
Appendix V

Environmental Assessment



Temporary Storage for MiC Components and Construction Materials with Ancillary Workshops, Office, Staff Car Park and Machinery at Various Lots in DD 107, Sha Po Environmental Assessment Report

Prepared for:
Sanfield (Management) Ltd

15 December 2023

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CONTENTS

| | | |
|----------|---|------------|
| 1 | INTRODUCTION | 1-1 |
| 1.1 | Project Background..... | 1-1 |
| 1.2 | Site Description | 1-1 |
| 1.3 | Project Description | 1-1 |
| 1.4 | Objectives of the Report..... | 1-2 |
| 2 | AIR QUALITY..... | 2-1 |
| 2.1 | Environmental Legislation and Standards..... | 2-1 |
| 2.2 | Identification of Air Sensitive Receiver (“ASRs”) | 2-2 |
| 2.3 | Identification of Air Pollution Sources..... | 2-3 |
| 2.4 | Conclusion | 2-5 |
| 3 | NOISE | 3-1 |
| 3.1 | Environmental Legislation and Standards..... | 3-1 |
| 3.2 | Noise Impact of Construction Phase..... | 3-2 |
| 3.3 | Noise Impact of Operation Phase | 3-4 |
| 3.4 | Conclusion | 3-6 |
| 4 | WATER QUALITY | 4-1 |
| 4.1 | Environmental Legislation and Standards..... | 4-1 |
| 4.2 | Potential Impacts | 4-1 |
| 4.3 | Mitigation Measures | 4-2 |
| 4.4 | Conclusion | 4-4 |
| 5 | WASTE MANAGEMENT AND LAND CONTAMINATION | 5-1 |
| 5.1 | Environmental Legislation and Standards..... | 5-1 |
| 5.2 | Potential Impacts | 5-2 |
| 5.3 | Mitigation Measures | 5-7 |
| 5.4 | Land Contamination..... | 5-9 |
| 5.5 | Conclusion | 5-10 |
| 6 | CONCLUSIONS AND RECOMMENDATIONS..... | 6-1 |

APPENDICES

| | |
|------------|-----------------------------------|
| Appendix A | Noise Calculation of Fixed Source |
| Appendix B | Aerial Photographs |

FIGURES

| | | |
|------------|---|------|
| Figure 1-1 | Site Location and its Environs | 1-3 |
| Figure 2-1 | Buffer Distance Requirement from the Surrounding Roads..... | 2-6 |
| Figure 3-1 | Location of Identified Representative NSRs | 3-7 |
| Figure 3-2 | Location of Potential Noise Sources | 3-8 |
| Figure 5-1 | Site Inspection Photos of the Project Site and Surrounding Environment..... | 5-11 |

TABLES

| | | |
|-----------|---|-----|
| Table 2-1 | Hong Kong Air Quality Objectives..... | 2-1 |
| Table 2-2 | HKPSG Minimum Setback Distances..... | 2-2 |
| Table 2-3 | Identified Representative ASRs | 2-2 |
| Table 3-1 | Construction Noise Criteria for Non-Restricted Hours | 3-1 |
| Table 3-2 | Acceptable Noise Levels for Fixed Noise Source..... | 3-2 |
| Table 3-3 | Identified Representative NSRs of Noise from Fixed Sources | 3-5 |
| Table 3-4 | Noise Criteria of Noise from Fixed Sources of Identified Representative NSRs | 3-6 |
| Table 3-5 | Predicted Noise Impact Level During Operation Phase..... | 3-6 |
| Table 5-1 | Total Estimated Inert C&D Materials Generated During Construction..... | 5-3 |
| Table 5-2 | Total Estimated Non-Inert C&D Materials Generated During Construction..... | 5-4 |
| Table 5-3 | Estimated Amount of Different Types of Wastes to be Generated During Construction Phase . | 5-6 |
| Table 6-1 | Summary of Mitigation Measures..... | 6-2 |

1 INTRODUCTION

1.1 Project Background

- 1.1.1 Aligning with Government directives to enhance the quantity, speed, efficiency, and quality of housing, the construction industry is spearheading the development of highly productive construction methods, including the widespread adoption of Modular Integrated Construction (“MiC”). MiC, an innovative construction method, involves assembling building components off-site in a controlled environment before transporting and seamlessly integrating them into the construction site.
- 1.1.2 In order to support in adopting MiC, a temporary open storage for MiC Components and Construction Materials with Ancillary Workshops, Office, Staff Car Park and Machinery for a period of three years (“the Proposed Development” or “Proposed Use”) at various lots in DD 107, Sha Po, Yuen Long, New Territories (“the Site”) is proposed.
- 1.1.3 The Site is zoned Comprehensive Development Area (1) (“CDA(1)”) under the Approved Kam Tin North Outline Zoning Plan (“OZP”) No. S/YL-KTN/10. In accordance with Note (11) of the OZP, temporary use of development of any land or building exceeding a period of three years will require permission from the Town Planning Board (“TPB”). Therefore, a planning application pursuant to Section 16 of the *Town Planning Ordinance* (“TPO”) is required.
- 1.1.4 In order to support the planning application for the Proposed Development, EnviroSolutions & Consulting Ltd (“ESC”) has been appointed to prepare this Environmental Assessment (“EA”) Report.

1.2 Site Description

- 1.2.1 The Site location and its environs are shown in **Figure 1-1** which the uses surrounding the Site include:
- To the North: Park Yoho
 - To the East: temporary structures
 - To the South: nullah and open storage
 - To the West: Park Yoho

1.3 Project Description

- 1.3.1 The Site area will be approximately 9,705m². The indicative layout of the Proposed Development can be referred to the Planning Statement.
- 1.3.2 The Proposed Use aims to serve as a transshipment depot for MiC components, with the objective of meeting the growing demand for MiC applications while ensuring efficient logistics and seamless implementation of MiC in housing projects. MiC components intended for temporary storage will weigh about 10 to 20 tonnes, with maximum length and width of approx. 8m and 2.5m respectively. The Proposed Use also serves as a hub for modular construction materials being used for housing project sites in order to promote more Green Construction Methodology. The Proposed Development comprises an open storage area, providing a secure location for the temporary storage of MiC components and modular construction materials, along with ancillary facilities, including three

workshops, an office, a staff car park, a guardhouse and machinery (i.e. tower crane and hoisting crane etc.) to support its operational needs. The proposed ancillary office is a two-storey structure designed to accommodate about 50 staff members. The office is intended to provide administrative/supporting services to facilitate the seamless transshipment of MiC components. The proposed ancillary single-storey workshops, equipped with lifting machinery, will be enclosed, primarily serving for internal quality control and quality assurance checks of MiC components, as well as any necessary final touching-up works before their delivery to construction sites. Additionally, solar panels will be installed on the workshop and office roofs for self-sufficiency purpose, contributing to environmental protection through renewable energy generation.

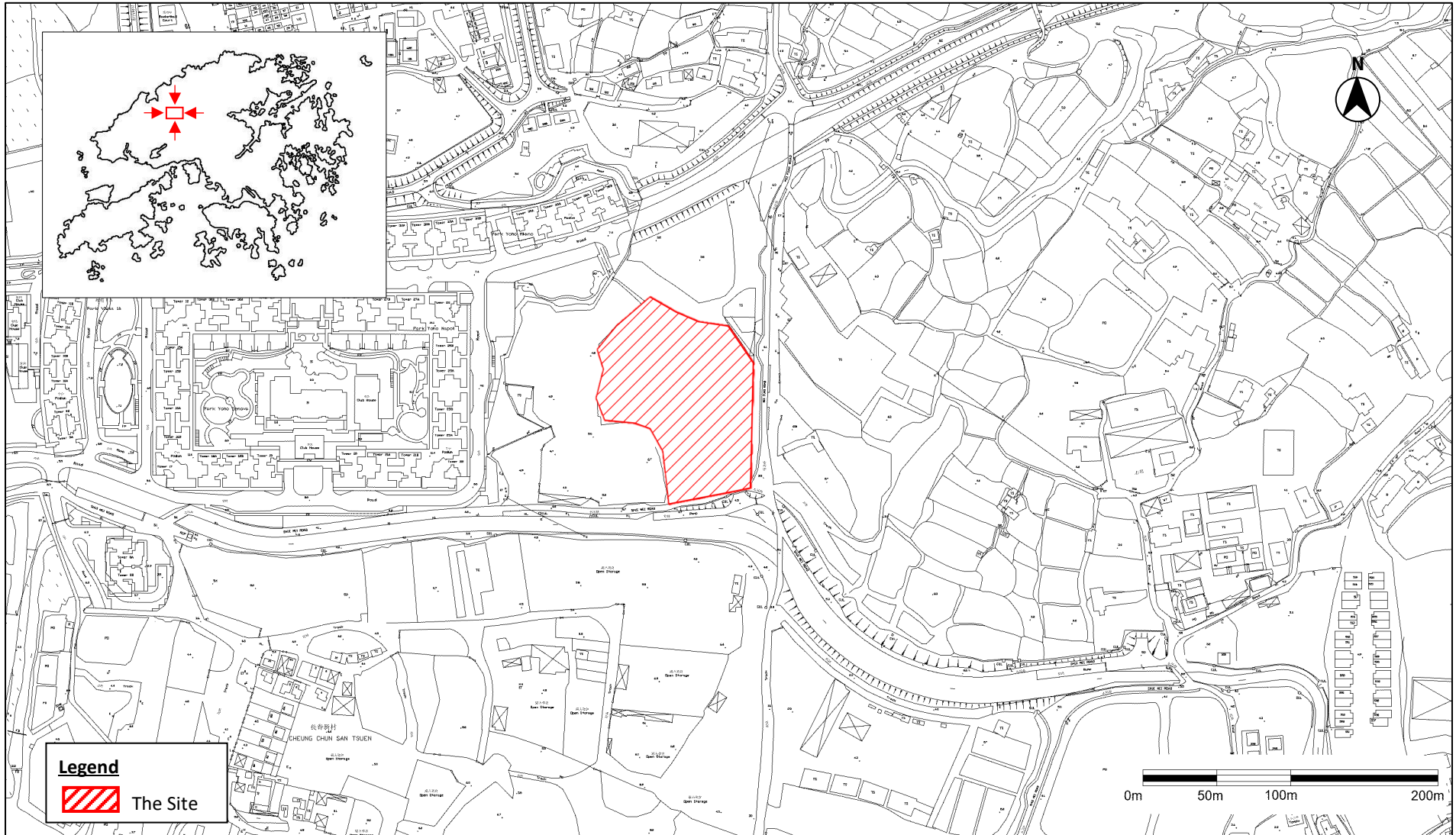
1.3.3 The operating hours of the Proposed Use will be from 8:00 a.m. to 7:00 p.m. from Monday to Saturday and without operation on Sunday and public holidays.

1.4 Objectives of the Report

1.4.1 The objectives of this EA Report are to:

- Assess the potential environmental impacts arising from the operation of the Proposed Development, in terms of air quality, noise, water quality and waste management.
- Recommend appropriate measures to mitigate any impacts if necessary.

Figure 1-1 Site Location and its Environs



2 AIR QUALITY

2.1 Environmental Legislation and Standards

Air Quality Objectives

2.1.1 The Air Quality Objectives (“AQOs”) established under the *Air Pollution Control Ordinance* (“APCO”) (Cap. 311) are given in **Table 2-1**.

Table 2-1 Hong Kong Air Quality Objectives

| POLLUTANT | AVERAGING TIME | CONCENTRATION LIMIT [Note 1] ($\mu\text{g}/\text{m}^3$) | NUMBER OF EXCEEDANCES ALLOWED |
|--|----------------|--|-------------------------------|
| Sulphur Dioxide (SO_2) | 10-minute | 500 | 3 |
| | 24-hour | 50 | 3 |
| Respirable Suspended Particulates (“RSP” or “ PM_{10} ”) [Note 2] | 24-hour | 100 | 9 |
| | Annual | 50 | Not applicable |
| Fine Suspended Particulates (“FSP” or “ $\text{PM}_{2.5}$ ”) [Note 3] | 24-hour | 50 | 35 |
| | Annual | 25 | Not applicable |
| Nitrogen Oxide | 1-hour | 200 | 18 |
| | Annual | 40 | Not applicable |
| Ozone | 8-hour | 160 | 9 |
| Carbon Monoxide | 1-hour | 30,000 | 0 |
| | 8-hour | 10,000 | 0 |
| Lead | Annual | 0.5 | Not applicable |

Notes:

1. All measurements of the concentration of gaseous air pollutants, i.e. SO_2 , NO_2 , O_3 and CO , are to be adjusted to a reference temperature of 293 Kelvin and a reference pressure of 101.325 kilopascal.
2. RSP means suspended particles in air with a nominal aerodynamic diameter of $10\mu\text{m}$ or less.
3. FSP means suspended particles in air with a nominal aerodynamic diameter of $2.5\mu\text{m}$ or less.

Air Pollution Control (Construction Dust) Regulation

2.1.2 Enacted under Section 43 of the APCO, the *Air Pollution Control (Construction Dust) Regulation* defines notifiable and regulatory works to ensure effective dust abatement measures have been properly implemented to reduce dust emissions for a number of construction activities.

2.1.3 The Regulation requires that advance notice is given to EPD for any notifiable work^[Ref.#1] and the contractor shall ensure that the notifiable and regulatory works are carried out in accordance with the Schedule of the Regulation, which also includes dust control and suppression measures.

¹ Notifiable works include site formation, reclamation, demolition of a building, work carried out in any part of a tunnel that is within 100m of any exit to the open air, construction of the foundation of a building, construction of the superstructure of a building and road construction work.

Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation

- 2.1.4 This Regulation takes effect on June 2015 and required Non-road Mobile Machinery (“NRMM”), except those exempted, to comply with the prescribed emission standards. From 1 September 2015, all regulated machines sold or leased for use in Hong Kong must be approved or exempted with a proper label in a prescribed format issued by EPD. Starting from 1 December 2015, only approved or exempted NRMMs with a proper label are allowed to be used I specified activities and locations including construction sites, container terminals and back up facilities, restricted areas of the airport, designated waste disposal facilities and specified processes.

Hong Kong Planning Standards and Guidelines (“HKPSG”)

- 2.1.5 The minimum buffer distances required between different types of roads and active open spaces are recommended in Chapter 9 Environment of HKPSG and are summarised in **Table 2-2** for ease of reference.

Table 2-2 HKPSG Minimum Setback Distances

| POLLUTION SOURCE | TYPE OF ROAD | BUFFER DISTANCE | PERMITTED USES |
|-------------------|------------------------------------|--------------------------|-------------------------------------|
| Road and Highways | Trunk Road and Primary Distributor | >20m | Active and passive recreational use |
| | | 3 – 20m | Passive recreational use |
| | | <3m | Amenity areas |
| | District Distributor | >10m | Active and passive recreational use |
| | | <10m | Passive recreational uses |
| | Local Distributor | >5m | Active and passive recreational use |
| | | <5m | Passive recreational use |
| Under Flyovers | - | Passive recreational use | |

Source: Adapted from Table 3.1 of Chapter 9 Environment of HKPSG

2.2 Identification of Air Sensitive Receiver (“ASRs”)

- 2.2.1 The first layer ASRs within 500m from the boundary of the Site have been identified. All identified ASRs are existing ASRs and no planned ASR has been identified within the assessment area. The locations of these ASRs are shown in **Figure 2-1** and summarised in **Table 2-3**.

Table 2-3 Identified Representative ASRs

| ASR ID | DESCRIPTION | LANDUSE | NO. OF STOREY | APPROZIMATE DISTANCE TO SITE BOUNDARY |
|--------|---------------|-------------|---------------|---------------------------------------|
| ASR1 | PARK YOHO T36 | Residential | 12 | 64m |
| ASR2 | PARK YOHO T25 | Residential | 15 | 90m |

2.3 Identification of Air Pollution Sources

Construction Phase

2.3.1 Fugitive dust is the major impact that will be generated during construction activities, such as excavation, stockpiling, earth moving, transferring or handling of dusty materials.

2.3.2 With the implementation of dust control measures stipulated in the *Air Pollution Control (Construction Dust) Regulation*, dust generation can be controlled and significant fugitive dust impact is therefore not anticipated.

2.3.3 To avoid adverse dust impact on the air sensitive uses nearby, good practice and dust control measures to be implemented during the construction phase are as follows:

- Provide hard paving on open area, regular watering to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather.
- The working area of any excavation or earth moving operation shall be sprayed with water immediately before, during and immediately after the operation so as to maintain the entire surface wet.
- Frequent watering for particularly dusty areas and areas close to ASRs.
- Any stockpile of dusty materials shall be either covered entirely by impervious sheeting, placed in an area sheltered on the top and three sides, or sprayed with water so as to maintain the entire surface wet.
- Where possible, dusty materials shall be sprayed with water immediately prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet.
- The working area for the uprooting of trees, shrubs, or vegetation or for the removal of boulders, poles, pillars or temporary or permanent structures shall be sprayed with water immediately before, during and immediately after the operation so as to maintain the entire surface wet.
- All demolished items (including trees, shrubs, vegetation, boulders, poles, pillars, structures, debris, rubbish and other items arising from the site clearance) that may dislodge dust particles shall be covered entirely by impervious sheeting or placed in an area sheltered on the top and three sides within a day of demolition.
- Tarpaulin covering of all dusty vehicles loads transported to, from and between site locations.
- Vehicle washing facilities including a high-pressure water jet shall be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point shall be paved with concrete, bituminous materials or hardcore.
- Provision of not less than 2.4m high hoarding from ground level along site boundary where adjoins a road, streets or other accessible to the public except for a site entrance or exit.
- Spray water on the surface of façade grinding work as far as practicable.
- Equip vacuum cleaner on grinder for façade grinding work as far as practicable.

- Main haul road shall be sprayed with water so as to maintain the entire surface wet. Imposition of speed controls for vehicles on site haul roads and confine haulage and delivery vehicles to designated roadways inside the site.
- A portion of any road leading only to a construction site that is within 30m of a discernible or designated vehicle entrance or exit shall be kept clear of dusty materials.
- Where possible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from the ASRs.
- Every stock of more than 20 bags of cement or dry Pulverised Fuel Ash (“PFA”) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and three sides.

2.3.4 In addition, the EPD’s *Recommended Pollution Control Clause (“RPCC”) for Construction Contract* in COP should be incorporated in the relevant works contract. The RPCC are generally good engineering practice to minimize inconvenience and environmental nuisance to nearby residents and other sensitive receivers. The general requirements are summarised below:

- The Contractor shall observe and comply with the APCO and its subsidiary regulations, particularly the Air Pollution Control (Open Burning) Regulation and Air Pollution Control (Construction Dust) Regulation and Air Pollution Control (Smoke) Regulation.
- The Contractor shall undertake at all times to prevent dust nuisance and smoke as a result of his activities.
- The Contractor shall ensure that there will be adequate water supply / storage for dust suppression.
- The Contractor shall devise, arrange methods of working and carrying out the works in such a manner as to minimise dust impacts on the surrounding environment, and shall provide experienced personnel with suitable training to ensure that these methods are implemented.
- For better smoke control, the Contractor shall not use diesel hammer for percussive piling.
- Before commencement of any work, the Engineer may require the methods of working, plant, equipment and air pollution control system to be used on the site to be made available for inspection and approval to ensure that they are suitable for the project.

Operation Phase

2.3.5 The Proposed Development will be used as a temporary workshop and storage yard for MiC component and modular construction materials which transported to the Site by lorries. The number of trips per hour and per day of lorries will be minimal. Thus, adverse air quality impact arising from the operation of the Proposed Development is not anticipated.

2.3.6 Shui Mei Road and Mei Fung Road are the roads near the Site as shown in **Figure 2-1**. With reference to the *Annual Traffic Census 2022* published by the Transport Department (“TD”), no relevant information regarding the road types of Shui Mei Road and Mei Fung Road is provided. Nevertheless, as mentioned in paragraphs 2.1.5 and 2.1.6, as well as Table 2.3 of the Traffic Impact Assessment (“TIA”) Report, they are single track access roads. No specific buffer distance requirement is recommended for single track access road

in Table 3.1 of Chapter 9 of HKPSG. The minimum buffer distance of 5m between air sensitive uses and these two roads is adopted for the Site. As illustrated in **Figure 2-1**, all the site area can satisfy the buffer distance of 5m between the roads and Site, except the east part. There is no air sensitive use within the 5m buffer distance between Shui Mei Road and the eastern part of the Site. In order to avoid adverse air quality impact from traffic emission, a buffer zone is recommended for the Proposed Development with the following requirements:

- No fresh air intake/openable window of air sensitive uses shall be located within the buffer zone.
- Any air sensitive uses within the buffer zone shall rely on fresh air intake/openable window located out of the buffer zone for ventilation.

2.3.7 With the provision of the buffer zone, the buffer distances recommended in HKPSG will be satisfied. Therefore, no adverse air quality impact on the Site from traffic emission is anticipated.

2.3.8 The engines of the vehicles will be switched off during loading/unloading within the Site. Besides, Shui Mei Road and Mei Fung Road will still operate with ample capacity with the Proposed Development as per Section 5 of the TIA Report. As indicated in the TIA Report, only a few traffic will be generated by operating the Proposed Development. The additional traffic trips related to the Proposed Development are considered insignificant and can be absorbed by the road networks. Therefore, it is anticipated that the induced traffic would not cause adverse traffic congestion problem and queuing on the public road leading worsening of vehicular emission impact. Moreover, Swept Path analysis has been conducted as mentioned in the TIA and all the reverse movement of vehicles will be confined within the Site only. Hence, no reverse movement of vehicles on the public road due to the Proposed Development is expected. Due to the low traffic flow generated and no idling emission from the vehicles during loading/unloading activities, adverse air quality impact from the Proposed Development on the surrounding air sensitive uses is not anticipated.

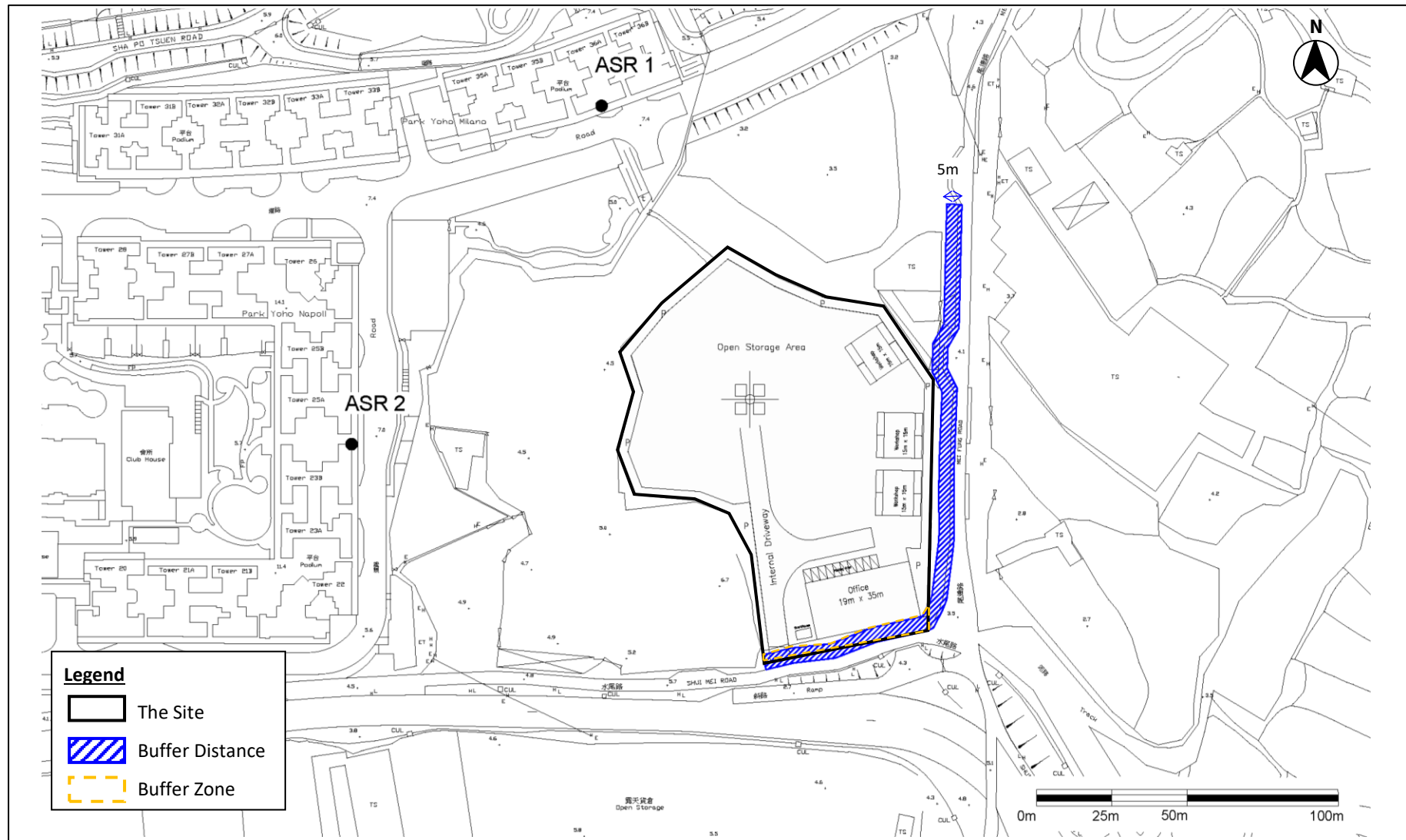
2.4 Conclusion

2.4.1 With the implementation of the recommended mitigation measures and good site practice, adverse impacts during the construction phases are not anticipated.

2.4.2 No adverse air quality impact on the Site from vehicular emissions is anticipated with the implementation of the proposed mitigation measures during the operation phase. At the same time, the operation of the Proposed Development will not cause adverse air quality impacts on the surrounding air sensitive uses.

2.4.3 Overall, no adverse air quality impacts are anticipated during the construction and operation phases of the Proposed Development.

Figure 2-1 Buffer Distance Requirement from the Surrounding Roads



3 NOISE

3.1 Environmental Legislation and Standards

Noise Control Ordinance (“NCO”, Cap. 400)

3.1.1 The principal legislation controlling environmental noise impact is the *Noise Control Ordinance* (“NCO”). The NCO enables regulations and Technical Memoranda (“TMs”) to be enacted, which introduces detailed control criteria, measurement procedures and other technical matters. The TMs of NCO include:

- TM on Noise from Percussive Piling (“PP-TM”)
- TM on Noise from Construction Work other than Percussive Piling (“GW-TM”)
- TM on Noise from Construction Work in Designated Area (“DA-TM”)
- TM for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites (“IND-TM”)

3.1.2 The Site falls within a Designated Area (“DA”) in accordance with EPD’s Plan No. EPD/AN/NT-01 for Yuen Long, Tin Shui Wai, Mai Po, Shek Kong and Kwu Tung. Therefore, DA-TM is applicable.

3.1.3 In addition, the following requirements are given under the NCO:

- Hand-held breakers having a mass of above 10kg and any air compressor capable of supplying compressed air at 500kPa or above must be fitted with Noise Emission Label issued under the *Noise Control (Hand Held Percussive Breakers) Regulation and Noise Control (Air Compressors) Regulation* of NCO.
- Construction Noise Permit (“CNP”) must be applied by the Contractor from EPD for any percussive piling at any time or any other construction activities conducted within restricted hours (for all days 7pm to 7am the next day and at all times on Public Holidays or Sundays) as defined in NCO.

3.1.4 For noise arising from construction activities (other than percussive piling) during normal working hours (7am to 7pm from Monday to Saturday, not including general holidays), the noise criteria as shown in **Table 3-1** and control measures for construction noise impact during normal working hours can be referred to *Professional Persons Environmental Consultative Committee Practice Note PN2/93 Noise from Construction Activities – Non-statutory Controls* (“ProPECC PN2/93”).

Table 3-1 Construction Noise Criteria for Non-Restricted Hours

| NOISE SENSITIVE USE | $L_{eq(30min)}$ NOISE CRITERIA BETWEEN 0700 AND 1900 ON ANY DAY NOT BEING A SUNDAY OR GENERAL HOLIDAY |
|---------------------|---|
| Dwellings | 75 dB(A) |
| School | 70 dB(A) (or 65 dB(A) during examination) |

3.1.5 For fixed plant noise during operation phase, the requirements of IND-TM shall be complied with. Table 2 of IND-TM stipulates the day, evening and night time Acceptable Noise Levels (“ANLs”) for Noise Sensitive Receivers (“NSRs”) according to the

corresponding Area Sensitive Rating (“ASR”), which is determined by Influencing Factors (“IFs”) in accordance with the IND-TM. These are summarised in **Table 3-2**.

Table 3-2 Acceptable Noise Levels for Fixed Noise Source

| TIME PERIOD | ANL, dB(A) | | |
|------------------------------|------------|---------|---------|
| | ASR “A” | ASR “B” | ASR “C” |
| Day (0700 to 1900 hours) | 60 | 65 | 70 |
| Evening (1900 to 2300 hours) | | | |
| Night (2300 to 0700 hours) | 50 | 55 | 60 |

Hong Kong Planning Standards & Guidelines (“HKPSG”)

3.1.6 The noise criteria for planned fixed source shall follow the requirements of Table 4.1 of Chapter 9 of HKPSG:

- a. 5 dB(A) below the appropriate ANLs shown in Table 2 of IND-TM, and
- b. The prevailing background noise levels

3.2 Noise Impact of Construction Phase

3.2.1 Various construction activities such as excavation, piling, etc. will be the key noise sources generated during the construction phase. In particular, the use of Powered Mechanical Equipment (“PME”) and the vehicle movement within the Site are the major noise sources.

3.2.2 Construction should be carried out during non-restricted hours as far as practicable. The mitigation measures recommended in ProPECC PN2/93 should be implemented where applicable. In addition, the following measures and on-site practice are recommended in order to minimise the potential construction noise impacts during daytime:

- Quiet PME and construction method should be adopted as far as practicable
- The Contractor should devise and execute working methods to minimise the noise impacts on the surrounding sensitive uses, and provide experienced personnel with suitable training to ensure that those methods are implemented
- Switch off idling equipment
- Regular maintenance of equipment
- Use of muffler/silencer for equipment when necessary
- Noisy equipment and noisy activities should be located as far away from the NSRs as far as practicable
- Use quiet construction method, e.g. use of saw-cut or hydraulic crusher instead of excavator-mounted percussive breaker as far as practicable
- PME should be kept to a minimum and the parallel use of noisy equipment / machineries should be avoided
- Erect noise barriers or noise enclosure for the PME if appropriate
- Implement good house-keeping and provide regular maintenance to the PME
- Spot check resultant noise levels at nearby NSRs

- 3.2.3 If construction work involving the use of PME will be required during restricted hours, a CNP shall be applied for under the NCO. The noise criteria and assessment procedures for obtaining a CNP are specified in GW-TM.
- 3.2.4 In addition, the EPD's RPCC for Construction Contract should be incorporated in the relevant works contract. The RPCC are generally good engineering practice to minimize inconvenience and environmental nuisance to nearby residents and other sensitive receivers. The general requirements as summarised as follows:
- The Contractor shall observe and comply with the NCO and its subsidiary regulation.
 - The Contractor shall ensure that all plant and equipment to be used on the Site are properly maintained in good operating condition and noisy construction activities shall be effectively sound-reduced by means of silencers, mufflers, acoustic linings and shields, acoustic sheds or screen or other means, to avoid disturbance to nearby noise sensitive receivers.
 - For carrying out any construction work other than percussive piling during the time period from 0700 to 1900 hours on any day not being a general holiday (including Sundays), the Contractor shall comply with the following requirements.
 - The noise level measured at 1m from most affected external façade of the nearby noise sensitive receivers from the construction works alone during any 30-minute period shall not exceed an equivalent sound level ("L_{eq}") of 75dB(A).
 - The noise level measured at 1m from most affected external façade of the nearby schools from the construction works alone during any 30-minute period shall not exceed L_{eq} of 70dB(A) [65dB(A) during school examination period]. The Contractor shall liaise with the schools and/or the Examination Authority to ascertain the exact dates and times of all examination periods during the course of the contract.
 - Should the limits stated in the above be exceeded, the construction shall stop and shall not recommence until appropriate measures acceptable to the Engineer that are necessary for compliance have been implemented.
 - The Contractor shall adopt, where necessary, the use of Quiet Construction Equipment ("QCE") and/or shall employ the quietist practicable working methods when carrying out demolition works, and /or road opening works during restricted hours.
 - Before commencement of any work, the Engineer may require the methods of working, plant equipment and sound-reducing measures to be used on the Site to be made available for trial demonstration inspection and approval to ensure that they are suitable for the project.
 - The Contractor shall devise, arrange methods of working and carry out the Works in such a manner so as to minimise noise impacts on the surrounding environment, and shall provide experienced personnel with suitable training to ensure that these methods are implemented.
 - Notwithstanding the requirements and limitations set out in the bullet above and subject to compliance with the second and fifth bullet above, the Engineer may upon application in writing by the Contractor, allow the use of equipment and the carrying out of any construction activities for any duration provided that the Engineer is satisfied with the application which, in Engineer's opinion, is considered to be of absolute necessity and adequate noise insulation has been provided to the schools to be affected, or of emergency nature, and not in contravention with the NCO in any respect.

- The Contractor shall, when necessary, apply for a construction noise permit in accordance with the *Noise Control (General) Regulations* prior to the commencement of the relevant part(s) of the works, display the permit as required and provide a copy to the Engineer.
- Measures that are to be taken to protect adjacent school and adjacent noise sensitive receivers, if necessary, shall include, but not be limited to, adequate noise barriers. The barriers shall be of substantial construction and designed to reduce transmission of noise. The barriers shall be surmounted with baffle boxes designed to reduce transmission of noise. The location and details of the barriers shall be submitted to the Engineer for approval before works commence adjacent to schools and other NSRs.

3.2.5 With the implementation of the abovementioned mitigation measures, adverse construction noise impact is not anticipated.

3.3 Noise Impact of Operation Phase

General

3.3.1 The Proposed Development will be used as a temporary workshop and storage yard for MiC materials and modular construction materials. Lorries will deliver MiC components to the site and tower crane as well as forklift will be adopted to transport the Mic component to each workshop. The MiC components will undergo quality control and quality assurance checks as well as final touch-up works if necessary, before being delivered to construction sites.

3.3.2 As mentioned in **paragraph 1.3.3**, the operation hours of the Proposed Development will be from 08:00 to 19:00 from Monday to Saturday except general holidays. Thus, potential noise impacts during day time should be assessed.

3.3.3 The potential major noise sources during the operation of the Proposed Development were identified as follows:

- On-site movements of vehicles
- Mechanical and Electrical (“M&E”) equipment

Assessment Assumptions and Methodology

On-site movement of vehicles

3.3.4 Since the MiC components will be delivered via lorries, on-site movement of vehicles are considered to be the major noise source.

3.3.5 For the noise generated from on-site movement of vehicles, the *Method for Mobile Plant Using a Regular Well-Defined Route* stipulated in Annex F of BS 5228-1:2009+A1:2014 has been adopted for the assessment. Calculation is based on the following standard formula:

$$SPL = SWL - 33 + 10\log Q - 10\log V - 10\log d + AC + FC$$

where SPL = Sound Pressure Levels at receiver, in dB(A)
 SWL = Sound Power Levels of PME, in dB(A)
 Q = Number of vehicles per hour
 V = Average vehicle speed, in km/h

d = Distance of receiving position from the centre of haul road, in metres
 AC = Angle of view Correction = $10\log(\Theta/180)$ where Θ is the angle of view (in degree) of a particular haul road segment
 FC = Façade Correction of +3 dB(A)

- 3.3.6 SWLs of the manoeuvring vehicles were reference to Table 3 of the GW-TM and the *Sound Power Levels of Other Commonly Used PME* available from EPD's website ^{Note 2}.
- 3.3.7 Boundary wall with a surface density of equal to or more than 10kg/m^2 will be erected. With regard to the screening effect, a 5 dB(A) noise reduction was adopted for the NSRs without direct line-of-sight to the noisy part of particular haul road segment.

M&E Equipment

- 3.3.8 During the operation, tower crane (electricity) and forklift will be used on site for the MiC component transportation within the Site to workshops and are considered as the major fixed plant noise source.
- 3.3.9 Some M&E equipment, such as handheld drill, welding machines, circular cutter, etc., will be used only inside the workshops. The three workshops will be enclosed by the claddings with a surface density of at least 10kg/m^2 . The two opening of the workshops will be either sliding door or acoustic strips. Thus, no significant noise impact arising from enclosed M&E equipment is anticipated.
- 3.3.10 The noise levels were assessed based on the standard acoustics formula as follows:

$$SPL = SWL - DC + FC$$

where SPL = Sound Pressure Levels at receiver, in dB(A)
 SWL = Sound Power Levels of PME, in dB(A)
 DC = Distance Correction, in dB(A) by $DC = 20\log_{10}(D) + 8$
 D = Horizontal distance between the NSR and the source in metres
 FC = Façade Correction of +3 dB(A)

- 3.3.11 With regard to the screening effect due to the boundary wall, a 5 dB(A) noise reduction was adopted for NSRs without direct line-of-sight to the noisy part of the PME.

NSRs

- 3.3.12 For operation noise, the first layer NSRs within 300m from the boundary of the Site have been identified. All identified NSRs are existing NSRs and no planned NSR has been identified within the assessment area. The location of these NSRs are shown in **Figure 3-1** and details are summarised in **Table 3-3**.

Table 3-3 Identified Representative NSRs of Noise from Fixed Sources

| NSR ID | DESCRIPTION | LANDUSE | NO. OF STOREY | APPROXIMATE DISTANCE TO SITE BOUNDARY |
|--------|---------------|-------------|---------------|---------------------------------------|
| IN1 | PARK YOHO T36 | Residential | 12 | 64m |
| IN2 | PARK YOHO T25 | Residential | 15 | 90m |

²http://www.epd.gov.hk/epd/sites/default/files/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf

3.3.13 The identified NSRs is located in a low density residential area consisting of low-rise or isolated high-rise developments and is considered not directly affected by the IF. No major roads with annual average daily traffic flow in excess of 30,000 and industrial areas are found in the vicinity of the identified NSRs. Therefore, the ASRs of the identified NSR is determined as Type A in accordance with IND-TM.

3.3.14 The ASR and ANLs adopted in this EA report are used for assessment purpose only. They should not bind the Noise Control Authority’s decision in determining the noise criteria based on the legislation and practices being in force, and contemporary conditions / situations of adjoining land uses.

Noise Criteria

3.3.15 As discussed in **paragraph 3.3.13**, the ASR of all identified NSRs is “A”. The noise criteria for the planned fixed noise source were determined with reference to ANL-5 and the noise level is shown in **Table 3-4**.

Table 3-4 Noise Criteria of Noise from Fixed Sources of Identified Representative NSRs

| NSR ID | DESCRIPTION | TIME PERIOD | NOISE CRITERIA (ANL-5, dB(A)) |
|--------|---------------|-------------|-------------------------------|
| IN1 | PARK YOHO T36 | Day | 55 |
| IN2 | PARK YOHO T25 | Day | 55 |

Assessment Results

3.3.16 The predicted noise impact results are summarised in **Table 3-5** and detailed in **Appendix A**.

Table 3-5 Predicted Noise Impact Level During Operation Phase

| NSR ID | DESCRIPTION | TIME PERIOD | NOISE CRITERIA (ANL-5, dB(A)) | PREDICTED NOISE LEVEL, dB(A) | EXCEEDANCE |
|--------|---------------|-------------|-------------------------------|------------------------------|------------|
| IN1 | PARK YOHO T36 | Day | 55 | 55 | No |
| IN2 | PARK YOHO T25 | Day | 55 | 54 | No |

3.4 Conclusion

3.4.1 During the construction phase of the Proposed Development, with the implementation of the noise mitigation measures recommended in **paragraph 3.2.4**, no adverse noise impact is anticipated.

3.4.2 PME and on-site vehicle movement are the major potential noise sources during the operational phase. Since the workshops will be enclosed, no significant noise impact arising from enclosed M&E equipment is anticipated. Quantitative assessment for the fixed noise sources was conducted. The predicted noise level during operation ranges from 54 dB(A) to 55 dB(A) which indicated that all the noise levels at NSRs would comply with the relevant noise criterion.

3.4.3 Overall, therefore, there will be no adverse noise impact during the construction and operation phases of the Proposed Development.

Figure 3-1 Location of Identified Representative NSRs

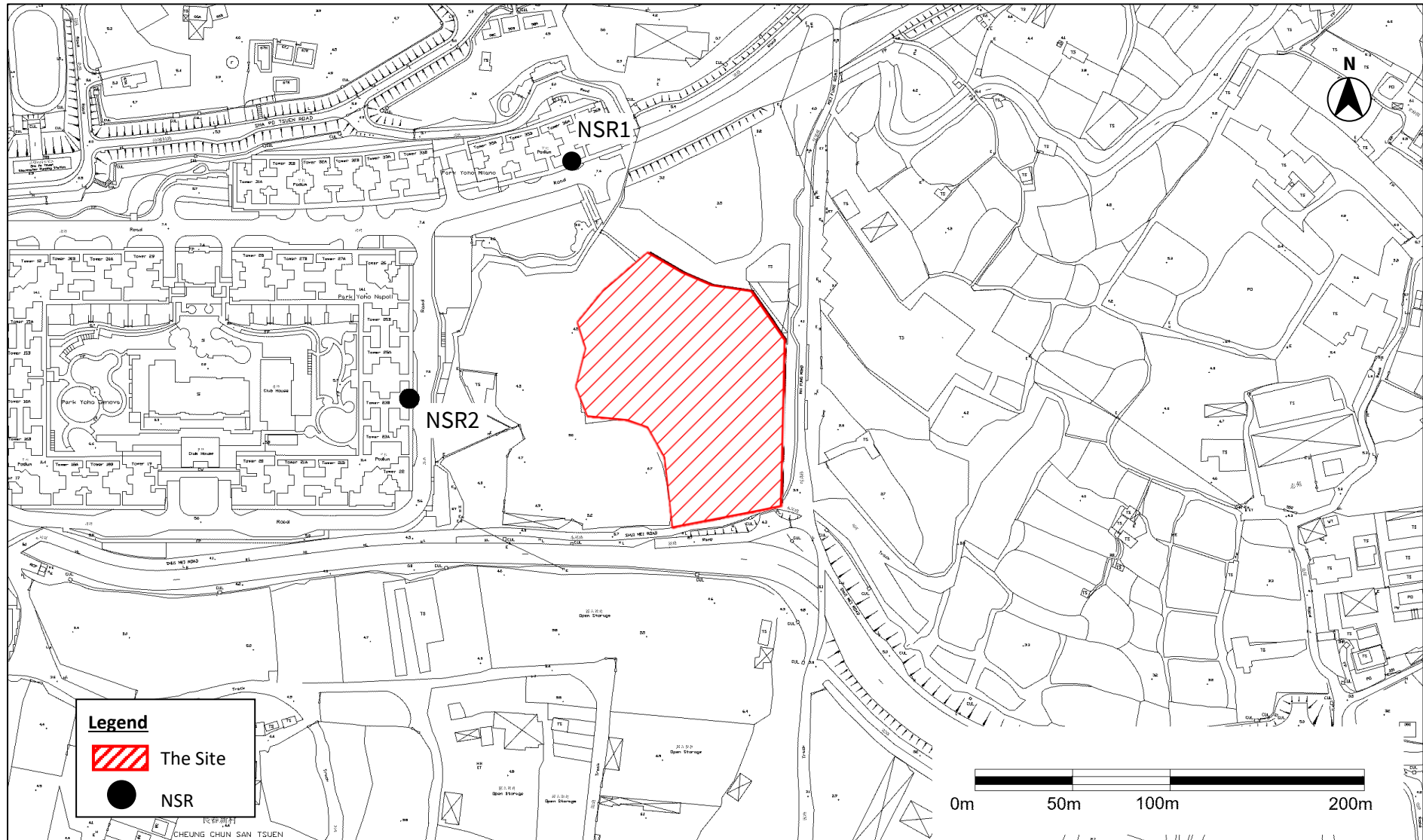
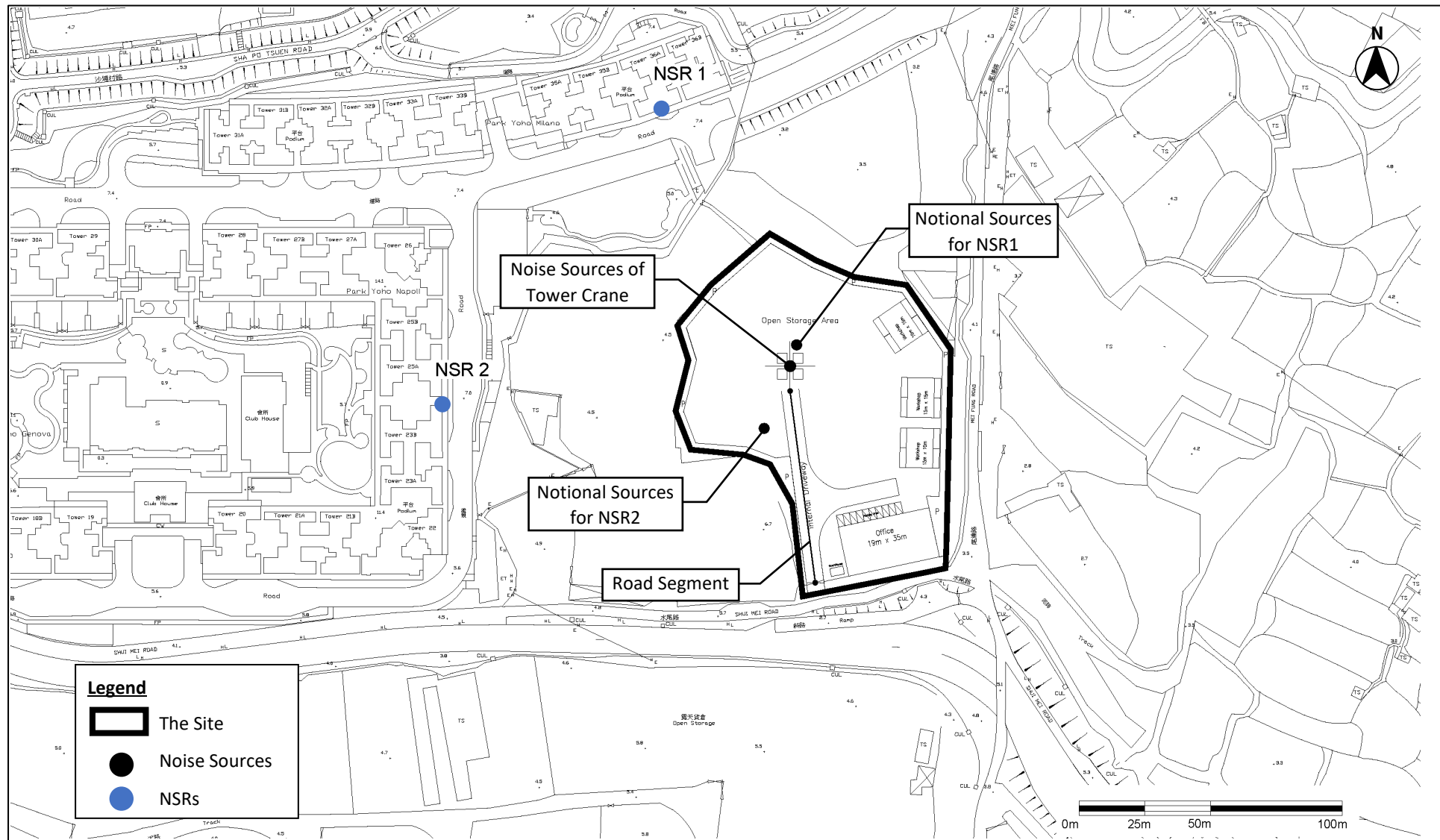


Figure 3-2 Location of Potential Noise Sources



4 WATER QUALITY

4.1 Environmental Legislation and Standards

Water Pollution Control Ordinance (Cap. 358)

- 4.1.1 The *Technical Memorandum – Standards for Effluent Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters* (“WPCO-TM”) is issued under Section 21 of the *Water Pollution Control Ordinance* (“WPCO”). All discharges into government sewerage systems, marine and inland waters are required to comply with the standards stipulated in the WPCO-TM.

Construction Site Drainage, ProPECC PN2/23

- 4.1.2 With reference to *Professional Persons Environmental Consultative Committee* (“ProPECC”) *Practice Note Construction Site Drainage* (“ProPECC PN2/23”), various guidelines for the handling and disposal of construction site discharges are included. The guidelines include the use of sediment traps, wheel washing facilities for vehicles leaving the Site, adequate maintenance of drainage systems to prevent flooding, overflow, sewage collection and treatment, and comprehensive waste management (collection, handling, transportation, and disposal) procedures.

Drainage Plan subject to Comment by the Environmental Protection Department, ProPECC PN1/23

- 4.1.3 With reference to *ProPECC Practice Note Drainage Plan subject to Comment by the Environmental Protection Department – Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations* (“ProPECC PN1/23”), various guidelines for the pollution control for discharge to storm drains and foul sewers, such as the use of grease trap for wastewater from the restaurant kitchen, the use of silt removal facilities for open surface channel led to stormwater drains, etc., are included. The guidelines also include the requirements for submission of drainage plans.

4.2 Potential Impacts

Construction and Reinstatement Phase

- 4.2.1 Muddy runoff from the Site may be generated during the construction/reinstatement phase, including filling activities and reinstatement works, especially during the rainy season.
- 4.2.2 Wash water from vehicles and equipment; silt from any on-site stockpiles of soil, cement and grouting materials; and spillage of fuels, oil and lubricants from construction/reinstatement vehicles and plant may generate water quality impacts. If these pollution sources are not properly controlled, it would lead to increased amounts of suspended solids, grease and oil, pH, Biochemical Oxygen Demand (“BOD”), etc. in the drainage system.
- 4.2.3 There is also the issue of sewage generated by construction/reinstatement workers on-site.

Operation Phase

- 4.2.4 The major source of sewage/wastewater during operation phase would be sewage and grey water from toilets. Adequate capacity and number of wastewater storage tanks for temporarily storing all the wastewater will be provided onsite, or septic tank/soakaway pit system will be provided as recommended in the Sewerage Review Report.
- 4.2.5 Non-point/diffuse source pollution, such as dust, tyre scraps, oil etc. might be washed from road surface, proposed footpath and/or open areas into watercourse during regular cleaning or during rainstorms. In order to minimise this pollution loading, silt/sand traps should be provided for the drainage systems of open areas in accordance with the relevant government guidelines. Paved perimeter u-channel would be provided to prevent discharge of spillage of wastewater beyond the site boundary, and accumulation of deposits on nearby public roads. Good practices stated in ProPECC PN 1/23 should be also referenced when designing on-site drainage. With the provision and implementation of the aforementioned mitigation measures for non-point source pollution, adverse water quality impact is not anticipated.
- 4.2.6 A Drainage Proposal for the Proposed Development has been carried out. As mentioned in the Drainage Proposal, runoff will be proposed diverted to the open channel to the south of the Site. No adverse drainage impact from the Site with the provision of the proposed internal drainage system is anticipated.

4.3 Mitigation Measures

Construction Phase

- 4.3.1 During construction phase, adequate capacity and number of portable toilets with adequate frequency for offsite disposal to be supplied, maintained and emptied by a licensed collector should be provided for construction workers.
- 4.3.2 The construction contractor shall follow good site practice and be responsible for providing, implementing and maintaining the mitigation measures as specified in ProPECC PN 2/23 for construction site drainage. The key requirements are as follows:
- 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 sediment basins. Temporary construction drainage or earth bunds or sand bag barriers should be provided on site to properly direct storm water to such silt removal facilities. Perimeter channels at site boundaries should be provided 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 construction in advance of site formation works and earthworks.
 - 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 ensure that these facilities are functioning properly at all times.
 - Construction works should be programmed to minimise soil excavation works in rainy reasons (generally from April to September). If soil excavation works could not be avoided in these months or at any time of year when rainstorms are likely, for the purpose of preventing soil erosion, temporarily 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) to prevent storm runoff from washing across exposed soil surfaces. Arrangements should always be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm.

- Earthworks final surfaces should be well compacted and the subsequent permanent works or surface protection works 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 when necessary.
- Measures should be taken to minimise 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 should be discharged into storm drains via silt removal facilities.
- Open stockpiles of construction materials (e.g. aggregates, sand and fill material) on sites should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.
- 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.
- All vehicles and plant should be cleaned before they leave a construction site to ensure no earth, mud, debris and the like is deposited by them 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 water drains. The section of construction road between the wheel washing bay and the public road should be paved to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains.

4.3.3 In addition, the EPD's RPCC for Construction Contract should be incorporated in the relevant works contract. The RPCC are generally good engineering practice to minimise inconvenience and environmental nuisance to nearby residents and other sensitive receivers. The general requirements are summarised below:

- The Contractor shall observe and comply with WPCO and its subsidiary regulation.
- The Contractor shall carry out the Works in such a manner as to minimise adverse impacts on the water quality during execution of the works. In particular the Contractor shall arrange his method of working to minimise the effects on the water quality within and outside the Site, on the transport routes and at the loading, dredging and dumping areas.
- The Contractor shall follow the practices, and be responsible for the design, construction, operation and maintenance of all the mitigation measures as specified in the ProPECC PN 2/23 "Construction Site Drainage" issued by the Director of Environmental Protection. The design of the mitigation measures shall be submitted by the Contractor to the Engineer for approval.
- The Contractor shall not discharge directly or indirectly or cause or permit or suffer to be discharged into any public sewer, stormwater drain, channel, stream-course or sea

any trade effluent or foul or contaminated water or cooling or hot water without the prior written consent of the Engineer in consultation with the Director of Environmental Protection and Director of Water Supplies, who may as a condition of granting his consent require to the Contractor to provide, operate and maintain at the Contractor's own expense to the satisfaction of the Engineer suitable works for the treatment and disposal of such trade effluent or foul or contaminated or cooling or hot water. The design of such treatment works shall be submitted to the Engineer for approval not less than one month before commencement of the relevant works.

- If any office, site canteen or site toilet facilities is/are erected, foul water effluent shall be directed to a foul sewer or to a sewage treatment and disposal facilities either directly or indirectly by means of pumping or other means approved by the Engineer.

Operation Phase

- 4.3.4 During operation phase, the sewage generated from the staff will be either treated by Septic Tank/Soakaway Pit System (Option 1) or collected by sewage storage tanks and tankered away with adequate frequency for Off-Site Disposal by a licensed collector (Option 2) as detailed in the Sewerage Review Report. For Option 1, adequate size of the septic tank shall be provided. For Option 2, adequate capacity and number of wastewater storage tanks with adequate frequency for offsite disposal by a licensed collector will be provided onsite. With the provision of either Option 1 or Option 2, no adverse water quality impact arising from the Proposed Development is anticipated.
- 4.3.5 In order to reduce pollution due to runoff, silt/sand traps should be provided for the drainage systems of open areas in accordance with ProPECC PN1/23. In addition, runoff should be controlled by best management practice.

4.4 Conclusion

- 4.4.1 During construction, water quality impacts can be properly controlled with the implementation of good site practice, as stated in **paragraph 4.3.2**. Adequate capacity and number of portable toilets will be provided for construction workers on-site. With the provision, implementation and maintenance of the recommended measures, no adverse water quality impacts from the Site during construction phase is anticipated.
- 4.4.2 The contractor shall apply for a Discharge Licence from EPD under the WPCO. All site discharged shall be treated in accordance with the terms and conditions of the Discharge Licence.
- 4.4.3 During operation, no adverse water quality impact is anticipated from wastewater/sewage from employees. The wastewater arising from the Proposed Development will be either treated by Septic Tank/Soakaway Pit System (Option 1) or collected by wastewater storage tanks and tankered away with adequate frequency for Off-Site Disposal by a licensed collector (Option 2). With the provision of either Option 1 or Option 2, no adverse water quality impact from the Proposed Development is anticipated.

5 WASTE MANAGEMENT AND LAND CONTAMINATION

5.1 Environmental Legislation and Standards

Waste Management

5.1.1 The key environmental legislation and standards are as follows:

- Waste Disposal Ordinance (Cap. 354) (“WDO”)
- Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C)
- Waste Disposal (Charges for Disposal of Chemical Waste) Regulation (Cap. 354J)
- Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)
- Land (Miscellaneous Provisions) Ordinance (Cap. 28)
- Public Health and Municipal Services Ordinance (Cap.132BK) – Public Cleansing and Prevention of Nuisances Regulation
- Environmental, Transport and Works Bureau (“ETWB”) Technical Circular (Works) No. 19/2005, Environmental Management on Construction Sites
- ETWB Technical Circular (Works) No. 22/2003A, Additional Measures to improve Site Cleanliness and Control Mosquito Breeding on Construction Sites
- Development Bureau (“DevB”) Technical Circular (Works) No. 6/2010, Trip Ticket System for Disposal of Construction & Demolition Materials
- Civil Engineering and Development Department (“CEDD”) Technical Circulars (CEDD TC No. 11/2019), Management of Construction and Demolition Materials
- Building Department Practice Note for Authorised Persons, Registered Structural Engineers and Registered Geotechnical Engineers Waste Minimisation – Construction and Demolition Waste (“ADV-19”)
- Building Department Practice Note for Authorised Persons, Registered Structural Engineers and Registered Geotechnical Engineers Waste Minimisation – Provision of Fitments and Fittings in New Buildings (“APP-114”)
- Building Department Practice Note for Registered Contractors (“PNRC 17”), Control of Environmental Nuisance from Construction Sites
- CEDD Project Administration Handbook for Civil Engineering Works (“PAH”)
- EPD Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes
- EPD Recommended Pollution Control Clauses (“RPCC”) for Construction Contracts

Land Contamination

5.1.2 The references of contaminated land management include the following documents published by EPD:

- Guidance Note for Contaminated Land Assessment and Remediation
- Guidance Manual for Use of Risk-Based Remediation Goals for Contaminated Land Management

- Practice Guide for Investigation and Remediation of Contaminated Land

5.2 Potential Impacts

Construction Phase

5.2.1 The key potential waste sources during the construction phase are:

- Inert Construction and Demolition (“C&D”) materials (e.g. waste concrete, surplus soil, waste asphalt etc.)
- Non-inert C&D Waste (e.g. wood and plastics)
- Chemical wastes such as waste battery and waste lubricating oil from vehicles/plant maintenance
- General refuse generated by site workers

Inert C&D Materials

5.2.2 Inert C&D materials are those which do not decompose, such as debris, rubble, earth and concrete, and which are suitable for land reclamation and site formation.

5.2.3 The major source of inert C&D materials during construction includes excavation for removal of paving. The Site area is approx. 9,705m² and approx. 20% of the Site area with concrete paving will be removed, i.e., 1,941m². Assuming the paving density is 2 tonnes/m³ and the thickness of paving is 100mm, approx. 194 tonnes waste paving will be generated from the removal of paving.

5.2.4 As advised by the Applicant, excavation will be minimal and the amount of C&D material due to excavation is therefore assumed to be negligible.

5.2.5 Construction waste will also be generated during construction of the Proposed Development. This will comprise inert C&D materials, such as concrete waste, waste from blockwork and brickwork; and non-inert C&D materials (or C&D waste) from timber formwork, packaging waste and other non-inert wastes.

5.2.6 In accordance with Section 3.2 of *A Guide for Managing and Minimizing Building and Demolition Waste* published by the Hong Kong Polytechnic University in May 2001 (“the Guide”), it provides a “waste index” for building waste generation in Hong Kong based on the Gross Floor Area (“GFA”) of three different building types as follows:

- Private Housing Projects 0.250m³/m² GFA
- Government Housing Projects 0.174m³/m² GFA
- Commercial Office Projects 0.200m³/m² GFA

5.2.7 In order to properly estimate building waste from the Proposed Development, the “waste index” also include C&D wastes such as timber formwork, packaging waste and other wastes. On the other hand, the Guide does not identify what proportion of building waste is inert C&D materials and what proportion is C&D wastes.

5.2.8 With reference to Plate 2.12 of EPD’s *Monitoring of Solid Waste in Hong Kong – Waste Statistics for 2021*, in 2021 94% of construction wastes was either reused on-site or sent to

the public fill reception facilities, implying that such construction wastes should be inert C&D materials. The proportion of inert C&D materials in the “waste index” can therefore be estimated by applying the Hong Kong-wide proportion of inert C&D materials in construction waste, i.e. 94%, to the “waste index” as follows:

$$\begin{aligned} \text{Waste Index}_{\text{Inert C\&D materials (Commercial Office Projects)}} &= 0.94 \times 0.200\text{m}^3/\text{m}^2 \text{ GFA} \\ &= 0.188\text{m}^3/\text{m}^2 \text{ GFA} \end{aligned}$$

5.2.9 The inert C&D materials component of building waste from the Proposed Development with a total floor area of approx. 2,025m² has therefore been estimated below:

$$\begin{aligned} \text{Building Waste} &= \text{Waste Index}_{\text{Inert C\&D materials (Commercial Office Projects)}} \times \text{GFA} \\ &= 0.188 \times 2,025 \\ &= 381\text{m}^3 \end{aligned}$$

5.2.10 Assuming the density of inert C&D materials is 1.8 tonnes/m³, approx. 686 tonnes of building waste would be generated by the Proposed Development.

Table 5-1 Total Estimated Inert C&D Materials Generated During Construction

| INERT C&D MATERIAL TYPE | ESTIMATED NON-INERT C&D MATERIAL GENERATION (TONNES) |
|--|--|
| STAGE: SITE CLEARANCE AND FORMATION | |
| Paving | 194 |
| Excavated Material | Negligible |
| STAGE: INFRASTRUCTURE CONSTRUCTION | |
| Building Waste | 686 |
| Total | 880 |

5.2.11 In total, approx. 880 tonnes of inert C&D materials may be generated throughout the construction period. Assuming the construction period to be nine months with six working days a week and four weeks a month, the daily inert C&D material generation rate will be approx. 4 tonnes/day (i.e. 880 tonnes/(6 x 4) x 9 months)).

5.2.12 Inert C&D materials should be reused on-site as far as practicable. Good site practice and mitigation measures recommended in **Section 5.3** should be provided and implemented. Surplus inert C&D materials, if any, should be reused or recycled off-site as far as practicable. If there will still be any remaining materials, they should be delivered to public fill reception facilities such as Fill Bank at Tuen Mun Area 38.

5.2.13 With the provision and implementation of the recommended mitigation measures, no adverse waste impact from the handling, transportation or disposal of inert C&D materials during construction of the Proposed Development is anticipated.

Non-Inert C&D Materials (or C&D Waste)

5.2.14 Non-inert C&D materials (or C&D waste), are those which can decompose such as bamboo, timber, vegetation, packaging waste and other organic material, and which are therefore unsuitable for land reclamation.

- 5.2.15 The major source of non-inert C&D materials during construction will be building waste including non-inert C&D materials such as timber formwork, packaging waste.
- 5.2.16 The building waste are included in the “waste index” provided in the Guide, discussed above, however, this also includes inert C&D materials.
- 5.2.17 As shown in Plate 2.12 of Waste Statistics for 2021, in 2021 6% of C&D waste was disposed of at landfills. The proportion of non-inert C&D materials (or C&D waste) in the “waste index” can therefore be estimated by applying the Hong Kong-wide proportion of non-inert C&D materials (or C&D waste) in construction waste, i.e. 6%, to the “waste index” as follows:

$$\begin{aligned} \text{Waste Index}_{\text{Non-Inert C\&D materials (Commercial Office Projects)}} &= 0.06 \times 0.200\text{m}^3/\text{m}^2 \text{ GFA} \\ &= 0.012\text{m}^3/\text{m}^2 \text{ GFA} \end{aligned}$$

- 5.2.18 Hence, the non-inert C&D materials (or C&D waste) components in building waste can therefore be estimated as follows:

$$\begin{aligned} \text{Building Waste} &= \text{Waste Index}_{\text{Non-Inert C\&D materials (Commercial Office Projects)}} \times \text{GFA} \\ &= 0.012 \times 2,025 \\ &= 24.3\text{m}^3 \end{aligned}$$

- 5.2.19 Assuming the density of non-inert C&D materials is 1.0 tonnes/m³, approx. 24.3 tonnes of C&D waste will be arising from the Proposed Development. Assuming the construction period to be nine months with six working days a week and four weeks a month, the daily C&D waste generation rate will be approx. 0.11 tonnes/day (i.e. 24.3 tonnes/(6 x 4) x 9 months)).
- 5.2.20 The non-inert C&D waste is summarised in **Table 5-2**.

Table 5-2 Total Estimated Non-Inert C&D Materials Generated During Construction

| NON-INERT C&D MATERIAL TYPE | ESTIMATED NON-INERT C&D MATERIAL GENERATION (TONNES) |
|---|--|
| STAGE: INFRASTRUCTURE CONSTRUCTION | |
| Building Waste | 24.3 |
| Total | 24.3 or 24 |

- 5.2.21 On-site sorting should be carried out for non-inert C&D materials generated from the works. Recyclable materials, such as metal, paper product, timber and plastics, should be collected by local recyclers for recycling. All non-inert C&D materials should be recycled as far as possible and landfill disposal should be adopted as the last resort.
- 5.2.22 The quantity of the generated non-inert building waste could be recycled/reused is expected to be no more than 10% of the generated amount in view of the scale of the Proposed Development. Therefore, no more than 2 tonnes C&D waste may be reused or recycled on-site.
- 5.2.23 If 10% C&D waste can be reused/recycled on-site, the surplus C&D waste mainly comprising building waste will be approx. 22 tonnes in total. Assuming the construction

period to be nine months with six working days a week and four weeks a month, the total daily C&D waste for disposal of at WENT Landfill would be approx. 0.1 tonnes/day (i.e. 22 tonnes/(6 x 4) x 9 months)).

- 5.2.24 With the above estimation, no adverse waste impact from the handling, transportation or disposal of non-inert C&D materials (or C&D waste) during construction of the Proposed Development is anticipated.

General Refuse

- 5.2.25 General refuse from workers is similar to domestic waste and includes packaging and organic material.
- 5.2.26 The number of workers will depend on the construction methods employed and on which contractor carries out the work. According to the Applicant's experience, the number of construction workers for the Proposed Development should be no more than 20 per day.
- 5.2.27 Each construction worker will generate general refuse, which is similar to domestic waste. According to Plate 2.7 of Waste Statistics for 2021, the per capita domestic waste disposal rate in 2021 was 0.94kg/person/day, although the per worker generation rate of general refuse will likely be less than this. For a conservative approach, the per capita domestic waste disposal rate in 2021 has been adopted for general refuse generation by construction workers. On this basis:

$$\begin{aligned} \text{General Refuse/Day} &= \text{No. of workers/day} \times \text{per capita generation rate} \\ &= 20 \text{ workers} \times 0.94\text{kg/workers/day} \\ &= 18.8\text{kg/day} \\ \text{Total General Refuse} &= \text{General Refuse/Day} \times \text{Construction Duration} \\ &= 18.8\text{kg/day} \times [6 \text{ days/week} \times 4 \text{ weeks/month} \times 9 \text{ months}] \\ &= 4,060.8\text{kg or } 4.1 \text{ tonnes} \end{aligned}$$

- 5.2.28 On-site sorting should be carried out for general refuse generated from the works. Recyclable materials, such as metal, paper and plastic, should be collected by local recyclers for recycling. All general refuse should be recycled as far as possible and landfill disposal should be adopted as the last resort.
- 5.2.29 According to Plate 3.2 of Waste Statistics for 2021, in 2021 the recovery rate of domestic waste is approx. 20%. It is therefore assumed that 20% of general refuse, i.e., ~812kg of general refuse, would be reused and recycled by the recyclers. The surplus general refuse of 3,249 kg or 15kg/day in average would be disposed of at landfill.
- 5.2.30 Given the above, no adverse waste impact from the handling, transportation or disposal of general refuse from workforce during construction of the Proposed Development is anticipated.

Chemical Waste

- 5.2.31 No hazardous materials or hazardous wastes are expected to be generated during the construction phase. Only limited amount which is expected to be less than 1 tonne of

chemical waste including waste batteries, lubricating oil and waste paints may be generated given the small scale of the works. Other chemical wastes include waste lamp will be generated and the amount will be insignificant.

- 5.2.32 The Contractor shall register as a Chemical Waste Producer under the WDO. All chemical waste shall be stores at a properly designed chemical waste storage area located within the construction site in accordance with EPD's *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*. A licensed collector shall be employed to handle and dispose of all chemical wastes, e.g. at the Chemical Waste Treatment Centre ("CWTC") at Tsing Yi, or other facility approved by EPD.
- 5.2.33 Given the above, no adverse waste impact from the handling, transportation or disposal of chemical waste during the construction of the Proposed Development is anticipated.

Summary

- 5.2.34 The type and estimated quantities of different types of wastes generated during the construction phase are summarised in **Table 5-3**.

Table 5-3 Estimated Amount of Different Types of Wastes to be Generated During Construction Phase

| WASTE TYPE | ESTIMATED QUANTITY (TONNES) | KEY SOURCES OF WASTE GENERATION | TREATMENT |
|-----------------------------------|-----------------------------|---|---|
| INERT C&D MATERIAL | | | |
| Paving | 194 | Removal of paving | 1. On-site reuse/recycle 2. Off-site reuse/recycle 3. Disposal of at public fill reception facilities |
| Excavated material | Negligible | Excavation | |
| Building Waste | 686 | Building works | |
| NON-INERT C&D MATERIAL | | | |
| Building Waste | 24.3 | Building works | 1. On-site sorting for reuse/recycle 2. Disposal of at landfill |
| OTHERS | | | |
| General Refuse | 4.1 | Construction staff | 1. On-site sorting for reuse/recycle 2. Disposal of at landfill |
| Chemical Waste | <1 | Waste batteries, lubricating oil and waste paints, etc. | All to be collected by the licensed chemical waste collector and treated in the CWTC. |

Operation Phase

- 5.2.35 During the operation phase, the major type of waste generated will be waste from office and the MiC component and modular construction materials storage. According to the Waste Statistic for 2021, the most recent per municipal solid waste disposal rate is 1.53kg/person/day. The estimated total staff of the Proposed Development would be around 50 people, so the quantity of commercial waste disposed of is expected to be less than 24 tonnes per year.

- 5.2.36 Plate 3.2 of Waste Statistics for 2021 shows that in 2021, the recovery rate of municipal solid waste is 31%. It is therefore estimated that 31% of commercial waste (i.e. 7.4 tonnes) could be reused and recycled by the recyclers.
- 5.2.37 The surplus commercial waste of 16.6 tonnes (i.e. 0.05 tonnes/day on average assuming seven working days per week) would be disposed of at the NWNNTS.
- 5.2.38 Since commercial waste will be collected on a regular basis by registered waste collectors, and since commercial waste will be disposed at the landfill managed by EPD, no adverse waste impacts from handling transportation or disposal are anticipated. Nevertheless, to minimise domestic waste generation mitigation measures proposed in **Section 5.3** should be implemented.
- 5.2.39 Overall, there should be no adverse waste impact from the handling, transportation or disposal of domestic waste during the operation of the Proposed Development.

5.3 Mitigation Measures

Construction Phase

- 5.3.1 Waste management shall be controlled through contractual requirements as well as through statutory requirements.
- 5.3.2 A Waste Management Plan (“WMP”) should be developed by the contractor and submitted to the Project Engineer/Architect for approval in accordance with ADV-19 before the commencement of any construction works. The objectives of the WMP will be to identify any potential environmental impacts from the generation of waste at the Site; to recommend appropriate waste handling, collection, sorting, disposal and recycling measures in accordance with requirements of the current regulations; and to categorise and permit segregation of C&D materials where practicable (i.e. inert material/non-inert material) for disposal considerations i.e. public fill/landfill.
- 5.3.3 The contractors should adopt good housekeeping practices with reference to the WMP such as waste segregation prior to disposal. Besides the provision of stockpiling and segregating areas at site, effective collection of site wastes is required to prevent waste materials being blown around by wind, flushed or leached into nearby waters, or creating odour nuisance pest and vermin problems. Waste storage areas should be well maintained and cleaned regularly.
- 5.3.4 A trip-ticket system should be established in accordance with DevB TC(W) No. 6/2010 and the *Waste Disposal (Charges for Disposal of Construction Waste) Regulation* to monitor the disposal of public fill and solid wastes at public filling facilities and landfills, and to control fly-tipping. A trip-ticket system should be included as one of the contractual requirements for the contractor to strictly implement.
- 5.3.5 Whenever there are excess recyclable construction materials, including bricks, plastics and metals, reuse and recycling should be carried out as far as practicable to minimise the amount of waste disposal. Other inert non-recyclable materials such as concrete, asphalt, etc. should be treated as public fill. Non-inert and non-recyclable wastes should be disposed at designated landfill site.

- 5.3.6 General refuse should be stored in enclosed bins or compaction units separate from C&D material. A reputable waste collector should be employed by the construction contractor to remove general refuse from the Site, separately from C&D materials. Preferably an enclosed and covered area should be provided to reduce the occurrence of “wind-blown” materials.
- 5.3.7 For chemical waste, the Contractor should follow the ‘trip-ticket’ system of which the arrangement of production, collection and disposal in accordance with the *Waste Disposal (Chemical Waste) (General) Regulation*.
- 5.3.8 In addition, the EPD’s RPCC for Construction Contract should be incorporated in the relevant works contract. The RPCC are generally good engineering practice to minimise inconvenience and environmental nuisance to nearby residents and other sensitive receivers. The general requirements are as follows:
- The Contractor shall observe and comply with the WDO and its subsidiary.
 - The Contractor shall submit to the Engineer for approval a waste management plan with appropriate mitigation measures including allocation of an area for waste segregation and shall ensure that the day-to-day site operations comply with the approved waste management plan.
 - The Contractor shall minimise the generation of waste from his work. Avoidance and minimisation of waste generation can be achieved through changing or improving design and practices, careful planning and good site management.
 - The Contractor shall ensure that different types of wastes are segregated on-site and stored in different containers, skips or stockpiles to facilitate reuse / recycling of waste and, as the last resort, disposal at different outlets as appropriate.
 - The reuse and recycling of waste shall be practised as far as possible. The recycled materials shall include paper / cardboard, timber and metal etc.
 - The Contractor shall ensure that C&D materials are sorted into public fill (inert portion) and C&D waste (non-inert portion). The public fill which comprises soil, rock, concrete, brick, cement plaster/mortar, inert building debris, aggregates and asphalt shall be reused such as earth filling, reclamation, site formation works, etc. as far as practicable, and disposed of at Fill Bank as the last resort. The C&D waste which comprises metal, timber, paper, glass, etc. shall be reused and recycled as far as practicable, and, as the last resort, disposal of at landfills.
 - The Contractor shall record the amount of waste generated, recycled and disposed of (including the disposal sites).
 - The Contractor shall use a trip ticket system for the disposal of C&D materials to any designated public filling facility and/or landfill.
 - Training shall be provided for workers about the concepts of site cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling.
 - The Contractor shall not permit sewage and untreated effluent containing sand, cement, silt or any other suspended or dissolved material to flow from the Site onto any adjoining land, or allow any solid waste including refuse which is not part of the final product from waste processing plants to be deposited anywhere within the Site and the

adjoining land. He shall arrange removal of such matter from the Site in a proper manner to the satisfaction of the Engineer in consultation with the EPD.

- The Contractor shall observe and comply with the *Waste Disposal (Chemical Waste) (General) Regulation*.
- The Contractor shall apply for registration as chemical waste producer under the *Waste Disposal (Chemical Waste) (General) Regulation* when chemical waste is produced. All chemical waste shall be properly stored, labelled, packaged and collected in accordance with the Regulation.

Operation Phase

5.3.9 The operator shall encourage reuse and recycling of commercial wastes in line with government policy. The waste management hierarchy shall be adopted by the building management to manage commercial wastes in a suitable manner. The waste management hierarchy is a concept which shows the desirability of various waste management methods and comprises the following in order of preference:

- Avoidance
- Minimisation
- Recycling/reuse

5.3.10 The majority of waste generated during the operation of the Proposed Development will mainly comprise general refuse and commercial wastes such as food waste, food packaging, paper, can, plastic bottles, etc., which shall be collected and stores in appropriate waste receptacles with a secure lid to minimise the potential adverse impact due to wind blowing away any waste and to improve hygiene. Recyclable and non-recyclable waste shall be regularly collected by licensed waste collectors and taken off-site for recycling or disposal, respectively.

5.4 Land Contamination

5.4.1 Historical aerial photographs provided in **Appendix B** shows that the Site was an agriculture land in Year 1970 to 1990s, which the historical agricultural activities unlikely caused land contamination. In Year 2003, the Site was observed to be abandoned and covered in vegetation. The trend of abandoning agriculture uses within the Site was continued in 2000s. In 2015, a warehouse/storage area with car park is observed. There is no evidence of any past land use, either agriculture land, vacant land or industrial use, within the Site that could have resulted in contamination. As such, there is no reason to suspect that contaminated land was present within the Site.

5.4.2 The Site is currently a plant nursery with an open storage area. Majority of the Site is currently paved. No land contamination activities on the Site was observed. Photographs taken in November 2023 are provided in **Figure 5-1** for reference.

5.4.3 No existing and previous development with potential land contamination activities on the Site is identified. Hence, no land contamination issue is anticipated.

5.5 Conclusion

- 5.5.1 With the development of WMP and to implement the good site practices recommended therein, the waste generation during construction phase can be greatly reduced. Provided that good site practices as recommended in **Section 5.3** will be followed, there should be no adverse impacts related to the management, handling and transportation of waste during the construction phase.
- 5.5.2 During the operation phase, the major type of waste generated will be commercial wastes. Since commercial wastes will be collected on a regular basis by registered waste collectors and will be disposed at a landfill managed by EPD, no adverse waste impacts from handling, transportation, or disposal are anticipated during operation.
- 5.5.3 With the implementation of the recommended mitigation measures, adverse waste impacts generated during the construction and operational phases of the Proposed Development are not anticipated.
- 5.5.4 There was no previous development with potential land contamination activities on the Site. Hence, no land contamination issue is anticipated.

Figure 5-1 Site Inspection Photos of the Project Site and Surrounding Environment



6 CONCLUSIONS AND RECOMMENDATIONS

6.1.1 This EA has indicated that the Proposed Development will not generate any unacceptable environmental impacts during construction and operation phases, provided that all the recommended mitigation measures and good site practice are strictly implemented.

6.1.2 Specific conclusions for air quality, noise, water quality and waste management are as follows:

Air Quality

6.1.3 With the implementation of the recommended mitigation measures and good site practice, adverse impacts during construction phases are not anticipated.

6.1.4 No adverse air quality impact on the Proposed Development is anticipated with the implementation of the proposed mitigation measures during operation phase.

6.1.5 Overall, no adverse air quality impact is anticipated during the construction or operation phases of the Proposed Development.

Noise

6.1.6 During the construction phase of the Proposed Development, with the implementation of the noise mitigation measures recommended in **Section 3.2**, no adverse impact is anticipated.

6.1.7 Quantitative assessment for the fixed noise sources during operation phase was conducted. The results show that the noise from the fixed sources of the Proposed Development is expected to comply with the relevant noise criterion after implementing proper mitigation measure.

6.1.8 Overall, there will be no adverse impact during the construction and operation phases of the Proposed Development.

Water Quality

6.1.9 During construction phase, water quality impacts will be properly controlled with the implementation of good site practice. Portable toilets, when necessary will be provided for construction workers on-site. Provided these measures are implemented, adverse water quality impact is not anticipated during the construction phase. The Contractor shall apply for a Discharge Licence under the WPCO and the effluent discharged from the construction site shall comply with the terms and conditions of the Discharge Licence.

6.1.10 During operation, no adverse water quality impact is anticipated from the Proposed Development since sewage generated from staff will be either treated by Septic Tank/Soakaway Pit System (Option 1) or collected by wastewater storage tanks and tankered away with adequate frequency for Off-Site Disposal by a licensed collector (Option 2).

Waste Management

- 6.1.11 With the provision and implementation of the good site practices recommended therein, the waste generation during construction phase will be reduced. Provided that good site practices are followed, there should be no adverse impacts related to the management, handling and transportation of waste during construction phase.
- 6.1.12 During operation phase, the major type of waste generated will be commercial waste. Since commercial waste will be collected on a regular basis by registered collectors and will be disposed of at landfill, no adverse waste impacts from handling, transportation or disposal are anticipated during the operation phase.
- 6.1.13 Based on the preliminary land contamination review, no existing and/or previous uses with potential land contamination activities on the Site were identified.

Appendix A Noise Calculation of Fixed Source

Predicted Noise Level at NSR1

| Fixed-noise Sources | Source Type | Ref. Code | SWL/unit, dB(A) | Quantity | At-source Noise Mitigation Measures | Noise Reduction from Mitigation Measures, dB(A) | Corrected SWL, dB(A) | Distance, m | Speed, km/h | Angle of view, degree | Operation (30mins) | % on time | Correction | | | | | | CNL, dB(A) | Total CNL, dB(A) | Criterion, dB(A) |
|------------------------------------|-------------|-----------|-----------------|----------|-------------------------------------|---|----------------------|-------------|-------------|-----------------------|--------------------|-----------|------------|----------|---------------|-------|--|--------|------------|------------------|------------------|
| | | | | | | | | | | | | | Time | Distance | Angle of view | Speed | Screening Effect, dB(A) ⁽²⁾ | Facade | | | |
| Tower Crane | Stationary | CNP 049 | 95 | 1 | NA | 0 | 95.0 | 109.0 | NA | NA | 30 | 100.0% | 0.0 | -48.7 | NA | NA | 0 | 3 | 49.3 | 55 | 55 |
| Forklift (speeds10km/hr) | Stationary | Other PME | 104 | 2 | NA | 0 | 107.0 | 103.1 | NA | NA | 15 | 50.0% | -3.0 | -48.2 | NA | NA | -5 | 3 | 53.8 | | |
| Rd1 Lorry (5.5-gross veh weights38 | Haul Road | Other PME | 105 | 4 | NA | 0 | NA | 152.9 | 10 | 6.6 | NA | N/A | NA | -21.8 | -14.4 | -10 | -5 | 3 | 29.8 | | |

Notes:

1 A 5 dB(A) noise reduction if there is no direct line of sight to the noisy part of the source(s) within the Site.

Predicted Noise Level at NSR2

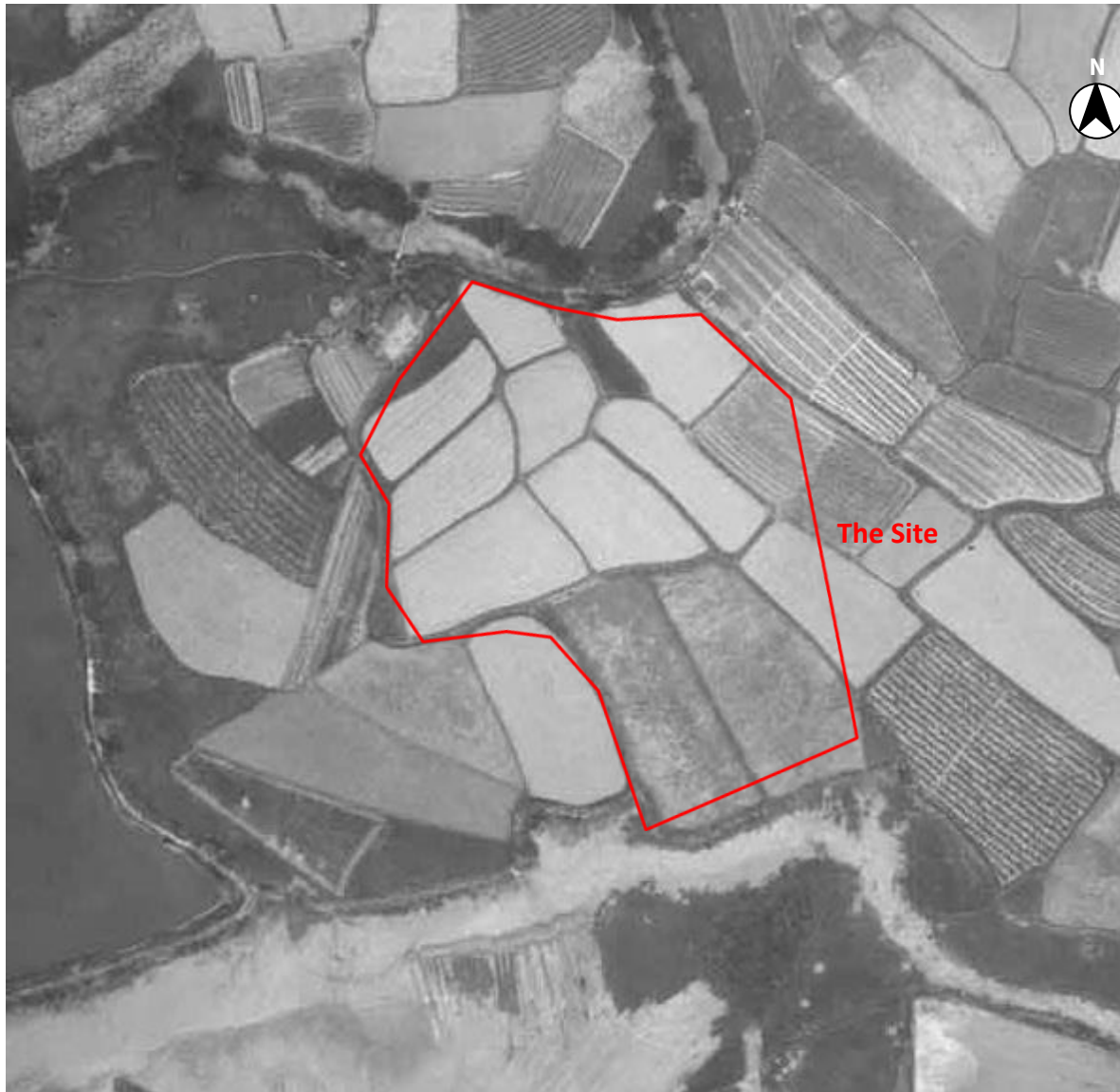
| Fixed-noise Sources | Source Type | Ref. Code | SWL/unit, dB(A) | Quantity | At-source Noise Mitigation Measures | Noise Reduction from Mitigation Measures, dB(A) | Corrected SWL, dB(A) | Distance, m | Speed, km/h | Angle of view, degree | Operation (30mins) | % on time | Correction | | | | | | CNL, dB(A) | Total CNL, dB(A) | Criterion, dB(A) |
|------------------------------------|-------------|-----------|-----------------|----------|-------------------------------------|---|----------------------|-------------|-------------|-----------------------|--------------------|-----------|------------|----------|---------------|-------|--|--------|------------|------------------|------------------|
| | | | | | | | | | | | | | Time | Distance | Angle of view | Speed | Screening Effect, dB(A) ⁽²⁾ | Facade | | | |
| Tower Crane | Stationary | CNP 049 | 95 | 1 | NA | 0 | 95.0 | 132.8 | NA | NA | 30 | 100.0% | 0.0 | -50.4 | NA | NA | 0 | 3 | 47.6 | 54 | 55 |
| Forklift (speeds10km/hr) | Stationary | Other PME | 104 | 2 | NA | 0 | 107.0 | 122.5 | NA | NA | 15 | 50.0% | -3.0 | -49.7 | NA | NA | -5 | 3 | 52.3 | | |
| Rd1 Lorry (5.5-gross veh weights38 | Haul Road | Other PME | 105 | 4 | NA | 0 | NA | 140.2 | 10 | 6.6 | NA | N/A | NA | -21.5 | -14.4 | -10 | -5 | 3 | 30.1 | | |

Notes:

1 A 5 dB(A) noise reduction if there is no direct line of sight to the noisy part of the source(s) within the Site.

Appendix B Aerial Photographs

Figure D-1 Aerial Photograph in Year 1970



Source: Lands Department

In 1960, the Site was an agriculture land. No activities likely to result in land contamination were observed.

Figure D-2 Aerial Photograph in Year 1988



Source: Lands Department

In 1988, the Site was an agriculture land. No activities likely to result in land contamination were observed.

Figure D-3 Aerial Photograph in Year 1995



Source: Lands Department

In 1995, the Site was an agriculture land. No activities likely to result in land contamination were observed.

Figure D-4 Aerial Photograph in Year 2003



Source: Lands Department

In 2003, the Site appears to be abandoned and covered with sparse vegetation.

Figure D-5 Aerial Photograph in Year 2009



Source: Lands Department

In 2009, the Site appears to be abandoned and covered with sparse vegetation.

Figure D-6 Aerial Photograph in Year 2015



Source: Lands Department

In 2015, the Site appears to be used as a storage area/warehouse with a car park.

Figure D-7 Aerial Photograph in Year 2022



Source: Lands Department

In 2022, the Site appears to be used as a plant nursey and open storage of building materials.



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Accountability

We understand the importance of being accountable to each other and our clients.



Passion

We are completely passionate about providing practical solutions and outcomes that deliver for our clients.



Insight

We work in an environment that encourages and values insight as a critical quality which informs our decisions and our clients and supports practical solutions and project delivery.



Integrity

We behave with respect and honesty toward each other, our clients and our stakeholders.