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Urban Renewal Authority

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Ramboll Hong Kong Limited

AMENDMENTS TO AN APPROVED MASTER LAYOUT PLAN FOR THE PROPOSED COMPREHENSIVE REDEVELOPMENT OF TAI HANG SAI ESTATE WITH MINOR RELAXATION OF PLOT RATIO, BUILDING HEIGHTS AND NON-BUILDING AREA RESTRICTIONS

WASTE MANAGEMENT ASSESSMENT

Date	**September 2026**
Prepared by	**Sally Chiu** **Assistant Environmental Consultant**
Signed	
Approved by	**Tony Cheng** **Senior Manager**
Signed	
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Ramboll Hong Kong Limited

21/F, BEA Harbour View Centre
56 Gloucester Road, Wan Chai, Hong Kong

Tel: (852) 3465 2888
Fax: (852) 3465 2899
Email: hkinfo@ramboll.com

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1. INTRODUCTION

1.1 Project Background

1.1.1 The Project falls within the Approved Shek Kip Mei Outline Zoning Plan (OZP) No. S/K4/31, and the zoning of the Application Site is Comprehensive Development Area (CDA).

1.1.2 In 2021, a s.16 Application (no. A/K4/76) was jointly submitted by the Hong Kong Settlers Housing Corporation Limited (HKSHCL) and Urban Renewal Authority (URA) (the "Applicants") for the proposed comprehensive redevelopment of the Tai Hang Sai Estate (the "Proposed Development"). The application was approved by the Town Planning Board (TPB). In the approved scheme, the Proposed Development comprised tow sites, namely Site 1 and Site 2. It is proposed that Site 1 be granted to HKSHCL for rehousing units, while Site 2 will be developed by URA.

1.1.3 The Applicants submit the current planning application to seek the TPB approval for amendments to the approved Master Layout Plan (MLP). The proposed amendments mainly involve relaxation on the building height restriction for adoption of Modilar Integrated Construction (MiC) and changing the number of units in Site 2. For Site 1, it will largely adhere to the approved MLP.

1.1.4 The Waste Management Assessment is prepared as a technical supporting document to assess the potential waste management issues during the construction and operation phase arising from the Proposed Development of Site 2. For Site 1, please refer to the assessment submitted under Application No. A/K4/76. Mitigation measures are also proposed to alleviate impacts, where necessary.

1.2 The Application Site and Its Environs

1.2.1 The Application Site is located in Shek Kip Mei, Kowloon. The ground elevation increases gradually towards the northwest side. The Subject Site is bounded by Woh Chai Street to the south, Wai Chi Street to the west, Tai Hang Sai Street to the northeast and Tai Hang Tung Road to the east.

1.2.2 The Application Site is currently occupied by Tai Hang Sai Estate. It is surrounded by mid-rise to high-rise developments, e.g. Nam Shan Estate to the northeast, Tai Hang Tung Estate to the east and Shek Kip Mei Estate to the west.

1.2.3 It is noted that to the immediate south of the Subject Site, there's a decommissioned service reservoir which is located on the Woh Chai Shan with an elevation of about 80mPD.

1.2.4 **Figure 1.1** shows the location of the Application Site and its environment.

1.3 Proposed Development

1.3.1 According to the approved MLP, Site 1 consists of 2 residential towers with not more than 1,289 units on top of retail podium. For Site 2 under the proposed development, it consists of 4 residential towers with not more than 2,900 residential units on top of retail and GIC podium. Development Parameters for the Proposed Development are summarised below.

Table 1.1 Development Parameters for Proposed Development

	Proposed Development for Site 1	Proposed Development for Site 2
Site Area (m^2)	Please refer to the assessment submitted under Application No. A/K4/76.	About 15,410
No. of Flat		Not more than 2,900
Auxiliary Facilities		Carpark, Residents Recreational Facilities (RRF), Retail Facilities and Social Welfare Facilities
Maximum GFA for GIC (m^2)		About 6,500
Maximum GFA for Retail (m^2)		About 5,000
Area of RRF (m^2)		About 2,148

1.3.2 The MLP, floor plans and sections of the Proposed Development are shown in **Appendix 1.1**.

1.3.3 The tentative completion year of Site 2 is 2032.

2. WASTE MANAGEMENT ASSESSMENT

2.1 Scope of Work

2.1.1 The aim of this study is to assess the potential waste management issues during the construction and operation phase of the project. Mitigation measures are also recommended to alleviate impacts, where necessary.

2.2 Relevant Legislation, Standards & Guidelines

2.2.1 The following legislations and guidelines are relevant to the handling, treatment and disposal of waste in HKSAR and references were made in assessing the potential impacts and their avoidance or mitigation:

- *Waste Disposal Ordinance (Cap. 354);*
- *Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C);*
- *Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N);*
- *Practice Note for Authorized Persons and Registered Structural Engineers – Construction and Demolition Waste (PNAP ADV-19, also known as PN for AR&RSE No. 243);*
- *Public Health and Municipal Services Ordinance (Cap 132);*
- *Land (Miscellaneous Provisions) Ordinance (Cap 28);*
- *Monitoring of Solid Waste in Hong Kong 2023*

2.2.2 The following guidelines also relate to waste management and disposal:

- *Waste Disposal Plan for Hong Kong (1989);*
- *Hong Kong Planning Standards and Guidelines (HKPSG), Chapter 9 – Environment;*
- *WBTC No. 2/93, Public Dumps;*
- *WBTC No. 2/93B, Public Filling Facilities;*
- *WBTC No. 12/2000, Fill Management, Hong Kong SAR Government;*
- *WBTC No. 12/2002, Specification Facilitating the Use of Recycled Aggregates, Works Bureau, Hong Kong SAR Government;*
- *WBTC No. 32/92, The Use of Tropical Hard Wood on Construction Site;*
- *ETWB TC(W) No. 19/2005 Environmental Management on Construction Sites;*
- *DEVB TC(W) No. 2/2011, Encouraging the Use of Recycled and other Green Materials in Public Works Projects;*
- *DEVB TC(W) No. 6/2010, Trip Ticket System for Disposal of Construction & Demolition Materials, Development Bureau, Hong Kong SAR Government;*
- *DEVB TC(W) No. 8/2010, Enhanced Specification for Site Cleanliness and Tidiness, Works Bureau, Hong Kong SAR Government;*
- *CEDD TC No. 11/2019, Management of Construction and Demolition Materials;*
- *Code of Practice on the Handling, Transportation and Disposal of Asbestos Waste (1993) Environmental Protection Department;*
- *Code of Practice on Asbestos Control: Preparation of Asbestos Investigation Report, Asbestos Management Plan and Asbestos Abatement Plan (1997) Environmental Protection Department;*
- *ProPECC PN2/97, Handling of Asbestos Containing Materials in Buildings; and*

- *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes, EPD (1992)*

2.3 Assessment Methodology

2.3.1 The assessment of the potential waste management implications during the construction and operation phases of the Project has been conducted in accordance with Annexes 7 and 15 of the EIAO-TM, including the following tasks:

- Estimation of the types and quantities of the wastes generated;
- Evaluation of opportunities for waste reduction and re-use;
- Identification of disposal options for each type of wastes;
- Assessment of potential environmental impacts arising from the wastes management with respect of potential hazards, air and odour emissions, noise, wastewater discharge, and public transport; and
- Assessment of the impacts caused by handling, collection, transportation and re-use /disposal of wastes.

2.3.2 Prior to considering the disposal options for various types of waste, opportunities for reducing waste generation, on-site or off-site reuse and recycling have been evaluated. Measures which can be taken in the planning and design phases (e.g. by modifying the design approach) and in the construction phase for maximizing waste reduction have been separately considered. Practices to promote segregation of waste materials are additionally considered for advancing the waste management efficiency.

2.3.3 After considering the opportunities for reducing waste generation and maximizing reuse, the types and quantities of the waste required to be disposed of have been estimated and the disposal options for each type of waste have been described. The disposal method recommended for each type of waste has been taken into account the result of the assessment. The impacts caused by handling (including stockpiling, labelling, packaging and storage), collection and reuse / disposal of waste have been addressed and appropriate mitigation measures have been proposed.

2.4 Identification and Evaluation of Potential Impact during Construction Stage

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

- Construction and Demolition (C&D) materials due to excavation and site formation;
- General refuse generated by the workforce;
- Chemical and oily wastes due to maintenance of equipment; and
- Asbestos Containing Materials (ACM)

Key sources of C&D materials

It is anticipated that the majority of C&D materials will be generated from the following key construction activities:

- Excavation of ground for basement of the Proposed Development;
- Demolition existing residential buildings; and
- Building construction and superstructure works.

C&D Materials

2.4.2 C&D materials comprise mainly of unwanted materials, including surplus materials arising from excavations that are generated from the works (e.g. site clearance, demolition works of substructure, site formation works, excavation work for basement). Inert soft C&D materials comprise of soil, sand, clay, slurry, etc., while hard C&D materials comprise of crushed concrete, asphalt, rock, etc. The amount of non-inert C&D materials generated during site clearance would be minor (as there is little vegetation at the Application Site). C&D materials may comprise different types of materials, including:

- Inert C&D materials (also known as public fill, including soil, rock debris, rubble earth, concrete, etc.) do not decompose and are suitable to reuse as filling materials for land reclamation and site formation. Inert C&D materials could be reused on-site as filling materials. For those inert C&D materials that cannot be reused should be delivered to CEDD designated public fill reception facilities.
- Non-inert C&D materials (also known as C&D waste, including bamboo, timber, paper, metal, glass, plastic, packaging wastes, etc.). Non-inert C&D materials should be reused or recycled as far as possible. For those non-inert C&D materials that cannot be reused or recycled, they should be disposed of at designated landfill sites as last resort.

2.4.3 The general waste management strategy is to avoid waste generation in the first place. Should it be unavoidable, reduction and segregation at-source should be exercised as far as practicable, and recycling and reuse should be adopted at the same time to salvage all the recyclable and reusable materials as much as possible.

2.4.4 According to ETWB TC(W) 19/2005 on "Environmental Management on Construction Sites", waste management plan (WMP) becomes part of Environmental Management Plan (EMP) to be submitted to Architect/ Engineer for approval before construction works. The Project team will require the Contractor(s) to submit WMPs for approval. The WMPs will include appropriate mitigation measures to avoid, reduce, reuse and recycle C&D materials. It will ensure that the day-to-day operations on site comply with the approved WMPs. It will control the delivery of inert C&D materials and non-inert C&D materials to public fill reception facilities and landfills, respectively, through a trip-ticket system. It will require the Contractor(s) to separate public fill from C&D materials for delivery at appropriate facilities. It will record the delivery, reuse and recycling of C&D materials for monitoring purposes.

2.4.5 As advised by the Project Proponent, the volume of inert and non-inert materials produced during the demolition is about, 18,600m^3 and 1,300m^3 respectively.

2.4.6 For site formation, as advised by the Project Engineer, the excavation depth is ranged from about 7.2m to 15.2m, and the total excavation volume is about 138,926 m^3. The detailed calculation is shown in **Appendix 2.1**. Assuming 90% inert C&D materials and the remaining are non-insert C&D materials, it is estimated that 125,036m^3 and 13,890m^3 of inert and non-inert materials are generated from excavation.

2.4.7 During the building construction, appropriately 12,500 m^3 C&D materials will be produced. Assuming 90% are inert materials and 10% non-inert materials, 11,250m^3 and 1,250m^3 of inert and non-inert materials will be produced.

2.4.8 Therefore, it is estimated that about 154,886m^3 of inert C&D material and 16,440m^3 of non-inert C&D material will be generated during the course of construction (including demolition, excavation and building construction). Adequate areas for sorting and storage of segregated materials should be provided onsite. Construction wastes shall be sorted, with the inert C&D materials broken up into small pieces for delivery at public fill reception facility, and the non-inert C&D materials should be disposed of at landfill.

2.4.9 The Contractor(s) should be responsible for ensuring that all on-site wastes will be collected by approved waste collectors and appropriate measures should be undertaken to minimise adverse impacts to the surrounding environment, such as dust generation. The Contractor(s) must also ensure that all necessary waste disposal permits have been obtained before actions.

2.4.10 Prior to disposal of non-inert C&D materials, it is recommended that wood, steel, glass and other metals will be collected separately for re-use and/or recycling and inert C&D materials utilized as fill materials to minimize the quantity of waste to be delivered to the Public Fill Reception Facilities and landfill. The details are shown in **Table 2.1**.

2.4.11 All the soil generated from the underground work should be refill on site to form the site to the required level. Other C&D materials should be used on-site as far as practicable.

2.4.12 Under DEVB TCW No. 6/2010 Trip Ticket System for Disposal of Construction and Demolition Materials, for all contracts that are expected to generate inert C&D materials requiring disposal from site, the project office should write to the Public Fill Committee (PFC) through Secretary of the PFC to request a designated disposal ground for incorporation into the tender documents. For contracts where the estimated amount of non-inert C&D materials requiring disposal at landfill facilities equals to or exceeds 50,000 m3, the project office should seek confirmation from the DEP in terms of the availability of landfill facilities for disposal of such materials and the DEP would designate landfill facilities, if available, for the contracts. For contracts where the estimated amount of non-inert C&D materials to be generated from the contract is less than 50,000 m3, the project office is not required to apply to DEP for designated landfill facilities, but it should still specify in the tender documents of the appropriate landfill facilities for disposal.

Chemical Waste

2.4.13 Construction plant and equipment will require regular maintenance and servicing, which would generate waste such as solvents, lubrication oil and fuel, etc. Chemical wastes arising during the construction phase may pose serious environmental, health and safety hazards if not stored and disposed of in an appropriate manner.

2.4.14 It is difficult to quantify the amount of chemical wastes as it will solely depend on the contractor's on-site maintenance practice and the quantities of plant and vehicles utilized at the construction site. Nevertheless, it is anticipated that the quantity of chemical waste such as lubrication oil and solvent produced from equipment maintenance would be small and less than hundred litres per month.

2.4.15 The contractor is required to register as a chemical waste producer if chemical wastes would be produced from the construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes. The amount of chemical waste to be generated shall be quantified in the Waste Management Plan (WMP) as part of the Environmental Management Plan (EMP) to be prepared by the Contractor in the subsequent construction stage. Also, the requirements to register with EPD as a chemical producer is observed and will be duly followed by the Project Proponent or its Contractor.

2.4.16 Storage, handling, transportation and disposal of chemical waste should be arranged in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Waste published by the EPD. Chemical wastes such as wasted solvents, lubrication oil and fuel, etc. will need special handling and storage arrangements and should be collected by licensed chemical waste collectors for subsequent disposal and appropriate treatment at licensed waste disposal facilities, for example the Chemical Waste Treatment Facility Centre (CWTC) in Tsing Yi. Mitigation and control requirements for chemical waste are provided in the "Recommended Pollution Control Clauses for Construction Contracts" available in EPD website mentioned the handling, storage and disposal of chemical wastes. With good management and site particles, adverse environmental impacts should not result.

General Refuse

2.4.17 Throughout the construction stage, the workforce would generate general refuse comprising food scraps, wastepaper, empty containers, etc. Release of general refuse into the nearby storm drain should not be permitted as introduction of these wastes is likely to have detrimental effects on water quality in the area. Effective collection of site wastes would be required to prevent waste materials being blown around by wind, flushed or leached into the surrounding environment, and odour nuisance. The work site may also attract pests and vermin if the waste storage area is not well maintained and cleaned regularly.

2.4.18 Recyclable materials (i.e., food scraps and container, paper, plastic bottles and aluminium cans) will be separated for recycling, in order to reduce the amount of general refuse to be disposed of at landfill. Adequate number of enclosed waste containers will be provided to avoid over-spillage of waste. The non-recyclable refuse will be placed in bags and stored in enclosed containers and disposed of on a daily basis to designated landfill.

2.4.19 With the implementation of recommended waste management practices at the site, adverse environmental impacts would not arise from the storage, handling and transportation of general refuse.

Asbestos Containing Materials (ACM)

2.4.20 Asbestos was widely used in the construction industry prior to the early 1980s for fireproofing, thermal and electrical insulation as well as in sound absorption materials. However, asbestos is currently recognized as hazardous materials, due to its etiological effects on human respiratory system.

2.4.21 As the Schemes involve the demolition of buildings/ structures that were built before 1980s, ACM may be present in the buildings within the Schemes. It requires that all asbestos wastes must be disposed of at designated or licensed facilities. In Hong Kong, the only proven method of disposing of asbestos is by secure burial in a landfill site, so as to avoid the release of harmful asbestos fibres to environment and minimise potential hazard.

2.4.22 All ACM if confirmed to be present within the existing premises must be removed and disposed of in accordance with the Air Pollution Control Ordinance (APCO) and WDO prior to the demolition works. A Registered Asbestos Consultant and Registered Asbestos Laboratory shall be engaged to conduct investigation for the presence of ACM. An Asbestos Investigation Report, an Asbestos Abatement Plan (AAP) (if required) and a notification of commencement of asbestos abatement works commences. Also, the removal of ACMs should be carried out by a Registered Asbestos Contractor according to the approved AAP under the supervision of a Registered Asbestos Consultant. The asbestos waste generated shall be disposed of by a licensed chemical waste collectors in compliance with the WDO.

2.4.23 **Table 2.1** below presents the estimation of waste generated during construction phase.

Table 2.1 Summary Table of Estimated Waste during Construction Phase

Construction activities	Factor/ Assumption adopted	Estimated Quantities of C&D Materials Generated
Demolition of Existing Building	• Provided by Project Proponent • Ratio for Inert and Non-Inert C&D Materials: 9:1	• Inert C&D Materials generated: 18,600 m^3 ~5% (i.e. 930 m^3) would be reused or recycled on site or in other projects; ~95% (i.e. 17,670 m^3) would be delivered to Public Fill Reception Facilities for another beneficial reuse.(c)(d) • Non-inert C&D Materials generated: 1300 m^3
Excavation of Basements	• Excavation Area:15,410 m^2 • Excavation Depth: 7.2 m to 15.2 m • Ratio for Inert and Non-Inert C&D Materials: 9:1	• Inert C&D Materials generated: ~125,036 m^3 ~5% (i.e. ~6251.8 m^3) would be reused or recycled on site or in other projects; ~95% (i.e. ~118,784.3 m^3) would be delivered to Public Fill Reception Facilities for another beneficial reuse. (c)(d) • Non-inert C&D Materials generated: ~13,890 m^3
Construction of New Buildings/Structures	• GFA: 125,484 m^2 • Ratio for Inert and Non-Inert C&D Materials: 9:1	• Inert C&D Materials generated: ~ 11,250 m^3 • Non-inert C&D Materials generated: ~1,250m^3
General refuse	• ~33 kg per day	• Recyclables to recyclers; • Non-recyclables to landfill
Chemical Waste	• Anticipated to be limited (not more than 50L of chemical waste)	• To be collected by licensed chemical waste collectors and deliver to Chemical Waste Centre

(a) The above estimated quantities are subject to detailed design.

(b) With total ~205,591 tonnes inert/ non-inert C&D material, the number of dump truck is anticipated to be around 9 trucks/day (assuming each truck can carry 15 tones and the construction period for the Proposed Development is 6 year (around 270 working day per year))

(c) The destination of inert C&D materials is subject to the designation by the Public Fill Committee according to DEVB TC(W) No.6/2010

(d) The disposal of non- inert C&D materials is subject to agreement with relevant section of the EPD

2.5 Mitigation Measures During Construction Phase

2.5.1 The mitigation measures for construction phase are recommended based on the waste management hierarchy principles. Recommendations of good site practices, waste reduction measures as well as the waste transportation, storage and collection are described in following sub-sections.

Good Site Practices

2.5.2 Appropriate waste handling, transportation and disposal methods for all waste arisings generated during the construction phase should be implemented to ensure that construction waste do not enter the nearby sensitive receivers.

2.5.3 It is expected that adverse impacts from waste management would not arise, provided that good site practices are strictly followed. Recommendations for good site practices during construction include:

- Nomination of approved personnel, such as a site manager, to be responsible for good site practices, and making arrangements for collection of all wastes generated at the site and effective disposal to appropriate facilities;
- Training of site personnel in proper waste management and chemical waste handling procedures;
- Provision of sufficient waste disposal points and regular collection for disposal;
- Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers;
- Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors.

2.5.4 In order to monitor the disposal of C&D material at landfills and public fill reception facilities, as appropriate, and to control fly tipping, a trip-ticket system should be included as one of the contractual requirements to be implemented by the Contractor. Reference shall be made to DEVB TCW No. 6/2010 for details.

Waste Reduction Measures

2.5.5 Good management and control can prevent the generation of significant amounts of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:

- Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;
- Separate labelled bins shall be provided to segregate aluminium cans from other general refuse generated by the work force, and to encourage collection of by individual collectors;
- Any unused chemicals or those with remaining functional capacity shall be recycled;
- Maximising the use of reusable steel formwork to reduce the amount of c&d material;
- Prior to disposal of non-inert C&D material, it is recommended that wood, steel and other metals shall be separated for re-use and / or recycling to minimise the quantity of waste to be disposed of to landfill;
- Proper storage and site practices to minimise the potential for damage or contamination of construction materials;

- Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste; and
- Minimize over ordering of concrete, mortars and cement grout by doing careful check before ordering.

2.5.6 In addition to the above good site practices and waste reduction measures, specific mitigation measures are recommended for the identified waste to minimise environmental impacts during handling, transportation and disposal of these wastes.

General Refuse

2.5.7 Recycle bins will be provided onsite to collect recyclable wastes such as paper, metal (e.g. cans), plastic and glass. Recyclable wastes will be segregated from non-recyclable waste to be stored in enclosed bins or compaction units. A reputable waste collector should be employed by the contractor to remove general refuse from the site on a daily basis. Recyclable waste will be collected in appropriate frequency to ensure no over stacking of recyclable wastes. An enclosed and covered area is preferred to reduce the occurrence of 'wind blown' light material.

2.5.8 For the food waste, it is recommended an adequate number of enclosed waste containers will be provided to avoid over-spillage of waste. Also, food waste will be placed in bags and stored in enclosed containers. The containers should be placed in prominent places to promote wate separation at the source. The food waste should be collected by daily basis to minimize any potential odour and environmental hygiene impacts.

Construction and Demolition Material

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

2.5.10 The Applicant and its contractor will consider if "All dump trucks engaged on-site for delivery of inert and non-inert C&D material from the site to the designated disposal location, including PFRFs, landfill etc., should be equipped with GPS or equivalent system for tracking and monitoring of their travel routings and parking locations by the Contractor to prohibit illegal dumping and landfilling of materials." and "The data collected by GPS or equivalent system should be recorded properly for checking and analysis the travel routing and parking locations of dump truck engaged on site." are appropriate in the construction phase. Disposal and transportation of C&D materials are recommended before foreseeable inclement weather such as typhoon or heavy rain.

2.5.11 Suitable areas should be designated within the site for temporary stockpiling of C&D material and to facilitate the sorting process. Within stockpile areas, the following measures should be taken to control potential environmental impacts or nuisance:

- Covering material during heavy rainfall;
- Locating stockpiles to minimise potential air quality, water quality and visual impacts; and
- Minimising land intake of stockpile areas as far as possible.

Chemical Wastes

2.5.12 For those processes which would generate chemical waste, it may be possible to find alternatives to eliminate the use of chemicals, to reduce the generation quantities or to select a chemical type of less impact on environment, health and safety as far as possible.

Chemical wastes are produced at the construction site, the Contractor should register with EPD as a Chemical Waste Producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes should be used. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosives, flammable, oxidising, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed chemical waste collector to transport, and disposal of the chemical wastes generated at the Chemical Waste Treatment Centre at Tsing Yi, or other licenced facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.

2.5.13 Due to the potential presence of ACM during the site clearance stage, asbestos investigation is required. An asbestos specialist shall be employed during the design and construction stage to investigate this issue.

2.5.14 Sufficient and reasonable lead time shall be allowed for the preparation, vetting and implementation of asbestos investigation report and asbestos abatement plan in accordance with APCO before commencement of any demolition or site clearance work.

2.5.15 Asbestos waste will be handled in accordance with the Code of practice on the Handling, Transportation and Disposal of Asbestos Waste issued by the EPD.

2.5.16 Some key precautionary measures related to the handling and disposal of asbestos based on Handling of Asbestos Containing Materials in Buildings (ProPECC PN 2/97) are listed as following:

- Adoption of protection, such as full containment, mini containment, or segregation of work area;
- Provision of decontamination facilities for cleaning of workings, equipment and bagged waste before leaving the work area;
- Adoption of engineering control techniques to prevent fibre release from work area, such as use of negative pressure equipment with high efficiency particulate air (HEPA) filters to control air flow between the work area and the outside environment;
- Wetting of asbestos containing materials before and during disturbance, minimising the breakage and dropping of asbestos containing materials, and packing of debris and waste immediately after it is produced;
- Cleaning of work area by wet wiping and vacuuming with HEPA filtered vacuum cleaner;
- Coating on any surfaces previously in contact with or contained by asbestos with a sealant;
- Proper bagging, safe storage and disposal of asbestos and asbestos contaminated waste;
- Pre-treatment of all effluent from the work area before discharged; and
- Air monitoring strategy to check the leakage and clearance of the work area during and after the asbestos work.

2.6 Identification and Evaluation of Potential Impact during Operation Phase

2.6.1 During operation of the project, there will be waste generation from residential and recreational such as glass, metals, paper, plastics, food wastes, textile, wood, household hazardous wastes and others. Instead, general waste is anticipated to be the major type of waste generated during the operation of the proposed development. With reference to the latest data from "Monitoring of Solid Waste in Hong Kong 2023" by EPD, the per capita disposal rates of municipal solid waste, domestic waste, commercial & industrial waste are respectively 1.44 kg/person/day, 0.89 kg/person/day and 0.55 kg/person/day (Plate 2.7 of Waste Statistics for 2023). Among domestic and commercial waste, the recovery rate is 21% and 46% respectively (Plate 3.2 of Waste Statistics for 2023). Based on the Proposed Development with around 6,960 residential population and 768 working population, there will be around 8,623kg/day of waste generation (i.e. 0.89/ (1-21%) x 6960 + 0.55/ (1-46%) x 768). With adequate waste collection/storage facilities provided to segregate recyclable and non-recyclable wastes, the burden of waste treatment facilities in Hong Kong will be reduced. In addition, the applicant will explore in detailed design stage to collect these recyclable wastes mentioned above to further reduce waste generation.

2.6.2 The refuse shall be properly managed by suitable waste collectors so that intentional or accidental release to the surrounding environment will not occur. Storage of general refuse would generate odour nuisance and visual impact if they are not managed in a proper manner. Vermin and pests may also be attracted if the waste containers are not cleaned or maintained properly and frequently. Therefore, general refuse should be temporarily stored in proper containers with covers to avoid adverse impact to the surroundings. To reduce waste and improve recycling, sufficient properly labelled recycling bins for paper, plastic and aluminium should be provided at appropriate locations of the site to collect recyclables for off-site recycling. Regular (e.g., daily) waste removal and recyclables collecting should be arranged to avoid odour nuisance or pest/vermin problem. These waste management practices and good site practises should be properly implemented to ensure adverse environmental impacts from handling and disposal of general refuse would not arise.

2.6.3 For the food wastes such as leftovers, it is recommended an adequate number of enclosed waste containers will be provided to avoid over-spillage of waste. Also, leftovers will be placed in bags and stored in enclosed containers. Rather than disposing of the food waste to the designated landfill directly, the project proponent is recommended to deliver the food waste to the Organic Resources Recovery Centre (ORRC) to reduce the pressure on the existing landfill. Therefore, the chances of odour nuisance and hygiene issues are reduced.

Chemical Waste

2.6.4 Chemical waste will be generated from various routine maintenance and servicing activities for air conditioning systems, and other electrical and mechanical equipment. Chemical waste such as waste lubricating oil, contaminated rags, waste paint, used solvents and spent chemicals are expected to be generated from these activities. It is difficult to quantify the amount of chemical waste that will arise from those activities at this stage since it will be dependent on the equipment maintenance requirements and the amount of equipment utilised.

2.6.5 Chemical wastes arising during the operation phase may pose environmental, health and safety hazards if not stored and disposed of in an appropriate manner as stipulated in the Waste Disposal (Chemical Waste) (General) Regulations. The potential hazards include:

- Toxic effects to workers;
- Adverse impacts on water quality and wildlife from spills; and
- Fire hazards.

2.6.6 Chemical wastes will require special handling and storage arrangements in accordance with the relevant regulations before off-site disposal at the approved Chemical Waste Treatment Facility or recycling by licensed facilities. Provided that the handling, storage and disposal of chemical wastes will be in accordance with these requirements, adverse environmental impacts will not be expected.

3. CONCLUSION

3.1.1 The types of wastes which may be generated from the construction and operation of the Project have been identified. The quantities of waste shall be estimated during the later project design stage when more information is available. The storage, handling and disposal of the identified wastes shall follow relevant guidelines in order to minimize potential environmental nuisance to the nearby sensitive receivers.

Figures

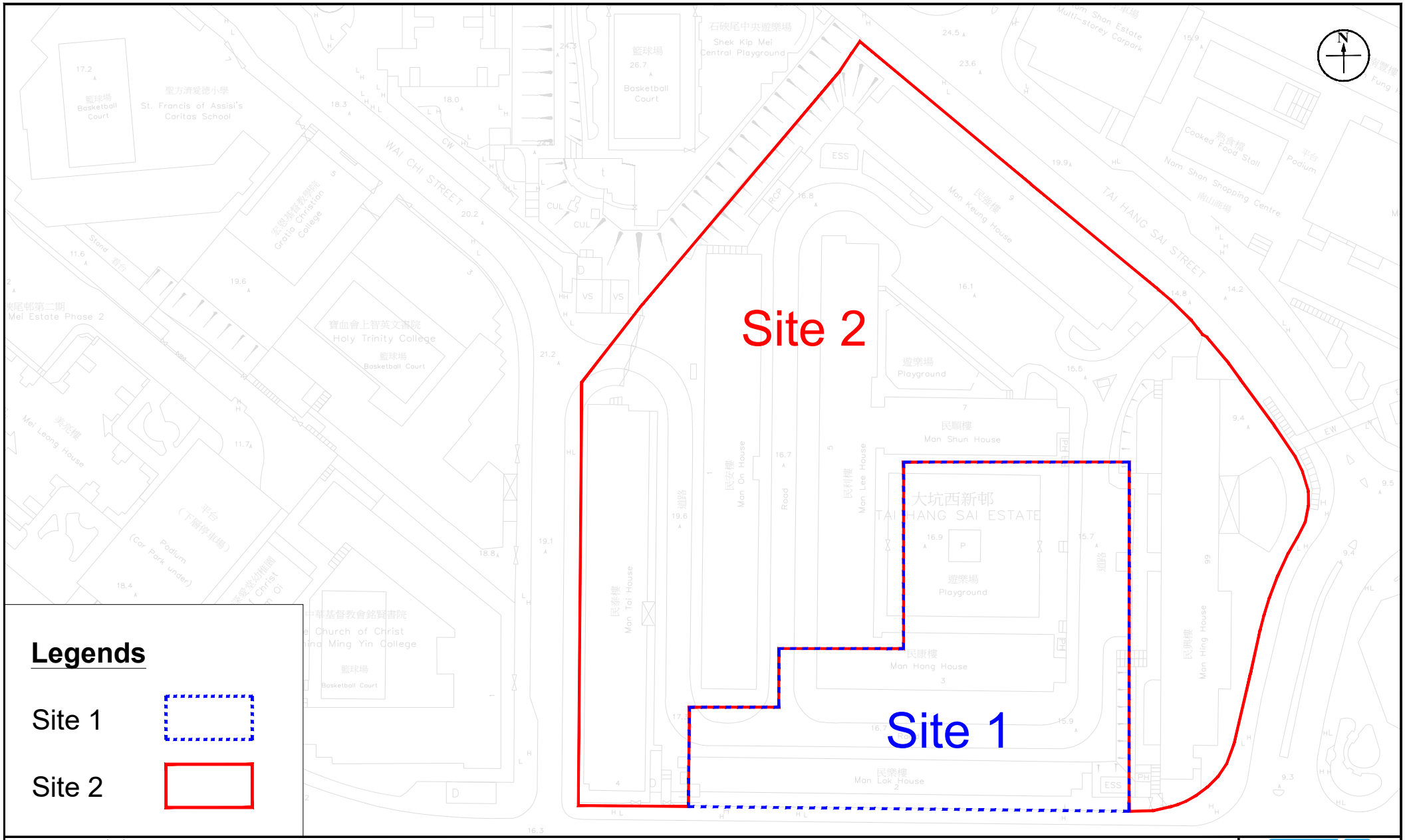


Figure: 1.1	RAMBOLL
Title: Site Location and its Environs	Drawn by: SC
	Checked by: TC
Project: Amednments to an Approved Master Layout Plan for the Proposed Comprehensive Redevelopment of Tai Hang Sai Estate with Minor Relaxation of Plot Ratio, Building Heights and Non-Building Area Restrictions	Rev.: 1.0
	Date: Sep 2026

Q:\Projects\P&TTHSS2AI00\05 Assessments\03 Water\Fig 1.1_Site Location.dwg

Appendix 1.1 Master Layout Plan, Floor Plans and Sections of the Proposed Development


SITE 2
SITE 1
TOWER 2A
+180
TOWER 2B
+143
TOWER 3A &
TOWER 3B
+180
TOWER 5A &
TOWER 5B
+180
TOWER 1
+143
BLOCK 1
+135
BLOCK 2
+115
GIC
EVA
NON-BUILDING AREA
25000
EXISTING SLOPE
PEDESTRIAN ACCESS
5000
MTR EXIT
VS
CUL
TAI HANG SAI STREET
TAI HANG TUNG ROAD
WAI CHI STREET
WOH CHAI STREET
籃球場
Basketball Court
石硤尾中央遊樂場
Shek Kip Mei Central Playground
大坑西街休憩處
南山邨多層停車場
Nam Shan Estate Multi-storey Carpark
南豐樓
Nam Fung House
熟食檔
Cooked Food Stall
平台
Podium
南山商場
Nam Shan Shopping Centre
市場
Market
南樂樓
Nam Lok House
大坑東道
宏恩基督教學院
Gratia Christian College
寶血會上智英文書院
Holy Trinity College
中華基督教會銘賢書院
The Church of Christ in China Ming Yin College
中華基督教會深愛堂幼稚園
The Church of Christ in China Shum Oi Kindergarten
仁寶大廈
I－P座
A－H座
Ample
RESIDENTIAL TOWERS OF SITE 1
RESIDENTIAL TOWERS OF SITE 2
PROPOSED GIC FACILITIES
PUBLIC OPEN SPACE
PRIVATE LANDSCAPE PODIUM
PRIVATE LANDSCAPE ROOF
EVA
SETBACK AREA AT GRADE
COVERED WALKWAY
FOOTBRIDGE
PRIVATE AREA
SITE BOUNDARY OF SITE 1
SITE BOUNDARY OF SITE 2

UNEXCAVATED

UNEXCAVATED

NON-BUILDING AREA

25000

UNDERGROUND MTR STRUCTURE

SITE 2

UNEXCAVATED

UNEXCAVATED

25000

NON-BUILDING AREA

CARPARK

SITE 1

UNEXCAVATED

TAI HANG TUNG ROAD

南樂樓
Nam Lok House

大坑東道

道路
Road

東龍樓
Tung Lung House

SITE BOUNDARY OF SITE 1

SITE BOUNDARY OF SITE 2

Proposed Scheme - Basement (Site 1)

UNEXCAVATED

UNEXCAVATED

CARPARK

NON-BUILDING AREA

25000

UNDERGROUND MTR STRUCTURE

UNEXCAVATED

25000

NON-BUILDING AREA

CARPARK

RETAIL / E&M

CARPARK

UNEXCAVATED

南樂樓
Nam Lok House

大坑東道

道路
Road

東龍樓
Tung Lung House

TAI HANG TUNG ROAD

仁寶大廈
1–13
A－H座
P－P座
Ample

SITE BOUNDARY OF SITE 1

SITE BOUNDARY OF SITE 2

Proposed Scheme - LG/F

UNEXCAVATED

UNEXCAVATED

UNEXCAVATED

CARPARK

NON-BUILDING AREA 25000

UNDERGROUND MTR STRUCTURE

NON-BUILDING AREA 25000

SHOP & SERVICES /EATING PLACE

GIC (UG1/F)

BLOCK 1 LIFT LOBBY

BLOCK 2 LIFT LOBBY

RAMP 1/8

TO BASEMENT CARPARK

G SAI STREET

TAI HANG TUNG ROAD

南豐樓 Nam Fung House

熟食檔 Cooked Food Stall

平台 Podium

Shan Shopping Centre 南山商場

市場 Market

南樂樓 Nam Lok House

大坑東道

道路 Road

東龍樓 Tung Lung House

1–13 仁寶大廈

I – P 座

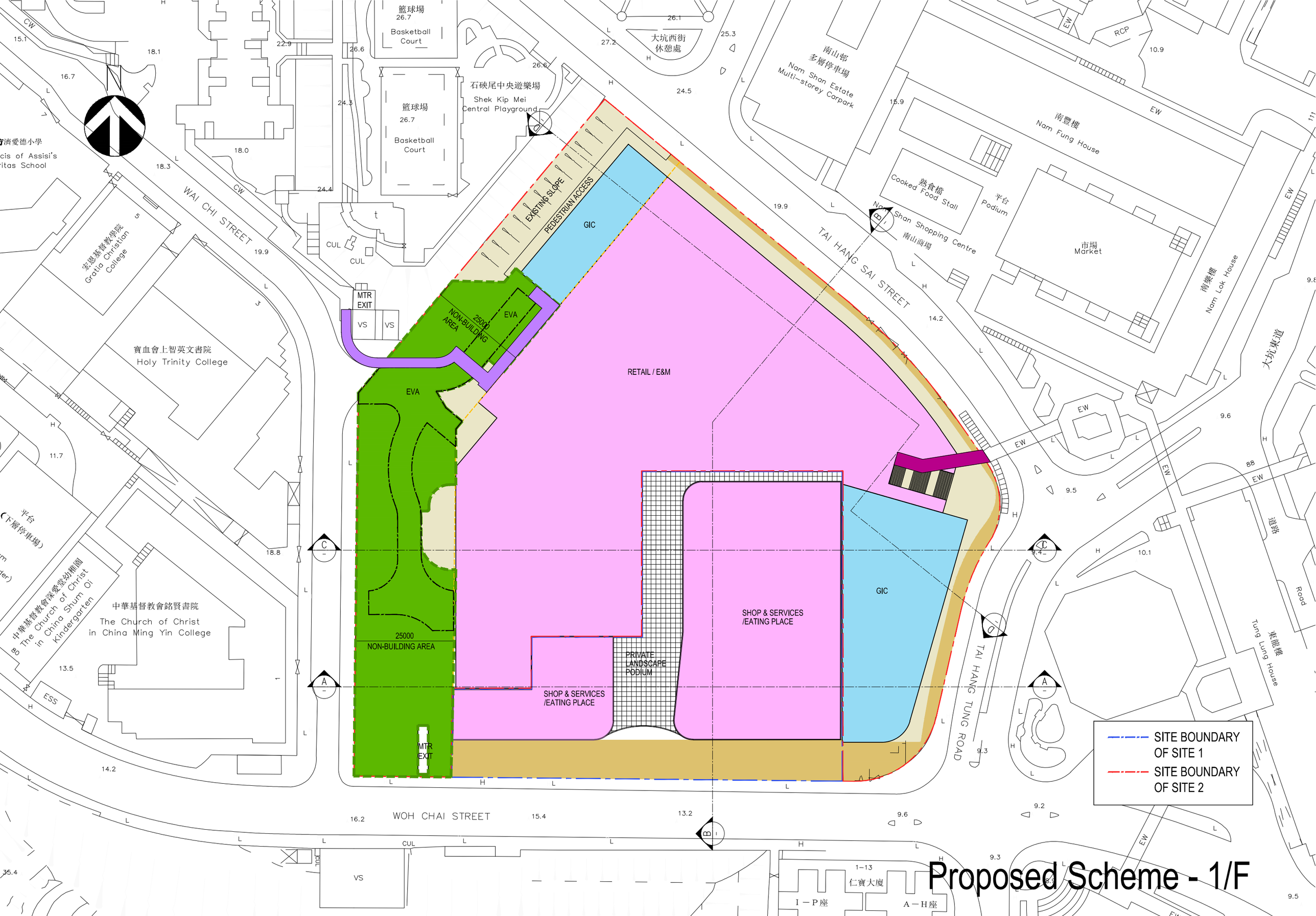
A – H 座

Ample

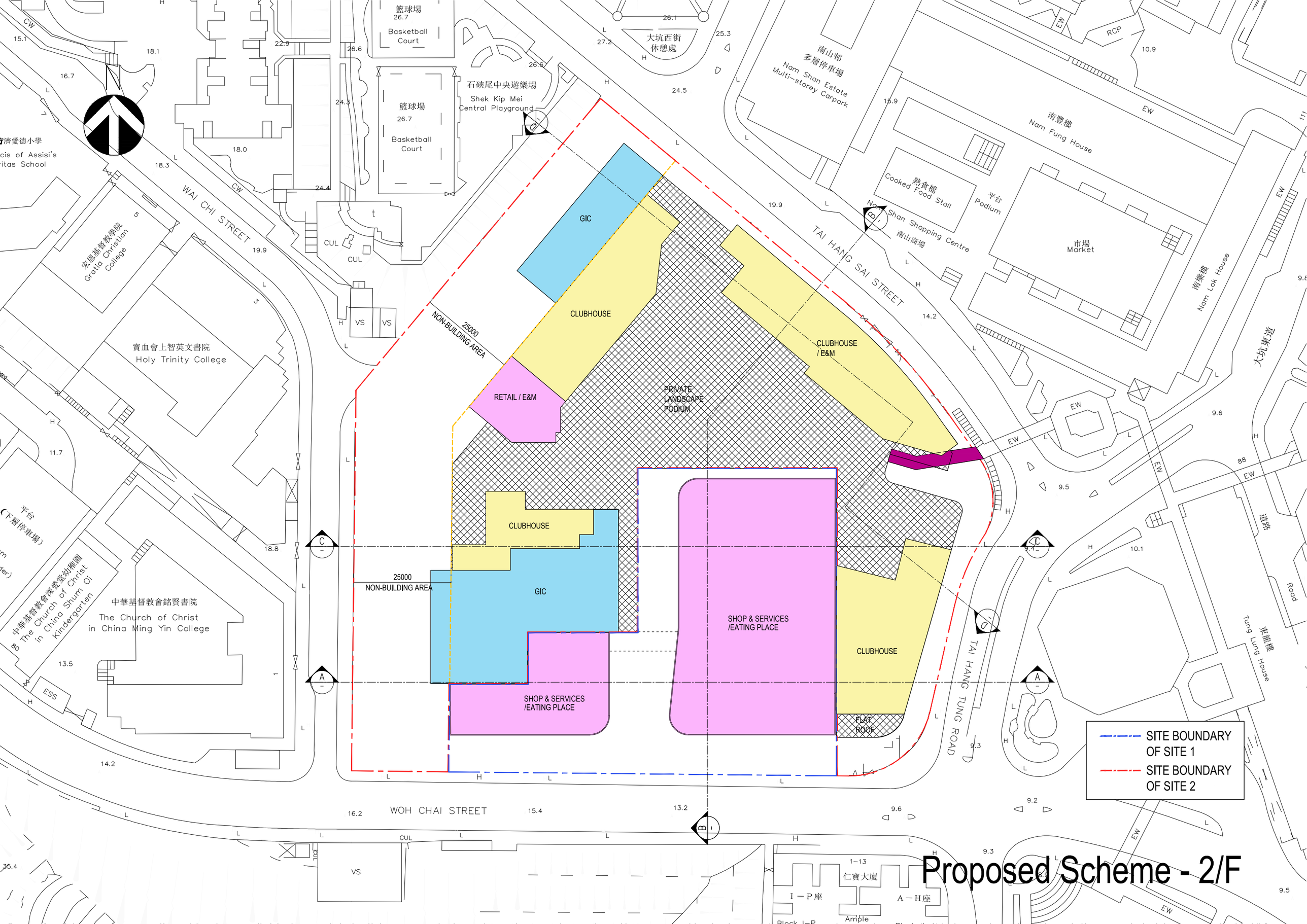
SITE BOUNDARY OF SITE 1

SITE BOUNDARY OF SITE 2

Proposed Scheme - UG/F



Proposed Scheme - 1/F



Proposed Scheme - 2/F

籃球場
26.7
Basketball Court

籃球場
26.7
Basketball Court

石硤尾中央遊樂場
Shek Kip Mei Central Playground

大坑西街休憩處

南山邨多層停車場
Nam Shan Estate Multi-storey Carpark

南豐樓
Nam Fung House

熟食檔
Cooked Food Stall

平台
Podium

Nam Shan Shopping Centre
南山商場

市場
Market

南樂樓
Nam Lok House

大坑東道

濟愛德小學
cis of Assisi's
ritas School

WAI CHI STREET

TAI HANG SAI STREET

TAI HANG TUNG ROAD

宏恩基督教學院
Gratia Christian College

寶血會上智英文書院
Holy Trinity College

中華基督教會深愛堂幼稚園
The Church of Christ in China Shum Oi Kindergarten

中華基督教會銘賢書院
The Church of Christ in China Ming Yin College

WOH CHAI STREET

FLAT ROOF

CLUBHOUSE

PRIVATE LANDSCAPE ROOF

CLUBHOUSE

25000
NON-BUILDING AREA

PRIVATE LANDSCAPE ROOF

CLUBHOUSE/ E&M

25000
NON-BUILDING AREA

PRIVATE LANDSCAPE ROOF

CLUBHOUSE/ E&M/ TRANSFER PLATE

FLAT ROOF

1–13 仁寶大廈

I – P 座

A – H 座

Ample

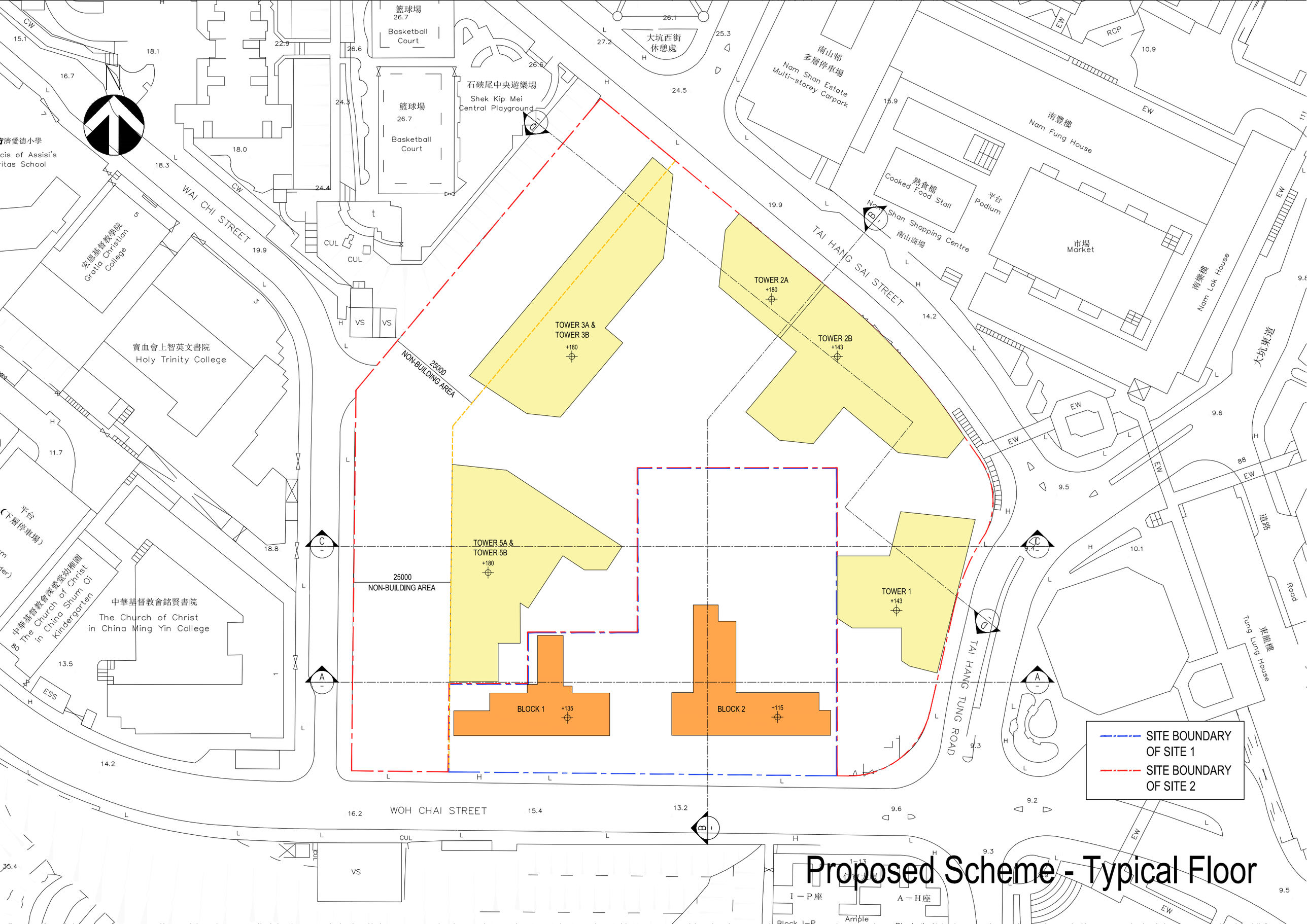
道路
Road

東龍樓
Tung Lung House

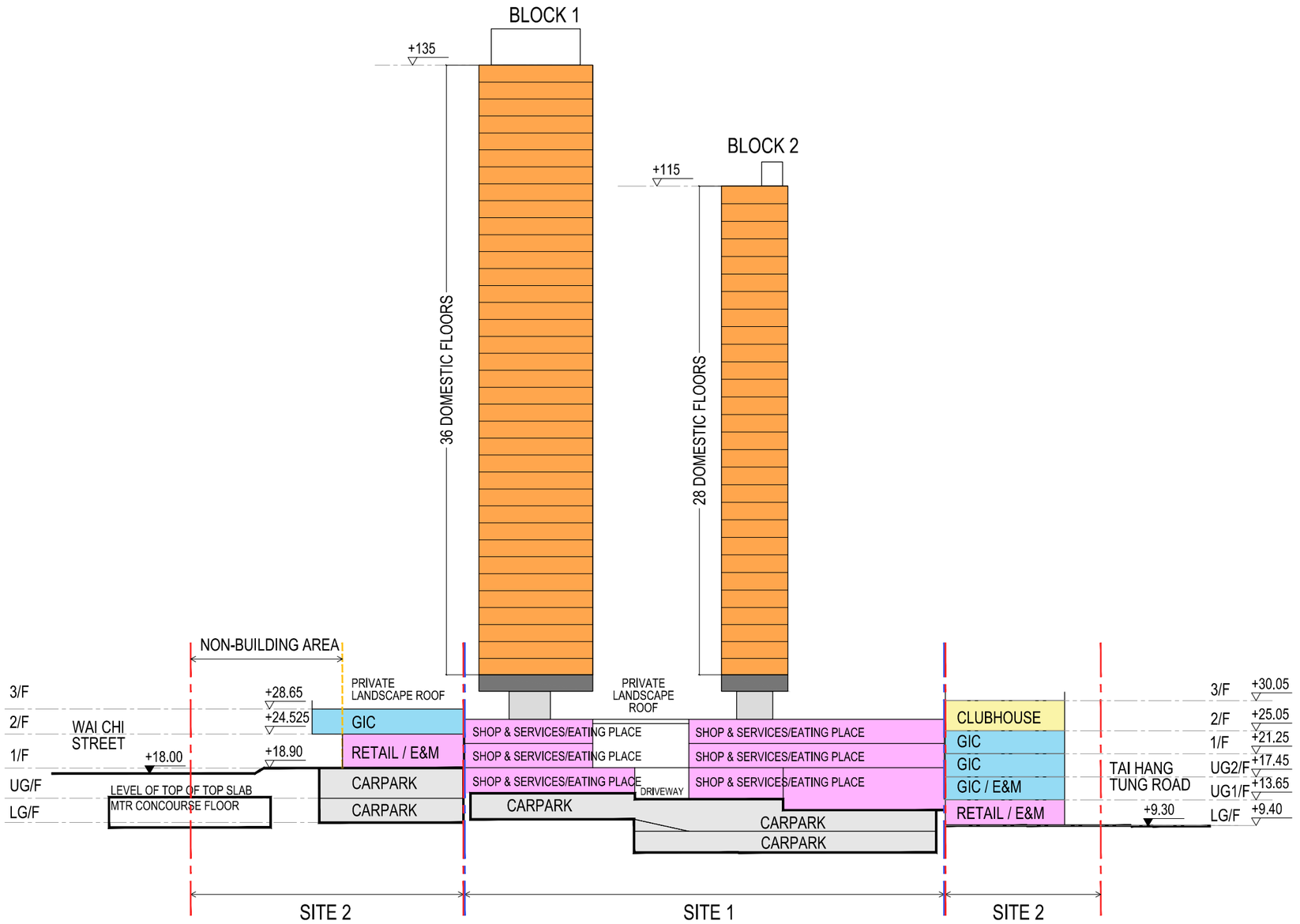
SITE BOUNDARY OF SITE 1

SITE BOUNDARY OF SITE 2

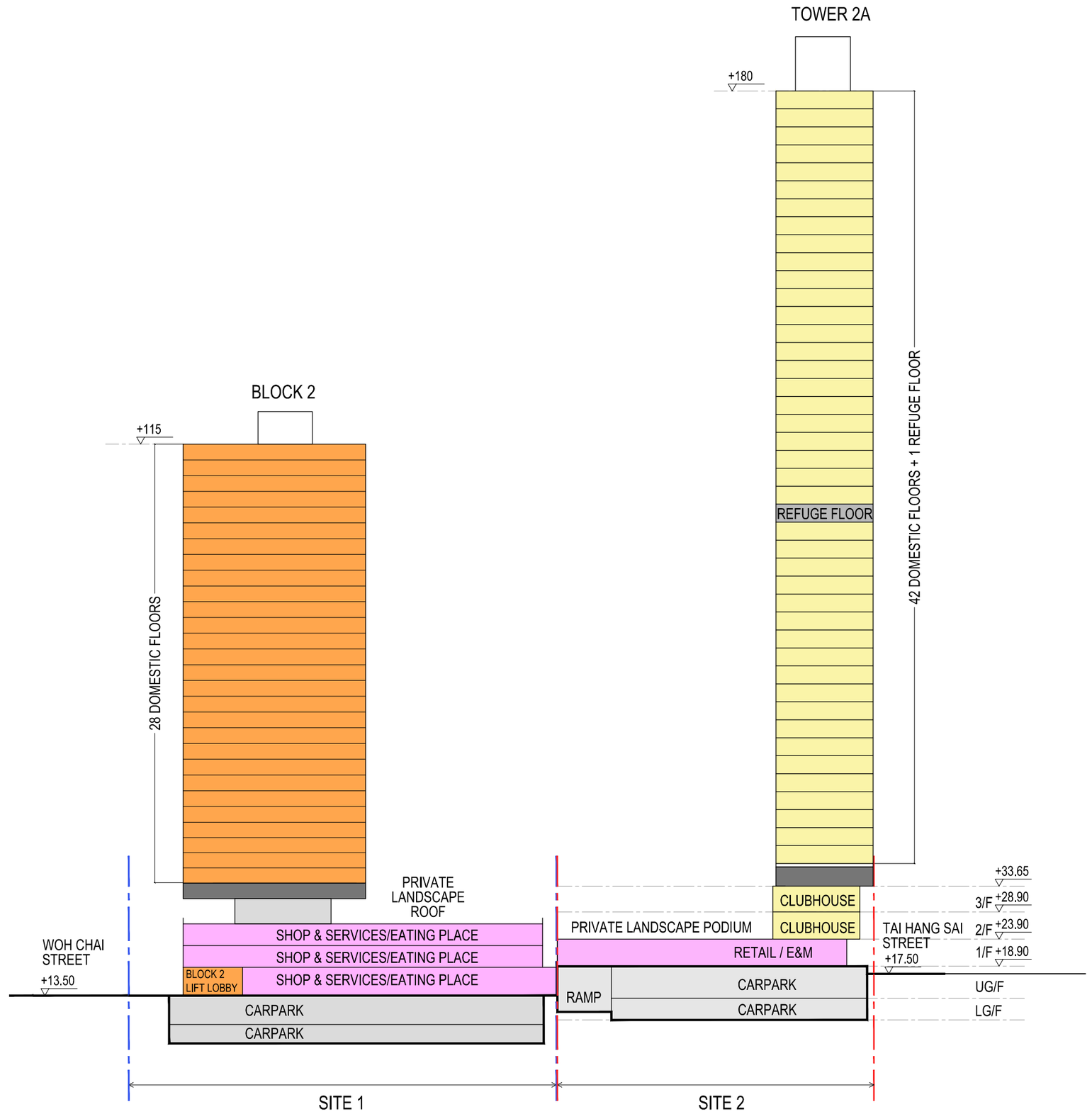
Proposed Scheme - 3/F



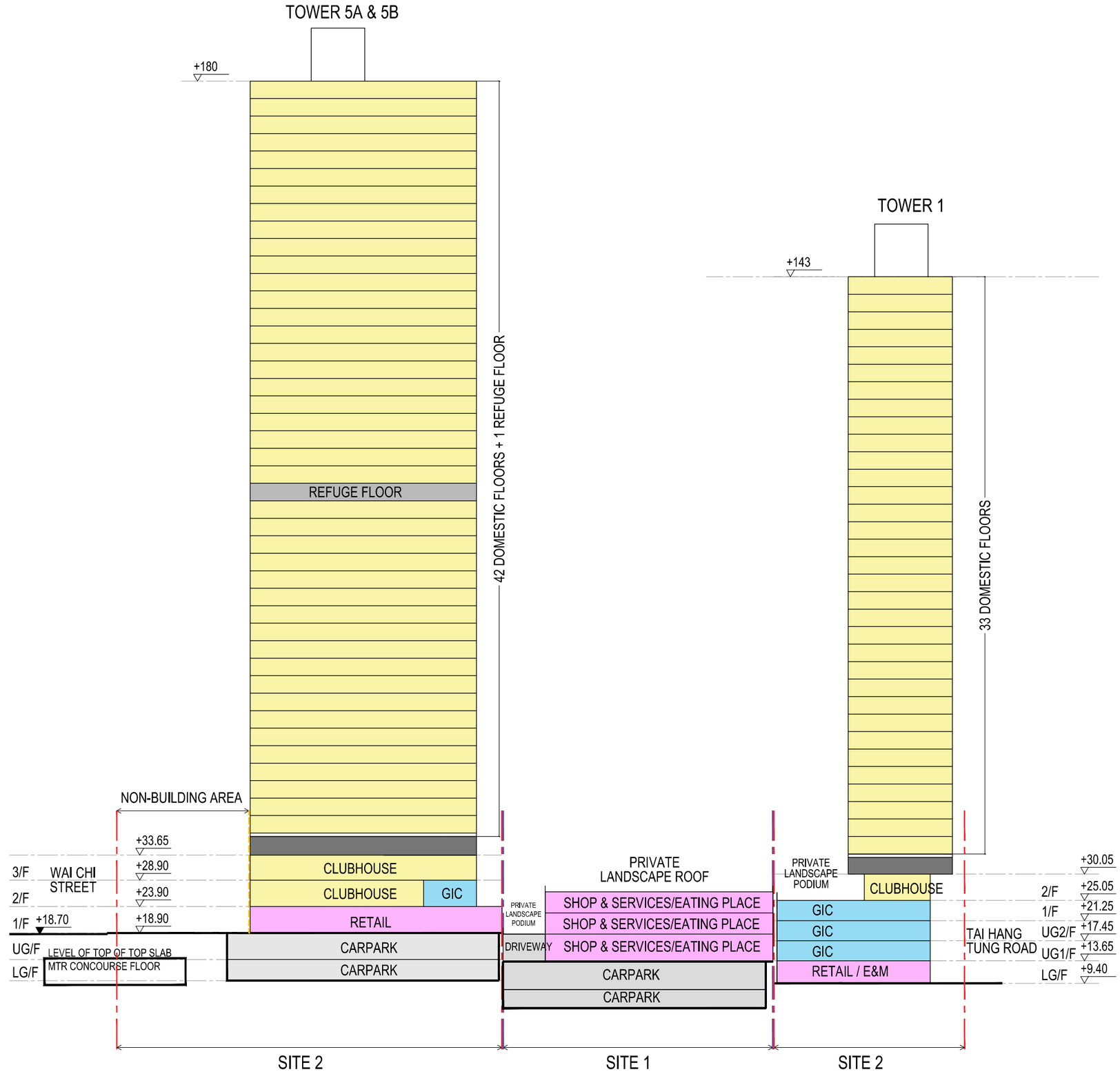
Proposed Scheme - Typical Floor



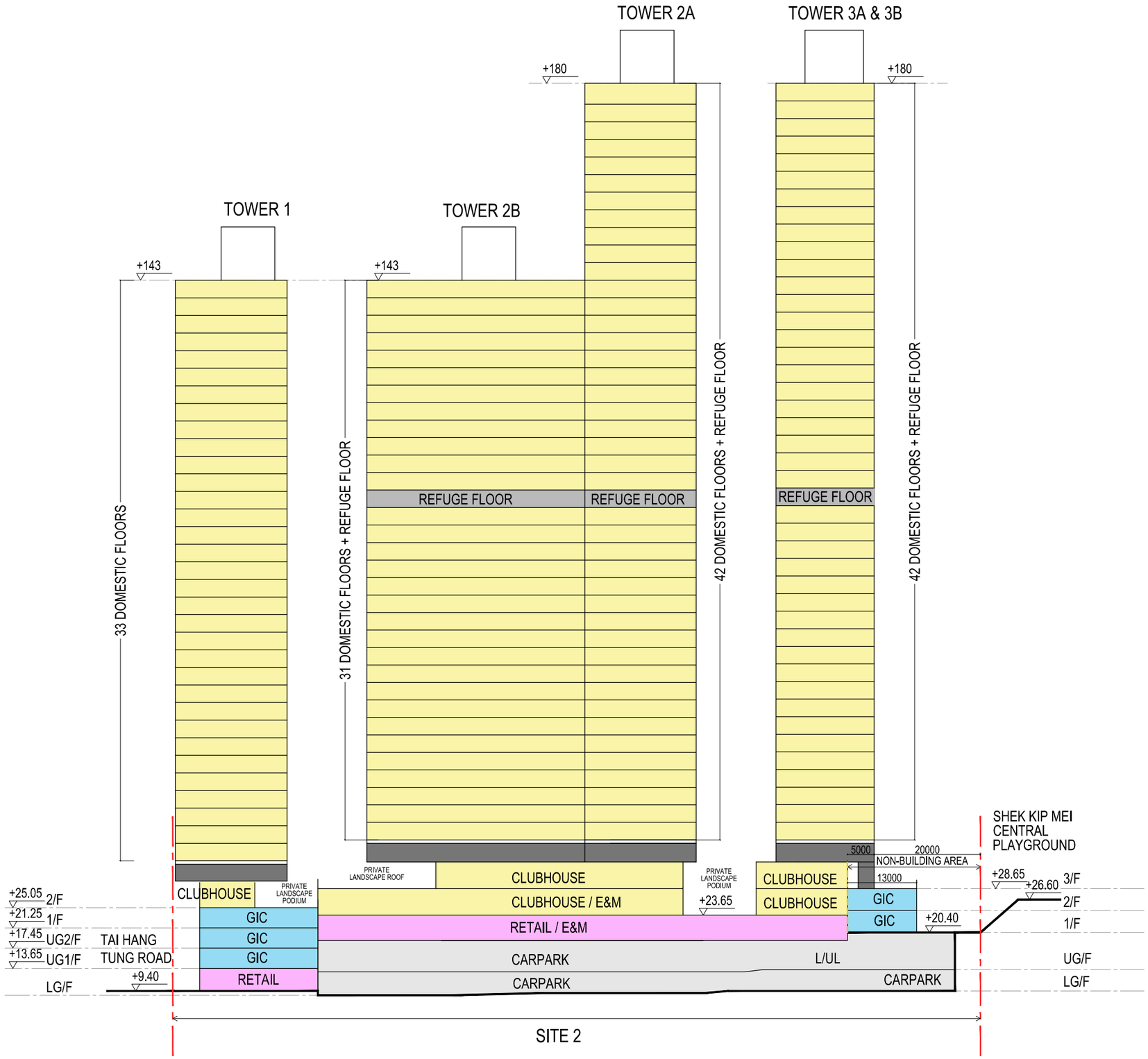
Proposed Scheme - Section A-A



Proposed Scheme - Section B-B



Proposed Scheme - Section C-C



Proposed Scheme - Section D-D

Appendix 2.1 Excavation Volume

Excavation Level = +2.300
Excavation Depth = +16.570- 2.300
=14.270m
Area = 990.515 m2
Volume = 14134.649 m3

Excavation Level = +4.825
Excavation Depth = +16.97 - 4.825
=12.145m
Area = 5527.212 m2
Volume = 67127.990 m3

Excavation Level = +5.925
Excavation Depth = +18.480- 5.925
=12.555m
Area = 3504.848 m2
Volume = 44003.367 m3

Excavation Level = +2.800
Excavation Depth = +18.045 - 2.800
=15.245m
Area = 658.755 sqm
Volume = 10042.720 m3

Excavation Level = +2.300
Excavation Depth = +9.510 - 2.300
=7.210m
Area = 501.710 m2
Volume = 3617.329 m3

Approx. excavated total volume = 138926.055 m3

AREA V
AREA IV
AREA II
AREA III
AREA I

ADJACENT SITE (WIP)
(3/4016/24(DPU))

3m PROTECTION ZONE FROM MTR STRUCTURE

NEW DRAWING