

Appendix G

Air Quality Impact Assessment

Prepared by
Ramboll Hong Kong Limited

SECTION 16 APPLICATION FOR PROPOSED FLAT, SHOP AND
SERVICES AND EATING PLACE WITH MINOR RELAXATION
OF PLOT RATIO AND BUILDING HEIGHT RESTRICTIONS IN
"RESIDENTIAL (GROUP E)" ZONE AT NO. 4 TUNG YUEN
STREET, YAU TONG, KOWLOON

AIR QUALITY IMPACT ASSESSMENT

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1. INTRODUCTION

1.1 Background

- 1.1.1 The Application Site is located at Yau Tong Marine Lot No. 70, Tung Yuen Street (hereinafter collectively called "Application Site"). The Application Site is zoned as "Residential (Group E)" ("R(E)") under the Approved Cha Kwo Ling, Yau Tong, Lei Yue Mun Outline Zoning Plan No. S/K15/27. Figure 1.1 shows the location of the Application Site.
- 1.1.2 Ramboll Hong Kong Limited is commissioned by the Applicants to provide environmental consultancy services and prepare the relevant submissions to demonstrate the environmental sustainability of the Proposed Development for this section 16 planning application.
- 1.1.3 The master layout plan (MLP) is provided by the project architect – P&T Architects Ltd. The traffic forecast for vehicular emission impact assessment and road traffic noise impact assessment is provided by the project traffic consultant – MVA Asia Ltd.

1.2 Application Site and its Environ

- 1.2.1 "Residential (Group E)" ("R(E)") under the Approved Cha Kwo Ling, Yau Tong, Lei Yue Mun Outline Zoning Plan No. S/K15/27 (OZP). The area of the Site is about 2,419 m² and currently occupied by Wah Tung Godown Building.
- 1.2.2 The Application Site is bounded by Tung Yuen Street to the east and Ko Fai Road to the north. The surrounding areas are currently dominated by industrial and residential uses. Figure 1.1 shows the location of the Application Site and its environs.

1.3 Proposed Development

- 1.3.1 The Proposed Development consists of 1 residential tower, providing not more than 342 residential units. The residential tower is situated atop a 3 storeys podium accommodating a shopping arcade, E&M rooms and clubhouse. 2 storeys of carpark and loading/ unloading area are located at the basement.
- 1.3.2 The residential tower has a various building height, ranging from ~ 80mPD to ~ 100 mPD, and the level of first residential floor is from 21.10 mPD.
- 1.3.3 Floor layout plans and sections of the Proposed Development are shown in Appendix 1.1.
- 1.3.4 Table 1.1 shows the summary table of the key parameters for the Proposed Development.

Table 1.1 Key Development Parameters of Proposed Development

Key Development Parameters	Proposed Scheme
No. of Storey for Residential	22 - 28 storeys (for inland portion only), excluding 2 storeys of basement carpark
Floor Level of lowest Residential Floor (mPD)	21.10
Building Height (mPD)	80mPD to 100mPD (for inland portion only)

Key Development Parameters	Proposed Scheme
Ancillary Facilities	Clubhouse, shopping arcade
No. of Residential Block	1
No. of Residential Units	342
Anticipated Completion year	2032
Site Area (m ²)	About 2,419m ²

2. QUANTITATIVE AIR QUALITY IMPACT ASSESSMENT

2.1 Scope of Work

2.1.1 This assessment predicts air quality pollutant concentration at the Proposed Development, informing the provision of air quality mitigation measures to ensure future residents are not exposed to unacceptable levels of poor air. The air pollutants assessed are Nitrogen Dioxide (NO₂), Sulphur Dioxide (SO₂), Respirable Suspended Particulate (RSP) and Fine Suspended Particulate (FSP). Concentrations of these pollutants are predicted at air sensitive receivers (ASRs) within the Proposed Development through the use of quantitative computer modelling and are compared with the relevant Air Quality Objectives (AQOs).

2.1.2 The study also considers nearby odour sources within 500m radius of the Application Site and identified three potential odour sources, i.e. Yau Tong Sewage Pumping Station, Kwon Tong Wholesale Fish Market and Sam Ka Tsuen Typhoon Shelter. According to the several site visits conducted in November 2023, December 2023, there are no changes to the aforementioned odour sources as compared to those mentioned in the 126 Approval Scheme. Therefore, the odour emission information used in the 126 Approval Scheme is adopted in this assessment.

2.1.3 The assessment area of 500m radius from the Application Site is shown in Figure 2.1.

2.1.4 Appropriate mitigation measures will be recommended if exceedances of AQOs and/or odour units are identified.

2.1.5 The air quality control measures during the construction phase of Proposed Development are also addressed in this chapter.

2.2 Relevant Legislations, Standards and Guidelines

2.2.1 The following legislation and regulations provide the standards and guidelines for evaluation of air quality impacts and the type of works that are subject to air pollution control:

- Air Pollution Control Ordinance (APCO) (Cap. 311) and the Air Quality Objectives (AQO)
- Air Pollution Control (Construction Dust) Regulation
- Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation
- Air Pollution Control (Fuel Restriction) Regulation
- Recommended Pollution Control Clauses for Construction Contracts
- Control of Air Pollution in Car Parks (ProPECC PN 2/96)

Air Pollution Control Ordinance (CAP 311)

2.2.2 A set of Air Quality Objectives (AQOs) is established under the Air Pollution Control Ordinance (Cap. 311). The latest set of AQOs that came into effect on 1 January 2022 is presented in Table 2.1.

Table 2.1 Hong Kong Air Quality Objectives (AQOs)

Pollutants	Average Time	Standard ^[i] (µg/m ³)	No. of exceedances allowed
SO ₂	10-min	500	3
	24-Hour	50	3
RSP (PM ₁₀) ^[ii]	24-Hour	100	9
	Annual	50	NA
FSP (PM _{2.5}) ^[iii]	24-Hour	50	35
	Annual	25	NA
NO ₂	1-Hour	200	18
	Annual	40	NA
Ozone (O ₃)	8-Hour	160	9
Carbon Monoxide (CO)	1-Hour	30,000	0
	8-Hour	10,000	0
Lead (Pb)	Annual	0.5	NA

Notes:

[i] All measurements of the concentration of gaseous air pollutants, i.e. sulphur dioxide, nitrogen dioxide, ozone and carbon monoxide, are to be adjusted to a reference temperature of 293 Kelvin and a reference pressure of 101.325 kilopascal.

[ii] Respirable suspended particulates mean suspended particles in air with a nominal aerodynamic diameter of 10 µm or less.

[iii] Fine suspended particulates mean suspended particles in air with a nominal aerodynamic diameter of 2.5 µm or less.

- 2.2.3 In accordance with the EIAO-TM, odour predicted at all ASRs should meet 5 odour units (OUs) based on an averaging time of 5 seconds.

Air Pollution Control (Construction Dust) Regulation

- 2.2.4 Made under Section 43 of the APCO, this Regulation defines notifiable and regulatory works for achieving the purpose of dust control for a number of activities. The Regulation requires that any notifiable work shall give advance notice to EPD, and the Contractors shall ensure that the notifiable and regulatory works are carried out in accordance with the Schedule of the Regulation. Dust control and suppression measures are also provided in the Schedule.
- 2.2.5 The proposed construction works for the proposed Project are both regulatory and notifiable works due to activities including material stockpiling and dusty material handling as potential sources of fugitive dust emissions as detailed under Parts I to IV of the Schedule on Dust Control Requirements.

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

- 2.2.6 The Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation, which aims to control emissions from non-road mobile machinery (NRMMS) to improve air quality, became effective on 1 June 2015. NRMMS include non-road vehicles, as well as mobile machines and equipment (regulated machines) such as crawler cranes, excavators and air compressors.
- 2.2.7 Under the regulation, regulated machines have to comply with the Stage IIIA emission standards of the European Union (EU). It also requires all regulated machines sold or leased for use in Hong Kong to bear an approval or exemption label issued to them by the EPD, started from 1 September 2015. It restricts specified activities and locations including construction sites, designed waste disposal facilities and specified processes to use only NRMMS that bear an approval or exemption label issued to them by the EPD, with effect from 1 December 2015.

Air Pollution Control (Fuel Restriction) Regulation

- 2.2.8 The Air Pollution Control (Fuel Restriction) Regulation was enacted in 1990 to impose legal control on the type of fuels allowed for use and their sulphur contents in commercial and industrial processes to reduce sulphur dioxide (SO₂) emissions. In June 2008, the Regulation was amended to tighten the control requirements of liquid fuels. The Regulation does not apply to any fuel-using equipment that is used or operated in premises used solely as a dwelling or is used or operated in or on a vessel, motor vehicle, railway locomotive or aircraft.

Practice Note on Control of Air Pollution in Car Parks

- 2.2.9 This practice notes include air quality guidelines required for the protection of public health and factors that should be considered in the design and operation of car parks in order to achieve the required air quality. The limits for air pollutants as recommended by the practice notes are summarised in Table 2.2.

Table 2.2 Limits of Air Pollutant Concentrations Inside Car Parks

Air Pollutant	Average Time	Maximum Concentration (µg/m ³) ^[i]	Parts Per Million (ppm)
Carbon Monoxide (CO)	5 minutes	115,000	100
Nitrogen Dioxide (NO ₂)	5 minutes	1,800	1

Notes:

[i] All limits are expressed as at reference conditions of 298K and 101.325kPa.

2.3 Existing Air Quality in Kwun Tong District

- 2.3.1 The nearest air quality monitoring station (AQMS) to the Proposed Development is the Kwun Tong AQMS. The five most recent years of air quality monitoring data, 2019 to 2023, from this station are summarized in Table 2.3. According to the AQMS monitoring data presented in Table 2.3, exceedance in annual NO₂ concentrations is recorded.

Table 2.3 Air Quality Monitoring Data at Kwun Tong AQMS

Pollutant	Averaging Time	AQO	Pollutant Concentration (µg/m ³)				
			2019	2020	2021	2022	2023
Respirable Suspended Particulates (RSP)	10th Highest 24-hour	100 (9)	73	67	72	49	57
	Annual	50	38	32	31	24	26
Fine Suspended Particulates (FSP)	36th Highest 24-hour	50 (35)	34	27	28	26	25
	Annual	25	21	16	17	14	15
Nitrogen Dioxide (NO ₂)	19th Highest hour	200 (18)	184	153	164	145	147
	Annual	40	45	43	49	45	41
Sulphur Dioxide (SO ₂)	4th Highest 10-Min	500 (3)	41	24	24	19	29
	4th Highest 24-hour	50 (3)	11	8	7	11	10
Ozone (O ₃)	10th Highest 8-hour	160 (9)	150	126	136	148	136

Pollutant	Averaging Time	AQO	Pollutant Concentration ($\mu\text{g}/\text{m}^3$)				
			2019	2020	2021	2022	2023
Carbon Monoxide (CO)	1st Highest hour	30000 (0)	-	-	-	-	-
	1st Highest 8-hour	10000 (0)	-	-	-	-	-

(a) Bolded values exceed the relevant AQO.
(b) Data extracted from EPD's Smart Air Modelling Platform (SAMP v2.0).

- 2.3.2 Apart from the air quality monitoring data, a set of background levels from PATH v3.0 ("Pollutants in the Atmosphere and their Transport over Hong Kong") is also reviewed. As the tentative year of the completion of the Proposed Development is 2032, the hourly background concentrations of NO₂, RSP and FSP of the year of 2030 in Grid 46,30; 46,31; 47,30 and 47,31 have been adopted for the purpose of this assessment and summarized in Table 2.4. With respect to the future background air quality predicted by PATH v3.0 in Table 2.4, all values are below the relevant AQOs except O₃.

Table 2.4 Year 2030 Background Annual Average Concentrations of the Air Pollutants from PATH v3.0

Pollutant	Averaging Time	AQO	Data Summary	PATH v3.0 Grid in Year 2030			
				46,31	46,30	47,31	47,30
RSP	24-hour	100 (9)	10th	51	49	50	50
			Exceedance	0	0	0	0
	Annual	50	-	19	19	19	19
FSP	24-hour	50 (18,35)	19th	29	28	28	28
			36th	24	23	24	23
			Exceedance	0	0	0	0
	Annual	25	-	12	11	11	11
NO ₂	1-hour	200 (18)	19th	82	71	76	69
			Exceedance	0	0	0	0
	Annual	40	-	13	13	11	11
SO ₂	10-Min	500 (3)	4th	23	23	22	23
			Exceedance	0	0	0	0
	24-hour	50 (3)	4th	7	7	7	7
			Exceedance	0	0	0	0
O ₃	8-Hour	160 (9)	10th	171	171	172	172
			Exceedance	17	20	21	21
CO	1-Hour	30000 (0)	1st	520	516	512	510
			Exceedance	0	0	0	0
	8-Hour	10000 (0)	1st	486	484	480	482
			Exceedance	0	0	0	0

(a) Numbers in brackets is the number of exceedances allowed per year
(b) Bolded values exceed the relevant AQO
(c) Data extracted from EPD's Smart Air Modelling Platform (SAMP v2.0)

2.4 Identification of Representative Air Sensitive Receivers (ASRs) during Construction Phase

2.4.1 There are a number of industrial buildings, residential buildings, churches, community centres, sports centres and playgrounds located within 500m of the Proposed Development. Location of representative ASRs during construction phase are shown in Figure 2.2. Their details are listed below:

Table 2.5 Details of Representative Air Sensitive Receivers during Construction Phase

Representative ASR ID	Description	Land Use	Assessment Height (m)	Horizontal Distance from the Application Site (m)
A01	Planned Transitional Housing	Residential	1.5 - 33.0	18
A02	Peninsula East	Residential	1.5 - 150	34
A03	Kwun Tong Wholesale Fish Market	G/IC	1.5 - 18.0	138
A04	Planned Residential Development (Application No. A/K15/122)	Residential	1.5 - 100	37
A05	Planned Comprehensive Residential Development (Application No. A/K15/126)	Residential	1.5 - 100	203
A06	Planned Residential Development (Application No. A/K15/121)	Residential	1.5 - 75.5	222
A07	Montego Bay	Residential	1.5 - 100	351
A08	Yau Tong Industrial City Block B	Industrial	1.5 - 54.0	121
A09	Wah Lee Industrial Building	Industrial	1.5 - 53.0	177
A10	Maya by Nouvelle	Residential	1.5 - 112	224
A11	Planned Residential Development (Application No. A/K15/129)	Residential	1.5 - 120.0	160
A12	Mai Tong Industrial Building	Industrial	1.5 - 33.0	268
A13	The Spectacle	Residential	1.5 - 150	305
A14	Canaryside at Shung Shun Street	Residential	1.5 - 120	402
A15	Ocean One at Shung Shun Street	Residential	1.5 - 120	424
A16	Ko Fai Industrial Building	Industrial	1.5 - 50.0	323
A17	Sam Ka Tsuen Recreation Ground	G/IC	1.5	308
A18	Yau Tong Centre Tower 7 at Ka Wing Street	Residential	1.5 - 18.0	443

2.5 Impact arising from Proposed Development - Construction Phase

Identification of Sources

2.5.1 Major source of potential air quality impact during construction phase would be fugitive dust generated from wind erosion of the stockpiles and open sites, as well as from the following construction activities:

- Excavation resulting in exposed ground vulnerable to air erosion;
- Earth moving, loading and unloading of excavated material;
- Wind effect on material stockpiling; and
- Vehicle movements on haul roads and over the construction site.

2.5.2 There will be potential impacts from the criteria pollutants (e.g. nitrogen oxides (NO_x), sulphur dioxide (SO₂), and carbon monoxide (CO)). Emission from diesel trucks for the haulage of materials and construction plants will contain high percentage of smoke particulate and unburned hydrocarbons in comparison with petrol driven vehicles. In all circumstances, the contractor will be required to observe all relevant regulations and maintain all equipment in good condition to avoid any excessive emission. Under the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation, only approved or exempted non-road mobile machineries (NRMMS) (including mobile generator, air compressor, excavator, crawler crane, bulldozer and etc.) with a proper label are allowed to be used in the construction site. Exempted NRMMS shall be avoided as far as practicable to minimize the fugitive dust and gaseous emissions. In addition, availability of electricity supply during construction of the project will be explored and such requirement will be specified in future contract. If available, contractor should maximise use of electric non-road mobile machinery (NRMMS) and with least reliance of diesel fuelled equipment (e.g. for electricity powered stationary equipment such as pump instead of using generator).

2.5.3 The Proposed Development includes excavation of basement for car parking facilities, erection of residential towers and ancillary facilities. The tentative excavation area is around 1,800m² with a depth of about 12m. The site topography is generally flat so that no extensive site formation work is required. Excavation, pilling, and superstructure works are typical of many residential developments in Hong Kong. The effective mitigation measures for the construction activities (mentioned below) will be considered and implemented to minimize the air quality impacts arising from the Proposed Development during the construction periods.

Mitigation Measures for Dust Emission

2.5.4 Fugitive dust emission arising from the construction can be effectively suppressed by incorporating proper mitigation measures into work procedures through contractual clauses (e.g. regular and sufficient watering, enclosure of potential dust sources, etc.), good site management, and close enforcement of the resident engineers. The contractor(s) shall be required to follow the requirements of the Air Pollution Control (Construction Dust) Regulation which requires notification before carrying out construction works and to adopt dust reduction measures while carrying out construction activities. A monitoring programme can be instigated to monitor the construction process in order to enforce dust controls and modify methods of works to reduce the dust emission down to acceptable levels.

2.5.5 To mitigate fugitive dust impacts, all dust control measures recommended in the Air Pollution Control (Construction Dust) Regulation, where applicable, shall be implemented. Relevant dust control measures include:

- The works area for site clearance shall be sprayed with water before, during and after the operation so as to maintain the entire surface wet;
- Restricting heights from which materials are to be dropped, as far as practicable to minimize the fugitive dust arising from unloading/ loading;
- Immediately before leaving a construction site, all vehicles shall be washed to remove any dusty materials from the bodies and wheels. However, all spraying of materials and surfaces should avoid excessive water usage;
- When a vehicle leaving a construction site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials will not leak from the vehicle;
- Erection of hoarding of not less than 2.4 m high from ground level along the site boundary, where appropriate;
- Any stockpile of dusty materials shall be covered entirely by impervious sheeting; and/or placed in an area sheltered on the top and four sides;
- All dusty materials shall be sprayed with water immediately prior to any loading, unloading or transfer operation to maintain the dusty materials wet; and
- To reduce the traffic induced dust dispersion and re-suspension, the travelling speed of vehicles within the site should be controlled.

2.5.6 In addition, emission control during the construction phase shall be carried out in accordance with the requirements of the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation. The emissions of non-road mobile machinery (NRMMS) include mobile machines and vehicles powered by internal combustion engines used primarily off-road. All NRMMS operating on-site which are subject to the emissions control of the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation shall be approved/exempted (as the case may be) and affixed with the requisite approval/exemption labels.

2.5.7 The recommended dust mitigation measures for protection of nearby ASRs are described below:

Good Site Management

2.5.8 Good site management is important in reducing potential air quality impacts to an acceptable level. As a general guide, the contractor(s) shall maintain a high standard of housekeeping to prevent fugitive dust emissions. Loading, unloading, handling and storage of fuel, demolished debris and wastes or by-products should be carried out in a manner so as to minimise the release of visible dust emission.

2.5.9 Appropriate working methods should be devised and arranged to minimise dust emissions and to ensure any installed control system and/or measures are operated and/or implemented in accordance with their design merits. No free falling of debris should be allowed. Debris should be lowered by a hoist to the ground, preferably with an enclosed tunnel.

2.5.10 A high standard of housekeeping shall be maintained. Any piles of materials accumulated on or around the work areas shall be cleaned up regularly. Cleaning, repair and maintenance of all plant facilities within the work areas shall be carried out in a manner that does not generate fugitive dust emissions. Prior to cleaning, the materials should be handled properly to prevent fugitive dust emission.

2.5.11 Frequent mist spraying should be applied on dusty areas. The frequency of spraying will depend upon local conditions such as rainfall, temperature, wind speed and

humidity. The amount of mist spraying should be just enough to dampen the materials without over-watering, which could result in surface water runoff.

Dust Emissions from Site Traffic

- 2.5.12 Dust emission from construction traffic is generated predominantly from the travelling of waste removal lorries. Areas within the Application Site where there are regular vehicle movements should have a hard surface. Speed controls at an upper limit of 10km/hr should be imposed and their movements should be confined to designated roadways within the Application Site. All dusty vehicle loads should have side and tail boards covered by tarpaulin extending at least 300mm over the edges. Wheel-wash troughs and hoses should be provided at exit points of the Application Site.
- 2.5.13 "Recommended Pollution Control Clauses for Construction Contracts" is available on the EPD website which set out the recommended air pollution control measures to be implemented by the contractor(s) during the construction stage of the Project.
- 2.5.14 With the adoption of good practices, it is expected that emission of construction fugitive dust can be kept to an acceptable level.
- 2.6 Identification of Air Sensitive Receivers (ASRs) during Operational Phase
- 2.6.1 Representative ASRs within the Proposed Development are selected to assess the air quality at the Proposed Development and determine the appropriate fresh air intake locations for the podium of the Proposed Development.
- 2.6.2 Assessment heights of each ASR are scattered from the local ground floor to the higher floors of the residential towers.
- 2.6.3 The locations of the representative ASRs during operational phase are shown in Figure 2.3 and summarized in Table 2.6. All the fresh air intake and openable window of facilities have been included as ASRs.

Table 2.6 Details of Representative Air Sensitive Receivers during Operational Phase

ASR ID	Local Ground mPD	Flagpole Height, mAG	Assessment Height, mPD
D01 to D14	4.4	1.5 – 92.85	5.9 – 97.25

2.7 Identification of Pollution Sources During Operational Phase

General

- 2.7.1 In line with EPD's "Guidelines on Assessing the 'TOTAL' Air Quality Impacts", all three tiers of emissions that will contribute to the total air quality impacts on ASRs within the assessment area have been identified, including:
- (1) Primary Contribution: Project induced
 - (2) Secondary Contributions: Pollutant-emitting activities in the immediate neighbourhood
 - (3) Background Contributions: Pollution not accounted for by (1) and (2)
- 2.7.2 Primary and secondary contributions are near-field source impacts due to sources within the assessment area such as vehicular emission from existing road network and proposed roads (if any), industrial emissions and marine emissions, etc. Background contributions are far-field source impacts outside the assessment area and are predicted using the PATH v3.0. The cumulative air quality impact assessment for

operation phase is a combination of all three tiers of contributions and thus has considered the near-field and far-field sources.

- 2.7.3 Several site visits were conducted in November 2023, December 2023, February 2024 and September 2024 to verify the presence of chimneys and other industrial activities. Upon the visits, no active chimney was identified within 500m assessment area from the site boundary of the Site. Besides, there will not be any proposed air emission sources within the Site anticipated.
- 2.7.4 As referred to 2nd paragraph of Section 2.3 of EPD's "Guidelines on Assessing the 'TOTAL' Air Quality Impacts", for Tier 3 – Background Contributions, a major point source located within 4km from a receptor should be evaluated to see if it can cause direct impact. According to the list of major point sources provided in the guideline, two major point sources, i.e. Kai Tak Cruise Terminal and Cape Collinson Crematorium, have been identified within the 4km radius area of the Application Site. The details of identified major point sources would be discussed in Section 2.7.29 to 2.7.32.
- 2.7.5 As mentioned above, emissions from open roads and industrial sources (i.e. secondary contributions), and major sources (i.e. background contributions), have been considered and assessed. Table 2.7 shows a summary of the sources and the associated air pollutants of concern.

Table 2.7 Summary of Emission Sources

Sources	SO ₂	NO _x	RSP	FSP
(i) Industrial Emissions	X	X	✓	✓
(ii) Marine Vessels Emissions	✓	✓	✓	✓
(iii) Other Major Emission Sources within 4km	✓	✓	✓	✓
(iv) Vehicular Emissions				
a. Bus Terminus	-	-	-	-
b. Open Roads	X	✓	✓	✓

- 2.7.6 A summary of model input in AERMOD for sources is given in Appendix 2.8.
- (i) Industrial Emissions
- Emissions from Concrete Batching Plant
- 2.7.7 In general, the process of concrete batching plant involves mixing of aggregate, cement and other cementitious materials without combustion. Therefore, the major emission from concrete batching plants is dust emission, i.e. RSP and FSP.
- 2.7.8 As shown in Figure 2.4, three concrete batching plants are recorded within 500m radius of the Application Site, including Redland Concrete Limited, China Concrete Co. Limited and Hong Kong Concrete Co. Limited. The emissions from these concrete batching plants have been included in this assessment.
- 2.7.9 Although the Specified Process (SP) Licenses of China Concrete Co. Limited and Hong Kong Concrete Co. Limited has been expired during 2018 to 2020 (see Appendix 2.1) and their zoning is for residential use, the emissions coming from these concrete batching plants will be considered in the assessment as a hypothetical conservative scenario.
- 2.7.10 According to Annex I of A Guidance Note on the Technical, Management and Monitoring Requirements for Specified Process – Cement Works (Concrete Batching Plant) BPM 3/2 (16) issued in February 2016, the concentration limit of particulate matter should be limited to 10mg/m³ for license renewal by 1 January 2018. Therefore, any one of

the three concrete batching plants after 2032 (the commission year of the Proposed Development) has to comply with the relevant requirements.

- 2.7.11 Site visits conducted in November 2023, December 2023, February 2024 and September 2024 requested the emission information from all the plant's operators available. However, due to the confidentiality, nil or rejection replies were received from the companies and site staffs. Based on the latest available information, the emission information of China Concrete Co. Limited and Hong Kong Concrete Co. Limited and Redland Concrete Limited are referenced from the SP license (see Appendix 2.1).
- 2.7.12 Haul road emissions were modelled as area sources and the extent of which were based on the operations observed during the several site surveys for the three concrete batching plants.
- 2.7.13 Sand at the concrete batching plants will be refilled by barges, given that the refilling activities and sand storage area of the barge were enclosed, wind erosion from these activities are not anticipated.
- 2.7.14 Detailed calculations of concrete batching plant emissions are shown in Appendix 2.2. Emissions from Sand Depot at Yau Tong Bay
- 2.7.15 A sand depot at Yau Tong Bay is identified within the 500m assessment area. The location of the sand depot is presented in Figure 2.4. Detailed calculations of sand depot are presented in Appendix 2.3.

(ii) Marine Vessels Emissions

- 2.7.16 Desktop review and a number of site visits were conducted in November 2023, December 2023, February 2024 and September 2024 to identify the emissions from marine vessels within the 500m radius assessment area. The details of model input of marine vessels emissions are shown in Appendix 2.1. The identified sources are as follows:
- Ferry service between Sam Ka Tsuen and Sai Wan Ho provided by Coral Sea Ferry Service;
 - Ferry service between Sam Ka Tsuen and Tung Lung Island provided by Coral Sea Ferry Service;
 - Barge serving China Concrete Co. Limited and Hong Kong Concrete Co. Limited and Redland Concrete Limited;
 - Speedboats and sampans at Sam Ka Tsuen Typhoon Shelter;
 - Fishing Vessels at the Kwun Tong Wholesale Fish Market; and
 - Planned local vessels at Lei Yue Mun Waterfront
- 2.7.17 With reference to "Study on Marine Vessels Emission Inventory – Final Report" by HKUST in February 2012, the total emissions from vessels can be calculated using the following equations:

$$\text{Total Emission}_{(\text{pollutant})} = \sum \text{Emission}_{(\text{pollutant, activity mode, equipment})}$$

$$\text{Emission}_{(\text{pollutant, activity mode, equipment})} = P \times FL \times T \times EF$$

where P is the installed power of equipment;

FL is fractional load of equipment in a specific mode;

T is operation time-in-mode; and

EF is fractional load emission factor of equipment.

- 2.7.18 Emissions from ferries and barges during sailing have been modelled as evenly distributed point sources representing the segment they travel to and from the berths within the 500m assessment area. The individual routes are shown in Figure 2.5.

Ferry services between Sam Ka Tsuen and Sai Wan Ho/ Tung Lung Island provided by Coral Sea Ferry Service

- 2.7.19 No information of the engine powers, engine load factors and time-in-mode can be obtained from operators. The information of passenger ferries including release height, exit temperature, exit velocity and internal diameter of its chimney extracted from Appendix 3.5 of approved EIA for Lei Yue Mun Waterfront Enhancement Project (EIA-258/2018) are therefore adopted.
- 2.7.20 According to the current ferry schedule on the operator's website¹, the visiting frequencies of different modes at each hour are studied and presented in Appendix 2.5.

Barges for Concrete batching Plants

- 2.7.21 Based on the site visits, both main engine and auxiliary engine of the barges will be switched off during the berth. The auxiliary engine will operate intermittently during sand refilling of silos only. As a conservative approach, it is assumed that the auxiliary engine of the barge will be in operation during sand refilling process for the entire working hours. In additions, only one barge can berth at one loading/ unloading point at any one time based on observation, therefore, the maximum number of barges in operation at any time would be three. Since the barge will berth at the CBPs for several days, it is assumed that there would be one arrival/ departure per hour of barge at each loading/ unloading point during operation hours for the worst-case scenario.
- 2.7.22 According to the site visits, raw materials stored on the barges are not fully enclosed on some occasions, wind erosion of raw materials may impose negative impact on the Proposed Development. To be conservative, wind erosion of raw materials from barges at the three concrete batching plants are included as shown in Figure 2.4 and it is assumed that the barges stay at the berths for the whole day.
- 2.7.23 Detailed calculations of barge emissions and its wind erosion are shown in Appendix 2.2.

Fishing Vessels at Kwun Tong Wholesale Fish Market

- 2.7.24 Information for the fishing vessels at Kwun Tong Wholesale Fish Market was not provided by the operator, referenced is therefore made to the approved S16 application for Proposed Residential Development in "Comprehensive Development Area (4)" Zone and "Road" at No. 18 Tung Yuen Street, Cha Kwo Ling Yau Tong, Kowloon (A/K15/121). As stated in A/K15/121, the activities at Kwun Tong Whole Sale Fish Market include delivery and collection of fish by fishing vessels during the morning (i.e. 05:00 to 12:00) and night (i.e. 00:00 to 02:00) periods. The maximum number of fishing vessels berthing can be up to 16 at 07:00 to 12:00 as advised by AFCD. For assessment purposes, it is assumed that there would be 16 fishing vessels and 2 night-time fishing vessels (i.e. 2 vessels for night-berthing as there would be 2 arriving / departing according to AFCD) berthing at the market during the morning and night periods, respectively. The auxiliary engines of fishing vessels will be in continuous operation for the entire period for conservative approach.
- 2.7.25 Detailed calculations of fishing vessels emissions and the visiting frequency (extracted from A/K15/121) are shown in Appendix 2.5.

¹ <https://www.coralseaferryservice.com.hk/timetable>

Planned Local Vessel/ Ferry/ Tour Vessel/Government Vessel at Sam Ka Tsuen Landing Steps and Lei Yue Mun New Landing Steps

- 2.7.26 There will be additional marine traffic at Sam Ka Tsuen Landing Steps and Lei Yue Mun New Landing Steps, and tentatively scheduled for completion in the fourth quarter of 2024². The emissions from the additional marine traffic at Sam Ka Tsuen Landing Steps and Lei Yue Mun New Landing Steps are included in this assessment.
- 2.7.27 Due to lack of information, the emission parameters for the planning local vessels are referenced to the approved planning application A/K15/121 and presented in Appendix 2.6.

Speedboats and sampans at Sam Ka Tsuen Typhoon Shelter

- 2.7.28 Several site visits were conducted in November 2023, December 2023, February 2024 and September 2024 to observe the speedboats and sampans activities at Sam Ka Tsuen Typhoon Shelter. Less than 5 speedboats and sampans were sailing within the shelter in every hour based on observation. In addition, the operators turned off the engine after berthing. The impact is considered insignificant and therefore would not be included in the assessment.

(iii) Other Major Point Sources within 4km

- 2.7.29 As referred to EPD's "Guidelines on Assessing the 'TOTAL' Air Quality Impacts", for Tier 3 – Background Contributions, a major point source located within 4km from a receptor should be evaluated to see if it can cause direct impact.

Kai Tak Cruise Terminal

- 2.7.30 According to the list of major point sources provided in the guideline, the cruise emission in hotelling mode at Kai Tak Cruise Terminal was identified as a major point source about 2.4km from the site boundary of the Application Site. According to the latest cruise schedule from 2024 to 2027, the highest number of scheduled cruise liners visiting Hong Kong will be in the Year 2024 and, hence, the cruise liner type in 2024 has been reviewed. As presented in Appendix 2.7, Costa Serena has the highest engine power among all cruise ships in Year 2024. Given there are two berthing spaces at the Cruise Terminal, another cruise ships with the second-highest engine power have been identified, including Spectrum of the Seas, Quantum of the Seas, Queen Mary 2 and Celebrity Solstice which have the same engine power. However, in view of the frequency of visit to Hong Kong of these four cruises, Spectrum of the Seas has therefore been selected as the second cruise ship for hotelling at Kai Tak Cruise Terminal at the same time for every hour of a day as "Costa Serena" for a conservative approach.
- 2.7.31 The details of model inputs and the detailed information of the emission rates of these cruise vessels are shown in Appendix 2.7.

Cape Collinson Crematorium

- 2.7.32 Cape Collinson Crematorium has been identified as a major point source located about 3.9km from the site boundary of the Application Site. However, the emission from Cape Collinson Crematorium would not have a direct impact to the representative ASRs of the Application Site due to screening by natural terrain. The potential impact from the emission of Cape Collinson Crematorium is considered sufficiently represented by the PATH v3.0 model (i.e. Tier 3 contribution) and thus not separately modelled by local dispersion model.

² LC Paper No. CB(4)390/19-20(03) (<https://www.legco.gov.hk/yr19-20/english/panels/e/dev/papers/e/devcb4-390-3-e.pdf>)

(iv) Vehicular Emission

a. Bus Terminus

2.7.33 Two bus terminuses, namely Yau Tong (Shung Tak Wai) Bus Terminus and Yau Tong Bus Terminus, are found to be located within the 500m air assessment area. Since the Yau Tong Bus Terminus is far away from the Application Site (over 470m), it is considered that the start emission generated by this bus terminus is insignificant to the Proposed Development. An on-street bus terminus "Yau Tong (Shung Tak Wai) Bus Terminus" is located at northeast of the Application Site which is being served for one bus route only. In view of this terminus scale is relatively small, the start emission generated by the bus terminus is minimal. Nevertheless, start emission of all 18 vehicle classes (including FBSD and FBDD) have been assigned to all roads identified with cold start as broad-brush approach to prevent any underestimation of emission from the bus terminus.

b. Open Roads Emissions

2.7.34 Air pollutant concentration at the Application Site due to the emission from the nearby road networks (vehicular tailpipe emissions) was assessed. The emission rate of each road within 500m from the Application Site is calculated from with latest EMFAC-HK issued by EPD. Based on the emission rate of each road, the air pollutant concentration at the Application Site was modelled with AERMOD.

2.8 Dispersion Modelling and Modelling Approach for Emission Sources

Computer Modelling

- 2.8.1 The dispersion of NO_x, RSP, FSP and SO₂ were modelled using AERMOD software released by Lakes Environmental Software. The model is based on the principle of Gaussian dispersion and is widely accepted by EPD and is used in this assessment to predict both concentration and deposition of pollutants from line, point and area sources. As discussed in Section 2.7.2, PATH v3.0 was adopted to provide the background pollutant concentrations in assessing the total air quality impact on the representative ASRs. In addition, met data including temperature and relative humidity extracted from the SAMP v2.0 were also adopted for modelling.
- 2.8.2 The Application Site and its 500m assessment area fall within the PATH grids (46,30), (46,31), (47,30) and (47,31). The predicted meteorological data for the relevant PATH grids from PATH v3.0 obtained from EPD's website were used for model input. The WRF meteorological data, including wind data, temperature, relative humidity, pressure, cloud cover, mixing height and Pasquill stability classes, for Year 2019 extracted from the PATH v3.0 released by EPD in January 2024 at the relevant grids have been adopted as on-site data into AERMET.
- 2.8.3 Land use types surrounding the Proposed Development, the albedo, Bowen ratio for the 10km x 10 km area, surface roughness for the 1km area, and the Surface File and Profile File to be used as input in AERMOD are downloaded and extracted from the AERMET tool in the SAMP v2.0. The relevant information is provided in Appendix 2.9.
- 2.8.4 Model input parameters and assumptions for the operation phase are summarised in Table 2.8.

Table 2.8 Model Input Parameters and Assumptions for Operation Phase

Input Parameters & Assumptions	Descriptions
Type of Sources	<ul style="list-style-type: none"> Emissions from concrete batching plants: Point and Area sources

Input Parameters & Assumptions	Descriptions
	<ul style="list-style-type: none"> • Emissions from marine vessels and major point source: Point sources • Vehicular Emissions: Line sources
Assessment Parameters	<ul style="list-style-type: none"> • Hourly and annual NO_x/ NO/ NO₂ • Daily and annual RSP • Daily and annual FSP • 10-min and daily SO₂
Meteorological data	<ul style="list-style-type: none"> • Year 2019 WRF data from PATH v3.0 • PATH grids: (46,30) • Mixing height values recorded by HKO in 2019 were in the range of 119m to 2009m. Mixing heights from WRF data which are lower than 119 or higher than 2009 were adjusted to 119m and 2009m, respectively • Wind speed <0.5m/s adjusted to 0.5m/s • Anemometer height of WRF data: 8.5m

EMFAC-HK (embedded in SAMP v2)

- 2.8.5 2032 is chosen as the Model Year for EMFAC-HK year in the SAMP v2.0 to represent the worst-case scenario emission.
- 2.8.6 In accordance with a Guideline of Use of Temperature and Relative Humidity Data for Vehicular Emission Factor Prediction published by EPD in March 2021, the monthly minimum temperature and relative humidity (RH) (i.e. ranging from 11°C – 26°C and 25% to 61%) were applied for both short-term (i.e. hourly) and long-term (i.e. annual average) air quality impact of NO₂ while annual minimum temperature and RH (i.e. 11°C and 25%) were applied for both short-term (i.e. daily average) and long-term (i.e. annual average) air quality impact of RSP and FSP.. Summary of met data is shown in Appendix 2.10.

Traffic Data

- 2.8.7 Project specific hourly traffic data for 2047 having the maximum traffic data of the concerned roadway network within 15 years from the assumed completion year of the developments was adopted in combination with emission factors based on the EMFAC-HK Model (with calendar year set as 2032) to estimate the highest vehicular emission rate for each roadway. The traffic data predicted by the project traffic consultant includes hourly traffic flows with a composition of 18 vehicle classes according to "Guideline on Modelling Vehicle Emissions". Traffic forecast, based on the traffic count including vehicles from all concrete batching plants within the vicinity, is included in Appendix 2.11, which shows the hourly Vehicle Kilometer Travelled (VKT), the number of trips travelled, and the hourly averaged speed of road carriageways respectively, with 24-hour speed limits of 50 kilometers per hour (kph).
- 2.8.8 The estimated 18-class distribution as defined in EMFAC-HK was derived by sectoring the relevant classes in the Transport Department's Annual Traffic Census record or vehicle distribution obtained from manual traffic count surveys, in proportion to the recorded distribution in EPD document: "2018 Licensed Vehicle by Age and Technology Group Fractions".
- 2.8.9 The roadway network within the 500m study area consists of 73 distinct roadway links.

- 2.8.10 The established road traffic data, including traffic flow, 24-hour vehicle mix and speed limits (with the latter assumed to be the same under the same road groups) will be confirmed by the Project Traffic Consultant. Relevant correspondence of the endorsement and the confirmation letter from traffic consultant on the validity of the traffic data will be provided when it is available.

Calculation of Vehicular Emissions

- 2.8.11 The road segments within 500m assessment area and their corresponding predicted traffic flow were imported into SAMP v2.0. Setting of the road width and centerline XY for all roads within 500m assessment area are followed the "Modelling Open Road Emissions using AERMOD" published by EPD. Zero emission vehicle scenario was adopted in the assessment. The total composite emission rate calculated by SAMP contains the running emissions and start emissions by broad-brush approach. For calculations of start emissions by the broad-brush approach, start emissions for each vehicle class are assumed directly proportional to Trips per Vehicle-kilometer-travelled ratio (Trip/VKT) with consideration of the proportion of local and rural roads within Hong Kong based on the Annual Traffic Census (ATC) prepared by the TD. For SAMP v2.0, default trip and VKT values from EMFAC-HK model v4.3 are used in the calculations and the proportion of local and rural roads within Hong Kong of 14.34% is assumed based on ATC 2022.

Noise Barrier

- 2.8.12 No vertical or cantilevered noise barriers are found within 500m from the Site.

Road Elevation

- 2.8.13 The base elevation is the elevation of the ground surface underneath the road link in meter above Principal Datum (mPD). The height of the road surface above ground (in mAG) should be added to the release height.

2.9 Post-processing of Modelling Results and Background Pollutant Contribution

- 2.9.1 Pollutant dispersion from vehicular, industrial and marine emissions have been simulated using the AERMOD model. Dispersion results and background pollutant contributions have been combined and post-processed for the different averaging periods required for comparison with the relevant AQOs.

Ozone Limiting Method for Short-term Cumulative NO₂ Assessment

- 2.9.2 The conversion of NO_x to NO₂ is a result of a series of complex photochemical reactions and determines the prediction of near field impact of NO_x emissions. To determine vehicular emission impacts, the emission factors of NO₂ are extracted from the results of the EMFAC-HK Model version 4.3 and the emission factors of NO are calculated from the emission factors of NO_x and NO₂ for all motor vehicle types. For the industrial emissions, initial NO₂ to NO_x ratio for chimneys is assumed as 10% with reference to the Heathrow Airport EIA report.
- 2.9.3 For NO_x in particularly, an algorithm has been built-in to convert a portion of NO_x predicted at ASRs into NO₂ using the Ozone Limiting Method (OLM) when they mix with the ambient O₃. The OLM assumes a conversion process that is stoichiometrically limited by the ambient O₃ levels, and hence the latter can be used to predict the maximum convertible NO₂ from NO_x for superimposing onto the initial "out-of-tailpipe / in-stack" NO₂ levels as the base level. OLM has been applied for the sum of the vehicular, industrial and marine sources to compare with the available ozone for conversion to NO₂.

$$[NO_2]_{Predicted} = [NO_2]_{initial} + \text{Min}([NO]_{Predicted} \text{ or } \frac{46}{48}[O_3]_{PATH})$$

where

- $[NO_2]_{Predicted}$ is the predicted NO₂ Concentration;
- $[NO_2]_{initial}$ is the initial NO₂ Concentration;
- Min* means the minimum of the two values within the bracket;
- $[O_3]_{PATH}$ is the representative O₃ PATH Concentration (from other contribution);
- $\frac{46}{48}$ is the molecular weight of NO₂ divided by the molecular weight of O₃.

Jenkin Method for Long-term Cumulative NO₂ Assessment

- 2.9.4 For the long-term cumulative NO₂ assessment (i.e. predictions of annual average NO₂ concentration), Jenkin Method was adopted for the conversion of cumulative annual average NO_x to cumulative annual average NO₂. The details of Jenkin Method for this assessment extracted from the SAMP v2.0 are shown in Appendix 2.12.

Background Pollutant Contribution

- 2.9.5 The latest Pollutants in the Atmosphere and their Transport over Hong Kong model (PATH v3.0) released by EPD is used to estimate the background air quality. Since Year 2032 has been selected as the assessment year, PATH v3.0 for Year 2030 of Grid 46,30 has been adopted as the background concentration.

2.10 Assessment Results

- 2.10.1 The predicted air quality concentrations from surrounding vehicular, industrial and marine emissions have been quantitatively assessed separately for SO₂, NO₂, RSP and FSP. The predicted results of SO₂, NO₂, RSP and FSP at all predetermined ASRs are summarized in Appendix 2.13. The range of the assessment results of all the pollutants are summarized below.

Table 2.9 Range of Assessment Results of All Pollutants

ASR ID	NO ₂		RSP		FSP		SO ₂	
	19th Highest Hourly (AQO=200)	Annual Average (AQO=40)	10th Highest Daily (AQO=100)	Annual Average (AQO=50)	36th Highest Daily (AQO=50)	Annual Average (AQO=25)	4th Highest 10-min (AQO=500)	4th Highest Daily (AQO=50)
D01	82.5-104.3	13.8-25.7	49.4-51.0	18.7-20.4	23.4-24.0	11.1-11.8	22.6-22.7	6.8
D02	82.5-104.1	13.8-25.7	49.4-51.2	18.7-20.7	23.4-24.1	11.1-11.8	22.6-22.7	6.8

ASR ID	NO ₂		RSP		FSP		SO ₂	
	19th Highest Hourly (AQO=200)	Annual Average (AQO=40)	10th Highest Daily (AQO=100)	Annual Average (AQO=50)	36th Highest Daily (AQO=50)	Annual Average (AQO=25)	4th Highest 10-min (AQO=500)	4th Highest Daily (AQO=50)
D03	82.5-104.8	13.8-25.9	49.4-51.3	18.7-21.2	23.4-24.1	11.1-11.9	22.6-22.7	6.8
D04	82.7-105.0	13.8-25.6	49.4-51.8	18.7-22.5	23.4-24.1	11.1-12.3	22.6-22.7	6.8
D05	85.3-88.9	13.8-19.9	49.4-60.9	18.7-26.8	23.4-24.4	11.1-13.6	22.6-22.7	6.8
D06	85.7-90.2	13.8-18.3	49.4-90.9	18.7-42.1	23.4-33.4	11.1-18.1	22.6-22.8	6.8
D07	87.3-96.2	13.9-18.6	49.5-67.7	18.7-28.8	23.4-27.6	11.1-14.2	22.6-22.8	6.8-6.9
D08	86.9-135.3	13.9-21.3	49.5-58.6	18.7-25.5	23.4-25.4	11.1-13.2	22.6-22.9	6.8-6.9
D09	85.7-102.4	13.9-18.4	49.5-56.7	18.7-23.9	23.4-25.2	11.1-12.8	22.6-22.8	6.8-6.9
D10	85.7-92.6	13.8-17.2	49.5-54.1	18.7-22.7	23.4-24.6	11.1-12.4	22.6-22.7	6.8
D11	83.2-91.4	13.8-17.3	49.5-52.2	18.7-21.6	23.4-24.0	11.1-12.1	22.6-22.7	6.8
D12	85.1-90.9	13.8-17.9	49.4-51.5	18.7-21.4	23.4-24.0	11.1-12.0	22.6-22.7	6.8
D13	85.1-89.2	13.8-18.8	49.4-51.5	18.7-20.9	23.4-23.9	11.1-11.8	22.6-22.7	6.8
D14	83.2-88.9	13.8-20.6	49.4-51.2	18.7-20.6	23.4-23.8	11.1-11.7	22.6-22.7	6.8

SO₂

2.10.2 The predicted results of the 4th highest 10-minute average and daily average SO₂ concentration at ASR levels are summarized in Appendix 2.13. The results indicate that SO₂ concentrations at the Proposed Development comply with the relevant AQOs.

NO₂

2.10.3 The predicted results of the 19th highest 1-hour average and annual average NO₂ concentration at all selected ASR levels are summarized in Appendix 2.13. The results indicate that NO₂ concentrations at all locations of the Proposed Development comply

with the relevant AQOs, except those of 19th highest 1-hour average at G/F lobby (1.5m above ground) at the south portion of the proposed Development.

RSP

- 2.10.4 The predicted results of the 10th highest 24-hours and annual average RSP concentrations at all ASR levels are summarized in Appendix 2.13. The results indicate that RSP concentrations at all locations of the Proposed Development comply with the relevant AQOs.

FSP

- 2.10.5 The predicted results of the 36th highest 24-hours and annual average FSP concentration for all selected ASRs at all levels are summarized in Appendix 2.13. The results indicate that FSP concentration at all locations of the Proposed Development comply with the relevant AQOs.

2.11 Odour Impact Assessment

Introduction

- 2.11.1 Based on the several site visits carried in November 2023, December 2023, February 2024 and September 2024, the odour source of the area is same as that assessed in the approved planning application of the 126 Approval Scheme, i.e. three identified odour sources are Yau Tong Sewage Pumping Station, Kwun Tong Wholesale Fish Market and Sam Ka Tsuen Typhoon Shelter as shown in Figure 2.7. Also, there is no change in their operation. Therefore, the odour impact assessment used in the previous assessment for A/K15/126 is adopted in this assessment.

Identified Odour Sources

a. Yau Tong Sewage Pumping Station

- 2.11.2 Yau Tong Sewage Pumping Station (YTPS) is located at the junction of Ko Fai Road and Tung Yuen Street which is next to the Application Site. The pumping station has three sewage pumps that operate in a 2 duty and 1 standby mode with each pump having a design capacity of 0.55 m³/s. Therefore, the ultimate design capacity for YTPS is 1.1 m³/s according to the approved EIA Study for Yau Tong Bay Development – Engineering Feasibility Study for the Comprehensive Development at Yau Tong Bay (AEIAR-054/2002).

- 2.11.3 Several site visits were conducted to identify any noticeable odour at the site boundary of the sewage pumping station. No identifiable odour was detected at the site boundary of the sewage pumping station and the junction of Shung Tai Wai and Tung Yuen Street. With the consideration of the above findings, odour impact from sewage pumping station is not anticipated.

b. Kwun Tong Wholesale Fish Market

- 2.11.4 Kwun Tong Wholesale Fish Market, which is located at the junction of Shung Wo Path and Tung Yuen Street, is at about 100m from the Application Site. The peak operating hour of the market would be from 7:00am to 12:00 noon. The market activities include the delivery by fishing vessels and immediate collection, after transaction, by lorry of boxed fresh marine fish. The live fish are delivered in containers which are transferred to shore, alive, and are placed in aquariums inside the market or transported directly to waiting lorries which are equipped with aquariums inside. Since fish market office building and Tung Yuen Street Cooked Food Market are situated at the northern and southern sides of the fish market respectively and the fish market is covered by a roof, odour can only be emitted at the sides facing the sea and Tung Yuen Street.

2.11.5 Based on several site visits, it is observed that some fish stores were not in operation and floor was dry at some area. In addition, polyfoam boxes were collected at a designated area inside the fish market and disposed of by dump trucks regularly. However, in this odour assessment, to be conservative, apart from carpark, indoor storage area and administrative building, all other area are regarded as different types of odour sources (see Figure 2.8). Impact from these area sources is modelled by AERMOD. Emission parameters for the Kwun Tong Wholesale Fish Market are referenced to the approved planning application A/K15/126 and are presented in Appendix 2.15.

c. Sam Ka Tsuen Typhoon Shelter

2.11.6 Sam Ka Tsuen Typhoon Shelter is located to the southeast of the Application Site. The proposed residential buildings are at least 180m away from the Typhoon Shelter. In the south-eastern side of the typhoon shelter, many seafood restaurants and shops exist to serve the public and tourists visiting the area.

2.11.7 The area is predominantly impacted by sewage outfalls of the seafood restaurant, shops and low-rise village houses in the vicinity. In order to resolve the odour problem arising from the sewage outfalls, in-situ bioremediation works for facilitating decomposition of organic pollutants in sediments were carried out in the typhoon shelter in 2004 ^[Ref-3]. Several studies ^[Ref-2,4,5,6&7] documented its successful application to treat odorous sediments at Sam Ka Tsuen Typhoon Shelter where over 95% of odorous acid volatile sulphides were removed. Referring to the meeting minute of the Legislative Council on 1 February 2012 ^[Ref-2], no complaint regarding odour of Sam Ka Tsuen Typhoon Shelter was recorded in Year 2009 to 2011 (i.e. 5 to 7 years after the bioremediation works).

2.11.8 Moreover, Drainage Services Department (DSD) is carrying out a study "Lei Yue Mun Village Sewerage – Investigation, Design and Construction (4398DS)" to improve the water quality at Sam Ka Tsuen Typhoon Shelter and the hygiene conditions of the unsewered areas at Lei Yue Mun by providing sewerage system which is expected to be completed in Year 2021 ^[Ref-8] i.e. one year before the operation of the Project. In light of this, it is expected that Sam Ka Tsuen Typhoon Shelter therefore will no longer be impacted by sewage outfalls of the unsewered areas during heavy rainfall.

2.11.9 Odour patrol was conducted at the boundary of Sam Ka Tsuen Typhoon Shelter. A slightly detectable odour was noticed at the Sam Ka Tsuen Typhoon Shelter. However, no odour was noticeable at around 20m away from the Sam Ka Tsuen Typhoon Shelter. Since the boundary Application Site is around 180m away from the Sam Ka Tsuen Typhoon Shelter, it is anticipated that the associated odour impact is not anticipated.

Odour Impact Appraisal and Assessment Result

2.11.10 Nevertheless, a quantitative odour assessment was conducted in an environmental study supporting a S16 town planning application of a neighbouring planned residential

Ref-3 LCQ3: Tackling odour problem of waterfront tourist attractions (2012), <http://www.info.gov.hk/gia/general/201202/01/P201202010276.htm>

Ref-4 United States Patent US 8,647,566 B2 (2014), Deodorant for treating sediment in-situ and the associated facilities and method (https://www.google.com/patents/US8647566?utm_source=gb-gplus-sharePatent)

Ref-5 Estes T.J. and McGrath C.J. (2014) Economical Treatment of Dredged Material to Facilitate

Ref-6 Agreement No. CE 35/2006(CE) Kai Tak Development Engineering Study cum Design and Construction of Advance Works – Investigation, Design and Construction - Annex A Report on KTAC and KTTS studies

Ref-7 Kai Tak Development Environmental Improvement to Kai Tak Approach Channel CB(1)1375/08-09(01)

Ref-8 工務計劃項目編號 4398DS 鯉魚門村污水收集系統工程 (觀塘區議會屬下環境及衛生委員會文件第 18/2016 號,

http://www.districtcouncils.gov.hk/kt/doc/2016_2019/tc/committee_meetings_doc/EHC/10261/E_HC_18_2016.pdf

site under Application No. A/K15/126 (Feb 2022). The report also identified that Yau Tong Sewage Pumping Station, Kwun Tong Fish Market and Sam Ka Tsuen Typhoon Shelter as existing odour sources in the vicinity of their Application Site. Similar to the findings in this EAS, odour impact for Yau Tong Sewage Pumping Station and Sam Ka Tsuen Typhoon Shelter was not anticipated at the planned residential site. Therefore, a quantitative odour impact assessment was carried out under the environmental study of Application No. A/K15/126 for the Kwun Tong Wholesale Fish Market only, which is considered relevant and applicable for this EAS.

2.11.11 The predicted result of odour impact for all selected ASRs at all levels are summarized in Appendix 2.16. It reveals that odour at all locations of the Proposed Development comply with the criterion (i.e. <50Us).

2.12 Review on Impact from Proposed Carpark

2.12.1 Basement carpark has been proposed for the Proposed Development. The air quality inside the basement carpark should satisfy the air pollutant standards as recommended by the ProPECC PN 2/96 Control of Air Pollution in Car Parks. Therefore, the mechanical ventilation system and layout the basement carpark should be properly designed. Furthermore, the exhaust outlet of the mechanical ventilation system of the basement carpark should also be designed by facing away from the nearest air sensitive uses as practicable as possible to ensure not to cause a nuisance to the occupants/ residents of the air sensitive uses including the surrounding developments and the Proposed Development. As the Project is still under initial design stage, the location of the exhaust outlet of the mechanical ventilation system is yet available.

3. CONCLUSION

- 3.1.1 Based on the air quality impact and odour assessment results, the Proposed Development will not be subject to any unacceptable air quality or odour impact provided that the air pollutant concentrations and odour at the fresh air intake locations for the Proposed Development comply with the AQOs and odour criteria. Besides, the fresh air intake for the Proposed Development is recommended to be located at or above 1.5mAG.
- 3.1.2 Based on above conclusion, it confirms the feasibility and acceptability of the Proposed Redevelopment from an environmental perspective.

Figures

Legend
 Application Site

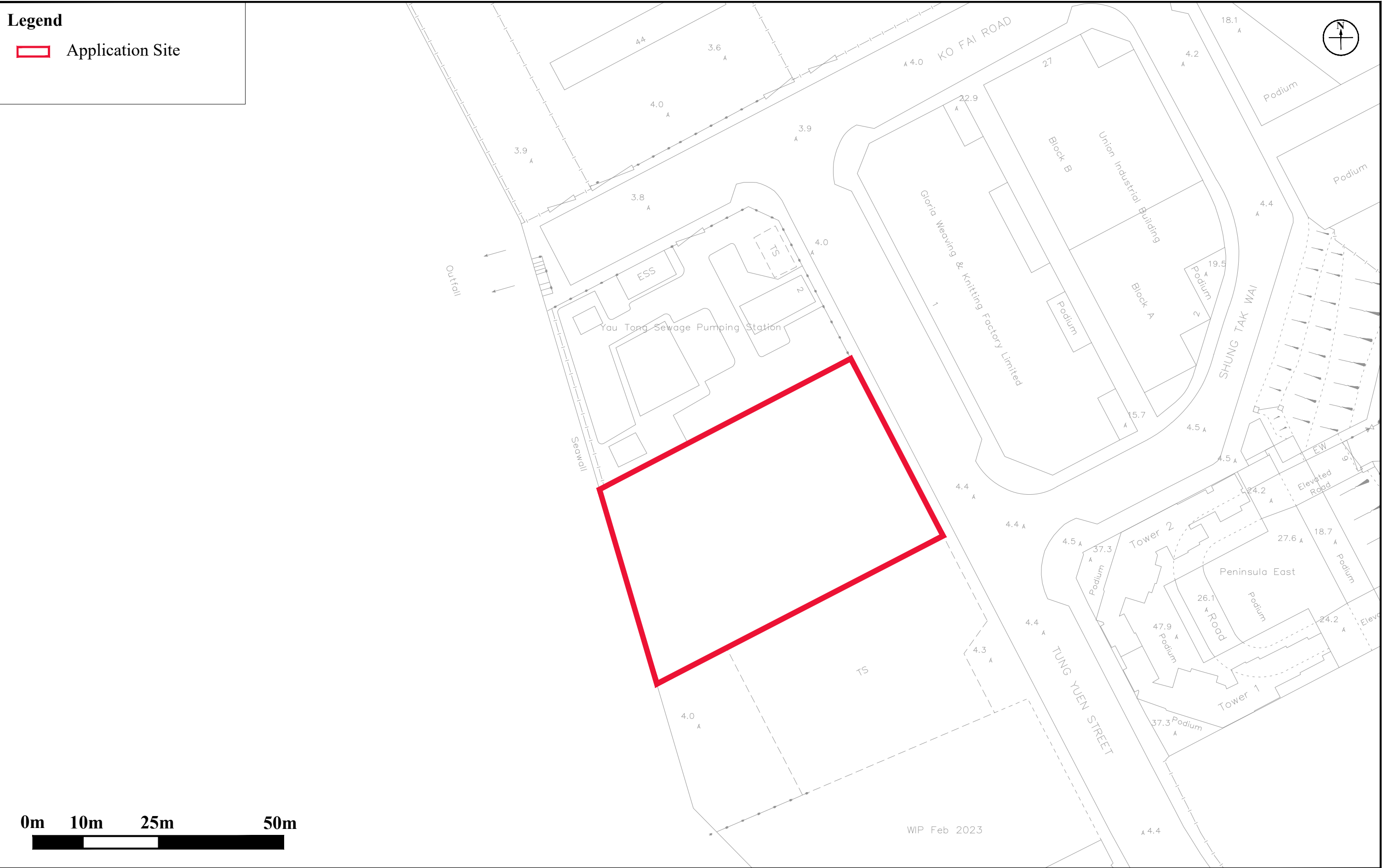


Figure: 1.1
Title: Location of Application Site and its Environs
Project: Section 16 Application for Proposed Flat, Shop and Services and Eating Place with Minor Relaxation of Plot Ratio and Building Height Restrictions in "Residential (Group E)" Zone at No. 4 Tung Yuen Street, Yau Tong, Kowloon

RAMBOLL	
Drawn by:	WT
Checked by:	TC
Rev.:	1.0
Date:	Nov 2024

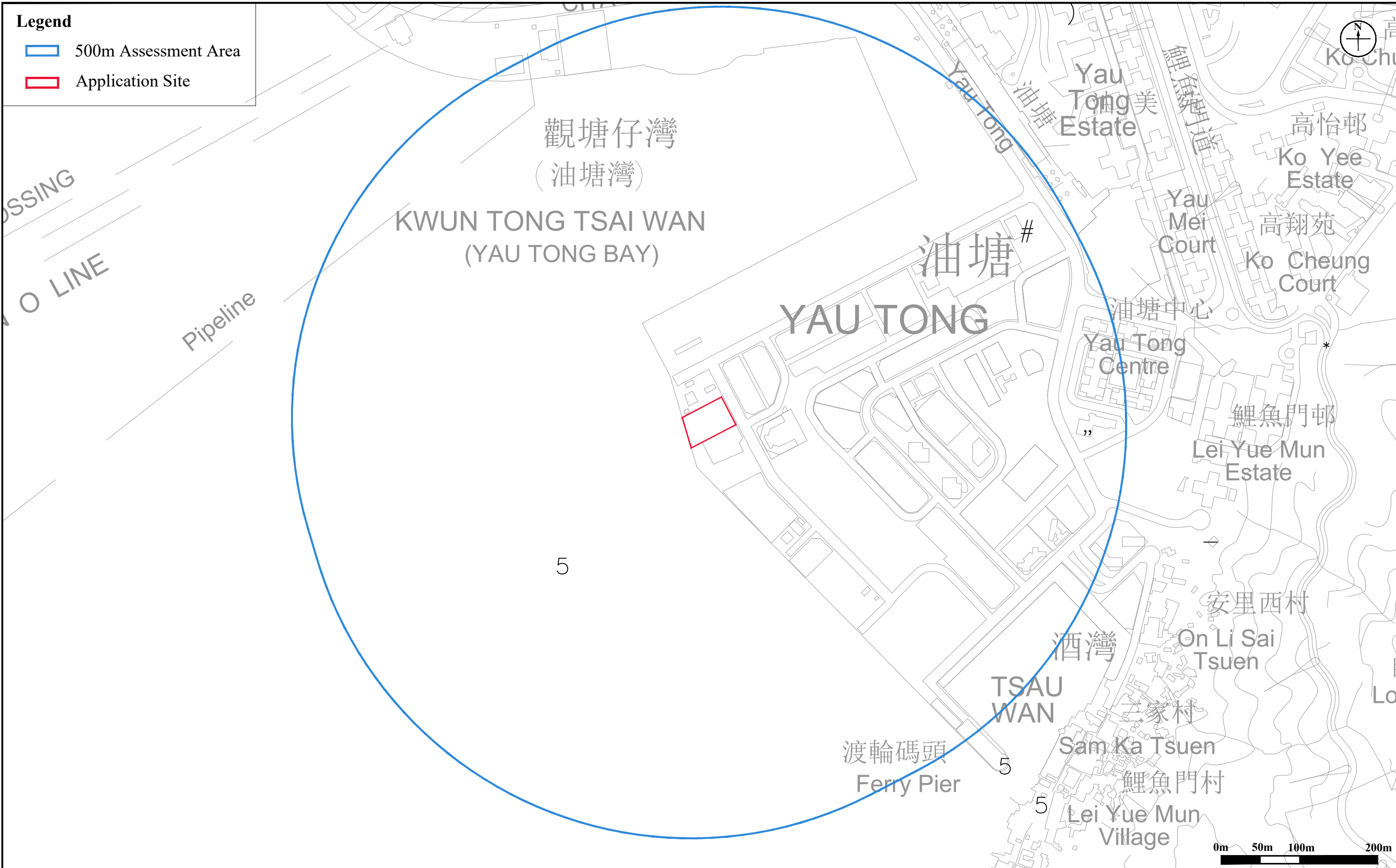


Figure: 2.1
Title: 500m Assessment Area for Air Quality Impact Assessment

Project: Section 16 Application for Proposed Flat, Shop and Services and Eating Place with Minor Relaxation of Plot Ratio and Building Height Restrictions in "Residential (Group E)" Zone at No. 4 Tung Yuen Street, Yau Tong, Kowloon

RAMBOLL	
Drawn by:	WT
Checked by:	TC
Rev.:	1.0
Date:	Nov 2024

Legend

- 500m Assessment Area
- Application Site
- A01 Representative Air Sensitive Receiver

Representative ASR ID	Description
A01	Planned Transitional Housing
A02	Peninsula East
A03	Kwun Tong Wholesale Fish Market
A04	Planned Residential Development (Application No. A/K15/122)
A05	Planned Comprehensive Residential Development (Application No. A/K15/126)
A06	Planned Residential Development (Application No. A/K15/121)
A07	Montego Bay
A08	Yau Tong Industrial City Block B
A09	Wah Lee Industrial Building
A10	Maya by Nouvelle
A11	Planned Residential Development (Application No. A/K15/129)
A12	Mai Tong Industrial Building
A13	The Spectacle
A14	Canaryside at Shung Shun Street
A15	Ocean One at Shung Shun Street
A16	Ko Fai Industrial Building
A17	Sam Ka Tsuen Recreation Ground
A18	Yau Tong Centre Tower 7 at Ka Wing Street

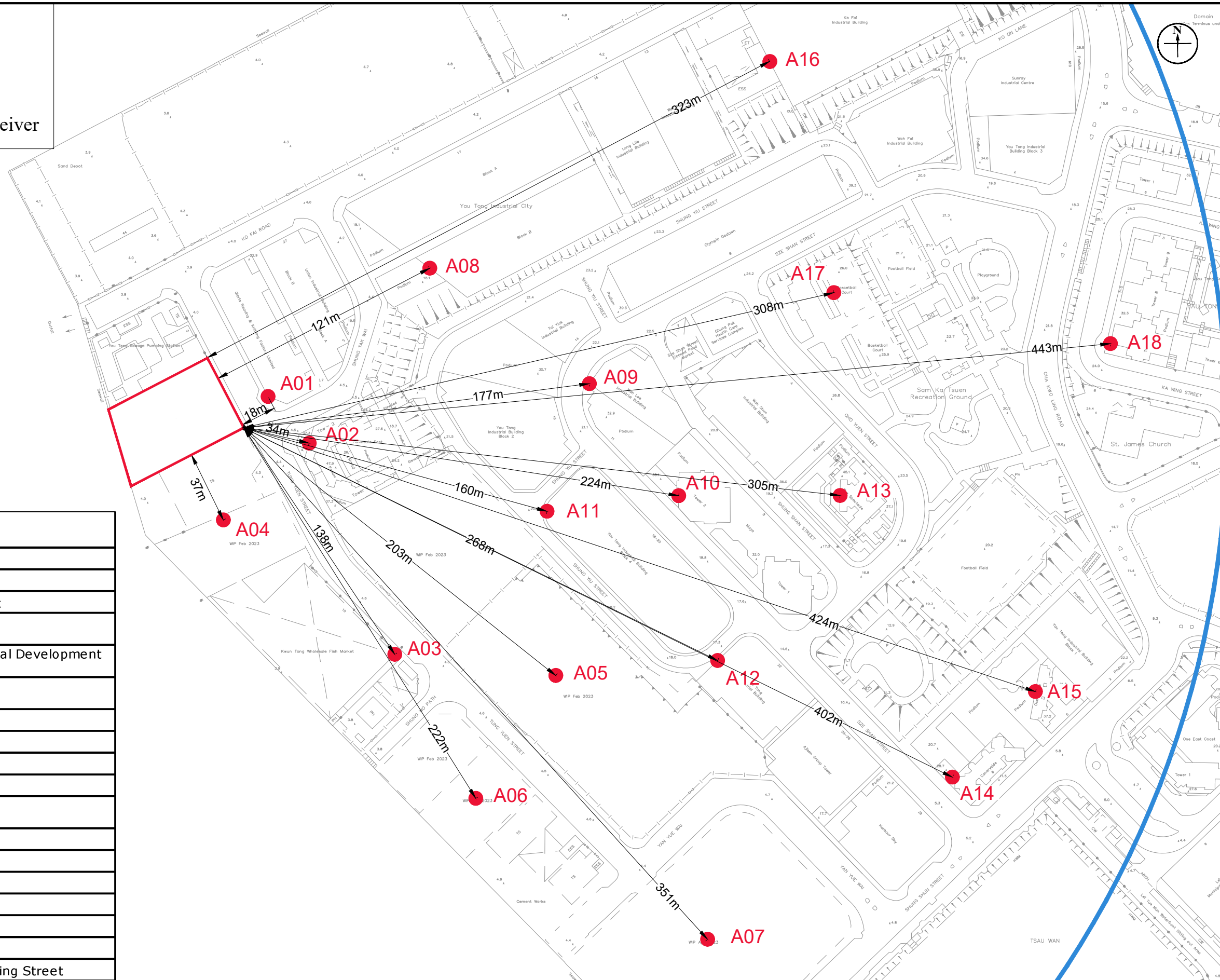


Figure: 2.2

Title: Representative Air Sensitive Receivers during Construction Phase

Project: Section 16 Application for Proposed Flat, Shop and Services and Eating Place with Minor Relaxation of Plot Ratio and Building Height Restrictions in "Residential (Group E)" Zone at No. 4 Tung Yuen Street, Yau Tong, Kowloon

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Drawn by: WT

Checked by: TC

Rev.: 1.0

Date: Nov 2024

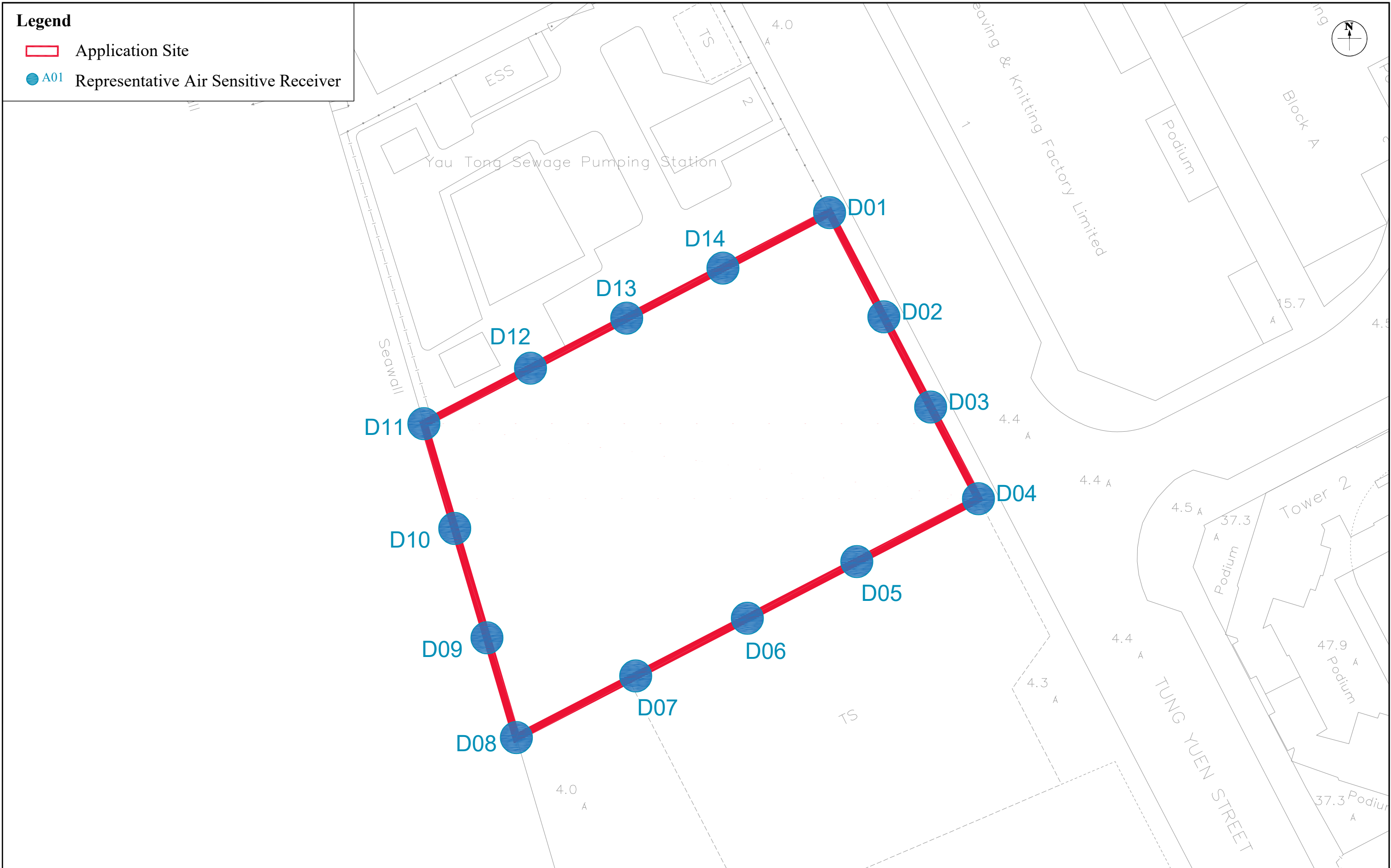
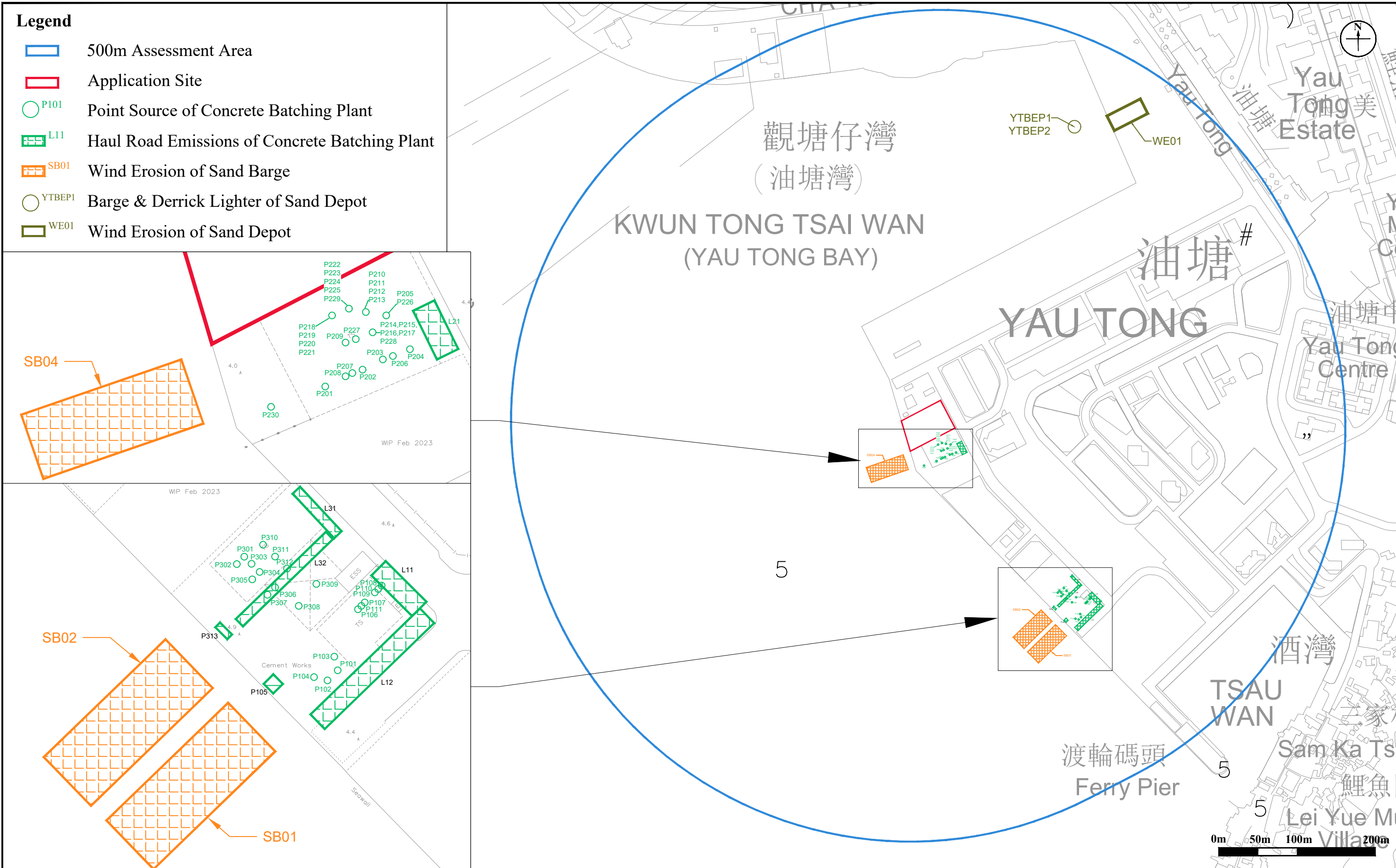


Figure: 2.3
Title: Representative Air Sensitive Receivers during Operation Phase

Project: Section 16 Application for Proposed Flat, Shop and Services and Eating Place with Minor Relaxation of Plot Ratio and Building Height Restrictions in "Residential (Group E)" Zone at No. 4 Tung Yuen Street, Yau Tong, Kowloon

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Rev.:	1.0
Date:	Nov 2024



Project: Section 16 Application for Proposed Flat, Shop and Services and Eating Place with Minor Relaxation of Plot Ratio and Building Height Restrictions in "Residential (Group E)" Zone at No. 4 Tung Yuen Street, Yau Tong, Kowloon	RAMBOLL
	Drawn by: WT
	Checked by: TC
	Rev.: 1.0
	Date: Nov 2024

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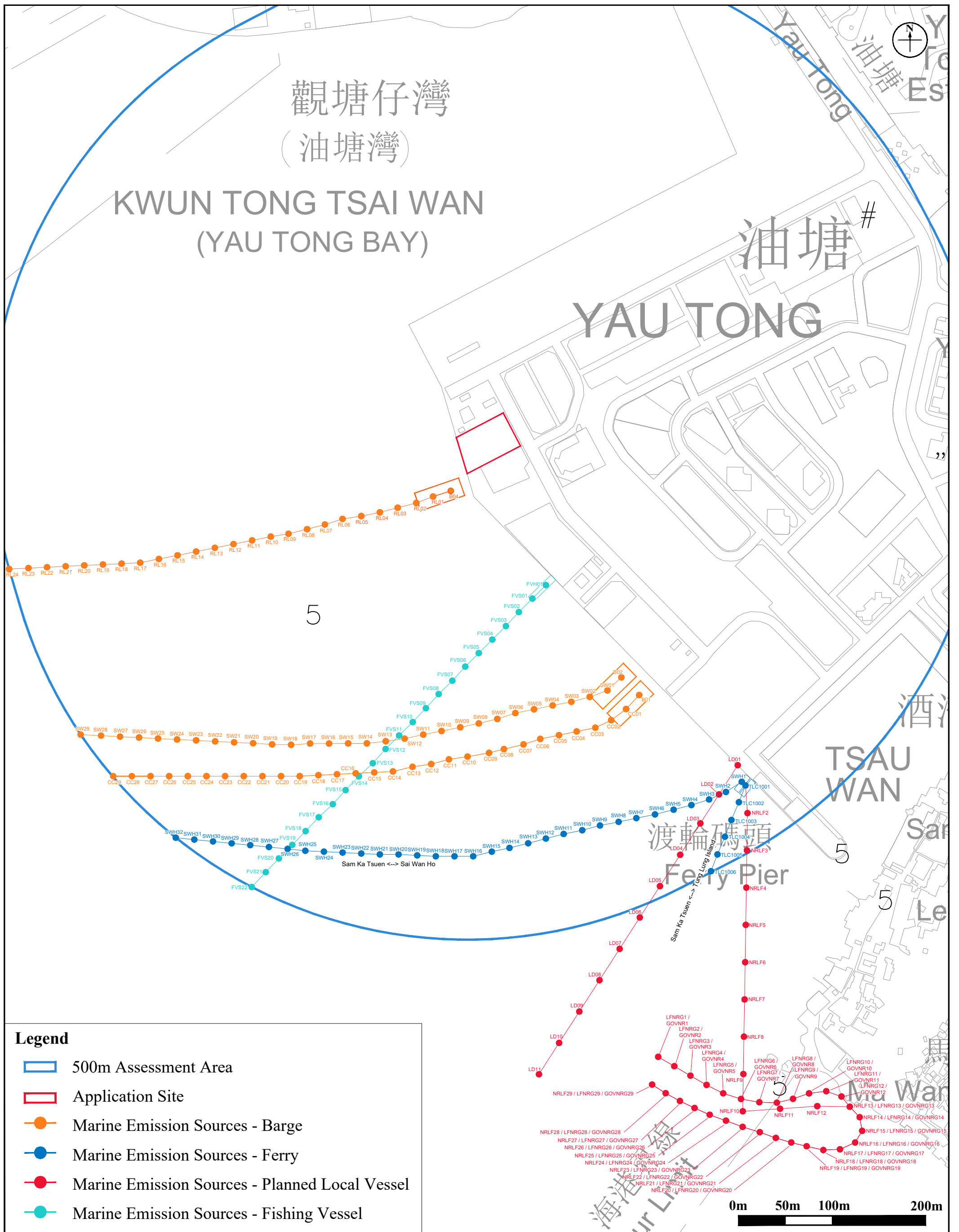


Figure: 2.5

Title: Location of Identified Marine Vessels Emission Sources within 500m Assessment Area

Project: Section 16 Application for Proposed Flat, Shop and Services and Eating Place with Minor Relaxation of Plot Ratio and Building Height Restrictions in "Residential (Group E)" Zone at No. 4 Tung Yuen Street, Yau Tong, Kowloon



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Checked by: TC

Rev.: 1.0

Date: Nov 2024

Legend

- 4km Assessment Area
- Application Site
- H1 Major Point Source - Kai Tak Cruise Terminal

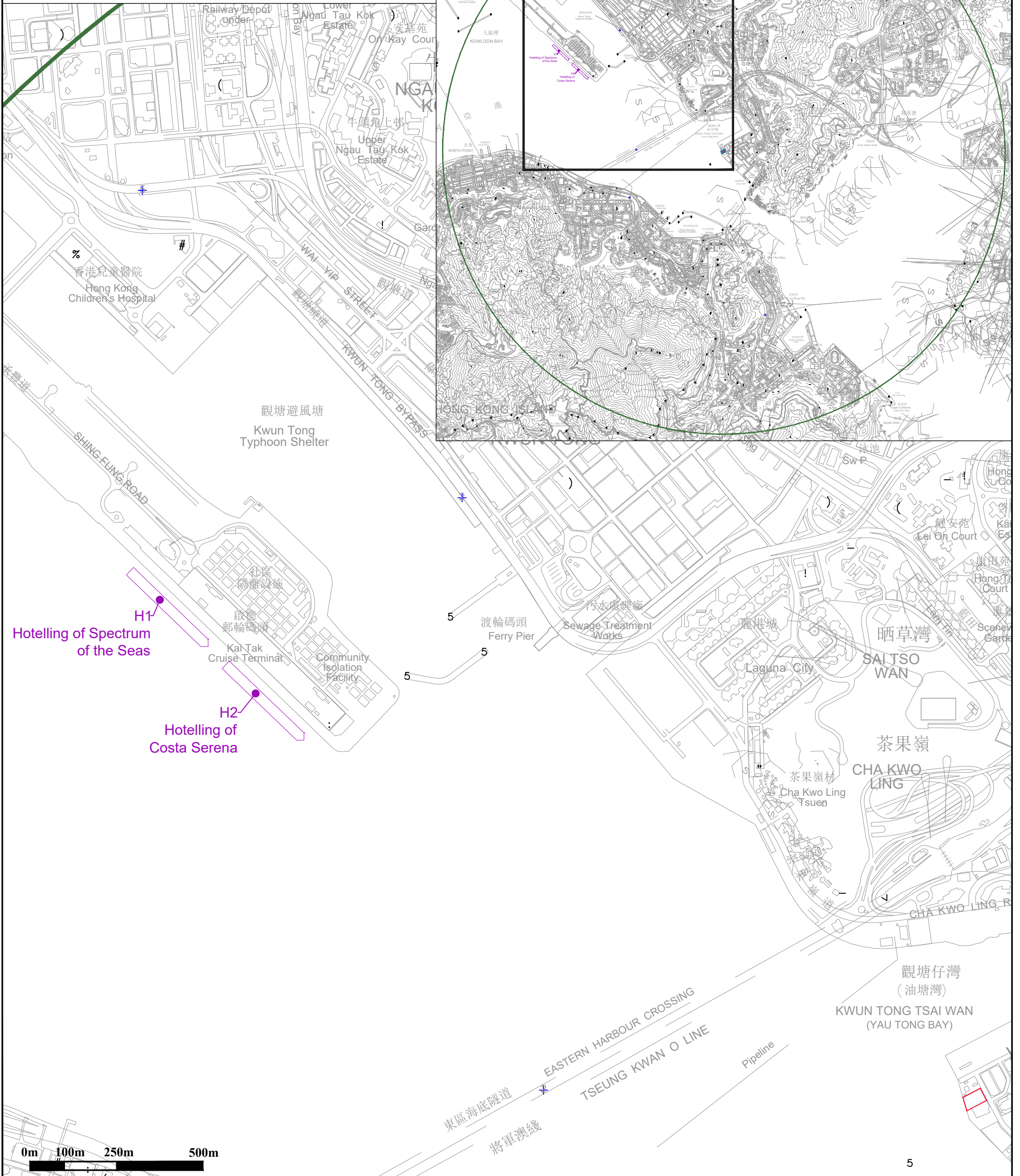


Figure: 2.6

Title: Location of Identified Major Point Source within 4km Assessment Area

Project: Section 16 Application for Proposed Flat, Shop and Services and Eating Place with Minor Relaxation of Plot Ratio and Building Height Restrictions in "Residential (Group E)" Zone at No. 4 Tung Yuen Street, Yau Tong, Kowloon

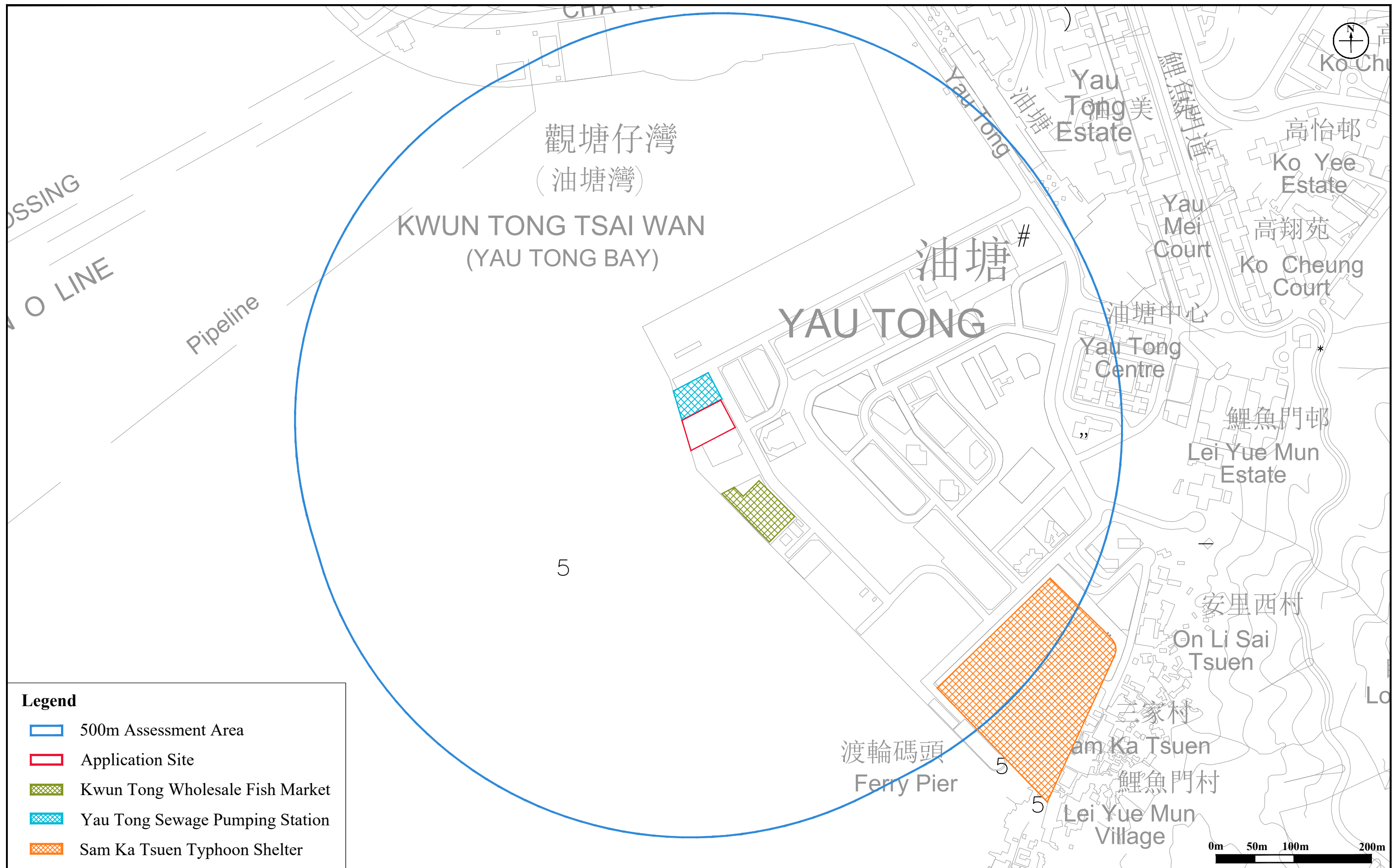
RAMBOLL

Drawn by: WT

Checked by: TC

Rev.: 1.0

Date: Nov 2024



Legend

- 500m Assessment Area
- Application Site
- Kwun Tong Wholesale Fish Market
- Yau Tong Sewage Pumping Station
- Sam Ka Tsuen Typhoon Shelter

Figure: 2.7

Title: Location of Identified Odour Sources within 500m Assessment Area

Project: Section 16 Application for Proposed Flat, Shop and Services and Eating Place with Minor Relaxation of Plot Ratio and Building Height Restrictions in "Residential (Group E)" Zone at No. 4 Tung Yuen Street, Yau Tong, Kowloon

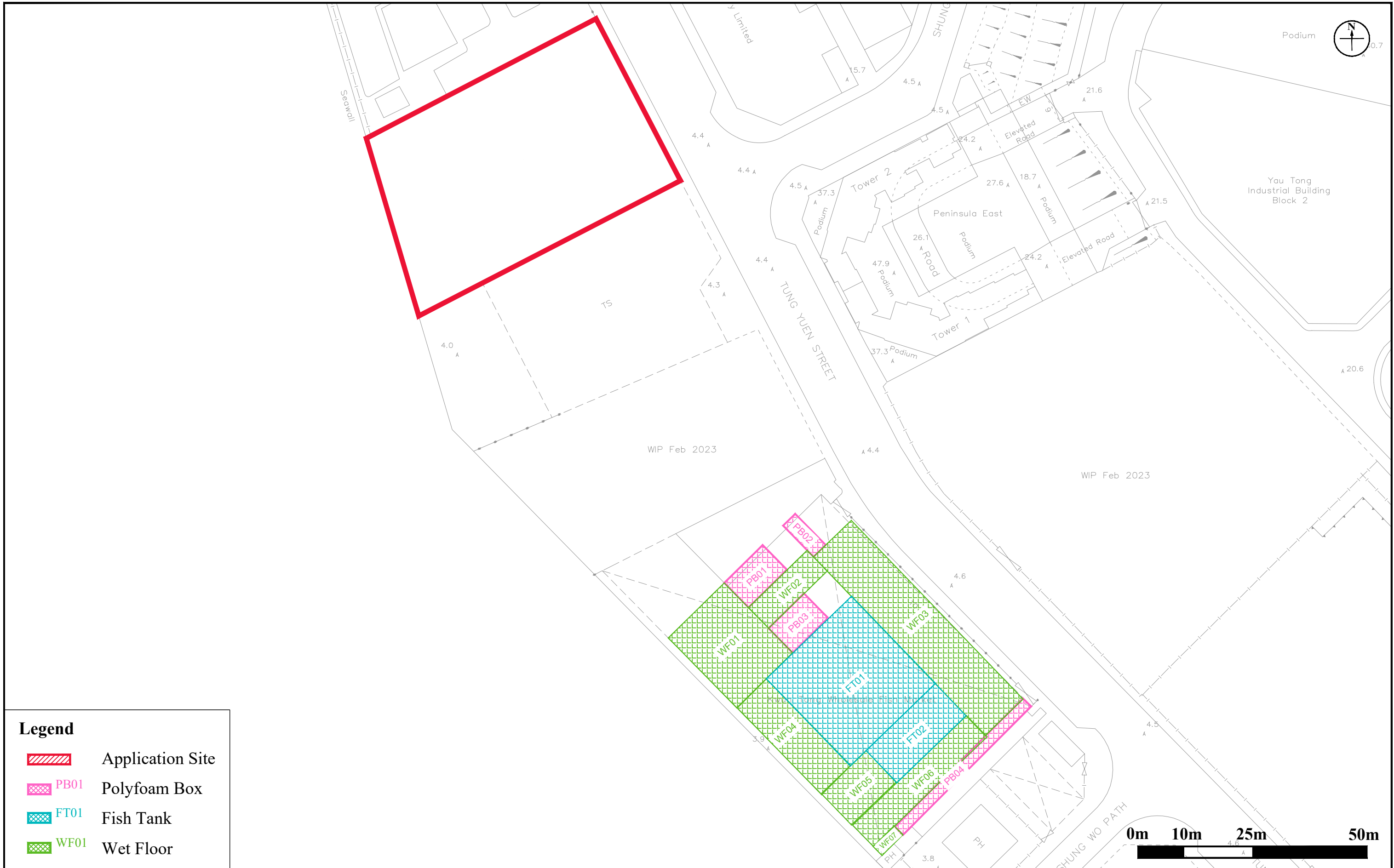
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Drawn by: WT

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Rev.: 1.0

Date: Nov 2024



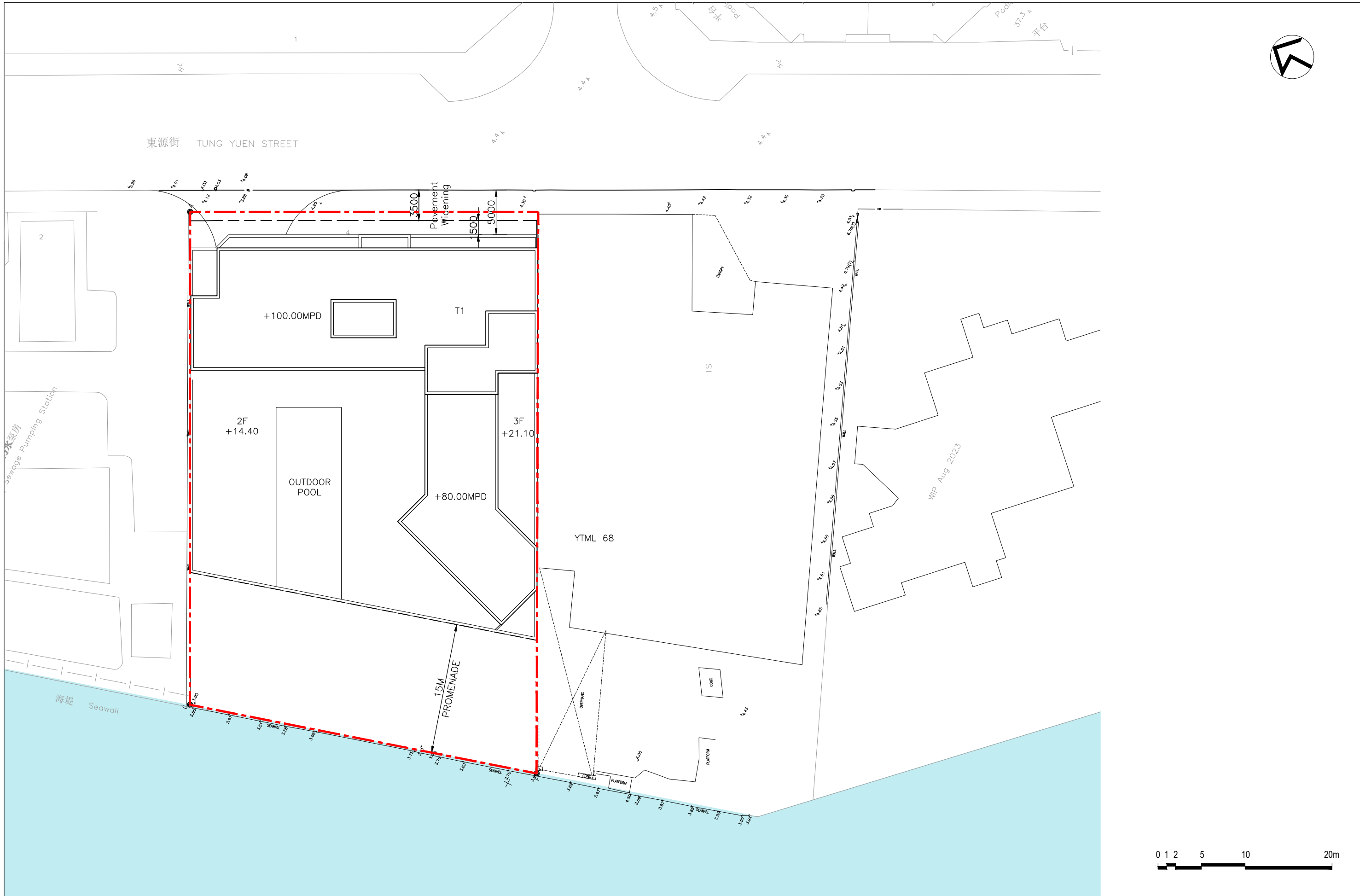
Legend	
	Application Site
	PB01 Polyfoam Box
	FT01 Fish Tank
	WF01 Wet Floor

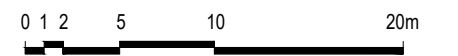
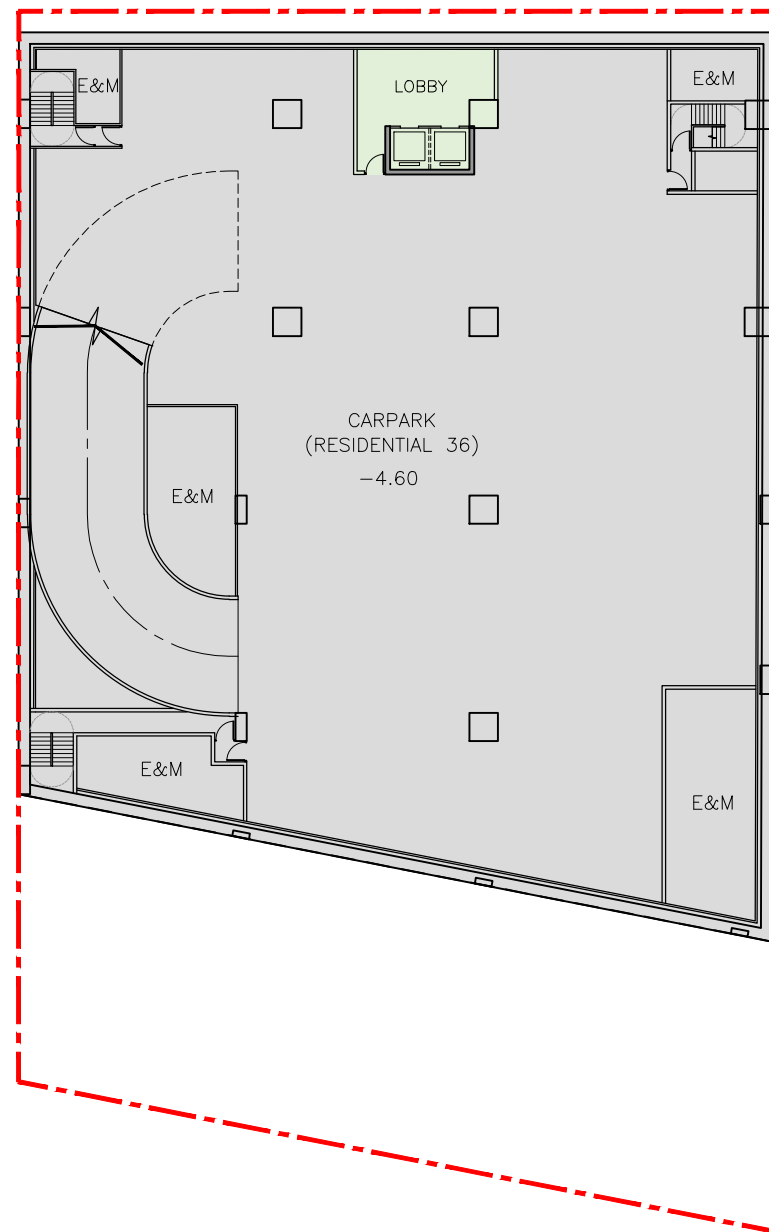
Figure: 2.8
Title: Location of Odour Sources within Kwun Tong Wholesale Fish Market

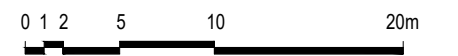
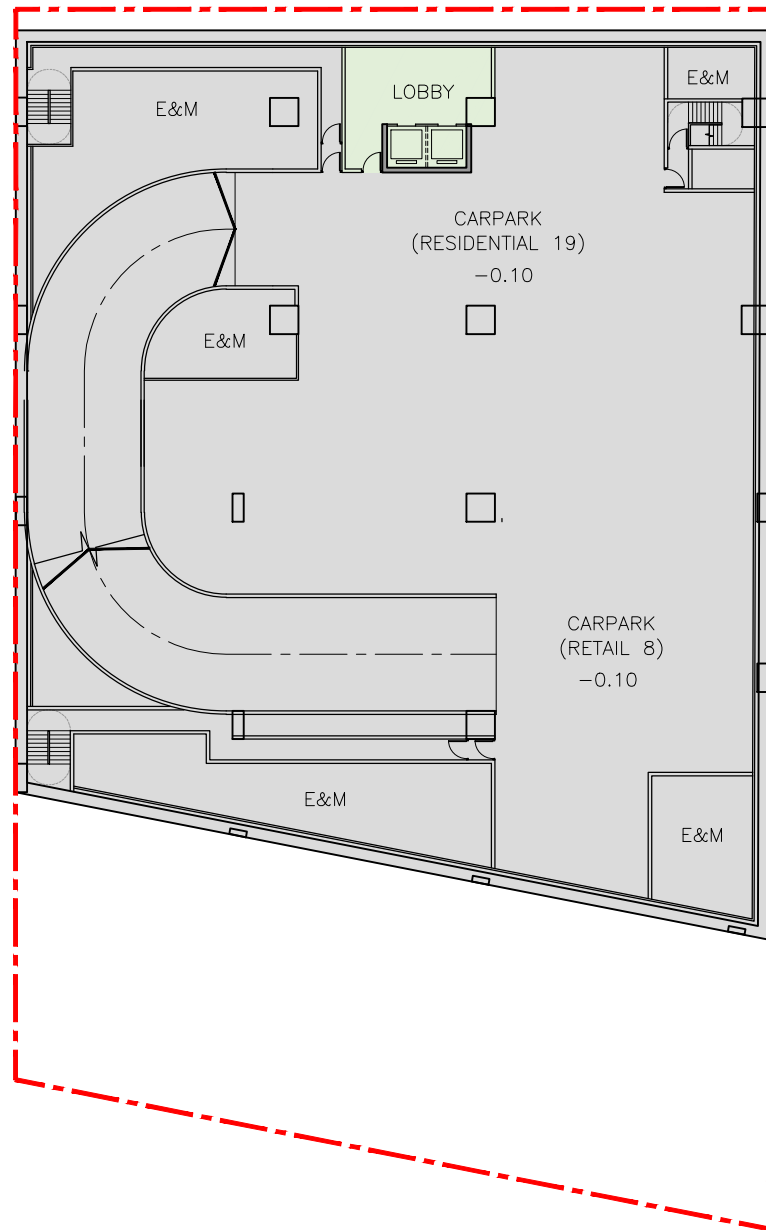
Project: Section 16 Application for Proposed Flat, Shop and Services and Eating Place with Minor Relaxation of Plot Ratio and Building Height Restrictions in "Residential (Group E)" Zone at No. 4 Tung Yuen Street, Yau Tong, Kowloon

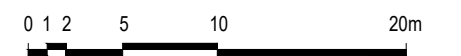
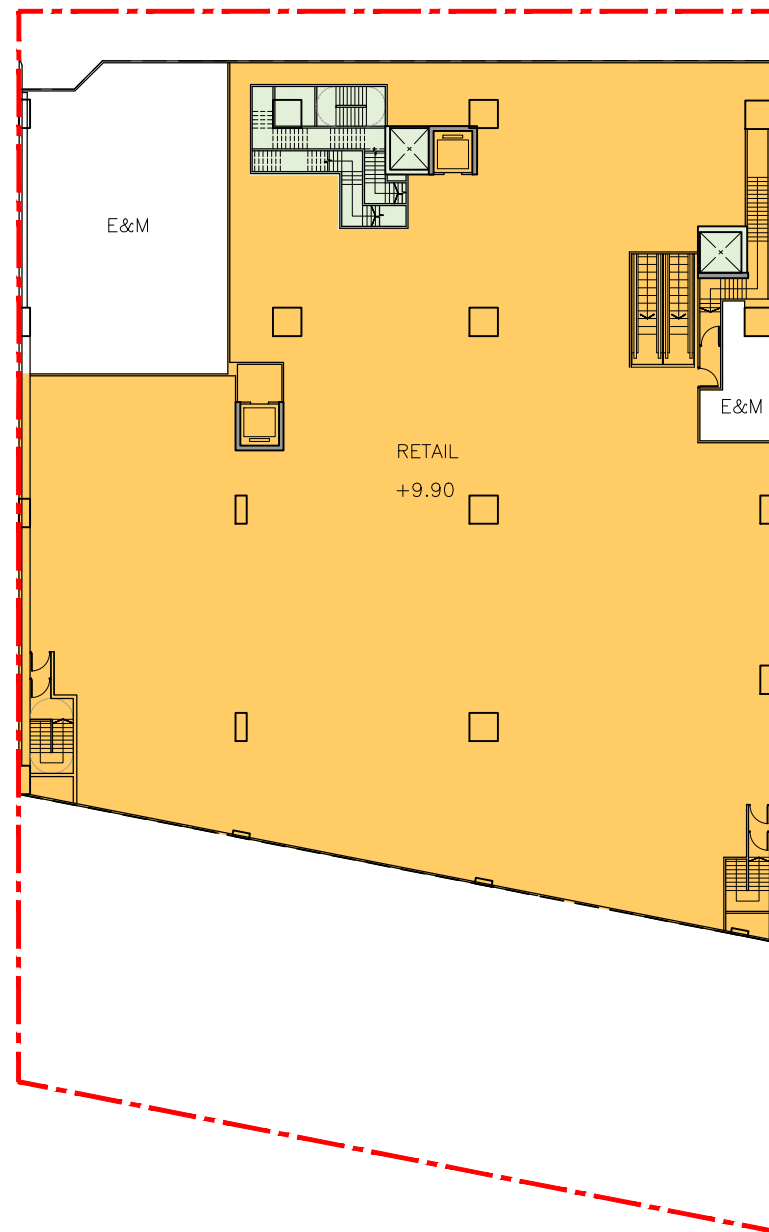
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Rev.:	1.0
Date:	Nov 2024

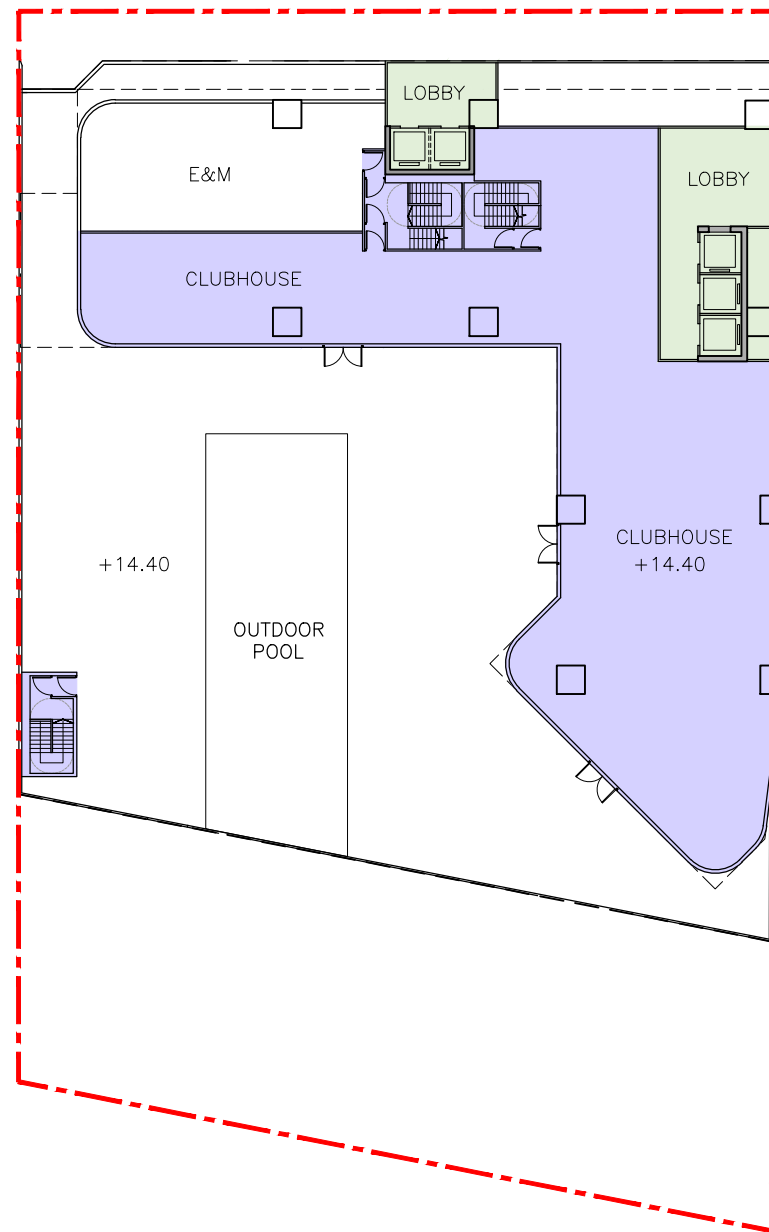
Appendix 1.1 Master Layout Plan of the Proposed Development

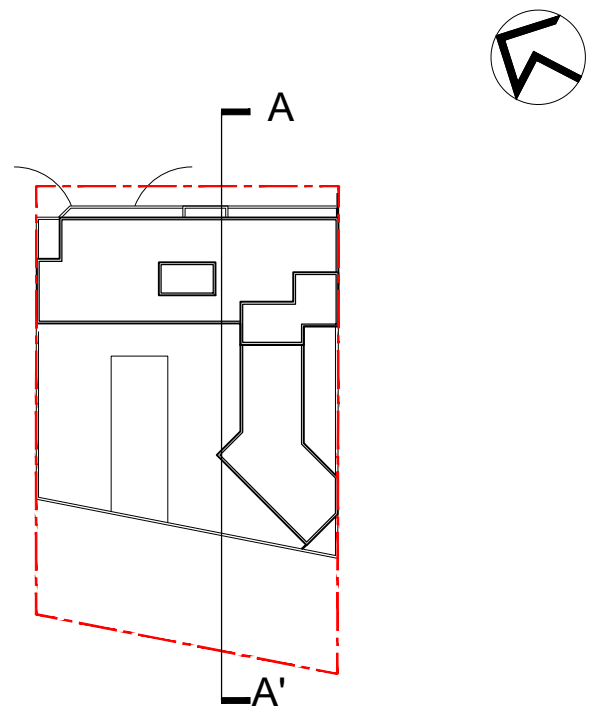
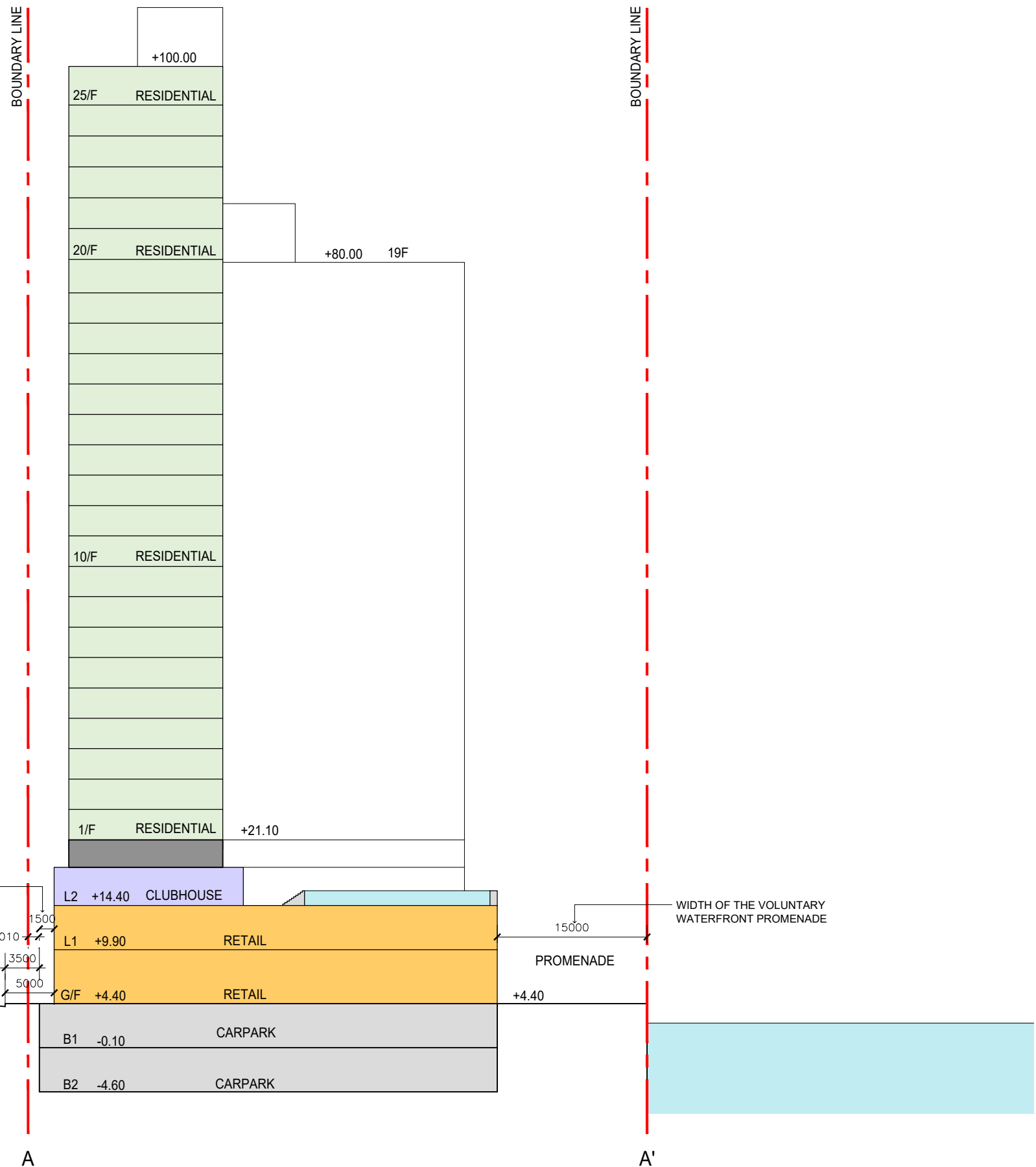


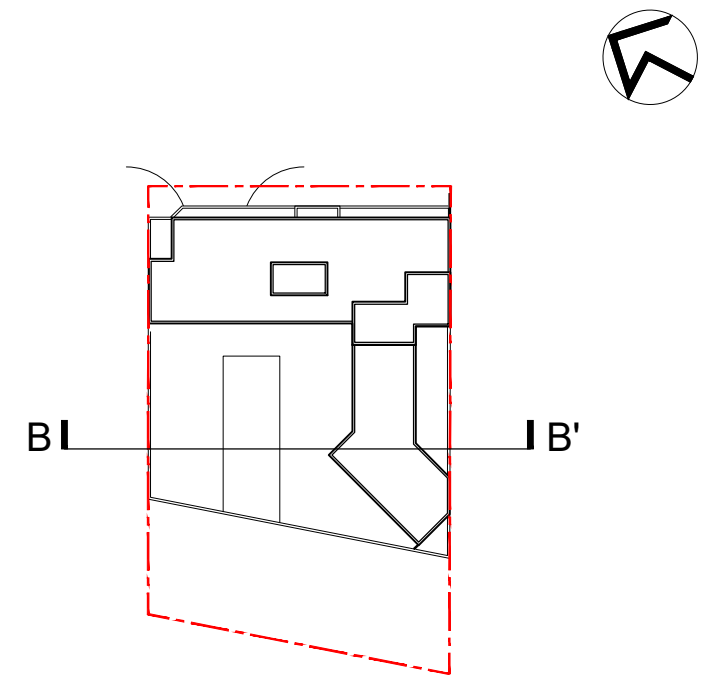
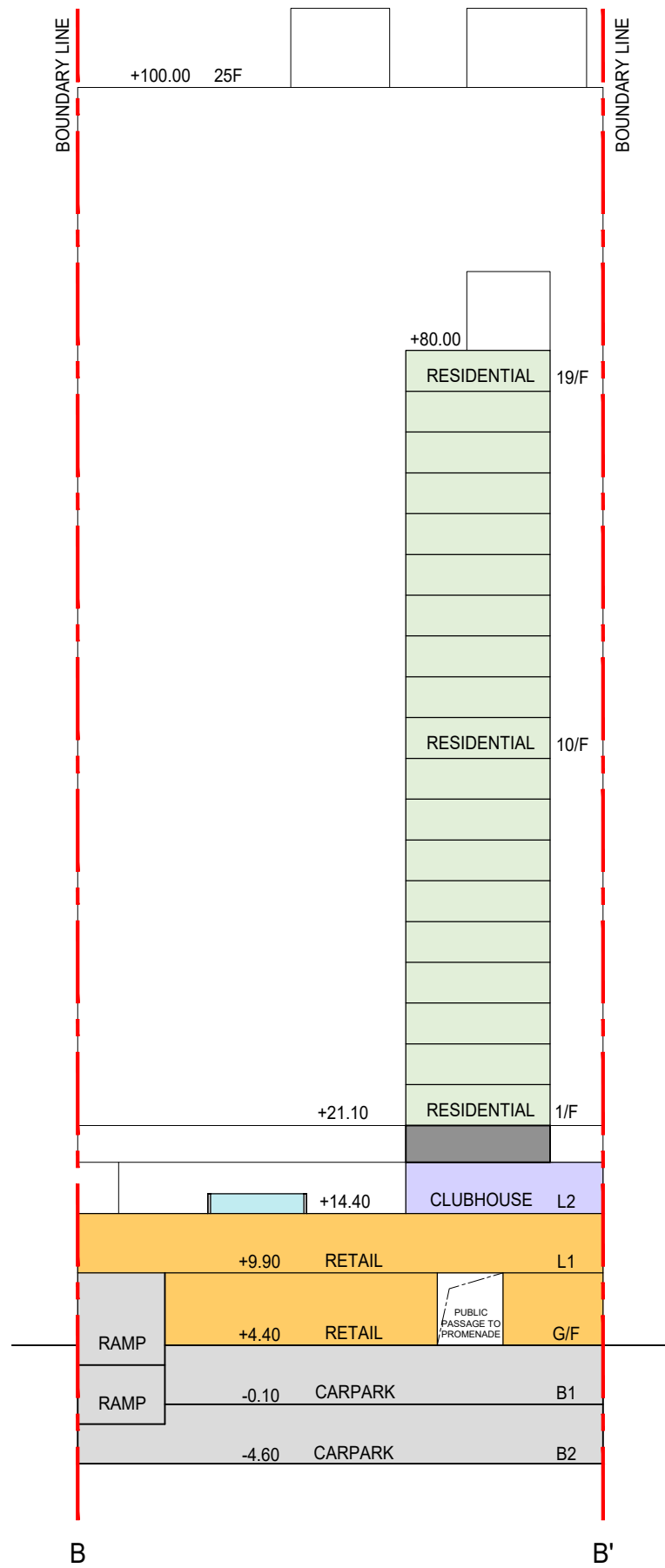












Appendix 2.1 SP License of Concrete Batching Plants

License Holder	License No	Expired Date
China Concrete Co. Ltd.	L-3-194(4)	31 Dec 2019
Hong Kong Concrete Co. Ltd.	L-3-218(3)	11 May 2020
Redland Concrete Limited	L-3-117(6)	23 Aug 2025

**REGISTER OF LICENCES FOR THE CONDUCT OF A SPECIFIED
PROCESS GRANTED UNDER THE AIR POLLUTION CONTROL ORDINANCE**

Serial No.: R0499

Licence No.: : L-3-194(4)

1. Details of the Licence

Date of Issue	Date of Expiry	Date of Application	Serial No. of the Application	Serial No. of the Licence (if any) being Renewed
16 January, 2017	31 December, 2019	8 March, 2016	---	R0360
Name of Licence Holder			Certificate of Incorporation No.	
English		Chinese		
China Concrete Co. Ltd.		中國混凝土有限公司		720948
Name of the Premises under which the Specified Process is conducted				
China Concrete Co. Ltd.				
Address of the Premises at which the Specified Process is conducted				
No. 22 Tung Yuen Street, Yau Tong, Kowloon				
Classification of Specified Process**		Installed/Processing* Capacity	Silo Capacity (for Cement Works only)	
Cement Works		240 cubic metre per hour	4460 tonnes	

Yau Tong

Delete if not applicable.
As specified in the First Schedule of the Ordinance

22 Tung Yuen St

Appendix 11

REGISTER OF APPLICATIONS UNDER SECTION 14(3)(a) OF THE AIR POLLUTION CONTROL ORDINANCE

Serial No.: A0567

1. Type of Application*

- New Licence
- Renewal of Licence
- Variation of Licence
- Transfer of Licence
- A Licence subsequent to the Cessation of an Exemption under Section 21
- Cancellation or Variation of Any Term or Condition of Exemption

2. Name of Applicant (English) China Concrete Co. Ltd.

(Chinese) 中國混凝土有限公司

3. Address of Applicant 24/F, China Merchants Tower, Shun Tak Centre, 168-200 Connaught Road., Central, Hong Kong

4. Date of Application 12 February, 2003

5. Date of Entry into Register 26 April, 2003

6. Date of Last Notice in Newspapers 26 April, 2003

*Tick the appropriate box

Handwritten mark on a yellow sticky note.

7. Premises Where the Specified Process is Conducted

Name of Premises		Address
English	Chinese	
China Concrete Co. Ltd.	中國混凝土有限公司	No. 22, Tung Yuen Street, Yau Tong, Kowloon

8. Nature of Work

Existing Licence No.	Expiry Date	Classification of Specified Process [†] under Application	Mode of Operation (Continuous / Batch)	Installed/ Processing* Capacity	Silo Capacity (for Cement Works Only) (tonnes (t))	Total No. of Emission Points
L-3-194(1)	22 May, 2006.	Cement Works	Batch	Concrete production: <u>Existing licence:</u> 120 cubic metre per hour <u>Proposed variation:</u> 240 cubic metre per hour	<u>Cement:</u> 4x1000 t, 2x130 t <u>PFA:</u> 1x100 t <u>Microsilica:</u> 1x100 t	<u>Existing licence:</u> 13 <u>Proposed variation:</u> 12 (EP12 to be deleted)

9. Other Specified Processes Conducted in Same Premises: Not applicable.

Classification of Specified Process †	Licence / Exemption* Numbers

9A. Air Pollution Control Plan under Section 14A

- a. Has the plan been submitted Yes/No *
- b. Whether the plan is available for inspection Yes/No *

† As specified in the Schedule 1 of the Ordinance

* Delete if not applicable

10. Noxious or Offensive Emissions *

Emission Point No	Exhaust Gas Flowrate (m ³ /h)		Mode of Discharge to Atmosphere											
			Exit Temperature (°C)		Fugitive Emission (Yes/No)		Discharge or Chimney Height (m)		Cross-Section of Discharge Exit or Chimney					
									Width (m)		Length (m)		Diameter (m)	
1	2	1	2	1	2	1	2	1	2	1	2	1	2	
1	1750		Ambient		No		31		0.125		0.25		N.A.	
2	1750		Ambient		No		31		0.125		0.25		N.A.	
3	1750		Ambient		No		8		0.125		0.25		N.A.	
4	1750		Ambient		No		8		0.125		0.25		N.A.	
5 or 5a (NOTE A)	N.A.		Ambient		Yes		6		4(EP5) 3(EP5a)		4(EP5) 3(EP5a)		N.A.	
6	1750		Ambient		No		30		0.125		0.25		N.A.	
7	1750		Ambient		No		30		0.125		0.25		N.A.	
8	1750		Ambient		No		30		0.125		0.25		N.A.	
9	1750		Ambient		No		30		0.125		0.25		N.A.	
10	3500		Ambient		No		12		0.25		0.25		N.A.	
11	3500		Ambient		No		12		0.25		0.25		N.A.	
12	10200	To be deleted	Ambient	To be deleted	No	To be deleted	31	To be deleted	0.5	To be deleted	0.5	To be deleted	N.A.	To be deleted
13	N.A.		Ambient		Yes		0.5		30		15		N.A.	

Column 1 of each item refers to PROPOSED VALUE in the case of a new application or EXISTING VALUE if otherwise and column 2 refers to PROPOSED VARIATION

NOTE A: EP5a, i.e. an aggregate receiving hopper (ARH-2) serves as a back up for EP5, i.e. an aggregate receiving hopper (ARH-1).

Emission Point No.	Details of Emissions													
	Composition		Emission Rate (kg/h)				Control Equipment		Average Daily Concentration* (mg/m ³)		Maximum Concentration* (mg/m ³)		Duration of Maximum Concentration (h/d)	
			Average		Maximum				1	2	1	2	1	2
	1	2	1	2	1	2	1	2	1	2	1	2		
1	Dust		0.0364		0.0875		Dust collector		20.8		10		10	14
2	Dust		0.0364		0.0875		Dust collector		20.8		10		10	14
3	Dust		0.0364		0.0875		Dust collector		20.8		10		10	14
4	Dust		0.0364		0.0875		Dust collector		20.8		10		10	14
5 or 5a (NOTE A)	Dust		0.323		0.775		3-side and top enclosure and water spray		N.A.		N.A.		10	14
6	Dust		0.0364		0.0875		Dust collector		20.8		10		10	14
7	Dust		0.0364		0.0875		Dust collector		20.8		10		10	14
8	Dust		0.0364		0.0875		Dust collector		20.8		10		10	14
9	Dust		0.0364		0.0875		Dust collector		20.8		10		10	14
10	Dust		0.0728		0.175		Dust collector		20.8		10		10	14
11	Dust		0.0728		0.175		Dust collector		20.8		10		10	14
12	Dust	To be deleted	0.212	To be deleted	0.51	To be deleted	Dust collector	To be deleted	20.8	To be deleted	10	To be deleted	10	To be deleted
13	Dust		0.0897		0.215		Paved road and water spray		N.A.		N.A.		N.A.	N.A.

* Expressed as at standard temperature & pressure of 0°C and 101.325 kPa

Column 1 of each item refers to PROPOSED VALUE in the case of a new application or EXISTING VALUE if otherwise and column 2 refers to PROPOSED VARIATION

NOTE A: EP5a, i.e. an aggregate receiving hopper (ARH-2) serves as a back up for EP5, i.e. an aggregate receiving hopper (ARH-1).

11. Note:

Any person may object within 30 days of notice in newspapers, to the granting of the application on the grounds that the Air Quality Objective in that area is being threatened or the emission of noxious or offensive emissions would be, or be likely to be, prejudicial to health. An objection requires the name, address, and identity of the person making the objection, the address of the premises of the proposed specified process, and how the Air Quality Objective is being threatened or how the emission of noxious or offensive emissions would cause prejudice to health. Objections should be made in Form 5 in the Second Schedule to the Air Pollution Control (Specified Processes) Regulations and be forwarded to the Authority and copied to the Secretary for the Environment, Transport and Works.

REGISTER OF LICENCES FOR THE CONDUCT OF A SPECIFIED
PROCESS GRANTED UNDER THE AIR POLLUTION CONTROL ORDINANCE

Serial No.: R0485

Licence No.: L-3-218(3)

1. Details of the Licence

Date of Issue	Date of Expiry	Date of Application	Serial No. of the Application	Serial No. of the Licence (if any) being Renewed
8 June, 2016	11 May, 2020	12 February, 2015	A0605	R0333
Name of Licence Holder			Certificate of Incorporation No.	
English		Chinese		255320
Hong Kong Concrete Co. Ltd.		港九混凝土有限公司		
Name of the Premises under which the Specified Process is conducted				
Hong Kong Concrete Co. Ltd.				
Address of the Premises at which the Specified Process is conducted				
Yau Tong Marine Lot Nos. 60 & 61, 20 Tung Yuen Street, Yau Tong, Kowloon				
Classification of Specified Process**		Installed/Processing* Capacity	Silo Capacity (for Cement Works only)	
Cement Works		250 cubic metre per hour	2075 tonnes	

* Delete if not applicable.
** As specified in the First Schedule of the Ordinance

Mobile plant
K. H. Co.

港九
Y12

Appendix III

**REGISTER OF APPLICATION UNDER SECTION 14(3) (a) OF
THE AIR POLLUTION CONTROL ORDINANCE**

Serial No. : A0605

1. Type of Application*

New Licence

Renewal of Licence

Variation of Licence

Transfer of Licence

A Licence subsequent to the Cessation of an Exemption under Section 21

Cancellation of Variation of Any Term or Condition of Exemption

2. Name of Applicant (English) Hong Kong Concrete Co. Ltd.

(Chinese) 港九混凝土有限公司

3. Address of Applicant Unit 2602, 26/F, 118 Connaught Road West, Hong Kong.

4. Date of Application 31 March, 2004

5. Date of Entry into Register 29 May, 2004

6. Date of Last Notice in Newspapers 29 May, 2004

* Tick the appropriate box

7. Premises Where the Specified Process is Conducted

Name of Premises		Address
English	Chinese	
Hong Kong Concrete Co. Ltd.	港九混凝土有限公司	Yau Tong Marine Lot Nos. 60 & 61, 20 Tung Yuen Street, Yau Tong, Kowloon

8. Nature of Work

Existing Licence No.	Expiry Date	Classification of Specified Process [⊙] under Application	Mode of Operation (Continuous/Batch)	Installed/ Processing* Capacity	Silo Capacity (for Cement Works Only)	Total No. Of Emission Points
N/A	N/A	Cement Works	Batch	250 m ³ /hr.	2075 Tonnes	14

9. Other Specified Processes Conducted in Same Premises

Classification of Specified Process [⊙]	Licence / Exemption*Numbers
N/A	N/A

9A. Air Pollution Control Plan under Section 14A

- a. Has the Plan been submitted Yes/No*
- b. Whether the plan is available for inspection Yes/No*

[⊙]As specified in the Schedule 1 of the Ordinance

*Delete if not appropriate

N/A Not applicable

10. Noxious or Offensive Emission*

Emission Point No.	Exhaust Gas Flow Rate (m ³ /h)		Mode of Discharge to Atmosphere											
			Exit Temperature (°C)		Fugitive Emission (Yes/No)		Discharge Exit or Chimney Height Above Ground (m)		Cross-Section of Discharge Exit or Chimney					
			1	2	1	2	1	2	Width (m)		Length (m)		Diameter (m)	
								1	2	1	2	1	2	
EP1A(1)	1550		Ambient		No		33		0.125		0.25		N/A	
EP1B(2)	1550		Ambient		No		33		0.125		0.25		N/A	
EP1C(3)	1550		Ambient		No		33		0.125		0.25		N/A	
EP1D(4)	1550		Ambient		No		33		0.125		0.25		N/A	
EP1E(5)	1550		Ambient		No		33		0.125		0.25		N/A	
EP1F(6)	1550		Ambient		No		33		0.125		0.25		N/A	
EP1G(7)	1550		Ambient		No		33		0.125		0.25		N/A	
EP1H(8)	1550		Ambient		No		28		0.125		0.25		N/A	
EP1I(9)	1550		Ambient		No		33		0.125		0.25		N/A	
EP2A(10)	1550		Ambient		No		13		0.125		0.25		N/A	
EP2B(11)	1550		Ambient		No		13		0.125		0.25		N/A	
EP2C(12)	1550		Ambient		No		13		0.125		0.25		N/A	
EP4(13)	-		Ambient		Yes		9		2.5		5		N/A	
EP9(14)	-		Ambient		Yes		0.5		-		-		N/A	

*Column 1 of each item refers to PROPOSED VALUE in the case of a new application or EXISTING VALUE if otherwise and column 2 refers to PROPOSED VARIATION.

N/A Not applicable

Emission Point No.	Details of Emission													
	Composition		Emission Rate (kg/h)				Control Equipment		Average Daily Concentration* (mg/m ³)		Maximum Concentration* (mg/m ³)		Duration of Maximum Concentration (h/d)	
			Average		Maximum				1	2	1	2	1	2
	1	2	1	2	1	2	1	2	1	2	1	2		
EP1A(1)	Dust		-		0.0775		Dust collector		-		50		12	
EP1B(2)	Dust		-		0.0775		Dust collector		-		50		12	
EP1C(3)	Dust		-		0.0775		Dust collector		-		50		12	
EP1D(4)	Dust		-		0.0775		Dust collector		-		50		12	
EP1E(5)	Dust		-		0.0775		Dust collector		-		50		12	
EP1F(6)	Dust		-		0.0775		Dust collector		-		50		12	
EP1G(7)	Dust		-		0.0775		Dust collector		-		50		12	
EP1H(8)	Dust		-		0.0775		Dust collector		-		50		12	
EP1I(9)	Dust		-		0.0775		Dust collector		-		50		12	
EP2A(10)	Dust		-		0.0775		Dust collector		-		50		12	
EP2B(11)	Dust		-		0.0775		Dust collector		-		50		12	
EP2C(12)	Dust		-		0.0775		Dust collector		-		50		12	
EP4(13)	Dust		-		-		3 sides & top enclosure & water spray		-		-		12	
EP9(14)	Dust		-		-		Road paved & wetted		-		-		12	

11. Note:

Any person may object within 30 days of notice in newspapers to the granting of the application on the grounds that the air quality objective in that area is being threatened or the emission of noxious or offensive emissions would be, or be likely to be, prejudicial to health. An objection requires the name, address, and identity of person making the objection, the address of the premises of the proposed specified process, and how the air quality objective is being threatened or how the emission of noxious or offensive emission would cause prejudice to health. Objections should be made in Form 5 in the Second Schedule to the Air Pollution Control (Specified Processes) Regulations and be forwarded to the Authority and copied to the Secretary for the Environment, Transport and Works.

*Expressed as at Standard Temperature & Pressure of 0°C and 101.325kPa.

**REGISTER OF LICENCES FOR THE CONDUCT OF A SPECIFIED
PROCESS GRANTED UNDER THE AIR POLLUTION CONTROL ORDINANCE**

Serial No.:.....R0667.....

Licence No.:.....L-3-117(6).....

1. Details of the Licence

Date of Issue	Date of Expiry	Date of Application	Serial No. of the Application	Serial No. of the Licence (if any) being Renewed
24 August 2023	23 August 2025	20 September 2022	A0596	R0587
Name of Licence Holder			Certificate of Incorporation No.	
English		Chinese		
Redland Concrete Limited		中港混凝土有限公司		165951
Name of the Premises under which the Specified Process is conducted				
Redland Concrete Limited				
Address of the Premises at which the Specified Process is conducted				
YTML 68, 6 Tung Yuen Street, Yau Tong, Kowloon				
Classification of Specified Process**		Installed/Processing* Capacity		Silo Capacity (for Cement Works only)
Cement Works		520 cubic metre per hour		6,800 tonnes plus the maximum capacity of barges/vessels at 5,000 tonnes

* Delete if not applicable.

** As specified in the First Schedule of the Ordinance

2. Variation(s) of the Licence during the Licensing Period

Date of Application	Date of Grant of Application
15 December, 1997	1 August, 1998
27 January, 1999	7 June, 1999
10 January, 2001	4 June, 2001

3. Transfer(s) of the Licence during the Licensing Period

Date of Application	Date of Grant of Application	Name of the Transferee		Identity Card/ Certificate of Incorporation* No. of the Transferee
		English	Chinese	
N.A.				

4. Cancellation of the Licence

Date of CancellationN.A.....

N. A. : Not applicable

* Delete if not applicable.

牌照登記冊
根據《空氣污染管制條例》第15條發出的
批准進行指明工序牌照

編號：.....R0667.....

牌照號碼：.....L-3-117(6).....

1. 牌照詳情

發出日期	有效期至	申請日期	申請編號	擬續期牌照(如有)編號
2023年8月24日	2025年8月24日	2022年9月20日	A0596	R0587
持牌人姓名			公司註冊證書號碼	
英文		中文		
Redland Concrete Limited		中港混凝土有限公司		165951
用作進行指明工序的樓宇名稱				
中港混凝土有限公司				
用作進行指明工序的樓宇地址				
九龍油塘海旁地段68號東源街6號				
指明工序類別**		設備的裝置/處理*能力		筒倉容量(只適用於水泥廠)
水泥工程		每小時520立方米		6,800公噸 以及躉船/船隻最大容量為5,000公噸

* 刪去不適用部分

** 在條例第一附表指定

2. 持牌期間牌照更改情況

申請日期	申請批准日期
1997年12月15日	1998年8月1日
1999年1月27日	1999年6月7日
2001年1月10日	2001年6月4日

3. 持牌期間牌照轉讓情況

申請日期	申請批准日期	承讓人姓名		承讓人的身份證 /公司 註冊證書 * 號碼
		英文	中文	
不適用				

4. 撤銷牌照

撤銷日期.....不適用.....

*刪去不適用部分

**REGISTER OF APPLICATION UNDER SECTION 14(3) (a) OF
THE AIR POLLUTION CONTROL ORDINANCE**

Serial No. : A0509

1. Type of Application*

New Licence

Renewal of Licence

Variation of Licence

Transfer of Licence

A Licence subsequent to the Cessation of an Exemption under Section 21

Cancellation of Variation of Any Term or Condition of Exemption

2. Name of Applicant (English) Redland Concrete Ltd.

(Chinese) 中港混凝土有限公司

Address of Applicant 8/F, Kaiseng Commercial Centre, 4-6 Hankow Road, Tsim Sha Tsui, Kowloon.

4. Date of Application 10 January, 2001

5. Date of Entry into Register 2 March, 2001

6. Date of Last Notice in Newspapers 2 March, 2001

* Tick the appropriate box

7. Premises Where the Specified Process is Conducted

Name of Premises		Address	Telephone No.
English	Chinese		
Redland Concrete Ltd.	中港混凝土有限公司	YTML 68, 6 Tung Yuen Street, Yau Tong, Kowloon	

8. Nature of Work

Existing Licence No.	Expiry Date	Classification of Specified Process [⊙] under Application	Mode of Operation (Continuous/Batch)	Installed/ Processing* Capacity	Silo Capacity (for Cement Works Only)	Total No. Of Emission Points
L-3-117	28 September, 2002	Cement Works	Batch	560 m ³ /hour concrete production	6800 tonne	44(existing licence) 46(proposed variation)

9. Other Specified Processes Conducted in Same Premises N/A

Classification of Specified Process [⊙]	Licence / Exemption*Numbers

9A. Air Pollution Control Plan under Section 14A

a. Has the Plan been submitted Yes/No*

b. Whether the plan is available for inspection Yes/No*

[⊙]As specified in the Schedule 1 of the Ordinance

*Delete if not appropriate

N/A Not applicable

10. Noxious or Offensive Emission*

Emission Point No.	Exhaust Gas Flow Rate (m ³ /h)		Mode of Discharge to Atmosphere											
			Exit Temperature (°C)		Fugitive Emission (Yes/No)		Discharge Exit or Chimney Height Above Ground (m)		Cross-Section of Discharge Exit or Chimney					
			1	2	1	2	1	2	Width (m)		Length (m)		Diameter (m)	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2
EP1	N.A.		Ambient		No		1		N.A.		N.A.		0.50	
EP2	1750		"		"		26		"		"		0.15	
EP3	1750		"		"		26		"		"		0.15	
EP4	1750		"		"		26		"		"		0.15	
EP5	1750		"		"		26		"		"		0.15	
EP6	200		"		"		8		"		"		0.20	
EP7	1750		"		"		10		"		"		0.15	
EP8	1750		"		"		10		"		"		0.15	
EP9	1750		"		"		10		"		"		0.15	
EP10	200		"		"		8		"		"		0.20	
EP11	N.A.		"		Yes		12		5		5		N.A.	
EP12	"		"		"		17		0.612		0.612		"	
EP13	"		"		"		26		16		12		"	
EP14	"		"		"		26		16		12		"	

*Column 1 of each item refers to PROPOSED VALUE in the case of a new application or EXISTING VALUE if otherwise and column 2 refers to PROPOSED VARIATION.

Not applicable

10. Noxious or Offensive Emission*

Emission Point No.	Exhaust Gas Flow Rate (m ³ /h)		Mode of Discharge to Atmosphere											
			Exit Temperature (°C)		Fugitive Emission (Yes/No)		Discharge Exit or Chimney Height Above Ground (m)		Cross-Section of Discharge Exit or Chimney					
	1	2	1	2	1	2	1	2	Width (m)		Length (m)		Diameter (m)	
EP15	N.A.		Ambient		Yes		0		3.46		3.46		N.A.	
EP16	“		“		“		0		0.612		0.612		“	
EP17	“		“		“		0		0.612		0.612		“	
EP18	1750		“		No		26		N.A.		N.A.		0.15	
EP19	1750		“		“		26		“		“		0.15	
EP20	200		“		“		15		“		“		0.20	
EP21	1750		“		“		12		“		“		0.15	
EP22	1750		“		“		26		“		“		0.15	
EP23	1750		“		“		26		“		“		0.15	
EP24	200		“		“		15		“		“		0.20	
EP25	1750		“		“		12		“		“		0.15	
EP26	1750		“		“		26		“		“		0.15	
EP27	1750		“		“		26		“		“		0.15	
EP28	200		“		“		15		“		“		0.20	

*Column 1 of each item refers to PROPOSED VALUE in the case of a new application or EXISTING VALUE if otherwise and column 2 refers to PROPOSED VARIATION.

N/A Not applicable

Emission Point No.	Exhaust Gas Flow Rate (m ³ /h)		Mode of Discharge to Atmosphere											
			Exit Temperature (°C)		Fugitive Emission (Yes/No)		Discharge Exit or Chimney Height Above Ground (m)		Cross-Section of Discharge Exit or Chimney					
	1	2	1	2	1	2	1	2	Width (m)		Length (m)		Diameter (m)	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2
EP29	3500		Ambicnt		No		12		0.4		0.4		N.A.	
EP30	1750		"		"		26		N.A.		N.A.		0.15	
EP31	1750		"		"		26		"		"		0.15	
EP32	200		"		"		15		"		"		0.2	
EP33	3500		"		"		12		0.4		0.4		N.A.	
EP34	N.A.		"		Yes		1		N.A.		N.A.		0.5	
EP35	200		"		No		8		"		"		0.2	
EP36	200		"		"		8		"		"		0.2	
EP37	N.A.		"		Yes		1		"		"		0.45	
EP38	200		"		No		12		"		"		0.2	
EP39	200		"		"		12		"		"		0.2	
EP40	N.A.		"		"		8		"		"		N.A.	
EP41	"		"		"		15		"		"		"	
EP42	"		"		"		24		"		"		"	
EP43	"		"		"		10		"		"		"	
EP44	"		"		"		8		3		3		"	
EP45		N.A.		Ambicnt		No		2		N.A.		N.A.		N.A.
EP46		10200		"		"		3		"		"		"

Emission Point No.	Details of Emission													
	Composition		Emission Rate (kg/h)				Control Equipment		Average Daily Concentration * (mg/m ³)		Maximum Concentration * (mg/m ³)		Duration of Maximum Concentration (h/d)	
			Average		Maximum									
	1	2	1	2	1	2	1	2	1	2	1	2		
EP15	Dust		N.A.		N.A.		Water spray		N.A.		N.A.		N.A.	
EP16	"		"		"		"		"		"		"	
EP17	"		"		"		"		"		"		"	
EP18	"		0.088		0.088		Filter		50		50		7	
EP19	"		"		"		"		"		"		"	
EP20	"		0.01		0.01		"		"		"		"	
EP21	"		0.088		0.088		"		"		"		"	
EP22	"		"		"		"		"		"		"	
EP23	"		"		"		"		"		"		"	
EP24	"		0.01		0.01		"		"		"		"	
EP25	"		0.088		0.088		"		"		"		"	
EP26	"		"		"		"		"		"		"	
EP27	"		"		"		"		"		"		"	
EP28	"		0.01		0.01		"		"		"		"	

Emission Point No.	Details of Emission													
	Composition		Emission Rate (kg/h)				Control Equipment		Average Daily Concentration* (mg/m ³)		Maximum Concentration* (mg/m ³)		Duration of Maximum Concentration (h/d)	
			Average		Maximum				1	2	1	2	1	2
	1	2	1	2	1	2	1	2	1	2	1	2		
EP29	Dust		0.175		0.175		Filter		50		50		7	
EP30	"		0.088		0.088		"		"		"		"	
EP31	"		"		"		"		"		"		"	
EP32	"		0.01		0.01		"		"		"		"	
EP33	"		0.175		0.175		"		"		"		N.A.	
EP34	"		N.A.		N.A.		Total enclosure		N.A.		N.A.		"	
EP35	"		0.01		0.01		Filter		50		50		7	
EP36	"		"		"		"		"		"		"	
EP37	"		N.A.		N.A.		Total enclosure		N.A.		N.A.		N.A.	
EP38	"		0.01		0.01		Filter		50		50		8	
EP39	"		"		"		"		"		"		"	
EP40	"		N.A.		N.A.		Total enclosure		N.A.		N.A.		N.A.	
EP41	"		"		"		"		"		"		"	
EP42	"		"		"		"		"		"		"	
EP43	"		"		"		"		"		"		"	
EP44	"		"		"		Enclosure, water spray"		"		"		"	
EP45		Dust		N.A.		N.A.		Total enclosure		N.A.		N.A.		N.A.
EP46		"		0.17		0.17		Filters		50		50		24

*Expressed as at Standard Temperature & Pressure of 0°C and 101.325kPa.

II. Note:

Any person may object within 30 days of notice in newspapers to the granting of the application on the grounds that the air quality objective in that area is being threatened or the emission of noxious or offensive emissions would be, or be likely to be, prejudicial to health. An objection requires the name, address, and identity of person making the objection, the address of the premises of the proposed specified process, and how the air quality objective is being threatened or how the emission of noxious or offensive emission would cause prejudice to health. Objections should be made in Form 5 in the Second Schedule to the Air Pollution Control (Specified Processes) Regulation 1987 and be forwarded to the Authority and copied to the Secretary for the Environment and Food.

Appendix 2.2 Calculation of Concrete Batching Plant Emissions

Calculations of Time-In-Mode (TIM) for Barge to/ from the Concrete Batching Plant (CBP)

Premise	Vessel Type	Length of Sailing Route (m) [1]	Design Speed (m/s)	Speed Under Various Mode (m/s)		Time-In-Mode (min)	
				Hotelling	Maneuvering [2]	Hotelling [3]	Maneuvering [4]
China Concrete Co. Ltd.	Barge	581.7	NA	0	3.09	60	3.14
HK Concrete Co. Ltd.	Barge	592.4	NA	0	3.09	60	3.20
Redland Concrete Ltd.	Barge	483.5	NA	0	3.09	60	2.61

Notes:

[1] Length of sailing route within 500m assessment area.

[2] No information is available from the operator. The travelling speed of sand barges with similar nature and operation mode are recorded and can be found at <https://www.marinetraffic.com>. The recorded averaged speed of sand barges (i.e. about 6 knots, 3.09m/s) is adopted in this assessment, assuming the travelling speed of the barges is the same during their journey. According to EPD's study on marine vessel (2012), the speed in maneuvering mode ranges from 1 to 8 knots (i.e. 0.51 and 4.12m/s). Therefore, the barges are travelling under maneuvering mode within the assessment area for assessment purpose.

[3] Time-In-Mode (TIM) for hotelling - As advised by the operator, there would be one barge at one time serving each CBP and the barges would stay for around one to two days then depart. Given that the long duration of stay and infrequent sailing schedule of the barges, it is assumed that there would be one barge for each CBP hotelling continuously during the operation hours as a conservative assessment.

[4] TIM for maneuvering is estimated based on the recorded averaged speed of the barges and the length of sailing route within 500m assessment area.

Emission Factor for Barge of Concrete Batching Plant (CBP)

Marine Emission

Emission Rate = Engine Power x Loading Factor x Emission Factor x Time-in -mode

Premise	Vessel Type	Engine Type	Average Engine Power (kW) [1]	Loading Factor [4]		Time-In-Mode (min) [5]		Emission Factor (g/kWh)			
				Hotelling	Maneuvering	Hotelling	Maneuvering	SO ₂ [2]	NO _x [2]	RSP [2]	FSP [2]
China Concrete Co. Ltd.	Barge	Main Engine	727	0.00	0.30	60	3.14	0.21	10.00	0.30	0.29
		Auxiliary Engine	116	0.43	0.43	60	3.14	0.21	10.00	0.40	0.39
HK Concrete Co. Ltd.	Barge	Main Engine	727	0.00	0.30	60	3.20	0.21	10.00	0.30	0.29
		Auxiliary Engine	116	0.43	0.43	60	3.20	0.21	10.00	0.40	0.39
Redland Concrete Ltd.	Barge	Main Engine	727	0.00	0.30	60	2.61	0.21	10.00	0.30	0.29
		Auxiliary Engine	116	0.43	0.43	60	2.61	0.21	10.00	0.40	0.39

Note:

[1] Engine Power for Main Engine and Auxiliary Engine - No information from operator is available. Referenced to Table 4-5 and 4-6 of the Study on Marine Vessels Emissions Inventory, February 2012, Main Engine Power and Auxiliary Engine of Barge at GRT Class >=1000 for conservative purpose.

[2] Emission Factor for Main Engine and Auxiliary Engine - No information from operator is available. Reference to EPD's Table 4-16 of the Study on Marine Vessels Emissions Inventory, February 2012, engine type of ME(Cat.1) for main engine and AE for Auxiliary Engine.

[3] The emission factor of SO₂ is corrected with the fuel sulphur content according to Section 4.2.31 of EPD's "Study on Marine Vessels Emission Inventory" using the following equation: SO₂ Emission Factor (Auxiliary Engine) = BSFC x 2 x 0.9755 x Fuel Sulphur Fraction where

BSFC of the vessel is referenced to Section 4.2.27 of EPD's "Study on Marine Vessels Emission Inventory", i.e. 213 g/kWh.

Fuel Sulphur Fraction refers to the fuel sulphur content limit of the MLD i.e. 0.05% with effective of the Air Pollution Control (Marine Light Diesel) Regulation on 1st April, 2014.

Therefore, SO₂ Emission Factor of Auxiliary Engine = 213 x 2 x 0.9755 x (0.05/100) = 0.21 g/kWh

[4] Loading Factor for Main Engine and Auxiliary Engine - No information from operator is available. Reference to EPD's Tables 4-7 and 4-10 of the Study on Marine Vessels Emissions Inventory, February 2012, vessel type of All except tug and All RTVs respectively for conservative purpose.

[5] Time-In-Mode (TIM) Estimation - Refer to Calculations of TIM for Barge to / from the concrete batching plant.

Detailed Emission Rate

Premise	Vessel Type	Engine Type	Emission Factor (kg/hour)							
			Hotelling				Maneuvering			
			SO ₂	NO _x	RSP	FSP	SO ₂	NO _x	RSP	FSP
China Concrete Co. Ltd.	Barge	Main Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.370E-03	1.141E-01	3.422E-03	3.308E-03
		Auxiliary Engine	1.04E-02	4.99E-01	2.00E-02	1.95E-02	5.420E-04	2.608E-02	1.043E-03	1.017E-03
HK Concrete Co. Ltd.	Barge	Main Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.413E-03	1.162E-01	3.485E-03	3.368E-03
		Auxiliary Engine	1.04E-02	4.99E-01	2.00E-02	1.95E-02	5.520E-04	2.656E-02	1.063E-03	1.036E-03
Redland Concrete Ltd.	Barge	Main Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.970E-03	9.480E-02	2.844E-03	2.749E-03
		Auxiliary Engine	1.04E-02	4.99E-01	2.00E-02	1.95E-02	4.505E-04	2.168E-02	8.672E-04	8.455E-04

Note:

[1] It is assumed that there would be one barge hotelling at each concrete batching plant during the operation hours.

[2] Emission = Engine Power (kW) x Loading Factor x Time-in-mode (hr) x Emission Factor (g/kWh)

e.g. NO_x emission factor of auxiliary engine under maneuvering at China Concrete Co. Ltd. (kg/hour)

= Engine Power (kW) x Loading Factor x Emission Factor (g/kWh) x Time-in-mode (hr) / 1000

= (116 x 0.43 x 10.0 x 3.246 / 60 / 1000)

= 0.02698 kg/hour

Calculations of Emission Factor for Wind Erosion within Concrete Batching Plant (CBP)

	Emission Factor	Unit	Reference
TSP =	0.85	Mg/hectare/yr	Table 11.9.4 of AP-42 S11.9

Therefore,

RSP =	0.40	Mg/hectare/yr	Multiplied by a conversion factor of 0.47 for TSP to RSP according to Table 2 of AP-42 S13.2.4
=	1.27E-06	g/sq.m/s	24 hour emission. No watering and covering are assumed in emission rate calculation as a conservative approach.
FSP =	0.06	Mg/hectare/yr	Multiplied by a conversion factor of 0.07 for TSP to FSP according to Table 2 of AP-42 S13.2.4
=	1.89E-07	g/sq.m/s	24 hour emission. No watering and covering are assumed in emission rate calculation as a conservative approach.

Calculations of Emission Factor for Paved Road within Concrete Batching Plant (CBP)

$$E = k (sL)^{0.91} \times (W)^{1.02}$$

where

E= Emission factor in grams per vehicle kilometre travelled (g/veh-km)

k= Particle size multiplier, k = 0.62 g/veh-km for RSP and 0.15 g/veh-km for FSP as defined according to Table 2 of AP42 S13.2.1-1

sL= Road surface silt loading (g/m²), as per AP-42 Table 13.2.1-3, mean silt loading for concrete batching plant is 12 g/m²

W= Average weight (ton) of vehicles travelling on road, 22 tons is assumed as full load condition

RSP Emission Factor = 0.139 g/veh-m

FSP Emission Factor = 0.034 g/veh-m

Description	Source ID	Distance (m)	Road Width (m)	Road Surface Area (m ²)	Peak Hourly Flow of Mixer Trucks ⁽¹⁾	Dust Removal Efficiency (%) ⁽²⁾	Emission Rate ⁽³⁾⁽⁵⁾	
							RSP	FSP
							(g/s/m ²)	(g/s/m ²)
China Concrete Co. Ltd. ⁽⁴⁾	L11	17	6	102	-	-	3.10E-05	7.49E-06
	L12	6	45	268	-	-	3.10E-05	7.49E-06
HK Concrete Co. Ltd.	L31	3	18	53	22	91.70%	4.01E-06	9.70E-07
	L32	37	3	113	22	91.70%	2.35E-05	5.69E-06
Redland Concrete Ltd.	L21	7	16	110	22	91.70%	4.44E-06	1.08E-06

Note:

1. Peak hourly mixer trucks count of each concrete batching plants based on site observations.
2. Calculation of Dust Removal Efficiency for HK Concrete Co. Ltd. and Redland Concrete Ltd.

$$C = 100 - \frac{0.8pdt}{i}$$

(ref.: Eq. 3-2 in Section 3.3.3 of USEPA Control of Open Fugitive Dust Sources - Final Report)

where

C = Average control efficiency, in percent

p = Potential average hourly daytime evaporation rate, 0.23676 mm/h (p = 0.0049 x 48.3189 inch is equivalent to total evaporation of 1227.3mm obtained from Hong Kong Observatory)

d = Average hourly daytime traffic rate per hour, 22 veh/hr based on site observation

t = Time between applications in hour, once in each working hour as observed during site visit

i = Application intensity, 0.5 L/m² for haul road as minimum application intensity

Therefore,

$$C = 100 - (0.8)(0.2368)(22)(1)/0.5 = \underline{91.7\%}$$

3. Emission Rate(g/s) = Emission Factor x (1- Dust Removal Efficiency) x No. of Trucks per hour x Travelling Distance/Road Surface Area

4. According to the SP License for China Concrete Co. Ltd. (L-3-194(4)), the maximum dust emission rate from paved roads is 0.215kg/hr with dust control equipment (i.e. water spray).

5. According to Table 2 of AP42 S13.2.1-1, Particle size multiplier (k) of TSP, RSP and FSP for paved road is defined as 3.23 g/veh-km, 0.62 g/veh-km and 0.15 g/veh-km, respectively. The conversion ratio of TSP to RSP and FSP for paved road has thus referenced to the particle size multiplier.

Calculations of Emission Sources within Concrete Batching Plant (CBP)

Description	Fugitive Emission (Y/N)	Source ID	Source ID from SPL	Emissions/ Parameters extracted from SP License ⁽¹⁾							Concentration	Emission Rate adjusted to Emission Concentration Limit (10 mg/m ³) ⁽²⁾⁽³⁾		Exit Velocity (m/s)	Operation Hours ⁽⁴⁾
				Exhaust Gas Flowrate (m ³ /h)	Exit Temp (K)	Emission Height (mAG)	Stack Width (m)	Stack Length (m)	Stack Diameter (m)	Max Emission Rate (kg/hr)		RSP (mg/m ³)	RSP (g/s)		
China Concrete Co. Ltd. ⁽¹⁾⁽²⁾	N	P101	1	1750	298.15	31	0.125	0.25	0.20	0.0875	26	0.00486	0.00143	15.6	0700 to 2100 (14 hours)
	N	P102	2	1750	298.15	31	0.125	0.25	0.20	0.0875	26	0.00486	0.00143	15.6	
	N	P103	3	1750	298.15	8	0.125	0.25	0.20	0.0875	26	0.00486	0.00143	15.6	
	N	P104	4	1750	298.15	8	0.125	0.25	0.20	0.0875	26	0.00486	0.00143	15.6	
	Y	P105	5 or 5a	-	298.15	6	4	4	-	0.7750	-	0.00686	0.00202	-	
	N	P106	6	1750	298.15	30	0.125	0.25	0.20	0.0875	26	0.00486	0.00143	15.6	
	N	P107	7	1750	298.15	30	0.125	0.25	0.20	0.0875	26	0.00486	0.00143	15.6	
	N	P108	8	1750	298.15	30	0.125	0.25	0.20	0.0875	26	0.00486	0.00143	15.6	
	N	P109	9	1750	298.15	30	0.125	0.25	0.20	0.0875	26	0.00486	0.00143	15.6	
	N	P110	10	3500	298.15	12	0.25	0.25	0.28	0.1750	26	0.00972	0.00286	15.6	
	N	P111	11	3500	298.15	12	0.25	0.25	0.28	0.1750	26	0.00972	0.00286	15.6	
HK Concrete Co. Ltd. ⁽¹⁾⁽²⁾	N	P301	EP1A (1)	1550	298.15	33	0.125	0.25	0.20	0.0775	26	0.00431	0.00127	13.8	0700 to 1900 (12 hours)
	N	P302	EP1B (2)	1550	298.15	33	0.125	0.25	0.20	0.0775	26	0.00431	0.00127	13.8	
	N	P303	EP1C (3)	1550	298.15	33	0.125	0.25	0.20	0.0775	26	0.00431	0.00127	13.8	
	N	P304	EP1D (4)	1550	298.15	33	0.125	0.25	0.20	0.0775	26	0.00431	0.00127	13.8	
	N	P305	EP1E (5)	1550	298.15	33	0.125	0.25	0.20	0.0775	26	0.00431	0.00127	13.8	
	N	P306	EP1F (6)	1550	298.15	33	0.125	0.25	0.20	0.0775	26	0.00431	0.00127	13.8	
	N	P307	EP1G (7)	1550	298.15	33	0.125	0.25	0.20	0.0775	26	0.00431	0.00127	13.8	
	N	P308	EP1H (8)	1550	298.15	28	0.125	0.25	0.20	0.0775	26	0.00431	0.00127	13.8	
	N	P309	EP1I (9)	1550	298.15	33	0.125	0.25	0.20	0.0775	26	0.00431	0.00127	13.8	
	N	P310	EP2A (10)	1550	298.15	13	0.125	0.25	0.20	0.0775	26	0.00431	0.00127	13.8	
	N	P311	EP2B (11)	1550	298.15	13	0.125	0.25	0.20	0.0775	26	0.00431	0.00127	13.8	
	N	P312	EP2C (12)	1550	298.15	13	0.125	0.25	0.20	0.0775	26	0.00431	0.00127	13.8	
	Y	P313	EP4(13)	-	298.15	9	2.5	5	-	0.7750	-	0.00878	0.00258	-	
Redland Concrete Ltd. ⁽¹⁾⁽²⁾	N	P201	EP2	1750	298.15	26	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	0700 to 1900 (12 hours)
	N	P202	EP3	1750	298.15	26	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	
	N	P203	EP4	1750	298.15	26	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	
	N	P204	EP5	1750	298.15	26	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	
	N	P205	EP6	200	298.15	8	-	-	0.20	0.0100	26	0.00056	0.00016	1.8	
	N	P206	EP7	1750	298.15	10	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	
	N	P207	EP8	1750	298.15	10	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	
	N	P208	EP9	1750	298.15	10	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	
	N	P209	EP10	200	298.15	8	-	-	0.20	0.0100	26	0.00056	0.00016	1.8	
	N	P210	EP18	1750	298.15	26	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	
	N	P211	EP19	1750	298.15	26	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	
	N	P212	EP20	200	298.15	15	-	-	0.20	0.0100	26	0.00056	0.00016	1.8	
	N	P213	EP21	1750	298.15	12	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	
	N	P214	EP22	1750	298.15	26	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	
	N	P215	EP23	1750	298.15	26	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	
	N	P216	EP24	200	298.15	15	-	-	0.20	0.0100	26	0.00056	0.00016	1.8	
	N	P217	EP25	1750	298.15	12	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	
	N	P218	EP26	1750	298.15	26	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	
	N	P219	EP27	1750	298.15	26	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	
	N	P220	EP28	200	298.15	15	-	-	0.20	0.0100	26	0.00056	0.00016	1.8	
	N	P221	EP29	3500	298.15	12	0.4	0.4	0.45	0.1750	26	0.00972	0.00286	6.1	
	N	P222	EP30	1750	298.15	26	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	
	N	P223	EP31	1750	298.15	26	-	-	0.15	0.0880	26	0.00486	0.00143	27.5	
N	P224	EP32	200	298.15	15	-	-	0.20	0.0100	26	0.00056	0.00016	1.8		
N	P225	EP33	3500	298.15	12	0.4	0.4	0.45	0.1750	26	0.00972	0.00286	6.1		
N	P226	EP35	200	298.15	8	-	-	0.20	0.0100	26	0.00056	0.00016	1.8		
N	P227	EP36	200	298.15	8	-	-	0.20	0.0100	26	0.00056	0.00016	1.8		
N	P228	EP38	200	298.15	12	-	-	0.20	0.0100	26	0.00056	0.00016	1.8		
N	P229	EP39	200	298.15	12	-	-	0.20	0.0100	26	0.00056	0.00016	1.8		
N	P230	EP46	10200	298.15	3	0.5	0.5	0.56	0.1700	9	0.02408	0.00708	11.3		

Note:

- No information is provided by the operators, reference has been made to the Specified Processes (SP) License (L-3-194(4) for China Concrete Co. Ltd.; L-3-218(3) for HK Concrete Co. Ltd.; and L-3-117 (6) for Redland Concrete Ltd.).
- According to Appendix B.2, General Particle Size Distributions, page B.2-13, AP-42, 1/95 version, USEPA, RSP and FSP are 51% and 15% of TSP for general concrete batching activity.
- According to Annex I of A Guidance Note on the Technical, Management and Monitoring Requirements for Specified Process - Cement Works (Concrete Batching Plant) BPM3/2(16) (February 2016), the concentration limit of Particulate Matter (PM) would be limited to 10mg/m³ for license renewal by 1 January 2018 for all plants.
- Operation hours of these three CBPs were made reference to Approved Lei Yue Mun Waterfront Enhancement Project EIA (EIA258/2018).

Appendix 2.3 Calculation of Sand Depot at Yau Tong Bay

Calculation of Emission factor for Berthing Emissions from Barge (Sand Depot)

Emission Factor is referenced from Applications for Variation of Environmental Permits (VEP-627/2023): Fill Bank at Tseung Kwan O Area 137

where

RSP Emission Factor =	8.60	g/hr/vessel	Remark
FSP Emission Factor =	8.39	g/hr/vessel	Appendix A1 of VEP-627/2023, Fill Bank at Tseung Kwan O Area 137.

Unmitigated Emission Factor, E (g/m²/s) = $\frac{\text{RSP}}{2.39\text{E-}03}$ $\frac{\text{FSP}}{2.33\text{E-}03}$

Calculation of Emission factor for Berthing Emissions from Derrick Lighter (Sand Depot)

Emission Factor is referenced from Applications for Variation of Environmental Permits (VEP-627/2023): Fill Bank at Tseung Kwan O Area 137

where

RSP Emission Factor	46.40	g/hr/vessel	Remark
FSP Emission Factor	45.30	g/hr/vessel	Appendix A1 of VEP-627/2023, Fill Bank at Tseung Kwan O Area 137.

Unmitigated Emission Factor, E (g/m²/s) = $\frac{\text{RSP}}{1.29\text{E-}02}$ $\frac{\text{FSP}}{1.26\text{E-}02}$

Calculation of Emission factor for Wind Erosion at Sand Dunes (Sand Depot)

Emission Factor is referenced to USEPA AP-42, 5th ed. 8/04 ed.: Section 11.9

where

p = Percentage active area =	100.0%		Remark
d = Number of working days per year =	365		Emission to be applied during 19:00 and 07:00 hours
TSP Emission Factor =	0.85	Mg/hectare/year of activity	USEPA AP-42, 5th ed. 8/04 ed., Section 11.9.2, Table 11.9-4 for Western Surface Coal Mining
RSP Emission Factor =	0.40	Mg/hectare/year of activity	USEPA AP-42, 5th ed. 8/04 ed., Section 13.2.4.3 TSP to RSP ratio: 0.35/0.74=0.473=47.3%
FSP Emission Factor =	0.06	Mg/hectare/year of activity	USEPA AP-42, 5th ed. 8/04 ed., Section 13.2.4.3 TSP to RSP ratio: 0.053/0.74=0.072=7.2%

Unmitigated Emission Factor, E (g/m²/day) = $\frac{\text{RSP}}{1.10\text{E-}01}$ $\frac{\text{FSP}}{1.68\text{E-}02}$
 Unmitigated Emission Factor, E (g/m²/s) = $\frac{\text{RSP}}{1.27\text{E-}06}$ $\frac{\text{FSP}}{1.94\text{E-}07}$ 24 hour emission

Appendix 2.4 Calculation of Passenger Ferry Emissions and Visiting
Frequencies

Calculations of Time-In-Mode (TIM) for Marine Vessels

Vessel Type	Journey	Length of Sailing Route (m) [1]	Design Speed (m/s)	Averaged Travelling Speed (m/s) [2]	Time-In-Mode (min)		
				Maneuvering	Hotelling [3]	Maneuvering [4]	
Sam Ka Tsuen <-> Sai Wan Ho							
Ferry	Departure	620.1	NA	2.78	5	3.72	
	Arrival	620.1	NA	2.78	5	3.72	
Sam Ka Tsuen <-> Tung Lung Chau							
Ferry	Departure	99.2	NA	2.78	5	0.59	
	Arrival	99.2	NA	2.78	5	0.59	

Notes:

[1] Length of sailing route within 500m assessment area. The entire length of the navigation route (within and outside assessment area) is indeed 1.5km and 7.5km for Sam Ka Tsuen <-> Sai Wan Ho and Sam Ka Tsuen <-> Tung Lung Chau, respectively.

[2] No information is available from the operator. The averaged travelling speed of the ferry is referenced to the approved planning application A/K15/126 (i.e. 2.78m/s) and it has been adopted for assessment purpose. According to EPD's study on marine vessel (2012), the speed in maneuvering mode ranges from 1 to 8 knots (i.e. 0.51 and 4.12m/s). Therefore, it is assumed that the kaito ferry is travelling under maneuvering mode within the assessment area for assessment purpose.

[3] TIM for hotelling is referenced to the approved planning application A/K15/126 (i.e. 5) and it has been adopted for assessment purpose.

[4] TIM for maneuvering is estimated based on the averaged speed of the ferry and the length of sailing route within 500m assessment area.

Emission Factor for Marine Vessels

Marine Emission

Emission Rate = Engine Power x Loading Factor x Emission Factor x Time-in -mode

Vessel Type	Journey	Engine Type	Engine Power (kW) [1]	Loading Factor [2]		Time-In-Mode (min) [3]		Emission Factor (g/kWh)			
				Hotelling	Maneuvering	Hotelling	Maneuvering	SO ₂ [5]	NOx [4]	RSP [4]	FSP [4]
Sam Ka Tsuen <-> Sai Wan Ho											
Ferry	Departure	Main Engine	643	0.00	0.30	5	3.72	0.21	10.00	0.30	0.29
		Auxiliary Engine	66	0.43	0.43	5	3.72	0.21	10.00	0.40	0.39
	Arrival	Main Engine	643	0.00	0.30	5	3.72	0.21	10.00	0.30	0.29
		Auxiliary Engine	66	0.43	0.43	5	3.72	0.21	10.00	0.40	0.39
Sam Ka Tsuen <-> Tung Lung Chau											
Ferry	Departure	Main Engine	643	0.00	0.30	5	0.59	0.21	10.00	0.30	0.29
		Auxiliary Engine	66	0.43	0.43	5	0.59	0.21	10.00	0.40	0.39
	Arrival	Main Engine	643	0.00	0.30	5	0.59	0.21	10.00	0.30	0.29
		Auxiliary Engine	66	0.43	0.43	5	0.59	0.21	10.00	0.40	0.39

Note:

[1] Engine Power for Main Engine - No information from operator is available. Referenced to "Other Vessel" (GRT 0-499) in Table 4-5 of the Study on Marine Vessels Emissions Inventory, February 2012.

Engine Power for Auxiliary Engine - No information from operator is available. Referenced to "Others" in Table 4-6 of the Study on Marine Vessels Emissions Inventory, February 2012.

[2] Loading Factor for Main Engine - No information from operator is available. Reference to "All except tug" in Table 4-7 of the Study on Marine Vessels Emissions Inventory, February 2012.

Loading Factor for Auxiliary Engine - No information from operator is available. Reference to "All RTVs" in Table 4-10 of the Study on Marine Vessels Emissions Inventory, February 2012.

[3] Time-In-Mode (TIM) Estimation - Refer to Calculations of TIM for Marine Vessels

[4] Emission Factor for the Propulsion Engine & Auxiliary Engine of Ferry - No information from operator is available. As a conservative approach, the emission factors for river-trade vessels from Table 4-16 of the Study on Marine Vessels Emissions Inventory, February 2012 are adopted.

[5] The emission factor of SO₂ is corrected with the fuel sulphur content according to Section 4.2.31 of EPD's "Study on Marine Vessels Emission Inventory" using the following equation: SO₂ Emission Factor (Auxiliary Engine) = BSFC x 2 x 0.9755 x Fuel Sulphur Fraction

where

BSFC of the vessel is referenced to Section 4.2.27 of EPD's "Study on Marine Vessels Emission Inventory", i.e. 213 g/kWh.

Fuel Sulphur Fraction refers to the fuel sulphur content limit of the MLD i.e. 0.05% with effective of the Air Pollution Control (Marine Light Diesel) Regulation on 1st April, 2014.

Therefore, SO₂ Emission Factor of Auxiliary Engine = 213 x 2 x 0.9755 x (0.05/100) = 0.21 g/kWh

Detailed Emission Rate

Vessel Type	Journey	Engine Type	Emission Factor (kg/hour)							
			Hotelling				Maneuvering			
			SO ₂	NOx	RSP	FSP	SO ₂	NOx	RSP	FSP
Sam Ka Tsuen <-> Sai Wan Ho										
Ferry	Departure	Main Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.48E-03	1.20E-01	3.59E-03	3.47E-03
		Auxiliary Engine	4.91E-04	2.37E-02	9.46E-04	9.22E-04	3.65E-04	1.76E-02	7.03E-04	6.86E-04
	Arrival	Main Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.48E-03	1.20E-01	3.59E-03	3.47E-03
		Auxiliary Engine	4.91E-04	2.37E-02	9.46E-04	9.22E-04	3.65E-04	1.76E-02	7.03E-04	6.86E-04
Sam Ka Tsuen <-> Tung Lung Chau										
Ferry	Departure	Main Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.97E-04	1.91E-02	5.73E-04	5.54E-04
		Auxiliary Engine	4.91E-04	2.37E-02	9.46E-04	9.22E-04	5.84E-05	2.81E-03	1.12E-04	1.10E-04
	Arrival	Main Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.97E-04	1.91E-02	5.73E-04	5.54E-04
		Auxiliary Engine	4.91E-04	2.37E-02	9.46E-04	9.22E-04	5.84E-05	2.81E-03	1.12E-04	1.10E-04

Note:

[1] Emission = Engine Power (kW) x Loading Factor x Time-in-mode (hr) x Emission Factor (g/kWh)

e.g. NOx emission factor of auxiliary engine under maneuvering (kg/hour)

= Engine Power (kW) x Loading Factor x Emission Factor (g/kWh) x Time-in-mode (hr) / 1000

= (66 x 0.43 x 10.0 x 3.72 / 60 / 1000)

= 0.0176 kg/hour

Coral Sea Ferry Service Frequency

Passenger Ferry Schedule (Sam Ka Tsuen <-> Sai Wan Ho)

Hour		Number of Activities per hour			
		Sam Ka Tsuen <-> Sai Wan Ho			
Start	End	Monday to Sunday & Public Holidays			
		Departure		Arrival	
		Hotelling	Maneuvering	Hotelling	Maneuvering
0	1				
1	2				
2	3				
3	4				
4	5				
5	6				
6	7	1		1	1
7	8	2	3	2	3
8	9	2	2	3	2
9	10	2	2	2	2
10	11	2	2	2	2
11	12	2	2	2	2
12	13	2	2	2	2
13	14	2	2	2	2
14	15	2	2	2	2
15	16	2	2	2	2
16	17	2	2	2	2
17	18	2	2	2	2
18	19	2	2	2	2
19	20	2	2	2	2
20	21	2	2	2	2
21	22	2	2	2	2
22	23	1	2	1	1
23	24				

Number of Activities Adopted in this Assessment			
Sam Ka Tsuen <-> Sai Wan Ho			
Departure		Arrival	
Hotelling	Maneuvering	Hotelling	Maneuvering
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
1	0	1	1
2	3	2	3
2	2	3	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
1	2	1	1
0	0	0	0

Notes:

- ⁽¹⁾ The daily schedule of the ferry service is reference to the operator's website (<https://www.coralseaferryservice.com.hk/timetable>); accessed on 9 March 2024.
- ⁽²⁾ The hour of arrival is determined by the departure time and hotelling duration at Sai Wan Ho Public Ferry Pier as well as sailing time to arrive the pier.
e.g. If a ferry departs Sam Ka Tsuen Public Ferry Pier at 07:00 and the total sailing time to arrive the pier & hotelling time before departure is about 13 minutes according to "Calculations of TIM for Marine Vessel connecting Sam Ka Tsuen / Sai Wan Ho / Tung Lung Chau" as referenced from Appendix 3.7 of the approved planning application A/K15/121, it will arrive Sam Ka Tsuen Public Ferry at 06:47. Hour 6-7 is then adopted as the arrival hour of the ferry.
- ⁽³⁾ The hour of departure is the hour the ferry departs at Sam Ka Tsuen Public Pier.

Passenger Ferry Schedule (Sam Ka Tsuen <-> Tung Lung Island)

Hour		Number of Activities per hour			
		Sam Ka Tsuen <-> Tung Lung Island			
		Saturday, Sunday & Public Holidays			
Start	End	Departure		Arrival	
		Hotelling	Maneuvering	Hotelling	Maneuvering
0	1				
1	2				
2	3				
3	4				
4	5				
5	6				
6	7				
7	8				
8	9	1	1		
9	10	1	1	1	1
10	11	1	1	1	1
11	12	1	1	1	1
12	13			1	1
13	14	1	1		
14	15	1	1	1	1
15	16	1	1	1	1
16	17	1	1	1	1
17	18			1	1
18	19				
19	20				
20	21				
21	22				
22	23				
23	24				

Number of Activities Adopted in this Assessment			
Sam Ka Tsuen <-> Tung Lung Island			
Departure		Arrival	
Hotelling	Maneuvering	Hotelling	Maneuvering
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
1	1	0	0
1	1	1	1
1	1	1	1
1	1	1	1
0	0	1	1
1	1	0	0
1	1	1	1
1	1	1	1
1	1	1	1
0	0	1	1
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

Notes:

- ⁽¹⁾ The daily schedule of the ferry service is reference to the operator's website (<https://www.coralseaferryservice.com.hk/timetable>); accessed on 9 March 2024.
- ⁽²⁾ The ferry services between Sam Ka Tsuen and Tung Lung Island are only provided on Saturday, Sunday & public holidays.
- ⁽³⁾ The hour of departure is the hour the ferry departs at Sam Ka Tsuen Public Pier.

Appendix 2.5 Calculation of Fishing Vessel Emissions and Visiting
Frequencies

Calculations of Time-In-Mode (TIM) for Fishing Vessels

Vessel Type	Journey	Length of Sailing Route (m) [1]	Design Speed (m/s)	Averaged Travelling Speed (m/s) [2]	Time-In-Mode (min) [3][4]	
				Maneuvering	Hotelling [3]	Slow Cruise [4]
Ferry	Departure	452.2	NA	4.12	60	1.83
	Arrival	452.2	NA	4.12	60	1.83

Notes:

[1] Length of sailing route within 500m assessment area.

[2] Averaged travelling speed of the fishing vessel was referenced AIS Marine traffic (<http://www.marinetraffic.com/>). The speed of the fishing vessels range from 8.2 to 10.2knots. 8 knots (4.12m3/h) is adopted as a conservative assumption due to the longest TIM resulted. As the design speed of the fish vessel is not available, it is assumed the vessels will be sailing under its maximum speed. Therefore, the vessel is assumed travelling under slow cruise mode within the assessment for assessment purpose.

[3] TIM for hotelling is assumed as continuous operation (i.e. 60 mins) per hour as a conservative assumption.

[4] TIM for cruising is estimated based on the averaged speed of the ferry and the length of sailing route within 500m assessment area.

Emission Factor for Marine Vessels

Marine Emission

Emission Rate = Engine Power x Loading Factor x Emission Factor x Time-in -mode

Vessel Type	Journey	Engine Type	Engine Power (kW) [1]	Loading Factor [2]		Time-In-Mode (min) [3]		Emission Factor (g/kWh)			
				Hotelling	Maneuvering	Hotelling	Maneuvering	SO ₂ [5]	NO _x [4]	RSP [4]	FSP [4]
Ferry	Departure	Main Engine	250	0.00	0.45	60	1.83	0.21	10.00	0.30	0.29
		Auxiliary Engine	83	0.43	0.43	60	1.83	0.21	10.00	0.40	0.39
	Arrival	Main Engine	250	0.00	0.45	60	1.83	0.21	10.00	0.30	0.29
		Auxiliary Engine	83	0.43	0.43	60	1.83	0.21	10.00	0.40	0.39

Note:

[1] Engine Power for Main Engine - No information from operator is available. Referenced to "Other Vessel" (GRT 0-499) in Table 4-5 of the Study on Marine Vessels Emissions Inventory, February 2012.

Engine Power for Auxiliary Engine - No information from operator is available. Referenced to "Others" in Table 4-6 of the Study on Marine Vessels Emissions Inventory, February 2012.

[2] Loading Factor for Main Engine - No information from operator is available. Reference to "All except tug" in Table 4-7 of the Study on Marine Vessels Emissions Inventory, February 2012.

Loading Factor for Auxiliary Engine - No information from operator is available. Reference to "All RTVs" in Table 4-10 of the Study on Marine Vessels Emissions Inventory, February 2012.

[3] Time-In-Mode (TIM) Estimation - Refer to Calculations of TIM for Fishing Vessel

[4] Emission Factor for the Propulsion Engine & Auxiliary Engine of Ferry - No information from operator is available. As a conservative approach, the emission factors for river-trade vessels from Table 4-16 of the Study on Marine Vessels Emissions Inventory, February 2012 are adopted.

[5] The emission factor of SO₂ is corrected with the fuel sulphur content according to Section 4.2.31 of EPD's "Study on Marine Vessels Emission Inventory" using the following equation: SO₂ Emission Factor (Auxiliary Engine) = BSFC x 2 x 0.9755 x Fuel Sulphur Fraction

where

BSFC of the vessel is referenced to Section 4.2.27 of EPD's "Study on Marine Vessels Emission Inventory", i.e. 213 g/kWh.

Fuel Sulphur Fraction refers to the fuel sulphur content limit of the MLD i.e. 0.05% with effective of the Air Pollution Control (Marine Light Diesel) Regulation on 1st April, 2014.

Therefore, SO₂ Emission Factor of Auxiliary Engine = 213 x 2 x 0.9755 x (0.05/100) = 0.21 g/kWh

Detailed Emission Rate

Vessel Type	Journey	Engine Type	Emission Factor (kg/hour)							
			Hotelling				Maneuvering			
			SO ₂	NO _x	RSP	FSP	SO ₂	NO _x	RSP	FSP
Ferry	Departure	Main Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.13E-04	3.43E-02	1.03E-03	9.95E-04
		Auxiliary Engine	7.42E-03	3.57E-01	1.43E-02	1.39E-02	2.26E-04	1.09E-02	4.35E-04	4.24E-04
	Arrival	Main Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.13E-04	3.43E-02	1.03E-03	9.95E-04
		Auxiliary Engine	7.42E-03	3.57E-01	1.43E-02	1.39E-02	2.26E-04	1.09E-02	4.35E-04	4.24E-04

Note:

[1] Emission = Engine Power (kW) x Loading Factor x Time-in-mode (hr) x Emission Factor (g/kWh)

e.g. NO_x emission factor of auxiliary engine under maneuvering (kg/hour)

= Engine Power (kW) x Loading Factor x Emission Factor (g/kWh) x Time-in-mode (hr) / 1000

= (66 x 0.43 x 10.0 x 3.72 / 60 / 1000)

= 0.0176 kg/hour

Fishing Vessels Schedule

Hour		Number of Activities per hour		
Start	End	Monday to Sunday & Public Holidays		
		Hotelling	Departure	Arrival
0	1	2	2	2
1	2	2	2	2
2	3	0	0	0
3	4	0	0	0
4	5	0	0	0
5	6	16	16	16
6	7	16	16	16
7	8	16	16	16
8	9	16	16	16
9	10	16	16	16
10	11	16	16	16
11	12	16	16	16
12	13	0	0	0
13	14	0	0	0
14	15	0	0	0
15	16	0	0	0
16	17	0	0	0
17	18	0	0	0
18	19	0	0	0
19	20	0	0	0
20	21	0	0	0
21	22	0	0	0
22	23	0	0	0
23	24	0	0	0

Notes:

1. The schedule of fishing vessels is made referenced to the approved S16 application for Proposed Residential Development in "Comprehensive Development Area (4)" Zone and "Road" at No. 18 Tung Yuen Street, Cha Kwo Ling Yau Tong, Kowloon (A/K15/121). AFCD advised that the maximum number of fishing vessels berthing can be up to 16 at 07:00 to 12:00. For assessment purposes, it is assumed that there would be 16 and 2 fishing vessels (i.e. 2 vessels for night-berthing as there would be 2 arriving / departing according to AFCD) berthing at the market during the morning and night periods, respectively.

Appendix 2.6 Extracts from Approved Planning Application A/K15/121 -
Emission Rates and Visiting Frequencies of Planned Local
Vessels

Emission Inventory (Marine Emission from Lei Yue Mun Enhancement Project)

Source	Source ID	Type	X (m)	Y (m)	Release Height [1] (m)	Exit Temperature [1] (K)	Exit velocity [1] (m/s)	Internal diameter [1] (m)	Number of Trips per Day [1]	Emission Rate per day [1]				Emission Rate per trip [1]			
										NOx	RSP	FSP	SO ₂	NOx	RSP	FSP	SO ₂
										(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)
Local Vessel landing at Sam Ka Tsuen Landing Steps	LD1	POINT	842373	816905	8	555	8	0.8	44	9.66E-01	2.24E-02	2.06E-02	1.47E-02	2.20E-02	5.10E-04	4.69E-04	3.33E-04
	LD2	POINT	842353	816873	8	555	8	0.8	88	6.16E-02	1.43E-03	1.31E-03	9.34E-04	7.00E-04	1.63E-05	1.49E-05	1.06E-05
	LD3	POINT	842333	816842	8	555	8	0.8	88	6.16E-02	1.43E-03	1.31E-03	9.34E-04	7.00E-04	1.63E-05	1.49E-05	1.06E-05
	LD4	POINT	842311	816809	8	555	8	0.8	88	6.16E-02	1.43E-03	1.31E-03	9.34E-04	7.00E-04	1.63E-05	1.49E-05	1.06E-05
	LD5	POINT	842289	816775	8	555	8	0.8	88	6.16E-02	1.43E-03	1.31E-03	9.34E-04	7.00E-04	1.63E-05	1.49E-05	1.06E-05
	LD6	POINT	842268	816741	8	555	8	0.8	88	6.16E-02	1.43E-03	1.31E-03	9.34E-04	7.00E-04	1.63E-05	1.49E-05	1.06E-05
	LD7	POINT	842246	816708	8	555	8	0.8	88	6.16E-02	1.43E-03	1.31E-03	9.34E-04	7.00E-04	1.63E-05	1.49E-05	1.06E-05
	LD8	POINT	842224	816674	8	555	8	0.8	88	6.16E-02	1.43E-03	1.31E-03	9.34E-04	7.00E-04	1.63E-05	1.49E-05	1.06E-05
	LD9	POINT	842203	816640	8	555	8	0.8	88	6.16E-02	1.43E-03	1.31E-03	9.34E-04	7.00E-04	1.63E-05	1.49E-05	1.06E-05
	LD10	POINT	842181	816607	8	555	8	0.8	88	6.46E-02	1.51E-03	1.41E-03	9.72E-04	7.34E-04	1.72E-05	1.60E-05	1.10E-05
	LD11	POINT	842160	816573	8	555	8	0.8	88	6.46E-02	1.51E-03	1.41E-03	9.72E-04	7.34E-04	1.72E-05	1.60E-05	1.10E-05
Route of SKT Ferry to/from LYM New Landing Facility	NRLF2	POINT	842383	816853	8	555	8	0.8	21	1.45E-02	3.37E-04	3.10E-04	2.20E-04	6.91E-04	1.61E-05	1.48E-05	1.05E-05
	NRLF3	POINT	842383	816813	8	555	8	0.8	21	1.45E-02	3.37E-04	3.10E-04	2.20E-04	6.91E-04	1.61E-05	1.48E-05	1.05E-05
	NRLF4	POINT	842382	816773	8	555	8	0.8	21	1.45E-02	3.37E-04	3.10E-04	2.20E-04	6.91E-04	1.61E-05	1.48E-05	1.05E-05
	NRLF5	POINT	842381	816733	8	555	8	0.8	21	1.45E-02	3.37E-04	3.10E-04	2.20E-04	6.91E-04	1.61E-05	1.48E-05	1.05E-05
	NRLF6	POINT	842381	816693	8	555	8	0.8	21	1.45E-02	3.37E-04	3.10E-04	2.20E-04	6.91E-04	1.61E-05	1.48E-05	1.05E-05
	NRLF7	POINT	842380	816653	8	555	8	0.8	21	1.45E-02	3.37E-04	3.10E-04	2.20E-04	6.91E-04	1.61E-05	1.48E-05	1.05E-05
	NRLF8	POINT	842379	816613	8	555	8	0.8	21	1.45E-02	3.37E-04	3.10E-04	2.20E-04	6.91E-04	1.61E-05	1.48E-05	1.05E-05
	NRLF9	POINT	842379	816573	8	555	8	0.8	21	1.45E-02	3.37E-04	3.10E-04	2.20E-04	6.91E-04	1.61E-05	1.48E-05	1.05E-05
	NRLF10	POINT	842378	816533	8	555	8	0.8	21	1.45E-02	3.37E-04	3.10E-04	2.20E-04	6.91E-04	1.61E-05	1.48E-05	1.05E-05
	NRLF11	POINT	842418	816536	8	555	8	0.8	21	1.45E-02	3.37E-04	3.10E-04	2.20E-04	6.91E-04	1.61E-05	1.48E-05	1.05E-05
	NRLF12	POINT	842458	816539	8	555	8	0.8	21	1.45E-02	3.37E-04	3.10E-04	2.20E-04	6.91E-04	1.61E-05	1.48E-05	1.05E-05
	NRLF13	POINT	842493	816538	8	555	8	0.8	21	2.31E-01	5.36E-03	4.92E-03	3.50E-03	1.10E-02	2.55E-04	2.34E-04	1.66E-04
	NRLF14	POINT	842504	816527	8	555	8	0.8	21	6.72E-03	1.56E-04	1.44E-04	1.02E-04	3.20E-04	7.44E-06	6.83E-06	4.85E-06
	NRLF15	POINT	842506	816513	8	555	8	0.8	21	6.72E-03	1.56E-04	1.44E-04	1.02E-04	3.20E-04	7.44E-06	6.83E-06	4.85E-06
	NRLF16	POINT	842499	816500	8	555	8	0.8	21	6.72E-03	1.56E-04	1.44E-04	1.02E-04	3.20E-04	7.44E-06	6.83E-06	4.85E-06
	NRLF17	POINT	842482	816493	8	555	8	0.8	21	6.72E-03	1.56E-04	1.44E-04	1.02E-04	3.20E-04	7.44E-06	6.83E-06	4.85E-06
	NRLF18	POINT	842465	816492	8	555	8	0.8	21	6.72E-03	1.56E-04	1.44E-04	1.02E-04	3.20E-04	7.44E-06	6.83E-06	4.85E-06
	NRLF19	POINT	842447	816496	8	555	8	0.8	21	6.72E-03	1.56E-04	1.44E-04	1.02E-04	3.20E-04	7.44E-06	6.83E-06	4.85E-06
	NRLF20	POINT	842430	816500	8	555	8	0.8	21	6.72E-03	1.56E-04	1.44E-04	1.02E-04	3.20E-04	7.44E-06	6.83E-06	4.85E-06
	NRLF21	POINT	842414	816505	8	555	8	0.8	21	6.72E-03	1.56E-04	1.44E-04	1.02E-04	3.20E-04	7.44E-06	6.83E-06	4.85E-06
	NRLF22	POINT	842396	816511	8	555	8	0.8	21	1.21E-02	2.84E-04	2.65E-04	1.83E-04	5.78E-04	1.35E-05	1.26E-05	8.70E-06
	NRLF23	POINT	842378	816517	8	555	8	0.8	21	1.21E-02	2.84E-04	2.65E-04	1.83E-04	5.78E-04	1.35E-05	1.26E-05	8.70E-06
	NRLF24	POINT	842360	816523	8	555	8	0.8	21	1.21E-02	2.84E-04	2.65E-04	1.83E-04	5.78E-04	1.35E-05	1.26E-05	8.70E-06
	NRLF25	POINT	842343	816530	8	555	8	0.8	21	1.21E-02	2.84E-04	2.65E-04	1.83E-04	5.78E-04	1.35E-05	1.26E-05	8.70E-06
	NRLF26	POINT	842326	816537	8	555	8	0.8	21	1.21E-02	2.84E-04	2.65E-04	1.83E-04	5.78E-04	1.35E-05	1.26E-05	8.70E-06
	NRLF27	POINT	842311	816545	8	555	8	0.8	21	1.21E-02	2.84E-04	2.65E-04	1.83E-04	5.78E-04	1.35E-05	1.26E-05	8.70E-06
	NRLF28	POINT	842295	816553	8	555	8	0.8	21	1.21E-02	2.84E-04	2.65E-04	1.83E-04	5.78E-04	1.35E-05	1.26E-05	8.70E-06
NRLF29	POINT	842281	816562	8	555	8	0.8	21	1.21E-02	2.84E-04	2.65E-04	1.83E-04	5.78E-04	1.35E-05	1.26E-05	8.70E-06	
Route of Tour Vessel to/from LYM New Landing Facility	LFNRG1	POINT	842287	816592	8	555	8	0.8	4	2.20E-03	5.16E-05	4.81E-05	3.31E-05	5.50E-04	1.29E-05	1.20E-05	8.29E-06
	LFNRG2	POINT	842305	816582	8	555	8	0.8	4	2.20E-03	5.16E-05	4.81E-05	3.31E-05	5.50E-04	1.29E-05	1.20E-05	8.29E-06
	LFNRG3	POINT	842322	816572	8	555	8	0.8	4	2.20E-03	5.16E-05	4.81E-05	3.31E-05	5.50E-04	1.29E-05	1.20E-05	8.29E-06
	LFNRG4	POINT	842339	816562	8	555	8	0.8	4	2.20E-03	5.16E-05	4.81E-05	3.31E-05	5.50E-04	1.29E-05	1.20E-05	8.29E-06
	LFNRG5	POINT	842357	816553	8	555	8	0.8	4	1.32E-03	3.07E-05	2.82E-05	2.00E-05	3.30E-04	7.67E-06	7.05E-06	5.01E-06
	LFNRG6	POINT	842376	816547	8	555	8	0.8	4	1.32E-03	3.07E-05	2.82E-05	2.00E-05	3.30E-04	7.67E-06	7.05E-06	5.01E-06
	LFNRG7	POINT	842396	816543	8	555	8	0.8	4	1.32E-03	3.07E-05	2.82E-05	2.00E-05	3.30E-04	7.67E-06	7.05E-06	5.01E-06
	LFNRG8	POINT	842415	816543	8	555	8	0.8	4	1.32E-03	3.07E-05	2.82E-05	2.00E-05	3.30E-04	7.67E-06	7.05E-06	5.01E-06
	LFNRG9	POINT	842432	816547	8	555	8	0.8	4	1.32E-03	3.07E-05	2.82E-05	2.00E-05	3.30E-04	7.67E-06	7.05E-06	5.01E-06
	LFNRG10	POINT	842449	816553	8	555	8	0.8	4	1.32E-03	3.07E-05	2.82E-05	2.00E-05	3.30E-04	7.67E-06	7.05E-06	5.01E-06
	LFNRG11	POINT	842468	816555	8	555	8	0.8	4	1.32E-03	3.07E-05	2.82E-05	2.00E-05	3.30E-04	7.67E-06	7.05E-06	5.01E-06
	LFNRG12	POINT	842484	816549	8	555	8	0.8	4	1.32E-03	3.07E-05	2.82E-05	2.00E-05	3.30E-04	7.67E-06	7.05E-06	5.01E-06
	LFNRG13	POINT	842493	816538	8	555	8	0.8	4	4.39E-02	1.02E-03	9.38E-04	6.66E-04	1.10E-02	2.55E-04	2.34E-04	1.66E-04
	LFNRG14	POINT	842503	816527	8	555	8	0.8	4	1.27E-03	2.96E-05	2.72E-05	1.93E-05	3.18E-04	7.39E-06	6.79E-06	4.83E-06
	LFNRG15	POINT	842506	816512	8	555	8	0.8	4	1.27E-03	2.96E-05	2.72E-05	1.93E-05	3.18E-04	7.39E-06	6.79E-06	4.83E-06
	LFNRG16	POINT	842499	816500	8	555	8	0.8	4	1.27E-03	2.96E-05	2.72E-05	1.93E-05	3.18E-04	7.39E-06	6.79E-06	4.83E-06
	LFNRG17	POINT	842482	816493	8	555	8	0.8	4	1.27E-03	2.96E-05	2.72E-05	1.93E-05	3.18E-04	7.39E-06	6.79E-06	4.83E-06
	LFNRG18	POINT	842465	816492	8	555	8	0.8	4	1.27E-03	2.96E-05	2.72E-05	1.93E-05	3.18E-04	7.39E-06	6.79E-06	4.83E-06
	LFNRG19	POINT	842447	816496	8	555	8	0.8	4	1.27E-03	2.96E-05	2.72E-05	1.93E-05	3.18E-04	7.39E-06	6.79E-06	4.83E-06
	LFNRG20	POINT	842430	816500	8	555	8	0.8	4	1.27E-03	2.96E-05	2.72E-05	1.93E-05	3.18E-04	7.39E-06	6.79E-06	4.83E-06
	LFNRG21	POINT	842414	816505	8	555											

Source	Source ID	Type	X (m)	Y (m)	Release Height [1] (m)	Exit Temperature [1] (K)	Exit velocity [1] (m/s)	Internal diameter [1] (m)	Number of Trips per Day [1]	Emission Rate per day [1]				Emission Rate per trip [1]			
										NOx	RSP	FSP	SO ₂	NOx	RSP	FSP	SO ₂
										(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)
	LFNRG29	POINT	842281	816562	8	555	8	0.8	4	2.33E-03	5.46E-05	5.09E-05	3.51E-05	5.82E-04	1.36E-05	1.27E-05	8.77E-06
Route of Government Vessel to/from LYM New Landing Facility	GOVNRG1	POINTHOR	842287	816592	6	773	8	0.7	4	2.89E-02	6.75E-04	6.27E-04	4.35E-04	7.21E-03	1.69E-04	1.57E-04	1.09E-04
	GOVNRG2	POINTHOR	842305	816582	6	773	8	0.7	4	2.89E-02	6.75E-04	6.27E-04	4.35E-04	7.21E-03	1.69E-04	1.57E-04	1.09E-04
	GOVNRG3	POINTHOR	842322	816572	6	773	8	0.7	4	2.89E-02	6.75E-04	6.27E-04	4.35E-04	7.21E-03	1.69E-04	1.57E-04	1.09E-04
	GOVNRG4	POINTHOR	842339	816562	6	773	8	0.7	4	2.89E-02	6.75E-04	6.27E-04	4.35E-04	7.21E-03	1.69E-04	1.57E-04	1.09E-04
	GOVNRG5	POINTHOR	842357	816553	6	773	8	0.7	4	4.09E-02	9.47E-04	8.65E-04	6.22E-04	1.02E-02	2.37E-04	2.16E-04	1.56E-04
	GOVNRG6	POINTHOR	842376	816547	6	773	8	0.7	4	4.09E-02	9.47E-04	8.65E-04	6.22E-04	1.02E-02	2.37E-04	2.16E-04	1.56E-04
	GOVNRG7	POINTHOR	842396	816543	6	773	8	0.7	4	4.09E-02	9.47E-04	8.65E-04	6.22E-04	1.02E-02	2.37E-04	2.16E-04	1.56E-04
	GOVNRG8	POINTHOR	842415	816543	6	773	8	0.7	4	4.09E-02	9.47E-04	8.65E-04	6.22E-04	1.02E-02	2.37E-04	2.16E-04	1.56E-04
	GOVNRG9	POINTHOR	842432	816547	6	773	8	0.7	4	4.09E-02	9.47E-04	8.65E-04	6.22E-04	1.02E-02	2.37E-04	2.16E-04	1.56E-04
	GOVNRG10	POINTHOR	842449	816553	6	773	8	0.7	4	4.09E-02	9.47E-04	8.65E-04	6.22E-04	1.02E-02	2.37E-04	2.16E-04	1.56E-04
	GOVNRG11	POINTHOR	842468	816555	6	773	8	0.7	4	4.09E-02	9.47E-04	8.65E-04	6.22E-04	1.02E-02	2.37E-04	2.16E-04	1.56E-04
	GOVNRG12	POINTHOR	842484	816549	6	773	8	0.7	4	4.09E-02	9.47E-04	8.65E-04	6.22E-04	1.02E-02	2.37E-04	2.16E-04	1.56E-04
	GOVNRG13	POINTHOR	842493	816538	6	773	8	0.7	4	6.91E-01	1.60E-02	1.46E-02	1.05E-02	1.73E-01	4.00E-03	3.66E-03	2.62E-03
	GOVNRG14	POINTHOR	842503	816527	6	773	8	0.7	4	3.94E-02	9.13E-04	8.34E-04	6.00E-04	9.86E-03	2.28E-04	2.09E-04	1.50E-04
	GOVNRG15	POINTHOR	842506	816512	6	773	8	0.7	4	3.94E-02	9.13E-04	8.34E-04	6.00E-04	9.86E-03	2.28E-04	2.09E-04	1.50E-04
	GOVNRG16	POINTHOR	842499	816500	6	773	8	0.7	4	3.94E-02	9.13E-04	8.34E-04	6.00E-04	9.86E-03	2.28E-04	2.09E-04	1.50E-04
	GOVNRG17	POINTHOR	842482	816493	6	773	8	0.7	4	3.94E-02	9.13E-04	8.34E-04	6.00E-04	9.86E-03	2.28E-04	2.09E-04	1.50E-04
	GOVNRG18	POINTHOR	842465	816492	6	773	8	0.7	4	3.94E-02	9.13E-04	8.34E-04	6.00E-04	9.86E-03	2.28E-04	2.09E-04	1.50E-04
	GOVNRG19	POINTHOR	842447	816496	6	773	8	0.7	4	3.94E-02	9.13E-04	8.34E-04	6.00E-04	9.86E-03	2.28E-04	2.09E-04	1.50E-04
	GOVNRG20	POINTHOR	842430	816500	6	773	8	0.7	4	3.94E-02	9.13E-04	8.34E-04	6.00E-04	9.86E-03	2.28E-04	2.09E-04	1.50E-04
	GOVNRG21	POINTHOR	842414	816505	6	773	8	0.7	4	3.94E-02	9.13E-04	8.34E-04	6.00E-04	9.86E-03	2.28E-04	2.09E-04	1.50E-04
	GOVNRG22	POINTHOR	842396	816511	6	773	8	0.7	4	3.05E-02	7.14E-04	6.64E-04	4.61E-04	7.64E-03	1.79E-04	1.66E-04	1.15E-04
	GOVNRG23	POINTHOR	842378	816517	6	773	8	0.7	4	3.05E-02	7.14E-04	6.64E-04	4.61E-04	7.64E-03	1.79E-04	1.66E-04	1.15E-04
	GOVNRG24	POINTHOR	842360	816523	6	773	8	0.7	4	3.05E-02	7.14E-04	6.64E-04	4.61E-04	7.64E-03	1.79E-04	1.66E-04	1.15E-04
	GOVNRG25	POINTHOR	842343	816530	6	773	8	0.7	4	3.05E-02	7.14E-04	6.64E-04	4.61E-04	7.64E-03	1.79E-04	1.66E-04	1.15E-04
	GOVNRG26	POINTHOR	842326	816537	6	773	8	0.7	4	3.05E-02	7.14E-04	6.64E-04	4.61E-04	7.64E-03	1.79E-04	1.66E-04	1.15E-04
	GOVNRG27	POINTHOR	842311	816545	6	773	8	0.7	4	3.05E-02	7.14E-04	6.64E-04	4.61E-04	7.64E-03	1.79E-04	1.66E-04	1.15E-04
	GOVNRG28	POINTHOR	842295	816553	6	773	8	0.7	4	3.05E-02	7.14E-04	6.64E-04	4.61E-04	7.64E-03	1.79E-04	1.66E-04	1.15E-04
	GOVNRG29	POINTHOR	842281	816562	6	773	8	0.7	4	3.05E-02	7.14E-04	6.64E-04	4.61E-04	7.64E-03	1.79E-04	1.66E-04	1.15E-04

Notes:

[1] Information referenced from approved EIA for Lei Yue Mun Waterfront Enhancement Project (AEIAR-219/2018).

[2] With reference to approved EIA for Lei Yue Mun Waterfront Enhancement Project (AEIAR-219/2018), the operation of the Project will commence in Q1 2023. As a conservative assumption, emission contribution from the Project is included for the Year 2022.

Daily Profile (Marine Emission from Lei Yue Mun Enhancement Project)

Hour		Number of Vessel per hour							
		Local Vessel		SKT Ferry to/from LYM New Landing Facility		Tour Vessel to/from LYM New Landing Facility		Government Vessel to/from LYM New Landing Facility	
Sources		LD1-LD11		NRLF2-NRLF29		LFNRG1-LFNRG29		GOVNRG1-GOVNRG29	
Start	End	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
0	1								
1	2								
2	3								
3	4								
4	5								
5	6								
6	7								
7	8		2						
8	9		1						
9	10		1						
10	11		2						
11	12		2						
12	13		2						
13	14		6						
14	15		3						
15	16		3						
16	17		18						
17	18		24						
18	19		17		7				
19	20		7		7		4		4
20	21				7				
21	22								
22	23								
23	24								
Total		0	88	0	21	0	4	0	4

Number of Activity Adopted in this Assessment			
Local Vessel	SKT Ferry to/from LYM New Landing Facility	Tour Vessel to/from LYM New Landing Facility	Government Vessel to/from LYM New Landing Facility
LD1-LD11	NRLF2-NRLF29	LFNRG1-LFNRG29	GOVNRG1-GOVNRG29
2			
1			
1			
2			
2			
2			
6			
3			
3			
18			
24			
17	7		
7	7	4	4
	7		
88	21	4	4

Note:
 [1] Information referenced from approved EIA for Lei Yue Mun Waterfront Enhancement Project (AEIAR-219/2018).

Appendix 2.7 Calculation of Cruise Terminal Emissions and Year 2024
Cruise Schedule

Derivation of Emission Rates and Inventory of 4km Major Point Source (Tier 3)
Marine Emission from Cruises at Kai Tak Cruise Terminal

Emission Factors for Cruises

Cruises	Engine Type	Engine Power kW	Loading Factor [5]		Emission Factor (g/kWh) [6]		
			Hotelling		NOx	RSP	FSP
Spectrum of the Seas	Main Engine [1]	67200	0		13.20	0.31	0.29
	Auxiliary Engine [3]	18682	0.416		13.90	0.32	0.29
	Boiler [4]	1000	1		2.00	0.19	0.14
Costa Serena	Main Engine [2]	75600	0		13.20	0.31	0.29
	Auxiliary Engine [3]	21017	0.416		13.90	0.32	0.29
	Boiler [4]	1000	1		2.00	0.19	0.14

Note:

[1] Engine Power for the Main Engine of Spectrum of the Seas is referenced from website https://en.wikipedia.org/wiki/Spectrum_of_the_Seas

[2] Engine Power for the Main Engine of Costa Serena is referenced from website https://www.fincantieri.com/globalassets/prodotti-servizi/navi-da-crociera/costa/scheda_costa_concordia_serena_pacifica.pdf

[3] Engine Power for the Auxiliary Engine - According to Table 3-20 of the Study on Marine Vessels Emissions Inventory, February 2012, the ratio of the engine power for the Auxiliary Engine is equal to 0.278 of the engine power of the Main Engine.

[4] Engine Power for the Boiler - According to Table 3-23 of the Study of Marine Vessels Emissions Inventory, February 2012, the engine power for the boiler of the Cruise with the passenger carrying capacity >= 2600 is adopted as the passenger carrying capacity of Costa Serena (https://www.fincantieri.com/globalassets/prodotti-servizi/navi-da-crociera/costa/scheda_costa_concordia_serena_pacifica.pdf) and Spectrum of the Seas (https://en.wikipedia.org/wiki/Spectrum_of_the_Seas) are 4890 and 4905, respectively.

[5] Loading Factor for the Main Engine - Table 3-18 of the Study on Marine Vessels Emissions Inventory, February 2012 is referred.

Loading Factor for the Auxiliary Engine - Table 3-21 of the Study on Marine Vessels Emissions Inventory, February 2012 is referred.

Loading Factor for the Boiler - 100% of loading is assumed as a conservative approach.

[6] According to the Air Pollution Control (Fuel for Vessels) Regulation, starting from 1 January 2019, all vessels except for specified vessel types as set out in the Regulation, are required to use low sulphur marine fuel (i.e. with sulphur content no exceeding 0.5% by weight).

- Emission Factor for the Main Engine - According to Table 3-27 of the Study on Marine Vessels Emissions Inventory, February 2012 (assuming the engine type of Medium Speed Diesel engine and use of marine gas oil with 0.5% sulphur content).
- Emission Factor for the Auxiliary Engine - According to Table 3-28 of the Study on Marine Vessels Emissions Inventory, February 2012 (assuming the use of marine gas oil with 0.5% sulphur content).
- Emission Factor for the Boiler - According to Table 3-29 of the Study on Marine Vessels Emissions Inventory, February 2012 (assuming the use of marine gas oil with 0.5% sulphur content).

Emission Rate (Hotelling)

Emission Rate = Engine Power x Loading Factor x Emission Factor

Cruises	Air Pollutants	Emission Rate (kg/hr)				Emission Rate for 60 mins within an hour (g/s) [1]
		Main Engine	Auxiliary Engine	Boiler	Total	
Spectrum of the Seas	NOx	0.00	108.02	2	110.02	30.56
	RSP	0.00	2.49	0.19	2.68	0.74
	FSP	0.00	2.25	0.14	2.39	0.66
Costa Serena	NOx	0.00	121.53	2	123.53	34.31
	RSP	0.00	2.80	0.19	2.99	0.83
	FSP	0.00	2.54	0.14	2.68	0.74

Note:

[1] As there is no emission factor for TSP in the Study of Marine Vessels Emissions Inventory, February 2012, the emission rate of TSP is derived from the ratio between all PM and PM10 (55% of all PM is PM10), referenced from USEPA AP-42, 5th ed. 8/04 ed., Section 1.3, Table 1.3-7 Cumulative Particle Size Distribution and Size-specific Emission Factors Uncontrolled Commercial Boilers Burning Residual Or Distillate Oil.

Name of Cruise	Frequency of Visiting HK (Times) ^[a]	Total Engine Power (kW) ^[b]	Length (m) ^[b]
Celebrity Millennium	2	50000	294
Celebrity Solstice	6	67200	317
Coral Princess	1	33600	294
Costa Deliziosa	2	54400	294
Costa Serena	19	75600	290
Diamond Princess	2	60700	290
Insignia	2	18569	181
Mein Schiff 5	7	48000	295
Mein Schiff 6	2	48000	295
MSC Bellissima	2	38400	316
Noordam	1	35200	285
Norwegian Spirit	5	58800	269
Quantum of the Seas	1	67200	347
Queen Mary 2	2	67200	345
Resorts World One	45	58800	269
Royal Princess	1	62400	330
Serenade of the Seas	2	60000	293
Spectrum of the Seas	7	67200	347
Westerdam	4	35200	285
Zuiderdam	2	35200	285
Total	115		

Sources:

[a] <https://www.kaitakcruiseterminal.com.hk/schedule/2024-2/>

[b] Information of Engine Power

Celebrity Millennium: https://en.wikipedia.org/wiki/Celebrity_Millennium

Celebrity Solstice: https://en.wikipedia.org/wiki/Celebrity_Solstice

Celebrity Solstice: <https://www.rivieramm.com/news-content-hub/news-content-hub/celebrity-solstice-goes-to-top-of-the-class-50934>

Coral Princess: <https://www.doverferryphotosforums.co.uk/mv-coral-princess-past-and-present/>

Costa Deliziosa: <https://ships.jobmarineman.com/costa-deliziosa-9398917/>

Costa Serena: https://www.fincantieri.com/globalassets/prodotti-servizi/navi-da-crociera/costa/scheda_costa_concordia_serena_pacifica.pdf

Diamond Princess: <https://ships.jobmarineman.com/diamond-princess-9228198/>

Insignia: <https://www.scheepvaartwest.be/CMS/index.php/passengers-cruise/2732-insignia-imo-9156462>

Mein Schiff 5: https://www.meyerwerft.de/en/ships/mein_schiff_5.jsp

Mein Schiff 6: https://www.meyerwerft.de/en/ships/mein_schiff_6.jsp

MSC Bellissima: https://en.wikipedia.org/wiki/MS_Bellissima

Noordam: <https://www.fincantieri.com/en/products-and-services/cruise-ships/noordam/>

Norwegian Spirit: <https://www.scheepvaartwest.be/CMS/index.php/passengers-cruise/2774-norwegian-spirit-imo-9141065>

Quantum of the Seas: https://en.wikipedia.org/wiki/Quantum_of_the_Seas

Queen Mary 2: https://en.wikipedia.org/wiki/Queen_Mary_2

Resorts World One: https://en.wikipedia.org/wiki/Resorts_World_One

Royal Princess: [https://en.wikipedia.org/wiki/Royal_Princess_\(2012\)](https://en.wikipedia.org/wiki/Royal_Princess_(2012))

Serenade of the Seas: <https://www.balticshipping.com/vessel/imo/9228344>

Spectrum of the Seas: https://en.wikipedia.org/wiki/Spectrum_of_the_Seas

Westerdam: <https://www.fincantieri.com/en/products-and-services/cruise-ships/westerdam/>

Zuiderdam: <https://www.fincantieri.com/en/products-and-services/cruise-ships/zuiderdam/>

2024年船期 2024 Ship Calls

last edit 23 Oct 2024

一月 January					
日期 Date	船名 Ship	STA	STD		zone
We 03 Jan 2024	Celebrity Solstice	0600	1730	母港 turn	A
We 03 Jan 2024	名勝世界壹號 Resorts World One	0800	1300	母港 turn	B
Fr 05 Jan 2024	名勝世界壹號 Resorts World One	1630	2100	母港 turn	B
Sa 06 Jan 2024	Westerdam	0615		母港 turn	A
Su 07 Jan 2024	Westerdam		1700		
Su 07 Jan 2024	名勝世界壹號 Resorts World One	1000	1500	母港 turn	B
Fr 12 Jan 2024	名勝世界壹號 Resorts World One	1200	2100	母港 turn	B
Su 14 Jan 2024	名勝世界壹號 Resorts World One	1000	1500	母港 turn	B
We 17 Jan 2024	名勝世界壹號 Resorts World One	0700	1300	母港 turn	B
Fr 19 Jan 2024	名勝世界壹號 Resorts World One	1600	2100	母港 turn	B
Su 21 Jan 2024	名勝世界壹號 Resorts World One	1000	1500	母港 turn	B
Fr 26 Jan 2024	名勝世界壹號 Resorts World One	1200	2100	母港 turn	B
Sa 27 Jan 2024	Celebrity Solstice	0600	1730	母港 turn	A
Su 28 Jan 2024	名勝世界壹號 Resorts World One	1000	1500	母港 turn	B
We 31 Jan 2024	名勝世界壹號 Resorts World One	0700	1300	母港 turn	B
二月 February					
日期 Date	船名 Ship	STA	STD		zone
Fr 02 Feb 2024	名勝世界壹號 Resorts World One	1600	2100	母港 turn	B
Sa 03 Feb 2024	Westerdam	0600	2100	母港 turn	A
Su 04 Feb 2024	名勝世界壹號 Resorts World One	1000	1500	母港 turn	B

Th 08 Feb 2024	Costa Serena	0730	1600	母港 turn	A
Fr 09 Feb 2024	名勝世界壹號 Resorts World One	1200	2100	母港 turn	B
Su 11 Feb 2024	名勝世界壹號 Resorts World One	1000	1500	母港 turn	B
Fr 16 Feb 2024	名勝世界壹號 Resorts World One	1200	2100	母港 turn	B
Sa 17 Feb 2024	Costa Serena	0730	1600	母港 turn	A
Su 18 Feb 2024	名勝世界壹號 Resorts World One	1000	1500	母港 turn	B
Tu 20 Feb 2024	Celebrity Solstice	0600	1730	母港 turn	A
Th 22 Feb 2024	Costa Serena	0730	1600	母港 turn	A
Fr 23 Feb 2024	名勝世界壹號 Resorts World One	1200	2100	母港 turn	B
Su 25 Feb 2024	名勝世界壹號 Resorts World One	1000	1500	母港 turn	B
Tu 27 Feb 2024	Costa Serena	1145	1600	落船 debark	A
We 28 Feb 2024	名勝世界壹號 Resorts World One	0700	1300	母港 turn	B
三月 March					
日期 Date	船名 Ship	STA	STD		zone
Fr 01 Mar 2024	名勝世界壹號 Resorts World One	1700	2100	母港 turn	B
Sa 02 Mar 2024	Westerdam	0600	2100	母港 turn	A
Su 03 Mar 2024	名勝世界壹號 Resorts World One	1000	1500	母港 turn	B
Fr 08 Mar 2024	名勝世界壹號 Resorts World One	1200	2100	母港 turn	B
Sa 09 Mar 2024	Celebrity Millennium	1430		訪問 transit	A
Su 10 Mar 2024	Celebrity Millennium		1800		A
Su 10 Mar 2024	Diamond Princess	0900	2300	訪問 transit	B
We 13 Mar 2024	Queen Mary 2	0700			A
Th 14 Mar 2024	Queen Mary 2		2000	母港 turn	A
Fr 15 Mar 2024	Celebrity Solstice	0600	1730	母港 turn	A
Fr 15 Mar 2024	名勝世界壹號 Resorts World One	1600	2100	母港 turn	B
Sa 16 Mar 2024	Zuiderdam	0630		訪問 transit	A

Su 17 Mar 2024	Zuiderdam		1530		
Su 17 Mar 2024	名勝世界壹號 Resorts World One	1000	1500	母港 turn	B
Fr 22 Mar 2024	名勝世界壹號 Resorts World One	1200	2100	母港 turn	B
Su 24 Mar 2024	名勝世界壹號 Resorts World One	0700	1300	母港 turn	B
Tu 26 Mar 2024	Mein Schiff 5	0730			A
Tu 26 Mar 2024	名勝世界壹號 Resorts World One	1600	2100	母港 turn	B
We 27 Mar 2024	Mein Schiff 5			母港 turn	A
We 27 Mar 2024	Serenade of the Seas	0600		母港 turn	B
Th 28 Mar 2024	Serenade of the Seas		1830*		B
Th 28 Mar 2024	Mein Schiff 5		1900		A
Fr 29 Mar 2024	名勝世界壹號 Resorts World One	1600	2100	母港 turn	B
Su 31 Mar 2024	名勝世界壹號 Resorts World One	1000	1500	母港 turn	B
四月 April					
日期 Date	船名 Ship	STA	STD		zone
Tu 02 Apr 2024	Costa Deliziosa	0700		訪問 transit	A
We 03 Apr 2024	Costa Deliziosa		1800		
Fr 05 Apr 2024	名勝世界壹號 Resorts World One	1200	2100	母港 turn	B
Su 07 Apr 2024	名勝世界壹號 Resorts World One	1000	1300	落船 debark	B
Su 07 Apr 2024	Insignia	1630			A
Mo 08 Apr 2024	Insignia		2100	母港 turn	A
We 10 Apr 2024	Mein Schiff 5	0400		母港 turn	A
Th 11 Apr 2024	Mein Schiff 5		1900		A
Fr 12 Apr 2024	名勝世界壹號 Resorts World One	1700	2100	登船 embark	B
Su 14 Apr 2024	名勝世界壹號 Resorts World One	1000	1500	母港 turn	B
Fr 19 Apr 2024	Royal Princess	0645	2130	訪問 transit	A
Fr 19 Apr 2024	名勝世界壹號 Resorts World One	1200	2030	母港 turn	B
Su 21 Apr 2024	名勝世界壹號 Resorts World One	1000	1500	母港 turn	B

Mo 22 Apr 2024	海洋光譜號 Spectrum of the Seas	0700		訪問 transit	A
Tu 23 Apr 2024	海洋光譜號 Spectrum of the Seas		2000		A
We 24 Apr 2024	Mein Schiff 5	0400		母港 turn	A
We 24 Apr 2024	名勝世界壹號 Resorts World One	0700	1300	母港 turn	B
Th 25 Apr 2024	Mein Schiff 5		2200		A
Fr 26 Apr 2024	名勝世界壹號 Resorts World One	1600	2100	母港 turn	B
Su 28 Apr 2024	名勝世界壹號 Resorts World One	1000	1500	母港 turn	B
五月 May					
日期 Date	船名 Ship	STA	STD		zone
Fr 03 May 2024	名勝世界壹號 Resorts World One	1200	2100	母港 turn	B
Su 05 May 2024	名勝世界壹號 Resorts World One	1200	1800	母港 turn	B
Fr 10 May 2024	名勝世界壹號 Resorts World One	1200	2100	母港 turn	B
Su 12 May 2024	名勝世界壹號 Resorts World One	1200	1800	母港 turn	B
Fr 17 May 2024	名勝世界壹號 Resorts World One	1200	2100	母港 turn	B
Su 19 May 2024	名勝世界壹號 Resorts World One	1200	2000	母港 turn	B
六月 June					
日期 Date	船名 Ship	STA	STD		zone
Su 30 Jun 2024	地中海榮耀號 MSC Bellissima	0800	2200	訪問 transit	A
七月 July					
日期 Date	船名 Ship	STA	STD		zone
Su 07 Jul 2024	地中海榮耀號 MSC Bellissima	0700	2200	訪問 transit	A
八月 August					
日期 Date	船名 Ship	STA	STD		zone
Th 22 Aug 2024	Norwegian Spirit	1745		訪問 transit	A

Fr 23 Aug 2024	Norwegian Spirit		2300		A
九月 September					
日期 Date	船名 Ship	STA	STD		zone
We 11 Sep 2024	Diamond Princess	0700	1800	訪問 transit	A
Tu 24 Sep 2024	Costa Serena	1000	1700	母港 turn	A
Sa 28 Sep 2024	Costa Serena	0730	1700	母港 turn	A
十月 October					
日期 Date	船名 Ship	STA	STD		zone
We 02 Oct 2024	Costa Serena	0900	1700	母港 turn	A
Mo 07 Oct 2024	Costa Serena	0830	1700	母港 turn	A
Sa 12 Oct 2024	Costa Serena	0830	1700	母港 turn	A
We 16 Oct 2024	Costa Serena	0830	1700	母港 turn	A
Su 20 Oct 2024	Costa Serena	0830	1700	母港 turn	A
We 23 Oct 2024	Quantum of the Seas	0600	1800	訪問 transit	B
Th 24 Oct 2024	Costa Serena	0900	1700	母港 turn	A
Fr 25 Oct 2024	Coral Princess	1200	2300	訪問 transit	A
Tu 29 Oct 2024	Costa Serena	0930	1800	母港 turn	A
十一月 November					
日期 Date	船名 Ship	STA	STD		zone
Sa 02 Nov 2024	Costa Serena	0930	1800	母港 turn	A
We 06 Nov 2024	Costa Serena	0830	1700	母港 turn	A
Su 10 Nov 2024	Noordam	0600	1600	母港 turn	B
Su 10 Nov 2024	Costa Serena	0830	1700	母港 turn	A
Th 14 Nov 2024	Costa Serena	1300		落船 debark	A
Fr 15 Nov 2024	Costa Serena		0900		
Fr 15 Nov 2024	Celebrity Solstice	0600	1730	母港 turn	B

十二月 December					
日期 Date	船名 Ship	STA	STD		zone
Fr 06 Dec 2024	海洋光譜號 Spectrum of the Seas	0600	1600	母港 turn	A
Mo 09 Dec 2024	Celebrity Solstice	0600	1730	母港 turn	A
Mo 09 Dec 2024	Norwegian Spirit	1100			
Tu 10 Dec 2024	Norwegian Spirit			母港 turn	B
We 11 Dec 2024	Norwegian Spirit		1500		
We 11 Dec 2024	海洋光譜號 Spectrum of the Seas	0700	1700	母港 turn	A
Su 15 Dec 2024	海洋光譜號 Spectrum of the Seas	0600	1600	母港 turn	A
Fr 20 Dec 2024	海洋光譜號 Spectrum of the Seas	0700	1700	母港 turn	A
Fr 20 Dec 2024	Costa Serena	0900	1500	母港 turn	B
We 25 Dec 2024	Mein Schiff 6	0700		訪問 transit	A
Th 26 Dec 2024	Mein Schiff 6		2200		
Su 29 Dec 2024	海洋光譜號 Spectrum of the Seas	0630	1600	母港 turn	A

*Will depart via central fairway. 此郵輪將於預定啟航時間開航後在海港中部通航。

A() A(), A(), **W3C** ^{WAI-aa}
(<http://www.w3.org/WAI/WCAG2AA-Conformance>)

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[Web for All \(http://www.ogcio.gov.hk/en/community/web_accessibility/recognition_scheme/\)](http://www.ogcio.gov.hk/en/community/web_accessibility/recognition_scheme/) 無障礙網頁
[\(http://www.ogcio.gov.hk/tc/community/web_accessibility/recognition_scheme/\)](http://www.ogcio.gov.hk/tc/community/web_accessibility/recognition_scheme/)

[香港天文台 \(http://www.weather.gov.hk/contentc.htm\)](http://www.weather.gov.hk/contentc.htm), HK WEATHER FORECAST  [\(http://www.weather.gov.hk/contente.htm\)](http://www.weather.gov.hk/contente.htm)

Appendix 2.8 Input Parameters of Industrial and Marine Sources in
AERMOD

Input Parameters of Industrial Emission Sources in AERMOD

Concrete Batching Plant - Point Source

Description ⁽¹⁾	ID	X	Y	Ground mPD	RSP	FSP	Emission Height	Exit Temp	Exit Velocity	Stack Diameter	Operation Hours
					g/s	g/s	mAG	K	m/s	m	
China Concrete Co. Ltd.	P101	842301	817005	4.5	4.86E-03	1.43E-03	31	298.15	15.6	0.20	0700-2100
	P102	842298	817002	4.5	4.86E-03	1.43E-03	31	298.15	15.6	0.20	
	P103	842300	817009	4.5	4.86E-03	1.43E-03	8	298.15	15.6	0.20	
	P104	842294	817003	4.5	4.86E-03	1.43E-03	8	298.15	15.6	0.20	
	P106	842307	817023	4.5	4.86E-03	1.43E-03	30	298.15	15.6	0.20	
	P107	842309	817025	4.5	4.86E-03	1.43E-03	30	298.15	15.6	0.20	
	P108	842314	817030	4.5	4.86E-03	1.43E-03	30	298.15	15.6	0.20	
	P109	842312	817028	4.5	4.86E-03	1.43E-03	30	298.15	15.6	0.20	
	P110	842313	817029	4.5	9.72E-03	2.86E-03	12	298.15	15.6	0.28	
	P111	842308	817024	4.5	9.72E-03	2.86E-03	12	298.15	15.6	0.28	
	HK Concrete Co. Ltd.	P301	842273	817039	4.5	4.31E-03	1.27E-03	33	298.15	13.8	
P302		842271	817036	4.5	4.31E-03	1.27E-03	33	298.15	13.8	0.20	
P303		842276	817036	4.5	4.31E-03	1.27E-03	33	298.15	13.8	0.20	
P304		842278	817034	4.5	4.31E-03	1.27E-03	33	298.15	13.8	0.20	
P305		842276	817032	4.5	4.31E-03	1.27E-03	33	298.15	13.8	0.20	
P306		842282	817029	4.5	4.31E-03	1.27E-03	33	298.15	13.8	0.20	
P307		842280	817027	4.5	4.31E-03	1.27E-03	33	298.15	13.8	0.20	
P308		842289	817024	4.5	4.31E-03	1.27E-03	28	298.15	13.8	0.20	
P309		842295	817030	4.5	4.31E-03	1.27E-03	33	298.15	13.8	0.20	
P310		842279	817042	4.5	4.31E-03	1.27E-03	13	298.15	13.8	0.20	
P311		842282	817039	4.5	4.31E-03	1.27E-03	13	298.15	13.8	0.20	
P312		842286	817035	4.5	4.31E-03	1.27E-03	13	298.15	13.8	0.20	
Redland Concrete Ltd.	P201	842116	817205	4.5	4.86E-03	1.43E-03	26	298.15	27.5	0.15	0700-1900
	P202	842127	817210	4.5	4.86E-03	1.43E-03	26	298.15	27.5	0.15	
	P203	842133	817213	4.5	4.86E-03	1.43E-03	26	298.15	27.5	0.15	
	P204	842141	817216	4.5	4.86E-03	1.43E-03	26	298.15	27.5	0.15	
	P205	842134	817226	4.5	5.56E-04	1.63E-04	8	298.15	1.8	0.20	
	P206	842136	817214	4.5	4.86E-03	1.43E-03	10	298.15	27.5	0.15	
	P207	842124	817209	4.5	4.86E-03	1.43E-03	10	298.15	27.5	0.15	
	P208	842122	817208	4.5	4.86E-03	1.43E-03	10	298.15	27.5	0.15	
	P209	842122	817218	4.5	5.56E-04	1.63E-04	8	298.15	1.8	0.20	
	P210	842128	817227	4.5	4.86E-03	1.43E-03	26	298.15	27.5	0.15	
	P211	842128	817227	4.5	4.86E-03	1.43E-03	26	298.15	27.5	0.15	
	P212	842128	817227	4.5	5.56E-04	1.63E-04	15	298.15	1.8	0.20	
	P213	842128	817227	4.5	4.86E-03	1.43E-03	12	298.15	27.5	0.15	
	P214	842130	817221	4.5	4.86E-03	1.43E-03	26	298.15	27.5	0.15	
	P215	842130	817221	4.5	4.86E-03	1.43E-03	26	298.15	27.5	0.15	
	P216	842130	817221	4.5	5.56E-04	1.63E-04	15	298.15	1.8	0.20	
	P217	842130	817221	4.5	4.86E-03	1.43E-03	12	298.15	27.5	0.15	
	P218	842118	817226	4.5	4.86E-03	1.43E-03	26	298.15	27.5	0.15	
	P219	842118	817226	4.5	4.86E-03	1.43E-03	26	298.15	27.5	0.15	
	P220	842118	817226	4.5	5.56E-04	1.63E-04	15	298.15	1.8	0.20	
	P221	842118	817226	4.5	9.72E-03	2.86E-03	12	298.15	6.1	0.45	
	P222	842123	817228	4.5	4.86E-03	1.43E-03	26	298.15	27.5	0.15	
	P223	842123	817228	4.5	4.86E-03	1.43E-03	26	298.15	27.5	0.15	
P224	842123	817228	4.5	5.56E-04	1.63E-04	15	298.15	1.8	0.20		
P225	842123	817228	4.5	9.72E-03	2.86E-03	12	298.15	6.1	0.45		
P226	842134	817226	4.5	5.56E-04	1.63E-04	8	298.15	1.8	0.20		
P227	842125	817219	4.5	5.56E-04	1.63E-04	8	298.15	1.8	0.20		
P228	842130	817221	4.5	5.56E-04	1.63E-04	12	298.15	1.8	0.20		
P229	842123	817228	4.5	5.56E-04	1.63E-04	12	298.15	1.8	0.20		
P230	842100	817199	4.5	2.41E-02	7.08E-03	3	298.15	11.3	0.56		

Note:

1. Please refer to "Calculations of Emission Sources within Concrete Batching Plant (CBP)" for details.

Concrete Batching Plant - Area Source

Description ⁽¹⁾	ID	X	Y	Z	RSP	FSP	Release Height	X length	Y length	Source Angle	Plume Height	Operation Hours
					g/s-m ²	g/s-m ²	mAG	m	m	degree clockwise from N.	m	
China Concrete Co. Ltd.	P105 ⁽¹⁾	842282	817004	4.5	6.86E-03	2.02E-03	6.0	4	4	136	0	0700-2100
	L11 ⁽²⁾	842311	817033	4.5	3.10E-05	7.49E-06	0.5	17	6	45	0	
	L12 ⁽²⁾	842293	816992	4.5	3.10E-05	7.49E-06	0.5	6	45	46	0	
HK Concrete Co. Ltd.	P313 ⁽¹⁾	842266	817019	4.5	8.78E-03	2.58E-03	9.0	3	5	135	0	0700-1900
	L31 ⁽²⁾	842300	817044	4.5	4.01E-06	9.70E-07	0.5	3	18	-43	0	
	L32 ⁽²⁾	842273	817018	4.5	2.35E-05	5.69E-06	0.5	37	3	-44	0	
Redland Concrete Ltd.	L21 ⁽²⁾	842149	817213	4.5	4.44E-06	1.08E-06	0.5	7	16	-26	0	0700-1900

Note:

1. Please refer to "Calculations of Emission Sources within Concrete Batching Plant (CBP)" for details.

2. Please refer to "Calculations of Emission Factor for Paved Road within Concrete Batching Plant (CBP)" for details.

Wind Erosion of Sand Barge - Area Source

Description ⁽¹⁾⁽²⁾	ID	X	Y	RSP	FSP	Release Height	X length	Y length	Source Angle	Plume Height	Operation Hours
				g/s-m ²	g/s-m ²	mAG	m	m	degree clockwise from N.	m	
China Concrete Co. Ltd.	SB01	842232.7	816960.7	1.27E-06	1.89E-07	1.5	20	50	46	0	Full day
HK Concrete Co. Ltd.	SB02	842214.2	816979.4	1.27E-06	1.89E-07	1.5	20	50	46	0	Full day
Redland Concrete Ltd.	SB04	842026.2	817196.7	1.27E-06	1.89E-07	1.5	20	50	71	0	Full day

Notes:

1. All parameters of Wind Erosion of Sand Barge of concrete batching plants are referenced to the approved S16 application for Proposed Residential Development in "Comprehensive Development Area (4)" Zone and "Road" at No. 18 Tung Yuen Street, Cha Kwo Ling Yau Tong, Kowloon (A/K15/121) (extracted in Appendix 2.3).

2. Mean Sea Level is 1.5m, referenced to 2016 data of Hong Kong Observatory.

3. Details of RSP and FSP emission rates were shown in "Calculations of Emission Factor for Wind Erosion within Concrete Batching Plant (CBP)".

Yau Tong Bay Sand Depot - Point Source

Description ⁽¹⁾⁽²⁾	ID	X	Y	RSP	FSP	Release Height ⁽¹⁾	Exit Temp ⁽¹⁾	Area (4)	Approximate Air Flow Volume of Dust Collector	Discharge rate at Exit Temp. (2)	Exit Velocity (3)	Equiv. Stack dia. (5)	Operation Hours
				g/s-m ²	g/s-m ²	mAG	K	m ²	m ³ /h	m ³ /s	m/s	m	
Berthing Emission from Barge	YTBEP1	842292.8	817633.0	2.39E-03	2.33E-03	15.0	803.0	0.07	2.036	0.57	8.0	0.30	0700-1900
Berthing Emission from Derrick Lighter	YTBEP2	842291.8	817615.2	1.29E-02	1.26E-02	9.0	795.0	0.02	509	0.14	8.0	0.15	

Notes:

1. Referenced from Appendix A1 of VEP-627/2023, Fill Bank at Tseung Kwan O Area 137.

2. The discharge rate is calculated by Area * Exit Velocity

3. Exit velocity referenced from Appendix A1 of VEP-627/2023, Fill Bank at Tseung Kwan O Area 137.

4. Area is calculated by m²

5. The stack diameter is referenced from Appendix A1 of VEP-627/2023, Fill Bank at Tseung Kwan O Area 137.

Wind Erosion at Yau Tong Bay Sand Depot - Area Source

Description ⁽¹⁾⁽²⁾	ID	X	Y	RSP	FSP	Release Height	X length	Y length	Source Angle	Plume Height	Operation Hours
				g/s-m ²	g/s-m ²	mAG	m	m	degree clockwise from N.	m	
Wind Erosion at Yau Tong Bay Sand Depot	WE01	842334.3	817646.9	1.27E-06	1.94E-07	0.5	21	48	63	0	Full day

Note:

1. Please refer to "Calculation of Emission factor for Berthing Emissions from Barge (Sand Depot)" for details.

Input Parameters of Marine Emission Sources in AERMOD

Marine Emission - Passenger Ferry (Sam Ka Tsuen <-> Tung Lung Island)

Description ⁽¹⁾⁽²⁾	ID	Source Type	X	Y	SO2	NOx	RSP	FSP	Exit Temperature	Exit Velocity	Internal diameter	Release Height	Operation Hours
					g/s	g/s	g/s	g/s	K	m/s	m	mAG	
Passenger Ferry - Hotelling (Sam Ka Tsuen <-> Tung Lung Island)	TLC1001	POINT	842381	816883	1.37E-04	6.57E-03	2.63E-04	2.56E-04	555	8	0.8	8	Please refer to Appendix 2.4 for the coral sea ferry frequency
Passenger Ferry - Maneuvering (Sam Ka Tsuen <-> Tung Lung Island)	TLC1002	POINT	842374	816865	2.55E-05	1.23E-03	3.85E-05	3.72E-05	555	8	0.8	8	
	TLC1003	POINT	842366	816846	2.55E-05	1.23E-03	3.85E-05	3.72E-05	555	8	0.8	8	
	TLC1004	POINT	842359	816828	2.55E-05	1.23E-03	3.85E-05	3.72E-05	555	8	0.8	8	
	TLC1005	POINT	842351	816809	2.55E-05	1.23E-03	3.85E-05	3.72E-05	555	8	0.8	8	
	TLC1006	POINT	842344	816791	2.55E-05	1.23E-03	3.85E-05	3.72E-05	555	8	0.8	8	
	TLC1007	POINT	842336	816772	2.55E-05	1.23E-03	3.85E-05	3.72E-05	555	8	0.8	8	
	TLC1008	POINT	842329	816754	2.55E-05	1.23E-03	3.85E-05	3.72E-05	555	8	0.8	8	
	TLC1009	POINT	842321	816735	2.55E-05	1.23E-03	3.85E-05	3.72E-05	555	8	0.8	8	
	TLC1010	POINT	842314	816717	2.55E-05	1.23E-03	3.85E-05	3.72E-05	555	8	0.8	8	
	TLC1011	POINT	842306	816698									

Marine Emission - Passenger Ferry (Sam Ka Tsuen <-> Sai Wan Ho)

Description ⁽¹⁾	ID	Source Type	X	Y	SO2	NOx	RSP	FSP	Exit Temperature	Exit Velocity	Internal diameter	Release Height	Operation Hours
					g/s	g/s	g/s	g/s	K	m/s	m	mAG	
Passenger Ferry - Hotelling (Sam Ka Tsuen <-> Sai Wan Ho)	SWH01	POINT	842377	816887	1.37E-04	6.57E-03	2.63E-04	2.56E-04	555	8	0.8	8	Please refer to Appendix 2.4 for the coral sea ferry frequency
Passenger Ferry - Maneuvering (Sam Ka Tsuen <-> Sai Wan Ho)	SWH02	POINT	842360	816876	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH03	POINT	842342	816868	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH04	POINT	842323	816862	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH05	POINT	842304	816857	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH06	POINT	842284	816852	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH07	POINT	842264	816848	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH08	POINT	842245	816844	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH09	POINT	842225	816840	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH10	POINT	842206	816835	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH11	POINT	842186	816831	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH12	POINT	842167	816826	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH13	POINT	842148	816821	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH14	POINT	842128	816816	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH15	POINT	842109	816812	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH16	POINT	842089	816807	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH17	POINT	842069	816802	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH18	POINT	842049	816800	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH19	POINT	842029	816808	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH20	POINT	842009	816809	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH21	POINT	841989	816809	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH22	POINT	841969	816810	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH23	POINT	841949	816811	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH24	POINT	841929	816812	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH25	POINT	841909	816813	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH26	POINT	841890	816815	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH27	POINT	841870	816817	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH28	POINT	841850	816819	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH29	POINT	841830	816821	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH30	POINT	841810	816823	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH31	POINT	841790	816825	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	
	SWH32	POINT	841750	816829	2.55E-05	1.23E-03	3.84E-05	3.72E-05	555	8	0.8	8	

Notes:
1. No information from the operator is available. Ferry information including release height, exit temperature, exit velocity and internal diameter of its chimney is referenced to Appendix 3.5 of approved Lei Yue Mun Waterfront Enhancement Project EIA (EIA-258/2018).

Marine Emission - Barges

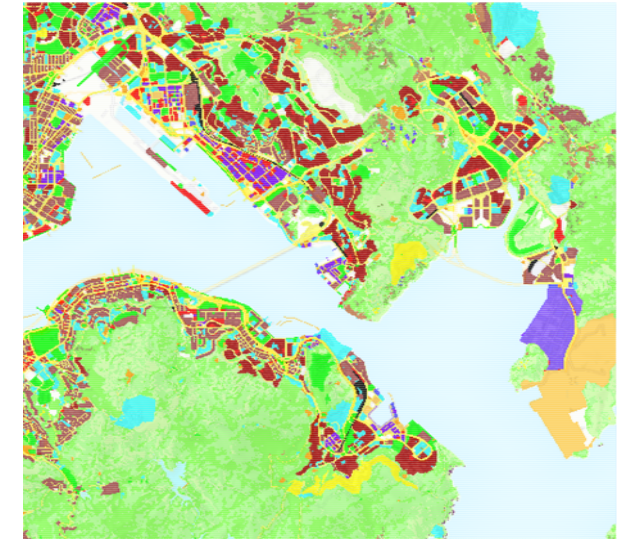
Description	ID	Type	X	Y	SO2	NOx	RSP	FSP	Exit Temperature ⁽¹⁾	Exit Velocity ⁽¹⁾	Internal diameter ⁽¹⁾	Release Height ⁽¹⁾	Operation Hours
					g/s	g/s	g/s	g/s	K	m/s	m	mAG	
Barge - Hotelling (China Concrete Co. Ltd.)	B01	POINT	842267	816980	2.88E-03	1.39E-01	5.54E-03	5.40E-03	555	25	0.8	8	0700 - 2100
Barge - Maneuvering (China Concrete Co. Ltd.)	CC01	POINT	842253	816965	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC02	POINT	842237	816953	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC03	POINT	842220	816945	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC04	POINT	842200	816941	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC05	POINT	842181	816937	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC06	POINT	842161	816933	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC07	POINT	842143	816927	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC08	POINT	842122	816922	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC09	POINT	842106	816918	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC10	POINT	842083	816914	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC11	POINT	842063	816911	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC12	POINT	842044	816906	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC13	POINT	842024	816903	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC14	POINT	842003	816898	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC15	POINT	841983	816897	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC16	POINT	841963	816896	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC17	POINT	841943	816895	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC18	POINT	841923	816894	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC19	POINT	841903	816893	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC20	POINT	841883	816893	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC21	POINT	841863	816893	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC22	POINT	841843	816893	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC23	POINT	841823	816893	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC24	POINT	841803	816893	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC25	POINT	841783	816893	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC26	POINT	841763	816893	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC27	POINT	841743	816893	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC28	POINT	841723	816893	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
	CC29	POINT	841683	816893	2.79E-05	1.34E-03	4.28E-05	4.14E-05	555	25	0.8	8	
Barge - Hotelling (HK Concrete Co. Ltd.)	B02	POINT	842248	816999	2.88E-03	1.39E-01	5.54E-03	5.40E-03	555	25	0.8	8	0700 - 1900
Barge - Maneuvering (HK Concrete Co. Ltd.)	SW01	POINT	842233	816985	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW02	POINT	842214	816978	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW03	POINT	842194	816973	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW04	POINT	842174	816969	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW05	POINT	842154	816965	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW06	POINT	842134	816961	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW07	POINT	842115	816954	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW08	POINT	842095	816950	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW09	POINT	842075	816945	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW10	POINT	842055	816941	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW11	POINT	842035	816937	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW12	POINT	842016	816933	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW13	POINT	841995	816930	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW14	POINT	841975	816928	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW15	POINT	841955	816928	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW16	POINT	841935	816928	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW17	POINT	841914	816928	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW18	POINT	841894	816927	2.84E-05	1.37E-03	4.36E-05	4.22E-05	555	25	0.8	8	
	SW19	POINT	841873	816927	2.84E-05	1.37E-03	4.36E-05						

Appendix 2.9 Detailed calculations of Albedo, Bowen ratio and surface roughness generated by Smart Air Modelling Platform (SAMP v2.0)

Code	Co	Hong Kong Planning Department Classification	Roughness	Albedo	Bowen Ratio	Grid Count	Percent	Albedo x Percent	b^An/Sn
1		Private Residential	1	0.18	1.5	51963	5.20%	0.00935334	1.021292706
2		Public Residential	1	0.18	1.5	51573	5.16%	0.00928314	1.02113122
3		Rural Settlement	0.375	0.165	0.9	7422	0.74%	0.00122463	0.99921832
11		Commercial/Business and Office	1	0.18	1.5	10727	1.07%	0.00193086	1.004358897
21		Industrial Land	0.7	0.18	1.5	8613	0.86%	0.00155034	1.003498376
22		Industrial Estates/Science and Technology Parks	0.7	0.18	1.5	8562	0.86%	0.00154116	1.003477625
23		Warehouse and Open Storage	0.7	0.18	1.5	1644	0.16%	0.00029592	1.000666807
31		Government, Institutional and Community Facilities	0.7	0.18	1.5	41968	4.20%	0.00755424	1.017162166
32		Open Space and Recreation	0.04	0.15	1	38799	3.88%	0.00581985	1
41		Roads and Transport Facilities	0.7	0.18	1.5	76899	7.69%	0.01384182	1.031671045
42		Railways	0.7	0.18	1.5	2462	0.25%	0.00044316	1.000998754
43		Airport	0.07	0.18	1.5	0	0.00%	0	1
44		Port Facilities	0.7	0.18	1.5	271	0.03%	0.00004878	1.000109887
51		Cemeteries/Funeral Facilities	0.7	0.18	1.5	8698	0.87%	0.00156564	1.003532962
52		Utilities	0.7	0.18	1.5	6422	0.64%	0.00115596	1.00260729
53		Vacant Land/Construction in Progress	0.2	0.18	1	36593	3.66%	0.00658674	1
54		Others	0.2	0.18	1	20700	2.07%	0.003726	1
61		Agricultural Land	0.1575	0.18	0.55	5913	0.59%	0.00106434	0.996471231
62		Fish Ponds/Gei Wais	0.001	0.1	0.1	0	0.00%	0	1
71		Woodland	1.05	0.1625	0.75	170154	17.02%	0.027650025	0.952228497
72		Shrubland	0.3	0.18	1.25	110622	11.06%	0.01991196	1.024991773
73		Grassland	0.065	0.185	0.8	63033	6.30%	0.011661105	0.986033048
74		Mangrove/Swamp	0.065	0.14	0.225	7	0.00%	0.00000098	0.999989558
81		Badland	0.15	0.1625	0.75	0	0.00%	0	1
83		Rocky Shore	0.05	0.2	4.75	212	0.02%	0.0000424	1.000330381
91		Reservoirs	0.001	0.1	0.1	1940	0.19%	0.000194	0.995542947
92		Streams and Nullahs	0.001	0.1	0.1	829	0.08%	0.0000829	0.998092978
99		SZ Residential *	1	0.18	1.5	0	0.00%	0	1
0		Open Sea *	0.001	0.1	0.1	273974	27.40%	0.0273974	0.532140116
			0.153927	0.565437		1000000			

* Non-PlanD Land Utilization categories

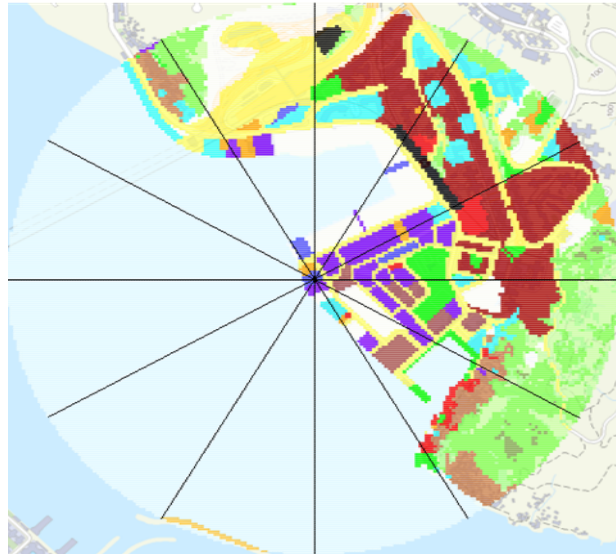
Center: X=842105, Y=817255, Z=5.0, Met Year=2019;



Land Utilization in Hong Kong 2023

Angle	Group	Inverse-distance	Roughness
0	0 - 30	5.176452751	0.087019
30	30 - 60	5.31768931	0.431486
60	60 - 90	5.176452751	0.595389
90	90 - 120	5.176452751	0.392559
120	120 - 150	5.31768931	0.139597
150	150 - 180	5.176452751	0.002000
180	180 - 210	5.176452751	0.001456
210	210 - 240	5.31768931	0.001463
240	240 - 270	5.176452751	0.001180
270	270 - 300	5.176452751	0.001220
300	300 - 330	5.31768931	0.005581
330	330 - 360	5.176452751	0.070439

Center: X=842105, Y=817255, Z=5.0; Met Year=2019;



Land Utilization in Hong Kong 2023

Code	Co	Hong Kong Planning Department Classification	Roughness	Albedo	Bowen Ratio
1		Private Residential	1	0.18	1.5
2		Public Residential	1	0.18	1.5
3		Rural Settlement	0.375	0.165	0.9
11		Commercial/Business and Office	1	0.18	1.5
21		Industrial Land	0.7	0.18	1.5
22		Industrial Estates/Science and Technology Parks	0.7	0.18	1.5
23		Warehouse and Open Storage	0.7	0.18	1.5
31		Government, Institutional and Community Facilities	0.7	0.18	1.5
32		Open Space and Recreation	0.04	0.15	1
41		Roads and Transport Facilities	0.7	0.18	1.5
42		Railways	0.7	0.18	1.5
43		Airport	0.07	0.18	1.5
44		Port Facilities	0.7	0.18	1.5
51		Cemeteries/Funeral Facilities	0.7	0.18	1.5
52		Utilities	0.7	0.18	1.5
53		Vacant Land/Construction in Progress	0.2	0.18	1
54		Others	0.2	0.18	1
61		Agricultural Land	0.1575	0.18	0.55
62		Fish Ponds/Gei Wais	0.001	0.1	0.1
71		Woodland	1.05	0.1625	0.75
72		Shrubland	0.3	0.18	1.25
73		Grassland	0.065	0.185	0.8
74		Mangrove/Swamp	0.065	0.14	0.225
81		Badland	0.15	0.1625	0.75
83		Rocky Shore	0.05	0.2	4.75
91		Reservoirs	0.001	0.1	0.1
92		Streams and Nullahs	0.001	0.1	0.1
99		SZ Residential *	1	0.18	1.5
0		Open Sea *	0.001	0.1	0.1

* Non-PlanD Land Utilization categories

Appendix 2.10 Summary of Met Data generated by Smart Air Modelling
Platform (SAMP v2.0)

Appendix 2.11 Year 2047 Traffic Forecasts for Air Quality Impact
Assessment

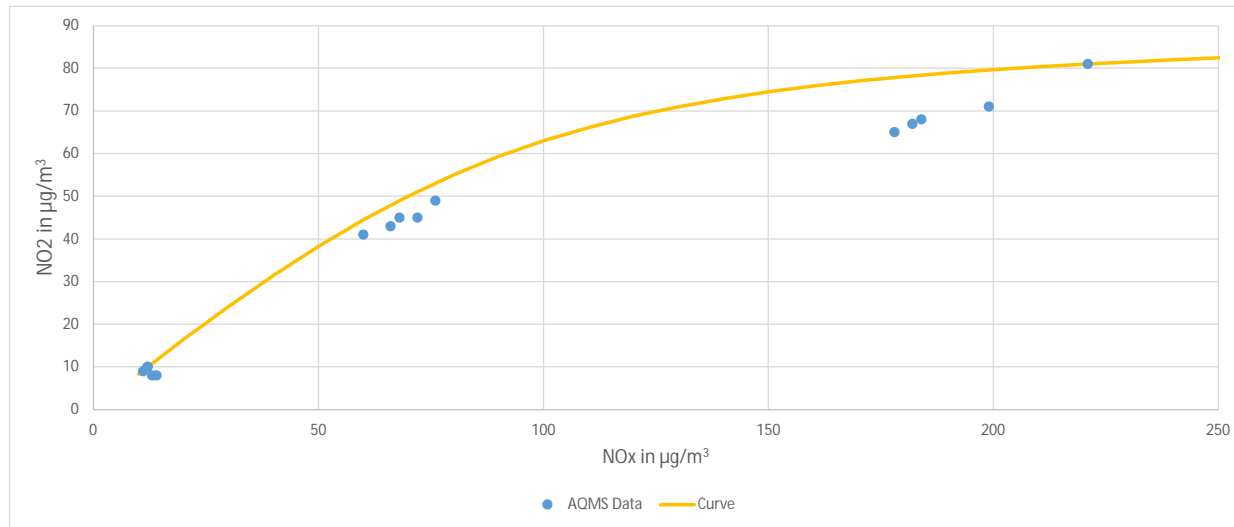
Cha Kwo Lino Road	57	1	50	30	Y	0000-0100	75	40.00%	13.33%	0.00%	13.33%	6.67%	0.00%	6.67%	6.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.67%	6.67%	0.00%	0.00%	100.00%		
Cha Kwo Lino Road	57	1	50	30	Y	0100-0200	70	42.86%	7.14%	0.00%	14.29%	7.14%	0.00%	7.14%	7.14%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.14%	7.14%	0.00%	0.00%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	0300-0400	25	60.00%	20.00%	0.00%	20.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	0400-0500	40	50.00%	12.50%	0.00%	12.50%	0.00%	0.00%	12.50%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	12.50%	0.00%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	0500-0600	185	42.42%	10.31%	0.00%	15.41%	5.41%	2.70%	5.41%	5.41%	0.00%	2.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.31%	5.41%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	0700-0800	420	41.67%	9.52%	1.19%	13.10%	4.79%	2.38%	4.79%	1.19%	2.38%	1.19%	2.38%	1.19%	2.38%	1.19%	2.38%	1.19%	9.52%	4.79%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	0900-1000	430	41.67%	9.52%	1.19%	13.10%	4.79%	2.38%	4.79%	1.19%	2.38%	1.19%	2.38%	1.19%	2.38%	1.19%	2.38%	1.19%	9.52%	4.79%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	1000-1100	455	41.76%	8.99%	1.10%	13.19%	4.40%	2.20%	4.40%	1.10%	2.20%	1.10%	2.20%	1.10%	2.20%	1.10%	2.20%	1.10%	8.99%	4.40%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	1200-1300	400	43.00%	10.00%	0.00%	10.00%	0.00%	0.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.00%	0.00%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	1300-1400	490	42.86%	11.22%	1.02%	12.24%	4.08%	2.04%	4.08%	1.02%	2.04%	1.02%	2.04%	1.02%	2.04%	1.02%	2.04%	1.02%	11.22%	5.10%	1.02%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	1400-1500	485	42.73%	11.56%	1.09%	12.58%	4.22%	2.11%	4.22%	1.09%	2.11%	1.09%	2.11%	1.09%	2.11%	1.09%	2.11%	1.09%	11.56%	5.78%	1.09%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	1500-1600	495	42.42%	12.12%	1.01%	12.12%	4.04%	2.02%	4.04%	1.01%	2.02%	1.01%	2.02%	1.01%	2.02%	1.01%	2.02%	1.01%	12.12%	5.10%	1.01%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	1600-1700	510	43.14%	12.73%	0.98%	11.76%	3.92%	1.96%	3.92%	0.98%	1.96%	0.98%	1.96%	0.98%	1.96%	0.98%	1.96%	0.98%	12.73%	4.90%	0.98%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	1700-1800	505	42.57%	12.88%	0.99%	11.81%	3.96%	1.98%	3.96%	0.99%	1.98%	0.99%	1.98%	0.99%	1.98%	0.99%	1.98%	0.99%	12.88%	4.95%	0.99%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	1800-1900	495	42.42%	12.12%	1.01%	12.12%	4.04%	2.02%	4.04%	1.01%	2.02%	1.01%	2.02%	1.01%	2.02%	1.01%	2.02%	1.01%	12.12%	5.10%	1.01%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	1900-2000	380	42.11%	11.84%	1.37%	11.84%	3.95%	1.97%	3.95%	1.37%	1.97%	1.37%	1.97%	1.37%	1.97%	1.37%	1.97%	11.84%	5.26%	1.37%	0.00%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	2100-2200	355	41.79%	11.44%	1.49%	11.44%	3.43%	1.71%	3.43%	1.49%	1.71%	1.49%	1.71%	1.49%	1.71%	1.49%	1.71%	11.44%	4.88%	1.49%	0.00%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	2200-2300	270	40.74%	11.11%	1.85%	11.11%	3.70%	1.85%	3.70%	1.85%	1.85%	1.85%	1.85%	1.85%	1.85%	1.85%	1.85%	1.85%	11.11%	5.60%	1.85%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	2300-2400	125	48.80%	16.00%	0.00%	16.00%	0.00%	0.00%	16.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	16.00%	0.00%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	0000-0100	95	42.11%	10.33%	0.00%	15.79%	5.26%	2.63%	5.26%	2.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.33%	5.26%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	0100-0200	95	42.86%	7.14%	0.00%	14.29%	7.14%	0.00%	7.14%	7.14%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.14%	7.14%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	0300-0400	95	45.83%	9.99%	0.00%	18.33%	9.99%	0.00%	9.99%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	9.99%	0.00%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	0400-0500	70	42.86%	7.14%	0.00%	14.29%	7.14%	0.00%	7.14%	7.14%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.14%	7.14%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	0500-0600	95	42.11%	10.33%	0.00%	15.79%	5.26%	2.63%	5.26%	2.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.33%	5.26%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	0600-0700	95	43.00%	10.00%	0.00%	10.00%	0.00%	0.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.00%	0.00%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	0700-0800	880	43.00%	8.62%	0.86%	14.66%	5.17%	3.45%	5.17%	3.45%	0.86%	2.58%	0.86%	2.58%	0.86%	2.58%	0.86%	8.62%	4.31%	0.86%	1.75%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	0800-0900	545	42.64%	8.53%	0.78%	14.73%	5.43%	3.15%	5.43%	3.85%	0.78%	2.31%	0.78%	2.31%	0.78%	2.31%	0.78%	8.53%	3.88%	0.78%	1.52%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	0900-1000	425	42.37%	8.24%	0.87%	14.84%	4.96%	2.48%	4.96%	2.18%	4.84%	0.87%	2.65%	0.87%	2.65%	0.87%	2.65%	0.87%	8.24%	3.71%	0.87%	1.54%	100.00%
Cha Kwo Lino Road	57	1	50	30	Y	1000-1100	440	42.19%	8.99%	0.78%	14.84%	5.47%	3.13%	5.47%	3.91%	0.78%	2.34%	0.78%	2.34%	0.78%	2.34%	0.78%	8.99%	4.69%	0.78%	1.56%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	1100-1200	715	43.36%	8.99%	0.78%	14.69%	5.59%	2.89%	5.59%	3.50%	0.78%	2.10%	0.78%	2.10%	0.78%	2.10%	0.78%	8.99%	3.50%	0.78%	1.40%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	1200-1300	525	43.06%	9.99%	0.00%	16.67%	6.23%	3.11%	6.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	9.99%	0.00%	0.00%	0.00%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	1300-1400	690	42.90%	9.42%	0.72%	14.49%	5.07%	2.53%	5.07%	3.62%	0.72%	2.17%	0.72%	2.17%	0.72%	2.17%	0.72%	9.42%	5.07%	0.72%	0.00%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	1400-1500	655	43.51%	9.20%	0.72%	14.50%	5.34%	3.02%	5.34%	3.82%	0.72%	1.51%	0.72%	1.51%	0.72%	1.51%	0.72%	9.20%	3.82%	0.72%	0.00%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	1500-1600	650	43.23%	9.54%	0.74%	14.56%	5.22%	2.61%	5.22%	3.58%	0.74%	1.48%	0.74%	1.48%	0.74%	1.48%	0.74%	9.54%	3.58%	0.74%	0.00%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	1600-1700	695	44.60%	10.07%	0.72%	14.30%	5.04%	2.88%	5.04%	3.60%	0.72%	1.44%	0.72%	1.44%	0.72%	1.44%	0.72%	10.07%	5.04%	0.72%	0.00%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	1700-1800	690	44.20%	10.14%	0.72%	14.49%	5.07%	2.90%	5.07%	3.62%	0.72%	1.45%	0.72%	1.45%	0.72%	1.45%	0.72%	10.14%	5.07%	0.72%	0.00%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	1800-1900	650	43.69%	9.99%	0.00%	16.67%	6.23%	3.11%	6.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	9.99%	0.00%	0.00%	0.00%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	1900-2000	520	43.27%	9.62%	0.66%	14.42%	4.81%	2.88%	4.81%	3.85%	0.66%	1.92%	0.66%	1.92%	0.66%	1.92%	0.66%	9.62%	4.81%	0.66%	0.00%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	2000-2100	455	42.86%	8.99%	1.10%	14.29%	5.49%	3.30%	5.49%	3.00%	1.10%	1.10%	1.10%	1.10%	1.10%	1.10%	8.99%	3.30%	1.10%	0.00%	100.00%		
Cha Kwo Lino Road	57	1	50	30	Y	2100-2200	460	43.06%	9.99%	0.00%	16.67%	6.23%	3.11%	6.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	9.99%	0.00%	0.00%	0.00%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	2200-2300	375	41.93%	9.33%	1.33%	13.33%	5.33%	2.67%	5.33%	4.00%	1.33%	1.33%	1.33%	1.33%	1.33%	1.33%	1.33%	9.33%	4.00%	1.33%	0.00%	100.00%	
Cha Kwo Lino Road	57	1	50	30	Y	2300-2400	185	45.93%	10.81%	0.00%	16.23%	5.41%	2.70%	5.41%	2.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.81%	2.70%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	40	Y	0100-0200	60	50.00%	8.33%	0.00%	16.67%	8.33%	0.00%	8.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	8.33%	0.00%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	40	Y	0200-0300	55	45.45%	9.99%	0.00%	18.18%	9.99%	0.00%	9.99%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	9.99%	0.00%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	40	Y	0300-0400	55	57.44%	14.29%	0.00%	14.29%	14.29%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	40	Y	0400-0500	55	46.11%	7.69%	0.00%	23.08%	7.69%	0.00%	7.69%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.69%	0.00%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	40	Y	0500-0600	55	47.27%	7.89%	0.00%	18.42%	7.89%	2.63%	7.89%	2.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.89%	2.63%	0.00%	0.00%	100.00%
Cha Kwo Lino Road	57	1	50	40	Y	0600-0700	460	43.00%	8.62%	0.86%	14.66%	5.17%	3.45%	5.17%	3.45%	0.86%	2.58%											

Appendix 2.12 Details of Jenkin Method extracted from Smart Air Modelling
Platform (SAMP v2.0)

AQMS Data of the Past 5 Years

Year	Station	NO2 (ug/m3)	NOx (ug/m3)	Conversion
2019	KWUN TONG	45	72	51.1
2020	KWUN TONG	43	66	47.9
2021	KWUN TONG	49	76	53.1
2022	KWUN TONG	45	68	49.0
2023	KWUN TONG	41	60	44.4
2019	TAP MUN	10	12	10.0
2020	TAP MUN	9	11	9.2
2021	TAP MUN	10	12	10.0
2022	TAP MUN	8	13	10.8
2023	TAP MUN	8	14	11.6
2019	CAUSEWAY BAY	81	221	81.0
2020	CAUSEWAY BAY	68	184	78.4
2021	CAUSEWAY BAY	71	199	79.6
2022	CAUSEWAY BAY	65	178	77.8
2023	CAUSEWAY BAY	67	182	78.2

OX 90.3
J/K 16.06



Appendix 2.13 Predicted Air Quality Impact Assessment Results

ASR Label	Location		Local Ground, Z (mPD)	Floor	Flag Pole Receiver Height, mAG	Flag Pole Receiver Height, mPD	NO ₂		RSP		FSP		SO ₂	
	x	y					19th Highest Hourly (AQO=200)	Annual (AQO=40) (Jenkin Method)	10th Highest Daily (AQO=100)	Annual (AQO=50)	19th Highest Daily (AQO=50)	Annual (AQO=25)	4th Highest 10-min (AQO=500)	4th Highest Daily (AQO=50)
	Easting	Northing												
D01_GF	842121	817283	4.4	G	1.5	5.9	104.3	25.7	51.0	20.4	24.0	11.8	22.7	6.8
D01_L1	842121	817283	4.4	L1	5.50	9.90	91.4	21.1	50.5	20.3	23.9	11.7	22.7	6.8
D01_L2	842121	817283	4.4	L2	10.00	14.40	85.5	16.8	50.3	20.4	23.7	11.7	22.7	6.8
D01_1F	842121	817283	4.4	1	18.20	22.60	82.5	15.9	50.0	20.1	23.6	11.6	22.7	6.8
D01_2F	842121	817283	4.4	2	21.30	25.70	82.6	15.8	50.0	20.0	23.6	11.6	22.7	6.8
D01_3F	842121	817283	4.4	3	24.40	28.80	82.6	15.8	49.9	20.1	23.6	11.6	22.7	6.8
D01_4F	842121	817283	4.4	4	27.50	31.90	85.0	15.7	49.9	20.1	23.6	11.6	22.7	6.8
D01_5F	842121	817283	4.4	5	30.60	35.00	85.0	15.6	49.8	19.9	23.5	11.5	22.7	6.8
D01_6F	842121	817283	4.4	6	33.70	38.10	85.0	15.5	49.7	19.6	23.5	11.4	22.7	6.8
D01_7F	842121	817283	4.4	7	36.80	41.20	85.0	15.4	49.7	19.5	23.5	11.4	22.7	6.8
D01_8F	842121	817283	4.4	8	39.90	44.30	85.0	15.3	49.6	19.3	23.5	11.3	22.7	6.8
D01_9F	842121	817283	4.4	9	43.00	47.40	82.9	15.1	49.6	19.2	23.5	11.3	22.7	6.8
D01_10F	842121	817283	4.4	10	46.10	50.50	83.0	14.9	49.6	19.1	23.5	11.3	22.7	6.8
D01_11F	842121	817283	4.4	11	49.20	53.60	84.4	14.8	49.5	19.0	23.4	11.2	22.7	6.8
D01_12F	842121	817283	4.4	12	52.30	56.70	85.1	14.6	49.5	19.0	23.4	11.2	22.7	6.8
D01_13F	842121	817283	4.4	13	55.40	59.80	83.3	14.5	49.5	18.9	23.4	11.2	22.7	6.8
D01_14F	842121	817283	4.4	14	58.50	62.90	83.4	14.4	49.5	18.9	23.4	11.2	22.7	6.8
D01_15F	842121	817283	4.4	15	61.60	66.00	83.5	14.3	49.5	18.8	23.4	11.2	22.7	6.8
D01_17F	842121	817283	4.4	17	67.80	72.20	83.8	14.1	49.4	18.8	23.4	11.2	22.7	6.8
D01_19F	842121	817283	4.4	19	74.00	78.40	85.0	14.0	49.4	18.8	23.4	11.2	22.7	6.8
D01_22F	842121	817283	4.4	22	83.40	87.80	85.3	13.9	49.4	18.7	23.4	11.1	22.6	6.8
D01_25F	842121	817283	4.4	25	92.85	97.25	87.0	13.8	49.4	18.7	23.4	11.1	22.6	6.8
D02_GF	842128	817270	4.4	G	1.5	5.9	104.1	25.7	51.2	20.5	24.1	11.8	22.7	6.8
D02_L1	842128	817270	4.4	L1	5.50	9.90	90.7	21.2	50.7	20.4	23.9	11.7	22.7	6.8
D02_L2	842128	817270	4.4	L2	10.00	14.40	85.8	16.8	50.4	20.7	23.8	11.8	22.7	6.8
D02_1F	842128	817270	4.4	1	18.20	22.60	82.5	16.0	50.2	20.4	23.7	11.7	22.7	6.8
D02_2F	842128	817270	4.4	2	21.30	25.70	82.5	16.0	50.1	20.2	23.7	11.6	22.7	6.8
D02_3F	842128	817270	4.4	3	24.40	28.80	82.5	16.0	49.9	20.4	23.7	11.7	22.7	6.8
D02_4F	842128	817270	4.4	4	27.50	31.90	85.1	15.9	50.0	20.6	23.7	11.7	22.7	6.8
D02_5F	842128	817270	4.4	5	30.60	35.00	85.0	15.8	49.9	20.2	23.7	11.6	22.7	6.8
D02_6F	842128	817270	4.4	6	33.70	38.10	85.0	15.7	49.8	19.9	23.7	11.5	22.7	6.8
D02_7F	842128	817270	4.4	7	36.80	41.20	85.0	15.6	49.7	19.6	23.5	11.4	22.7	6.8
D02_8F	842128	817270	4.4	8	39.90	44.30	85.0	15.4	49.7	19.4	23.5	11.4	22.7	6.8
D02_9F	842128	817270	4.4	9	43.00	47.40	82.8	15.2	49.6	19.2	23.5	11.3	22.7	6.8
D02_10F	842128	817270	4.4	10	46.10	50.50	82.9	15.0	49.6	19.1	23.5	11.3	22.7	6.8
D02_11F	842128	817270	4.4	11	49.20	53.60	84.0	14.9	49.6	19.0	23.5	11.3	22.7	6.8
D02_12F	842128	817270	4.4	12	52.30	56.70	85.1	14.7	49.5	19.0	23.4	11.2	22.7	6.8
D02_13F	842128	817270	4.4	13	55.40	59.80	83.2	14.6	49.5	18.9	23.4	11.2	22.7	6.8
D02_14F	842128	817270	4.4	14	58.50	62.90	83.3	14.4	49.5	18.9	23.4	11.2	22.7	6.8
D02_15F	842128	817270	4.4	15	61.60	66.00	83.4	14.3	49.5	18.9	23.4	11.2	22.7	6.8
D02_17F	842128	817270	4.4	17	67.80	72.20	85.2	14.2	49.4	18.8	23.4	11.2	22.7	6.8
D02_19F	842128	817270	4.4	19	74.00	78.40	85.1	14.0	49.4	18.8	23.4	11.2	22.7	6.8
D02_22F	842128	817270	4.4	22	83.40	87.80	85.2	13.9	49.4	18.7	23.4	11.1	22.6	6.8
D02_25F	842128	817270	4.4	25	92.85	97.25	87.2	13.8	49.4	18.7	23.4	11.1	22.6	6.8
D03_GF	842134	817259	4.4	G	1.5	5.9	104.8	25.9	51.3	20.6	24.1	11.9	22.7	6.8
D03_L1	842134	817259	4.4	L1	5.50	9.90	90.5	21.3	50.8	20.5	23.9	11.8	22.7	6.8
D03_L2	842134	817259	4.4	L2	10.00	14.40	86.1	16.9	50.6	21.0	23.8	11.9	22.7	6.8
D03_1F	842134	817259	4.4	1	18.20	22.60	85.8	16.1	50.6	20.8	23.7	11.8	22.7	6.8
D03_2F	842134	817259	4.4	2	21.30	25.70	85.4	16.1	50.1	20.4	23.7	11.7	22.7	6.8
D03_3F	842134	817259	4.4	3	24.40	28.80	82.5	16.1	50.0	20.7	23.8	11.8	22.7	6.8
D03_4F	842134	817259	4.4	4	27.50	31.90	85.1	16.1	50.8	21.2	23.8	11.9	22.7	6.8
D03_5F	842134	817259	4.4	5	30.60	35.00	85.1	16.0	50.1	20.8	23.7	11.8	22.7	6.8
D03_6F	842134	817259	4.4	6	33.70	38.10	85.0	15.9	49.9	20.3	23.7	11.6	22.7	6.8
D03_7F	842134	817259	4.4	7	36.80	41.20	85.0	15.7	49.8	19.8	23.7	11.5	22.7	6.8
D03_8F	842134	817259	4.4	8	39.90	44.30	85.0	15.5	49.7	19.5	23.5	11.4	22.7	6.8
D03_9F	842134	817259	4.4	9	43.00	47.40	82.8	15.3	49.7	19.3	23.5	11.3	22.7	6.8
D03_10F	842134	817259	4.4	10	46.10	50.50	82.8	15.1	49.6	19.1	23.5	11.3	22.7	6.8
D03_11F	842134	817259	4.4	11	49.20	53.60	83.7	14.9	49.6	19.0	23.5	11.3	22.7	6.8
D03_12F	842134	817259	4.4	12	52.30	56.70	85.2	14.8	49.5	19.0	23.4	11.2	22.7	6.8
D03_13F	842134	817259	4.4	13	55.40	59.80	83.1	14.6	49.5	18.9	23.4	11.2	22.7	6.8
D03_14F	842134	817259	4.4	14	58.50	62.90	83.2	14.5	49.5	18.9	23.4	11.2	22.7	6.8
D03_15F	842134	817259	4.4	15	61.60	66.00	83.3	14.4	49.5	18.8	23.4	11.2	22.7	6.8
D03_17F	842134	817259	4.4	17	67.80	72.20	85.2	14.2	49.4	18.8	23.4	11.2	22.7	6.8
D03_19F	842134	817259	4.4	19	74.00	78.40	85.3	14.1	49.4	18.8	23.4	11.2	22.7	6.8
D03_22F	842134	817259	4.4	22	83.40	87.80	85.8	13.9	49.4	18.7	23.4	11.1	22.6	6.8
D03_25F	842134	817259	4.4	25	92.85	97.25	87.9	13.8	49.4	18.7	23.4	11.1	22.6	6.8
D04_GF	842140	817247	4.4	G	1.5	5.9	105.0	25.6	51.4	20.8	24.1	11.9	22.7	6.8
D04_L1	842140	817247	4.4	L1	5.50	9.90	90.7	21.2	50.9	20.7	23.9	11.8	22.7	6.8
D04_L2	842140	817247	4.4	L2	10.00	14.40	86.9	16.9	51.8	21.5	23.9	12.0	22.7	6.8
D04_1F	842140	817247	4.4	1	18.20	22.60	85.8	16.3	51.7	21.6	23.8	12.0	22.7	6.8
D04_2F	842140	817247	4.4	2	21.30	25.70	85.7	16.3	50.1	20.6	23.7	11.7	22.7	6.8
D04_3F	842140	817247	4.4	3	24.40	28.80	85.4	16.3	51.2	21.1	23.8	11.9	22.7	6.8
D04_4F	842140	817247	4.4	4	27.50	31.90	85.8	16.3	51.8	22.5	23.9	12.3	22.7	6.8
D04_5F	842140	817247	4.4	5	30.60	35.00	86.1	16.2	51.7	22.2	23.8	12.2	22.7	6.8
D04_6F	842140	817247	4.4	6	33.70	38.10	86.0	16.1	51.2	20.9	23.7	11.8	22.7	6.8
D04_7F	842140	817247	4.4	7	36.80	41.20	85.7	15.9	49.8	20.0	23.7	11.6	22.7	6.8
D04_8F	842140	817247	4.4	8	39.90	44.30	85.1	15.7	49.7	19.5	23.6	11.4	22.7	6.8
D04_9F	842140	817247	4.4	9	43.00	47.40	82.7	15.4	49.7	19.3	23.5	11.3	22.7	6.8
D04_10F	842140	817247	4.4	10	46.10	50.50	82.8	15.2	49.6	19.1	23.5	11.3	22.7	6.8
D04_11F	842140	817247	4.4	11	49.20	53.60	83.3	15.0	49.6	19.0	23.5	11.3	22.7	6.8
D04_12F	842140	817247	4.4	12	52.30	56.70	83.5	14.9	49.5	19.0	23.4	11.2	22.7	6.8
D04_13F	842140	817247	4.4	13	55.40	59.80	84.0	14.7	49.5	18.9	23.4	11.2	22.7	6.8
D04_14F	842140	817247	4.4	14	58.50	62.90	85.3	14.6	49.5	18.9	23.4	11.2	22.7	6.8
D04_15F	842140	817247	4.4	15	61.60	66.00	85.3	14.4	49.5	18.8	23.4	11.2	22.7	6.8
D04_17F	842140	817247												

ASR Label	Location		Local Ground, Z (mPD)	Floor	Flag Pole Receiver Height, mAG	Flag Pole Receiver Height, mPD	NO ₂		RSP		FSP		SO ₂	
	x	y					19th Highest Hourly (AQO=200)	Annual (AQO=40) (Jenkin Method)	10th Highest Daily (AQO=100)	Annual (AQO=50)	19th Highest Daily (AQO=50)	Annual (AQO=25)	4th Highest 10-min (AQO=500)	4th Highest Daily (AQO=50)
	Easting	Northing												
D06_GF	842111	817232	4.4	G	1.5	5.9	88.0	18.3	51.6	21.1	24.0	11.9	22.8	6.8
D06_L1	842111	817232	4.4	L1	5.50	9.90	87.8	18.0	51.6	21.5	24.0	12.0	22.7	6.8
D06_L2	842111	817232	4.4	L2	10.00	14.40	87.7	17.2	55.5	25.0	24.9	13.0	22.7	6.8
D06_1F	842111	817232	4.4	1	18.20	22.60	86.4	17.1	56.6	25.0	25.2	13.1	22.7	6.8
D06_2F	842111	817232	4.4	2	21.30	25.70	85.7	17.3	51.8	21.4	23.9	12.0	22.7	6.8
D06_3F	842111	817232	4.4	3	24.40	28.80	87.7	17.4	55.3	24.1	24.8	12.8	22.7	6.8
D06_4F	842111	817232	4.4	4	27.50	31.90	88.4	17.3	90.9	42.1	33.4	18.1	22.7	6.8
D06_5F	842111	817232	4.4	5	30.60	35.00	88.5	17.1	71.0	32.5	28.3	15.3	22.7	6.8
D06_6F	842111	817232	4.4	6	33.70	38.10	89.4	16.9	52.9	23.0	24.6	12.5	22.7	6.8
D06_7F	842111	817232	4.4	7	36.80	41.20	90.2	16.5	51.0	20.5	23.8	11.7	22.7	6.8
D06_8F	842111	817232	4.4	8	39.90	44.30	89.4	16.2	49.8	20.7	23.6	11.5	22.7	6.8
D06_9F	842111	817232	4.4	9	43.00	47.40	90.0	15.9	49.7	19.4	23.6	11.4	22.7	6.8
D06_10F	842111	817232	4.4	10	46.10	50.50	89.4	15.6	49.7	19.2	23.5	11.3	22.7	6.8
D06_11F	842111	817232	4.4	11	49.20	53.60	89.4	15.3	49.7	19.1	23.4	11.3	22.7	6.8
D06_12F	842111	817232	4.4	12	52.30	56.70	89.7	15.1	49.7	19.0	23.4	11.3	22.7	6.8
D06_13F	842111	817232	4.4	13	55.40	59.80	89.5	14.9	49.7	18.9	23.4	11.2	22.7	6.8
D06_14F	842111	817232	4.4	14	58.50	62.90	89.2	14.7	49.7	18.9	23.4	11.2	22.7	6.8
D06_15F	842111	817232	4.4	15	61.60	66.00	88.1	14.5	49.7	18.9	23.4	11.2	22.7	6.8
D06_17F	842111	817232	4.4	17	67.80	72.20	89.1	14.3	49.6	18.8	23.4	11.2	22.7	6.8
D06_19F	842111	817232	4.4	19	74.00	78.40	87.9	14.2	49.5	18.8	23.4	11.2	22.7	6.8
D06_22F	842111	817232	4.4	22	83.40	87.80	87.3	14.0	49.5	18.7	23.4	11.1	22.6	6.8
D06_25F	842111	817232	4.4	25	92.85	97.25	88.6	13.8	49.4	18.7	23.4	11.1	22.6	6.8
D07_GF	842097	817225	4.4	G	1.5	5.9	87.4	17.5	52.0	21.7	24.2	12.0	22.8	6.8
D07_L1	842097	817225	4.4	L1	5.50	9.90	87.7	17.4	52.7	22.6	24.3	12.3	22.7	6.8
D07_L2	842097	817225	4.4	L2	10.00	14.40	87.3	17.1	59.8	26.7	25.6	13.5	22.7	6.8
D07_1F	842097	817225	4.4	1	18.20	22.60	89.0	18.2	58.7	25.1	25.5	13.1	22.8	6.8
D07_2F	842097	817225	4.4	2	21.30	25.70	89.7	18.6	55.7	23.1	24.9	12.6	22.8	6.9
D07_3F	842097	817225	4.4	3	24.40	28.80	92.7	18.5	60.1	25.3	25.7	13.2	22.7	6.9
D07_4F	842097	817225	4.4	4	27.50	31.90	96.2	18.1	67.7	28.8	27.6	14.2	22.8	6.9
D07_5F	842097	817225	4.4	5	30.60	35.00	95.6	17.6	62.6	26.9	26.1	13.6	22.8	6.8
D07_6F	842097	817225	4.4	6	33.70	38.10	94.2	17.1	56.3	23.3	24.9	12.6	22.8	6.8
D07_7F	842097	817225	4.4	7	36.80	41.20	95.6	16.7	52.6	21.0	24.3	11.9	22.7	6.8
D07_8F	842097	817225	4.4	8	39.90	44.30	92.5	16.3	50.8	19.9	23.8	11.6	22.7	6.8
D07_9F	842097	817225	4.4	9	43.00	47.40	92.1	15.9	50.0	19.5	23.7	11.4	22.7	6.8
D07_10F	842097	817225	4.4	10	46.10	50.50	92.3	15.7	49.7	19.3	23.5	11.3	22.7	6.8
D07_11F	842097	817225	4.4	11	49.20	53.60	92.6	15.4	49.7	19.1	23.5	11.3	22.7	6.8
D07_12F	842097	817225	4.4	12	52.30	56.70	92.3	15.2	49.7	19.1	23.5	11.3	22.7	6.8
D07_13F	842097	817225	4.4	13	55.40	59.80	91.6	15.0	49.7	19.0	23.4	11.2	22.7	6.8
D07_14F	842097	817225	4.4	14	58.50	62.90	89.4	14.8	49.7	18.9	23.4	11.2	22.7	6.8
D07_15F	842097	817225	4.4	15	61.60	66.00	89.4	14.7	49.7	18.9	23.4	11.2	22.7	6.8
D07_17F	842097	817225	4.4	17	67.80	72.20	89.1	14.4	49.7	18.8	23.4	11.2	22.7	6.8
D07_19F	842097	817225	4.4	19	74.00	78.40	88.9	14.2	49.6	18.8	23.4	11.2	22.7	6.8
D07_22F	842097	817225	4.4	22	83.40	87.80	88.9	14.0	49.5	18.8	23.4	11.2	22.6	6.8
D07_25F	842097	817225	4.4	25	92.85	97.25	88.9	13.9	49.5	18.7	23.4	11.1	22.6	6.8
D08_GF	842083	817218	4.4	G	1.5	5.9	87.2	17.1	53.6	22.9	24.4	12.3	22.8	6.8
D08_L1	842083	817218	4.4	L1	5.50	9.90	87.1	17.1	54.7	23.9	24.7	12.7	22.7	6.8
D08_L2	842083	817218	4.4	L2	10.00	14.40	86.9	17.2	57.4	25.5	25.4	13.2	22.7	6.8
D08_1F	842083	817218	4.4	1	18.20	22.60	126.7	21.1	56.1	23.6	25.0	12.8	22.8	6.9
D08_2F	842083	817218	4.4	2	21.30	25.70	135.3	21.3	56.2	23.2	25.0	12.7	22.9	6.9
D08_3F	842083	817218	4.4	3	24.40	28.80	124.9	20.2	57.9	23.6	24.9	12.8	22.9	6.9
D08_4F	842083	817218	4.4	4	27.50	31.90	108.1	18.9	58.6	23.9	25.2	12.8	22.9	6.9
D08_5F	842083	817218	4.4	5	30.60	35.00	98.4	17.8	56.8	23.2	24.7	12.6	22.8	6.8
D08_6F	842083	817218	4.4	6	33.70	38.10	96.2	17.1	54.3	22.0	24.5	12.2	22.8	6.8
D08_7F	842083	817218	4.4	7	36.80	41.20	95.0	16.6	52.0	20.9	24.2	11.9	22.7	6.8
D08_8F	842083	817218	4.4	8	39.90	44.30	93.7	16.3	50.9	20.1	23.9	11.6	22.7	6.8
D08_9F	842083	817218	4.4	9	43.00	47.40	95.1	16.0	50.4	19.6	23.7	11.5	22.7	6.8
D08_10F	842083	817218	4.4	10	46.10	50.50	93.7	15.8	49.9	19.4	23.6	11.4	22.7	6.8
D08_11F	842083	817218	4.4	11	49.20	53.60	94.5	15.5	49.8	19.2	23.5	11.3	22.7	6.8
D08_12F	842083	817218	4.4	12	52.30	56.70	93.0	15.3	49.7	19.1	23.5	11.3	22.7	6.8
D08_13F	842083	817218	4.4	13	55.40	59.80	92.5	15.1	49.7	19.0	23.5	11.3	22.7	6.8
D08_14F	842083	817218	4.4	14	58.50	62.90	92.3	15.0	49.7	19.0	23.4	11.2	22.7	6.8
D08_15F	842083	817218	4.4	15	61.60	66.00	92.3	14.8	49.7	18.9	23.4	11.2	22.7	6.8
D08_17F	842083	817218	4.4	17	67.80	72.20	90.4	14.5	49.7	18.9	23.4	11.2	22.7	6.8
D08_19F	842083	817218	4.4	19	74.00	78.40	89.4	14.3	49.7	18.8	23.4	11.2	22.7	6.8
D08_22F	842083	817218	4.4	22	83.40	87.80	88.9	14.1	49.6	18.8	23.4	11.2	22.6	6.8
D08_25F	842083	817218	4.4	25	92.85	97.25	88.8	13.9	49.5	18.7	23.4	11.1	22.6	6.8
D09_GF	842079	817230	4.4	G	1.5	5.9	85.7	17.2	52.9	21.7	24.2	12.2	22.7	6.8
D09_L1	842079	817230	4.4	L1	5.50	9.90	85.7	17.0	53.4	22.7	24.3	12.3	22.7	6.8
D09_L2	842079	817230	4.4	L2	10.00	14.40	86.5	16.9	55.8	23.9	24.9	12.7	22.7	6.8
D09_1F	842079	817230	4.4	1	18.20	22.60	89.9	18.1	56.6	23.5	24.8	12.7	22.8	6.8
D09_2F	842079	817230	4.4	2	21.30	25.70	97.1	18.4	56.4	23.3	24.8	12.6	22.8	6.9
D09_3F	842079	817230	4.4	3	24.40	28.80	102.4	18.3	56.7	23.8	25.1	12.7	22.8	6.9
D09_4F	842079	817230	4.4	4	27.50	31.90	96.2	17.9	56.7	23.9	25.2	12.8	22.8	6.9
D09_5F	842079	817230	4.4	5	30.60	35.00	96.2	17.4	56.2	23.1	24.9	12.5	22.8	6.8
D09_6F	842079	817230	4.4	6	33.70	38.10	92.4	16.9	54.4	22.0	24.4	12.2	22.8	6.8
D09_7F	842079	817230	4.4	7	36.80	41.20	92.4	16.5	52.3	21.0	24.2	11.9	22.7	6.8
D09_8F	842079	817230	4.4	8	39.90	44.30	91.9	16.1	51.0	20.2	23.9	11.6	22.7	6.8
D09_9F	842079	817230	4.4	9	43.00	47.40	92.4	15.9	50.6	19.7	23.7	11.5	22.7	6.8
D09_10F	842079	817230	4.4	10	46.10	50.50	92.4	15.6	50.1	19.4	23.6	11.4	22.7	6.8
D09_11F	842079	817230	4.4	11	49.20	53.60	92.4	15.4	49.8	19.2	23.5	11.3	22.7	6.8
D09_12F	842079	817230	4.4	12	52.30	56.70	92.7	15.2	49.7	19.1	23.5	11.3	22.7	6.8
D09_13F	842079	817230	4.4	13	55.40	59.80	92.8	15.0	49.7	19.0	23.5	11.3	22.7	6.8
D09_14F	842079	817230	4.4	14	58.50	62.90	92.1	14.8	49.7	18.9	23.4	11.2	22.7	6.8
D09_15F	842079	817230	4.4	15	61.60	66.00	92.3	14.7	49.7	18.9	23.4	11.2	22.7	6.8
D09_17F	842079	817230												

ASR Label	Location		Local Ground, Z (mPD)	Floor	Flag Pole Receiver Height, mAG	Flag Pole Receiver Height, mPD	NO ₂		RSP		FSP		SO ₂	
	x	y					19th Highest Hourly (AQO=200)	Annual (AQO=40) (Jenkin Method)	10th Highest Daily (AQO=100)	Annual (AQO=50)	19th Highest Daily (AQO=50)	Annual (AQO=25)	4th Highest 10-min (AQO=500)	4th Highest Daily (AQO=50)
	Easting	Northing												
D11_GF	842071	817257	4.4	G	1.5	5.9	85.8	17.3	51.5	21.4	24.0	11.9	22.7	6.8
D11_L1	842071	817257	4.4	L1	5.50	9.90	85.7	17.1	51.5	21.3	24.0	11.9	22.7	6.8
D11_L2	842071	817257	4.4	L2	10.00	14.40	85.7	16.8	52.1	21.6	24.0	12.0	22.7	6.8
D11_1F	842071	817257	4.4	1	18.20	22.60	83.2	16.4	52.2	21.6	24.0	12.0	22.7	6.8
D11_2F	842071	817257	4.4	2	21.30	25.70	85.2	16.4	52.2	21.5	24.0	12.0	22.7	6.8
D11_3F	842071	817257	4.4	3	24.40	28.80	85.1	16.4	52.2	21.6	24.0	12.1	22.7	6.8
D11_4F	842071	817257	4.4	4	27.50	31.90	87.2	16.4	52.1	21.5	24.0	12.0	22.7	6.8
D11_5F	842071	817257	4.4	5	30.60	35.00	87.2	16.3	51.9	21.1	23.9	11.9	22.7	6.8
D11_6F	842071	817257	4.4	6	33.70	38.10	88.4	16.2	51.0	20.6	23.8	11.8	22.7	6.8
D11_7F	842071	817257	4.4	7	36.80	41.20	89.1	16.0	50.6	20.2	23.7	11.6	22.7	6.8
D11_8F	842071	817257	4.4	8	39.90	44.30	89.5	15.8	50.0	19.9	23.7	11.5	22.7	6.8
D11_9F	842071	817257	4.4	9	43.00	47.40	89.2	15.6	49.9	19.6	23.6	11.4	22.7	6.8
D11_10F	842071	817257	4.4	10	46.10	50.50	90.6	15.4	49.8	19.4	23.6	11.4	22.7	6.8
D11_11F	842071	817257	4.4	11	49.20	53.60	91.4	15.2	49.8	19.2	23.5	11.3	22.7	6.8
D11_12F	842071	817257	4.4	12	52.30	56.70	91.2	15.0	49.7	19.0	23.4	11.3	22.7	6.8
D11_13F	842071	817257	4.4	13	55.40	59.80	89.7	14.8	49.7	19.0	23.4	11.2	22.7	6.8
D11_14F	842071	817257	4.4	14	58.50	62.90	89.6	14.7	49.7	19.0	23.4	11.2	22.7	6.8
D11_15F	842071	817257	4.4	15	61.60	66.00	89.4	14.5	49.7	18.9	23.4	11.2	22.7	6.8
D11_17F	842071	817257	4.4	17	67.80	72.20	89.3	14.3	49.7	18.9	23.4	11.2	22.7	6.8
D11_19F	842071	817257	4.4	19	74.00	78.40	89.0	14.1	49.6	18.8	23.4	11.2	22.7	6.8
D11_22F	842071	817257	4.4	22	83.40	87.80	88.6	13.9	49.5	18.8	23.4	11.2	22.6	6.8
D11_25F	842071	817257	4.4	25	92.85	97.25	88.9	13.8	49.5	18.7	23.4	11.1	22.6	6.8
D12_GF	842084	817263	4.4	G	1.5	5.9	87.2	17.9	51.5	20.9	23.9	11.8	22.7	6.8
D12_L1	842084	817263	4.4	L1	5.50	9.90	87.1	17.7	51.2	21.0	23.9	11.8	22.7	6.8
D12_L2	842084	817263	4.4	L2	10.00	14.40	86.3	17.0	51.2	21.4	24.0	12.0	22.7	6.8
D12_1F	842084	817263	4.4	1	18.20	22.60	85.4	16.2	51.2	21.2	23.8	11.9	22.7	6.8
D12_2F	842084	817263	4.4	2	21.30	25.70	85.7	16.2	51.2	21.1	23.8	11.9	22.7	6.8
D12_3F	842084	817263	4.4	3	24.40	28.80	85.1	16.2	51.4	21.3	23.9	11.9	22.7	6.8
D12_4F	842084	817263	4.4	4	27.50	31.90	87.2	16.2	51.2	21.2	23.9	11.9	22.7	6.8
D12_5F	842084	817263	4.4	5	30.60	35.00	88.0	16.1	50.8	20.8	23.9	11.8	22.7	6.8
D12_6F	842084	817263	4.4	6	33.70	38.10	88.6	16.0	50.7	20.4	23.7	11.7	22.7	6.8
D12_7F	842084	817263	4.4	7	36.80	41.20	88.9	15.9	50.5	20.0	23.7	11.6	22.7	6.8
D12_8F	842084	817263	4.4	8	39.90	44.30	89.4	15.7	49.8	19.7	23.6	11.5	22.7	6.8
D12_9F	842084	817263	4.4	9	43.00	47.40	89.4	15.5	49.8	19.4	23.6	11.4	22.7	6.8
D12_10F	842084	817263	4.4	10	46.10	50.50	89.4	15.3	49.7	19.3	23.5	11.3	22.7	6.8
D12_11F	842084	817263	4.4	11	49.20	53.60	90.9	15.1	49.7	19.1	23.4	11.3	22.7	6.8
D12_12F	842084	817263	4.4	12	52.30	56.70	90.1	14.9	49.7	19.0	23.4	11.3	22.7	6.8
D12_13F	842084	817263	4.4	13	55.40	59.80	90.1	14.7	49.7	19.0	23.4	11.2	22.7	6.8
D12_14F	842084	817263	4.4	14	58.50	62.90	89.6	14.6	49.7	18.9	23.4	11.2	22.7	6.8
D12_15F	842084	817263	4.4	15	61.60	66.00	89.1	14.5	49.7	18.9	23.4	11.2	22.7	6.8
D12_17F	842084	817263	4.4	17	67.80	72.20	89.1	14.2	49.6	18.8	23.4	11.2	22.7	6.8
D12_19F	842084	817263	4.4	19	74.00	78.40	89.0	14.1	49.6	18.8	23.4	11.2	22.7	6.8
D12_22F	842084	817263	4.4	22	83.40	87.80	85.9	13.9	49.5	18.8	23.4	11.1	22.6	6.8
D12_25F	842084	817263	4.4	25	92.85	97.25	87.5	13.8	49.4	18.7	23.4	11.1	22.6	6.8
D13_GF	842096	817270	4.4	G	1.5	5.9	87.0	18.8	51.5	20.6	23.9	11.7	22.7	6.8
D13_L1	842096	817270	4.4	L1	5.50	9.90	86.8	18.4	51.2	20.6	23.8	11.7	22.7	6.8
D13_L2	842096	817270	4.4	L2	10.00	14.40	86.6	17.1	51.2	20.9	23.8	11.8	22.7	6.8
D13_1F	842096	817270	4.4	1	18.20	22.60	85.4	16.1	51.0	20.6	23.7	11.7	22.7	6.8
D13_2F	842096	817270	4.4	2	21.30	25.70	85.1	16.0	51.0	20.5	23.7	11.7	22.7	6.8
D13_3F	842096	817270	4.4	3	24.40	28.80	85.8	16.0	50.9	20.6	23.7	11.7	22.7	6.8
D13_4F	842096	817270	4.4	4	27.50	31.90	86.3	16.0	50.9	20.7	23.7	11.8	22.7	6.8
D13_5F	842096	817270	4.4	5	30.60	35.00	86.8	15.9	50.8	20.3	23.7	11.7	22.7	6.8
D13_6F	842096	817270	4.4	6	33.70	38.10	86.4	15.8	50.5	20.0	23.7	11.6	22.7	6.8
D13_7F	842096	817270	4.4	7	36.80	41.20	87.1	15.7	49.8	19.7	23.6	11.5	22.7	6.8
D13_8F	842096	817270	4.4	8	39.90	44.30	89.0	15.5	49.8	19.5	23.6	11.4	22.7	6.8
D13_9F	842096	817270	4.4	9	43.00	47.40	87.1	15.4	49.7	19.3	23.5	11.3	22.7	6.8
D13_10F	842096	817270	4.4	10	46.10	50.50	89.1	15.2	49.7	19.2	23.5	11.3	22.7	6.8
D13_11F	842096	817270	4.4	11	49.20	53.60	89.2	15.0	49.7	19.1	23.4	11.3	22.7	6.8
D13_12F	842096	817270	4.4	12	52.30	56.70	87.1	14.8	49.7	19.0	23.4	11.2	22.7	6.8
D13_13F	842096	817270	4.4	13	55.40	59.80	87.1	14.6	49.7	18.9	23.4	11.2	22.7	6.8
D13_14F	842096	817270	4.4	14	58.50	62.90	87.1	14.5	49.6	18.9	23.4	11.2	22.7	6.8
D13_15F	842096	817270	4.4	15	61.60	66.00	86.8	14.4	49.6	18.9	23.4	11.2	22.7	6.8
D13_17F	842096	817270	4.4	17	67.80	72.20	85.7	14.2	49.5	18.8	23.4	11.2	22.7	6.8
D13_19F	842096	817270	4.4	19	74.00	78.40	85.7	14.0	49.5	18.8	23.4	11.2	22.7	6.8
D13_22F	842096	817270	4.4	22	83.40	87.80	85.7	13.9	49.4	18.7	23.4	11.1	22.6	6.8
D13_25F	842096	817270	4.4	25	92.85	97.25	87.3	13.8	49.4	18.7	23.4	11.1	22.6	6.8
D14_GF	842108	817276	4.4	G	1.5	5.9	88.9	20.6	51.2	20.4	23.8	11.7	22.7	6.8
D14_L1	842108	817276	4.4	L1	5.50	9.90	87.2	19.5	50.8	20.4	23.8	11.7	22.7	6.8
D14_L2	842108	817276	4.4	L2	10.00	14.40	86.1	17.1	50.6	20.6	23.8	11.7	22.7	6.8
D14_1F	842108	817276	4.4	1	18.20	22.60	85.4	16.0	50.3	20.3	23.7	11.6	22.7	6.8
D14_2F	842108	817276	4.4	2	21.30	25.70	85.1	15.9	50.2	20.2	23.7	11.6	22.7	6.8
D14_3F	842108	817276	4.4	3	24.40	28.80	85.1	15.9	50.2	20.3	23.7	11.7	22.7	6.8
D14_4F	842108	817276	4.4	4	27.50	31.90	85.0	15.9	50.1	20.4	23.7	11.7	22.7	6.8
D14_5F	842108	817276	4.4	5	30.60	35.00	85.0	15.8	50.0	20.1	23.7	11.6	22.7	6.8
D14_6F	842108	817276	4.4	6	33.70	38.10	85.8	15.7	49.8	19.8	23.6	11.5	22.7	6.8
D14_7F	842108	817276	4.4	7	36.80	41.20	85.8	15.6	49.8	19.5	23.5	11.4	22.7	6.8
D14_8F	842108	817276	4.4	8	39.90	44.30	85.8	15.4	49.8	19.4	23.5	11.4	22.7	6.8
D14_9F	842108	817276	4.4	9	43.00	47.40	85.8	15.2	49.7	19.2	23.5	11.3	22.7	6.8
D14_10F	842108	817276	4.4	10	46.10	50.50	85.8	15.0	49.7	19.1	23.5	11.3	22.7	6.8
D14_11F	842108	817276	4.4	11	49.20	53.60	85.8	14.9	49.6	19.0	23.4	11.3	22.7	6.8
D14_12F	842108	817276	4.4	12	52.30	56.70	85.1	14.7	49.6	19.0	23.4	11.2	22.7	6.8
D14_13F	842108	817276	4.4	13	55.40	59.80	85.1	14.6	49.6	18.9	23.4	11.2	22.7	6.8
D14_14F	842108	817276	4.4	14	58.50	62.90	83.2	14.4	49.5	18.9	23.4	11.2	22.7	6.8
D14_15F	842108	817276	4.4	15	61.60	66.00	83.3	14.3	49.5	18.9	23.4	11.2	22.7	6.8
D14_17F	842108	817276	4.4</											

Appendix 2.14 Not Used

Appendix 2.15 Extracts from Approved Planning Application A/K15/126 –
Input Parameters of Odour Sources in AERMOD

Odour Strength inside Kwun Tong Wholesale Fish Market

Sampling flowrate = 5.42E-05 m³/s
 Covered surface area = 0.13 m²

Odour sources

Label	X1	Y1	X2	Y2	Z	Distance	Width	Angle (deg. Clockwise from N)	Release Height	Area	Sampling Concentration	Emission Rate	Plume Height
						(m)	(m)		m	m ²	OU/m ³	(OU/s-m ²)	m
PB01	842149	817159	842158	817167	4.4	11.8	7.54	45.6	3.0	89.1	14	5.83E-03	0.0
PB02	842162	817172	842165	817174	4.4	3.7	9.54	45.8	3.0	35.3	14	5.83E-03	0.0
PB03	842164	817144	842159	817149	4.4	7.5	10.88	-44.4	3.0	82.1	14	5.83E-03	0.0
PB04	842189	817104	842187	817106	4.4	2.5	39.74	-46.0	3.0	99.2	14	5.83E-03	0.0
FT01	842177	817119	842159	817138	4.4	26.5	26	-43.9	3.0	688.3	59	2.46E-02	0.0
FT02	842187	817115	842180	817122	4.4	9.7	21.1	-43.4	3.0	204.7	59	2.46E-02	0.0
WF01	842152	817132	842137	817147	4.4	21.5	17.17	-44.6	3.0	369.4	180	7.50E-02	0.0
WF02	842159	817149	842155	817154	4.4	6.3	17.9	-44.2	3.0	113.3	180	7.50E-02	0.0
WF03	842207	817126	842169	817165	4.4	54.3	11.5	-43.8	3.0	624.3	180	7.50E-02	0.0
WF04	842171	817113	842152	817132	4.4	26.5	9	-44.2	3.0	238.5	180	7.50E-02	0.0
WF05	842177	817106	842171	817113	4.4	9.5	13.6	-43.8	3.0	129.2	180	7.50E-02	0.0
WF06	842182	817101	842178	817106	4.4	6.5	34.6	-43.7	3.0	224.5	180	7.50E-02	0.0
WF07	842184	817099	842182	817101	4.4	2.8	6.46	-43.8	3.0	17.8	180	7.50E-02	0.0

Note:

Due to the erected concrete block wall at the northeast side of KTFM, release height is set at 3m, which is the worst-case scenario for the proposed residential development comprising residential units starting from 9m above ground.

Appendix 2.16 Predicted Odour Impact Assessment Results

ASR Label	Location		Local Ground, Z (mPD)	Floor	Flag Pole Receiver Height, mAG	Flag Pole Receiver Height, mPD	Odour
	x	y					Highest 5-s average
	Easting	Northing					
D01_GF	842121	817283	4.4	G	1.5	5.9	0.304
D01_L1	842121	817283	4.4	L1	5.50	9.90	0.276
D01_L2	842121	817283	4.4	L2	10.00	14.40	0.230
D01_1F	842121	817283	4.4	1	18.20	22.60	0.153
D01_2F	842121	817283	4.4	2	21.30	25.70	0.117
D01_3F	842121	817283	4.4	3	24.40	28.80	0.083
D01_4F	842121	817283	4.4	4	27.50	31.90	0.069
D01_5F	842121	817283	4.4	5	30.60	35.00	0.065
D01_6F	842121	817283	4.4	6	33.70	38.10	0.061
D01_7F	842121	817283	4.4	7	36.80	41.20	0.058
D01_8F	842121	817283	4.4	8	39.90	44.30	0.055
D01_9F	842121	817283	4.4	9	43.00	47.40	0.052
D01_10F	842121	817283	4.4	10	46.10	50.50	0.049
D01_11F	842121	817283	4.4	11	49.20	53.60	0.046
D01_12F	842121	817283	4.4	12	52.30	56.70	0.043
D01_13F	842121	817283	4.4	13	55.40	59.80	0.041
D01_14F	842121	817283	4.4	14	58.50	62.90	0.038
D01_15F	842121	817283	4.4	15	61.60	66.00	0.036
D01_17F	842121	817283	4.4	17	67.80	72.20	0.031
D01_19F	842121	817283	4.4	19	74.00	78.40	0.027
D01_22F	842121	817283	4.4	22	83.40	87.80	0.021
D01_25F	842121	817283	4.4	25	92.85	97.25	0.016
D02_GF	842128	817270	4.4	G	1.5	5.9	0.344
D02_L1	842128	817270	4.4	L1	5.50	9.90	0.303
D02_L2	842128	817270	4.4	L2	10.00	14.40	0.254
D02_1F	842128	817270	4.4	1	18.20	22.60	0.160
D02_2F	842128	817270	4.4	2	21.30	25.70	0.118
D02_3F	842128	817270	4.4	3	24.40	28.80	0.086
D02_4F	842128	817270	4.4	4	27.50	31.90	0.081
D02_5F	842128	817270	4.4	5	30.60	35.00	0.075
D02_6F	842128	817270	4.4	6	33.70	38.10	0.071
D02_7F	842128	817270	4.4	7	36.80	41.20	0.066
D02_8F	842128	817270	4.4	8	39.90	44.30	0.062
D02_9F	842128	817270	4.4	9	43.00	47.40	0.058
D02_10F	842128	817270	4.4	10	46.10	50.50	0.054
D02_11F	842128	817270	4.4	11	49.20	53.60	0.050
D02_12F	842128	817270	4.4	12	52.30	56.70	0.047
D02_13F	842128	817270	4.4	13	55.40	59.80	0.043
D02_14F	842128	817270	4.4	14	58.50	62.90	0.040
D02_15F	842128	817270	4.4	15	61.60	66.00	0.037
D02_17F	842128	817270	4.4	17	67.80	72.20	0.032
D02_19F	842128	817270	4.4	19	74.00	78.40	0.026
D02_22F	842128	817270	4.4	22	83.40	87.80	0.020
D02_25F	842128	817270	4.4	25	92.85	97.25	0.015
D03_GF	842134	817259	4.4	G	1.5	5.9	0.383
D03_L1	842134	817259	4.4	L1	5.50	9.90	0.328

ASR Label	Location		Local Ground, Z (mPD)	Floor	Flag Pole Receiver Height, mAG	Flag Pole Receiver Height, mPD	Odour
	x	y					Highest 5-s average
	Easting	Northing					
D03_L2	842134	817259	4.4	L2	10.00	14.40	0.276
D03_1F	842134	817259	4.4	1	18.20	22.60	0.165
D03_2F	842134	817259	4.4	2	21.30	25.70	0.116
D03_3F	842134	817259	4.4	3	24.40	28.80	0.100
D03_4F	842134	817259	4.4	4	27.50	31.90	0.092
D03_5F	842134	817259	4.4	5	30.60	35.00	0.085
D03_6F	842134	817259	4.4	6	33.70	38.10	0.079
D03_7F	842134	817259	4.4	7	36.80	41.20	0.073
D03_8F	842134	817259	4.4	8	39.90	44.30	0.067
D03_9F	842134	817259	4.4	9	43.00	47.40	0.062
D03_10F	842134	817259	4.4	10	46.10	50.50	0.057
D03_11F	842134	817259	4.4	11	49.20	53.60	0.053
D03_12F	842134	817259	4.4	12	52.30	56.70	0.048
D03_13F	842134	817259	4.4	13	55.40	59.80	0.044
D03_14F	842134	817259	4.4	14	58.50	62.90	0.041
D03_15F	842134	817259	4.4	15	61.60	66.00	0.037
D03_17F	842134	817259	4.4	17	67.80	72.20	0.030
D03_19F	842134	817259	4.4	19	74.00	78.40	0.025
D03_22F	842134	817259	4.4	22	83.40	87.80	0.018
D03_25F	842134	817259	4.4	25	92.85	97.25	0.014
D04_GF	842140	817247	4.4	G	1.5	5.9	0.433
D04_L1	842140	817247	4.4	L1	5.50	9.90	0.364
D04_L2	842140	817247	4.4	L2	10.00	14.40	0.308
D04_1F	842140	817247	4.4	1	18.20	22.60	0.167
D04_2F	842140	817247	4.4	2	21.30	25.70	0.126
D04_3F	842140	817247	4.4	3	24.40	28.80	0.115
D04_4F	842140	817247	4.4	4	27.50	31.90	0.105
D04_5F	842140	817247	4.4	5	30.60	35.00	0.096
D04_6F	842140	817247	4.4	6	33.70	38.10	0.087
D04_7F	842140	817247	4.4	7	36.80	41.20	0.079
D04_8F	842140	817247	4.4	8	39.90	44.30	0.072
D04_9F	842140	817247	4.4	9	43.00	47.40	0.065
D04_10F	842140	817247	4.4	10	46.10	50.50	0.059
D04_11F	842140	817247	4.4	11	49.20	53.60	0.053
D04_12F	842140	817247	4.4	12	52.30	56.70	0.048
D04_13F	842140	817247	4.4	13	55.40	59.80	0.043
D04_14F	842140	817247	4.4	14	58.50	62.90	0.039
D04_15F	842140	817247	4.4	15	61.60	66.00	0.034
D04_17F	842140	817247	4.4	17	67.80	72.20	0.027
D04_19F	842140	817247	4.4	19	74.00	78.40	0.021
D04_22F	842140	817247	4.4	22	83.40	87.80	0.018
D04_25F	842140	817247	4.4	25	92.85	97.25	0.016
D05_GF	842125	817239	4.4	G	1.5	5.9	0.440
D05_L1	842125	817239	4.4	L1	5.50	9.90	0.389
D05_L2	842125	817239	4.4	L2	10.00	14.40	0.316
D05_1F	842125	817239	4.4	1	18.20	22.60	0.156

ASR Label	Location		Local Ground, Z (mPD)	Floor	Flag Pole Receiver Height, mAG	Flag Pole Receiver Height, mPD	Odour
	x	y					Highest 5-s average
	Easting	Northing					
D05_2F	842125	817239	4.4	2	21.30	25.70	0.108
D05_3F	842125	817239	4.4	3	24.40	28.80	0.097
D05_4F	842125	817239	4.4	4	27.50	31.90	0.088
D05_5F	842125	817239	4.4	5	30.60	35.00	0.080
D05_6F	842125	817239	4.4	6	33.70	38.10	0.072
D05_7F	842125	817239	4.4	7	36.80	41.20	0.065
D05_8F	842125	817239	4.4	8	39.90	44.30	0.058
D05_9F	842125	817239	4.4	9	43.00	47.40	0.052
D05_10F	842125	817239	4.4	10	46.10	50.50	0.047
D05_11F	842125	817239	4.4	11	49.20	53.60	0.042
D05_12F	842125	817239	4.4	12	52.30	56.70	0.038
D05_13F	842125	817239	4.4	13	55.40	59.80	0.033
D05_14F	842125	817239	4.4	14	58.50	62.90	0.030
D05_15F	842125	817239	4.4	15	61.60	66.00	0.026
D05_17F	842125	817239	4.4	17	67.80	72.20	0.021
D05_19F	842125	817239	4.4	19	74.00	78.40	0.020
D05_22F	842125	817239	4.4	22	83.40	87.80	0.018
D05_25F	842125	817239	4.4	25	92.85	97.25	0.017
D06_GF	842111	817232	4.4	G	1.5	5.9	0.421
D06_L1	842111	817232	4.4	L1	5.50	9.90	0.368
D06_L2	842111	817232	4.4	L2	10.00	14.40	0.301
D06_1F	842111	817232	4.4	1	18.20	22.60	0.147
D06_2F	842111	817232	4.4	2	21.30	25.70	0.101
D06_3F	842111	817232	4.4	3	24.40	28.80	0.070
D06_4F	842111	817232	4.4	4	27.50	31.90	0.063
D06_5F	842111	817232	4.4	5	30.60	35.00	0.056
D06_6F	842111	817232	4.4	6	33.70	38.10	0.050
D06_7F	842111	817232	4.4	7	36.80	41.20	0.045
D06_8F	842111	817232	4.4	8	39.90	44.30	0.040
D06_9F	842111	817232	4.4	9	43.00	47.40	0.036
D06_10F	842111	817232	4.4	10	46.10	50.50	0.032
D06_11F	842111	817232	4.4	11	49.20	53.60	0.028
D06_12F	842111	817232	4.4	12	52.30	56.70	0.025
D06_13F	842111	817232	4.4	13	55.40	59.80	0.023
D06_14F	842111	817232	4.4	14	58.50	62.90	0.022
D06_15F	842111	817232	4.4	15	61.60	66.00	0.022
D06_17F	842111	817232	4.4	17	67.80	72.20	0.021
D06_19F	842111	817232	4.4	19	74.00	78.40	0.020
D06_22F	842111	817232	4.4	22	83.40	87.80	0.019
D06_25F	842111	817232	4.4	25	92.85	97.25	0.018
D07_GF	842097	817225	4.4	G	1.5	5.9	0.326
D07_L1	842097	817225	4.4	L1	5.50	9.90	0.301
D07_L2	842097	817225	4.4	L2	10.00	14.40	0.251
D07_1F	842097	817225	4.4	1	18.20	22.60	0.163
D07_2F	842097	817225	4.4	2	21.30	25.70	0.114
D07_3F	842097	817225	4.4	3	24.40	28.80	0.071

ASR Label	Location		Local Ground, Z (mPD)	Floor	Flag Pole Receiver Height, mAG	Flag Pole Receiver Height, mPD	Odour
	x	y					Highest 5-s average
	Easting	Northing					
D07_4F	842097	817225	4.4	4	27.50	31.90	0.051
D07_5F	842097	817225	4.4	5	30.60	35.00	0.046
D07_6F	842097	817225	4.4	6	33.70	38.10	0.040
D07_7F	842097	817225	4.4	7	36.80	41.20	0.037
D07_8F	842097	817225	4.4	8	39.90	44.30	0.035
D07_9F	842097	817225	4.4	9	43.00	47.40	0.034
D07_10F	842097	817225	4.4	10	46.10	50.50	0.032
D07_11F	842097	817225	4.4	11	49.20	53.60	0.030
D07_12F	842097	817225	4.4	12	52.30	56.70	0.028
D07_13F	842097	817225	4.4	13	55.40	59.80	0.027
D07_14F	842097	817225	4.4	14	58.50	62.90	0.025
D07_15F	842097	817225	4.4	15	61.60	66.00	0.023
D07_17F	842097	817225	4.4	17	67.80	72.20	0.020
D07_19F	842097	817225	4.4	19	74.00	78.40	0.020
D07_22F	842097	817225	4.4	22	83.40	87.80	0.018
D07_25F	842097	817225	4.4	25	92.85	97.25	0.017
D08_GF	842083	817218	4.4	G	1.5	5.9	0.254
D08_L1	842083	817218	4.4	L1	5.50	9.90	0.271
D08_L2	842083	817218	4.4	L2	10.00	14.40	0.245
D08_1F	842083	817218	4.4	1	18.20	22.60	0.158
D08_2F	842083	817218	4.4	2	21.30	25.70	0.113
D08_3F	842083	817218	4.4	3	24.40	28.80	0.072
D08_4F	842083	817218	4.4	4	27.50	31.90	0.052
D08_5F	842083	817218	4.4	5	30.60	35.00	0.046
D08_6F	842083	817218	4.4	6	33.70	38.10	0.041
D08_7F	842083	817218	4.4	7	36.80	41.20	0.037
D08_8F	842083	817218	4.4	8	39.90	44.30	0.036
D08_9F	842083	817218	4.4	9	43.00	47.40	0.034
D08_10F	842083	817218	4.4	10	46.10	50.50	0.032
D08_11F	842083	817218	4.4	11	49.20	53.60	0.031
D08_12F	842083	817218	4.4	12	52.30	56.70	0.029
D08_13F	842083	817218	4.4	13	55.40	59.80	0.028
D08_14F	842083	817218	4.4	14	58.50	62.90	0.026
D08_15F	842083	817218	4.4	15	61.60	66.00	0.025
D08_17F	842083	817218	4.4	17	67.80	72.20	0.022
D08_19F	842083	817218	4.4	19	74.00	78.40	0.019
D08_22F	842083	817218	4.4	22	83.40	87.80	0.017
D08_25F	842083	817218	4.4	25	92.85	97.25	0.016
D09_GF	842079	817230	4.4	G	1.5	5.9	0.225
D09_L1	842079	817230	4.4	L1	5.50	9.90	0.242
D09_L2	842079	817230	4.4	L2	10.00	14.40	0.222
D09_1F	842079	817230	4.4	1	18.20	22.60	0.155
D09_2F	842079	817230	4.4	2	21.30	25.70	0.116
D09_3F	842079	817230	4.4	3	24.40	28.80	0.079
D09_4F	842079	817230	4.4	4	27.50	31.90	0.048
D09_5F	842079	817230	4.4	5	30.60	35.00	0.040

ASR Label	Location		Local Ground, Z (mPD)	Floor	Flag Pole Receiver Height, mAG	Flag Pole Receiver Height, mPD	Odour
	x	y					Highest 5-s average
	Easting	Northing					
D09_6F	842079	817230	4.4	6	33.70	38.10	0.036
D09_7F	842079	817230	4.4	7	36.80	41.20	0.032
D09_8F	842079	817230	4.4	8	39.90	44.30	0.031
D09_9F	842079	817230	4.4	9	43.00	47.40	0.030
D09_10F	842079	817230	4.4	10	46.10	50.50	0.029
D09_11F	842079	817230	4.4	11	49.20	53.60	0.027
D09_12F	842079	817230	4.4	12	52.30	56.70	0.026
D09_13F	842079	817230	4.4	13	55.40	59.80	0.025
D09_14F	842079	817230	4.4	14	58.50	62.90	0.024
D09_15F	842079	817230	4.4	15	61.60	66.00	0.023
D09_17F	842079	817230	4.4	17	67.80	72.20	0.021
D09_19F	842079	817230	4.4	19	74.00	78.40	0.018
D09_22F	842079	817230	4.4	22	83.40	87.80	0.016
D09_25F	842079	817230	4.4	25	92.85	97.25	0.015
D10_GF	842075	817244	4.4	G	1.5	5.9	0.213
D10_L1	842075	817244	4.4	L1	5.50	9.90	0.213
D10_L2	842075	817244	4.4	L2	10.00	14.40	0.196
D10_1F	842075	817244	4.4	1	18.20	22.60	0.147
D10_2F	842075	817244	4.4	2	21.30	25.70	0.115
D10_3F	842075	817244	4.4	3	24.40	28.80	0.082
D10_4F	842075	817244	4.4	4	27.50	31.90	0.053
D10_5F	842075	817244	4.4	5	30.60	35.00	0.038
D10_6F	842075	817244	4.4	6	33.70	38.10	0.033
D10_7F	842075	817244	4.4	7	36.80	41.20	0.031
D10_8F	842075	817244	4.4	8	39.90	44.30	0.028
D10_9F	842075	817244	4.4	9	43.00	47.40	0.026
D10_10F	842075	817244	4.4	10	46.10	50.50	0.025
D10_11F	842075	817244	4.4	11	49.20	53.60	0.024
D10_12F	842075	817244	4.4	12	52.30	56.70	0.023
D10_13F	842075	817244	4.4	13	55.40	59.80	0.022
D10_14F	842075	817244	4.4	14	58.50	62.90	0.021
D10_15F	842075	817244	4.4	15	61.60	66.00	0.020
D10_17F	842075	817244	4.4	17	67.80	72.20	0.019
D10_19F	842075	817244	4.4	19	74.00	78.40	0.017
D10_22F	842075	817244	4.4	22	83.40	87.80	0.015
D10_25F	842075	817244	4.4	25	92.85	97.25	0.013
D11_GF	842071	817257	4.4	G	1.5	5.9	0.212
D11_L1	842071	817257	4.4	L1	5.50	9.90	0.200
D11_L2	842071	817257	4.4	L2	10.00	14.40	0.181
D11_1F	842071	817257	4.4	1	18.20	22.60	0.137
D11_2F	842071	817257	4.4	2	21.30	25.70	0.111
D11_3F	842071	817257	4.4	3	24.40	28.80	0.082
D11_4F	842071	817257	4.4	4	27.50	31.90	0.055
D11_5F	842071	817257	4.4	5	30.60	35.00	0.037
D11_6F	842071	817257	4.4	6	33.70	38.10	0.033
D11_7F	842071	817257	4.4	7	36.80	41.20	0.030

ASR Label	Location		Local Ground, Z (mPD)	Floor	Flag Pole Receiver Height, mAG	Flag Pole Receiver Height, mPD	Odour
	x	y					Highest 5-s average
	Easting	Northing					
D11_8F	842071	817257	4.4	8	39.90	44.30	0.028
D11_9F	842071	817257	4.4	9	43.00	47.40	0.026
D11_10F	842071	817257	4.4	10	46.10	50.50	0.024
D11_11F	842071	817257	4.4	11	49.20	53.60	0.022
D11_12F	842071	817257	4.4	12	52.30	56.70	0.021
D11_13F	842071	817257	4.4	13	55.40	59.80	0.019
D11_14F	842071	817257	4.4	14	58.50	62.90	0.019
D11_15F	842071	817257	4.4	15	61.60	66.00	0.018
D11_17F	842071	817257	4.4	17	67.80	72.20	0.017
D11_19F	842071	817257	4.4	19	74.00	78.40	0.015
D11_22F	842071	817257	4.4	22	83.40	87.80	0.014
D11_25F	842071	817257	4.4	25	92.85	97.25	0.012
D12_GF	842084	817263	4.4	G	1.5	5.9	0.270
D12_L1	842084	817263	4.4	L1	5.50	9.90	0.253
D12_L2	842084	817263	4.4	L2	10.00	14.40	0.214
D12_1F	842084	817263	4.4	1	18.20	22.60	0.129
D12_2F	842084	817263	4.4	2	21.30	25.70	0.102
D12_3F	842084	817263	4.4	3	24.40	28.80	0.074
D12_4F	842084	817263	4.4	4	27.50	31.90	0.049
D12_5F	842084	817263	4.4	5	30.60	35.00	0.040
D12_6F	842084	817263	4.4	6	33.70	38.10	0.038
D12_7F	842084	817263	4.4	7	36.80	41.20	0.035
D12_8F	842084	817263	4.4	8	39.90	44.30	0.033
D12_9F	842084	817263	4.4	9	43.00	47.40	0.030
D12_10F	842084	817263	4.4	10	46.10	50.50	0.028
D12_11F	842084	817263	4.4	11	49.20	53.60	0.026
D12_12F	842084	817263	4.4	12	52.30	56.70	0.024
D12_13F	842084	817263	4.4	13	55.40	59.80	0.022
D12_14F	842084	817263	4.4	14	58.50	62.90	0.020
D12_15F	842084	817263	4.4	15	61.60	66.00	0.018
D12_17F	842084	817263	4.4	17	67.80	72.20	0.015
D12_19F	842084	817263	4.4	19	74.00	78.40	0.014
D12_22F	842084	817263	4.4	22	83.40	87.80	0.013
D12_25F	842084	817263	4.4	25	92.85	97.25	0.012
D13_GF	842096	817270	4.4	G	1.5	5.9	0.308
D13_L1	842096	817270	4.4	L1	5.50	9.90	0.284
D13_L2	842096	817270	4.4	L2	10.00	14.40	0.232
D13_1F	842096	817270	4.4	1	18.20	22.60	0.136
D13_2F	842096	817270	4.4	2	21.30	25.70	0.098
D13_3F	842096	817270	4.4	3	24.40	28.80	0.071
D13_4F	842096	817270	4.4	4	27.50	31.90	0.048
D13_5F	842096	817270	4.4	5	30.60	35.00	0.045
D13_6F	842096	817270	4.4	6	33.70	38.10	0.043
D13_7F	842096	817270	4.4	7	36.80	41.20	0.040
D13_8F	842096	817270	4.4	8	39.90	44.30	0.038
D13_9F	842096	817270	4.4	9	43.00	47.40	0.035

ASR Label	Location		Local Ground, Z (mPD)	Floor	Flag Pole Receiver Height, mAG	Flag Pole Receiver Height, mPD	Odour
	x	y					Highest 5-s average
	Easting	Northing					
D13_10F	842096	817270	4.4	10	46.10	50.50	0.033
D13_11F	842096	817270	4.4	11	49.20	53.60	0.031
D13_12F	842096	817270	4.4	12	52.30	56.70	0.029
D13_13F	842096	817270	4.4	13	55.40	59.80	0.027
D13_14F	842096	817270	4.4	14	58.50	62.90	0.025
D13_15F	842096	817270	4.4	15	61.60	66.00	0.024
D13_17F	842096	817270	4.4	17	67.80	72.20	0.020
D13_19F	842096	817270	4.4	19	74.00	78.40	0.017
D13_22F	842096	817270	4.4	22	83.40	87.80	0.013
D13_25F	842096	817270	4.4	25	92.85	97.25	0.012
D14_GF	842108	817276	4.4	G	1.5	5.9	0.307
D14_L1	842108	817276	4.4	L1	5.50	9.90	0.286
D14_L2	842108	817276	4.4	L2	10.00	14.40	0.231
D14_1F	842108	817276	4.4	1	18.20	22.60	0.145
D14_2F	842108	817276	4.4	2	21.30	25.70	0.109
D14_3F	842108	817276	4.4	3	24.40	28.80	0.076
D14_4F	842108	817276	4.4	4	27.50	31.90	0.060
D14_5F	842108	817276	4.4	5	30.60	35.00	0.056
D14_6F	842108	817276	4.4	6	33.70	38.10	0.053
D14_7F	842108	817276	4.4	7	36.80	41.20	0.050
D14_8F	842108	817276	4.4	8	39.90	44.30	0.047
D14_9F	842108	817276	4.4	9	43.00	47.40	0.044
D14_10F	842108	817276	4.4	10	46.10	50.50	0.042
D14_11F	842108	817276	4.4	11	49.20	53.60	0.039
D14_12F	842108	817276	4.4	12	52.30	56.70	0.037
D14_13F	842108	817276	4.4	13	55.40	59.80	0.034
D14_14F	842108	817276	4.4	14	58.50	62.90	0.032
D14_15F	842108	817276	4.4	15	61.60	66.00	0.030
D14_17F	842108	817276	4.4	17	67.80	72.20	0.026
D14_19F	842108	817276	4.4	19	74.00	78.40	0.022
D14_22F	842108	817276	4.4	22	83.40	87.80	0.017
D14_25F	842108	817276	4.4	25	92.85	97.25	0.013
						Max.	0.440075
						AQO	5

Note:

1. Shaded cell in orange denotes the predicted air quality exceeds the relevant HKAQOs.
2. Bolded cell denotes the largest value.