RURAL AND NEW TOWN PLANNING COMMITTEE
OF THE TOWN PLANNING BOARD

RNTPC Paper No. 8/17

For Consideration by
the Rural and New Town Planning Committee on 13.10.2017

PROPOSED AMENDMENTS TO THE
APPROVED KAM TIN SOUTH OUTLINE ZONING PLAN NO. S/YL-KTS/13

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1. Introduction

This paper is to seek Members' agreement that:

(a) the proposed amendments to the approved Kam Tin South Outline Zoning Plan (OZP) No. S/YL-KTS/13 as shown on the draft OZP No. S/YL-KTS/13A (**Attachment II**) and its Notes (**Attachment III**) are suitable for exhibition for public inspection under section 5 of the Town Planning Ordinance (the Ordinance); and

(b) the revised Explanatory Statement (ES) of the OZP (**Attachment IV**) should be adopted as an expression of the Town Planning Board (the Board)'s planning intentions and objectives for various land use zonings of the OZP and is suitable for exhibition together with the draft OZP.

2. Status of the Current OZP

2.1 On 30.8.2016, the Chief Executive in Council (CE in C), under section 9(1)(a) of the Ordinance, approved the draft Kam Tin South OZP, which was subsequently renumbered as S/YL-KTS/13 (**Attachment I**). On 9.9.2016, the approved OZP No. S/YL-KTS/13 was exhibited for public inspection under section 9(5) of the Ordinance.

2.2 On 7.2.2017, the CE in C referred the approved Kam Tin South OZP No. S/YL-KTS/13 (the OZP) to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. On 17.2.2017, the reference back of the OZP was notified in the Gazette under section 12(2) of the Ordinance.

3. Background

3.1 In March 2014, the Planning Department (PlanD) completed the Land Use Review for Kam Tin South and Pat Heung (LUR) covering the planning scheme area of the Kam Tin South OZP. A total of 14 potential housing sites have been identified for public and private housing developments under the LUR (**Plan 1**). Broad technical assessments have also been undertaken confirming that there

should be no insurmountable problem for the development proposals of the 14 potential housing sites subject to the provision of adequate infrastructure.

3.2 In view of the infrastructure constraints, particularly the capacity of the sewage treatment facilities, and the comments received during the public consultation, the 14 potential housing sites identified under the LUR would be implemented by phases. To meet the pressing demand for housing supply, the two West Rail sites (i.e. Kam Sheung Road Station (KSRS) and Pat Heung Maintenance Centre (PHMC)) were proposed for rezoning first as the proposed developments on the sites are technically viable, no substantial infrastructure improvement works would be required for the proposed development and no land resumption/clearance of private land would be involved. Rezoning of KSRS and PHMC sites for private housing and commercial development was gazetted under section 5 of the Ordinance on 29.5.2015. After giving consideration to the representations and comments on 11.12.2015 and 28.1.2016, the Board on 11.3.2016 noted the supporting representations and decided not to propose any amendments to the draft OZP to meet any representation. The CE in C approved the draft Kam Tin South OZP on 30.8.2016.

3.3 For the three proposed public housing sites located to the immediate south of KSRS, namely Sites 1, 4a and 6 (**Plan 1**), taking into account the advantage of the close proximity to the West Rail station and the future commercial/residential development thereat, as well as the infrastructural capacity in the area, they are considered having potential for early implementation to meet the acute public housing demand. Various Government, institution or community (GIC) facilities including a sports centre, a clinic, 3 kindergartens, 2 primary schools and other supporting facilities would be provided to serve the existing and future residents of the area. Further assessments for Sites 1, 4a and 6 have been carried out to assure feasible design scheme can be implemented with no major unresolved technical problems. On the other hand, the remaining nine potential housing sites identified under the LUR would be subject to further study for provision of supporting infrastructures.

4. Amendment Items A1 to A3 – Rezoning Proposal of the Three Public Housing Sites (**Plans 2a, 3a-1, 3b-1** and **3c-1**)

Proposed public housing developments at Sites 1, 4a and 6 (**Plan A2**)

4.1 The current proposed amendments to the Kam Tin South OZP are mainly related to the three proposed public housing sites, namely Sites 1, 4a and 6, which are currently zoned "Agriculture" ("AGR") (for Sites 1 and 6) and "Other Specified Uses" annotated "Rural Use" ("OU(RU)") (for Site 4a) on the Kam Tin South OZP (**Attachment I**). Based on the LUR, these sites have potential for housing development.

4.2 Taking into account the development constraints including limited infrastructure capacities (such as road capacity and sewage treatment capacity), Shek Kong Airfield Height Restriction (SKAHR), environmental implications (in particular

noise impact from West Rail Line, PHMC and major roads, air ventilation and visual impacts) and ecological considerations, a total plot ratio (PR) of 3 for Sites 1, 4a and 6 respectively was recommended under the LUR. Housing Department (HD) and the Civil Engineering and Development Department (CEDD) have conducted further technical assessments with a view to maximizing the flat production of Sites 1, 4a and 6. With reference to the recommendations of the LUR and the infrastructural capacity in the area, technical assessments demonstrated that a total of 9,000 flats for the three sites with a total PR of 3 could be achieved without insurmountable technical problems (paragraph 7 below refers). Major development parameters of Sites 1, 4a and 6 under HD's conceptual layout (**Plan 4**) and the rezoning proposal are shown below.

	Proposed Public Housing Sites			**Total**
	Site 1	**Site 6**	**Site 4a**	
Amendment Item	A1	A2	A3	-
Proposed Zoning	"Residential (Group A)" ("R(A)")			-
Zoning Area (about)	6.21 ha	2.76 ha	7.06 ha	16.03 ha
Site Area of the Public Housing Development (about)	5.8 ha	2.7 ha	5.8 ha	14.3 ha
Maximum Total PR (equivalent to total Gross Floor Area (GFA) - about)	3			3
	(174,000 m^2)	(81,000 m^2)	(174,000 m^2)	(429,000 m^2)
Maximum Building Height (BH)	69 mPD (including any roof-top structures) (about 17 storeys)			-
No. of Blocks (about)	10	8	9	27
Estimated No. of Flats (about)	3,700	1,550	3,750	9,000
Estimated Population (about)	10,360	4,340	10,500	25,200
Supporting Facilities	Retail, kindergartens and other required GIC facilities			
Estimated Earliest Completion Date (tentative)	2025/26	2025/26	2028/29	-

Rezoning proposal for public housing developments

4.3 To take forward the proposed public housing developments with other supporting commercial and GIC facilities at Sites 1, 4a and 6, it is proposed to rezone the proposed public housing developments at the respective sites as follows (**Plan 2a**):

(a) **Items A1** and **A2**: Sites 1 and 6 from "AGR" to "R(A)" subject to a

maximum total PR of 3 and a maximum BH of 69 mPD (**Plans 2a to 2c, 3a-1 to 3a-3, 3b-1 to 3b-3 and 4**).

(b) **Item A3**: Site 4a from "OU(RU)" to "R(A)" subject to a maximum total PR of 3 and a maximum BH of 69 mPD (**Plans 2a to 2c, 3c-1 to 3c-4 and 4**).

4.4 The proposed public housing developments at the three sites will be guided by planning briefs which would set out the planning parameters, the design requirements as well as the technical assessments to be conducted for the public housing developments.

5. Amendment Items B1 to B2 and C1 – Rezoning Proposal of GIC Facilities and Designation of Existing Road

5.1 In support of the proposed public housing developments and to serve the local community, two sites adjoining the proposed public housing developments at Site 1 (**Item A1**) and Site 6 (**Item A2**) for GIC facilities were recommended under the LUR. It is proposed to rezone the two sites from "AGR" to "Government, Institution or Community" ("G/IC") as follows (**Plan 2a**):

(a) **Item B1**: The site, with a zoning area of about 1.73 ha, adjoins the public housing development at Site 1 on the west. A primary school is proposed at the southern portion of the site, while the northern portion is reserved for a GIC complex, a sports centre and an electricity sub-station (ESS). The proposed GIC complex will accommodate a clinic and other social welfare facilities as proposed by the Director of Social Welfare (DSW) which will be determined at detailed design stage (**Plans 2a to 2c, and 3a-1 to 3a-3)**.

(b) **Item B2**: The site, with a zoning area of about 0.73 ha, adjoins the public housing development at Site 6 on the east. The site is reserved for the development of a primary school (**Plans 2a to 2c, 3b-1 to 3b-2 and 3b-4).**

5.2 **Item C**: A section of the existing Kam Ho Road (site area: about 0.70 ha) (**Plans 2a to 2c, and 3b-1 to 3b-2)**

To tally with the proposed rezoning boundary of public housing development and primary school at Site 6 under Amendment **Items A2** and **B2** respectively, a section of the existing Kam Ho Road and its roundabout to the south of the West Rail KSRS (about 0.7 ha) is proposed to rezone from "AGR" to an area shown as 'Road' to reflect the existing road (**Plans 3b-1** and **3b-2**).

6. The Sites and their Surroundings

6.1 Sites 1, 4a and 6 are located at the immediate south of West Rail KSRS (**Plan 2a**), and the sites are mostly occupied by private land (with about 75% on private land and about 25% on Government land) (**Plan 2b**). The KSRS and the adjoining public transport interchange (PTI) with a park-and-ride facilities is zoned "OU" annotated "Railway Station and Public Transport Interchange with

Commercial/ Residential Development", subject to maximum domestic GFA of 186,234 m^2 , non-domestic GFA of 53,535 m^2 and a maximum BH of 69 mPD. The PHMC, located on the south of these sites, is zoned "OU" annotated "Railway Depot with Commercial/ Residential Development", subject to maximum domestic GFA of 422,340 m^2, non-domestic GFA of 3,000 m^2 and maximum BH of 109 mPD. Tsing Long Highway is located on the west, while to the east is a piece of land zoned "OU(RU)" mainly occupied by a mixed of residential structures/dwellings and various temporary uses. The proposed three public housing developments (**Items A1, A2 and A3**) and the adjoining "G/IC" sites (**Items B1** and **B2**) would affect an initial estimation of about 166 existing structures[1] and 4.8 ha of active agricultural land[1].

6.2 Site 1, comprising a proposed public housing development with zoning area of about 6.21 ha (**Item A1**) and proposed "G/IC" site with zoning area of about 1.73 ha (**Item B1**), is mainly occupied by a mixed of active/fallow agricultural land (**Plans 3a-1 to 3a-3**). According to the study conducted by CEDD[1], there is an initial estimation of about 18 existing structures. The structures are mainly for agricultural use. The site, which is currently zoned "AGR" on the Kam Tin South OZP, is bounded by Tung Wui Road on the north, Ho Pui Stream on the east, and the PHMC and West Rail railway track on the south and west. The proposed public housing developments at Site 4a (**Item A3**) and Site 6 **(Item A2**) are located on the east and west respectively.

6.3 Site 6, comprising a proposed public housing development with zoning area of about 2.76 ha (**Item A2**) and a proposed "G/IC" site with zoning area of 0.73 ha (**Item B2**), is mainly occupied by a mixed of active/fallow agricultural land with some residential structures/dwellings and parking of vehicles (**Plans 3b-1** to **3b-4**). According to the study conducted by CEDD[1], there is an initial estimation of about 48 existing structures. The structures are mainly for agricultural and domestic uses. The site, which is currently zoned "AGR" on the Kam Tin South OZP, is bounded by the KSRS on the north, West Rail railway track on the east and Tsing Long Highway on the west. A piece of land zoned "Conservation Area" ("CA") adjoins the site on the south.

6.4 Site 4a, comprising a proposed public housing development with a zoning area of about 7.06 ha (**Item A3**), is occupied by a mixed of active/fallow agriculture land, plant nurseries/orchards, residential structures/dwellings, public vehicle park, storages/warehouses/factories and vacant/unused land (**Plans 3c-1** to **3c-4**). According to the study conducted by CEDD[1], there is an initial estimation of about 100 existing structures. The structures are mainly for agricultural, domestic and factories/warehouse/storage uses. The site, which is currently zoned "OU(RU)" on the Kam Tin South OZP, is bounded by Tung Wui Road on the north and Ho Pui Stream on the west. On the east and south is the remaining portion of the "OU(RU)" zone comprising similar existing uses as Site 4a, as well as two sites zoned "G/IC" currently occupied by the S.K.H. St Joseph's Church and kindergarten, and Elchk Kam Sheung Lutheran Church.

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[1] Based on CEDD's Site Formation and Infrastructural Works for the Initial Sites at Kam Tin South, Yuen Long – Investigation, Design and Construction

7. Technical Assessments

7.1 To ascertain the technical feasibility of the proposed public housing and GIC developments at Sites 1, 4a and 6 (including the site formation and infrastructure works), various technical assessments on traffic, environmental, visual, air ventilation, ecological, tree and landscape, sewerage, drainage, water supply and geotechnical engineering have been conducted. It is confirmed that the proposed development would not cause insurmountable problems on traffic and other infrastructural capacity as well as the environmental aspects. The findings were summarized in the following paragraphs. The Traffic Impact Assessment (TIA), Environmental Assessment (EA), Visual Appraisal (VA), Air Ventilation Assessment (Expert Evaluation) (AVA(EE)), Ecological Impact Assessment (EcoIA), Sewerage Impact Assessment (SIA), Drainage Impact Assessment (DIA) and Waterworks Impact Assessment (WIA) are attached in **Appendices VIII to XV**. A full copy of all technical assessments is deposited at the meeting for Members' inspection.

Traffic Aspect

7.2 The TIA (**Attachment VIII**) ascertains that, with reference to the TIA carried out under the LUR and taking into account the latest development parameters and assumptions, the proposed public housing developments and GIC facilities at Sites 1, 4a and 6 would not have adverse traffic impacts. Off-site road improvement works including road widening of some sections of Kam Ho Road, Kam Po Road and Kam Tin Road and junctions improvement (**Plan 5**) were recommended to improve the future traffic operation and to cater for additional traffic demand generated from the population of the proposed housing development. It reveals that all the junctions under assessments will be operating within capacity after the implementation of the proposed road improvement works.

7.3 Besides, in order to improve the traffic conditions of Kam Sheung Road, four new bus lay-bys along Kam Sheung Road (**Plan 5**) will be included under CEDD's project. In addition, bus lay-bys and coach parking bays will be provided on the future widened Kam Ho Road. Transport Department (TD) considers no insurmountable traffic impact is envisaged.

7.4 The Transport and Housing Bureau (THB) has reviewed the planning of transport infrastructure in Northwest New Territories (NWNT)[2]. It is expected that the trains of the West Rail Line would gradually be changed from 7-car to 8-car, and any adjustment to train frequency is subject to the actual passenger demand upon opening of the East West Corridor of the Shatin to Central Link (SCL). Even after taken into account various development proposals including the three proposed public housing developments at Sites 1, 4a and 6, the West Rail Line would be able to meet the demands during the peak hours with the trains slightly congested upon completion of the new railway projects. According to the "Public Transport Strategy Study" promulgated by THB in June 2017, with the continuous rise of population in NWNT, the West Rail Line

[2] "Planning of Transport Infrastructure in Northwest New Territories" (Paper No. CB(4)1306/14-15(04)) presented to Legislative Council Panel on Transport by THB.

will inevitably become more crowded. Passengers may also need to wait for a longer time to board a train. Therefore, in the longer run, the Government will study whether it is necessary to construct a new heavy rail to directly connect NWNT to urban areas, in parallel with West Rail Line.

7.5 In view of the local demand and acute shortage of public car parking space in Kam Tin South, in particular the need of public parking facilities near the West Rail KSRS, TD has no objection for a review on the provision of public vehicle park at the three public housing and GIC developments in Sites 1, 4a and 6 at detailed design stage.

Environmental Aspect

7.6 An EA was conducted by CEDD and HD (**Attachment IX)**. The proposed developments will be subject to potential impacts of traffic noise from surrounding roads and railway noise from the West Rail Line and future Northern Link (NOL) as well as potential fixed noise sources from car repairing workshops, small factories and godowns in the vicinity. At-source mitigation measures (such as provision of noise barrier and low noise road surface which is subject to design review) and at-receiver mitigation measures (such as single aspect building design, building set back, architectural fins and fixed windows) will be considered in alleviating the traffic and rail noise impacts. With the incorporation of the necessary practicable noise mitigation measures, it is anticipated that the relevant planning standards and statutory requirements can be met.

7.7 Moreover, chimney surveys were conducted and no chimney was identified within the 500m study area. Building separations of minimum 5m from main roads and 20m from Tsing Long Highway will be incorporated into the development layouts. No adverse air quality impact from industrial and vehicular emission on the proposed developments is envisaged.

7.8 The assessments in form of site appraisal regarding land contamination within the development sites have been carried out by CEDD. Site re-appraisal and site investigation upon completion of land resumption, together with necessary remediation will be completed by CEDD before the commencement of construction for the proposed developments. The proposed developments will be served by public sewerage networks upon flat intake.

7.9 Overall, the EA concluded that the proposed public housing developments and GIC facilities in Sites 1, 4a and 6 would be environmentally acceptable with the implementation of appropriate mitigation measures. In particular, the noise impact assessment indicates that with mitigation measures including the use of low noise road surfacing where practicable, the traffic noise performance will be improved and that no insurmountable environmental impact in respect of noise are identified. Environmental Protection Department (EPD) and other relevant Government departments consider the EA acceptable in principle. HD will further review the development layouts and carry out environmental assessment study on the potential impacts with proposed mitigation measures for enhancement at the detailed design stage.

Visual Appraisal

7.10 The three proposed public housing sites are situated to the immediate south and southeast of KSRS. Developments at the sites are proposed to be subject to a maximum building height of not more than 69mPD, which is in line with the SKAHR. They are to form part of the future suburban township, replacing incompatible land uses, such as open storage, in the area and enhancing the townscape with hard and soft landscaping. A VA (**Attachment X**) has been undertaken to assess the possible visual impact of the proposed developments at the sites. As shown in the photomontages (**Plans 6a** to **6g**), the proposed developments are compatible in scale and height with the adjoining future developments at KSRS and PHMC that range from 69mPD to 109mPD in height.

Air Ventilation Assessment

7.11 An AVA(EE) (**Attachment XI**) was conducted to evaluate the potential air ventilation impacts on the pedestrian wind environment within and in the vicinity of the sites due to the proposed public housing developments.

7.12 According to the AVA(EE) report, the annual prevailing winds for the area mainly come from E, NE, ENE and ESE directions, while the summer winds come from E, S, SSE, SSW and SW directions. The report has identified and evaluated the potential air ventilation impacts due to the proposed public housing developments. The major affected areas include the future GIC site at Site 1 under E and ENE winds and St. Joseph Kindergarten under SSW and SW winds. Considering the site constraints as well as other design considerations, some good design features (**Plan 7**) have been proposed including 30m-wide Non-Building Areas (NBAs); 15m-wide building separations; setbacks from the site boundary and/or nearby major roads; minimum podium coverage and open void at ground level at strategic location to promote air movement.

7.13 The AVA(EE) has also recommended that further quantitative AVA Initial Studies should be carried out after the plan amendment for assessing the effectiveness of the improvement design measures of the proposed developments and scheme optimization at the detailed design stage. The requirement of quantitative AVA Initial Studies and mitigation measures for individual public housing site(s) will be incorporated in the respective planning briefs.

Ecological Aspect

7.14 There are no recognized sites of conservation importance within Sites 1, 4a and 6. Patches of "CA" zone are located to the west and on the south of Site 6. Tai Lam Country Park is located at the southwest of Site 1.

7.15 The proposed housing developments may cause habitat loss of a relatively small area of woodland, grassland, agricultural land, modified watercourse, village/orchard and developed area/wasteland habitats of relatively low ecological value. The adoption of mitigation measures and good site practices

during construction and operation phases (e.g. provision of eco-corridor, water quality control measures, dust suppression measures, noise control measures, night-time lighting control and reduction of excessive lighting usage, etc.) would help to further minimize the disturbance impacts. No significant adverse ecological impacts are expected. The Director of Agriculture, Fisheries and Conservation (DAFC) has no objection to the proposed amendments from the nature conservation point of view provided that the relevant requirements could be taken into account at detailed design and implementation stages by the project proponent. According to the study conducted by CEDD[1], about 4.8 ha of active agricultural land would be affected by the proposed developments at Sites 1, 4a and 6. The EcoIA is at **Attachment XII**.

Tree Survey and Landscape Aspects

7.16 Preliminary tree group survey indicated that the existing trees at Sites 1, 4a and 6 are generally of low to medium value and no Old and Valuable Trees has been identified within the three sites. Landscape Impact due to the proposed developments is envisaged to be tolerable with implementation of appropriate compensatory tree planting and mitigation measures. The compensatory proposal will follow the prevailing technical circulars, in a ratio of not less than 1:1 in terms of quantity, as far as practical. The preliminary conceptual landscape master plan (LMP) of the public housing development is at **Plan 8**.

Sewerage, Drainage and Water Supply Aspects

7.17 The SIA and DIA indicate that the proposed housing developments and GIC facilities at Sites 1, 4a and 6 do not have unacceptable impact on the existing sewerage and drainage facilities. Sewage from these sites will be discharged to Kam Tin Sewage Pumping Station through the proposed sewers and then to Nam Sang Wai Sewage Pumping Station. The sewage flow will be ultimately conveyed to the Yuen Long Sewage Treatment Works which will have sufficient capacity to cater for the sewage flow from the proposed developments in Sites 1, 4a and 6. With the implementation of the proposed sewage disposal scheme, adverse impact is not expected to be imposed on the existing sewerage system. The WIA indicates that the existing water supply system will not be adequate to serve the additional demands arising from the proposed public housing developments and GIC facilities. Extension and upgrading of existing water supply system are required. EPD, Drainage Services Department (DSD) and Water Supplies Department (WSD) consider there are no insurmountable problems on the sewerage, drainage and water supply aspects at this stage. The SIA, DIA and WIA are at **Attachments XIII, XIV and XV**.

Other Aspects

7.18 The Geotechnical Assessment (GA) Report indicates that Sites 1, 4a and 6 are considered geotechnically feasible for the proposed development. Further geotechnical investigation and design would be carried out in the detailed design.

7.19 Coordination meeting had been arranged with utility companies to assess the

utility services required for supporting the future population at Sites 1, 4a and 6. Installation of the required utility services, including an ESS at the proposed "G/IC" sites at Site 1, is considered feasible.

7.20 Relevant technical assessments to ascertain the technical feasibility of the proposed public housing and GIC developments (**Items A1, A2, A3, B1** and **B2**) were conducted by HD and CEDD as discussed above. Concerned departments including EPD, TD, AFCD, WSD, DSD, Education Bureau (EDB), Leisure and Cultural Services Department (LCSD) and Social Welfare Department (SWD), have been consulted regarding the proposed "R(A)" and "G/IC" zones. The proposed development would not cause any insurmountable problems on environmental, traffic, ecological, sewerage, drainage and water supplies aspects and the concerned Government departments have no adverse comment on the proposed rezoning.

8. Provision of Open Space and GIC Facilities (Attachment V)

8.1 According to the Hong Kong Planning Standards and Guidelines (HKPSG), a minimum of 1m^2 per person, each for district open space (DOS) and local open space (LOS), should be provided. Regarding the provision of open space in Kam Tin South, there will be a deficit of about 3.07 ha of DOS and a surplus of about 1.50 ha of LOS in the area. Although there is a shortfall of DOS in Kam Tin South area, the proposed amendments to the OZP (including **Items A1** to **A3**, **B1** to **B2** and **C1**) would not result in loss of open space provision in the area. To cater for the need of the future increased population, the LUR has recommended the provision of a district open space of about 7 ha (Riverine Park) at the north-eastern fringe of Site 7 which would be subject to detailed design/ further review (**Plan 1**). In view of this, without commitment to the future development, management and maintenance of the Riverine Park, the Director of Leisure and Cultural Services (DLCS) has no in-principle objection to the subject rezoning proposals.

8.2 The proposed two "G/IC" sites under Amendment **Items B1** and **B2** for one primary school at each site would help alleviating the primary school deficit in the Kam Tin South area. Adequate GIC facilities including kindergartens and primary schools have been provided at Sites 1, 4a and 6 to serve the need of the future population arising from the proposed development. The development of the proposed schools would tie in with the population in-take of the proposed public housing developments. For the shortfall of about 21 classrooms for primary school (or about one primary school) and 46 classrooms for secondary school in Kam Tin South, it can be addressed by schools available in the Yuen Long District in the long term. The Secretary for Education (SED) has no objection to the rezoning proposals. PlanD will also explore with SED if the shortfall of school facilities could be addressed by provision in the adjoining area in the long term. The remaining shortfall for the premises-based kindergarten/ nursery could be incorporated in future development/ redevelopment as appropriate.

8.3 Besides, there are deficits of about 345 hospital beds in Kam Tin South. The

Hospital Authority (HA) plans its services on a cluster basis. In service planning, HA has taken into account a number of factors, including the increase of service demand as a result of population growth and demographic changes, advancement of medical technology, manpower availability as well as organisation of services of the clusters and hospitals. HA monitors the service utilisation and updates the service demand projection regularly according to the latest population projection parameters and development plan of the Government, to inform the service planning. For the New Territories West (NTW) Cluster, which covers the service requirement from residents in Tuen Mun and Yuen Long Districts, the new hospital constructed in Tin Shui Wai has commenced operation in the first quarter of 2017 by phases. Tin Shui Wai Hospital will provide 300 hospital beds when it comes into full operation. In the long run, the HA has considered making use of the adjoining site of Tin Shui Wai Hospital for future expansion of the hospital to further increase service capacity. At the same time, the Government has reserved a site at Hung Shui Kiu New Development Area for the construction of a new hospital (about 1,000 beds) to meet the growing healthcare demand of the population in NTW.

8.4 With regard to the request of the Director of Social Welfare (DSW) for provision of social welfare facilities in the area, part of the proposed "G/IC" site at Site 1 under Amendment **Item B1** will be reserved for a GIC complex with a clinic and other GIC facilities. The detailed welfare facilities to be accommodated in the proposed GIC complex will be subject to further assessment / liaison with the concerned departments including DSW at the detailed design stage.

8.5 In view of the local request (paragraph 13.1 below) on the provision of additional GIC or social welfare facilities in Kam Tin South, concerned departments will review/explore the provision of GIC or social welfare facilities at the three public housing and GIC developments in Sites 1, 4a and 6 at detailed design stage.

9. Proposed Amendments to the Approved Kam Tin South OZP

The proposed amendments to the approved OZP are shown on the draft Kam Tin South OZP No. S/YL-KTS/13A at **Attachment II** for Members' consideration. Details of the amendment items are as follows:

Items A1 and A2 (about 6.21 ha and 2.76 ha respectively) (**Plans 2a to 2c, 3a-1 to 3a-3, and 3b-1 to 3b-3)**

9.1 Rezoning of the proposed public housing development at Sites 1 and 6 from "AGR" to "R(A)" with stipulation of BH restriction in accordance with paragraph 4.3 above.

Item A3 (about 7.06 ha) (**Plans 2a to 2c, and 3c-1 to 3c-4**)

9.2 Rezoning of the proposed public housing development at Site 4a from "OU(RU)" to "R(A)" with stipulation of BH restriction in accordance with paragraph 4.3 above.

Items B1 and B2 (about 1.73 ha and 0.73 ha respectively) **(Plans 2a to 2c, 3a-1 to 3a-3,** and **3b-1 to 3b-2 and 3b-4)**

9.3 Rezoning of two pieces of land to the east and west of the West Rail railway track respectively at Sites 1 and 6 from "AGR" to "G/IC" in accordance with paragraph 5.1 above.

Item C (about 0.70 ha) (**Plans 2a to 2c, and 3b-1 to 3b-2**)

9.4 Rezoning of a section of the existing Kam Ho Road and its roundabout to the south of the West Rail KSRS from "AGR" to area shown as 'Road' in accordance with paragraph 5.2 above.

10. Proposed Amendments to the Notes of the OZP (Attachment III)

The proposed amendments to the Notes of the OZP (with additions in ***bold and italics*** and deletions in '~~crossed out~~') are at **Attachment III** for Members' consideration. The proposed amendments are summarized as follows:

"R(A)" zone

10.1 Incorporation of a new set of Notes for the "R(A)" zone with stipulation of PR and BH restrictions with exemption clause for PR calculation and minor relaxation clause.

10.2 'Public vehicle park (excluding container vehicles)' use will be incorporated as a Column 1 use under the Notes of the "R(A)" zone to facilitate possible public vehicle park as mentioned in paragraph 7.5 above.

10.3 Incorporation of exemption clause for public vehicle park, GIC or social welfare facilities, as required by the Government, from PR calculation for the "R(A)" zone to allow flexibility to facilitate relevant facilities required by the Government taking into account the strong local demand as mentioned in paragraphs 7.5 and 8.5 above while not affecting the flat supply to meet the acute shortage of public housing developments. The provision of the relevant facilities is subject to the consideration of concerned departments and technical feasibility at detailed design stage. In general, public vehicle park, GIC or social welfare facilities are to be included in the PR calculation, so as to avoid excessive building bulk of the proposed development. Given the developments in "R(A)" zone are subject to a maximum PR of 3 and BH restriction of 69mPD and the proposed public housing developments will be guided by planning briefs, it is considered that the PR exemption will not result in excessive building bulk.

Technical amendments

10.4 Opportunity is also taken to revise the exemption clause for PR / GFA / site coverage calculation in relation to caretaker's quarters in the Remarks of the Notes for the "Comprehensive Development Area" ("CDA"), "Residential

(Group C)" ("R(C)"), "Residential (Group D)" ("R(D)"), "OU(Railway Station and Public Transport Interchange with Commercial/Residential Development)", "OU(Railway Depot with Commercial/Residential Development)" and "OU(Rural Use)" zones.

11. Revision to the ES of the OZP (Attachment IV)

The ES of the OZP has been revised to take into account the proposed amendments as mentioned in the above paragraphs. Opportunity has also been taken to update the general information for various land use zones to reflect the latest status and planning circumstances of the OZP. The proposed amendments to the ES of the OZP (with additions in ***bold and italics*** and deletions in '~~crossed out~~') are at **Attachment IV** for Members' consideration.

12. Plan Number

Upon gazetting, the Kam Tin South OZP will be renumbered as S/YL-KTS/14.

13. Consultation

Consultation with the Rural Committees (RCs) and District Council (DC)

13.1 The Kam Tin and Pat Heung RCs and the Yuen Long DC (YLDC) were consulted on 26.7.2017, 2.8.2017 and 5.9.2017 respectively regarding the proposed amendments to the Kam Tin South OZP. Their major comments are summarized as follows:

(a) The two RCs and YLDC noted the importance of providing public housing flats to meet the acute public housing demand.

(b) However, they raised concerns/comments on potential adverse traffic impact. Regarding the capacity of local roads to accommodate the future population of the proposed housing developments, they strongly requested for a definite implementation programme for the widening/upgrading of Kam Sheung Road, Kam Tin Road, a section of Lam Kam Road, and/or provision of a new slip road to address traffic problem in Kam Tin/Pat Heung south before implementation of housing developments in the area.

(c) They also requested the provision of adequate public car parking spaces, recreational, medical and educational facilities and raised concerns on land resumption/compensation arrangements.

13.2 The PHRC passed a motion (**Attachment VI**) and YLDC passed two motions (**Attachments VIIa** and **VIIb**) at the meeting on 2.8.2017 and 5.9.2017 respectively urging the Government to implement the road improvements works of Kam Sheung Road, Kam Tin Road and a section of Lam Kam Road before developing the Kam Tin/ Pat Heung south area.

13.3 In response, the assessments in paragraph 7 above have demonstrated that the proposed developments are technically feasible. In particular, the TIA reveals that there will be no unacceptable adverse traffic impact after the implementation of the proposed road improvement works. To address local concerns, Highways Department (HyD) is undertaking an investigation study for the proposed improvement of a section of Kam Tin Road and Lam Kam Road, subject to detailed design. CEDD will also carry out a study to review the traffic condition of Kam Sheung Road, and formulate improvement options (including the provision of an alternative road) where appropriate. The study is anticipated to commence in end 2017. Besides, the provision of open space and GIC facilities are generally adequate to meet the demand of the planned population. The proposed "G/IC" sites under Amendment **Items B1** and **B2** will be reserved for two primary schools, a GIC complex (including a clinic) and a sports centre. On the concern on compensation and rehousing arrangement, the Government will offer compensation, Ex-gratia Allowances and/or rehousing arrangements to the eligible affected parties in accordance with prevailing policies. Also, concerned departments will review the provision of public vehicle park at the three public housing and GIC developments in Sites 1, 4a and 6 at detailed design stage. In order not to affect the supply of public housing flats, there is provision of exemption clause for public vehicle park, GIC or social welfare facilities, as required by the Government, from PR calculation for the "R(A)" zone (paragraph 10.3 refers).

Departmental Consultation

13.4 The proposed amendments have been circulated to the following Government bureaux / departments and their comments (if any) have been incorporated into the proposed amendments to the OZP as appropriate:

(a) Secretary for Education;
(b) Secretary for Security;
(c) Secretary for Food and Health;
(d) Chief Architect/Central Management Division 2, Architectural Services Department;
(e) Chief Building Surveyor/New Territories West, Buildings Department;
(f) Chief Engineer/Construction, WSD;
(g) Chief Engineer/Mainland North, DSD;
(h) Chief Engineer/Land Drainage, DSD;
(i) Chief Engineer/Sewerage Projects, DSD;
(j) Chief Estate Surveyor/Railway Development, Lands Department (LandsD);
(k) Chief Engineer/Railway Development 2-2, Railway Development Office, Highways Department (HyD);
(l) Chief Highway Engineer/New Territories West, HyD;
(m) Chief Town Planning/Urban Design and Landscape, PlanD;
(n) Commissioner for Transport;
(o) Commissioner of Police;
(p) Director of Agriculture, Fisheries and Conservation;
(q) Director of Electrical and Mechanical Services;

(r) Director of Environmental Protection;
(s) Director General of Civil Aviation;
(t) Director of Fire Services;
(u) Director of Health;
(v) Director of Social Welfare;
(w) Director of Leisure and Cultural Services Department;
(x) Antiquities and Monuments Office, Leisure and Cultural Services Department;
(y) District Lands Officer/Yuen Long, LandsD;
(z) Chief Estate Survey/Acquisition, LandsD;
(aa) District Officer (Yuen Long), Home Affairs Department (HAD);
(bb) Senior Executive Officer, Division II, Headquarters, HAD;
(cc) Project Manager (New Territories West), CEDD;
(dd) Head of Geotechnical Engineering Office, CEDD;
(ee) Director of Housing;
(ff) Postmaster General;
(gg) Property Government Administrator; and
(hh) Director of Food and Environmental Hygiene.

Public Consultation

13.5 If the proposed amendments were agreed by the Committee, the draft OZP (to be re-numbered as S/YL-KTS/14 upon exhibition) and its Notes will be suitable for exhibition under section 5 of the Ordinance. Members of the public can submit representations on the OZP to the Board during the two-month statutory public inspection period. The YLDC and Kam Tin and Pat Heung RCs will be further consulted during the concerned OZP exhibition period.

14. Decision Sought

Members are invited to:

(a) agree to the proposed amendments to the approved Kam Tin South OZP No. S/YL-KTS/13 and that the draft Kam Tin South OZP No. S/YL-KTS/13A (to be renumbered as S/YL-KTS/14) at **Attachment II** and its Notes at **Attachment III** are suitable for exhibition for public inspection under section 5 of the Ordinance; and

(b) adopt the revised ES at **Attachment IV** for the draft Kam Tin South OZP No. S/YL-KTS/13A (to be renumbered as S/YL-KTS/14) as an expression of the planning intention and objectives of the Board for various land use zonings of the OZP and the revised ES will be published together with the draft OZP.

15. Attachments

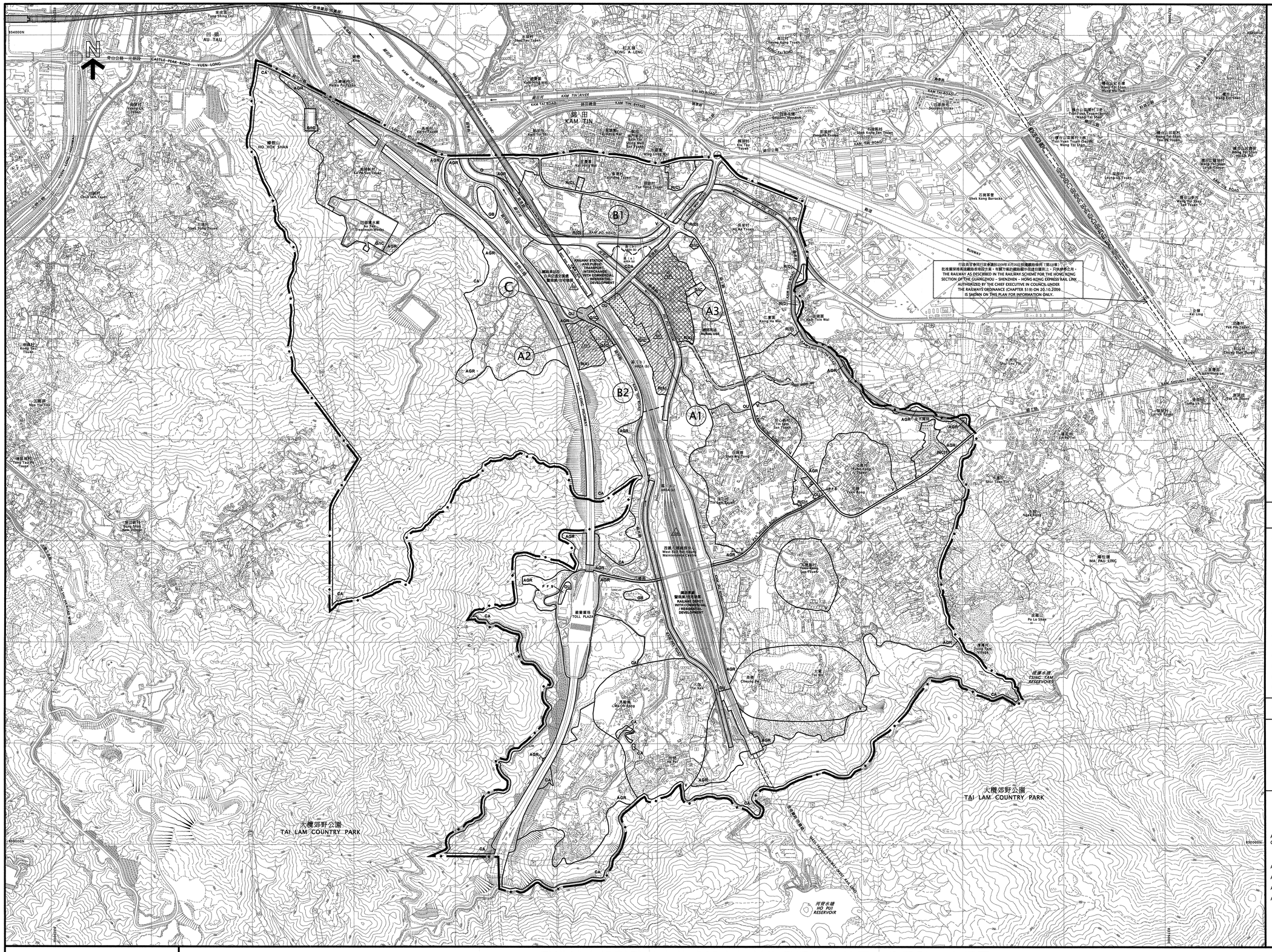
Attachment I	Approved Kam Tin South OZP No. S/YL-KTS/13 (reduced to A3 size)
Attachment II	Draft Kam Tin South OZP No. S/YL-KTS/13A

Attachment III	Notes of the draft Kam Tin South OZP No. S/YL-KTS/13A
Attachment IV	ES of the draft Kam Tin South OZP No. S/YL-KTS/13A
Attachment V	Provision of major GIC facilities and open space in Kam Tin South
Attachment VI	Motion passed in PHRC on 2.8.2017
Attachments VIIa and VIIb	Motions passed in YLDC on 5.9.2017
Attachment VIII	Traffic Impact Assessment
Attachment IX	Environmental Assessment
Attachment X	Visual Appraisal
Attachment XI	Air Ventilation Assessment (Expert Evaluation)
Attachment XII	Ecological Impact Assessment
Attachment XIII	Sewerage Impact Assessment
Attachment XIV	Drainage Impact Assessment
Attachment XV	Waterworks Impact Assessment

Plan 1	14 potential housing sites under the LUR
Plan 2a	Location plan of amendment items
Plan 2b	Site plan of amendment items
Plan 2c	Aerial photo of amendment items
Plans 3a-1 to 3a-3	Site plan, aerial photo and site photos of Amendment Items A1 and B1
Plans 3b-1 to 3b-4	Site plan, aerial photo and site photos of Amendment Items A2, B2 and C
Plans 3c-1 to 3c-4	Site plan, aerial photo and site photo of Amendment Item A3
Plan 4	Conceptual Layout Plan of the three public housing sites (Sites 1, 4a and 6)
Plan 5	Off-site road improvement works
Plans 6a to 6g	Photomontages for the proposed developments at the three public housing sites (Sites 1, 4a and 6)
Plan 7	Major building separations at the three public housing sites (Sites 1, 4a and 6)
Plan 8	Conceptual Landscape Master Plan

PLANNING DEPARTMENT
OCTOBER 2017


N
青山公路 - 元朗段 CASTLE PEAK ROAD - YUEN LONG
AU TAU
KAM TIN
KAM TIN RIVER
KAM TIN BYPASS
KAM TIN ROAD
CHO HOO ROAD
KAM TAI ROAD
KAM SHEUNG ROAD
YUEN LONG HIGHWAY
MASS TRANSIT RAILWAY (MTR) EAST RAIL LINE
HO HOK SHAN
KONG A LENG
SHUI TAU TSUEN
CHUNG KONG TSUEN
SHEK KONG BARRACKS
SHEUNG YUE RIVER
SHEUNG YUE RIVER TRAINING CHANNEL
RAILWAY STATION AND PUBLIC TRANSPORT INTERCHANGE WITH COMMERCIAL / RESIDENTIAL DEVELOPMENT
RURAL USE
AREA (a)
AREA (b)
KCRC West Rail Fan Heung Maintenance Centre
RAILWAY DEPOT WITH COMMERCIAL / RESIDENTIAL DEVELOPMENT
TOLL PLAZA
TSING LONG HIGHWAY
TSING LONG HIGHWAY
TSING LONG HIGHWAY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KAM TIN RIVER
KAM TIN ROAD
KAM TAI ROAD
KAM SHEUNG ROAD
SHUEN WAN ROAD
YUEN LONG HIGHWAY
SHEUNG YUE RIVER
TSING LONG HIGHWAY
TUEN MUN - CHEK LAP KOK TUNNEL
TUEN MUN - CHEK LAP KOK ROAD - NORTH
TUEN MUN - CHEK LAP KOK ROAD - SOUTH
TUEN MUN - CHEK LAP KOK EXPRESSWAY
MAN KAM TO BOUNDARY CROSSING FACILITIES
SHUM MEI ROAD
SHUM MEI ROAD WEST
KAM TIN BYPASS
KAM TIN SOUTH BYPASS
KAM TIN BYPASS
KAM TIN BYPASS WEST
KAM TIN BYPASS EAST
KAM TIN BYPASS SOUTH
KAM TIN BYPASS SOUTH WEST
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KAM TIN BYPASS NORTH

Attachment III of
RNTPC Paper No. 8/17

APPROVED***DRAFT*** KAM TIN SOUTH OUTLINE ZONING PLAN NO. S/YL-KTS/13***A***

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

NOTES

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

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

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

(3) 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 interim development permission area 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 interim development permission area 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 interim development permission area 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 interim development permission area 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 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 interim development permission area 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;

(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*** KAM TIN SOUTH
OUTLINE ZONING PLAN NO. S/YL-KTS/13***A***

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COMMERCIAL

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
Ambulance Depot Commercial Bathhouse/Massage Establishment Eating Place Education Institution Exhibition or Convention Hall Government Use (not elsewhere specified) Information Technology and Telecommunications Industries Institutional Use (not elsewhere specified) Library Off-course Betting Centre Place of Entertainment Place of Recreation, Sports or Culture Private Club Public Clinic Public Convenience Public Transport Terminus or Station Public Utility Installation Public Vehicle Park (excluding container vehicle) Recyclable Collection Centre Religious Institution School Shop and Services Social Welfare Facility Training Centre Utility Installation for Private Project	Broadcasting, Television and/or Film Studio Government Refuse Collection Point Hospital Office Petrol Filling Station

Planning Intention

This zone is intended primarily for commercial developments, which may include shop, services, place of entertainment and eating place, functioning mainly as local shopping centre serving the neighbourhood.

(Please see next page)

COMMERCIAL (cont'd)

Remarks

(a) 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 non-domestic gross floor area (GFA) of 1,280 m^2, a maximum site coverage of 40% and a maximum building height of 2 storeys (including basement), or the GFA, site coverage and height of the existing building, whichever is the greater.

(b) In determining the maximum GFA 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, 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 GFA, 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.

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
	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 Rural Committee/Village Office 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 primarily for comprehensive development/redevelopment of the area for residential use with the provision of commercial, open space and other supporting facilities, if any. 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" 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 sizes, 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) a visual impact assessment report (including photomontages) to examine any possible visual impact that may be caused to or by the proposed development and the proposed mitigation measures to tackle them;

(viii) 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;

(Please see next page)

COMPREHENSIVE DEVELOPMENT AREA (cont'd)

Remarks (cont'd)

(ix) 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;

(x) 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

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

(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 a maximum plot ratio of 0.4 and a maximum building height of 3 storeys (9m). No building development is permitted in Area (b) which shall be designated as a landscaped area for public use.

(d) 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.

(e) 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***, or*** ~~and~~ caretaker's quarters~~, or~~ ***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.

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)*** ***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*** ***Religious Institution (not elsewhere specified)*** ***School (not elsewhere specified)*** ***Shop and Services*** ***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 medium-density residential developments. Commercial uses are always permitted on the lowest three floors of a building or in the purpose-designed non-residential portion of an existing building.

Remarks

(a) ***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 3 and a maximum building height in terms of metres above Principal Datum as stipulated on the Plan, or the plot ratio and height of the existing building, whichever is the greater.***

(b) ***In determining the maximum plot ratio for the purpose 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. Any floor space that is constructed or intended for use solely as public vehicle park, GIC or social welfare facilities, as required by the Government, may also be disregarded.***

(c) ***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.***

RESIDENTIAL (GROUP C)

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 Utility Installation for Private Project	Ambulance Depot Eating Place Educational Institution Government Refuse Collection Point Government Use (not elsewhere specified) Institutional Use (not elsewhere specified) Library 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 Rural Committee/Village Office School Shop and Services Social Welfare Facility Training Centre

Planning Intention

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

(Please see next page)

RESIDENTIAL (GROUP C) (cont'd)

Remarks

(a) On land designated "Residential (Group 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 0.8, a maximum site coverage of 40% and a maximum building height of 4 storeys (12m), 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 interim development permission area plan, whichever is the greater.

(b) On land designated "Residential (Group C)1", no new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of a maximum plot ratio of 0.4 and a maximum building height of 3 storeys (9m) 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 interim development permission area plan, whichever is the greater.

(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 paragraphs (a) and (b) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

(d) In determining the maximum plot ratio for the purposes of paragraphs (a) and (b) 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*** ~~and~~ caretaker's quarters~~,~~ ~~or~~ ***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.

(e) In determining the maximum site coverage for the purpose of paragraph (a) above, any floor space that is constructed or intended for use solely as loading/unloading bay, plant room, plant room~~,~~ ***and*** caretaker's office***, or*** ~~and~~ caretaker's quarters~~, or~~ ***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.

RESIDENTIAL (GROUP D)

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 (Redevelopment; Addition, Alteration and/or Modification to existing house only) On-Farm Domestic Structure Rural Committee/Village Office	Eating Place Flat Government Refuse Collection Point Government Use (not elsewhere specified) # House (not elsewhere specified) 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 # 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

Planning Intention

This zone is intended primarily for improvement and upgrading of existing temporary structures within the rural areas through redevelopment of existing temporary structures into permanent buildings. It is also intended for low-rise, low-density residential developments subject to planning permission from the Town Planning Board.

(Please see next page)

RESIDENTIAL (GROUP D) (cont'd)

Remarks

(a) No addition, alteration and/or modification to or in-situ redevelopment of an existing temporary structure or an existing building (except to 'New Territories Exempted House' or to those annotated with #) shall result in a total development and/or redevelopment in excess of a maximum building area of 37.2m^2 and a maximum building height of 2 storeys (6m), or the building area and height of the building which was in existence on the date of the first publication in the Gazette of the notice of the interim development permission area plan, whichever is the greater.

(b) No development including redevelopment for 'Flat' and 'House' (except 'New Territories Exempted House') uses, other than those to which paragraph (a) above shall apply, shall result in a development and/or redevelopment in excess of a maximum plot ratio of 0.2 and a maximum building height of 2 storeys (6m).

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

(d) In determining the maximum plot ratio for the purposes of paragraph (b) 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*** ~~and~~ caretaker's quarters~~,~~ ~~or~~ ***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.

(e) Any filling of 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 interim development permission area plan without the permission from the Town Planning Board 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 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 interim 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 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 interim development permission area plan without the permission from the Town Planning Board under section 16 of the Town Planning Ordinance.

GOVERNMENT, INSTITUTION OR COMMUNITY

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
Ambulance Depot Animal Quarantine Centre (in Government building only) Broadcasting, Television and/or Film Studio 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 Institution 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 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) Off-course Betting Centre Office Petrol Filling Station Place of Entertainment Private Club Radar, Telecommunications Electronic Microwave Repeater, Television and/or Radio Transmitter Installation Residential Institution Sewage Treatment/Screening Plant Shop and Services 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	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.

Remarks

Any filling of pond or excavation of land, including that to effect a change of use to any of those specified in Columns 1 or 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 interim development permission area plan without the permission from the Town Planning Board under section 16 of the Town Planning Ordinance.

OTHER SPECIFIED USES

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

For "Railway Station and Public Transport Interchange with Commercial/Residential Development" only

Ambulance Depot
Eating Place
Educational Institution
(in a commercial building or in the purpose-designed non-residential portion[@] of a building only)
Flat
Government Use (not elsewhere specified)
Library
Market
Off-course Betting Centre
Office
Place of Entertainment
Place of Recreation, Sports or Culture
Private Club
Public Clinic
Public Convenience
Public Transport Terminus or Station
Public Utility Installation
Public Vehicle Park (excluding container vehicle)
Railway Station
Railway Track
Religious Institution
Residential Institution
School (in a free-standing purpose-designed school building, in a commercial building or in the purpose-designed non-residential portion[@] of a building only)
Shop and Services
Social Welfare Facility
Utility Installation for Private Project

Commercial Bathhouse/Massage Establishment
Educational Institution (not elsewhere specified)
Government Refuse Collection Point
Institutional Use
Petrol Filling Station
Recyclable Collection Centre
School (not elsewhere specified)
Training Centre

@ Excluding floors containing wholly or mainly car parking, loading/unloading bay and/or plant room

Planning Intention

This zone is intended primarily to provide land for railway station and a public transport interchange with commercial/residential development.

(Please see next page)

OTHER SPECIFIED USES (cont'd)

For "Railway Station and Public Transport Interchange with Commercial/Residential Development" only (cont'd)

Remarks

(a) No new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of a maximum domestic gross floor area (GFA) of 186,234 m^2, a maximum non-domestic GFA of 53,535 m^2 and a maximum building height in terms of metres above Principal Datum as stipulated on the Plan.

(b) In determining the maximum GFA for the purposes of paragraph (a) above:

(i) any floor space that is constructed or intended for use solely as car park, loading/unloading bay, plant room~~,~~ ***and*** caretaker's office***, or*** ~~and~~ caretaker's quarters~~, or~~ ***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; and

(ii) any floor space that is constructed or intended for use solely as public transport facilities (including public transport interchange, public bicycle parking, park-and-ride and pick-up and drop-off facilities), railway station and associated facilities, as required by the Government, or covered walkway may also be disregarded.

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

(Please see next page)

OTHER SPECIFIED USES (cont'd)

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

For "Railway Depot with Commercial/Residential Development" only

Ambulance Depot
Eating Place
Educational Institution
(in a commercial building or in the purpose-designed non-residential portion[@] of a building only)
Flat
Government Use (not elsewhere specified)
Library
Market
Off-course Betting Centre
Office
Place of Entertainment
Place of Recreation, Sports or Culture
Private Club
Public Clinic
Public Convenience
Public Transport Terminus or Station
Public Utility Installation
Public Vehicle Park (excluding container vehicle)
Railway Depot
Railway Track
Religious Institution
Residential Institution
School (in a free-standing purpose-designed school building, in a commercial building or in the purpose-designed non-residential portion[@] of a building only)
Shop and Services
Social Welfare Facility
Utility Installation for Private Project

Commercial Bathhouse/Massage Establishment
Educational Institution (not elsewhere specified)
Government Refuse Collection Point
Institutional Use
Petrol Filling Station
Recyclable Collection Centre
School (not elsewhere specified)
Training Centre

@ Excluding floors containing wholly or mainly car parking, loading/unloading bay and/or plant room

Planning Intention

This zone is intended primarily to provide land for railway depot with commercial/residential development.

(Please see next page)

OTHER SPECIFIED USES (cont'd)

For "Railway Depot with Commercial/Residential Development" only (cont'd)

Remarks

(a) No new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of a maximum domestic gross floor area (GFA) of 422,340 m^2, a maximum non-domestic GFA of 3,000 m^2 and a maximum building height in terms of metres above Principal Datum as stipulated in Area (a) on the Plan.

(b) No building development (except ancillary structures) is permitted in Area (b) which shall be designated as a landscaped pedestrian linkage.

(c) In determining the maximum GFA for the purposes of paragraph (a) above:

(i) any floor space that is constructed or intended for use solely as car park, loading/unloading bay, plant room~~,~~ ***and*** caretaker's office***, or*** ~~and~~ caretaker's quarters~~, or~~ ***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; and

(ii) any floor space that is constructed or intended for use solely as railway depot and associated facilities, primary school, secondary school, as required by the Government, or covered walkway may also be disregarded.

(d) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the GFA, building height and no building development 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.

(Please see next page)

OTHER SPECIFIED USES (cont'd)

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

For "Rural Use" only

Agricultural Use
Barbecue Spot
Field Study/Education/Visitor Centre
Government Use (Police Reporting Centre, Post Office only)
On-Farm Domestic Structure
Picnic Area
Place of Recreation, Sports or Culture (Horse Riding School, Hobby Farm, Fishing Ground only)
Public Convenience
Religious Institution (Ancestral Hall only)
Rural Committee/Village Office
Tent Camping Ground

Animal Boarding Establishment
Broadcasting, Television and/or Film Studio
Burial Ground
Driving School
Eating Place
Flat
Golf Course
Government Refuse Collection Point
Government Use (not elsewhere specified) #
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)
Institutional Use (not elsewhere specified) #
Market
Petrol Filling Station
Place of Recreation, Sports or Culture (not elsewhere specified)
Private Club
Public Clinic
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

Planning Intention

This zone is intended primarily for the preservation of the character of the rural area. Uses or developments compatible with the rural landscape, such as passive recreation uses and a selected range of rural uses, may be allowed on application to the Town Planning Board, with a view to upgrading or improving the area or providing support to the local communities.

(Please see next page)

OTHER SPECIFIED USES (cont'd)

For "Rural Use" only (cont'd)

Remarks

(a) No new development, or addition, alteration and/or modification to or redevelopment of an existing building (except development or redevelopment to 'New Territories Exempted House' or to those annotated with #) 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 3 storeys (9m), 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 interim development permission area plan, whichever is the greater.

(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) 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*** ~~and~~ caretaker's quarters~~, or~~ ***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) Any filling of 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 interim development permission area plan without the permission from the Town Planning Board under section 16 of the Town Planning Ordinance.

(Please see next page)

OTHER SPECIFIED USES (cont'd)

Column 1 Uses~~s~~ always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
For "Petrol Filling Station" only	
Petrol Filling Station	Public Utility Installation

Planning Intention

This zone is intended primarily for the provision of petrol filling station serving the needs of the district.

AGRICULTURE

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 only) On-Farm Domestic Structure Public Convenience Religious Institution (Ancestral Hall only) Rural Committee/Village Office	Animal Boarding Establishment Barbecue Spot Burial Ground Field Study/Education/Visitor Centre Government Refuse Collection Point Government Use (not elsewhere specified) House (New Territories Exempted House only, other than rebuilding of New Territories Exempted House or replacement of existing domestic building by New Territories Exempted House permitted under the covering Notes) Picnic Area Place of Recreation, Sports or Culture (Horse Riding School, Hobby Farm, Fishing Ground only) Public Utility Installation Religious Institution (not elsewhere specified) School Utility Installation for Private Project

Planning Intention

This zone is intended primarily to retain and safeguard good quality agricultural land/farm/fish ponds for agricultural purposes. It is also intended to retain fallow arable land with good potential for rehabilitation for cultivation and other agricultural purposes.

Remarks

(a) Any filling of pond, 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 interim development permission area plan without the permission from the Town Planning Board under section 16 of the Town Planning Ordinance.

(Please see next page)

AGRICULTURE (cont'd)

Remarks (cont'd)

(b) Any filling 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 Kam Tin South Outline Zoning Plan No. S/YL-KTS/8 without the permission from the Town Planning Board under section 16 of the Town Planning Ordinance. This restriction does not apply to filling of land specifically required under prior written instructions of Government department(s) or for the purposes specified below:

(i) laying of soil not exceeding 1.2m in thickness for cultivation; or

(ii) construction of any agricultural structure with prior written approval issued by the Lands Department.

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 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

(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 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 interim 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 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) Picnic Area 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 and to separate sensitive natural environment such as Country Park from the adverse effects of development.

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 projects 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 interim 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, shall not be undertaken or continued on or after the date of the first publication in the Gazette of the notice of the interim development permission area plan without the permission from the Town Planning Board under section 16 of the Town Planning Ordinance.

Attachment IV of
RNTPC Paper No. 8/17

~~APPROVED~~***DRAFT*** KAM TIN SOUTH OUTLINE ZONING PLAN NO. S/YL-KTS/13***A***

EXPLANATORY STATEMENT

EXPLANATORY STATEMENT

~~APPROVED~~***DRAFT*** KAM TIN SOUTH OUTLINE ZONING PLAN NO. S/YL-KTS/13***A***

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~~APPROVED~~ DRAFT KAM TIN SOUTH OUTLINE ZONING PLAN NO. S/YL-KTS/13***A***

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

EXPLANATORY STATEMENT

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

1. INTRODUCTION

This Explanatory Statement is intended to assist an understanding of the ~~approved~~ ***draft*** Kam Tin South Outline Zoning Plan (OZP) No. S/YL-KTS/13***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 The land covered by the Kam Tin South OZP was previously included in the Kam Tin South Interim Development Permission Area (IDPA) Plan and the Kam Tin South Development Permission Area (DPA) Plan.

2.2 On 5 October 1990, the Kam Tin South IDPA Plan No. IDPA/YL-KTS/1 prepared by the Director of Planning was notified in the Gazette. The draft Kam Tin South DPA Plan No. DPA/YL-KTS/1 was exhibited for public inspection under section 5 of the Town Planning Ordinance (the Ordinance) on 12 July 1991. On 26 April 1994, the draft DPA Plan was approved by the then Governor in Council under section 9(1)(a) of the Ordinance and renumbered as DPA/YL-KTS/2.

2.3 On 17 May 1993, 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 Kam Tin South area.

2.4 On 17 June 1994, the draft Kam Tin South OZP No. S/YL-KTS/1 was exhibited for public inspection under section 5 of the Ordinance. Subsequently, the draft OZP was amended twice on 12 February 1999 and 6 August 1999, and exhibited for public inspection under section 7 of the

Ordinance. On 26 October 1999, the Chief Executive in Council (CE in C), under section 9(1)(a) of the Ordinance, approved the draft Kam Tin South OZP, which was subsequently renumbered as S/YL-KTS/4.

2.5 On 25 January 2000, the CE in C referred the approved Kam Tin South OZP No. S/YL-KTS/4 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. The OZP was subsequently amended five times and exhibited under section(s) 5, 6(7) or 7 of the Ordinance. On 26 June 2007, the CE in C, under section 9(1)(a) of the Ordinance, approved the draft Kam Tin South OZP, which was subsequently renumbered as S/YL-KTS/11.

2.6 On 3 May 2011, the CE in C referred the approved Kam Tin South OZP No. S/YL-KTS/11 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 20 May 2011 under section 12(2) of the Ordinance.

2.7 On 29 May 2015, the draft Kam Tin South OZP No. S/YL-KTS/12, incorporating mainly amendments to rezone areas shown as 'Railway' and adjoining land of "Agriculture" ("AGR") zone to "Other Specified Uses" ("OU") annotated "Railway Station and Public Transport Interchange with Commercial/Residential Development" and "OU" annotated "Railway Depot with Commercial/Residential Development" zones; a site under "OU" annotated "Petrol Filling Station" and "Residential (Group C)1" zones to "Commercial" ("C") zone; and imposition of development restrictions on the "OU" annotated "Railway Station and Public Transport Interchange with Commercial/Residential Development", "OU" annotated "Railway Depot with Commercial/Residential Development" and "C" zones, was exhibited for public inspection under section 5 of the Ordinance. During the two-month exhibition period, a total of 55 representations were received. On 28 August 2015, the Board published the representations for three weeks for public comments and a total of 330 comments were received. After giving consideration to the representations and comments, the Board on 11 March 2016 decided not to uphold the representations.

2.8 On 20 April 2016, 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 six months from 29 April 2016 to 29 October 2016.

2.9 On 30 August 2016, the CE in C, under section 9(1)(a) of the Ordinance, approved the draft Kam Tin South OZP, which was subsequently re-numbered as S/YL-KTS/13. On 9 September 2016, the approved Kam Tin South OZP

No. S/YL-KTS/13 ~~(the Plan)~~ was exhibited for public inspection under section 9(5) of the Ordinance.

2.10 On 7 February 2017, the CE in C referred the approved Kam Tin South OZP No. S/YL-KTS/13 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 17 February 2017 under section 12(2) of the Ordinance.

2.11 On _____, the draft Kam Tin South OZP No. S/YL-KTS/14 (the Plan), incorporating amendments mainly to rezone two sites near the West Rail Kam Sheung Road Station from "AGR" zone to "Residential (Group A)" ("R(A)") zone, and another site nearby from "OU" annotated "Rural Use" ("OU(RU)") zone to "R(A)" zone to facilitate public housing developments; two sites at Tung Wui Road and Kam Ho Road from "AGR" zone to "Government, Institution or Community" zone for schools and other Government, institution or community (GIC) uses; and imposition of development restrictions on the "R(A)" zone, 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 transport networks for the Kam Tin South 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 only. It is a small scale plan and the road alignments and boundaries between the land-use zones may be subject to minor alterations as detailed planning proceeds.

3.3 Since the Plan is to show broad land-use zonings, there would be situations in which small strips of land not intended for building development purposes and carry no development right under the lease, such as 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 calculation. Development within residential zones should be restricted to building lots carrying development right in order to maintain the character and amenity of the Kam Tin South area and not to overload the road network in this area.

4. NOTES OF THE PLAN

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

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

5. THE PLANNING SCHEME AREA

5.1 The Area is about 785 ha. It is located in the south-eastern part of the North West New Territories (NWNT). It is bounded by the Shek Kong Barracks and Ma Pau Ling in the east, Kam Tin Road in the north, Ho Hok Shan in the west and the Tai Lam Country Park in the south. The boundary of the Area is shown by a heavy broken line on the Plan.

5.2 The boundary of the Area is delineated having regard to physical and topographical features such as roads, drainage channels 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 should not have implications on development rights, particularly Small House applications.

5.3 The Area mainly comprises a steep upland portion in the western part whereas the remaining area is predominantly low-lying flat land and in the form of a series of broad alluvial valley floors draining into the Kam Tin River. The lowland is characterized by parcels of farmland. Several villages and open storage and other rural industrial-related activities are found along Kam Tin Road and Kam Sheung Road. The southern portion is an area of flat alluvial plain linking the foothills of Tai Mo Shan to the lower hills of the Ho Pui area. In recent years, large pieces of agricultural land, particularly those located along Kam Tin Road and Kam Sheung Road, have been filled up and

converted into open storage uses.

5.4 Two Sites of Archaeological Interest, namely Ho Pui and Ho Pui Trackway are located within the Area. One declared monument, Leung Ancestral Hall and a number of graded historic buildings are located within the Area. Details of these historic buildings have been uploaded onto the official website of the Antiquities Advisory Board (AAB) at http://www.aab.gov.hk. The sites of archaeological interest, declared monument and graded historic buildings are worthy of preservation. Prior consultation with the Antiquities and Monuments Office (AMO) of the Leisure and Cultural Services Department should be made if any development, redevelopment or rezoning proposal might affect the sites of archaeological interest, monument, graded/proposed graded historic buildings/structures and new items pending for grading assessment and their immediate environs.

5.5 The Area falls within the area affected by the height restriction of the Shek Kong Airfield. Details should be referred to the Plan of the Shek Kong Airfield Height Restriction (AHR) No. YLM6917a prepared by the Lands Department. Developments in the Area would be subject to aircraft noise and other associated constraints arising from the aircraft operations at the Shek Kong Airfield.

6. POPULATION

6.1 According to the 2011 Population Census, the population of the Area was about 14,500 persons. The population concentrates in and around several recognized villages in the Area including Ma On Kong, Ho Pui, Cheung Po, Tai Kek, Tai Wo***r***, Shek Wu Tong, Tin Sam ~~Tsuen~~, Yuen Kong, Yuen Kong San Tsuen, Kat Hing Wai, Tai Hong ~~Tsuen~~ ***Wai, Wing Lung Wai, Kam Tin Shi*** and ~~Tsz~~ ***Chi*** Tong Tsuen.

6.2 Future expansion of population will be concentrated in the areas zoned for residential use along Kam Sheung Road and Kam Tin Road. It is estimated that the planned population for the Area will reach about ~~37,490~~ ***62,690***.

7. OPPORTUNITIES AND CONSTRAINTS

7.1 Opportunities

7.1.1 There are a number of agricultural lots under active cultivation in the

Area. A number of infrastructural improvement works such as irrigation facilities, drainage channels and farm accesses have been constructed. As such, there are ample opportunities for agricultural development in the Area.

7.1.2 With the completion of Tsing Long Highway and the West Rail which run through the western part of the Area, the accessibility of the Area has been greatly enhanced. The Area would be subject to development pressure.

7.1.3 Development of the West Rail Kam Sheung Road Station is in line with the Government policy for rail-based development to facilitate fast and mass movement of people in an environmentally friendly mode of transport. Opportunities exist to make better use of valuable land resources atop/in proximity to the railway station.

7.1.4 Kam Tin South and the adjoining area in Pat Heung are one of the earliest residential settlements in Hong Kong. Appropriate level of new developments and effective use of land and infrastructure resources would add vibrancy to this rural area. Development proposals with good urban design, appropriate development intensity and provision of appropriate community facilities and open space would also act as a catalyst to gradually improve the visual and environmental quality of the Area.

7.2 Development Constraints

7.2.1 There are many well-established recognized villages in the Area. Sufficient land has to be reserved to meet Small House demand of the indigenous villagers as well as for future expansion of the villages.

7.2.2 The areas fringing the western boundaries are hilly and thus unsuitable for development. Development would therefore be confined to the valley floors within the Area.

7.2.3 There are no public sewers and limited ducted drainage system in the Area. Urban type development should be kept to an appropriate scale to avoid having adverse effect on the environment until improvement schemes are implemented.

7.2.4 The low-lying areas in Kam Tin South are subject to flooding hazard. Developments in these areas should avoid the flood fringes until

improvement schemes are implemented.

7.2.5 The West Rail and the proposed Northern Link and their associated railway facilities, the nearby major roads and rural industrial uses would impose constraints on developments. Mitigation measures will be required when developments proceed.

7.2.6 The Kam Tin South area consists of a number of ecological habitats including abandoned egretries, streams/abandoned meanders/drainage channels and mitigation woodlands and wetlands, etc. Any direct or indirect ecological impact should be avoided.

7.2.7 The declared monument, graded historic buildings and sites of archaeological interest as mentioned in paragraph 5.4 above are worthy of preservation. Prior consultation with the AMO should be made if any development, redevelopment or rezoning proposal might affect the sites of archaeological interest, monument, graded/proposed graded historic buildings/structures and new items pending for grading assessment and their immediate environs.

7.2.8 There are 400kV overhead lines passing through the western and southern edges of the Area, relevant guidelines in Chapter 7 of the Hong Kong Planning Standards and Guidelines regarding developments in the vicinity of the 400kV overhead lines and safety clearances from these lines should be observed.

7.2.9 Existing water supply system in some sites of the Area has already been committed. 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.

8. GENERAL PLANNING INTENTION

8.1 The planning intention for the Area is to facilitate appropriate scale of development near the West Rail Kam Sheung Road Station to optimize the use of land and to channel suburban type uses to appropriate areas. The types of developments include private ***and public*** residential developments, village housing, and environmental and infrastructural improvements. Also, good quality agricultural land especially those under active cultivation will be retained as appropriate.

8.2 In the designation of various zones in the Area, considerations have been given to the natural environment, physical landform, existing settlements, land status, availability of infrastructure and local development pressures. Moreover, buildings and places of historical and archaeological interests in the Area should be preserved as far as possible.

9. LAND-USE ZONINGS

9.1 "Commercial" ("C") : Total Area: 0.17 ha

9.1.1 This zone is intended primarily for commercial developments, which may include shop, services, place of entertainment and eating place, functioning mainly as local shopping centre serving the neighbourhood. Development in this zone is restricted to a maximum non-domestic gross floor area (GFA) of 1,280 m^2, a maximum site coverage of 40% and a maximum building height of 2 storeys (including basement). To provide flexibility for innovative design adapted to the characteristics of particular sites, minor relaxation of the GFA, 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 planning merits.

9.1.2 The site, which is adjacent to a petrol filling station with liquefied petroleum gas (LPG) facilities, would be subject to risk constraints. The respective developer(s) should conduct a quantitative risk assessment to ascertain that the risk levels posed by the LPG facilities to the surrounding, taking into account the final design and layout of the proposed development at the site, are still in compliance with the government risk guidelines stated in the Hong Kong Planning Standards and Guidelines.

9.2 "Comprehensive Development Area" ("CDA") : Total Area: 2.51 ha

9.2.1 This zone is intended primarily for comprehensive development/ redevelopment of the area for residential use with the provision of commercial, open space and other supporting facilities, if any. 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. Any development/redevelopment proposal on site under this zoning should be submitted in the form of a Master Layout Plan (MLP) to the Board for consideration. When approved by the Board,

a copy of the approved MLP shall be made available for public inspection in the Land Registry pursuant to section 4A(3) of the Ordinance.

9.2.2 With regard to the need of preserving the natural landscape and private development right, a triangular site bounded by Kam Tin River to the north, Tung Wui Road to the south-east and Kam Po Road to the south-west is zoned "CDA" with a maximum plot ratio of 0.4 and a maximum building height of 3 storeys (9m). Area (b) at the northern part of the site shall be designated as a landscaped area for public use and no building development is permitted. Existing trees and abandoned meander retained under the drainage project within the zone should be preserved as far as practicable. Minor boundary adjustment of Areas (a) and (b) may be permitted at the MLP submission stage.

9.2.3 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 planning merits.

9.3 Residential (Group A) ("R(A)") : Total Area : 16.03 ha

9.3.1 This zone is intended for medium-density public housing developments. Commercial uses are always permitted on the lowest three floors of a building or in the purpose-designed non-residential portion of an existing building.

9.3.2 Developments and/or redevelopments in areas zoned "R(A)" are subject to a maximum plot ratio of 3 and a maximum building height of 69 metres above Principal Datum (mPD) (including roof-top structures).

9.3.3 There is a demand for public vehicle parks, GIC or social welfare facilities to serve the local needs. In order to facilitate provision of public vehicle park, GIC or social welfare facilities while not affecting the provision of public housing flats, in determining the maximum plot ratio of the developments and/or redevelopments, any floor space that is constructed or intended for use solely as public vehicle park, GIC or social welfare facilities, as required by the Government, may be disregarded in the calculation of plot ratio.

9.3.4 ***An expert evaluation on air ventilation assessment (AVA(EE)) has been conducted in support of the public housing development. Considering the site constraints as well as other design considerations, various design measures including non-building areas (NBAs), building separations, setbacks, minimization of podium coverage and open void at ground level have been proposed to promote air movement. As recommended in the AVA(EE), quantitative air ventilation studies are required for individual development for scheme optimization at detailed design stage. The requirement of quantitative AVA studies and mitigation measures for individual public housing site(s) will be incorporated in the respective planning brief(s) for implementation as appropriate.***

9.3.5 ***To take forward the proposed public housing developments, planning brief(s) will be prepared to set out the planning parameters and the design requirements of individual sites as well as the detailed technical studies to be undertaken by the Housing Department at the detailed design stage.***

9.3.6 ***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 Residential (Group C) ("R(C)") : Total Area : 11.74 ha

9.4.1 This zone is intended primarily for low-rise, low-density residential developments where commercial uses serving the residential neighbourhood may be permitted on application to the Board. It is also the intention to recognize the committed private residential developments and to reflect the "Residential (Zone 3)" ("R3") zoning on the adopted Kam Tin Layout Plan.

9.4.2 On land zoned "R(C)", residential developments are restricted to a maximum plot ratio of 0.8, a maximum site coverage of 40% and a maximum building height of 4 storeys (12m). Reference should be made to the adopted Kam Tin Layout Plan when detailed planning proceeds.

9.4.3 There are three sites designated as "R(C)". The areas to south of Kat Hing Wai abutting Kam Sheung Road, and to the east of ~~Tsz~~ ***Chi*** Tong

Tsuen are zoned "R(C)" in conforming with the adopted Kam Tin Layout Plan, whereas the small site to the immediate south of Kat Hing Wai is an existing residential development.

9.4.4 For area designated as "R(C)1", residential developments are restricted to a maximum plot ratio of 0.4 and a maximum building height of 3 storeys (9m) including car park. The areas within this zone are located to the east of Tin Sam ~~Tsuen~~ abutting Pat Heung Road and to the north-east of Yuen Kong abutting Kam Sheung Road.

9.4.5 To provide flexibility for innovative design adapted to the characteristics of particular sites, minor relaxation of the restrictions stated in paragraphs ~~9.3.2~~ ***9.4.2*** and ~~9.3.4~~ ***9.4.4*** above may be considered by the Board through the planning permission system. Each proposal will be considered on its individual planning merits.

9.4.6 Since the areas along Kam Tin Road and Kam Sheung Road would be subject to severe traffic noise impact, any proposed development near the roads should provide adequate mitigation measures to minimize such impact.

9.5 Residential (Group D) ("R(D)") : Total Area : 31.96 ha

9.5.1 The planning intention of this zone is primarily to improve and upgrade the existing temporary structures within the rural area to permanent buildings. Replacement housing for temporary structures shall not result in a total redevelopment in excess of a maximum building area of 37.2m^2 and a maximum building height of 2 storeys (6m).

9.5.2 Apart from the intention of residential upgrading, very low-rise and low-density residential development may be permitted on application to the Board. To be in line with the development intensity of existing domestic accommodation within the zone, residential development (other than New Territories Exempted House) 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 prove to the Board that the proposed development would have no or minimal adverse effects on the environment. To provide flexibility for innovative design adapted to the characteristics of particular sites, minor relaxation of the above restrictions may be considered by the Board through the planning permission system. Each proposal will

be considered on its individual planning merits.

9.5.3 The areas to the east of Kam Sheung Road at Ng Ka Tsuen are zoned "R(D)". The areas along the road are now occupied by some temporary workshops and open storage yards. Areas further away from the road are mainly developed for agricultural and residential purposes.

9.5.4 Since the areas along Kam Tin Road and Kam Sheung Road would be subject to severe traffic noise impact, any proposed development near the roads should provide adequate mitigation measures to minimize such impact.

9.6 Village Type Development ("V") : Total Area : 119.14 ha

9.6.1 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.

9.6.2 The recognized villages in the Area include Ma On Kong, Ho Pui, Cheung Po, Tai Kek, Tai Wo***r***, Shek Wu Tong, Tin Sam ~~Tsuen~~, Yuen Kong, Yuen Kong San Tsuen, Kat Hing Wai, Tai Hong ~~Tsuen~~ ***Wai, Wing Lung Wai, Kam Tin Shi*** and ~~Tsz~~ ***Chi*** Tong Tsuen.

9.6.3 The boundaries of the "V" zones are drawn up having regard to the existing village environs, outstanding Small House demands for the next ten years, topography and site constraints. Areas of difficult terrain, dense vegetation, stream courses and burial grounds have been avoided. Village expansion areas and other infrastructural improvements will be guided by detailed layout plans whenever applicable.

9.6.4 Since the areas along Kam Tin Road and Kam Sheung Road would be

subject to severe traffic noise impact, any proposed development near the roads should provide adequate mitigation measures to minimize such impact.

9.6.5 According to the 2011 Population Census, there were about 10,780 persons living in the "V" zones of the Area. Adequate land has been reserved in this zone to cater for the demand for Small House of the Area. Village improvement works on access, drainage, sewerage, water and electricity will be initiated through the Rural Public Works.

9.7 Government, Institution or Community ("G/IC") : Total Area : ~~6.34~~ ***8.80*** ha

9.7.1 This zone is intended primarily for the provision of ~~Government, institution or community (~~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. As detailed planning proceeds, other land may be designated from other uses to this category to meet the envisaged demands of the growing population in the Area.

9.7.2 The existing electricity sub-stations near West Rail Kam Sheung Road Station and that at Au Tau, and the Au Tau Water Treatment Works near Ho Hok Shan are zoned "G/IC". Stage I of the Au Tau Water Treatment Works was commissioned in March 1992 and Stage II was commissioned in February 1995. The existing St. Joseph's Church kindergarten and the Kam Sheung Life Lutheran Church to the west of Kam Sheung Road are also zoned "G/IC".

9.7.3 Planned developments at Tung Wui Road and Kam Ho Road are intended for the development of two primary schools, a GIC complex with a clinic, a sports centre and an electricity sub-station to serve the local community.

9.7.4 The NBAs of the public housing development in the "R(A)" zone as mentioned in paragraph 9.3.4 above should be taken into account in the future developments within the "G/IC" zone at Tung Wui Road and Kam Ho Road.

9.8 Open Space ("O") : Total Area : 3.20 ha

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. An area abutting Kam Tin Road is zoned "O" to cater for the need of the local population.

9.9 "Other Specified Uses" ("OU") : Total Area : ~~66.99~~ ***59.93*** ha

As annotated on the Plan, the sites zoned "OU" on the Plan include the following:

"OU" annotated "Railway Station and Public Transport Interchange with Commercial/Residential Development" : Total Area : 10.64 ha

9.9.1 This zone is intended primarily to provide land for railway station and a public transport interchange with commercial and residential development. The area occupied by the existing West Rail Kam Sheung Road Station with a public transport interchange, public bicycle parking and park-and-ride facilities, and the existing MTR Kam Tin Building located to the east of Tsing Long Highway is zoned "OU" annotated "Railway Station and Public Transport Interchange with Commercial/Residential Development".

9.9.2 Development and/or redevelopment in this "OU" site are subject to a maximum domestic GFA of 186,234 m^2, a maximum non-domestic GFA of 53,535 m^2 (including the GFA of the existing MTR Kam Tin Building, commercial facilities and kindergarten) and a maximum building height of 69 mPD (including roof-top structures).

9.9.3 The existing public transport interchange, public bicycle parking and park-and-ride facilities shall be reprovided upon development. Besides, pick-up and drop-off facilities for public use, as required by the Government, shall be provided. Also, one kindergarten shall be provided in this "OU" site.

9.9.4 In determining the maximum GFA of the development and/or redevelopment in this "OU" site, the GFA of public transport facilities (including public transport interchange, public bicycle parking, park-and-ride and pick-up and drop-off facilities), railway station and associated facilities, as required by the Government, or covered walkway may be exempted from GFA calculation.

9.9.5 The layout of the development shall be comprehensively planned and designed and take into account the interfacing work (if any) with the railway station and associated facilities. Except development and/or redevelopment of the existing MTR Kam Tin Building, a master layout plan shall be submitted by the respective developer(s) to the Government to ensure an integrated and compatible layout for development in this "OU" site before development proceeds.

9.9.6 The site would be subject to various technical constraints such as air ventilation, noise, drainage, ecological, traffic and risk associated with the Au Tau Water Treatment Works which is a potentially hazardous installation, etc. The respective developer(s) would be required to ascertain the impacts on various technical aspects induced by the proposed development at the site and other nearby developments with implementation of appropriate mitigation measures. Other technical requirements including assessments on air ventilation and noise impact, as required by the Government, shall be fulfilled by the respective developer(s) at detailed design stage.

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

"OU" annotated "Railway Depot with Commercial/Residential Development" : Total Area : 32.18 ha

9.9.8 This zone is intended primarily to provide land for railway depot with commercial and residential development. The area occupied by the existing West Rail Pat Heung Maintenance Centre and railway tracks located to the east of Tsing Long Highway and its Toll Plaza is zoned "OU" annotated "Railway Depot with Commercial/Residential Development".

9.9.9 Development and/or redevelopment in this "OU" site are subject to a maximum domestic GFA of 422,340 m^2, a maximum non-domestic GFA of 3,000 m^2 (including the GFA of commercial facilities) and a maximum building height of 109 mPD (including roof-top structures). The maximum building height restriction of 109 mPD for Area (a) reflects the maximum height limit of the site under the Shek Kong AHR, which may not be applicable throughout the whole site. Any

development within the site should also comply with the Shek Kong AHR indicated in the Plan of the Shek Kong AHR No. YLM6917a prepared by the Lands Department.

9.9.10 A landscaped pedestrian linkage shall be provided in Area (b) of this "OU" site and no building development (except ancillary structures) is permitted. One primary school and one secondary school, as required by the Government, shall also be provided in this "OU" site.

9.9.11 In determining the maximum GFA of the development and/or redevelopment in this "OU" site, the GFA of railway depot and associated facilities, primary school, secondary school, as required by the Government, or covered walkway may be exempted from GFA calculation.

9.9.12 The layout of the development shall be comprehensively planned and designed and take into account the interfacing work (if any) with the railway depot and associated facilities. A master layout plan shall be submitted by the respective developer(s) to the Government to ensure an integrated and compatible layout for development in this "OU" site before development proceeds.

9.9.13 The site would be subject to various technical constraints such as air ventilation, noise, drainage, ecological and traffic, etc. The respective developer(s) would be required to ascertain the impacts on various technical aspects induced by the proposed development at the site and other nearby developments with implementation of appropriate mitigation measures. Other technical requirements including assessments on air ventilation and noise impact, as required by the Government, shall be fulfilled by the respective developer(s) at detailed design stage.

9.9.14 To provide flexibility for innovative design adapted to the characteristics of particular sites, minor relaxation of the GFA, building height and no building development restrictions may be considered by the Board through the planning permission system. Each proposal will be considered on its individual planning merits.

"OU" annotated "Rural Use"("OU(RU)") : Total Area: ~~23.60~~ ***16.54*** ha

9.9.15 This zone is intended primarily for the preservation of the character of the rural area. Uses or developments compatible with the rural

landscape, such as passive recreation uses and a selected range of rural uses, may be allowed on application to the Board, with a view to upgrading or improving the area or providing support to the local communities. Low-rise recreational and residential development compatible with the rural landscape may be permitted on application to the Board subject to the demonstration of sustainability in ecological, environmental, traffic and infrastructural terms. The development intensity shall not exceed a maximum plot ratio of 0.4 and a maximum building height of 3 storeys (9m). To provide flexibility for innovative design adapted to the characteristics of particular sites, minor relaxation of the above restrictions may be considered by the Board through the planning permission system. Each proposal will be considered on its individual planning merits.

~~9.9.16 An area to the north of Shek Wu Tong and bounded by Kam Sheung Road to the east, Kam Po Road to the west and Tung Wui Road to the north is zoned "OU(RU)". As part of the area is of archaeological potential, a detailed Archaeological Impact Assessment (AIA) conducted by a qualified archaeologist is required for development works within the area. The archaeologist shall apply for a licence to conduct the AIA under the Antiquities and Monuments Ordinance (Cap.53). An AIA proposal shall be submitted to the Antiquities and Monuments Office for agreement prior to applying for a licence.~~

"OU" annotated "Petrol Filling Station" : Total Area: 0.57 ha

9.9.1~~7~~6 An area to the west of Yuen Kong abutting Kam Sheung Road and another area near the Toll Plaza of Tsing Long Highway are zoned "OU" annotated "Petrol Filling Station" and are intended primarily for the provision of petrol filling station serving the needs of the district.

9.10 Agriculture ("AGR") : Total Area : ~~234.08~~ ***221.96*** ha

9.10.1 This zone is intended primarily to retain and safeguard good quality agricultural land/farm/fish ponds for agricultural purposes. It is also intended to retain fallow arable land with good potential for rehabilitation for cultivation and other agricultural purposes. The areas under this zoning are usually well served by irrigation and servicing facilities as well as marketing facilities for intensive farming including livestock rearing, fish culture and horticulture.

9.10.2 The areas under this zoning include the flat land adjacent to the hill in

the west and the flat land in the south-eastern part of the Area. The agricultural land in the areas at present are under active cultivation.

9.10.3 As filling of land/pond may cause adverse drainage and environmental impacts on the adjacent areas, permission from the Board is required for such activities. However, filling of land specifically required under prior written instructions of Government department(s), or for the purposes of genuine agricultural practice including laying of soil not exceeding 1.2m in thickness for cultivation, and construction of agricultural structure with prior written approval from the Lands Department is exempted from the control.

9.11 Green Belt ("GB") : Total Area : 1.67 ha

9.11.1 This zone is intended 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.

9.11.2 Two isolated knolls located to the east of Tsing Long Highway are zoned "GB". They are occupied by some traditional burial grounds.

9.11.3 As filling of land/pond and excavation of land may cause adverse drainage impacts on the adjacent areas and adverse impacts on the natural environment, permission from the Board is required for such activities.

9.12 Conservation Area ("CA") : Total Area : ~~258.80~~ ***258.81*** ha

9.12.1 This zone is intended to protect and retain the existing natural landscape, ecological or topographical features of the area for conservation, educational and research purposes and to separate sensitive natural environments such as Country Park from the adverse effects of development. 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 projects with overriding public interest may be permitted. Uses related to

conservation purposes such as nature reserve and nature trail are always permitted. Only a selective range of uses such as public convenience and tent camping ground which would have insignificant impact on environment and infrastructural provision may be permitted with or without conditions on application to the Board.

9.12.2 The majority of the areas under this zoning are flanking the western and southern boundaries of the Area. They are sloping land adjoining either the Ho Hok Shan or the Tai Lam Country Park. Three plots of land clustering at Ho Pui which cover existing or recorded egretries are also zoned "CA". At present, some traditional burial grounds are found.

9.12.3 Filling of land/pond and excavation of land may cause adverse drainage impacts on the adjacent areas and adverse impacts on the natural environment. In view of the conservation value of the area within this zone, permission from the Board is required for such activities.

10. TRANSPORT AND COMMUNICATION

10.1 Road Network

10.1.1 Tsing Long Highway, being in operation since May 1998, is a main trunk road running through the western part of the Area and connects NWNT with the urban area.

10.1.2 Kam Tin Road, an important local distributor, provides pedestrian and vehicular access to the Area. Another important road serving the Area is Kam Sheung Road which branches off from Kam Tin Road.

10.1.3 Village settlements within the Area are linked up by sub-standard tracks which will be improved and upgraded wherever possible under the programme of the Rural Public Works.

10.1.4 There is improvement in accessibility upon completion of the Kam Tin Bypass and the Improvement to Kam Tin Road, Stage I. With the implementation of the "Upgrading of Remaining Sections of Kam Tin Road and Lam Kam Road" project, road safety will be improved. However, the programme of implementation of this project is subject to review.

10.2 Railway

The West Rail, which has been in operation since 2003, provides a sub-regional passenger link connecting the NWNT and the urban areas from Nam Cheong in West Kowloon to Tuen Mun via Mei Foo, Tsuen Wan West, Kam Sheung Road, Yuen Long, Long Ping, Tin Shui Wai and Siu Hong. In 2009, West Rail Line was extended to include Austin and East Tsim Sha Tsui and terminated at Hung Hom. Upon commissioning, the Tai Wai to Hung Hom section of the Shatin to Central Link will link up the Ma On Shan Line and the West Rail Line at each end, forming the East West Corridor. With the proposed Northern Link, it is proposed to provide a new railway shuttle service between the Kam Sheung Road Station on the East West Corridor and a new station at Kwu Tung on the Lok Ma Chau Spur Line. The exact alignment of the proposed Northern Link is subject to detailed design.

10.3 Public Transport Provision

The areas adjacent to Kam Tin Road and Kam Sheung Road are well served by existing buses, public light buses and taxis.

11. UTILITY SERVICES

11.1 Water Supply

The existing water treatment works capacity available in NWNT ~~will soon~~ ***has been*** fully committed. ~~Further~~ ***Additional*** treatment works capacity~~, if required,~~ would be made available from the future extension of Ngau Tam Mei Water Treatment Works ***(WTW) and/or other WTWs***. ***Further*** ~~E~~***e***xtension 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

At present, there is no public sewer serving the Area. The Yuen Long and Kam Tin Sewage Master Plan Review has a plan to extend trunk sewerage to these unsewered areas. In addition to private residential developments, other major developments in the Area may require the provision of on-site sewage treatment/disposal facilities before a public sewer is in place.

11.3 Electricity

The Area has long been supplied with electricity. Adequate supply of electricity is provided via the 400kV network to reinforce the electricity supply in the Area. Additional electricity supply can be provided to the Area by expanding the existing electricity network.

11.4 Gas

Gas pipelines have already been laid from Au Tau Roundabout to the junction of Kam Tin Road and Kam Sheung Road near Kat Hing Wai. Therefore, piped gas supply could be extended to the Area depending on the demand of the future developments.

12. IMPLEMENTATION

12.1 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.

12.2 At present, there is no overall programme for the provision of infrastructure within the Area. The implementation process will be gradual 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.

12.3 The provision and improvement of infrastructure, e.g. road widening and laying of services, will be implemented through the Public Works Programme and the Rural Public Works 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 use indicated on the Plan, provided that their proposals meet Government requirements.

13. PLANNING CONTROL

13.1 The types of permitted developments and uses on land within the Area are listed in the Notes to the Plan. Unless otherwise specified, all buildings, 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.

13.2 Uses of land or building which were in existence immediately before the first publication in the Gazette of the notice of the IDPA plan and which are not in compliance with the terms of the Plan may have adverse impacts on the environment, drainage and traffic of the area. Although no action is required to make such use conform to this 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.

13.3 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 departmental outline development plans and layout plans, and guidelines published by the Board. The outline development plans and layout plans are available for public inspection at the Planning Department. Guidelines published by the Board are available from the Board's website, the Secretariat of the Board and the Technical Services Division of the Planning Department. Application forms and Guidance Notes for planning applications can be downloaded from the Board's website and are available from the Secretariat of the Board, the Technical Services Division and 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.

13.4 Any development, other than those referred to in paragraph 13.1 above or in conformity with this Plan or with the permission of the Board, undertaken or continued on or after 5 October 1990 on land included in a plan of the Kam Tin South IDPA may be subject to enforcement proceedings under the Ordinance. Any filling of land/pond and excavation of land in the relevant zones on or after the exhibition of the specific plan referred to in the Notes of the relevant zones without the permission from the Board may also be subject to enforcement proceedings.

TOWN PLANNING BOARD
~~SEPTEMBER~~ ***OCTOBER 2017*** **~~2016~~**

Attachment V of
RNTPC Paper No. 8/17

Provision of Major GIC Facilities and Open Space in Kam Tin South

Type of Facilities	Hong Kong Planning Standards and Guidelines (HKPSG)	HKPSG Requirement	Provision		Surplus/ Shortfall (Against planned provision)
			Existing Provision	Planned Provision (Existing + Planned Provision)	
District Open Space	10 ha per 100,000 persons	6.27 ha	0 ha	3.2 ha	-3.07 ha
Local Open Space	10 ha per 100,000 persons	6.27 ha	0.47 ha	7.77ha	+1.50 ha
Secondary School	1 whole-day classroom for 40 persons aged 12-17	76 classrooms	0 classroom	30 classroom	-46 classrooms
Primary School	1 whole-day classroom for 25.5 persons aged 6-11	123 classrooms	12 classrooms	102 classrooms	-21 classrooms
Kindergarten/Nursery	26 classrooms for 1,000 children aged 3 to under 6	40 classrooms	13 classrooms	40 classrooms	0 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	345 beds	0 bed	0 bed	-345 beds
Clinic/Health Centre	1 per 100,000 persons	1	0	1	0
Post Office	Accessible within 1.2km in urban areas and 3.2km in rural areas	N.A.	0	0	N.A.
Magistracy (with 8 courtrooms)	1 per 660,000 persons	0	0	0	0
Integrated Children and Youth Services Centre	1 for 12,000 persons aged 6-24	1	0	0	-1

Type of Facilities	Hong Kong Planning Standards and Guidelines (HKPSG)	HKPSG Requirement	Provision		Surplus/ Shortfall (Against planned provision)
			Existing Provision	Planned Provision (Existing + Planned Provision)	
Integrated Family Services Centre	1 for 100,000 to 150,000 persons	0	0	0	0
Library	1 district library for every 200,000 persons	0	0	0	0
Sports Centre	1 per 50,000 to 65,000 persons	1	0	1	0
Sports Ground/Sports 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
Swimming Pool - leisure	1 per district	0	0	0	0

* The Hospital Authority plans its services on a cluster basis. Tin Shui Wai Hospital will provide 300 hospital beds when it comes into full operation, and there is a planned hospital (about 1,000 beds) in Hung Shui Kiu New Development Area.

八鄉鄉事委員會第 25 屆第 12 次執行委員會暨

第 4 次全體村代表會員聯席會議

會議日期：2017 年 8 月 2 日

會議時間：早上 10 時

會議地點：八鄉鄉事委員會會議室

諮詢擬議修訂《錦田南分區計劃大綱核准圖編號 S/YL-KTS/13》

第 1、6 及 4a 號地盤作公營房屋及相關發展

政府計劃發展八鄉南，興建公營及私營房屋，大量居住人口將遷入八鄉南區，增加錦上路的交通負荷。錦上路建於 1960 年代，是一條不合標準道路，意外頻生，早已超出負荷。**本會強烈要求政府在發展八鄉南之前，必須落實全面規劃擴闊錦上路成爲一條合標準道路，及開闢新道路，解決大量居住人口遷入而對八鄉南造成的交通壓力和擠迫，否則本會會堅決反對到底。**

動議：

和議：

鄭祖佑 鄭強勝 李子能 鄧華耀

元朗區議會
元朗橋樂坊 2 號
元朗政府合署十三樓

YUEN LONG DISTRICT COUNCIL
13/F., Yuen Long Government Offices,
No. 2, Kiu Lok Square,
Yuen Long, N.T.

檔號：HAD YLDC 13/10/1 (2017)
電話：2475 3807
傳真：2478 7334

規劃署粉嶺、上水及元朗東規劃專員
錢敏儀女士

錢專員：

有關諮詢擬議修訂《錦田南分區計劃大綱核准圖編號 S/YL-KTS/13》第 1、6 及 4a 號地盤作公營房屋及相關發展的動議

元朗區議會在二零一七年九月五日的會議，討論有關諮詢擬議修訂《錦田南分區計劃大綱核准圖編號 S/YL-KTS/13》第 1、6 及 4a 號地盤作公營房屋及相關發展。有關的議員提問請參閱附件一。

經討論後，議員以 30 票贊成、0 票反對及 0 票棄權的絕對多數票通過以下動議（動議表決結果請參閱附件二）：

> 「政府計劃發展八鄉南，興建公營及私營房屋，大量居住人口將遷入八鄉南區，增加錦上路的交通負荷。錦上路建於 1960 年代，是一條不合標準道路，意外頻生，早已超出負荷。本會強烈要求政府在發展八鄉南之前，必須落實全面規劃擴闊錦上路成為一條合標準道路，及開闢新道路，解決大量居住人口遷入而對八鄉南造成的交通壓力和擠迫，否則本會會堅決反對到底。」

本會邀請貴署就上述動議統籌回應，並於**二零一七年十月十三日**或之前作出書面回覆。如有任何查詢，請致電2475 3807與元朗區議會秘書江國彪先生聯絡。

元朗區議會主席 沈豪傑

連附件

副本送： 元朗民政事務專員

規劃署高級城市規劃師/元朗東 2	黃楚娃女士
房屋署高級規劃師(1)	李倩儀女士
土木工程拓展署高級工程師/4(新界西)	張慧中女士
運輸署總運輸主任／新界西北	許家耀先生
路政署高級工程師／公共關係	楊漢輝先生

二零一七年九月二十二日

附件一

2017 年元朗區議會第四次會議

會議日期：2017 年 9 月 5 日(星期二)

諮詢擬議修訂《錦田南分區計劃大綱核准圖編號 S/YL-KTS/13》

第 1、6 及 4a 號地盤作公營房屋及相關發展

政府計劃發展八鄉南，興建公營及私營房屋，大量居住人口將遷入八鄉南區，增加錦上路的交通負荷。錦上路建於 1960 年代，是一條不合標準道路，意外頻生，早已超出負荷。本會強烈要求政府在發展八鄉南之前，必須落實全面規劃擴闊錦上路成爲一條合標準道路，及開闢新道路，解決大量居住人口遷入而對八鄉南造成的交通壓力和擠迫，否則本會會堅決反對到底。

動議：鄧瑞民 黎佐雄 [illegible]

和議：文炳南 張木秋 王國仁 梁福元
周永勤 鄧煥謙 姚國威 劉桂宏
鄧慶業 陳英蓮 鄧寶年 鄧宏良
[illegible] 鄧勵東 [illegible] 楊[illegible] 梁明[illegible]
[illegible] [illegible] [illegible] 黃佛照 袁敏兒 文光明
[illegible] 周伯[illegible] 郭慶平 [illegible] 梁[illegible]
[illegible] [illegible] [illegible] 陳[illegible] 麥業成

附件二

有關諮詢擬議修訂《錦田南分區計劃大綱核准圖編號 S/YL-KTS/13》第1、6 及 4a 號地盤作公營房屋及相關發展的動議

表決結果

		贊 成	反 對	棄 權
1	湛家雄議員, BBS, MH, JP	✓		
2	陳美蓮議員	✓		
3	陳思靜議員	✓		
4	張木林議員	✓		
5	程振明議員	✓		
6	趙秀嫻議員, MH	✓		
7	周永勤議員	✓		
8	郭　強議員, MH	✓		
9	鄺俊宇議員	✓		
10	黎偉雄議員	✓		
11	劉桂容議員	✓		
12	梁志祥議員, SBS, MH, JP	✓		
13	梁明堅議員	✓		
14	呂　堅議員, MH	✓		
15	馬淑燕議員	✓		
16	麥業成議員	✓		
17	文炳南議員, MH	✓		
18	蕭浪鳴議員	✓		
19	鄧焯謙議員	✓		
20	鄧卓然議員	✓		
21	鄧慶業議員, BBS	✓		
22	鄧家良議員	✓		
23	鄧瑞民議員	✓		
24	鄧鎔耀議員	✓		
25	曾樹和議員	✓		
26	黃卓健議員	✓		
27	黃偉賢議員	✓		
28	姚國威議員	✓		
29	楊家安議員	✓		
30	袁敏兒議員	✓		
	Total	30	0	0

元朗區議會
元朗橋樂坊 2 號
元朗政府合署十三樓

YUEN LONG DISTRICT COUNCIL
13/F., Yuen Long Government Offices,
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電話：2475 3807
傳真：2478 7334

規劃署粉嶺、上水及元朗東規劃專員
錢敏儀女士

錢專員：

有關要求盡快落實林錦公路凌雲寺段及錦田公路擴闊工程時間表的動議

元朗區議會在二零一七年九月五日的會議，討論有關要求盡快落實林錦公路凌雲寺段及錦田公路擴闊工程時間表。有關的議員提問請參閱附件一。

經討論後，議員以 30 票贊成、0 票反對及 0 票棄權的絕對多數票通過以下動議（動議表決結果請參閱附件二）：

「因應錦田公路經常擠塞及林錦公路近凌雲寺段路窄多彎意外頻生的現況，以及錦田及八鄉將有大規模房屋發展，要求路政署盡快落實林錦公路及錦田公路擴闊工程時間表。」

本會邀請貴署就上述動議統籌回應，並於**二零一七年十月十三日**或之前作出書面回覆。如有任何查詢，請致電2475 3807與元朗區議會秘書江國彪先生聯絡。

元朗區議會主席 沈豪傑

連附件

副本送： 元朗民政事務專員

規劃署高級城市規劃師／元朗東 2	黃楚娃女士
房屋署高級規劃師(1)	李倩儀女士
土木工程拓展署高級工程師／4(新界西)	張慧中女士
運輸署總運輸主任／新界西北	許家耀先生
路政署高級工程師／公共關係	楊漢輝先生

二零一七年九月二十二日

附件一

2017 年元朗區議會第四次會議

會議日期：2017 年 9 月 5 日(星期二)

要求盡快落實林錦公路凌雲寺段及錦田公路擴闊工程時間表

因應錦田公路經常擠塞及林錦公路近凌雲寺段路窄多彎意外頻生的現況，以及錦田及八鄉將有大規模房屋發展，要求路政署盡快落實林錦公路及錦田公路擴闊工程時間表。

動議：

鄧瑞民議員　黎偉雄議員　鄧鎔耀議員

和議：

附件二

有關要求盡快落實林錦公路凌雲寺段及錦田公路擴闊工程時間表的動議
表決結果

		贊 成	反 對	棄 權
1	湛家雄議員, BBS, MH, JP	✓		
2	陳美蓮議員	✓		
3	陳思靜議員	✓		
4	張木林議員	✓		
5	程振明議員	✓		
6	趙秀嫻議員, MH	✓		
7	周永勤議員	✓		
8	郭　強議員, MH	✓		
9	鄺俊宇議員	✓		
10	黎偉雄議員	✓		
11	劉桂容議員	✓		
12	梁志祥議員, SBS, MH, JP	✓		
13	梁明堅議員	✓		
14	呂　堅議員, MH	✓		
15	馬淑燕議員	✓		
16	麥業成議員	✓		
17	文炳南議員, MH	✓		
18	蕭浪鳴議員	✓		
19	鄧焯謙議員	✓		
20	鄧卓然議員	✓		
21	鄧慶業議員, BBS	✓		
22	鄧家良議員	✓		
23	鄧瑞民議員	✓		
24	鄧鎔耀議員	✓		
25	曾樹和議員	✓		
26	黃卓健議員	✓		
27	黃偉賢議員	✓		
28	姚國威議員	✓		
29	楊家安議員	✓		
30	袁敏兒議員	✓		
	Total	30	0	0

PROPOSED AMENDMENTS TO THE APPROVED KAM TIN SOUTH OUTLINE ZONING PLAN NO. S/YL-KTS/13

Sites 1, 4a and 6 for Public Housing Development and Government, Institution or Community Facilities

Traffic Impact Assessment Report

AECOM ASIA COMPANY LIMITED

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Annexes

Annex A Kam Tin South Housing Development – Layout Plan

1 INTRODUCTION

1.1 Objective of the Report

1.1.1 The objectives of the TIA Report are as follows:-

- To assemble available data, identify deficiency areas and conduct necessary surveys to establish the existing traffic conditions in the area of influence;
- To forecast the traffic conditions in the design year by taking account of the traffic growth and all other planned developments and identify any traffic deficiency areas;
- To estimate the traffic demand generated by Kam Tin South (KaTS) Development and assesses its traffic impact on the adjacent road system; and
- To recommend road improvement works and/ or traffic mitigation measures in the identified deficiency areas.

1.2 Structure of the Report

1.2.1 Following this introductory section, there are seven further chapters:-

- Section 2 presents the development schedule of KaTS Development;
- Section 3 describes the existing traffic conditions;
- Section 4 presents the traffic modelling methodology, trip generation of KaTS Development and traffic forecasts;
- Section 5 reports the results of the junction and link capacity assessments;
- Section 6 discusses the construction traffic impact assessment;
- Section 7 discusses the improvement of railway capacity; and
- Section 8 concludes the TIA Report.

2 DEVELOPMENT PROPOSAL OF KAM TIN SOUTH DEVELOPMENT

2.1 Proposed Development of Initial Sites at KaTS

2.1.1 The Initial Sites comprises of three subject sites, namely Site 1, Site 4a and Site 6 as shown in **Annex A**. Based on the information provided by Land Use Review (LUR) for study and preliminary public housing schemes from Housing Department, Initial sites Site 1, 4a, 6 comprises of public housing developments, retail and G/IC facilities.

2.1.2 The development schedules of the Initial Sites adopted in this TIA are summarized in **Table 2.1**.

Table 2.1 Development Schedule of Initial Sites at KaTS

	Site 1(4)	Site 4a	Site 6	Total
Residential Type	PRH/SSF(2)	PRH/SSF(2)	PRH/SSF(2)	-
No. of Flats	4,100(1)	3,800(1)	1,700(1)	9,600(1)
Population (approx.)	12,628(1)	11,704(1)	5,236(1)	29,568(1)
Commercial/ Retail GFA	7,000m^2	1,100m^2	-	8,100m^2
Kindergarten	1	1	1	3
School	1	-	1	2

Notes:
(1) Figures have included additional 10% of the flat and population estimates as at December 2014 for design flexibility purpose.
(2) "PRH/SSF means public rental housing and subsidized sale flats.
(3) The figures shown in this table are for testing the infrastructural capacity and subject to review in later design stage, land resumption and further discussion with the relevant government departments
(4) Site 1 includes supporting G/IC facilities including an electricity substation, a sports centre, a clinic etc.

2.2 Planned Development of MTRCL Sites at KaTS

2.2.1 According to the LUR, two MTRCL West Rail development sites on top of KSRS and PHMC are located in Kam Tin South area as shown in **Annex A**. Based on the information provided by LUR study and recent update from MTRCL, KSRS and PHMC Sites comprises of private housing developments, commercial/retail and G/IC facilities.

2.2.2 The development schedules of the KSRS and PHMC Sites adopted in this TIA are summarized in **Table 2.2**.

Table 2.2 Development Schedule of MTRCL Sites at KaTS

	KSRS Site	PHMC Site	Total
Residential Type	Private	Private	-
No. of Flats	2,692	6,060	8,752
Average Flat Size (approx.)	69m^2	70m^2	-
Population (approx.)	6,600	14,800	21,400
Commercial/ Retail GFA	40,000m^2	3,000m^2	43,000m^2
Kindergarten	1	-	1
School	-	2	2

3 EXISTING TRAFFIC CONDITION

3.1 Existing Road Network

3.1.1 Currently, there are mainly local villages and a few establishments of different industry sectors including rural workshop/ open storages in Kam Tin South area. They are adjacent to and served by various rural roads including Kam Tin Road, Kam Sheung Road, Kam Ho Road, Tung Wui Road, Pat Heung Road, and a rural trunk Kam Tin Bypass at north of KaTS. There are two major access points connecting with Tsing Long Highway at Kam Tin Road and Pat Heung Road respectively for road traffic to/from Kowloon via Tai Lam Tunnel.

3.1.2 Tsing Long Highway is a dual 3-lane expressway, connecting San Tin Highway and Yuen Long Highway at the north and Tsing Kwai Highway at the south. It is a major strategic road link connecting northwest New Territories with Kowloon.

3.1.3 Kam Tin Road is a major east-west rural road connecting with Au Tau Interchange on the west heading to Yuen Long, Lam Kam Road and Route Twisk on the east heading to Tai Po and Tsuen Wan respectively. The section between Au Tau Interchange and Kam Ho Road/ Kam Tin Bypass is a dual 2-lane carriageway, while the remaining section is a single 2-lane carriageway. It also connects with Tsing Long Highway by slip roads near Ko Po Tsuen, therefore it serves as the major northern access between Tsing Long Highway and KaTS.

3.1.4 Kam Tin Bypass is a dual 2-lane carriageway running parallel to Kam Tin Road between Kam Ho Road and Tung Wui Road and bypassing the Kam Tin town centre where the main villages are concentrated.

3.1.5 Kam Ho Road is a rural road running in north-south direction parallel to Tsing Long Highway on eastern side. It is a single 2-lane carriageway between Kam Tin Road and Pat Heung Road, while the remaining section to the south of Pat Heung Road is a single track access road with a cul-de-sac at its southern end.

3.1.6 Tung Wui Road, a dual 2-lane carriageway, is another major rural road running in east-west direction. It connects with Kam Ho Road on its western end and Kam Tin Road on its eastern end.

3.1.7 Kam Sheung Road is a single 2-lane carriageway running in north-south direction between Kam Tin Road and Pat Heung Road and east-west direction between Pat Heung Road and Kam Tin Road. It connects with Kam Tin Road at both western and eastern ends.

3.1.8 Pat Heung Road is a single 2-lane carriageway running in east-west direction to the south of KaTS. It connects with Tsing Long Highway on its west and Kam Sheung Road on its east. Therefore, it serves as the major southern access between Tsing Long Highway and KaTS.

3.2 Traffic Survey

3.2.1 The key junctions and road sections to be assessed in the TIA are summarized in **Table 3.1** and **3.2**, and show in **Figure 3.1** and **3.2** respectively.

Table 3.1 Key Road Junctions within area of influence (AOI)

Junction No.	Location
J1	Au Tau Interchange
J2	Kam Tin Road/ Tsing Long Highway Slip Road
J3	Kam Tin Road/ Kam Tin Bypass/ Kam Ho Road
J4	Kam Tin Road/ Kam Sheung Road (Western Junction)
J5	Kam Tin Road/ Kam Tin Bypass/ Tung Wui Road
J6	Kam Ho Road/ Access Road to KSR Station
J7	Kam Ho Road/ Tung Wui Road / Access Road to KSR Station
J8	Tung Wui Road / Access Road to KSR Station Eastern PTI
J9	Tung Wui Road/ Kam Po Road
J10	Tung Wui Road / Kam Sheung Road
J11	Pat Heung Road/ Tsing Long Highway Slip Road
J12	Pat Heung Road/ Link Road to Kam Ho Road
J13	Pat Heung Road / Kam Ho Road
J14	Pat Heung Road/ Link Road to Kam Po Road
J15	Pat Heung Road/ Kam Sheung Road
J16	Castle Peak Road – Tam Mi / Sam Tam Road
J17	Kam Tin Road / Fan Kam Road
J18	Kam Tin Road / Kam Sheung Road (Eastern Junction)
J19	Kam Tin Road / Lam Kam Road / Route Twisk
J20	Pok Oi Interchange

Table 3.2 Key Road Links within AOI

Link No.	Location
L1	Kam Tin Road between Tsing Long Highway Slip Road and Kam Ho Road
L2	Tsing Long Highway Slip Road
L3	Kam Tin Road between Kam Ho Road and Kam Sheung Road
L4	Kam Ho Road north of Tung Wui Road
L5	Kam Sheung Road north of Tung Wui Road
L6	Kam Sheung Road south of Tung Wui Road
L7	Tung Wui Road between Kam Po Road and Kam Sheung Road
L8	Kam Ho Road south of Tung Wui Road
L9	Link Road between Pat Heung Road and Kam Ho Road
L10	Pat Heung Road west of Kam Sheung Road
L11	Kam Tin Road between Kam Sheung Road and Tung Wui Road
L12	Kam Sheung Road south of Pat Heung Road
L13	Kam Tin Bypass
L14	Kam Po Road south of Tung Wui Road
L15	Kam Tin Road east of Tung Wui Road
L16	Kam Tin Road west of Tsing Long Highway Slip Road
L17	Tsing Long Highway north of Slip Road to Kam Tin Road
L18	Tsing Long Highway south of Slip Road to Kam Tin Road
L19	Tai Lam Tunnel
L20	Tung Wui Road west of Kam Po Road
L21	Tung Wui Road east of Kam Sheung Road
L22	Kam Tin Road east of Fan Kam Road
L23	Kam Tin Road between Kam Sheung Road and Lam Kam Road
L24	Kam Sheung Road west of Kam Tin Road eastern junction
L25	Kam Po Road south of Site 4A

3.2.2 Manual classified traffic count surveys were conducted at the above-mentioned key road junctions and sections within the area of influence (AOI) during 07:30 – 09:30 and 17:00 – 19:00 on a typical weekday in January 2015. Based on the survey results, the morning and evening peak periods were 08:00 – 09:00 and 17:30 – 18:30 respectively.

3.3 Existing Operation Performance of Key Junctions and Road Links

3.3.1 The existing performances of the junctions were also assessed based on the observed traffic flows according to the methodology set out in the Transport Planning and Design Manual (TPDM) Volume 2 Chapter 4 for priority junction or roundabout and Volume 4 for signalized junction.

3.3.2 Performance of priority junctions and roundabouts are measured by a Design Flow to Capacity ratio (DFC). The junction is considered operating within capacity if DFC is less than 1 or is overloaded if DFC is greater than 1.

3.3.3 Performance of signalized junction is measured by Reserve Capacity (RC) in percentage. A signalized junction is considered within capacity if RC is greater than 0% or is overloaded if the RC is less than 0%.

3.3.4 The existing junction performances are presented in **Table 3.3**.

Table 3.3 2015 Existing Junction Performance

No.	Junction	Type(1)	2015 RC/DFC(2)	
			AM Peak	PM Peak
J1	Au Tau Interchange	R	0.56	0.46
J2	Kam Tin Road/ Tsing Long Highway Slip Road	S	26%	8%
J3	Kam Tin Road/ Kam Tin Bypass/ Kam Ho Road	R	0.49	0.53
J4	Kam Tin Road/ Kam Sheung Road (Western Junction)	P	0.55	0.61
J5	Kam Tin Road/ Kam Tin Bypass/ Tung Wui Road	R	0.43	0.50
J6	Kam Ho Road/ Access Road to KSRS	R	0.44	0.32
J7	Kam Ho Road/ Tung Wui Road / Access Road to KSRS	R	0.29	0.33
J8	Tung Wui Road / Access Road to KSRS Eastern PTI	S	67%	65%
J9	Tung Wui Road/ Kam Po Road	P	0.09	0.07
J10	Tung Wui Road / Kam Sheung Road	S	45%	52%
J11	Pat Heung Road/ Tsing Long Highway Slip Road	P	0.57	0.55
J12	Pat Heung Road/ Link Road to Kam Ho Road	P	0.53	0.30
J13	Pat Heung Road / Kam Ho Road	R	0.25	0.25
J14	Pat Heung Road/ Link Road to Kam Po Road	P	0.11	0.08
J15	Pat Heung Road/ Kam Sheung Road	P	0.42	0.52
J16	Castle Peak Road – Tam Mi / Sam Tam Road	P	0.39	0.35
J17	Kam Tin Road / Fan Kam Road	R	0.66	0.67
J18	Kam Tin Road / Kam Sheung Road (Eastern Junction)	P	0.61	0.59
J19	Kam Tin Road / Lam Kam Road / Route Twisk	R	0.56	0.58
J20	Pok Oi Interchange	R	0.84	0.83

Notes:
(1) "S" represents signalized junction, "R" represents roundabout and "P" represents priority junction.
(2) Figure in % represents RC for signalized junction, figure in decimal number represents DFC for priority or roundabout.

3.3.5 The results of the junction capacity analysis revealed that all the existing junctions are operating satisfactorily without capacity problem.

3.3.6 Apart from junction capacity analysis, the existing link performances for the major road links within the AOI were assessed based on the observed traffic flow.

3.3.7 Link performance is measured by Volume to Capacity ratio (V/C). It is an indication of the traffic condition of roads during peak hours. A V/C ratio equal to or less than 1.0 is considered acceptable. A V/C ratio between 1.0 and 1.2 indicates a manageable degree of congestion. A V/C ratio above 1.2 indicates more serious congestion.

3.3.8 Road capacity was determined in accordance with Transport Planning and Design Manual (TPDM) Volume 2 Chapter 2.4 and Volume 2 Chapter 3.11 and converted to passenger car unit (PCU) value by a global PCU factor of about 1.3 according to traffic survey. Road capacities for various road types are summarised in **Table 3.4**.

Table 3.4 Road Capacity

Road Type	Direction	Peak Hourly Flow (pcu/hr)	Remarks
Single Track Access Road (3.5m)	Both directions of flow	130	With passing bays
Single 2-lane carriageway (6.75m)	Both directions of flow	1,800	With frontage development, side roads, pedestrian crossings, bus stops, loading restrictions at peak hours
Single 2-lane carriageway (7.3m)	Both directions of flow	2,200	With frontage development, side roads, pedestrian crossings, bus stops, loading restrictions at peak hours
Dual 2-lane carriageway (Dual 7.3m)	One direction of flow	3,600	No frontage crossings, no standing vehicles, negligible cross traffic
Dual 3-lane carriageway (Dual 11m)	One direction of flow	5,400	No frontage crossings, no standing vehicles, negligible cross traffic
Dual 3-lane carriageway (Dual 11m)	One direction of flow	6,100	Expressway

3.3.9 **Table 3.5** shows the existing link performance of the major road links within the AOI.

Table 3.5 2015 Existing Link Performance

No.	Road	Config.	Dir.	Capacity (pcu/hr)	2015 Existing			
					AM Peak		PM Peak	
					Flow	V/C	Flow	V/C
L1	Kam Tin Road	D2	EB	3,600	1,940	0.54	1,770	0.49
		D2	WB	3,600	1,540	0.43	1,950	0.54
L2	Tsing Long Highway Slip Road	S2	NB	3,600	320	0.09	560	0.16
		S2	SB	3,600	210	0.06	130	0.04
L3	Kam Tin Road	S2	EB	900	600	0.67	640	0.71
			WB	900	620	0.69	640	0.71
L4	Kam Ho Road	S2	NB	1,100	570	0.52	590	0.54
			SB	1,100	140	0.13	120	0.11
L5	Kam Sheung Road	S2	NB	900	290	0.32	340	0.38
			SB	900	240	0.26	270	0.30
L6	Kam Sheung Road	S2	NB	900	320	0.36	480	0.53
			SB	900	470	0.52	500	0.56
L7	Tung Wui Road	D2	EB	3,600	490	0.14	510	0.14
		D2	WB	3,600	560	0.16	550	0.15
L8	Kam Ho Road	S2	NB	1,100	420	0.38	460	0.42
			SB	1,100	450	0.41	290	0.26
L9	Pat Heung Road Link Road	S2	EB	1,100	380	0.35	370	0.34
			WB	1,100	390	0.35	320	0.29
L10	Pat Heung Road	S2	EB	1,100	270	0.25	340	0.31
			WB	1,100	400	0.36	290	0.26
L11	Kam Tin Road	S2	EB	900	340	0.38	310	0.34
			WB	900	330	0.37	360	0.40
L12	Kam Sheung Road	S2	EB	900	380	0.42	490	0.54
			WB	900	490	0.54	460	0.51
L13	Kam Tin Bypass	D2	EB	3,600	680	0.19	580	0.16
		D2	WB	3,600	460	0.13	740	0.21
L14	Kam Po Road	S1	2-way	130	70	0.54	60	0.46
L15	Kam Tin Road	S2	EB	900	1,000	**1.11**	880	0.98
			WB	900	960	**1.07**	1,120	**1.24**
L16	Kam Tin Road	D2	EB	3,600	1,890	0.53	1,640	0.46
		D2	WB	3,600	1,600	0.44	2,250	0.63
L17	Tsing Long Highway	D3	NB	6,100	1,440	0.24	2,800	0.46
		D3	SB	6,100	4,430	0.73	2,330	0.38
L18	Tsing Long Highway	D3	NB	6,100	1,760	0.29	3,360	0.55
		D3	SB	6,100	4,640	0.76	2,460	0.40
L19	Tai Lam Tunnel	D3	NB	5,400	2,020	0.37	3,610	0.67
		D3	SB	5,400	5,030	0.93	2,640	0.49
L20	Tung Wui Road	D2	EB	3,600	480	0.13	500	0.14
		D2	WB	3,600	590	0.16	570	0.16
L21	Tung Wui Road	D2	EB	3,600	390	0.11	410	0.11
		D2	WB	3,600	670	0.19	560	0.16
L22	Kam Tin Road	S2	EB	1,000	770	0.70	670	0.61
		S2	WB	1,000	620	0.56	810	0.74
L23	Kam Tin Road	S2	EB	900	810	0.74	830	0.75
		S2	WB	900	670	0.61	870	0.79
L24	Kam Sheung Road	S2	EB	900	530	0.59	310	0.34
		S2	WB	900	310	0.34	340	0.38
L25	Kam Po Road	S1	2-way	130	70	0.54	60	0.46

3.3.10 It is found that V/C ratio of a section of Kam Tin Road east of Tung Wui Road (Link L15) is greater than 1.0 but below 1.2 in the morning peak period. The degree of congestion is manageable. And the V/C ratio of the westbound in evening peak period is greater than 1.2, which indicates more serious congestion.

3.3.11 It is expected that the link performance of L15 would be improved after completion of Highway Department's project "Upgrading of Remaining Sections of Kam Tin Road and Lam Kam Road" which covers widening of Kam Tin Road east of Tung Wui Road to a standard 7.3m wide carriageway.

4 TRAFFIC MODELLING AND FORECAST

4.1 Design Year and Assessment Scenarios for TIA

4.1.1 According to "Guidelines and Requirements for Traffic Impact Assessment (TIA) Studies", the TIA shall take into account a longer development horizon at least 3 years after the planned completion of the development. With reference to the initial population intake targets provided by the Planning Department, the design year of the TIA should be Year 2029 and beyond. With consideration of the available planning data provided by Planning Department, Year 2031 (one of the strategic planning years of various government studies) is therefore adopted as the design year for the TIA under this Project.

4.1.2 Three scenarios will be assessed in the TIA and summarized in **Table 4.1**.

Table 4.1 Assessment Scenarios for TIA

Scenario	KaTS Development		RIW (3)	Remarks
	MTRCL Sites (1)	Initial Sites (2)		
1	×	×	×	For reference, without KaTS Development and road improvement works.
2	✓	✓	×	For reference, with KaTS Initial Sites Development but without road improvement works.
3	✓	✓	✓	For checking the adequacy of the proposed road improvement works upon population intake of KaTS Initial Sites Development

Notes:
(1) MTRCL Sites refer to the two MTRCL Sites on top of KSRS and PHMC, its implementation programme are under review by MTRCL, it is assumed that the population intake year of MTRCL Sites is on or before 2031 for technical assessment.
(2) Initial Sites of KaTS Development refer to Site 1, 4a and 6.
(3) RIW refers to the road improvement works for Initial Sites proposed under this Project.

4.2 Overview of Traffic Modelling Approach

Model Structure and Coverage

4.2.1 The main purpose of establishing a transport demand model for the Assignment is to estimate the traffic activities within the AOI and to determine the demand and requirement of the transport infrastructure. The transport demand model incorporated the Enhanced 2011-based TPEDM (controlled version) including the demographic and land use data, socio-economic characteristics, highway infrastructure, railway network assumptions, etc.

Strategic Territorial Model (STM)

4.2.2 AECOM's in-house strategic transport demand model that covers the entire Hong Kong Special Administrative Region (HKSAR) will be applied. This well-established model meets the particular requirements of HKSAR and is compatible with the Enhanced CTS-3 Model both in terms of model structure and calibration/validation data.

4.2.3 The strategic transport demand model has been reviewed and refined, and also incorporated with the latest Enhanced 2011-based TPEDM (controlled version) in Planning Data Zones (PDZ) 454-zone system. In addition, the model has also incorporated with the

latest travel characteristics for people and good vehicles from the "Travel Characteristics Survey 2011" (TCS2011), "Good Vehicle Travel Characteristic Survey 2011" (GVTCS2011), latest cross boundary travel survey data and 2011 Population Census.

Local Area Traffic Model (LATM)

4.2.4 The highway-based local area traffic model was developed which is equipped with detailed junction simulation capability. This allows traffic behaviour at junctions including junction delays, traffic queues and platoon effects to be taken into account in a combined traffic simulation and assignment process. The LATM was developed and validated to year 2015 traffic conditions representing the morning peak (AM) and afternoon peak (PM) relevant to the AOI.

Other Major Developments

4.2.5 There are some major developments in NWNT including Hung Shui Kiu New Development Area and Potential Development Areas in Yuen Long South which may not be fully updated in the controlled version of Enhanced 2011-based TPEDM, the planning data of the relevant PDZ zones have been updated with the latest available development parameters and programme to fulfil the study purpose.

Model Input Assumptions

4.2.6 The agreed model input assumptions including Enhanced 2011-based TPEDM, strategic highway and railway network assumptions for design year 2031 are adopted.

4.3 Trip Generation and Attraction

4.3.1 The likely traffic volume generated by the KaTS Development was estimated based on relevant trip rates provided in the Transport Planning and Design Manual (TPDM), TD Traffic Generation Survey and DR 439.

4.3.2 The trip rates adopted for the major residential, commercial developments and G/IC facility within KaTS Development are presented in **Table 4.4**, and the trip generations of various types of development within KaTS are shown in **Table 4.5**.

Table 4.4 Adopted Trip Rates for Major Residential and Commercial Developments in KaTS

Development Type	Unit	AM Peak		PM Peak	
		Generation	Attraction	Generation	Attraction
Subsidized Housing(1)	pcu/hr/flat	0.0622	0.0426	0.0297	0.0401
Private Housing(2)	pcu/hr/flat	0.0888	0.0515	0.0356	0.0480
Commercial / Retail(3)	pcu/hr/100sqm GFA	0.2296	0.2434	0.3100	0.3563
Primary School(4)	pcu/30CR Sch	7	30	1	1
Secondary School(4)	pcu/30CR Sch	7	24	1	1

Notes:
(1) Source from TPDM Volume 1, Chapter 3, Annex D, Table 1, mean trip rates for 50sqm average flat size subsidized housing.
(2) Source from TPDM Volume 1, Chapter 3, Annex D, Table 1, mean trip rates for 70sqm average flat size private housing.
(3) Source from TPDM Volume 1, Chapter 3, Annex D, Table 2, mean trip rates for retail / shopping complex (office + retail).
(4) Source from DR439, Transport Department.

Table 4.5 Trip Generation of Various Development Sites in KaTS

Site No.		AM Peak		PM Peak	
		Generation	Attraction	Generation	Attraction
MTRCL Sites	KSRS Phase 1	331	236	220	271
	PHMC (via Kam Ho Road Access)	176	117	72	96
	PHMC (via Pat Heung Road access)	383	256	155	208
	Total Trips (pcu/hr)	**890**	**609**	**447**	**575**
Initial Sites	1(1)	318	266	184	250
	4a	239	165	116	156
	6	113	102	51	69
	Total Trips (pcu/hr)	**670**	**533**	**352**	**476**

Notes:
(1) Traffic generation from GIC supporting facilities is included with reference to the Land Use Review for Kam Tin South and Pat Heung.

4.4 Proposed Road Improvement Works for Initial Sites at KaTS

4.4.1 Off-site road improvement works (RIW) were recommended in the LUR to improve the future traffic operation and to cater for the additional traffic demand arisen from populations at KaTS.

4.4.2 The layout and arrangement of the RIW as proposed in the LUR was reviewed, and further modification / refinement / alternatives to the RIW were proposed. The RIW for the Initial Sites development includes:-

- Junction improvement at J/O Kam Tin Road / Tsing Long Highway Slip Road (J2);
- Junction improvement at J/O Kam Tin Road / Kam Tin Bypass / Kam Ho Road (J3);
- Junction improvement at Western J/O Kam Tin Road / Kam Sheung Road (J4);
- Junction improvement at J/O Kam Ho Road / Access Road to KSR Station (J6);
- Junction improvement at J/O Kam Ho Road / Tung Wui Road (J7);
- Junction improvement at J/O Tung Wui Road / Access Road to KSRS Eastern PTI (J8)
- Junction improvement at J/O Tung Wui Road / Kam Po Road (J9);
- Junction improvement at J/O Tung Wui Road / Kam Sheung Road (J10);
- Junction improvement at J/O Pat Heung Road / Tsing Long Highway Slip Road (J11);
- Junction improvement at J/O Pat Heung Road / Link Road to Kam Ho Road (J12);
- Junction improvement at J/O Pat Heung Road / Kam Sheung Road (J15);
- Widening of a section of Kam Po Road south of Tung Wui Road;
- Widening of a section of Kam Ho Road between Kam Tin Road and Tung Wui Road;
- Widening of a section of Kam Tin Road between Kam Ho Road and Kam Sheung Road, and
- Improvement to existing on-street bus stops along Kam Sheung Road.

4.4.3 The general layout plans of the RIW for Initial Site as proposed under this Project are shown in **Figure 4.2 – 4.21**.

4.4.4 The enhancements/ changes proposed for the road layout comparing with the LUR are summarized in **Table 4.6**.

Table 4.6 Summary of Changes on Road Layout comparing with the LUR

Junction / Road Link	Changes comparing with LUR	Justification
Figure 4.3 - Kam Tin Road / Tsing Long Highway Slip Road (J2)	- Provision of 2 right turn traffic lanes from Tsing Long Highway Slip Road to Kam Tin Road	- To enhance the junction capacity
Figure 4.4 - Kam Tin Road / Kam Tin Bypass / Kam Ho Road (J3)	- Minor modification of the exclusive left turn lane from Kam Ho Road to Kam Tin Road	- To avoid encroachment into mitigation wetlands re-created under the West Rail Project

Junction / Road Link	Changes comparing with LUR	Justification
Figure 4.5 - Kam Tin Road / Kam Sheung Road Western Junction (J4)	- Provision of pedestrian crossings across Kam Tin Road - A channelizing island is provided for left turn traffic movement from Kam Sheung Road to Kam Tin Road - Maintain existing footpath of Kam Tin Road in front of Lot STT2660, STT638 and P3092	- To improve pedestrian circulation at junction for completeness - To enhance road safety for split phase arrangement - To minimize environmental impact to the existing neighbourhoods
Figure 4.6 - Kam Ho Road / Access Road to KSR Station (J6)	- Right turning traffic movements are banned	- To minimize cross traffic at the future widened dual 2-lane Kam Ho Road considering that the existing access road to KSR Station will be closed and serve MTR Kam Tin Building only
Figure 4.7 - Kam Ho Road / Tung Wui Road (J7)	- Minor modification and re-alignment of Kam Ho Road approaching arm	- To comply with the current highway design standards and greening requirement
Figure 4.8 - Tung Wui Road / Access Road to KSRS Eastern PTI (J8)	- A new 6m wide crossing on eastern side of the junction	- To accommodate the pedestrian demand generated by initial sites (Before formation of access road to KSRS Phase 2 Development, the existing crossing at Tung Wui Road will be widened to at least 9m before completion of the Initial Sites 1, 4a and 6.)
Figure 4.9 - Tung Wui Road / Kam Po Road (J9)	- Signalized junction with right turn traffic movement from Tung Wui Road eastbound to Kam Po Road	- To attract traffic heading to Kam Po Road via the future widened Kam Ho Road in order to minimize traffic loading on Kam Tin Road and Kam Sheung Road in future
Figure 4.10 - Tung Wui Road / Kam Sheung Road (J10)	- Minor modification on pedestrian crossing arrangement, road marking and layout of southwest approach arm	- To enhance junction capacity and avoid modification of existing footbridge and noise barrier
Figure 4.11 - Pat Heung Road / Tsing Long Highway Slip Road (J11)	- Mini-roundabout is proposed instead of signalized junction	- To improve circulation of Pat Heung Road traffic and junction performance
Figure 4.12 - Pat Heung Road / Link	- Re-provisioning of the existing pedestrian crossing	- To maintain the existing pedestrian circulation

Junction / Road Link	Changes comparing with LUR	Justification
Road to Kam Ho Road (J12)		
Figure 4.13 - Pat Heung Road / Kam Sheung Road (J15)	- Pedestrian crossings are provided - Local widening of Kam Sheung Road to provide additional traffic lane	- To improve pedestrian circulation at junction and enhance junction capacity
Figures 4.4, 4.5, 4.14 - Kam Tin Road between Kam Ho Road and Kam Sheung Road	- Widening to standard 7.3m single 2-lane carriageway	- To minimize area of land resumption thus the impact to the locals but maintain manageable traffic condition in the future at the same time
Figure 4.15 & 4.16	- Addition of bus lay-bys and temporary on-street pick-up/drop-off bay at Kam Ho Road	- To accommodate future transport demand arising from Kam Sheung Road Station Development and columbarium during festive periods

Lay-bys

4.4.5 In order to improve traffic condition of Kam Tin Road and Kam Sheung Road where on-street pick-up and drop-off activities of public transport services are identified on roadside, 6 number of bus lay-bys are proposed for Mung Yeung School eastbound bus stop, Kat Hing Wai westbound bus stop, Pat Heung Road Pat Heung northbound and southbound bus stops, Kam Tsin Wai northbound bus stop and Full Silver Garden southbound bus stop as shown in **Figure 4.4**, **Figure 4.5**, **Figure 4.13**, **Figure 4.20** and **Figure 4.21** respectively.

4.4.6 Bus lay-bys and coach parking bays are also proposed on the future widened Kam Ho Road to accommodate possible public transport demand in the future as shown in **Figures 4.15** and **4.16**.

4.4.7 It has been identified that traffic of Pat Heung Road between the two acceses to/from Tsing Long Highway and demand of pick-up/drop-off activities would be increased due to its close proximity to the bus-bus interchange of Tai Lam Tunnel, extension of the existing bus lay-by on Pat Heung Road underneath Tsing Long Highway is proposed with inclusion of a taxi stand as shown in **Figure 4.11**.

4.4.8 In order to accommodate possible demands of loading/unloading activities arising from the initial sites developments in future, lay-bys and general loading/unloading bays are proposed at Kam Ho Road near the School Site and the access road to Site 1 as shown in **Figures 4.17** and **4.18**.

5 TRAFFIC IMPACT ASSESSMENT

5.1 Junction Capacity Analysis

5.1.1 The performances of the key junctions within the AOI were assessed based on the traffic forecasts for the three assessment scenarios in 2031, and are summarized in **Table 5.1**.

Table 5.1 2031 Junction Performance

No.	Junction	2031 RC/DFC[1]					
		Scenario 1		Scenario 2		Scenario 3	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
J1	Au Tau Interchange	0.60	0.49	0.78	0.65	0.7	0.65
J2	Kam Tin Road/ Tsing Long Highway Slip Road	7%	**-4%**	**-12%**	**-17%**	40%	24%
J3	Kam Tin Road/ Kam Tin Bypass/ Kam Ho Road	0.54	0.56	**1.06**	0.88	0.75	0.66
J4	Kam Tin Road/ Kam Sheung Road (Western Junction)	0.57	0.61	**1.22**	**1.29**	45%	30%
J5	Kam Tin Road/ Kam Tin Bypass/ Tung Wui Road[2]	0.45	0.52	0.48	0.56	0.48	0.56
	Kam Tin Road/ Kam Tin Bypass/ Tung Wui Road[3]	0.45	0.52	0.48	0.56	0.48	0.56
J6	Kam Ho Road/ Access Road to KSRS	0.45	0.33	0.85	0.62	0.03	0.03
J7	Kam Ho Road/Tung Wui Road/Access Road to KSRS	0.29	0.33	0.84	0.62	0.79	0.55
J8	Tung Wui Road / Access Road to KSRS Eastern PTI	62%	61%	**-7%**	14%	44%	87%
J8A	Tung Wui Road / Access Road to Site 1	-	-	0.46	0.24	0.46	0.24
J9	Tung Wui Road/ Kam Po Road	0.09	0.07	**1.05**	0.49	45%	>100%
J10	Tung Wui Road / Kam Sheung Road	44%	48%	**-21%**	**-11%**	30%	46%
J11	Pat Heung Road/ Tsing Long Highway Slip Road	0.57	0.55	**1.31**	**1.20**	0.48	0.44
J12	Pat Heung Road/ Link Road to Kam Ho Road	0.53	0.32	**1.68**	0.82	0.56	0.37
J13	Pat Heung Road / Kam Ho Road	0.26	0.25	0.33	0.30	0.39	0.34
J14	Pat Heung Road/ Link Road to Kam Po Road	0.11	0.08	0.11	0.08	0.11	0.08
J15	Pat Heung Road/ Kam Sheung Road	0.42	0.53	0.54	0.60	95%	89%
J16	Castle Peak Road – Tam Mi / Sam Tam Road	31%	41%	19%	31%	19%	31%
J17	Kam Tin Road/ Fan Kam Road[2]	0.71	0.70	0.79	0.75	0.79	0.75
	Kam Tin Road/ Fan Kam Road[3]	0.63	0.70	0.71	0.75	0.71	0.75
J18	Kam Tin Road/ Kam Sheung Road (Eastern Junction)[2]	0.64	0.61	0.71	0.70	0.71	0.70
	Kam Tin Road/ Kam Sheung Road (Eastern Junction)[3]	0.62	0.59	0.59	0.67	0.69	0.67
J19	Kam Tin Road / Lam Kam Road / Route Twisk[2]	0.59	0.60	0.65	0.63	0.65	0.63
	Kam Tin Road / Lam Kam Road / Route Twisk[3]	0.58	0.59	0.64	0.62	0.64	0.62

No.	Junction	2031 RC/DFC(1)					
		Scenario 1		Scenario 2		Scenario 3	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
J20	Pok Oi Interchange	0.69	0.81	0.84	0.88	0.84	0.88

Notes:
(1) Explanatory notes for the terms "RC" and "DFC" are given in para. 3.3.2 and 3.3.3 respectively.
(2) Existing layout without "Upgrading of Remaining Sections of Kam Tin Road and Lam Kam Road".
(3) With widening to a standard 7.3m wide single 2-lane carriageway under "Upgrading of Remaining Sections of Kam Tin Road and Lam Kam Road" by Highways Department.

5.1.2 With the proposed road improvement works, it is anticipated that all problematic junctions identified in the Assessment Scenario 2 could be alleviated without further capacity problem.

5.2 Link Capacity Analysis

5.2.1 The identified key road links within the AOI were assessed based on the traffic forecasts of the 3 assessment scenarios in 2031. The link performances are shown in **Tables 5.2 – 5.4**.

Scenario 1 (without KaTS Development and RIW)

5.2.2 Kam Tin Road east of Tung Wui Road (L15) would be overloaded (V/C = 1.3) in 2031. With the improvement works "Upgrading of Remaining Sections of Kam Tin Road and Lam Kam Road" implemented by Highway Department, the V/C ratio would be dropped to 1.06.

5.2.3 Tai Lam Tunnel (L19) would operate with spare capacity but close to its capacity limit in 2031 even without KaTS development (V/C =1.05).

Scenario 2 (with KaTS Initial Sites but without RIW)

5.2.4 With the 2 MTRCL Sites and 3 Initial Sites, Kam Ho Road (L4) and Kam Po Road (L14 and L25) would be overloaded (V/C > 1.2), road improvement works is required in order to support KaTS Initial Sites Developments.

5.2.5 With the improvement works "Upgrading of Remaining Sections of Kam Tin Road and Lam Kam Road" implemented by Highway Department, Kam Tin Road (L3 and L15) would operate at capacity (V/C < 1.2). Otherwise, Kam Tin Road (L15) would be overloaded as same as Scenario 1.

5.2.6 With KaTS Initial Sites Developments, Tai Lam Tunnel (L19) would still operate at capacity (V/C = 1.18) which is still manageable.

Scenario 3 (with KaTS Initial Sites and RIW)

5.2.7 With the road improvement works implemented under the Project, all the road links would operate with ample capacity (V/C < 1.0) except Kam Tin Road (L15) and Tai Lam Tunnel (L19) which indicates a manageable degree of congestion (V/C > 1.0 but V/C <1.2).

Table 5.2 Link Performance of 2031 Assessment Scenario 1

No.	Road	Config.	Dir.	Capacity (pcu/hr)	AM Peak		PM Peak	
					Flow	V/C	Flow	V/C
L1	Kam Tin Road	D2	EB	3,600	2,180	0.61	1,880	0.52
		D2	WB	3,600	1,750	0.49	2,080	0.58
L2	Tsing Long Highway Slip Road	S2	NB	3,600	410	0.11	660	0.18
		S2	SB	3,600	340	0.09	180	0.05
L3	Kam Tin Road	S2	EB	900	610	0.68	650	0.72
			WB	900	630	0.70	650	0.72
L4	Kam Ho Road	S2	NB	1,100	570	0.52	600	0.55
			SB	1,100	140	0.13	120	0.11
L5	Kam Sheung Road	S2	NB	900	300	0.33	350	0.39
			SB	900	240	0.27	270	0.30
L6	Kam Sheung Road	S2	NB	900	320	0.36	490	0.54
			SB	900	480	0.53	520	0.58
L7	Tung Wui Road	D2	EB	3,600	500	0.14	520	0.14
		D2	WB	3,600	560	0.16	560	0.16
L8	Kam Ho Road	S2	NB	1,100	420	0.38	460	0.42
			SB	1,100	450	0.41	300	0.27
L9	Pat Heung Road Link Road	S2	EB	1,100	390	0.35	390	0.35
			WB	1,100	390	0.35	320	0.29
L10	Pat Heung Road	S2	EB	1,100	270	0.25	340	0.31
			WB	1,100	400	0.36	300	0.27
L11	Kam Tin Road	S2	EB	900	350	0.39	310	0.34
			WB	900	340	0.38	360	0.40
L12	Kam Sheung Road	S2	EB	900	390	0.43	500	0.56
			WB	900	490	0.54	480	0.53
L13	Kam Tin Bypass	D2	EB	3,600	740	0.21	610	0.17
		D2	WB	3,600	500	0.14	780	0.22
L14	Kam Po Road	S1	2-way	130	80	0.62	70	0.54
L15	Kam Tin Road (1)	S2	EB	900	1,050	**1.17**	900	**1.00**
			WB	900	1,000	**1.11**	1,170	**1.30**
	Kam Tin Road (2)	S2	EB	1,100	1,050	0.95	900	0.82
			WB	1,100	1,000	0.91	1,170	**1.06**
L16	Kam Tin Road	D2	EB	3,600	2,130	0.59	1,750	0.49
		D2	WB	3,600	1,770	0.49	2,430	0.68
L17	Tsing Long Highway	D3	NB	6,100	2,310	0.38	4,150	0.68
		D3	SB	6,100	4,960	0.81	3,330	0.55
L18	Tsing Long Highway	D3	NB	6,100	2,720	0.45	4,810	0.79
		D3	SB	6,100	5,300	0.87	3,510	0.58
L19	Tai Lam Tunnel	D3	NB	5,400	2,980	0.55	5,060	0.94
		D3	SB	5,400	5,690	**1.05**	3,690	0.68
L20	Tung Wui Road	D2	EB	3,600	500	0.14	520	0.14
		D2	WB	3,600	590	0.16	580	0.16
L21	Tung Wui Road	D2	EB	3,600	390	0.11	420	0.12
		D2	WB	3,600	680	0.19	580	0.16
L22	Kam Tin Road	S2	EB	1,000	810	0.74	690	0.63
		S2	WB	1,000	640	0.58	840	0.76
L23	Kam Tin Road	S2	EB	1,100	840	0.76	850	0.77
		S2	WB	1,100	700	0.64	910	0.83
L24	Kam Sheung Road	S2	EB	900	540	0.60	310	0.34
		S2	WB	900	310	0.34	350	0.39
L25	Kam Po Road	S1	2-way	130	80	0.62	70	0.54

Notes:
(1) Existing layout without “Upgrading of Remaining Sections of Kam Tin Road and Lam Kam Road”.
(2) With widening to a standard 7.3m wide single 2-lane carriageway under “Upgrading of Remaining Sections of Kam Tin Road and Lam Kam Road” by Highways Department.

Table 5.3 Link Performance of 2031 Assessment Scenario 2

No.	Road	Config.	Dir.	Capacity (pcu/hr)	AM Peak		PM Peak	
					Flow	V/C	Flow	V/C
L1	Kam Tin Road	D2	EB	3,600	2,900	0.81	2,550	0.71
		D2	WB	3,600	2,720	0.76	2,590	0.72
L2	Tsing Long Highway Slip Road	S2	NB	3,600	610	0.17	850	0.24
		S2	SB	3,600	600	0.17	330	0.09
L3	Kam Tin Road	S2	EB	900	1,080	**1.20**	1,080	**1.20**
			WB	900	630	0.70	650	0.72
L4	Kam Ho Road	S2	NB	1,100	1,560	**1.42**	1,140	**1.04**
			SB	1,100	840	0.76	680	0.62
L5	Kam Sheung Road	S2	NB	900	300	0.33	350	0.39
			SB	900	720	0.80	700	0.78
L6	Kam Sheung Road	S2	NB	900	400	0.44	560	0.62
			SB	900	480	0.53	520	0.58
L7	Tung Wui Road	D2	EB	3,600	610	0.17	580	0.16
		D2	WB	3,600	1,200	0.33	1,150	0.32
L8	Kam Ho Road	S2	NB	1,100	550	0.50	550	0.50
			SB	1,100	700	0.64	440	0.40
L9	Pat Heung Road Link Road	S2	EB	1,100	650	0.59	600	0.55
			WB	1,100	870	0.79	550	0.50
L10	Pat Heung Road	S2	EB	1,100	400	0.36	450	0.41
			WB	1,100	440	0.40	320	0.29
L11	Kam Tin Road	S2	EB	900	350	0.39	310	0.34
			WB	900	340	0.38	360	0.40
L12	Kam Sheung Road	S2	EB	900	440	0.49	530	0.59
			WB	900	530	0.59	500	0.56
L13	Kam Tin Bypass	D2	EB	3,600	740	0.21	610	0.17
		D2	WB	3,600	500	0.14	780	0.22
L14	Kam Po Road	S1	2-way	130	920	**7.08**	590	**4.54**
L15	Kam Tin Road (1)	S2	EB	900	1,160	**1.29**	960	**1.07**
			WB	900	1,080	**1.20**	1,250	**1.39**
	Kam Tin Road (2)	S2	EB	1,100	1,160	**1.05**	960	0.87
			WB	1,100	1,080	0.98	1,250	**1.14**
L16	Kam Tin Road	D2	EB	3,600	2,650	0.74	2,230	0.62
		D2	WB	3,600	2,480	0.69	2,790	0.78
L17	Tsing Long Highway	D3	NB	6,100	2,300	0.38	4,160	0.68
		D3	SB	6,100	4,960	0.81	3,330	0.55
L18	Tsing Long Highway	D3	NB	6,100	2,910	0.48	5,010	0.82
		D3	SB	6,100	5,560	0.91	3,660	0.60
L19	Tai Lam Tunnel	D3	NB	5,400	3,490	0.65	5,540	**1.03**
		D3	SB	5,400	6,390	**1.18**	4,050	0.75
L20	Tung Wui Road	D2	EB	3,600	610	0.17	580	0.16
		D2	WB	3,600	1,390	0.39	1,090	0.30
L21	Tung Wui Road	D2	EB	3,600	500	0.14	480	0.13
		D2	WB	3,600	770	0.21	660	0.18
L22	Kam Tin Road	S2	EB	1,100	860	0.78	720	0.65
		S2	WB	1,100	680	0.62	870	0.79
L23	Kam Tin Road	S2	EB	1,100	940	0.85	900	0.82
		S2	WB	1,100	760	0.69	970	0.88
L24	Kam Sheung Road	S2	EB	900	590	0.66	330	0.37
		S2	WB	900	340	0.38	380	0.42
L25	Kam Po Road	S1	2-way	130	500	**3.85**	350	**2.69**
L26	New Public Road to Site 1	S2	NB	1,100	320	0.29	180	0.16
		S2	SB	1,100	270	0.25	250	0.23

Notes:
(1) Existing layout without “Upgrading of Remaining Sections of Kam Tin Road and Lam Kam Road”.
(2) With widening to a standard 7.3m wide single 2-lane carriageway under “Upgrading of Remaining Sections of Kam Tin Road and Lam Kam Road” by Highways Department.

Table 5.4 Link Performance of 2031 Assessment Scenario 3

No.	Road	Config.	Dir.	Capacity (pcu/hr)	AM Peak		PM Peak	
					Flow	V/C	Flow	V/C
L1	Kam Tin Road (1)	D3	EB	5,400	2,900	0.54	2,550	0.47
		D2	WB	3,600	2,720	0.76	2,590	0.72
L2	Tsing Long Highway Slip Road	S2	NB	3,600	610	0.17	850	0.24
		S2	SB	3,600	600	0.17	330	0.09
L3	Kam Tin Road(2)	S2	EB	1,100	800	0.73	830	0.75
			WB	1,100	630	0.57	650	0.59
L4	Kam Ho Road(3)	D2	NB	3,600	1,560	0.43	1,150	0.32
		D2	SB	3,600	1,140	0.32	930	0.26
L5	Kam Sheung Road	S2	NB	900	300	0.33	350	0.39
			SB	900	440	0.49	450	0.50
L6	Kam Sheung Road	S2	NB	900	370	0.41	530	0.59
			SB	900	480	0.53	520	0.58
L7	Tung Wui Road	D2	EB	3,600	610	0.17	580	0.16
		D2	WB	3,600	900	0.25	880	0.24
L8	Kam Ho Road	S2	NB	1,100	670	0.61	610	0.55
			SB	1,100	760	0.69	500	0.45
L9	Pat Heung Road Link Road(8)	S2	EB	1,100	830	0.75	710	0.65
			WB	2,200	1,020	0.46	630	0.29
L10	Pat Heung Road	S2	EB	1,100	370	0.34	420	0.38
			WB	1,100	440	0.40	320	0.29
L11	Kam Tin Road	S2	EB	900	350	0.39	310	0.34
			WB	900	340	0.38	360	0.40
L12	Kam Sheung Road	S2	EB	900	440	0.49	530	0.59
			WB	900	530	0.59	500	0.56
L13	Kam Tin Bypass	D2	EB	3,600	740	0.21	610	0.17
		D2	WB	3,600	500	0.14	780	0.22
L14	Kam Po Road(4)	S2	NB	1,100	450	0.41	220	0.20
			SB	1,100	300	0.27	270	0.25
L15	Kam Tin Road (5)	S2	EB	900	1,160	**1.29**	960	**1.07**
			WB	900	1,080	**1.20**	1,250	**1.39**
	Kam Tin Road (6)	S2	EB	1,100	1,160	**1.05**	960	0.87
			WB	1,100	1,080	0.98	1,250	**1.14**
L16	Kam Tin Road	D2	EB	3,600	2,650	0.74	2,230	0.62
		D2	WB	3,600	2,480	0.69	2,790	0.78
L17	Tsing Long Highway	D3	NB	6,100	2,300	0.38	4,160	0.68
		D3	SB	6,100	4,960	0.81	3,330	0.55
L18	Tsing Long Highway	D3	NB	6,100	2,910	0.48	5,010	0.82
		D3	SB	6,100	5,560	0.91	3,660	0.60
L19	Tai Lam Tunnel	D3	NB	5,400	3,490	0.65	5,540	**1.03**
		D3	SB	5,400	6,390	**1.18**	4,050	0.75
L20	Tung Wui Road	D2	EB	3,600	890	0.25	830	0.23
		D2	WB	3,600	1,340	0.37	1,090	0.30
L21	Tung Wui Road	D2	EB	3,600	500	0.14	480	0.13
		D2	WB	3,600	770	0.21	660	0.18
L22	Kam Tin Road	S2	EB	1,100	860	0.78	720	0.65
		S2	WB	1,100	680	0.62	870	0.79
L23	Kam Tin Road	S2	EB	1,100	940	0.85	900	0.82
		S2	WB	1,100	760	0.69	970	0.88
L24	Kam Sheung Road	S2	EB	900	590	0.66	330	0.37
		S2	WB	900	340	0.38	380	0.42
L25	Kam Po Road(7)	S2	NB	1,100	270	0.25	150	0.14
			SB	1,100	180	0.16	170	0.15
L26	New Public Road to Site 1	S2	NB	1,100	320	0.29	180	0.16
		S2	SB	1,100	270	0.25	250	0.23

Notes:
(1) With widening of Kam Tin Road eastbound between Tsing Long Highway and Kam Ho Road to 3 traffic lanes due to junction improvement of Kam Tin Road / Tsing Long Highway (J2).
(2) With widening to a standard 7.3m wide single 2-lane carriageway.
(3) With widening to a standard 7.3m wide dual 2-lane carriageway.
(4) With widening to a standard 7.3m wide single 2-lane carriageway.
(5) Existing layout without “Upgrading of Remaining Sections of Kam Tin Road and Lam Kam Road”.
(6) With widening to a standard 7.3m wide single 2-lane carriageway under “Upgrading of Remaining Sections of Kam Tin Road and Lam Kam Road” by Highways Department.
(7) With widening of the remaining section of Kam Po Road between Site 4a and Pat Heung Road under separate project.
(8) With widening of westbound Pat Heung Road Link Road between the future western site access of PHMC site and Pat Heung Road to 2 traffic lanes.

6 CONSTRUCTION TRAFFIC IMPACT ASSESSMENT

6.1 Overview

6.1.1 Temporary Traffic Management (TTM) schemes would be derived to facilitate the construction works including proposed widening of existing vehicular bridge and box culvert structures across Kam Tin River as well as construction works at public roads and footpaths. Safety of the general public and construction workers would be ensured during the implementation of the TTM schemes.

6.1.2 Report on Traffic Management Scheme for each stage of the works detailing all the assessments, findings and proposals in relation to the required TTM schemes will be prepared under the design phase.

7 IMPROVEMENT OF RAILWAY CAPACITY

7.1.1 To alleviate the current crowdedness of the West Rail Line (WRL), the number of train compartments of the WRL has been gradually increased from 7-car to 8-car starting from January 2016. When comparing with the situation of 7-car trains with the hourly frequency of 20 at each direction in 2015, the passenger carrying capacity will be increased by about 14% after all WRL trains are operated with 8-car. With consideration of the facilities along the “East-West Corridor”(comprises Ma On Shan Line, Shatin to Central Link (Tai Wai to Hung Hom Section) and WRL) such as the fire safety requirements at tunnel sections and the length of platforms etc., it is estimated that the “East-West Corridor” can ultimately reach an hourly frequency of 28 at each direction, with 8-car trains. On this basis, the carrying capacity of the WRL will increase by 60% over the 7-car trains operating in 2015 at an hourly frequency of about 20.

7.1.2 In the long term, the Government will timely commence studies on improving the carrying capacity of the railways in the Northwest New Territories beyond 2031, to cope with the passenger demands.

8 SUMMARY AND CONCLUSIONS

8.1.1 Traffic impact assessments for a total of 3 assessment scenarios for design year 2031 were conducted as discussed in Section 4.

8.1.2 With the proposed road improvement works, all the assessed junctions would be operating within capacity.

8.1.3 In Scenario 3 (i.e. with 2 MTRCL Sites, 3 Initial Sites and road improvement works), all the assessed road links would be operating satisfactorily within capacity except the following road sections will be operating close to its capacity limit but still manageable (i.e. V/C ratio between 1.0 and 1.2)

- L15 Kam Tin Road east of Tung Wui Road (V/C ratio 1.14 with widening to 7.3m carriageway)
- L19 Tai Lam Tunnel (V/C ratio 1.18)

8.1.4 In conclusion, the TIA has demonstrated that the proposed road improvement works under this Project is adequate to cater for the development of the Initial Sites, and the traffic impact caused by development of Initial Sites (Sites 1, 4a, 6) is acceptable from traffic engineering point of view.

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

LEGEND:

J1 JUNCTION NO.

INITIAL SITE

AREA OF INFLUENCE

N

822800 E

825200 E

827600 E

834800 N

832400 N

830000 N

CASTLE PEAK ROAD - YUEN LONG

SAM TIN HIGHWAY

YUEN LONG HIGHWAY

KAM TIN BYPASS

KAM TIN ROAD

TUNG WU ROAD

KAM PO ROAD

KAM HO ROAD

TSING LONG HIGHWAY

KAM SHEUNG ROAD

PAT HEUNG ROAD

FAN KAM ROAD

LAM KAM ROAD

ROUTE TWISK

TAI LAM TUNNEL

TSING TAM UPPER IRRIGATION RESERVOIR

TSING TAM LOWER IRRIGATION RESERVOIR

HO PUI IRRIGATION RESERVOIR

J1 J2 J3 J4 J5 J6 J7 J8 J9 J10 J11 J12 J13 J14 J15 J16 J17 J18 J19 J20

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CLIENT 業主

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STATUS 階段

SCALE 比例
A1 1 : 12000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱
KEY PLAN FOR ROAD JUNCTION

SHEET NUMBER 圖紙編號
60336159/TIA-06/FIGURE 3.1

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

822800 E

825200 E

827600 E

834800 N

832400 N

830000 N

NAM SANG WAI

SAM TIN HIGHWAY

KAM TIN RIVER

LAM TSUEN COUNTRY PARK

CASTLE PEAK ROAD – YUEN LONG

YUEN LONG HIGHWAY

SHAP PAT HEUNG

PAT HEUNG

SHEK KONG

KAM TIN BYPASS

KAM TIN ROAD

TUNG WUI ROAD

KAM PO ROAD

KAM SHEUNG ROAD

KAM HO ROAD

TSING LONG HIGHWAY

PAT HEUNG ROAD

FAN KAM ROAD

LAM KAM ROAD

ROUTE TWISK

TAI LAM TUNNEL

TSING LAM LOWER IRRIGATION RESERVOIR

TSING LAM UPPER IRRIGATION RESERVOIR

HO PUI IRRIGATION RESERVOIR

Airfield

Barracks

L1 L2 L3 L4 L5 L6 L7 L8 L9 L10 L11 L12 L13 L14 L15 L16 L17 L18 L19 L20 L21 L22 L23 L24 L25

N

LEGEND:

L1 LINK NO.

INITIAL SITE

AREA OF INFLUENCE

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SCALE 比例
A1 1 : 12000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱
KEY PLAN FOR ROAD LINK

SHEET NUMBER 圖紙編號
60336159/TIA-06/FIGURE 3.2

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

824000 E

825000 E

KAM TIN BYPASS

KONG TAI ROAD

KAM TIN ROAD

KAM TIN

MTR WEST RAIL LINE

KAM PO ROAD

TSING LONG HIGHWAY

SHEK KONG AIRFIELD ROAD

SHAP PAT HEUNG

KAM HO ROAD

PAT HEUNG ROAD

KAM SHEUNG ROAD

YUEN KONG SAN TSUEN

FIGURE 4.3

FIGURE 4.4

FIGURE 4.5

FIGURE 4.6

FIGURE 4.7

FIGURE 4.8

FIGURE 4.9

FIGURE 4.10

FIGURE 4.11

FIGURE 4.12

FIGURE 4.13

FIGURE 4.14

FIGURE 4.15

FIGURE 4.16

FIGURE 4.17

FIGURE 4.18

FIGURE 4.19

FIGURE 4.20

FIGURE 4.21

933000 N

932000 N

931000 N

LEGEND:

INITIAL SITE

N

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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
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

KEY PLAN FOR ROAD IMPROVEMENT WORKS (RIW)

SHEET NUMBER
圖紙編號

60336159/TIA-06/FIGURE 4.2

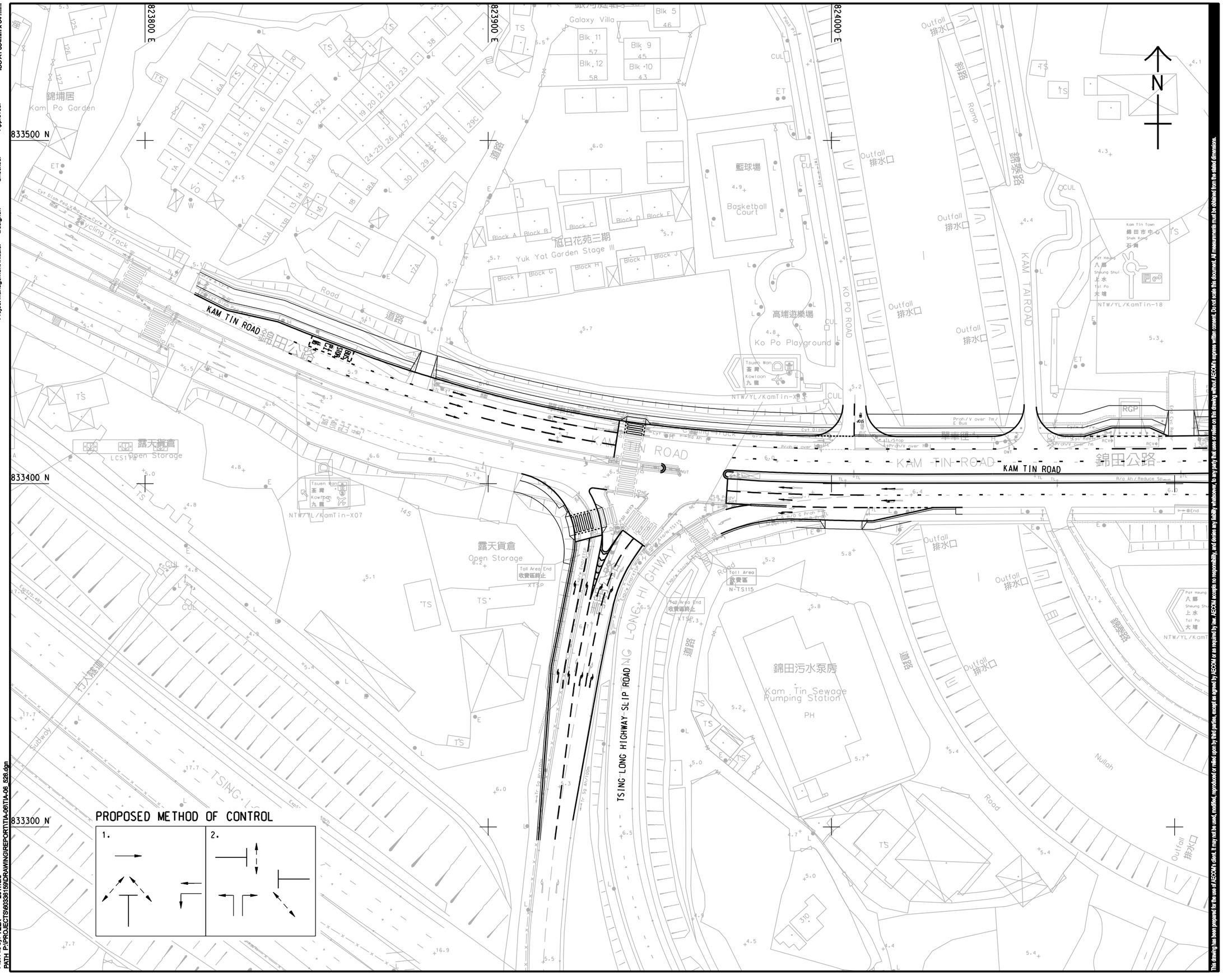
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initiials:



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SCALE 比例
A3 1 : 1000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

PROPOSED JUNCTION IMPROVEMENT FOR JUNCTION OF KAM TIN ROAD / TSING LONG HIGHWAY SLIP ROAD (J2)

SHEET NUMBER
圖紙編號

60336159/TIA-06/FIGURE 4.3

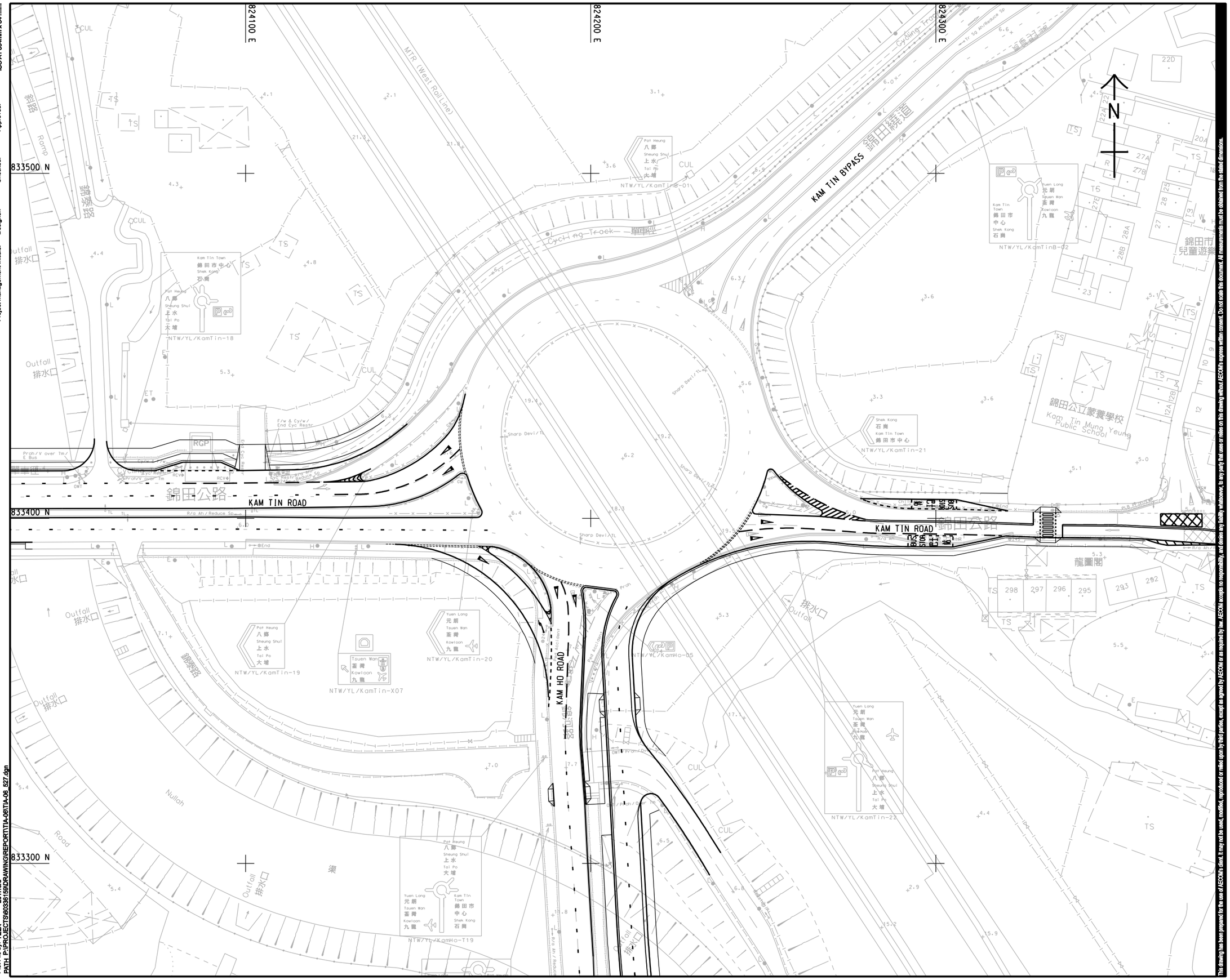
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



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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
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

PROPOSED JUNCTION IMPROVEMENT FOR JUNCTION OF KAM TIN ROAD / KAM TIN BYPASS / KAM HO ROAD (J3)

SHEET NUMBER
圖紙編號

60336159/TIA-06/FIGURE 4.4

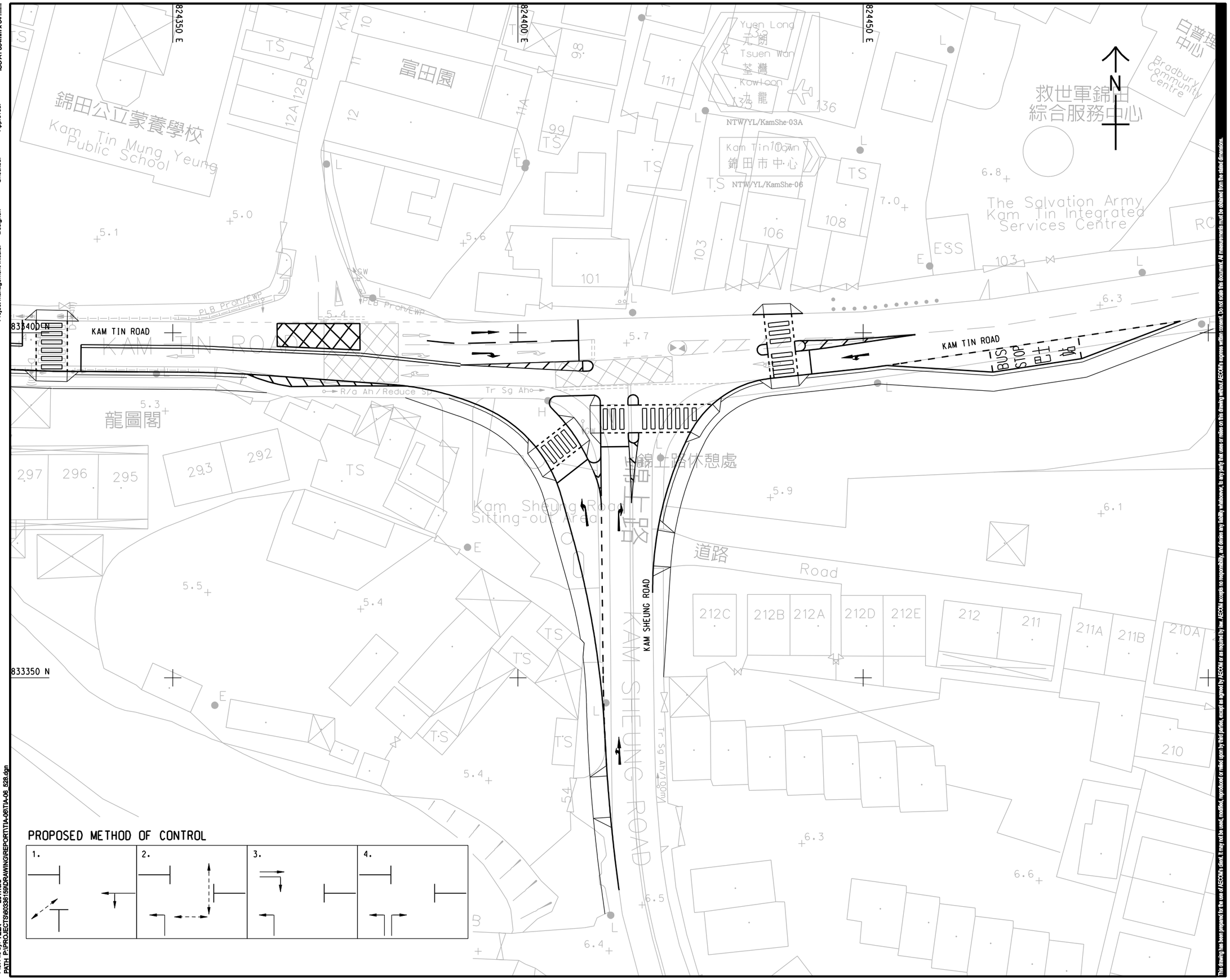
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



PROPOSED METHOD OF CONTROL

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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
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

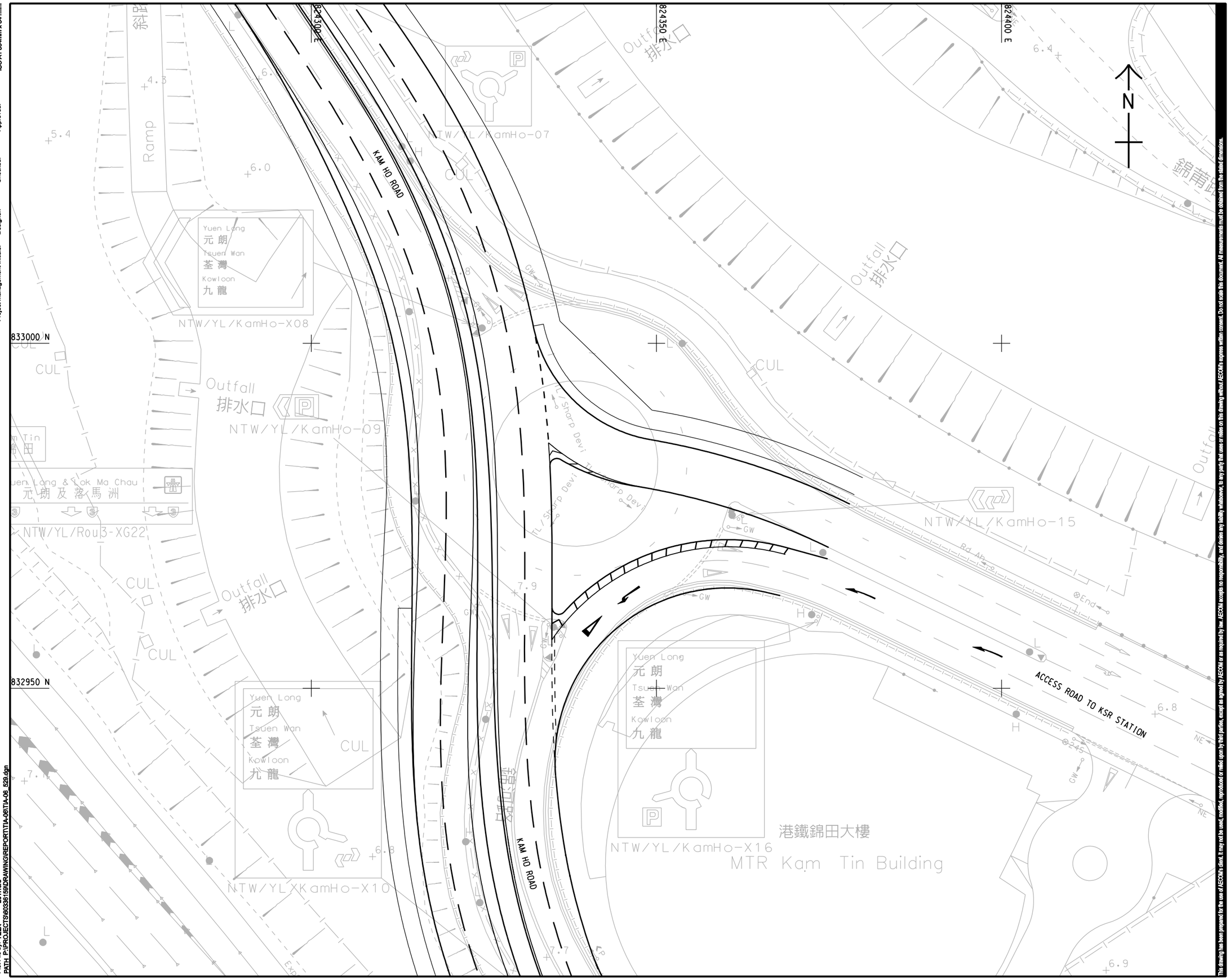
SHEET TITLE 圖紙名稱

PROPOSED JUNCTION IMPROVEMENT FOR WESTERN JUNCTION OF KAM TIN ROAD / KAM SHEUNG ROAD (J4)

SHEET NUMBER 圖紙編號

60336159/TIA-06/FIGURE 4.5

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm



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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
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

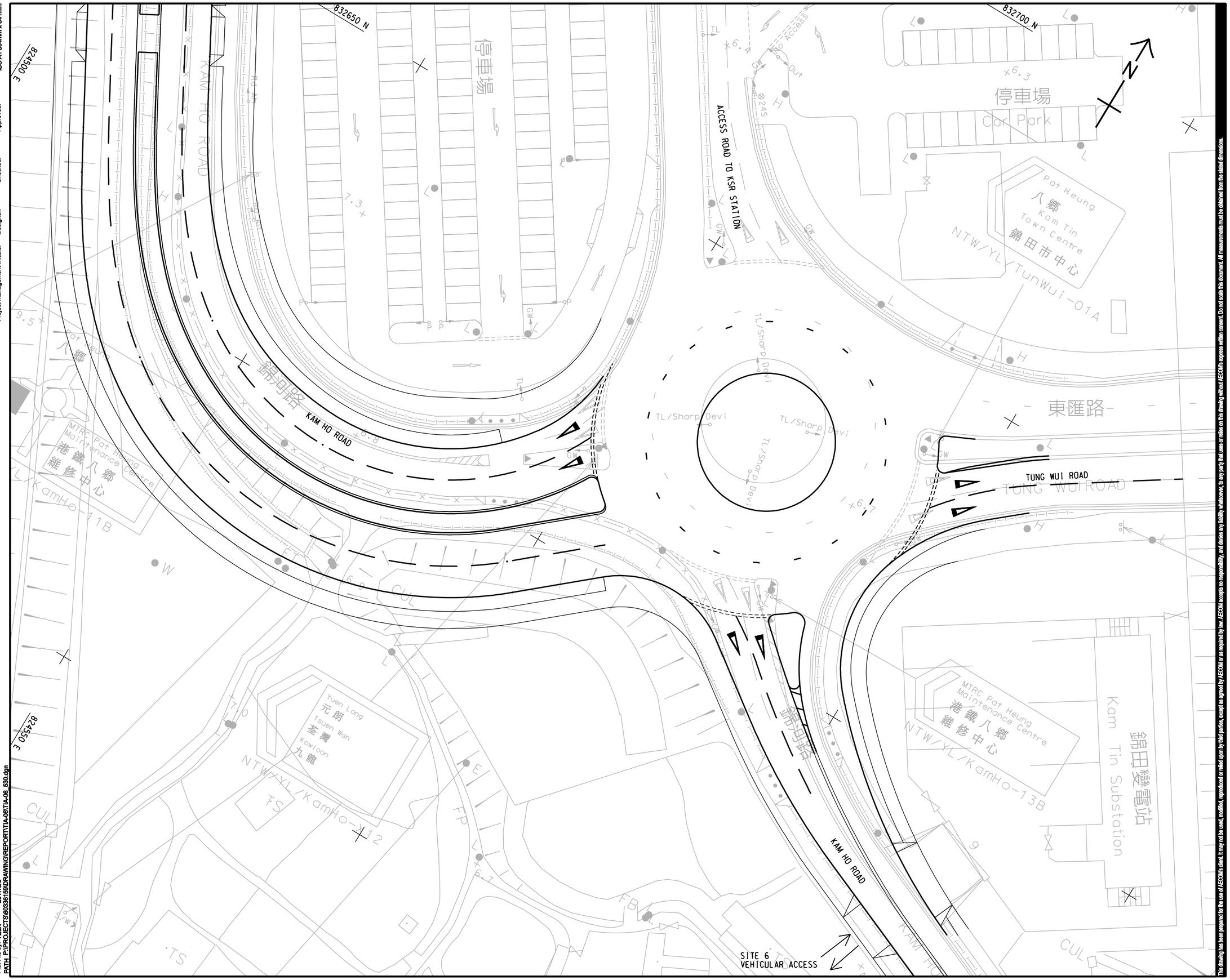
SHEET TITLE 圖紙名稱

PROPOSED JUNCTION IMPROVEMENT FOR JUNCTION OF KAM HO ROAD / ACCESS ROAD TO KSR STATION (J6)

SHEET NUMBER 圖紙編號

60336159/TIA-06/FIGURE 4.6

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm



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SCALE 比例
A3 1 : 500

DIMENSION UNIT 尺寸基位
METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號
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CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

PROPOSED JUNCTION IMPROVEMENT FOR JUNCTION OF KAM HO ROAD / TUNG WUI ROAD / ACCESS ROAD TO KSR STATION (J7)

SHEET NUMBER 圖紙編號

60336159/TIA-06/FIGURE 4.7

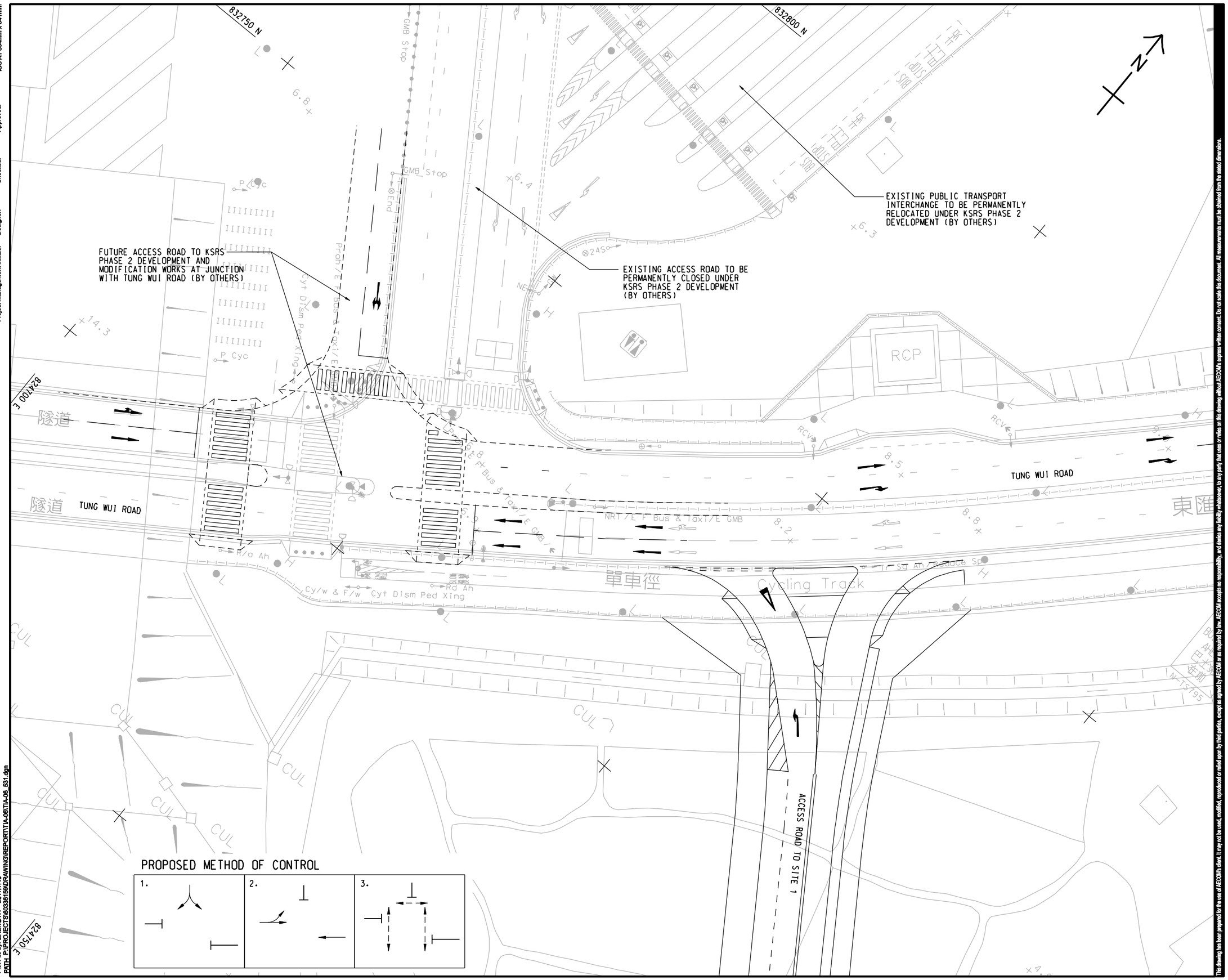
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



Plot File by: ZHENGYH 2017/7/19
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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
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CONTRACT NO. 合約編號
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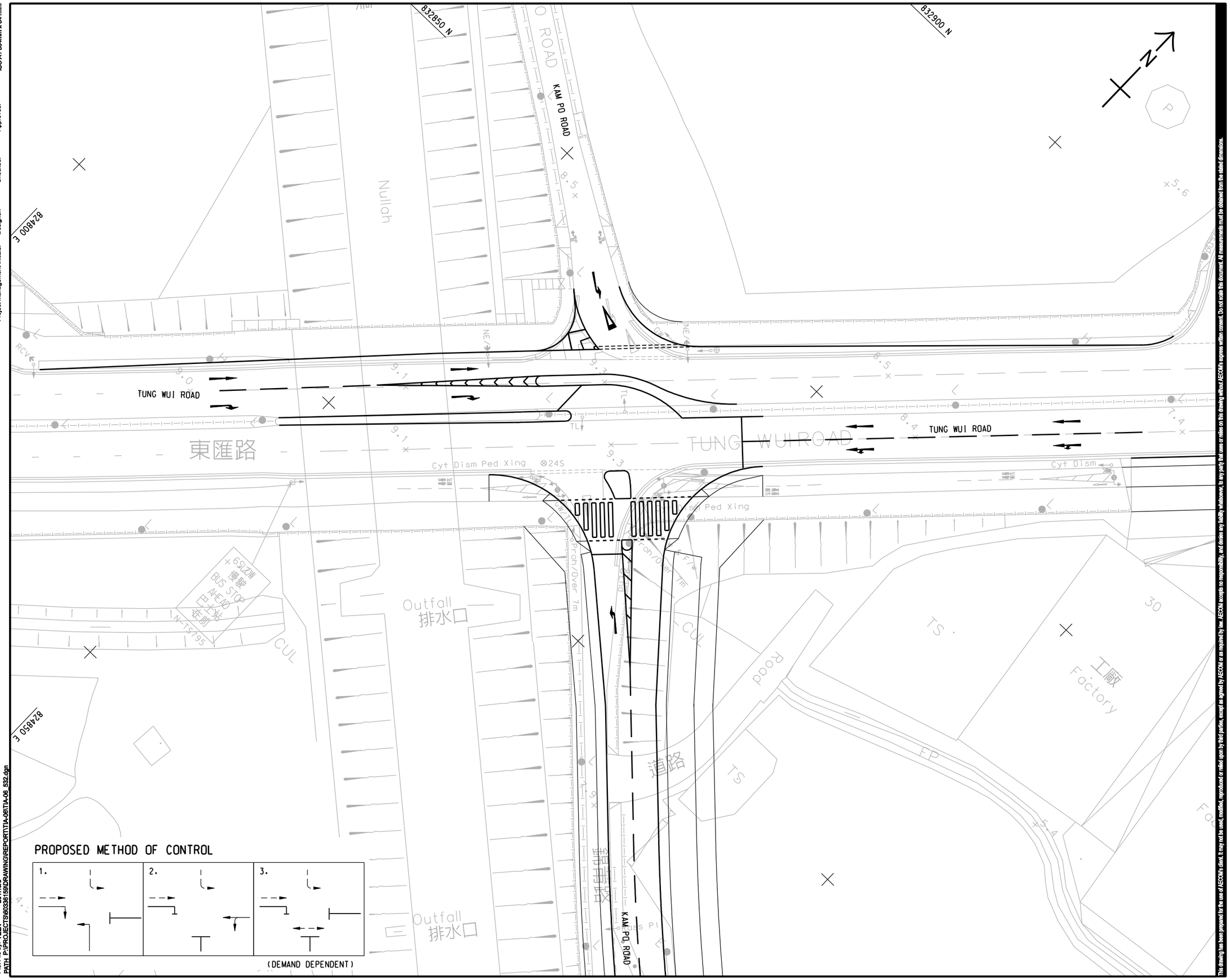
SHEET TITLE 圖紙名稱
PROPOSED JUNCTION IMPROVEMENT FOR JUNCTION OF TUNG WUI ROAD / ACCESS ROAD TO KSR STATION EASTERN PTI (J8)

SHEET NUMBER 圖紙編號
60336159/TIA-04/FIGURE 4.8



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Plot File by: YELX 2017/5/8
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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: 60336159

CONTRACT NO. 合約編號: CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

PROPOSED JUNCTION IMPROVEMENT FOR JUNCTION OF TUNG WUI ROAD / KAM PO ROAD (J9)

SHEET NUMBER
圖紙編號

60336159/TIA-06/FIGURE 4.9

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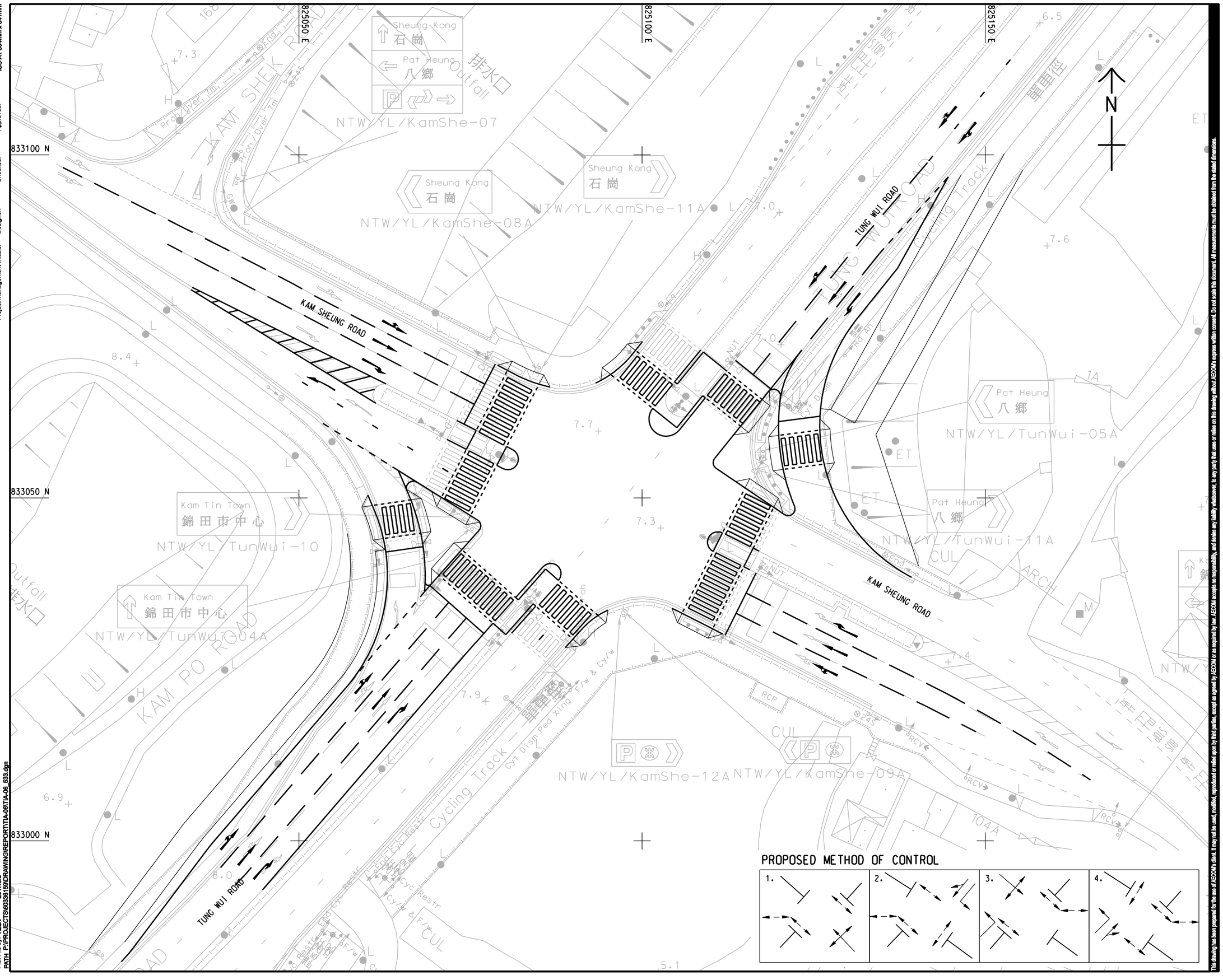

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

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SCALE 比例
A3 1 : 500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

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CONTRACT NO. 合約編號
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SHEET TITLE
圖紙名稱

PROPOSED JUNCTION IMPROVEMENT FOR JUNCTION OF TUNG WUI ROAD / KAM SHEUNG ROAD (J10)

SHEET NUMBER
圖紙編號

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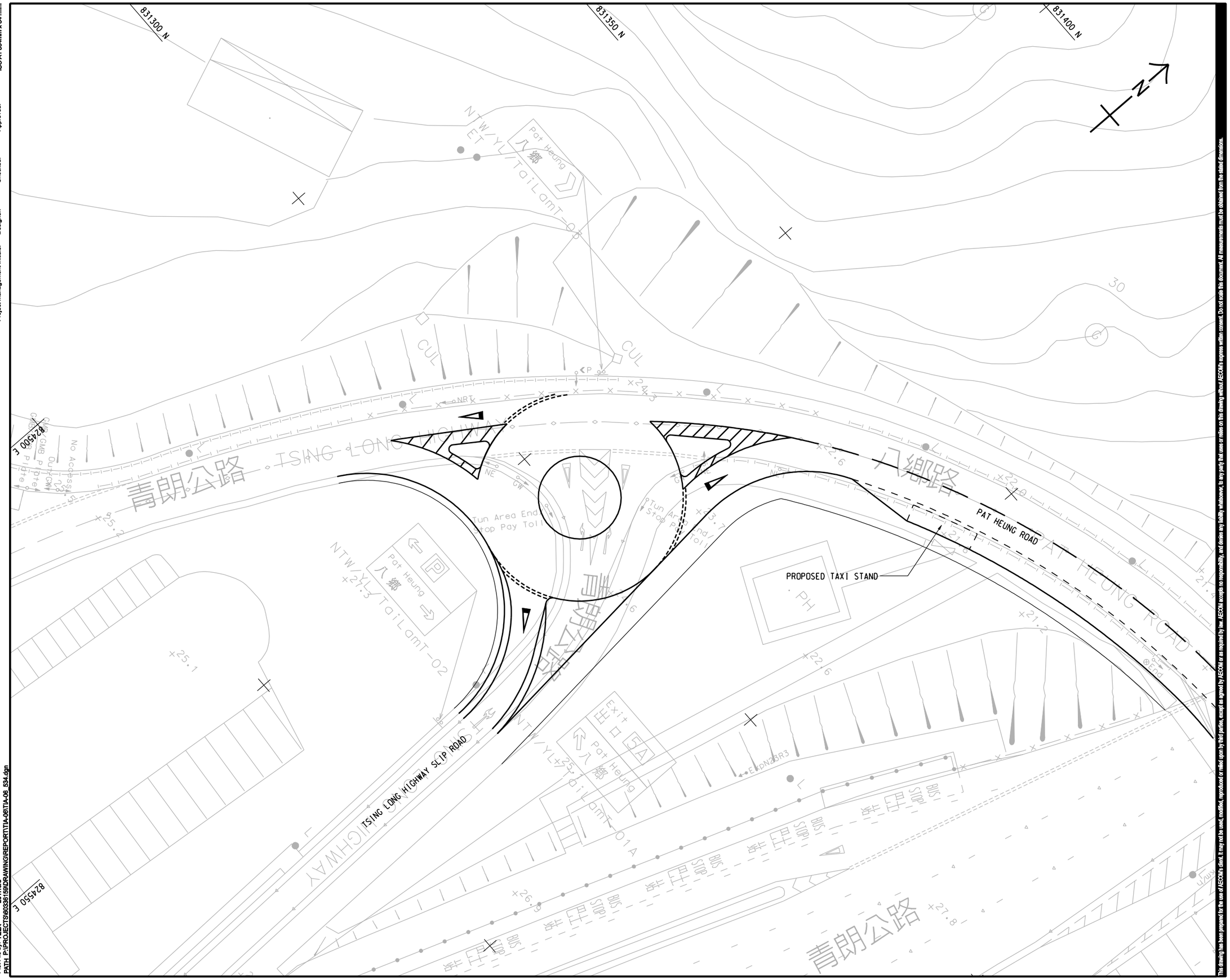

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I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核對

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: 60336159

CONTRACT NO. 合約編號: CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

PROPOSED JUNCTION IMPROVEMENT FOR JUNCTION OF PAT HEUNG ROAD / TSING LONG HIGHWAY SLIP ROAD (J11)

SHEET NUMBER
圖紙編號

60336159/TIA-06/FIGURE 4.11

Plot File by: YELX 2017/5/8
PATH: P:\PROJECTS\60336159\DRAWING\REPORT\TIA-06\TIA-06_534.dgn

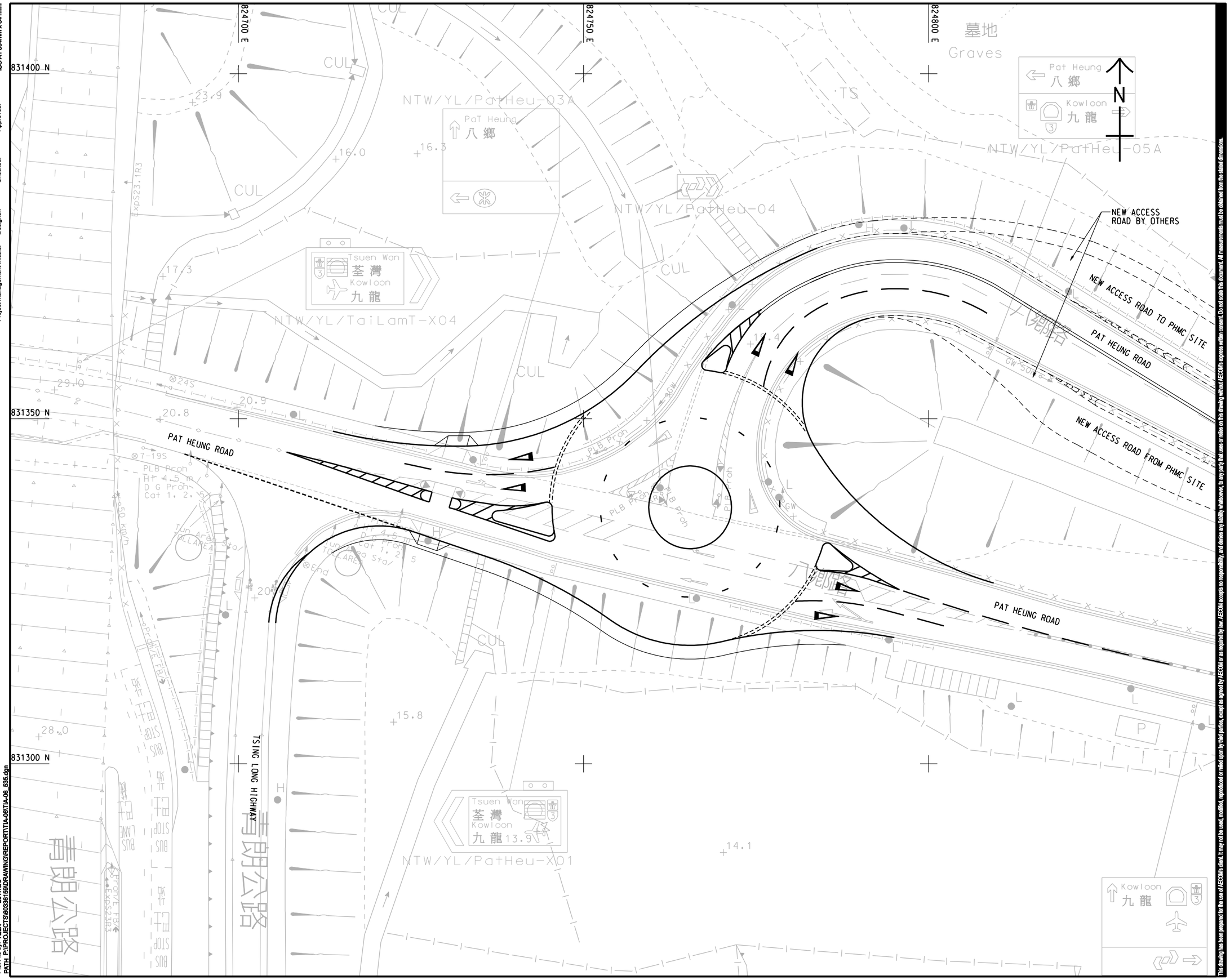
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initiials:



Plot File by:- YELX 2017/5/8
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SITE FORMATION AND INFRASTRUCTURAL WORKS FOR THE INITIAL SITES AT KAM TIN SOUTH, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT
業主

土木工程拓展署
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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
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

PROPOSED JUNCTION IMPROVEMENT FOR JUNCTION OF PAT HEUNG ROAD / LINK ROAD TO KAM HO ROAD (J12)

SHEET NUMBER
圖紙編號

60336159/TIA-06/FIGURE 4.12

ISO A1 594mm x 841mm

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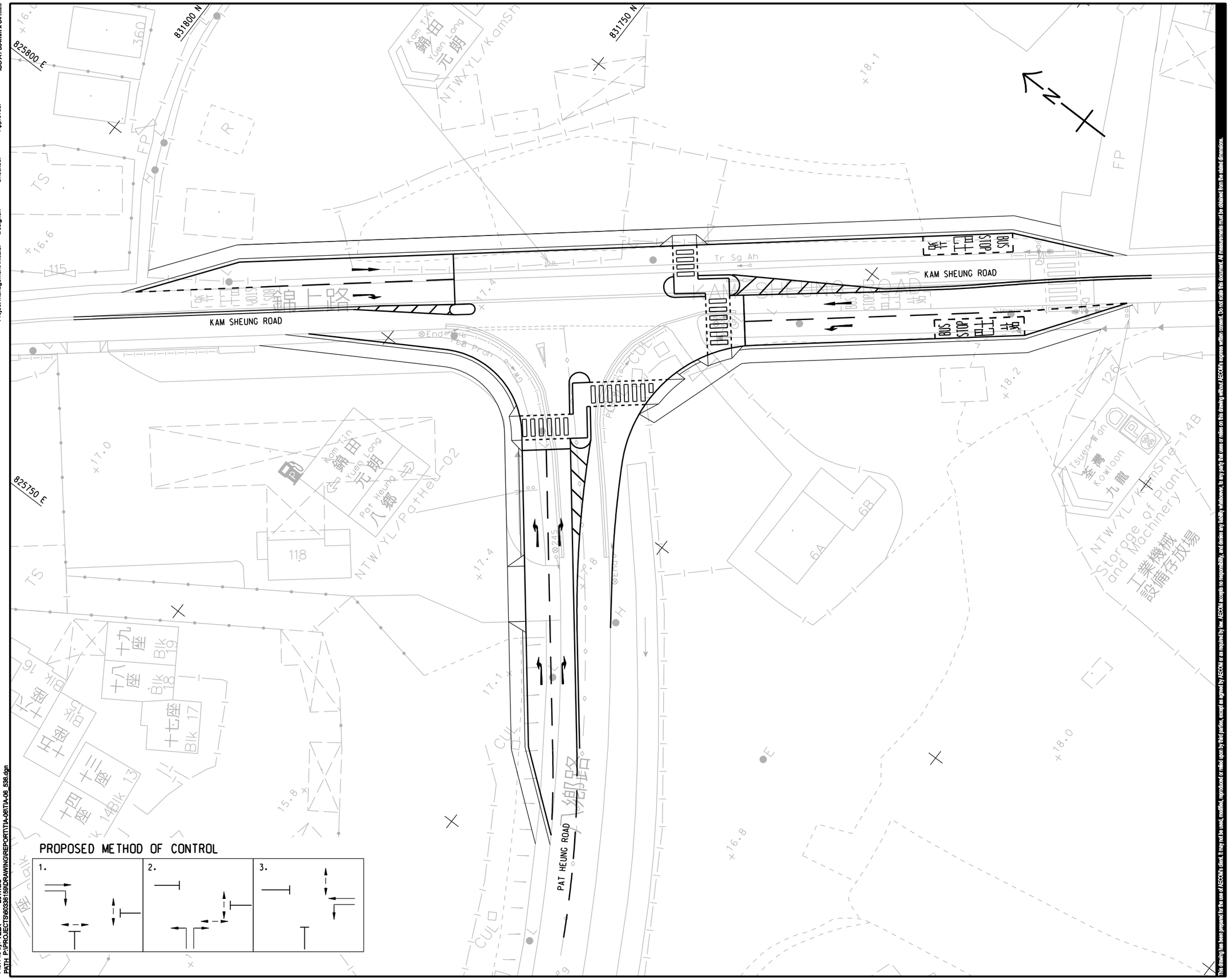
Checked:

Designer:

Project Management Initials:



PROPOSED METHOD OF CONTROL

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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 — 60336159

CONTRACT NO. 合約編號 — CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

PROPOSED JUNCTION IMPROVEMENT FOR JUNCTION OF PAT HEUNG ROAD / KAM SHEUNG ROAD (J15)

SHEET NUMBER
圖紙編號

60336159/TIA-06/FIGURE 4.13

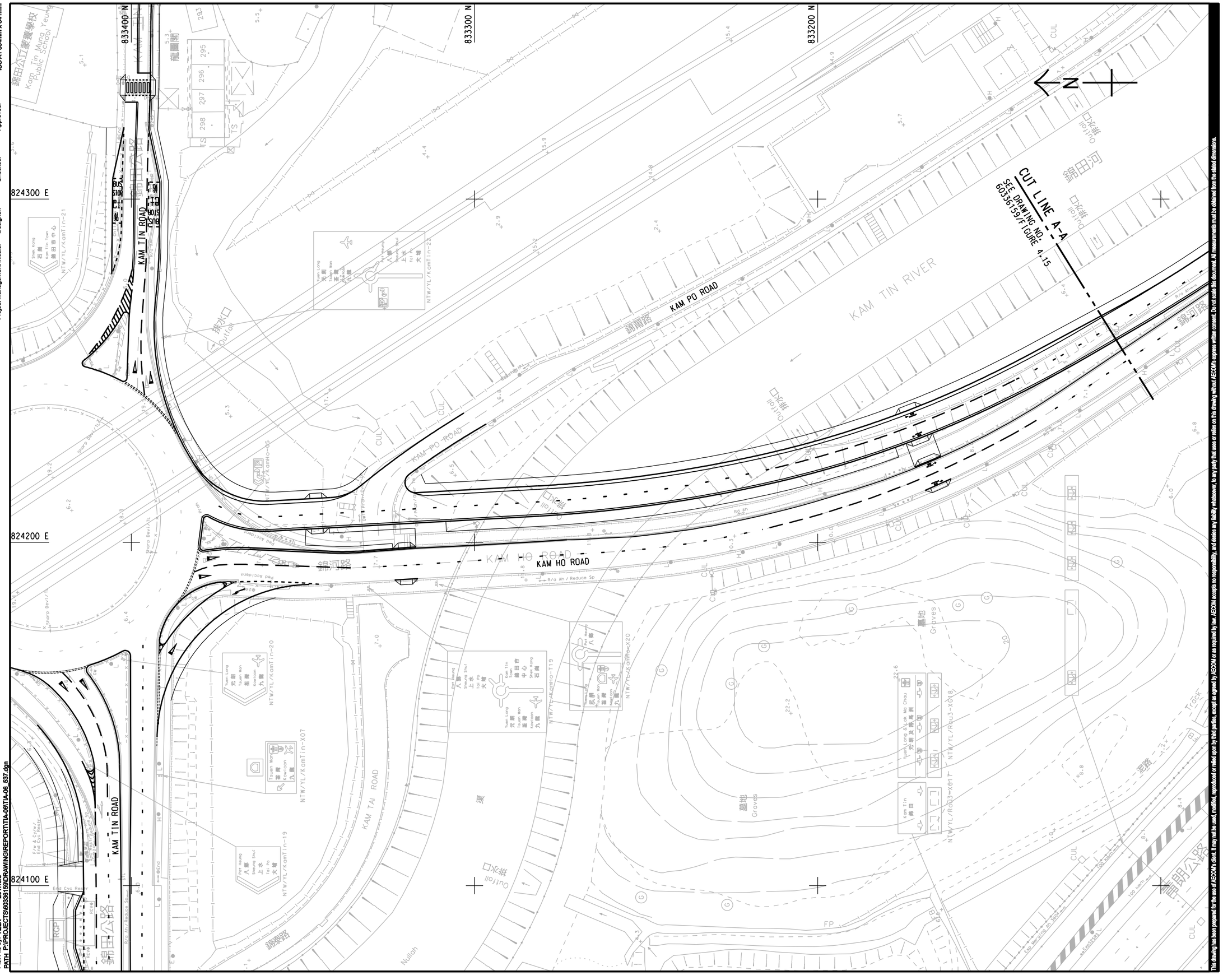
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



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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
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

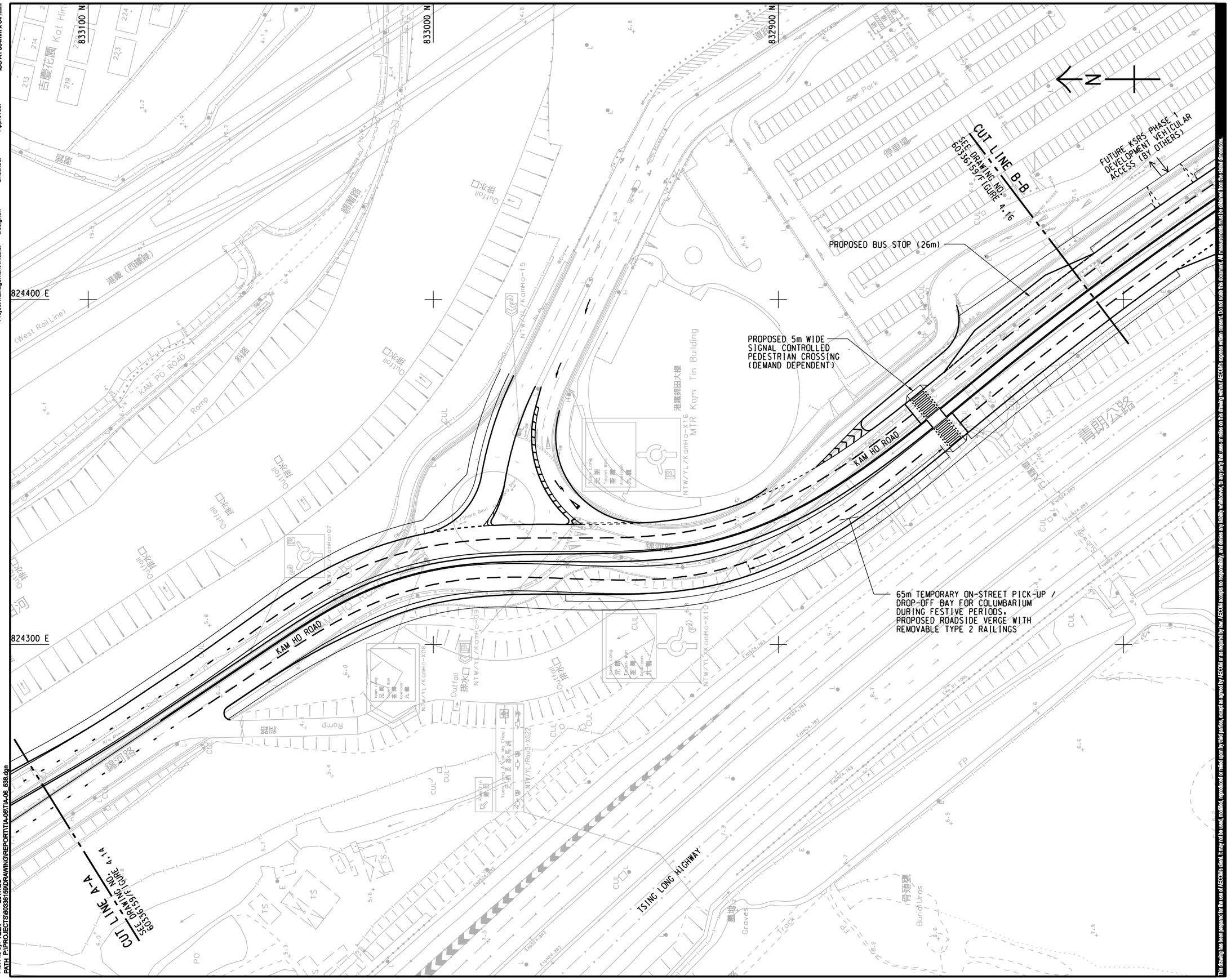
PROPOSED ROAD WIDENING FOR KAM HO ROAD

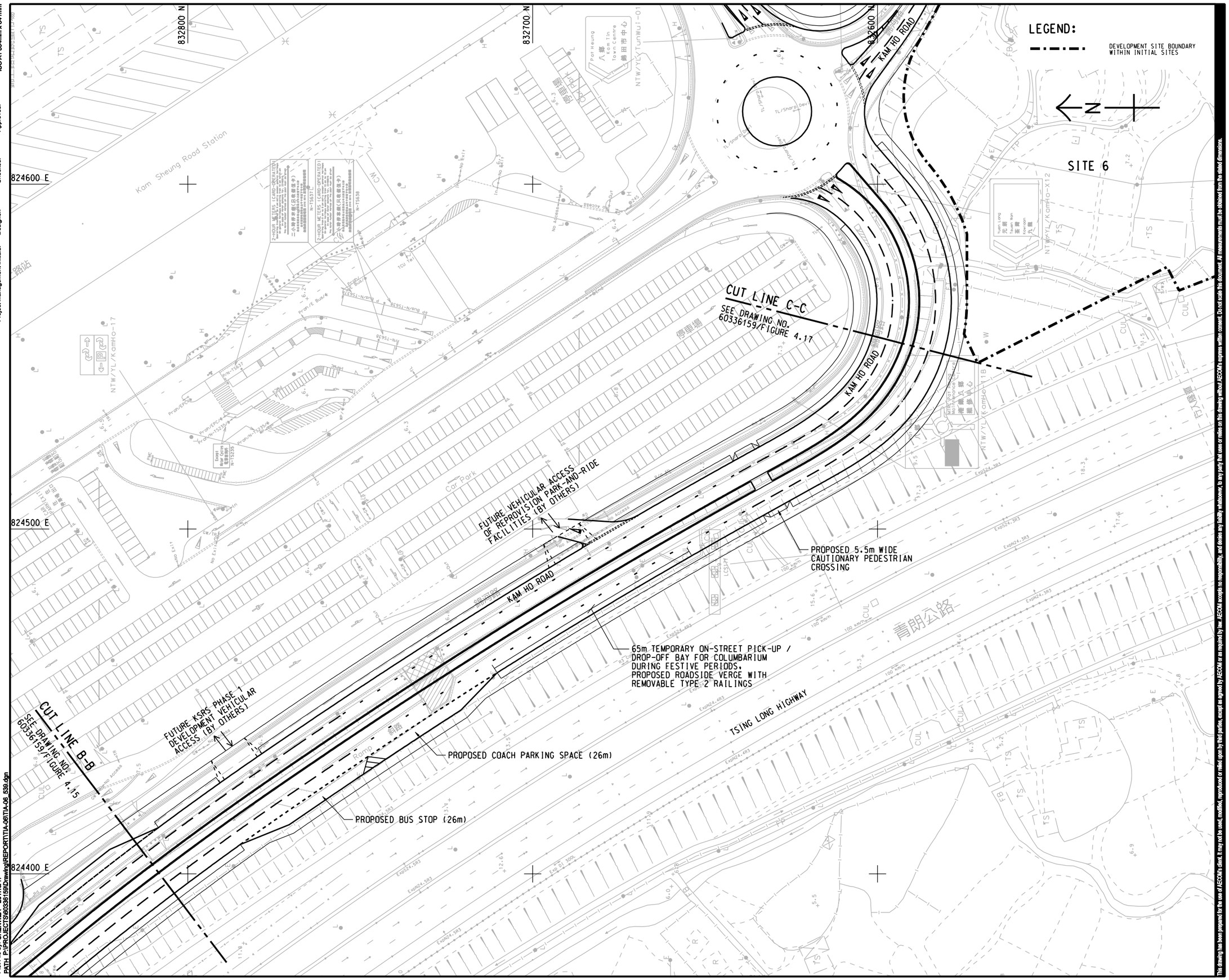
SHEET 1 OF 4

SHEET NUMBER
圖紙編號

60336159/TIA-06/FIGURE 4.14

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm


833100 N
833000 N
832900 N
824400 E
824300 E
KAM HO ROAD
KAM PO ROAD
(West Rail Line)
港鐵（西鐵線）
錦南路
錦河路
青朝公路
TSING LONG HIGHWAY
MTR Kam Tin Building
港鐵錦田大樓
PROPOSED BUS STOP (26m)
PROPOSED 5m WIDE SIGNAL CONTROLLED PEDESTRIAN CROSSING (DEMAND DEPENDENT)
65m TEMPORARY ON-STREET PICK-UP / DROP-OFF BAY FOR COLUMBARIUM DURING FESTIVE PERIODS. PROPOSED ROADSIDE VERGE WITH REMOVABLE TYPE 2 RAILINGS
FUTURE KSRS PHASE 1 DEVELOPMENT VEHICULAR ACCESS (BY OTHERS)
CUT LINE B-B
SEE DRAWING NO. 60336159/FIGURE 4.16
CUT LINE A-A
SEE DRAWING NO. 60336159/FIGURE 4.14
NTW/YL/KamHo-15
NTW/YL/KamHo-09
NTW/YL/KamHo-X08
NTW/YL/KamHo-X10
NTW/YL/Road3-X622
NTW/YL/KamHo-07
N
Kam Tin Shopping Centre
Kam Tin Sports Ground
Kam Tin Park
Kam Tin Swimming Pool
Kam Tin Public Library
Kam Tin Complex
Kam Tin Community Hall
Kam Tin Sitting Out Area
Kam Tin Children's Playground
Kam Tin Basketball Court
Kam Tin Soccer Pitch
Kam Tin Tennis Court
Kam Tin Indoor Games Hall
Kam Tin Jockey Club Activity Centre
Kam Tin Jockey Club Clubhouse
Kam Tin Jockey Club Public Toilet
Kam Tin Jockey Club Changing Room
Kam Tin Jockey Club Car Park
Kam Tin Jockey Club Sitting Out Area
Kam Tin Jockey Club Children's Playground
Kam Tin Jockey Club Basketball Court
Kam Tin Jockey Club Soccer Pitch
Kam Tin Jockey Club Tennis Court
Kam Tin Jockey Club



Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

Plot File by: CHENWZA 2017/8/17
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PROJECT 項目

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR THE INITIAL SITES AT KAM TIN SOUTH, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

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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: 60336159

CONTRACT NO. 合約編號: CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

PROPOSED ROAD WIDENING FOR KAM HO ROAD

SHEET 3 OF 4

SHEET NUMBER 圖紙編號

60336159/TIA-06/FIGURE 4.16

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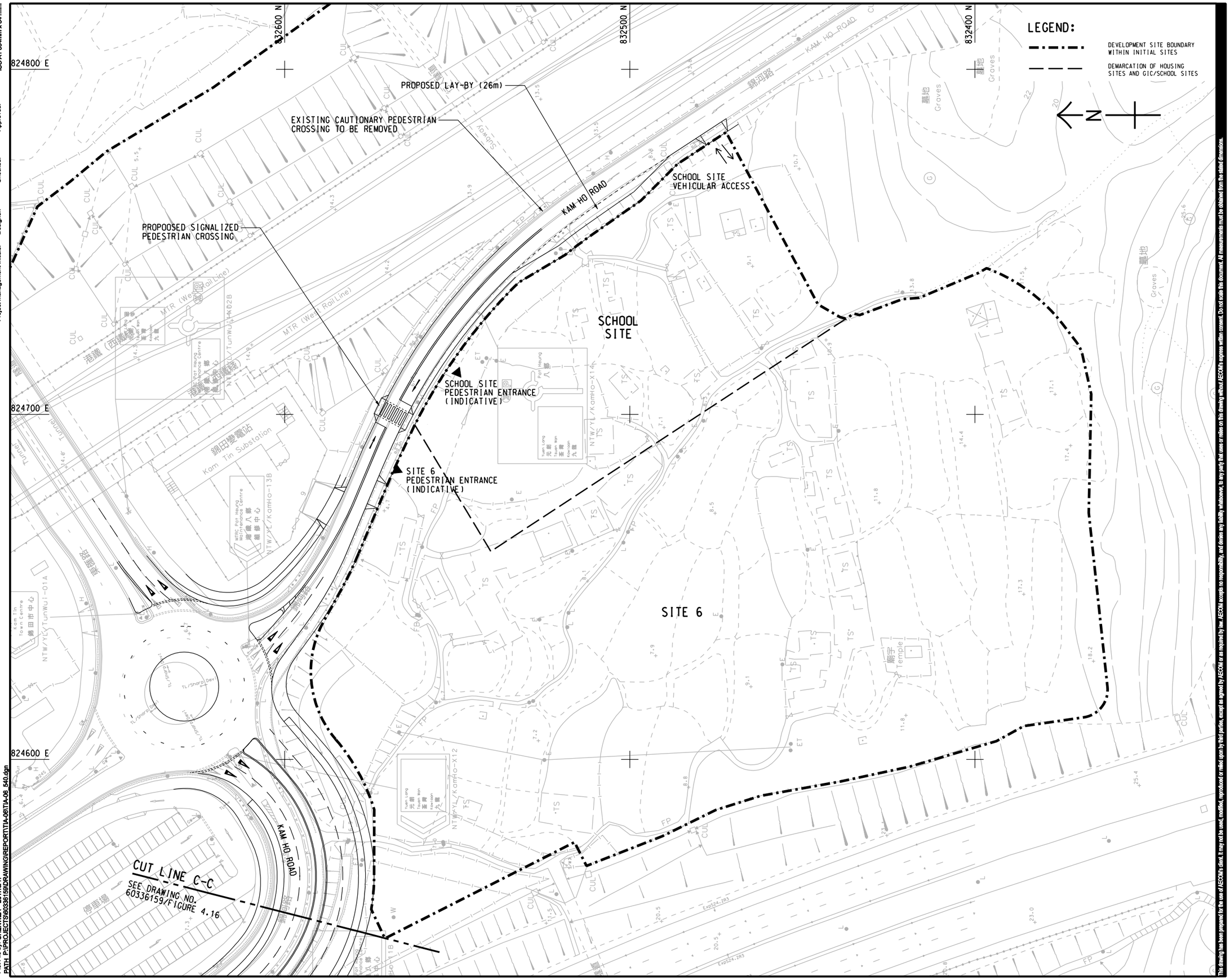

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

Plot File by: CHENWZA 2017/8/17
PATH P:\PROJECTS\60336159\DRAWING\REPORT\TIA-06\TIA-06 540.dgn

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PROJECT 項目

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STATUS 階段

SCALE 比例

DIMENSION UNIT 尺寸單位

METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號

60336159

CONTRACT NO. 合約編號

CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

PROPOSED ROAD WIDENING FOR KAM HO ROAD

SHEET 4 OF 4

SHEET NUMBER 圖紙編號

60336159/TIA-06/FIGURE 4.17

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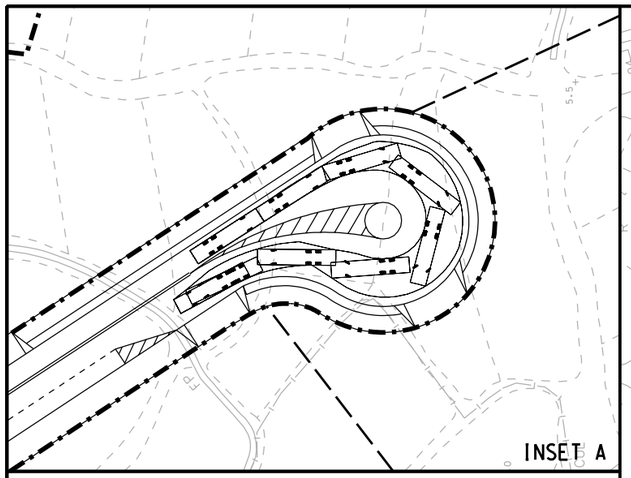
Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm



SWEPT PATH ANALYSIS FOR 12.8m BUS

Plot File by: CHENWZA 2017/8/17
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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 60336159

CONTRACT NO. 合約編號 CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

PROPOSED ROAD WIDENING FOR KAM PO ROAD

SHEET 1 OF 2

SHEET NUMBER 圖紙編號

60336159/TIA-06/FIGURE 4.18

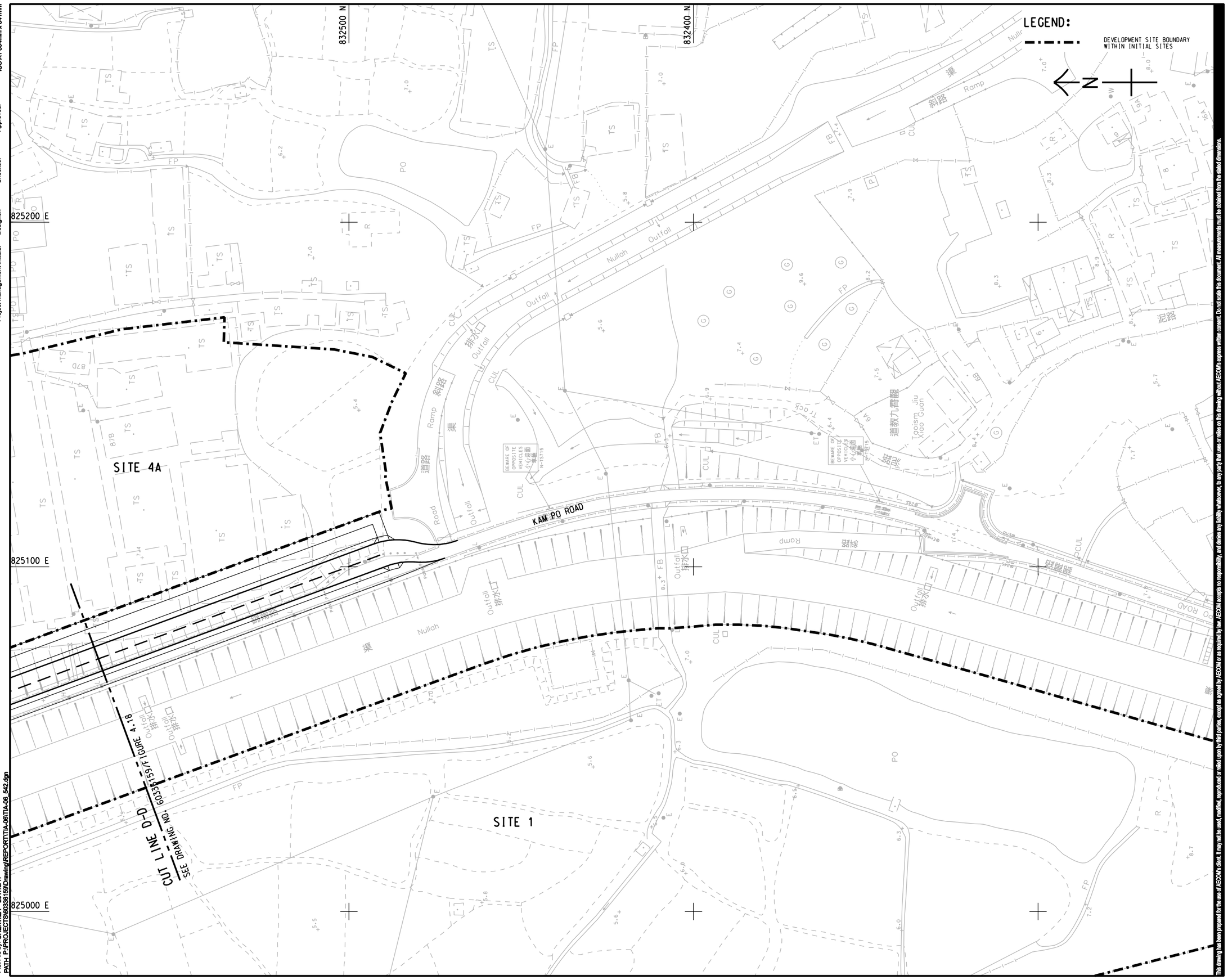
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



Plot File by: CHENWZA 2017/9/17
PATH P:\PROJECTS\60336159\Drawing\REPORT\TIA-06\TIA-06 542.dgn

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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
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

PROPOSED ROAD WIDENING FOR KAM HO ROAD

SHEET 2 OF 2

SHEET NUMBER
圖紙編號

60336159/TIA-06/FIGURE 4.19

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm



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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
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

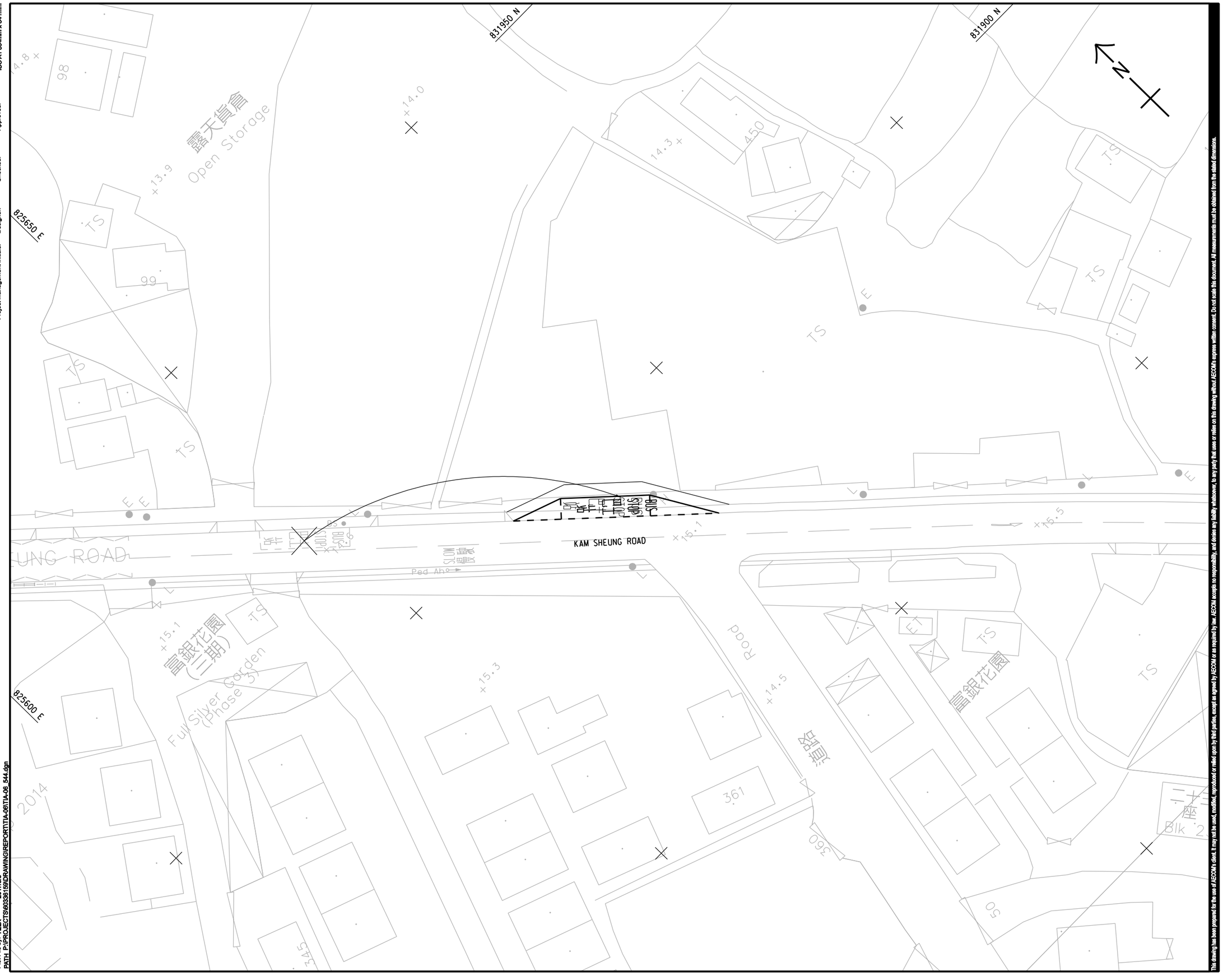
SHEET TITLE 圖紙名稱

PROPOSED IMPROVEMENT TO KAM TSIN WAI BUS STOP AT KAM SHEUNG ROAD

SHEET NUMBER 圖紙編號

60336159/TIA-06/FIGURE 4.20

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm



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STATUS
狀態

SCALE 比例
A3 1 : 500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

PROPOSED IMPROVEMENT TO TIN SAM TSUEN BUS STOP AT KAM SHEUNG ROAD

SHEET NUMBER
圖紙編號

60336159/TIA-06/FIGURE 4.21

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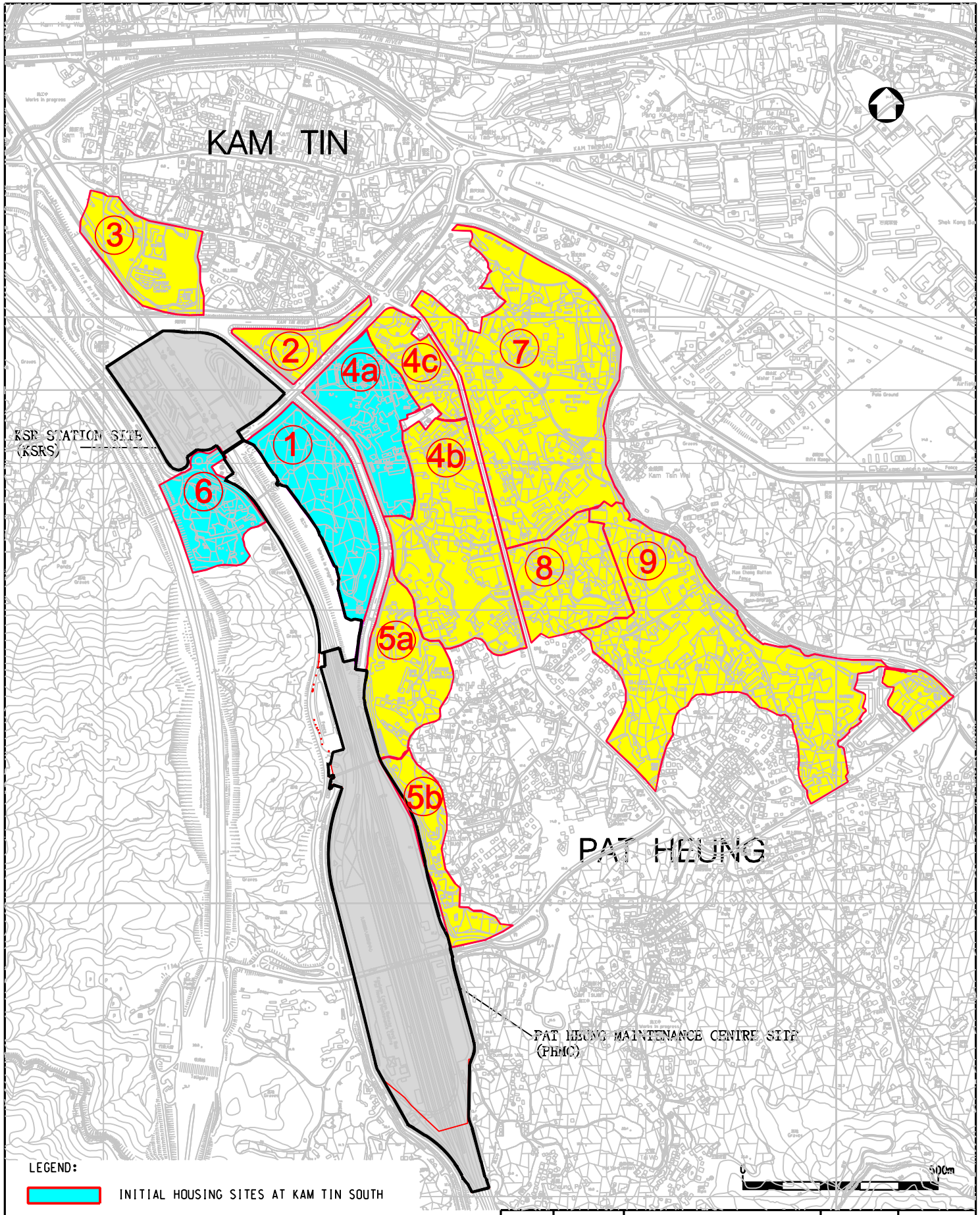
Annex A

Kam Tin South Housing Development – Layout Plan



LEGEND:

INITIAL HOUSING SITES AT KAM TIN SOUTH

REMAINING HOUSING SITES AT KAM TIN SOUTH

編號 no.	日期 date	修訂 REVISION 內容摘要 description	核對 checked	核准 approved
A	12.08.2014	TITLE BLOCK UPDATED	SIGNED	SIGNED

圖則名稱 drawing title

KAM TIN SOUTH HOUSING DEVELOPMENT -LAYOUT PLAN

繪圖 drawn	S M CHU	簽署 initial	SIGNED	日期 date 18.10.13
核對 checked	H S KO	簽署 initial	SIGNED	日期 date 18.10.13
核准 approved	K L CHEUNG	簽署 initial	SIGNED	日期 date 18.10.13

項目編號 item no.

比例 scale AS SHOWN

圖則編號 drawing no. NTNZ1855A

辦事處 office

新界西拓展處
NEW TERRITORIES WEST DEVELOPMENT OFFICE

土木工程拓展署
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

date filename

(Updated as at 30 JUL 2014) L:\Drawing-MS\Ntnz1855-1856\Ntnz1855A.dgn

A3 297MM X 420MM

PROPOSED AMENDMENTS TO THE APPROVED KAM TIN SOUTH OUTLINE ZONING PLAN NO. S/YL-KTS/13

Sites 1, 4a and 6 for Public Housing Development and Government, Institution or Community Facilities

Environmental Assessment

Executive Summary

Environmental Assessments (EAs) have been conducted to evaluate the environmental feasibility for the public housing at Kam Tin South consisting of Site 1, Site 4a and Site 6, with respect to the Hong Kong Planning Standards and Guidelines (HKPSG). The EAs are based upon the indicative layout plan provided by Hong Kong Housing Authority (HKHA).

Land Contamination
A site appraisal, in the form of desktop review and site walkover, had been carried out in December 2014. A total of 4 potentially contaminating sites and 2 sites with unknown activities were identified. A site re-appraisal is recommended at a later stage of the Project. The further land contamination assessment and, if necessary, remediation works would follow EPD's Guidance Manual, Guidance Note and Practice Guide and any soil/groundwater contamination would be identified and properly treated prior to the commencement of works under the project. Land contamination impacts are therefore considered not insurmountable to future occupants.

Ecology
A preliminary environmental review, based on literature review and field surveys, for the site formation and infrastructural works for the Initial Sites has been conducted. The habitats identified within the assessment area are of low to moderate ecological value. A total 0.63 ha of mitigation wetland from the West Rail project would be lost as a result of the Project. Compensation wetland of 0.7 ha would be provided to mitigate for the surrendered wetland. There are no significant adverse ecological impacts identified in the assessment.

Landscape and Visual Impacts
Due to the proposed road widening and junction improvement works, the vegetation at some roadside amenity areas, slopes and agricultural land as well as stream course, mitigation wetland, woodland and sitting-out area will be affected. Mitigation measures such as tree transplanting, compensatory planting and tree preservation will be implemented during the construction phase. For operation phase, roadside amenity planting, woodland mix planting and re-provision of sitting out area and compensation wetland are also proposed as mitigation measures. It is considered that the residual landscape and visual impacts is considered acceptable with mitigation measures implemented during construction and operation phases.

Road Traffic Noise and Railway Noise
The proposed developments would be subject to potential impacts of traffic noise from surrounding roads and railway noise from the West Rail Line and future Northern Link (NOL). At-source mitigation measures and at-receiver mitigation measures would be considered in alleviating the traffic noise impact. At-receiver mitigation measures, such as proper design of the layout of building blocks including single aspect building design, building setback and etc., would be considered in alleviating the railway noise impact from the West Rail Line. With the incorporation of the necessary practicable noise mitigation measures, it is anticipated that the relevant HKPSG requirement on road traffic noise and railway noise impact from West Rail Line can be met.

The future NOL connecting the West Rail Line and the Lok Ma Chau Spur Line of East Rail with interchange at Kam Sheung Road Station is considered as a designated project under the Environmental Impact Assessment Ordinance (EIAO). An Environmental Permit (EP) should be required for construction and operation of the NOL and an environmental impact assessment should therefore be carried out to assess and mitigate the possible impacts on the affected sensitive receivers nearby.

Fixed Noise
Potential fixed noise sources such as car repairing workshops, small factories and godown have been identified. It is anticipated that the relevant HKPSG requirements on fixed noise impact can be met. HKHA would further review the development layouts and carry out environmental assessment study on the potential fixed noise impact at the detailed design stage. Appropriate mitigation measures would be proposed if necessary.

Air Quality

Chimney surveys were conducted and no chimney was identified within the 500m study area. Building separations of minimum 5m from local roads and 20m from Tsing Long Highway were incorporated into the development layouts. No adverse air quality impact from industrial and vehicular emission on the proposed developments is envisaged.

With the implementation of appropriate mitigation measures, it is anticipated that the relevant HKPSG requirements can be met. HKHA would further review the development layouts and carry out environmental assessment study on the potential impacts with proposed mitigation measures for enhancement at the detailed design stage.

PROPOSED AMENDMENTS TO THE APPROVED KAM TIN SOUTH OUTLINE ZONING PLAN NO. S/YL-KTS/13

Sites 1, 4a and 6 for Public Housing Development and Government, Institution or Community Facilities

PART I

Site Formation and Infrastructure Works for the Initial Sites at Kam Tin South

AECOM ASIA COMPANY LIMITED

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1 POTENTIAL ENVIRONMENTAL NUISANCES DURING CONSTRUCTION

1.1 Air Quality

1.1.1 Potential air quality impacts from the construction works of the site formation and infrastructural works would mainly be related to construction dust from excavation, materials handling, spoil removal, stockpiling of materials and wind erosion. In view of the limited scale of the proposed infrastructural works, adverse dust impact at the ASRs would not be expected. Nevertheless, appropriate dust suppression measures as stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices should be implemented to minimize any potential dust impact.

1.2 Noise

1.2.1 Construction noise impacts during normal daytime working hours have been reviewed. With the use of quieter PMEs, quieter alternative construction methods and use of movable barriers and temporary barriers, no insurmountable construction noise impact is anticipated.

1.3 Water Quality

1.3.1 Water quality impacts from construction are associated with the general construction activities, construction site run-off, accidental spillage, and sewage effluent from construction workforce. Impacts can be controlled by implementing the recommended mitigation measures.

1.4 Waste

1.4.1 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, general refuse from the workforce and chemical wastes from the maintenance of construction vehicles and equipment. 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.

2 LAND CONTAMINATION ASSESSMENT

2.1 Introduction

2.1.1 This section summarises the potential implications of land contamination associated with the site formation and infrastructural works (referred as the Project in this section).

2.2 Assessment Methodology

2.2.1 Land contamination assessment, in the form of site appraisal, was carried out according to the relevant Guidance Note, Practice Guide and Guidance Manual.

2.2.2 The site appraisal, comprises of desktop study and site walkover, was conducted to identify the potentially contaminating land uses that may pose adverse impact to the Project. The site walkover was conducted within the Project Area to review the generally site conditions and to identify any source of land contamination (or 'hotspots').

2.2.3 In addition to the above, information (if any) on dangerous goods, chemical wastes, chemical spillage/leakage and fire incidents from the identified potentially contaminated sites was acquired and reviewed from Environmental Protection Department (EPD) or Fire Services Department (FSD).

2.3 Identification of Potential Sites of Land Contamination Concern

2.3.1 Site appraisal was carried out in December 2014 with a thorough site walkover conducted on 30 December 2014. A Contamination Assessment Plan (CAP), presenting the findings of the site appraisal and preliminary sampling and testing plan for the concerned areas, was separately prepared and submitted to EPD and other relevant government departments for endorsement under this Assignment.

2.3.2 According to the CAP and based on the site appraisal, a total of **4** potentially contaminating sites (viz. Site 4a-1, Site 4a-2, Site 4a-3 and Site OCA2-1) (or 'Category A sites') and 2 sites with unknown activities (viz. Site 4a-5 and Site 6-2) (or 'Category U sites') were identified within Site 4a and 6 as well as the works area at the intersection of Kam Sheung Road and Pat Heung Road. Details of the site appraisal for these sites are shown in **FIGURE 2.1**, **FIGURE 2.2** and **FIGURE 2.3**.

2.3.3 All of the abovementioned sites were inaccessible at the time of reporting for site walkover/SI works. Further works as detailed below for the land contamination assessment are therefore recommended to be carried out.

2.4 Recommended Further Works

2.4.1 As the potential sites of land contamination concern were inaccessible at the time of reporting, re-appraisal of the Project Area would need to be carried out to (i) assess the site conditions of the Category A and U sites and other project area and (ii) confirm whether there are any changes in the future development plan that may affect findings of the CAP (i.e. revision to the Project site boundary and relocation of more sensitive land uses (e.g. schools) within the Category A and U sites). Findings of the site re-appraisals would need to be documented in the updated CAP prior to carrying out any SI works.

2.5 Possible Remediation Measures

2.5.1 The actual remediation methods could only be determined after gaining of site access, completion of the SI works and EPD's agreement on the Contamination Assessment Report (CAR) and Remediation Action Plan (RAP) at the later stage of the Project. The latter will provide details of the remedial actions for the identified contaminated soil and groundwater.

2.6 Evaluation of Land Contamination Impacts

2.6.1 Based on the site appraisal, contamination (if any) would likely be restricted to a number of land lots and extensive contamination for the project area is therefore not envisaged. Land contamination impacts are therefore considered not insurmountable to future occupants if the further works as recommended in this report were followed and contaminated soil and groundwater (if any) were properly treated using appropriate remediation methods and according to EPD approved RAP.

2.7 Conclusion

2.7.1 A site appraisal, in the form of desktop review and site walkover, had been carried out in December 2014. A total of 4 potentially contaminating sites and 2 sites with unknown activities were identified within Site 4a and 6 as well as the project boundary area at the intersection of Kam Sheung Road and Pat Heung Road.

2.7.2 A site re-appraisal is recommended at a later stage of the Project. The further land contamination assessment and, if necessary, remediation works would follow EPD's Guidance Manual, Guidance Note and Practice Guide and any soil/groundwater contamination would be identified and properly treated prior to the commencement of works under the project. Land contamination impacts are therefore considered not insurmountable to future occupants if the recommended further works were followed and contaminated soil and groundwater (if any) were properly treated using appropriate remediation methods and according to EPD approved RAP.

3 ECOLOGICAL IMPACT ASSESSMENT

3.1 Introduction

3.1.1 A preliminary environmental review, based on literature review and dry and wet season ecological surveys, has been undertaken to assess the potential ecological impacts associated with the construction and operation of the site formation and infrastructure works proposed for the Project.

3.2 Environmental Legislation, Policies, Plans, Standards and Assessment Criteria

3.2.1 Guidelines, standards, documents and ordinances/regulations listed below were referred to during the course of the preliminary ecological review.

- The Country Parks Ordinance (Cap. 208)
- The Forests and Countryside Ordinance (Cap. 96)
- The Wild Animals Protection Ordinance (Cap. 170)
- The Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586)
- Town Planning Ordinance (Cap. 131)
- Chapter 10 of the Hong Kong Planning Standard and Guidelines (HKPSG)
- Annexes 8 and 16 of the EIAO-TM
- EIAO Guidance Note Nos. 6/2010, 7/2010, and 10/2010
- The IUCN Red List of Threatened Species
- The Key Protected Wildlife Species List details Category I and Category II protected animal species under the People's Republic of China's (PRC) Wild Animal Protection Law.
- The Convention on Biological Diversity (CBD)

3.3 Assessment Methodology

3.3.1 The ecological assessment area is defined as the Project Sites (Site 1, 4a and 6), areas with widening road works on sections of Kam Po Road, Kam Ho Road, Kam Tin Road, Kam Sheung Road and Pat Heung Road, the mitigation wetlands for West Rail in the vicinity of the sites, sections of Kam Tin River, and drainage channel KT15 (refer to **Figure 3.1**). Ecologically sensitive receivers were identified and ecological impacts were then assessed. Possible mitigation measures were proposed to address potential adverse impacts.

- Literature Review

3.3.2 A desktop review of relevant available studies/surveys regarding the ecological character of the assessment area was undertaken. Literature reviewed included:

- Survey results from Hong Kong Biodiversity Database (Unpublished Data) (AFCD, 2015a);
- Egretry Counts in Hong Kong, with particular reference to the Mai Po Inner Deep Bay Ramsar Site (HKBWS, 2007; 2008; 2009; 2010; 2011; 2012; 2013; 2014; 2015);

- EIA Report of Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link (MTRCL, 2009a);
- Preliminary Ecological Impact Assessment of Land Use Review for Kam Tin South and Pat Heung (PlanD, 2014);
- Final Assessment Report – West Kowloon to Tuen Mun Centre – Environmental Impact Assessment (KCRC, 1998);
- Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai Drainage Improvement, Stage 1, Phase 2B – Kam Tin Secondary Drainage Channels KT14 & KT15; and
- Extracted raw data from 2010 - 2014 of the Ecological Monitoring and Adaptive Management Advice Services for Lok Ma Chau and West Rail Wetland (MTRCL, n.d.)
- Final Ecological Assessment Report of the Proposed Public Housing Sites 1, 4a and 6, Kam Tin South, Yuen Long (HKHA, 2016)

▪ <u>Ecological Surveys</u>

3.3.3 Terrestrial ecological surveys were conducted in the dry season month of February 2015 and wet season month of May 2015 to obtain baseline ecological characteristics.

▪ *Habitat and Vegetation Survey*

3.3.4 Terrestrial habitats within the assessment area were identified, sized and mapped. Representative photographs of the habitat types and/or any important ecological features identified were taken.

3.3.5 Vegetation surveys were conducted by direct observation to record diversity and dominance of plant species present in different habitat types. The location of any plant species of conservation importance was recorded.

▪ *Avifauna Survey*

3.3.6 The presence and abundance of avifauna species at various habitats were recorded visually and aurally. Avifauna within the assessment area were surveyed quantitatively using the transect count method. The location of any avifauna species of conservation importance encountered was recorded, along with notable behaviour.

▪ *Odonate and Butterfly Survey*

3.3.7 Odonate and butterflies within the assessment area were surveyed. Attention was given to potential habitats for odonate and butterfly. Relative abundance of dragonfly, damselfly and butterfly was recorded.

▪ *Herpetofauna Survey*

3.3.8 Herpetofauna within the assessment area were surveyed qualitatively. Potential microhabitats were searched. All reptiles and amphibians sighted were recorded.

▪ *Mammal Survey*

3.3.9 Surveys were conducted in areas which may potentially be utilized by terrestrial mammals. The surveys focused on searching for field signs left by larger terrestrial mammals. In addition, any mammal directly observed was identified.

▪ *Freshwater Communities Survey*

3.3.10 Freshwater communities were surveyed, during the wet and dry seasons, via direct observation at a section of modified watercourse within the assessment area, the ponds in

the mitigation wetlands, sections of Kam Tin River and KT15 which is located to the south of Site 4a and the modified watercourse between Site 1 and Site 4a which might potentially be impacted indirectly. Organisms encountered were recorded and identified to the lowest possible taxon level.

3.4 Ecological Baseline Condition

- Literature Review

3.4.1 Literature reviewed covers the current assessment area including the Project Sites, road widening work sites, the mitigation wetlands of West Rail, sections of Kam Tin River and KT15 and the sites of conservation importance in the vicinity of the assessment area.

- *Project Sites*

3.4.2 The site formation and infrastructural work involve three Initial Sites (Site 1, 4a and 6) and proposed road widening works on sections of Kam Po Road, Kam Ho Road, Kam Tin Road, Kam Sheung Road and Pat Heung Road.

3.4.3 Sites 1 and 6 mainly consisted of active or abandoned agriculture lands (PlanD, 2014), while Site 4a consisted of mainly village houses and disturbed areas. Small areas of plantation were recorded in the south and east of Site 1, in the west of Site 4a and on the western boundary of Site 6. A small area of woodland was recorded in the south-west of Site 6.

3.4.4 Findings from a more recent study revealed that Site 1 was made up of mostly active agricultural land, plantation and a small area of grassland. Site 4a was made up of mostly shrubland and developed area with two small patches of grassland. Finally, Site 6 was made up of mostly village/orchard (HKHA, 2016). No species of conservation importance were recorded within the project sites during this study.

3.4.5 According to the Biodiversity Database of AFCD, three bird species of conservation importance, namely, Northern Shoveler (*Anas clypeata*), Long-billed Plover (*Charadrius placidus*) and Black Baza (*Aviceda leuphotes*) and one amphibian species of conservation importance, Chinese Bullfrog (*Hoplobatrachus rugulosus*), had been recorded within or in the vicinity of the Project Sites (AFCD, 2015a).

- *Mitigation Wetlands*

3.4.6 There are 11 parcels of mitigation wetlands that were provided as part of the habitat compensation for the loss of wetland habitats from the construction of West Rail to the north of the three Initial Sites in this study (MTRCL, 2009a). The wetlands are located underneath the viaduct of West Rail and comprise of grassy and open shallow water areas. Greater Painted-snipe (*Rostratula benghalensis*), a species of Local Concern (Fellowes *et al*., 2002), was regularly radio-tracked and recorded in these mitigation wetlands and other favourable habitats nearby in Kam Tin (e.g. buffalo field and marshes) in a long term ecological monitoring programme for West Rail by KCRC and MTRCL.

3.4.7 The ecological monitoring data from 2010 to 2014 at Mitigation Wetland Parcels C, E, F, G, H, I and J have been extracted for discussion as they are located closest to the Project Sites and are considered as part of the assessment area under this assignment.

3.4.8 In total, 27 avifauna species of conservation importance were recorded within these seven Mitigation Wetland Parcels in the recent five years of monitoring (extracted raw data provided by MTRCL, n.d.). Wetland-dependent species included ardeids, Northern Shoveler, Eurasian Teal (*Anas crecca*) and Collared Crow (*Corvus torquatus*). Raptor species included Black Kite (*Milvus migrans*), Common Kestrel (*Falco tinnunculus*) and Common Buzzard (*Buteo buteo*) and other recorded avifauna of conservation importance included Greater Coucal (*Centropus sinensis*), Lesser Coucal (*Centropus bengalensis*), and Asian Barred Owlet (*Glaucidium cuculoides*).

3.4.9 Other recorded species of conservation importance from the ecological monitoring (extracted raw data provided by MTRCL, n.d.) included 11 butterfly species including Grass Demon (*Udaspes folus*), Forget-me-not (*Catochrysops strabo strabo*), Danaid Eggfly (*Hypolimnas misippus*); five odonate species including Blue Chaser (*Potamarcha congener*), Sapphire Flutterer (*Rhyothemis triangularis*), Scarlet Basker (*Urothemis signata signata*); one amphibian species, Chinese Bullfrog and four reptile species, Indo-Chinese Rat Snake (*Ptyas korros*), Common Rat Snake (*Ptyas mucosus*), Many-banded Krait (*Bungarus multicinctus multicinctus*) and Chinese Cobra (*Naja atra*).

3.4.10 In another study, a six-month ecological survey covering wet and dry seasons between 2009 and 2010 recorded species of conservation importance including Chinese Pond Heron (*Ardeola bacchus*), Great Egret (*Ardea modesta*), Grey Heron (*Ardea cinerea*), Wood Sandpiper (*Tringa glareola*), Grey-chinned Minivet (*Pericrocotus solaris*), Emerald Cascader (*Zygonyx iris insignis*) and Japanese Pipistrelle (*Pipistrellus abramus*) in the mitigation wetlands (PlanD, 2014).

- *Historic Egretries*

3.4.11 According to the findings by PlanD (2014), three abandoned egretries, Ma On Kong Egretry, Ho Pui Egretry and Ko Po Tsuen Egretry were active in the 1990s. Ma On Kong egretry has been abandoned since 2009 (HKBWS, 2009; 2010). Ho Pui Egretry has been abandoned since 2005 (HKBWS, 2005; 2006). Ko Po Tsuen Egretry had been abandoned since 1996 (KCRC, 1998). No active egretry has been reported in the vicinity of the proposed works since then.

- *Flight Paths*

3.4.12 No important flight paths were identified in Kam Tin area by the Land Use Review Study (PlanD, 2014). However, eco-corridors were proposed during the study (PlanD, 2014) to mitigate the potential ecological impact caused by the project in the future. The proposed eco-corridor is to provide flight paths to birds to travel through the residential areas between roosting and foraging sites. Although no active egretries currently exist in Kam Tin (HKBWS, 2014), the proposed eco-corridor is considered a conservative approach to minimize the potential impact to the egretries which may establish in the future.

- *Drainage Channel*

3.4.13 A section of drainage channel – KT15 is located to the south of Site 4a (refer to **Figure 3.1**). According to the survey results of a previous study (DSD, 2005), recorded aquatic fauna species in KT15 included Spotted Snakehead (*Channa maculata*), Nile Tilapia, North African Catfish (*Clarias gariepinus*), Common Carp (*Cyprinus carpio*), Chinese Barb (*Puntius semifasciolatus*) and Mosquito fish (*Gambusia affinis*). Except Spotted Snakehead, Common Carp and Chinese Barb which are native species, the rest of the fish species are exotic.

3.4.14 Waterbird species of conservation importance, Chinese Pond Heron, Little Egret and Wood Sandpiper were recorded in the drainage channel between Site 1 and Site 4a. Japanese Pipistrelle was recorded at the narrow drainage channel located east of Tsing Long Highway (HKHA, 2016).

- *Sites of Conservation Importance*

3.4.15 There are no recognized sites of conservation importance within the assessment area (the three Initial Sites, proposed road widening works area and mitigation wetlands). However, outside of the Initial Sites, patches of Conservation Area (CA) are located adjacent to Site 6. Tai Lam Country Park is located along the edges of these Conservation Areas (**Figure 3.1** refers). The nearest distance from the Project Sites to Tai Lam Country Park is approximately 390 m. The CA located adjacent to Project Site 6 has been highly disturbed, based on recent aerial photos, a significant portion of this area of CA has been devegetated.

- Survey Findings

- *Habitat Type and Vegetation*

3.4.16 A total of nine habitat types were identified within the assessment area namely woodland, plantation, grassland, active agricultural land, abandoned agricultural land, village/orchard, developed area/wasteland, pond and modified watercourse. A map and representative photographs of habitats recorded within the assessment area are shown in **Figure 3.1** and **Appendix 3.1**.

3.4.17 The flora recorded during the vegetation survey within the assessment area is listed in **Appendix 3.2**. The habitats identified within the assessment area are described below. **Table 3.1** summarizes the size of each habitat type within the assessment area.

Table 3.1 Habitats Recorded within the Assessment Area

Habitat Type	Approximate Area (ha)
Developed Area/Wasteland	17.5
Woodland	0.1
Plantation	6.9
Grassland	7.7
Village/Orchard	4.2
Active Agricultural Land	4.8
Abandoned Agricultural Land	1.1
Pond	2.0
Modified Watercourse	1.3
Total	45.6

3.4.18 Sites 1, 4a and 6 comprise of woodland, plantation, grassland, active agricultural land, abandoned agricultural land, village/orchard and developed area/wasteland. Areas proposed for widening road works on sections of Kam Po Road, Kam Ho Road, Kam Tin Road, Kam Sheung Road and Pat Heung Road are comprised of mostly developed area/wasteland with a small section of modified watercourse. Habitats within the mitigation wetlands comprise of plantation, grassland and pond.

- *Developed Area/Wasteland*

3.4.19 Developed area/wasteland was recorded within Sites 4a, 6 and the proposed road widening works on sections of Kam Po Road, Kam Ho Road, Kam Tin Road, Kam Sheung Road and Pat Heung Road work sites. This consists of open storage areas, factories, car parks and existing roads.

3.4.20 The vegetation recorded were mainly planted trees along the roads including Taiwan Acacia (*Acacia confusa*), Paper-bark Tree (*Melaleuca cajuputi*), Norfolk Island Pine (*Araucaria heterophylla*) and Tree Cotton (*Bombax ceiba*). Other commonly recorded species including herb *Bidens alba* and Lantana (*Lantana camara*). This habitat was highly disturbed by human activities. Sixty-seven flora species were recorded, no species of conservation importance were observed.

- *Woodland*

3.4.21 The only patch of woodland was recorded at the southwest of Site 6 and was small in size. This patch of woodland comprised of mainly native species including Ivy Tree (*Schefflera heptaphylla*), Chekiang Machilus (*Machilus chekiangensis*) and Elephant's Ear (*Macaranga tanarius*) which were commonly recorded within this habitat. While shrub species, Wild Coffee (*Psychotria asiatica*), Microcos (*Microcos nervosa*) were present in the middle layer and herb exotic species *Bidens alba* in the ground layer. However, as this woodland was located near village housing, agriculture land and highway, it was subject to high anthropogenic disturbance (e.g. noise, emission from vehicles, illegal dumping activities).

- *Plantation*

3.4.22 Plantation habitat was mostly recorded along the margins of Site 1. Trees were observed to be planted along the two sides of the pathway. The dominant tree species recorded was Chinese Banyan (*Ficus microcarpa*). Exotic White Popinac (*Leucaena leucocephala*) was commonly found to be naturally generated within this habitat. Herb species Annual Bluegrass (*Ipomoea cairica*) and Mile-a-minute Weed (*Mikania micrantha*) were commonly recorded in the ground layer.

3.4.23 Plantation was also recorded along the outer edge of the mitigation wetlands where it was small in size with simple structural complexity. Tree species, Chinese Banyan (*Ficus microcarpa*) and White Popinac were recorded as the dominant plants at this habitat. At Land Parcel J, Rhododendron was recorded at the western plantation area. Fifty-one flora species were recorded, no species of conservation importance were observed within this habitat type.

- *Active Agricultural Land*

3.4.24 Active agricultural land dominated most of Site 1 and was also recorded near the village houses of Site 6. This is a man-made habitat for crop production. The majority of this habitat type at Site 1 comprised of an operating organic farm. Crops in the active agricultural land in Site 1 are covered by nets to keep birds away to prevent crop damage. Agricultural activities and human activities were observed in the active agricultural land during the survey in Site 6.

3.4.25 Dry agricultural activities were observed during the recent survey. Crops commonly recorded were Chinese Kale (*Brassica oleracea L.* var. *albiflora*), Flowering Chinese Cabbage (*Brassica parachinensis*), Carrot (*Daucus carota* var. *sativa*) and Cabbage (*Brassica oleracea Linnaeus* var. *capitata Linnaeus*). Fruit trees such as Papaya (*Carica papaya*) and Longan (*Dimocarpus longan*) were commonly cultivated at the bund near the fields. Fifty-two flora species were recorded, no species of conservation importance were observed.

- *Abandoned Agricultural Land*

3.4.26 Small patches of abandoned agricultural land were recorded near the active area of agriculture. Although active agricultural activities have been undertaken at these sites in the past, these sites were overgrown with weed and herb species during the surveys. The dominant plants recorded were *Bidens alba* and Many-flowered Silvergrass (*Miscanthus floridulus*). Fruit trees such as Papaya and Longan were scattered on the field bunds. Thirty-three flora species were recorded, no species of conservation importance were observed.

- *Village/Orchard*

3.4.27 Village/orchard habitat was recorded at Site 4a and Site 6. This habitat was comprised of low density, simple village housing surrounded by small orchards dominated by fruit trees, including Wampi (*Clausena lansium*), Mango (*Mangifera indica*) and Longan. Fifty-one flora species were recorded, no species of conservation importance were recorded.

- *Pond*

3.4.28 Pond habitat was recorded at six parcels of mitigation wetlands, i.e. Parcels A, B, B1, C, D and J (**Figure 3.1** refers). These ponds have high turbidity and slow water flow. Odour was recorded at ponds at Parcels C and J. The dominant plant was reed species Common Reedgrass (*Phragmites australis*). Other commonly recorded plants included Ditch Millet (*Paspalum scrobiculatum* var. *orbiculare*), Diffuse Day-flower (*Commelina diffusa*) and *Polygonum* spp. Ponds at Parcels C and J were subject to human disturbance such as fishing and illegal dumping activities. Fifty-six flora species were recorded, no species of conservation importance were observed.

- *Grassland*

3.4.29 Grassland habitat was small in size and found to be scattered within Site 1 and Site 4a. The dominant plants recorded were grass species Annual Bluegrass, Chinese Silvergrass (*Miscanthus sinensis*), Guinea Grass (*Panicum maximum*) and herb species Mile-a-minute Weed. A pond which was recorded in a previous study at the southeast of Site 1 (PlanD, 2014) was observed to be dry and turned into grassland during the recent survey.

3.4.30 Based on our survey findings, this habitat type was found to be dominant in most of the mitigation wetlands (Parcels A, B, B1, D, E, F, G, H, I and J). This habitat was mainly comprised of grass and herb species, with some shrubs or small trees scattered throughout. The dominant species were *Bidens alba*, Nut-grass Glaingale (*Cyperus rotundus*), Chinese Silvergrass, Guinea Grass and Wild Kudzu Vine (*Pueraria phaseoloides*). Sixty-two flora species were recorded, no flora species of conservation importance were recorded within this habitat type during our survey.

- *Modified Watercourse*

3.4.31 Sections of Kam Tin River are located at the proposed road widening works on sections of Kam Ho Road work site and between Site 1 and Site 4a. The section to the north is approximately 30 m in width and the section between Site 1 and Site 4a is approximately 10 m in width. KT15 is located to the south of Site 4a and is approximately 5 m in width. As Kam Tin River and KT15 are concrete trapezoidal channels, limited vegetation species were recorded. The water flow rate was moderate and the turbidity is low during the recent survey. This habitat was subject to human disturbance such as fishing and illegal dumping activities. Thirteen flora species were recorded, no species of conservation importance were observed.

3.4.32 For the modified watercourse observed between Site 1 and Site 4a, although this is outside of the assessment area, given its close proximity to the site formation works, the presence of this watercourse is worthy of note.

3.4.33 Another section of modified watercourse was also identified adjacent to Tsing Long Highway and runs through the northern section of Site 6. This modified watercourse was concrete vertical channel (approximately 4 m in width) and limited vegetation species were recorded.

- <u>*Fauna*</u>

3.4.34 The following sections represent the results of dry and wet season fauna survey.

- *Avifauna*

3.4.35 Thirty-nine species of avifauna were recorded during the survey, including four species of conservation importance (**Table 3.2** and **Appendix 3.3**). Avifauna diversity was highest at plantation habitats. Generalists and open-area bird species such as Red-whiskered Bulbul (*Pycnonotus jocosus*), Chinese Bulbul (*Pycnonotus sinensis*), Spotted Dove (*Streptopelia chinensis*) and Japanese White-eye (*Zosterops japonicus*) were recorded in most of the habitats. Individuals of the species of conservation importance, Tufted Duck (*Aythya fuligula*), Grey Heron (*Ardea cinerea*) and Little Egret (*Egretta garzetta*) were recorded at the pond habitats within the mitigation wetlands outside of the Initial Sites and proposed road works areas. One individual of Chinese Pond Heron (*Ardeola bacchus*) was recorded in a grassland habitat within the mitigation wetland.

Table 3.2 Avifauna Species of Conservation Importance Recorded within the Assessment Area

Common Name	Scientific Name	Distribution in Hong Kong (1)	Level of Concern (2)	Habitat Recorded
Tufted Duck(3)	*Aythya fuligula*	Uncommon	LC	Pond
Chinese Pond Heron(3)	*Ardeola bacchus*	Common	PRC (RC)	Grassland
Grey Heron(3)	*Ardea cinerea*	Common	PRC	Pond
Little Egret(3)	*Egretta garzetta*	Common	PRC (RC)	Pond

Note:
1. AFCD (2015b).
2. Fellowes *et al.* (2002): LC=Local Concern; PRC=Potential Regional Concern; RC=Regional Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in nesting and/or roosting sites rather than in general occurrence.
3. Protected under Wild Animals Protection Ordinance (Cap. 170)

- *Odonate and Butterfly*

3.4.36 Fourteen odonate species were recorded during the survey. Most of the species were recorded in the pond habitat within the mitigation wetlands (**Appendix 3.3**). All recorded odonate species are either common or abundant in Hong Kong. No species of conservation importance were recorded.

3.4.37 Twelve butterfly species were recorded during the survey (**Appendix 3.3**). An individual of a rare butterfly species, Grass Demon (*Udaspes folus*) was recorded in a village/orchard habitat within Site 4a. Other species are commonly found in Hong Kong. The dominant butterfly species recorded was Indian Cabbage White (*Pileis canidia*). The butterfly diversity was highest at village/orchard habitat.

- *Herpetofauna*

3.4.38 Six amphibian species were recorded during the survey. All species are widely distributed in Hong Kong and no species of conservation importance were recorded. Most of the amphibian species were recorded in plantation or village/orchard habitats.

3.4.39 Three reptile species were recorded during the survey. All of the recorded species are common in Hong Kong.

- *Mammal*

3.4.40 Mammal species recorded within the assessment area included four bat species: Chinese Noctule (*Nyctalus plancyi*), Japanese Pipistrelle, a *Pipistrellus* species which cannot be identified to species level and a bat species which could not be identified to genus level, herein referred to as Bat sp. 1 (**Table 3.3** and **Appendix 3.3**). Chinese Noctule and Japanese Pipistrelle were recorded foraging over the pond, plantation and grassland habitats of the mitigation wetlands outside the Project Sites. The *Pipistrellus* species and Bat sp. 1 were recorded commuting in the village/orchard habitat of Site 4a and Kam Tin River. All bat species are protected under Wild Animal Protection Ordinance (Cap. 170) in Hong Kong.

Table 3.3 Mammal Species of Conservation Importance Recorded within the Assessment Area

Common Name	Scientific Name	Distribution in Hong Kong (1)	Level of Concern(2)	Habitat Recorded
Chinese Noctule(3)	*Nyctalus plancyi*	Common	PRC(RC)	Pond
Japanese Pipistrelle(3)	*Pipistrellus abramus*	Very Common	-	Plantation and Grassland
-	*Pipistrellus* sp. (3)	-	-	Village / Orchard
Bat sp. 1(3)	-	-	-	Village / Orchard and Modified Watercourse

Note:
1. AFCD (2015b).
2. Fellowes *et al.* (2002): PRC=Potential Regional Concern; RC=Regional Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in nesting and/or roosting sites rather than in general occurrence.
3. Protected under Wild Animals Protection Ordinance (Cap. 170)

- *Freshwater Communities*

3.4.41 A common exotic freshwater fish species, Nile Tilapia (*Oreochromis niloticus*) was recorded in high numbers in the pond habitats within the mitigation wetlands and in low numbers in the modified watercourses within the assessment area. Other recorded species include an exotic snail species, *Pomacea canaliculata*; and *Metrocoris* sp. No species of conservation

importance were recorded. No aquatic fauna were recorded in the modified watercourse between Site 1 and Site 4a.

3.5 Ecological Value

3.5.1 The ecological importance of recorded habitats have been evaluated in accordance with the EIAO-TM Annex 8 criteria and are shown in **Table 3.4** to **Table 3.8** below.

- *Woodland*

3.5.2 A small area of woodland was recorded within Site 6. The woodland is adjacent to village housing, agricultural land and highways and was observed to be disturbed by illegal dumping. While the woodland is dominated by native species, no species of conservation importance were recorded and there is low flora and fauna diversity.

Table 3.4 Ecological Evaluation of the Woodland Habitats within the Assessment Area

Criteria	**Woodland**
Naturalness	Moderate, subject to human disturbance
Size	Small
Diversity	41 flora species 8 fauna species
Rarity	No species of conservation importance were recorded
Re-creatability	Re-creatable but trees and habitat structure need time to mature
Fragmentation	High, fragmented by highways, villages and agriculture areas
Ecological linkage	The woodland is not structurally and functionally linked to other important habitats
Potential value	Low to moderate due to its small size and potential value in developing into a more mature woodland
Nursery ground	None recorded
Age	Unknown
Abundance/ Richness of Wildlife	Low
Ecological Value	**Moderate**

- *Plantation*

3.5.3 Plantation habitat recorded within the assessment area was ranked as low ecological value. It is a man-made habitat with low flora and fauna diversity. Low abundance of Japanese Pipistrelle, a species of conservation importance, was recorded in this habitat.

- *Grassland*

3.5.4 Grassland habitat within the Project Sites was considered to be low in ecological value due to its fragmented distribution and absence of species of conservation importance. However, grassland habitats at the mitigation wetlands were considered to be of low to moderate ecological value due to their ecological connectivity to the ponds and use by species of conservation importance, Japanese Pipistrelle and Chinese Pond Heron.

Table 3.5 Ecological Evaluation of the Plantation and Grassland Habitats within the Assessment Area

Criteria	**Plantation**	**Grassland**
Naturalness	Low, trees are planted	Moderate, derived from natural succession but experiences human disturbances
Size	Small	Small

Criteria	Plantation	Grassland
Diversity	51 flora species 24 fauna species	62 flora species 21 fauna species
Rarity	Japanese Pipistrelle was recorded within the plantation habitat of the mitigation wetland	Japanese Pipistrelle was recorded foraging at the mitigation wetland. An individual of Chinese Pond Heron was recorded roosting in the grassland of the mitigation wetland
Re-creatability	High, it is a man-made habitat	Re-creatable
Fragmentation	Low, areas of plantation habitats are mostly connected	High, patches of grassland were recorded within Sites 1, 4a and mitigation wetlands.
Ecological linkage	The habitat was not structurally or functionally linked to any high ecological value resources.	Grassland habitat at the mitigation wetlands are structurally and functionally linked to ponds
Potential value	Low	Low
Nursery ground	None recorded	None recorded
Age	< 20 years	<10 years
Abundance/ Richness of Wildlife	Low	Low
Ecological Value	**Low**	**Low at Sites 1, 4a and 6** **Low to Moderate at mitigation wetlands**

- *Active Agricultural Land*

3.5.5 The majority of the Active Agricultural Land within the assessment area was observed to be part of an organic farm in Site 1, nets were commonly found covering the crop to prevent crop damage, this results in limited ecological value as the crops are not available for associated fauna to forage and roost at. The agricultural lands in Site 6 are small and have low flora and fauna abundance and diversity. Therefore, the ecological value of this habitat type is considered to be low.

- *Abandoned Agricultural Land*

3.5.6 Abandoned Agricultural Land is considered to be of low ecological value. Fauna and flora species diversity were low and species recorded were of low ecological value.

Table 3.6 Ecological Evaluation of the Active Agricultural Land and Abandoned Agricultural Land within the Assessment Area

Criteria	Active Agricultural Land	Abandoned Agricultural Land
Naturalness	Low, vegetation is composed of crops and fruit trees	Low, vegetation is composed of weeds/herbs and fruit trees
Size	Small	Small
Diversity	52 flora species 16 fauna species	33 flora species 6 fauna species
Rarity	No species of conservation importance were recorded	No species of conservation importance were recorded
Re-creatability	High, it is a man-made habitat	High, it is a man-made habitat
Fragmentation	High, patches of active agricultural lands were scattered at Sites 1 and 6.	High, patches of abandoned agricultural lands were scattered at Sites 1 and 6.

Criteria	Active Agricultural Land	Abandoned Agricultural Land
Ecological linkage	The habitat was not structurally or functionally linked to any high ecological value resources.	The habitat was not structurally or functionally linked to any high ecological value resources.
Potential value	Moderate, provision of wet agriculture can provide roosting and foraging ground for waterbirds	Moderate, rehabilitation of farming with the provision of wet agriculture can provide roosting and foraging ground for waterbirds
Nursery ground	None recorded	None recorded
Age	n/a	n/a
Abundance/ Richness of Wildlife	Low to moderate	Low
Ecological Value	**Low**	**Low**

- *Village/Orchard*

3.5.7 Low abundances of three species of conservation importance were recorded in this habitat. This habitat is man-made with planted vegetation and subject to frequent human disturbance. Due to a high level of human disturbance, this habitat is not considered as an important habitat to the recorded species of conservation importance. Hence, village/orchard habitats were considered to be of low ecological value.

- *Developed Area/Wasteland*

3.5.8 Developed area/wasteland is considered to be of low ecological value. It is a highly disturbed, man-made habitat with low species diversity.

Table 3.7 Ecological Evaluation of the Village/Orchard and Development Area/Wasteland within the Assessment Area

Criteria	Village/Orchard	Developed Area/Wasteland
Naturalness	Low, comprised of man-made structures and fruit trees	Low, comprised of man-made structures with high level of human disturbances
Size	Small	Small
Diversity	51 flora species 31 fauna species	67 flora species 11 fauna species
Rarity	Recorded species of conservation importance include Grass Demon, *Pipistrellus* sp. and Bat sp. 1	No species of conservation importance were recorded
Re-creatability	High, it is a man-made habitat	High, it is a man-made habitat
Fragmentation	n/a	n/a
Ecological linkage	This habitat occurred near the Tai Lam Country Park and Conservation Area.	This habitat occurred near the Tai Lam Country Park and Conservation Area.
Potential value	Low	Low
Nursery ground	None recorded	None recorded
Age	n/a	n/a
Abundance/ Richness of Wildlife	Low	Low
Ecological Value	**Low**	**Low**

- *Pond*

3.5.9 Ponds within the assessment area were considered to be moderate in ecological value due to the presence of species of conservation importance recorded during the recent survey and its potential value with the appropriate management measures.

- *Modified Watercourse*

3.5.10 The section of modified watercourse within the assessment area is small in size and located near existing roads. It is considered to be of low ecological value.

Table 3.8 Ecological Evaluation of Pond Habitat and Modified Watercourse within the Assessment Area

Criteria	**Pond**	**Modified Watercourse**
Naturalness	Moderate, it forms part of a compensation wetland habitat that was man-made but with natural features	Low, it is a man-made structure.
Size	Small	Very small
Diversity	56 flora species 24 fauna species	19 flora species 11 fauna species
Rarity	Species of conservation importance, Tufted Duck, Grey Heron, Little Egret and Chinese Noctule were recorded in this habitat type.	Unknown Bat sp. 1 was recorded flying above the watercourse between Site 1 and 4a. Japanese Pipistrelle was recorded flying above the watercourse east of Tsing Long Highway. (1) Chinese Pond Heron, Little Egret and Wood Sandpiper were recorded at the watercourse between Sites 1 and 4a. (1)
Re-creatability	Re-creatable, it is a man-made mitigation habitat to compensate wetland lost.	High, it is a man-made habitat
Fragmentation	n/a	n/a
Ecological linkage	The habitat was not structurally or functionally linked to any high ecological value resources.	The habitat was not structurally or functionally linked to any high ecological value resources.
Potential value	Moderate, with proper management of water levels, this habitat can provide roosting and foraging grounds for high numbers of waterbirds	Low
Nursery ground	None recorded	None recorded
Age	Create less than 20 years ago as part as wetland compensation	N/A
Abundance/ Richness of Wildlife	Low to Moderate	Low
Ecological Value	**Moderate**	**Watercourse east of Tsing Long Highway: Low** **Other watercourses within the study area: Low to moderate**

Note:
(1) Records were obtained from the EA of Public Housing Sites (HKHA, 2016).

3.6 Identification and Evaluation of Ecological Impacts

- Construction Phase

- *Habitat and Vegetation Loss*

3.6.1 Loss of woodland, plantation, grassland, active agricultural land, abandoned agricultural land, village/orchard and modified watercourse habitats within the footprints of the site formation works at Sites 1, 4a and 6 is anticipated. The ecological values of these habitats are low and thus the ecological impacts to these habitats are not significant.

3.6.2 Due to the implementation of the project, the proposed road works would affect a significant portion of land Parcel G & H as well as minor portion of Parcel J. The remaining unaffected portion of Parcel G & H will have limited ecological function. In order to provide a better linkage with other wetlands and enhance the wetland characteristic, the whole land Parcel G of 0.21 ha and Parcel H of 0.41 ha will be surrendered completely and portion of Parcel J, approximately 135m^2, will be surrendered. The habitats in these parts comprise of small and isolated grasslands (about 0.63 ha in total). The grassland habitats in these wetland parcels are considered to have low to moderate ecological value and given the small size of affect area, the ecological impacts arising from the road works are considered to be minor. Refer to **Figure 3.2** for the locations of permanent mitigation wetland loss.

3.6.3 A small piece of woodland of moderate ecological value exists at the southwestern portion within Site 6, this is where a small area of about 0.03 ha would be also be lost from the Project. As the area of loss is small and located along the edges of the woodland where it is already subject to high anthropogenic disturbance, the ecological impacts are not significant. Furthermore, no species of conservation importance were recorded in the area of woodland loss.

3.6.4 Grass Demon, *Pipistrellus* sp. and Bat sp. 1 were recorded in the village/orchard habitat in low numbers within Site 4a which would be lost due to the site formation work. However, since this habitat is currently subject to high level of human disturbance so it is not considered as an important habitat to these species. In reference to the potential impacts to Grass Demon, adult butterflies are mobile while larvae are restricted to areas where host plants are present. Since no larvae of Grass Demon were observed during the current surveys and nectar plant of adults (*Hedychium coronarium*) and host plant of caterpillars (e.g. leaves of Zingiberacea) of Grass Demon were not found within the Subject Sites. The ecological impact of the loss is not significant.

3.6.5 Outside of Sites 1, 4a and 6, the existing modified watercourse located north of Site 6 would be loss due to the proposed road widening works. The total area of habitat loss is 0.14 ha (381m in length). As the ecological value of the watercourse is low, no significant impacts are anticipated.

3.6.6 The proposed sewer works to be undertaken within Kam Tin River would involve trenchless construction method and therefore no habitat loss is anticipated and there would not be any affects on the hydrology of the river. Due to health and safety issues, the avoidance of the dry season months is unfeasible (as the water flow within the river would be high during wet season) and thus works must take place during the two dry seasons.

- *Direct Loss of Fauna*

3.6.7 In addition to direct impacts to terrestrial habitat and vegetation, the construction activities of the project have a potential to cause direct injury / mortality to wildlife. No substantial direct impacts to wildlife with high levels of mobility (e.g. avifauna) are anticipated. Animals with lower mobility (e.g. amphibians and reptile) would be at a higher level of risk, and could be injured or killed by construction activities. However, most species recorded from the assessment area were common in Hong Kong therefore it is unlikely to result in a significant impact.

- *Disturbance Impact*

3.6.8 Indirect impacts on the habitats and associated fauna would arise from the increase in human disturbance during the construction phase. Construction activities would increase human activities and noise disturbance from traffic and construction machinery, and would bring about indirect impacts to nearby habitats and their associated fauna. Potential consequences to wildlife include avoidance of areas in the vicinity of the works areas, and decline in density in areas close to the source of disturbance. Highly mobile species such as birds and mammals would be displaced to nearby similar habitats.

3.6.9 Low levels of disturbance from the construction are anticipated at Tai Lam Country Park mainly arising from the site formation works at Site 6 and road widening work at Pat Heung Road. The patch of the Tai Lam Country Park is located 390 m away from the nearest point of the Project Site, this patch of the Country Park is already located adjacent to an existing busy road and the duration of construction phase disturbance would be temporary.

3.6.10 The patch of CA located next to Project Site 6 would experience indirect construction phase disturbance. Although the current state of this CA is devegetated, mitigation measures would still be necessary to minimize these impacts. The erection of hoarding is recommended as to prevent the encroachment into the CA by contractors which would allow the regeneration of vegetation as well as minimizing the level of noise and dust arising from the construction.

- *Site Runoff*

3.6.11 Road widening works at a section of Kam Ho Road would be undertaken above the modified watercourse during the construction of the works, this low ecological value modified watercourse could be subject to deterioration of water quality as a result of site run-off, if unmitigated.

- Operational Phase

- *Disturbance to Flight Paths*

3.6.12 No active egretries are currently identified within Kam Tin (HKBWS, 2014). According to the results of a flight path survey (PlanD, 2014), the public housing sites are not considered as an important flight path for birds especially ardeids.

- *Bird Collision*

3.6.13 Potential bird collision at noise barriers could occur especially during the overwintering months when bird abundances are high. Man-made, transparent structures (i.e. the use of glass) can be difficult for birds to see, leading to fatal collision to occur.

- *Disturbance Impact*

3.6.14 The operation of the housing sites would lead to an increase of vehicles and human activities, which would indirectly cause disturbance to adjacent sites of conservation importance (i.e. Conservation Areas and Tai Lam Country Park), habitats and associated fauna around the housing sites. The increased level of traffic might raise the disturbance to the environment at the boundary of Tai Lam Country Park; however the impact is unlikely to be significant as the edges of these areas are located next to an existing busy road and currently already experiencing disturbance impacts from traffic.

- *Impacts to Mitigation Wetlands*

3.6.15 The permanent loss of natural habitats within the mitigation wetlands parcels could potentially affect their ecological functions and existing hydrology. The Project alignment would result in the loss of about half of Parcels G and H, which could potentially affect the overall performance of the wetland in terms of ecological function. Due to this reason, MTRCL, who currently manages these parcels of mitigation wetlands, will surrender the active habitat management of Parcels G and H. Therefore, although the unaffected areas of these parcels would remain natural, the lack of active management could impact its ecological function as

a mitigation wetland. In summary, with the loss of 135 m2 of Parcel J, the permanent loss of mitigation wetland resulting from the Project alignment would be 0.63 ha.

3.6.16 Small corners of grassland habitats would be lost at Parcels J. The area of habitat loss is small in size and are located adjacent to existing busy roads (refer to **Figure 3.2**). Pond habitat exists adjacent to grassland habitat, the area of grassland loss is not anticipated to interfere with the functions and hydrology of the pond as there would be buffering grassland habitat that would be retained.

3.6.17 According to the West Rail – Final Assessment report West Kowloon to Tuen Mun Centre EIA (KCRC, 1998), the ecological objectives of the re-created wetlands are to:

- re-create freshwater wetland habitat;
- re-provide habitat suitable for dragonflies;
- re-provide habitat suitable for reptiles and amphibians; and
- re-provide habitat suitable for wetland-dependent birds.

▪ These specific objectives provide a “like-to-like” form of compensation to the original wetlands affected by the West Rail project (KCRC, 1998). Based on findings from the reviewed literature and ecological surveys, the affected areas of wetland Parcels G, H and J are grassland habitats that do not retain water and thus the loss of these areas would not interfere with the performance of these wetlands in meeting their ecological objectives. When taking into consideration all of the mitigation wetland parcels, the areas where the objectives listed above are being fulfilled are located at areas where pond habitats are found (**Figure 3.1** refers). The areas of mitigation wetland to be lost as a result of the project would not reduce the overall ecological functions of the entire complex of mitigation wetlands as a freshwater habitat suitable for dragonflies, herpetofauna and wetland-dependent birds. Although the overall ecological functions of the mitigation wetlands would not be affected, wetland compensation is still recommended as these mitigation wetlands were provided as part of the Environmental Permit (EP) of the West Rail Project. These mitigation wetlands are intended to provide long term protection in order to compensate for the wetland loss from the construction of the West Rail. The details on the compensation wetland under the current Project are discussed in **Sections 3.7.7** to **3.7.9** below.

3.6.18 Potential disturbance impacts to Parcels C, F J and I could arise during the construction phase of the proposed road works. Construction noise, dust and human disturbances would be present and could deteriorate the habitat quality of these parcels of mitigation wetlands. The magnitude of these impacts would be relatively greater along the edges of the wetland parcel closest to the proposed road works. With the presence of these disturbances during the construction period, it is possible that birds would avoid these areas and would be displaces to similar habitat nearby.

3.6.19 Potential ecological impacts on habitats before mitigation, associated with the construction and operation of the Project have been evaluated in accordance with the EIAO-TM Annex 8, and are presented in **Table 3.9** to **Table 3.13**.

Table 3.9 Evaluation of Ecological Impacts to the Woodland Habitats within the Assessment Area

Evaluation Criteria	**Woodland**
Habitat quality	Moderate
Species	No rare species or species of conservation importance were recorded
Size/Abundance	about 0.03 ha would be directly lost
Duration	Direct loss of habitat would be permanent
Reversibility	Irreversible
Magnitude	Low
Overall impact evaluation	**Low to moderate**

Table 3.10 Evaluation of Ecological Impacts to the Plantation and Grassland Habitats within the Assessment Area

Evaluation Criteria	**Plantation**	**Grassland**
Habitat quality	Low	Low at Sites 1 and 4a Low to moderate at mitigation wetlands
Species	Japanese Pipistrelle was recorded in the plantation of mitigation wetland.	Chinese Pond Heron and Japanese Pipistrelle were recorded at the grassland of the mitigation wetland.
Size/Abundance	1.73 ha of this habitat type would be lost	1.1 ha of this habitat type at Sites 1 and 4a would be lost 0.63 ha of the mitigation wetland would be loss from the road widening works
Duration	Direct loss of habitat would be permanent	Direct loss of habitat would be permanent
Reversibility	Loss of habitat would be irreversible	Loss of habitat would be irreversible
Magnitude	Low	Low
Overall impact evaluation	**Low**	**Low**

Table 3.11 Evaluation of Ecological Impacts to Active Agricultural Land and Abandoned Agricultural Land within the Assessment Area

Evaluation Criteria	**Active Agricultural Land**	**Abandoned Agricultural Land**
Habitat quality	Low	Low
Species	No rare species or species of conservation importance were recorded	No rare species or species of conservation importance were recorded
Size/Abundance	4.8 ha of this habitat type would be lost	1.4 ha of this habitat type would be lost
Duration	Direct loss of habitat would be permanent	Direct loss of habitat would be permanent

Evaluation Criteria	Active Agricultural Land	Abandoned Agricultural Land
Reversibility	Loss of habitat would be irreversible	Loss of habitat would be irreversible
Magnitude	Low	Low
Overall impact evaluation	**Low**	**Low**

Table 3.12 Evaluation of Ecological Impacts to Village/Orchard and Developed Area/Wasteland within the Assessment Area

Evaluation Criteria	Village/Orchard	Developed Area/Wasteland
Habitat quality	Low	Low
Species	Recorded species of conservation importance include Grass Demon, a *Pipistrellus* sp. and an unknown Bat sp. 1	No rare species or species of conservation importance were recorded
Size/Abundance	4.2 ha of this habitat type would be lost	16.2 ha of this habitat type would be lost
Duration	Direct loss of habitat would be permanent	Direct loss of habitat would be permanent
Reversibility	Loss of habitat would be irreversible	Loss of habitat would be irreversible
Magnitude	Low	Low
Overall impact evaluation	**Low**	**Negligible**

Table 3.13 Evaluation of Ecological Impacts to Pond Habitat and Modified Watercourse within the Assessment Area

Evaluation Criteria	Pond	Modified Watercourse
Habitat quality	Moderate	Low
Species	Four species of conservation importance, Tufted Duck, Grey Heron, Little Egret and Chinese Noctule were recorded	Unknown Bat sp. 1 was recorded flying above the watercourse between Site 1 and 4a. Japanese Pipistrelle was recorded flying above the watercourse east of Tsing Long Highway. (1) Chinese Pond Heron, Little Egret and Wood Sandpiper were recorded at the watercourse between Sites 1 and 4a. (1)

Evaluation Criteria	**Pond**	**Modified Watercourse**
Size/Abundance	No direct loss of this habitat type	About 0.14 ha (381 m in length) would be permanently lost at the modified watercourse north of Site 6 as a result of the proposed culvert works. Within Kam Tin River, 11m^2 (0.0011 ha) would be permanently lost due to the installation of bridge piles. A temporary loss of 360m^2 (0.036 ha) would be occur within Kam Tin River for two dry season for the sewer works.
Duration	Disturbance impacts would be temporary and restricted to construction phase	A temporary loss of 360m^2 (0.036 ha) within Kam Tin River for two dry seasons. Disturbance impacts would be temporary and restricted to construction phase
Reversibility	Impacts would be reversible	Impacts would be reversible
Magnitude	Low	Low
Overall impact evaluation	**Low**	**Watercourse east of Tsing Long Highway: Low** **Other watercourses within the study area: Low**

Note:
(1) Records were obtained from the EA of Public Housing Sites (HKHA, 2016).

3.7 Recommendation for Mitigation Measures of Adverse Ecological Impacts

3.7.1 Due to the population increase from the housing sites, results from the Traffic Impact Assessment revealed that road widening works would be required in order to meet future traffic demands. Alternative alignment options for the road widening works at Kam Ho Road have been considered to avoid encroachment of mitigation wetland as much as possible. The currently proposed alignment has taken into consideration existing constraints such as the presence of the existing burial ground and open drainage channel at the west side. Widening works on the west side would also encroach mitigation wetland (Parcels F and I) which would amount to a larger overall size of mitigation wetland loss. Based on this, the current alignment has been deemed suitable to fulfil future traffic needs and imposes the least ecological impacts to the mitigation wetlands compared to other alternative alignment options.

- *Minimise Disturbance Impacts to Habitats and Fauna*

3.7.2 General mitigation measures for noise, air quality and pollution impacts and good site practice can be considered to further minimize the disturbance on habitats, flora and fauna at the same time. In general, the disturbance impacts to the sites of conservation importance (i.e. Conservation Areas and Tai Lam Country Park), terrestrial habitat and associated wildlife arising from the construction activities could be minimized by adopting good site practice, including, but not limited to the following:

- Noise impact during construction phase could be minimized to limit the disturbance to the habitats adjacent to the work areas. Mitigation measures are recommended, but not limited to the following: machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum. Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities. The use of Quiet Mechanical Plant (QMP) is recommended to limit noise emissions at source. QMP and

other machines and plants (e.g. air compressors, concrete pumps) could be covered by noise enclosure to further reduce noise impact;

- Dust suppression measures could minimize the dust covering leaves of plants that would affect their photosynthesis, and thus their health and growth. Regular spraying of haul roads is recommended. By covering trucks or by transporting wastes in enclosed containers, windblown litter and dust during transportation of waste shall be minimized.
- Hoarding should be erected around the works areas to confine human disturbances within a small area. Hoarding erected at the southern boundary of Site 6 would also prevent encroachment of CAs by contractors.

3.7.3 It is recommended that non-percussive piling construction method should be adopted for the installation of bridge piles into Kam Tin River in order to minimize the noise and vibration impacts to sensitive waterbirds nearby. To further reduce the potential impacts to birds, it is recommended that the works should be completed as fast as possible, piling works within Kam Tin River are to be completed within the duration of one dry season.

▪ *Minimise Bird Collision Impact*

3.7.4 To minimize bird collision due to the presence of the proposed noise barriers, it is recommended that the design of the noise barriers to include bird-friendly features, including the use of coloured glass, bird stickers and/or other solid colours or designs so that bird can easily visualize the presence of these barriers.

▪ *Minimise Water Quality Impact*

3.7.5 Although no significant impact on water quality has been identified, proper site management measures could control construction site runoff and drainage from the works areas to nearby streams, particularly the modified watercourse next to the site. Practices to minimize surface runoff and to reduce suspended solid levels should be undertaken. Measures should also be put into place so that litter, fuels and solvents do not enter the nearby watercourses or storm water drains.

3.7.6 Not Use

▪ *Compensation Wetland for Permanent Mitigation Wetland Loss*

3.7.7 In order to compensate for the 0.63 ha of unavoidable permanent habitat loss at Mitigation Wetland Parcels G, H and J, a compensation wetland with the size of approximately 0.7 ha would be provided on a like-to-like basis. A potential compensation wetland has been chosen east of Mitigation Wetland Parcel D (**Figure 3.3**). This area was deemed suitable based on the following criteria:

- Ecological connectivity: It is located adjacent to an existing Mitigation Wetland (Parcel D) and Kam Tin River;
- Nearby disturbances: its surrounding areas experience low levels of human traffic and no busy roads are nearby;
- Integrity: compensation of 0.7 ha is intact and can be compensated as one piece of wetland, whereas other areas connected to the existing Mitigation Wetlands closer to the development sites do not have a sufficient amount of land available;
- Existing flora and fauna adjacent to the site: wetland flora species (e.g. *Ludwigia perennis,* Primrose Willow and Taro) and wetland associated avifauna (e.g. Chinese Pond Heron) were recorded adjacent to the potential compensation wetland;
- Geographic location: relative to the other areas of the Project which are located south of the potential compensation wetland, this northern part is located closer to other existing fishponds and wetland habitats at the northern part of Hong Kong; and

- Enhancement potential: the existing conditions of the potential compensation wetland allows for habitat enhancement opportunities.

3.7.8 The potential compensation wetland is located east of Mitigation Wetland Parcel D. The western portion and north eastern portion of the potential compensation wetland are currently raised area covered with small trees, the south eastern portion is a small downward sloping area that connects to the existing marsh (abandoned meander KN8) just east of the potential compensation wetland (refer to **Figure 3.3**). Given its existing conditions, the removal of the invasive White Popinac, other small trees, followed by re-profiling of the raised area and the downward sloping area would greatly benefit its ecological conditions as a functioning wetland habitat. The raised area and the downward sloping area should be re-profiled so that it is the same level as the existing marsh and wetland plants should be planted so that the condition is similar to the adjacent marsh. As the target habitat of Parcels H and G are seasonal marsh and terrestrial vegetation according to the Habitat Creation and Management Plan of the West Rail Project, seasonal marsh habitat with terrestrial vegetation along the boundaries as buffer should be the target habitat types of this new compensation wetland. Buffer planting with terrestrial vegetation should be planted along the boundaries of the southeast portion where the future public open space area would be provided in the future in order to minimize human disturbances to the mitigation wetland.

3.7.9 The implementation and establishment of this compensation wetland should take place upon the commencement of road widening works at Kam Ho Road, before wetland parcels G, H and J are surrendered for construction works. Fencing would need to be erected around the boundaries of the wetland similar to the existing Mitigation Wetlands. Active habitat management and ecological monitoring would be required in order to ensure that the compensation wetland is functioning ecologically. As the targeted habitat would be wetland, the target species listed under the management objectives should also be wetland species. It is recommended that the management measures (i.e. hydrological conditions, vegetation management, etc.), management objectives and target species of this compensation wetland to make reference to the past monitoring results of the nearby Mitigation Wetland (i.e. Parcel D). The ecological monitoring parameters should also be similar to the requirements of the current monitoring requirements. The guiding principles, target species, habitats to be created and implementation principles of the new compensation wetland should follow the Habitat Creation and Management Plan of the West Rail Project in order to meet statutory requirements of the relevant Environmental Permit. This holistic approach by incorporating the compensation wetland into the management plan of the existing mitigation wetland would be the most effective way to ensure that the new compensation wetland provides suitable wetland habitat for its associated species. The Project Proponent would liaise with KCRC/MTRCL and prepare necessary submissions to meet the statutory requirements under the EIAO regarding the mitigation measures mentioned above.

3.8 Recommendation for Ecological Enhancement Measures

- *Flight Paths*

3.8.1 Although no important flight paths were identified within the assessment area, to enhance the environment for bird use in the future in case new egretries form, some building design features have been considered. Even though no active egretries are present nearby and no flight paths have been identified, an eco-corridor of about 30m wide across the Subject Sties previously proposed in the Land Use Review for Kam Tin South and Pat Heung dated March 2014 would be provided as far as practicable as a conservation approach. The eco-corridor would have some soft and hard landscape works with some native plants to enlighten the environment. It is anticipated that low-rsie structure less than 10m in height within the corridor would unlikely have any significant ecological impact to the surrounding habitats and associated wildlife.

3.9 Environmental Monitoring and Audit Requirements

3.9.1 With the implementation of the recommended mitigation measures mentioned in Section 8.7, no adverse ecological impacts are expected and thus no specific monitoring program for ecology is required.

3.9.2 Ecological monitoring at the compensation wetland would be carried out by Government separately under the West Rail Project. The monitoring program would follow that of the Habitat Creation and Management Plan of the West Rail Project.

3.10 Conclusion

3.10.1 A preliminary environmental review, based on literature review and field surveys, for the site formation and infrastructural works for the Initial Sites at Kam Tin South, Yuen Long has been conducted.

3.10.2 The habitats identified within the assessment area included woodland, plantation, grassland, active agricultural land, abandoned agricultural land, village/orchard, developed area/wasteland, pond and modified watercourse. The ecological value of these habitats varied from low to moderate. Tai Lam Country Park and Conservation Areas are located west of the assessment area.

3.10.3 A total 0.63 ha of mitigation wetland from the West Rail project would be lost as a result of the Project. Compensation wetland of 0.7 ha would be provided to mitigate for the surrendered wetland. Long term management and ecological monitoring requirements would make reference to the monitoring program for the West Rail mitigation wetlands nearby. The guiding principles, target species, habitats to be created and implementation principles of the new compensation wetland should follow the Habitat Creation and Management Plan of the West Rail Project in order to meet statutory requirements of the relevant Environmental Permit

3.10.4 There are no significant adverse ecological impacts identified in the assessment. The adoption of good site practices during construction phase (e.g. water quality control measure, air quality mitigation measures) would help to further minimize the disturbance impacts. At areas of Project Site 6 that are located adjacent to the CA, the erection of hoarding is recommended during the construction phase to minimize indirect impacts.

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4 LANDSCAPE AND VISUAL IMPACTS

4.1 Introduction

4.1.1 This section provides a preliminary landscape and visual impact assessment and identifies the potential landscape and visual impacts arising from the proposed infrastructure works. Mitigation measures are recommended to alleviate any potential adverse landscape and visual impacts due to the site formation and infrastructural works (referred as the Project in this section).

4.2 Environmental Legislation, Standards and Guidelines

4.2.1 The following legislation, standards and guidelines are applicable to landscape and visual impact assessment associated with the construction and operation of the project: -

- Environmental Impact Assessment Ordinance (Cap.499.S.16) and the Technical Memorandum on EIA Process (EIAO TM), particularly Annexes 10 and 18;
- Environmental Impact Assessment Ordinance Guidance Note 8/2010;
- Hong Kong Planning Standards and Guidelines Chapters 4, 10 and 11;
- ETWB TCW No. 29/2004 - Registration of Old and Valuable Trees, and Guidelines for their Preservation;
- DEVB TC(W) No. 2/2012 - Allocation of Space for Quality Greening on Roads;
- DEVB TC(W) No. 6/2015 - Maintenance of Vegetation and Hard Landscape Features;
- DEVB TC(W) No. 7/2015 - Tree Preservation;
- Study on Landscape Value Mapping of Hong Kong; and
- The Latest Requirement for Handover of Vegetation to Highways Department.

4.3 Assessment Methodology

4.3.1 The landscape impacts have been assessed according to the following procedures.

- ***Identification of the baseline landscape resources and landscape characters found within the study area.*** This is achieved by site visits and desktop study of topographical maps, information databases and photographs.
- ***Assessment of the degree of sensitivity of the landscape resources and landscape character areas.*** This is influenced by a number of factors including whether the resource/character is common or rare, whether it is considered to be of local, regional, national or global importance, whether there are any statutory or regulatory limitations/requirements relating to the resource, the quality of the resource/character, the maturity of the resource and the ability of the resource/character to accommodate change.
- The sensitivity of each landscape feature and character area is classified as follows:

  High: Important landscape character or resource of particularly distinctive character or high importance, sensitive to relatively small change.

  Medium: Landscape character or resource of moderately valued landscape characteristics reasonably tolerant to change.

Low: Landscape character or resource, the nature of which is largely tolerant to change.

- ***Identification of potential sources of landscape changes.*** These are the various elements of the construction works and operation procedures that would generate landscape impacts.

- The magnitude of landscape changes is classified as follows:

  Large: The landscape character or landscape resource would incur a major change.

  Intermediate: The landscape character or landscape resource would incur a moderate change.

  Small: The landscape or landscape resource would incur slight or barely perceptible change.

  Negligible: The landscape or landscape resource would incur no discernible change.

- ***Identification of potential landscape mitigation measures.*** These may take the form of adopting basic engineering design to prevent and/or minimize adverse landscape impacts before adopting other mitigation or compensatory measures to alleviate the impacts. Potential mitigation measures shall also include the preservation of vegetation and natural landscape resources, transplanting trees in good condition and value, provision of roadside amenity planting, re-vegetation of new slopes, compensatory planting, aesthetic design of aboveground structures including provision of finishes, colour scheme, texture of materials used and any measures to mitigate the impact on the landscape character areas identified.

- ***Prediction of the significance of landscape impacts before and after the implementation of the mitigation measures.*** By synthesizing the magnitude of the various impacts and the sensitivity of the various landscape resources, it is possible to categorize impacts in a logical, well-reasoned and consistent fashion. **Table 4.1** shows the rationale for dividing the degree of significance into four thresholds, namely insubstantial, slight, moderate, and substantial, depending on the combination of a negligible-small-intermediate-large magnitude of change and a low-medium-high degree of sensitivity of landscape resource /character.

Table 4.1 Relationship between Landscape Sensitivity and Magnitude of Change in Defining Impact Significance

Magnitude of Change	**Large**	Moderate	Moderate / Substantial	Substantial
	Intermediate	Slight / Moderate	Moderate	Moderate / Substantial
	Small	Insubstantial / Slight	Slight / Moderate	Moderate
	Negligible	Insubstantial	Insubstantial	Insubstantial
		Low	**Medium**	**High**
		Sensitivity of Landscape Character Area and Resource		

Note: All impacts are Adverse unless otherwise noted with Beneficial.

- The significance of landscape impacts is categorized as follows:

Substantial: Adverse / beneficial impact where the proposal would cause significant deterioration or improvement in existing landscape quality.

Moderate: Adverse / beneficial impact where the proposal would cause a noticeable deterioration or improvement in existing landscape quality.

Slight: Adverse / beneficial impact where the proposal would cause a barely perceptible deterioration or improvement in existing landscape quality.

Insubstantial: No discernible change in the existing landscape quality.

- ***Prediction of Acceptability of Impacts.*** An overall assessment of the acceptability, or otherwise, of the impacts according to the five criteria set out in Annex 10 of the EIAO-TM.

4.3.2 The visual impacts have been assessed according to the following procedures.

- ***Identification of the Key VSRs to be potentially affected by the Project.*** These are the people who would reside within, work within, play within, or travel through, and potentially affected by the Project.

- Assessment of the degree of sensitivity of the VSRs. Factors considered include:

  - the type of VSRs, which is classified according to whether the person is at home, at work, at play, or travelling. Those who view the change from their homes are considered to be highly sensitive as the attractiveness or otherwise of the outlook from their home will have a substantial effect on their perception of the quality and acceptability of their home environment and their general quality of life. Those who view the impact from their workplace are considered to be only moderately sensitive as the attractiveness or otherwise of the outlook will have a less important, although still material, effect on their perception of their quality of life. The degree to which this applies depends on whether the workplace is industrial, retail or commercial. Those who view the impact whilst taking part in an outdoor leisure activity may display varying sensitivity depending on the type of leisure activity. Those who view the impact whilst travelling on a public thoroughfare will also display varying sensitivity depending on the speed of travel.

  - other factors which are considered (as required by EIAO GN 8/2010) include the value and quality of existing views, the availability and amenity of alternative views, the duration or frequency of view, and the degree of visibility.

- The sensitivity of VSRs is classified as follows:

  High: The VSR is highly sensitive to any change in their viewing experience.

  Medium: The VSR is moderately sensitive to any change in their viewing experience.

  Low: The VSR is only slightly sensitive to any change in their viewing experience.

- ***Identification of relative numbers of VSRs.*** This is expressed in terms of whether there are “many“, “medium” and “few” VSRs in any one category of VSR.

- ***Identification of potential sources of visual changes.*** These are the various elements of the construction works and operation that would generate visual changes.

- Assessment of the potential magnitude of visual changes. Factors considered include:

  - the compatibility with the surrounding landscape;

  - the duration of the impact;

- the reversibility of the impact;
- the scale of the impact and distance of the source of impact from the viewer; and
- the degree of visibility of the impact, and the degree of which the impact dominates the field of vision of the viewer.

- The magnitude of visual changes is classified as follows:

  Large: The VSRs would suffer a major change in their viewing experience.

  Intermediate: The VSRs would suffer a moderate change in their viewing experience.

  Small: The VSRs would suffer a small change in their viewing experience.

  Negligible: The VSRs would suffer no discernible change in their viewing experience.

- ***Identification of potential landscape mitigation measures.*** These may take the form of adopting basic engineering design to prevent and/or minimize adverse visual impacts before adopting other mitigation or compensatory measures to alleviate the impacts. Potential mitigation measures shall also include the preservation of vegetation and natural landscape resources, provision of roadside amenity planting, re-vegetation of new slopes, aesthetic design of aboveground structures including provision of finishes, colour scheme, texture of materials used and any measures to mitigate the impact on adjacent visually sensitive receivers.

- ***Prediction of the significance of visual impacts before and after the implementation of the mitigation measures.*** By synthesizing the magnitude of the various visual impacts and the sensitivity of the VSRs, and the numbers of VSRs that are affected, it is possible to categorize the degree of significance of the impacts in a logical, well-reasoned and consistent fashion. **Table 4.2** shows the rationale for dividing the degree of significance into four thresholds, namely, insubstantial, slight, moderate and substantial, depending on the combination of a negligible-small-intermediate-large magnitude of change and a low-medium-high degree of sensitivity of VSRs.

Table 4.2 Relationship between Visually Sensitive Receivers (VSRs) Sensitivity and Magnitude of Change in Defining Impact Significance

Magnitude of Change	**Large**	Moderate	Moderate / Substantial	Substantial
	Intermediate	Slight / Moderate	Moderate	Moderate / Substantial
	Small	Insubstantial / Slight	Slight / Moderate	Moderate
	Negligible	Insubstantial	Insubstantial	Insubstantial
		Low	**Medium**	**High**
		Sensitivity of Visually Sensitive Receivers (VSRs)		

Note: All impacts are Adverse unless otherwise noted with Beneficial.

- The significance of visual impacts is categorized as follows:

  Substantial: Adverse / beneficial impact where the proposal would cause significant deterioration or improvement in existing visual quality.

  Moderate: Adverse / beneficial impact where the proposal would cause a noticeable deterioration or improvement in existing visual quality.

  Slight: Adverse / beneficial impact where the proposal would cause a barely perceptible deterioration or improvement in existing visual quality.

  Insubstantial: No discernible change in the existing visual quality.

- ***Prediction of Acceptability of Impacts.*** An overall assessment of the acceptability, or otherwise, of the impacts according to the five criteria set out in Annex 10 of the EIAO-TM.

4.4 Baseline Findings

4.4.1 For Landscape Impact Assessment, the extent of baseline study shall only covers Landscape Resources and Character Areas that would be potentially affected by the proposed project. Landscape Resources and Character Areas that will not be affected are not included and assessed.

4.4.2 For Visual Impact Assessment, key VSRs that would be potentially affected will be included and assessed.

Landscape Resources (LRs)

4.4.3 The details of Baseline LRs which will be potentially affected, together with their sensitivity are described in **Table 4.3**. Landscape resources that would be potentially affected are illustrated in **Figure 4.1-00** to **4.1-15**. Photos of the landscape resources are illustrated in **Appendix 4.1**.

Table 4.3 Baseline LRs and their Sensitivity

LRs	Description	Sensitivity
LR-(A)	***Vegetation in Roadside Amenity Area*** Roadside planting areas along both sides of Kam Tin Road, Kam Po Road, Kam Ho Road and at the existing road junctions to be improved comprise predominately tree and shrub planting. Dominant tree species include *Archontophoenix alexandrae*, *Senna siamea* and *Spathodea campanulata*. Trees are of semi-mature size. Plant species found are common roadside landscape species in Hong Kong. The quality of this LR is considered as medium. The ability to accommodate changes and the sensitivity of this LR is considered as medium.	Medium
LR-(B)	***Vegetation on Man-made Slope*** Vegetation on existing man-made slopes comprise a mix of exotic and native species found along the embankment of existing roads. Vegetation found is common species in man-made woodland slopes of Hong Kong. Dominant tree species nclude *Acacia confusa*, *Acacia mangium*, *Bauhinia purpurea*, *Bombax ceiba*, *Celtis sinensis*, *Eucalyptus camaldulensis*, *Eucalyptus citriodora*, *Ficus benjamina*, *Ficus hispida*, *Ficus microcarpa*, *Ficus virens var. sublanceolata*, *Leucaena leucocephala*, *Macaranga tanarius*, *Melia azedarach*, *Sapium sebiferum*, and *Spathodea campanulata*. They are generally in semi-mature size. It is a common landscape resource. The quality of these resources is medium. The ability to accommodate changes and the sensitivity of this LR is considered as medium.	Medium
LR-(C)	***Vegetation in Agricultural Land*** Vegetation found in the Agricultural Land are crops and fruit trees. They are all common species found in Hong Kong. Dominant tree species include *Artocarpus heterohpyllus*, *Averrhoa carambola*, *Carica papaya*, *Celtis sinensis*, *Citrus maxima*, *Clausena lansium*, *Dimocarpus longan*, *Ficus microcarpa*, *Litchi chinensis*, *Macaranga tanarius*, *Mangifera indica*, and *Psidium guajava*. They are generally in mature to semi-mature size. This is a common landscape resource in Hong Kong. The quality of this resources is medium. The ability to accommodate change is medium and the sensitivity of this resource is considered as medium.	Medium
LR-(D)	***Stream course*** Kam Tin River is main stream course found within the project boundary. It is an engineered stream courses without landscape treatment at the river embankment and bottom. It is a common landscape resource. The ability to accommodate changes and the sensitivity of this LR is considered as medium.	Medium
LR-(E)	***Mitigation Wetland*** They are the mitigation wetlands that were provided as part of the habitat compensation for the loss of wetland habitats from the construction of West Rail. It comprises of grassy and open shallow water areas. It is a common artificial wetland found in the Kam Tin. The ability to accommodate change is low and the sensitivity of this resource is considered as high.	High

LRs	Description	Sensitivity
LR-(F)	***Kam Sheung Road Sitting-out Area*** The Sitting-out Areas comprise of a number of seating areas under trellis and chess tables surrounded by amenity tree and shrub planting. It is a common landscape resource of local importance. The sensitivity of Kam Sheung Road Sitting-out Area is considered as medium.	Medium
LR-(G)	***Woodland*** This is a small patch of woodland located at the southwest end of Site 6. It is located next to existing village housing, farmland and Tsing Long Highway. Dominantly comprises of native species, e.g. *Schefflera heptaphylla, Machilus chekiangensis, Macaranga tanarius* etc. This is a common landscape resources of local importance in Hong Kong. The quality of it is fair with low ability to accommodate change. Therefore, the sensitivity of this LR is considered as Medium.	Medium

Broad Brush Tree Survey

4.4.4 Existing trees and vegetation at the both sides of the Kam Po Road, Kam Ho Road and at the existing road junctions to be improved; and within the Site 1, 4a and 6 boundary would be the key landscape resources that would be potentially affected by the road works and site formation works respectively. Based on a broad brush tree survey, it is estimated that approximately 2,400 nos. of individual trees are surveyed within the project boundary. There is no OVT, rare and endangered species found. They are generally in an average of fair form, fair health and medium amenity value. Dominant species include *Archontophoenix alexandrae*, *Acacia confusa*, *Acacia mangium*, *Albizia lebbeck*, *Artocarpus heterohpyllus*, *Averrhoa carambola*, *Carica papaya*, *Celtis sinensis*, *Citrus maxima*, *Clausena lansium*, *Delonix regia*, *Dimocarpus longan*, *Ficus microcarpa*, *Hibiscus tiliaceus*, *Koelreuteria bipinnata*, *Leucaena leucocephala*, *Litchi chinensis*, *Macaranga tanarius*, *Mangifera indica*, *Psidium guajava*, and *Spathodea campanulata*.

Landscape Character Areas (LCAs)

4.4.5 The proposed infrastructural works is generally within Kam Tin Miscellaneous Rural Fringe Landscape Character Area. This landscape would traditionally have consisted of patterns of agricultural fields, meandering streams, stands of woodland and scattered villages, connected by winding lanes and footpaths. Changes to the land uses have led to the widespread abandonment of agricultural fields and their subsequent use, in many cases, as sites for open storage, parking, workshop and horticulture. The result of these changes is a landscape which, while it retains many of its rural characteristics, has witnessed a fragmentation in land use and traditional landscape patterns and which has tended to become increasingly incoherent. It is a common landscape found in New Territories in Hong Kong. The sensitivity of this landscape is considered as low. Kam Tin Miscellaneous Rural Fringe Landscape Character Area is illustrated in **Figure 4.2**. Photos of the landscape character areas are illustrated in **Figure 4.2**.

Visually Sensitive Receivers (VSRs)

4.4.6 The proposed project comprises of road works and site formation works. There would not be any temporary or permanent high-rise structures. The existing landuse in Kam Tin is dominated by low rise development. The key VSRs to be affected are the people who are living near the proposed infrastructural works and travelling along the existing roads where road widening works or improvement works are proposed. Key VSRs that would be potentially affected by the Project are illustrated in **Figure 4.3**.

4.4.7 There are a number of low rise residential developments which is close to the proposed works would be potentially affected by the proposed works. Residential VSRs to be affected include Residents in Yuk Yat Garden (R1), Kam Tin Shi (R2), Tsz Tong Tsuen (R3), Ng Ka Tsuen (R4), Full Silver Garden (R5) and Yuen Long Tsuen (R6). There are few of individual. The quality of their view is predicted as fair. There would be alternative views and the degree of visibility would be partial to glimpse. The duration of view is long and their view is frequent. The sensitivity of these Residential VSRs is considered as medium.

4.4.8 There would be many number of individual in the Residential VSRs (R7) in Future Housing Development in Site 1, 4a and 6. It is predicted the quality of their view would be good. There would be alternative views and the degree of visibility would be full. The duration of view is long and their view is frequent. The sensitivity of the VSRs R7 is considered as high.

4.4.9 Travelers along Kam Tin Road (T1), Kam Ho Road (T2), Tung Wui Road (T3), Kam Sheung Road (T4) and Pat Heung Road (T5) would be potentially affected by the proposed road widening and junction improvement/modification works. There are many numbers of individuals within each VSR. The quality of view is generally fair. There are alternative views. The degree of visibility is glimpse. The duration of view is short and the frequency of view is rare. The sensitivity of Travelling VSRs is generally considered as low.

4.5 Landscape and Visual Impact Assessment

Predicted Landscape Impact

4.5.1 Due to the road widening and junction improvement works, approximately 1,733 m^2 of Vegetation in Roadside Amenity Area [LR-(A)] would be permanently affected. The affected areas are small and localized. The magnitude of change is considered as intermediate. The sensitivity of this LR is medium. The resultant significance of unmitigated landscape impact on LR-(A) would be moderate during construction and operation phase.

4.5.2 Approximately 6,784 m^2 of Vegetation on Man-made Slopes [LR-(B)] would be permanently affected by the proposed roadworks and site formation works. The affected areas are small and localized. The magnitude of change is considered as intermediate. The sensitivity of this LR is medium. The resultant significance of unmitigated landscape impact on LR-(B) would be moderate during construction and operation phase.

4.5.3 Approximately 89304 m^2 of Vegetation in Agricultural Land [LR-(C)] would be would be permanently affected by the proposed site formation works. As most the agricultural land within the site boundary will be affected, the magnitude of change is considered as large. The sensitivity of this LR is medium. The resultant significance of unmitigated landscape impact on LR-(C) would be moderate during construction and operation phase.

4.5.4 Due to the construction of the proposed bridge across Kam Tin River [LR-(D)], there would be localized impact on the river channel due to the bridge foundation. The newly proposed bridge foundation are designed to be in-line with the existing bridge foundation. Therefore, the magnitude of change is considered as small. The sensitivity of this LR is medium. The resultant significance of unmitigated landscape impact on LR-(D) would be slight during construction and operation phase.

4.5.5 Approximately 6300 m^2 of Mitigation Wetland [LR-(E)] would be permanently affected by the proposed road widening works. The affected areas are small and localized. The magnitude of change is considered as small. The sensitivity of this LR is high. The resultant significance of unmitigated landscape impact on LR-(E) would be moderate during construction and operation phase.

4.5.6 Due to the road improvement/modification works at Kam Tin Road and Kam Sheung Road junction, Kam Sheung Road Sitting-out Area [LR-(F)] will be permanently alienated by the road works. The magnitude of change to the Sitting-out Area would be considered as large. The sensitivity of the Sitting-out Area is medium. The resultant significance of unmitigated landscape impact on the Sitting-out Area would be substantial during construction and operation phase.

4.5.7 By estimation, around 1059 m^2 of Woodland near Tsing Long Highway [LR-(G)] would be affected by the Site 6 site formation work. It would be a permanent and irreversible change. As the affected area is relatively small, the thinning effect of the existing tree buffer along the graveyard hill bottom would not be very obvious. As this piece of transition woodland has low ecological value, the magnitude of change would be small. Consider its medium sensitivity, the resultant significance of unmitigated landscape impact on this LR would be moderate.

4.5.8 Based the findings in the broad brush tree survey carried out, it is estimated that approximately 485 nos. would be affected by the road widening and junction improvement/modification works and approximately 1,545 nos. of existing trees would be affected by site formation works for Site 1, 4a and 6. It comprises approx. 579 trees from Site 1, 492 trees from Site 4a and 474 trees are from Site 6. There is no OVT, rare and endangered species identified to be affected.

4.5.9 Due to the scale of the Project, there would be significantly loss of existing trees and vegetation due to the road widening and improvement works; and site formation works for Site 1, 4a and 6 within Kam Tin Miscellaneous Rural Fringe Landscape Character Area. It is predicted that there would be significant change in the landscape character and land use pattern particularly in Site 1, 4a and 6. The compatibility of the Project, particularity for the site formation works, with the surrounding landscape is low. It is predicted the magnitude of change due to the Project would be large. The sensitivity of Kam Tin Miscellaneous Rural Fringe Landscape Character Area is low. The resultant significance of unmitigated impact on this landscape would be moderate during construction and operation phase.

Predicted Visual Impact

4.5.10 During construction, there would be road widening along Kam Po Road, Kam Ho Road and a number of junction improvement works within the project boundary. There would be extensive site formation works at Initial Sites 1, 4a and 6. Large number of existing trees will be removed. A short section of 6m high cantilever noise barrier and 1m high vertical noise barriers to be erected at the junction of Kam Tin Road and Tsing Long Highway. The compatibility of the project with the surrounding landscape is low. The duration of impacts is medium. The scale of development is large. All permanent works including site formation and road widening and improvement works constructed during construction phase are irreversible. Since the proposed works are at low level, there would not be any temporary high structures proposed during construction phase, there would not be any potential blockage of view during construction.

4.5.11 It is predicted that there would be large magnitude of impact during construction on Traveling VSRs (T1, T2, T3, T4 and T5) who are immediately next to the proposed road widening and improvement works along Kam Tin Road. The sensitivity of these VSRs is low and the resultant significance of unmitigated visual impact on VSRs T1, T2, T3, T4 and T5 is moderate.

4.5.12 Residential VSRs (R1, R2, R3, R4, R5 and R6) who are approximately at least 10-50m away from the proposed road works and site formation works. The views to the proposed works would be partially screened by existing trees within the low rise residential developments. The proposed noise barrier near R1 will replace the existing one which has similar height and would also mostly screened by the existing trees. The change of view experienced by R1 would be barely noticeable. It is predicted that there would be intermediate to small magnitude of visual impact on these VSRs. The sensitivity of these VSRs is medium and the resultant significance of unmitigated visual impact would be moderate.

4.5.13 During operation, the compatibility of the project with the surrounding is low. The duration of impact is long. The scale of the permanent works is large and the works constructed are irreversible. There would not be any potential blockage of view during operation.

4.5.14 It is predicted that, without any mitigation measures proposed, the significance of unmitigated visual impact on Traveling VSRs (T1, T2, T3, T4 and T5) and Residential VSRs (R1, R2, R3, R4, R5 and R6) would remain moderate during operation phase.

4.5.15 There would be small magnitude of visual impact on VSRs R7 in year 10 of the operation phase. The sensitivity of these VSRs is high and the resultant significance of unmitigated visual impact would be moderate in year 10 of the operation phase.

4.6 Landscape and Visual Mitigation Measures

4.6.1 Based on the potential landscape and visual impacts predicted, a series of landscape and visual mitigation measures in the construction and operation phase are recommended to mitigate any adverse impacts and listed in **Table 4.4** and **4.5** below. Landscape layout plans showing the recommended landscape and visual mitigation measures are illustrated in **Figure 4.4-00** to **4.4-15**.

Table 4.4 Proposed Landscape and Visual Mitigation Measures for Construction Phase

ID No.	Landscape and Visual Mitigation Measures
CM1	Trees of high amenity value which would be affected by the proposed works shall be proposed for transplanting, having considered for technical feasibility and cost effectiveness in accordance with DEVB TC(W) No. 7/2015 - Tree Preservation and the latest Guidelines on Tree Transplanting issued by GLTM Section of DevB.
CM2	Compensatory Planting shall be provided to mitigate for loss of existing trees in accordance with DEVB TC(W) No. 7/2015 - Tree Preservation.
CM3	Control of night-time lighting glare.
CM4	Erection of decorative screen hoarding compatible with the surrounding setting around the proposed site formation works.
CM5	Management of facilities on work sites which give control on the height and disposition/arrangement of all facilities on the works site to minimize visual impact to adjacent VSRs.
CM6	All hard and soft landscape areas disturbed temporarily, including all cut and cover works and junction improvement works, during construction should be reinstated on like-to-like basis.
CM7	All existing Trees to be retained and not to be affected by the Roadworks shall be carefully protected during construction accordance with DEVB TCW No. 7/2015 – Tree Preservation and the latest Guidelines on Tree Preservation during Development issued by GLTM Section of DEVB.

Table 4.5 Proposed Landscape and Visual Mitigation Measures for Operation Phase

ID No.	Landscape and Visual Mitigation Measures
OM1	The proposed Noise Barriers in the regard of forms, finishes and colours shall be sensitively designed so as to blend in the structures to the adjacent landscape and visual context.
OM2	Retaining structures proposed shall be sensitively designed in the regard of form, tonal colour and texture so as to minimize any potential adverse landscape and visual impact.
OM3	Roadside amenity Tree and Shrub Planting shall be proposed along the widened section of Kam Po Road and Kam Ho Road so as to enhance the landscape and visual amenity value of the roads.
OM4	Woodland Mix Planting, 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.
OM5	Kam Sheung Road Sitting-out Area to be affected by the Project shall be reprovided on a like to like basis at the vicinity of the existing Sitting-out Area.

ID No.	Landscape and Visual Mitigation Measures
OM6	Landscape linkages between existing fragmented landscapes shall be provided as far as appropriate under the Project, in order to strengthen the overall landscape coherence.

4.6.2 The mitigation measures for construction phase listed above shall be implemented as early as possible in order to minimize the landscape impacts in the construction stage. The mitigation measures for operation phase listed above shall be adopted during the detailed design and be built as part of the construction works at the last stage of the construction period so that they are in place at the date of commissioning of the Project.

4.6.3 Compensatory planting proposed within the Initial Site 1, 4a and 6 will be implemented as part of the building construction. Compensatory planting off-site, if required, will be implemented as soon as possible when the site for compensation is made available.

4.7 Evaluation of Residual Impacts

Residual Landscape Impact

4.7.1 Approximately 1733 m^2 of Vegetation in Roadside Amenity Area [LR-(A)] would be permanently affected by the proposed works. Under the project, approximately 6,900m^2 of roadside planting areas will be proposed for the Project. With the implementation of proposed mitigation measures, it is predicted that the residual impact on LR-(A) would become slight in day 1 of operation and would be further reduced to insubstantial in year 10 of operation when the proposed tree planting becomes mature.

4.7.2 Approximately 6784 m^2 of Vegetation on Man-made Slopes [LR-(B)] would be permanently affected by the proposed roadworks and site formation works. Under the project, approximately 2,961 m^2 of woodland mix planting on soil cut/fill slopes will be proposed for the Project. With the implementation of proposed mitigation measures, it is predicted that the residual impact on LR-(B) would become moderate in day 1 of operation and would be further reduced to slight in year 10 of operation when the proposed tree planting becomes mature.

4.7.3 Approximately 102,149 m^2 of Vegetation in Agricultural Land [LR-(C)] would be would be permanently affected by the proposed site formation works. Under the project, the loss of agricultural land will not be reprovided. It is predicted that the residual impact on LR-(C) would become remains moderate during construction and operation phase.

4.7.4 There would be slight magnitude of unmitigated impact on Kam Tin River [LR-(D)] due to the bridge foundation construction. The newly proposed bridge foundation are designed to be in-line with the existing bridge foundation to minimise the residual impact. With the reinstatement of the disturbed areas after construction, it is predicted that the residual impact on LR-(D) would be reduced to insubstantial in operation phase.

4.7.5 Approximately 6300 m^2 of Mitigation Wetland [LR-(E)] would be permanently affected by the proposed road widening works. A compensation wetland with a 1:1 compensation ratio will be provided for the project to compensate for the loss. With the implementation of the compensation wetland, it is predicted that the residual impact on LR-(E) would be reduced to slight in operation phase.

4.7.6 The existing Kam Sheung Road Sitting-out Area [LR-(F)] will be relocated to facilitate the junction improvement works thereat. There would still be substantial residual impact during construction. With the reprovisioning of Kam Sheung Road Sitting-out Area on a like to like basis at the vicinity, it is predicted that there would be moderate residual impact in day 1 of operation and the residual impact would be further reduced to slight when the proposed tree planting in the Sitting-out Area becomes mature in year 10 of operation.

4.7.7 For the Woodland near Tsing Long Highway [LR-(G)], approx. 1059 m^2 would be affected by proposed site formation works. Compensatory tree planting shall be provided on not less than 1 to 1 ratio. It is predicted that the residual impact on LR-(G) would be moderate on day 1 of

operation and would be further reduced to insubstantial in year 10 of operation when the proposed tree planting becomes mature.

4.7.8 Under the Project, approximately 1,840 nos. of existing trees will be affected by the road widening and junction improvement/modification works; and site formation works for Initial Site 1, 4a and 6. Among the trees affected by proposed works, trees are selected as far as possible following the latest Guidelines on Tree Transplanting issued by GLTM Section of DevB. Detailed tree treatment recommendations including transplanting proposals will be provided in the design phase of this Project.

4.7.9 Any tree to be felled shall be compensated in accordance with DEVB TC(W) No. 7/2015. Under the Project, approximately 2,800 sqm of woodland mix planting on soil cut/fill slopes, approximately 506 no. of heavy standard trees and 5300 sqm of shrub planting in roadside amenity areas are proposed to compensate for the loss of the greenery due to the road widening and junction improvement/modification works.

4.7.10 Approximately 1545 no. of trees will be affected by the site formation works for Site 1, 4a and 6. In order to compensate the loss of existing trees to meet the minimum requirement as stipulated in DEVB TC(W) No. 7/2015, off-site compensation within the district shall be further explored, since it is predicted that there may not be enough space to accommodate the compensatory trees within the Initial Site 1, 4a and 6. The implementation of tree compensation within Site 1, 4a and 6, subject to any trees remained after site formation works and in conflict with housing development, will follow the master development programme of the subject sites and will not be in place in day 1 of the operation of the Project.

4.7.11 With the implementation of proposed mitigation measures, including tree transplanting and compensation planting in accordance with DEVB TC(W) No. 7/2015 in the construction phase, it is predicted that there would still be substantial residual landscape impact on existing trees and vegetation during construction. During day 1 of operation, only tree compensation for road works and site formation works will be implemented and some of the trees will be compensated off-site, the residual impact would remain substantial. In year 10 of operation of the Project, it is assumed tree compensation within Site 1, 4a and 6 will be in place and the tree planted under the road works becomes mature. It is predicted that there would still be moderate residual impact on existing trees and vegetation in year 10 of the operation of the Project.

4.7.12 During construction, with the implementation of night-time glare control, erection of decorative screen hoarding, management of works site facilities, reinstatement of disturbed landscape areas, it is predicted that there would still be moderate residual impact on Kam Tin Miscellaneous Rural Fringe Landscape Character Area due to the loss of large number of existing trees and large scale construction activities within Site 1, 4a and 6.

4.7.13 During day 1 of operation, only tree compensation for road works and slope works will be implemented and some of the trees will be compensated off-site. The site formation works for Site 1, 4a and 6 will be completed and pending for housing developments. It is predicted that the residual impact in day 1 of operation would remain moderate. In year 10 of operation, it is assumed that the housing developments in Site 1, 4a and 6 will be completed and the compensation planting in the housing sites will be in place. However, the tree loss under the Project may not be able to be compensated fully within the project boundary. It is predicted that there would still be moderate residual impact on Kam Tin Miscellaneous Rural Fringe Landscape Character Area in year 10 of the operation of the Project.

Residual Visual Impact

4.7.14 With the implementation of proposed mitigation measures including control of night-time lighting glare, decorative screen hoarding, management of facilities on works sites and reinstatement of temporarily disturbed landscape areas, it is predicted that there would still be moderate residual impact on Traveling VSRs (T1, T2, T3, T4 and T5) and Residential VSRs (R1, R2, R3, R4, R5 and R6) during construction phase.

4.7.15 The residual impact on these VSRs (T1, T2, T3, T4 ,T5, R1, R2, R3, R4, R5 and R6) would be reduced to slight in day 1 of operation with the implementation of proposed mitigation

measures including sensitively design of noise barriers and retaining structures, provision of roadside amenity planting and woodland mix planting on slopes. The residual impact would be further reduced to insubstantial when the proposed tree planting becomes mature in year 10 of operation.

4.7.16 It is predicted that VSRS R7 will have an overview of the proposed roadworks at Kam Ho Road and Kam Po Road. The residual impact on VSRs R7 would be slight with the implementation of proposed mitigation measures.

4.8 Conclusion

4.8.1 As a whole, it is considered that the residual landscape and visual impacts of the proposed project is considered acceptable with mitigation measures implemented during construction and operation phases.

Figures

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



PHOTO 6639
A FACTORY BUILDING AT SITE 4a-2
PHOTO TAKEN: 30/12/14



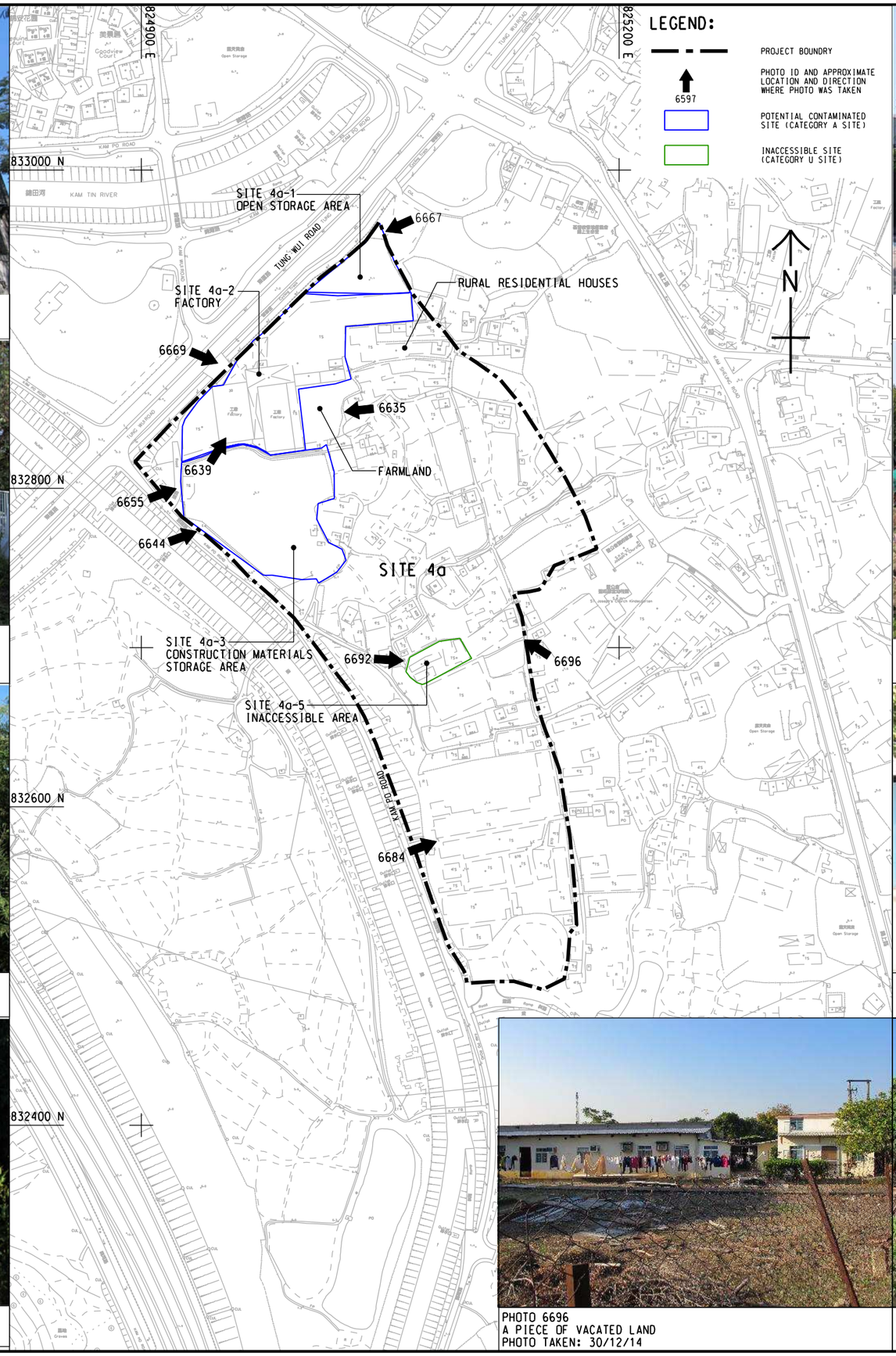
PHOTO 6655
ENTRANCE OF THE CONSTRUCTION MATERIALS STORAGE AREA AT SITE 4a-3
PHOTO TAKEN: 30/12/14



PHOTO 6644
CONSTRUCTION MATERIALS STORAGE AREA AT SITE 4a-3
PHOTO TAKEN: 30/12/14



PHOTO 6692
FENCE OF THE INACCESSIBLE SITE 4a-5
PHOTO TAKEN: 30/12/14



LEGEND:

- PROJECT BOUNDRY
- 6597 — PHOTO ID AND APPROXIMATE LOCATION AND DIRECTION WHERE PHOTO WAS TAKEN
- POTENTIAL CONTAMINATED SITE (CATEGORY A SITE)
- INACCESSIBLE SITE (CATEGORY U SITE)



PHOTO 6667
AN OPEN STORAGE SITE AT SITE 4a-1 IN THE BACKGROUND
PHOTO TAKEN: 30/12/14



PHOTO 6635
A FARMLAND AND A FACTORY BUILIDNG AT THE BACk
PHOTO TAKEN: 30/12/14



PHOTO 6669
ENTRANCE OF THE FACTORY AT SITE 4a-2
PHOTO TAKEN: 30/12/14

PHOTO 6696
A PIECE OF VACATED LAND
PHOTO TAKEN: 30/12/14



PHOTO 6684
A PIECE OF VACATED LAND WITH VEGETATION
PHOTO TAKEN: 30/12/14

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SITE FORMATION AND INFRASTRUCTURAL WORKS FOR THE INITIAL SITES AT KAM TIN SOUTH, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT
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CEDD 土木工程拓展署 Civil Engineering and Development Department

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STATUS
狀況

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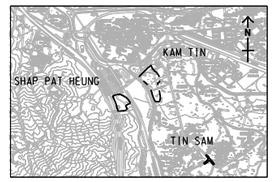

PROJECT NO. 項目編號 — 60336159

CONTRACT NO. 合約編號 — CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

LOCATIONS & PHOTOGRAPHIC RECORD OF SITE 4a-1, SITE 4a-2, SITE 4a-3 AND SITE 4a-5

SHEET NUMBER
圖紙編號

60336159/PER/FIGURE 2.1

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ISO A1 594mm x 841mm

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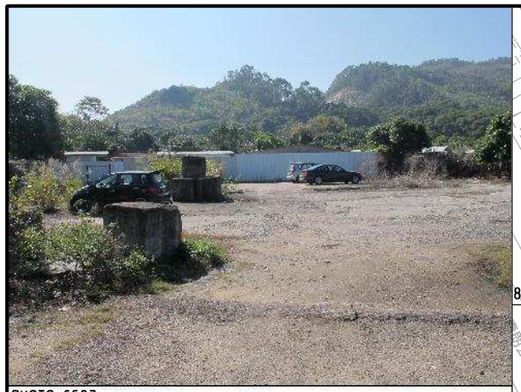

PHOTO 6597
A PRIVATE CAR PARK AT SITE 6
PHOTO TAKEN: 30/12/14



PHOTO 6580
VILLAGE HOUSES AT SITE 6
PHOTO TAKEN: 30/12/14



PHOTO 6599
ENTRACE OF THE INACCESSIBLE VILLAGE HOUSE AT SITE 6-1
PHOTO TAKEN: 30/12/14

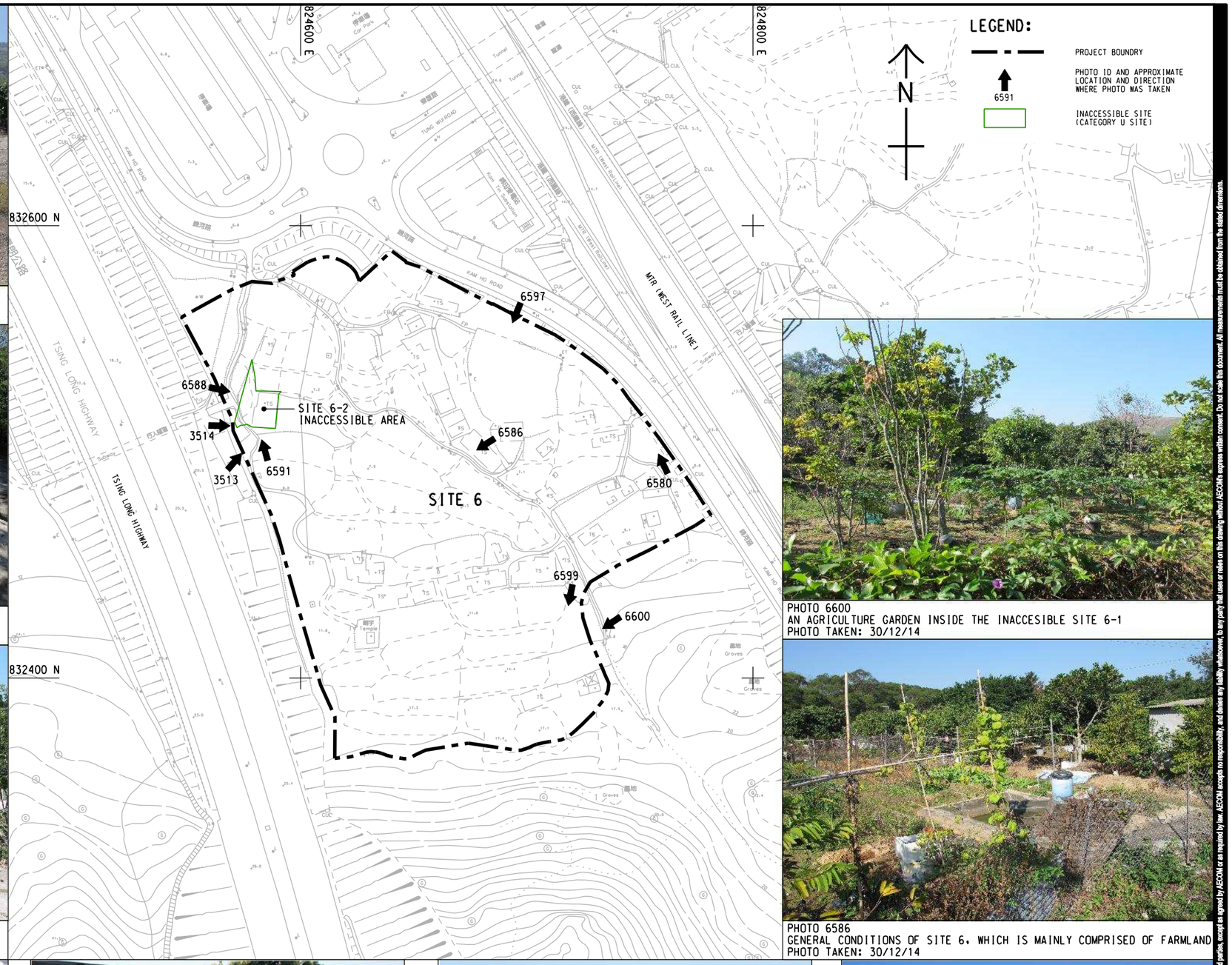

PHOTO 6600
AN AGRICULTURE GARDEN INSIDE THE INACCESIBLE SITE 6-1
PHOTO TAKEN: 30/12/14

PHOTO 6586
GENERAL CONDITIONS OF SITE 6, WHICH IS MAINLY COMPRISED OF FARMLAND
PHOTO TAKEN: 30/12/14



PHOTO 6588
FENCE OF INACCESSIBLE LOT AT SITE 6-2
PHOTO TAKEN: 30/12/14



PHOTO 3514
FENCE OF INACCESSIBLE LOT AT SITE 6-2
PHOTO TAKEN: 30/12/14



PHOTO 3513
FARMLAND THAT NEXT TO THE INACCESSIBLE SITE 6-2
PHOTO TAKEN: 30/12/14



PHOTO 6591
FENCE OF INACCESSIBLE LOT AT SITE 6-2
PHOTO TAKEN: 30/12/14

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SITE FORMATION AND INFRASTRUCTURAL WORKS FOR THE INITIAL SITES AT KAM TIN SOUTH, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

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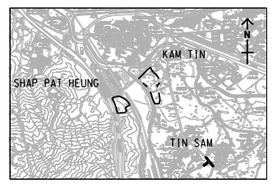

PROJECT NO. 項目編號: 60336159
CONTRACT NO. 合約編號: CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

LOCATIONS & PHOTOGRAPHIC RECORD OF SITE 6-2

SHEET NUMBER
圖紙編號

60336159/PER/FIGURE 2.2

ISO A1 594mm x 841mm

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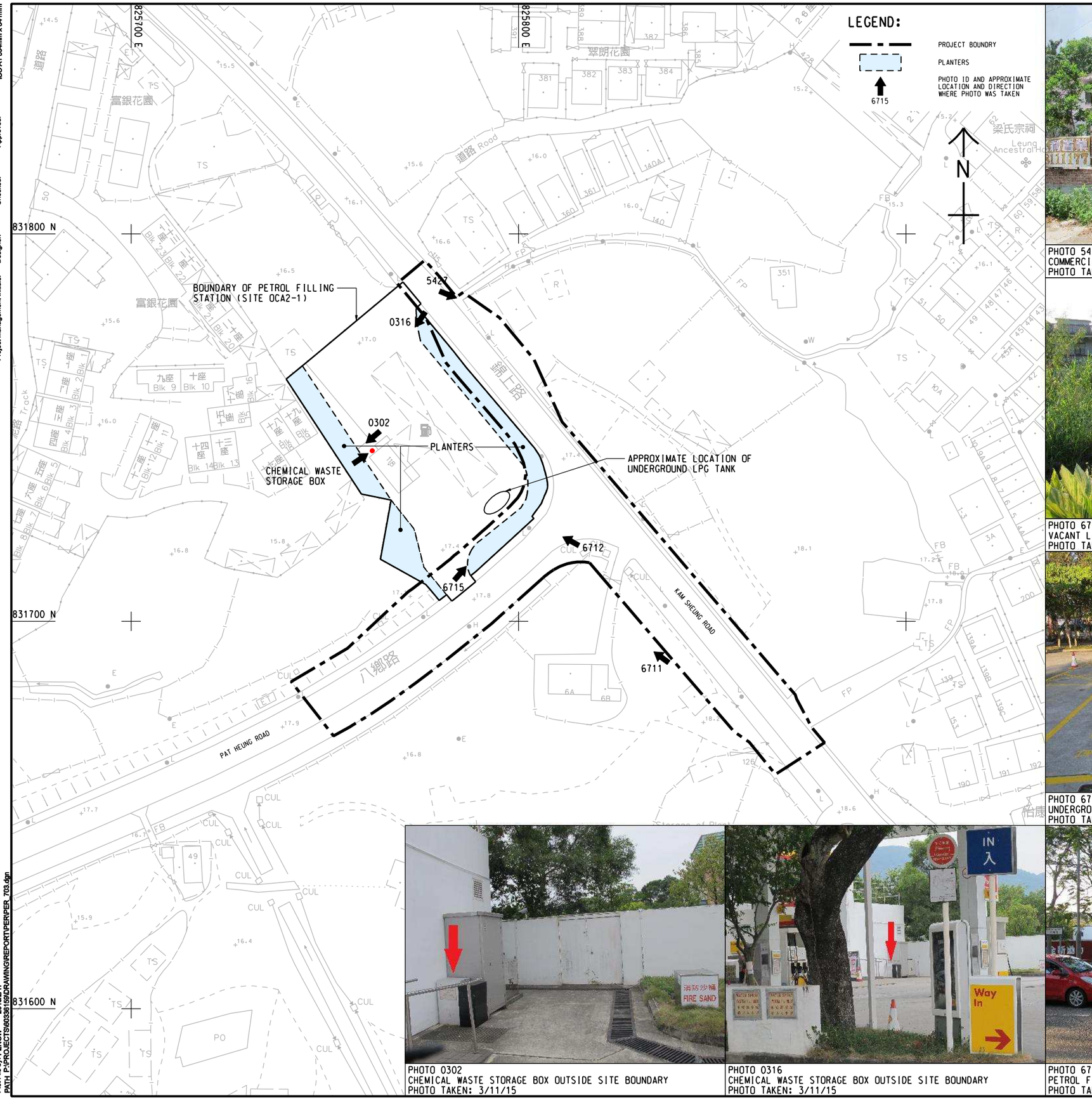
Project Management Initials:



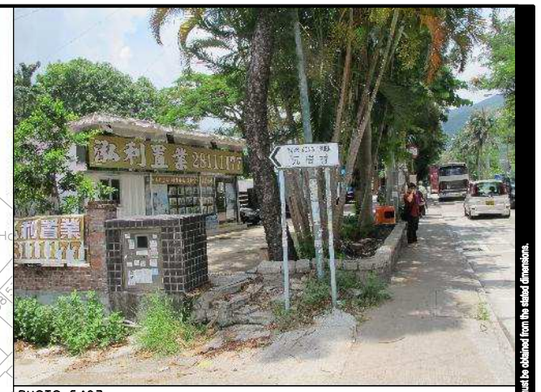


PHOTO 5427
COMMERCIAL (REAL ESTATE) BUILDING
PHOTO TAKEN: 11/6/15



PHOTO 6711
VACANT LAND WITH VEGETATION ALONG PEDESTRIAN PATHWAY
PHOTO TAKEN: 30/12/14



PHOTO 6715
UNDERGROUND LPG TANK WITHIN PETROL FILLING STATION
PHOTO TAKEN: 30/12/14

PHOTO 0302
CHEMICAL WASTE STORAGE BOX OUTSIDE SITE BOUNDARY
PHOTO TAKEN: 3/11/15

PHOTO 0316
CHEMICAL WASTE STORAGE BOX OUTSIDE SITE BOUNDARY
PHOTO TAKEN: 3/11/15



PHOTO 6712
PETROL FILLING STATION
PHOTO TAKEN: 30/12/14

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PROJECT
項目

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR THE INITIAL SITES AT KAM TIN SOUTH, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

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STATUS
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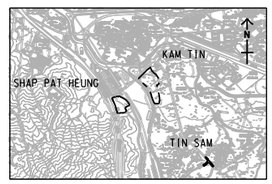

PROJECT NO. 項目編號: 60336159

CONTRACT NO. 合約編號: CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

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2016/2/17

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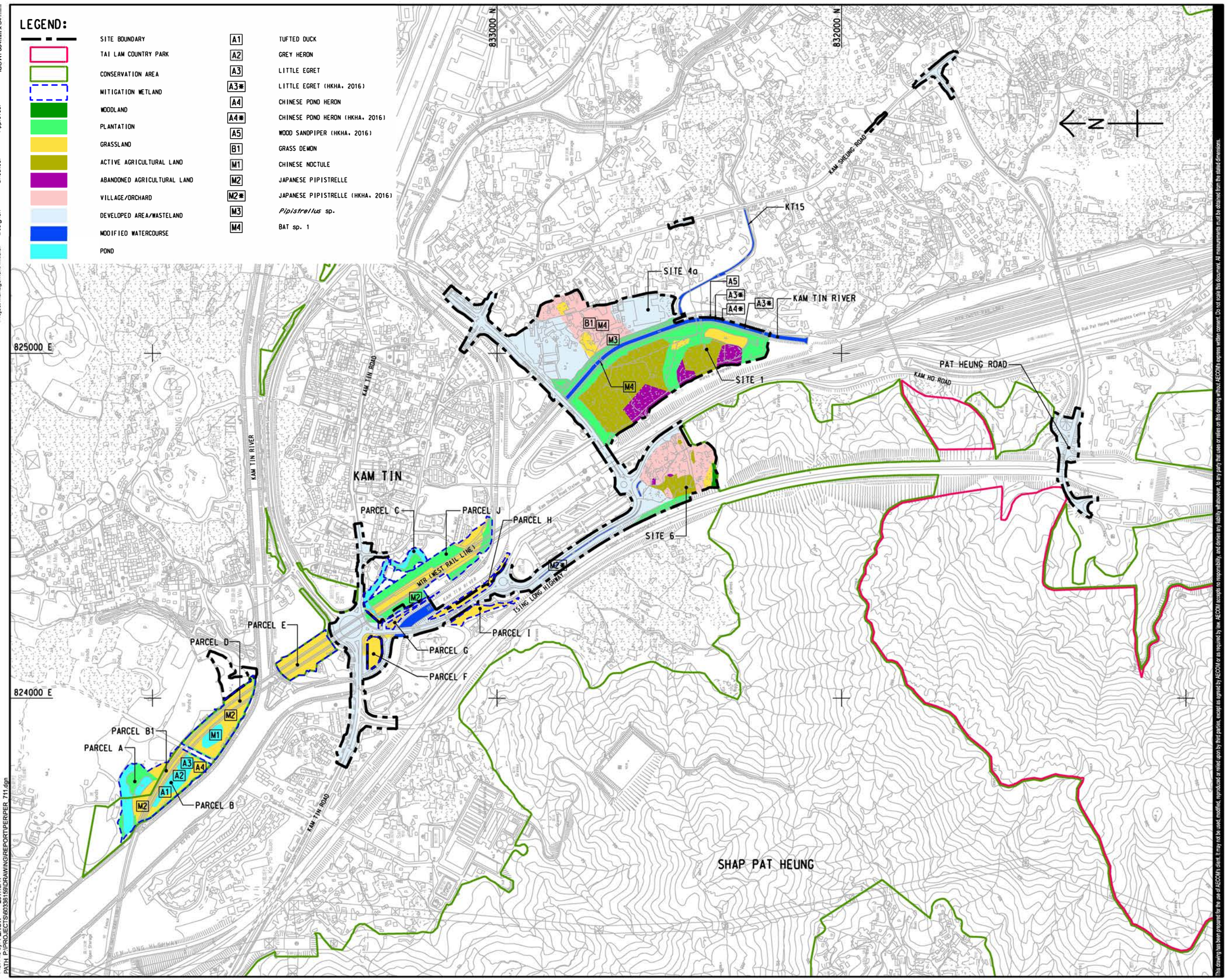
Designer:

Project Management Initials:

LEGEND:

SITE BOUNDARY		A1	TUFTED DUCK
TAI LAM COUNTRY PARK		A2	GREY HERON
CONSERVATION AREA		A3	LITTLE EGRET
MITIGATION WETLAND		A3*	LITTLE EGRET (HKHA, 2016)
WOODLAND		A4	CHINESE POND HERON
PLANTATION		A4*	CHINESE POND HERON (HKHA, 2016)
GRASSLAND		A5	WOOD SANDPIPER (HKHA, 2016)
ACTIVE AGRICULTURAL LAND		B1	GRASS DEMON
ABANDONED AGRICULTURAL LAND		M1	CHINESE NOCTULE
VILLAGE/ORCHARD		M2	JAPANESE PIPISTRELLE
DEVELOPED AREA/WASTELAND		M2*	JAPANESE PIPISTRELLE (HKHA, 2016)
MODIFIED WATERCOURSE		M3	*Pipistrellus* sp.
POND		M4	BAT sp. 1



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階段

SCALE 比例
A1 1 : 5000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱
HABITAT MAP

SHEET NUMBER
圖紙編號
60336159/PER/FIGURE 3.1

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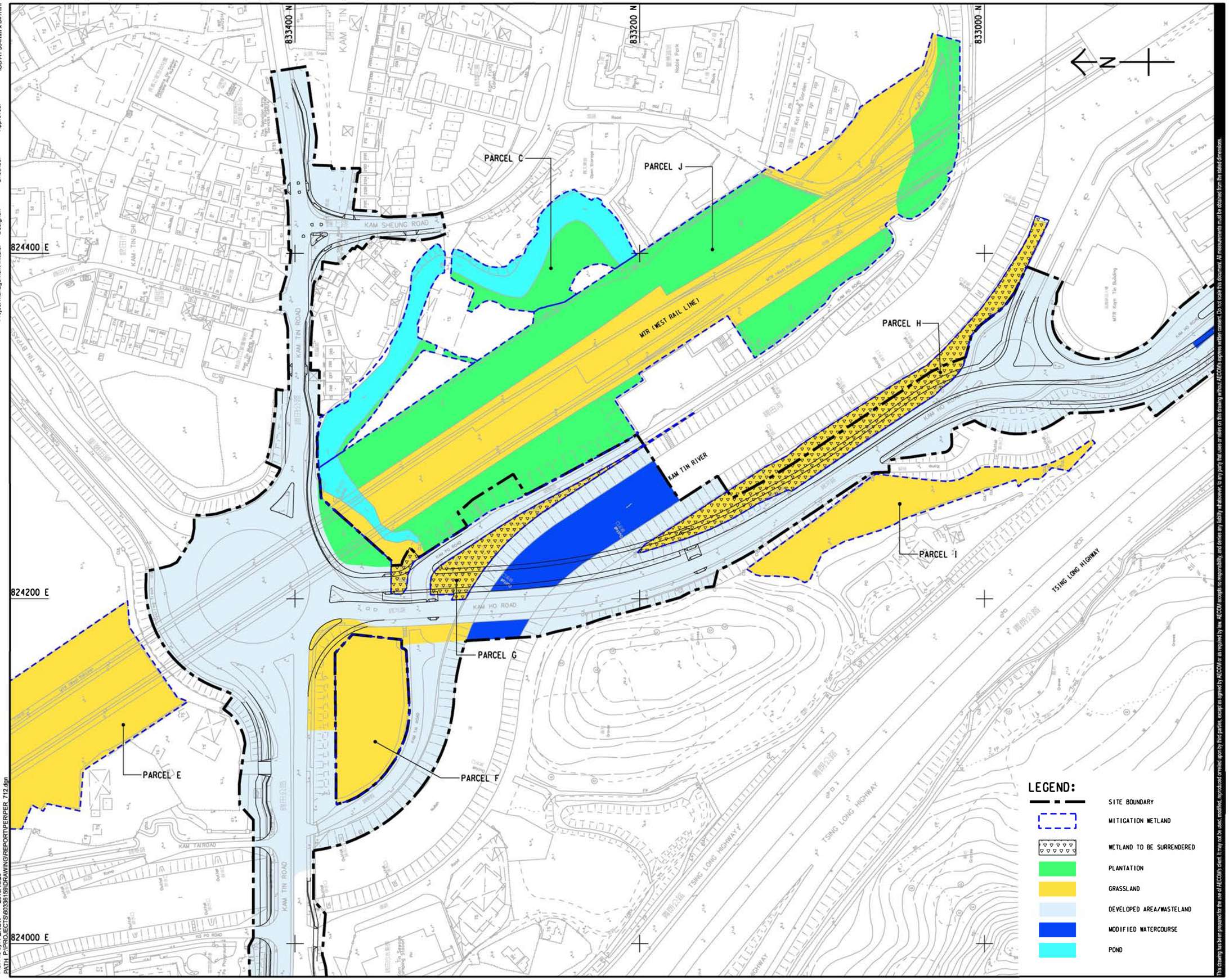
Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm



Plot File by: PENGW 2016/10/20
PATH: P:\PROJECTS\60336159\DRAWING\REPORT\PER\PER_712.dgn

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CLIENT 業主

CEDD 土木工程拓展署 Civil Engineering and Development Department

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ISSUE/REVISION 修訂

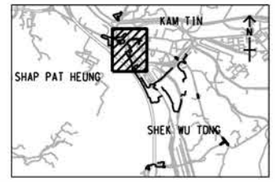
I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核查

STATUS 階段

SCALE 比例
A1 1 : 1000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖 A1 1 : 50000



PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

HABITAT LOSS AT MITIGATION WETLANDS

SHEET NUMBER 圖紙編號

60336159/PER/FIGURE 3.2

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

824000 E

824500 E

834000 N

833500 N

833000 N

LEGEND:

SITE BOUNDARY

CONSERVATION AREA

MITIGATION WETLAND

POTENTIAL COMPENSATION WETLAND

N

PARCEL A

PARCEL B

PARCEL B1

PARCEL D

PARCEL E

PARCEL F

PARCEL G

PARCEL C

PARCEL J

PARCEL I

PARCEL H









KAM TIN RIVER

KAM TIN ROAD

KAM TIN

MTR (WEST RAIL LINE)

Plot File by: CHENDY 2016/9/6

PATH: P:\PROJECTS\60335\60335DRAWINGS\REPORT\PER\PER_713.dgn

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階段

SCALE 比例
A1 1 : 2500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60336159

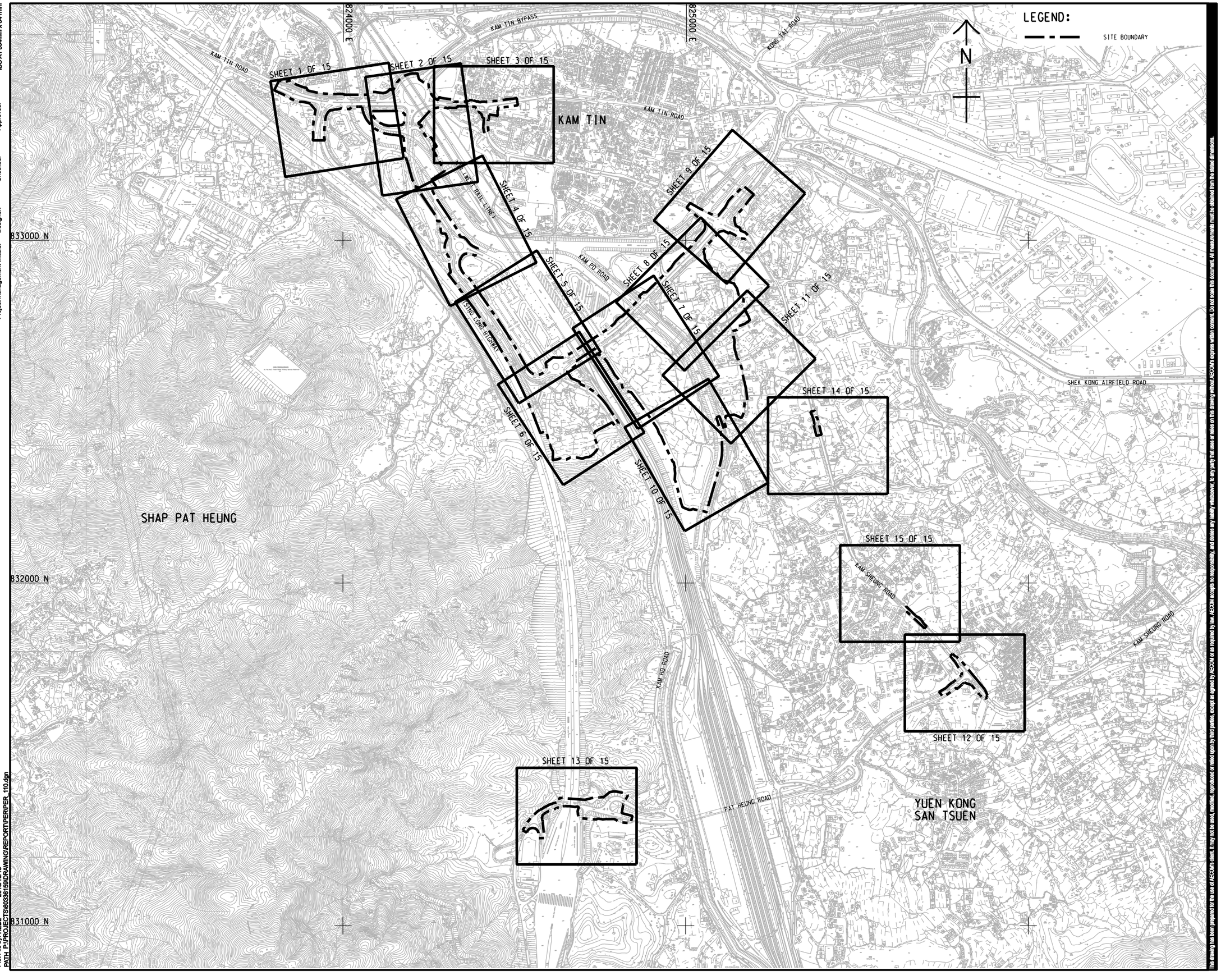
CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

LOCATION OF POTENTIAL COMPENSATION WETLAND

SHEET NUMBER
圖紙編號

60336159/PER/FIGURE 3.3



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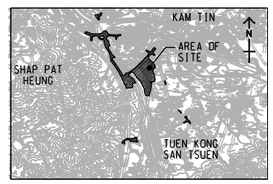
STATUS
階段

SCALE 比例: A1 1 : 5000

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號: 60336159

CONTRACT NO. 合約編號: CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

LANDSCAPE RESOURCES - KEY PLAN

SHEET NUMBER 圖紙編號

60336159/PER/FIGURE 4.1-00

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Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

Plot File by: HED2 2016/10/13
PATH P:\PROJECTS\60336159\DRAWING\REPORT\PER\PER_110.dgn

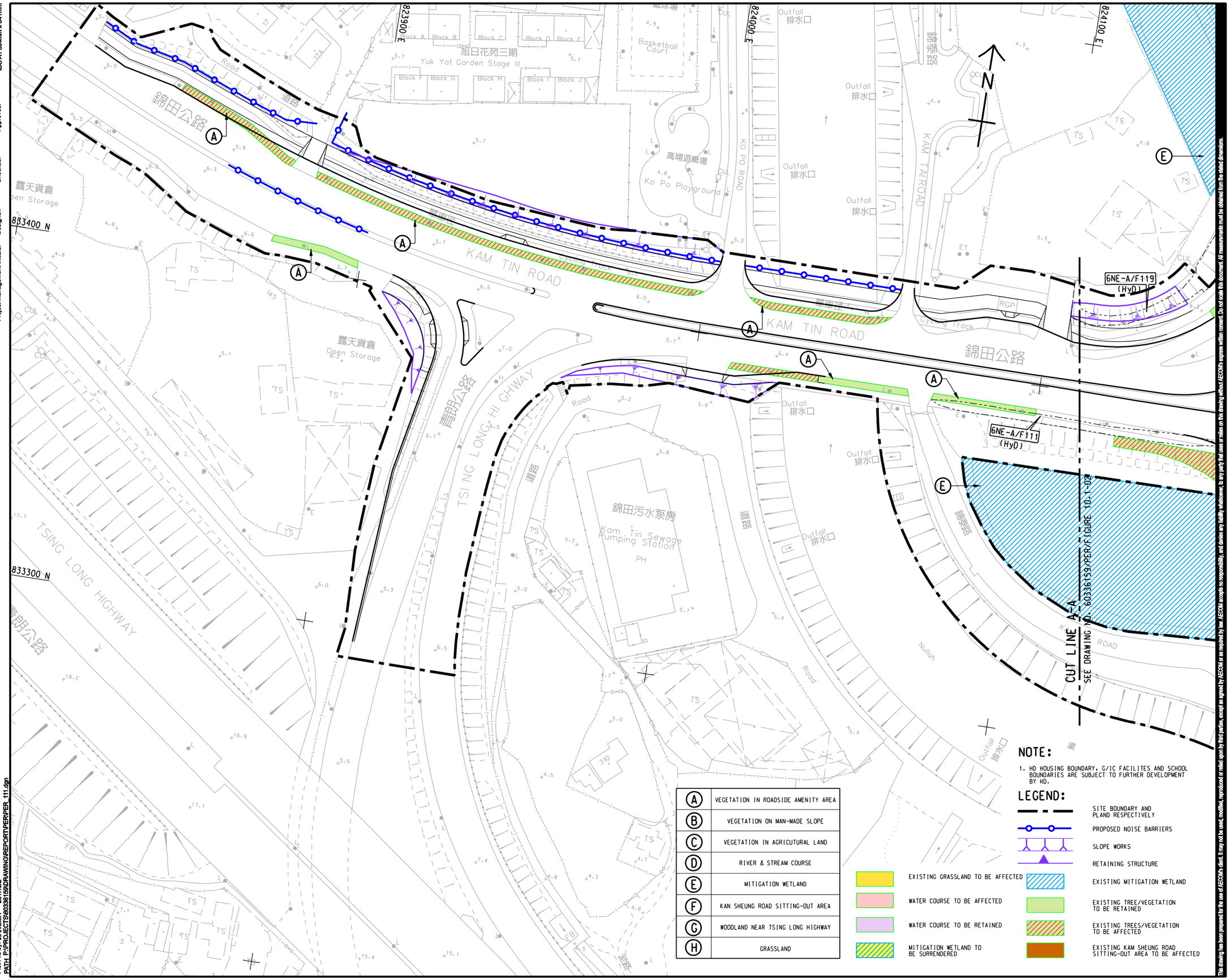
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



A	VEGETATION IN ROADSIDE AMENITY AREA
B	VEGETATION ON MAN-MADE SLOPE
C	VEGETATION IN AGRICUTURAL LAND
D	RIVER & STREAM COURSE
E	MITIGATION WETLAND
F	KAN SHEUNG ROAD SITTING-OUT AREA
G	WOODLAND NEAR TSING LONG HIGHWAY
H	GRASSLAND

NOTE:

1. HD HOUSING BOUNDARY. G/IC FACILITES AND SCHOOL BOUNDARIES ARE SUBJECT TO FURTHER DEVELOPMENT BY HD.

LEGEND:

- SITE BOUNDARY AND PLAND RESPECTIVELY
- PROPOSED NOISE BARRIERS
- SLOPE WORKS
- RETAINING STRUCTURE
- EXISTING GRASSLAND TO BE AFFECTED
- EXISTING MITIGATION WETLAND
- WATER COURSE TO BE AFFECTED
- EXISTING TREE/VEGETATION TO BE RETAINED
- WATER COURSE TO BE RETAINED
- EXISTING TREES/VEGETATION TO BE AFFECTED
- MITIGATION WETLAND TO BE SURRENDERED
- EXISTING KAM SHEUNG ROAD SITTING-OUT AREA TO BE AFFECTED

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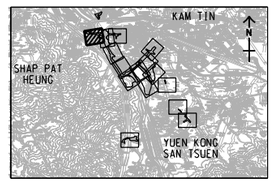
階段

SCALE 比例: A1 1 : 500

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號: 60336159

CONTRACT NO. 合約編號: CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

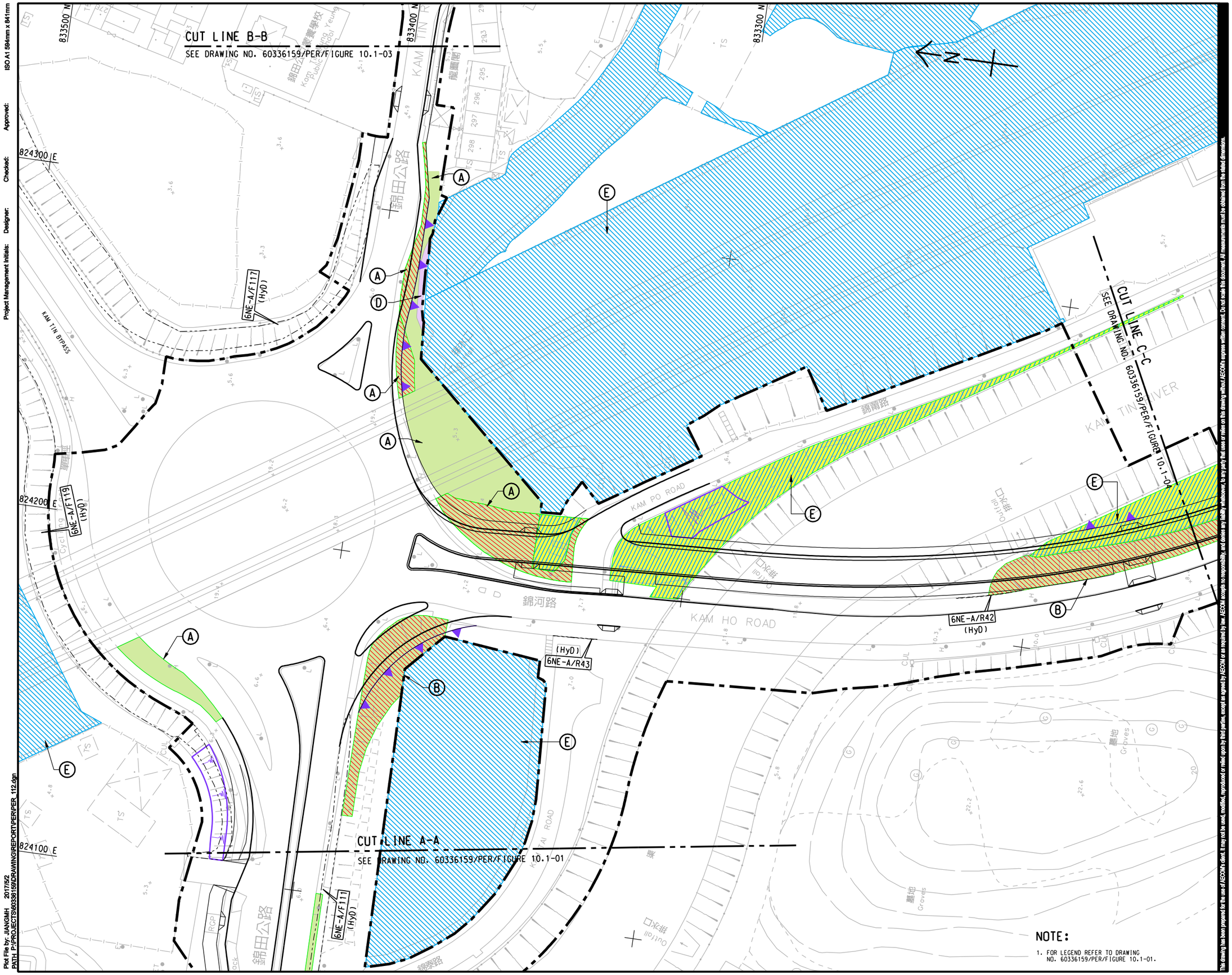
LANDSCAPE RESOURCES

SHEET 1 OF 15

SHEET NUMBER 圖紙編號

60336159/PER/FIGURE 4.1-01

Plot File by: JIANGMH 2017/5/2
PATH: P:\PROJECTS\60336159\DRAWING\REPORT\PER\PER_111.dgn



NOTE:

1. FOR LEGEND REFER TO DRAWING NO. 60336159/PER/FIGURE 10.1-01.

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

Plot File by: JIANGMH 2017/5/2
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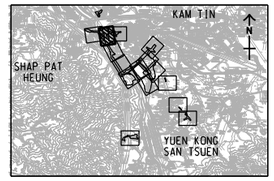
STATUS 階段

SCALE 比例: A1 1 : 500

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號: 60336159

CONTRACT NO. 合約編號: CE 34/2014 (CE)

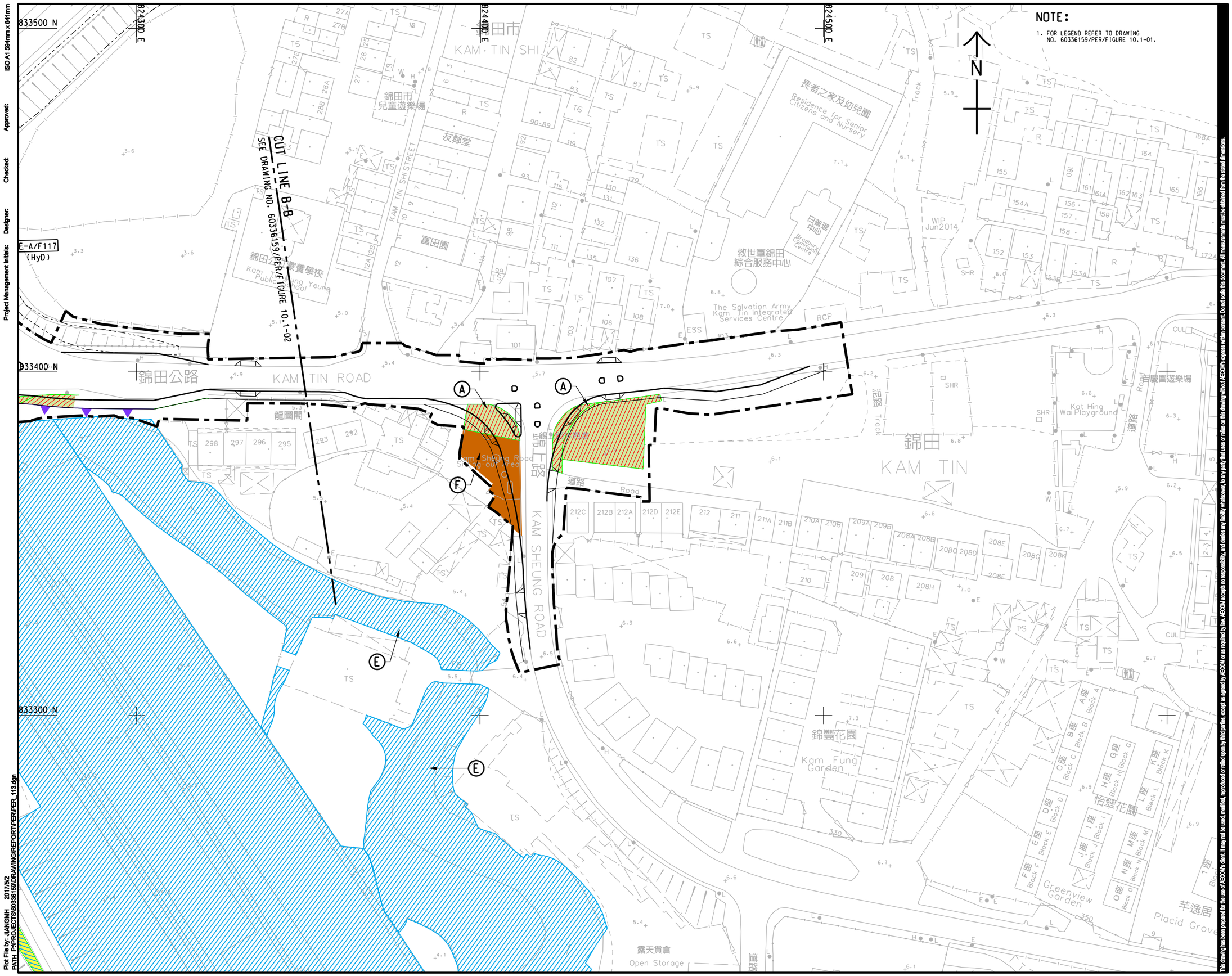
SHEET TITLE 圖紙名稱

LANDSCAPE RESOURCES

SHEET 2 OF 15

SHEET NUMBER 圖紙編號

60336159/PER/FIGURE 4.1-02



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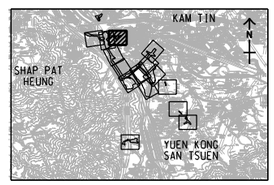
STATUS
階段

SCALE 比例: A1 1 : 500

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號: 60336159

CONTRACT NO. 合約編號: CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

LANDSCAPE RESOURCES

SHEET 3 OF 15

SHEET NUMBER 圖紙編號

60336159/PER/FIGURE 4.1-03

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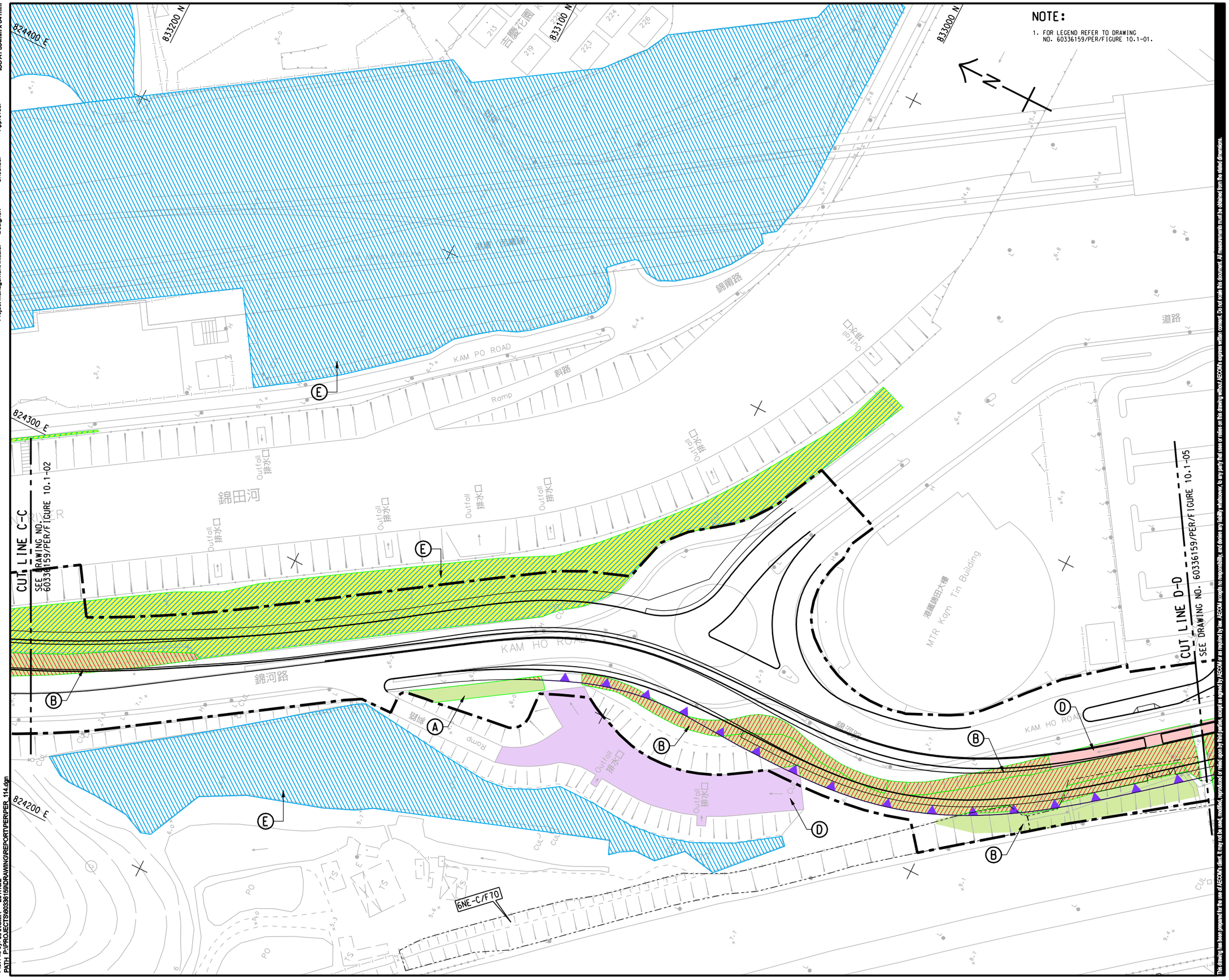
Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

Plot File by: JIANGMH 2017/5/2
PATH P:\PROJECTS\60336159\DRAWING\REPORT\PER\PER_113.dgn



Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

Plot File by: JIANGMH 2017/5/2
PATH P:\PROJECTS\60336159\DRAWING\REPORT\PER\PER_114.dgn

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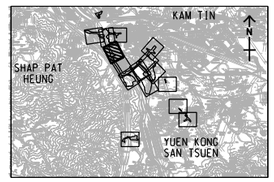
STATUS
階段

SCALE 比例: A1 1 : 500

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN 索引圖: A1 1 : 60000



PROJECT NO. 項目編號: 60336159

CONTRACT NO. 合約編號: CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

LANDSCAPE RESOURCES

SHEET 4 OF 15

SHEET NUMBER 圖紙編號

60336159/PER/FIGURE 4.1-04

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ISO A1 594mm x 841mm

Approved:

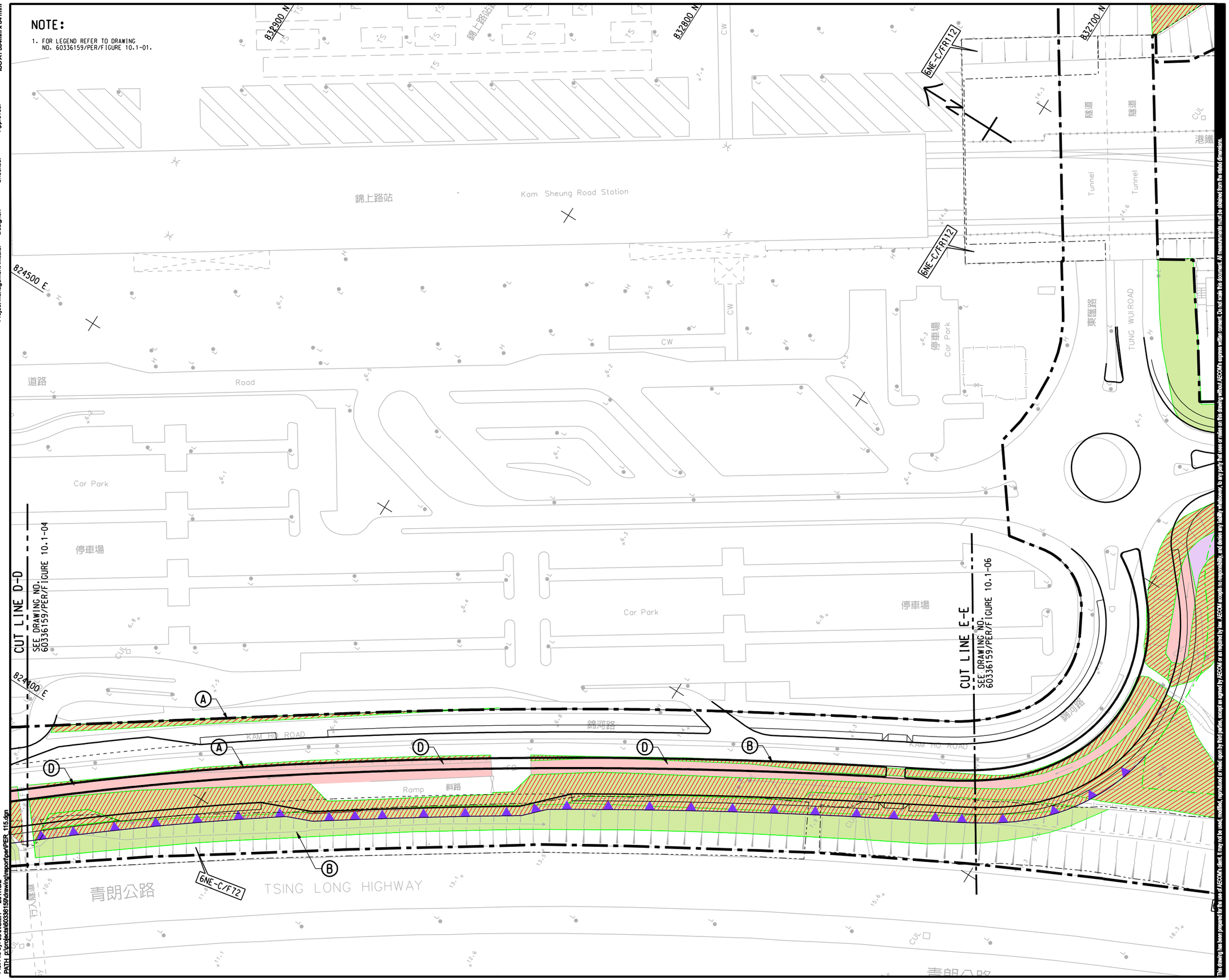
Checked:

Designer:

Project Management Initials:

NOTE:

1. FOR LEGEND REFER TO DRAWING NO. 60336159/PER/FIGURE 10.1-01.



Plot File by: JIANGMH 2017/6/2
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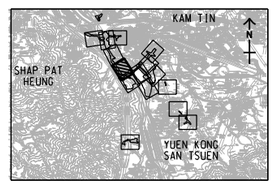
STATUS
狀況

SCALE 比例
A1 1 : 500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱
LANDSCAPE RESOURCES

SHEET 5 OF 15

SHEET NUMBER 圖紙編號
60336159/PER/FIGURE 4.1-05



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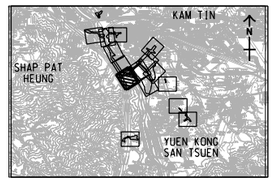
STATUS
階段

SCALE 比例: A1 1 : 500

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號: 60336159

CONTRACT NO. 合約編號: CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

LANDSCAPE RESOURCES

SHEET 6 OF 15

SHEET NUMBER
圖紙編號

60336159/PER/FIGURE 4.1-06

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ISO A1 594mm x 841mm
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Checked:
Designer:
Project Management Initials:
Plot File by: HED2 2017/5/4
PATH: P:\PROJECTS\60336159\DRAWING\REPORT\PER\PER_116.dgn

ISO A1 594mm x 841mm

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Checked:

Designer:

Project Management Initials:



Plot File by: JIANGMH 2017/5/2
PATH: p:\projects\60336159\drawing\report\per\PER_117.dgn

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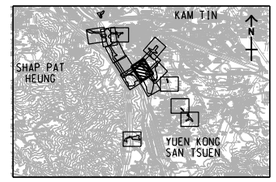
階段

SCALE 比例: A1 1 : 500
DIMENSION UNIT 尺寸單位: METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號: 60336159
CONTRACT NO. 合約編號: CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

LANDSCAPE RESOURCES

SHEET 7 OF 15

SHEET NUMBER
圖紙編號

60336159/PER/FIGURE 4.1-07

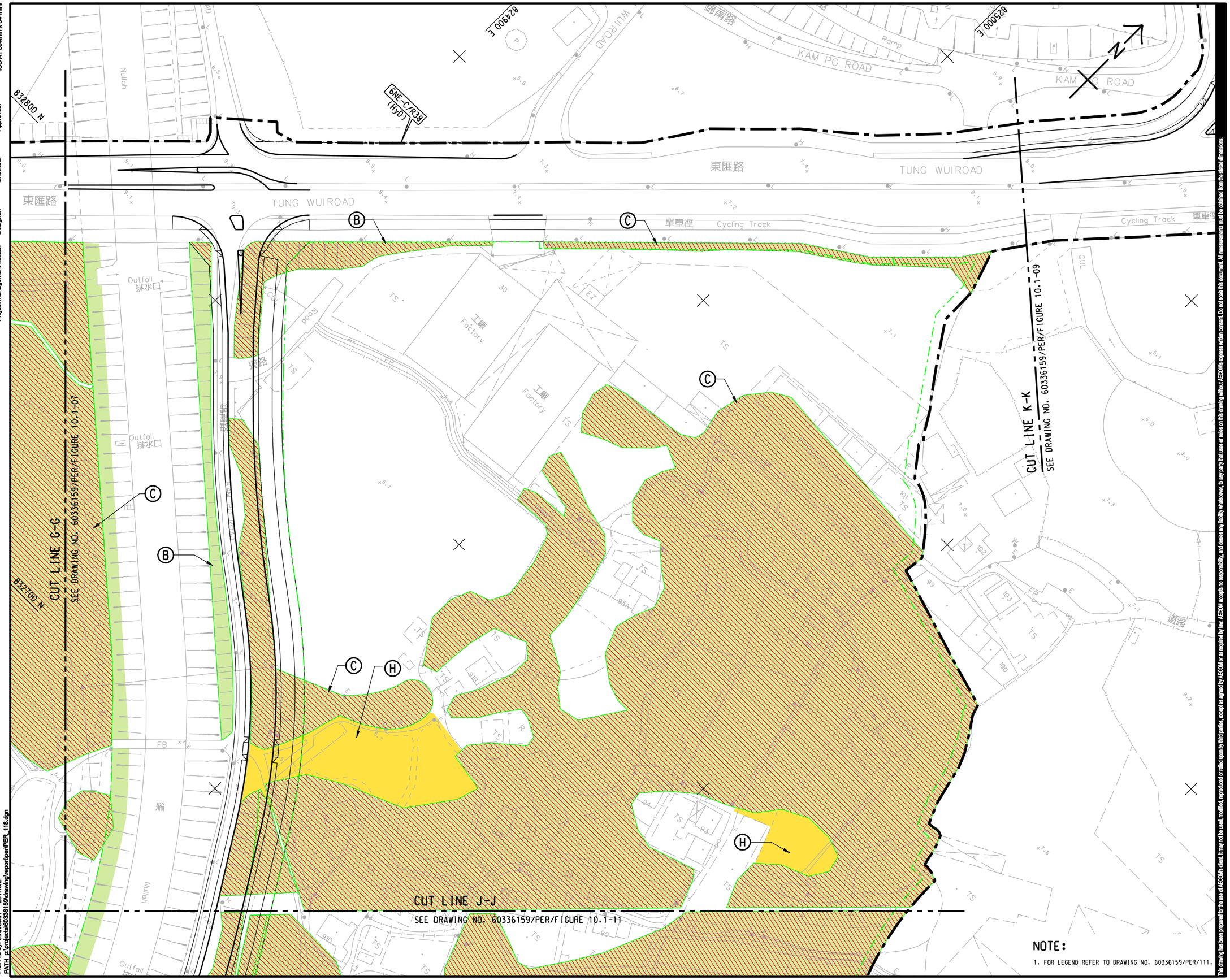
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



NOTE:

1. FOR LEGEND REFER TO DRAWING NO. 60336159/PER/111.

Plot File by: JIANGMH 2017/5/2
PATH: P:\projects\60336159\drawing\report\per\PER_118.dgn

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CLIENT
業主

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Civil Engineering and Development Department

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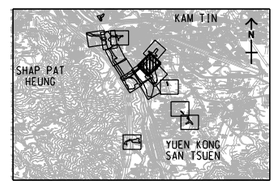
STATUS
現狀

SCALE 比例
A1 1 : 500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱
LANDSCAPE RESOURCES

SHEET 8 OF 15

SHEET NUMBER 圖紙編號
60336159/PER/FIGURE 4.1-08

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

NOTE:

1. FOR LEGEND REFER TO DRAWING NO. 60336159/PER/FIGURE 10.1-01.

833100 N

833200 N

825000 E

825100 E

CUT LINE K-K
SEE DRAWING NO. 60336159/PER/FIGURE 10.1-08

KAM PO ROAD

KAM SHEK ROAD

TUNG WUI ROAD

Cycling Track 單車徑

Open Storage 露天貨倉

鎮青路

錦石路

東匯路

NG KA TSUEN 吳家村

道路 Road

郁青別墅

教堂 Church

基督教香港信義會 Christian Church of Sacred Love in Hong Kong

排水口 Outfall

ETW

FB

CUL

RCP

TS

FP

ARCH

Plot File by: HED2
PATH: p:\projects\60336159\drawing\report\per\PER_119.dgn
2016/10/13

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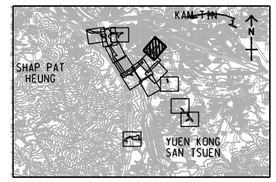
STATUS
階段

SCALE 比例
A1 1 : 500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖 A1 1 : 60000



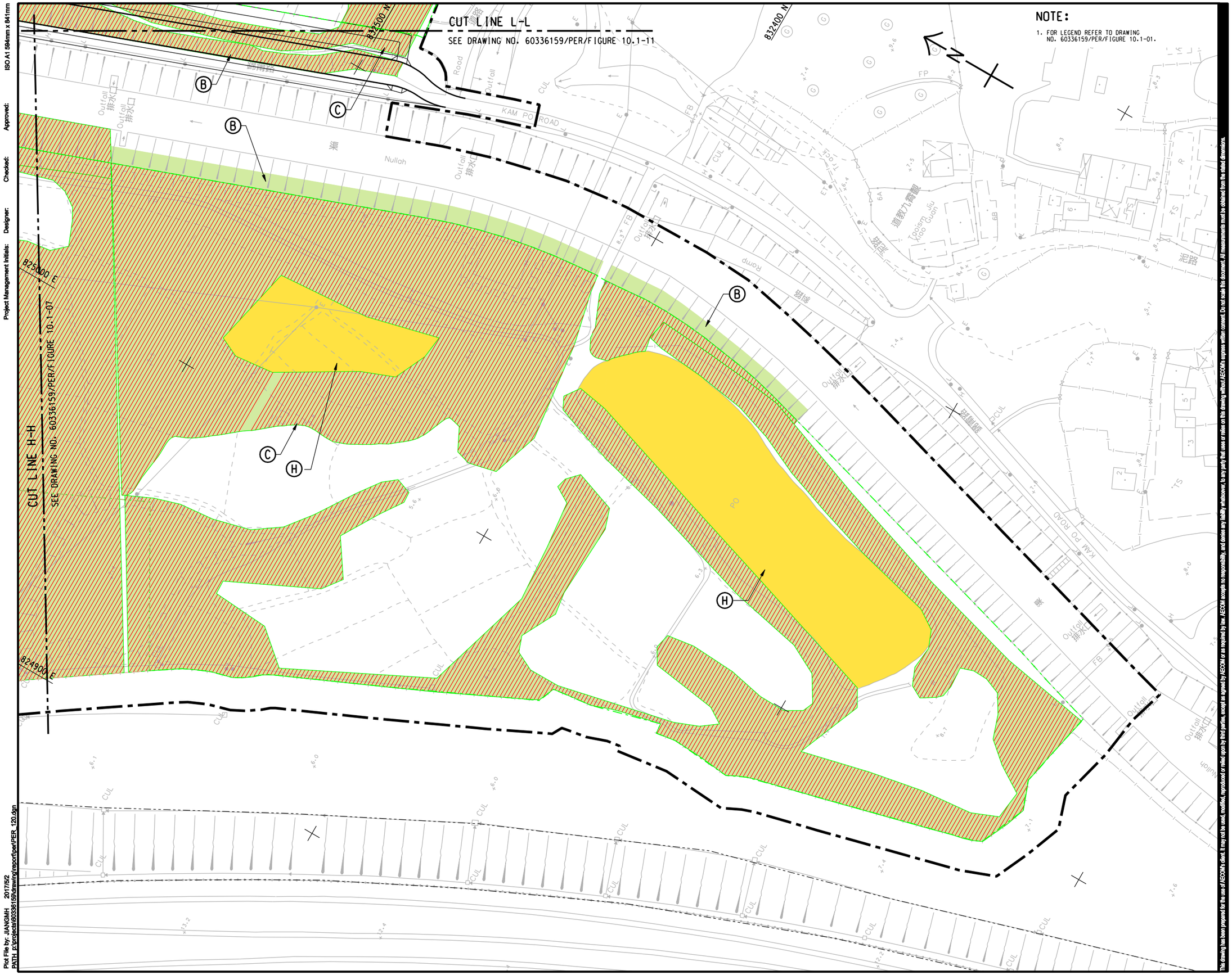
PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱
LANDSCAPE RESOURCES

SHEET 9 OF 15

SHEET NUMBER 圖紙編號
60336159/PER/FIGURE 4.1-09



NOTE:

1. FOR LEGEND REFER TO DRAWING NO. 60336159/PER/FIGURE 10.1-01.

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項目

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR THE INITIAL SITES AT KAM TIN SOUTH, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

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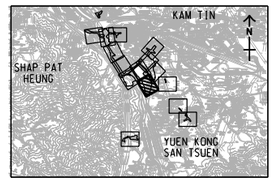
STATUS
階段

SCALE 比例: A1 1 : 500

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號: 60336159

CONTRACT NO. 合約編號: CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

LANDSCAPE RESOURCES

SHEET 10 OF 15

SHEET NUMBER 圖紙編號

60336159/PER/FIGURE 4.1-10

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ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

Plot File by: JIANGMH 2017/5/2
PATH p:\projects\60336159\drawing\report\per\PER_120.dgn

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

CUT LINE J-J
SEE DRAWING NO.
60336159/PER/FIGURE 10.1-08

CUT LINE L-L
SEE DRAWING NO.
60336159/PER/FIGURE 10.1-10

832600 N

832500 N

825000 E

825100 E

NOTE:

1. FOR LEGEND REFER TO DRAWING NO. 60336159/PER/FIGURE 10.1-01.

Plot File by: HED2 2017/5/5
PATH: P:\PROJECTS\60336159\DRAWING\REPORT\PER\PER_121.dgn

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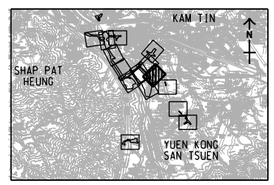
STATUS
狀況

SCALE 比例
A1 1 : 500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖 A1 1 : 60000



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60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱
LANDSCAPE RESOURCES

SHEET 11 OF 15

SHEET NUMBER
圖紙編號
60336159/PER/FIGURE 4.1-11

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

NOTE:

1. FOR LEGEND REFER TO DRAWING NO. 60336159/PER/FIGURE 10.1-01.

825700 E

825800 E

825900 E

831800 N

831700 N

831600 N

N

Plot File by: HED2 2016/10/13
PATH: p:\projects\60336159\drawing\report\per\PER_122.dgn

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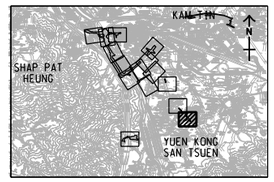
STATUS
階段

SCALE 比例
A1 1 : 500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱
LANDSCAPE RESOURCES

SHEET 12 OF 15

SHEET NUMBER 圖紙編號
60336159/PER/FIGURE 4.1-12

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

NOTE:

1. FOR LEGEND REFER TO DRAWING NO. 60336159/PER/FIGURE 10.1-01.

824600 E

824700 E

831400 N

831300 N

831200 N

N

6NE-C/C222 (HyD)

6NE-C/F81 (HyD)

6NE-C/F118 (HyD)

6NE-C/F110

6NE-C/FR82 (HyD)

6NE-C/F79

6NE-C/F78

PAT HEUNG ROAD

八鄉路

TSING LONG HIGHWAY

青朗公路

墓地 Graves

CUL

TS

Plot File by: JIANGMH 2017/5/2
PATH: p:\projects\60336159\drawing\report\per\PER_123.dgn

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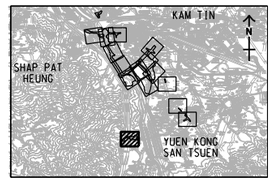
STATUS 階段

SCALE 比例 A1 1 : 500

DIMENSION UNIT 尺寸單位 METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號 60336159

CONTRACT NO. 合約編號 CE 34/2014 (CE)

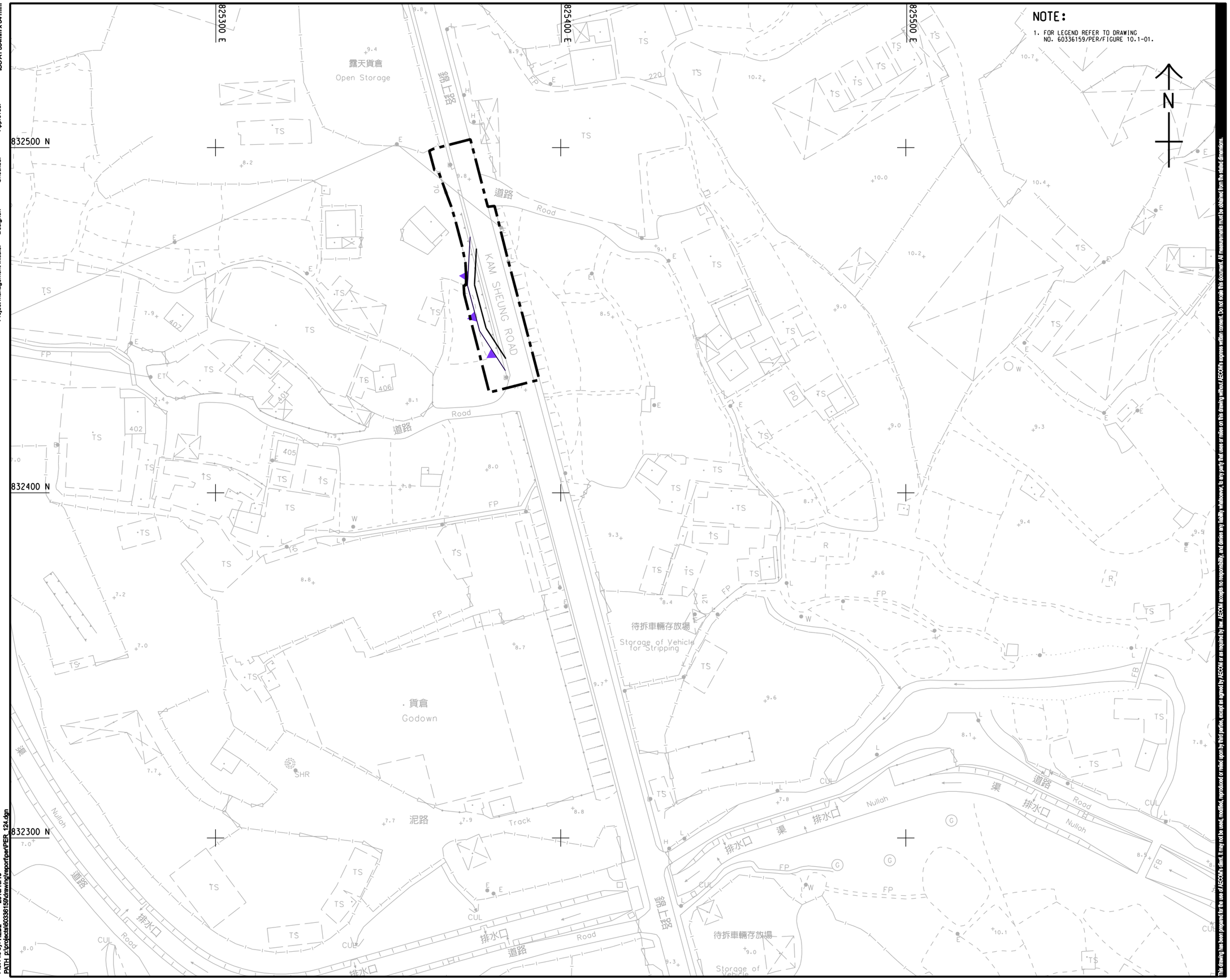
SHEET TITLE 圖紙名稱

LANDSCAPE RESOURCES

SHEET 13 OF 15

SHEET NUMBER 圖紙編號

60336159/PER/FIGURE 4.1-13



NOTE:

1. FOR LEGEND REFER TO DRAWING NO. 60336159/PER/FIGURE 10.1-01.

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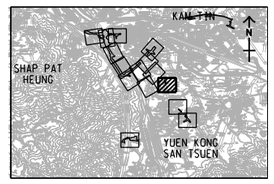
SCALE 比例: A1 1 : 500

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號: 60336159

CONTRACT NO. 合約編號: CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

LANDSCAPE RESOURCES

SHEET 14 OF 15

SHEET NUMBER 圖紙編號

60336159/PER/FIGURE 4.1-14

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ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

Plot File by: HED2 2016/10/13
PATH p:\projects\60336159\drawing\report\per\PER_124.dgn

ISO A1 594mm x 841mm

Approved:

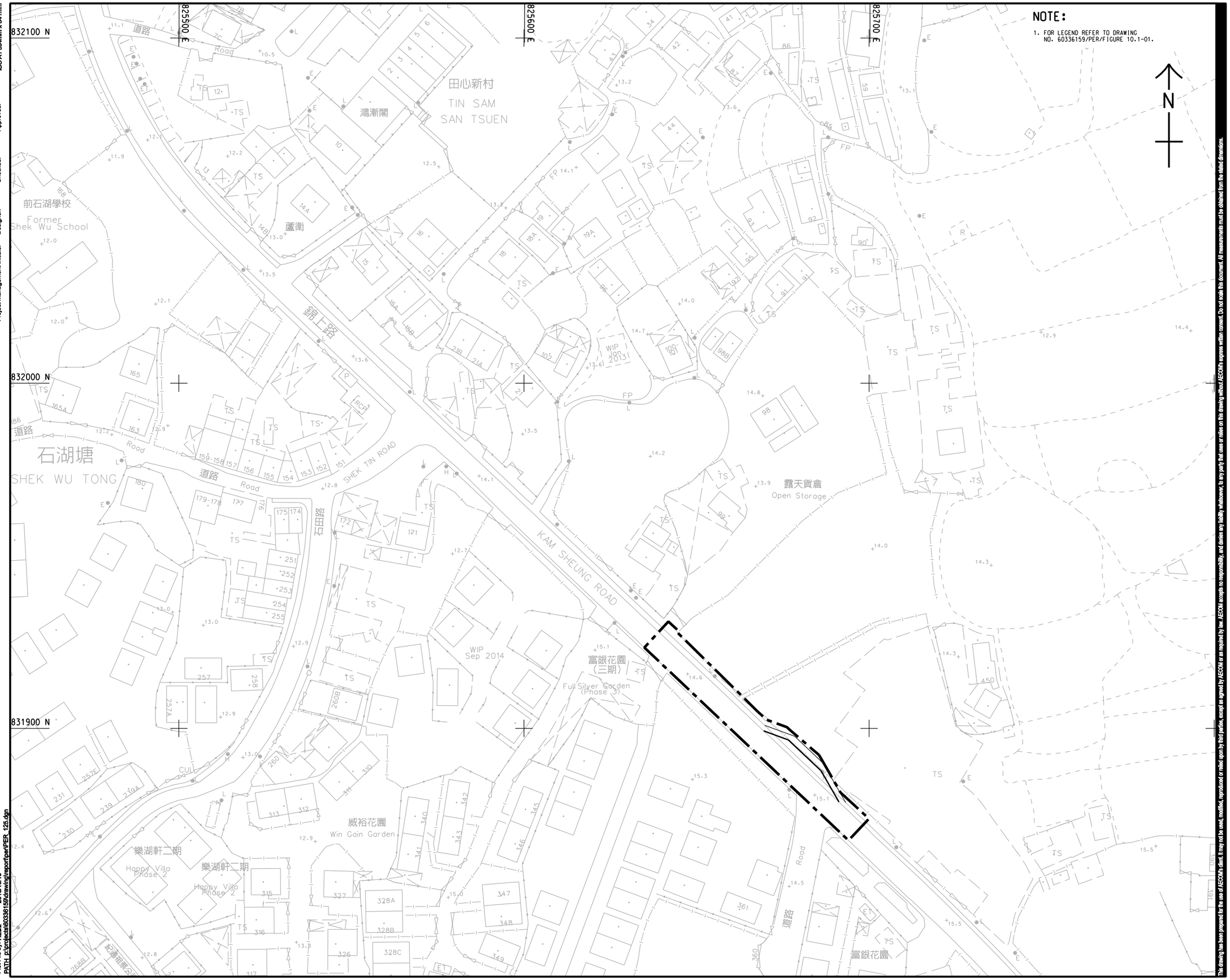
Checked:

Designer:

Project Management Initials:

NOTE:

1. FOR LEGEND REFER TO DRAWING NO. 60336159/PER/FIGURE 10.1-01.



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PROJECT 項目

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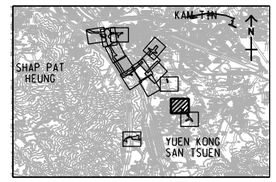
STATUS 階段

SCALE 比例 A1 1 : 500

DIMENSION UNIT 尺寸單位 METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號 60336159

CONTRACT NO. 合約編號 CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

LANDSCAPE RESOURCES

SHEET 15 OF 15

SHEET NUMBER 圖紙編號

60336159/PER/FIGURE 4.1-15

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Plot File by: HED2 2016/10/13
PATH: p:\projects\60336159\drawing\report\per\PER_125.dgn

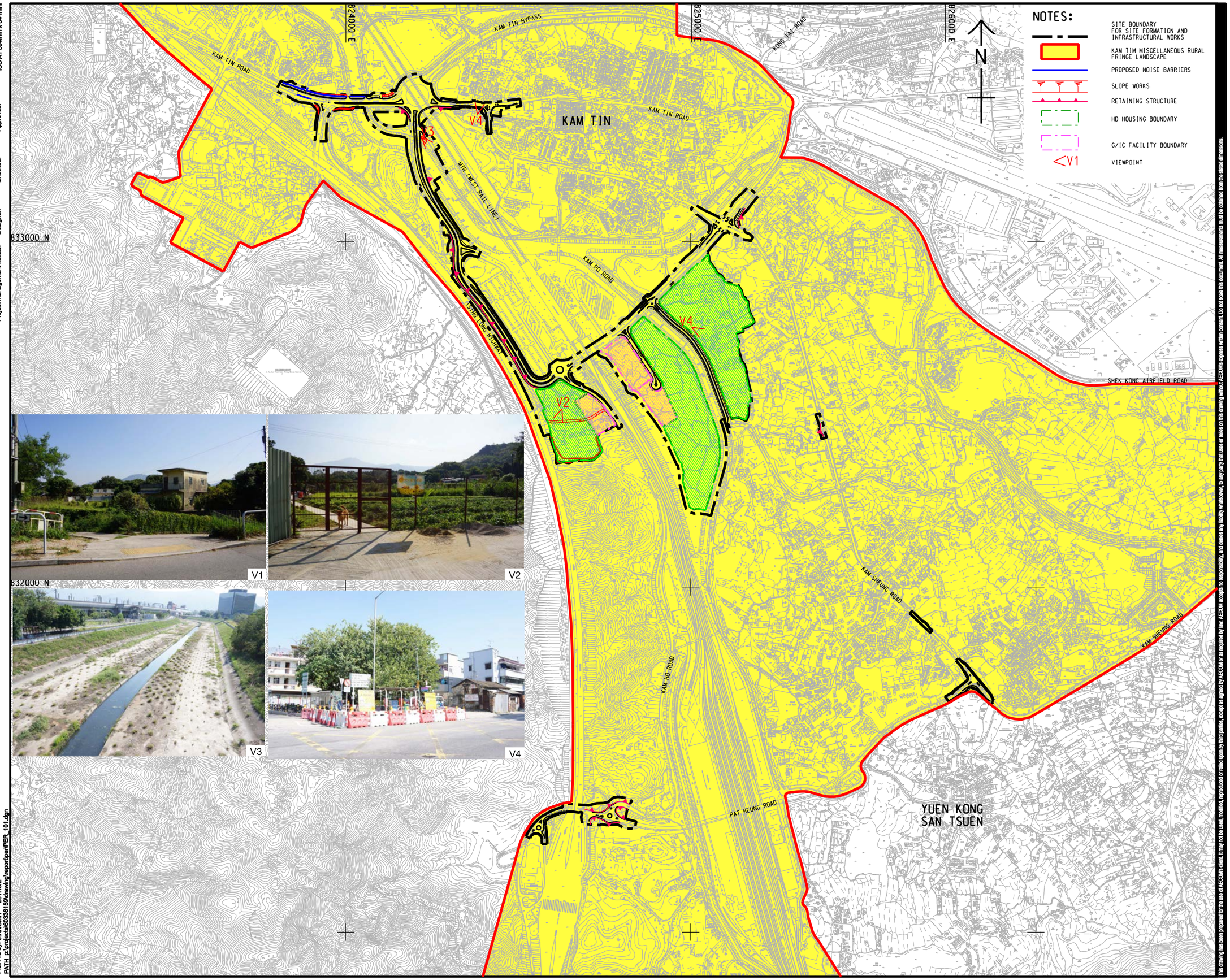
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



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PATH: p:\projects\60336159\drawing\report\per\PER_101.dgn

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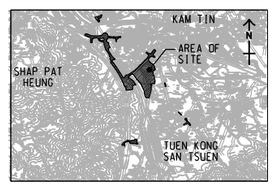
STATUS
狀態

SCALE 比例
A1 1 : 5000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖



PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

LANDSCAPE CHARACTER AREA

SHEET NUMBER
圖紙編號

60336159/PER/FIGURE 4.2

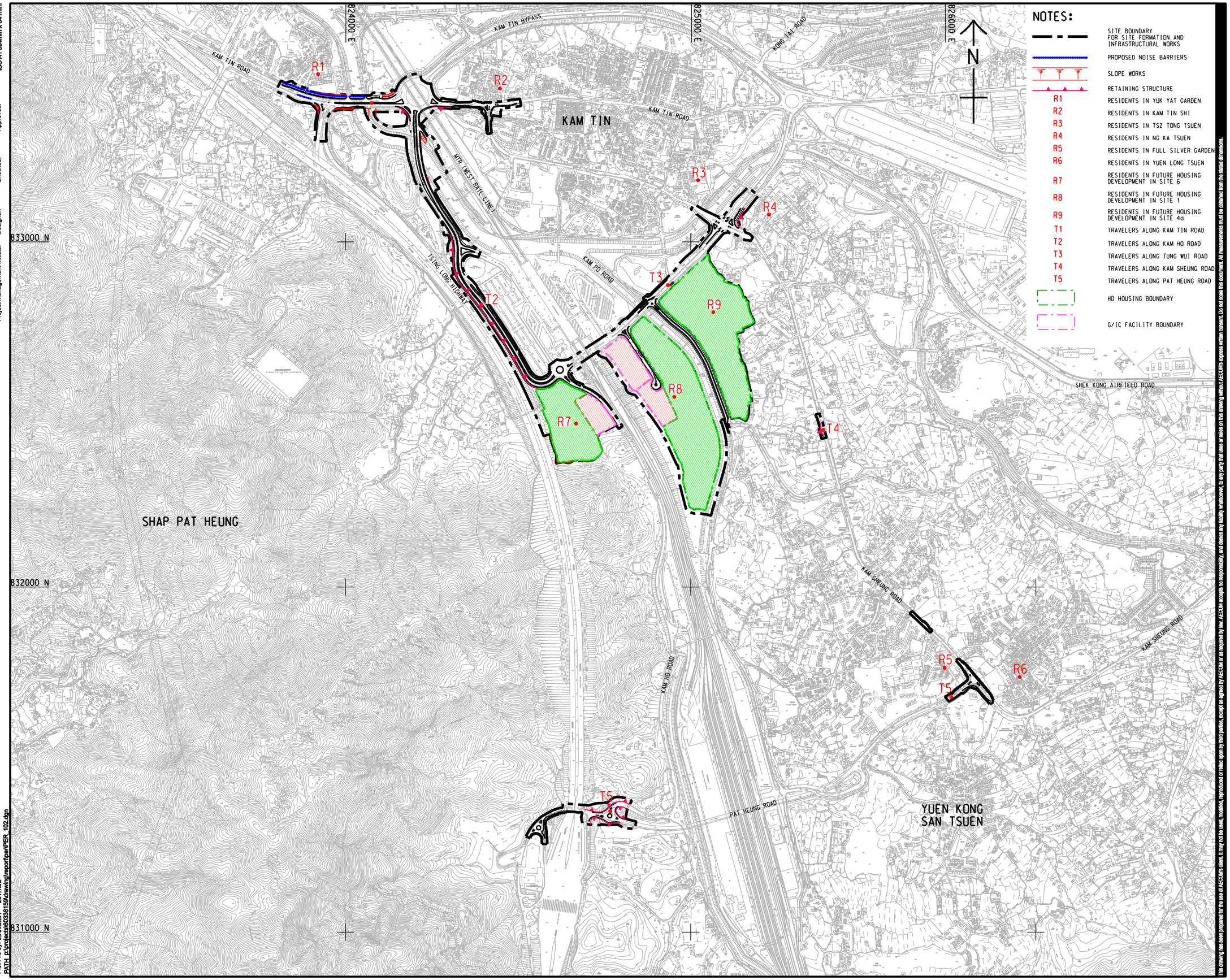
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



NOTES:

- SITE BOUNDARY FOR SITE FORMATION AND INFRASTRUCTURAL WORKS
- PROPOSED NOISE BARRIERS
- SLOPE WORKS
- RETAINING STRUCTURE
- R1 RESIDENTS IN YUK YAT GARDEN
- R2 RESIDENTS IN KAM TIN SHI
- R3 RESIDENTS IN TSZ TONG TSUEN
- R4 RESIDENTS IN NG KA TSUEN
- R5 RESIDENTS IN FULL SILVER GARDEN
- R6 RESIDENTS IN YUEN LONG TSUEN
- R7 RESIDENTS IN FUTURE HOUSING DEVELOPMENT IN SITE 6
- R8 RESIDENTS IN FUTURE HOUSING DEVELOPMENT IN SITE 1
- R9 RESIDENTS IN FUTURE HOUSING DEVELOPMENT IN SITE 4a
- T1 TRAVELERS ALONG KAM TIN ROAD
- T2 TRAVELERS ALONG KAM HO ROAD
- T3 TRAVELERS ALONG TUNG WUI ROAD
- T4 TRAVELERS ALONG KAM SHEUNG ROAD
- T5 TRAVELERS ALONG PAT HEUNG ROAD
- HD HOUSING BOUNDARY
- G/IC FACILITY BOUNDARY

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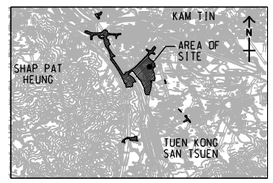
STATUS
階段

SCALE 比例
A1 1 : 5000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖



PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

VISUALLY SENSITIVE RECEIVERS (VSRs)

SHEET NUMBER
圖紙編號

60336159/PER/FIGURE 4.3

Plot File by: JIANGMH 2017/5/2
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ISO A1 594mm x 841mm

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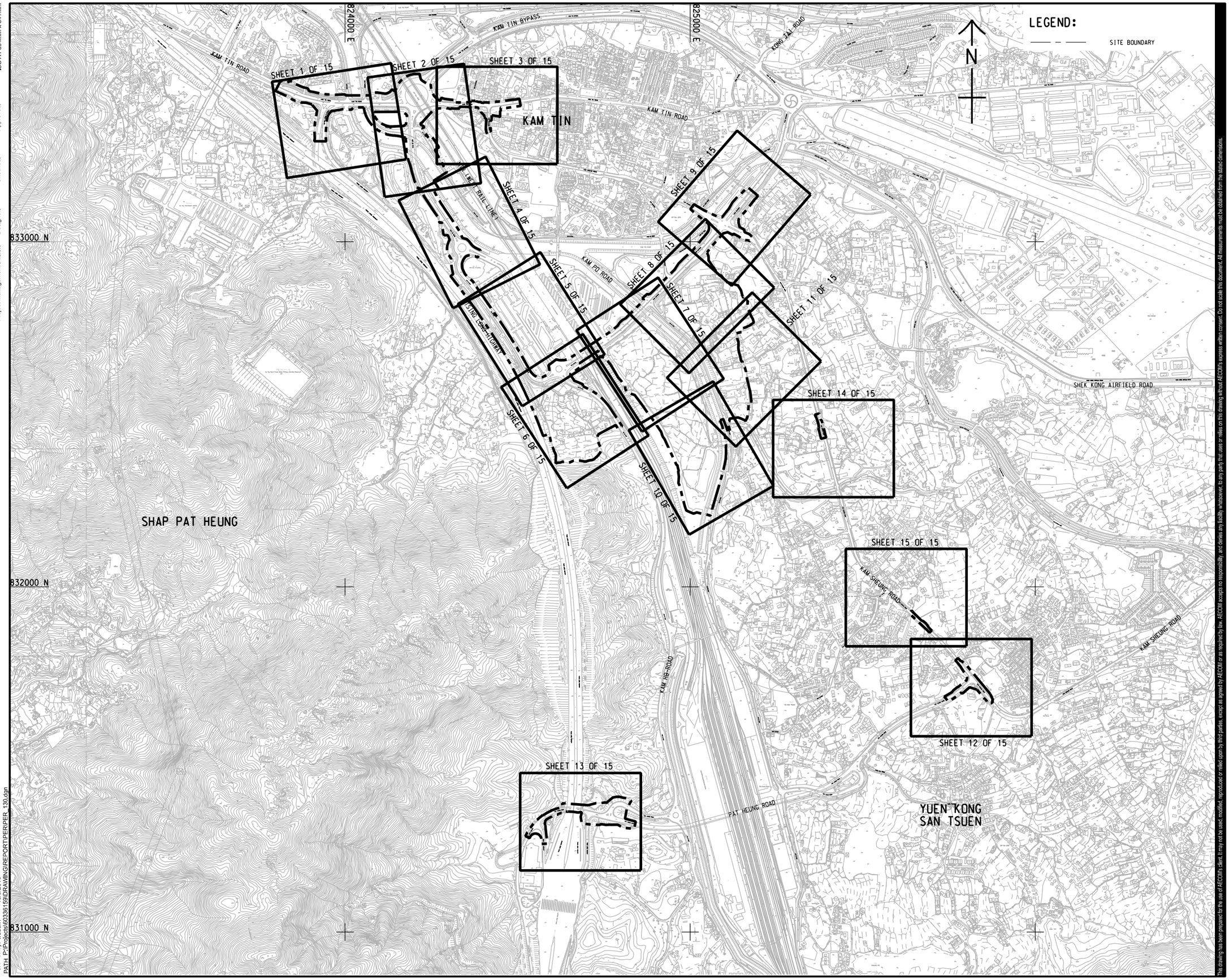
Designer:

Project Management Initials:



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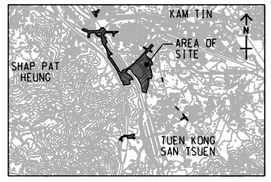
STATUS
階段

SCALE 比例
A1 1 : 5000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

LANDSCAPE AND VISUAL MITIGATION MEASURES - KEY PLAN

SHEET NUMBER 圖紙編號

60336159/PER/FIGURE **4.4-00**

Plot File by: woochi 10/5/2016
PATH: P:\Projects\60336159\DRAWING\REPORT\PER\PER_130.dgn

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

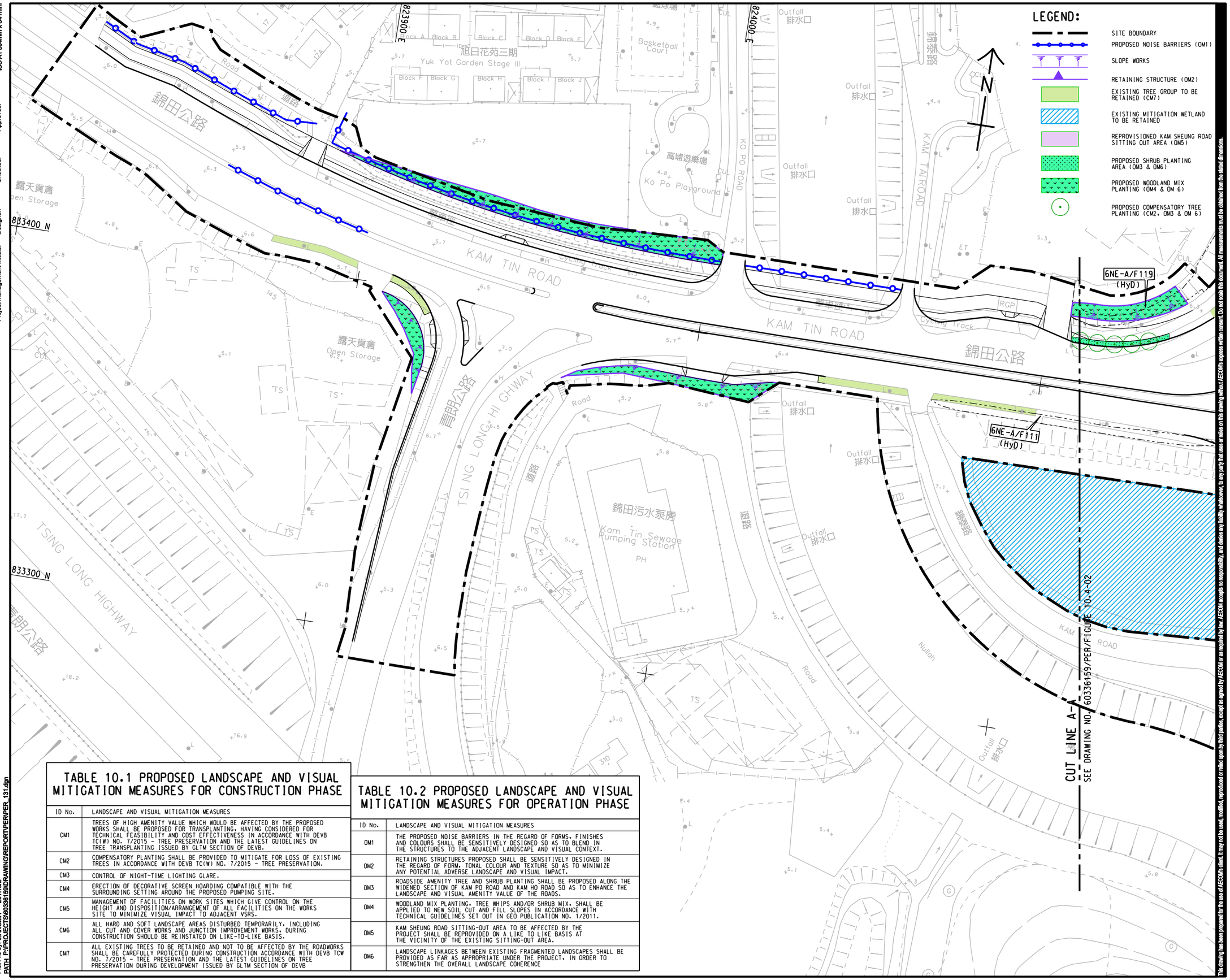


TABLE 10.1 PROPOSED LANDSCAPE AND VISUAL MITIGATION MEASURES FOR CONSTRUCTION PHASE

ID No.	LANDSCAPE AND VISUAL MITIGATION MEASURES
CM1	TREES OF HIGH AMENITY VALUE WHICH WOULD BE AFFECTED BY THE PROPOSED WORKS SHALL BE PROPOSED FOR TRANSPLANTING, HAVING CONSIDERED FOR TECHNICAL FEASIBILITY AND COST EFFECTIVENESS IN ACCORDANCE WITH DEVB TC(W) NO. 7/2015 - TREE PRESERVATION AND THE LATEST GUIDELINES ON TREE TRANSPLANTING ISSUED BY GLTM SECTION OF DEVB.
CM2	COMPENSATORY PLANTING SHALL BE PROVIDED TO MITIGATE FOR LOSS OF EXISTING TREES IN ACCORDANCE WITH DEVB TC(W) NO. 7/2015 - TREE PRESERVATION.
CM3	CONTROL OF NIGHT-TIME LIGHTING GLARE.
CM4	ERECTION OF DECORATIVE SCREEN HOARDING COMPATIBLE WITH THE SURROUNDING SETTING AROUND THE PROPOSED PUMPING SITE.
CM5	MANAGEMENT OF FACILITIES ON WORK SITES WHICH GIVE CONTROL ON THE HEIGHT AND DISPOSITION/ARRANGEMENT OF ALL FACILITIES ON THE WORKS SITE TO MINIMIZE VISUAL IMPACT TO ADJACENT VSRS.
CM6	ALL HARD AND SOFT LANDSCAPE AREAS DISTURBED TEMPORARILY, INCLUDING ALL CUT AND COVER WORKS AND JUNCTION IMPROVEMENT WORKS, DURING CONSTRUCTION SHOULD BE REINSTATED ON LIKE-TO-LIKE BASIS.
CM7	ALL EXISTING TREES TO BE RETAINED AND NOT TO BE AFFECTED BY THE ROADWORKS SHALL BE CAREFULLY PROTECTED DURING CONSTRUCTION ACCORDANCE WITH DEVB TCW NO. 7/2015 - TREE PRESERVATION AND THE LATEST GUIDELINES ON TREE PRESERVATION DURING DEVELOPMENT ISSUED BY GLTM SECTION OF DEVB

TABLE 10.2 PROPOSED LANDSCAPE AND VISUAL MITIGATION MEASURES FOR OPERATION PHASE

ID No.	LANDSCAPE AND VISUAL MITIGATION MEASURES
OM1	THE PROPOSED NOISE BARRIERS IN THE REGARD OF FORMS, FINISHES AND COLOURS SHALL BE SENSITIVELY DESIGNED SO AS TO BLEND IN THE STRUCTURES TO THE ADJACENT LANDSCAPE AND VISUAL CONTEXT.
OM2	RETAINING STRUCTURES PROPOSED SHALL BE SENSITIVELY DESIGNED IN THE REGARD OF FORM, TONAL COLOUR AND TEXTURE SO AS TO MINIMIZE ANY POTENTIAL ADVERSE LANDSCAPE AND VISUAL IMPACT.
OM3	ROADSIDE AMENITY TREE AND SHRUB PLANTING SHALL BE PROPOSED ALONG THE WIDENED SECTION OF KAM PO ROAD AND KAM HO ROAD SO AS TO ENHANCE THE LANDSCAPE AND VISUAL AMENITY VALUE OF THE ROADS.
OM4	WOODLAND MIX PLANTING, 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.
OM5	KAM SHEUNG ROAD SITTING-OUT AREA TO BE AFFECTED BY THE PROJECT SHALL BE REPROVIDED ON A LIKE TO LIKE BASIS AT THE VICINITY OF THE EXISTING SITTING-OUT AREA.
OM6	LANDSCAPE LINKAGES BETWEEN EXISTING FRAGMENTED LANDSCAPES SHALL BE PROVIDED AS FAR AS APPROPRIATE UNDER THE PROJECT, IN ORDER TO STRENGTHEN THE OVERALL LANDSCAPE COHERENCE

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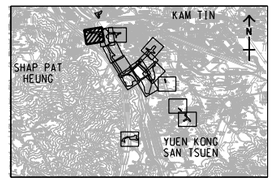
STATUS
階段

SCALE 比例
A1 1 : 500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱
LANDSCAPE AND VISUAL MITIGATION MEASURES

SHEET 1 OF 15

SHEET NUMBER 圖紙編號
60336159/PER/FIGURE 4.4-01

ISO A1 594mm x 841mm

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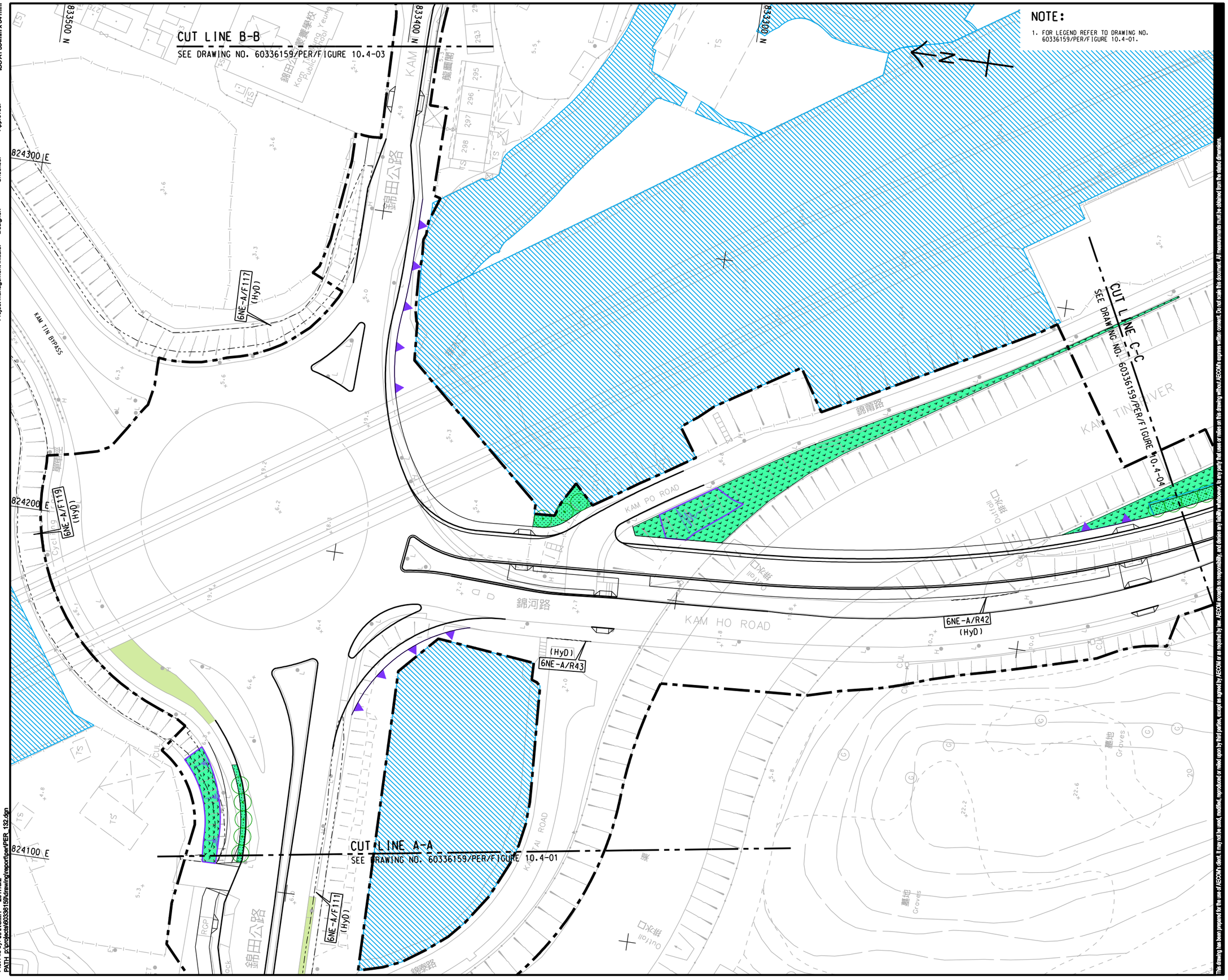
Designer:

Project Management Initials:



NOTE:

1. FOR LEGEND REFER TO DRAWING NO. 60336159/PER/FIGURE 10.4-01.

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SCALE 比例
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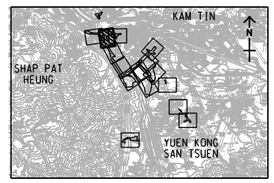
DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱
LANDSCAPE AND VISUAL MITIGATION MEASURES

SHEET NUMBER 圖紙編號
60336159/PER/FIGURE 4.4-02

NOTE:

1. FOR LEGEND REFER TO DRAWING NO. 60336159/PER/FIGURE 10.4-01.

N

CUT LINE B-B
SEE DRAWING NO. 60336159/PER/FIGURE 10.4-02

833500 N
833400 N
833300 N
824300 E
824400 E
824500 E

KAM TIN SHI
錦田市
KAM TIN ROAD
錦田公路
KAM SHEUNG ROAD
錦上路
KAM TIN
錦田
KAM TIN SHI STREET
Kam Tin Shi Tsuen Primary School
錦田市立小學
Kam Pui Shan Yeung Study Room
錦貝山洋書房
Kam Tin Shi Children's Playground
錦田市兒童遊樂場
Residence for Senior Citizens and Nursery
長者之家及幼兒園
Bradbury Centre
白普理中心
The Salvation Army Kam Tin Integrated Services Centre
救世軍錦田綜合服務中心
WIP Jun2014
Kat Hing Wai Playground
吉慶圍遊樂場
Kam Fung Garden
錦豐花園
Greenview Garden
Placid Grove
Open Storage
露天貨倉
道路 Road
泥路 Track
SHR
RCP
CUL
ESS

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STATUS 階段

SCALE 比例
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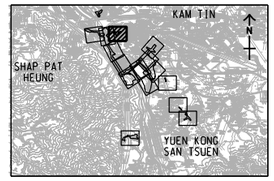
DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱
LANDSCAPE AND VISUAL MITIGATION MEASURES

SHEET 3 OF 15

SHEET NUMBER 圖紙編號
60336159/PER/FIGURE 4.4-03

ISO A1 594mm x 841mm

Project Management Initials: Designer: Checked: Approved:

NOTE:

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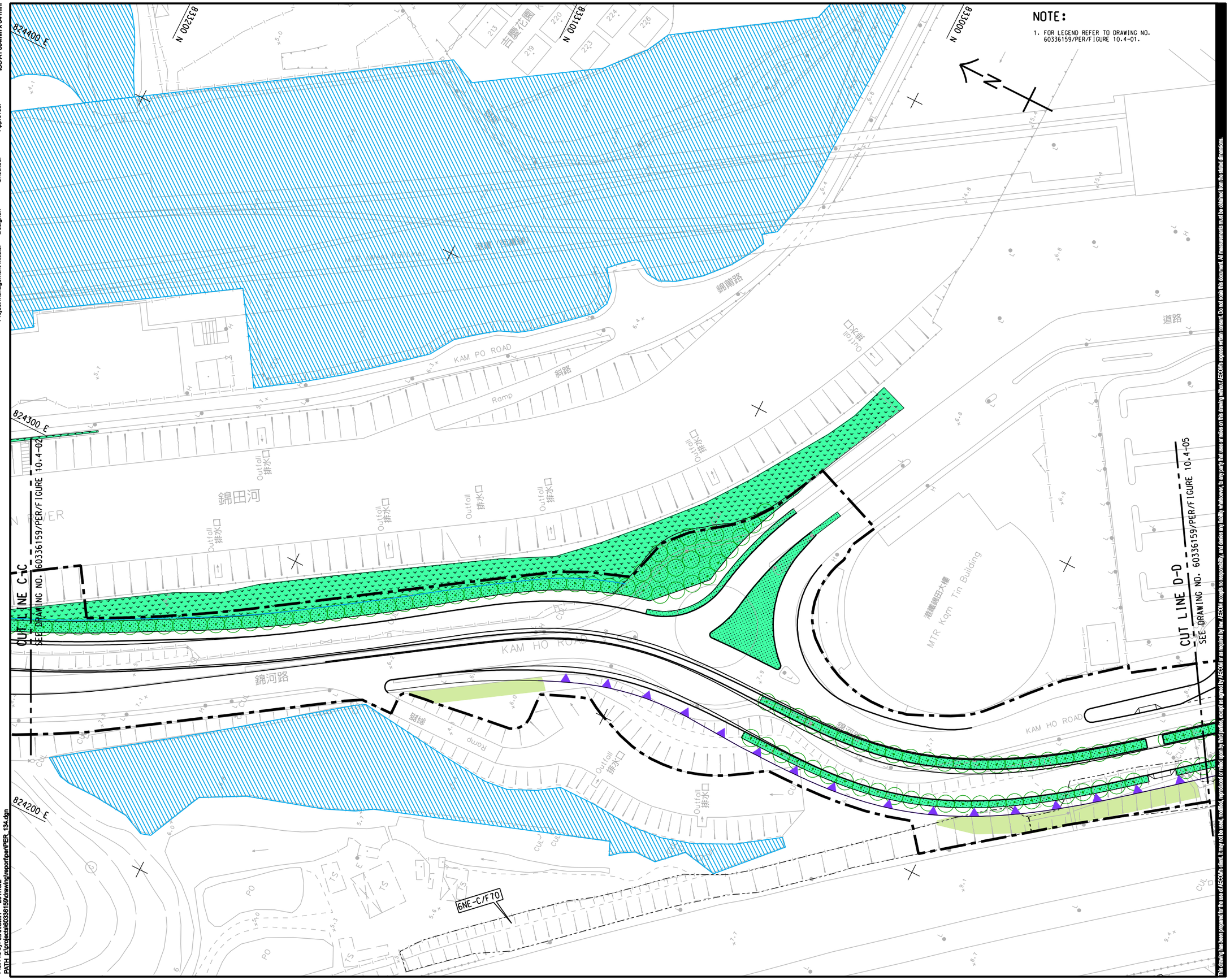

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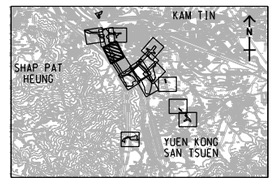
階段

SCALE 比例 A1 1 : 500

DIMENSION UNIT 尺寸單位 METRES

KEY PLAN 索引圖 A1 1 : 60000



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CONTRACT NO. 合約編號 CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

LANDSCAPE AND VISUAL MITIGATION MEASURES

SHEET 4 OF 15

SHEET NUMBER
圖紙編號

60336159/PER/FIGURE 4.4-04

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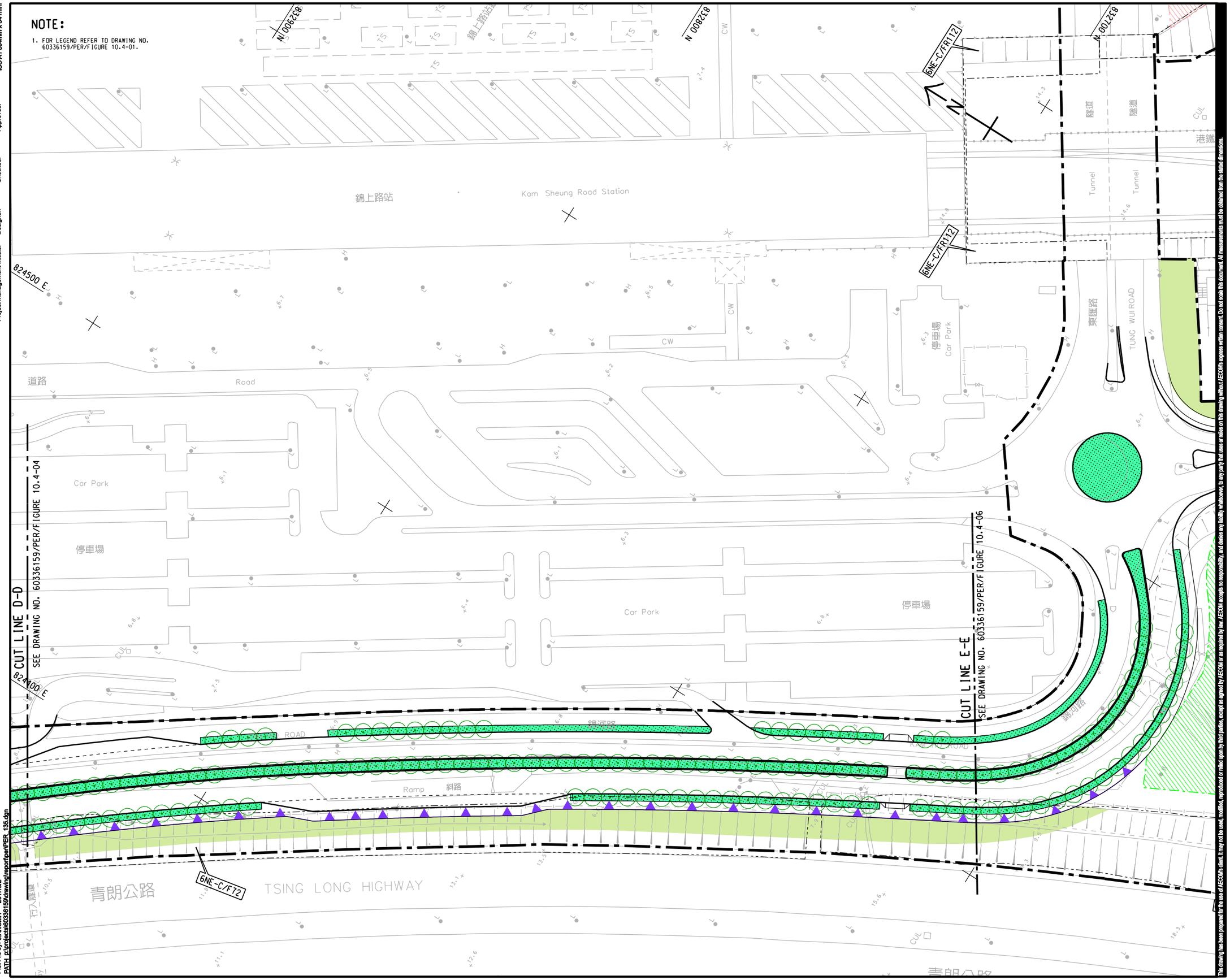
NOTE:

1. FOR LEGEND REFER TO DRAWING NO. 60336159/PER/FIGURE 10.4-01.



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階段

SCALE 比例
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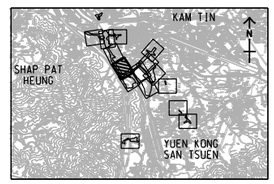
DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖 A1 1 : 60000



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SHEET TITLE
圖紙名稱

LANDSCAPE AND VISUAL MITIGATION MEASURES

SHEET 5 OF 15

SHEET NUMBER
圖紙編號

60336159/PER/FIGURE 4.4-05

CUT LINE F-F
SEE DRAWING NO. 60336159/PER/FIGURE 10.4-07

CUT LINE E-E
SEE DRAWING NO. 60336159/PER/FIGURE 10.4-05

NOTE:
1. FOR LEGEND REFER TO DRAWING NO. 60336159/PER/FIGURE 10.4-01.

PROPOSED BORED PILE WALL FOR INDICATION ONLY

港鐵（西鐵綫） MTR (West Rail Line)
錦田變電站 Kam Tin Substation
錦田路 KAM HO ROAD
TUNG WUI ROAD 東匯路
TSING LONG HIGHWAY 青朗公路
Tunnel
Subway 行人隧道
Car Park
Graves

6NE-C/FR112
6NE-C/FR108
6NE-C/F109
6NE-C/FR28
6NE-C/FR32 (HyD)
6NE-C/F73
6NE-C/F96
6NE-C/F75

824600 E
825500 N

ISO A1 594mm x 841mm
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Designer:
Project Management Initials:

Plot File by: JIANGMH 2017/5/2
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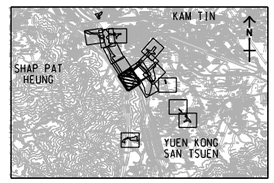
STATUS

SCALE A1 1 : 500
DIMENSION UNIT METRES

KEY PLAN A1 1 : 60000

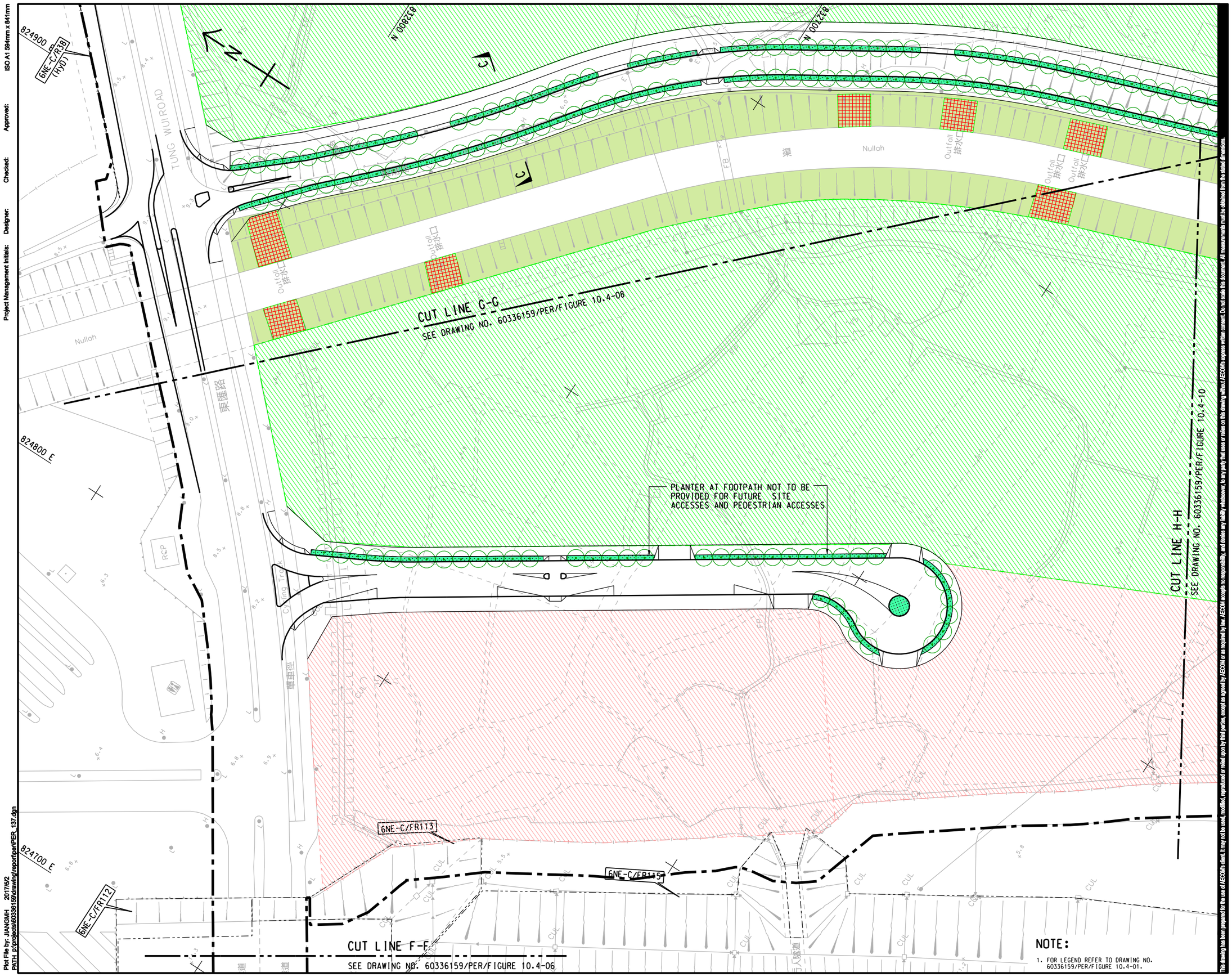


PROJECT NO. 60336159
CONTRACT NO. CE 34/2014 (CE)

SHEET TITLE
LANDSCAPE AND VISUAL MITIGATION MEASURES

SHEET 6 OF 15

SHEET NUMBER
60336159/PER/FIGURE 4.4-06



NOTE:

1. FOR LEGEND REFER TO DRAWING NO. 60336159/PER/FIGURE 10.4-01.

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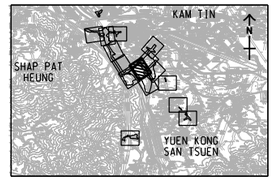
STATUS 階段

SCALE 比例 A1 1 : 500

DIMENSION UNIT 尺寸單位 METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號 60336159

CONTRACT NO. 合約編號 CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

LANDSCAPE AND VISUAL MITIGATION MEASURES

SHEET 7 OF 15

SHEET NUMBER 圖紙編號

60336159/PER/FIGURE 4.4-07

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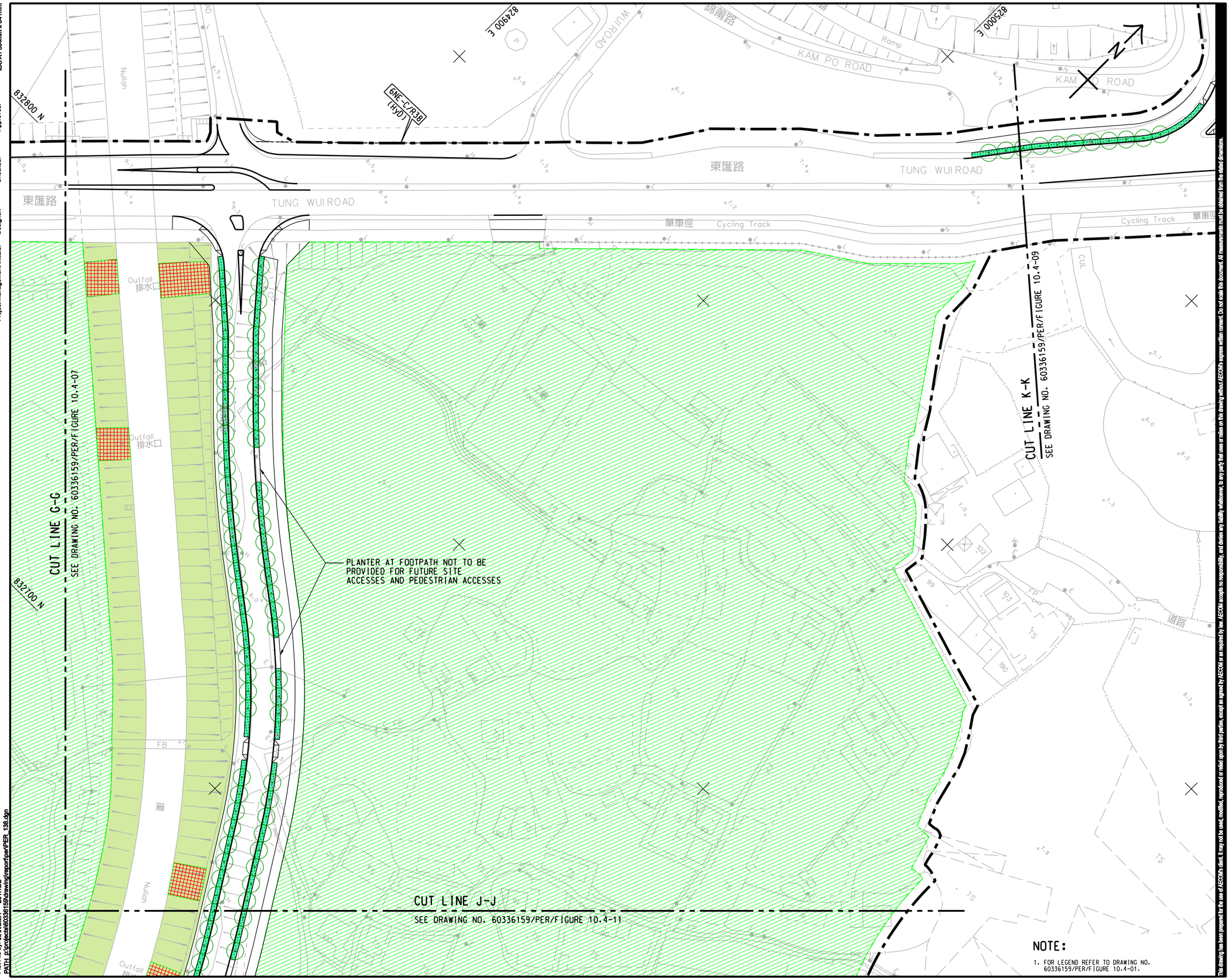
Checked:

Designer:

Project Management Initials:



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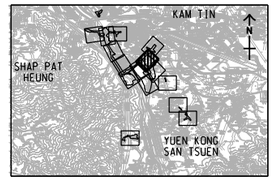
DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號
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CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

LANDSCAPE AND VISUAL MITIGATION MEASURES

SHEET 8 OF 15

SHEET NUMBER
圖紙編號

60336159/PER/FIGURE 4.4-08

ISO A1 594mm x 841mm

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Checked:

Designer:

Project Management Initials:

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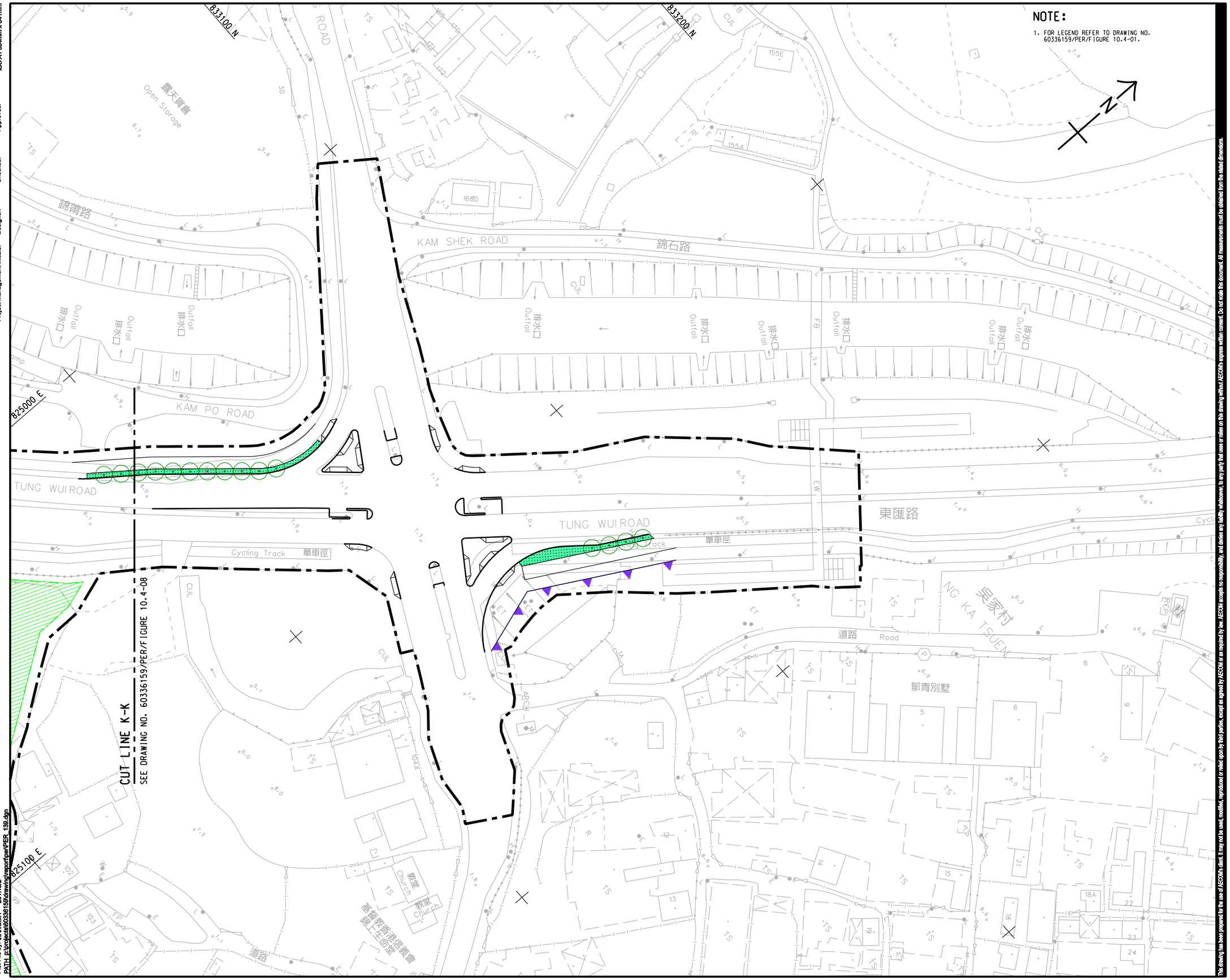

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DIMENSION UNIT 尺寸單位 METRES

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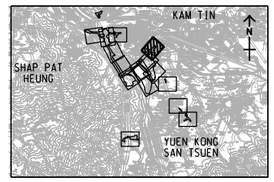

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CONTRACT NO. 合約編號 CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

LANDSCAPE AND VISUAL MITIGATION MEASURES

SHEET 9 OF 15

SHEET NUMBER 圖紙編號

60336159/PER/FIGURE 4.4-09

ISO A1 594mm x 841mm

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Designer:

Project Management Initials:

NOTE:

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CUT LINE L-L

SEE DRAWING NO. 60336159/PER/FIGURE 10.4-11

832400 N

825200 N

CUT LINE H-H

SEE DRAWING NO. 60336159/PER/FIGURE 10.4-07

825000 E

824900 E

KAM PO ROAD

Nullah

Ramp

Rock

Outfall 排水口

CUL

FB

FP

TS

PCUL

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DIMENSION UNIT 尺寸單位
METRES

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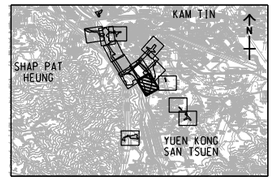


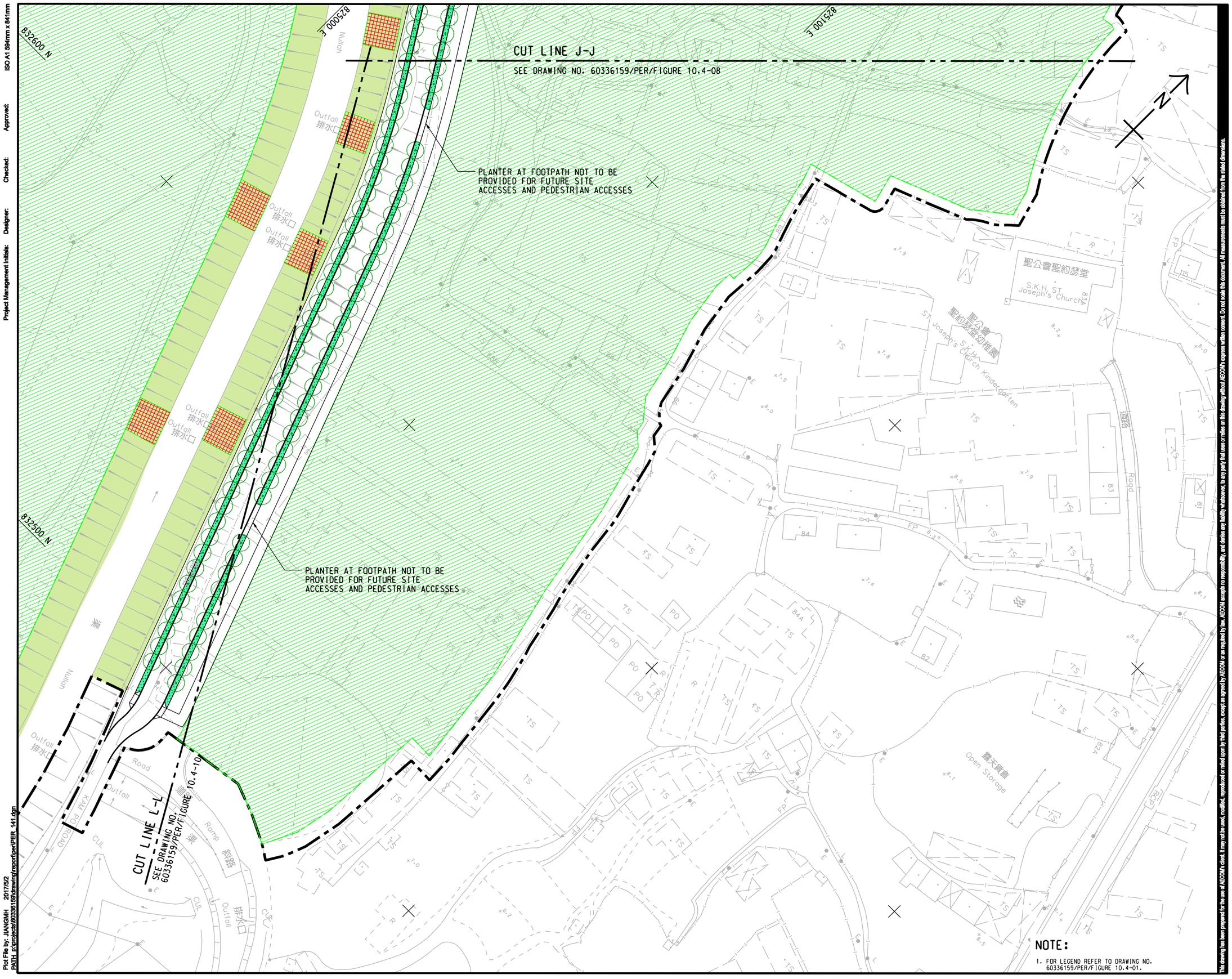
PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱
LANDSCAPE AND VISUAL MITIGATION MEASURES

SHEET 10 OF 15

SHEET NUMBER 圖紙編號
60336159/PER/FIGURE 4.4-10



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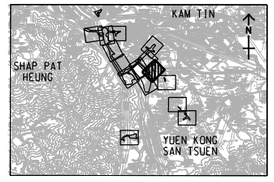

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CONTRACT NO. 合約編號: CE 34/2014 (CE)

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SHEET 11 OF 15

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60336159/PER/FIGURE 4.4-11

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825700 E

825800 E

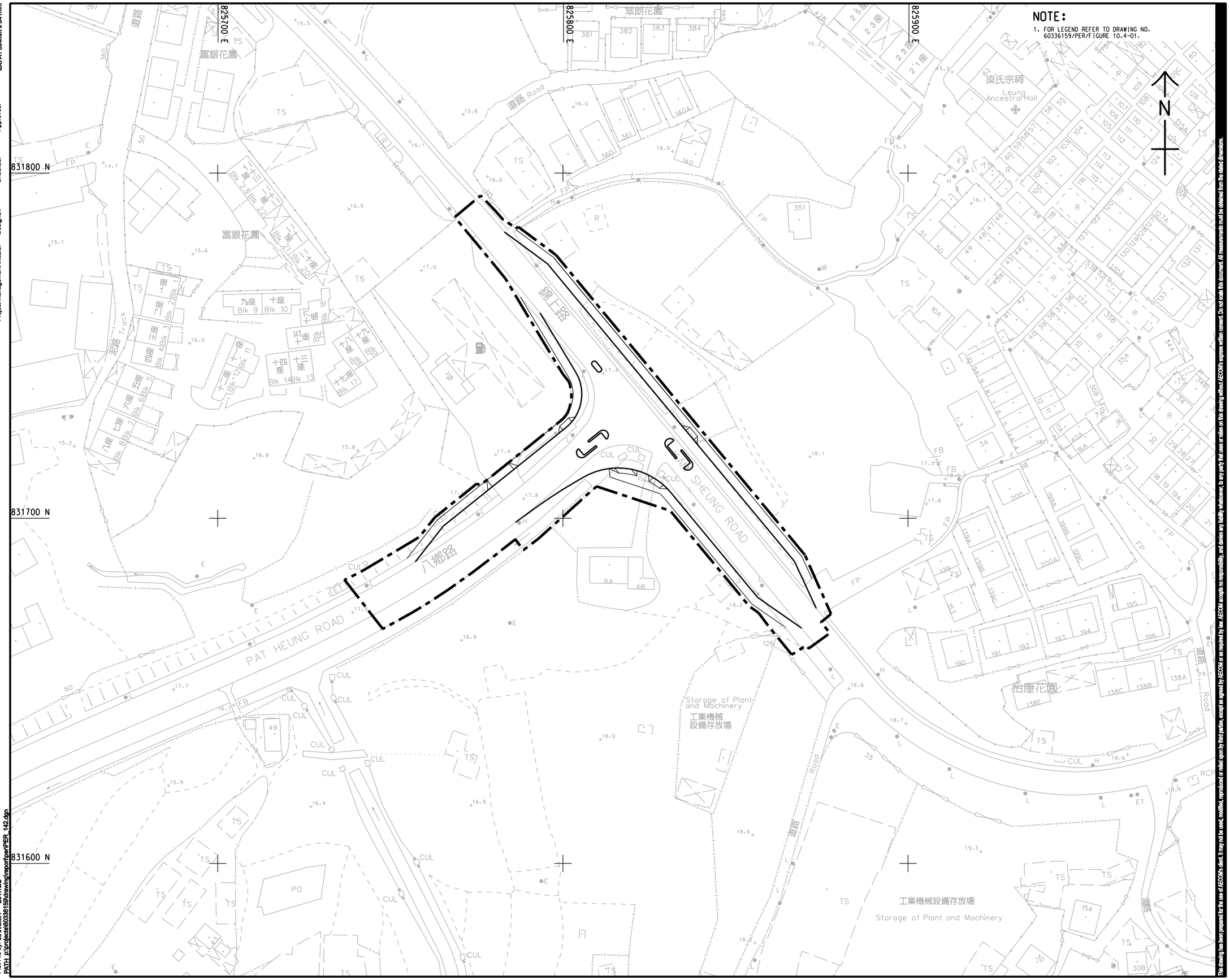
825900 E

831800 N

831700 N

831600 N

N



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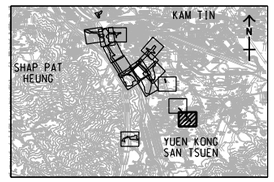
DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖 A1 1 : 60000



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60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

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SHEET 12 OF 15

SHEET NUMBER 圖紙編號
60336159/PER/FIGURE 4.4-12

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PATH: p:\projects\60336159\drawing\report\per\PER_142.dgn

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Designer:

Project Management Initials:

824600 E

824700 E

824800 E

NOTE:

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N

831400 N

831300 N

831200 N

6NE-C/C222 (HyD)

6NE-C/F81 (HyD)

6NE-C/F118 (HyD)

6NE-C/F110

6NE-C/FR82 (HyD)

6NE-C/F79

6NE-C/F78

PAT HEUNG ROAD

八鄉路

TSING LONG HIGHWAY

青朗公路

墓地 Graves

CUL

TS

PH

ET

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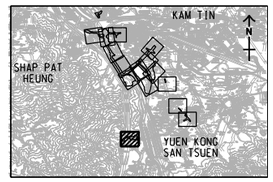

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CONTRACT NO. 合約編號: CE 34/2014 (CE)

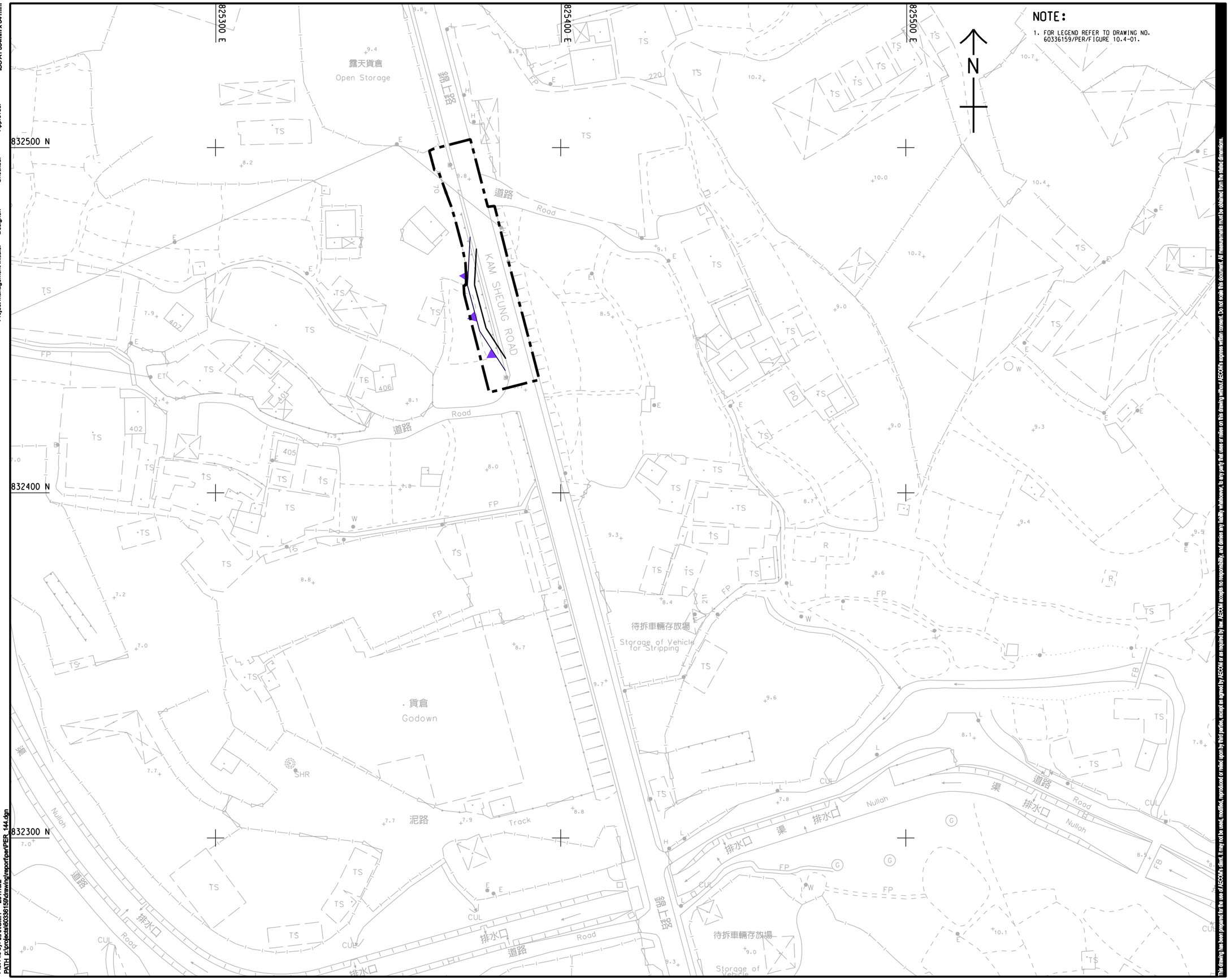
SHEET TITLE 圖紙名稱

LANDSCAPE AND VISUAL MITIGATION MEASURES

SHEET 13 OF 15

SHEET NUMBER 圖紙編號

60336159/PER/FIGURE 4.4-13



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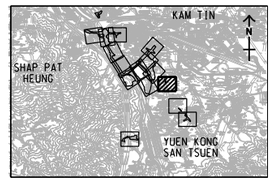
DIMENSION UNIT 尺寸單位 METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號 60336159

CONTRACT NO. 合約編號 CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

LANDSCAPE AND VISUAL MITIGATION MEASURES

SHEET 14 OF 15

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60336159/PER/FIGURE 4.4-14

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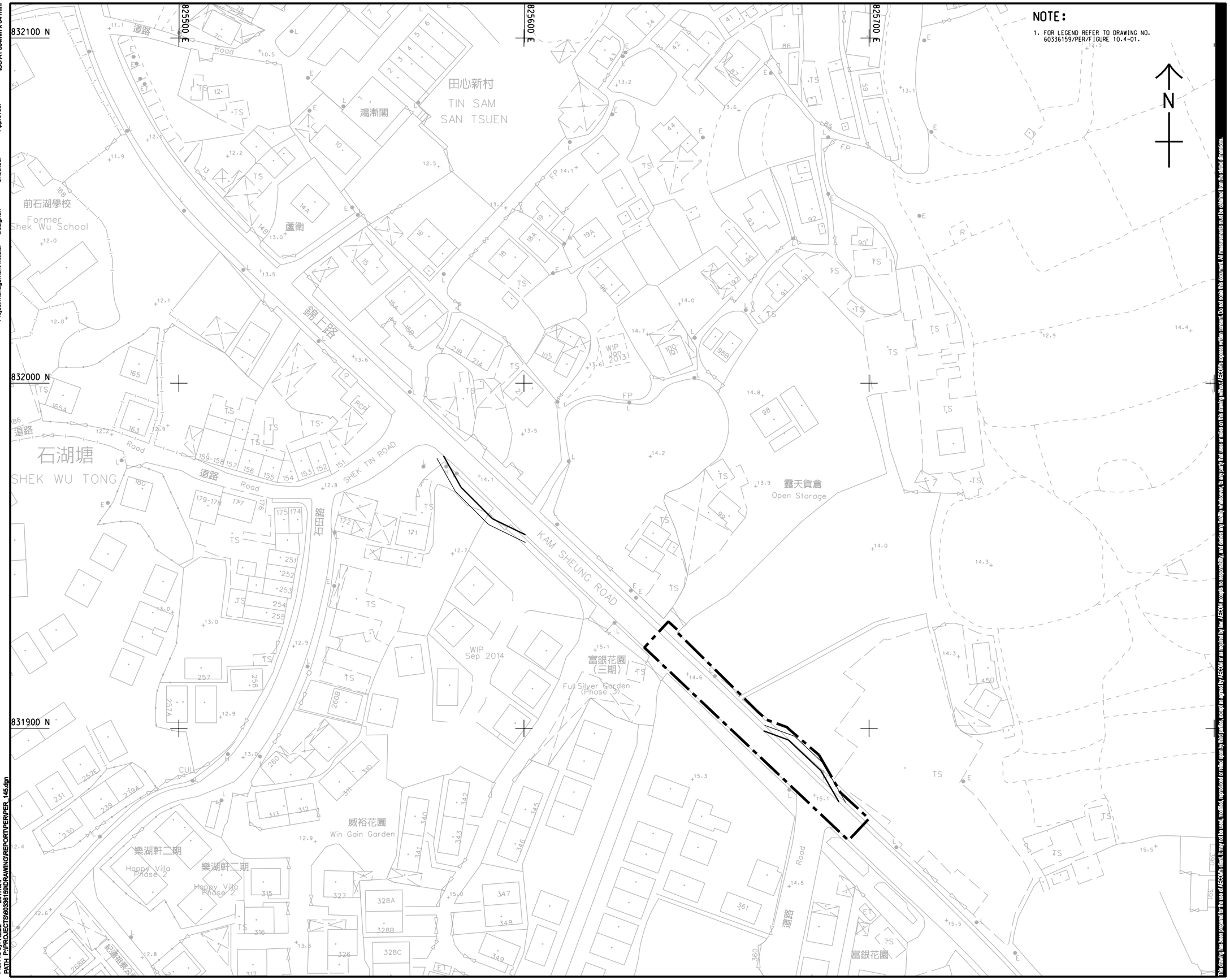

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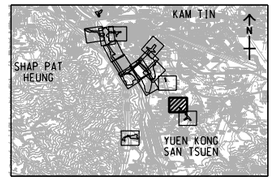
DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖 A1 1 : 60000



PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱

LANDSCAPE AND VISUAL MITIGATION MEASURES

SHEET 15 OF 15

SHEET NUMBER 圖紙編號

60336159/PER/FIGURE 4.4-15

Plot File by: HED2 2017/5/4
PATH: P:\PROJECTS\60336159\DRAWING\REPORT\PER\PER_145.dgn

Appendix 3.1



Plate 1 - Woodland at Site 6



Plate 2 - Plantation at Site 1



Plate 3 - Grassland at Site 1

AECOM	Agreement No. CE 34/2014 (CE) Site Formation and Infrastructural Works for the Initial Sites at Kam Tin South, Yuen Long - Investigation, Design and Construction	SCALE	N.T.S.	DATE	May 2015
		CHECK	LAMCCG	DRAWN	TWYC
	Representative Photographs of Habitats Recorded within the Assessment Area	JOB NO.	60336159	**Appendix No.** 3.1	**Rev** -



Plate 4 - Active Agricultural Land at Site 1



Plate 5 - Abandoned Agricultural Land at Site 6



Plate 6 - Village/Orchard at Site 4a

AECOM	Agreement No. CE 34/2014 (CE) Site Formation and Infrastructural Works for the Initial Sites at Kam Tin South, Yuen Long - Investigation, Design and Construction	SCALE	N.T.S.	DATE	May 2015
		CHECK	LAMCCG	DRAWN	TWYC
	Representative Photographs of Habitats Recorded within the Assessment Area	JOB NO.	60336159	**Appendix No.** 3.1	**Rev** -



Plate 7 - Developed Area/Wasteland at Site 4a



Plate 8 - Modified Watercourse



Plate 9 - Pond at Land Parcel D

AECOM	Agreement No. CE 34/2014 (CE) Site Formation and Infrastructural Works for the Initial Sites at Kam Tin South, Yuen Long - Investigation, Design and Construction	SCALE	N.T.S.	DATE	May 2015
		CHECK	LAMCCG	DRAWN	TWYC
	Representative Photographs of Habitats Recorded within the Assessment Area	JOB NO.	60336159	**Appendix No.** 3.1	**Rev** -

Appendix 3.2

Plant Species Recorded within the Assessment Area

Scientific Name	Growth Form	Native / Exotic to Hong Kong	Distribution in Hong Kong [1]	Woodland	Plantation	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Village/Orchard	Developed Area/Wasteland	Modified Watercourse	Pond
Acacia confusa	tree	exotic	-	+						+++		+
Ageratum conyzoides	herb	exotic	common			++	+	++	+	++		++
Aglaonema spp.	herb	-	-	+								
Albizia lebbeck	tree	exotic	-	+		+						
Allium fistulosum	herb	exotic	-				++		+			
Alocasia macrorrhizos	perennial herb	native	very common	+	++	+	++	++	++	++		++
Aloe vera var. chinensis	perennial herb	exotic	-				+		+			
Amaranthus viridis	herb	native	very common			+		+			+	
Ammannia arenaria	herb	native	uncommon [2]			+						
Ananas comosus	herb	exotic	-						+			
Annona squamosa	tree	exotic	-				++	+	++			
Apluda mutica	perennial herb	native	common [2]									++
Aporusa dioica	tree	native	very common	+								
Araucaria heterophylla	tree	exotic	-		+					++		
Archontophoenix alexandrae	tree palm	exotic	-							++		
Artocarpus heterophyllus	tree	exotic	common		+				++			
Arundinella spp.	perennial herb	native	very common		+	+				+		+
Bauhinia spp.	-	-	-							++		
Bauhinia variegata	tree	exotic	-									+
Benincasa hispida	herbaceous vine	exotic	-				+					
Bidens alba	herb	exotic	very common	++	++	++	++	+++	++	+++	++	++
Bidens pilosa	herb	exotic	very common							+		
Boehmeria nivea	subshrub or shrub	exotic	restricted [4]	+						+		
Bombax ceiba	tree	exotic	-		++	+				++		
Bougainvillea spectabilis	climbing shrub	exotic	-						++	++		
Brachiaria mutica	herb	exotic	common [2]		+	++						+++
Brassica chinensis	biennial herb	exotic	-				++					
Brassica oleracea L. var. *albiflora*	herb	exotic	cultivated				+++					
Brassica oleracea L. var. *botrytis* L.	herb	exotic	cultivated				+					
Brassica parachinensis	biennial herb	exotic	-				+++		+			
Bridelia tomentosa	shrub or small tree	native	very common	+	++	+	+	+		++	+	+
Calliandra haematocephala	shrub	exotic	common		+				+			
Carica papaya	tree	exotic	-				++	+	++	+		
Carmona microphylla	shrub	exotic	-						+			
Caryota maxima	tree palm	exotic	-		+							+
Casuarina equisetifolia	tree	exotic	rare [4]						+	++		
Celosia argentea	herb	native	very common		+		+	+		+		
Celtis sinensis	tree	native	common		++			+	++	+		+
Chloris barbata	herb	native	very common		+	++						++
Cinnamomum camphora	large tree	native	common	++						+		
Cinnamomum parthenoxylon	large tree	native	common	+								
Citrus reticulata	small tree	native	-						+			
Clausena lansium	small tree	native	-				++	+	+++			

Plant Species Recorded within the Assessment Area

Scientific Name	Growth Form	Native / Exotic to Hong Kong	Distribution in Hong Kong [1]	Woodland	Plantation	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Village/Orchard	Developed Area/Wasteland	Modified Watercourse	Pond
Cocos nucifera	tree palm	exotic	-				+					
Colocasia esculenta	herb	native	common [2]				++					
Commelina diffusa	herb	native	very common [2]									++
Conyza canadensis	herb	exotic	very common	+	+	++		++	++	+	+	+
Coriandrum sativum	herb	exotic	-				+					
Cuscuta chinensis	parasitic herb	native	common			+				+		
Cyclosorus parasiticus	herb	native	very common			++						+
Cynodon dactylon	perennial herb	native	very common		++	++				++		+
Cyperus involucratus	herb	exotic	restricted, cultivated and naturalized									++
Cyperus rotundus	herb	native	common [2]		++	+++						++
Cyperus spp.	herb	-	-									+
Dactyloctenium aegyptium	herb	native	common			+		+			+	
Daphniphyllum spp.	tree	native	common	+								
Daucus carota var. sativa	perennial herb	exotic	-				+++					
Desmos chinensis	shrub	native	common	+								
Dicranopteris pedata	herb	native	very common	+								
Dimocarpus longan	tree	exotic	restricted but widely cultivated	+			++	+	+++	++		+
Dracaena sanderiana	shrub	exotic	-				++		++			
Duranta erecta	climbing shrub	exotic	common							++		
Dypsis lutescens	shrub palm	exotic	-						+			
Eleusine indica	herb	native	very common		+	++		++				
Emilia sonchifolia	herb	native	very common								+	+
Eriobotrya japonica	small tree	exotic	-						++			
Ficus hirta	shrub or small tree	native	common	++								
Ficus hispida	shrub or small tree	native	very common	+	++	+		++	+	++		++
Ficus microcarpa	tree	native	common		+++	+			++	++		+
Ficus religiosa	tree	exotic	restricted; widely planted						+			
Ficus variegata	shrub	native	common							+	+	+
Fimbristylis sieboldii	herb	native	common [2]									+
Fragaria ananassa	perennial herb	exotic	-				+					
Gardenia jasminoides	shrub	native	common		++							
Hibiscus rosa-sinensis	shrub	exotic	-				+		++			
Hibiscus tiliaceus	tree or shrub	native	very common									++
Ilex asprella	shrub	native	very common	+	+							
Ilex rotunda	tree	exotic	common		+							
Imperata cylindrica var. major	perennial herb	native	very common			++	+	+++	+	++	+	++
Ipomoea batatas	herb	exotic	-				++					
Ipomoea cairica	climber: twining herb	exotic	very common	+	+++	+++	+	++	++	+++	+	++
Kyllinga brevifolia	herb	native	common [2]									+++
Lactuca sativa	herb	exotic	cultivated				++					
Lantana camara	shrub	exotic	very common	+	+	++			+	++		

Plant Species Recorded within the Assessment Area

Scientific Name	Growth Form	Native / Exotic to Hong Kong	Distribution in Hong Kong [1]	Woodland	Plantation	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Village/Orchard	Developed Area/Wasteland	Modified Watercourse	Pond
Lemna minor	floating small herb	native	common [2]								++	
Leucaena leucocephala	small tree	exotic	common	+	+++	++		++	+	++	++	+
Ligustrum sinense	tree or shrub	native	common	+	+	+			++	+		
Lindernia crustacea	herb	native	common [2]			++						
Litchi chinensis	tree	exotic	restricted but widely planted (Wild Plant under State Protection: Category II)						++	++		
Litsea glutinosa	tree	native	very common	+						+		
Litsea rotundifolia	shrub	native	very common	+	+					+		
Livistona chinensis	tree palm	exotic	-						+	+		
Ludwigia octovalvis	perennial herb	native	very common [2]			+						+
Lycium chinense	shrub	exotic	-				++					
Lycopersicon esculentum	herb	exotic	-				++					
Lygodium japonicum	climbing herb	native	very common	+								
Lygodium scandens	climbing herb	native	common			+						
Macaranga tanarius	tree	native	common	++	++	+	++	++	+	++	+	++
Machilus chekiangensis	tree	native	common	++						+		
Machilus pauhoi	tree	native	common	+								
Mangifera indica	tree	exotic	-				++		+++	++		
Manihot esculenta	shrub	exotic	common			+	++	+				
Mariscus cyperoides	herb	native	very common			++						++
Melaleuca cajuputi	tree	exotic	-							+++		
Melastoma malabathricum L.	shrub	native	common			+			+			
Melia azedarach	tree	exotic	common	+	+					++		
Melinis repens	perennial herb	exotic	very common			++				++		
Microcos nervosa	shrub or small tree	native	common	++		+				+		
Microstegium ciliatum	perennial procumbent herb	native	very common, common [2]	++	++	++						++
Mikania micrantha	climbing herb	exotic	very common	+	+++	+++	+	++	++	++		++
Mimosa diplotricha	herb	exotic	rare [4]			++						+
Mimosa pudica	herb	exotic	very common			+					+	
Miscanthus floridulus	perennial herb	native	common		++	++		+++		++	+	+
Miscanthus sinensis	perennial herb	native	very common		+	+++	+	++	+	++	+	++
Morus alba	tree or shrub	native	common		+	++				+		+
Murraya paniculata	small tree	native	-		+				+			
Musa x *paradisiaca*	perennial herb	exotic	-		+	+	++	+		+		+
Mussaenda pubescens	climbing Shrub	native	very common	+								
Neyraudia reynaudiana	perennial herb	native	common [2]			++				++		
Osmanthus fragrans	tree or shrub	exotic	-						+			
Oxalis corniculata	perennial herb	native	very common		+	++	++	++	+	++		+
Oxalis debilis subsp. *Corymbosa*	perennial herb	exotic	common				+	+	++	+		+
Palhinhaea cernua	herb	native	very common			++						
Panicum maximum	perennial herb	exotic	very common		++	+++	++	+++	++	+++	+	++

Plant Species Recorded within the Assessment Area

Scientific Name	Growth Form	Native / Exotic to Hong Kong	Distribution in Hong Kong [1]	Woodland	Plantation	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Village/Orchard	Developed Area/Wasteland	Modified Watercourse	Pond
Panicum repens	perennial herb	native	very common [2]		++	++						+
Paspalum conjugatum	perennial herb	exotic	common		++	++	+			++		+
Paspalum scrobiculatum var. orbiculare	perennial herb	native	common [2]			++						+
Phragmites australis	perennial herb	native	common [2]									+++
Phragmites vallatorius	perennial herb	native	common [2]			++						
Pisum sativum	climbing herb	exotic	cultivated				++					
Platycladus orientalis	tree	exotic	-						+			
Polygonum barbatum	herb	native	common [2]									+
Polygonum chinense	herb	native	very common		+	++	+	++		+		+
Polygonum spp.	herb	-	-			+						++
Prunus persica	tree	exotic	common						+			
Psidium guajava	tree	exotic	common							+		
Psychotria asiatica	tree or shrub	native	very common	++								+
Psychotria serpens	climber: vine	native	very common	+								
Pueraria phaseoloides	climber: vine	native	very common			+++	+	++	++	++	+	+
Pyrostegia venusta	climber: vine	exotic	-						++			
Raphanus sativus	biennial herb	exotic	-				+					
Rhaphiolepis indica	shrub	native	common		++	+						+
Rhapis excelsa	shrub palm	native	common, principally on the outlying islands, also cultivated		+							
Rhododendron spp. [3]	shrub	-	-			+						
Rhus hypoleuca	shrub or small tree	native	common		+	+	+					
Rhus succedanea	shrub or small tree	native	common	+								
Saccharum officinarum	perennial herb	exotic	-						+			
Sansevieria trifasciata	perennial herb	exotic	-						+	+		
Sapium discolor	small tree	native	very common	+								
Sapium sebiferum	tree	native	common			+						
Schefflera heptaphylla	tree	native	very common	++	+					+		
Setaria sp.	herb	-	-								+	
Sida rhombifolia	erect subshrub	native	common		+	+				+		
Smilax corbularia	climbing shrub	native	common	+	+	+		+				
Solanum americanum	herb	exotic	very common		+	+				+		
Solanum melongena	herb or subshrub	exotic	cultivated				+					
Solanum torvum	shrub	exotic	common							+		
Stephania longa	climber: vine	native	common	++				+	+	++		
Sterculia lanceolata	semi-deciduous tree	native	very common	++								
Syzygium jambos	tree	exotic	common							++		
Tabernaemontana divaricata	shrub	exotic	-							++		+
Uraria crinita	subshrub	native	common		++	+++	+	++		++		
Wedelia trilobata	perennial herb	exotic	common; also widely cultivated		++	++				++	++	+
Youngia japonica	herb	native	very common					+		+		

Plant Species Recorded within the Assessment Area

Scientific Name	Growth Form	Native / Exotic to Hong Kong	Distribution in Hong Kong [1]	Woodland	Plantation	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Village/Orchard	Developed Area/Wasteland	Modified Watercourse	Pond
Zea mays	herb	exotic	-				++					
Beta vulgaris	herb	exotic	cultivated				++					
Hydrocotyle verticillata	herb	-	-									+
Lactuca indica	herb	exotic	cultivated				++		+			
Terminalia mantaly	tree	exotic								+		
Bambusa sp.	clumped tree bamboo	-	-		+							
Citrus mitis	small tree or shrub	-	-				+					
Brassica oleracea Linnaeus var. capitata Linnaeus	biennial herb	-	-				+++					
Hylocereus undatus	-	-	-				+					

Notes:

1. Corlett, R., Xing, F., Ng, S.C., Chau, L, Wong, L. (2000). *Hong Kong Vascular Plants: Distribution and Status* . Memoirs of the Hong Kong Natural History Society. 23:1-3.

2. Yip, Y., Yip, K. L., Liu, K. U., Ngar, Y. N., Lai, C. C. (2010). A Floristic Survey of Marshes in Hong Kong. Hong Kong Biodiversity. Issue No. 19.

3. Listed under Forests and Countryside Ordinance Cap. 96. However, as this species is artificially planted, it is not considered as species of conservation importance.

Code for Abundance: ++++=abundant; +++=frequent; ++=occasional; +=scarce

4. Distribution of the species is described as 'rare' or 'restricted' in Corlett *et al.* (2002) but it is exotic and largely cultivated/commonly seen in Hong Kong.

Appendix 3.3

Fauna Species Recorded within the Assessment Area

Avifauna

Common Name[1]	Scientific Name	Distribution in Hong Kong[2]	Level of Concern[3]	Woodland	Plantation	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Village / Orchard	Developed Area / Wasteland	Modified Watercourse	Pond
Tufted Duck[4]	***Aythya fuligula***	Uncommon	LC									+
Chinese Pond Heron[4]	***Ardeola bacchus***	Common	PRC (RC)			+						
Grey Heron[4]	***Ardea cinerea***	Common	PRC									+
Little Egret[4]	***Egretta garzetta***	Common	PRC (RC)									+
White-breasted Waterhen[4]	*Amaurornis phoenicurus*	Common	-								+	
Common Moorhen[4]	*Gallinula chloropus*	Common	-									+
Green Sandpiper[4]	*Tringa ochropus*	Uncommon	-									+
Common Sandpiper[4]	*Actitis hypoleucos*	Common	-								+	
Domestic Pigeon	*Columba livia*	Common	-							+		
Spotted Dove	*Streptopelia chinensis*	Abundant	-		+		+	+	+	+	+	
Asian Koel	*Eudynamys scolopacea*	Common	-		+				+			
White-throated Kingfisher[4]	*Halcyon smyrnensis*	Common	(LC)		+							
Black Drongo	*Dicrurus macrocercus*	Common	-						+			
Large-billed Crow	*Corvus macrorhynchos*	Common	-		+							
Cinereous Tit	*Parus cinereus*	Common	-	+								
Red-whiskered Bulbul	*Pycnonotus jocosus*	Abundant	-	+	++	+	++	+	++	+	+	
Chinese Bulbul	*Pycnonotus sinensis*	Abundant	-		+	+		+	+	+		
Barn Swallow	*Hirundo rustica*	Abundant	-			++						
Dusky Warbler	*Phylloscopus fuscatus*	Common	-	+		+	+	+				
Yellow-browed Warbler	*Phylloscopus inornatus*	Common	-		+	+	+	+				
Yellow-bellied Prinia	*Prinia flaviventris*	Common	-		+	++	+			+		
Plain Prinia	*Prinia inornata*	Common	-			+	+					
Common Tailorbird	*Orthotomus sutorius*	Common	-	+	+				+	+		
Masked Laughingthrush	*Garrulax perspicillatus*	Abundant	-		+				+			
Japanese White-eye	*Zosterops japonicus*	Abundant	-	+	++	+			+	+		
Crested Myna	*Sitta frontalis*	Common	-		+	+	+					
Common Myna	*Acridotheres tristis*	Uncommon	-								+	
Black-collared Starling	*Gracupica nigricollis*	Common	-		+	+			+	+		
White-shouldered Starling	*Sturnia sinensis*	Common	(LC)		+							
Common Blackbird	*Turdus merula*	Common	-		+							
Oriental Magpie Robin	*Copsychus saularis*	Abundant	-		+		+		+	+		
Daurian Redstart	*Phoenicurus auroreus*	Common	-				+					
Stejneger's Stonechat	*Saxicola stejnegeri*	Common	-			+						
Fork-tailed Sunbird	*Aethopyga christinae*	Common	-						+			
Eurasian Tree Sparrow	*Passer montanus*	Abundant	-				+		+	+		
Scaly-breasted Munia	*Lonchura punctulata*	Common	-			+	+					
Grey Wagtail	*Motacilla cinerea*	Common	-						+		+	
White Wagtail	*Motacilla alba*	Common	-			+	+				+	
Richard's Pipit	*Anthus richardi*	Common	-				+					

Note:
(1) All wild birds are Protected under Wild Animals Protection Ordinance (Cap. 170).
(2) AFCD (2015). Hong Kong Biodiversity Database.
(3) Fellowes *et al.* (2002): LC=Local Concern; RC=Regional Concern; PRC=Potential Regional Concern.
Letters in parentheses indicate that the assessment is on the basis of restrictedness in nesting and/or roosting sites rather than in general occurrence.
(4) Wetland-dependent species (including wetland-dependent species and waterbirds).

Species of conservation importance is in bold type face
Code of Abundance: +=Rare; ++=Occasional; +++=Common; ++++=Abundant; +++++=Dominant

Fauna Species Recorded within the Assessment Area Butterfly

Common Name	Scientific Name	Distribution in Hong Kong[(1)]	Woodland	Plantation	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Village / Orchard	Developed Area / Wasteland	Modified Watercourse	Pond
Grass Demon	***Udaspes folus***	Rare						+			
Red Helen	*Papilio helenus helenus*	Very common	+					+			
Common Mormon	*Papilio polytes polytes*	Very common	+			+		+			
Spangle	*Papilio protenor protenor*	Very common		+	+	+		+			
Paris Peacock	*Papilio paris paris*	Very common						+			
Indian Cabbage White	*Pieris canidia canidia*	Very common		+	+	+	+	+			
Great Orange Tip	*Hebomoia glaucippe glaucippe*	Common								+	
Common Grass Yellow	*Eurema hecabe hecabe*	Very common			+				+		
Common Hedge Blue	*Acytolepis puspa gisca*	Common		+	+			+			
Common Five-ring	*Ypthima baldus baldus*	Very common	+	+							
Common Jester	*Symbrenthia lilaea lunica*	Common						+			
Common Mapwing	*Cyrestis thyodamas chinensis*	Common						+			

Notes:
(1) AFCD (2015). Hong Kong Biodiversity Database.
Status of butterfly species was not assessed in IUCN Red List as of July 2015.

Species of conservation importance is in bold type face
Code of Abundance: +=Rare; ++=Occasional; +++=Common; ++++=Abundant; +++++=Dominant

Fauna Species Recorded within the Assessment Area

Odonate

Common Name	Scientific Name	Distribution in Hong Kong[1]	Level of Concern[2]	IUCN Red List (Version 2015.2)[3]	Woodland	Plantation	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Village / Orchard	Developed Area / Wasteland	Modified Watercourse	Pond
Common Blue Jewel	*Rhinocypha perforata perforata*	Abundant	-	-									+
Wandering Midget	*Agriocnemis pygmaea*	Common	-	-									+
Orange-tailed Sprite	*Ceriagrion auranticum*	Abundant	-	-									+
Common Bluetail	*Ischnura senegalensis*	Abundant	-	-									+
Yellow Featherlegs	*Copera marginipes*	Abundant	-	-									+
Pale-spotted Emperor	*Anax guttatus*	Abundant	-	-									+
Blue Dasher	*Brachydiplax chalybea*	Common	-	-									+
Crimson Darter	*Crocothemis servilia servilia*	Abundant	-	-									+
Russet Percher	*Neurothemis fulvia*	Abundant	-	-									+
Green Skimmer	*Orthetrum sabina sabina*	Common	-	-									+
Wandering Glider	*Pantala flavescens*	Abundant	-	-			++			+			+
Pied Skimmer	*Pseudothemis zonata*	Common	-	-									+
Variegated Flutterer	*Rhyothemis variegata arria*	Common	-	-									++
Crimson Dropwing	*Trithemis aurora*	Abundant	-	-									+

Notes:
(1) AFCD (2015). Hong Kong Biodiversity Database.
(2) Fellowes *et al* . (2002)
(3) IUCN (2015). IUCN Red List of Threatened Species. Version 2015.2.

Code of Abundance: +=Rare; ++=Occasional; +++=Common; +++++=Abundant; ++++++=Dominant

Fauna Species Recorded within the Assessment Area

Herpetofauna

Common Name	Scientific Name	Distribution in Hong Kong[1]	Level of Concern[2]	IUCN Red List (Version 2015.2)[3]	Woodland	Plantation	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Village / Orchard	Developed Area / Wasteland	Modified Watercourse	Pond
Amphibian													
Asian Common Toad	*Bufo melanostictus*	Widely distributed	-	-		+				+			
Asiatic Painted Frog	*Kaloula pulchra*	Widely distributed	-	-		+							
Butler's Pigmy Frog	*Microhyla butleri*	Widely distributed	-	-			+						
Ornate Pigmy Frog	*Microhyla ornata*	Widely distributed	-	-						+			
Paddy Frog	*Fejervarya limnocharis*	Widely distributed	-	-		+				++			
Gunther's Frog	*Rana guentheri*	Widely distributed	-	-						+			
Reptile													
Chinese Gecko	*Gekko chinensis*	Very common and widely distributed	-	-						+			
Long-tailed Skink	*Mabuya longicaudata*	Widely distributed	-	-						+			
Red-eared Slider Turtle	*Trachemys scripta*	-	-	-									+

Notes:
(1) AFCD (2015). Hong Kong Biodiversity Database.
(2) Fellowes *et al.* (2002): LC=Local Concern; PRC=Potential Regional Concern; PGC: Potential Global Concern.
(3) IUCN (2015). IUCN Red List of Threatened Species. Version 2015.2.

Code of Abundance: +=Rare; ++=Occasional; +++=Common; ++++=Abundant; +++++=Dominant

Fauna Species Recorded within the Assessment Area

Mammal

Common Name	Scientific Name	Distribution in Hong Kong[1]	Level of Concern[2]	Woodland	Plantation	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Village / Orchard	Developed Area / Wasteland	Modified Watercourse	Pond
Chinese Noctule[3]	***Nyctalus plancyi***	Common	PRC, (RC)									+
Japanese Pipistrelle[3]	***Pipistrellus abramus***	Abundant	-		+	+						
-	***Pipistrellus* sp.[3]**	-	-						+			
Bat sp. 1[3]	-	-	-						+		+	

Freshwater Communities

Common Name	Scientific Name	Distribution in Hong Kong[1]	Level of Concern[2]	Modified Watercourse	Pond
Nile Tilapia	*Oreochromis niloticus*	Common	-	+	++++
-	*Pomacea canaliculata*	-	-	+	++
-	*Metrocoris* sp.	-	-		+

Notes:
(1) AFCD (2015). Hong Kong Biodiversity Database.
(2) Fellowes *et al.* (2002): RC=Regional Concern; PRC=Potential Regional Concern.
Letters in parentheses indicate that the assessment is on the basis of restrictedness in nesting and/or roosting sites rather than in general occurrence.
(3) Protected under Wild Animals Protection Ordinance (Cap. 170).

Species of conservation importance is in bold type face
Code of Abundance: +=Rare; ++=Occasional; +++=Common; ++++=Abundant; +++++=Dominant

Appendix 4.1



Photo 1 Vegetation in roadside amenity area



Photo 2 Vegetation in roadside amenity area



Photo 3 Vegetation on man-made slope



Photo 4 Vegetation on man-made slope



Photo 5 Vegetation in agricultural land



Photo 6 Vegetation in agricultural land

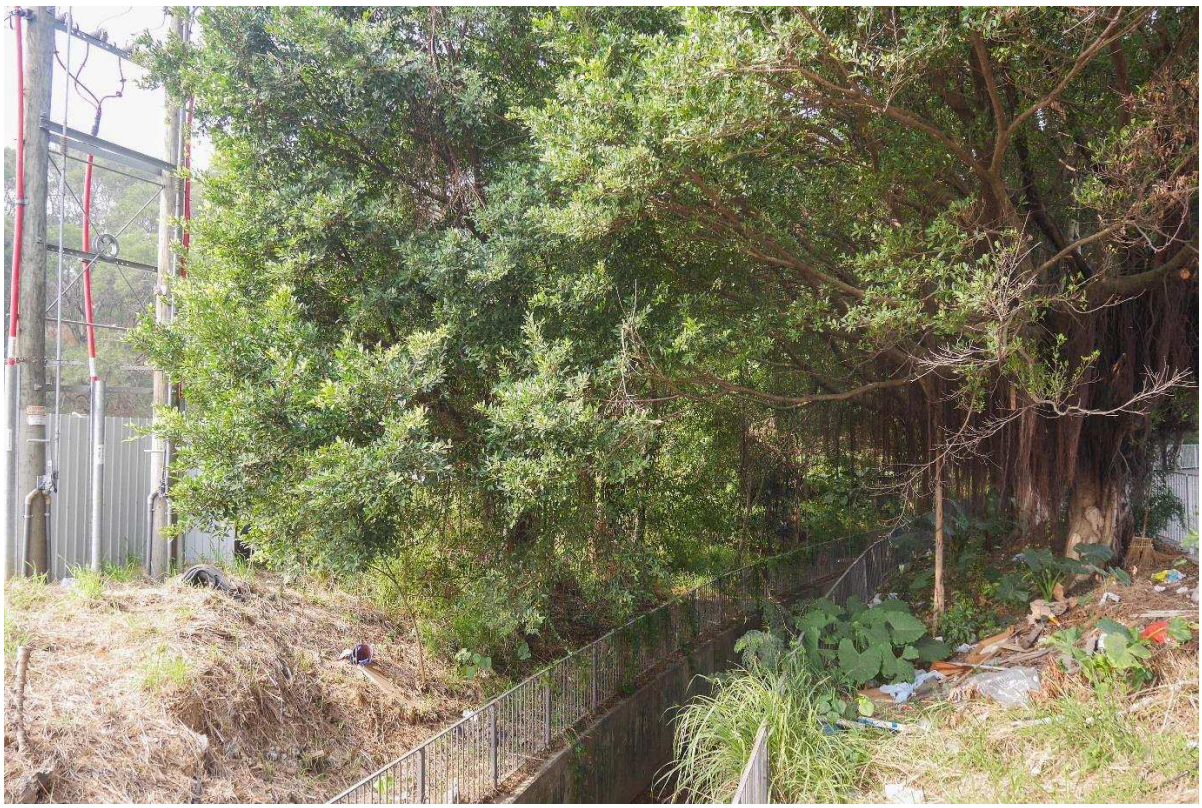


Photo 7 Stream Course



Photo 8 Stream Course



Photo 9 Mitigation Wetland



Photo 10 Mitigation Wetland



Photo 11 Kam Sheung Road Sitting-out Area



Photo 12 Kam Sheung Road Sitting-out Area



Photo 13 Woodland and grassland near Tsing Long Highway

PROPOSED AMENDMENTS TO THE APPROVED KAM TIN SOUTH OUTLINE ZONING PLAN NO. S/YL-KTS/13

Sites 1, 4a and 6 for Public Housing Development and Government, Institution or Community Facilities

PART II

Proposed Housing Developments at Kam Tin South Sites 1, 4a and 6

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1 INTRODUCTION

1.1 Background

1.1.1 Public Housing Development was proposed at Kam Tin South, Yuen Long. The proposed development consists of 3 sites, namely Sites 1, 4a and 6, with areas of approximately 5.8, 5.8 and 2.7 hectares, respectively. This Preliminary Environmental Assessment (PEA) is based upon the indicative layout plan provided by HKHA.

1.1.2 AECOM Asia Co. Ltd was commissioned by HKHA to carry out a PEA for the proposed development. The objective of this PEA is to identify the potential environmental impacts on the proposed development with respect to guidelines for environmental considerations provided in Chapter 9 – Environment of the Hong Kong Planning Standards & Guidelines (HKPSG).

1.1.3 In view of the environmental setting of the sites, the proposed development would be subject to potential impacts of traffic noise from surrounding roads including Tsing Long Highway, Tung Wui Road, Kam Ho Road, Kam Po Road, and etc., railway noise from the West Rail Line and fixed noise from various existing fixed noise sources in the surrounding area. The air quality impact of vehicular emissions is also reviewed.

1.1.4 The Site Formation and Infrastructural Works for the Initial Sites at Kam Tin South, Yuen Long would be carried out by CEDD under Agreement No. CE34/2014(CE). This project covers road widening of a section of Kam Ho Road, Kam Po Road and construction of an Access Road for Site 1, and minor improvement works of junctions as well as site formation of the Sites 1, 4a and 6. Practicable at-source mitigation measures proposed under the project to alleviate the traffic noise impact are incorporated in this PEA report. The proposed road works would be completed before the population intake year of three Subject Sites. The assessments regarding land contamination and sewage disposal from the proposed development would be carried out by CEDD under Agreement No. CE34/2014(CE). The land contamination assessment and remediation if needed would be satisfactorily completed before the commencement of construction for the proposed development. The proposed development would be served by public sewerage networks upon population intake.

1.2 Concurrent Projects

1.2.1 Concurrent projects in the vicinity of the development sites are identified at the following paragraphs. The status of these concurrent projects is based on the available information at the time of submission of this Report. It should be noted that the implementation of individual projects would be subject to further development and subsequent actions of the respective project proponents.

(a) Northern Link (NOL): NOL is a rail link connecting the West Rail Line and the Lok Ma Chau Spur Line of East Rail with interchange at Kam Sheung Road Station. The Kam Sheung Road Station and Pat Heung Maintenance Centre would support the future NOL. According to the Railway Development Strategy 2014 prepared by the Transport and Housing Bureau, the actual implementation of the project is contingent upon the technical and financial studies as well as public consultation at the detailed planning stage of NOL. Under the Environmental Impact Assessment Ordinance (EIAO), the development of NOL is considered as designated project. An Environmental Permit (EP) should be required to construction and operate the NOL. The project proponent of NOL should carry out environmental impact assessment to assess and mitigate the possible impacts on the affected sensitive receivers under EIAO for application of EP. .

(b) Planned development at Kam Sheung Road Station: The development layout (i.e. Master Layout Plan 2013) is presented in the “Land Use Review for Kam Tin South and Pat Heung”. With reference to the Land Use Review Report, the population intake year would be 2022.

2 SITE LOCATION AND BUILDING DESIGN

2.1 Site Location

2.1.1 Site 1 is bounded by Tung Wui Road to the north, Kam Tin River to the east, MTR Pat Heung Depot to the south and West Rail Line to the west. The site is presently an organic farm in the northern part and an open area in the southern part.

2.1.2 Site 4a is bounded by Tung Wui Road to the north, Ng Ka Tsuen to the east, drainage channel KT 15 to the south and Kam Po Road to the west. The existing land use of Site 4a is mainly a flat open area being used for village houses and a factory.

2.1.3 Site 6 is bounded by Kam Ho Road to the north and east, and Tsing Long Highway to the west. South of Site 6 is mountainous. The existing land use of Site 6 is a slope open area being used for village houses.

2.1.4 The site location plan is depicted in **Figure 2.1**.

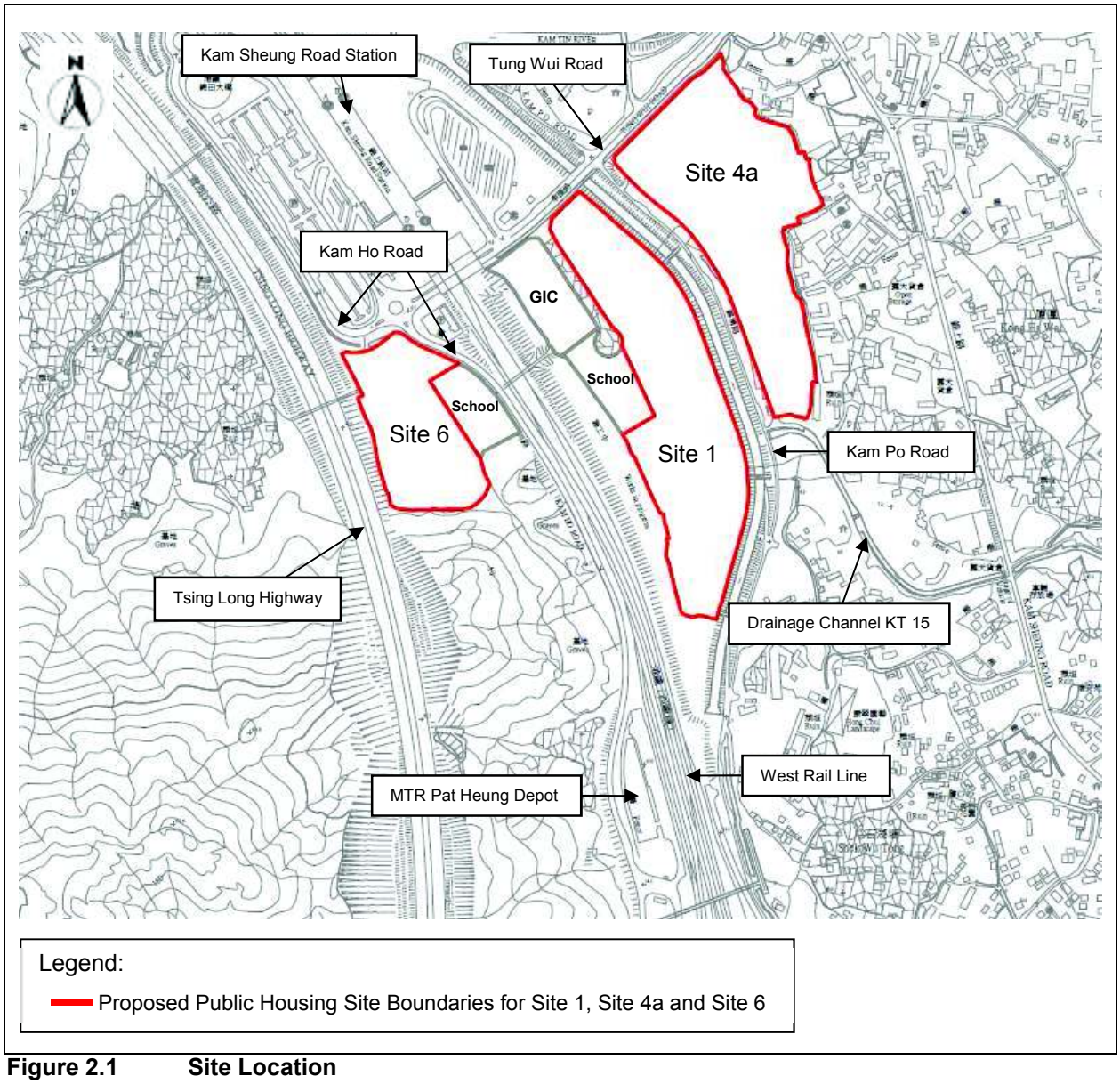


Figure 2.1 Site Location

2.2 Building Design

2.2.1 The proposed public housing developments at Kam Tin South consists of 3 sites, namely Sites 1, 4a and 6. The current layouts of the three proposed sites are illustrated in **Figure 2.2** to **Figure 2.4**. The planned building heights range from +57.50 mPD to +59.00 mPD. The key development parameters for assessment are given in **Table 2.1**. The proposed layouts and development parameters are subject to detailed design.

Table 2.1 Key Development Parameters for Assessment

Parameters	Site 1		Site 4a	Site 6		
	Block 1	Block 2 - 10	Block 1 - 9	Block 1,2,8	Block 3,4,6,7	Block 5
No. of Storeys (Excluding Ground Floor)	16	16	16	16	16	15
Floor to Floor Height	2.75 m	2.75 m	2.75 m	2.75 m	2.75 m	2.75 m
Ground Floor Level	+8.00 mPD	+8.00 mPD	+8.00 mPD	+7.50 mPD	+9.00 mPD	+11.00 mPD
First NSR Level	+15.20 mPD	+15.20 mPD	+15.20 mPD	+14.70 mPD	+16.20 mPD	+18.20 mPD
Main Roof Level	+58.00 mPD	+58.00 mPD	+58.00 mPD	+57.50 mPD	+59.00 mPD	+58.25 mPD
Total Number of Flats	3700 approx.		3750 approx.	1550 approx.		

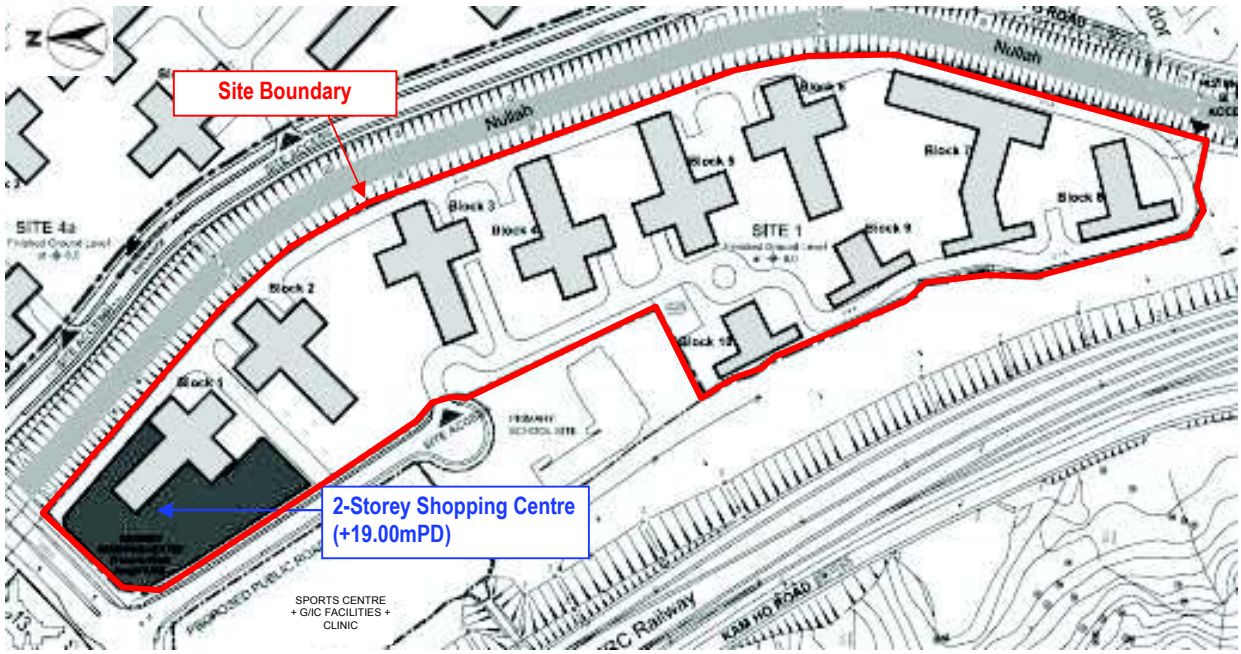


Figure 2.2 Site 1 Layout Plan

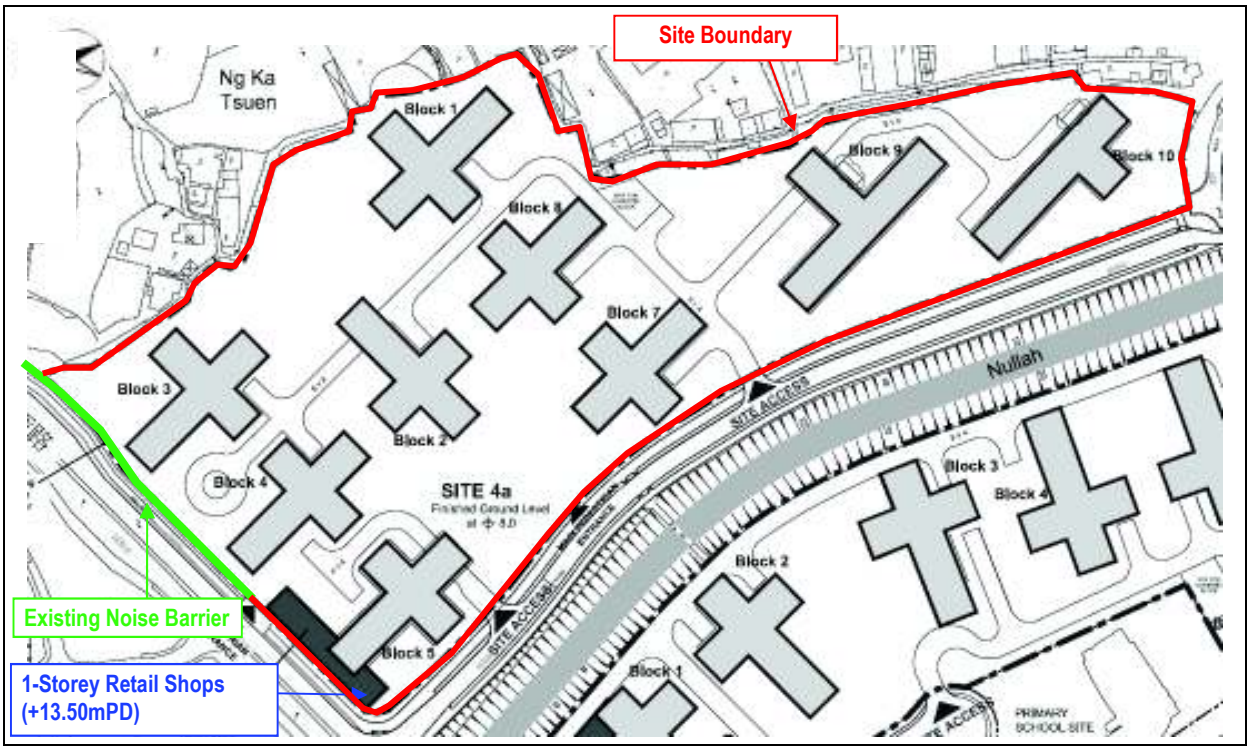


Figure 2.3 Site 4a Layout Plan

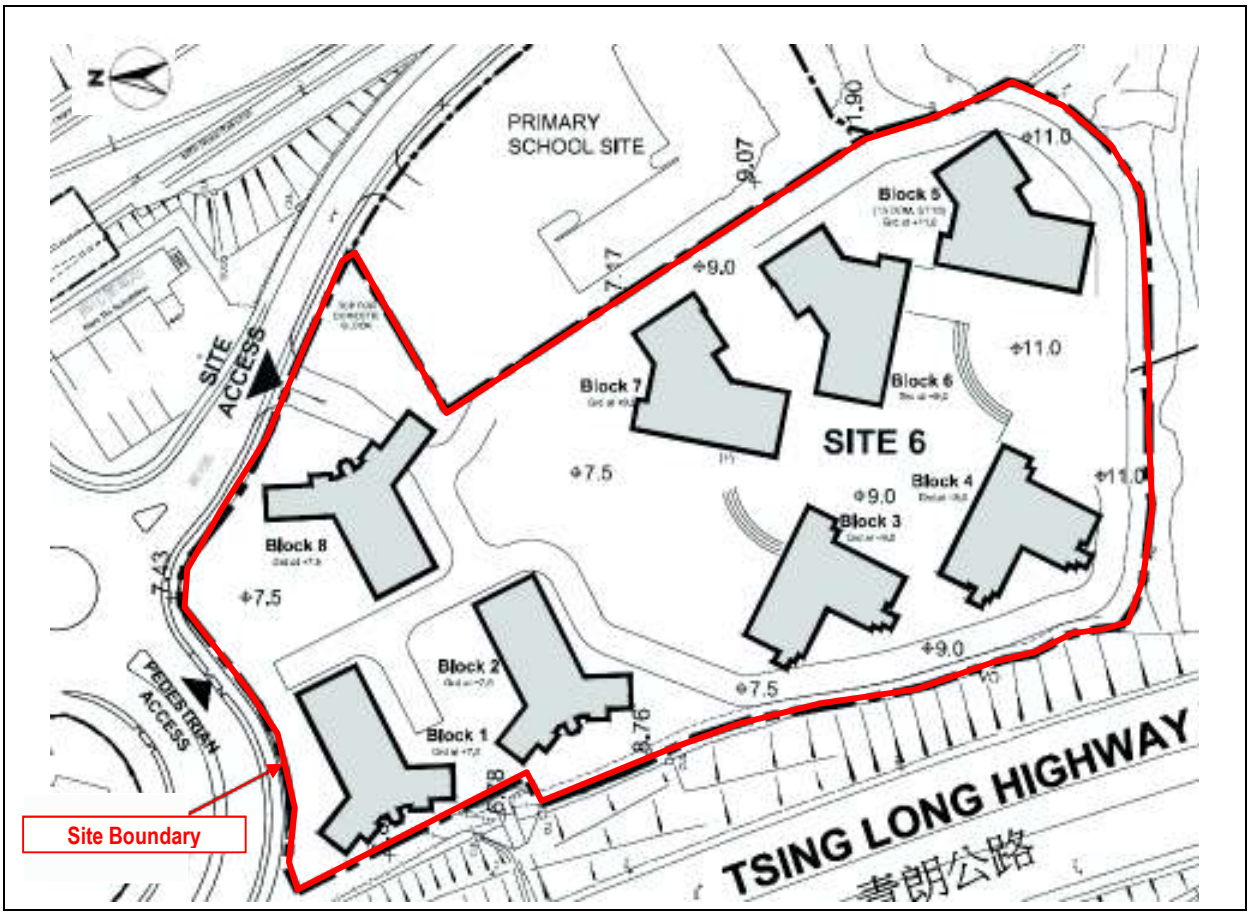


Figure 2.4 Site 6 Layout Plan

3 SITE INSPECTION

3.1.1 Site visits were carried out in June and July 2015. Photographs taken at the site location and the neighbouring areas are given in **Figure 3.2** to **Figure 3.26.**

3.1.2 For Site 1, the site is presently an organic farm in the northern part and an open area in the southern part. West Rail track lines are aligned to the west of the site. West Rail Kam Sheung Road (KSR) Station and KSR Railway Station bus terminus are located at the north-west of Site 1, separated by Tung Wui Road. The bus terminus is proposed to be relocated to the south-west corner beneath the planned private development at Kam Sheung Road Station. Therefore, noise impact from the Kam Sheung Road Station Bus Terminus is not anticipated.

3.1.3 For Site 4a, the site is currently being used for village houses and a factory. A construction site is located at the north of Site 4a, separated by Tung Wui Road. Various village houses are located to the east and south of the site. No apparent environmental issues have been identified from these village houses during site visits.

3.1.4 For Site 6, the existing land use is a slope open area being used for village houses. West Rail track lines and CLP Kam Tin Substation are located at the east of the site, separated by Kam Ho Road. West Rail Kam Sheung Road Station and its associated car park are located at the north of the site, separated by Kam Ho Road. The planned private development at Kam Sheung Road Station is proposed at the Kam Sheung Road Station car park. Therefore, noise impact from the car park is not anticipated.

3.1.5 The Shek Kong Airport is located at the north-east of Site 1, Site 4a and Site 6 with a distance of over 500m. With reference to the aircraft noise impact assessments presented in “Land Use Review Report for Kam Tin South and Pat Heung Main Report” and extracted below, ‘For aircraft noise impact due to fixed wing civil aircraft by the Hong Kong Aviation Club and helicopter noise impact due to Shek Kong Airport, according to the corresponding assessments presented in “Planning and Development Study on Northwest New Territories”, it was considered that aircraft noise impact on the proposed Kam Tin/ Au Tau New Development Area (NDA) was minor and potential helicopter noise impact on the proposed Kam Tin/ Au Tau NDA was also considered to be in compliance with relevant noise criterion in the abovementioned Study Report. Therefore, it is anticipated that the impacts due to aircraft noise and helicopter noise should not be a concern’. Hence, aircraft noise impact for Site 1, Site 4a and Site 6 should not be a concern.

3.1.6 Various fixed noise sources such as car repairing workshops, small factories and godown are identified along Kam Sheung Road which is located to the east of Site 4a. The locations of these developments are depicted in **Figure 3.1**. The fixed noise impact arising from these developments are assessed in **Section 6**.

3.1.7 Based on chimney survey conducted within 500m away from the boundary of proposed development, no active industrial chimney is identified. Therefore, air quality impact due to chimney emission is not expected.

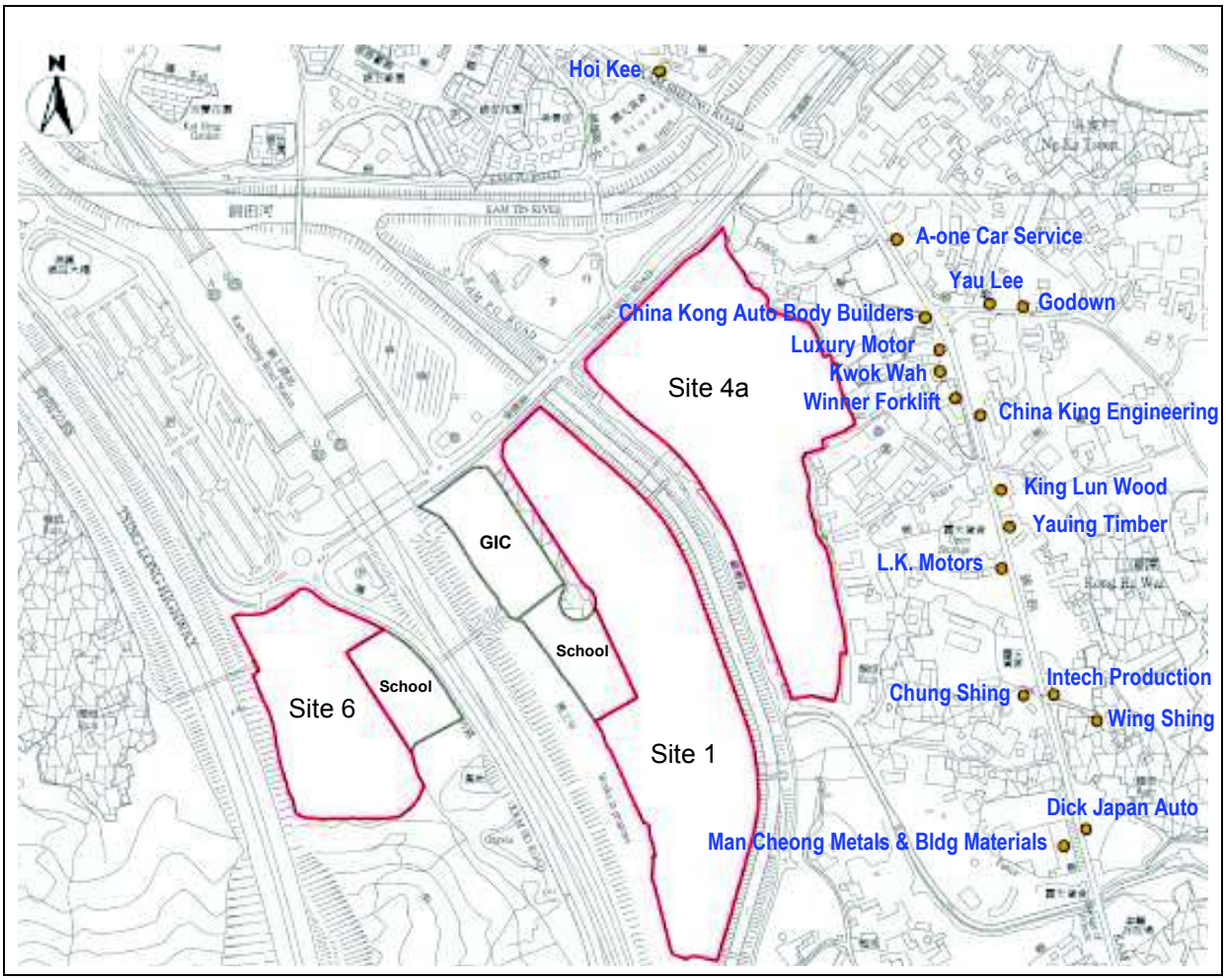


Figure 3.1 Locations of Potential Fixed Plant Noise Sources



Figure 3.2 Existing Land Use of Site 1 – Organic Farm



Figure 3.3 Existing Land Use of Site 4a – Village houses



Figure 3.4 Existing Land Use of Site 4a – Factory



Figure 3.5 Existing Land Use of Site 6 – Village houses



Figure 3.6 West Rail KSR Station, Car Park and Bus Terminus



Figure 3.7 West Rail track lines



Figure 3.8 MTR Pat Heung Depot



Figure 3.9 Construction Site



Figure 3.10 Hoi Kee 開記汽車服務



Figure 3.11 A-one Car Service Centre



Figure 3.12 China Kong Auto Body Builders Co. Ltd.



Figure 3.13 Yau Lee 友利車房



Figure 3.14 Godown 友聯 A 倉



Figure 3.15 Luxury Motor Company



Figure 3.16 Kwok Wah 國華電單車行



Figure 3.17 Winner Forklift Engineering Ltd



Figure 3.18 China King Engineering Ltd
華光工程



Figure 3.19 King Lun Wood Prods & Doors Co Ltd
金輪木業門廠



Figure 3.20 Yauing Timber Ltd 友盛木業



Figure 3.21 L.K. Motors



Figure 3.22 Chung Shing 中成車身廠



Figure 3.23 Intech Production Ltd 形匠



Figure 3.24 Wing Shing 永成五金



Figure 3.25 Dick Japan Auto



Figure 3.26 Man Cheong Metals & Building Materials Co Ltd

4 ROAD TRAFFIC NOISE ASSESSMENT

4.1 Noise Criteria

4.1.1 Noise standards are recommended in Chapter 9 on Environment of the Hong Kong Planning Standards and Guidelines (HKPSG) for planning against potential noise impact from road traffic, railway and aircraft etc. According to the HKPSG, the maximum allowed road traffic noise level, measured in terms of $L10_{(1\text{-hr.})}$ is recommended to be 70 dB(A) for domestic premises at 1 metre away from typical noise sensitive façades. This criterion applies to premises which rely on openable windows as a primary means of ventilation.

4.2 Traffic Flow Data

4.2.1 The traffic noise levels at the sensitive façades of the proposed residential block have been predicted based on Year 2043 traffic data presented in **Appendix 4.1** which is same set of traffic data adopted in the Preliminary Environmental Review for Agreement No. CE 34/2014(CE) "Site Formation and Infrastructural Works for the Initial Sites at Kam Tin South, Yuen long – Investigation, Design and Construction".

4.3 Methodology

4.3.1 The planned development at Kam Sheung Road Station presented on the Master Layout Plan (MLP) 2013 of "Land Use Review for Kam Tin South and Pat Heung" and the proposed road alignments and proposed mitigation measures including Low Noise Road Surfacing (LNRS) presented in the Preliminary Environmental Review for Agreement No. CE 34/2014(CE) "Site Formation and Infrastructural Works for the Initial Sites at Kam Tin South, Yuen long – Investigation, Design and Construction" have been incorporated in the base scenario of this study. Traffic noise levels at the façades of the proposed development have been predicted. The prediction is based on the traffic flow data in Year 2043 and calculation method in accordance with the UK Department of the Transport "Calculation of Road Traffic Noise" (CRTN). The locations of noise sensitive receivers (NSRs) are presented in **Figure 4.1** to **Figure 4.3**.

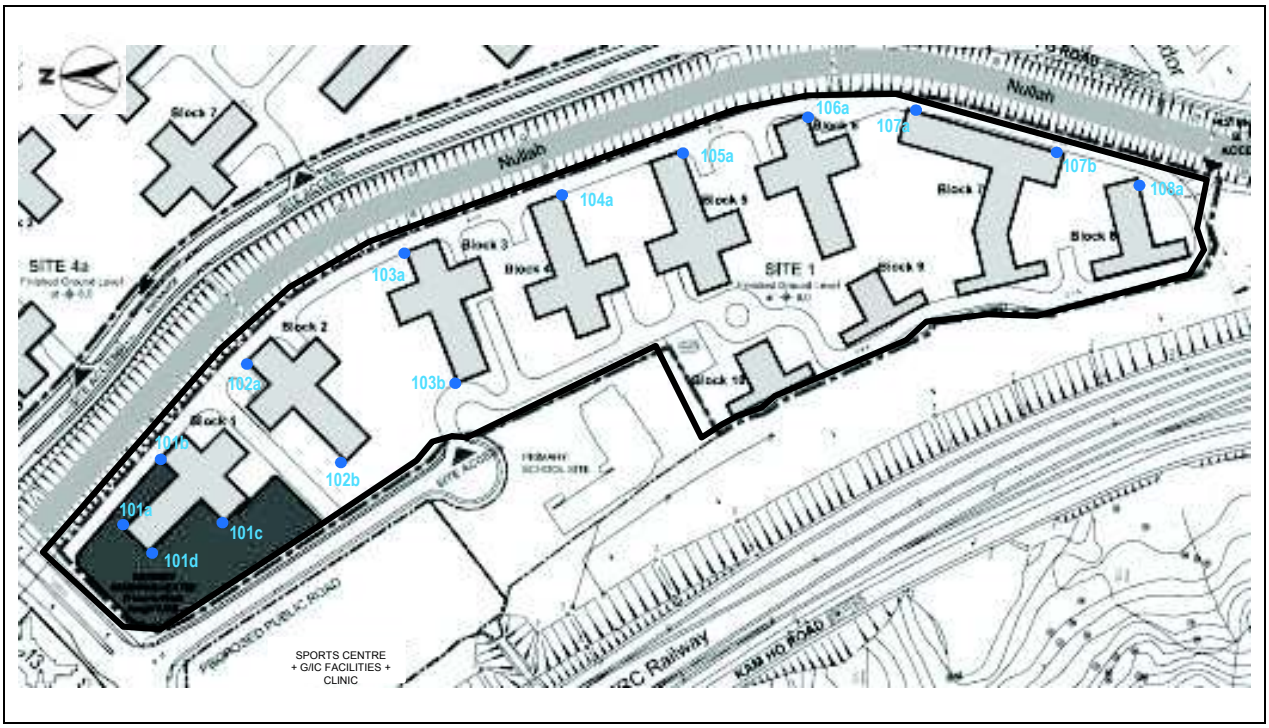


Figure 4.1 Representative Noise Sensitive Receivers in Site 1

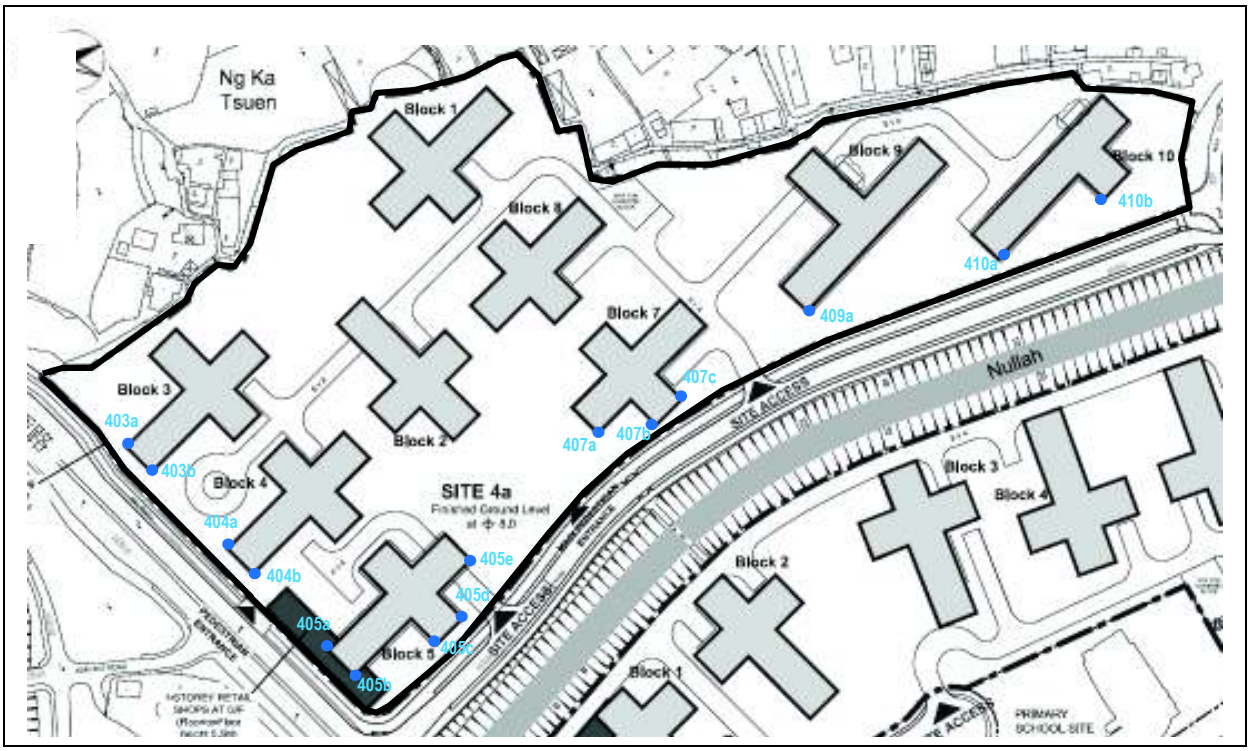


Figure 4.2 Representative Noise Sensitive Receivers in Site 4a

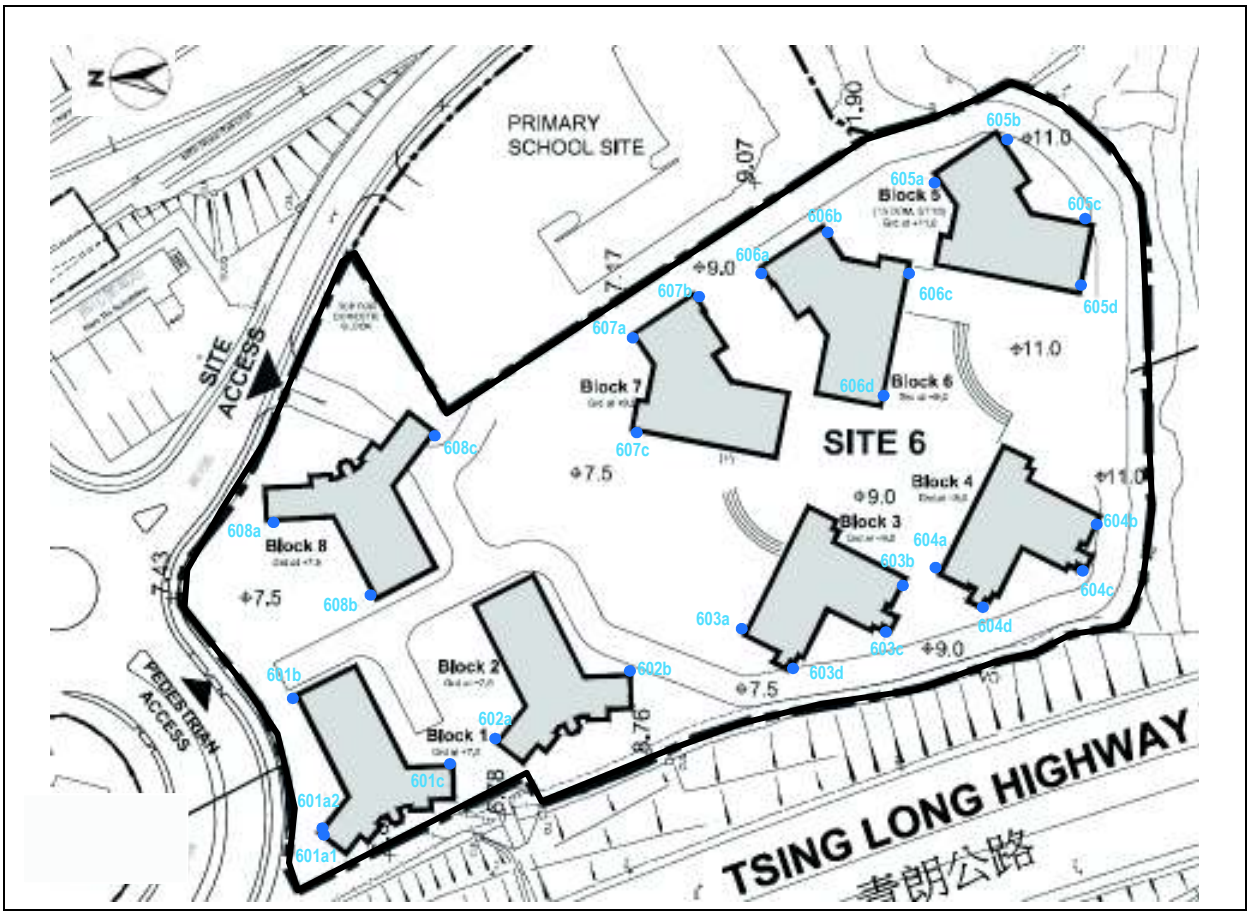


Figure 4.3 Representative Noise Sensitive Receivers in Site 6

4.4 Predicted Noise Impact

Base scenario

4.4.1 The predicted façade noise levels of the proposed residential development in Site 1, 4a and 6 are presented in **Appendix 4.1**. It is estimated that some flats in Site 1, 4a and 6 will be exposed to noise levels in excess of the 70 dB(A) criterion without incorporation of mitigation measures. The maximum predicted noise level is 82 dB(A).

Mitigation of Traffic Noise Impact

4.4.2 At-source mitigation measures such as noise barriers and at-receiver mitigation measures such as fixed glazing with Allen key for maintenance purpose, architectural fins, acoustic window system and acoustic balconies would be considered in alleviating the traffic noise impact. For the noise sensitive receivers with predicted noise level greater than 78 dB(A), fixed glazing with Allen Key for maintenance purpose would be considered in alleviating the traffic noise impact. With the implementation of appropriate mitigation measures, it is anticipated that the relevant HKPSG requirement on traffic noise impact can be met. The provision of LNRS under Agreement No. CE 34/2014(CE) by CEDD is subject to design review and agreement with Highway Department. HKHA would further review the development layouts and carry out environmental assessment study on the potential traffic noise impact with proposed mitigation measures for enhancement at the detailed design stage.

4.5 Conclusion

4.5.1 The proposed developments would be subject to potential impacts of traffic noise from surrounding roads. At-source mitigation measures (such as noise barriers) and at-receiver mitigation measures (such as fixed glazing with Allen key for maintenance purpose, architectural

fins, acoustic window system and acoustic balconies) would be considered in alleviating the traffic noise impact. With the implementation of appropriate mitigation measures, it is anticipated that the relevant HKPSG requirement on traffic noise impact can be met. The provision of LNRS under Agreement No. CE 34/2014(CE) by CEDD is subject to design review and agreement with Highway Department. HKHA would further review the development layouts and carry out environmental assessment study on the potential traffic noise impact with proposed mitigation measures for enhancement at the detailed design stage.

5 RAIL NOISE IMPACT ASSESSMENT

5.1 Rail Noise Criteria

5.1.1 Rail noise is controlled under the Noise Control Ordinance (NCO) and the associated Technical Memorandum for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites (TM-Places). In accordance with the HKPSG, a 24-hour averaged noise level of 65 dB(A) $Leq_{(24hr)}$ and maximum noise level of 85 dB(A) Lmax between 2300 and 0700 have been specified.

5.1.2 The three subject sites – Site 1, Site 4a and Site 6 are located at Kam Tin South. It is considered that the three subject sites are not classified as rural area and low-density residential area. Site 1, 4a and 6 are considered as Type iv Area – Area other than above, according to Table 1 of TM-Places. Site 1 and 4a are not affected by Influencing Factor (IF). Therefore, an Area Sensitivity Rating of B has been applied to Site 1 and 4a. Site 6 is bounded by Tsing Long Highway to the west. Tsing Long Highway have an annual average daily traffic flows (AADT) of 61,010, according to the Annual Census, 2015. Tsing Long Highway is therefore considered as IF. However, for the NSRs facing the existing West Rail which is situated to the east of the site, the noise generated by the IF is not a dominant feature of the noise climate of those NSRs. Therefore, an Area Sensitivity Rating of B has been applied for Site 6. An Acceptable Noise Level (ANL) of 65 dB(A) for day and evening time and 55 dB(A) for night-time has been adopted.

5.2 Existing Condition of West Rail and Proposed Northern Link nearby the Subject Sites

5.2.1 As shown in **Figure 2.1**, the existing West Rail is aligned along the north-south axis. Kam Sheung Road Station (KSR Station) and Pat Heung Maintenance Centre are situated along the railway line. The section of railway line within KSR Station and to its north is in the form of viaduct, whereas the section to the south of KSR Station is at grade and elevated, where the subject Site 1 and Site 6 are situated to the east and west of the railway line respectively.

5.2.2 The future Northern Link (NOL) is currently under planning and the implementation programme is not yet confirmed. NOL is a rail link connecting the West Rail Line and the Lok Ma Chau Spur Line of East Rail with interchange at Kam Sheung Road Station. The Kam Sheung Road Station and Pat Heung Maintenance Centre would support the future NOL. According to the Railway Development Strategy 2014 prepared by the Transport and Housing Bureau, the actual implementation of the project is contingent upon the technical and financial studies as well as public consultation at the detailed planning stage of NOL. Under the Environmental Impact Assessment Ordinance (EIAO), the development of NOL is considered as designated project. An Environmental Permit (EP) should be required to construction and operate the NOL. The project proponent of NOL should carry out environmental impact assessment to assess and mitigate the possible impacts on the affected sensitive receivers under EIAO for application of EP.

5.3 Operational Characteristics of West Rail

5.3.1 This assessment was based on the information extracted from the Environmental Review Report of Pat Heung Depot Modification Works (VEP-361/2012) submitted by MTRC in June 2012 and the latest West Rail Train Noise Assessment Report prepared by MTRC under the Environmental Permit No. FEP-24/004/1998/J in July 2015. According to the Environmental Review Report of Pat Heung Depot Modification Works, the noise source term is based on the measured noise level during the commissioning of SP1900 train and a disc braked Electric Multiple Unit (EMU). The L_{max} of 75.3 dB(A) is adopted in this study. According to the latest West Rail EP/ VEP, the number of train cars is 9 whilst the main line is currently operating with 7-car trains. As a conservative approach, the assessment is based on 9 train cars. The calculated SEL for 9 train cars is 83.2 dB(A). The operational parameters of West Rail are extracted and shown in **Table 5.1** below.

Table 5.1 Summary of West Rail Operation

Train Operations	Assessment Period	
	2300-0700	0700-2300
Train frequency		
- Main Line (trains per hour per direction)	20 (20)	20 (28)
- Sidings (Existing - Western) (trains per 30 min.)	5	5
- Sidings (Planned - Eastern) (trains per 30 min.)	(5)	(5)
- Car Wash Facility (Existing) (trains per 30 min.)	3	3
- Car Wash Facility (Planned) (trains per 30 min.)	(3)	(3)
Train speed (kph)		
- Main Line	Up to 130	Up to 130
- Siding (Existing/Planned)	25	25
- Car Wash Facility (Existing/Planned)	25	25
Train length (car/m)	7/175 (9/225)	7/175 (9/225)

Note: Operational parameters of existing and future (in bracket) scenarios are given.

5.4 Methodology

5.4.1 The planned development at Kam Sheung Road Station presented on the Master Layout Plan (MLP) 2013 of "Land Use Review for Kam Tin South and Pat Heung" has been incorporated in this study.

5.4.2 According to **Table 5.1**, the daytime and night-time train frequency adopted in this study are different, both day and evening time, night-time railway noise impact are assessed. Based on the reference SEL and future operational parameters above, the Leq $_{(30\text{-min})}$ levels during the day and evening time, night-time period at NSRs have been predicted using the NoiseMap V software which is in accordance with the EPD-accepted method specified in the UK Department of Transport Calculation of Railway Noise (CRN).

5.4.3 This assessment covers track section within 300m study area from the proposed residential development. The existing noise barriers are included in the modelling. The locations of noise barriers and the operational speed of the concerned track section are shown in **Figure 5.1**.

5.4.4 The subject Site 1 and Site 6 are situated to the east and west of the railway line respectively while Site 4a is further apart from the railway line and screened by Site 1. Therefore, only the railway noise impact on Site 1 and Site 6 has been assessed. The locations of NSRs are presented in **Figure 5.2** and **Figure 5.3**.

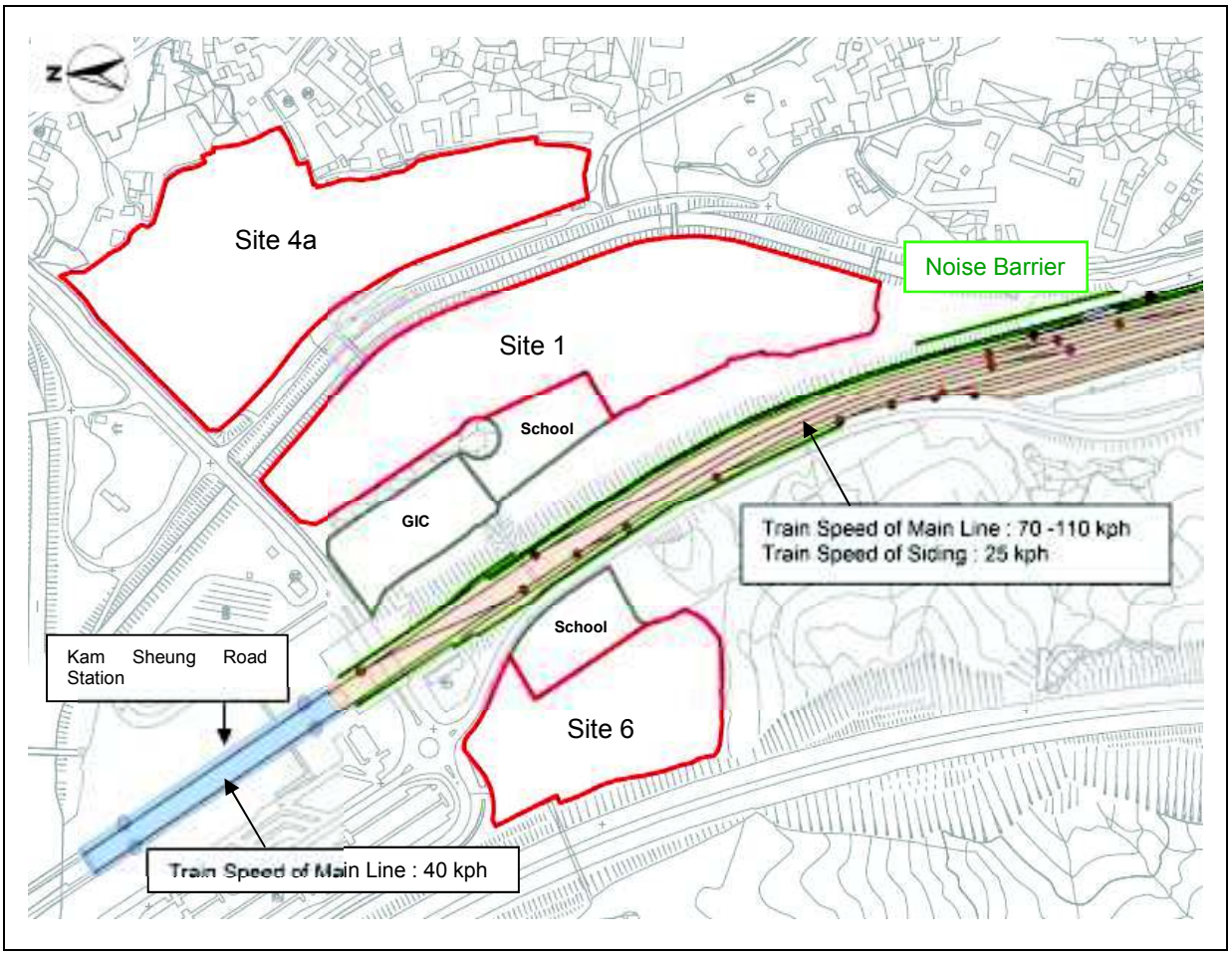


Figure 5.1 The Locations of Noise Barriers and the Operational Speed of the concerned tracks

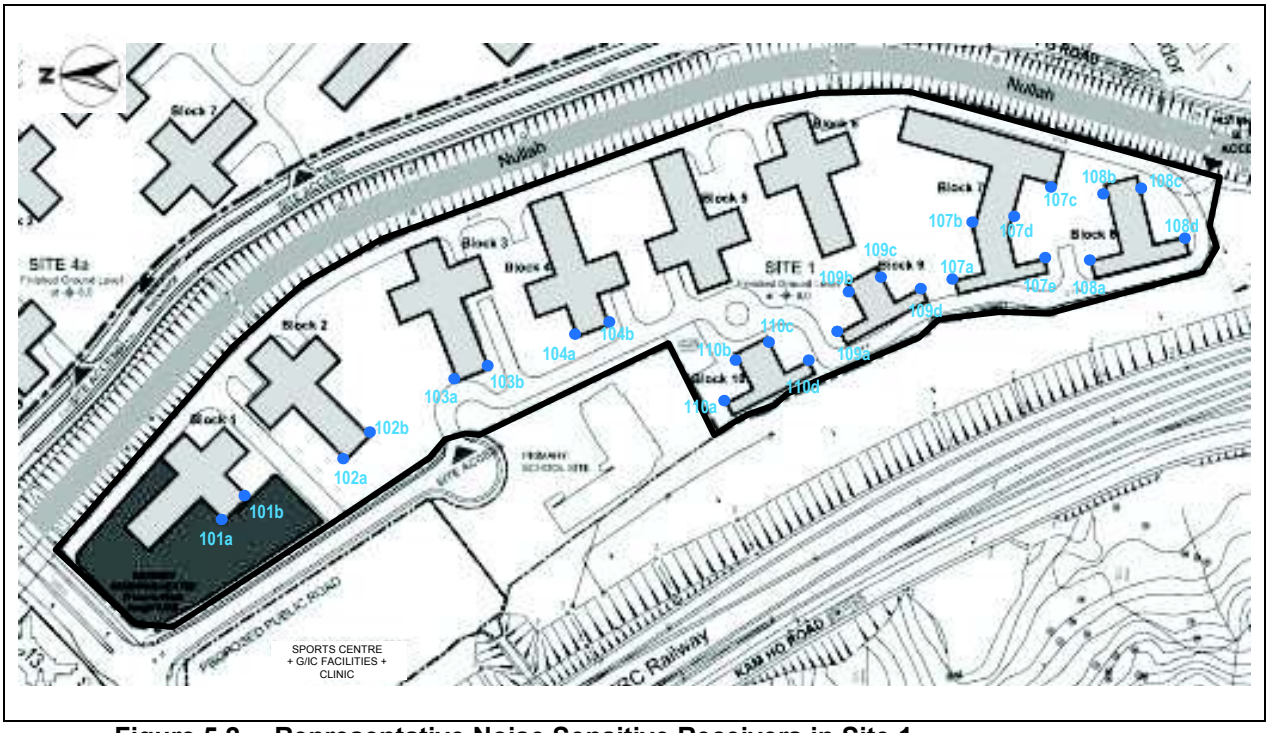


Figure 5.2 Representative Noise Sensitive Receivers in Site 1

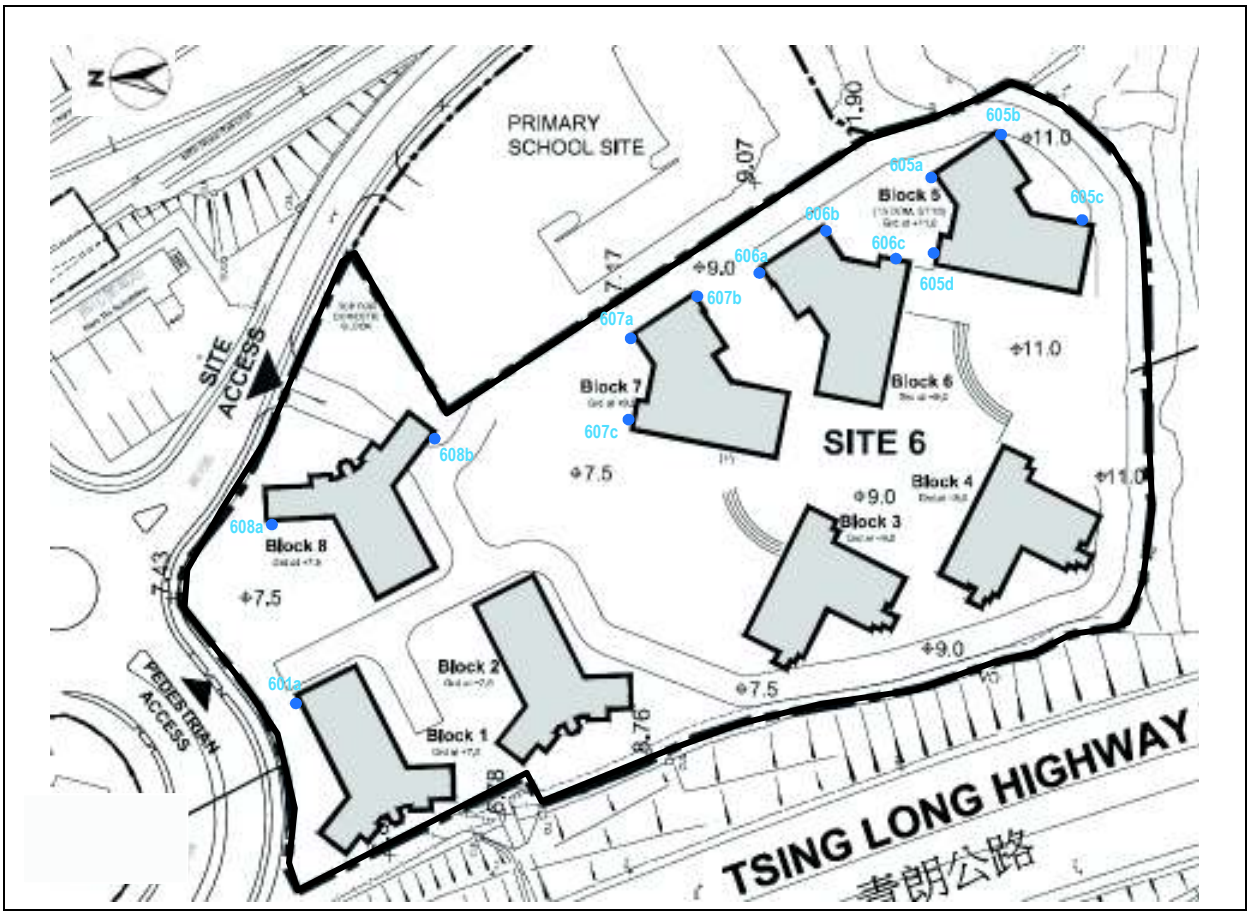


Figure 5.3 Representative Noise Sensitive Receivers in Site 6

5.5 Predicted Noise Impact (Day and Evening Time)

Base Scenario

5.5.1 The predicted day and evening time façade noise levels of the proposed residential development in Sites 1 and 6 are presented in **Appendix 5.1**. It is estimated that all flats would comply with the noise criterion of 65 dB(A) for day and evening time without incorporation of mitigation measures.

5.6 Predicted Noise Impact (Night-time)

Base Scenario

5.6.1 The predicted Night-time façade noise levels of the proposed residential development in Site 1 and 6 are presented in **Appendix 5.2**. Sample calculation of railway noise for representative NSR is presented in **Appendix 5.3**. It is estimated that some flats in Site 1 would be exposed to noise levels marginally exceeding the night-time noise standard.

Mitigation of Railway Noise Impact

5.6.2 At-receiver mitigation measures such as fixed glazing with Allen key for maintenance purpose, architectural fins and acoustic balconies would be considered in alleviating the railway noise impact. With the implementation of appropriate mitigation measures, it is anticipated that the relevant HKPSG requirement on rail noise impact can be met. HKHA would further review the development layouts and carry out environmental assessment study on the potential rail noise impact with proposed mitigation measures for enhancement at the detailed design stage.

5.7 Predicted Noise Impact (24-Hour Averaged Noise Level $Leq_{(24hr)}$)

5.7.1 As a conservative approach, the peak train frequency (i.e. train frequency during day and evening time as shown in **Table 5.1**) is adopted throughout 24 hours. Representative NSR at Block 8 in Site 1 would be subject to the highest predicted $Leq_{(24hr)}$ of 57 dB(A) and therefore would comply with the noise criterion of 65dB(A).

5.8 Predicted Noise Impact (Maximum Noise Level Lmax)

5.8.1 The L_{max} of 75.3 dB(A), for train speed of 130kph and measured at 25m from track, is adopted in this study. This noise level is significantly lower than the noise criterion of 85 dB(A). Among the identified representative NSRs, the setback distance is more than 25m from the railway line. Therefore, the noise level at this setback distance would not exceed the noise criterion of 85 dB(A).

5.9 Conclusion

5.9.1 The proposed developments would be subject to potential impacts of railway noise from the West Rail Line and future Northern Link (NOL). Proper design of the building blocks layout including single aspect building design, building set back have been adopted. At-receiver mitigation measures (such as fixed glazing with Allen Key for maintenance purpose, architectural fins and acoustic balconies) would be considered in alleviating the railway noise impact from the West Rail Line. With the implementation of appropriate mitigation measures, it is anticipated that the relevant HKPSG requirement on rail noise impact from West Rail Line can be met. HKHA would further review the development layouts and carry out environmental assessment study on the potential rail noise impact with proposed mitigation measures for enhancement at the detailed design stage.

6 FIXED NOISE IMPACT ASSESSMENT

6.1 Potential noise sources

6.1.1 Based on the desktop review and site inspections carried out in June 2015, July 2015, fixed noise sources have been identified, and are summarized in **Table 6.1**. Their locations are illustrated in **Figure 6.1**. Apart from these sources, there is no other significant noise source identified at the Kam Sheung Road Station and the 300m study area from the proposed residential development.

Table 6.1 Existing Fixed Noise Sources Identified

ID	Location
1	Hoi Kee Car Repairing Workshop (開記汽車服務)
2	A-one Car Serice Center (A-one 汽車服務中心)
3	Yau Lee Car Repairing Workshop (友利車房)
4	Godown (友聯 A 倉)
5	China Kong Auto Body Builders (中港車身製造廠)
6	Luxury Motor Company (名駒汽車公司)
7	Kwok Wah Car Repairing Workshop (國華電單車行)
8	Winner Forklift Engineering Ltd (永利叉車有限公司)
9	China King Engineering Ltd (華光工程)
10	King Lun Wood Prods & Doors Co Ltd (金輪木業門廠)
11	Yauing Timber Ltd (友盛木業)
12	L.K. Motors Car Repairing Workshop (電記汽車)
13	Intech Production Ltd (形匠)
14	Chung Shing Car Repairing Workshop (中成車身廠)
15	Wing Shing (永成五金)
16	Dick Japan Auto Car Repairing Workshop (永安日本汽車)
17	Man Cheong Metals & Building Materials Co Ltd (萬昌五金建材有限公司)

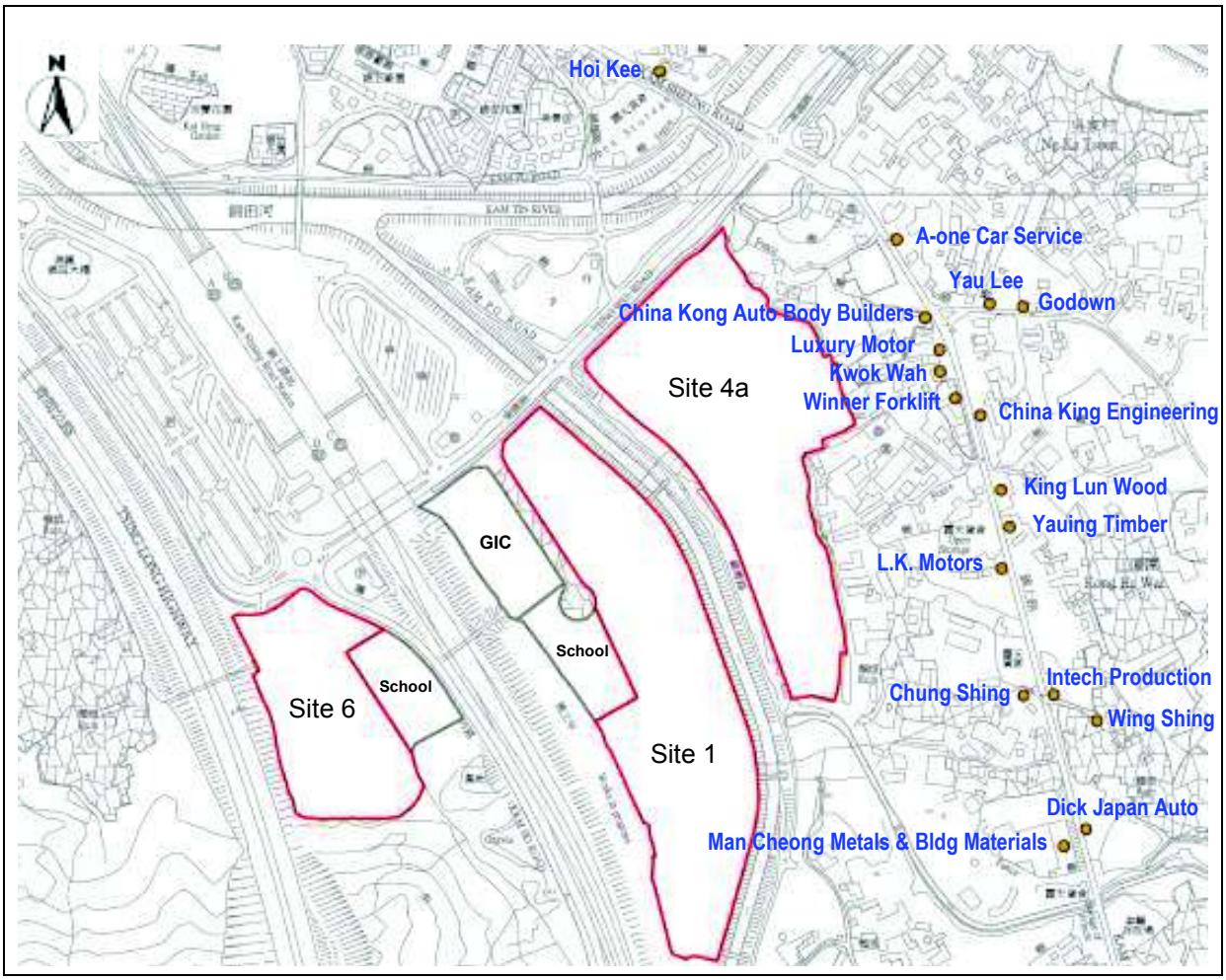


Figure 6.1 Locations of Potential Fixed Plant Noise Sources

6.1.2 As shown in **Figure 6.1**, the potential fixed plant noise sources are located to the east of Site 4a. Based on site visits and on-site interviews, the operating hours of the potential fixed plant noise sources are from 0900 to 1900 and there is no evening time or night time operation. No noticeable noise due to its operation is observed during site visits at day time. Hence, noise impact from these noise sources are not expected.

6.2 Fixed Noise Source Criteria

6.2.1 Noise from fixed sources is controlled by the Noise Control Ordinance and the relevant noise limits are stipulated in the Technical Memorandum for Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites (TM-Places).

6.2.2 The three subject sites – Site 1, Site 4a and Site 6 are located at Kam Tin South. It is considered that the three subject sites are not classified as rural area and low-density residential area. Site 1, 4a and 6 are considered as Type iv Area – Area other than above, according to Table 1 of TM-Places. Site 1 and 4a are not affected by Influencing Factor (IF). Therefore, an Area Sensitivity Rating of B has been applied to Site 1 and 4a. Site 6 is bounded by Tsing Long Highway to the west. Tsing Long Highway have an annual average daily traffic flows (AADT) of 61,010, according to the Annual Census, 2015. Tsing Long Highway is therefore considered as IF. However, for the noise sensitive facades facing the identified fixed plant noise sources which is situated to the east of the site, the noise generated by the IF is not a dominant feature of the noise climate of those noise sensitive facades. Therefore, an Area Sensitivity Rating of B has been applied for Site 6. An Acceptable Noise Level (ANL) of 65 dB(A) for day and evening time and 55 dB(A) for night-time has been adopted.

6.3 Impact Assessment

6.3.1 Fixed noise sources assessment was conducted in accordance with the following procedures:

- Identify and locate the fixed noise sources;
- Access the noise impact of fixed noise sources

6.3.2 The subject Site 1 and Site 6 are situated with a distance of more than 300m from the identified fixed noise sources, the fixed noise impact on these two sites are negligible. With reference to S6.1.2, the fixed noise sources are not in operation during evening and night-time periods. Therefore, only the fixed noise impact on Site 4a during day-time has been assessed.

6.3.3 On-site noise measurements at M1, M2 and M3 of Site 4a were conducted in February 2016. The eastern part of Site 4a is presently a private land with no public access. Therefore, the nearest accessible location M1 is selected for the on-site noise measurements. The representative NSR for fixed noise assessment are shown in **Figure 6.2** below. Details of the noise measurements are shown in **Appendix 6.1**. A positive 3 dB(A) has been added to the measured noise levels due to the façade effect.

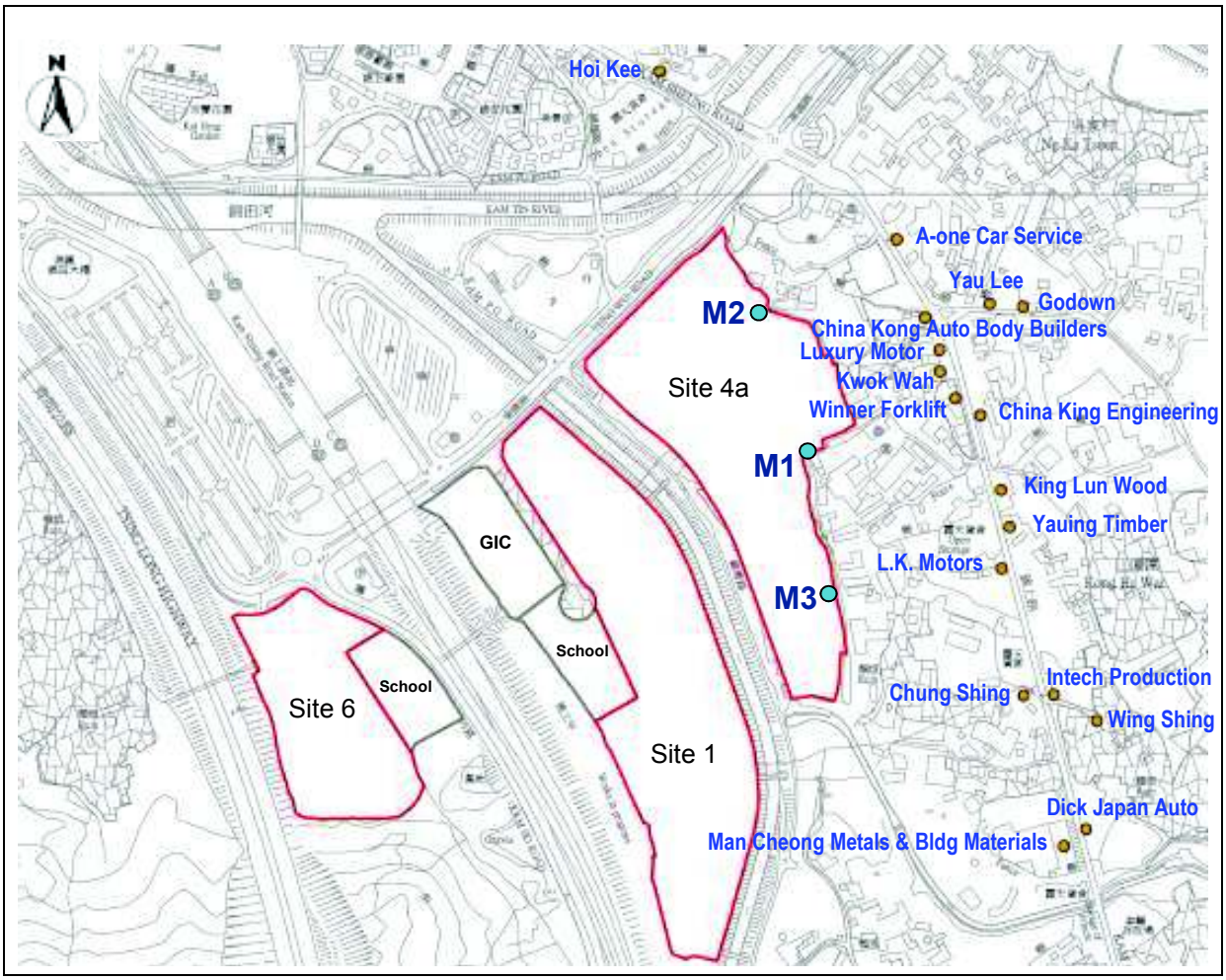


Figure 6.2 Locations of Noise Measurement

6.3.4 Based on the noise measurement results, the measured noise levels would be in the range of 57 to 65 dB(A), Leq (30min) with façade correction. The measured noise levels are below the daytime and evening time noise criterion of 65 dB(A). Given background noise influence correction has not been applied to the measured noise levels, the actual noise impact due to the fixed noise sources would be lower than the abovementioned values after background noise correction. It is anticipated that the relevant HKPSG requirements on fixed noise impact can be

met. HKHA would further review the development layouts and carry out environmental assessment study on the potential fixed noise impact at the detailed design stage. Appropriate mitigation measure would be proposed if necessary.

6.4 Conclusion

6.4.1 The fixed plant noise impact from car repairing workshops, small factories and godown on the proposed development has been assessed based on on-site noise measurements and desktop review. It is anticipated that the relevant HKPSG requirements on fixed noise impact can be met. HKHA would further review the development layouts and carry out environmental assessment study on the potential fixed noise impact at the detailed design stage. Appropriate mitigation measures would be proposed if necessary.

7 AIR QUALITY IMPACT ASSESSMENT

7.1 Air Quality Criteria

7.1.1 The air quality impact assessment criteria shall make reference to the Air Pollution Control Ordinance (APCO) (Cap. 311).

7.1.2 The APCO (Cap. 311) provides the statutory framework for controlling air pollutants from a variety of sources. The Hong Kong Air Quality Objectives (AQOs), which must be satisfied, stipulate the maximum allowable concentrations over specific periods for a number of criteria air pollutants. The AQOs are listed in **Table 7.1**.

Table 7.1 Hong Kong Air Quality Objectives

Pollutants	Averaging Time	Concentration Limit ($\mu g/m^3$) (1)	No. of Exceedances to be Allowed per Calendar Year
Sulphur Dioxide (SO_2)	10-min	500	3
	24-hour	125	3
Respirable Suspended Particulates (PM_{10} / RSP) (2)	24-hour	100	9
	1-year	50	Not applicable
Fine Suspended Particulates ($PM_{2.5}$ / FSP) (3)	24-hour	75	9
	1-year	35	Not applicable
Nitrogen Dioxide (NO_2)	1-hour	200	18
	1-year	40	Not applicable
Ozone (O_3)	8-hour	160	9
Carbon Monoxide (CO)	1-hour	30000	0
	8-hour	10000	0
Lead (Pb)	1-year	0.5	Not applicable

Notes:
(1) All measurements of the concentration of gaseous air pollutants, i.e., sulphur dioxide, nitrogen dioxide, ozone and carbon monoxide, are to be adjusted to a reference temperature of 293 Kelvin and a reference pressure of 101.325 kilopascal.
(2) Respirable suspended particulates means suspended particles in air with a nominal aerodynamic diameter of 10 μm or less.
(3) Fine suspended particulates means suspended particles in air with a nominal aerodynamic diameter of 2.5 μm or less.

7.1.3 Chapter 9 of "Environment" of the Hong Kong Planning Standards and Guidelines (HKPSG) suggests the buffer distance requirements for roads and highways.

7.2 Identification of Pollution Sources

7.2.1 Based on chimney survey conducted within 500m away from the boundary of the proposed development, no active industrial chimney is identified. The potential air quality impacts on the proposed development would be associated with vehicle emissions from surrounding open roads only.

7.3 Vehicular Emission Impact (Site 1)

7.3.1 Site 1 is bounded by Tung Wui Road to the north and the Proposed Public Road for Site 1 to the west. Tung Wui Road and the Proposed Public Road for Site 1 are small roads that have not been classified under traffic census. In accordance with the traffic flow data presented in **Section 4**, the peak-hour two-way traffic flow for Tung Wui Road and the Proposed Public Road for Site 1 are 2297 vehicles/hour and 456 vehicles/hour, respectively.

7.3.2 Since Tung Wui Road and the Proposed Public Road for Site 1 have not been classified under the traffic census and therefore, there is no recommended buffer distance under the HKPSG. As a conservative approach, 5m recommended buffer distance from local distributor under the HKPSG is adopted for Tung Wui Road and the Proposed Public Road for Site 1. **Figure 7.1** below shows the recommended buffer distances from nearby roads.

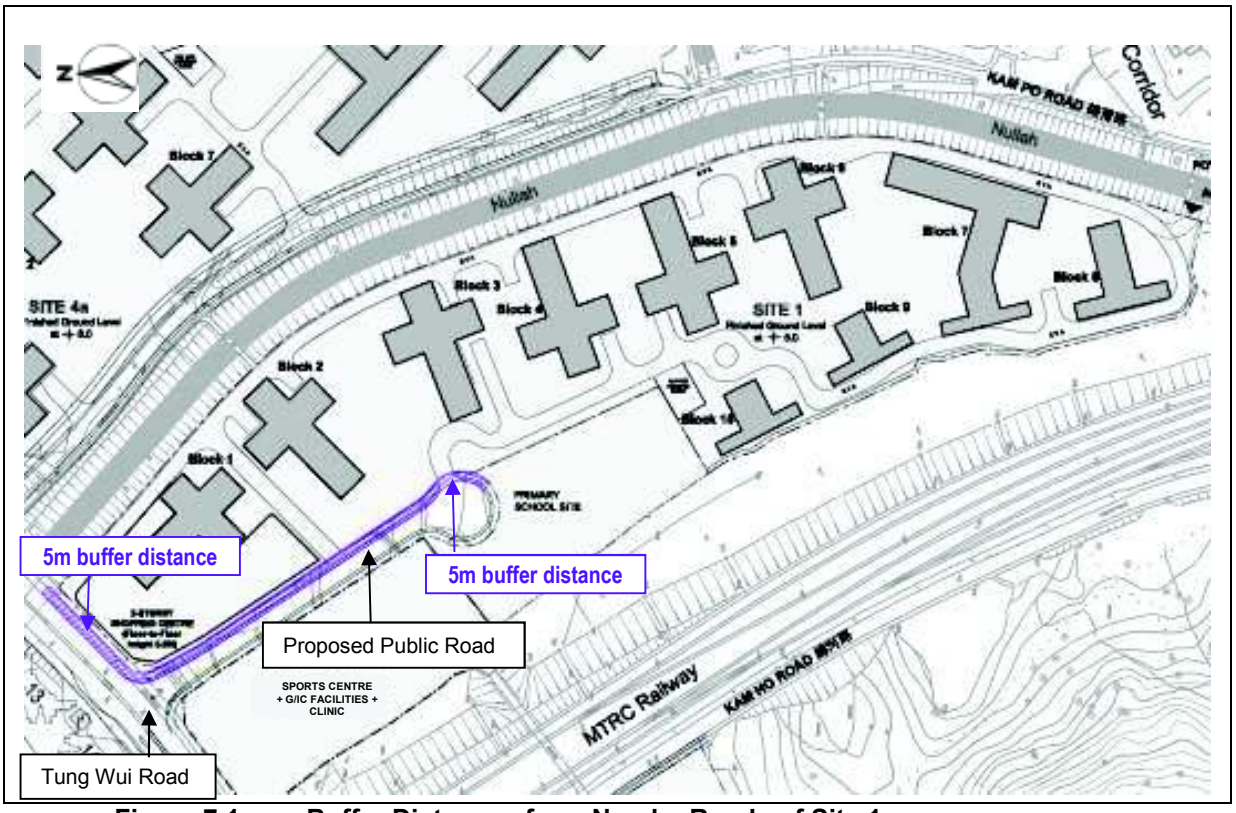


Figure 7.1 Buffer Distances from Nearby Roads of Site 1

7.3.3 As shown in **Figure 7.1** above, since the distance between the site boundary and road kerbs of the Proposed Public Road to Site 1 is less than the recommended distance, a constraint of non-air sensitive use area is proposed at Site 1. The location of proposed non-air sensitive use area is shown in **Figure 7.2**. Air sensitive uses should not be planned in this area, such as temporary housing accommodation, garden with sitting area, playground, etc.

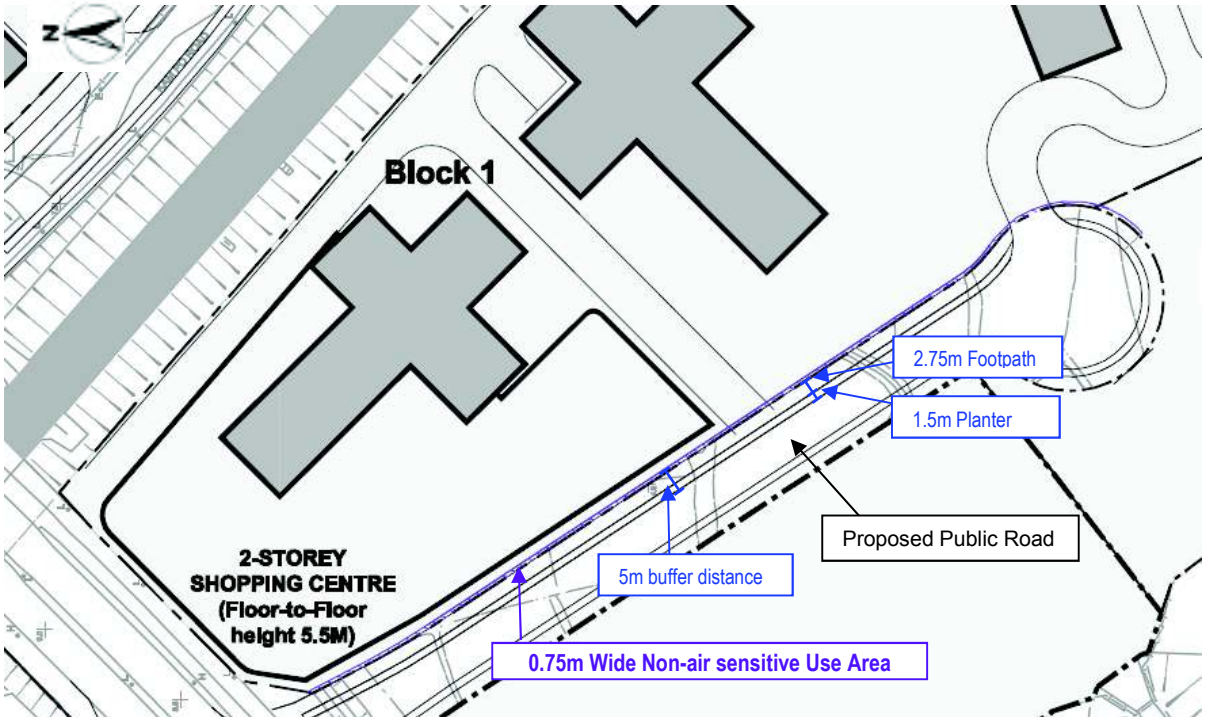


Figure 7.2 Proposed Non-air Sensitive Use Area for Site 1

7.4 Vehicular Emission Impact (Site 4a)

7.4.1 Site 4a is bounded by Tung Wui Road to the north and Kam Po Road to the west. Tung Wui Road and Kam Po Road are small roads that have not been classified under traffic census. In accordance with the traffic flow data presented in **Section 4**, the peak-hour two-way traffic flow for Tung Wui Road and Kam Po Road are 1,298 vehicles/hour and 911 vehicles/hour, respectively.

7.4.2 Since Tung Wui Road and Kam Po Road have not been classified under the traffic census and therefore, there is no recommended buffer distance under the HKPSG. As a conservative approach, 5m recommended buffer distance from local distributor under the HKPSG is adopted for Tung Wui Road and Kam Po Road. **Figure 7.3** below shows the recommended buffer distances from nearby roads.

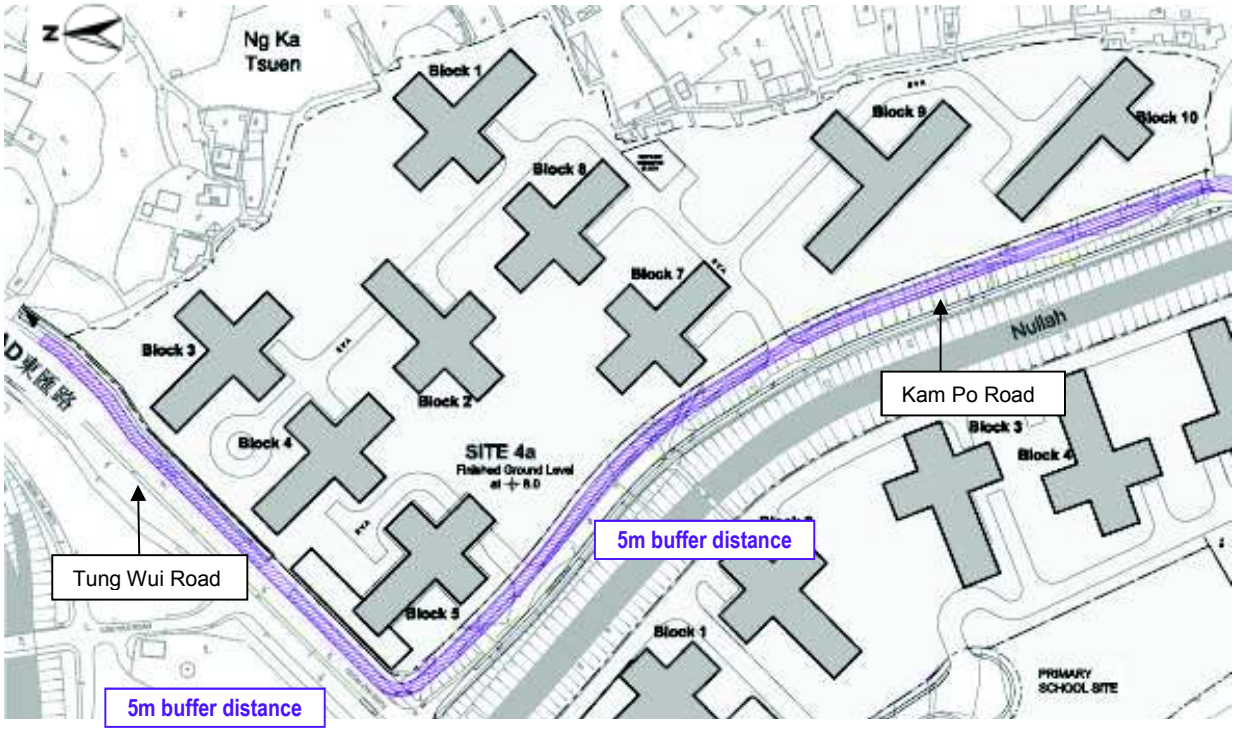


Figure 7.3 Buffer Distances from Nearby Roads of Site 4a

7.4.3 As shown in **Figure 7.3** above, the site boundary of 4a are located beyond the 5m recommended buffer distance. It is therefore not anticipated that there will be any adverse impact due to vehicular emissions on Site 4a.

7.5 Vehicular Emission Impact (Site 6)

7.5.1 Site 6 is bounded by Kam Ho Road to the north and east, and Tsing Long Highway to the west. Kam Ho Road is a rural road, whereas Tsing Long Highway is an expressway. In accordance with the traffic flow data presented in **Section 4**, the peak-hour two-way traffic flow for Kam Ho Road and Tsing Long Highway are 2,578 vehicles/hour and 6,342 vehicles/hour respectively.

7.5.2 With reference to the HKPSG, a 20m buffer distance from the trunk road/ expressway (Tsing Long Highway) and 5m buffer distance from local distributor/ rural road (Kam Ho Road) are recommended. **Figure 7.4** below shows the recommended buffer distances from nearby roads.

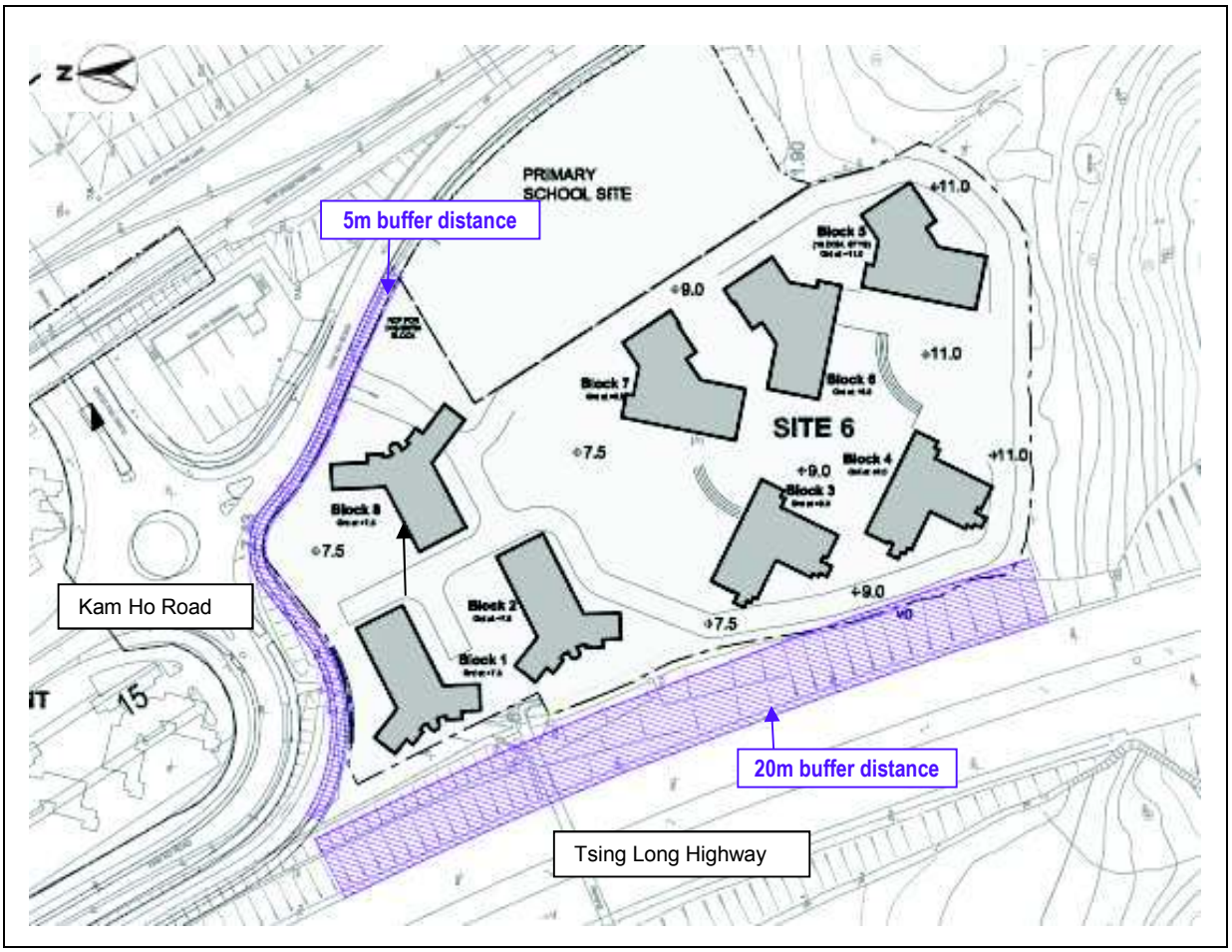


Figure 7.4 Buffer Distances from Nearby Roads of Site 6

7.5.3 As shown in **Figure 7.4** above, since the distances between the site boundary and road kerbs of the Kam Ho Road and Tsing Long Highway are less than the recommended distance, a constraint of non-air sensitive use area is proposed at Site 6. The location of proposed non-air sensitive use area is shown in **Figure 7.5**. Air sensitive uses should not be planned in this area, such as temporary housing accommodation, garden with sitting area, playground, etc.

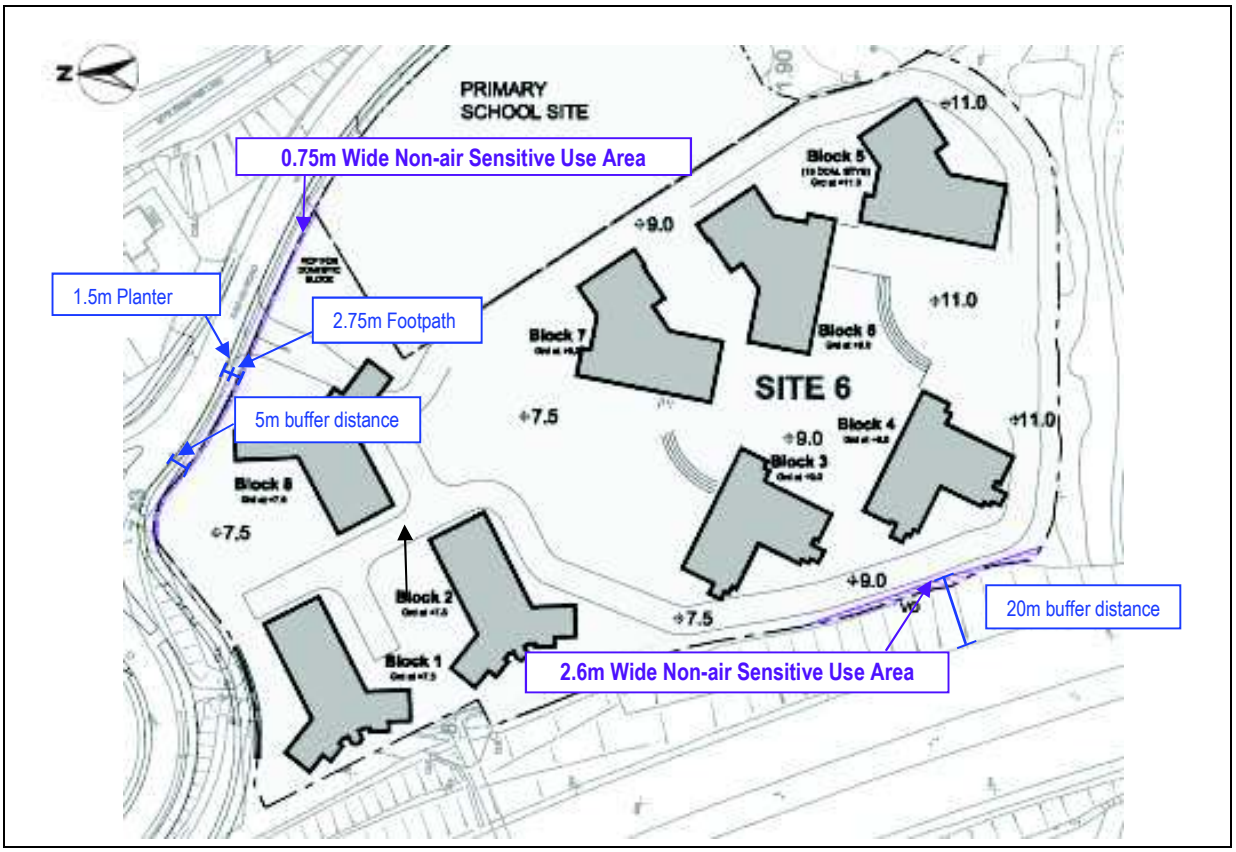


Figure 7.5 Proposed Non-air Sensitive Use Area for Site 6

7.6 Conclusion

7.6.1 Potential air quality impacts of vehicular emissions on the proposed development have been examined. No adverse air quality impact on the proposed Public Housing Development is envisaged.

Appendices 4.1 to 6.1 of Part II of the
Environmental Assessment are not attached in
Attachment IX of the RNTPC Paper.

The full report of the Environmental Assessment is deposited at
the meeting for Members' inspection.

Visual Appraisal for the Proposed Development at Public Housing Sites 1, 4a and 6, Kam Tin South, Yuen Long

1. Purpose

1.1. This Visual Appraisal (VA) is to examine the anticipated visual impacts of the proposed development at Public Housing Sites 1, 4a and 6 (namely Sites 1, 4a and 6), Kam Tin South.

1.2. Currently, these three sites fall within the Kam Tin South Outline Zoning Plan (OZP) No. S/YL-KTS/12. Sites 1 and 6 are zoned as "Agriculture" while Site 4a is zoned as "Other Specified Uses (Rural Use)". VA is one of the technical studies required to facilitate rezoning of these sites to "Residential (Group A)" ("R(A)") for medium-density public housing developments.

2. Visual Context

2.1. The subject sites are located at the south of Kam Sheung Road MTR station (KSRS) at Kam Tin South, Yuen Long **(Plan 1)**. They are bounded by Tung Wui Road in the north and Tsing Long Highway in the west and Kam Sheung Road in the near east. The sites are relatively flat with the site levels of about 5 to 7 mPD (Site 1), 6 to 7mPD (Site 4a) and 7mPD to 17mPD (Site 6) approximately. Their areas are about 5.8ha (Site 1), 5.8ha (Site 4a) and 2.7ha (Site 6) respectively. The land is currently covered by woodland, plantation, grassland, active/abandoned agricultural land, village/orchard, workshops, warehouse, vacant land, open storage and temporary structure.

2.2. The sites are located in a suburban setting with predominantly low-lying flat land in their surroundings. The main visual elements (**Plans 1 and 2**) in their surroundings included:

- villages clusters in low-lying plain (about 6mPD to 11mPD) including Ng Ka Tsuen, Kam Tsin Wai and Kong Ha Wai in the east, Shek Wu Tong, Tin Sam Tsuen in the south and Kat Hing Wai, Tai Hong Tsuen, Tsz Tong Tsuen, Tai Hong Wai…etc. in the north. Developments are mainly low-rise village type developments/residential developments up to a maximum of 3-4 storeys,
- Shek Kong Barracks and Airfield with mainly open grounds and low-rise structures, locate in the northeast of the sites,
- Hilly terrain adjoining of the Lam Tsuen Country Park (about 170mPD to 590mPD) in the northeast, Ho Hok Shan (about 150mPD) in the northwest, Tai Lam Country Park (about 100mPD to 590mPD) in the southwest.
- Kam Tin River running along in the north of the West Rail KSRS,
- West Rail KSRS (about 24 mPD) and Pat Heung Maintenance Centre (PHMC) (about 25mPD) in the north and south of the subject Sites,
- MTR elevated West Rail Line lies between Site 1 and 6 and

- Tsing Long Highway is located to the west of the sites.

3. Planned/Potential Housing Developments in the Surrounding Area

3.1. The Land Use Review of Kam Tin South and Pat Heung (the LUR) completed in March 2014 has identified a total of 14 potential housing sites (including the KSRS, PHMC Sites, Sites 1, 4a and 6) for public and private housing developments**.** Broad technical assessments have also confirmed that there should be no insurmountable problem for the development proposals of these 14 potential housing sites subject to the provision of adequate infrastructure. The findings and recommendations of the LUR serve as a basis for subsequent amendments of the Kam Tin South Outline Zoning Plan (OZP) to guide future development.

3.2. According to the LUR, the Kam Tin South and Pat Heung Area will be developed into a suburban township. Major developments are planned within walking distance from the KSRS railway station. Building height restrictions due to the operation of Shek Kong Airfield have been referenced. The KSRS and PHMC sites and the adjoining public housing sites are allocated with the maximum plot ratio (PR) of 3.0 and maximum building heights (BHs) ranging from 69mPD to 109mPD where appropriate. For sites further away from the railway station, a lower PR and BHs will be adopted. For details, please refer to **Table 1** (**Plan 3** refers).

Proposed Plot Ratios and Building Heights for the 14 Potential Sites in Kam Tin South under the LUR (Table 1)

Potential Sites	Maximum Plot Ratio	Maximum Building Heights
Subject Public Housing Sites:		
Site 1	3.0	69mPD
Site 4a	3.0	69mPD
Site 6	3.0	69mPD
Remaining Public Housing Sites:		
Site 4b	3.0	69mPD
Site 5a	3.0	69mPD
West Rail Sites:		
KSRS	3.0	69mPD
PHMC	3.0	108.5mPD
Private Housing Sites:		
Site 2	2.1	12 storeys
Site 3	2.1	12 storeys
Site 4c	2.1	12 storeys
Site 7	1.5	12 storeys
Site 8	1.5	12 storeys
Site 5b	0.8	6 storeys
Site 9	0.8	6 storeys

4. The Proposed Public Housing Developments at Sites 1, 4a and 6

4.1. The proposed public housing developments at Sites 1, 4a and 6 will follow the development intensity and building height limits recommended by the LUR (i.e. PR3.0 and 69mPD).

4.2. As per the latest conceptual scheme, a total of about 9,000 flats for a population of 25,200 will be provided in the Sites 1, 4a and 6 **(Plan 4).**

5. Viewing Points

5.1. Having discussed with Planning Department, the following 7 viewing points (VPs) from different directions and distances are selected **(Figure 1)**. These VPs are selected mainly from key pedestrian/traffic nodes and popular travel routes.

VPs	Viewpoint	Remarks
VP 1	Kam Ho Road (**Figure 2**)	• Kam Ho Road stretches from Kam Tin Road and binds KSRS and PHMC on their western boundaries and terminates in Ho Pui Village.
VP 2	Tung Wui Road Pedestrian Bridge (**Figure 3**)	• Tung Wui Road stretches from Kam Tin Road in the east to the KSR MTR Station.
VP 3	Pat Heung Road (**Figure 4**)	• Pat Heung Road connects Tsing Long Highway with Kam Tin and Pat Heung.
VP4	Ho Hok Shan (**Figure 5**)	• Ho Hok Shan is a hill location west of Kam Sheung Road MTR Station.
VP5	Tai Lam Mountain Bike Trail – Ho Pui Section (**Figure 6**)	• Tai Lam Country Park provides the largest network of trails and roads open to mountain biking. The Ho Pui Trail is a mountain bike trail which starts from Route Twist and descends to Tai Lam Reservoir via Ho Pui Reservoir area.

VP 6	Kam Sheung Road (**Figure 7**)	• Kam Sheung Road connects to Kam Tin Road in the north and the south.
VP 7	Shek Kong Airfield Road (**Figure 8**)	• Shek Kong Airfield Road connects to Tung Wui Road and binds Shek Kong Airfield to the west and south.

6. Visual Appraisal

6.1. The assessment of their visual impacts from selected viewpoints are listed as follows:

VP1: Kam Ho Road **(Figure 2)**

6.2. The view is taken at Kam Ho Road above the Kam Tin River, facing to the KSRS site in its southeast. It is one of the primary routes for vehicles to access the KSRS. The public viewers at VP1 are considered to have medium to high sensitivity to visual change.

6.3. The Photomontage at **Figure 2** shows that Kam Tin River, the West Rail MTR Line and Kam Sheung MTR Station have occupied the foreground of the photomontage. Both of the ridgelines of Lam Tsuen Country Park and Tai Lam Country Park can be viewed in a long distance away. After incorporating the future developments mentioned in the LUR and the subject developments, the visual change is significant. The visual context has changed from rural to suburban townscape. The view of most of the ridgeline of Tai Lam Country Park is blocked by the building mass and form of the future developments. Amongst the future developments, only minor portion of the developments at Sites 1 and 6 can be seen though the building gaps in KSRS development. For Site 4a, it is fully screened off by future developments. Having noted that the proposed developments at subject public housing sites are of the similar development intensity with that at KSRS Site (i.e. PR3.0 and 69mPD), they are therefore compatible with the surrounding proposed developments. From VP1, since the subject developments at Sites 1, 4a and 6 are mostly shielded by adjoining future developments, their visual impacts from VP1 are negligible. They have not caused any visual incompatibility with the surroundings.

VP2: Tung Wui Rd Pedestrian Bridge **(Figure 3)**

6.4. Tung Wui Road is another major vehicular/pedestrian access to the KSRS and the future public housing developments at Sites 1, 4a and 6. This viewpoint represents the views of the public at the pedestrian bridge on Tung Wui Road. The public viewers at VP2 are considered to have high sensitivity to visual change.

6.5. From the Photomontage at **Figure 3**, Tung Wui Road and the trees at both roadsides have occupied the foreground of the photomontage. Before the change, the mountain backdrop (i.e. about 230mPD) at the end of Tung Wui Road and the rural landscape can be viewed. The view is open and wide. After the change, the visual context has changed from rural to suburban townscape. The view is predominated by the substantial building heights and building mass at Site 1, 4a and 6 and adjoining private housing sites. The view towards the mountain backdrop is partially screened off by Site 4a and Site 6.

6.6. Notwithstanding the above, the proposed developments at Site 1, 4a and 6 are compatible with the adjoining proposed developments in terms of development scale & height. Compared to Site 4, Site 6 is much farther away from VP2. Therefore, even with the same development intensity, the visual bulk of Site 6 is not as dominant as Site 4a. Visual relief to the remaining higher portion of the mountain backdrop above Site 6 is still available. Furthermore, design measures like facade treatment with visual interest and building gaps would be considered as far as possible in the detailed design stage so as to mitigate the visual impact.

VP3: Pat Heung Road **(Figure 4)**

6.7. Pat Heung Road is a significant arterial link to Hong Kong's Route 3, carrying people to the urban areas of Hong Kong. Pat Heung Road crosses directly over PHMC. The public viewers at VP3 are considered to have medium to high sensitivity to visual change.

6.8. The Photomontage at **Figure 4** shows that Pat Heung Road offers a panoramic view over the ridgelines of Tai Lam Country Park and Lam Tsuen Country Park, the West Rail MTR Line and the low rise village developments in Kam Tin Plain. The proposed developments and the adjoining future developments will partially block the view of the mountain backdrop. However, **Figure 4** illustrates that Sites 1, 4a and 6 are fully screened off by the future developments in the foreground of the photomontage. Therefore, the visual impacts due to the developments at Sites 1, 4a and 6 from VP3 are negligible. They would not cause any significant visual incompatibility with the surroundings.

VP4: Ho Hok Shan **(Figure 5)**

6.9. Ho Hok Shan is one of hiker's spots within the area. The public viewers at VP4 are considered to have high sensitivity to visual change. Photomontage at **Figure 5** shows that VP4 will offer a panoramic view over the ridgelines of Lam Tsuen Country Park, Tai Lam Country Park, the elevated West Rail MTR Line and the villages in the district of Kam Tin. After the change, suburban townscape in the areas around KSRS has been added into the visual context. However, the views of

the hilly terrain adjoining the Lam Tsuen Country Park and Tai Lam Country Park remain dominant and unaffected. **Figure 5** shows that only minor portion of the developments at Site 1, 4a and 6 can be viewed on top of the future building mass around KSRS. Their building heights are in harmony with the surrounding developments. Therefore, the visual impacts due to the developments at Sites 1, 4a and 6 from VP4 are negligible. They would not cause any significant visual incompatibility with the surroundings.

VP5: Tai Lam Mountain Bike Trail, Ho Pui Section **(Figure 6)**

6.10. Tai Lam Country Park provides the largest network of trails and roads open to mountain biking. The Ho Pui Trail is a mountain bike trail which starts from Route Twist and descends to Tai Lam Reservoir via Ho Pui Reservoir area. It is one of the popular trails in Hong Kong. The public viewers at VP5 are considered to have high sensitivity to visual change.

6.11. The Photomontage at **Figure 6** shows that the VP5 provides a panoramic view over the ridgelines of Lam Tsuen Country Park and Tai Lam Country Park and the rural settlements on the both sides of the west rail tracks. After the change, the visual context has changed from rural to suburban townscape. Building heights of the future developments will descend from KSRS/PHMC to the area near the Shek Kong Barracks/Airfield in the east. However, the views of the hilly terrain adjoining the ridgeline of Lam Tsuen Country Park and the ridgeline of Tai Lam Country Park have not been largely affected. **Figure 6** shows that the developments at Site 4a are largely screened off. Only minor portions can be seen on top of the adjoining building mass. Their building heights are consistent with the surrounding developments. For Site 1 and Site 6, their developments are fully screened off by the future development at PHMC. Therefore, as the subject developments at Sites 1, 4a and 6 are mostly/wholly shielded by adjoining future developments, their visual impacts from VP5 are negligible. They would not cause any significant visual incompatibility with the surroundings.

VP6: Kam Sheung Road **(Figure 7)**

6.12. Kam Sheung Road is one of the major transport arteries in Kam Tin. It is a rural road running in south-north direction. It serves as a local road to the adjacent villages or other nearby developments. The VP6 at Kam Sheung Road is looking southwest towards the Sites 1, 4a and 6. The public viewers at VP6 are considered to have medium to high sensitivity to visual change.

6.13. The Photomontage at **Figure 7** shows that Kam Sheung Road, the trees at both roadsides and a private housing development have occupied most of the foreground of the photomontage. The proposed development at Site 4a will be fully blocked by existing and future private housing developments. For Sites 1 and 6, they are out of

the field of vision from this VP. The visual impacts due to the developments at Sites 1, 4a and 6 are negligible. They would not cause any visual incompatibility with the surroundings.

VP7: Shek Kong Airfield Road **(Figure 8)**

6.14. Shek Kong Airfield Road locates next to Shek Kong Barrack. Public viewers at VP7 are considered to have medium to high sensitivity to visual change.

6.15. The Photomontage at **Figure 8** shows that the Kam Tin River and the agricultural landuse have occupied the foreground of the photomontage. After the change, the view has significantly changed from rural to suburban characters in term of the area affected, substantial building heights and building mass of the future developments involved. However, **Figure 8** shows that the proposed developments at Sites 1, 4a and 6 will be totally blocked by the future developments in front. Therefore, the visual impacts due to the developments at Sites 1, 4a and 6 from VP7 are negligible. They would not cause any visual incompatibility with the surroundings.

7. Conclusion

7.1. The proposed developments at Sites 1, 4a and 6 form part of the future township of the Kam Tin South area. The developments in the area are subject to the airport height restrictions of Shek Kong Airfield. The proposed developments at the three subject sites are restricted to maximum building height of 69mPD, which is the same as the adjacent proposed development at KSRS. As shown in the photomontages, they are compatible in development scale & height with the neighbouring proposed developments, including those of lower building heights in the periphery.

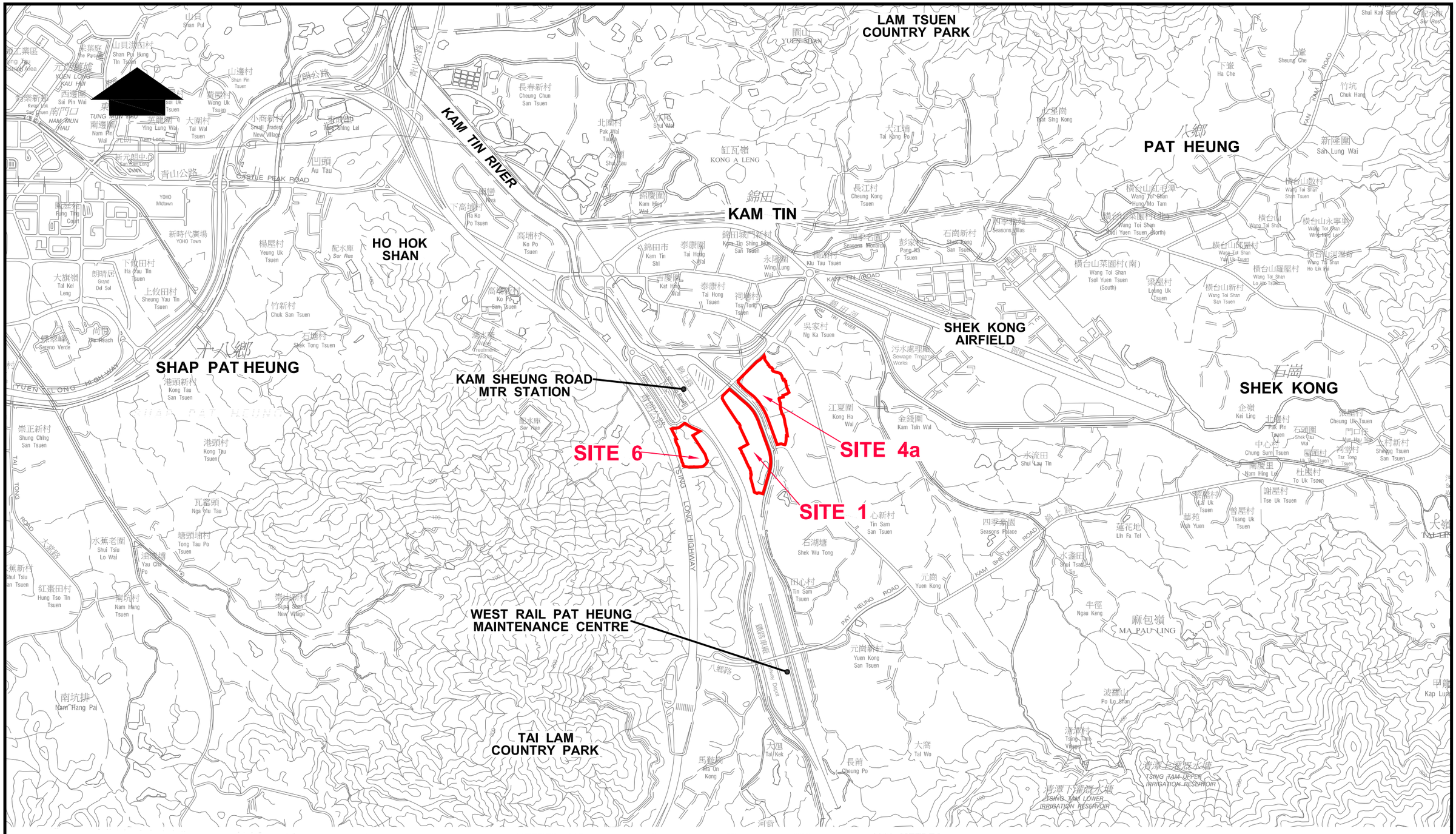
7.2. Furthermore, since the subject sites are surrounded by other potential sites in their north, east and south (Plan 2 refers), the visual impacts of the proposed developments at Sites 1, 4a and 6 are used to be obstructed/blocked by nearby future developments. Reference can be made from photomontages at the viewpoints VP1(Kam Ho Road), VP3 (Pat Heung Road), VP4 (Ho Hok Shan), VP5 (Ho Pui Trail, VP6 (Kam Sheung Road) and VP7(Shek Kong Airfield Road). The future developments at KSRS/PHMC and other potential sites will shield all/most of the views of the subject developments at Sites 1, 4a and 6. Therefore, their visual impacts from these viewpoints are negligible. Only from the viewpoint VP2 (Tung Wui Road), the visual impacts of Sites 4a and 6 together with nearby future developments will be moderately significant. Part of the view of the mountain backdrop will be blocked. The substantial building mass of the future developments and the subject developments will add significant visual bulk in the visual context of VP2. However, the building height, mass and form of the subject sites are in harmony with the future surrounding developments.

7.3. Upon development of these three public housing sites, incompatible land uses such as open storage, wasteland, abandoned agricultural land, temporary structures…etc., will be phased out. Public housing development will present a planned, well-organized building environment supplemented with necessary open space/greeneries. The overall visual and environmental quality of these public housing sites will be improved.

Attachments

Plan 1	Location Plan of Kam Sheung Road Sites 1, 4a and 6
Plan 2	Surrounding Area of Kam Sheung Road Sites 1, 4a and 6
Plan 2	Proposed Plot Ratios and Building Heights for 14 Potential Sites in Kam Tin South
Plan 4	Preliminary Site Layout
Figure 1	Viewpoints
Figures 2 to 8	Photomontages

HOUSING DEPARTMENT
September 2016



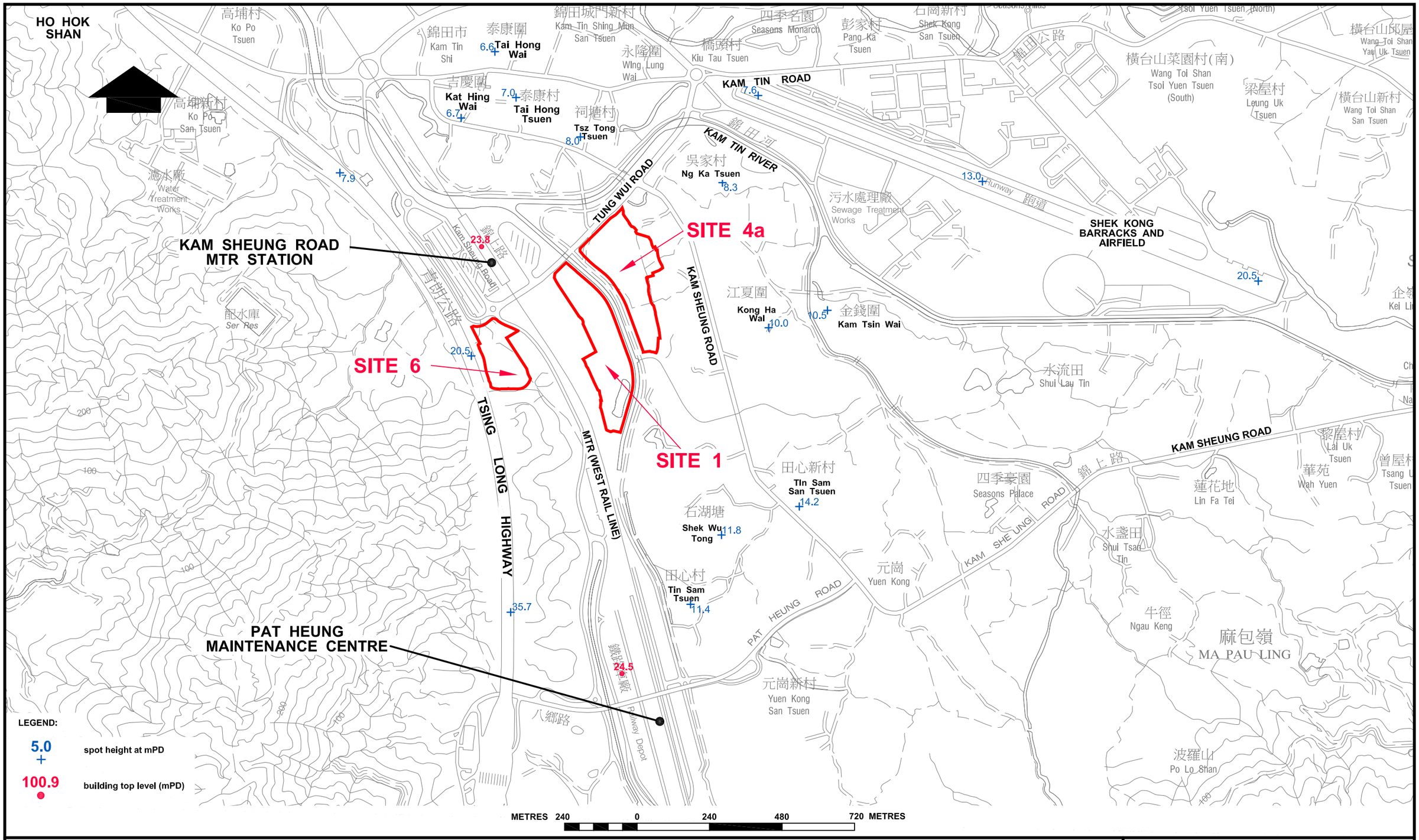
KAM SHEUNG ROAD SITES 1, 4a & 6

HOUSING DEPARTMENT
PLANNING SECTION

PLAN 1

DATE :
2. 2. 2016

16_0109YL



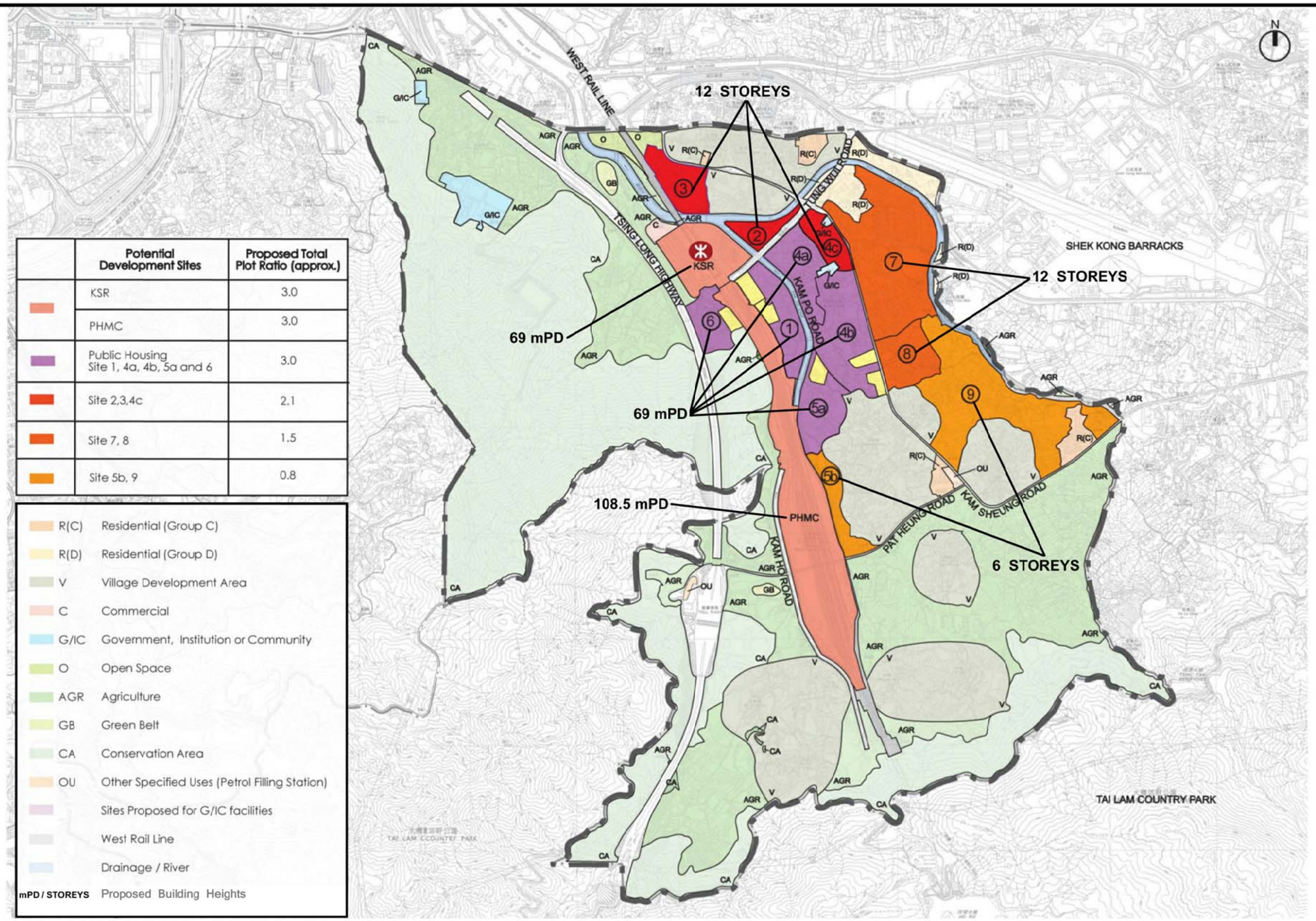
SURROUNDING AREA OF KAM SHEUNG ROAD SITES 1, 4a & 6

HOUSING DEPARTMENT
PLANNING SECTION

PLAN 2

DATE : 10. 3. 2016

16_0224YL_1



	Potential Development Sites	Proposed Total Plot Ratio (approx.)
	KSR	3.0
	PHMC	3.0
	Public Housing Site 1, 4a, 4b, 5a and 6	3.0
	Site 2,3,4c	2.1
	Site 7, 8	1.5
	Site 5b, 9	0.8

	R(C)	Residential (Group C)
	R(D)	Residential (Group D)
	V	Village Development Area
	C	Commercial
	G/IC	Government, Institution or Community
	O	Open Space
	AGR	Agriculture
	GB	Green Belt
	CA	Conservation Area
	OU	Other Specified Uses (Petrol Filling Station)
		Sites Proposed for G/IC facilities
		West Rail Line
		Drainage / River
mPD / STOREYS		Proposed Building Heights

SOURCE : BASED ON LAND USE REVIEW FOR KAM TIN SOUTH AND PAT HEUNG DATED MARCH 2014

METRES 400 0 400 800 1200 METRES

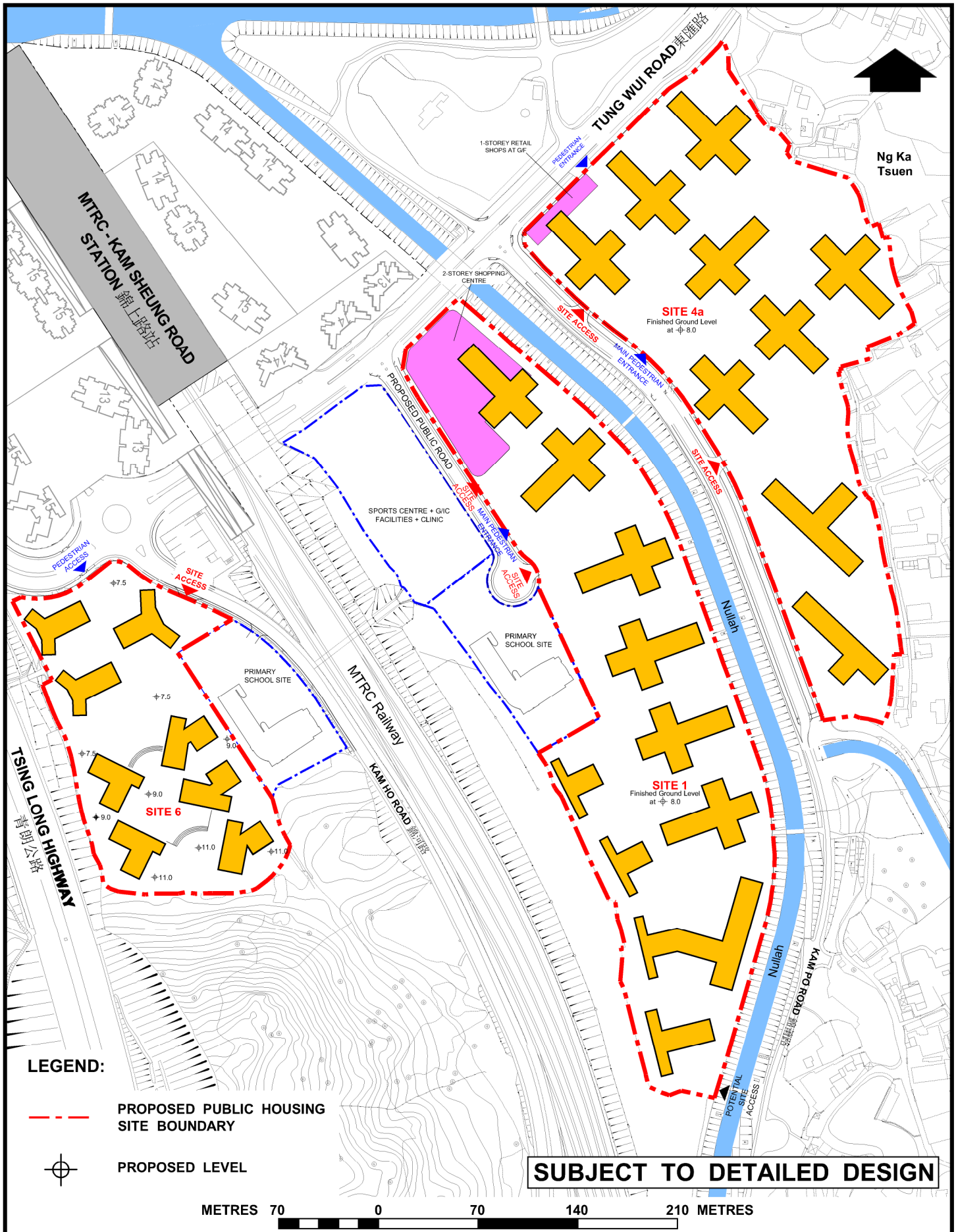
PROPOSED PLOT RATIOS AND BUILDING HEIGHTS FOR 14 POTENTIAL SITES IN KAM TIN SOUTH

HOUSING DEPARTMENT
PLANNING SECTION

PLAN 3

DATE :
10. 3. 2016

16_0208YL_Plan3



PUBLIC HOUSING DEVELOPMENT AT KAM SHEUNG ROAD SITES 1, 4a & 6 (CONCEPTUAL LAYOUT PLAN)

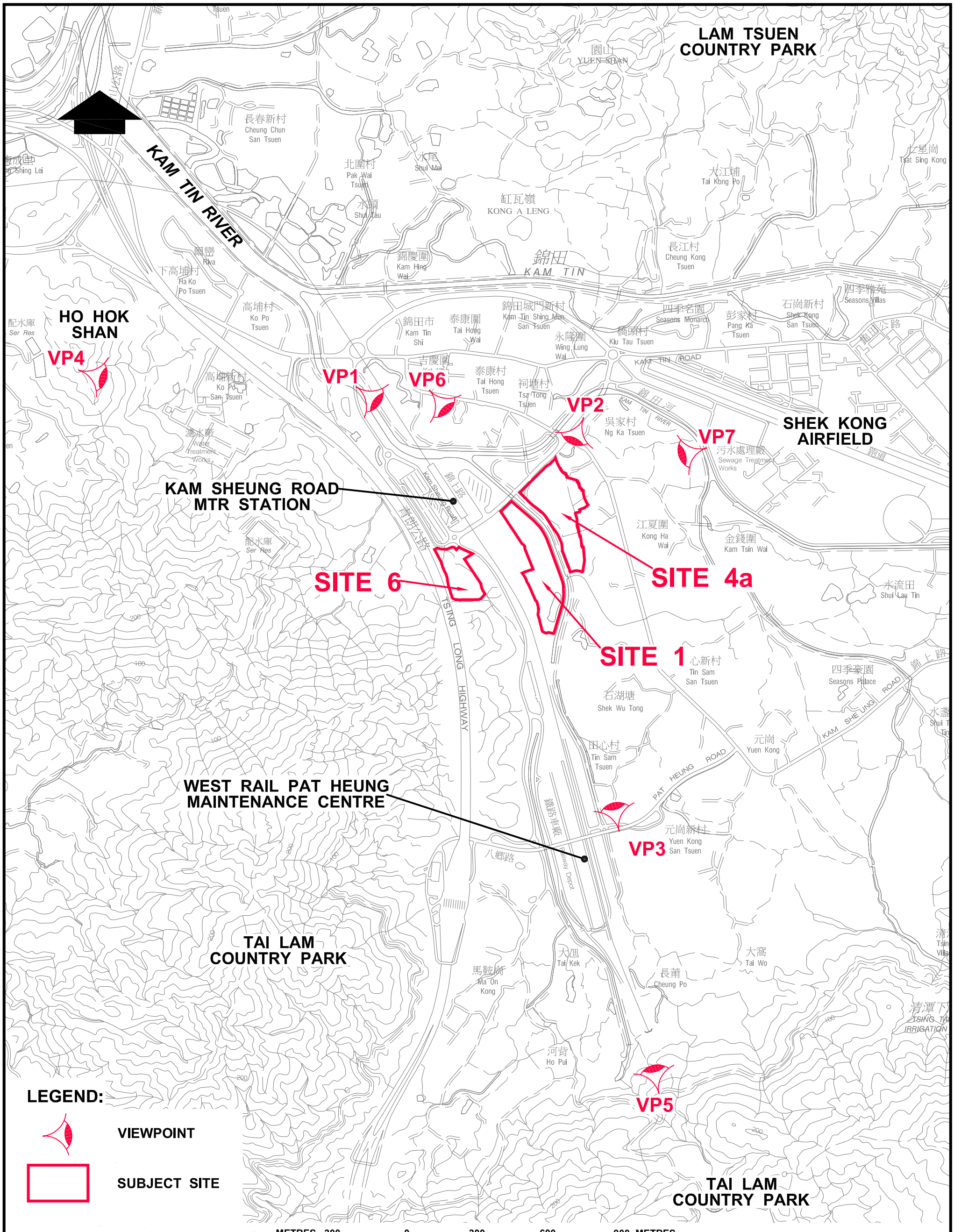
HOUSING DEPARTMENT
PLANNING SECTION

PLAN 4

DATE : 18. 8. 2017

BASE EXTRACTED FROM SHT. Nos. 6-NE-12A, 12B, 12C, 12D, 17A & 17B

17_0853YL



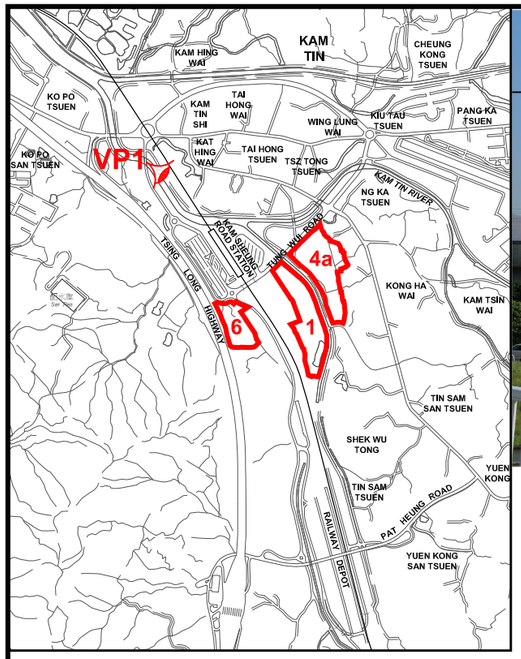
VIEWPOINTS (VPs)
KAM SHEUNG ROAD SITES 1, 4a & 6

HOUSING DEPARTMENT
PLANNING SECTION

Figure 1

DATE : 2. 2. 2016

16_0058YL

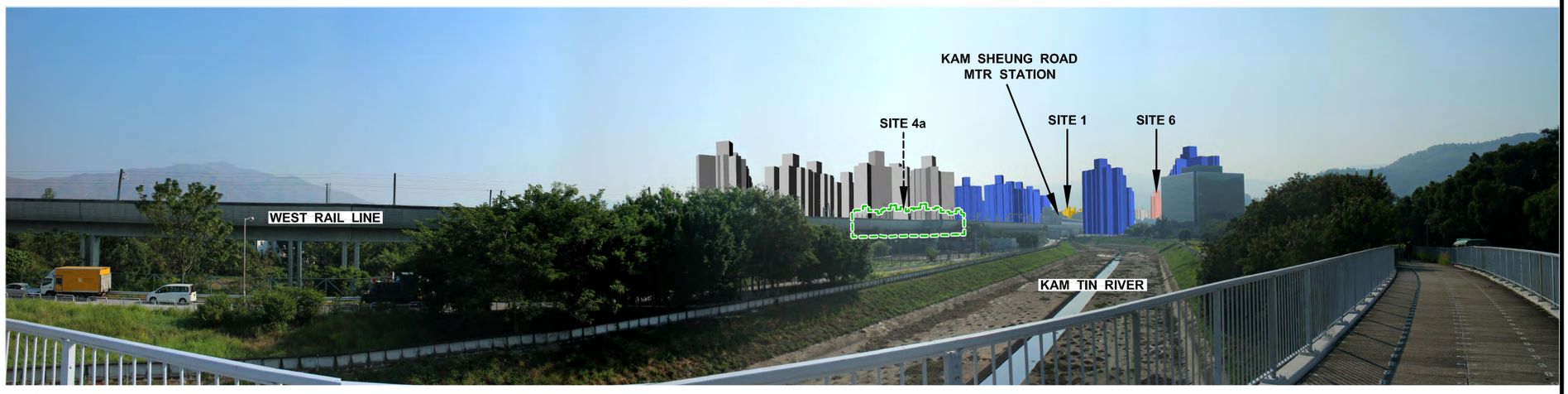




Before

Legend:

- Site 1
- Site 6
- Area KSR
- Other Potential Development Sites
- Site 4a



After

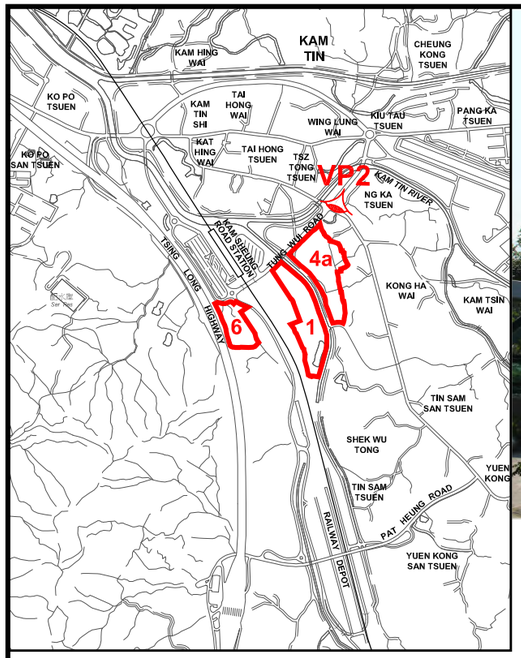
PHOTOMONTAGE AT VIEWING POINT VP1 (KAM HO ROAD)

HOUSING DEPARTMENT
PLANNING SECTION

Figure 2

DATE : 16. 3. 2016

16_0207YL_VP1

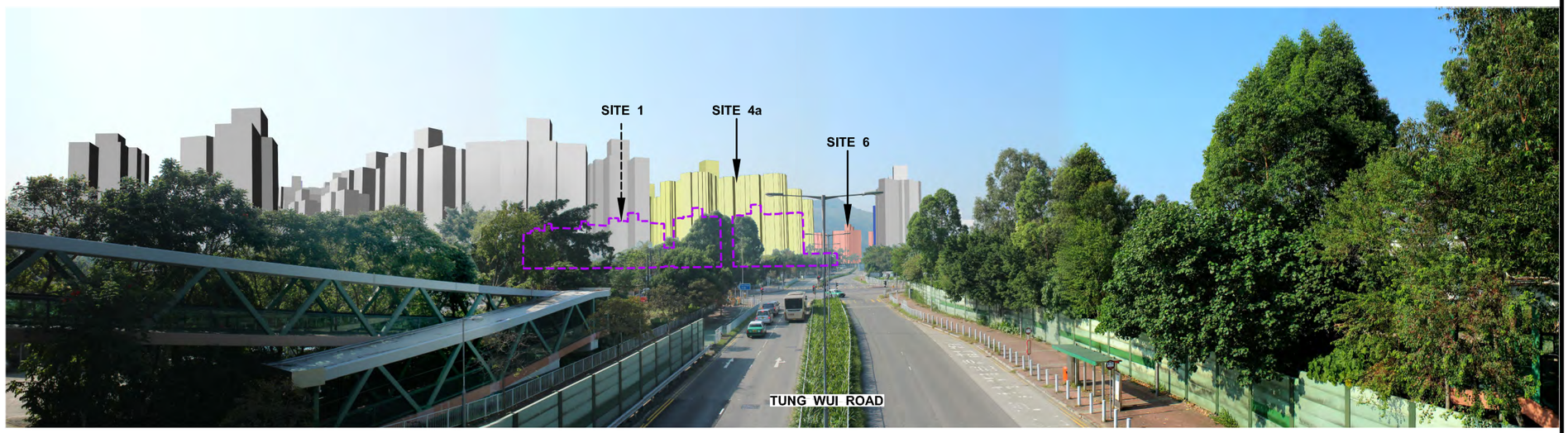




Before

Legend:

- Site 4a
- Site 6
- Area KSR
- Other Potential Development Sites
- Site 1



After

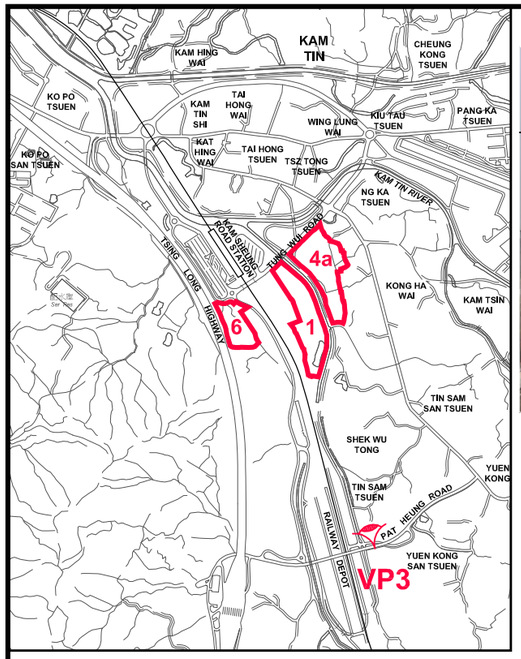
PHOTOMONTAGE AT VIEWING POINT VP2 (TUNG WUI ROAD PEDESTRIAN BRIDGE)

HOUSING DEPARTMENT
PLANNING SECTION

Figure 3

DATE : 16. 3. 2016

16_0207YL_VP2

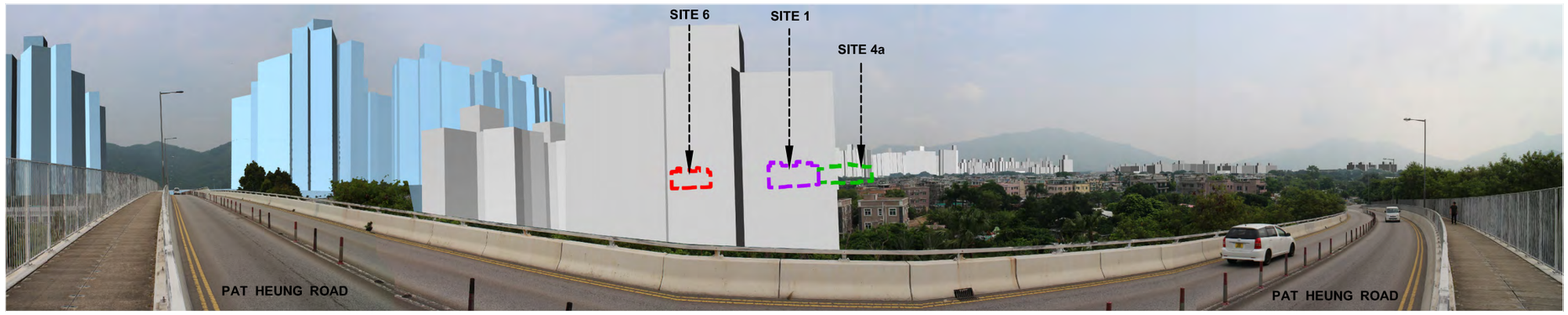




Before

Legend:

- Area PHMC
- Other Potential Development Sites
- Site 1
- Site 4a
- Site 6



After

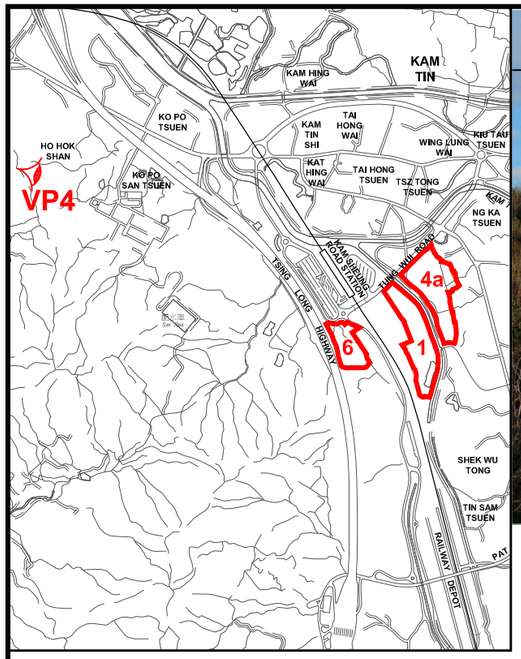
PHOTOMONTAGE AT VIEWING POINT VP3 (PAT HEUNG ROAD)

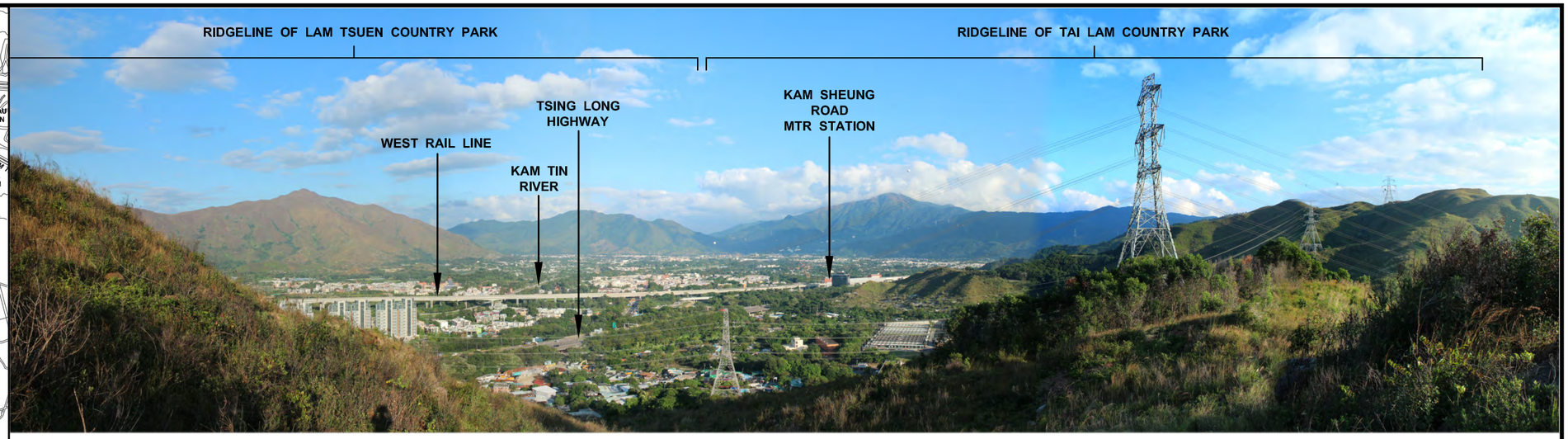
HOUSING DEPARTMENT
PLANNING SECTION

Figure 4

DATE : 17. 3. 2016

16_0207YL_VP3

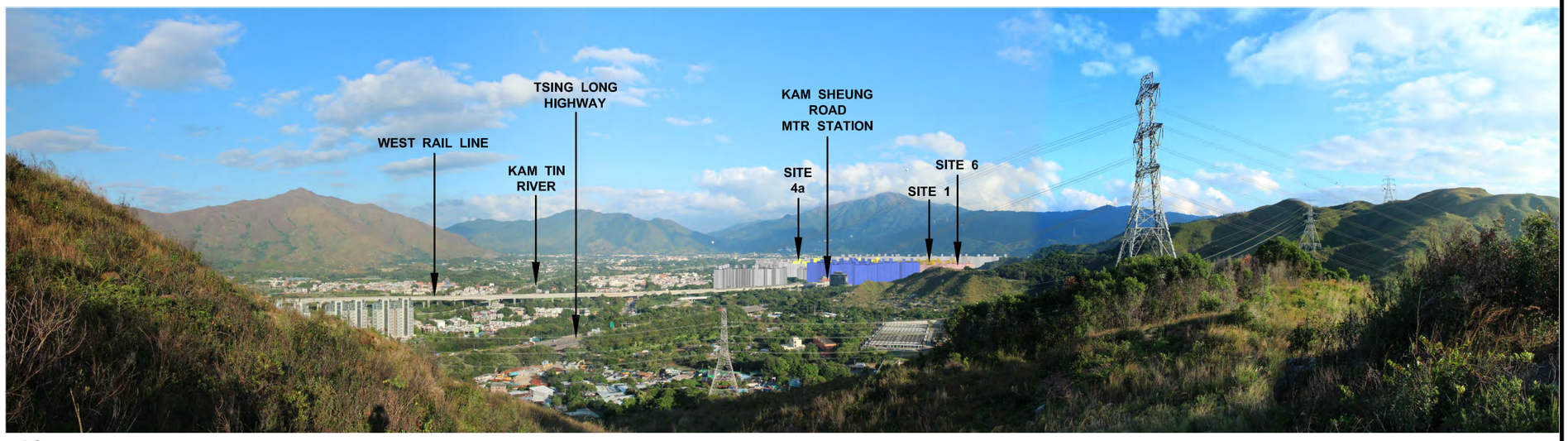




Before

Legend:

- Site 1
- Site 4a
- Site 6
- Area KSR
- Other Potential Development Sites



After

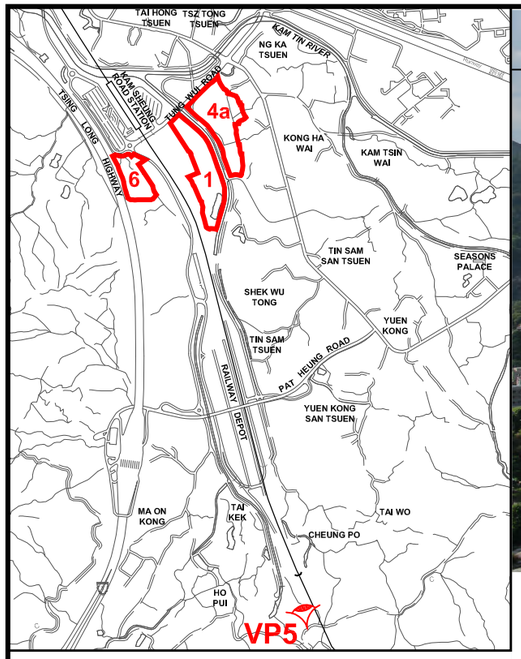
PHOTOMONTAGE AT VIEWING POINT VP4 (HO HOK SHAN)

HOUSING DEPARTMENT
PLANNING SECTION

Figure 5

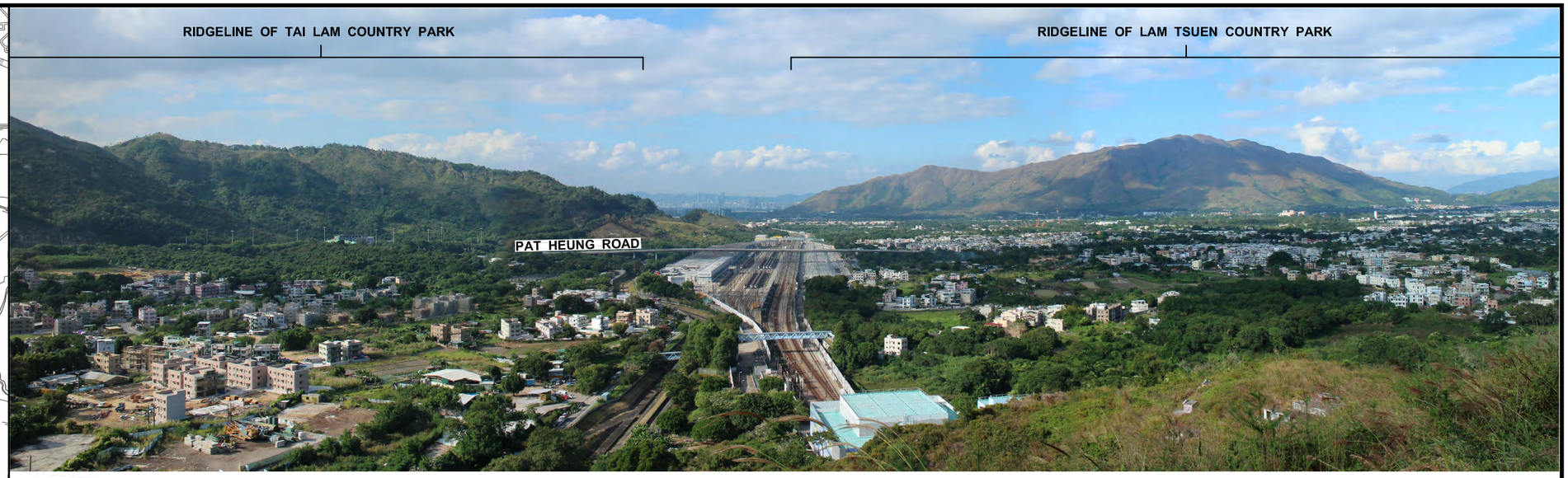
DATE : 16. 3. 2016

16_0207YL_VP4

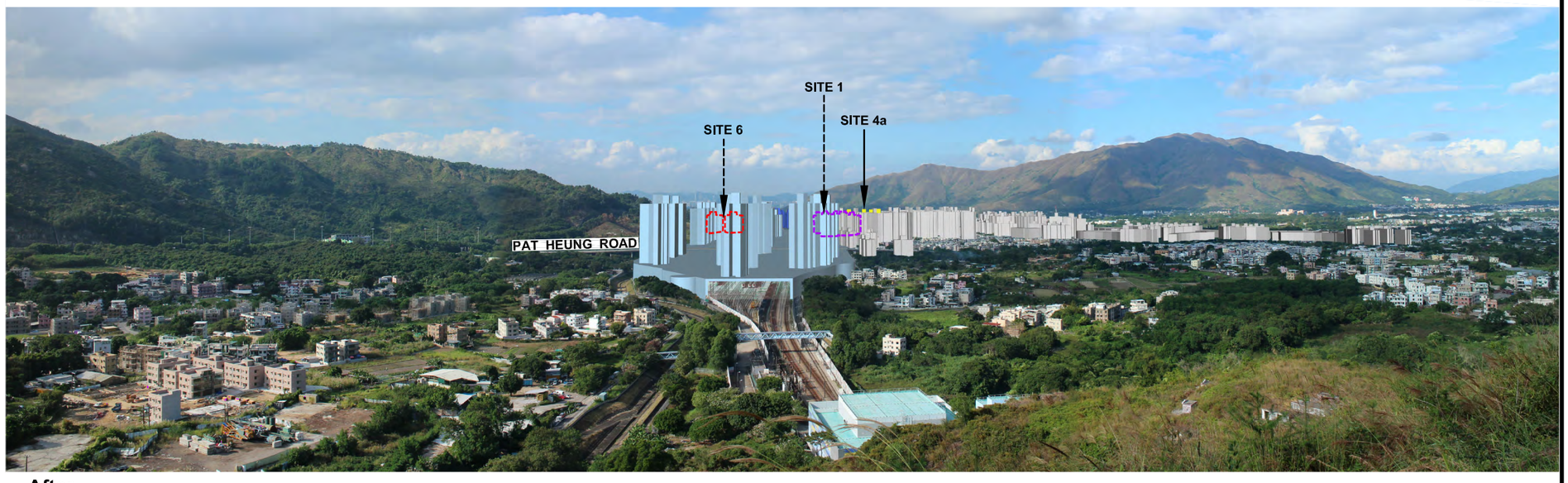


Legend:

- Site 4a
- Area KSR
- Area PHMC
- Other Potential Development Sites
- Site 1
- Site 6



Before



After

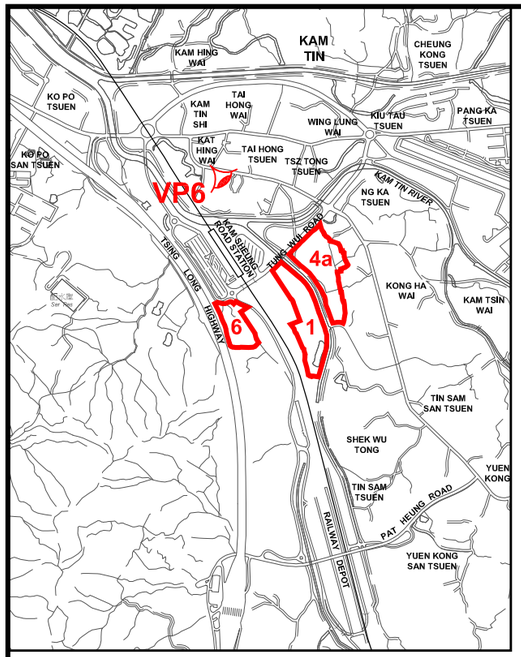
PHOTOMONTAGE AT VIEWING POINT VP5 (TAI LAM MOUNTAIN BIKE TRAIL, HO PUI SECTION)

HOUSING DEPARTMENT
PLANNING SECTION

Figure 6

DATE : 16. 3. 2016

16_0207YL_VP5

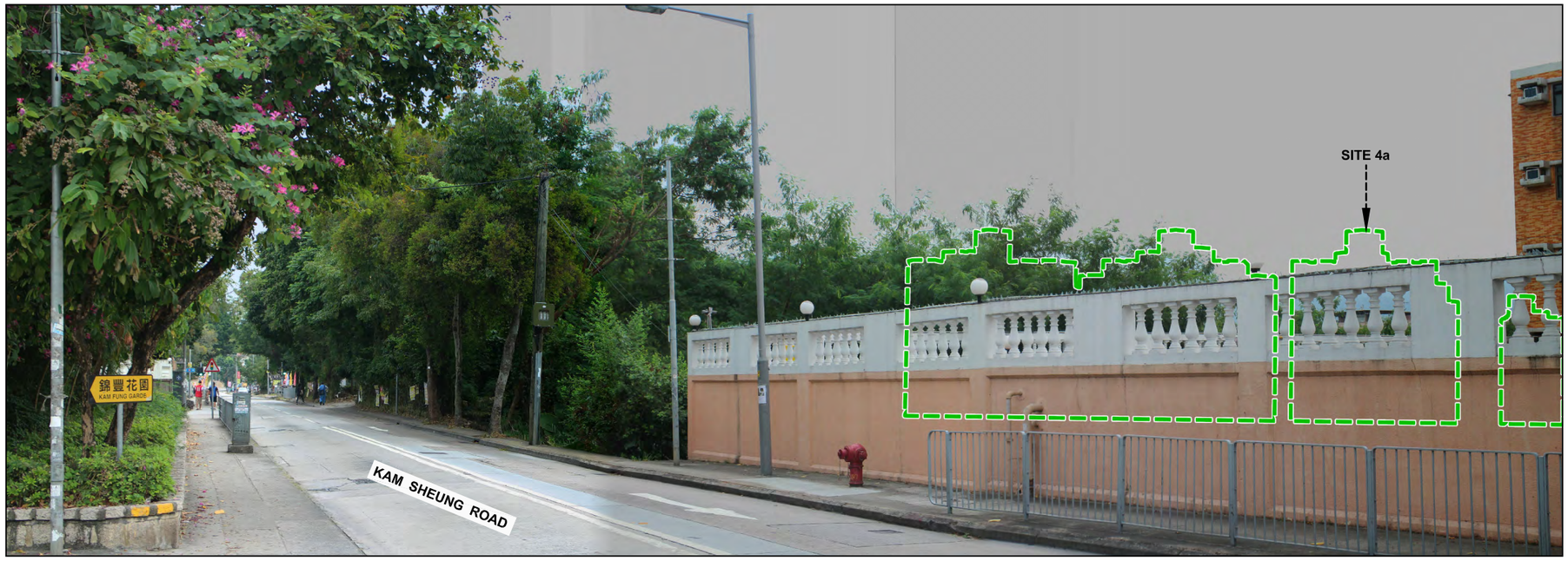




Before

Legend:

- Other Potential Development Sites
- Site 4a



After

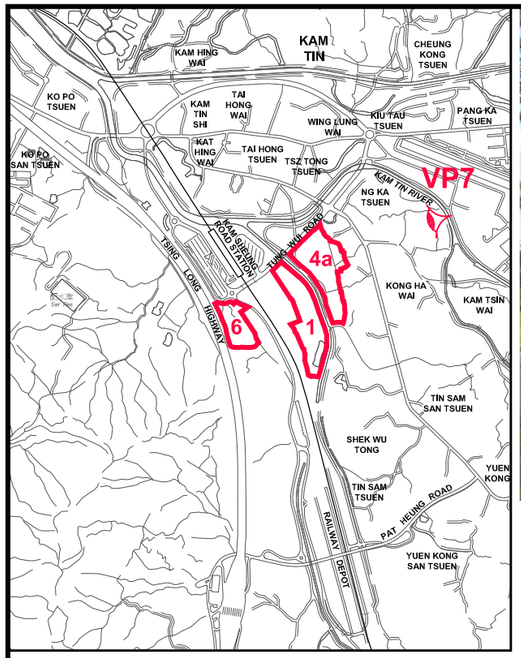
PHOTOMONTAGE AT VIEWING POINT VP6 (KAM SHEUNG ROAD)

HOUSING DEPARTMENT
PLANNING SECTION

Figure 7

DATE : 16. 3. 2016

16_0207YL_VP6

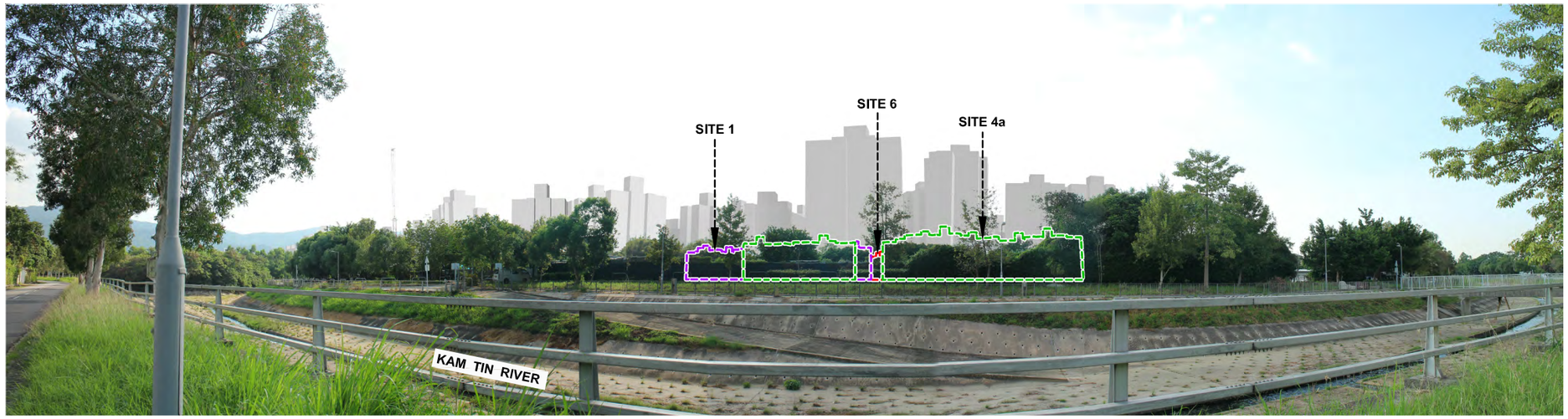




Before

Legend:

- Other Potential Development Sites
- Site 1
- Site 4a
- Site 6



After

PHOTOMONTAGE AT VIEWING POINT VP7 (SHEK KONG AIRFIELD ROAD)

HOUSING DEPARTMENT
PLANNING SECTION

Figure 8

DATE : 16. 3. 2016

16_0207YL_VP7

AECOM

Hong Kong Housing Authority

Proposed Public Housing Development at Kam Sheung Road Site 1, Site 4a and Site 6 Air Ventilation Assessment

Expert Evaluation – Final Report

August 2017

	Name	Signature
Prepared & Checked:	Karl An	
Reviewed & Approved:	Yu Tin Tang	

AECOM

Hong Kong Housing Authority

Proposed Public Housing Development at Kam Sheung Road Site 1, Site 4a and Site 6 Air Ventilation Assessment

Expert Evaluation – Final Report

September 2016

	Name	Signature
Prepared & Checked:	Karl An	
Reviewed & Approved:	Kenneth Lam	

Version: Final Version 8 Date: 12th September 2016

Disclaimer

This Expert Evaluation – Final Report is prepared for Housing Authority and is given for its sole benefit in relation to and pursuant to Kam Sheung Road Development and may not be disclosed to, quoted to or relied upon by any person other than Housing Authority / identified recipient as requested under the Agreement with Housing Authority without our prior written consent. No person (other than Housing Authority) into whose possession a copy of this Expert Evaluation –Final Report comes may rely on this Expert Evaluation – Final Report without our express written consent and Housing Authority may not rely on it for any purpose other than as described above.

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Table 2.1 Summary of annual and summer prevailing winds from different sources
Table 4.1 Proposed Parameters of the Developments in the Project Areas

1 INTRODUCTION

Background

1.1 3 sites, namely Site 1, Site 4a and Site 6 near Kam Sheung Road are proposed for public housing development. It is considered necessary to conduct an expert evaluation to assess the preliminary air ventilation impacts of the proposed development proposal and development parameters which include the imposition of appropriate development restrictions to guide future development of the area. Site 1, Site 4a and Site 6, namely the Project Areas hereafter, are located at the south-east portion of Kam Sheung Road MTR station, north bounded by Tung Wui Road and Kam Sheung Road Station, east near the Kam Sheung Road and west bounded by Tsing Long Highway.

1.2 In December 2015, AECOM Asia Company Ltd. (the Consultant) was commissioned by the HA to undertake an Expert Evaluation Study for the Project Areas located at Kam Sheung Road as shown in **Figure 1.1** below to examine the air ventilation performance of the potential development within the Project Areas and its immediate surrounding. The proposed layout and development parameters are subject to detailed design.

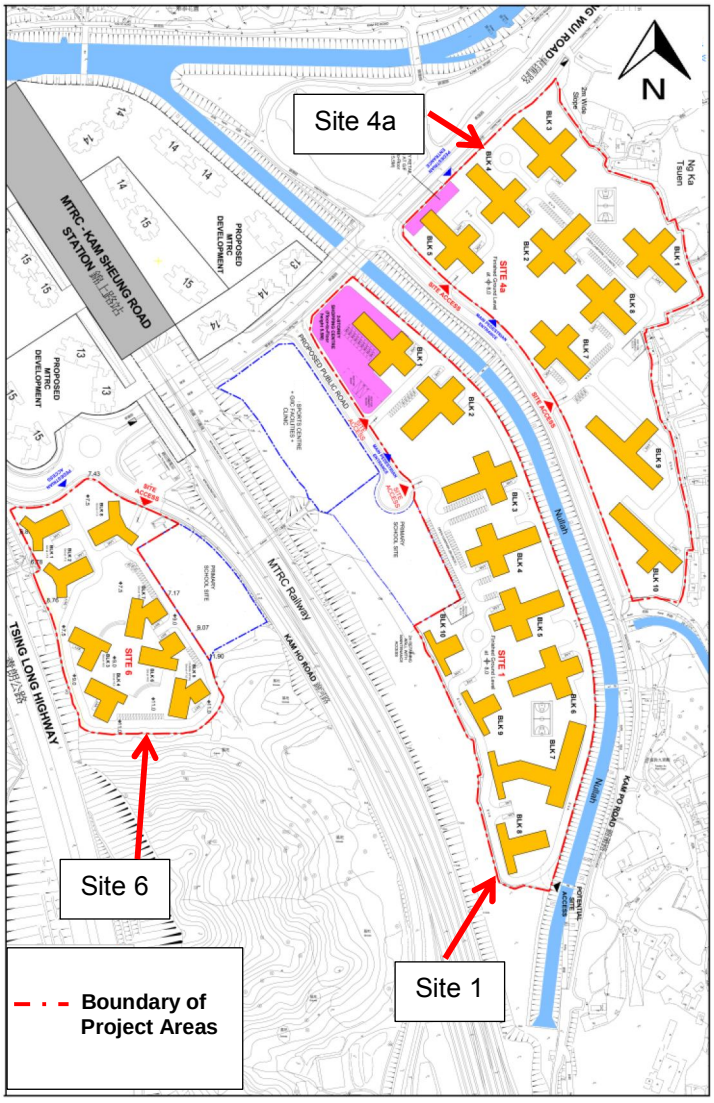


Figure 1.1 Project Areas (Site 1, 4a, 6)

1.3 This expert evaluation report is based on the following materials available to the Consultant:

- Location Map of the Project Areas (Site 1, Site 4a and Site 6)
- Development Parameters of the Project Areas (Site 1, Site 4a and Site 6)
- Experimental Site Wind Availability Study for Kam Sheung Road, Hong Kong

1.4 In the preparation stage of the expert evaluation report, the Consultant has studied the given materials listed in Paragraph 1.3 and carried out site visit and inspection.

Objectives of the Expert Evaluation Study

1.5 The objective of this study is to assess the air ventilation impacts of the development proposal for incorporation into the Outline Zoning Plan (OZP). The Expert Evaluation Study has made reference to the "Housing, Planning and Lands Bureau Technical Circular No.1/06, Air Ventilation Assessment" which recommended that it is important to allow adequate air ventilation through the built environment for pedestrian comfort.

1.6 The key purposes of the Expert Evaluation are to identify the major wind breezeways, air paths good wind performance areas, locate obvious problematic areas and propose appropriate improvement measures if necessary. Based on the findings of the Expert Evaluation, it is required to determine whether further study is required.

1.7 This Expert Evaluation Report presents the following findings:

- Analyse relevant wind data to understand the wind environment of the Project Areas and its surroundings;
- Identify and analyse major topographical features of the Project Areas and its immediate vicinity. In addition, greeneries/landscape characteristics of the Project Areas as well as its surroundings are identified;
- Identify and analyse the land use of the Project Areas as well as its immediate surrounding areas including existing developments, committed developments and potential developments.
- Based on the analyses of the baseline conditions, identify good features that shall be retained/strengthened while spotting problematic wind regions that may warrant attention; and
- Recommend appropriate technical methodologies if further initial study/detailed study for Project Areas is required.

1.8 This Expert Evaluation Report is written and arranged as follows:

- The "Wind Environment" section analyses relevant wind data to ascertain the wind environment of the Project Areas and neighbouring regions.
- After the prevailing wind directions are identified, the topographical features of the Project Areas and its immediate vicinity are analysed in the section "Topographical Features and Wind Flow" where **the impact of the topographies on the wind environment within Project Areas** is discussed.
- Following the section of "Topographical Features and Wind Flow" is a section of "Existing land use and Building Morphology". Land uses of the Project Areas as well as its immediate surrounding areas including existing developments are discussed in this section. Investigation of the impact of existing developments on **the wind environment within Project Areas** is carried out. Existing good features and problematic areas are also identified.
- Following discussion of the impact of the existing developments on wind performance of the Project Areas, the investigation of **the potential impacts on the existing wind environment induced by the proposed developments within the Project Areas** are documented in the section "Expert Evaluation on the Project Area". Existing good features that should be retained is identified while problematic regions that may warrant attention be spotted.
- Propose improvement measures if any problematic areas are identified.
- A conclusion and summary section on the major findings of this study and a recommendation on whether further AVA study on the Project Areas is required are presented in the end.

2 WIND ENVIRONMENT

2.1 Natural wind availability is crucial to the investigation of wind ventilation performance. In this section, relevant measured wind data obtained from the Hong Kong Observatory (HKO) weather station, computed wind data from the MM5 model and RAMS model at the Study Area are analysed and compared in order to identify the prevailing wind directions.

Wind Direction Analysis based on HKO Weather Stations' Data

2.2 There are a total of 46 weather stations (See **Figure 2.1**) operated by Hong Kong Observatory (HKO) which provide reliable data on the wind environment in Hong Kong. The wind information and weather data from these stations provide reference to aid a general understanding of the surface wind environment.

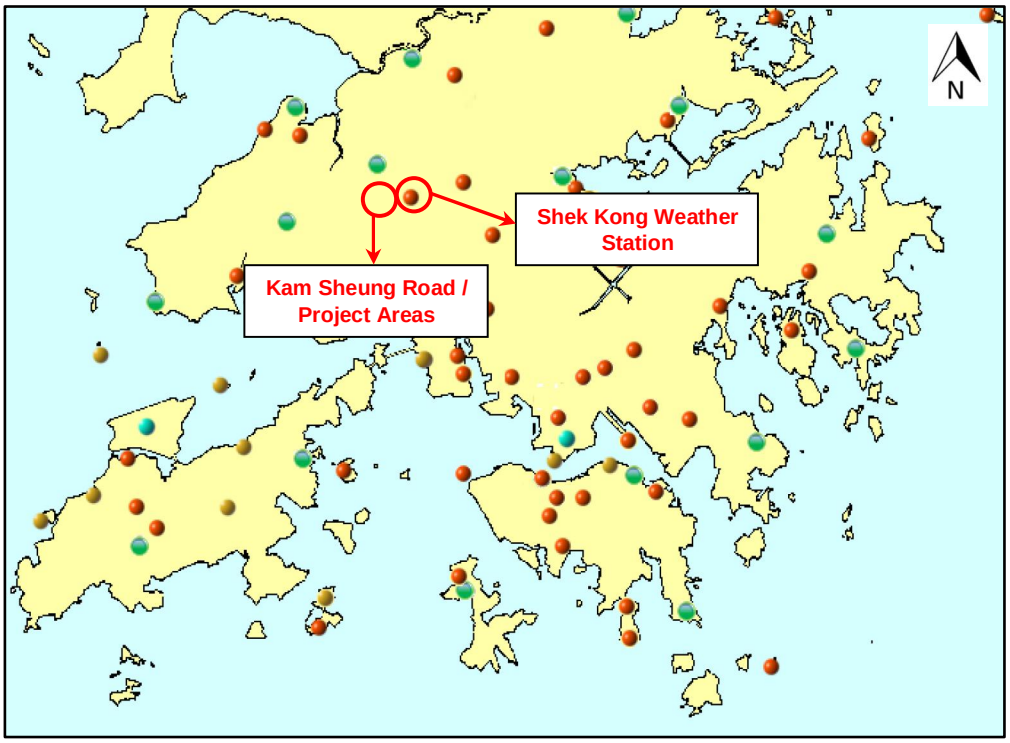


Figure 2.1 Locations of HKO Weather Stations in Hong Kong

2.3 The Shek Kong Automatic Weather Station is the closest station to the Project Areas (with the distance of 1.8km from the boundary of the Project Areas). The wind data from Shek Kong Weather Station is therefore used for identification of the prevailing wind directions and in assessing the site wind availability.

Wind Direction Analysis based on Shek Kong Station Data

2.4 Wind Rose from Shek Kong Weather Station are extracted from the HKO website (http://www.hko.gov.hk/cis/region_climat/SEK/SEK_windrose_year_e.htm), the wind rose are divided into 12 wind directions.

2.5 The Shek Kong Weather Station is 16mPD in height, located at the Shek Kong Barracks surrounded by Tai Mo Shan, Tai To Yan and Kai Kung Leng. The prevailing winds will be redirected and channelled by local terrain features near the Weather Station. This explains the wind data collected by the weather station are mainly concentrated in north-easterly winds.

2.6 Referring to the average annual wind rose at Shek Kong Weather Station from 1997 to 2014 as shown in **Figure 2.2**; it is observed that the winds from E and ENE directions have high probabilities of occurrence (each over 15% of annual percentage frequency occurrence).

2.7 Apart from the mentioned two wind directions in paragraph 2.6, annual winds from other directions all have percentage occurrence frequencies of less than 10%. As a result, annual winds from the E and ENE are considered as annual prevailing winds.

2.8 Wind data from June to August are able to reflect the wind environment during summer seasons and are used to identify the prevailing summer wind directions. According to the average monthly wind roses (averaged from 1997 to 2014) of the summer months at Shek Kong Automatic Weather Station in **Figure 2.3**, the winds from E and S have percentage frequency occurrences of more than 15% for all the three summer months with one exception, which is the wind from S in August, with approximately 10% frequency occurrence.

2.9 From the discussion in paragraph 2.7, winds from E and S are considered to be prevailing summer prevailing wind directions.

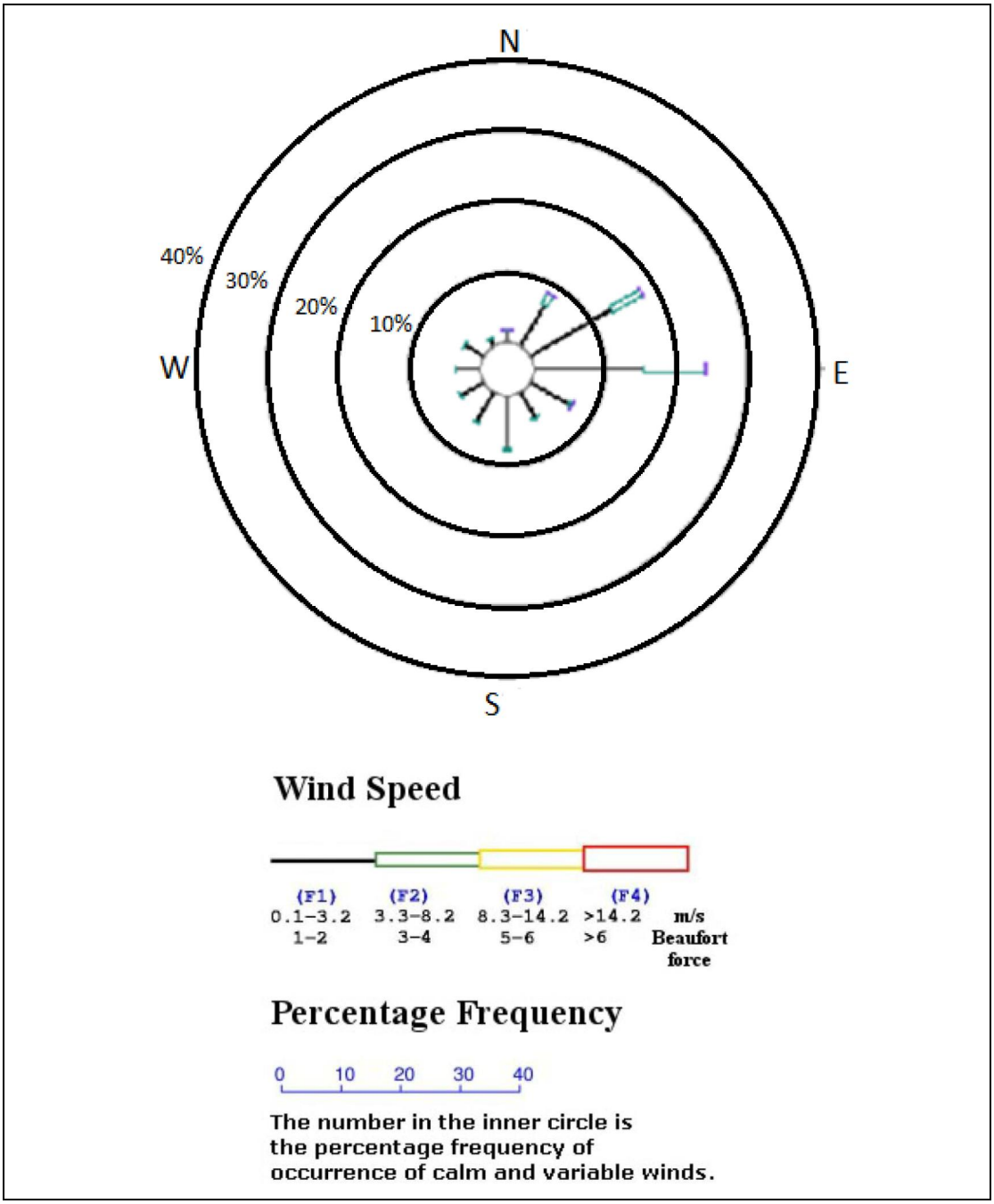


Figure 2.2 Annual Wind Rose of Shek Kong Station (1997 - 2014)

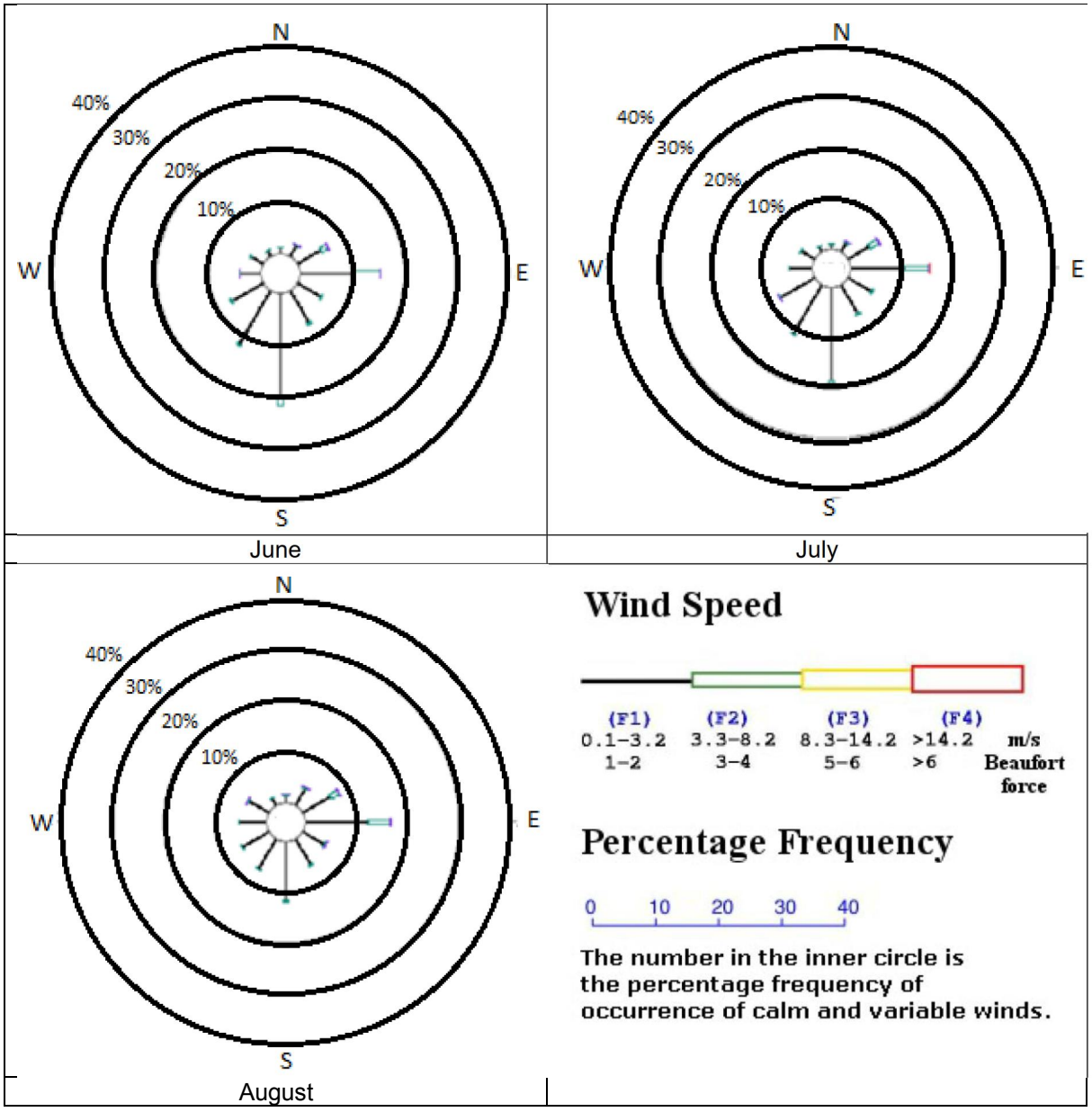


Figure 2.3 Wind Roses in summer months from Shek Kong Station (1997 - 2014)

2.10 According to the analysis in paragraphs 2.4 to 2.8 and based on the Shek Kong Weather Station wind roses, the winds from E and ENE are considered to be the prevailing annual winds, while the winds from S and E are considered to be summer prevailing winds.

Wind Direction Analysis based on MM5 wind data

2.11 The reserachers in HKUST released a set of Site Wind Availability simulated by MM5 model, the annual and summer wind roses based on these wind data at location near the Project Areas are presented in **Figure 2.4** below, details of the wind availability is documented in "Land Use Review for Kam Tin South and Pat Heung, Air Ventilation Assessment – Expert Evaluation".

2.12 By referring to the wind roses obtained from HKUST MM5 wind data, the annual prevailing winds are mainly comprised by NE, ENE, E and ESE winds. While summer winds mainly come from E, SSE and S directions.

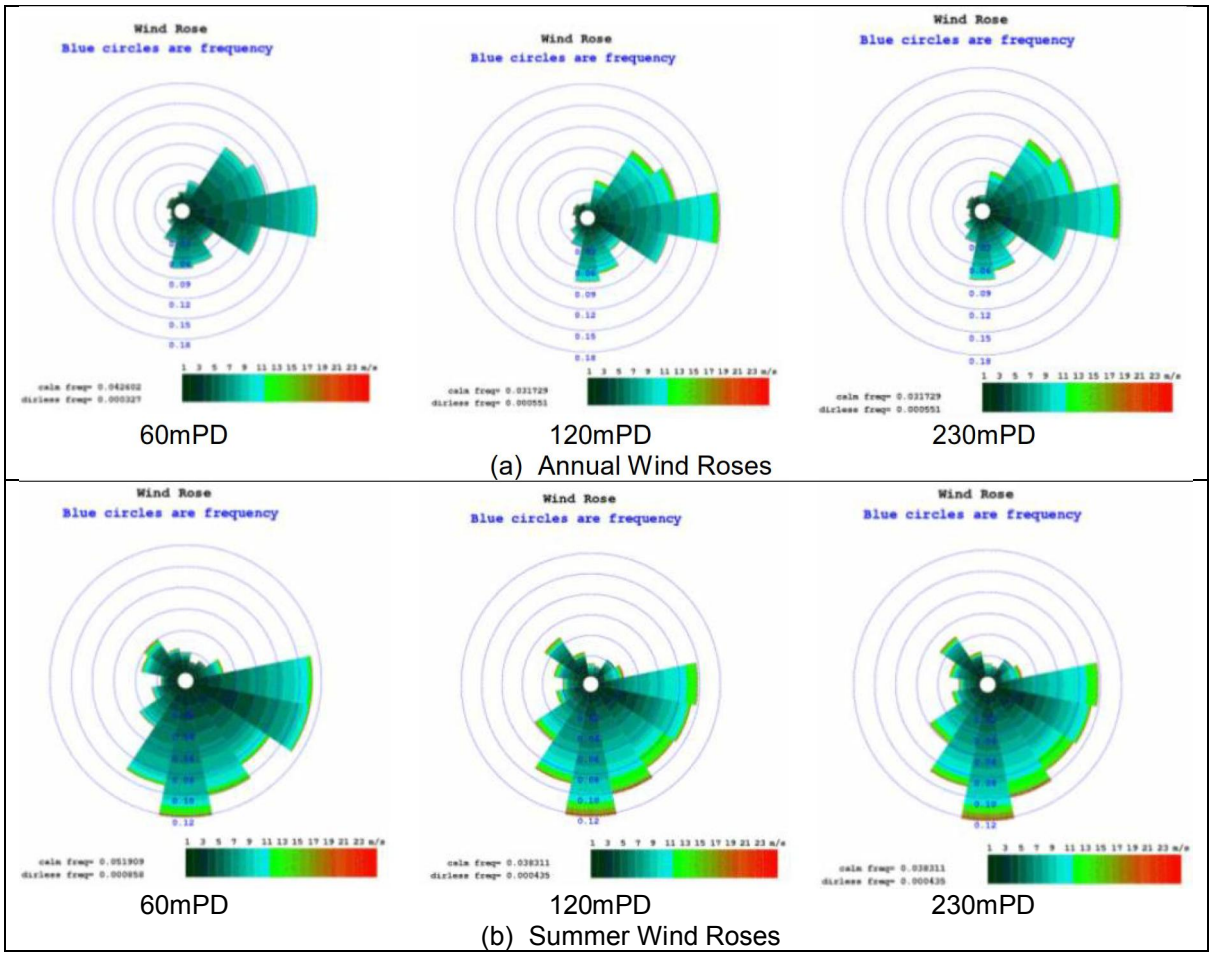


Figure 2.4 Annual and Summer Wind Roses obtained from MM5 simulation

Wind Direction Analysis based on PlanD RAMS wind data

2.13 The Hong Kong Planning Department also released a set of Site Wind Availability, the annual and summer wind roses based on these wind data at location near the Project Areas are presented in **Figure 2.5** below.

2.14 By referring to the wind roses obtained from PlanD RAMS wind data, the annual prevailing winds are mainly comprised by NE, ENE, and E winds. While summer winds mainly come from SW, SSW and S directions.

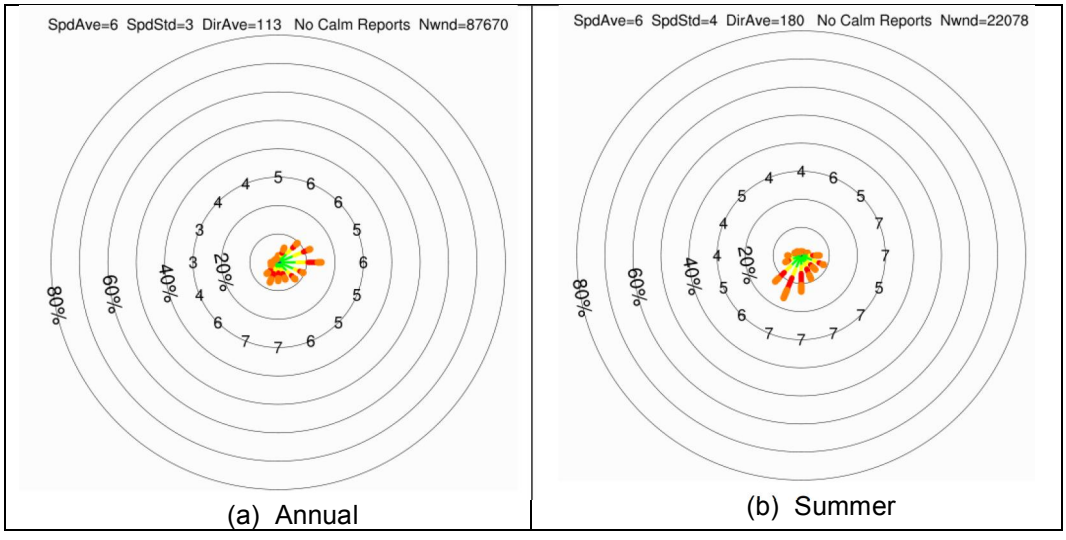


Figure 2.5 Annual and Summer Wind Roses based on PlanD RAMS wind data (500mPD level)

Summary and Identification of prevailing wind directions

2.15 By reviewing the wind data from HKO Shek Kong weather station, HKUST MM5 data and PlanD RAMS wind data, it can be concluded that the annual prevailing winds mainly come from E, NE, ENE and ESE directions.

2.16 During the summer season, wind mainly comes from the easterly directions, south easterly (i.e. E, S, SSE) and south westerly quadrant (i.e. SSW, SW).

2.17 **Table 2.1** summarized the annual and summer prevailing winds from difference sources, while **Figure 2.5** is an illustration diagram showing the prevailing wind directions towards the Project Areas during the annual and summer seasons.

Table 2.1 Summary of annual and summer prevailing winds from different sources

	Annual	Summer
HKO Shek Kong Weather Station	E, ENE	S, E
HKUST MM5	NE, ENE, E, ESE	E, SSE, S
PlanD RAMS wind data	NE, ENE, E, ESE	S, SSW, SW

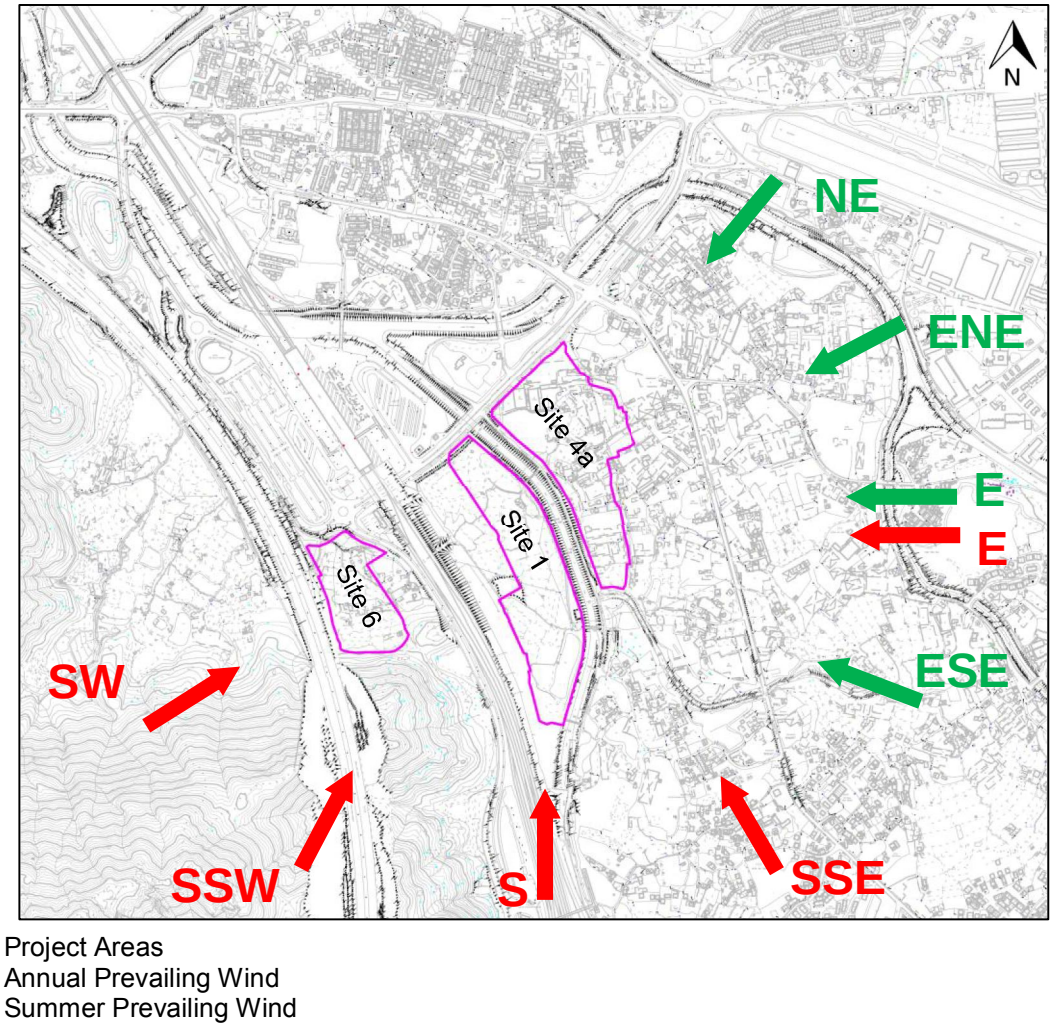


Figure 2.6 Summary of Prevailing Winds towards the Project Areas

3 TOPOGRAPHICAL FEATURES AND WIND FLOW

3.1 The topographical features surround the Project Areas will affect the wind flows and the general wind environment of the Kam Sheung Road.

3.2 The flow of wind around and over hilly terrains is very complex and depends greatly on the shape of the topographies, atmospheric stability conditions and the strength of the prevailing wind etc. **Figure 3.1** below illustrates typical wind flow over hills under moderate wind speed conditions. As shown in the figure, wind either flows over the hill or bends around it and creates eddy flows with opposite direction to the upper wind flow in the lee side.

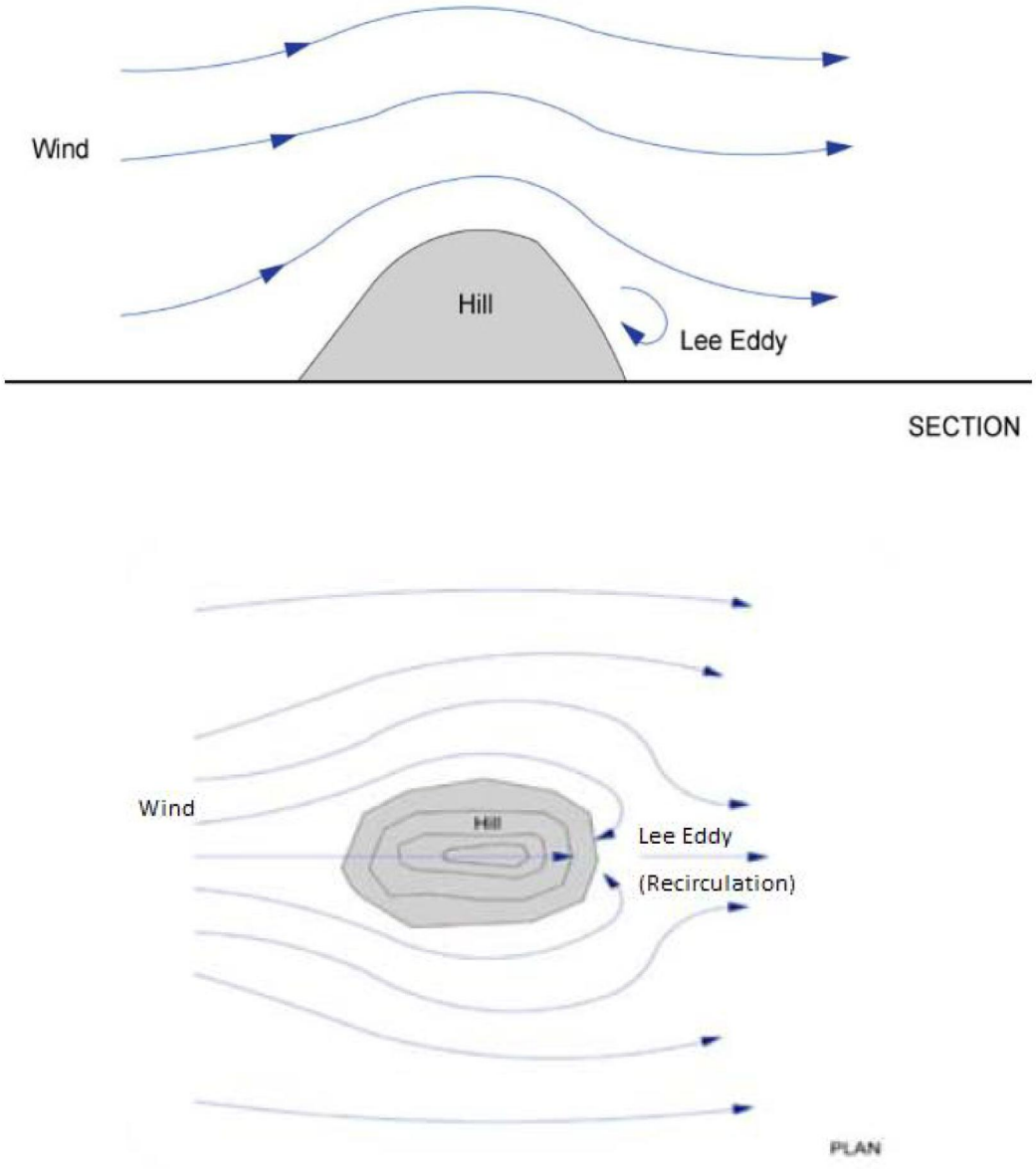


Figure 3.1 Illustration of Wind Flow over Hills under Moderate Wind

(Source: Cat. A1– Term Consultancy for Expert Evaluation and Advisory Services on Air Ventilation Assessment (PLNQ 35/2009), Revised Final Report, Chai Wan Area)

3.3 This section describes the major topographical features within Kam Sheung Road and their impacts on the wind environment of the Project Areas during annual and summer seasons.

Major Topographical Features

3.4 The Project Areas of Kam Sheung Road and its immediate vicinity are located in the inland areas of New Territories. There are the hilly slopes of Tai Lam Country Park (200mPD in height) to the southwest of the Project Areas. On the other hand, the terrain features to the near east, northeast, southeast and northwest directions of the Project Areas are relatively flat, with terrain height of generally 10mPD. By referring to the RAMS wind data, summer winds are from south western quadrant. These winds have already been weakened by the hilly terrains of Tai Lam Country Park before reaching Site 6. Meanwhile the prevailing winds from the north eastern and south eastern quadrant are expected to reach Site 1 and Site 4a without obstruction.

Under the Annual Prevailing Winds

3.5 As mentioned in Section 2 above, the prevailing annual wind directions are from NE, ENE, E and ESE. Thus, all the annual winds are not likely to be affected by the topographical features before reaching the Project Areas.

Under the Summer Prevailing Winds

3.6 The prevailing summer wind directions are observed to come from the S, E, SSW and SW based on HKO Shek Kong Weather Station and PlanD RAMS wind data. The summer easterly wind will reach the Project Areas without significant terrain blockage. Summer winds from S, SSW and SW directions obtained from the RAMS data will be moderated by the hilly terrains of Tai Lam Country Park, before reaching the Project Area (Site 6).

3.7 The Project Area (Site 6) located near the hill slope of Tai Lam Country Park. These hilly slopes are useful local cool air production source that is anticipated to create downhill air ventilation which can benefit the Project Area (Site 6) and its immediate vicinity.

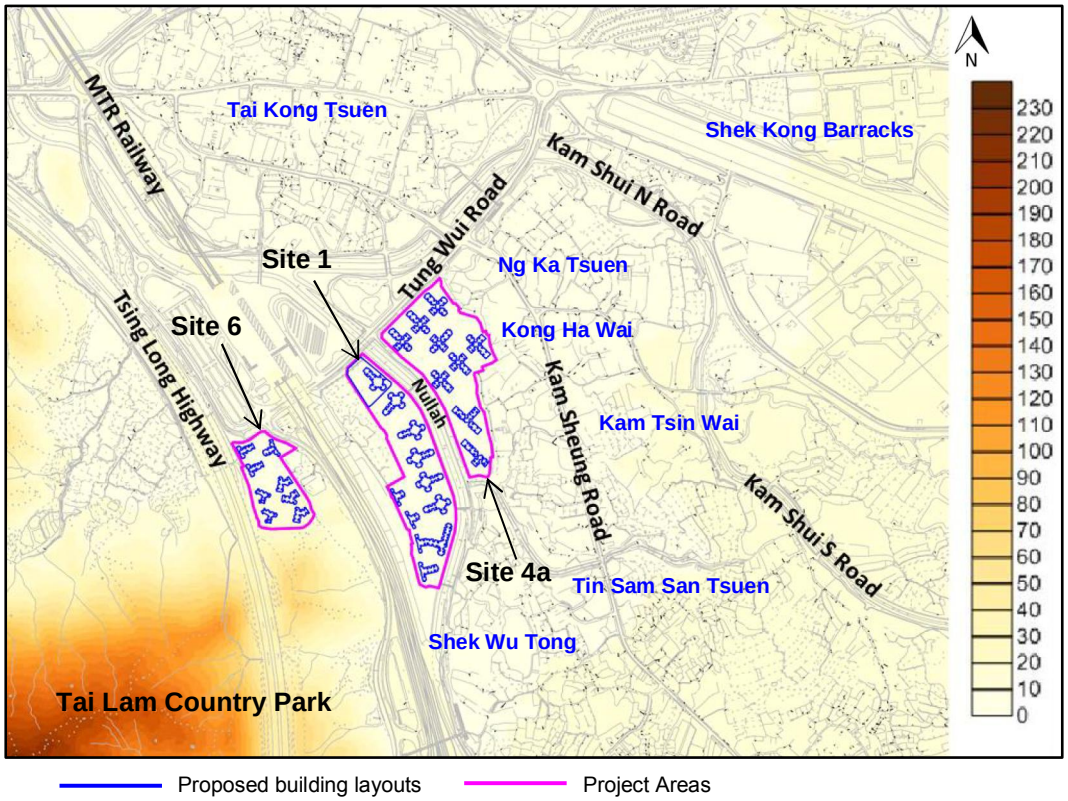


Figure 3.2 Digital Elevation Map near the Project Areas

4 EXISTING LAND USE AND BUILDING MORPHOLOGY WITHIN STUDY AREA

4.1 Following the investigation of the effect of topographical features on the wind environment of the Project Areas in Section 3 above, this section investigates the potential impact of the building morphology of Kam Sheung Road on the air ventilation performance of the Project Areas.

Land Use

4.2 The land use on Kam Sheung Road is guided by the Kam Tin South Outline Zoning Plan (OZP) No. S/YL-KTS/11. The land use types are shown in **Figure 4.1** below:

- The area in grass green, light green and green are zoned as "Green Belt", "Agriculture" and "Open Space", respectively.
- The areas in greenish brown are designated as Village Type Development.
- The areas in orange and yellow are zoned "Other Specified Uses", and "Other Specified Uses (Amenity)".
- The areas in yellowish brown are designated as Residential Type land uses and zoned as "Residential (Group C)" and "Residential (Group D)".
- The areas highlighted in light blue are zoned "Government, Institution or Community".
- The areas in red are zoned as "Commercial".
- The areas in pink are zoned as "Industrial (Group D)"
- The Project Areas falls within areas zoned "Agriculture" and "Other Specified Uses"

4.3 Proposed residential buildings (with a height restriction of 69mPD, due to Shek Kong Airfield Height Restriction) are proposed within the Project Areas. The parameters of the proposed developments at the Project Areas are listed in **Table 4.1** below.

Table 4.1 Proposed Parameters of the Developments in the Project Areas

Approximate Site Area	5.8 ha. (Site 1), 5.8 ha (Site 4a), 2.7 ha (Site 6)
Building Height Restriction	69mPD

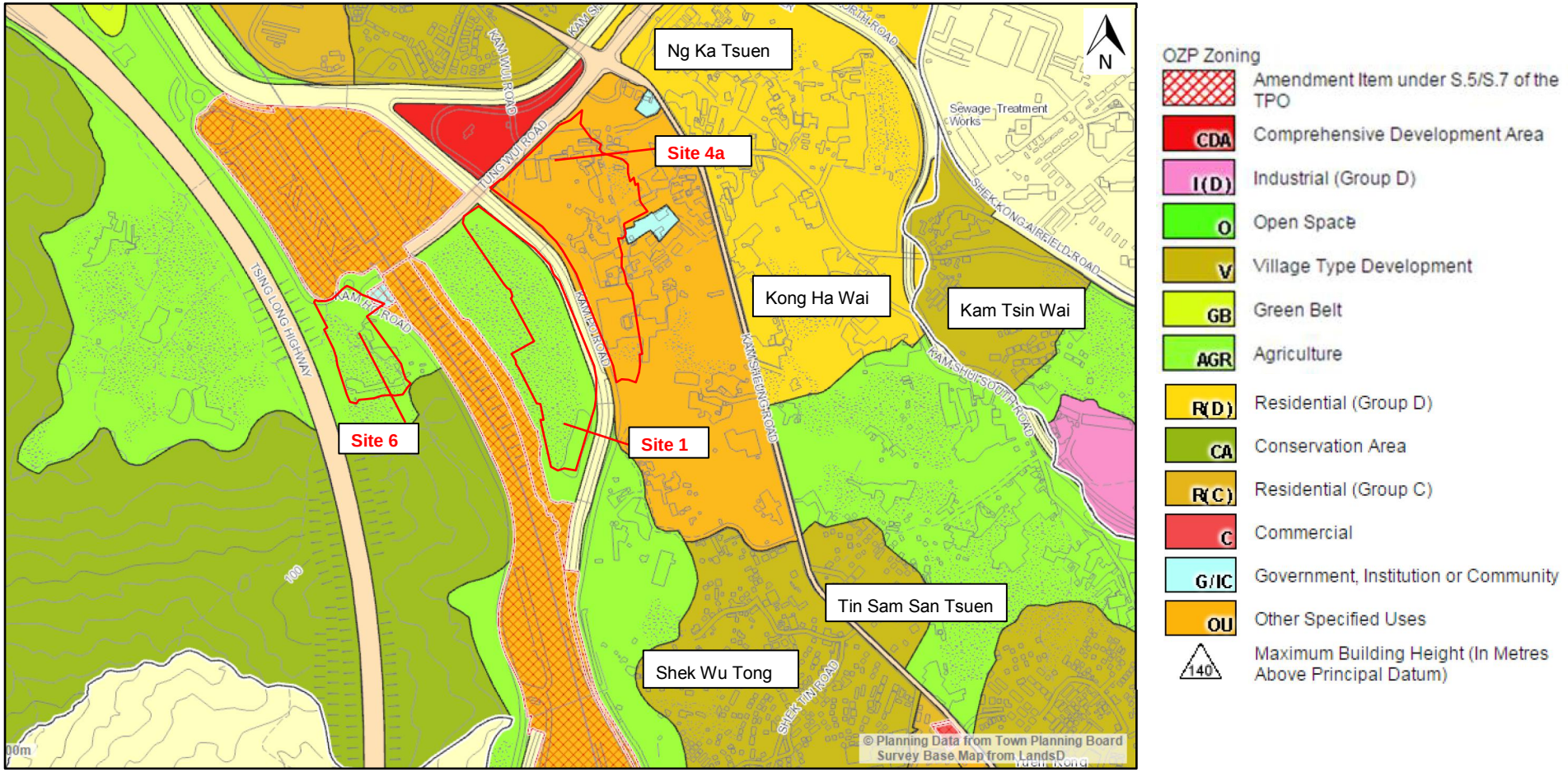
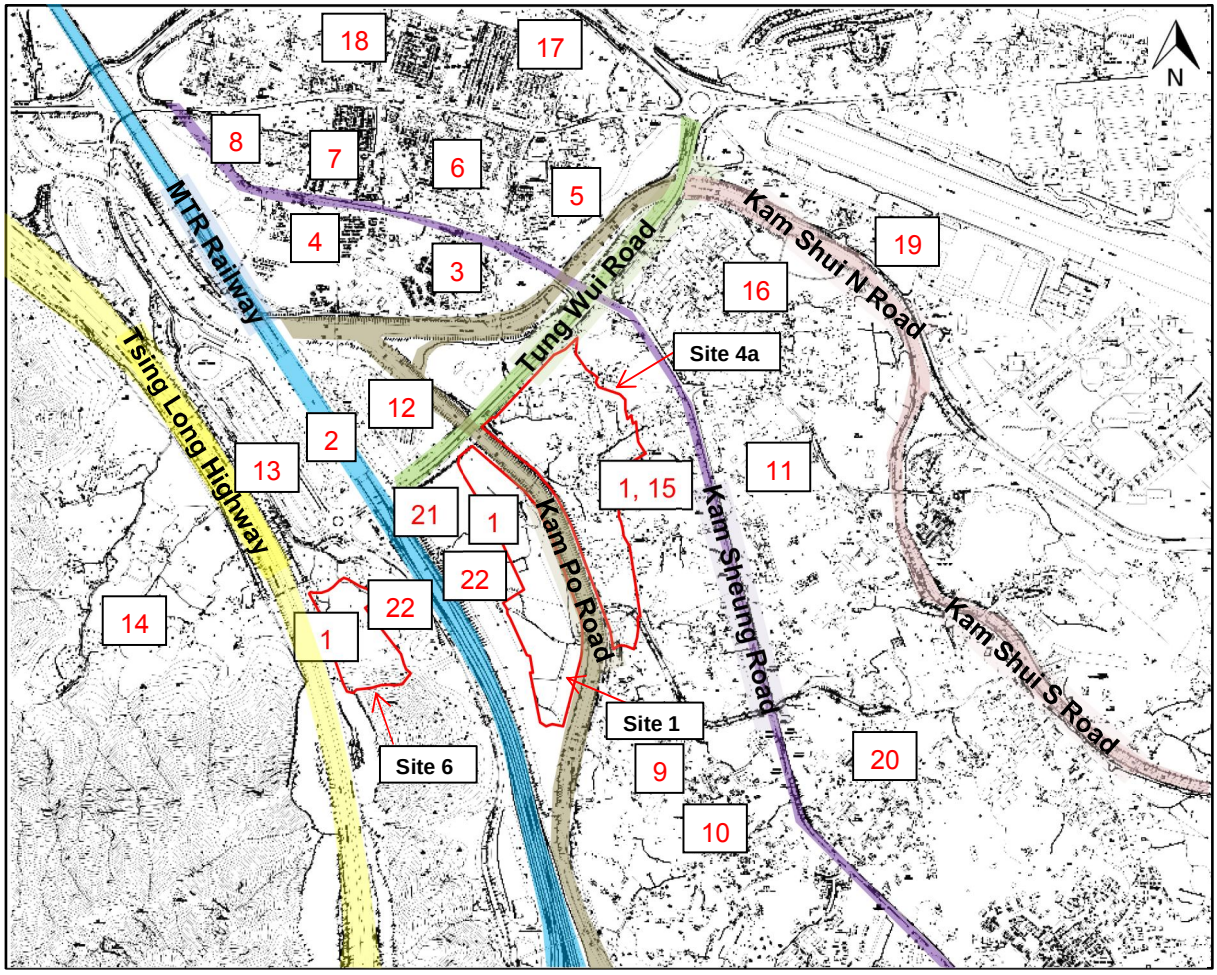


Figure 4.1 Land Uses within Kam Tin Area

Existing and Potential Building Morphology near the Project Areas

4.4 **Figure 4.2** below shows the major existing and proposed developments at the surroundings of the Project Areas within the Study Area. While the **Figure 4.3** shows the potential development at the nearby region of Project Areas



1. Project Areas (Site 1, Site 4a, Site 6, proposed 69mPD)	2. Kam Sheung Road Station (~30.2 mPD), MTR Kam Tin Building (~52.0 mPD)
3. Super King Court (~14.1 mPD), Goodview Court (~16.2 mPD), Genuine Court (~15.3 mPD), Royal Benz (~13.9 mPD), Hermitage Garden (~14 mPD)	4. Noble Park (~18.2 mPD), Kat Hing Garden (~16.2 mPD)
5. Wing Ling San Tsuen (~17.5 mPD)	6. Residence of Tang Pak Kau (~14.6 mPD), Tsz Tong Tsuen(~15.8 mPD), Charming Garden (~17.8 mPD), Tai Hong Tsuen (~11.3 mPD)
7. Kat Hing Wai (~16.0 mPD), Benz Garden(~10.9 mPD), Placid Groves(~17.5 mPD), Greenview Garden (~17.8 mPD)	8. Kam Fung Garden (~14.0 mPD)
9. Mei Yee Garden (~20.2 mPD), Shek Wu Tong (~21.7 mPD), Grace Lodge (~19.7 mPD)	10. Happy Villa (~23.1 mPD), Full Silver Garden (~24.7 mPD), Lake Emerald (~21.1 mPD), Strong Sing Garden (~19.8 mPD), Jazz Garden (~21.0 mPD), Tin Sam Tsuen (~19.2 mPD)
11. Kong Ha Wai (~14.9 mPD)	12. Proposed MTR Development (69mPD)
13. Proposed MTR Development (69mPD)	14. Farms (~16.7 mPD)
15. Park View Villas (~15.7 mPD), Kam Tsin Wai (~13.5 mPD), St. Joseph Church Kindergarten (~12.0 mPD)	16. Ng Ka Tsuen (~16.7 mPD)
17. Pattaya (~15), Wing Lung Wai (~15.5 mPD), Kam Tin Shing Mun Tsuen (~15.9 mPD)	18. Tai Hong Wai (~16.0 mPD)

19. Shek Kong Barracks (~14.1 mPD)	20. Tin Sam San Tsuen (~28.8 mPD)
21. The Proposed G/IC areas (assumed 38mPD for a 8 storeys building)	22. The Proposed schools (assumed 38mPD for a 8 storeys building)

Figure 4.2 Existing and Proposed Developments within Kam Tin Area

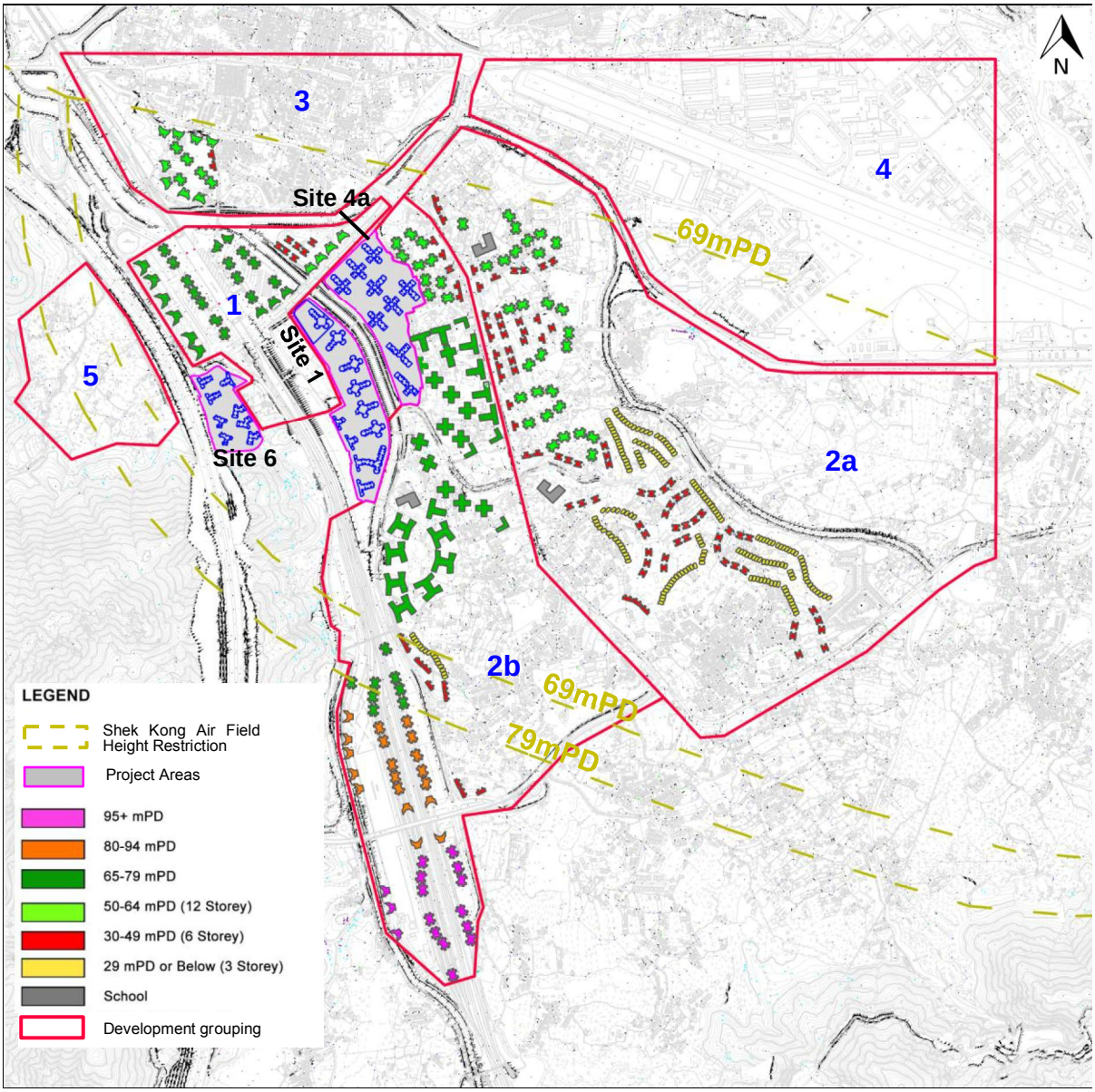


Figure 4.3 Potential development sites and proposed building heights near Project Areas

(*Source: Indicative potential development layout based on Land Use Review for Kam Tin South and Pat Heung (PlanD, 2014)*)

4.5 The regions to the east, northeast, west and far north of Project Areas are currently occupied by low-rise village type developments, while the potential developments located at the immediate northwest, north, northeast, east, and south to the Project Areas are mostly designed as mid-rise residential buildings (with building height varying from 30mPD to 79mPD). Meanwhile, the potential development in the southern portion of the PHMC Development Site to the further south has a building height which may exceed 95mPD. The elevated MTR Railway and Tsing Long Highway are located at the immediate east and west of the Site 6, while a nullah and Kam Po Road are sandwiched between Site 1 and Site 4a. The major existing / potential developments are divided into 5 groups according to their location in relation to major roads, river canal and the Project Areas, as shown in **Figure 4.4**.

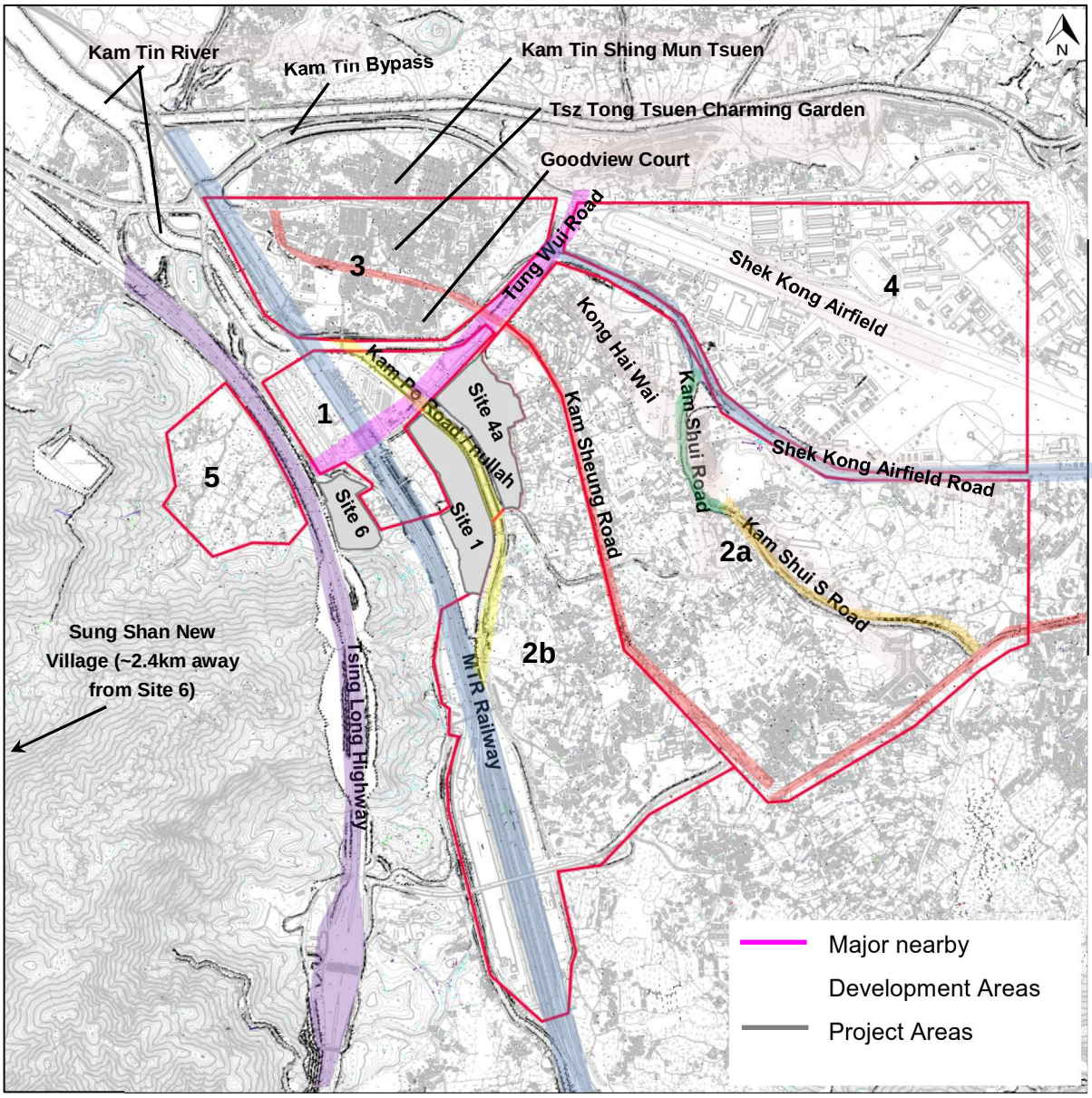


Figure 4.4 Major Groups of Developments

4.6 Region 1 is located at the immediate north / north-northwest of the Project Areas, which are mainly the potential KSRS Development Site. Within Region 1 are mid-rise potential residential developments with height ranging from 65 to 79mPD, and the existing Kam Sheung Road MTR Station with its elevated railway. While the portion of Region 1 that sandwiched between Project Areas (Site 1 and Site 6), are proposed to be developed into mid-rise G/IC facilities such as clinic / sports centre and primary schools (with assumed building height of around 30 mPD).

4.7 Region 2a is located to the east to the Project Areas (Site 4a, Site 1 and Site 6). The current condition of this region consists of low-rise village type developments and storage houses which mainly belongs to Ng Ka Tsuen, and Kong Ha Wai. There are also potential mid-rise developments in this region, with maximum building height of 64mPD.

4.8 The Region 2b is located to the immediate east and south of the Project Areas, the Tin Sam San Tsuen is located within this region. The committed development within the Region 2b is around 65-79mPD in height. It is also noticed that the proposed developments of West Rail Pat Heung Maintenance Centre is located further south within Region 2b, with building height of around 95+mPD.

4.9 Region 3 is located to the far north of the Project Areas. This area is surrounded by Kam Tin Bypass and Kam Tin River. The existing developments in this region are also low-rise village developments and luxury houses which have building heights of around 3 storeys above ground (~10mPD). The major developments fall in this region are those belonging to Kam Tin Shing Tsuen, Tsz Tong Tsuen Charming Garden and Goodview Court, etc. Meanwhile, there will be potential developments at the west most portion of this region, which will have maximum building height of around 64mPD.

4.10 Region 4 is located on the far northeast to the Project Areas. This region covers the Shek Kong Barrack and the Shek Kong Airport, which contain mainly open grounds and low-rise structures.

4.11 Region 5 is located to the west of the Project Area (Site 6) separated by the elevated Tsing Long Highway. Within Region 5 are low-rise village houses with low-density and green lands.

Air Paths near the Project Areas

4.12 By understanding the prevailing winds direction, the local topography and building morphology, the air paths near the Project Areas are identified and illustrated in **Figure 4.5** below.

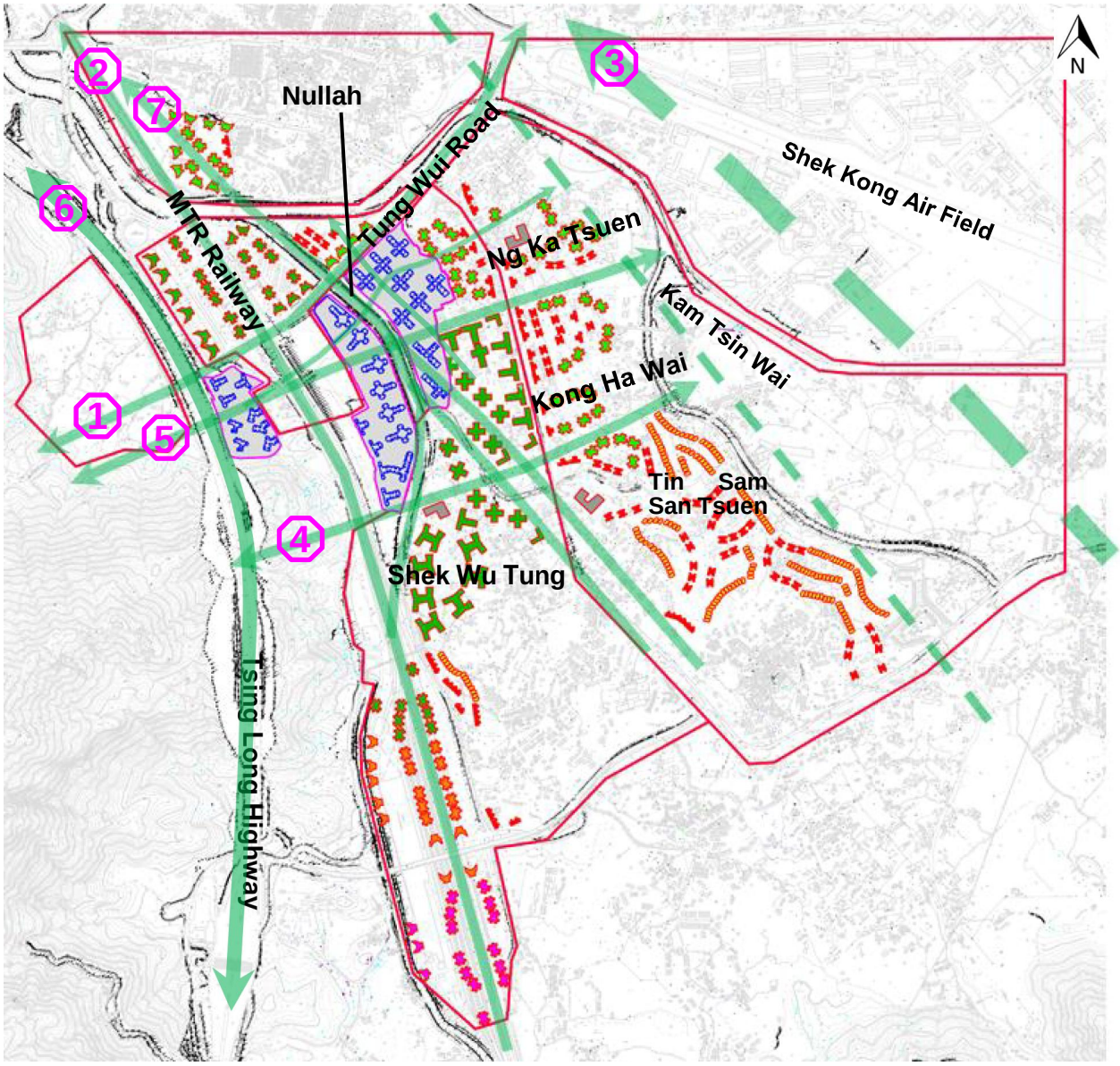


Figure 4.5 Indicative of Air paths within Kam Tin area under existing / committed scenario

Air Paths near and within the Project Areas

4.13 There are several major air paths facilitating air ventilation within the study area. They basically follow road alignments, the nullah and space between existing and committed building groups. The breezeway No.1 is located between Tai Kong Tsuen and Ng Ka Tsuen, along Tung Wui Road and aligning in NE-SW direction. The breezeway No.2 follows railway (MTR West Rail) alignments and aligns in NNW-SSE direction. The breezeway No.3 passes through Shek Kong Airport runway which aligns in ESE-WNW direction. The breezeway No.4 and No.5 passes between Kam Tsin Wai and Tin Sam Sun Tsuen, as well as Kong Ha Wai and Ng Kai Tsuen, facilitating wind penetration in this area due to low-rise nature of the mentioned villages. No.6 air path is located along Tsing Long Highway, redirecting the winds from south and

southeast. The last air path (No.7) is the Nullah and the area between Shek Wu Tong and Kong Ha Wai.

4.14 Tung Wui Road (breezeway No.1) is located in between Tai Kong Tsuen and Ng Ka Tsuen which aligns in NE-SW direction. It serves as a air path in under ENE and NE annual prevailing winds, as well as summer SW / SSW winds. This air path is essential to the wind environments within Tai Kong Tsuen and Ng Ka Tsuen.

4.15 The section of railway (breezeway No.2) alignments nearby Kam Sheung Road station which located between the Project Areas (Site 1 and Site 6) aligns NNW-SSE direction. It also passes the western part of Tin Sam Tsuen and buildings at Shek Wu Tong. It serves as a potential air path under S summer winds near the Project Areas. This air path maintains the wind environments in the vicinity of the Project Areas (Site 1 and Site 6),

4.16 The Shek Kong airport (breezeway No.3) and Kam Tsin Wai formed a large area which only contains open spaces and regions covered by low-rise houses, alinging in ESE-WNW direction. It elongates to the northern part of Tai Kong Tsuen and serves as a potential air path in under eastern quadrant annual and summer winds.

4.17 According to the "Land Use Review for Kam Tin South and Pat Heung, Air Ventilation Assessment – Expert Evaluation", the space between the committed developments in Kong Ha Wai and Tin Sam Sun Tsuen create a major wind corridor (breezeway No.4) in ENE-WSW direction. It is also elongate by the stripe of open space between the south most portion of the Project Area (Site 1) and northern buildings at Shek Wu Tong. This air path would promote penetration of wind under ENE / E annual winds as well as WSW / SW summer winds, facilitating the wind environment at the central portion of Region 2a / 2b.

4.18 There are building separation spaces between the committed development in Ng Ka Tsuen, which forms two air paths aligning in ENE – WSW direction (breezeway No.5). These two corridors passes through the Project Area (Site 4a and Site 1) and facilitate the air flow to the down wind region near the railway and Tsing Long Highway (breezeway No.6).

4.19 The nullah between Site 1 and Site 4a serves as an air path (breezeway No.7) under the S prevailing wind direction. After flowing pass Tin Sam Tsuen and Shek Wu Tong, this nullah directs the southerly summer prevailing wind to pass both Sites 1 and 4a to Tung Wu Road and continue to reach Tai Kong Tsuen.

Impact of Existing Developments on the Wind Environment within Project Areas

Under the Annual Prevailing Winds

Impact caused by developments within Regions 1

4.20 There are planned developments with building height of 65mPD to 69mPD in Region 1. Due to the fact that Region 1 is located at the sideway / downwind side (north / northwest direction) of the Project Areas (Site 1 and Site 4a) under NE, ENE, E and ESE annual wind directions, it is not expected that the existing and planned buildings would cause wind blockage against Site 1 and Site 4a under the aforementioned wind directions. However, the Project Area (Site 6) is located at the southwest direction of Region 1, thus air ventilation performance in Site 6 maybe affected by the mid to high-rise planned buildings in Region 1.

Impact caused by developments within Region 2a

4.21 Region 2a covers the area east and southeast to the Project Areas. It is noticed that the potential developments in this region are mainly mid-rise developments with building height varying from below 29mPD to about 64mPD and would likely to cause wind influences to the downwind side (i.e. the area to the west and southwest of the planned developments). However, given the fact that the potential developments in Region 2a are relatively far from the Project Areas (around 100m away from Site 4a), thus significant wind impact in the Project Areas caused by the planned buildings in Region 2a is not expected.

Impact caused by developments within Region 2b

4.22 Region 2b covers the areas to the immediate east, southeast and south of the Project Areas (Site 1, 4a and 6), and the planned buildings in this region are ranged from 30-64mPD located in the northern region to those of high-rise 65-95+mPD located in the middle to southern areas. It is also noticed that most Region 2b planned buildings in the immediate vicinity of the Project Areas (Site 1, 4a, and 6) are around 65mPD to 69mPD (Shek Kong Airport height restrciton) in height, and would likely to create wind shelter against the Project Areas (Site 1, 4a and 6). However, the wind corridors between Ng Ka Tsuen and Kong Ha Wai, as well as the breezeway between Kong Ha Wai and Tin Shan San Tsuen / Shek Wu Tong, allows the prevailing winds to penetrate through the Project Area and reduce the blockage of wind.

Impact caused by developments within Region 3 and Region 4

4.23 The existing buildings in Region 3 and Region 4 are mostly low-rise developments with generally 3-storeys in building heights, with the only exception of the west portion of Region 3, which will be occupied by planned buildings with maximum building height of about 64mPD. It is noticed that between Region 4 and the Project Areas are more than 100m in distance. Thus the developments in Region 4 developments are not expected to cause significant influences to the wind environment within the Project Areas. Meanwhile, although Region 3 is located near the northern portion of Site 4a, the buildings of Region 3 near Site 4a are all low-rise developments while the high-rise planned buildings are mainly located at the far sideways of the Project Areas, and would not likely to induce wind influences against the Project Areas.

Impact caused by developments within Region 5

4.24 Under all annual prevailing winds, the Project Areas are located at the upwind side of the Region 5. Thus, wind influences caused by Region 5 developments are not expected.

Under the Summer Prevailing Winds

Impact of developments within Region 1

4.25 Under the E, S, SSW and SW summer winds, Region 1 developments will not cause negative impact on the wind environment at the Project Areas, since all Project Areas are located at the upwind side of Region 1.

Impact of developments within Region 2

4.26 Similar to the discussion in Paragraph 4.21, existing and potential developments at Region 2a will not cause impacts on the wind environment at the Project Areas, due to the relatively far distances from the Project Areas.

4.27 The planned developments within Region 2b are located at the east to southeast vicinity of the Project Areas (Site 1 and 4a), the mid to high-rise buildings are likely to create wind shelter against the incoming summer winds. However, air flow under the summer prevailing winds can still reach the Project Areas through the breezeways between the planned developments at Shek Wu Tung and Tin Shan San Tsuen / Kong Ha Wai, which would alleviate the wind impact.

4.28 It is also noticed that the potential Region 2b development with 95mPD in height within the West Rail Pat Heung Maintenance Centre is located at the upwind region of the Project Areas under the southern summer winds. Given the distance of around 500m between these proposed developments and the Project Areas, it is not expected that these developments would give rise to air ventilation issues in the Project Areas.

Impact of developments within Region 3 and Region 4

4.29 Due to the fact that the Region 3 and Region 4 are located to the north and east (i.e. downwind side under the E, SE and SW quadrant winds) of the Project Areas, the influences against the Project Areas caused by developments in these regions are not expected.

Impact of developments within Region 5

4.30 It is noticed that the developments in Region 5 are comprised by low-rise low-density storage houses (mostly 1 storey (3-5m) above ground), and maintained a distance of around 70m away from Project Areas. Thus, it is not anticipated that the existing structures in Region 5 would cause significant impact on the wind environment in Project Areas.

5 EXPERT EVALUATION ON THE PROJECT AREAS

5.1 Following the investigation of the potential impact of the existing developments on the Project Area in terms of air ventilation performance in Section 4, this section presents the influence of the proposed developments within the Project Areas on the areas of the immediate vicinity.

Recap of planning parameters and general characteristic of the Project Areas

5.2 The Project Areas are situated at the south and southeast to the Kam Sheung Road MTR Station. The existing developments at their surroundings are mostly low-rise buildings, and incoming winds can penetrate Site 1, Site 4a and Site 6. There are planned residential developments with proposed heights ranging from 30mPD to 79mPD located at the vicinity of the Project Areas, However, due to the Shek Kong Air Field Height Restriction of 69mPD (areas covered by this constraint can be referred to the yellow dashed lines of **Figure 4.3**)), buildings at the immediate surrounding of of Project Areas will be 69mPD in maximum height.

5.3 The Project Areas are proposed to be developed into mid-rise residential buildings with a height restriction of 69mPD and a plot ratio of around 3.0.

5.4 The Project Areas consisted of three sites (Site 1, Site 4a and Site 6), each site contained multiple midrise residential developments (with height restriction of 69mPD). Wind corridors of 30m in width are introduced at strategic locations. Meanwhile, there are several building separations of at least 15m between the proposed residential blocks (as shown in **Figure 5.1**), such separations may elongated with one another to allow wind penetration through the site. The effectiveness of these wind corridors / building seperations will be further justified in the future AVA initial study. In addition, the existing air paths along Tung Wui Road, the railway and the nullah between Site 1 & Site 4a will also be maintained after the proposed housing developments.

The prevailing winds towards the Project Areas

5.5 As mentioned in Section 2, the annual prevailing wind comes from NE, ENE, E and ESE winds while the summer prevailing winds comes from the E, S, SE, SSW and SW directions.

Impact of existing developments on the wind environment in Project Areas

5.6 The major existing developments near the Project Areas have been discussed in Section 4. Owing to the relatively low-rise and low-density nature of the buildings in Regions 3, 4 and 5, significant influences in terms of wind environment within Project Areas caused by the existing developments within the aforementioned regions are not expected. However, the planned developments in Region 1 are expected to be residential buildings of 65mPD to 69mPD in height, thus it is likely to cause a slight impact on air ventilation performance in Project Areas under the NE annual wind. It is also noticed that the planned developments in Region 2 are mid to high-rise in nature, which may cause air ventilation impact against the Project Areas under winds from E, SE and S quadrants.

Merit design features of the Project Areas

5.7 There are merit design features incorporated in the illustrative scheme observed in the Project Areas. Such features are described as follows, and are shown in **Figure 5.1**.

- The Project Areas 4a, 1, and 6 have incorporated a 30m width NBA[1] which penetrate through all three sites in E/ENE – W/WSW direction and redirect the winds through the Project Areas and reduce the cumulative impact. Meanwhile, a 30m NBA[1] in ENE - WSW is incorporated at the south most region of Site 1, which provides better wind permeability at the southern area of the sites.

Remark: [1] Permeable structures with low-profile such as fence walls, covered walkway, green features, street furniture, construction of footbridge, planters, pergola and trellis are allowed in the Non-Building-Area (NBA) proposed in this section.

- In addition to the 30m NBA, Site 4a has incorporated three stripes of major building separations with around 15m in width to improve wind permeability.
- A 30m wind corridor (NBA) is incorporated in the south most region of Site 1, which will enhance penetration of wind.
- In additional to the two 30m NBAs, major building separations with 15m in width are incorporated to provide breezeway through Site 1, 4a and 6 and provided approximately 20% permeability of each sites. Moreover, the building separation between BLKs1 and 2 of Site 1

elongates a 15m wide building separation to Site 4a, providing breezeway penetrating both sites and reduce the cumulative impact.

- Building setback of 10m from the site boundary and / or nearby major roads are considered for the development layouts of Sites 1, 4a, and 6.
- The south most building (BLK 5) of the Site 6 maintained a 15m setback from the site boundary, which provides a 15m width wind corridor to enhance penetration of wind.
- The proposed buildings in the Project Areas will maintain a setback (approximately 10 meters) from road kerb, which would reduce the extent of wind influence regions to the vicinity areas and along the main corridors, which are shown in **Figure 5.2** below.

Under the Annual Prevailing Winds

5.8 It is noticed that the proposed buildings would be mainly mid-rise residential towers, compared to those of currently existing low-rise village houses, such mid-rise buildings may cause slight declination in the magnitude of the prevailing winds, thus the existing general wind environment is expected to be slightly weakened after the construction of these proposed buildings.

5.9 There are two major wind corridors in the current indicative scheme, the northern one penetrated through all three site in roughly ENE-WSW direction, while the southern one is located at the south most region of Site 1. Detailed location of these two wind corridors are shown in **Figures 5.1, 5.4** and **5.5**. In view of the importance in maintaining air ventilation performance, the area of these two wind corridors are suggested to be designed as Non-Building-Area (NBA)[1]. The effectiveness of these wind corridors will be further justified in the Initial Study.

Remark: [1] Permeable structures with low-profile such as fence walls, covered walkway, green features, street furniture, construction of footbridge, planters, pergola and trellis are allowed in the Non-Building-Area (NBA) proposed in this section.

5.10 Under the annual ENE, E winds, the proposed developments in Site 1 and Site 4a may provide wind shelter to the nullah and the G/IC sites which are located at the immediate west / southwest to the Site 1 (i.e. the proposed primary school and G/IC site at the southern portion of Region 1), thus, the prevailing winds would pass through the developments in Site 4a and Site 1 in succession before reaching these G/IC developments, such cumulative shelter may inflict wind impact on the G/IC site. However, the wind corridor (the proposed NBA) with 30m in width penetrating through middle of Sites 1, 4a and 6, along with the major building separation between the Tower 1 and 2 in Site 1 (as shown in **Figure 5.1** and **5.3**), will provide breezeways which allow air flow to reach the concerned area and hence reduce the wind impact.

5.11 It is noticed that Site 6 is also located at the downwind side of Site 1 and 4a under the E / ENE winds. Owing to the relative far distances (approximately 190m) between the Site 1 and Site 6, the influence at Site 6 caused by the cumulative sheltering of Site 1 and 4a should not be significant.

5.12 Most of proposed buildings in the Project Areas adopted podium free design except BLK1 which has a 2-storey podium located at the north most region of Site 1 and facing part of the Tung Wui Road (as shown in **Figure 5.2**), this podium structure is 5.5m above ground in height and only covers a relatively small area at the north most region. Thus the wind influences region induced by the podium structures would only reach the immediate downwind side of the structure. Given the low-profile of the podium, the impact caused by this podium is not expected to be significant.

5.13 Similar to that under the ENE wind, the G/IC site is also situated at the downwind side of Project Area (Site 1 and 4a) under the NE wind, and the wind environment may be influenced by the proposed developments. However, a major buildings separation of 15m is located between BLK 1 and 2 of Site 1, which is elongated by the separation between BLK 2 and 4 of Site 4a. These building separation provided wind breezeway to allow penetration of wind, which will reduced the wind impact caused by the proposed developments.

5.14 Under ESE wind, the G/IC site and the southern portion of Region 1 are also located at the downwind of Site 1 and 4a, thus the prevailing ESE winds will be redirected and moderated by the proposed developments of the Project Area, resulting in a slightly declined wind environment under this specific annual winds. However, given that the occurrence of ESE wind (around 10%) is relatively lower than other annual prevailing winds, the slight wind influence under the ESE wind would not likely to cause severe reduction in overall annual wind environment.

5.15 Under the annual ESE wind, proposed developments within Site 6 are located at the upwind side of the Flower World, Hello Kitty Go Green Farm. However, the proposed developments in Site 6 are located at around 200m away from the Hello Kitty Go Green Farm and Flower World etc.. Therefore, the wind influences region induced by the proposed development are not likely to reach the aforementioned area and induce wind impact.

5.16 Also, it is note that Sung Shan New Village is located at the downwind side of the Project Areas under the easterly winds. However, given the fact that the Sung Shan New Village is located approximately 2.4km away from Site 6 and the NE and E prevailing winds will reattach at pedestrian level after skimming over the proposed developments within the Project Areas. Therefore, the proposed developments in the Project Areas would not induce any wind impact upon this village.

Under the Summer Prevailing Winds

5.17 Under the E summer prevailing wind, the air ventilation impacts induced by the proposed developments within Project Areas are similar to the easterly annual winds and can be referred to the above discussions in Paragraph 5.10 and 5.11.

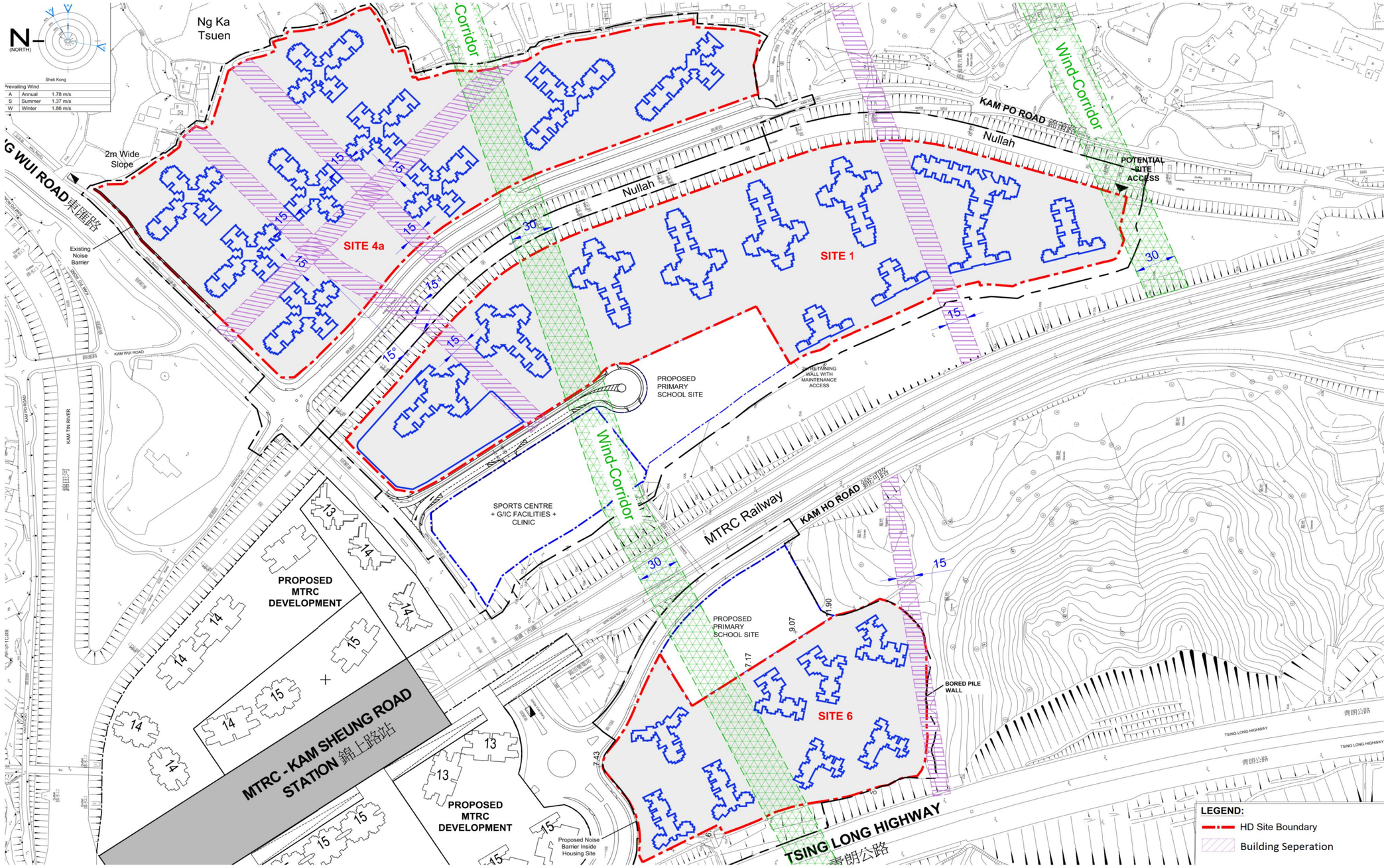
5.18 Under the southern summer prevailing wind (S and SSE), the prevailing winds will flow through the proposed developments in Region 2b and Site 1 / Site 4a before reaching Regions 1 and 3. Owing to the cumulative blockage of Region 2b as well as Sites 1 and 4a, the proposed developments may weaken incoming winds towards the G/IC region, Tung Wui Road and the majority of Region 1 areas which are located to the immediate north /northwest of the Project Areas as well as the southern portion of the public transport interchange next to the Kam Sheung Road MTR Station. This may cause influence to the wind environment in the south portion of Region 1 area (the G/IC site) and the PTI. However, since two major existing wind corridors on both east and west side of Site 1 (i.e. the Nullah and the MTR railway) will be retained, the prevailing air flows is enhanced and would therefore reach the G/IC area, as well as the potential developments in the Region 1 area near the PTI. Also for Site 4a, although it has a 210m frontal length, with the provision of a major building separation of 15m in width penetrating Site 4a in SE-NW direction, the incoming air flow is allowed to penetrate through the site reaching Tung Wui Road and Region 1 area. Therefore, wind shelter effect at this region is alleviated.

5.19 Generally speaking, cumulative wind impact is anticipated to be less significant under the winds coming from southerly direction, owing to the wind corridors (i.e. the nullah, West Rail and Tsing Long Highway) in between the 3 development sites, as shown in **Figure 5.3** below. The wind corridor of nullah would break down the wind wake interaction between Sites 1 and 4a at their leeward side, while the West Rail would break down the wind wake interaction between Sites 1 and 6.

5.20 The proposed developments within Site 6 are located at upwind side of the Flower World, Hello Kitty Go Green Farm under SE wind. Similar to the discussion in Para.5.8, the proposed developments will have a far distance from the Hello Kitty Go Green Farm and Flower World etc. Therefore, it is not expected that the proposed developments would cause significant wind impact to these areas.

5.21 Under the SSW and SW summer wind directions, wind environment at the open area / storage ground near the Tung Wui Road / Kam Sheung Road junction along with the northern portion of Region 2b is likely to be affected after construction of the proposed developments at Project Area (Site 4a). Prevailing summer wind from south westerly quadrant will also have to pass through Sites 1 and 4a before reaching St. Joseph Church Kindergarten. However, since the 30m wide wind corridor is close to the St. Joseph Church Kindergarten (**Figure 5.3**), this would allow penetration of wind to reach the kindergarten, reducing the wind impact.

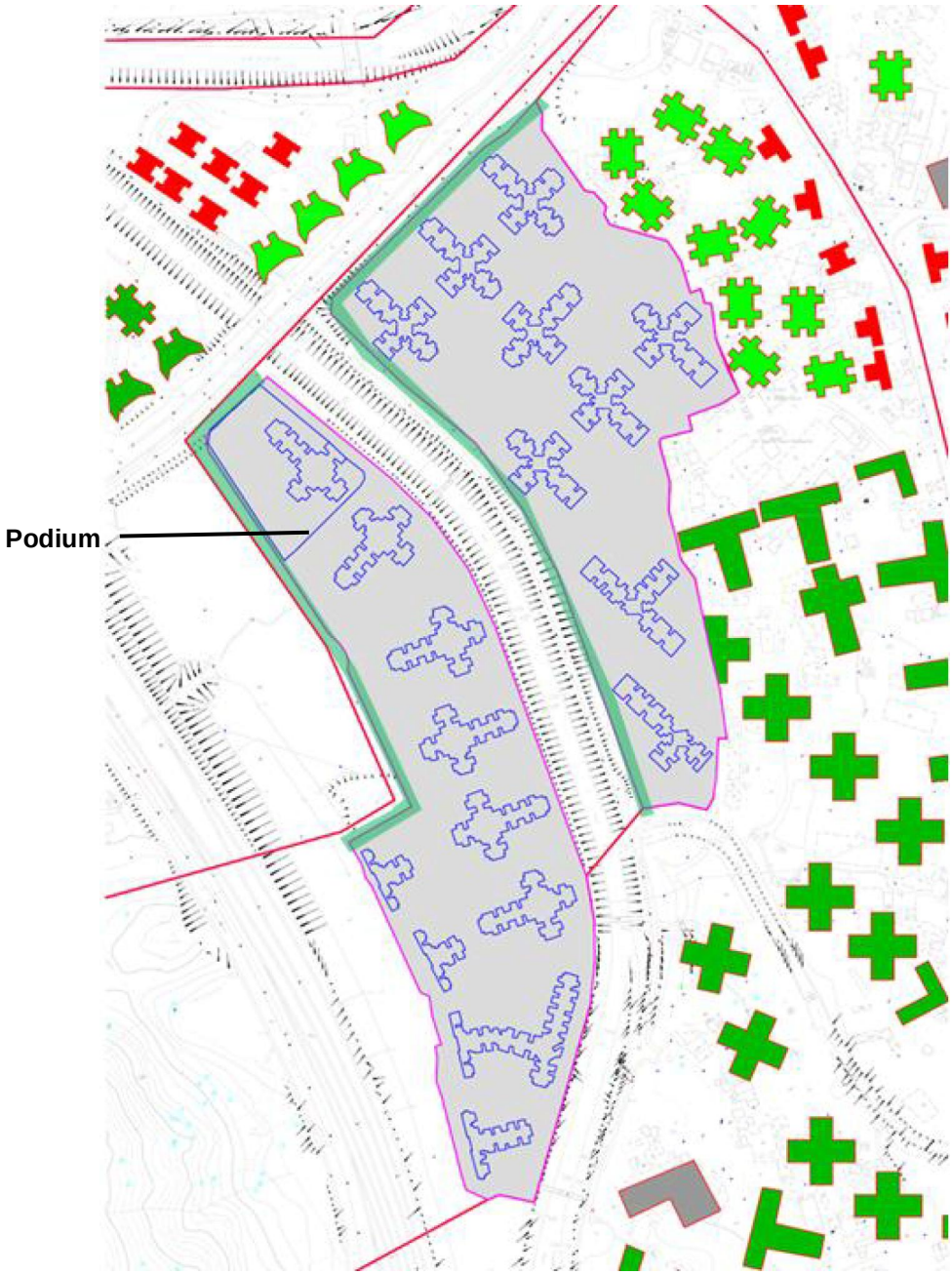
5.22 In regard to the possible influence on the St. Joseph Church Kindergarten, it is suggested to incorporate open void of approximately 3.5m in height at ground level at the southern wing of BLK7 in Site 4a (as shown in **Figure 5.4**), such measures would reduce the blockage of wind at pedestrian level, providing better wind environment to the vicinity areas. Detailed application and dimension of this measure will be subjected to the refinement of development layout in later design stage.



Proposed NBA of 30m width

The major building separation of around 15m in width

Figure 5.1 Illustration of the schemes and major building separations in Project Areas



Location of the 10 meters setback
Setback from Road Kerb

Figure 5.2

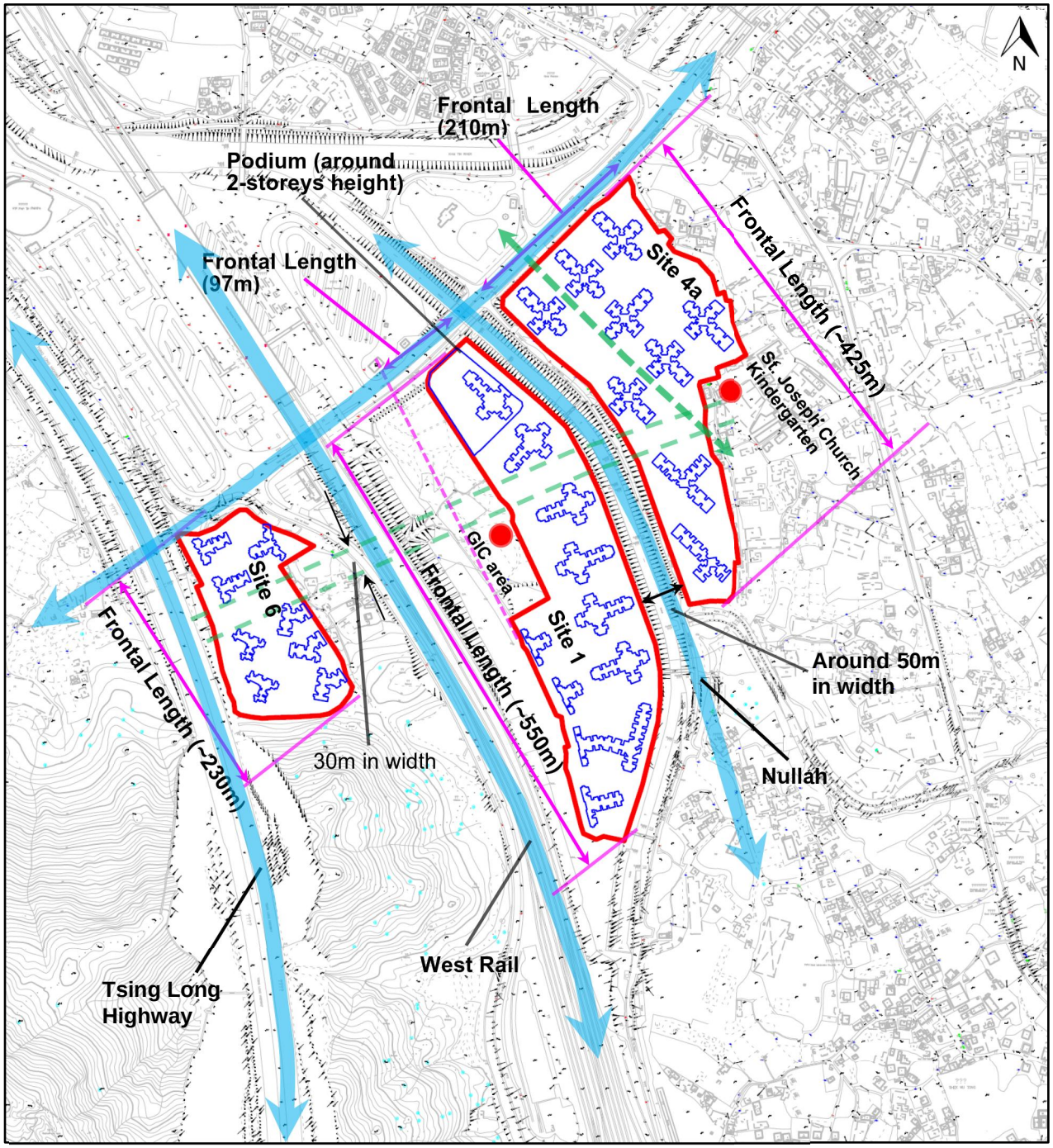


Figure 5.3 Illustration of potential features of the Project Areas

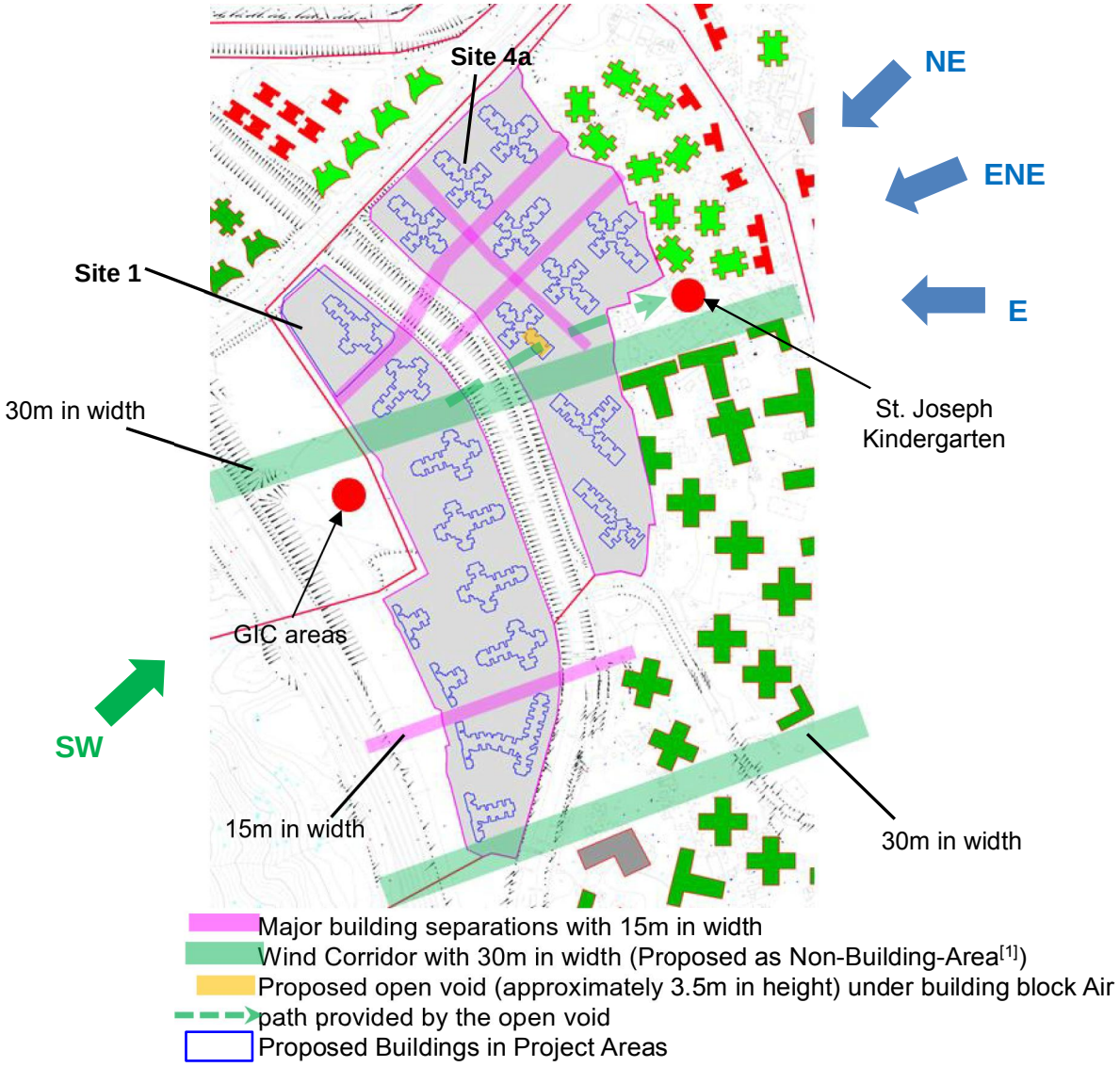


Figure 5.4 Illustration of proposed additional measures in Site 1 and Site 4a

Remark: [1] Permeable structures with low-profile such as fence walls, covered walkway, green features, street furniture, construction of footbridge, planters, pergola and trellis are allowed in the Non-Building-Area (NBA) proposed in this section.

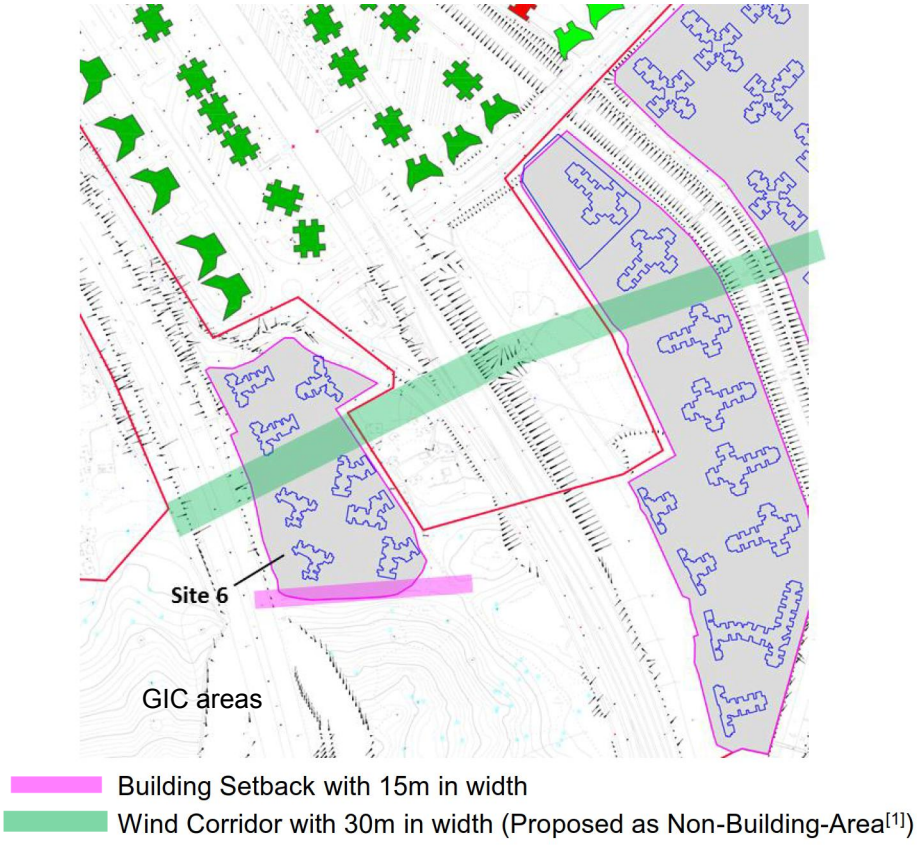


Figure 5.5 Illustration proposed additional measures in Site 6

Remark: [1] Permeable structures with low-profile such as fence walls, covered walkway, green features, street furniture, construction of footbridge, planters, pergola and trellis are allowed in the Non-Building-Area (NBA) proposed in this section.

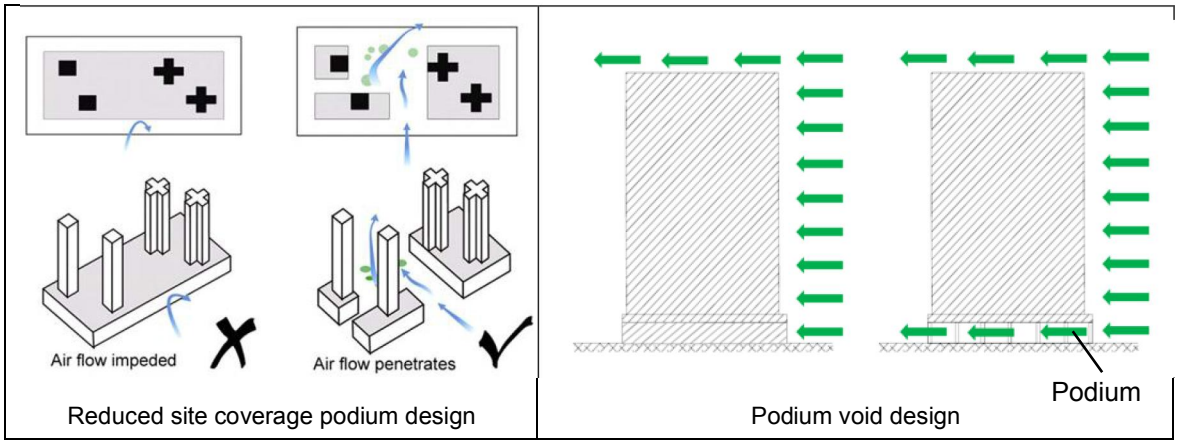


Figure 5.6 Merit design principles

6 GENERAL PRINCIPLES RECOMMENDED FOR THE FURTURE DESIGN STAGE

6.1 In addition to the improvement measures proposed in the Section 5 above, a few general principles are also encouraged to be retained / taken into consideration for the developments of the Project Areas in future design stage:

- Building Permeability equivalent to 20% to 33.3% of total frontal area;
- Minimization of podium bulk with ground coverage of no more than 65%;
- Building setback;
- Greenery coverage of at least 20% and an overall target of 30% is aimed to be achieved.
- Avoidance of long continuous façades; and
- Reference could also be made to recommendations of design measures in the Hong Kong Planning Standards and Guidelines.

7 SUMMARY AND CONCLUSION

7.1 The Project Areas of this study are situated at the inland Kam Tin area in the New Territories, south of the Kam Sheung Road MTR Station. There are hilly terrains of the Tai Lam Country Park located to the south and southwest of the Project Areas, with maximum height of around 200mPD in the vicinity of Project Areas. Meanwhile, the terrain to the north, northeast, east and southeast are relatively flat.

7.2 Based on the wind data from the HKO, HKUST MM5 and the RAMS model, the annual prevailing winds of Kam Tin area are from the NE, ENE, E and ESE, whereas the summer prevailing winds are winds from S, E, SSE, SSW and SW directions.

7.3 The existing developments in the vicinity of the Project Areas are mainly village houses and storage facilities with low building height and density, which are not expected to cause observable impact upon the wind environment within the Project Areas.

7.4 There are several existing wind corridors in the vicinity of the Project Areas including the Nullah, MTR railway and Tsing Long Highway. These wind corridors enhance air ventilation performance within the Project Areas and their surrounding areas.

7.5 The proposed buildings in the Project Areas are mid-rise residential developments, with a building height restriction of 69mPD. It is noticed that the Sites 1, 4a and 6 are located close to each other, which may cause cumulative effect in terms of wind influence, slight adverse wind impact may occure at the GIC area west to Site 1 under the annual north-eastern quadrant winds, as well as the St. Joseph Kindergarten under the SW summer wind. However, due to the 30m wide wind corridor (the proposed NBA) provided through Sites 1, 4a and 6 in the indicative layout, and the major building separations, a portion of air flow could reach the G/IC site under NE / ENE / E winds and St. Joseph Kindergarten under SW summer wind. Furthermore, the proposed developments will provide several major building separations of around 15m in width and adopt reduced podium coverage design whenever possible to enhance the wind environment of the region. On the other hand, with the existence of West Rail between Sites 1 and 6 as well as the nullah between Sites 1 and 4a, they serve as wind corridors under the southerly wind alleviating the potential wind impact at Regions 1 and 3 which are located at north to the Project Areas.

7.6 With regard to the possible impact of wind environment against the vicinity areas, improvement measures including building setback, inexcessive podium coverage and open void at ground level of buildings are recommended for the Project Areas. Building permeability for each individual sites of no less than 20% are considered. Moreover, areas situated at the major wind corridors are suggested to be retained as Non-Building-Area where only low profile permeable structures/features are allowed in air ventilation perspective. Such improvement measures would alleviate the possible wind influence at pedestrian level. The effectiveness of these measures would be further justified quantitatively in the Initial Study stage.

7.7 Since the final design layout for the proposed buildings within Project Areas has to take into account many factors other than air ventilation. The future design of the layout would balance all the factors and incorporate improvement measures as much as possible. The improvment measures explored and justified in the following Air Ventilation Assessment – Initial Study stage, will further optimize the development layouts of the Project Areas in terms of air ventilation performance.

7.8 In order to quantitatively estimate the air ventilation performance and the possible effect in wind environment caused by the proposed developments in Project Areas, an AVA initial study in assessing the wind performance and the effectiveness of the improvement design measures of the proposed developments is recommended to be carried out in the future detail design stage.

AECOM

Hong Kong Housing Authority

Consultancy for Ecological Assessment (Agreement No. CB20140231) – Ecological Impact Assessment (EcoIA) Consultancy Services for the Proposed Public Housing Sites 1, 4a and 6, Kam Tin South, Yuen Long

Final Ecological Assessment Report of the Proposed Public Housing Sites 1, 4a and 6, Kam Tin South, Yuen Long

May 2016

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Version: 4	Date: 16 May 2016

Disclaimer

This **Ecological Assessment Report** is prepared for **Hong Kong Housing Authority (HKHA)** and is given for its sole benefit in relation to and pursuant to **Agreement No. CB 20140231 Consultancy for Ecological Assessment for Proposed Public Housing Developments at Sites 1, 4a and 6, Kam Tin South, Yuen Long** and may not be disclosed to, quoted to or relied upon by any person (other than HKHA) without our prior written consent. No person other than HKHA into whose possession a copy of this Ecological Assessment Report without our express written consent and HKHA may not rely on it for any purpose other than as described above.

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1. INTRODUCTION

1.1 Background

1.1.1 AECOM Asia Co. Ltd. has been commissioned by the Hong Kong Housing Authority (HKHA) to undertake Ecological Impact Assessment (EcoIA) Consultancy Services for the Public Housing Sites 1, 4a and 6, Kam Tin South, Yuen Long.

1.1.2 This Ecological Assessment Report focuses on the construction and operation of the proposed public housing development at Sites 1, 4a and 6 at Kam Tin South, Yuen Long, which are located next to the Kam Sheung Road MTR station (refer to **Figure 1**). **Sites 1, 4a and 6 here refer to the "Public Housing Sites" which are intended solely for public housing development.**

1.1.3 Currently, a consultancy under the Civil Engineering and Development Department (CEDD), "**Agreement No. CE 34/2014 (CE): Site Formation and Infrastructural Works for the Initial Sites at Kam Tin South, Yuen Long – Investigation, Design and Construction (IDC)"** for the public housing development at Sites 1, 4a and 6 is underway. However, the Ecological Impact Assessment (EcoIA) under the "Preliminary Environmental Review" of the IDC will not cover the impacts due to the construction and operation of the proposed public housing development. To facilitate the rezoning process for these housing sites and to meet the ecological study requirement, there is a need to conduct an additional ecological impact assessment.

1.2 Scope of Work

1.2.1 The objective of the study is to provide all necessary report, information, presentation, liaison with relevant government departments and materials for submission to relevant authorities for the purpose of rezoning these three sites. The EcoIA makes reference to the criteria and guidelines for evaluating and assessing ecological impacts as stated in Annexes 8 and 16 of the EIAO-TM as well as the relevant EIAO guidance notes. The scope of work includes:

(a) To collate and review the existing available data and information on the areas within the Study Area and provide a habitat map of suitable scale.

(b) To undertake terrestrial ecological field surveys on the Study Area on the habitat, vegetation, avifauna, butterfly, dragonfly, amphibian, reptile, mammal, freshwater stream communities (fish and macro-invertebrates) in dry season to collect updated and representative data of the Study Area.

(c) To conduct an EcoIA for the construction and operation of the public housing developments based on findings of the desktop review (including results of wet season survey of available study) and ecological field surveys.

(d) To provide recommendation for possible alternatives and practicable mitigation measures to avoid, minimize and/or compensate for any adverse ecological impacts identified due to the construction and operation of the public housing development.

(e) To submit the Ecological Assessment (EA) Reports and respond to the relevant comments from government departments and public enquiries.

1.2.2 The main deliverables for this project include:

- **Draft Ecological Assessment (EA) Report** (submitted in January 2016);
- **Draft Final EA Report** (submitted in March2016); and;
- **Final EA Report** (the current report).

1.3 Environmental Legislation, Plans, Standards and Guidelines

1.3.1 Guidelines, standards, documents and HKSAR Government ordinances and regulations listed below were referred to during the course of the ecological impact assessment.

- The *Country Parks Ordinance* (Cap. 208) provides for the designation and management of country parks and special areas. Country parks are designated for the purpose of nature conservation, countryside recreation and outdoor education. Special Areas are created mainly for the purpose of nature conservation.
- The *Forests and Countryside Ordinance* (Cap. 96) prohibits felling, cutting, burning or destroying of trees and growing plants in forests and plantations on Government land. Related subsidiary Regulations prohibit the selling or possession of listed restricted and protected plant species. The list of protected species in Hong Kong, under the Forestry Regulations, was last amended on 11 June 1993 under the Forestry (Amendment) Regulation under Section 3 of the Forests and Countryside Ordinance.
- Under the *Wild Animals Protection Ordinance* (Cap. 170), designated wild animals are protected from being hunted, whilst their nests and eggs are protected from injury, destruction and removal. All birds and most mammals, including marine cetaceans, are protected under this Ordinance.
- The amended *Town Planning Ordinance* (Cap. 131) provides for the designation of coastal protection areas, Sites of Special Scientific Interest (SSSIs), Conservation Area, Country Park, Green Belt or other specified uses that promote conservation or protection of the environment. The authority responsible for administering the Town Planning Ordinance is the Town Planning Board.
- The *Protection of Endangered Species of Animals and Plants Ordinance* (Cap. 586) provides protection for certain plant and animal species through controlling or prohibiting trade in the species.
- Chapter 10 of the Hong Kong Planning Standards and Guidelines (HKPSG) covers planning considerations relevant to conservation. This chapter details the principles of conservation, the conservation of natural landscape and habitats, historic buildings, archaeological sites and other antiquities. It also describes enforcement issues. The appendices list the legislation and administrative controls for conservation, other conservation related measures in Hong Kong and government departments involved in conservation.
- Annex 16 of the EIAO-TM sets out the general approach and methodology for assessment of ecological impacts arising from a project or proposal, to allow a complete and objective identification, prediction and evaluation of the potential ecological impacts. Annex 8 recommends the criteria that can be used for evaluating habitat and ecological impact.
- Environmental Impact Assessment Ordinance (EIAO) Guidance Note No. 3/2010 provides general guidelines for assessing the recommended environmental mitigation measures in Environmental Impact Assessment reports.
- EIAO Guidance Note No. 6/2010 clarifies the requirements of ecological assessments under the EIAO.
- EIAO Guidance Note No. 7/2010 provides general guidelines for conducting ecological baseline surveys in order to fulfil requirements stipulated in the EIAO-TM.
- EIAO Guidance Note No. 10/2010 introduces general methodologies for conducting terrestrial and freshwater ecological baseline surveys.
- DEVB TC(W) 7/2015 Tree Preservation sets out the policy on tree preservation, and the procedures for control of tree felling, transplanting and pruning in Government projects.
- The IUCN Red List of Threatened Species provides taxonomic, conservation status and distribution information on taxa that have been evaluated using the IUCN Red List

Categories and Criteria. This system is designed to determine the relative risk of extinction, and the main purpose of the IUCN Red List is to catalogue and highlight those taxa that are facing a higher risk of global extinction. The IUCN Red List also includes information on taxa that are either close to meeting the threatened thresholds or that would be threatened were it not for an ongoing taxon-specific conservation programme.

- The Key Protected Wildlife Species List details Category I and Category II protected animal species under the PRC's Wild Animal Protection Law.

2. ASSESSMENT METHODOLOGY

2.1 Study Area

2.1.1 The Study Area of ecological impact assessment includes the Subject Sites (Proposed Public Housing Sites 1, 4a and 6) and areas within the 500 m boundary of the Subject Sites (refer to **Figure 1**).

2.2 Literature Review

2.2.1 A review of the findings of relevant studies was undertaken to identify ecologically sensitive receivers and sites of conservation importance within the Study Area. The information sources reviewed included the following:

- Final Assessment Report – West Kowloon to Tuen Mun Centre Contract No. TS-900 – Environmental Impact Assessment (KCRC, 1998);
- Egretry Counts in Hong Kong, with particular reference to the Mai Po Inner Deep Bay Ramsar Site (HKBWS, 2007; 2008; 2009; 2010; 2011; 2012; 2013; 2014; 2015);Project Profile of Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai Drainage Improvement, Stage 1, Phase 2B – Kam Tin Secondary Drainage Channels KT14 & KT15 (DSD, 2005);
- EIA Report of Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link (MTRCL, 2009a);
- Preliminary Ecological Impact Assessment of Land Use Review for Kam Tin South and Pat Heung (PlanD, 2014);
- Survey results from Hong Kong Biodiversity Database (Unpublished Data) (AFCD, 2015a); and
- Preliminary Environmental Review Report – Site Formation and Infrastructural Works for the Initial Sites at Kam Tin South, Yuen Long – Investigation, Design and Construction (IDC) (CEDD, n,d,).

2.3 Ecological Surveys

2.3.1 Wet season and dry season ecological surveys within the Study Area had been conducted by previous studies “Site Formation and Infrastructural Works for the Initial Sites at Kam Tin South, Yuen Long – Investigation, Design and Construction (IDC)” (CEDD, n.d.) and “Preliminary Ecological Impact Assessment of Land Use Review for Kam Tin South and Pat Heung (LUR)” (PlanD, 2014). According to the EcoIA of the LUR and IDC, the habitats within the 500 m of the initial public housing sites are mostly urbanized / disturbed area and shrubland / grassland, with some agricultural land and modified watercourse which are of low ecological value. Six-month ecological surveys covering both dry and wet seasons were undertaken under the LUR. One-off wet and dry season surveys were also conducted under the IDC. As wet season ecological information is available from previous studies, terrestrial ecological surveys were conducted in the dry season months of November and December in 2015 to obtain baseline ecological characteristics. The ecological impact assessment would take into account the survey findings of these studies for both wet and dry seasons.

Habitat Mapping and Vegetation Survey

2.3.2 Aerial photos of the Study Area were reviewed to generate preliminary habitat maps for the Study Area. These were verified by ground truthing. Terrestrial habitats within the Study Area were identified, sized and mapped. Representative photographs of the habitat types and/or any important ecological features identified were taken. A habitat map of suitable scale (1:3000) showing the types and locations of terrestrial habitats within the Study Area was prepared (refer to **Figure 2**).

2.3.3 Direct observations to record the diversity and dominance of plant species present in different habitat types was conducted. The location of any plant species of conservation importance was recorded. Areas where species of conservation importance have been previously recorded as well as any potential areas where these species are likely to be present were explored. Identification of flora species and status in Hong Kong would be made with reference to Corlett *et al*. (2000), Hu *et al*. (2003), Hong Kong Herbarium (2004), and Hong Kong Herbarium and South China Botanical Garden (2007; 2008; 2009; 2011).

Fauna Survey

Avifauna Survey

2.3.4 The avifauna species at various habitats were recorded visually and aurally. The location of any avifauna species of conservation importance encountered were 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 recent updated list from the Hong Kong Bird Watching Society.

Butterfly and Odonate Survey

2.3.5 Butterflies and odonates within the Study Area were surveyed by direct observation. Surveys focused on potentially suitable habitats for butterfly and dragonfly. Relative abundance of butterfly and odonate were recorded. Nomenclature of butterfly follows Lo and Hui (2005) and nomenclature of odonate follows Tam *et al*. (2011).

Herpetofauna Survey

2.3.6 Herpetofauna within the Study Area was surveyed. Amphibian survey focused 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 this was also supplemented when possible by visual observation of eggs, tadpoles and adult frogs and toads. During reptile surveys, careful searches of appropriate microhabitats and refugia (e.g. stones, pond bunds, crevices, leaf litter/debris, and rotten log) were undertaken. All reptiles observed were identified. In addition to active searching, observation of exposed, basking or foraging reptiles was recorded. Nomenclature of amphibian and reptile follows Chan *et al*. (2005) and Karsen *et al*. (1998), respectively.

Mammal Survey

2.3.7 Surveys were conducted in areas, which may be potentially utilized by terrestrial mammals. The surveys focused on searching for field signs such as droppings, footprints, diggings or burrows left by larger terrestrial mammals. Mammal identification was made as accurate as possible from the field signs encountered. In addition, any mammal directly observed was identified. Nomenclature of mammals follows Shek (2006). Flying mammals would also be taken into account during the mammal survey.

Freshwater Survey

2.3.8 Freshwater communities were surveyed via direct observation at a section of modified watercourse between Site 1 and Site 4a and sections of Kam Tin River and KT15 which is located to the south of Site 4a. Organisms encountered were recorded and identified to the lowest possible taxon level.

3. ECOLOGICAL BASELINE CONDITION

3.1 Literature Review

General Ecological Findings

3.1.1 According to the Biodiversity Database of AFCD, three bird species of conservation importance, namely, Northern Shoveler (*Anas clypeata*), Long-billed Plover (*Charadrius placidus*) and Black Baza (*Aviceda leuphotes)* and one amphibian species of conservation importance, Chinese Bullfrog (*Hoplobatrachus rugulosus*), had been recorded within or in the vicinity of the Study Area (AFCD, 2015a).

3.1.2 During the ecological surveys undertaken for the Land Use Review Study in 2010, 11 habitats were recorded including stream/abandoned meander, abandoned agricultural land, active agricultural land, drainage channel, mitigation wetland, mitigation woodland, plantation, pond, shrubland/grassland, urbanized/disturbed area and woodland (PlanD, 2014). Seven species of conservation importance were recorded within the current Study Area. Black Kite (*Milvus migrans*) (in flight) and Collared Scops Owl (*Otus lettia*) were recorded north of Site 4a and Grey-faced Buzzard (*Butastur indicus*) was recorded south of Site 6. Additional records of Black Kite were also observed south of Site 1. Other records, including Leopard Cat (*Prionailurus bengalensis*), Greater Coucal (*Centropus sinensis*), Eastern Buzzard (*Buteo japonicas*) and Chinese Bullfrog (*Hoplobatrachus chinensis*) were recorded at the natural habitats (grassland/shrubland and abandoned agricultural land, which are now identified as woodland and active agricultural land during the current surveys) west of Tsing Long Highway (PlanD, 2014). No species of conservation importance were recorded within the Subject Sites.

Subject Sites

3.1.3 According to the separate consultancy "Site Formation and Infrastructural Works for the Initial Sites at Kam Tin South, Yuen Long – Investigation, Design and Construction (IDC)" (CEDD, n.d.), its ecological surveys covered the proposed Subject Sites (Public Housing Sites 1, 4a and 6) in dry season month of February 2015 and wet season month of May 2015. Seven habitat types were identified within the Subject Sites, including woodland, plantation, grassland, active agricultural land, abandoned agricultural land, village/orchard and developed area/wasteland. The habitats possessed low ecological values with three species of conservation importance recorded, including butterfly Grass Demon (*Udaspes folus*), and a Pipistrellus species which cannot be identified to species level and unidentified Bat sp. 1.

Mitigation Wetlands

3.1.4 There are 11 parcels of mitigation wetlands that were provided as part of the habitat compensation for the loss of wetland habitats from the construction of West Rail to the north of the three Initial Sites in this study (MTRCL, 2009a). The wetlands located underneath the viaduct of West Rail (outside of the Study Area) are comprised of grassy and open shallow water areas. Greater Painted-snipe (*Rostratula benghalensis*), a species of Local Concern (Fellowes *et al*., 2002), was regularly radio-tracked and recorded in these mitigation wetlands and other favourable habitats nearby in Kam Tin (e.g. buffalo field and marshes) in a long term ecological monitoring programme for West Rail.

3.1.5 In the LUR study, a six-month ecological survey covering wet and dry seasons between 2009 and 2010 recorded species of conservation importance including Chinese Pond Heron (*Ardeola bacchus*), Great Egret (*Ardea modesta*), Grey Heron (*Ardea cinerea*), Wood Sandpiper (*Tringa glareola*), Grey-chinned Minivet (*Pericrocotus solaris*), Emerald Cascader (*Zygonyx iris insignis*) and Japanese Pipistrelle (*Pipistrellus abramus*) in the mitigation wetlands (PlanD, 2014).

3.1.6 The majority of these mitigation wetlands are located outside of the current Study Area. Small sections of three mitigation wetlands (Parcel J, H and I) fall within the northern

boundary of the Study Area.

Drainage Channel

3.1.7 A section of drainage channel – KT15 is located to the south of Site 4a (refer to **Figure 2**). According to the survey results of a previous study (DSD, 2005), recorded aquatic fauna species in KT15 included Spotted Snakehead (*Channa maculata*), Nile Tilapia (*Oreochromis niloticus*), North African Catfish (*Clarias gariepinus*), Common Carp (*Cyprinus carpio*), Chinese Barb (*Puntius semifasciolatus*) and Mosquito fish (*Gambusia affinis*). Except Spotted Snakehead, Common Carp and Chinese Barb which are native species, the rest of the fish species are exotic.

Sites of Conservation Importance

3.1.8 There are no recognized sites of conservation importance within the Subject Sites. On the west side of the Study Area patches of Conservation Area (CA) are located to the west and on the south of Site 6. Tai Lam Country Park is located along the edges of these Conservation Areas (refer to **Figure 1**). The nearest distance between the housing sites and Tai Lam Country Park, measuring from Site 1, is approximately 390 m. The CA is composed of woodland, shrubland and plantation habitats, with a small part located adjacent to Site 6 has been disturbed (e.g. illegal dumpling and graves).

Historic Egretries

3.1.9 According to the findings by PlanD (2014), three abandoned egretries, Ma On Kong Egretry, Ho Pui Egretry and Ko Po Tsuen Egretry were active in the 1990s. Ma On Kong egretry has been abandoned since 2009 (HKBWS, 2009; 2010). Ho Pui Egretry has been abandoned since 2005 (HKBWS, 2005; 2006). Ko Po Tsuen Egretry had been abandoned since 1996 (KCRC, 1998). No active egretry has been reported in the vicinity of the Study Area since then.

Flight Paths

3.1.10 No important flight paths were identified in the Kam Tin area by the Land Use Review Study (PlanD, 2014). However, eco-corridors were proposed during the study (PlanD, 2014) to mitigate the potential ecological impact caused by the project in the future. Although no active egretries currently exist in Kam Tin (HKBWS, 2014), the proposed eco-corridor is considered a conservative approach to minimize the potential impact to the egretries.

3.2 Survey Findings

3.2.1 Ecological surveys identified a total of 12 habitat types, including woodland, shrubland, plantation, grassland, active agricultural land, abandoned agricultural land, marsh, village / orchard, modified watercourse, natural watercourse, pond and developed area / wasteland within the Study Area (refer to **Figure 2**). Representative photographs of the habitats are presented in **Appendix 1**. Representative photographs of species of conservation importance recorded within the Study Area are presented in **Appendix 2**.

3.2.2 **Appendix 3** lists the flora recorded during the current ecological surveys. A total of 254 plant species were recorded from the Study Area, and most of them are either common or very common in Hong Kong. One flora species of conservation importance, Small Persimmon (*Diospyros vaccinioides*), was recorded in woodland habitat within the Study Area outside of the Subject Sites during the current survey (refer to **Figure 2**).

3.2.3 The habitats identified within the Study Area are described below. **Table 1** summarizes the size of each habitat type within the Study Area and Subject Sites.

Table 1 Habitats Recorded within the Study Area

Habitat Type	Approximate Area (ha) / Length (km)
Woodland	23.4 ha (0.03 ha)
Shrubland	9.3 ha (–)
Plantation	23.2 ha (1.9 ha)
Grassland	6.0 ha (0.9 ha)
Active Agricultural Land	16.1 ha (3.6 ha)
Abandoned Agricultural Land	3.3 ha (0.5 ha)
Marsh	0.3 ha (–)
Village/Orchard	12.6 ha (3.3 ha)
Modified Watercourse	5.8 ha / 5.8 km (0.01 ha / 0.02 km)
Natural Watercourse	0.06 ha (–) / 0.3 km (–)
Pond	0.5 ha (–)
Developed Area/Wasteland	117.7 ha (4.0 ha)
Total Area	**218.3 ha (14.3 ha)**

Note:
1. ( ) denotes area within the Subject Public Housing Sites.

Study Area

Woodland

3.2.4 Woodland habitat was mainly found in the western part of the Study Area, with a total of 146 plant species were recorded in this habitat. A small strip of woodland was also recorded at the southwestern portion of Site 6.

3.2.5 The small strip of woodland within the Site 6 was contiguous with the woodland and shrubland at the south. This habitat was located at the woodland margin. The structural complexity was relatively simple, with small tree/tall shrub species at the top layer and fern/herb species at the understorey. Scattered Elephant's Ear (*Macaranga tanarius*) and Opposite-leaved Fig (*Ficus hispida*) of 2 -3 m in height were commonly recorded. This woodland is regarded as a transition habitat and is considered to have lower ecological value than normal mature woodland habitat. In addition, this woodland is highly disturbed with illegal dumping and wire fence observed. No flora species of conservation importance were recorded within this woodland.

3.2.6 In the woodland habitat outside of Site 6, there are trees such as Taiwan Acacia (*Acacia confusa*), Ivy Tree (*Schefflera heptaphylla*) and Chekiang Machilus (*Machilus chekiangensis*) at the top layer which were commonly recorded in this habitat; shrubs such as Wild Coffee (*Psychotria asiatica*), Aporusa (*Aporusa dioica*) at the middle layer and herb exotic species Oriental Blechnum (*Blechnum orientale*) and *Bidens alba* at the ground layer. However, as this woodland was located near village housing and highway, it is subject to high anthropogenic disturbance (e.g. noise, emission from vehicles, illegal dumping and burning activities). No flora species of conservation importance were recorded within this woodland.

3.2.7 When compared to the woodland near Site 6, the woodland located at the west side of the Tsing Long Highway was relatively undisturbed, it also forms part of the Tai Lam Country Park. Limited anthropogenic disturbance was observed during the survey. The woodland at west of the Tsing Long Highway was dominated by Chinese Banyan (*Ficus microcarpa*), Chinese Hackberry (*Celtis sinensis*) and Taiwan Acacia at the top layer; shrub Hairy Fig

(*Ficus hirta*), Desmos (*Desmos chinensis*) and Wild Coffee at the middle layer; and fern species Dichotomy Forked Fern (*Dicranopteris pedata*) and Oriental Blechnum at the understorey. One flora species of conservation importance, Small Persimmon (*Diospyros vaccinioides*), was recorded within this woodland. One individual of 1.5 m in height was recorded at the woodland patch west of the plantation adjacent to the Tsing Long Highway (refer to **Figure 2**).

Shrubland

3.2.8 The recorded shrubland was located approximately 50 m south of the Site 6. A total of 71 floral species were recorded in this habitat, dominated by native shrub species such as Dwarf Mountain Pine (*Baeckea frutescens*), Dichotomy Forked Fern, Common Melastoma (*Common Melastoma*); and herb species Many-flowered Silvergrass (*Miscanthus floridulus*). The shrubland was young and its structural complexity was simple with only short shrubs and herbaceous species at the ground layer. This habitat was subject to a high level of human disturbance, which vegetation clearance and burning activities were commonly recorded near the graves. No shrubland habitat was recorded within the Subject Sites. No flora species of conservation importance were recorded within this habitat.

Plantation

3.2.9 Plantation habitat was recorded along the margins of Site 1, at urban area at the northern and southern portion of the Project Site, and along the slopes adjacent to watercourse and Tsing Long Highway. A total of 103 flora species were recorded within plantation habitat. The plantation areas in the vicinity of the Tsing Long Highway, within Site 1 and southern to Site 1 were relatively mature. The dominant species were exotic plantation species such as Ear-leaved Acacia (*Acacia auriculiformis*) and Taiwan Acacia, with native species re-generated in the understory, such as Oriental Blechnum and Dichotomy Forked Fern. Exotic White Popinac (*Leucaena leucocephala*) was commonly found to be naturally generated within this habitat. The plantation along watercourse was mainly comprised of herb species such as *Bidens alba*, *Imperata cylindrica* var. *major*, with only scattered immature Chinese Banyan recorded. No flora species of conservation importance were recorded.

Grassland

3.2.10 Grassland habitat was small in size and found to be scattered throughout the Study Area and within all three of the Subject Sites. The dominant plants recorded were grass and herb species such as *Bidens alba*, *Imperata cylindrica* var. *major*, Guinea Grass (*Panicum maximum*). Scattered tree species including Taiwan Acacia, Chinese Alangium (*Alangium chinense*) and Chinese Hackberry were also within the grassland. A total of 51 flora species were recorded within this habitat. No flora species of conservation importance were recorded.

Active Agricultural Land

3.2.11 Active agricultural lands were recorded at Site 1, Site 6, and the eastern and western portion of the Study Area. This habitat was a man-made habitat for the purpose of crop growing. The majority of this habitat type at Site 1 comprised of an operating organic farm. Crops in the active agricultural land in Site 1 were covered by nets to keep birds away to prevent crop damage, while agricultural lands at Site 6 and within the Study Area were open fields. Dry agricultural activities were observed during the recent surveys. The commonly recorded crops species included Chinese Kale (*Brassica oleracea L.* var. *albiflora*), Flowering Chinese Cabbage (*Brassica parachinensis*), Carrot (*Daucus carota* var. *sativa*) and Chinese White Cabbage (*Brassica chinensis*). Fruit trees such as Papaya (*Carica papaya*), Guava (*Psidium guajava*) and Longan (*Dimocarpus longan*) were commonly cultivated at the bund near the fields. A total of 62 flora species were recorded and no species of conservation importance were observed.

Abandoned Agricultural Land

3.2.12 Several patches of abandoned agricultural lands were found in the eastern, southern and western part of the Study Area, as well as within Site 1 and Site 6 (refer to **Figure 2**). Although active agricultural activities have been undertaken at these sites in the past, they were overgrown with weed and herb species during the current surveys. The recorded dominated species included exotic species such as seedlings of White Popinac, Guinea Grass (*Panicum maximum*) and Hilo Grass (*Paspalum conjugatum*). Fruit trees such as Longan, Mango (*Mangifera indica*) and Common Banana (*Musa* x *paradisiaca*) were also recorded. A total of 46 flora species were recorded within this habitat while no flora species of conservation importance were recorded.

Marsh

3.2.13 A piece of marsh was located at approximately 250 m northwest of Site 6. A thin layer of water was observed on the ground. Herb species such as Wood-fern (*Cyclosorus parasiticus*), Ciliate Microstegium (*Microstegium ciliatum*), Mile-a-minute Weed (*Mikania micrantha*) and *Wedelia trilobata* were commonly recorded. Marsh species such as *Polygonum* spp. and Ginger Lily (*Hedychium coronarium*) were also recorded within this habitat. The structural complexity of this habitat was simple with herbaceous and grass species grew on the ground layer with some establishment of exotic species Mile-a-minute Weed and *Wedelia trilobata* within the marsh. A total of 19 flora species were recorded within this area but no flora species of conservation importance were recorded.

Village / Orchard

3.2.14 Small areas of village / orchard habitats were identified within Site 4a, Site 6 and at the southeastern, southern and western part of the Study Area. It was mainly comprised of village houses, orchards and small area of active agricultural lands. A total of 84 flora species were recorded within this habitat. The dominated species were fruit tree species such as Wampi (*Clausena lansium*) and Longan. This habitat was subject to a high level of disturbance (e.g. noise, human activities). No flora species of conservation importance were recorded.

Modified Watercourse

3.2.15 Sections of modified watercourse including Kam Tin River ran through the Study Area. The northern section of Kam Tin River was approximately 30 m in width and the section between Site 1 and Site 4a was approximately 10 m in width. KT15 was located to the south of Site 4a and was approximately 5 m in width. As Kam Tin River, KT15 and other small modified watercourse were concrete trapezoidal channels, limited vegetation species were recorded. The water flow rate was moderate and the turbidity is low during the recent survey. This habitat was subject to human disturbance such as illegal dumping activities and sewage discharge. Another section of modified watercourse (W1) adjacent to Tsing Long Highway ran through the northern section of Site 6. This modified watercourse was concrete vertical channel (approximately 4 m in width) and limited vegetation species were recorded. The water was shallow and the water flow was slow in the section outside of Site 6. No water was observed in the section within Site 6. A total of 40 flora species were recorded and no species of conservation importance were recorded.

Natural Watercourse

3.2.16 Natural watercourse was located at the western part of the Study Area and comprised of a mix of sandy and muddy bottom. The natural watercourse was approximately 1 – 4 m in width and 0.2 to 0.5 m in depth. The water flow rate was fast and the riparian zone was recorded. Diffuse Day-flower (*Commelina diffusa*) and Blunt Signal-grass (*Brachiaria mutica*) were the dominated species recorded within this habitat. Other recorded including trees

Elephant's Ear (*Macaranga tanarius*) and Common Red-stem Fig; herbs *Bidens alba* and Giant Alocasia (*Alocasia macrorrhizos*). This habitat was subject to moderate level of disturbance (e.g. discharge from adjacent village housing and littering). A total of 50 flora species were recorded and no flora species of conservation importance were recorded within this stream.

Pond

3.2.17 Six ponds were recorded at the western and southern part of the Study Area, most of them were located near dry agricultural lands. Aquatic plant species such as Water Hyacinth (*Eichhornia crassipes*) and Indian Lotus (*Nelumbo nucifera*) were recorded within the pond. Herb species such as *Bidens alba* and Blunt Signal-grass (*Brachiaria mutica*) were recorded at the pond bund. Most of the recorded ponds were under active management; therefore, they were disturbed due to human activities. A total of 13 flora species were recorded within this habitat and no species of conservation importance were recorded.

Developed Area / Wasteland

3.2.18 Developed area / wasteland habitat predominantly occurred in the northern and eastern part of the Study Area and within Site 4a and Site 6. This habitat was mainly comprised of roads, buildings of housing developments, mass infrastructure and abandoned open area, which were highly disturbed due to human activities.

3.2.19 A total of 112 flora species were recorded within this habitat. Vegetation coverage was low and dominated by exotic tree species including, Taiwan Acacia, Candlenut Tree (*Aleurites moluccana*), Horsetail Tree (*Casuarina equisetifolia*), and herbs such as *Imperata cylindrica* var. *major* and *Wedelia trilobata*. No plant species of conservation importance were recorded in this habitat.

3.3 Fauna

Avifauna

3.3.1 A total of 43 avifauna species were recorded within the Study Area during the survey period. Active agricultural land had the highest diversity of birds with 23 species recorded. Most of the species are common and widespread in Hong Kong for example, Black-collared Starling (*Gracupica nigricollis*), Eurasian Tree Sparrow (*Passer montanus*) and Japanese White-eye (*Zosterops japonicus*). A full list of avifauna species, with their protection status and the habitats in which they were recorded under the current study, is presented in **Appendix 4**.

3.3.2 Nine avifauna species of conservation importance were recorded within the Study Area (four recorded during the current ecological surveys undertaken in the current study and five were recorded in the LUR study) (refer to **Table 2**). No breeding behaviour, juvenile or nest was observed, and no known egretries were present within the Study Area. No avifauna species of conservation importance were recorded within the three Subject Sites.

Table 2 Avifauna Species of Conservation Importance Recorded within the Study Area

Common Name [1]	Scientific Name	Distribution in Hong Kong [2]	Level of Concern [3]	Protection Status in China [4]	China Red Data Book [5]	Habitat Recorded	Recorded within Subject Sites
Chinese Pond Heron [8]	*Ardeola bacchus*	Common	PRC (RC)	-	-	Active Agricultural Land; Modified Watercourse	No

Common Name [1]	Scientific Name	Distribution in Hong Kong [2]	Level of Concern [3]	Protection Status in China [4]	China Red Data Book [5]	Habitat Recorded	Recorded within Subject Sites
Grey Heron [8]	*Ardea cinerea*	Common	PRC	-	-	Modified Watercourse	No
Little Egret [8]	*Egretta garzetta*	Common	PRC (RC)	-	-	Active Agricultural Land; Modified Watercourse	No
Wood Sandpiper [8]	*Tringa glareola*	Common	LC			Modified Watercourse	No
Grey-faced Buzzard [6]	*Butastur indicus*	Uncommon	-	Class II	Rare	Shrubland (previously recorded in Shrubland/ Grassland Habitat in the LUR Study [7])	No
Eastern Buzzard [6]	*Buteo japonicas*	Common	-	Class II	-	Woodland (previously recorded in Shrubland/ Grassland Habitat in the LUR Study [7])	No
Black Kite [6]	*Milvus migrans*	Common	(RC)	Class II	-	Woodland; Modified Watercourse; Developed Area/ Wasteland (previously recorded in Shrubland/ Grassland Habitat in the LUR Study [7])	No
Greater Coucal [6]	*Centropus sinensis*	Common	-	Class II	Vulnerable	Woodland; Active Agricultural Land (previously recorded in Shrubland/ Grassland Habitat in the LUR Study [7])	No
Collared Scops owl [6]	*Otus lettia*	Common	-	Class II	-	Developed Area/ Wasteland (previously recorded in Plantation Habitat in the LUR Study [7])	No

Note:
1. All wild birds are protected under Wild Animals Protection Ordinance (Cap. 170).
2. AFCD (2015).

3. Fellowes *et al.* (2002): RC=Regional Concern; LC=Local Concern; PRC=Potential Regional Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence.
4. List of Wild Animals Under State Protection (promulgated by State Forestry Administration and Ministry of Agriculture on 14 January, 1989). [國家重點保護野生動物名錄(1989 年 1 月 14 日林業局及農業部發佈施行)]
5. Zheng, G. M. and Wang, Q. S. (1998).
6. Records were obtained from the ecological surveys undertaken during the LUR study (PlanD, 2014). Ecological survey data was recorded in 2010.
7. The habitat was previously recorded in 2010 under the LUR Study and the habitat has been updated during the current surveys.
8. Records were obtained during the current surveys.

Butterfly

3.3.3 A total of 26 butterfly species were recorded within the Study Area during the field surveys. Most of the recorded butterfly species are common and very common in Hong Kong. Butterfly diversity was found to be highest at village / orchard. One butterfly species of conservation importance, Grass Demon (*Udaspes folus*) was recorded at the village / orchard habitat within Site 4a during the IDC study (CEDD, n,d,). A full list of butterfly species recorded, with their protection status and the habitats in which they were recorded under the current study, is presented in **Appendix 5.**

Odonate

3.3.4 A total of seven odonate species were recorded within the Study Area during the field surveys. Dragonfly diversity was found to be the highest at village/orchard and modified watercourse. A full list of odonate species recorded under the current study is given in **Appendix 6**. Most of the recorded species are abundant in Hong Kong. No species of conservation importance were recorded.

Herpetofauna

3.3.5 Six species of amphibian and five species of reptile were recorded under the current study. Relatively high abundance of herpetofauna was recorded at village / orchard habitat. The record of reptile species is presented in **Appendix 7**. One species of conservation importance, Chinese Bullfrog (*Hoplobatrachus chinensis*) was recorded at abandoned agricultural land (which is now identified as active agricultural land during the current surveys) west of Tsing Long Highway during the LUR study (PlanD, 2014). Chinese Bullfrog is considered as of Potential Regional Concern by Fellowes *et al*. (2002) and is a Class II species under List of Wild Animals Under State Protection.

Mammal

3.3.6 Five mammal species, including three bat species, Pallas's Squirrel (*Callosciurus erythraeus*) and Leopard Cat (*Prionailurus bengalensis*), were recorded within the Study Area during the current surveys and previous studies (CEDD, n.d. and PlanD, 2014). All species were recorded in low abundances. The mammal species recorded under the current study are presented in **Appendix 8**. All the mammal species recorded are of conservation importance. Japanese Pipistrelle (*Pipistrelle abramus*), a Pipistrellus species which cannot be identified to species level and a bat species which could not be identified to genus level, herein referred to as Bat sp. 1 (refer to **Table 3**) were the recorded bat species. Japanese Pipistrelle was recorded in woodland, village / orchard and modified watercourse adjacent to Tsing Long Highway. The Pipistrellus species and Bat sp. 1 were recorded commuting in the village/orchard habitat of Site 4a and Kam Tin River during the IDC study (CEDD, n.d.). All bat species are protected under Wild Animals Protection Ordinance (Cap. 170) in Hong Kong. Pallas's Squirrel was recorded in village / orchard. Leopard Cat (*Prionailurus bengalensis*) was recorded at the woodland habitat west of the Tsing Long Highway during the LUR study (PlanD, 2014).

Table 3 Mammal Species of Conservation Importance Recorded within the Study Area

Common Name [1]	Scientific Name	Distribution in Hong Kong [2]	China Red Data Book [3]	Habitat Recorded	Recorded within Subject Sites
Japanese Pipistrelle [5]	*Pipistrelle abramus*	Very common	-	Woodland, Village/orchard, Modified Watercourse	No
Pipistrelle sp. [4]	-	-	-	Village/ orchard	Yes
Bat sp. 1 [4]	-	-	-	Village/ orchard, Modified Watercourse	Yes
Pallas's Squirrel [5]	*Callosciurus erythraeus*	Fairly widely distributed	-	Village / orchard	No
Leopard Cat [6]	*Prionailurus bengalensis*	Uncommon	Vulnerable	Woodland (previously recorded in Shrubland/ Grassland Habitat in the LUR Study [7])	No

Note:
1. All wild birds are protected under Wild Animals Protection Ordinance (Cap. 170).
2. AFCD (2015).
3. Zheng, G. M. and Wang, Q. S. (1998).
4. Recorded under the IDC study.
5. Recorded under the current study.
6. Records were obtained from the ecological surveys undertaken during the LUR study (PlanD, 2014). Ecological survey data was recorded in 2010.
7. The habitat was previously recorded in 2010 under the LUR Study and the habitat has been updated during the current surveys.

Freshwater Communities

3.3.7 A common exotic freshwater fish species, Nile Tilapia (*Oreochromis niloticus*) was recorded in in low numbers in the modified watercourses within the Study Area. Exotic snail species, *Pomacea canaliculata,* was also recorded. No species of conservation importance were recorded. No aquatic fauna were recorded in the modified watercourse between Site 1 and Site 4a.

4. ECOLOGICAL VALUE

4.1.1 The ecological importance of the recorded habitats has been evaluated in accordance with the EIAO-TM Annex 8 criteria and are shown in **Table 4** to **Table 9** below. According to EIAO-TM Annex 8, some general criteria can be used for evaluating the ecological importance of a site / habitat and they are shown below:

Naturalness: Truly natural habitats (i.e. not modified by man) are usually highly valued. However, most areas of the territory have been modified. Generally, those habitats less modified will tend to be rated higher.

Size: In general larger area of habitat(s) shall be more valuable than smaller ones, all else being equal.

Diversity: The more diverse the species assemblages and communities of a site, the higher is its conservation value.

Rarity: Rarity can apply to habitats as well as species. The presence of one or more rare habitats and species will give a site higher value than those without rarity.

Re-creatability: Habitats which are difficult to be re-created naturally or artificially are usually valued higher.

Fragmentation: In general, the more fragmented habitat, the lower is its value.

Ecological Linkage: The value of a habitat increases if it lies in close proximity and/or links functionally to a highly valued habitat of any type.

Potential Value: Certain sites, through appropriate management or natural processes, may eventually develop a nature conservation interest substantially greater than that existing at present. Factors limiting such potential being achieved shall be noted.

Nursery/Breeding Ground: Such areas are very important for the regeneration and long term survival of many organisms and their populations.

Age: Ancient natural or semi-natural habitats are normally highly valued. For some habitats such as woodlands, older ones are normally valued much higher than recent ones.

Abundance/Richness of Wildlife: In general sites supporting more wildlife will be rated higher.

Woodland

4.1.2 Woodland habitats exist at the western part of the Study Area that forms part of the Conservation Area and is connected to the Tai Lam Country Park. These woodlands are mostly undisturbed are dominated by native species, with one flora species of conservation importance, Small Persimmon, recorded. Three avifauna species and two mammal speices of conservation importance were also recorded within this habitat. The overall low flora and fauna diversity were low. It has moderate potential in developing into more mature woodland. Woodland habitat is considered to be moderate in ecological value.

Shrubland

4.1.3 The shrubland recorded within the Study Area is subject to a high level of human disturbance, burning activities were commonly recorded near the graves. Based on the composition of the plant species present, the fire disturbance is believed to have taken place less than five years ago and shrubland species are now beginning to regenerate. Low species diversity and abundances were recorded in the habitat type. Shrubland habitat is considered to be low in ecological value.

Table 4 Ecological Evaluation of the Woodland and Shrubland Habitats within the Study Area

Criteria	Woodland	Shrubland
Naturalness	Moderate, mostly undisturbed	Low, subject to a high levels of human disturbance, which burning activities were commonly recorded near the graves
Size	Moderate	Moderate
Diversity	146 flora species 11 fauna species	71 flora species 3 fauna species
Rarity	One flora species (Small Persimmon) and five fauna species of conservation importance (Eastern Buzzard, Black Kite, Greater Coucal, Japanese Pipistrelle and Leopard Cat) were recorded from current surveys and previous study. All these species were recorded outside of the Subject Sites.	No rare species or species of conservation importance were recorded.
Re-creatability	Re-creatable but trees and habitat structure need time to mature	Re-creatable but trees and habitat structure need time to mature
Fragmentation	Woodland areas are intact and connected to the Country Park and Conservation Area	Shrubland recorded within the Study Area is intact
Ecological Linkage	The woodland is structurally and functionally linked to the Conservation Area and Tai Lam Country Park	The shrubland is structurally and functionally linked to the Conservation Area and Tai Lam Country Park
Potential Value	Moderate due to its potential value in developing into a more mature woodland	Moderate as it was recently disturbed, succession would need to take place in order for it to mature
Nursery/Breeding Ground	None recorded	None recorded
Age	Unknown	< 5 years
Abundance/ Richness of Wildlife	Low	Low
Ecological Value	**Moderate**	**Low**

Plantation

4.1.4 It is a man-made habitat with trees artificially planted and the flora and fauna diversity were low. Exotic White Popinac (*Leucaena leucocephala*) was also commonly found to be naturally generated within this habitat. Plantation habitat recorded within the Study Area is considered to be of low ecological value.

Grassland

4.1.5 This habitat was subject to human disturbance and had low flora and fauna diversity. Grassland habitats within the Study Area were considered to be low in ecological value due to its fragmented distribution and absence of species of conservation importance.

Table 5 Ecological Evaluation of the Plantation and Grassland Habitats within the Study Area

Criteria	Plantation	Grassland
Naturalness	Low, trees are planted	Moderate, derived from natural succession but experiences human disturbances
Size	Small	Small
Diversity	103 flora species 22 fauna species	51 flora species 9 fauna species
Rarity	No rare species or species of conservation importance were recorded.	No rare species or species of conservation importance were recorded.
Re-creatability	High, it is a man-made habitat	Re-creatable if succession is allowed to occur
Fragmentation	Low, areas of plantation habitats are mostly connected	High, patches of grassland were recorded scattered throughout the Study Area
Ecological Linkage	The habitat was not structurally or functionally linked to any high ecological value resources.	The habitat was not structurally or functionally linked to any high ecological value resources.
Potential Value	Low	Low
Nursery/Breeding Ground	None recorded	None recorded
Age	< 20 years	<10 years
Abundance/ Richness of Wildlife	Low	Low
Ecological Value	**Low**	**Low**

Active Agricultural Land

4.1.6 The Active Agricultural Land within the Study Area was observed scattered throughout the Study Area, with one relatively large patch located at the western part north of the woodland within the Conservation Area, this is where avifauna species of conservation importance were recorded. The second largest patch was recorded within Site 1, where an operating organic farm exists. This patch supported low fauna diversity as nets are deployed to prevent birds from eating the crops. This habitat is considered to be of low ecological value.

Abandoned Agricultural Land

4.1.7 Fauna and flora species diversity were low and species recorded were of low ecological value. Patches of this habitat type was recorded scattered throughout the Study Area. Abandoned Agricultural Land is considered to be of low ecological value.

Table 6 Ecological Evaluation of the Active Agricultural Land and Abandoned Agricultural Land within the Study Area

Criteria	Active Agricultural Land	Abandoned Agricultural Land
Naturalness	Low, vegetation is composed of crops and fruit trees	Low, vegetation is composed of weeds/herbs and fruit trees
Size	Moderate	Small
Diversity	62 flora species 29 fauna species	46 flora species 5 fauna species

Criteria	Active Agricultural Land	Abandoned Agricultural Land
Rarity	Three avifauna species (Chinese Pond Heron, Little Egret and Greater Coucal) and one amphibian species (Chinese Bullfrog) of conservation importance were recorded from current surveys and previous study. All these species were recorded outside of the Subject Sites.	No rare species or species of conservation importance were recorded.
Re-creatability	High, it is a man-made habitat	High, it is a man-made habitat
Fragmentation	High, patches of active agricultural lands were scattered throughout the Study Area	High, patches of abandoned agricultural lands were scattered throughout the Study Area
Ecological Linkage	The habitat patch on the west side of the Study Area is structurally linked to the woodland of the Conservation Area	The habitat was not structurally or functionally linked to any high ecological value resources.
Potential Value	Moderate, provision of wet agricultural land can provide roosting and foraging ground for waterbirds	Moderate, rehabilitation of farming with the provision of wet agricultural land can provide roosting and foraging ground for waterbirds
Nursery/Breeding Ground	None recorded	None recorded
Age	n/a	n/a
Abundance/ Richness of Wildlife	Low to moderate	Low
Ecological Value	**Low to moderate**	**Low**

Village/Orchard

4.1.8 This habitat is man-made with planted vegetation and subject to frequent human disturbance. Due to a high level of human disturbance, this habitat is not considered as an important habitat to the recorded species of conservation importance. Hence, village/orchard habitats were considered to be of low ecological value.

Developed Area/Wasteland

4.1.9 Developed Area/wasteland is a highly disturbed, man-made habitat with low species diversity. This habitat is considered to be of low ecological value.

Table 7 Ecological Evaluation of the Village/Orchard and Development Area/Wasteland within the Study Area

Criteria	Village/Orchard	Developed Area/Wasteland
Naturalness	Low, comprised of man-made structures and fruit trees	Low, comprised of man-made structures with high level of human disturbances
Size	Small	Small
Diversity	84 flora species 48 fauna species	112 flora species 18 fauna species

Criteria	Village/Orchard	Developed Area/Wasteland
Rarity	Four mammal species of conservation importance (Japanese Pipistrelle, Pipistrelle sp., Bat sp. 1 and Pallas's Squirrel) and one butterfly species of conservation important (Grass Demon) were recorded from current surveys and previous study. Species recorded within the Subject Sites: Grass Demon, Pipistrelle sp. and Bat sp. 1 Species recorded outside of the Subject Sites: Japanese Pipistrelle and Pallas's Squirrel	Two avifauna species of conservation importance (Black Kite and Collared Scops owl) were recorded from previous study. These species were recorded outside of the Subject Sites.
Re-creatability	High, it is a man-made habitat	High, it is a man-made habitat
Fragmentation	n/a	n/a
Ecological Linkage	The habitat was not structurally or functionally linked to any high ecological value resources.	The habitat was not structurally or functionally linked to any high ecological value resources.
Potential Value	Low	Low
Nursery/Breeding Ground	None recorded	None recorded
Age	n/a	n/a
Abundance/ Richness of Wildlife	Low	Low
Ecological Value	**Low**	**Low**

Pond

4.1.10 Ponds were recorded within village / orchard habitats and were observed to be actively managed with evidence of human disturbances. Low flora and fauna diversity were recorded. Ponds within the Study Area were considered to be of low ecological value.

Marsh

4.1.11 The marsh recorded within the Study Area is small in size and mostly natural. Low flora and fauna diversity were recorded. Although no species of conservation importance were recorded, marsh habitats are wetland habitats that have potential for providing breeding, roosting and foraging ground for fauna. It is considered to be of low to moderate ecological value.

Table 8 Ecological Evaluation of Pond and Marsh within the Study Area

Criteria	Pond	Marsh
Naturalness	Low, most of the ponds were observed to be actively managed	Moderate, natural with some evidence of human disturbances due to the presence of exotic plant species

Criteria	Pond	Marsh
Size	Small	Small
Diversity	13 flora species 1 fauna species	19 flora species 11 fauna species
Rarity	No rare species or species of conservation importance were recorded.	No rare species or species of conservation importance were recorded.
Re-creatability	Re-creatable	Re-creatable with the appropriate habitat management measures
Fragmentation	n/a	n/a
Ecological Linkage	The habitat was not structurally or functionally linked to any high ecological value resources.	The habitat was not structurally or functionally linked to any high ecological value resources.
Potential Value	Moderate, with proper management of water levels, this habitat can provide roosting and foraging grounds for high numbers of waterbirds during the times with the ponds are drained	High, with proper management and suitable hydrological conditions, it can provide suitable breeding/roosting/foraging habitats for odonates and waterbirds
Nursery/Breeding Ground	None recorded	None recorded
Age	N/A	N/A
Abundance/ Richness of Wildlife	Low	Low
Ecological Value	**Low**	**Low to moderate**

Modified Watercourse

4.1.12 The modified watercourse, Kam Tin River, is considered to have low to moderate ecological value. Waterbird species of conservation importance were recorded foraging and roosting within the river. The small section of modified watercourse (concrete vertical channel) running through the northern section of Site 6 (W1) was narrow with limited vegetation species. No species of conservation importance were recorded. This small section of modified watercourse is considered to be of low ecological value.

Natural Watercourse

4.1.13 The section of natural watercourse within the Study Area is small in size and located near existing roads. It is considered to be of low ecological value.

Table 9 Ecological Evaluation of Modified Watercourse and Natural Watercourse within the Study Area

Criteria	Modified Watercourse	Natural Watercourse
Naturalness	Low, it is a man-made structure	Low to moderate, made up of natural substrate but subject to pollution from nearby human activities
Size	Small	Small
Diversity	40 flora species 24 fauna species	50 flora species 8 fauna species

Criteria	Modified Watercourse	Natural Watercourse
Rarity	Five avifauna species of conservation importance (Chinese Pond Heron, Grey Heron, Little Egret, Wood Sandpiper and Black Kite) and two mammal species of conservation importance (Japanese Pipistrelle and Bat sp. 1) were recorded from current surveys and previous study. All these species were recorded outside of the Subject Sites.	No rare species or species of conservation importance were recorded.
Re-creatability	High, it is a man-made habitat	Moderate
Fragmentation	n/a	n/a
Ecological Linkage	The habitat was not structurally or functionally linked to any high ecological value resources.	The habitat was not structurally or functionally linked to any high ecological value resources.
Potential Value	W1: Low Other modified watercourses: Moderate, with proper management this habitat can provide roosting and foraging grounds for high numbers of waterbirds	Moderate, pollution sources would have to be eliminated and species would require time to re-establish themselves
Nursery/Breeding Ground	None recorded	None recorded
Age	n/a	n/a
Abundance/ Richness of Wildlife	W1: Low Other modified watercourses: Low to Moderate	Low
Ecological Value	**W1: Low** **Other modified watercourses: Low to moderate**	**Low**

5. IDENTIFICATION AND EVALUATION OF ECOLOGICAL IMPACTS

5.1 Identification of Ecological Impacts – Construction Phase

Direct Impacts

Vegetation / Habitat Loss

5.1.1 Loss of plantation, grassland, active agricultural land, abandoned agricultural land, village / orchard, modified watercourse (W1) and developed area / wasteland habitats within the footprints of the Sites 1, 4a and 6 is anticipated. The ecological values of these habitats are low and thus the ecological impacts to these habitats are not significant.

5.1.2 A small piece of woodland of moderate ecological value exists at the southwestern portion within Site 6, this is where a small area of about 0.03 ha would also be lost from the Project. However, this habitat was located at the woodland margin. The structural complexity was relatively simple, with small tree/tall shrub species at the top layer and fern/herb species at the understorey. This woodland is regarded as a transition habitat and is considered to have lower ecological value than normal mature woodland habitat. In addition, this woodland is already subject to high anthropogenic disturbance. Therefore, the ecological impacts due to the loss of this small area of disturbed woodland are not significant. Furthermore, no species of conservation importance were recorded in the area of woodland loss.

Direct Loss of Fauna

5.1.3 In addition to direct impacts to terrestrial habitats and vegetation, the construction activities of the project have a potential to cause direct injury / mortality to wildlife. No substantial direct impacts to wildlife with high levels of mobility (e.g. avifauna) are anticipated. Animals with lower mobility (e.g. amphibians and reptile) would be at a higher level of risk, and could be injured or killed by construction activities. However, all species recorded from the Study Area were common in Hong Kong therefore it is unlikely to result in a significant impact. Three species of conservation importance, the butterfly Grass Demon, the Bat sp. 1 and Pipistrelle sp., were recorded at the village / orchard habitat in low numbers within Site 4a. The Bat sp. 1 and Pipistrelle sp. are highly mobile and would be displaced to other similar habitats nearby. Adult butterflies are mobile but not their larvae. The presence of butterfly larvae would be dependent on the presence of host plants. However, no larvae of Grass Demon were observed during the current surveys. In addition, nectar plant of adults (*Hedychium coronarium*) and host plant of caterpillars (e.g. leaves of Zingiberacea) of Grass Demon were not found within the Subject Sites. Furthermore, since this habitat is currently subject to high levels of human disturbances, it is not considered as an important habitat to these species. The ecological impact to these species is not significant.

Indirect Impacts

5.1.4 Indirect impacts on the habitats and associated fauna would arise from the increase in human disturbance during the construction phase. Construction activities would increase human activities and noise disturbance from traffic and construction machinery, and would bring about indirect impacts to nearby habitats and their associated fauna. Potential consequences to wildlife include avoidance of areas in the vicinity of the works areas, and decline in density in areas close to the source of disturbance. Highly mobile species such as birds and mammals would be displaced to nearby similar habitats.

5.1.5 The woodland which is outside of Site 6 in the south, comprised of Conservation Area, would be disturbed by construction activities during the construction phase. Dust emitted from construction works would reduce habitat quality and may hinder plant growth. Construction noise generated from machines could drive fauna away which results in reduction of fauna density. Mitigation measures would be necessary to minimize these impacts. The erection of

hoarding is recommended as to prevent the encroachment into the Conservation Area by contractors as well as minimizing the level of noise and dust arising from the construction.

5.1.6 Low levels of disturbance from the construction are anticipated at Tai Lam Country Park. Tai Lam Country Park is located 390 m away from the nearest point of the housing sites, this patch of the Country Park is already located adjacent to an existing Tsing Long Highway and the duration of construction phase disturbance would be temporary.

5.1.7 Dust generated during the construction phase and improper storage or dumping of construction materials could degrade the habitats adjacent to works areas. Construction dust could cover leaves and result in lethal/sublethal effects by reduction in photosynthetic rate, abrasion, and blockage of stomata. The habitats nearby are subjected to dust pollution arising from construction work and the associated road traffic.

5.1.8 With the implementation of the proposed mitigation measures in **Section 6**, adverse disturbance impacts during the construction phase are not expected.

Site Runoff

5.1.9 The construction of Housing Sites 1 and 4a would take place next to the existing modified watercourse. Surface runoff during the construction, if not properly treated, would discharge into the modified watercourse. Given that the waterbird species were recorded foraging at the modified watercourse, the deterioration of water quality arising from site runoff could deteriorate the habitat quality. With the implementation of the proposed mitigation measures to control water quality in **Section 6**, adverse ecological impacts from site runoff during the construction phase are not expected.

5.2 Identification of Ecological Impacts – Operational Phase

Disturbance to Flight Paths

5.2.1 No active egretries are currently identified within Kam Tin (HKBWS, 2015). According to the results of a flight path survey (PlanD, 2014), no flight paths of birds are identifiable surrounding the proposed public housing sites. No ardeids were recorded within or flying over the Subject Sites. Therefore, potential disturbance to flight paths is considered to be insignificant.

Disturbance Impact

5.2.2 During the operational phase, increased level of human activities would cause disturbance to the woodland habitat south of Site 6. The operation of the housing sites would lead to an increase of vehicles and human activities, which would indirectly cause disturbance to adjacent sites of conservation importance (i.e. Conservation Areas and Tai Lam Country Park), habitats and associated fauna around the housing sites. The increased level of traffic might raise the disturbance level to the environment at the boundary of Tai Lam Country Park; however the impact is unlikely to be significant as the edges of these areas are located next to an existing busy road, Tsing Long Highway, and currently already experiencing disturbance impacts from traffic.

5.2.3 Glare (due to excessive usage of artificial light) has been shown to affect some wildlife and can result in a reduction in the density of a faunal population in an area through disorientation from, and attraction to artificial light, and effects on the light-sensitive cycles of a species. This can affect migration, foraging/predation and breeding success of species. As the surrounding areas of the housing sites are mostly undeveloped with woodland habitats at the south and west side of Site 6, mitigation for glare disturbance to wildlife should be implemented during the construction and operation phase. With the implementation of mitigation measures, impacts to the woodland are considered to be low.

5.3 Evaluation of Ecological Impacts

5.3.1 This section presents the evaluation of ecological impacts upon the 12 habitats within the Study Area due to the construction and operation of the public housing development.

5.3.2 The overall impact to woodland is considered to be low to moderate as a small area of woodland would be lost falls within Site 6 but this area was already subject to high level of human disturbance, such as illegal dumping and burning activities. No species of conservation importance were recorded within the area of woodland loss. Impact to shrubland is considered to be low as the shrubland south of Site 6 would only be subject to indirect disturbance impacts.

Table 10 Evaluation of Ecological Impacts to the Woodland and Shrubland Habitats within the Study Area

Evaluation Criteria	**Woodland**	**Shrubland**
Habitat quality	Moderate	Low
Species	One flora species of conservation importance (Small Persimmon) and five fauna species of conservation importance (Eastern Buzzard, Black Kite, Greater Coucal, Japan Pipistrelle and Leopard Cat) were recorded from current surveys and previous study. All these species were recorded outside of the Subject Sites.	No rare species or species of conservation importance were recorded.
Size/Abundance	Small loss of woodland margin of about 0.03 ha at the southwestern portion of Site 6	No direct loss of this habitat type
Duration	Direct loss of habitat would be permanent. Short term disturbance during construction phase Permanent disturbance during operation phase	Short term disturbance during construction phase Permanent disturbance during operation phase
Reversibility	Construction phase disturbance would be temporary and reversible Operation phase disturbance would be permanent and irreversible	Construction phase disturbance would be temporary and reversible Operation phase disturbance would be permanent and irreversible
Magnitude	Low	Low
Overall Impact Evaluation	**Low to Moderate**	**Low**

5.3.3 Plantation is a man-made habitat while grassland habitat within the study area was subject to human disturbance. Both habitats are considered to be low in ecological value. Flora and fauna diversity were low in both habitats and no species of conservation importance were recorded. As such, the loss of small areas of these habitats and other indirect disturbance would not cause significant impacts to these habitats. The overall impacts to plantation and

grassland are considered to be low.

Table 11 Evaluation of Ecological Impacts to the Plantation and Grassland Habitats within the Study Area

Evaluation Criteria	**Plantation**	**Grassland**
Habitat quality	Low	Low
Species	No rare species or species of conservation importance were recorded.	No rare species or species of conservation importance were recorded.
Size/Abundance	About 1.9 ha of this habitat type would be lost	About 0.9 ha of this habitat type would be lost
Duration	Direct loss of habitat would be permanent. Short term disturbance during construction phase Permanent disturbance during operation phase	Direct loss of habitat would be permanent. Short term disturbance during construction phase Permanent disturbance during operation phase
Reversibility	Construction phase disturbance would be temporary and reversible Operation phase disturbance would be permanent and irreversible	Construction phase disturbance would be temporary and reversible Operation phase disturbance would be permanent and irreversible
Magnitude	Low	Low
Overall Impact Evaluation	**Low**	**Low**

5.3.4 The overall impacts to active agricultural land and abandoned agricultural land are considered to be low. Active agricultural land within Site 1 is an organic farm with limited ecological value as the crops are covered by nets, no species of conservation importance were recorded at Site 1 or at the open fields at Site 6. The abandoned agricultural land is considered to be of low ecological value and the area loss is small in size.

Table 12 Evaluation of Ecological Impacts to Active Agricultural Land and Abandoned Agricultural Land within the Study Area

Evaluation Criteria	**Active Agricultural Land**	**Abandoned Agricultural Land**
Habitat quality	Low to moderate	Low
Species	Three avifauna species (Chinese Pond Heron Little Egret and Greater Coucal) and one amphibian species (Chinese Bullfrog) of conservation importance were recorded from current surveys and previous study. All these species were recorded outside of the Subject Sites.	No rare species or species of conservation importance were recorded.

Evaluation Criteria	**Active Agricultural Land**	**Abandoned Agricultural Land**
Size/Abundance	About 3.6 ha of this habitat type would be lost	About 0.5 ha of this habitat type would be lost
Duration	Direct loss of habitat would be permanent. Short term disturbance during construction phase Permanent disturbance during operation phase	Direct loss of habitat would be permanent. Short term disturbance during construction phase Permanent disturbance during operation phase
Reversibility	Construction phase disturbance would be temporary and reversible Operation phase disturbance would be permanent and irreversible	Construction phase disturbance would be temporary and reversible Operation phase disturbance would be permanent and irreversible
Magnitude	Low	Low
Overall Impact Evaluation	**Low**	**Low**

5.3.5 Village/orchard habitat has low ecological value as the vegetation is artificially planted and the habitat is subject to frequent human disturbance. Although three species of conservation importance were recorded within this habitat within the Site 1, the bat species could be displaced to other similar habitats nearby. Adult butterflies are mobile but not their larvae. The presence of butterfly larvae would be dependent on the presence of host plants. However, no larvae of Grass Demon were observed during the current surveys. In addition, nectar plants of adults (*Hedychium coronarium*) and host plant of caterpillars (e.g. leaves of Zingiberacea) of Grass Demon were not found within the Subject Sites. Furthermore, due to a high level of human disturbance, this habitat is not considered as an important habitat for these species. The overall impact to village/orchard is considered to be low. Developed area/wasteland has low ecological value as this habitat is highly disturbed with low species diversity. No species of conservation importance recorded within this habitat would be directly affected. The overall impact to developed area/wasteland is negligible as development area would be created as a result of the project.

Table 13 Evaluation of Ecological Impacts to Village/Orchard and Developed Area/Wasteland within the Study Area

Evaluation Criteria	**Village/Orchard**	**Developed Area/Wasteland**
Habitat quality	Low	Low

Evaluation Criteria	Village/Orchard	Developed Area/Wasteland
Species	Four mammal species of conservation importance (Japanese Pipistrelle, Pipistrelle sp., Bat sp. 1 and Pallas's Squirrel) and one butterfly species of conservation important (Grass Demon) were recorded from current surveys and previous study. Species recorded within the Subject Sites: Grass Demon, Pipistrelle sp. and Bat sp. 1 Species recorded outside of the Subject Sites: Japanese Pipistrelle and Pallas's Squirrel	Two avifauna species of conservation importance (Black Kite and Collared Scops owl) were recorded from previous study. These species were recorded outside of the Subject Sites.
Size/Abundance	About 3.3 ha of this habitat type would be lost	About 4.0 ha of this habitat type would be lost
Duration	Direct loss of habitat would be permanent. Short term disturbance during construction phase Permanent disturbance during operation phase	Direct loss of habitat would be permanent. Short term disturbance during construction phase Permanent disturbance during operation phase
Reversibility	Construction phase disturbance would be temporary and reversible Operation phase disturbance would be permanent and irreversible	Construction phase disturbance would be temporary and reversible Operation phase disturbance would be permanent and irreversible
Magnitude	Low	Low
Overall Impact Evaluation	**Low**	**Negligible**

5.3.6 The overall impacts to pond and marsh habitats within the Study Area are considered to be negligible as there are no direct impacts to these habitats and they are located away from the Subject Sites.

Table 14 Evaluation of Ecological Impacts to Pond and Marsh within the Study Area

Evaluation Criteria	Pond	Marsh
Habitat quality	Low	Low to moderate
Species	No rare species or species of conservation importance were recorded.	No rare species or species of conservation importance were recorded.
Size/Abundance	No direct loss of this habitat type	No direct loss of this habitat type

Evaluation Criteria	Pond	Marsh
Duration	Short term disturbance during construction phase Permanent disturbance during operation phase	Short term disturbance during construction phase Permanent disturbance during operation phase
Reversibility	Construction phase disturbance would be temporary and reversible Operation phase disturbance would be permanent and irreversible	Construction phase disturbance would be temporary and reversible Operation phase disturbance would be permanent and irreversible
Magnitude	Low	Low
Overall Impact Evaluation	**Negligible**	**Negligible**

5.3.7 A small section of modified watercourse (W1) of low ecological value at the northern section of Site 6 would be lost. The disturbance impacts to the modified watercourses adjacent to the Subject Sites during the construction and operational phase are considered to be low as similar habitats are available nearby. The overall impact to natural watercourse within the Study Area is considered to be negligible as this habitat type is located far away from the Subject Sites.

Table 15 Evaluation of Ecological Impacts to Modified Watercourse and Natural Watercourse within the Study Area

Evaluation Criteria	Modified Watercourse	Natural Watercourse
Habitat quality	W1: Low Other modified watercourses: Low to moderate	Low
Species	Five avifauna species of conservation importance recorded (Chinese Pond Heron, Grey Heron, Little Egret, Wood Sandpiper and Black Kite) and two mammal species of conservation importance (Japanese Pipistrelle and Bat sp.1) were recorded from current surveys and previous study. All these species were recorded outside of the Subject Sites.	No rare species or species of conservation importance were recorded
Size/Abundance	About 0.01 ha (0.02 km in length) of this habitat type would be lost	No direct loss of this habitat type
Duration	Short term disturbance during construction phase Permanent disturbance during operation phase	No impacts are anticipated

Evaluation Criteria	**Modified Watercourse**	**Natural Watercourse**
Reversibility	Construction phase disturbance would be temporary and reversible Operation phase disturbance would be permanent and irreversible	No impacts are anticipated
Magnitude	Low	Negligible
Overall Impact Evaluation	**W1: Low** **Other modified watercourses: Low**	**Negligible**

Impacts to Species of Conservation Importance

5.3.8 Based on the IDC study, one butterfly and two mammal species of conservation importance were recorded within the Subject Sites. No other species of conservation importance were recorded within the Subject Sites from the current surveys and the LUR study. Within the village/orchard of Site 4a, where a butterfly species of conservation importance, Grass Demon was recorded, the construction works would result in the loss of foraging/roosting habitat for this species. Adult butterflies are mobile but not their larvae. The presence of butterfly larvae would be dependent on the presence of host plants. However, no larvae of Grass Demon were observed during the current surveys. In addition, nectar plant of adults (*Hedychium coronarium*) and host plant of caterpillars (e.g. leaves of Zingiberacea) of Grass Demon were not found within the Subject Sites. Bat species (Pipistrelle sp. and Bat sp. 1) recorded within Site 4a would be displaced to other similar habitats nearby as the construction works would result in the loss of foraging grounds. Since this habitat is currently subject to high levels of human disturbances, it is not considered as an important habitat to these species. The ecological impact to these species is not significant.

5.3.9 Based on the current surveys, the LUR study and the IDC study, a total of one flora, nine avifauna, one amphibian and four mammal species of conservation importance were recorded within the Study Area outside of the Subject Sites. Adjacent to Site 1, three avifauna species (Chinese Pond Heron, Little Egret and Wood Sandpiper) and one mammal species (Bat sp. 1) of conservation importance were recorded. During the construction and operational phase, the avifauna and bat species of conservation importance adjacent to Site 1 recorded utilizing the modified watercourse would be indirectly impacted by the human and noise disturbances, these waterbirds and bat would be displaced to other foraging areas along the watercourse. Collared Scops Owl and Black Kite were recorded north of Site 4a, it is anticipated that during the construction phase they would be displaced to other habitat nearby.

5.3.10 Other species of conservation importance recorded within the Study Area outside of the Subject Sites were mainly recorded west of or along Tsing Long Highway, as well as south of Site 6. They included flora species (Small Persimmon), avifauna species (Little Egret, Grey Heron, Chinese Pond Heron, Grey-faced Buzzard, Eastern Buzzard, Black Kite and Greater Coucal), amphibian species (Chinese Bullfrog) and mammal species (Japanese Pipistrelle, Pallas's Squirrel and Leopard Cat). It is anticipated that the construction phase disturbances to these species would be low as they were recorded further away from the housing sites and the high mobility of these species and their ability to find other suitable foraging and roosting habitats nearby. No significant disturbance impacts are anticipated during the operational phase.

5.3.11 The overall impacts on species of conservation importance are summarized in **Table 16**. With the implementation of mitigation measures and good site practices recommended in

Section 6 below, no adverse impacts to these species are anticipated.

Table 16 Overall Impact Evaluation on Species of Conservation Importance within the Study Area

Species of Conservation Importance	Species Category	Recorded Within Subject Sites	Recorded From Current / Previous Study	Construction Phase Impacts		Operation Phase Impacts	
				Description	Evaluation	Description	Evaluation
Collared Scops Owl (*Otus lettia*)	Avifauna	No	LUR Study (PlanD, 2014)	Recorded at the developed area/wasteland north of Site 4a. Construction disturbances would displace the individuals to other similar habitat types nearby	**Low**	Light, human and noise disturbances would increase during the operational phase. Individuals would be displaced to other similar habitat types nearby.	**Low**
Grey-faced Buzzard (*Butastur indicus*)	Avifauna	No	LUR Study (PlanD, 2014)	Recorded in-flight at the shrubland east of Tsing Long Highway, outside of the Subject Sites. Construction disturbances would displace the individuals to other similar habitat types nearby	**Low**	The species was recorded further away from the housing sites. The species is highly mobile and could find other suitable foraging and roosting habitats nearby.	**Low**
Eastern Buzzard (*Buteo japonicas*)	Avifauna	No	LUR Study (PlanD, 2014)	Recorded at the woodland west of Tsing Long Highway, outside of the Subject Sites. Construction disturbances would displace the individuals to other similar habitat types nearby	**Low**	The species was recorded further away from the housing sites. The species is highly mobile and could find other suitable foraging and roosting habitats nearby.	**Low**
Black Kite	Avifauna	No	LUR Study	Recorded in-flight at woodland, modified	**Low**	The species was recorded further away from the housing sites. The	**Low**

Species of Conservation Importance	Species Category	Recorded Within Subject Sites	Recorded From Current / Previous Study	Construction Phase Impacts		Operation Phase Impacts	
				Description	Evaluation	Description	Evaluation
(*Milvus migrans*)			(PlanD, 2014)	watercourse and developed area/wasteland outside of the Subject Sites. Construction disturbances would displace the individuals to other similar habitat types nearby		species is highly mobile and could find other suitable foraging and roosting habitats nearby.	
Greater Coucal (*Centropus sinensis*)	Avifauna	No	LUR Study (PlanD, 2014)	Recorded at the woodland and active agricultural land west of Tsing Long Highway, outside of the Subject Sites	**Low**	The species was recorded further away from the housing sites. The species is highly mobile and could find other suitable foraging and roosting habitats nearby.	**Low**
Chinese Bullfrog (*Hoplobatrachus chinensis*)	Amphibian	No	LUR Study (PlanD, 2014)	Recorded at the active agricultural land west of the Tsing Long Highway, outside of the Subject Sites No direct or indirect impacts are anticipated as the recorded individual was located far away from the Subject Sites.	**No impact**	No direct or indirect impacts are anticipated as the recorded individual was located far away from the Subject Sites.	**No impact**
Leopard Cat (*Prionailurus bengalensis*)	Mammal	No	LUR Study (PlanD, 2014)	Recorded at the woodland west of Tsing Long Highway, outside of the Subject Sites. No direct impacts from the project; indirect disturbance during construction phase	**Low**	The species was recorded further away from the housing sites. The species is highly mobile and could find other suitable foraging and roosting habitats nearby.	**Low**

Species of Conservation Importance	Species Category	Recorded Within Subject Sites	Recorded From Current / Previous Study	Construction Phase Impacts		Operation Phase Impacts	
				Description	Evaluation	Description	Evaluation
				expected			
Grass Demon (*Udaspes folus*)	Butterfly	Yes	IDC Study (CEDD, n.d.)	One individual was recorded at the village/orchard within Site 4a. Habitat loss during the construction phase would result in the loss of foraging/roosting grounds. Adult butterflies are mobile but not their larvae. The presence of butterfly larvae would be dependent on the presence of host plants. However, no larvae of Grass Demon were observed during the current surveys. In addition, nectar plant of adults (*Hedychium coronarium*) and host plant of caterpillars (e.g. leaves of Zingiberacea) of Grass Demon were not found within the Subject Sites.	**Low**	No impacts are anticipated during the operation phase	**No impact**
Pipistrelle sp.	Mammal	Yes	IDC Study (CEDD, n.d.)	One individual was recorded at the village/orchard within Site 4a. Habitat loss during the construction phase would result in the loss of foraging grounds. This species would	**Low**	Increased light, human and noise disturbance is anticipated during the operation phase. This species would be displaced to other similar habitats nearby.	**Low**

Species of Conservation Importance	Species Category	Recorded Within Subject Sites	Recorded From Current / Previous Study	Construction Phase Impacts		Operation Phase Impacts	
				Description	**Evaluation**	**Description**	**Evaluation**
				be displaced to other similar habitats nearby.			
Bat sp. 1	Mammal	Yes	IDC Study (CEDD, n.d.)	One individual was recorded at the village/orchard within Site 4a. One individual was also recorded at the modified watercourse in between Site 1 and Site 4a outside of the Subject Sites. Habitat loss during the construction phase would result in the loss of foraging grounds. This species would be displaced to other similar habitats nearby.	**Low**	Increased light, human and noise disturbance is anticipated during the operation phase. This species would be displaced to other similar habitats nearby.	**Low**
Small Persimmon (*Diospyros vaccinioides*)	Flora	No	Current Study	One individual was recorded at the woodland outside of the Subject Sites, southwest of Site 6. No direct or indirect impacts are anticipated as it is located away from the Subject Sites.	**No impact**	No impact	**No impact**
Chinese Pond Heron (*Ardeola bacchus*)	Avifauna	No	Current Study	Individuals were recorded at the active agricultural lands outside of the Subject Sites, west of Tsing Long Highway and at the modified watercourse adjacent to Site 1	**Low**	Light, human and noise disturbances at the modified watercourse adjacent to Site 1 would increase during the operational phase. Individuals would be displaced to other similar	**Low**

Species of Conservation Importance	Species Category	Recorded Within Subject Sites	Recorded From Current / Previous Study	Construction Phase Impacts		Operation Phase Impacts	
				Description	**Evaluation**	**Description**	**Evaluation**
				and also at the eastern end of the Study Area. Construction disturbances would displace the individuals roosting/foraging at the modified watercourse adjacent to Site 1. Individuals would be displaced to other similar habitat types nearby.		habitat types nearby.	
Grey Heron (*Ardea cinerea*)	Avifauna	No	Current Study	One individual was recorded at the modified watercourse outside of the Subject Sites at the northwestern part of the Study Area. No direct or indirect impacts are anticipated as the recorded individual was located far away from the Subject Sites.	**No impact**	No impact	**No impact**
Little Egret (*Egretta garzetta*)	Avifauna	No	Current Study	Individuals were recorded at the active agricultural lands outside of the Subject Sites, west of Tsing Long Highway as well as at the modified watercourse adjacent to Site 1. Construction disturbances would displace the individuals	**Low**	Light, human and noise disturbances at the modified watercourse adjacent to Site 1 would increase during the operational phase. Individuals would be displaced to other similar habitat types nearby.	**Low**

Species of Conservation Importance	Species Category	Recorded Within Subject Sites	Recorded From Current / Previous Study	Construction Phase Impacts		Operation Phase Impacts	
				Description	Evaluation	Description	Evaluation
				roosting/foraging at the modified watercourse adjacent to Site 1. Individuals would be displaced to other similar habitat types nearby.			
Wood Sandpiper (*Tringa glareola*)	Avifauna	No	Current Study	One individual was recorded at the modified watercourse adjacent and outside of Site 1. Construction disturbances would displace the individuals roosting/foraging at the modified watercourse adjacent to Site 1. Individuals would be displaced to other similar habitat types nearby.	**Low**	Light, human and noise disturbances at the modified watercourse adjacent to Site 1 would increase during the operational phase. Individuals would be displaced to other similar habitat types nearby.	**Low**
Japanese Pipistrelle (*Pipistrellus abramus*)	Mammal	No	Current Study	Individuals were recorded in the woodland, village / orchard, and modified watercourse adjacent to Tsing Long Highway, outside of the Subject Sites. Light disturbances during the construction phase, especially from Site 6, could deteriorate the habitat quality.	**Low**	Increased light, human and noise disturbance is anticipated during the operation phase. This species would be displaced to other similar habitats nearby.	**Low**
Pallas's Squirrel (*Callosciurus*	Mammal	No	Current Study	Recorded at the village / orchard west of Tsing Long Highway, outside of the	**No impact**	No direct or indirect impacts are anticipated as the recorded individual was located far away	**No impact**

Species of Conservation Importance	Species Category	Recorded Within Subject Sites	Recorded From Current / Previous Study	Construction Phase Impacts		Operation Phase Impacts	
				Description	Evaluation	Description	Evaluation
erythraeus)				Subject Sites. No direct or indirect impacts are anticipated as the recorded individual was located far away from the Subject Sites.		from the Subject Sites.	

6. RECOMMENDATION FOR MITIGATION MEASURES OF ECOLOGICAL IMPACTS

6.1.1 According to the EIAO-TM Annex 16 and EIAO Guidance Note. 3/2010, ecological impacts on important habitats and the associated wildlife caused by the proposed development should be mitigated by, in order of priority, avoidance, minimization, and compensation approaches to the maximum practical extent.

6.1.2 Although no adverse ecological impacts are anticipated, mitigation measures are recommended in order to further minimize the indirect impacts arising from the construction and operation of the Project. The following sections present the recommended mitigation measures.

Minimize Indirect Impacts to Habitats and Fauna

6.1.3 General mitigation measures for noise, air quality and pollution impacts and good site practice should be considered to further minimize the disturbance on habitats, flora and fauna at the same time. In general, the disturbance impacts to the sites of conservation importance (i.e. Conservation Areas and Tai Lam Country Park), terrestrial habitat and associated wildlife arising from the construction activities could be minimized by adopting good site practice, including:

- Noise impact during construction phase could be minimized to limit the disturbance to the habitats adjacent to the work areas. Mitigation measures are recommended, but not limited to the following: machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum. Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities. The use of Quiet Mechanical Plant (QMP) is recommended to limit noise emissions at source. QMP and other machines and plants (e.g. air compressors, concrete pumps) could be covered by noise enclosure to further reduce noise impact;
- Dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices could minimize the dust covering leaves of plants that would affect their photosynthesis, and thus their health and growth. Regular spraying of haul roads is recommended. By covering trucks or by transporting wastes in enclosed or covered containers, windblown litter and dust during transportation of waste shall be minimized.
- Glare impact can be minimized with the implementation of night-time lighting control during construction phase, reduction of excessive lighting usage (apart from normal lighting usage from future residences) during the operation phase could be considered as part of the development of the masterplan, for example:
  - Reduce light sources pointing outward to the surrounding natural habitats during the design of buildings.
  - Excessive light should be avoided in outdoor public facilities (e.g. car park, playground).
  - Lampshades should be installed on street lamps to direct the light towards the road only.
- Even though no active egretries are present nearby and no flight paths have been identified, an eco-corridor of about 30 m wide across the Subject Sites previously proposed in the Landuse Review for Kam Tin South and Pat Heung dated March 2014 (refer to **Appendix 9**) would be provided as far as practicable as a conservation approach. The eco-corridor would have some soft and hard landscape works with some native plants to enlighten the environment. It is anticipated that low-rise structure less than 10 m in height within the eco-corridor would unlikely have any significant ecological impact to the surrounding habitats and associated wildlife.

- A 20 m building setback from channel KT15 is recommended to minimize disturbances to wildlife as far as possible.
- Podium-free building block design would be incorporated for majority of the areas of the housing sites.
- Large pieces of glass such as curtain wall design would not be adopted as far as practicable so as to minimize potential bird collision.
- Translucent or opaque materials, or silhouettes on transparent noise barrier would be adopted as far as practicable.

Minimize Water Quality Impact

6.1.4 Proper site management measures could control construction site runoff and drainage from the works areas to nearby watercourses, particularly the modified watercourse next to the Subject Sites. Practices to minimize surface runoff and to reduce suspended solid levels should be undertaken. Measures should also be put into place so that litter, fuels and solvents do not enter the nearby watercourses or storm water drains.

Construction Site Run-off

6.1.5 The site practices outlined in ProPECC PN 1/94 "Construction Site Drainage" should be followed as far as practicable to minimize surface run-off and the chance of erosion. The following measures are recommended to protect water quality, and when properly implemented should be sufficient to adequately control site discharges so as to avoid water quality impact.

6.1.6 Surface run-off 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 to properly direct stormwater to such silt removal facilities. Perimeter channels at site boundaries should be provided on site boundaries where necessary to intercept storm run-off 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.

6.1.7 Silt removal facilities, channels and manholes should be maintained and the deposited silt and grit should be removed regularly, at the onset of and after each rainstorm to prevent local flooding. Any practical options for the diversion and re-alignment of drainage should comply with both engineering and environmental requirements in order to provide adequate hydraulic capacity of all drains.

6.1.8 Construction works should be programmed to minimize soil excavation works in rainy seasons (April to September). If excavation in soil cannot be avoided in these months or at any time of year when rainstorms are likely, for the purpose of preventing soil erosion, temporary exposed slope surfaces should be covered e.g. by tarpaulin, and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Intercepting channels should be provided (e.g. along the crest / edge of excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements should always be in place in such a way that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm.

6.1.9 Earthworks final surfaces should be well compacted and the subsequent permanent work or surface protection should be carried out immediately after the final surfaces are formed to prevent erosion caused by rainstorms. Appropriate drainage like intercepting channels should be provided where necessary.

6.1.10 Measures should be taken to minimize the ingress of rainwater into trenches. If excavation of

trenches in wet seasons is necessary, they should be dug and backfilled in short sections. Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.

6.1.11 Construction materials (e.g. aggregates, sand and fill material) on sites should be covered with tarpaulin or similar fabric during rainstorms.

6.1.12 Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers. Discharge of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system.

Wheel Washing Water

6.1.13 All vehicles and plant should be cleaned before they leave a construction site to minimize the deposition of earth, mud, debris on roads. A wheel washing bay should be provided at every site exit if practicable and wash-water 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 backfall to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains.

Rubbish and Litter

6.1.14 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.

Accidental Spillage

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

6.1.16 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.

6.1.17 Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance details the requirements to deal with chemical wastes. General requirements are given as follows:

- Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport;
- Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents; and
- Storage area should be selected at a safe location on site and adequate space should be allocated to the storage area.

Sewage Effluent from Construction Workforce

6.1.18 The construction workforce on site will generate sewage. It is recommended to provide sufficient chemical toilets in the works areas. A licensed waste collector should be deployed to clean the chemical toilets on a regular basis.

6.1.19 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 will provide an effective control of any malpractices and can encourage continual improvement of environmental performance on site. It is anticipated that sewage generation during the construction phase of the project would not cause water pollution problem after undertaking all required measures.

7. CONCLUSION

7.1.1 An ecological assessment, based on literature review and field surveys, for the construction and operation of the proposed public housing sites (Sites 1, 4a and 6) has been conducted.

7.1.2 Twelve habitats were identified within the Study Area: woodland, shrubland, plantation, grassland, active agricultural land, abandoned agricultural land, village/orchard, developed area/wasteland, pond, marsh, modified watercourse and natural watercourse. The ecological value of these habitats varied from low to moderate. Tai Lam Country Park and Conservation Areas are located at the western part of the Study Area, outside of the housing sites.

7.1.3 Impacts during the construction phase include direct habitat loss of woodland, plantation, grassland, active agricultural land, abandoned agricultural land, modified watercourse, village/orchard and developed area/wasteland habitats, disturbance impacts, dust and site runoff, whilst operation phase impacts include disturbance impacts and glare. There are no significant adverse ecological impacts identified in the assessment. The adoption of mitigation measures and good site practices during construction and operation phases (e.g. water quality control measure, dust suppression measures, noise control measures, night-time lighting control and reduction of excessive lighting usage, etc.) would help to further minimize the disturbance impacts.

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Figures and Appendices

ISO A1 594mm x 841mm

Approved:

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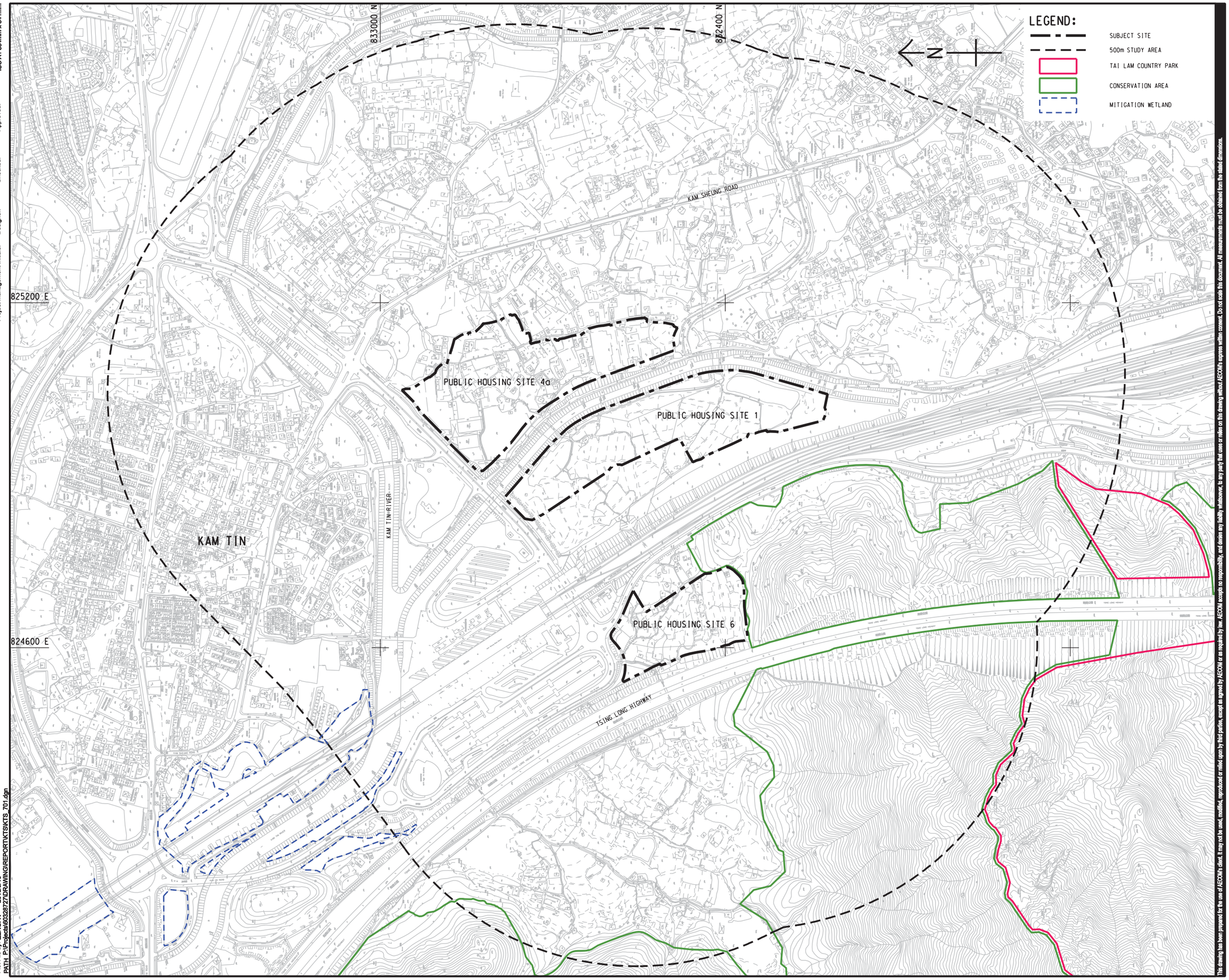
Project Management Initials:



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PROJECT
項目

CONSULTANCY FOR ECOLOGICAL ASSESSMENT FOR PROPOSED PUBLIC HOUSING SITES 1, 4a AND 6, KAM TIN SOUTH, YUEN LONG

CLIENT
業主

Hong Kong Housing Authority

CONSULTANT
工程顧問公司

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ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核對

STATUS
階段

SCALE 比例
A1 1 : 3000

DIMENSION UNIT 尺寸基位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60328727

CONTRACT NO. 合約編號

SHEET TITLE
圖紙名稱

SUBJECT SITE AND STUDY AREA FOR ECOLOGICAL ASSESSMENT

SHEET NUMBER
圖紙編號

60328727/KTS/FIGURE 1

ISO A1 594mm x 841mm

Approved:

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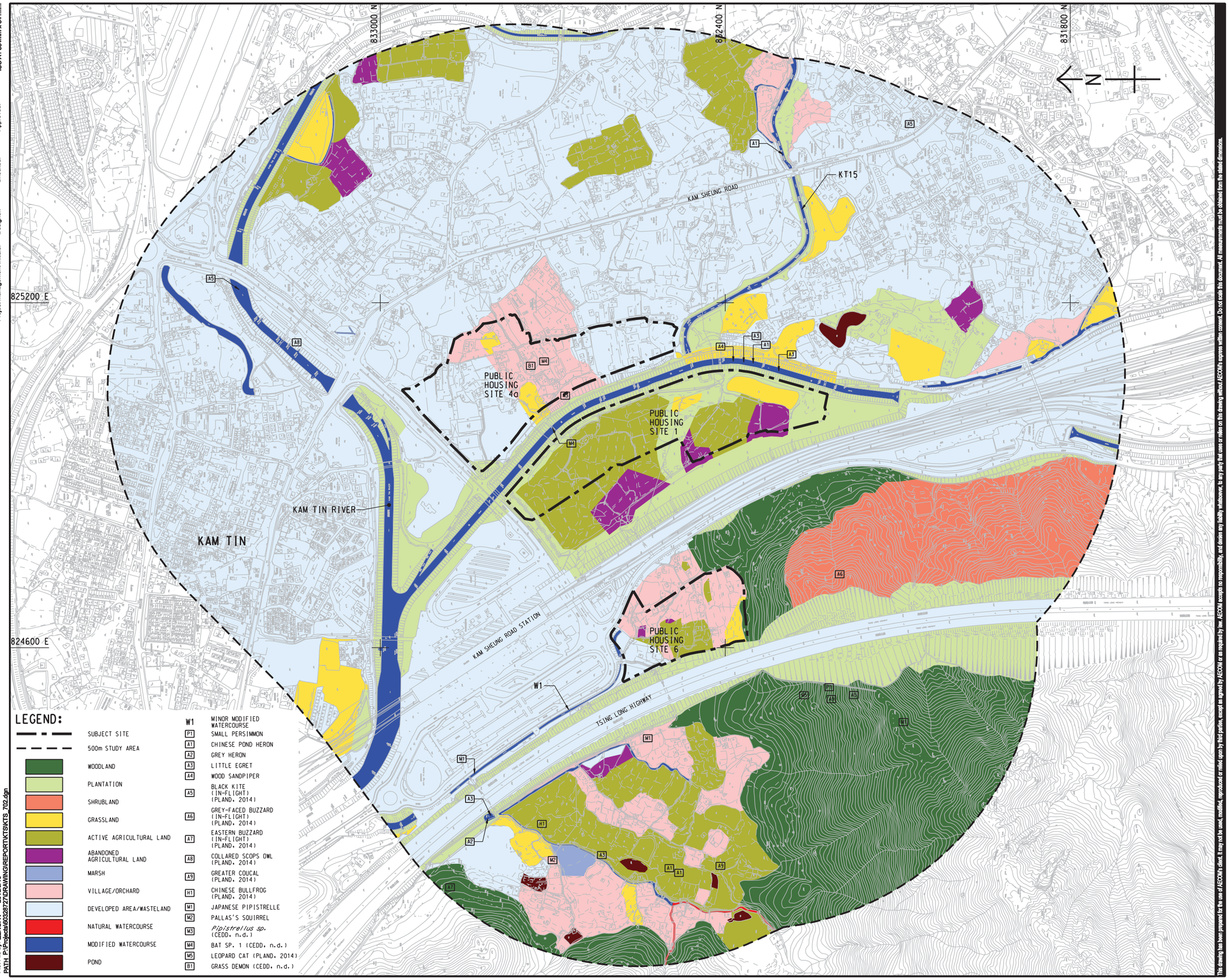

LEGEND:

	SUBJECT SITE	W1	MINOR MODIFIED WATERCOURSE
	500m STUDY AREA	P1	SMALL PERSIMMON
	WOODLAND	A1	CHINESE POND HERON
	PLANTATION	A2	GREY HERON
	SHRUBLAND	A3	LITTLE EGRET
	GRASSLAND	A4	WOOD SANDPIPER
	ACTIVE AGRICULTURAL LAND	A5	BLACK KITE (IN-FLIGHT) (PLAND, 2014)
	ABANDONED AGRICULTURAL LAND	A6	GREY-FACED BUZZARD (IN-FLIGHT) (PLAND, 2014)
	MARSH	A7	EASTERN BUZZARD (IN-FLIGHT) (PLAND, 2014)
	VILLAGE/ORCHARD	A8	COLLARED SCOPS OWL (PLAND, 2014)
	DEVELOPED AREA/WASTELAND	A9	GREATER COUCAL (PLAND, 2014)
	NATURAL WATERCOURSE	H1	CHINESE BULLFROG (PLAND, 2014)
	MODIFIED WATERCOURSE	M1	JAPANESE PIPISTRELLE
	POND	M2	PALLAS'S SQUIRREL
		M3	*Pipistrellus sp.* (CEDD, n.d.)
		M4	BAT SP. 1 (CEDD, n.d.)
		M5	LEOPARD CAT (PLAND, 2014)
		B1	GRASS DEMON (CEDD, n.d.)

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DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60328727

CONTRACT NO. 合約編號

SHEET TITLE
圖紙名稱

HABITAT MAP AND LOCATION OF SPECIES OF CONSERVATION IMPORTANCE

SHEET NUMBER
圖紙編號

60328727/KTS/FIGURE 2



Plate 1 Woodland



Plate 2 Plantation



Plate 3 Shrubland

AECOM	Ecological Impact Assessment Consultancy Services for the Proposed Public Housing Sites 1, 4a and 6, Kam Tin South, Yuen Long	SCALE	N/A	DATE	January 2016
		CHECK	SMcM	DRAWN	WANTLI
	Representative Photographs of Habitats within the Study Area	JOB NO.	60328727	**Appendix No.** 1	**Rev** -



Plate 4 Grassland



Plate 5 Active Agricultural Land



Plate 6 Abandoned Agricultural Land

AECOM	Ecological Impact Assessment Consultancy Services for the Proposed Public Housing Sites 1, 4a and 6, Kam Tin South, Yuen Long	SCALE	N/A	DATE	January 2016
		CHECK	SMcM	DRAWN	WANTLI
	Representative Photographs of Habitats within the Study Area	JOB NO.	60328727	**Appendix No.** 1	**Rev** -



Plate 7 Marsh



Plate 8 Village/Orchard



Plate 9 Developed Area/Wasteland

AECOM	Ecological Impact Assessment Consultancy Services for the Proposed Public Housing Sites 1, 4a and 6, Kam Tin South, Yuen Long	SCALE	N/A	DATE	January 2016
		CHECK	SMcM	DRAWN	WANTLI
	Representative Photographs of Habitats within the Study Area	JOB NO.	60328727	**Appendix No.** 1	**Rev** -



Plate 10 Natural Watercourse



Plate 11 Modified Watercourse



Plate 12 Pond

AECOM	Ecological Impact Assessment Consultancy Services for the Proposed Public Housing Sites 1, 4a and 6, Kam Tin South, Yuen Long	SCALE	N/A	DATE	January 2016
		CHECK	SMcM	DRAWN	WANTLI
	Representative Photographs of Habitats within the Study Area	JOB NO.	60328727	**Appendix No.** 1	**Rev** -



Plate 1
Small Persimmon (*Diospyros vaccinioides*)



Plate 2
Chinese Pond Heron (*Ardeola bacchus*)



Plate 3
Little Egret (*Egretta garzetta*)



Plate 4
Wood Sandpiper (*Tringa glareola*)

AECOM	Ecological Impact Assessment Consultancy Services for the Proposed Public Housing Sites 1, 4a and 6, Kam Tin South, Yuen Long	SCALE	N/A	DATE	January 2016	
		CHECK	SMcM	DRAWN	WANTLI	
	Representative Photographs of Species of Conservation Importance Recorded within the Study Area	JOB NO.	60328727	**Appendix No.** 2		**Rev** -

Appendix 3 - Flora Species Recorded within the Study Area during the Current Surveys from November to December 2015

Scientific Name	Growth Form	Native / Exotic in Hong Kong	Distribution in Hong Kong (1)	Protection Status	Woodland	Plantation	Shrubland	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Marsh	Village/ Orchard	Developed Area/ Wasteland	Natural Watercourse	Modified Watercourse	Pond
Acacia auriculiformis	tree	exotic	common	-	++	++++	++						++			
Acacia confusa	tree	exotic	-	-	++++	++++	++	+	+			++	++++	+	+	
Acacia mangium	tree	exotic	-	-	++			+								
Adiantum capillus-veneris	herb	native	common	-	+++	++	++									
Ageratum conyzoides	herb	exotic	common	-				+				+	+			
Aglaia odorata	shrub or small tree	exotic	common	-									++			
Aglaonema spp.	herb	-	-	-								+				
Alangium chinense	tree or shrub	native	common	-	+++	+++	++	++		++		+	++	+	+	
Albizia lebbeck	tree	exotic	-	-											+	
Alchornea trewioides	shrub	native	common	-	++											
Aleurites moluccana	tree	exotic	common	-									+++			
Allamanda cathartica	climbing shrub	exotic	-	-								++	++			
Alocasia macrorrhizos	perennial herb	native	very common	-	+++	+++	++	++	+	+++	++	++	++	++	+	
Alpinia hainanensis	perennial herb	native	very common	-	+									+		
Alpinia zerumbet	perennial herb	native	very common	-	++											
Alpinia zerumbet 'Variegata'	perennial herb	native	very common	-									++			
Amaranthus viridis	herb	native	very common	-					+	+	+		+	+	+	
Aporusa dioica	tree	native	very common	-	++++	++	+					+	++	+		
Araucaria heterophylla	tree	exotic	-	-	+	+							++			
Archidendron clypearia	tree	native	common	-	++	+										
Archidendron lucidum	tree	native	common	-	++	+										
Ardisia crenata	shrub	native	common	-	+											
Ardisia lindleyana	shrub	native	common	-	+											
Artocarpus heterophyllus	tree	exotic	common	-	+							++		+		
Aster baccharoides	perennial herb	native	very common	-	+											

Appendix 3 - Flora Species Recorded within the Study Area during the Current Surveys from November to December 2015

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Aster subulatus	perennial herb	exotic	common (2)	-				+++	++	++			++			
Axonopus compressus	perennial procumbent	exotic	common	-				++								
Baeckea frutescens	shrub or small tree	native	very common	-	+		++++									
Bambusa sp.	bamboo	-	-	-								++				
Bauhinia spp.	-	-	-	-		++							+++		+	
Berchemia floribunda	climbing shrub: vine	native	common	-	++	++										
Bidens alba	herb	exotic	very common	-	++	++	+	++++	++	++	++	++	+++	++	+	+
Bischofia javanica	tree	native	common	-		+										
Blechnum orientale	herb	native	very common	-	++++	++										
Boehmeria nivea	subshrub or shrub	exotic	restricted	-	++	++			++	++		++				
Bougainvillea spectabilis	climbing shrub	exotic	cultivated	-	+		+					++	++			
Brachiaria mutica	herb	exotic	common (2)	-				++	++	++		++	++	+++	+	++
Brassica chinensis	biennial herb	exotic	-	-					++							
Brassica juncea	herb	exotic	-	-					++							
Brassica oleracea L. var. albiflora	herb	exotic	cultivated	-					++							
Brassica parachinensis	biennial herb	exotic	-	-					++							
Breynia fruticosa	shrub	native	very common	-	++	++	++	++				+	++	+		
Bridelia tomentosa	shrub or small tree	native	very common	-	+++	++	++	++	+	++		++	++	++	+	
Calliandra haematocephala	shrub	exotic	common	-		++										
Callicarpa formosana	shrub	native	common	-									++			
Callistemon viminalis	tree	exotic	-	-									+			
Canarium album	tree	exotic	restricted, Fung Shui	-	+											
Canna indica	perennial herb	exotic	cultivated	-								++				
Caryota maxima	tree palm	exotic	-	-		+										
Cassia fistula	tree	exotic	-	-									+			
Cassytha filiformis	parasitic climber:	native	very common	-	+	+										

Appendix 3 - Flora Species Recorded within the Study Area during the Current Surveys from November to December 2015

Scientific Name	Growth Form	Native / Exotic in Hong Kong	Distribution in Hong Kong (1)	Protection Status	Woodland	Plantation	Shrubland	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Marsh	Village/ Orchard	Developed Area/ Wasteland	Natural Watercourse	Modified Watercourse	Pond
Casuarina equisetifolia	tree	exotic	rare	-	++++	++++	+						+++			
Catharanthus roseus	herb	exotic	common	-	+							+	+++			
Catunaregam spinosa	tree or shrub	native	restricted	-								+	+			
Cayratia corniculata	herbaceous vine	native	very common	-	++	+										
Celosia argentea	herb	native	very common	-					+							
Celtis sinensis	tree	native	common	-	+++	++	++	++	++	++		++	+++	++	+	
Chloris barbata	herb	native	very common	-	+	+		++	+	++		+	+++	++	++	
Chrysopogon aciculatus	perennial herb	native	very common	-		+										
Cinnamomum burmannii	tree or large shrub	native	-	-		++							+			
Cinnamomum camphora	large tree	native	common	-	++								+			
Cinnamomum parthenoxylon	large tree	native	common	-	+++	+						+	+	+		
Citrus maxima	tree	exotic	widely planted	-								+				
Citrus reticulata	small tree	exotic	common	-								+				
Clausena lansium	small tree	exotic	common	-	++	+						++++	++			
Clerodendrum fortunatum	shrub	native	common	-			++									
Codiaeum variegatum	shrub	exotic	-	-			+									
Colocasia esculenta	herb	exotic	common (2)	-												+
Commelina diffusa	herb	native	common, very common (2)	-							++			++++	++	++
Conyza canadensis	herb	exotic	very common	-												+
Cordyline fruticosa	shrub	exotic	-	-								+				
Cratoxylum cochinchinense	tree or shrub	native	very common	-	++		+					+				
Cyclosorus parasiticus	herb	native	very common	-	++						+++			++	++	
Cynodon dactylon	perennial herb	native	very common	-	+	+		+++	++	++			++			
Cyperus rotundus	herb	native	very common; common (2)	-	+	+		+++		+++			++		++	
Cyperus spp.	herb	-	-	-				++								++
Cyrtococcum patens	herb	native	very common	-				+++	++			++	+++			

Appendix 3 - Flora Species Recorded within the Study Area during the Current Surveys from November to December 2015

Scientific Name	Growth Form	Native / Exotic in Hong Kong	Distribution in Hong Kong (1)	Protection Status	Woodland	Plantation	Shrubland	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Marsh	Village/ Orchard	Developed Area/ Wasteland	Natural Watercourse	Modified Watercourse	Pond
Dactyloctenium aegyptium	herb	native	common	-				++	++				++			
Dalbergia benthamii	climber: vine	native	common	-	+++	++	+++			++						
Daphniphyllum calycinum	tree	native	common	-	++	++	++									
Daucus carota var. sativa	perennial herb	exotic	-	-					++							
Delonix regia	tree	exotic	-	-									++			
Desmos chinensis	woody vine	native	common	-	++	+										
Dicranopteris pedata	herb	native	very common	-	+++	+++	++++	+								
Dimocarpus longan	tree	exotic	restricted but widely	-	++	++			++	++		++++	++	+		
Diospyros kaki	tree or shrub	exotic	common	-								+				
Diospyros vaccinioides	shrub	native	very common	Listed as "Critically Endangered" in IUCN Red List (ver. 2015.4)	+											
Dracaena sanderiana	shrub	exotic	-	-					++			++				
Duranta erecta	climbing shrub	exotic	common	-								+	++			
Dypsis lutescens	shrub palm	exotic	-	-		+			+			+	+			
Eichhornia crassipes	floating herb	exotic	common (2)	-												++
Elaeocarpus chinensis	tree or small tree	native	common	-	+											
Emilia sonchifolia	herb	native	very common	-	+			+	+				+			
Epipremnum aureum	tall climbing plant	exotic	-	-	+											
Eriobotrya japonica	small tree	exotic	cultivated	-								++				
Eucalyptus citriodora	tree	exotic	cultivated	-		++							++			
Euphorbia hirta	herb	exotic	-	-	+	+	+	+	+	++		+	+++		+	
Euphorbia pulcherrima	shrub	exotic	common	-								+				
Eurya nitida	shrub or small tree	native	very common	-	++	+	+++								+	
Ficus elastica	tree	exotic	cultivated	-	+							+	++			

Appendix 3 - Flora Species Recorded within the Study Area during the Current Surveys from November to December 2015

Scientific Name	Growth Form	Native / Exotic in Hong Kong	Distribution in Hong Kong (1)	Protection Status	Woodland	Plantation	Shrubland	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Marsh	Village/ Orchard	Developed Area/ Wasteland	Natural Watercourse	Modified Watercourse	Pond
Ficus hirta	shrub or small tree	native	common	-	+++	+++	+						++			
Ficus hispida	shrub or small tree	native	very common	-	+++	+++	+++	++	++	++	+	++	+++	+	+	
Ficus microcarpa	tree	native	common	-	++++	++						++	+++	+		
Ficus religiosa	tree	exotic	restricted; widely planted	-	++	++						++	+++			
Ficus variegata	tree	native	common	-	++	++	++	++	++	+		++	++	++	+	
Ficus virens	tree	native	common	-	++	++							++			
Garcinia oblongifolia	tree	native	very common	-	+											
Garcinia subelliptica	-	exotic	-	-		+										
Gardenia jasminoides	shrub	native	common	-			+									
-	-	exotic	-	-					+							
Glochidion eriocarpum	shrub	native	very common	-	++	++	+									
Glochidion wrightii	tree	native	very common	-	++		+									
Gnetum parvifolium	woody vine	native	common	-	+											
Hedychium coronarium	perennial herb	exotic	common (2)	-							++					
Helicteres angustifolia	subshrub	native	very common	-	+											
Hibiscus mutabilis	shrub or small tree	exotic	-	-								+	+			
Hibiscus rosa-sinensis	shrub	exotic	-	-									++			
Hibiscus tiliaceus	tree or shrub	native	very common	-	++	++	+	++				+	++		+	
Homalium cochinchinensis	shrub or tree	native	common	-	+											
Ilex asprella	shrub	native	very common	-	+++	++	+++	+				+	+			
Ilex pubescens	shrub	native	very common	-	++											
Ilex rotunda	tree	exotic	common	-				++								
Imperata cylindrica var. major	perennial herb	native	very common	-	++	++		++++	+	+++			+++		+	
Ipomoea cairica	climber: twining herb	exotic	very common	-			+	++	+	++	++		++	+	+	
Ipomoea triloba	herbaceous climber	exotic	common	-		+										
Ixora chinensis	shrub	native	restricted but widely	-									++			

Appendix 3 - Flora Species Recorded within the Study Area during the Current Surveys from November to December 2015

Scientific Name	Growth Form	Native / Exotic in Hong Kong	Distribution in Hong Kong (1)	Protection Status	Woodland	Plantation	Shrubland	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Marsh	Village/ Orchard	Developed Area/ Wasteland	Natural Watercourse	Modified Watercourse	Pond
Kyllinga nemoralis	herb	native	very common; common (2)	-	++	++		++				+	++	++		
Lactuca sativa	herb	exotic	cultivated	-					++							
Lagerstroemia speciosa (3)	large tree	exotic	-	Listed under Forests and Countryside Ordinance Cap. 96									++			
Lantana camara	shrub	exotic	very common	-	++	++	+	+++	++	++		++	+++	++	+	
Lemna minor	floating small herb	native	common (2)	-										+	++	+
Lepidosperma chinense	herb	native	very common; common (2)	-			++									
Leucaena leucocephala	small tree	exotic	common	-	++	++++	++	+++	+	++++		++	+++	++	++	
Ligustrum sinense	small tree or shrub	native	common	-	+++	++	++					+	+++		+	
Lindernia crustacea	herb	native	restricted; common (2)	-				+								
Lindsaea orbiculata	herb	native	very common	-	+											
Liquidambar formosana	tree	native	common	-	++	++							++			
Liriope spicata	perennial herb	native	very common	-	++	+										
Litchi chinensis	tree	exotic	restricted but widely planted	-	+							++				
Litsea cubeba	shrub or small tree	native	common	-	+		++									
Litsea glutinosa	tree	native	very common	-	+++	++		+				+	++			
Litsea rotundifolia	shrub	native	very common	-	+++	++	+++						+	+	+	
Livistona chinensis	tree palm	exotic	-	-	+								++			
Lophostemon confertus	tree	exotic	-	-	+	++										
Ludwigia octovalvis	perennial herb	native	common; very common (2)	-										+		+
Ludwigia perennis	herb	native	restricted	-							+				+	+
Luffa aegyptiaca	herbaceous vine	exotic	cultivated	-					+							
Lycopersicon esculentum	herb	exotic	cultivated	-					++							
Lygodium japonicum	climbing herb	native	very common	-	+++	+++	++									
Macaranga tanarius	tree	native	common	-	+++	+++	++	+++	++	+++		+++	+++	++	+	

Appendix 3 - Flora Species Recorded within the Study Area during the Current Surveys from November to December 2015

Scientific Name	Growth Form	Native / Exotic in Hong Kong	Distribution in Hong Kong (1)	Protection Status	Woodland	Plantation	Shrubland	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Marsh	Village/ Orchard	Developed Area/ Wasteland	Natural Watercourse	Modified Watercourse	Pond
Machilus chekiangensis	tree	native	very common	-	+++	+++						+	++			
Machilus pauhoi	tree	native	very rare	-	+++	+++										
Mallotus paniculatus	tree or shrub	native	very common	-	+++	++	++	+	+	++		++	++	+	+	
Malvaviscus arboreus	shrub	exotic	common	-		+							++			
Mangifera indica	tree	exotic	-	-	++				+	+		+++	++			
Manihot esculenta	shrub	exotic	common	-					++	++		+		+		
Melastoma malabathricum L.	shrub	native	common	-	++	++	++++									
Melastoma sanguineum	shrub	native	common	-	++	++	+++									
Melia azedarach	tree	exotic	common	-	++	++						+	++		+	
Melinis repens	perennial herb	exotic	very common	-			++	++					+++			
Microstegium ciliatum	perennial procumbent	native	very common; common (2)	-	+++	++	++	+++	+	+++	+++		++	++		
Mikania micrantha	climbing herb	exotic	very common	-	+	+		++		+++	+++		++	+	+	
Millettia nitida	climbing shrub	native	very common	-	++											
Miscanthus floridulus	perennial herb	native	common	-	++	++	++++	+++		+			++	+	+	
Miscanthus sinensis	perennial herb	native	very common	-	++	++	+++	+++		+			++	+	+	
Monstera deliciosa	climbing shrub	exotic	-	-								+	+			
Morus alba	tree or shrub	native	common	-		+						+				
Murraya paniculata	small tree	exotic	common	-	+							+	++			
Musa x paradisiaca	perennial herb	exotic	common	-	++				++	++		++	++	+		
Nelumbo nucifera	aquatic herb	exotic	-	-												++
Neyraudia reynaudiana	perennial herb	native	very common; common (2)	-	+	+	++			++			++			
Palhinhaea cernua	creeping herb	native	very common	-			++									
Panicum maximum	perennial herb	exotic	very common	-	++	++	++	++++	++	++++	+	++	+++	++	++	+
Panicum repens	perennial herb	native	very common (2)	-				++++	++				+++			
Parthenocissus dalzielii	woody vine	exotic	rare	-								+	++			
Paspalum conjugatum	perennial herb	native	common	-	+	+		+++	++	++++		++	+++	++	++	

Appendix 3 - Flora Species Recorded within the Study Area during the Current Surveys from November to December 2015

Scientific Name	Growth Form	Native / Exotic in Hong Kong	Distribution in Hong Kong (1)	Protection Status	Woodland	Plantation	Shrubland	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Marsh	Village/ Orchard	Developed Area/ Wasteland	Natural Watercourse	Modified Watercourse	Pond
Paspalum scrobiculatum var. orbiculare	perennial herb	native	common (2)	-						+	+					
Peltophorum pterocarpum	exotic	-	-	-									++			
Phragmites vallatorius	perennial herb	native	very common; common (2)	-										+	+	
Phyllanthus cochinchinensis	shrub	native	very common	-	++		++									
Phyllanthus emblica	tree or shrub	native	very common	-	+		+++									
Pinus elliottii	tree	exotic	common	-	++		++									
Pinus massoniana	tree	native	common	-	++		++						+			
Platycladus orientalis	tree	exotic	-	-								+	+			
Plumeria rubra	tree	exotic	-	-								+				
Polygonum chinense	herb	native	very common	-	+	+	++	++	++	++	+		+	+	+	
Polygonum spp.	herb	-	-	-							++			+		
Psidium guajava	tree	exotic	common	-	+	+			++			++			+	
Psychotria asiatica (Psychotria rubra)	tree or shrub	native	very common	-	++++	+++	++						++			
Pteris multifida	herb	native	very common	-	++	++										
Pteris semipinnata	herb	native	very common	-	++	+										
Pueraria lobata var. thomsonii	climber: vine	exotic	common	-						+					+	
Pueraria phaseoloides	climber: vine	native	very common	-	++	++	++	+++	++	++	++	++	++	++	+	
Punica granatum	shrub or small tree	exotic	cultivated	-					+			+				
Pyrostegia venusta	climber: vine	exotic	common	-									++			
Pyrrosia adnascens	herb	native	common	-	++											
Rhaphiolepis indica	shrub or small tree	native	very common	-				+								
Rhodomyrtus tomentosa	shrub	native	very common	-	++	++	++++									
Rhus chinensis	shrub or small tree	native	common	-	++		+									
Rhus hypoleuca	shrub or small tree	native	common	-	++	++	++						+			
Rhus succedanea	shrub or small tree	native	common	-	+++	++	++			++	+		++	+		
Rosa laevigata	climbing shrub	native	common	-	+											

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Scientific Name	Growth Form	Native / Exotic in Hong Kong	Distribution in Hong Kong (1)	Protection Status	Woodland	Plantation	Shrubland	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Marsh	Village/ Orchard	Developed Area/ Wasteland	Natural Watercourse	Modified Watercourse	Pond
Rotala rotundifolia	herb	native	common (2)	-										+		
Roystonea regia	tree palm	exotic	-	-									++			
Rubus leucanthus	climbing shrub	native	common	-	++		++									
Rubus reflexus	climbing shrub	native	very common	-	++	+	++	+		++	+					
Saccharum officinarum	perennial herb	exotic	cultivated	-					+							
Salix babylonica	tree	exotic	common	-					+							
Sansevieria trifasciata	perennial herb	exotic	-	-								+	+			
Sapium discolor	small tree	native	very common	-	++	+	++	+		+			+	+		
Sapium sebiferum	tree	native	common	-	++		+					+	++			
Sarcandra glabra	subshrub	native	very common	-	++	+	+									
Saurauia tristyla	small tree	native	common	-	+											
Schefflera heptaphylla	tree	native	very common	-	++++	++				+		+	++	+		
Schima superba	tree	native	common	-	++	++	++									
Senecio scandens	herbaceous climber	native	common	-	++											
Senna siamea	tree	exotic	-	-									++			
Sesbania cannabina	subshrub	exotic	common	-	+	+				++		+		++		
Setaria pumila	herb	native	very common	-				++					+			
Setaria sp.	herb	-	-	-	++	++	++	+	++	++			++			
Smilax china	climbing shrub	native	very common	-	++	++										
Smilax corbularia	climbing shrub	native	common	-	++	++						+				
Smilax glabra	climbing shrub	native	very common	-	++							+				
Solanum mammosum	erect herb	exotic	-	-					+							
Solanum melongena	herb or subshrub	exotic	cultivated	-					+							
Solanum torvum	shrub	exotic	common	-	+	+			+	++		+	+	+		
Spathodea campanulata	tree	exotic	-	-									++			
Stephania longa	climber: vine	native	common	-	++	++						+				

Appendix 3 - Flora Species Recorded within the Study Area during the Current Surveys from November to December 2015

Scientific Name	Growth Form	Native / Exotic in Hong Kong	Distribution in Hong Kong (1)	Protection Status	Woodland	Plantation	Shrubland	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Marsh	Village/ Orchard	Developed Area/ Wasteland	Natural Watercourse	Modified Watercourse	Pond
Strophanthus divaricatus	woody vine	native	common	-	+++		+++									
Syzygium jambos	tree	exotic	common	-	+++	++			++			++	++			
Syzygium levinei	tree	native	common	-	++											
Tabernaemontana divaricata	shrub	exotic	-	-	++	++				+		+	++			
Tetracera asiatica	Woody Vine	native	very common	-	+++	++	+		+							
Tetradium glabrifolium	tree	native	common	-	+											
Trema tomentosa	shrub or small tree	native	common	-	++	+							+	+		
Uvaria macrophylla	woody climbing	native	common	-	++							+		+		
Wedelia trilobata	perennial herb	exotic	common; also widely cultivated	-	++	++	++	++	+		+++	++	++++			
Zanthoxylum avicennae	tree	native	common	-	+++	+++	++		+	+		++	++			
Zanthoxylum nitidum	climbing shrub	native	very common	-	+		+									
Zea mays	herb	exotic	-	-					+							
Beta vulgaris	herb	exotic	cultivated	-					++							
Helianthus annuus	herb	exotic	-	-					+							
Hydrocotyle verticillata	herb	exotic	-	-										++		++
Lactuca indica	herb	exotic	cultivated	-					++							
Terminalia mantaly	tree	exotic	-	-								+	++			
Bambusa textilis McClure	clumped tree	exotic	-	-	++											
Bambusa sp.	clumped tree	-	-	-	++								+			
Citrus mitis	small tree or shrub	-	-	-								+				
Alstonia scholaris (L.) R. Br.	tree	exotic	-	-									++			
Garcinia subelliptica	tree	exotic	-	-									+			
Abelmoschus esculentus (L.) Moench	-	exotic	cultivated	-					++							
Lasianthus attenuatus	shrub	native	restricted	-	++											
Artemisia indica Willd.	herb	native	-	-	+							+				

Appendix 3 - Flora Species Recorded within the Study Area during the Current Surveys from November to December 2015

Scientific Name	Growth Form	Native / Exotic in Hong Kong	Distribution in Hong Kong (1)	Protection Status	Woodland	Plantation	Shrubland	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Marsh	Village/ Orchard	Developed Area/ Wasteland	Natural Watercourse	Modified Watercourse	Pond
Tectona grandis	tree	exotic	-	-								+				

Notes:

(1) Corlett, R., Xing, F., Ng, S. C., Chau, L., Wong, L. (2000). *Hong Kong Vascular Plants: Distribution and Status* . Memoirs of the Hong Kong Natural History Society. 23:1-3.

(2) Yip, Y., Yip, K. L., Liu, K. U., Ngar Y. N., Lai, C. C. (2010). A Floristic Survey of Marshes in Hong Kong. Hong Kong Biodiversity. Issue No. 19.

(3) This species is listed under Forests and Countryside Ordinance Cap. 96. However, as it is artificially introduced to the habitat, it is not considered as species of conservation importance.

Species of conservation importance is in bold type face.

Species of conservation importance with species name hatched in yellow represents its record within the Study Area outside of the Subject Sites.

Code for Abundance: ++++=abundant; +++=frequent; ++=occasional; +=scarce

Appendix 4 - Avifauna Species Recorded within the Study Area during the Current Surveys from November to December 2015

Common Name [1]	Chinese Name	Scientific Name	Distribution in Hong Kong [2]	Principal Status [3]	Level of Concern [4]	Woodland	Plantation	Shrubland	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Marsh	Village/ Orchard	Developed Area/ Wasteland	Modified Watercourse	Natural Watercourse	Pond
Chinese Pond Heron[9]	**池鷺**	*Ardeola bacchus*	Common	P	PRC (RC)					+					++		
Grey Heron[9]	**蒼鷺**	*Ardea cinerea*	Common	W	PRC										+		
Little Egret[9]	**小白鷺**	*Egretta garzetta*	Common	P	PRC (RC)					+					+		
White-breasted Waterhen[9]	白胸苦惡鳥	*Amaurornis phoenicurus*	Common	R	-					+							
Green Sandpiper[9]	白腰草鷸	*Tringa ochropus*	Uncommon	W	-										+		
Wood Sandpiper[9]	**林鷸**	*Tringa glareola*	Common	M,W	LC										+		
Domestic Pigeon	原鴿	*Columba livia*	Common	R	-									+			
Spotted Dove	珠頸斑鳩	*Streptopelia chinensis*	Abundant	R	-		+			+			+	+	++		
Asian Koel	噪鵑	*Eudynamys scolopacea*	Common	Su,R	-		+						+				
House Swift	小白腰雨燕	*Apus nipalensis*	Common	R,SpM	-					+							
White-throated Kingfisher[9]	白胸翡翠	*Halcyon smyrnensis*	Common	AM,P	(LC)		+										
Long-tailed Shrike	棕背伯勞	*Lanius schach*	Common	R	-					+	+						
Black Drongo	黑卷尾	*Dicrurus macrocercus*	Common	M,Su	-		+			+	+		+				
Eurasian Magpie	喜鵲	*Pica pica*	Common	R	-								+				
Large-billed Crow	大嘴烏鴉	*Corvus macrorhynchos*	Common	R	-	+											
Cinereous Tit	蒼背山雀	*Parus cinereus*	Common	R	-	+							+	+	+		
Red-whiskered Bulbul	紅耳鵯	*Pycnonotus jocosus*	Abundant	R	-			+	+	+++++		+	+	+			
Chinese Bulbul	白頭鵯	*Pycnonotus sinensis*	Abundant	R	-					+			+++	+			
Dusky Warbler	褐柳鶯	*Phylloscopus fuscatus*	Common	W	-		+			+			+	+			
Pallas's Leaf Warbler	黃腰柳鶯	*Phylloscopus proregulus*	Common	W	-								+				
Yellow-browed Warbler	黃眉柳鶯	*Phylloscopus inornatus*	Common	W	-		+			+			+	+			
Yellow-bellied Prinia	黃腹鷦鶯	*Prinia flaviventris*	Common	R	-				+	+	+	+	+	+			
Plain Prinia	純色鷦鶯	*Prinia inornata*	Common	R	-					+							
Common Tailorbird	長尾縫葉鶯	*Orthotomus sutorius*	Common	R	-					+		+	+	+			
Masked Laughingthrush	黑臉噪鸝	*Garrulax perspicillatus*	Abundant	R	-	+			+	++			+		+		
Japanese White-eye	暗綠繡眼鳥	*Zosterops japonicus*	Abundant	R,?W	-	+	++++	+		+++			+	+			
Crested Myna	八哥	*Sitta frontalis*	Common	R	-		++++					+	+		+		
Common Myna	家八哥	*Acridotheres tristis*	Uncommon	R	-										+		
Black-collared Starling	黑領椋鳥	*Gracupica nigricollis*	Common	R	-	++	++++			5			+		+		
White-shouldered Starling	灰背椋鳥	*Sturnia sinensis*	Common	M,W,Su	(LC)		+										
Common Blackbird	烏鶇	*Turdus merula*	Common	W,M	-		+										
Oriental Magpie Robin	鵲鴝	*Copsychus saularis*	Abundant	R	-		+						+	+	+		
Daurian Redstart	北紅尾鴝	*Phoenicurus auroreus*	Common	W	-										+		
Stejneger's Stonechat	黑喉石(即鳥)	*Saxicola stejnegeri*	Common	W,M	-					+							
Asian Brown Flycatcher	北灰鶲	*Muscicapa latirostris*	Common	M,W	-												+
Scarlet-backed Flowerpecker	朱背啄花鳥	*Dicaeum cruentatum*	Common	R	-								+				
Fork-tailed Sunbird	叉尾太陽鳥	*Aethopyga christinae*	Common	R	-		+	+				+		+			
Scaly-breasted Munia	斑文鳥	*Lonchura punctulata*	Common	R	-				+	+	+	+					
Eastern Yellow Wagtail	東黃鶺鴒	*Motacilla tschutschensis*	Common	M,W	-					+				+	+		
Grey Wagtail	灰鶺鴒	*Motacilla cinerea*	Common	W	-										+		
White Wagtail	白鶺鴒	*Motacilla alba*	Common	W,R	-					++			+		+++		
Richard's Pipit	理氏鵐	*Anthus richardi*	Common	W,R	-					+							
Olive-backed Pipit	樹鷚	*Anthus hodgsoni*	Common	W	-					+							
				No. of species recorded		**5**	**13**	**3**	**4**	**23**	**4**	**6**	**19**	**13**	**15**	**0**	**1**

Note:
(1) All wild birds are Protected under Wild Animals Protection Ordinance (Cap. 170)
(2) AFCD (2015). Hong Kong Biodiversity Database
(3) Carey *et al.* (2001): R=resident; W=winter visitor; Su=summer visitor; M=migrant; Sp=spring; A=autumn; P=present all year, exact composition unknown
(4) Fellowes *et al.* (2002): GC=Global Concern; LC=Local Concern; RC=Regional Concern; PRC=Potential Regional Concern; PGC: Potential Global Concern
Letters in parentheses indicate that the assessment is on the basis of restrictedness in nesting and/or roosting sites rather than in general occurrence
(5) List of Wild Animals Under State Protection (promulgated by State Forestry Administration and Ministry of Agriculture on 14 January, 1989). [國家重點保護野生動物名錄(1989年1月14日林業局及農業部發佈施行)]
(6) Zheng, G. M. and Wang, Q. S. (1998)
(7) IUCN (2015). IUCN Red List of Threatened Species. Version 2015.1
(8) Protected under Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586)
(9) Wetland-dependent species (including wetland-dependent species and waterbirds)
Species of conservation importance is in bold type face.
Species of conservation importance with species name hatched in yellow represents its record within the Study Area outside of the Subject Sites.
Code of Abundance: +=Rare; ++=Occasional; +++=Common; +++++=Abundant; ++++++=Dominant

Appendix 5 - Butterfly Species Recorded within the Study Area during the Current Surveys from November to December 2015

Common Name	Chinese Name	Scientific Name	Distribution in Hong Kong [1]	Woodland	Plantation	Shrubland	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Marsh	Village/ Orchard	Developed Area/ Wasteland	Natural Watercourse	Modified Watercourse	Pond
Tailed Jay	統帥青鳳蝶	*Graphium agamemnon agamemnon*	Common								+				
Red Helen	玉斑鳳蝶	*Papilio helenus helenus*	Very common	+	+						+		+		
Common Mormon	玉帶鳳蝶	*Papilio polytes polytes*	Very common							+		+	+		
Great Mormon	美鳳蝶	*Papilio memnon agenor*	Very common									+		+	
Spangle	藍鳳蝶	*Papilio protenor protenor*	Very common		+		+	+			+				
Paris Peacock	巴黎翠鳳蝶	*Papilio paris paris*	Very common								+				
Indian Cabbage White	東方菜粉蝶	*Pieris canidia canidia*	Very common		++		+	++		+	+	+++		+	
Great Orange Tip	鶴頂粉蝶	*Hebomoia glaucippe glaucippe*	Common								+	+			
Common Grass Yellow	寬邊黃粉蝶	*Eurema hecabe hecabe*	Very common		+				+	+		+			
Purple Sapphire	斜斑彩灰蝶	*Heliophorus epicles phoenicoparyphus*	Common										+		
Pale Grass Blue	酢漿灰碟	*Pseudozizeeria maha serica*	Very common								+				
Quaker	一點灰蝶	*Neopithecops zalmora zalmora*	Uncommon				+								
Common Hedge Blue	鈕灰蝶	*Acytolepis puspa gisca*	Common								+		+		
Plum Judy	蛇目褐蜆蝶	*Abisara echerius echerius*	Very common	+											
Common Five-ring	矍眼蝶	*Ypthima baldus baldus*	Very common	+									+		
Angled Castor	波蛺蝶	*Ariadne ariadne alterna*	Common								+				
Blue Admiral	琉璃蛺蝶	*Kaniska canace canace*	Common					+							
Common Jester	散紋盛蛺蝶	*Symbrenthia lilaea lunica*	Common								+				
Common Sailer	中環蛺蝶	*Neptis hylas hylas*	Very common	+							+				
Common Mapwing	網絲蛺蝶	*Cyrestis thyodamas chinensis*	Common										+		
Red Ring Skirt	黑脈蛺蝶	*Hestina assimilis assimilis*	Common					+							
Glassy Tiger	絹斑蝶	*Parantica aglea melanoides*	Common										+		
Common Tiger	虎斑蝶	*Danaus genutia genutia*	Common		+						+				
Blue-spotted Crow	藍點紫斑蝶	*Euploea midamus midamus*	Very common							+					
Common Indian Crow	幻紫斑蝶	*Euploea core amymone*	Common	+	+						+				
			No. of species recorded	**5**	**6**	**0**	**3**	**4**	**1**	**4**	**13**	**5**	**7**	**2**	**0**

Notes:
(1) AFCD (2015). Hong Kong Biodiversity Database.
Status of butterfly species was not assessed in IUCN Red List as of Aug 2014.
Code of Abundance: +=Rare; ++=Occasional; +++=Common; ++++=Abundant; +++++=Dominant

Appendix 6 - Odonate Species Recorded within the Study Area during the Current Surveys from November to December 2015

Common Name	Chinese Name	Scientific Name	Distribution in Hong Kong[(1)]	Woodland	Plantation	Shrubland	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Marsh	Village/ Orchard	Developed Area/ Wasteland	Natural Watercourse	Modified Watercourse	Pond
Common Bluetail	褐斑異痣蟌	*Ischnura senegalensis*	Abundant					+							
Blue Percher	紋藍小蜻	*Diplacodes trivialis*	Abundant								+				
Marsh Skimmer	呂宋灰蜻	*Orthetrum luzonicum*	Abundant											+	
Common Red Skimmer	赤褐灰蜻	*Orthetrum pruinosum neglectum*	Abundant					+						++++	
Wandering Glider	黃蜻	*Pantala flavescens*	Abundant				++				+				
Pied Skimmer	玉帶蜻	*Pseudothemis zonata*	Common											+	
Crimson Dropwing	曉褐蜻	*Trithemis aurora*	Abundant								+		+		
		No. of species recorded		**0**	**0**	**0**	**1**	**2**	**0**	**0**	**3**	**0**	**1**	**3**	**0**

Notes:
(1) AFCD (2015). Hong Kong Biodiversity Database.
Code of Abundance: +=Rare; ++=Occasional; +++=Common; ++++=Abundant; +++++=Dominant

Appendix 7 - Herpetofauna Species Recorded within the Study Area during the Current Surveys from November to December 2015

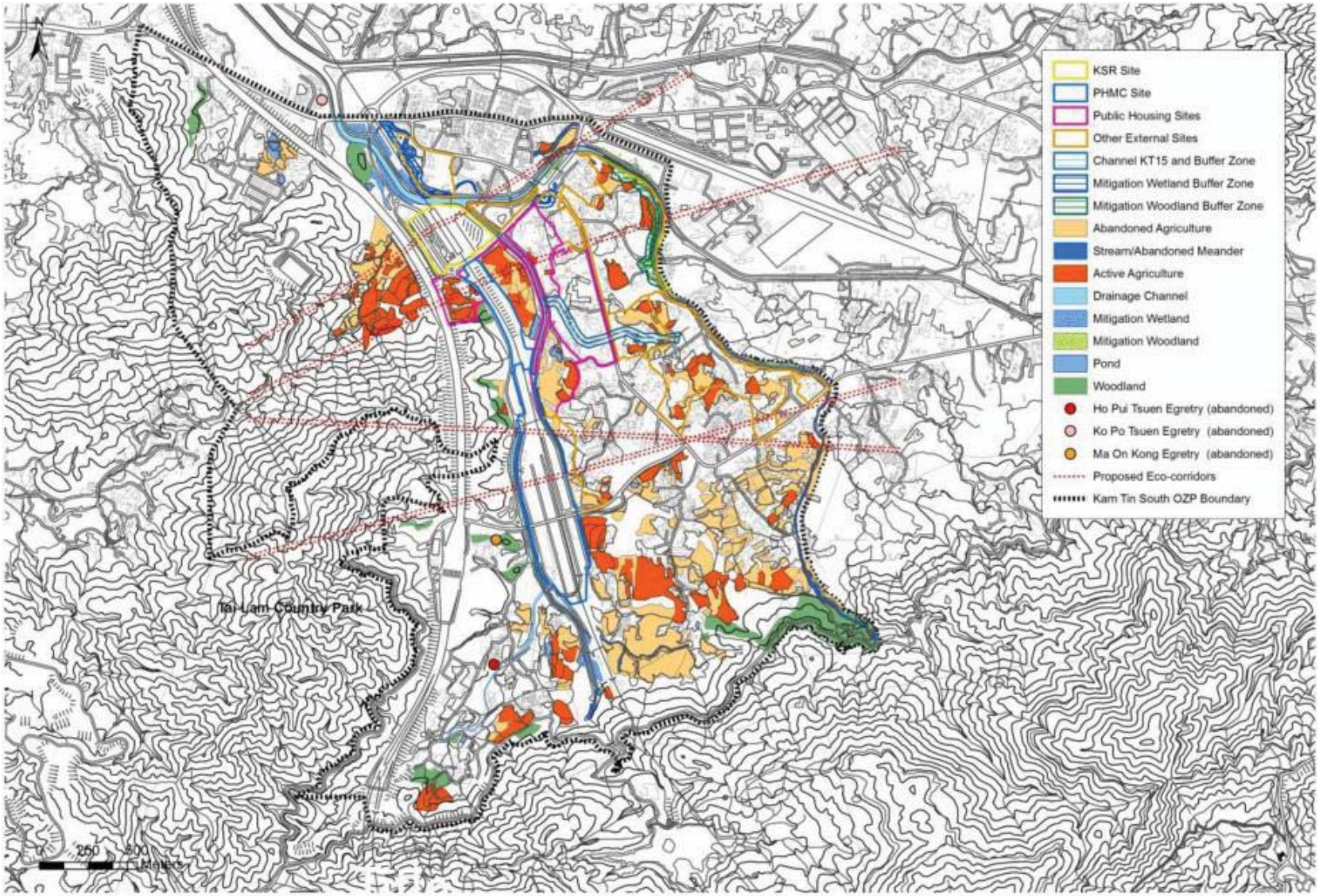
Common Name	Chinese Name	Scientific Name	Distribution in Hong Kong [(1)]	Woodland	Plantation	Shrubland	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Marsh	Village/ Orchard	Developed Area/ Wasteland	Natural Watercourse	Modified Watercourse	Pond
Amphibian															
Asian Common Toad	黑眶蟾蜍	*Bufo melanostictus*	Widely distributed		+						+				
Asiatic Painted Frog	花狹口蛙	*Kaloula pulchra*	Widely distributed		+										
Bulter's Pygmy Frog	粗皮姬蛙	*Microhyla butleri*	Widely distributed				+								
Ornate Pigmy Frog	飾紋姬蛙	*Microhyla ornata*	Widely distributed								+				
Paddy frog	澤蛙	*Fejervarya limnocharis*	Widely distributed		+						++				
Gunther's Frog	沼蛙	*Rana guentheri*	Widely distributed								+				
Reptile															
Chinese Gecko	壁虎	*Gekko chinensis*	Very common and widely distributed								+				
Bowring's Gecko	原尾蜥虎	*Hemidactylus bowringii*	Distributed throughout Hong Kong								+				
Changeable Lizard	變色樹蜥	*Calotes versicolor*	Widely distributed								+				
Long-tailed Skink	長尾南蜥	*Mabuya longicaudata*	Widely distributed								+				
Brown Forest Skink	股銅蜓蜥	*Sphenomorphus incognitus*	Distributed in streams in central and eastern New Territories							+					
			No. of species recorded	**0**	**3**	**0**	**1**	**0**	**0**	**1**	**8**	**0**	**0**	**0**	**0**

Notes:
(1) AFCD (2015). Hong Kong Biodiversity Database.
Code of Abundance: +=Rare; ++=Occasional; +++=Common; ++++=Abundant; ++++++=Dominant

Appendix 8 - Mammal Species Recorded within the Study Area during the Current Surveys from November to December 2015

Common Name	中文名稱	Scientific Name	Distribution in Hong Kong[2]	Woodland	Plantation	Shrubland	Grassland	Active Agricultural Land	Abandoned Agricultural Land	Marsh	Village/ Orchard	Developed Area/ Wasteland	Natural Watercourse	Modified Watercourse	Pond
Japanese Pipistrelle[1]	東亞家蝠	*Pipistrellus abramus*	Very Common	+							+			+	
Pallas's Squirrel[1]	赤腹松鼠	*Callosciurus erythraeus*	Fairly widely distributed								+				
			No. of species recorded	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**1**	**0**

Notes:
(1) Protected under Wild Animals Protection Ordinance (Cap. 170).
(2) AFCD (2015). Hong Kong Biodiversity Database.
Species of conservation importance is in bold type face.
Species of conservation importance with species name hatched in yellow represents its record within the Study Area outside of the Subject Sites.
Code of Abundance: +=Rare; ++=Occasional; +++=Common; ++++=Abundant; +++++=Dominant



Appendix 9 Plan 4.3 of "Land Use Review for Kam Tin South and Pat Heung" Main Report dated March 2014

PROPOSED AMENDMENTS TO THE APPROVED KAM TIN SOUTH OUTLINE ZONING PLAN NO. S/YL-KTS/13

Sites 1, 4a and 6 for Public Housing Development and Government, Institution or Community Facilities

Sewerage Impact Assessment Report

AECOM ASIA COMPANY LIMITED

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Appendices

Appendix A	Kam Tin South Housing Development – Layout Plan
Appendix B	Sewage Flow Estimation
Appendix C	Calculations of Sewage Pipe Performance

1 INTRODUCTION

1.1 Objective of the Report

1.1.1 This report outlines the assessment results of the potential short-term and long-term impacts on sewerage system caused by the proposed development in the Initial Sites (refer to **Appendix A** for layout plan). This report contains the following essential contents:-

- a general description of the proposed sewerage works and discussion of how the Proposed Development affects the existing and proposed sewerage facilities;
- assessment of the current and planned capacities of the sewerage networks/system (e.g. sewage pipe networks, pumping station);
- assessment of the impacts of the Development on the existing and planned sewerage system;
- formulation of a feasible and cost-effective sewerage proposal (e.g. provision of new pipe installation and/or improvement to existing sewerage system); and
- recommendations in details with plans and schemes together with calculations and works specifications on the proposed sewage scheme, mitigation and protection measures for those affected facilities, diversion, re-provisioning works and/or modification of them for further development for incorporation in the detailed design.

1.2 Definitions

1.2.1 In this report, the following terms are defined below:-

- “The KaTS Development” refers to the development in the Initial Sites plus the potential developments in MTRCL Sites, as shown on **Figure 60336159/SIA/01**;
- “The Initial Sites” comprises Sites 1, 4a and 6, and nearby GIC sites;
- “MTRCL Sites” comprises Sites at Kam Sheung Road Station (KSRS) and Pat Heung Maintenance Centre (PHMC).

2 EXISTING SEWERAGE CONDITION

2.1.1 After a review of existing DSD record plans in Kam Tin area, it is revealed that there are no public sewerage networks along Tung Wui Road and Kam Ho Road for the collection of sewage from the Initial Sites. (**Figure 60336159/SIA/02** refers).

2.1.2 There is an existing Kam Tin Sewage Pumping Station (KTSPS) located in vicinity of Kam Tin Road/Kam Tin Bypass Interchange which is about 1.1 km away from the Initial Sites. KTSPS is currently pumping the sewage by 3.3 km northward to Nam Sang Wai Sewage Pumping Station; and ultimately being conveyed by 2.2 km westwards to Yuen Long Sewage Treatment Works (YLSTW).

2.1.3 KTSPS has a design capacity of 16,221 m^3/day. Based on information provided from DSD in 1st quarter of 2017, KTSPS has an average daily flow of ~925m^3/day.

3 DEVELOPMENT PROPOSAL OF THE DEVELOPMENT SITE

3.1 Proposed Development Site at Initial Sites

3.1.1 The Initial Sites under this Project comprises of three subject sites, namely Site 1, Site 4a and Site 6 as shown on the location plan of the Site (**Figure 60336159/SIA/01** refers). Based on the information in the Land Use Review for Kam Tin South and Pat Heung (LUR) Report and recent update from Housing Department (HD), the Initial Sites comprise of Public Housing Developments Sites, Areas for Sport Centre, Clinic, other GIC facilities and two Primary School Sites. Development details adopted in this assessment are summarized in **Table 3.1** to **3.3** below.

3.1.2 Additional 10% increase of the population and flat estimates as at December 2014 for Sites 1, 4a and 6 have been incorporated for future design flexibility purposes. Since the detail planning of the public housing sites has not yet commenced, the site area/ boundary of the public housing sites in this technical studies are preliminary estimates only and will be further reviewed, subject to fine-tuning in later stage, land resumption and further discussion with relevant government department.

3.1.3 Site 1 is located the southeast of existing KSRS and will be scheduled mainly for public housing development and G/IC facilities. Details of the development parameters for Site 1 are appended in **Table 3.1** below.

3.1.4 **Table 3.1: Development Parameters for Site 1**

Site 1 – Public Housing Development Site and G/IC, School Site	
Public Housing (Public Rental Housing (PRH) and Subsidized Sale Flats (SSF))	
No. of Flats	4100 for PRH/SSF
Estimated Population	12,628 for PRH/SSF
Other Supporting/Ancillary Facilities	
Kindergarten (Inside Housing Site)	1 no. of 6-Classroom
Primary School (Outside Housing Site)	1 no. of 30-Classroom
	Total 1039 Students + Staff (including 945 students, and 94 teachers and staff)
Retail (7,000 m^2 GFA)	240 Employee
GIC Complex (Sports Centre, Clinic and other supporting G/IC facilities) (Outside Housing Site)	1000 Users and 100 Staff
	Total 1340 Users + Employee (including 1000 users and 340 employee)

Notes:

1) *The retail areas within the public housing sites are preliminary estimates only and subject to further update in later design stage.*
2) *Flats and population of public housing developments have included extra 10% buffer of then estimates as at Dec 2014 for SIA assessment.*

3.1.5 Site 4a is located at the east of the existing KSRS and tentatively planned for public housing development only. A section of 400m-long existing Kam Po Road within Site 4a will be widened to suit the development. Details of the development parameters for Site 4a are appended in **Table 3.2** below.

3.1.6 **Table 3.2: Development Parameters for Site 4a**

Site 4a – Public Housing Development Site	
Public Housing (Public Rental Housing (PRH) and Subsidized Sale Flats (SSF))	
No. of Flats	3,800 for PRH/SSF
Estimated Population	11,704 for PRH/SSF
Other Supporting/Ancillary Facilities	
Kindergarten (Inside Housing Site)	1 no. of 6-Classroom
	Total 210 Students + Staff (including 180 students, and 30 teachers and staff)
Retail (1,100 m^2 GFA)	27 Employee
	Total 27 Employee

Notes:

1) *The retail areas within the public housing sites are preliminary estimates only and subject to further update in later design stage.*
2) *Flats and population of public housing developments have included extra 10% buffer of then estimates as at Dec 2014 for SIA assessment.*

3.1.7 Site 6 is located at the south of existing KSRS and in adjacent to Tsing Long Highway. It is tentatively planned for public housing development and G/IC facilities. Details of the development parameters for Site 6 are appended in **Table 3.3** below.

Table 3.3: Development Parameters for Site 6

Site 6 – Public Housing Development Site and School Site	
Public Housing (Public Rental Housing (PRH) and Subsidized Sale Flats (SSF))	
No. of Flats	1,700 for PRH/SSF
Estimated Population	5,236 for PRH/SSF
Other Supporting/Ancillary Facilities	
Kindergarten (Inside Housing Site)	1 no. of 6-Classroom
Primary School (Outside Housing Site)	1 no. of 30-Classroom
	Total 1039 Students + Staff (including 945 students, and 94 teachers and staff)

Notes:

1) *The retail areas within the public housing sites are preliminary estimates only and subject to further update in later design stage.*
2) *Flats and population of public housing developments have included extra 10% buffer of then estimates as at Dec 2014 for SIA assessment.*

3.1.8 With further request from MTRCL, the new sewerage system shall also collect an additional 100m^3/day discharge from the existing Kam Sheung Road Station. This sewage flow is also included in the assessment.

4 ASSESSMENT METHODOLOGY

4.1 Overview of Methodology

4.1.1 The methodology of the technical assessment is highlighted as follows:

- Collect existing and planned sewerage networks in the area;
- Determine the sewage flow generated from the proposed Initial Sites;
- Assess the impact on the existing system; and
- Recommend improvement/upgrading works where necessary.

4.2 Population to be Adopted for Assessment

4.2.1 HD's estimated population for Initial Sites as mentioned in **Section 3.1** is used to estimate the sewage generation.

4.2.2 The following assumptions were made to the kindergartens, primary schools, community and social welfare facilities under this development:-

- For the population prediction for kindergarten/primary school, the numbers of schools of each site are referring to the data given by HD;
- For the retail facilities, the number of employee are predicted by referring the average IFA/Employee ratio (derived from Section 2.1 of HKP&G) and GFA data given by HD ; and
- For sport complex located in Site 1, since no information on the no. of visitors and staff is available in such early planning stage, it is generally assumed that there would be daily 1000 people visiting the sport complex, and 100 staff (i.e. 10% of the visitors) would be employed to run the complex.

4.3 Unit Flow Estimation

4.3.1 EPD's Technical Paper – Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) was referenced to estimate the sewage generation from KaTS Development. Unit demand factors as presented in **Table 4.1** below are adopted in this assessment.

Table 4.1: Unit Flow Factors for the Proposed Development

Population or Employment Type	Unit	ADWF (l/h/d)
Domestic		
Public Rental Housing	Person	190
Private R1, plot ratio 5-10	Person	190
Private R2, plot ratio 5.0 max	Person	270
Commercial (Extra over on Specific Trades included)		
Service Trade – Wholesale & Retail (J4)	Employee	280
Service Trade – Restaurant & Hotels (J10)	Employee	1580
Service Trade – Community, Social & Personal Services (GIC) (J11)	Employee	280
School Student	Person	40
Teachers and School Staff	Employee	280

4.4 Catchment Inflow Factors & Peaking Factor

4.4.1 Referring to Chapter 10 of GESF, no Catchment Inflow Factor shall be adjusted (i.e. PCIF = 1.0) for this assessment, as the proposed development is a newly developing area which should be free from misconnections and pipe defects.

4.4.2 In accordance with Chapter 11 and Table T-5 of GESF, as the proposed sewerage system is newly laid, the following peaking factors (P) for new sewer networks (excluding stormawater allowance) are adopted in this assessment:-

$Q_{PEAK} = Q_{AVERAGE} \times P$

Sewers : P = 3

4.5 Peak Flow Velocity

4.5.1 In accordance with section 5.1.2 of the DSD's Sewerage Manual Part 1 (DSDSM1), a minimum self-cleansing velocity of 1 m/s under peak flow condition is desirable to avoid water stagnant.

4.5.2 In addition to section 5.1.3 of DSDSM1 suggested, the maximum flow velocity under peak flow for both gravity sewers and pumping mains should be less than 3 m/s.

4.5.3 In light of the above, the design flow velocity of gravity sewer shall be bounded between 1m/s to 3 m/s under peak flow condition.

4.6 Deep Sewer

4.6.1 For gravity sewers with diameters not less than 675mm and invert levels exceeding 6m below ground level, particular care and liaison with DSD on maintenance requirements is required (DSD Practice Note No. 1/2011 refers).

5.3 Proposed Sewer Alignment/Arrangement

5.3.1 The details of the proposed sewer alignment shall refer to **Figure No. 60336159/SIA/03**.

5.3.2 For the Initial Sites, two connection points from each subject site is assumed for sewerage impact assessment and sizing of proposed public main branch sewer purpose only. The exact location and number of connection points shall be further agreed and coordinated with HD in detailed design submission. Separate connection points for schools and other G/IC facilities will also be provided.

5.3.3 A DN750 trunk sewer will be laid along Tung Wui Road to collect flow from Sites 1,4a, and KSRS, and it will then increase to DN800 after collecting flow from Site 6.

5.3.4 This series of DN750/DN800 sewer would then run north-westwards along the proposed widened Kam Ho Road and convey the sewage to KTSPS.

5.3.5 DN350/ DN450/ DN350 branch sewers will be provided along Kam Po Road, Kam Ho Road and planned access road to Site 1 to convey sewage flow from the Initial Sites to the trunk sewer along Tung Wui Road.

5.4 Interface with Existing Structures

5.4.1 Sewer Pipe Crossing Kam Tin South Channel at Tung Wui Road

5.4.1.1 According to the conceptual sewer alignment in the LUR report, the proposed sewer (passing through a section of Kam Tin South Channel) with invert level at +2.75mPD is found infeasible to construct as it will affect the drainage area of Kam Tin South Channel (i.e. invert level at +1.33mPD) (refer **Figure 60336159/SIA/10**). The proposed section of sewer pipe in the LUR will inevitably cause adverse impact to the Kam Tin South Channel in terms of hydraulic performance and maintenance point of view.

5.4.2 Recommended Option

5.4.2.1 Several options on the sewerage system were reviewed, such as deep gravity sewers, introducing Sewerage Pumping Station at Initial Site 1, Sewerage Pumping Station at Initial Site 4a and Conveying the Sewerage to the future Pumping Station near Ng Ka Tsuen. Deep gravity sewer is recommended as this requires the minimal land for sewerage works, and eliminate the sewage pumping station which will trigger the EIAO and hence induce a very negative impact on the implementation programme and target population intake date. This option also avoids the potential environmental nuisance caused by SPS which will likely be located close to residential blocks.

5.4.2.2 Although the O&M of deep sewer is much complicated as compared to normal sewer. There are other examples of deep sewers currently in operation or under construction in Hong Kong which are maintained by DSD. AECOM will coordinate closely with DSD during the detailed design stage to enable easier maintenance of the proposed deep sewers such as twin-duty pipe system for crossing existing structures to facilitate future operation and maintenance is one of the measures.

5.5 Sewer Pipe Crossing the West Rail Vehicular Underpass (Structure Ref. NU36) at Tung Wui Road

5.5.1 After reviewing the as-constructed records of the underpass structure, the bottom level of this underpass is approximately +5.0mPD. Based on the option involving deep gravity sewers (i.e. the Recommended Option), the tentative invert level of the proposed sewer is about -0.7mPD. Twin-duty pipe system is proposed to cross this existing structure and to provide sufficient capacity to cater the sewage flow.

5.5.2 The proposed twin-DN525 sewer will run across the West Rail Vehicular Underpass at Tung

Wui Road (Highways Structure Reference NU36); then this twin-sewer will run along Kam Ho Road and eventually towards KTSPS.

5.5.3 This twin-sewer will be constructed by trenchless method, and approximately 4m clearance between the underpass structure and crown level of pipe will be maintained to avoid damaging the underpass structures.

5.6 Sewer Pipe Crossing the Existing DSD's Drainage 4-cell Box Culvert at Kam Ho Road

5.6.1 For the DN800 sewer pipe along Kam Ho Road, its alignment shall be come across with the existing 4-cell drainage box culvert at Kam Ho Road. This box culvert is used to discharge the existing drainage channel along the hillside of Tsing Long Highways and upstream open channel from MTRC Pat Heung Maintenance Centre.

5.6.2 The invert level of the existing box culvert varies from +2.78mPD to +2.48mPD according to the DSD drainage record plans. The preliminary design invert level of the proposed sewer pipe is about -2.23mPD. Nevertheless, twin-duty pipe system is proposed to cross this existing structure and to provide sufficient capacity to cater the sewage flow.

5.6.3 Trenchless method will also be adopted, and impact to the drainage structure is not anticipated with ~ 3m clearance between the proposed sewer and box culvert.

5.7 Sewer Pipe Crossing Kam Tin River "West Rail North Access Road Vehicular Bridge" (HyD Structure Ref. N845) at Kam Ho Road

5.7.1 The alignment of the conceptual layout passes through the gap between the abutment of the existing vehicular bridge N845 at south-west bank of Kam Tin South Channel and the permitted burial ground and then goes around the burial ground before connecting to the KTSPS. After assessment, this alignment is found undesirable as there is insufficient space between the abutment and the boundary of the burial ground to avoid either negative impact to the abutment or encroachment into burial ground. As encroachment into burial ground is highly undesirable as advised by the DO/YL, an alternative route have been identified.

5.7.2 Alternative route is to lay the sewer underneath Kam Tin River towards the north bank on the north east of Kam Ho Road. Twin duty-pipe system will be provided for crossing this section of Kam Tin River. After crossing Kam Tin River, the proposed sewer will be laid westward along the existing DSD maintenance access at the north bank of Kam Tin River (i.e. Kam Tai Road).

5.7.3 This proposed alignment will overlap with a series of existing manholes and sewers (between manhole ref. FSH1001861 to FSH1001865) along Kam Tai Road. According to DSD's record, these manholes and sewers were constructed under Contract No. DC/2011/07 and commissioned in August 2016. However, these existing manholes and sewers are shallower than the proposed sewer, which make connection of proposed sewer to these existing manholes infeasible. Therefore, the proposed sewer will be laid parallel to the above said existing sewers and connected to an existing manhole (manhole ref. MHFSH1001865) which further connected to Kam Tin SPS via a DN 1200 sewer underneath Kam Tin River (**Figure 60336159/SIA/03** refers). The concerned existing sewerage system along Kam Tai Road will be maintained and duly protected during the construction works.

5.8 Assessment on Existing Capacity of Kam Tin Sewage Pumping Station (KTSPS)

5.8.1 Based on the sewage estimation in Section 5.1, the Initial Sites have a sewage generation of ~6,200m^3/day (ADWF).

5.8.2 Taking account the existing flow to KTSPS is ~925 m^3/day as advised by DSD in 1st quarter of 2017, the total flow to KTSPS including KaTS development (i.e. Initial Sites and MTRCL's sites) is ~ 13,862m^3/day (i.e. 6,115 m^3/day + 6,822 m^3/day + 925 m^3/day = 13,862m^3/day, say ~13,900m^3/day) which is ~85% of the design capacity of KTSPS (i.e. 16,221m^3/day). The

remaining capacity of KTSPS has sufficient capacity to cater EPD's committed flow.

5.8.3 Therefore, KTSPS will have sufficient capacity to cater the additional flow from KaTS development without bringing any adverse impact to the existing sewerage system.

5.9 Proposed Construction Method of Proposed Sewer

5.9.1 In view of the size of the proposed DN750 and DN800 sewer pipes and the proposed widening works at Tung Wui Road/Kam Ho Road, no insurmountable construction difficulties are anticipated for the proposed sewer pipes to be laid along Kam Ho Road and Tung Wui Road. Sewers with plug end will be provided for future connection to terminal manholes by others.

5.9.2 As the proposed alignment would pass underneath Kam Tin South Channel at Tung Wui Road, existing West Rail crossing/ underpass at Tung Wui Road, and Kam Tin River at Kam Ho Road, trenchless method is proposed to construct the twin-duty main systems. Sufficient clearance between the bottom level of the existing structures and the crown level of the proposed sewer can be maintained under the current scheme.

5.9.3 Adequate precautions shall also be made during the design and construction stage to avoid conflict with both the existing and proposed foundations of the vehicular bridges.

5.9.4 Due to the proposed open cut method and the proposed location of the manhole at Kam Po Road, temporary traffic arrangement is anticipated at this section of Kam Po Road. Further agreement on the temporary traffic arrangement with TD will be sought.

5.9.5 The detailed assessment on constructability will be addressed in the later detailed design phase.

6 CONCLUSION

6.1.1 In accordance with the Brief, sewage from the Initial Sites shall be discharged to KTSPS. MTRCL has also requested CEDD to accommodate their sewage flow (~100m^3/day) from their existing KSRS. This existing sewage flow has also been incorporated in the assessment. Therefore, the Initial Sites has a sewage generation of ~6,200m^3/day in Average Dry Weather Flow (ADWF).

6.1.2 In view of the urgency of KaTS Development, EPD/SIG agreed to allocate sufficient capacity of KTSPS to KaTS Development for further conveyance to Yuen Long Sewage Treatment Works.

6.1.3 Total sewage to be conveyed to KTSPS is ~13,900m^3/day (ADWF) (existing flow and KaTS Development flow), which is ~85% of KTSPS design capacity. The remaining KTSPS capacity is sufficient to cater EPD's committed flow. Therefore, the proposed development have no insurmountable impact to the existing sewerage system.

6.1.4 Several options for conveying sewage generated from Site 4a was reviewed. Deep gravity sewer is recommended because it can maximize the lands area for public housing development, and has the least impact to the Project's implementation programme.

6.1.5 Encroachment into burial ground is highly undesirable as advised by the DO/YL. Alternative route is therefore recommended which involve laying the proposed sewer underneath the Kam Tin River towards the north bank on the north east of Kam Ho Road and connecting to existing manhole (manhole ref. MH FSH1001865) at Kam Po Road, which is already connected to Kam Tin SPS via a DN1200 pipe.

6.1.6 Trenchless method is proposed for crossing existing structures, such as Kam Tin River and West Rail North Access Road Vehicular Bridge (HyD Structure Ref. N845). Sufficient clearance between the bottom level of the existing structures and the crown level of the proposed sewer will be maintained.

Figures

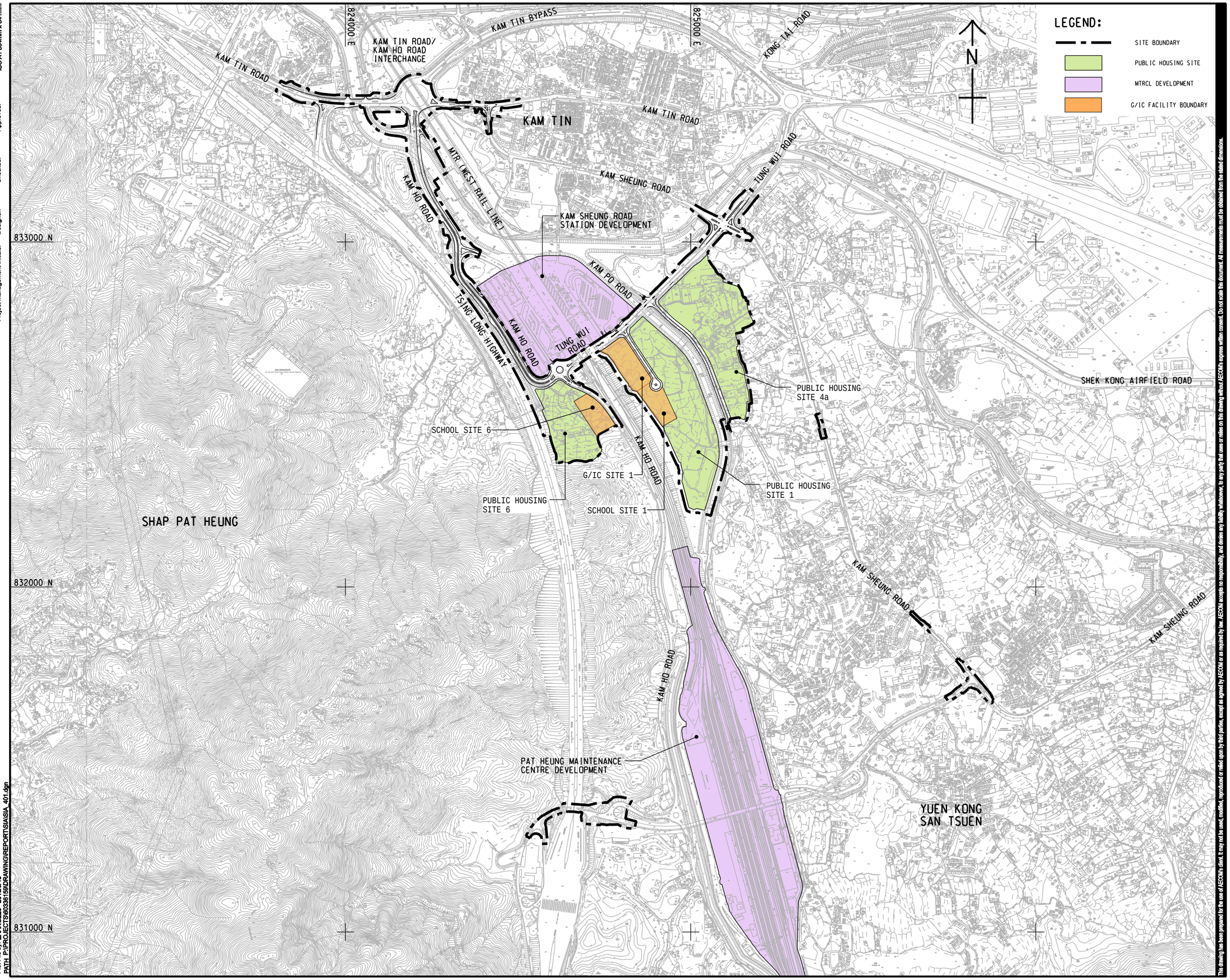
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



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PROJECT
項目

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR THE INITIAL SITES AT KAM TIN SOUTH, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT
業主

土木工程拓展署
Civil Engineering and Development Department

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I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核實

STATUS
階段

SCALE 比例
A1 1 : 5000

DIMENSION UNIT 尺寸單位

KEY PLAN
索引圖

PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱
LOCATION PLAN OF THE SITES

SHEET NUMBER
圖紙編號
60336159/SIA/FIGURE 01

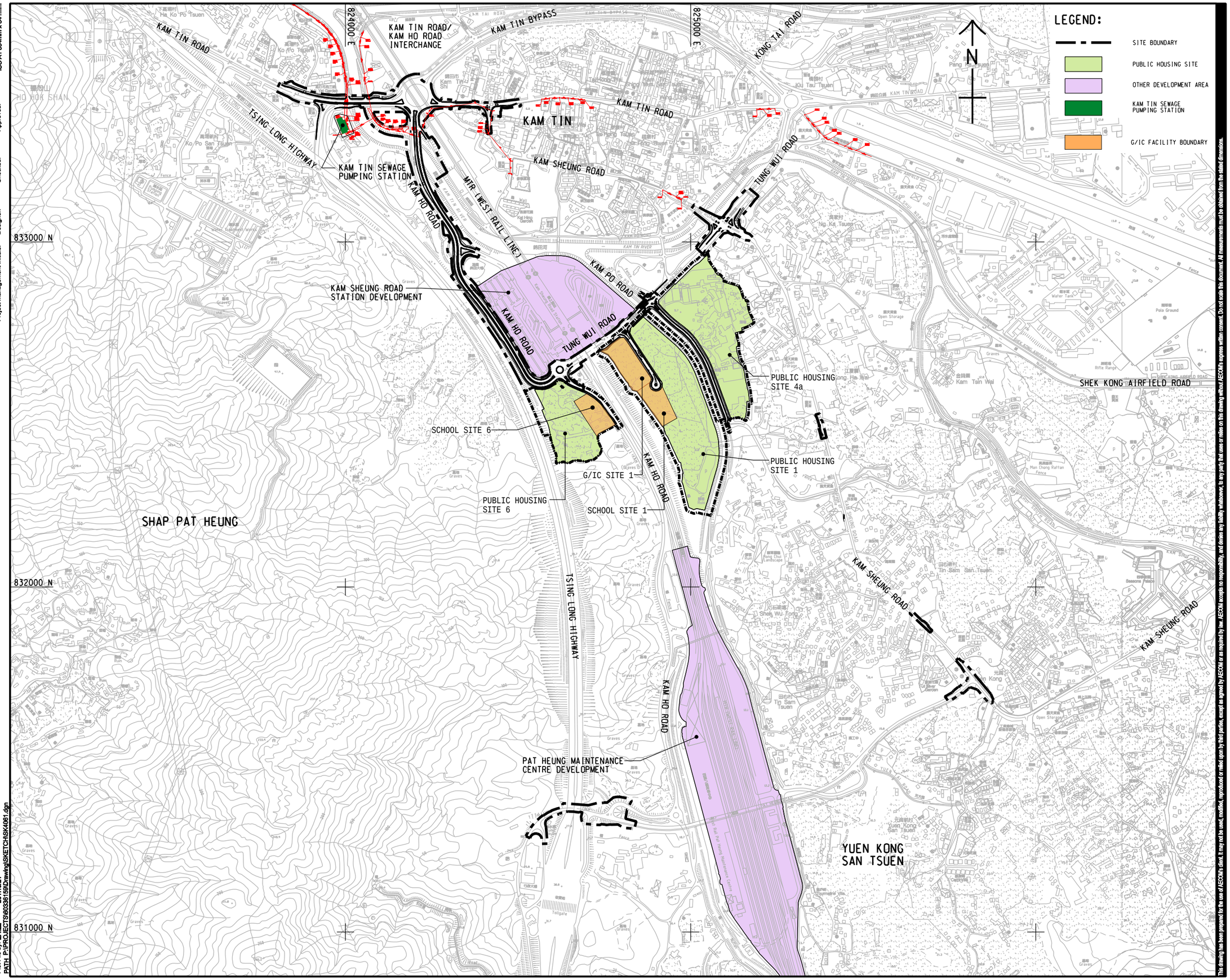
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



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PROJECT 項目

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR THE INITIAL SITES AT KAM TIN SOUTH, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

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SCALE 比例
A1 1 : 5000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱
EXISTING LOCAL SEWERAGE NETWORKS ARRANGEMENT

SHEET NUMBER 圖紙編號
60336159/SIA/FIGURE 02

ISO A1 594mm x 841mm

Project Management Initials: Designer: Checked: Approved:

824000 E

824500 E

825000 E

833000 N

832500 N

KAM TIN ROAD

KAM TIN ROAD/
KAM HO ROAD
INTERCHANGE

KAM TIN

KAM TIN SEWAGE
PUMPING STATION

VEHICULAR BRIDGE
AT KAM PO ROAD/
KAM TIN RIVER

MTR WEST RAIL LINE

KAM HO ROAD

KAM TIN RIVER

EXISTING 4-CELL
BOX CULVERT

EXISTING 4-CELL
BOX CULVERT

KAM SHEUNG ROAD
STATION DEVELOPMENT

KAM SHEUNG ROAD

KAM PO ROAD

TUNG WUI ROAD

TSING LONG HIGHWAY

WEST RAIL
VEHICULAR
UNDERPASS

PUBLIC HOUSING
SITE 4a

PUBLIC HOUSING
SITE 1

PUBLIC HOUSING
SITE 6

SHAP PAT HEUNG

LEGEND:

- SITE BOUNDARY
- PROPOSED TWIN DUTY SEWER PIPELINE (TO BE CONSTRUCTED BY THIS PROJECT)
- PROPOSED SINGLE SEWER PIPELINE (TO BE CONSTRUCTED BY THIS PROJECT)
- PROPOSED SEWER MANHOLE (TO BE CONSTRUCTED BY THIS PROJECT)
- TM TENTATIVE LOCATION OF TERMINAL MANHOLE TO BE CONSTRUCTED BY OTHERS. EXACT LOCATION SHALL BE FURTHER DETERMINED IN DETAIL DESIGN .
- PUBLIC HOUSING SITE
- MTRCL DEVELOPMENT
- KAM TIN SEWAGE PUMPING STATION
- G/IC FACILITY BOUNDARY

N

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SITE FORMATION AND INFRASTRUCTURAL WORKS FOR THE INITIAL SITES AT KAM TIN SOUTH, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

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SCALE 比例: A1 1 : 2500

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60336159

CONTRACT NO. 合約編號: CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

PROPOSED SEWER
NETWORKS ARRANGEMENT

SHEET NUMBER
圖紙編號

60336159/SIA/FIGURE 03

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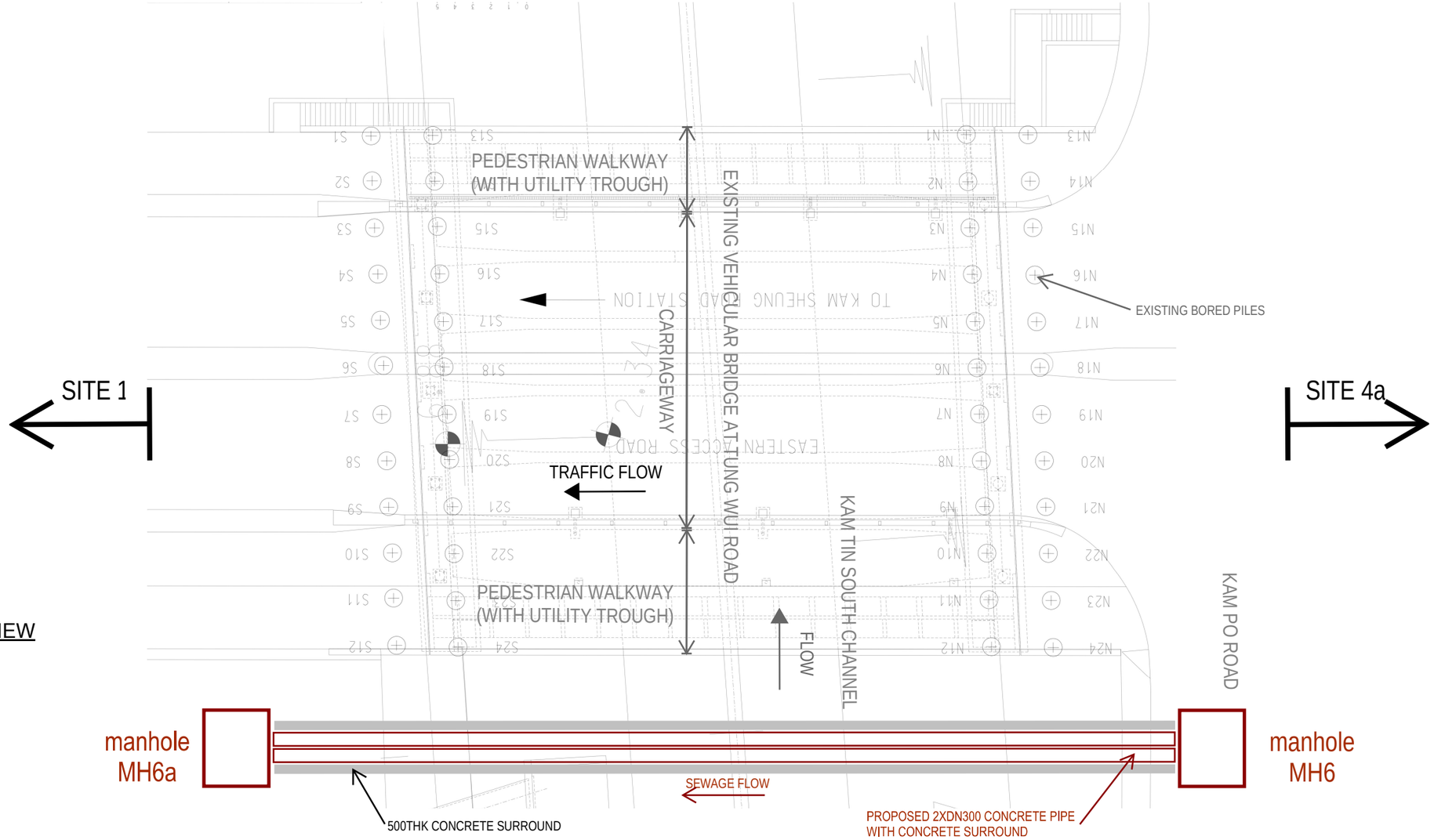
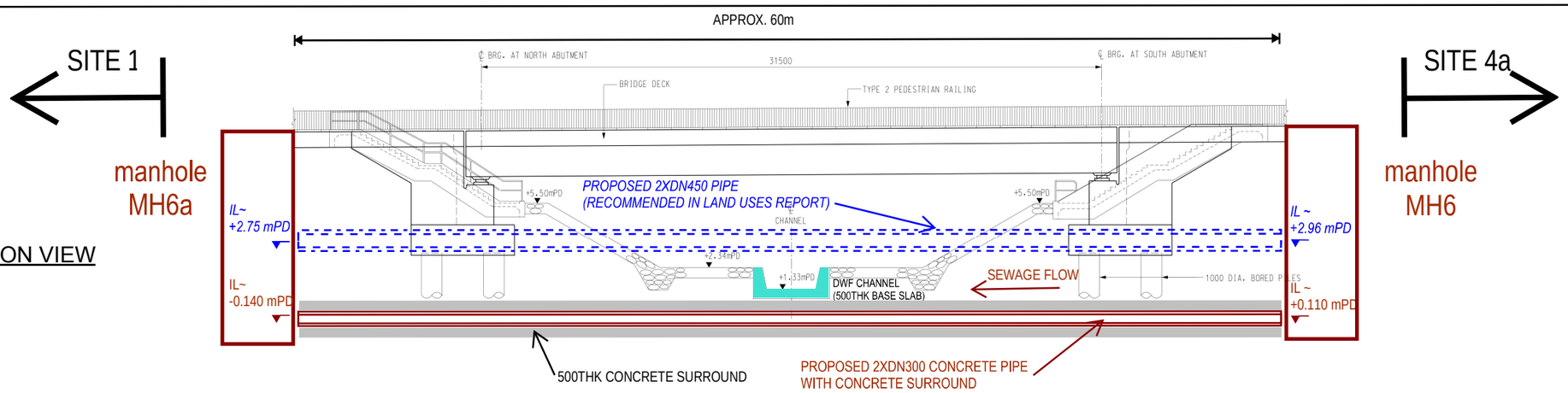
Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

PLAN VIEW



ELEVATION VIEW



EXISTING VEHICULAR BRIDGE (HyD STRUCTURE REF. N867) AT TUNG WUI ROAD

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SCALE 比例: A1 1 : 2500
DIMENSION UNIT 尺寸單位: METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60336159
CONTRACT NO. 合約編號: CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

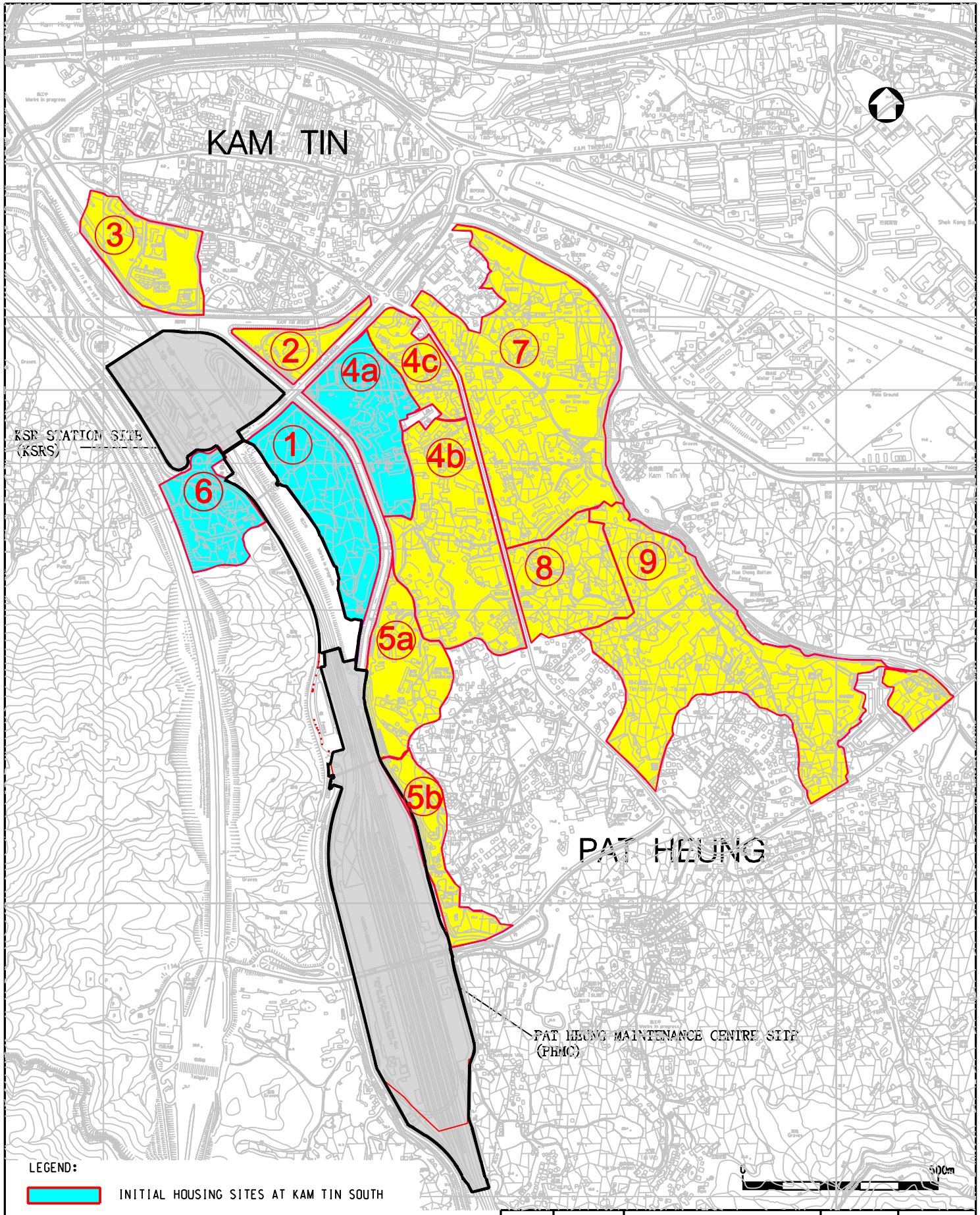
PROPOSED SEWER PIPE CLASHING RUNNING ACROSS KAM TIN SOUTH CHANNEL

SHEET NUMBER
圖紙編號

60336159/SIA/10

Appendix A

Kam Tin South Housing Development – Layout Plans



LEGEND:

INITIAL HOUSING SITES AT KAM TIN SOUTH

REMAINING HOUSING SITES AT KAM TIN SOUTH

編號 no.	日期 date	修訂 REVISION 內容摘要 description	核對 checked	核准 approved
A	12.08.2014	TITLE BLOCK UPDATED	SIGNED	SIGNED

圖則名稱 drawing title

KAM TIN SOUTH HOUSING DEVELOPMENT -LAYOUT PLAN

繪圖 drawn	S M CHU	簽署 initial	SIGNED	日期 date 18.10.13
核對 checked	H S KO	簽署 initial	SIGNED	日期 date 18.10.13
核准 approved	K L CHEUNG	簽署 initial	SIGNED	日期 date 18.10.13

項目編號 item no.

比例 scale AS SHOWN

圖則編號 drawing no. NTNZ1855A

辦事處 office

新界西拓展處
NEW TERRITORIES WEST DEVELOPMENT OFFICE

土木工程拓展署
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

date filename

(Updated as at 30 JUL 2014) L:\Drawing-MS\Ntnz1855-1856\Ntnz1855A.dgn

A3 297MM X 420MM

Appendix B

Sewage Flow Estimation

Appendix B - Sewage Flow Estimation

Site Reference	Population (head)	Land Use Type	Sub-type	Unit Flow Factor (m3/head/day)	Predicted Flow (m3/day)	Accumulated ADWF (m3/day)
Site 1	12628	Domestic	Public Rental	0.19	2399.32	2695.84
		Domestic	Private R2	0.27	0	
	196	Commercial	Retails (J4)	0.28	54.88	
	44	Commercial	Restaurants & Hotels (J10)	1.58	69.52	
	100	Commerical/ Employee	Community & Social (J11)	0.28	28	
	1000	Commerical/ Visitor	Visitor	0.08	80	
	945	Institutional	Student	0.04	37.8	
	94	Institutional	Teacher and School Staff	0.28	26.32	
Site 4a	11704	Domestic	Public Rental	0.19	2223.76	2259.92
		Domestic	Private R2	0.27	0	
	17	Commercial	Retails (J4)	0.28	4.76	
	10	Commercial	Restaurants & Hotels (J10)	1.58	15.8	
		Commercial	Community & Social (J11)	0.28	0	
	180	Institutional	Student	0.04	7.2	
	30	Institutional	Teacher and School Staff	0.28	8.4	
Site 6	5236	Domestic	Public Rental	0.19	994.84	1058.96
		Domestic	Private R2	0.27	0	
		Commercial	Retails (J4)	0.28	0	
		Commercial	Restaurants & Hotels (J10)	1.58	0	
		Commercial	Community & Social (J11)	0.28	0	
	945	Institutional	Student	0.04	37.8	
	94	Institutional	Teacher and School Staff	0.28	26.32	
					Total ADWF	6014.72

Notes:

1) EPD's "Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning" (GESF) is referenced for the adopted UFF.

2) For Public Housing Development area, residential population and work trade prediction have been further updated with reference to the email correspondences from HD dated 31 December 2014. Extra 10% buffer of the residential population estimates are included in for SIA assessment.

3) CEDD has accepted and instructed to cater the existing sewage from existing West Rail Kam Sheung Road station with design flow (ADWF) upto 100 cu.m per day. This current sewage is discharged into the holding tank (Holding Tank No. 2), and for future connection, the sewage will be connected, by others, to the manhole for the KSRS.

4) It is estimated that 100 staff (10% of the daily visitor) will be employed to run the sport complex at Site 1.

5) Since visitor would normally stay at sport complex less than 7 hours and would likely having shower, adopting UFF of 0.08 is considered appropriate as it is doubled of UFF for students.

6) 40% of the commercial trade employee was assumed to be worked at restaurant.

7) EPD confirmed that the Average Dry Weather Flow (ADWF) for KSRS Site and PHMC Site are 2606 m3/day and 4216 m3/day respectively. So, the ADWF for the MTRCL's sites is 6822 m3/day.

Appendix C

Calculations of Sewerage Pipe Performance

AECOM ASIA CO. LTD

Kam Tin South, Yuen Long

Proposed Sewer Alginment (Full development Option 1)

Recommended Option

DATE May 2017

												Conc Ks	0.15	**HDPE Ks**	0.15	
	Manhole		Pipe	Pipe	U/S	D/S	Invert Level (mPD)		Pipe Gradient	Flow	Accumulation	Vel.*	Capacity	Design Flow	Adequacy ?	Pipe	Pipe
Pipe No.	U/S	D/S	Diameter (mm)	Length (m)	GL (mPD)	GL (mPD)	U/S	D/S	(1 IN)	ADWF (m^3/d)	ACC_ADWF (m^3/d)	(m/s)	**(m^3/s)**	/Capacity		Material	Class
MH1.1	MH1	MH2	350	76.44	7.40	7.27	3.90	3.59	250	2259.92	2259.92	1.3	0.12	65%	Yes	HDPE	PE 100
MH2.1	MH2	MH3	350	60.24	7.27	7.14	3.59	3.35	250	0.00	2259.92	1.3	0.12	65%	Yes	HDPE	PE 100
MH3.1	MH3	MH4	350	67.22	7.14	7.00	3.35	3.08	250	0.00	2259.92	1.3	0.12	65%	Yes	HDPE	PE 100
MH4.1	MH4	MH5	350	76.55	7.00	7.74	3.08	2.78	250	0.00	2259.92	1.3	0.12	65%	Yes	HDPE	PE 100
MH5.1	MH5	MH6	350	75.41	7.74	8.70	2.78	2.48	250	0.00	2259.92	1.3	0.12	65%	Yes	HDPE	PE 100
MH6.1	MH6	MH7	350	62.64	8.70	9.30	2.48	2.23	250	0.00	2259.92	1.3	0.12	65%	Yes	HDPE	PE 100
MH7.1	MH7	MH8	300	51.30	9.30	9.00	-0.87	-1.08	250	0.00	2259.92	1.1	0.16	49%	Yes	HDPE	PE 100
MH8.1	MH8	MH9	350	59.94	9.00	8.00	-1.08	-1.24	380	0.00	2259.92	1.0	0.10	81%	Yes	HDPE	PE 100
MH9.1	MH9	MH10	750	79.10	8.00	6.80	-1.24	-1.32	900	4205.80	6465.72	1.0	0.46	49%	Yes	Conc	120
MH10.1	MH10	MH11	525	94.36	6.80	6.70	-1.32	-1.48	620	0.00	6465.72	1.0	0.44	51%	Yes	HDPE	PE 100
MH11.1	MH11	MH12	800	114.64	6.70	6.80	-1.48	-1.62	800	5377.49	11843.21	1.2	0.58	71%	Yes	Conc	120
MH12.1	MH12	MH13	800	17.69	6.80	6.90	-1.62	-1.64	800	0.00	11843.21	1.2	0.58	71%	Yes	Conc	120
MH13.1	MH13	MH14	800	115.23	6.90	6.80	-1.64	-1.79	775	0.00	11843.21	1.2	0.59	70%	Yes	Conc	120
MH14.1	MH14	MH15	800	88.06	6.80	6.90	-1.79	-1.90	775	1092.96	12936.17	1.2	0.59	76%	Yes	Conc	120
MH15.1	MH15	MH16	800	112.33	6.90	7.10	-1.90	-2.05	775	0.00	12936.17	1.2	0.59	76%	Yes	Conc	120
MH16.1	MH16	MH17	800	64.12	7.10	7.70	-2.05	-2.13	775	0.00	12936.17	1.2	0.59	76%	Yes	Conc	120
MH17.1	MH17	MH18	800	90.20	7.70	6.80	-2.13	-2.25	775	0.00	12936.17	1.2	0.59	76%	Yes	Conc	120
MH18.1	MH18	MH19	600	63.38	6.80	6.20	-2.25	-2.35	600	0.00	12936.17	1.1	0.63	71%	Yes	HDPE	PE 100
MH19.1	MH19	MH20	800	93.30	6.20	6.90	-2.35	-2.48	750	0.00	12936.17	1.2	0.60	75%	Yes	Conc	120
MH20.1	MH20	MH21	600	151.28	6.90	6.40	-2.48	-2.69	700	0.00	12936.17	1.0	0.58	77%	Yes	HDPE	PE 100
MH21.1	MH21	MH22	800	61.83	6.40	6.20	-2.69	-2.77	775	0.00	12936.17	1.2	0.59	76%	Yes	Conc	120
MH22.1	MH22	MH23	800	68.30	6.20	7.00	-2.77	-2.86	775	0.00	12936.17	1.2	0.59	76%	Yes	Conc	120
MH23.1	MH23	MH24	800	42.71	7.00	5.94	-2.86	-2.92	775	0.00	12936.17	1.2	0.59	76%	Yes	Conc	120
MH9a.1	MH9a	MH9b	350	64.46	8.00	8.00	5.00	4.68	200	2695.84	2695.84	1.407	0.135	69%	Yes	HDPE	PE 100
MH9b.1	MH9b	MH9c	350	78.10	8.00	8.00	4.68	4.29	200	0	2695.84	1.407	0.135	69%	Yes	HDPE	PE 100
MH9c.1	MH9c	MH9	350	51.10	8.00	8.00	3.69	3.43	200	0	2695.84	1.407	0.135	69%	Yes	HDPE	PE 100
MH12a.1	MH12a	MH12b	450	78.98	12.60	10.19	4.00	3.68	250	5274.69	5274.69	1.468	0.234	78%	Yes	HDPE	PE 100
MH12b.1	MH12b	MH12c	450	80.00	10.19	8.71	3.38	3.06	250	0	5274.69	1.468	0.234	78%	Yes	HDPE	PE 100
MH12c.1	MH12c	MH12d	450	59.64	8.71	8.27	2.76	2.53	250	0	5274.69	1.468	0.234	78%	Yes	HDPE	PE 100
MH12d.1	MH12d	MH11	450	50.54	8.27	8.29	2.23	2.02	250	0	5274.69	1.468	0.234	78%	Yes	HDPE	PE 100

Note: * Velocity was calculated using Colebrook-White Equation according to DSD Sewerage manual Part 1

for circular pipes flowing full,

$$V = -\sqrt{(8gDs)}\log\left(\frac{ks}{3.7D} + \frac{2.5\,lv}{D\sqrt{(2gDs)}}\right)$$

PROPOSED AMENDMENTS TO THE APPROVED KAM TIN SOUTH OUTLINE ZONING PLAN NO. S/YL-KTS/13

Sites 1, 4a and 6 for Public Housing Development and Government, Institution or Community Facilities

Drainage Impact Assessment Report

AECOM ASIA COMPANY LIMITED

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Figure No.	**Title**
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Appendix

Appendix A Kam Tin South Housing Development – Layout Plan

1 INTRODUCTION

1.1 Scope of Works

1.1.1 In terms of drainage provisions for the three housing sites, the following will be constructed

1. Temporary peripheral surface drains/channels to be handed over to the Housing Department (HD);

2. Pipe connection towards HD site for Permanent terminal manholes (manhole to be constructed by HD); and

3. Connection to existing drainage system from the terminal manholes

1.2 Objective of the Report

1.2.1 This DIA has been prepared in accordance with ETWB TC(W) No. 2 /2006 – Drainage Impact Assessment Process for Public Sector Projects.

1.2.2 This report aims to assess the potential drainage impact on the existing drainage system due to the proposed development at the Initial Sites.

1.2.3 No additional runoff from MTRCL Sites (i.e. Kam Sheung Road Station and Pat Heung Maintenance Centre) is anticipated as these two sites are already paved before the proposed development. To review the existing drainage system as a whole, it is assumed that runoff from the two sites will be discharged according to its current arrangement. However, the project proponent for the MTRCL sites shall be responsible for submission on their drainage matters.

1.2.4 The main objective of this assessment includes the followings:

- Review the existing drainage condition and flooding susceptibility due to the proposed development.

- Determine the hydraulic condition when structural floor level for Site 1 and Site 4a is set as +8.0mPD, and when minimum structural floor level for Site 6 is set as +7.5mPD.

- Outline changes to the drainage characteristics and potential drainage impacts due to the development.

- Develop the recommended drainage scheme for the Initial Sites.

- Discuss the responsibility of the maintenance aspects of the proposed drainage system.

1.3 Definitions

1.3.1 In this report, the following terms are defined below:-

- “The KaTS Development” refers to the development in Initial Sites plus the potential developments in MTRCL Sites, as shown on **Figure 60336159/DIA/01**.

- “The Initial Sites” comprises Sites 1, 4a and 6, and adjoining GIC sites.

- “MTRCL Sites” comprises Sites at Kam Sheung Road Station (KSRS) and Pat Heung Maintenance Centre (PHMC).

2 DEVELOPMENT PROPOSAL OF THE DEVELOPMENT SITE

2.1.1 The location of the Initial Sites for public housing and associated school/GIC development (namely Site 1, Site 4a & Site 6) and two MTRCL sites for private developments (namely KSRS & PHMC) are shown on **Figure 60336159/DIA/01**.

2.1.2 Site 1 is located on the southeast of existing KSRS, on the western bank of Kam Tin South Channel. It has a gross site area of about 7.9ha. This site will be further sub-divided for public housing development, educational facilities, and G/IC facilities.

2.1.3 Site 4a is located at the east of existing KSRS, on the eastern bank of Kam Tin South Channel. It has a gross site area of about 6.5ha. This site is planned for public housing development and proposed widening of existing Kam Po Road.

2.1.4 Site 6 is located at the south of existing KSRS and adjacent to Tsing Long Highway. It has a gross site area of about 4.8ha. This site is planned for public housing development and educational facilities.

2.1.5 The public housing site boundaries/areas will be reviewed and subject to fine-tuning in later stage land resumption and further discussion with relevant government departments.

2.1.6 KSRS site is located at the existing West Rail Link – Kam Sheung Road Station with its associated Public Transport Interchanges (PTI) and public parking area. It is currently a paved area and has a gross site area of about 9.36ha. KSRS site is planned for private housing development to accommodate about 6,600 population, educational facilities and other supporting/ ancillary facilities.

2.1.7 PHMC site located at the existing West Rail Link – Pat Heung Maintenance Centre. It is currently a paved area and has a gross site area of about 31.8ha. PHMC site is planned for private housing development to accommodate approximate 14,800 population, educational facilities, and other supporting/ ancillary facilities.

3 EXISTING DRAINAGE CONDITION

3.1.1 The 5 sites assessed under this DIA occupy about 60.4 ha in area. The existing ground levels of these 5 sites range from +5.2mPD to +9mPD. The three Initial sites are currently for agriculture and village use, with some areas used for parking, workshop and storage purpose. There are existing buildings/structures/sheds and access roads within all 3 Initial sites. The two MTRCL sites consist of a paved station, parking area, PTI and maintenance centre.

3.1.2 The runoff from Site 1 and Site 4a are discharged directly to the Kam Tin South Channel via surface channels and underground pipes. The runoff collected by surface channels from Site 6 is discharged to the Kam Ho Road Channel A which is a 4m wide open channel running between Tsing Long Highway and Kam Ho Road and ultimately joining the main Kam Tin River near the MTRCL Kam Tin Building. Similarly, runoff from PHMC site is discharged to Kam Tin South Channel and runoff from KSRS site is discharged to Kam Tin South Channel and Kam Tin River via drainage system maintained by MTRCL accordingly.

3.1.3 For other roads proposed to be widened, the surface runoff are currently collected by road drainage by means of gullies and carrier drain systems and discharged into existing box culverts or Kam Tin River.

3.1.4 According to the drawing “DLD 1699 – Locations of DSD Flooding Blackspots as at March 2015” promulgated by Land Drainage Division of DSD, no flooding black spot is identified in the surrounding areas of the Initial Sites and MTRCL’s development.

3.2 Identification of Key Drainage Issue

3.2.1 In general, existing catchment area and flow paths remain unchanged after the development. However, paved and unpaved ratio will be changed.

3.2.2 Based on the obtained YL&ND DMP model, the existing land use and associated CN values for the Initial Sites and MTRCL development sites are summarized and presented in **Table 3.1** below.

Table 3.1. Existing Land use and Associated CN Values

Area	Existing Land Use	Existing CN Value	Gross Site Area (ha)
Site 1	Agriculture	70	7.9
Site 4a	Village	90	6.5
Site 6	Agriculture	70	4.8
KSRS	Rail	100	9.36
PHMC	Rail	100	31.8

It is anticipated that additional runoff and peak discharge will be generated from Site 1, Site 4a, and Site 6 due to the increase in paved area. As KSRS and PHMC are already paved in the current condition, no additional runoff is anticipated.

3.2.3 In view of current topography, some part of Site 1, 4a & 6 are currently in the low lying area.

4 ASSESSMENT METHODOLOGY

4.1 Overview of Methodology

4.1.1 This DIA is carried out in accordance with the requirements set out in ETWB TC(W) No.2/2006 - Drainage Impact Assessment Process for Public Sector Projects.

4.1.2 DSD drainage records and YL&ND DMP hydraulic models will be used as baseline for assessment. The future scenario will be set up based on the master layout plan and landscape plan.

The design criteria and assumptions adopted for the assessment as in accordance with DSD's Stormwater Drainage Manual (SDM).

Apart from the drainage design specified in Section 4.1.3 above, additional requirement of the Project brief is to investigate/assess on the impact of 200-year storm event on the housing development such that no flooding to the housing site is expected. Therefore under this DIA, 4 events in **Table 4.1** will be considered for assessment purpose.

Table 4.1 – Design Storm Events

Design Event	Rainfall/Flow	Tide Level
50A	50 year	10 year
50B	10 year	50 year
200A	200 year	10 year
200B	10 year	200 year

4.1.3 In order to provide the same basis for hydraulic analysis of post-development scenarios, an InfoWroks-ICM calibration model was developed based on the hydrological parameters used for YL&ND DMP SOBEK model. This calibration model has been agreed with DSD and used as baseline model for our drainage assessment.

4.1.4 In accordance with Section 6.5 of DSD's Stormwater Drainage Manual, minimum 300mm freeboard will be provided for all proposed drainage works, including proposed pipelines and box culvert.

4.1.5 As the detailed design of the drainage systems within the housing sites and G/IC facilities shall be carried out by HD and ArchSD respectively. Only main drainage system such as box culvert, outfalls, and pipelines along public roads will be assessed and designed. Drainage systems within housing sites and G/IC facilities are only envisaged design to facilitate a comprehensive hydraulic assessment.

4.2 Simulation Tools

4.2.1 InfoWorks-ICM version 5.0 is adopted as the simulation tool of this DIA. InfoWorks-ICM is capable of simulating the hydraulics and hydrology of natural and man-made environments to be incorporated into a single model.

4.3 Hydrological Calculations

Rainfall-Runoff Model

4.3.1 SCS method is adopted for hydrological calculations. The parameters for hydrological routing are as follows:-

- Volume Model : SCS method
- Routing Model : User-tp-tb
- Time to Peak (tp) : Time of Concentration
- Base Time (tb) : 5 times of Time of Concentration

4.3.2 The design Curve Number (CN) adopted in hydrological calculation are summarized in **Table 4.2**.

Table 4.2 – Summary of Adopted CN Values

Land Use Types	Curve Number (CN)
Woodland	40
Agricultural	70
Village	90
G/IC	90
CDA	95
Residential	95
Road	100
Rail	100
River	100

4.3.3 For Natural catchments, Brandsby William's Equation is adopted for calculations of time of concentration. For urban catchments, flow velocity of 1.5 m/s in drains is assumed for calculation of time of concentration.

Rainfall Profile

4.3.4 YL&ND DMP Review has incorporated the rainfall data up to 2007 and derived a site-specific rainfall profile for Yuen Long region. The 4-hr 1in50yr & 1in200yr rainfall profile with the following parameters is adopted as the assessment rainfall profile.

$$F(t) = \begin{cases} \dfrac{a[b + 2(1-c)t}{(2t+b)^{c-1}} & ,0 \le t \le \dfrac{t_d}{2} \\ F(-t) & ,-\dfrac{t_d}{2} \le t \le 0 \end{cases}$$

Where $F(t) = $ Rate of rainfall or instantaneous intensity in mm/hr at time t (minutes)

$t_d = $ Rainstorm duration (minutes) $(t_d \le 240)$

$a = 514.9$ (for 50yr) / 500.9 (for 200yr)

$b = 1.22$ (for 50yr) / 0.77 (for 200yr)

$c = 0.381$ (for 50yr) / 0.346 (for 200yr)

Note : rainfall data is extracted from Section 6.2.4 & Table 6.3 of YL & ND DMP Final Report.

4.4 Boundary Condition

4.4.1 The boundary of the InfoWorks-ICM model is set at the confluence point between the Kam Tin Road crossing of Kam Tin River.

4.4.2 Boundary water levels are made reference to the simulation results of SOBEK Model under YL&ND DMP Review. The boundary water levels at node ID KTR_A_1838 is adopted and the values are presented in **Table 4.3** below.

Table 4.3 - Boundary Water Levels

Scenarios	Water Level (mPD)
50A (Rainfall Dominant)	5.000
50B (Tide Dominant)	4.860
200A (Rainfall Dominant)	5.107
200B (Tide Dominant)	5.075

4.5 Hydraulic Calculations

Pursuant to Section 9.3 of Stormwater Drainage Manual, the following siltation level is allowed in calculations of pipe flow capacity. The following siltation levels are assumed for drainage pipes:-

- 5% reduction in flow area if the gradient is greater than 1 in 25; and
- 10% reduction in flow area is assumed in other cases.

4.6 Consideration of Climate Changes

4.6.1 As per DSD's recent researches, the design parameter due to climate changes in YL&ND DMP review was developed under the IPCC Fourth Assessment Report of 2007 (AR4) requirement, this requirement shall be updated to latest version as IPCC Fifth Assessment Report of 2013 (AR5), DSD therefore requested to incorporate the latest AR5 requirement into this DIA exercise.

4.6.2 Simulation on climate change effect under Year 2050 RCP 4.5 scenario was carried out for sensitivity analysis. The details for climate change scenarios are tabled below.

Table 4.4 – Summary of parameter for Yr2050-RCP4.5 scenario

Item	Parameter
Design Year	Year 2050
Greenhouse Gases Emission prediction (Representative Concentration Pathways)	Intermediate Emission (RCP 4.5)
Increase in rainfall intensity	+ 14.18% increase DMP review rainfall
Rise in sea level	+ 273 mm increase @Tsim Bei Tsui

5 SUSTAINABLE DRAINAGE SYSTEM (SUDS) AND BLUE GREEN INFRASTRUCTURE

5.1.1 Sustainable Drainage System such as bio-swale, porous pavement, etc. will be pursued under this project as far as practicable with a view to retain and treat the stormwater near the source of rainfall and reduce peak surface runoff to the downstream stormwater drainage system. The concept of Blue Green Infrastructure and revitalization of water bodies as promulgated in the 2015 Policy Address shall also be applied in the drainage design.

5.1.2 Bioswale is proposed on roadside planters along Kam Ho Road and porous pavement is proposed for footpath on public access roads, as far as practicable, to possibility reduce surface runoff. Exact extent of bioswale and porous pavement shall be agreed with the relevant maintenance department in the detailed design stage.

5.1.3 In addition to the measures as mentioned above which could practically reduce runoff generated from the roadside planters and footpaths along the public access roads, greening areas to be provided within the development sites in accordance with relevant technical circulars could also reduce the amount of additional runoff. The final drainage design of these Initial sites, including the design/ approach of greening area, will be decided and carried out by HD & MTRCL in detailed design stage.

5.1.4 In addition, the following preliminary SuDS ideas, subject to the detail design review, could possibly be considered within the development areas and in the later study for the remaining sites of KaTS development to reduce runoff generation and to tackle the climate change as far as practicable.

- *Bioswale* – Bioswale could be used in the proposed roadside planter/ planting areas for connecting and filtering the surface runoff to the drainage system.
- *Porous Pavement* – Porous Pavement may be applied along pedestrian footpath to allow runoff be soaked into the ground, which resulting in reduction of runoff discharge rate and volume to drainage system.
- *Green Roof* – Vegetation at the green roof of building(s) can reduce the runoff amount and lengthen the time for the runoff to leave the roof (i.e. attenuating peak flow rate). In combination of rainwater harvesting system, the rainwater can then be collected and reused for non-potable (e.g. irrigation) purposes.
- *Rainwater Harvesting System* – runoff can be collected and stored into an underground storage tank, and be reused for irrigation or other non-potable purposes. Thus, runoff would not be discharged to drainage system and alleviate the system demand.
- *Flood Retention provision/ facilities* – Flood Retention provision/ facilities could attenuate peak flow and also serve as scenic view and irrigation purpose. Co-use of land could possibly be explored to serve both drainage function and leisure purposes. These provision/ facilities could blend in with the environment and promote water-friendly culture as well.
- *Rain Garden* – Rain garden is designed to temporarily hold and soak in rain water/ runoff during rain. Shrubs and flowers could be planted at rain garden to increase its aesthetics value.

It was agreed that engineering review for the remaining sites of Kam Tin South Development would take into consideration the latest climate change effect as promulgated under the Fifth Assessment Report by Intergovernmental Panel on Climate Changes (IPCC AR5) (or further updated assessment report as appropriate) and Hong Kong Observatory's downscaling data. The concept of Blue Green Infrastructure, Revitalization of Water Bodies, Sustainable Drainage System, etc. should be explored by the future project proponent.

6 CONCLUSIONS

6.1.1 Potential impacts due to the development of Initial Sites (Site 1, Site 4a and Site 6) and MTRCL Sites (KSRS and PHMC) are assessed in this DIA.

6.1.2 As the MTRCL sites are already paved and the current drainage arrangements are assumed to be maintained, no adverse drainage impact is anticipated. Respective project proponent should be responsible for submission on their drainage matters for relevant departments' approval.

6.1.3 An InfoWorks-ICM model is developed for the impact assessment under 1 in 50yr rainstorm scenario. Flooding investigation was also carried for 1 in 200yr rainstorm scenario to ensure no flooding is anticipated for the proposed development sites.

6.1.4 As the permanent drainage system within the Initial Sites will be designed and constructed by HD, for comprehensive assessment purpose, main trunks within the Initial Sites are envisaged for flood susceptibility assessment.

6.1.5 To maximize the no. of flat without flooding the proposed development sites, it was agreed that the minimum structural floor levels are set at +8.0mPD for Site 1 and Site 4a and at +7.5mPD for Site 6.

6.1.6 As the proposed structural floor level would disturb the surface runoff flow path from Ng Ka Tsuen and nearby area, a peripheral channel will be constructed on the east of Site 4a to collect and convey surface runoff from these existing low laying areas for discharge at Kam Tin South Channel.

6.1.7 Sustainable Drainage System such as bio-swale and porous pavement will be adopted at roadside planter and footpath, as far as practicable, with a view to retain and treat the stormwater near the source of rainfall and to reduce peak surface runoff. Exact extend shall be further liaised and agreed with the relevant departments in the detailed design stage.

6.1.8 Existing open channel along Kam Ho Road would be replaced by a twin cell box culvert due to the widening of existing Kam Ho Road. A total of 3m-wide roadside planter in the form of bioswale is proposed along both sides of widened Kam Ho Road as mitigation measure, as shown on **Figure 60336159/SK4058** and **SK4059.**

6.1.9 Increasing of surface runoff is inevitable with the change in land use at the Initial Sites. Based on the current findings and with implementation of the mitigation measures, there would be no insurmountable drainage impact caused by the proposed development of the Initial Sites, which is just an intermediate stage of the overall Kam Tin South Development (**Appendix A** refers). Considering the relatively small development scale of the Initial Sites and its urgency, it was agreed that long term effects of additional runoff generated would be catered by the remaining planned Kam Tin South Development in the later stage.

Figures

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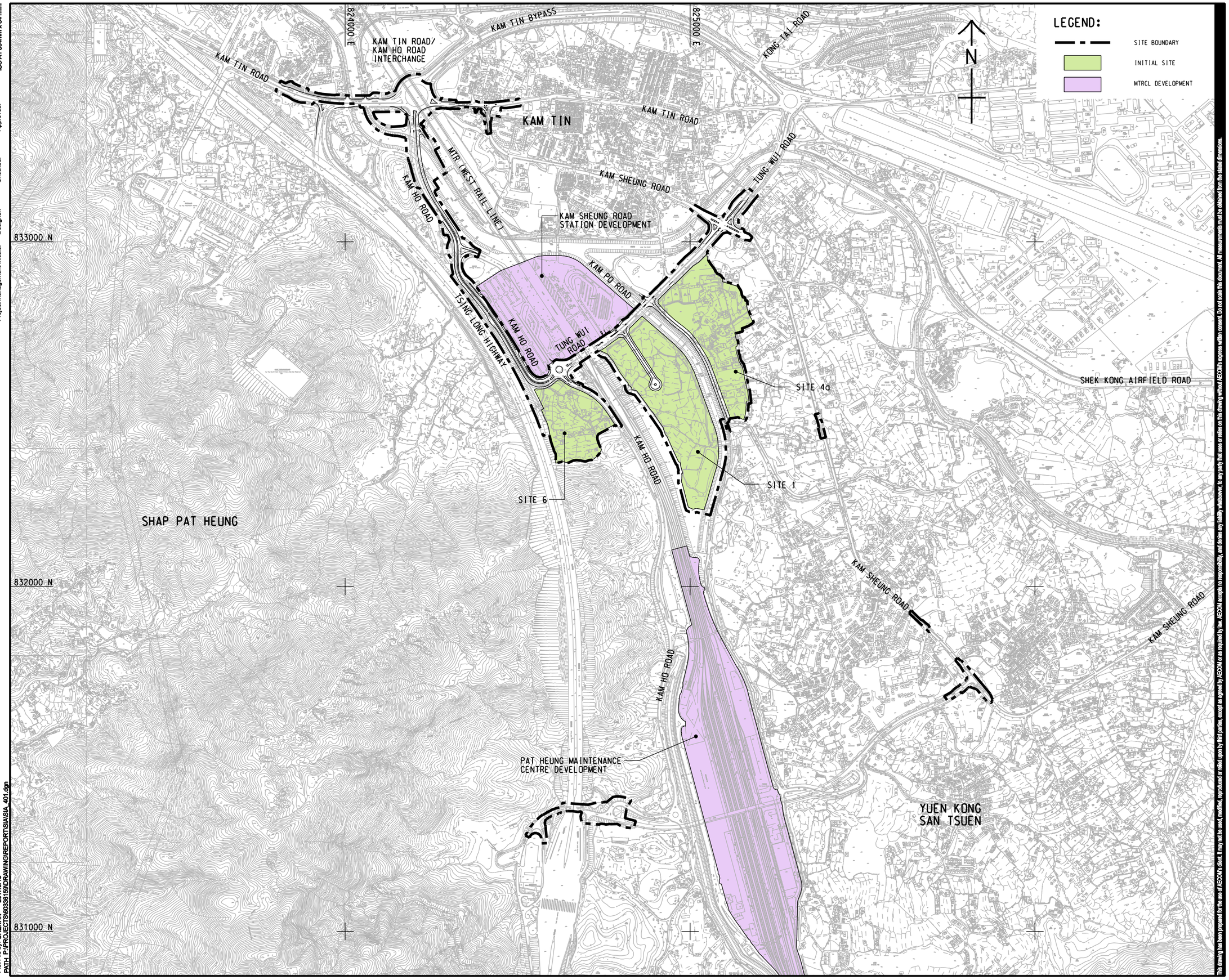
Project Management Initials:



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SITE FORMATION AND INFRASTRUCTURAL WORKS FOR THE INITIAL SITES AT KAM TIN SOUTH, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

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CEDD 土木工程拓展署 Civil Engineering and Development Department

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A1 1 : 5000

DIMENSION UNIT 尺寸單位

KEY PLAN
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CONTRACT NO. 合約編號
CE 34/2014 (CE)

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圖紙名稱
LOCATION PLAN OF THE SITES

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圖紙編號
60336159/DIA/01

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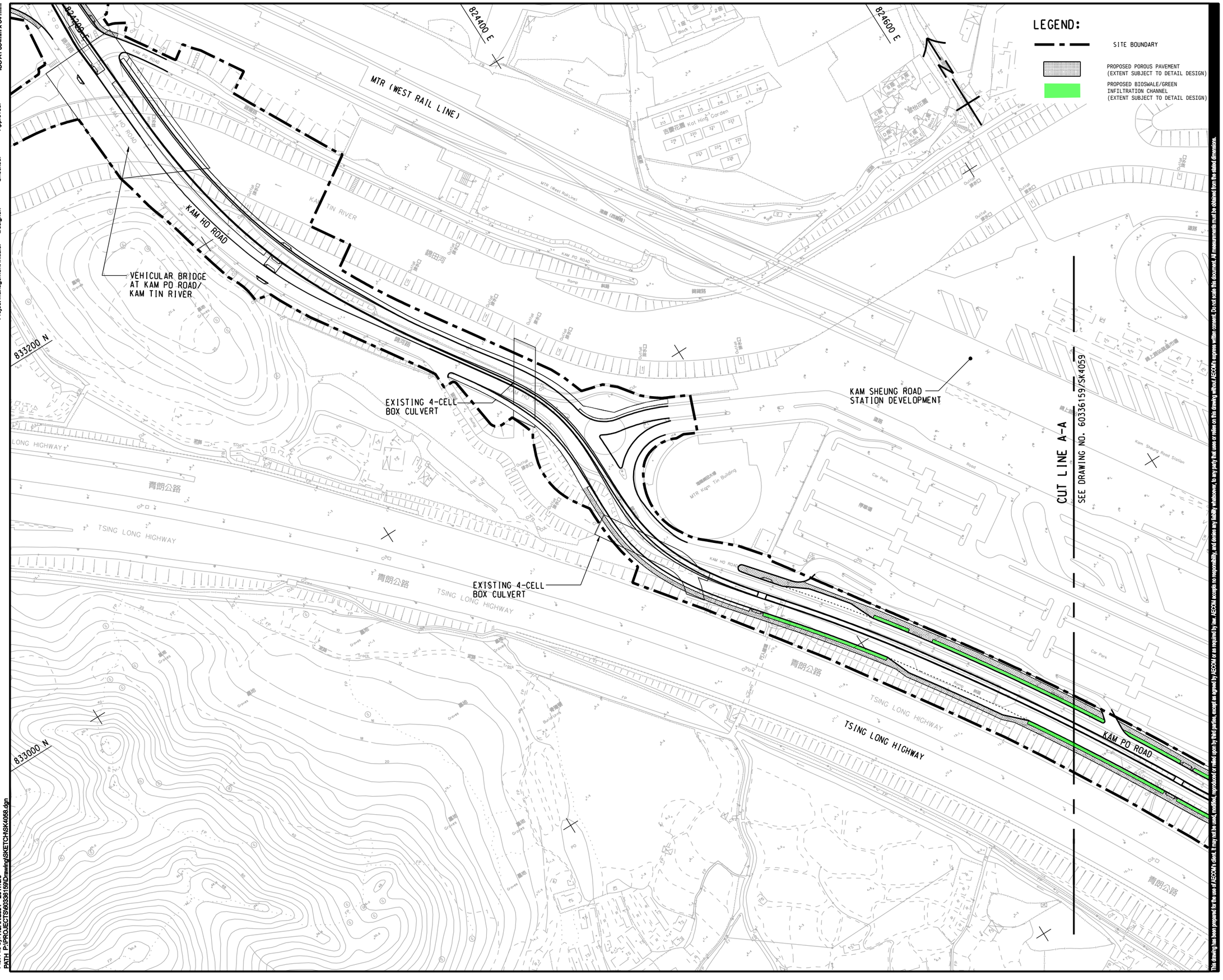

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SITE FORMATION AND INFRASTRUCTURAL WORKS FOR THE INITIAL SITES AT KAM TIN SOUTH, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

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KEY PLAN
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CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱
GENERAL LAYOUT
(SHEET 1 OF 2)

SHEET NUMBER
圖紙編號
60336159/SK4058

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Project Management Initials:

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1. FOR LEGEND REFER TO DRAWING NO.60336159/SK4058.

824600 E
824800 E
825000 E
832800 N
832600 N
832400 N

KAM SHEUNG ROAD STATION DEVELOPMENT

CUT LINE A-A
SEE DRAWING NO. 60336159/SK4058

KAM PO ROAD
YUNG WUI ROAD
WEST RAIL VEHICULAR UNDERPASS
KAM HO ROAD
TSING LONG HIGHWAY
KAM TIN BYPASS

SITE 4a
SITE 6
SITE 1

N

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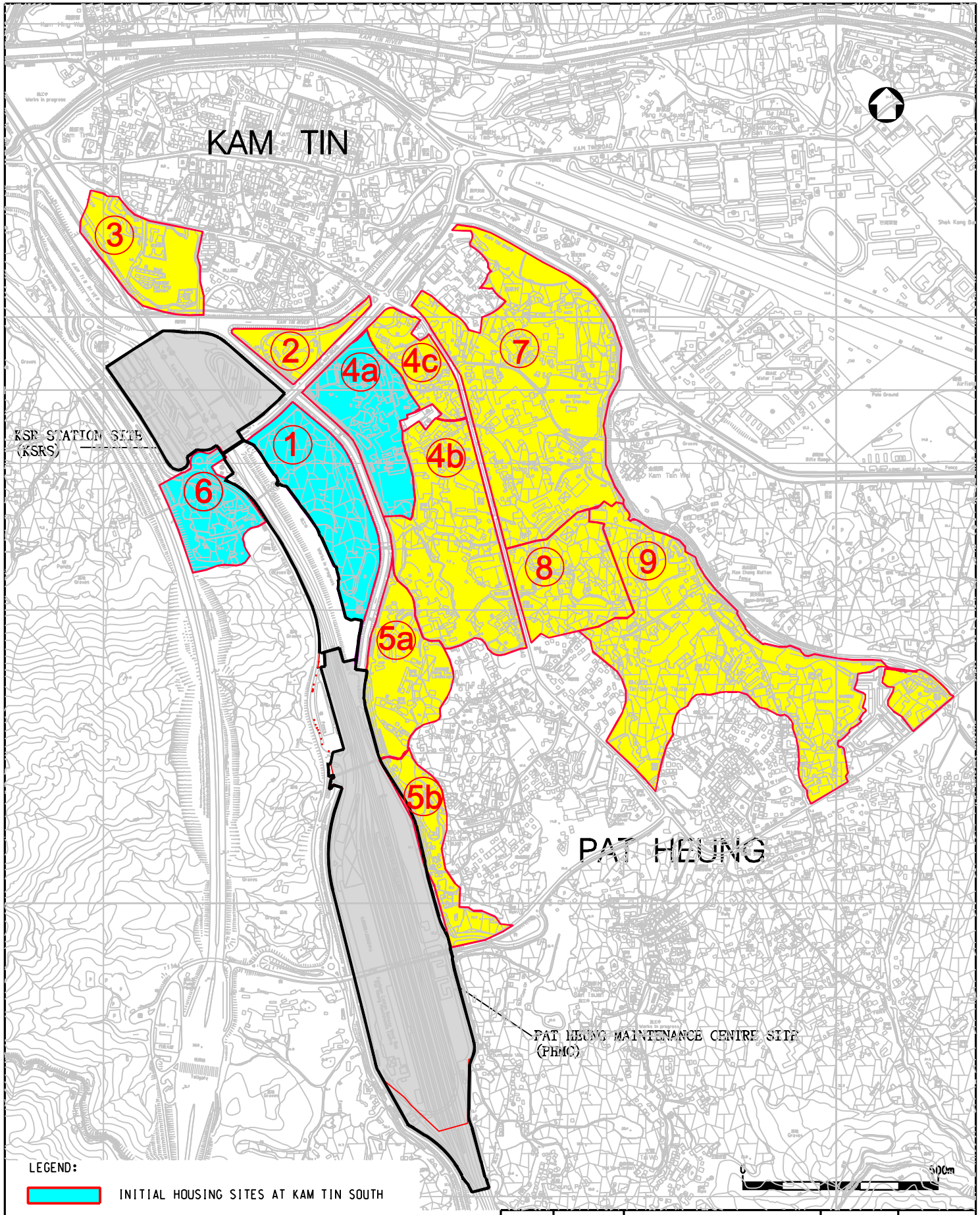
GENERAL LAYOUT
(SHEET 2 OF 2)

SHEET NUMBER
圖紙編號

60336159/SK4059

Appendix A

Kam Tin South Housing Development – Layout Plans



LEGEND:

INITIAL HOUSING SITES AT KAM TIN SOUTH

REMAINING HOUSING SITES AT KAM TIN SOUTH

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A	12.08.2014	TITLE BLOCK UPDATED	SIGNED	SIGNED

圖則名稱 drawing title

KAM TIN SOUTH HOUSING DEVELOPMENT -LAYOUT PLAN

繪圖 drawn	S M CHU	簽署 initial	SIGNED	日期 date 18.10.13
核對 checked	H S KO	簽署 initial	SIGNED	日期 date 18.10.13
核准 approved	K L CHEUNG	簽署 initial	SIGNED	日期 date 18.10.13

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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PROPOSED AMENDMENTS TO THE APPROVED KAM TIN SOUTH OUTLINE ZONING PLAN NO. S/YL-KTS/13

Sites 1, 4a and 6 for Public Housing Development and Government, Institution or Community Facilities

Waterworks Impact Assessment Report

AECOM ASIA COMPANY LIMITED

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1 INTRODUCTION

1.1 Objective of the Report

1.1.1 This report outlines the assessment results of the potential short-term and long-term impacts on water supply system caused by the proposed development in the Initial Sites (See **Appendix A**). This report contains the following essential contents:-

- a general description of the proposed water works and discussion of how the proposed development affects the existing and proposed waterworks facilities;
- to take cognisance of the existing and proposed studies and projects which may have a bearing on the WIA by assessing of the current and planned capacities of the water supply system (e.g. water treatment works, service reservoirs, pumping stations, trunk mains and distribution networks);
- assessment of the impacts of the water demand on the existing and planned water supply system;
- review and liaise with the Housing Department (HD) for the latest development layout and determine the location of connection point of the existing watermains;
- formulation of a feasible and cost-effective water supply proposal (e.g. provision of new waterworks installation and/or improvement to existing water supply system) and protect waterworks facilities and keep minimum disturbance to their normal operation during construction and in operation stage; and
- recommendations in details with plans and schemes together with calculations and works specifications on the proposed water supply scheme, mitigation and protection measures for those affected waterworks facilities, water gathering ground, diversion, re-provisioning works and/or modification of them for further development for incorporation in the detailed design.

1.2 Definitions

1.2.1 In this report, the following terms are defined below:-

- “The KaTS Development” refers to the development in Initial Sites, plus the potential developments in MTRCL Sites, as shown on **Figure 01**;
- “The Initial Sites” comprises Sites 1, 4a and 6, and nearby GIC sites; and
- “MTRCL Sites” comprises Sites at Kam Sheung Road Station (KSRS) and Pat Heung Maintenance Centre (PHMC).

2 EXISTING WATER SUPPLY CONDITION

2.1.1 Fresh water to Kam Tin (KT) area is supplied by Au Tau Water Treatment Works (ATWTW) via Au Tau Fresh Water Primary Service Reservoir, as **Figure 02** refers. The current nominal output for ATWTW is 230 million litres per day (MLD). WSD is now planning for the modernization works for ATWTW, which will be resumed to the design output of 330 MLD upon the completion of modernization works in 2024 tentatively.

2.1.2 In view of available information extracted from WSD record plan, there is no existing regional sea (salt) water supply for flushing in KT area.

3 DEVELOPMENT PROPOSAL OF THE DEVELOPMENT SITE

3.1 Proposed Development Site at Initial Sites

3.1.1 Three Initial Sites comprises of three subject sites, namely Site 1, Site 4a and Site 6 and the nearby GIC sites. Based on the information provided by and Use Review for Kam Tin South and Pat Heung (LUR) Report and recent update from Housing Department, Initial Sites comprise of Public Housing Development Site, Areas for Sport Centre, Clinic, other GIC facilities and two Primary School Sites (**Figure 01** refers).

3.1.2 Additional 10% buffer of the population and flat estimates as at December 2014 for Sites 1, 4a and 6 have been incorporated for future design flexibility purposes in the assessment of WIA. The public housing site area/boundaries will be fine-tuned and subject to change in later design stage pending any land resumption issues and further discussion with relevant government departments.

3.1.3 The overall area of Site 1 is about 7.9ha. It is located south of existing Kam Sheung Road Station. This site will be scheduled for three main purposes as i) public housing development; ii) G/IC facilities and iii) Education facilities. It has been scheduled 5.8ha of land for public housing development, which can provide around 4,100 flats and accommodate approx. 12,600 people. The public housing development will include domestic blocks, non-domestic facilities such as retail & kindergarten. The proposed GIC facilities provided at Site 1 include a GIC complex with clinic and other GIC facilities, a sports centre and an electricity sub-station. For educational facilities, one 6-classroom kindergarten (to be located inside the housing site) and one 30-classroom primary school (to be located next to the housing site) are proposed to be constructed.

3.1.4 The overall area of Site 4a is about 6.5ha. It is located at the eastern portion of the Initial Site and tentatively planned for public housing development solely, which can provide about 3,800 flats and accommodate approx. 11,700 people. A 6-classroom kindergarten will be provided within the public housing site. A section of 400m-long existing Kam Po Road within Site 4a will also been widened to suit the development of Site 4a.

3.1.5 The overall area of Site 6 is about 4.8ha. It is located south of existing Kam Sheung Road Station adjacent to Tsing Long Highway. It is tentatively planned for public housing development which can provide around 1,700 flats and accommodate approx. 5,200 people. One 6-classroom kindergarten (to be located inside the housing site) & one 30-classroom primary school (to be located next to the housing site) are also located at Site 6.

3.1.6 Details of the Development Parameters for Site 1, Site 4a and Site 6 to be adopted in the assessments are presented in **Tables 3.1, 3.2 & 3.3**.

Table 3.1 : Development Parameters for Site 1

Site 1 – Public Housing Development Site and G/IC, School Site	
Public Rental Housing (PRH) and Subsidized Sale Flats (SSF)	
No. of Flats	4100 for PRH/SSF
Estimated Population	12,628 for PRH/SSF
Other Supporting/Ancillary Facilities	
Kindergarten	1 no. of 6-Classroom
Primary School (Outside Housing Site)	1 no. of 30-Classroom
	Total 1039 Students + Staff (including 945 students, and 94 teachers and staff)
Retail (7,000 m^2)	Approx. 240 Employee
GIC Complex (Sports Centre, Clinic and other supporting G/IC facilities e.g. electricity sub-station) (Outside Housing Site)	1000 Users and 100 Staff
	Total 1340 User + Employee

	(including 1000 users and 340 employee)

Note: Flats and population of public housing developments have included extra 10% buffer of then estimates as at December 2014 for WIA assessment. Retail GFA/IFA are preliminary estimates by HD and subject to further review.

Table 3.2 : Development Parameters for Site 4a

Site 4a – Public Housing Development Site	
Public Rental Housing (PRH) and Subsidized Sale Flats (SSF)	
No. of Flats	3,800 for PRH/SSF
Estimated Population	11,704 for PRH/SSF
Other Supporting/Ancillary Facilities	
Kindergarten	1 no. of 6-Classroom
	Total 210 Students + Staff (including 180 students, and 30 teachers and staff)
Retail (1,100 m^2)	Approx. 27 Employee
	Total 27 Employee

Note: Flats and population of public housing developments have included extra 10% buffer of then estimates as at December 2014 for WIA assessment. Retail GFA/IFA are preliminary estimates by HD and subject to further review.

Table 3.3 : Development Parameters for Site 6

Site 6 – Public Housing Development Site and School Site	
Public Rental Housing (PRH) and Subsidized Sale Flats (SSF)	
No. of Flats	1,700 for PRH/SSF
Estimated Population	5,236 for PRH/SSF
Other Supporting/Ancillary Facilities	
Kindergarten	1 no. of 6-Classroom
Primary School (Outside Housing Site)	1 no. of 30-Classroom
	Total 1039 Students + Staff (including 945 students, and 94 teachers and staff)

Note: Flats and population of public housing developments have included extra 10% buffer of then estimates as at December 2014 for WIA assessment. Retail GFA/IFA are preliminary estimates by HD and subject to further review.

4 ASSESSMENT METHODOLOGY

4.1 Overview of Methodology

4.1.1 The methodology of the technical assessment is highlighted as follows:

- Collect existing and planned water supply infrastructure information in the area and relevant to the proposed development;
- Determine the water demand of the development;
- Assess the impact on the existing source of supply and the system capacity; and
- Recommend improvement/upgrading works where necessary.

4.2 Assumptions

4.2.1 In general, the estimated population for HD Sites (Site 1, 4a & 6) shall refer to the latest data given by HD.

4.2.2 The following assumptions shall be made to the kindergartens, primary schools, community and social welfare facilities under this development:-

- For the population prediction for kindergarten/primary school, the numbers of schools of each site are referring to the data given by HD;
- For the retail facilities, the number of employee are predicted making reference to the average IFA/Employee ratio (derived from section 2.1 of HKP&G) and GFA data given by HD (for Site 1, 4a & 6). A 50% allowance in population is made for design flexibility; and
- For sport complex, located in Site 1, since no available information in this early planning stage, it is generally assumed that a daily 1,000 people-visit for this sport complex. A 50% allowance in population is made for design flexibility (by others) in future.

4.2.3 It has been agreed with HD that the planning data given on 31 December 2014 will be used for all technical assessment including this WIA. The estimated population of Site 1, 4a and 6 was revised from 24,170 (LUR) to 29,570 i.e. an increment of 5,400 population approximately.

4.2.4 It is also noted that the estimated water demand from LUR has yet been considered the water consumption for irrigation purposes in KaTS. In this regard, the water demand for irrigation shall also be taken into account and reconsidered in this assessment.

4.2.5 For estimating the water demand for public housing sites, as per HD's recommended 20% of site area as green area shall be adopted; whereas for private residential development, 30% of site area shall be allowed for green area as per Table 2 of the Sustainable Building Design (SBD) Guideline from Building Department (PNAP App-152).

4.3 Unit Demand

4.3.1 In accordance with WSD's Departmental Instruction (DI) 1309, the following unit demand factors are adopted in this assessment as presented in **Table 4.1**:-

Table 4.1 : Unit Demand Rates for the Proposed Development

Population or Employment Type	Unit Potable Water Demand (l/h/d)	Unit Flushing Water Demand (l/h/d)
Residential – Public Housing	140	70
Residential – R1, including SSF	230	70
Residential – R2, plot ratio 5-10	300	70
Service Trade – Employee (J4)	280	25
Service Trade – Employee (extra over for Restaurant, Catering services) (J10)	1580	70
Service Trade – Employee (GIC) (J12)	280	25
Student/Child – Non Boarding	25	25
School Staff – Non Boarding	25	25
Note: The water demand for service trade shall refer to the data from EPD's Technical Paper (Report No. EPD/TP1/05) – Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning, (GESF)		

4.4 Peaking Factor

4.4.1 In accordance with WSD's Departmental Instruction (DI) 1309, the following peaking factors are adopted in this assessment:-

Fresh Water (Potable Water) : 3 x mean daily demand

Salt Water (Flushing Water) : 2 x mean daily demand

4.5 Peak Flow Velocity

4.5.1 In accordance with section 1.2.1 of WSD's Manual of Mainlaying Practice (2012), the maximum flow velocity under peak flow for both pumping mains and distribution mains should be less than 3 m/s.

4.5.2 In addition, a minimum velocity of 1 m/s under peak flow condition is desirable to avoid water stagnant.

4.5.3 In light of the above, the flow velocity of watermains shall be bounded between 1 to 3 m/s under peak flow condition.

4.6 Residual Heads

4.6.1 In accordance with WSD's Departmental Instruction (DI) 1309 and Handbook on Plumbing Installation for Buildings (2014), the following minimum residual heads shall be maintained at extremity of system:-

Fresh Water (Potable Water) : 20m

Salt Water (Flushing Water) : 15m

5 IMPACT ASSESSMENT AND MITIGATION MEASURES

5.1 Estimation of Water Demand

5.1.1 Based on the estimated population and the unit demands presented in **Table 3.1 to 3.3 and Table 4.1** respectively, the estimated water demands are determined and summarised as **Table 5.1** below.

Table 5.1 : Estimated Water Demand (provision for 5 Sites)

Site Area	Potable Water Demand (m^3/d)	Flushing Water Demand (m^3/d)
Site 1 – Public Housing Development, School and GIC facilities	3,389	1,029
Site 4a – Public Housing Development	2,768	826
Site 6 – Public Housing Development and School.	1,250	393
KSRS Site – Private Residential Development with Retails, Schools and Other Supporting/Ancillary Facilities	2,605	508
PHMC Site – Private Residential Development with Retails, Schools and Other Supporting/Ancillary Facilities	5,031	1,094
Sub-Total	**15,042**	**3,850**
Total	**18,892 (Say 18,900)**	

* Totals may not sum due to rounding

5.1.2 Since there are no water sources other than freshwater (e.g. salt water or reclaimed water) currently available for flushing in this region, temporary mains water for flushing is proposed. Thus the total potable (fresh) water demand will be 18,900 m^3/d.

5.1.3 The existing Au Tau Fresh Water Primary Service Reservoir which is located in vicinity of the development sites at Kam Tin area; in view of geographical consideration, the development falls within the supply zone of this service reservoir.

5.2 Regional Water Supply Arrangement

5.2.1 Fresh water to Kam Tin area is supplied by Au Tau Water Treatment Works (ATWTW) via existing FWSR, namely Au Tau Fresh Water Primary Service Reservoir. ATWTW currently has a nominal capacity of 330 million litres per day (MLD).

5.2.2 The additional water demand of 18.9 MLD (from the 3 Initial Sites and 2 MTRCL Sites), the total water demand is about 5.7 percent of the ATWTW normal capacity. The capacity of ATWTW is larger than the required water demand, the water supply sources (directed supplied from ATWTW or other supply sources) shall be advised by WSD.

5.3 Local Water Supply Arrangement

5.3.1 For the Initial Sites, currently there are one pair of DN600/DN700 and one DN250 fresh watermains underneath Ko Po San Tseun Road and Kam Tin Road. At Kam Tin Road/Kam Ho Road Interchange, an existing DN450 tapped from the above DN600 for water supply and ran southwards along the Kam Ho Road and Tung Wui Road towards the existing area for the Initial Sites, as **Figure 03** refers.

5.3.2 The existing DN450 as shown in **Figure 03** provides the supply to existing Kam Tin areas, in view of the predicted water demand, this existing watermains will not able to facilitate a stable demand on both existing area and future additional water demand for Initial Sites. In order to minimise the disturbance of the current water supply system, laying new watermains would be a more appropriate approach rather than online replacement/upgrading existing watermains.

5.3.3 To cope with the future water demand of the 3 Initial Sites, one new set of DN800/DN400 for

potable/flushing water respectively, tapping to the existing DN600 & DN700 fresh watermain underneath Kam Tin Road/Kam Ho Road Interchange. This new set of DN800/DN400 pipe is proposed to lay underneath Kam Ho Road and Tung Wui Road for both potable water supply and flushing water supply to the development site respectively. Separate potable and flushing connections shall be provided for the housing sites, school and GIC sites at Sites 1, 4a and 6 accordingly for future connection by the end-users. The proposed water supply arrangement is shown in **Figure 05** to **Figure 07**.

5.3.4 The DN800 potable watermain at the entrance of each Initial Site shall be further splitted in range of DN250~DN400 for potable water; whereas the DN300 pipe shall be splitted in range of DN150~DN250 for flushing water respectively.

5.4 Fire Fighting Requirement

5.4.1 According to paragraph 13 of the WSD's DI 1309, development with density zoned as R1 shall be provided with water supply of 9,900 m^3/d for 12 hours.

5.4.2 In comparing the volume of water for fire fighting (9.9MLD) and daily water demand(18.9MLD for 5 sites), the Au Tau Fresh Water Primary Service Reservoir shall capable to supply the required volume for fire fighting water.

5.4.3 Installation of fire service (including the street fire hydrant system) within Initial Sites will be required. The fire service main should be connected to the government main outside the lot boundary of each development site.

5.4.4 The street fire hydrant system along the main road towards Site 1, 4a and 6 shall be installed to the satisfactory of relevant authorities.

5.5 Residual Pressures

5.5.1 Au Tau Fresh Water Primary Service Reservoir has invert level at 87.22 mPD and top water level at 96mPD. Pursuant to paragraph 14 of WSD's DI 1309, it shall be assumed in the design that the water level at the primary service reservoir is at 75% of the full depth. In this regard, the average water level at Au Tau No. 2 FWSR is assumed to be 93.8 mPD.

5.5.2 Following the paragraph 21 of the WSD's DI 1309, the minimum residual heads shall be 30-meter and 15-meter head for fresh (potable) water and salt (flushing) water respectively. Further recommendation from the paragraph 3.1.1 of Handbook on Plumbing Installation for Buildings (July 2014) published by Water Supplies Department, the minimum residual pressure in fresh (potable) water supply zone has been lowered from 30-meter head to 20-meter head. In this regard, a minimum residual head of 20-meter head shall be provided at the extremities of the site area. For salt (flushing) water, the minimum residual head is 15-meter head as per WSD's DI 1309. Thus, the same residual head is applied to the flushing water supply network.

5.5.3 Au Tau Fresh Water Primary Service Reservoir is located at about 3km away (in term of pipe works) from nearest KaTS Development (entrance of Site 6). The hydraulic calculations on residual heads of potable water and flushing water with illustrated figure are enclosed in **Appendix B** and the estimation results are summarized in **Tables 5.2 and 5.3** below.

Table 5.2 Estimated Residual Pressures for Potable Water

Site Area	Water Head (mPD)	Ground Level (mPD)	Residual Head (m)
Site 1 – Public Housing Development, School and GIC facilities	60.4 (Site 1's Entrance)	8.0 (Site 1's Entrance)	52.4 (Site 1's Entrance)
Site 4a – Public Housing Development	57.8 (Site 4a's Entrance)	8.0 (Site 4a's Entrance)	49.8 (Site 4a's Entrance)
Site 6 – Public Housing Development and School.	62.6 (Site 6's Entrance)	8.0 (Site 6's Entrance)	54.6 (Site 6's Entrance)

Table 5.3 Estimated Residual Pressures for Flushing Water

Site Area	Water Head (mPD)	Ground Level (mPD)	Residual Head (m)
Site 1 – Public Housing Development, School and GIC facilities	59.6 (Site 1's Entrance)	8.0 (Site 1's Entrance)	51.6 (Site 1's Entrance)
Site 4a – Public Housing Development	56.9 (Site 4a's Entrance)	8.0 (Site 4a's Entrance)	48.9 (Site 4a's Entrance)
Site 6 – Public Housing Development and School.	62.0 (Site 6's Entrance)	8.0 (Site 6's Entrance)	54.0 (Site 6's Entrance)

5.5.4 The residual head of potable and flushing water at the entrances of Site 1, 4a and 6 exceeds 20-meter and 15-meter head respectively.

5.6 Constructability of Proposed Watermains

5.6.1 In view of the size of the proposed water mains and the proposed widening works at Kam Ho Road, no insurmountable construction difficulties are anticipated for the proposed watermains to be laid underneath Kam Ho Road and Tung Wui Road. The connection works to the existing water mains will be carried out by WSD. The cost of the connection works shall be borne by the proposed project.

5.6.2 As described in Section 5.3.4, a set of DN800/DN400 for potable/flushing water respectively is proposed to be laid from underneath the Kam Tin Road/Kam Ho Road Interchange, along a section of Kam Ho Road and Tung Wui Road where the Initial Sites are located.

5.6.3 For the proposed new DN800 (potable) & DN400 (flushing) watermains to Site 1, since the pipeline shall pass underneath of existing West Rail crossing/underpass at Tung Wui Road, the section of pipe is recommended to adopt the trenchless method for this crossing.

5.6.4 For the proposed new DN800(potable) & DN400 (flushing) watermains to Site 4a, since the pipeline shall pass underneath of existing Kam Tin South Channel at Tung Wui Road, the section of pipe is also recommended to adopt the trenchless for this crossing.

5.6.5 For the section of pipe running along the crossing of Kam Ho Road/Kam Tin River, pipe trench (utilities trench) will be reserved in the vehicular bridge structure for pipe laying works.

5.6.6 The detailed assessment on constructability will be addressed again in the later detailed design phase.

5.6.7 In accordance with request made from HD, a provision of 500mm long water pipe run inside Housing Sites for future connection. The exact location of such connection provisions will be further liaised with HD in later detailed design stage.

5.7 Construction Programme

5.7.1 The proposed DN800/DN400 to Site 1, 4a and 6 (plus trenchless crossing the Kam Tin River /Tung Wui Road and underneath Kam Ho Road/Tung Wui Road) shall be constructed by CEDD together with road widening works.

5.8 Other Requirements

5.8.1 All the proposed works for the KaTS Development will be designed to avoid (if not possible, keep minimum) disturbance to the water mains and waterworks installation in the vicinity as well as operation and maintenance of the existing water supply system. If unavoidable, all the temporary and permanent diversion of the existing water mains affected by the proposed works will be carried out under the proposed project. The works shall comply with "Conditions of Working in the Vicinity of Waterworks Installations" as enclosed in **Appendix C**.

5.8.2 Water Intelligent Network (WIN) should be adopted in the project as far as practicable. WIN includes, but not limited to, the design and construction of District Metering Areas (DMAs) and/or Pressure Management Areas (PMAs) to avoid the loss of precious water.

5.8.3 In order to maintain and minimise the disturbance to local residence/villages (except areas within Site 1, 4a and 6), the existing supply watermains (for both potable water and flushing water) along to Kam Ho Road and Tung Wui Road will be retained. If necessary, local diversion of watermains will be carried out to relocate the watermains within the Initial Sites. Protective measures will be provided during construction stage.

5.8.4 Water supply to the existing KSR Station and PH Maintenance Centre will also be retained to minimise the impact and maintain the daily operations/services of these two MTR's facilities. Localised disturbance may be encountered when the Tee-off section for future KSRS & PHMC developments are installed in vicinity to these areas, since most of the pipes laying works shall be done along Kam Ho Road and Tung Wui Road.

6 CONCLUSIONS

6.1.1 The total demands on potable water and flushing water for KaTS development (Initial Sites and 2 MTRCL's development) are 15,042 m^3/d and 3,850 m^3/d respectively.

6.1.2 In view of WSD existing record, there is no salt water supply to the development site for the population intake for Site 1, 4a & 6, therefore fresh water will be used for flushing purposes. The estimated total demand on fresh water is 18,892 m^3/d, say 18,900 m^3/d.

6.1.3 Au Tau Fresh Water Primary Service Reservoir currently has a nominal capacity of 330 million litres per day (MLD).

6.1.4 KaTS development shall generate additional water demand of 18.9 MLD (5.7% of Au Tau Fresh Water Primary Service Reservoir's capacity).

6.1.5 The nearest water supply facilities shall be Au Tau Fresh Water Primary Service Reservoir, which is currently feed by Au Tau Water Treatment Works. This reservoir is located at about 3km away (in term of pipe works) from the nearest KaTS Development (entrance of Site 6).

6.1.6 There are existing one DN600 and one DN700 fresh watermains underneath Kam Tin Road/Kam Ho Road Interchange. An existing DN450 is tapped and running southwards along Kam Ho Road and to Kam Sheung Road Station and Pat Heung Railway Depot.

6.1.7 To cope with the water demand of the development for Initial Sites (Site 1, 4a & 6), one new set of DN800/DN400 watermains (for potable and flushing respectively) shall be tapping to the existing DN600/DN700 fresh watermains at Kam Tin Road/Kam Ho Road Interchange for water supply (both potable water and flushing water) to the Sites.

6.1.8 The proposed new DN800 potable and DN 400 flushing watermain for Initial Sites underneath Kam Ho Road shall be constructed by CEDD together with the road widening works. The existing DN450 watermain will be retained.

6.1.9 The residual head of potable and flushing water at the entrances of Site 1, 4a and 6 exceeds 20-meter and 15-meter head respectively.

6.1.10 For the proposed new watermains to Initial Site 1, since the pipeline shall pass underneath of existing West Rail crossing/underpass at Tung Wui Road, the section of pipe is recommended to adopt the trenchless method.

6.1.11 For the proposed new watermains to Initial Site 4a, since the pipeline shall pass underneath of existing Kam Tin South Channel at Tung Wui Road, a section of pipe underneath of the channel can adopt the trenchless method.

6.1.12 The connection works to the existing water mains will be carried out by WSD. The cost of the diversion and connection works shall be borne by the proposed project.

6.1.13 Water Intelligent Network (WIN) should be adopted in the project as far as practicable to minimize the chance of water leakage.

Figures

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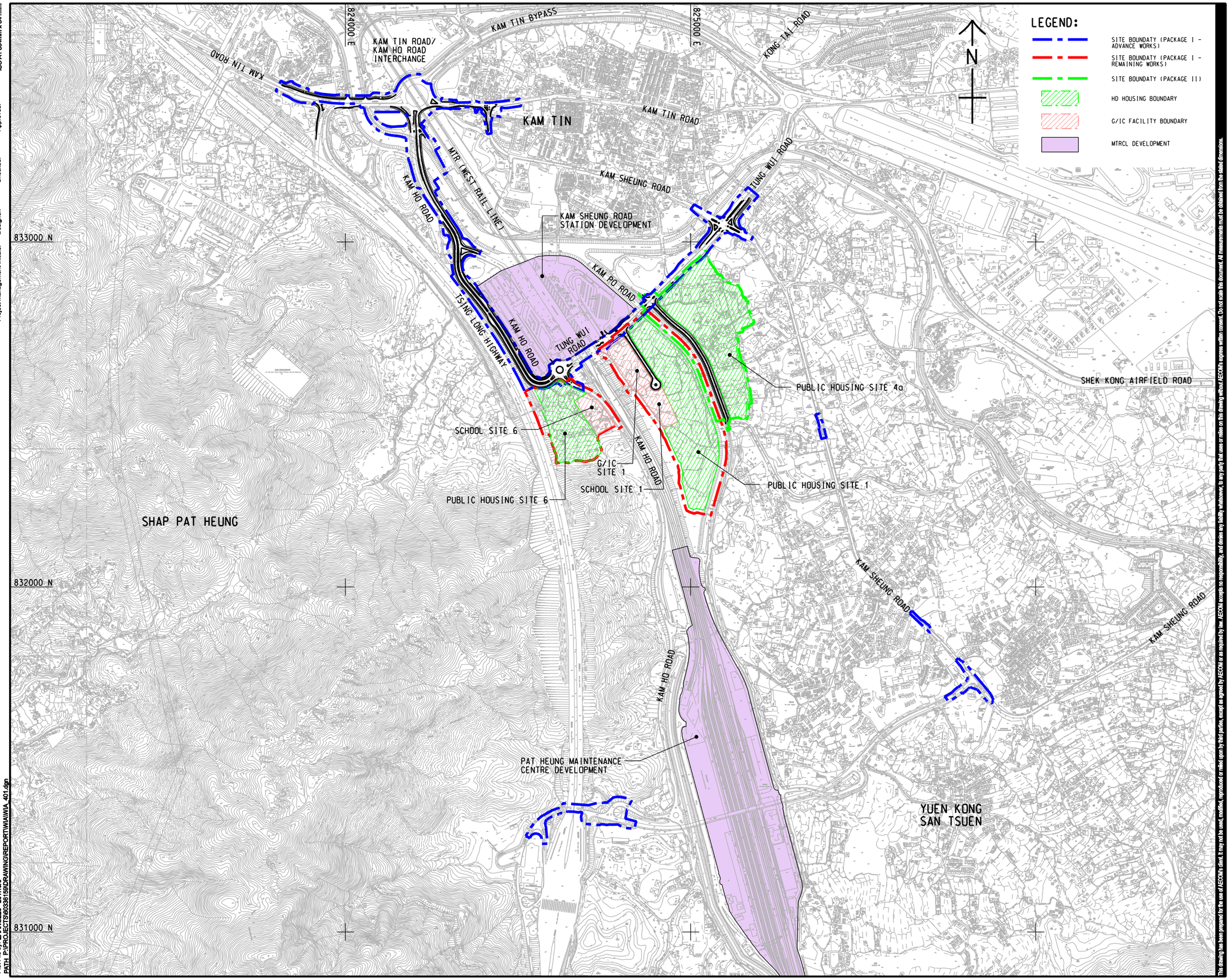

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PROJECT
項目

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR THE INITIAL SITES AT KAM TIN SOUTH, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

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STATUS
狀況

SCALE 比例
A1 1 : 5000

DIMENSION UNIT 尺寸基位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

LOCATION PLAN OF THE SITES

SHEET NUMBER
圖紙編號

60336159/WIA/FIGURE 01

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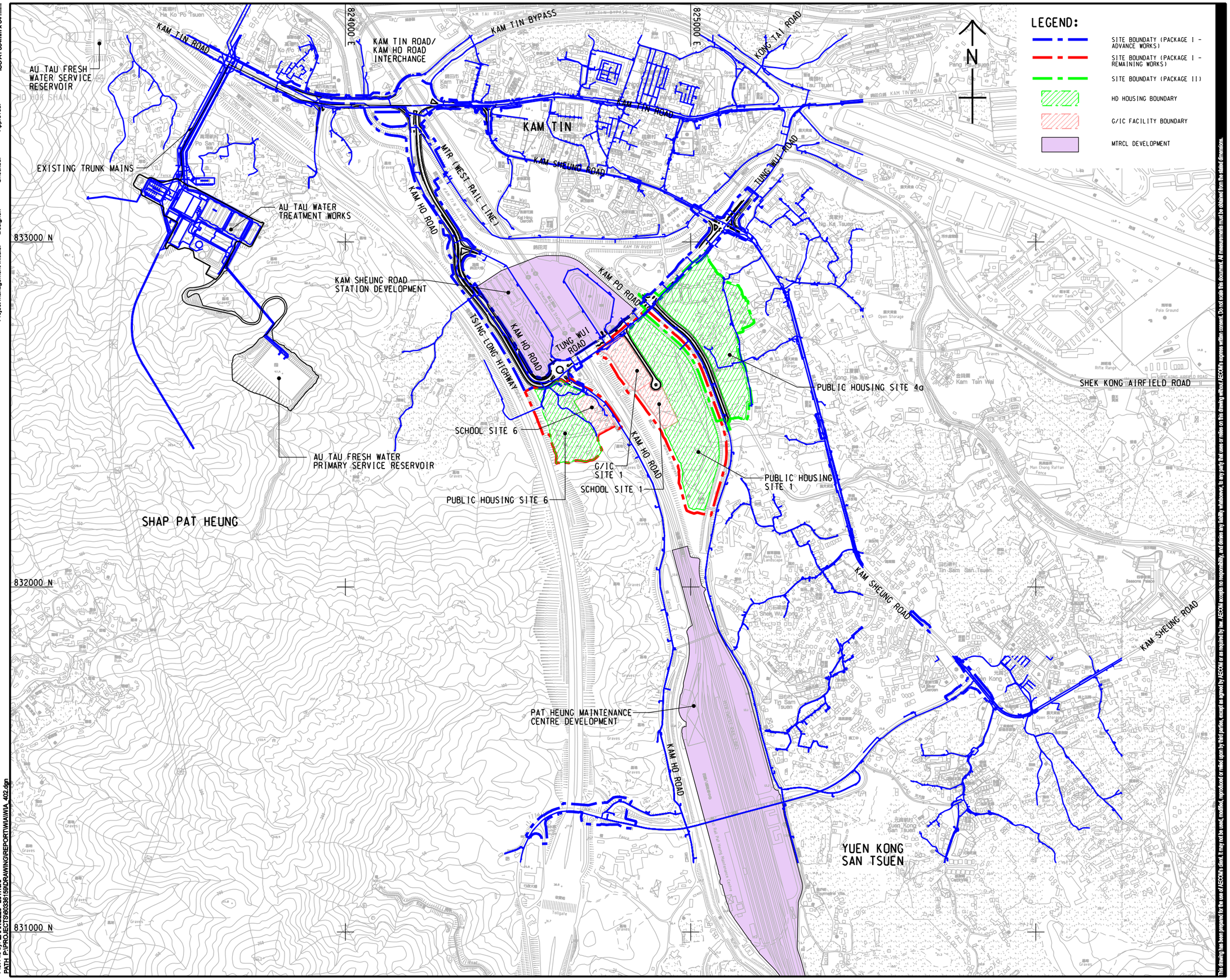

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DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

EXISTING REGIONAL WATER SUPPLY NETWORK

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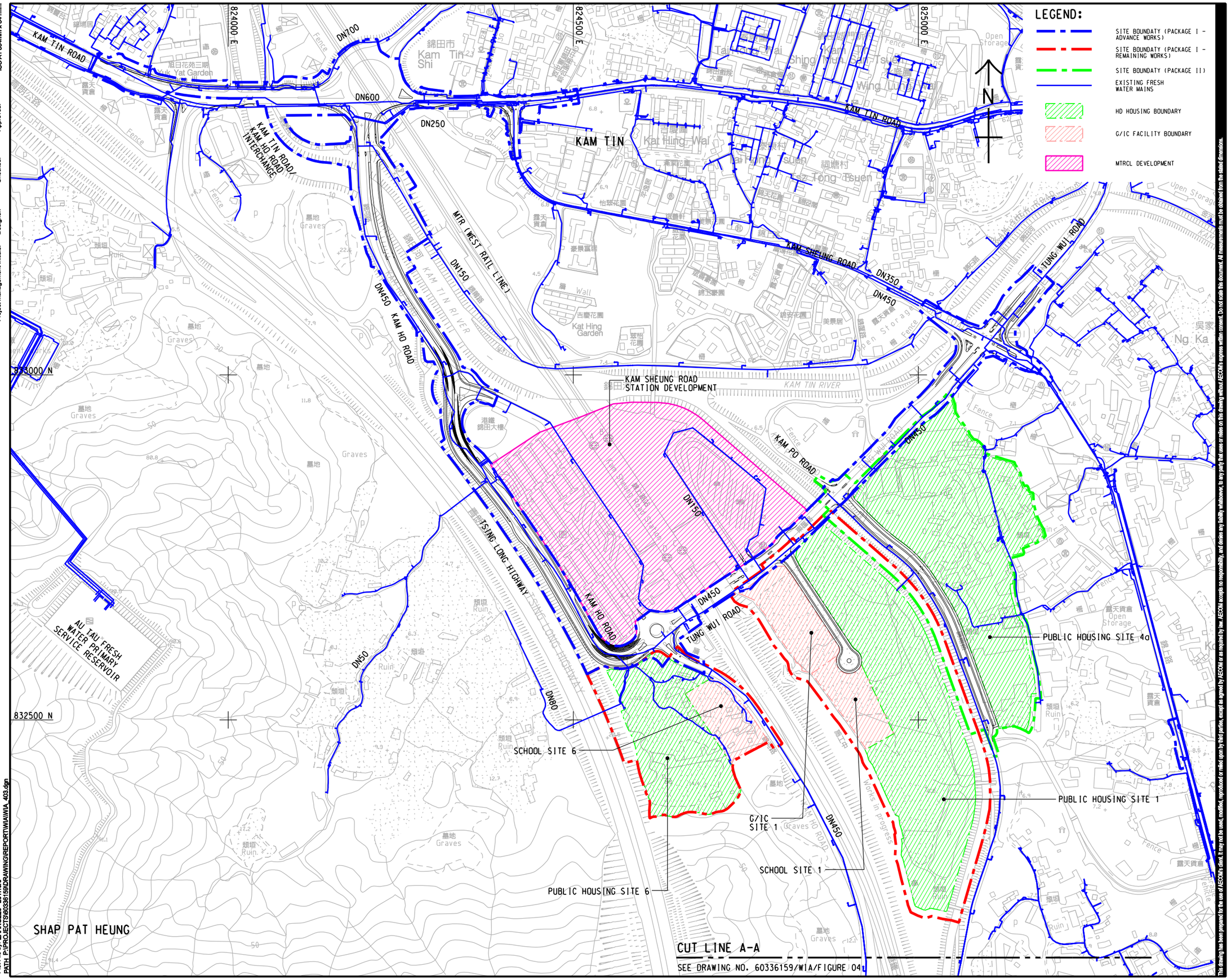
ISO A1 594mm x 841mm

Project Management Initials: Designer: Checked: Approved:



Plot File by: ZHANGLE3 2017/3/6
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PROJECT 項目

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR THE INITIAL SITES AT KAM TIN SOUTH, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT 業主

CEDD 土木工程拓展署 Civil Engineering and Development Department

CONSULTANT 工程顧問公司

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ISSUE/REVISION 發行

I/R 發行	DATE 日期	DESCRIPTION 內容摘要	CHK. 核核

STATUS 狀況

SCALE 比例
A1 1 : 2500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱
EXISTING LOCAL WATER SUPPLY ARRANGEMENT

SHEET NUMBER 圖紙編號
60336159/WIA/FIGURE 03

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Initials:

Project Manager:

NOTES:

1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 60336159/WIA/FIGURE 05.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60336159/WIA/FIGURE 05 TO FIGURE 09.

LEGEND:

- SITE BOUNDATY (PACKAGE I - ADVANCE WORKS)
- SITE BOUNDATY (PACKAGE I - REMAINING WORKS)
- SITE BOUNDATY (PACKAGE II)
- EXISTING FRESH WATER MAINS
- PROPOSED FRESH WATER MAINS (LAID BY THIS PROJECT)
- PROPOSED FLUSHING WATER MAINS (LAID BY THIS PROJECT)
- PROPOSED POTABLE WATER MAINS (LAID BY OTHERS)
- PROPOSED POTABLE WATER MAINS (LAID BY OTHERS)
- RAILWAY PROTECTION ZONE
- HD HOUSING BOUNDARY
- G/IC FACILITY BOUNDARY
- MTRCL DEVELOPMENT
- FIRE HYDRANT

833400 N

833200 N

824200 E

824000 E

KAM TIN SHI

KAM TIN ROAD / KAM HO ROAD INTERCHANGE

EXISTING DN600 FRESH WATER MAIN

EXISTING DN700 FRESH WATER MAIN

PROPOSED DN800 FRESH WATER MAIN FOR POTABLE USE

PROPOSED DN400 FRESH WATER MAIN FOR FLUSHING USE

KAM PO ROAD

KAM HO ROAD

KAM TIN RIVER

TSING LONG HIGHWAY

青朗公路

CUT LINE A-A
SEE DRAWING NO. 60336159/WIA/FIGURE 06

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PROJECT
項目

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR THE INITIAL SITES AT KAM TIN SOUTH, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT
業主

土木工程拓展署
CEDD Civil Engineering and Development Department

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I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核實

STATUS
階段

SCALE
比例

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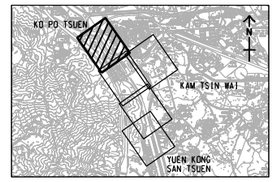
DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖 A1 1 : 50000



PROJECT NO.
項目編號

60336159

CONTRACT NO.
合約編號

CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

PROPOSED LOCAL WATER SUPPLY ARRANGEMENT

SHEET 1 OF 3

SHEET NUMBER
圖紙編號

60336159/WIA/FIGURE 05

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

NOTES:

1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 60336159/WIA/FIGURE 05.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60336159/WIA/FIGURE 05, FIGURE 07

CUT LINE B-B

SEE DRAWING NO. 60336159/WIA/FIGURE 07

833000 N

832800 N

824600 E

824400 E

CUT LINE A-A

SEE DRAWING NO. 60336159/WIA/FIGURE 05

CUT LINE C-C

SEE DRAWING NO. 60336159/WIA/FIGURE 08

CONNECTION TO FUTURE KSRS DEVELOPMENT

MTRCL'S KSRS DEVELOPMENT

CONNECTION TO FUTURE PUBLIC HOUSING SITE 1

PUBLIC HOUSING SITE 1

SCHOOL SITE 1

G/IC SITE 1

CONNECTION TO FUTURE GIC COMPLEX

CONNECTION TO FUTURE SCHOOL

DN800

DN400

TUNG WUI ROAD

SECTION OF PIPEWORKS UNDER EXISTING UNDERPASS SHALL BE INSTALLED BY TRENCHLESS METHOD

PROPOSED DN200 FRESH WATER MAIN FOR FLUSHING USE

PROPOSED DN400 FRESH WATER MAIN FOR POTABLE USE

KAM HO ROAD

DN200

CONNECTION TO FUTURE SCHOOL

SCHOOL SITE 6

BLANK FLANGE WILL BE INSTALLED FOR FUTURE EXTENSION

CONNECTION TO FUTURE PUBLIC HOUSING SITE 6

EXISTING WATER PIPE TO BE REMOVED

PUBLIC HOUSING SITE 6

PROPOSED DN800 FRESH WATER MAIN FOR POTABLE USE

DN600

PROPOSED DN400 FRESH WATER MAIN FOR FLUSHING USE

TSING LONG HIGHWAY

青朗公路

EXISTING WATER PIPE TO BE DIVERTED (ALIGNMENT TO BE FINALISED)

Plot File by: WANGDF 2016/9/10
PATH: P:\PROJECTS\60336159\DRAWING\REPORT\WIA\WIA_406.dgn

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PROJECT
項目

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR THE INITIAL SITES AT KAM TIN SOUTH, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT
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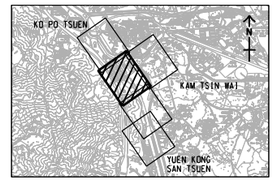
STATUS
階段

SCALE 比例
A1 1 : 1000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖 A1 1 : 50000



PROJECT NO. 項目編號
60336159

CONTRACT NO. 合約編號
CE 34/2014 (CE)

SHEET TITLE 圖紙名稱
PROPOSED LOCAL WATER SUPPLY ARRANGEMENT

SHEET 2 OF 3

SHEET NUMBER 圖紙編號
60336159/WIA/FIGURE 06

NOTES:

1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 60336159/WIA/FIGURE 05.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60336159/WIA/FIGURE 05 TO FIGURE 06, FIGURE 08 TO 09.

PROPOSED DN800 FRESH WATER MAIN FOR POTABLE USE (LAID BY THIS PROJECT)

BLANK FLANGE WILL BE INSTALLED FOR FUTURE EXTENSION

PROPOSED DN600 FRESH WATER MAIN FOR POTABLE USE (LAID BY OTHERS)

PROPOSED DN300 FRESH WATER MAIN FOR FLUSHING USE (LAID BY OTHERS)

PROPOSED DN300 FRESH WATER MAIN FOR FLUSHING USE (LAID BY THIS PROJECT)

PROPOSED DN300 FRESH WATER MAIN FOR FLUSHING USE

EXSTING WATER PIPE TO BE REMOVED

PUBLIC HOUSING SITE 4a

CONNECTION TO FUTURE PUBLIC HOUSING SITE 4a

EXISTING WATER PIPE TO BE REMOVED

CONNECTION TO FUTURE PUBLIC HOUSING SITE 4a

PROPOSED DN800 FRESH WATER MAIN FOR POTABLE USE

SECTION OF PIPEWORKS UNDER EXISTING KAM TIN SOUTH CHANNEL SHALL BE INSTALLED BY TRENCHLESS METHOD

CUT LINE B-B

SEE DRAWING NO. 60336159/WIA/FIGURE 06

PUBLIC HOUSING SITE 1

833200 N

833000 N

825000 E

824800 E

TUNG WUI ROAD

KAM SHEUNG ROAD

KAM WUI ROAD

KAM PO ROAD

KAM TIN RIVER

DN800

DN600

DN300

DN150

DN400

Approved:

Checked:

Designer:

Project Management Initials:

ISO A1 594mm x 841mm

Plot File by: WANGDF 2016/6/10
PATH: P:\PROJECTS\60336159\DRAWING\REPORT\WIA\WIA_407.dgn

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PROJECT
項目

SITE FORMATION AND INFRASTRUCTURAL WORKS FOR THE INITIAL SITES AT KAM TIN SOUTH, YUEN LONG - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT
業主

CEDD 土木工程拓展署 Civil Engineering and Development Department

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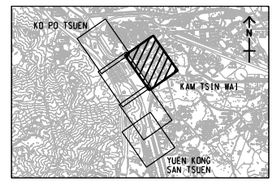
STATUS
狀況

SCALE 比例: A1 1 : 1000

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN 索引圖 A1 1 : 50000



PROJECT NO. 項目編號: 60336159

CONTRACT NO. 合約編號: CE 34/2014 (CE)

SHEET TITLE
圖紙名稱

PROPOSED LOCAL WATER SUPPLY ARRANGEMENT

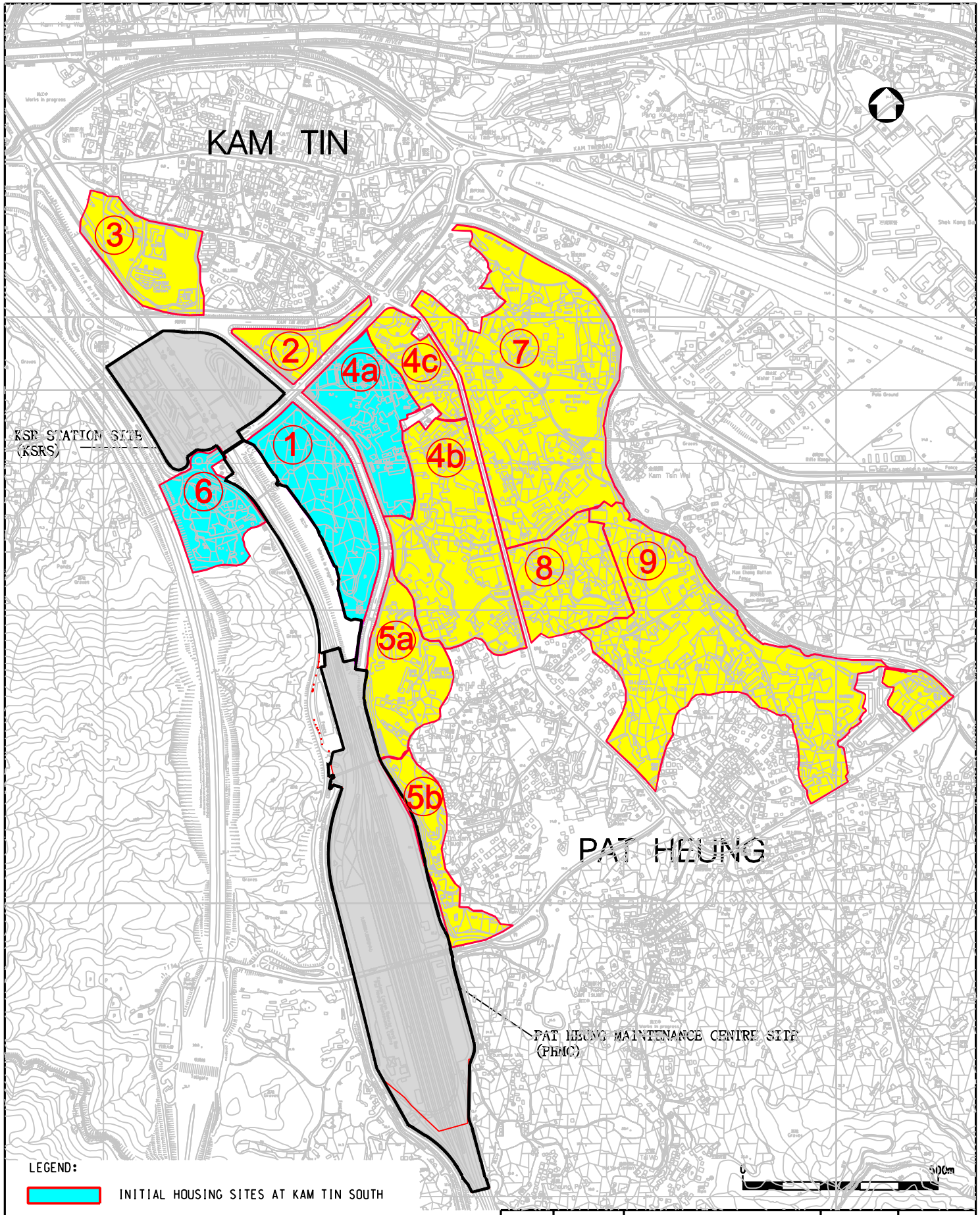
SHEET 3 OF 3

SHEET NUMBER
圖紙編號

60336159/WIA/FIGURE 07

Appendix A

Kam Tin South Housing Development – Layout Plans



LEGEND:

INITIAL HOUSING SITES AT KAM TIN SOUTH

REMAINING HOUSING SITES AT KAM TIN SOUTH

編號 no.	日期 date	修訂 REVISION 內容摘要 description	核對 checked	核准 approved
A	12.08.2014	TITLE BLOCK UPDATED	SIGNED	SIGNED

圖則名稱 drawing title

KAM TIN SOUTH HOUSING DEVELOPMENT -LAYOUT PLAN

繪圖 drawn	S M CHU	簽署 initial	SIGNED	日期 date 18.10.13
核對 checked	H S KO	簽署 initial	SIGNED	日期 date 18.10.13
核准 approved	K L CHEUNG	簽署 initial	SIGNED	日期 date 18.10.13

項目編號 item no.

比例 scale AS SHOWN

圖則編號 drawing no. NTNZ1855A

辦事處 office

新界西拓展處
NEW TERRITORIES WEST DEVELOPMENT OFFICE

土木工程拓展署
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

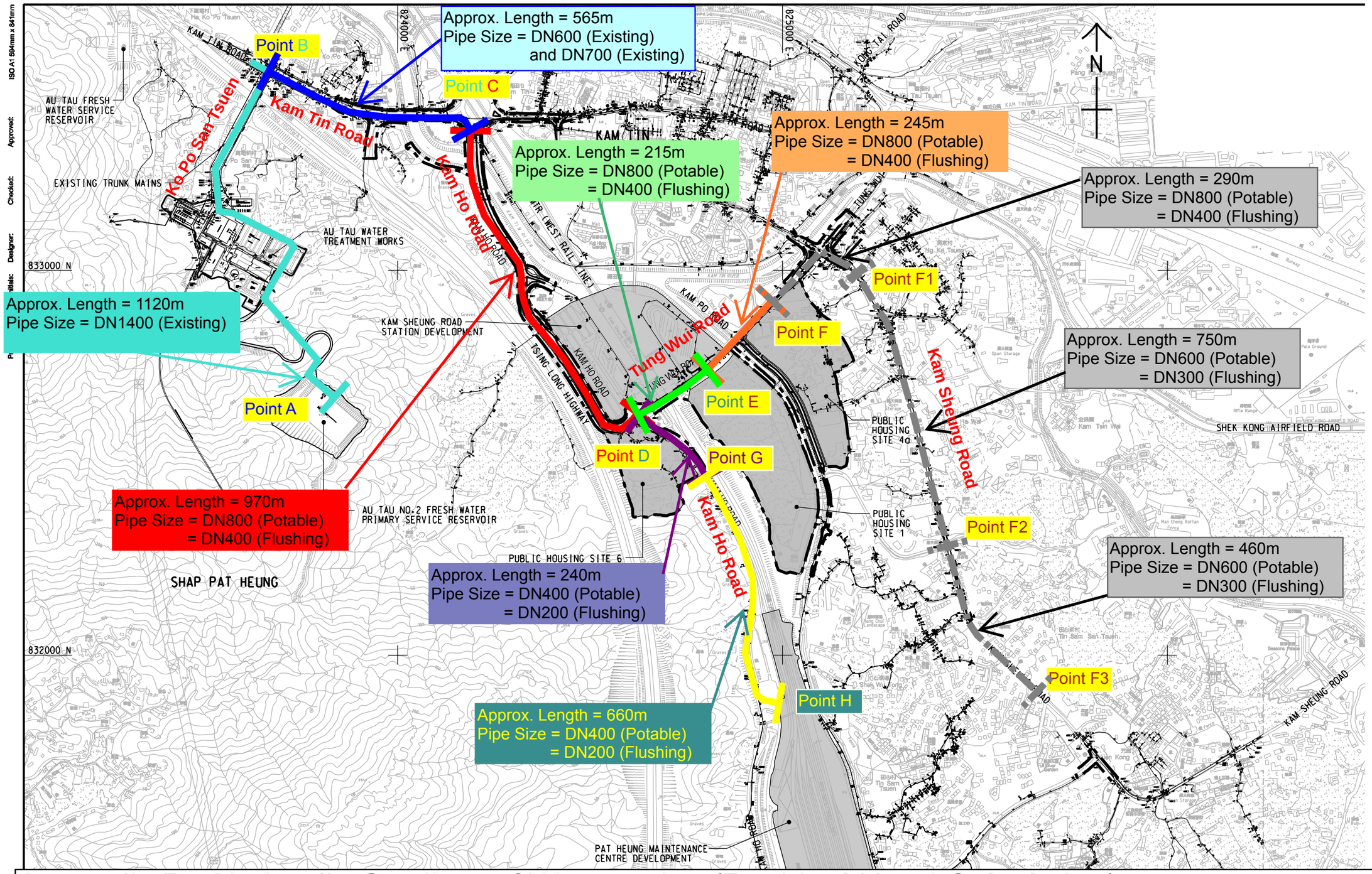
date filename

(Updated as at 30 JUL 2014) L:\Drawing-MS\Ntnz1855-1856\Ntnz1855A.dgn

A3 297MM X 420MM

Appendix B

Calculations of Assumed Hydraulic Gradient



Appendix B - Hydraulic Gradient of Watermains (Residual Head Calculation)

Layout Plan

Appendix B - Estimation of Hydraulic Gradient and Headloss (For POTABLE WATER for 5 Sites in this Project) by using Hazen-Williams Equation

$V = 0.85\, C_{hw}\, R^{0.63}\, S_f^{0.54}$

From Au Tau Fresh Water Primary Service Reservoir ATFWPSR to Nearest Point of the Development (Potable water)

Parameters	Unit	Watermain Section: Ko Po San Tsuen DN600 - Existing from Pt A to B	Kam Tin Road DN700 - Existing from Pt B to Pt C	Kam Ho Road DN700 - New lay from Pt C to Pt D
Nominal Pipe Diameter, D	mm	1400	600	800
Assumed Velocity Under Peak Flow Condition, V	m/s	3.0	3.0	3.0
Hydraulic Radius, R	m	0.35	0.15	0.2
Hazen-Williams Coef, C_{hw}		120	120	120
Hydraulic Gradient, Sf		0.0050	0.0133	0.0095
or 1 in		201	75	105
Travel Distance	m	1,120	565	970
Estimated Headloss (including 10% combined loss)	m	6.1	8.3	10.2

Point A, Delivery Head at ATFWPSR	mPD	87.2	Assume the IL of ATFWPSR as lowest point
Point B, Water Head at J/o Kam Tin Rd	mPD	81.1	
Point C, Water Head at Au Tau Interchange	mPD	72.8	
Point D, Water Head at Site 6 &KSRS's Entrance	mPD	62.6	
Point E, Water Head at Site 1 & KSRS's Entrance	mPD	see checking below	
Point F, Water Head at Site 4a's Entrance	mPD	see checking below	
Point G, Water Head at Site End@Kam Ho Road	mPD	59.5	
Point H, Water Head at PHMC's Entrance	mPD	see checking below	

From Site 6 to Site 1, 4a

Parameters	Unit	Watermain Section: Site 1/KSRS's Entrance Point E	Site 4a's Entrance Point F	Site 6's Entrance Point D
Nominal Pipe Diameter, D	mm	800	800	800
Assumed Velocity Under Peak Flow Condition, V	m/s	3.00	3.00	3.00
Hydraulic Radius, R	m	0.2	0.2	0.2
Hazen-Williams Coef, C_{hw}		120	120	120
Hydraulic Gradient, Sf		0.0095	0.0095	0.0095
or 1 in		105	105	105
Travel Distance	m	215	460	0
Estimated Headloss	m	2.3	4.8	0.0
(including extra 10% as combined loss for bend)				
Water Head at Point D (@KamHo Rd Roundabout)	mPD	62.6	62.6	62.6
Water Levels at Site	mPD	60.4	57.8	62.6
Approx. Ground Level	mPD	8.0	8.0	8.0
Residual Head	m	52.4	49.8	54.6
Required Residual Head of 20m (for new Potable Water)		OK	OK	OK

From PHMC Site - MTRCL Development

Parameters	Unit	Watermain Section: Along Kam Ho Rd [Pt D to Pt G]	PHMC Entrance Point H
Nominal Pipe Diameter, D	mm	400	400
Assumed Velocity Under Peak Flow Condition, V	m/s	2.00	2.00
Hydraulic Radius, R	m	0.1	0.1
Hazen-Williams Coef, C_{hw}		110	110
Hydraulic Gradient, Sf		0.0119	0.0119
or 1 in		84	84
Travel Distance	m	240	900
Estimated Headloss	m	3.1	11.8
(including extra 10% as combined loss for bend)			
Water Head at Point D (@KamHo Rd Rounadbout)	mPD	62.6	62.6
Water Levels at Site	mPD	59.5	50.9
Approx. Ground Level	mPD	13.5	12.1
Residual Head	m	46.0	38.8
Required Residual Head of 20m (for new Potable Water)		OK	OK

Note:

1. Hydraulic checks on residual head are for the purpose of estimating the delivery level up to the boundary of each development site at Kam Tin South area.

2. The respective authority (HD & MTRCL) shall liaise with Water Authority, and determine the size and routing of watermains to be laid (including inside services) to suit their development layout and to the satisfactory of relevant authorities.

3. An individual sump and pump system may be required to effect adequate water supply to the development based on their development layout and to the satisfactory of relevant authorities.

Appendix B - Estimation of Hydraulic Gradient and Headloss (For FLUSHING WATER for 5 Sites in this Project) by using Hazen-Williams Equation

$V = 0.85\, C_{hw}\, R^{0.63}\, S_f^{0.54}$

From Au Tau Fresh Water Primary Service Reservoir ATFWPSR to Nearest Point of the Development (Flushing water)

Parameters	Unit	Watermain Section Ko Po San Tsuen DN600 - Existing from Pt A to B	Kam Tin Road DN700 - Existing from Pt B to Pt C	Kam Ho Road DN700 - New lay from Pt C to Pt D
Nominal Pipe Diameter, D	mm	1400	600	400
Assumed Velocity Under Peak Flow Condition, V	m/s	3.0	3.0	1.5
Hydraulic Radius, R	m	0.35	0.15	0.1
Hazen-Williams Coef, C_{hw}		120	120	90
Hydraulic Gradient, Sf		0.0050	0.0133	0.0101
or 1 in		201	75	99
Travel Distance	m	1,120	565	970
Estimated Headloss (including 10% combined loss)	m	6.1	8.3	10.8

Point A, Delivery Head at ATFWPSR	mPD	87.2	Assume the IL of ATFWPSR as lowest point
Point B, Water Head at J/o Kam Tin Rd	mPD	81.1	
Point C, Water Head at Au Tau Interchange	mPD	72.8	
Point D, Water Head at Site 6 &KSRS's Entrance	mPD	62.0	
Point E, Water Head at Site 1 & KSRS's Entrance	mPD	see checking below	
Point F, Water Head at Site 4a's Entrance	mPD	see checking below	
Point G, Water Head at Site End@Kam Ho Road	mPD	56.0	
Point H, Water Head at PHMC's Entrance	mPD	see checking below	

From Site 6 to Site 1, 4a

Parameters	Unit	Watermain Section Site 1/KSRS's Entrance Point E	Site 4a's Entrance Point F	Site 6's Entrance Point D
Nominal Pipe Diameter, D	mm	400	400	400
Assumed Velocity Under Peak Flow Condition, V	m/s	1.50	1.50	1.50
Hydraulic Radius, R	m	0.1	0.1	0.1
Hazen-Williams Coef, C_{hw}		90	90	90
Hydraulic Gradient, Sf		0.0101	0.0101	0.0101
or 1 in		99	99	99
Travel Distance	m	215	460	0
Estimated Headloss	m	2.4	5.1	0.0
(including extra 10% as combined loss for bend)				
Water Head at Point D (@KamHo Rd Rounadbout)	mPD	62.0	62.0	62.0
Water Levels at Site	mPD	59.6	56.9	62.0
Approx. Ground Level	mPD	8.0	8.0	8.0
Residual Head	m	51.6	48.9	54.0
Required Residual Head of 15m (for new Flushing Water)		OK	OK	OK

From PHMC Site - MTRCL Development

Parameters	Unit	Watermain Section Along Kam Ho Rd [Pt D to Pt G]	PHMC Entrance Point H
Nominal Pipe Diameter, D	mm	200	200
Assumed Velocity Under Peak Flow Condition, V	m/s	1.50	1.50
Hydraulic Radius, R	m	0.05	0.05
Hazen-Williams Coef, C_{hw}		90	90
Hydraulic Gradient, Sf		0.0227	0.0227
or 1 in		44	44
Travel Distance	m	240	900
Estimated Headloss	m	6.0	22.5
(including extra 10% as combined loss for bend)			
Water Head at Point D (@KamHo Rd Rounadbout)	mPD	62.0	62.0
Water Levels at Site	mPD	56.0	39.6
Approx. Ground Level	mPD	13.5	12.1
Residual Head	m	42.5	27.5
Required Residual Head of 15m (for new Flushing Water)		OK	OK

Note:

1. Hydraulic checks on residual head are for the purpose of estimating the delivery level up to the boundary of each development site at Kam Tin South area.

2. The respective authority (HD & MTRCL) shall liaise with Water Authority, and determine the size and routing of watermains to be laid (including inside services) to suit their development layout and to the satisfactory of relevant authorities.

3. An individual sump and pump system may be required to effect adequate water supply to the development based on their development layout and to the satisfactory of relevant authorities.

Appendix B - Estimation of Hydraulic Gradient and Headloss (For POTABLE WATER for Remaining 9 sites) by using Hazen-Williams Equation

$V = 0.85\, C_{hw}\, R^{0.63}\, S_f^{0.54}$

From Au Tau Fresh Water Primary Service Reservoir ATFWPSR to Nearest Point of the Development (Potable water)

Parameters	Unit	Watermain Section Ko Po San Tsuen DN600 - Existing from Pt A to B	 Kam Tin Road DN700 - Existing from Pt B to Pt C	 Kam Ho Road DN700 - New lay from Pt C to Pt D
Nominal Pipe Diameter, D	mm	1400	600	800
Assumed Velocity Under Peak Flow Condition, V	m/s	3.0	3.0	3.0
Hydraulic Radius, R	m	0.35	0.15	0.2
Hazen-Williams Coef, C_{hw}		120	120	120
Hydraulic Gradient, Sf		0.0050	0.0133	0.0095
or 1 in		201	75	105
Travel Distance	m	1,120	565	970
Estimated Headloss (including 10% combined loss)	m	6.1	8.3	10.2

Point A, Delivery Head at ATFWPSR	mPD	87.2	Assume the IL of ATFWPSR as lowest point
Point B, Water Head at J/o Kam Tin Rd	mPD	81.1	
Point C, Water Head at Au Tau Interchange	mPD	72.8	
Point D, Water Head at Site 6 &KSRS's Entrance	mPD	62.6	
Point E, Water Head at Site 1 & KSRS's Entrance	mPD	see checking below	
Point F, Water Head at Site 4a's Entrance	mPD	see checking below	
Point G, Water Head at Site End@Kam Ho Road	mPD	54.8	
Point H, Water Head at PHMC's Entrance	mPD	see checking below	

From Site 6 to Site 1, 4a

Parameters	Unit	Watermain Section Site 1's Entrance Point E	 Site 4a's Entrance Point F	 Tung Wui Road's East End Point F1
Nominal Pipe Diameter, D	mm	800	800	600
Assumed Velocity Under Peak Flow Condition, V	m/s	3.00	3.00	3.00
Hydraulic Radius, R	m	0.2	0.2	0.15
Hazen-Williams Coef, C_{hw}		120	120	90
Hydraulic Gradient, Sf		0.0095	0.0095	0.0227
or 1 in		105	105	44
Travel Distance	m	215	460	750
Estimated Headloss	m	2.3	4.8	18.7
(including extra 10% as combined loss for bend)				
Water Head at Point D (@KamHo Rd Roundabout)	mPD	62.6	62.6	62.6
Water Levels at Site	mPD	60.4	57.8	43.9
Approx. Ground Level	mPD	8.0	8.0	7.4
Residual Head	m	52.4	49.8	36.5
Required Residual Head of 20m (for new Potable Water)		OK	OK	OK

Towards Remaining 9 Sites

Parameters	Unit	Watermain Section @Kam Sheung Rd [Point F1 - Site 7]	 @Kam Sheung Rd [Point F2 - Site 8]	 @Kam Sheung Rd Point F3 - Site 9
Nominal Pipe Diameter, D	mm	600	600	600
Assumed Velocity Under Peak Flow Condition, V	m/s	2.50	2.50	2.50
Hydraulic Radius, R	m	0.15	0.15	0.15
Hazen-Williams Coef, C_{hw}		120	120	120
Hydraulic Gradient, Sf		0.0095	0.0095	0.0095
or 1 in		105	105	105
Travel Distance	m	290	1,040	1,500
Estimated Headloss	m	3.0	10.9	15.7
(including extra 10% as combined loss for bend)				
Water Head at Point F (@Site 4a)	mPD	57.8	57.8	57.8
Water Levels at Site	mPD	54.8	46.9	42.1
Approx. Ground Level	mPD	7.4	9.3	12.1
Residual Head	m	47.4	37.6	30.0
Required Residual Head of 20m (for new Potable Water)		OK	OK	OK

Note:

1. Hydraulic checks on residual head are for the purpose of estimating the delivery level up to the boundary of each development site at Kam Tin South area.

2. The respective authority (HD & MTRCL) shall liaise with Water Authority, and determine the size and routing of watermains to be laid (including inside services) to suit their development layout and to the satisfactory of relevant authorities.

3. An individual sump and pump system may be required to effect adequate water supply to the development based on their development layout and to the satisfactory of relevant authorities.

Appendix B - Estimation of Hydraulic Gradient and Headloss (For FLUSHING WATER for Remaining 9 Sites) by using Hazen-Williams Equation

$V = 0.85\, C_{hw}\, R^{0.63}\, S_f^{0.54}$

From Au Tau Fresh Water Primary Service Reservoir ATFWPSR to Nearest Point of the Development (Flushing water)

Parameters	Unit	Watermain Section Ko Po San Tsuen DN600 - Existing from Pt A to B	 Kam Tin Road DN700 - Existing from Pt B to Pt C	 Kam Ho Road DN700 - New lay from Pt C to Pt D
Nominal Pipe Diameter, D	mm	1400	600	300
Assumed Velocity Under Peak Flow Condition, V	m/s	3.0	3.0	1.5
Hydraulic Radius, R	m	0.35	0.15	0.075
Hazen-Williams Coef, C_{hw}		120	120	90
Hydraulic Gradient, Sf		0.0050	0.0133	0.0141
or 1 in		201	75	71
Travel Distance	m	1,120	565	970
Estimated Headloss (including 10% combined loss)	m	6.1	8.3	15.1

Point A, Delivery Head at ATFWPSR	mPD	87.2	Assume the IL of ATFWPSR as lowest point
Point B, Water Head at J/o Kam Tin Rd	mPD	81.1	
Point C, Water Head at Au Tau Interchange	mPD	72.8	
Point D, Water Head at Site 6 &KSRS's Entrance	mPD	57.7	
Point E, Water Head at Site 1 & KSRS's Entrance	mPD	see checking below	
Point F, Water Head at Site 4a's Entrance	mPD	see checking below	
Point G, Water Head at Site End@Kam Ho Road	mPD	46.1	
Point H, Water Head at PHMC's Entrance	mPD	see checking below	

From Site 6 to Site 1, 4a

Parameters	Unit	Watermain Section Site 1's Entrance Point E	 Site 4a's Entrance Point F	 Tung Wui Road's East End Point F1
Nominal Pipe Diameter, D	mm	300	300	500
Assumed Velocity Under Peak Flow Condition, V	m/s	1.50	1.50	1.50
Hydraulic Radius, R	m	0.075	0.075	0.125
Hazen-Williams Coef, C_{hw}		90	90	90
Hydraulic Gradient, Sf		0.0141	0.0141	0.0078
or 1 in		71	71	128
Travel Distance	m	215	460	750
Estimated Headloss	m	3.3	7.2	6.4
(including extra 10% as combined loss for bend)				
Water Head at Point D (@KamHo Rd Roundabout)	mPD	57.7	57.7	57.7
Water Levels at Site	mPD	54.4	50.6	51.3
Approx. Ground Level	mPD	8.0	8.0	7.4
Residual Head	m	46.4	42.6	43.9
Required Residual Head of 15m (for new Flushing Water)		OK	OK	OK

Towards Remaining 9 Sites

Parameters	Unit	Watermain Section @Kam Sheung Rd [Point F1 - Site 7]	 @Kam Sheung Rd [Point F2 - Site 8]	 @Kam Sheung Rd Point F3 - Site 9
Nominal Pipe Diameter, D	mm	300	300	300
Assumed Velocity Under Peak Flow Condition, V	m/s	1.50	1.50	1.50
Hydraulic Radius, R	m	0.075	0.075	0.075
Hazen-Williams Coef, C_{hw}		90	90	90
Hydraulic Gradient, Sf		0.0141	0.0141	0.0141
or 1 in		71	71	71
Travel Distance	m	290	1,040	1,500
Estimated Headloss	m	4.5	16.2	23.3
(including extra 10% as combined loss for bend)				
Water Head at Point F (@Site 4a)	mPD	50.6	50.6	50.6
Water Levels at Site	mPD	46.1	34.4	27.3
Approx. Ground Level	mPD	7.4	9.3	12.1
Residual Head	m	38.7	25.1	15.2
Required Residual Head of 15m (for new Flushing Water)		OK	OK	OK

Note:

1. Hydraulic checks on residual head are for the purpose of estimating the delivery level up to the boundary of each development site at Kam Tin South area.

2. The respective authority (HD & MTRCL) shall liaise with Water Authority, and determine the size and routing of watermains to be laid (including inside services) to suit their development layout and to the satisfactory of relevant authorities.

3. An individual sump and pump system may be required to effect adequate water supply to the development based on their development layout and to the satisfactory of relevant authorities.

Appendix C

Conditions of Working in the Vicinity of Waterworks Installations

Conditions of Working in the Vicinity of Waterworks Installations

Water Mains

1. No water mains or their support shall be interfered with or buried without the prior approval of Water Supplies Department (WSD).

2. The Contractor shall check the location of water mains and cables and other services by hand dug trial holes and take precautionary measures to protect them.

3. Free access shall be maintained at all times for the staff of WSD, their contractors and vehicles to go into and/or through the site to carry out installation, inspection, operation, maintenance or repair works.

4. No additional filling material is to be deposited over a water main without the approval of WSD.

5. No structures shall be erected or materials stored within 3 metres from the centre line of mains of 900mm diameter or under, and 5 metres for mains exceeding 900mm in diameter.

6. No cable, pipe or duct shall be laid over, in parallel to, or within the Waterworks Reserve or 300mm around, the water mains without prior written approval from WSD. No trees or shrubs with penetrating roots shall be planted within the Waterworks Reserve or within 2.5m from the edge of the water mains. No planting or obstruction of any kind except turfing shall be permitted within the space of 1.5m around the cover of any WSD valve or within a distance of 1m from any hydrant outlet.

7. No footing shall be constructed above any existing water mains. Isolated footings shall be constructed instead of continuous footing for installation of the hoarding in the vicinity of the existing water mains. A minimum clearance of 300mm between the footing and the existing water mains shall be maintained.

8. Full details of any proposed temporary works affecting waterworks installations and of any temporary support or protective measure to mains shall be submitted to the Client Department where appropriate for approval and to WSD for information. Work shall not commence until approval is given by the Client Department.

9. Diversion of WSD mains, other than those already shown on the contract drawings, shall only be considered when all other options such as protection of the mains or modification of design have been considered and found to be impracticable.

10. The programme for laying or diversions of all WSD mains shall be agreed with WSD in advance. A 14-day notice shall be served to WSD to confirm

site availability for the commencement of any agreed diversion. WSD shall also be notified of any change required in the agreed programme as soon as possible.

11. All excavation works within 1.5m of water mains exceeding 900mm in diameter shall be carried out by hand. No excavation shall be carried out within lines 45° below the centre line of such mains or 45° below the edges of the foundation of their supports without approved ground support. If the support is in the form of steel sheets, they shall be left in place after works. Removal of support from underneath the mains is not permitted.

12. No earth fill ramps are to be used to form temporary crossings of the large diameter mains. Temporary ramps/bridges in steel, timber, or concrete shall be used with the deck and support piers clear of the mains so that no loading is imposed on the mains.

13. All temporary works near the large diameter water mains shall be kept at least 1 metre away from the edge of the mains and the length of mains affected shall be well protected by a temporary timber cover raised 250mm clear of the mains to ensure no impact damage.

Blasting, Drilling and Piling near Waterworks Installations

14. No blasting, drilling or pile driving (including sheet piling) within a distance of 60m from waterworks tunnels will be carried out. Furthermore, blasting within 50m from any water retaining structure other than water mains; 6m from water mains of 600mm diameter and above; and 6m from any non-water-retaining structure shall not be carried out without the prior approval of WSD.

15. The maximum particle velocity and amplitude of ground movements due to blasting or pile driving as measured at the nearest waterworks tunnel or other water retaining structures shall not exceed 13mm/sec. and 0.1mm respectively.

16. The maximum particle velocity and amplitude of ground movements due to blasting or pile driving as measured at the nearest water mains shall not exceed 25mm/sec. and 0.2mm respectively.

17. The size of charge, pattern and timing of detonation etc. will be decided by the Commissioner of Mines after carrying out test firing at site.

18. The movement of mains and structures shall be monitored by surveys jointly attended by WSD, the project Department and the Contractor. One week's notice shall be given to WSD for any survey request.

19. Vibration from blasting, piling or other causing activities shall be monitored by means of agreed vibrograph readings. The vibrograph shall comply with the Specification below and shall be provided free by the Contractor.

20. The results of monitoring of the vibration and any movement of water mains and waterworks structures shall be submitted to WSD for record purpose. If the aforementioned vibration limits are exceeded or movement in excess of 5mm is detected, works shall be suspended until approved remedial works are completed. Full details of the proposed works shall be approved by WSD before my work commences.

Specification for Vibrograph

(a) The machine shall be a direct reading type peak particle velocity vibrograph.

(b) It shall have 3 channels, recording in 3 mutually perpendicular directions.

(c) It must be able to record particle velocity and amplitude, although not necessarily at the same time.

(d) It must produce a permanent trace on paper, preferably by using ultra-violet light.

(e) The recording paper must be easily obtainable locally.

(f) The instrument must be portable and battery operated (or else a generator must be supplied free).

(g) Operating instructions must be in English.

Excavation near Waterworks Installations

21. Excavation shall not be permitted within lines drawn at 45° downwards from a point 6m away from the foundation lines of any waterworks structure.

22. No excavation should be carried out within 60 metres, horizontally of any tunnel and no excavation or well driving shall be carried out above any tunnel.

23. No quarrying operations shall be carried out above and/or within 150 metres horizontally from any waterworks tunnel.

Prevention of Pollution of Waterworks Catchments

24. Site formation, construction and drainage plans shall be submitted to WSD for approval prior to commencement of work.

25. Protective measures shall be taken by the Contractor to prevent pollution or siltation to the catchment area. Any bulk excavation within the catchment shall be provided with silt traps to prevent any particular matter form entering

streams or intakes. The details of silt traps shall be submitted to WSD for approval. Silt traps shall be cleared out regularly and in particular after any rainstorm.

26. The storage and discharge of pesticides, toxicant, flammable or toxic solvents, petroleum oil, diesel, tar or other toxic substances are strictly prohibited within the gathering grounds.

27. No latrine lines shall be allowed within waterworks catchment area.

28. Only dry-type portable toilet facility with regular desludging schedules is allowed during the construction period. The sludge must be disposed of properly outside the gathering grounds. Portable toilets shall be kerbed on all sides, located at least 30 metres away from the streams and desludged on a regular basis.

29. The Contractor shall be responsible for cleaning frequently any waterworks roads and associated drainage works of mud and debris.

30. Should pollution be detected in future due to the development, immediate remedial actions to clear the pollution must be taken by the Contractor.

Waterworks Installation (e.g. Treatment Works) Nearby

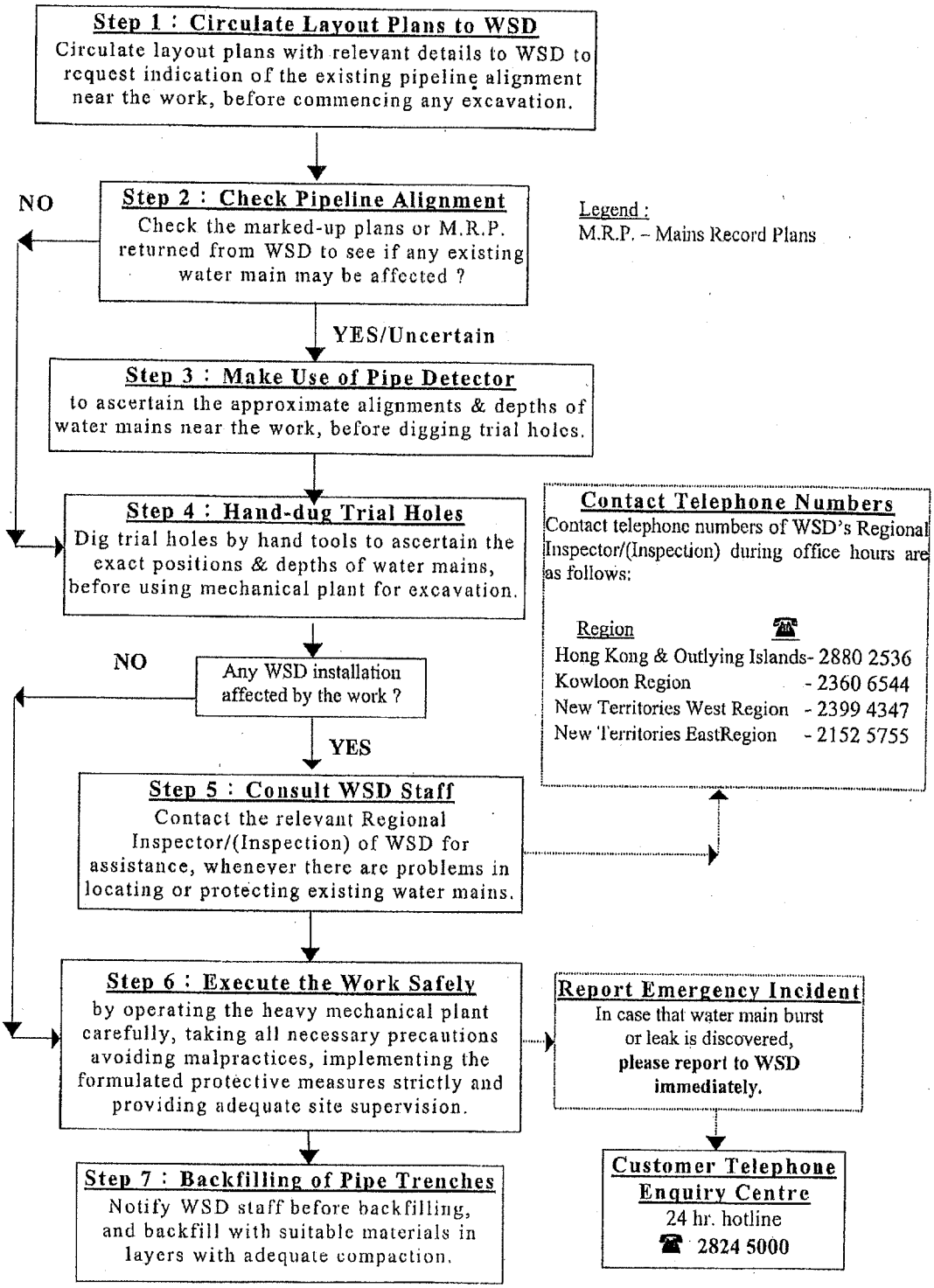
31. The Contractor will not be permitted access to any adjacent waterworks installations.

32. An unimpeded free vehicular access shall be maintained at all times to and from the adjacent waterworks installations in the vicinity.

Special Provisions

33. WSD may impose further conditions as deemed necessary for the protection of waterworks that may be adversely affected by the proposed works including but not limited to the appointment of independent checking engineer and specialists at the expense of the project.

Flow Chart on Procedures for Safe Working Near Water Mains



	具發展潛力用地 Potential Development Sites	建議總地積比率(大約) Proposed Total Plot Ratio (approx.)
	錦上路站 KSR	3.0
	八鄉維修中心 PHMC	3.0
	公營房屋 用地1、4a、4b、5a及6 Public Housing Site 1, 4a, 4b, 5a and 6	3.0
	用地2、3、4c Site 2,3,4c	2.1
	用地7、8 Site 7, 8	1.5
	用地5b、9 Site 5b, 9	0.8

R(C)	住宅(丙類) Residential (Group C)
R(D)	住宅(丁類) Residential (Group D)
V	鄉村式發展 Village Development Area
C	商業 Commercial
G/IC	政府、機構或社區 Government, Institution or Community
O	休憩用地 Open Space
AGR	農業 Agriculture
GB	綠化地帶 Green Belt
CA	自然保育區 Conservation Area
OU	其他指定用途(加油站) Other Specified Uses (Petrol Filling Station)
	土地建議作政府、機構及社區設施用地 Sites Proposed for G/IC facilities
	西鐵綫 West Rail Line
	排水渠/河流 Drainage / River

200 0 400 米 m

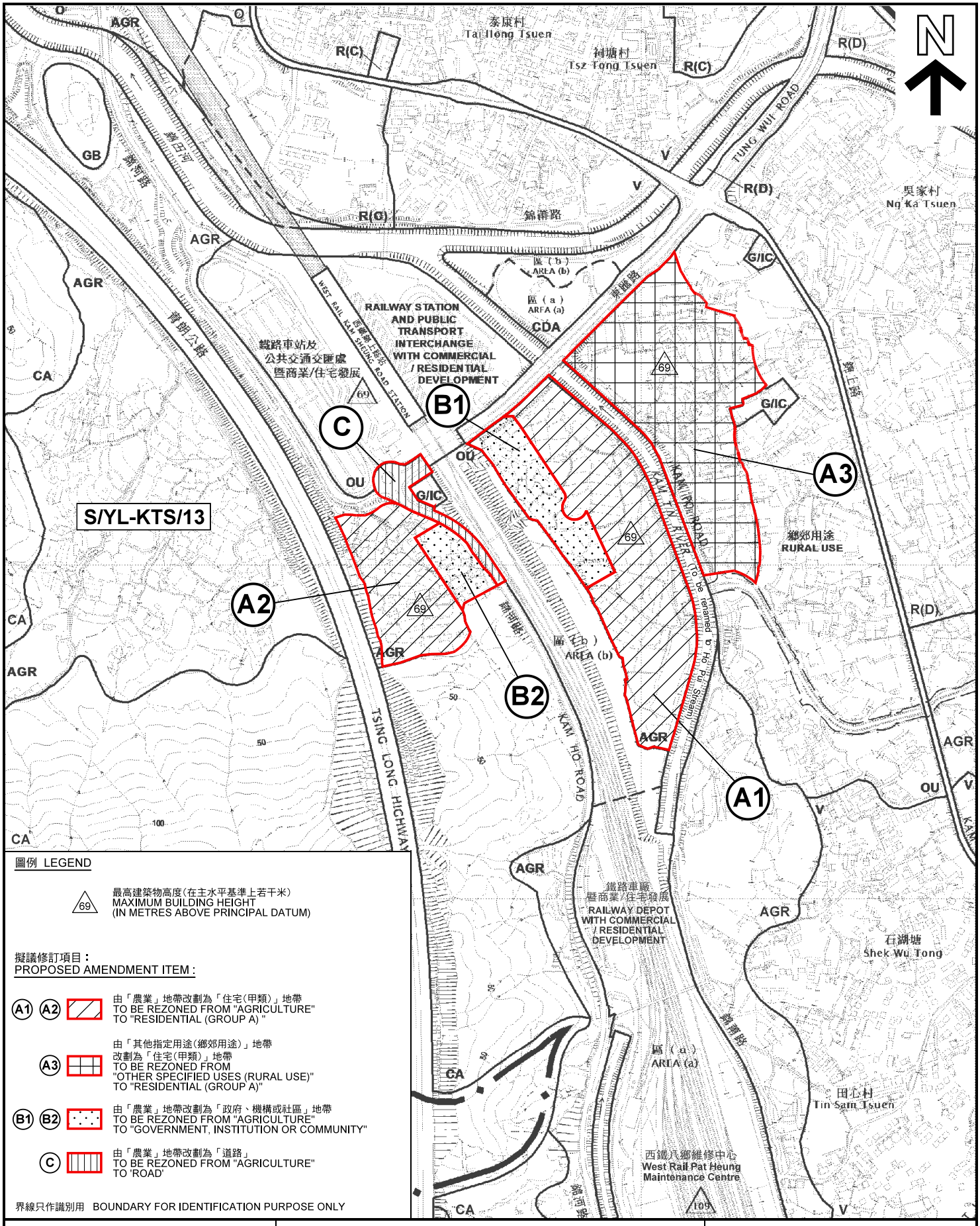
本摘要圖於2017年10月6日擬備
EXTRACT PLAN PREPARED ON 6.10.2017

《錦田南及八鄉區土地用途檢討》所物色的十四幅具發展潛力用地
14 POTENTIAL SITES UNDER THE LAND USE REVIEW FOR KAM TIN SOUTH AND PAT HEUNG

規劃署
PLANNING DEPARTMENT

參考編號 REFERENCE No.
M/YLE/17/22

圖 PLAN
1



圖例 LEGEND

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

擬議修訂項目：
PROPOSED AMENDMENT ITEM :

A1 A2 由「農業」地帶改劃為「住宅(甲類)」地帶
TO BE REZONED FROM "AGRICULTURE"
TO "RESIDENTIAL (GROUP A) "

A3 由「其他指定用途(鄉郊用途)」地帶
改劃為「住宅(甲類)」地帶
TO BE REZONED FROM
"OTHER SPECIFIED USES (RURAL USE)"
TO "RESIDENTIAL (GROUP A)"

B1 B2 由「農業」地帶改劃為「政府、機構或社區」地帶
TO BE REZONED FROM "AGRICULTURE"
TO "GOVERNMENT, INSTITUTION OR COMMUNITY"

C 由「農業」地帶改劃為「道路」
TO BE REZONED FROM "AGRICULTURE"
TO 'ROAD'

界線只作識別用 BOUNDARY FOR IDENTIFICATION PURPOSE ONLY

本摘要圖於2017年8月31日擬備，
所根據的資料為於2016年8月30日
核准的分區計劃大綱圖編號 S/YL-KTS/13
(用途地帶界線有所微調)
EXTRACT PLAN PREPARED ON 31.8.2017
BASED ON OUTLINE ZONING PLAN NO.
S/YL-KTS/13 APPROVED ON 30.8.2016
(WITH MINOR ADJUSTMENT TO
ZONE BOUNDARY)

位置圖 LOCATION PLAN

錦田南分區計劃大綱核准圖
編號 S/YL-KTS/13 的擬議修訂
PROPOSED AMENDMENTS TO THE APPROVED
KAM TIN SOUTH OUTLINE ZONING PLAN No. S/YL-KTS/13

SCALE 1 : 7 500 比例尺
米 METRES 100 0 100 200 300 米 METRES

規劃署
PLANNING DEPARTMENT

參考編號
REFERENCE No.
M/YLE/17/22

圖 PLAN
2a



擬議修訂項目：
PROPOSED AMENDMENT ITEM :

A1 A2 — 由「農業」地帶改劃為「住宅(甲類)」地帶
TO BE REZONED FROM "AGRICULTURE"
TO "RESIDENTIAL (GROUP A) "

A3 — 由「其他指定用途(鄉郊用途)」地帶
改劃為「住宅(甲類)」地帶
TO BE REZONED FROM
"OTHER SPECIFIED USES (RURAL USE)"
TO "RESIDENTIAL (GROUP A)"

B1 B2 — 由「農業」地帶改劃為「政府、機構或社區」地帶
TO BE REZONED FROM "AGRICULTURE"
TO "GOVERNMENT, INSTITUTION OR COMMUNITY"

C — 由「農業」地帶改劃為「道路」
TO BE REZONED FROM "AGRICULTURE"
TO 'ROAD'

界線只作識別用 BOUNDARY FOR IDENTIFICATION PURPOSE ONLY

圖例 LEGEND

私人地段
PRIVATE LOT

常耕 / 休耕農地 / 植物苗圃 / 果園
ACTIVE / FALLOW AGRICULTURAL LAND / PLANT NURSERY / ORCHARD

住用
DOMESTIC

貯存 / 貨倉 / 工廠
STORAGE / WAREHOUSE / FACTORY

車輛停泊 / 公眾停車場
PARKING OF VEHICLES / PUBLIC VEHICLE PARK

空置 / 沒有用途的土地
VACANT / UNUSED LAND

本摘要圖於2017年10月9日擬備，所根據的資料為測量圖編號 6-NE-12A、12B、12C、12D、17A及17B
EXTRACT PLAN PREPARED ON 9.10.2017 BASED ON SURVEY SHEETS No. 6-NE-12A, 12B, 12C, 12D, 17A & 17B

註釋 Note :
在此圖顯示的土地用途，是基於規劃署於2017年2月3日及2017年2月17日的實地視察。
Land uses shown on this plan are based on the site visit conducted by the Planning Department on 3.2.2017 and 17.2.2017.

平面圖 SITE PLAN

錦田南分區計劃大綱核准圖
編號 S/YL-KTS/13 的擬議修訂
PROPOSED AMENDMENTS TO THE APPROVED KAM TIN SOUTH OUTLINE ZONING PLAN No. S/YL-KTS/13

SCALE 1 : 3 000 比例尺
米 METRES 60 0 60 120 米 METRES

規劃署
PLANNING DEPARTMENT

參考編號
REFERENCE No.
M/YLE/17/22

圖 PLAN
2b



圖例 LEGEND

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

擬議修訂項目：
PROPOSED AMENDMENT ITEM :

A1 A2 由「農業」地帶改劃為「住宅(甲類)」地帶
TO BE REZONED FROM "AGRICULTURE"
TO "RESIDENTIAL (GROUP A) "

A3 由「其他指定用途(鄉郊用途)」地帶
改劃為「住宅(甲類)」地帶
TO BE REZONED FROM
"OTHER SPECIFIED USES (RURAL USE)"
TO "RESIDENTIAL (GROUP A) "

B1 B2 由「農業」地帶改劃為「政府、機構或社區」地帶
TO BE REZONED FROM "AGRICULTURE"
TO "GOVERNMENT, INSTITUTION OR COMMUNITY"

C 由「農業」地帶改劃為「道路」
TO BE REZONED FROM "AGRICULTURE"
TO 'ROAD'

界線只作識別用 BOUNDARY FOR IDENTIFICATION PURPOSE ONLY

本摘要圖於2017年8月31日擬備，所根據的資料為地政總署於2015年12月18日拍得的航攝照片
EXTRACT PLAN PREPARED ON 31.8.2017
BASED ON AERIAL PHOTOS
TAKEN ON 18.12.2015
BY LANDS DEPARTMENT

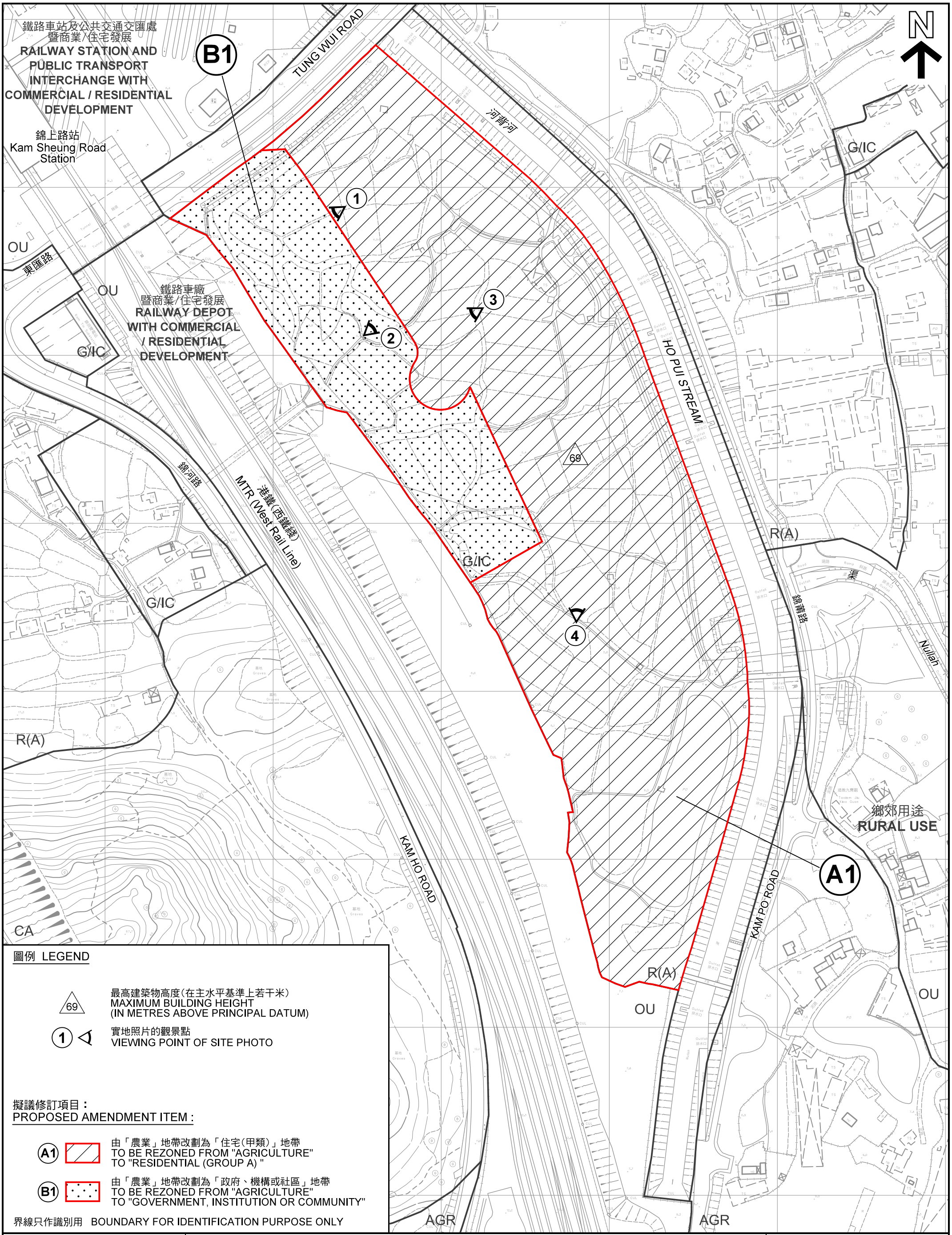
航攝照片 AERIAL PHOTO

錦田南分區計劃大綱核准圖
編號 S/YL-KTS/13 的擬議修訂
PROPOSED AMENDMENTS TO THE APPROVED KAM TIN SOUTH OUTLINE ZONING PLAN No. S/YL-KTS/13

規劃署
PLANNING DEPARTMENT

參考編號
REFERENCE No.
M/YLE/17/22

圖 PLAN
2c



圖例 LEGEND

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

① 實地照片的觀景點
VIEWING POINT OF SITE PHOTO

擬議修訂項目：
PROPOSED AMENDMENT ITEM :

A1 由「農業」地帶改劃為「住宅(甲類)」地帶
TO BE REZONED FROM "AGRICULTURE"
TO "RESIDENTIAL (GROUP A) "

B1 由「農業」地帶改劃為「政府、機構或社區」地帶
TO BE REZONED FROM "AGRICULTURE"
TO "GOVERNMENT, INSTITUTION OR COMMUNITY"

界線只作識別用 BOUNDARY FOR IDENTIFICATION PURPOSE ONLY

本摘要圖於2017年10月9日擬備，所根據的資料為測量圖編號 6-NE-12C、12D、17A、17B
EXTRACT PLAN PREPARED ON 9.10.2017 BASED ON SURVEY SHEETS No. 6-NE-12C, 12D, 17A, 17B

平面圖 SITE PLAN

錦田南分區計劃大綱核准圖
編號 S/YL-KTS/13 的擬議修訂 - 項目 A1 及 B1
PROPOSED AMENDMENTS TO THE APPROVED KAM TIN SOUTH OUTLINE ZONING PLAN No. S/YL-KTS/13 ITEMS A1 AND B1

SCALE 1 : 2 000 比例尺
米 METRES 40 0 40 80 米 METRES

規劃署
PLANNING DEPARTMENT

參考編號
REFERENCE No.
M/YLE/17/22

圖 PLAN
3a-1



圖例 LEGEND

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

擬議修訂項目：
PROPOSED AMENDMENT ITEM :

A1 由「農業」地帶改劃為「住宅(甲類)」地帶
TO BE REZONED FROM "AGRICULTURE"
TO "RESIDENTIAL (GROUP A) "

B1 由「農業」地帶改劃為「政府、機構或社區」地帶
TO BE REZONED FROM "AGRICULTURE"
TO "GOVERNMENT, INSTITUTION OR COMMUNITY"

界線只作識別用 BOUNDARY FOR IDENTIFICATION PURPOSE ONLY

本摘要圖於2017年10月6日擬備，所根據的資料為地政總署於2015年12月18日拍得的航攝照片
EXTRACT PLAN PREPARED ON 6.10.2017
BASED ON AERIAL PHOTOS
TAKEN ON 18.12.2015
BY LANDS DEPARTMENT

航攝照片 AERIAL PHOTO

錦田南分區計劃大綱核准圖
編號 S/YL-KTS/13 的擬議修訂 - 項目 A1 及 B1
PROPOSED AMENDMENTS TO THE APPROVED
KAM TIN SOUTH OUTLINE ZONING PLAN No. S/YL-KTS/13
ITEMS A1 AND B1

規劃署
PLANNING DEPARTMENT

參考編號
REFERENCE No.
M/YLE/17/22

圖 PLAN
3a-2

1



2



3



4



本圖於2017年10月6日擬備，所根據的資料為攝於2017年8月25日的實地照片
PLAN PREPARED ON 6.10.2017
BASED ON SITE PHOTOS
TAKEN ON 25.8.2017

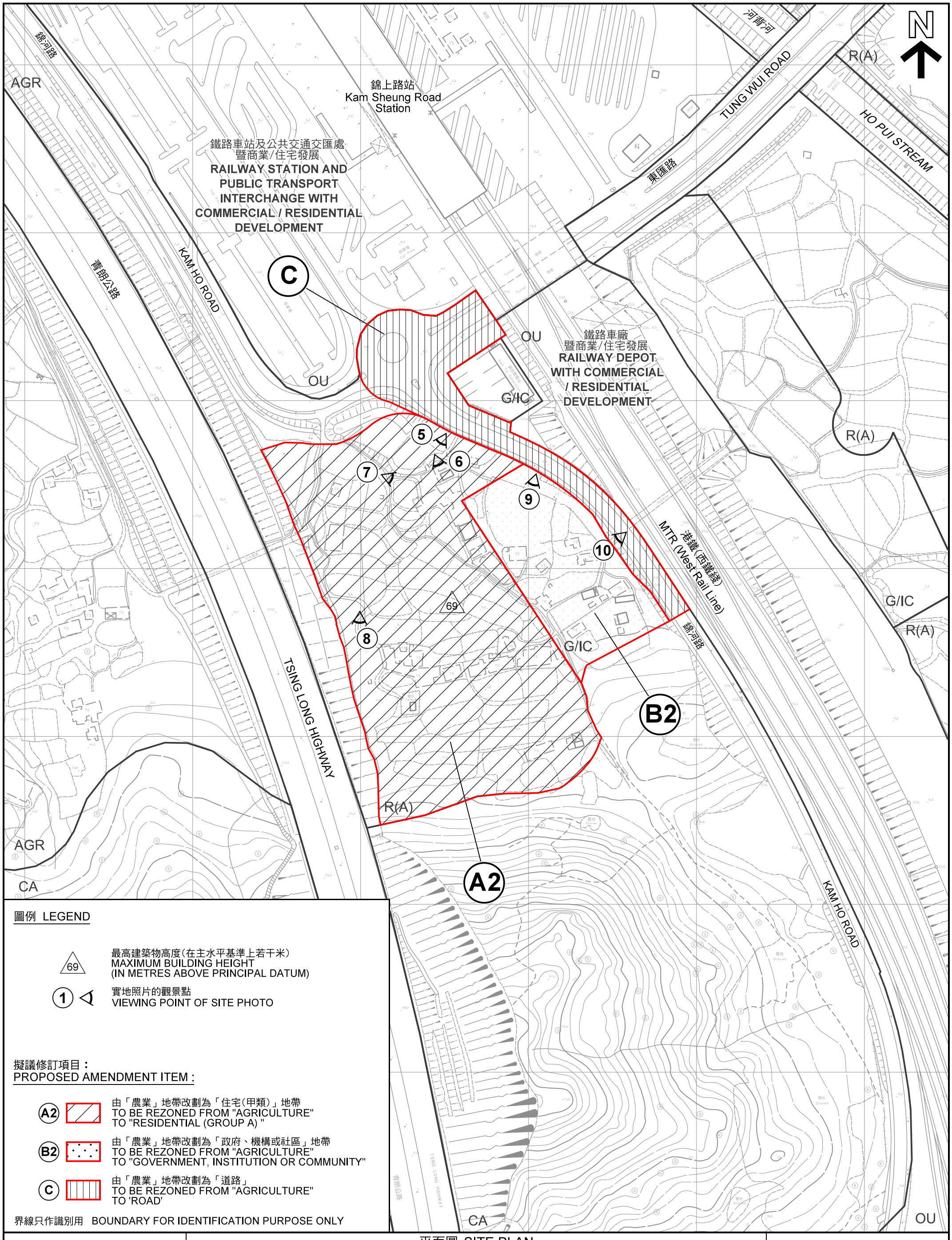
實地照片 SITE PHOTOS

錦田南分區計劃大綱核准圖
編號 S/YL-KTS/13 的擬議修訂 - 項目 A1 及 B1
PROPOSED AMENDMENTS TO THE APPROVED
KAM TIN SOUTH OUTLINE ZONING PLAN No. S/YL-KTS/13
ITEMS A1 AND B1

規劃署
PLANNING DEPARTMENT

參考編號
REFERENCE No.
M/YLE/17/22

圖 PLAN
3a-3



圖例 LEGEND

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

1 實地照片的觀景點
VIEWING POINT OF SITE PHOTO

擬議修訂項目：
PROPOSED AMENDMENT ITEM :

A2 由「農業」地帶改劃為「住宅(甲類)」地帶
TO BE REZONED FROM "AGRICULTURE"
TO "RESIDENTIAL (GROUP A) "

B2 由「農業」地帶改劃為「政府、機構或社區」地帶
TO BE REZONED FROM "AGRICULTURE"
TO "GOVERNMENT, INSTITUTION OR COMMUNITY"

C 由「農業」地帶改劃為「道路」
TO BE REZONED FROM "AGRICULTURE"
TO 'ROAD'

界線只作識別用 BOUNDARY FOR IDENTIFICATION PURPOSE ONLY

本摘要圖於2017年8月31日擬備，所根據的
資料為測量圖編號 6-NE-12C、12D、17A、17B
EXTRACT PLAN PREPARED ON 31.8.2017
BASED ON SURVEY SHEETS No.
6-NE-12C, 12D, 17A, 17B

平面圖 SITE PLAN

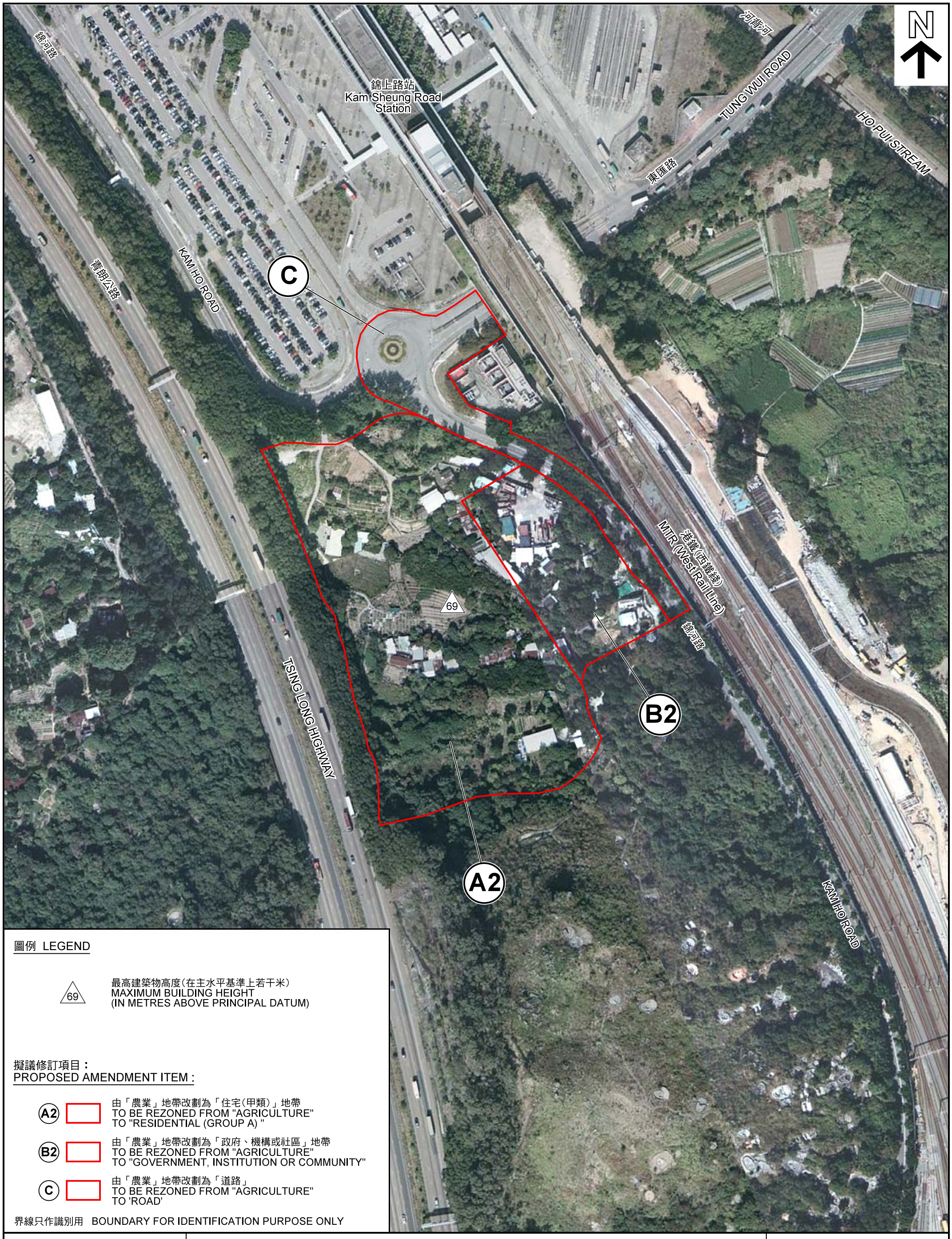
錦田南分區計劃大綱核准圖
編號 S/YL-KTS/13 的擬議修訂 - 項目 A2、B2 及 C
PROPOSED AMENDMENTS TO THE APPROVED
KAM TIN SOUTH OUTLINE ZONING PLAN No. S/YL-KTS/13
ITEMS A2, B2 AND C

SCALE 1 : 2 000 比例尺
米 METRES 40 0 40 80 米 METRES

規劃署
PLANNING DEPARTMENT

參考編號
REFERENCE No.
M/YLE/17/22

圖 PLAN
3b-1



圖例 LEGEND

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

擬議修訂項目：
PROPOSED AMENDMENT ITEM :

A2 由「農業」地帶改劃為「住宅(甲類)」地帶
TO BE REZONED FROM "AGRICULTURE"
TO "RESIDENTIAL (GROUP A) "

B2 由「農業」地帶改劃為「政府、機構或社區」地帶
TO BE REZONED FROM "AGRICULTURE"
TO "GOVERNMENT, INSTITUTION OR COMMUNITY"

C 由「農業」地帶改劃為「道路」
TO BE REZONED FROM "AGRICULTURE"
TO 'ROAD'

界線只作識別用 BOUNDARY FOR IDENTIFICATION PURPOSE ONLY

本摘要圖於2017年10月6日擬備，所根據的資料為地政總署於2015年12月18日拍得的航攝照片
EXTRACT PLAN PREPARED ON 6.10.2017
BASED ON AERIAL PHOTOS
TAKEN ON 18.12.2015
BY LANDS DEPARTMENT

航攝照片 AERIAL PHOTO

錦田南分區計劃大綱核准圖
編號 S/YL-KTS/13 的擬議修訂 - 項目 A2、B2 及 C
PROPOSED AMENDMENTS TO THE APPROVED
KAM TIN SOUTH OUTLINE ZONING PLAN No. S/YL-KTS/13
ITEMS A2, B2 AND C

規劃署
PLANNING DEPARTMENT

參考編號
REFERENCE No.
M/YLE/17/22

圖 PLAN
3b-2

5



6



7



8



本圖於2017年8月31日擬備，所根據的資料為攝於2017年8月25日的實地照片
PLAN PREPARED ON 31.8.2017
BASED ON SITE PHOTOS
TAKEN ON 25.8.2017

錦田南分區計劃大綱核准圖
編號 S/YL-KTS/13 的擬議修訂 - 項目 A2
PROPOSED AMENDMENTS TO THE APPROVED
KAM TIN SOUTH OUTLINE ZONING PLAN No. S/YL-KTS/13
ITEM A2

規劃署
PLANNING
DEPARTMENT

參考編號
REFERENCE No.
M/YLE/17/22

圖 PLAN
3b-3

9



10



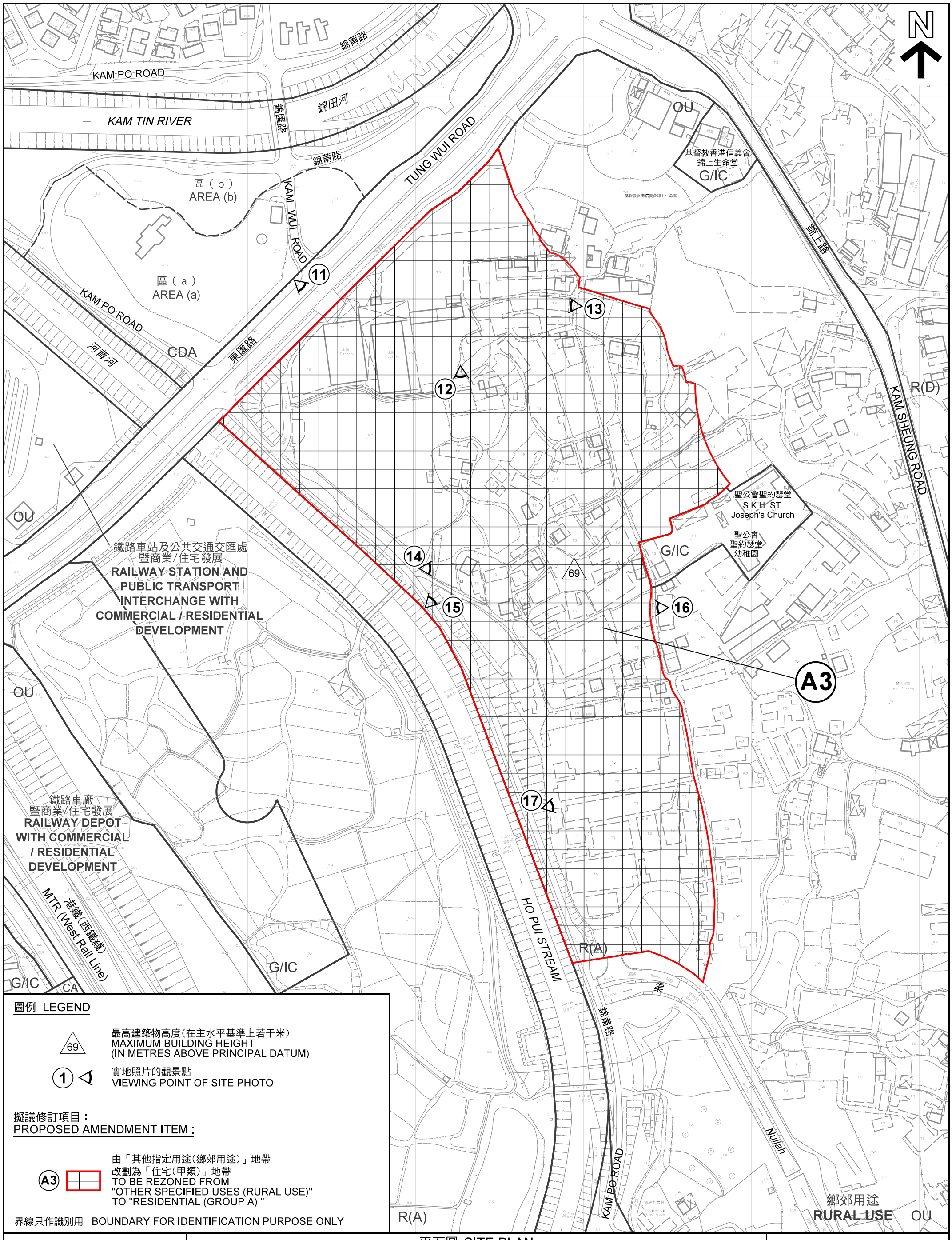
本圖於2017年8月31日擬備，所根據的資料為攝於2017年8月25日的實地照片
PLAN PREPARED ON 31.8.2017
BASED ON SITE PHOTOS
TAKEN ON 25.8.2017

錦田南分區計劃大綱核准圖
編號 S/YL-KTS/13 的擬議修訂 - 項目 B2
PROPOSED AMENDMENTS TO THE APPROVED
KAM TIN SOUTH OUTLINE ZONING PLAN No. S/YL-KTS/13
ITEM B2

規劃署
PLANNING
DEPARTMENT

參考編號
REFERENCE No.
M/YLE/17/22

圖 PLAN
3b-4



圖例 LEGEND

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

① — 實地照片的觀景點
VIEWING POINT OF SITE PHOTO

擬議修訂項目：
PROPOSED AMENDMENT ITEM :

A3 — 由「其他指定用途(鄉郊用途)」地帶
改劃為「住宅(甲類)」地帶
TO BE REZONED FROM
"OTHER SPECIFIED USES (RURAL USE)"
TO "RESIDENTIAL (GROUP A) "

界線只作識別用　BOUNDARY FOR IDENTIFICATION PURPOSE ONLY

本摘要圖於2017年8月31日擬備，所根據的
資料為測量圖編號 6-NE-12B、12D、17B
EXTRACT PLAN PREPARED ON 31.8.2017
BASED ON SURVEY SHEETS No.
6-NE-12B, 12D, 17B

平面圖 SITE PLAN

錦田南分區計劃大綱核准圖
編號 S/YL-KTS/13 的擬議修訂 - 項目 A3
PROPOSED AMENDMENTS TO THE APPROVED
KAM TIN SOUTH OUTLINE ZONING PLAN No. S/YL-KTS/13
ITEM A3

SCALE 1 : 2 000 比例尺
米 METRES 40 0 40 80 米 METRES

規劃署
PLANNING
DEPARTMENT

參考編號
REFERENCE No.
M/YLE/17/22

圖 PLAN
3c-1



圖例 LEGEND

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

擬議修訂項目：
PROPOSED AMENDMENT ITEM :

A3 由「其他指定用途(鄉郊用途)」地帶
改劃為「住宅(甲類)」地帶
TO BE REZONED FROM
"OTHER SPECIFIED USES (RURAL USE)"
TO "RESIDENTIAL (GROUP A) "

界線只作識別用 BOUNDARY FOR IDENTIFICATION PURPOSE ONLY

本摘要圖於2017年8月31日擬備，所根據的資料為地政總署於2015年12月18日拍得的航攝照片
EXTRACT PLAN PREPARED ON 31.8.2017
BASED ON AERIAL PHOTOS
TAKEN ON 18.12.2015
BY LANDS DEPARTMENT

航攝照片 AERIAL PHOTO

錦田南分區計劃大綱核准圖
編號 S/YL-KTS/13 的擬議修訂 - 項目 A3
PROPOSED AMENDMENTS TO THE APPROVED
KAM TIN SOUTH OUTLINE ZONING PLAN No. S/YL-KTS/13
ITEM A3

規劃署
PLANNING DEPARTMENT

參考編號
REFERENCE No.
M/YLE/17/22

圖 PLAN
3c-2

11



12



13



本圖於2017年8月31日擬備，所根據的資料為攝於2017年8月25日的實地照片
PLAN PREPARED ON 31.8.2017
BASED ON SITE PHOTOS
TAKEN ON 25.8.2017

錦田南分區計劃大綱核准圖
編號 S/YL-KTS/13 的擬議修訂 - 項目 A3
PROPOSED AMENDMENTS TO THE APPROVED
KAM TIN SOUTH OUTLINE ZONING PLAN No. S/YL-KTS/13
ITEM A3

規劃署
PLANNING DEPARTMENT

參考編號
REFERENCE No.
M/YLE/17/22

圖 PLAN
3c-3

14



15



16



17



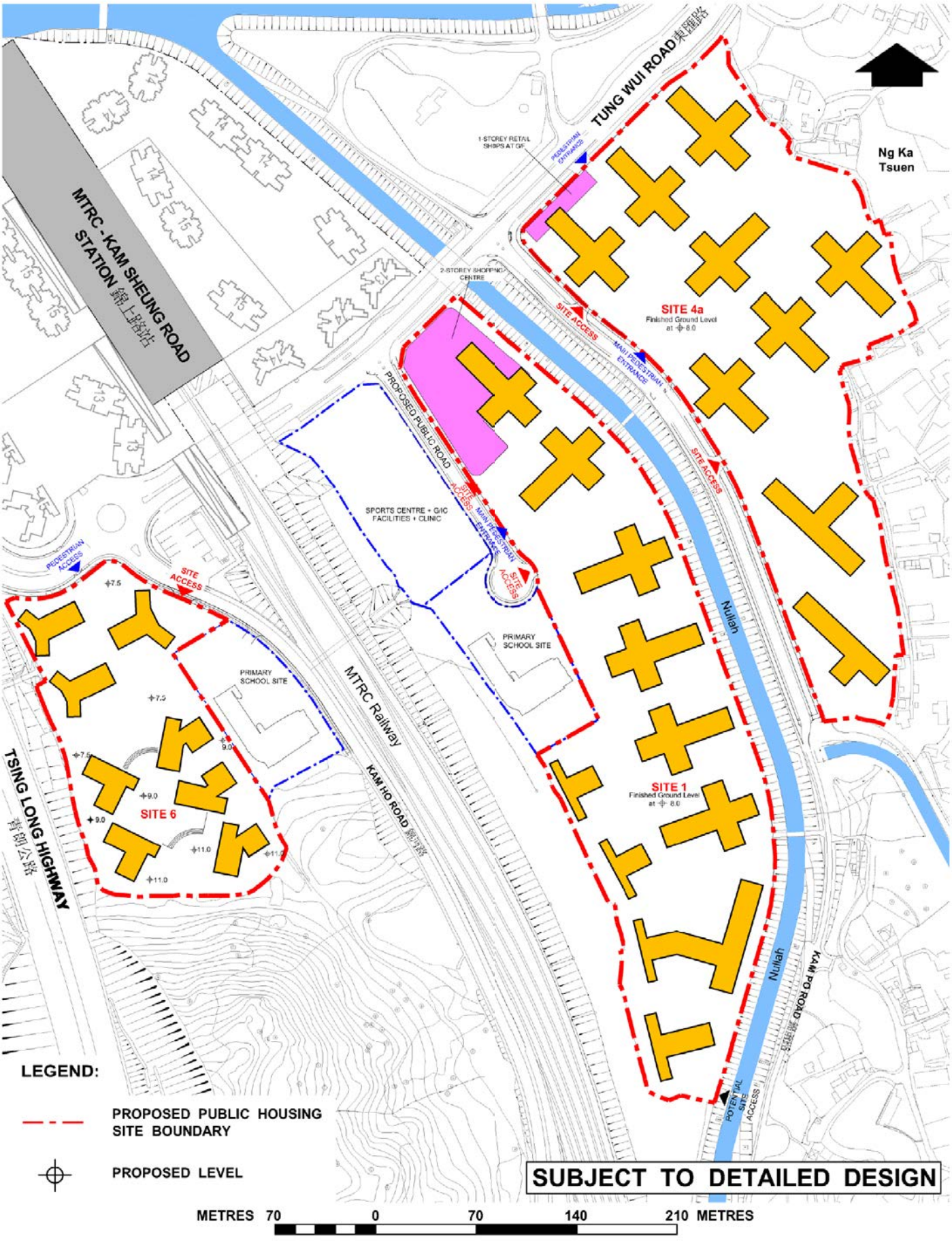
本圖於2017年8月31日擬備，所根據的資料為攝於2017年8月25日的實地照片
PLAN PREPARED ON 31.8.2017
BASED ON SITE PHOTOS
TAKEN ON 25.8.2017

錦田南分區計劃大綱核准圖
編號 S/YL-KTS/13 的擬議修訂 - 項目 A3
PROPOSED AMENDMENTS TO THE APPROVED
KAM TIN SOUTH OUTLINE ZONING PLAN No. S/YL-KTS/13
ITEM A3

規劃署
PLANNING DEPARTMENT

參考編號
REFERENCE No.
M/YLE/17/22

圖 PLAN
3c-4



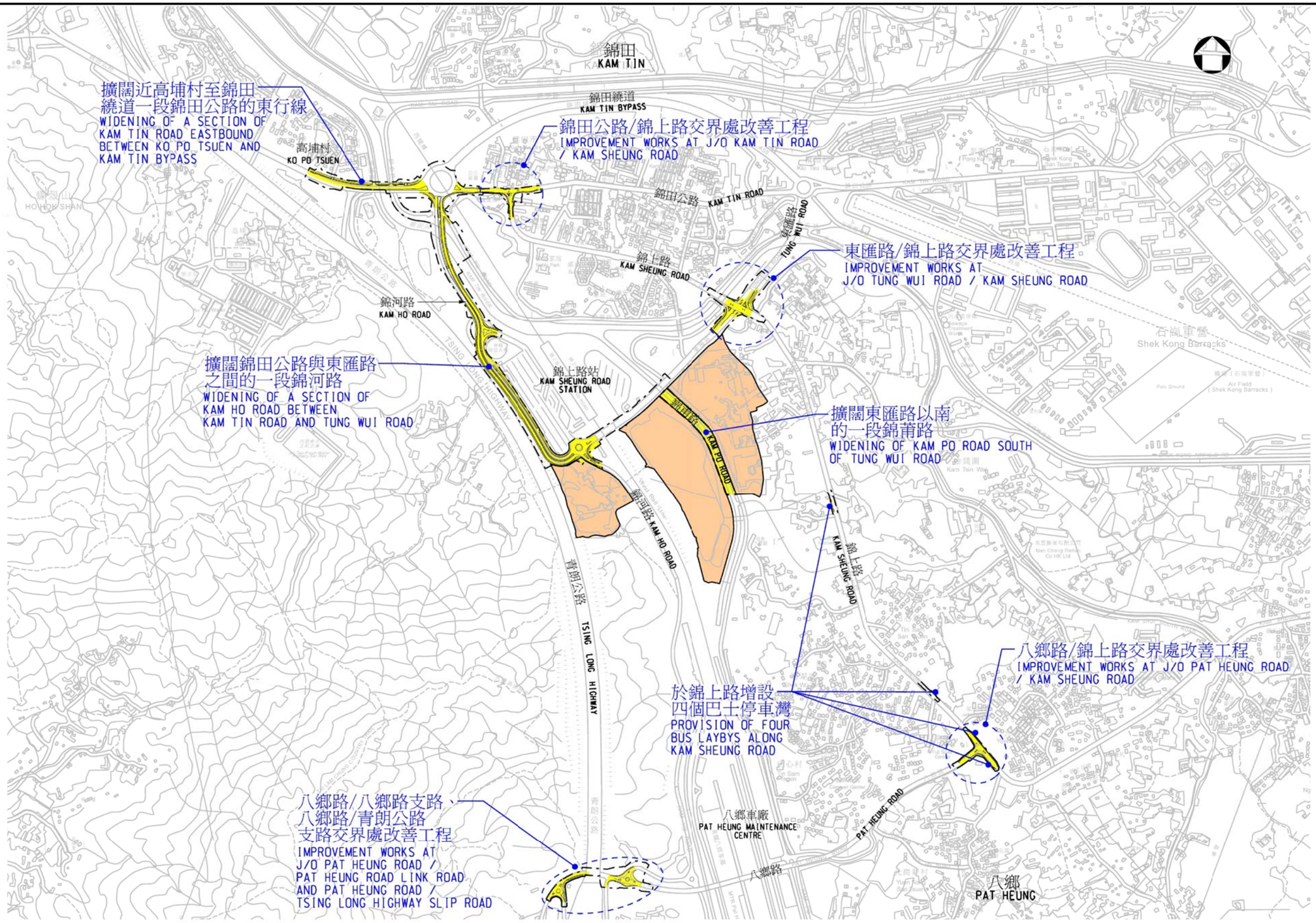
本摘要圖於2017年8月31日擬備
資料來源:房屋署
EXTRACT PLAN PREPARED ON 31.8.2017
DATA SOURCE : HOUSING DEPARTMENT

PUBLIC HOUSING DEVELOPMENT AT
KAM SHEUNG ROAD SITES 1, 4a & 6
(CONCEPTUAL LAYOUT PLAN)

規劃署
PLANNING DEPARTMENT

參考編號
REFERENCE No.
M/YLE/17/22

圖 PLAN
4



道路擴闊 / 改善工程有待詳細設計
Road widening / improvement works subject to detailed design

本摘要圖於2017年10月9日擬備
資料來源:土木工程拓展署
EXTRACT PLAN PREPARED ON 9.10.2017
DATA SOURCE :
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

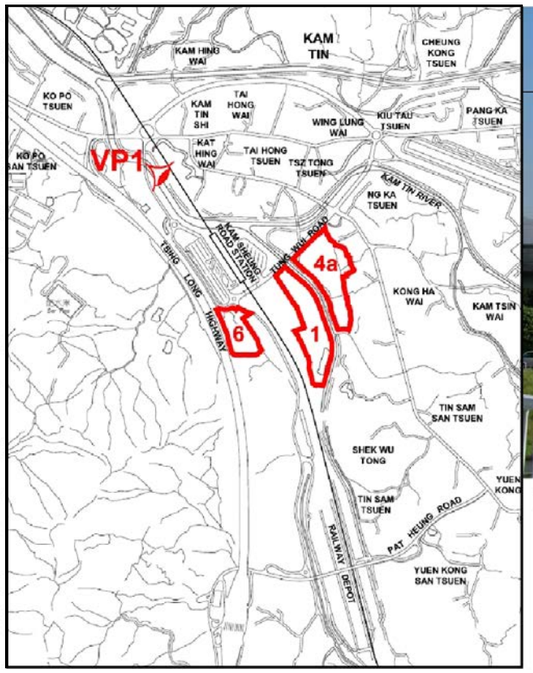
場外道路改善工程 OFF-SITE ROAD IMPROVEMENT WORKS

錦田南分區計劃大綱核准圖
編號 S/YL-KTS/13 的擬議修訂
PROPOSED AMENDMENTS TO THE APPROVED KAM TIN SOUTH OUTLINE ZONING PLAN No. S/YL-KTS/13

規劃署
PLANNING DEPARTMENT

參考編號 REFERENCE No.
M/YLE/17/22

圖 PLAN
5

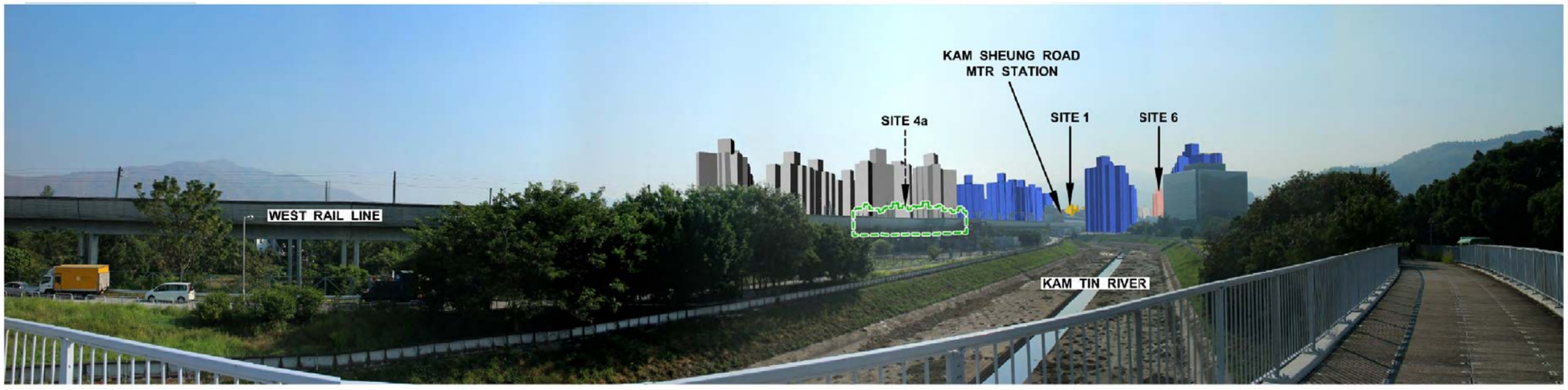




Before

Legend:

- Site 1
- Site 6
- Area KSR
- Other Potential Development Sites
- Site 4a



After

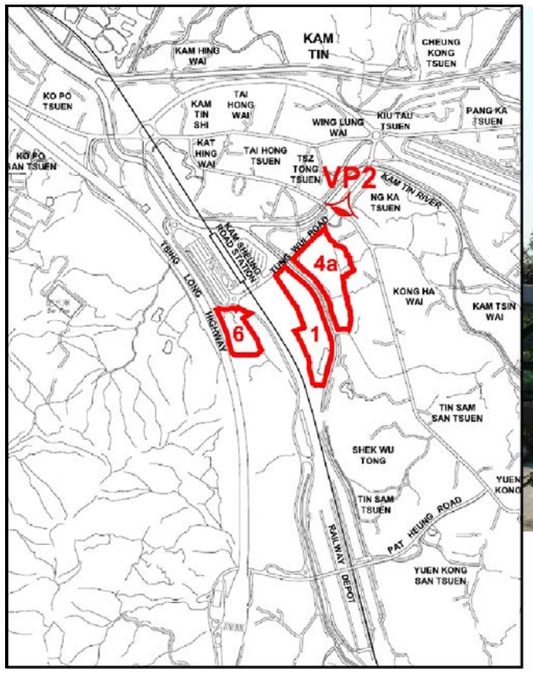
本摘要圖於2017年9月12日擬備
資料來源:房屋署
EXTRACT PLAN PREPARED ON 12.9.2017
DATA SOURCE : HOUSING DEPARTMENT

瞭望點 VP1 的合成照片
（錦河路）
PHOTOMONTAGE AT VIEWING POINT VP1
(KAM HO ROAD)

規劃署
PLANNING DEPARTMENT

參考編號 REFERENCE No.
M/YLE/17/22

圖 PLAN
6a

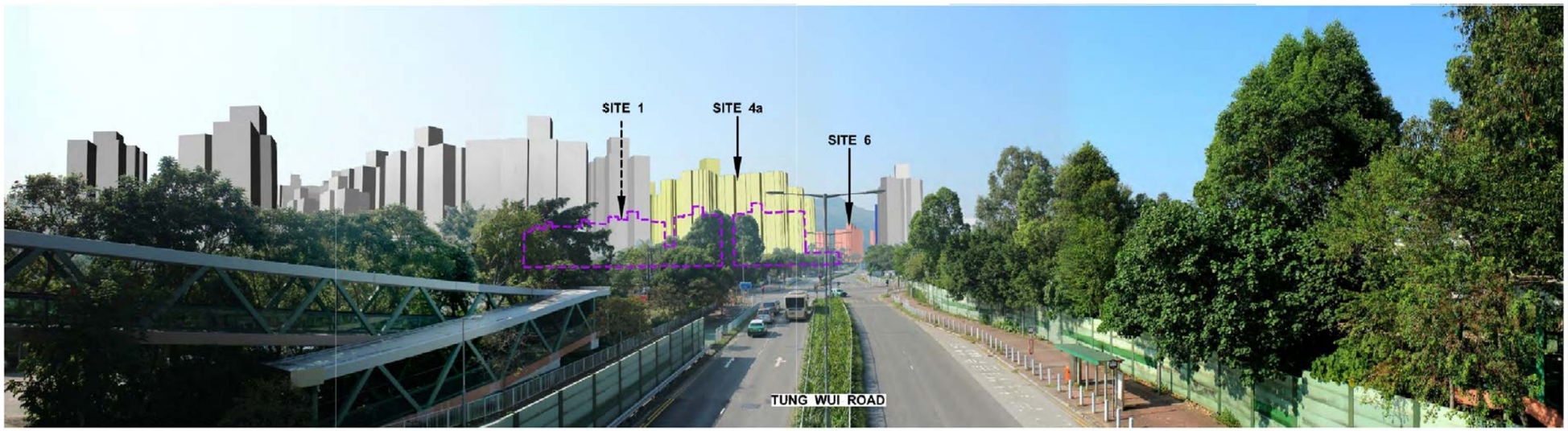




Before

Legend:

- Site 4a
- Site 6
- Area KSR
- Other Potential Development Sites
- Site 1



After

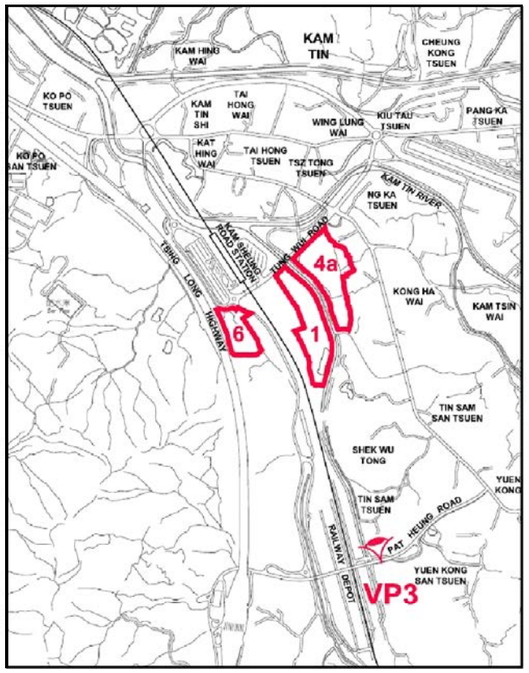
本摘要圖於2017年9月12日擬備
資料來源:房屋署
EXTRACT PLAN PREPARED ON 12.9.2017
DATA SOURCE : HOUSING DEPARTMENT

瞭望點 VP2 的合成照片
（東匯路人行天橋）
PHOTOMONTAGE AT VIEWING POINT VP2
(TUNG WUI ROAD PEDESTRIAN BRIDGE)

規劃署
PLANNING DEPARTMENT

參考編號 REFERENCE No.
M/YLE/17/22

圖 PLAN
6b

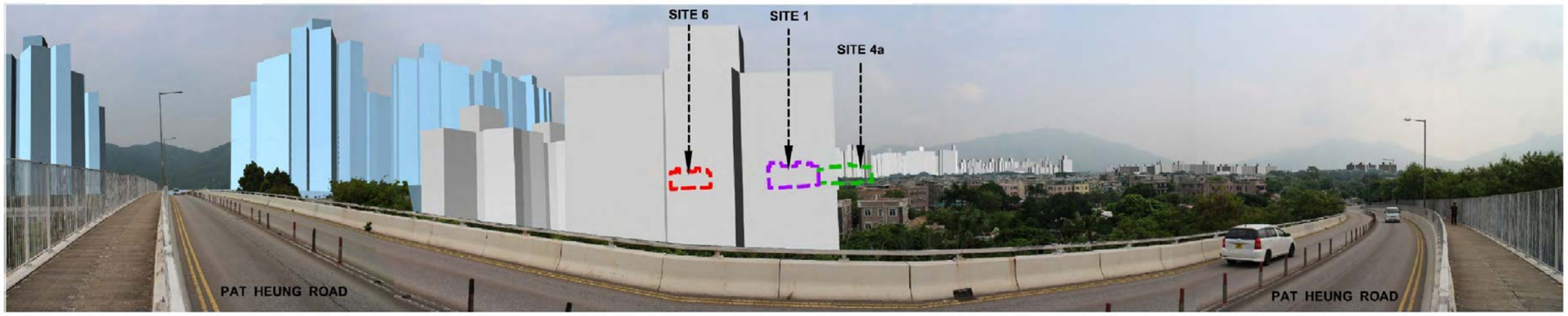




Before

Legend:

- Area PHMC
- Other Potential Development Sites
- Site 1
- Site 4a
- Site 6



After

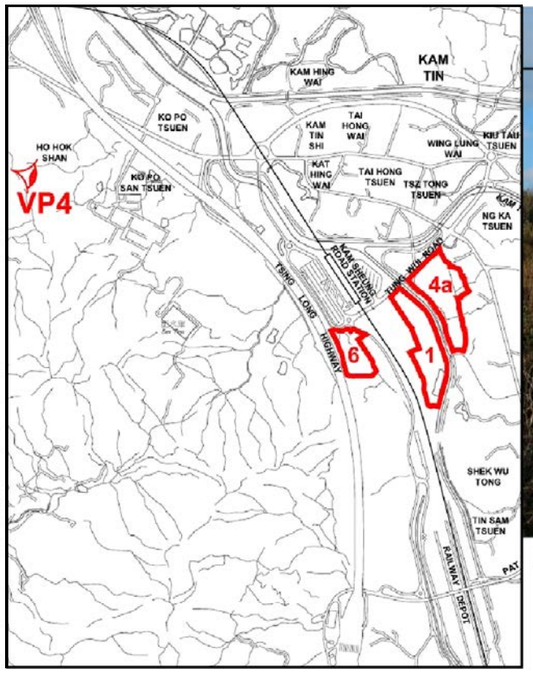
本摘要圖於2017年9月12日擬備
資料來源:房屋署
EXTRACT PLAN PREPARED ON 12.9.2017
DATA SOURCE : HOUSING DEPARTMENT

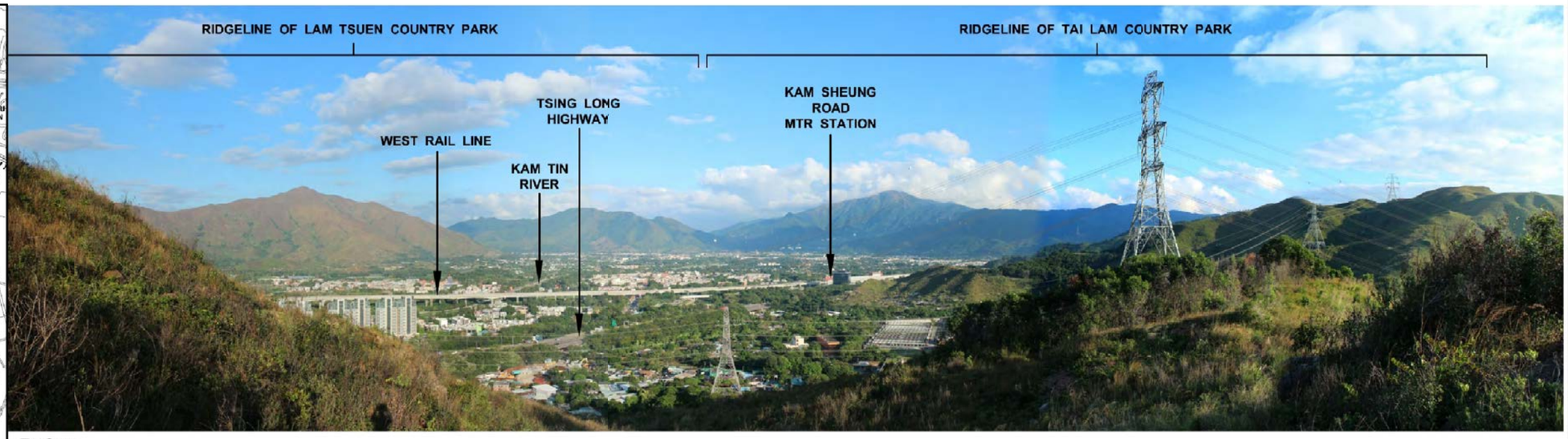
瞭望點 VP3 的合成照片
（八鄉路）
PHOTOMONTAGE AT VIEWING POINT VP3
(PAT HEUNG ROAD)

規劃署
PLANNING DEPARTMENT

參考編號 REFERENCE No.
M/YLE/17/22

圖 PLAN
6c

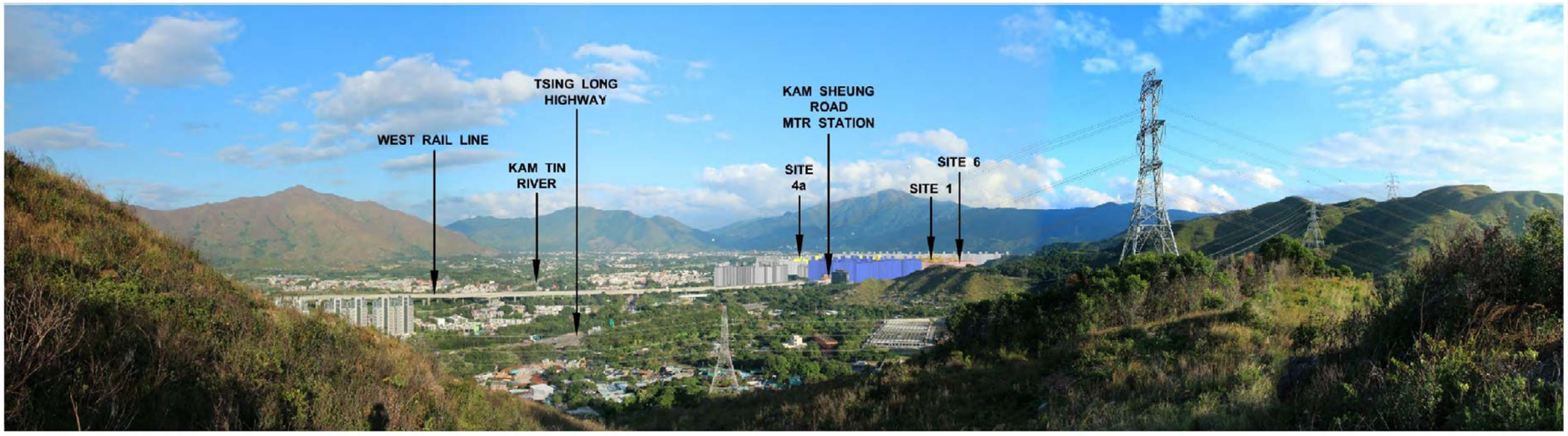




Before

Legend:

- Site 1
- Site 4a
- Site 6
- Area KSR
- Other Potential Development Sites



After

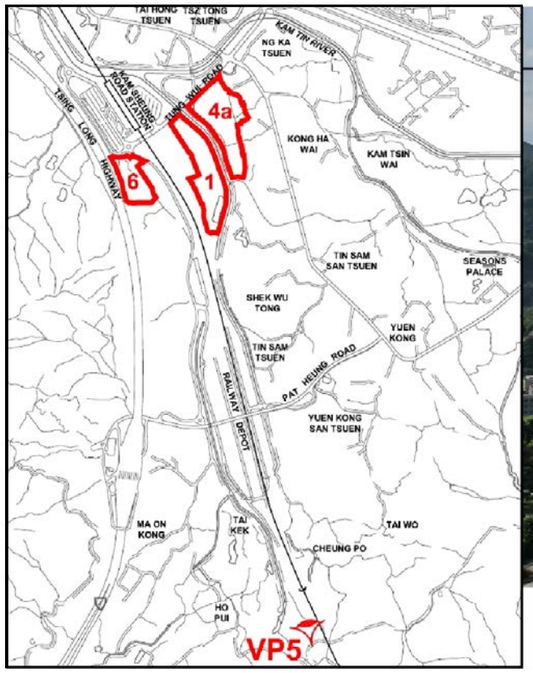
本摘要圖於2017年9月12日擬備
資料來源:房屋署
EXTRACT PLAN PREPARED ON 12.9.2017
DATA SOURCE : HOUSING DEPARTMENT

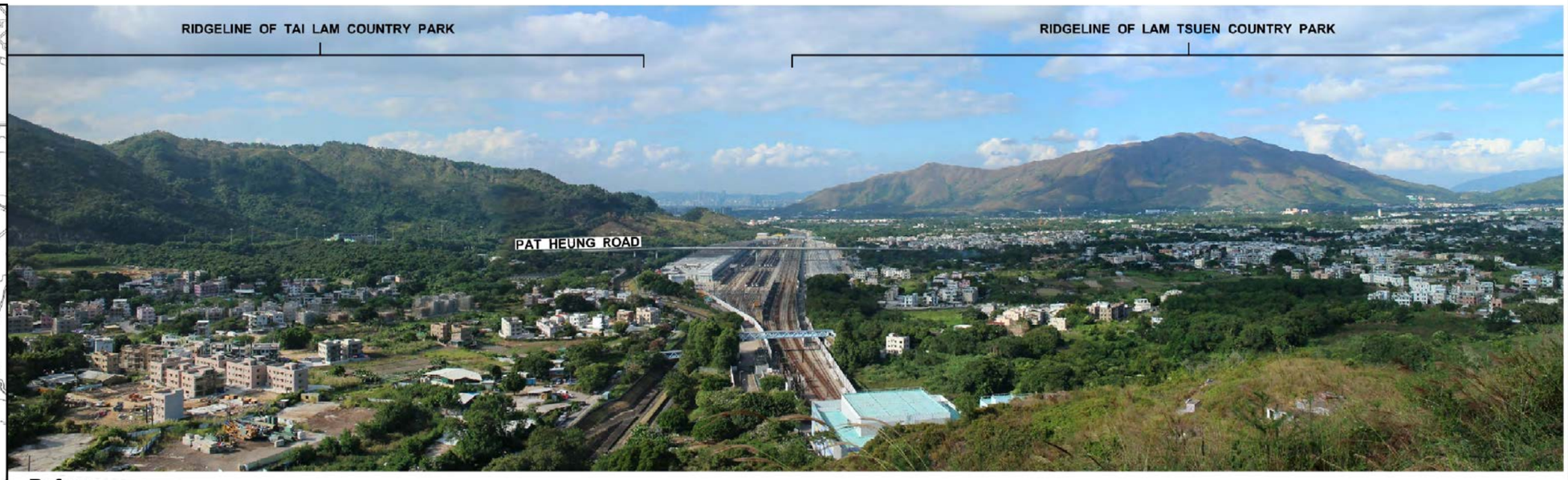
瞭望點 VP4 的合成照片
（蠔殼山）
PHOTOMONTAGE AT VIEWING POINT VP4
(HO HOK SHAN)

規劃署
PLANNING DEPARTMENT

參考編號 REFERENCE No.
M/YLE/17/22

圖 PLAN
6d

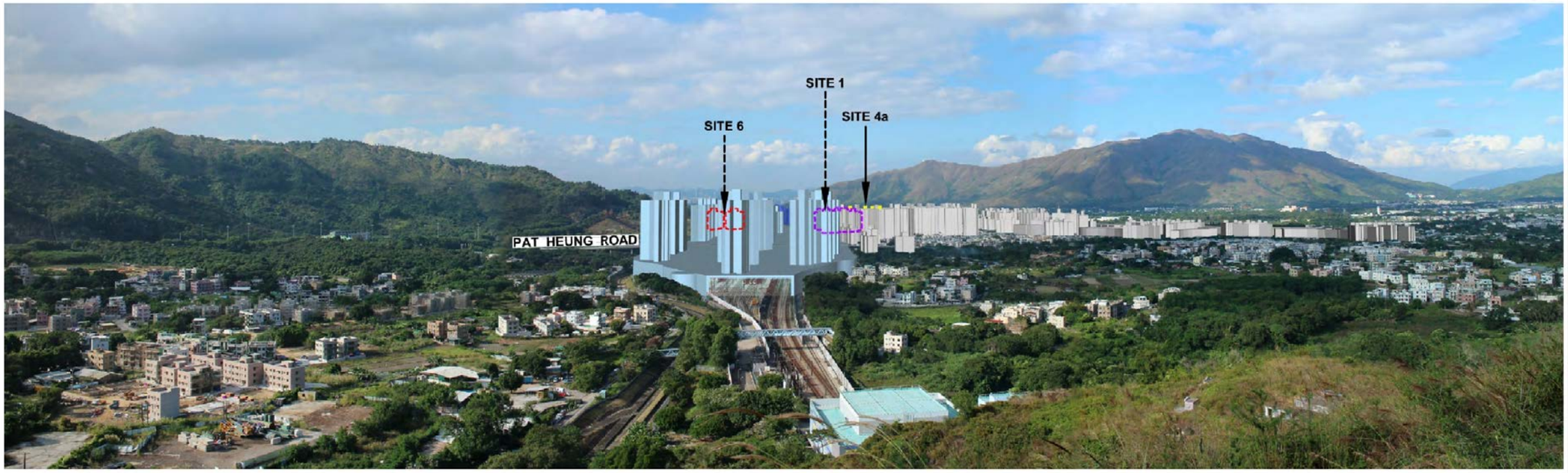




Before

Legend:

- Site 4a
- Area KSR
- Area PHMC
- Other Potential Development Sites
- Site 1
- Site 6



After

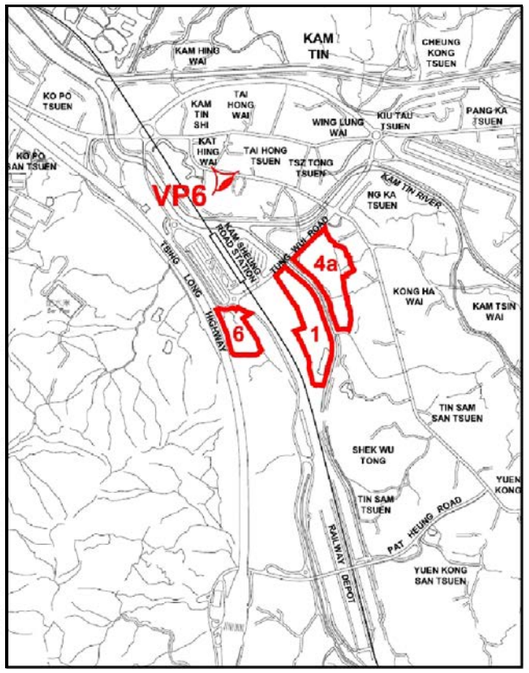
本摘要圖於2017年9月12日擬備
資料來源:房屋署
EXTRACT PLAN PREPARED ON 12.9.2017
DATA SOURCE : HOUSING DEPARTMENT

瞭望點 VP5 的合成照片
（大欖越野單車徑河背段）
PHOTOMONTAGE AT VIEWING POINT VP5
(TAI LAM MOUNTAIN BIKE TRAIL, HO PUI SECTION)

規劃署
PLANNING DEPARTMENT

參考編號 REFERENCE No.
M/YLE/17/22

圖 PLAN
6e





Before

Legend:

- Other Potential Development Sites
- Site 4a



After

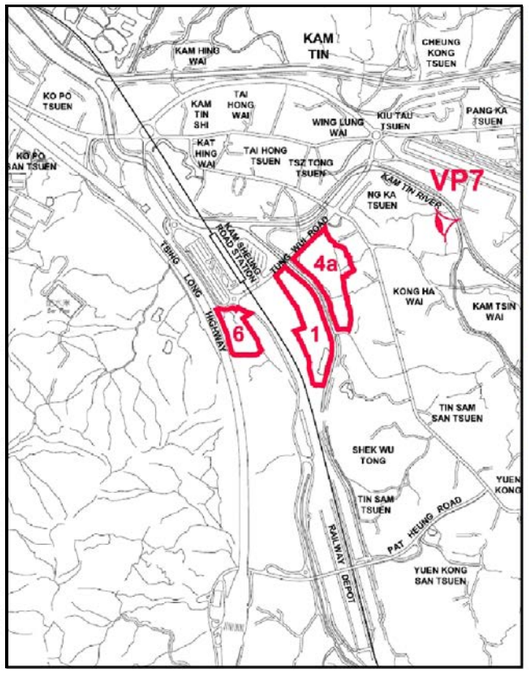
本摘要圖於2017年9月12日擬備
資料來源:房屋署
EXTRACT PLAN PREPARED ON 12.9.2017
DATA SOURCE : HOUSING DEPARTMENT

瞭望點 VP6 的合成照片
（錦上路）
PHOTOMONTAGE AT VIEWING POINT VP6
(KAM SHEUNG ROAD)

規劃署
PLANNING DEPARTMENT

參考編號 REFERENCE No.
M/YLE/17/22

圖 PLAN
6f

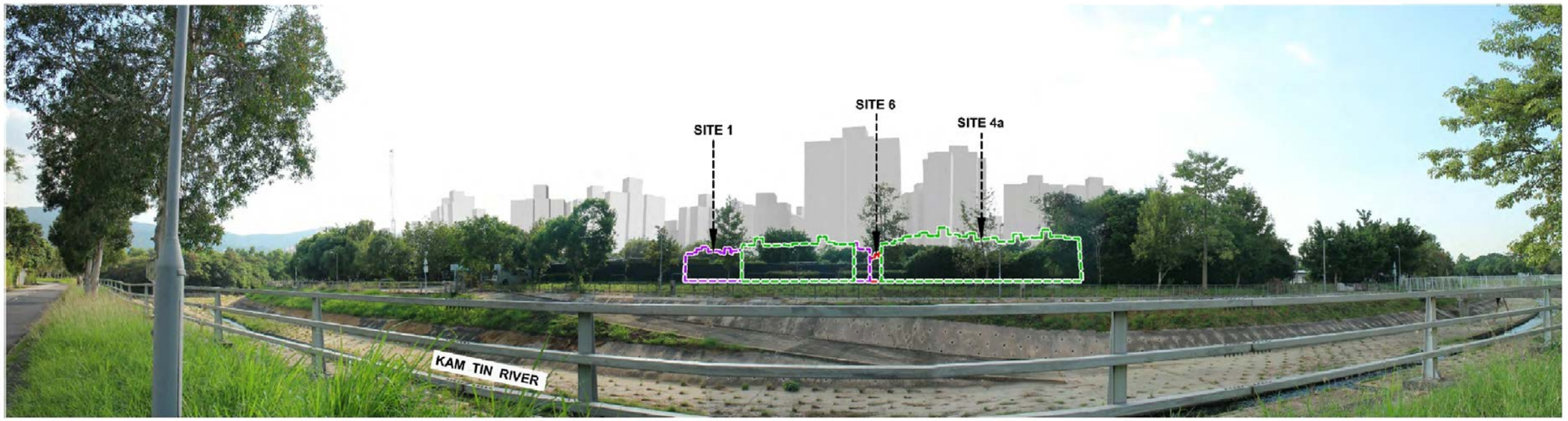




Before

Legend:

- Other Potential Development Sites
- Site 1
- Site 4a
- Site 6



After

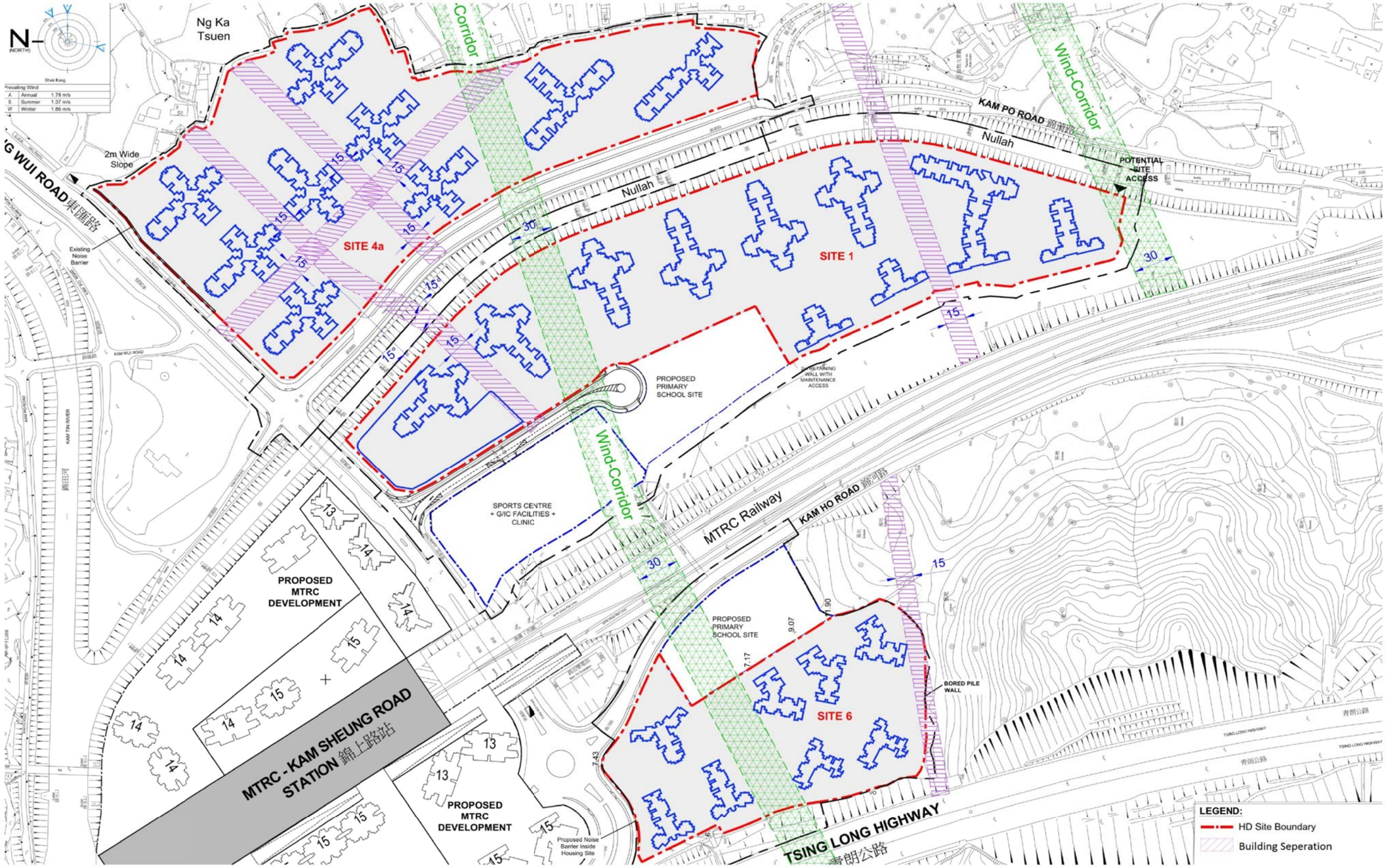
本摘要圖於2017年9月12日擬備
資料來源:房屋署
EXTRACT PLAN PREPARED ON 12.9.2017
DATA SOURCE : HOUSING DEPARTMENT

瞭望點 VP7 的合成照片
（石崗機場路）
PHOTOMONTAGE AT VIEWING POINT VP7
(SHEK KONG AIRFIELD ROAD)

規劃署
PLANNING DEPARTMENT

參考編號 REFERENCE No.
M/YLE/17/22

圖 PLAN
6g



本摘要圖於2017年8月31日擬備
EXTRACT PLAN PREPARED ON 31.8.2017

MAJOR BUILDING SEPARATIONS AT
THE THREE PUBLIC HOUSING SITES (SITES 1, 4a AND 6)

規劃署
PLANNING DEPARTMENT

參考編號 REFERENCE No.
M/YLE/17/22

圖 PLAN
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