9. AIR QUALITY

9.1 Introduction

This *Section* presents the Air Quality Impact Assessment (AQIA) associated with the construction and operation of the Project in accordance with *Clause 3.4.9* of the EIA Study Brief.

9.2 Legislative Requirements and Evaluation Criteria

The principle legislation for the management of air quality in Hong Kong is the *Air Pollution Control Ordinance (APCO) (Cap. 311)*. Evaluation criteria for the AQIA will follow the prevailing Air Quality Objective (AQOs) which stipulate the statutory limits of typical air pollutants in the ambient air and the maximum allowable number of exceedances over the specified periods under APCO. The new set of AQOs, came into effect since 1 January 2022, has been adopted as the assessment criteria in this assessment. The statutory limits and the maximum allowable numbers of exceedances over specific periods for the new AQOs are presented in ***Table 9.1***.

Table 9.1 Hong Kong Air Quality Objectives

Air Pollutant	Averaging Time	Concentration (µg/m^3) [(a)]	No. of Exceedances Allowed per Year
Sulphur Dioxide (SO_2)	10 minute	500	3
	24-hour	50	3
Respirable Suspended Particulates (RSP) [(b)]	24-hour	100	9
	Annual	50	-
Fine Suspended Particulates (FSP) [(c)]	24-hour	50	35/ 18 [(d)]
	Annual	25	-
Nitrogen Dioxide (NO_2)	1-hour	200	18
	Annual	40	-
Carbon Monoxide (CO)	1-hour	30,000	0
	8-hour	10,000	0
Ozone (O_3)	8-hour	160	9
Lead	Annual	0.5	-

Notes:

(a) All measurements of the concentration of gaseous air pollutants (i.e. SO_2, NO_2, CO, O_3) are to be adjusted to a reference temperature of 293 degree K and a reference pressure of 101.325kPa.

(b) Suspended particles in air with a nominal aerodynamic diameter of 10 µm or less.

(c) Suspended particles in air with a nominal aerodynamic diameter of 2.5 µm or less.

(d) On a best endeavours basis, a more stringent standard of 24-hour AQO for FSP at a concentration level of 50 µg/m^3 and the number of allowable exceedances of 18 days per calendar year (in lieu of 35 days per calendar year as set out in the *Air Pollution Control (Amendment) Bill 2021*) is adopted as the benchmark for conducting air quality impact assessment under this EIA study.

In addition to the APCO, a maximum hourly average Total Suspended Particulates (TSP) concentration of 500 µg/m^3 at Air Sensitive Receivers (ASRs) is stipulated in *Annex 4* of the *Technical Memorandum in Environmental Impact Assessment Process (EIAO-TM)* to address potential construction dust impacts. The measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* will be followed to ensure that potential dust impacts are properly controlled. Requirements stipulated in the *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation* will also be followed to control potential emissions from non-road mobile machinery during construction and operation phase.

For fuel usage during both construction and operation phases, the *Air Pollution Control (Fuel Restriction) Regulation* will be followed, which specifies the legal control on the type of fuels to be allowed for use and the sulphur contents of the fuels in commercial and industrial processes. The *Air Pollution Control (Marine Light Diesel) Regulation* will also be followed which specifies a statutory cap of 0.05% on the sulphur content of locally supplied marine light diesel. In addition, the *Air Pollution Control (Fuel for Vessels) Regulation* will be followed which specifies a vessel during its stay in the waters of Hong Kong is prohibited from using any fuel other than compliant fuel for combustion purposes for operating any of its specified machinery, which includes the main engine, auxiliary engine, boiler and generator.

In accordance with the *Annex 4* of the *EIAO-TM*, odour level at an air sensitive receiver shall meet 5 odour units based on an averaging time of 5 seconds.

9.3 Assessment Area and Air Sensitive Receivers

The Study Area of the Project is indicatively shown in ***Figure 1.1***. As discussed in ***Section 2.6.2***, the Project will be developed within the Key Area identified for potential CMP development as shown in ***Figure 2.6***. The Assessment Area for the AQIA is thus defined as an area within 500 m from the boundary of the Project (i.e. Key Area identified for potential CMP development), as presented in ***Figure 9.1***.

No existing and planned ASRs have been identified within the Assessment Area with reference to current land uses, relevant Outline Zoning Plans, Development Permission Area Plans, Outline Development Plans and Layout Plans. The nearest representative ASRs from the Project site have been identified on Lamma Island, Cheung Chau and Hei Ling Chau beyond the Assessment Area, and they are listed in ***Table 9.2***. The locations of the identified representative ASRs are shown in ***Figure 9.1***.

Table 9.2 Identified Representative ASRs

ASR	Description	Type of Use	Approx. Maximum Height above ground (mAG)	Approx. Separation Distance from the Project Site Boundary (m)
A1	Administration Building of Lamma Power Station	Industrial	22	2,600
A2	Village Houses at Yung Shue Wan	Residential	7	3,150
A3	Village Houses at Pak Kok San Tsuen	Residential	4	3,620
A4	Village House at Hung Shing Ye	Residential	5	4,000
A5	Village House at Sok Kwu Wan	Residential	8	4,775
A6	Seaview Garden	Residential	10	2,835
A7	Hei Ling Chau Correctional Institution	Government, Institution or Community	90	4,550

As shown in ***Table 9.2***, the administration building of Lamma Power Station (LPS), which is located more than 2.5 km to the east of the Project site, is identified as the nearest ASR from the Project site.

9.4 Baseline Conditions

The Project is located in the West Lamma Channel, in an area to the west of Lamma Island and to the east of the recommended TSS between south of KYC and Fan Lau (route via south of Cheung Chau). The air quality in the Project site area is likely influenced by industrial emissions from the operation of the LPS and emissions from marine traffic in the vicinity.

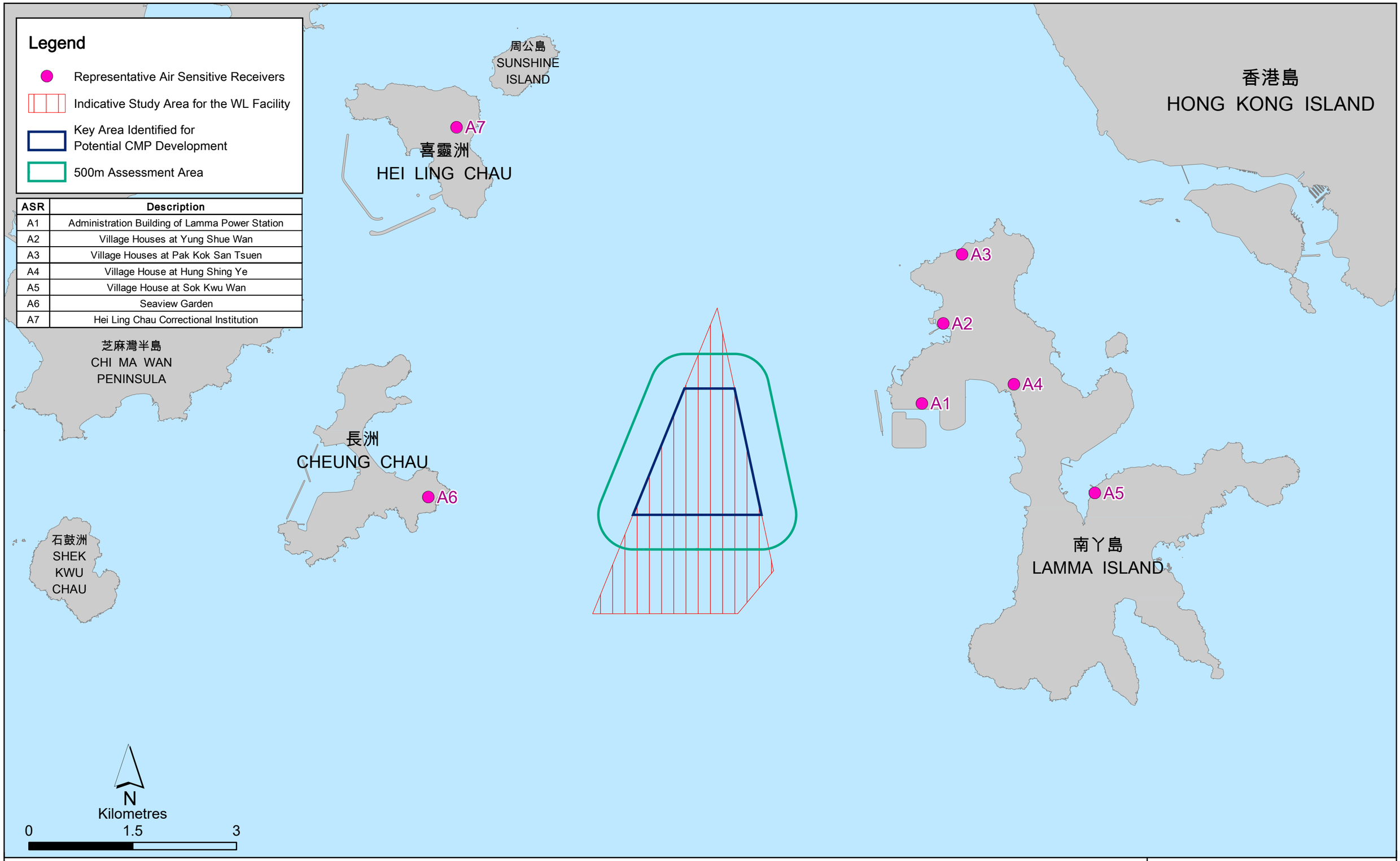

Figure 9.1

Location of Representative Air Sensitive Receivers in the vicinity of the Project

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Date: 17/12/2021

Environmental Resources Management

ERM

9.4.1 Measured Background Air Quality from Air Quality Monitoring Station

There is no air quality monitoring station (AQMS) operated by EPD in the vicinity of the Project.

HK Electric operate a number of AQMSs in accordance with the requirements of its LPS Specified Process (SP) licence, and the air quality monitoring data (i.e. NO_2 and SO_2) from these AQMSs are available for the most recent three years on HK Electric's website [82]. AQMSs at Cheung Chau and Ap Lei Chau operated by HK Electric are located at about 3.9 km and 7.8 km from the Project site, respectively. The relevant time-averaging concentrations of the measured NO_2 and SO_2 data from AQMSs at Cheung Chau and Ap Lei Chau in the most recent three years (i.e. 2018 to 2020) are presented in ***Table 9.3*** and ***Table 9.4*** for comparison with the AQOs.

Table 9.3 Concentrations of Air Pollutants Measured at HK Electric's Cheung Chau AQMS in the Recent Three Years (2018-2020)

Year	Concentration of Pollutants (µg/m^3)			
	19th highest 1-hour NO_2	Annual NO_2	4th highest 24-hour SO_2	4th highest 10-min SO_2
2018	160	27	20	67
2019	154	27	12	47
2020	123	22	14	34
New AQOs	**200**	**40**	**50**	**500**

Table 9.4 Concentrations of Air Pollutants Measured at HK Electric's Ap Lei Chau AQMS in the Recent Three Years (2018-2020)

Year	Concentration of Pollutants (µg/m^3)			
	19th highest 1-hour NO_2	Annual NO_2	4th highest 24-hour SO_2	4th highest 10-min SO_2
2018	127	18	35	183
2019	123	13	12	32
2020	92	14	6	28
New AQOs	**200**	**40**	**50**	**500**

As shown in ***Table 9.3*** and ***Table 9.4***, no exceedance of 1-hour and annual average NO_2 criteria or 10-minute and 24-hour average SO_2 criteria was recorded at both Cheung Chau and Ap Lei Chau AQMSs in the past three years (2018-2020).

9.4.2 Predicted Future Background Air Quality

The background air pollutant concentrations predicted by the PATH model (v2.1) in 2024 (tentative year of commencement of construction for the Project) for the relevant PATH grids within the Assessment Area are presented in ***Table 9.5***.

(82) https://www.hkelectric.com/en/sustainability/Protecting-our-Environment/how-we-care-for-our-environment/air-quality-monitoring-statistics

Table 9.5 Background Air Pollutant Concentrations Predicted by PATH Model (v2.1) in 2024

PATH Grid	Concentration of Pollutants (μg/m^3)										
	19th highest 1-hour NO_2	Annual NO_2	4th highest 24-hour SO_2	4th highest 10-min SO_2 [(a)]	10th highest 24-hour RSP	Annual RSP	19th highest 24-hour FSP	Annual FSP [(d)]	10th highest Daily Max. 8-hour O_3	Daily Max. 1-hour CO	Daily Max. 8-hour CO
28,19	118	24	11	69	64	28	33	14	216	876	781
28,20	128	30	11	70	63	28	34	14	204	876	782
29,19	110	21	10	69	64	28	33	14	223	867	775
29,20	112	23	11	69	63	28	34	14	217	868	776
29,21	120	26	11	71	63	28	34	14	214	868	777
29,22	128	33	12	72	63	28	34	14	204	868	778
30,19	106	21	10	71	64	28	33	14	216	864	771
30,20	112	22	11	72	63	28	34	14	214	866	772
30,21	122	24	11	73	63	28	34	14	213	867	774
30,22	126	27	11	74	63	28	34	14	210	869	776
30,23	130	29	11	75	63	28	34	14	208	872	779
30,24	137	36	11	78	63	28	35	14	201	873	782
31,19	106	19	11	72	64	28	33	14	218	852	768
31,20	108	21	11	73	63	28	34	14	215	856	769
31,21	116	22	11	74	63	28	34	14	212	859	770
31,22	122	25	11	76	63	28	34	14	209	863	773
31,23	127	27	11	78	63	28	34	14	205	868	777
31,24	133	29	11	80	63	28	34	14	204	871	781
32,19	106	18	10	71	64	28	33	13	215	834	765
32,20	108	19	11	72	63	28	33	14	214	835	767
New AQOs	**200**	**40**	**50**	**500**	**100**	**50**	**50**	**25**	**160**	**30,000**	**10,000**

Notes:
(a) The multiplicative factor for the stability class calculated for each hour was applied to the 1-hour SO_2 concentrations to estimate the 10-minute SO_2 concentrations.
(b) Underlined values mean AQO exceedance.
(c) An adjustment of 11.0 ug/m^3 and 10.3 ug/m^3 were added to the RSP background for calculation of 24-hour RSP and annual RSP, respectively.
(d) An adjustment of 3.5 ug/m^3 was added to the FSP background for calculation of annual FSP.

As shown in ***Table 9.5***, the background air pollutant concentrations in the relevant PATH grids in 2024 are below the relevant new AQO criteria, except for the exceedance of the daily maximum 8-hour average O_3 criterion.

9.5 Potential Sources of Impact

9.5.1 Construction Phase

The major construction activities of the Project involve dredging of marine sediment to form CMPs in the Key Area, with a total of about 24 Mm^3 uncontaminated sediment required to be excavated.

During the construction phase, the excavated marine sediments exposed to atmosphere may have the potential to generate fugitive dust and odour emissions. However, as the excavated marine mud would be completely wet, the potential fugitive dust emissions associated with the excavated marine mud are expected to be minimal. In addition, the dredging works will be carried out by deploying either one TSHD or two grab dredgers working concurrently. The operation of the TSHD or the grab dredgers and powered mechanical equipment (PME) on board (e.g. mobile generator, air compressor) involve combustion emissions, including NO_2, SO_2, RSP and FSP.

The key air pollutants during the construction phase include NO_2, SO_2, RSP, FSP and odour.

9.5.2 Operation Phase

The major operation activities of the Project involve disposal of contaminated sediment in the formed CMPs (i.e. backfilling) and capping of the exhausted CMPs by uncontaminated sediment up to the original seabed level. The contaminated sediment for backfilling and uncontaminated sediment for capping will be kept wet before they are disposed of at the formed CMPs. With low dispersion properties from wet sediments, the potential dust emissions associated with these sediments are expected to be minimal.

During operation, TSHD / hopper barges with tug boats will be deployed during backfilling and capping at the formed CMPs, and operation of the works vessels and PMEs on board may generate combustion emissions, including NO_2, SO_2, RSP and FSP.

The key air pollutants during the operation phase include NO_2, SO_2, RSP, FSP and odour.

9.6 Assessment Methodology

9.6.1 Construction Phase

As discussed in ***Section 9.5.1***, dredging of marine sediment is not considered to be dust generating activity given its marine nature. The operation of the TSHD or grab dredgers and other PMEs may give rise to combustion emissions during the dredging works, but in view of the large separation distance between the construction sites and the nearest ASRs (more than 2.5 km apart), adverse air quality impact on the nearest identified ASRs during the construction phase of the Project is not anticipated. Similarly, due to large separation distance, adverse odour impact to the identified ASRs due to the excavated marine sediments is also not expected. Quantitative assessment of air quality and odour impacts arising from the construction of the Project is considered not necessary and the construction air quality and odour impacts have been addressed qualitatively in ***Section 9.7.1***.

9.6.2 Operation Phase

As discussed in ***Section 9.5.2***, potential dust emissions arising from backfilling of sediments and capping works are expected to be minimal. The operation of the works vessels and other PMEs may give rise to combustion emissions during the backfilling and capping works, but in view of the large separation distance between the CMPs and the nearest ASRs (more than 2.5 km apart), adverse air quality impact on the nearest identified ASRs during the operation phase of the Project is not anticipated. Similarly, due to large separation distance from the ASRs, adverse odour impact from the contaminated sediment for disposal at the CMPs is also not expected. Quantitative assessment of air quality and odour impacts arising from the operation of the Project is considered not necessary and the operational air quality and odour impacts have been addressed qualitatively in ***Section 9.7.2***.

9.7 Evaluation of Impacts

9.7.1 Construction Phase

9.7.1.1 Dredging of Marine Sediment and Associated Activities at the Proposed CMPs

As the dredging activities are marine-based and the dredged marine sediment will be generally wet, fugitive dust emissions from the dredged marine sediment during the construction phase would be minimal. No land-based works will be required during the construction of the Project. Adverse fugitive dust impact from the dredged marine sediment at the Project site is thus not expected.

Any potential odour emissions from the dredged marine sediment would be transient as the dredged marine sediment will be transported away from the Project site once excavated. Considering the large separation distance between the Project site and the identified ASRs (more than 2.5 km apart), adverse odour impact from the dredged marine sediment at the Project site is not anticipated.

The use of TSHD or grab dredgers and the associated PMEs may give rise to combustion emissions during the dredging works, including loading and unloading of dredged sediments to these vessels. During the construction phase, either one TSHD or a maximum of two grab dredgers will be deployed for the dredging works. In the case of grab dredging, a maximum of two grab dredgers will be working concurrently and continuously for 24 hours on a daily basis, with a total excavation rate of 100,000 m^3/week. Assuming hopper barges with 800m^3 capacity are deployed, there will be approximate 18 vessel trips per day for the dredging works of the Project. In the case of dredging with TSHD, one TSHD will be working continuously for 24 hours on a daily basis, with a total excavation rate of 256,000 m^3/week. With reference to the approved *EIA of New Contaminated Mud Marine Disposal Facility at Airport East/ East Sha Chau Area (AEIAR-089/2005)*, it is assumed that TSHD with hopper size of 4,500m^3 would be used. Following the assumptions adopted in AEIAR-089/2005, about 3,050m^3 of in-situ sediment would be removed in 20 minutes for each cycle. Therefore, it is estimated that there will be about 12 vessel trips per day for the dredging works of the Project using TSHD.

The construction activities at different CMPs will not take place concurrently. According to the tentative construction programme, dredging works during construction phase and backfilling/capping works during operation phase will, however, take place at the other CMPs of the WL Facility concurrently. CEDD and the CMP management contractor to be employed by CEDD will make necessary coordination with relevant parties to minimise the number of marine vessels travelling to and from the Project site on a daily basis during such overlapping periods.

In view of the large separation distance between the Project site and the nearest ASRs (more than 2.5 km apart), and that the number of vessel trips per day during construction is limited, adverse air quality impact on the identified ASRs due to emissions from the grab dredgers/ TSHD and the associated PMEs at the Project site during the construction is not anticipated. The *Air Pollution Control (Fuel Restriction) Regulations, Air Pollution Control (Marine Light Diesel) Regulation, Air Pollution Control (Fuel for Vessels) Regulation* and *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation* would be followed to control emissions from the TSHD, grab dredgers and the associated PMEs.

9.7.1.2 Transportation and Disposal of Dredged Marine Sediment

The majority of dredged marine sediment from the construction of the CMPs would either be disposed of at the nearby available Sediment Disposal Facility (SDF) or used as capping materials for the existing CMPs, which are located more than 500 m away from nearby ASRs. The dredged marine sediment on the hopper barges/ TSHD will be generally wet during transportation until its disposal at the SDFs or existing CMPs as capping materials. Fugitive dust emissions from the dredged marine sediment during transportation and disposal would be minimal, and thus adverse fugitive dust impact is not expected.

During transportation, any potential odour emissions from the dredged marine sediment would be transient. Considering that there would be sufficient separation distance between the vessel routes and ASRs along the vessel routes, as well as between the SDFs/ CMPs and nearby ASRs (more than 500 m apart), adverse odour impact during transportation and disposal of dredged marine sediment is not expected.

As discussed in ***Section 9.7.1.1***, it is estimated that the dredging works of the Project would involve about 18 vessel trips per day using hopper barges with tug boats and about 12 vessel trips per day using TSHD. Given the limited number of vessel trips per day, combustion emissions from these hopper barges with tug boats or TSHD during their transportation of the dredged sediment from the Project site to the SDFs or CMPs as capping materials for disposal are expected to be minimal. Marine emissions from the hopper barges with tug boats or TSHD during transportation are also expected to be transient. With sufficient separation distance between the vessel routes and ASRs along the vessel routes, as well as between the SDFs/ CMPs and nearby ASRs (more than 500 m apart), adverse air quality impact due to marine emissions during transportation and disposal of dredged marine sediment during construction phase is not anticipated. The *Air Pollution Control*

(Fuel Restriction) Regulations, Air Pollution Control (Marine Light Diesel) Regulation, Air Pollution Control (Fuel for Vessels) Regulation and *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation* would be followed to control emissions from the TSHD, hopper barges with tug boats and the associated PMEs.

9.7.2 Operation Phase

9.7.2.1 Backfilling/Capping Activities at the Proposed CMPs

As the contaminated sediment for backfilling and uncontaminated sediments for capping will be generally wet before they are disposed of at the formed CMPs, the potential dust emissions associated with these contaminated and uncontaminated sediments are expected to be minimal. Adverse fugitive dust impact due to backfilling and capping at the formed CMPs is not expected.

Any potential odour emissions from the sediment would be transient as the sediment will be disposed of at the proposed CMPs once the hopper barges arrive at the Project site. Considering the large separation distance between the Project site and the identified ASRs (more than 2.5 km apart), adverse fugitive odour impact from backfilling/ capping at the formed CMPs during the operation phase is not anticipated.

The operation of the works vessels and the associated PMEs may give rise to combustion emissions during backfilling/ capping at the formed CMPs. For backfilling works, TSHD / hopper barges will be deployed for marine dumping at the formed CMPs. Conservatively, the maximum disposal rate for backfilling operation is assumed to be 26,700 m^3/day. Assuming each hopper barge will be loaded with 800m^3 of sediment, it is estimated that there will be approximately 34 vessel trips per day during operation phase. For capping, the maximum disposal rate and arrangement are similar to that of backfilling. In normal circumstances, backfilling and capping activities at the formed CMPs will be based on the actual sediment disposal demand, and thus the number of vessel trips is expected to be much lower than the above conservative trip estimation.

Within the proposed WL Facility, backfilling and capping works may take place concurrently with the dredging works at different CMPs. CEDD and the CMP management contractor to be employed by CEDD will thus coordinate with relevant parties as appropriate to minimise the number of marine vessels travelling to and from the Project site on a daily basis during such overlapping periods.

The number of vessel trips per day during the operation phase of the Project is limited and the associated emissions are considered transient as the works vessels will leave the Project site immediately after the disposal. Considering the large separation distance between the Project site and the identified ASRs (i.e. at least 2.5 km apart), adverse air quality impact on the identified ASRs due to emissions from the works vessels and the associated PMEs during backfilling and capping at the formed CMPs is not expected. The *Air Pollution Control (Fuel Restriction) Regulations*, *Air Pollution Control (Marine Light Diesel) Regulation*, *Air Pollution Control (Fuel for Vessels) Regulation* and *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation* will be followed to control emissions from the works vessels and other associated PMEs.

9.7.2.2 Transportation of Contaminated / Uncontaminated Sediment to the Proposed CMPs

The contaminated / uncontaminated sediment on the hopper barges / TSHD will be generally wet during transportation until its disposal at the formed CMPs. Fugitive dust emissions from the sediment during transportation would be minimal, and thus adverse fugitive dust and impact is not expected.

As the formed CMPs will be open to the public for disposal during operation phase [(83)], contaminated / uncontaminated sediment for disposal at the formed CMPs could come from different places within

(83) Application for Marine Dumping Permit and relevant requirements for marine disposal as per *ETWB TC(W) No.34/2002 – Management of Dredged/ Excavated Sediment*.

Hong Kong via fairways with varying vessel travelling routes. However, considering that there would be sufficient separation distance between the vessel routes and ASRs along the vessel routes, and that any potential odour emissions from the sediment would be transient, adverse odour impact during transportation of the sediment to the formed CMPs is not expected.

Combustion emissions from these works vessels during their transportation of the sediment to the formed CMPs for disposal are expected to be transient. The number of vessels trips to the formed CMPs would be based on the actual sediment disposal demand and is expected to be much lower than the conservative trip estimation as discussed in ***Section 9.7.2.1***. With the coordination from CEDD and the CMP management contractor, the number of vessels trips could be optimised to further reduce potential air quality impact due to marine emissions from the works vessels. With sufficient separation distance between the vessel routes and ASRs along the vessel routes, adverse air quality impact due to marine emissions from transportation of contaminated / uncontaminated sediment to the formed CMPs during operation phase is not anticipated. The *Air Pollution Control (Fuel Restriction) Regulations, Air Pollution Control (Marine Light Diesel) Regulation, Air Pollution Control (Fuel for Vessels) Regulation* and *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation* would be followed to control emissions from the TSHD, hopper barges and the associated PMEs.

9.8 Mitigation Measures

9.8.1 Construction Phase

Dust control measures stipulated in the *Air Pollution Control (Construction Dust) Regulation (Cap. 311R)* should be implemented during the construction phase where appropriate. Requirements stipulated in the *Air Pollution Control (Fuel Restriction) Regulations, Air Pollution Control (Marine Light Diesel) Regulation, Air Pollution Control (Fuel for Vessels) Regulation* and *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation* will also be followed to control emissions from the marine vessels and other associated PMEs. The following air quality and odour mitigation measures should be incorporated during construction phase:

9.8.1.1 Operation of TSHD, Grab Dredgers and PMEs

- Ultra-low sulphur diesel (ULSD) will be used for all PMEs, as defined as diesel fuel containing not more than 0.005% sulphur by weight) as stipulated in *Environment, Transport and Works Bureau Technical Circular (ETWB TC(W)) No. 19/2005* on Environmental Management on Construction Sites;
- The engine of the PMEs during idling shall be switched off;
- Regular maintenance of PMEs shall be conducted to prevent black smoke emission;
- All PMEs shall comply with the prescribed emission standards and approved with a proper label by EPD; and
- Number of trips would be monitored and vessel travelling routes would be kept away from the ASRs as far as possible.

9.8.1.2 Sediment Dredging, Loading and Unloading

- Loading of the dredged marine sediment to the TSHD and hopper barges should be controlled to avoid splashing and overflowing of the sediment slurry to the surrounding water;
- Dredged marine sediment on board the TSHD and hopper barges should be properly covered as far as practicable to minimise the exposed area and potential fugitive dust and odour emissions during its transportation. If the dredged marine sediment is found to be malodorous, it shall be removed from site as soon as possible; and

- Dredged marine sediment on board the TSHD and hopper barges should be transferred to disposal sites at the SDFs/ CMPs as capping materials as soon as possible to minimise potential fugitive dust and odour emissions.

9.8.2 Operation Phase

Dust control measures stipulated in the *Air Pollution Control (Construction Dust) Regulation (Cap 311R)* should be implemented during the operation phase where appropriate. The sediments on board the hopper barges / TSHD to be disposed of at the formed CMPs should be transported to the formed CMPs as soon as possible to minimise potential fugitive dust and odour emissions.

Requirements stipulated in the *Air Pollution Control (Fuel Restriction) Regulations, Air Pollution Control (Marine Light Diesel) Regulation, Air Pollution Control (Fuel for Vessels) Regulation* and *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation* will be followed to control emissions from the hopper barges and other associated PMEs.

9.9 Cumulative Impacts

As discussed in ***Section 9.7***, adverse air quality impact is not expected to arise from the construction and operation of the Project. A number of potential concurrent projects located in the vicinity between Cheung Chau and Lamma Island have been identified in the vicinity of the Project in ***Section 2.8*** and further discussed below.

9.9.1 Hong Kong Offshore Liquefied Natural Gas (LNG) Terminal

The construction works for the LPS subsea pipeline of the Hong Kong Offshore LNG Terminal project is expected to be completed by 2022 and will not coincide with the construction and operation phase of the Project. No cumulative air quality impact is expected.

9.9.2 Improvement Dredging on LPS Navigation Channel

Improvement dredging is to be carried out periodically in the LPS Navigation Channel to the immediate west of the LPS, >1 km away from the Project site. Considering its relatively large separation distance from the Project site and its infrequent dredging involved, adverse cumulative air quality impact from the dredging works in the LPS Navigation Channel is not expected.

9.9.3 Development of a 100MW Offshore Wind Farm in Hong Kong

The proposed offshore wind farm by HK Electric is located more than 2 km away from the Key Area. Considering its relatively large separation distance from the Key Area, adverse cumulative air quality impact from the marine construction works for the proposed offshore wind farm is not expected.

9.9.4 Re-provision of Open Cycle Gas Turbines at LPS

The existing open cycle gas turbines located within LPS at >2 km from the Project site will be demolished and replaced by new ones between 2022 and 2028. Considering its relative large separation distance from the Project site and the small-scale construction works involved, reprovisioning of the open cycle gas turbines at LPS is not expected to cause adverse cumulative air quality impact with the Project.

9.9.5 1,800MW Gas-fired Power Station at Lamma Extension

This project includes the construction and operation of six new gas-fired combined cycle gas turbine (CCGT) units at the Lamma Extension, which is >2 km from the Project site. Considering its relatively large separation distance from the Project site and the small-scale construction works involved, this project is not expected to cause adverse cumulative air quality impact with the Project.

9.9.6 Outlying Island Sewerage Stage 2 - Upgrading of Cheung Chau Sewage Collection, Treatment and Disposal Facilities

This project involves the expansion and upgrade of existing sewerage facilities in Cheung Chau. Treated effluent is proposed for non-potable reuse, with remaining portion discharged via an outfall. The construction commenced in 2021 for operation in 2026. Considering its relatively large separation distance from the Project (>4 km away) and the small-scale construction works involved, this project is not expected to cause adverse cumulative air quality impact with the Project.

9.9.7 Pier Improvement Works

The pier improvement works at Pak Kok Pier located about 3.2km from the Project site is expected to be completed by 2022 and will not coincide with the construction or operation phase of the Project.

No other planned developments have been identified in the vicinity of the Project apart from those discussed above. Therefore, adverse cumulative impact during the construction and operation phase of the Project is not anticipated.

9.10 Residual Impacts

9.10.1 Construction Phase

As discussed in ***Section 9.7.1***, no adverse air quality or odour impact arising from the construction of the Project is expected. Hence, no adverse residual air quality or odour impact is anticipated during the construction of the Project.

9.10.2 Operation Phase

As discussed in ***Section 9.7.2***, no adverse air quality or odour impact is expected to arise from the operation of the Project. Hence, there would be no adverse residual air quality or odour impact during the operation of the Project.

9.11 Environmental Monitoring and Audit

9.11.1 Construction Phase

No adverse air quality or odour impact is expected during construction phase and thus air quality monitoring is not required. However, with specific air quality mitigation measures proposed as described in ***Section 9.8.1***, regular site audits are recommended to ensure that these specific air quality mitigation measures are properly implemented throughout the construction phase.

9.11.2 Operation Phase

No adverse air quality or odour impact is anticipated during the operation of the Project. Therefore, air quality monitoring is not required. Regular site audit are recommended to ensure that the specific air quality mitigation measures are properly implemented throughout the operation phase.

9.12 Conclusion

9.12.1 Construction Phase

Dredging activities are marine based and thus dust emissions from the dredged sediment would be minimal. The dredged marine sediment will also be transported away from the Project site immediately after excavated. Adverse fugitive dust impact during construction phase is not anticipated. Considering the large separation distance between the Project site and the identified ASRs (more than 2.5 km apart), sufficient separation distance between the vessel routes and ASRs along the vessel routes, as well as between the SDFs/ CMPs and nearby ASRs (more than 500 m apart), and the transient nature of any potential odour emissions, adverse odour impact during

construction phase is not expected. Marine vessel emissions may arise from the dredging activities and subsequent transportation and disposal of the dredged sediment during the construction phase. No ASR has been identified within the 500 m Assessment Area, with the nearest identified ASR more than 2.5 km away from the Project site. The SDFs/ CMPs are located more than 500 m away from nearby ASRs and the vessel travelling routes from the Project site to the SDFs/ CMPs will also be at sufficient separation distance from the nearby ASRs, with limited vessel trips per day. In view of the limited number of vessel trips per day, the sufficient separation distance from the ASRs, and the transient nature of the marine emissions, adverse air quality impact due to marine emissions during the construction phase of the Project is not anticipated. Air quality monitoring is considered not necessary for the construction phase of the Project. Regular site audits are recommended to check implementation of the specific mitigation measures throughout the construction phase.

9.12.2 Operation Phase

As the contaminated / uncontaminated sediment in transportation to the formed CMPs for disposal and capping will be generally wet before its disposal, adverse fugitive dust impact during operation phase is not anticipated. Considering the large separation distance between the Project site and the identified ASRs (more than 2.5 km apart), sufficient separation distance between the vessel routes and ASRs along the vessel routes and the transient nature of any potential odour emissions, adverse odour impact during operation phase is not expected. Marine vessel emissions may arise from transportation and disposal of sediment at the formed CMPs during the operation phase. No ASR has been identified within the 500 m Assessment Area, with the nearest identified ASR more than 2.5 km away from the Project site. The vessel travelling routes to the formed CMPs will also be at sufficient separation distance from the nearby ASRs, with limited vessel trips per day. In view of the limited number of vessel trips per day, the sufficient separation distance from the ASRs, and the transient nature of the marine emissions, adverse air quality impact during the operation phase of the Project is not anticipated. Air quality monitoring is considered not necessary for the operation phase of the Project. Regular site audits are recommended to check implementation of the specific mitigation measures throughout the operation phase.