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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

EXECUTIVE SUMMARY

FOR

CONSTRUCTION OF ANNEX BLOCK AT HONG KONG OBSERVATORY HEADQUARTERS, TSIM SHA TSUI

Prepared by

Allied Environmental Consultants Ltd.

COMMERCIAL-IN-CONFIDENCE

Allied Environmental Consultants Limited

Member of AEC Group (HKEX Stock Code: 8320.HK)

27/F, Overseas Trust Bank Building, 160 Gloucester Road, Wan Chai, Hong Kong

www.asecg.com T: +852 2815 7028 F: +852 2815 5399

沛然環境評估工程顧問有限公司

沛然環保集團成員 (港交所股份代號: 8320.HK)

香港灣仔告士打道 160 號海外信託銀行大廈 27 樓

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Figure 1.1 Site Location Plan

1. INTRODUCTION

1.1. PROJECT BACKGROUND

- 1.1.1. The Project is for construction of a new Annex Block, and refurbishment of the existing Red House at Hong Kong Observatory (HKO) Headquarters in Tsim Sha Tsui (hereinafter referred as the “Project”). Site location plan of the Project is shown in *Figure 1.1*.
- 1.1.2. The Project is within a site of cultural heritage, and therefore is classified as a Designated Project(DP) under Item Q.1 in Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO), the construction and operation of the Project will require an Environmental Permit (EP).
- 1.1.3. The Project Proponent of the Project is HKO. Architectural Services Department (ArchSD) is the works agent of the Project. Allied Environmental Consultants Limited (AEC) was commissioned by ArchSD to undertake the Environmental Impact Assessment (EIA) study for the Project. A separate architectural lead consultant will be engaged by ArchSD to undertake investigation, planning, design and construction supervision of the Project. Construction works under the Project will be carried out by the Contractor engaged by ArchSD.
- 1.1.4. In accordance with the requirements of *Section 5(1)(a)* of the EIAO, a Project Profile (No. PP-630/2021) for the Project was submitted to the Director of Environmental Protection (DEP) for application for an EIA Study Brief on 20 September 2021. Pursuant to *Section 5(7)(a)* of the EIAO, the DEP issued a Study Brief (No.:ESB-347/2021) on 29 October 2021 for the EIA study.

1.2. OBJECTIVES OF THE EIA STUDY

- 1.2.1. The overall objectives of the EIA Study are to provide information on the nature and extent of environmental impacts arising from the construction and operation of the Project; to recommend appropriate mitigation measures to control the potential environmental impacts arising from the Project so as to comply with the requirements of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) of EIAO; and to confirm the environmental acceptability of the Project. Key environmental issues identified include cultural heritage, air quality, noise, water quality and sewerage, waste management, and landscape and visual.
- 1.2.2. The potential environmental impacts arising from the construction and operation of the Project have been assessed in accordance with the guidelines and requirements stipulated in the EIAO-TM.

2. PROJECT DESCRIPTION

2.1. LOCATION OF THE PROJECT

2.1.1. The Project Site is located at the southern side of HKO Headquarters at 134A Nathan Road, Tsim Sha Tsui. It is a Declared Monument under the *Antiquities and Monuments Ordinance (Cap.53)*. An open car park, the Red House (being used as an electronics laboratory at present) and an access road are found in the Project Site as shown in *Figure 1.1*.

2.2. SCOPE OF THE PROJECT

2.2.1. The Project aims to construct a new Annex Block in the form of a four-storey building (plus a mezzanine floor above G/F and U1/F above 1/F). Other associated and supporting facilities such as rest rooms for shift duty officers, 7 open car parking spaces for the Annex Block, etc. will be provided to meet HKO's operation needs and to support the round-the-clock uninterrupted operations of HKO's mission-critical services. The proposed building height is capped at +45 metres above Hong Kong Principal Datum (mPD) as stipulated in the Tsim Sha Tsui Outline Zoning Plan (OZP) No. S/K1/28. Since the existing car park is situated at around +24.4 mPD, the building height measured from the car park level should not exceed about 20.6m.

2.2.2. The Project also covers refurbishment works to convert the existing Red House into a History Room for showing the history of HKO to the public. In addition, the Project includes road widening works for the Emergency Vehicular Assess (EVA) at the existing access road and minor utility and maintenance works.

2.3. NEED OF THE PROJECT

2.3.1. There is currently an acute shortfall of office space and functional areas at the HKO Headquarters. HKO staff and the existing equipment are accommodated in very congested environment hampering the effective operations of existing essential services. The Project is to provide necessary space and premises to (a) support and upgrade HKO's essential operation and services to strengthen HKO's weather monitoring and forecasting capability to cope with more extreme weather under the threat of climate change, and (b) organize more public education and outreach activities for enhancing the community's awareness of climate change and natural disaster prevention and response.

2.3.2. Without this Project, the HKO could not develop and render new services to the government and the public for coping with the challenges of climate change as there is no additional space to house the required facilities, thereby causing negative impacts on the disaster risk reduction and public safety which is undesirable to the society.

2.4. CONSIDERATION OF ALTERNATIVE OPTIONS

2.4.1. To provide functional areas and necessary facilities for supporting and upgrading HKO's essential operation, a medium sized Annex Block that can house adequate office space and

functional areas have to be provided. Different locations and design options have been identified and examined, in order to optimize the operational benefits while minimizing environmental impacts.

Location of the New Annex Block

2.4.2. The location, size and arrangement on the new Annex Block is bounded by operation needs of HKO. The suitable location within the HKO Headquarters should be away from (1) the meteorological equipment/instruments in operation at the grasslands in front of the 1883 Building; and (2) historic buildings/structures as far as practicable.

2.4.3. Two alternative locations within HKO Headquarters have been proposed for the new Annex Block (see *Plate 2-1*):

- Location A – Existing open car park and its vicinity area located at the southern side of the HKO Headquarters; and
- Location B – Green area situated on a slope. Located at the northern side of the HKO Headquarters.

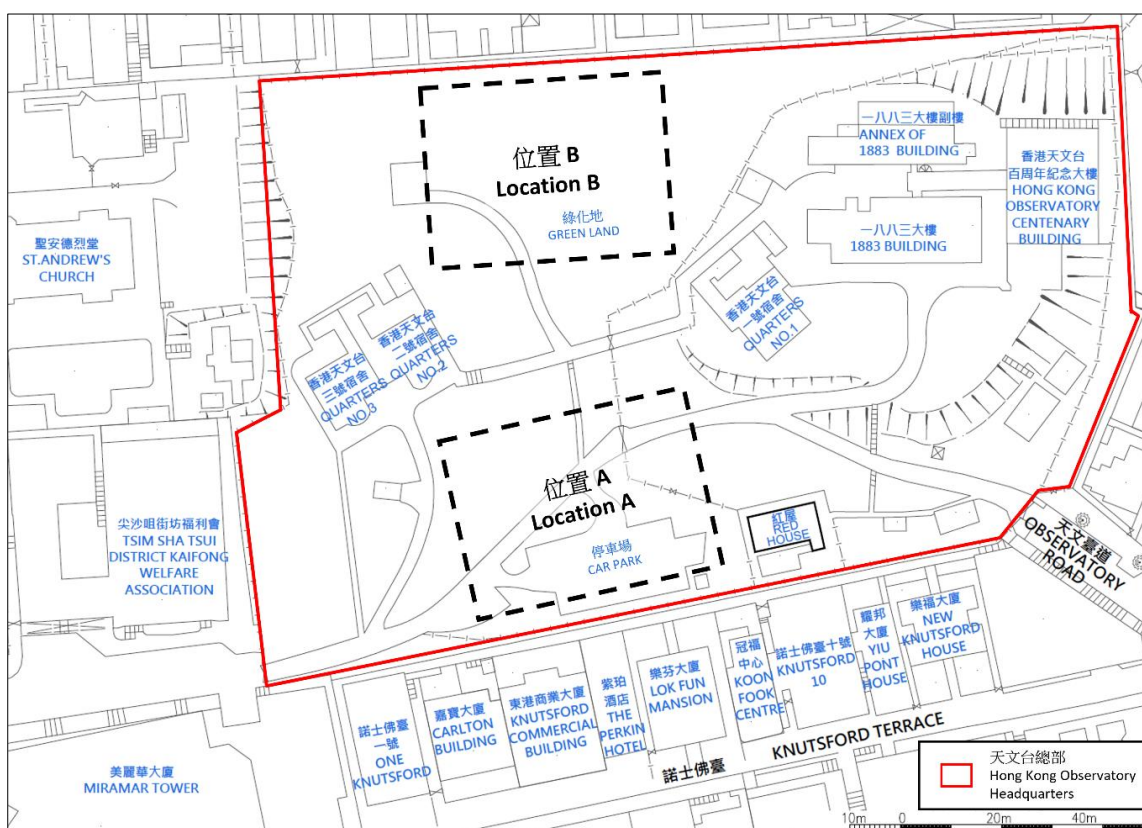


Plate 2-1 Alternative Locations of the New Annex Block

2.4.4. Location A is considered more preferable given the following benefits:

- Impact to the existing trees would be minimized as it is an open car park and access road, with more paved area and less vegetation;
- The green area at Location B is known as one of the remainings in urban Kowloon, so it should be preserved; and
- As the green area at Location B is situated on a slope, it is technically more complicated and of a higher cost for constructing a building on a slope.

2.4.5. Location A has therefore been selected as the preferred location for the new Annex Block that could best minimize the adverse environmental impacts associated with the Project while achieving the needs of HKO.

Design of the New Annex Block

2.4.6. Two design options have been identified:

- Option A – One block scheme; and
- Option B – One block scheme with a wide atrium at 1/F.

2.4.7. Option A consists of one block with building height capped at +45 mPD. The new Annex Block with no atrium in Option A may cause obstruction to visual context of the building users and visitors.

2.4.8. Option B consists of one block with the building height capped at +45mPD with a wide east to west aligned atrium at 1/F which is beneficial to the visual context of the visitors. The atrium will act as air path and enhance the natural ventilation, thereby reducing the electricity demand of mechanical ventilation system and air conditioning. Also, Option B will provide footpaths and encourage pedestrian movement within the HKO Headquarters.

2.4.9. Moreover, the central void above the atrium within the 2/F to R/F in Option B would allow natural daylight entering the rooms on lower floors and hence reduce the energy consumption in interior lighting.

2.4.10. From cultural heritage perspective, Option B can provide a more articulated and dynamic form with reduced building mass to minimise visual intrusion and preserve sight lines to the existing historic buildings within HKO Headquarters.

2.4.11. In view of the above, Option B is considered to be the preferred design option for the Project.

Construction Methodology

2.4.12. For the construction of the Project, the major construction activities comprise the following:

- Site preparation and road works;
- Excavation and Foundation; and
- Construction of Annex Block and Refurbishment of Red House.

Foundation works

2.4.13. Feasibility of various foundation methods have been reviewed and studied. Driven H-pile and socketed H-piles are being considered for the Project. For driven H-piles, it will not be adopted as it would induce a relatively high disturbance in terms of noise level and vibration. Silent hydraulic press-in method is also studied and will not be used for the Project, as it is to be used for sheet piling while no such works will be carried out. In view of the above, socketed H-piles is considered most suitable for the Project as it could generate less noise and vibration with minimal soil disturbance.

Main Building Construction

2.4.14. In general, the suitable main building construction options will not present significant differences in terms of the environmental impacts to the nearby sensitive receivers. Conventional cast in-situ reinforced beam-slab system will be adopted based on the latest design.

2.4.15. Innovative construction methods are encouraged in this Project. Reinforced concrete Modular Integrated Construction (MiC) by fully making use of Building Information Modelling (BIM) tool, will be adopted where applicable for staff offices, rest rooms, lavatories and panties at 2/F and 3/F. It will be sub-divided into pre-finished modules with building services provisions by means of off-site prefabrication.

Preferred Option

2.4.16. The preferred options should introduce minimal environmental impacts and present environmental benefits when compared to other options and alternatives. Based on the above considerations, the preferred options in respect of the location, building, design and construction method are summarized below for detailed design of the Project and adopted for this EIA study.

- Optimum location: at the existing open car park and its vicinity area located at the southern side of the HKO Headquarters;
- Optimum design: One block scheme with a wide atrium at 1/F at the existing carpark within the HKO Headquarters; and
- Optimum construction method: socketed H-piling and conventional cast in-situ reinforced beam-slab system, with MiC method where applicable.

2.4.17. The elevation drawing and rendering diagrams for the preliminary building design are shown in *Plate 2-2 to Plate 2-5*.

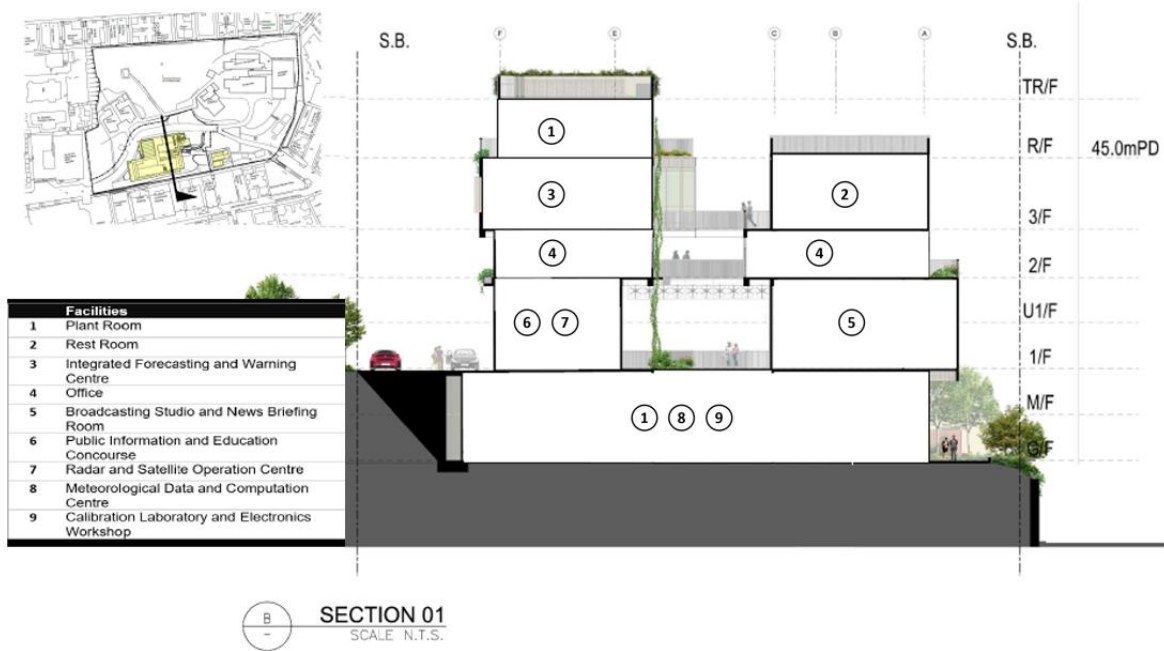


Plate 2-2 Elevation Drawing of the New Annex Block



Plate 2-3 Preliminary Design of the New Annex Block (1)



Plate 2-4 Preliminary Design of the New Annex Block (2)



Plate 2-5 Preliminary Design of the New Annex Block(3)

2.5. **PROJECT IMPLEMENTATION PROGRAMME**

2.5.1. Subject to the design process, the availability of fundings and other constraints, the construction of the Project is tentatively scheduled to commence in 2025 Q3 and completed in 2029 Q1.

2.6. **PUBLIC CONSULTATION**

2.6.1. The Food, Environmental Hygiene and Public Works Committee of Yau Tsim Mong District Council (YTMDC) was consulted on the scope of the Project on 2 March 2021 and Members attended the meeting expressed their general support to the Project. The Project Profile for EIA study was exhibited to the public for comments on 21 September 2021 for 14 days. Comments received from the public mainly focused on the potential impacts of Project on air ventilation, natural daylight, air quality, noise, landscape, visual, building separation and tree management which have been assessed in this EIA study. Key concerns and comments have also been incorporated into the design of the Project as far as practicable.

3. ENVIRONMENTAL IMPACT ASSESSMENT

3.1.1. The EIA Study was conducted in accordance with the EIA Study Brief No. ESB-347/2021, following the guidelines on assessment methodologies in the EIAO-TM. The relevant aspects of the existing environment have been identified and described to provide a baseline for the identification and prediction of potential impacts which are likely to arise from the Project. Individual aspect assessments have been undertaken to qualitatively/quantitatively predict environmental impacts during the construction and operation phases. Mitigation measures have been identified and evaluated to avoid, control, minimise or remedy the potential impacts.

3.2. AIR QUALITY IMPACT

3.2.1. Potential air quality impacts associated with the construction and operation phases of the Project have been assessed in accordance with the criteria and guidelines as stated in the requirements given in *Section 3.4.4* and Appendix B of the EIA Study Brief, as well as Annexes 4 and 12 of EIAO-TM. The assessment area for air quality impact assessment is within 500m from the boundary of the Project Site.

Construction Phase

3.2.2. The potential dust emission sources would be mainly from the construction work activities of the excavation and wind erosion at the Project Site. As the size of the Project Site is limited and the excavation is minor such that the amount of excavated materials generated would be small, no adverse dust impact would be anticipated at the representative air sensitive receivers (ASRs) with the implementation of sufficient dust suppression measures as stipulated under the *Air Pollution Control (Construction Dust) Regulation and guidelines* stipulated in EPD's *Recommended Pollution Control Clauses for Construction Contracts* as well as following the requirements under *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation*.

Operation Phase

3.2.3. During operation of the Project, the Annex Block will be equipped with central air condition for daily operation and will not rely on opened window for ventilation. Also, the location of fresh air intake will be carefully designed with sufficient separation distance from nearby roads. No chimney is identified within 500m assessment area from the Project Site. There would be limited vehicular emissions from parking activities of the Project. No gaseous industrial emission from the Project is expected. Therefore, the Project would not be considered a pollution source during the operation phase. With the low induced traffic and use of non-polluting energy sources, adverse air quality impact due to the operation of the Project is not anticipated.

3.3. NOISE IMPACT

3.3.1. Potential noise impacts associated with the construction and operation phases of the Project have been assessed in accordance with the criteria and guidelines as stated in the requirements given in *Section 3.4.5* and Appendix C of the EIA Study Brief, as well as Annexes 5 and 13 of

the EIAO-TM. The assessment area for noise impact assessment is defined by a distance of 300m from the boundary of the Project Site.

Construction Phase

3.3.2. Potential noise emission would be generated from construction work activities. Powered mechanical equipment (PME) would be the major noise sources. Construction noise assessment was conducted in accordance with the EIAO-TM and the Technical Memorandum (TM) on Noise from Construction Work other than Percussive Piling. The unmitigated scenario showed that the construction noise impact at 7 noise sensitive receivers (NSRs) near the Project Site ranges from 65 dB(A) to 86 dB(A), resulting in exceedances at 6 NSRs. The exceedances can be mitigated by optimisation of construction programme, using quieter PME and quiet working methods and movable noise barrier. Mitigated scenario showed the construction noise impact at the NSRs would be reduced to 56 dB(A) from 75 dB(A) and comply with construction noise standards. As such, no adverse impact would be anticipated at the NSRs during the construction phase of the Project.

Operation Phase

3.3.3. During the operation phase, assessment was conducted in accordance to the TM for the *Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites*. Noise from fixed plant including mechanical ventilation and air conditioning system (MVAC) equipment and other fixed noise sources have been assessed, and will be properly selected and implemented with mitigation measures where necessary in order to reduce the noise generated by the fixed plant not to exceed the maximum allowable sound power levels (SWLs). As such, adverse fixed noise impact on the NSRs is not anticipated during the operation phase.

3.4. WATER QUALITY AND SEWERAGE IMPACT

Construction Phase

3.4.1. Potential water pollution sources during construction phase have been identified as wastewater generated from general construction activities, construction site runoff, sewage from construction workforce and accidental spillage of chemicals. Measures including the implementation of good site practices in accordance with the EPD's *ProPECC PN1/94 Construction Site Drainage*, provision and management of portable chemical toilets on-site as well as preventive measures for avoiding accidental chemical spillages are recommended to mitigate any adverse water quality impacts. With the implementation of these measures, adverse residual impacts would not be anticipated.

Operation Phase

3.4.2. The potential sources of water quality impacts during operation phase would be related to increased surface runoff. Adequate drainage system with silt traps and oil interceptors will be incorporated to collect the surface runoff. With proper design of drainage system and

implementation of the recommended pollution control measures, no adverse water quality impact from surface runoff would be expected.

- 3.4.3. Furthermore, there would be insignificant sewerage and sewage treatment implications during the operation of the Project. Additional sewerage generated from the operation of the Project is estimated taking surrounding catchment areas into consideration. It is expected that the public sewers and pumping station at downstream would have sufficient capacity to cater for the additional flow from the Project. No upgrading works is required and adverse water quality impact would not be anticipated with the implementation of the recommended mitigation measures.

3.5. WASTE MANAGEMENT IMPLICATIONS

- 3.5.1. The major waste types generated from construction activities will include construction and demolition (C&D) materials from site preparation and road works, excavation and foundation works, construction of Annex Block and refurbishment of Red House; chemical waste from maintenance of construction plant and equipment and general refuse from the workforce. Provided that all these identified wastes are handled, stored, collected, transported and disposed of in strict accordance with the relevant legislative and recommended requirements and that the recommended good site practices are properly implemented, adverse environmental impact is not anticipated during construction phase of the Project.

- 3.5.2. During the operation phase, waste generated will be primarily from typical office activities. No chemical waste or waste lead-acid batteries is anticipated from laboratory workshops and battery rooms provided at the new Annex Block. Provided that waste will be stored and handled properly and disposed of at regular interval, environmental impacts associated with the waste management is not expected.

3.6. CULTURAL HERITAGE IMPACT

- 3.6.1. Cultural heritage resources have been identified and reviewed through literature review and field surveys. The study area for the cultural heritage impact is defined by a distance of 150 m from the boundary of the Project Site. Visual impact to the major heritage resources is not anticipated during construction and operation phases. The underground utilities diversion works will be localised, the refurbishment works will only be within the Red House area, and mitigation measures will be taken to reduce the impact on the key historic buildings. Indirect vibration/settlement/tilting impact on historic buildings during construction phase will be monitored with monitoring measures.

- 3.6.2. No Site of Archaeological Interest is found within the cultural heritage assessment area.

- 3.6.3. The excavation of the Project is mainly located in the developed area undergone construction works with high level of ground disturbance, and area unfavourable to cultural deposit accumulation which has no archaeological potential, therefore no adverse archaeological impact due to the Project is anticipated. The Project Proponent is required to inform AMO

immediately when any antiquities or supposed antiquities under the *Antiquities and Monuments Ordinance (Cap. 53)* are discovered during the course of works.

- 3.6.4. To conclude, the construction and operation of the Project would not cause unacceptable impact on cultural heritage resources.

3.7. LANDSCAPE AND VISUAL IMPACT

- 3.7.1. A landscape and visual impact associated with the construction and operation phases of the Project has been assessed in accordance with the relevant requirements as specified in *Section 3.4.9* and Appendix G of the EIA Study Brief, as well as Annexes 10 and 18 of the EIAO-TM. The assessment area for landscape assessment is within 500 m from the boundary of the Project Site while that of visual impact is based on the Project's Visual Envelope(VE) or Zone of Visual Influence (ZVI) within which the Project is pronouncedly visible from key sensitive viewers.
- 3.7.2. Landscape and visual impact on Landscape Character Areas (LCAs), Landscape Resources (LRs) and Visually Sensitive Receivers (VSRs) of the Project have been assessed.
- 3.7.3. The Project will generate some unavoidable landscape and visual impacts which are identified and addressed in the Landscape and Visual Impact Assessment. The impacts include the removal of some existing trees, site formation works and the construction of a new building within the Project Site.
- 3.7.4. Mitigation measures have been incorporated to reduce the impacts, which include minimizing the development footprint, retention of existing vegetation, careful design and positioning of the building footprint to avoid impact to sensitive LR, planting of new compensatory trees, greening on-site for the loss of trees and vegetation, and designing and implementing the new buildings and structures which are integrated into the existing environment.
- 3.7.5. 136 nos. of existing trees (188 nos. in total) within the Project site will be potentially affected. Tree preservation and compensatory tree planting will be carried out in accordance with *DEVB TC(W) NO. 4/2020*. These trees are mainly common woodland or cultivated tree species, and not in the Register of Old and Valuable Tree promulgated under *DEVB TC (W) 5/2020*. The affected trees depending on their conditions will either be transplanted or compensated with planting ratio of a minimum 1:1 by number as far as practicable within the HKO Headquarters.
- 3.7.6. Of the 8 LR identified within the assessment area, only LR1(S) (Semi-Natural Woodland within Site) will experience *Substantial* residual impact due to the limited ability to compensate for the loss of woodland within the Project Site. However, LR1 and LR1(S) Combined (Semi-Natural Woodland within HKO Headquarters) will experience *Moderate* residual impact. All the other LR will experience no residual impacts in the construction and operation phases of the Project.
- 3.7.7. Of the 9 LCAs identified, only LCA6(S) (Urban Forest Landscape within the Site) will experience *Moderate* residual impact due to limited ability to compensate for the loss of

woodland within the Project Site. LCA1(S) (Institutional Landscape within Site) will experience *Insubstantial* residual impacts and all the others will experience no residual impacts.

3.7.8. Of the 19 VSRs, the adverse residual visual impact with mitigations ranges from *None* to *Moderate*.

3.7.9. The overall residual landscape and visual impacts of the Project are **Acceptable with Mitigation Measures** during the construction and operation phases.

4. ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

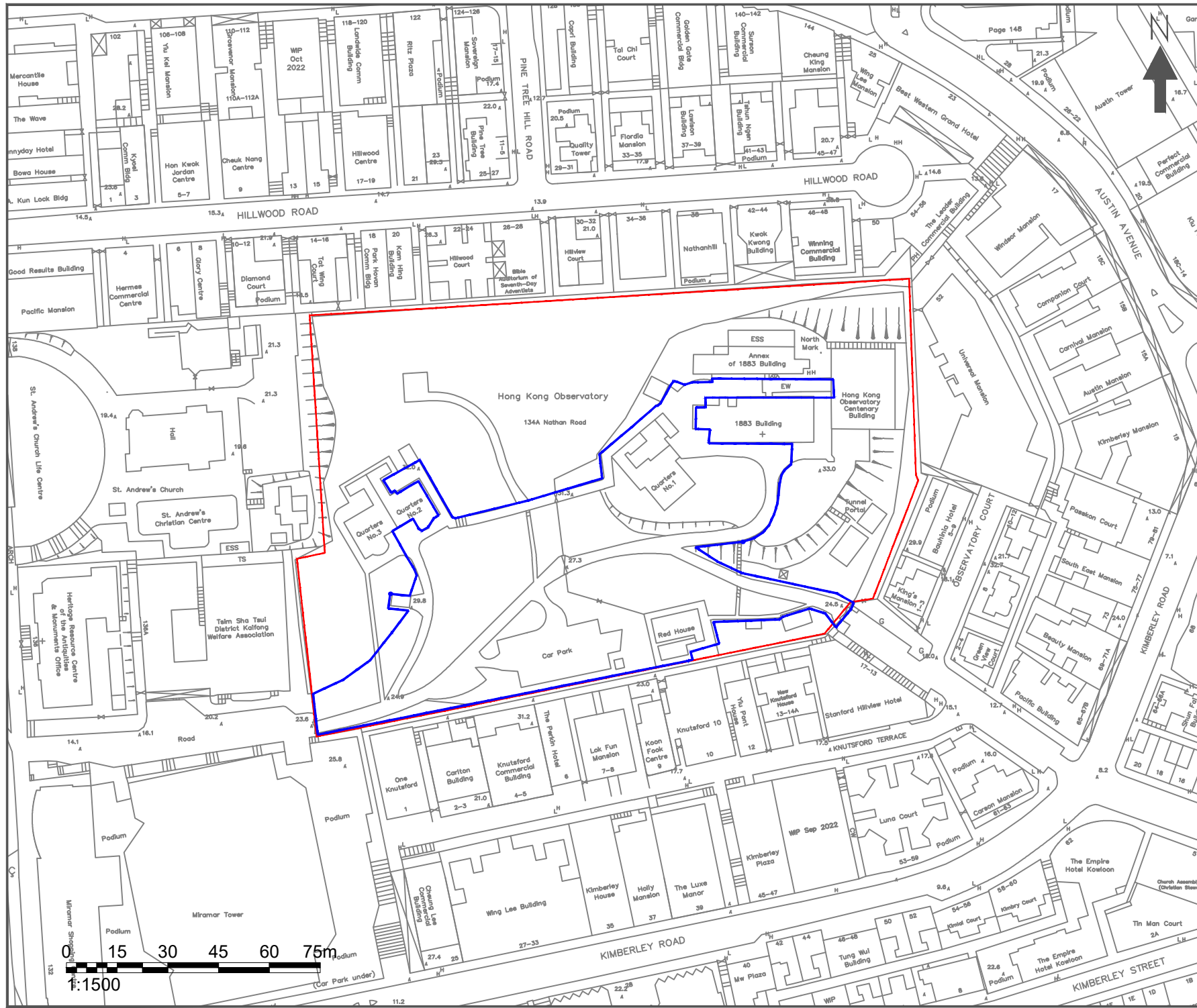
- 4.1. Environmental Monitoring and Audit (EM&A) represents for air quality, noise, water quality and sewerage, waste management, cultural heritage as well as landscape and visual input have been recommended, with proper site inspection and audit during construction and operation phases, to check the effectiveness of the recommended mitigation measures and compliance of relevant statutory criteria. The EM&A requirements are divided into environmental monitoring and/ or project auditing in the form of site inspection and supervision.

Table 4.1 Summary of EM&A Requirements

Environmental Aspect	Construction Phase	Operation Phase	Monitoring Parameter
Air Quality	Site Audit	/	/
Noise	Site Audit + Monitoring	Site Audit	L _{eq} (30mins)
Water Quality and Sewerage	Site Audit	/	/
Waste	Site Audit	/	/
Cultural Heritage	Site Audit + Monitoring	/	3A levels monitoring
Landscape and Visual	Site Audit	Site Audit	/

5. CONCLUSION

- 5.1. The environmental impact assessment has concluded that with the implementation of the recommended mitigation measures, the Project would comply with the requirements of the EIA Study Brief and EIAO-TM, and would not give rise to unacceptable environmental impacts during both construction and operation phases.



- NOTES :
- PROJECT SITE
工程項目工地
 - BOUNDARY OF HONG KONG OBSERVATORY HEADQUARTERS (SAME AS THE BOUNDARY OF DECLARED MONUMENT)
尖沙咀天文台總部邊界範圍 (與法定古蹟範圍一樣)

Consultant



Allied Environmental Consultants Limited

Project No. : 1709

File Name : -

Project : CONSTRUCTION OF ANNEX BLOCK AT HONG KONG OBSERVATORY HEADQUARTERS, TSIM SHA TSUI
尖沙咀天文台總部副樓興建計劃

Drawing Title : SITE LOCATION PLAN
工程項目工地位置圖

Drawing No. : FIGURE 1.1 圖1.1	Revision : 5
Scale : AS SHOWN 如圖示	Date : OCT 2023

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