FORM
5

EAP(TS)1

Application No. : VEP-627/2023
Reference No. :
(For official use) A+(5) to EP2/N8/C/23

FORM 5
ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE
(CHAPTER 499)
SECTION 13(1)

Application for Variation of an Environmental Permit

PART A PREVIOUS APPLICATIONS

☐ No previous application for variation of an environmental permit.

☑ The environmental permit was previously amended.

Application No. : VEP-624/2023

PART B DETAILS OF APPLICANT

B1. Name : (person or company)

Civil Engineering and Development Department

[Note : In accordance with section 13(1) of the Ordinance, the person holding an environmental permit or a person who assumes responsibility for the designated project may apply for variation of the environmental permit.]

B2. Business Registration No. : (if applicable) [redacted]

B3. Correspondence Address : [redacted]

B4. Name of Contact Person : [redacted]

B5. Position of Contact Person : [redacted]

B6. Telephone No. : [redacted]

B7. Fax No. : [redacted]

B8. E-mail Address : (if any) andrewkwcheung@cedd.gov.hk

PART C DETAILS OF CURRENT ENVIRONMENTAL PERMIT

C1. Name of the Current Environmental Permit Holder :

Civil Engineering and Development Department

C2. Application No. of the Current Environmental Permit : VEP-624/2023 (EP-134/2002/P)

C3. The Current Environmental Permit was Issued in : month / year

0 2 / 2 0 2 3

Important Notes : Please submit the application together with

(a) 3 copies of this completed form; and

(b) appropriate fee as stipulated in the Environmental Impact Assessment (Fees) Regulation

to the Environmental Protection Department at the following address :

The EIA Ordinance Register Office,
27th floor, Southorn Centre,130 Hennessy Road,
Wan Chai, Hong Kong.

RECEIVED
19 OCT 2023
EIAO Register
Office, E.P.D.

☐ Tick (✓) the appropriate box

PART D PROPOSED VARIATIONS TO THE CONDITIONS IN CURRENT ENVIRONMENTAL PERMIT

D1 Condition(s) in the Current Environmental Permit	D2 Proposed Variation(s)	D3 Reasons for Variation(s)	D4 Describe the environmental changes arising from the proposed variation(s) :	D5 Describe how the environment and the community might be affected by the proposed variation(s)	D6 Describe how and to what extent the environmental performance requirements set out in the EIA report previously approved or project profile previously submitted for this project may be affected :	D7 Describe any additional measures proposed to eliminate, reduce or control any adverse environmental impact arising from the proposed variation(s) and to meet the requirements in the Technical Memorandum on Environmental Impact Assessment Process :
Part C – Condition 2.8A The fill bank shall not be operated between 11:00 p.m. and 8:00 a.m. on the following day, except the following : (a) the Construction and Demolition Material Sorting Facility and the adjoining barging point; (b) delivery of public fill by barges and the transportation between north portion of stockpiling area and the barging points (three locations shown in Figure 2 of this Permit). Except the Construction and Demolition Material Sorting Facility, the fill bank shall be closed during the Chinese New Year Holiday.	**Part C – Condition 2.8A** The fill bank shall not be operated between 11:00 p.m. and 8:00 a.m. on the following day, except the following : (a) the Construction and Demolition Material Sorting Facility; (b) delivery of public fill by barges at TKO Basin and the transportation between north portion of stockpiling area and the barging points (three locations shown in Figure 2 of this Permit). Except the Construction and Demolition Material Sorting Facility, the fill bank shall be closed during the Chinese New Year Holiday.	Barging point adjoining to the Construction and Demolition Material Sorting Facility no longer exists.	Potential environmental impacts associated with the proposed variation, including air quality, noise, water quality, landscape and visual, landfill gas hazard, ecology and cultural heritage, have been reviewed. No adverse environmental impacts are anticipated due to proposed variation.	To verify no adverse impact on the environment and the community, the potential environmental impacts due to the proposed variation (including air quality, noise, water quality, landscape and visual, landfill gas hazard, ecology and cultural heritage) have been reviewed and are concluded to be in compliance with the relevant environmental standards set out in the approved EIA Report (AEIAR-060/2002) and the Technical Memorandum on EIA Process, as shown in the attached Environmental Review Report.	The environmental performance requirements set out in the approved EIA Report will not be violated and will comply with the Technical Memorandum on EIA Process.	No additional measures are required.
Part C – Condition 2.8B At any one time, only 6 out of the 7 construction and demolition material sorting facilities and 6 out of the 7 barging points and tipping halls in the area coloured yellow as shown in Figure 2 of this Permit can be operated round-the-clock everyday. The remaining construction and demolition material sorting facilities, barging points and tipping halls shall not be operated between 11:00 p.m. and 7:00 a.m. on the following day unless otherwise agreed by the Director. The area coloured yellow as shown in Figure 2 of this Permit shall be closed during the Chinese New Year Holiday.	**Part C – Condition 2.8B** The 2 construction and demolition material sorting facilities and 2 barging points and tipping halls in the area coloured yellow as shown in Figure 2 of this Permit can be operated round-the-clock everyday. The area coloured yellow as shown in Figure 2 of this Permit shall be closed during the Chinese New Year Holiday.	Updated to reflect the proposed change of operation of the sorting facility area south of the TKO Basin within TKOFB. 5 of the 7 baring points and the associated C&DMSFs located south of the TKO Basin will no longer be in operation with the proposed changes, such that overall, it is likely to result in less environmental impact.				

D1 Condition(s) in the Current Environmental Permit	D2 Proposed Variation(s)	D3 Reasons for Variation(s)	D4 Describe the environmental changes arising from the proposed variation(s) :	D5 Describe how the environment and the community might be affected by the proposed variation(s)	D6 Describe how and to what extent the environmental performance requirements set out in the EIA report previously approved or project profile previously submitted for this project may be affected :	D7 Describe any additional measures proposed to eliminate, reduce or control any adverse environmental impact arising from the proposed variation(s) and to meet the requirements in the Technical Memorandum on Environmental Impact Assessment Process :
Part C – Condition 2.9 The temporary barging point at the existing Explosives Off-loading Barging Point (shown in Figure 2 of this Permit) shall not be operated for loading and unloading of public fill during 7:00 p.m. to 12:00 noon (Monday to Saturday) or any other periods when explosives are being handled at the Explosives Off-loading Barging Point.	Delete Condition 2.9	No loading and unloading of public fill associated with the TKOFB operation would be performed at the existing Explosives Off-loading Barging Point.				
Part C – Condition 2.26 After the completion of the Contract "TKO Port Development at Area 137 Stage 2 – Construction of Seawalls and Reclamation", the Permit Holder shall be required to provide silt curtains at the outward side of the TKO basin near the barging point throughout the operational phase when there is public fill intake by barges and throughout the removal phase when there is public fill delivered out by barges. The silt curtains shall be constructed in accordance with the details deposited under Condition 2.5 above. At the same time, a waste collection vessel shall be provided to remove floating debris on the sea around the fill bank. When the barging point at the C&DMSF is in operation, a waste collection vessel shall also be provided to remove floating debris on the sea around the barging point. The barging point at the C&DMSF should only be used for loading of sorted public fill free of refuse from the site to barges. The temporary barging point located at the existing Explosives Off-loading Barging Point should only be used for loading 1 barge of public fill per day. When the temporary barging point is in operation, a waste collection vessel shall be provided to remove	**Part C – Condition 2.26** After the completion of the Contract "TKO Port Development at Area 137 Stage 2 – Construction of Seawalls and Reclamation", the Permit Holder shall be required to provide silt curtains at the outward side of the TKO basin near the barging point throughout the operational phase when there is public fill intake by barges and throughout the removal phase when there is public fill delivered out by barges. The silt curtains shall be constructed in accordance with the details deposited under Condition 2.5 above. At the same time, a waste collection vessel shall be provided to remove floating debris on the sea around the fill bank. When the barging point at the C&DMSF is in operation, a waste collection vessel shall also be provided to remove floating debris on the sea around the barging point. The barging point at the C&DMSF should only be used for loading of sorted public fill free of refuse from the site to barges.	No loading and unloading of public fill associated with the TKOFB operation would be performed at the existing Explosives Off-loading Barging Point.				

D1 Condition(s) in the Current Environmental Permit	D2 Proposed Variation(s)	D3 Reasons for Variation(s)	D4 Describe the environmental changes arising from the proposed variation(s) :	D5 Describe how the environment and the community might be affected by the proposed variation(s)	D6 Describe how and to what extent the environmental performance requirements set out in the EIA report previously approved or project profile previously submitted for this project may be affected :	D7 Describe any additional measures proposed to eliminate, reduce or control any adverse environmental impact arising from the proposed variation(s) and to meet the requirements in the Technical Memorandum on Environmental Impact Assessment Process :
floating debris on the sea around this barging point.						
Figure 2	Revised Figure 2. Revised to illustrate (a) location of relocated Construction and Demolition Material Crushing Facility (C&DMCF), (b) updated sorting facility area, (c) removal of the referral to the "Explosives Off-loading Barging Point", (d) location of the barging points at south of the TKO Basin.	Updated to reflect the proposed change of operation.				

PART E DECLARATION BY APPLICANT

E1. I hereby certify that the particulars given above are correct and true to the best of my knowledge and belief. I understand the environmental permit may be suspended, varied or cancelled if any information given above is false, misleading, wrong or incomplete.

[redacted] [redacted] [redacted]

Signature of Applicant | Full Name in Block Letters | Position

FILL MANAGEMENT DIVISION - CEDD - HONG KONG - 土木工程拓展署 - 填料管理組 - CEDD

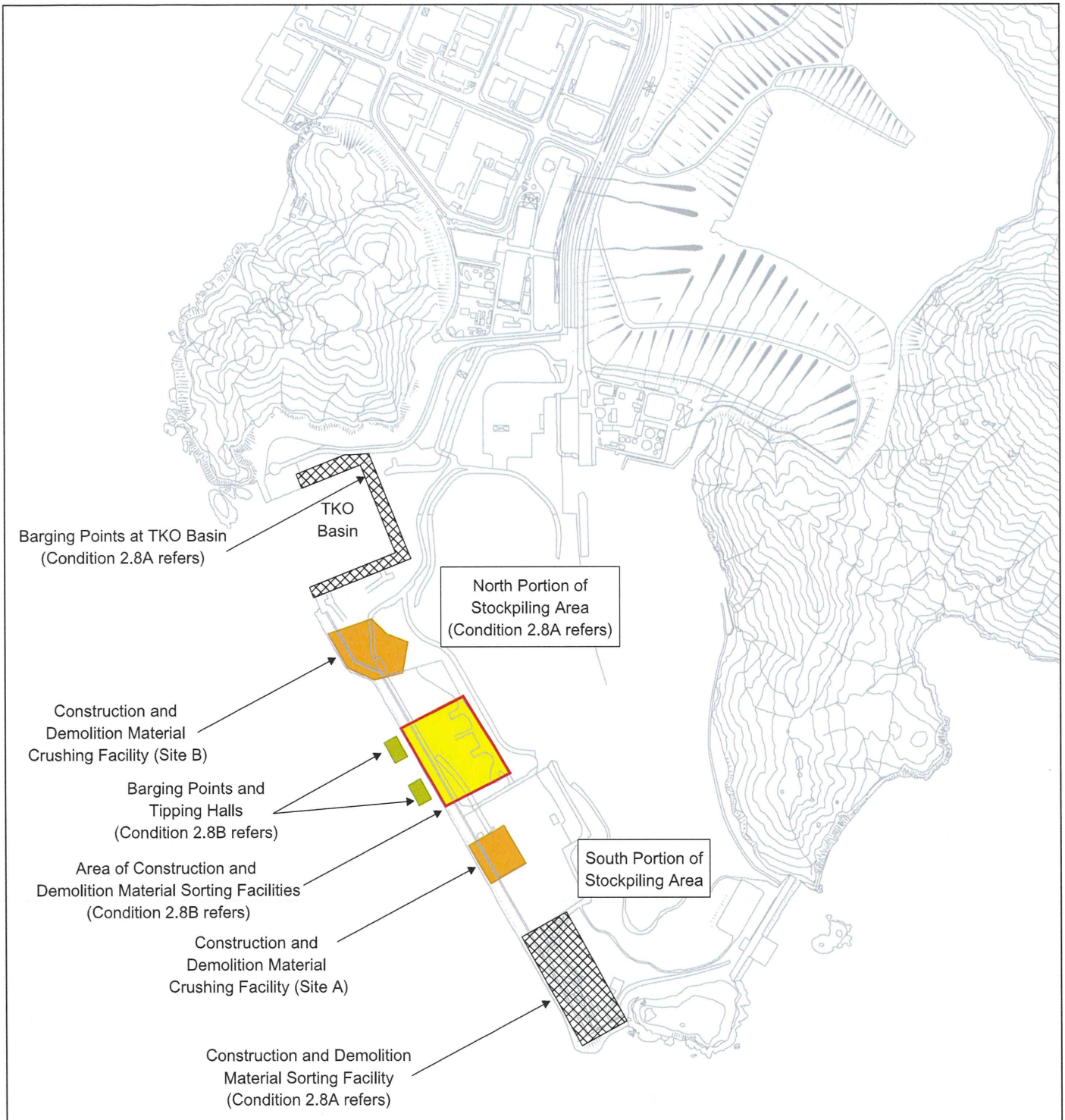
on behalf of Civil Engineering and Development Department 17 October 2023

Company Name and Chop (as appropriate) | Date

NOTES :

1. A person who constructs or operates a designated project in Part I of Schedule 2 of the Ordinance or decommissions a designated project listed in Part II of Schedule 2 of the Ordinance without an environmental permit or contrary to the permit conditions commits an offence under the Ordinance and is liable to a maximum fine of $5,000,000 and to a maximum imprisonment for 2 years.

2. A person for whom a designated project is constructed, operated or decommissioned and who permits the carrying out of the designated project in contravention of the Ordinance commits an offence and is liable to a maximum fine of $5,000,000 and to a maximum imprisonment for 2 years.



Coordinates of the Yellow Zone	
Hong Kong 1980 Grid System	
Easting (m)	Northing (m)
845852	814506
845996	814580
846105	814402
845955	814326

N

Metres

0 150 300

Note: Construction and Demolition Material Crushing Facility shall be operated in either Site A or Site B

Figure 2

Locations of Facilities within Tseung Kwan O Fill Bank

File: T:\GIS\CONTRACT\0676933\mxd\EP\0676933_Locations_of_Facilities.mxd
Date: 14/9/2023

Environmental Resources Management

ERM

Civil Engineering and Development Department

Provision of Additional Crushing Plant and Screening Machine at Tseung Kwan O Area 137 Fill Bank

Environmental Review Report

13 October 2023

Project No.: 0676933

The business of sustainability

ERM

Document details	The details entered below are automatically shown on the cover and the main page footer. PLEASE NOTE: This table must NOT be removed from this document.
Document title	Provision of Additional Crushing Plant and Screening Machine at Tseung Kwan O Area 137 Fill Bank
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Date	13 October 2023
Version	4.0
Author	Various
Client Name	Civil Engineering and Development Department

Document history

				ERM approval to issue		
Version	Revision	Author	Reviewed by	Name	Date	Comments
	1.0	Various	CH	JN	30.05.2023	-
	2.0	Various	CH	JN	03.08.2023	EPD's comment dated 12.07.2023 and 25.07.2023
	3.0	Various	CH	JN	08.09.2023	EPD's comment dated 05.09.2023
	4.0	Various	CH	JN	13.10.2023	EPD's comment dated 13.10.2023

Signature Page

13 October 2023

Provision of Additional Crushing Plant and Screening Machine at Tseung Kwan O Area 137 Fill Bank

Environmental Review Report

Dr Jasmine Ng
Managing Partner

ERM-Hong Kong, Limited
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18 Tak Fung Street,
Hunghom, Kowloon
Hong Kong

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1. INTRODUCTION

1.1 Project Background

The potential environmental impacts associated with the construction, operation and decommission of the Fill Bank at Tseung Kwan O Area 137 (TKOFB or the Project) has been presented in the approved Environmental Impact Assessment (EIA) Report for the "Fill Bank at Tseung Kwan O Area 137" (EIAO Register No.: AEIAR-060/2002) (hereafter referred to as the approved EIA Report).

A variation of the EP (VEP-603/2021) and the associated Environmental Review (ER) Report (1) ("hereinafter referred to as "the 2021 ER Report") for extending the operation of TKOFB from 1 January 2022 to 31 December 2026 was approved by the Environmental Protection Department (EPD) on 26 November 2021. Subsequently, the latest application of variation of the EP (VEP-624/2023) for increasing the maximum stockpiling height at TKOFB to +65.2mPD and total stockpiling capacity to 12 million m^3 and the associated ER Report ("hereinafter referred to as "the 2022 ER Report") was approved by EPD on 14 February 2023. As per the Project's current Environmental Permit (EP-134/2002/P) held by the Civil Engineering and Development Department (CEDD), TKOFB is allowed to be operated until 31 December 2026.

Currently, the existing Construction and Demolition Material Crushing Facility (C&DMCF) established at TKOFB consists of three jaw crushers for handling and treating construction and demolition (C&D materials) to produce Grade 200 recycled rockfill which can be ordered and collected for use by public and non-public works projects. The total processing capacity of the existing C&DMCF is approximately 5,000 tonnes per day. To maximise the reuse of public fill, CEDD proposes to recycle suitable C&D materials (such as rock or broken concrete) as recycled manufactured sand for beneficial reuse as blanket layer material in future reclamation projects. In this regard, CEDD proposes to increase the total processing capacity of the C&DMCF and install three additional crushers (i.e. one jaw crusher, one cone crusher and one impact crusher) and one screening machine. CEDD also proposes to relocate the C&DMCF to a new location in TKOFB at which the existing crushers, new crushers/ screening machine and other associated equipment will be located.

The proposed changes to the C&DMCF operation at TKOFB has the potential to cause environmental impacts and an environmental review is thus required to confirm its environmental acceptability. In this connection, CEDD has commissioned ERM-Hong Kong, Limited (ERM) to undertake an environmental review to assess the potential environmental impacts from the proposed changes to the C&DMCF operation at TKOFB.

The objective of this ER Report is to review the likely environmental impacts assessed in the approved EIA Report taking into account the proposed changes of the Project and to demonstrate that the environmental impacts associated with the proposed changes comply with the requirements and criteria as stipulated in the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) and that the associated environmental impacts are not considered to be materially changed with the mitigation measures in place under the EIAO. This ERR provides recommendations as to whether any modification and/or refinement of proposed mitigation measures and monitoring and audits requirements are needed. This ERR serves to support the application for variation of an environmental permit for the Project under Section 13 of the EIAO.

(1) Environmental Review Report of Environmental Review and Traffic Impact Assessment for Extension of Operation of Fill Bank at Tseung Kwan O Area 137 – Investigation, 2022

2. PROPOSED CHANGE AND ASSOCIATED ENVIRONMENTAL ISSUES

2.1 Proposed Change to the TKOFB Operation

To increase the total processing capacity of the C&DMCF, CEDD proposes to install three additional crushers (i.e. one jaw crusher, one cone crusher and one impact crusher) and one screening machine, and operate the existing and additional C&DMCF equipment at a new location in TKOFB.

The cone and impact crushers will be used for secondary crushing, and will receive the crushed materials from the primary crushing by the four jaw crushers (i.e. three existing jaw crushers plus one new crusher). The jaw crushers will have a maximum processing capacity of 2,500 tonnes per day each. Therefore, the total processing capacity of the C&DMCF will be increased to 10,000 tonnes per day. The C&DMCF will operate from 07:00-23:00 daily. The C&DMCF will be relocated to either one of the two identified sites (namely Site A and Site B). Locations of Site A and Site B and other key facilities within TKOFB during its future operation with the proposed changes are shown in **Figure 2.1**. The key facilities within TKOFB in the current TKOFB Operation are shown in **Figure 2.2**. The rock/ concrete materials will be transported from the stockpiling area to the relocated C&DMCF, and the processed rockfill will be transported via internal trucks back to the stockpiling area for storage and subsequent export via existing barging points at TKO Basin when needed.

In addition to the proposed changes to the C&DMCF operation, the number of Construction and Demolition Material Sorting Facility (C&DMSF) and associated barging points will also be reduced to two sets (i.e. NB4 to NB5 and NSD to NSE). Under Condition 2.8B of the current EP, among the seven sets of C&DMSFs (NSA to NSG) and barging points (NB0 to NB6) south of the TKO Basin, six of them can be operated 24 hours, while the remaining set closest to the TKO Basin can be operated from 07:00-23:00 hours only. As only two sets of C&DMSFs and baring points will remain in the future operation of TKOFB, both sets will have the capacity to operate 24 hours under such EP Condition.

It should be noted that no additional off-site road traffic will be generated due to the proposed operation of the additional crushers and screening machine, as well as the proposed reduction in the number of C&DMSFs and barging points. The traffic flow of on-site roads will be altered due to the different locations of C&DMCF but are not expected to significantly increase the overall on-site traffic flows, considering the significant reduction of traffic from the reduction in the number of C&DMSFs and barging points.

Key aspects of the TKOFB operation with the proposed changes are summarised in **Table 2.1**.

Table 2.1 Key Aspects of TKOFB Operation with Proposed Changes

Key Item	Current TKOFB Operation	TKOFB Operation with Proposed Changes
Maximum stockpiling height at TKOFB	■ Maximum +65.2 mPD	■ No change
Total stockpiling capacity	■ 12 million m^3 of public fill	■ No change
Receiving public fill by land-based transportation route	■ From 08:00 to 21:00 hrs	■ No change
Nos. of incoming truck trips (public fill delivered by road)	■ 1,500 truck loads/day	■ No change
Barging Points at TKO Basin (exporting)	■ 24-hr operation (B1 to B3) ■ 29,510 tonnes (07:00-23:00 hrs) ■ 18,000 tonnes (23:00-07:00 hrs)	■ 24-hr operation (B1 to B3) ■ 24,510 tonnes (07:00-23:00 hrs) ■ 12,020 tonnes (23:00-07:00 hrs)
Barging points at TKO Basin (importing)	■ 24-hr operation (IB1 to IB4) ■ 2,500 tonnes (24 hrs)	■ No change

Key Item	Current TKOFB Operation	TKOFB Operation with Proposed Changes
Operation of TKO Sorting Facility (TKOSF)	■ 24-hr operation	■ No change
Other C&DMSFs south of the TKO Basin	■ NSA (24 hours) ■ NSB (24 hours) ■ NSC (24 hours/07:00-23:00 hrs) (a) ■ NSD (24 hours/07:00-23:00 hrs) (a) ■ NSE (24 hours/07:00-23:00 hrs) (a) ■ NSF (24 hours/07:00-23:00 hrs) (a) ■ NSG (24 hours)	■ NSD (24 hours) ■ NSE (24 hours)
Other barging points south of the TKO Basin for exporting public fill	■ NB1 (24 hours) ■ NB2 (24 hours) ■ NB3 (24 hours/07:00-23:00 hrs) (b) ■ NB4 (24 hours/07:00-23:00 hrs) (b) ■ NB5 (24 hours/07:00-23:00 hrs) (b) ■ NB6 (24 hours/07:00-23:00 hrs) (b) ■ NB0 (24 hours)	■ NB4 (24 hours) ■ NB5 (24 hours)
Operation of C&DMCF	■ 5,000 tonnes/day (07:00-23:00 hrs) ■ 3 jaw crushers (1 in standby)	■ 10,000 tonnes/day (07:00-23:00 hrs) ■ C&DMCF will be relocated to either Site A or Site B ■ 3 existing jaw crushers ■ 1 additional jaw crusher, 1 additional cone crusher, 1 additional impact crusher and 1 additional screening machine

Notes:
(a) Any 3 of the 4 C&DMSFs (NSC, NSD, NSE, NSF) will be operated 24 hours while the remaining one will be operated 07:00-23:00 hrs only at any one time.
(b) Any 3 of the 4 barging points (NB3, NB4, NB5, NB6) will be operated 24 hours while the remaining one will be operated 07:00-23:00 hrs only at any one time.

2.2 Reason and Benefit of the Proposed Changes

As discussed in **Section 1.1**, the reason of increasing the total processing capacity of C&DMCF is to cope with the plan of CEDD to maximise the reuse of public fill, including recycling suitable C&D materials (such as rock or broken concrete) as recycled manufactured sand for beneficial reuse as blanket layer material in future reclamation projects.

Although such proposed changes include operation of additional crushers and a screening machine, 5 of the current barging points and the corresponding C&DMSFs at the south of the TKO Basin will not be in use during the future operation of TKOFB, such that overall, it is likely to result in less environmental impact (in particular for the associated air quality impacts).

2.3 Projects in the Vicinity of the TKOFB

The following project(s) in the vicinity of TKOFB have been considered in this environmental review.

2.3.1 South East New Territories (SENT) Landfill Extension

The SENT Landfill Extension (SENTX) is located to the north-east and east of the TKOFB. SENTX has commenced its operation in 2021 and has been accepting construction waste from 08:00 hrs to 22:00 hrs. The site office of the SENTX closes at 23:00 hrs.

2.3.2 Desalination Plant

Water Supplies Department (WSD) is constructing the first stage of Tseung Kwan O Desalination Plant (TKODP) located south of SENTX. The TKODP is scheduled for completion and commissioning in around Q4 of 2023.

2.4 Potential Environmental Impact

Potential environmental impacts associated with the proposed changes at TKOFB are listed in **Table 2.2**. Detailed discussions of the potential environmental impacts are shown in the subsequent sections.

Table 2.2 Potential Environmental Issues

Environmental Issues	Potential Issues
Air Quality	✓
Noise	✓
Water Quality	✓
Landscape and Visual	✓
Landfill Gas Hazard	×
Cultural Heritage	×
Ecology	×

✓ possible × not expected

3. AIR QUALITY IMPACT ASSESSMENT

3.1 Introduction

As a result of the proposed change as described in **Section 2.1**, the potential air quality impact needs to be reviewed. This *Section* reviews and assesses the potential air quality impact associated with the proposed change.

3.2 Legislative Requirement and Evaluation Criteria

The principal legislation for the management of air quality in Hong Kong is the *Air Pollution Control Ordinance* (APCO) (CAP.311). Under the APCO, the *Hong Kong Air Quality Objectives* (AQOs) (see **Table 3.1**) stipulate the statutory limits for air pollutants and the maximum allowable numbers of exceedances over specific periods.

Table 3.1 Hong Kong Air Quality Objectives

Air Pollutant	Averaging Time	Concentration (μg/m³) [(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	Not Applicable
Fine Suspended Particulates (FSP) [(c)(d)]	24-hour	50	35 (18)
	Annual	25	Not Applicable
Nitrogen Dioxide (NO_2)	1-hour	200	18
	Annual	40	Not Applicable
Ozone (O_3)	8-hour	160	9
Carbon Monoxide (CO)	1-hour	30,000	0
	8-hour	10,000	0
Lead	Annual	0.5	Not Applicable

Notes:
(a) Measured at 293K and 101.325kPa.
(b) Suspended particles in air with a nominal aerodynamic diameter of 10μm or less
(c) Suspended particles in air with a nominal aerodynamic diameter of 2.5μm or less
(d) The value inside the bracket refers to a reduced number of allowable exceedances of 18 days per year for 24-hour FSP (in lieu of 35 days per year as set out in the Air Pollution Control (Amendment) Bill 2021) should be adopted for air quality impact assessments for new government projects on a best endeavours basis.

The criterion for Total Suspended Particulates (TSP) has been removed from the latest *Technical Memorandum on the Environmental Impact Assessment Process* (EIAO-TM) issued on 30 June 2023 under the *EIAO*. However, TSP has been assessed to demonstrate that there would be no adverse air quality impact induced by the proposed changes.

The *Air Pollution Control (Construction Dust) Regulation* recommends dust control measures for dust generating activities and these should be followed. Requirements stipulated in the *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation* and *Development Bureau Technical Circular No.1/2015 (Emissions Control of NRMM in Capital Works Contracts of Public Works)* will be followed to control potential emissions from non-road mobile machinery (NRMM) within TKOFB. Also, the *Air Pollution Control (Fuel Restriction) Regulation* which requires the use of liquid fuel with a sulphur content not exceeding 0.005% by weight will also be followed to control potential emissions from NRMM within TKOFB.

A set of engineering practices listed in *Recommended Pollution Control Clauses for Construction Contracts* will be followed to minimise the inconvenience and environmental nuisance to nearby

sensitive receivers, and to ensure the Contractor of TKOFB to comply with the Air Pollution Control Ordinance and its subsidiary regulations.

The technical circular *DEVB's TC No.13/2020, Timely Application of Temporary Electricity and Water Supply for Public Works Contracts and Wider Use of Electric Vehicles in Public Works Contracts*, aims at widening the use of electric vehicles (EVs) in public works contracts to improve roadside air quality and reduce emissions, as well as promoting timely provision of electricity and water supply at the beginning of construction works with a view to reducing carbon emissions. *DEVB's TC No.13/2020* will be followed as far as practicable.

3.3 Baseline Conditions

The Study Area is within 500m from the TKOFB site boundary as shown in **Figure 3.1**. SENT Landfill and its extension and TVB City are located to the north-east and north of the Site, respectively. Wan Po Road is the major road linking the Site and TKO town. The local air quality of the Project Site area is primarily influenced by vehicular emissions from local road networks and within TKOFB, as well as emissions associated with the operation of the TKOFB, including dust emissions from fill handling activities, truck movements and stockpiling area, and marine emissions.

3.3.1 EPD's Air Quality Monitoring Station

The nearest EPD's Air Quality Monitoring Station (AQMS) is located at Tseung Kwan O District. The latest 5-year concentrations (2018 - 2022) of NO_2, SO_2, RSP and FSP recorded at the AQMS are presented in **Table 3.2**.

Table 3.2 Concentrations of Air Pollutants Measured at the EPD's TKO AQMS in the Past 5 Years (2018 – 2022)

Year	Concentration of Pollutants (µg/m³)							
	19th highest 1-hour NO_2	Annual NO_2	4th highest 10-min SO_2 (a)	4th highest 24-hour SO_2	10th highest 24-hour RSP	Annual RSP	19th highest 24-hour FSP	Annual FSP
2018	135	28	38	11	53	28	28	15
2019	155	29	25	12	60	29	34	17
2020	136	23	18	7	52	24	26	12
2021	132	26	18	9	50	24	27	13
2022	110	21	12	7	46	22	28	13
Prevailing AQOs	**200**	**40**	**500**	**50**	**100**	**50**	**50**	**25**

The NO_2, SO_2, RSP and FSP concentrations from 2018 to 2022 are below their respective prevailing AQOs. It should be noted that the TKO AQMS is situated in TKO residential area and more than 5km away from the Project site. Given the differences in land use and the considerable separation distance, the monitoring data recorded at TKO AQMS may not be representative of the current baseline air quality at the Project site.

3.3.2 Predicted Future Background Air Quality

The background air pollutant concentrations predicted by the PATH v2.1 model (i.e. Pollutants in the Atmosphere and their Transport over Hong Kong) in different PATH grids where the identified ASRs are located in within the Study Area in Year 2023 (i.e. the year of TKOFB operation with the proposed changes) are presented in **Table 3.3**.

Table 3.3 Background Air Pollutant Concentrations Predicted by the PATH v2.1 Model in 2023

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	10th highest Daily Max. 8-hour O_3	Daily Max. 1-hour CO	Daily Max. 8-hour CO
5027	80	12	10	34	65	28	32	14	205	872	788
5028	77	10	10	39	64	27	32	14	208	873	785
5029	75	11	10	38	66	27	33	14	208	877	788
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 11.0ug/m^3 and 10.3ug/m^3 were added to the RSP background for calculation of 24-hour RSP and annual RSP, respectively.
(d) An adjustment of 3.5ug/m^3 was added to the FSP background for calculation of annual FSP.

As shown in **Table 3.3**, predicted background concentrations of NO_2, SO_2, RSP, FSP and CO in the relevant PATH grids within the Study Area in 2023 are below the relevant AQO criteria, except for O_3 where exceedances of the corresponding AQO criterion are predicted in all relevant PATH grids.

3.4 Air Sensitive Receivers

A number of representative existing and planned ASRs have been identified within the Study Area and they are listed in **Table 3.4**. The locations of the identified representative ASRs are shown in **Figure 3.1**.

Table 3.4 Identified Representative ASRs

ASR	Description	Type of Use	Approx. Separation Distance from the Site Boundary (m)	Approx. Base Elevation (m)	Approx. Max. Height (mAG)
A1	TVB City	Commercial	60	5.3	30
A2	TVB City	Commercial	90	5.3	30
A3	HAESL	Industrial	310	5.3	30
A4	TVB City	Commercial	360	6.1	30
A5	HAESL Component Overhaul Building	Industrial	420	5.8	30
A6	Digital Savvis Investment	Commercial	485	9.5	30
A7	Trade Development Council	Commercial	510	7.7	20
A8	Office Building of SENT Landfill Extension	Industrial	90	5.0	4.5
A9	Office Building of Desalination Plant	Industrial	60 (a)	5.0	35
A10	Administrative Building of P-Tech Landfill Gas (SENT) Company Limited	Industrial	50	5.9	1.5

Note:
(a) Distance from the reduced TKOFB boundary due to the earmarked land for Desalination Plant.

3.5 Potential Sources of Air Emissions

3.5.1 Air Emission Sources Associated with TKOFB Operation

Potential key air emission sources within TKOFB were identified as below:

- Dust emissions from the TKOFB operational activities including fill material handling at stockpiling areas and barging points, operation of material crushing and sorting facilities, truck movements on major haul roads, as well as wind erosion from stockpiling areas;
- Vehicular emissions from internal roads within TKOFB (incoming trucks and internal trucks); and
- Emissions from marine vessels (e.g. barges, derrick lighters, tug boats) during berthing and maneuvering for exporting and importing fill materials; and
- Emissions from the operation of C&DMCF and diesel generators within TKOFB.

3.5.2 Air Emission Sources in the Vicinity of TKOFB

Other potential key air emission sources within the Study Area include:

- Vehicular emissions from external roads within 500m of the Study Area; and
- Emissions associated with the operation of SENTX and the existing HAESL located in Tseung Kwan O Industrial Estate (TKOIE).

The construction of the first stage of TKODP is close to completion and the remaining construction works include Electrical and Mechanical (E&M) installation, building services works and internal renovation works that are expected to generate minimal dust emissions if any. Adverse air quality impact due to TKODP construction is thus not expected. There are no air emissions associated with the operation of the first stage of TKODP as advised by WSD.

3.5.3 Key Air Pollutants of Concern

The operation of the relocated C&DMCF involves material crushing, handling and screening. Together with the other emission sources, such as truck movement on haul roads and berthing and maneuvering of marine vessels, the induced dust emissions and gaseous emissions may potentially lead to air quality impact. Therefore, TSP, RSP, FSP, NO_2 and SO_2 were identified to be the key air pollutants of interest associated with the proposed changes at TKOFB.

3.6 Evaluation of Air Quality Impact due to Proposed Changes

3.6.1 Assessment Methodology and Assumptions

Dust Emissions from TKOFB Operational Activities

The dust emission sources associated with TKOFB operational activities include fill material handling (loading/unloading at stockpiling areas, C&DMCF, C&DMSFs, TKOSF and barging points), crushing and screening from C&DMCF, C&DMSFs and TKOSF, truck movements on haul roads, and wind erosion from stockpiling areas. The locations of the aforementioned dust emission sources are illustrated in **Figures 3.2**. The TSP, RSP and FSP emission rates were estimated based on published documents and references such as *Compilation of Air Pollutant Emission Factors, AP-42, 5th Edition* by the United States Environmental Protection Agency (USEPA). Dust mitigation measures as discussed in **Section 3.7** have been considered in the assessment. The detailed calculations of TSP, RSP and FSP emission rates, assumptions and emission inventory of these dust emission sources are shown in **Appendix A1**.

Emissions from Marine Vessels and Site Facilities

Berthing and maneuvering emissions from marine vessels (i.e. barges, derrick lighters, tug boats) for exporting and importing fill materials, emissions from the C&DMCF, as well as diesel generators associated with the overall site operation may give rise to RSP, FSP, NO_2 and SO_2 impacts. The locations of the barging points and the diesel generators are shown in **Figures 3.2** and **3.3**. Locations of the marine vessel maneuvering routes are shown in **Figure 3.4**. The detailed calculations of RSP, FSP, NO_2 and SO_2 emission rates, assumptions and emission inventory of these dust emission sources are provided in **Appendix A1**.

Vehicular Emissions from Internal and External Roads

NO_2, RSP and FSP emissions arising from TKOFB internal road traffic (incoming trucks and internal trucks) and other external road traffic within the Study Area will contribute to the overall air quality impacts and thus have been considered in the quantitative assessment. Due to the proposed relocation of the C&DMCF and increase of its processing capacity, the predicted traffic flows for internal truck movement have been updated. The proposed changes to the C&DMCF operation will not have impact on external traffic flows and thus the projected traffic flows for the identified external roads remain unchanged. The internal road alignment is illustrated in **Figure 3.2**. Other external roads identified within the Study Area are illustrated in **Figure 3.5**.

Other Emissions in the Vicinity of TKOFB

During the operation of SENTX, potential dust emissions from active filling and haul roads as well as stack emissions may arise. In addition, emissions from the existing HAESL stack may contribute to the overall air quality impacts within the Study Area. Therefore, these emissions have also been included in this assessment. Locations of these emission sources are illustrated in **Figure 3.5**. The detailed TSP, RSP, FSP, NO_2 and SO_2 emission inventory for the abovementioned emission sources is provided in **Appendix A2**.

Assumptions and Modelling Approach

Modelling Scenarios

Two modelling scenarios, Scenario 1 and Scenario 2, have been assessed. Scenario 1 represents the proposed changes at TKOFB with the C&DMCF relocated to Site A, whereas Scenario 2 represents the proposed changes at TKOFB with the C&DMCF relocated to Site B.

Year 2023 has been chosen as the assessment year for both Scenarios, considering the proposed changes will take place within year 2023. As a worst-case approach for simulating the vehicular emissions (for both on-site and off-site roads), the traffic data of year 2026 with the highest traffic flow has been adopted in combination with the emission factors from the EMFAC calendar year 2023.

Potential air quality impacts under Scenario 1 and Scenario 2 at the existing ASRs A1 to A10 have been assessed. Details of Scenario 1 and Scenario 2 are summarised in **Table 3.5**.

Table 3.5 Summary of Modelling Scenarios Adopted in the Assessment

Modelling Scenario	Description	Emission Sources Considered
Scenario 1	Proposed changes at TKOFB with the C&DMCF at Site A	■ Emissions associated with TKOFB operational activities ■ Vehicular emissions from external roads within Study Area ■ Dust emissions from SENTX operation ■ Industrial emissions (i.e. stacks of SENTX and the existing HAESL stack)
Scenario 2	Proposed changes at TKOFB with the C&DMCF at Site B	

Air Dispersion Model and Meteorological Data

An EPD recommended air dispersion model, AERMOD, was used to assess the air quality impact at the identified ASRs from dust emission sources and marine emissions. The quantitative assessment has been conducted following the latest EPD's *Guidelines for Local-scale Air Quality Assessment Using Model*.

The relevant PATH grids in which the identified ASRs are located have been identified. The predicted meteorological data for the relevant PATH grids were used for model input. The relevant PATH grids for the identified ASRs are shown in **Table 3.6**.

Table 3.6 Relevant PATH Grids for the Representative ASRs

ASR	Description	Relevant PATH Grid
A1	TVB City	50,29
A2	TVB City	50,29
A3	HAESL	50,29
A4	TVB City	50,29
A5	HAESL Component Overhaul Building	50,29
A6	Digital Savvis Investment	50,29
A7	Trade Development Council	50,29
A8	Office Building of SENT Landfill Extension	50,28
A9	Office Building of Desalination Plant	50,27
A10	Administrative Building of P-Tech Landfill Gas (SENT) Company Limited	50,28

An EPD recommended model, EMFAC-HK v4.3, was used to predict the vehicular emission factors of NO, NO_2, RSP and FSP for the 18 vehicle types in 2023 (both Scenario 1 and Scenario 2) with reference to EPD's *Guidelines on Use of Temperature and Relative Humidity Data for Vehicular Emission Factor Prediction*. "EMFAC" mode was used for the model run.

An EPD recommended air dispersion model, CALINE4, was used for predicting the NO_2, NO, RSP and FSP impacts due to vehicular emissions from the identified internal roads and external roads within the Study Area. *Background Air Quality*

The hourly background NO_2, RSP and FSP concentrations in 2023 predicted by the PATH v2.1 were used to establish the background contributions for the cumulative AQIA. The predicted PATH background concentrations specific to the PATH grids within which the ASRs are located were adopted. The predicted PATH background concentrations adopted are conservative estimates with double counting of vehicular emissions.

As per *Guidelines on Choices of Models and Model Parameters* published by EPD, the RSP and FSP concentrations from PATH v2.1 were adjusted as below:

- 10^{th} highest daily RSP concentration: add 11.0μg/m^3;
- Annual RSP concentration: add 10.3μg/m^3;
- 19^{th} highest daily FSP concentration: Nil; and
- Annual FSP concentration: add 3.5μg/m^3.

The background air pollutant concentrations predicted by the PATH-v2.1 model in 2023 for the PATH grids within the Study Area are presented in **Table 3.3**.

Cumulative Impact

The predicted TSP, RSP, FSP, NO_2 and SO_2 results from AERMOD and CALINE4 model at each ASR were added up with the PATH-v2.1 background concentrations on an hour-by-hour basis. Considering that vehicular RSP emissions also contribute to the total TSP impact, TSP results from AERMOD were added up with the RSP results from CALINE4 and PATH-v2.1 background RSP concentrations to assess the cumulative TSP impact. The relevant time period averages for each air pollutant assessed were calculated and compared with the relevant assessment criteria to evaluate the cumulative air quality impact at the identified ASRs.

3.6.2 Evaluation of Impacts

TSP, RSP and FSP Impacts

Cumulative TSP, RSP and FSP impacts on the identified ASRs have been assessed. The predicted cumulative maximum 1-hour TSP, the 10th highest 24-hour and annual RSP, and the 19th highest 24-hour and annual FSP at the worst affected height of the identified ASRs are presented in **Table 3.7**. Detailed results of all relevant assessment heights of each ASR are provided in **Appendix A3**.

Table 3.7 Predicted Cumulative TSP, RSP and FSP Concentrations at the Worst Affected Height at Identified ASRs

ASR	Predicted Cumulative Concentration (µg/m³)									
	Scenario 1					Scenario 2				
	Max 1-hour TSP	10th Highest 24-hour RSP [(a)]	Annual RSP	19th Highest 24-hour FSP [(b)]	Annual FSP	Max 1-hour TSP	10th Highest 24-hour RSP [(a)]	Annual RSP	19th Highest 24-hour FSP [(b)]	Annual FSP
A1	181.0	66.3	29.9	33.0	15.7	166.9	66.3	29.8	33.0	15.7
A2	168.8	66.2	29.2	32.9	15.3	174.4	66.2	29.2	32.9	15.4
A3	151.8	66.2	28.4	33.0	15.0	156.2	66.2	28.4	33.0	15.0
A4	157.6	66.2	28.4	33.0	15.0	157.6	66.2	28.4	33.0	15.1
A5	151.2	66.2	28.2	32.9	14.9	151.2	66.2	28.2	32.9	15.0
A6	152.7	66.1	28.2	32.9	14.9	152.7	66.1	28.2	32.9	15.0
A7	134.3	66.0	27.9	32.8	14.7	134.3	66.0	27.9	32.8	14.8
A8	299.0	67.4	34.8	32.4	15.5	222.8	64.8	30.1	32.1	15.1
A9	175.0	65.6	28.7	32.0	13.8	197.9	65.6	28.6	32.0	13.8
A10	262.8	65.9	32.4	32.2	15.3	190.5	64.9	30.9	32.2	15.4
Criteria	**500**	**100**	**50**	**50**	**25**	**500**	**100**	**50**	**50**	**25**

Notes:
(a) The AQO allows 9 exceedances over a year, therefore, the results presented are in the 10th highest.
(b) The AQO allows 18 exceedances over a year, therefore, the results presented are in the 19th highest. The 1-hour TSP criterion is referenced from EIAO-TM. RSP and FSP criteria are AQO criteria.

The assessment results show that the cumulative TSP, RSP and FSP impacts at the identified ASRs comply with the relevant AQO criteria. Therefore, adverse dust impact due to the proposed change is not anticipated.

NO_2 Impacts

Cumulative NO_2 impacts on the identified ASRs have been assessed. The predicted cumulative 19th highest 1-hour NO_2 and annual NO_2 at the worst affected height of the identified ASRs are presented in **Table 3.8**. Detailed results of all relevant assessment heights of each ASR are provided in **Appendix A3**.

Table 3.8 Predicted Cumulative NO_2 Concentrations at the Worst Affected Height at Identified ASRs

ASR	Predicted Cumulative Concentration (μg/m³)			
	Scenario 1		Scenario 2	
	19th Highest 1-hour NO_2 (a)	Annual NO_2	19th Highest 1-hour NO_2 (a)	Annual NO_2
A1	187.9	30.6	192.7	31.3
A2	172.5	24.1	181.3	24.9
A3	148.5	21.6	149.6	22.0
A4	152.9	24.9	151.8	25.4
A5	145.0	20.8	143.6	21.1
A6	150.1	22.4	152.3	22.7
A7	133.8	15.8	146.1	16.0
A8	192.6	29.9	170.3	26.4
A9	154.7	14.9	143.5	14.7
A10	165.2	28.5	197.2	29.5
Criteria	**200**	**40**	**200**	**40**

Note:
(a) The AQO allows 18 exceedances over a year, therefore, the results presented are in the 19th highest.

The assessment results show that the cumulative NO_2 impacts at the identified ASRs comply with the relevant AQO criteria. Therefore, adverse NO_2 impact arising from the proposed change is not anticipated.

SO_2 Impacts

Cumulative SO_2 impacts on the identified ASRs have been assessed. The predicted cumulative 4th highest 10-minute SO_2 and 4th highest 24-hour SO_2 at the worst affected height of the identified ASRs are presented in **Table 3.9**. Detailed results of all relevant assessment heights of each ASR are provided in **Appendix A3**.

Table 3.9 Predicted Cumulative SO_2 Concentrations at the Worst Affected Height at Identified ASRs

ASR	Predicted Cumulative Concentration (μg/m³)			
	Scenario 1		Scenario 2	
	4th Highest 10-min SO_2 (a)	4th Highest 24-hour SO_2 (a)	4th Highest 10-min SO_2 (a)	4th Highest 24-hour SO_2 (a)
A1	38.3	9.9	38.3	9.9
A2	38.3	9.9	38.3	9.9
A3	38.3	9.8	38.3	9.8
A4	38.3	9.8	38.3	9.8
A5	38.3	9.8	38.3	9.8
A6	38.3	9.8	38.3	9.8
A7	38.4	9.8	38.4	9.8
A8	39.4	9.8	39.4	9.8
A9	34.1	9.9	34.1	9.9
A10	38.8	9.8	38.8	9.8
Criteria	**500**	**50**	**500**	**50**

ASR	Predicted Cumulative Concentration (μg/m³)			
	Scenario 1		Scenario 2	
	4th Highest 10-min SO_2 (a)	4th Highest 24-hour SO_2 (a)	4th Highest 10-min SO_2 (a)	4th Highest 24-hour SO_2 (a)

Note:
(a) The AQO allows 3 exceedances over a year, therefore, the results presented are in the 4th highest.

The assessment results show that the cumulative SO_2 impacts at the identified ASRs for both scenarios comply with the relevant AQO criteria. Therefore, adverse air quality impact from potential SO_2 emissions due to the proposed change is not anticipated.

Summary

The proposed changes will not have impact on external traffic flows and thus the projected traffic flows for the identified external roads remain unchanged (i.e. same as those used in the 2021 ER Report for which the traffic forecast has been endorsed by the Transport Department (TD)). Other emission sources in the vicinity of TKOFB including the operation of SENTX and HAESL remain essentially the same in terms of their operation mode and emission strengths.

Also, as shown in **Table 3.3**, the predicted background pollutant concentrations including NO_2, SO_2, RSP and FSP in 2023 are below their respective AQO criteria and are lower in general compared with preceding years (e.g. 2022). Improvement of the background air quality beyond 2023 is expected with continuous effort from the HKSAR government to implement air quality improvement measures in Hong Kong.

As discussed in **Section 2.1**, it is proposed to relocate the existing C&DMCF to either Site A or Site B (see **Figure 2.1**), and to increase the capacity of the relocated C&DMCF from the existing 5,000 tonnes/ day to 10,000 tonnes/ day with the addition of new jaw/ cone/ impact crushers and screening machine. While there would be an increase in air emission from the proposed additional C&DMCFs, the emission from the barging points and associated C&DMSFs would be reduced since 5 of the 7 barging points and associated C&DMSFs located south of the TKO Basin will no longer be in operational under proposed changes as considerably lower amount of fill being processed and handled. Besides, mitigation measures such as covering of tarpaulin sheets or sprayed with water regularly for dust suppression will be implemented to minimise the potential air quality impact. Based on the air quality modelling result, it is concluded that, under the proposed changes, all relevant air quality parameters including cumulative TSP, RSP, FSP, NO_2 and SO_2 would comply with the respective AQO criteria.

3.7 Mitigation Measures

The existing relevant air quality mitigation measures will continue to be undertaken during the operation of TKOFB with the proposed changes:

- Temporary slope surfaces of the stockpiling areas shall be covered with tarpaulin sheets or other impermeable sheets, or sprayed with water or a dust suppression chemical;
- Major haul roads and material stockpiling areas will be watered at least once every hour during operation to ensure that the roads and stockpiling areas are kept sufficiently dampened;
- Site hoarding of at least 2.4 m high shall be provided along the northern boundary of the site except at the site entrance/ exit;
- Vehicle wheel washing facilities including high pressure water jets shall be provided at designated vehicle exit points and operated by designated staff. Before leaving the site, every vehicle shall be washed to remove any dusty materials from its body and wheels;
- Trucks carrying dusty load entered to the site shall be sprayed with water once the impervious sheeting covering the load is removed;

- All public fill delivery trucks carrying dusty load leaving the fill bank shall be required to be covered entirely by clean impervious sheeting to prevent the dusty materials leaking from the vehicles;
- All haul roads within the site shall be paved with concrete, bituminous materials, hardcores or metal plates;
- At the barging point, the drop height between the barge and dump trucks shall be minimised;
- Tipping halls provided for transfer of public fill from trucks to barges shall be top and 3-sides enclosed;
- Truck speed shall be controlled to within 10 km per hour;
- All dusty fill materials shall be sprayed with water or a dust suppression chemical prior to loading, unloading or transfer so as to maintain the fill material wet, except of situations where the moisture content of the dusty material is a matter of concern;
- Loading of public fill delivered by barges to the site shall be sprayed with water at the material landing point to minimise dust emissions except when the materials are sufficiently dampened when landed. Any mist spraying applied should only dampen the dusty materials and overwatering should be avoided;
- Belt conveyor systems used for transfer of dusty materials shall be enclosed on top and 2 sides. Every transfer point between two conveyors shall be totally enclosed. There is no emission associated with the belt conveyor systems;
- Belt conveyor shall be equipped with bottom plates or other similar means to prevent falling of materials from the return belt;
- The vertical distance between the belt conveyor and the material landing point shall be maintained at no more than 1m;
- Dusty materials loaded from a belt conveyor outlet to stockpiles, storage bins, trucks, barges and other open areas shall be sprayed with water or a dust suppression chemical; and
- Final slope surfaces shall be treated by compaction, followed by hydroseeding, vegetation planting or other suitable surface stabilizer approved by CEDD to prevent the washing away of stockpiled material.

Requirements stipulated in the *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation* and *Development Bureau Technical Circular No.1/2015 (Emissions Control of NRMM in Capital Works Contracts of Public Works)* will continue be followed to control potential emissions from non-road mobile machinery (NRMM) within TKOFB. The *Air Pollution Control (Fuel Restriction) Regulation* which requires the use of liquid fuel with a sulphur content not exceeding 0.005% by weight will continue be followed to control potential emissions from NRMM within TKOFB.

3.8 EM&A Requirements

The monitoring locations remain the same as those suggested in the 2022 ER Report. The monitoring frequency and equipment used for the existing 1-hour and 24-hour TSP monitoring as required under the EM&A programme will remain unchanged. 1-hour TSP levels and 24-hour TSP levels will be monitored three times every six days and once every six days, respectively, using high volume samplers.

4. NOISE

4.1 Introduction

This *Section* reviews and assesses the potential noise impact associated with the proposed changes at TKOFB.

4.2 Legislative Requirements and Evaluation Criteria

4.2.1 Fixed Plant Noise

The principal legislation relating to the control of operational noise is the *EIAO*. The *EIAO-TM*, issued under the *EIAO*, provides guidelines and noise criteria for evaluating the noise impacts.

The *Noise Control Ordinance (Cap. 400)* (*NCO*) also provides means to assess operational noise impacts. The *Technical Memorandum on Noise From Places Other than Domestic Premises, Public Places or Construction Sites* (*IND-TM*) issued under the *NCO* specifies the applicable Acceptable Noise Levels (ANLs) for the operation of the TKOFB.

In accordance with the approved EIA Report and the ER Reports associated with previous VEP applications, noise generated from the use of Powered Mechanical Equipment (PME) in the TKOFB would be within the ANL - 5dB(A) criterion, i.e. 60dB(A) and 50dB(A), during the daytime and evening period, and night-time period, respectively.

4.2.2 Road Traffic Noise

The traffic noise standards for planning purposes specified in Table 1 under Annex 5 of the *EIAO-TM* were employed as the noise limits for the road traffic noise impact assessment. The applicable road traffic noise standards are 70dB(A) $L_{10(1\text{-hour})}$ and 65dB(A) $L_{10(1\text{-hour})}$ for domestic premises and educational institutions, respectively. These noise limits were applied for the peak hour traffic flows and for uses that rely on opened windows for ventilation.

In situations where the predicted traffic noise levels at the Noise Sensitive Receivers (NSRs) are above the noise standards but the noise contribution attributable to TKOFB operations is less than 1.0dB(A), the noise contribution from TKOFB operations is considered insignificant.

4.3 Noise Sensitive Receivers

The Study Area is shown in **Figure 4.1**. The representative NSRs as identified in the 2021 ER Report have been reviewed and remain valid. The locations of the identified representative NSRs selected for assessment are presented in **Figures 4.1a** to **4.1e**.

4.4 Potential Sources of Impact

4.4.1 Fixed Plant Operation

Noise will arise from the operation of the existing crushers, additional crushers/ screening machine at the relocated C&DMCF as well as other PMEs within TKOFB.

The C&DMCF may be relocated to one of two proposed locations within TKOFB. Therefore, two scenarios, Scenario 1 and Scenario 2, have been assessed with respect to fixed plant noise impacts. Scenario 1 represents the proposed changes at TKOFB with the C&DMCF relocated to Site A, whereas Scenario 2 represents the proposed changes at TKOFB with the C&DMCF relocated to Site B.

NSRs Island Resort (IR1) and Lohas Park, Le Prestige Moonlight (LP2) and Lohas Park, Wings at Sea (LP4) are considered the worst assessment points in terms of fixed plant noise impacts. Potential operational fixed noise impacts under Scenario 1 and Scenario 2 at these selected NSRs have been assessed. Details of Scenario 1 and Scenario 2 are summarised in **Table 4.1**.

Operational fixed plant inventory (including truck movement along haul roads) during daytime/ evening and nighttime periods within TKOFB for Scenario 1 and Scenario 2 are provided in **Appendix B1** and **Appendix B2** respectively. The adopted fixed plant inventory and utilization rate for the calculation of fixed noise impact assessment were provided by the Project Engineer of CEDD. The locations of key noise sources are shown in **Figure 4.2**.

Table 4.1 Summary of Modelling Scenarios Adopted in the Assessment

Modelling Scenario	Description	Noise Sources Considered	Key Difference in the Noise Sources
Scenario 1	Proposed changes at TKOFB with the C&DMCF at Site A	■ Fixed plant noise sources within TKOFB, including PMEs and truck movement on internal roads ■ Fixed plant noise from SENTX operation (for cumulative assessment)	■ Operation of C&DMCF at Site A ■ Internal truck movement of C&DMCF from/to stockpiling areas through routes: R9b < > R11a < > R11/R12
Scenario 2	Proposed changes at TKOFB with the C&DMCF at Site B		■ Operation of C&DMCF at Site B ■ Internal truck movement of C&DMCF from/to stockpiling areas through routes: R9a < > R11a < > R11/R12

Compared with the assumptions in the 2021 ER Report, proposed changes to the TKOFB operation include the following:

- Operation of additional crushers at the relocated C&DMCF between 07:00 hrs and 23:00 hrs;
- Updated truck movement within TKOFB due to the relocation of C&DMCF;
- Updated the number of PMEs within stockpiling and TKO Basin area; and
- Reduction of 7 sets of C&DMSFs and barging points to 2 sets (i.e. NB4 to NB5 and NSD to NSE).

4.4.2 Road Traffic Noise

As described in **Section 2.1**, no off-site road traffic will be generated by the proposed changes at TKOFB. The number of trucks associated with the transportation of materials to the TKOFB (i.e. public roads outside the TKOFB) will remain unchanged. Therefore, there is no change to the road traffic noise impact assessment and the assessment results as presented in the 2021 ER Report remain valid. There will be no adverse road traffic noise impact due to the proposed changes at TKOFB.

4.5 Assessment Methodology

4.5.1 Fixed Plant Operation

Noise impact assessment due to fixed plant noise from TKOFB is undertaken based on standard acoustic principles as per the requirements of the *EIAO-TM*.

4.6 Evaluation of Impacts

4.6.1 Fixed Plant Operation

The predicted noise levels at the representative NSRs due to the proposed changes at TKOFB are summarised in **Table 4.2**. The predicted noise levels comply with the noise criteria as stated in **Section 4.2.1**. Details of the calculations for Scenario 1 and Scenario 2 are provided in **Appendix B1** and **Appendix B2** respectively.

Table 4.2 Predicted Operational Noise Levels at Representative NSRs (Worst Assessment Points)

NSR	Predicted Noise Level in 2021 ER Report, dB(A)		Predicted Noise Level for Scenario 1, dB(A)		Predicted Noise Level for Scenario 2, dB(A)		Noise Criteria, dB(A)	
	Daytime (Evening)	Night-time	Daytime (Evening)	Night-time	Daytime (Evening)	Night-time	Daytime (Evening)	Night-time
Island Resort (IR1)	55 (55)	48 (a)	55 (55)	46	55 (55)	46	60 (60)	50
The Lohas Park, Le Prestige Moonlight (LP2)	54 (54)	45 (a)	54 (54)	42	55 (55)	42	60 (60)	50
The Lohas Park, Wing at Sea (LP4)	54 (54)	45 (a)	54 (54)	42	54 (54)	42	60 (60)	50

Note:
(a) The maximum noise level among the assessed scenarios presented in the 2021 ER Report.

Based on the above-mentioned results, adverse fixed plant noise impact due to the proposed changes at TKOFB is not expected.

4.7 Cumulative Impact

The predicted maximum operational noise levels at the Lohas Park and Island Resort due to SENTX operation are provided in the approved EIA Report for SENTX (Register No.: AEIAR-117/2008). The cumulative noise levels at the Lohas Park and Island Resort taking into account operational noise from TKOFB and SENTX for both Sites are summarised in **Table 4.3**. Details of the calculation for Scenario 1 and Scenario 2 are provided in **Appendix B1** and **Appendix B2** respectively.

Table 4.3 Cumulative Noise Levels at Representative NSRs (Worst Assessment Points)

NSR	Max Noise Level from SENTX, dB(A)		Cumulative Noise Level for Scenario 1, dB(A)		Cumulative Noise Level for Scenario 2, dB(A)		Noise Criteria, dB(A)	
	Daytime (Evening)	Night-time	Daytime (Evening)	Night-time	Daytime (Evening)	Night-time	Daytime (Evening)	Night-time
Island Resort (IR1)	50 (50)	46	56 (56)	49	57 (57)	49	60 (60)	50
The Lohas Park, Le Prestige Moonlight (LP2) (a)	53 (53)	47	57 (57)	48	57 (57)	48	60 (60)	50
The Lohas Park, Wing at Sea (LP4)	53 (53) (a)	47 (a)	56 (56)	48	57 (57)	48	60 (60)	50

Note:
(a) Maximum noise levels from SENTX at LP2 during daytime, evening and night-time periods have been adopted for conservative approach.

As shown in **Table 4.3**, cumulative noise levels at the representative NSRs comply with the noise criteria for all periods. Hence, adverse cumulative noise impact from the proposed changes at TKOFB is not anticipated.

4.8 Mitigation Measures

The contractor will continue to implement the noise management measures currently adopted as per the recommendations in **Section 5.5.13** of the approved EIA Report.

As no adverse noise impact is expected due to the proposed changes at TKOFB, additional mitigation measures are considered not necessary.

4.9 EM&A Requirements

Noise monitoring is being carried out outside of site egress along Wan Po Road (i.e. TKO-N1) for 30 minutes ($L_{eq(30\text{-}min)}$) once every month. The monitoring location and frequency of noise monitoring will remain unchanged. No additional EM&A requirement related to noise is considered necessary.

5. OTHER ENVIRONMENTAL OUTCOMES

5.1.1 Water Quality

Operation of the TKOFB involves handling, transfer and stockpiling of fill materials at the fill bank, including the barging points. Potential water quality impact from these activities could be resulted from erosion of stockpiled materials, accidental dropping of materials to the sea, and non-point source discharge of surface runoff containing high levels of suspended solids. The potential water quality impacts have been assessed in the approved EIA Report and previous ER Reports. Practical mitigation measures have been recommended accordingly to minimise the potential water quality impacts. It is recommended that these measures should continue to be implemented during the TKOFB operation with proposed changes. The guidelines for handling and disposal of construction site discharges as stipulated in EPD's *ProPECC Note PN1/94 Construction Site Drainage* should be followed.

Similar to the existing operations, public fill will be delivered to and removed from the TKOFB by barges at the barging points during the TKOFB operation. To prevent water pollution due to the transportation of fill materials by barges, all environmental control and mitigation measures recommended in the approved EIA Report and previous ER Reports will be followed, including the following:

- All barges used should be of an appropriate size such that adequate clearance is maintained between the vessels and the seabed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movements;
- All vessels used for transportation of fill material should have tight fitting seals to their bottom openings to prevent leakage of materials during transport;
- The equipment and transfer methods used shall avoid dropping of fill materials into the sea during the transfers at all times;
- Barges should not be filled to a level which may cause the overflow of materials during loading or transportation; and
- Barge effluents (e.g. muddy water) should be properly collected and treated prior to disposal.

With the implementation of the appropriate mitigation measures, it is anticipated that no adverse water quality impacts will arise as a result of the proposed changes at TKOFB.

The existing water quality monitoring programme will remain unchanged. It is recommended that the monitoring parameters, frequency and equipment will be maintained as the existing monitoring programme.

5.1.2 Landscape and Visual

5.1.2.1 Landscape and Visual Implications

The C&DMCF will be relocated to the proposed site (Site A or Site B) within the TKOFB. Existing landscape resources, including existing trees, are not present within either of the proposed sites. Hence, no issues of landscape impact are anticipated due to the proposed changes at TKOFB.

Chromatic treatment will be provided to the design of the proposed addition additional crushers and screening machine at the relocated C&DMCF. The material use, colour and finish of structures of the additional crushers and screening machine will be compatible to the existing facilities in the TKOFB. Colour shall be blended into the TKOFB design and natural landscape, i.e. the use of light colours and tones such as green, grey and brown as far as practicable. The materials used will be in low reflectivity and the form of structure will be similar to the form of the TKOFB. With the implementation of the aforementioned measures, no adverse visual impacts will arise as a result of the proposed changes at TKOFB.

5.1.2.2 Night-time Glare

Additional illuminations may be required due to the operation of additional crushers and screening machine at the relocated C&DMCF. Following the existing operations within TKOFB, illuminations shall be provided at active works areas only, for example, the C&DMCF, C&DMSFs, TKOSF, barging points, access roads and the working areas of the stockpiling area. Night-time glare may cause nuisance to adjacent visual sensitive receivers at night time if the lighting intensity and direction are not properly controlled. To avoid light spills to the surrounding area, all lightings provided at night should be directional downward, generally focused and shielded to reduce glare and should illuminate the required areas only. Other possible control measures as recommended in the *Guidelines on Industry Best Practices for External Lighting Installations* shall be followed where appropriate and as far as practicable. Yet, given the large separation distance between the residential sensitive receivers and the TKOFB (i.e. more than 1.8km), the light intensity would drop significantly and therefore the light glare is not considered significant.

With the continued implementation of the above-mentioned measures, no significant night-time glare nuisance due to the proposed changes at TKOFB is anticipated.

5.1.3 Landfill Gas Hazard

About 11.88ha of the TKOFB area is located within the 250m consultation zone of the SENT Landfill, as shown in **Figure 5.1**. A qualitative risk assessment had been carried out in the approved EIA Report and concluded that the risk associated with the landfill gas migration hazard of SENT landfill is low with the implementation of the mitigation measures currently stipulated in the Environmental Permit of TKOFB.

The SENTX Landfill has commissioned since November 2021. About 21.83ha of the TKOFB area is located with the 250m consultation zone of the SENTX Landfill as shown in **Figure 5.1**. As reported in the approved EIA report for SENTX Landfill (EIAO Register No. AEIAR-117/2008), the Environmental Review Report supporting the VEP for SENTX Landfill (EIAO Register No. VEP-348/2011), the risk posed by the SENTX Landfill to adjacent developments ranges from very low to low depending on the nature and location of these developments. The TKOFB area falls within the 250m consultation zone of the SENTX Landfill will be occupied by open stockpiling areas and site haul roads.

All operation works of the TKOFB within the landfill consultation zones will be carried out above ground. Only surface channels will be used for collection of surface drainage run-off and, thus, no underground drainage and sewerage systems including underground pipelines and chambers will be installed within the consultation zones. Most of the site offices for the contractor and the resident supervising staff will be located outside the consultation zones to minimize the potential risk of the landfill gas. An existing site office with an inspection platform is located at the site entrance, and the combined reception and exit office is immediate to the south of the site entrance. These buildings are located within the consultation zones. The container type office is supported by a raised hollow platform that allow natural ventilation and avoid accumulation of landfill gas, if any, beneath the office. This measure is demonstrated to be effective to prevent landfill gas accumulation within the office.

With the continued adoption of the precaution and safety measures recommended in the approved EIA report and the Environmental Permit of TKOFB, the potential landfill gas hazard due to the operation of TKOFB with the proposed changes will be low. The additional crushers and screener at the relocated C&DMCF will also be outside the consultation zones of SENT and SENTX Landfills. Thus, no issues of landfill gas hazard are anticipated due to the proposed changes at TKOFB.

5.1.4 Cultural Heritage

As reported in the approved EIA Report and the 2022 ER Report, the TKO Area 137 is a reclaimed land and there is no cultural heritage concern onsite. As stated in the EIA Study Brief, Junk Island House Ruin on Fat Tong Chau, i.e. the Fat Tau Chau House Ruin Site of Archaeological Interest (SAI)

is located to the north of the TKOFB. There will not be any works associated with the operation of TKOFB at Fat Tong Chau.

As stated in the 2022 ER Report, the SAI is located at the mountainous area with an elevation of about +20mPD to +30mPD, separated from the TKOFB and is not easily accessible by public. The Fat Tau Chau House Ruin SAI is about 550m away from the nearest site of the relocated C&DMCF (i.e. Site B). TKOFB also has a 2.4m high fencing erected and maintained along the northern site boundary abutting Fat Tong Chau to avoid any accidental disturbance of the SAI by the workers. Disturbance, visual impact and structural impact to the SAI were not expected.

Since commission of the TKOFB, these environmental settings have been unchanged. The additional crushers and screening machine at the relocated C&DMCF would not alter the environmental settings or the operation mode of the TKOFB. Thus, no issues of cultural heritage impacts are anticipated due to the proposed changes at TKOFB.

5.1.5 Ecology

As reported in the approved EIA Report, potential impact on ecology was avoided through proper site selection. As TKO Area 137 was formed by reclamation, there are no recognized sites of conservation importance and important ecological habitats. Besides, a buffer distance of at least 10m would be provided along the eastern boundary of TKOFB to separate the TKOFB from the western boundary of the Clear Water Bay Country Park.

Since the commission of the TKOFB, these environmental settings have been unchanged. The additional crushers and screener at the relocated C&DMCF would not alter the environmental settings or the operation mode of the TKOFB. Thus, no issues of ecological impacts are anticipated due to the proposed changes at TKOFB.

6. CONCLUSION AND CONSIDERATION OF MATERIAL CHANGE

CEDD proposes to increase the total processing capacity of the C&DMCF and install three additional crushers (i.e. one jaw crusher, one cone crusher and one impact crusher) and one screening machine. CEDD also proposes to relocate the C&DMCF to a new location (Site A or Site B shown in **Figure 2.1**) in TKOFB at which the existing and new C&DMCF equipment will be located.

The proposed changes to the C&DMCF operation has the potential to cause additional environmental impacts and an environmental review is thus required to confirm its environmental acceptability. In this connection, CEDD has commissioned ERM-Hong Kong, Limited (ERM) to undertake an environmental review to assess the potential environmental impacts from the proposed changes to the C&DMCF operation.

In addition to the proposed changes to the C&DMCF operation, the number of C&DMSFs and barging points will also be reduced to two sets (i.e. NB4 to NB5 and NSD to NSE). Both sets will have the capacity to operate 24 hours under Condition 2.8B of the current EP.

An environmental review has been carried out to assess the potential environmental impacts associated with the proposed changes at TKOFB. The findings of this environmental review serve to support the application for variation of environmental permit for the Project under Section 13 of the EIAO. This environmental review indicates that no adverse environmental impacts are anticipated.

The environmental impacts associated with the proposed changes at TKOFB comply with the requirements described in the EIAO-TM and will not constitute a material change to the TKOFB under Section 6.2 of the EIAO-TM. The existing environmental mitigation measures and EM&A programme are considered applicable. It is considered that the proposed changes could be incorporated into the EP of TKOFB via a variation of the existing EP.

7. PROPOSED VARIATIONS OF THE EXISTING EP

7.1 Proposed Amendment of Figures 2 of the EP

It is proposed to update the area of C&DMSF, the locations of the barging points south of the TKO Basin, the locations (i.e. Site A and Site B) of the C&DMCF and removal of the label "Temporary Barging point at GEO's Explosive Off-Loading Barging Point" in Figure 2. The proposed update to the Figure 2 of EP is illustrated in **Figure 7.1**.

7.2 Proposed Amendment of Condition 2.8A in Part C of EP

It is proposed to amend Condition 2.8A from:

"The fill bank shall not be operated between 11:00 p.m. and 8:00 a.m. on the following day, except the following : (a) the Construction and Demolition Material Sorting Facility and the adjoining barging point; (b) delivery of public fill by barges and the transportation between north portion of stockpiling area and the barging points (three locations shown in Figure 2 of this Permit). Except the Construction and Demolition Material Sorting Facility, the fill bank shall be closed during the Chinese New Year Holiday."

to:

"The fill bank shall not be operated between 11:00 p.m. and 8:00 a.m. on the following day, except the following : (a) the Construction and Demolition Material Sorting Facility; (b) delivery of public fill by barges at TKO Basin and the transportation between north portion of stockpiling area and the barging points (three locations shown in Figure 2 of this Permit). Except the Construction and Demolition Material Sorting Facility, the fill bank shall be closed during the Chinese New Year Holiday."

7.3 Proposed Amendment of Condition 2.8B in Part C of EP

It is proposed to amend Condition 2.8B from:

"At any one time, only 6 out of the 7 construction and demolition material sorting facilities and 6 out of the 7 barging points and tipping halls in the area coloured yellow as shown in Figure 2 of this Permit can be operated round-the-clock everyday. The remaining construction and demolition material sorting facilities, barging points and tipping halls shall not be operated between 11:00 p.m. and 7:00 a.m. on the following day unless otherwise agreed by the Director. The area coloured yellow as shown in Figure 2 of this Permit shall be closed during the Chinese New Year Holiday."

to:

"The 2 construction and demolition material sorting facilities and 2 barging points and tipping halls in the area coloured yellow as shown in Figure 2 of this Permit can be operated round-the-clock everyday. The area coloured yellow as shown in Figure 2 of this Permit shall be closed during the Chinese New Year Holiday."

7.4 Proposed Amendment of Conditions 2.26 and 2.9 in Part C of EP

As confirmed by CEDD, no loading and unloading of public fill associated with the TKOFB operation would be performed at the existing Explosives Off-loading Barging Point.

It is proposed to remove Condition 2.9.

It is proposed to delete the last two sentences in Condition 2.26, as follows:

"After the completion of the Contract "TKO Port Development at Area 137 Stage 2 – Construction of Seawalls and Reclamation", the Permit Holder shall be required to provide silt curtains at the outward side of the TKO basin near the barging point throughout the operational phase when there is public fill intake by barges and throughout the removal phase when there is public fill delivered out by barges. The silt curtains shall be constructed in accordance with the details deposited under Condition 2.5

above. At the same time, a waste collection vessel shall be provided to remove floating debris on the sea around the fill bank. When the barging point at the C&DMSF is in operation, a waste collection vessel shall also be provided to remove floating debris on the sea around the barging point. The barging point at the C&DMSF should only be used for loading of sorted public fill free of refuse from the site to barges. ~~The temporary barging point located at the existing Explosives Off-loading Barging Point should only be used for loading 1 barge of public fill per day. When the temporary barging point is in operation, a waste collection vessel shall be provided to remove floating debris on the sea around this barging point.~~"

FAT TONG CHAU

露天貨倉
Open Storage

IB4
IB1
IB3
Seawall
海堤
B3
IB2
B2
B1
海堤
C&DMCF (SIte B)
NSE
NB5
NSD
NB4
HWM
C&DMCF (SIte A)
TKOSF

儲水缸
翠谷工程
Green Valley Landfill
儲水缸
Water Tank
TIN H
100
50
50
碼頭
Pier
鐵篆洲
TIT CHAM CHAU
Rocky Area
20
岩地

N
Metres
0 100 200

Legend

- Tseung Kwan O Fill Bank
- Construction & Demolition Material Sorting Facilities (Others)
- Other Barging Points for Exporting Materials
- TKOFB Barging Points for Exporting Materials
- TKOFB Barging Points for Importing Materials
- TKOFB Construction & Demolition Material Crushing Facility (Site A)
- TKOFB Construction & Demolition Material Crushing Facility (Site B)
- TKO Sorting Facility

Figure 2.1

Locations of Key Facilities at Tseung Wan O Fill Bank
(Operation with Proposed Changes)

File: T:\GIS\CONTRACT\0676933\mxd\0676933_Key_Facilities_and_Barging_Points.mxd
Date: 14/9/2023

Environmental Resources Management
ERM

FAT TONG CHAU

露天貨倉
Open Storage

IB4
IB1
IB3
Seawall
海堤

B3

B2
Seawall
海堤
IB2

B1

C&DMCF

NSF

NB6

NSE
NB5

NSD

NB4

NSC

NB3
WM

NB2

NSB

NSA

NB1

NSG

NB0

儲水缸
翠谷工程
Green Valley Landfill

儲水缸
Water Tank

TIN H

TKOSF

碼頭
Pier

鐵箩洲
TIT CHAM CHAU

Rocky Area

N

Metres
0 100 200

Legend

- Tseung Kwan O Fill Bank
- Construction & Demolition Material Sorting Facilities (Others)
- Other Barging Points for Exporting Materials
- TKOFB Barging Points for Exporting Materials
- TKOFB Barging Points for Importing Materials
- TKOFB Construction & Demolition Material Crushing Facility
- TKO Sorting Facility

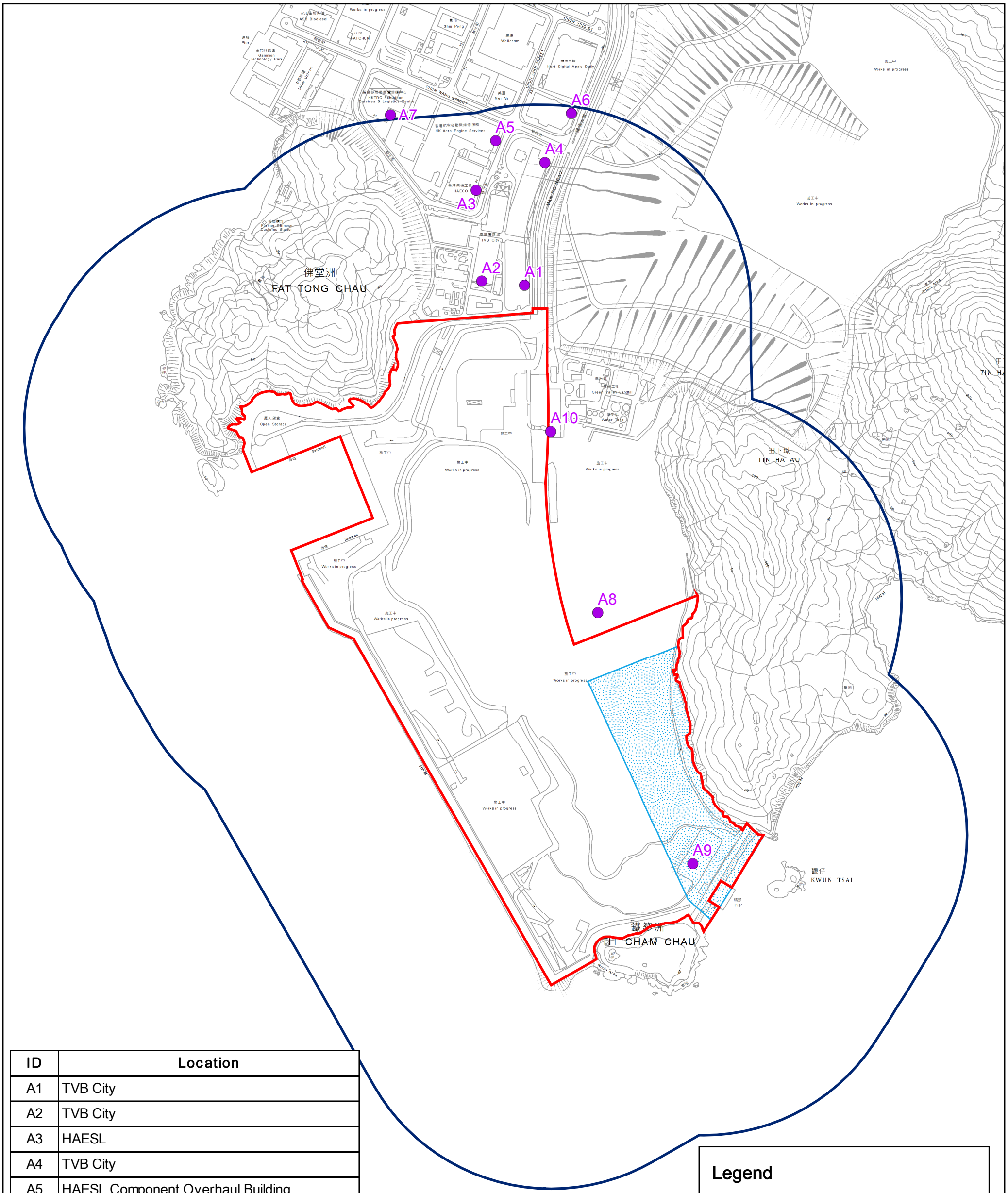
Figure 2.2

Locations of Key Facilities at Tseung Wan O Fill Bank
(Current Operation)

File: T:\GIS\CONTRACT\0676933\mxd\0676933_Key_Facilities_and_Barging_Points_(Current).mxd
Date: 14/9/2023

Environmental Resources Management

ERM



ID	Location
A1	TVB City
A2	TVB City
A3	HAESL
A4	TVB City
A5	HAESL Component Overhaul Building
A6	Digital Savvis Investment
A7	Trade Development Council
A8	Office Building of SENT Landfill Extension
A9	Office Building of Desalination Plant
A10	Administrative Building of P-Tech Landfill Gas (SENT) Company Limited

Figure 3.1

Locations of Representative Air Sensitive Receivers

File: T:\GIS\CONTRACT\0676933\mxd\0676933_ASR.mxd
Date: 13/10/2023

Environmental Resources Management

ERM

佛堂洲
FAT TONG CHAU

田下坳
TIN HA AU

鐵篙洲
LIT CHAM CHAU

觀仔
KWUN TSAI

A1
A2
A3
A4
A5
A6
A7
A8
A9
A10

R1a
R1
R1b
R2
R3
R4
R5
R6
R7
R8
R9a
R9b
R10
R11
R11a
R12

SP3h
SP3i
SP3f
SP3g
SP3c
SP3a
SP3b
SP3d
SP3e

A003
A001
A002
A004

IB4
IB3
IB1
IB2
B1
B2
B3

C&DMCF
(Site B)

NB5
NSE
NB4
NSD

C&DMCF
(Site A)

TKOSF

N
Metres
0 150 300

Legend

- ASR
- Construction & Demolition Material Sorting Facilities (Others)
- Fill Loading and Unloading Points
- Other Barging Points for Exporting Materials
- TKOFB Barging Points for Exporting Materials
- TKOFB Barging Points for Importing Materials
- TKOFB Construction & Demolition Material Crushing Facility (Site A)
- TKOFB Construction & Demolition Material Crushing Facility (Site B)
- TKO Sorting Facility
- Generators
- Haul Roads
- Marine Vessel Maneuvering Route
- Tseung Kwan O Fill Bank
- Tseung Kwan O Fill Bank 500m Study Area
- Open Area
- Stockpiling Areas

Figure 3.2

Locations of Major Emission Sources within Tseung Kwan O Fill Bank

File: T:\GIS\CONTRACT\0676933\mxd\0676933_Major_Emission_Sources.mxd
Date: 14/9/2023

Environmental Resources Management
ERM

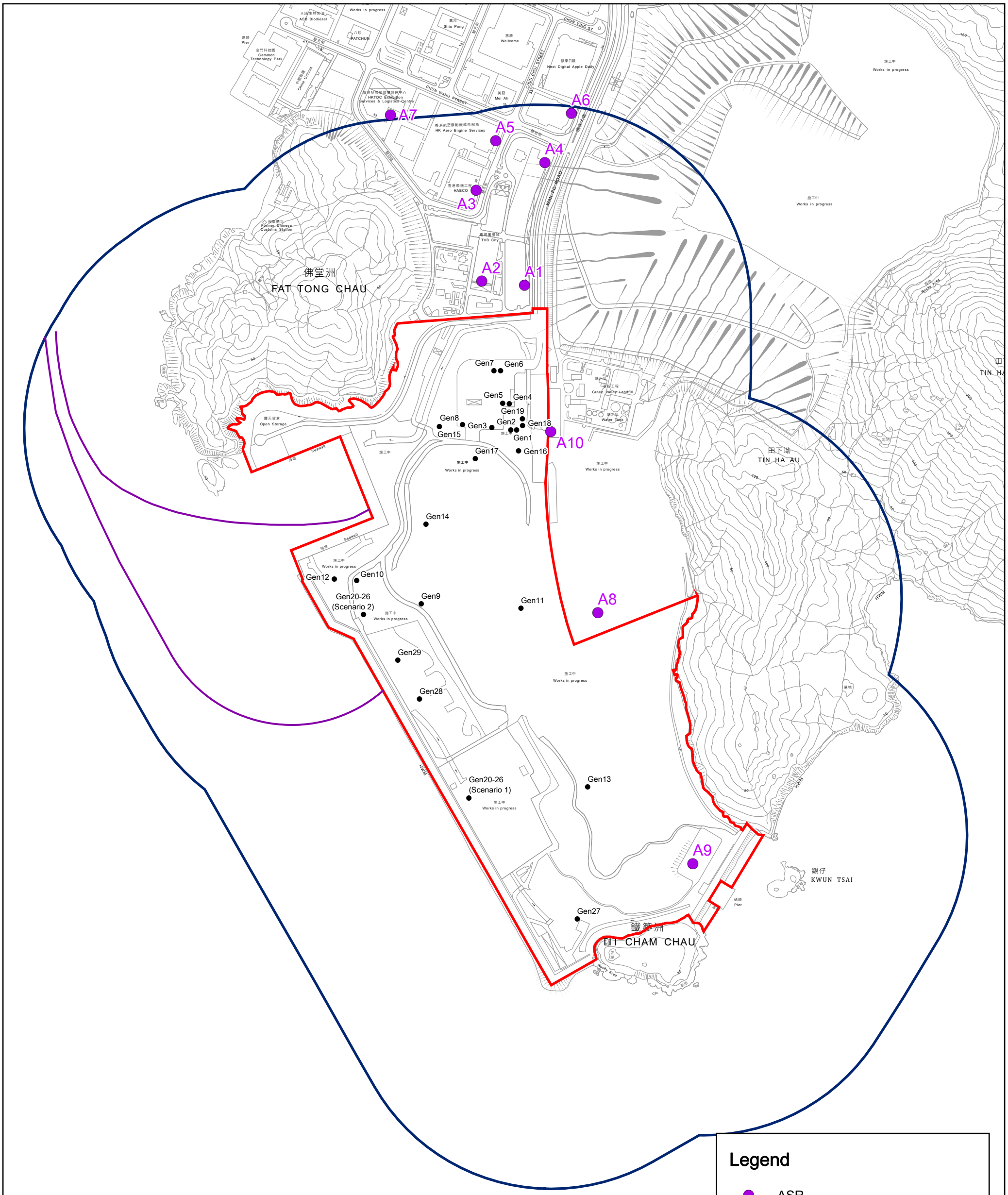


Figure 3.3

Locations of Generators and Internal Crushers (Internal Combustion Engines) within Tseung Kwan O Fill Bank

File: T:\GIS\CONTRACT\0676933\mxd\0676933_Generators_and_Internal_Crushers.mxd
Date: 14/9/2023

Environmental Resources Management

ERM

Legend

- Maneuvering route to and from Barging Points South of TKO Basin
- Maneuvering route to and from TKO Basin

佛堂洲

FAT TONG CHAU

◇ 稅關遺址
Former Chinese Customs Station

露天貨倉
Open Storage

Seawall
海堤

施工中
Works in progress

岩地

50

10

M1 M2 M3 M4 M5 M6 M7 M8 M9 M10 M11 M12 M13 M14 M15 M16 M17 M18 M19 M20 M21 M22 M23 M24 M25 M26 M27 M28 M29 M30 M31 M32 M33 M34 M35 M36 M37 M38 M39 M40 M41 M42 M43 M44 M45 M46 M47 M48 M49 M50 M51 M52 M101 M102 M103 M104 M105 M106 M107 M108 M109 M110 M111 M112 M113 M114 M115 M116 M117 M118 M119 M120 M121 M122 M123 M124 M125 M126 M127 M128 M129 M130 M131 M132 M133 M134 M135 M136 M137 M138 M139 M140 M141 M142 M143 M144 M145 M146 M147 M148 M149 M150 M151 M152 M153 M154 M155 M156 M157 M158 M159 M160 M161 M162 M171 M172 M173

HWM

N

Metres

0 75 150

Figure 3.4

Marine Vessel Maneuvering Route at TKOFB

File: T:\GIS\CONTRACT\0676933\mxd\0676933_Marine_Vessel_Maneuvering_Route.mxd
Date: 31/7/2023

Environmental Resources Management

ERM

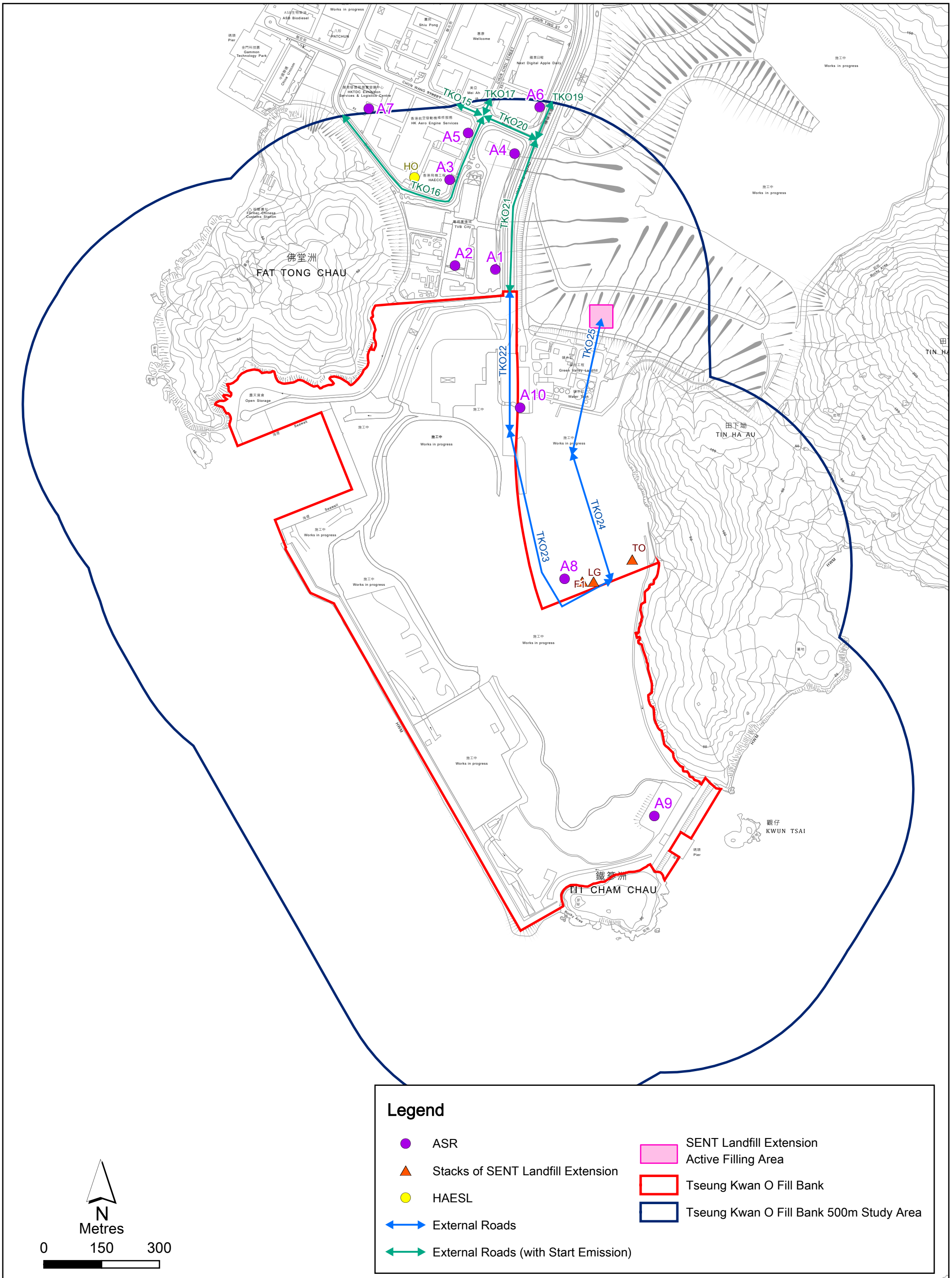


Figure 3.5

External Roads and Industrial Sources within 500m Study Area

File: T:\GIS\CONTRACT\0676933\mxd\0676933_External_Roads_and_Industrial_Sources.mxd
Date: 14/9/2023

Environmental Resources Management

ERM

Legend

- Tseung Kwan O Fill Bank
- Tseung Kwan O Fill Bank 300m Study Area

No.	Location
1	On Ning Garden
2	Nan Fung Plaza & Two Primary Schools
3	La Cite Noble
4	Yuk Ming Court
5	Oscar by the Sea
6	Creative Secondary School
7	Fire and Ambulance Services Academy
8	TKO Area 78 Hospital Development
9	The Beaumount
10	Lohas Park Phase 1 - The Capitol
11	Lohas Park Phase 2 - La Prestige
12	Lohas Park Phase 4a – Wings at Sea
13	TKO Area 86 School Development
14	Island Resort
15	TKO Area 85 Residential Development
16	Lohas Park Phase 3 - Hemera
17	Fire Services Department Pak Shing Kok Married Quarters
18	Shrewsbury International School Hong Kong
19	Lohas Park Phase 8 - Sea To Sky
20	Lohas Park Phase 9c - Ocean Marini
21	Lohas Park Phase 9b - Grand Marini
22	Lohas Park Phase 9a - Marini
23	Lohas Park Phase 10 - LP10
24	Lohas Park Phase 6

Metres
0 500 1,000

Figure 4.1 The 300m Study Area for Noise Impact Assessment and Representative Noise Sensitive Receivers along Wan Po Road

File: T:\GIS\CONTRACT\0676933\mxd\0676933_NSR.mxd
Date: 14/9/2023

Environmental Resources Management

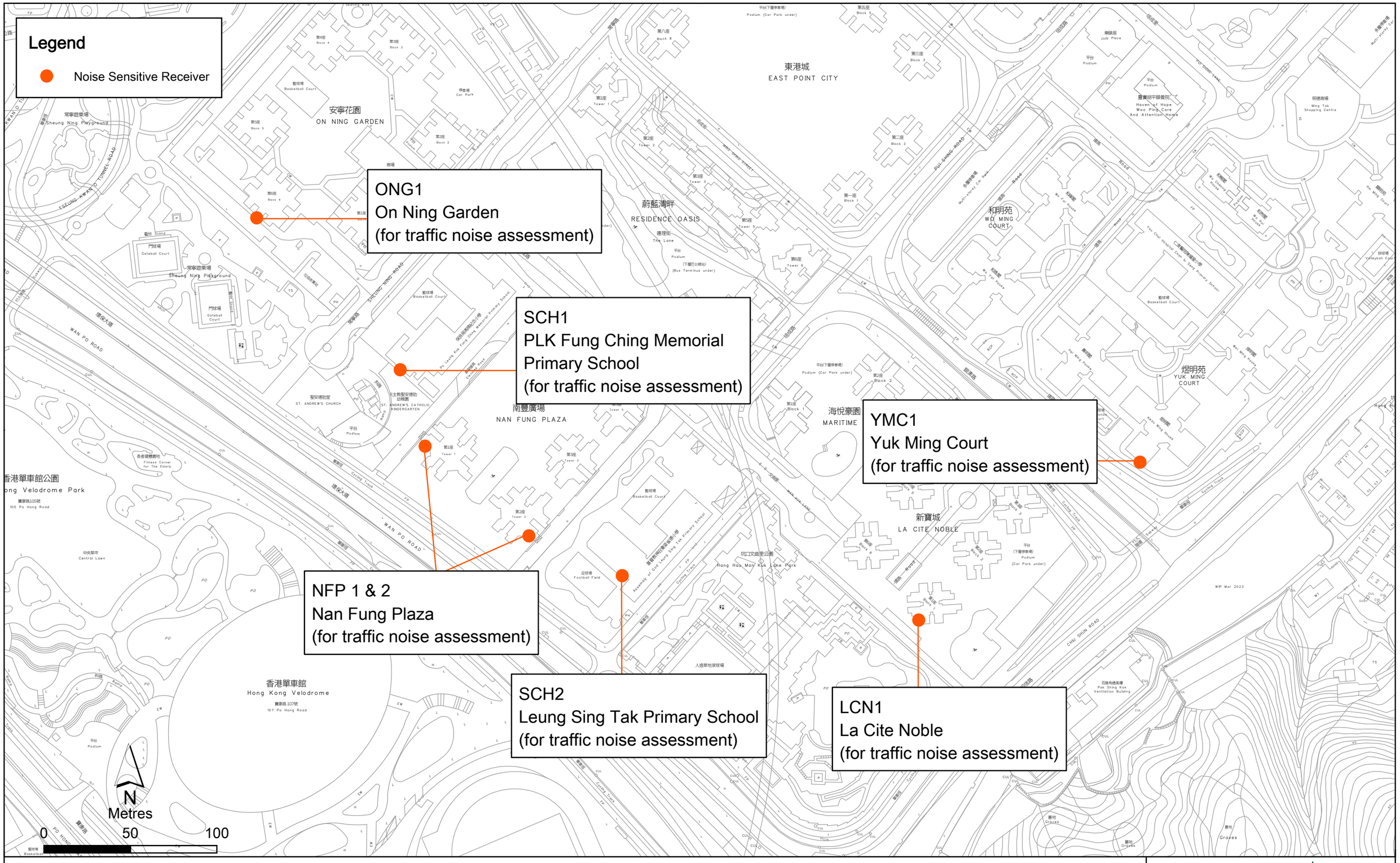


Figure 4.1a

Locations of Representative Noise Sensitive Receivers for Assessment

File: T:\GIS\CONTRACT\0676933\mxd\0676933_NSR_1.mxd
Date: 27/7/2023

Environmental Resources Management

ERM

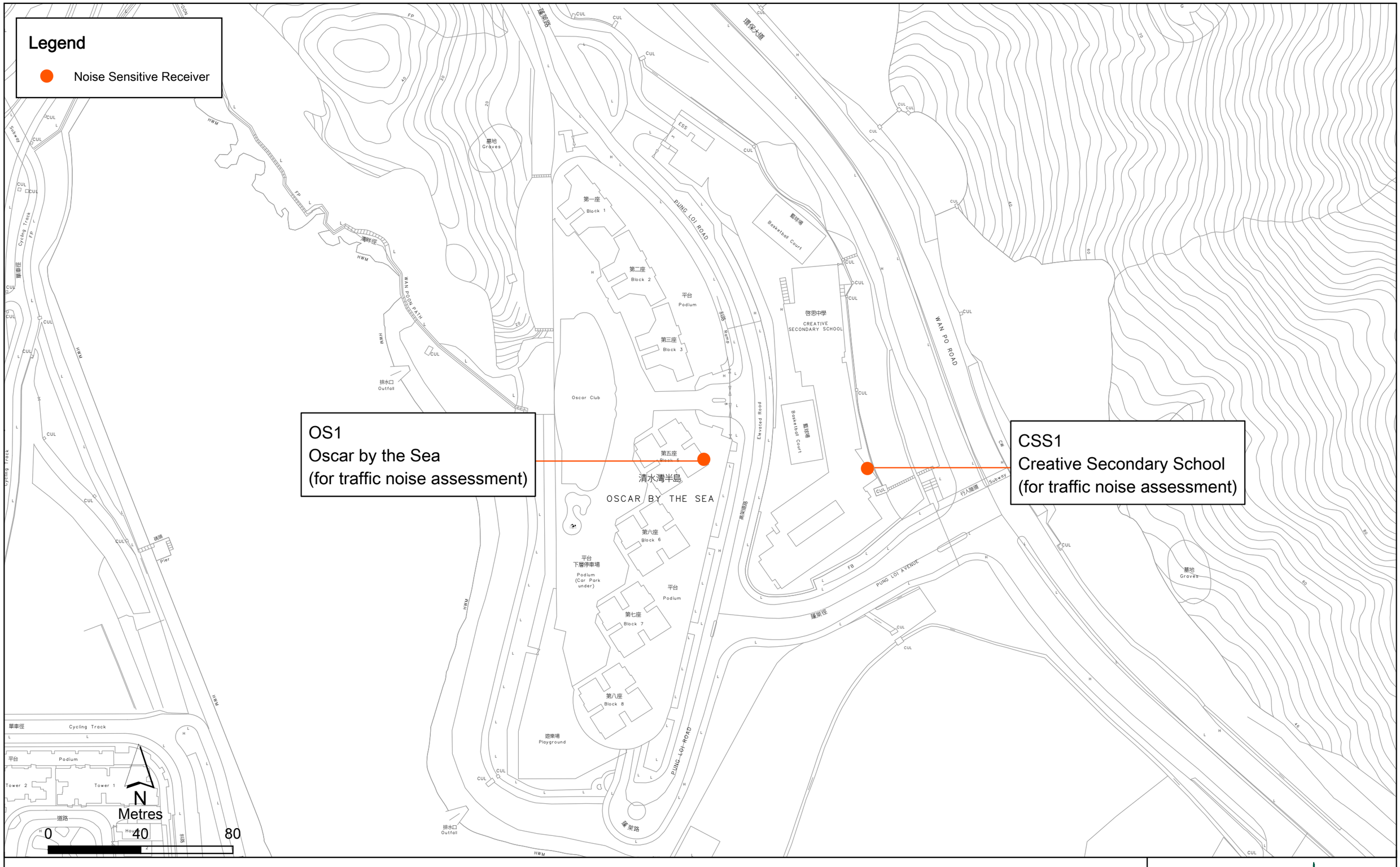


Figure 4.1b

Locations of Representative Noise Sensitive Receivers for Assessment

File: T:\GIS\CONTRACT\0676933\mxd\0676933_NSR_2.mxd
Date: 27/7/2023

Environmental Resources Management

ERM

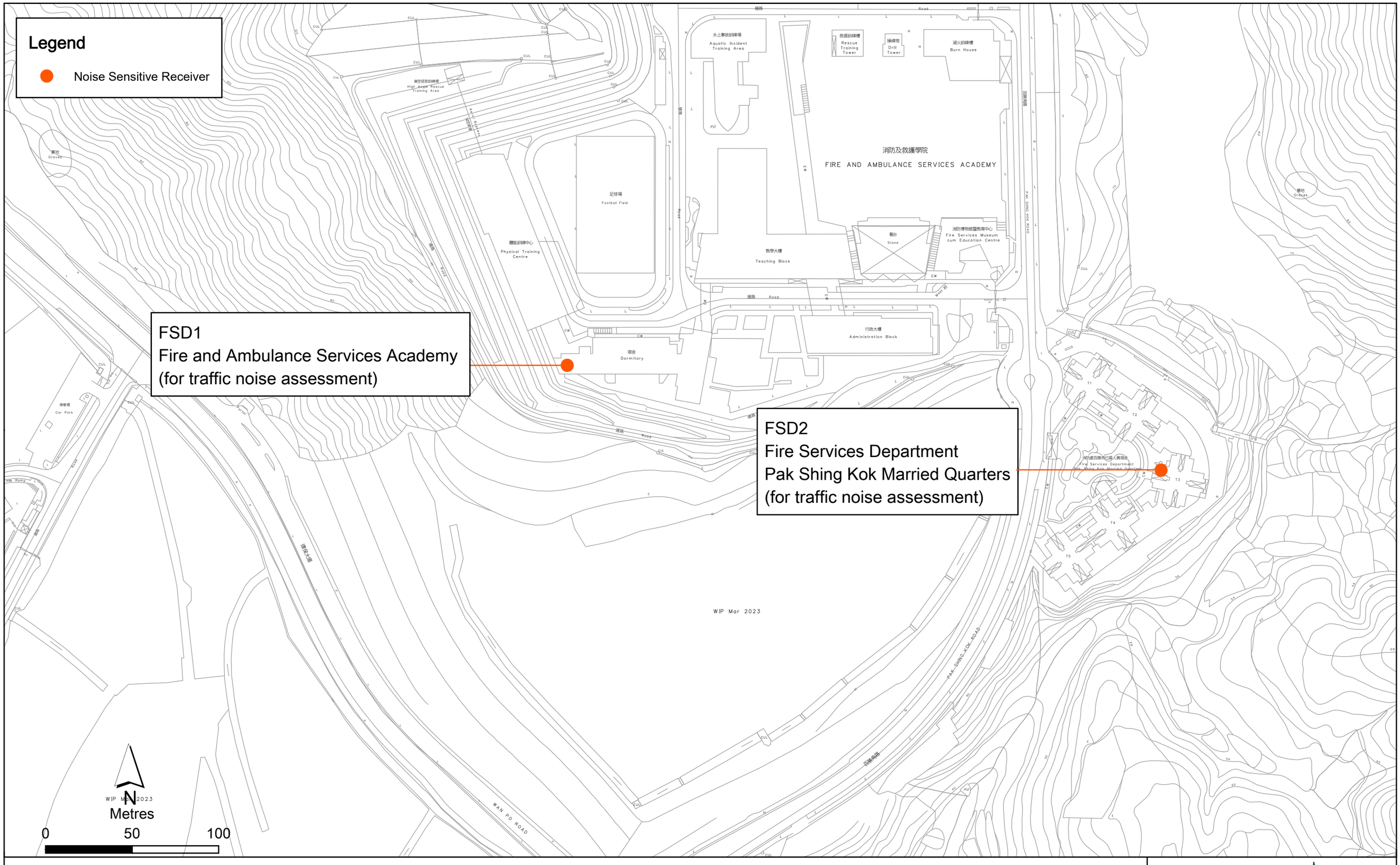


Figure 4.1c

Locations of Representative Noise Sensitive Receivers for Assessment

File: T:\GIS\CONTRACT\0676933\mxd\0676933_NSR_3.mxd
Date: 27/4/2023

Environmental Resources Management

ERM

Legend

Noise Sensitive Receiver

SIS1
Shrewsbury International School Hong Kong
(for Traffic Noise Assessment)

LP1
The Capitol Whistler
(for Traffic Noise Assessment)

LP5
Hemera
(for Traffic Noise Assessment)

TB1
The Beaumount
(for Traffic Noise Assessment)

TKO85-1
TKO Area 85 Residential Development
(for Traffic Noise Assessment)

TKO85-2
TKO Area 85 Residential Development
(for Traffic Noise Assessment)

LP3
La Splendeur Tower 9
(for Traffic Noise Assessment)

LP9
Sea to Sky
(for Traffic Noise Assessment)

LP11a-11d
Lohas Park Phase 6
(for Traffic Noise Assessment)

TKO86-1
TKO Area 86 School Development
(for Traffic Noise Assessment)

LP2
Le Prestige Moonlight
(for Traffic and Fixed Plant Noise Assessment)

LP10
LP10
(for Traffic Noise Assessment)

LP8
Marini
(for Traffic Noise Assessment)

LP6
Ocean Marini
(for Traffic Noise Assessment)

LP7
Grand Marini
(for Traffic Noise Assessment)

LP4
Wings at Sea
(for Traffic and Fixed Plant Noise Assessment)

N
Metres
0 100 200

Figure 4.1d

Locations of Representative Noise Sensitive Receivers for Assessment

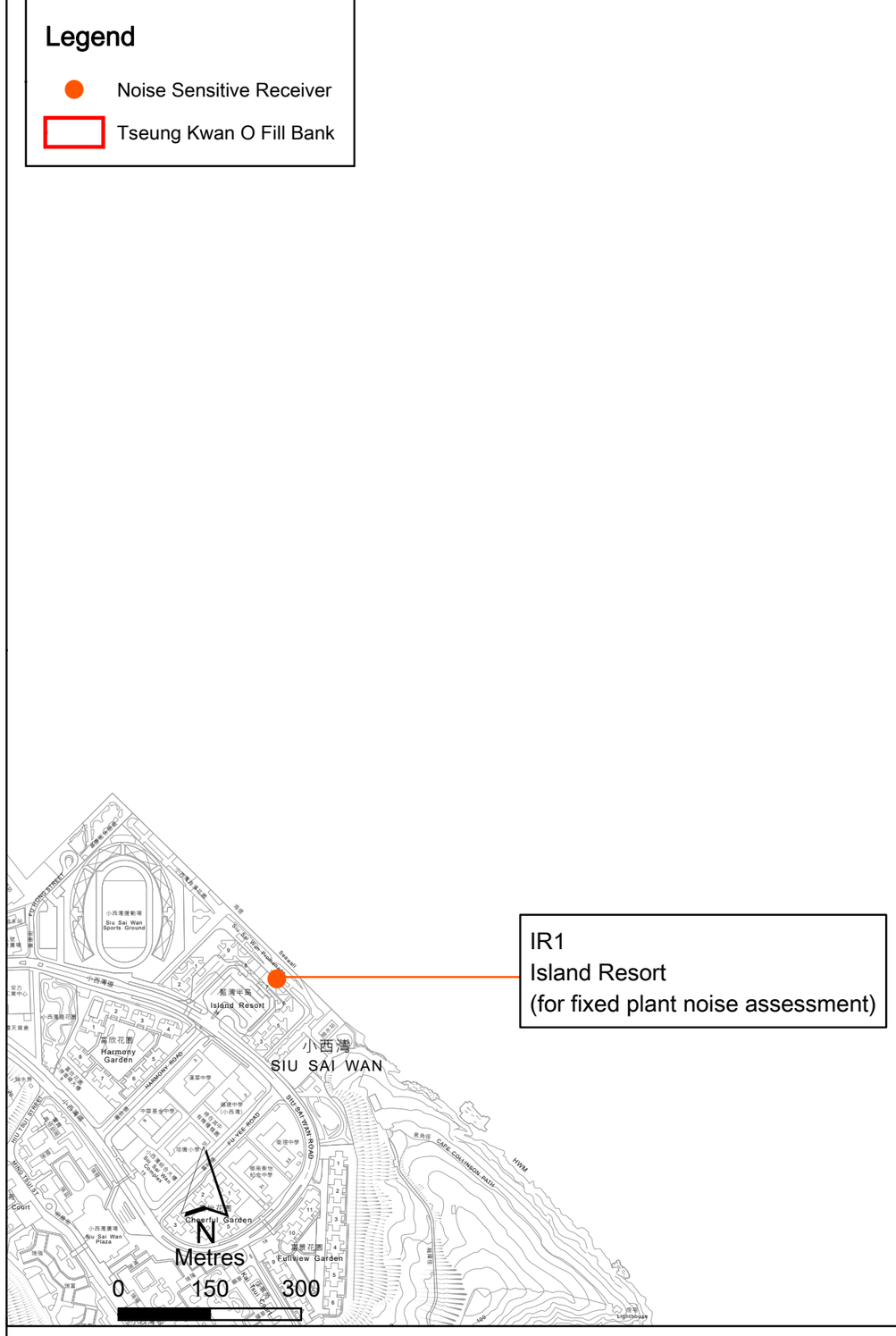
File: T:\GIS\CONTRACT\0676933\mxd\0676933_NSR_4.mxd
Date: 27/7/2023

Environmental Resources Management

ERM

Legend

- Noise Sensitive Receiver
- Tseung Kwan O Fill Bank



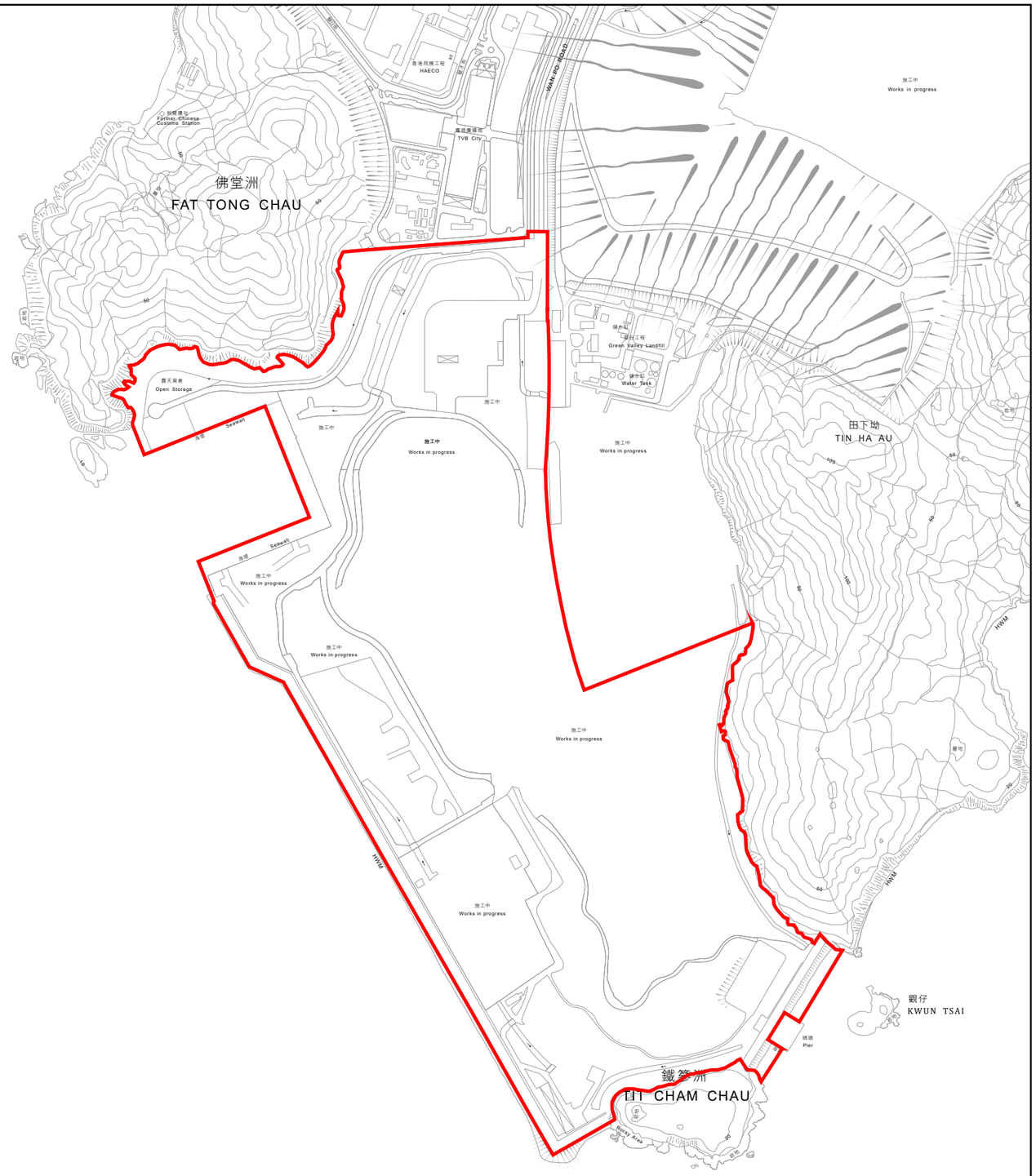


Figure 4.1e

Locations of Representative Noise Sensitive Receivers for Assessment

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Date: 14/9/2023

Environmental Resources Management

ERM

佛堂洲
FAT TONG CHAU

田下坳
TIN HA AU

觀仔
KWUN TSAI

鐵篦洲
IT CHAM CHAU

R1a
R1
R1b
R2
R3
R4
R5
R6
R7
R8
R9a
R9b
R10
R11
R11a
R12

B1
B2
B3
NB4
NB5
NSE
NSD
TKOSF

C&DMCF
(SIte B)

C&DMCF
(SIte A)

N
Metres
0 150 300

Legend

- Construction & Demolition Material Sorting Facilities (Others)
- Other Barging Points for Exporting Materials
- TKOFB Barging Points for Exporting Materials
- TKOFB Construction & Demolition Material Crushing Facility (Site A)
- TKOFB Construction & Demolition Material Crushing Facility (Site B)
- TKO Sorting Facility
- Haul Roads with Truck Movement during All Periods
- Haul Roads with Truck Movement during Daytime and Evening Periods (0700 - 2300 hrs)
- Earmarked Site for SENT Landfill Extension (14ha)
- Earmarked Site for Desalination Plant (approx. 10ha)
- Tseung Kwan O Fill Bank
- Tseung Kwan O Fill Bank 300m Study Area
- Stockpiling Areas

Figure 4.2

Locations of Key Noise Emission Sources Associated with Tseung Kwan O Fill Bank Operation

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Date: 14/9/2023

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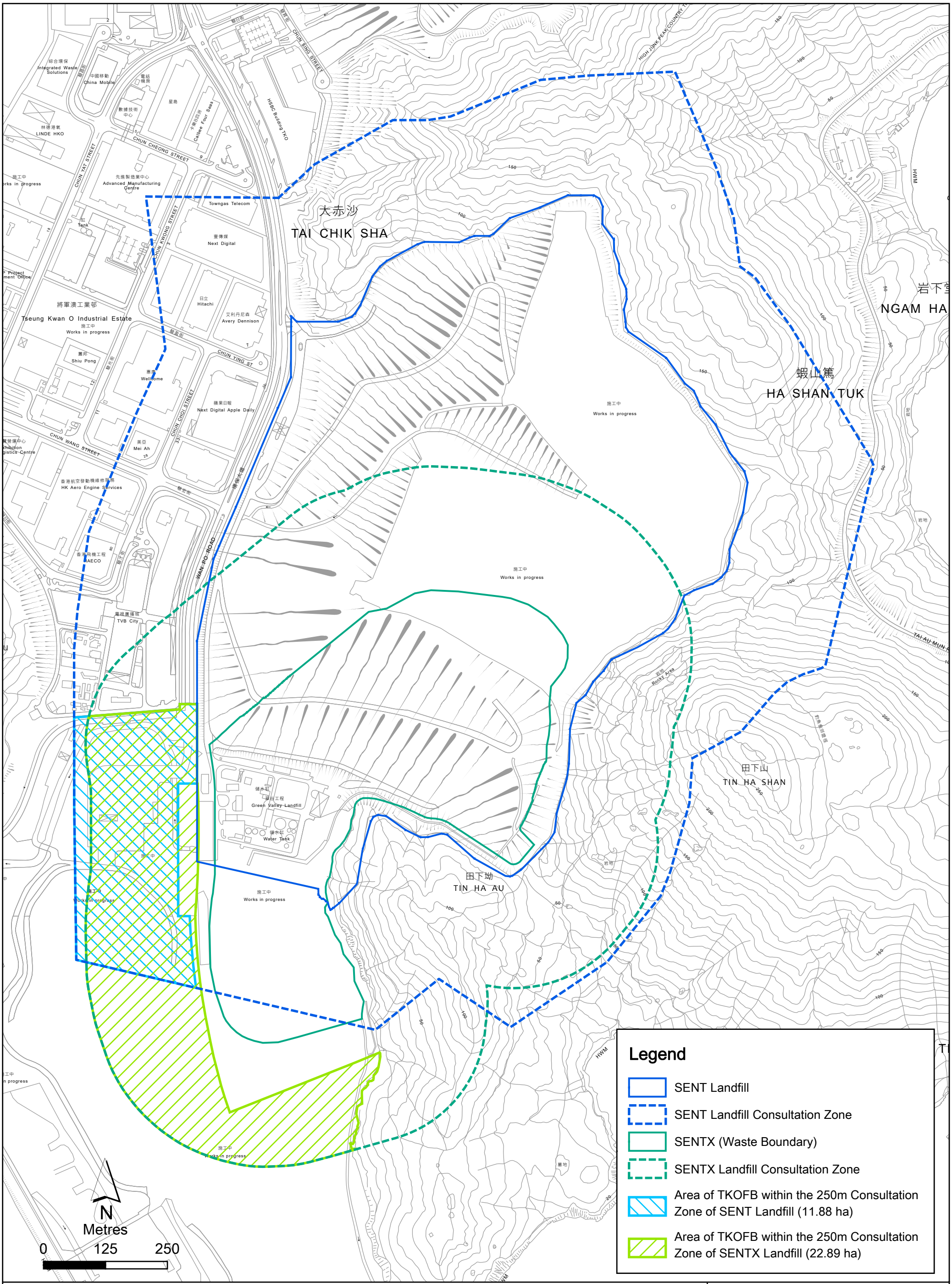

Figure 5.1

250m Consultation Zones of SENT Landfill and SENTX Landfill

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Date: 14/9/2023

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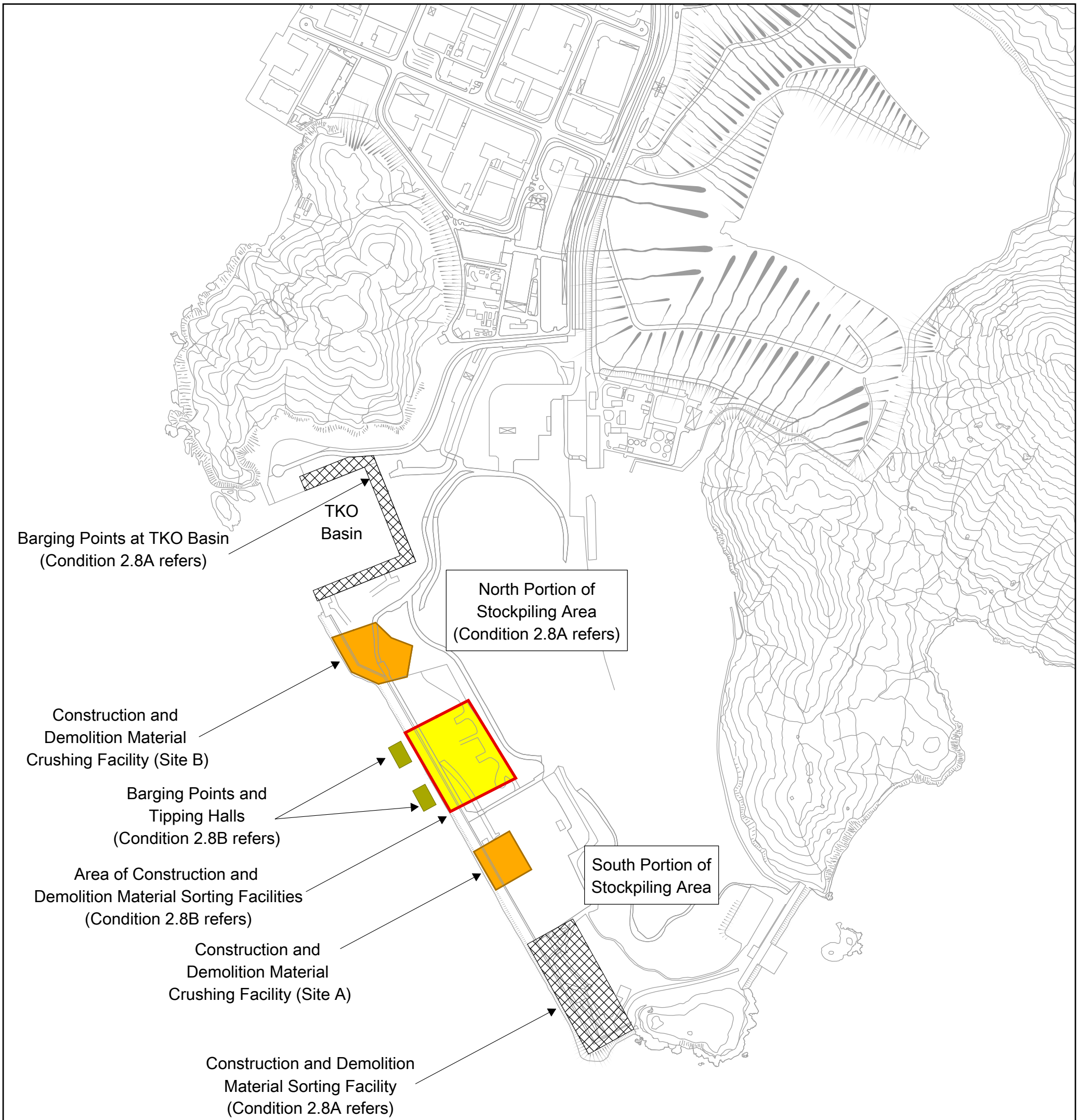

Coordinates of the Yellow Zone	
Hong Kong 1980 Grid System	
Easting (m)	Northing (m)
845852	814506
845996	814580
846105	814402
845955	814326

N
Metres
0 150 300

Note: Construction and Demolition Material Crushing Facility shall be operated in either Site A or Site B

Figure 7.1

Locations of Facilities within Tseung Kwan O Fill Bank

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Date: 14/9/2023

Environmental Resources Management
ERM

APPENDIX A1 TKOFB EMISSION INVENTORY AND DETAILED EMISSION RATE CALCULATIONS

Appendix A1 - TSP, RSP and FSP Emission Rate Calculations for Dust Emission Sources associated with TKOFB Operation (Scenario 1)

Item	Location	Source	Pollutant	Parameters	Value	Unit	Emission Rate			Reference
							Unmitigated	Mitigated	Unit	
1	Stockpiling Areas A001 to A004	wind erosion		% of dust suppression	91.7	%				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	0.85	Mg/ha/yr	2.70E-06	2.24E-07	$g/m^2/s$	AP-42, Section 11.9 (Edition 10/98), Table 11.9-4
			RSP	Emission Factor	0.40	Mg/ha/yr	1.27E-06	1.06E-07	$g/m^2/s$	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	0.06	Mg/ha/yr	1.93E-07	1.60E-08	$g/m^2/s$	AP-42, Section 13.2.4 (Edition 11/06)
2	Stockpiling Area A003	Material Handling at SP3a		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	87	truck/hour [(c)]				Provided by CEDD. Temporary fill loading location to stockpiling area A003.
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	7.69E-02	7.69E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	3.64E-02	3.64E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	5.50E-03	5.50E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material Handling at SP3b (daytime)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	704	truck/day				Provided by CEDD Material movement from stockpiling area A003 to C&DMCF.
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	3.89E-02	3.89E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	1.84E-02	1.84E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	2.78E-03	2.78E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material Handling at SP3b (nighttime)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	424	truck/night				Provided by CEDD Material movement from stockpiling area A003 to TKO basin barging points.
				Working Hours	8	hours				23:00 to 07:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	4.68E-02	4.68E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	2.21E-02	2.21E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	3.35E-03	3.35E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material Handling at SP3c (daytime)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	1584	truck/day				Provided by CEDD Material movement from stockpiling area A003 to TKO basin barging points.
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	8.75E-02	8.75E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	4.14E-02	4.14E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	6.26E-03	6.26E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material Handling at SP3c (nighttime)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	424	truck/night				Provided by CEDD Material movement from stockpiling area A003 to TKO basin barging points.
				Working Hours	8	hours				23:00 to 07:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	4.68E-02	4.68E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	2.21E-02	2.21E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	3.35E-03	3.35E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material Handling at SP3f (loading)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	189	truck/hour[(c)]				Provided by CEDD Material movement from entrance to temporary fill loading location by external trucks, and TKOSF to stockpiling area A003.
				Working Hours	13	hours				08:00 to 21:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	1.67E-01	1.67E-02	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	7.90E-02	7.90E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	1.20E-02	1.20E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material Handling at SP3g (unloading)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	87	truck/hour [(c)]				Provided by CEDD Material movement from temporary fill loading location to stockpiling area A003, and TKOSF to stockpiling area A003.
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	7.69E-02	7.69E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	3.64E-02	3.64E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	5.50E-03	5.50E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
3	Stockpiling Area A001	Material Handling at SP3d		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	424	truck/day				Provided by CEDD - Material movement from stockpiling area A001 to TKO basin barging points - Material movement from C&DMCF to stockpiling area A001
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	2.34E-02	2.34E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	1.11E-02	1.11E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	1.68E-03	1.68E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
4	Stockpiling Area A002	Material Handling at SP3e (daytime)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	1784	truck/day				Provided by CEDD - Material movement from stockpiling area A002 to TKO basin and other barging points - Material movement from C&DMCF to stockpiling area A002
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	9.85E-02	9.85E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	4.66E-02	4.66E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	7.06E-03	7.06E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material Handling at SP3e (nighttime)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	680	truck/night				Provided by CEDD - Material movement from stockpiling area A002 to other barging points
				Working Hours	8	hours				23:00 to 07:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	7.51E-02	7.51E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	3.55E-02	3.55E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	5.38E-03	5.38E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
5	Near Road R1b	Material Handling at SP3h (loading)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	210	truck/day				Provided by CEDD Material movement from entrance temporary stockpiling area near road R1b.
				Working Hours	14	hours				08:00 to 22:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	1.33E-02	1.33E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	6.27E-03	6.27E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	9.49E-04	9.49E-05	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material Handling at SP3i (unloading)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	280	truck/day				Provided by CEDD Material movement from temporary stockpiling area near R1b to external landfills and TKOSF
				Working Hours	14	hours				08:00 to 22:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	1.77E-02	1.77E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	8.36E-03	8.36E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	1.27E-03	1.27E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)

AP-42, Section 13.2.4 (Edition 11/06)

Emission factor = k(0.0016)(U/2.2)^1.3/(M/2)^1.4

Aerodynamic Particle Size Multiplier (k)				
< 30 µm	< 15 µm	< 10 µm	< 5 µm	< 2.5 µm
0.74	0.48	0.35	0.2	0.053

U =	3.66	m/s	Note (a)
M =	10.6	%	Note (b)

(a) Wind data from PATH_v2.1 (Grid 50,28) is adopted, considering majority of the TKOFB area falls within Grid 50,28.

(b) Measured averaged moisture content from 2013 TKOFB ERR

AP42 Section 13.2.1 (Edition 1/11)

Emission factor for paved road: E (g/vkt) = k ((sL)^0.91)*((W)^1.02)

Aerodynamic Particle Size Multiplier (k) - g/vkt			
< 30 µm	< 15 µm	< 10 µm	< 2.5 µm
3.23	0.77	0.62	0.15

sL =	2.4	g/m2	Note (c)
W (avg.) =	25.1	US ton	Note (d)
W (loaded) =	33.0	US ton	Note (d)
W (unloaded) =	8.6	US ton	Note (d)

(c) Surface silt loading for quarry with reference to 2013 TKOFB ERR

(d) Mean vehicle weight.

Loaded truck is 30MT; Unloaded truck is 15.7MT.

Appendix A1 - TSP, RSP and FSP Emission Rate Calculations for Dust Emission Sources associated with TKOFB Operation (Scenario 1)

Item	Location	Source	Pollutant	Parameters	Value	Unit	Emission Rate			Reference
							Unmitigated	Mitigated	Unit	
6	C&DMCF	Material handling, crushing and screening		Handling Capacity (crushing)	20000	tonnes/day				Provided by CEDD - 4 jaw crushers with max. production of 2500 tonnes/day - 1 cone crusher with max. production of 5000 tonnes/day - 1 impact crusher with max. production of 5000 tonnes/day
				Handling Capacity (screening)	9600	tonnes/day				Provided by CEDD - 1 screening machine with max. capacity of 9600 tonnes/day
				Handling Capacity (handling, at intake)	10000	tonnes/day				Provided by CEDD
				Handling Capacity (handling, at output)	10000	tonnes/day				Provided by CEDD
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression (crushing)	0	%				
				% of dust suppression (screening)	0	%				
				% of dust suppression (handling)	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor (crushing)	6.00E-04	kg/Mg	2.08E-01	2.08E-01	g/s	AP-42, Table 11.19.2-1, Tertiary Crushing (controlled)
				Emission Factor (screening)	1.10E-03	kg/Mg	1.83E-01	1.83E-01	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
				Emission Factor (handling, at intake)	2.22E-04	kg/Mg	3.86E-02	3.86E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (handling, at output)	2.22E-04	kg/Mg	3.86E-02	3.86E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor (crushing)	2.70E-04	kg/Mg	9.38E-02	9.38E-02	g/s	AP-42, Table 11.19.2-1, Tertiary Crushing (controlled)
				Emission Factor (screening)	3.70E-04	kg/Mg	6.17E-02	6.17E-02	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
				Emission Factor (handling, at intake)	1.05E-04	kg/Mg	1.83E-02	1.83E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (handling, at output)	1.05E-04	kg/Mg	1.83E-02	1.83E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor (crushing)	5.00E-05	kg/Mg	1.74E-02	1.74E-02	g/s	AP-42, Table 11.19.2-1, Tertiary Crushing (controlled)
				Emission Factor (screening)	2.50E-05	kg/Mg	4.17E-03	4.17E-03	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
				Emission Factor (handling, at intake)	1.59E-05	kg/Mg	2.77E-03	2.77E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (handling, at output)	1.59E-05	kg/Mg	2.77E-03	2.77E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
7	TKOSF	Material handling and screening		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	20	truck/day				Provided by CEDD
				Working Hours	24	hours				Provided by CEDD
				% of dust suppression (handling)	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
				% of dust suppression (screening)	0	%				
			TSP	Emission Factor (handling)	2.22E-04	kg/Mg	7.36E-04	7.36E-05	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	1.10E-03	kg/Mg	3.64E-03	3.64E-03	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
			RSP	Emission Factor (handling)	1.05E-04	kg/Mg	3.48E-04	3.48E-05	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	3.70E-04	kg/Mg	1.22E-03	1.22E-03	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
			FSP	Emission Factor (handling)	1.59E-05	kg/Mg	5.27E-05	5.27E-06	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	2.50E-05	kg/Mg	8.28E-05	8.28E-05	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
8	Barging points for importing materials	Material handling at IB1, IB2, IB3, IB4		Handling rate (per location)	2500	tonnes/day				Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
				Working Hours	24	hours				Provided by CEDD
			TSP	Emission Factor	2.22E-04	kg/Mg	6.44E-03	6.44E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	3.04E-03	3.04E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	4.61E-04	4.61E-05	g/s	AP-42, Section 13.2.4 (Edition 11/06)
9	Barging points for exporting materials	Material handling at B1, B2, B3 (daytime)		Handling rate (per location)	8170	tonnes/day				Provided by CEDD
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	3.15E-02	3.15E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	1.49E-02	1.49E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	2.26E-03	2.26E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material handling at B1, B2, B3 (nighttime)		Handling rate (per location)	4004	tonnes/night				Provided by CEDD
				Working Hours (nighttime)	8	hours				23:00 to 07:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	3.09E-02	3.09E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	1.46E-02	1.46E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	2.21E-03	2.21E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
10	Other barging points	Material handling at NB4 to NB5 (daytime)		Handling rate (per location)	9664	tonnes/day				Provided by CEDD
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	3.73E-02	3.73E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	1.76E-02	1.76E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	2.67E-03	2.67E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material handling at NB4 to NB5 (nighttime)		Handling rate (per location)	4832	tonnes/night				Provided by CEDD
				Working Hours	8	hours				23:00 to 07:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	3.73E-02	3.73E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	1.76E-02	1.76E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	2.67E-03	2.67E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
11	Other C&DMSFs	Material handling and screening at NSD to NSE (daytime)		Handling rate (per location)	9664	tonnes/day				Provided by CEDD
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression (handling)	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
				% of dust suppression (screening)	0	%				
			TSP	Emission Factor (handling)	2.22E-04	kg/Mg	3.73E-02	3.73E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	1.10E-03	kg/Mg	1.85E-01	1.85E-01	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
			RSP	Emission Factor (handling)	1.05E-04	kg/Mg	1.76E-02	1.76E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	3.70E-04	kg/Mg	6.21E-02	6.21E-02	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
			FSP	Emission Factor (handling)	1.59E-05	kg/Mg	2.67E-03	2.67E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	2.50E-05	kg/Mg	4.19E-03	4.19E-03	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
		Material handling and screening at NSD to NSE (nighttime)		Handling rate (per location)	4832	tonnes/day				Provided by CEDD
				Working Hours	8	hours				23:00 to 07:00. Provided by CEDD
				% of dust suppression (handling)	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
				% of dust suppression (screening)	0	%				
			TSP	Emission Factor (handling)	2.22E-04	kg/Mg	3.73E-02	3.73E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	1.10E-03	kg/Mg	1.85E-01	1.85E-01	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
			RSP	Emission Factor (handling)	1.05E-04	kg/Mg	1.76E-02	1.76E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	3.70E-04	kg/Mg	6.21E-02	6.21E-02	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
			FSP	Emission Factor (handling)	1.59E-05	kg/Mg	2.67E-03	2.67E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	2.50E-05	kg/Mg	4.19E-03	4.19E-03	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
12	Truck movement on haul road	R1		Truck Quantity	380	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	13	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	2.03E-02	1.68E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	3.89E-03	3.23E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	9.42E-04	7.81E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R2		Truck Quantity	377	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	13	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	2.01E-02	1.67E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	3.86E-03	3.20E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	9.34E-04	7.75E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R3		Truck Quantity	377	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	13	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	2.01E-02	1.67E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	3.86E-03	3.20E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	9.34E-04	7.75E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)

Appendix A1 - TSP, RSP and FSP Emission Rate Calculations for Dust Emission Sources associated with TKOFB Operation (Scenario 1)

Item	Location	Source	Pollutant	Parameters	Value	Unit	Emission Rate			Reference
							Unmitigated	Mitigated	Unit	
		R1a		Truck Quantity	68	truck/hour (c)				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	13.5	hours				Provided by CEDD
				% of dust suppression	91.7	%				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	3.63E-03	3.01E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	6.96E-04	5.78E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	1.68E-04	1.40E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R1b		Truck Quantity	71	truck/hour (c)				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	13.5	hours				Provided by CEDD
				% of dust suppression	91.7	%				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	3.79E-03	3.14E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	7.27E-04	6.04E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	1.76E-04	1.46E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R4		Truck Quantity	206	truck/hour (c)				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	16	hours				Provided by CEDD
				% of dust suppression	91.7	%				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	64.59254	g/vkt	3.70E-03	3.07E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	12.39857	g/vkt	7.09E-04	5.89E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	2.999653	g/vkt	1.72E-04	1.42E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R5		Truck Quantity	226	truck/hour (c)				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	16	hours				Provided by CEDD
				% of dust suppression	91.7	%				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	253.559	g/vkt	1.59E-02	1.32E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	48.67076	g/vkt	3.06E-03	2.54E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	11.77518	g/vkt	7.39E-04	6.14E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R6		Truck Quantity	197	truck/hour (c)				Provided by CEDD, maximum hourly flow during operation hours
				% of dust suppression	91.7	%				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
				Working Hours	24	hours				Provided by CEDD
			TSP	Emission Factor	192.0787	g/vkt	1.05E-02	8.72E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	2.02E-03	1.67E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	4.88E-04	4.05E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R7		Truck Quantity	565	truck/hour (c)				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	24	hours				Provided by CEDD
				% of dust suppression	91.7	%				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	64.59254	g/vkt	1.01E-02	8.41E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	12.39857	g/vkt	1.95E-03	1.62E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	2.999653	g/vkt	4.71E-04	3.91E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R8		Truck Quantity	377	truck/hour (c)				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	24	hours				Provided by CEDD
				% of dust suppression	91.7	%				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	2.01E-02	1.67E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	3.86E-03	3.20E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	9.34E-04	7.75E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R9a		Truck Quantity	331	truck/hour (c)				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	24	hours				Provided by CEDD
				% of dust suppression	91.7	%				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	1.77E-02	1.47E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	3.39E-03	2.81E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	8.20E-04	6.81E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R9b		Truck Quantity	350	truck/hour (c)				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	24	hours				Provided by CEDD
				% of dust suppression	91.7	%				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	1.87E-02	1.55E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	3.58E-03	2.98E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	8.67E-04	7.20E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R10		Truck Quantity	36	truck/hour (c)				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	16	hours				Provided by CEDD
				% of dust suppression	91.7	%				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	1.92E-03	1.59E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	3.69E-04	3.06E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	8.92E-05	7.40E-06	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R11		Truck Quantity	262	truck/hour (c)				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	24	hours				Provided by CEDD
				% of dust suppression	91.7	%				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	1.40E-02	1.16E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	2.68E-03	2.23E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	6.49E-04	5.39E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R11a		Truck Quantity	333	truck/hour (c)				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	24	hours				Provided by CEDD
				% of dust suppression	91.7	%				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	1.78E-02	1.47E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	3.41E-03	2.83E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	8.25E-04	6.85E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R12		Truck Quantity	106	truck/hour (c)				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	16	hours				Provided by CEDD
				% of dust suppression	91.7	%				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	5.66E-03	4.69E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	1.09E-03	9.01E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	2.63E-04	2.18E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)

Note:

(a) Watering once every hour during Working Hours. It is assumed that 91.7% dust suppression efficiency can be achieved by watering frequency of once every hour with reference to USEPA's Control of Open Fugitive Dust Sources (EPA-450/3-98-008).
C = 100 -
0.8pdt / i
= 100 - 0.8 x 0.2323 x 280 x 1 / 6.3 = 91.7%
where:
C = percentage of efficiency, %
p = potential average hourly daytime evaporation rate, mm/hr = 0.0049 x 47.41 inches = 0.2323
Evaporation recorded at King's Park between 1991 to 2020 is 1204.1mm (47.41 inches). (https://www.hko.gov.hk/en/cis/normal/1991_2020/normals.htm)
d = average hourly daytime traffic rate, in vehicles per hour = 280
t = time between application of watering, hr = 1 (i.e. once every hour)
i = application intensity, L/m^2 = 6.3

(b) According to AP-42, Section 11.19.1.2 (Emission and Controls), the spray systems on material handling operations have been estimated to reduce emissions 70 to 95 %. With reference to "Gregory E. Muleski, Chatten Cowherd Jr. & John S. Kinsey (2005): Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783", the published control efficiency of particulate emissions by applying water can reach over 90%. A dust suppression efficiency of 90% for material handling sources has been adopted in this assessment.

(c) Maximum hourly truck flow within the specified Working Hours for emission sources SP3a, SP3f, SP3g, and R1-R12.

Appendix A1 - TSP, RSP and FSP Emission Rate Calculations for Dust Emission Sources associated with TKOFB Operation (Scenario 2)

Item	Location	Source	Pollutant	Parameters	Value	Unit	Emission Rate			Reference
							Unmitigated	Mitigated	Unit	
1	Stockpiling Areas A001 to A004	wind erosion		% of dust suppression	91.7	%				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	0.85	Mg/ha/yr	2.70E-06	2.24E-07	$g/m^2/s$	AP-42, Section 11.9 (Edition 10/98), Table 11.9-4
			RSP	Emission Factor	0.40	Mg/ha/yr	1.27E-06	1.06E-07	$g/m^2/s$	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	0.06	Mg/ha/yr	1.93E-07	1.60E-08	$g/m^2/s$	AP-42, Section 13.2.4 (Edition 11/06)
2	Stockpiling Area A003	Material Handling at SP3a		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	87	truck/hour [(c)]				Provided by CEDD. Temporary fill loading location to stockpiling area A003.
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	7.69E-02	7.69E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	3.64E-02	3.64E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	5.50E-03	5.50E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material Handling at SP3b (daytime)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	704	truck/day				Provided by CEDD Material movement from stockpiling area A003 to C&DMCF.
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	3.89E-02	3.89E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	1.84E-02	1.84E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	2.78E-03	2.78E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material Handling at SP3b (nighttime)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	424	truck/night				Provided by CEDD Material movement from stockpiling area A003 to TKO basin barging points.
				Working Hours	8	hours				23:00 to 07:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	4.68E-02	4.68E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	2.21E-02	2.21E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	3.35E-03	3.35E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material Handling at SP3c (daytime)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	1584	truck/day				Provided by CEDD Material movement from stockpiling area A003 to TKO basin barging points.
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	8.75E-02	8.75E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	4.14E-02	4.14E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	6.26E-03	6.26E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material Handling at SP3c (nighttime)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	424	truck/night				Provided by CEDD Material movement from stockpiling area A003 to TKO basin barging points.
				Working Hours	8	hours				23:00 to 07:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	4.68E-02	4.68E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	2.21E-02	2.21E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	3.35E-03	3.35E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material Handling at SP3f (loading)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	189	truck/hour[(c)]				Provided by CEDD Material movement from entrance to temporary fill loading location by external trucks, and TKOSF to stockpiling area A003.
				Working Hours	13	hours				08:00 to 21:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	1.67E-01	1.67E-02	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	7.90E-02	7.90E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	1.20E-02	1.20E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material Handling at SP3g (unloading)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	87	truck/hour [(c)]				Provided by CEDD Material movement from temporary fill loading location to stockpiling area A003, and TKOSF to stockpiling area A003.
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	7.69E-02	7.69E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	3.64E-02	3.64E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	5.50E-03	5.50E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
3	Stockpiling Area A001	Material Handling at SP3d		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	424	truck/day				Provided by CEDD - Material movement from stockpiling area A001 to TKO basin barging points - Material movement from C&DMCF to stockpiling area A001
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	2.34E-02	2.34E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	1.11E-02	1.11E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	1.68E-03	1.68E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
4	Stockpiling Area A002	Material Handling at SP3e (daytime)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	1784	truck/day				Provided by CEDD - Material movement from stockpiling area A002 to TKO basin and other barging points - Material movement from C&DMCF to stockpiling area A002
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	9.85E-02	9.85E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	4.66E-02	4.66E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	7.06E-03	7.06E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material Handling at SP3e (nighttime)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	680	truck/night				Provided by CEDD - Material movement from stockpiling area A002 to other barging points
				Working Hours	8	hours				23:00 to 07:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	7.51E-02	7.51E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	3.55E-02	3.55E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	5.38E-03	5.38E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
5	Near Road R1b	Material Handling at SP3h (loading)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	210	truck/day				Provided by CEDD Material movement from entrance temporary stockpiling area near road R1b.
				Working Hours	14	hours				08:00 to 22:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	1.33E-02	1.33E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	6.27E-03	6.27E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	9.49E-04	9.49E-05	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material Handling at SP3i (unloading)		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	280	truck/day				Provided by CEDD Material movement from temporary stockpiling area near R1b to external landfills and TKOSF
				Working Hours	14	hours				08:00 to 22:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	1.77E-02	1.77E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	8.36E-03	8.36E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	1.27E-03	1.27E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)

AP-42, Section 13.2.4 (Edition 11/06)

Emission factor = k(0.0016)(U/2.2)^1.3/(M/2)^1.4

Aerodynamic Particle Size Multiplier (k)				
< 30 µm	< 15 µm	< 10 µm	< 5 µm	< 2.5 µm
0.74	0.48	0.35	0.2	0.053

U =	3.66	m/s	Note (a)
M =	10.6	%	Note (b)

(a) Wind data from PATH_v2.1 (Grid 50,28) is adopted, considering majority of the TKOFB area falls within Grid 50,28.

(b) Measured averaged moisture content from 2013 TKOFB ERR

AP42 Section 13.2.1 (Edition 1/11)

Emission factor for paved road: E (g/vkt) = k ((sL)^0.91)*((W)^1.02)

Aerodynamic Particle Size Multiplier (k) - g/vkt			
< 30 µm	< 15 µm	< 10 µm	< 2.5 µm
3.23	0.77	0.62	0.15

sL =	2.4	g/m2	Note (c)
W (avg.) =	25.1	US ton	Note (d)
W (loaded) =	33.0	US ton	Note (d)
W (unloaded) =	8.6	US ton	Note (d)

(c) Surface silt loading for quarry with reference to 2013 TKOFB ERR

(d) Mean vehicle weight.

Loaded truck is 30MT; Unloaded truck is 15.7MT.

Appendix A1 - TSP, RSP and FSP Emission Rate Calculations for Dust Emission Sources associated with TKOFB Operation (Scenario 2)

Item	Location	Source	Pollutant	Parameters	Value	Unit	Emission Rate			Reference
							Unmitigated	Mitigated	Unit	
6	C&DMCF	Material handling, crushing and screening		Handling Capacity (crushing)	20000	tonnes/day				Provided by CEDD - 4 jaw crushers with max. production of 2500 tonnes/day - 1 cone crusher with max. production of 5000 tonnes/day - 1 impact crusher with max. production of 5000 tonnes/day
				Handling Capacity (screening)	9600	tonnes/day				Provided by CEDD - 1 screening machine with max. capacity of 9600 tonnes/day
				Handling Capacity (handling, at intake)	10000	tonnes/day				Provided by CEDD
				Handling Capacity (handling, at output)	10000	tonnes/day				Provided by CEDD
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression (crushing)	0	%				
				% of dust suppression (screening)	0	%				
				% of dust suppression (handling)	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor (crushing)	6.00E-04	kg/Mg	2.08E-01	2.08E-01	g/s	AP-42, Table 11.19.2-1, Tertiary Crushing (controlled)
				Emission Factor (screening)	1.10E-03	kg/Mg	1.83E-01	1.83E-01	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
				Emission Factor (handling, at intake)	2.22E-04	kg/Mg	3.86E-02	3.86E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (handling, at output)	2.22E-04	kg/Mg	3.86E-02	3.86E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor (crushing)	2.70E-04	kg/Mg	9.38E-02	9.38E-02	g/s	AP-42, Table 11.19.2-1, Tertiary Crushing (controlled)
				Emission Factor (screening)	3.70E-04	kg/Mg	6.17E-02	6.17E-02	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
				Emission Factor (handling, at intake)	1.05E-04	kg/Mg	1.83E-02	1.83E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (handling, at output)	1.05E-04	kg/Mg	1.83E-02	1.83E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor (crushing)	5.00E-05	kg/Mg	1.74E-02	1.74E-02	g/s	AP-42, Table 11.19.2-1, Tertiary Crushing (controlled)
				Emission Factor (screening)	2.50E-05	kg/Mg	4.17E-03	4.17E-03	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
				Emission Factor (handling, at intake)	1.59E-05	kg/Mg	2.77E-03	2.77E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (handling, at output)	1.59E-05	kg/Mg	2.77E-03	2.77E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
7	TKOSF	Material handling and screening		Truck Capacity	14.3	tonnes/truck				Provided by CEDD
				Truck Quantity	20	truck/day				Provided by CEDD
				Working Hours	24	hours				Provided by CEDD
				% of dust suppression (handling)	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
				% of dust suppression (screening)	0	%				
			TSP	Emission Factor (handling)	2.22E-04	kg/Mg	7.36E-04	7.36E-05	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	1.10E-03	kg/Mg	3.64E-03	3.64E-03	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
			RSP	Emission Factor (handling)	1.05E-04	kg/Mg	3.48E-04	3.48E-05	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	3.70E-04	kg/Mg	1.22E-03	1.22E-03	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
			FSP	Emission Factor (handling)	1.59E-05	kg/Mg	5.27E-05	5.27E-06	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	2.50E-05	kg/Mg	8.28E-05	8.28E-05	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
8	Barging points for importing materials	Material handling at IB1, IB2, IB3, IB4		Handling rate (per location)	2500	tonnes/day				Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
				Working Hours	24	hours				Provided by CEDD
			TSP	Emission Factor	2.22E-04	kg/Mg	6.44E-03	6.44E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	3.04E-03	3.04E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	4.61E-04	4.61E-05	g/s	AP-42, Section 13.2.4 (Edition 11/06)
9	Barging points for exporting materials	Material handling at B1, B2, B3 (daytime)		Handling rate (per location)	8170	tonnes/day				Provided by CEDD
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	3.15E-02	3.15E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	1.49E-02	1.49E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	2.26E-03	2.26E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material handling at B1, B2, B3 (nighttime)		Handling rate (per location)	4004	tonnes/night				Provided by CEDD
				Working Hours (nighttime)	8	hours				23:00 to 07:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	3.09E-02	3.09E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	1.46E-02	1.46E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	2.21E-03	2.21E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
10	Other barging points	Material handling at NB4 to NB5 (daytime)		Handling rate (per location)	9664	tonnes/day				Provided by CEDD
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	3.73E-02	3.73E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	1.76E-02	1.76E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	2.67E-03	2.67E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
		Material handling at NB4 to NB5 (nighttime)		Handling rate (per location)	4832	tonnes/night				Provided by CEDD
				Working Hours	8	hours				23:00 to 07:00. Provided by CEDD
				% of dust suppression	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
			TSP	Emission Factor	2.22E-04	kg/Mg	3.73E-02	3.73E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			RSP	Emission Factor	1.05E-04	kg/Mg	1.76E-02	1.76E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
			FSP	Emission Factor	1.59E-05	kg/Mg	2.67E-03	2.67E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
11	Other C&DMSFs	Material handling and screening at NSD to NSE (daytime)		Handling rate (per location)	9664	tonnes/day				Provided by CEDD
				Working Hours	16	hours				07:00 to 23:00. Provided by CEDD
				% of dust suppression (handling)	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
				% of dust suppression (screening)	0	%				
			TSP	Emission Factor (handling)	2.22E-04	kg/Mg	3.73E-02	3.73E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	1.10E-03	kg/Mg	1.85E-01	1.85E-01	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
			RSP	Emission Factor (handling)	1.05E-04	kg/Mg	1.76E-02	1.76E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	3.70E-04	kg/Mg	6.21E-02	6.21E-02	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
			FSP	Emission Factor (handling)	1.59E-05	kg/Mg	2.67E-03	2.67E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	2.50E-05	kg/Mg	4.19E-03	4.19E-03	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
		Material handling and screening at NSD to NSE (nighttime)		Handling rate (per location)	4832	tonnes/day				Provided by CEDD
				Working Hours	8	hours				23:00 to 07:00. Provided by CEDD
				% of dust suppression (handling)	90	%				AP-42, Section 11.19.1.2; Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783
				% of dust suppression (screening)	0	%				
			TSP	Emission Factor (handling)	2.22E-04	kg/Mg	3.73E-02	3.73E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	1.10E-03	kg/Mg	1.85E-01	1.85E-01	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
			RSP	Emission Factor (handling)	1.05E-04	kg/Mg	1.76E-02	1.76E-03	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	3.70E-04	kg/Mg	6.21E-02	6.21E-02	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
			FSP	Emission Factor (handling)	1.59E-05	kg/Mg	2.67E-03	2.67E-04	g/s	AP-42, Section 13.2.4 (Edition 11/06)
				Emission Factor (screening)	2.50E-05	kg/Mg	4.19E-03	4.19E-03	g/s	AP-42, Table 11.19.2-1, Screening (controlled)
12	Truck movement on haul road	R1		Truck Quantity	380	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	13	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	2.03E-02	1.68E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	3.89E-03	3.23E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	9.42E-04	7.81E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R2		Truck Quantity	377	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	13	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	2.01E-02	1.67E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	3.86E-03	3.20E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	9.34E-04	7.75E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R3		Truck Quantity	377	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	13	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	2.01E-02	1.67E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	3.86E-03	3.20E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	9.34E-04	7.75E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)

Appendix A1 - TSP, RSP and FSP Emission Rate Calculations for Dust Emission Sources associated with TKOFB Operation (Scenario 2)

Item	Location	Source	Pollutant	Parameters	Value	Unit	Emission Rate			Reference
							Unmitigated	Mitigated	Unit	
		R1a		Truck Quantity	68	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	13.5	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	3.63E-03	3.01E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	6.96E-04	5.78E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	1.68E-04	1.40E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R1b		Truck Quantity	71	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	13.5	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	3.79E-03	3.14E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	7.27E-04	6.04E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	1.76E-04	1.46E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R4		Truck Quantity	206	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	16	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	64.59254	g/vkt	3.70E-03	3.07E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	12.39857	g/vkt	7.09E-04	5.89E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	2.999653	g/vkt	1.72E-04	1.42E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R5		Truck Quantity	226	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	16	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	253.559	g/vkt	1.59E-02	1.32E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	48.67076	g/vkt	3.06E-03	2.54E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	11.77518	g/vkt	7.39E-04	6.14E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R6		Truck Quantity	197	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
				Working Hours	24	hours				Provided by CEDD
			TSP	Emission Factor	192.0787	g/vkt	1.05E-02	8.72E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	2.02E-03	1.67E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	4.88E-04	4.05E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R7		Truck Quantity	565	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	24	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	64.59254	g/vkt	1.01E-02	8.41E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	12.39857	g/vkt	1.95E-03	1.62E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	2.999653	g/vkt	4.71E-04	3.91E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R8		Truck Quantity	377	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	24	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	2.01E-02	1.67E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	3.86E-03	3.20E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	9.34E-04	7.75E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R9a		Truck Quantity	507	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	24	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	2.71E-02	2.25E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	5.19E-03	4.31E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	1.26E-03	1.04E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R9b		Truck Quantity	174	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	24	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	9.28E-03	7.71E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	1.78E-03	1.48E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	4.31E-04	3.58E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R10		Truck Quantity	36	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	16	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	1.92E-03	1.59E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	3.69E-04	3.06E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	8.92E-05	7.40E-06	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R11		Truck Quantity	262	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	24	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	1.40E-02	1.16E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	2.68E-03	2.23E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	6.49E-04	5.39E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R11a		Truck Quantity	333	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	24	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	1.78E-02	1.47E-03	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	3.41E-03	2.83E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	8.25E-04	6.85E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
		R12		Truck Quantity	106	truck/hour [(c)]				Provided by CEDD, maximum hourly flow during operation hours
				Working Hours	16	hours				Provided by CEDD
				% of dust suppression	91.7	**%**				USEPA, Control of Open Fugitive Dust Sources (EPA-450/3-98-008) Please refer to Note (a) for the calculation of dust suppression efficiency.
			TSP	Emission Factor	192.0787	g/vkt	5.66E-03	4.69E-04	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			RSP	Emission Factor	36.8696	g/vkt	1.09E-03	9.01E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)
			FSP	Emission Factor	8.920064	g/vkt	2.63E-04	2.18E-05	g/m/s	AP42 Section 13.2.1 (Edition 1/11)

Note:

(a) Watering once every hour during Working Hours. It is assumed that 91.7% dust suppression efficiency can be achieved by watering frequency of once every hour with reference to USEPA's Control of Open Fugitive Dust Sources (EPA-450/3-98-008).

C = 100 - 0.8pdt / i

= 100 - 0.8 x 0.2323 x 280 x 1 / 6.3 = 91.7%

where:

C = percentage of efficiency, %

p = potential average hourly daytime evaporation rate, mm/hr = 0.0049 x 47.41 inches = 0.2323

Evaporation recorded at King's Park between 1991 to 2020 is 1204.1mm (47.41 inches). (https://www.hko.gov.hk/en/cis/normal/1991_2020/normals.htm)

d = average hourly daytime traffic rate, in vehicles per hour = 280

t = time between application of watering, hr = 1 (i.e. once every hour)

i = application intensity, L/m^2 = 6.3

(b) According to AP-42, Section 11.19.1.2 (Emission and Controls), the spray systems on material handling operations have been estimated to reduce emissions 70 to 95 %. With reference to "Gregory E. Muleski, Chatten Cowherd Jr. & John S. Kinsey (2005): Particulate Emissions from Construction Activities, Journal of the Air & Waste Management Association, 55:6, 772-783", the published control efficiency of particulate emissions by applying water can reach over 90%. A dust suppression efficiency of 90% for material handling sources has been adopted in this assessment.

(c) Maximum hourly truck flow within the specified Working Hours for emission sources SP3a, SP3f, SP3g, and R1-R12.

Appendix A1 - TSP, RSP and FSP Emission Inventory for Dust Emission Sources associated with TKOFB Operation (Scenario 1)

Source ID	Description	Source Type	Coordinates		Dimension/		Base Elevation	Height	Angle/ Width	Working Hour [a]	TSP Emission Rate		RSP Emission Rate		FSP Emission Rate	
			X1	Y1	X2	Y2					Working Hours	Non-working Hours / Nighttime Working Hours	Working Hours	Non-working Hours / Nighttime Working Hours	Working Hours	Non-working Hours / Nighttime Working Hours
			m	m	m	m	m	m	deg / m		g/m^2/s	g/m^2/s	g/m^2/s	g/m^2/s	g/m^2/s	g/m^2/s
A001	Wind Erosion	Area	846054.1	814389.2	282.4	331.5	5	25	61.05	0800-2300	2.24E-07	2.70E-06	1.06E-07	1.27E-06	1.60E-08	1.93E-07
A002	Wind Erosion	Area	846289.5	814174.2	266.8	211.9	5	25	60.18	0800-2300	2.24E-07	2.70E-06	1.06E-07	1.27E-06	1.60E-08	1.93E-07
A003	Wind Erosion	Polygon Area	845950.6	815074.1			5	25	-	0800-2300	2.24E-07	2.70E-06	1.06E-07	1.27E-06	1.60E-08	1.93E-07
			846088.1	815099.7												
			846214.6	815010.1												
			846297.7	814528.4												
			846036.6	814385.9												
			845813.9	814765.1												
			845916.5	814906.5												
A004	Wind Erosion	Area	846168.9	814020.7	213.5	125.0	5	0.5	61.7	0800-2300	2.24E-07	2.70E-06	1.06E-07	1.27E-06	1.60E-08	1.93E-07
SP3a	Material Handling	Area	846126.5	814646.2	10.0	10.0	5	30	0	0700-2300	7.69E-05	-	3.64E-05	-	5.50E-06	-
SP3b	Material Handling	Area	846095.9	814596.5	10.0	10.0	5	30	0	0700-2300 (daytime), 2300-0700 (nighttime)	3.89E-05	4.68E-05	1.84E-05	2.21E-05	2.78E-06	3.35E-06
SP3c	Material Handling	Area	846012.2	814840.9	10.0	10.0	5	15	0	0700-2300 (daytime), 2300-0700 (nighttime)	8.75E-05	4.68E-05	4.14E-05	2.21E-05	6.26E-06	3.35E-06
SP3d	Material Handling	Area	846314.9	814383.7	10.0	10.0	5	30	0	0700-2300	2.34E-05	-	1.11E-05	-	1.68E-06	-
SP3e	Material Handling	Area	846425.0	814148.8	10.0	10.0	5	30	0	0700-2300 (daytime), 2300-0700 (nighttime)	9.85E-05	7.51E-05	4.66E-05	3.55E-05	7.06E-06	5.38E-06
SP3f	Material Handling	Area	846063.7	815077.3	10.0	10.0	5	5	0	0800-2100	1.67E-04	-	7.90E-05	-	1.20E-05	-
SP3g	Material Handling	Area	846063.7	815077.3	10.0	10.0	5	0.5	0	0700-2300	7.69E-05	-	3.64E-05	-	5.50E-06	-
SP3h	Material Handling	Area	845928.5	815188.8	10.0	10.0	5	0.5	0	0800-2200	1.33E-05	-	6.27E-06	-	9.49E-07	-
SP3i	Material Handling	Area	845928.5	815188.8	10.0	10.0	5	0.5	0	0800-2200	1.77E-05	-	8.36E-06	-	1.27E-06	-
C&DMCF_C	Material Crushing	Area	846073.3	814227.3	10.0	10.0	5	5	0	0700-2300	2.08E-03	-	9.38E-04	-	1.74E-04	-
C&DMCF_S	Material Sorting	Area	846073.3	814227.3	10.0	10.0	5	5	0	0700-2300	1.83E-03	-	6.17E-04	-	4.17E-05	-
C&DMCF_H1	Material Handling	Area	846073.3	814227.3	10.0	10.0	5	5	0	0700-2300	3.86E-05	-	1.83E-05	-	2.77E-06	-
C&DMCF_H2	Material Handling	Area	846073.3	814227.3	10.0	10.0	5	0.5	0	0700-2300	3.86E-05	-	1.83E-05	-	2.77E-06	-
TKOSF_S	Material Sorting	Area	846339.2	813930.6	10.0	10.0	5	5	0	24 hours	7.36E-07	7.36E-07	3.48E-07	3.48E-07	5.27E-08	5.27E-08
TKOSF_H	Material Handling	Area	846339.2	813930.6	10.0	10.0	5	0.5	0	24 hours	3.64E-05	3.64E-05	1.22E-05	1.22E-05	8.28E-07	8.28E-07
IB1	Material Handling	Area	845796.5	815097.3	10.0	10.0	5	0.5	0	24 hours	6.44E-06	6.44E-06	3.04E-06	3.04E-06	4.61E-07	4.61E-07
IB2	Material Handling	Area	845763.3	814852.8	10.0	10.0	5	0.5	0	24 hours	6.44E-06	6.44E-06	3.04E-06	3.04E-06	4.61E-07	4.61E-07
IB3	Material Handling	Area	845665.2	815077.2	10.0	10.0	5	0.5	0	24 hours	6.44E-06	6.44E-06	3.04E-06	3.04E-06	4.61E-07	4.61E-07
IB4	Material Handling	Area	845741.7	815108.0	10.0	10.0	5	0.5	0	24 hours	6.44E-06	6.44E-06	3.04E-06	3.04E-06	4.61E-07	4.61E-07
B1	Material Handling	Area	845685.4	814821.5	10.0	10.0	5	0.5	0	0700-2300 (daytime), 2300-0700 (nighttime)	3.15E-05	3.09E-05	1.49E-05	1.46E-05	2.26E-06	2.21E-06
B2	Material Handling	Area	845809.2	814871.2	10.0	10.0	5	0.5	0	0700-2300 (daytime), 2300-0700 (nighttime)	3.15E-05	3.09E-05	1.49E-05	1.46E-05	2.26E-06	2.21E-06
B3	Material Handling	Area	845839.4	814990.2	10.0	10.0	5	0.5	0	0700-2300 (daytime), 2300-0700 (nighttime)	3.15E-05	3.09E-05	1.49E-05	1.46E-05	2.26E-06	2.21E-06
NB4	Material Handling	Area	845894.0	814425.0	10.0	10.0	5	0.5	0	0700-2300 (daytime), 2300-0700 (nighttime)	3.73E-05	3.73E-05	1.76E-05	1.76E-05	2.67E-06	2.67E-06
NB5	Material Handling	Area	845830.4	814542.9	10.0	10.0	5	0.5	0	0700-2300 (daytime), 2300-0700 (nighttime)	3.73E-05	3.73E-05	1.76E-05	1.76E-05	2.67E-06	2.67E-06
NSD_S	Material Screening	Area	845952.5	814469.8	10.0	10.0	5	5	0	0700-2300 (daytime), 2300-0700 (nighttime)	3.73E-05	3.73E-05	1.76E-05	1.76E-05	2.67E-06	2.67E-06
NSD_H	Material Handling	Area	845952.5	814469.8	10.0	10.0	5	0.5	0	0700-2300 (daytime), 2300-0700 (nighttime)	1.85E-03	1.85E-03	6.21E-04	6.21E-04	4.19E-05	4.19E-05
NSE_S	Material Screening	Area	845899.1	814565.3	10.0	10.0	5	5	0	0700-2300 (daytime), 2300-0700 (nighttime)	3.73E-05	3.73E-05	1.76E-05	1.76E-05	2.67E-06	2.67E-06
NSE_H	Material Handling	Area	845899.1	814565.3	10.0	10.0	5	0.5	0	0700-2300 (daytime), 2300-0700 (nighttime)	1.85E-03	1.85E-03	6.21E-04	6.21E-04	4.19E-05	4.19E-05
R1	Road Dust	Area	846250.2	815293.9	8.0	121.0	5	0.5	0.7	0800 - 2100	2.10E-04	-	4.04E-05	-	9.77E-06	-
R2	Road Dust	Area	846092.8	815292.6	8.0	161.0	5	0.5	88.1	0800 - 2100	2.09E-04	-	4.01E-05	-	9.69E-06	-
R3	Road Dust	Area	846084.1	815099.8	8.0	187.0	5	0.5	1.4	0800 - 2100	2.09E-04	-	4.01E-05	-	9.69E-06	-
R1a	Road Dust	Area	846015.5	815371.8	8.0	244.0	5	0.5	78.8	0800 - 2200	3.76E-05	-	7.23E-06	-	1.75E-06	-
R1b	Road Dust	Area	845946.7	815075.0	8.0	301.0	5	0.5	12.6	0800 - 2200	3.93E-05	-	7.54E-06	-	1.83E-06	-
R4	Road Dust	Area	845949.8	815078.0	8.0	140.0	5	0.5	79.5	0700 - 2300	3.83E-05	-	7.36E-06	-	1.78E-06	-
R5	Road Dust	Area	846090.5	815103.0	8.0	155.0	5	10	125.3	0700 - 2300	1.65E-04	-	3.17E-05	-	7.67E-06	-
R6	Road Dust	Area	845919.7	814908.7	8.0	98.0	5	15	145.3	24 hours	1.09E-04	1.09E-04	2.09E-05	2.09E-05	5.06E-06	5.06E-06
R7	Road Dust	Area	845912.5	814907.3	8.0	171.0	5	0.5	11.5	24 hours	1.05E-04	1.05E-04	2.02E-05	2.02E-05	4.88E-06	4.88E-06
R8	Road Dust	Area	845810.7	814767.4	8.0	175.0	5	0.5	35.9	24 hours	2.09E-04	2.09E-04	4.01E-05	4.01E-05	9.69E-06	9.69E-06
R9a	Road Dust	Area	845813.9	814765.1	8.0	440.0	5	0.5	149.8	24 hours	1.83E-04	1.83E-04	3.52E-05	3.52E-05	8.51E-06	8.51E-06
R9b	Road Dust	Area	846035.2	814385.1	8.0	353.0	5	0.5	149.8	24 hours	1.94E-04	1.94E-04	3.72E-05	3.72E-05	9.00E-06	9.00E-06
R10	Road Dust	Area	846218.6	815010.7	8.0	489.0	5	20	170.2	0700 - 2300	1.99E-05	-	3.83E-06	-	9.25E-07	-
R11	Road Dust	Area	846145.5	814639.7	8.0	188.0	5	30	124.9	24 hours	1.45E-04	1.45E-04	2.78E-05	2.78E-05	6.74E-06	6.74E-06
R11a	Road Dust	Area	846033.3	814388.6	8.0	299.0	5	15	61.4	24 hours	1.84E-04	1.84E-04	3.54E-05	3.54E-05	8.56E-06	8.56E-06
R12	Road Dust	Area	846301.3	814530.2	8.0	404.0	5	30	154.4	0700 - 2300	5.87E-05	-	1.13E-05	-	2.72E-06	-

Note:

(a) TKOFB is operational on all days except Sundays and public holidays.

(b) Dry deposition was considered for fugitive dust sources (i.e. wind erosion, material handling/screening/crushing and haul roads) based on the particle size distributions of the respective dust sources.

(c) As advised by CEDD, it is proposed to increase the highest point of stockpiling areas to approximately 65mPD (60mAG) during the extended TKOFB operation (2022-2026). Currently, the highest point of the existing stockpiling areas A001, A002 and A003 is approximately 35mPD (30mAG) and on average the height is 30mPD (25mAG). The average height of the stockpiling areas (A001, A002 and A003) was adopted in the model as a conservative approach, given that the identified ASRs within the Study Area are all low-rise buildings (i.e. 30-35mAG).
For the public fill tipping (material handling) spots at these stockpiling areas (SP3a, SP3b, SP3d and SP3e), the highest point of the stockping areas 35mPD (30mAG) was adopted as the model height.
The roads at the stockpiling areas are assumed inclined from the ground level to the highest point of stockping areas 35mPD (30mAG).

The emission heights of other sources,as confirmed by CEDD, are detailed below:
SP3c: The truck loading (material handling) of public fill at stockpiling area for transporting to TKO basin is approximately at 20mPD (15mAG).
SP3f, SP3g: Th temporary fill loading location where the external trucks unload the public fill (material handling) from height of 10mPD (5mAG), and internal truck loads the public fill at a lower level of 5.5mPD (0.5mAG).
SP3h, SP3i: Loading and unloding of public fill at the temporary stockpiling area near entrace at 5.5mPD (0.5mAG).
C&DMCF: Unloading of public fill (material handling) to C&DMCF (C&DMCF_H1) and the subsequent crushing and screening (C&DMCF_C, C&DMCF_S) happen at a higher level 10mPD (5mAG). The output of processed public fill from C&DMCF and subseqent truck loading of processed public fill (material handling) (C&DMCF_H2) happen at a lower level 5.5mPD (0.5mAG).
TKOSF, NSD, NSE: Screening of public fill happens at a higher level 10mPD (5mAG). The output of processed public fill from screener and subsequent material handling of processed fill happen at a lower level 5.5mPD (0.5mAG).
IB1, IB2, IB3, IB4, B1, B2, B3, NB4, NB5: Material handling of public fill at barging points at 5.5mPD (0.5mAG).

(d) The maximum TSP, RSP and FSP emission rates of the dust emission sources are presented. Hourly emission rates for the dust emission sources are provided in a separate table.

Appendix A1 - TSP, RSP and FSP Emission Inventory for Dust Emission Sources associated with TKOFB Operation (Scenario 2)

Source ID	Description	Source Type	Coordinates		Dimension/		Base Elevation	Height	Angle/ Width	Working Hour [a]	TSP Emission Rate		RSP Emission Rate		FSP Emission Rate	
			X1	Y1	X2	Y2					Working Hours	Non-working Hours / Nighttime Working Hours	Working Hours	Non-working Hours / Nighttime Working Hours	Working Hours	Non-working Hours / Nighttime Working Hours
			m	m	m	m	m	m	deg / m		g/m^2/s	g/m^2/s	g/m^2/s	g/m^2/s	g/m^2/s	g/m^2/s
A001	Wind Erosion	Area	846054.1	814389.2	282.4	331.5	5	25	61.05	0800-2300	2.24E-07	2.70E-06	1.06E-07	1.27E-06	1.60E-08	1.93E-07
A002	Wind Erosion	Area	846289.5	814174.2	266.8	211.9	5	25	60.18	0800-2300	2.24E-07	2.70E-06	1.06E-07	1.27E-06	1.60E-08	1.93E-07
A003	Wind Erosion	Polygon Area	845950.6	815074.1			5	25	-	0800-2300	2.24E-07	2.70E-06	1.06E-07	1.27E-06	1.60E-08	1.93E-07
			846088.1	815099.7												
			846214.6	815010.1												
			846297.7	814528.4												
			846036.6	814385.9												
			845813.9	814765.1												
			845916.5	814906.5												
A004	Wind Erosion	Area	846168.9	814020.7	213.5	125.0	5	0.5	61.7	0800-2300	2.24E-07	2.70E-06	1.06E-07	1.27E-06	1.60E-08	1.93E-07
SP3a	Material Handling	Area	846126.5	814646.2	10.0	10.0	5	30	0	0700-2300	7.69E-05	-	3.64E-05	-	5.50E-06	-
SP3b	Material Handling	Area	846095.9	814596.5	10.0	10.0	5	30	0	0700-2300 (daytime), 2300-0700 (nighttime)	3.89E-05	4.68E-05	1.84E-05	2.21E-05	2.78E-06	3.35E-06
SP3c	Material Handling	Area	846012.2	814840.9	10.0	10.0	5	15	0	0700-2300 (daytime), 2300-0700 (nighttime)	8.75E-05	4.68E-05	4.14E-05	2.21E-05	6.26E-06	3.35E-06
SP3d	Material Handling	Area	846314.9	814383.7	10.0	10.0	5	30	0	0700-2300	2.34E-05	-	1.11E-05	-	1.68E-06	-
SP3e	Material Handling	Area	846425.0	814148.8	10.0	10.0	5	30	0	0700-2300 (daytime), 2300-0700 (nighttime)	9.85E-05	7.51E-05	4.66E-05	3.55E-05	7.06E-06	5.38E-06
SP3f	Material Handling	Area	846063.7	815077.3	10.0	10.0	5	5	0	0800-2100	1.67E-04	-	7.90E-05	-	1.20E-05	-
SP3g	Material Handling	Area	846063.7	815077.3	10.0	10.0	5	0.5	0	0700-2300	7.69E-05	-	3.64E-05	-	5.50E-06	-
SP3h	Material Handling	Area	845928.5	815188.8	10.0	10.0	5	0.5	0	0800-2200	1.33E-05	-	6.27E-06	-	9.49E-07	-
SP3i	Material Handling	Area	845928.5	815188.8	10.0	10.0	5	0.5	0	0800-2200	1.77E-05	-	8.36E-06	-	1.27E-06	-
C&DMCF_C	Material Crushing	Area	845815.0	814677.0	10.0	10.0	5	5	0	0700-2300	2.08E-03	-	9.38E-04	-	1.74E-04	-
C&DMCF_S	Material Sorting	Area	845815.0	814677.0	10.0	10.0	5	5	0	0700-2300	1.83E-03	-	6.17E-04	-	4.17E-05	-
C&DMCF_H1	Material Handling	Area	845815.0	814677.0	10.0	10.0	5	5	0	0700-2300	3.86E-05	-	1.83E-05	-	2.77E-06	-
C&DMCF_H2	Material Handling	Area	845815.0	814677.0	10.0	10.0	5	0.5	0	0700-2300	3.86E-05	-	1.83E-05	-	2.77E-06	-
TKOSF_S	Material Sorting	Area	846339.2	813930.6	10.0	10.0	5	5	0	24 hours	7.36E-07	7.36E-07	3.48E-07	3.48E-07	5.27E-08	5.27E-08
TKOSF_H	Material Handling	Area	846339.2	813930.6	10.0	10.0	5	0.5	0	24 hours	3.64E-05	3.64E-05	1.22E-05	1.22E-05	8.28E-07	8.28E-07
IB1	Material Handling	Area	845796.5	815097.3	10.0	10.0	5	0.5	0	24 hours	6.44E-06	6.44E-06	3.04E-06	3.04E-06	4.61E-07	4.61E-07
IB2	Material Handling	Area	845763.3	814852.8	10.0	10.0	5	0.5	0	24 hours	6.44E-06	6.44E-06	3.04E-06	3.04E-06	4.61E-07	4.61E-07
IB3	Material Handling	Area	845665.2	815077.2	10.0	10.0	5	0.5	0	24 hours	6.44E-06	6.44E-06	3.04E-06	3.04E-06	4.61E-07	4.61E-07
IB4	Material Handling	Area	845741.7	815108.0	10.0	10.0	5	0.5	0	24 hours	6.44E-06	6.44E-06	3.04E-06	3.04E-06	4.61E-07	4.61E-07
B1	Material Handling	Area	845685.4	814821.5	10.0	10.0	5	0.5	0	0700-2300 (daytime), 2300-0700 (nighttime)	3.15E-05	3.09E-05	1.49E-05	1.46E-05	2.26E-06	2.21E-06
B2	Material Handling	Area	845809.2	814871.2	10.0	10.0	5	0.5	0	0700-2300 (daytime), 2300-0700 (nighttime)	3.15E-05	3.09E-05	1.49E-05	1.46E-05	2.26E-06	2.21E-06
B3	Material Handling	Area	845839.4	814990.2	10.0	10.0	5	0.5	0	0700-2300 (daytime), 2300-0700 (nighttime)	3.15E-05	3.09E-05	1.49E-05	1.46E-05	2.26E-06	2.21E-06
NB4	Material Handling	Area	845894.0	814425.0	10.0	10.0	5	0.5	0	0700-2300 (daytime), 2300-0700 (nighttime)	3.73E-05	3.73E-05	1.76E-05	1.76E-05	2.67E-06	2.67E-06
NB5	Material Handling	Area	845830.4	814542.9	10.0	10.0	5	0.5	0	0700-2300 (daytime), 2300-0700 (nighttime)	3.73E-05	3.73E-05	1.76E-05	1.76E-05	2.67E-06	2.67E-06
NSD_S	Material Screening	Area	845952.5	814469.8	10.0	10.0	5	5	0	0700-2300 (daytime), 2300-0700 (nighttime)	3.73E-05	3.73E-05	1.76E-05	1.76E-05	2.67E-06	2.67E-06
NSD_H	Material Handling	Area	845952.5	814469.8	10.0	10.0	5	0.5	0	0700-2300 (daytime), 2300-0700 (nighttime)	1.85E-03	1.85E-03	6.21E-04	6.21E-04	4.19E-05	4.19E-05
NSE_S	Material Screening	Area	845899.1	814565.3	10.0	10.0	5	5	0	0700-2300 (daytime), 2300-0700 (nighttime)	3.73E-05	3.73E-05	1.76E-05	1.76E-05	2.67E-06	2.67E-06
NSE_H	Material Handling	Area	845899.1	814565.3	10.0	10.0	5	0.5	0	0700-2300 (daytime), 2300-0700 (nighttime)	1.85E-03	1.85E-03	6.21E-04	6.21E-04	4.19E-05	4.19E-05
R1	Road Dust	Area	846250.2	815293.9	8.0	121.0	5	0.5	0.7	0800 - 2100	2.10E-04	-	4.04E-05	-	9.77E-06	-
R2	Road Dust	Area	846092.8	815292.6	8.0	161.0	5	0.5	88.1	0800 - 2100	2.09E-04	-	4.01E-05	-	9.69E-06	-
R3	Road Dust	Area	846084.1	815099.8	8.0	187.0	5	0.5	1.4	0800 - 2100	2.09E-04	-	4.01E-05	-	9.69E-06	-
R1a	Road Dust	Area	846015.5	815371.8	8.0	244.0	5	0.5	78.8	0800 - 2200	3.76E-05	-	7.23E-06	-	1.75E-06	-
R1b	Road Dust	Area	845946.7	815075.0	8.0	301.0	5	0.5	12.6	0800 - 2200	3.93E-05	-	7.54E-06	-	1.83E-06	-
R4	Road Dust	Area	845949.8	815078.0	8.0	140.0	5	0.5	79.5	0700 - 2300	3.83E-05	-	7.36E-06	-	1.78E-06	-
R5	Road Dust	Area	846090.5	815103.0	8.0	155.0	5	10	125.3	0700 - 2300	1.65E-04	-	3.17E-05	-	7.67E-06	-
R6	Road Dust	Area	845919.7	814908.7	8.0	98.0	5	15	145.3	24 hours	1.09E-04	1.09E-04	2.09E-05	2.09E-05	5.06E-06	5.06E-06
R7	Road Dust	Area	845912.5	814907.3	8.0	171.0	5	0.5	11.5	24 hours	1.05E-04	1.05E-04	2.02E-05	2.02E-05	4.88E-06	4.88E-06
R8	Road Dust	Area	845810.7	814767.4	8.0	175.0	5	0.5	35.9	24 hours	2.09E-04	2.09E-04	4.01E-05	4.01E-05	9.69E-06	9.69E-06
R9a	Road Dust	Area	845813.9	814765.1	8.0	440.0	5	0.5	149.8	24 hours	2.81E-04	2.81E-04	5.39E-05	5.39E-05	1.30E-05	1.30E-05
R9b	Road Dust	Area	846035.2	814385.1	8.0	353.0	5	0.5	149.8	24 hours	9.63E-05	9.63E-05	1.85E-05	1.85E-05	4.47E-06	4.47E-06
R10	Road Dust	Area	846218.6	815010.7	8.0	489.0	5	20	170.2	0700 - 2300	1.99E-05	-	3.83E-06	-	9.25E-07	-
R11	Road Dust	Area	846145.5	814639.7	8.0	188.0	5	30	124.9	24 hours	1.45E-04	1.45E-04	2.78E-05	2.78E-05	6.74E-06	6.74E-06
R11a	Road Dust	Area	846033.3	814388.6	8.0	299.0	5	15	61.4	24 hours	1.84E-04	1.84E-04	3.54E-05	3.54E-05	8.56E-06	8.56E-06
R12	Road Dust	Area	846301.3	814530.2	8.0	404.0	5	30	154.4	0700 - 2300	5.87E-05	-	1.13E-05	-	2.72E-06	-

Note:

(a) TKOFB is operational on all days except Sundays and public holidays.

(b) Dry deposition was considered for fugitive dust sources (i.e. wind erosion, material handling/screening/crushing and haul roads) based on the particle size distributions of the respective dust sources.

(c) As advised by CEDD, it is proposed to increase the highest point of stockpiling areas to approximately 65mPD (60mAG) during the extended TKOFB operation (2022-2026). Currently, the highest point of the existing stockpiling areas A001, A002 and A003 is approximately 35mPD (30mAG) and on average the height is 30mPD (25mAG). The average height of the stockpiling areas (A001, A002 and A003) was adopted in the model as a conservative approach, given that the identified ASRs within the Study Area are all low-rise buildings (i.e. 30-35mAG).
For the public fill tipping (material handling) spots at these stockpiling areas (SP3a, SP3b, SP3d and SP3e), the highest point of the stockping areas 35mPD (30mAG) was adopted as the model height.
The roads at the stockpiling areas are assumed inclined from the ground level to the highest point of stockping areas 35mPD (30mAG).

The emission heights of other sources, as advised by CEDD, are detailed below:
SP3c: The truck loading (material handling) of public fill at stockpiling area for transporting to TKO basin is approximately at 20mPD (15mAG).
SP3f, SP3g: Th temporary fill loading location where the external trucks unload the public fill (material handling) from height of 10mPD (5mAG), and internal truck loads the public fill at a lower level of 5.5mPD (0.5mAG).
SP3h, SP3i: Loading and unloading of public fill at the temporary stockpiling area near entrance at 5.5mPD (0.5mAG).
C&DMCF: Unloading of public fill (material handling) to C&DMCF (C&DMCF_H1) and the subsequent crushing and screening (C&DMCF_C, C&DMCF_S) happen at a higher level 10mPD (5mAG). The output of processed public fill from C&DMCF and subseqent truck loading of processed public fill (material handling) (C&DMCF_H2) happen at a lower level 5.5mPD (0.5mAG).
TKOSF, NSD, NSE: Screening of public fill happens at a higher level 10mPD (5mAG). The output of processed public fill from screener and subsequent material handling of processed fill happen at a lower level 5.5mPD (0.5mAG).
IB1, IB2, IB3, IB4, B1, B2, B3, NB4, NB5: Material handling of public fill at barging points at 5.5mPD (0.5mAG).

(d) The maximum TSP, RSP and FSP emission rates of the dust emission sources are presented. Hourly emission rates for the dust emission sources are provided in a separate table.

Appendix A1 - Mass Fractions of Particle Sizes for Dust Sources

Material Handling and Wind Erosion

Particle Size (µm)	Average Particle Size (µm)	Mass Fraction		
		TSP	RSP	FSP
2.5	1.25	0.07	0.15	1
5	3.75	0.2	0.42	-
10	7.5	0.2	0.43	-
15	12.5	0.18	-	-
30	22.5	0.35	-	-

Reference: AP-42, Section 13.2.4 (Edition 11/06)

Material Crushing

Particle Size (µm)	Average Particle Size (µm)	Mass Fraction		
		TSP	RSP	FSP
2.5	1.25	0.08	0.19	1
10	6.25	0.37	0.81	-
30	20	0.55	-	-

Reference: AP-42, Table 11.19.2-1, Tertiary Crushing (controlled)

Material Screening

Particle Size (µm)	Average Particle Size (µm)	Mass Fraction		
		TSP	RSP	FSP
2.5	1.25	0.02	0.07	1
10	6.25	0.31	0.93	-
30	20	0.67	-	-

Reference: AP-42, Table 11.19.2-1, Screening (controlled)

Haul Road

Particle Size (µm)	Average Particle Size (µm)	Mass Fraction		
		TSP	RSP	FSP
2.5	1.25	0.04	0.24	1
10	6.25	0.15	0.76	-
15	12.5	0.05	-	-
30	22.5	0.76	-	-

Reference: AP-42 Section 13.2.1 (Edition 1/11)

Appendix A1 - NOx, SO2, RSP and FSP Emission Rate Calculations for Marine Vessels (Scenarios 1 and 2)

Item	Source	Pollutant	Parameters	Value	Unit	Emission Rate	Unit	Reference
1	Berthing emissions		Average Auxiliary Engine Power (Barge)	50	kW			Provided by CEDD
	from Barge		Auxiliary Engine Load factor	0.43				Table 4.10, Study on Marine Vessels Emission Inventory Final Report 2012, EPD
		NOx	Emission Factor	10	g/kWh	2.15E+02	g/hr/vessel	Table 4.16, Study on Marine Vessels Emission Inventory Final Report 2012, EPD
		SO2	Emission Factor	0.208	g/kWh	4.47E+00	g/hr/vessel	Table 4.16, Study on Marine Vessels Emission Inventory Final Report 2012, EPD Fuel for local vessels in Hong Kong has sulphur content limited to 0.05% under the Air Pollution Control (Marine Light Diesel) Regulation
		RSP	Emission Factor	0.4	g/kWh	8.60E+00	g/hr/vessel	Table 4.16, Study on Marine Vessels Emission Inventory Final Report 2012, EPD
		FSP	Emission Factor	0.39	g/kWh	8.39E+00	g/hr/vessel	Table 4.16, Study on Marine Vessels Emission Inventory Final Report 2012, EPD
2	Berthing emissions		Average Auxiliary Engine Power (Derrick Lighter)	270	kW			Provided by CEDD
	from Derrick Lighter		Auxiliary Engine Load factor	0.43				Table 4.10, Study on Marine Vessels Emission Inventory Final Report 2012, EPD
		NOx	Emission Factor	10	g/kWh	1.16E+03	g/hr/vessel	Table 4.16, Study on Marine Vessels Emission Inventory Final Report 2012, EPD
		SO2	Emission Factor	0.208	g/kWh	2.41E+01	g/hr/vessel	Table 4.16, Study on Marine Vessels Emission Inventory Final Report 2012, EPD Fuel for local vessels in Hong Kong has sulphur content limited to 0.05% under the Air Pollution Control (Marine Light Diesel) Regulation
		RSP	Emission Factor	0.4	g/kWh	4.64E+01	g/hr/vessel	Table 4.16, Study on Marine Vessels Emission Inventory Final Report 2012, EPD
		FSP	Emission Factor	0.39	g/kWh	4.53E+01	g/hr/vessel	Table 4.16, Study on Marine Vessels Emission Inventory Final Report 2012, EPD
3	Maneuvering (Barge)		Average Main Engine Power (Barge)	1100	kW			Provided by CEDD
			Main Engine Load factor	0.3				Table 4.7, Study on Marine Vessels Emission Inventory Final Report 2012, EPD
		NOx	Emission Factor	10	g/kWh	3.30E+03	g/hr/vessel	Table 4.16, Main Engine (Cat.1), Study on Marine Vessels Emission Inventory Final Report 2012, EPD
		SO2	Emission Factor	0.208	g/kWh	6.86E+01	g/hr/vessel	Table 4.16, Main Engine (Cat.1), Study on Marine Vessels Emission Inventory Final Report 2012, EPD Fuel for local vessels in Hong Kong has sulphur content limited to 0.05% under the Air Pollution Control (Marine Light Diesel) Regulation
		RSP	Emission Factor	0.3	g/kWh	9.90E+01	g/hr/vessel	Table 4.16, Main Engine (Cat.1), Study on Marine Vessels Emission Inventory Final Report 2012, EPD
		FSP	Emission Factor	0.29	g/kWh	9.57E+01	g/hr/vessel	Table 4.16, Main Engine (Cat.1), Study on Marine Vessels Emission Inventory Final Report 2012, EPD
4	Maneuvering (Tugboat)		Average Main Engine Power (tugboat)	392	kW			Provided by CEDD
			Main Engine Load factor	0.3				Table 4.7, Study on Marine Vessels Emission Inventory Final Report 2012, EPD
		NOx	Emission Factor	13.2	g/kWh	1.55E+03	g/hr/vessel	Table 4.16, Main Engine (Cat.2), Study on Marine Vessels Emission Inventory Final Report 2012, EPD
		SO2	Emission Factor	0.208	g/kWh	2.45E+01	g/hr/vessel	Table 4.16, Main Engine (Cat.2), Study on Marine Vessels Emission Inventory Final Report 2012, EPD Fuel for local vessels in Hong Kong has sulphur content limited to 0.05% under the Air Pollution Control (Marine Light Diesel) Regulation
		RSP	Emission Factor	0.72	g/kWh	8.47E+01	g/hr/vessel	Table 4.16, Main Engine (Cat.2), Study on Marine Vessels Emission Inventory Final Report 2012, EPD
		FSP	Emission Factor	0.7	g/kWh	8.23E+01	g/hr/vessel	Table 4.16, Main Engine (Cat.2), Study on Marine Vessels Emission Inventory Final Report 2012, EPD

Appendix A1 - NOx, SO2, RSP and FSP Emission Rate Calculations for Marine Vessels (Scenarios 1 and 2)

Berthing

					NOx			SO2			RSP			FSP		
	Time-in-mode [1] (hr)	Daily Flow [2]	Working Hour	Type of Vessel [3]	Emission Rate (g/hr/vessel)	Emission Rate (g/s)	AERMOD input hour	Emission Rate (g/hr/vessel)	Emission Rate (g/s)	AERMOD input hour	Emission Rate (g/hr/vessel)	Emission Rate (g/s)	AERMOD input hour	Emission Rate (g/hr/vessel)	Emission Rate (g/s)	AERMOD input hour
B1_B B2_B B3_B	4	4	0700 - 2300	Barge	2.15E+02	5.97E-02	0700 - 2300	4.47E+00	1.24E-03	0700 - 2300	8.60E+00	2.39E-03	0700 - 2300	8.39E+00	2.33E-03	0700 - 2300
B1_B_N B2_B_N B3_B_N	4	2	2300 - 0700	Derrick Lighter	1.16E+03	3.23E-01	2300 - 0700	2.41E+01	6.71E-03	2300 - 0700	4.64E+01	1.29E-02	2300 - 0700	4.53E+01	1.26E-02	2300 - 0700
IB1_B IB2_B IB3_B IB4_B	4	2	0000 - 2400	Derrick Lighter	1.16E+03	1.08E-01	0000 - 2400	2.41E+01	2.24E-03	0000 - 2400	4.64E+01	4.30E-03	0000 - 2400	4.53E+01	4.19E-03	0000 - 2400
NB4_B NB5_B	4	6	0000 - 2400	Derrick Lighter	1.16E+03	3.23E-01	0000 - 2400	2.41E+01	6.71E-03	0000 - 2400	4.64E+01	1.29E-02	0000 - 2400	4.53E+01	1.26E-02	0000 - 2400

Maneuvering

					NOx			SO2			RSP			FSP		
	Time-in-mode [1] (hr)	Daily Flow [2]	Working Hour	Type of Vessel [3]	Emission Rate (g/hr/vessel)	Emission Rate (g/s)	AERMOD input hour	Emission Rate (g/hr/vessel)	Emission Rate (g/s)	AERMOD input hour	Emission Rate (g/hr/vessel)	Emission Rate (g/s)	AERMOD input hour	Emission Rate (g/hr/vessel)	Emission Rate (g/s)	AERMOD input hour
from B1 - B3	0.33	24	0700 - 2300	Barge	3.30E+03	4.58E-01		6.86E+01	9.53E-03		9.90E+01	1.38E-02		9.57E+01	1.33E-02	
from B1 - B3	0.33	12	2300 - 0700	Barge	3.30E+03	4.58E-01		6.86E+01	9.53E-03		9.90E+01	1.38E-02		9.57E+01	1.33E-02	
from IB1 - IB4	0.33	16	0000 - 2400	Barge	3.30E+03	2.04E-01		6.86E+01	4.24E-03		9.90E+01	6.11E-03		9.57E+01	5.91E-03	
M1-M52						1.27E-02	0700 - 2300		2.65E-04	0700 - 2300		3.82E-04	0700 - 2300		3.69E-04	0700 - 2300
M1-M52						1.27E-02	2300 - 0700		2.65E-04	2300 - 0700		3.82E-04	2300 - 0700		3.69E-04	2300 - 0700
from NB4 & NB5	0.50	24	0000 - 2400	Barge	3.30E+03	4.58E-01		6.86E+01	9.53E-03		9.90E+01	1.38E-02		9.57E+01	1.33E-02	
M101-M173						6.28E-03	0700 - 2300		1.31E-04	0700 - 2300		1.88E-04	0700 - 2300		1.82E-04	0700 - 2300
M101-M173						6.28E-03	2300 - 0700		1.31E-04	2300 - 0700		1.88E-04	2300 - 0700		1.82E-04	2300 - 0700

Notes:

(1) Time-in-mode for berthing refers to the berthing time at barging point and is assumed to be 4 hours as confirmed with CEDD.
Time-in-mode for maneuvering refers to the maneuvering time within the Study Area and is assumed to be 20 minutes for route M1-M52 and 30 minutes for route M101-M173 as confirmed with CEDD.

(2) Daily flow for berthing refers to number of vessels at berth at each barging point each day and these were confirmed with CEDD.
Daily flow for maneuvering refers to vessel arrival and departure volume at all relevant barging points (i.e. total of two-way routes) and these were confirmed with CEDD.

(3) For berthing, marine vessels for material export at TKO Basin during daytime period (0700-2300 hr) are barges.
Marine vessels for material export at TKO Basin during nighttime period (2300-0700 hr) and at barging points south of TKO Basin may be barge or derrick lighter. Emission rate (g/hr/vessel) of derrick lighter at berth is higher and is adopted as a conservative assessment.
Marine vesssels for material import at TKO Basin are derrick lighter.
For maneuvering, the emission rate (g/hr/vessel) of barge is higher than that of tugboat with derrick lighter and hence is adopted as a conservative assessment (i.e. M1 to M52; M101 to M173).

Appendix A1 - Emission Inventory for Marine Vessels (Scenarios 1 and 2)

Source ID	Description	Source Type	Coordinates		Base Elevation	Height	Stack Temp	Stack Velocity	Stack Diameter	Working Hour	NOx Emission Rate		SO2 Emission Rate		RSP Emission Rate		FSP Emission Rate	
			X1	Y1							0700 - 2300	2300 - 0700	0700 - 2300	2300 - 0700	0700 - 2300	2300 - 0700	0700 - 2300	2300 - 0700
			m	m	m	m	K	m/s	m		g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s
B1_B	Berthing	Point	845685.4	814821.5	0	15	803	8	0.3	0700-2300	5.97E-02	0.00E+00	1.24E-03	0.00E+00	2.39E-03	0.00E+00	2.33E-03	0.00E+00
B2_B	Berthing	Point	845809.2	814871.2	0	15	803	8	0.3	0700-2300	5.97E-02	0.00E+00	1.24E-03	0.00E+00	2.39E-03	0.00E+00	2.33E-03	0.00E+00
B3_B	Berthing	Point	845839.4	814990.2	0	15	803	8	0.3	0700-2300	5.97E-02	0.00E+00	1.24E-03	0.00E+00	2.39E-03	0.00E+00	2.33E-03	0.00E+00
B1_B_N	Berthing (nighttime)	Point	845685.4	814821.5	0	9	795	8	0.15	2300-0700	0.00E+00	3.23E-01	0.00E+00	6.71E-03	0.00E+00	1.29E-02	0.00E+00	1.26E-02
B2_B_N	Berthing (nighttime)	Point	845809.2	814871.2	0	9	795	8	0.15	2300-0700	0.00E+00	3.23E-01	0.00E+00	6.71E-03	0.00E+00	1.29E-02	0.00E+00	1.26E-02
B3_B_N	Berthing (nighttime)	Point	845839.4	814990.2	0	9	795	8	0.15	2300-0700	0.00E+00	3.23E-01	0.00E+00	6.71E-03	0.00E+00	1.29E-02	0.00E+00	1.26E-02
IB1_B	Berthing	Point	845796.5	815097.3	0	9	795	8	0.15	24 hours	1.08E-01	1.08E-01	2.24E-03	2.24E-03	4.30E-03	4.30E-03	4.19E-03	4.19E-03
IB2_B	Berthing	Point	845763.3	814852.8	0	9	795	8	0.15	24 hours	1.08E-01	1.08E-01	2.24E-03	2.24E-03	4.30E-03	4.30E-03	4.19E-03	4.19E-03
IB3_B	Berthing	Point	845665.2	815077.2	0	9	795	8	0.15	24 hours	1.08E-01	1.08E-01	2.24E-03	2.24E-03	4.30E-03	4.30E-03	4.19E-03	4.19E-03
IB4_B	Berthing	Point	845741.7	815108.0	0	9	795	8	0.15	24 hours	1.08E-01	1.08E-01	2.24E-03	2.24E-03	4.30E-03	4.30E-03	4.19E-03	4.19E-03
NB4_B	Berthing	Point	845894.0	814425.0	0	9	795	8	0.15	24 hours	3.23E-01	3.23E-01	6.71E-03	6.71E-03	1.29E-02	1.29E-02	1.26E-02	1.26E-02
NB5_B	Berthing	Point	845830.4	814542.9	0	9	795	8	0.15	24 hours	3.23E-01	3.23E-01	6.71E-03	6.71E-03	1.29E-02	1.29E-02	1.26E-02	1.26E-02
M1	Maneuvering	Point	845828.9	814935.0	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M2	Maneuvering	Point	845810.3	814925.3	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M3	Maneuvering	Point	845791.7	814915.5	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M4	Maneuvering	Point	845772.2	814909.3	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M5	Maneuvering	Point	845751.5	814905.3	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M6	Maneuvering	Point	845731.0	814902.6	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M7	Maneuvering	Point	845710.1	814900.8	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M8	Maneuvering	Point	845689.2	814899.0	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M9	Maneuvering	Point	845668.6	814897.6	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M10	Maneuvering	Point	845647.6	814897.6	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M11	Maneuvering	Point	845626.6	814897.6	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M12	Maneuvering	Point	845605.6	814897.6	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M13	Maneuvering	Point	845584.9	814897.6	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M14	Maneuvering	Point	845563.9	814898.9	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M15	Maneuvering	Point	845542.9	814900.3	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M16	Maneuvering	Point	845522.0	814901.6	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M17	Maneuvering	Point	845501.0	814902.9	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M18	Maneuvering	Point	845480.5	814905.1	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M19	Maneuvering	Point	845459.7	814908.2	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M20	Maneuvering	Point	845438.9	814911.4	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M21	Maneuvering	Point	845418.2	814914.6	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M22	Maneuvering	Point	845397.9	814918.8	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M23	Maneuvering	Point	845377.4	814923.4	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M24	Maneuvering	Point	845357.0	814928.1	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M25	Maneuvering	Point	845337.2	814934.2	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M26	Maneuvering	Point	845317.3	814941.0	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M27	Maneuvering	Point	845297.5	814947.8	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M28	Maneuvering	Point	845278.5	814955.9	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M29	Maneuvering	Point	845259.8	814965.5	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M30	Maneuvering	Point	845241.1	814975.1	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M31	Maneuvering	Point	845222.5	814984.7	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M32	Maneuvering	Point	845205.7	814996.7	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M33	Maneuvering	Point	845189.1	815009.7	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M34	Maneuvering	Point	845172.6	815022.6	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M35	Maneuvering	Point	845161.1	815039.8	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M36	Maneuvering	Point	845149.5	815057.3	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M37	Maneuvering	Point	845138.9	815075.1	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M38	Maneuvering	Point	845128.9	815093.6	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M39	Maneuvering	Point	845119.0	815112.0	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M40	Maneuvering	Point	845110.3	815130.8	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M41	Maneuvering	Point	845101.5	815149.9	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M42	Maneuvering	Point	845093.8	815169.1	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M43	Maneuvering	Point	845088.7	815189.4	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M44	Maneuvering	Point	845083.6	815209.8	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M45	Maneuvering	Point	845078.9	815230.0	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M46	Maneuvering	Point	845074.2	815250.4	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M47	Maneuvering	Point	845070.2	815270.7	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M48	Maneuvering	Point	845067.2	815291.5	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M49	Maneuvering	Point	845064.3	815312.3	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M50	Maneuvering	Point	845062.4	815332.9	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M51	Maneuvering	Point	845061.0	815353.9	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M52	Maneuvering	Point	845059.9	815370.0	0	15	803	8	0.3	24 hours	1.27E-02	1.27E-02	2.65E-04	2.65E-04	3.82E-04	3.82E-04	3.69E-04	3.69E-04
M101	Maneuvering	Point	845862.8	814490.4	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M102	Maneuvering	Point	845847.3	814477.7	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M103	Maneuvering	Point	845831.1	814466.0	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M104	Maneuvering	Point	845814.3	814455.1	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M105	Maneuvering	Point	845796.9	814445.3	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M106	Maneuvering	Point	845779.0	814436.5	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M107	Maneuvering	Point	845760.5	814428.9	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M108	Maneuvering	Point	845741.6	814422.2	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M109	Maneuvering	Point	845722.4	814416.7	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M110	Maneuvering	Point	845702.9	814412.4	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M111	Maneuvering	Point	845683.1	814409.2	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M112	Maneuvering	Point	845663.2	814407.2	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M113	Maneuvering	Point	845643.3	814406.3	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M114	Maneuvering	Point	845623.3	814406.6	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M115	Maneuvering	Point	845603.3	814408.2	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M116	Maneuvering	Point	845583.5	814410.9	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M117	Maneuvering	Point	845563.9	814414.7	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M118	Maneuvering	Point	845544.5	814419.6	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M119	Maneuvering	Point	845525.5	814425.8	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M120	Maneuvering	Point	845506.9	814433.0	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M121	Maneuvering	Point	845488.7	814441.3	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M122	Maneuvering	Point	845471.0	814450.6	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M123	Maneuvering	Point	845453.9	814461.0	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M124	Maneuvering	Point	845437.5	814472.4	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M125	Maneuvering	Point	845421.7	814484.8	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M126	Maneuvering	Point	845406.7	814497.9	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M127	Maneuvering	Point	845392.5	814512.0	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M128	Maneuvering	Point	845379.2	814526.9	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M129	Maneuvering	Point	845366.7	814542.6	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M130	Maneuvering	Point	845355.2	814558.9	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M131	Maneuvering	Point	845344.6	814575.9	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M132	Maneuvering	Point	845334.9	814593.4	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M133	Maneuvering	Point	845325.2	814610.9	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M134	Maneuvering	Point	845315.5	814628.4	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M135	Maneuvering	Point	845305.8	814645.8	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M136	Maneuvering	Point	845296.0	814663.3	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M137	Maneuvering	Point	845286.2	814680.7	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M138	Maneuvering	Point	845276.4	814698.2	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M139	Maneuvering	Point	845266.6	814715.6	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M140	Maneuvering	Point	845256.9	814733.0	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M141	Maneuvering	Point	845247.1	814750.5	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M142	Maneuvering	Point	845237.4	814768.0	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M143	Maneuvering	Point	845227.7	814785.5	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M144	Maneuvering	Point	845218.0	814803.0	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M145	Maneuvering	Point	845209.1	814820.9	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M146	Maneuvering	Point	845200.4	814838.9	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M147	Maneuvering	Point	845191.8	814856.9	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M148	Maneuvering	Point	845183.1	814875.0	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M149	Maneuvering	Point	845174.5	814893.0	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M150	Maneuvering	Point	845165.8	814911.0	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M151	Maneuvering	Point	845157.5	814929.2	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M152	Maneuvering	Point	845149.4	814947.5	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M153	Maneuvering	Point	845141.3	814965.8	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M154	Maneuvering	Point	845133.2	814984.1	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M155	Maneuvering	Point	845125.1	815002.4	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M156	Maneuvering	Point	845117.0	815020.7	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M157	Maneuvering	Point	845108.9	815038.9	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M158	Maneuvering	Point	845101.1	815057.3	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M159	Maneuvering	Point	845094.5	815076.2	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M160	Maneuvering	Point	845087.8	815095.1	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M161	Maneuvering	Point	845081.2	815113.9	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04

Appendix A1 - Emission Inventory for Marine Vessels (Scenarios 1 and 2)

Source ID	Description	Source Type	Coordinates		Base Elevation	Height	Stack Temp	Stack Velocity	Stack Diameter	Working Hour	NOx Emission Rate		SO2 Emission Rate		RSP Emission Rate		FSP Emission Rate	
			X1	Y1							0700 - 2300	2300 - 0700	0700 - 2300	2300 - 0700	0700 - 2300	2300 - 0700	0700 - 2300	2300 - 0700
			m	m	m	m	K	m/s	m		g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s
M162	Maneuvering	Point	845074.6	815132.8	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M163	Maneuvering	Point	845067.9	815151.7	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M164	Maneuvering	Point	845061.3	815170.5	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M165	Maneuvering	Point	845057.6	815190.2	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M166	Maneuvering	Point	845054.6	815209.9	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M167	Maneuvering	Point	845051.5	815229.7	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M168	Maneuvering	Point	845048.5	815249.5	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M169	Maneuvering	Point	845045.4	815269.2	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M170	Maneuvering	Point	845042.4	815289.0	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M171	Maneuvering	Point	845039.9	815308.8	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M172	Maneuvering	Point	845037.4	815328.7	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04
M173	Maneuvering	Point	845034.9	815348.5	0	15	803	8	0.3	24 hours	6.28E-03	6.28E-03	1.31E-04	1.31E-04	1.88E-04	1.88E-04	1.82E-04	1.82E-04

Notes:

(a) It is assumed that all emissions from marine vessels (berthing and maneuvering) occur concurrently as a worst case scenario.

(b) The stack parameters including height, temperature, velocity and diameter were reasonably assumed as confirmed by CEDD.

Appendix A1 - Emission Inventory for Generators and Crushers (Internal Combustion Engines) within TKOFB (Scenario 1)

Source ID	Description	Source Type	Coordinates		Base Elevation	Stack Height	Stack Temp	Stack Velocity	Stack Diameter	Working Hour	Total Working Hour	Fuel Consumption	Engine Power	Engine Power	NOx	SO2	RSP	FSP
			X1	Y1														
			m	m	m	m	K	m/s	m			L/hr	kVA	kW	g/s	g/s	g/s	g/s
Gen1	CH-01GN	Point	846190.4	815130.4	5	1.70	773	84.9	0.1	0700-2200	15	20	150	120	1.33E-01	6.08E-04	1.00E-02	1.00E-02
Gen2	CH-02GN	Point	846176.1	815130.4	5	1.70	773	52.8	0.075	0700-2200	15	14	100	80	8.89E-02	4.25E-04	6.67E-03	6.67E-03
Gen3	CH-03GN	Point	846130.0	815136.3	5	1.70	773	84.9	0.1	0700-2100	14	10	150	120	1.33E-01	3.04E-04	1.00E-02	1.00E-02
Gen4	CH-04GN	Point	846172.9	815195.0	5	1.75	773	80.8	0.105	2100-0700	10	28	220	176	1.96E-01	8.51E-04	9.78E-03	9.78E-03
Gen5	CH-05GN	Point	846156.5	815196.0	5	1.85	793	52.4	0.135	0700-2100	14	41	300	240	2.67E-01	1.25E-03	1.33E-02	1.33E-02
Gen6	CH-06GN	Point	846151.2	815276.0	5	1.75	783	80.8	0.105	0700-2200	15	25	220	176	1.96E-01	7.60E-04	9.78E-03	9.78E-03
Gen7	CH-07GN	Point	846134.8	815274.9	5	2.20	773	37.3	0.16	0700-2200	15	30	400	320	3.56E-01	9.12E-04	1.78E-02	1.78E-02
Gen8	CH-08GN	Point	846058.0	815143.7	5	1.70	773	84.9	0.1	0700-2200	15	18	150	120	1.33E-01	5.47E-04	1.00E-02	1.00E-02
Gen9	CH-10GN	Point	845956.8	814703.3	30	1.85	793	52.4	0.135	0700-2200	15	17	300	240	2.67E-01	5.17E-04	1.33E-02	1.33E-02
Gen10	CH-12GN	Point	845798.3	814760.8	5	1.05	763	79.6	0.04	0700-2200	15	3	25	20	4.17E-02	9.12E-05	3.33E-03	3.33E-03
Gen11	CH-13GN	Point	846201.4	814692.8	30	1.05	763	79.6	0.04	1800-2200	4	2	25	20	4.17E-02	6.08E-05	3.33E-03	3.33E-03
Gen12	CH-14GN	Point	845743.5	814764.3	5	1.35	763	58.9	0.06	0700-2200	15	4	60	48	6.27E-02	1.22E-04	5.33E-03	5.33E-03
Gen13	CH-16GN	Point	846364.8	814254.4	30	1.05	763	79.6	0.04	0700-2200	15	2	25	20	4.17E-02	6.08E-05	3.33E-03	3.33E-03
Gen14	CH-17GN	Point	845968.3	814898.7	30	1.05	763	79.6	0.04	0700-2200	15	2	25	20	4.17E-02	6.08E-05	3.33E-03	3.33E-03
Gen15	CH-18GN	Point	846001.1	815138.7	5	1.05	763	79.6	0.04	0700-2200	15	2	25	20	4.17E-02	6.08E-05	3.33E-03	3.33E-03
Gen16	CH-19GN	Point	846195.2	815078.2	5	1.70	773	52.8	0.075	0700-2200	15	16	100	80	8.89E-02	4.86E-04	6.67E-03	6.67E-03
Gen17	CH-20GN	Point	846089.1	815059.4	5	1.05	763	79.6	0.04	1800-2200	4	1	25	20	4.17E-02	3.04E-05	3.33E-03	3.33E-03
Gen18	E01	Point	846205.3	815140.2	5	2.00	803	78.5	0.1	0700-2000	13	46	220	176	1.96E-01	1.40E-03	9.78E-03	9.78E-03
Gen19	E02	Point	846204.6	815157.5	5	1.70	773	84.9	0.1	2000-0700	11	34	150	120	1.33E-01	1.03E-03	1.00E-02	1.00E-02
Gen20	Jaw Crusher 1 [(d)]	Point	846073.3	814227.3	5	1.90	773	30.8	0.1	0700-2300	16	32	-	168	1.87E-01	9.72E-04	9.33E-03	9.33E-03
Gen21	Jaw Crusher 2 [(d)]	Point	846073.3	814227.3	5	1.90	773	30.8	0.1	0700-2300	16	32	-	168	1.87E-01	9.72E-04	9.33E-03	9.33E-03
Gen22	Jaw Crusher 3 [(d)]	Point	846073.3	814227.3	5	1.90	773	30.8	0.1	0700-2300	16	32	-	168	1.87E-01	9.72E-04	9.33E-03	9.33E-03
Gen23	Jaw Crusher 4 [(e)]	Point	846073.3	814227.3	5	3.18	760	59.0	0.073	0700-2300	16	52	-	310	3.44E-01	1.58E-03	1.72E-02	1.72E-02
Gen24	Cone Crusher [(e)]	Point	846073.3	814227.3	5	3.15	839	79.0	0.1016	0700-2300	16	66	-	403	4.48E-01	2.01E-03	2.24E-02	2.24E-02
Gen25	Impact Crusher [(e)]	Point	846073.3	814227.3	5	3.13	839	59.0	0.073	0700-2300	16	66	-	403	4.48E-01	2.01E-03	2.24E-02	2.24E-02
Gen26	Screening Machine [(e)]	Point	846073.3	814227.3	5	1.32	820	124.9	0.058	0700-2300	16	17	-	100	1.11E-01	5.17E-04	8.33E-03	8.33E-03
Gen27	Gen27	Point	846339.2	813930.6	5	2.60	744	78.4	0.15	24 hours	24	102.2	500	400	4.44E-01	3.11E-03	2.22E-02	2.22E-02
Gen28	Gen28	Point	845952.5	814469.8	5	2.80	816	122.5	0.16	24 hours	24	161	640	512	5.69E-01	4.89E-03	2.84E-02	2.84E-02
Gen29	Gen29	Point	845899.1	814565.3	5	2.80	816	122.5	0.16	24 hours	24	161	640	512	5.69E-01	4.89E-03	2.84E-02	2.84E-02

Notes:

(a) NOx and RSP emission rates were calculated based on the engine power output and NOx and RSP emission factors from European Union Stage IIIA Standard specified under the Air Pollution Control (Non-road Mobile Machinery)(Emission) Regulation. FSP emission rate was assumed the same as RSP emission rate for conservative assessment.

(b) SO2 emission rate was calculated based on plant fuel consumption and the SO2 emission factor for diesel industrial engines from Table 3.3-1, Section 3.3 (Gasoline and Diesel Industrial Engines), AP-42 Vol 1. With reference to Table 5 of "Exhaust Emissions from Uncontrolled Vehicles and Related Equipment Using Internal Combustion Engines, Part 5: Farm, Construction, and Industrial Engines" published by USEPA, the SO2 emission factors for diesel industrial engines provided in AP-42 were estimated based on a fuel sulphur content of 0.22% for diesel fuel. Therefore, the SO2 emission factors adopted in this assessment have been corrected based on a sulphur content of 0.005% for ULSD in Hong Kong. Energy content of diesel fuel was assumed to be 38.6 MJ/L.

(c) Information for the generators within TKOFB were provided by CEDD. Maximum fuel consumption rate and engine power output of the generators as provided by CEDD were adopted as a conservative assessment. The actual engine power outputs of the generators would be lower than the adopted maximum engine power outputs which were based on equipment specifications.

(d) The parameters of the three existing jaw crushers in the 2021 ER Report have been adopted.

(e) TKOFB will operate a new jaw crusher, cone crusher, impact crusher and screening machine. The final model of these equipment has yet to be decided but will be chosen among the models provided by a number of suppliers. As such, the parameters that will lead to the worst-case prediction among the available equipment models have been adopted as a conservative assumption.

Appendix A1 - Emission Inventory for Generators and Crushers (Internal Combustion Engines) within TKOFB (Scenario 2)

Source ID	Description	Source Type	Coordinates		Base Elevation	Stack Height	Stack Temp	Stack Velocity	Stack Diameter	Working Hour	Total Working Hour	Fuel Consumption	Engine Power	Engine Power	NOx	SO2	RSP	FSP
			X1	Y1														
			m	m	m	m	K	m/s	m			L/hr	kVA	kW	g/s	g/s	g/s	g/s
Gen1	CH-01GN	Point	846190.4	815130.4	5	1.70	773	84.9	0.1	0700-2200	15	20	150	120	1.33E-01	6.08E-04	1.00E-02	1.00E-02
Gen2	CH-02GN	Point	846176.1	815130.4	5	1.70	773	52.8	0.075	0700-2200	15	14	100	80	8.89E-02	4.25E-04	6.67E-03	6.67E-03
Gen3	CH-03GN	Point	846130.0	815136.3	5	1.70	773	84.9	0.1	0700-2100	14	10	150	120	1.33E-01	3.04E-04	1.00E-02	1.00E-02
Gen4	CH-04GN	Point	846172.9	815195.0	5	1.75	773	80.8	0.105	2100-0700	10	28	220	176	1.96E-01	8.51E-04	9.78E-03	9.78E-03
Gen5	CH-05GN	Point	846156.5	815196.0	5	1.85	793	52.4	0.135	0700-2100	14	41	300	240	2.67E-01	1.25E-03	1.33E-02	1.33E-02
Gen6	CH-06GN	Point	846151.2	815276.0	5	1.75	783	80.8	0.105	0700-2200	15	25	220	176	1.96E-01	7.60E-04	9.78E-03	9.78E-03
Gen7	CH-07GN	Point	846134.8	815274.9	5	2.20	773	37.3	0.16	0700-2200	15	30	400	320	3.56E-01	9.12E-04	1.78E-02	1.78E-02
Gen8	CH-08GN	Point	846058.0	815143.7	5	1.70	773	84.9	0.1	0700-2200	15	18	150	120	1.33E-01	5.47E-04	1.00E-02	1.00E-02
Gen9	CH-10GN	Point	845956.8	814703.3	30	1.85	793	52.4	0.135	0700-2200	15	17	300	240	2.67E-01	5.17E-04	1.33E-02	1.33E-02
Gen10	CH-12GN	Point	845798.3	814760.8	5	1.05	763	79.6	0.04	0700-2200	15	3	25	20	4.17E-02	9.12E-05	3.33E-03	3.33E-03
Gen11	CH-13GN	Point	846201.4	814692.8	30	1.05	763	79.6	0.04	1800-2200	4	2	25	20	4.17E-02	6.08E-05	3.33E-03	3.33E-03
Gen12	CH-14GN	Point	845743.5	814764.3	5	1.35	763	58.9	0.06	0700-2200	15	4	60	48	6.27E-02	1.22E-04	5.33E-03	5.33E-03
Gen13	CH-16GN	Point	846364.8	814254.4	30	1.05	763	79.6	0.04	0700-2200	15	2	25	20	4.17E-02	6.08E-05	3.33E-03	3.33E-03
Gen14	CH-17GN	Point	845968.3	814898.7	30	1.05	763	79.6	0.04	0700-2200	15	2	25	20	4.17E-02	6.08E-05	3.33E-03	3.33E-03
Gen15	CH-18GN	Point	846001.1	815138.7	5	1.05	763	79.6	0.04	0700-2200	15	2	25	20	4.17E-02	6.08E-05	3.33E-03	3.33E-03
Gen16	CH-19GN	Point	846195.2	815078.2	5	1.70	773	52.8	0.075	0700-2200	15	16	100	80	8.89E-02	4.86E-04	6.67E-03	6.67E-03
Gen17	CH-20GN	Point	846089.1	815059.4	5	1.05	763	79.6	0.04	1800-2200	4	1	25	20	4.17E-02	3.04E-05	3.33E-03	3.33E-03
Gen18	E01	Point	846205.3	815140.2	5	2.00	803	78.5	0.1	0700-2000	13	46	220	176	1.96E-01	1.40E-03	9.78E-03	9.78E-03
Gen19	E02	Point	846204.6	815157.5	5	1.70	773	84.9	0.1	2000-0700	11	34	150	120	1.33E-01	1.03E-03	1.00E-02	1.00E-02
Gen20	Jaw Crusher 1 [(d)]	Point	845815.0	814677.0	5	1.90	773	30.8	0.1	0700-2300	16	32	-	168	1.87E-01	9.72E-04	9.33E-03	9.33E-03
Gen21	Jaw Crusher 2 [(d)]	Point	845815.0	814677.0	5	1.90	773	30.8	0.1	0700-2300	16	32	-	168	1.87E-01	9.72E-04	9.33E-03	9.33E-03
Gen22	Jaw Crusher 3 [(d)]	Point	845815.0	814677.0	5	1.90	773	30.8	0.1	0700-2300	16	32	-	168	1.87E-01	9.72E-04	9.33E-03	9.33E-03
Gen23	Jaw Crusher 4 [(e)]	Point	845815.0	814677.0	5	3.18	760	59.0	0.073	0700-2300	16	52	-	310	3.44E-01	1.58E-03	1.72E-02	1.72E-02
Gen24	Cone Crusher [(e)]	Point	845815.0	814677.0	5	3.15	839	79.0	0.1016	0700-2300	16	66	-	403	4.48E-01	2.01E-03	2.24E-02	2.24E-02
Gen25	Impact Crusher [(e)]	Point	845815.0	814677.0	5	3.13	839	59.0	0.073	0700-2300	16	66	-	403	4.48E-01	2.01E-03	2.24E-02	2.24E-02
Gen26	Screening Machine [(e)]	Point	845815.0	814677.0	5	1.32	820	124.9	0.058	0700-2300	16	17	-	100	1.11E-01	5.17E-04	8.33E-03	8.33E-03
Gen27	Gen27	Point	846339.2	813930.6	5	2.60	744	78.4	0.15	24 hours	24	102.2	500	400	4.44E-01	3.11E-03	2.22E-02	2.22E-02
Gen28	Gen28	Point	845952.5	814469.8	5	2.80	816	122.5	0.16	24 hours	24	161	640	512	5.69E-01	4.89E-03	2.84E-02	2.84E-02
Gen29	Gen29	Point	845899.1	814565.3	5	2.80	816	122.5	0.16	24 hours	24	161	640	512	5.69E-01	4.89E-03	2.84E-02	2.84E-02

Notes:

(a) NOx and RSP emission rates were calculated based on the engine power output and NOx and RSP emission factors from European Union Stage IIIA Standard specified under the Air Pollution Control (Non-road Mobile Machinery)(Emission) Regulation. FSP emission rate was assumed the same as RSP emission rate for conservative assessment.

(b) SO2 emission rate was calculated based on plant fuel consumption and the SO2 emission factor for diesel industrial engines from Table 3.3-1, Section 3.3 (Gasoline and Diesel Industrial Engines), AP-42 Vol 1. With reference to Table 5 of "Exhaust Emissions from Uncontrolled Vehicles and Related Equipment Using Internal Combustion Engines, Part 5: Farm, Construction, and Industrial Engines" published by USEPA, the SO2 emission factors for diesel industrial engines provided in AP-42 were estimated based on a fuel sulphur content of 0.22% for diesel fuel. Therefore, the SO2 emission factors adopted in this assessment have been corrected based on a sulphur content of 0.005% for ULSD in Hong Kong. Energy content of diesel fuel was assumed to be 38.6 MJ/L.

(c) Information for the generators within TKOFB were provided by CEDD. Maximum fuel consumption rate and engine power output of the generators as provided by CEDD were adopted as a conservative assessment. The actual engine power outputs of the generators would be lower than the adopted maximum engine power outputs which were based on equipment specifications.

(d) The parameters of the three existing jaw crushers in the 2021 ER Report have been adopted.

(e) TKOFB will operate a new jaw crusher, cone crusher, impact crusher and screening machine. The final model of these equipment has yet to be decided but will be chosen among the models provided by a number of suppliers. As such, the parameters that will lead to the worst-case prediction among the available equipment models have been adopted as a conservative assumption.

APPENDIX A2 EMISSION INVENTORY AND DETAILED EMISSION RATE CALCULATIONS FOR ADJACENT EMISSION SOURCES

Appendix A2 - Emission Inventory for Stack Emission Sources in the Vicinity of TKOFB

Sources	Model Input ID	X	Y	Elevation	RSP Emission	FSP Emission	NOx Emission	SO2 Emission	Discharge Height	Temp	Exit Velocity	Diameter	Operation Hour
				m	g/s	g/s	g/s	g/s	m	K	m/s	m	
SENTX Flare1 [(a)]	F1	846465	814674	7			0.243	0.079	12.2	1144	10.0	2.0	24 hours
SENTX Thermal oxidizer [(a)]	TO	846565	814732	7			2.5	0.07	21.65	518	7.5	2.1	24 hours
SENTX LFG Generator [(a)]	LG	846435	814675	7			0.0527	0.034	15	764	28.2	0.5	24 hours
HAECO [(b)]	HO	846000	815724	6.7			106	1.92	40	325	16.4	14.7	24 hours

Notes:

(a) Emission details were referenced from the appproved Technical Note on Operational Air Quality Impact Due to Proposed Design Changes for SENT Extension in 2019.

(b) Emission information was confirmed valid by HAECO making reference to the TKOFB Environmental Review Report approved in Nov 2018.

Appendix A2 - TSP, RSP and FSP Emission Inventory for Dust Emission Sources for Operation of SENT Landfill Extension

Source ID	Description	Source Type	Coordinates		Dimension		Base Elevation	Height	Angle/ Width	Working Hour	TSP Emission Rate		RSP Emission Rate		FSP Emission Rate	
			X1	Y1	X2	Y2					Working Hours	Non-working Hours	Working Hours	Non-working Hours	Working Hours	Non-working Hours
			m	m	m	m	m	m	deg / m		g/s or g/m²/s	g/s or g/m²/s	g/s or g/m²/s	g/s or g/m²/s	g/s or g/m²/s	g/s or g/m²/s
AA	Active Filling Area	Area	846469.8	815348.2	30.0	40.0	7.0	0.5	0.00	0800-2300	1.40E-05	2.70E-06	4.20E-06	8.09E-07	4.20E-07	8.09E-08
TKO22	Paved Haul Road	Area	846243.4	815066.4	7.0	361.6	7.0	0.5	0.09	0800-2300	6.20E-05	0.00E+00	1.19E-05	0.00E+00	2.88E-06	0.00E+00
TKO23-A	Unpaved Haul Road	Area	846250.3	815067.1	7.0	377.2	7.0	0.5	167.28	0800-2300	2.29E-04	2.70E-06	6.19E-05	8.09E-07	6.19E-06	8.09E-08
TKO23-B	Unpaved Haul Road	Area	846333.2	814700.3	7.0	103.0	7.0	0.5	149.31	0800-2300	2.29E-04	2.70E-06	6.19E-05	8.09E-07	6.19E-06	8.09E-08
TKO23-C	Unpaved Haul Road	Area	846381.2	814613.1	7.0	145.4	8.5	0.5	61.80	0800-2300	2.29E-04	2.70E-06	6.19E-05	8.09E-07	6.19E-06	8.09E-08
TKO24	Unpaved Haul Road	Area	846412.8	815008.0	7.0	343.5	15.5	0.5	162.87	0800-2300	2.29E-04	2.70E-06	6.19E-05	8.09E-07	6.19E-06	8.09E-08
TKO25	Unpaved Haul Road	Area	846406.1	815007.7	7.0	355.2	26.5	0.5	12.25	0800-2300	2.29E-04	2.70E-06	6.19E-05	8.09E-07	6.19E-06	8.09E-08

Note:

(a) Dust emission sources from the operation of SENT Landfill Extension (SENTX) considered were confirmed valid by Landfills and Development Group (LDG) of EPD. Indicative locations of haul roads TKO22 to TKO25 and active filling area are illustrated in Figure 3.5.

(b) The area for haul road TKO22 is paved when handing over for SENT Landfill Extension as confirmed by CEDD.

Wind Erosion - Active Filling Area and Unpaved Haul Road

TSP emission factor	0.85	Mg/hectare/yr	USEPA AP-42 Section 11.9, Table 11.9.4
RSP to TSP ratio	0.3		Estimating Particulate Matter Emissions From Construction Operations, USEPA 1999
FSP to TSP ratio	0.03		Estimating Particulate Matter Emissions From Construction Operations, USEPA 1999
Unmitigated TSP emission rate	2.70E-06	g/m²/s	
Unmitigated RSP emission rate	8.09E-07	g/m²/s	
Unmitigated FSP emission rate	8.09E-08	g/m²/s	
Dust Removal Efficiency	91.7	%	Watering once every hour, TKODP ERR
Mitigated TSP emission rate	2.237E-07	g/m²/s	
Mitigated RSP emission rate	6.711E-08	g/m²/s	
Mitigated FSP emission rate	6.711E-09	g/m²/s	

Active Filling Area (AA) (0800 to 2300)

TSP emission factor	2.69	Mg/hectare/month of activity	USEPA AP-42 Section 13.2.3.3
No of working days per month	30		
Number of working hours per day	15		
RSP to TSP ratio	0.3		Estimating Particulate Matter Emissions From Construction Operations, USEPA 1999
FSP to TSP ratio	0.03		Estimating Particulate Matter Emissions From Construction Operations, USEPA 1999
Unmitigated TSP emission rate	1.66E-04	g/m²/s	
Unmitigated RSP emission rate	4.98E-05	g/m²/s	
Unmitigated FSP emission rate	4.98E-06	g/m²/s	
Dust Removal Efficiency	91.7	%	Watering once every hour, TKODP ERR
Mitigated TSP emission rate	1.38E-05	g/m²/s	
Mitigated RSP emission rate	4.13E-06	g/m²/s	
Mitigated FSP emission rate	4.13E-07	g/m²/s	

Paved Haul Road - TKO22 (0800 to 2300)

k (TSP)	3.23		USEPA AP-42 Section 13.2.1, Table 13.2.1-1
k (RSP)	0.62		USEPA AP-42 Section 13.2.1, Table 13.2.1-1
k (FSP)	0.15		USEPA AP-42 Section 13.2.1, Table 13.2.1-1
s - surface silt loading	2.4	g/m2	USEPA AP-42 Section 13.2.1, Table 13.2.1-3
W - mean vehicle weight	18.88	US tons	
E (TSP)	143.4	g/Vkt	
E (RSP)	27.5	g/Vkt	
E (FSP)	6.7	g/Vkt	
No of trucks per hour	109		Maximum hourly no. of truck from Traffic forecast (i.e. Road To/From TKO SENTX)
Dust suppression %	90	%	TKODP ERR
width of road	7	m	TKODP ERR
Mitigated TSP emission rate	6.20E-05	g/m²/s	
Mitigated RSP emission rate	1.19E-05	g/m²/s	
Mitigated FSP emission rate	2.88E-06	g/m²/s	

Unpaved Haul Road -TKO23 to TKO25 (0800 to 2300)

k (TSP)	4.9		USEPA AP-42 Section 13.2.2, Table 13.2.2-2
k (RSP)	1.5		USEPA AP-42 Section 13.2.2, Table 13.2.2-2
k (FSP)	0.15		USEPA AP-42 Section 13.2.2, Table 13.2.2-2
s - surface material silt content	6.4	%	USEPA AP-42 Section 13.2.2, Table 13.2.2-1
a (TSP)	0.7		USEPA AP-42 Section 13.2.2, Table 13.2.2-2
a (RSP and FSP)	0.9		USEPA AP-42 Section 13.2.2, Table 13.2.2-2
b (TSP, RSP and FSP)	0.45		USEPA AP-42 Section 13.2.2, Table 13.2.2-2
W - mean vehicle weight	18.88	US tons	
E (TSP)	2.035	g/Vmt	
E (RSP)	0.549	g/Vmt	
E (FSP)	0.055	g/Vmt	
No of trucks per hour	109		Maximum hourly no. of truck from Traffic forecast (i.e. Road To/From TKO SENTX)
Dust suppression %	90	%	TKODP ERR
width of road	7	m	TKODP ERR
vehicle speed correction	74	%	TKODP ERR
Mitigated TSP emission rate	2.29E-04	g/m²/s	
Mitigated RSP emission rate	6.18E-05	g/m²/s	
Mitigated FSP emission rate	6.18E-06	g/m²/s	

Appendix A2 - Hourly Emission Rate Profile for Dust Emission Sources for Operation of SENT Landfill Extension

a. Active Filling Area - Hourly Emission Rates

Hour	Active Filling Area (AA)		
	Emission Rates (g/s or g/m2/s)		
	TSP	RSP	FSP
1	2.70E-06	8.09E-07	8.09E-08
2	2.70E-06	8.09E-07	8.09E-08
3	2.70E-06	8.09E-07	8.09E-08
4	2.70E-06	8.09E-07	8.09E-08
5	2.70E-06	8.09E-07	8.09E-08
6	2.70E-06	8.09E-07	8.09E-08
7	2.70E-06	8.09E-07	8.09E-08
8	2.70E-06	8.09E-07	8.09E-08
9	1.40E-05	4.20E-06	4.20E-07
10	1.40E-05	4.20E-06	4.20E-07
11	1.40E-05	4.20E-06	4.20E-07
12	1.40E-05	4.20E-06	4.20E-07
13	1.40E-05	4.20E-06	4.20E-07
14	1.40E-05	4.20E-06	4.20E-07
15	1.40E-05	4.20E-06	4.20E-07
16	1.40E-05	4.20E-06	4.20E-07
17	1.40E-05	4.20E-06	4.20E-07
18	1.40E-05	4.20E-06	4.20E-07
19	1.40E-05	4.20E-06	4.20E-07
20	1.40E-05	4.20E-06	4.20E-07
21	1.40E-05	4.20E-06	4.20E-07
22	1.40E-05	4.20E-06	4.20E-07
23	1.40E-05	4.20E-06	4.20E-07
24	2.70E-06	8.09E-07	8.09E-08
Maximum	**1.40E-05**	**4.20E-06**	**4.20E-07**

b. Paved and Unpaved Haul Road - Hourly Emission Rates

Hour	Truck Flow To/From SENTX (Veh) [(a)]	Paved Haul Road (TKO22)			Unpaved Haul Road (TKO23 - TKO25)		
		Emission Rates (g/s or g/m2/s)			Emission Rates (g/s or g/m2/s)		
		TSP	RSP	FSP	TSP	RSP	FSP
1	0	0.00E+00	0.00E+00	0.00E+00	2.70E-06	8.09E-07	8.09E-08
2	0	0.00E+00	0.00E+00	0.00E+00	2.70E-06	8.09E-07	8.09E-08
3	0	0.00E+00	0.00E+00	0.00E+00	2.70E-06	8.09E-07	8.09E-08
4	0	0.00E+00	0.00E+00	0.00E+00	2.70E-06	8.09E-07	8.09E-08
5	0	0.00E+00	0.00E+00	0.00E+00	2.70E-06	8.09E-07	8.09E-08
6	0	0.00E+00	0.00E+00	0.00E+00	2.70E-06	8.09E-07	8.09E-08
7	0	0.00E+00	0.00E+00	0.00E+00	2.70E-06	8.09E-07	8.09E-08
8	0	0.00E+00	0.00E+00	0.00E+00	2.70E-06	8.09E-07	8.09E-08
9	30	1.71E-05	3.28E-06	7.93E-07	6.31E-05	1.70E-05	1.70E-06
10	94	5.35E-05	1.03E-05	2.48E-06	1.98E-04	5.33E-05	5.33E-06
11	101	5.75E-05	1.10E-05	2.67E-06	2.12E-04	5.73E-05	5.73E-06
12	99	5.64E-05	1.08E-05	2.62E-06	2.08E-04	5.62E-05	5.62E-06
13	88	5.01E-05	9.61E-06	2.33E-06	1.85E-04	4.99E-05	4.99E-06
14	91	5.18E-05	9.94E-06	2.41E-06	1.91E-04	5.16E-05	5.16E-06
15	100	5.69E-05	1.09E-05	2.64E-06	2.10E-04	5.67E-05	5.67E-06
16	101	5.75E-05	1.10E-05	2.67E-06	2.12E-04	5.73E-05	5.73E-06
17	109	6.20E-05	1.19E-05	2.88E-06	2.29E-04	6.19E-05	6.19E-06
18	77	4.38E-05	8.41E-06	2.04E-06	1.62E-04	4.37E-05	4.37E-06
19	61	3.47E-05	6.66E-06	1.61E-06	1.28E-04	3.46E-05	3.46E-06
20	30	1.71E-05	3.28E-06	7.93E-07	6.31E-05	1.70E-05	1.70E-06
21	12	6.83E-06	1.31E-06	3.17E-07	2.52E-05	6.81E-06	6.81E-07
22	5	2.85E-06	5.46E-07	1.32E-07	1.05E-05	2.84E-06	2.84E-07
23	2	1.14E-06	2.19E-07	5.29E-08	4.20E-06	1.13E-06	1.13E-07
24	0	0.00E+00	0.00E+00	0.00E+00	2.70E-06	8.09E-07	8.09E-08
Maximum		**6.20E-05**	**1.19E-05**	**2.88E-06**	**2.29E-04**	**6.19E-05**	**6.19E-06**

Note:

(a) Hourly truck flow to and from SENTX was provided by traffic consultant based on daily truck flow predictions as advised by EPD.

c. Hourly Emission Rate Ratio for Model Input

Hour	Active Filling Area (AA)			Paved Haul Road (TKO22)			Unpaved Haul Road (TKO23 - TKO25)		
	TSP	RSP	FSP	TSP	RSP	FSP	TSP	RSP	FSP
1	0.19	0.19	0.19	0	0	0	0.01	0.01	0.01
2	0.19	0.19	0.19	0	0	0	0.01	0.01	0.01
3	0.19	0.19	0.19	0	0	0	0.01	0.01	0.01
4	0.19	0.19	0.19	0	0	0	0.01	0.01	0.01
5	0.19	0.19	0.19	0	0	0	0.01	0.01	0.01
6	0.19	0.19	0.19	0	0	0	0.01	0.01	0.01
7	0.19	0.19	0.19	0	0	0	0.01	0.01	0.01
8	0.19	0.19	0.19	0	0	0	0.01	0.01	0.01
9	1	1	1	0.28	0.28	0.28	0.28	0.28	0.28
10	1	1	1	0.86	0.86	0.86	0.86	0.86	0.86
11	1	1	1	0.93	0.93	0.93	0.93	0.93	0.93
12	1	1	1	0.91	0.91	0.91	0.91	0.91	0.91
13	1	1	1	0.81	0.81	0.81	0.81	0.81	0.81
14	1	1	1	0.83	0.83	0.83	0.83	0.83	0.83
15	1	1	1	0.92	0.92	0.92	0.92	0.92	0.92
16	1	1	1	0.93	0.93	0.93	0.93	0.93	0.93
17	1	1	1	1	1	1	1	1	1
18	1	1	1	0.71	0.71	0.71	0.71	0.71	0.71
19	1	1	1	0.56	0.56	0.56	0.56	0.56	0.56
20	1	1	1	0.28	0.28	0.28	0.28	0.28	0.28
21	1	1	1	0.11	0.11	0.11	0.11	0.11	0.11
22	1	1	1	0.05	0.05	0.05	0.05	0.05	0.05
23	1	1	1	0.02	0.02	0.02	0.02	0.02	0.02
24	0.19	0.19	0.19	0	0	0	0.01	0.01	0.01

APPENDIX A3 PREDICTED CUMULATIVE POLLUTANT CONCENTRATIONS AT ASRS

Appendix A3 - Predicted Cumulative Pollutant Concentrations at Representative ASRs

						NO_2												
						Cumulative 19th Highest 1-hour Average (μg/m^3)												
						Receptor Height (mAG)												
						Scenario 1							Scenario 2					
ASR ID	ASR Description	X	Y	PATH Grid	Base Height (mPD)	1.5	4.5	7.5	10	20	30	40	1.5	4.5	7.5	10	20	30	40
A1	TVB City	846210	815485	50_29	5.3	187.86	187.74	186.19	185.76	184.32	162.94	-	192.08	191.44	192.19	191.70	192.72	172.27	-
A2	TVB City	846105	815495	50_29	5.3	172.50	171.07	170.77	171.81	169.28	149.53	-	176.19	175.86	176.13	176.84	181.31	164.85	-
A3	HAESL	846091	815718	50_29	5.3	148.52	148.16	147.43	145.13	141.60	126.27	-	149.58	148.37	147.49	147.24	145.56	137.40	-
A4	TVB City	846260	815786	50_29	6.1	152.46	152.87	150.84	149.92	143.50	122.60	-	151.76	150.37	149.03	147.71	144.56	139.65	-
A5	HAESL Component Overhaul Building	846139	815840	50_29	5.8	145.00	144.53	144.04	143.59	136.03	120.26	-	143.60	142.59	141.80	141.48	133.60	120.50	-
A6	Digital Savvis Investment	846325	815907	50_29	9.5	150.05	147.05	143.68	143.42	133.90	119.71	-	152.34	149.62	145.83	145.70	140.75	127.64	-
A7	Trade Development Council	845881	815903	50_29	7.7	133.76	133.05	132.81	131.35	130.91	-	-	146.06	144.34	140.15	136.40	130.41	-	-
A8	Office Building of SENT Landfill Extension	846390	814682	50_28	5.0	191.56	192.61	-	-	-	-	-	170.17	170.28	-	-	-	-	-
A9	Office Building of Desalination Plant	846623	814066	50_27	5.0	151.18	150.37	149.49	149.76	154.67	133.00	105.12	129.14	128.80	129.65	129.09	143.55	128.91	104.68
A10	Administrative Building of P-Tech Landfill Gas (SENT) Company Limited	846274	815126	50_28	5.9	165.23	-	-	-	-	-	-	197.21	-	-	-	-	-	-
					Assessment Criterion	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**
					Max % Relative to Assessment Criterion	95.78%	96.31%	93.09%	92.88%	92.16%	81.47%	52.56%	98.60%	95.72%	96.10%	95.85%	96.36%	86.14%	52.34%

						NO_2												
						Cumulative Annual Average (μg/m^3)												
						Receptor Height (mAG)												
						Scenario 1							Scenario 2					
ASR ID	ASR Description	X	Y	PATH Grid	Base Height (mPD)	1.5	4.5	7.5	10	20	30	40	1.5	4.5	7.5	10	20	30	40
A1	TVB City	846210	815485	50_29	5.3	30.61	29.12	27.22	25.78	22.49	20.13	-	31.30	29.79	27.88	26.44	23.13	20.81	-
A2	TVB City	846105	815495	50_29	5.3	24.15	23.79	23.37	23.05	21.41	19.23	-	24.87	24.51	24.11	23.80	22.14	19.90	-
A3	HAESL	846091	815718	50_29	5.3	21.58	20.20	19.29	18.87	17.74	16.66	-	21.99	20.61	19.72	19.29	18.15	17.04	-
A4	TVB City	846260	815786	50_29	6.1	24.94	23.57	21.87	20.58	17.73	16.55	-	25.36	24.00	22.31	21.01	18.15	16.94	-
A5	HAESL Component Overhaul Building	846139	815840	50_29	5.8	20.78	19.46	18.56	18.09	17.06	16.65	-	21.12	19.80	18.91	18.44	17.39	16.96	-
A6	Digital Savvis Investment	846325	815907	50_29	9.5	22.37	20.37	18.71	17.91	16.78	16.15	-	22.73	20.73	19.06	18.26	17.12	16.46	-
A7	Trade Development Council	845881	815903	50_29	7.7	15.80	15.67	15.55	15.45	15.13	-	-	16.00	15.86	15.74	15.64	15.29	-	-
A8	Office Building of SENT Landfill Extension	846390	814682	50_28	5.0	29.88	29.57	-	-	-	-	-	26.36	26.11	-	-	-	-	-
A9	Office Building of Desalination Plant	846623	814066	50_27	5.0	14.54	14.51	14.54	14.62	14.89	14.27	13.50	14.36	14.34	14.37	14.44	14.72	14.17	13.47
A10	Administrative Building of P-Tech Landfill Gas (SENT) Company Limited	846274	815126	50_28	5.9	28.46	-	-	-	-	-	-	29.49	-	-	-	-	-	-
					Assessment Criterion	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**
					Max % Relative to Assessment Criterion	76.54%	73.94%	68.04%	64.46%	56.21%	50.33%	33.75%	78.25%	74.47%	69.70%	66.09%	57.83%	52.02%	33.68%

Appendix A3 - Predicted Cumulative Pollutant Concentrations at Representative ASRs

						SO_2												
						Cumulative 4th Highest 10-minute Average (µg/m^3)												
						Receptor Height (mAG)												
						Scenario 1							Scenario 2					
ASR ID	ASR Description	X	Y	PATH Grid	Base Height (mPD)	1.5	4.5	7.5	10	20	30	40	1.5	4.5	7.5	10	20	30	40
A1	TVB City	846210	815485	50_29	5.3	38.32	38.32	38.32	38.32	38.32	38.32	-	38.32	38.32	38.32	38.32	38.32	38.32	-
A2	TVB City	846105	815495	50_29	5.3	38.33	38.33	38.33	38.33	38.33	38.33	-	38.34	38.33	38.33	38.33	38.33	38.33	-
A3	HAESL	846091	815718	50_29	5.3	38.29	38.29	38.29	38.29	38.29	38.31	-	38.29	38.29	38.29	38.29	38.30	38.31	-
A4	TVB City	846260	815786	50_29	6.1	38.29	38.29	38.29	38.29	38.29	38.29	-	38.29	38.29	38.29	38.29	38.29	38.29	-
A5	HAESL Component Overhaul Building	846139	815840	50_29	5.8	38.29	38.29	38.29	38.29	38.29	38.29	-	38.29	38.29	38.29	38.29	38.29	38.29	-
A6	Digital Savvis Investment	846325	815907	50_29	9.5	38.28	38.28	38.28	38.28	38.28	38.28	-	38.28	38.28	38.28	38.28	38.28	38.28	-
A7	Trade Development Council	845881	815903	50_29	7.7	38.36	38.36	38.37	38.37	38.38	-	-	38.36	38.36	38.37	38.37	38.38	-	-
A8	Office Building of SENT Landfill Extension	846390	814682	50_28	5.0	39.28	39.40	-	-	-	-	-	39.28	39.40	-	-	-	-	-
A9	Office Building of Desalination Plant	846623	814066	50_27	5.0	34.07	34.07	34.07	34.07	34.07	34.07	34.07	34.07	34.07	34.07	34.07	34.07	34.07	34.07
A10	Administrative Building of P-Tech Landfill Gas (SENT) Company Limited	846274	815126	50_28	5.9	38.84	-	-	-	-	-	-	38.84	-	-	-	-	-	-
					Assessment Criterion	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**
					Max % Relative to Assessment Criterion	7.86%	7.88%	7.67%	7.67%	7.68%	7.67%	6.81%	7.86%	7.88%	7.67%	7.67%	7.68%	7.67%	6.81%

						SO_2												
						Cumulative 4th Highest 24-hour Average (µg/m^3)												
						Receptor Height (mAG)												
						Scenario 1							Scenario 2					
ASR ID	ASR Description	X	Y	PATH Grid	Base Height (mPD)	1.5	4.5	7.5	10	20	30	40	1.5	4.5	7.5	10	20	30	40
A1	TVB City	846210	815485	50_29	5.3	9.85	9.85	9.85	9.85	9.85	9.85	-	9.86	9.85	9.85	9.85	9.85	9.85	-
A2	TVB City	846105	815495	50_29	5.3	9.85	9.85	9.85	9.85	9.85	9.85	-	9.85	9.85	9.85	9.85	9.85	9.85	-
A3	HAESL	846091	815718	50_29	5.3	9.85	9.85	9.84	9.84	9.84	9.84	-	9.85	9.85	9.84	9.84	9.84	9.84	-
A4	TVB City	846260	815786	50_29	6.1	9.85	9.85	9.84	9.84	9.84	9.84	-	9.85	9.85	9.84	9.84	9.84	9.84	-
A5	HAESL Component Overhaul Building	846139	815840	50_29	5.8	9.85	9.84	9.84	9.84	9.84	9.84	-	9.85	9.84	9.84	9.84	9.84	9.84	-
A6	Digital Savvis Investment	846325	815907	50_29	9.5	9.84	9.84	9.84	9.84	9.84	9.84	-	9.84	9.84	9.84	9.84	9.84	9.84	-
A7	Trade Development Council	845881	815903	50_29	7.7	9.84	9.84	9.84	9.84	9.84	-	-	9.84	9.84	9.84	9.84	9.84	-	-
A8	Office Building of SENT Landfill Extension	846390	814682	50_28	5.0	9.82	9.82	-	-	-	-	-	9.82	9.82	-	-	-	-	-
A9	Office Building of Desalination Plant	846623	814066	50_27	5.0	9.94	9.94	9.93	9.92	9.91	9.90	9.89	9.94	9.94	9.93	9.92	9.91	9.90	9.89
A10	Administrative Building of P-Tech Landfill Gas (SENT) Company Limited	846274	815126	50_28	5.9	9.84	-	-	-	-	-	-	9.84	-	-	-	-	-	-
					Assessment Criterion	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**
					Max % Relative to Assessment Criterion	19.89%	19.88%	19.86%	19.85%	19.82%	19.79%	19.77%	19.89%	19.88%	19.86%	19.85%	19.82%	19.79%	19.77%

Appendix A3 - Predicted Cumulative Pollutant Concentrations at Representative ASRs

						FSP												
						Cumulative 19th Highest 24-hour Average (μg/m^3)												
						Receptor Height (mAG)												
						Scenario 1							Scenario 2					
ASR ID	ASR Description	X	Y	PATH Grid	Base Height (mPD)	1.5	4.5	7.5	10	20	30	40	1.5	4.5	7.5	10	20	30	40
A1	TVB City	846210	815485	50_29	5.3	33.02	32.98	32.91	32.87	32.80	32.79	-	33.03	32.98	32.91	32.87	32.81	32.79	-
A2	TVB City	846105	815495	50_29	5.3	32.93	32.92	32.89	32.88	32.84	32.81	-	32.93	32.92	32.89	32.88	32.84	32.81	-
A3	HAESL	846091	815718	50_29	5.3	32.96	32.90	32.87	32.85	32.82	32.80	-	32.96	32.90	32.87	32.85	32.82	32.80	-
A4	TVB City	846260	815786	50_29	6.1	33.00	32.95	32.90	32.87	32.79	32.78	-	33.00	32.96	32.90	32.87	32.80	32.78	-
A5	HAESL Component Overhaul Building	846139	815840	50_29	5.8	32.95	32.89	32.85	32.84	32.80	32.78	-	32.95	32.89	32.85	32.84	32.80	32.79	-
A6	Digital Savvis Investment	846325	815907	50_29	9.5	32.86	32.82	32.79	32.78	32.78	32.78	-	32.86	32.82	32.79	32.78	32.78	32.78	-
A7	Trade Development Council	845881	815903	50_29	7.7	32.81	32.80	32.80	32.79	32.79	-	-	32.81	32.80	32.80	32.80	32.79	-	-
A8	Office Building of SENT Landfill Extension	846390	814682	50_28	5.0	32.38	32.23	-	-	-	-	-	32.13	32.11	-	-	-	-	-
A9	Office Building of Desalination Plant	846623	814066	50_27	5.0	31.99	31.98	31.97	31.97	31.96	31.96	31.95	31.98	31.98	31.97	31.97	31.96	31.96	31.95
A10	Administrative Building of P-Tech Landfill Gas (SENT) Company Limited	846274	815126	50_28	5.9	32.18	-	-	-	-	-	-	32.19	-	-	-	-	-	-
					Assessment Criterion	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**
					Max % Relative to Assessment Criterion	66.05%	65.95%	65.82%	65.76%	65.68%	65.61%	63.90%	66.05%	65.96%	65.82%	65.77%	65.68%	65.62%	63.90%

						FSP												
						Cumulative Annual Average (μg/m^3)												
						Receptor Height (mAG)												
						Scenario 1							Scenario 2					
ASR ID	ASR Description	X	Y	PATH Grid	Base Height (mPD)	1.5	4.5	7.5	10	20	30	40	1.5	4.5	7.5	10	20	30	40
A1	TVB City	846210	815485	50_29	5.3	15.65	15.60	15.53	15.48	15.28	15.08	-	15.72	15.67	15.60	15.54	15.34	15.13	-
A2	TVB City	846105	815495	50_29	5.3	15.34	15.31	15.28	15.26	15.15	14.99	-	15.39	15.37	15.34	15.32	15.20	15.03	-
A3	HAESL	846091	815718	50_29	5.3	15.01	14.96	14.93	14.91	14.86	14.78	-	15.04	14.99	14.96	14.94	14.88	14.81	-
A4	TVB City	846260	815786	50_29	6.1	15.05	15.01	14.98	14.95	14.86	14.79	-	15.08	15.05	15.01	14.98	14.89	14.82	-
A5	HAESL Component Overhaul Building	846139	815840	50_29	5.8	14.94	14.89	14.86	14.84	14.79	14.73	-	14.96	14.92	14.88	14.87	14.81	14.75	-
A6	Digital Savvis Investment	846325	815907	50_29	9.5	14.93	14.89	14.85	14.83	14.78	14.73	-	14.96	14.92	14.88	14.86	14.81	14.75	-
A7	Trade Development Council	845881	815903	50_29	7.7	14.75	14.74	14.73	14.73	14.70	-	-	14.76	14.76	14.75	14.74	14.71	-	-
A8	Office Building of SENT Landfill Extension	846390	814682	50_28	5.0	15.46	15.40	-	-	-	-	-	15.08	15.03	-	-	-	-	-
A9	Office Building of Desalination Plant	846623	814066	50_27	5.0	13.82	13.81	13.81	13.80	13.81	13.74	13.66	13.80	13.79	13.78	13.78	13.79	13.74	13.66
A10	Administrative Building of P-Tech Landfill Gas (SENT) Company Limited	846274	815126	50_28	5.9	15.28	-	-	-	-	-	-	15.44	-	-	-	-	-	-
					Assessment Criterion	**25**	**25**	**25**	**25**	**25**	**25**	**25**	**25**	**25**	**25**	**25**	**25**	**25**	**25**
					Max % Relative to Assessment Criterion	62.60%	62.40%	62.13%	61.90%	61.12%	60.32%	54.65%	62.86%	62.66%	62.40%	62.17%	61.36%	60.53%	54.65%

Appendix A3 - Predicted Cumulative Pollutant Concentrations at Representative ASRs

						RSP												
						Cumulative 10th Highest 24-hour Average (μg/m^3)												
						Receptor Height (mAG)												
						Scenario 1							Scenario 2					
ASR ID	ASR Description	X	Y	PATH Grid	Base Height (mPD)	1.5	4.5	7.5	10	20	30	40	1.5	4.5	7.5	10	20	30	40
A1	TVB City	846210	815485	50_29	5.3	66.28	66.23	66.17	66.12	66.05	66.02	-	66.28	66.23	66.17	66.12	66.05	66.03	-
A2	TVB City	846105	815495	50_29	5.3	66.16	66.15	66.13	66.12	66.08	66.05	-	66.16	66.15	66.13	66.12	66.08	66.05	-
A3	HAESL	846091	815718	50_29	5.3	66.20	66.14	66.10	66.09	66.05	66.03	-	66.20	66.14	66.11	66.09	66.05	66.03	-
A4	TVB City	846260	815786	50_29	6.1	66.24	66.20	66.15	66.11	66.03	66.01	-	66.25	66.20	66.15	66.11	66.03	66.01	-
A5	HAESL Component Overhaul Building	846139	815840	50_29	5.8	66.19	66.13	66.09	66.07	66.04	66.02	-	66.19	66.13	66.10	66.08	66.04	66.02	-
A6	Digital Savvis Investment	846325	815907	50_29	9.5	66.10	66.06	66.03	66.02	66.01	66.01	-	66.10	66.06	66.03	66.02	66.01	66.01	-
A7	Trade Development Council	845881	815903	50_29	7.7	66.03	66.03	66.03	66.03	66.02	-	-	66.04	66.03	66.03	66.03	66.02	-	-
A8	Office Building of SENT Landfill Extension	846390	814682	50_28	5.0	67.42	67.37	-	-	-	-	-	64.78	64.76	-	-	-	-	-
A9	Office Building of Desalination Plant	846623	814066	50_27	5.0	65.63	65.63	65.62	65.62	65.61	65.61	65.60	65.63	65.62	65.62	65.62	65.61	65.61	65.60
A10	Administrative Building of P-Tech Landfill Gas (SENT) Company Limited	846274	815126	50_28	5.9	65.88	-	-	-	-	-	-	64.92	-	-	-	-	-	-
					Assessment Criterion	100	100	100	100	100	100	100	100	100	100	100	100	100	100
					Max % Relative to Assessment Criterion	67.42%	67.37%	66.17%	66.12%	66.08%	66.05%	65.60%	66.28%	66.23%	66.17%	66.12%	66.08%	66.05%	65.60%

						RSP												
						Cumulative Annual Average (μg/m^3)												
						Receptor Height (mAG)												
						Scenario 1							Scenario 2					
ASR ID	ASR Description	X	Y	PATH Grid	Base Height (mPD)	1.5	4.5	7.5	10	20	30	40	1.5	4.5	7.5	10	20	30	40
A1	TVB City	846210	815485	50_29	5.3	29.90	29.83	29.71	29.58	29.10	28.67	-	29.80	29.73	29.62	29.50	29.05	28.63	-
A2	TVB City	846105	815495	50_29	5.3	29.24	29.20	29.15	29.09	28.80	28.45	-	29.20	29.16	29.11	29.06	28.77	28.42	-
A3	HAESL	846091	815718	50_29	5.3	28.37	28.31	28.26	28.24	28.14	27.99	-	28.36	28.30	28.26	28.23	28.13	27.97	-
A4	TVB City	846260	815786	50_29	6.1	28.41	28.37	28.33	28.29	28.16	28.02	-	28.39	28.35	28.31	28.27	28.14	28.01	-
A5	HAESL Component Overhaul Building	846139	815840	50_29	5.8	28.21	28.15	28.11	28.08	28.00	27.88	-	28.19	28.14	28.10	28.07	27.99	27.87	-
A6	Digital Savvis Investment	846325	815907	50_29	9.5	28.20	28.15	28.11	28.08	28.00	27.89	-	28.19	28.14	28.09	28.07	27.99	27.88	-
A7	Trade Development Council	845881	815903	50_29	7.7	27.89	27.88	27.87	27.86	27.80	-	-	27.88	27.87	27.86	27.85	27.79	-	-
A8	Office Building of SENT Landfill Extension	846390	814682	50_28	5.0	34.78	34.51	-	-	-	-	-	30.11	30.04	-	-	-	-	-
A9	Office Building of Desalination Plant	846623	814066	50_27	5.0	28.66	28.64	28.60	28.55	28.52	28.37	28.13	28.56	28.54	28.51	28.47	28.48	28.35	28.11
A10	Administrative Building of P-Tech Landfill Gas (SENT) Company Limited	846274	815126	50_28	5.9	32.43	-	-	-	-	-	-	30.88	-	-	-	-	-	-
					Assessment Criterion	50	50	50	50	50	50	50	50	50	50	50	50	50	50
					Max % Relative to Assessment Criterion	69.57%	69.01%	59.41%	59.17%	58.20%	57.33%	56.25%	61.76%	60.08%	59.24%	59.00%	58.09%	57.26%	56.21%

Appendix A3 - Predicted Cumulative Pollutant Concentrations at Representative ASRs

						TSP												
						Cumulative Maximum 1-hour Average (µg/m^3)												
						Receptor Height (mAG)												
						Scenario 1							Scenario 2					
ASR ID	**ASR Description**	**X**	**Y**	**PATH Grid**	**Base Height (mPD)**	**1.5**	**4.5**	**7.5**	**10**	**20**	**30**	**40**	**1.5**	**4.5**	**7.5**	**10**	**20**	**30**	**40**
A1	TVB City	846210	815485	50_29	5.3	174.81	181.02	176.82	166.32	166.87	156.45	-	166.02	164.82	165.67	166.32	166.86	156.45	-
A2	TVB City	846105	815495	50_29	5.3	167.33	166.54	167.99	168.83	166.99	152.09	-	171.19	171.39	174.44	171.96	166.99	152.09	-
A3	HAESL	846091	815718	50_29	5.3	151.74	151.08	151.58	151.79	151.55	143.07	-	151.74	151.08	151.58	154.49	156.16	143.07	-
A4	TVB City	846260	815786	50_29	6.1	156.49	156.36	157.20	157.56	157.58	151.38	-	156.48	156.35	157.19	157.55	157.58	151.38	-
A5	HAESL Component Overhaul Building	846139	815840	50_29	5.8	150.59	150.16	150.88	151.18	151.20	144.24	-	150.59	150.16	150.88	151.18	151.19	144.24	-
A6	Digital Savvis Investment	846325	815907	50_29	9.5	152.02	152.47	152.63	152.66	151.95	145.59	-	152.00	152.45	152.62	152.65	151.95	145.59	-
A7	Trade Development Council	845881	815903	50_29	7.7	134.34	134.34	134.33	134.33	134.32	-	-	134.34	134.34	134.33	134.33	134.32	-	-
A8	Office Building of SENT Landfill Extension	846390	814682	50_28	5.0	288.92	299.04	-	-	-	-	-	216.54	222.77	-	-	-	-	-
A9	Office Building of Desalination Plant	846623	814066	50_27	5.0	149.87	150.29	160.18	156.97	175.03	140.22	133.34	152.20	153.12	162.94	170.72	197.93	140.99	133.34
A10	Administrative Building of P-Tech Landfill Gas (SENT) Company Limited	846274	815126	50_28	5.9	262.78	-	-	-	-	-	-	190.51	-	-	-	-	-	-
					Assessment Criterion	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**
					Max % Relative to Assessment Criterion	57.78%	59.81%	35.36%	33.77%	35.01%	31.29%	26.67%	43.31%	44.55%	34.89%	34.39%	39.59%	31.29%	26.67%

APPENDIX B1 CALCULATION OF OPERATIONAL FIXED NOISE IMPACT (SCENARIO 1)

Appendix B1 - Calculation of Noise Impact Assessment (Site A)

Cumulative Noise Impact (Site A)

NSR: Island Resort (IR1)			
Operational Activities	**Predicted Noise Levels, $L_{eq(30\text{-}min)}$, dB(A)**		
	Daytime	**Evening**	**Night-time**
Truck Movement within TKO Fill Bank [(a)(b)]	41.8	41.8	38.2
Stockpiling and TKO Basin	52.9	52.9	32.8
C&D Material Sorting Facility	45.4	45.4	--
C&D Material Crushing Facility	47.5	47.5	--
Sub-total	*54.8*	*54.8*	*39.3*
Barging Point NB4 & Sorting Facility NSD	41.5	41.5	41.5
Barging Point NB5 & Sorting Facility NSE	41.8	41.8	41.8
Sub-total	*44.7*	*44.7*	*44.7*
Overall Noise Level due to the Project, dB(A)	**55.2**	**55.2**	**45.8**
Noise Contribution from SENTX, dB(A)	**50**	**50**	**46**
Cumulative Noise Level, dB(A)	**56.3**	**56.3**	**48.9**
Noise Criterion (ANL - 5), dB(A)	**60**	**60**	**50**
Compliance (Yes / No)	**Yes**	**Yes**	**Yes**

Notes:

(a) Truck movement is carried out based on BS 5228 Part 1: 2009.

(b) 15% Utilisation rate for loading/unloading activities; 85% Utilisation rate for truck movements remained the same as the approved BCF ERR (October 2011)

Appendix B1 - Calculation of Noise Impact Assessment (Site A)

Cumulative Noise Impact (Site A)

NSR: Lohas Park, Le Prestige Moonlight (LP2)			
Operational Activities	**Predicted Noise Levels, $L_{eq(30\text{-}min)}$, dB(A)**		
	Daytime	**Evening**	**Night-time**
Truck Movement within TKO Fill Bank [(a)(b)]	39.8	39.8	33.5
Stockpiling and TKO Basin	52.9	52.9	31.7
C&D Material Sorting Facility	40.8	40.8	--
C&D Material Crushing Facility	42.8	42.8	--
Sub-total	*53.7*	*53.7*	*35.7*
Barging Point NB4 & Sorting Facility NSD	37.9	37.9	37.9
Barging Point NB5 & Sorting Facility NSE	38.4	38.4	38.4
Sub-total	*41.2*	*41.2*	*41.2*
Overall Noise Level due to the Project, dB(A)	**53.9**	**53.9**	**42.3**
Noise Contribution from SENTX, dB(A)	**53**	**53**	**47**
Cumulative Noise Level, dB(A)	**56.5**	**56.5**	**48.3**
Noise Criterion (ANL - 5), dB(A)	**60**	**60**	**50**
Compliance (Yes / No)	**Yes**	**Yes**	**Yes**

Notes:

(a) Truck movement is carried out based on BS 5228 Part 1: 2009.

(b) 15% Utilisation rate for loading/unloading activities; 85% Utilisation rate for truck movements remained the same as the approved BCF ERR (October 2011)

Appendix B1 - Calculation of Noise Impact Assessment (Site A)

Cumulative Noise Impact (Site A)

NSR: Lohas Park, Wings at Sea (LP4)			
Operational Activities	**Predicted Noise Levels, $L_{eq(30\text{-}min)}$, dB(A)**		
	Daytime	**Evening**	**Night-time**
Truck Movement within TKO Fill Bank [(a)(b)]	40.0	40.0	33.8
Stockpiling and TKO Basin	52.5	52.5	31.7
C&D Material Sorting Facility	41.0	41.0	--
C&D Material Crushing Facility	43.1	43.1	--
Sub-total	*53.5*	*53.5*	*35.9*
Barging Point NB4 & Sorting Facility NSD	38.1	38.1	38.1
Barging Point NB5 & Sorting Facility NSE	38.6	38.6	38.6
Sub-total	*41.4*	*41.4*	*41.4*
Overall Noise Level due to the Project, dB(A)	**53.7**	**53.7**	**42.4**
Noise Contribution from SENTX, dB(A)	**53**	**53**	**47**
Cumulative Noise Level, dB(A)	**56.4**	**56.4**	**48.3**
Noise Criterion (ANL - 5), dB(A)	**60**	**60**	**50**
Compliance (Yes / No)	**Yes**	**Yes**	**Yes**

Notes:

(a) Truck movement is carried out based on BS 5228 Part 1: 2009.

(b) 15% Utilisation rate for loading/unloading activities; 85% Utilisation rate for truck movements remained the same as the approved BCF ERR (October 2011)

Appendix B1 - Calculation of Noise Impact Assessment (Site A)

Operation Fixed Noise Impact Assessment (Daytime and Evening Period) (Site A)

Island Resort (IR1)

CNP No.	PME	No. of PME	Unit SWL	On-time %	Distance between Source to NSR	Correction, dB(A)						CNL of individual PME
			dB(A)	%	m	No. of PME [g]	Distance	Barrier	On-time %	Air Absorption[a]	Façade	dB(A)
Stockpiling and TKO Basin												**52.9**
CNP 061	Derrick Barge	3	104	100%	1841	5	-73.3	0	0.0	-5.2	3	33.3
CNP 221	Tug Boat	3	110	50%	1841	5	-73.3	0	-3.0	-5.2	3	36.3
CNP 067	Dump Truck	80	117	15%	2088	19	-74.4	0	-8.2	-5.8	3	50.5
CNP 030	Bulldozer	5	115	100%	2088	7	-74.4	0	0.0	-5.8	3	44.7
CNP 081	Excavator/Loader	6	112	100%	2088	8	-74.4	0	0.0	-5.8	3	42.5
CNP 186	Roller	3	108	100%	2088	5	-74.4	0	0.0	-5.8	3	35.5
CNP 141	Water Lorry	7	112	100%	2088	8	-74.4	0	0.0	-5.8	3	43.2
CNP 103	Generator	19	95	100%	2402	13	-75.6	0	0.0	-6.7	3	28.5
CNP 050	Compactor	2	105	100%	2088	3	-74.4	0	0.0	-5.8	3	30.8
C&D Material Sorting Facility												**45.4**
CNP 081	Excavator/Loader	4	112	100%	2395	6	-75.6	0	0.0	-6.7	3	38.7
CNP 103	Generator	2	95	100%	2395	3	-75.6	0	0.0	-6.7	3	18.7
CNP 141	Grab Lorry	1	112	100%	2395	0	-75.6	0	0.0	-6.7	3	32.7
CNP 141	Water Lorry	1	112	50%	2395	0	-75.6	0	-3.0	-6.7	3	29.7
CNP 067	Dump Truck	8	117	50%	2395	9	-75.6	0	-3.0	-6.7	3	43.7
--	Sorting Facility [c]	1	109	100%	2395	0	-75.6	0	0.0	-6.7	3	29.7
C&D Material Crushing Facility												**47.5**
CNP 081	Excavator/Loader	6	112	100%	2115	8	-74.5	0	0.0	-5.9	3	42.3
CNP 103	Generator	1	95	100%	2115	0	-74.5	0	0.0	-5.9	3	17.6
CNP 067	Dump Truck	12	117	15%	2115	11	-74.5	0	-8.2	-5.9	3	42.1
--	Jaw Crusher [e]	4	115	100%	2115	6	-74.5	0	0.0	-5.9	3	43.6
--	Cone Crusher [f]	1	96	100%	2115	0	-74.5	0	0.0	-5.9	3	18.3
--	Impact Crusher [f]	1	91	100%	2115	0	-74.5	0	0.0	-5.9	3	13.2
--	Screening Machine [f]	1	94	100%	2115	0	-74.5	0	0.0	-5.9	3	16.6
NB4 & NSD												**41.5**
CNP 101	Generator	1	108	100%	1978	0	-73.9	0	0.0	-5.5	3	31.5
CNP 068	Dump Truck [d]	15	105	15%	2000	12	-74.0	-10	-8.2	-5.6	3	21.9
CNP 081	Excavator	3	112	100%	2000	5	-74.0	0	0.0	-5.6	3	40.2
CNP 061	Derrick Barge	1	104	100%	1935	0	-73.7	0	0.0	-5.4	3	27.8
--	Sorting Facility [c]	1	109	100%	2000	0	-74.0	0	0.0	-5.6	3	32.4
NB5 & NSE												**41.8**
CNP 101	Generator	1	108	100%	1935	0	-73.7	0	0.0	-5.4	3	31.8
CNP 068	Dump Truck [d]	15	105	15%	1973	12	-73.9	-10	-8.2	-5.5	3	22.1
CNP 081	Excavator	3	112	100%	1973	5	-73.9	0	0.0	-5.5	3	40.3
CNP 061	Derrick Barge	1	104	100%	1891	0	-73.5	0	0.0	-5.3	3	28.2
--	Sorting Facility [c]	1	109	100%	1973	0	-73.9	0	0.0	-5.5	3	32.6

Appendix B1 - Calculation of Noise Impact Assessment (Site A)

Operation Fixed Noise Impact Assessment (Daytime and Evening Period) (Site A)

Lohas Park, Le Prestige Moonlight (LP2)

CNP No.	PME	No. of PME	Unit SWL	On-time %	Distance between Source to NSR	Correction, dB(A)						CNL of individual PME
			dB(A)	%	m	No. of PME [g]	Distance	Barrier	On-time %	Air Absorption[a]	Façade	dB(A)
Stockpiling and TKO Basin												**52.9**
CNP 061	Derrick Barge	3	104	100%	2137	5	-74.6	0	0.0	-6.0	3	31.2
CNP 221	Tug Boat	3	110	50%	2137	5	-74.6	0	-3.0	-6.0	3	34.2
CNP 067	Dump Truck	80	117	15%	2087	19	-74.4	0	-8.2	-5.8	3	50.6
CNP 030	Bulldozer	5	115	100%	2087	7	-74.4	0	0.0	-5.8	3	44.8
CNP 081	Excavator/Loader	6	112	100%	2087	8	-74.4	0	0.0	-5.8	3	42.5
CNP 186	Roller	3	108	100%	2087	5	-74.4	0	0.0	-5.8	3	35.5
CNP 141	Water Lorry	7	112	100%	2087	8	-74.4	0	0.0	-5.8	3	43.2
CNP 103	Generator	19	95	100%	1859	13	-73.4	0	0.0	-5.2	3	32.2
CNP 050	Compactor	2	105	100%	2087	3	-74.4	0	0.0	-5.8	3	30.8
C&D Material Sorting Facility												**40.8**
CNP 081	Excavator/Loader	4	112	100%	3168	6	-78.0	0	0.0	-8.9	3	34.1
CNP 103	Generator	2	95	100%	3168	3	-78.0	0	0.0	-8.9	3	14.1
CNP 141	Grab Lorry	1	112	100%	3168	0	-78.0	0	0.0	-8.9	3	28.1
CNP 141	Water Lorry	1	112	50%	3168	0	-78.0	0	-3.0	-8.9	3	25.1
CNP 067	Dump Truck	8	117	50%	3168	9	-78.0	0	-3.0	-8.9	3	39.1
--	Sorting Facility [c]	1	109	100%	3168	0	-78.0	0	0.0	-8.9	3	25.1
C&D Material Crushing Facility												**42.8**
CNP 081	Excavator/Loader	6	112	100%	2871	8	-77.2	0	0.0	-8.0	3	37.6
CNP 103	Generator	1	95	100%	2871	0	-77.2	0	0.0	-8.0	3	12.8
CNP 067	Dump Truck	12	117	15%	2871	11	-77.2	0	-8.2	-8.0	3	37.4
--	Jaw Crusher [e]	4	115	100%	2871	6	-77.2	0	0.0	-8.0	3	38.8
--	Cone Crusher [f]	1	96	100%	2871	0	-77.2	0	0.0	-8.0	3	13.5
--	Impact Crusher [f]	1	91	100%	2871	0	-77.2	0	0.0	-8.0	3	8.4
--	Screening Machine [f]	1	94	100%	2871	0	-77.2	0	0.0	-8.0	3	11.8
NB4 & NSD												**37.9**
CNP 101	Generator	1	108	100%	2620	0	-76.4	0	0.0	-7.3	3	27.3
CNP 068	Dump Truck	15	105	15%	2641	12	-76.4	0	-8.2	-7.4	3	27.7
CNP 081	Excavator	3	112	100%	2598	5	-76.3	0	0.0	-7.3	3	36.2
CNP 061	Derrick Barge	1	104	100%	2652	0	-76.5	0	0.0	-7.4	3	23.1
--	Sorting Facility [c]	1	109	100%	2598	0	-76.3	0	0.0	-7.3	3	28.4
NB5 & NSE												**38.4**
CNP 101	Generator	1	108	100%	2533	0	-76.1	0	0.0	-7.1	3	27.8
CNP 068	Dump Truck	15	105	15%	2641	12	-76.4	0	-8.2	-7.4	3	27.7
CNP 081	Excavator	3	112	100%	2522	5	-76.0	0	0.0	-7.1	3	36.7
CNP 061	Derrick Barge	1	104	100%	2543	0	-76.1	0	0.0	-7.1	3	23.8
--	Sorting Facility [c]	1	109	100%	2522	0	-76.0	0	0.0	-7.1	3	28.9

Appendix B1 - Calculation of Noise Impact Assessment (Site A)

Operation Fixed Noise Impact Assessment (Daytime and Evening Period) (Site A)

Lohas Park, Wings at Sea (LP4)

CNP No.	PME	No. of PME	Unit SWL	On-time %	Distance between Source to NSR	Correction, dB(A)						CNL of individual PME
			dB(A)	%	m	No. of PME [g]	Distance	Barrier	On-time %	Air Absorption[a]	Façade	dB(A)
Stockpiling and TKO Basin												**52.5**
CNP 061	Derrick Barge	3	104	100%	2109	5	-74.5	0	0.0	-5.9	3	31.4
CNP 221	Tug Boat	3	110	50%	2109	5	-74.5	0	-3.0	-5.9	3	34.4
CNP 067	Dump Truck	80	117	15%	2134	19	-74.6	0	-8.2	-6.0	3	50.2
CNP 030	Bulldozer	5	115	100%	2134	7	-74.6	0	0.0	-6.0	3	44.4
CNP 081	Excavator/Loader	6	112	100%	2134	8	-74.6	0	0.0	-6.0	3	42.2
CNP 186	Roller	3	108	100%	2134	5	-74.6	0	0.0	-6.0	3	35.2
CNP 141	Water Lorry	7	112	100%	2134	8	-74.6	0	0.0	-6.0	3	42.9
CNP 103	Generator	19	95	100%	1858	13	-73.4	0	0.0	-5.2	3	32.2
CNP 050	Compactor	2	105	100%	2134	3	-74.6	0	0.0	-6.0	3	30.4
C&D Material Sorting Facility												**41.0**
CNP 081	Excavator/Loader	4	112	100%	3139	6	-77.9	0	0.0	-8.8	3	34.3
CNP 103	Generator	2	95	100%	3139	3	-77.9	0	0.0	-8.8	3	14.3
CNP 141	Grab Lorry	1	112	100%	3139	0	-77.9	0	0.0	-8.8	3	28.3
CNP 141	Water Lorry	1	112	50%	3139	0	-77.9	0	-3.0	-8.8	3	25.3
CNP 067	Dump Truck	8	117	50%	3139	9	-77.9	0	-3.0	-8.8	3	39.3
--	Sorting Facility [c]	1	109	100%	3139	0	-77.9	0	0.0	-8.8	3	25.3
C&D Material Crushing Facility												**43.1**
CNP 081	Excavator/Loader	6	112	100%	2819	8	-77.0	0	0.0	-7.9	3	37.9
CNP 103	Generator	1	95	100%	2819	0	-77.0	0	0.0	-7.9	3	13.1
CNP 067	Dump Truck	12	117	15%	2819	11	-77.0	0	-8.2	-7.9	3	37.7
--	Jaw Crusher [e]	4	115	100%	2819	6	-77.0	0	0.0	-7.9	3	39.1
--	Cone Crusher [f]	1	96	100%	2819	0	-77.0	0	0.0	-7.9	3	13.8
--	Impact Crusher [f]	1	91	100%	2819	0	-77.0	0	0.0	-7.9	3	8.7
--	Screening Machine [f]	1	94	100%	2819	0	-77.0	0	0.0	-7.9	3	12.1
NB4 & NSD												**38.1**
CNP 101	Generator	1	108	100%	2578	0	-76.2	0	0.0	-7.2	3	27.6
CNP 068	Dump Truck	15	105	15%	2592	12	-76.3	0	-8.2	-7.3	3	28.0
CNP 081	Excavator	3	112	100%	2578	5	-76.2	0	0.0	-7.2	3	36.3
CNP 061	Derrick Barge	1	104	100%	2626	0	-76.4	0	0.0	-7.4	3	23.3
--	Sorting Facility [c]	1	109	100%	2578	0	-76.2	0	0.0	-7.2	3	28.6
NB5 & NSE												**38.6**
CNP 101	Generator	1	108	100%	2485	0	-75.9	0	0.0	-7.0	3	28.1
CNP 068	Dump Truck	15	105	15%	2592	12	-76.3	0	-8.2	-7.3	3	28.0
CNP 081	Excavator	3	112	100%	2485	5	-75.9	0	0.0	-7.0	3	36.9
CNP 061	Derrick Barge	1	104	100%	2513	0	-76.0	0	0.0	-7.0	3	24.0
--	Sorting Facility [c]	1	109	100%	2485	0	-75.9	0	0.0	-7.0	3	29.1

Remarks:

(a) Air Absorption = 2.8 dB(A) per 1000m

(b) Calculation is developed based on the approved ER 2008 Report (May 2008).

(c) SWL of sorting facility is with reference to the approved EIA Report for TKOFB (Register No.: AEIAR-060/2002) which includes vibrating feeder, magnetic separator and conveyor belts.

(d) Substantial noise barrier will be erected to totally screen the operation of dump truck such that none of PME will be visible when viewed from the NSR. A negative correction factor of 10dB(A) is applied in the assessment.

(e) SWL of jaw crusher is with reference to the approved EIA Report for TKOFB (Register No.: AEIAR-060/2002).

(f) SWL of cone crusher, impact crusher and screening machine are referenced from the technical specification sheets provided by CEDD.

(g) Correction for No. of PME = 10log(No. of PME)

Appendix B1 - Calculation of Noise Impact Assessment (Site A)

Operation Fixed Noise Impact Assessment (Night-time Period) (Site A)

Island Resort (IR1)

CNP No.	PME	No. of PME	Unit SWL	On-time %	Distance between Source to NSR	Correction, dB(A)						CNL of individual PME
			dB(A)	%	m	No. of PME [e]	Distance	Barrier	On-time %	Air Absorption[a]	Façade	dB(A)
Stockpiling and TKO Basin												**32.8**
CNP 141	Water Lorry	1	112	15%	2088	0	-74.4	0	-8.2	-5.8	3	26.5
CNP 103	Generator	2	95	100%	2402	3	-75.6	0	0.0	-6.7	3	18.7
CNP 061	Derrick Barge	3	104	65%	1841	5	-73.3	0	-1.9	-5.2	3	31.4
NB4 & NSD												**41.5**
CNP 101	Generator	1	108	100%	1978	0	-73.9	0	0.0	-5.5	3	31.5
CNP 068	Dump Truck [d]	15	105	15%	2000	12	-74.0	-10	-8.2	-5.6	3	21.9
CNP 081	Excavator	3	112	100%	2000	5	-74.0	0	0.0	-5.6	3	40.2
CNP 061	Derrick Barge	1	104	100%	1935	0	-73.7	0	0.0	-5.4	3	27.8
--	Sorting Facility [c]	1	109	100%	2000	0	-74.0	0	0.0	-5.6	3	32.4
NB5 & NSE												**41.8**
CNP 101	Generator	1	108	100%	1935	0	-73.7	0	0.0	-5.4	3	31.8
CNP 068	Dump Truck [d]	15	105	15%	1973	12	-73.9	-10	-8.2	-5.5	3	22.1
CNP 081	Excavator	3	112	100%	1973	5	-73.9	0	0.0	-5.5	3	40.3
CNP 061	Derrick Barge	1	104	100%	1891	0	-73.5	0	0.0	-5.3	3	28.2
--	Sorting Facility [c]	1	109	100%	1973	0	-73.9	0	0.0	-5.5	3	32.6

Appendix B1 - Calculation of Noise Impact Assessment (Site A)

Operation Fixed Noise Impact Assessment (Night-time Period) (Site A)

Lohas Park, Le Prestige Moonlight (LP2)

CNP No.	PME	No. of PME	Unit SWL	On-time %	Distance between Source to NSR	Correction, dB(A)						CNL of individual PME
			dB(A)	%	m	No. of PME [(e)]	Distance	Barrier	On-time %	Air Absorption[(a)]	Façade	dB(A)
Stockpiling and TKO Basin												**31.7**
CNP 141	Water Lorry	1	112	15%	2087	0	-74.4	0	-8.2	-5.8	3	26.5
CNP 103	Generator	2	95	100%	1859	3	-73.4	0	0.0	-5.2	3	22.4
CNP 061	Derrick Barge	3	104	65%	2137	5	-74.6	0	-1.9	-6.0	3	29.3
NB4 & NSD												**37.9**
CNP 101	Generator	1	108	100%	2620	0	-76.4	0	0.0	-7.3	3	27.3
CNP 068	Dump Truck	15	105	15%	2641	12	-76.4	0	-8.2	-7.4	3	27.7
CNP 081	Excavator	3	112	100%	2598	5	-76.3	0	0.0	-7.3	3	36.2
CNP 061	Derrick Barge	1	104	100%	2652	0	-76.5	0	0.0	-7.4	3	23.1
--	Sorting Facility [(c)]	1	109	100%	2598	0	-76.3	0	0.0	-7.3	3	28.4
NB5 & NSE												**38.4**
CNP 101	Generator	1	108	100%	2533	0	-76.1	0	0.0	-7.1	3	27.8
CNP 068	Dump Truck	15	105	15%	2641	12	-76.4	0	-8.2	-7.4	3	27.7
CNP 081	Excavator	3	112	100%	2522	5	-76.0	0	0.0	-7.1	3	36.7
CNP 061	Derrick Barge	1	104	100%	2543	0	-76.1	0	0.0	-7.1	3	23.8
--	Sorting Facility [(c)]	1	109	100%	2522	0	-76.0	0	0.0	-7.1	3	28.9

Appendix B1 - Calculation of Noise Impact Assessment (Site A)

Operation Fixed Noise Impact Assessment (Night-time Period) (Site A)

Lohas Park, Wings at Sea (LP4)

CNP No.	PME	No. of PME	Unit SWL	On-time %	Distance between Source to NSR	Correction, dB(A)						CNL of individual PME
			dB(A)	%	m	No. of PME [(e)]	Distance	Barrier	On-time %	Air Absorption[(a)]	Façade	dB(A)
Stockpiling and TKO Basin												**31.7**
CNP 141	Water Lorry	1	112	15%	2134	0	-74.6	0	-8.2	-6.0	3	26.2
CNP 103	Generator	2	95	100%	1858	3	-73.4	0	0.0	-5.2	3	22.4
CNP 061	Derrick Barge	3	104	65%	2109	5	-74.5	0	-1.9	-5.9	3	29.5
NB4 & NSD												**38.1**
CNP 101	Generator	1	108	100%	2578	0	-76.2	0	0.0	-7.2	3	27.6
CNP 068	Dump Truck	15	105	15%	2592	12	-76.3	0	-8.2	-7.3	3	28.0
CNP 081	Excavator	3	112	100%	2578	5	-76.2	0	0.0	-7.2	3	36.3
CNP 061	Derrick Barge	1	104	100%	2626	0	-76.4	0	0.0	-7.4	3	23.3
--	Sorting Facility [(c)]	1	109	100%	2578	0	-76.2	0	0.0	-7.2	3	28.6
NB5 & NSE												**38.6**
CNP 101	Generator	1	108	100%	2485	0	-75.9	0	0.0	-7.0	3	28.1
CNP 068	Dump Truck	15	105	15%	2592	12	-76.3	0	-8.2	-7.3	3	28.0
CNP 081	Excavator	3	112	100%	2485	5	-75.9	0	0.0	-7.0	3	36.9
CNP 061	Derrick Barge	1	104	100%	2513	0	-76.0	0	0.0	-7.0	3	24.0
--	Sorting Facility [(c)]	1	109	100%	2485	0	-75.9	0	0.0	-7.0	3	29.1

Remarks:

(a) Air Absorption = 2.8 dB(A) per 1000m

(b) Calculation is developed based on the approved ER 2008 Report (May 2008).

(c) SWL of sorting facility is with reference to the approved EIA Report for TKOFB (Register No.: AEIAR-060/2002) which includes vibrating feeder, magnetic separator and conveyor belts.

(d) Substantial noise barrier will be erected to totally screen the operation of dump truck such that none of PME will be visible when viewed from the NSR. A negative correction factor of 10dB(A) is applied in the assessment.

(e) Correction for No. of PME = 10log(No. of PME)

Appendix B1 - Calculation of Noise Impact Assessment (Site A)

Operation Fixed Noise Impact Assessment (On-site Vehicle Movement) (Daytime and Evening Period) (Site A)

Calculation of Noise levels at Island Resort (IR1)

Noise Source	Vehicle Type	SWL[(a)]	Traffic	Parameters			Speed[(d)]	Correction							CNL[(b)]
		dB(A)	Q	Hs	Lsr	V	km/h	CLsr	Cv	Cno	Cspd	Csri	Catm[(c)]	Cfac	dB(A)
R1_Internal Road	Dump Truck	105	190	2	2577	2	10	-34	-19	23	-10	0	-7	3	27.7
R1a_Internal Road	Dump Truck	105	34	2	2489	2	10	-34	-20	15	-10	0	-7	3	19.2
R1b_Internal Road	Dump Truck	105	36	2	2275	6	10	-34	-15	16	-10	0	-6	3	25.7
R2_Internal Road	Dump Truck	105	189	2	2476	2	10	-34	-21	23	-10	0	-7	3	26.3
R3_Internal Road	Dump Truck	105	189	2	2358	4	10	-34	-16	23	-10	0	-7	3	31.0
R4_Internal Road	Dump Truck	105	103	2	2250	1	10	-34	-23	20	-10	0	-6	3	21.8
R5_Internal Road	Dump Truck	105	113	2	2359	3	10	-34	-18	21	-10	0	-7	3	27.6
R6_Internal Road	Dump Truck	105	99	2	2100	3	10	-33	-18	20	-10	0	-6	3	27.4
R7_Internal Road	Dump Truck	105	283	2	2133	4	10	-33	-17	25	-10	0	-6	3	33.5
R8_Internal Road	Dump Truck	105	189	2	2015	3	10	-33	-18	23	-10	0	-6	3	31.1
R9a_Internal Road	Dump Truck	105	166	2	2005	12	10	-33	-12	22	-10	0	-6	3	36.8
R9b_Internal Road	Dump Truck	105	175	2	2166	8	10	-33	-13	22	-10	0	-6	3	34.6
R10_Internal Road	Dump Truck	105	18	2	2371	12	10	-34	-12	13	-10	0	-7	3	25.3
R11_Internal Road	Dump Truck	105	131	2	2297	3	10	-34	-17	21	-10	0	-6	3	28.8
R11a_Internal Road	Dump Truck	105	167	2	2225	3	10	-33	-18	22	-10	0	-6	3	29.5
R12_Internal Road	Dump Truck	105	53	2	2432	9	10	-34	-13	17	-10	0	-7	3	28.5
											TOTAL				**42.5**

Appendix B1 - Calculation of Noise Impact Assessment (Site A)

Operation Fixed Noise Impact Assessment (On-site Vehicle Movement) (Daytime and Evening Period) (Site A)

Calculation of Noise levels at Lohas Park, Le Prestige Moonlight (LP2)

Noise Source	Vehicle Type	SWL[(a)]	Traffic	Parameters			Speed[(d)]	Correction							CNL[(b)]
		dB(A)	Q	Hs	Lsr	V	km/h	CLsr	Cv	Cno	Cspd	Csri	Catm[(c)]	Cfac	dB(A)
R1_Internal Road	Dump Truck	105	190	2	1742	0	10	-32	-30	23	-10	0	-5	3	20.1
R1a_Internal Road	Dump Truck	105	34	2	1706	8	10	-32	-14	15	-10	0	-5	3	29.7
R1b_Internal Road	Dump Truck	105	36	2	1888	1	10	-33	-23	16	-10	0	-5	3	19.7
R2_Internal Road	Dump Truck	105	189	2	1805	5	10	-33	-15	23	-10	0	-5	3	34.7
R3_Internal Road	Dump Truck	105	189	2	1906	0	10	-33	-30	23	-10	0	-5	3	20.1
R4_Internal Road	Dump Truck	105	103	2	2017	4	10	-33	-17	20	-10	0	-6	3	29.7
R5_Internal Road	Dump Truck	105	113	2	2042	4	10	-33	-17	21	-10	0	-6	3	29.7
R6_Internal Road	Dump Truck	105	99	2	2245	2	10	-34	-20	20	-10	0	-6	3	24.8
R7_Internal Road	Dump Truck	105	283	2	2123	0	10	-33	-27	25	-10	0	-6	3	23.0
R8_Internal Road	Dump Truck	105	189	2	2285	2	10	-34	-20	23	-10	0	-6	3	28.3
R9a_Internal Road	Dump Truck	105	166	2	2536	6	10	-34	-15	22	-10	0	-7	3	31.2
R9b_Internal Road	Dump Truck	105	175	2	2864	4	10	-35	-17	22	-10	0	-8	3	28.0
R10_Internal Road	Dump Truck	105	18	2	2327	2	10	-34	-20	13	-10	0	-7	3	17.4
R11_Internal Road	Dump Truck	105	131	2	2513	4	10	-34	-17	21	-10	0	-7	3	28.0
R11a_Internal Road	Dump Truck	105	167	2	2639	6	10	-34	-15	22	-10	0	-7	3	30.6
R12_Internal Road	Dump Truck	105	53	2	2755	3	10	-34	-18	17	-10	0	-8	3	22.5
											TOTAL				**40.5**

Appendix B1 - Calculation of Noise Impact Assessment (Site A)

Operation Fixed Noise Impact Assessment (On-site Vehicle Movement) (Daytime and Evening Period) (Site A)

Calculation of Noise levels at Lohas Park, Wings at Sea (LP4)

Noise Source	Vehicle Type	SWL[(a)]	Traffic	Parameters			Speed[(d)]	Correction							CNL[(b)]
		dB(A)	Q	Hs	Lsr	V	km/h	CLsr	Cv	Cno	Cspd	Csri	Catm[(c)]	Cfac	dB(A)
R1_Internal Road	Dump Truck	105	190	2	1705	0	10	-32	-30	23	-10	0	-5	3	20.3
R1a_Internal Road	Dump Truck	105	34	2	1658	8	10	-32	-14	15	-10	0	-5	3	29.9
R1b_Internal Road	Dump Truck	105	36	2	1827	1	10	-33	-23	16	-10	0	-5	3	20.0
R2_Internal Road	Dump Truck	105	189	2	1760	5	10	-32	-15	23	-10	0	-5	3	34.9
R3_Internal Road	Dump Truck	105	189	2	1854	0	10	-33	-30	23	-10	0	-5	3	20.4
R4_Internal Road	Dump Truck	105	103	2	1960	4	10	-33	-17	20	-10	0	-5	3	30.0
R5_Internal Road	Dump Truck	105	113	2	1995	4	10	-33	-17	21	-10	0	-6	3	30.0
R6_Internal Road	Dump Truck	105	99	2	2183	2	10	-33	-20	20	-10	0	-6	3	25.1
R7_Internal Road	Dump Truck	105	283	2	2059	0	10	-33	-27	25	-10	0	-6	3	23.3
R8_Internal Road	Dump Truck	105	189	2	2218	2	10	-33	-20	23	-10	0	-6	3	28.6
R9a_Internal Road	Dump Truck	105	166	2	2474	6	10	-34	-15	22	-10	0	-7	3	31.5
R9b_Internal Road	Dump Truck	105	175	2	2815	4	10	-34	-17	22	-10	0	-8	3	28.2
R10_Internal Road	Dump Truck	105	18	2	2287	2	10	-34	-20	13	-10	0	-6	3	17.6
R11_Internal Road	Dump Truck	105	131	2	2470	4	10	-34	-17	21	-10	0	-7	3	28.2
R11a_Internal Road	Dump Truck	105	167	2	2593	6	10	-34	-15	22	-10	0	-7	3	30.8
R12_Internal Road	Dump Truck	105	53	2	2722	3	10	-34	-18	17	-10	0	-8	3	22.7
											TOTAL				**40.7**

Remarks:

SWL	- the sound power level of a source, dB(A)
Q	- the number of vehicle per 30min
Lsr	- the horizontal distance between the source and NSR, m
V	- the angle of view of the segment, degree
Hs	- the height of noise source assumed at 1m above ground level, m
CLsr	- correction for slant distance between the source and the NSR, -10log(Lsr)dB(A)
Cv	- correction for angle of view less than 180°, 10log(V/180)dB(A)
Cno	- correction for number of vehicles, 10log(Q)dB(A)
Cspd	- speed correction, -10log(Speed)dB(A)
Csri	- barrier attentuation, dB(A)
Catm	- correction for atmospheric absorption, dB(A)
Cfac	- facade correction, dB(A)
CNL	- corrected noise level, dB(A)(1 hour)

Notes:

(a) Reference is made to SWL provided in the document prepared by the Noise Control Authority (Dump truck, 5.5 tonne < gross vehicle weight <= 38 tonne)
(http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf)

(b) Noise calculation from truck movement is carried out in accordance with BS 5228 - Part 1:2009.
Corrected Noise Level (CNL) = SWL - 33 + distance correction + angle correction + correction for number of vehicles +barrier correction + correction for atmospheric absorption + façade correction + speed correction

(c) Air Absorption = 2.8 dB(A) per 1000m

(d) 10km/h of speed limit is adopted in accordance with EP Condition 2.13.

Appendix B1 - Calculation of Noise Impact Assessment (Site A)

Operation Fixed Noise Impact Assessment (On-site Vehicle Movement) (Night-time Period) (Site A)

Calculation of Noise levels at Island Resort (IR1)

Noise Source	Vehicle Type	SWL[(a)]	Traffic	Parameters			Speed[(d)]	Correction							CNL[(b)]
		dB(A)	Q	Hs	Lsr	V	km/h	CLsr	Cv	Cno	Cspd	Csri	Catm[(c)]	Cfac	dB(A)
R1_Internal Road	Dump Truck	105	0	2	2577	2	10	-34	-19	0	-10	0	-7	3	0.0
R1a_Internal Road	Dump Truck	105	0	2	2489	2	10	-34	-20	0	-10	0	-7	3	0.0
R1b_Internal Road	Dump Truck	105	0	2	2275	6	10	-34	-15	0	-10	0	-6	3	0.0
R2_Internal Road	Dump Truck	105	0	2	2476	2	10	-34	-21	0	-10	0	-7	3	0.0
R3_Internal Road	Dump Truck	105	0	2	2358	4	10	-34	-16	0	-10	0	-7	3	0.0
R4_Internal Road	Dump Truck	105	0	2	2250	1	10	-34	-23	0	-10	0	-6	3	0.0
R5_Internal Road	Dump Truck	105	0	2	2359	3	10	-34	-18	0	-10	0	-7	3	0.0
R6_Internal Road	Dump Truck	105	53	2	2100	3	10	-33	-18	17	-10	0	-6	3	24.7
R7_Internal Road	Dump Truck	105	105	2	2133	4	10	-33	-17	20	-10	0	-6	3	29.2
R8_Internal Road	Dump Truck	105	105	2	2015	3	10	-33	-18	20	-10	0	-6	3	28.6
R9a_Internal Road	Dump Truck	105	137	2	2005	12	10	-33	-12	21	-10	0	-6	3	35.9
R9b_Internal Road	Dump Truck	105	85	2	2166	8	10	-33	-13	19	-10	0	-6	3	31.4
R10_Internal Road	Dump Truck	105	0	2	2371	12	10	-34	-12	0	-10	0	-7	3	0.0
R11_Internal Road	Dump Truck	105	53	2	2297	3	10	-34	-17	17	-10	0	-6	3	24.9
R11a_Internal Road	Dump Truck	105	53	2	2225	3	10	-33	-18	17	-10	0	-6	3	24.5
R12_Internal Road	Dump Truck	105	0	2	2432	9	10	-34	-13	0	-10	0	-7	3	0.0
											TOTAL				**38.9**

Appendix B1 - Calculation of Noise Impact Assessment (Site A)

Operation Fixed Noise Impact Assessment (On-site Vehicle Movement) (Night-time Period) (Site A)

Calculation of Noise levels at Lohas Park, Le Prestige Moonlight (LP2)

Noise Source	Vehicle Type	SWL[(a)]	Traffic	Parameters			Speed[(d)]	Correction							CNL[(b)]
		dB(A)	Q	Hs	Lsr	V	km/h	CLsr	Cv	Cno	Cspd	Csri	Catm[(c)]	Cfac	dB(A)
R1_Internal Road	Dump Truck	105	0	2	1742	0	10	-32	-30	0	-10	0	-5	3	0.0
R1a_Internal Road	Dump Truck	105	0	2	1706	8	10	-32	-14	0	-10	0	-5	3	0.0
R1b_Internal Road	Dump Truck	105	0	2	1888	1	10	-33	-23	0	-10	0	-5	3	0.0
R2_Internal Road	Dump Truck	105	0	2	1805	5	10	-33	-15	0	-10	0	-5	3	0.0
R3_Internal Road	Dump Truck	105	0	2	1906	0	10	-33	-30	0	-10	0	-5	3	0.0
R4_Internal Road	Dump Truck	105	0	2	2017	4	10	-33	-17	0	-10	0	-6	3	0.0
R5_Internal Road	Dump Truck	105	0	2	2042	4	10	-33	-17	0	-10	0	-6	3	0.0
R6_Internal Road	Dump Truck	105	53	2	2245	2	10	-34	-20	17	-10	0	-6	3	22.1
R7_Internal Road	Dump Truck	105	105	2	2123	0	10	-33	-27	20	-10	0	-6	3	18.7
R8_Internal Road	Dump Truck	105	105	2	2285	2	10	-34	-20	20	-10	0	-6	3	25.7
R9a_Internal Road	Dump Truck	105	137	2	2536	6	10	-34	-15	21	-10	0	-7	3	30.4
R9b_Internal Road	Dump Truck	105	85	2	2864	4	10	-35	-17	19	-10	0	-8	3	24.9
R10_Internal Road	Dump Truck	105	0	2	2327	2	10	-34	-20	0	-10	0	-7	3	0.0
R11_Internal Road	Dump Truck	105	53	2	2513	4	10	-34	-17	17	-10	0	-7	3	24.1
R11a_Internal Road	Dump Truck	105	53	2	2639	6	10	-34	-15	17	-10	0	-7	3	25.6
R12_Internal Road	Dump Truck	105	0	2	2755	3	10	-34	-18	0	-10	0	-8	3	0.0
											TOTAL				**34.2**

Appendix B1 - Calculation of Noise Impact Assessment (Site A)

Operation Fixed Noise Impact Assessment (On-site Vehicle Movement) (Night-time Period) (Site A)

Calculation of Noise levels at Lohas Park, Wings at Sea (LP4)

Noise Source	Vehicle Type	SWL[(a)]	Traffic	Parameters			Speed[(d)]	Correction							CNL[(b)]
		dB(A)	Q	Hs	Lsr	V	km/h	CLsr	Cv	Cno	Cspd	Csri	Catm[(c)]	Cfac	dB(A)
R1_Internal Road	Dump Truck	105	0	2	1705	0	10	-32	-30	0	-10	0	-5	3	0.0
R1a_Internal Road	Dump Truck	105	0	2	1658	8	10	-32	-14	0	-10	0	-5	3	0.0
R1b_Internal Road	Dump Truck	105	0	2	1827	1	10	-33	-23	0	-10	0	-5	3	0.0
R2_Internal Road	Dump Truck	105	0	2	1760	5	10	-32	-15	0	-10	0	-5	3	0.0
R3_Internal Road	Dump Truck	105	0	2	1854	0	10	-33	-30	0	-10	0	-5	3	0.0
R4_Internal Road	Dump Truck	105	0	2	1960	4	10	-33	-17	0	-10	0	-5	3	0.0
R5_Internal Road	Dump Truck	105	0	2	1995	4	10	-33	-17	0	-10	0	-6	3	0.0
R6_Internal Road	Dump Truck	105	53	2	2183	2	10	-33	-20	17	-10	0	-6	3	22.4
R7_Internal Road	Dump Truck	105	105	2	2059	0	10	-33	-27	20	-10	0	-6	3	19.0
R8_Internal Road	Dump Truck	105	105	2	2218	2	10	-33	-20	20	-10	0	-6	3	26.0
R9a_Internal Road	Dump Truck	105	137	2	2474	6	10	-34	-15	21	-10	0	-7	3	30.7
R9b_Internal Road	Dump Truck	105	85	2	2815	4	10	-34	-17	19	-10	0	-8	3	25.1
R10_Internal Road	Dump Truck	105	0	2	2287	2	10	-34	-20	0	-10	0	-6	3	0.0
R11_Internal Road	Dump Truck	105	53	2	2470	4	10	-34	-17	17	-10	0	-7	3	24.3
R11a_Internal Road	Dump Truck	105	53	2	2593	6	10	-34	-15	17	-10	0	-7	3	25.8
R12_Internal Road	Dump Truck	105	0	2	2722	3	10	-34	-18	0	-10	0	-8	3	0.0
											TOTAL				**34.5**

Remarks:

SWL	- the sound power level of a source, dB(A)
Q	- the number of vehicle per 30min
Lsr	- the horizontal distance between the source and NSR, m
V	- the angle of view of the segment, degree
Hs	- the height of noise source assumed at 1m above ground level, m
CLsr	- correction for slant distance between the source and the NSR, -10log(Lsr)dB(A)
Cv	- correction for angle of view less than 180°, 10log(V/180)dB(A)
Cno	- correction for number of vehicles, 10log(Q)dB(A)
Cspd	- speed correction, -10log(Speed)dB(A)
Csri	- barrier attentuation, dB(A)
Catm	- correction for atmospheric absorption, dB(A)
Cfac	- facade correction, dB(A)
CNL	- corrected noise level, dB(A)(1 hour)

Notes:

(a) Reference is made to SWL provided in the document prepared by the Noise Control Authority (Dump truck, 5.5 tonne < gross vehicle weight <= 38 tonne) (http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf)

(b) Noise calculation from truck movement is carried out in accordance with BS 5228 - Part 1:2009.
Corrected Noise Level (CNL) = SWL - 33 + distance correction + angle correction + correction for number of vehicles +barrier correction + correction for atmospheric absorption + façade correction + speed correction

(c) Air Absorption = 2.8 dB(A) per 1000m

(d) 10km/h of speed limit is adopted in accordance with EP Condition 2.13.

APPENDIX B2 CALCULATION OF OPERATIONAL FIXED NOISE IMPACT (SCENARIO 2)

Appendix B2 - Calculation of Noise Impact Assessment (Site B)

Cumulative Noise Impact (Site B)

NSR: Island Resort (IR1)			
Operational Activities	**Predicted Noise Levels, $L_{eq(30\text{-}min)}$, dB(A)**		
	Daytime	**Evening**	**Night-time**
Truck Movement within TKO Fill Bank [(a)(b)]	42.1	42.1	38.2
Stockpiling and TKO Basin	52.9	52.9	32.8
C&D Material Sorting Facility	45.4	45.4	--
C&D Material Crushing Facility	48.4	48.4	--
Sub-total	*55.0*	*55.0*	*39.3*
Barging Point NB4 & Sorting Facility NSD	41.5	41.5	41.5
Barging Point NB5 & Sorting Facility NSE	41.8	41.8	41.8
Sub-total	*44.7*	*44.7*	*44.7*
Overall Noise Level due to the Project, dB(A)	**55.4**	**55.4**	**45.8**
Noise Contribution from SENTX, dB(A)	**50**	**50**	**46**
Cumulative Noise Level, dB(A)	**56.5**	**56.5**	**48.9**
Noise Criterion (ANL - 5), dB(A)	**60**	**60**	**50**
Compliance (Yes / No)	**Yes**	**Yes**	**Yes**

Notes:

(a) Truck movement is carried out based on BS 5228 Part 1: 2009.

(b) 15% Utilisation rate for loading/unloading activities; 85% Utilisation rate for truck movements remained the same as the approved BCF ERR (October 2011)

Appendix B2 - Calculation of Noise Impact Assessment (Site B)

Cumulative Noise Impact (Site B)

NSR: Lohas Park, Le Prestige Moonlight (LP2)			
Operational Activities	**Predicted Noise Levels, $L_{eq(30\text{-}min)}$, dB(A)**		
	Daytime	**Evening**	**Night-time**
Truck Movement within TKO Fill Bank [(a)(b)]	39.9	39.9	33.5
Stockpiling and TKO Basin	52.9	52.9	31.7
C&D Material Sorting Facility	40.8	40.8	--
C&D Material Crushing Facility	47.1	47.1	--
Sub-total	*54.3*	*54.3*	*35.7*
Barging Point NB4 & Sorting Facility NSD	37.9	37.9	37.9
Barging Point NB5 & Sorting Facility NSE	38.4	38.4	38.4
Sub-total	*41.2*	*41.2*	*41.2*
Overall Noise Level due to the Project, dB(A)	**54.5**	**54.5**	**42.3**
Noise Contribution from SENTX, dB(A)	**53**	**53**	**47**
Cumulative Noise Level, dB(A)	**56.8**	**56.8**	**48.3**
Noise Criterion (ANL - 5), dB(A)	**60**	**60**	**50**
Compliance (Yes / No)	**Yes**	**Yes**	**Yes**

Notes:

(a) Truck movement is carried out based on BS 5228 Part 1: 2009.

(b) 15% Utilisation rate for loading/unloading activities; 85% Utilisation rate for truck movements remained the same as the approved BCF ERR (October 2011)

Appendix B2 - Calculation of Noise Impact Assessment (Site B)

Cumulative Noise Impact (Site B)

NSR: Lohas Park, Wings at Sea (LP4)			
Operational Activities	**Predicted Noise Levels, $L_{eq(30\text{-}min)}$, dB(A)**		
	Daytime	**Evening**	**Night-time**
Truck Movement within TKO Fill Bank [(a)(b)]	40.2	40.2	33.8
Stockpiling and TKO Basin	52.5	52.5	31.7
C&D Material Sorting Facility	41.0	41.0	--
C&D Material Crushing Facility	47.6	47.6	--
Sub-total	*54.2*	*54.2*	*35.9*
Barging Point NB4 & Sorting Facility NSD	38.1	38.1	38.1
Barging Point NB5 & Sorting Facility NSE	38.6	38.6	38.6
Sub-total	*41.4*	*41.4*	*41.4*
Overall Noise Level due to the Project, dB(A)	**54.4**	**54.4**	**42.4**
Noise Contribution from SENTX, dB(A)	**53**	**53**	**47**
Cumulative Noise Level, dB(A)	**56.8**	**56.8**	**48.3**
Noise Criterion (ANL - 5), dB(A)	**60**	**60**	**50**
Compliance (Yes / No)	**Yes**	**Yes**	**Yes**

Notes:

(a) Truck movement is carried out based on BS 5228 Part 1: 2009.

(b) 15% Utilisation rate for loading/unloading activities; 85% Utilisation rate for truck movements remained the same as the approved BCF ERR (October 2011)

Appendix B2 - Calculation of Noise Impact Assessment (Site B)

Operation Fixed Noise Impact Assessment (Daytime and Evening Period) (Site B)

Island Resort (IR1)

CNP No.	PME	No. of PME	Unit SWL	On-time %	Distance between Source to NSR	Correction, dB(A)						CNL of individual PME
			dB(A)	%	m	No. of PME [g]	Distance	Barrier	On-time %	Air Absorption[a]	Façade	dB(A)
Stockpiling and TKO Basin												**52.9**
CNP 061	Derrick Barge	3	104	100%	1841	5	-73.3	0	0.0	-5.2	3	33.3
CNP 221	Tug Boat	3	110	50%	1841	5	-73.3	0	-3.0	-5.2	3	36.3
CNP 067	Dump Truck	80	117	15%	2088	19	-74.4	0	-8.2	-5.8	3	50.5
CNP 030	Bulldozer	5	115	100%	2088	7	-74.4	0	0.0	-5.8	3	44.7
CNP 081	Excavator/Loader	6	112	100%	2088	8	-74.4	0	0.0	-5.8	3	42.5
CNP 186	Roller	3	108	100%	2088	5	-74.4	0	0.0	-5.8	3	35.5
CNP 141	Water Lorry	7	112	100%	2088	8	-74.4	0	0.0	-5.8	3	43.2
CNP 103	Generator	19	95	100%	2402	13	-75.6	0	0.0	-6.7	3	28.5
CNP 050	Compactor	2	105	100%	2088	3	-74.4	0	0.0	-5.8	3	30.8
C&D Material Sorting Facility												**45.4**
CNP 081	Excavator/Loader	4	112	100%	2395	6	-75.6	0	0.0	-6.7	3	38.7
CNP 103	Generator	2	95	100%	2395	3	-75.6	0	0.0	-6.7	3	18.7
CNP 141	Grab Lorry	1	112	100%	2395	0	-75.6	0	0.0	-6.7	3	32.7
CNP 141	Water Lorry	1	112	50%	2395	0	-75.6	0	-3.0	-6.7	3	29.7
CNP 067	Dump Truck	8	117	50%	2395	9	-75.6	0	-3.0	-6.7	3	43.7
--	Sorting Facility [c]	1	109	100%	2395	0	-75.6	0	0.0	-6.7	3	29.7
C&D Material Crushing Facility												**48.4**
CNP 081	Excavator/Loader	6	112	100%	1996	8	-74.0	0	0.0	-5.6	3	43.2
CNP 103	Generator	1	95	100%	1996	0	-74.0	0	0.0	-5.6	3	18.4
CNP 067	Dump Truck	12	117	15%	1996	11	-74.0	0	-8.2	-5.6	3	43.0
--	Jaw Crusher [e]	4	115	100%	1996	6	-74.0	0	0.0	-5.6	3	44.4
--	Cone Crusher [f]	1	96	100%	1996	0	-74.0	0	0.0	-5.6	3	19.1
--	Impact Crusher [f]	1	91	100%	1996	0	-74.0	0	0.0	-5.6	3	14.0
--	Screening Machine [f]	1	94	100%	1996	0	-74.0	0	0.0	-5.6	3	17.4
NB4 & NSD												**41.5**
CNP 101	Generator	1	108	100%	1978	0	-73.9	0	0.0	-5.5	3	31.5
CNP 068	Dump Truck [d]	15	105	15%	2000	12	-74.0	-10	-8.2	-5.6	3	21.9
CNP 081	Excavator	3	112	100%	2000	5	-74.0	0	0.0	-5.6	3	40.2
CNP 061	Derrick Barge	1	104	100%	1935	0	-73.7	0	0.0	-5.4	3	27.8
--	Sorting Facility [c]	1	109	100%	2000	0	-74.0	0	0.0	-5.6	3	32.4
NB5 & NSE												**41.8**
CNP 101	Generator	1	108	100%	1935	0	-73.7	0	0.0	-5.4	3	31.8
CNP 068	Dump Truck [d]	15	105	15%	1973	12	-73.9	-10	-8.2	-5.5	3	22.1
CNP 081	Excavator	3	112	100%	1973	5	-73.9	0	0.0	-5.5	3	40.3
CNP 061	Derrick Barge	1	104	100%	1891	0	-73.5	0	0.0	-5.3	3	28.2
--	Sorting Facility [c]	1	109	100%	1973	0	-73.9	0	0.0	-5.5	3	32.6

Appendix B2 - Calculation of Noise Impact Assessment (Site B)

Operation Fixed Noise Impact Assessment (Daytime and Evening Period) (Site B)

Lohas Park, Le Prestige Moonlight (LP2)

CNP No.	PME	No. of PME	Unit SWL	On-time %	Distance between Source to NSR	Correction, dB(A)						CNL of individual PME
			dB(A)	%	m	No. of PME [g]	Distance	Barrier	On-time %	Air Absorption[a]	Façade	dB(A)
Stockpiling and TKO Basin												**52.9**
CNP 061	Derrick Barge	3	104	100%	2137	5	-74.6	0	0.0	-6.0	3	31.2
CNP 221	Tug Boat	3	110	50%	2137	5	-74.6	0	-3.0	-6.0	3	34.2
CNP 067	Dump Truck	80	117	15%	2087	19	-74.4	0	-8.2	-5.8	3	50.6
CNP 030	Bulldozer	5	115	100%	2087	7	-74.4	0	0.0	-5.8	3	44.8
CNP 081	Excavator/Loader	6	112	100%	2087	8	-74.4	0	0.0	-5.8	3	42.5
CNP 186	Roller	3	108	100%	2087	5	-74.4	0	0.0	-5.8	3	35.5
CNP 141	Water Lorry	7	112	100%	2087	8	-74.4	0	0.0	-5.8	3	43.2
CNP 103	Generator	19	95	100%	1859	13	-73.4	0	0.0	-5.2	3	32.2
CNP 050	Compactor	2	105	100%	2087	3	-74.4	0	0.0	-5.8	3	30.8
C&D Material Sorting Facility												**40.8**
CNP 081	Excavator/Loader	4	112	100%	3168	6	-78.0	0	0.0	-8.9	3	34.1
CNP 103	Generator	2	95	100%	3168	3	-78.0	0	0.0	-8.9	3	14.1
CNP 141	Grab Lorry	1	112	100%	3168	0	-78.0	0	0.0	-8.9	3	28.1
CNP 141	Water Lorry	1	112	50%	3168	0	-78.0	0	-3.0	-8.9	3	25.1
CNP 067	Dump Truck	8	117	50%	3168	9	-78.0	0	-3.0	-8.9	3	39.1
--	Sorting Facility [c]	1	109	100%	3168	0	-78.0	0	0.0	-8.9	3	25.1
C&D Material Crushing Facility												**47.1**
CNP 081	Excavator/Loader	6	112	100%	2173	8	-74.7	0	0.0	-6.1	3	42.0
CNP 103	Generator	1	95	100%	2173	0	-74.7	0	0.0	-6.1	3	17.2
CNP 067	Dump Truck	12	117	15%	2173	11	-74.7	0	-8.2	-6.1	3	41.7
--	Jaw Crusher [e]	4	115	100%	2173	6	-74.7	0	0.0	-6.1	3	43.2
--	Cone Crusher [f]	1	96	100%	2173	0	-74.7	0	0.0	-6.1	3	17.9
--	Impact Crusher [f]	1	91	100%	2173	0	-74.7	0	0.0	-6.1	3	12.8
--	Screening Machine [f]	1	94	100%	2173	0	-74.7	0	0.0	-6.1	3	16.2
NB4 & NSD												**37.9**
CNP 101	Generator	1	108	100%	2620	0	-76.4	0	0.0	-7.3	3	27.3
CNP 068	Dump Truck	15	105	15%	2641	12	-76.4	0	-8.2	-7.4	3	27.7
CNP 081	Excavator	3	112	100%	2598	5	-76.3	0	0.0	-7.3	3	36.2
CNP 061	Derrick Barge	1	104	100%	2652	0	-76.5	0	0.0	-7.4	3	23.1
--	Sorting Facility [c]	1	109	100%	2598	0	-76.3	0	0.0	-7.3	3	28.4
NB5 & NSE												**38.4**
CNP 101	Generator	1	108	100%	2533	0	-76.1	0	0.0	-7.1	3	27.8
CNP 068	Dump Truck	15	105	15%	2641	12	-76.4	0	-8.2	-7.4	3	27.7
CNP 081	Excavator	3	112	100%	2522	5	-76.0	0	0.0	-7.1	3	36.7
CNP 061	Derrick Barge	1	104	100%	2543	0	-76.1	0	0.0	-7.1	3	23.8
--	Sorting Facility [c]	1	109	100%	2522	0	-76.0	0	0.0	-7.1	3	28.9

Appendix B2 - Calculation of Noise Impact Assessment (Site B)

Operation Fixed Noise Impact Assessment (Daytime and Evening Period) (Site B)

Lohas Park, Wings at Sea (LP4)

CNP No.	PME	No. of PME	Unit SWL	On-time %	Distance between Source to NSR	Correction, dB(A)						CNL of individual PME
			dB(A)	%	m	No. of PME [g]	Distance	Barrier	On-time %	Air Absorption[a]	Façade	dB(A)
Stockpiling and TKO Basin												**52.5**
CNP 061	Derrick Barge	3	104	100%	2109	5	-74.5	0	0.0	-5.9	3	31.4
CNP 221	Tug Boat	3	110	50%	2109	5	-74.5	0	-3.0	-5.9	3	34.4
CNP 067	Dump Truck	80	117	15%	2134	19	-74.6	0	-8.2	-6.0	3	50.2
CNP 030	Bulldozer	5	115	100%	2134	7	-74.6	0	0.0	-6.0	3	44.4
CNP 081	Excavator/Loader	6	112	100%	2134	8	-74.6	0	0.0	-6.0	3	42.2
CNP 186	Roller	3	108	100%	2134	5	-74.6	0	0.0	-6.0	3	35.2
CNP 141	Water Lorry	7	112	100%	2134	8	-74.6	0	0.0	-6.0	3	42.9
CNP 103	Generator	19	95	100%	1858	13	-73.4	0	0.0	-5.2	3	32.2
CNP 050	Compactor	2	105	100%	2134	3	-74.6	0	0.0	-6.0	3	30.4
C&D Material Sorting Facility												**41.0**
CNP 081	Excavator/Loader	4	112	100%	3139	6	-77.9	0	0.0	-8.8	3	34.3
CNP 103	Generator	2	95	100%	3139	3	-77.9	0	0.0	-8.8	3	14.3
CNP 141	Grab Lorry	1	112	100%	3139	0	-77.9	0	0.0	-8.8	3	28.3
CNP 141	Water Lorry	1	112	50%	3139	0	-77.9	0	-3.0	-8.8	3	25.3
CNP 067	Dump Truck	8	117	50%	3139	9	-77.9	0	-3.0	-8.8	3	39.3
--	Sorting Facility [c]	1	109	100%	3139	0	-77.9	0	0.0	-8.8	3	25.3
C&D Material Crushing Facility												**47.6**
CNP 081	Excavator/Loader	6	112	100%	2101	8	-74.5	0	0.0	-5.9	3	42.4
CNP 103	Generator	1	95	100%	2101	0	-74.5	0	0.0	-5.9	3	17.7
CNP 067	Dump Truck	12	117	15%	2101	11	-74.5	0	-8.2	-5.9	3	42.2
--	Jaw Crusher [e]	4	115	100%	2101	6	-74.5	0	0.0	-5.9	3	43.7
--	Cone Crusher [f]	1	96	100%	2101	0	-74.5	0	0.0	-5.9	3	18.4
--	Impact Crusher [f]	1	91	100%	2101	0	-74.5	0	0.0	-5.9	3	13.3
--	Screening Machine [f]	1	94	100%	2101	0	-74.5	0	0.0	-5.9	3	16.7
NB4 & NSD												**38.1**
CNP 101	Generator	1	108	100%	2578	0	-76.2	0	0.0	-7.2	3	27.6
CNP 068	Dump Truck	15	105	15%	2592	12	-76.3	0	-8.2	-7.3	3	28.0
CNP 081	Excavator	3	112	100%	2578	5	-76.2	0	0.0	-7.2	3	36.3
CNP 061	Derrick Barge	1	104	100%	2626	0	-76.4	0	0.0	-7.4	3	23.3
--	Sorting Facility [c]	1	109	100%	2578	0	-76.2	0	0.0	-7.2	3	28.6
NB5 & NSE												**38.6**
CNP 101	Generator	1	108	100%	2485	0	-75.9	0	0.0	-7.0	3	28.1
CNP 068	Dump Truck	15	105	15%	2592	12	-76.3	0	-8.2	-7.3	3	28.0
CNP 081	Excavator	3	112	100%	2485	5	-75.9	0	0.0	-7.0	3	36.9
CNP 061	Derrick Barge	1	104	100%	2513	0	-76.0	0	0.0	-7.0	3	24.0
--	Sorting Facility [c]	1	109	100%	2485	0	-75.9	0	0.0	-7.0	3	29.1

Remarks:

(a) Air Absorption = 2.8 dB(A) per 1000m

(b) Calculation is developed based on the approved ER 2008 Report (May 2008).

(c) SWL of sorting facility is with reference to the approved EIA Report for TKOFB (Register No.: AEIAR-060/2002) which includes vibrating feeder, magnetic separator and conveyor belts.

(d) Substantial noise barrier will be erected to totally screen the operation of dump truck such that none of PME will be visible when viewed from the NSR. A negative correction factor of 10dB(A) is applied in the assessment.

(e) SWL of jaw crusher is with reference to the approved EIA Report for TKOFB (Register No.: AEIAR-060/2002).

(f) SWL of cone crusher, impact crusher and screening machine are referenced from the technical specification sheets provided by CEDD.

(g) Correction for No. of PME = 10log(No. of PME)

Appendix B2 - Calculation of Noise Impact Assessment (Site B)

Operation Fixed Noise Impact Assessment (Night-time Period) (Site B)

Island Resort (IR1)

CNP No.	PME	No. of PME	Unit SWL	On-time %	Distance between Source to NSR	Correction, dB(A)						CNL of individual PME
			dB(A)	%	m	No. of PME [e]	Distance	Barrier	On-time %	Air Absorption[a]	Façade	dB(A)
Stockpiling and TKO Basin												**32.8**
CNP 141	Water Lorry	1	112	15%	2088	0	-74.4	0	-8.2	-5.8	3	26.5
CNP 103	Generator	2	95	100%	2402	3	-75.6	0	0.0	-6.7	3	18.7
CNP 061	Derrick Barge	3	104	65%	1841	5	-73.3	0	-1.9	-5.2	3	31.4
NB4 & NSD												**41.5**
CNP 101	Generator	1	108	100%	1978	0	-73.9	0	0.0	-5.5	3	31.5
CNP 068	Dump Truck [d]	15	105	15%	2000	12	-74.0	-10	-8.2	-5.6	3	21.9
CNP 081	Excavator	3	112	100%	2000	5	-74.0	0	0.0	-5.6	3	40.2
CNP 061	Derrick Barge	1	104	100%	1935	0	-73.7	0	0.0	-5.4	3	27.8
--	Sorting Facility [c]	1	109	100%	2000	0	-74.0	0	0.0	-5.6	3	32.4
NB5 & NSE												**41.8**
CNP 101	Generator	1	108	100%	1935	0	-73.7	0	0.0	-5.4	3	31.8
CNP 068	Dump Truck [d]	15	105	15%	1973	12	-73.9	-10	-8.2	-5.5	3	22.1
CNP 081	Excavator	3	112	100%	1973	5	-73.9	0	0.0	-5.5	3	40.3
CNP 061	Derrick Barge	1	104	100%	1891	0	-73.5	0	0.0	-5.3	3	28.2
--	Sorting Facility [c]	1	109	100%	1973	0	-73.9	0	0.0	-5.5	3	32.6

Appendix B2 - Calculation of Noise Impact Assessment (Site B)

Operation Fixed Noise Impact Assessment (Night-time Period) (Site B)

Lohas Park, Le Prestige Moonlight (LP2)

CNP No.	PME	No. of PME	Unit SWL	On-time %	Distance between Source to NSR	Correction, dB(A)						CNL of individual PME
			dB(A)	%	m	No. of PME [(e)]	Distance	Barrier	On-time %	Air Absorption[(a)]	Façade	dB(A)
Stockpiling and TKO Basin												**31.7**
CNP 141	Water Lorry	1	112	15%	2087	0	-74.4	0	-8.2	-5.8	3	26.5
CNP 103	Generator	2	95	100%	1859	3	-73.4	0	0.0	-5.2	3	22.4
CNP 061	Derrick Barge	3	104	65%	2137	5	-74.6	0	-1.9	-6.0	3	29.3
NB4 & NSD												**37.9**
CNP 101	Generator	1	108	100%	2620	0	-76.4	0	0.0	-7.3	3	27.3
CNP 068	Dump Truck	15	105	15%	2641	12	-76.4	0	-8.2	-7.4	3	27.7
CNP 081	Excavator	3	112	100%	2598	5	-76.3	0	0.0	-7.3	3	36.2
CNP 061	Derrick Barge	1	104	100%	2652	0	-76.5	0	0.0	-7.4	3	23.1
--	Sorting Facility [(c)]	1	109	100%	2598	0	-76.3	0	0.0	-7.3	3	28.4
NB5 & NSE												**38.4**
CNP 101	Generator	1	108	100%	2533	0	-76.1	0	0.0	-7.1	3	27.8
CNP 068	Dump Truck	15	105	15%	2641	12	-76.4	0	-8.2	-7.4	3	27.7
CNP 081	Excavator	3	112	100%	2522	5	-76.0	0	0.0	-7.1	3	36.7
CNP 061	Derrick Barge	1	104	100%	2543	0	-76.1	0	0.0	-7.1	3	23.8
--	Sorting Facility [(c)]	1	109	100%	2522	0	-76.0	0	0.0	-7.1	3	28.9

Appendix B2 - Calculation of Noise Impact Assessment (Site B)

Operation Fixed Noise Impact Assessment (Night-time Period) (Site B)

Lohas Park, Wings at Sea (LP4)

CNP No.	PME	No. of PME	Unit SWL	On-time %	Distance between Source to NSR	Correction, dB(A)						CNL of individual PME
			dB(A)	%	m	No. of PME [e]	Distance	Barrier	On-time %	Air Absorption[a]	Façade	dB(A)
Stockpiling and TKO Basin												**31.7**
CNP 141	Water Lorry	1	112	15%	2134	0	-74.6	0	-8.2	-6.0	3	26.2
CNP 103	Generator	2	95	100%	1858	3	-73.4	0	0.0	-5.2	3	22.4
CNP 061	Derrick Barge	3	104	65%	2109	5	-74.5	0	-1.9	-5.9	3	29.5
NB4 & NSD												**38.1**
CNP 101	Generator	1	108	100%	2578	0	-76.2	0	0.0	-7.2	3	27.6
CNP 068	Dump Truck	15	105	15%	2592	12	-76.3	0	-8.2	-7.3	3	28.0
CNP 081	Excavator	3	112	100%	2578	5	-76.2	0	0.0	-7.2	3	36.3
CNP 061	Derrick Barge	1	104	100%	2626	0	-76.4	0	0.0	-7.4	3	23.3
--	Sorting Facility [c]	1	109	100%	2578	0	-76.2	0	0.0	-7.2	3	28.6
NB5 & NSE												**38.6**
CNP 101	Generator	1	108	100%	2485	0	-75.9	0	0.0	-7.0	3	28.1
CNP 068	Dump Truck	15	105	15%	2592	12	-76.3	0	-8.2	-7.3	3	28.0
CNP 081	Excavator	3	112	100%	2485	5	-75.9	0	0.0	-7.0	3	36.9
CNP 061	Derrick Barge	1	104	100%	2513	0	-76.0	0	0.0	-7.0	3	24.0
--	Sorting Facility [c]	1	109	100%	2485	0	-75.9	0	0.0	-7.0	3	29.1

Remarks:

(a) Air Absorption = 2.8 dB(A) per 1000m

(b) Calculation is developed based on the approved ER 2008 Report (May 2008).

(c) SWL of Sorting Facility is with reference to the approved EIA Report for TKOFB (Register No.: AEIAR-060/2002) which includes vibrating feeder, magnetic separator and conveyor belts.

(d) Substantial noise barrier will be erected to totally screen the operation of dump truck such that none of PME will be visible when viewed from the NSR. A negative correction factor of 10dB(A) is applied in the assessment.

(e) Correction for No. of PME = 10log(No. of PME)

Appendix B2 - Calculation of Noise Impact Assessment (Site B)

Operation Fixed Noise Impact Assessment (On-site Vehicle Movement) (Daytime and Evening Period) (Site B)

Calculation of Noise levels at Island Resort (IR1)

Noise Source	Vehicle Type	SWL[(a)]	Traffic	Parameters			Speed[(d)]	Correction							CNL[(b)]
		dB(A)	Q	Hs	Lsr	V	km/h	CLsr	Cv	Cno	Cspd	Csri	Catm[(c)]	Cfac	dB(A)
R1_Internal Road	Dump Truck	105	190	2	2577	2	10	-34	-19	23	-10	0	-7	3	27.7
R1a_Internal Road	Dump Truck	105	34	2	2489	2	10	-34	-20	15	-10	0	-7	3	19.2
R1b_Internal Road	Dump Truck	105	36	2	2275	6	10	-34	-15	16	-10	0	-6	3	25.7
R2_Internal Road	Dump Truck	105	189	2	2476	2	10	-34	-21	23	-10	0	-7	3	26.3
R3_Internal Road	Dump Truck	105	189	2	2358	4	10	-34	-16	23	-10	0	-7	3	31.0
R4_Internal Road	Dump Truck	105	103	2	2250	1	10	-34	-23	20	-10	0	-6	3	21.8
R5_Internal Road	Dump Truck	105	113	2	2359	3	10	-34	-18	21	-10	0	-7	3	27.6
R6_Internal Road	Dump Truck	105	99	2	2100	3	10	-33	-18	20	-10	0	-6	3	27.4
R7_Internal Road	Dump Truck	105	283	2	2133	4	10	-33	-17	25	-10	0	-6	3	33.5
R8_Internal Road	Dump Truck	105	189	2	2015	3	10	-33	-18	23	-10	0	-6	3	31.1
R9a_Internal Road	Dump Truck	105	254	2	2005	12	10	-33	-12	24	-10	0	-6	3	38.6
R9b_Internal Road	Dump Truck	105	87	2	2166	8	10	-33	-13	19	-10	0	-6	3	31.5
R10_Internal Road	Dump Truck	105	18	2	2371	12	10	-34	-12	13	-10	0	-7	3	25.3
R11_Internal Road	Dump Truck	105	131	2	2297	3	10	-34	-17	21	-10	0	-6	3	28.8
R11a_Internal Road	Dump Truck	105	167	2	2225	3	10	-33	-18	22	-10	0	-6	3	29.5
R12_Internal Road	Dump Truck	105	53	2	2432	9	10	-34	-13	17	-10	0	-7	3	28.5
											TOTAL				**42.8**

Appendix B2 - Calculation of Noise Impact Assessment (Site B)

Operation Fixed Noise Impact Assessment (On-site Vehicle Movement) (Daytime and Evening Period) (Site B)

Calculation of Noise levels at Lohas Park, Le Prestige Moonlight (LP2)

Noise Source	Vehicle Type	SWL[(a)]	Traffic	Parameters			Speed[(d)]	Correction							CNL[(b)]
		dB(A)	Q	Hs	Lsr	V	km/h	CLsr	Cv	Cno	Cspd	Csri	Catm[(c)]	Cfac	dB(A)
R1_Internal Road	Dump Truck	105	190	2	1742	0	10	-32	-30	23	-10	0	-5	3	20.1
R1a_Internal Road	Dump Truck	105	34	2	1706	8	10	-32	-14	15	-10	0	-5	3	29.7
R1b_Internal Road	Dump Truck	105	36	2	1888	1	10	-33	-23	16	-10	0	-5	3	19.7
R2_Internal Road	Dump Truck	105	189	2	1805	5	10	-33	-15	23	-10	0	-5	3	34.7
R3_Internal Road	Dump Truck	105	189	2	1906	0	10	-33	-30	23	-10	0	-5	3	20.1
R4_Internal Road	Dump Truck	105	103	2	2017	4	10	-33	-17	20	-10	0	-6	3	29.7
R5_Internal Road	Dump Truck	105	113	2	2042	4	10	-33	-17	21	-10	0	-6	3	29.7
R6_Internal Road	Dump Truck	105	99	2	2245	2	10	-34	-20	20	-10	0	-6	3	24.8
R7_Internal Road	Dump Truck	105	283	2	2123	0	10	-33	-27	25	-10	0	-6	3	23.0
R8_Internal Road	Dump Truck	105	189	2	2285	2	10	-34	-20	23	-10	0	-6	3	28.3
R9a_Internal Road	Dump Truck	105	254	2	2536	6	10	-34	-15	24	-10	0	-7	3	33.1
R9b_Internal Road	Dump Truck	105	87	2	2864	4	10	-35	-17	19	-10	0	-8	3	25.0
R10_Internal Road	Dump Truck	105	18	2	2327	2	10	-34	-20	13	-10	0	-7	3	17.4
R11_Internal Road	Dump Truck	105	131	2	2513	4	10	-34	-17	21	-10	0	-7	3	28.0
R11a_Internal Road	Dump Truck	105	167	2	2639	6	10	-34	-15	22	-10	0	-7	3	30.6
R12_Internal Road	Dump Truck	105	53	2	2755	3	10	-34	-18	17	-10	0	-8	3	22.5
											TOTAL				**40.6**

Appendix B2 - Calculation of Noise Impact Assessment (Site B)

Operation Fixed Noise Impact Assessment (On-site Vehicle Movement) (Daytime and Evening Period) (Site B)

Calculation of Noise levels at Lohas Park, Wings at Sea (LP4)

Noise Source	Vehicle Type	SWL[(a)]	Traffic	Parameters			Speed[(d)]	Correction							CNL[(b)]
		dB(A)	Q	Hs	Lsr	V	km/h	CLsr	Cv	Cno	Cspd	Csri	Catm[(c)]	Cfac	dB(A)
R1_Internal Road	Dump Truck	105	190	2	1705	0	10	-32	-30	23	-10	0	-5	3	20.3
R1a_Internal Road	Dump Truck	105	34	2	1658	8	10	-32	-14	15	-10	0	-5	3	29.9
R1b_Internal Road	Dump Truck	105	36	2	1827	1	10	-33	-23	16	-10	0	-5	3	20.0
R2_Internal Road	Dump Truck	105	189	2	1760	5	10	-32	-15	23	-10	0	-5	3	34.9
R3_Internal Road	Dump Truck	105	189	2	1854	0	10	-33	-30	23	-10	0	-5	3	20.4
R4_Internal Road	Dump Truck	105	103	2	1960	4	10	-33	-17	20	-10	0	-5	3	30.0
R5_Internal Road	Dump Truck	105	113	2	1995	4	10	-33	-17	21	-10	0	-6	3	30.0
R6_Internal Road	Dump Truck	105	99	2	2183	2	10	-33	-20	20	-10	0	-6	3	25.1
R7_Internal Road	Dump Truck	105	283	2	2059	0	10	-33	-27	25	-10	0	-6	3	23.3
R8_Internal Road	Dump Truck	105	189	2	2218	2	10	-33	-20	23	-10	0	-6	3	28.6
R9a_Internal Road	Dump Truck	105	254	2	2474	6	10	-34	-15	24	-10	0	-7	3	33.4
R9b_Internal Road	Dump Truck	105	87	2	2815	4	10	-34	-17	19	-10	0	-8	3	25.2
R10_Internal Road	Dump Truck	105	18	2	2287	2	10	-34	-20	13	-10	0	-6	3	17.6
R11_Internal Road	Dump Truck	105	131	2	2470	4	10	-34	-17	21	-10	0	-7	3	28.2
R11a_Internal Road	Dump Truck	105	167	2	2593	6	10	-34	-15	22	-10	0	-7	3	30.8
R12_Internal Road	Dump Truck	105	53	2	2722	3	10	-34	-18	17	-10	0	-8	3	22.7
											TOTAL				**40.9**

Remarks:

SWL	- the sound power level of a source, dB(A)
Q	- the number of vehicle per 30min
Lsr	- the horizontal distance between the source and NSR, m
V	- the angle of view of the segment, degree
Hs	- the height of noise source assumed at 1m above ground level, m
CLsr	- correction for slant distance between the source and the NSR, -10log(Lsr)dB(A)
Cv	- correction for angle of view less than 180°, 10log(V/180)dB(A)
Cno	- correction for number of vehicles, 10log(Q)dB(A)
Cspd	- speed correction, -10log(Speed)dB(A)
Csri	- barrier attentuation, dB(A)
Catm	- correction for atmospheric absorption, dB(A)
Cfac	- facade correction, dB(A)
CNL	- corrected noise level, dB(A)(1 hour)

Notes:

(a) Reference is made to SWL provided in the document prepared by the Noise Control Authority (Dump truck, 5.5 tonne < gross vehicle weight <= 38 tonne)
(http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf)

(b) Noise calculation from truck movement is carried out in accordance with BS 5228 - Part 1:2009.
Corrected Noise Level (CNL) = SWL - 33 + distance correction + angle correction + correction for number of vehicles +barrier correction + correction for atmospheric absorption + façade correction + speed correction

(c) Air Absorption = 2.8 dB(A) per 1000m

(d) 10km/h of speed limit is adopted in accordance with EP Condition 2.13.

Appendix B2 - Calculation of Noise Impact Assessment (Site B)

Operation Fixed Noise Impact Assessment (On-site Vehicle Movement) (Night-time Period) (Site B)

Calculation of Noise levels at Island Resort (IR1)

Noise Source	Vehicle Type	SWL[(a)]	Traffic	Parameters			Speed[(d)]	Correction							CNL[(b)]
		dB(A)	Q	Hs	Lsr	V	km/h	CLsr	Cv	Cno	Cspd	Csri	Catm[(c)]	Cfac	dB(A)
R1_Internal Road	Dump Truck	105	0	2	2577	2	10	-34	-19	0	-10	0	-7	3	0.0
R1a_Internal Road	Dump Truck	105	0	2	2489	2	10	-34	-20	0	-10	0	-7	3	0.0
R1b_Internal Road	Dump Truck	105	0	2	2275	6	10	-34	-15	0	-10	0	-6	3	0.0
R2_Internal Road	Dump Truck	105	0	2	2476	2	10	-34	-21	0	-10	0	-7	3	0.0
R3_Internal Road	Dump Truck	105	0	2	2358	4	10	-34	-16	0	-10	0	-7	3	0.0
R4_Internal Road	Dump Truck	105	0	2	2250	1	10	-34	-23	0	-10	0	-6	3	0.0
R5_Internal Road	Dump Truck	105	0	2	2359	3	10	-34	-18	0	-10	0	-7	3	0.0
R6_Internal Road	Dump Truck	105	53	2	2100	3	10	-33	-18	17	-10	0	-6	3	24.7
R7_Internal Road	Dump Truck	105	105	2	2133	4	10	-33	-17	20	-10	0	-6	3	29.2
R8_Internal Road	Dump Truck	105	105	2	2015	3	10	-33	-18	20	-10	0	-6	3	28.6
R9a_Internal Road	Dump Truck	105	137	2	2005	12	10	-33	-12	21	-10	0	-6	3	35.9
R9b_Internal Road	Dump Truck	105	85	2	2166	8	10	-33	-13	19	-10	0	-6	3	31.4
R10_Internal Road	Dump Truck	105	0	2	2371	12	10	-34	-12	0	-10	0	-7	3	0.0
R11_Internal Road	Dump Truck	105	53	2	2297	3	10	-34	-17	17	-10	0	-6	3	24.9
R11a_Internal Road	Dump Truck	105	53	2	2225	3	10	-33	-18	17	-10	0	-6	3	24.5
R12_Internal Road	Dump Truck	105	0	2	2432	9	10	-34	-13	0	-10	0	-7	3	0.0
											TOTAL				**38.9**

Appendix B2 - Calculation of Noise Impact Assessment (Site B)

Operation Fixed Noise Impact Assessment (On-site Vehicle Movement) (Night-time Period) (Site B)

Calculation of Noise levels at Lohas Park, Le Prestige Moonlight (LP2)

Noise Source	Vehicle Type	SWL[(a)]	Traffic	Parameters			Speed[(d)]	Correction							CNL[(b)]
		dB(A)	Q	Hs	Lsr	V	km/h	CLsr	Cv	Cno	Cspd	Csri	Catm[(c)]	Cfac	dB(A)
R1_Internal Road	Dump Truck	105	0	2	1742	0	10	-32	-30	0	-10	0	-5	3	0.0
R1a_Internal Road	Dump Truck	105	0	2	1706	8	10	-32	-14	0	-10	0	-5	3	0.0
R1b_Internal Road	Dump Truck	105	0	2	1888	1	10	-33	-23	0	-10	0	-5	3	0.0
R2_Internal Road	Dump Truck	105	0	2	1805	5	10	-33	-15	0	-10	0	-5	3	0.0
R3_Internal Road	Dump Truck	105	0	2	1906	0	10	-33	-30	0	-10	0	-5	3	0.0
R4_Internal Road	Dump Truck	105	0	2	2017	4	10	-33	-17	0	-10	0	-6	3	0.0
R5_Internal Road	Dump Truck	105	0	2	2042	4	10	-33	-17	0	-10	0	-6	3	0.0
R6_Internal Road	Dump Truck	105	53	2	2245	2	10	-34	-20	17	-10	0	-6	3	22.1
R7_Internal Road	Dump Truck	105	105	2	2123	0	10	-33	-27	20	-10	0	-6	3	18.7
R8_Internal Road	Dump Truck	105	105	2	2285	2	10	-34	-20	20	-10	0	-6	3	25.7
R9a_Internal Road	Dump Truck	105	137	2	2536	6	10	-34	-15	21	-10	0	-7	3	30.4
R9b_Internal Road	Dump Truck	105	85	2	2864	4	10	-35	-17	19	-10	0	-8	3	24.9
R10_Internal Road	Dump Truck	105	0	2	2327	2	10	-34	-20	0	-10	0	-7	3	0.0
R11_Internal Road	Dump Truck	105	53	2	2513	4	10	-34	-17	17	-10	0	-7	3	24.1
R11a_Internal Road	Dump Truck	105	53	2	2639	6	10	-34	-15	17	-10	0	-7	3	25.6
R12_Internal Road	Dump Truck	105	0	2	2755	3	10	-34	-18	0	-10	0	-8	3	0.0
											TOTAL				**34.2**

Appendix B2 - Calculation of Noise Impact Assessment (Site B)

Operation Fixed Noise Impact Assessment (On-site Vehicle Movement) (Night-time Period) (Site B)

Calculation of Noise levels at Lohas Park, Wings at Sea (LP4)

Noise Source	Vehicle Type	SWL[(a)]	Traffic	Parameters			Speed[(d)]	Correction							CNL[(b)]
		dB(A)	Q	Hs	Lsr	V	km/h	CLsr	Cv	Cno	Cspd	Csri	Catm[(c)]	Cfac	dB(A)
R1_Internal Road	Dump Truck	105	0	2	1705	0	10	-32	-30	0	-10	0	-5	3	0.0
R1a_Internal Road	Dump Truck	105	0	2	1658	8	10	-32	-14	0	-10	0	-5	3	0.0
R1b_Internal Road	Dump Truck	105	0	2	1827	1	10	-33	-23	0	-10	0	-5	3	0.0
R2_Internal Road	Dump Truck	105	0	2	1760	5	10	-32	-15	0	-10	0	-5	3	0.0
R3_Internal Road	Dump Truck	105	0	2	1854	0	10	-33	-30	0	-10	0	-5	3	0.0
R4_Internal Road	Dump Truck	105	0	2	1960	4	10	-33	-17	0	-10	0	-5	3	0.0
R5_Internal Road	Dump Truck	105	0	2	1995	4	10	-33	-17	0	-10	0	-6	3	0.0
R6_Internal Road	Dump Truck	105	53	2	2183	2	10	-33	-20	17	-10	0	-6	3	22.4
R7_Internal Road	Dump Truck	105	105	2	2059	0	10	-33	-27	20	-10	0	-6	3	19.0
R8_Internal Road	Dump Truck	105	105	2	2218	2	10	-33	-20	20	-10	0	-6	3	26.0
R9a_Internal Road	Dump Truck	105	137	2	2474	6	10	-34	-15	21	-10	0	-7	3	30.7
R9b_Internal Road	Dump Truck	105	85	2	2815	4	10	-34	-17	19	-10	0	-8	3	25.1
R10_Internal Road	Dump Truck	105	0	2	2287	2	10	-34	-20	0	-10	0	-6	3	0.0
R11_Internal Road	Dump Truck	105	53	2	2470	4	10	-34	-17	17	-10	0	-7	3	24.3
R11a_Internal Road	Dump Truck	105	53	2	2593	6	10	-34	-15	17	-10	0	-7	3	25.8
R12_Internal Road	Dump Truck	105	0	2	2722	3	10	-34	-18	0	-10	0	-8	3	0.0
											TOTAL				**34.5**

Remarks:

SWL	- the sound power level of a source, dB(A)
Q	- the number of vehicle per 30min
Lsr	- the horizontal distance between the source and NSR, m
V	- the angle of view of the segment, degree
Hs	- the height of noise source assumed at 1m above ground level, m
CLsr	- correction for slant distance between the source and the NSR, -10log(Lsr)dB(A)
Cv	- correction for angle of view less than 180°, 10log(V/180)dB(A)
Cno	- correction for number of vehicles, 10log(Q)dB(A)
Cspd	- speed correction, -10log(Speed)dB(A)
Csri	- barrier attentuation, dB(A)
Catm	- correction for atmospheric absorption, dB(A)
Cfac	- facade correction, dB(A)
CNL	- corrected noise level, dB(A)(1 hour)

Notes:

(a) Reference is made to SWL provided in the document prepared by the Noise Control Authority (Dump truck, 5.5 tonne < gross vehicle weight <= 38 tonne)
(http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf)

(b) Noise calculation from truck movement is carried out in accordance with BS 5228 - Part 1:2009.
Corrected Noise Level (CNL) = SWL - 33 + distance correction + angle correction + correction for number of vehicles +barrier correction + correction for atmospheric absorption + façade correction + speed correction

(c) Air Absorption = 2.8 dB(A) per 1000m

(d) 10km/h of speed limit is adopted in accordance with EP Condition 2.13.