities and disturbance of the groundwater system in the region. The

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groundwater and the adjacent facilities shall be closely monitored throughout the construction.

9.3 Proposed Site Formation Works

9.3.1 In order to match the existing topography and to suit the housing layout as much as possible, it is proposed to form a 3-step platform to separate the westmost portion, the middle portion the remaining portion of the Site. The westmost platform would accommodate Block 1 and Block 6, while the middle portion would accommodate Block 2 and Block 7 based on the block layout of the Optimal Scheme under this Assignment, as shown in **Figure 198170/B&V/OPT/003**. The proposed site formation layout and details of the proposed retaining structures and slopes are provided in **Figure 196587/B&V/SFA/001** and **Figure 196587/B&V/SFA/001A.**

9.3.2 The proposed eastern platform, which covers approximately 75% of the Site, will be formed as a gently inclined ground rising from the east to the west direction to match the existing topography. The lowest formation level is designed to be +6.5 mPD to allow sufficient fall of the internal drains. Each proposed school site at the eastmost portion of the Site would be formed as a single platform with a uniform level of +6.5 mPD. To the west of the proposed cul-de-sac, the eastern platform will rise from +6.5 to +8.0 mPD to match, in general, the existing topography.

9.3.3 The eastern end of the proposed public access road will be formed at +4.2 mPD to match the existing ground level of Fuk Hi Street. The proposed public access road will rise to +6.5 mPD at the western end with a gradient of about 3%. Furthermore, the access of the proposed PTI at the northeast corner of the Site will be formed at +4.5 mPD for connection to Fuk Hi Street. The back end of the PTI will rise to +6.5 mPD to facilitate its accessibility for the residents within the Site.

9.3.4 In order to maximize the use of site area and avoid excessive cut into the hillside, two stepped platforms are proposed at the western portion and the middle portion of the Site. Four construction access roads with gradient of 5% are provided for construction vehicle access between the three proposed platforms. Under the Optimal Scheme, a future Emergency Vehicular Access (EVA) is planned along the western site boundary and there is not enough room in between for slope grading works. In view that the maximum existing ground level along the western boundary is approximately +19.1 mPD, the formation level of the western platform is proposed at +12.0 mPD to limit the retaining height to less than 8 m.

9.4 Associated Geotechnical Works

Retaining wall

9.4.1 L-shaped retaining walls with retaining height of 2.2 m to 7.2 m are proposed at the western boundary of the Site. Prior to any major earthworks within the Site, the proposed retaining walls shall be installed. As the major cut works are expected at the western portion of the Site, it is recommended that the proposed earthworks

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starts from the western portion to provide a source of materials for the proposed earth-filling works at remaining parts of the Site.

Temporary /Permanent Slopes

9.4.2 In addition to the proposed retaining wall mentioned above, slope systems (with gradient of 1:2) will be proposed on all sides of the Site to accommodate various level differences between the Site and the adjacent grounds. Permanent slopes are proposed along part of the western and southern boundaries where rooms for slope grading are available based on the block layout of the Optimal Scheme under the Assignment. As discussed above, the proposed formation level at the eastern portion of the Site is constrained by the drainage condition in the vicinity of the Site. With the YLBS, the drainage condition in the vicinity of the Site can be improved and the proposed site level at the eastern portion can be further optimized. Moreover, the formation level of YLIEE to the immediate north of the Site is subject to review and adjustment. In view of the uncertainty of the implementation status of the YLIEE and the YLBS, temporary slopes are proposed along the northern and eastern boundaries to avoid potential abortive works due to unnecessary retaining walls and allow flexibility to further optimize the site level / cut-fill balance.

9.5 Unsuitable Top Soil Material

9.5.1 Reference is made to the existing GI records and observations during site inspection for estimation of quantities of unsuitable top soil materials. As more than half of the Site is brownfield area and no deep excavation in the Site had been observed from the aerial photos, an average depth of 0.5 m unsuitable top soil materials is assumed for the overall site. An extra depth of 1.5 m of unsuitable top soil materials is assumed for areas of agricultural lands and green landscape. The exact quantities of the unsuitable and top soil materials would require further confirmation after site-specific GI could be carried out.

9.5.2 The unsuitable materials would be disposed off-site, while the remaining top soil would be re-used for planting purpose. The top soil materials would be used in planting areas such as roadside slope, roadside planter, amenity area and local open space.

9.6 Earthwork Inventory

9.6.1 The estimated cut and fill volumes for the Development are shown in **Table 9.1**. The area distribution of the associated cut and fill within the Site are shown in **Figure 196587/B&V/SFA/002.**

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Table 9.1 – Earthwork Volume for the Development

Cut (m^3)		Fill (m^3)	Surplus/ Deficit(1) (+/-) (m^3)
Unsuitable Top Soil Materials	Suitable Materials		
105,841	23,466	225,869	-202,403

Note:
(1) Surplus / Deficit = (Suitable Material) – (Fill)

9.7 Imported Fill Material

9.7.1 For preliminary design it is assumed that the major public fill source will be from the Tuen Mun Area 38 Fill Bank, which is the closest public fill reception facility to the Site. The allocation of the fill source will be subject to approval by the Public Fill Committee (PFC) of the CEDD.

9.7.2 Alternative sources for fill materials using available public fill materials from other concurrent construction projects will be identified at a later stage. The mechanism to receive public fill is to designate some concurrent projects as supply source before commencement of construction.

9.8 Dumping of Unsuitable Materials

9.8.1 The dumping of unsuitable materials should be carried out in accordance with WBTC No. 12/2000 and ETWB TCW No. 34/2002. The preliminary estimated quantity of unsuitable materials to be disposed off-site is about 105,841m^3. The volume will be further confirmed upon the completion of more site-specific GI at a later stage.

9.8.2 As the estimated C&D material is more than 50,000 m^3, a C&D Material Management Plan (C&DMMP) will be prepared in accordance with PAH Chapter 4 and ETWB TCW No. 19/2005.

9.8.3 The West New Territories (WENT) Landfill at Nim Wan is considered as a feasible site for dumping the unsuitable materials. However, consultation with EPD and PFC should be conducted to identify the final dumping site within the Northwest New Territories (NWNT) for the unsuitable materials.

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10 PRELIMINARY ENVIRONMENTAL REVIEW

10.1 Introduction

10.1.1 The objective of the Preliminary Environmental Review (PER) is to:

- To identify the important environmental factors of the Development and infrastructure works;
- To identify existing and planned sensitive receivers and sensitive parts of the natural environment which might subject to impact by the Development and infrastructure works;
- To determine the possible impacts of the Development and infrastructure works on the environment;
- To identify, assess and specify methods, measures and standards, to be included in the detailed design, construction and operation of the Development and infrastructure works which are necessary to mitigate these impacts and reduce them to established levels;
- To identify alternate proposals/alignments of the Development and infrastructure works to minimise the potential environmental impacts; and
- To determine the environmental impacts arising from and encountered by the Development and to recommend mitigation measures to keep the potential impacts within the acceptable levels of the current standards/regulations.

10.1.2 Findings and recommendation of the PER are presented in Preliminary Environmental Review Report. A summary of the assessment is presented in the sections below.

10.1.3 It has been confirmed that the Development will be implemented in one phase. The following three scenarios will be taken into account to assess whether they will have a bearing on the environmental impacts of the Development.

- Scenario 1 – Existing brownfield operations to the north of the Site shall continue at the time of population intake for the Development;
- Scenario 2 – Existing brownfield operations to the north of the Site were cleared at the time of population intake for the Development; and
- Scenario 3 - The development of the YLIEE is complete at the time of population intake for the Development.

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10.2 Air Quality Impact

Air Sensitive Receiver

10.2.1 The assessment area for air quality impact is defined by a distance of 500 m from the boundary of the Site and associated infrastructure works.

10.2.2 The existing and planned Air Sensitive Receivers (ASRs) during construction phase and operational phase have been identified with reference to the HKPSG as shown in **Figure 196587/B&V/PER/FIG 3.1a – 3.1d** and **Figure 196587/B&V/PER/FIG 3.2**, and their impacts to the ASRs have been assessed.

Air Quality Impact during Construction Phase

10.2.3 The construction works for the Development is tentatively scheduled to commence in early 2027, after the completion of land resumption/site clearance. The infrastructure works within the Site and outside the Site would be completed by 2029 and 2033 respectively. During the construction of the Development, potential air quality impacts on the nearby ASRs are related to dust and emission (sulphur dioxide (SO_2) and nitrogen dioxide (NO_2)) arising from movement of vehicles/ construction equipment along unpaved roads and paved road, as well as material handling and wind erosion of exposed area.

10.2.4 The air quality impact is considered manageable provided that appropriate mitigation measures specified in Air Pollution Control (Construction Dust) Regulation are implemented. Given the limited number of construction plant required on-site for a development of this scale, the associated gaseous emissions are expected to be limited. For Non-road Mobile Machineries (NRMM) at construction work sites, they are controlled under the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation and that site works will strictly comply with the regulatory requirements so as to minimize emissions from NRMM. It is therefore considered that the air quality impact arising from construction plant should be minimal.

Air Quality Impact during Operational Phase

Vehicular Emissions

10.2.5 The existing ASRs and planned ASRs within the Site will potentially be affected by vehicle exhausts from existing roads, in particular Fuk Hi Street, Long Ping Road and the proposed access road to the Site. NO_2, respirable and fine suspended particulates (RSP and FSP) are the major pollutants of concern from vehicle exhaust, especially to receivers at low level. The layout design has incorporated appropriate setback distance of at least 5 m and 10 m from the local road and district distributor respectively with reference to the requirements stated in the HKPSG. Hence, the potential vehicular emission impact is considered minimal.

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Chimney Emissions

10.2.6 A total of 22 active chimneys identified within YLIE are shown in **Figure 196587/B&V/PER/FIG 3.3**, of which 4 chimneys are located within 500 m of the Site. Apart from a small part of the carpark cum community facilities, all sensitive receivers are at least 200 m away from the existing active chimneys. It is not uncommon that community facilities will not rely on windows for ventilation and be equipped with central air conditioning. It is recommended that any fresh air intake location of the community facilities should be located at least 200 m away from the nearest chimney. With appropriate design of fresh air intake location for the community facilities to be at least 200 m away from the nearest chimney, all sensitive receivers within the Site would comply with the minimum buffer distance from chimneys recommended in the HKPSG.

10.2.7 The planned development of the YLIEE may also has chimney installations which are regarded as future air pollution sources. However, since there is no information on the development programme and details of the YLIEE at this stage and the development of the YLIEE is a designated project under the Environmental Impact Assessment Ordinance (EIAO), the potential impact associated with chimney installations of the YLIEE should be addressed as part of the Environmental Impact Assessment (EIA) study for the development of the YLIEE.

Public Transport Interchange

10.2.8 Mechanical ventilation system will be installed at PTI (if required in future detailed design) to reduce the air pollutants accumulation inside PTI.

Mitigation measures

Construction Phase

10.2.9 To mitigate fugitive dust impacts, all dust control measures recommended in the Air Pollution Control (Construction Dust) Regulation, where applicable, will be implemented.

Operational Phase

10.2.10 As mentioned in Para. 10.2.6, fresh air intake location for the community facilities shall be designed to be at least 200 m away from the existing active chimneys.

Public Transport Interchange

10.2.11 A mechanical ventilation system will be provided (if required in future detailed design) for the PTI to ensure that air quality inside the PTI would comply with the requirement of the EPD. Should a mechanical ventilation system is provided in future, the exhaust louver of the ventilation fan would be located at the northern façade, which is facing away from the planned ASRs within the Development and the existing ASRs along Fuk Hi Street. The ventilation system will be designed based on the considerations as specified in EPD's Control of Air Pollution in Semi-Confined

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Public Transport Interchanges (ProPECC PN1/98). Therefore, adverse air quality impact due to the PTI is not anticipated.

10.3 Noise Impact

Noise Sensitive Receiver

10.3.1 Noise sensitive receivers (NSRs) are identified with reference to the HKPSG at a distance of 300 m from the boundary of the Site, as shown in **Figure 196587/B&V/PER/FIG 4.1** and **Figure 196587/B&V/PER/FIG 4.1a - 4.1c**. The impacts to the NSRs during the construction and operational phases have been assessed.

Construction Noise Impact

10.3.2 Key construction activities of the proposed site formation and infrastructure works have been identified for noise assessment. The major construction works would include the following activities:

- Site clearance;
- Excavation works;
- Filling works;
- Construction of retaining structures;
- Formation of internal access road;
- Infrastructure works such as sewerage works, water supply works, drainage works, and utilities construction; and
- Road improvement works and junction improvement works.

Unmitigated Scenario

10.3.3 There would be noise exceedances predicted at all NSRs except C07. Exceedances are anticipated at all NSRs (C01-C03, C10-C11) along Fuk Shun Street throughout late 2027 to early 2029. Village houses at the Wang Chau Village Extension Area (C04-C05, C12-C13) and Kam Ping House at Long Ping Estate (C06) are also predicted with exceedances for the period of late 2027 to late 2029. In addition, C08 near the junction improvement of Fuk Hi Street and Wang Lok Street as well as C09 near the junction improvement of Fung Chi Road and Wang Tat Road are both predicted with exceedances in late 2028. Implementation of noise mitigation measures would be necessary to reduce the noise impact.

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Mitigation Measures

10.3.4 Noise mitigation measures including the use of quiet Powered Mechanical Equipment (PMEs), installation of temporary noise barriers and enclosure for the PMEs to screen noise from the affected NSRs are proposed.

10.3.5 Future appointed contractor will be required through contract specifications to provide and implement sufficient direct mitigation measures with reference to the recommendations in this PER or the future detailed design to achieve acceptable noise levels on the nearby NSRs.

10.3.6 It is also recommended to implement good site practices as far as practicable so as to further reduce noise impact at NSRs. Since the effect of the good site practices could not be quantified, the mitigated noise levels calculated in the subsequent sections have not taken into account this effect.

10.3.7 With the implementation of the proposed mitigation measures, adverse construction noise impact to all NSRs is not anticipated.

Operational Noise Impact - Road Traffic Noise

10.3.8 The road traffic noise impact imposed on the existing NSRs and planned NSRs of the Development would be generated by the roads within 300 m from the boundary of the Site, road improvement works, and junction improvement works. The main roads considered for the road traffic noise assessment are Fuk Hi Street, Long Ping Road and the proposed access road to the Site, as well as the roads in the vicinity of the junction proposed for improvements.

10.3.9 Under the three scenarios mentioned in Para. 10.1.3, the road traffic will have different noise impacts to the existing and planned NSRs.

Scenarios 1 and 2

10.3.10 Under Scenarios 1 and 2, worse road traffic noise impact would occur in AM peak hour. There would be exceedances for existing NSRs along Fuk Hi Street and Long Ping Road as well as planned NSRs within the Site (i.e. Blocks 11, 13 and two proposed primary schools) and the planned Wang Chau Phase 1 Development. For some of the existing NSRs and all planned NSRs within the Site, the exceedances are due to Project Roads (i.e. Fuk Hi Street, proposed access road). Therefore, direct mitigation measures would be required such that the predicted noise level at these NSRs would comply with the noise criteria.

Scenario 3

10.3.11 As mentioned previously, since there is currently no available information on the YLIEE, a quantitative assessment could not be conducted. Nonetheless, it is expected that the road traffic noise impact of Scenario 3 would be greater than that of Scenario 2 due to the addition of vehicles induced by the YLIEE. As for comparing between Scenario 1 and Scenario 3, it is difficult to determine whether the traffic of brownfield operations under Scenario 1 or the YLIEE under Scenario 3 is greater at

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this stage. Since the development of YLIEE is a designated project under the EIAO, the potential road traffic noise induced by the YLIEE should be quantitively addressed as part of the EIA study for the development of YLIEE.

Mitigation Measures

10.3.12 Direct mitigation measures should be considered or proposed for road projects if there would be adverse environmental impact. If the NSRs are affected by noise from other existing roads, direct mitigation measures are required to reduce the noise from the concerned road projects. Upon exhausting all direct mitigation measures, indirect mitigation measures in the form of window insulation and air-conditioning is often the "last resort" to address the noise impact.

10.3.13 Exceedance of the noise criteria at both existing NSRs and planned NSRs within the Site are predicted in the unmitigated case for both Scenario 1 and Scenario 2. As such, direct mitigation measures are required to alleviate the potential road traffic noise impact. The predicted unmitigated noise levels revealed that the AM peak hour in Scenario 1 generally represented the worst-case between the two scenarios. Hence, direct mitigation measures are recommended to mitigate the road traffic noise impact for this worst-case scenario, which would be applicable and acceptable for other scenarios with less impact.

10.3.14 A combination of roadside barrier and application of low noise road surfacing material (LNRS) of polymer modified friction course (PMFC) material is proposed for noise mitigation works for parts of Fuk Hi Street as far as possible. Two 4 m high vertical barriers along the southbound of Fuk Hi Street is proposed to reduce the road traffic noise impact on the existing NSRs. Further mitigation measures have been considered ineffective as the exceedance is mainly due to the direct line of sight to Fuk Hi Street through the vehicular ingress/egress.

10.3.15 At-receiver mitigation measures in the form of architectural fins made of concrete and acoustic windows with noise reduction of 4.7 dB(A) are proposed to alleviate the road traffic noise impacts for the NSRs at Block 11 and Block 13, subject to detailed design at later stages. With the implementation of a combination of LNRS along Fuk Hi Street and architectural fins and acoustic windows at the receivers, the predicted noise levels at all the representative planned residential NSRs within the Site will comply with the relevant noise criteria.

10.3.16 For the two primary schools within the Site, increasing the boundary wall of schools to 5 m high is proposed as the only feasible direct mitigation measure at this stage taking into account the inapplicable of LNRS at the proposed access road and limit of sightline due to erection of noise barriers along the proposed access road and Fuk Hi Street near the access road junction. However, the adoption of the 5 m boundary wall shall be reviewed by Architectural Services Department or the future project proponent of the school following the Class Assessment Document when detailed layout of the schools is available during detailed design stage of the primary schools.

10.3.17 The locations and extents of the proposed noise mitigation measures are summarized and illustrated in **Figure 196587/B&V/PER/FIG 4.8**.

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10.3.18 In addition to the LNRS (PMFC type) proposed for the section of Fuk Hi Street with road improvement works, the application of LNRS (PMSMA6) on the proposed access road and braking zone of Fuk Hi Street has also been explored, as shown in **Figure 196587/B&V/PER/FIG 4.9.** However, promising findings of the trials with PMSMA6 have yet to be established and such technical application criteria are still undetermined. It is thus recommended that a review on the use of new road surfacing materials, if applicable, on roads within the Project Boundary (including the proposed access road and at the junction of Fuk Hi Street and Long Ping Road where the application of LNRS is constrained by current application criteria) shall be conducted at the detailed design stage with a view to further alleviating the traffic noise impacts to the existing and planned NSRs. The feasibility and effectiveness of the application of PMSMA6 is subject to findings from ongoing trials conducted by the Highways Department.

Residual Road Traffic Noise Impacts

10.3.19 With the implementation of direct mitigation measures such as noise barriers, LNRS, architectural fins and acoustic windows, there should be no adverse road traffic noise impact on the residential blocks within the Site.

10.3.20 Residual impacts are still predicted at the auxiliary blocks of the two proposed schools, which are primarily due to the proposed access road and Fuk Hi Street. As discussed above, both noise barriers and LNRS are not feasible for the proposed access road. Nonetheless, the Architectural Services Department or the project proponent of the schools to be identified in the future should follow the Class Assessment Document to provide the necessary noise mitigation measures for the confirmed detailed layout of the school to address the noise impact during the detailed design stage of the primary school development.

10.3.21 For existing NSRs, upon exhausting all feasible direct mitigation measures, residual impacts contributed dominantly by the Project Roads were predicted at E02, E03, E06 and E07. However, these NSRs do not fulfill all the testing criteria eligible for indirect mitigation measure. Hence, indirect mitigation measures would not be provided. Nevertheless, with the provision of proposed mitigation measures, the traffic noise impact along the modified section of Fuk Hi Street is alleviated when compare with the without Project scenario.

<u>Operational Noise Impact - Fixed Plant Noise Impact</u>

Scenario 1

10.3.22 Fixed noise impacts due to the applicable sources identified in **Figure 196587/B&V/PER/FIG 4.5** have been predicted for the planned representative NSRs within the Site under Scenario 1. To minimize direct line-of-sight with NSRs, the ventilation fan of the PTI (if required in future detailed design) is proposed to be located at the north facing façade of the PTI. It is assumed to be located at the furthest west of the north facing façade as a worst case assumption. By limiting the Sound Power Levels (SWLs) of the ventilation fan to 100 dB(A) and 94 dB(A) for daytime/evening and night-time period respectively, full compliance of the criteria

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would be achievable at all planned NSRs. The results revealed that full compliance to the noise criteria can be achieved at all NSRs within the Site.

Scenario 2

10.3.23 Fixed noise impacts due to the applicable sources identified in **Figure 196587/B&V/PER/FIG 4.6** are predicted for the representative NSRs under Scenario 2. The ventilation fan of the PTI (if required in future detailed design) is assumed to be located at the furthest west of the north facing façade as a worst-case assumption. The results revealed that full compliance to the noise criteria can be achieved at all planned NSRs within the Site.

Scenario 3

10.3.24 **Figure 196587/B&V/PER/FIG 4.7** shows the location of fixed noise sources under scenario 3. However, since there is no information on the development programme and nature of YLIEE at this stage, no quantitative fixed noise impact assessment has been conducted for Scenario 3. Nonetheless, since the development of YLIEE is a designated project under the EIAO, the induced fixed noise sources impact on the planned NSRs within the Site is expected to be assessed to confirm compliance with the criteria stipulated in the Noise Control Ordinance (NCO).

Impacts on Existing NSRs due to Planned Noise Sources

10.3.25 To cater for a worst-case scenario for the existing NSRs, a separate SWL has been established by assuming the location of the ventilation fan at the far east of the north facing façade (if required in future detailed design). Should the ventilation fan of the PTI be located at the far east of the northern façade (if required in future detailed design), the SWLs of the ventilation fan will need to be limited to 96 dB(A) and 88 dB(A) for daytime/evening and night-time period respectively in order to achieve full compliance to the criteria at existing NSRs.

Mitigation Measures

10.3.26 Future appointed contractor will be required through contract specifications to implement a design that could mitigate noise impact with reference to the recommendations in the PER or the future detailed design such that no adverse noise impact arising from the planned ventilation fan of PTI (if required in future detailed design) is anticipated.

10.3.27 If installation of mechanical ventilation system at the PTI is required in future detailed design, no residual fixed noise source impacts are anticipated for the existing NSRs at Fuk Hi Street as well as all planned NSRs within the Site by adopting a maximum allowable SWL for the ventilation fan. As such, no residual fixed noise source impacts are envisaged with the adoption of recommended mitigation measures.

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10.4 Water Quality

Assessment Area and Water Sensitive Receivers

10.4.1 The assessment area for water quality is defined as all areas within 500 m from the boundary of the Site.

10.4.2 According to the desktop reviews and site surveys, the water quality sensitive receivers within the assessment area for water quality were identified as shown in **Figure 196587/B&V/PER/FIG 5.3**.

Identification and Evaluation of Impact

Construction Water Quality

10.4.3 Surface runoff of the Site may cause potential water quality impact. During construction, soil surfaces would be exposed. Surface runoff of the Site would wash away soil particles on unpaved lands and areas with topsoil exposed. This runoff is characterised by high concentrations of suspended solids. Release of the runoff into water bodies directly or via drainage channels could lead to increase in suspended solid levels and turbidity in the nearby water bodies. The runoff may also wash away contaminated soil particles and therefore cause water pollution.

10.4.4 The runoff generated from these watercourses upstream of the Site will be intercepted and diverted into peripheral U-channels, and eventually be discharged to Yuen Long Nullah. The construction of these U-channels would commence with general site formation works. Mitigation measures are to be implemented during alterations. As such, no unacceptable water quality impacts would be expected.

10.4.5 Site drainage would be well maintained and good construction practices would be observed to ensure that litter, fuels and solvents are managed, stored and handled properly and will not enter nearby streams and water bodies. Therefore, it is expected that no water quality impact will be caused by accidental spillage.

10.4.6 Domestic sewage would be generated from workforce of construction stage. However, it should be collected onsite using chemical toilets and be suitably handled by licensed contractors. No direct discharge of sewage to water bodies would be allowed. No adverse water quality impact from sewage effluent from construction workforce is expected.

Operational Water Quality

10.4.7 The sewage generated from the Development will be discharged to the nearby public sewers to meet the requirement as stipulated in the Technical Memorandum on Water Pollution Control Ordinance. As all sewage will be properly collected by public sewer leading to the YLSTW for treatment before discharge, no adverse water quality impact is expected.

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10.4.8 Surface run-off to be generated from the Development is known as non-point source pollution. At the planning and design stages, the drainage systems should be properly planned to receive road runoff. Road runoff is expected to carry silt and grit and should be properly handled before discharge. Appropriate facilities, such as gullies and silt traps shall be installed to intercept suspended solids before discharge into the nearby drainage system. With the implementation of the proposed mitigation measures, no adverse water quality from road runoff would be expected.

10.4.9 Surface runoff arises from the Development due to the increase in paved area. The level of contaminants in the runoff is generally limited for new development area and does not pose a significant threat to the nearby watercourses. For locations that are prone to pollution, e.g. public transport interchange and car park, separate drainage system should be considered at these locations and the collected runoff should be intercepted by gullies, silt traps or oil interceptors before discharge as necessary. With the implementation of the proposed mitigation measures, no adverse water quality impact from surface runoff is expected.

10.5 Waste

Identification and Evaluation of Potential Impacts

10.5.1 The construction activities to be carried out for the Development would generate a variety of wastes that can be divided into distinct categories based on their composition and ultimate method of disposal. The identified waste types include:

- Site clearance waste
- Construction and demolition (C&D) materials
- General refuse
- Chemical waste
- Asbestos containing materials (ACM)

10.5.2 C&D materials, comprising both inert and non-inert portions, would be generated from site excavation and general construction works. The estimated amount of inert C&D materials generated during the construction phase would be approximately 127,501 m^3, of which about 23,466 m^3 of the soft inert C&D materials are expected to be reused on site and approximately 104,035 m^3 of both hard and soft inert C&D materials, which is considered as unsuitable soil, will be disposed off-site to designate public fill reception facilities. Opportunities to maximise the reuse of inert C&D materials will be explored during the detailed design stage. The estimated amount of non-inert C&D materials is approximately 1,806 m^3, which will be disposed of at landfill. Detailed breakdown of the various types of waste material is provided in **Table 10.1**. Although the excavated material would be mostly general fill material, not all excavated material would be suitable for backfilling. On the

other hand, import of approximately 202,403 m^3 of fill material will be required for site formation of raised platform.

Table 10.1 – Summary of Estimated Quantities of C&D Materials

Type of C&D Materials and Waste		Total Quantity (m^3)	Reused on Site (m^3)	Disposed offsite (m^3)
Inert C&D Material	*Soft Inert Material*	115,460	23,466	91,994
	Hard Inert Material	12,041	-	12,041
Non-inert C&D Materials		1,806	-	1,806
Total		**129,307**	**23,466**	**105,841**

10.5.3 The C&D materials generated from site formation should be sorted on-site into inert C&D materials (that is, public fill) and non-inert C&D materials. In order to minimise the impact resulting from collection and transportation of C&D materials for off-site disposal, the excavated materials comprising fill materials should be reused on-site as backfilling material as far as practicable. Non-inert C&D materials, such as wood, plastic, steel and other metals should be reused or recycled, as a last resort, before disposing of to landfill.

10.5.4 Precautionary measures related to the handling and disposal of asbestos should also be implemented based on Handling of Asbestos Containing Materials in Buildings (ProPECC PN 2/97).

10.5.5 With the implementation of mitigation measures, such as maximizing the reuse of inert C&D materials, and proper waste management practices for handling, transportations and disposal of identified waste arisings from the site formation works, no residual impacts are expected during the construction phase.

10.6 Ecological Impact

Ecological Impacts within and in the vicinity of the Site

10.6.1 The assessment area for ecological impact is defined as areas within 500 m from the boundary of the Site and associated infrastructure works, which would be potentially affected by the Development.

10.6.2 Ecological surveys were carried out from December 2012 to February 2014 under the previous "Planning and Engineering Study for the Public Housing Site and Yuen Long Industrial Estate Extension at Wang Chau" (P&E Study), which covers habitat and vegetation, mammal, avifauna, herpetofauna, butterfly and dragonfly, and freshwater fauna. To supplement the desktop study, site visits and verification surveys were conducted between September and December 2017 covering a 4 months period including both wet and dry seasons to update the current conditions.

10.6.3 The assessment area for ecological impact assessment contains developed area, agricultural lands, plantation, shrubland/grassland, woodland, fishponds and watercourses, while the Site mainly consists of developed area, agricultural land and some minor watercourses. The infrastructure works are located mainly along existing roads. The overall ecological value of the Site is fairly low due to its

disturbed nature. Thus the overall direct impact due to loss of habitats of the Site is ranked as minor.

10.6.4 Japanese Pipistrelle, Common Rat Snake and Freshwater Crab were the species of conservation importance recorded within the Site. Japanese Pipistrelle was recorded in previous study, but its location is not specified in the study. Similar with birds, Japanese Pipistrelle was in low abundance within the Site and more suitable alternative habitats are available outside the Site. Common Rat Snake was recorded in section of watercourse by previous studies and a Freshwater Crab species *Somanniathelphusa zanklon* was recorded during the verification study. Channelised watercourse is not the typical habitat for Common Rat Snake or the dependent habitat for the Freshwater Crab given that natural sections of watercourse with better conditions were present upstream. Both species were only recorded in small numbers. In view of the potential pollution, the severity of impact is considered to be minor.

10.6.5 **Figure 196587/B&V/PER/FIG 8.2** has shown the ecological resources within and in the vicinity of the Site identified in literature review and verification survey.

Direct Impacts during Construction Phase

10.6.6 All existing habitats within the boundary of the Site will be lost due to the proposed site formation works. However, the Site only consists of developed area, agricultural land and minor watercourses. As shown in **Table 10.2,** the ecological values of the Habitats inside the Site were ranked as "Low".

Table 10.2 – Ecological Values of the Habitats inside the Site

Criteria	Developed Area	Agricultural Land	Watercourse
Naturalness	Man-made.	Man-made habitat.	The watercourse towards the west (upstream) is largely natural, while the lower course is channelised and modified, mostly with concrete wall and bottom. The watercourse is subject to pollution from the surroundings.
Size of Habitat Loss	9.83 ha	2.21 ha	660 m
Diversity	Low floral and faunal diversity	Low floral and faunal diversity.	Low floral and faunal diversity.
Rarity	Very common habitat; Two bird species, Collared Crow, and While-shouldered Starling, recorded are of conservation importance.	Common habitat in the rural area. Greater Coucal of conservation importance recorded.	Common habitat in rural areas in Hong Kong. Common Rat Snake, and Freshwater Crab *Somanniathelphusa zanklon* were of conservation importance.

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Criteria	Developed Area	Agricultural Land	Watercourse
Re-creatability	Readily re-creatable.	Readily re-creatable.	Re-creatable.
Fragmentation	Not fragmented.	Fragmented by the developed area.	Fragmented from the natural section upstream by modification and pollution.
Ecological Linkage	No significant linkage.	Isolated from other natural habitats	No significant linkage due to channelized section.
Potential Value	Limited.	Limited due to the small size and isolation from natural habitats	Low given the channelization.
Nursery / Breeding Ground	No known breeding ground of significance	No known nursery/breeding ground of significance	Not observed
Age	Unknown.	Unknown.	Unknown
Abundance / Richness of Wildlife	Moderate floral abundance and diversity; low faunal abundance and diversity.	Low floral and faunal abundance and diversity.	Low floral and faunal diversity and abundance
Ecological Value	**Low**	**Low** as species of conservation importance recorded are in small numbers, and not restricted to this habitat type.	**Low**

10.6.7 The associated infrastructure works, such as the upgrade of a water main connecting the existing service reservoir, would be taken place along the existing roads. As the existing roads would be reinstated to the original conditions after the works, no permanent habitat loss would be caused by the associated infrastructure works area.

Indirect Impacts during Construction Phase

10.6.8 Disturbance to the surrounding habitats may occur during the construction and operational phases due to the increase in human activities. The surrounding habitats are already subject to disturbance from the existing uses in the Site and the adjacent developed areas to the north and east. Only negligible disturbance impact to these areas will occur during construction and operational phases.

10.6.9 The surrounding areas of the associated infrastructure works are mostly developed areas which are under high level of human activities. Hence, the disturbance to the surrounding habitats of the associated infrastructure works is considered to be insignificant. Part of the associated infrastructure works near the Wang Chau Service Reservoir falls within Conservation Area zone and is immediately adjacent to secondary woodland. Since this section of infrastructure works located on an existing road and at the edge of Conservation Area zone and the works area is small,

the disturbance to the surrounding habitats of the associated infrastructure works is considered to be insignificant.

Operational Phase Impacts

10.6.10 Possible bird strikes with buildings and/or noise barriers by birds (if any) may occur. The cause of bird strikes is related to the transparent or reflective nature of the building facade or the barriers. Impacts are not likely to be of significance as the abundance of birds is low at the Site and the Site is not located between areas with high abundance of birds.

Impacts on Recognised Sites and Species of Conservation Importance

10.6.11 The Site is located outside Wetland Conservation Area (WCA) and Wetland Buffer Area (WBA) and outside Deep Bay Buffer Zone 1 and Zone 2. No recognised sites of conservation importance were identified within the Site. The northern portion of the associated infrastructure works falls within the WBA, while the northern end of the assessment area also falls within WCA. Since the associated infrastructure works would be taken place in existing roads of developed area, significant adverse impact on wetlands of conservation significance from associated infrastructure works are not expected with implementation of good site practices and compliance with the Water Pollution Control Ordinance during the construction and operational phases.

10.6.12 Hillsides near the western and southwestern parts and fish ponds on the northern fringe of the assessment area are zoned as "Conservation Area" (CA). The CA is to protect and retain existing natural landscape, ecological or topographical features of the area for conservation, education and research purposes. This is a general presumption against developments in the CA. In general, only developments that are needed to support conservation of the existing natural landscape or scenic quality of the area or any essential infrastructure works with overriding public interest may be permitted. The section of minor watercourse within the Site is located downstream from the nearest CA zone on slopes of Kai Shan. The WCFR S/R and access road, that are subjected to improvement works also fall within CA zone at Kai Shan. The improvement works, though along the fringe of CA, lies on existing roads, and therefore potential ecological impact on the CA zone are not anticipated.

10.6.13 A butterfly hotspot at Kai Shan was located more than 400 m to the west of the Site although it also lies along and in the vicinity of the infrastructure works along the existing road.

10.6.14 The Site is located at the fringe of the secondary woodland. No loss or fragmentation of the suitable habitats for butterflies will result from the Development. The nectar/larval food plants for the butterfly species of conservation interest recorded within the Site are all common or very common. No significant ecological impacts on the potential feeding/breeding/nursery ground for the butterfly species of conservation significance recorded in the assessment area are expected.

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Ecological Mitigation

Avoidance

10.6.15 The CA zone including Kai Shan Butterfly Hotspot, WBA, WCA, the ponds and surrounding wetland habitats in the west and northwest of the assessment area are ecologically linked to the Deep Bay Area are areas or habitats of conservation importance. They should be well protected and preserved to avoid any negative impacts arising from the Development.

Minimisation

10.6.16 The boundary of the Site has been refined during the course of the assessment to minimize the loss of habitats with ecological value, in particular to reduce the woodland loss caused by the Development.

10.6.17 The alignment of the infrastructure works will all follow and within existing roads. The impacts would be limited to temporary disturbance and temporary habitat loss during construction phase. Due to this, the impacts of both habitat loss and disturbance would be minimised.

Mitigation

10.6.18 Sensitive design of building facade and noise barrier is to be adopted to prevent bird strike. The use of transparent or reflective materials should be avoided where possible, except the necessary ones such as windows for residential flats. Large-scaled and continuous application of transparent or reflective materials such as glass curtain walls should be avoided.

10.6.19 Common Rat Snake and Freshwater Crab *Somanniathelphusa zanklon* were recorded in channelised minor watercourse within the Site. They were both widely distributed in Hong Kong and only of low abundance within the Site. To take a precautionary approach, a precautionary site check and translocation if necessary covering fauna of conservation importance (Common Rat Snake and the Freshwater Crab *Somanniathelphusa zanklon*) prior to site formation at the minor watercourse is recommended. If any individuals are captured, they should be translocated to other nearby watercourses with natural banks and beds outside the Site.

10.6.20 Proper site management measures should be implemented to control site runoff and drainage, and thereby minimize potential adverse impacts on water quality. It shall follow prevailing practices, including mitigation measures for design, construction, operation and maintenance as specified in the ProPECC PN 1/94 - Construction Site Drainage. These mitigation measures should include good practices to minimise site surface runoff and the chance of erosion, and also to retain and reduce any suspended solids prior to discharge.

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Enhancement on the Quality of the Habitats for Butterflies by planting Nectar/ Larval Food Plants in the Site:

10.6.21 Vegetation within the Site will be cleared for the Development, including a number of floral species which are the nectar/ larval food plants for butterfly species of conservation significance that have been recorded at Kai Shan. Though these butterfly species were not identified within the Site, the nectar/ larval food plants within the assessment area may be a possible food source for them. Since these plant species, and also other nectar plants which attract many butterfly species, are very common or common (Xing et al., 2000) and are mostly not present in large numbers in the areas to be cleared, the loss of nectar/larval food plants is predicted to be of low significance. Yet, it is still proposed to plant a number of floral species in the landscaped areas, if possible. This can enhance the quality of the habitats for butterflies and to provide a benefit to the wider butterfly community.

10.7 Cultural Heritage

Environmental Legislation, Policies, Standards and Criteria

10.7.1 The relevant legislations, standards and guidelines applicable to the Assignment for the assessment of cultural heritage include:

- Antiquities and Monuments Ordinance;
- Technical Memorandum on Environmental Impact Assessment Process;
- Hong Kong Planning Standards and Guidelines;
- Guidelines for Cultural Heritage Impact Assessment;
- Development Bureau Technical Circular (Works) No. 6/2009: Heritage Impact Assessment Mechanism for Capital Works Projects;
- List of the 1,444 Historic Buildings with Assessment Results; and
- List of New Items for Grading Assessment with Assessment Results.

Archaeological Background

10.7.2 According to **Figure 196587/B&V/PER/FIG 9.1**, no Sites of Archaeological Interest (SAI) is identified within the Development. Two SAI, namely Sheung Cheung Wai SAI and Mong Tseng SAI are identified in the vicinity of the Development. The closest distance from the SAI to the Development is about 1,300 m. It is anticipated that no SAI will be affected by the proposed works.

Historical Villages

10.7.3 There are a number of historical villages around the Site. No historical village is within the Site. The location of historical villages in the vicinity of the Development

is presented in **Figure 196587/B&V/PER/FIG 9.2**. The shortest distance from the historical village (i.e. Shui Tin Tsuen) to the Development is about 32 m. Since the infrastructure works is confined within existing roads which comprises various underground utilities, it is anticipated that no historical village will be affected by the proposed works.

Built Heritage

10.7.4 A well and shrine is identified within the Site, which is shown in **Figure 196587/B&V/PER/FIG 9.3**. The well has a plaque with a date of 1912 written on it and it seems that the date refers to the notice for usage. Given its high fung shui value and historical value for the local communities, it is recommended that the well and shrine could be retained in-situ as far as possible within the Site. Antiquities and Monuments Office (AMO) has no adverse comment on the retention of the well and shrine in-situ.

10.7.5 No declared monument or graded historic building is identified within the Site and 50 m from the boundary of the Site, hereafter defined as assessment area for built heritage. It is anticipated that no declared monument and graded historic building will be affected by the proposed works. The declared monument and graded historic buildings in the vicinity of the Development are shown in **Figure 196587/B&V/PER/FIG 9.3** and **196587/B&V/PER/FIG 9.4.**

10.7.6 A few items of heritage interest are barely encroached into the assessment area. The items are about 48 m from the infrastructure works. Since the infrastructure works is confined within existing roads which comprises various underground utilities, it is anticipated that no items of heritage interest will be affected by the proposed works. The items are shown in **Figure 196587/B&V/PER/FIG 9.4** and are listed below:

- HB01 – Village House in Shing Uk Tsuen
- HB02 – Shrine at Tai Tseng Wai
- HB03 – Shrine at Ng Uk Tsuen

10.7.7 As shown in **Figures 196857/B&V/PER/FIG 9.3** and **196857/B&V/PER/FIG 9.5**, there are existing burial grounds and graves which are located to the south and west of the Site. The boundary of the Site has been adjusted to preserve the burial grounds and graves in-situ. Direct impact to these burial grounds or graves is not expected.

Findings of Archaeology

10.7.8 After reviewing the Archaeological Desk-based Review and Proposal for Archaeological Field Survey in the P&E Study, three archaeological potential areas were identified, namely Area A, Area B and Area C which are indicated in **Figure 196587/B&V/PER/FIG 9.1**. Only Area A and Area C are partially within the southern part of the Site respectively. These areas may have moderate archaeological potential to yield Ming to Early Qing dynasty archaeological deposits due to observations identified during site walks. During the site visit, it is noticed that the archaeological potential areas are mostly private and permission are

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required from respective owners or tenants to carry out field investigation work. Due to issues on privacy and rights of land ownership, there are constraints on the access for a comprehensive field investigation. It is therefore recommended that field investigation and field testing work should be conducted to assess the archaeological potential in Area A and Area C falling within the Site after land resumption.

10.7.9 The potential impact on archaeological resources cannot be determined at this stage. It is subject to further field investigation and field testing work which will be conducted at potential areas in Area A and Area C falling within the Site after land resumption. Future contractor should appoint qualified archaeologist and prepare a field investigation and field-testing report and seek AMO agreement before construction.

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11 PRELIMINARY LANDSCAPE AND VISUAL IMAPCT ASSESSMENT

11.1 Introduction

11.1.1 The objective of a landscape and visual impact assessment is to:

(a) Carry out a baseline study including an appraisal of the landscape resources and characters of the Site;

(b) Assess the potential landscape impacts associated with the Development and recommend effective mitigation measures to avoid or minimize the adverse landscape impacts identified; and

(c) Assess the potential visual impacts associated with the Development and recommend effective mitigation measures to avoid or minimize the adverse visual impacts identified.

11.1.2 Findings and recommendations of the LVIA are presented in the Preliminary Landscape and Visual Impact Assessment Report. A summary of the assessment is presented in the sections below.

11.2 Methodologies

Landscape

11.2.1 Landscape Impact Assessment has been carried out under this Assignment out with the steps below.

(a) Identification of the baseline Landscape Resources (LRs) and Landscape Character Areas (LCAs) should be found within the assessment area, achieved by site visits and desktop studies;

(b) Assessment of the degree of sensitivity to change of the LRs and LCAs;

(c) Identification of potential sources of landscape change;

(d) Identification of the magnitude of landscape change;

(e) Identification of potential landscape mitigation measures;

(f) Prediction of the significance of landscape impacts before and after the implementation of the mitigation measures; and

(g) Prediction of Acceptability of Impacts.

11.2.2 The assessment area for landscape impact (hereinafter named as the assessment area) is 500 m from the site boundary and 100 m from the Inset A, B and C boundary. It is illustrated on **Figure 196587/B&V/LVIA/001**.

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Visual

11.2.3 The overall visual impact of the Development is evaluated, taking into account the sensitivity of the key public viewers, visual resources and visual amenities likely to be affected, the magnitude, extent and duration of impact and any resultant improvement or degradation in the visual quality and character of the surrounding areas, and planning intention and known planned developments nearby.

11.2.4 The methodology adopted for this visual appraisal consists of:

(a) Identification of Baseline Conditions (Assessment Area/ Zone of Visual Influence (ZVI)), Planned and Committed Development, Visual Elements and Resources and Public Viewing Points;

(b) Identification of Potential Sources of Impact;

(c) Mitigation Measures;

(d) Appraisal of Visual Change;

(e) Assessment of the potential magnitude of visual change; and

(f) Evaluation of overall visual impact.

11.2.5 The assessment of the potential magnitude of visual changes depends on a number of factors including the physical extent of the change, the landscape and visual contexts of the change – i.e. a set of circumstances/facts surrounding the change, the compatibility of the project with the surrounding landscape; and the time-scale of the change - i.e. whether it is temporary (short, medium or long term), permanent but potentially reversible, or permanent and irreversible.

11.3 Baseline Condition

11.3.1 Based on the broad-brush tree survey, an estimated total of 7,799 nos. of existing trees in 80 tree groups were identified within 500 m from the boundary of the Site and 100 m from the Inset A, Inset B and Inset C. No registered Old and Valuable Trees (OVTs) were identified. 10 nos. of Important Trees (ITs) were identified in village and residential areas outside the Site. The approximate locations are also marked on **Figure 196587/B&V/LVIA/003**. Approximately 509 nos. of trees within the Site, 5 nos. of them within Inset A, 20 nos. of them within Inset B and 60 nos. of them within Inset C are recorded within the proposed limits of site formation and infrastructure works. According to the preliminary findings, about 2 nos. of affected trees within the Site and 3 nos. of trees within Inset A would be transplanted, about 558 nos. of trees within the Site, Inset A, Inset B and Inset C would require felling due to unavoidable conflicts with the Development, while the remaining trees would be preserved in place. Detailed tree felling application and compensatory planting proposals will be submitted in accordance with ETWB TCW No. 29/2004, DEVB TCW 6/2015 and 7/2015 in the detail design stage of the Development. This requires a compensatory planting ratio of a minimum 1:1 by number as far as possible.

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Landscape Baseline Review

11.3.2 Twenty-six LRs and twenty LCAs have been identified within the assessment area and their locations are illustrated in **Figure 196587/B&V/LVIA/003 and Figure 196587/B&V/LVIA/004**, respectively.

Visual Analysis of Key Viewpoints

11.3.3 Six key public viewing points within the zone of visual influence have been identified and are indicated on **Figure 196587/B&V/LVIA/006**.

11.4 Impact Assessment Prior Mitigation

Landscape

11.4.1 The magnitude of change, before implementation of mitigation measures, on the LRs and LCAs that would occur in the construction phase is summarised below and tabulated in **Table 11.1**.

Table 11.1 – Magnitude of Landscape Change during the Construction and Operation Phases before Mitigation

ID No.	**Landscape Resources/ Landscape Character Areas**	**Construction Phase/ Operation Phase**	**Magnitude of Change before Mitigation** (None, Negligible, Small, Intermediate, Large)
LR1	Agricultural Land and associated Tree Planting outside Site	Construction	None
		Operation	None
LR1(S)	Agricultural Land and associated Tree Planting within Site	Construction	Large
		Operation	Large
LR1 & LR1(S) combined	Agricultural Land and associated Tree Planting within Assessment area	Construction	Large
		Operation	Large
LR2	Secondary Woodland	Construction	None
		Operation	None
LR3	Mixed Trees, Shrubs and Grassland outside Site	Construction	None
		Operation	None
LR3(S)	Mixed Trees, Shrubs and Grassland within Site	Construction	Large
		Operation	Large

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ID No.	Landscape Resources/ Landscape Character Areas	Construction Phase/ Operation Phase	Magnitude of Change before Mitigation (None, Negligible, Small, Intermediate, Large)
LR3 and LR3(S) Combined	Mixed Trees, Shrubs and Grassland within Assessment Area	Construction	Negligible
		Operation	Negligible
LR4	Ponds	Construction	None
		Operation	None
LR5	Natural Watercourses	Construction	None
		Operation	None
LR6	Amenity Planting within Residential Area	Construction	None
		Operation	None
LR7	Amenity Planting along Roads and Urban Infrastructure outside Inset A, Inset B and Inset C	Construction	None
		Operation	None
LR7(A)	Amenity Planting along Roads and Urban Infrastructure within Inset A	Construction	Large
		Operation	Large
LR7(B)	Amenity Planting along Roads and Urban Infrastructure within Inset B	Construction	Intermediate
		Operation	Intermediate
LR7(C)	Amenity Planting along Roads and Urban Infrastructure within Inset C	Construction	Large
		Operation	Large
LR7, LR7(A), LR7(B) and LR7(C) Combined	Amenity Planting along Roads and Urban Infrastructure within Assessment Area	Construction	Small
		Operation	Small
LR8	Amenity Planting within Industrial Area	Construction	None
		Operation	None

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ID No.	Landscape Resources/ Landscape Character Areas	Construction Phase/ Operation Phase	**Magnitude of Change before Mitigation** (None, Negligible, Small, Intermediate, Large)
LR9	Amenity Planting within Open Storage Area outside Site	Construction	None
		Operation	None
LR9(S)	Amenity Planting within Open Storage Area of the Site	Construction	Large
		Operation	Large
LR9(C)	Amenity Planting within Open Storage Area of Inset C	Construction	Large
		Operation	Large
LR9, LR9(S) and LR9(C) combined	Amenity Planting within Open Storage Area within Assessment area	Construction	Intermediate
		Operation	Intermediate
LR10	Amenity Planting within Village Area outside Site	Construction	None
		Operation	None
LR10(S)	Amenity Planting within Village Area of the Site	Construction	Large
		Operation	Large
LR10 and LR10(S) combined	Amenity Planting within Village Area of the Assessment Area	Construction	Small
		Operation	Small
LR11	Watercourses outside Site	Construction	None
		Operation	None
LR11(S)	Watercourses within Site	Construction	Large
		Operation	Large
LR11 and LR11(S) Combined	Watercourses within Assessment Area	Construction	Large
		Operation	Large
LCA1	Industrial Urban Landscape	Construction	None
		Operation	None

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ID No.	Landscape Resources/ Landscape Character Areas	Construction Phase/ Operation Phase	**Magnitude of Change before Mitigation** (None, Negligible, Small, Intermediate, Large)
LCA2	Miscellaneous Rural Fringe Landscape outside Site	Construction	None
		Operation	None
LCA2(S)	Miscellaneous Rural Fringe Landscape within Site	Construction	Large
		Operation	Large
LCA2 and LCA2(S) combined	Miscellaneous Rural Fringe Landscape within Assessment Area	Construction	Intermediate
		Operation	Intermediate
LCA3	Upland and Hillside Landscape outside Site	Construction	None
		Operation	None
LCA3 (S)	Upland and Hillside Landscape within Site	Construction	Large
		Operation	Large
LCA3 and LCA3 (S) Combined	Upland and Hillside Landscape within Assessment Area	Construction	Negligible
		Operation	Negligible
LCA4	Residential Urban Landscape	Construction	None
		Operation	None
LCA5	Transportation Corridor Landscape outside Inset A, Inset B and Inset C	Construction	None
		Operation	None
LCA5(A)	Transportation Corridor Landscape within Inset A	Construction	Intermediate
		Operation	Intermediate
LCA5(B)	Transportation Corridor Landscape within Inset B	Construction	Intermediate
		Operation	Intermediate
LCA5(C)	Transportation Corridor Landscape within Inset C	Construction	Large
		Operation	Large
LCA5, LCA5(A), LCA5(B) and LCA5(C) Combined	Transportation Corridor Landscape within Assessment Area	Construction	Small
		Operation	Small

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ID No.	Landscape Resources/ Landscape Character Areas	Construction Phase/ Operation Phase	Magnitude of Change before Mitigation (None, Negligible, Small, Intermediate, Large)
LCA6	Urban Peripheral Village Landscape outside Site	Construction	None
		Operation	None
LCA6(S)	Urban Peripheral Village Landscape within Site	Construction	Large
		Operation	Large
LCA6 and LCA6(S) combined	Urban Peripheral Village Landscape within Assessment Area	Construction	Small
		Operation	Small
LCA7	Urban River Corridor Landscape	Construction	None
		Operation	None
LCA8	Agricultural Landscape outside Site	Construction	None
		Operation	None
LCA8(S)	Agricultural Landscape within Site	Construction	Large
		Operation	Large
LCA8 and LCA8(S) combined	Agricultural Landscape within Assessment Area	Construction	Intermediate
		Operation	Intermediate

Visual

VP1: View from Wang Lok Street (refer **Figure 196587/B&V/LVIA/011a** to **Figure 196587/B&V/LVIA/011b**)

11.4.2 The view along Wang Lok Street is selected as a representative of views from drivers and pedestrians along Wang Lok Street between the urban area of Yuen Long and the Yuen Long Industrial Estate (YLIE). Wang Lok Street has mature and semi-mature trees along either side, and viewers currently experience partial views towards the Site. After construction, drivers and pedestrians will experience partial views of the upper storeys of the proposed residential buildings at a distance of approximately 400 m from this viewpoint.

11.4.3 Wang Lok Street is a busy road with daily vehicular and pedestrian traffic. These public viewers will tend to be focused on both the roadway and the surrounding streetscape. Their views will be transient and brief. As such, these public viewers are considered to have a *Low* sensitivity to visual change.

VP2: View from Yuen Long Industrial Estate (refer **Figure 196587/B&V/LVIA/012a** to **Figure 196587/B&V/LVIA/012b**)

11.4.4 The YLIE is a privately owned industrial development, which is located to the north of the Site. The height of the buildings varies from 3 storeys to 8 storeys. Existing views towards the Site comprise a man-made channel and a public footpath along the edge of the YLIE in the foreground, agricultural land and a two-storey village house in the middle ground, and Kai Shan in the distance with the upper storeys of Long Ping Estate as the skyline. Workers or visitors to the YLIE will have partial (the lower portion will be screened by existing vegetation) permanent views of the Development at a distance of approximately 500 m. The small footpaths on both sides of the drainage channel adjacent to the YLIE are used by a small number of pedestrians on a daily basis, mostly workers accessing to the agricultural fields and open storage areas. Their distance of view to the Site is far (500 m) and they will tend to be focused on the agricultural land and the ridgeline of Kai Shan to the west. These public viewers are considered to have *Medium* sensitivity to visual change as they are either within or accessing to a place of work.

VP3: View from hiking trail on Kai Shan (refer **Figure 196587/B&V/LVIA/013a** to **Figure 196587/B&V/LVIA/013b**)

11.4.5 Kai Shan lies to the west of the Site. The view to the east towards the Site from the hiking trail is of mixed trees, shrubs and grassland in the foreground, open storage areas, village houses and Kai Shan in the middle ground, the vegetated hill of Chu Wong Ling, the ridgelines of Kai Kung Leng, Ngau Tam Mei and the Long Ping Estate in the background. Hikers and visitors to the existing grave sites will have permanent partial views of the upper storeys of the Site at a distance of approximately 400 m.

11.4.6 The hiking trail is frequented by a small number of walkers on a daily basis, some for recreational hiking and some for visiting the grave sites. As recreational hikers seek high quality views, these viewers are considered to have a *High* sensitivity to visual change.

VP4: View from Long Ping Road (refer **Figure 196587/B&V/LVIA/014a** to **Figure 196587/B&V/LVIA/014b**)

11.4.7 This viewpoint was selected as a representative of views from drivers, passengers and pedestrians along Long Ping Road as it provides views from the south of the Site. The viewpoint is provided on the footpath northwest of Long Ping Estate at an elevation of approximately +5 mPD. Long Ping Road has mature and semi-mature trees along either side, and viewers currently experience partial views towards the Site. It is assumed that Wang Chau Phase 1 Development should be completed before the Development and will thus obstruct most of the sight. Following construction, drivers and passengers will experience partial views of the upper storeys of the proposed residential buildings at a distance of approximately 300 m.

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11.4.8 The viewers will tend to be focused on both the roads and the surrounding streetscape. Their views will be transient and brief. However, since the existing view is relatively open, these public viewers are therefore considered to have *Medium* sensitivity to visual change.

VP5: View from Sai Tau Wai Village (refer **Figure 196587/B&V/LVIA/015a** to **Figure 196587/B&V/LVIA/015b**)

11.4.9 Sai Tau Wai lies to the east of the Site. Existing views comprise dense low-rise village housing and narrow streets in the foreground and an open skyline beyond. With the implementation of the Development, villagers will have partial views of the upper storeys of the proposed residential buildings at a distance of approximately 250 m. The pathways within the village are used by a large number of villagers on a daily basis. The distance of view is relatively close (250 m) so the viewers will tend to focus on the village houses rather than the skyline. As such, these public viewers are considered to have *Medium* sensitivity to visual change.

VP6: View from Fuk Hi Street (refer **Figure 196587/B&V/LVIA/016a** to **Figure 196587/B&V/LVIA/016b**)

11.4.10 The view along Fuk Hi Street is selected as a representative of views from drivers, passengers and pedestrians travelling between the urban area of Yuen Long and the YLIE. There are existing mature and semi-mature trees along Fuk Hi Street. Viewers currently experience low level full views towards the Site. The existing Long Ping Estate forms a dominant vertical visual element on the left side of the view. An open skyline above the tree line appears at the centre and right hand side of the view. Wang Chau Phase 1 Development will be constructed, which will extend the vertical mass of the Long Ping Estate towards the centre of view. Drivers and passengers experience a full view towards the Development including the roadside trees and the new building façades.

11.4.11 Fuk Hi Street is a busy road with daily vehicular and pedestrian traffic. The distance of view to the Site is very close (potentially as close as 10 m although for the purposes of illustration a set-back view has been selected). The public viewers will tend to focus on both the roadway and the surrounding streetscape. Although the existing view is of transitory nature, which includes an open skyline of reasonable quality. Therefore, the public viewers are considered to have *Medium* sensitivity to visual change.

11.5 Mitigation Measures

11.5.1 Tree preservation and compensatory tree planting will be carried out in accordance with the DEVB TC (W) No. 7/2015 Tree Preservation. This requires a compensatory planting ratio of a minimum 1:1 by number, as far as possible. During the later stage of the Development, an updated tree survey will be carried out and a tree felling application will be submitted. The exact number of trees to be retained/transplanted/felled will be reviewed. The final tree transplantation

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locations shall be identified and the compensatory planting proposal will be prepared together with the application.

11.5.2 Mitigation measures can only be illustrated generically on plan at this stage. An Outline Landscape Plan has been developed in the study which illustrates the conceptual layout of the mitigation measures.

11.5.3 The proposed landscape and visual mitigation measures for potential impacts generated during the construction and operational phases together with the associated funding, implementation, management and maintenance agencies are described below in **Table 11.2** and **Table 11.3** and are illustrated on **Figure 196587/B&V/LVIA/017**.

Table 11.2 – Proposed Landscape and Visual Mitigation Measures During the Construction Phase

ID No.	Landscape and Visual Mitigation Measure	Landscape measure	Visual measure	Funding Agency	Implementation Agency
CM1	The construction area and contractor's temporary works areas should be minimised to avoid impacts on adjacent landscape.	✓	✓	CEDD for roads; Education Bureau for schools; HKHA for housing area development during foundation and main contract	CEDD's Contractor (during site formation phase); Education Bureau and HKHA (during housing development phase)
CM2	Reduction of construction period to practical minimum.		✓	CEDD for roads; Education Bureau for schools; HKHA for housing area development during foundation and main contract	EDB/ HKHA/CEDD's Contractor
CM3	Construction traffic including construction plant, construction vessels should be kept to a practical minimum.		✓	CEDD for roads; Education Bureau for schools; HKHA for housing area development during foundation and main contract	EDB/ HKHA/CEDD's Contractor
CM4	Erection of decorative mesh screens or construction hoardings around works areas in visually unobtrusive colours.		✓	CEDD for roads; Education Bureau for schools; HKHA for housing area development during foundation and main contract	EDB/ HKHA/CEDD's Contractor
CM5	Avoidance of excessive height and bulk of site buildings and structures.		✓	CEDD for roads; Education Bureau for schools; HKHA for housing area development during foundation and main contract	EDB/ HKHA/CEDD's Contractor

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ID No.	Landscape and Visual Mitigation Measure	Landscape measure	Visual measure	Funding Agency	Implementation Agency
CM6	Control of night-time lighting by hooding all lights and through minimisation of night working periods.		✓	CEDD for roads; Education Bureau for schools; HKHA for housing area development during foundation and main contract	EDB/ HKHA/CEDD's Contractor
CM7	All existing trees to be retained adjacent to the site boundary shall be carefully protected before, during and after construction. A Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees or trees to be transplanted, including trees in contractor's works areas. Early preparation of trees to be transplanted shall be undertaken to increase their likely survival rate following transplanting.	✓	✓	CEDD for site formation works	CEDD's Contractor

Table 11.3 – Proposed Landscape and Visual Mitigation Measures During the Operation Phase

ID No.	Landscape and Visual Mitigation Measure	Landscape Measure	Visual Measure	Funding Agency	Implementation Agency	Management Agency	Maintenance Agency
OM1	Sensitive design of buildings in terms of scale, height and bulk (visual weight).		✓	HKHA	HKHA	HKHA	HKHA
OM2	Use of appropriate building materials and colours to complement surroundings.		✓	HKHA	HKHA	HKHA	HKHA
OM3	Road lighting units to be directional and minimise		✓	CEDD/ HKHA	CEDD/ HKHA	HyD/ HKHA	HyD/ HKHA

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ID No.	Landscape and Visual Mitigation Measure	Landscape Measure	Visual Measure	Funding Agency	Implementation Agency	Management Agency	Maintenance Agency
	unnecessary light spill and glare.						
OM4	Provision of 20% amenity planting/ greenery area within schools in accordance to *Development Bureau Technical Circular (Works) No. 3/2012 – Site Coverage of Greenery for Government Building Projects*. The exact layout of the greenery area will be subjected to detail design in the future.	✓	✓	ArchSD	ArchSD	Future schools	Future schools
OM5	Compensatory tree planting shall be provided at 1:1 ratio as far as possible based on felled tree numbers and to the satisfaction of relevant Government departments. Required numbers and locations of compensatory trees shall be determined and agreed separately with Government during the Tree Felling Application process under *Development Bureau Technical Circular (Works) No. 7/2015 – Tree Preservation.*	✓	✓	CEDD	CEDD	LCSD	LCSD
OM6	Provision of landscape roof on top of multi-storey carpark if appropriate.	✓	✓	HKHA	HKHA	HKHA	HKHA
OM7	Streetscape (e.g. paving, signage, street furniture, lighting etc.) shall be	✓	✓	CEDD/ HKHA	CEDD/ HKHA	HyD/ HKHA	HyD/ HKHA

ID No.	Landscape and Visual Mitigation Measure	Landscape Measure	Visual Measure	Funding Agency	Implementation Agency	Management Agency	Maintenance Agency
	sensitively designed in a manner that responds to the existing context, and minimises potential adverse landscape and visual impacts.						
OM8	Provision of amenity landscape area and new tree planting (approximately 640 nos.) within the HKHA Site.	✓	✓	HKHA	HKHA	HKHA	HKHA
OM9	Aesthetic design of noise barriers along Fuk Hi Street		✓	CEDD	CEDD	HyD	HyD

Notes:
- The proposed mitigation measures, management and maintenance Agency shall be agreed with the relevant government departments before implementation.
- "CEDD" stands for Civil Engineering and Development Department
- "ArchSD" stands for Architectural Services Department
- "HKHA" stands for Hong Kong Housing Authority
- "HyD" stands for Highways Department
- "LCSD" stands for Leisure and Cultural Services Department
- "EDB" stands for Education Bureau

11.5.4 The Development would provide adequate local open space according to the requirements of the HKPSG subject to detailed design.

11.6 Residual Impact Assessment – Upon Implementation of Mitigation Measures

Significance of Residual Landscape Impacts upon Mitigation

11.6.1 The potential significance of the landscape impacts during the construction and operational phases after mitigation is provided in **Table 11.4**. The assessment follows the methodology outlined in Section 11.2 and assumes that the appropriate mitigation measures identified in **Table 11.2** and **Table 11.3** will be implemented, and that the full effect of the soft landscape mitigation measures will be realised after 10 years.

Table 11.4 – Significance of Landscape Impacts during the Construction and Operation Phases

Id. No.	Landscape Resource / Landscape Character	Recommended Mitigation Measures	Residual Impact Significance Threshold AFTER Mitigation (None, Insubstantial, Slight, Moderate, Substantial)		
			Construction	Operation	
				DAY 1	**YEAR 10**
Landscape Resources					
LR1	Agricultural Land and associated Tree Planting outside Site	N/A	None	None	None
LR1(S)	Agricultural Land and associated Tree Planting within Site	CM1, CM7, OM8	Substantial	Moderate	Moderate
LR1 and LR1(S) combined	Agricultural Land and associated Tree Planting within Assessment Area	CM1, CM7, OM8	Substantial	Moderate	Moderate
LR2	Secondary Woodland	N/A	None	None	None
LR3	Mixed Trees, Shrubs and Grassland outside Site	N/A	None	None	None
LR3(S)	Mixed Trees, Shrubs and Grassland within Site	CM1, CM7, OM5, OM7, OM8	Substantial	Moderate	Slight
LR3 and LR3(S) Combined	Mixed Trees, Shrubs and Grassland outside Site	CM1, CM7, OM5, OM7, OM8	Insubstantial	Insubstantial	Insubstantial
LR4	Ponds	N/A	None	None	None
LR5	Natural Watercourses	N/A	None	None	None
LR6	Amenity Planting within Residential Area	N/A	None	None	None
LR7	Amenity Planting along Roads and Urban Infrastructure outside Inset A, Inset B, Inset C	N/A	None	None	None
LR7(A)	Amenity Planting along Roads and Urban Infrastructure within Inset A	CM1, CM2, CM3, CM6, CM7, OM3, OM5, OM7	Moderate	Moderate	Moderate

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Id. No.	Landscape Resource / Landscape Character	Recommended Mitigation Measures	Residual Impact Significance Threshold AFTER Mitigation (None, Insubstantial, Slight, Moderate, Substantial)		
			Construction	Operation	
				DAY 1	**YEAR 10**
LR7(B)	Amenity Planting along Roads and Urban Infrastructure within Inset B	CM1, CM2, CM3, CM6, CM7, OM3, OM5, OM7	Moderate	Moderate	Moderate
LR7(C)	Amenity Planting along Roads and Urban Infrastructure within Inset C	CM1, CM2, CM3, CM6, CM7, OM3, OM5, OM7	Moderate	Slight	Insubstantial
LR7, LR7(A), LR7(B) and LR7(C) combined	Amenity Planting along Roads and Urban Infrastructure within Assessment Area	CM1, CM2, CM3, CM6, CM7, OM3, OM5, OM7	Slight	Slight	Slight
LR8	Amenity Planting within Industrial Area	N/A	None	None	None
LR9	Amenity Planting within Open Storage Area outside Site	N/A	None	None	None
LR9(S)	Amenity Planting within Open Storage Area of the Site	OM4, OM8	Moderate	Slight	Insubstantial
LR9(C)	Amenity Planting within Open Storage Area of Inset C	CM1, CM2, CM3, CM6, CM7, OM3, OM5, OM7	Moderate	Slight	Insubstantial
LR9 and LR9(S) combined	Amenity Planting within Open Storage Area of the Assessment Area	CM1, CM7 OM4, OM8	Moderate	Slight	Insubstantial
LR10	Amenity Planting within Village Area outside Site	N/A	None	None	None
LR10 (S)	Amenity Planting within Village Area of the Site	OM5, OM8	Substantial	Moderate	Slight
LR10 and LR10(S) combined	Amenity Planting within Village Area of the Assessment Area	CM1, CM7 OM4, OM8	Slight	Slight	Insubstantial
LR11	Watercourses within Site	N/A	None	None	None

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Id. No.	Landscape Resource / Landscape Character	Recommended Mitigation Measures	Residual Impact Significance Threshold AFTER Mitigation (None, Insubstantial, Slight, Moderate, Substantial)		
			Construction	Operation	
				DAY 1	**YEAR 10**
LR11 (S)	Watercourses outside Site	N/A	Moderate	Moderate	Moderate
LR11 and LR11(S) Combined	Watercourses within Assessment Area	N/A	Moderate	Moderate	Moderate
Landscape Character Areas					
LCA1	Industrial Urban Landscape	N/A	None	None	None
LCA2	Miscellaneous Rural Fringe Landscape outside Site	N/A	None	None	None
LCA2 (S)	Miscellaneous Rural Fringe Landscape within Site	CM7 OM4, OM6, OM7, OM8	Moderate	Slight	Slight
LCA2 and LCA2(S) combined	Miscellaneous Rural Fringe Landscape within Assessment Area	CM1, CM7 OM4, OM6, OM7, OM8	Slight	Insubstantial	Insubstantial
LCA3	Upland and Hillside Landscape outside Site	N/A	None	None	None
LCA3(S)	Upland and Hillside Landscape within Site	CM1, CM7, OM8	Substantial	Moderate	Slight
LCA3 and LCA3(S) Combined	Upland and Hillside Landscape within Assessment Area	CM1, CM7, OM8	Insubstantial	Insubstantial	Insubstantial
LCA4	Residential Urban Landscape	N/A	None	None	None
LCA5	Transportation Corridor Landscape outside Site	N/A	None	None	None
LCA5(A)	Transportation Corridor Landscape within Inset A	CM1, CM2, CM3, CM6, CM7, OM3, OM5, OM7	Moderate	Insubstantial	Insubstantial
LCA5(B)	Transportation Corridor Landscape within Inset B	CM1, CM2, CM3, CM6, CM7, OM3, OM5, OM7	Moderate	Insubstantial	Insubstantial

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Id. No.	Landscape Resource / Landscape Character	Recommended Mitigation Measures	Residual Impact Significance Threshold AFTER Mitigation (None, Insubstantial, Slight, Moderate, Substantial)		
			Construction	Operation	
				DAY 1	**YEAR 10**
LCA5(C)	Transportation Corridor Landscape within Inset C	CM1, CM2, CM3, CM6, CM7, OM3, OM5, OM7	Moderate	Slight	Insubstantial
LCA5, LCA5(A), LCA5(B) and LCA5(C) combined	Transportation Corridor Landscape within Assessment Area	CM1, CM2, CM3, CM6, CM7, OM3, OM5, OM7	Slight	Insubstantial	Insubstantial
LCA6	Urban Peripheral Village Landscape outside Site	N/A	None	None	None
LCA6 (S)	Urban Peripheral Village Landscape within Site	CM1, CM7, OM4, OM7, OM8	Moderate	Moderate	Moderate
LCA6 and LCA6(S) combined	Urban Peripheral Village Landscape within Assessment Area	CM1, CM7, OM4, OM7, OM8	Slight	Slight	Slight
LCA7	Urban River Corridor Landscape	N/A	None	None	None
LCA8	Agricultural Landscape outside Site	N/A	None	None	None
LCA8 (S)	Agricultural Landscape within Site	OM4, OM8	Substantial	Substantial	Substantial
LCA8 and LCA8(S) combined	Agricultural Landscape within Assessment Area	CM1, CM7, OM4, OM8	Moderate	Moderate	Moderate

Significance of Residual Visual Impacts upon Mitigation

11.6.2 The photomontages showing the Development at 'Existing Baseline Conditions' on 'Day 1 of completed works without mitigation measures', 'Day 1 of the completed works with mitigation measures' and 'Year 10 of the completed works with mitigation measures' are illustrated on **196587/B&V/LVIA/011a, 011b, 012a, 012b, 013a, 013b, 014a, 014b, 015a, 015b, 016a and 016b.**

11.6.3 The magnitude of visual change resulting from the construction and operational phases of the Development before mitigation is summarised in **Table 11.5.**

Table 11.5 – Magnitude of Visual Change during Construction and Operational Phases before Mitigation

Viewpoint No.	Key VSR	Magnitude of Visual Change BEFORE Mitigation (Large/ Intermediate/ Small/ Negligible/ None)	
		Construction	Operation
VP1	View from Wang Lok Street	Intermediate	Intermediate
VP2	View from Yuen Long Industrial Estate	Intermediate	Intermediate
VP3	View from hiking trail on Kai Shan	Large	Large
VP4	View from Long Ping Road	Intermediate	Intermediate
VP5	View from Sai Tau Wai	Small	Small
VP6	View from Fuk Hi Street	Large	Large

11.6.4 **Viewpoint 1: View from Wang Lok Street**

(a) The view of the Development from Wang Lok Street will be distant (approximately 400 m) and partially obscured by existing trees along the carriageway and in the foreground where the street intersects Fuk Hi Street.

(b) Effects on Visual Composition: This existing view currently comprises the tree-lined Wang Lok Street with dense avenues of trees on either side of the carriageway that concentrate views down the roadway. The tops of the towers of the Wang Chau Phase 1 Development will be visible above the trees on the left hand side of the view and similarly only the tops of the Site will be visible above the tree in the centre of the view. The Development will be perceived as an extension of the Wang Chau Phase 1 Development and will form a relatively inconspicuous visual backdrop as viewers will tend to focus on the closer and lower streetscape elements.

(c) Effects on Visual Obstruction: The presence of the Development will result in visual obstruction on part of the open skyline above the existing treeline.

(d) Effects on Visual Elements/ Resources: Apart from the effects on the existing skyline, the presence of the proposed buildings will result in no additional impact upon the existing Visual Elements/ Resources.

(e) Effects on Public Viewers: The current view of Motorists along Wang Lok Street consists of a lush, tree lined avenue with views of the Development in the background. Following construction the public viewers will have partially obscured views of the Development at a distance of approximately 400 m. The Development will constitute an ***Intermediate*** magnitude of change. This when combined with the ***Low*** sensitivity of the public viewers will result in ***Moderately Adverse*** visual impact significance. The residual impact will be reduced to ***Slightly Adverse*** as the streetscape in Inset B will be resumed to its original character and the new public housing integrates with the adjacent residential building following mitigation.

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11.6.5 Viewpoint 2: View from Yuen Long Industrial Estate

(a) The view of the Development from Yuen Long Industrial Estate will be distant (approximately 500 m) and partial as the lower storeys will be screened by existing vegetation in the foreground.

(b) Effects on Visual Composition: The view currently comprises a man-made channel and a public footpath along the edge of the YLIE in the foreground, agricultural land and a two-storey village house in the middle ground, and Kai Shan dominating the middle skyline with the upper storeys of Long Ping Estate on the southern skyline. The scene is essentially a rural outlook but the Site will be seen as an extension of the urban character of the YLIE and an intensification of the existing Long Ping Estate which will block some of the skyline. Due to the distance, the scale of the Site will not dominate the visual composition and the dominance of Kai Shan will remain.

(c) Effects on Visual Obstruction: The Development will result in visual obstruction of part of the open skyline, the Long Ping Estate and part of the newly constructed Wang Chau Phase 1 to the south. However, this will only be a minor reduction of the expansive skyline panorama.

(d) Effects on Visual Elements/ Resources: In additional to the impact on the existing skyline and residential development, the presence of the proposed buildings will not affect any other existing visual elements.

(e) Effects on Public Viewers: The public viewers will have permanent partial views of the Development at a distance of approximately 500 m. The Development will constitute an ***Intermediate*** magnitude of change. This when combined with the ***Medium*** sensitivity of the public viewers will result in a ***Moderately Adverse*** visual impact significance. Following mitigation, the residual impact remains ***Moderately Adverse*** as the mitigation measures cannot further reduce the impact significance.

11.6.6 Viewpoint 3: View from hiking trail on Kai Shan

(a) The view of the Development from hiking trail on Kai Shan will be distant and partial with the lower storeys of the Site blocked by existing topography and vegetation screens.

(b) Effects on Visual Composition: The view towards the Site from the hiking trail is open and expansive with green vegetated slopes in the foreground, open storage areas, village houses, the YLIE and Yuen Long in the middle distance and the vegetated hills of Chu Wong Ling and the prominent ridgelines of Kai Kung Leng, Ngau Tam Mei in the far distance. The Site is compatible in character with the Long Ping Estate to the east and the general urban area but from this view point it does not integrate with them in terms of scale being visually very intrusive to the existing visual composition.

(c) Effects on Visual Obstruction: The Development will result in the visual obstruction of most of Yuen Long and the distant ridgelines of Chu Wong Ling, Kai Kung Leng, Ngau Tam Mei. The distant hills provide a scenic outlook and the visual obstruction constitutes a major adverse impact to hikers.

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(d) Effects on Visual Elements/ Resources: apart from the obstruction of the visual elements listed in the previous item, existing vegetation on the Site will be removed and replaced with the residential towers.

(e) Effects on Public Viewers: Hikers will have permanent partial views of the upper storeys of the Development at a distance of approximately 400 m. The Development will constitute a ***Large*** magnitude of change. This when combined with the ***High*** sensitivity of the public viewers will result in a visual impact significance considered to be ***Substantially Adverse.*** Following mitigation, the residual impact significance remains ***Substantially Adverse*** as the scale and mass of the Development cannot be effectively mitigated from this viewpoint.

11.6.7 **Viewpoint 4: View from Long Ping Road**

(a) The view of the Development from Long Ping Road will be relatively far (300 m) and partially obscured by existing roadside vegetation screens and the new Wang Chase Phase 1 Development.

(b) Effects on Visual Composition: The viewpoint is on the footpath northwest of Long Ping Estate at an elevation of approximately +5 mPD. Long Ping Road has mature and semi-mature trees along either side, and viewers currently experience partial views towards the Site through existing tree screens. Wang Chau Phase 1 and the Development will introduce new high-rise elements behind the trees, dominating the skyline.

(c) Effects on Visual Obstruction: The Development will result in visual obstruction of an area of the open sky above the treeline (although this will be relatively minor compared to the obstruction caused by Wang Chau Phase 1 which is nearer the viewpoint).

(d) Effects on Visual Elements/ Resources: Apart from the impact on the existing skyline, the presence of the proposed buildings will result in no additional impact upon the Visual Elements/ Resources.

(e) Effects on Public Viewers: Long Ping Road has mature and semi-mature trees along either side, and the public viewers will experience partial views of the upper storeys of the Development at a distances of approximately 300 m. The Development will constitute an ***Intermediate*** magnitude of change. This when combined with the ***Medium*** sensitivity of the public viewers will result in a visual impact significance considered to be ***Moderately Adverse.*** Following mitigation, the residual impact significance remains ***Moderately Adverse*** as the openness of this view is significantly blocked.

11.6.8 **Viewpoint 5: View from Sai Tau Wai**

(a) The view of the Development from Sai Tau Wai Village will be distant and partially obscured as only the upper storeys will be visible on the skyline above the existing village development.

(b) Effects on Visual Composition: The view currently comprises dense, low rise village housing in the fore-and middle ground and an open sky above. The Development will result in buildings of a different visual forms on the skyline. However, due to the distance and relatively small scale as perceived from this viewpoint, the additional visual element is considered

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to only represent a minor adverse impact on the existing visual composition.

(c) Effects on Visual Obstruction: The Development will result in visual obstruction of small part of the skyline above the village houses.

(d) Effects on Visual Elements/ Resources: Apart from the impact on the existing skyline, the presence of the proposed buildings will result in no additional impact upon the Visual Elements/ Resources.

(e) Effects on Public Viewers: The public viewers will have permanent, partial views of the upper storeys of the Development at a distance of approximately 250 m. The Development will constitute a ***Small*** magnitude of change. This when combined with the ***Medium*** sensitivity of the public viewers will result in a visual impact significance considered to be ***Slightly Adverse.*** Following mitigation, the residual impact significance remains ***Slightly Adverse*** as the scale and mass of the Development cannot be effectively mitigated from this viewpoint.

11.6.9 **Viewpoint 6: View from Fuk Hi Street**

(a) The view of the Development from Fuk Hi Street will be close and full.

(b) Effects on Visual Composition: The view is on the footpath along Fuk Hi Street towards the Development. The current visual composition is of tree-lined streetscape with an open skyline above except for the high-rise towers of the Long Ping Estate dominating the skyline to the south west. The Development will introduce a striking new visual element, the scale of which will dominate the view. 4 m high noise barriers are proposed along the street between the carriageway and the planter. The character of the element will be visually compatible with the existing housing development but the increased height of the towers will change the perception of the locality from urban fringe to urban.

(c) Effects on Visual Obstruction: The Development will result in a visual obstruction of a large part of the open skyline above the Fuk Hi Street.

(d) Effects on Visual Elements/ Resources: Apart from the impact of the existing skyline and the presence of the proposed buildings, the only other effect on visual resources will be the loss of existing trees and vegetation within the Site.

(e) Effects on Public Viewers: The public viewers will experience full unobstructed views towards the Development including trees along the site boundary and the boundary fence. The Development will constitute a ***Large*** magnitude of change to the existing view. This when combined with the ***Medium*** sensitivity of the public viewers will result in a visual impact significance considered to be ***Substantially Adverse***. Following mitigation, the residual impact significance remains ***Substantially Adverse*** as the scale and mass of the Development cannot be effectively mitigated from this viewpoint.

11.6.10 The magnitude of visual change resulting from the construction and operational phases of the Development after mitigation is summarised in **Table 11.6** below.

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Table 11.6 – Significance of Visual Impacts

Viewpoint	Recommended Visual Mitigation Measures	Impact Significance during Operation Phase after Mitigation (Substantial, Moderate, Slight, Insubstantial)
VP1: View from Wang Lok Street	CM1, CM2, CM3, CM5, CM6 OM1, OM2, OM3	**Slightly Adverse**
VP2: View from Yuen Long Industrial Estate	CM1, CM2, CM3, CM5, CM6 OM1, OM2, OM3	**Moderately Adverse**
VP3: View from Hiking trail on Kai Shan	CM1, CM2, CM3, CM5, CM6 OM1, OM2, OM3	**Substantially Adverse**
VP4: View from Long Ping Road	CM1, CM2, CM3, CM5, CM6, CM7 OM1, OM2, OM3, OM5	**Moderately Adverse**
VP5: View from Sai Tau Wai	CM1, CM2, CM3, CM5, CM6 OM1, OM2, OM3	**Slightly Adverse**
VP6: View from Fuk Hi Street	CM1, CM2, CM3, CM4, CM5, CM6, CM7 OM1, OM2, OM3, OM4, OM5, OM6, OM7, OM8, OM9	**Substantially Adverse**

11.7 Summary of Landscape and Visual Impacts

11.7.1 The Development will generate some unavoidable landscape and visual impacts which are identified and addressed in this LVIA with an aim of avoiding (where practicable) and at the very least, minimising such impacts to within acceptable levels. There are opportunities, during the project's design, construction and operational stages, for incorporating mitigation measures which will reduce landscape and visual impacts. These include reducing the scale of the construction impact and designing and implementing new buildings and structures which are sensitively integrated into the existing environment.

11.7.2 Of the 26 LRs identified within the assessment area, 15 LRs are within the Site and are affected by the Development. When assessed within the context of the Site, Inset A, Inset B and Inset C only, the significance of any adverse residual landscape impacts at Year 10 following mitigation is *Moderate* (LR1(S), LR7(A), LR7(B) and LR11(S)), *Slight* (LR3(S) and LR10(S)) and *Insubstantial* (LR7(C), LR9(S) and LR9(C)). When assessed in the context of the assessment area as a whole, the significance of any adverse residual impacts at Year 10 following mitigation is *Moderate* (LR1 and LR1(S) Combined and LR11 and LR11(S) Combined), *Slight* (LR7, LR7(A), LR7(B) and LR7(C) Combined), and *Insubstantial* (LR3 and LR3(S) Combined, LR9 and LR9(S) Combined and LR10 and LR10(S) Combined).

11.7.3 Of the 20 LCAs identified within the assessment area, 12 LCAs occur within the Site and are affected by the Development. When assessed within the context of the Site, Inset A, Inset B and Inset C only, the significance of any adverse residual impacts at Year 10 following mitigation is *Substantial* (LCA8(S)), *Moderate* (LCA6(S)), *Slight* (LCA2(S) and LCA3(S)) and *Insubstantial* (LCA5(A), LCA5(B) and LCA5(C)). When

assessed in the context of the assessment area as a whole, the significance of any adverse residual impacts at Year 10 following mitigation is *Moderate* (LCA8 and LCA8(S) Combined), *Slight* (LCA6 and LCA6(S) Combined) and *Insubstantial* LCA2 and LCA2(S) Combined, LCA3 and LCA3(S) Combined and LCA5, LCA5(A), LCA5(B) and LCA5(C) Combined).

11.7.4 The overall residual landscape impacts of the Development are considered to be **Moderately Adverse** following mitigation during the construction and operational phases (i.e. the Development will, with or without mitigation measures result in overall terms, negative landscape impacts to the identified LRs and LCAs).

11.7.5 Of the 6 key public viewpoints identified within the visual assessment area, the significance of the adverse residual visual impact significance following mitigation at Year 10 is *Substantial* (VP3 and VP6), *Moderate* (VP2 and VP4) and *Slight* (VP1 and VP5). In accordance with the criteria and guidelines for evaluating and assessing visual impacts as stated in TPB PG-No.41, the overall *residual visual impacts* of the Development are considered to be **Moderately Adverse** with mitigation during the operational phase (i.e. the Development will, with or without mitigation measures result in overall terms, negative visual impacts to the identified key public viewpoints).

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12 PRELIMINARY LAND CONTAMINATION ASSESSMENT

12.1 Introduction

12.1.1 The objective of the Preliminary Land Contamination and Remediation Study (LCRS) is to evaluate and assess the potential land contamination impact due to previous land uses and the existing operations and determine the nature and the extent of contamination.

12.1.2 Findings and recommendations of the LCRS are presented in the Preliminary Land Contamination and Remediation Study Report. A summary of the assessment is presented in the sections below.

12.2 Legislation and Guidelines

12.2.1 The preliminary land contamination and remediation study is prepared following the guidances and steps outlined in the EPD published guidelines listed below:

- Guidance Manual for Use of Risk-Based Remediation Goals for Contaminated Land Management, dated December 2007;
- Guidance Note for Contaminated Land Assessment and Remediation, dated 15 August 2007; and
- Practice Guide for Investigation and Remediation of Contaminated Land, dated August 2011 (hereafter refers as "EPD's Practice Guide").

12.3 Identification of Land Contamination Issues

12.3.1 The site appraisal comprising desktop review and site inspections were conducted to identify the potentially contaminated land uses that may pose adverse impact to the Development. For the desktop review, the following information was reviewed:

- Aerial photographs;
- Past site investigation (SI) records; and
- Records on dangerous goods, chemical wastes, chemical spillage incidents from relevant government departments.

12.3.2 The site inspections were conducted in November 2017 and July 2018 to identify any sources of land contamination or hotspots and review the site conditions. It was observed that the public access roads are paved with concrete in good condition (i.e. no crack observed) and there were no signs of obvious/suspected contamination such as oil staining, abnormal odour, distress vegetation, dangerous goods storages and/or chemical waste storage within the areas accommodating the associated infrastructure works.

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12.3.3 Rural residential dwellings, farmlands and natural vegetation were observed within the southern portion of the Site while a lot of industrial activities (e.g. open carpark, open storage, waste recycling, vehicle services, workshops and etc.) were observed in operation within the remaining parts of the Site. However, most of the remaining parts of the Site accommodating current industrial activities were inaccessible during the site inspections. Observation of these areas was made from Kai Shan.

12.4 Site Inspection and Observation

12.4.1 Site inspections covering the Site were conducted in November 2017 and July 2018. Since there are a lot of private lands within the Site and the industrial activities in the northern portion of the Site are still in operation, some areas within the Site are inaccessible. **Figure 196587/B&V/FR/LCRS/001** shows the layout of photo taking area in the site inspections. The observations are summarized below.

Areas Accommodating Associated Infrastructure Works (A15)

12.4.2 During the site inspections at the areas accommodating the associated infrastructure works, it was observed that the public access roads are paved with concrete in a good condition (i.e. no crack observed) and there were no signs of obvious/suspected contamination such as oil staining, abnormal odour, distress vegetation, dangerous goods storages and/or chemical waste storage.

Southern Portion of the Site (A1 to A10) and Middle Portion of the Site (A11 to A14)

12.4.3 Squatters for residential purpose, farmlands and natural vegetation were observed within the southern portion of the Site. It was also observed that the areas of the squatters for residential purpose are paved with concrete and there were no signs of obvious/suspected contamination such as oil staining, abnormal odour, distress vegetation, dangerous goods storages and/or chemical waste storage. No industrial activities were observed within the areas of the squatters for residential purpose.

Eastern Portion of the Site (A16 to A20) and Northern Portion of the Site (A21 to A26)

12.4.4 During the site visits, most of the eastern and northern portions of the Site accommodating the existing industrial activities were inaccessible. However, based on the observation from Kai Shan and peripheral observation of some industrial premises, there are a lot of industrial activities (e.g. open carpark, open storage, waste recycling, vehicle services, workshops and etc.) in operation within the eastern and northern portions of the Site.

12.4.5 Based on the peripheral observations and the signboards of few premises near the eastern boundary of the northern portion of the Site observed during the site visits, there were three premises for vehicle repairing and maintenance services (including two sharing the same land lot in A19 and one in A20 and two logistic companies in A16 and A21.

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12.4.6 Based on the observation from the Kai Shan and/or the peripheral observations, there were suspected waste recycling workshops in A17, A23 and A26 at the eastern central and western parts of the northern portion of the Site respectively, and open carparks in A18 and A22 at the eastern and northern parts of the northern portion of the Site respectively. Areas for storage of construction equipment in A24 and open storage areas for suspected construction materials in A25 at the western part of the northern portion of the Site were also observed. Since these areas were inaccessible, there was no further information of the industrial activities for these areas.

12.4.7 Moreover, the Consultant approached some current occupiers of the premises within the northern portion of the Site. However, there were no responses from them up to the time of the preparation of this LCRS. Hence, there is no further information to identify the industrial activities in detail for each premise within the northern portion of the Site.

12.5 Proposed Site Investigation

12.5.1 The extent of the proposed SI area for the LCRS is determined based on findings from the site appraisal. Based on the signboards of the premises, the peripheral site observations, the observation from Kai Shan and records of chemical waste producer, the proposed SI area is divided into eleven (11) parts (namely A16 to A26), as shown on **Figure 196587/B&V/PER/FIG 10.2**. For each part of the proposed SI area, the proposed site investigation in regular grid pattern for land contamination has been determined based on recommendations given in the Practice Guide for Investigation and Remediation of Contaminated Land (PG). The proposed square grid size of regular grid pattern and a number of proposed sampling locations for each part are summarised in **Table 12.1**.

12.5.2 Based on the past and current land uses for each part of the proposed SI area, the associated potential Chemicals of Concern (COCs) are determined. The associated potential COCs for each part of proposed SI area are summarised in **Table 12.1**.

Table 12.1 – Summary of Proposed Site Investigation and Potential COCs

Area No.	Historical Land Use	Current Land Use (1)	Approximate Area (m^2)	Size of Proposed Sampling Grid(2)	Number of Proposed Sampling Location(2)	Potential COCs (2), (3)
Eastern Part of Northern Portion of the Site						
A16	Farmlands and natural vegetation since 1982 or before, then industrial activities (suspected open carparks and suspected open storages) gradually developed within the area	Logistic company	[redacted]	15m x 15m	13	M & HC
A17		Waste recycling workshop/ facilities		17m x 17m	15	M, HC & PCBs
A18		Open carparks		19m x 19m	29	M & HC
A19		Vehicle repairing and maintenance service workshops		13m x13m	13	M & HC
A20				13m x 13m	11	M & HC

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Area No.	Historical Land Use	Current Land Use (1)	Approximate Area (m^2)	Size of Proposed Sampling Grid(2)	Number of Proposed Sampling Location(2)	Potential COCs (2), (3)
A21		Logistic company	[redacted]	17m x 17m	23	M & HC
Northern Part of the Northern Portion of the Site						
A22	Farmlands and natural vegetation in 1982 and before, then industrial activities (suspected open carparks and suspected open storages) gradually developed within the area	Open carparks	[redacted]	29m x 29m	32	M & HC
Centre Part of Northern Portion of the Site						
A23	Farmlands and natural vegetation in 1982 and before, then industrial activities (suspected open carparks and suspected open storages) gradually developed within the area	Suspected waste recycling workshop	[redacted]	17m x 17m	21	M, HC & PCBs
Southern Part of Northern Portion of the Site						
A24	Farmlands and natural vegetation in 1982 and before, then industrial activities (suspected open carparks and suspected open storages) gradually developed within the area	Open storage area for construction equipment	[redacted]	20m x 20m	31	M & HC
Western Part of Northern Portion of the Site						
A25	Farmlands and natural vegetation in 1982 and before, then industrial activities (suspected open carparks and suspected open storages) gradually developed within the area	Open storage area for suspected construction materials	[redacted]	22m x 22m	34	M & HC
A26		Suspected waste recycling workshop	[redacted]	16m x 16m	15	M, HC & PCBs

Notes:

(1) The current land use was determined based on the current aerial photos, site visit / peripheral site observations, signboard of the premises and valid registered of Chemical Waste Producer.

(2) Based on the historical and current land use, the proposed grid size, number of proposed sampling location and potential of COCs are tentatively proposed for the respective area only, but subject to review in the future site re-appraisal after land resumption.

(3) M-Metals (including Antimony, Arsenic, Barium, Cadmium, Chromium III, Chromium VI, Cobalt, Copper, Lead, Manganese, Mercury, Molybdenum, Nickel, Tin and Zinc, all inclusive as listed in Annex H); HC-Hydrocarbons (including Petroleum Carbon Range (PCRS), VOCs, SVOCs, all inclusive as listed in Annex H of PCAP); PCBs – Polychlorinated biphenyls.

12.5.3 The majority of potential contaminated sites in the Proposed SI Area for the LCRS were inaccessible. Therefore, it is recommended that once land resumption is completed, further site re-appraisal should be conducted for the whole Site in order to assess any changes in land use which may give rise to potential land contamination and to ascertain the contaminative sources, hotspots of contamination and the associated potential COCs within the Site. The sampling and testing plans should be updated based on the future site re-appraisal and submitted in the comprehensive Contamination Assessment Plan (CAP) for EPD's endorsement. Therefore, the proposed sampling strategies as described in **Table 12.1** are tentative only and subject to further review in the future site-re-appraisal after land resumption.

12.5.4 Contamination Assessment Report (CAR), Remediation Action Plan (RAP) and Remediation Report (RR) (if necessary) should also be prepared and submitted to EPD for agreement and remediation works (if necessary) should be finished prior to the commencement of the site formation for the Development.

13 PRELIMINARY AIR VENTILATION ASSESSMENT

13.1 Introduction

13.1.1 In order to demonstrate that the Development will not induce undesirable impact to various air ventilation aspects and the surrounding pedestrian wind environment, an Air Ventilation Assessment in the form of Expert Evaluation (AVA-EE) is carried out.

13.2 Methodology

13.2.1 As the preliminary air ventilation assessment is conducted in the form of expert evaluation, it is considered acceptable to use the Regional Atmospheric Modelling System (RAMS) data for site wind availability as a starting point. The latest RAMS data of the grid (049, 072) extracted from the Site Wind Availability Data of Planning Department's website are used for the assessment.

13.2.2 The 500 m site wind availability data represents the wind characteristics giving a good indication of the free wind at the Site. The 200 m site wind availability data represents the wind characteristics that takes into account the topographical effect around the Site. Therefore, a lower level of windrose at 200 m height is considered more representative to study the prevailing wind condition as it represents the incoming wind to the Site and the influence on the prevailing winds by the surrounding topography.

13.3 Air Ventilation Impacts and Mitigation Measures

13.3.1 Based on the wind data from RAMS and the Experimental Site Wind Availability Study (SWAS) for Public Housing Site and the YLIEE at Wang Chau (2014), it is considered that the annual prevailing wind comes from NNE, NE, E, ENE and S directions while the summer prevailing wind comes from SSE, S, SW, SSW and WSW directions.

13.3.2 As shown in **Figure 196587/B&V/AVA/008**, under annual E wind condition, the proposed high-rise residential building blocks (ie. Blocks 6 to 8) would obstruct the E winds from penetrating into its downstream areas such as the hilly region of Kai Shan to the west of the Site. Although the air ventilation performance compared with existing condition in the surrounding areas would be lowered, the proposed building separation of at least 28 m along E-W direction between the two schools and the two rows of residential blocks will enable the entry of E prevailing wind to the open areas within the Site and penetrate to the downstream area at Kai Shan. In addition, the E prevailing wind would penetrate atop the proposed low-rise buildings (i.e. at-grade PTI with integrated design and other facilities and multi-storey carpark etc.) at the northern portion of the Development or through the setback of Block 13 (around 21 m) from the southern boundary of the Development to the downstream areas of Kai Shan. Therefore, the unfavorable impact in terms of wind environment on the surrounding areas is expected to be

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reduced.

13.3.3 The illustration of wind flow from NE, NNE and ENE are shown in **Figure 196587/B&V/AVA/009** and **Figure 196587/B&V/AVA/010.** Under annual NE, NNE and ENE wind conditions, the proposed high-rise residential buildings within the Development will obstruct these prevailing winds from reaching the downstream areas near Kai Shan located to the northwestern of the Site, Wing Ning Tsuen, Umah International Primary School and Wang Chau Phase 1 Development. However, the annual NE and NNE prevailing winds are expected to flow atop the low-rise village houses located to the east of the Development and proposed schools and towards Long Ping Road via the open space between Block 13 and Long Ping Road. Moreover, it is expected that the prevailing winds will flow atop the at-grade PTI with integrated design and reach the open area at the central area of the Development. Furthermore, there are 15 m building separations between Block 1 and Block 2, between Block 2 and Block 3 and between Block 4 and Block 5. It allows part of the NNE and NE winds to penetrate through and reach the open spaces inside the Development and the downstream areas including the southeast side of the Development. Therefore, it is anticipated that the unfavourable impact in terms of wind environment would be reduced. For ENE wind conditions, the wind will penetrate the Development and flow towards Kai Shan between the building separations between the two schools and between Block 8 and Block 9. The ENE wind is also expected to flow towards Wang Chau Phase 1 development via the open space between Block 13 and Long Ping Road. Therefore, the unfavorable impact in terms of wind environment on the surrounding areas is expected to be reduced.

13.3.4 Under SSE and S wind conditions, although the availability of SSE and S winds will be limited due to the high- rise buildings of Long Ping Estate and Wang Chau Phase 1 Development and will not be able to penetrate through the building separations between Block 1 to Block 5 to reach the downstream areas, around 15 m building separations between Block 12 and Block 13, between School 2 and Block 11 and between School 1 and Block 5 along S-N direction and building setbacks (around 26 m) are proposed in order to alleviate any possible air ventilation impact from the Development on the downstream areas (e.g. existing brownfields, YLIE and planned YLIEE) by increasing the wind penetration through the Site. The illustration of wind flow under SSE and S wind condition is shown in **Figure 196587/B&V/AVA/011.**

13.3.5 As illustrated in **196587/B&V/AVA/012**, the proposed high-rise residential buildings of the Development will obstruct these prevailing winds from reaching the downstream area under summer SW, SSW and WSW wind condition. 15 m building separations (between Blocks 6 and 7, between Blocks 7 and 8, between Blocks 9 and 10) along SSW-NNE direction are proposed in order to alleviate any possible air ventilation impacts from the Development on the downstream areas (e.g. existing brownfields, YLIE and planned YLIEE) by increasing the wind penetration through the Development. In addition, the SW, SSW and WSW prevailing winds are expected to flow to the village houses located to the east of the Development along Long Ping Road and via the open space between Block 13 and Long Ping Road. Given that the building setbacks (about 26 m) from the boundary of the Development along Fuk Hi Street are proposed, the SW, SSW and WSW winds could flow along Fuk Hi Street to

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the downstream areas such as proposed YILEE. Therefore, the unfavourable impact in terms of wind environment on the surrounding areas is expected to be reduced.

13.3.6 It is considered that the proposed high-rise buildings within the Development may obstruct the wind flow to downwind areas under the annual and summer prevailing wind directions. The opportunity to create wind corridors within the Development has been optimized and the proposed mitigated measures such as effective building separations and setbacks in have been incorporated in the design of the site layout to allow wind penetration, as illustrated in **Figure 196587/B&V/AVA/013**.

13.4 Recommendations

13.4.1 Apart from building separations and building setbacks in the site layout design, the following recommendations shall also be considered in the detailed design stage:

- Building Permeability equivalent to 20% to 33.3% of total frontal area with reference to PNAP APP-152;
- Minimisation of podium bulk with ground coverage of no more than 65%;
- Building setback with reference to PNAP APP-152;
- Providing minimum 20% greening ratio but targeting for 30%, taking into account the site constraints of individual phases;
- Avoidance of long continuous façades; and
- Reference should also be made to recommendations of design measures in the Hong Kong Planning Standards and Guidelines.

13.4.2 It is recommended that a quantitative AVA (in form of Initial Study) shall be conducted for the Development at the detailed design stage to review the mitigation measures to suit the detailed architectural layout. The current qualitative AVA is subject to change upon detail layout development.

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14 PRELIMINARY LAND REQUIREMENT STUDY

14.1 Introduction

14.1.1 The objective of the Preliminary Land Requirement Study (LRS) is to:

- Identify all existing, planned, possible or proposed land uses, facilities, installations and development rights which may be affected by the implementation of the Development;
- Identify the need for land resumption, site clearance and re-provisioning / improvement works; and
- Prepare a plan which includes and clearly delineates the works areas required for the implementation of the Development.

14.1.2 Findings and recommendations of the LRS are presented in Preliminary Land Requirement Study Report. A summary of various aspects of the review are presented in the sections below.

14.2 Methodologies

14.2.1 A desk study on iB1000 Digital Topographic Map, iC1000 Digital Land Boundary Map, aerial photographs taken in 2017 and land owner information from Land Registry has been carried out to establish the current land status in the vicinity of the Development. Several site visits were also conducted in 2017 and 2018 for further verification of the land status of the concerned areas. The details are shown in Preliminary LRS Report prepared under this Assignment.

14.3 Land Requirement

14.3.1 The extent of land requirement for the Development (i.e. the proposed works limit) is presented in the Land Requirement Plan as shown in **Figures 196587/B&V/LRP/001 to 007**. The total area of the required land is approximately 173,386 m^2. The affected private and government lands required within the Site are presented in **Figure 196587/B&V/LRS/001a** to **Figure 196587/B&V/LRS/001b**, and are summarised in **Table 14.1**.

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Table 14.1 – Land Required for the Development (Works limit for construction contract)[1]

Type of Land	Area (m^2)
(a) Private lots to be resumed	84,791
(b) Government land to be required within the Site	36,996
(c) Government land on public roads	51,599
Total required land (i.e. land within the works limit) = (a) + (b) + (c)	173,386

Private Land and Rights

14.3.2 A total number of 233 private lots with approximately 84,791 m^2 of area are located within the proposed works limit. All of these private lots are classified as Old Schedule Lot (OSL). Some of the private lots within the Site will be significantly affected by the Development, in which the remaining areas after the Development would be smaller than 0.01 acre (一分地). To avoid segmentation of land parcels, the whole lots will be fully acquired under land resumption.

14.3.3 Compensation to the owners of the affected private lots will be assessed by the Lands Department (LandsD) based on the latest Ex-gratia Compensation Rates for Resumed Land.

14.3.4 In addition to the private lots, 2 Building Licences (BL)[2], 26 Modification of Tenancy (MOT)[3] and 2 Letter of Approval (LOA)[4] are identified within the Site and would be resumed / cancelled prior to the proposed site formation works for the Development.

Government Land Allocations, Tenancies and Licences

14.3.5 The total area of the government land required for the Development is 88,595 m^2. Government Land Allocation (GLA) No. GLA-YL 86, which is a permanent GLA for Wang Chau Service Reservoir, is the only GLA situated within the proposed works limit. An area of approximately 2,220 m^2 of this GLA will be temporarily affected due to the proposed upgrading works of the existing watermains. Moreover, no Government Land Licence (GLL) is located within the proposed works limit and no associated resumption will be required.

14.3.6 14 Short Term Tenancies (STT) with a total area of 9,032 m^2 are located within the Site.

1 Works Limit is the physical limit of which contractor has obligation to carry out relevant construction works under contract.
2 A licence granted by the Government permitting the erection of building(s) on a land.
3 The permission granted by the Government to construct temporary structure(s) on a land.
4 The permission granted by the Government to construct agricultural structure(s) on a leasehold agricultural land.

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Burial Grounds, Graves, Cultural Heritage and Fung Shui Concerns

14.3.7 A significant extent of permitted burial ground area is located to the south and west of the Site. These burial ground areas, which comprise a number of "Tso"/ "Tong" graves, have high fung shui values to the local communities. The proposed works limit will not encroach upon these burial ground areas.

14.3.8 There is no grave, urn and kam tap identified within the proposed works limit. However, a well and a shrine are identified within the Site. The well has a plaque with a date of 1912 written on it, which seems to refer to the year of beginning of service. Given their fung shui and historical value, it is recommended that the well and shrine could be retained in-situ as far as possible within the Site. AMO has no adverse comment on the retention of the well and shrine in-situ.

Villages, Buildings, Structures, and Residents

14.3.9 According to the latest approved Ping Shan OZP and Yuen Long OZP, the proposed works limit will not encroach upon "Village Type Development" zones. However, a non-indigenous village called "Tseng Tau Tsuen" is partially located within the proposed site boundary, as indicated in **Figure 196587/B&V/LRP/006**.

14.3.10 A total number of 161 buildings/structures covering a total of 17,209 m^2 are identified within the Site. Among these 161 identified buildings/structures, 49 of them are considered as domestic use, while 112 of them are considered as non-domestic uses. The domestic building/structures are mainly squatters and dwellings of Tseng Tau Tsuen, while non-domestic buildings/structures are mainly low-rise offices and open-sided shelters. These affected buildings/structures will be cleared during the proposed site formation works at the Site.

14.3.11 Also, along the northern site boundary, there are three (3) existing non-domestic structures currently straddle across the Site into the area of future YLIEE. To avoid partially cutting off existing structures, it is recommended to fully resume the structures for the Development and the future YLIEE development.

Trees, Agricultural Lands, Fish Ponds and Livestock Farms

14.3.12 A total area of approximately 22,071 m^2 of agricultural lands (including orchards) is identified within the Site.

Roads, Footpaths and Accesses

14.3.13 The access to Kai Shan and the existing squatters/dwellings to the south of the Site will be partially affected during the site formation works at the Site. A new footpath along the southern boundary of the Site is proposed for reprovision of access to these areas.

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Businesses and Services

14.3.14 There are brownfield operations within the Site, including open storage areas, open carparks, vehicle repair/maintenance workshops, logistic companies and waste recycling workshops. Based on the aerial photos, site reconnaissance and other available information, 38 nos. of businesses units with a total area of 75,375 m^2 will be affected by the Development, as illustrated in **Figure 196587/B&V/LRS/006**. It is anticipated that the clearance of brownfield will be addressed by proper compensation or relocation policy (e.g. brownfield relocation), which is now under separate studies by the Government.

Other Regulated Uses

14.3.15 The proposed works limit for the improvement works at the junction of Fung Chi Road/Wang Tat Road encroaches upon the Railway Protection Boundary for MTR's West Rail Line. In order to ensure no adverse impact to be imposed on MTR's services during the construction phase, further liaison with MTR Corporation shall be made during the later stages of the Development.

Summary

14.3.16 Based on the proposed extent of land required for the implementation of the Development, the number and extent of the land uses, facilities and properties that may be affected by the Development has been identified and summarised in ***Table 14.2***.

Table 14.2 – Summary of Major Features Affected by the Development

Feature	Affected Number	Affected Area (m^2)
Private Lot (OSL)	233	84,791
BL	2	91
MOT	26	2,490
LOA	2	84
GLA	1	2,220
Existing STT	14	9,032
Graves/Urns/Kam Taps	0	-
Shrines	1	-
Building/ Structures	161	17,209
Residents	142	-
Registered Slope	1	-
Agricultural Lands	-	22,071
Businesses (1)	38	75,375

Note: (1) According to the Preliminary Land Requirement Study Report of this study, the term "Businesses" include open storage areas, open carparks, vehicle repair/maintenance workshops, logistic companies, waste recycling workshops, etc.

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15 PRELIMINARY SUSTAINABILITY ASSESSMENT

15.1 Introduction

15.1.1 The objective of the Preliminary Sustainability Assessment (SA) is to:

a) Use the Computer-Aided Sustainability Evaluation Tool (CASET) as evaluation framework to evaluate and assess the sustainability implications;

b) Devise a set of guiding principles; indicators and evaluation criteria to assess / update the sustainability implications;

c) Conduct assessment on cost effectiveness and possible environmental impacts during construction and operational stages;

d) Conduct assessment on the social implications to the local community as well as to Hong Kong at large; and

e) Identify key sustainability issues.

15.1.2 Findings and recommendations of the SA are presented Preliminary Sustainability Assessment Report. A summary of assessment is presented in the sections below.

15.2 Approaches for Sustainability Assessment

15.2.1 An application namely "Computer-Aided Sustainability Evaluation Tool (the CASET) Version 4.1" developed by Planning Department is adopted as an evaluation framework to assess the sustainability implications of the Development in a structured manner.

15.2.2 A set of guiding principles extracted from the CASET is listed as follows:

- Economy;
- Health and Hygiene;
- Natural Resources;
- Society and Social Infrastructure;
- Biodiversity;
- Leisure and Cultural Vibrancy;
- Environmental Quality; and
- Mobility.

15.2.3 A list of characterisation includes:

- Art / Culture / Recreation / Entertainment;
- Conservation, Environment and Agriculture;

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- Demographics;
- Economics;
- Education;
- Energy;
- Health and Living Conditions;
- Housing;
- Industry;
- Land and Infrastructure;
- Transport; and
- Waste and Waste Water.

15.3 Scenario

15.3.1 Considerations are compared between the "with the Development" and "without the Development" scenarios. For instance, the "without" scenario represents the baseline condition of the indicator prior to the implementation of the Development while the "with" scenario would include the Development.

15.3.2 The Site is currently zoned as GB and OS, of which re-zoning is required prior to implementation of the Development.

15.3.3 The site formation works include earth filling/excavation works as well as geotechnical works/structures. The proposed infrastructure works, i.e. road works, drainage (drains and box culvert), water supply (water mains), sewerage (gravity sewers) etc. will be constructed to cater for the increase in future demand due to population intake scheduled in 2033.

15.3.4 Environmental mitigation measures would be proposed, if necessary, to minimise environmental and public disturbance.

15.4 Results of the Sustainability Assessment

15.4.1 The computer programme - CASET is adopted as evaluation framework to assess the sustainability implications of the Development. The CASET parameters have been assessed qualitatively and quantitatively where possible. The SA results are summarized in **Table 15.1**.

Table 15.1 – Summary of Anticipated Impacts for each Sustainability Parameter

Economic / Environmental Parameters	Qualitative Changes	Expected Range of Change in Conditions
Carbon Dioxide Emitted Per Year	Increase	Very Small Deterioration
Construction Waste	Increase	Very Small Deterioration
Cost-benefit	Increase	Very Small Improvement

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Economic / Environmental Parameters	Qualitative Changes	Expected Range of Change in Conditions
Criteria Air Pollutants	Increase	Very Small Deterioration
Energy Consumption	Remain	-
Excessive Noise	Remain	-
Fixed Capital	Increase	Small Improvement
Freight Costs	Decrease	Small Improvement
Freshwater Supplied and Consumed	Decrease	Small Deterioration
Income Differential	Remain	-
Job Creation	Increase	Very Small Improvement
Landfill Capacity	Decrease	Very Small Deterioration
Local Freshwater	Remain	-
Municipal Solid Waste	Increase	Very Small Deterioration
Open Space Shortfall	Decrease	Small Improvement
River Water Quality	Remain	-
Significant Landscape Features (Area)	Decrease	Small Deterioration
Significant Landscape Features (point)	Decrease	Very Small Deterioration
Terrestrial Ecological Value	Decrease	Small Deterioration
Travel Distance	Decrease	Small Improvement
Travel Speed	Remain	-

15.4.2 The SA at this stage indicates that with the implementation of the Development, the main benefits would be improvement in housing and living conditions, economy, leisure and society and social infrastructure. These benefits come in the form of improved health and well-being of residents, positive economic return, and enhancement to social involvement. Also, the associated transport infrastructure would improve connectivity between the Site and nearby areas. On the other hand, negative impacts come mainly in the form of environmental degradation, with deterioration in natural resources.

15.4.3 Overall, the benefits produced by the Development outweigh the residual negative impacts especially in the long term. Therefore, with the implementation of the proposed mitigation measures to minimize the negative impacts, the Development is considered sustainable.

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16 COST ESTIMATION, PHASING, PROGRAMME, IMPLEMENTATION MECHNISMS

16.1 Cost Estimation

16.1.1 The proposed infrastructure and associated works, as discussed in the previous sections, consists of drainage works, sewerage works, waterworks, roadworks, site formation works, environmental mitigation measures, landscaping works and land decontamination.

16.1.2 The unit rates or prices adopted are based on historical data from other government projects with adjustment using Civil Engineering Works Index published by CEDD. The estimates are calculated at September 2018 price level. Some items of works are excluded from the cost estimate. The excluded items include private utility works such as electricity, town gas and telecommunication.

16.1.3 The estimated construction costs at September 2018 price level are summarized in **Table 16.1**.

Table 16.1 – Estimated Construction Costs of Works Packages (excluding project contingencies)

Item	Cost (HK$ Million)
Total Base Estimate	
Site Formation	
Earth Retaining Structures	
Roadworks	
Drainage	
Sewerage	
Waterworks	
Landscaping Works	
Noise Mitigation Works	
Environmental Investigation and Remediation	
Total	
Pre-tender Estimate (PTE)	
Preliminaries (30%)	
Site Safety & Environmental	
Provisional Sum for MPF	
Consultancy fees	
Ground Investigation works	
Contingency	
Resident Site Staff (RSS) Cost	
Total Estimate Cost	

16.1.4 The total annual recurrent cost for the Development is approximately HK$ while the annual recurrent proposed for respective maintenance agents are summarized in **Table 16.2**.

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Table 16.2 – Estimated Recurrent Costs for Maintenance Agents

Department	Recurrent Cost Estimates (HK$ in Sept 2018 prices)
DSD	
FEHD	
LCSD	
HyD	
TD	
WSD	
HD	
ArchSD	
Others	
Total (with [redacted]% uncertainty)	

16.2 Implementation Mechanisms

16.2.1 Detailed implementation strategy and risk considerations are provided in Report on Implementation Approach. This section summarizes the proposed implementation approach for the Development.

Contract Procurements

16.2.2 "Designer led" or Engineer-Design-Contractor-Build (EDCB) is a traditional approach which is for delivery of public works in Hong Kong, and many of stakeholders and the responsible staff are well familiar with the procedures.

16.2.3 Considering the nature of the Development, by utilising EDCB, the risk of uncertainties would not be transferred to contractors as the scope of works of the Development would be well-defined and designed before the construction works whilst it is expected that the design responsibility will be rested with consultants. In addition, it is also envisaged that contractors might bid a competitive tender when all design information is available. Design-Build (DB) Approach is not suitable for public housing development as it is the norm for CEDD to carry out site formation works before handing over formed site to Housing Department for building works. As such, we recommend using the EDCB approach for contract procurement for the Development.

Construction Packaging

16.2.4 The prime objective of the Development is to complete all the essential site formation, infrastructure and building works supporting for the population intake in 2033. Thus, it is considered more appropriate to package the works in a single works contract for site formation and infrastructure works in order to have the works implemented in a more effective manner.

Funding Arrangement

16.2.5 The estimated cost for consultancy fees is about HK$[redacted], which could be classified as a PWP category D project. This offers slight programme advantage in

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the funding arrangement for pre-construction stage. However, the total cost for construction stage would certainly exceed HK$ 30M. Hence the Development would be upgraded to Category B after successful inclusion of project in Resource Allocation System (RAS), and subsequently be upgraded to Category A after the approval of Finance Committee of the Legislature.

Contract Form

16.2.6 New Engineering Contract (NEC) has been promoted by DEVB for public works projects in Hong Kong, and therefore we suggest adopting NEC for the construction of this Development.

16.2.7 In general, the six Main Options can be categorized into four major types of contract strategies, which have different risk allocation between the Employer and the Contractor. The six Main Options are listed as follows.

- Option A – Priced Contract with Activity Schedule
- Option B – Priced Contract with Bills of Quantities
- Option C – Target Contract with Activity Schedule
- Option D – Target Contract with Bills of Quantities
- Option E – Cost Reimbursable Contract
- Option F – Management Contract

16.2.8 To identify the most appropriate Main Option for the Development, a qualitative approach was used to evaluate the six Options available under NEC.

16.2.9 Option D is a target cost contract with a pain/gain share mechanism. The Contractor will be reimbursed with actual costs plus a percentage fee subject to a cap determined by a target cost. The target cost is calculated by the bill of quantities. The pain/gain share mechanism is an incentive to the Contractor for better project management or cost-saving proposals. In fact, we expect that the Contractor may have an alternative cost-saving design, whilst the pain/gain share mechanism under Option D will encourage the Contractor to propose such designs. In addition, timely completion of the land decontamination works, if any and site formation works are the key to success in the Development with an aim to meet the population intake target. The pain/gain share mechanism is an incentive to the Contractor for better project management to minimize the construction time and hence to reduce his overhead costs. Admittedly, under the current partnering policy on construction industry, target cost contract is promoted and encouraged by the Hong Kong's Government for civil engineering projects due to its benefits. Hence, using Option D under the proposed works contract is preferable than Option B.

16.2.10 In fact, there are many benefits under Option D. If the Employer wishes to make interim assessments of the Contractor's share for cost monitoring and management

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purposes or for interim payment, the Employer has to prepare his forecast of the final Price for Work Done to Date and his forecast of the final total of the Prices. Since the target price of Option D is based on bill of quantities, the Employer can establish the forecast final total of the Prices with the bills of quantities for the comprehensive unit rates to facilitate calculation of compensation events. Despite that compensation events are priced on actual cost, i.e. an estimate from first principle of labour, plant, and materials; the bill rates can be used as a guide to direct a cross check against the cost.

16.2.11 Last but not least, Option D may have positive effect to the contract management of this proposed works contract. When looking into the details of the specific works nature, Option D would be the appealing choice.

16.2.12 In addition to the main options, Engineering and Construction Contract (ECC) also has different secondary options to suit the needs of different projects. The following secondary options are recommended for the Development:

- X1 (Price adjustment for inflation) – This clause includes an amount for price adjustment to the amount due (for Options A and B) or to the total of the Prices (for Options C and D) in each payment to compensate the Contractor's costs due to inflation. It is proposed to include this clause to reduce the inflation risk of the Contractor.

- X5 (Section Completion) – Sectional completion of the works may be required for some environmental mitigation works such as land decontamination works, if any.

- X7 (Delay damages) – It is equivalent to the "liquidated damages" of traditional GCC contract. It is proposed to include this clause to protect the Employer if the works are delayed by the Contractor.

- X15 (Limitation of the Contractor's liability for his design to reasonable skill and care) – This option reduces the Contractor's liability for his design from "fit for the purpose" to "reasonable skill and care". It is a common practice of traditional GCC contract and has been adopted in other previous NEC contracts in Hong Kong.

- X16 (Retention) – It is proposed to keep retention money to ensure the Contractor to perform the contract.

- X20 (Key Performance Indicators) – The clause will be used to incorporate the new Pay for Safety Performance Merit Scheme in the contract.

- Z (Additional conditions of contract) – This option is for inclusion of other additional conditions, such as those promulgated by the Government's technical circulars or memos, into the contract.

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16.3 Implementation Programme

16.3.1 The milestone dates of the key activities are summarised in ***Table 16.3*** below.

Table 16.3 – Milestone Dates of the Key Activities

Key Activities	Milestone Dates
Completion of Rezoning Exercise	August 2021
Commencement of Investigation Phase	June 2020
Commencement of Detailed Design Phase	December 2021
Completion of Road Gazettal Process (including ExCo Approval)	June 2023
Completion of Land Resumption / Land Clearance	March 2025
Commencement of Construction Phase (Site formation and Infrastructure Works)	January 2027
Site Formation Works Completed for Site Handover to HD	July 2029
Completion of public housing construction of Remaining Phases of Wang Chau Development	July 2033

16.3.2 The proposed implementation programme is presented in **Appendix A**. It shall be noted that the programme will need further review throughout the subsequent stages of the Development. Details of the project implementation programme should refer to the Report on Programme and Phasing Report under this Study.

16.4 Works Phasing and Programme of Major Works

16.4.1 It is given to understand that the proposed site formation works and the essential infrastructure works including roadworks (except the internal roads within the future housing sites), drainage, sewerage and water supply facilities, as well as the necessary environmental and natural terrain hazard mitigation measures, will be carried out by CEDD; while the implementation of the proposed public housing developments will be carried out by HD. The implementation programme showing the major works elements is presented in **Appendix B**. Details of the project implementation programme should refer to the Report on Programme and Phasing Report under this Study.

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17 CONCLUSION

17.1 General

17.1.1 This Final Report summarizes the findings and other salient issues of relevant technical assessments for the Development in terms of infrastructures, utilities, geotechnical, site formation, environmental, landscape, visual, cost estimation and operation and maintenance requirements.

17.2 Traffic and Transportation

17.2.1 In order to support the Development, various new traffic and transport facilities and upgrading of existing facilitates are recommended. It is proposed to provide the development access at Fuk Hi Street. In order to cater for the additional traffic, it is proposed to widen the existing Fuk Hi Street from single 2 carriageway to dual 2 carriageway with 3 northbound traffic lanes and 2 southbound traffic lanes. The access road and Fuk Hi Street will form a new signalized junction to provide an all movement access. Junction improvements at Fuk Hi Street / Long Ping Road, Long Ping Road / Long Ping Estate Bus Terminus, Long Ping Road/ Fung Chi Road, Fung Chi Road / Wang Tat Road, Fuk Hi Street / Wang Lok Street are proposed to alleviate the future traffic condition.

17.3 Drainage, Sewerage, Water Supply and Utilities

17.3.1 New provision of infrastructures and upgrading of existing utilities have been proposed to support the Development and mitigate impacts to be induced by the Development. No adverse impact is anticipated with respect to drainage, sewerage, water supply and utilities.

17.4 Geotechnical Assessment and Site Formation

17.4.1 From the current available information, no adverse geological and geotechnical features are observed. The proposed works is considered feasible.

17.4.2 An initial screening and alert criteria screening for NTHS are carried out in accordance with GEO Report No. 138. Based on the geomorphological characteristics of the catchments, the landslide history and the significance of the landslide hazards in each catchment, the Development is not subjected to a significant risk of natural terrain hazards, further NTHS are not required for the Site.

17.4.3 Based on the existing topography at the Development, a site formation scheme is proposed to obtain a balanced cut and fill approach to minimize the export or import of fill materials. It is proposed to form a 3-step platform to separate the westmost portion with +12.0 mPD, the middle portion with +10.0 mPD the remaining portion of the Site with +8.0 mPD to +6.5 mPD.

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17.5 Environmental, Landscape and Visual, Land contamination and Sustainability

17.5.1 Environmental and planning considerations are reviewed and preliminary mitigation measures are proposed to minimize adverse impacts as much as practicable. Further liaison with relevant authorities at the detailed design stage is required to confirm proper implementation of mitigation measures.

17.6 Air Ventilation

17.6.1 An expert evaluation of wind performance of the Development is carried out.

17.6.2 According to the findings of this AVA-EE, the annual prevailing wind comes from NNE, NE, E, ENE and S directions while the summer prevailing wind comes from SSE, S, SW, SSW and WSW directions. The block layout is carefully considered incorporating good design practices in air ventilation aspect. After taking into account the existing topography, the location of the existing built areas and provision of mitigation measures, it is considered that the Development would not have adverse air ventilation impacts to surrounding environment.

17.7 Land Requirement

17.7.1 Based on the proposed extent of land required for the implementation of the Development, the number and extent of the land uses, facilities and properties that may be affected by the Development has been identified.

17.7.2 It is recommended a Clearance Application Form (CAF) be prepared and submitted in the investigation and detailed design consultancies so as to kick start the process of land resumption / land clearance for the Development. Further liaison with LandsD should be carried out at a later stage.

17.8 Cost and Implementation

17.8.1 The estimated cost for the site formation and infrastructure works is approximately [redacted] (at September 2018 price level). The recurrent costs are estimated to be approximately [redacted] per annum.

17.8.2 An implementation programme is proposed with the site formation and infrastructure works tentatively completed in mid-2029 and Q1 2033 respectively subject to successful funding arrangement and procurement of works contract.

END OF TEXT

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FIGURES

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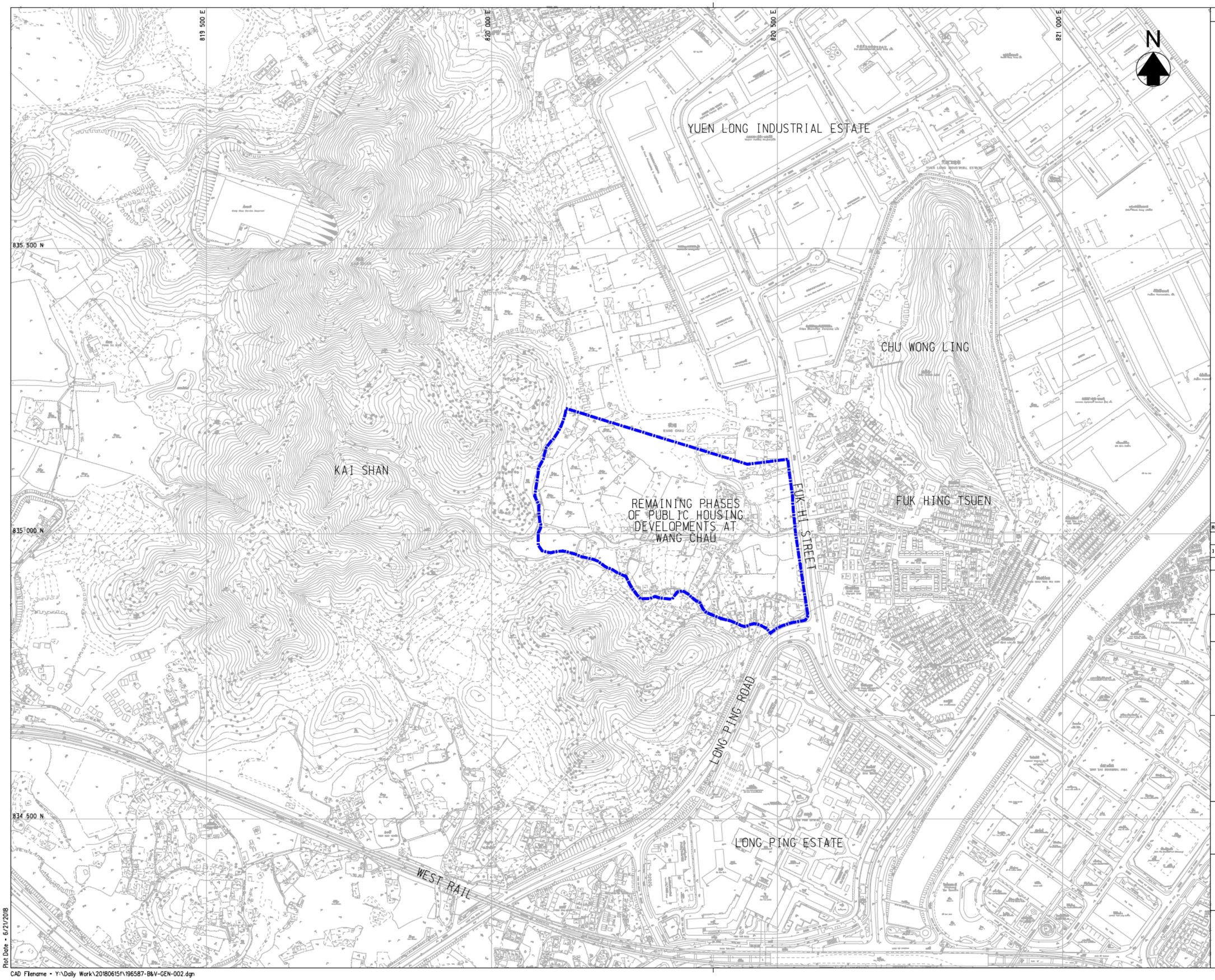

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LEGEND:

BOUNDARY OF THE SITE (SUBJECT TO REVIEW)

Revision	Date	Description		Initial
	Designed	Checked	Drawn	Checked
Initial	–	–	SZ	–
Date	12/17	12/17	12/17	12/17

Approved

Agreement no.

CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG – FEASIBILITY STUDY

Drawing Title

LOCATION PLAN OF THE SITE

Drawing No.	Scale
196587/B&V/GEN/002	1 : 3000 (A1) 1 : 6000 (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Plot Date = 6/21/2018

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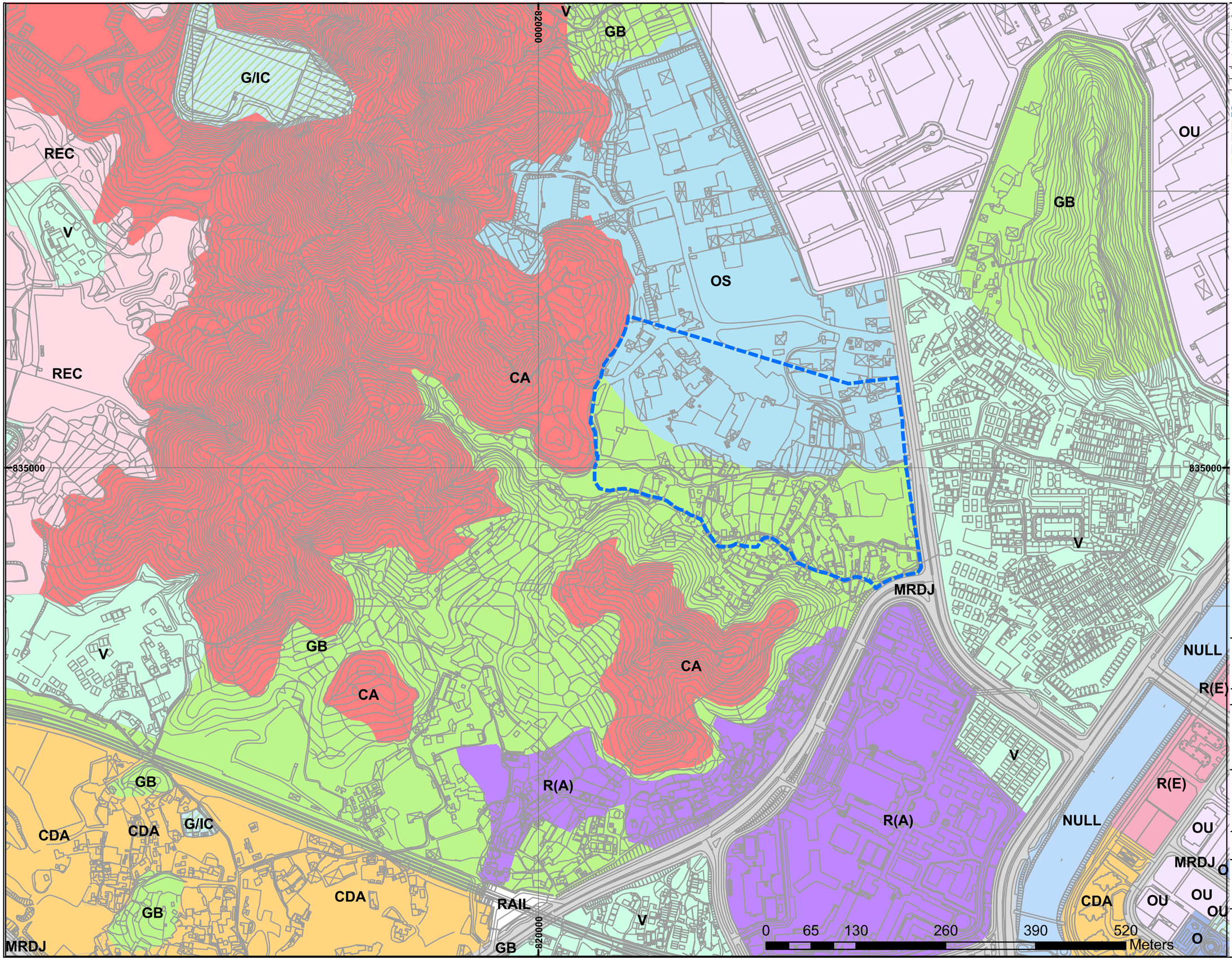

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	Designed	Reviewed	Drawn	Checked
Initial	WT	KC	WT	KC
Date	Sep 2017	Sep 2017	Sep 2017	Sep 2017

Revision	Date	Description	Initial
-	-	-	-

Legend

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- CONSERVATION AREA (CA)
- COMPREHENSIVE DEVELOPMENT AREA (CDA)
- GOVERNMENT, INSTITUTION OR COMMUNITY (G/IC)
- GREEN BELT (GB)
- MAJOR ROAD AND JUNCTION (MRDJ)
- NULL
- OPEN SPACE (O)
- OPEN STORAGE (OS)
- OTHER SPECIFIED USES (OU)
- RESIDENTIAL(A) R(A)
- RESIDENTIAL(E) R(E)
- RECREATION (REC)
- VILLAGE DEVELOPMENT (V)

Approved

Agreement No. CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Figure Title

OUTLINE ZONING PLAN

Drawing No.	Scale
196587/B&V/OZP/001	1:5,000 @ A3

Client

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Consultant

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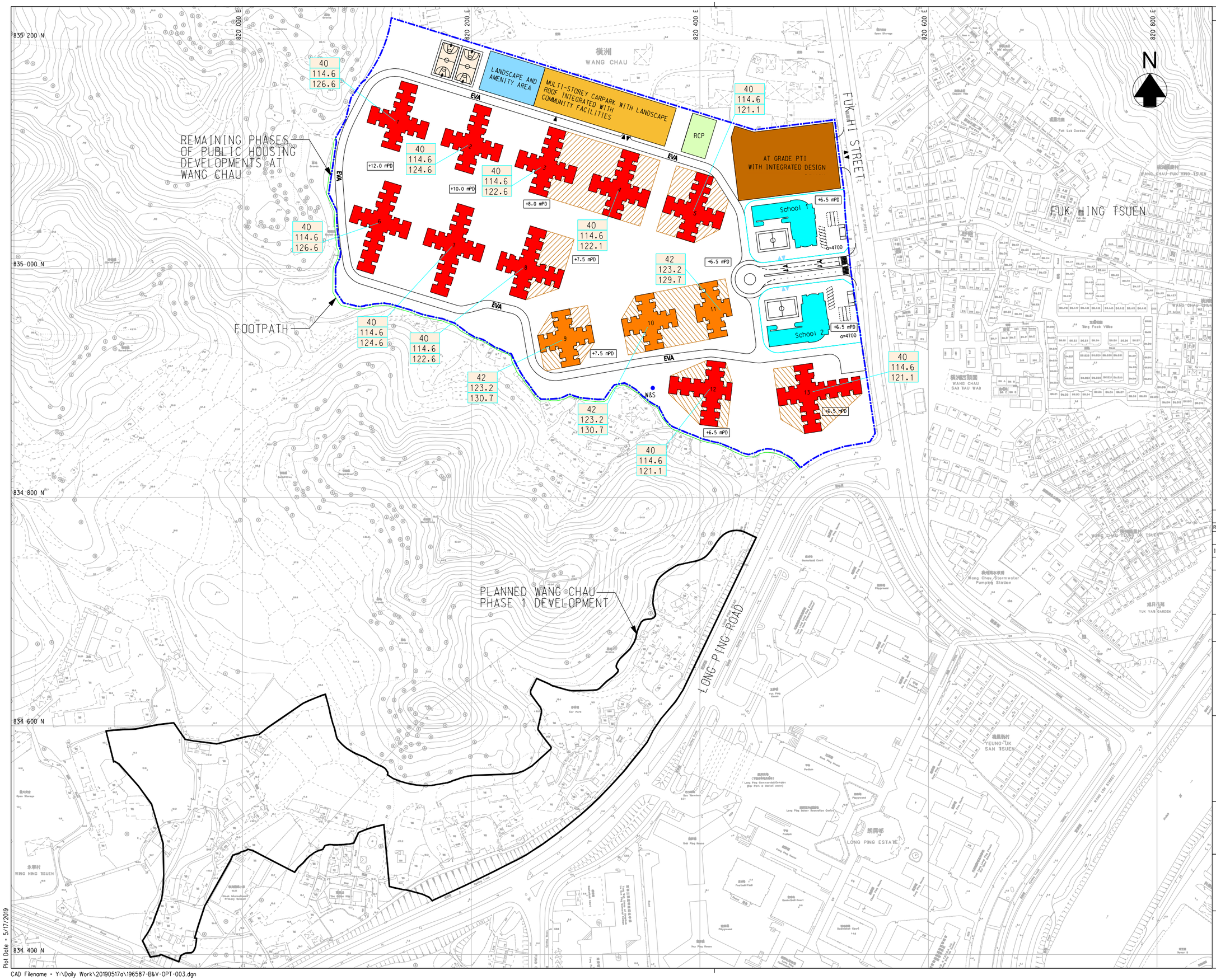

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- SITE BOUNDARY FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU (SUBJECT TO REVIEW)
- RESIDENTIAL BLOCKS (41 STOREYS)
- RESIDENTIAL BLOCKS (44 STOREYS (WITH 1 REFUGE FLOOR))
- RETAIL
- G/IC FACILITY
- 40 — NO. OF DOMESTIC STOREYS (EXCL. PODIUM/LOBBY)
- 114.6 — BUILDING HEIGHT (METERS)
- 123.6 — mPD OF BUILDING (METERS)
- WELL AND SHRINE (TO BE RETAINED IN SITU AS FAR AS POSSIBLE)
- PROPOSED FOOTPATH
- ACCESS TO SCHOOL SITE

Revision	Date	Description	Initial
A	01/18		WT

	Designed	Checked	Drawn	Checked
Initial	WT	KC	SZ	-
Date	01/18	01/18	01/18	01/18

Approved

Agreement no.
CE 13/2017 (CE)

Preject Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
PROPOSED LAYOUT OF INITIAL DEVELOPMENT OPTION 3

Drawing No.	Scale
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CEDD Civil Engineering and Development Department

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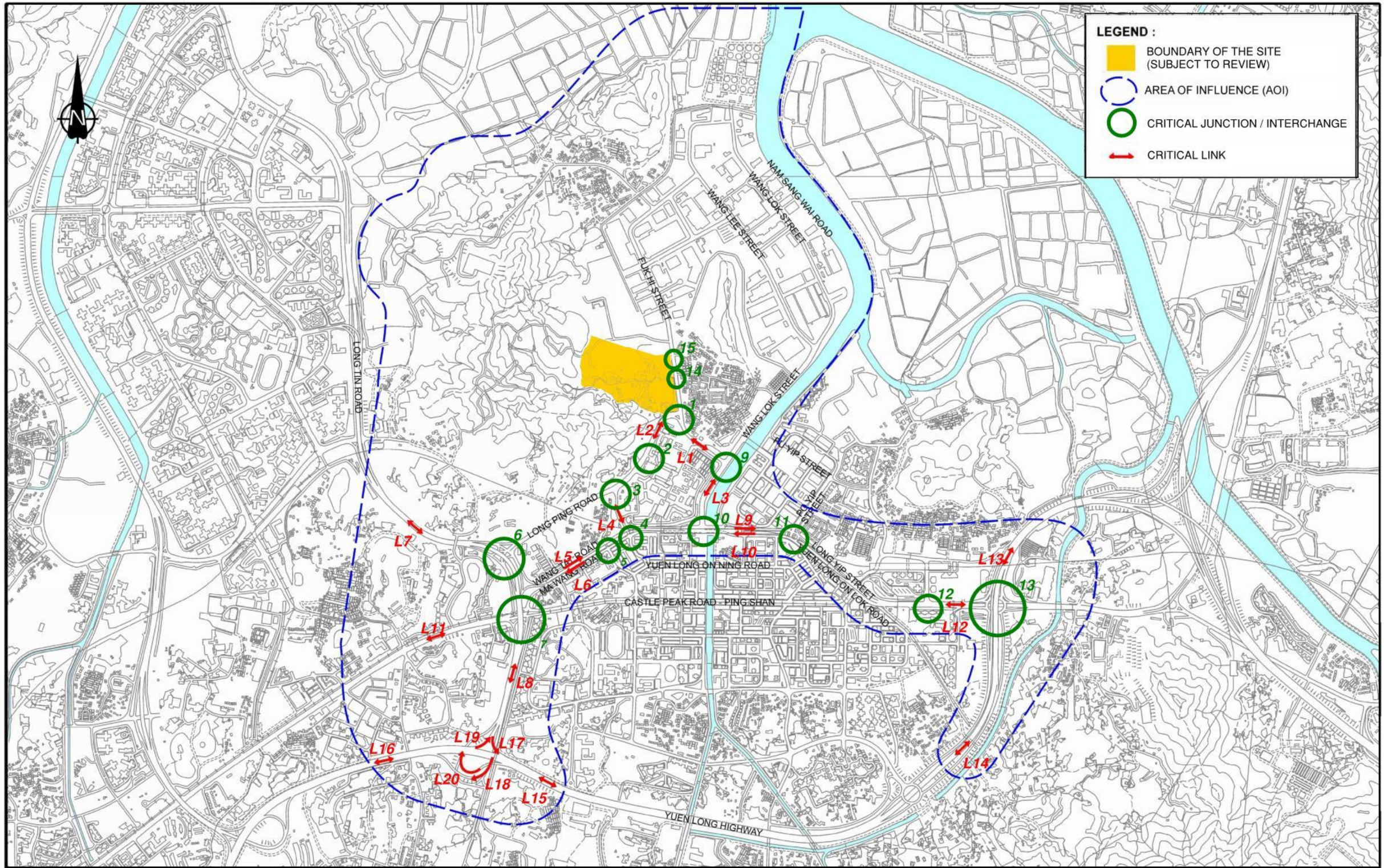

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B	MINOR AMENDMENT	GPH	28JUN18
A	MINOR AMENDMENT	GPH	27APR18

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

EXISTING ROAD NETWORK

Designed	Checked	Scale	Date	Drawing No.	Rev.
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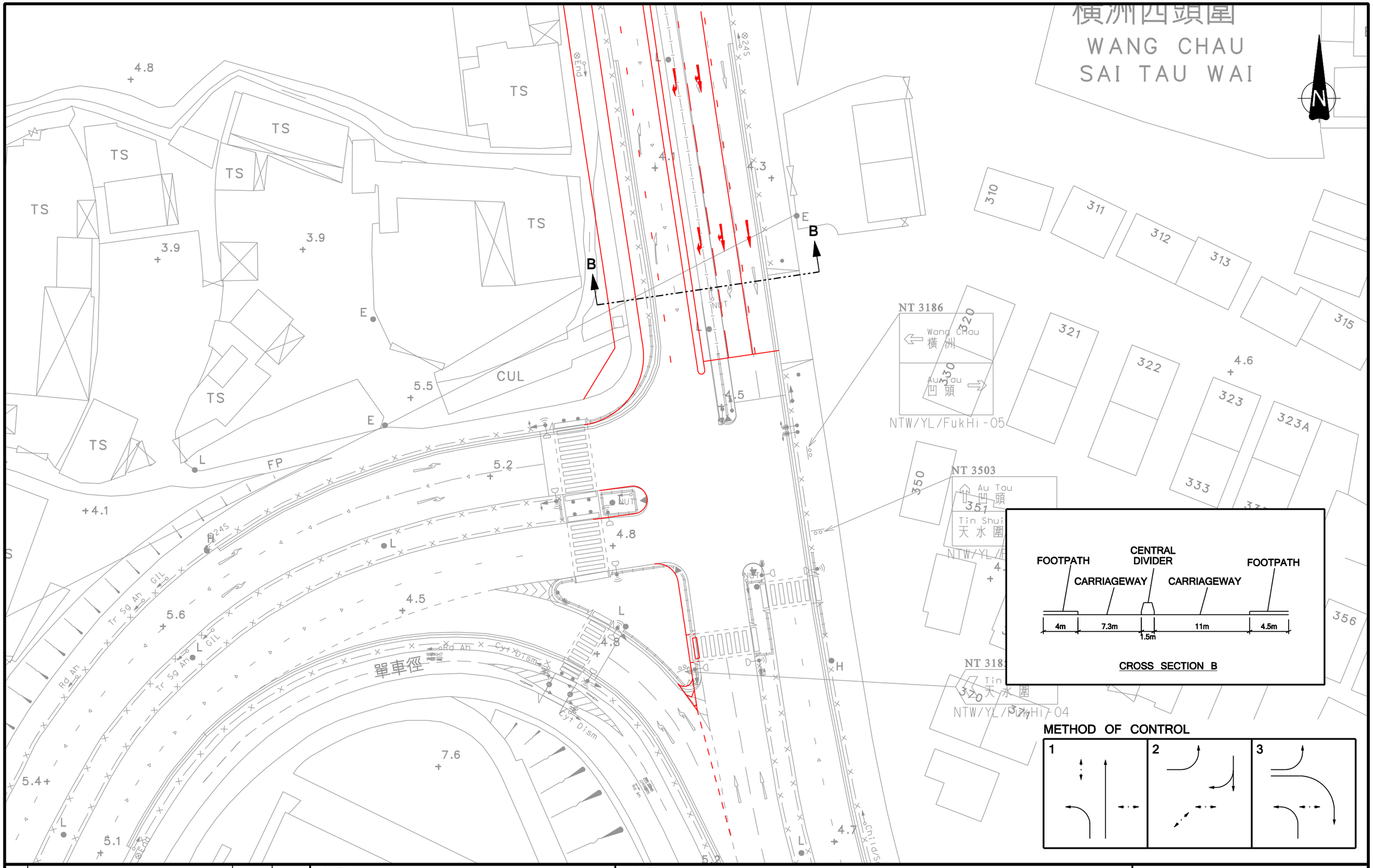

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A	MINOR AMENDMENT	GPH	23APR18

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

PROPOSED IMPROVEMENT SCHEME AT FUK HI STREET/ LONG PING ROAD (J1)

Designed	Checked	Scale	Date	Drawing No.	Rev.
SFL	GPH	1:500(A3)	JAN 2018	196587/B&V/TTIA/102	A

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SYSTRA MVA

CHK50284710/TIA/F53-A.DGN/CYC/23APR18

LEGEND:

BOUNDARY OF THE SITE (SUBJECT TO REVIEW)

J1

J14

J15

FUK HI STREET

LONG PING ROAD

WANG CHAU SAI TAU WAI 橫洲西頭圍

Chun Yick Garden 振益花園

Elegant Villa 雍雅山莊

Meun Court 美安苑

福喜街

Rev.	Description	Checked	Date
E	MINOR AMENDMENT	GPH	21DEC18
D	MINOR AMENDMENT	GPH	05SEP18
C	MINOR AMENDMENT	GPH	28JUN18
B	MINOR AMENDMENT	GPH	30MAY18

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

PROPOSED JUNCTION LAYOUTS AT FUK HI STREET (J1, J14 & J15)

Designed	Checked	Scale	Date	Drawing No.	Rev.
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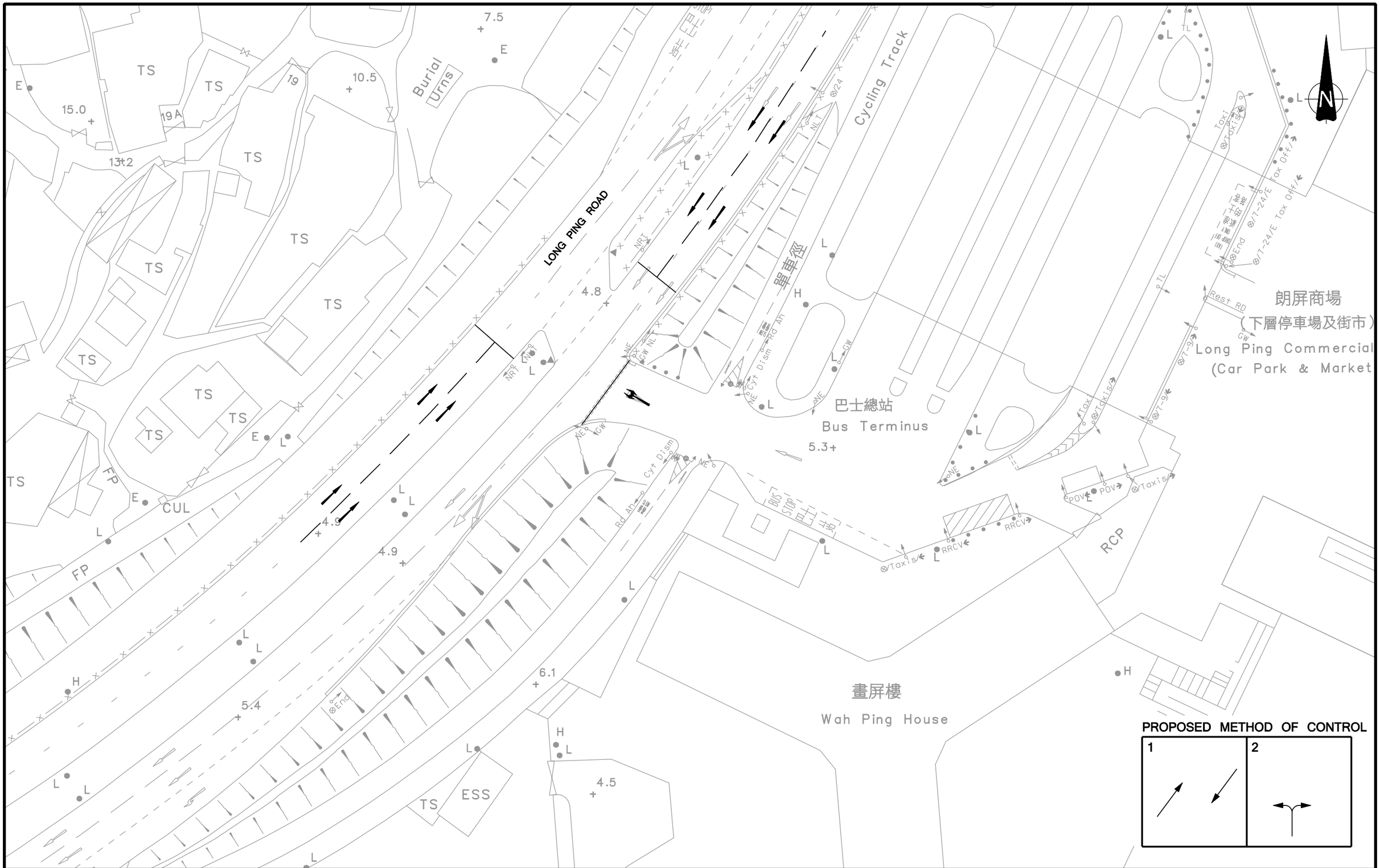

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A	MINOR AMENDMENT	GPH	20APR18

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

MODIFICATION OF METHOD OF CONTROL AT JUNCTION OF LONG PING ROAD/LONG PING ESTATE BUS TERMINUS (J2)

Designed	Checked	Scale	Date	Drawing No.	Rev.
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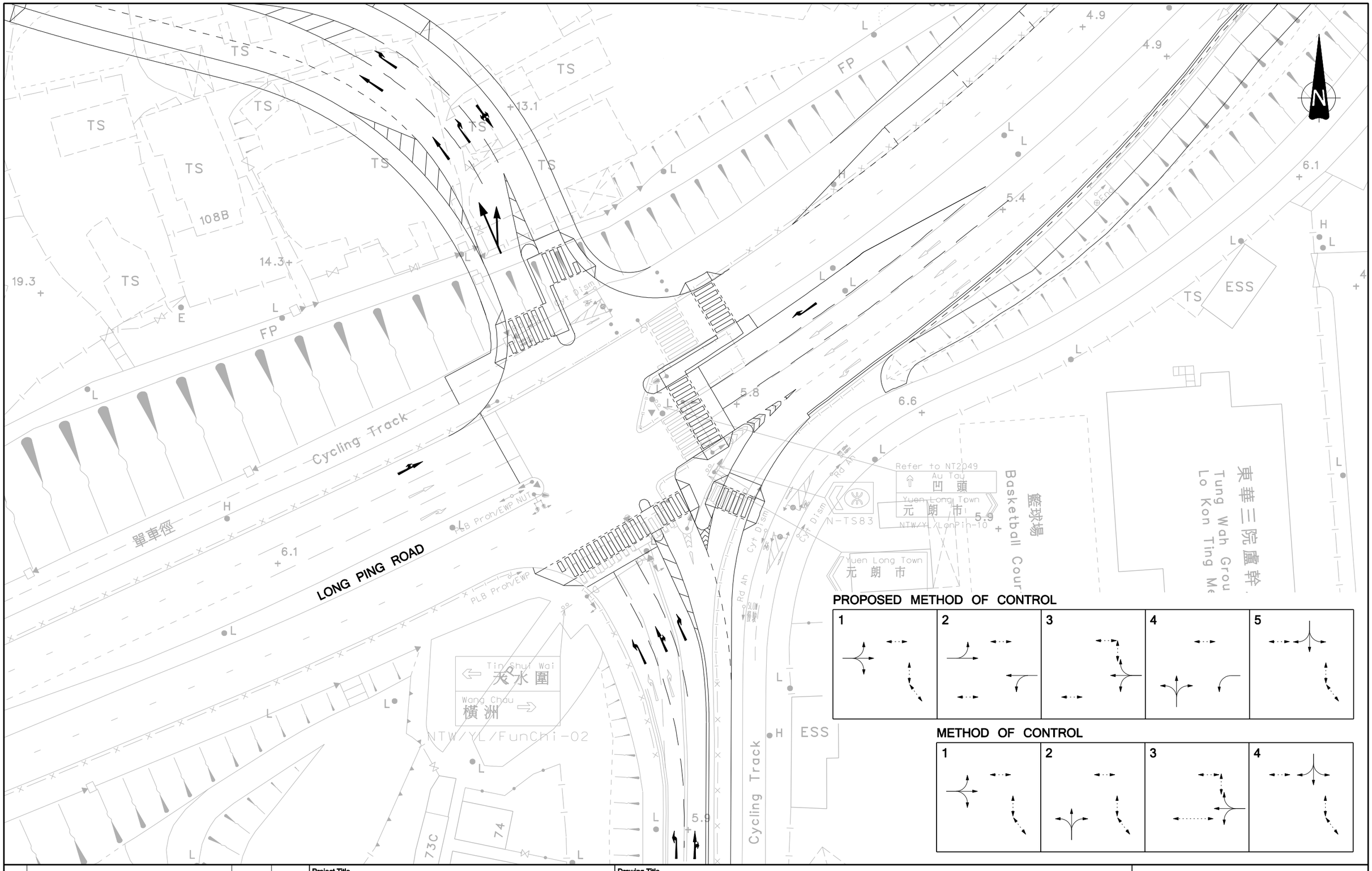

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Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

MODIFICATION OF METHOD OF CONTROL AT LONG PING ROAD/ FUNG CHI ROAD (J3)

Designed	Checked	Scale	Date	Drawing No.	Rev.
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CEDD Civil Engineering and Development Department

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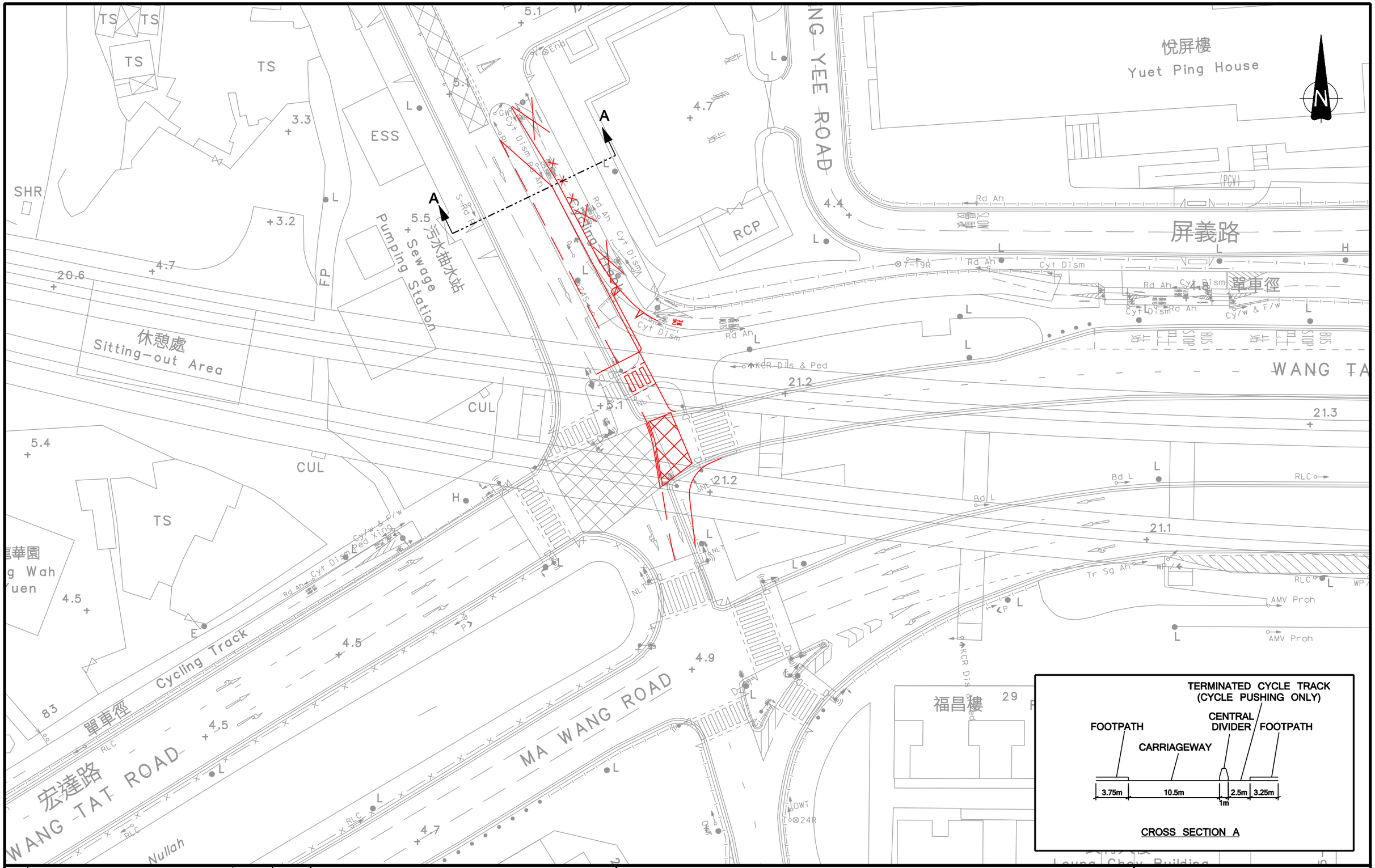

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Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

PROPOSED IMPROVEMENT SCHEME AT JUNCTION OF FUNG CHI ROAD / WANG TAT ROAD (J4)

Designed	Checked	Scale	Date	Drawing No.	Rev.
SFL	GPH	1:500(A3)	JAN 2018	196587/B&V/TTIA/106	B

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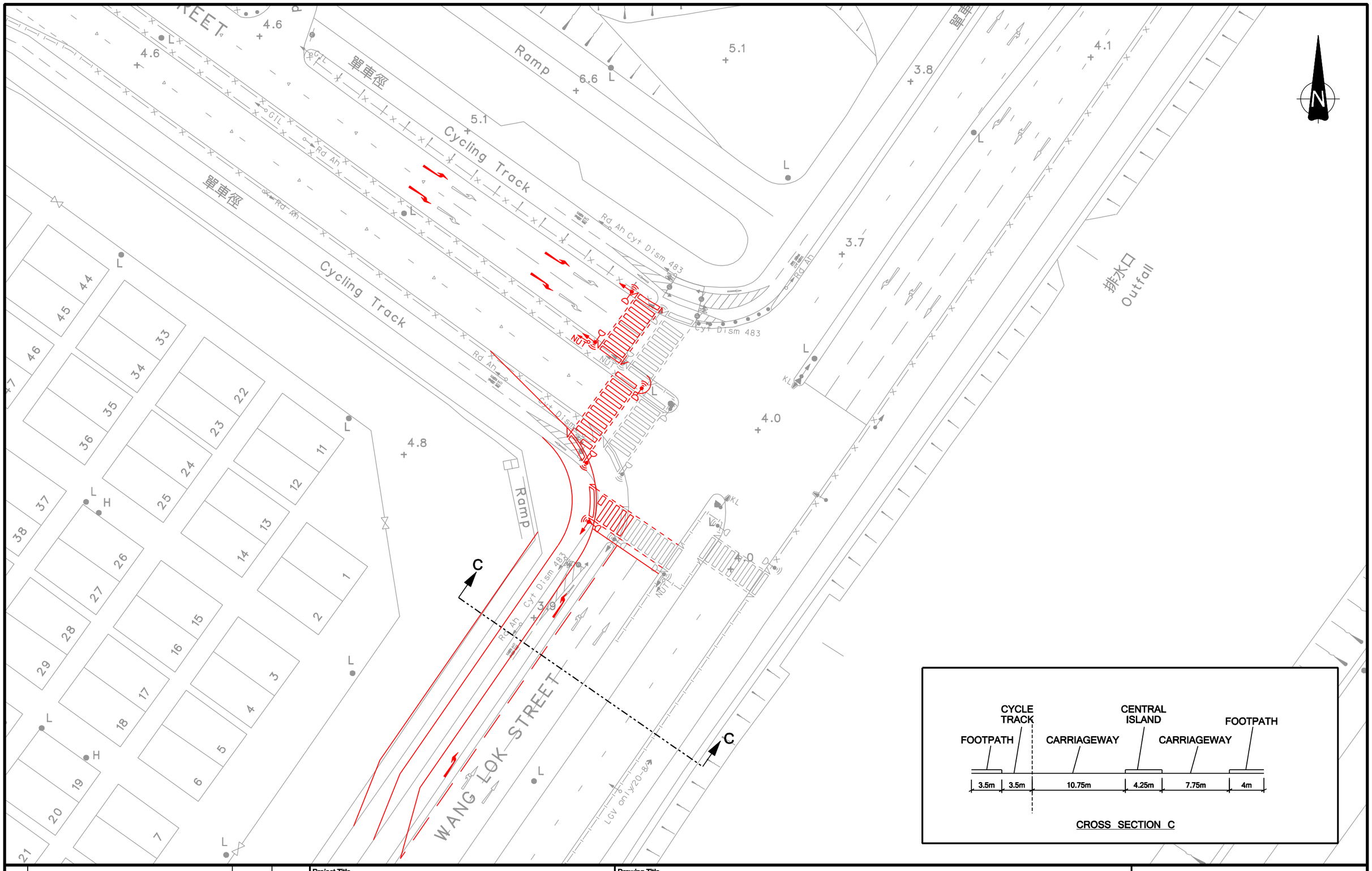

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Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

PROPOSED JUNCTION OF FUK HI STREET/ WANG LOK STREET (J9)

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CEDD 土木工程拓展署 Civil Engineering and Development Department

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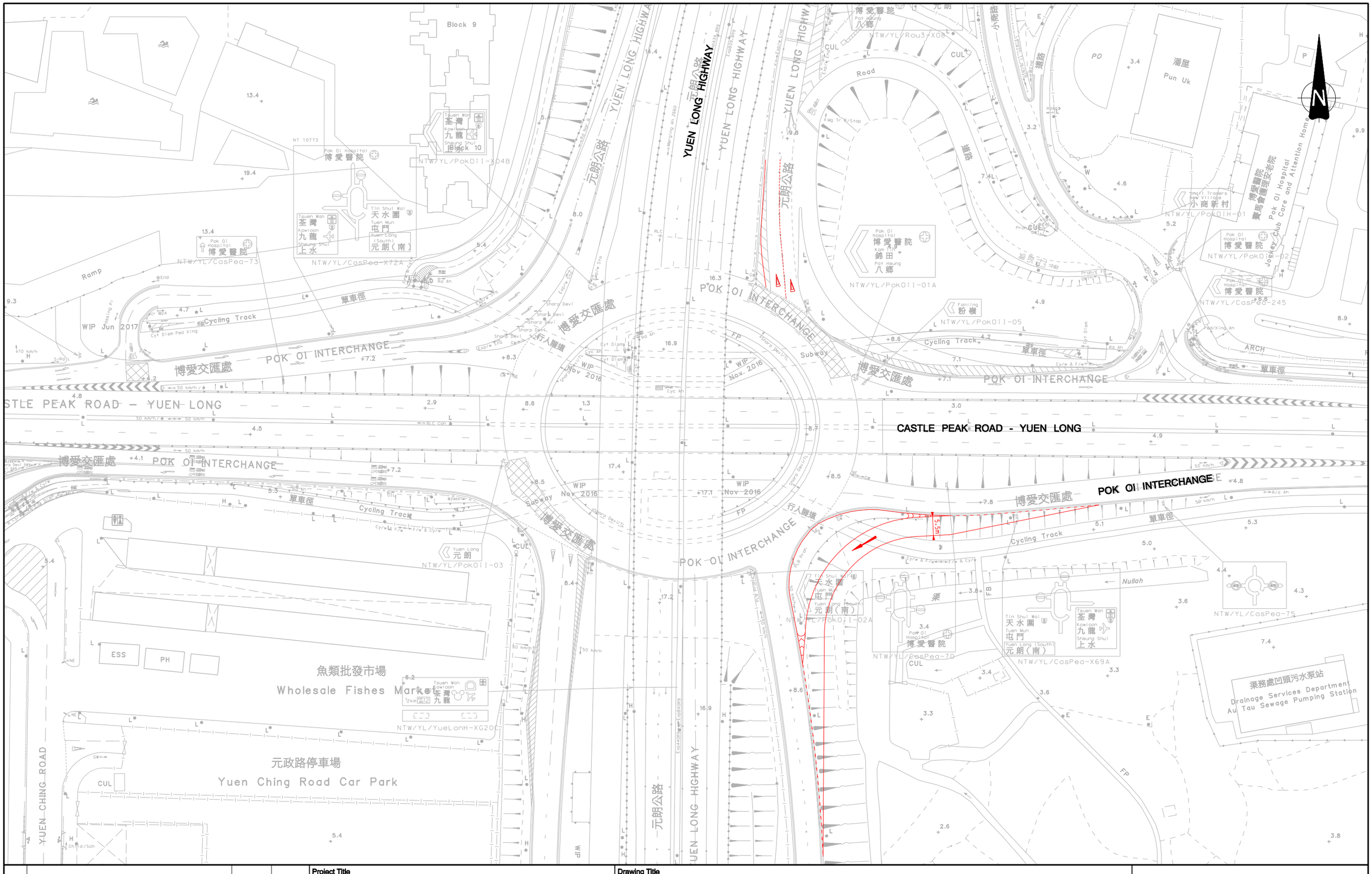
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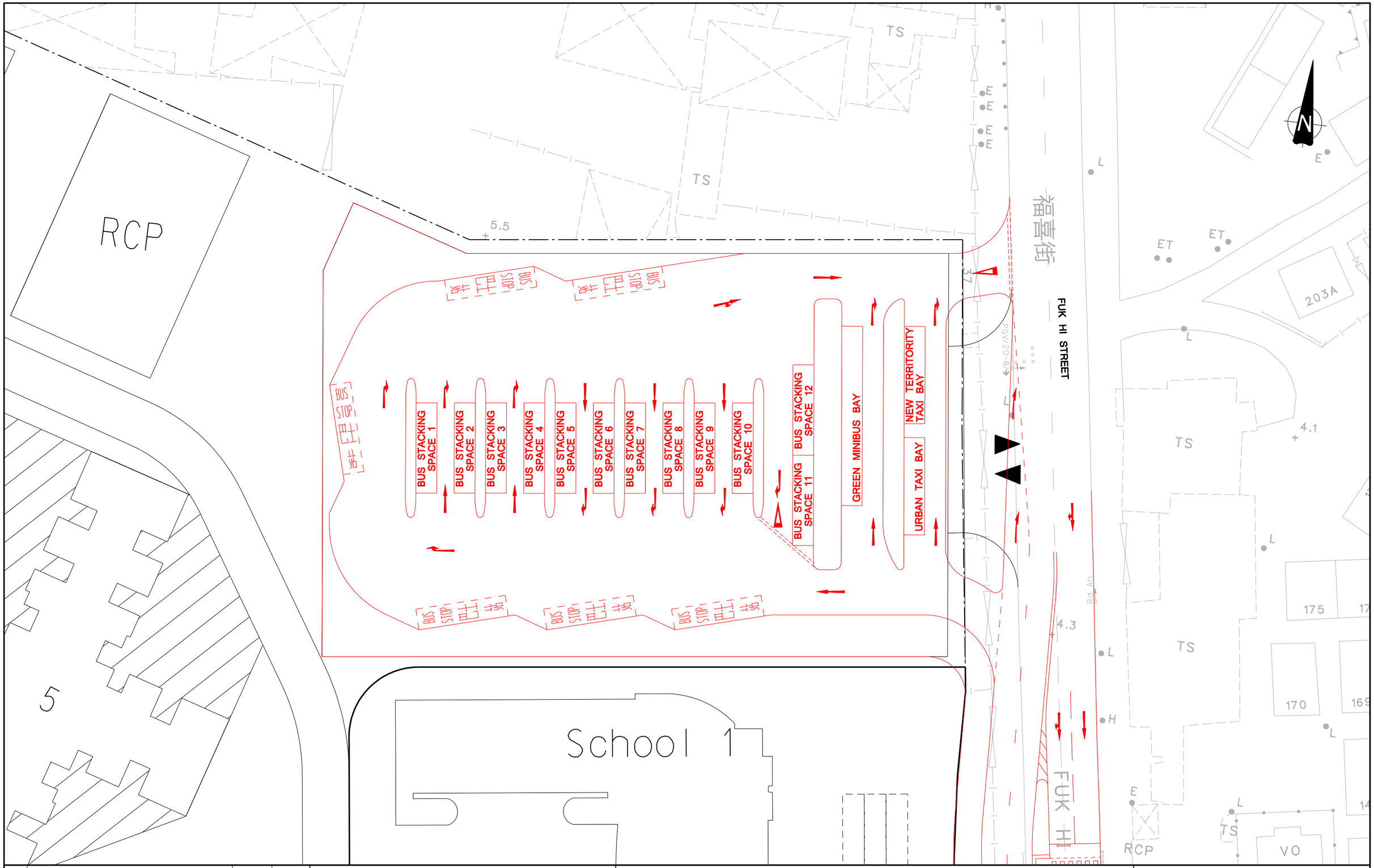
POK OI INTERCHANGE
CASTLE PEAK ROAD - YUEN LONG
Cycling Track
單車徑
WIP Jun 2017
WIP Nov 2016
Subway
行人隧道
Block 9
Block 10
Pok Oi Hospital
博愛醫院
Tsuen Wan
荃灣
Kowloon
九龍
Sheung Shui
上水
Tin Shui Wai
天水圍
Tuen Mun
屯門
Yuen Long (South)
元朗（南）
Kam Tin
錦田
Pat Heung
八鄉
Fanling
粉嶺
Shek Wu Hui
石湖墟
Sheung Tsuen
上村
Pun Uk
潘屋
Sheung Yuen Long
上元朗
Tai Tong
大棠
Ping Ha
坪廈
Tai Tong Tsuen
大棠村
Tai Kong Po
大江埔
Tai Kong Po Tsuen
大江埔村
Tai Kong Po Road
大江埔路
Tai Kong Po Interchange
大江埔交匯處
Tai Kong Po Bridge
大江埔橋
Tai Kong Po Footbridge
大江埔行人天橋
Tai Kong Po Subway
大江埔行人隧道
Tai Kong Po Cycle Track
大江埔單車徑
Tai Kong Po Slip Road
大江埔匝道
Tai Kong Po Underpass
大江埔地下通道
Tai Kong Po Viaduct
大江埔高架橋
Tai Kong Po Tunnel
大江埔隧道
Tai Kong Po Ramp
大江埔斜道
Tai Kong Po Roundabout
大江埔環島
Tai Kong Po Junction
大江埔交界處
Tai Kong Po Crossing
大江埔交叉處
Tai Kong Po Overpass
大江埔天橋



Rev.	Description	Checked	Date
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

PROPOSED LAYOUT OF PUBLIC TRANSPORT INTERCHANGE

Designed	Checked	Scale	Date	Drawing No.	Rev.
LAU	GPH	1:500(A3)	MAY 2018	196587/B&V/TTIA/109	-

土木工程拓展署 CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司

SYSTRA

CHK50284710/TIA/F34.DGN/CYC/14MAY18

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LEGEND:

- PROPOSED DRAINAGE PIPE
- UC — PROPOSED U-CHANNEL
- PROPOSED BOX CULVERT
- PROPOSED UNDERGROUND STORAGE TANK
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- PROPOSED RETAINING WALL
- PROPOSED SLOPE
- +8.00 PROPOSED SITE FORMATION LEVEL

N

820 200 E

820 400 E

820 600 E

835 200 N

835 000 N

834 800 N

横洲
WANG CHAU

+8.00

+7.50

+12.00

+10.00

+8.00

+6.50

+8.50

+6.50

+6.50

+7.50

+6.50

+6.50

+10.00

+12.00

CONNECTION TO EXISTING MANHOLE SMH1010805

PROPOSED 900mm DIA. DRAINAGE PIPE

CONNECTION TO PROPOSED BOX CULVERT

PROPOSED 1360 CU.M STORAGE TANK (INVERT LEVEL: +1.1mPD)

PROPOSED UPGRADING FROM 300-450mm TO 1500mm DIA.

PROPOSED 1:100 600mm U-CHANNEL

PROPOSED SINGLE-CELL 3.5m (W) x 2.0m (H) BOX CULVERT

PROPOSED 450mm DIA. DISCHARGE PIPE (SUBJECT TO REVIEW)

PROPOSED 1:150 750mm U-CHANNEL

PROPOSED 1:100 600mm U-CHANNEL

CONNECTED TO EXISTING TWIN-CELL 3.5m (W) X 2.0m (H) BOX CULVERT

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	WT	KC	SZ	-	
Date	10/18	10/18	10/18	10/18	

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
PROPOSED DRAINAGE SYSTEM (WITH YLBS)

Drawing No.
196587/B&V/DIA/105

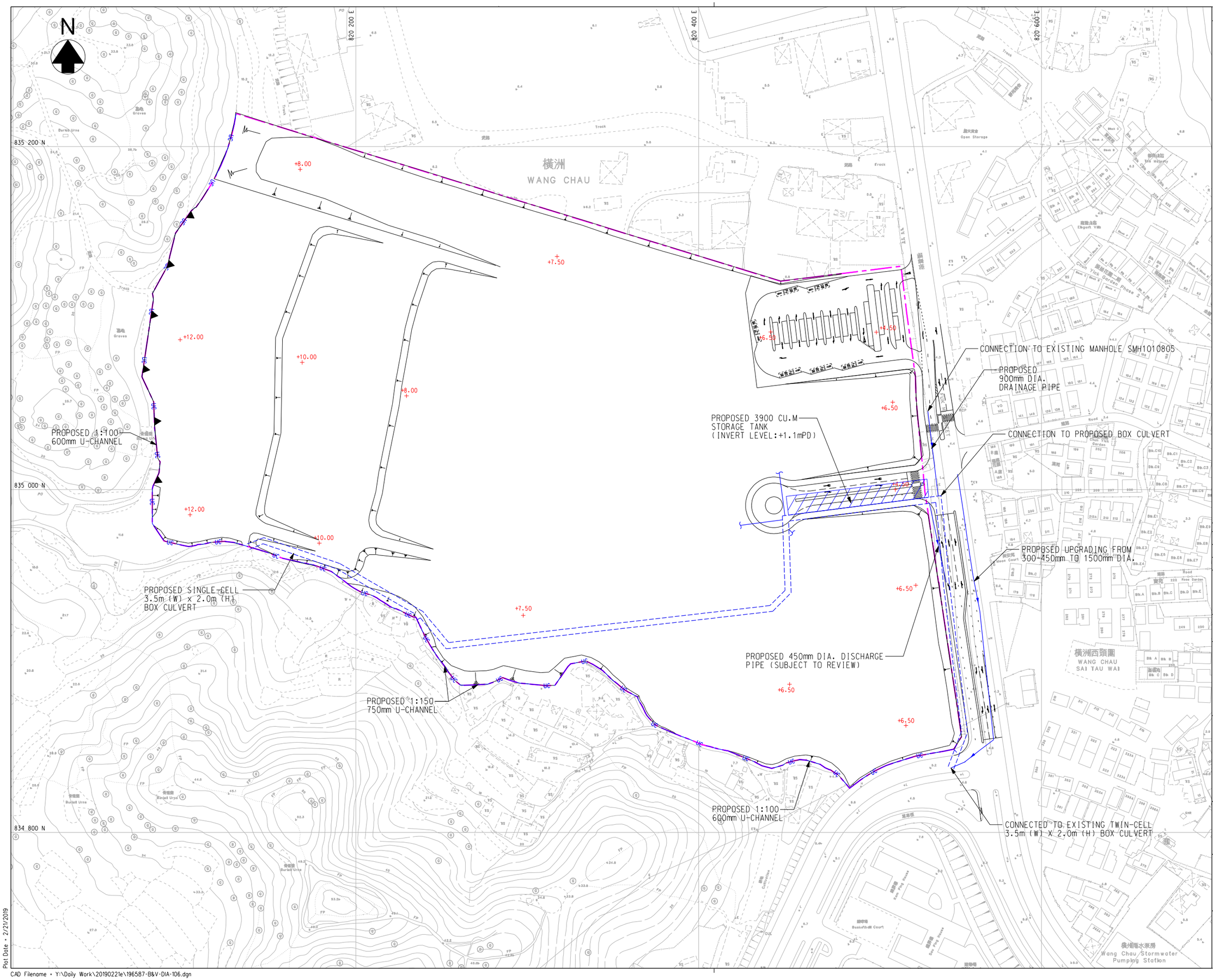
Scale
1 : 1000 (A1)
1 : 2000 (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Plot Date = 2/21/2019

CAD Filename = Y:\Daily Work\20190221e\196587-B&V-DIA-105.dgn



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LEGEND:

- PROPOSED DRAINAGE PIPE
- UC — PROPOSED U-CHANNEL
- PROPOSED BOX CULVERT
- PROPOSED UNDERGROUND STORAGE TANK
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- PROPOSED RETAINING WALL
- PROPOSED SLOPE
- +8.00 PROPOSED SITE FORMATION LEVEL

Revision	Date	Description			Initial
		Designed	Checked	Drawn	Checked
Initial		WT	KC	SZ	-
Date		10/18	10/18	10/18	10/18

Approved

Agreement no.

CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

PROPOSED DRAINAGE SYSTEM (WITHOUT YLBS)

Drawing No.

196587/B&V/DIA/106

Scale

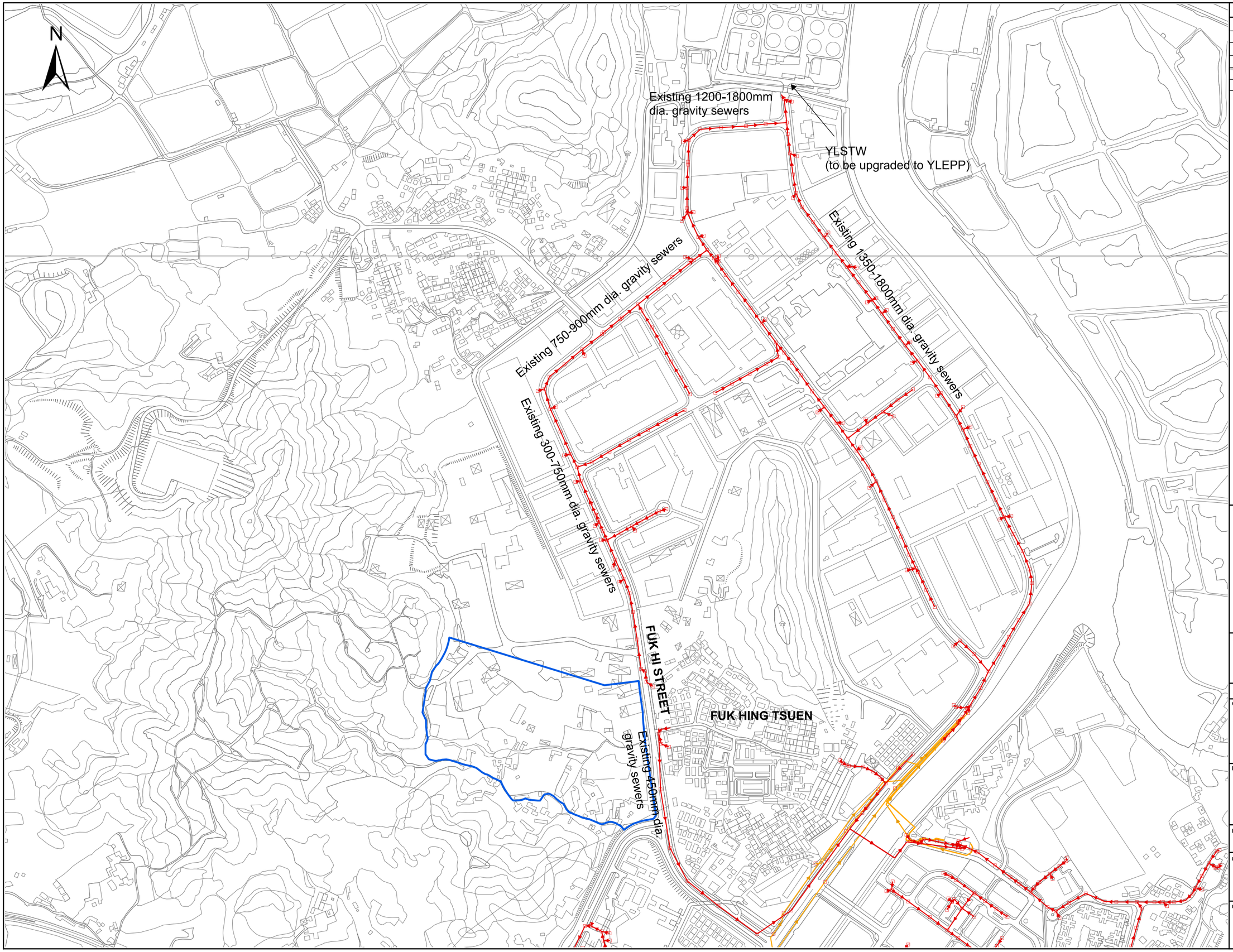
1 : 1000 (A1)
1 : 2000 (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Plot Date : 2/21/2019

CAD Filename : Y:\Daily Work\20190221e\196587-B&V-DIA-106.dgn



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	Designed	Reviewed	Drawn	Checked
Initial	CLH	CLH	CLH	CLH
Date	12/17	12/17	12/17	12/17

Revision	Date	Description	Initial

LEGEND

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- EXISTING SEWAGE MANHOLE
- EXISTING GRAVITY SEWER
- EXISTING RISING MAIN

NOTE:
SEWERAGE WITHIN FUK HING TSUEN IS NOT SHOWN ON THE FIGURE FOR SIMPLICITY.

Overview

Approved

Contract Title

AGREEMENT NO. CE 13/2017 (CE)
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG – FEASIBILITY STUDY

Figure Title

EXISTING SEWAGE SYSTEM

Drawing No.	Scale
196587/B&V/SIA/001	1:7,000 @ A3

Client

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Consultant

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MXD: B:\Project\196587\MXD

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N

819 500 E
820 000 E
820 500 E
821 000 E
836 000 N
835 500 N
835 000 N

PROPOSED CONNECTION AT MANHOLE NO. FMH1008582

PROPOSED 1200mm DIA. SEWER (UPGRADED FROM EXISTING 750 - 900mm SEWER)

PROPOSED 1050mm DIA. SEWER (UPGRADED FROM EXISTING 300 - 750mm SEWER)

PROPOSED CONNECTION AT MANHOLE NO. FMH1009148

PROPOSED 750mm DIA. SEWER

PROPOSED SEWERAGE MANHOLE

+8.00
+7.50
+12.00
+7.50
+12.00
+7.50
+4.50
+6.50
+4.50
+6.50
+6.50

LEGEND:

- PROPOSED SEWERAGE PIPE
- PROPOSED SEWERAGE MANHOLE
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- PROPOSED RETAINING WALL
- PROPOSED SLOPE
- +8.00 PROPOSED SITE FORMATION LEVEL

Revision	Date	Description		Initial
	Designed	Checked	Drawn	Checked
Initial	WT	KC	SZ	-
Date	09/18	09/18	09/18	09/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
PROPOSED SEWERAGE SCHEME

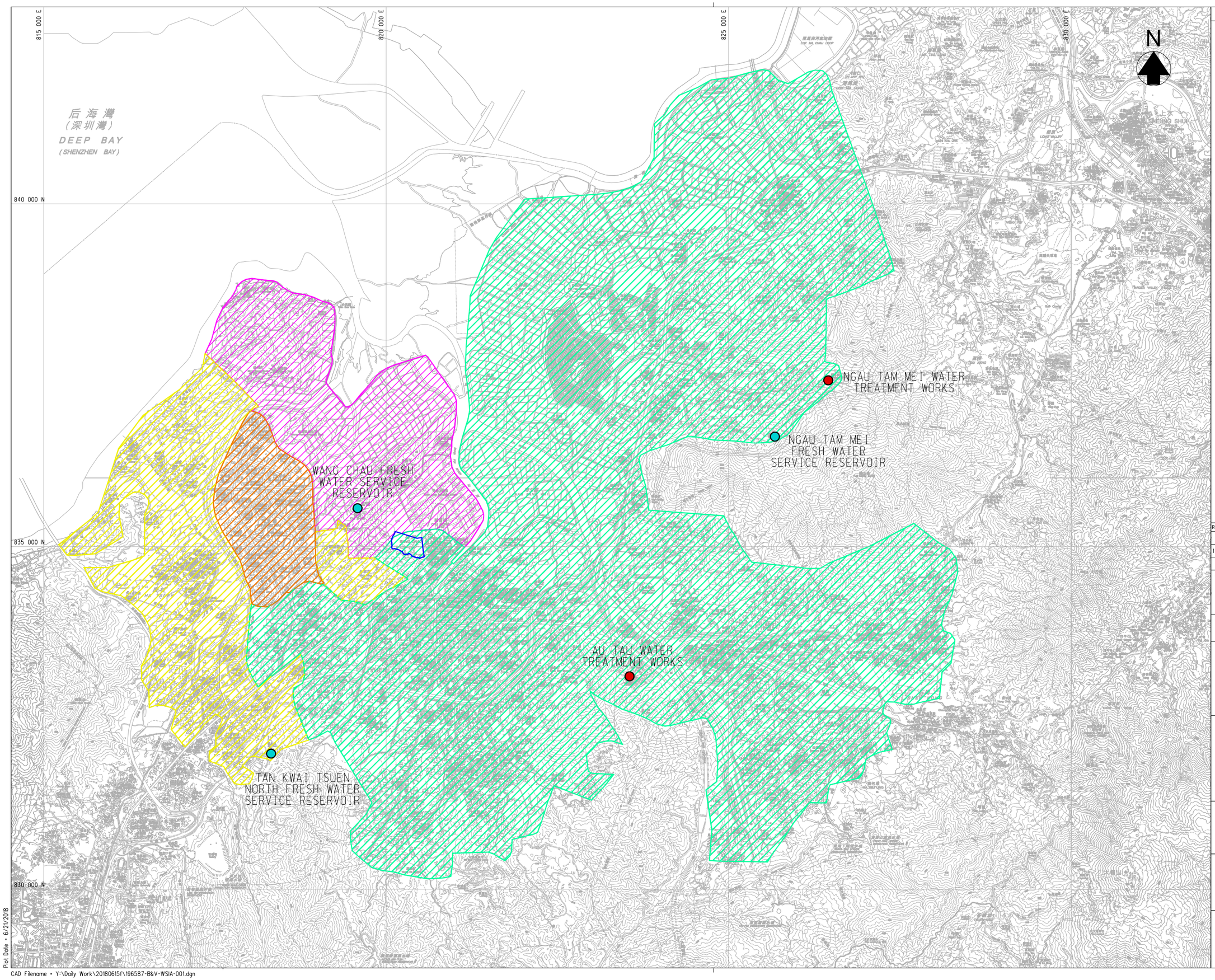
Drawing No.	Scale
196587/B&V/SIA/102	1 : 2500 (A1) 1 : 5000 (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Plot Date = 2/21/2019

CAD Filename = Y:\Daily Work\20190221e\196587-B&V-SIA-102.dgn



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LEGEND:

- SITE BOUNDARY FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU (SUBJECT TO REVIEW)
- WANG CHAU FRESH WATER SERVICE RESERVOIR SUPPLY ZONE
- TAN KWAI TSUEN NORTH FRESH WATER SERVICE RESERVOIR SUPPLY ZONE
- JOINT WANG CHAU AND TAN KWAI TSUEN NORTH FRESH WATER SERVICE RESERVOIR SUPPLY ZONE
- NGAU TAM MEI FRESH WATER PRIMARY SERVICE RESERVOIR AND AU TAU FRESH WATER PRIMARY RESERVOIR SUPPLY ZONE
- EXISTING FRESH WATER SERVICE RESERVOIRS
- WATER TREATMENT WORKS

Revision	Date	Description		Initial
	Designed	Checked	Drawn	Checked
Initial	WT	KC	SZ	-
Date	09/17	09/17	09/17	09/17

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
FRESH WATER SUPPLY ZONE

Drawing No.	Scale
196587/B&V/WSIA/001	1 : 25000 (A1) 1 : 50000 (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Plot Date = 6/21/2018

CAD Filename = Y:\Daily Work\20180615\196587-B&V-WSIA-001.dgn

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	Designed	Reviewed	Drawn	Checked
Initial	WT	KC	HLam	KC
Date	Feb 2018	Feb 2018	Feb 2018	Feb 2018

Revision	Date	Description	Initial
-	-	-	-

Legend

- SITE BOUNDARY FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENT AT WANG CHAU (SUBJECT TO REVIEW)
- SITE BOUNDARY FOR PHASE 1 OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU
- EXISTING FRESH WATER DISTRIBUTION MAIN
- EXISTING FRESH WATER TRUNK MAIN
- PLANNED FRESH WATER MAINS (BY OTHERS)

Approved

Agreement No. CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Figure Title

EXISTING AND PLANNED FRESH WATER SUPPLY LAYOUT

Drawing No.	Scale
196587/B&V/WSIA/002	1:8,000 @ A3

Client

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Consultant

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Ng Uk Tsuen
Kai Shan
Chu Wong Ling
Long Ping Estate
Long Ping Staton
Fuk Shun Street
Fuk Hi Street
Wang Lok Stieet
Long Ping Road
Source from Wang Chau Fresh Water Service Reservoir
Source from Tan Kwai Tsuen North Fresh Water Service Reservoir
Source from Ngan Tam Mei Fresh Water Primary Service Reservoir
DN 600 and DN 450
DN 750 DI
DN 900 MS
DN 450 DI
DN 250 DI
DN 300 DI
DN 450 DI
DN 300 AC
DN 900 MS
DN 600 MS
DN 80 PE
DN 200 DI
DN 150 DI
DN 900 MS
DN 300
DN 600
DN 80 PE
DN 80 PE
DN 250 DI
819000
819500
820000
820500
821000
821500
836000
835500
835000
834500

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	Designed	Reviewed	Drawn	Checked
Initial	WT	KC	HLam	KC
Date	Feb 2018	Feb 2018	Feb 2018	Feb 2018

Revision	Date	Description	Initial
-	-	-	-

Legend

- SITE BOUNDARY FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENT AT WANG CHAU (SUBJECT TO REVIEW)
- SITE BOUNDARY FOR PHASE 1 OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU
- EXISTING SALT WATER DISTRIBUTION MAIN

Approved

Agreement No. CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Figure Title

EXISTING AND PLANNED SALT WATER SUPPLY LAYOUT

Drawing No.	Scale
196587/B&V/WSIA/003	1:7,000 @ A3

Client

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Consultant

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Fuk Shun Street

Fuk Hi Street

Kai Shan

Chu Wong Ling

DN 300 DI SW MAIN

Wang Lok Street

Long Ping Estate

DN 400 DI SW MAIN

Source from Tan Kwai Tsuen Salt Water Service Reservoir

Long Ping Road

Source from Tan Kwai Tsuen Salt Water Service Reservoir

819500 820000 820500 821000

835500 835000 834500

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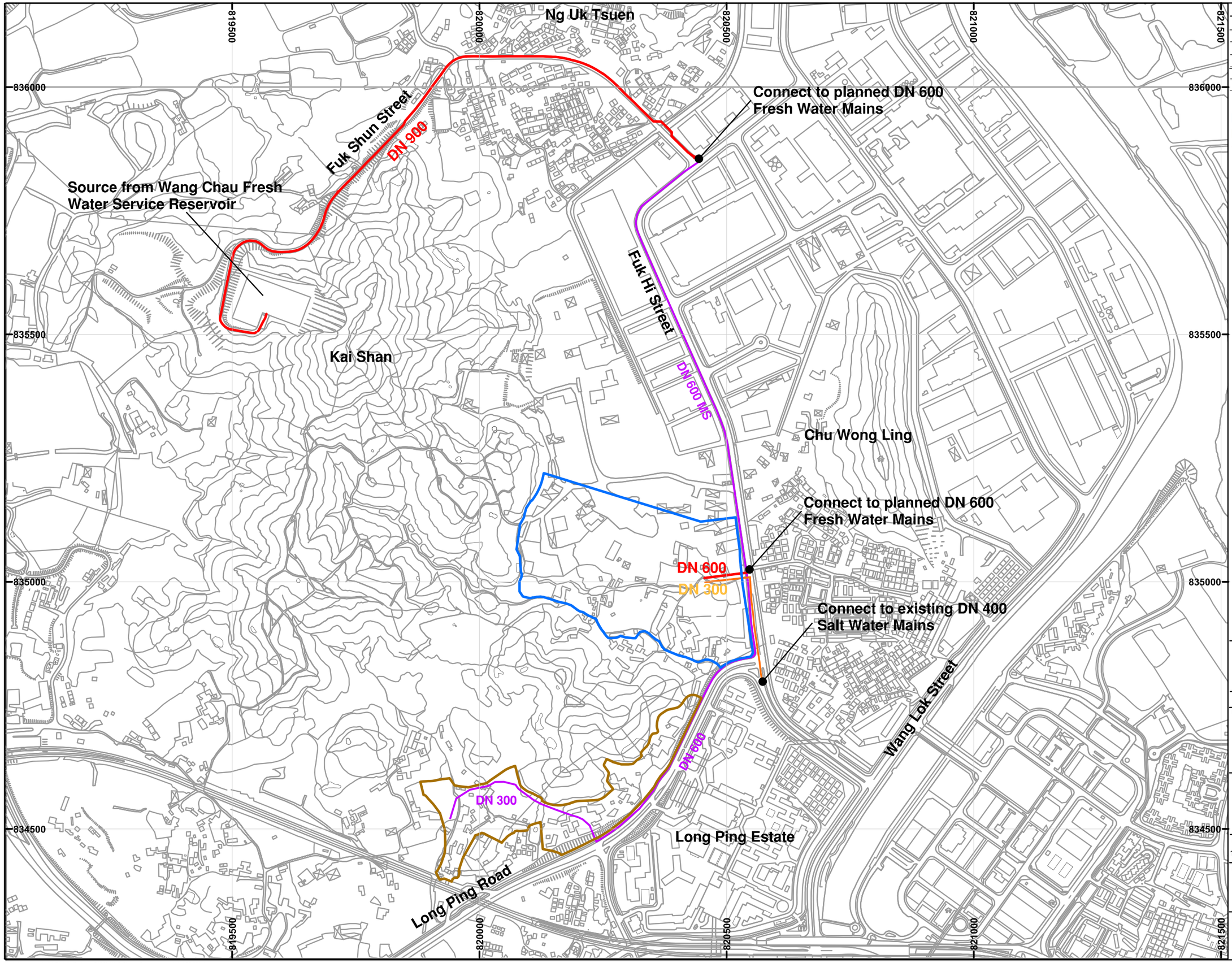

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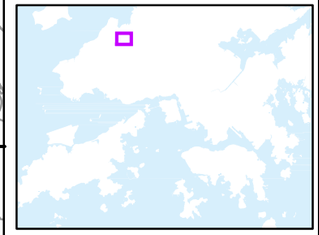
	Designed	Reviewed	Drawn	Checked
Initial	WT	KC	HLam	KC
Date	Feb 2018	Feb 2018	Feb 2018	Feb 2018

Revision	Date	Description	Initial
-	-	-	-

Legend

- SITE BOUNDARY FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENT AT WANG CHAU (SUBJECT TO REVIEW)
- SITE BOUNDARY FOR PHASE 1 OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU
- PROPOSED FRESH WATER MAIN
- PROPOSED SALT WATER MAIN
- PLANNED FRESH WATER MAINS (BY OTHERS)



Approved

Agreement No. CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Figure Title

PROPOSED FRESH AND FLUSHING WATER SUPPLY SCHEME (SALT WATER)

Drawing No.	Scale
196587/B&V/WSIA/004	1:7,000 @ A3

Client

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Consultant

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LEGEND:

- BOUNDARY OF THE SITE (SUBJECT TO REVEIW)
- EXISTING BOREHOLE
- SITE-SPECIFIC DRILLHOLE

Revision	Date	Description		Initial
	Designed	Checked	Drawn	Checked
Initial	WT	KC	SZ	-
Date	04/18	04/18	04/18	04/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
EXISTING GROUND INVESTIGATION RECORDS

Drawing No.	Scale
196587/B&V/PGA/008	1 : 1500 (A1) 1 : 3000 (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

KEY PLAN
SCALE A1 1:60000
A3 1:120000

Plot Date = 11/22/2018
CAD Filename = Y:\Daily Work\20181120e\196587-B&V-PGA-008.dgn

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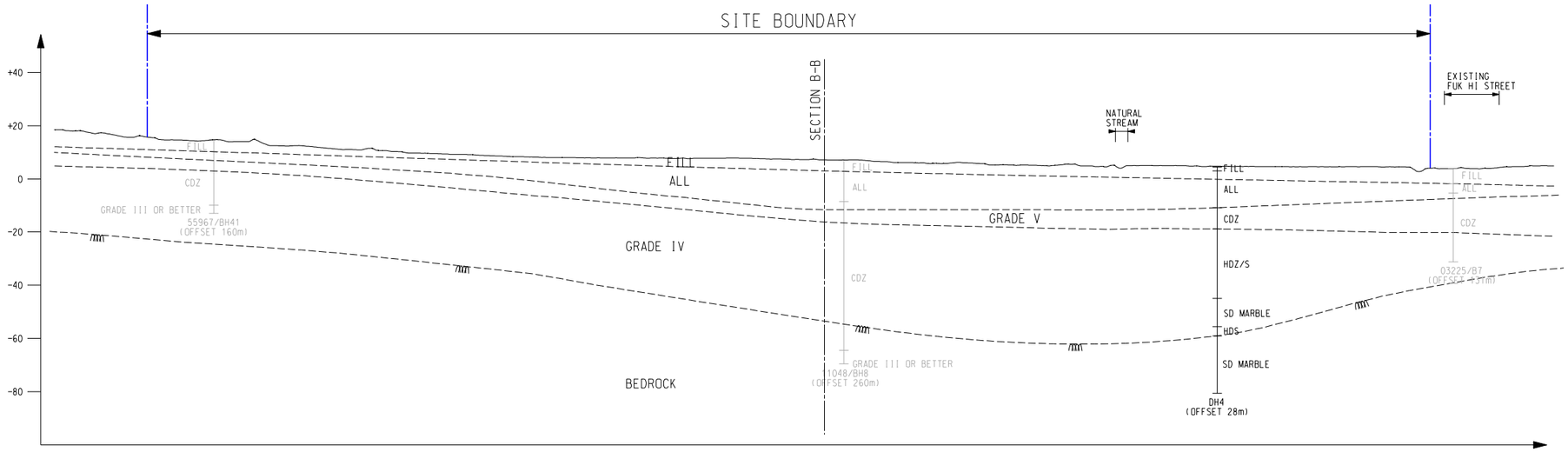
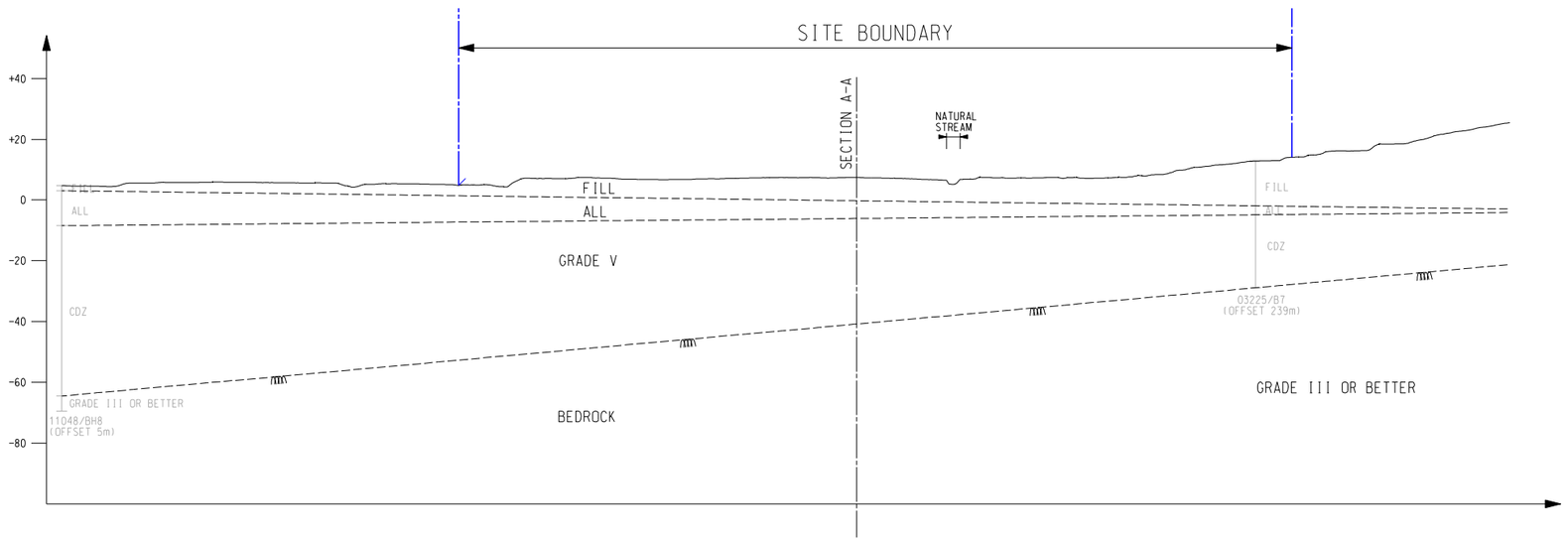


SECTION A - A
SCALE 1 : 2000 (A3)



SECTION B - B
SCALE 1 : 2000 (A3)

LEGEND:

FILL	FILL
ALL	ALLUVIUM
CDZ	COMPLETELY DECOMPOSED METASILTSTONE
HDZ/S	HIGHLY DECOMPOSED METASILTSTONE / METASANDSTONE
SD MARBLE	SLIGHTLY DECOMPOSED MARBLE
----	INFERRED GEOLOGICAL PROFILE
—m—	INFERRED BEDROCK LEVEL

Revision	Date	Description		Initial
	Designed	Checked	Drawn	Checked
Initial	FN	LCH	SZ	LGH
Date	05/18	05/18	05/18	05/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
INFERRED GEOLOGICAL PROFILES

Drawing No.
196587/B&V/PGA/009

Scale
1 : 1000 (A1)
1 : 2000 (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
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Plot Date = 12/12/2018

CAD Filename = Y:\Daily Work\20181212\196587-B&V-PGA-009.dgn

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	Designed	Reviewed	Drawn	Checked
Initial	WT	KC	WT	KC
Date	Sep 2017	Sep 2017	Sep 2017	Sep 2017

Revision	Date	Description	Initial
-	-	-	-

LEGEND

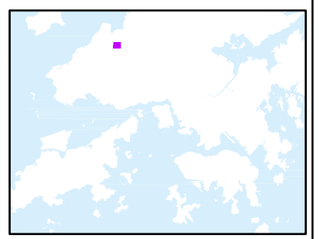
BOUNDARY OF THE SITE (SUBJECT TO REVIEW)

PROPOSED DRILLHOLE

DH4

820600 820100 820200 820300 820400 820500 820600

835200 835100 835000 834900 834800



Approved

Agreement No. CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Figure Title

PROPOSED GROUND INVESTIGATION

Drawing No.	Scale
196587/B&V/PGA/019	1:2,000 @ A3

Client

CEDD CIVIL ENGINEERING AND EVE.OPMENT DEPARTMENT

Consultant

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LEGEND:

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- EXISTING MAN-MADE FEATURES

6NW-B/C 3
6NW-B/C 4
6NW-B/C 69
6NW-B/F 204
6NW-B/C 146
6NW-B/C 145
6NW-B/C 109
6NW-B/C 108
6NW-B/C 107
6NW-B/C 101
6NW-B/C 114
6NW-B/C 116
6NW-B/C 117
6NW-B/C 118
6NW-B/C 112
6NW-B/C 111
6NW-B/C 113
6NW-B/C 110
6NW-B/C 105
6NW-B/C 103
6NW-B/C 104
6NW-B/C 102
6NW-B/C 119
6NW-B/C 121
6NW-B/C 120
6NW-B/R 88
6NW-B/C 122
6NW-B/C 56
6NW-B/R 85
6NW-B/C 22
6NW-B/C 21
6NW-B/C 20
6NW-B/R 89
6NW-B/C 23
6NW-B/C 24
6NW-B/R 18
6NW-B/F 52
6NW-B/F 51
6NW-B/C 16
6NW-B/C 154

820 000 E
820 500 E
835 500 N
835 000 N

KAI SHAN
WANG CHAU
FUK HING TSUEN
FUK HI STREET
LONG PING ROAD
LONG TIN ROAD
NAM SANG WAI
YUEN LONG
HONG KONG WETLAND PARK

REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU

N

KEY PLAN
SCALE A1 1:20000
A3 1:40000

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	WT	KC	SZ	-	
Date	10/17	10/17	10/17	10/17	

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
LOCATION OF REGISTERED GEOTECHNICAL FEATURES

Drawing No.	Scale
196587/B&V/PGA/002	1 : 2000 (A1) 1 : 4000 (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Plot Date = 11/22/2018
CAD Filename = Y:\Daily Work\20181120e\196587-B&V-PGA-002.dgn

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	Designed	Reviewed	Drawn	Checked
Initial	YLC	KC	WT	KC
Date	Oct 2017	Oct 2017	Oct 2017	Oct 2017

Revision	Date	Description	Initial
-	-	-	-

LEGEND

- NATURAL TERRAIN SCREENING SECTION
- NATURAL TERRAIN CATCHMENT
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BURIAL GROUND

Approved

Agreement No. CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Figure Title

NATURAL TERRAIN HAZARDS STUDY SCREENING MAP

Drawing No.	Scale
196587/B&V/PGA/012	1:2,500 @ A3

Client

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Consultant

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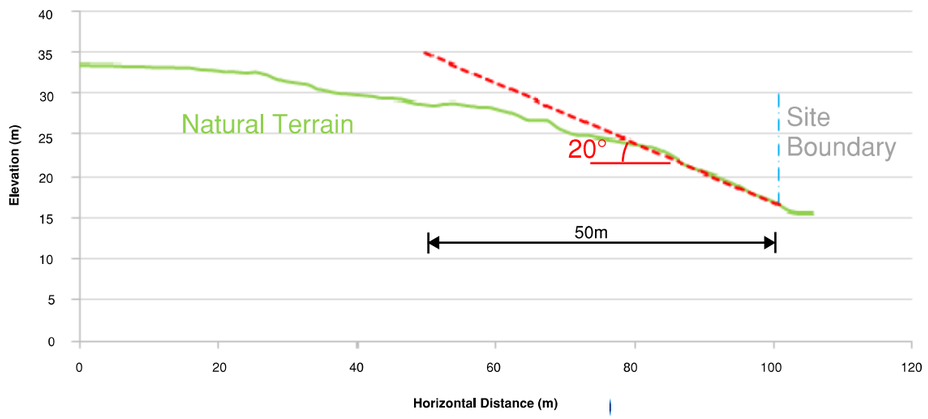
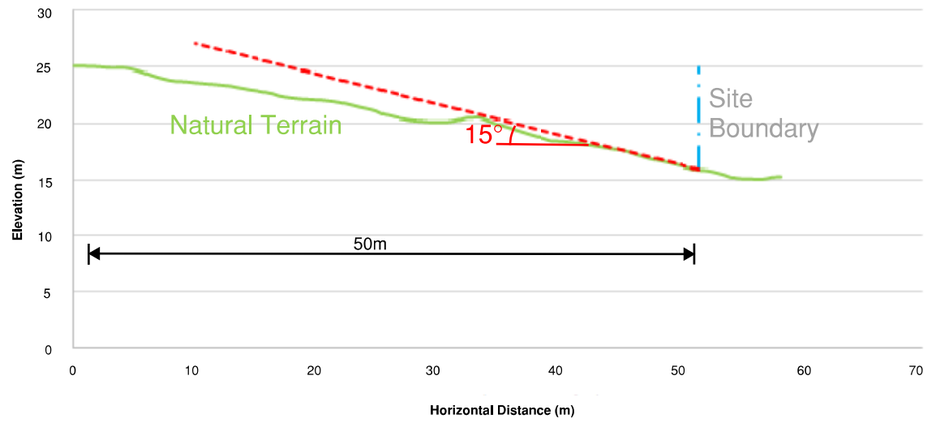
	Designed	Reviewed	Drawn	Checked
Initial	WT	WT	HLam	KC
Date	02/18	02/18	02/18	02/18

Revision	Date	Description	Initial

Section A-A (Alert Criteria met)



Section B-B (Alert Criteria not met)



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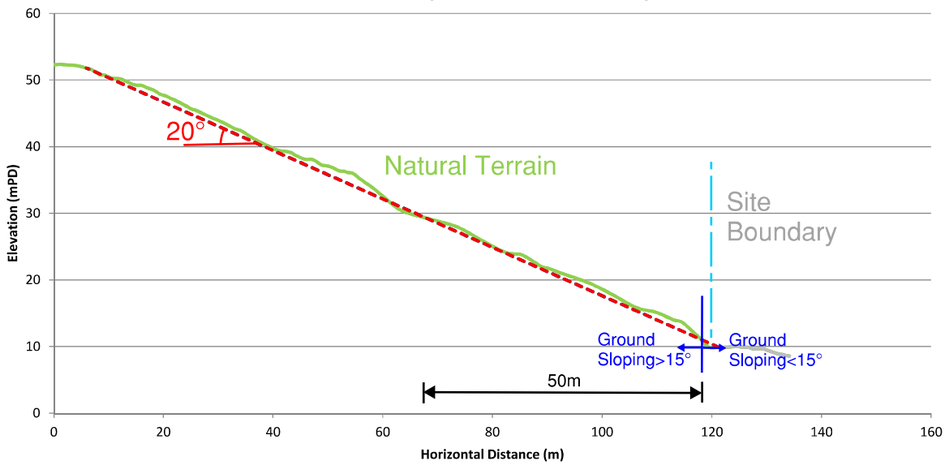

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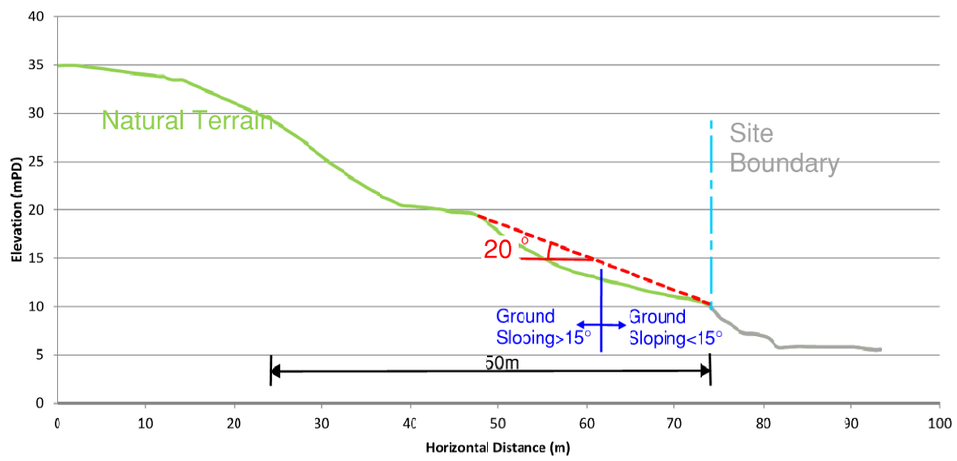

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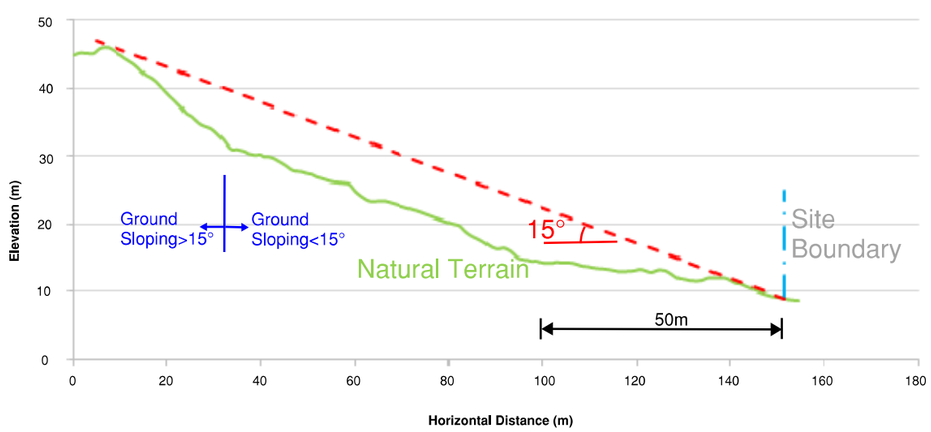

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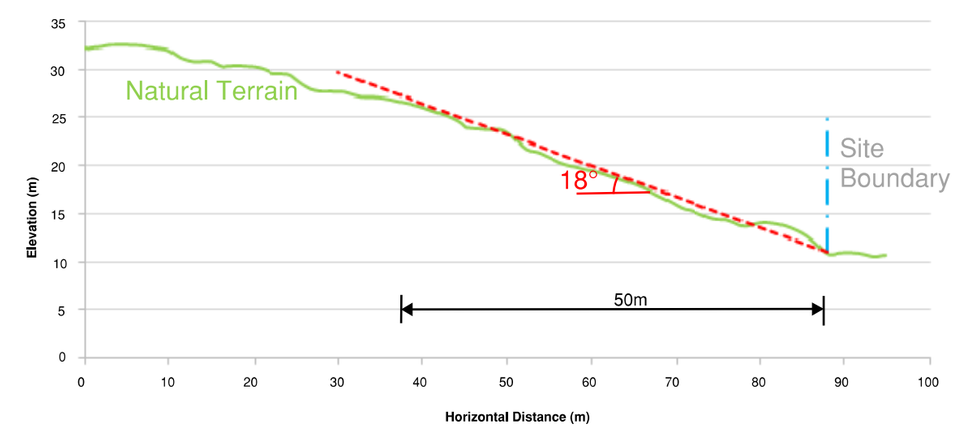

Approved

Contract Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Figure Title
SECTIONS FOR NATURAL TERRAIN SCREENING

Drawing No.: 196587/B&V/PGA/013
Scale: N.T.S.

Client: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Consultant: BLACK & VEATCH Building a world of difference.

MXD: C:\Program Files\ArcGIS\Bin\Icons\A3_Template.mxt 11/6/2007 11:57:55 Enter Author Name in File>Properties

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LEGEND:

- PROPOSED RETAINING WALL
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- TEMPORARY SLOPE
- PERMANENT SLOPE
- +7.80 EXISTING GROUND LEVEL
- +8.00 PROPOSED SITE FORMATION LEVEL
- UC PROPOSED U-CHANNEL MAINTAINED AND MANAGED BY DSD
- BH4 PROPOSED DRILLHOLE

PROPOSED 1:2 TEMPORARY CUT/FILL SLOPE

PROPOSED 1:2 TEMPORARY FILL SLOPE

PROPOSED 2.2 TO 7.2m HIGH RETAINING WALL

WESTERN PLATFORM

EASTERN PLATFORM

PROPOSED 1:2 TEMPORARY CUT/FILL SLOPE

PROPOSED 1:2 TEMPORARY CUT/FILL SLOPE

PROPOSED 1:2 PERMANENT FILL SLOPES

PROPOSED 1:2 TEMPORARY FILL SLOPE

PROPOSED 1:2 TEMPORARY FILL SLOPE

PROPOSED 1:2 PERMANENT CUT SLOPE

PROPOSED 1:2 TEMPORARY FILL SLOPE

PROPOSED 1:2 TEMPORARY FILL SLOPE

橫洲 WANG CHAU

橫洲西頭圍 WANG CHAU SAI TAU WAI

橫洲雨水泵房 Wang Chau Stormwater Pumping Station

FUK TI STREET

DH4

835 200 N

835 000 N

834 800 N

820 200 E

820 400 E

820 600 E

Revision	Date	Description		Initial
	Designed	Checked	Drawn	Checked
Initial	WT	KC	SZ	-
Date	10/18	10/18	10/18	10/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
PROPOSED RETAINING STRUCTURES AND SLOPE GRADING

Drawing No.
196587/B&V/SFA/001

Scale
1 : 1000 (A1)
1 : 2000 (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Plot Date = 2/15/2019

CAD Filename = Y:\Daily Work\20190213c\196587-B&V-SFA-001.dgn

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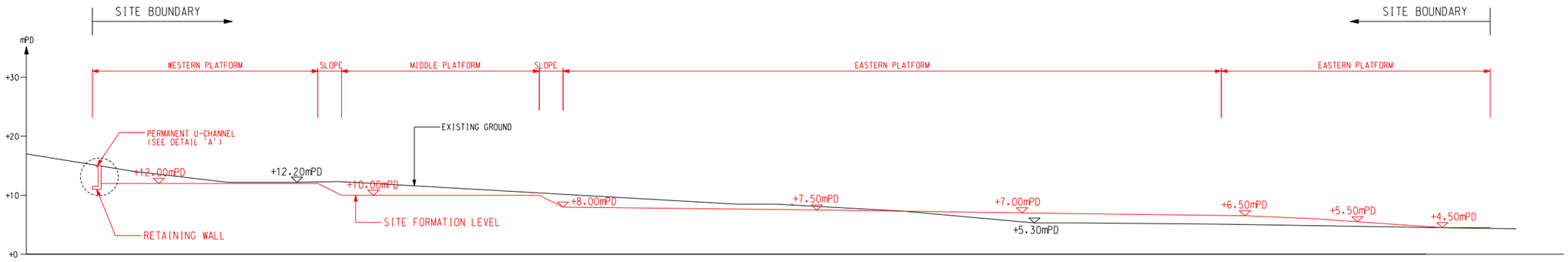

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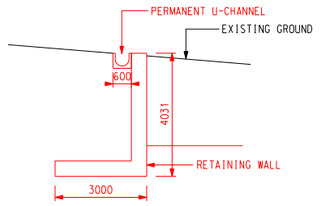

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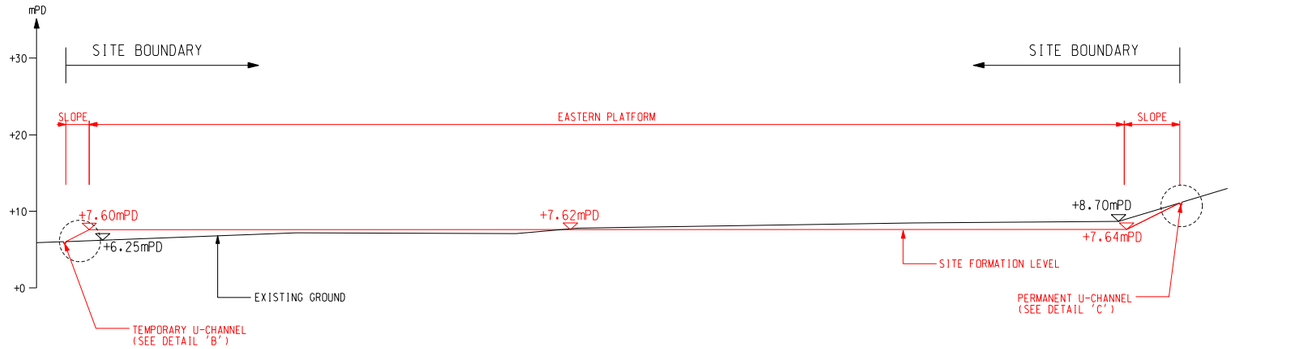

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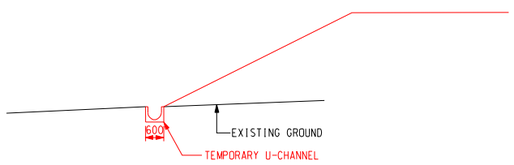

DETAIL 'B'

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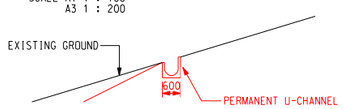
A3 1 : 200



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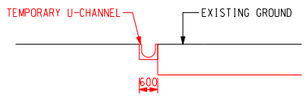

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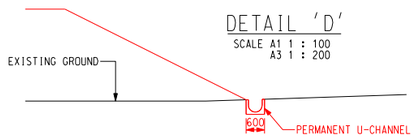

DETAIL 'E'

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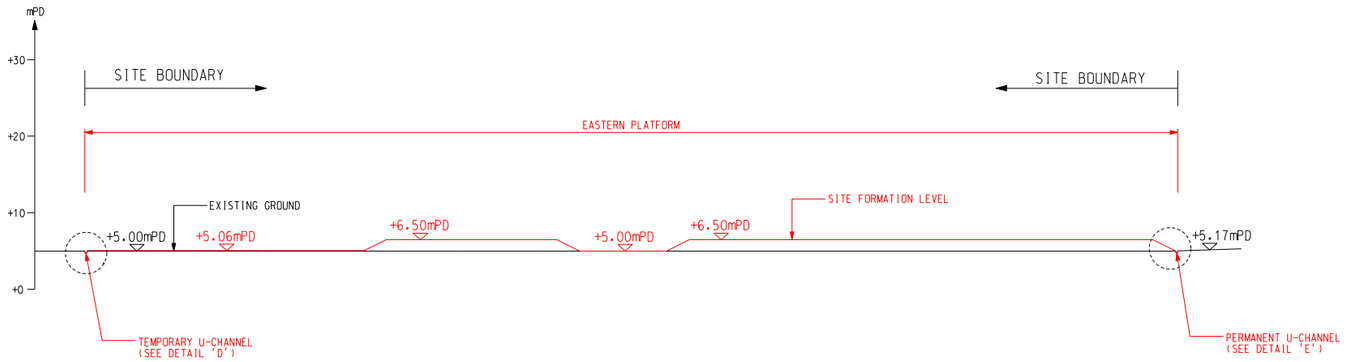


SECTION C - C

SCALE HORIZONTAL A1 1 : 800
VERTICAL A1 1 : 400

Revision	Date	Description		Initial
	Designed	Checked	Drawn	Checked
Initial	WT	KC	SZ	-
Date	11/18	11/18	11/18	11/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
CROSS SECTION OF PROPOSED SITE FORMATION

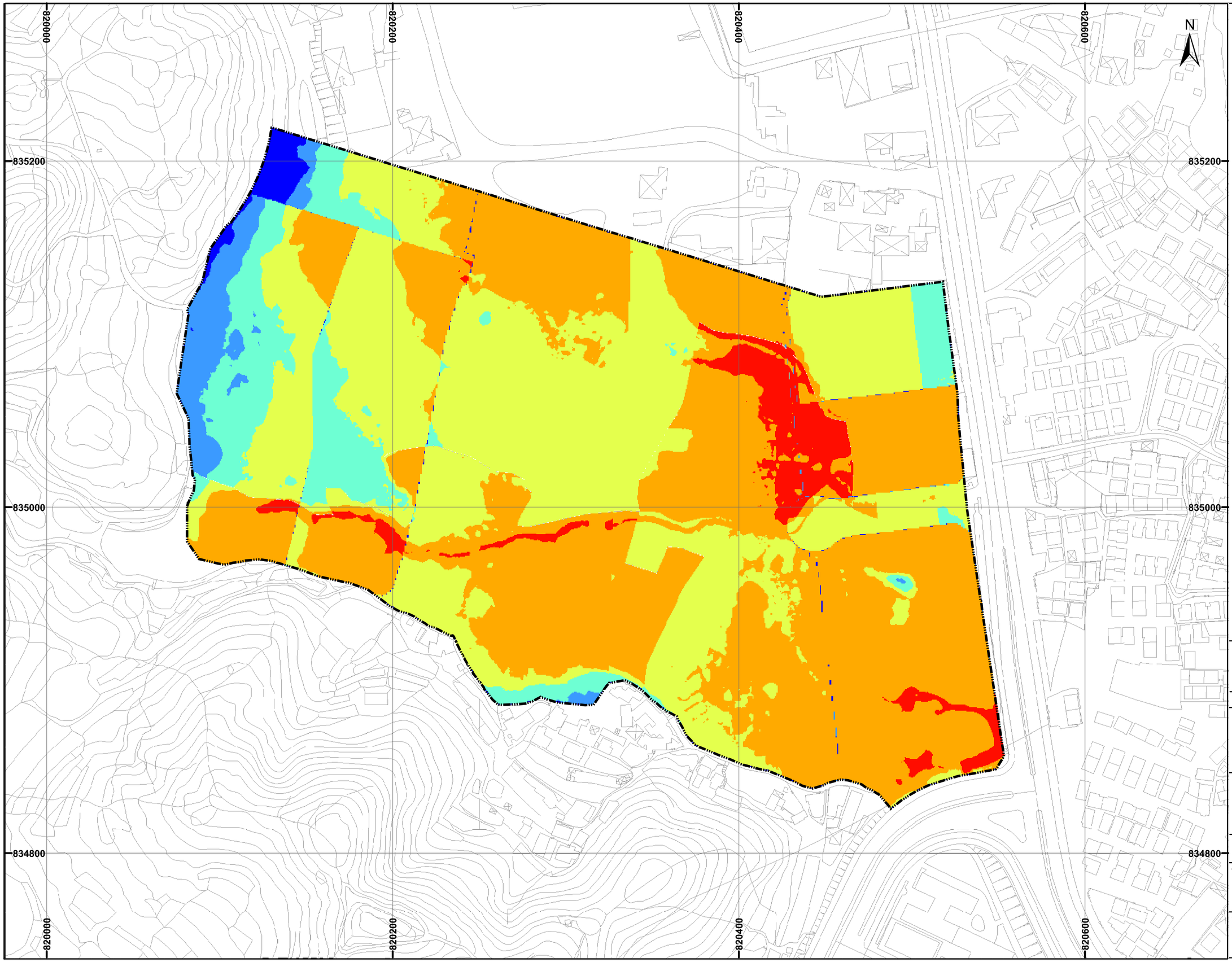
Drawing No.	Scale
196587/B&V/SFA/001A	AS SHOWN

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Plot Date = 2/15/2019

CAD Filename = Y:\Daily Work\20190213c\196587-B&V-SFA-001A.dgn



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	Designed	Reviewed	Drawn	Checked
Initial	CLH	KC	CLH	KC
Date	Aug 2018	Aug 2018	Aug 2018	Aug 2018

Revision	Date	Description	Initial
-	-	-	-

LEGEND

BOUNDARY OF THE SITE (SUBJECT TO REVIEW)

FILL DEPTH (m) (NEGATIVE VALUE = CUT DEPTH)

- -18.51185608 - -4
- -3.999999999 - -2
- -1.999999999 - 0
- 0 - 2
- 2.000000001 - 4
- 4.000000001 - 10

Approved

Agreement No. CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Figure Title

CUT AND FILL AREAS

Drawing No.	Scale
196587/B&V/SFA//002	1:2,000 @ A3

Client

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Consultant

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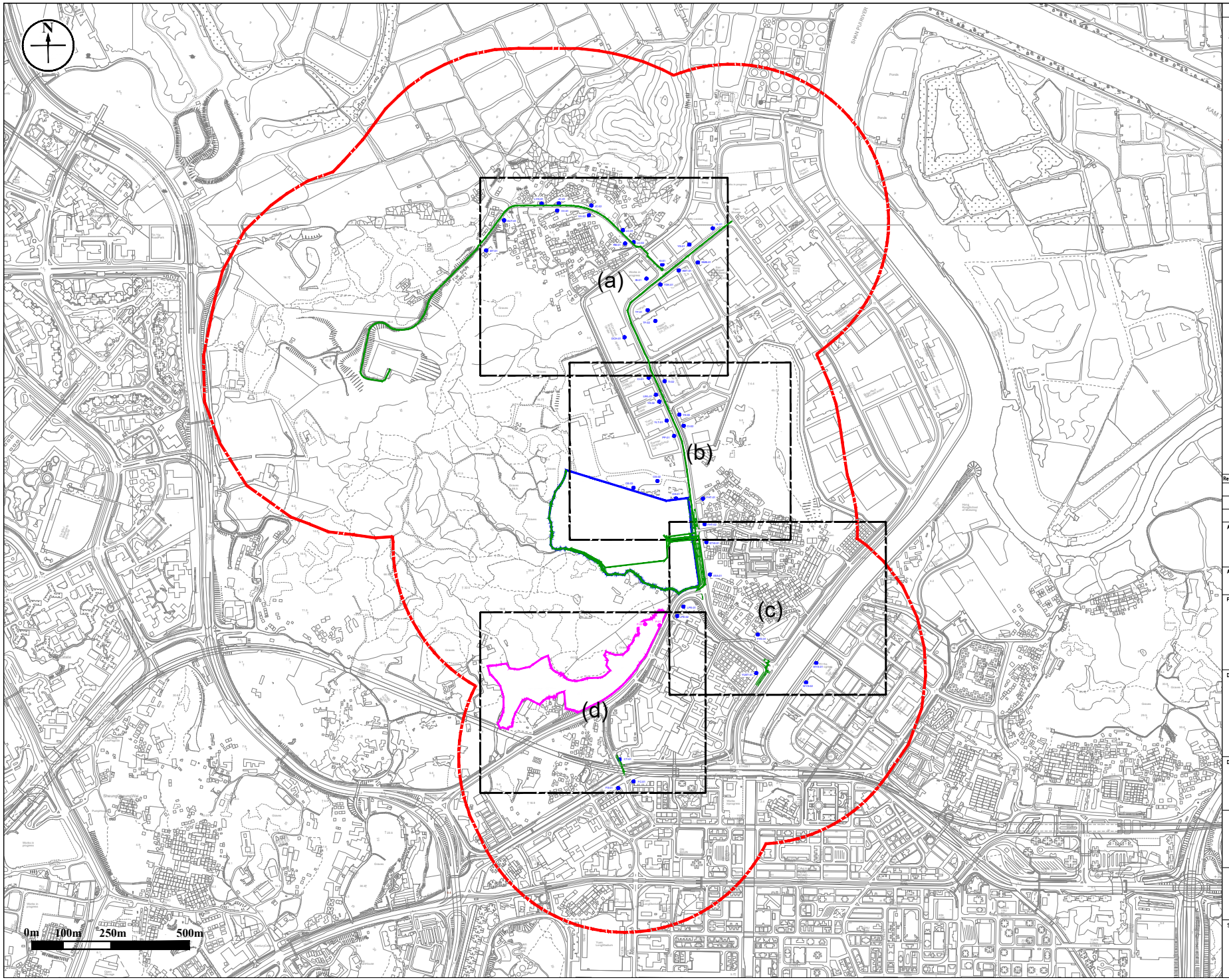

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LEGEND

- AIR SENSITIVE RECEIVERS (EXISTING)
- AIR SENSITIVE RECEIVERS (PLANNED)
- ASSESSMENT AREA FOR CONSTRUCTION AIR QUALITY (500M FROM BOUNDARY OF THE SITE AND INFRASTRUCTURE WORKS)
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- INFRASTRUCTURE WORKS
- PLANNED WANG CHAU PHASE 1 DEVELOPMENT

NOTE
THE LAYOUT OF PLANNED WANG CHAU PHASE 1 DEVELOPMENT IS SUBJECT TO DETAILED DESIGN.

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	WT	KC	SZ	-	
Date	07/18	07/18	07/18	07/18	

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG- FEASIBILITY STUDY

Drawing Title
LOCATION OF REPRESENTATIVE AIR SENSITIVE RECEIVERS DURING CONSTRUCTION PHASE

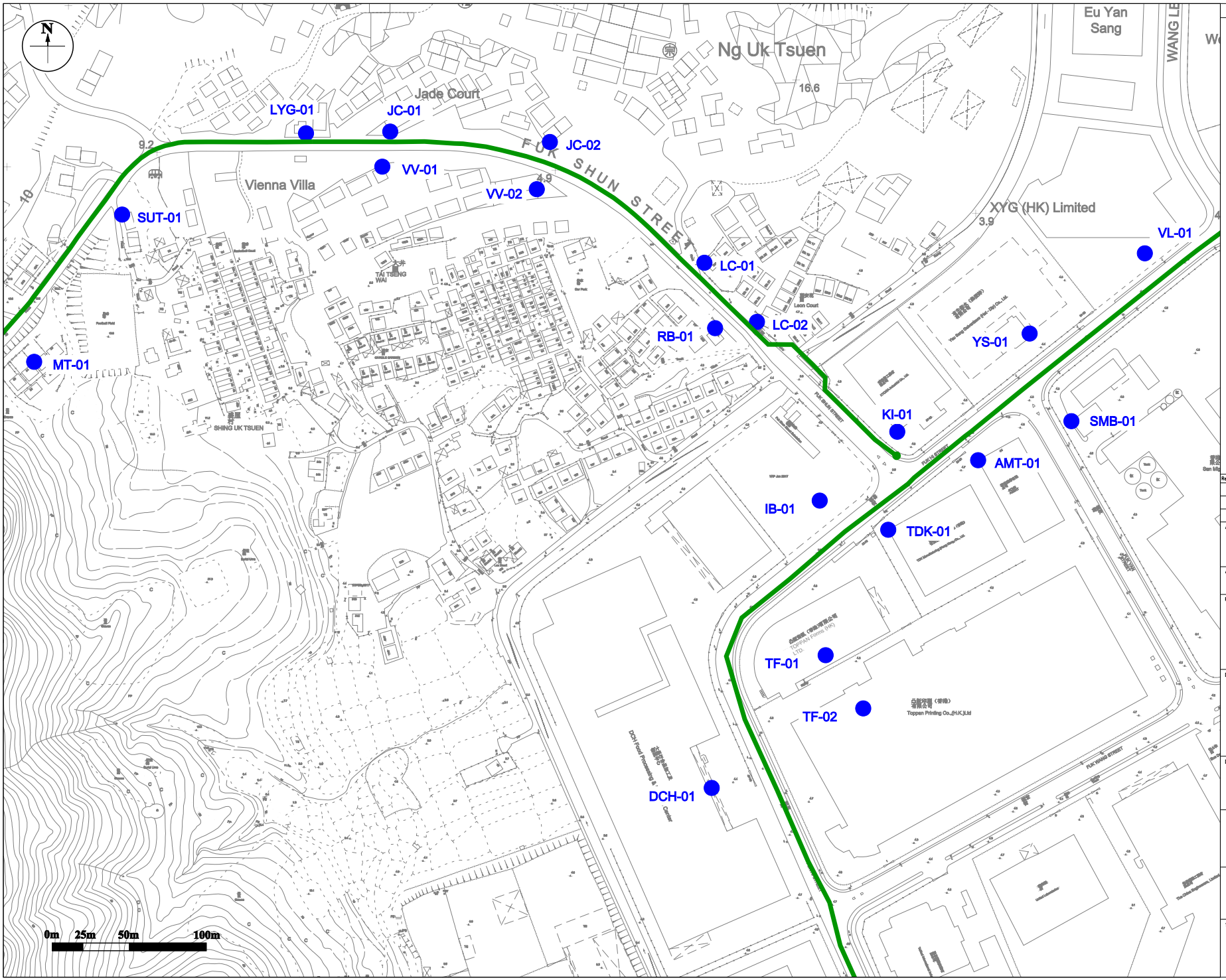
Drawing No.
196587/B&V/PER/FIG 3.1

Scale

土木工程拓展署
Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Sub Consultant:
RAMBOLL



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LEGEND

- AIR SENSITIVE RECEIVERS (EXISTING)
- INFRASTRUCTURE WORKS

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	WT	KC	SZ	-	
Date	07/18	07/18	07/18	07/18	

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Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG- FEASIBILITY STUDY

Drawing Title
LOCATION OF REPRESENTATIVE AIR SENSITIVE RECEIVERS DURING CONSTRUCTION PHASE

Drawing No.
196587/B&V/PER/FIG 3.1a

Scale

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Sub Consultant:
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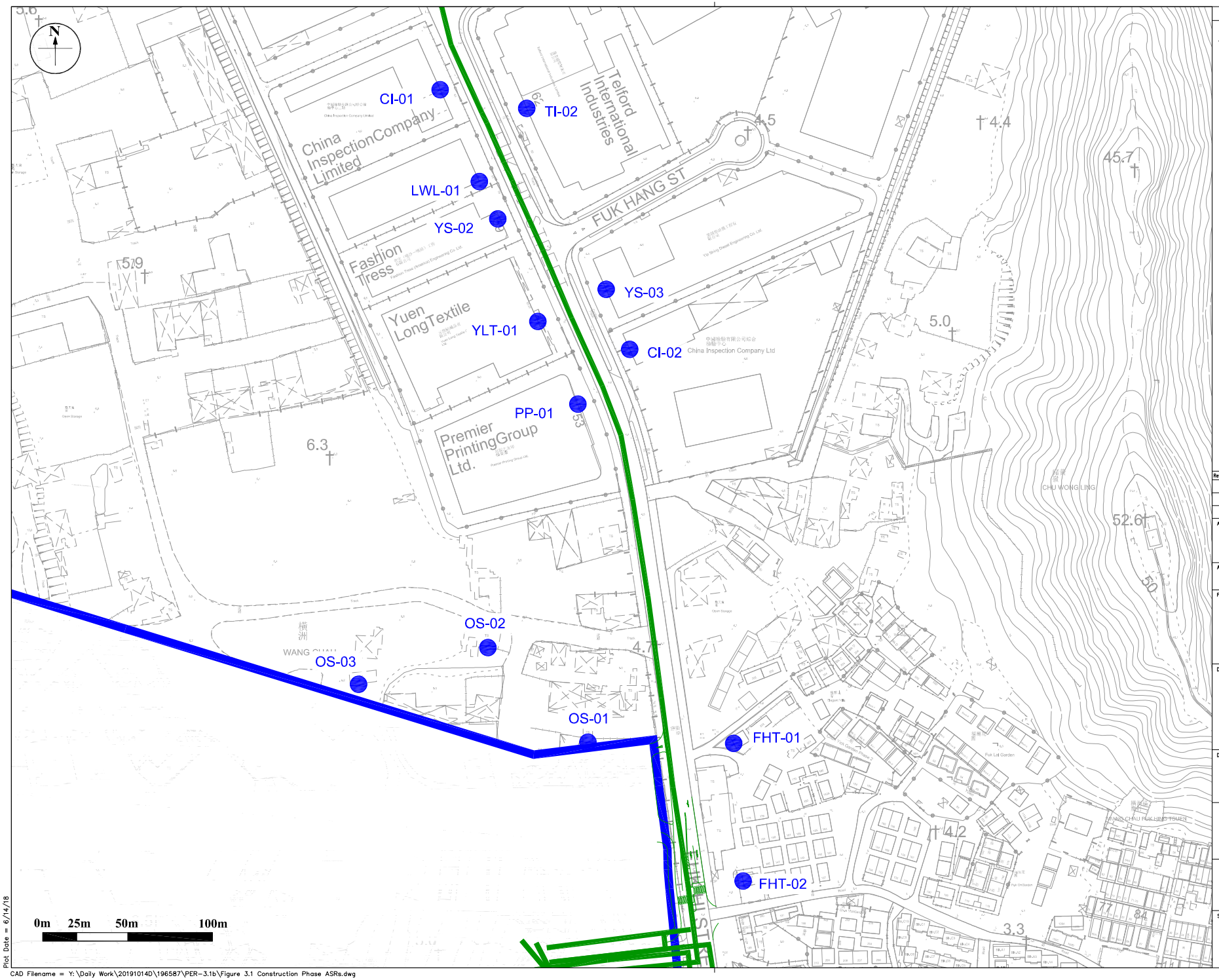

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LEGEND

- AIR SENSITIVE RECEIVERS (EXISTING)
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- INFRASTRUCTURE WORKS

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	WT	KC	SZ	–	
Date	07/18	07/18	07/18	07/18	

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG– FEASIBILITY STUDY

Drawing Title
LOCATION OF REPRESENTATIVE AIR SENSITIVE RECEIVERS DURING CONSTRUCTION PHASE

Drawing No.
196587/B&V/PER/FIG 3.1b

Scale

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Sub Consultant:
RAMBOLL

Plot Date = 6/14/18

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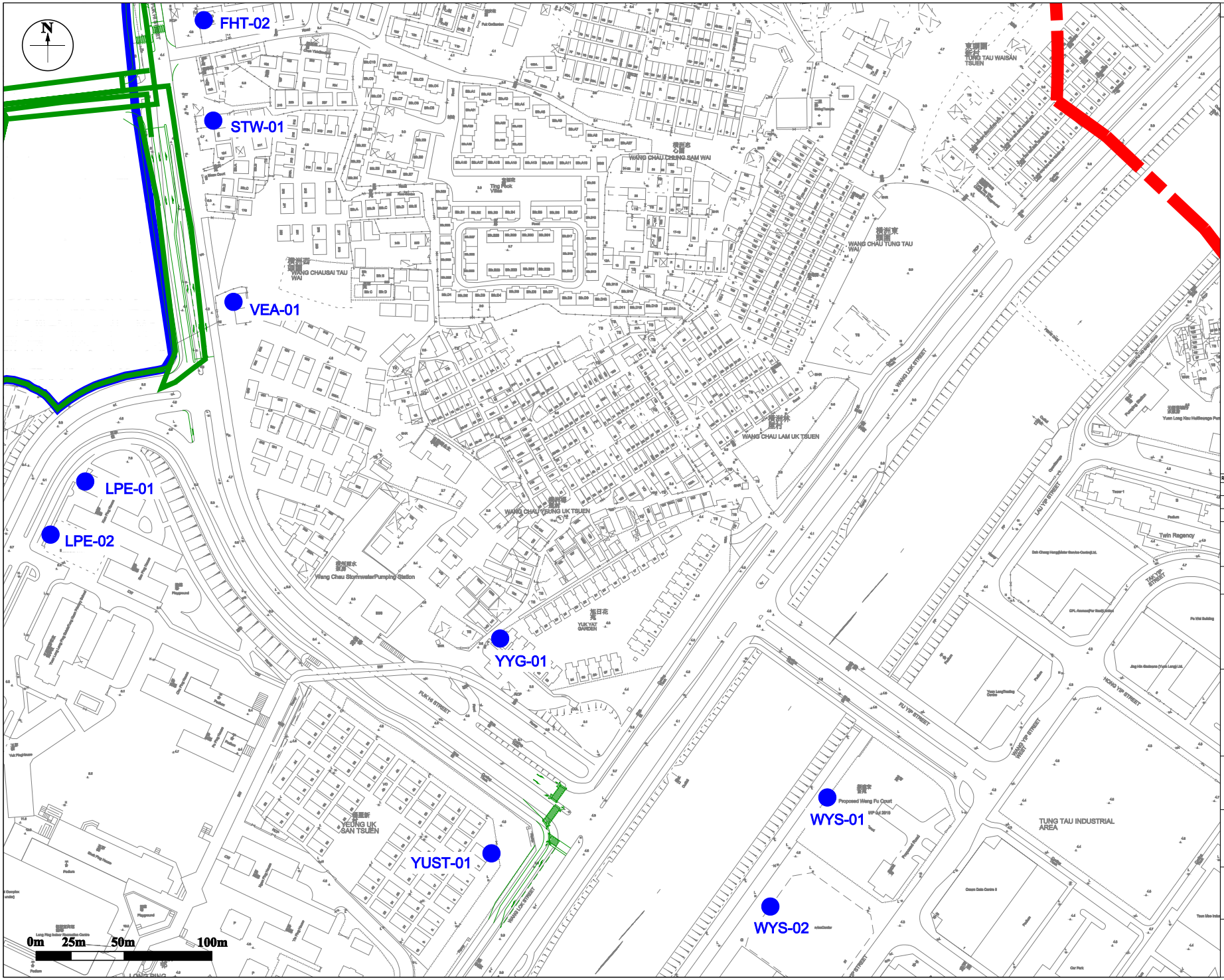

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LEGEND

- AIR SENSITIVE RECEIVERS (EXISTING)
- ASSESSMENT AREA FOR AIR QUALITY (500M FROM BOUNDARY OF THE SITE AND INFRASTRUCTURE WORKS)
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- INFRASTRUCTURE WORKS

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	WT	KC	SZ	-	
Date	07/18	07/18	07/18	07/18	

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG- FEASIBILITY STUDY

Drawing Title
LOCATION OF REPRESENTATIVE AIR SENSITIVE RECEIVERS DURING CONSTRUCTION PHASE

Drawing No.
196587/B&V/PER/FIG 3.1c

Scale

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Sub Consultant:
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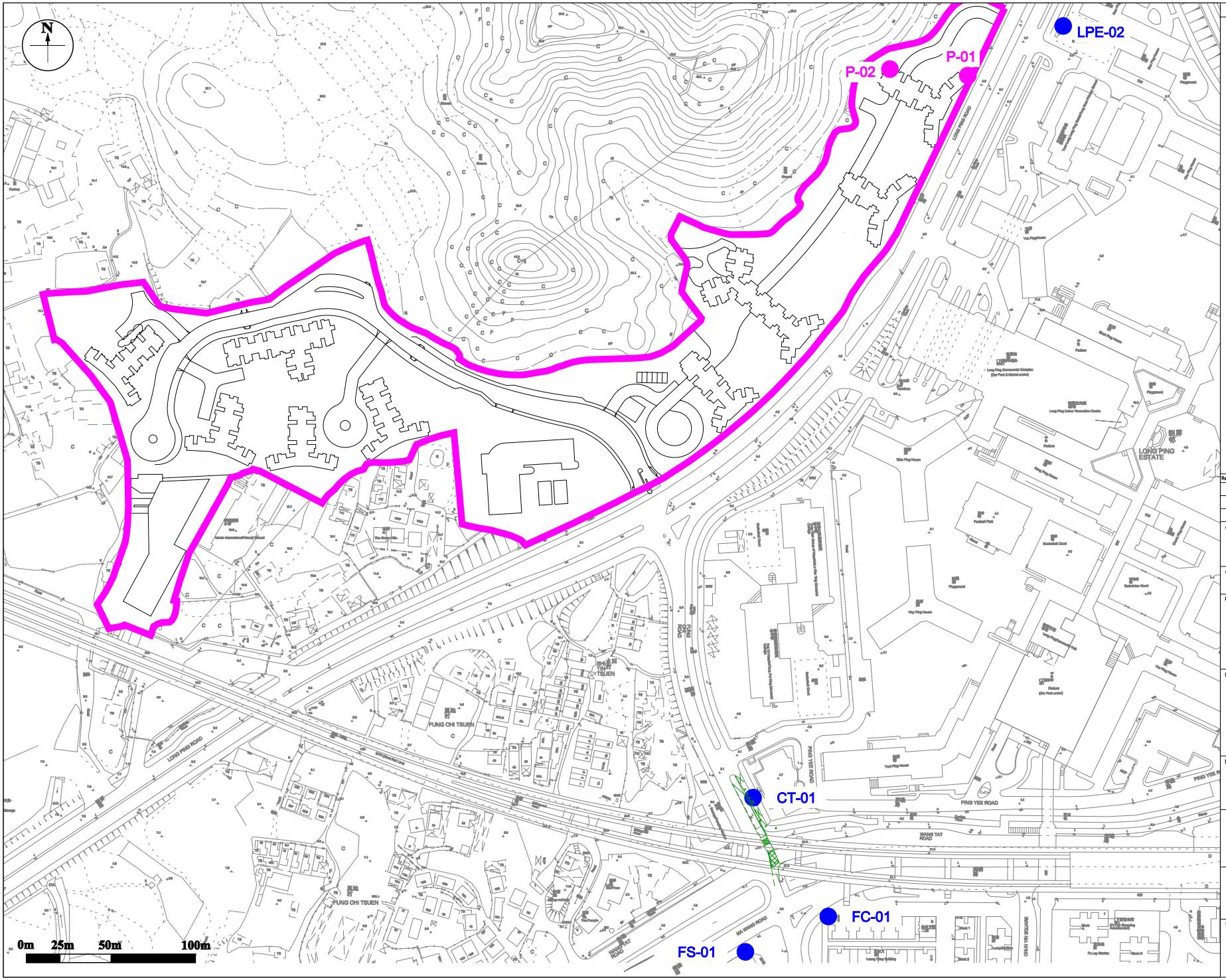

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LEGEND

- AIR SENSITIVE RECEIVERS (EXISTING)
- AIR SENSITIVE RECEIVERS (PLANNED)
- INFRASTRUCTURE WORKS
- PLANNED WANG CHAU PHASE 1 DEVELOPMENT

NOTE

THE LAYOUT OF PLANNED WANG CHAU PHASE 1 DEVELOPMENT IS SUBJECT TO DETAILED DESIGN.

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	WT	KC	SZ	-	
Date	07/18	07/18	07/18	07/18	

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG- FEASIBILITY STUDY

Drawing Title
LOCATION OF REPRESENTATIVE AIR SENSITIVE RECEIVERS DURING CONSTRUCTION PHASE

Drawing No.
196587/B&V/PER/FIG 3.1d

Scale

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

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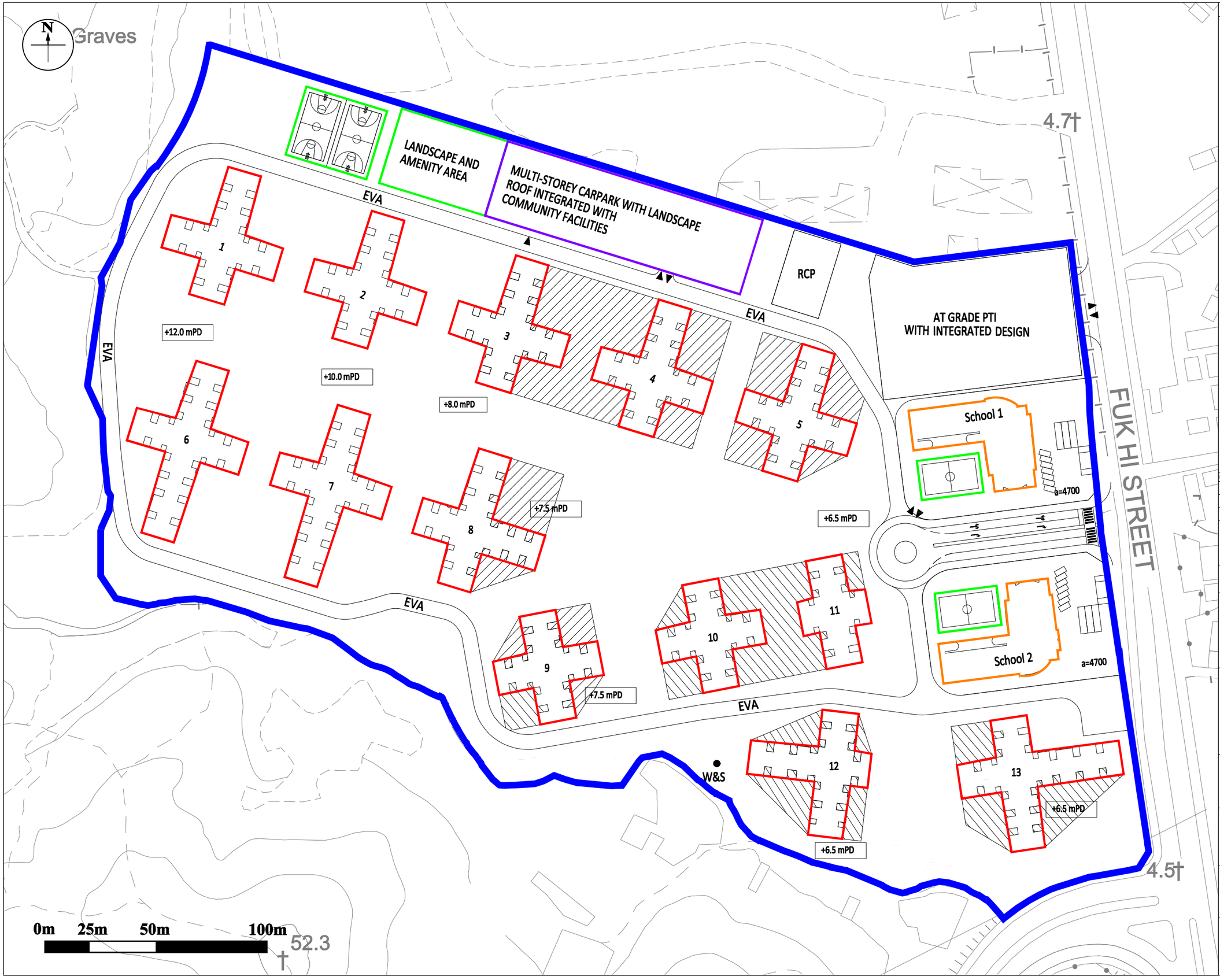
RAMBOLL



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LEGEND

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- PUBLIC HOUSING BLOCK
- SCHOOL
- USE COMMONLY SUPPLIED BY AIR-CONDITIONING
- RECREATION AREA

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	WT	KC	SZ	–	
Date	12/17	12/17	12/17	12/17	

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG– FEASIBILITY STUDY

Drawing Title
LOCATION OF REPRESENTATIVE AIR SENSITIVE RECEIVERS DURING OPERATIONAL PHASE

Drawing No.
196587/B&V/PER/FIG 3.2

Scale

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Sub Consultant:
RAMBOLL

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LEGEND

- CHIMNEY
- ASSESSMENT AREA FOR OPERATIONAL AIR QUALITY ASSESSMENT (500M FROM BOUNDARY OF THE SITE)
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)

evision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	WT	KC	SZ	–	
Date	07/18	07/18	07/18	07/18	

Approved

Agreement no.

CE 13/2017 (CE)

Preject Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG– FEASIBILITY STUDY

Drawing Title

LOCATION OF CHIMNEYS

Drawing No.

196587/B&V/PER/FIG 3.3

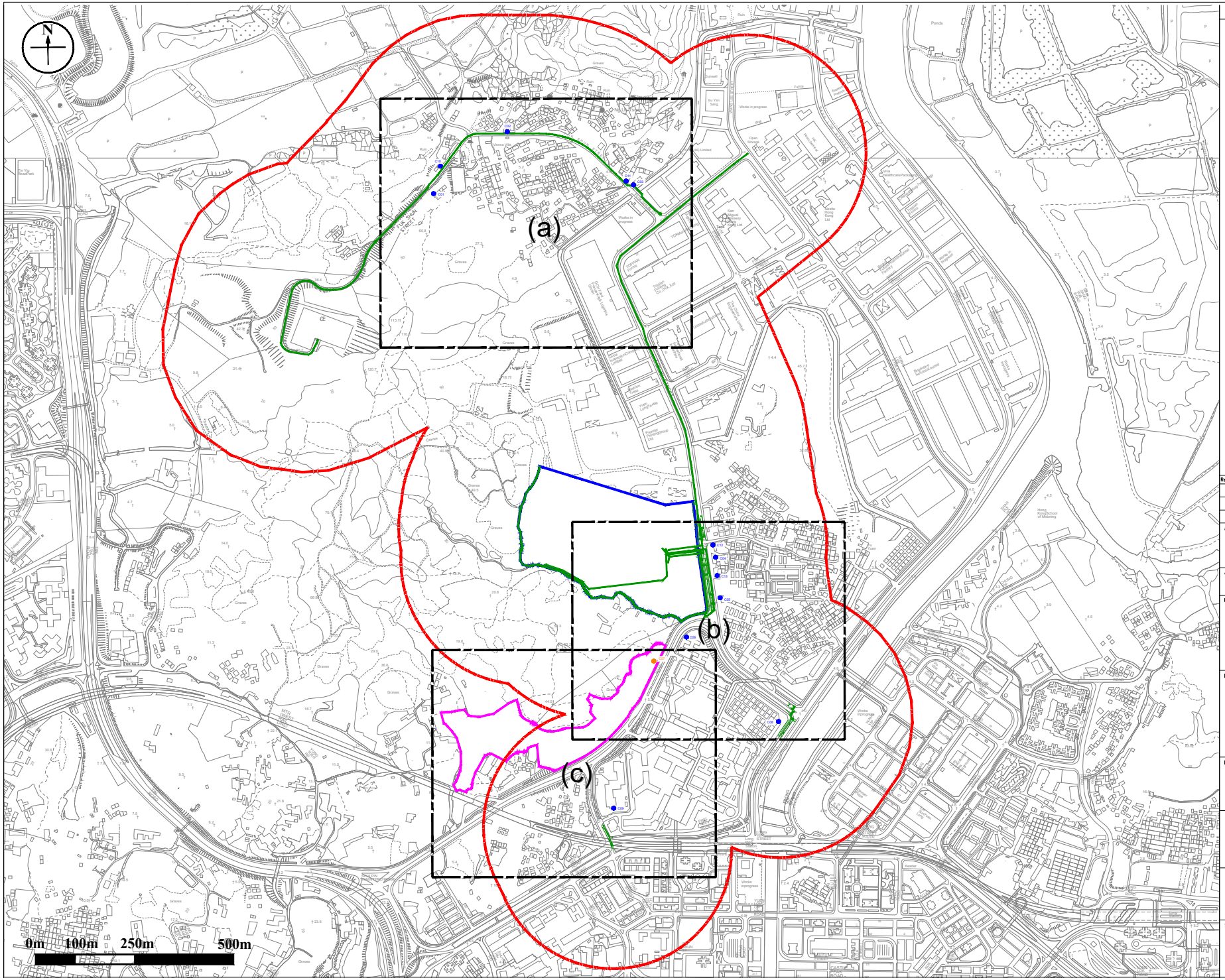
Scale

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Sub Consultant:

RAMBOLL



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LEGEND

- NOISE SENSITIVE RECEIVERS (EXISTING)
- NOISE SENSITIVE RECEIVERS (PLANNED)
- ASSESSMENT AREA FOR CONSTRUCTION NOISE IMPACT (300M FROM BOUNDARY OF THE SITE AND INFRASTRUCTURE WORKS)
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- INFRASTRUCTURE WORKS
- PLANNED WANG CHAU PHASE 1 DEVELOPMENT

NOTE
THE LAYOUT OF PLANNED WANG CHAU PHASE 1 DEVELOPMENT IS SUBJECT TO DETAILED DESIGN.

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	WT	KC	SZ	-	
Date	07/18	07/18	07/18	07/18	

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG- FEASIBILITY STUDY

Drawing Title
LOCATION OF REPRESENTATIVE NOISE SENSITIVE RECEIVERS DURING CONSTRUCTION PHASE

Drawing No.
196587/B&V/PER/FIG 4.1

Scale

土木工程拓展署
Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Sub Consultant:
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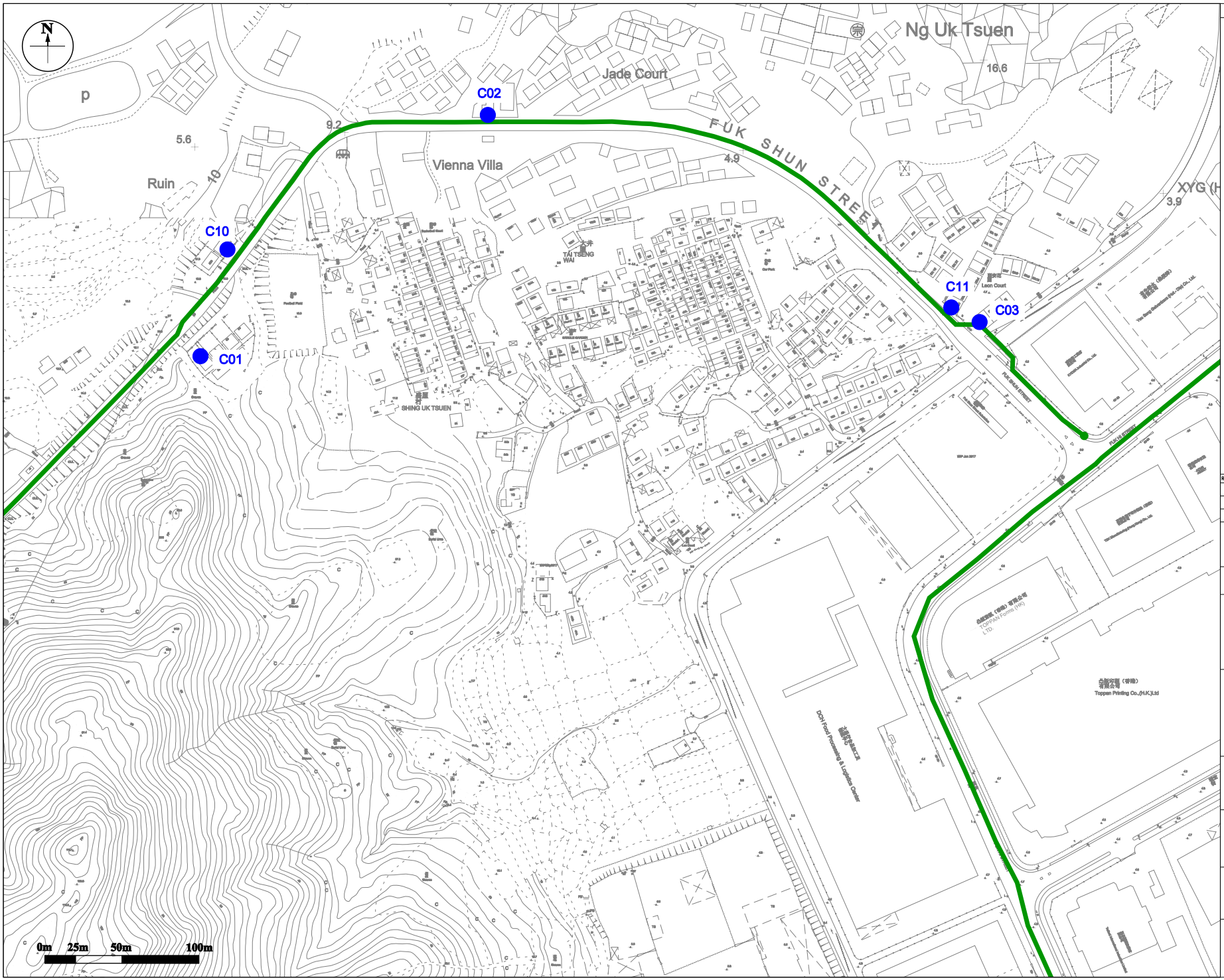

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LEGEND

- NOISE SENSITIVE RECEIVERS (EXISTING)
- INFRASTRUCTURE WORKS

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	WT	KC	SZ	-	
Date	07/18	07/18	07/18	07/18	

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG- FEASIBILITY STUDY

Drawing Title
LOCATION OF REPRESENTATIVE NOISE SENSITIVE RECEIVERS DURING CONSTRUCTION PHASE

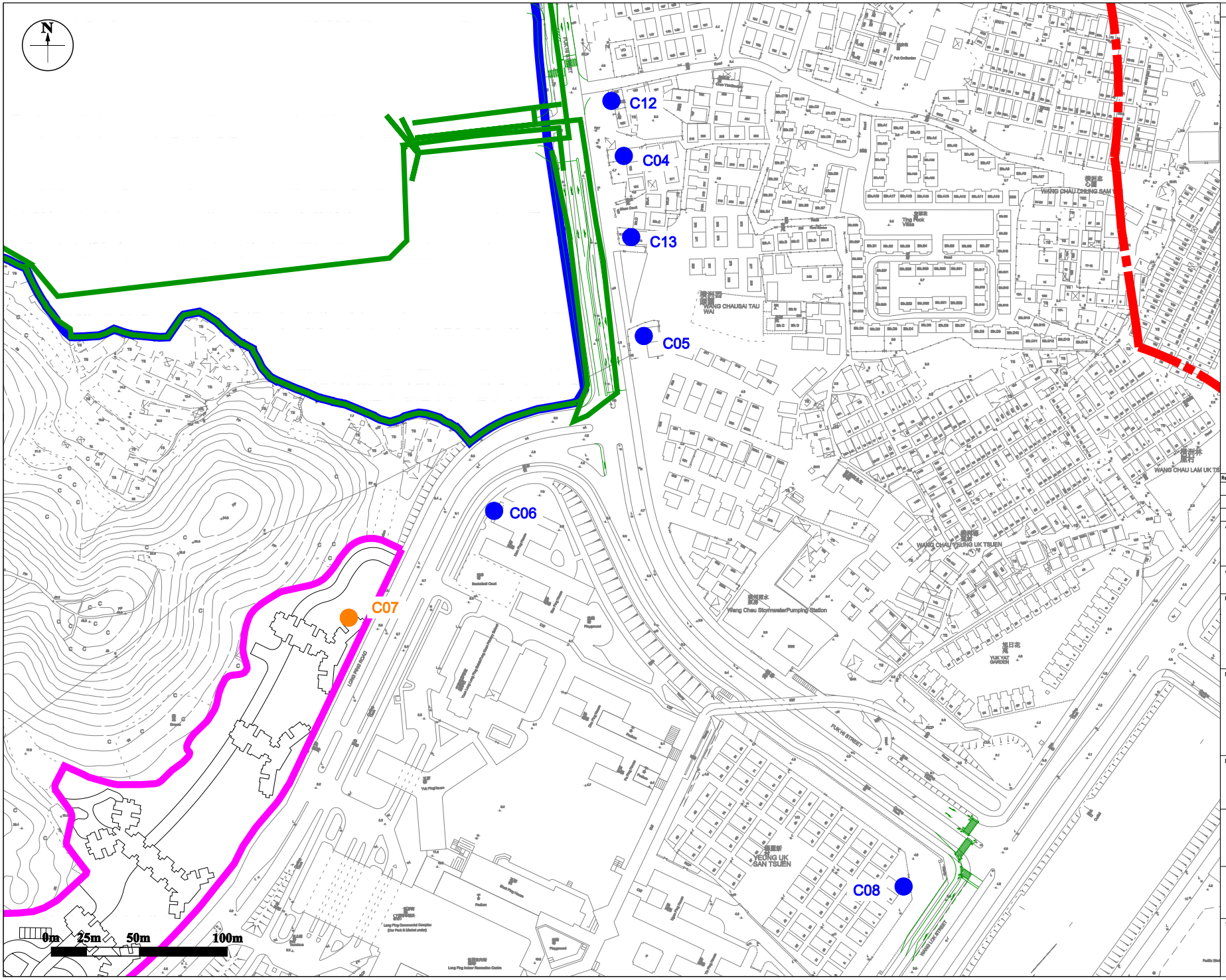
Drawing No.
196587/B&V/PER/FIG 4.1a

Scale

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Sub Consultant:
RAMBOLL



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LEGEND

- NOISE SENSITIVE RECEIVERS (EXISTING)
- NOISE SENSITIVE RECEIVERS (PLANNED)
- ASSESSMENT AREA FOR CONSTRUCTION NOISE IMPACT (300M FROM BOUNDARY OF THE SITE AND INFRASTRUCTURE WORKS)
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- INFRASTRUCTURE WORKS
- PLANNED WANG CHAU PHASE 1 DEVELOPMENT

NOTE

THE LAYOUT OF PLANNED WANG CHAU PHASE 1 DEVELOPMENT IS SUBJECT TO DETAILED DESIGN.

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	WT	KC	SZ	-	
Date	07/18	07/18	07/18	07/18	

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG- FEASIBILITY STUDY

Drawing Title
LOCATION OF REPRESENTATIVE NOISE SENSITIVE RECEIVERS DURING CONSTRUCTION PHASE

Drawing No.
196587/B&V/PER/FIG 4.1b

Scale

土木工程拓展署
CEDD Civil Engineering and Development Department

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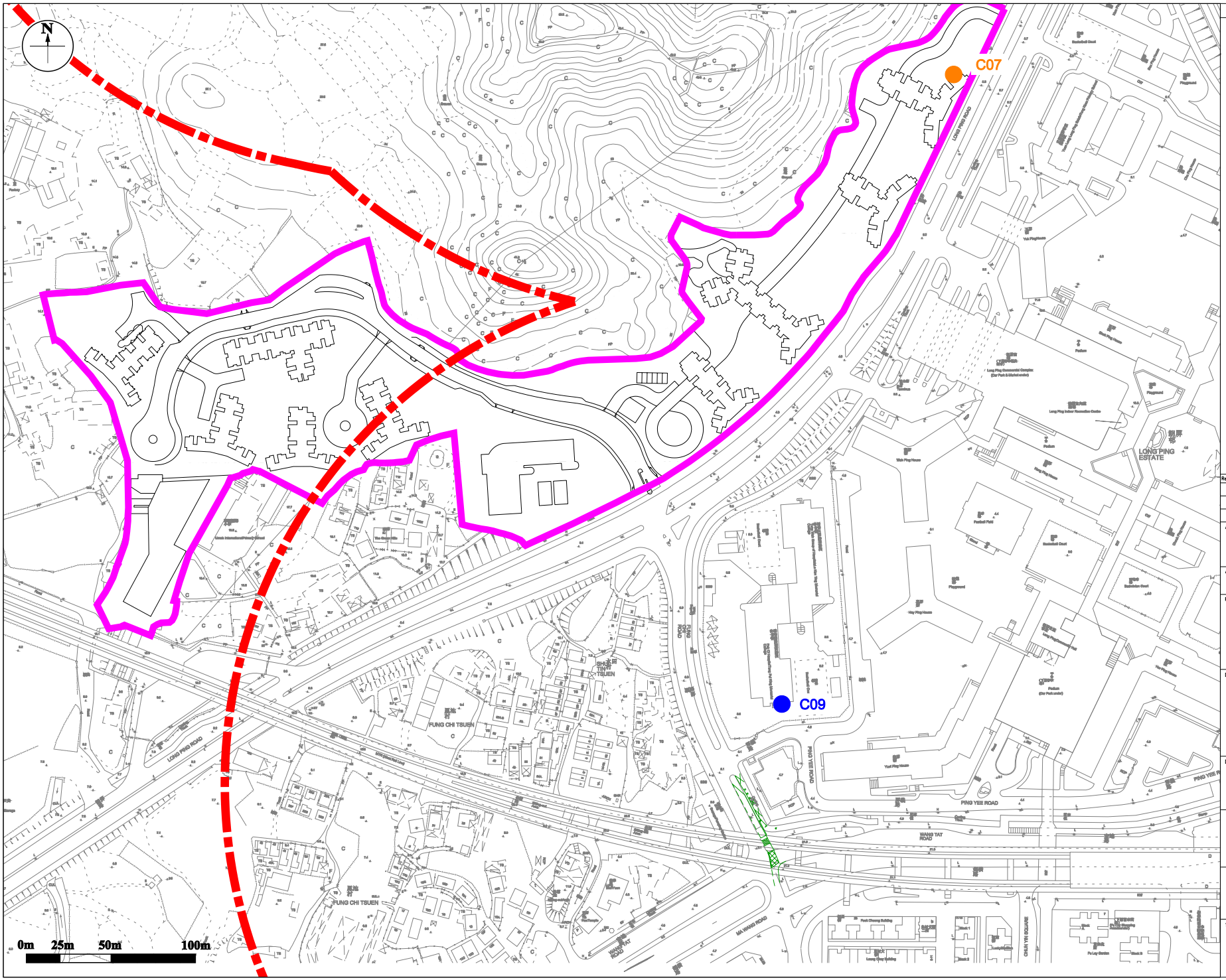

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LEGEND

- NOISE SENSITIVE RECEIVERS (EXISTING)
- NOISE SENSITIVE RECEIVERS (PLANNED)
- ASSESSMENT AREA FOR CONSTRUCTION NOISE IMPACT (300M FROM BOUNDARY OF THE SITE AND INFRASTRUCTURE WORKS)
- INFRASTRUCTURE WORKS
- PLANNED WANG CHAU PHASE 1 DEVELOPMENT

NOTE

THE LAYOUT OF PLANNED WANG CHAU PHASE 1 DEVELOPMENT IS SUBJECT TO DETAILED DESIGN.

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Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG- FEASIBILITY STUDY

Drawing Title
LOCATION OF REPRESENTATIVE NOISE SENSITIVE RECEIVERS DURING CONSTRUCTION PHASE

Drawing No.
196587/B&V/PER/FIG 4.1c

Scale

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
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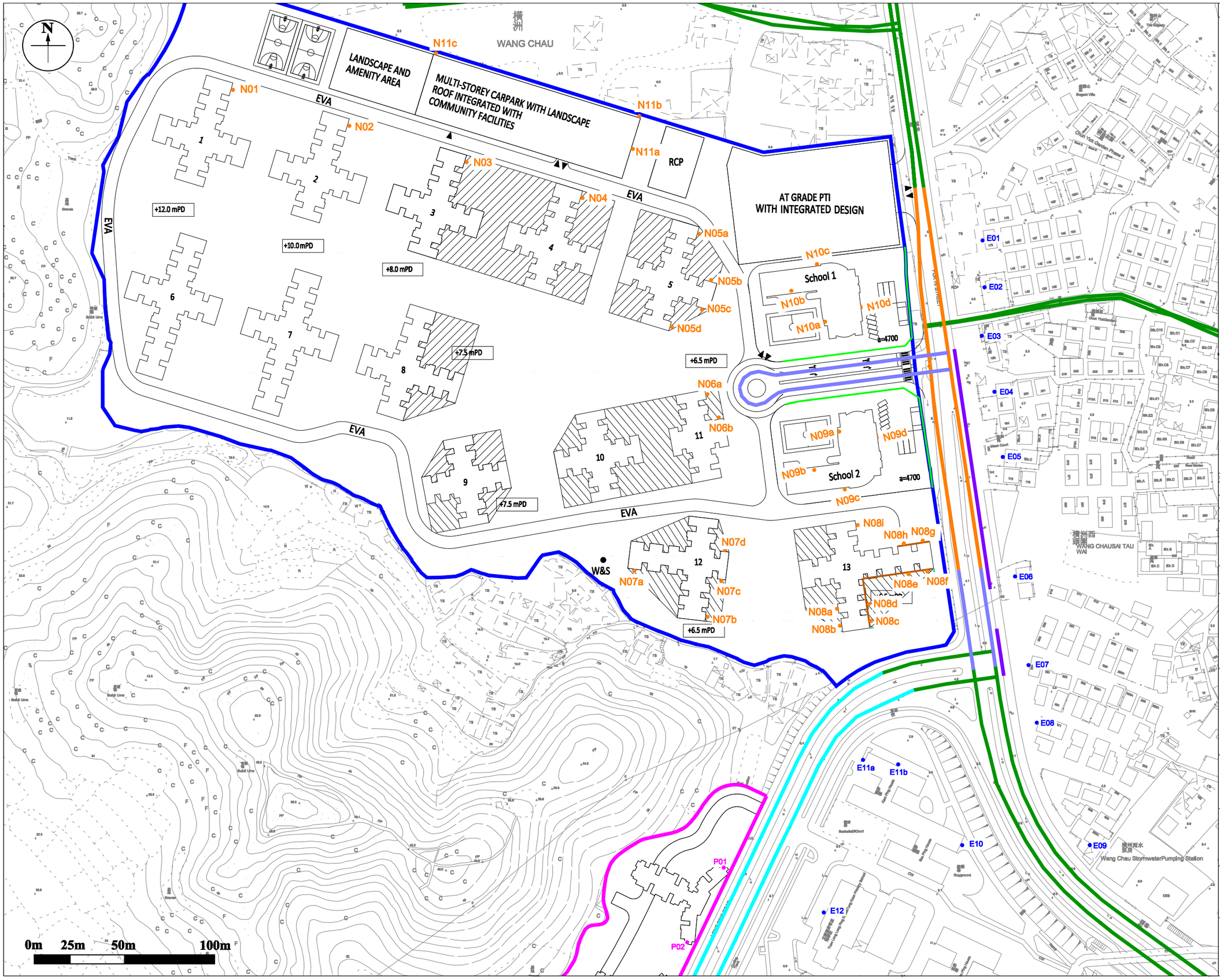

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LEGEND

- NOISE SENSITIVE RECEIVERS WITHIN THE SITE
- NOISE SENSITIVE RECEIVERS (EXISTING)
- NOISE SENSITIVE RECEIVERS (PLANNED)
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- PLANNED WANG CHAU PHASE 1 DEVELOPMENT
- EXISTING ROAD
- EXISTING ROAD WITH LOW NOISE ROAD SURFACING
- PROJECT ROAD
- PROJECT ROAD WITH PROPOSED LOW NOISE ROAD SURFACING
- PROPOSED 4M VERTICAL BARRIER
- PROPOSED 5M BOUNDARY WALL
- 2M ARCHITECTURAL FIN
- ACOUSTIC WINDOW

NOTE
THE LAYOUT OF PLANNED WANG CHAU PHASE 1 DEVELOPMENT IS SUBJECT TO DETAILED DESIGN.

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	WT	KC	SZ	–	
Date	08/18	08/18	08/18	08/18	

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Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG– FEASIBILITY STUDY

Drawing Title
PROPOSED MITIGATION MEASURES FOR ROAD TRAFFIC NOISE IMPACT ASSESSMENT

Drawing No.
196587/B&V/PER/FIG 4.8

Scale

CEDD 土木工程拓展署 Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司

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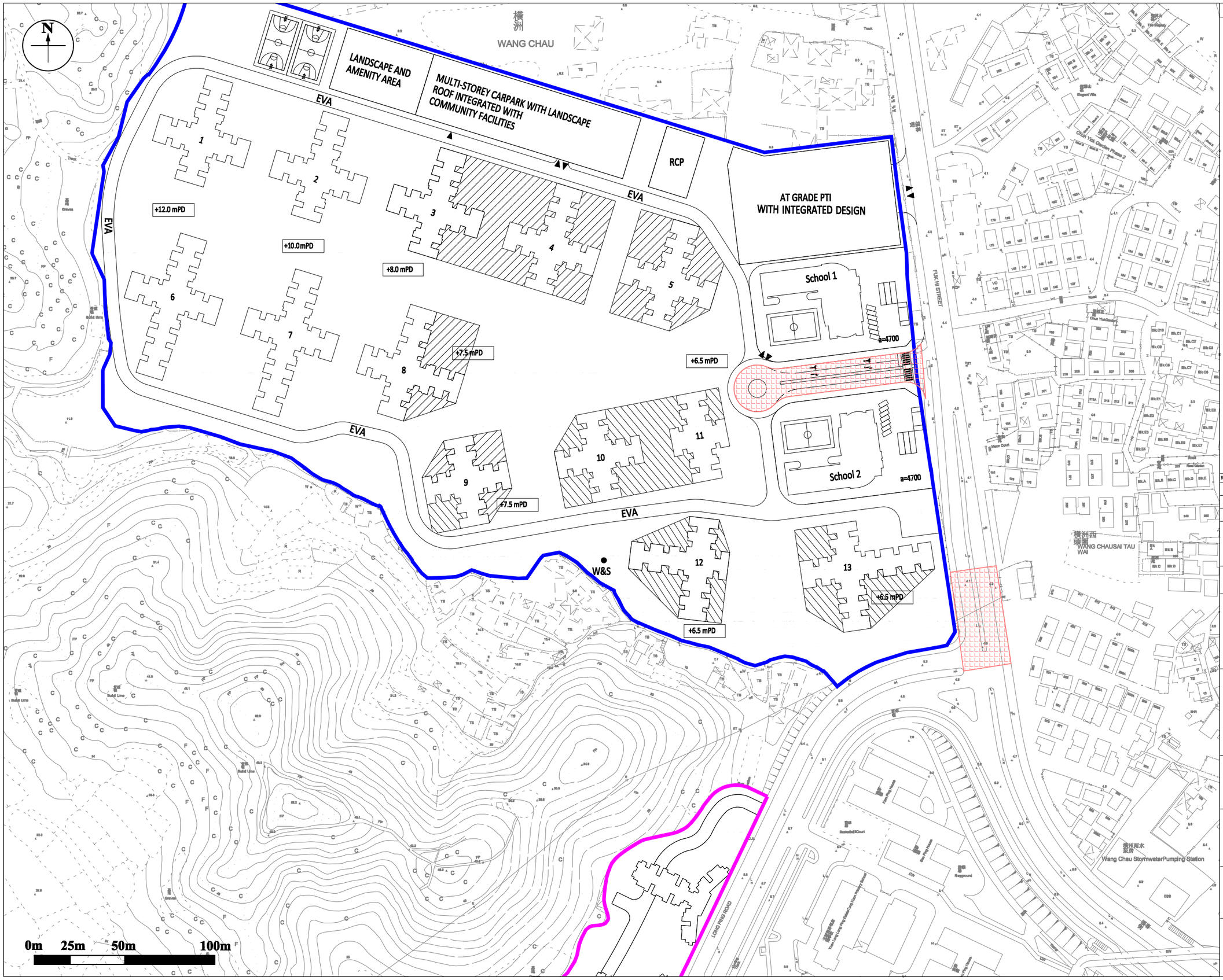

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LEGEND

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- PLANNED WANG CHAU PHASE 1 DEVELOPMENT
- POTENTIAL LOCATIONS FOR THE APPLICATION OF PMSMA6

NOTE

1 THE FEASIBILITY AND EFFECTIVENESS OF THE APPLICATION OF PMSMA6 IS SUBJECT TO FINDINGS FROM ONGOING TRIALS CONDUCTED BY HIGHWAYS DEPARTMENT.

2 THE LAYOUT OF PLANNED WANG CHAU PHASE 1 DEVELOPMENT IS SUBJECT TO DETAILED DESIGN.

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Initial	WT	KC	SZ	–	
Date	08/18	08/18	08/18	08/18	

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Agreement no.

CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG- FEASIBILITY STUDY

Drawing Title

POTENTIAL LOCATIONS FOR THE APPLICATION OF PMSMA6

Drawing No.

196587/B&V/PER/FIG 4.9

Scale

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CEDD Civil Engineering and Development Department

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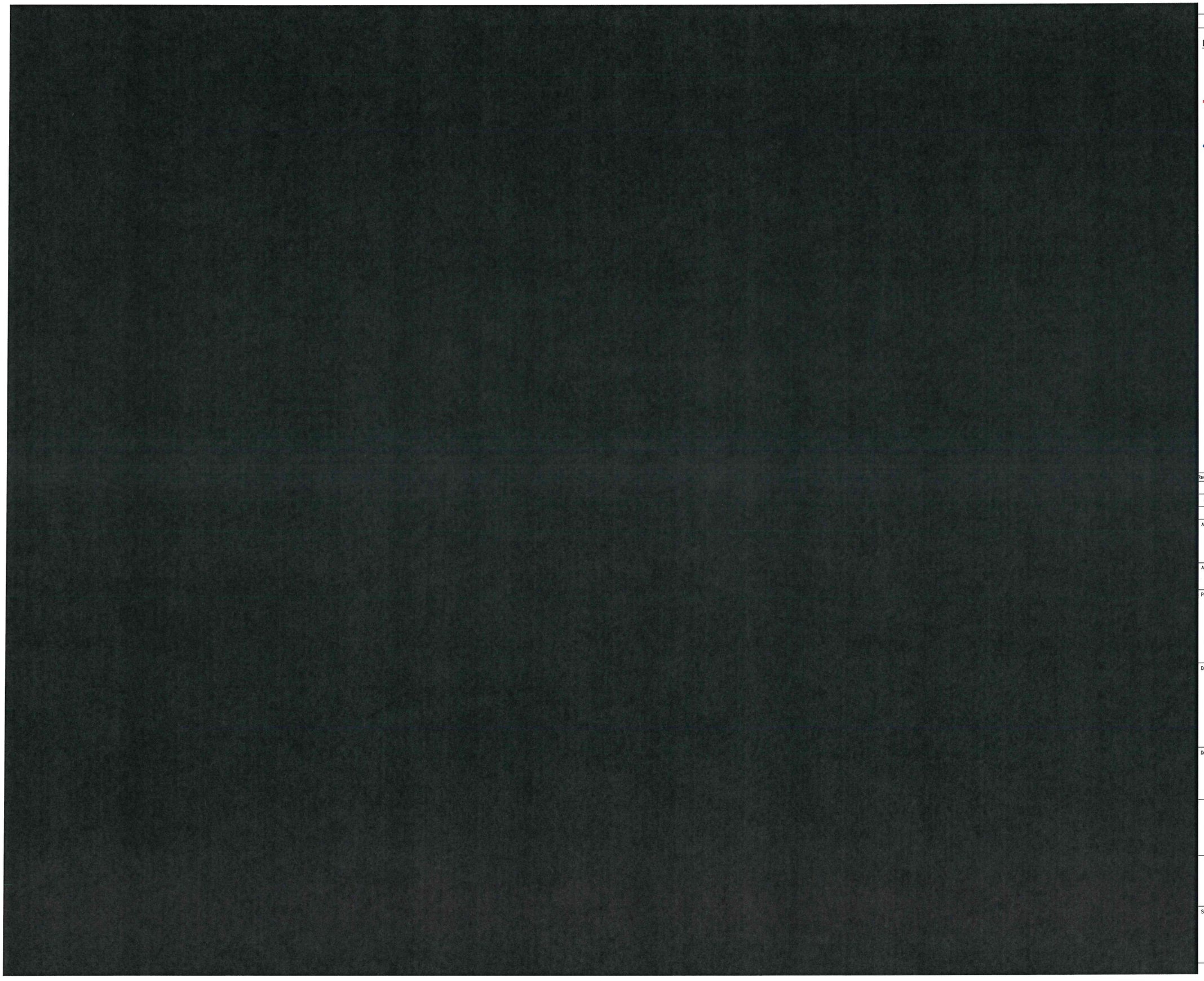

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LEGEND

- FIXED NOISE SOURCE
- ASSESSMENT AREA FOR FIXED NOISE SOURCE IMPACT (300M FROM BOUNDARY OF THE SITE)
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)

Revision	Date	Description		Initial
	Designed	Checked	Drawn	Checked
Initial	WT	KC	SZ	–
Date	07/18	07/18	07/18	07/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG- FEASIBILITY STUDY

Drawing Title
LOCATION OF FIXED NOISE SOURCES (SCENARIO 1)

Drawing No.
196587/B&V/PER/FIG 4.5

Scale

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CEDD Civil Engineering and Development Department

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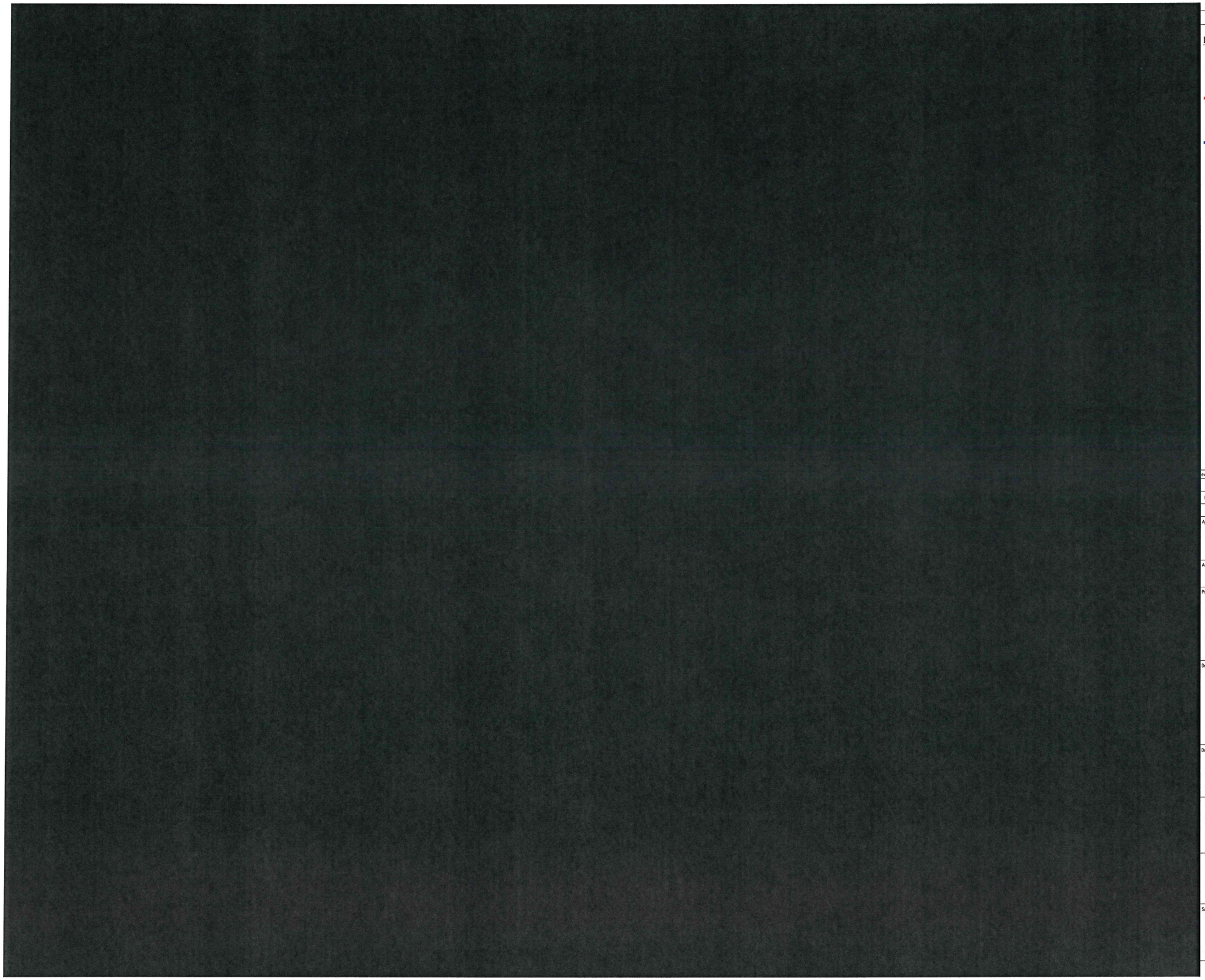

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LEGEND

- FIXED NOISE SOURCE
- ASSESSMENT AREA FOR FIXED NOISE SOURCE IMPACT (300M FROM BOUNDARY OF THE SITE)
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)

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	Designed	Checked	Drown	Checked
Initial	WT	KC	SZ	–
Date	07/18	07/18	07/18	07/18

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Agreement no.

CE 13/2017 (CE)

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SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG– FEASIBILITY STUDY

Drawing Title

LOCATION OF FIXED NOISE SOURCES (SCENARIO 2)

Drawing No.

196587/B&V/PER/FIG 4.6

Scale

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CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Sub Consultant:

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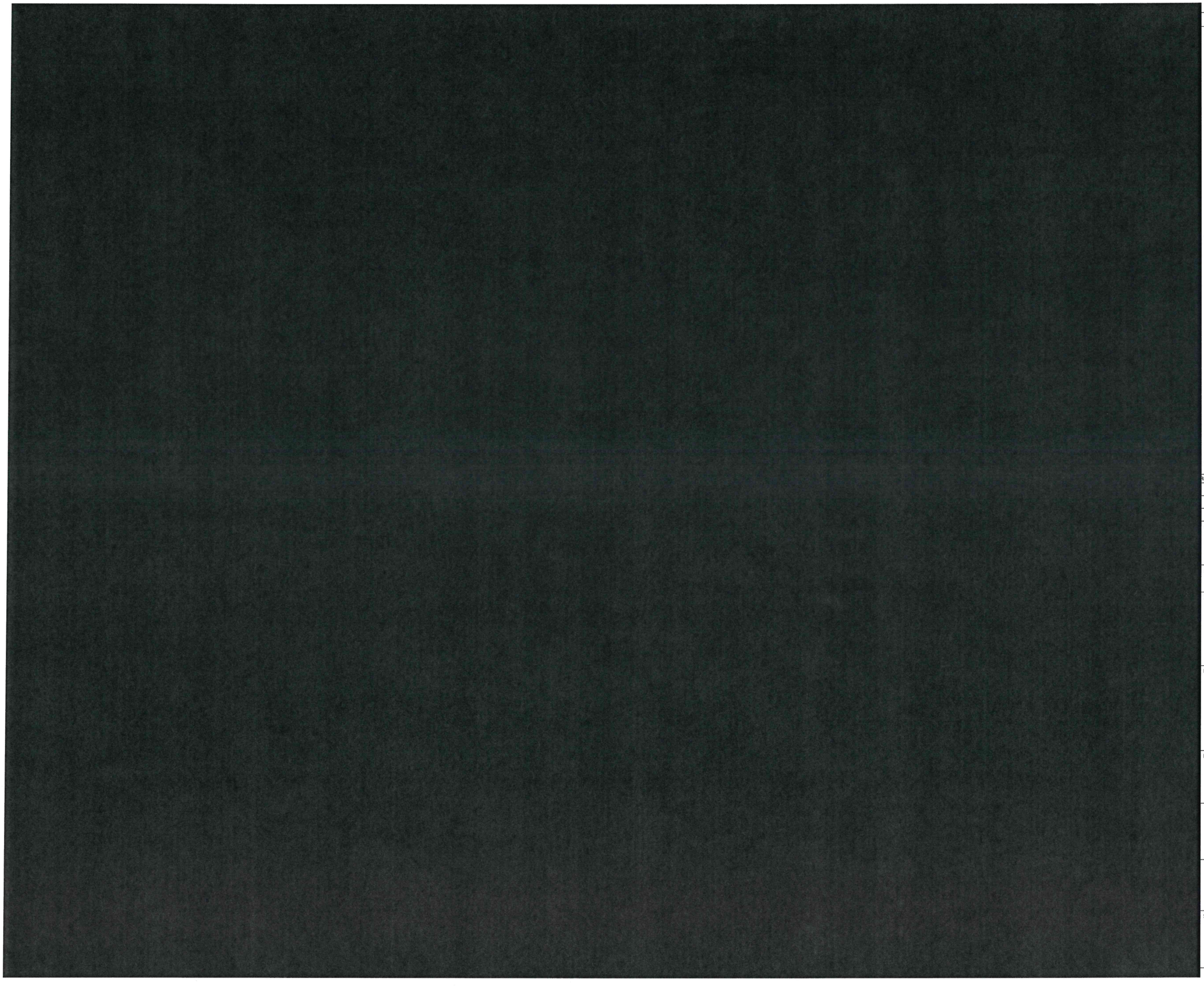

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LEGEND

- FIXED NOISE SOURCE
- ASSESSMENT AREA FOR FIXED NOISE SOURCE IMPACT (300M FROM BOUNDARY OF THE SITE)
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BOUNDARY OF YUEN LONG INDUSTRIAL ESTATE EXTENSION

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	WT	KC	SZ	–	
Date	07/18	07/18	07/18	07/18	

Approved

Agreement no.

CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG– FEASIBILITY STUDY

Drawing Title

LOCATION OF FIXED NOISE SOURCES (SCENARIO 3)

Drawing No.

196587/B&V/PER/FIG 4.7

Scale

土木工程拓展署
CEDD Civil Engineering and Development Department

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LEGEND

- ASSESSMENT AREA FOR WATER QUALITY (500M FROM BOUNDARY OF THE SITE)
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- INFRASTRUCTURE WORKS

WATER SENSITIVE RECEIVERS

- WETLAND CONSERVATION AREA
- PONDS
- WATERCOURSES
- MAN-MADE CHANNELS
- IRRIGATION SYSTEMS

SPECIES OF CONSERVATION IMPORTANCE

- COMMON RAT SNAKE
- NANHAIPOTAMON HONGKONGENSE
- SOMMANNIATHELPHUSA ZANKLON
- SMALL SNAKEHEAD

Revision	Date	Description			Initial
		Designed	Checked	Drawn	Checked
Initial		WT	KC	SZ	–
Date		07/18	07/18	07/18	07/18

Approved

Agreement no.

CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURALWORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTSAT WANG CHAU, YUEN LONG– FEASIBILITY STUDY

Drawing Title

LOCATION OF WATER SENSITIVE RECEIVERS

Drawing No.

196587/B&V/PER/FIG 5.3

Scale

土木工程拓展署
Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Sub Consultant:

RAMBOLL

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Plot Date = 6/14/18

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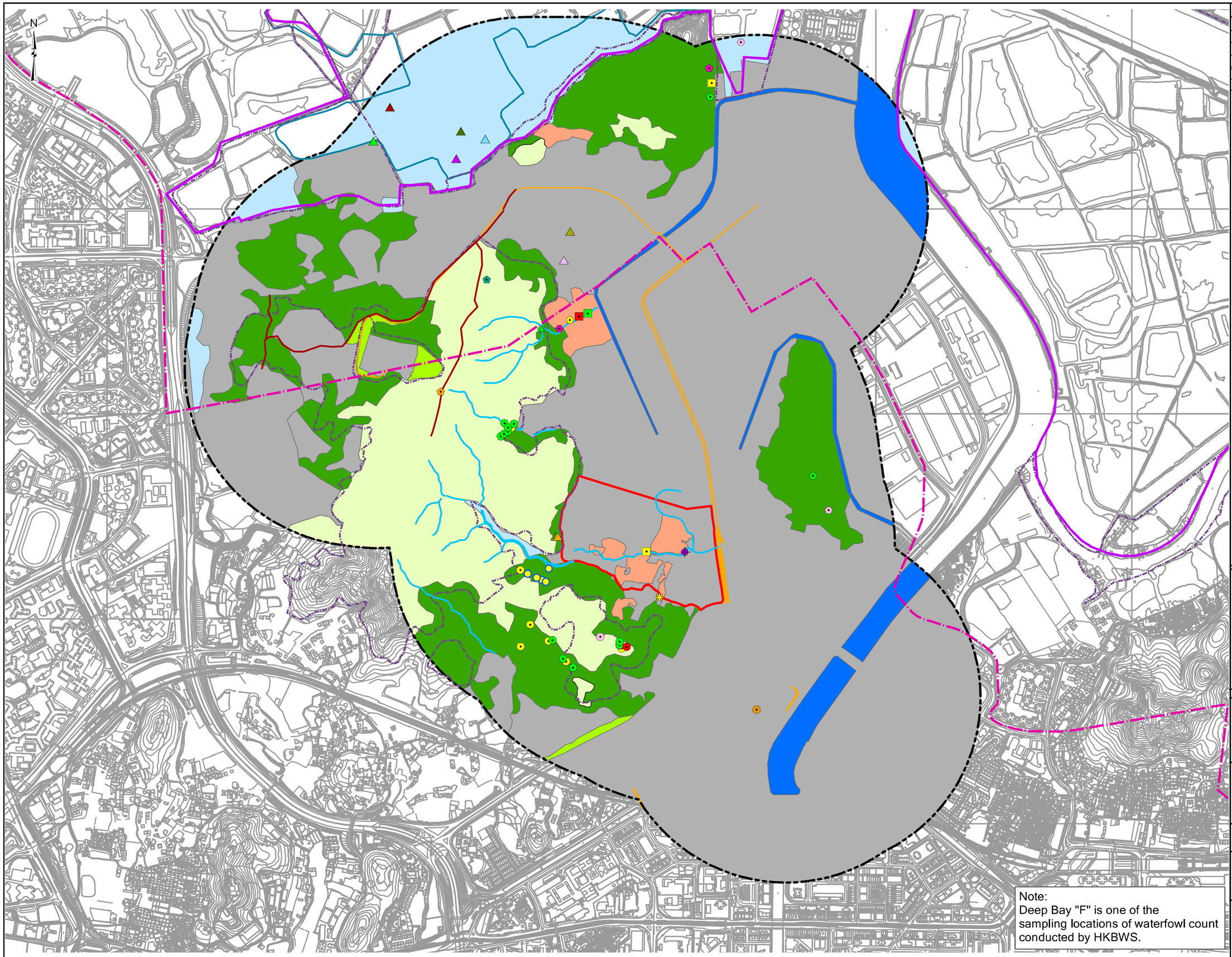

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Initial	WT	KC	HLam	KC
Date	09/18	09/18	09/18	09/18

Revision	Date	Description	Initial

Legend

- BUTTERFLY HOTSPOT
- WETLAND BUFFER AREA
- WETLAND CONSERVATION AREA
- ZONING BOUNDARY OF CONSERVATION AREA
- DEEP BAY "F"
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- ASSESSMENT AREA FOR ECOLOGICAL IMPACT
- INFRASTRUCTURE WORKS

HABITAT

- AGRICULTURAL LAND
- DEVELOPED AREA/WASTELAND
- FISH PONDS
- PLANTATION
- SHRUBLAND/GRASSLAND
- WATERCOURSE
- SECONDARY WOODLAND

VERIFICATION SURVEY

PLANT
- AQUILARIA SINENSIS (SEEDLINGS)

BIRD
- BLACK KITE
- CHINESE HWAMEI
- COMMON EMERALD DOVE
- GREAT EGRET
- GREATER SPOTTED EAGLE
- GREY HERON
- INTERMEDIATE EGRET
- WHITE THROATED KINGFISHER
- TUFTED DUCK

MACROINVERTEBRATE
- SOMANNIATHELPHUSA ZANKLON

LITERATURE REVIEW

PLANT
- AQUILARIA SINENSIS (POTENTIAL OVT)
- AQUILARIA SINENSIS (SEEDLINGS)
- AQUILARIA SINENSIS (TREE)
- CAMELLIA OLIFERA
- RHODODENDRON SIMSII

HERPETOFAUNA
- CHINESE BULL FROG
- COMMON RAT SNAKE
- REEVES TERRAPIN

BUTTERFLY
- COLON SWIFT
- COMMON AWL
- COMMON YELLOW SWALLOWTAIL
- FORGET-ME-NOT
- PALE PALM DART
- PEACOCK ROYAL

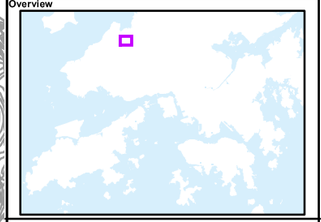
DRAGONFLY
- RUBY DARTER
- SCARLET BASKER

MACROINVERTEBRATE
- NANHAIPOTAMON HONGKONGENSE

FISH
- SMALL SNAKEHEAD

MAMMAL
- JAPANESE PIPISTRELLE (LOCATION NOT SPECIFIED)

Overview



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Contract Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Figure Title

HABITAT MAP

Drawing No.	Scale
196587/B&V/PER/FIG 8.2	1:10,000 @ A3

Client

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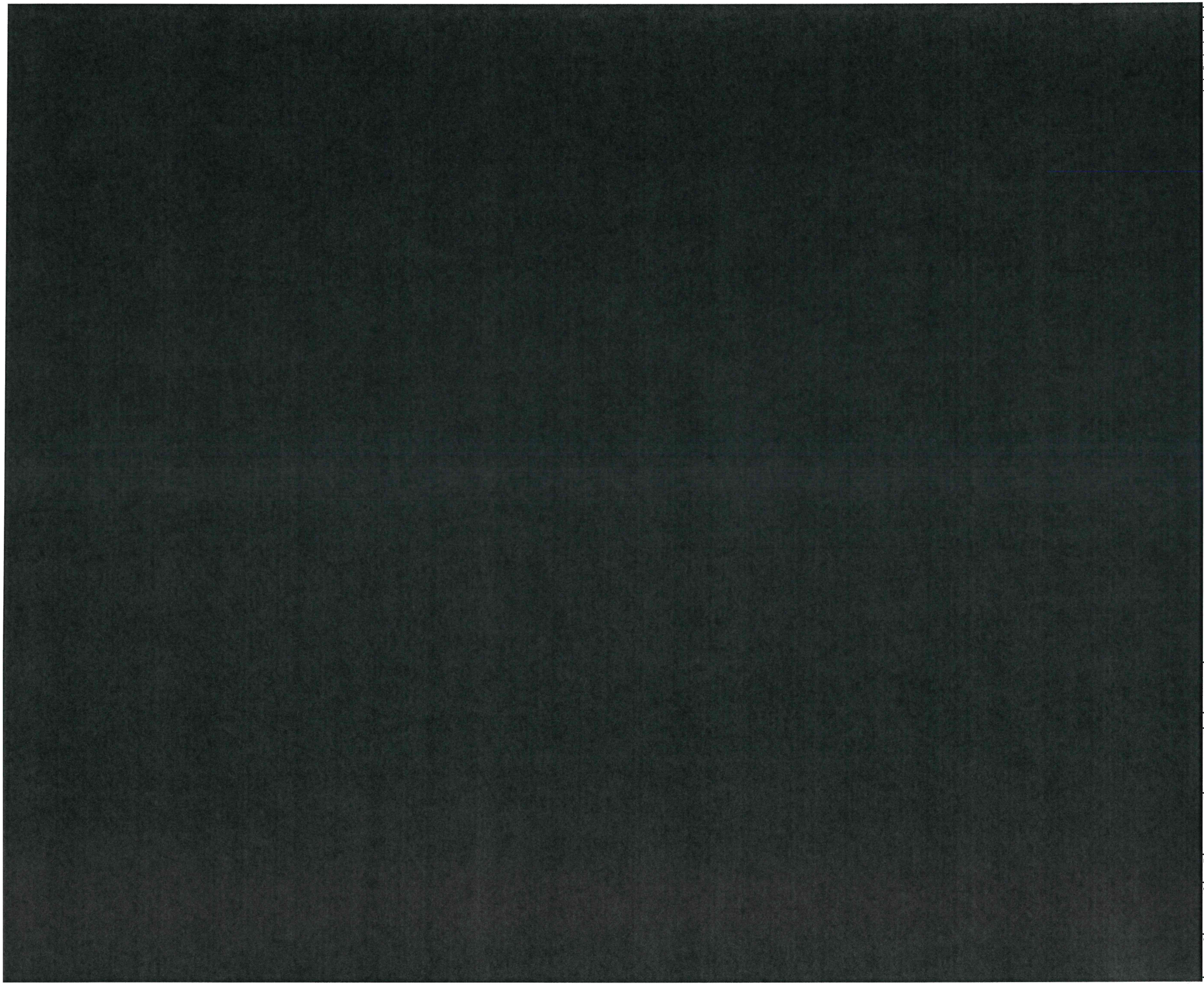

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Initial	FL	ET	FL	ET
Date	JUL 2018	JUL 2018	JUL 2018	JUL 2018

Revision	Date	Description	Initial

Legend

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- INFRASTRUCTURE WORKS
- SITE OF ARCHAEOLOGICAL INTEREST
- ARCHAEOLOGICAL POTENTIAL AREA*

*NOTE:
AREAS REFERS TO ARCHAEOLOGICAL DESK-BASED REVIEW AND PROPOSAL FOR ARCHAEOLOGICAL FIELD SURVEY PREPARED UNDER AGREEMENT NO. CB2012093 PLANNING AND ENGINEERING STUDY FOR THE PUBLIC HOUSING SITE AND YUEN LONG INDUSTRIAL ESTATE EXTENSION AT WANG CHAU.

Approved

Agreement No. CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASE OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Figure Title

SITE OF ARCHAEOLOGICAL INTEREST

Drawing No.	Scale
196587/B&V/PER/FIG 9.1	1:13,000 @ A3

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Date	JUL 2018	JUL 2018	JUL 2018	JUL 2018

Revision	Date	Description	Initial

N

Legend

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- INFRASTRUCTURE WORKS
- HISTORICAL VILLAGE

Ng Uk Tsuen
Shing Uk Tsuen
Tai Tseng Wai
Fuk Hing Tsuen
Tung Tau Wai
Chung Sam Wai
Sai Tai Wai
Lam Uk Tsuen
Yeung Uk Tsuen
Shui Tin Tsuen
Fung Chi Tsuen

0 75 150 300 Meters

Approved

Agreement No. CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASE OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Figure Title
LOCATIONS OF HISTORICAL VILLAGES

Drawing No.	Scale
196587/B&V/PER/FIG 9.2	1:8,000 @ A3

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Document Path: C:\Users\lam80489\Desktop\GIS\MXD\196587-Wang Chau\Heritage\Figure 2.mxd

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	Designed	Reviewed	Drawn	Checked
Initial	FL	ET	FL	ET
Date	JUL 2018	JUL 2018	JUL 2018	JUL 2018

Revision	Date	Description	Initial

Legend

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- INFRASTRUCTURE WORKS
- ASSESSMENT AREA FOR BUILT HERITAGE
- DELCARED MONUMENT
- GRADED HISTORIC BUILDINGS
- ITEMS OF HERITAGE INTEREST
- GRAVES
- SHRINE
- WELL AND SHRINE (TO BE RETAINED IN SITU AS FAR AS POSSIBLE)

No. 41 Fuk Hing Tsuen
No. 40 Fuk Hing Tsuen
Yu Yuen, Tung Tau Wai
I Shing Temple
Nos. 4 & 7A and Lot WCL132 in DD123, Sai Tau Wai
Lung Wah Yuen. No. 83 Fung Chi Tsuen
Tin Hau Temple, Fung Chi Tsuen

0 37.5 75 150 Meters

Approved

Agreement No. CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASE OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Figure Title
BUILT HERITAGE RESOURCES (SHEET 1 OF 2)

Drawing No.	Scale
196587/B&V/PER/FIG 9.3	1:4,000 @ A3

Client
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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Initial	FL	ET	FL	ET
Date	JUL 2018	JUL 2018	JUL 2018	JUL 2018

Revision	Date	Description	Initial

Legend

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- INFRASTRUCTURE WORKS
- ASSESSMENT AREA FOR BUILT HERITAGE
- DELCARED MONUMENT
- GRADED HISTORIC BUILDINGS
- ITEMS OF HERITAGE INTEREST

Entrance Gate at Tai Tseng Ng Uk Tsuen

HB03 – Shrine at Ng Uk Tsuen

HB01 – Village House in Shing Uk Tsuen

HB02 – Shrine at Tai Tseng Wai

No. 39-43 Shing Uk Tsuen

Wang Chau Service Reservoir

0 37.5 75 150 Meters

Approved

Agreement No. CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASE OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Figure Title

BUILT HERITAGE RESOURCES (SHEET 2 OF 2)

Drawing No.	Scale
196587/B&V/PER/FIG 9.4	1:4,000 @ A3

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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Initial	FL	ET	FL	ET
Date	JUL 2018	JUL 2018	JUL 2018	JUL 2018

Revision	Date	Description	Initial

Legend

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- INFRASTRUCTURE WORKS
- BURIAL GROUNDS

Kai Shan Burial Grounds

Chu Wong Ling

0 75 150 300 Meters

Approved

Agreement No. CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASE OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Figure Title

BURIAL GROUNDS

Drawing No. 196587/B&V/PER/FIG 9.5

Scale 1:7,000 @ A3

Client

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LEGEND:

BOUNDARY OF THE ASSESSMENT AREA (SUBJECT TO REVIEW)

PROPOSED SITE INVESTIGATION AREA

AREA EXCLUDED FROM THE PROPOSED SITE INVESTIGATION AREA

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Initial				
Date				

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Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG– FEASIBILITY STUDY

Drawing Title

PROPOSED SITE INVESTIGATION AREA

Drawing No.

196587/B&V/PER/FIG 10.2

Scale

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Civil Engineering and Development Department

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博威工程顧問有限公司

Sub Consultant:

RAMBOLL

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LEGEND

- ASSESSMENT AREA FOR LANDSCAPE RESOURCES
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)
- +9.10 EXISTING LEVEL

Revision	Date	Description	Initial
C	01FEB19	FINAL LVIA ISSUE 2	CI
B	13DEC18	FINAL LVIA ISSUE 1	CI
A	17JUL18	ISSUE 2	CI

	Designed	Checked	Drawn	Checked
Initial	CI	TO	AC	CI
Date	04/18	04/18	04/18	04/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
AERIAL PHOTO AND LANDSCAPE IMPACT ASSESSMENT AREA

Figure No.
196587/B&V/LVIA/001

Scale
1 : 7500 (A3)

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博威工程顧問有限公司

Planning, Urban Design, Landscape, Golf & Environmental Consultants
Urbis Limited, 11/F Siu On Centre, 188 Lockhart Road, Wan Chai, Hong Kong. Tel 2802 3333 Fax 2802 6662

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NOTE:
AREAS NOT COLOURED WITHIN THE STUDY BOUNDARY DO NOT CONSTITUTE LANDSCAPE RESOURCES.

LEGEND

- ASSESSMENT AREA FOR LANDSCAPE RESOURCES
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)
- LR7(A) AMENITY PLANTING ALONG ROADS AND URBAN INFRASTRUCTURE WITHIN INSET A (0.01 HA)
- LR7(B) AMENITY PLANTING ALONG ROADS AND URBAN INFRASTRUCTURE WITHIN INSET B (0.06 HA)
- LR7(C) AMENITY PLANTING ALONG ROADS AND URBAN INFRASTRUCTURE WITHIN INSET C(0.23 HA)
- LR8 AMENITY PLANTING WITHIN INDUSTRIAL AREA (0.9 HA)
- LR9 AMENITY PLANTING WITHIN OPEN STORAGE AREA OUTSIDE SITE (2.5 HA)
- LR9(S) AMENITY PLANTING WITHIN OPEN STORAGE OF THE SITE (1.3 HA)
- LR9(C) AMENITY PLANTING WITHIN OPEN STORAGE OF INSET C(0.04 HA)
- LR10 AMENITY PLANTING WITHIN VILLAGE AREA OUTSIDE SITE (3.1HA)
- LR10(S) AMENITY PLANTING WITHIN VILLAGE AREA OF THE SITE (0.2 HA)
- LR11 WATERCOURSES OUTSIDE SITE (88m)
- LR11(S) WATERCOURSES WITHIN SITE (673m)
- T1 IMPORTANT TREES

SPECIES OF CONSERVATION IMPORTANCE (LITERATURE REVIEW)

- AQUILARIA SINENSIS (SEEDLINGS)
- AQUILARIA SINENSIS (TREE)
- CAMELIA OLIFERA
- RHODODENDRON SIMSII

SPECIES OF CONSERVATION IMPORTANCE (VERIFICATION SURVEY)

- AQUILARIA SINENSIS (SEEDLINGS)

SPECIES UNDER CAP.96

- MICHELIA X ALBA

- LR1 AGRICULTURAL LAND & ASSOCIATED TREE PLANTING OUTSIDE SITE (2.1 HA)
- LR1(S) AGRICULTURAL LAND & ASSOCIATED TREE PLANTING WITHIN SITE (2.2 HA)
- LR2 SECONDARY WOODLAND (25.9 HA)
- LR3 MIXED TREES, SHRUBS AND GRASSLAND OUTSIDE SITE (40.2 HA)
- LR3(S) MIXED SHRUBS AND GRASSLAND WITHIN SITE (0.4 HA)
- LR4 PONDS (0.3 HA)
- LR5 NATURAL WATERCOURSES OUTSIDE SITE (2261m)
- LR6 AMENITY PLANTING WITHIN RESIDENTIAL AREA (7.7 HA)
- LR7 AMENITY PLANTING ALONG ROADS AND URBAN INFRASTRUCTURE OUTSIDE INSET A, INSET B AND INSET C (3.8 HA)

Revision	Date	Description	Initial
D	03JUN19	FINAL LVIA ISSUE 4	CI
C	01FEB19	FINAL LVIA ISSUE 2	CI
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	Designed	Checked	Drawn	Checked
Initial	CI	TO	AC	CI
Date	04/18	04/18	04/18	04/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
LANDSCAPE RESOURCES PLAN

Figure No.
196587/B&V/LVIA/003

Scale
1 : 7500 (A3)

土木工程拓展署
Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Urbis Limited
Planning, Urban Design, Landscape, Golf & Environmental Consultants
Urbis Limited, 11/F Siu Ki Centre, 148 Lockhart Road, Wan Chai, Hong Kong. Tel 2802 3533 Fax 2802 0662

SCALE 1 : 7,500
0 100 200 300 400 500m

Plot Date = 28/Jun/2019

CAD Filename = I:\BP15\DGN-GA\Preliminary LVIA\Final LVIA issue 4\196587B&VLVIA_003.dgn

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LEGEND

- ASSESSMENT AREA FOR LANDSCAPE RESOURCES
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)
- LCA1 — INDUSTRIAL URBAN LANDSCAPE (17.2 Ha)
- LCA2 — MISCELLANEOUS RURAL FRINGE LANDSCAPE OUTSIDE SITE (16.9Ha)
- LCA2(S) — MISCELLANEOUS RURAL FRINGE LANDSCAPE WIHTIN SITE (8.0 Ha)
- LCA3 — UPLAND AND HILLSIDE LANDSCAPE OUTSIDE SITE (66.7 Ha)
- LCA3(S) — UPLAND AND HILLSIDE LANDSCAPE WITHIN SITE (0.4 Ha)
- LCA4 — RESIDENTIAL URBAN LANDSCAPE (20.2 Ha)
- LCA5 — TRANSPORTATION CORRIDOR LANDSCAPE OUTSIDE INSET A, INSET B AND INSET C (9.2 Ha)
- LCA5(A) — TRANSPORTATION CORRIDOR LANDSCAPE WITHIN INSET A (0.14 Ha)
- LCA5(B) — TRANSPORTATION CORRIDOR LANDSCAPE WITHIN INSET B (0.31 Ha)
- LCA5(C) — TRANSPORTATION CORRIDOR LANDSCAPE WITHIN INSET C (1.05 Ha)
- LCA6 — URBAN PERIPHERAL VILLAGE LANDSCAPE OUTSIDE SITE (25.7 Ha)
- LCA6(S) — URBAN PERIPHERAL VILLAGE LANDSCAPE WITHIN SITE (1.5 Ha)
- LCA7 — URBAN RIVER CORRIDOR LANDSCAPE (4.4 Ha)
- LCA8 — AGRICULTURAL LANDSCAPE OUTSIDE SITE (2.0 Ha)
- LCA8(S) — AGRICULTURAL LANDSCAPE WITHIN SITE (2.2 Ha)
- HERITAGE FEATURE
- T1 — IMPORTANT TREES

SPECIES OF CONSERVATION IMPORTANCE (LITERATURE REVIEW)

- AQUILARIA SINENSIS (SEEDLINGS)
- AQUILARIA SINENSIS (TREE)
- CAMELIA OLIFERA
- RHODODENDRON SIMSII

SPECIES OF CONSERVATION IMPORTANCE (VERIFICATION SURVEY)

- AQUILARIA SINENSIS (SEEDLINGS)

SPECIES UNDER CAP.96

- MICHELIA X ALBA

Revision	Date	Description	Initial
D	03JUN19	FINAL LVIA ISSUE 4	CI
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Initial	CI	TO	AC	CI
Date	04/18	04/18	04/18	04/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
LANDSCAPE CHARACTER AREAS PLAN

Figure No.
196587/B&V/LVIA/004

Scale
1 : 7500 (A3)

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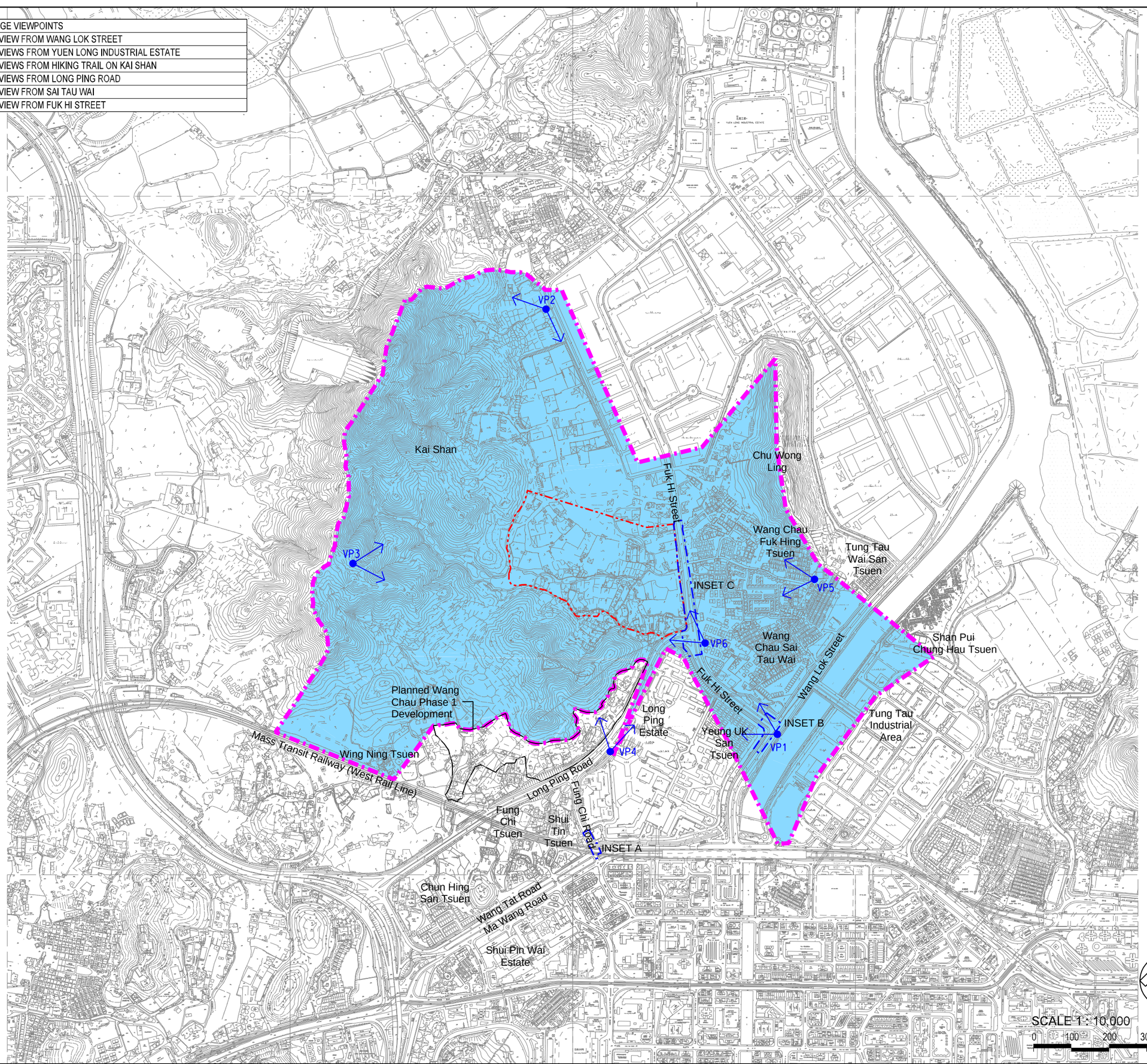
SCALE 1 : 7,500
0 100 200 300 400 500m

Plot Date = 28/Jun/2019
CAD Filename = I:\BP15\DGN-GA\Preliminary LVIA\Final LVIA issue 4\196587B&VLVIA_004.dgn

PHOTOMONTAGE VIEWPOINTS	
VP1	VIEW FROM WANG LOK STREET
VP2	VIEWS FROM YUEN LONG INDUSTRIAL ESTATE
VP3	VIEWS FROM HIKING TRAIL ON KAI SHAN
VP4	VIEWS FROM LONG PING ROAD
VP5	VIEW FROM SAI TAU WAI
VP6	VIEW FROM FUK HI STREET



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LEGEND

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)
- ZONE OF VISUAL INFLUENCE (ZVI)
- EXTENT OF VISUAL IMPACT
- PHOTOMONTAGE VIEWPOINTS (VP1)

Revision	Date	Description	Initial
B	13DEC18	FINAL LVIA ISSUE 1	CI
A	17JUL18	ISSUE 2	CI

	Designed	Checked	Drawn	Checked
Initial	CI	TO	AC	CI
Date	04/18	04/18	04/18	04/18

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Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
ZONE OF VISUAL INFLUENCE (ZVI) AND KEY PUBLIC VEWPOINTS

Figure No.	Scale
196587/B&V/LVIA/006	1:10,000 (A3)

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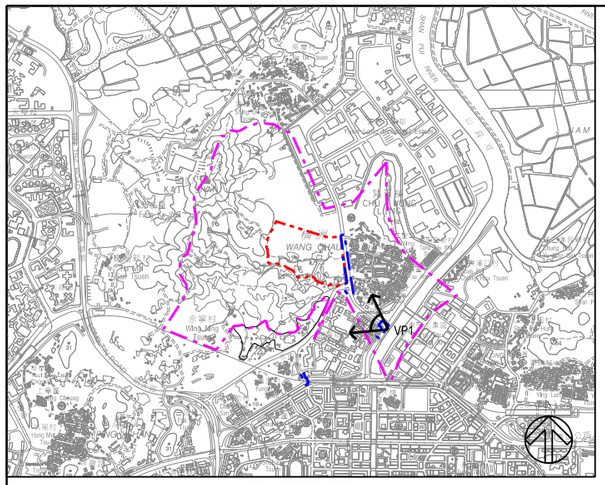

KEY PLAN

EXISTING CONDITIONS

DAY 1 WITHOUT MITIGATION MEASURES

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LEGEND

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)
- EXTENT OF VISUAL IMPACT

Revision	Date	Description	Initial
C	01FEB19	FINAL LVIA ISSUE 2	CI
B	13DEC18	FINAL LVIA ISSUE 1	CI
A	17JUL18	ISSUE 2	CI

	Designed	Checked	Drawn	Checked
Initial	CI	TO	AC	CI
Date	04/18	04/18	04/18	04/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
PHOTOMONTAGE VIEWPOINT VP1: VIEW FROM WANG LOK STREET (1 OF 2)

Figure No.
196587/B&V/LVIA/011a

Scale
NTS (A3)

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Plot Date • 06/Jun/2019

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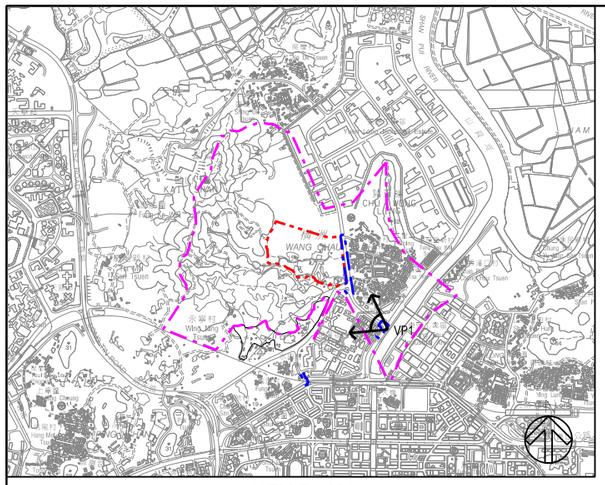

KEY PLAN

Proposed Operation Phase Landscape and Visual Mitigation Measures

ID No.	Landscape and Visual Mitigation Measure
OM1	Sensitive design of buildings in terms of scale, height and bulk (visual weight).
OM2	Use of appropriate building materials and colours to complement surroundings.
OM3	Road lighting units to be directional and minimise unnecessary light spill and glare.
OM7	Streetscape (e.g. paving, signage, street furniture, lighting etc.) shall be sensitively designed in a manner that responds to the existing context, and minimises potential adverse landscape and visual impacts.

YEAR 10 WITH MITIGATION MEASURES

DAY 1 WITH MITIGATION MEASURES

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LEGEND

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)
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Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
PHOTOMONTAGE VIEWPOINT VP1: VIEW FROM WANG LOK STREET (2 OF 2)

Figure No.
196587/B&V/LVIA/011b

Scale
NTS (A3)

土木工程拓展署
Civil Engineering and Development Department

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Plot Date = 06/Jun/2019

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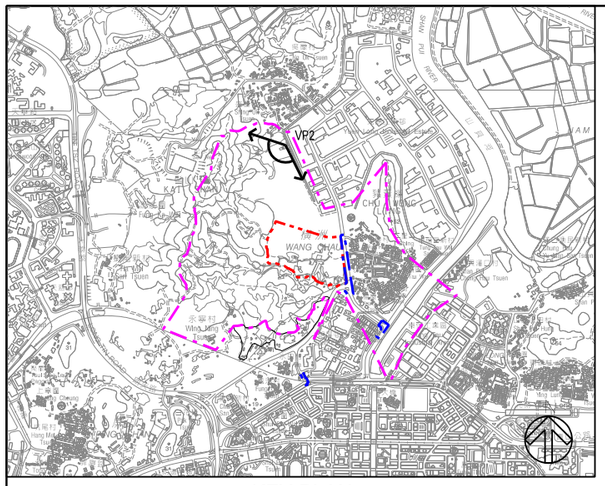

KEY PLAN

EXISTING CONDITIONS

DAY 1 WITHOUT MITIGATION MEASURES

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LEGEND

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)
- EXTENT OF VISUAL IMPACT

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Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
PHOTOMONTAGE VIEWPOINT VP2: VIEW FROM YUEN LONG INDUSTRIAL ESTATE (1 OF 2)

Figure No.
196587/B&V/LVIA/012a

Scale
NTS (A3)

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CEDD Civil Engineering and Development Department

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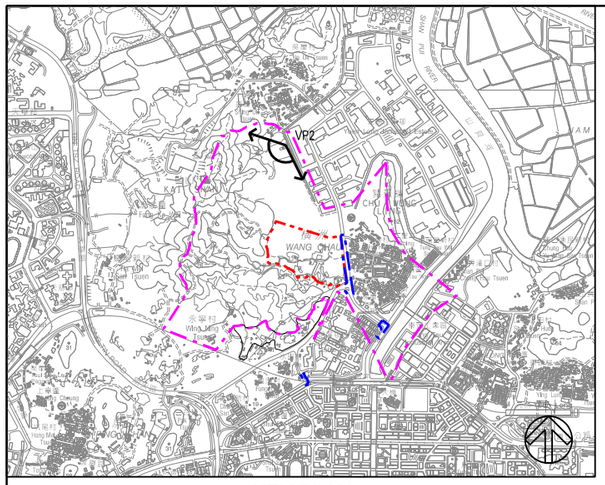

KEY PLAN

Proposed Operation Phase Landscape and Visual Mitigation Measures

ID No.	Landscape and Visual Mitigation Measure
OM1	Sensitive design of buildings in terms of scale, height and bulk (visual weight).
OM2	Use of appropriate building materials and colours to complement surroundings.

DAY 1 WITH MITIGATION MEASURES

YEAR 10 WITH MITIGATION MEASURES

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LEGEND

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)
- EXTENT OF VISUAL IMPACT

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A	17JUL18	ISSUE 2	CI

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Date	04/18	04/18	04/18	04/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
PHOTOMONTAGE VIEWPOINT VP2: VIEW FROM YUEN LONG INDUSTRIAL ESTATE (2 OF 2)

Figure No.
196587/B&V/LVIA/012b

Scale
NTS (A3)

土木工程拓展署
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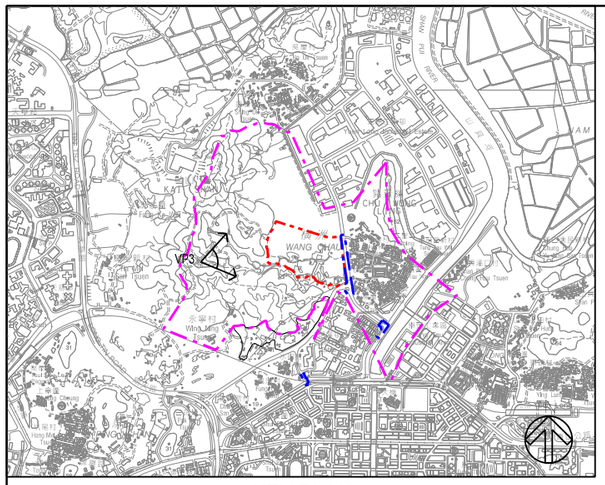

KEY PLAN

DAY 1 WITHOUT MITIGATION MEASURES

EXISTING CONDITIONS

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LEGEND

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)
- EXTENT OF VISUAL IMPACT

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D	03JUN19	FINAL LVIA ISSUE 4	CI
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CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
PHOTOMONTAGE VIEWPOINT VP3: VIEW FROM HIKING TRAIL ON KAI SHAN (1 OF 2)

Figure No.
196587/B&V/LVIA/013a

Scale
NTS (A3)

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Plot Date = 28/Jun/2019

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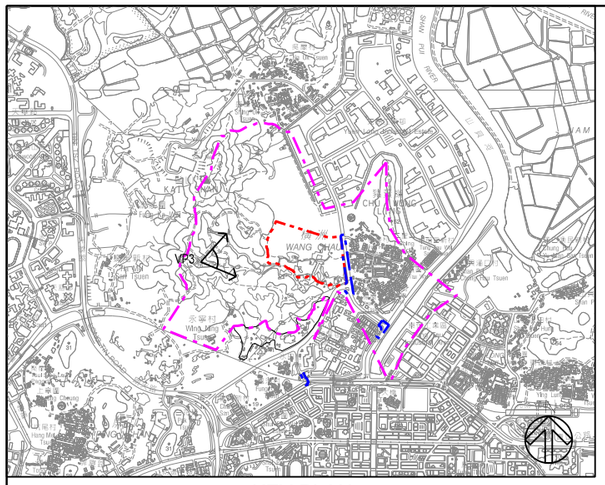

KEY PLAN

Proposed Operation Phase Landscape and Visual Mitigation Measures

ID No.	Landscape and Visual Mitigation Measure
OM1	Sensitive design of buildings in terms of scale, height and bulk (visual weight).
OM2	Use of appropriate building materials and colours to complement surroundings.

YEAR 10 WITH MITIGATION MEASURES

DAY 1 WITH MITIGATION MEASURES

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LEGEND

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)
- EXTENT OF VISUAL IMPACT

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B	13DEC18	FINAL LVIA ISSUE 1	CI
A	17JUL18	ISSUE 2	CI

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Initial	CI	TO	AC	CI
Date	04/18	04/18	04/18	04/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
PHOTOMONTAGE VIEWPOINT VP3: VIEW FROM HIKING TRAIL ON KAI SHAN (2 OF 2)

Figure No.
196587/B&V/LVIA/013b

Scale
NTS (A3)

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CEDD Civil Engineering and Development Department

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Plot Date = 28/Jun/2019

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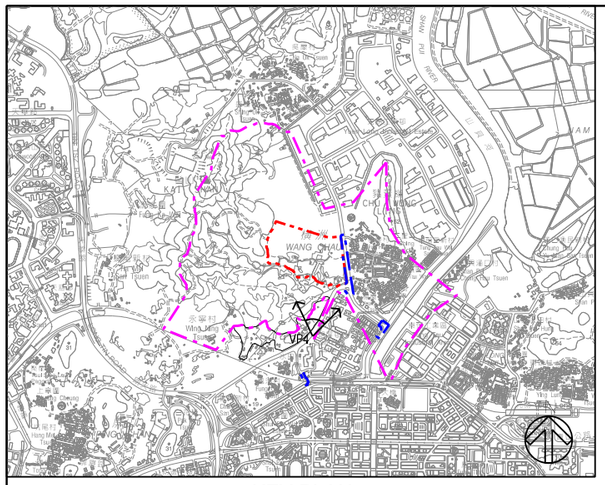

KEY PLAN

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LEGEND

BOUNDARY OF THE SITE (SUBJECT TO REVIEW)

BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)

EXTENT OF VISUAL IMPACT

DAY 1 WITHOUT MITIGATION MEASURES

WANG CHAU PHASE 1 DEVELOPMENT

EXISTING CONDITIONS

Revision	Date	Description	Initial
C	01FEB19	FINAL LVIA ISSUE 2	CI
B	13DEC18	FINAL LVIA ISSUE 1	CI
A	17JUL18	ISSUE 2	CI

	Designed	Checked	Drawn	Checked
Initial	CI	TO	AC	CI
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Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
PHOTOMONTAGE VIEWPOINT VP4: VIEW FROM LONG PING ROAD (1 OF 2)

Figure No.
196587/B&V/LVIA/014a

Scale
NTS (A3)

土木工程拓展署
Civil Engineering and Development Department

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博威工程顧問有限公司

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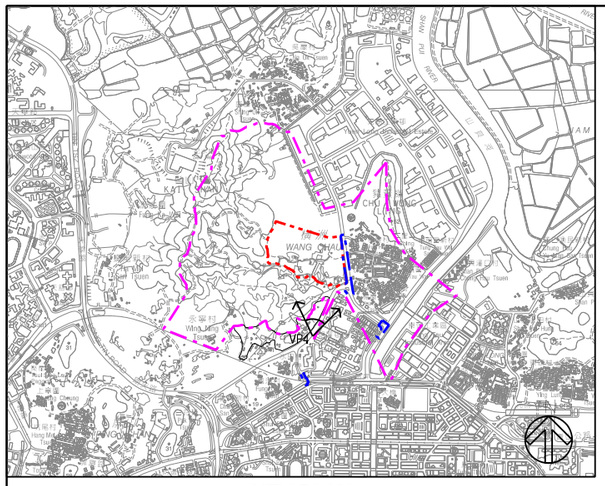

KEY PLAN

Proposed Operation Phase Landscape and Visual Mitigation Measures

ID No.	Landscape and Visual Mitigation Measure
OM1	Sensitive design of buildings in terms of scale, height and bulk (visual weight).
OM2	Use of appropriate building materials and colours to complement surroundings.

YEAR 10 WITH MITIGATION MEASURES

DAY 1 WITH MITIGATION MEASURES

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LEGEND

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)
- EXTENT OF VISUAL IMPACT

Revision	Date	Description	Initial
C	01FEB19	FINAL LVIA ISSUE 2	CI
B	13DEC18	FINAL LVIA ISSUE 1	CI
A	17JUL18	ISSUE 2	CI

	Designed	Checked	Drawn	Checked
Initial	CI	TO	AC	CI
Date	04/18	04/18	04/18	04/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
PHOTOMONTAGE VIEWPOINT VP4: VIEW FROM LONG PING ROAD (2 OF 2)

Figure No.
196587/B&V/LVIA/014b

Scale
NTS (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Planning, Urban Design, Landscape, Golf & Environmental Consultants
Urbis Limited, 11/F Siu Ov Centre, 188 Lockhart Road, Wan Chai, Hong Kong. Tel 2802 3333 Fax 2802 8662

Plot Date = 06/Jun/2019

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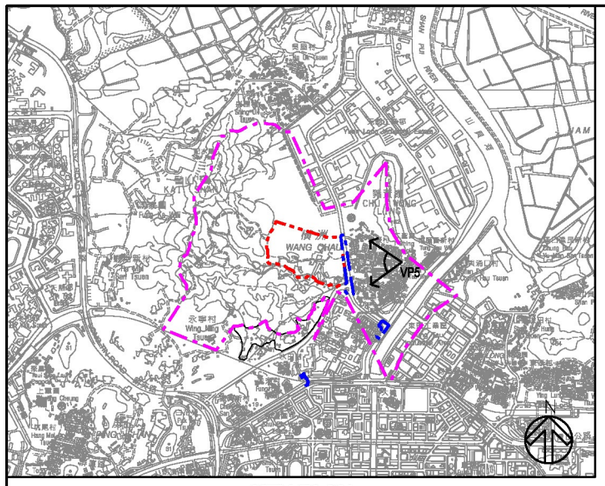

KEY PLAN

EXISTING CONDITIONS

DAY 1 WITHOUT MITIGATION MEASURES

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LEGEND

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)
- EXTENT OF VISUAL IMPACT

Revision	Date	Description	Initial
C	01FEB19	FINAL LVIA ISSUE 2	CI
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Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
PHOTOMONTAGE VIEWPOINT VP5: VIEW FROM SAI TAU WAI (1 OF 2)

Figure No.
196587/B&V/LVIA/015a

Scale
NTS (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Urbis Limited
Planning, Urban Design, Landscape, Golf & Environmental Consultants
Urbis Limited, 11/F Siu On Centre, 188 Lockhart Road, Wan Chai, Hong Kong. Tel 3182 3333 Fax 3182 3182

Plot Date = 06/Jun/2019

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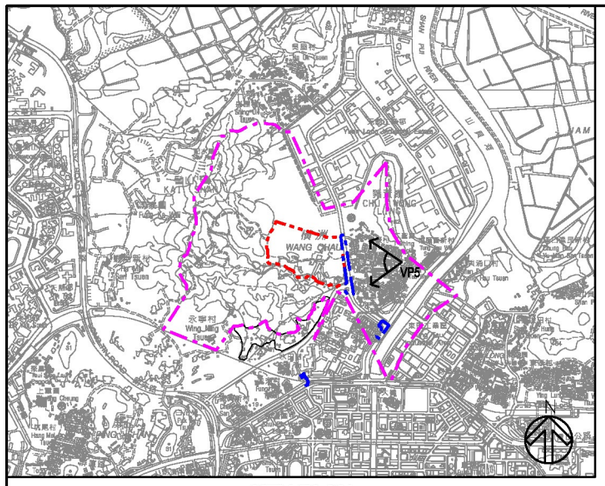
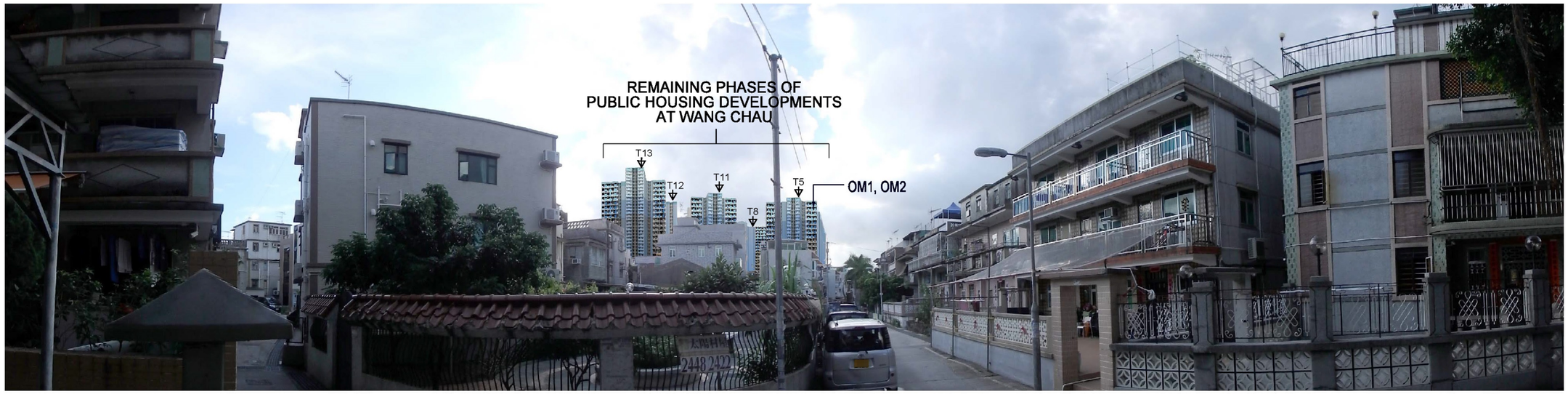


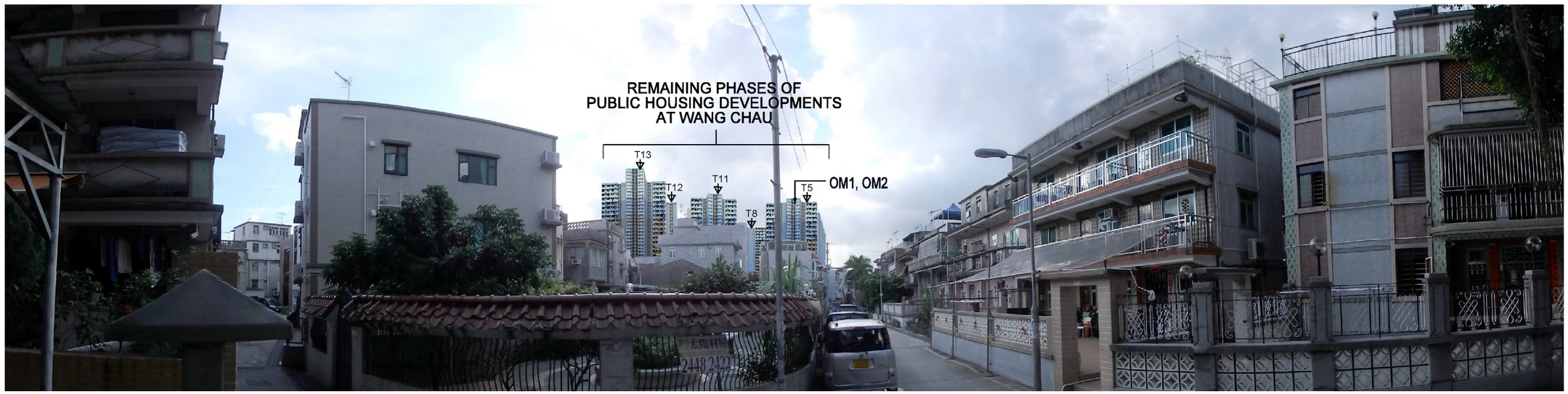
KEY PLAN

Proposed Operation Phase Landscape and Visual Mitigation Measures

ID No.	Landscape and Visual Mitigation Measure
OM1	Sensitive design of buildings in terms of scale, height and bulk (visual weight).
OM2	Use of appropriate building materials and colours to complement surroundings.



DAY 1 WITH MITIGATION MEASURES



YEAR 10 WITH MITIGATION MEASURES

LEGEND

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)
- EXTENT OF VISUAL IMPACT

Revision	Date	Description	Initial
C	01FEB19	FINAL LVIA ISSUE 2	CI
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Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
PHOTOMONTAGE VIEWPOINT VP5: VIEW FROM SAI TAU WAI (2 OF 2)

Figure No.
196587/B&V/LVIA/015b

Scale
NTS (A3)

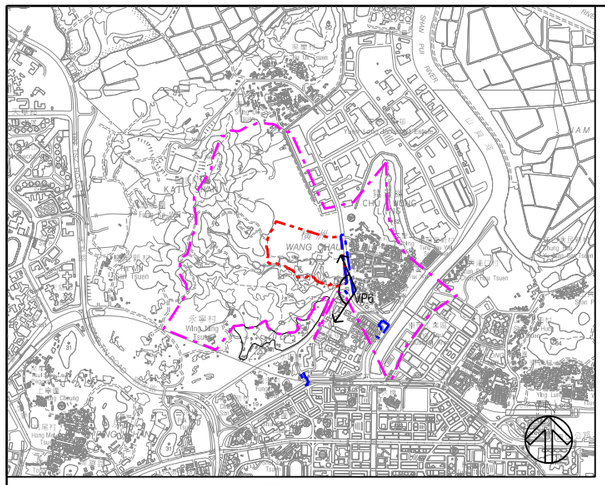
土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

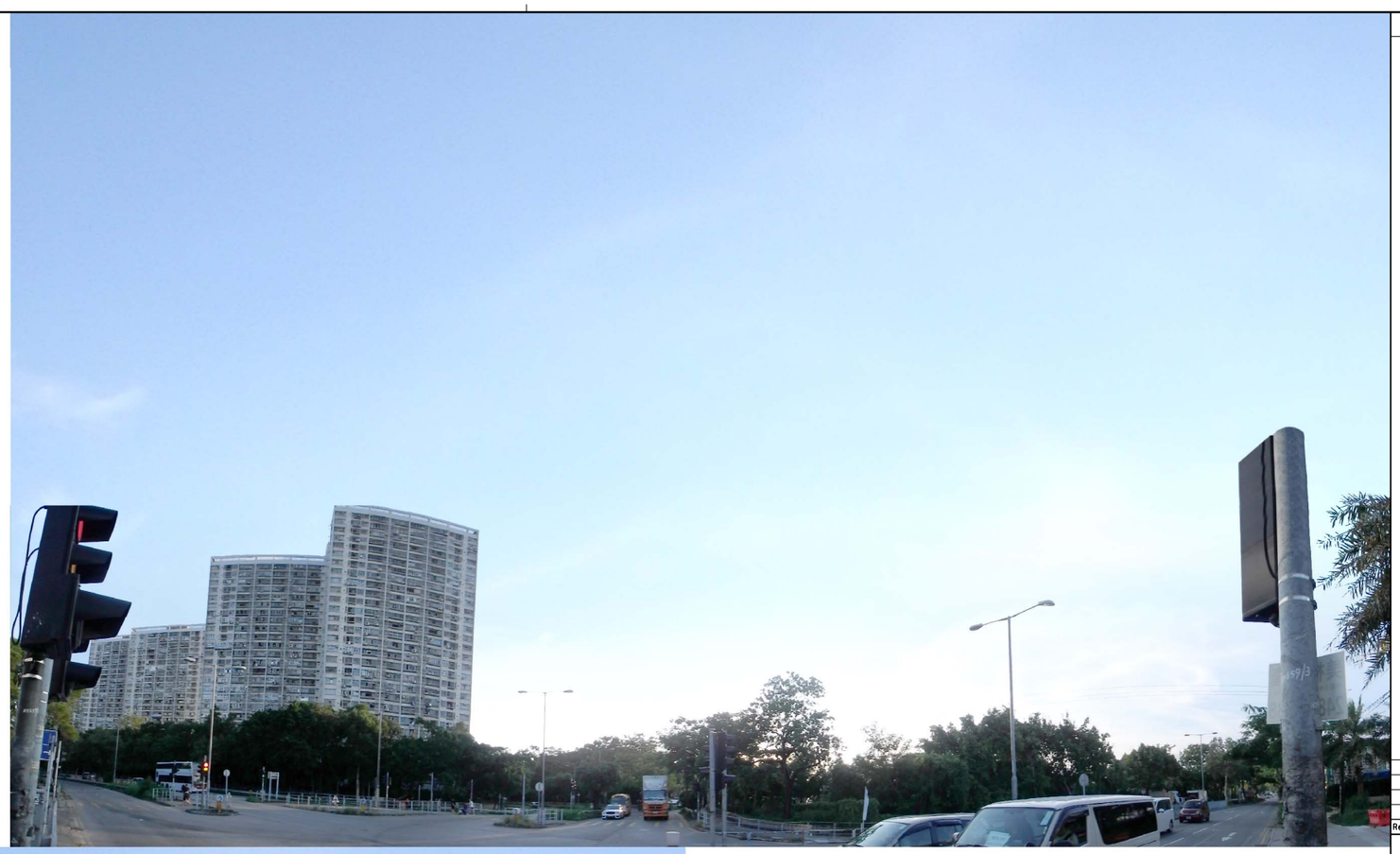
Urbis Limited
Planning, Urban Design, Landscape, Golf & Environmental Consultants
Urbis Limited, 11/F Siu On Centre, 188 Lockhart Road, Wan Chai, Hong Kong. Tel 3182 3333 Fax 3182 3182

Plot Date = 06/Jun/2019

CAD Filename = I:\BP15\DGN-GA\Preliminary LVIA\Final LVIA issue 4\196587B&VLVIA_015b.dgn



KEY PLAN



EXISTING CONDITIONS

DAY 1 WITHOUT MITIGATION MEASURES

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LEGEND

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)
- EXTENT OF VISUAL IMPACT

Revision	Date	Description	Initial
D	03JUN19	FINAL LVIA ISSUE 4	CI
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Date	04/18	04/18	04/18	04/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
PHOTOMONTAGE VIEWPOINT VP6: VIEW FROM FUK HI STREET (1 OF 2)

Figure No.
196587/B&V/LVIA/016a

Scale
NTS (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

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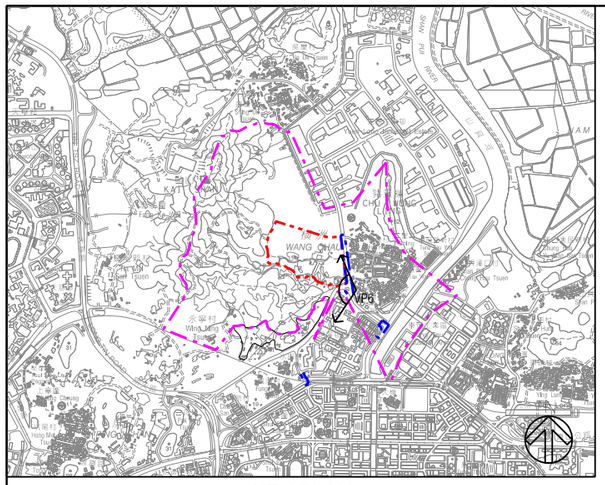
Urbis Limited, 11/F Siu On Centre, 188 Lockhart Road, Wan Chai, Hong Kong. Tel 2802 2331 Fax 2802 5662

Plot Date = 28/Jun/2019

CAD Filename = I:\BP15\DGN-GA\Preliminary LVIA\Final LVIA issue 4\196587B&VLVIA_016a.dgn



KEY PLAN

YEAR 10 WITH MITIGATION MEASURES

DAY 1 WITH MITIGATION MEASURES

Proposed Operation Phase Landscape and Visual Mitigation Measures

ID No.	Landscape and Visual Mitigation Measure
OM1	Sensitive design of buildings in terms of scale, height and bulk (visual weight).
OM2	Use of appropriate building materials and colours to complement surroundings.
OM3	Road lighting units to be directional and minimise unnecessary light spill and glare.
OM5	Compensatory tree planting shall be provided at 1:1 ratio as far as possible based on felled tree numbers and to the satisfaction of relevant Government departments. Required numbers and locations of compensatory trees shall be determined and agreed separately with Government during the Tree Felling Application process under Development Bureau Technical Circular (Works) No. 7/2015 - Tree Preservation.
OM7	Streetscape (e.g. paving, signage, street furniture, lighting etc.) shall be sensitively designed in a manner that responds to the existing context, and minimises potential adverse landscape and visual impacts.
OM8	Provision of amenity landscape area and new tree planting (approximately 640 nos.) within the HKHA Site.
OM9	Aesthetic design of noise barriers along Fuk Hi Street.

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LEGEND

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)
- EXTENT OF VISUAL IMPACT

Revision	Date	Description	Initial
D	03JUN19	FINAL LVIA ISSUE 4	CI
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Date	04/18	04/18	04/18	04/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
PHOTOMONTAGE VIEWPOINT VP6: VIEW FROM FUK HI STREET (2 OF 2)

Figure No.
196587/B&V/LVIA/016b

Scale
NTS (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Urbis Limited
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Urbis Limited, 11/F Siu On Centre, 188 Lockhart Road, Wan Chai, Hong Kong. Tel 2802 2331 Fax 2802 5662

Plot Date = 28/Jun/2019

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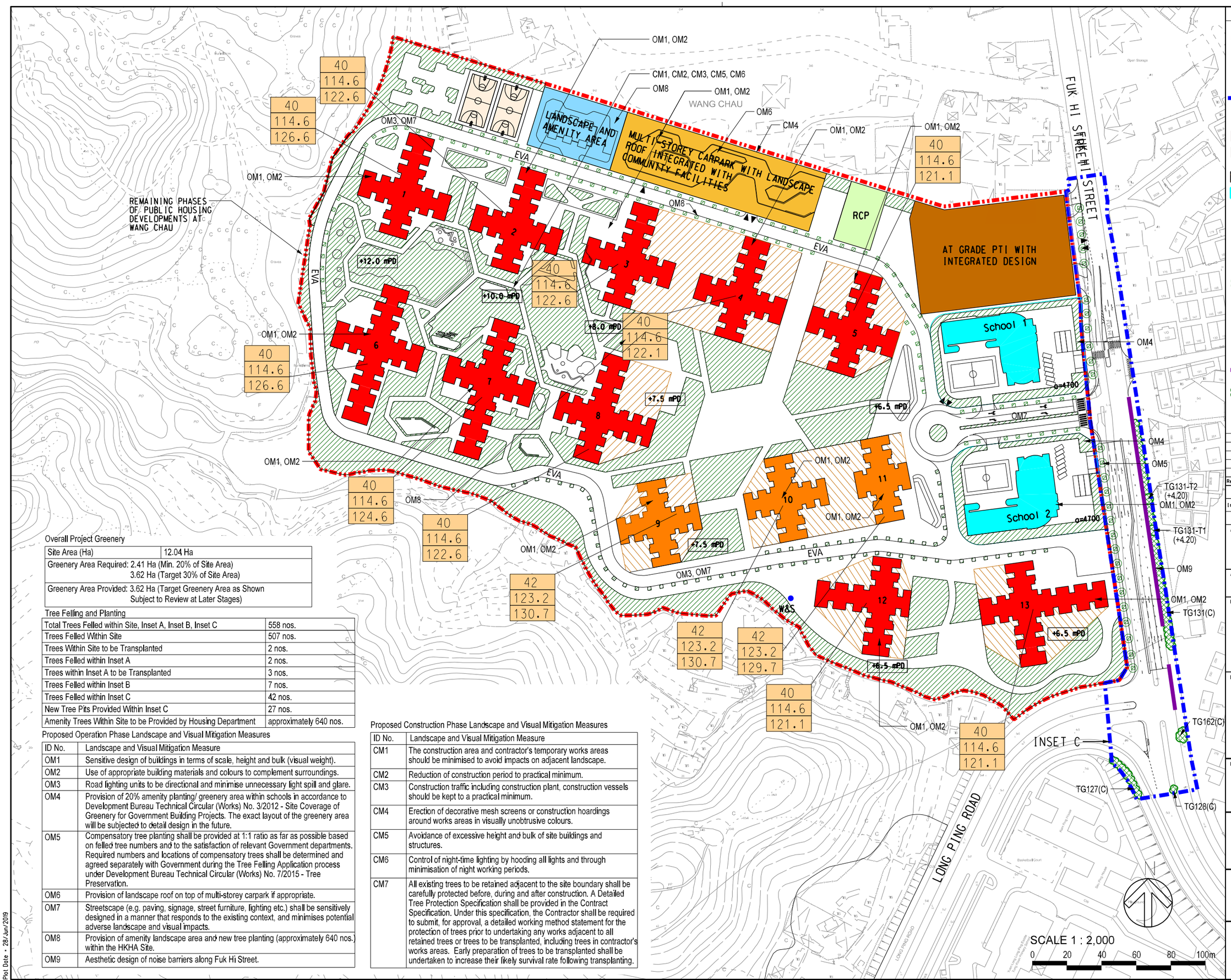

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LEGEND

- SITE BOUNDARY FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU (SUBJECT TO REVIEW)
- BOUNDARY FOR ROAD IMPROVEMENT WORKS OF THE DEVELOPMENT (SUBJECT TO REVIEW)
- RESIDENTIAL BLOCK (41 STOREYS)
- RESIDENTIAL BLOCK (44 STOREYS (WITH 1 REFUGE FLOOR))
- RETAIL
- G/IC FACILITY
- 40 / 114.6 / 123.6 — NO. OF DOMESTIC STOREYS (EXCL. PODIUM/LOBBY) / BUILDING HEIGHT (METERS) / mPD OF BUILDING (METERS)
- WELL AND SHRINE (TO BE RETAINED IN SITU AS FAR AS POSSIBLE)
- NOTIONAL POTENTIAL GREENERY AREA
- TREE PIT (STREETSCAPE TREE PLANTING), OM5
- +6.5mPD — PROPOSED LEVELS
- OM8 TREE PIT WITHIN SITE
- PROPOSED 4m VERTICAL BARRIER
- EXISTING TREES TO BE RETAINED

Revision	Date	Description	Initial
E	03JUN19	FINAL LVIA ISSUE 4	CI
D	17APR19	FINAL LVIA ISSUE 3	CI
C	01FEB19	FINAL LVIA ISSUE 2	CI
B	13DEC18	FINAL LVIA ISSUE 1	CI
A	17JUL18	ISSUE 2	CI

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Date	04/18	04/18	04/18	04/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
LANDSCAPE AND VISUAL MITIGATION MEASURES

Figure No.
196587/B&V/LVIA/017

Scale
1 : 2000 (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Urbis Limited
Planning, Urban Design, Landscape, Golf & Environmental Consultants
Urbis Limited, 11/F Siu On Centre, 188 Lockhart Road, Wan Chai, Hong Kong. Tel 2802 3333 Fax 2802 0662

Overall Project Greenery

Site Area (Ha)	12.04 Ha
Greenery Area Required: 2.41 Ha (Min. 20% of Site Area) 3.62 Ha (Target 30% of Site Area)	
Greenery Area Provided: 3.62 Ha (Target Greenery Area as Shown Subject to Review at Later Stages)	

Tree Felling and Planting

Total Trees Felled within Site, Inset A, Inset B, Inset C	558 nos.
Trees Felled Within Site	507 nos.
Trees Within Site to be Transplanted	2 nos.
Trees Felled within Inset A	2 nos.
Trees within Inset A to be Transplanted	3 nos.
Trees Felled within Inset B	7 nos.
Trees Felled within Inset C	42 nos.
New Tree Pits Provided Within Inset C	27 nos.
Amenity Trees Within Site to be Provided by Housing Department	approximately 640 nos.

Proposed Operation Phase Landscape and Visual Mitigation Measures

ID No.	Landscape and Visual Mitigation Measure
OM1	Sensitive design of buildings in terms of scale, height and bulk (visual weight).
OM2	Use of appropriate building materials and colours to complement surroundings.
OM3	Road lighting units to be directional and minimise unnecessary light spill and glare.
OM4	Provision of 20% amenity planting/ greenery area within schools in accordance to Development Bureau Technical Circular (Works) No. 3/2012 - Site Coverage of Greenery for Government Building Projects. The exact layout of the greenery area will be subjected to detail design in the future.
OM5	Compensatory tree planting shall be provided at 1:1 ratio as far as possible based on felled tree numbers and to the satisfaction of relevant Government departments. Required numbers and locations of compensatory trees shall be determined and agreed separately with Government during the Tree Felling Application process under Development Bureau Technical Circular (Works) No. 7/2015 - Tree Preservation.
OM6	Provision of landscape roof on top of multi-storey carpark if appropriate.
OM7	Streetscape (e.g. paving, signage, street furniture, lighting etc.) shall be sensitively designed in a manner that responds to the existing context, and minimises potential adverse landscape and visual impacts.
OM8	Provision of amenity landscape area and new tree planting (approximately 640 nos.) within the HKHA Site.
OM9	Aesthetic design of noise barriers along Fuk Hi Street.

Proposed Construction Phase Landscape and Visual Mitigation Measures

ID No.	Landscape and Visual Mitigation Measure
CM1	The construction area and contractor's temporary works areas should be minimised to avoid impacts on adjacent landscape.
CM2	Reduction of construction period to practical minimum.
CM3	Construction traffic including construction plant, construction vessels should be kept to a practical minimum.
CM4	Erection of decorative mesh screens or construction hoardings around works areas in visually unobtrusive colours.
CM5	Avoidance of excessive height and bulk of site buildings and structures.
CM6	Control of night-time lighting by hooding all lights and through minimisation of night working periods.
CM7	All existing trees to be retained adjacent to the site boundary shall be carefully protected before, during and after construction. A Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees or trees to be transplanted, including trees in contractor's works areas. Early preparation of trees to be transplanted shall be undertaken to increase their likely survival rate following transplanting.

Plot Date = 28/Jun/2019

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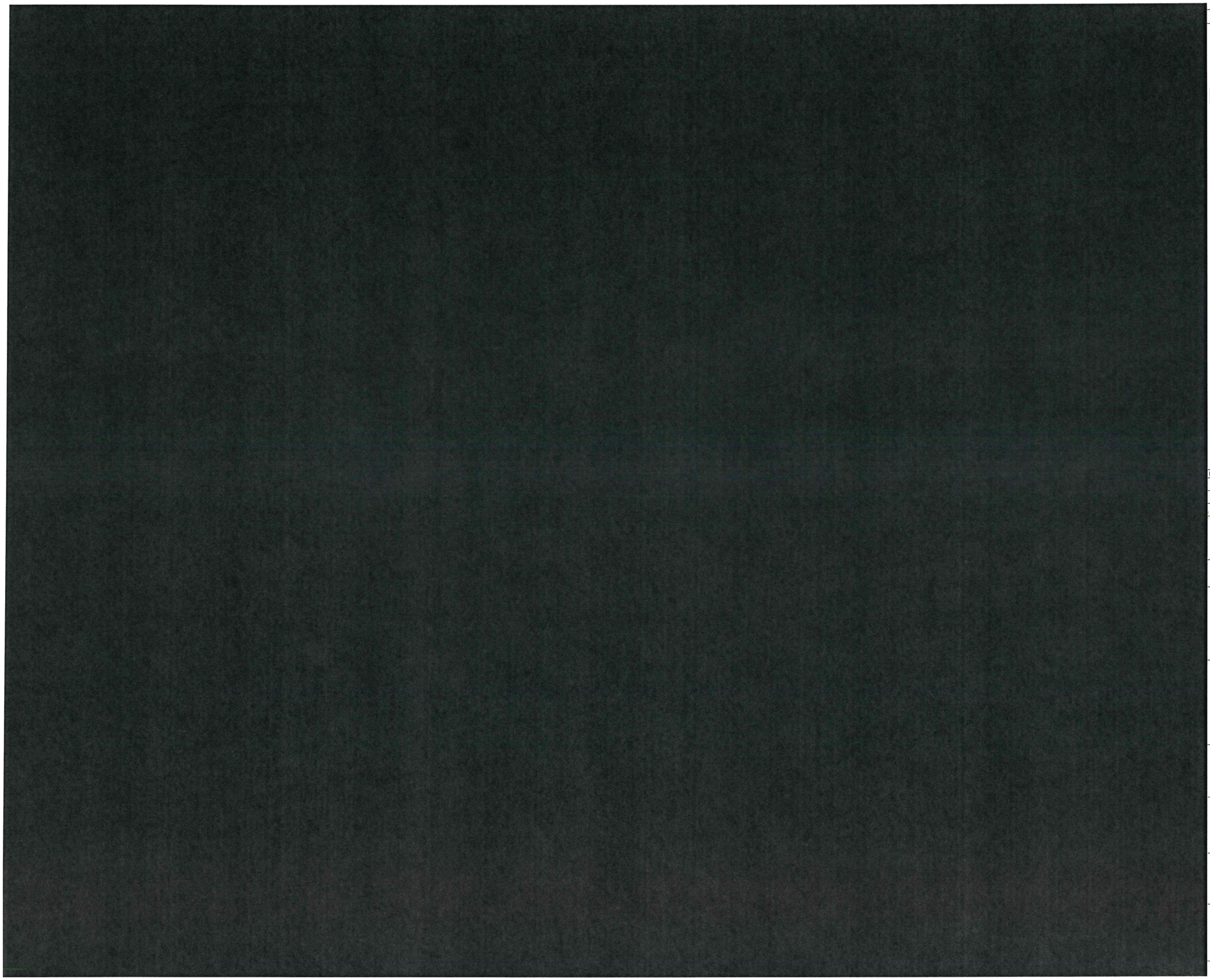

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LEGEND:

BOUNDARY OF THE ASSESSMENT AREA (SUBJECT TO REVIEW)

PHOTO TAKING AREA WITH AREA NO.

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial					
Date					

Approved

Agreement no.

CE 13/2017 (CE)

Preject Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG– FEASIBILITY STUDY

Drawing Title

SITE INSPECTION LOCATION

Drawing No.

196587/B&V/FR/LCRS/001

Scale

土木工程拓展署
Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Sub Consultant:

RAMBOLL

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LEGEND:

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- PLANNED WANG CHAU (PHASE 1) DEVELOPMENT
- RETAIL
- EXPECTED WIND FLOW (PEDESTRIAN WIND)
- EXSTING BREEZEWAY
- WIND CORRIDOR
- PORTION OF COVERED PTI WITHOUT SIDE WALL
- ANNUAL WIND

N

820 000 E | 820 200 E | 820 400 E | 820 600 E

835 200 N | 835 000 N | 834 800 N

ANNUAL WIND (E)

横洲
WANG CHAU

LANDSCAPE AND AMENITY AREA

MULTI-STOREY CARPARK WITH LANDSCAPE ROOF INTEGRATED WITH COMMUNITY FACILITIES

RCP

AT GRADE PTI WITH INTEGRATED DESIGN

School 1

School 2

FUK HIK STREET

EVA

15m

+12.0 mPD

+10.0 mPD

+8.0 mPD

28m

+6.5 mPD

+7.5 mPD

13°

15°

26m

a=4700

18m

21m

W&S

1 2 3 4 5 6 7 8 9 10 11 12 13

横洲西頭圖
WANG CHAU SAI TAU WAI

Plot Date = 7/18/2019

CAD Filename = Y:\Daily Work\20190712e\196587-B&V-AVA-008.dgn

Revision	Date	Description		Initial
	Designed	Checked	Drawn	Checked
Initial	WT	KC	SZ	-
Date	07/19	07/19	07/19	07/19

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
ILLUSTRATION OF WIND FLOW FROM EAST DIRECRION

Drawing No.
196587/B&V/AVA/008

Scale
1 : 1000 (A1)
1 : 2000 (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
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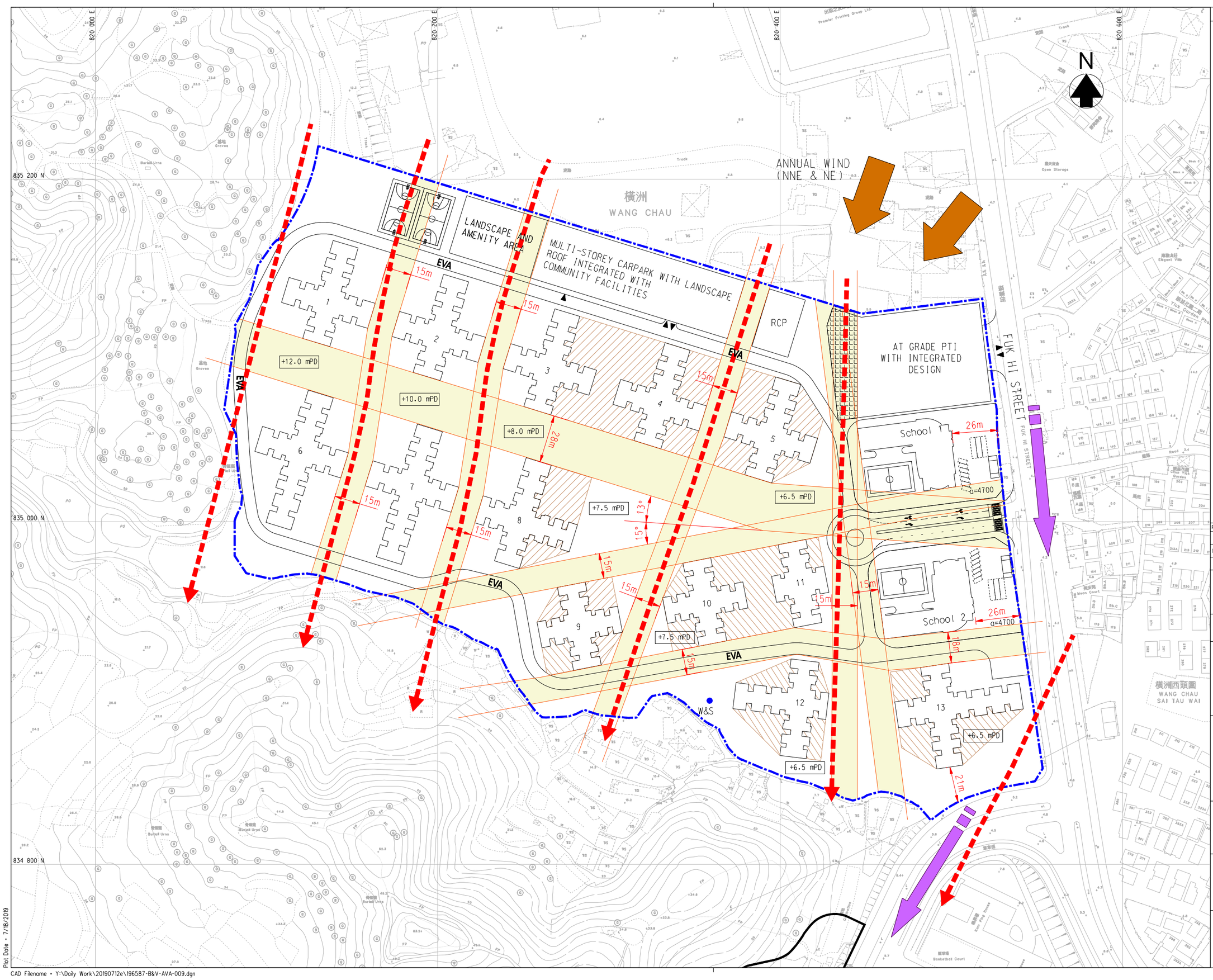

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LEGEND:

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- PLANNED WANG CHAU (PHASE 1) DEVELOPMENT
- RETAIL
- EXPECTED WIND FLOW (PEDESTRIAN WIND)
- EXSTING BREEZEWAY
- WIND CORRIDOR
- PORTION OF COVERED PTI WITHOUT SIDE WALL
- ANNUAL WIND

Revision	Date	Description			Initial
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Approved

Agreement no.

CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

ILLUSTRATION OF WIND FLOW FROM NNE AND NE DIRECTIONS

Drawing No.

196587/B&V/AVA/009

Scale

1 : 1000 (A1)
1 : 2000 (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Plot Date : 7/18/2019

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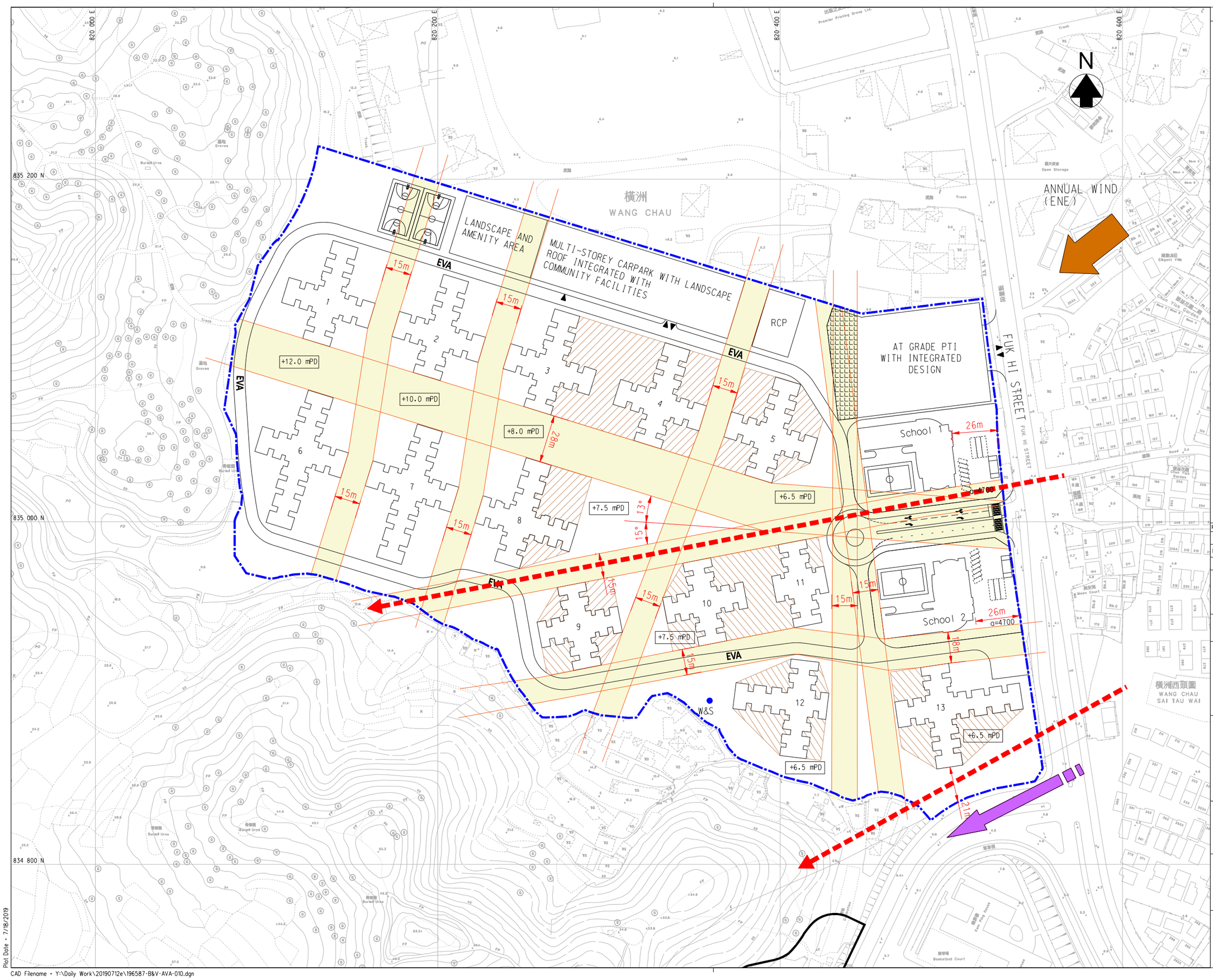

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LEGEND:

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- PLANNED WANG CHAU (PHASE 1) DEVELOPMENT
- RETAIL
- EXPECTED WIND FLOW (PEDESTRIAN WIND)
- EXSTING BREEZEWAY
- WIND CORRIDOR
- PORTION OF COVERED PTI WITHOUT SIDE WALL
- ANNUAL WIND

Revision	Date	Description			Initial
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CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

ILLUSTRATION OF WIND FLOW FROM ENE DIRECTION

Drawing No.

196587/B&V/AVA/010

Scale

1 : 1000 (A1)
1 : 2000 (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Plot Date : 7/18/2019

CAD Filename : Y:\Daily Work\20190712e\196587-B&V-AVA-010.dgn

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LEGEND:

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- PLANNED WANG CHAU (PHASE 1) DEVELOPMENT
- RETAIL
- EXPECTED WIND FLOW (PEDESTRIAN WIND)
- EXSTING BREEZEWAY
- WIND CORRIDOR
- PORTION OF COVERED PTI WITHOUT SIDE WALL
- ANNUAL WIND
- SUMMER WIND

820 000 E
820 200 E
820 400 E
820 600 E
835 200 N
835 000 N
834 800 N

N

横洲
WANG CHAU

LANDSCAPE AND AMENITY AREA

MULTI-STOREY CARPARK WITH LANDSCAPE ROOF INTEGRATED WITH COMMUNITY FACILITIES

RCP

AT GRADE PTI WITH INTEGRATED DESIGN

FUK HI STREET

School 1

School 2

EVA

15m

28m

26m

18m

21m

+12.0 mPD
+10.0 mPD
+8.0 mPD
+7.5 mPD
+6.5 mPD

1
2
3
4
5
6
7
8
9
10
11
12
13

a=4700

W&S

ANNUAL / SUMMER WIND (S)

SUMMER WIND (SSE)

横洲西頭圖
WANG CHAU SAI TAU WAI

Revision	Date	Description		Initial
	Designed	Checked	Drawn	Checked
Initial	WT	KC	SZ	-
Date	07/19	07/19	07/19	07/19

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CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
ILLUSTRATION OF WIND FLOW FROM S AND SSE DIRECTIONS

Drawing No.
196587/B&V/AVA/011

Scale
1 : 1000 (A1)
1 : 2000 (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Plot Date = 7/18/2019
CAD Filename = Y:\Daily Work\20190712e\196587-B&V-AVA-011.dgn

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LEGEND:

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- PLANNED WANG CHAU (PHASE 1) DEVELOPMENT
- RETAIL
- EXPECTED WIND FLOW (PEDESTRIAN WIND)
- EXSTING BREEZEWAY
- WIND CORRIDOR
- PORTION OF COVERED PTI WITHOUT SIDE WALL
- SUMMER WIND

820 000 E
820 200 E
820 400 E
820 600 E
835 200 N
835 000 N
834 800 N

N

横洲
WANG CHAU

LANDSCAPE AND AMENITY AREA

MULTI-STOREY CARPARK WITH LANDSCAPE ROOF INTEGRATED WITH COMMUNITY FACILITIES

RCP

AT GRADE PTI WITH INTEGRATED DESIGN

FUK HI STREET

EVA

15m

28m

26m

18m

21m

+12.0 mPD
+10.0 mPD
+8.0 mPD
+7.5 mPD
+6.5 mPD

1
2
3
4
5
6
7
8
9
10
11
12
13

School 1
School 2
q=4700

W&S

SUMMER WIND
(SW, SSW, AND WSW)

横洲西頭圍
WANG CHAU SAI TAU WAI

Revision	Date	Description		Initial
	Designed	Checked	Drawn	Checked
Initial	WT	KC	SZ	-
Date	07/19	07/19	07/19	07/19

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
ILLUSTRATION OF WIND FLOW FROM SW, SSW AND WSW DIRECTIONS

Drawing No.
196587/B&V/AVA/012

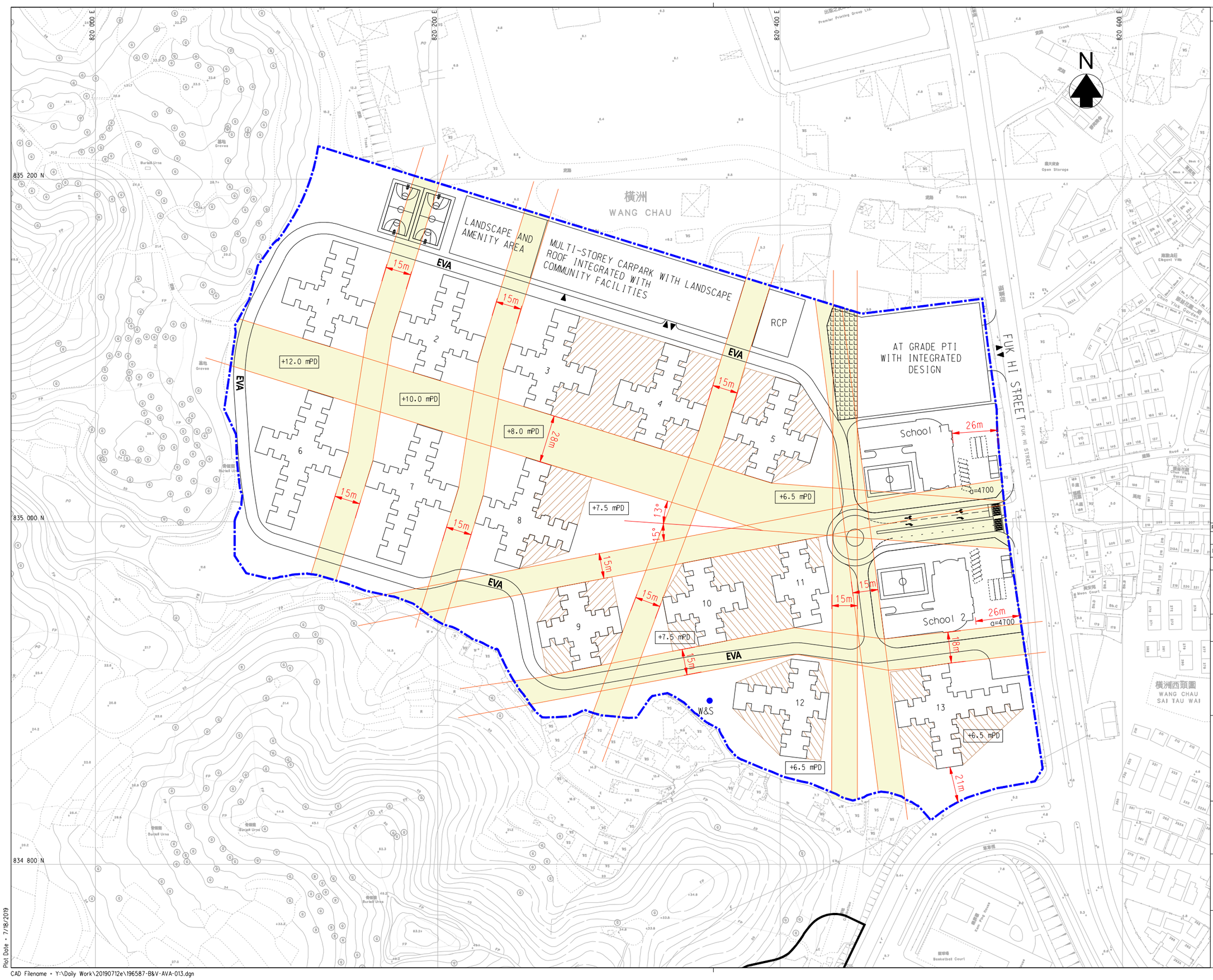
Scale
1 : 1000 (A1)
1 : 2000 (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Plot Date = 7/18/2019

CAD Filename = Y:\Daily Work\20190712e\196587-B&V-AVA-012.dgn



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LEGEND:

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- PLANNED WANG CHAU (PHASE 1) DEVELOPMENT
- RETAIL
- WIND CORRIDOR
- PORTION OF COVERED PTI WITHOUT SIDE WALL

Revision	Date	Description			Initial
	Designed	Checked	Drawn		Checked
Initial	WT	KC	SZ		-
Date	07/19	07/19	07/19		07/19

Approved

Agreement no.

CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

DETAILED INFORMATION OF THE PROPOSED MEASURES

Drawing No.

196587/B&V/AVA/013

Scale

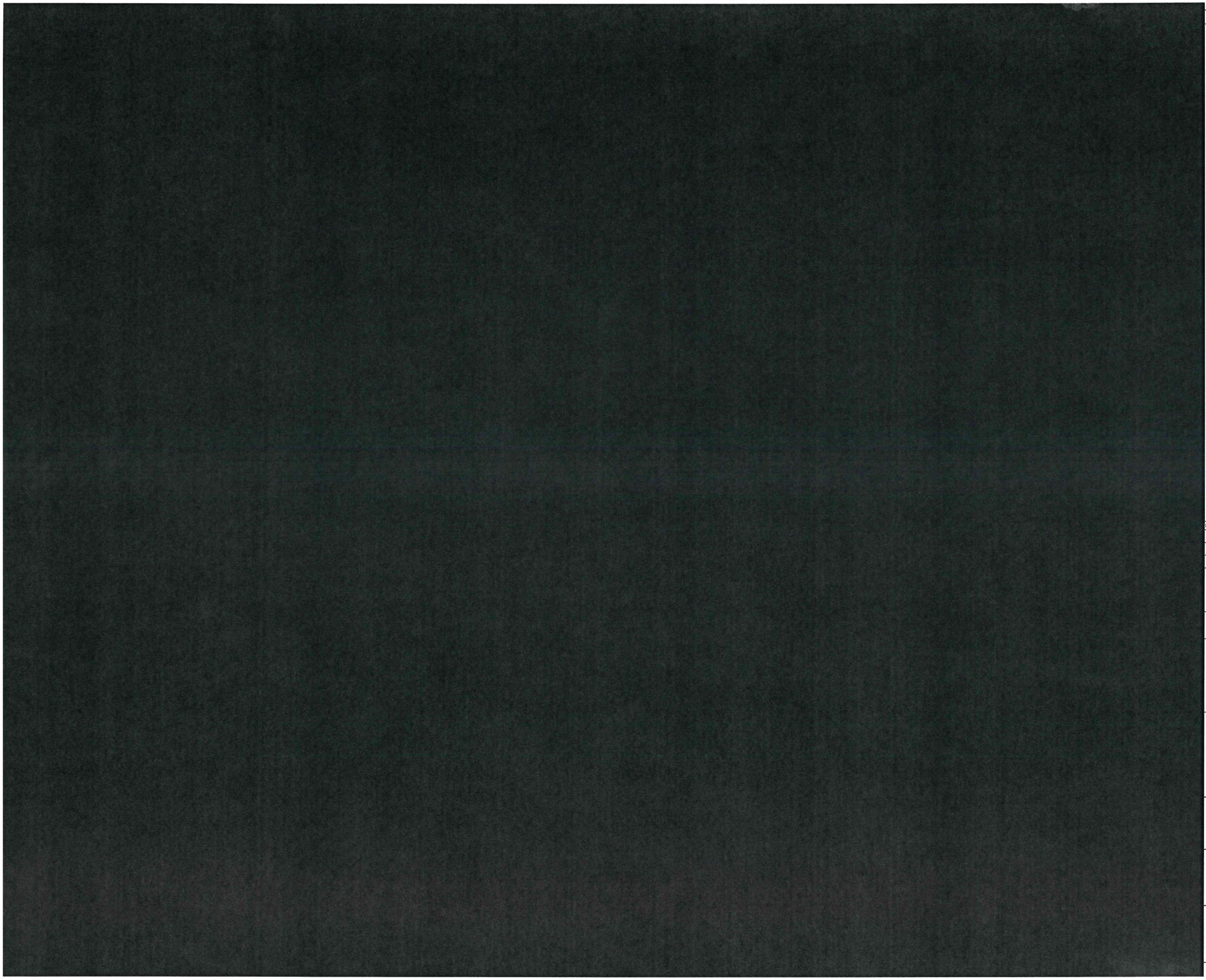
1 : 1000 (A1)
1 : 2000 (A3)

土木工程拓展署
CEDD Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Plot Date : 7/18/2019

CAD Filename : Y:\Daily Work\20190712e\196587-B&V-AVA-013.dgn



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LEGEND:

- PROPOSED WORKS LIMIT
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- EXTENT OF ROAD OPENINGS / ROADWORKS WITHIN EXISTING ROADS (SUBJECT TO REVIEW)
- EXISTING STRUCTURES TO BE CLEARED
- EXISTING FARMLANDS TO BE CLEARED
- EXTENT OF ROAD OPENINGS / ROADWORKS WITHIN EXISTING FOOTPATHS / CYCLE TRACKS (SUBJECT TO REVIEW)

Revision	Date	Description			Initial
	Designed	Checked	Drawn		Checked
Initial	CLH	WT	SZ		WT
Date	07/18	07/18	07/18		07/18

Approved

Agreement no.

CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

LAND REQUIREMENT PLAN (KEY PLAN)

Drawing No.	Scale
196587/B&V/LRP/001	1 : 4500 (A1) 1 : 9000 (A3)

土木工程拓展署
Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
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NOTES:

1. FOR NOTES AND LEGEND REFER TO 196587/B&V/LRP/001
2. SEE APPENDIX A FOR THE REGISTERED NUMBER AND APPROXIMATE AREA OF THE AFFECTED LOTS.
3. STOCKPILE AREAS/TEMPORARY WORKS AREA FOR CONTRACTORS AND RESIDENT SITE STAFF WILL BE DETERMINED AND ALLOCATED IN THE SUBSEQUENT STAGES OF THE DEVELOPMENT.

LEGEND:

PROPOSED WORKS LIMIT

EXTENT OF ROAD OPENINGS / ROADWORKS WITHIN EXISTING ROADS (SUBJECT TO REVIEW)

Revision	Date	Description			Initial
	Designed	Checked	Drawn		Checked
Initial	CLH	WT	SZ		WT
Date	07/18	07/18	07/18		07/18

Approved

Agreement no.

CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

LAND REQUIREMENT PLAN

(SHEET 1 OF 6)

Drawing No.

196587/B&V/LRP/002

Scale

1 : 1000 (A1)
1 : 2000 (A3)

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Civil Engineering and Development Department

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NOTES:

1. FOR NOTES AND LEGEND REFER TO 196587/B&V/LRP/001
2. SEE APPENDIX A FOR THE REGISTERED NUMBER AND APPROXIMATE AREA OF THE AFFECTED LOTS.
3. STOCKPILE AREAS/TEMPORARY WORKS AREA FOR CONTRACTORS AND RESIDENT SITE STAFF WILL BE DETERMINED AND ALLOCATED IN THE SUBSEQUENT STAGES OF THE DEVELOPMENT.

LEGEND:

PROPOSED WORKS LIMIT

EXTENT OF ROAD OPENINGS / ROADWORKS WITHIN EXISTING ROADS (SUBJECT TO REVIEW)

Revision	Date	Description			Initial
	Designed	Checked	Drawn		Checked
Initial	CLH	WT	SZ		WT
Date	07/18	07/18	07/18		07/18

Approved

Agreement no.

CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

LAND REQUIREMENT PLAN

(SHEET 2 OF 6)

Drawing No.

196587/B&V/LRP/003

Scale

1 : 1000 (A1)
1 : 2000 (A3)

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Civil Engineering and Development Department

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NOTES:

1. FOR NOTES AND LEGEND REFER TO 196587/B&V/LRP/001
2. SEE APPENDIX A FOR THE REGISTERED NUMBER AND APPROXIMATE AREA OF THE AFFECTED LOTS.
3. STOCKPILE AREAS/TEMPORARY WORKS AREA FOR CONTRACTORS AND RESIDENT SITE STAFF WILL BE DETERMINED AND ALLOCATED IN THE SUBSEQUENT STAGES OF THE DEVELOPMENT.

LEGEND:

PROPOSED WORKS LIMIT

EXTENT OF ROAD OPENINGS / ROADWORKS WITHIN EXISTING ROADS (SUBJECT TO REVIEW)

evision	Date	Description			Initial
	Designed	Checked	Drawn		Checked
nitial	CLH	WT	SZ		WT
Date	07/18	07/18	07/18		07/18

Approved

Agreement no.

CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

LAND REQUIREMENT PLAN

(SHEET 3 OF 6)

Drawing No.

196587/B&V/LRP/004

Scale

1 : 1000 (A1)
1 : 2000 (A3)

土木工程拓展署
Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
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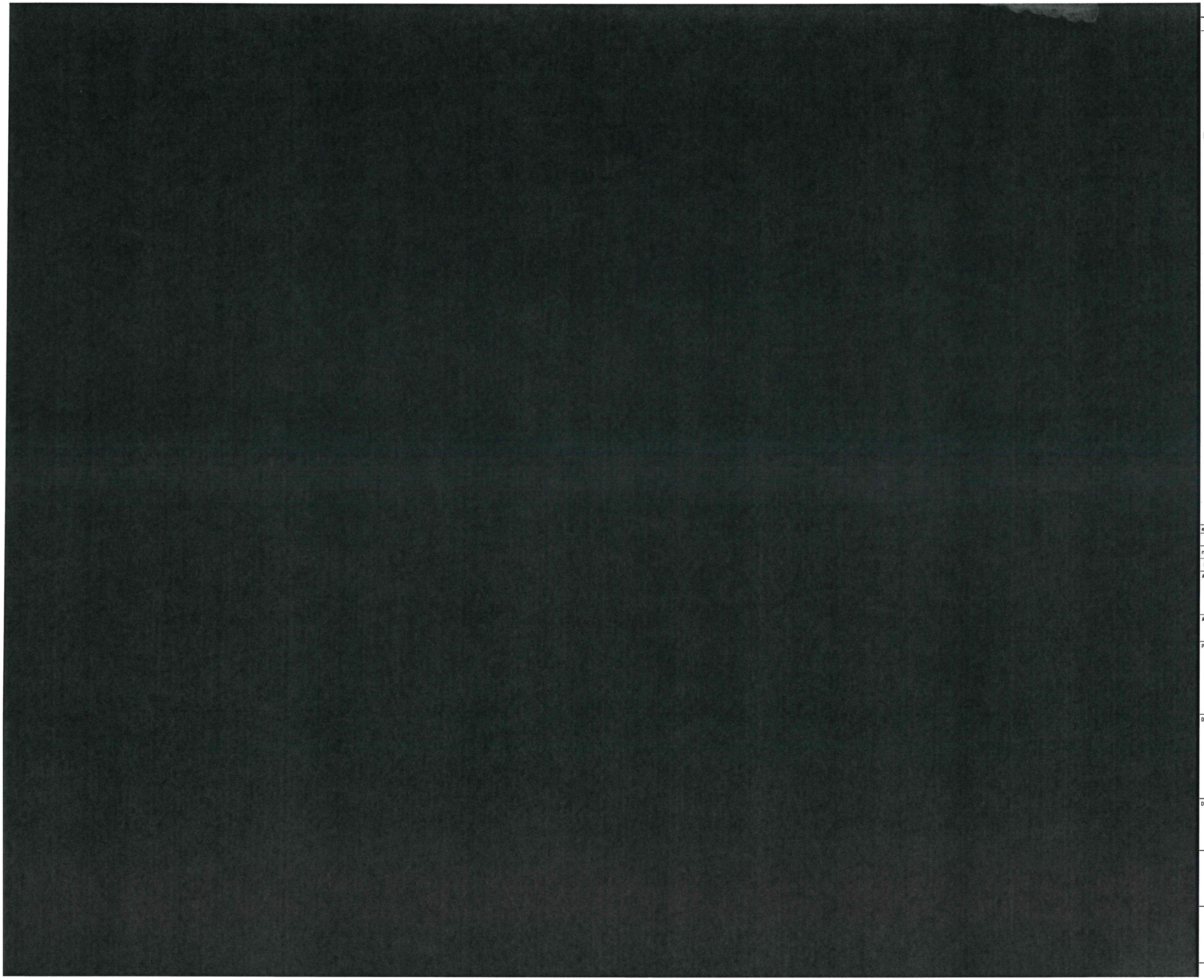

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NOTES:

1. FOR NOTES AND LEGEND REFER TO 196587/B&V/LRP/001
2. SEE APPENDIX A FOR THE REGISTERED NUMBER AND APPROXIMATE AREA OF THE AFFECTED LOTS.
3. STOCKPILE AREAS/TEMPORARY WORKS AREA FOR CONTRACTORS AND RESIDENT SITE STAFF WILL BE DETERMINED AND ALLOCATED IN THE SUBSEQUENT STAGES OF THE DEVELOPMENT.

LEGEND:

PROPOSED WORKS LIMIT

EXTENT OF ROAD OPENINGS / ROADWORKS WITHIN EXISTING ROADS (SUBJECT TO REVIEW)

evision	Date	Description			Initial
	Designed	Checked	Drawn		Checked
nitial	CLH	WT	SZ		WT
Date	07/18	07/18	07/18		07/18

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
LAND REQUIREMENT PLAN

(SHEET 4 OF 6)

Drawing No.
196587/B&V/LRP/005

Scale
1 : 1000 (A1)
1 : 2000 (A3)

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CEDD Civil Engineering and Development Department

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NOTES:

1. FOR NOTES AND LEGEND REFER TO 196587/B&V/LRP/001
2. SEE APPENDIX A FOR THE REGISTERED NUMBER AND APPROXIMATE AREA OF THE AFFECTED LOTS.
3. STOCKPILE AREAS/TEMPORARY WORKS AREA FOR CONTRACTORS AND RESIDENT SITE STAFF WILL BE DETERMINED AND ALLOCATED IN THE SUBSEQUENT STAGES OF THE DEVELOPMENT.

LEGEND:

- PROPOSED WORKS LIMIT
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- EXTENT OF ROAD OPENINGS / ROADWORKS WITHIN EXISTING ROADS (SUBJECT TO REVIEW)
- EXISTING STRUCTURES TO BE CLEARED
- EXISTING FARMLANDS TO BE CLEARED
- EXTENT OF ROAD OPENINGS / ROADWORKS WITHIN EXISTING FOOTPATHS / CYCLE TRACKS (SUBJECT TO REVIEW)

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked	
Initial	CLH	WT	SZ	WT	
Date	07/18	07/18	07/18	07/18	

Approved

Agreement no.
CE 13/2017 (CE)

Project Title
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title
LAND REQUIREMENT PLAN

(SHEET 5 OF 6)

Drawing No.
196587/B&V/LRP/006

Scale
1 : 1000 (A1)
1 : 2000 (A3)

土木工程拓展署
Civil Engineering and Development Department

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NOTES:

1. FOR NOTES AND LEGEND REFER TO 196587/B&V/LRP/001
2. SEE APPENDIX A FOR THE REGISTERED NUMBER AND APPROXIMATE AREA OF THE AFFECTED LOTS.
3. STOCKPILE AREAS/TEMPORARY WORKS AREA FOR CONTRACTORS AND RESIDENT SITE STAFF WILL BE DETERMINED AND ALLOCATED IN THE SUBSEQUENT STAGES OF THE DEVELOPMENT.

LEGEND:

PROPOSED WORKS LIMIT

EXTENT OF ROAD OPENINGS / ROADWORKS WITHIN EXISTING ROADS (SUBJECT TO REVIEW)

EXTENT OF ROAD OPENINGS / ROADWORKS WITHIN EXISTING FOOTPATHS / CYCLE TRACKS (SUBJECT TO REVIEW)

evision	Date	Description			Initial
	Designed	Checked	Drawn		Checked
nitial	CLH	WT	SZ		WT
Date	07/18	07/18	07/18		07/18

Approved

Agreement no.

CE 13/2017 (CE)

Project Title

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG - FEASIBILITY STUDY

Drawing Title

LAND REQUIREMENT PLAN

(SHEET 6 OF 6)

Drawing No.

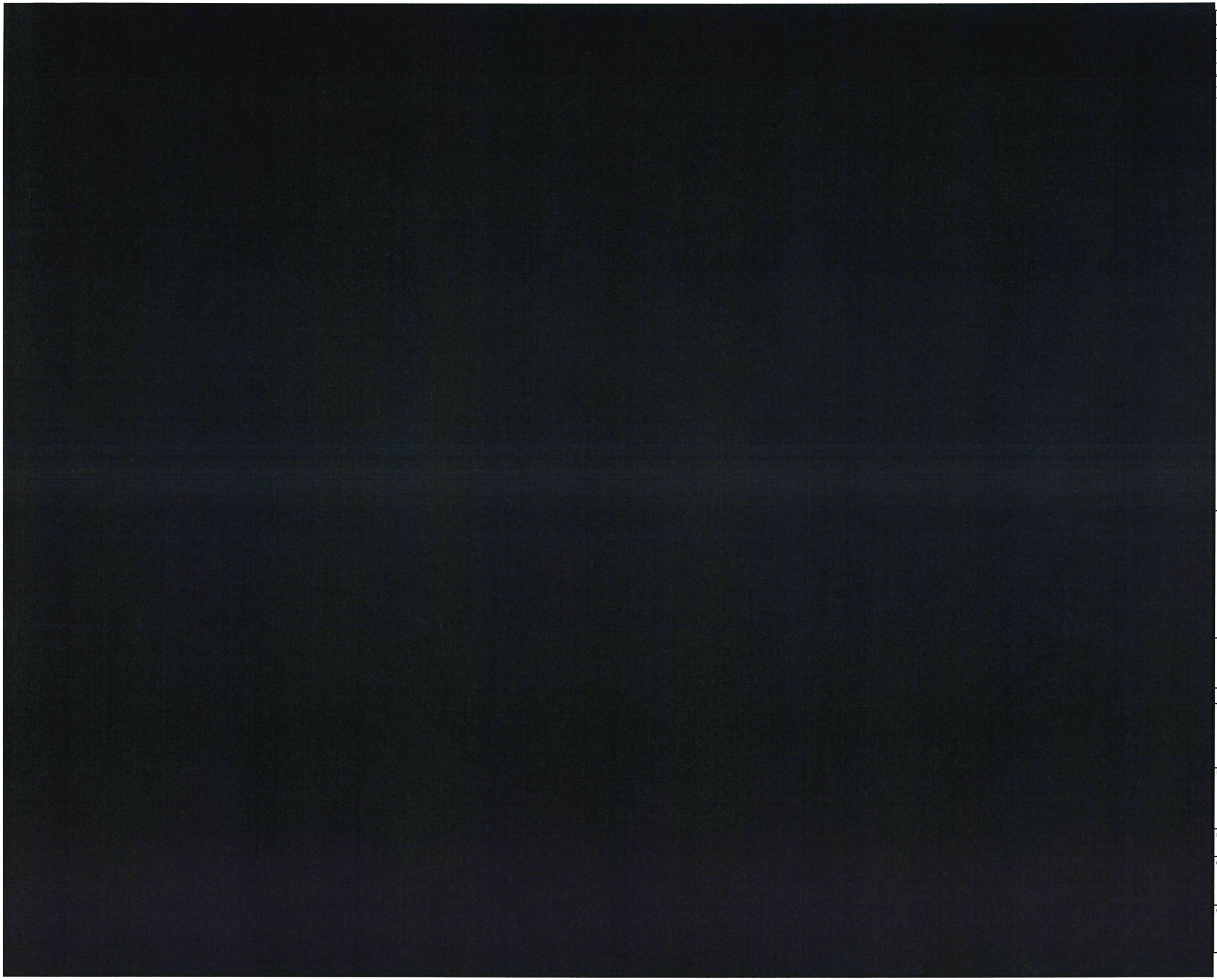
196587/B&V/LRP/007

Scale

1 : 1000 (A1)
1 : 2000 (A3)

土木工程拓展署
Civil Engineering and Development Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司



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	Designed	Reviewed	Drawn	Checked
Initial	CLH	BT	CLH	BT
Date	10/18	10/18	10/18	10/18

Revision	Date	Description	Initial

LEGEND

- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- LETTER OF APPROVAL
- MODIFICATION OF TENANCY
- PROPOSED WORKS LIMIT
- BUILDING LICENCE
- EXISTING SHORT TERM TENANCY
- PRIVATE LOT

Overview

Approved

Contract Title

AGREEMENT NO. CE 13/2017 (CE)
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG – FEASIBILITY STUDY

Figure Title

AFFECTED PRIVATE AND GOVERNMENT LANDS
(SHEET 1 OF 2)

Drawing No.	Scale
196587/B&V/LRS/001a	1:2,000 @ A3

Client

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Consultant

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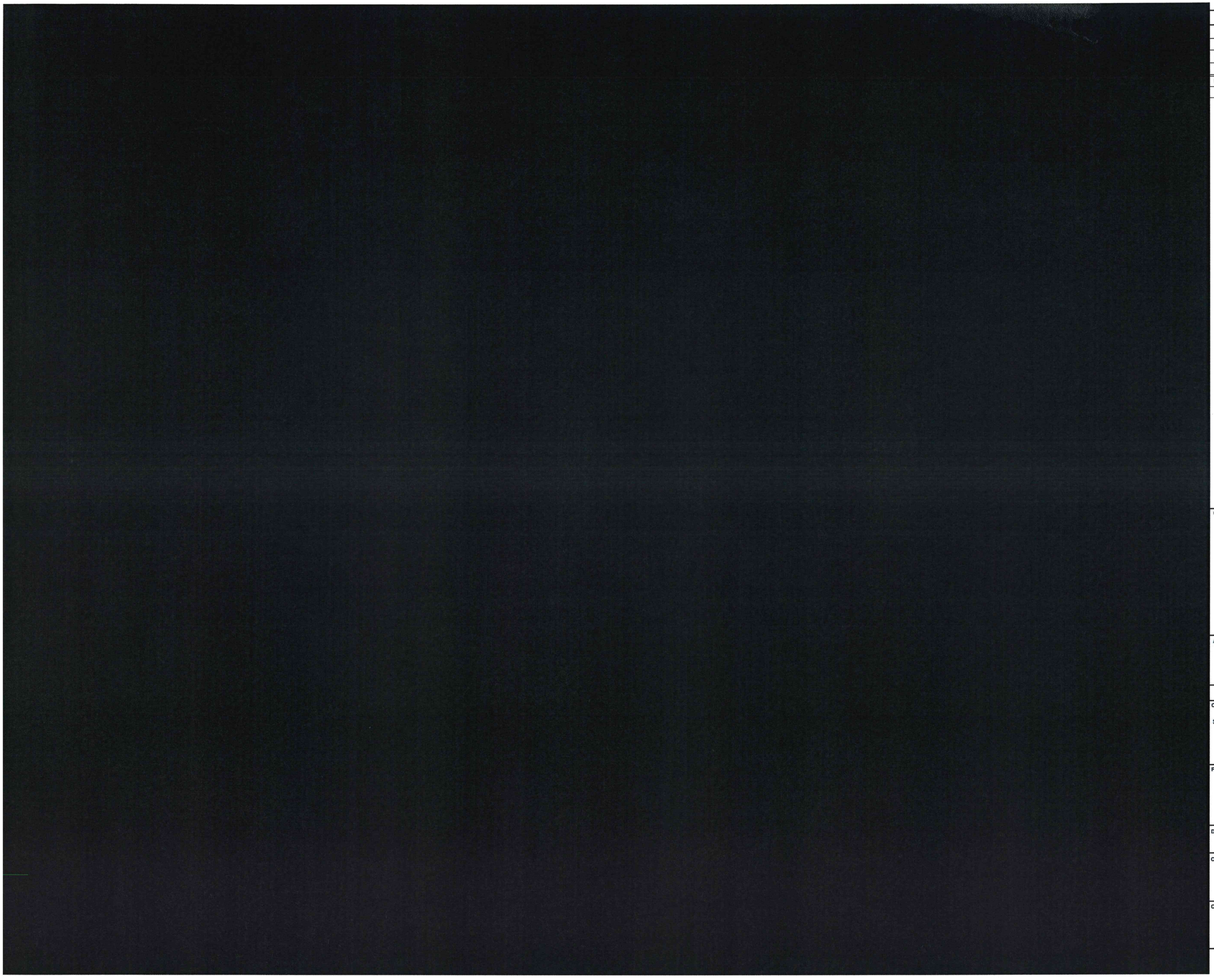

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	Designed	Reviewed	Drawn	Checked
Initial	CLH	WT	CLH	WT
Date	07/18	07/18	07/18	07/18

Revision	Date	Description	Initial

LEGEND

PROPOSED WORKS LIMIT

GOVERNMENT LAND ALLOCATION

Overview

Approved

Contract Title

AGREEMENT NO. CE 13/2017 (CE)
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG – FEASIBILITY STUDY

Figure Title

AFFECTED PRIVATE AND GOVERNMENT LANDS (SHEET 2 OF 2)

Drawing No.	Scale
196587/B&V/LRS/001b	1:2,000 @ A3

Client

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Consultant

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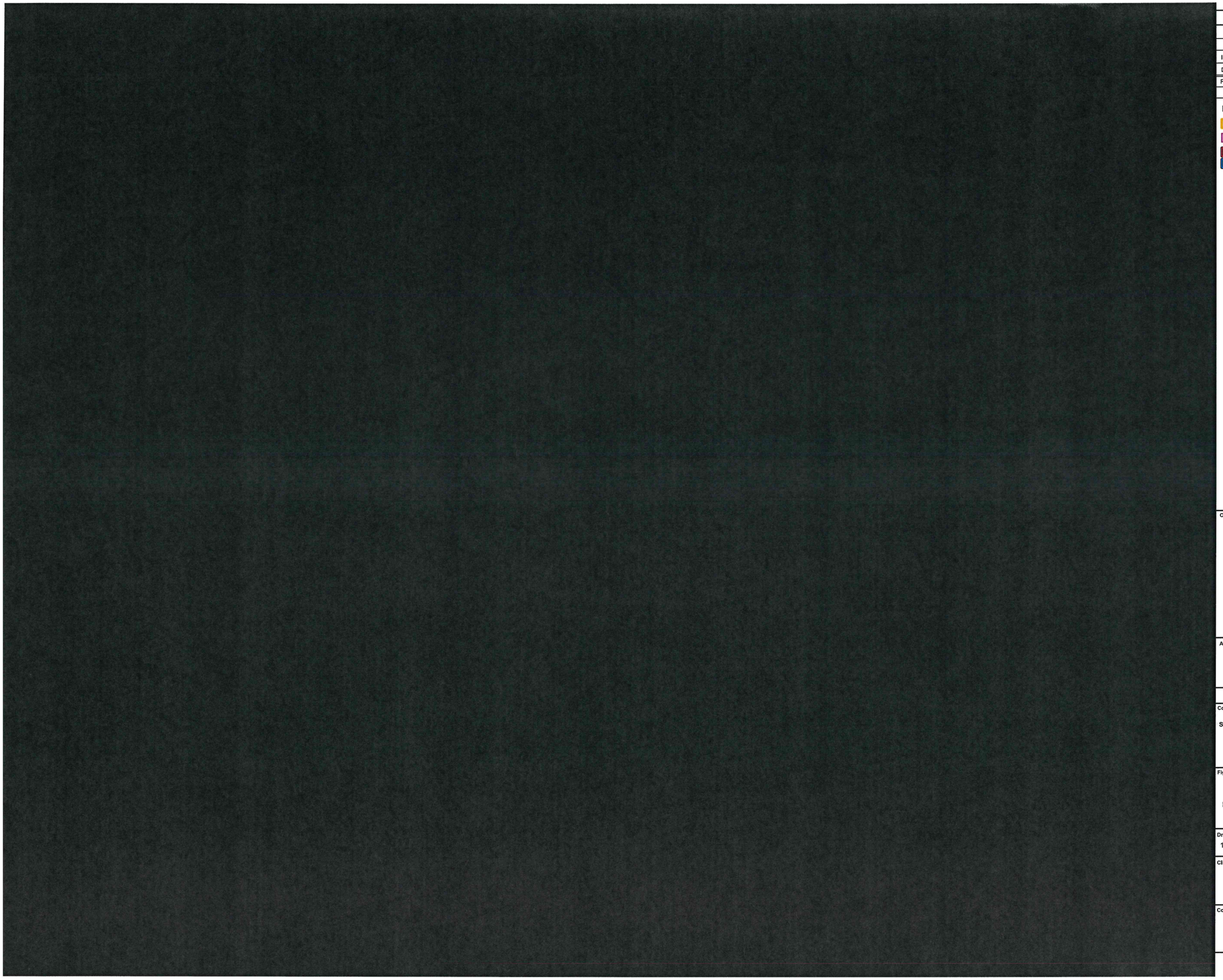

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	Designed	Reviewed	Drawn	Checked
Initial	CLH	WT	CLH	WT
Date	07/18	07/18	07/18	07/18

Revision	Date	Description	Initial

LEGEND

- BOUNDARY OF EXISTING BUSINESS
- ACCESS ROAD FOR BROWNFIELD OPERATIONS WITHIN THE SITE
- BOUNDARY OF THE SITE (SUBJECT TO REVIEW)
- PROPOSED WORKS LIMIT

Overview

Approved

Contract Title

AGREEMENT NO. CE 13/2017 (CE)
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR REMAINING PHASES OF PUBLIC HOUSING DEVELOPMENTS AT WANG CHAU, YUEN LONG – FEASIBILITY STUDY

Figure Title

BROWNFIELD OPERATIONS WITHIN THE SITE

Drawing No.	Scale
196587/B&V/LRS/006	1:1,500 @ A3

Client

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Consultant

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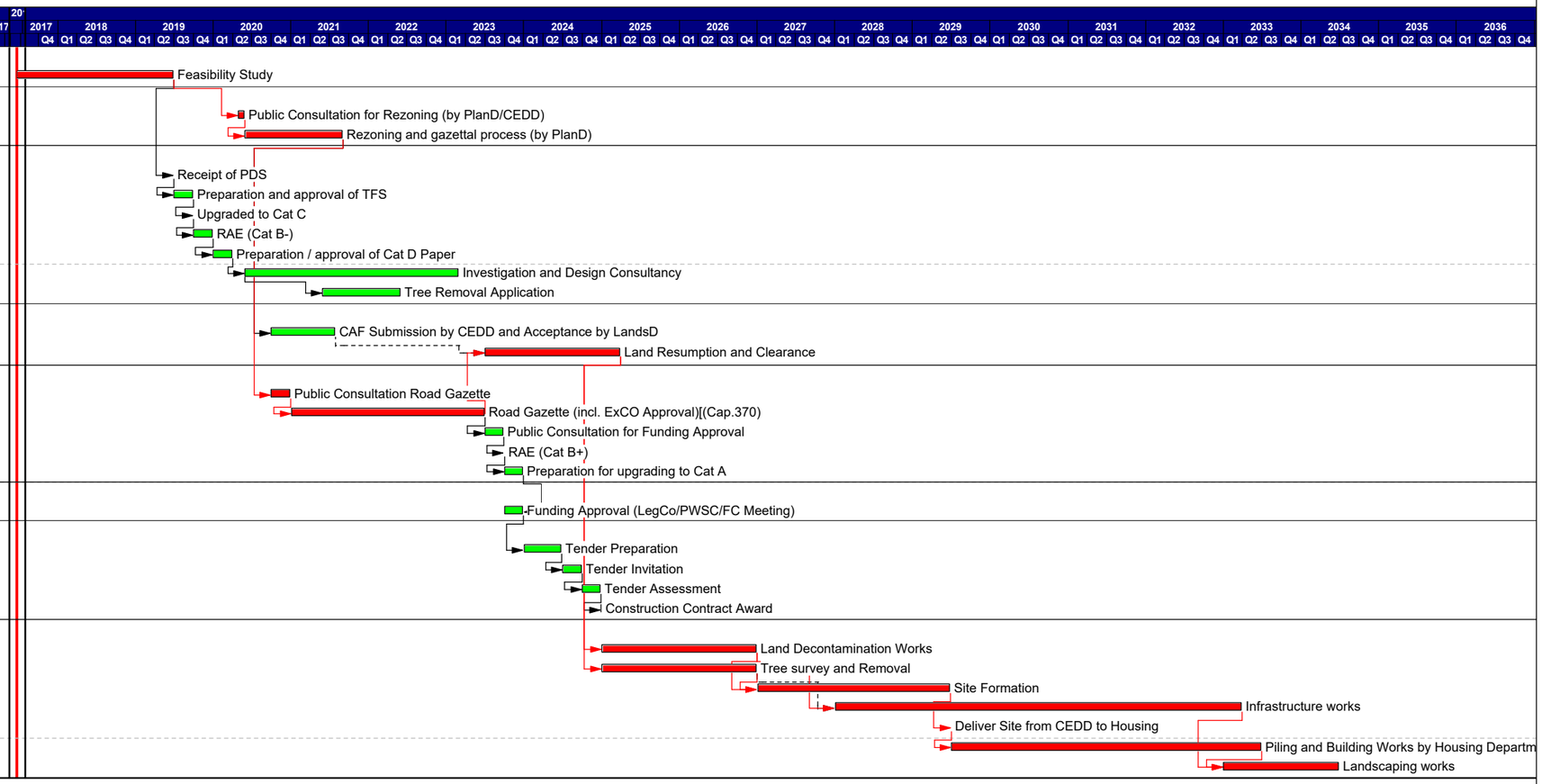
APPENDIX A

TENTATIVE PROJECT IMPLEMENATION PROGRAMME

再造紙
recycled paper

Final Report - Appendix A - Tentative Project Implementation Programme

Activity ID	Description	Orig Dur	Early Start	Early Finish
Feasbility Study				
1000	Feasibility Study	496	28JUL17	28JUN19
Rezoning Exercise				
1010	Public Consultation for Rezoning (by PlanD/CEDD)	21	01MAY20	29MAY20
1020	Rezoning and gazettal process (by PlanD)	325	01JUN20	31AUG21
Investigation Stage				
1090	Receipt of PDS	1	01JUL19	01JUL19
1091	Preparation and approval of TFS	64	02JUL19	30SEP19
1092	Upgraded to Cat C	1	01OCT19	01OCT19
1093	RAE (Cat B-)	64	02OCT19	31DEC19
1094	Preparation / approval of Cat D Paper	64	02JAN20	31MAR20
1030	Investigation and Design Consultancy	714	01JUN20	28FEB23
1031	Tree Removal Application	261	01JUN21	31MAY22
Land Resumption				
1070	CAF Submission by CEDD and Acceptance by LandsD	215	01OCT20	30JUL21
1230	Land Resumption and Clearance	450	03JUL23	31MAR25
Gazettal Procedure				
1320	Public Consultation Road Gazette	65	01OCT20	31DEC20
1311	Road Gazette (incl. ExCO Approval)[(Cap.370)	649	04JAN21	30JUN23
1440	Public Consultation for Funding Approval	64	03JUL23	29SEP23
1410	RAE (Cat B+)	1	02OCT23	02OCT23
1420	Preparation for upgrading to Cat A	63	03OCT23	29DEC23
Public Works Programme Procedure				
1110	Funding Approval (LegCo/PWSC/FC Meeting)	64	02OCT23	29DEC23
Tender Stage				
1340	Tender Preparation	129	02JAN24	28JUN24
1350	Tender Invitation	64	02JUL24	30SEP24
1360	Tender Assessment	64	01OCT24	30DEC24
1390	Construction Contract Award	1	31DEC24	31DEC24
Construction Stage				
1270	Land Decontamination Works	517	02JAN25	31DEC26
1290	Tree survey and Removal	517	02JAN25	31DEC26
1260	Site Formation	647	04JAN27	29JUN29
1265	Infrastructure works	1357	03JAN28	31MAR33
1280	Deliver Site from CEDD to Housing	1	02JUL29	02JUL29
1300	Piling and Building Works by Housing Department	1034	03JUL29	30JUN33
1310	Landscaping works	389	03JAN33	30JUN34



Start date	28JUL17
Finish date	30JUN34
Data date	28JUL17
Run date	16OCT19
Page number	1A
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CE13/2017 (CE)
Site Formation and Infrastructural Works for Remaining Phases of Public Housing Developments at Wang Chau

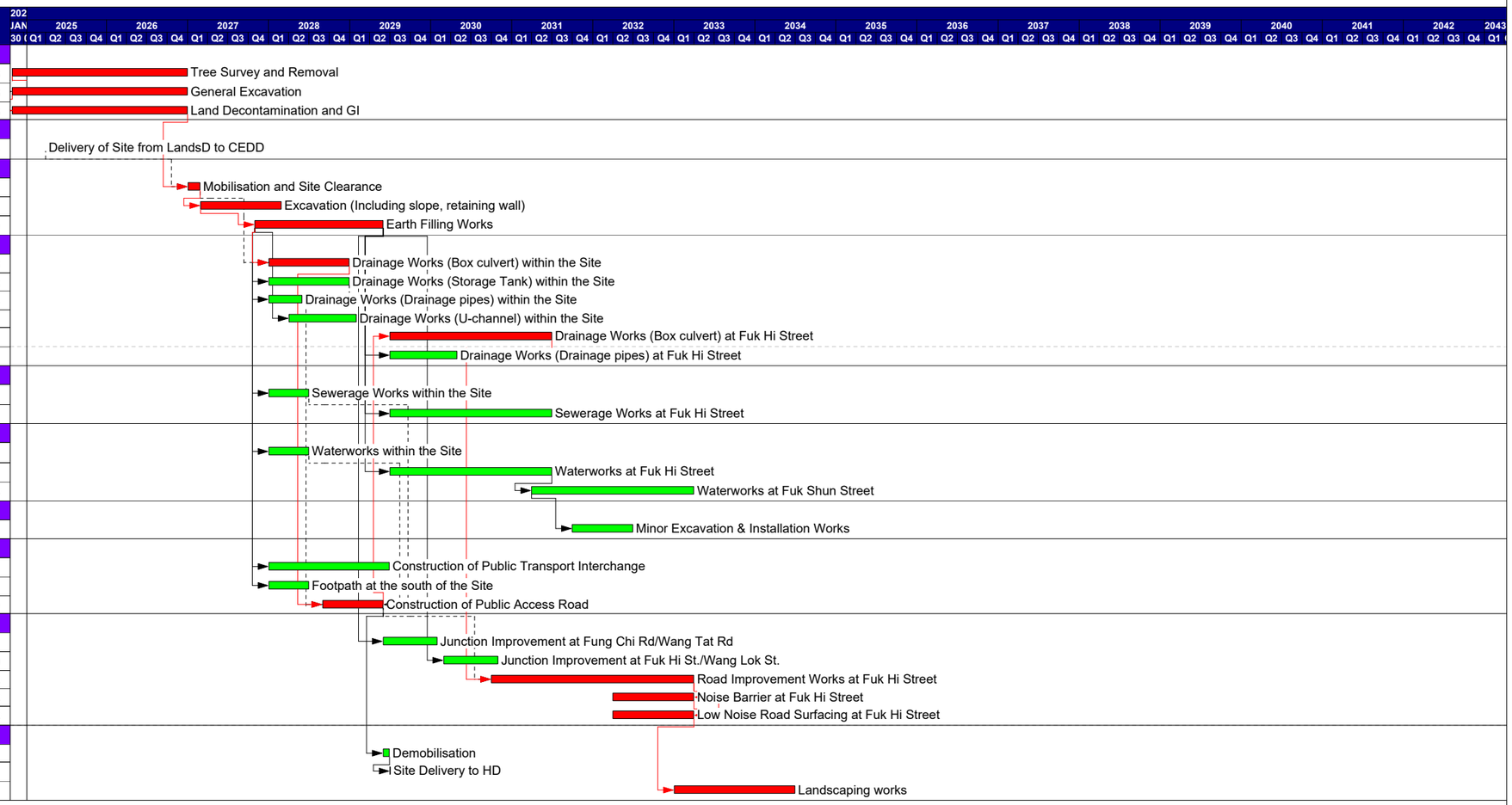
- Early bar
- Progress bar
- Critical bar
- Summary bar
- Start milestone point
- Finish milestone point

APPENDIX B

TENTATIVE MASTER PROGRAMME FOR MAJOR WOKRS

再造紙
recycled paper

Activity ID	Description	Orig Dur	Early Start	Early Finish
LAND DECONTAMINATION				
2010	Tree Survey and Removal	517	02JAN25	31DEC26
2011	General Excavation	517	02JAN25	31DEC26
2012	Land Decontamination and GI	517	02JAN25	31DEC26
LAND RESUMPTION AND SITE DELIVERY				
2001	Delivery of Site from LandsD to CEDD	1	01APR25	01APR25
SITE FORMATION WORKS				
2020	Mobilisation and Site Clearance	40	04JAN27	26FEB27
2023	Excavation (Including slope, retaining wall)	261	01MAR27	28FEB28
2022	Earth Filling Works	411	01NOV27	31MAY29
DRAINAGE WORKS				
2031	Drainage Works (Box culvert) within the Site	258	03JAN28	29DEC28
2032	Drainage Works (Storage Tank) within the Site	258	03JAN28	29DEC28
2033	Drainage Works (Drainage pipes) within the Site	108	03JAN28	31MAY28
2030	Drainage Works (U-channel) within the Site	215	03APR28	31JAN29
2034	Drainage Works (Box culvert) at Fuk Hi Street	515	02JUL29	30JUN31
2035	Drainage Works (Drainage pipes) at Fuk Hi Street	214	02JUL29	30APR30
SEWERAGE WORKS				
2040	Sewerage Works within the Site	130	03JAN28	30JUN28
2041	Sewerage Works at Fuk Hi Street	515	02JUL29	30JUN31
WATERWORKS				
2050	Waterworks within the Site	130	03JAN28	30JUN28
2052	Waterworks at Fuk Hi Street	515	02JUL29	30JUN31
2051	Waterworks at Fuk Shun Street	520	01APR31	31MAR33
UTILITIES WORKS				
2060	Minor Excavation & Installation Works	194	01OCT31	30JUN32
ROADWORKS WITHIN SITE				
2074	Construction of Public Transport Interchange	387	03JAN28	29JUN29
2077	Footpath at the south of the Site	130	03JAN28	30JUN28
2073	Construction of Public Access Road	193	01SEP28	31MAY29
ROADWORKS OUTSIDE SITE				
2071	Junction Improvement at Fung Chi Rd/Wang Tat Rd	171	01JUN29	30JAN30
2085	Junction Improvement at Fuk Hi St./Wang Lok St.	174	01MAR30	31OCT30
2070	Road Improvement Works at Fuk Hi Street	648	01OCT30	31MAR33
2075	Noise Barrier at Fuk Hi Street	261	01APR32	31MAR33
2076	Low Noise Road Surfacing at Fuk Hi Street	261	01APR32	31MAR33
MOBILIZATION AND SITE DELIVERY TO HD				
2080	Demobilisation	21	01JUN29	29JUN29
2081	Site Delivery to HD	1	02JUL29	02JUL29
2065	Landscaping works	389	03JAN33	30JUN34



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Finish date	30JUN34
Data date	01JAN25
Run date	28OCT19
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Site Formation and Infrastructural Works for Remaining Phases of Public Housing Developments at Wang Chau

- Early bar
- Progress bar
- Critical bar
- Summary bar
- Start milestone point
- Finish milestone point

土木工程拓展署
Civil Engineering and
Development Department

Agreement No. CE 11/2018 (CE)

Site Formation and Infrastructural Works for Proposed Public Housing Development near Tin Shui Wai – Feasibility Study

Report for Zoning Amendment

April 2021

AECOM

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April 2021

Reviewed: Allen LEE 8 April 2021

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AECOM ASIA COMPANY LIMITED

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ABBREVIATION

The following table lists out the abbreviated titles of Government bureau, departments, offices, statutory bodies and public organizations:

Abbreviation	Full title
ACABAS	Advisory Committee on the Appearance of Bridges and Associated Structures
ACE	Advisory Council on the Environment
AMO	Antiquities and Monuments Office
CEDD	Civil Engineering and Development Department
CLP	CLP Power Hong Kong Limited
DC	District Council
DEVB	Development Bureau
DLC	District Land Conference
DSD	Drainage Services Department
EMSD	Electrical and Mechanical Services Department
EPD	Environmental Protection Department
ExCo	Executive Council
FC	Finance Committee
GEO	Geotechnical Engineering Office of CEDD
HD	Housing Department
HyD	Highways Department
ITC	Innovation and Technology Commission
LandsD	Lands Department
LCSD	Leisure and Cultural Services Department
LegCo	Legislative Council
PFC	Public Fill Committee of the CEDD
PlanD	Planning Department
PlanD/UD&L	Urban Design and Landscape Section of PlanD
PWSC	Public Works Subcommittee
RC	Rural Committee
SMO	Survey and Mapping Office of LandsD
TD	Transport Department
TPB	Town Planning Board
VCAB	Vetting Committee on Aesthetic Design of Pumping Station Buildings
WSD	Water Supplies Department

The following table lists out the meaning of abbreviation for expressions:

Abbreviation	Full meaning
AOI	Area of influence for conducting Preliminary Traffic and Transport Impact Assessment
AVA-EE	Air Ventilation Assessment in the form of Expert Evaluation
B/Ds	Government Bureaux/ Departments
CAD	Computer-Aided-Drafting
CASET	Computer Aided Sustainability Evaluation Tool
CAP	Contamination Assessment Plan
CAR	Contamination Assessment Report
CEDD TC	Technical circulars issued by CEDD
C&D materials	Construction and Demolition Materials
C&DMMP	C&D Material Management Plan
DEP	Director of Environmental Protection
DEVB TCW	Development Bureau Technical Circular (Works)
DIA	Drainage Impact Assessment
DP	Designated Project
DR	Director's Representative as referred to in Clause 16 of the General Conditions of Employment

EE	Expert Evaluation
EFS	Engineering Feasibility Study
EIA	Environmental Impact Assessment
EIAO	Environmental Impact Assessment Ordinance
ETWB TCW	Technical circular (works) issued by the then Environment, Transport and Works Bureau
GA	Geotechnical Assessment
GB	Green Belt
GIC	Government/ Institution/ Community
HIA	Heritage Impact Assessment
HSK/HT NDA	Hung Shui Kiu/ Ha Tsuen New Development Area
IMS	Integrated Management System
LCRS	Land Contamination and Remediation Study
LRS	Land Requirement Study
LVIA	Landscape and Visual Impact Assessment
LT	Laboratory Testing
NTHS	Natural Terrain Hazard Study
NTHMS Report	Natural Terrain Hazard Mitigation Strategy Report
OHL	Overhead Transmission Line
OVT	Old and Valuable Trees
PAH	Project Administration Handbook for Civil Engineering Works
PELP	Preliminary Engineering Layout Plan
PER	Preliminary Environmental Review
POA	Platform Option Assessment
PTI	Public Transport Interchange
QRA	Quantitative Risk Assessment
RAP	Remediation Action Plan
SA	Sustainability Assessment
SCE	Special Conditions of Employment
SFA	Site Formation Assessment
SI works	All ground investigation and/or marine investigation
SIA	Sewerage Impact Assessment
TFS	Technical Feasibility Statement
TM	Technical Memorandum
TTIA	Traffic and Transport Impact Assessment
UIS	Utilities Impact Study
WBTC	Works Branch Technical Circular, issued by the then Works Bureau, the then Works Branch, the then Lands & Works Branch or the then Public Works Department
WP	Working Paper
WSIA	Water Supply Impact Assessment
XPMS	Excavation Permit Management System
XP	Excavation Permit

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1. INTRODUCTION

1.1 Background

1.1.1 Following the 2015 Policy Address, the Government has adopted 460,000 units as the public and private housing total supply target for the ten-year period from 2016-17 to 2025-26, which comprises 280,000 units of public housing. To meet this policy objective, Planning Department (PlanD) together with other relevant Government departments have jointly identified potential public housing sites for study on the feasibility and development potential. The site near Tin Tsz Road in Tin Shui Wai is one of these potential public housing sites. CEDD is tasked to conduct an engineering feasibility study (EFS) to examine the engineering feasibility of developing public housing at the site.

1.1.2 AECOM Asia Co Ltd has been commissioned by the Civil Engineering and Development Department (CEDD) to undertake Agreement No. CE 11/2018 (CE) – Site Formation and Infrastructural Works for Proposed Public Housing Development near Tin Shui Wai – Feasibility Study (the Assignment).

1.1.3 The Assignment is to confirm the feasibility of the developments and infrastructure works by undertaking a series of technical assessments so as to support the proposed zoning amendment of land use. The Assignment would take into account the technical feasibility, environmental acceptability and cost-effectiveness in formulating the proposed works, mitigation measures and implementation programme. Throughout the study period under the Assignment, the boundary of the proposed public housing development has been refined for the purpose of optimizing land utilization and addressing site constraints.

1.1.4 The site near Tin Shui Wai is located at the east of Tin Tsz Road. It is located adjacent to the village environ of Ha Mei San Tsuen at the southwest and Fung Ka Wai at the northeast, and adjoins the Wetland Buffer Area at the north and a burial ground at Kai Shan at the east. The site is currently zoned as “Recreation” (“REC”) on the approved Ping Shan Outline Zoning Plan (OZP) No. S/YL-PS/18 shown in **Figure 1.1**.

1.2 The Project

1.2.1 The aim of this EFS is to assess the feasibility of site formation and infrastructural works to support the proposed public housing development. The scope of the works include, but not limited to, the following principal works elements:

(a) Site clearance;
(b) Site formation including slope cutting and earth filling works as well as geotechnical works/structures (including natural terrain hazard mitigation works if required);
(c) Land decontamination works;
(d) Roadworks (including construction of new roads and footpaths, improvement and upgrading of existing roads and/ or junctions, construction of traffic improvement works, and footbridges etc. if found necessary);
(e) Sewage infrastructure works (including pumping station(s));
(f) Drainage infrastructure works (including pumping station and flood retention tank) and necessary diversion works;
(g) Waterworks;
(h) Environmental mitigation measures; and
(i) Other infrastructure works such as landscaping works and utility services connections (by respective agencies or utility undertakings) etc. deemed to be necessary to support the developments.

1.2.2 A series of technical assessment would be carried out for assessing the feasibility of site formation and infrastructural works to support the proposed public housing development. These assessments include, but not limited to:

(a) Preliminary traffic and transport impact assessment;
(b) Preliminary geotechnical assessment (including natural terrain hazards impact assessment);
(c) Preliminary site formation assessment;
(d) Preliminary drainage impact assessment;
(e) Preliminary sewerage impact assessment;
(f) Preliminary water supply impact assessment;
(g) Preliminary land requirement study;
(h) Preliminary environmental review;
(i) Preliminary landscape and visual impact assessment;
(j) Preliminary utilities impact assessment; and
(k) Preliminary air ventilation assessment.

1.3 Purpose and Structure of the Report

1.3.1 The purpose of this Report for Zoning Amendment is to summarise the key findings, recommendations and conclusions of various preliminary technical assessments, and the implementation strategy and frameworks for the recommended infrastructure.

1.3.2 Apart from this introductory section, the sections of this report are as follows:

Section 2:	presents the preliminary development proposal
Sections 3 to 13:	provides a summary of findings and recommendations of various technical assessments for the proposed public housing development including traffic and transport, geotechnical, site formation, drainage, sewerage, water supply, land requirement, environment, landscape and visual, utilities and air ventilation
Section 14:	provides a tentative implementation programme
Section 15:	provides conclusions of the report

2. PRELIMINARY DEVELOPMENT PROPOSAL

2.1 General

2.1.1 The site near Tin Shui Wai, with a study area of about 16.2 hectares, is located at the east of Tin Tsz Road as shown in **Figure 2.1**. The site is currently zoned as "Recreation" ("REC") on the approved Ping Shan Outline Zoning Plan No. S/YL-PS/18.

2.2 Proposed Development Area Boundary

2.2.1 The site is generally located on a flat area at the western side and a hilly area at the south-eastern side. At the south-eastern portion of the site, the elevation of the site increases from about +5.5mPD at Ha Mei San Tsuen Road to about +19.0mPD at the toe of Kai Shan. In this regard, slope cutting to a gentle gradient of about 26° is required to fulfill the safety standard of slope works. This will cause reduction in the footprint for the public housing development and result in narrow width of the development platform in east-west direction. Retaining structures such as L-shaped retaining wall would occupy space and affect the development footprint while retaining structures involving pile foundation or pile wall would induce cost implication with respect to the large wall retaining height.

2.2.2 Apart from the hilly terrain at the south-eastern portion, it is preliminary estimated that there are approx. 700 nos. of trees at the southern portion of the site. The hilly terrain at the south-eastern portion would require a substantial extent of mitigation works including extensive retaining structures, this would further reduce the footprint for public housing development and may affect the village developments and village houses adjacent to the existing Ha Mei San Tsuen Road.

2.2.3 In view of the above, it is recommended to develop the relatively flat western portion of the site (about 9.0 ha) for about 9,000 to 9,500 no. of flats[1] as indicated in **Figure 2.2**. Development at the remaining part of the site (i.e. south-eastern portion of the site) should be subject to further separate study.

2.3 Development Layout

2.3.1 According to the preliminary housing layout plan, the site will accommodate 10 residential blocks with maximum building height up to +160 mPD for providing about 9,000 to 9,500 nos. of flats. The preliminary housing layout plan is preliminary and indicative only for purpose of technical assessments to support the proposed zoning amendment and subject to review in the later investigation and design stage . The public housing development will be supported by retail facilities, welfare facilities, car park and a Public Transport Interchange (PTI). Other infrastructural supporting facilities outside the public housing boundary include a new access road, extension of the existing footbridge, floodwater retention tank and associated pumping station and sewage pumping station, etc. The proposed development layout plan is shown in **Figure 2.3**.

[1] Subject to the Public Rental Housing (PRH): Subsidized Sale Flats (SSF) mix ratio to be further reviewed in the investigation and design stage, about 9,500 to 11,200 no. of flats (with 10% design buffer) are adopted in the preliminary technical assessments for purposes of conservative assessments.

2.3.2 Four (4) types of site boundaries are presented in **Figure 2.3**, the Study Boundary is representing the extent of boundary that stipulated in the Brief. The Proposed Development Area Boundary is formulated by optimizing the Study Boundary which excluding some areas that will not be developed at this stage such as the southern side of the site. The Proposed Works Area Boundary is the extent of land required for the proposed works, including the extent of proposed development area, the works area for the new access road and the pipe laying works at southern side. The Proposed Housing Site Boundary is representing the indicative extent of the area that will be utilized for the proposed public housing development and provision of associated facilities for the housing site.

2.3.3 The preliminary development parameters[4] are summarized in **Table 2.1a** and **Table 2.1b** respectively

Table 2.1a Development Parameters Table

Development Parameters	
Site Area	
Proposed Development Site Area	9.0 ha
Proposed Housing Site (Net Site Area)	6.2 ha
Maximum Building Height	160mPD
Maximum Permitted Plot Ratio	
Domestic	6.5
Non-Domestic	0.2[1] (under OZP)
Total Plot Ratio	6.7 (under OZP)
GFA	
Domestic	403,215 m^2
Commercial	8,790 m^2
Welfare Facilities[2]	19,900 m^2
Other non-domestic GFA	
Estate Management Office (EMO)	1,000 m^2
19 CR kindergarten classrooms	2,490 m^2
Ancillary Carpark	53,305 m^2
Public Transport Interchange (PTI) (within Housing Site Boundary)	3,400 m^2
Average Flat Size	42 m^2
Number of Flats[3]	9,000 to 9,500
Population[3]	24,300 to 25,650
Target Population Intake	2033

Table 2.1b Development Parameters Table for other facilities

Other facilities	**Area Reserved**
Floodwater Pumping Station	900 m^2
Retention Tank (Volume = 10,300 m^3)	2,500 m^2
Sewage Pumping Station (ADWF of the development = 7,120 m^3)	900 m^2

Remarks

[1] *The accountable non-domestic GFA would only include commercial facilities, kindergarten, and Housing Authority's ancillary facilities including EMO. Welfare facilities, ancillary carpark and PTI are not included in the calculation of non-domestic plot ratio and total plot ratio. For purpose of conservative assessment, a non-domestic PR of 0.5 has been adopted in the technical assessments.*

[2] *Details of welfare facilities to be provided are subject to review and will be determined by relevant government departments at detailed design stage.*

[3] *10% of design buffer has been considered in the technical assessments to allow design flexibility at later design stage. Worst scenarios of 9,500 – 11,200 no. of flats, depending on different mixing ratio of housing types, have been adopted in the technical assessments.*

[4] *Subject to review at detailed design stage*

2.4 Development Parameters Adopted in Technical Assessment

2.4.1 The mixing ratio of PRH and SSF would be subject to the latest housing policy of the Government. For purpose of conservative assessments, worst scenario of 9,500 -11,200 no. of flats depends on different mixing ratio of housing types have been adopted in the technical assessments. Summary of the different mixing ratio of housing types is shown in **Table 2.2** below.

Table 2.2 Estimation of flat nos. based on different mixing ratio

Scenario	Scenario 1 (100% PRH)	Scenario 2 (Mixing of PRH & SSF)	Scenario 3 (100% SSF)
Flat no. (Total)	10,200	9,500	8,650
Flat no. (10% contingency included)	11,200	10,500	9,500

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3. PRELIMINARY TRAFFIC AND TRANSPORT IMPACT ASSESSMENT

3.1 Introduction

3.1.1 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 public housing development.

3.2 Approach and Methodology of the TTIA

Area of Influence (AOI)

3.2.1 The agreed AOI for assessment under this study are presented in **Figure 3.1**, which included the following key junctions and road links:

Table 3.1 Key Junctions and Road Links within the AOI

Name	Location	Type
J1	Ha Mei San Tsuen Road/ Long Tin Road/ Tin Tsz Road/ Tin Fuk Road	Signalised Junction (S)
J2	Shui Pin Wai Interchange	S
J3	Tin Fuk Road/ Ping Ha Road/ Tin Yiu Road	S (with LRT)
J4	Ping Ha Road/ Tin Ying Road	S
J5	Tin Tsz Road/ Tin Wah Road	S
J6	Tin Shing Road/ Tin Fuk Road	S
J7	Tong Yan San Tsuen Interchange Northbound Slip Roads	Priority Junction (P)
L1	Tong Yan San Tsuen Interchange South-Eastbound Slip Road	Link
L2	Tong Yan San Tsuen Interchange South-Westbound Slip Road	Link
L3	Tong Yan San Tsuen Interchange West-Northbound Slip Road	Link
L4	Tong Yan San Tsuen Interchange Northbound Slip Road	Link
L5	Tong Yan San Tsuen Interchange East-Northbound Slip Road	Link

3.2.2 The existing capacity issues will be analysed based on the junction capacity analysis as well as the road link capacity analysis. The existing operational performances of the critical junctions will be assessed by means of the Reserve Capacity (RC) for signalised junctions and the Design Flow to Capacity (DFC) for roundabouts and priority junctions. Junction capacity analysis will be carried out for the key junctions to appraise the existing traffic condition based on the 2019 observed peak hour traffic flows. The capacity analysis will be undertaken in accordance with the methods stated in the Transport Planning and Design Manual (TPDM) published by the Transport Department (TD). Apart from the junction capacity analysis, the performances of major road links within the AOI will be reviewed.

Traffic Surveys and Assessment of Existing Road Network

3.2.3 Manual classified traffic count survey was conducted on typical weekdays in April and May 2019 during 07:00-09:30 and 17:00-19:00 for the critical junctions and links within the AOI. Based on the surveyed results, the morning peak and evening peak hour periods were 07:30-08:30 and 17:30-18:30 respectively.

3.2.4 The assessment results indicate that, within the AOI, existing capacity issues are mainly present at Tong Yan San Tsuen Interchange, especially on the slips roads connecting to urban area. There are no capacity issues on the local road network in Tin Shui Wai.

Traffic and Transport Modelling

3.2.5 It is expected that future traffic condition of road network surrounding the project development will not explicate dynamic changes because majority of the roads adjoining the site are local roads that would not be the desirable routes for other developments to travel for access to other urban areas. As a substantial proportion of the development traffic is anticipated to access Yuen Long Highway via Tong Yan San Tsuen Interchange, serving traffics from Tin Shui Wai, Yuen Long and Ping Shan areas, a local area traffic model would be constructed based on the 2015 Base District Traffic Model (BDTM) of Tuen Mun and Yuen Long area to forecast the design year traffic at the interchange. Cumulative impacts of planned developments in the region also affecting Tong Yan San Tsuen Interchange would be taken into consideration in the local area traffic model for background traffic forecast. It is therefore considered reasonable that the TTIA is to be conducted without the use of territory-wide strategic model. A sub-regional traffic model covering the AOI should be adopted for the TTIA.

Assumptions for Traffic Forecast

3.2.6 As the project commenced in August 2018 and road options have already been tested based on preliminary forecasts using 2014-Based Territorial Population and Employment Data Matrix (TPEDM), it is proposed to adopt the 2014-Based TPEDM for TIA under this Study.

3.2.7 Furthermore, comparing the population and employment data forecast of the 2014-Based TPEDM and 2016-Based TPEDM, there would not be significant differences between the two sets of data for the zones in vicinity of the development site. Therefore, the 2014-Based TPEDM was considered acceptable to reflect the update-to-date planning data for areas related to this TIA.

3.2.8 As the anticipated intake year for the public housing developments are 2033, the traffic assessment for the design year of 2036 would be adopted (3 years after population intake), The traffic generated / attracted during the construction and operation stage of other planned major developments/ infrastructures would be included to assess cumulative traffic impact. Details and results of the operational traffic forecast are presented in **Section 3.3**.

3.3 Operational Traffic Impact Assessment and Mitigation Measures

3.3.1 The performances of the junctions were assessed based on the traffic forecasts for the reference scenario (without the development) and design scenarios (with the development site under the proposed road scheme) in Year 2036.

3.3.2 Trip generation and attraction were estimated in accordance to the mean trip rates in TPDM. Trip rates for Subsidized Housing: SSF was adopted in the traffic impact assessment as it would generate the most traffic after testing the 3 abovementioned scenarios stipulated in **Table 2.2** with different ratio of PRH and SSF. Therefore, 100% Subsidized Housing: SSF was adopted for TTIA under this study to cover the worst-case scenario in term of trip generation.

Assessment of Major Junctions

3.3.3 The assessment results for critical junctions in design year 2036 are presented in **Table 3.2**.

Table 3.2 Critical Junction Performance for Design Year 2036

Junction No.	Junction Name	Junction Type(1)	RC(2) / DFC(3)					
			2036 Reference Scenario		2036 Design Scenario		2036 Design Scenario with Improvements	
			AM	PM	AM	PM	AM	PM
J1	Ha Mei San Tsuen Road/ Long Tin Road/ Tin Tsz Road/ Tin Fuk Road	S	25%	19%	18%(4)	15%(4)	-	-
J2	Shui Pin Wai Interchange	S	4%	17%	2%	17%	18%	23%
J3	Tin Fuk Road/ Ping Ha Road/ Tin Yiu Road	S (With LRT)	76%	48%	63%	24%	-	-
J4	Ping Ha Road/ Tin Ying Road	R	0.87(5)	0.77(5)	0.91(5)	0.78(5)	-	-
J5	Tin Tsz Road/ Tin Wah Road	S	>100%	>100%	**-21%**	**-3%**	2% *30%(6)*	15% *24%(6)*
J6	Tin Shing Road/ Tin Fuk Road	S	59%	53%	44%	41%	-	-
J7	Tong Yan San Tsuen Interchange Northbound Slip Roads (between L3 and L4)	Will be modified and deleted under the proposed improvement works under Yuen Long South development						

Notes:

(1) P – Priority Junction; R – Roundabout; S – Signalised Junction.

(2) A positive RC indicates that the junction is operating with spare capacity. A negative RC indicates that the junction is overloaded that would result in traffic queues and longer delay time.

(3) DFC = 1.0 indicates continual queuing and could not be considered acceptable. DFC = 0.85 indicates that queuing would theoretically be avoided in 85% of cases, can be considered reasonable. DFC = 0.7 indicates that queuing would be avoided in 95% of cases.

(4) Junction performance based on conservative traffic flow generation, assuming 100% subsidized housing with 10% contingency

(5) Junction design/improvement under review by Hung Shui Kiu/ Ha Tsuen New Development Area (HSK/HT NDA) project and further assessment will be conducted in the investigation, design and construction stage according to latest junction layout under HSK/HT NDA.

(6) Junction performance on Junction J5 under alternative scheme subject to further reviewed in later Investigation, Design and Construction stage of the Project.

3.3.4 As shown in **Table 3.2**, most of the critical junctions in the AOI would have sufficient capacity to cater for the design scenario in 2036 except Junction J2 and J5. Junction J2 would operate over capacity under the reference scenario due to background traffic increase. The development traffic generated from the Site would not have significant impact on this junction.

3.3.5 For Junction J5, there are plenty capacity under the reference case. With all development traffic generated from the Site travelling through this junction, the junction performance worsened under the design scenario to negative value during the morning peak. This is due to the heavy left turn movement from Tin Wah Road westbound into Tin Tsz Road southbound.

Mitigations Measures

3.3.6 For Junction J2, improvement scheme was proposed under other projects. RC would be improved to 18% and 23% in morning peak and afternoon peak respectively if future improvement scheme proposed under other projects are taken into consideration. As the programme for the proposed improvement scheme is not yet confirmed at this stage, possibility for adopting the improvement for J2- Shui Pin Wai Interchange under this project would be considered. The improvement scheme would be further reviewed in the investigation and design stage.

3.3.7 For Junction J5, dedicated left turn lane is proposed at the junction and junction performance would be improved to 2% during morning peak. The proposed improvement is presented in **Figure 3.2.** In view of a low reserve of junction performance, alternative scheme as illustrated in **Figures 3.3** has also been proposed for achieving a better performance (>15%) on this junction subject to further review on land utilities and noise issues in later investigation and design stage of the Project.

Assessment of Road Links

3.3.8 The critical links at Tong Yan San Tsuen Interchange were also assessed based on the traffic forecast, taking into consideration of proposed improvements under concurrent projects. The assessment results for critical links are presented in **Table 3.3**.

3.3.9 As shown in **Table 3.3**, based on the improvement works proposed under Yuen Long South development, the link capacity of Link L2 and L5 were increased due to additional lane at these locations. Most of the links would be operating with spare capacity apart from Link L1. With single-lane arrangement maintained under the improved layout, the V/C ratio of Link L1 for reference and design scenario in 2036 were estimated to be 1.08 and 1.14 in morning peak and 1.13 and 1.16 in evening peak respectively. Due to background traffic flow increase and additional development traffic from the proposed housing development within the Site in 2036 would only incur a small fraction contributing to the high V/C ratio. The underlying problems are mainly strategic issues in the area, including:

- the increasing traffic demand on this link between planned developments in areas north of Yuen Long Highway and urban areas;
- the limited link capacity due to single-lane arrangement; and
- lack of alternative routes for traffic going to urban area.

3.3.10 It is noticed that possible improvement schemes / upgrading of Tong Yan San Tsuen Interchange are being pursued under Yuen Long South Development which has yet finalised. A detailed traffic and transport impact assessment will be carried out in the later investigation and design stage of the Project to assess whether the improvement/ upgrading works can accommodate the additional traffic flow arising from the Project and the public housing developments in the vicinity. The implementation arrangement of any necessary improvement/upgrading works will be proposed and investigate at later stage.

Table 3.3 Critical Link Performance for Design Year 2036

Link No.	Location	Direction	Capacity (pcu/hr)	2036 Reference Scenario				2036 Design Scenario			
				Traffic Flows (pcu/hr)		V/C Ratio		Traffic Flows (pcu/hr)		V/C Ratio	
				AM	PM	AM	PM	AM	PM	AM	PM
L1	Tong Yan San Tsuen Interchange Slip Road	South to East	1800	1950	2025	1.08	1.13	2050	2085	1.14(2)	1.16(2)
L2	Tong Yan San Tsuen Interchange Slip Road	South to West	3600	1675	1480	0.47	0.41	1725	1515	0.48	0.42
L3	Tong Yan San Tsuen Interchange Slip Road	West to North	1800	1025	1420	0.57	0.79	1185	1505	0.66	0.84
L4	Tong Yan San Tsuen Interchange Slip Road	North	1800	1230	1540	0.68	0.86	1400	1625	0.78	0.90(2)
L5	Tong Yan San Tsuen Interchange Slip Road	East to North	3600	1325	2240	0.37	0.62	1355	2285	0.38	0.63

Notes:

(1) A v/c ratio equal to or less than 1.0 indicates that a road has sufficient capacity to cope with the volume of vehicular traffic under consideration and the resultant traffic will flow smoothly. A v/c ratio above 1.0 indicates the onset of congestion. A v/c ratio above 1.2 indicates more serious congestion with traffic speeds deteriorating progressively with further increase in traffic.

(2) Improvements on Tong Yan San Tsuen Interchange (TYSTI) are being reviewed under Agreement No. CE58/2019(CE). Further review on link assessment will be conducted with reference to finalized layout of TYSTI.

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3.4 Construction Traffic Impact Assessment

3.4.1 The design year for construction TIA is assumed to be 2033 for the worst case scenario, just before the planned population intake. It is assumed that the peak construction traffic to be generated by site formation works is around 50 pcu/hour in both directions. Based on the location of public dumping sites, the construction vehicles are most likely to travel to dumpling site at Tuen Mun 38 in North West Territories via Link L2 and Yuen Long Highway. The final destination of the construction vehicles would be subject to future arrangement during the detailed design and construction stage.

3.4.2 The construction TIA were therefore conducted based on the above assumptions for critical junctions and links within the AOI. The results are presented in **Tables 3.4 and 3.5**.

Table 3.4 Critical Junction Performance in Design Year 2033

Junction No.	Junction Name	Junction Type(1)	2033 Reference Scenario		2033 Design Scenario (with Construction Traffic	
			RC(2) / DFC(3)		RC(2) / DFC(3)	
			AM	AM	AM	PM
J1	Ha Mei San Tsuen Road/ Long Tin Road/ Tin Tsz Road/ Tin Fuk Road	S	37%	34%	37%	34%
J2	Shui Pin Wai Interchange	S	7%	16%	7%	16%
J3	Tin Fuk Road/ Ping Ha Road/ Tin Yiu Road	S	64%	55%	64%	55%
J4	Ping Ha Road/ Tin Ying Road	S	7%	2%	7%	2%
J5	Tin Tsz Road/ Tin Wah Road	S	>100%	>100%	>100%	94%
J6	Tin Shing Road/ Tin Fuk Road	S	67%	59%	67%	59%
J7	Tong Yan San Tsuen Interchange Northbound Slip Roads (between L3 and L4)	Will be modified and deleted under the proposed improvements works under Yuen Long South development				

Notes:
(1) P – Priority Junction; R – Roundabout; S – Signalised Junction.
(2) A positive RC indicates that the junction is operating with spare capacity. A negative RC indicates that the junction is overloaded that would result in traffic queues and longer delay time.
(3) DFC = 1.0 indicates continual queuing and could not be considered acceptable. DFC = 0.85 indicates that queuing would theoretically be avoided in 85% of cases, can be considered reasonable. DFC = 0.7 indicates that queuing would be avoided in 95% of cases.

3.4.3 As shown in **Table 3.4**, most of critical junctions in the AOI would still operate within capacity under both scenarios in design year 2033. The results for design scenario are almost identical as the reference scenario, indicating that impact of additional construction traffic on these junctions are negligible. For junction J2 during morning peak and J4 during both peaks, reserved capacity would be positive but below 15% in both reference and design scenario. This is due to the background increase of traffic in the area. The construction traffic would not pass these junctions and have no adverse impacts on them.

Table 3.5 Critical Link Performance Design Year 2033

Link No.	Location	Direction	Capacity (pcu/hr)	2033 Reference Scenario				2033 Design Scenario (With Construction Traffic)			
				Traffic Flows (pcu/hr)		V/C Ratio		Traffic Flows (pcu/hr)		V/C Ratio	
				AM	PM	AM	PM	AM	PM	AM	PM
L1	Tong Yan San Tsuen Interchange Slip Road	South to East	1800	1890	1780	1.05	0.99	1890	1780	1.05	0.99
L2	Tong Yan San Tsuen Interchange Slip Road	South to West	3600	1600	1680	0.44	0.47	1650	1730	0.46	0.48
L3	Tong Yan San Tsuen Interchange Slip Road	West to North	1800	1105	1555	0.61	0.86	1105	1555	0.61	0.86
L4	Tong Yan San Tsuen Interchange Slip Road	Northbound	1800	1345	1690	0.75	0.94	1345	1690	0.75	0.94
L5	Tong Yan San Tsuen Interchange Slip Road	East to North	3600	1405	2310	0.39	0.64	1455	2360	0.40	0.66

Note:

(1) A v/c ratio equal to or less than 1.0 indicates that a road has sufficient capacity to cope with the volume of vehicular traffic under consideration and the resultant traffic will flow smoothly. A v/c ratio above 1.0 indicates the onset of congestion. A v/c ratio above 1.2 indicates more serious congestion with traffic speeds deteriorating progressively with further increase in traffic.

(2) Improvements on Tong Yan San Tsuen Interchange (TYSTI) are being reviewed under Agreement No. CE58/2019(CE). Further review on link assessment will be conducted with reference to finalized layout of TYSTI.

3.4.4 As shown in **Table 3.5**, most of the links would be operating with spare capacity, except Link L1 which would be operating near capacity with the V/C ratio to be 1.05 and 0.99 in morning peak and in evening peak respectively in both reference and design scenarios. As construction traffic is not anticipated to affect L1, this is due to the background increase of traffic in the area. Improvement scheme on TYSTI is being reviewed under Agreement No, CE 58/2019(CE).

3.5 Pedestrian Facilities

3.5.1 Under the proposed road scheme, a minimum 2m wide footpath would be provided along a section of western side and all along eastern side of the proposed access road to connect with the existing footpaths on Tin Wah Road and Wetland Park Road to the housing site as shown **in Figure 3.4**. An uncontrolled cautionary crossing is proposed to provide connection between the footpaths on each side of the access road.

3.5.2 Extension of the existing footbridge NF360 across Tin Tsz Road to the housing site could be established to connect the housing site with Tin Pak Road Park, which is close to shopping malls and community facilities in Tin Shui Wai.

3.6 Parking Provisions

3.6.1 Parking provisions for the development site would be estimated according to the latest parking standards in Hong Kong Planning Standards and Guidelines (HKPSG). It is proposed to provide the upper bound of the parking provisions under the latest standards in the HKPSG as far as practicable.

3.7 Public Transport Services

3.7.1 To consider the worst-case scenario in terms of public transport (PT) services, Scenario 1 in **Table 2.2** with 11,200 number of flats with the highest population was adopted in the estimation. Based on the estimated public transport demand, a public transport interchange (PTI) is proposed to provide sufficient pick-up/set-down bays cum stacking areas for franchised bus (FB), green minibus (GMB) and taxi for loading/unloading. Details of provisions of public transport services the preferred mode of operation would be further reviewed in later stage. The preliminary layout of the PTI is illustrated in **Figure 3.5**. The layout will be reviewed at later investigation and design stage. Sufficient space will be reserved for provision of Sawtooth PTI and necessary ancillary facilities, e.g. bus operator kiosks, toilets and other essential facilities as mentioned in TPDM.

3.7.2 In view of the long walking distance (over 500m) between the housing site and the nearest railway station (i.e. Tin Shui Wai Station), connection between railway stations and the housing site would be catered by feeder bus and / or GMB services.

3.7.3 It is estimated that approximately 1,089 passengers per hour would be generated by the proposed public housing development to use West Rail Line. As this is only an insignificant fraction of the carrying capacity of the West Rail Line, it is considered that the proposed public housing development would not cause significant impact to the West Rail Line.

3.7.4 It was estimated that additional 122 passenger per hour would be generated by the proposed public housing development for Light Rail Transit (LRT) services near the housing site. It is estimated that the additional passengers generated from the proposed public housing development can be catered by the spare capacity of the LRT routes.

3.8 Conclusion

3.8.1 Traffic forecasts were conducted for design year 2036 including all major planned developments and junction/ road improvement works in the area. A total of 7 key junctions and 5 road links were assessed.

3.8.2 The assessment result indicates that critical road junction J5 (Tin Tsz Road/ Tin Wah Road) would operate over capacity in Design Scenario 2036. Junction Improvement works are proposed to mitigate the traffic impact.

3.8.3 For Junction J2, improvement scheme was proposed under other projects. The junction would operate with spare capacity if future improvement scheme proposed under other projects are taken into consideration. As the programme for the proposed improvement scheme is not yet confirmed at this stage, possibility for adopting the improvement for J2-Shui Pin Wai Interchange under this project would be considered. The improvement scheme would be further reviewed in the investigation and design stage.

3.8.4 Most of the road links would be operating with spare capacity apart from Link L1 (Tong Yan San Tsuen Interchange South-Eastbound Slip Road). However, it is noticed that possible improvement schemes / upgrading of Tong Yan San Tsuen Interchange are being pursued under Yuen Long South Development which has yet finalised. Proposed improvement works at Tong Yan San Tsuen Interchange shall be further discussed / liaise with relevant departments.

3.8.5 Under the proposed road scheme, a minimum 2m wide footpath would be provided along a section of western side and all along eastern side of the proposed access road to connect with the existing footpaths on Tin Wah Road and Wetland Park Road to the housing site. Extension of existing footbridge over Tin Tsz Road to the Site is proposed to improve the connectivity for pedestrian.

3.8.6 Additional public transport services including feeder services to railway stations, FB and GMB services are proposed to cater for the demand of the proposed public housing developments. A Public Transport Interchange will be proposed within the proposed public housing development to provide sufficient loading/unloading bays for FB, GMB and taxi services. Details of provisions of services of public transport services and the preferred mode of operation would be further review in later stage.

3.8.7 The overall performance of critical links and junctions were considered acceptable with implementation of proposed improvement schemes within the AOI and there would be no significant issue on the proposed developments from traffic point of view.

4. PRELIMINARY GEOTECHNICAL ASSESSMENT

4.1 Introduction

4.1.1 The objective of this chapter is to:

- Identify all potentially significant ground and geotechnical engineering constraints associated with the Developments and the Infrastructural Works;
- Recommend solutions to the ground and geotechnical engineering constraints and confirm the technical and economic feasibility of the proposed Developments and Infrastructural Works;
- Study, identify and evaluate all potential risks arising from natural terrain hazards for the Developments and the Infrastructural Works and assess the need for hazard mitigation measures in accordance with GEO Report No. 138 (2nd Edition).

4.2 Geology and Hydrogeology

Site Geology

4.2.1 The superficial geology of the Site mainly comprises intertidal deposits (Qhi) of Hang Hau Formation at the western portion of the Site while the majority of eastern portion of the Site is covered with a layer of terraced alluvium (Qca) of Chek Lap Kok Formation comprising well-sorted to semi-sorted clay/silt, gravelly sandy. Colluvium (Qcd) are mapped on the natural terrain and at the footslope areas of Kai Shan.

4.2.2 The Site is expected to be underlain by a few metres of fill materials in highly variable composition, a few meters of marine deposits and then a layer of alluvium/pond deposits. The intertidal/marine deposits encountered within Tin Shui Wai area and its vicinity area generally comprise a relatively uniform layer of very soft to soft, silty clay or silt/clay with local sand lenses. Based on the available ground investigation (GI) records, terraced alluvium associated with drainage channel transects the Site may be up to 6 m thick and the thickness is expected to increase from east to west.

4.2.3 The Site falls within the Scheduled Area No. 2, the solid geology of the Site and nearby area comprises metasiltstone of Lok Ma Chau Formation (Cslm_ztm). The Cslm_ztm is in turn underlain by the subcrops of Yuen Long Formation, Long Ping Member (Csyl) and is inferred to comprise Carboniferous metasedimentary rocks, including grey marble which are subjected to risk of dissolution and deep cavities. Based on the existing GI information at Tin Shui Wai area, cavity infill/cavity deposits/karst deposits have been recorded but no marble has been identified.

4.2.4 The Site is located within a fault-bounded area. A few northwest-southeast trending transverse faults were inferred traversing through the Site, also major northeast-southwest trending inferred faults are mapped in general area of the Site. At areas with marble/cavity, it is inferred that the rockhead profile would be more undulating within a short distance.

4.2.5 Neither marble-bearing rocks nor fault-related features are observed in drillholes at Tin Tsz Road, as well as drillholes at the peripheral of the site. It is inferred that the potential for the presence of deep weathering zone within the site is low based on existing GI information.

Ground Conditions

4.2.6 Based on the available GI information, it is estimated that Category 2 rock will generally be encountered from -60mPD at the west to +10mPD at the east. No marble has been identified in the vicinity of the site. In general, fill is encountered in most boreholes and the maximum thickness reaches 10.3m. Alluvium deposits are encountered below the fill layers. The thickness ranges between 1m and 13m. Completely to Highly Decomposed Metamorphosed Sandstone and Siltstone (CDS) are found above the bedrock. Six geological sections, Sections A1-A1 to F1-F1 have been constructed across the site to illustrate the site topography and sub-surface ground conditions. The section locations and sections are shown in **Figure 4.1 to Figure 4.3**.

Groundwater Conditions

4.2.7 The groundwater level is approximate -1.33mPD to +3.26mPD for the site. The groundwater level is quite close to the ground surface within the site.

4.3 Preliminary Geotechnical Assessment

Geotechnical Constraints

4.3.1 Geotechnical constraints of the site were summarised and discussed below and presented in the Geotechnical Constraint Map as shown in **Figure 4.4**. It is concluded that there should be no adverse effect added on to the proposed development with the current available information. However, extra caution and further recommendation should be provided regarding the constraints during investigation and detailed design stage.

Geotechnical Constraints - Adjacent Man-made Slopes

4.3.2 According to the Slope Maintenance Responsibility Information System (SMRIS) record, there are 11 man-made slopes within or straddling across the development site. The degree of compaction of existing fill slopes should be verified upon further site investigation (SI).

Geotechnical Constraints - Various Rockhead Contour

4.3.3 As mentioned in **Para. 4.2.4**, few northwest-southeast trending transverse faults were inferred traversing through the Site, also major northeast-southwest trending inferred faults are mapped in general area of the Site. The presence of fault may induce deep weathering profile which may cause local deepening of rockhead and thus pile lengths. The various rockhead should be reviewed based on the results of further SI works. Deep rockhead will limit the choice of foundation systems.

Geotechnical Constraints - Scheduled Area No. 2

4.3.4 The site is within Scheduled Area No. 2 in which cavity deposits were commonly recorded in boreholes together with the presence of meta-sedimentary rocks and/or marble. From the existing GI information, the bedrock encountered in the vicinity of the site is mainly metasiltstone and metasandstone. Although no marble has been identified in the vicinity of the site based on available information, possibility of cavernous marble or marble bearing rock cannot be totally ruled out, further SI should be carried out to assess the presence of the cavities and their effect to the foundation works of the Project in accordance with WBTC No. 4/2004.

Geotechnical Constraints - Inferred Fault

4.3.5 As mentioned in **Para. 4.3.4**, based on the available GI information, it is estimated that Category 2 (Table 2.1, Foundation code 2017, Building Department) or better bedrock with presumed bearing capacity of 3000 kPa would be encountered, further GI works for verification will be carried in later investigation and design stage of the Project.

Geotechnical Appraisal related to existing registered and unregistered Slopes and Retaining Walls

4.3.6 A total of eleven (11) registered man-made features (Feature Nos. 6NW-B/C77, 6NW-B/C83, 6NW-B/C84, 6NW-B/C86, 6NW-B/F146, 6NW-B/F187, 6NW-B/F199, 6NW-B/F208, 6NW-B/FR209, 6NW-B/FR210 and 6NW-B/F212) and four (4) unregistered features (Feature nos. URS1 to URS4) shown in **Figure 4.4**, comprising cut slopes, fill slopes and retaining walls have been identified within and/or in the vicinity of the Site. Among these features, four (4) of the registered features will be affected by the proposed development; no unregistered features will be affected by the proposed development. The details of the four (4) features which will be affected by the proposed development are shown in **Table 4.1** below.

Table 4.1 Summary of Impacts to Existing Registered and Unregistered Slopes and Retaining Walls

No.	Feature No.	Feature Type	Envisaged Impact	Proposed works required in view of the Development
1	6NW-B/F187	F	Modified	Proposed Access Road
2	6NW-B/F208	F	Modified	Proposed Access Road
3	6NW-B/FR209	FR	Modified	Proposed Access Road
4	6NW-B/FR210	FR	Modified	Proposed Access Road
5	6NW-B/C77	C	No impacts but to be reviewed subject to future development plan.	Within the Study Area but outside proposed development
6	6NW-B/C83	C		
7	6NW-B/C84	C		
8	6NW-B/C86	C		
9	6NW-B/F146	F		
10	6NW-B/F199	F		
11	6NW-B/F212	F		
12	Unregistered Slope URS1	F	No impacts but to be reviewed subject to future development plan.	Within the Study Area but outside proposed development
13	Unregistered Slope URS3	F		In vicinity of Study Area
14	Unregistered Slope URS2	F		In vicinity of Study Area
15	Unregistered Slope URS4	F		Within the Study Area but outside proposed development

4.3.7 The remaining features are located far away from the proposed road and housing site boundary. They will not affect or be affected by the proposed works with consideration of the travel angle of landslide debris as stipulated in GEO Technical Guidance Note No. 15 (TGN 15). As such, it is considered that they will not affect the proposed development under this project in case of failure.

Evaluation of the Foundation Problems

4.3.8 As mentioned in **Para. 4.2.3**, cavity infill/cavity deposits/karst deposits have been recorded within the Scheduled Area No. 2. The presence of cavity infill/cavity deposits/karst deposits imposes significant geotechnical constraint to the options of foundation scheme. These features impose major constraints on the choice and depth of the shallow foundation and the length of friction piles that could be driven into the ground. In the case of end-bearing piles on rock, the piles would be required to penetrate through the cavities in order to found on sound bedrock.

4.3.9 As mentioned in **Para. 4.2.3**, marble is not generally identifiable from existing GI in vicinity of the Site. In this regard, the foundation problems in relation to the karst features which will affect the disposition of residential blocks are not envisaged at this stage. However, due to limited available GI results within the site, presence of local scale of karst features could not be ruled out. Further vertical drillholes are considered necessary to encounter any karst feature within the site. Inclined drillholes and geophysical surveys may be required to demarcate the extent of karst features subject to the results of further GI works.

4.3.10 In view of the various rockhead as mentioned in **Para. 4.3.3**, different types of foundation system may be required for the housing development. In case end-bearing foundation is adopted, the piles may have to be founded at sufficient depth to encounter sound bedrock. Alternatively, frictions piles may be adopted either in soil or with rock sockets. However, the load carrying capacity of a single friction pile is less than that of an end-bearing pile. As a result, for a given building loading, more extensive and costly foundation works may generally be required for the friction pile scheme.

4.4 Natural Terrain Hazard Assessment

General

4.4.1 Screening has been carried out based on the recommendation of GEO Report No. 138 (2nd Edition), to examine whether the Site may be subject to natural terrain hazards from the catchments. The Study Area for natural terrain hazard assessment has been delineated which generally fulfilled the “Inclusion” guidelines as stated in Section 2.3.2 of GEO Report No. 138 (2nd Edition). The natural terrain hazard screening for each catchment referring to the “Alert Criteria” is discussed in **Para. 4.4.3** to **4.4.6** below.

4.4.2 Six potential natural terrain hazard models, including open hillslope failure, topographic depression failure, channelized debris flow, boulder fall, rock fall and deep-seated failure have been investigated for the catchments which is recommended for further study in **Para. 4.4.6** . A design event approach has been adopted for each of the hazard model of the Study Area. In addition, landslide risks posed from hillside pocket is reviewed where previous anthropogenic disturbance exists. From the appreciation of the locations of past landslide events, slope angle and regolith, a natural terrain hazard map has been produced showing potential source areas in **Figure 4.5**.

Screening of Catchments

4.4.3 Ten number of catchments are identified within the Study Area.

4.4.4 According to the results of screening, Catchments TSW-02, TSW-04, TSW-05, TSW-08 to TSW-10 meet the “Alert Criteria”. As mentioned in the GEO Report No. 138 (2nd Edition), special consideration for dealing with planar hillside catchment is applied to the OH catchments (TSW-02, TSW-05 and TSW-10). Catchments TSW-02 and TSW-10 are open hillslope with no recent and relict landslide, and no sign of distress or evidence of severe erosion can be observed within these catchments. Hence, they have met all the principles of special consideration for OH catchment, and therefore, further study is not recommended. Since a large landslide feature was recorded within catchment TSW-05, based on limited GI information, the possibly for the large landslide feature to be a genuine landslide cannot be ruled out yet, and therefore, further study is recommended for catchment TSW-05.

4.4.5 Referring to *Section 2.3.4* of *GEO Report No. 138 (2nd Edition),* an NTHS may be required for sites that lie beyond the area delineated by the alert criteria for sites that are either intersected by, or adjacent to, a natural drainage course. Catchment TSW-06 is a CD catchment and its drainage lines intersect the proposed Development Site. Considering its angular elevation is slightly lower than 20°, catchment TSW-06 is recommended to be included in the hazard assessment.

4.4.6 As a result, natural terrain hazards assessment is recommended for catchments TSW-04, TSW-05, TSW-06, TSW-08 and TSW-09, and the hazards assessment is discussed below.

Design Event Requirements

4.4.7 Design event approach is adopted in accordance with GEO Report No. 138 (2nd Edition). According to the guidelines on enhanced approach for NTHS, the design requirements for the hillside catchments should be based on a 'Design Event', which is a sufficiently conservative estimate of the credible failure volume at a notional return period of 100 years. The credible failure volume is estimated based on verified recent/relict landslides that occurred within and in the vicinity of the Study Area.

4.4.8 Based on API and field mapping, no multiple recent landslides have been identified or mapped within the Study Area. Hence, the Study Area is not considered particularly active in terms of landslide response to rainfall and the likelihood of concurrent landslides from multiple source areas is low.

4.4.9 The Study Area consists of 13 verified relict landslides located within the Study Area, which the failure volume is estimated ranging from approx. 20-270 m^3. Although there are 2 recent landslides occurred in 2000, these landslides are occurred on unregistered cut slopes and not considered as natural terrain landslide. Design event volume of 270 m^3 is adopted with reference to the largest relict landslide RL1 (ENTLI No. 06NWB0115E), which is credible and reasonably conservative for the Study Area.

Natural Terrain Hazards Assessment

Channelized Debris Flow

4.4.10 Catchments TSW-04, TSW-06 and TSW-08 are classified as CD catchment, where open hillslope failures initiated from TU3 would run into the well-defined drainage lines, and discharge at the mouth of incise drainage channels. Sharp convex break-in-slope at the head and both flanks of the drainage line is considered as the active erosion front, where failure is likely to occur. Any failure from upslope catchment of drainage lines is likely to become channelized debris flow and affect the at-risk facilities at the toe.

Topographic depression failure

4.4.11 Catchment TSW-09 is classified as TD catchment, where the debris from open hillside failure initiated from TU3 will concentrated into the mouth of poorly defined drainage line DL7 and become and debris flow. Sharp convex break-in-slope at the head and both flanks of the drainage line is considered as the active erosion front, where failure is likely to occur. Therefore, the Development Site is susceptible to TDF hazard from catchment TSW-09.

Open hillslope failure

4.4.12 Western portion of Catchment TSW-04, upper portion of catchment TSW-05, lower southern spur of catchment TSW-08, and both flanks of catchment TSW-09 consists of steep terrain of TU2 and directly overlooking the proposed Development Site. The steep terrain in TU2 is susceptible for landslide initiation and may affect the Development Site. Therefore, catchments TSW-04, TSW-05, TSW-08 and TSW-09 may be susceptible for OHL hazard.

Boulder fall / rock fall

4.4.13 According to GEO Report No. 138 (2nd Edition) para 2.3.5, "it is necessary to establish that there would be a significant risk before any further action is taken to deal with the boulders". There is no known record of boulder fall incident reaching the site or close to the development. Based on API and field mapping, only some small corestones were observed at the crest of catchments TSW-04, TSW-05 and TSW-06. No potential unstable boulders can be identified in field mapping. The potential for boulder fall hazard affecting the proposed Development Site is considered to be low. However, as the coverage of field mapping is limited, the potential for boulder fall hazard shall be reviewed during detailed design stage.

4.4.14 No prominent rock outcrop can be observed in API and during field mapping. Therefore, the potential for rock fall hazard is minimal.

Deep seated failure

4.4.15 Neither tension cracks nor signs of distress such as bulging could be identified from API or site observations to indicate a potential deep-seated failure hazard within the Study Area. In addition, although large landslide feature 6NWBL002 is present in catchment TSW-05, the depression is shallow and not related to deep-seated failure. Deep-seated landslides are unlikely to be a significant hazard.

Hillside Pocket

4.4.16 In general, the natural terrain within the Study Area has been slightly disturbed by ancient agricultural activities, but these features are mostly degraded and unlikely to affect the slope stability. Also, no fill material can be identified relating to agricultural activities.

4.4.17 Based on API, there are a few fill bodies in associate with graves have been identified in 1963 at catchment TSW-04, TSW-05, TSW-08 and TSW-09. Some of them are located at relatively steep terrain in upper catchment or at a close proximity of drainage line, which have hazardous factors for landslide initiation in hillside pocket. However, these fill bodies are generally small, the design event of 270 m3 adopted for OHL, TDF and CDF would adequately cover the risk arise from hillside pocket.

Run-out Analysis

4.4.18 DAN-W (Release 10) has been used to predict the extent of debris runout and mitigation design parameters for potential OHL, TDF and CDF hazards as identified in **Para. 4.4.10 to 4.4.17**. The results are shown in **Figure 4.5**.

4.4.19 The modelling results indicate that debris from CDF from catchment TSW-08 and OHL from catchment TSW08 and TSW09 could present risk to the proposed development located at the toe of the Study Area. Therefore, mitigation measures are required for catchments TSW-08 and TSW-09.

Mitigation Measures

4.4.20 The preferred option for natural terrain hazard mitigation works would be delineation of non-building area as shown in **Figure 4.6** for the following reasons:

- No works and maintenance are required
- Cost-saving approach by avoiding the potential natural terrain hazard
- No environmental and visual impact
- Conservation area, graves and burial ground are not affected.

4.5 Conclusion

4.5.1 With the available information at the time of report preparation, geotechnical constraints, including the man-made features, inferred fault, various rockhead contour, etc, have been reviewed and concluded that there should be no adverse effect to the proposed development. Further recommendation should be provided regarding the constraints during later investigation and design stage of the Project.

4.5.2 Further SI should be carried out to assess any adverse geological features including karst features within the Site.

4.5.3 The Site is considered geotechnically feasible for the proposed development based on the current available information.

4.5.4 Following the review of the background information, detailed API, observations from fieldwork and results from run-out analysis, it is considered that catchment TSW-08 poses potential channelized debris flow and open hillslope landslide hazards to the proposed development, while catchment TSW-09 poses potential open hillslope landslide hazards to the proposed development. With the proposed mitigation works of delineation of non-building area, it is anticipated that there is no insurmountable natural terrain hazard to the proposed housing site. However, the proposed non-building areas would be further reviewed at later stage

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5. PRELIMINARY SITE FORMATION ASSESSMENT

5.1 Introduction

5.1.1 This Preliminary Site Formation Assessment aims to assess the site formation requirements for the proposed development and presents recommendations in relation to site formation for the proposed development.

5.2 Site Formation Design Consideration and Constraints

5.2.1 In general, the proposed site formation should be designed to follow the existing drainage characteristics. The *preliminary drainage impact assessment* (DIA) was conducted to assess its drainage impact and formulate the necessary mitigation measures with the associated minimum site formation level for the development site.

5.2.2 The proposed site formation level is designed on basis of the hydraulic requirements as recommended in the preliminary DIA to prevent flooding with adequate freeboard. It should be noted that increase in sea level due to climate change effects has been incorporated in the analysis of water levels in drainage channels.

5.2.3 The proposed site formation level has also been reviewed taken into account the existing topography and access allowed to the adjacent area. The level of the proposed access road should match with the housing site platform as far as practicable to minimize the extent of slopes works and retaining structures and maximize of land use.

5.2.4 A balanced cut and fill approach is adopted as far as practicable in designing the proposed site formation level. It is proposed to form one single platform with a gentle gradient of 1 in 40 for proposed public housing development to provide adequate fall for draining the stormwater runoff within the Site. Temporary peripheral drains will be provided around the development site to collect the surface runoff and divert the collected surface runoff to nearby drainage facilities during construction.

5.2.5 Apart from the levels of the housing site platform and access to adjacent area mentioned in **Para. 5.2.3**, the proposed road formation levels are designed taken into account the invert levels and pipe sizes of drainage and sewerage system beneath the roads. Where possible, to protect the underground installation, a minimum 1m cover to underground installation is allowed in designing the road formation levels.

5.2.6 The existing geological conditions have also been taken into account for the design of site formation works for the proposed developments. Details of the site formation assessments and associated recommendations are discussed in **Section 5.4**.

5.3 Proposed Site Formation Works

5.3.1 As discussed in **Para. 5.2.4**, a balanced cut and fill approach is adopted as far as practicable in designing the proposed site formation levels. The proposed formation levels for the proposed development are shown in **Figure 5.1**. The proposed site formation level ranges from +6mPD to +8.5mPD (for housing site) and from +3.7mPD to +7.5 mPD (for proposed access roads).

5.3.2 Based on the proposed site formation levels and associated cross sections shown in **Figure 5.1** and **Figure 5.2** respectively, it is estimated that approximately 13,800m^3 of material will be excavated and approximately 158,000 m^3 of fill materials are required to achieve the proposed formation levels.

5.4 Site Formation Assessment

Formation of New Slopes and Retaining Walls

5.4.1 Both cutting and filling works will be required throughout the proposed development area to achieve the required development levels and this may necessitate the formation of new slopes and retaining walls. Some of the geotechnical constraints specific to these works are summarized below:

i) Excavation and slope formation work may be required in materials that have persistent weakness planes such as bedding, shear planes, foliation, cleavage etc. This can have implications for rock and soil slope stability, particularly if the weakness planes are adversely oriented with respect to the slope face.

ii) Whilst the majority of excavated soils are likely to be suitable for re-use of fill within the proposed development area. Any unsuitable materials will need to be identified and either treated prior to re-use or removed from the Site.

Although, landscape treatment for new man-made slope and retaining wall is not required in the current feasibility stage. It is recommended to further review the requirement in future design of proposed new man-made slope and retaining wall in accordance to GEO Publication No. 1/2011.

5.4.2 As mentioned in **Para. 4.3.6**, 4 existing man-made structures will be modified by the proposed development including fill slopes and fill slope associated with retaining walls. New retaining walls are also proposed at the access road and along the drainage reserve near Fung Ka Wai with approximate total length of 900m and height range of 0.9m to 4.7m

Ground Settlement

5.4.3 Ground settlement can be induced by additional loads from filling, groundwater drawdown and nearby excavation works. The collapse of cavities within marble could also result in ground subsidence. The largest settlements however typically result from the consolidation of soft/compressible silts and clays as found in the marine/estuarine deposits, pond deposits and alluvium. These settlements can also take many years to complete and as such can affect the progress and programming of the proposed developments. The estimation of the ground settlement caused by the propose filling works should be carried out in the investigation and design stage of the Project.

Groundwater Control

5.4.4 Available data for the development site indicates that the groundwater level is generally high and close to ground surface. Due to relatively high groundwater level, it is likely that groundwater control will be required for the excavation works. The hydrogeological conditions at development site should be further investigated in the investigation stage to ensure that groundwater control measures are adequate and do not have adverse impacts on nearby structures, facilities etc.

Soft/compressible Superficial Deposits within the Development Site

5.4.5 With reference to the discussion in **Para. 4.2.2**, the marine deposits, alluvium and pond deposits are recorded in boreholes in the vicinity of the development site. However, further GI works in the investigation and design stage is required to assess the extent of these materials. Treating the materials in-situ is expected to minimize the need for large scale excavation and disposal of excavated materials.

Handling of Unsuitable Materials

5.4.6 Unsuitable material such as soft clay/silts may be encountered during excavation works within the development site. It is proposed to carry out appropriate soil mixing or cement mixing work to improve the physical properties of these materials such that they can be re-used on site as general fill material if necessary.

5.4.7 Non-inert materials from demolition and construction activities will be reused and recycled within the site as much as possible before disposal. Disposal should be considered as last resort and is proposed to be disposed of at one of the three strategic landfills, according to current practices.

Importation of Fill Material

5.4.8 As the imported fill materials in this project are estimated to be more than 50,000m^3, a Construction and Demolition Material Management Plan (C&DMMP) is required for this Project in accordance with the Project Administration Handbook (Chapter 4 and ETWB TCW No. 19/2005. Based on the preliminary design, it is noted that Tuen Mun Area 38 Fill Bank is the nearest public fill source to the Study Area, the available supply of fill material and location of fill source are subject to further agreement with Public Fill Committee of CEDD in later investigation and design stage.

5.4.9 In addition, various alternative sources for fill materials are identified in this assessment study. The possible fill sources include the following:

(i) Using public fill materials from Fill Banks operated by CEDD;

(ii) Using available public fill materials from other concurrent projects; and

(iii) Purchasing fill material from Mainland China.

5.5 Conclusions and Recommendations

5.5.1 The estimated cut and fill volume for the proposed site formation works is summarized in **Table 5.1** below.

Table 5.1 Estimated cut and fill volume in terms of site formation

Cut (m^3)		Fill (m^3)	Surplus(+) / Deficit (-) (m^3) *(2)*
Unsuitable Soil Materials*(1)*	Suitable Material		
3,970	9,830	158,000	- 148,170

Notes:

(1) Unsuitable materials are mainly referring to (i) Contaminated Materials; (ii) Soft/Compressible Superficial Deposits; and (iii) Non-inert C&D waste from demolition and construction activities.

(2) The volume calculated does not include the volume of excavated material from other infrastructural works (proposed floodwater retention tanks and pumping station, sewage pumping station).

5.5.2 There is no insurmountable technical problem in terms of site formation works at this stage. As only limited geological information can be obtained at the current stage, site specific GI works should be carried out in the investigation and design stage of the Project to further verify the geological conditions of the Site.

6. PRELIMINARY DRAINAGE IMPACT ASSESSMENT

6.1 Introduction

6.1.1 The preliminary Drainage Impact Assessment (DIA) aims to introduce a structured and systematic approach to identify, assess and mitigate potential adverse drainage impacts which might arise from the proposed Developments and the Infrastructure Works, and develop an optimum drainage scheme to support the proposed development.

6.1.2 Findings and recommendations of the DIA are presented in Preliminary Drainage Impact Assessment Report. A summary of the assessment is presented in sections below.

6.2 Methodologies

6.2.1 The DIA study is carried out in accordance with the Environment, Transport and Works Bureau (ETWB) Technical Circular (Works) No. 2/2006, Drainage Impact Assessment Process for Public Sector Projects and Stormwater Drainage Manual. DSD drainage records and the Tin Shui Wai SOBEK hydraulic models had been reviewed.

6.2.2 The SOBEK model formed a baseline scenario of the existing drainage network and the existing paved/unpaved ratio. The post-development scenario is developed based on the proposed paved/unpaved ratio of the proposed development area.

6.2.3 The proposed housing development is located adjacent to Tin Tsz Road. Most of the existing runoff generated is discharged to the existing drainage system in Tin Tsz Road. A floodwater retention tank is proposed to be constructed within the proposed development area to temporarily store the additional runoff generated from the proposed development when required. This temporary storage will be eventually pumped back to the existing drainage system after the rainfall to avoid overloading the drainage system.

6.2.4 The Soil Conservation Services (SCS) Curve Number method as referred to the SOBEK model will be adopted to compute the runoff.

6.2.5 The hydraulic performance of the existing drainage systems which would likely be affected by the proposed housing development has been assessed for the design return period of 1 in 50 to identify boundary condition for the mitigation measures of adverse drainage impact due to the proposed development.

6.2.6 The design maximum water levels of Tin Tsz Road box culvert used in the SOBEK model as the boundary conditions at the downstream end to carry out simulation for the upstream drainage system. The design of drainage pipes proposed under the Project is based on 50 years return period. However, 200 years return period is also considered in site formation design to avoid backflow of water from the existing box culvert. The adopted water levels under various design scenarios are summarized in **Table 6.1** below: -

Table 6.1 Maximum Water Level for Return Periods of Tin Tsz Road Box Culvert

Return Period	Water Level (mPD)
50	4.72
200	5.19

6.3 Existing Drainage System

6.3.1 The Site is located at the eastern region of Tin Shui Wai. The surface runoff in the development site is currently collected by the existing modified watercourse at the centre of the Site. Then, the runoff is converged into two manholes as shown in **Table 6.2** and discharged to the existing box culvert at the Tin Tsz Road on the west side shown in **Figure 6.1**.

Table 6.2 - Summary of Existing Manholes to Existing Box Culvert

Name	DSD Reference	Invert Level	Outlet Pipe Size
Manhole A	SWD1030518	+1.19mPD	1800mm
Manhole B	SWD1030510	+1.23mPD	1800mm

6.3.2 The catchments of the Site are delineated according to the existing site topography, as **Figure 6.1** refers.

Mixed-Use Site (RR_T_EC04) and Carpark Site (OJ-C7A)

6.3.3 The catchments located at the northern side of the Site with approximate ground level +6.4mPD which similar to the site formation level of the proposed development. Part of the runoff from the catchments will flow to the Site including the access road from Tin Wah Road, currently collected by the existing modified watercourse crossing from Fung Ka Wai to existing Tin Tsz Road Box Culvert. Refer to the SOBEK hydraulic model, the runoff is currently discharged to the existing Tin Tsz Road Box culvert.

Kai Shan Site (RR_T_EC02_B)

6.3.4 Kai Shan Site is a hill located adjacent to this Study Site. The runoffs of the catchment fall from Kai Shan to existing natural stream and further convey through Fung Ka Wai via the modified watercourse at Carpark Site (OJ-C7A).

Storage Area Site (258)

6.3.5 The Storage Area located southern side of the existing modified watercourse connected to the Tin Tsz Road. Runoffs from this catchment is currently collected by the existing modified watercourse and lagoon for Ha Mei San Tsuen Stormwater Pumping Station and the existing box culvert in the Tin Tsz Road.

6.4 Potential Drainage Impacts

6.4.1 The potential drainage impacts incurred by the proposed development are as follows:

- Increase in surface runoff due to increase in paved surface

6.4.2 The existing and proposed land uses, in terms Runoff coefficient for each sub-catchment, are summarized in **Tables 6.3** below*.*

Table 6.3 – Land uses of Fixed Runoff Coefficient method for existing and after development scenarios

Site	Catchment Area (ha)	Existing Paved %	Proposed Paved %	Net Increase in Paved Area (ha)
Mixed Use Site (RR_T_EC04)	4.8	90% paved	100% paved	0.48
Carpark Site (OJ-CJA)	3.1	100% paved	100% paved	0
Storage Area Site (258)	3.7	80% paved	100% paved	0.73
Kai Shan Site (RR_T_EC02B)	11.6	85% paved	100% paved	1.74

6.4.3 From **Table 6.3**, additional runoff and increased peak discharge from the sites are anticipated due to the increment of paved surface upon completion of the development.

6.4.4 The potential impacts and the corresponding mitigation measures are analyzed in **Section 6.5** below.

6.5 Proposed Drainage Schemes

Constraints to Site Formation Level

6.5.1 According to **Para. 6.2.6**, the water level of the existing box culvert at Tin Tsz Road will be the constraints to the site formation level. 200 years return period is considered to avoid backflow of water to the development site from the existing box culvert.

6.5.2 The existing modified watercourse between Fung Ka Wai and Tin Tsz Road within the site will be reconstructed to box culvert with a minimum 2m cover. The proposed box culvert shall be equal to or larger than the capacity of the existing modified watercourse (preliminary dimension 3m x 2.5m) and have no adverse drainage impact to the existing drainage system. The preliminary drainage scheme is presented in **Figure 6.2**.

6.5.3 The runoff from Fung Ka Wai and Kai Shan at the north-eastern side of site will be collected by a peripheral U-channel along the development site boundary for subsequent discharge to the proposed box culvert. Another peripheral U-channel along the eastern side of the site will carry the runoff to the south and discharge to the proposed road drainage system and eventually to the proposed box culvert.

Mixed-Use site (RR_T_EC04)

6.5.4 The surface runoff in the Mixed-Use Site within the proposed housing site will be collected by the internal drainage for subsequent discharge to the proposed box culvert within the housing site and finally to the existing box culvert at Tin Tsz Road.

6.5.5 The surface runoff from the proposed access road connecting Tin Wah Road and the development site will be collected by the road drainage for discharging to the proposed box culvert.

Carpark Site (OJ-C7A)

6.5.6 The surface run-off will be collected by the internal drainage within the housing site and the proposed drainage pipes along the periphery of the housing site for discharging to the proposed box culvert.

6.5.7 No additional runoff would be anticipated as the Carpark Site is already paved, there would be no additional runoff contribution to this catchment area. No adverse impact to its drainage performance is expected.

Kai Shan Site (RR_T_EC02_B)

6.5.8 The discharge of the surface runoff arising from Kai Shan Site will be split into two discharge points. Surface runoff from the western portion of the Site and the U-channel along the development site boundary will be discharged to the proposed box culvert at the centre of development site through drainage pipelines. The collected runoff will be discharged to the existing Tin Tsz Road Box Culvert which is currently collecting runoff from Kai Shan. The runoff from the remaining area will be carried to south and temporarily stored in the floodwater retention tank as shown in **Figure 6.2**. The stored runoff will be discharged to the proposed box culvert after the rainfall event.

6.5.9 With the above mitigation measure, the additional runoff due to the development will be stored in the retention tank for discharge to the existing drainage system after rainfall event. Therefore, the proposed development at. Kai Shan Site will require no additional drainage capacity from the existing drainage system. Hence, the impact on existing drainage system is anticipated to be insignificant.

Storage Area Site (258)

6.5.10 Although a small portion of Storage Area Site fall within the Study boundary of the Project, this site mainly refers to the existing Ha Mei San Tsuen Stormwater Pumping Station which largely fall outside the proposed development area and proposed works area. Hence, it is anticipated that runoffs from the proposed development on this Site would impose no adverse burden on the existing drainage system.

Mitigation Measures – Proposed Floodwater Retention Tank

6.5.11 Based on the estimated additional runoff generated from the proposed development, a floodwater retention tank is proposed (10,300m^3 with 10% additional allowance) at the south of the development site as shown in **Figure 6.2**. The capacity of the retention tank is determined to store all the additional runoff generated from the housing development such that the overall amount of runoff remains unchanged to the existing drainage system during the rainfall.

6.5.12 According to the preliminary design, the footprint dimension of the retention tank is about 1,500m^2 and the depth is about 7m. The retention tank volume required is estimated to be 10,300m^3 with 10% additional design buffer allowed. The proposed site formation level would be +7.0 mPD and invert level of the discharge outlet to be +3 mPD subject to further review in the detailed design stage.

6.5.13 The downstream of the retention tank will be connected to the existing box culvert at Tin Tsz Road. A floodwater pumping station is proposed to pump the stored runoff in the retention tank to the existing box culvert when the rainfall end. The preliminary footprint area for the floodwater pumping station is 900m^2 and the depth is around 12m (i.e, 5m deeper than the retention tank for housing the pumping facilities). The proposed invert level to be +0.5mPD subject to further review in the detailed design stage. Therefore, it is anticipated there will be no adverse impact to the existing box culvert and drainage system.

6.6 Conclusion

6.6.1 Based on the findings of the preliminary DIA, a floodwater retention tank is proposed to accommodate the additional runoff generated from the proposed housing development. A floodwater pumping station is also proposed to convey the stored additional runoff to the existing drainage after the rainfall event.

6.6.2 Drainage reserve is proposed along the periphery of the housing site for construction of the proposed drainage channels which is subject to further reviewed at later investigation and design stage.

6.6.3 With the implementation of the above mitigation measures, it is anticipated that there is no adverse drainage impact arising from the proposed development. However, DIA with detailed design of the proposed drainage works and mitigation measures will be carried out at the investigation and design stage.

7. PRELIMINARY SEWERAGE IMPACT ASSESSMENT

7.1 Introduction

7.1.1 This preliminary Sewerage Impact Assessment (SIA) aims to introduce a structured and systematic approach to identify, assess and mitigate potential adverse sewerage impacts which might arise from the proposed Developments and the Infrastructural Works, and to develop an optimum sewerage scheme to support the proposed developments.

7.1.2 Findings and recommendations of the SIA are presented in Preliminary Sewerage Impact Assessment Report. A summary of the assessment is presented in sections below.

7.2 Approach for assessment

7.2.1 The SIA study has been carried out in accordance with the standards set out in the Sewerage Manual (SM) and the guidelines laid down in the Technical Paper on Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning Version 1.0 (EPD, 2005).

7.2.2 The methodology for flow estimation is based on the following steps:

i. Population forecast by categories

ii. Establish additional population and/or industrial development

iii. Calculate flow components by applying appropriate unit flow factor

iv. Estimate planning average dry weather flow

7.3 Existing Sewerage Infrastructure

Existing Sewerage System

7.3.1 The Site is located within the sewerage catchment of San Wai Sewage Treatment Works (SWSTW).

7.3.2 According to DSD's existing sewerage record, there is no public sewers located inside the Site except the sewer at the western fringe of the site. There is an existing Ha Mei San Tsuen Sewage Pumping Station (HMSTSPS) located in the vicinity of the Site. This SPS is receiving sewage generated from Ha Mei San Tsuen via an existing 225mm diameter gravity pipeline system. Upstream section of this gravity pipeline connected with the existing Ha Mei San Tsuen Public Toilet. Sewage collected by HMSTSPS will be transferred to SWSTW via Tin Shui Wai Tin Chuk Street Sewage Pumping Station and Ha Tsuen Sewage Pumping Station.

7.3.3 In general, an existing trunk system of pipe size ranging from 1350mm to 2100mm in diameter running along Tin Fuk Road and Ping Ha Road for collecting sewage from the eastern catchment of Tin Shui Wai to the west. The collected sewage is finally conveyed to SWSTW via Ha Tsuen Sewage Pumping Station.

7.3.4 The layout of the major existing sewerage systems in the vicinity of the Site is shown in **Figure 7.1**. Twin rising main system with 100mm in diameter run along Tin Tsz Road near western edge of the Site which discharges sewage from HMSTSPS to the manholes FMH1023740 and FMH1023763. The downstream of the manholes is a gravity sewer system of 225mm to 300mm in diameter along Tin Tsz Road / Tin Cheung Road.

7.3.5 Under DSD Agreement No. CE30/2006 (DS), Ha Tsuen Sewage Pumping Station (SPS) was expanded with an additional 1200mm diameter rising main constructed in parallel with the original twin 1200mm diameter rising mains. The current capacity of Ha Tsuen SPS is 193,100m^3 per day.

Sewage Treatment Facilities

7.3.6 SWSTW will receive all sewage generated from the existing and planned developments within North West New Territories (NWNT). It is located at Ha Tsuen Road near Hung Shui Kiu. There is a proposal for construction of Hung Shui Kiu Effluent Polishing Plant (HSKEPP) for treatment of sewage generated from Hung Shui Kiu/ Ha Tsuen New Development Areas (HSK/HT NDAs) which will be located in the proximity of the existing SWSTW.

7.3.7 The SWSTW will be upgraded under PWP item 4411DS - Upgrading of San Wai sewage treatment works – phase 1 – Contract No. DC/2013/10, from preliminary treatment to chemically enhanced primary treatment plus disinfections facilities, and increase the treatment capacity to 200,000m^3 per day as shown in **Table 7.1.** The upgrading works has been substantially completed and in operation in Q1/2021.

Table 7.1 Design Flows of SW STW – Phase 1

	Peak Wet Weather Flow (PWWF) (m^3/s)	Peaking Factor	Average Dry Weather Flow (ADWF) (m^3 per day)
Upgrading of SWSTW – Phase 1(1) (substantially completed and in operation in Q1/2021)	5.72	2.55	200,000

Notes: (1) Refer to "DSD Agreement No. CE43/2007 (DS)"

7.3.8 The effluent of the upgraded SWSTW will be discharged to the existing junction chamber of the 9km long NWNT tunnel (of capacity 11.6m^3/s in terms of PWWF) and eventually discharged to the existing Urmston Road Submarine Outfall. The alignment of the existing NWNT effluent tunnel is shown in **Figure 7.1**.

7.4 Preliminary Sewerage Impact Assessment

7.4.1 The unit flow factor in Table T-1 of the Technical Paper on Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) published by EPD has been referred to for the estimation of sewage flow and the relevant unit flow factors are listed in **Table 7.2** below:

Table 7.2 Unit Flow Factors of Domestic Flows

Use	Unit	Global Unit Flow Factors (m^3/day/head)
Public Rental/ Private R1	Head	0.190

Sewage Flow from the Proposed Developments

7.4.2 Scenario 1 (assuming 100% PRH) in **Table 2.2** has been adopted to estimate the average dry weather flows (ADWF) for purpose of conservative assessment. The summary of the average flows is given in **Table 7.3** below.

Table 7.3 Estimated Sewage Flow from the Site

Categories	GFA (m^2)	Population (head)	Unit Flow Factor (m^3/head/day)	ADWF (m^3/d)
Public Rental Housing	443,537 @	30,240 ##	0.19	5,746
Accountable non-domestic GFA (assumed a PR of 0.5)				
Restaurants	3,600	180 *	1.58 ***	285
Retail other than restaurants	5,190	260 *	0.28 **	73
Estate Management Office (EMO)	1,000	50 *	0.28 **	14
Kindergarten (Student)	2,490	380	0.04	16
Kindergarten (Employee)		125 *	0.28 **	35
Others	18,800 #	940 *	0.28 **	264
Non-Accountable non-domestic GFA				
Welfare Facilities	19,900	995 *	0.28 **	279
PTI and Carpark	56,705	2,268 *	0.18 $	408
			Total	**7,120**

@ 10% buffer has been included

** According to HKPSG Chapter 5 Table 2, the worker density shall be in the range of 20-25 sqm/job for business Use. An average of 1 job/20 sqm is assumed and for this Project in general. For conservative assessment purpose, sewage generated from the carpark and PTI is estimated based on 1 job/25 sqm. The GFA for retail, welfare facilities, PTI and carpark are 8,790m^2,19,900m^2,3,400m^2 and 53,305 m^2 respectively.*

*** According to Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning Table T-2, the unit flow factor is assumed to be sum of unit flow factors by commercial employee (0.08) and wholesale & retail/ community, social & personal services (0.2).*

**** According to Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning Table T-2, the unit flow factor is assumed to be sum of unit flow factors by commercial employee (0.08) and restaurants & hotels (1.5).*

$ According to Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning Table T-2, the unit flow factor is assumed to be sum of unit flow factors by commercial employee (0.08) and Transport, Storage & Communication (0.1).

 # For conservative assessment and allowing flexibility in future design, non-domestic plot ratio of 0.5 has been adopted in the assessment. Additional sewage flow is reserved for the non-domestic plot ratio/GFA that have not used up by retail and welfare facilities.

According to Housing Department, 2.7 occupants/ public housing flat has been adopted as the average domestic household size for EFS study.

Remark: In general, the PTI and carpark would not be taken into account in the estimation of sewage flow, they have been considered in the calculation in this Project for conservative approach.

7.5 Mitigation Measures and Proposed Sewerage Scheme

Proposed Sewerage Scheme

7.5.1 A new sewage pumping station and new connecting sewers are proposed to convey the sewage generated from the proposed development to existing sewage manhole (FMH1009269) at invert level +0.74mPD at Tin Fuk Road shown in **Figure 7.1**. The sewage will then be transferred to Ha Tsuen Sewage Pumping Station by gravity flow then ultimately to the upgraded San Wai Sewage Treatment Works (SWSTW) for treatment and eventually discharged to the existing Urmston Road Submarine Outfall.

7.5.2 The spare capacity of HTSPS (48,040m^3/day) and trunk sewers running along Tin Fuk Road and Ping Ha Road are sufficient for receiving the sewage generated from the Site (7,120m^3/day).

7.5.3 In the early stage of the HSK/HT NDA development, the sewage flow from the Advance Works and Stage 1 Works is proposed to be temporarily treated by the upgraded SWSTW. Upon commissioning of proposed YLSEPP in 2032, some sewage flow generated from the Advance Works and Stage 1 of HSK/ HT NDA originally handled by the upgraded SWSTW will be handled by the YLSEPP. Hence, after review with EPD, it is expected that the upgraded SWSTW would have adequate capacity after 2033.

7.5.4 In view of the above, the free up sewage treatment capacity at SWSTW by YLSEPP after 2032 could be utilized to collect sewage generated from the Site. Liaison with EPD will be conducted in the detailed design stage to ensure that the free up capacity is adequate to handle the sewage from the Site and the upgraded SWSTW will not be overloaded.

Proposed New Sewage Pumping Station and Associated Sewage Pipelines

7.5.5 Based on the estimated sewage flow as predicted in **Table 7.3**, new sewers of 600mm diameter are proposed for collection and conveyance of sewage generated from the Site to the existing sewerage system at Tin Fuk Road**.** Due to the topographic constraints, a new sewage pumping station with design capacity of at least 14,240m^3 would be required to convey the sewage generated from the Site to existing sewerage system at Tin Fuk Road. The proposed sewage pumping station would constitute as a designated project according to Category F.3 under Part 1 of Schedule 2 of the EIAO. Application for the environmental permit for construction and operation of the proposed sewage pumping station will be carried in the investigation and design stages.

7.5.6 The sewerage system within the housing site will be designed, constructed and maintained by the Housing Department (HD). Clear demarcation will be made at discharge points of the development (i.e. the terminal manholes) for easy identification of maintenance responsibility amongst DSD and HD. In general, the terminal manholes will be located within but as close as possible to the boundary of each of the public housing sites. The terminal manholes and all upstream sewerage system within the Site will be maintained by HD. The downstream pipes from these terminal manholes will be maintained by DSD as public sewerage system.

7.6 Conclusion

7.6.1 Based on the preliminary SIA results and the proposed sewerage scheme, it could be concluded that there is no adverse sewerage impact arising from the proposed development.

8. PRELIMINARY WATER SUPPLY IMPACT ASSESSMENT

8.1 Introduction

8.1.1 The preliminary Water Supply Impact Assessment (WSIA) assessment aims to assess the short-term and long-term impacts on the water supply system arising from the proposed developments, formulate a feasible and cost-effective water supply proposal with implementation strategy to support the proposed developments.

8.1.2 Findings and recommendations of the WSIA are presented in Preliminary Water Supply Impact Assessment Report. A summary of the assessment is presented in sections below.

8.2 Assessment methodology and Design Criteria

Assessment Methodology

8.2.1 The following approaches are involved in carrying out the WSIA:

i. To identify the existing waterworks facilities and recommend any watermain diversion works required within the Site;

ii. To assess the water demands, water supply pressure and capacities for proposed developments;

iii. To investigate the impact of existing facilities; and

iv. To recommend the suitable mitigation measures and diversion scheme to protect existing waterworks.

8.2.2 The proposed demand rates and peaking factors are mainly based on the values defined in the WSD's Departmental Instruction No.1309 – Design Criteria (DI 1309), and where the relevant rates are not available, assumptions have been adopted in accordance with the past records for similar user types.

Design Criteria

8.2.3 Water main for water supply should be designed according to the following:

- WSD CE Engineering Manual Volume 1&2
- WSD Manual of Mainlaying Practice (2012 Edition)
- WSD Departmental Instructions and relevant circulars
- Code of Practice on Minimum Fire Service Installation and Equipment

8.2.4 The fresh and flushing water demands for the proposed development have been estimated based on unit demand figures with reference to WSD's Departmental Instruction DI 1309. The relevant unit demands are listed in **Table 8.1**.

Table 8.1 Unit Demand of Water Supply

Zoning	Unit Demand of Fresh Water	Unit Demand of Flushing Water
PRH	140 L/head/day	70 L/head/day
R1, SSF	230 L/head/day	70 L/head/day
Service Trade	40 L/head/day	-
GIC	200 m^3/hectare/day	70 m^3/hectare/day
OU	200 m^3/hectare/day	70 m^3/hectare/day
Industry	200 m^3/hectare/day	70 m^3/hectare/day
School	25 L/head/day	25 L/head/day
LO, DO	10L/m^2/day	-

8.2.5 The peak flow rates in distribution mains are listed as follows:
- Fresh Water: 3 x mean daily demand
- Salt Water: 2 x mean daily demand

8.2.6 The minimum residual heads at extremity of the systems are listed as follows:
- Fresh Water: 20m
- Salt Water: 15m

8.2.7 With reference to WSD's DI No. 1309, the fire-fighting requirement is 6,000 m^3/d with a discharge pressure of 17m head and assuming a draw-off rate of 3,000 m^3/d through any single pedestal hydrant.

8.3 Existing Waterworks Facilities

Water Treatment Works

8.3.1 The Site is located within the fresh water supply zone of Ngau Tam Mei Water Treatment Works (NTMWTW) and Au Tau Water Treatment Works (ATWTW). WSD is planning to expand the existing NTMWTW from 230,000m^3/day to 440,000m^3/day. WSD is also planning for expansion of NTWWTW beyond 440,000m^3/day or further improvement works of ATWTW to support the development growth in the NWNT region.

Fresh Water Supply System

8.3.2 Although the Site is close to Wang Chau Fresh Water Service Reservoirs, substantial part of the Site is covered by the existing Tan Kwai Tsuen North and South Fresh Water Service Reservoirs by referring to the latest plan of water supply zone. The capacities of these fresh water service reservoirs are summarized in **Table 8.2**.

Table 8.2 Capacity of Existing Fresh Water Service Reservoirs

Fresh Water Service Reservoirs	Capacity (m^3)
Tan Kwai Tsuen North Fresh Water Service Reservoir	81,516
Tan Kwai Tsuen South Fresh Water Service Reservoir	77,742

8.3.3 There is a 900mm diameter water main identified in the northwest corner of the Site and this trunk supply main is sourced from the existing Wang Chau Fresh Water Service Reservoir. A 300mm dimeter fresh water main is running along Tin Tsz Road to serve roadside fire hydrants for fire-fighting purpose. In addition, a small 38mm diameter fresh water main is identified within the site area and that main is supplied to Ha Mei San Tsuen.

Salt Water Supply System

8.3.4 The salt water supply system for the Northwest New Territories (NWNT) was commissioned in mid-2015. Around 700,000 residents in Tuen Mun East, Yuen Long and Tin Shui Wai are able to use salt water for flushing. At present, salt water supply in NWNT is supplied by Lok On Pai Salt Water Pumping Station (LOPSWPS) via Tan Kwai Tsuen Salt Water Service Reservoir with a pumping capacity of 83,000 m^3/d and commissioned in 2014. However, the supply does not cover the proposed development of the Site according to the current planning data. Capacity of Tan Kwai Tsuen Salt Water Service Reservoir is shown in **Table 8.3**.

Table 8.3 Capacity of Existing Salt Water Service Reservoirs

Salt Water Service Reservoirs	Capacity (m^3)
Tan Kwai Tsuen Salt Water Service Reservoir	18,100

8.4 Assessment for Water Demand

8.4.1 With reference to **Table 8.1** above, the unit demand of fresh water and flushing water are varied under different zoning, hence different scenarios would be adopted for conservative assessment in the calculation of fresh water demand and flushing water demand as shown in **Table 8.4** and **8.5** below:

Estimation of Fresh Water Demand for the Proposed Development (Scenario 3 – 100% SSF)

8.4.2 With reference to unit demands described in **Table 8.1**, the total estimated fresh water demand for the residential housing development is summarized in **Table 8.4.**

Table 8.4 Summary of Estimated Demand for Fresh Water

Category	Population	Unit Demand (m^3/h/day)	Mean Daily Demand (MDD) (m^3/day)	Peak Water Demand in Distribution Mains (PWD) (m^3/day)
Residential Housing	25,650	0.230	5,900	17,700
Service Trade	25,650	0.040	1,026	3,078
Irrigation	25,650	0.010	257	771
Restaurants*	180#	1.53	276	828
Retail other than restaurants*	260#	0.040	11	33
Estate Management Office	50#	0.040	2	6
Kindergarten (Student)	380	0.025	10	30
Kindergarten (Employee)	125#	0.025	4	12
Others	940#	0.040	38	114
Welfare facilities	995#	0.040	40	120
Carpark and PTI*	2,268#	0.040	91	273
		Total	**7,655**	**22,965**

* The GFA for retail, welfare facilities, PTI and car park are 8,790m^2,19,900m^2,3,400m^2 and 53,305 m^2 respectively.

\# According to HKPSG Chapter 5 Table 2, the worker density shall be in the range of 20-25 sqm/job for business Use. An average of 1 job/20 sqm is assumed for this Project in general. For conservative assessment purpose, fresh water demand from the carpark and PTI is estimated based on 1 job/25 sqm.

Estimation of Flushing Water Demand for the Proposed Development (Scenario 1 – 100% PRH)

8.4.3 With reference to the unit demands described in **Table 8.1**, the total estimated flushing water demand for the proposed development is summarized in **Table 8.5**.

Table 8.5 Summary of Estimated Demand for Flushing Water

Category	Population	Unit Demand (m^3/h/day)	Mean Daily Demand (MDD) (m^3/day)	Peak Water Demand in Distribution Mains (PWD) (m^3/day)
Residential Housing	30,240	0.070	2,117	4,234
Accountable non-domestic GFA				
Restaurant*	180#	0.050	9	18
Retail other than Restaurant*	260#	0.040	11	22
Estate Management Office	50#	0.040	2	4
Kindergarten (Student)	380	0.025	10	20
Kindergarten (Employee)	125#	0.025	4	8
Others	940#	0.040	38	76
Non-Accountable non-domestic GFA				
Welfare facilities*	995 #	0.040	40	80
Carpark and PTI*	2,268	0.040	91	182
		Total	**2,322**	**4,644**

*The GFA for retail, welfare facilities, PTI and car park are 8,790m^2,19,900m^2,3,400m^2 and 53,305 m^2 respectively.
#According to HKPSG Chapter 5 Table 2, the worker density shall be in the range of 20-25 sqm/job for business Use. An average of 1 job/20 sqm is assumed for this Project in general. For conservative assessment purpose, flushing water demand from the carpark and PTI is estimated based on 1 job/25 sqm.

8.5 Potential Impact to Waterworks Facilities and Mitigation Measures

8.5.1 WSD is planning to expand the existing NTMWTW from 230,000m^3/day to 440,000m^3/day. WSD will consider several options on further expansion / upgrading of water treatment works or providing water supply from existing services reservoirs in Yuen Long to supply the demand arising from the development.

8.5.2 In order to provide sufficient fresh and flushing water for this development, it has preliminarily explored to provide the required fresh and flushing water either by (i) subsuming them in the fresh and flushing service reservoirs (Tan Kwai Tsuen East Fresh Water Service Reservoirs (TKTEFWSR) and Tan Kwai Tsuen Reclaimed Water Service Reservoirs (TKTRWSR)) proposed under Hung Shui Kiu/Ha Tsuen New Development Area (HSK/HT NDA), (ii) upgrading the service reservoirs of HSK/HT NDA under this Project , (iii) cavern option which is being explored under WSD's Agreement No. CE 39/2018 (WS) - Strategic Cavern Areas to Accommodate Existing and Proposed Service Reservoir in Lam Tei and Adjoining Area — Feasibility Study" (the Cavern Study), or (iv) supplying from existing service reservoirs in Tan Kwai Tsuen, Yuen Long.

Potential Fresh and Flushing Water Supply Arrangement

Option 1 - Engineering feasibility of increasing the size of proposed service reservoirs under HSK/HT NDA (For both fresh water and flushing water)

8.5.3 For accommodation of the additional fresh water demand (i.e. 7,655m^3/day) of the proposed housing development in 2033. The storage capacity of TKTEFWSR is proposed to be increased from 38,410m^3 to 44,534 m^3 (interconnected supply zones with capacity of service reservoirs equals to 80% of the mean daily demand). The DN600 fresh water main is proposed to be tee off from the proposed trunk mains in Hung Shui Kiu and eventually connected to the proposed housing site for provision of fresh water supply as shown in **Figure 8.1**.

8.5.4 For accommodation of the additional flushing water demand (i.e. 2,322 m^3/day) of the proposed housing development in 2033, the storage capacity of TKTRWSR (Phase 1) is proposed to be increased from 10,086 m^3 to 11,573m^3 (interconnected supply zones with capacity of service reservoirs equals to 64% of the mean daily demand). The DN300 flushing water main is proposed to be tee off from the proposed trunk mains in Hung Shui Kiu and eventually connected to the proposed housing site for provision of flushing water supply as shown in **Figure 8.2.**

8.5.5 The footprint reserved for the two proposed water service reservoirs is required to be enlarged to 180m x 75m, which is larger than the footprint of site formation area reserved for the construction of these two proposed water service reservoirs. Therefore, further increase of site formation area is required for the enlargement of the proposed TKTEFWSR and TKTRWSR under this option.

Option 2 - Construction of additional compartments next to the proposed TKTEFWSR and TKTRWSR

8.5.6 Since the increase of the storage capacity of the proposed service reservoirs under HSK/HT NDA and the feasibility of accommodating the service reservoir for the storage capacity arose from the proposed development into cavern are still under review, alternative approach of construction of an additional compartment of reservoir (approximate size 1,300m^2 with 6m depth) next to the proposed fresh and flushing service reservoirs proposed under HSK/HT NDA as shown in **Figure 8.3**.

Option 3 - Cavern Option (For both fresh water and flushing water)

8.5.7 The Cavern Study is being undertaken by WSD to explore the feasibility of accommodating four existing service reservoirs and seven proposed service reservoirs (including the proposed fresh and flushing water service reservoirs under the HSK/HT NDA project) into caverns. As one of the fresh and flushing water supply options for the proposed public housing development under this Project is by enlarging the proposed fresh and flushing service reservoirs proposed under HSK/HT NDA as mentioned in **Paragraphs 8.5.3** to **8.5.5**, the Cavern Study will also explore whether cavern option for the enlarged fresh and flushing service reservoirs for HSK/HT NDA is feasible. Nevertheless, the feasibility for the Cavern Study is still being studied at the time being.

Option 4 -Engineering Feasibility of supply from existing service reservoirs in Tan Kwai Tsuen, Yuen Long (For both fresh and flushing water)

8.5.8 Apart from the new services reservoirs supplying both fresh and flushing water from HSK/HT NDA, another option has also been explored by supplying fresh and flushing water from the existing service reservoirs in Tan Kwan Tsuen as illustrated in **Figures 8.4 and 8.5**. The existing Tan Kwai Tsuen North Fresh Water Services Reservoir and Tan Kwai Tsuen Salt Water Services Reservoir would have sufficient capacity to accommodate the fresh and flushing water demand for the proposed public housing development upon commissioning of the proposed service reservoirs to be constructed under HSK/HT NDA project.

8.5.9 The four options mentioned in **Para. 8.5.3** to **8.5.8** are only preliminary options. The fresh water and flushing water supply arrangements / details / assessments are subject to further reviewed among relevant departments in the investigation and design stage.

8.6 Conclusion

8.6.1 With consideration of the above preliminary fresh and flushing water supply schemes, there is no insurmountable technical aspect for providing fresh and flushing water supply to the proposed development. The fresh water and flushing water supply arrangements / details / assessments are subject to further review among relevant departments in the investigation and design stage.

8.6.2 Continuous review and liaison with the project team of HSK/HT NDA of CEDD and WSD should be conducted to ascertain the detailed fresh and flushing water service reservoirs arrangement including use of reclaimed water for flushing and requirement of associated waterworks such as laying of new water mains.

9. PRELIMINARY LAND REQUIREMENT STUDY

9.1 Introduction

9.1.1 The Preliminary Land Requirement Study (LRS) presented below is to formulate the land requirement for proposed development, and identify land uses, facilities, installations and properties that may be affected by the land resumption and clearance for the proposed development.

9.2 Land Requirement

9.2.1 The estimated total area within the proposed works boundary is approximately 11.4 hectare (ha). The affected private and government lands (either permanently or temporarily for the proposed development) are summarized in **Table 9.1** below. Details of land requirements are presented in the *Preliminary Land Requirement Study Report*.

Table 9.1 Land Requirement within the Proposed Works Area

Type of Land	Total Area (ha) (Approx.)	Area within the Proposed Public Housing Site (ha) (Approx.)
(a) Private lots to be resumed	8.14	6.1
(b) Government land to be required within the Proposed Development Area	0.84	0.1
(c) Government land to be required within the Proposed Works Area Boundary excluding (b) above	2.41	-
Total Required Land	**11.4**	**6.2**

Private Land Lots

9.2.2 Based on the updated base map and available land status plan, it is estimated that 85 numbers of private land lots are identified within the proposed works area boundary while 64 of them are identified within the proposed public housing site boundary, summary of the affected private lots is shown in **Table 9.2** below:

Table 9.2 Summary of the affected private lots within Proposed Works Area Boundary

No. of affected private lot	Approx. Size of Land (ha)	Remarks
85	8.14	Permanent land acquisition

Cultural Heritage, existing structures, Graves, Urns, Kam Taps and Shrines

9.2.3 No structure held under building licence has been identified within the proposed development area.

9.2.4 Some existing graves are located on the eastern side of the Site. Since the alignment of proposed access road is designed to avoid affecting the nearby existing graves, clearance of grave is not required under this Project. No graves, urns, kam taps and shrines will be removed under this project. Details are shown in **Figure 9.1**.

9.2.5 No built heritage is identified within the Study Boundary and Proposed Works Area Boundary. Hence, no direct impact from construction works of the Project on built heritages would be anticipated.

Registered Old and Valuable Trees (OVT) or Tree of Particular Interest

9.2.6 There are three (3) nos. of trees of particular interest identified in the vicinity of the Proposed Works Area Boundary whereas there is no Registered OVT as defined under DEVB TC(W) No. 5/2020 identified within the Study Boundary and the Proposed Works Area Boundary.

9.2.7 Felling or transplanting of these trees of particular interest would be avoided as far as possible. Sufficient spaces will be maintained for the growth of the Trees of Particular Interest in a health condition.

Ponds and Watercourse

9.2.8 There are four (4) nos. of existing ponds are found to the north of the site. A vehicular access road abutted with footpath will be constructed next to these ponds. The alignment of the proposed access road will be avoided to encroach onto the ponds and adjacent land lots as far as possible.

9.2.9 There is an existing modified watercourse located across the middle portion of the housing site. It is proposed to reconstruct this existing modified watercourse into box culvert for drainage purpose and maximise the potential land use utilisation.

Nearby Villages

9.2.10 Fung Ka Wai is in the eastern side of the Site and Ha Mei San Tsuen is in the southern side of the Site. The northern strip of the Site will be excluded from Works Area Boundary due to ineffective land use planning. The Proposed Works Area boundary would not encroach onto the village environ boundary of these two villages. The extent of the village boundaries of the existing villages is shown in **Figure 9.1**.

Brownfield Sites

9.2.11 As at 14 January 2021, there are seven (7) numbers of brownfield operations identified within the Study Boundary.

9.2.12 Upon completion of the proposed public housing development, it is anticipated that the Town Planning Board would consider planning applications for proposed open storage and/or workshop uses in the surrounding areas under the new planning circumstances with due consideration to the compatibility of uses and environmental impacts.

Government Land Allocations

9.2.13 Government Land Allocations can be further divided as permanent Government Land Allocations (GLA) and Temporary Government Land Allocation (TGLA). This is the formal allocation of lands of Government Projects e.g. Government office buildings, treatment plants, depots, works area. One (1) no. of GLA is located within the Study Boundary but outside the Proposed Works Area Boundary. Therefore, this GLA would not be affected by the proposed works.

Affected License Area and Modification of Land Leases under Private Ownership

9.2.14 Modification of Tenancy (MOT) was issued by Lands Department in the old days to a private lot to cover uses nowadays permitted/ documented by way of a short-term waiver. One (1) no. of MOT is affected by the proposed works.

9.3 Conclusion

9.3.1 The number and extent of the land uses, facilities and properties affected by the proposed development are summarized in **Table 9.3** below:

Table 9.3 Summary of Major Features affected by the Development

Feature	Affected Number within the Proposed Works Area Boundary	Affected Area within Proposed Works Area Boundary (ha)	Affected Number/Area within the Proposed Public Housing Site (ha)
Private Lots	85	8.14	~6.1
Building Licenses	-	-	-
Modification of Tenancy	1	0.02	Partially
Letter of Approval	-	-	-
Government Land Allocations	-	-	-
Short Term Tenancies	-	-	-
Graves/Urns/Kam Taps/Shrines	-	-	-
Brownfield Area	5	6.71	~5.7

9.3.2 The impacts on cultural heritage, trees, graves, ponds, modified watercourse, nearby villages and brownfield site and other land lots have been identified with no insurmountable land issue expected. Sufficient lead time should be allowed for the land acquisition and site clearance process when planning the implementation programme.

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10. PRELIMINARY ENVIRONMENTAL REVIEW

10.1 Introduction

10.1.1 The purpose of the Preliminary Environmental Review (PER) is to identify and determine the possible environmental impacts arising from the proposed development, and propose relevant mitigation measures to alleviate the potential adverse impacts.

10.1.2 Findings and recommendations of the PER are presented in Preliminary Environmental Review Report. A summary of various aspects of the PER is presented in sections below.

10.2 Environmental Impact Assessment Ordinance (EIAO) Implication

10.2.1 The proposed sewage pumping station (more than 2,000m^3 per day) would be a Designated Project (DP) under items F.3.(b)(i) and F.3.(b)(iii), Schedule 2, EIAO. Application for an Environmental Permit in accordance with the EIAO for construction and operation of the proposed sewage pumping station will be carried out by the project proponent in the investigation and design stage.

10.3 Air Quality

Air Sensitive Receiver

10.3.1 The air quality assessment area is defined as 500m from the Site. The representative air sensitive receivers (ASRs) which would likely be affected within the 500m air quality assessment area are identified and presented in **Figure 10.1**.

Identification and Evaluation of Potential Environmental Impacts

Construction Phase

Construction Dust Emission

10.3.2 Based on the preliminary engineering design information, the construction activities for the Project would be commenced in 2026 and completed in 2033.

10.3.3 The proposed housing site area is about 6.2 ha in size. The major sources of air quality impact during construction phase would be fugitive dust emissions during site formation stage due to earthworks movement activities and handling/transportation of excavated/fill materials. In view of the close proximity of the works area from the ASR A11, the site formation works would be divided and conducted in different work fronts during different period to minimise the potential construction dust emission at any given time. Each of the site formation phase would last for about 7 to 9 months, depending on the size of the works area. The overall site formation works for the Project would be last for about 24 months. In view of the short-term impact of each phase and implementation of the dust suppression measures as stipulated in the Air Pollution Control (Construction Dust) Regulation during construction phase, adverse air quality due to site formation works is not anticipated. Superstructure works including construction of the residential blocks, a public transport interchange, sewage pumping station and floodwater pumping station, etc. are not expected to be dusty construction activities.

10.3.4 Emissions of other air pollutants such as carbon monoxide and dioxide, nitrogen oxides and sulphur dioxide generated by powered mechanical equipment (PME) and vehicle exhausts on-site should not be significant since only limited amount of construction plants will be used on-site. Therefore, unacceptable impacts from the criteria pollutants (such as NO_2, SO_2, and CO) are unlikely to occur as significant emissions of pollutants are not anticipated, and further assessment is not necessary.

10.3.5 A currently sub-standard access road of about 540m in length, connecting the proposed development site and junction of Tin Wah Road/Tin Tsz Road, would be upgraded to a standard local road with footpath on the eastern side, as presented in **Figure 3.4**. The works would involve excavation and road construction. As the construction works would be conducted section-by-section, the number of construction plants and area of open excavation at a given time would be limited. The associated construction dust emission and air emission from PME would also be minimal.

10.3.6 The sewage rising mains, flushing water mains and fresh water mains will be constructed by cut-and-cover method. Followed by open excavating of around 1m wide pavement, the sewage rising mains and fresh water mains would be laid along the alignment as shown in **Figure 2.3**. Backfilling and pavement would then be provided. As the construction would be conducted section-by-section, the number of construction plants and area of open excavation at a given time would be limited. The associated construction dust emission and air emission from PME would also be minimal.

Operation Phase

Vehicular Emission

10.3.7 Vehicular emission from the proposed access road under the Project and nearby existing road networks such as Tin Tsz Road, Tin Fuk Road, Tin Wah Road and Tin Cheung Road would be the major potential vehicular emission source affecting the proposed ASRs in the Site during operation phase. According to the Annual Traffic Census 2018, Tin Tsz Road, Tin Fuk Road and Tin Wah Road are classified as District Distributor and Tin Cheung Road is classified as local distributor. With reference to the HKPSG, the suggested minimum buffer distance between District Distributor and places for active and passive recreational uses is 10m, whereas the suggested minimum buffer distance between local distributor and places for active and passive recreational uses is 5m. Since active and passive recreational uses are considered an ASR under Annex 12 of EIAO-TM, it is desirable to provide the same buffer distance to the residential/commercial uses. Based on the latest indicative layout plan of the Project, the minimum separation distance between the proposed housing development and Tin Tsz Road, Tin Fuk Road, Tin Wah Road, Tin Cheung road and the proposed access roads are about 20m, 430m, 430m, 40m and 5m respectively, more than the HKPSG recommendations. Therefore, no adverse air quality impact on proposed development site is anticipated from vehicular emission.

Emission from the Proposed PTI

10.3.8 Detailed design of the proposed PTI will be carried out in the next stage of the Project. The proposed PTI should be designed in accordance with the requirements in Professional Persons Environmental Consultative Committee (ProPECC) Practice Notes (PN) Control of Air Pollution in Semi-Confined Public Transport Interchanges (PN 1/98). In particular, the PTI exhaust outlet should be designed to locate away from nearby ASRs to avoid causing any air pollutant nuisance.

Odour Emission

10.3.9 Odour emission from the existing Ha Mei San Tsuen Sewage Pumping Station and operation of the proposed sewage pumping station (SPS) at the southwest of the proposed housing site would be another air quality concern during operation phase of the Project. With reference to the current Project layout, the shortest separation distance between the proposed sewage pumping station and proposed housing site is around 20m.

10.3.10 Potential odour emission from wet well, inlet chamber and screen chamber are the possible odorous sources of the existing and Ha Mei San Tsuen SPS and the proposed SPS. Deodourizing facilities are installed at existing Ha Mei San Tsuen SPS to minimize impact on the nearby ASRs. To minimize the odour impact arising from operation of the proposed SPS on nearby ASRs, recommended odour mitigation measures as presented in **para. 10.3.14**. Given the recommended mitigation measures implemented properly, the odour impact due to the proposed SPS would be minimised. Detailed design of the proposed SPS will be carried out at the investigation and design stage.

10.3.11 With the implementation of the aforementioned mitigation measures, the odour impact at the existing and planned ASRs due to the proposed SPS would be minimised. Compared with the referenced studies of SPS, similar environmental outcome would be anticipated. Thus, compliance with EIAO-TM 5 OU criterion would be expected, and hence, no adverse odour impact would be anticipated.

Mitigation Measures

Construction Phase

10.3.12 Dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation should be incorporated to control dust emission from the construction work sites.

Operation Phase

10.3.13 With the reference to the HKPSG, a 10m buffer distance is suggested between air sensitive uses of the proposed development, and Tin Tsz Road, Tin Wah Road and Tin Fuk Road. Whereas, a 5m buffer distance is suggested between air sensitive uses of the proposed development, and Tin Cheung Road and the proposed access road. Tin Wah Road, Tin Fuk Road and Tin Cheung Road are relatively far away from the proposed housing site. For Tin Tsz Road and the proposed access road, the corresponding required buffer distances are shown in **Figure 10.2**. With the provision of the recommended buffer distances stipulated in the HKPSG, adverse air quality impacts on the proposed housing development during the operation phase would not be anticipated.

10.3.14 Subject to the design of the proposed SPS in the investigation and design stage, it is proposed to implement odour mitigation measures with reference to the latest granted direct applications of environmental permits of SPSs of similar capacities, e.g. SPS for Public Housing Development at Long Bin in Yuen Long (DIR-282/2021) and SPSs at North East New Territories (DIR-280/2020). It is recommended to fully enclose the SPS by reinforced concrete structure, negative pressure should be maintained within the SPS via ventilation system, the collected gas from the SPS should pass through the installed deodouriser with 99.5% odour removal efficiency and locate the deodouriser exhaust outlet of the proposed SPS away from the nearby ASRs as far as practicable. Screening waste will be stored in covered containers, packed and handled carefully inside the screen houses; and remained in the covered containers before disposal at landfill site to avoid off-site odour nuisance along the disposal route. The potential environmental impact of the proposed SPS and the associated mitigation measures would be reviewed and recommended in the investigation and design stage for applying environmental permit under the EIAO.

Conclusion

Construction Phase

10.3.15 The potential air quality impacts from the construction works of the Project would mainly be related to construction dust from site formation, construction of access road, laying of sewage and fresh water mains. With the implementation of mitigation measures specified in the Air Pollution Control (Construction Dust) Regulation together with the recommended dust suppression measures and good site practices, no adverse dust impacts at nearby ASRs would be anticipated.

Operation Phase

10.3.16 Adverse air quality impacts from the vehicular emissions during operation phase are not expected, with the provision of HKPSG recommended buffer distances. The environmental impacts due to the proposed sewage pumping station has been addressed and mitigation measures have been recommended. The proposed sewage pumping station is considered as a Schedule 2 Designated Project under item F.3. (b)(i), Part I of the EIAO. Application for an environmental permit for the proposed sewage pumping station in accordance with the EIAO will be carried out in the investigation and design stage.

10.4 Noise

Noise Sensitive Receivers

10.4.1 Existing and planned representative Noise Sensitive Receivers (NSRs) have been identified within 300m assessment area with reference to the EIAO-TM. The locations of these NSRs are presented in **Figure 10.3**.

10.4.2 The impacts to the representative NSRs during the construction and operational phases have been assessed.

10.4.3 In order to demonstrate that the proposed housing development would not be adversely affected by traffic noise and fixed plant noise, quantitative assessment has been performed at the affected representative NSRs. The locations of the assessment points for traffic noise impact are identified and shown in **Figure 10.3** and the assessment points have been taken to be at 1.2 m above each floor of each storey and 1 m away from facades of openable windows.

Identification and Evaluation of Potential Environmental Impacts

Construction Noise

10.4.4 Construction noise impact on existing noise sensitive uses has been assessed as referred to **Figures 10.4**. Key construction activities of the proposed site formation and infrastructure works have been identified for noise impact assessment. The major construction works include the following activities:

- Site clearance;
- Excavation works;
- Filling works;
- Construction of retaining structures;
- Construction of access roads and pedestrian facilities;
- Infrastructure works such as sewerage works, water supply works, drainage works and utilities construction; and
- Road and/ or junction improvement works.

10.4.5 The predicted construction noise levels at the representative NSRs under the unmitigated scenario would comply with the construction noise criterion of 75 dB(A) except for NSR N7 whereas the maximum noise levels were predicted to be 82 dB(A) at NSR N7. Mitigation measures are required and presented below to alleviate the potential construction noise impact to the affected NSRs.

Operation Noise Impact – Road Traffic Noise

10.4.6 The road traffic noise impact imposed on the existing NSRs and planned NSRs of the proposed development would be generated by the existing and planned roads within 300m from the boundary of the Site, road improvement works and junction improvement works. The main roads considered for road traffic noise impact assessment include the proposed access road to the Site, Tin Tsz Road, Tin Fuk Road, Tin Wah Road, etc.

10.4.7 Based on the traffic data and latest development layout, the road traffic noise levels at the noise sensitive uses as referred to **Figures 10.5** to **10.8** under unmitigated scenario have been calculated.

10.4.8 As the predicted maximum noise levels at some of the planned NSRs would be up to 78 dB(A), exceeding the 70 dB(A) noise criterion for residential uses, mitigation measures are recommended in **Para. 10.4.12** to **10.4.14** below.

Operation Noise Impact –Fixed Plant Noise

10.4.9 Fixed plant noise impact on proposed noise sensitive uses has been assessed as referred to **Figures 10.4**. The relevant fixed plant noise sources include the existing floodwater pumping station, proposed PTI, the proposed sewage pumping station and the proposed floodwater pumping station. These newly proposed fixed noise sources will operate 24 hours a day, 7 days a week for conservative assessment.

10.4.10 As the fixed plant noise criteria would be the most stringent in night-time period, maximum allowable sound power levels of these fixed plants would be calculated based on the night-time noise criteria. The maximum allowable sound power levels (SWL) of the proposed floodwater pumping station, the proposed sewage pumping stations and proposed PTI would be 72 dB(A), 73 dB(A) and 67 dB(A), respectively. Given the maximum allowable SWL could be implemented, no adverse operation phase fixed plant noise impact would be anticipated.

Mitigation Measures

Construction Noise

10.4.11 To mitigate the potential exceedance due to construction of the Project, use of quiet PME, noise barrier and noise enclosure have been recommended. With the mitigation measures in place, the predicted construction noise levels at representative NSRs would be reduced to not more than 75 dB(A). No adverse construction noise impact would be anticipated.

Operation Noise Impact – Road Traffic Noise

10.4.12 The predicted road traffic noise levels are varying from 38 dB(A) to 78 dB(A) subject to the orientation and height of the housing flats. No noise mitigation measure will be proposed for the predicted noise level not exceeding 70 dB(A); whereas it is also found that for a certain number of the noise assessment points in which the predicted noise levels are exceeding 70 dB(A) (up to 78 dB(A)), necessary noise mitigation measures are required. The proposed noise mitigation measures are illustrated in **Figure 10.9** in respect to various predicted noise levels.

10.4.13 In general, Acoustic Window would be recommended for noise assessment points with exceedance of 1 dB(A) to 7 dB(A), which provides at least 7 dB(A) of noise attenuation. Acoustic Balcony would be recommended for noise assessment points with exceedance of 8 dB(A), which provides at least 8 dB(A) of noise attenuation. In the situation that for noise assessment points with exceedance above 8 dB(A), blank façade should be provided.

10.4.14 With the aforementioned mitigation measures in place, the road traffic noise levels could be reduced to 70 dB(A), complying with the traffic noise criterion for residential use. Hence, no adverse road traffic noise impact would be anticipated

Operation Phase Fixed Plant Noise

10.4.15 Given the maximum allowable sound power levels could have been achieved, no adverse fixed noise impact would be anticipated to the proposed noise sensitive uses. Fixed noise mitigation measures such as acoustic louvre, silencers, building design to avoid the ventilation vents facing noise sensitive uses could be considered to lower the sound power levels of the fixed noise source, such that the maximum allowable sound power level could be achieved. Fixed plant commissioning test would be included as construction contract requirement to ensure fixed noise compliance.

Conclusion

Construction Noise

10.4.16 The potential noise impacts from the construction works of the Project would mainly be related to the use of powered mechanical equipment (PME). Construction noise assessment has been carried out. The maximum noise levels are predicted to be at 82 dB(A) at NSR N7. With the implementation of noise mitigation measures such as good site practices, use of quiet PME, movable noise barriers and noise enclosures, the maximum noise levels are reduced to 75 dB(A), complying with the relevant noise criteria. Therefore, no adverse construction noise impact would be anticipated.

Operation Phase Road Traffic Noise

10.4.17 The road traffic noise levels of up to 78 dB(A) at some of the planned NSRs have been predicted without mitigation measures in place. For noise assessment points with exceedance of 1 dB(A) to 7 dB(A), it is recommended to provide acoustic window of at least 7 dB(A) noise attenuation. For noise assessment points with exceedance of 8 dB(A), it is recommended to provide acoustic balcony of at least 8 dB(A) noise attenuation. For noise assessment points with exceedance above 8 dB(A), blank façade should be provided. With the aforementioned mitigation measures in place, the road traffic noise levels could be reduced to 70 dB(A), complying with the traffic noise criterion for residential use. Hence, no adverse road traffic noise impact would be anticipated.

Operation Phase Fixed Plant Noise

10.4.18 Given the maximum allowable sound power levels for the proposed floodwater pumping station, the proposed sewage pumping stations and proposed PTI at respective 72 dB(A), 73 dB(A) and 67 dB(A) could be achieved, no adverse operation phase fixed plant noise impact would be expected.

10.5 Water Quality

Water Sensitive Receivers

10.5.1 The assessment area for water quality impact assessment is defined as all areas within 500m from the boundary of the Site and Proposed Works Area Boundary. Key Water Sensitive Receivers (WSRs) that may be affected by the proposed development are summarized as below:

- Streams running from Kai Shan western slope across the Site;
- Ponds in Ping Shan Culture Farm;
- Flood pond southwest of the Site;
- Ha Mei San Tsuen Floodwater Pumping Station;
- Ha Mei San Tsuen Sewage Pumping Station;
- Wang Chau Service Reservoir; and
- Hong Kong Wetland Park.

The watercourses within 500m assessment boundary is shown in **Figure 10.10**.

Identification and Evaluation of Potential Environmental Impacts

Construction Phase

10.5.2 The Project will only involve land-based construction works. Potential sources of water quality impact associated with the construction of the Project have been identified as below:

- General construction activities
- Construction site runoff;
- Construction works near watercourses;
- Construction works in watercourses;
- Accidental spillage of chemicals;
- Sewage effluent from construction workforce; and
- Groundwater from contaminated areas, contaminated site runoff and wasterwater from land decontamination.

General Construction Activities

10.5.3 Effluent discharged from temporary site facilities should be controlled to prevent direct discharge to the neighbouring inland waters and storm drains. Such effluent may include wastewater generated from wheel washing of site vehicles at site entrances, discharge of debris and rubbish such as packaging, construction materials and refuse.

Construction Site Runoff

10.5.4 Surface runoff generated from the construction site may contained increased loads of SS and contaminants. Potential pollution sources of site runoff may include:

- Runoff and erosion of exposed bare soil and earth, drainage channel, earth working area and stockpiles;
- Wash water from dust suppression sprays and wheel washing facilities; and
- Fuel, oil and lubricants from maintenance of construction vehicles and equipment

Construction Works near Watercourses

10.5.5 Construction works near these watercourses may pollute the stormwater or inland waters due to potential release of construction wastes. Construction wastes are generally characterised by high concentration of SS and elevated pH. Adoption of good housekeeping and mitigation measures would reduce the generation of construction wastes and potential water pollution. The implementation of measures to control run-off and drainage water will be important for the construction works adjacent to the inland water in order to prevent run-off and drainage water with high levels of SS from entering the water environment. With the implementation of BMPs and provision of mitigation measures as specified in ProPECC Note PN 1/94 "Construction Site Drainage" and ETWB TC (Works) No. 5/2005.

Construction Works in Watercourses

10.5.6 The existing modified watercourse between existing brownfield area will be modified to box culvert along the existing alignment. Potential impacts may be generated by discharge of construction materials, wastewater, sediment and spillage to the receiving waters in the downstream. The construction method and sequence of the proposed construction in watercourses should be carefully designed so that all the construction works including any excavation and construction operations would be undertaken within a dry zone and physically separated from the water flow in the existing watercourses.

Accidental Spillage of Chemicals

10.5.7 The use of engine oil and lubricants, and their storage as waste materials has the potential to create impacts on the water quality of adjacent inland water bodies or storm drains if spillage occurs. Waste oil may infiltrate into the surface soil layer, or run-off into local water courses, increasing hydrocarbon levels. The potential impacts could however be mitigated by practical mitigation measures and good site practices.

Sewage Effluent from Construction Workforce

10.5.8 Potential water quality impacts upon the local drainage and fresh water system may arise from these sewage effluents, if no controlled measures to be provided during the construction of the Project, the workforce on site may generate sewage effluents, which are characterized by high levels of BOD, ammonia and E. coli counts. Based on the DSD Sewerage Manual, the sewage production rate for construction workers is estimated at 0.35 m^3 per worker per day. For every 100 construction workers working simultaneously at the construction site, about 35 m^3 of sewage would be generated per day.

Groundwater from Contaminated Areas, Contaminated Site Runoff and Wastewater from Land Decontamination

10.5.9 It is identified that the Site is currently occupied by temporary warehouse and open storage areas which may have land contamination issues. Any contaminated material disturbed, or material which comes into contact with the contaminated material, has the potential to be washed with site runoff into drainage system. Any wastewater discharge from land decontamination processes could also adversely affect the nearby water environment. Excavated contaminated materials would be properly stored, housed and covered to avoid generation of contaminated runoff. Open stockpiling of contaminated materials will not be allowed. Any contaminated site runoff and wastewater from land decontamination activities will be properly treated and disposed in compliance with the requirements of the TM-DSS. Mitigation measures for contaminated site runoff and wastewater from land decontamination are recommended. With proper implementation of the recommended mitigation measures, the potential water quality impacts arising from the land decontamination works would be minimised.

10.5.10 Groundwater pumped out or from dewatering process during excavation works in the contaminated areas might be potentially contaminated. Any contaminated groundwater will be either properly treated or properly recharged into the ground in compliance with the requirements of the TM-DSS. No direct discharge of contaminated groundwater will be adopted.

Operation Phase

10.5.11 Potential water quality impacts arising from operation of the Project would include:

- Sewage and Sewerage System; and
- Surface Runoff and Potential Flooding Risk

Operation Phase - Sewage and Sewerage System

10.5.12 Sewage effluent will be generated from the proposed development. All sewage generated from the proposed development will be discharged to the public sewerage system and diverted to sewage treatment works for proper treatment. Therefore, the increase in sewage flow from the proposed development will have no adverse water quality impact on Deep Bay.

10.5.13 A new sewage pumping station (SPS) is proposed under this Project. Potential water quality impact may arise from emergency overflow / bypass of sewage from the proposed SPS due to pump failure, power supply failure and damage to pressure main or flooding.

10.5.14 To minimise the chance of emergency sewage discharge from the proposed SPS, standby pump would be provided to cater for emergency breakdown or maintenance of the duty pump. Backup power supply in the form of dual / ring circuit power supply or generator would be provided to secure electrical power supply. Various precautionary measures to be incorporated in the design of the proposed SPS. With incorporation of the recommended preventive measures, the chance of emergency sewage bypass would be exceptionally rare.

10.5.15 To minimise the potential water quality impact in case of emergency discharge from the proposed SPS, development of a Contingency Plan in the detailed design stage is recommended to deal with the remote occurrence of emergency discharge.

Operation Phase - Surface Runoff and Potential Flooding Risk

10.5.16 The Site is a low-lying area and is prone to frequent flooding during typhoons or heavy rainstorms. Flood protection measures will be provided under this Project to protect the low-lying area in the Site from flooding due to increase in surrounding formation levels as well as long-term climate change. The flood protection measures would include perimeter interceptor to prevent the ingress of flood water into the low-lying area and floodwater pumping station to discharge the flood water to the nearby drainage system. A retention tank will be constructed to retain stormwater runoff from flowing into the low-lying area and surrounding drainage system. With implementation of the recommended flood protection measures, the potential flooding risk would be minimised. The recommended measures would be completed before the construction works for the development.

10.5.17 There would be additional pollution loading in association with the increase of surface runoff, which is known as non-point source pollutions during operation phase. A small amount of oil, grease and grit may be deposited on the surfaces of the road within the Site and these pollutants could be washed into the nearby drainage system or inland waters during rainfall events. Surface run-off generated from other paved or developed areas within the Sites may also contain debris, refuse, dust from the roof of buildings and cleaning agents used for washing streets and building façade, which may also affect the quality of the nearby receiving water environment, if uncontrolled. Under normal condition, runoff will not be generated in low rainfall intensity. However, the worst scenario to water quality will take place during the first flush under heavy rainstorm events. Proper drainage systems with silt traps should be installed. The design of road gullies with silt traps should be incorporated in later detailed design.

Mitigation Measures

Construction Phase

10.5.18 Control of potential pollution of nearby water bodies during the construction phase of the Project should be achieved by measures to:

- prevent or minimise the likelihood of pollutants (generated from construction activities) being in contact with rainfall or run-off; and
- abate pollutants in the stormwater surface run-off prior to the discharge of surface run-off to the nearby water bodies.

10.5.19 These principle objectives should be achieved by implementation of the Best Management Practices (BMPs) of mitigation measures in controlling water pollution. The guidelines for handling and disposal of construction site discharges as detailed in the ProPECC PN 1/94 "Construction Site Drainage" should be followed, where applicable. All effluent discharged from the construction site should comply with the standards stipulated in the TM-DSS. The following measures are recommended to protect water quality of the inland and coastal waters, and when properly implemented should be sufficient to adequately control site discharges so as to avoid water quality impacts.

Construction Site Runoff

10.5.20 Surface runoff from construction sites should be discharged into storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sedimentation basins. Channels or earth bunds or sand bag barriers should be provided on site during construction works to properly direct stormwater to such silt removal facilities. Perimeter channels should be provided on site boundaries where necessary to intercept storm runoff from outside the Site so that it will not wash across the Site. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks.

Boring and Drilling Water

10.5.21 Water used in ground boring and drilling for site investigation or rock / soil anchoring should as far as practicable be re-circulated after sedimentation. When there is a need for final disposal, the wastewater should be discharged into storm drains via silt removal facilities.

Wheel Washing Water

10.5.22 All vehicles and plants should be cleaned before they leave a construction site to minimise the deposition of earth, mud, debris on roads. A wheel washing bay should be provided at every site exit of practicable and washwater should have sand and silt settled out or removed before discharging into storm drains. The section of construction road between the wheel washing bay and the public road should be paved with backfill to reduce vehicle tracking of soil and to prevent site runoff from entering public road drains.

Rubbish and Litter

10.5.23 Good site practices should be adopted to remove rubbish and litter from construction sites so as to prevent the rubbish and litter from spreading from the site area. It is recommended to clean the construction sites on a regular basis.

Construction Works near Watercourses

10.5.24 The practices outlined in ETWB TC (Works) No. 5/2005 "Protection of Natural Streams/Rivers from adverse impacts arising from Construction Works" should also be adopted where applicable to minimize the water quality impacts upon any natural streams or surface water systems. Relevant mitigation measures from the ETWB TC (Works) No. 5/2005 are listed below:

- Construction works should preferably be carried out in dry season as far as practicable where the flow in the watercourse is low;
- The use of less or smaller construction plants may be specified in works areas close to the watercourses
- Temporary storage of materials (e.g. equipment, filling materials, chemicals and fuel) and temporary stockpile of construction materials should be located well away from any watercourses during carrying out of the construction works ;
- Stockpiling of construction materials and dusty materials should be covered and located away from any watercourses
- Construction debris and spoil should be covered up and/or disposed of as soon as possible to avoid being washed into the nearby water receivers
- Construction effluent, site run-off and sewage should be properly collected and/or treated; and
- Proper shoring may need to be erected in order to prevent soil/mud from slipping into the watercourses.

Construction Works near Watercourses

10.5.25 The construction method and sequence of the proposed construction in watercourses should be carefully designed so that all the construction works including any excavation would be undertaken within a dry zone and physically separated from the watercourses downstream.

Accidental Spillage of Chemicals

10.5.26 Contractor must register as a chemical waste producer if chemical wastes would be produced from the construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation, should be observed and complied with for control of chemical wastes. The Contractor is also recommended to develop management procedures for chemicals used and prepare an emergency spillage handling procedure to deal with chemical spillage in case of accident occurs.

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

Sewage Effluent from Construction Workforce

10.5.28 No discharge of sewage to the stormwater drains and inland water will be allowed. Adequate and sufficient portable chemical toilets should be provided in the works areas to handle sewage from construction workforce. A licensed waste collector should be employed to clean and maintain the chemical toilets on a regular basis.

10.5.29 Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the surrounding environment. Regular environmental audit of the construction site should be conducted to provide an effective control of any malpractices and achieve continual improvement of environmental performance on site

Groundwater from Contaminated Areas, Contaminated Site Runoff and Wastewater from Land Decontamination

10.5.30 Any excavated contaminated material and exposed contaminated surface should be properly housed and covered to avoid generation of contaminated runoff. Open stockpiling of contaminated materials should not be allowed. Any contaminated runoff or wastewater generated from the land decontamination processes should be properly collected and diverted to wastewater treatment facilities (WTF) as necessary. The WTF shall deploy suitable treatment processes (e.g. oil interceptor / activated carbon) to reduce the pollution level to an acceptable standard and remove any prohibited substances (such as total petroleum hydrocarbon) to an undetectable range. All treated effluent from the wastewater treatment system shall meet the requirements as stated in TM-DSS and should be either discharged into the foul sewers or tankered away for proper disposal.

10.5.31 No direct discharge of groundwater from contaminated areas should be adopted. Prior to any excavation works within the potentially contaminated areas, the baseline groundwater quality in these areas should be reviewed based on the past relevant site investigation data and any additional groundwater quality measurements to be performed with reference to Guidance Note for Contaminated Land Assessment and Remediation and the review results should be submitted to EPD for examination. If the review results indicated that the groundwater to be generated from the excavation works would be contaminated, this contaminated groundwater should be either properly treated or properly recharged into the ground in compliance with the requirements of the TM-DSS. If wastewater treatment is to be deployed for treating the contaminated groundwater, the wastewater treatment unit shall deploy suitable treatment processes (e.g. oil interceptor / activated carbon) to reduce the pollution level to an acceptable standard and remove any prohibited substances (such as total petroleum hydrocarbon) to an undetectable range. All treated effluent from the wastewater treatment plant shall meet the requirements as stated in the TM-DSS and should be either discharged into the foul sewers or tankered away for proper disposal.

Operation Phase

10.5.32 In order to minimise the chance of emergency sewage discharge and flooding risk, precautionary measures and contingency plan are proposed

Sewage and Sewerage System

10.5.33 In order to minimise the chance of emergency sewage discharge, the following precautionary measures are proposed to be incorporated in the design of the SPS:

- A standby pump and screen should be provided to cater for breakdown and maintenance of the duty pump in order to avoid emergency discharge.
- Backup power supply in the form of dual / ring circuit power supply or generator should be provided to secure electricity supply.
- An alarm should be installed to signal emergency high water level in the wet well.
- An emergency storage tank / spare volume of wet well should be provided for the proposed SPS to cater for breakdown and maintenance of duty pump.
- Regular maintenance and checking of plant equipment should be undertaken to prevent equipment failure.
- Twin rising mains system should be provided to facilitate maintenance works and to avoid emergency discharge of sewage.
- A telemetry system to the nearest manned station / plant should be provided so that swift action can be undertaken in case of malfunction of the unmanned facilities.
- A bar screen (with clear spacing of approximately 25 mm) should be provided to cover the lower half of the opening of any emergency sewage bypass which can prevent the discharge of floating solids into receiving waters as far as practicable while ensuring flooding at the facilities would not occur event if the screen is blocked.

10.5.34 A Contingency Plan to deal with the emergency discharges that may occur during operation of the SPS should be developed in the detailed design stage including the following items:

- Locations of water bodies or WSRs in the vicinity of the emergency discharges.
- A list of relevant government departments to be informed and to provide assistance in the event of emergency discharge, including key contact persons and telephone numbers.
- Reporting procedures required in the event of emergency discharges.
- Procedures listing the most effective means in rectifying the breakdown of the SPS in order to minimise the discharge duration.

Best Stormwater Management Practices

10.5.35 Best Management Practices (BMPs) for stormwater discharge are recommended to reduce stormwater pollution arising from the Project.

Devices / Facilities to Control Pollution

10.5.36 Screening facilities such as standard gully grating and trash grille, with spacing which is capable of screening large substances such as fallen leaves and rubbish should be provided at the inlet of drainage system.

Administrative Measures

10.5.37 Good management measures such as regular cleaning and sweeping of road surface / open areas is suggested. The road surface / open area cleaning should also be carried out prior to occurrence of rainstorm.

Evaluation of Residual Environmental Impacts

10.5.38 With proper implementation of the recommended mitigation measures, no unacceptable residual water quality impact would be anticipated from the Project during construction and operation phases.

Conclusion

Construction Phase

10.5.39 With the implementation of the recommended mitigation measures, the construction works for the Project would not result in unacceptable impacts on water quality.

Operation Phase

10.5.40 All sewage generated from the Project will be discharged to the public sewerage system and diverted to sewage treatment works for proper treatment. Hence, no net increase in the pollution loading to the Deep Bay waters would be induced by the Project sewage effluent. No adverse water quality impact associated with sewage effluent is anticipated.

10.5.41 In view of the potential adverse effect of emergency sewage bypass on the quality of the nearby watercourses, various precautionary measures are proposed to be incorporated in the design of the SPS to avoid emergency bypass of sewage to the maximum practicable extent. A Contingency Plan is also recommended to deal with the remote occurrence of emergency discharge. With the incorporation of the precautionary measures and Contingency Plan as recommended in this study, the possibility of emergency sewage bypass would be remote and the potential water quality impacts in the unlikely event that an overflow does occur would be minimised.

10.5.42 Another source of potential impact during the operation phase will be the runoff or non-point source pollution from road surfaces and developed areas. Stormwater control measures including adequate stormwater drainage system with suitable pollutant removal devices and best stormwater management practices are recommended for the Project to minimise the non-point source pollution. With proper implementation of the recommended mitigation measures, it is anticipated that the water quality impacts associated with the non-point source discharge from road surfaces and developed areas would be minimised.

10.6 Waste Management

Identification and Evaluation of Wastes Implications

10.6.1 The construction activities to be carried out for the proposed site formation and infrastructure works of the Project would be generate a variety of wastes that can be divided into distinct categories based on their composition and ultimate method of disposal. The identified wastes types are:

- Construction and demolition (C&D) materials;
- Chemical Waste; and
- General Refuse.

Construction Phase - Construction and Demolition (C&D) Materials

10.6.2 C&D materials would be generated from excavation works for site formation and infrastructure works. The C&D materials would comprise both inert and non-inert components, such as vegetation, soil, artificial hard materials (AHM) (i.e. broken concrete, etc.), rocks, wood and metals.

10.6.3 The C&D materials would be sorted on-site and the inert portion would be stored in different containers, skips or stockpiles to re-use on-site for subsequent backfilling as far as possible to minimise the net amount of C&D materials generated from this Project. Surplus excavated materials would therefore require to be exported off-site. The surplus inert C&D materials generated would be reused as far as practicable at other concurrent projects before disposal to public fill reception facilities. The Project Proponent shall notify Public Fill Committee (PFC) of CEDD for the estimated spoil volumes to be generated, liaise and obtain confirmation from the PFC of CEDD for the disposal arrangement of surplus inert C&D materials during the detailed design phase of the Project. Based on the preliminary development plan, the amount of C&D materials generated from the proposed development has been estimated. A summary of C&D materials generated during construction phase is presented in **Table 10.1**. The potential environmental impacts arising from the handling and disposal of the C&D materials, such as air and odour emissions, noise and potential hazard, are considered negligible. Appropriate measures should be taken to minimise potential adverse impacts from dust during the transportation of C&D materials.

Table 10.1 Summary of Estimated Quantities of C&D Materials (m^3)

/	Total C&D Materials	Inert C&D Materials (e.g. soil, rock, concrete)	Non-inert C&D Materials (C&D waste)	Backfilling (on site reuse) of Inert C&D Materials	Inert C&D Materials to be Disposed of at PFRF	Non-inert C&D Materials to be Disposed of at Landfill
Total	**44,300**	**42,085**	**2,215**	**31,550**	**10,535**	**2,215**

Note: The volume of excavated materials is based on preliminary development plan and is subject to review with the detailed design of the proposed works in the next stage.

With reference to **Para.5.3.1**, an approximate 158,000m^3 of fill materials are required for site formation works of the proposed development. Therefore, an estimate of 126,450 m^3 of imported materials are required for the site formation works.

10.6.4 Non-inert C&D materials generated would be reused and recycled as much as possible before disposing to landfills.

10.6.5 The Contractor would quantify in the Waste Management Plan (WMP) the amount of C&D materials expected to be generated.

Construction Phase - Chemical Waste

10.6.6 The maintenance and servicing of construction plant and equipment may possibly generate some chemical wastes, for instance, cleaning fluids, solvents, lubrication oil and fuel. Maintenance of vehicles may also involve the use of a variety of chemicals, oil and lubricants. It is anticipated that the quantity of chemical waste, such as lubrication oil and solvent produced from plant maintenance, would be small and in the order of a few litres per month. The amount of chemical waste to be generated would be quantified in the WMP to be prepared by the Contractors.

10.6.7 Materials classified as chemical wastes will require special handling and storage arrangements before removal for appropriate treatment at the Chemical Waste Treatment Centre (CWTC) at Tsing Yi. Wherever possible opportunities should be taken to reuse and recycle materials. Mitigation and control requirements for chemical wastes are detailed in the *Preliminary Environmental Review Report*. Provided that the handling, storage and disposal of chemical wastes are in accordance with these requirements, adverse environmental impacts are not expected to result.

Construction Phase - General Refuse

10.6.8 It is difficult to quantify the amount of general refuse that would arise from the construction activities as it would be highly dependent on the contractor's on-site maintenance activities and the quantity of plant and equipment utilized. However, as a worst case, it is estimated that a factor of 0.65 kg per worker per day of general refuse will be generated. The total quantity of waste generated would thus be estimated 130 kg per day, assuming the size of the work force would be a maximum of 200 construction workers.

10.6.9 Effective collection and removal of site wastes will be required to prevent waste materials being blown around by wind, flushed or leached into the aquatic environment, and to prevent odour nuisance. The work sites may also attract pests and vermin if the waste storage area is not well maintained and cleaned regularly. Disposal of refuse must be at approved waste transfer or disposal facilities. With the implementation of good waste management practices at the Site, adverse environmental impacts would not be expected to arise from the storage, handling and transportation of refuse.

Operation Phase

10.6.10 The operational phase of the proposed Project is not expected to generate any significant waste. The quantities of general refuse arising from the Project would be low and thus no significant waste implications during the operational phase are predicted. The refuse must be disposed at approved waste transfer or disposal facilities by refuse collection vehicle. As such it is considered to have no adverse environmental impacts.

Mitigation Measures

Good Site Practices

10.6.11 Appropriate waste handling, transportation and disposal methods for all waste arising generated during the construction works for the Project should be implemented to ensure that construction wastes do not enter the nearby streams or drainage channel.

10.6.12 It is anticipated that adverse impacts would not arise on the construction site, provided that good site practices are strictly followed.

Waste Reduction Measures

10.6.13 Good management and control of construction site activities/ processes can minimise the generation of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices.

Conclusion

10.6.14 Waste types generated by the construction activities are likely to include inert and non-inert C&D materials from construction and excavation works for site formation and infrastructure works, chemical wastes from the maintenance of construction vehicles and equipment and general refuse from the workforce. Provided that the identified wastes during construction phase would be handled, transported and disposed of using the recommended methods and that good site practices would be strictly followed, adverse environmental impacts during construction phase are not expected.

10.7 Land Contamination

Environmental Legislation, Standards and Criteria

10.7.1 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

10.7.2 A site appraisal was conducted for the preliminary Land Contamination and Remediation Study (LCRS) under this Assignment to identify any current / historical potentially contaminating land uses within the works area under the Project. The site appraisal, including site walkover and desktop review, was carried out with reference to the Guidance Note, Guidance Manual and Practice Guide.

10.7.3 The site walkover was conducted within the Study Boundary to identify any existing contaminative land uses and contamination sources (or 'hotspots'). For the desktop review, the following information was reviewed:

- Available records of dangerous goods, chemical wastes, chemical spillage/leakage and fire incidents from Environmental Protection Department (EPD) and Fire Services Department (FSD);
- Hong Kong Geological Survey (HKGS) Maps;
- Baseline Review Report (Section 7: Geotechnical Review) under this Assignment; and
- Selected aerial photographs and topographic maps held by the Lands Department (Lands D).

Identification of Potential Land Contamination Impacts

10.7.4 The site appraisal was carried out from April 2019 to August 2020 with site walkovers conducted in April and December 2019. Findings of the site appraisal are presented in the separate preliminary LCRS.

10.7.5 Based on the site appraisal, a total of 7 sites suspected to be used for industrial purposes were identified within the works area. Locations of these sites are shown in **Figure 10.11** and details are summarized in **Table 10.3**. The sites should be subject to further site appraisal in next stage of the Project when site access is available to confirm the land uses and to identify the presence of any potential contaminated sources.

Table 10.3 Details of Site Appraisal for the Sites with Suspected Industrial Land Use

Site ID[1]	Current Land Use	Approx. Site Area (m^2)	Site Observation and Information from EPD/FSD	Other Potential Contaminating Land Uses / Activities
SS-1	Vehicles storage	46,220 (Encroached area: 38,480)	• The vehicle storage is located in the northwest of the works area and was inaccessible for site inspection. • Based on peripheral observations, storage of new vehicles (i.e. private cars, coaches and minibuses) and temporary structures were observed. • Based on FSD/EPD, information, there were no DG/ chemical wastes/ fire incident/ spillage records for the site.	N/A
SS-2	Suspected industrial land use	2,200	• The site is located in the northwest of the works area and was inaccessible for site inspection. • Temporary structures were observed in the southwest near the entrance of the site. Gate closed. Site land use / activities could not be determined. • Based on FSD/EPD, information, there were no DG/ chemical wastes/ fire incident/ spillage records for the site.	N/A
SS-3	Suspected industrial land use	2,330 (Encroached area: 2300)	• The site is located in the northwest of the works area and was inaccessible for site inspection. • Excavators and vehicles were observed from the outside. A site office was observed to the west of the works area near the entrance. • Based on FSD/EPD, information, there were no DG/ chemical wastes/ fire incident/ spillage records for the site.	N/A
SS-4	Suspected industrial land use	790	• The site is located near the centre of the works area and was inaccessible for site inspection. Gate closed. Site land use / activities could not be determined. • Some construction machineries were observed from the outside. • Based on FSD/EPD, information, there were no DG/ chemical wastes/ fire incident/ spillage records for the site.	N/A

Site ID[1]	Current Land Use	Approx. Site Area (m^2)	Site Observation and Information from EPD/FSD	Other Potential Contaminating Land Uses / Activities
SS-5	Suspected industrial land use	1,780 (Encroached area: 1,620)	• The site is located in the northeast of the works area and was inaccessible for site inspection. • Trucks were observed from the outside. Site land use / activities could not be determined. • Based on FSD/EPD, information, there were no DG/ chemical wastes/ fire incident/ spillage records for the site.	N/A
SS-6	Construction materials storage	26,960 (Encroached area:22,620)	• The site is located in the northeast of the works area and was inaccessible for site inspection. • Construction materials such as cranes, metals and construction machineries were observed from the outside. • Based on FSD/EPD, information, there were no DG/ chemical wastes/ fire incident/ spillage records for the site.	Vehicles storage in 2003
SS-7	Construction materials storage	10,050	• The site is located in the northwest of the works area and was inaccessible for site inspection. • Storage of construction materials (e.g. metal pipes) were observed from the outside. • Based on FSD/EPD, information, there were no DG/ chemical wastes/ fire incident/ spillage records for the site.	Vehicles storage in 2003

Note:
1. Refer to **Figure 10.11** for locations of the sites.

N/A: Not Applicable

Evaluation of Potential Land Contamination Impacts

10.7.6 Based on the site appraisal, the 7 sites suspected to be used for industrial purposes were inaccessible during the site walkover to confirm their actual site activities or land uses.

10.7.7 The presence of land contamination within the above sites would depend on their actual site activities. In particular for vehicle and construction materials storages, whether contaminating activities such as vehicle maintenance / repairing, refuelling, storage of chemicals / chemical wastes etc. are / have been carried out. As such, further site appraisal should be carried out within these sites at a later stage of the Project when site access is available to confirm the land uses / activities and to identify the presence of any potential contamination sources. In addition, as the construction works would not commence until 2026, the further site appraisal should also cover any further changes to the land uses within the works area since the time of this report. If potentially contaminated sites were identified, intrusive site investigation (SI) and if necessary remediation works would also need to be carried out. The further site appraisal and if necessary intrusive SI and remediation works should be carried out prior to commencement of construction works under the Project in accordance with EPD's Guidance Manual, Guidance Note and Practice Guide.

10.7.8 Any soil/groundwater contamination would be identified and properly treated prior to the commencement of construction works under the Project if the further works provided in **para. 10.7.9** were implemented. Land contamination impacts are therefore considered not insurmountable to future occupants if proper follow up actions were followed and contaminated soil and groundwater (if any) were properly treated using appropriate remediation methods and according to EPD approved Remediation Action Plan (RAP).

Proposed Further Works

10.7.9 Further site appraisal and if necessary intrusive SI and remediation works should be carried out in accordance with EPD's Guidance Manual, Guidance Note and Practice Guide. The task flow for the works are as follow:

(a) Conduct site walkover within the concerned sites subject to the land resumption programme and remaining areas within the works area boundary to update the findings of the site appraisal;
(b) If necessary, submit Contamination Assessment Plan(s) (CAP(s)), presenting findings of the further site appraisal and the necessary sampling and testing plan, for EPD agreement;
(c) Carry out intrusive SI works according to EPD agreed CAP(s);
(d) Submit Contamination Assessment Report(s) (CAR(s)), detailing findings of the SI works and nature/extent of any contamination, and, if contamination identified, RAP(s), discussing the appropriate remedial methods for the identified contamination, for EPD agreement; and
(e) Carry out remediation works according to EPD agreed RAP(s). Submit Remediation Report(s) (RR(s)) upon completion of remediation for EPD record/agreement. No construction works or development of contaminated site should be carried out prior to EPD's approval of the RR.

Conclusion

10.7.10 Based on the desktop review and site walkover, a total of 7 sites suspected to be used for industrial purposes. Given the inaccessibility of the concerned sites during the site walkover, further site appraisal should be carried out in later stage of the Project when site access is available to confirm the land uses and to identify the presence of any potential contaminated sources and recommend the proposed remedial measures as necessary.

10.8 Ecology

Assessment Area

10.8.1 The assessment area for ecological impact assessment includes areas within 500 m from the boundary of the proposed works area shown in **Figure 10.12**.

Literature Review

10.8.2 Collation and review of relevant studies and available information regarding the ecological characteristics of the assessment area were carried out. The review collated ecological information from various reports and publications including:

- (Agreement No. CB20120293) Planning and Engineering Study for the Public Housing Site and Yuen Long Industrial Estate Extension at Wang Chau – Environmental Impact Assessment Report (HKHA, 2014)[2];
- (EIA-205/2012) Construction of Cycle Tracks and the Associated Supporting Facilities at Nam Sang Wai, Yuen Long – Environmental Impact Assessment Report (CEDD, 2013);
- (AEIAR-148/2009) Proposed Development at Fung Lok Wai, Yuen Long at Lot 1457 R.P. in D.D.12 – Approved Environmental Impact Assessment Report (Mutual Luck, 2008);
- Summer 2019 Report: Egretry Counts in Hong Kong with Particular Reference to the Mai Po Inner Deep Bay (Anon, 2020);
- Information Request: Hong Kong Biodiversity Database. Agriculture, Fisheries and Conservation Department, Government of HKSAR. (AFCD, 2018);
- Memoirs of the Hong Kong Natural History Society; and
- Hong Kong Biodiversity Newsletters published by the Agriculture, Fisheries and Conservation Department (AFCD).

Ecological Survey

10.8.3 A site inspection was conducted in October 2018 and four monthly ecological surveys were undertaken between December 2018 and May 2019, three out of which included night surveys. A verification survey and night survey were conducted in December 2019. Freshwater community survey was conducted once in the wet season. The ecological survey programme is shown in **Table 10.4**. Key findings from the site inspection were included to supplement the results of the ecological surveys.

Table 10.4 Ecological Survey Programme

	Oct 2018	Dec 2018	Jan 2019	Apr 2019	May 2019	Dec 2019
Habitat and Vegetation Survey	✓	✓		✓		✓
Avifauna Survey	✓	✓	✓(D&N)*	✓(D&N)	✓(D&N)	✓(D&N)
Butterfly and Odonate Survey	✓			✓	✓	✓
Herpetofauna Survey				✓(D&N)	✓(D&N)	✓(D&N)
Mammal Survey			✓(D&N)	✓(D&N)	✓(D&N)	✓(D&N)
Stream Fauna Survey					✓	

Note:* D&N=Day and night survey

[2] Downloaded from a webpage of the Transport and Housing Bureau. Last revision date: 7 December 2017. https://www.thb.gov.hk/eng/popup/wangchau_report_details.htm

Habitat Mapping and Vegetation Survey

10.8.4 Terrestrial habitats within the assessment area were identified, sized and mapped. Ecological characteristics of each habitat type, including size, vegetation type, species present, dominant species found, species diversity and abundance, community structure, ecological value and inter-dependence of the habitats and species, and presence of any features of ecological importance were defined and characterized. Representative photographs of the habitat types and/or any important ecological features identified were taken. A habitat map of suitable scale (1:1000 to 1:5000) showing types and locations of terrestrial habitats within the assessment area had been prepared from aerial photographs. The habitat map was then checked during ground truthing.

10.8.5 Vegetation surveys were conducted by direct observation to record diversity and dominance of plant species present in different habitat types. The location of plant species of conservation importance was recorded. Identification of flora species and status in Hong Kong were made with reference to Corlett et al. (2000), Hu et al. (2003), Hong Kong Herbarium (2012), and Hong Kong Herbarium and South China Botanical Gardens (2007; 2008; 2009; 2011).

Fauna Survey

10.8.6 The location of the proposed transects and sampling points for the fauna surveys is presented in **Figure 10.13**. The transects were located to provide representative coverage of the assessment area and habitats which could potentially be utilised by fauna. It was observed in the reconnaissance that the accessibility to certain parts of the assessment area were restricted by the hoarding and the running businesses. Thus, the transects and sampling points were adjusted based on actual site condition.

10.8.7 The presence and abundance of avifauna species at various habitats were recorded visually and aurally. Avifauna within the assessment area were surveyed quantitatively using transect count method. The location of any avifauna species of conservation importance encountered was recorded, along with notable behaviour (e.g. breeding behaviour such as nesting and presence of recently fledged juveniles, roosting, and feeding activities). Ornithological nomenclature in this report follows Carey et al. (2001), Viney et al. (2005) and the most recently updated list from the Hong Kong Bird Watching Society.

10.8.8 Butterflies and odonates (dragonflies and damselflies) within the assessment area were surveyed quantitatively using transect count method. Attention was given to their potential habitats and host plants of species of conservation importance. Relative abundance of butterfly, dragonfly and damselfly were recorded. Nomenclature of butterfly follows Lo and Hui (2010) and nomenclature of dragonfly and damselfly follows Tam et al. (2011).

Herpetofauna Survey

10.8.9 Herpetofauna within the assessment area were surveyed quantitatively. Potential microhabitats (e.g. leaf litter, underneath of rotten logs) were searched. All reptiles and amphibians sighted were recorded.

10.8.10 Amphibian surveys were conducted whenever possible on evening following or during periods of rainfall, focusing on areas suitable for amphibians (e.g. forests, shrublands, grasslands, streams, catchwaters, fishponds and marshes, if any). Records of calling amphibians formed the bulk of the data collected, but supplemented when possible by visual observation of eggs, tadpoles and frogs and toads.

10.8.11 During reptile surveys, careful searches of appropriate microhabitats and refugia (e.g. stones, pond bunds, crevices, leaf litter/debris, rotten log) were undertaken. All reptiles observed were identified. In addition to active searching, individuals that were basking, foraging or exposed to view were also recorded. Nomenclature of amphibian Chan et al. (2005), and that of reptile follows Karsen et al. (1998) and Chan et al. (2006).

Mammal Survey

10.8.12 Surveys were conducted in areas which might potentially be utilized by terrestrial mammals. The surveys focused on searching for field signs such as droppings, footprints, diggings or burrows left by larger terrestrial non-flying mammals. Mammal identification was made as accurate as possible from the field signs encountered. In addition, any flying or non-flying mammal directly observed was identified. Nomenclature of mammal follows Shek (2006). Flying mammals (e.g. bat species) were also taken into account during the mammal survey.

10.8.13 Bat surveys were undertaken by surveyor(s) equipped with ultrasonic bat detector at potential roosting, commuting, foraging and drinking sites. The acoustic information (species-specific echolocation calls) was recorded for later analysis with computer software, supplemented with other direct observation (e.g. size, flying pattern, flight height and utilization of nearby habitats) for species identification.

Freshwater Community Survey

10.8.14 Freshwater communities (freshwater fish and aquatic macro-invertebrate) were surveyed by means of either one or a combination of techniques (e.g. bank side observation, active search with hand nets and/or fish cages, kick sampling, hand-netting, turning over boulders in the watercourse to collect organisms). The proposed freshwater community survey locations are shown in **Figure 10.13**.

10.8.15 Freshwater fish and macroinvertebrate recorded were identified to the lowest possible taxonomic level with their relative abundance. Organisms encountered were recorded and identified to the lowest possible taxonomic level. Nomenclature for fish and macroinvertebrate follow Lee et al. (2004) and Dudgeon (2003) respectively.

Identification and Evaluation of Environmental Impacts- Construction Phase – Direct Impact

Permanent Loss of Vegetation and Habitats

10.8.16 The site clearance and site formation works in the proposed works area including the proposed public housing development could result in permanent loss of the mixed woodland, grassland, plantation, dry agricultural land, developed area/wasteland and modified watercourse habitats, in which the existing modified watercourses within the proposed works area would be diverted to a new box culvert and decked over. Most of the species recorded are common or very common. The mixed woodland has low to moderate ecological value with limited biodiversity and only a small patch of mixed woodland would be lost. The direct impact of the loss of mixed woodland would be anticipated to be low, while no adverse ecological direct impact would be anticipated for the remaining habitats with low ecological values.

10.8.17 One avifauna (Grey Heron) and two mammalian (Japanese Pipistrelle and Least Pipistrelle) species of conservation importance were recorded within the proposed works area in low abundance, in which the Grey Heron and a record of Japanese Pipistrelle fell within the proposed housing site. Grey Heron just flew over the proposed works area and is common winter migrant in Hong Kong, which often lives in various types of wetlands, thus the proposed housing site is not considered as a key habitat for this species. It is likely that the proposed works area was a suitable habitat for the roosting, commuting, foraging and/or drinking activities of both Japanese Pipistrelle and Least Pipistrelle. However, they are insectivorous/aerial feeding mammals which prey on small insects e.g. moth so their food source is not specific. Japanese Pipistrelle is the most common bat species found in urban areas and Least Pipistrelle can roost in a wide range of habitats. With their high mobility to displace to other readily available habitats in vicinity, the loss of habitat in the proposed Works Area would be anticipated to have minor adverse impact on them.

Habitats recorded within the assessment area

10.8.18 A total of 11 habitat types were identified within the assessment area, including mixed woodland, shrubland, grassland, plantation, village/orchard, dry agricultural land, nursery, developed area/wasteland, pond, natural watercourse and modified watercourse. An overview of habitats recorded within the assessment area is tabulated in **Table 10.5**.

Table 10.5 Habitats recorded within the assessment area

Habitat Type	Size (ha)		
	Proposed Housing Development	**Proposed Works Area**	**Assessment Area**
Mixed Woodland	0.05	0.1	27.0
Shrubland	-	-	7.9
Grassland	-	0.008	39.7
Plantation	0.1	1.4	10.7
Village / Orchard	-	-	4.8
Dry Agricultural Land	-	0.003	0.9
Nursery	-	-	0.5
Developed Area / Wasteland	5.9	9.6	229.6
Pond	-	-	15.0
Natural Watercourse	-	-	1812.3
Modified Watercourse	159 m	471 m	2177.7
Total Area/ Length	**6.2 ha/ 159 m**	**11.3 ha/ 471 m**	**334.9 ha/ 3990 m**

Injury and Mortality of Terrestrial Fauna

10.8.19 The construction activities may result in injury and mortality of wildlife. Animals may be killed or injured by rapidly moving vehicles or collision with stationary objects e.g. aboveground structures. Traffic flow brought by construction vehicles may lead to roadkill. However, currently over half of the proposed works area is developed and occupied by car parks and open storage areas, bringing in a number of heavy vehicles (e.g. lorry and container trunk) and low to moderate traffic flow to the existing sub-standard access road connecting to the junction of Tin Wah Road/Tin Tsz Road, which is partially within Wetland Buffer Area (WBA). The remaining sections of the proposed site access road will transverse into areas which are already developed, and small areas of mixed woodland and grassland which will be lost during site clearance works. With appropriate mitigation measures in place to restrict terrestrial fauna from entering the proposed works area, the chance of injury and mortality will be minimized. In addition, since most of the recorded species were common and widespread in urban areas and highly mobile, any impacts are unlikely to have a significant effect on the population numbers therefore the impact is considered as minor.

Encroachment onto Site of Conservation Importance

10.8.20 The northern part of the proposed works area i.e. northern section of the proposed access road falls within the WBA. The proposed works area will be confined along the existing access road and the adjacent narrow strips of plantation, both with low ecological values. Since it will not encroach into any pond, the direct ecological impact on WBA is considered minor.

Habitat Fragmentation

10.8.21 The majority of the proposed works area was developed and occupied by various human activities so further fragmentation is not anticipated to arise from the proposed development.

Identification and Evaluation of Environmental Impacts - Construction Phase – Indirect Impact

Impact to Site of Conservation Importance

10.8.22 The northern section of the proposed site access road falls within the WBA and occurs in a short distance to the ponds in Hong Kong Wetland Park and also Wetland Conservation Area (WCA), which overlaps with the Lau Fau Shan Shan Conservation Area (CA). Although it will not affect any pond in WBA nor WCA directly, the close proximity still renders indirect disturbance impacts e.g. arising from construction vehicles, noise and vibration, air/dust to these ponds, sites of conservation importance and the associated wildlife. The ecological impact will be low to moderate.

10.8.23 A short section of the eastern boundary of the propose works area would be near the western boundary of the Ping Shan CA at Fung Ka Wai and Kai Shan. The close proximity renders indirect disturbance impacts to the CA, e.g. arising from construction vehicles, noise and vibration, air/dust. Since the construction works would be temporary and the CA has been under human disturbance to a certain extent as the proposed works area currently composes open storage areas and roads, the impact caused by the construction activities to Ping Shan CA is considered minor.

Construction Disturbance to Habitat, Fauna and Vegetation

10.8.24 Site formation and excavation works would produce noise and vibration, causing disturbance to the surrounding habitats and the organisms that inhabit there.

10.8.25 Dust generated from construction could deposit on the leaves of vegetation in the adjacent habitats. Normal biological processes including photosynthesis and transpiration would be hindered, which would lead to deterioration of the conditions of vegetation and thus the quality of habitat. Given the terrain and location of Kai Shan, the western facing slope of Kai Shan might be susceptible to the dust deposition.

10.8.26 Although the proposed works area is currently occupied by various brownfield operations, which also create human disturbance to the habitat and wildlife there, the level of disturbance arising from construction would be higher, posing a low to moderate ecological impact.

Impacts to Water Quality

10.8.27 There were ponds along the proposed access road in the north and outside the southwest corner of the proposed works area. Surface runoff from the proposed works area may enter these water bodies, in particular during periods of downpour. The soil particles would increase the turbidity and enrich the nutrients of the water bodies, leading to eutrophication and impoverishment of the freshwater communities as well as their predators e.g. waterbirds. However, since the biodiversity recorded in these ponds was low, such ecological impact would be minor.

10.8.28 Likewise, the natural watercourses in proximity to the eastern part of the proposed works area might receive input of the surface runoff from the proposed works area. Nevertheless, since these sections of natural watercourses have been under human disturbance from the adjacent developed area and had low ecological value, the indirect impact expected to be minor.

10.8.29 The modified watercourses within the proposed works area would be modified and reconstructed in the form of box culvert. However, during construction phase, the surface runoff may still get into these watercourses and reach the further downstream areas, which could be the Deep Bay area if the discharge of these watercourses feed into there. Since the scale of the modified watercourses is small, such impact could be reduced, given proper mitigation measures are well implemented, and thus the impact should be low.

Identification and Evaluation of Environmental Impacts- Operation Phase – Indirect Impact

Effects of Landscape Change on Species

10.8.30 Kai Shan is a well-known hill-topping site for butterflies, but it is a relatively short knoll with its peak at mere 110 mPD. Within the proposed development area, the supporting welfare/ ancillary facilities are around 45 mPD while the residential buildings in the proposed housing site have height of approximately 65-160 mPD, which is likely to make the topographical features of the western aspects of Kai Shan less conspicuous to the hill-topping butterflies. While the proposed development area is located in developed area and no added habitat fragmentation is resulted, such obstruction of the topographical cues to butterflies could lead to low to moderate impact on the dispersal and hill-topping behaviour of butterflies and proper mitigation measures would be proposed.

10.8.31 The proposed housing site is situated near Deep Bay and there are a number of ponds and egretries in the north-western New Territories. During surveys conducted under this study, only a few individuals of ardeids were recorded and only one Grey Heron was observed on flight above the proposed housing site. No foraging behaviour was observed, suggesting the potential impact to ardeids is considered minor.

Glare

10.8.32 Glare or artificial lighting may create light pollution, which can affect the orientation or diurnal cycle of the nocturnal animals especially herpetofauna and bats. However, the majority of the proposed development area is developed and the areas west to Tin Tsz Road are also highly developed with numbers of high-rise buildings so the adjacent habitats in CA and WBA are already subjected to certain extent of artificial lighting. In addition, the level of disturbance is expected to be slightly higher than that of the current site conditions, thus the increase in level of disturbance would not be significant.

10.8.33 While between the south and west facing sides of the proposed works area are mostly urbanized areas, the north facing direction is open to the view of the major ponds and wetland areas in WCA located beyond the current assessment boundary. The glare emitted from the buildings in proposed development area could reach these ecologically sensitive areas but increase in level of disturbance caused by the glare would be insignificant, considering the surrounding area beyond the assessment area is already developed and comprises many high-rise buildings. Therefore, indirect impact resulting from the glare during operational phase is considered as low.

Noise, Traffic and Human Activities

10.8.34 The increase in traffic flow and human activities caused by the proposed access road and PTI might lead to noise pollution and disturbance impact to the adjacent natural habitats and their associated wildlife. The western section of the proposed access road will be reconstructed from the existing sub-standard access road connecting to the junction of Tin Wah Road/Tin Tsz Road, with low to moderate traffic flow and heavy vehicles predominantly. During the operational phase, the traffic flow may increase and the traffic composition may shift to bus and green minibus. The change in level of noise and disturbance to the ponds and wetland areas within the WBA and WCA from the current site conditions would be relatively small.

10.8.35 The remaining sections of the proposed site access road are mainly within the current open storage areas and garage. The eastern section of the proposed site access road will be near the mixed woodlands southeast to the proposed development area (near Ha Mei San Tsuen) with moderate biodiversity and abundance recorded. However, given the existing level of disturbance and with appropriate mitigation measures in place, minor ecological impacts arising from the operation phase are anticipated.

Cumulative Impact

10.8.36 The tentative construction programme of the Project is scheduled between 2026 and 2033. A total of three concurrent projects in vicinity are identified:

- Wang Chau Phase 1;
- Wang Chau Remaining Phase; and
- Proposed Yuen Long Industrial Estate Extension (YLIEE).

10.8.37 The tentative construction programme of Wang Chau Phase 1 would be completed in 2026~2027. Moreover, the works site also does not overlap with the assessment area of the Project. Given the indirect impacts to the surrounding habitats and ecologically sensitive areas and the associated fauna during operational phase would be low according to the EIA study (HKHA, 2014), no unacceptable cumulative ecological impact is anticipated.

10.8.38 The construction programme of Wang Chau Remaining Phase would be tentatively from 2027 to 2033 which may possibly overlapping with that of the current Project. However, the works site of Wang Chau Remaining Phase is outside the assessment area of the current Project. The indirect impacts to the surrounding habitats and Ping Shan CA and the associated fauna during both construction and operational phase would be insignificant according to the feasibility study. No unacceptable cumulative ecological impact is anticipated.

10.8.39 Only a limited works area of YLIEE in the eastern side of Kai Shan would overlap with the assessment area of the current Project. The construction period would be tentatively scheduled between 2019 and 2022, which does not overlap with that of the Project. Since the EIA study (HKHA, 2014) considered the off-site ecological impacts raised during operational phase of YLIEE would be low, no unacceptable cumulative ecological impact is anticipated.

Mitigation Measures of Adverse Ecological Impacts

Avoidance

10.8.40 The proposed development area is situated in a peri-urban area, in proximity to Ping Shan CA in the east and WBA in the north. The design and layout of the proposed development area has been adjusted at early planning stage to avoid encroachment and direct impacts onto these sites of conservation importance.

Minimization

10.8.41 In order to minimize the low to moderate ecological impacts arising from construction of the Project to the sites of conservation importance, nearby habitats and the associated wildlife, including noise, dust, and glare, general good site practice should be implemented to minimise impact.

10.8.42 The precautionary measures provided in "ProPECC PN 1/94 Practice Note for Professional Persons – Construction Site Drainage" (EPD, 1994) and the Technical Circular (Works) No. 5/2005 "Protection of natural streams/rivers from adverse impacts arising from construction works" (ETWB, 2005) e.g. isolating the works site with sandbags and silt curtains, covering up construction materials, debris and spoil, and proper collection and treatment of construction effluent and sewage should be strictly followed.

10.8.43 In response to the glare and noise which would arise from the traffic and human activities of the proposed development, buffer planting should be considered along the northern boundary of the proposed works area so that the glare and noise emitted would be more concentrated to the southern and western facing direction, which are all developed areas. Buffer planting and landscape areas are also recommended between the western boundary of Ping Shan CA and the eastern section of the proposed site access road to provide a buffer and screening to minimize the disturbance impacts to the Ping Shan CA.

Mitigation

10.8.44 Ecologically friendly measures would be incorporated into the landscaped areas within the proposed development area as far as practicable. Nectar plants and larval food plant could be planted to create a more butterfly friendly environment and to provide an olfactory cue for the butterflies to reach Kai Shan, so as to increase the landscape permeability to butterflies and minimize the barrier and edge effects caused by the building structures on their hill-topping behaviour and dispersal. The landscape areas within the proposed development area would serve as steppingstone habitats for the butterfly, which would enhance adequate migration flows within the wider landscape context. The core habitat at Kai Shan should be protected and enhanced by improving the quality of existing habitat.

Evaluation of Residual Ecological Impacts

10.8.45 With the proper implementation of the recommended mitigation measures, residual ecological impacts arising from the construction and operation of the proposed development are anticipated to be minor and acceptable.

Conclusion

10.8.46 In general, the eastern part of the assessment area, which covers Kai Shan, the Ping Shan CA, belonged to grassland habitat while the majority in the western part were developed area/wasteland habitats. The northern part of the assessment area consisted of ponds within the Hong Kong Wetland Park, WBA, WCA and the Lau Fau Shan CA, with some other habitats e.g. mixed woodland, shrubland, grassland and developed area/wasteland. Other areas surrounding the proposed works area are interspersed with mosaic of habitats including mixed woodland, shrubland, plantation, village/orchard, dry agricultural land, pond, natural watercourse and modified watercourse.

10.8.47 Majority of the proposed works area was composed of developed areas such as open storage areas and car parks, with modified watercourses and strips of plantations running in the centre and near the western boundary of the proposed works area. A patch of mixed woodland, a very small area of grassland and dry agricultural land were identified in the south-eastern section of the proposed works area. The proposed housing site, forming a major part of the proposed works area, also consisted mostly of developed areas, with sections of modified watercourse and strips of plantation in the middle and small patch of mixed woodland in the southeast. The habitats identified within the proposed works area and the proposed housing site have low ecological values, except the mixed woodland with low to moderate ecological value.

10.8.48 Three faunal species of conservation importance (i.e. Grey Heron, Japanese Pipistrelle and Least Pipistrelle) were recorded within the proposed works area, in which Grey Heron and one of the records of Japanese Pipistrelle were within the proposed housing site. The animals are generally mobile and would displace to other available habitats so the impact would be insignificant. Direct ecological impacts anticipated include permanent loss of vegetation and habitats, injury and mortality of terrestrial fauna and encroachment into the WBA. Indirect impacts include impacts to sites of conservation importance, construction disturbance to habitat, fauna and vegetation, impact to water quality physical obstruction to animals and operational disturbance brought by glare, noise, traffic and human activities. All of the ecological impacts anticipated range between insignificant to low-moderate.

10.8.49 Mitigation measures e.g. implementation of general good site practice and precautionary measures have been suggested to reduce construction disturbance and impacts to water quality to the habitats and wildlife present during construction phase while measures e.g. ecologically friendly measures for butterflies and buffer planting would be considered to minimize operational disturbance during operational phase.

10.9 Cultural Heritage

Environmental Legislation, Standards and Guidelines

10.9.1 The assessment of potential cultural heritage impacts is carried out by referring to the following guidelines and procedures:

- Antiquities and Monuments Ordinance (A&MO) (Cap. 53)
- Environmental Impact Assessment Ordinance (EIAO) (Cap. 499) and the related Technical Memorandum (TM)
- Guidelines for Cultural Heritage Impact Assessment (GCHIA)
- Hong Kong Planning Standards and Guidelines (HKPSG)

Identification and Evaluation of Environmental Impacts - Construction Phase

Built Heritage

10.9.2 No cultural heritage resources is identified within the proposed works area boundary. Fourteen (14) cultural heritage resources including twelve (12) built heritages, one (1) Site of Archaeological Interest and one (1) other cultural heritage resources are located outside the proposed works area boundary but within the 500m assessment area as shown in **Figure 10.14**. **Table 10.9.1** summarises these fourteen cultural heritage resources. In view of the considerable distance, no direct impact from construction works of the Project on these built heritages would be anticipated. It is however noted that part of historic villages like Hang Tau Tsuen, Hang Mei Tsuen and Sheung Cheung Wai lay / partly lay within the assessment area, any historical buildings/ structures further identify in later stage should be preserved as far as practicable.

Table 10.9.1 List of Cultural Heritage Resources within the Assessment Area

Cultural Heritage Resources	Grading	Remarks	Approximate Distance from Works Boundary
Built Heritage – Ping Shan Area			
Tsui Sing Lau Pagoda	Declared Monument	Spot of the Ping Shan Heritage Trail	100m
Tat Tak Communal Hall	Declared Monument		125m
Yeung Hau Temple (Sheung Cheung Wai)	Grade 3		390m
Shrine of the Earth God	Not graded by AMO		255m
Old Well	Not graded by AMO		410m
Entrance Gate, Sheung Cheung Wai	Nil-grade		295m
Shrine, Sheung Cheung Wai	Nil-grade	/	275m
Built Heritage – Ha Mei San Tsuen Area			
Nos. 13-19 Ha Mei San Tsuen	Grade 3	/	35m
No. 27 Ha Mei San Tsuen	Not graded by AMO	/	45m
Shrine of Ha Mei San Tsuen	Not graded by AMO	/	5m
Built Heritage – Fung Ka Wai Area			
Nos. 7-16 of Fung Ka Wai	Nil-grade	/	100m
Shrine of Fung Ka Wai	Not graded by AMO	/	90m
Archaeology			
Sheung Cheung Wai	Site of Archaeological Interest	/	150m
Other Cultural Heritage Resources			
Ping Shan Heritage Trail	Not graded by AMO	/	65m

10.9.3 Due to close proximity to the works boundary, indirect impacts of ground-borne vibration arising from construction works, would be anticipated on Nos. 13-19 Ha Mei San Tsuen (Grade 3) and No. 27 Ha Mei San Tsuen (not graded by AMO) due to the more ancient construction in green bricks.

10.9.4 The remaining built heritages, namely Tsui Sing Lau Pagoda (Declared Monument), Tat Tak Communal Hall (Declared Monument), Yeung Hau Temple (Sheung Cheung Wai) (Grade 3), Nos. 7-16 of Fung Ka Wai (Nil-grade), Shrine, Sheung Cheung Wai (Nil-grade) and Entrance Gate, Sheung Cheung Wai (Nil-grade), are located at least 100m from the proposed works boundary. Therefore, indirect impacts would not be anticipated on these built heritages during the construction phase due to the substantial distance between the built heritages and the proposed works boundary.

10.9.5 The Shrine of Ha Mei San Tsuen is located 5m outside the works boundary, thus no relocation of the shrine would be required. Due to its sturdy, modern nature, no indirect impact is anticipated to the shrine during the construction phase.

10.9.6 Shrine of Fung Ka Wai, Shrine of the Earth God and Old Well are located at a substantial distance from the works boundary. No indirect impact would be anticipated on these resources during the construction phase.

Archaeology

10.9.7 The closest SAI is Sheung Cheung Wai SAI, which is located at 150m away from the proposed works boundary. As the original landscape within the proposed works boundary and the assessment area have already been seriously modified by urban development such as construction of the roads, residential development and open storage, including modern fill of lands. Any potential archaeological resources within the proposed works boundary and the assessment area (except Sheung Cheung Wai SAI) would have been removed or seriously disturbed by the abovementioned human disturbances. The Preliminary Environmental Review also concludes that the areas of archaeological potential as identified in "Agreement No. CB20120293 Planning and Engineering Study for the Public Housing Site and Yuen Long Industrial Estate Extension at Wang Chau - Final Technical Report No. 3G (TR-3G) Preferred Option and Technical Assessment - Environmental Impact Assessment Report" falling within the proposed works boundary and the assessment area are archaeologically negligible. Besides, the archaeological potential within the proposed works boundary and the assessment area (except Sheung Cheung Wai SAI) are negligible. Thus, archaeological impact arising from the proposed works would not be anticipated during the construction phase

Other Cultural Heritage Resources

10.9.8 Ping Shan Heritage Trail is located at a substantial distance from the proposed works boundary. No adverse impact would be anticipated on the heritage trail during the construction phase.

<u>Identification and Evaluation of Environmental Impacts - Operational Phase</u>

Built Heritage

10.9.9 No impact would be anticipated on the built Heritage resources during the operational phase.

Archaeology

10.9.10 No impact would be anticipated on the archaeological resources during the operational phase.

Other Cultural Heritage Resources

10.9.11 Increase in local population could have brought potential increased visitors to the Ping Shan Heritage Trail, which would be a beneficial impact to the educational purpose of the heritage trail.

Mitigation Measures - Construction Phase

Built Heritage

10.9.12 To minimize the adverse impacts due to ground-borne vibration, monitoring of vibration, tilting and ground settlement, should be proposed to the satisfaction of AMO prior to the commencement of construction works and employed during the construction phase.

Archaeology

10.9.13 No further archaeological action or review would be required during the construction phase.

Other Cultural Heritage Resources

10.9.14 No mitigation measure would be required for Ping Shan Heritage Trail during the construction phase.

Mitigation Measures -Operation Phase

Built Heritage, Archaeology and Other Cultural Heritage Resources

10.9.15 No mitigation measure would be required for built Heritage, archaeology and other cultural heritage resources during the operational phase.

Conclusion

10.9.16 No cultural heritage resources is situated within the works boundary. Fourteen cultural heritage resources are identified outside the works boundary but within the 500m assessment area, including two Declared Monuments, two Grade 3 historic buildings, three nil-grade buildings, five buildings not graded by AMO, one Site of Archaeological Interest, and a heritage trail. Due to close proximity to the works boundary, indirect impacts of ground-borne vibration arising from construction works, would be anticipated on Nos. 13-19 Ha Mei San Tsuen (Grade 3) and No. 27 Ha Mei San Tsuen (not graded by AMO). Monitoring of vibration, tilting and ground settlement, should be proposed to the satisfaction of AMO prior to the commencement of construction works and employed during the construction phase.

10.9.17 The original landscape of the propose works area and the assessment area have already been seriously modified by construction of the roads, residential development and open storage, including modern fill of lands. Any potential archaeological resources within the proposed works boundary and the assessment area (except Sheung Cheung Wai SAI) would have been removed or seriously disturbed by the abovementioned human disturbances. The Preliminary Environmental Review also concludes that the areas of archaeological potential as identified in "Agreement No. CB20120293 Planning and Engineering Study for the Public Housing Site and Yuen Long Industrial Estate Extension at Wang Chau - Final Technical Report No. 3G (TR-3G) Preferred Option and Technical Assessment - Environmental Impact Assessment Report" falling within the proposed works boundary and the assessment area are archaeologically negligible. Besides, the Archaeological potential of the proposed works area and the assessment area (except Sheung Cheung Wai SAI) are negligible, thus, archaeological impact would not be anticipated during both construction and operational phases of the development. No mitigation measure would be required.

10.9.18 Increase in local population could have brought potential increased visitors to the Ping Shan Heritage Trail, which would be a beneficial impact to the educational purpose of the heritage trail.

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11. PRELIMINARY LANDSCAPE AND VISUAL IMPACT ASSESSMENT

11.1 Introduction

11.1.1 This chapter presents the assessment of the potential landscape and visual impacts associated with the proposed development. Key Landscape Resources (LRs), Landscape Character Areas (LCAs) and Visually Sensitive Receivers (VSRs) that are likely to be affected due to the proposed development are identified. The potential landscape and visual impacts are assessed and evaluated.

11.2 Assessment Methodology

Preliminary Landscape Impact Assessment Methodology

11.2.1 The assessment area for the preliminary Landscape Impact Assessment (LIA) is defined as 500m from the Site with reference to EIAO Guidance Note No. 8/2010.

11.2.2 The landscape impacts have been assessed according to the following procedures:

- Identification of the baseline landscape resources (LRs) and landscape characters found within the study area.
- Assessment of the degree of sensitivity of the LRs and landscape character areas (LCAs).
- Identification of potential sources of landscape changes.
- Identification of potential landscape mitigation measures.
- Prediction of the significance of landscape impacts before and after the implementation of the mitigation measures.
- Prediction of Acceptability of Impacts.

Preliminary Visual Impact Assessment Methodology

11.2.3 The assessment of visual impacts will include:

- Identification of the Visual Envelope of the Project;
- Identification of the Viewpoints (VPs) within the Visual Envelope;
- Assessment of the degree of sensitivity to change of the VPs;
- Visual elements; and
- Appraisal of visual changes.

11.3 Preliminary Landscape Impact Assessment

Baseline Findings

11.3.1 Based on the broad brush tree survey, it is estimated there are approximately 809 numbers of existing trees found within the proposed works area boundary. The assessment area for landscape impact is 500m from the site boundary as illustrated in **Figure 11.1**. Identified tree species include Acacia auriculiformis, Acacia confusa, Bauhinia variegata, Eucalyptus robusta, Ficus benjamina, Ficus hispida, Macaranga tanarius, Melaleuca cajuputi etc. Three (3) trees of particular interest with DBH over 1m are spotted in the proximity of the proposed works area boundary. All of them are Ficus microcarpa located along the roadside of Tin Tsz Road, two trees near Ha Mei San Tsuen Flood Water Pumping Station and one tree adjacent to the northern portion of the proposed road.

11.3.2 No Registered OVTs/potential OVTs under DEVB TC(W) No. 5/2020 are identified as the Site is not located either within built-up areas or tourist attraction spots in village areas as stated in DEVB TC(W) No. 5/2020. There are no rare or endangered species identified as well.

Potential Source and Magnitude of Landscape Impacts

11.3.3 The magnitude of unmitigated impacts on landscape resources and landscape character areas associated with the construction and operation of the Project are assessed and described in **Table 11.1**. The landscape resources and landscape character areas are illustrated in **Figure 11.2 and 11.3** respectively.

Table 11.1 – Magnitude of Changes on LRs and LCAs during Construction and Operation

LRs/ LCAs	Description	Potential Source of Change	Magnitude of Change (Large/Intermediate /Small/Negligible)
LR1	Plantation within Temporary Land Use (e.g. Open Storage, Workshop Areas, Parking, Recreational Use)	Approximately 300 numbers of trees will be affected by the proposed housing development and road works along the western boundary of Site. In view of the medium scale of the housing development and road works and the irreversible change, the magnitude of change is considered as intermediate.	Intermediate
LR2	Kai Shan Conservation Area	Considered there is no proposed works within the LR2, the magnitude of change is considered as negligible	Negligible
LR3	Mixed Woodland	Considered there is no proposed works within the LR3, the magnitude of change is considered as negligible	Negligible

LRs/ LCAs	Description	Potential Source of Change	Magnitude of Change (Large/Intermediate /Small/Negligible)
LR4	Village Planting in Rural Settlement Area	Considered there is no proposed works within the LR4, the magnitude of change is considered as negligible	Negligible
LR5	Landscape Area in Urban Development Area	Considered there is no proposed works within the LR5, the magnitude of change is considered as negligible	Negligible
LR6	Tin Shui Wai Park, Tin Pak Road Park, other Local Open Spaces and Sitting-out Areas	Considered there is no proposed works within the LR6, the magnitude of change is considered as negligible	Negligible
LR7	Roadside Trees	Approximately 212 trees will be affected by the proposed road along the western boundary. In view of the small scale of the road works, the magnitude of change is considered as intermediate.	Intermediate
LR8	Natural Watercourse	Considered there is no proposed works within the LR8, the magnitude of change is considered as negligible	Negligible
LR9	Modified Watercourse	Approximately 240m long LR9 will be modified into box-culvert across the Site. Since the modification work will not have irreversible change, the magnitude of change is small.	Small
LR10	Hong Kong Wetland Park and adjoining Wetland Conservation Area	Considered there is no proposed works within the LR10, the magnitude of change is considered as negligible	Negligible
LR11	Other Ponds	Since the proposed works boundary would not encroach onto ponds, the magnitude of change is considered as negligible.	Negligible
LCA1	Miscellaneous Rural Fringe Landscape	Approximately 108,000m^2 of LCA1 will be affected by the proposed housing development. In view of the medium scale of the housing development, the magnitude of change is considered as intermediate.	Intermediate

LRs/ LCAs	Description	Potential Source of Change	Magnitude of Change (Large/Intermediate /Small/Negligible)
LCA2	Residential Urban Landscape	Considered there is no proposed works within the LCA2, the magnitude of change is considered as negligible	Negligible
LCA3	Peak Landscape	Considered there is no proposed works within the LCA3, the magnitude of change is considered as negligible	Negligible
LCA4	Mixed Modern Comprehensive Urban Development	Considered there is no proposed works within the LCA4, the magnitude of change is considered as negligible	Negligible
LCA5	Park Urban Landscape	Considered there is no proposed works within the LCA5, the magnitude of change is considered as negligible	Negligible
LCA6	Miscellaneous Urban Fringe Landscape	Considered there is no proposed works within the LCA6, the magnitude of change is considered as negligible	Negligible
LCA7	Rural Coastal Plain Landscape	Considered there is no proposed works within the LCA7, the magnitude of change is considered as negligible	Negligible

Significance of Unmitigated Landscape Impacts

11.3.4 The predicted impact would include approximately 512 numbers of existing trees for removal, including 300 trees in LR1, and 212 trees in LR7. No OVTs/potential OVTs/important trees/trees of particular interest would be affected. Majority of the tree groups (LR1) identified and small portion of tree groups in LR7 would be affected, while the existing trees on steep slopes in the remaining part of the Site would be retained in general. The magnitude of change to both LR1 and LR7 are considered as intermediate. Approximately 240m long modified watercourse (LR9) would be further modified into box-culvert. The magnitude of change is considered small. The remaining LRs would anticipate the magnitude of change to be negligible.

11.3.5 Considering the Miscellaneous Rural Fringe Landscape LCA, approximately 108,000m^2 would be converted to Residential Urban Landscape LCA. As this may consider as expansion of adjacent existing Residential Urban Landscape LCA in Tin Shui Wai, the compatibility of proposed development is considered high. Therefore, the magnitude of landscape change is considered as intermediate. For the remaining LCAs, their magnitude of change would be negligible.

11.3.6 In view of the above, the proposed development is anticipated to have insubstantial to moderate landscape impact under unmitigated condition.

Preliminary Landscape Mitigation Measures
Mitigation Measures during Construction and Operational Phases

11.3.7 Based on the potential landscape changes identified in previous section, a list of mitigation measures is proposed in **Table 11.2** below and illustrated in **Figure 11.4** to alleviate any adverse landscape impacts.

Table 11.2 – Landscape Mitigation Measures

ID No.	Landscape Mitigation Measures	Implementation Agency	Maintenance / Management Party
MM1	**Preservation of existing vegetation** – All existing trees to be retained or not be affected by the project shall be carefully protected during construction in accordance with DEVB TC(W) No. 4/2020 – Tree Preservation and the latest guidelines on tree preservation during development issued by GLTM Section of DEVB.	CEDD (via Contractor)	LCSD (for roadside amenity area) HyD (for SIMAR slopes along road)
MM2	**Compensatory tree planting and new tree planting** – Any trees to be felled under the Project shall be compensated in accordance with DEVB TC(W) No. 4/2020 – Tree Preservation. Implementation of compensatory tree planting onsite and offsite should be of a ratio not less than 1:1 in terms of number as far as practicable. The number of compensatory trees shall not be lower than that of the number of trees removed including dead trees but excluding trees of undesirable species if space is not adequate for compensatory planting, off-site tree compensation within the same district shall be considered. The maintenance departments of the compensatory planting shall follow DEVB TC(W) No. 6/2015 – Maintenance of Vegetation and Hard Landscape Features.	CEDD (via Contractor)	LCSD (for roadside amenity area) HyD /LD (for SIMAR slopes along proposed road) HD (Greening within housing site)
MM3	**Reinstatement of landscape areas** – To reinstate all landscape areas disturbed temporarily during construction on like to like basis or for better quality.	CEDD (via Contractor)	LCSD (for roadside amenity area) HyD/ LD (for SIMAR slopes along proposed road)

ID No.	Landscape Mitigation Measures	Implementation Agency	Maintenance / Management Party
MM4	**Provision of Green Visual Corridors –** They shall be provided as far as possible extending from the Kai Shan and along Tin Tsz Road to connect with existing extensive greenery network. Selection of species shall aim to enhance the ecological value for wildlife from adjacent conservation area. The green visual corridors shall be subject to the detailed design by Housing Department in later stages.	HD (via Contractor)	HD (Greening within housing site)
MM5	**Aesthetical pleasing design of all man-made structures** – Design considerations in regards of layout, massing, form, materials and finishes. The design shall be sensitively designed to enhance the surrounding visual context. Proposed building massing shall provide a gradual transition and echoes with the ridgeline of Kai Shan. Building façade shall seek to break down the scale and avoid a monotony outlook.	CEDD (Infrastructure works via Contractor) HD (Building works via Contractor)	HD (for housing blocks) DSD (for pumping stations and retention tank)
MM6	**Maximize greenery provision –** Provision of greenery shall be maximized as far as appropriate, such as provision of green roof, podium garden and vertical greening on housing blocks, welfare buildings and utility buildings, to provide a source of visual relief for residents and viewers from surrounding area. The greenery provision (at least 20% of site area and target of 30%) shall be subject to the detailed design by Housing Department and relevant parties in later investigation and design stage.	CEDD (Infrastructure works via Contractor) HD (Building works via Contractor)	HD (for greening on housing blocks) DSD (for greening on the pumping stations and retention tank)
MM7	**Landscape Treatment on Slopes –** Tree whips and/or shrub mix, shall be applied to new soil cut and fill slopes in accordance with technical guidelines set out in GEO Publication No. 1/2011 along the proposed road works. Native species will be used where appropriate to enhance the ecological value of the area.	CEDD (via Contractor)	HyD/ LD
MM8	**Provision of roadside greening –** Quality greening on new roads in accordance with DEVB TC(W) No. 2/2012 shall be provided where appropriate. The greening zones shall be free of utilities in general and tree planting shall be prioritized. Planting proposal shall be in reference to the Greening Master Plan and the Street Tree Selection Guide.	CEDD (via Contractor)	LCSD
MM9	**Provision of adequate open space –** open space shall be provided with reference to the HKPSG to fulfil the requirement of local open space for public housing development (a minimum of 1m^2 open space per person for housing development). Details will be further reviewed in later investigation and design stage.	HD	HD

Evaluation on Residual Landscape Impact

11.3.8 The potential significance of the impacts on landscape resources and character areas during the construction and operation phases, before and after mitigation, is provided in **Table 11.3**. It is noted that there is no planned development nearby the site, any cumulative landscape impacts are therefore not anticipated. The assessment follows the proposed methodology and assumes that the appropriate mitigation measures identified in **Table 11.2** would be implemented, and the full effect of the soft landscape mitigation measures would be realized after ten years.

11.3.9 Based on the tree survey findings, approx. 809 trees are surveyed. Among them, approx. 512 trees are proposed to be removed, the remaining approx. 297 trees are proposed to be retained. 3 nos. trees of particular interest with DBH over 1m located along Tin Tsz Road would be retained. A total of approximately 550 nos. of compensatory trees, including about 250 heavy standard trees proposed along the proposed roadside amenity area and 300 whip trees on the proposed slopes within the proposed works area boundary but outside housing site boundary.

11.3.10 The major impact on the landscape resource within the assessment area is the removal of existing trees. The affected trees are located within LR1 and LR7. The residual impact significance before mitigating the residual impact on LR1 and LR7 are considered as moderate. With the implementation of proposed mitigation measures, including preservation of existing vegetation, compensatory tree planting, reinstatement of landscape areas, provision of green visual corridors, aesthetical pleasing design of all man-made structure, maximize greenery provision, landscape treatment on slopes and provision of roadside greening, the residual impact will be slight for LR1 and insubstantial for LR7 in day 1 of operation and will further be reduced to insubstantial for LR1 and LR7 when the proposed tree planting become matures in year 10 of operation. For the remaining LRs, the residual landscape impact will be insubstantial. For the landscape resource on the surrounding area, there is small magnitude of change on LR9 with low sensitivity and the resultant residual landscape impact is insubstantial. Appropriate landscape mitigation measures such as reinstatement of landscape area and provision of green visual corridors are also proposed on this LRs.

11.3.11 The proposed development mainly falls within the Miscellaneous Urban Fringe Landscape LCA (LCA1), which would be converted to Residential Urban Landscape Character Area. As this may consider as expansion of adjacent LCA in Tin Shui Wai, the proposed development will create a new landscape character which is compatible to the adjacent Residential Urban LCA. With the implementation of proposed mitigation measures, the residual impact of the new LCA will be slight in day 1 of operation and will further be reduced to insubstantial in year 10 of operation. For the remaining LCAs, the residual landscape impact will be insubstantial.

Table 11.3 Significance of Landscape Impacts during Construction and Operation Phases

ID No.	Landscape Resource / Character Areas	Sensitivity (Low, Medium, High)	Magnitude of Change (Negligible, Small, Intermediate, Large)	Impact Significance before Mitigation (Insubstantial, Slight, Moderate, Substantial)	Recommended Mitigation Measures	Significance of Residual Impact (Insubstantial, Slight, Moderate, Substantial)		
						Construction	Operation	
							Day 1	Year 10
Landscape Resources								
LR1	Plantation within Temporary Land Use (e.g. Open Storage, Workshop Areas, Parking, Recreational Use)	Low	Intermediate	Moderate	MM1, MM2, MM3, MM4, MM5 and MM6	Moderate	Slight	Insubstantial
LR2	Kai Shan Conservation Area	High	Negligible	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR3	Mixed Woodland	High	Negligible	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR4	Village Planting in Rural Settlement Area	Medium	Negligible	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR5	Landscape Area in Urban Development Area	Medium	Negligible	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR6	Tin Shui Wai Park, Tin Pak Road Park, other Local Open Spaces and Sitting-out Areas	Medium	Negligible	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR7	Roadside Trees	Medium	Intermediate	Moderate	MM1, MM2, MM3 and MM5	Slight	Slight	Insubstantial
LR8	Natural Watercourse	Low	Negligible	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR9	Modified Watercourse	Low	Small	Insubstantial	MM4	Insubstantial	Insubstantial	Insubstantial
LR10	Hong Kong Wetland Park and adjoining Wetland Conservation Area	High	Negligible	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR11	Other Ponds	Low	Negligiblel	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial

ID No.	Landscape Resource / Character Areas	Sensitivity (Low, Medium, High)	Magnitude of Change (Negligible, Small, Intermediate, Large)	Impact Significance before Mitigation (Insubstantial, Slight, Moderate, Substantial)	Recommended Mitigation Measures	Significance of Residual Impact (Insubstantial, Slight, Moderate, Substantial)		
						Construction	Operation	
							Day 1	Year 10
Landscape Character Areas								
LCA1	Miscellaneous Rural Fringe Landscape	Low	Intermediate	Moderate	MM1, MM2, MM3, MM4, MM5 and MM6	Moderate	Slight	Insubstantial
LCA2	Residential Urban Landscape	Medium	Negligible	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LCA3	Peak Landscape	High	Negligible	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LCA4	Mixed Modern Comprehensive Urban Development	Medium	Negligible	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LCA5	Park Urban Landscape	High	Negligible	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LCA6	Miscellaneous Urban Fringe Landscape	Low	Negligible	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LCA7	Rural Coastal Plain Landscape	High	Negligible	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial

11.4 Preliminary Visual Impact Assessment

11.4.1 The visual envelope of the proposed development have been identified by desktop study maps, photographs and site visit to determine visibility of the project site from various locations. As the topography of the area is mostly low-lying flat land, the VE is therefore defined by the surrounding high-density built development. The extent of the VE is indicated in **Figure 11.5**.

Selection of Viewpoints

11.4.2 The following public viewpoints are identified with reference to TPB PG No. 41, where it is easily accessible and popular to the public or tourists from different directions. When selecting the viewpoints, priority is given to major public open space, public focal points, existing / future pedestrian nodes, key pedestrian / vehicular corridor and existing major vistas, which are considered as major visual sensitive viewpoints. The viewpoint selection is also taken into account the location of existing elevated structures including footbridge and vehicular bridge across Tin Tsz Road. They are briefly described below and are illustrated in **Figure 11.6 to 11.9.**

11.4.3 **Viewpoint 1 (V1) – Tin Shui Wai Park** – is around 700m from the proposed development and located at Tin Shui Wai Park, which is the representative view for recreational users of the Park, the Tin Shui Wai Swimming Pool and the Tin Shui Wai Sports Centre (RE2). It captures the parkland view with lush greenery at foreground and open to the sky. The key public viewers of this viewpoint are mainly the open space users who engaging in recreational activities such as jogging and ball games and have alternative view. The viewing duration is ranging from short to medium to the proposed developments. The visual sensitivity of the public viewers from this viewpoint is graded as medium.

11.4.4 **Viewpoint 2 (V2) – Kai Shan** – is around 500m from the proposed development and shows the typical view of hikers at Kai Shan (RE1). It possesses panoramic view overlooking to the entire Tin Shui Wai Area, including the Tin Shui Wai Park and the major residential clusters at medium to long viewing distance. The key public viewers of this viewpoint are mainly the mountain hikers and users of visiting the graveyard, who involve a few numbers of individual and have relatively short viewing duration to the proposed development. Given the above, the visual sensitivity of the public viewers from this viewpoint is therefore graded as medium.

11.4.5 **Viewpoint 3 (V3) – Ha Mei San Tsuen** – is around 400m from the proposed development and is the typical view for residents of Ha Mei San Tsuen (R1). It also shares similar view of travelers along the Tin Tsz Road, Long Tin Road (T1), West Rail Line, Tin Fuk Road, Ha Mei San Tsuen Road and Tin Shui Wai Light Rail (T2) in medium to long distance. Their typical view is generally comprising of roadside planting at the foreground. Open sky and high-rise development form the backdrop of the view. As the key public viewers are mainly road travelers and railway travelers with short duration of view to the proposed development, and those residential VSRs in Ha Mei San Tsuen are relatively private in nature that cannot fully reflect the popular public view, the visual sensitivity of the public viewers from this viewpoint is graded as low.

11.4.6 **Viewpoint 4 (V4) – Tin Wah Road–** is around 500m from the proposed development and representing the typical view of GIC users at the Yuen Long Community Green Station (G1) and recreational users at Tin Yip Road Park (RE5). It is located at the periphery of the Tin Shui Wai urban built-up area, it enjoys the visual openness to the natural visual resources of greenery backdrop of Kai Shan and the open sky view from the Yuen Long Community Green Station, while the view from Tin Yip Road Park is partially blocked by the existing elevated bridge of Tin Tsz Road. In view of the nature and few numbers of individual of the GIC users and the partially blocked view from the RE5, the visual sensitivity of the public viewers from this viewpoint is graded as medium.

Appraisal of Visual Changes

Viewpoint 1 – Tin Shui Wai Park *(refer to Photomontage 1 -* ***Figure 11.6****)*

11.4.7 **Visual composition** – The scale of proposed development would be visible at a medium to long viewing distance. Since the existing plantings at the park have already dominant the view, there is only slight change to the visual harmony of this viewpoint with the presence of the proposed buildings. The scale of proposed buildings is considered as appropriate and will not create incompatibility with the surroundings.

11.4.8 **Visual obstruction –** As shown in the photomontage, the proposed development would inevitably create partial visual obstruction to the open sky in the background. There is no intervention to the existing lush greenery in the foreground.

11.4.9 **Effect on public viewers -** For recreational users at Tin Shui Wai Swimming Pool, Tin Shui Wai Sports Centre and Tin Shui Wai Park (RE2), the proposed buildings will be partially visible at medium to long viewing distance with existing trees at foreground. Although perceivable sense of openness to the sky would be weaken, the existing greenery view currently enjoyed would not be changed. With the proposed mitigation measures, in particularly on providing aesthetically pleasing design on building façade to break down the scale, the effect of visual changes to these public viewers are considered slight.

11.4.10 **Effect on visual resources –** The key visual resources in this view would be the amenity planting at foreground and the open sky. As mentioned above, the sky would inevitably be partially blocked, which shall slightly reduce the sense of openness of the view. With the adoption of proposed mitigation measures such as increase visual permeability through provision of visual corridor between buildings, it shall help to alleviate the sense of visual intrusiveness.

11.4.11 As stated above, the proposed development will only have partial obstructions to the sky view. It is unlikely that the proposed development will degrade the visual amenity that is enjoyed from the viewpoint. Therefore, visual impact anticipated from the proposed development of viewpoint V1 is slightly adverse.

Viewpoint 2 (V2) *– Kai Shan (refer to Photomontage 2 -* ***Figure 11.7****)*

11.4.12 **Visual composition –** As shown in photomontage, the proposed development shall match with the skyline of the residential development in the background. Although it will become visual dominant in this view, it will occupy the existing brownfield sites and integrate with the adjoining residential housing of Tin Tsz Estate and Kenswood Court in the background. Hence, it is considered compatible to the surrounding visual context.

11.4.13 **Visual obstruction** - Considering the Site is surrounded by extensive greenery on expansive flatland, the proposed development would inevitably block the view to Tin Shui Wai Park at the centre of the Tin Shui Wai built-up area. A reduced sense of openness and visual permeability would be expected. Provision of visual corridor shall improve visual permeability and reduce the perceived loss in visual greenery for the surrounding areas.

11.4.14 **Effect on public viewers -** RE1 at Kai Shan is anticipated an irreversible, large scale and permanent change of the panoramic view. Due to their strategic location, proposed development will be fully visible at medium viewing distance. Their viewing distance to the east would be much reduced with loss of visual connection to Tin Shui Wai Park. There would be perceivable loss in visual greenery and degradation in the quality of view. Therefore, the magnitude of change to RE1 is considered as moderate.

11.4.15 **Effect on visual resources** - Considering the Site is surrounded by extensive greenery on expansive flatland, the proposed development would inevitably block the view to the Tin Shui Wai Park. Provision of visual corridors is proposed to minimize the impact on sense of openness and visual permeability. There is no change to the skyline and ridgeline in the background of this view.

11.4.16 As stated above, the proposed development will have obstruction to the view to Tin Shui Wai Park. Although the effect of visual change is moderate, it will not have adverse change on the skyline and ridgeline in the background and is unlikely that the proposed development will substantially degrade the visual amenity that is enjoyed from the VP. Therefore, visual impact anticipated from the proposed development of viewpoint V2 is moderately adverse.

Viewpoint 3 (V3) – *Ha Mei San Tsuen (refer to Photomontage 3 -* ***Figure 11.8****)*

11.4.17 **Visual composition –** As shown in the photomontage, the proposed development is partially visible in the background of this VP. With the existing roadside greenery dominant in the foreground being maintained, the proposed development shall be visually compatible and blend with adjoining residential clusters.

11.4.18 **Visual obstruction**– It would be partially intercepted a small portion of existing open sky view. By implementation of the proposed mitigation measures such as provision of visual corridors, it shall help to improve visual permeability and alleviate the visual interception to the open sky view.

11.4.19 **Effect on public viewers -** The value of this view is primarily attached to the visual amenity of the existing roadside vegetation and the open sky view. The proposed development will slightly disturb the visual openness of the open sky view. There is only small change on the views currently enjoyed. Thus, the effect of visual changes on public viewers from this viewpoint V3 is qualitatively graded as slight.

11.4.20 **Effect on visual resources** – As mentioned above, the proposed development will have small visual impact on the open sky view. The sense of openness of this VP will only have small change. Besides, the proposed development shall be compatible to the adjoining residential clusters by introducing stepped building height profile as demonstrated in **Figure 11.8**. Thus, there is only slight degradation on the existing visual condition of this VP.

11.4.21 As stated above, the proposed development will only have partial obstructions to a small portion of the open sky view. The proposed development will only slightly degrade the visual amenity that is enjoyed from this viewpoint. Also, in consideration of the low sensitivity of this viewpoint, visual impact anticipated from the proposed development of viewpoint V3 is slightly adverse.

Viewpoint 4 (V4) – Tin Wah Road *(refer to Photomontage 4 -* ***Figure 11.9****)*

11.4.22 **Visual composition –** As shown in the photomontage, it is noted that there would be alteration of existing open sky view, the proposed development become dominant. With proposed mitigation measures, such as provision of viewing corridors and aesthetically designed man-made structures, it shall help to create a less monotonic view and enhance the compatibility of proposed development.

11.4.23 **Visual obstruction –** The open sky view is intercepted by the proposed development inevitably. The perceived change in sense of openness to the sky shall be minimized with careful position of the building blocks and wall effect shall be avoided.

11.4.24 **Effect on public viewers** – The visual attachment of this view is primarily due to the open sky. Although there is perceivable change to sense of openness to G1 at Yuen Long Community Green Station, the proposed development would provide visual contrast and create a rhythmic skyline as an extension of the adjoining residential development in Tin Tsz Estate and Kenswood Court. Therefore, the magnitude of change for this viewpoint is considered as moderate.

11.4.25 **Effect on visual resources –** Although RE5 at Tin Yip Road Park is currently partially visible to this view, G1 would experience an irreversible, medium scale and permanent change of the panoramic sky view. The proposed development will moderately disturb the visual openness of the open sky view. In order to improve visual permeability and maintain visual harmony, mitigation measures such as careful position of the building blocks, aesthetically pleasing design on building façade and maximization of greenery provision shall be proposed.

11.4.26 As stated above, the proposed development will have obstruction to the open sky view. As the proposed development shall be of similar nature as the existing residential development along Tin Tsz Road, it is considered as an expansion of the residential clusters. However, the sky view shall be significantly blocked by the relatively massive residential development. The proposed development will moderately degrade the visual amenity that is enjoyed from the viewpoint. Therefore, visual impact anticipated from the proposed development of viewpoint V4 is significantly adverse.

Evaluation of Overall Visual Impact and Mitigation Measures

11.4.27 It is noted that there is no planned development nearby the site, any cumulative landscape and visual impact are therefore not anticipated. The design and layout of the proposed development has carefully considered the surrounding contexts and key public viewers located within the assessment area. Key mitigation measures are listed and described below:

(i) VM1 - Creation of Visual Greening Connection and Breezeways

Potential visual impact and obstruction resulting from the proposed development with the greenery hillside as background would be unavoidable. In order to reduce the effect of these potential impact, visual and air corridors between building blocks are maintained to increase visual permeability of the development taking into account of the requirements of the Sustainable Building Design Guideline. Subject to further review in later investigation and design stage, the green visual corridors are designed to maintain the site permeability and serve as green corridor and connection between the Tin Shui Wai Park, Tin Pak Road Park and extending to the hillside of Kai Shan, creating a comprehensive greenery network

(ii) VM2 - Control of Development Heights and Massing

Development heights and massing within the proposed development shall be designed to create and define the spatial character of the Site. Building deployment and massing control shall maximize the overall permeability of the area which shall also act to increase ventilation, allow sunlight penetration and preserve views. Stepped height profile shall be designed as possible to integrate the development with the surrounding low-rise context.

(iii) VM3 - Visual Compatibility of the Proposed Development

The proposed development shall be visually compatible with the adjacent landscape setting. The overall setting of the proposed development, including building layouts and forms, materials, finishing (e.g. colour theme, pattern, texture), shall be carefully designed and effectuated to match the adjoining environment, providing a compatible extension from the adjoining residential built-up areas in Tin Tsz Estate and Kenswood Court.

(iv) VM4- Maximization of Greenery Provision

Under the proposed development, the greening opportunities, in terms of trees and shrub planting etc. shall be maximized to soften the future development so as to maximize the greening opportunities and minimize any potential adverse visual changes.

11.4.28 With the introduction of the proposed visual mitigation measures in the design layout, it is anticipated that there would still be some adverse visual changes to the adjacent public viewing points. Having considered the sensitivity of public viewers, the visual composition, the visual resources, the effects on public viewers and visual resources, it will not generate significantly adverse visual impact. The overall visual change caused by the proposed development is not significant when viewed from the identified VPs, the corresponding visual impact are summarised as **Table 11.4**.

Table 11.4 Visual impact to corresponding Viewpoints (VPs)

Viewpoint Reference / Location	Impact
V1 / Tin Shui Wai Park	Slightly adverse
V2 / Kai Shan	Moderately adverse
V3 / Ha Mei San Tsuen	Slightly adverse
V4 / Tin Wah Road	Significantly adverse

11.4.29 The visual impact of V1 is graded as slightly adverse; V2 is graded as moderately adverse; V3 is graded as slightly adverse and V4 is graded as significantly adverse. It will not detract the visual value attached to the views or have a significant impact to the visual accessibility to the existing visual amenity and resources nearby.

11.4.30 Other mitigation measures such as greening measures and facade treatments may be explored in subsequent architectural detailed design stage to further improve the overall aesthetics and visual interests of the proposed development.

11.4.31 To this end, the proposed development has, in overall terms, no significantly adverse visual impact. Efforts have been made to ameliorate the potential visual impact of the proposed development as far as possible. In return, the proposed development will make a positive contribution to the supply of housing units and optimize land utilization. The resultant overall impact is therefore concluded as moderately adverse.

11.5 Conclusion

Preliminary Landscape Impact Assessment

11.5.1 With the implementation of proposed mitigation measures, including preservation of existing vegetation, compensatory tree planting, reinstatement of landscape areas, provision of visual green corridors, aesthetical pleasing design of all man-made structures, maximizing greenery provision, landscape treatment on slopes and provision of roadside greening, the residual impact will be insubstantial to slight in Day 1 of operation.

11.5.2 The residual impact will further be reduced to insubstantial when the proposed tree planting become matures in Year 10 of operation.

11.5.3 In order to meet the HKPSG requirement, a minimum of 1m^2 open space per person for housing development will be provided. And the greening coverage requirement of at least 20% of site area can be provided and target of 30% can be achieved in accordance with conceptual landscape master plan. Details will be further reviewed in later investigation and design stage.

11.5.4 The overall predicted residual landscape impact of the proposed development is therefore reduced to an acceptable level.

Preliminary Visual Impact Assessment

11.5.5 With the implementation of proposed mitigation measures in the design layout, including creation of visual greening connection and breezeways, control of development heights and massing, visual compatibility of the proposed development and maximization of greenery provision, it is anticipated that there would still be some adverse visual changes to the adjacent public viewing points. Details would be subject to further reviewed and updated in later stages.

11.5.6 The proposed development has, in overall terms, no significant adverse visual impact. Efforts have been made to ameliorate the potential visual impact of the proposed development as far as possible. In return, the proposed development will make a positive contribution to the supply of housing units and optimize land utilization.

11.5.7 The resultant overall impact is therefore concluded as moderately adverse.

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12. PRELIMINARY UTILITIES IMPACT ASSESSMENT

12.1 Introduction

12.1.1 This chapter aims to identify the existing and the proposed arrangement of power supply, gas supply, telecommunication and street lighting.

12.2 Existing and Proposed Utilities Supply Networks

Existing and Proposed Power Supply

12.2.1 Some existing 11kV underground cables are located within and in the vicinity of the proposed development area. Apart from the existing underground cables, a set of existing Low Voltage (L.V.) overhead line which is supported by several steel cable towers are found in the proposed development area. These existing power networks provide power supply to Fung Ka Wai and Ha Mei San Tsuen.

12.2.2 Diversion of the existing L.V. overhead line to existing Fung Ka Wai would be further liaise with China Light and Power Company Limited (CLP) in terms of routing arrangement and programme in later stage of the Project.

12.2.3 Liaison with CLP has been made to seek their advice on the power supply capacity in the vicinity of the proposed development area. It is understood from CLP that their power supply network is capable to supply the estimated power to the proposed housing development, the available capacity of existing primary substation is capable of providing electricity to the proposed housing site.

12.2.4 Power will be supplied to the proposed housing site through the existing 11kV cable along Tin Tsz Road or through the proposed access road from northern side, subject to the advice from CLP at later stage of the Project.

Existing and Proposed Gas Supply

12.2.5 According to the available information, there is existing towngas pipeline network located in the western side of the proposed housing site with the existing gas mains running across Tin Tsz Road, while no existing gas main is located inside the proposed development area.

12.2.6 Towngas will be supplied to the proposed housing site through the existing towngas pipeline in Tin Tsz Road or through the proposed access road from northern side, subject to the advice from Hong Kong and China Gas Company Limited (HKCGC) at later stage of the Project.

Existing and Proposed Telecommunication

12.2.7 According to the available information, there is existing Hong Kong Telecom Limited (HKT) cables located in the western side of the proposed housing site and running across Tin Tsz Road. The existing HKT cables within the proposed housing site are required to be diverted.

12.2.8 Telecommunication network will be supplied to the proposed housing site through the existing telecommunication network in Tin Tsz Road or through the proposed access road from northern side, subject to the advice from HKT at later stage of the Project

Existing and Proposed Street Lighting Supply

12.2.9 Existing public lighting facilities including underground lighting cables are found along Tin Tsz Road and extended to Fung Ka Wai and Ha Mei San Tsuen through the proposed housing site, owned, managed and maintained by the Highways Department (HyD).

12.2.10 Proposed lighting system will be connected to the public road adjoining the proposed housing site through the existing public lighting cable along Tin Tsz Road or through the proposed access road from northern side, subjected to the advice from HyD at later stage of the Project.

12.2.11 The design of both temporary and permanent lighting systems within the proposed housing site, which will be carried out in next stage of the Project, should be in accordance with the relevant requirements of HyD and HD.

12.3 General Requirements for Underground Utilities Installation

12.3.1 The requirements for underground utilities installation from various utility undertakers are summarized in **Table 12.1** below.

Table 12.1: Requirements for Underground Utilities Installation from various utility undertakers

Common Utilities	Minimum Cover		Separation from Other Utilities
	Footpath/Areas without Vehicular Traffic	Road/Areas with Vehicular Traffic	
CLP cables			
132 kV	1000 mm	1200 mm	Working clearance of 300mm from other utilities
11 kV	750 mm	900 mm	150mm (1 m between 132 kV and 11 kV)
HKCGC pipes			
Low pressure	700 mm	1000 mm	300 mm
Intermediate pressure	1100 mm	1100 mm	
Telecommunication cables	450 mm	900 mm	

12.4 Conclusion

12.4.1 In conclusion, no adverse impact is anticipated with respect to utilities on the proposed development area.

12.4.2 Details in diversion routing and programme will be further liaise with relevant parties in later stage of the Project.

13. PRELIMINARY AIR VENTILATION ASSESSMENT

13.1 Introduction

13.1.1 This section presents the air ventilation assessment on the proposed housing layouts of the Developments to establish guiding principles in air ventilation terms and evaluate the Developments in accordance with the Technical Guide for Air Ventilation Assessment for Developments in Hong Kong (Annex A of HPLB and ETWB TC No. 1/06 for AVA or any subsequently amended version of the Technical Guide).

13.2 Evaluation of the wind environment under proposed development layout

The proposed development scenario

13.2.1 Ten residential with building height at approximately +65 mPD to +160 mPD with non-residential buildings for welfare/ancillary facilities (~+45 mPD), welfare facilities/ancillary facilities above a covered Public Transport Interchange (~+45mPD), floodwater pumping station (~+15mPD), sewage pumping station (~+15mPD) and retention tank (~+10mPD) are proposed in the preliminary development layout as shown in **Table 13.1**. Podium are proposed underneath residential blocks A to G and I.

13.2.2 The major buildings are placed in the central-north portion of the Study Area and are arranged roughly in “double-column” aligning from the northwest to east, while the southern portion of the Study Area retained as open area at current design stage. The illustrative layout of the proposed developments is shown in **Figure 13.1** below.

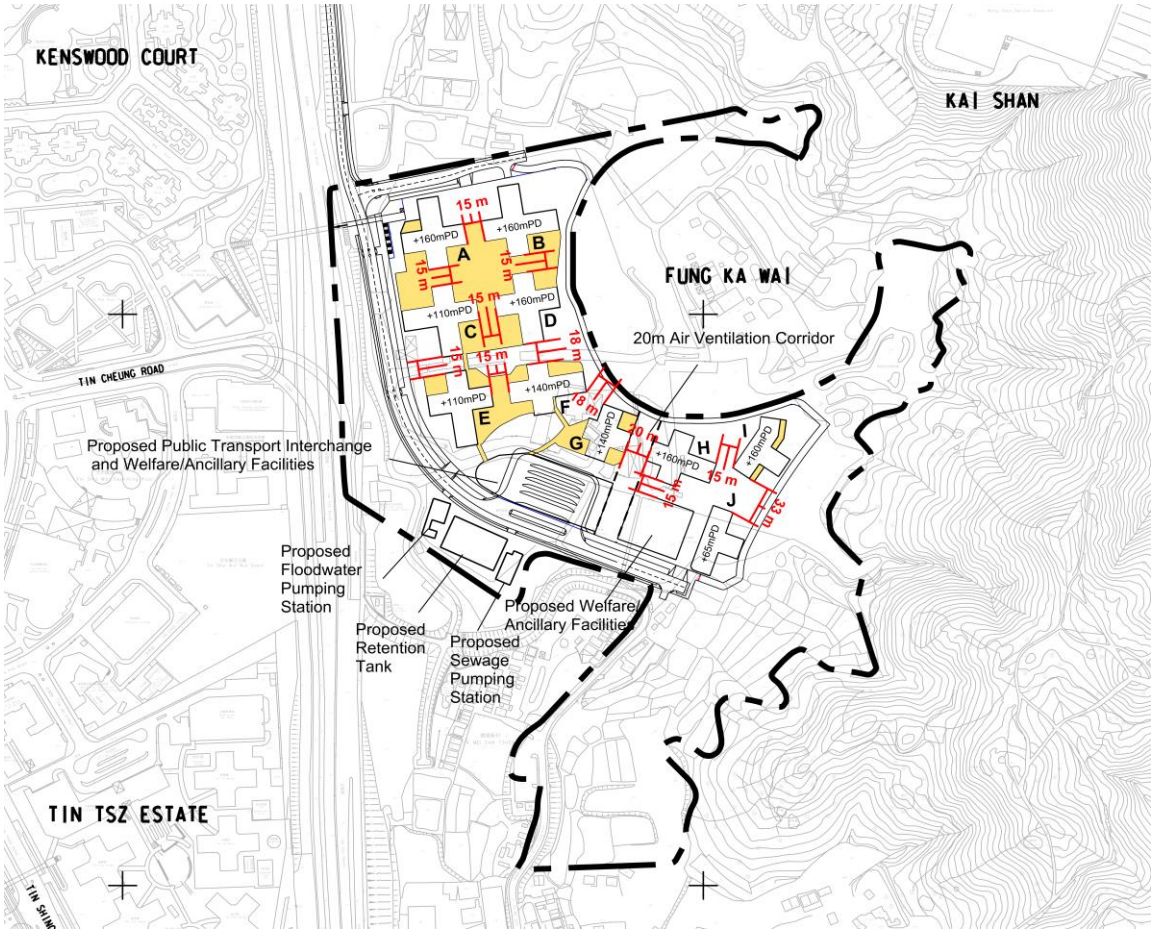

Figure 13.1 Scheme for the proposed developments in Study Area

Table 13.1 Maximum Building Height/ Height Profile of Building Blocks

Buildings	Maximum Building Height / Height Profile
Block A	+160mPD
Block B	+160mPD
Block C	+110mPD
Block D	+160mPD
Block E	+110mPD
Block F	+140mPD
Block G	+140mPD
Block H	+160mPD
Block I	+160mPD
Block J	+65mPD
Welfare / Ancillary Facilities	+45mPD
Public Transport Interchange and Welfare / Ancillary Facilities	+45mPD
Floodwater Pumping Station	+15mPD
Sewage Pumping Station	+15mPD
Floodwater Retention Tank	+10mPD

Note: all heights shown are rounded up to nearest 5m

Potential air ventilation performance under the annual prevailing winds

NNE prevailing winds

13.2.3 Under the annual NNE prevailing wind, the winds will flow through the relatively opened areas to the north of the Study Area (i.e. the Ping Shan Cultural Farm, Wang Chau Water Reservoir and their vicinity) and reach the Study Area. When compared to the existing condition, the presence of high-rise buildings within the Study Area would induce certain limitation against the air flow flowing towards the area to the south and southwest to it, such as the areas west to Ha Mei San Tsuen. On the other hand, a portion of winds flowing from the water reservoir would penetrate the Study Area via the building separations at the central portion of the Study Area (i.e. between Block G and Block H) and be directed towards the Ha Mei San Tsuen. Furthermore, the NNE wind would also enter the separation between Blocks H and I after flowing over Fung Ka Wai, eventually would reach the conservation region east to Ha Mei San Tsuen.

13.2.4 Despite the high-rise buildings at the northern portion of the Study Area, another portion of air flow driven by NNE wind could still reach the major air corridor (i.e. Tin Tsz Road) after flow around west side of Block A. This air flow would then reach the Tin Shui Wai Swimming Pool and existing developments at the west side of Tin Tsz Road (i.e. Tin Tsz Estate, Buddhist Mau Fung Memorial College and Bus Depot). Hence, the wind environment at these regions may still be maintained.

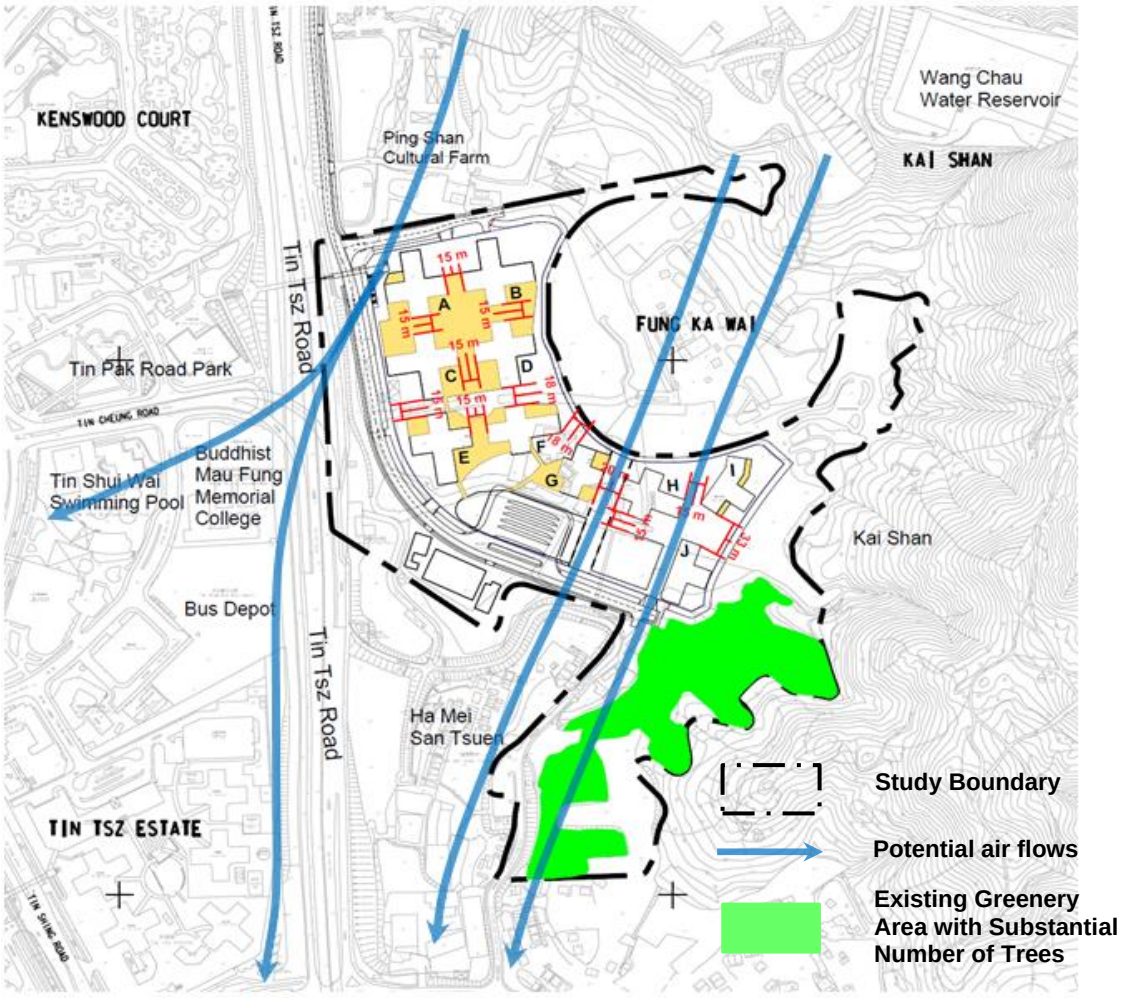

Figure 13.2 Potential wind environment under NNE wind

NE prevailing winds

13.2.5 Under the annual NE winds, air flow would also reach the Study Area via the open space between Ping Shan Cultural Farm and water reservoir. The buildings at the northwest portion of the Study Area (i.e. Blocks A to F) may alter the direction and intensity of the winds due to the orientations and dispositions of proposed buildings, resulting in a relatively weaken wind environment near Buddhist Mau Fung Memorial College. On the other hand, the air flow driven by the NE prevailing wind can still penetrate the Study Area via the building separations between Blocks F, G and H, flowing towards the Ha Mei San Tsuen, Tin Tsz Estate and the bus depot near Buddhist Mau Fung Memorial College. Hence, the air ventilation performance at these locations is not expected to be significantly reduced.

13.2.6 A portion of NE wind flows past the Ping Shan Cultural Farm is able to travel around the northwest building (Block A) and reach the air path of Tin Cheung Road and Tin Pak Road Park. This would facilitate the air flow into the Tin Shui Wai Park at their downstream and maintain the wind environment in the urban area of Tin Shui Wai.

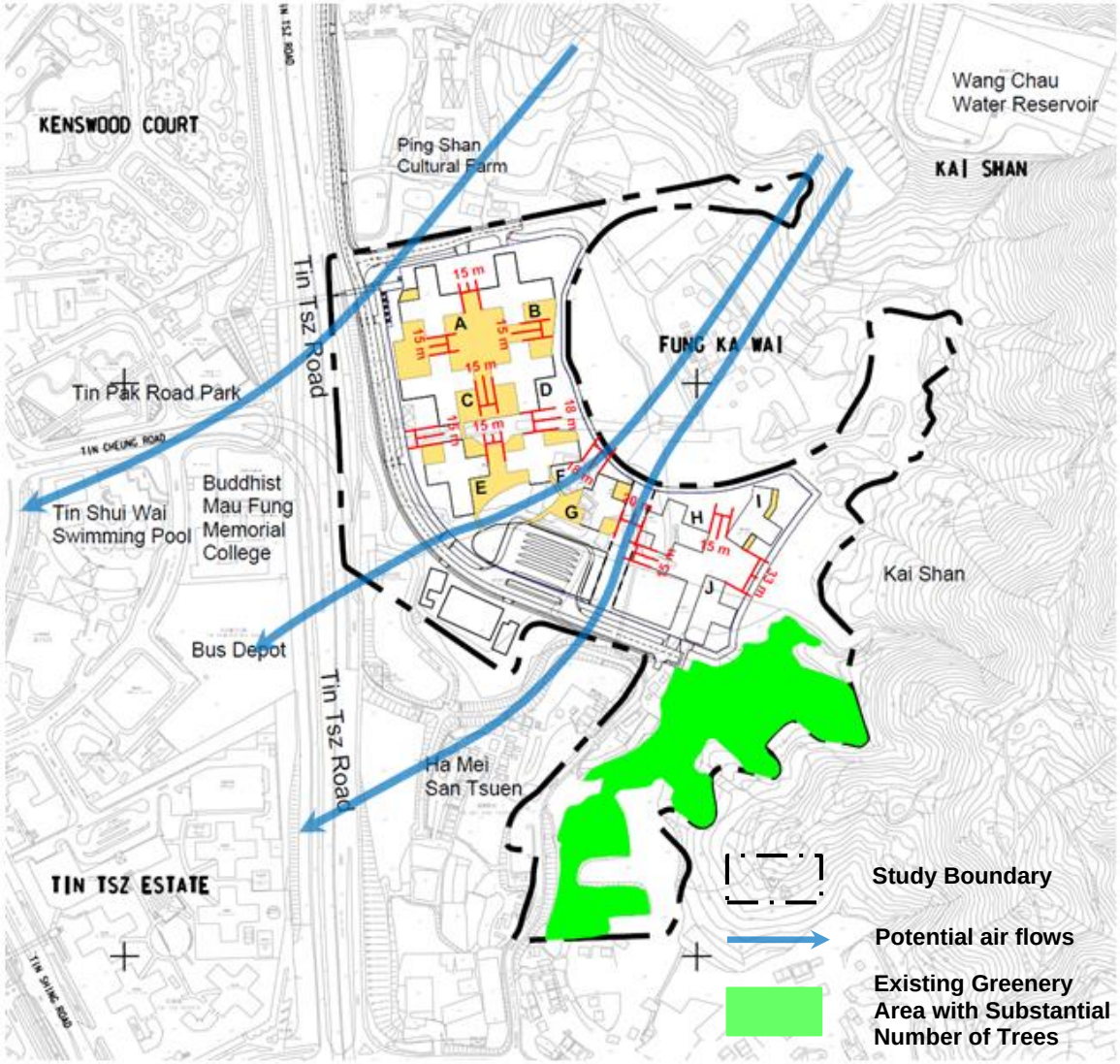

Figure 13.3 Potential wind environment under NE wind

ENE and E prevailing wind

13.2.7 Under the annual easterly and east-north easterly prevailing wind, the winds will skim over the hilly terrain of Kai Shan before reaching the Study Area. It is noticed that the arrays of high-profiled residential buildings at the central portion of the Study Area along with the non-residential blocks would create blockage against the winds approaching from the east, reducing the airflows that would reach the bus-depot and Buddhist Mau Fung Memorial College compared to the current condition. On the other hand, the winds approaching to the southern portion of the Study Area could travel around Block J and penetrate the Study Area. This wind would facilitate the air flow near Ha Mei San Tsuen and the region south to Bus Depot.

13.2.8 Owing to the location of buildings in the north-western portion of the Study Area, the air flows towards the Tin Pak Road Park / Tin Cheung Road would likely be moderated before reaching and entering this air path. However, the proposed development scheme has incorporated building separation of no less than 15m between the blocks (i.e. between Block C/D and Block E/F, as well as that between Block A/B and Block C/D upon the a low-rise podium (which allows air flow to skim over at a near ground level)), and these separations are aligning in roughly east-west directions, which would allow a portion of incoming winds to skim over the low-rise podium structures and flow through the Study Area, eventually reaching the Tin Pak Road Park and Tin Cheung Road. Furthermore, another portion of easterly winds would also flow into the building separation between Block F and Block G, which would infiltrate through the site and reach the Buddhist Mau Fung Memorial College. Hence, the air flow towards this wind corridor could be retained.

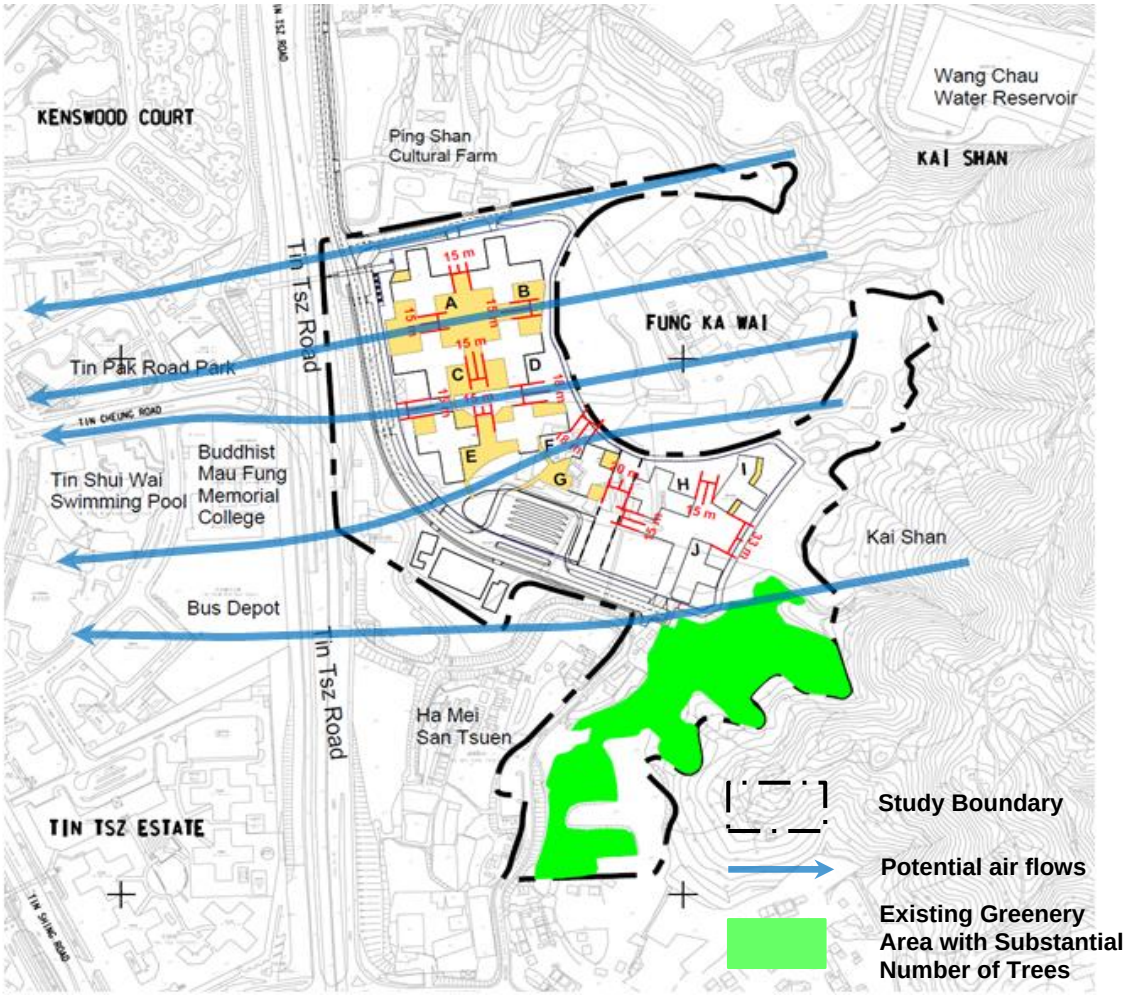

Figure 13.4 Potential wind environment under ENE and E winds

SSE and S prevailing winds

13.2.9 Under the annual south-south-easterly prevailing wind, air flow would approach the Study Area and its vicinity region from the area near MTR West Rail Line. It is noticed that the presence of the high-rise developments (around 110mPD to 160mPD) of Block A to Block F in Study Area would inevitably reduce the air flow reaching Ping Shan Cultural Farm and would induce moderation and redirection of the air flow through the region. For instance, the air flow towards the north of the Study Area would be redirected to flow towards the northwest and northeast by the residential buildings in western sector of the Study Area (i.e. Blocks A to F) and the welfare/ ancillary facilities over the PTI which is in the central portion of Study Area. These weakened air flows will proceed to Tin Tsz Road, or flow through the building separation between Block G and H and reach southern portion of Fung Ka Wai instead of flowing towards the Ping Shan Cultural Farm.

13.2.10 Another stream of the air flow driven by the SSE and S prevailing winds will flow over the south-eastern Study Area to reach the region near Block I and Block J. These two buildings along with Block H are all high-rise (around 160mPD), which would reduce the wind availability at Fung Ka Wai under the S/SSE winds. On the other hand, part of the SSE wind may flow around the eastern side of Block I and skim towards the eastern portion of Fung Ka Wai, partially maintaining the wind ventilation.

13.2.11 Apart from the above-mentioned air paths, the S wind could also flow along the Tin Tsz Road to reach the area north / northwest to the Study Area (i.e. the area near Kenswood Court and Pingshan Cultural Farm). Considering that the buildings in Study Area would not likely to create blockage against the Tin Tsz Road, the wind environment for areas along the road would not likely to suffer air ventilation impacts under the S and SSE winds.

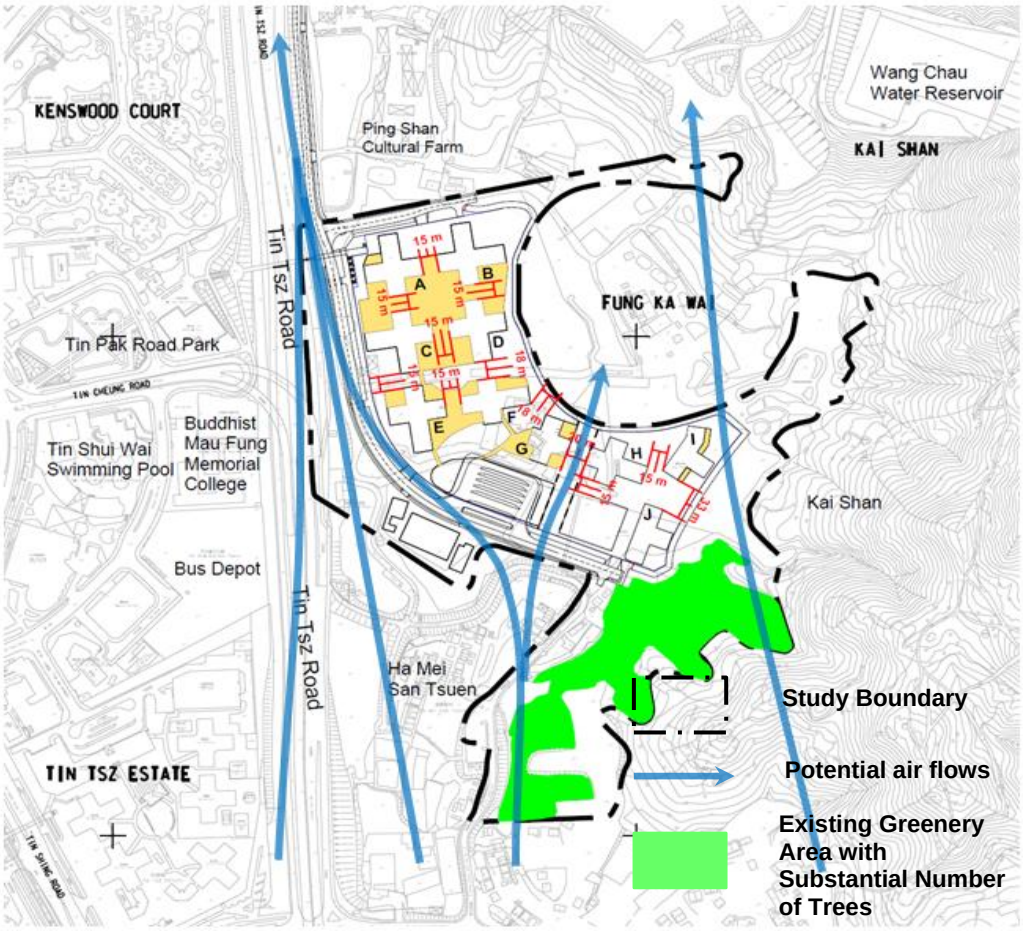

Figure 13.5 Potential wind environment under SSE / S wind

Potential air ventilation performance under the summer prevailing winds

SSE and S prevailing winds

13.2.12 Similar to that under the annual SSE / S prevailing wind, air flow driven by summer SSE / S wind approaching the Study Area would be moderated and redirected by the buildings at the south-central portion of the Study Area and flow towards the Fung Ka Wai and Tin Tsz Road. While another portion of air flow would reach and flow along the Tin Tsz Road to reach the area near Kenswood Court and Ping Shan Cultural Farm.

SSW prevailing wind

13.2.13 The air flow driven by the SSW wind would approach the Study Area and vicinity region from Tin Shui Wai West Rail Line. A portion of this air flow would flow around the Tin Tsz Estate and enter Tin Tsz Road. The air flow would continue to approach the western portion of the Study Area (i.e. flow around the Block A) and flow towards the Ping Shan Cultural Farm.

13.2.14 Another portion of winds will flow from the area near Ha Mei San Tsuen towards Fung Ka Wai. Owing to the high profiles of Block G (140mPD), Block H and I (160mPD for both buildings), the developments would result in certain wind shield against Fung Ka Wai under SSW wind. On the other hand, considering that the scheme incorporated building separation of 15m width between blocks in the eastern portion of the Study Area aligns roughly in SSW-NNE direction, as well as a wind corridor with 20m in width between Block G / H, it can be expected that part of the weakened air flow could still penetrate the Study Area to reach Fung Ka Wai.

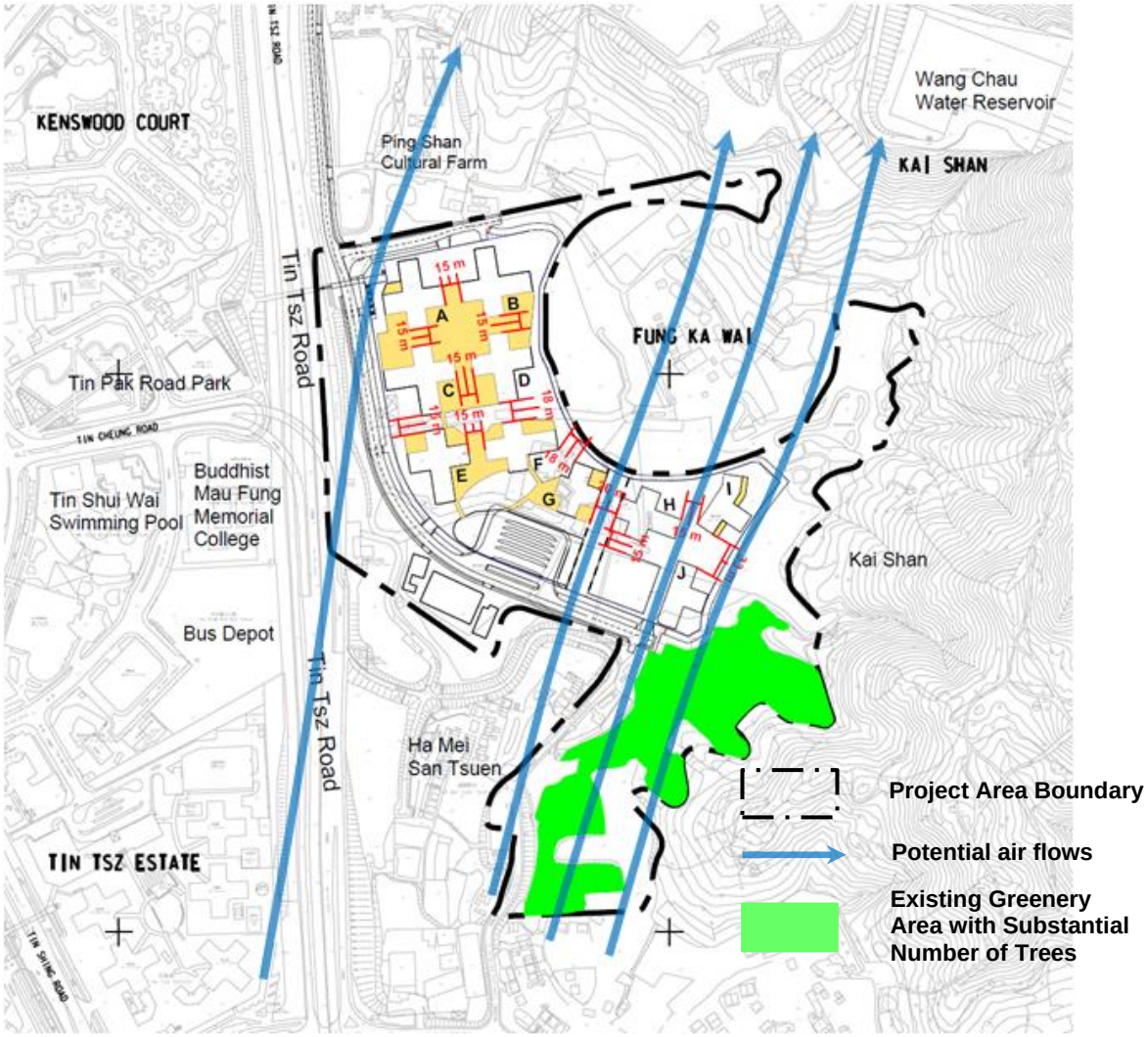

Figure 13.6 Potential wind environment under SSW wind

13.3 Recommendation for the proposed development design in Study Area

Brief summary of potential impact of wind environment

13.3.1 The proposed development scheme for the Study Area has incorporated building separations between the blocks of developments. This feature would allow certain directional winds penetrate the Study Area and reach the respective downwind areas. However, the presence of a cluster of high-rise development would inevitably induce partial blockage against the downwind regions. The critical impacts are summarized as follow.

- The partial blockage induced by buildings in north-west portion of the Study Area under E wind, which weakens the winds flowing into the air path of Tin Pak Road Park.
- The blockage against SSE wind induced by the buildings in the central and northwest portion of the Study Area, which reduced the airflow which would reach Ping Shan Cultural Farm.
- The high-rise buildings of Block G, H, I and J (around 160mPD) would reduce the wind availability in Fung Ka Wai under SSE, S and SSW prevailing winds.
- The wind environment at the Bus Depot and Buddhist Mau Fung Memorial School may be weakened, as the central blocks of the Study Area may divert the winds that originally flowing towards these areas to travel to the Ha Mei San Tsuen.

Incorporated mitigation measures for the Study Area

13.3.2 Regarding the probable wind impact induced by the proposed development scheme, mitigation measures are incorporated in the proposed building designs, aiming to improve the wind permeability through Study Area and facilitate the wind environment at the downstream area. Details of the merit measures potential merit features are listed below:

- The buildings fronting Tin Tsz Road has been setback from the center of the road (around 40m from the site boundary adjacent to the road), in order to widen the wind corridor of Tin Tsz Road – western Study Area. This measure would allow more air flows driven by southerly winds to enter this wind corridor and facilitate wind environment to the north (see **Figure 13.7**).
- The residential blocks have kept a minimum of 15m building separation from each other in compliance with SBD Guideline, this measure increases the permeability through the Study Area, allowing penetration of winds to reach the downstream side of the Study Area (see **Figure 13.7**).
- A wind corridor of 20m in width aligning in roughly NNE-SSW direction is incorporated in the center of the Study Area (between Block G and H).
- The increased building height of the residential blocks may allow potential rooms for incorporation of sustainable design measures to enhance the air ventilation.

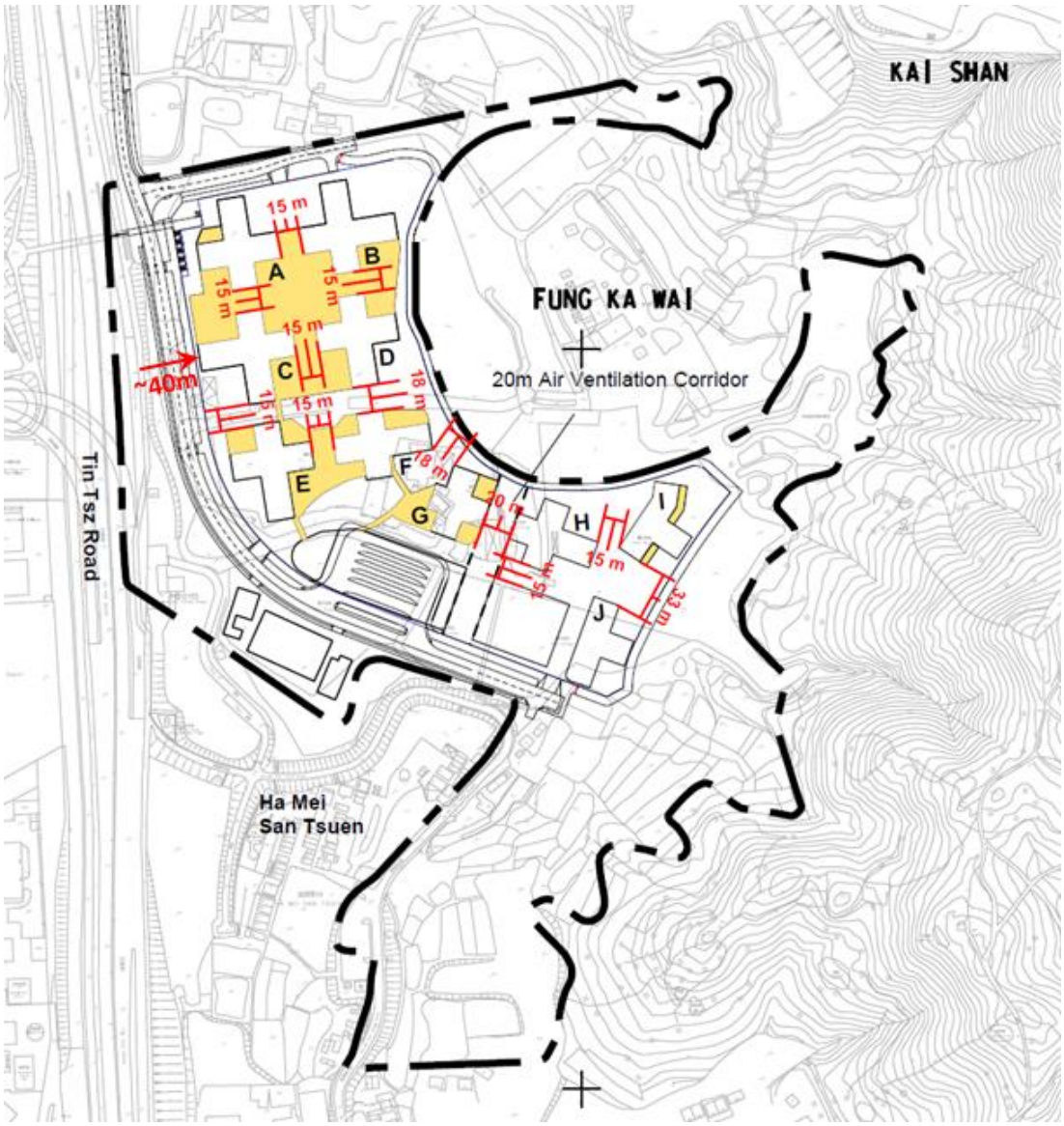

Figure 13.7 Illustration of merit designs for Study Area

13.3.3 In addition to the merit measures that have already been incorporated, several general recommendations are further suggested to be taken into consideration in further design stages, which are listed as follows:

- Minimize podium bulk wherever feasible;
- Adopt varying building height profile for the developments in Study Area. Aiming at inducing vertical air movement between buildings to facilitate the wind environment
- Incorporate greening measures of min. 30% site coverage of greenery in total with min 15% at primary zone with reference to PNAP APP-152, preferably through tree planting at grade;
- Avoid long continuous facades of building clusters to avoid "wall effects", building permeability of at least 20% should be maintained, as a general rule of thumb, building clusters with frontage length of more than 60m should incorporate building separation distances with minimum 15m in width as indicated by PNAP APP-152, subjected to Project Site constraints; and
- Make reference to the recommendations of design measures in the Hong Kong Planning Standards and Guidelines.

13.4 Conclusion

13.4.1 The Study Area fronts Tin Park Road Park and Tin Shui Wai urban area across the Tin Tsz Road to its west, and backs Kai Shan to its east. Based on the wind data from HKO weather station and PlanD RAMS model, the annual prevailing winds are mainly coming from NNE, NE, ENE, E, SSE and S directions, while the summer prevailing winds are mainly comprised by SSE, S and SSW winds.

13.4.2 Owing to the location and the nature of the major potential developments within the Study Area, the development scheme would inevitably induce wind influence on the downwind region under the respective prevailing wind directions, including but not limited to the Tin Pak Road Park, Fung Ka Wai, Ping Shan Cultural Farm and Ha Mei San Tsuen. However, since the development scheme has arranged the building disposition and orientation in a manner that they are separated from each other with a decent distance and many of these separation gaps are aligned in prevailing wind directions. Hence, certain portion of winds could still flow through the Study Area to facilitate air ventilation performance at the downstream area.

13.4.3 Attention should be paid to avoid potential decline of air ventilation performance and continuous optimization of the scheme and building layouts should be carried out based on the finding of this Air Ventilation Assessment – Expert Evaluation.

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14. IMPLEMENTATION PROGRAMME

14.1 Key Milestone and Activities

14.1.1 The milestone dates of the key activities for this Project are summarized in **Table 14.1** below.

Table 14.1 Milestone Dates of the Key Activities

Key Activities	Milestone Dates
Completion of Rezoning Exercise	Q2 2022
Commencement of Investigation Phase	Q3 2021
Commencement of Detailed Design Phase	Q3 2022
Completion of Road Gazettal Process (including ExCo Approval)	Q3 2024
Completion of Land Resumption / Land Clearance	Q2 2026
Commencement of Construction Phase (Land Decontamination Works, Site Formation and Infrastructure Works)	Q3 2026
Completion of land decontamination works	Q4 2027
Completion of Site Formation Works for Site Handover to HD	Q2 2029
Completion of public housing construction	Q4 2033

14.1.2 The proposed implementation programme as shown in **Table 14.1** above would be further reviewed in later investigation and design stage of the Project.

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15. CONCLUSION

15.1 General

15.1.1 For the proposed public housing development with 9,000 to 9,500 flats [3] , no insurmountable impacts upon various technical aspects are assessed in this EFS

15.2 Traffic and Transport

15.2.1 Traffic forecasts were conducted for design year 2036 including all major planned developments and junction/ road improvement works in the area. A total of 7 key junctions and 5 road links were assessed.

15.2.2 The assessment result indicates that critical road junction J5 (Tin Tsz Road/ Tin Wah Road) would operate over capacity in Design Scenario 2036. Junction Improvement works are proposed at this location to mitigate the traffic impact.

15.2.3 For Junction J2, improvement scheme was proposed under other projects. The junction would operate with spare capacity if future improvement scheme proposed under other projects are taken into consideration. As the programme for the proposed improvement scheme is not yet confirmed at this stage, possibility for adopting the improvement for J2-Shui Pin Wai Interchange under this project would be considered. The improvement scheme would be further reviewed in the investigation and design stage.

15.2.4 Most of the road links would be operating with spare capacity apart from Link L1 (Tong Yan San Tsuen Interchange South-Eastbound Slip Road). However, it is noticed that possible improvement schemes / upgrading of Tong Yan San Tsuen Interchange are being pursued under Yuen Long South Development which has yet finalised. Proposed improvement works at Tong Yan San Tsuen Interchange shall be further discussed / liaise with relevant departments.

15.2.5 Under the proposed road scheme, a minimum 2m wide footpath would be provided along a section of western side and all along eastern side of the proposed access road to connect with the existing footpaths on Tin Wah Road and Wetland Park Road to the housing site. Extension of existing footbridge over Tin Tsz Road to the Site is proposed to improve the connectivity for pedestrian.

15.2.6 Additional public transport services including feeder services to railway stations, FB and GMB services are proposed to cater for the demand of the proposed public housing developments. A Public Transport Interchange will be proposed within the Site to provide sufficient loading/unloading bays for FB, GMB and taxi services. Details of provisions of services would be further review in later stage.

15.2.7 The overall performance of critical links and junctions were considered acceptable within the AOI and there would be no significant issue on development of the Site from traffic point of view.

[3] 10% of design buffer has been considered in the technical assessments to allow design flexibility at later design stage. Worst scenarios of 9,500 – 11,200 no. of flats, depending on different mixing ratio of housing types, have been adopted in the technical assessments.

15.3 Geotechnical

15.3.1 With the available information at the time of report preparation, geotechnical constraints, including the man-made features, inferred fault, various rockhead contour, etc, were reviewed and concluded that there shall be no adverse effect to the proposed development and caution and further recommendation shall be provided regarding the constraints during investigation and detailed design stage. Further SI should be carried out to assess any adverse geological features including karst features within the Site.

15.3.2 The site is considered geotechnically feasible for the proposed development based on the current available information.

15.3.3 Following the review of the background information, detailed API, observations from fieldwork and results from run-out analysis, it is considered that catchment TSW-08 poses potential channelized debris flow and open hillslope landslide hazards to the proposed development, while catchment TSW-09 poses potential open hillslope landslide hazards to the proposed development. With the proposed mitigation works of delineation of non-building area (to be reviewed in later stage), it is anticipated that there is no insurmountable natural terrain hazard to the proposed housing site.

15.4 Site Formation

15.4.1 There is no insurmountable technical problem in terms of site formation at this stage. As only limited geological information can be obtained at the current stage, site specific GI works should be carried out in further investigation stage of the development project.

15.5 Drainage

15.5.1 Based on the assessment results with the proposed floodwater pumping station and retention tank, it could be concluded that there is no adverse drainage impact arising from the proposed development.

15.6 Sewerage

15.6.1 Based on the assessment results and the proposed sewerage scheme, it could be concluded that there is no adverse sewerage impact arising from the proposed development.

15.7 Water Supply

15.7.1 With consideration of the preliminary fresh and flushing water supply schemes as mentioned in **Section 8.5**, there is no insurmountable technical aspect for providing fresh and flushing water supply to the proposed development. The fresh water and flushing water supply arrangements / details / assessments are subject to further review among relevant departments in the investigation and design stage.

15.7.2 Continuous review and liaison with the project team of HSK/HT NDA of CEDD CEDD HSK/HT NDA and WSD should be conducted to ascertain the detailed fresh and flushing water service reservoirs arrangement including use of reclaimed water for flushing and requirement of associated waterworks such as laying of new water mains.

15.8 Land Requirement

15.8.1 The impact on cultural heritage, trees, graves, ponds, modified watercourse, nearby villages and brownfield sites and other land lots have been identified with no insurmountable land issue expected. Sufficient lead time should be allowed for the land acquisition and site clearance process when planning the implementation programme.

15.9 Environmental Review

Air Quality

Construction Phase

15.9.1 The potential air quality impacts from the construction works of the Project would mainly be related to construction dust from site formation, construction of access road, laying of sewage and fresh water mains. With the implementation of mitigation measures specified in the Air Pollution Control (Construction Dust) Regulation together with the recommended dust suppression measures and good site practices, no adverse dust impacts at nearby ASRs would be anticipated.

Operation Phase

15.9.2 Adverse air quality impacts from the vehicular emissions during operation phase are not expected, with the provision of HKPSG recommended buffer distances. The environmental impacts due to the proposed sewage pumping station has been addressed and mitigation measures have been recommended. The proposed sewage pumping station is considered as a Schedule 2 Designated Project under item F.3. (b)(i), Part I of the EIAO. Application for an environmental permit for the proposed sewage pumping station in accordance with the EIAO will be carried out in the investigation and design stage.

Noise

Construction Noise

15.9.3 The potential noise impacts from the construction works of the Project would mainly be related to the use of powered mechanical equipment (PME). Construction noise assessment has been carried out. The maximum noise levels are predicted to be at 82 dB(A) at NSR N7. With the implementation of noise mitigation measures such as good site practices, use of quiet PME, movable noise barriers and noise enclosures, the maximum noise levels are reduced to 75 dB(A), complying with the relevant noise criteria. Therefore, no adverse construction noise impact would be anticipated.

Operation Phase Road Traffic Noise

15.9.4 The road traffic noise levels of up to 78 dB(A) at some of the planned NSRs have been predicted without mitigation measures in place. For noise assessment points with exceedance of 1 dB(A) to 7 dB(A), it is recommended to provide acoustic window of at least 7 dB(A) noise attenuation. For noise assessment points with exceedance of 8 dB(A), it is recommended to provide acoustic balcony of at least 8 dB(A) noise attenuation. For noise assessment points with exceedance above 8 dB(A), blank façade should be provided. With the aforementioned mitigation measures in place, the road traffic noise levels could be reduced to 70 dB(A), complying with the traffic noise criterion for residential use. Hence, no adverse road traffic noise impact would be anticipated.

Operation Phase Fixed Plant Noise

15.9.5 Given the maximum allowable sound power levels for the proposed floodwater pumping station, the proposed sewage pumping stations and proposed PTI at respective 72 dB(A), 73 dB(A) and 67 dB(A) could be achieved, no adverse operation phase fixed plant noise impact would be expected.

Water Quality
Construction Phase

15.9.6 With the implementation of the recommended mitigation measures, the construction works for the Project would not result in unacceptable impacts on water quality.

Operation Phase

15.9.7 All sewage generated from the Project will be discharged to the public sewerage system and diverted to sewage treatment works for proper treatment. Hence, no net increase in the pollution loading to the Deep Bay waters would be induced by the Project sewage effluent. No adverse water quality impact associated with sewage effluent is anticipated.

15.9.8 In view of the potential adverse effect of emergency sewage bypass on the quality of the nearby watercourses, various precautionary measures are proposed to be incorporated in the design of the SPS to avoid emergency bypass of sewage to the maximum practicable extent. A Contingency Plan is also recommended to deal with the remote occurrence of emergency discharge. With the incorporation of the precautionary measures and Contingency Plan as recommended in this study, the possibility of emergency sewage bypass would be remote and the potential water quality impacts in the unlikely event that an overflow does occur would be minimised.

15.9.9 Another source of potential impact during the operation phase will be the runoff or non-point source pollution from road surfaces and developed areas. Stormwater control measures including adequate stormwater drainage system with suitable pollutant removal devices and best stormwater management practices are recommended for the Project to minimise the non-point source pollution. With proper implementation of the recommended mitigation measures, it is anticipated that the water quality impacts associated with the non-point source discharge from road surfaces and developed areas would be minimised.

Waste Management

15.9.10 Waste types generated by the construction activities are likely to include inert and non-inert C&D materials from construction and excavation works for site formation and infrastructure works, chemical wastes from the maintenance of construction vehicles and equipment and general refuse from the workforce. Provided that the identified wastes during construction phase would be handled, transported and disposed of using the recommended methods and that good site practices would be strictly followed, adverse environmental impacts during construction phase are not expected.

Land Contamination

15.9.11 Based on the desktop review and site walkover, a total of 7 sites suspected to be used for industrial purposes. Given the inaccessibility of the concerned sites during the site walkover, further site appraisal should be carried out in next stage of the Project when site access is available to confirm the land uses and to identify the presence of any potential contaminated sources and recommend the proposed remedial measures as necessary.

Ecology

15.9.12 In general, the eastern part of the assessment area, which covers Kai Shan, the Ping Shan CA, belonged to grassland habitat while the majority in the western part were developed area/wasteland habitats. The northern part of the assessment area consisted of ponds within the HKWP, WCA and the Lau Fau Shan CA, with some other habitats e.g. mixed woodland, shrubland, grassland and developed area/wasteland. Other areas surrounding the proposed works area are interspersed with mosaic of habitats including mixed woodland, shrubland, plantation, village/orchard, dry agricultural land, pond, natural watercourse and modified watercourse.

15.9.13 Majority of the proposed works area was composed of developed areas such as open storage areas and car parks, with a natural watercourses in the east, modified watercourses and strips of plantations running in the centre and near the western boundary of the proposed works area. A patch of mixed woodland, a very small area of grassland and dry agricultural land were identified in the south-eastern section of the proposed works area. The proposed housing site, forming a major part of the proposed works area, also consisted mostly of developed areas, with sections of modified watercourse and strips of plantation in the middle and small patch of mixed woodland in the southeast. The habitats identified within the proposed works area and the proposed housing site have low ecological values, except the mixed woodland with low to moderate ecological value.

15.9.14 Three faunal species of conservation importance (i.e. Grey Heron, Japanese Pipistrelle and Least Pipistrelle) were recorded within the proposed works area, in which Grey Heron and one of the record of Japanese Pipistrelle were within the proposed housing site. The animals are generally mobile and would displace to other available habitats so the impact would be insignificant. Direct ecological impacts anticipated include permanent loss of vegetation and habitats, injury and mortality of terrestrial fauna and encroachment into the WBA. Indirect impacts include impacts to sites of conservation importance, construction disturbance to habitat, fauna and vegetation, impact to water quality physical obstruction to animals and operational disturbance brought by glare, noise, traffic and human activities. All of the ecological impacts anticipated range between insignificant to low-moderate.

15.9.15 Mitigation measures e.g. implementation of general good site practice and precautionary measures have been suggested to reduce construction disturbance and impacts to water quality to the habitats and wildlife present during construction phase while measures e.g. ecologically friendly measures for butterflies and buffer planting would be considered to minimize operational disturbance during operational phase.

Cultural Heritage

15.9.16 No cultural heritage resources is situated within the proposed works boundary. Fourteen cultural heritage resources are identified outside the proposed works boundary but within the 500m assessment area, including two Declared Monuments, two Grade 3 historic buildings, three nil-grade buildings, five buildings not graded by AMO, one Site of Archaeological Interest, and a heritage trail. Due to close proximity to the works boundary, indirect impacts of ground-borne vibration arising from construction works, would be anticipated on Nos. 13-19 Ha Mei San Tsuen (Grade 3) and No. 27 Ha Mei San Tsuen (not graded by AMO). Monitoring of vibration, tilting and ground settlement, should be proposed to the satisfaction of AMO prior to the commencement of construction works and employed during the construction phase.

15.9.17 The original landscape of the proposed works area and the assessment area have already been seriously modified by construction of the roads, residential development and open storage, including modern fill of lands. Any potential archaeological resources within the proposed works boundary and the assessment area (except Sheung Cheung Wai SAI) would have been removed or seriously disturbed by the abovementioned human disturbances. The Preliminary Environmental Review also concludes that the areas of archaeological potential as identified in "Agreement No. CB20120293 Planning and Engineering Study for the Public Housing Site and Yuen Long Industrial Estate Extension at Wang Chau - Final Technical Report No. 3G (TR-3G) Preferred Option and Technical Assessment - Environmental Impact Assessment Report" falling within the proposed works boundary and the assessment area are archaeologically negligible. Besides, the Archaeological potential of the proposed works area and the assessment area (except Sheung Cheung Wai SAI) are negligible; thus, archaeological impact would not be anticipated during both construction and operational phases of the development. No mitigation measure would be required.

15.9.18 Increase in local population could have brought potential increased visitors to the Ping Shan Heritage Trail, which would be a beneficial impact to the educational purpose of the heritage trail.

15.10 Landscape and Visual

Preliminary Landscape Impact Assessment

15.10.1 With the implementation of proposed mitigation measures, including preservation of existing vegetation, compensatory tree planting, reinstatement of landscape areas, provision of visual green corridors, aesthetical pleasing design of all man-made structures, maximizing greenery provision, landscape treatment on slopes and provision of roadside greening, the residual impact will be insubstantial to slight in Day 1 of operation. Details would subject to further reviewed and updated in later stages.

15.10.2 The residual impact will further be reduced to insubstantial when the proposed tree planting become matures in Year 10 of operation.

15.10.3 In order to meet the HKPSG requirement, a minimum of 1m^2 open space per person for housing development will be provided. And the greening coverage requirement of at least 20% of site area can be provided and target of 30% can be achieved in accordance with conceptual landscape master plan. Details will be further reviewed in later investigation and design stage.

15.10.4 The overall predicted residual landscape impact of the proposed development is therefore reduced to an acceptable level.

Preliminary Visual Impact Assessment

15.10.5 With the implementation of proposed mitigation measures in the design layout, including creation of visual greening connection and breezeways, control of development heights and massing, visual compatibility of the proposed development and maximization of greenery provision, it is anticipated that there would still be some adverse visual changes to the adjacent public viewing points. Details would be subject to further reviewed and updated in later stages.

15.10.6 The proposed development has, in overall terms, no significant adverse visual impact. Efforts have been made to ameliorate the potential visual impact of the proposed development as far as possible. In return, the proposed development will make a positive contribution to the supply of housing units and optimize land utilization.

15.10.7 The resultant overall impact is therefore concluded as moderately adverse.

15.11 Utilities

15.11.1 No adverse impact is anticipated with respect to utilities on the housing development.

15.12 Air Ventilation

15.12.1 The Study Area fronts Tin Park Road Park and Tin Shui Wai urban area across the Tin Tsz Road to its west, and backs Kai Shan to its east. Based on the wind data from HKO weather station and PlanD RAMS model, the annual prevailing winds are mainly coming from NNE, NE, ENE, E, SSE and S directions, while the summer prevailing winds are mainly comprised by SSE, S and SSW winds.

15.12.2 Owing to the location and the nature of the major potential developments within the Study Area, the development scheme would inevitably induce wind influence on the downwind region under the respective prevailing wind directions, including but not limited to the Tin Pak Road Park, Fung Ka Wai, Ping Shan Cultural Farm and Ha Mei San Tsuen. However, since the development scheme has arranged the building disposition and orientation in a manner that they are separated from each other with a decent distance and many of these separation gaps are aligned in prevailing wind directions. Hence, certain portion of winds could still flow through the Study Area to facilitate air ventilation performance at the downstream area.

15.12.3 Attention should be paid to avoid potential decline of air ventilation performance and continuous optimization of the scheme and building layouts should be carried out based on the finding of this Air Ventilation Assessment – Expert Evaluation.

Figures

ISO A1 59

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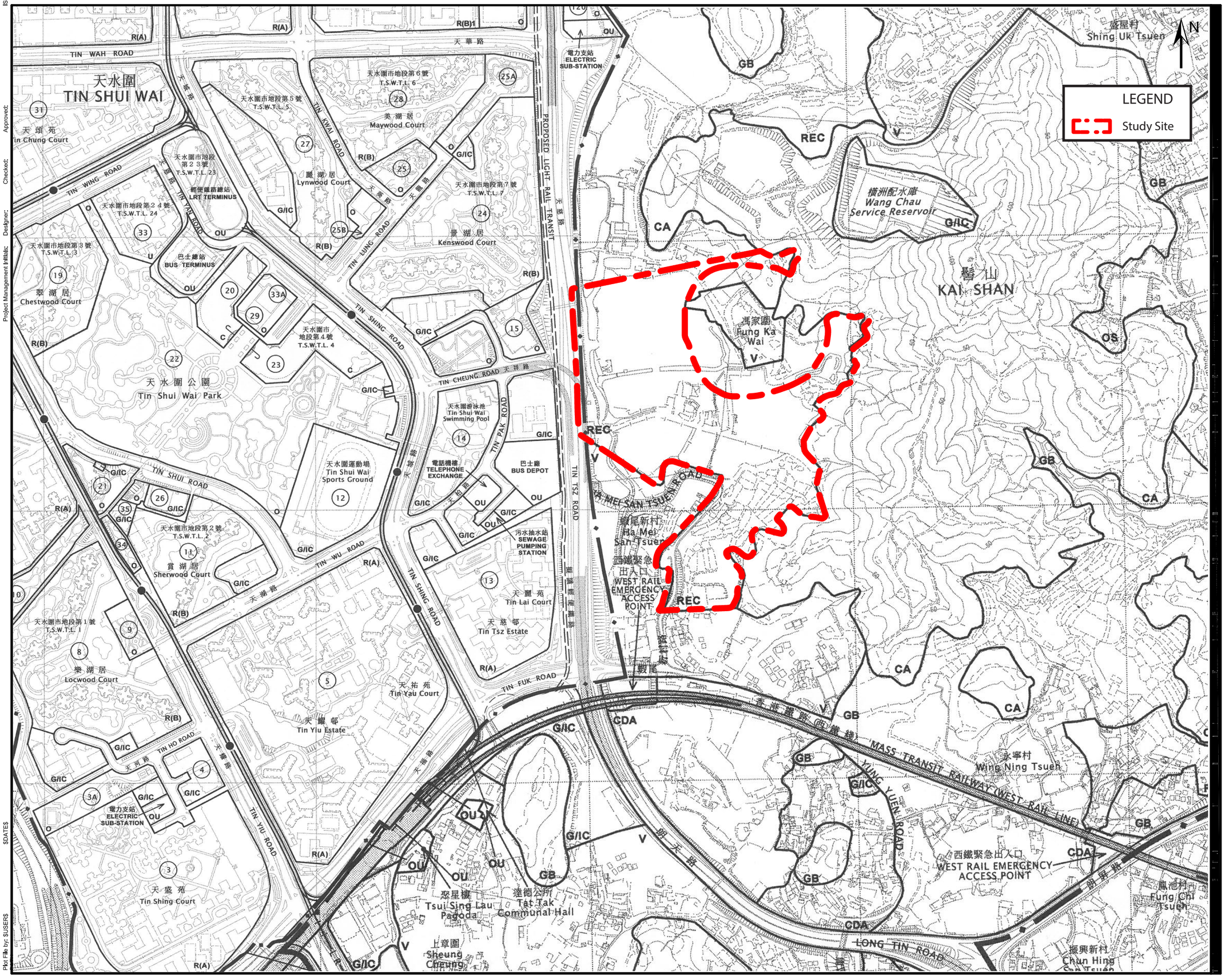

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SITE FORMATION AND INFRASTRUCTURAL WORKS FOR PROPOSED PUBLIC HOUSING DEVELOPMENT NEAR TIN SHUI WAI - FEASIBILITY STUDY

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STATUS
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SCALE 比例

DIMENSION UNIT 尺寸單位

KEY PLAN
索引圖

PROJECT NO. 項目編號
60587364

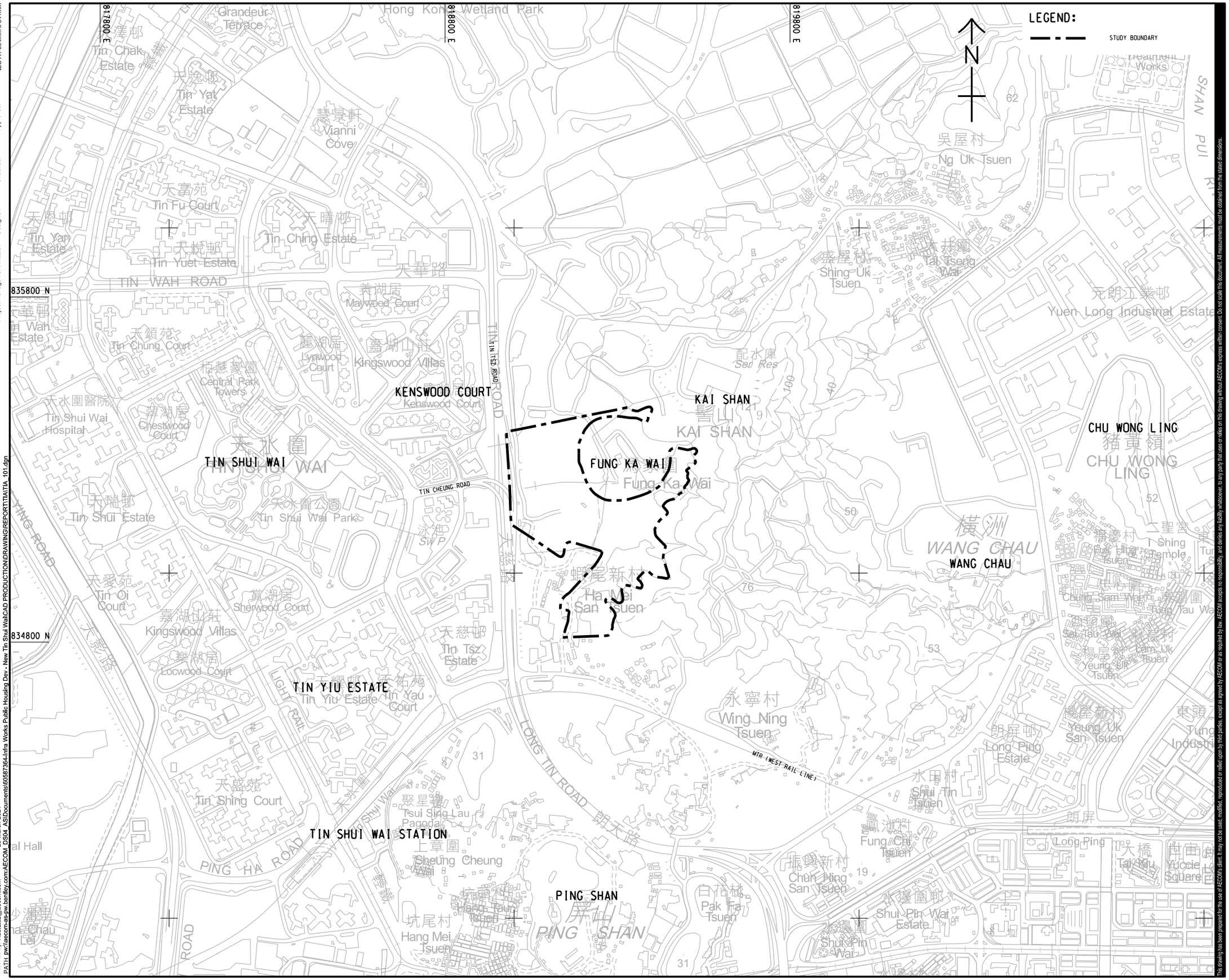
AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

LOCATION PLAN AND STATUTORY PLANNING CONTEXT

SHEET NUMBER
圖紙編號

FIGURE 1.1



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STATUS
階段

SCALE 比例	DIMENSION UNIT 尺寸單位
A3 1 : 10000	METERS

KEY PLAN
索引圖

PROJECT NO. 項目編號	AGREEMENT NO. 協議編號
60587364	CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

SITE LOCATION PLAN

SHEET NUMBER
圖紙編號

FIGURE 2.1

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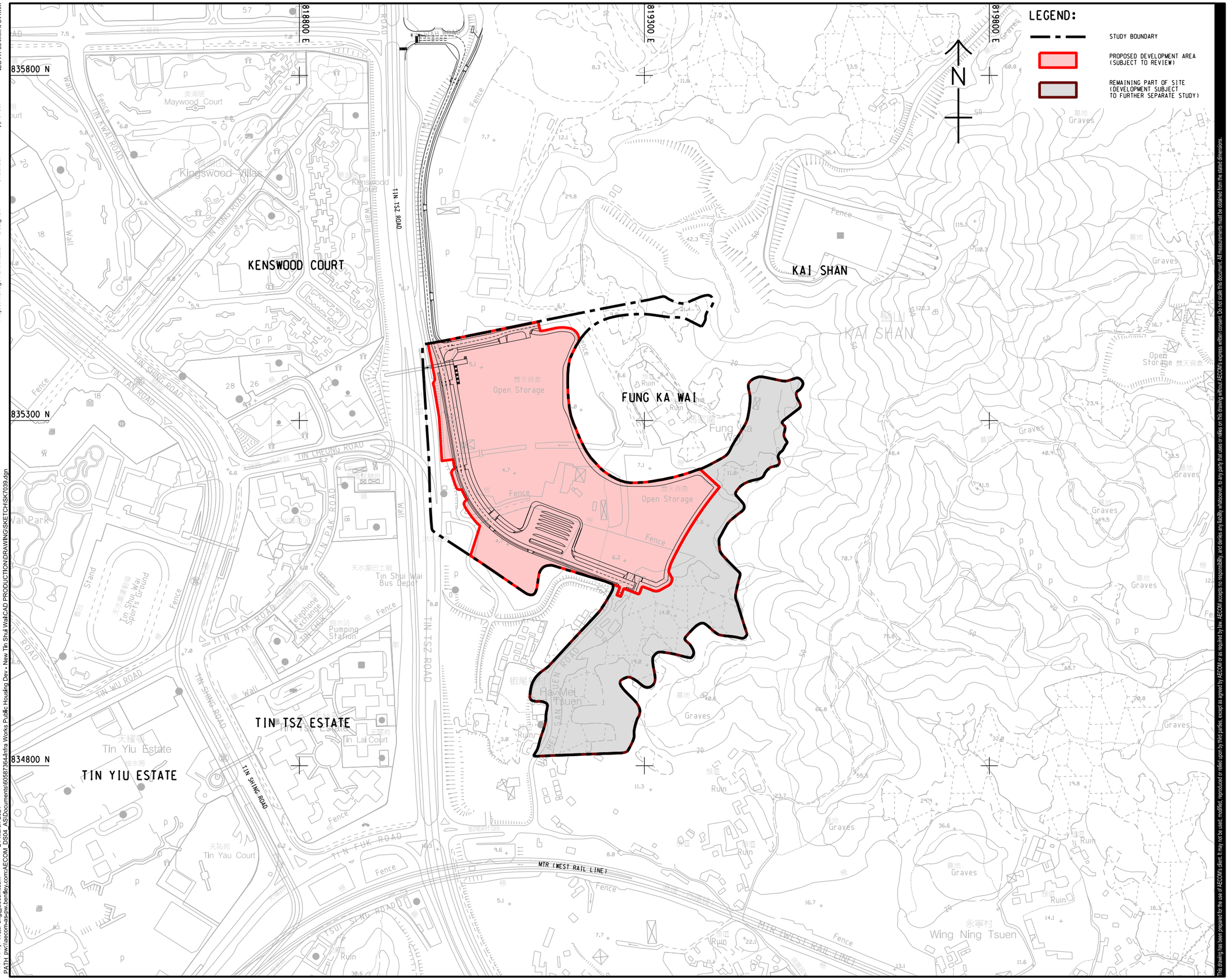

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階段

SCALE 比例
A3 1 : 5000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60587364

AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

PHASED DEVELOPMENT PLAN

SHEET NUMBER
圖紙編號

FIGURE 2.2

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NOTES:

1. THE INFORMATION SHOWN IS USED FOR FACILITATING THE PURPOSES FOR THIS FEASIBILITY STUDY, WHICH SUBJECT TO REVIEW IN LATER STAGE.
2. BUILDING BLOCK INFORMATION SHOWN, INLCUDING LAYOUT ARRANGEMENT/ MAXIMUM BUILDING HEIGHT/ NOS. OF STOREYS, IS SUBJECT TO REVIEW IN LATER STAGE.
3. BUILDING HEIGHT SHOWN IS ROUNDING UP TO NEAREST 5m FOR INDICATIVE PURPOSES, AND SUBJECT TO REVIEW IN LATER STAGE.

BUILDINGS	MAXIMUM BUILDING HEIGHT	DOMESTIC STOREYS	BUILDINGS	MAXIMUM BUILDING HEIGHT	DOMESTIC STOREYS
BLOCK A	+160mPD	47	BLOCK F	+140mPD	42
BLOCK B	+160mPD	47	BLOCK G	+140mPD	42
BLOCK C	+110mPD	31	BLOCK H	+160mPD	50
BLOCK D	+160mPD	47	BLOCK I	+160mPD	50
BLOCK E	+110mPD	31	BLOCK J	+65mPD	17

BUILDINGS	HEIGHT PROFILE
PUBLIC TRANSPORT INTERCHANGE AND WELFARE / ANCILLARY FACILITIES	+45mPD
WELFARE/ANCILLARY FACILITIES	+45mPD
FLOODWATER PUMPING STATION	~+15mPD
SEWAGE PUMPING STATION	~+15mPD
FLOODWATER RETENTION TANK	~+10mPD

LEGEND:

- STUDY BOUNDARY
- PROPOSED DEVELOPMENT AREA (SUBJECT TO REVIEW)
- PROPOSED HOUSING SITE BOUNDARY (SUBJECT TO REVIEW)
- PROPOSED WORKS AREA BOUNDARY (SUBJECT TO REVIEW)
- INDICATIVE EXTENT OF REMAINING BROWNFIELD SITES
- PROPOSED RETAINING WALL
- PROPOSED 1:2 FILL SLOPE
- PROPOSED 1:2 CUT SLOPE
- UC — PROPOSED U-CHANNEL
- 600Ø — PROPOSED SEWERAGE PIPELINE
- DN600 — PROPOSED FRESH WATER MAIN
- DN300 — PROPOSED FLUSHING WATER MAIN
- EXISTING GREENERY AREA (APPROX. 700 NO. OF TREES)
- PROPOSED DRAINAGE RESERVE FOR BOX CULVERT (TOTAL WIDTH=12m) (SUBJECT TO REVIEW)
- PROPOSED DRAINAGE RESERVE (TOTAL WIDTH=6m) (SUBJECT TO REVIEW)
- PROPOSED NON-BUILDING ZONE (SUBJECT TO REVIEW)
- PROPOSED RESIDENTIAL BLOCKS
- PROPOSED FOOTBRIDGE EXTENSION
- REMAINING PART OF SITE (DEVELOPMENT SUBJECT TO FURTHER SEPARATE STUDY)
- TREE OF PARTICULAR INTEREST
- GRAVE

818800 E · 819300 E · 819800 E · 835800 N · 835300 N · 834800 N · 834300 N

PING SHAN CULTURAL FARM

PROPOSED LIFT TOWER

TO BE CONNECTED WITH EXISTING FOOTBRIDGE

KAI SHAN

FUNG KA WAI

20m WIND CORRIDOR

PROPOSED PUBLIC TRANSPORT INTERCHANGE AND WELFARE / ANCILLARY FACILITIES

PROPOSED FLOODWATER PUMPING STATION

PROPOSED RETENTION TANK

PROPOSED SEWAGE PUMPING STATION

PROPOSED WELFARE / ANCILLARY FACILITIES

TIN TSZ ESTATE

TIN YIU ESTATE

CUT LINE A-A

CUT LINE A-A

CONNECTED TO PROPOSED TRUNK MAINS IN HUNG SHUI KIU

INSET PLAN

TIN SHUI WAI STATION

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PROJECT
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR PROPOSED PUBLIC HOUSING DEVELOPMENT NEAR TIN SHUI WAI - FEASIBILITY STUDY

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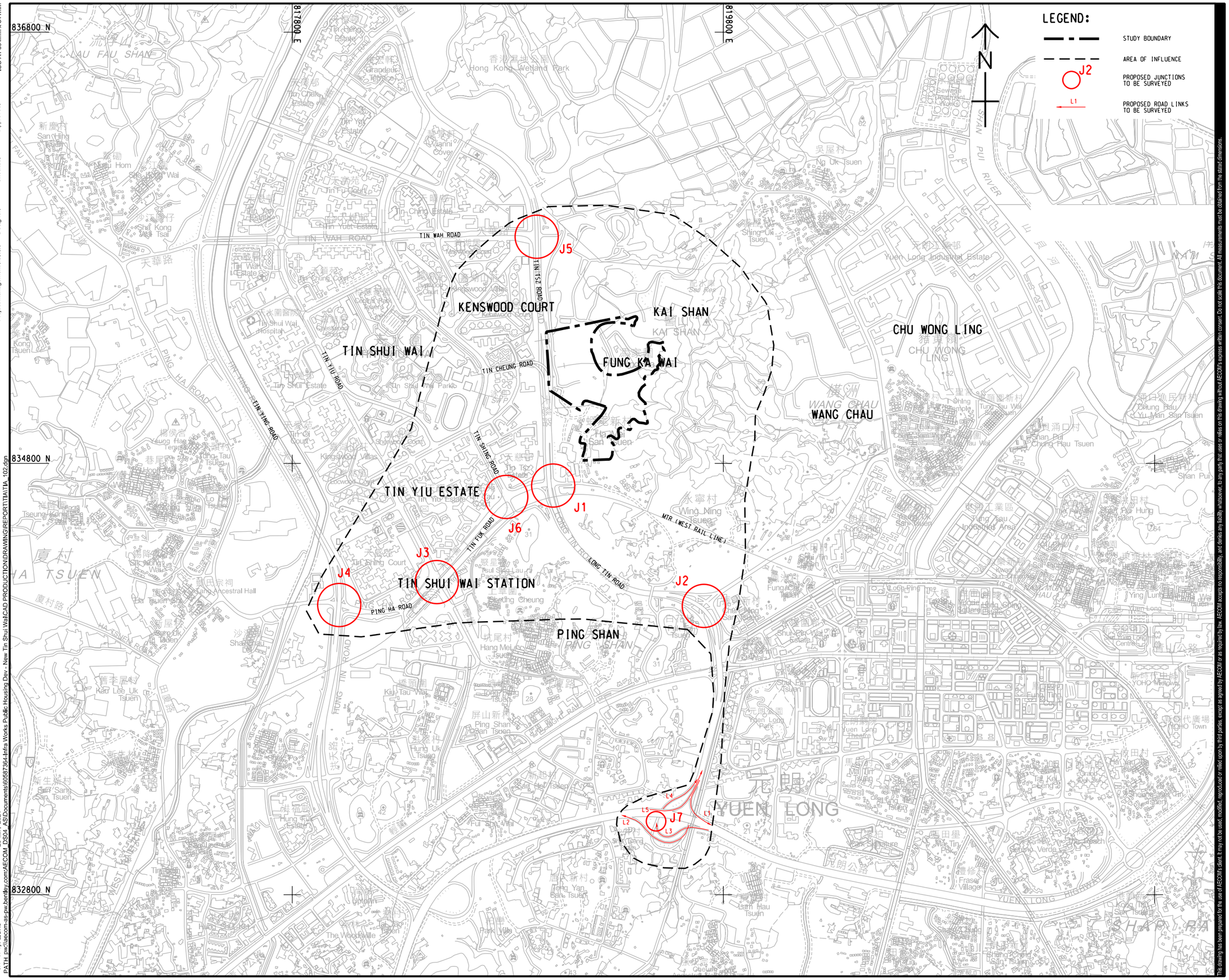
KEY PLAN

PROJECT NO. 60587364 · **AGREEMENT NO.** CE 11/2018 (CE)

SHEET TITLE
PROPOSED DEVELOPMENT LAYOUT PLAN

SHEET NUMBER
FIGURE 2.3



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SITE FORMATION AND INFRASTRUCTURAL WORKS FOR PROPOSED PUBLIC HOUSING DEVELOPMENT NEAR TIN SHUI WAI - FEASIBILITY STUDY

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SCALE 比例: A3 1 : 16000

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KEY PLAN
索引圖

PROJECT NO. 項目編號: 60587364

AGREEMENT NO. 協議編號: CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

AREA OF INFLUENCE AND LOCATIONS OF KEY JUNCTIONS

SHEET NUMBER
圖紙編號

FIGURE 3.1

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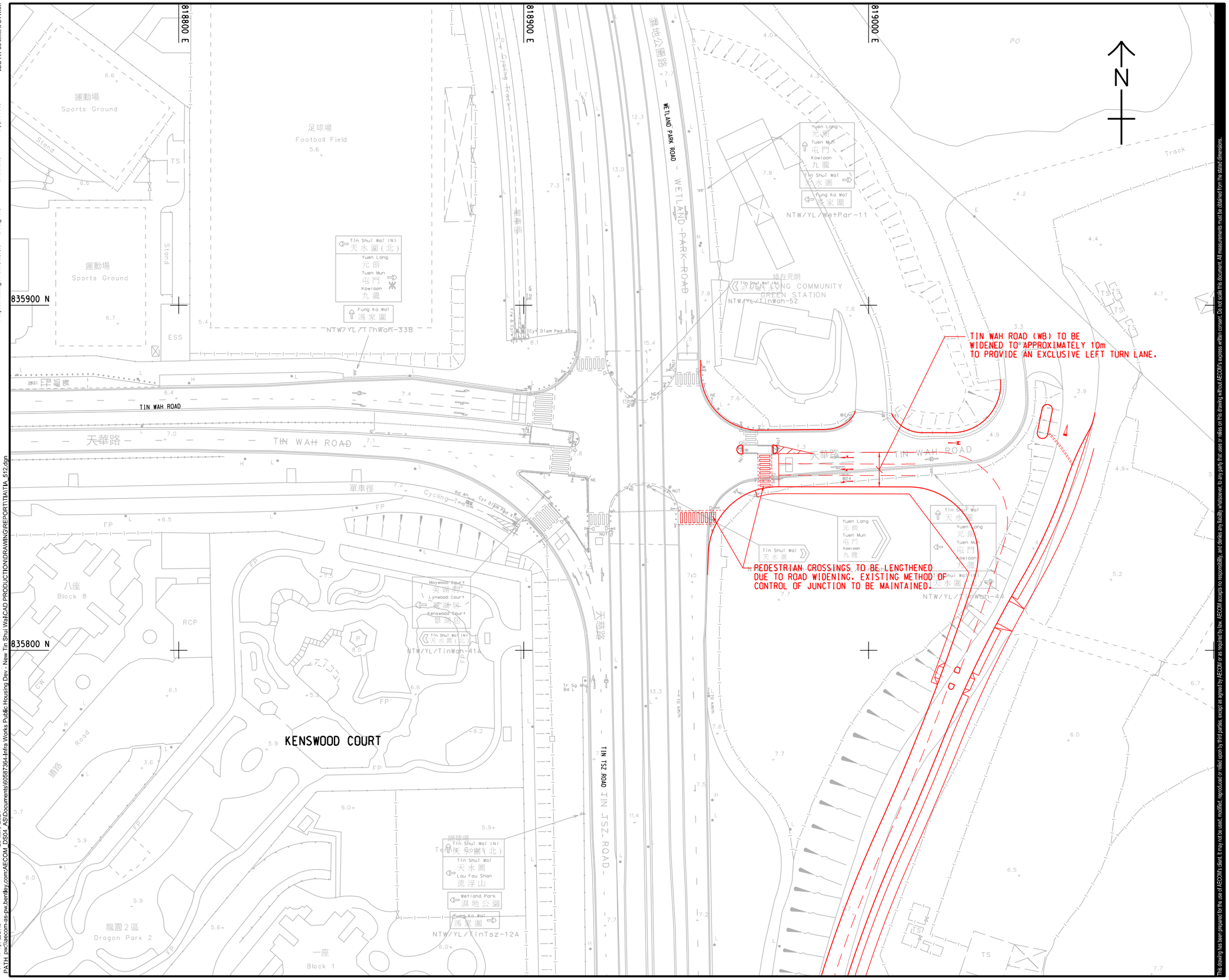
29-三月-2021



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SITE FORMATION AND INFRASTRUCTURAL WORKS FOR PROPOSED PUBLIC HOUSING DEVELOPMENT NEAR TIN SHUI WAI - FEASIBILITY STUDY

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I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核對
A	DEC. 19	TD'S COMMENTS	VZ
-	SEP. 19	FIRST ISSUE	VZ

STATUS
階段

SCALE 比例
A3 1 : 1000

DIMENSION UNIT 尺寸單位
METERS

KEY PLAN
索引圖

PROJECT NO. 項目編號
60587364

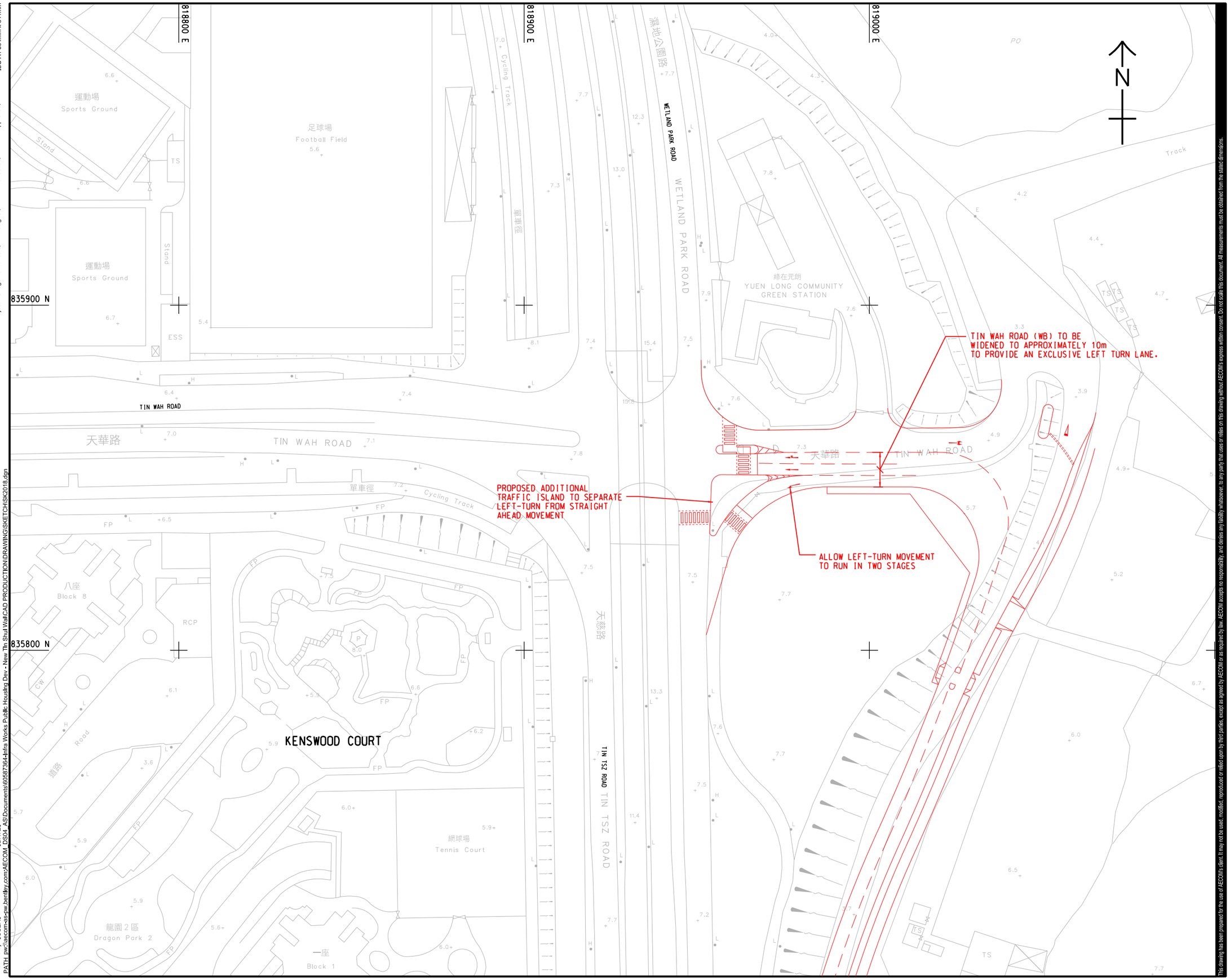
AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

PROPOSED JUNCTION IMPROVEMENT SCHEME ON J5

SHEET NUMBER
圖紙編號

FIGURE 3.2



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PROJECT 項目

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR PROPOSED PUBLIC HOUSING DEVELOPMENT NEAR TIN SHUI WAI - FEASIBILITY STUDY

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I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS 階段

SCALE 比例
A3 1 : 1000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號
60587364

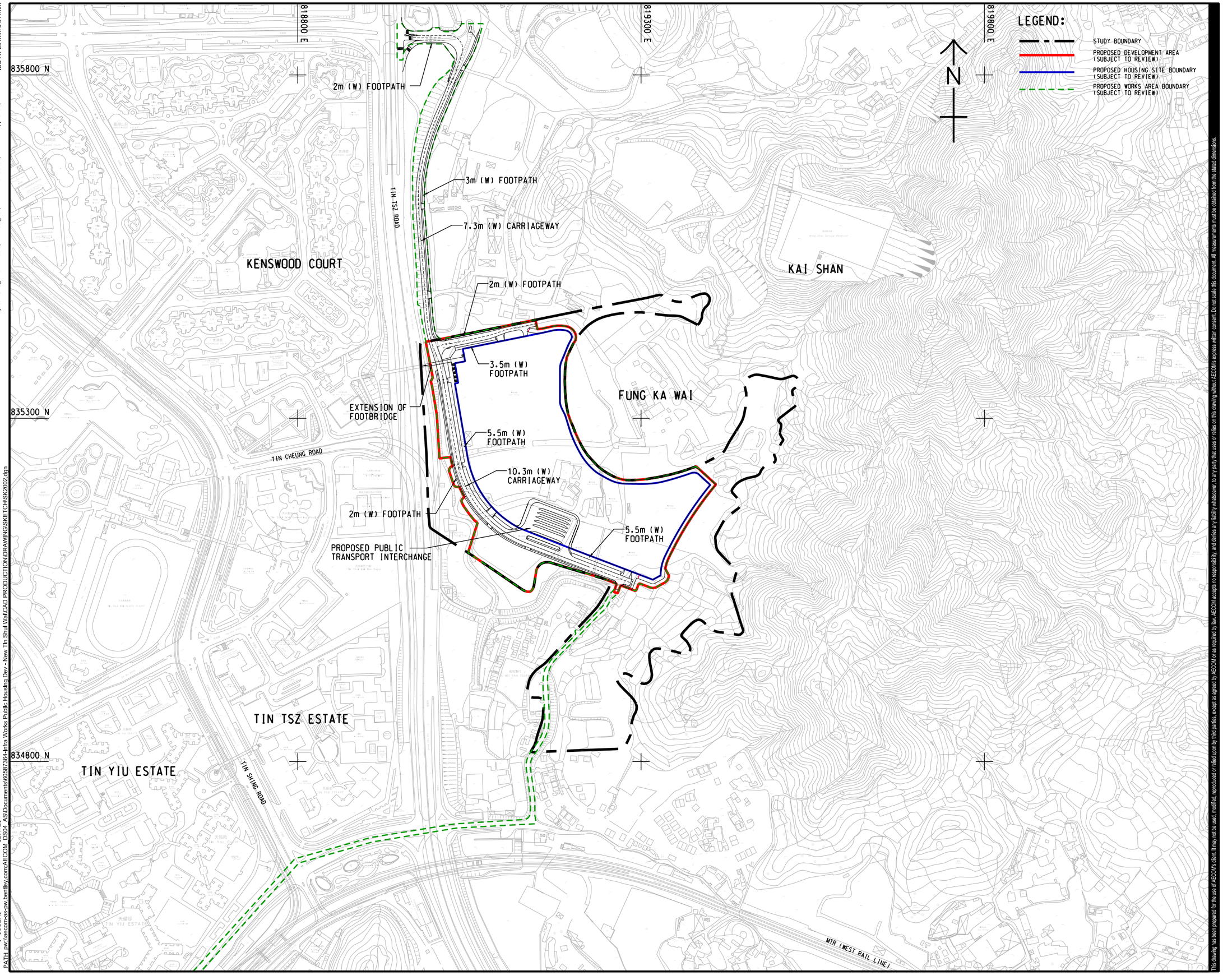
AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE 圖紙名稱

PROPOSED JUNCTION IMPROVEMENT SCHEME ON J5 - ALTERNATE OPTION

SHEET NUMBER 圖紙編號

FIGURE 3.3



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STATUS
階段

SCALE 比例
A3 1 : 5000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60587364

AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

PROPOSED ROAD SCHEME

SHEET NUMBER
圖紙編號

FIGURE 3.4

ISO A1 594mm x 841mm

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08-四月-2021

NOTES:

1. THE PROPOSED PTI LAYOUT IS FOR ILLUSTRATIVE PURPOSE. DETAILS OF LAYOUT WOULD BE FURTHER REVIEWED IN LATER STAGE OF THE PROJECT.
2. SUFFICIENT SPACE WILL BE RESERVED FOR FUTURE PROVISIONS OF SAWTOOTH PTI DESIGN IN LATER STAGE OF THE PROJECT.

LEGEND:

COLUMN-FREE AREA (CFA)
(TO BE FURTHER REVIEWED IN LATER STAGE)

N

BAY 1
BAY 2
BAY 3
BAY 4
BAY 5
BAY 6
BAY 7

6m
3m
3m
3m
3m
3m
3.5m
3m
3.5m
3m
7.3m
50m
6m
3m

露天貨倉
Open Storage

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SCALE 比例
A3 1 : 500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60587364

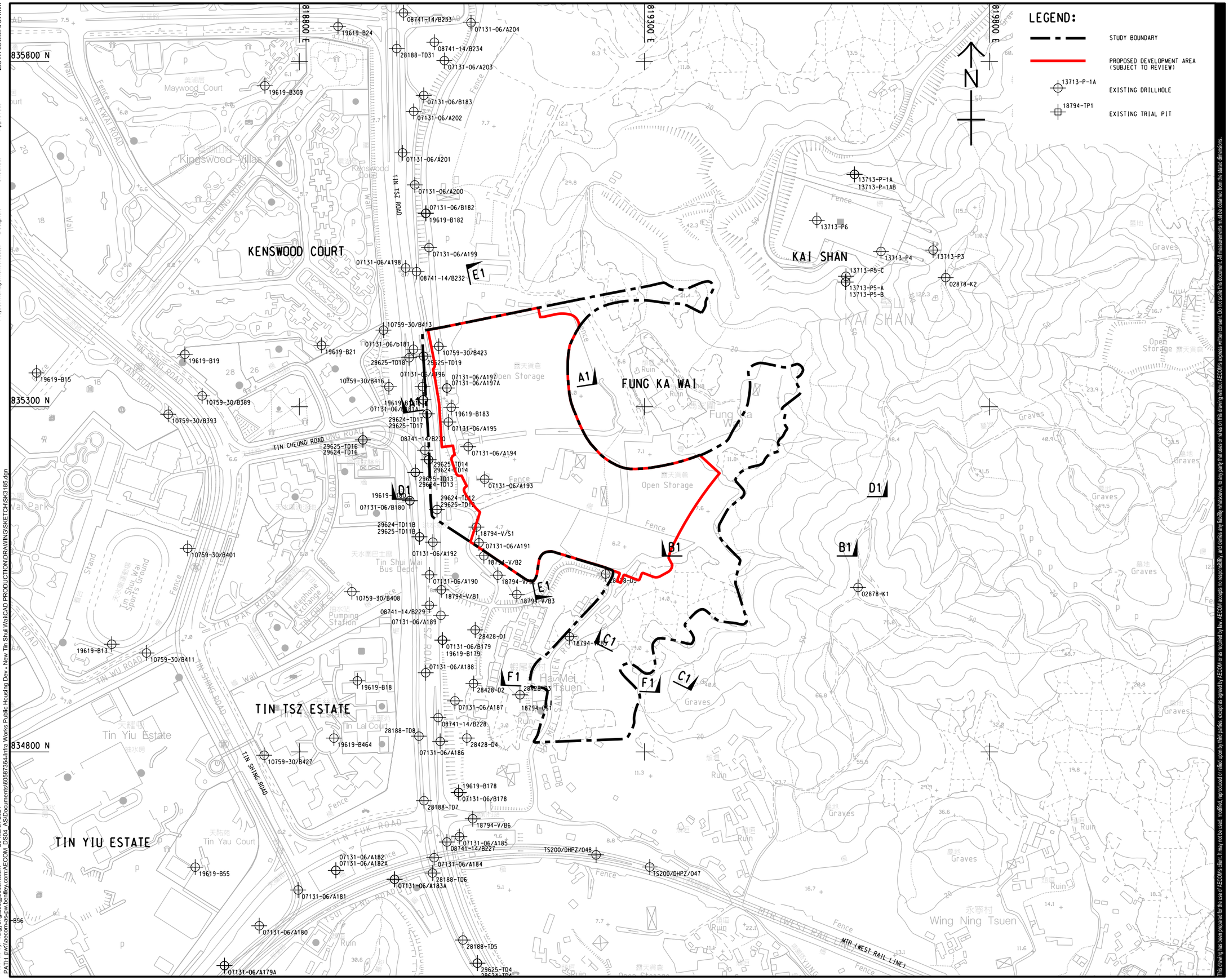
AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

PROPOSED PUBLIC TRANSPORT INTERCHANGE (PTI) LAYOUT

SHEET NUMBER
圖紙編號

FIGURE 3.5



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PROJECT
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階段

SCALE 比例	DIMENSION UNIT 尺寸單位
A3 1 : 5000	METERS

KEY PLAN
索引圖

PROJECT NO. 項目編號	AGREEMENT NO. 協議編號
60587364	CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

EXISTING GI LOCATION PLAN

SHEET NUMBER
圖紙編號

FIGURE 4.1

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Plot File by: Yingyong.Luo@aecom.com 25-March-2021
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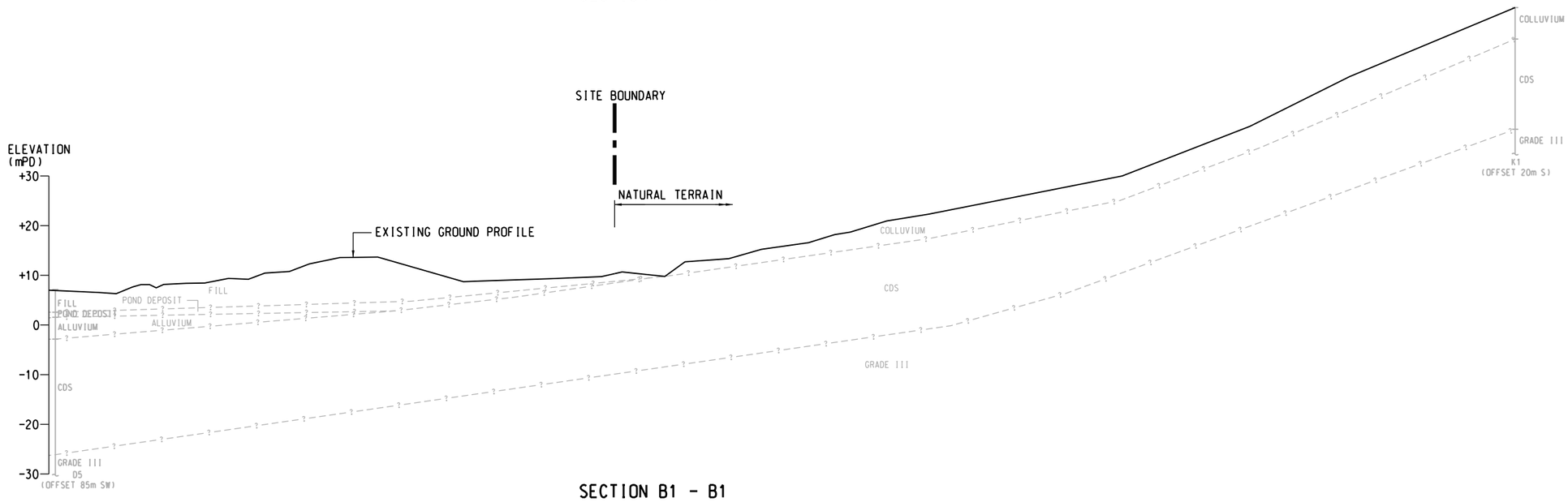
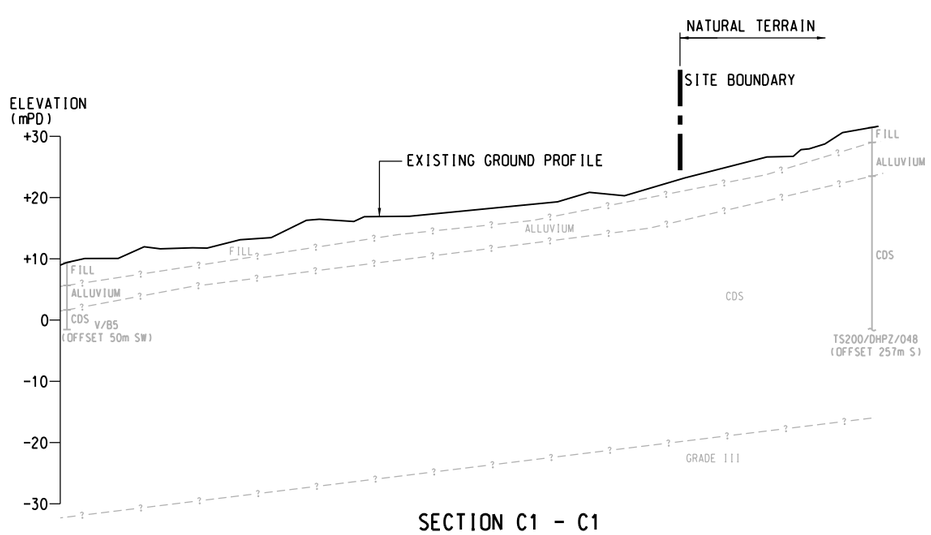
SECTION A1 - A1



SECTION B1 - B1



SECTION C1 - C1

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STATUS
階段

SCALE
比例

A3 1 : 1000

DIMENSION UNIT
尺寸單位

MILLIMTRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60587364

AGREEMENT NO.
協議編號

CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

GEOLOGICAL CROSS SECTIONS

SHEET 1 OF 2

SHEET NUMBER
圖紙編號

FIGURE 4.2

ISO A1 594mm x 841mm
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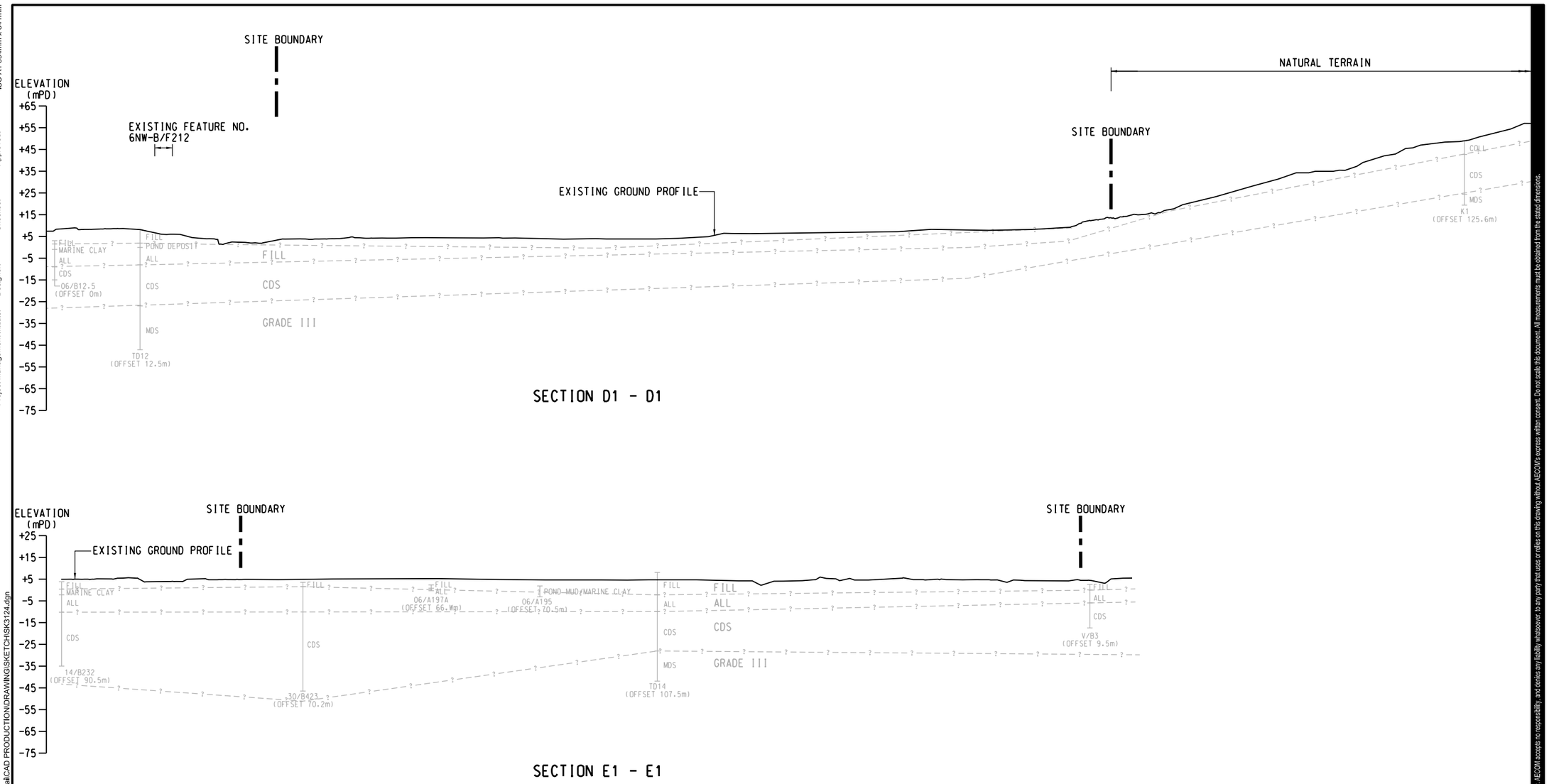
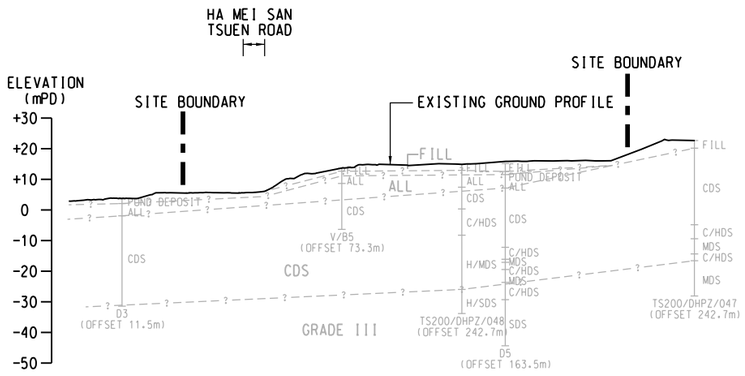


SECTION D1 - D1

SECTION E1 - E1



SECTION F1 - F1

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STATUS
狀況

SCALE 比例	DIMENSION UNIT 尺寸單位
A3 1 : 2000	MILLIMTRES

KEY PLAN
索引圖

PROJECT NO. 項目編號	AGREEMENT NO. 協議編號
60587364	CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

GEOLOGICAL CROSS SECTIONS

SHEET 2 OF 2

SHEET NUMBER
圖紙編號

FIGURE 4.3

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ISO A1 594mm x 841mm

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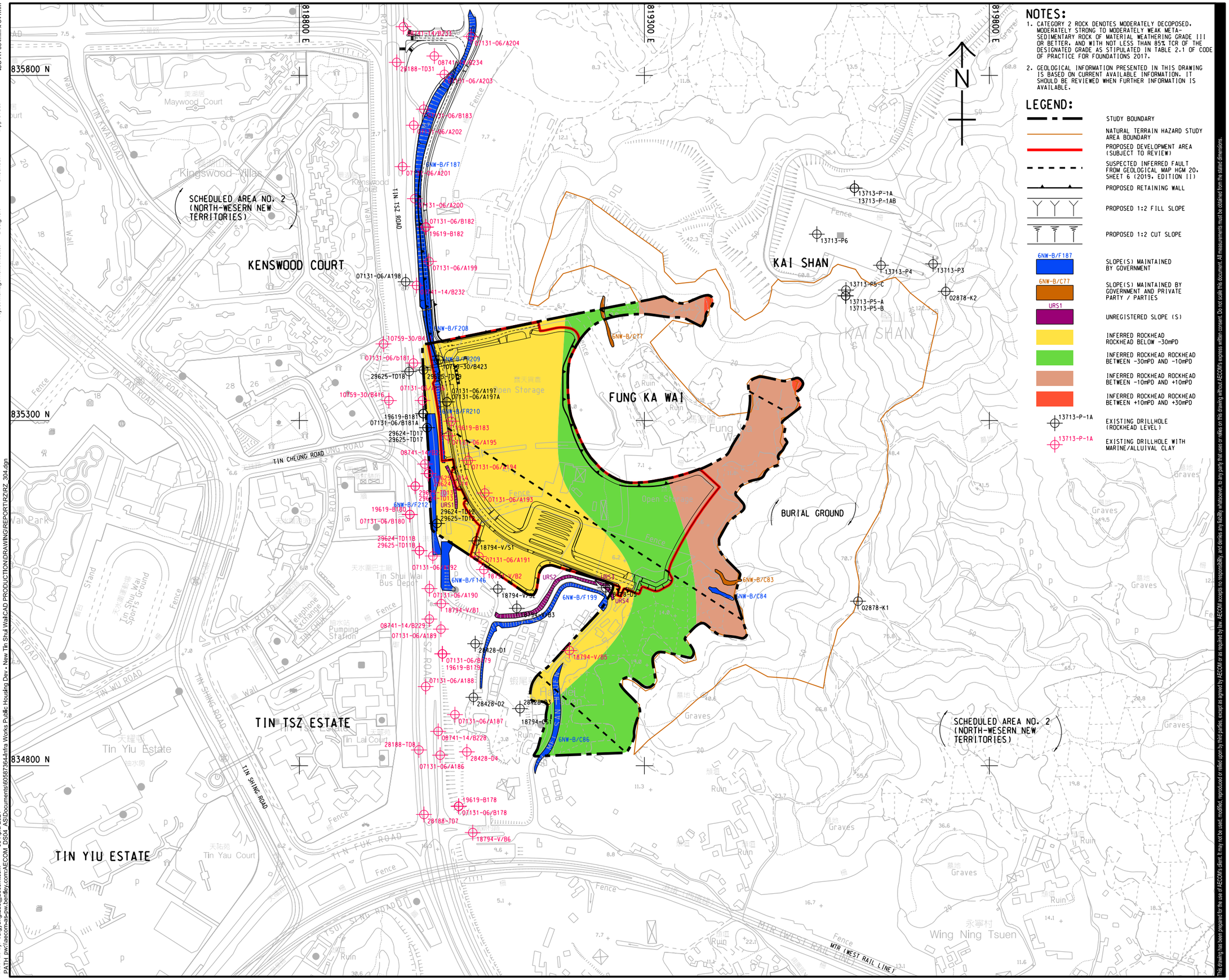

NOTES:

1. CATEGORY 2 ROCK DENOTES MODERATELY DECOPOSED, MODERATELY STRONG TO MODERATELY WEAK META-SEDIMENTARY ROCK OF MATERIAL WEATHERING GRADE III OR BETTER, AND WITH NOT LESS THAN 85% TCR OF THE DESIGNATED GRADE AS STIPULATED IN TABLE 2.1 OF CODE OF PRACTICE FOR FOUNDATIONS 2017.
2. GEOLOGICAL INFORMATION PRESENTED IN THIS DRAWING IS BASED ON CURRENT AVAILABLE INFORMATION. IT SHOULD BE REVIEWED WHEN FURTHER INFORMATION IS AVAILABLE.

LEGEND:

- STUDY BOUNDARY
- NATURAL TERRAIN HAZARD STUDY AREA BOUNDARY
- PROPOSED DEVELOPMENT AREA (SUBJECT TO REVIEW)
- SUSPECTED INFERRED FAULT FROM GEOLOGICAL MAP HGM 20, SHEET 6 (2019, EDITION II)
- PROPOSED RETAINING WALL
- PROPOSED 1:2 FILL SLOPE
- PROPOSED 1:2 CUT SLOPE
- 6NW-B/F187 — SLOPE(S) MAINTAINED BY GOVERNMENT
- 6NW-B/C77 — SLOPE(S) MAINTAINED BY GOVERNMENT AND PRIVATE PARTY / PARTIES
- URS1 — UNREGISTERED SLOPE (S)
- INFERRED ROCKHEAD ROCKHEAD BELOW -30mPD
- INFERRED ROCKHEAD ROCKHEAD BETWEEN -30mPD AND -10mPD
- INFERRED ROCKHEAD ROCKHEAD BETWEEN -10mPD AND +10mPD
- INFERRED ROCKHEAD ROCKHEAD BETWEEN +10mPD AND +30mPD
- 13713-P-1A — EXISTING DRILLHOLE (ROCKHEAD LEVEL)
- 13713-P-1A — EXISTING DRILLHOLE WITH MARINE/ALLUIVAL CLAY

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階段

SCALE 比例
A3 1 : 5000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60587364

AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

GEOTECHNICAL CONSTRAINT MAP

SHEET NUMBER
圖紙編號

FIGURE 4.4

819000

819500

835500

835000

TSW-01(OH)

TSW-02(OH)

TSW-03(OH)

TSW-04(CD)

TSW-05(OH)

TSW-06(CD)

TSW-07(OH)

TSW-08(CD)

TSW-09(TD)

TSW-10(OH)

P1a

P1

P2

P3

P4

P5

P5a

Debris Front at Ch.52

Debris Front at Ch.182

Debris Front at Ch.17

Debris Front at Ch.144

Debris Front at Ch.174

Debris Front at Ch.40

Debris Front at Ch.79

Legend

- Natural Terrain Study
- Natural Terrain Catchment
- Study Boundary
- Convex break in slope
- Concave break in slope
- Drainage line
- Verified Natural Terrain Landslide
- Potential Landslide initiation zone
- Design Source Area
- Debris Flow Path

AECOM

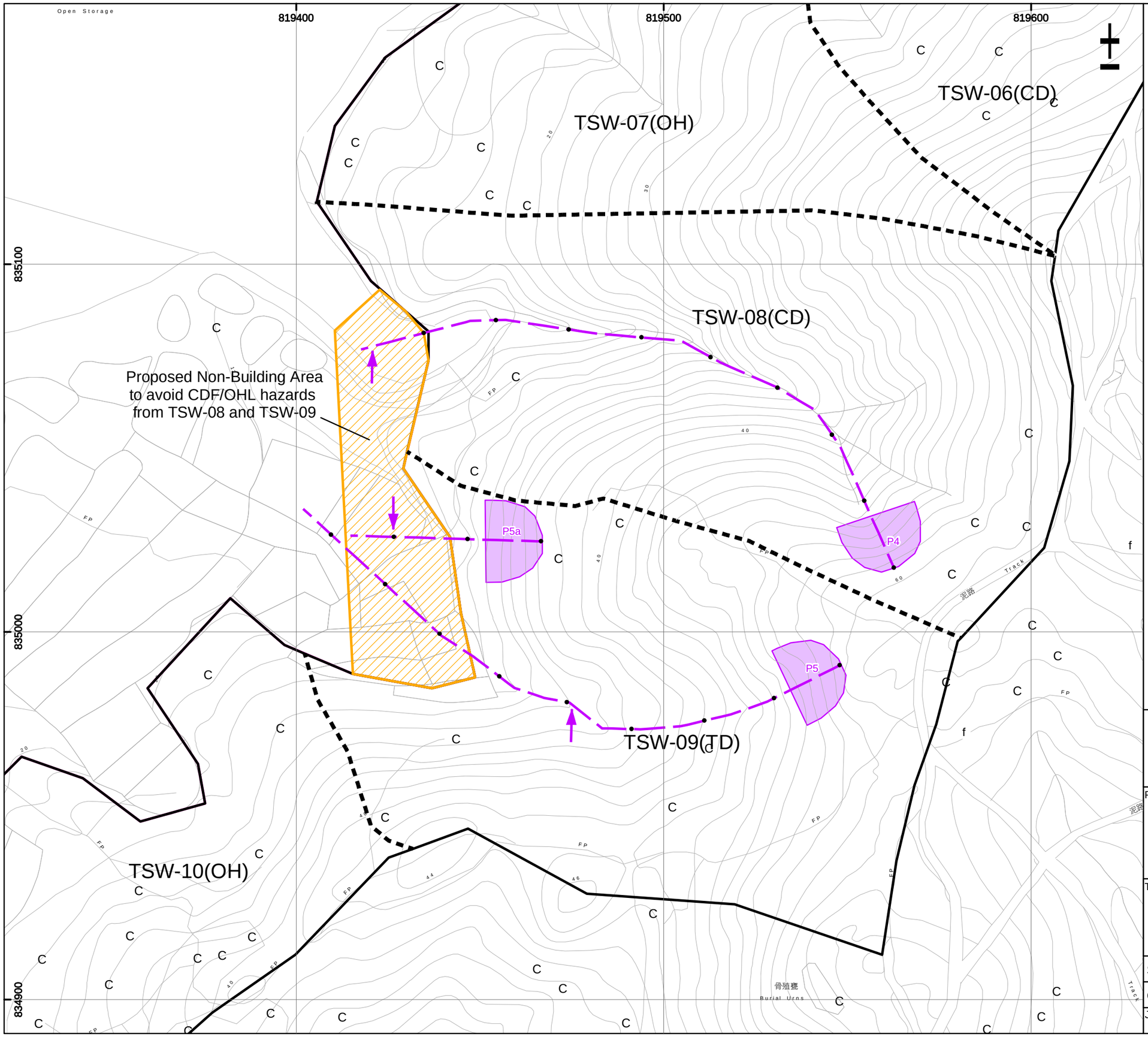
PROJECT

Agreement No. CE 11/2018 (CE)
Site Formation and Infrastructural Works for Proposed Public Housing Development Near Tin Shui Wai

TITLE

Natural Terrain Hazard Plan

SCALE	1:3,000	DATE	Nov 2019
CHECK	CI	DRAWN	JSYH
JOB No.	60587364	FIGURE No.	4.5
		Rev.	0



Legend

- Natural Terrain Study
- Natural Terrain Catchment
- Study Boundary
- Convex break in slope
- Concave break in slope
- Drainage line
- Verified Natural Terrain Landslide
- Potential Landslide initiation zone
- Design Source Area
- Debris Flow Path

AECOM

PROJECT

Agreement No. CE 11/2018 (CE)
Site Formation and Infrastructural Works for Proposed Public Housing Development Near Tin Shui Wai

TITLE

Natural Terrain Hazard Study - Proposed Mitigation Measures

SCALE	1:1,000	DATE	Jun 2020
CHECK	CI	DRAWN	JSYH
JOB No.	60587364	FIGURE No.	4.6 Rev. 0

ISO A1 594mm x 841mm

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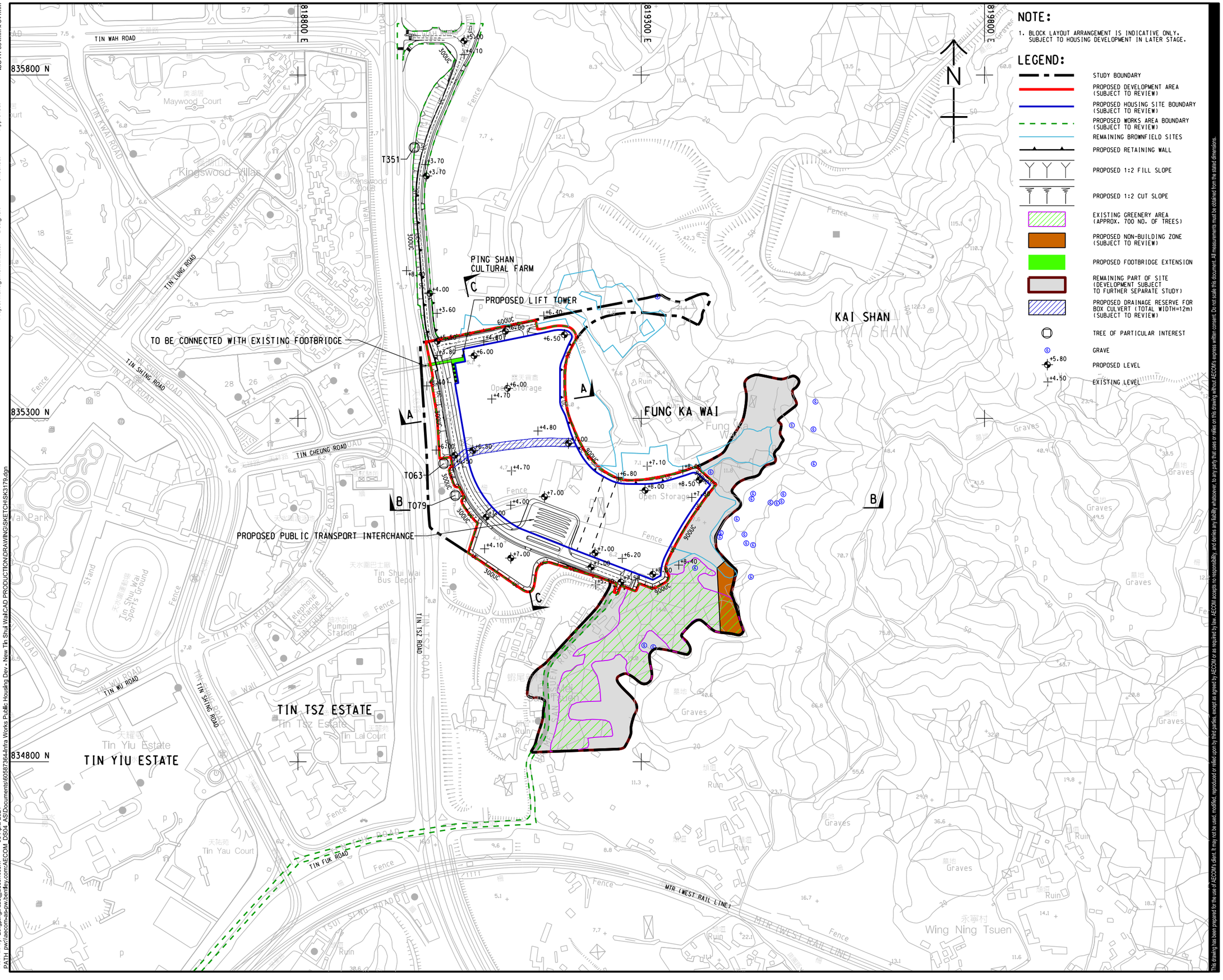
06-Apr-2021



NOTE:

1. BLOCK LAYOUT ARRANGEMENT IS INDICATIVE ONLY, SUBJECT TO HOUSING DEVELOPMENT IN LATER STAGE.

LEGEND:

- STUDY BOUNDARY
- PROPOSED DEVELOPMENT AREA (SUBJECT TO REVIEW)
- PROPOSED HOUSING SITE BOUNDARY (SUBJECT TO REVIEW)
- PROPOSED WORKS AREA BOUNDARY (SUBJECT TO REVIEW)
- REMAINING BROWNFIELD SITES
- PROPOSED RETAINING WALL
- PROPOSED 1:2 FILL SLOPE
- PROPOSED 1:2 CUT SLOPE
- EXISTING GREENERY AREA (APPROX. 700 NO. OF TREES)
- PROPOSED NON-BUILDING ZONE (SUBJECT TO REVIEW)
- PROPOSED FOOTBRIDGE EXTENSION
- REMAINING PART OF SITE (DEVELOPMENT SUBJECT TO FURTHER SEPARATE STUDY)
- PROPOSED DRAINAGE RESERVE FOR BOX CULVERT (TOTAL WIDTH=12m) (SUBJECT TO REVIEW)
- TREE OF PARTICULAR INTEREST
- GRAVE
- +5.80 PROPOSED LEVEL
- +4.50 EXISTING LEVEL

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STATUS
階段

SCALE 比例
A3 1 : 5000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60587364

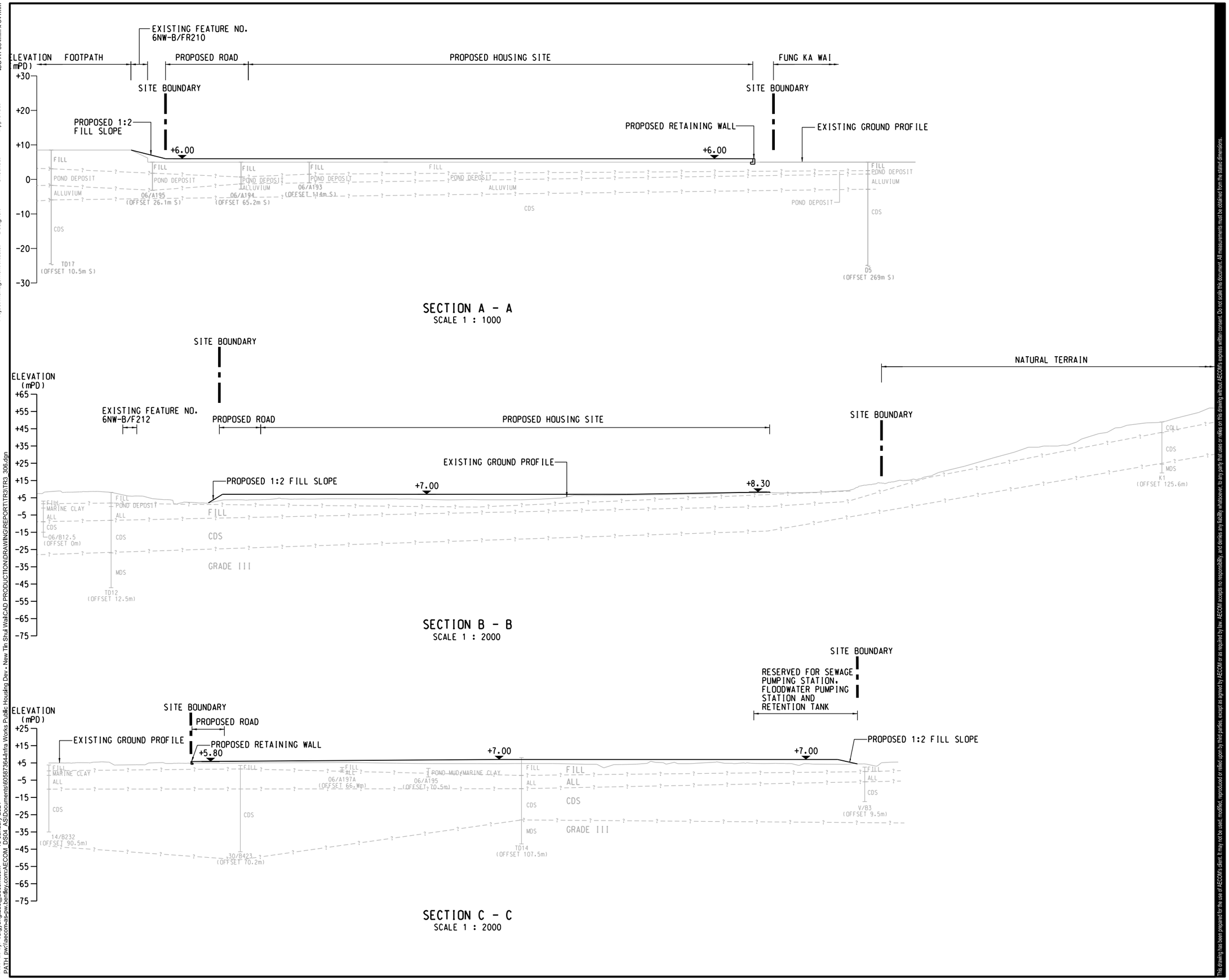
AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

PROPOSED SITE FORMATION PLAN

SHEET NUMBER
圖紙編號

FIGURE 5.1



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SITE FORMATION AND INFRASTRUCTURAL WORKS FOR PROPOSED PUBLIC HOUSING DEVELOPMENT NEAR TIN SHUI WAI - FEASIBILITY STUDY

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狀況

SCALE 比例
A3 AS SHOWN

DIMENSION UNIT 尺寸單位
MILLIMETRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60587364

AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

CROSS SECTIONS OF PROPOSED SITE FORMATION WORKS

SHEET NUMBER
圖紙號碼

FIGURE 5.2

ISO A1 594mm x 841mm
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Checked:
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LEGEND:
STUDY BOUNDARY
CATCHMENT AREA

N

818600 E
819800 E

835800 N
834800 N

MIXED-USE SITE
RR_T_EC04
RR_T_EC05_A
KAI SHAN
RR_T_EC02_A
FUNG KA WAI
RR_T_EC02_B
KAI SHAN SITE
RR_T_EC02_C
CARPARK SITE
OJ_C7A
MANHOLE A SWD1030518
MANHOLE B SWD1030510
STORAGE AREA SITE
OJ_H1012255
OJ_H1012256
OJ_H1012257
OJ_H1012258
OJ_H1012259
OJ_H1012260
OJ_H1012254
OJ_H1012253
OJ_H1012250
OJ_H1012251

KENSWOOD COURT
TIN SHUI WAI
TIN YIU ESTATE
SHEUNG CHEUNG WAI
PING SHAN
CHU WONG LING
WANG CHAU
Yuen Long Industrial Estate

TIN WAH ROAD
TIN TSZ ROAD
TIN CHEUNG ROAD
TIN YING ROAD
LONG LONG (TIN ROAD)
PING HA ROAD
LIGHT RAIL
MTR (WEST RAIL LINE)

Grandeur Terrace
Hong Kong Wetland Park
Tin Chak Estate
Tin Yat Estate
Vianni Cove
Tin Fu Court
Tin Yan Estate
Tin Yuet Estate
Tin Ching Estate
Maywood Court
Tin Wah Estate
Tin Chung Court
Lynwood Court
Kingswood Villas
Central Park Towers
Tin Shui Wai Hospital
Chestwood Court
Tin Shui Estate
Tin Shui Wai Park
Tin Oi Court
Sherwood Court
Locwood Court
Tin Yau Court
Tin Shing Court
Tsui Sing Lau Pagoda
Fung Ka Wai
Hang Mei Tsuen
Pak Fa Tsuen
Ng Uk Tsuen
Shing Uk Tsuen
Tai Tseng Wai
Yeung Uk Tsuen
Yeung Uk San Tsuen
Long Ping Estate
Shui Tin Tsuen
Fung Chi Tsuen
Chun Ping San Tsuen
Shui Pin Wai Estate
Tai Shu Tsuen
Tuccie Square
Tung Tau Wai
Chung Sam Wai
Tai Tau Wai
Tung Tau Tsuen
Shing Temple
Wing Ning Tsuen
Tin Tsz Estate
Ha Mei San Tsuen

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SCALE 比例: A3 1 : 10000
DIMENSION UNIT 尺寸單位: METERS

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60587364
AGREEMENT NO. 協議編號: CE 11/2018 (CE)

SHEET TITLE
圖紙名稱
EXISTING CATCHMENT BOUNDARY

SHEET NUMBER
圖紙編號
FIGURE 6.1

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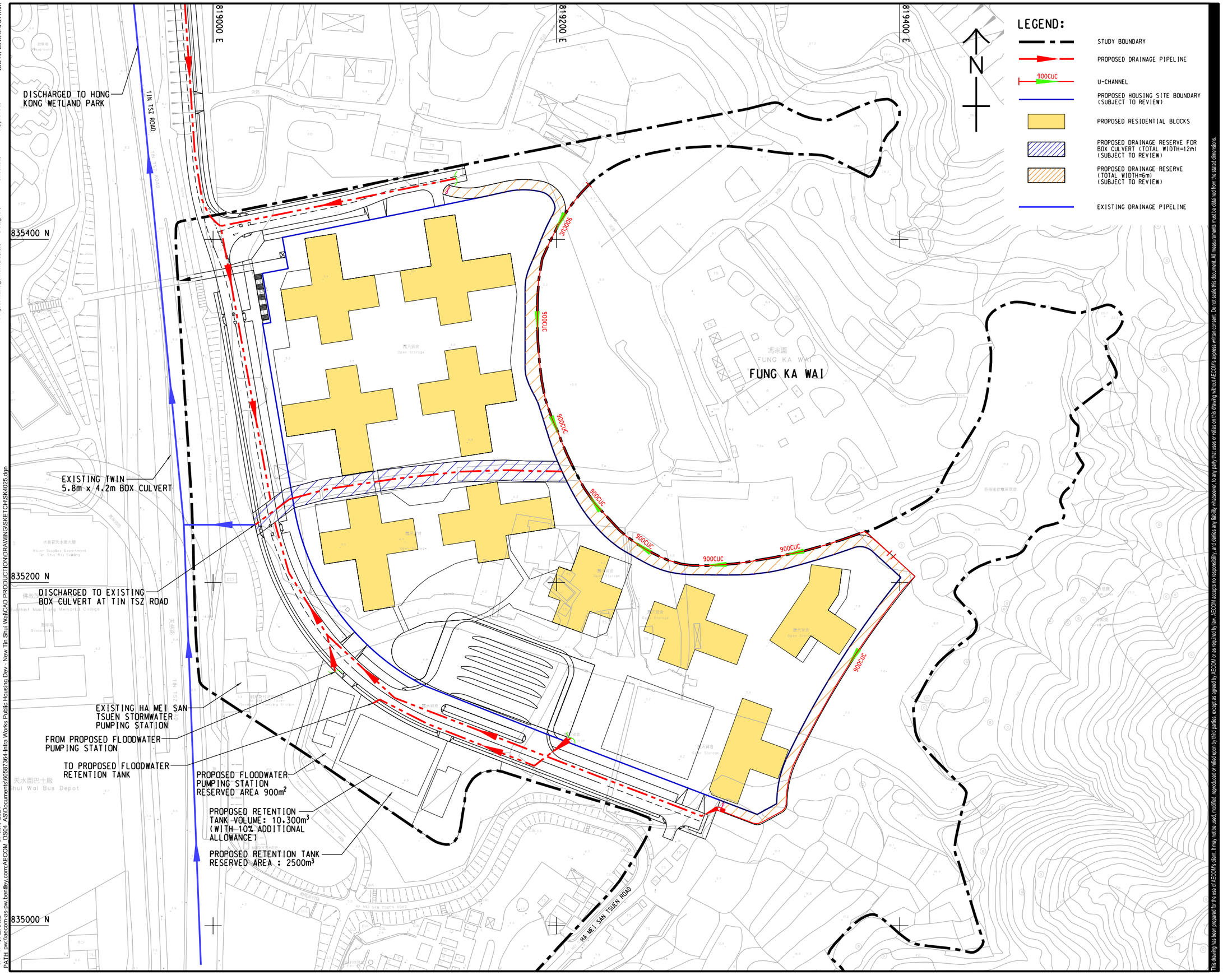

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SCALE 比例 A3 1 : 2000

DIMENSION UNIT 尺寸單位 METERS

KEY PLAN
索引圖

PROJECT NO. 項目編號 60587364

AGREEMENT NO. 協議編號 CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

PROPOSED DRAINAGE SCHEME

SHEET NUMBER
圖紙編號

FIGURE 6.2

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Designer:

Project Management Initials:

LEGEND:

- STUDY BOUNDARY
- EXISTING SEWERAGE PIPELINE (MAIN LINE)
- DISCHARGE ROUTE FROM SITE TO SAN WAI SEWAGE TREATMENT WORKS (EXISTING PIPELINE)
- PROPOSED WORKS BOUNDARY (SUBJECT TO REVIEW)
- PROPOSED HOUSING SITE BOUNDARY (SUBJECT TO REVIEW)
- 600Ø PROPOSED SEWERAGE PIPELINE
- EXISTING SEWERAGE FACILITIES
- PROPOSED RESIDENTIAL BLOCKS
- PROPOSED PUBLIC TRANSPORT INTERCHANGE
- PROPOSED SEWAGE PUMPING STATION

815800 E

817800 E

819800 E

834800 N

832800 N

N

DEEP BAY
(SHENZHEN WAN)

TIN WAH ROAD SEWAGE PUMPING STATION

DETAIL '1'

FMH1023763

SITE AREA

PROPOSED SEWAGE PUMPING STATION

TIN SHUI WAI

TIN SHUI WAI TIN CHUK STREET SEWAGE PUMPING STATION

HA MEI SAN TSUEN SEWAGE PUMPING STATION

FMH1023740

EXISTING SAN WAI SEWAGE TREATMENT WORKS

HA TSUEN

DISCHARGE TO FMH1009269 AT I.L. +0.74mPD

HA TSUEN SEWAGE PUMPING STATION

NWNT EFFLUENT TUNNEL

HUNG SHUI KIU

YUEN LONG

DETAIL '1'
SCALE 1 : 5000

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SCALE 比例: A3 1 : 20000

DIMENSION UNIT 尺寸單位: METERS

KEY PLAN
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PROJECT NO. 項目編號: 60587364

AGREEMENT NO. 協議編號: CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

PROPOSED DISCHARGE ROUTE FROM SITE TO SAN WAI SEWAGE TREATMENT WORKS

SHEET NUMBER
圖紙編號

FIGURE 7.1

ISO A1 594mm x 841mm

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Designer:

Project Management Initials:

831800 N

832800 N

833800 N

834800 N

816800 E

817800 E

818800 E

LEGEND:

STUDY BOUNDARY

PROPOSED DEVELOPMENT AREA (SUBJECT TO REVIEW)

200 FRESH WATER MAIN BY HSK/HT NDA DEVELOPMENT

DN600 FRESH WATER MAIN (BY PUBLIC HOUSING DEVELOPMENT NEAR TSW)

JUNCTION ID

AW PHASE 1

HUNG SHUI KIU

HA TSUEN

TIN SHUI WAI

PING SHAN

CASTLE PEAK ROAD

LONG SHAM WESTERN HIGHWAY

YUEN LONG HIGHWAY

TSING SHAN FIRING RANGE BOUNDARY

YUEN TAU SHAN

CONNECT TO PROPOSED WATER MAIN BY HSK/HT NDA TO PROPOSED RESERVOIR

DN600

DN600

TAN KWAI TSUEN EAST
FRESH WATER SERVICE RESERVOIR
(BY HSK NDA) WITH PHASE 1 CAPACITY INCREASE
FROM 38.410m³ TO 44.534m³ TO CATER FOR
THE ADDITIONAL FRESH WATER DEMAND
FROM THE PROPOSED PUBLIC HOUSING
DEVELOPMENT NEAR TIN SHUI WAI

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階段

SCALE 比例: A3 1:16000

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60587364

AGREEMENT NO. 協議編號: CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

PROPOSED FRESH WATER SUPPLY SCHEME - OPTION 1

SHEET NUMBER
圖紙編號

FIGURE 8.1

ISO A1 594mm x 841mm

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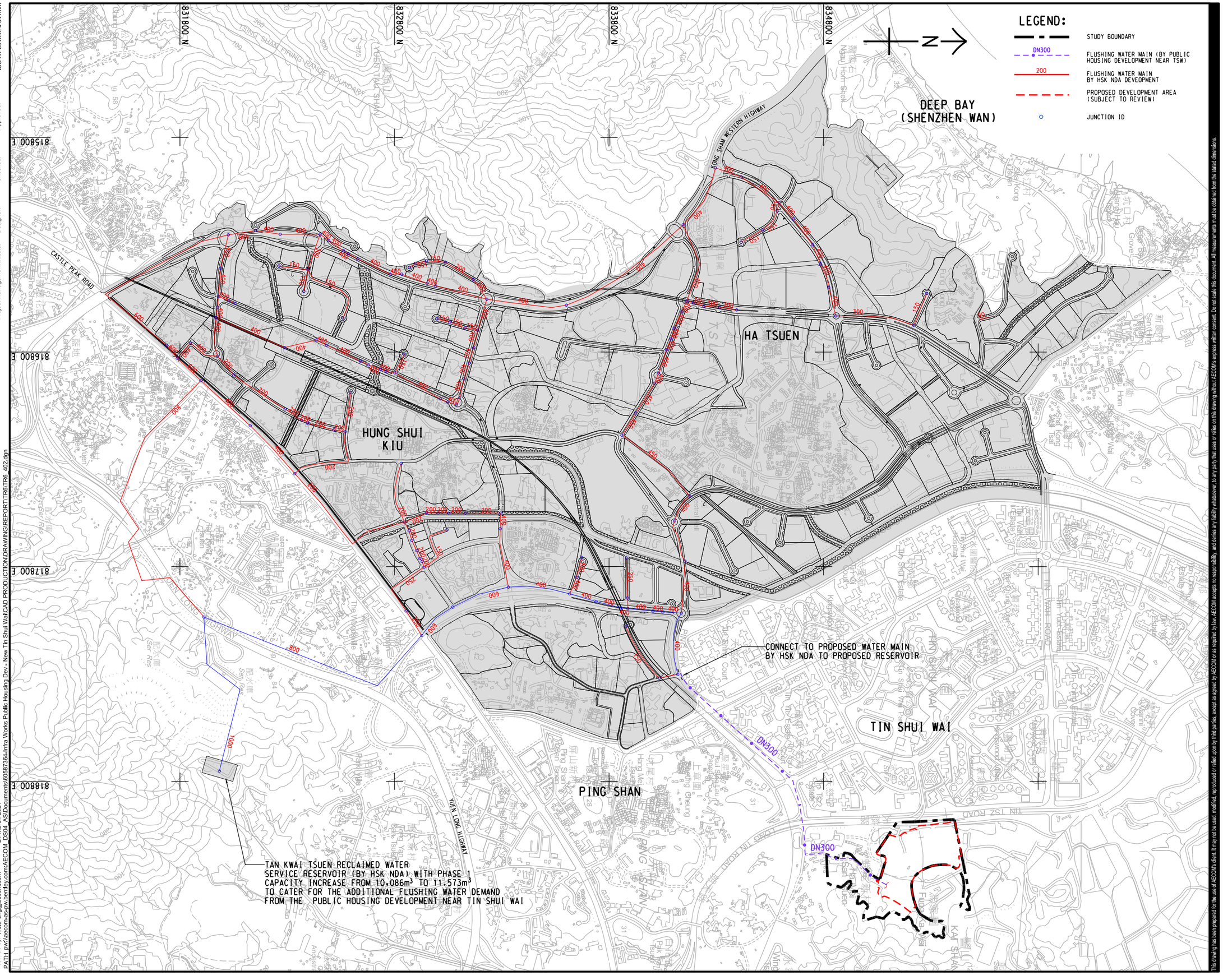

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SCALE 比例
A3 1:16000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60587364

AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱
PROPOSED FLUSHING WATER SUPPLY SCHEME - OPTION 1

SHEET NUMBER
圖紙編號
FIGURE 8.2

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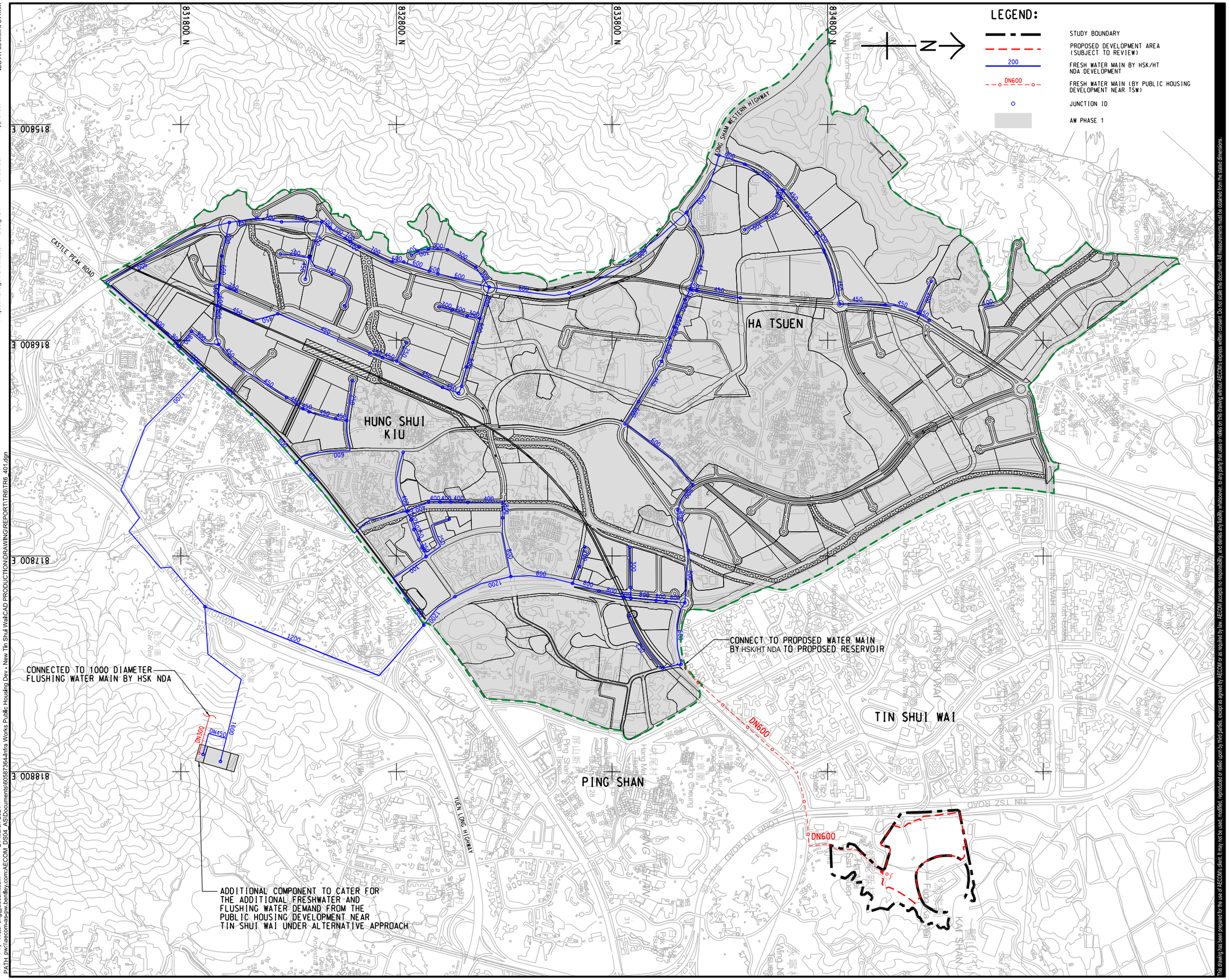

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SCALE 比例
A3 1:16000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
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PROJECT NO. 項目編號
60587364

AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

PROPOSED FRESH WATER AND FLUSHING WATER SUPPLY SCHEME - OPTION 2

SHEET NUMBER
圖紙編號

FIGURE 8.3

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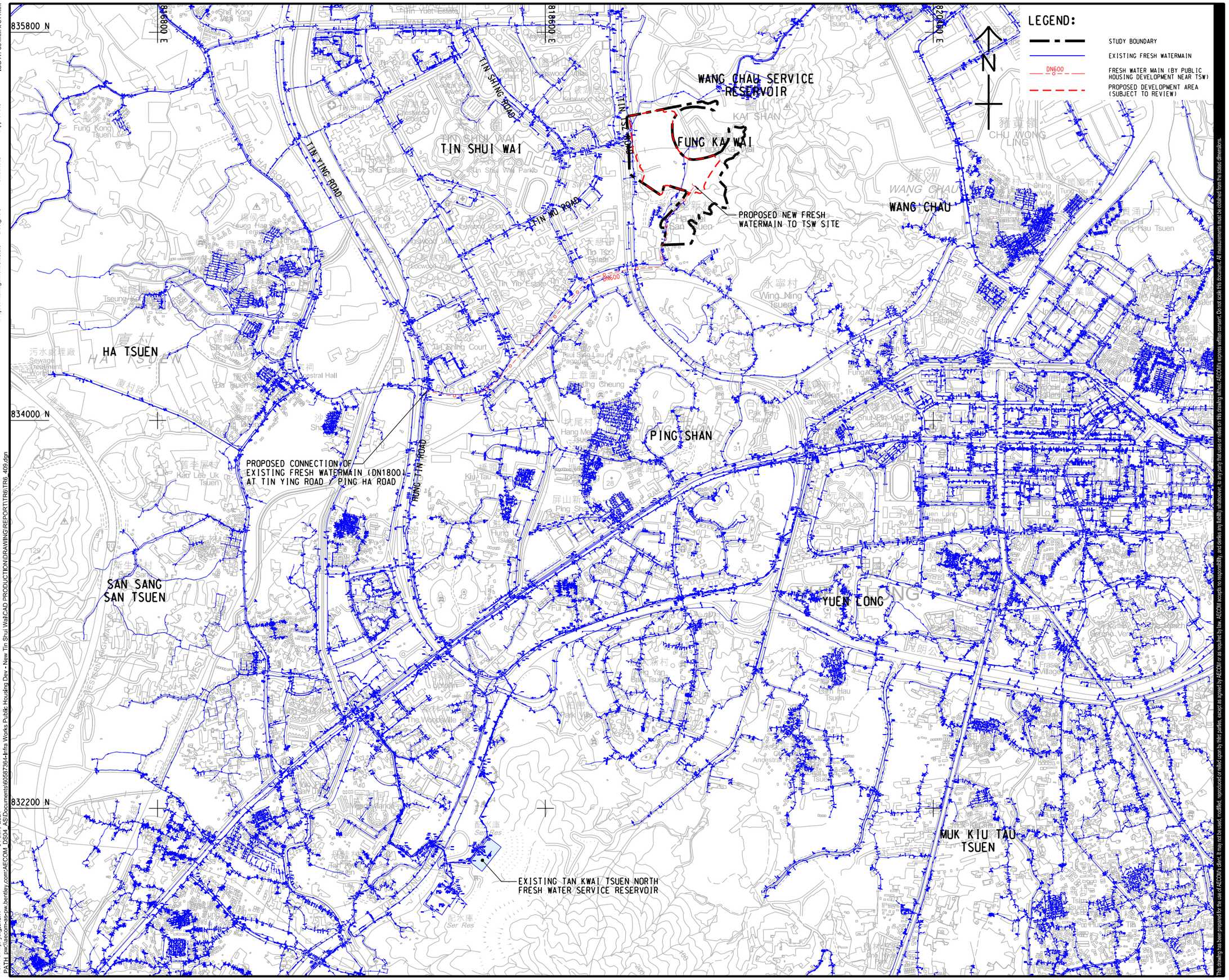

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SCALE 比例 A3 1 : 16000

DIMENSION UNIT 尺寸單位 METERS

KEY PLAN
索引圖

PROJECT NO. 項目編號 60587364

AGREEMENT NO. 協議編號 CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

PROPOSED FRESH WATER SUPPLY SCHEME - OPTION 4

SHEET NUMBER
圖紙編號

FIGURE 8.4

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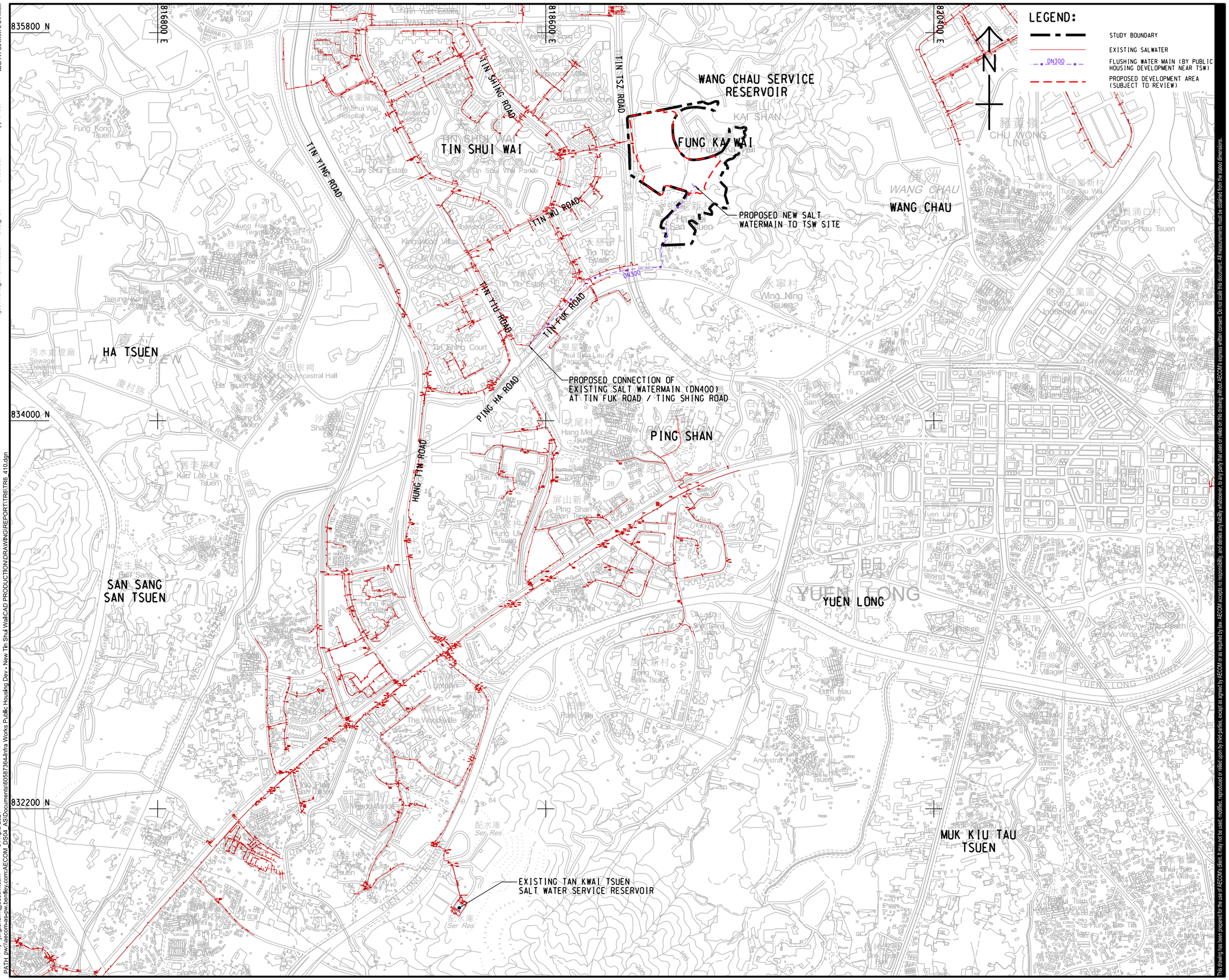

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WUD

SCALE
比例

A3 1 : 16000

DIMENSION UNIT
尺寸單位

METERS

KEY PLAN
索引圖

PROJECT NO.
項目編號

60587364

AGREEMENT NO.
協議編號

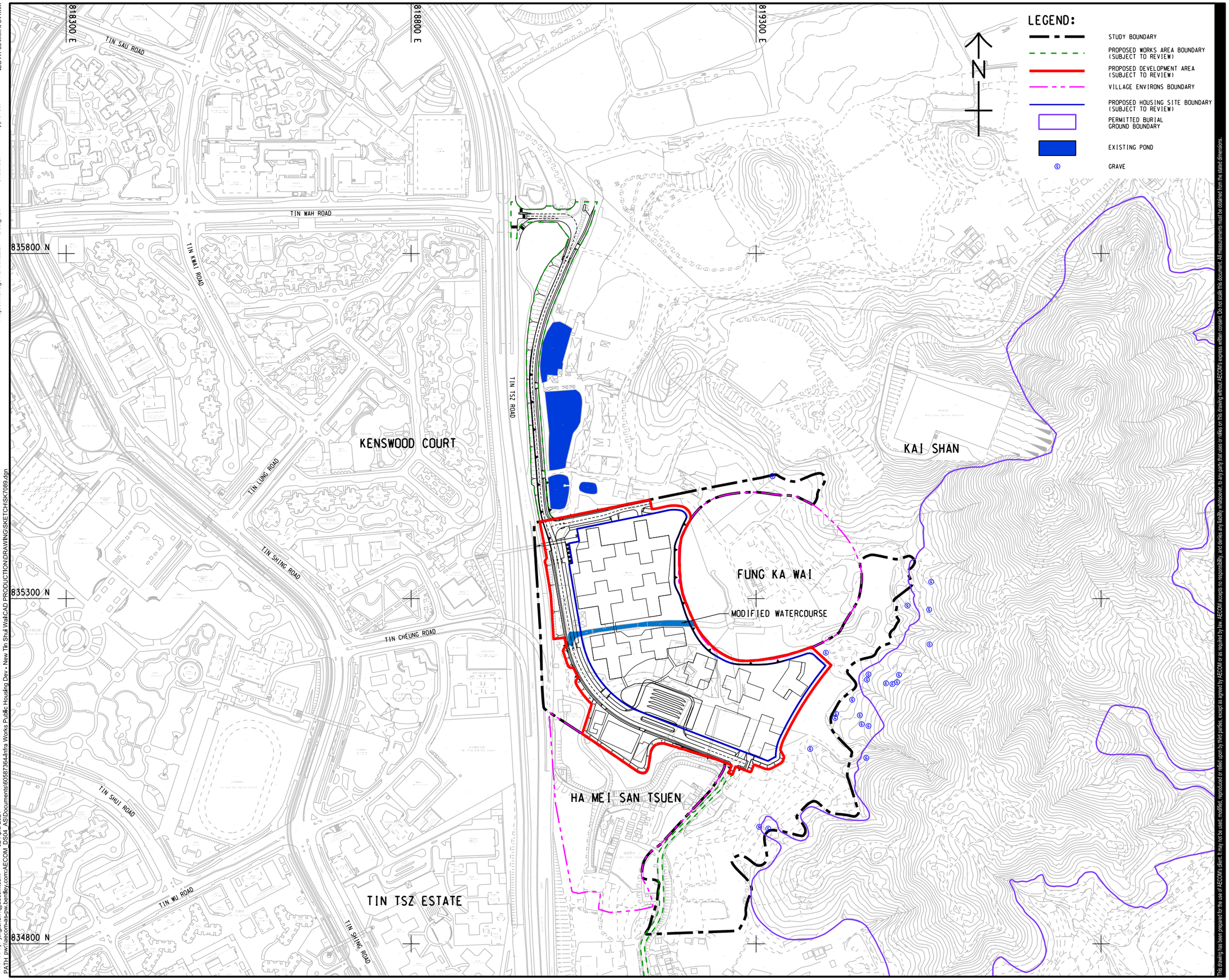
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

PROPOSED FLUSHING WATER SUPPLY SCHEME - OPTION 4

SHEET NUMBER
圖紙編號

FIGURE 8.5



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SCALE 比例
A3 1 : 5000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
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SHEET TITLE
圖紙名稱
LAND FEATURES

SHEET NUMBER
圖紙編號
FIGURE 9.1

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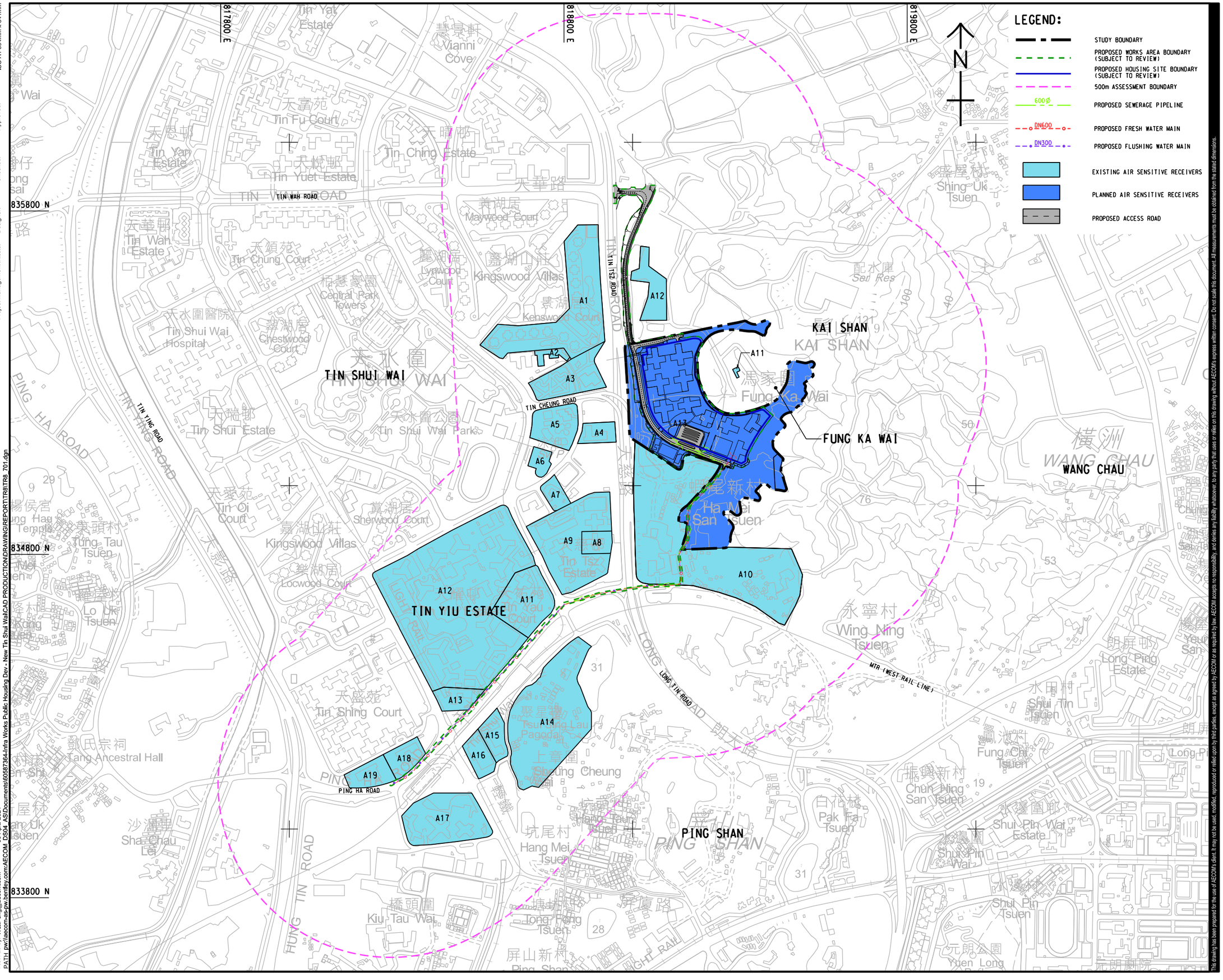

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PROJECT
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR PROPOSED PUBLIC HOUSING DEVELOPMENT NEAR TIN SHUI WAI - FEASIBILITY STUDY

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STATUS

SCALE: A3 1 : 10000
DIMENSION UNIT: METRES

KEY PLAN

PROJECT NO.: 60587364
AGREEMENT NO.: CE 11/2018 (CE)

SHEET TITLE
LOCATIONS OF REPRESENTATIVE AIR SENSITIVE RECEIVERS

SHEET NUMBER
FIGURE 10.1

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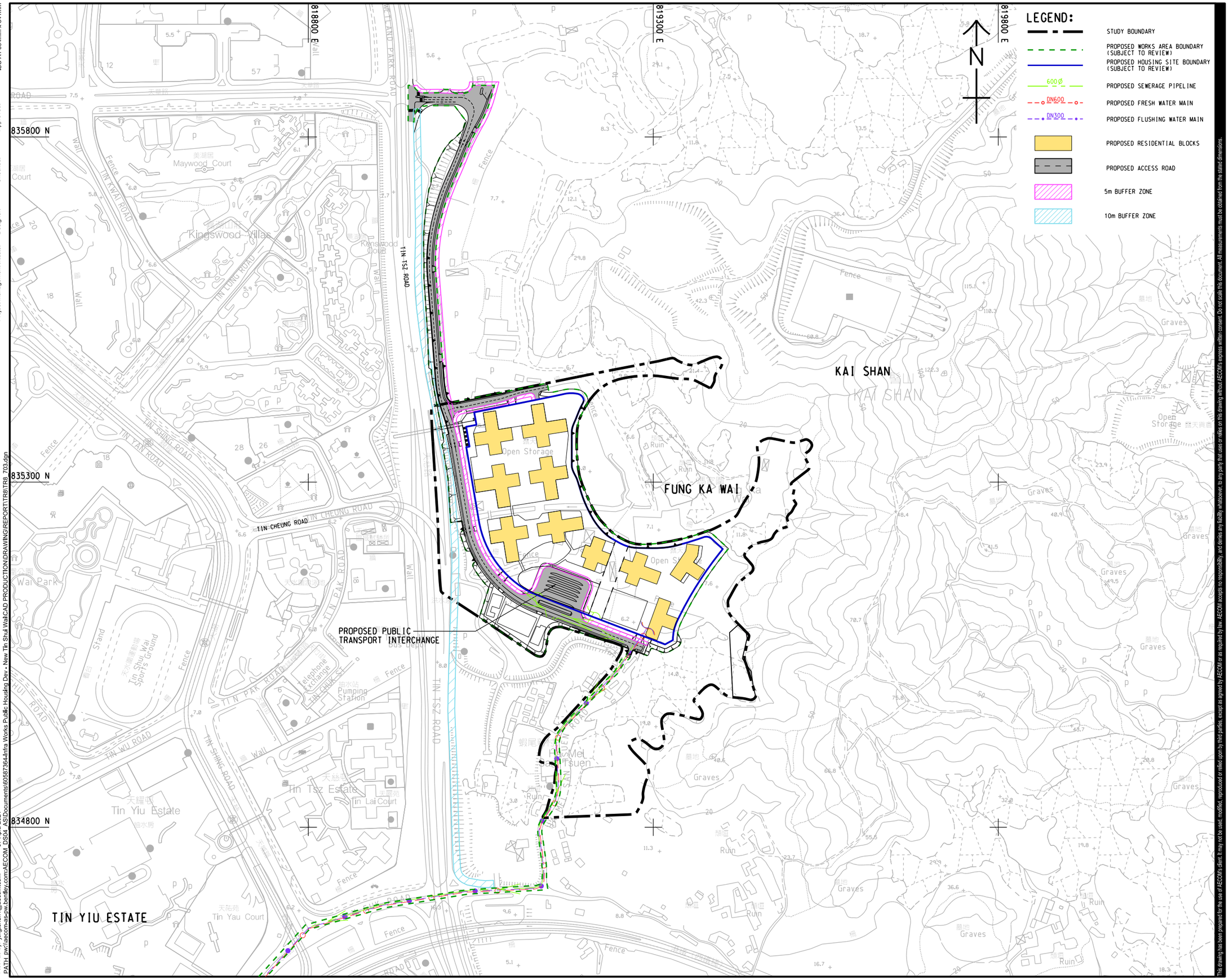

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STATUS
階段

SCALE 比例: A3 1 : 5000

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60587364

AGREEMENT NO. 協議編號: CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

RECOMMENDED BUFFER ZONES

SHEET NUMBER
圖紙編號

FIGURE 10.2

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ISO A1 594mm x 841mm

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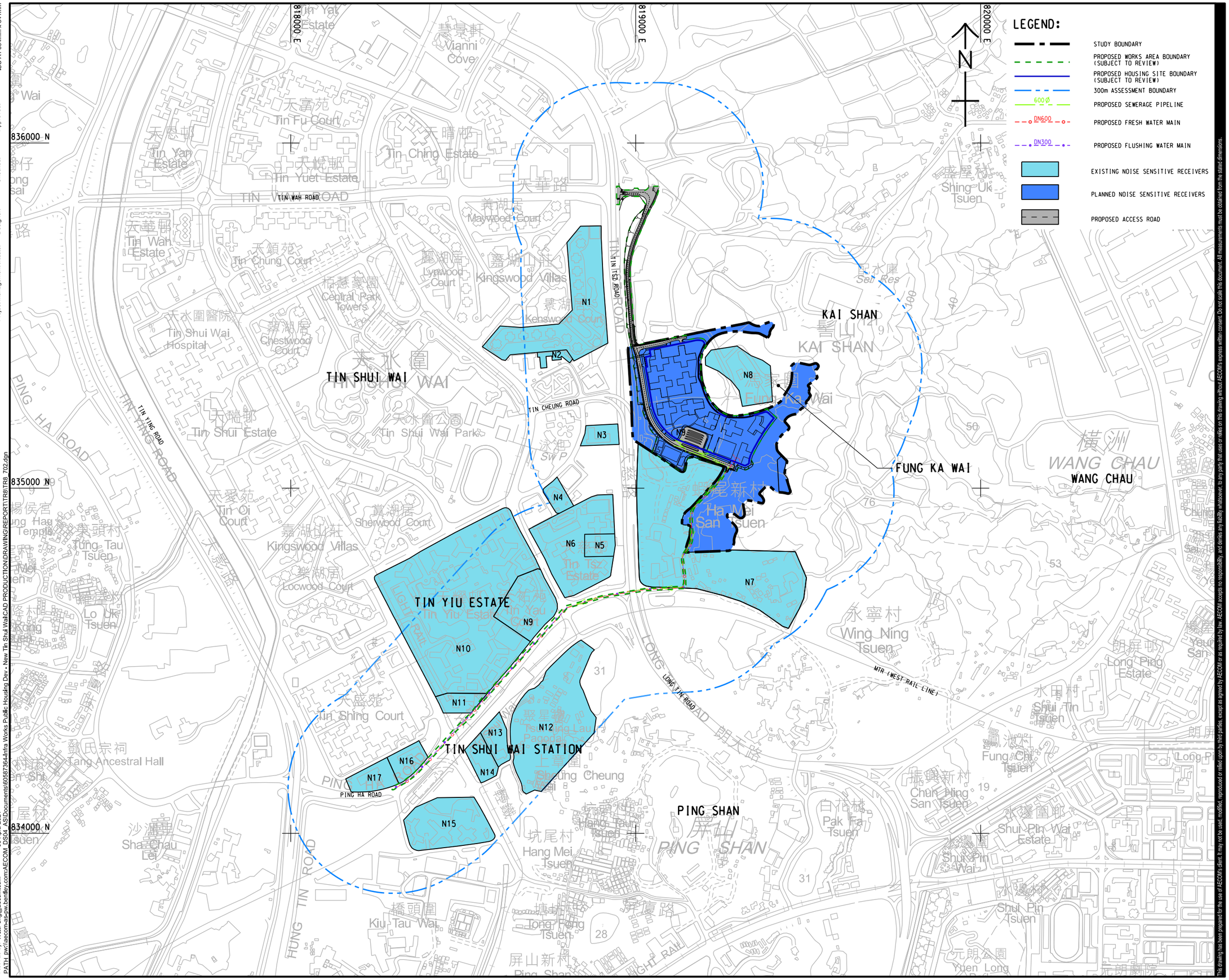

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階段

SCALE 比例
A3 1 : 10000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60587364

AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

LOCATIONS OF REPRESENTATIVE NOISE SENSITIVE RECEIVERS

SHEET NUMBER
圖紙編號

FIGURE 10.3

ISO A1 594mm x 841mm

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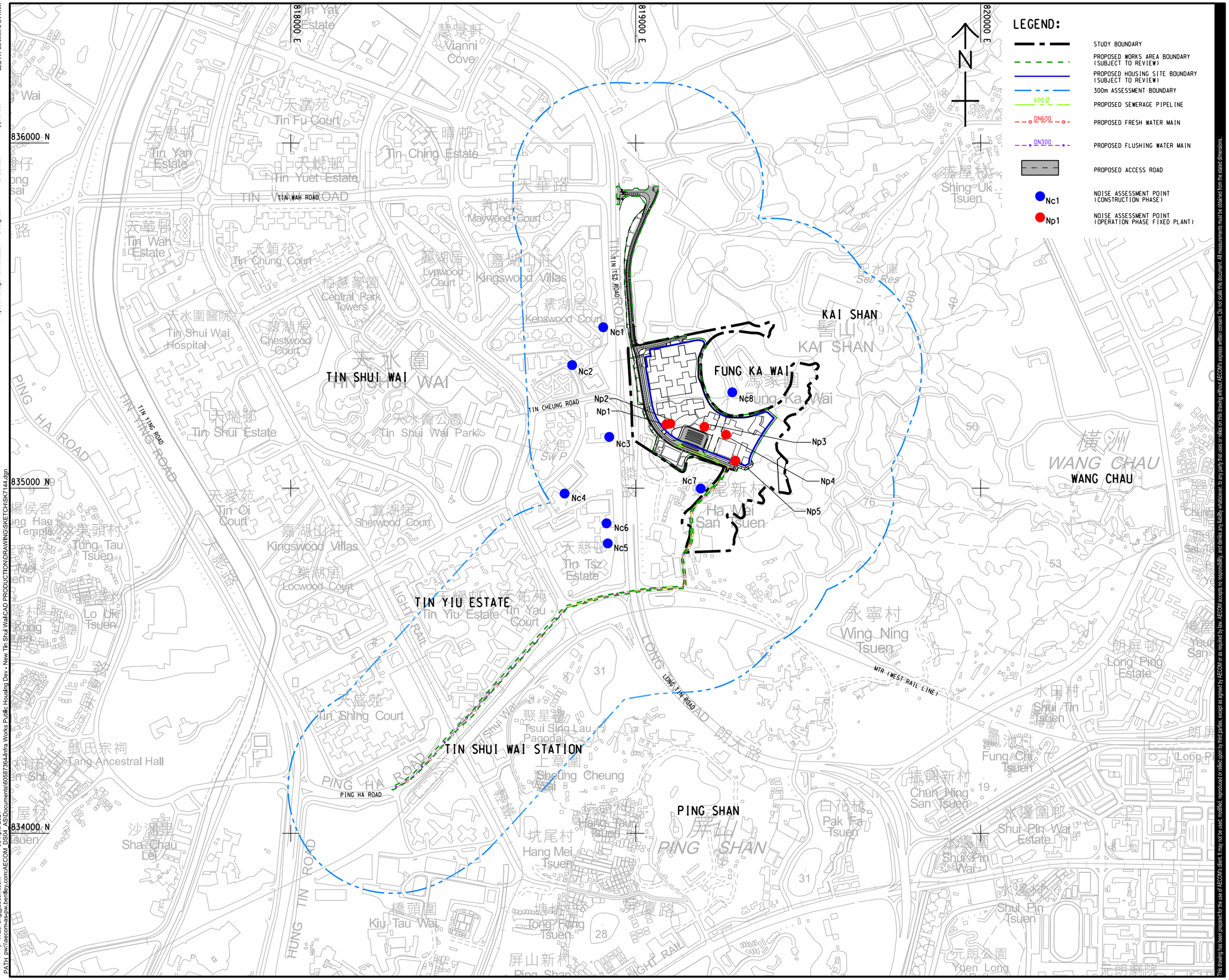

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SCALE 比例
A3 1 : 10000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60587364

AGREEMENT NO. 協議編號
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SHEET TITLE
圖紙名稱

LOCATIONS OF NOISE ASSESSMENT POINT- CONSTRUCTION AND FIXED PLANT

FIGURE 10.4

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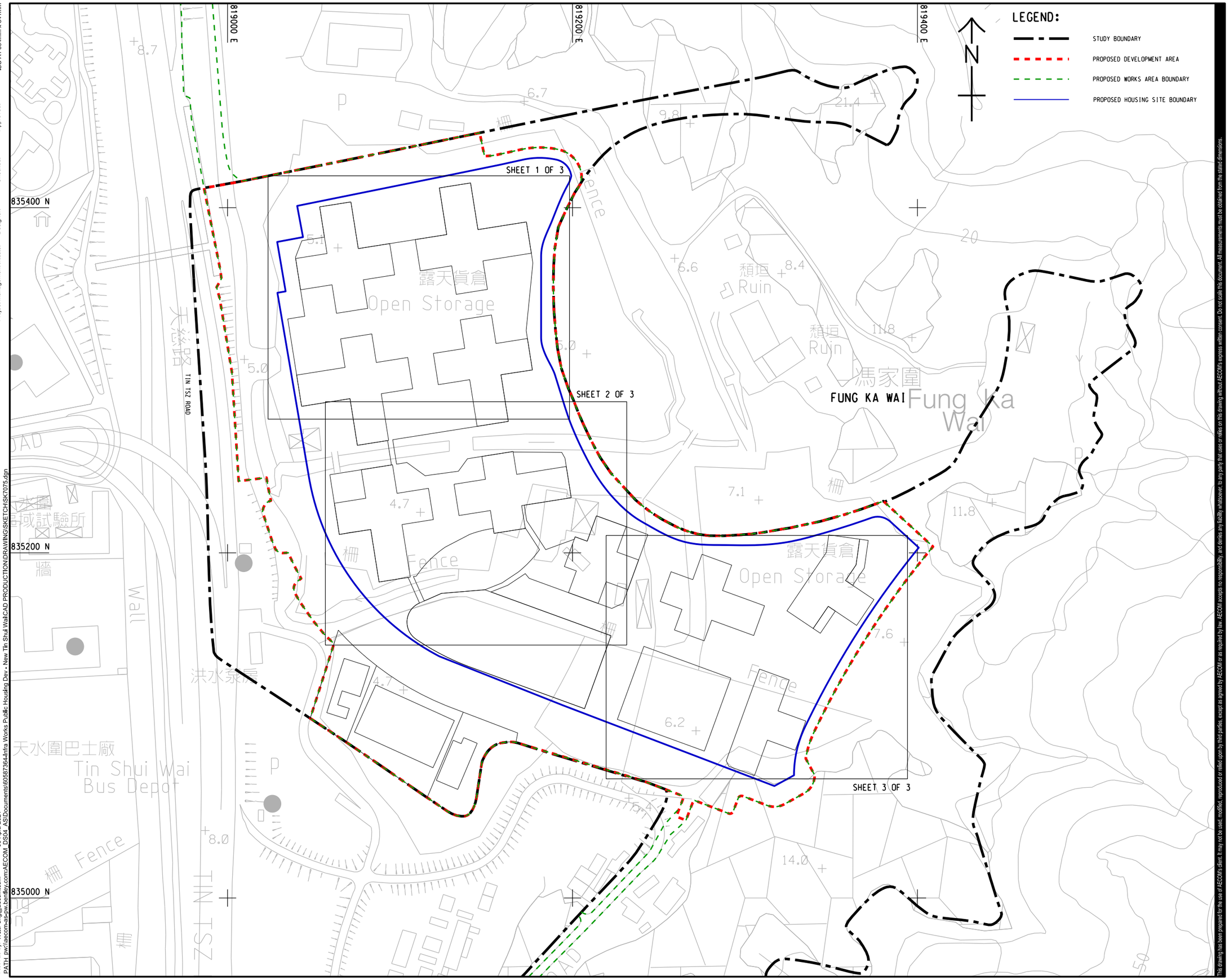

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SCALE 比例: A3 1 : 2000

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60587364

AGREEMENT NO. 協議編號: CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

LOCATIONS OF NOISE ASSESSMENT POINT - ROAD TRAFFIC - KEY PLAN

SHEET NUMBER
圖紙編號

FIGURE 10.5

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ISO A1 594mm x 841mm

Approved:

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Designer:

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819050 E

819100 E

819150 E

835400 N

835350 N

835300 N

PB7-R001 PB7-R002 PB7-R003 PB7-R004 PB7-R005 PB7-R006 PB7-R007 PB7-R008 PB7-R009 PB7-R010 PB7-R011 PB7-R012 PB7-R013 PB7-R014 PB7-R015 PB7-R016 PB7-R017 PB7-R018 PB7-R019 PB7-R020 PB7-R021 PB7-R022 PB7-R023 PB7-R024 PB7-R025 PB7-R026 PB7-R027 PB7-R028 PB7-R029 PB7-R030 PB7-R031 PB7-R032 PB7-R033 PB7-R034 PB7-R035 PB7-R036 PB7-R037 PB7-R038 PB7-R039 PB7-R040 PB7-R041

PB6-R001 PB6-R002 PB6-R003 PB6-R004 PB6-R005 PB6-R006 PB6-R007 PB6-R008 PB6-R009 PB6-R010 PB6-R011 PB6-R012 PB6-R013 PB6-R014

PB4-R001 PB4-R002 PB4-R003 PB4-R004 PB4-R005 PB4-R006 PB4-R007 PB4-R008 PB4-R009 PB4-R010 PB4-R011 PB4-R012 PB4-R013 PB4-R014 PB4-R015 PB4-R016 PB4-R017 PB4-R018 PB4-R019 PB4-R020 PB4-R021 PB4-R022 PB4-R023 PB4-R024 PB4-R025 PB4-R026 PB4-R027 PB4-R028 PB4-R029 PB4-R030 PB4-R031 PB4-R032 PB4-R033 PB4-R034 PB4-R035 PB4-R036 PB4-R043 PB4-R044 PB4-R045

露天貨倉

Open Storage

CUT LINE A-A

SEE DRAWING NO. 60587364/SK7077

N

NOTE:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60587364/SK7076 TO SK7078.

LEGEND:

STUDY BOUNDARY

PB6-R001 NOISE ASSESSMENT POINT

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STATUS
階段

SCALE
比例

A3 1 : 500

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60587364

AGREEMENT NO.
協議編號

CE 11/2018 (CE)

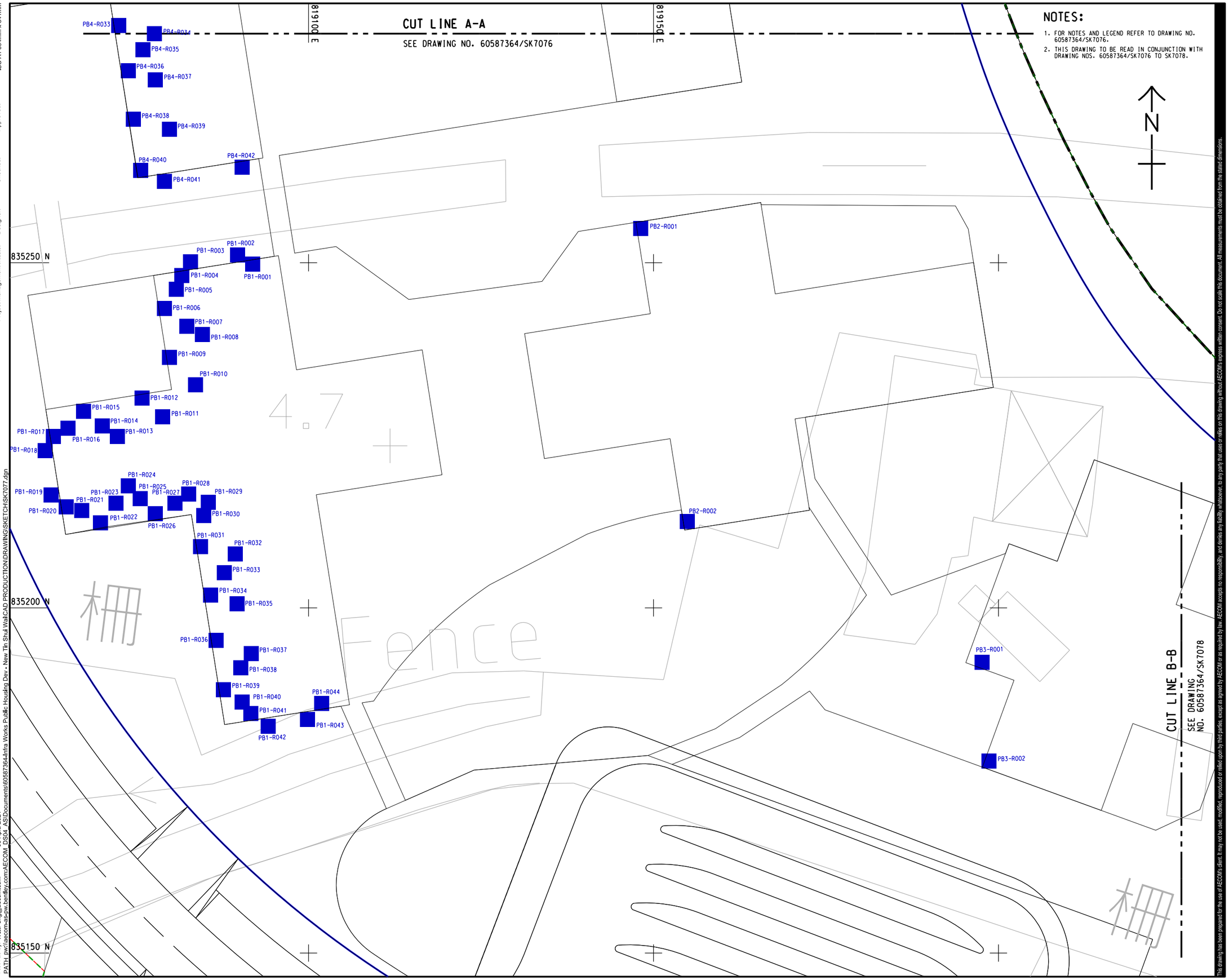
SHEET TITLE
圖紙名稱

LOCATION OF NOISE ASSESSMENT POINT - ROAD TRAFFIC

SHEET 1 OF 3

SHEET NUMBER
圖紙編號

FIGURE 10.6



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階段

SCALE 比例: A3 1 : 500

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60587364

AGREEMENT NO. 協議編號: CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

LOCATION OF NOISE ASSESSMENT POINT - ROAD TRAFFIC

SHEET 2 OF 3

SHEET NUMBER
圖紙編號

FIGURE 10.7

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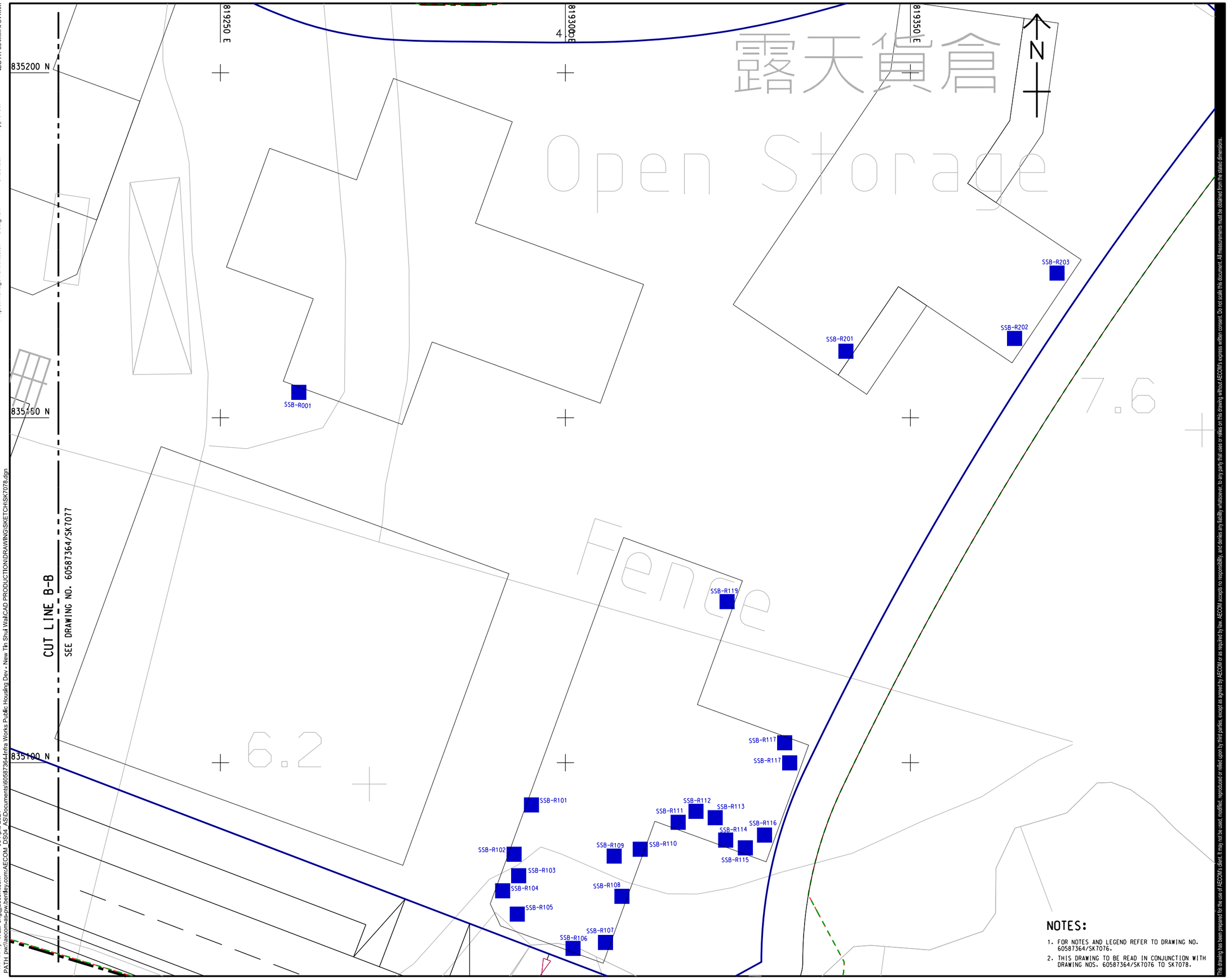

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STATUS 狀況

SCALE 比例
A3 1 : 500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號
60587364

AGREEMENT NO. 協議編號
CE 11/2018 (CE)

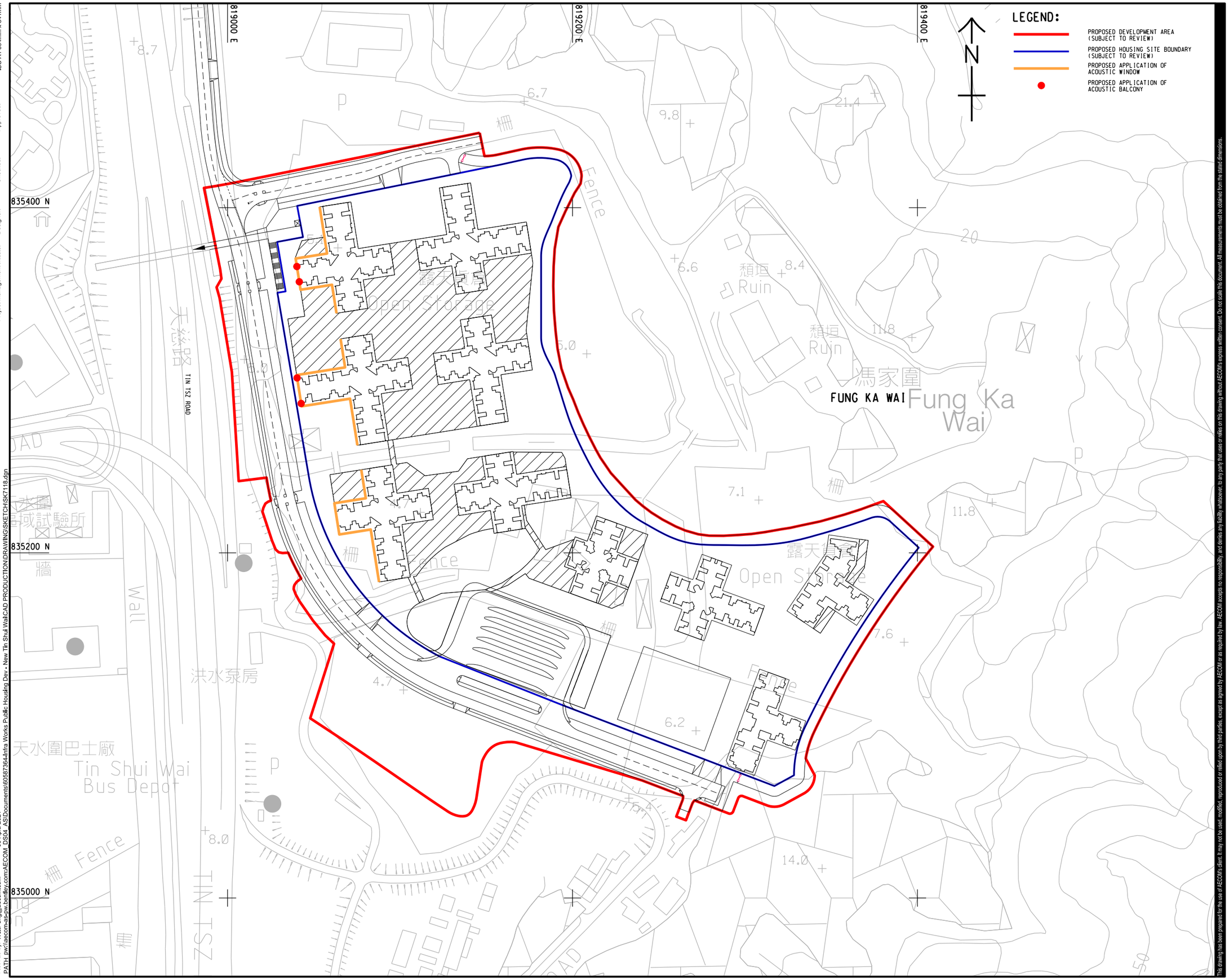
SHEET TITLE 圖紙名稱

LOCATION OF NOISE ASSESSMENT POINT - ROAD TRAFFIC

SHEET 3 OF 3

SHEET NUMBER 圖紙編號

FIGURE 10.8



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SCALE 比例: A3 1 : 2000

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60587364

AGREEMENT NO. 協議編號: CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

PROPOSED NOISE MITIGATION MEASURES

SHEET NUMBER
圖紙編號

FIGURE 10.9

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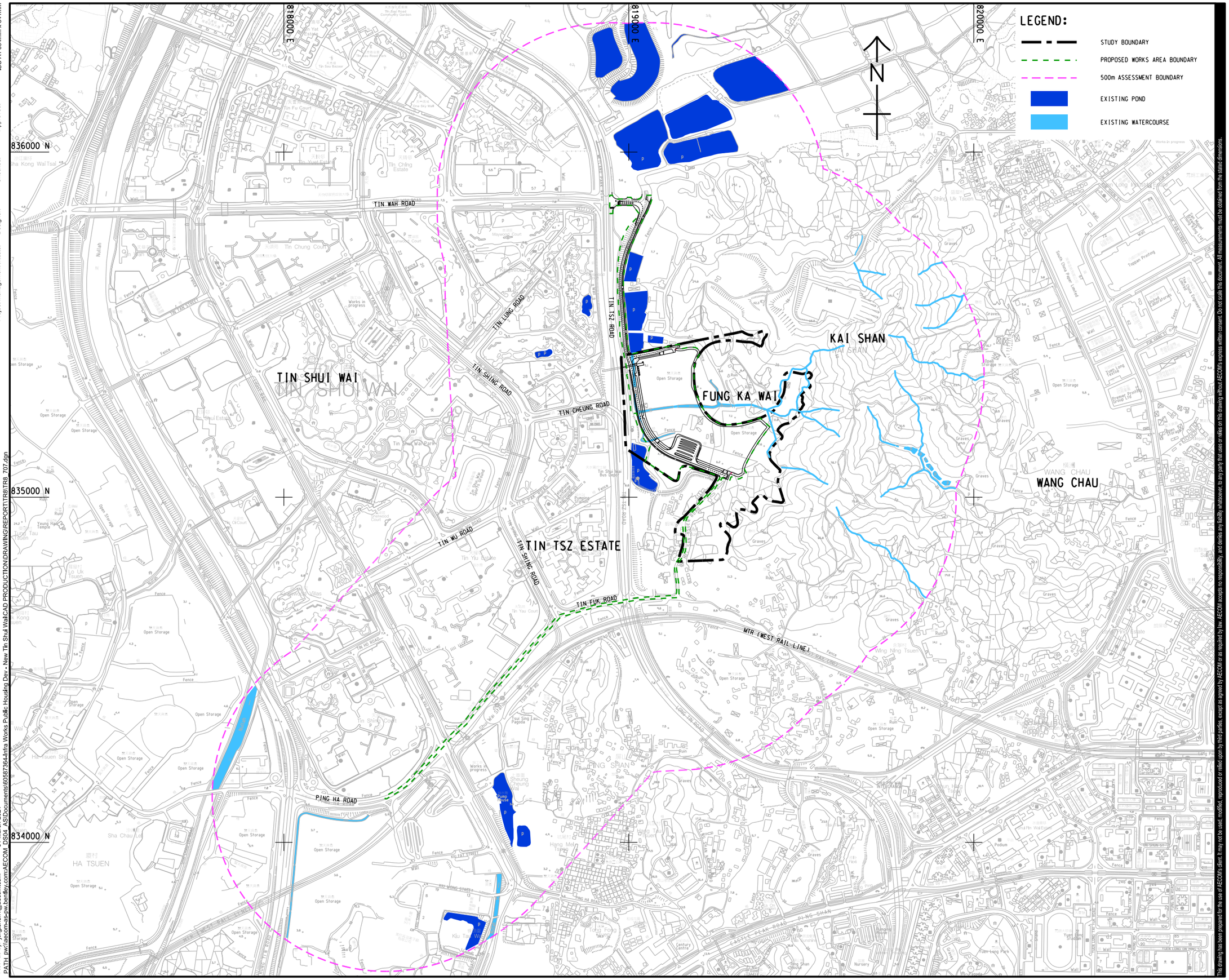

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SCALE 比例
A3 1 : 10000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
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PROJECT NO. 項目編號
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AGREEMENT NO. 協議編號
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SHEET TITLE
圖紙名稱

LOCATIONS OF EXISTING WATERCOURSES

SHEET NUMBER
圖紙編號

FIGURE 10.10

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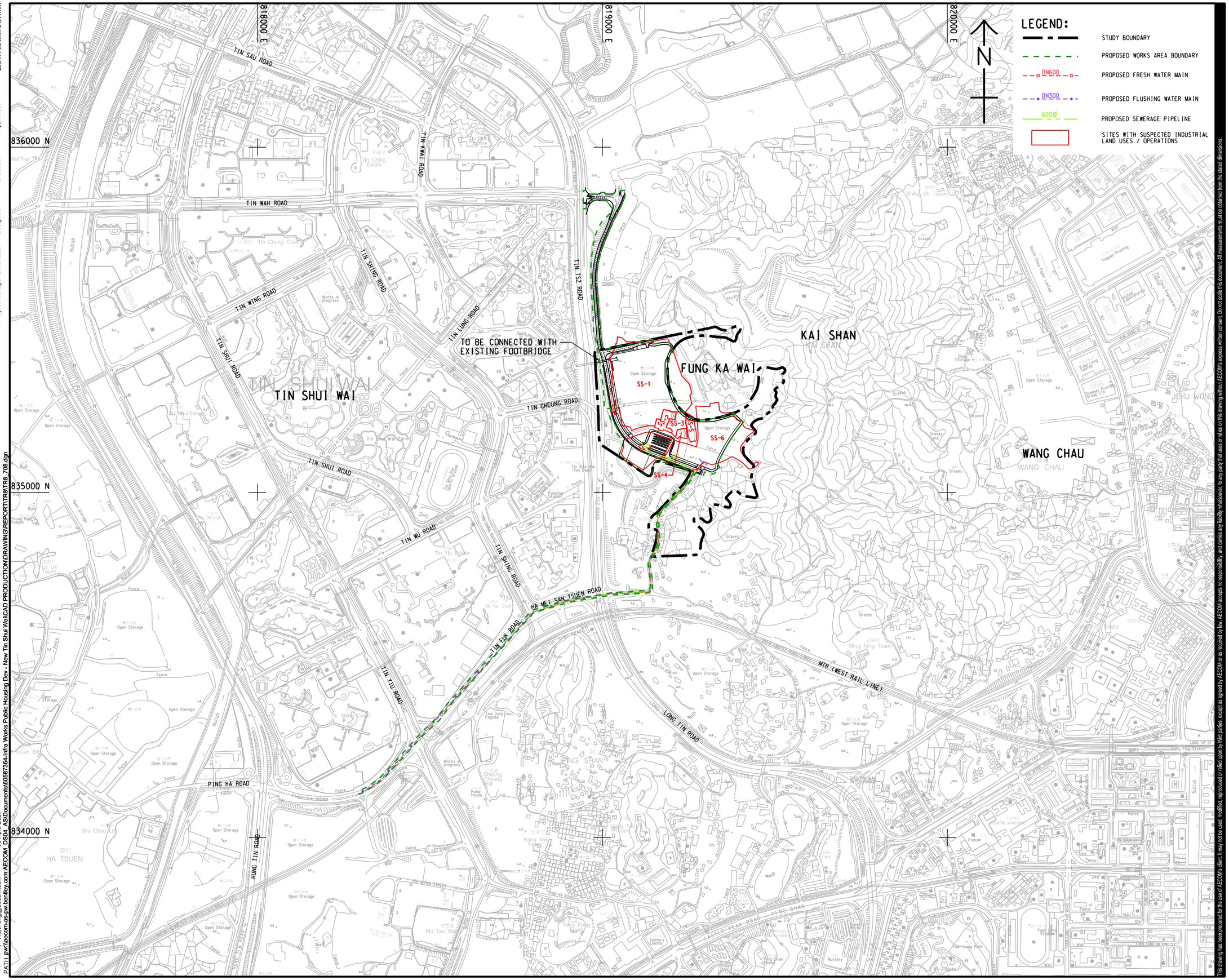

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SCALE 比例
A3 1 : 10000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60587364

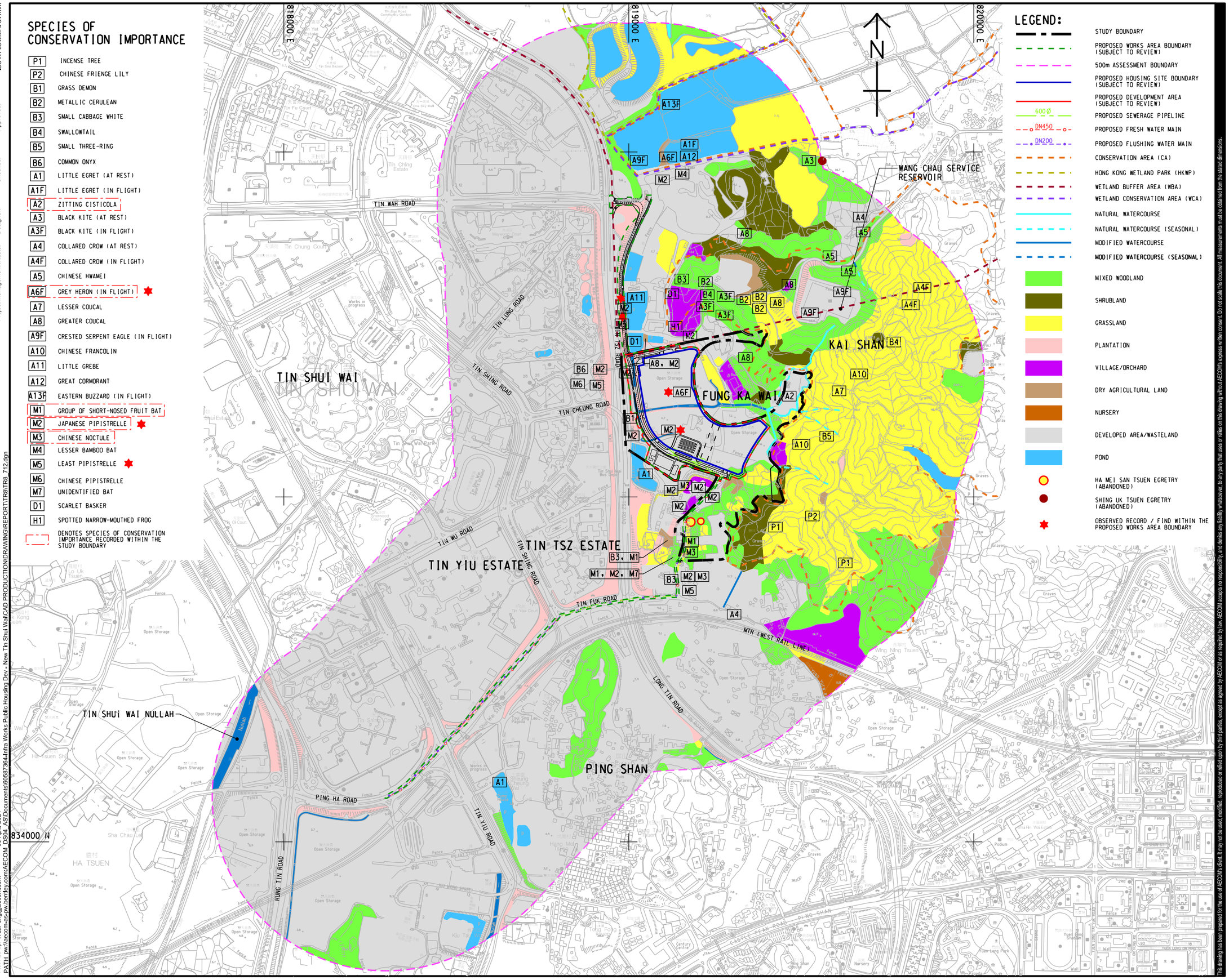
AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

LOCATIONS OF SITES WITH SUSPECTED INDUSTRIAL LAND USES / OPERATIONS

SHEET NUMBER
圖紙編號

FIGURE 10.11



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PROJECT
項目

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR PROPOSED PUBLIC HOUSING DEVELOPMENT NEAR TIN SHUI WAI - FEASIBILITY STUDY

CLIENT
業主

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CEDD Civil Engineering and Development Department

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I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE
比例
A3 1 : 10000

DIMENSION UNIT
尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號
60587364

AGREEMENT NO.
協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

HABITAT MAP AND LOCATIONS OF SPECIES OF CONSERVATION IMPORTANCE RECORDED

SHEET NUMBER
圖紙編號

FIGURE 10.12

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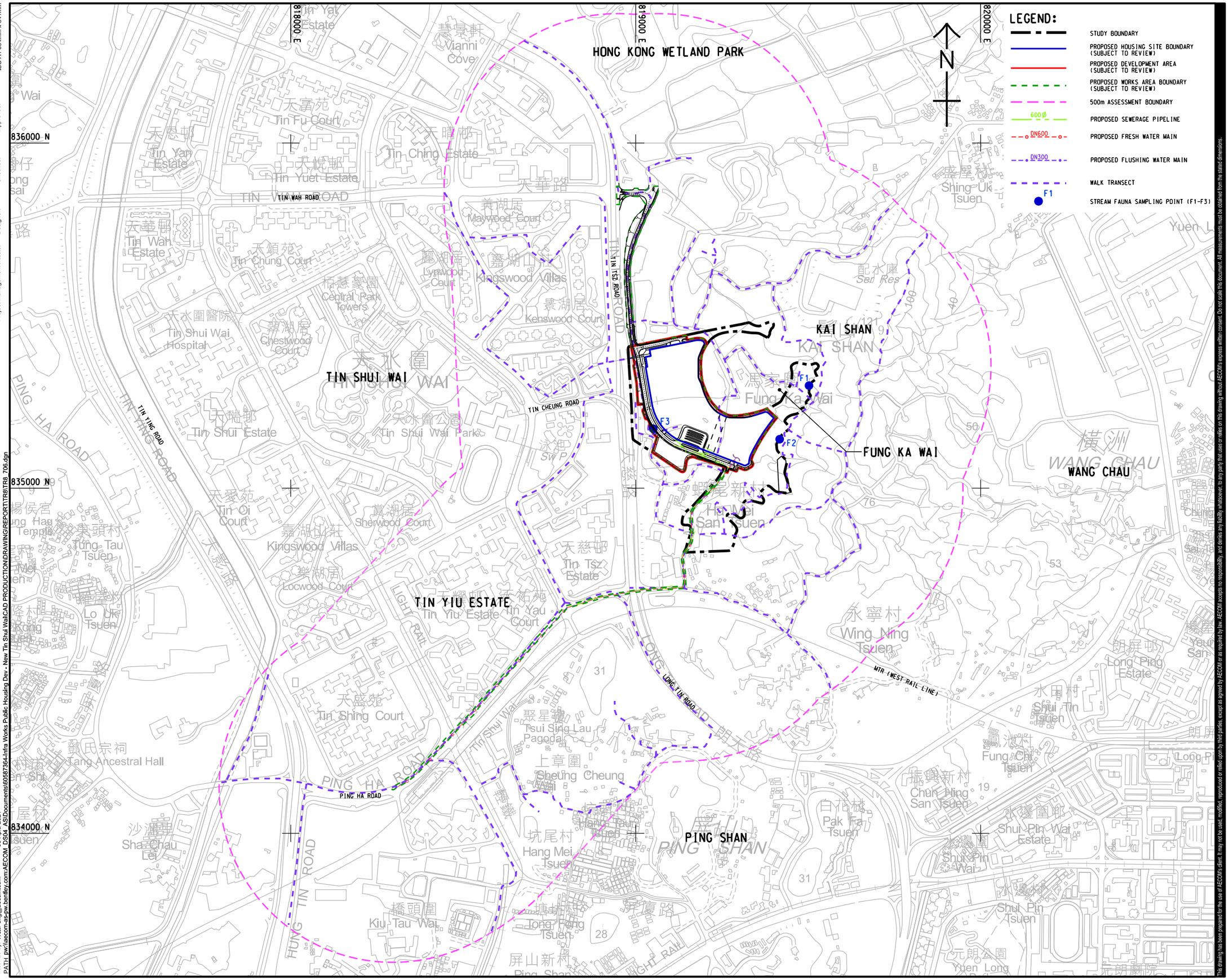

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STATUS
現狀

SCALE 比例
A3 1 : 10000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60587364

AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

ASSESSMENT AREA AND LOCATIONS OF ECOLOGICAL SURVEYS

SHEET NUMBER
圖紙編號

FIGURE 10.13

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818000 E
815000 E
820000 E
836000 N
835000 N
834000 N

TIN SAU ROAD
TIN WAH ROAD
TIN WAI ROAD
TIN WING ROAD
TIN SHUI ROAD
TIN SHING ROAD
TIN TSZ ROAD
TIN LUNG ROAD
TIN CHEUNG ROAD
TIN WU ROAD
HA MEI SAN TSUEN ROAD
LIN FA ROAD
TIN TIU ROAD
PING HA ROAD
HUNG TIN ROAD
LONG TIN ROAD
CASTLE PEAK ROAD
MTR WEST RAIL LINE

TIN SHUI WAI
KAI SHAN
WANG CHAU
PING SHAN
HA TSUEN

TO BE CONNECTED WITH EXISTING FOOTBRIDGE
FUNG KA WAI
NOS 7-16 FUNG KA WAI (NIL GRADE BUILDING)
SHRINE OF FUNG KA WAI
SHRINE OF HA MEI SAN TSUEN
NOS 13-19 HA MEI SAN TSUEN (GRADE 3)
NO. 27 HA MEI SAN TSUEN
TSUI SING LAU PAGODA (DECLARED MONUMENT)
TAT TAK COMMUNAL HALL (DECLARED MONUMENT)
SHEUNG CHEUNG WAI SITE OF ARCHAEOLOGICAL INTEREST
SHRINE - SHEUNG CHEUNG WAI
SHRINE OF THE EARTH GOD
ENTRANCE GATE, SHEUNG CHEUNG WAI (NIL-GRADE)
OLD WELL
YEUNG HAU TEMPLE (SHEUNG CHEUNG WAI) (GRADE 3)

N

LEGEND:

- STUDY BOUNDARY
- PROPOSED WORKS AREA BOUNDARY
- 500m ASSESSMENT BOUNDARY
- DN450 — PROPOSED FRESH WATER MAIN
- DN300 — PROPOSED FLUSHING WATER MAIN
- 600Ø — PROPOSED SEWERAGE PIPELINE
- PROPOSED WORKS AREA BOUNDARY (SUBJECT TO REVIEW)
- SITE OF ARCHAEOLOGICAL INTEREST
- PING SHAN HERITAGE TRAIL
- BUILT HERITAGE

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STATUS
狀況

SCALE 比例
A3 1 : 10000

DIMENSION UNIT 尺寸單位
METRES

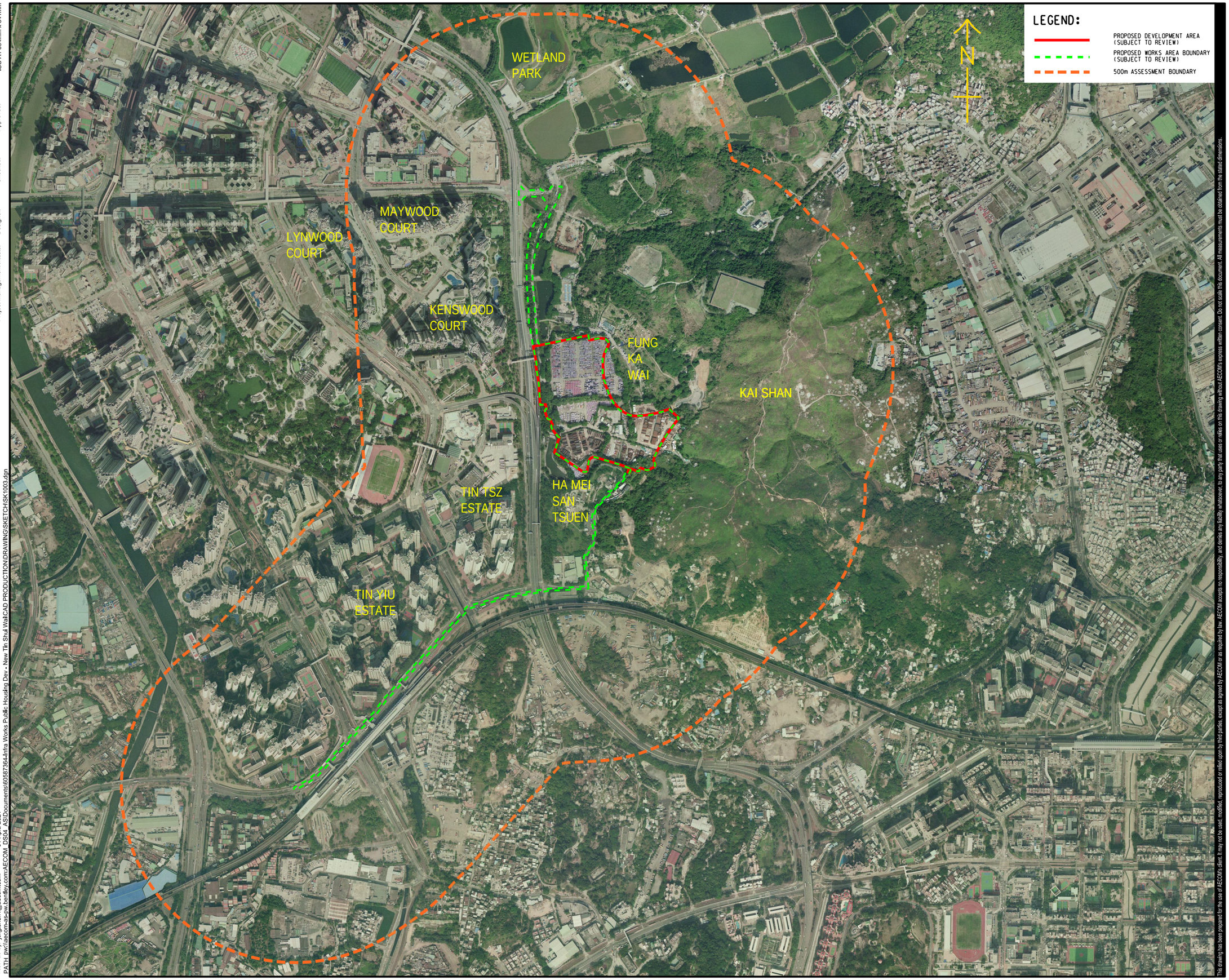
KEY PLAN
索引圖

PROJECT NO. 項目編號
60587364

AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱
LOCATIONS OF CULTURAL HERITAGE RESOURCES

SHEET NUMBER
圖紙編號
FIGURE 10.14



ISO A1 594mm x 841mm

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Checked:

Designer:

Project Management Initials:

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階段

SCALE 比例 — **DIMENSION UNIT** 尺寸單位

A1 1:5000

KEY PLAN
索引圖

PROJECT NO. 項目編號 — **AGREEMENT NO.** 協議編號

60587364 — CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

AERIAL PHOTO AND LANDSCAPE IMPACT ASSESSMENT AREA

SHEET NUMBER
圖紙編號

FIGURE 11.1

ISO A1 594mm x 841mm

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Checked:

Designer:

Project Management Initials:

LEGEND:

- STUDY BOUNDARY
- PROPOSED DEVELOPMENT AREA (SUBJECT TO REVIEW)
- PROPOSED WORKS AREA BOUNDARY (SUBJECT TO REVIEW)
- 500m ASSESSMENT BOUNDARY
- PROPOSED HOUSING SITE BOUNDARY (SUBJECT TO REVIEW)
- EXISTING GREENERY AREA (APPROX. 700 NO. OF TREES)
- LR1 PLANTATION WITHIN TEMPORARY LANDUSE (E.G. OPEN STORAGE, WORKSHOP AREAS, PARKING, RECREATIONAL USE)
- LR2 KAI SHAN CONSERVATION AREA
- LR3 MIXED WOODLAND
- LR4 VILLAGE PLANTING IN RURAL SETTLEMENT AREA
- LR5 LANDSCAPE AREA IN URBAN DEVELOPMENT AREA
- LR6 TIN SHUI WAI PARK, TIN PAK ROAD PARK, OTHER LOCAL OPEN SPACES AND SITTING-OUT AREAS
- LR7 ROADSIDE TREES
- LR10 HONG KONG WETLAND PARK AND ADJOINING WETLAND CONSERVATION AREA
- LR11 OTHER PONDS
- LR8 NATURAL WATERCOURSE
- LR9 MODIFIED WATERCOURSE

818000 E
819000 E
820000 E
835000 N
834000 N
N

TO BE CONNECTED WITH EXISTING FOOTBRIDGE
PROPOSED LIFT TOWER
TIN SHUI WAI
TIN SHUI WAI
TIN TSZ ESTATE
TIN YIU ESTATE
KAI SHAN
FUNG KA WAI
PING SHAN
HA TSUEN
WANG CHAU
TIN WING ROAD
TIN TSZ ROAD
TIN SHING ROAD
TIN YING ROAD
LIGHT RAIL
MTR (WEST RAIL LINE)
LONG TIN ROAD
LONG PING ROAD
PING YEE ROAD
PING HA ROAD
HUNG TIN ROAD
CASTLE PEAK ROAD - PING SHAN

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階段

SCALE 比例: A3 1 : 10000
DIMENSION UNIT 尺寸單位: METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60587364
AGREEMENT NO. 協議編號: CE 11/2018 (CE)

SHEET TITLE
圖紙名稱
LANDSCAPE RESOURCES

SHEET NUMBER
圖紙編號
FIGURE 11.2

ISO A1 594mm x 841mm

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Designer:

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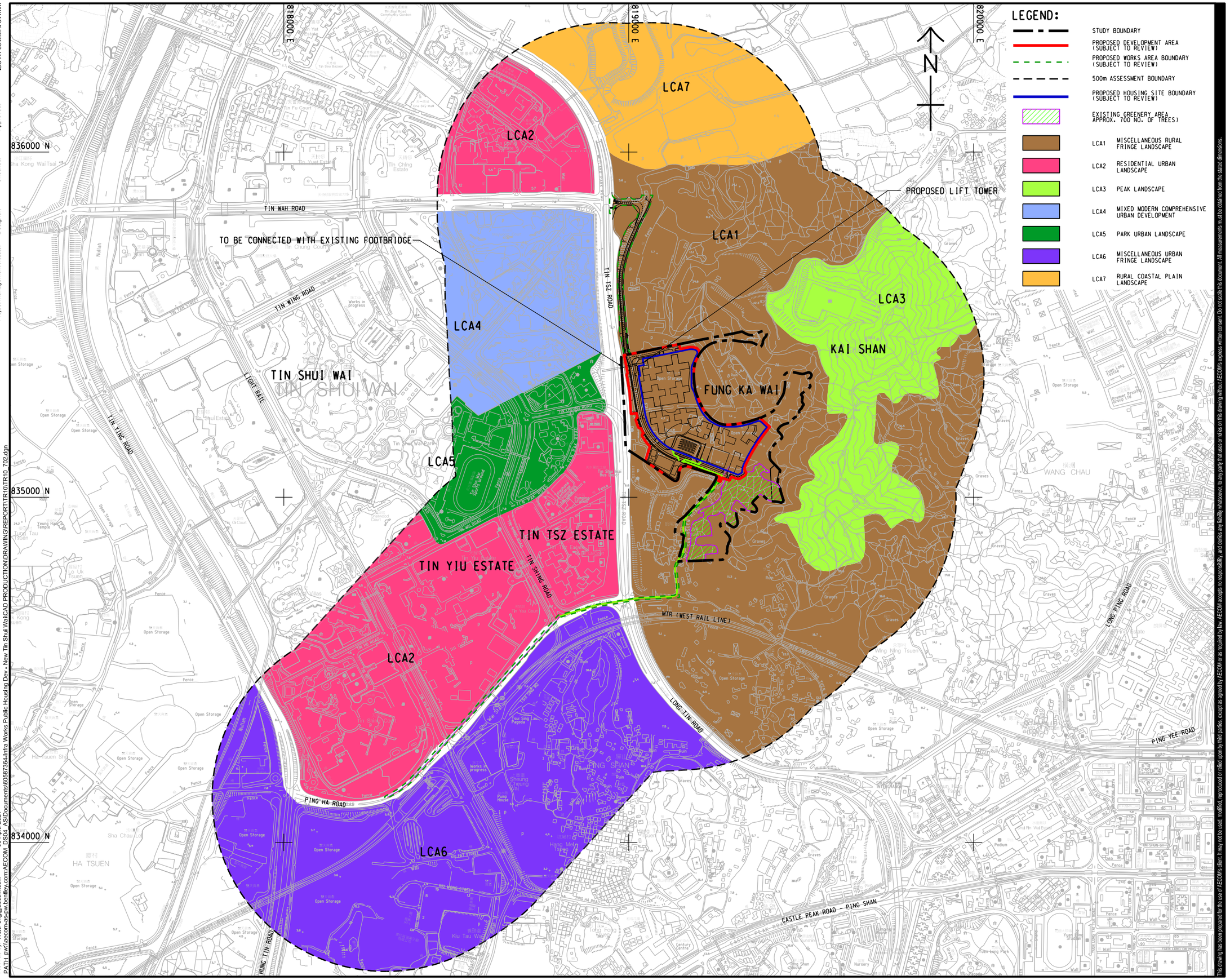

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階段

SCALE 比例
A3 1 : 10000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60587364

AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

LANDSCAPE CHARACTER AREAS

SHEET NUMBER
圖紙編號

FIGURE 11.3

ISO A1 594mm x 841mm
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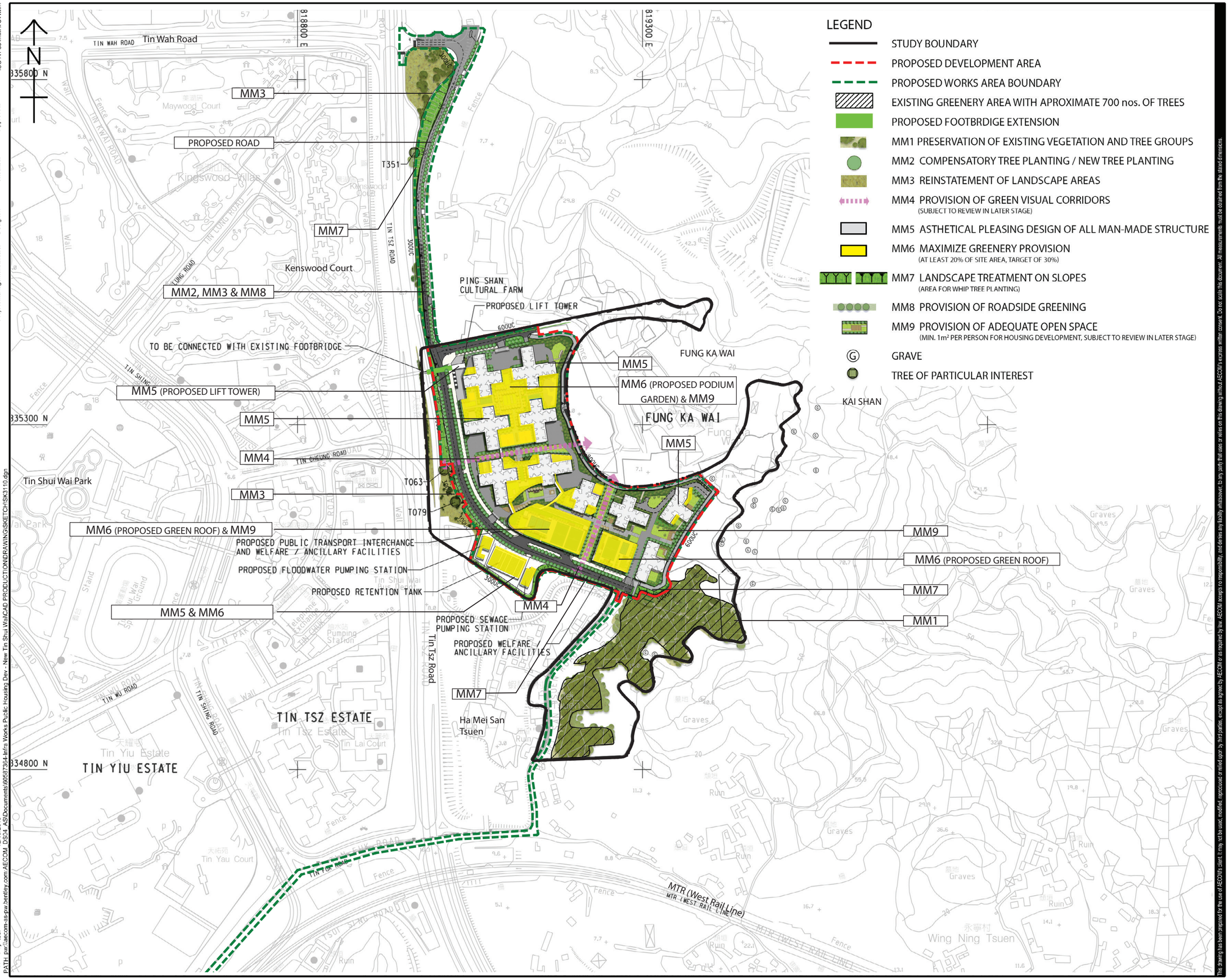
12/19/2019



LEGEND

- STUDY BOUNDARY
- PROPOSED DEVELOPMENT AREA
- PROPOSED WORKS AREA BOUNDARY
- EXISTING GREENERY AREA WITH APROXIMATE 700 nos. OF TREES
- PROPOSED FOOTBRDIGE EXTENSION
- MM1 PRESERVATION OF EXISTING VEGETATION AND TREE GROUPS
- MM2 COMPENSATORY TREE PLANTING / NEW TREE PLANTING
- MM3 REINSTATEMENT OF LANDSCAPE AREAS
- MM4 PROVISION OF GREEN VISUAL CORRIDORS (SUBJECT TO REVIEW IN LATER STAGE)
- MM5 ASTHETICAL PLEASING DESIGN OF ALL MAN-MADE STRUCTURE
- MM6 MAXIMIZE GREENERY PROVISION (AT LEAST 20% OF SITE AREA, TARGET OF 30%)
- MM7 LANDSCAPE TREATMENT ON SLOPES (AREA FOR WHIP TREE PLANTING)
- MM8 PROVISION OF ROADSIDE GREENING
- MM9 PROVISION OF ADEQUATE OPEN SPACE (MIN. 1m² PER PERSON FOR HOUSING DEVELOPMENT, SUBJECT TO REVIEW IN LATER STAGE)
- GRAVE
- TREE OF PARTICULAR INTEREST

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PROJECT
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階段

SCALE 比例: 1:5000
DIMENSION UNIT 尺寸單位: METERS

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60587364
AGREEMENT NO. 協議編號: CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

LANDSCAPE MITIGATION MEASURES PLAN

SHEET NUMBER
圖紙編號

FIGURE 11.4

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POINTS	PUBLIC VIEWERS	TYPE
RE1	KAI SHAN	RECREATIONAL
RE2	TIN SHUI WAI PARK, SWIMMING POOL AND SPORTS CENTRE	RECREATIONAL
RE3	CHU WONG LING	RECREATIONAL
RE4	PING SHAN TANG CLAN GALLERY CUM HERITAGE TRAIL VISITORS CENTRE	RECREATIONAL
RE5	TIN YIP ROAD PARK	RECREATIONAL
T1	TIN TSZ ROAD AND LONG TIN ROAD	TRAVELLING
T2	WEST RAIL LINE, TIN SHUI WAI LIGHT RAIL AND TIN FUK ROAD	TRAVELLING
R1	HA MEI SAN TSUEN	RESIDENTIAL
G1	YUEN LONG COMMUNITY GREEN STATION	GIC TYPE

818000 E

819000 E

820000 E

835000 N

834000 N

N

LEGEND:

- STUDY BOUNDARY
- PROPOSED DEVELOPMENT AREA (SUBJECT TO REVIEW)
- PROPOSED WORKS AREA BOUNDARY (SUBJECT TO REVIEW)
- VISUAL ENVELOPE
- PROPOSED HOUSING SITE BOUNDARY (SUBJECT TO REVIEW)
- 12m GREEN VISUAL CORRIDOR
- 20m GREEN VISUAL CORRIDOR CUM WIND CORRIDOR
- WETLAND VISUAL RESOURCE
- GREENERY VISUAL RESOURCE
- URBAN PARK VISUAL RESOURCE
- GRAVEYARD VISUAL DETRACTOR
- BROWNFIELD VISUAL DETRACTOR
- PUBLIC VIEWERS
- VIEW POINT

RE5 RE1 RE2 RE3 RE4 T1 T2 R1 V1 V2 V3 V4

TIN SHUI WAI

TIN SHUI WAI PARK

CHU WONG LING

HA TSUEN

PING SHAN

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STATUS
階段

SCALE 比例
A3 1 : 10000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60587364

AGREEMENT NO. 協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

VISUAL ENVELOPE AND VIEWPOINTS

SHEET NUMBER
圖紙編號

FIGURE 11.5

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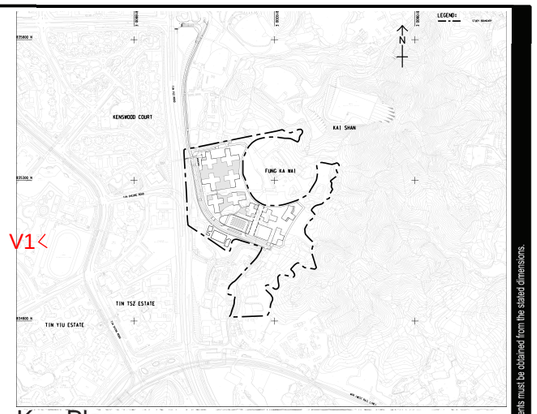
12/19/2019

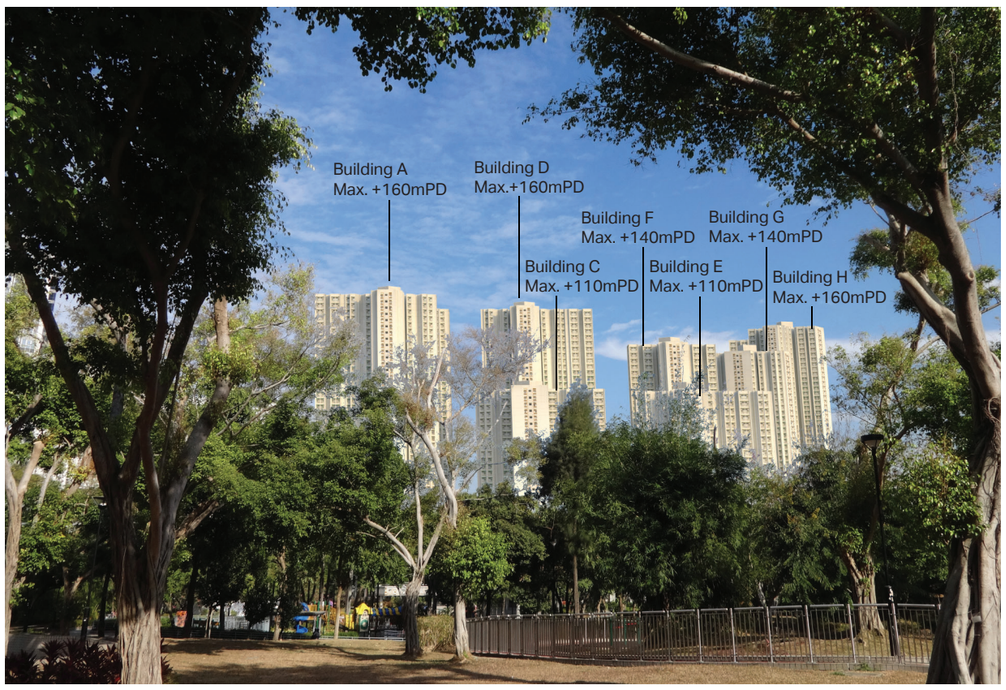
Existing Photo



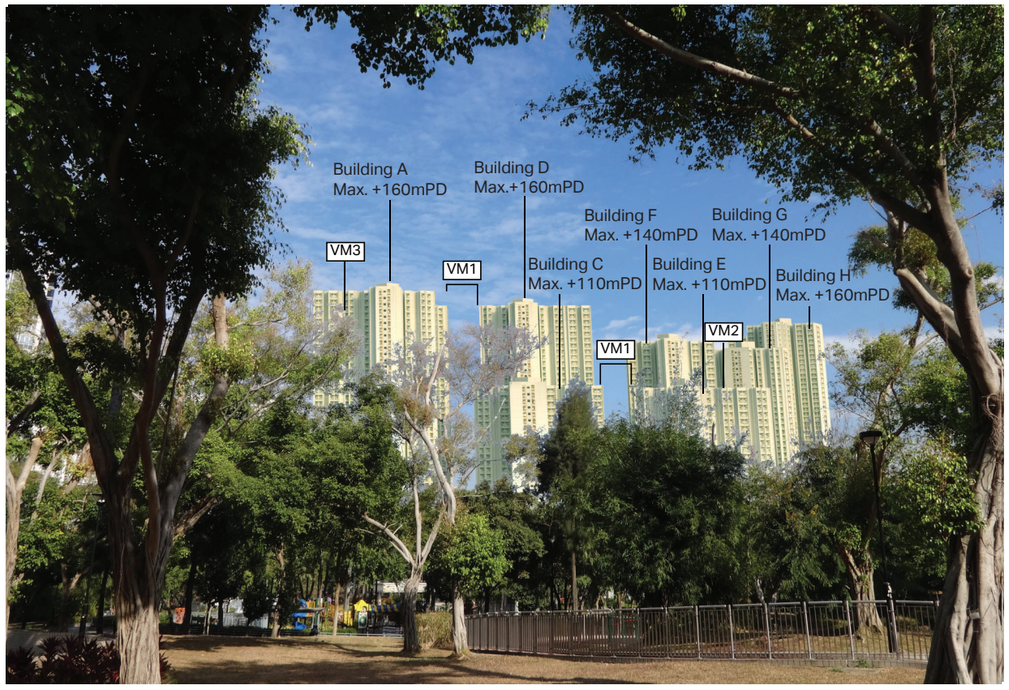
Key Plan

Visual Mitigation Measures

- VM1 Creation of Visual Greening Connection and Breezeways
- VM2 Control Development Heights and Massing
- VM3 Visual Compatibility of the Proposed Development
- VM4 Maximization of Greenery Provision



Photomontage of VP 1 - Tin Shui Wai Park (Day 1 without mitigation measures)



Photomontage of VP 1 - Tin Shui Wai Park (Day 1 / Year 10 with mitigation measures)

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STATUS
現段

SCALE 比例 | DIMENSION UNIT 尺寸單位
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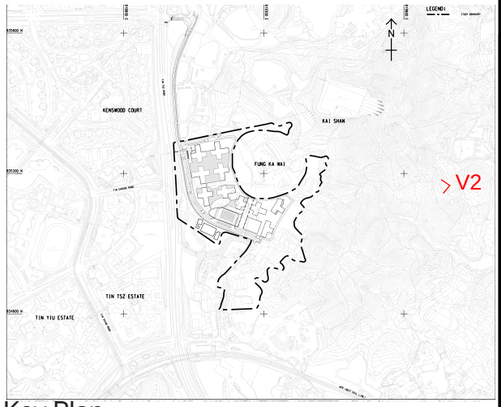
KEY PLAN
索引圖

PROJECT NO. 項目編號 | AGREEMENT NO. 協議編號
60587364 | CE 11/2018 (CE)

SHEET TITLE
圖紙名稱
PHOTOMONTAGE OF VP1- Tin Shui Wai Park

SHEET NUMBER
圖紙編號
FIGURE 11.6

Existing Photo



Key Plan

Visual Mitigation Measures

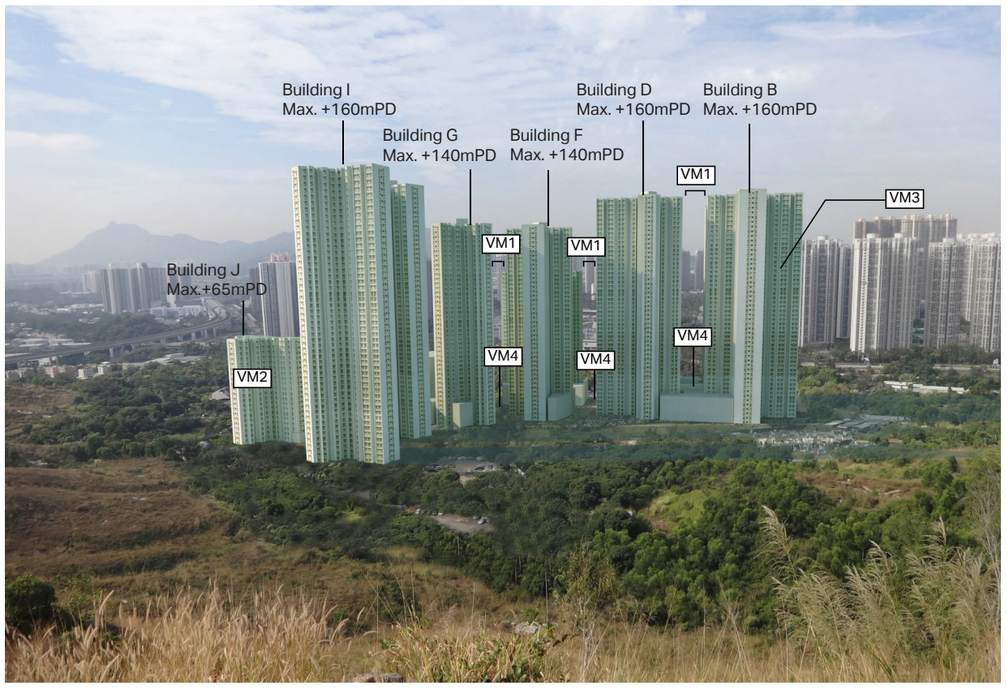
VM1 Creation of Visual Greening Connection and Breezeways

VM2 Control Development Heights and Massing

VM3 Visual Compatibility of the Proposed Development

VM4 Maximization of Greenery Provision

Photomontage of VP2- Kai Shan (Day 1 without mitigation measures)



Photomontage of VP2- Kai Shan (Day 1 / Year 10 with mitigation measures)

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PROJECT
項目
SITE FORMATION AND INFRASTRUCTURAL WORKS FOR PROPOSED PUBLIC HOUSING DEVELOPMENT NEAR TIN SHUI WAI - FEASIBILITY STUDY

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客戶
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KEY PLAN
索引圖

PROJECT NO.
項目編號
60587364

AGREEMENT NO.
協議編號
CE 11/2018 (CE)

SHEET TITLE
圖紙名稱
PHOTOMONTAGE OF VP2- Kai Shan

SHEET NUMBER
圖紙編號
FIGURE 11.7

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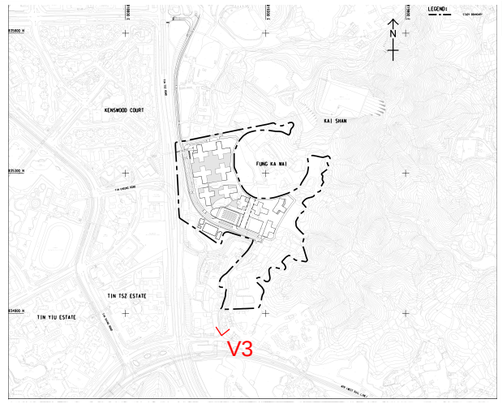
Existing Photo

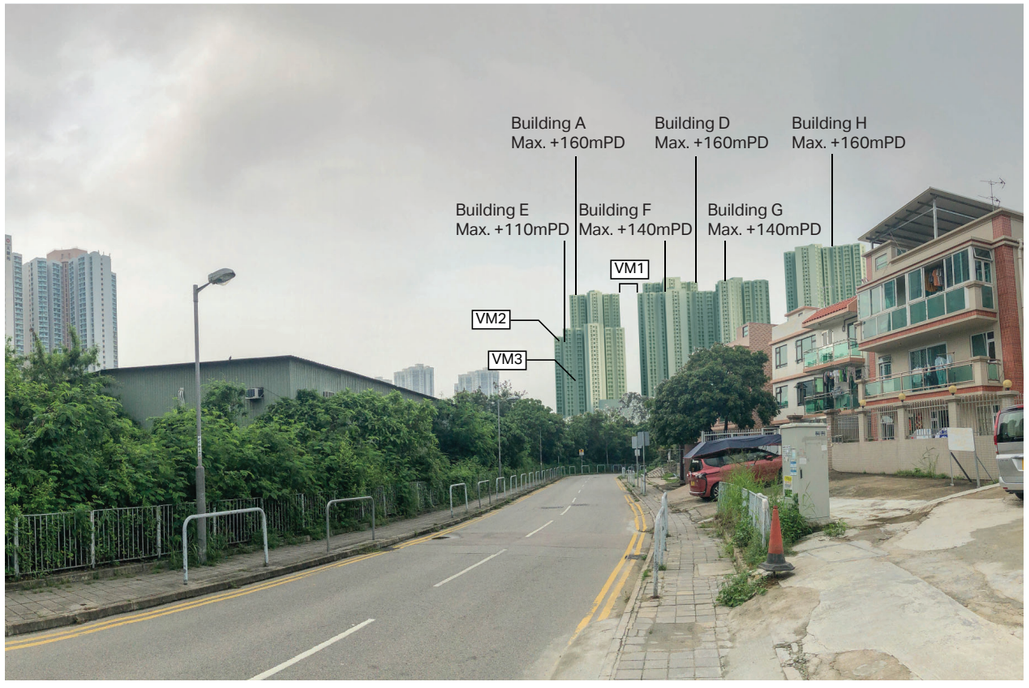


Key Plan

Visual Mitigation Measures

- VM1 Creation of Visual Greening Connection and Breezeways
- VM2 Control Development Heights and Massing
- VM3 Visual Compatibility of the Proposed Development
- VM4 Maximization of Greenery Provision

Photomontage of VP3- Ha Mei San Tsuen (Day 1 without mitigation measures)



Photomontage of VP3- Ha Mei San Tsuen (Day 1 / Year 10 with mitigation measures)

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PROJECT
項目

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR PROPOSED PUBLIC HOUSING DEVELOPMENT NEAR TIN SHUI WAI - FEASIBILITY STUDY

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CEDD Civil Engineering and Development Department

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STATUS
階段

SCALE
比例

DIMENSION UNIT
尺寸單位

KEY PLAN
索引圖

PROJECT NO.
項目編號

60587364

AGREEMENT NO.
協議編號

CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

PHOTOMONTAGE OF VP3- HA MEI SAN TSUEN

SHEET NUMBER
圖紙編號

FIGURE 11.8

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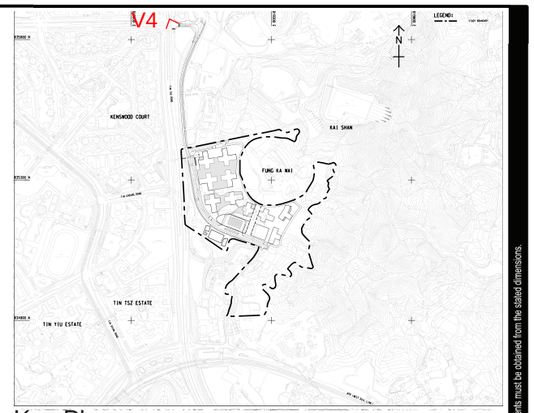
Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

Existing Photo

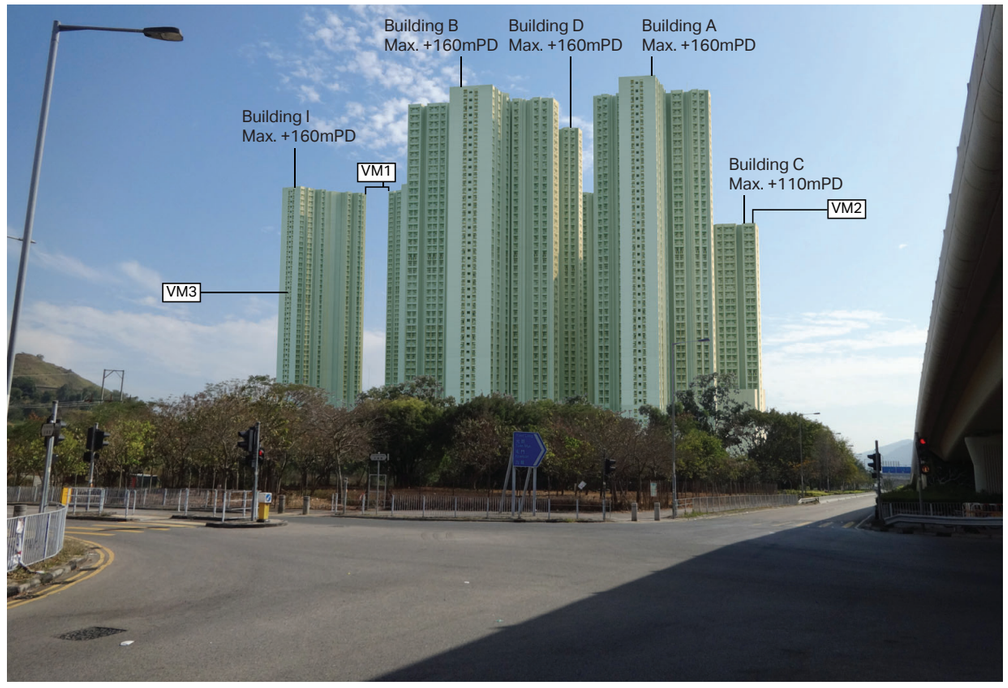


Key Plan

Visual Mitigation Measures

- VM1 Creation of Visual Greening Connection and Breezeways
- VM2 Control Development Heights and Massing
- VM3 Visual Compatibility of the Proposed Development
- VM4 Maximization of Greenery Provision

Photomontage of VP4- Tin Wah Road (Day 1 without mitigation measures)



Photomontage of VP4- Tin Wah Road (Day 1 / Year 10 with mitigation measures)

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PROJECT
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SITE FORMATION AND INFRASTRUCTURAL WORKS FOR PROPOSED PUBLIC HOUSING DEVELOPMENT NEAR TIN SHUI WAI - FEASIBILITY STUDY

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階段

SCALE 比例 — DIMENSION UNIT 尺寸單位

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KEY PLAN
索引圖

PROJECT NO. 項目編號 — AGREEMENT NO. 協議編號

60587364 — CE 11/2018 (CE)

SHEET TITLE
圖紙名稱

PHOTOMONTAGE OF VP4- TIN WAH ROAD

SHEET NUMBER
圖紙編號

FIGURE 11.9

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Attachment VII of
RNTPC Paper No. 3/21

Provision of Major GIC Facilities and Open Space in Ping Shan Outline Zoning Plan

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[#]	8.13 ha	0 ha	2.26 ha	-5.87 ha
Local Open Space	10 ha per 100,000 persons[#]	8.13 ha	1.65 ha	8.02 ha	-0.11 ha
Secondary School	1 whole-day classroom for 40 persons aged 12-17	56 classrooms	30 classrooms	30 classrooms	-26 classrooms
Primary School	1 whole-day classroom for 25.5 persons aged 6-11	92 classrooms	6 classrooms	78 classrooms	-14 classrooms
Kindergarten/ Nursery	34 classrooms for 1,000 children aged 3 to 6	72 classrooms	0 classroom	53 classrooms	-19 classrooms
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[^]	460 beds	0 bed	0 bed	-460 beds
Clinic/Health Centre	1 per 100,000 persons	0	0	0	0
Child Care Centre	100 aided places per 25,000 persons[#@]	325 places	0 place	100 places	-225 places
Integrated Children and Youth Services Centre	1 for 12,000 persons aged 6 to 24[#]	1	0	0	-1
Integrated Family Services Centre	1 for 100,000 to 150,000 persons[#]	0	0	1	+1

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 Elderly Community Centres	One in each new development area with a population of around 170,000 or above[#]	N.A.	0	0	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.	0	1	N.A.
Community Care Services (CCS) Facilities	17.2 subsidised places per 1,000 elderly persons aged 65 or above[#*@]	149 places	9 places	9 places	-140 places
Residential Care Homes For the Elderly	21.3 subsidised beds per 1,000 elderly persons aged 65 or above[#@]	185 beds	22 beds	342 beds	+157 beds
Library	1 district library for every 200,000 persons[π]	0	1	1	+1
Sports Centre	1 per 50,000 to 65,000 persons[#]	1	1	1	0
Sports/Ground Sport Complex	1 per 200,000 to 250,000 persons[#]	0	0	0	0
Swimming Pool Complex - standard	1 complex per 287,000 persons[#]	0	0	0	0

Note:
The planned resident population in Ping Shan area is about 81,342. If including transients, the overall planned population is about 83,775.
[#] 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.

APRIL 2021