AECOM

Gammon Construction Limited

Contract No. HY/2014/07
Central Kowloon Route – Kai Tak West

Construction Noise Mitigation Measures Plan

Sep 2018

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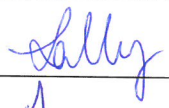
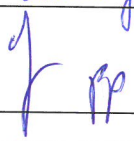
Prepared & Checked:	Sally Ng	
Reviewed & Approved:	Y T Tang	

Version: C

Date: 21 September 2018

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Gammon Construction Limited

Contract No. HY/2014/07

Central Kowloon Route – Kai Tak West

Construction Noise Mitigation Measures Plan (CNMMP)

(September 2018)

Certified by:	Y T Tang
Signature:	
Position:	Environmental Team Leader
Date:	21 September 2018

路政署
HIGHWAYS DEPARTMENT
主要工程管理處
MAJOR WORKS PROJECT MANAGEMENT OFFICE

ERM

Environmental Permit No. FEP-01/457/2013/C

Central Kowloon Route

Independent Environmental Checker Verification

Works Contract:	**Kai Tak West (HY/2014/07)**

Reference Document/Plan

~~Document~~/Plan to be ~~Certified~~/ Verified:	Construction Noise Mitigation Measure Plan
Date of Report:	21 September 2018 (KTW/CNMMP/Version C)
Date received by IEC:	21 September 2018

Reference EP Condition

Environmental Permit Condition: 2.9

To further reduce the air-borne construction noise impacts on Yau Ma Tei Catholic Primary School (Hoi Wang Road), Tak Cheong Building, Prosperous Garden Block 1, The Coronation Tower 1, Ko Fai House of Kwun Fat Court, Grand Waterfront Tower 3 and Hang Chien Court Block J, the Permit Holder shall, no later than one month before the commencement of construction of the corresponding component(s) of the Project, submit to the Director for approval four hard copies and one electronic copy of an updated Construction Noise Mitigation Measure Plan (CNMMP). The plan shall include:-

(a) a schedule of construction works to be carried out at the works areas of the Project within 300m from the NSRs;

(b) an updated construction methodology of the construction works;

(c) an updated powered mechanical equipment (PME) list for the construction works;

(d) an updated proposal of air-borne construction noise mitigation measures for the Noise Sensitive Receivers as mentioned above, including the provision of noise barriers, enclosures;

(e) other initiatives proposed by the Permit Holder; and

(f) an updated prediction of noise levels in accordance with the above updated information and mitigation proposals in place.

Before submission to the Director, the CNMMP shall be certified by the ET and verified by the IEC as conforming to the relevant information and recommendations contained in the EIA Report. The approved CNMMP shall be fully and properly implemented.

IEC Verification

I hereby verify that the above referenced ~~document~~/plan complies with the above referenced condition of FEP-01/457/2013/C.

Ms Mandy To

Independent Environmental Checker

Date: 21 September 2018

Our ref: 0436942_IEC Verification Cert_KTW_CNMMP_20180921.docx

Table of Contents

Page

List of Tables

List of Figures

Appendices

1 INTRODUCTION

1.1 Project Description

1.1.1 Central Kowloon Route (CKR) is a proposed dual 3-lane trunk road across central Kowloon linking the West Kowloon in the west and the proposed Kai Tak Development (KTD) in the east. The CKR will be about 4.7km long with an underground tunnel section of about 3.9km long, in particular, there will be an underwater tunnel of about 370m long in Kowloon Bay to the north of the To Kwa Wan Typhoon Shelter. It will connect the West Kowloon Highway at Yau Ma Tei Interchange with the road network at Kowloon Bay and the future Trunk Road T2 at KTD which will connect to the future Tseung Kwan O – Lam Tin Tunnel (TKO-LTT) and Cross Bay Link (CBL). CKR, Trunk Road T2 and TKO-LTT will form a strategic highway link, namely Route 6, connecting West Kowloon and Tseung Kwan O.

1.1.2 The Environmental Impact Assessment (EIA) Report for CKR (Register No. AEIAR-171/2013) was approved on 11 July 2013 under the Environmental Impact Assessment Ordinance (EIAO). Following the approval of the EIA Report, an Environmental Permit (EP) was granted on 9 August 2013 (EP No. EP-457/2013) for the construction and operation. Variations of EP (VEP) were applied after the issuance of the EP. The latest VEP was applied on 20 December 2016, and the corresponding EP (EP-457/2013/C) was issued by the Director of Environmental Protection (DEP) on 16 January 2017. The construction of the CKR had been divided into different civil construction works contracts. Further EP (FEP) was applied on 30 January 2018 for Contract No. HY/2014/07 for Kai Tak West. EP No. FEP-01/457/2013/C for this Works Contract was subsequently issued by the DEP on 28 February 2018.

1.1.3 Contract No. HY/2014/07 for Kai Tak West (hereafter referred to as “the Project”) involves the following construction activities:

(a) construction of an approximately 370m long underwater tunnel and the associated temporary reclamation in Kowloon Bay;
(b) construction of an approximately 160m long cut and cover tunnel in Ma Tau Kok;
(c) construction of an approximately 125m long depressed road and an approximately 170m long underpass in Kai Tak Development;
(d) construction and subsequent handover of access shaft, temporary traffic decking and associated noise enclosure in Ma Tau Kok to another contractor for the construction of the central tunnel section of Central Kowloon Route;
(e) reconstruction of Kowloon City Ferry Pier Public Transport Interchange;
(f) demolition and removal of the existing landside portion of the existing disused Kowloon City Vehicular Ferry Pier;
(g) demolition and subsequent reprovisioning of Ma Tau Kok Public Pier; and
(h) associated drainage and sewerage, waterworks and landscaping works.

1.1.4 This Works Contract was awarded to Gammon Construction Limited (the Contractor). EP No. FEP-01/457/2013/C was also granted to the Contractor.

1.1.5 As per Condition 2.9 of EP No. FEP-01/457/2013/C, a Construction Noise Mitigation Measures Plan (CNMMP) is required before the commencement of the Project.

1.2 Purpose of this Construction Noise Mitigation Plan

1.2.1 Condition 2.9 of EP No. FEP-01/457/2013/C for CKR – Kai Tak West (Contract No. HY/2014/07) stipulated that to further reduce the air-borne construction noise impacts on Grand Waterfront Tower 3 and Hang Chien Court Block J, the Permit Holder shall, no later than one month before the commencement of construction of the corresponding component(s) of the Project, submit to the Director for approval an updated Construction Noise Mitigation Measure Plan (CNMMP). The plan shall include:

(a) a schedule of construction works to be carried out at the works areas of the Project within 300m from the Noise Sensitive Receivers;

(b) an updated construction methodology of the construction works;
(c) an updated powered mechanical equipment (PME) list for the construction works;
(d) an updated proposal of air-borne construction noise mitigation measures for the Noise Sensitive Receivers as mentioned above, including the provision of noise Movable Barriers, enclosures;
(e) other initiatives proposed by the Permit Holder; and
(f) an updated prediction of noise levels in accordance with the above updated information and mitigation proposals in place.

1.2.2 AECOM Asia Co. Ltd. was commissioned by Gammon Construction Limited, to prepare the CNMMP for the Project.

1.2.3 Version B of the CNMMP was submitted to EPD on 22 March 2018, and was approved by EPD on 27 April 2018. Gammon Construction Limited updated the construction programme and plant inventory in September 2018. The CNMMP is therefore revised based on the latest available information.

1.2.4 The layout of the Project and location of the NSRs are shown in **Figure 1**.

2 CONSTRUCTION WORKS OF THE PROJECT

2.1 Construction Activities

2.1.1 The major construction activities of the Project are summarised in **Table 2.1**.

Table 2.1 Summary of Construction Tasks for the Works

Item	Major Construction Task
1.	Construction of an approximately 370m long underwater tunnel and the associated temporary reclamation in Kowloon Bay
2.	Construction of an approximately 160m long cut and cover tunnel in Ma Tau Kok
3.	Construction of an approximately 125m long depressed road and an approximately 170m long underpass in Kai Tak Development
4.	Construction and subsequent handover of access shaft, temporary traffic decking and associated noise enclosure in Ma Tau Kok to another contractor for the construction of the central tunnel section of Central Kowloon Route
5.	Reconstruction of Kowloon City Ferry Pier Public Transport Interchange
6.	Demolition and removal of the existing landside portion of the existing disused Kowloon City Vehicular Ferry Pier
7.	Demolition and subsequent reprovisioning of Ma Tau Kok Public Pier
8.	Associated drainage and sewerage, waterworks and landscaping works

2.2 Construction Programme

2.2.1 The construction works are expected to be conducted from April 2018 to 2023. An updated construction programme for the Project prepared by Gammon Construction Limited is shown in **Appendix 2.1**. The construction programme presents the construction activities to be undertaken and the tentative timeframe for each construction activity in corresponding worksites.

2.3 Plant Inventory

2.3.1 As recommended in the Approved CKR EIA Report, quiet Powered Mechanical Equipment (PME) should be adopted for the construction works to minimise the noise impact at the NSRs. Based on the Approved CKR EIA Report, a list of quiet Powered Mechanical Equipment (PME) to be adopted for the construction works of the Project are shown in **Table 3.3**. A detailed plant inventory for individual construction activities under the Project, which the types, numbers, grouping and percentage usages of the PME, and the mitigation measures proposed for the PME have been confirmed to be reasonable and practicable by the Engineer and the Contractor, is presented in **Appendix 2.2**.

3 AIRBORNE CONSTRUCTION NOISE ASSESSMENT

3.1 Noise Sensitive Receiver

3.1.1 According to EP No. FEP-01/457/2013/C for CKR – Kai Tak West, CNMMP is required for two NSRs, Grand Waterfront Tower 3 and Hang Chien Court Block J. Locations of these two NSRs are shown in **Figure 1.** Details of the NSRs with the predicted noise results in the Approved CKR EIA Report are presented in **Table 3.1**.

Table 3.1 Summary of Predicted Noise Levels in the Approved CKR EIA Report

NSR ID	NSR Description	Landuse	Noise Criteria, $L_{eq\ (30\text{-}min)}$, dB(A)	Maximum Construction Noise Levels, dB(A)			No. of months of exceedance (CKR only)
				Unmitigated	Mitigated	Cumulative	
E-N12	Grand Waterfront Tower 3	Residential	75	**89**	75	**80**	0
E-N21	Hang Chien Court Block J	Residential	75	**94**	**79**	**82**	6

Note:
[1] Bold values denote exceedance of the EIAO-TM criteria of 75 dB(A) for residential dwellings.

3.2 Assessment Criteria

3.2.1 Noise impacts generated by the construction of this Project have been assessed in accordance with the criteria given in the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM). The construction noise standards are presented in **Table 3.2**.

Table 3.2 Daytime Construction Noise Criteria

Use	Noise Level in $L_{eq\ (30\text{-}min)}$, dB(A)
Residential	75

3.3 Assessment Methodology

3.3.1 The construction noise assessment has been conducted following the same methodology used in the Approved CKR EIA Report based on the updated construction programme and plant inventory provided by Gammon Construction Limited.

3.3.2 Noise impacts generated by the construction of this Project are assessed in accordance with the methodology given in the *Technical Memorandum on Noise from Construction Work Other Than Percussive Piling* (GW-TM) under the Noise Control Ordinance.

3.3.3 Sound power levels (SWLs) of the equipment have been made reference from Table 3 of GW-TM. Where no relevant SWL is found in the GW-TM, reference has been made to other approved EIA Reports. SWLs of the quiet PME have been made reference from EPD's Quality Powered Mechanical Equipment (QPME) labels, British Standard 5228: Part 1:2009 Noise Control on Construction and Open Sites, and other approved EIA Reports.

3.3.4 It is assumed that all PME items required for a particular construction activity would be located at the notional source position, as defined in GW-TM.

3.3.5 To predict the noise level, PME items has been divided into groups for each discrete construction task. The objective is to identify the worst case scenario representing those items of PME that would be in use concurrently at any given time. The sound pressure level (SPL) of each construction task at the NSRs is calculated based on the number of plant and the notional distance from the noise assessment points. The notional distances of the works area to the NSR are presented in **Appendix 3.1**. If there are concurrent construction tasks, the noise

levels at representative noise assessment points are predicted by adding up the SPLs of all concurrent construction tasks.

3.3.6 A positive 3 dB(A) façade correction has been added to the predicted noise levels in order to account for the façade effect at each noise assessment point. Noise impact at the worst affected sensitive façade of the NSR to the noise source is assessed.

3.4 Cumulative Impacts

3.4.1 Based on the Approved CKR EIA Report, Shatin to Central Link – Tai Wai to Hung Hom Section [SCL(TAW-HUH)], Trunk Road T2 and Infrastructure at South Apron, and Kai Tak Development (KTD) were identified to be concurrent projects of the works at CKR east portion.

3.4.2 The works areas and construction programme of SCL(TAW-HUH) have been reviewed based on latest available information. SCL Works Contracts 1108A - Kai Tak Barging Point Facilities, 1108 - Kai Tak Station and Associated Tunnels, and 1109 - Stations and Tunnels of Kowloon City Section are the closest works sites of SCL(TAW-HUH) to the Project site. According to Monthly Environmental Monitoring and Audit (EM&A) Report No.49 (Period 1 to 30 September 2016) for Works Contract 1108A, the construction works under the contract were completed on 29 September 2016, such that Works Contract 1108A is not a concurrent project. For Works Contracts 1108 and 1109, their works areas are beyond 300m of the NSRs of this Project. As for Trunk Road T2 and Infrastructure at South Apron, their works areas are also out of 300m of the NSRs of this Project. Therefore, cumulative construction noise impact from construction of SCL(TAW-HUH) and Trunk Road T2 and Infrastructure at South Apron is not anticipated.

3.4.3 For KTD, it is divided into multiple contracts with different works areas. According to the latest available information on the project website of KTD, only the works area for Contract No. KL/2012/03 - Stage 4 infrastructure works at north apron area of Kai Tak Airport is within 300m of the NSRs. The contract commenced in 19 September 2013 and is estimated to complete before mid-2018. Therefore, cumulative construction noise impact from construction of KTD is anticipated from the commencement of the construction activities of this Project until mid-2018, i.e. from April to June 2018. Following the assumptions of the Approved CKR EIA Report, the noise level from KTD is assumed to be 78 dB(A) at both NSRs E-N12 and E-N21 for this assessment.

3.5 Mitigation Measures

3.5.1 The noise mitigation measures proposed in the Approved CKR EIA Report have been considered and reviewed in this CNMMP, including use of quiet PME as summarised in **Table 3.3**, use of movable barriers/acoustic sheet barriers as summarised in **Table 3.4**, large full enclosure for mucking out point, and sequencing operation/grouping of PME.

3.5.2 Taking into account the latest construction programme and PME inventory provided by the Contractor, extra quiet PME for dump truck, roller, vibratory, and spliter are proposed, in addition to the quiet PME proposed in the Approved CKR EIA Report. The quiet PME reference and SWL for road roller are updated as well. The quiet PME as listed in **Table 3.3** could be found in Hong Kong. However, if the exact model specified in the references of the listed quiet PME are not available during the construction period, the model with SWL not higher than the listed SWL shall be adopted.

Table 3.3 Quiet PME Recommended for Adoption during Construction Phase

PME	Reference [1]	SWL, dB(A)
Asphalt paver	BS D8-24	101
Breaker, excavator mounted, hydraulic	BS D8-13	110
Bulldozer	Ref 4	102
Crawler crane	BS D7-114	101
Crawler crane on flat-top barge	BS D7-114	101

PME	Reference [1]	SWL, dB(A)
Dump Truck	BS D9-39	103
Excavator / backhoe	BS C6-10	107
Hand held breaker	BS D8-12	106
Road roller	BS D8-30	101
Roller, vibratory	BS D3-116	106
Saw, circular wood	BS D7-79	103
Spliter	BS D8-2	118

Note:
[1] The SWLs are referred to the following references:
BS - British Standard 5228: Part 1:2009 Noise Control on Construction and Open Sites
Ref 4 - Table 4-14 of the approved EIA Report for Proposed Comprehensive Development at Wo Shang Wai, Yuen Long (Register No. AEIAR-120/2008)

3.5.3 Movable noise barriers/acoustic sheet barriers are proposed for certain PME as summarised in **Table 3.4**. The mitigation measures generally follow the suggestions in the Approved CKR EIA Report, except for the additional measures for air blower (electric), concrete pump truck, desander, HD90, mini backhoe (3 tonnes), mini excavator / backhoe, roller, vibratory, crawler mounted (hydraulic), spliter, vibratory hammer, hydraulic, rock drill, water pump, diesel, welding machine and welding set. Following the assumptions in the Approved CKR EIA Report, it is anticipated that suitably designed movable barriers/acoustic sheet barriers could achieve at least 5 to 10 dB(A) reduction. For a conservative assessment, only a reduction of 5 dB(A) is assumed. Movable barrier/acoustic sheet barrier material with surface mass at least 7kg/m^2 is recommended to achieve the predicted screening effect as suggested in the Approved CKR EIA Report. Movable barrier/acoustic sheet barrier should have no openings or gaps. Their locations should be adjusted where and when necessary taking into consideration the locations and type of PME involved and the NSRs intended to be protected.

Table 3.4 Noise Mitigation Measures for Certain PME during Construction Phase

PME	Noise Mitigation Measures	Noise Reduction, dB(A)
Air blower (electric)	Movable barrier/acoustic sheet barrier	5
Air compressor	Movable barrier/acoustic sheet barrier	5
Asphalt paver	Movable barrier/acoustic sheet barrier	5
Breaker, excavator mounted, hydraulic	Movable barrier/acoustic sheet barrier	5
Bulldozer	Movable barrier/acoustic sheet barrier	5
Compactor, vibratory	Movable barrier/acoustic sheet barrier	5
Concrete lorry mixer	Movable barrier/acoustic sheet barrier	5
Concrete pump	Movable barrier/acoustic sheet barrier	5
Concrete pump truck	Movable barrier/acoustic sheet barrier	5
Crawler crane	Movable barrier/acoustic sheet barrier	5
Crusher, excavator mounted, hydraulic	Movable barrier/acoustic sheet barrier	5
Desander	Movable barrier/acoustic sheet barrier	5
Dump truck	Movable barrier/acoustic sheet barrier	5
Dump truck with grab	Movable barrier/acoustic sheet barrier	5
Dump truck, with or without grab	Movable barrier/acoustic sheet barrier	5
Excavator / backhoe	Movable barrier/acoustic sheet barrier	5
Generator	Movable barrier/acoustic sheet barrier	5
Grout mixer	Movable barrier/acoustic sheet barrier	5

PME	Noise Mitigation Measures	Noise Reduction, dB(A)
Grout pump	Movable barrier/acoustic sheet barrier	5
Hand held breaker	Movable barrier/acoustic sheet barrier	5
HD90	Movable barrier/acoustic sheet barrier	5
Lorry with crane	Movable barrier/acoustic sheet barrier	5
Mini Backhoe (3 tonnes)	Movable barrier/acoustic sheet barrier	5
Mini Excavator / Backhoe	Movable barrier/acoustic sheet barrier	5
Pipe pile rig	Movable barrier/acoustic sheet barrier	5
Poker, vibratory, hand-held	Movable barrier/acoustic sheet barrier	5
Road roller	Movable barrier/acoustic sheet barrier	5
Rock drill, crawler mounted (hydraulic)	Movable barrier/acoustic sheet barrier	5
Roller, vibratory	Movable barrier/acoustic sheet barrier	5
Saw, circular wood	Movable barrier/acoustic sheet barrier	5
Saw, wire	Movable barrier/acoustic sheet barrier	5
Spliter	Movable barrier/acoustic sheet barrier	5
Tractor with trailer	Movable barrier/acoustic sheet barrier	5
Vibratory hammer, hydraulic	Movable barrier/acoustic sheet barrier	5
Water pump, diesel	Movable barrier/acoustic sheet barrier	5
Welding machine	Movable barrier/acoustic sheet barrier	5
Welding set	Movable barrier/acoustic sheet barrier	5

3.5.4 As suggested in the Approved CKR EIA Report, large full enclosures are proposed to be installed at three mucking out points at the west, central and east portions of CKR to screen off the loading/unloading activities. Appropriate design would be adopted for any openings such as access, vents etc. to ensure the acoustic integrity of the enclosures. The full enclosure for the mucking out locations could be designed to achieved a minimum noise reduction of 15 dB(A). In order to further mitigate the noise nuisance, the full enclosure for the mucking out location would be further optimized to accommodate mobile construction plant such as lorries and dump trucks to stay inside during loading and unloading activities. According to the latest information provided by the Contractor, the mucking out point at the east portion, i.e. the area covered by the Contract, will be located within Portion 1A. The noise reduction by the large full enclosure is not considered in the calculations in this CNMMP for the worst case scenario.

3.5.5 Some plant items will operate sequentially within the same work site in order to minimise the noise impacts from the construction activities to the NSRs. The sequencing operation/grouping of PME as presented in **Appendix 2.2** is confirmed to be practicable by the Engineer and the Contractor.

3.6 Noise Assessment Results

3.6.1 The airborne construction noise impacts for the construction works under the Project have been assessed based on the updated construction programme and plant inventory and are summarised in **Table 3.5**. Detailed assessment results are provided in **Appendix 3.2**. The proposed mitigation measures described in **Section 3.5** have been included in the assessment and hence only the mitigated scenario is presented.

3.6.2 Having implemented all practicable noise mitigation measures as stated in **Section 3.5**, the predicted noise levels at both NSRs fully comply with the EIAO-TM noise criteria of 75 dB(A) for residential dwelling. The predicted noise levels at Grand Waterfront Tower 3 (E-N12) range from 50 to 75 dB(A). The maximum predicted noise level remains the same as the level of 75

dB(A) predicted in the Approved CKR EIA Report. For Hang Chien Court Block J (E-N21), the predicted noise levels range from 60 to 75 dB(A). Comparing to the Approved CKR EIA Report, the maximum predicted noise level reduces from 79 to 75 dB(A). The duration of noise exceedance at E-N21 reduces from 6 months to no exceedance.

Table 3.5 Summary of Noise Assessment Result (CKR only)

NSR ID	NSR	Noise Criteria, $L_{eq\ (30\text{-}min)}$, dB(A)	Predicted Noise Level, $L_{eq\ (30\text{-}min)}$, dB(A)	Exceedance, $L_{eq\ (30\text{-}min)}$, dB(A)	No. of months of exceedance
E-N12	Grand Waterfront Tower 3	75	51 – 75	0	0
E-N21	Hang Chien Court Block J	75	67 – 75	0	0

3.6.3 **Table 3.6** presents the cumulative noise level at the identified NSRs and details of the calculation are given in **Appendix 3.2**. Following the Approved CKR EIA Report, the noise impacts contributed by KTD is assumed to be 78 dB(A) at both NSRs E-N12 and E-N21, which is already exceeding the noise criteria of 75 dB(A) for residential dwellings. However, the EIA study of KTD indicated that all practicable mitigation measures have been fully explored and exhausted to reduce the noise impact arising from construction activities of KTD.

3.6.4 Cumulative noise impact with adverse residual impacts exceeding the construction noise criteria by 3 dB(A) at E-N12 for 3 months, and 3 to 5 dB(A) at E-N21 for 3 months is predicted. Comparing to the Approved CKR EIA Report, the maximum predicted cumulative noise level at E-N12 reduces from 80 to 78 dB(A), while for E-N21, the maximum predicted cumulative noise level reduces from 82 to 80 dB(A).

Table 3.6 Summary of Noise Assessment Result (Cumulative)

NSR ID	NSR	Noise Criteria, $L_{eq\ (30\text{-}min)}$, dB(A)	Predicted Noise Level, $L_{eq\ (30\text{-}min)}$, dB(A)	Exceedance, $L_{eq\ (30\text{-}min)}$, dB(A)	No. of months of exceedance
E-N12	Grand Waterfront Tower 3	75	51 – 78	3	3
E-N21	Hang Chien Court Block J	75	67 – 80	3 – 5	3

4 CONCLUSION

4.1.1 This CNMMP has predicted the construction noise impact from Contract No. HY/2014/07 to the two representative NSRs at Grand Waterfront Tower 3 (E-N12) and Hang Chien Court Block J (E-N21). This plan has taken into account the updated information on PME and works programme which would be adopted by the Contractor. With the implementation of mitigation measures in form of quiet plants, movable barriers/acoustic sheet barriers and sequencing operation/grouping of PME, comparing to the Approved CKR EIA Report, the maximum predicted noise level at Grand Waterfront Tower 3 (E-N12) remains at 75 dB(A). For Hang Chien Court Block J (E-N21), the maximum predicted noise level reduces from 79 to 75 dB(A). Noise levels at both representative NSRs are predicted to comply with the EIAO-TM noise criteria of 75 dB(A). For the cumulative impacts from KTD, comparing to the Approved CKR EIA Report, the maximum predicted cumulative noise level at Grand Waterfront Tower 3 (E-N12) reduces from 80 to 78 dB(A), while for Hang Chien Court Block J (E-N21), the maximum predicted noise level reduces from 82 to 80 dB(A).

4.1.2 Where necessary, further review and update will be performed during the construction phase and liaison with affected parties is recommended to minimise the construction noise impacts as far as practicable.

Figure

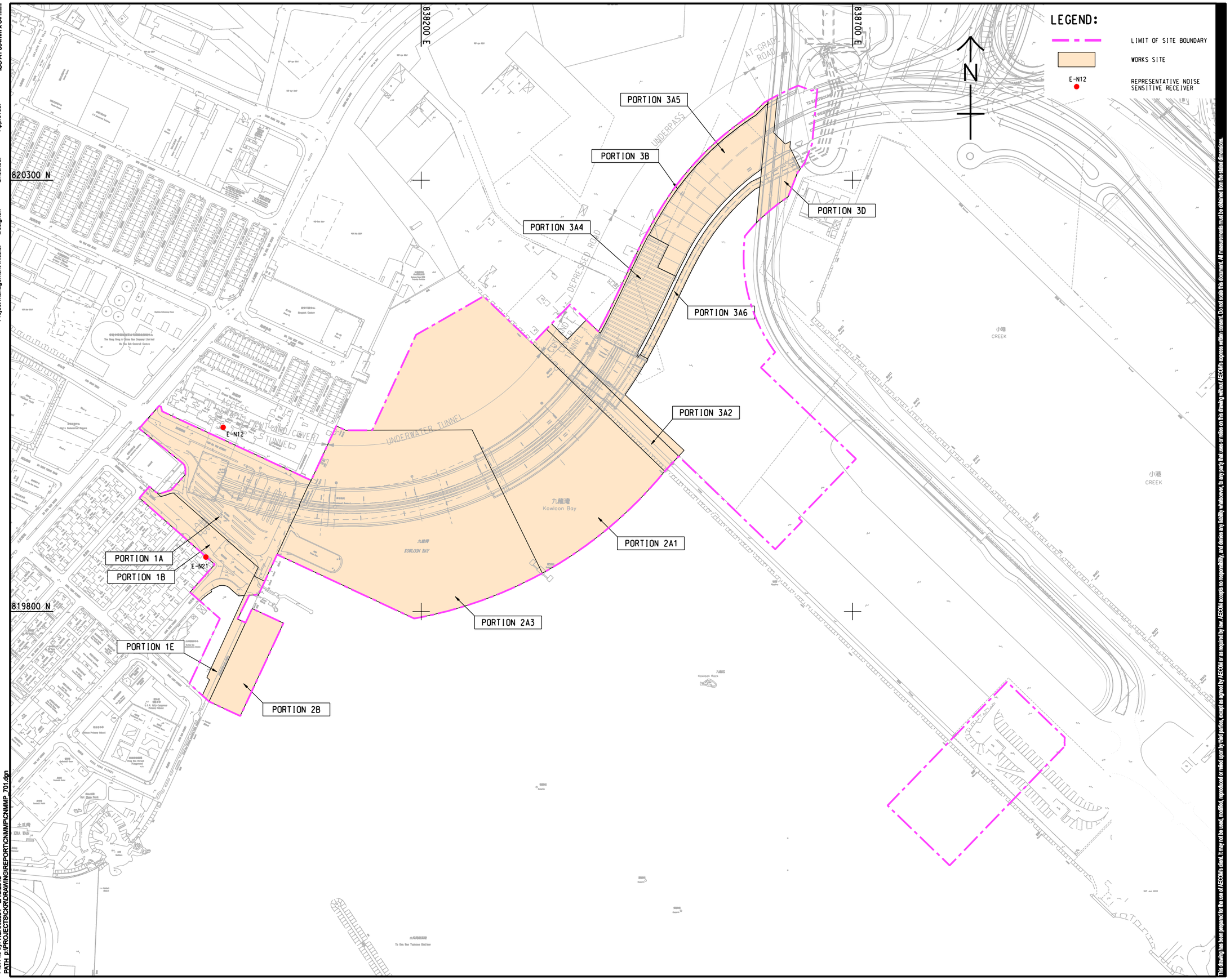
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



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AECOM

PROJECT
項目

CONTRACT NO. HY2014/07 CENTRAL KOWLOON ROUTE - KAI TAK WEST

CLIENT
業主

GAMMON CONSTRUCTION LIMITED

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
參訂

I/R 參訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核實

STATUS
階段

SCALE 比例
A1 1 : 2000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
XXXXXXXX

AGREEMENT NO. 協議編號
HY2014/07

SHEET TITLE
圖紙名稱

WORKS AREA AND LOCATIONS OF REPRESENTATIVE NOISE SENSITIVE RECEIVERS

SHEET NUMBER
圖紙編號

XXXXXXXX/FIGURE 1

Appendix 2.1

Tentative Construction Programme

Appendix 2.1 **Tentative Construction Programme**

ID	Construction Activities	Start	Finish	2018												2019												2020											
				A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M
Kowloon City Vehicular Ferry Pier (Portion 1B)																																							
S135, S136	Demolition of carpark building and ramp structure	02/06/18	18/07/18																																				
S150	Reprovision of new parking facilities	19/07/18	03/09/18																																				
Ma Tau Kok C&C tunnel & Access Shaft (Portion 1A)																																							
S380, S420	Piling and kingposts	17/09/18	23/03/19																																				
S426	Install decking	01/04/19	31/05/19																																				
S390, S391, S392, S393, S430, S431, S432	ELS work	01/04/19	11/05/22																																				
S400	Construction of RC wall and temporary noise enclosure	02/07/20	20/08/20																																				
S440	C&C Tunnel Structure	12/05/22	17/09/22																																				
S910	Backfill	19/09/22	14/01/23																																				
Landing Steps and Covered Walkway (Portion 1E & Portion 2B)																																							
S470	Removal of existing seawall	04/01/19	31/10/19																																				
S480, S490	Construction of landing steps and covered walkway	12/07/19	11/09/20																																				
Marine Tunnel Stage1 (tunnel footprint of Portion 2A1)																																							
S540	Construction of temp working platforms	01/11/18	21/02/19																																				
S545, S550	Cofferdam construction of sheetpiles and pipepiles	28/01/19	31/07/19																																				
S555	Temporary reclamation between pipepiles and sheetpiles	26/10/19	19/12/19																																				
S560, S561, S562	ELS work	21/01/20	13/05/20																																				
S570	Marine Tunnel Structure	09/05/20	29/10/20																																				
S575, S576	Backfill	22/10/20	05/11/20																																				
S580	Removal of reclamation/ temp platforms	06/11/20	08/01/21																																				
S585	Dredging for Stage 2 diversion	24/12/20	19/01/21																																				
Marine Tunnel Stage2 (tunnel footprint of Portion 2A3)																																							
S640	Construction of temp working platforms	20/01/21	04/03/21																																				
S645, S650	Cofferdam construction of sheetpiles and pipepiles	10/02/21	23/09/21																																				
S655	Temporary reclamation between pipepiles and sheetpiles	24/09/21	08/11/21																																				
S660, S661, S662	ELS work	07/12/21	07/06/22																																				
S670	Marine Tunnel Structure	19/05/22	11/10/22																																				
S675, S676	Backfill	12/10/22	09/12/22																																				
S677	Reprovision of MTK Public Pier	12/10/22	09/12/22																																				
S680	Removal of reclamation/ temp platforms	10/12/22	04/02/23																																				
Vertical Wall along depressed road at Portion 3B																																							
S200, S222	Pipepiles and sheetpiles	23/04/18	07/01/19																																				
Ventilation Adit at Eastern Interface(Portion 3A6)																																							
S300	Piling and pumping test	28/04/18	07/11/18																																				
S310	ELS work	08/11/18	31/01/19																																				
S320	Ventilation Adit Structure	01/02/19	07/08/19																																				
S325	Backfill	08/08/19	27/08/19																																				
Kai Tak C&C Tunnel (Portion 3A2 & Part of Portion 3A4)																																							
S605	Piling and kingposts	05/04/18	13/12/18																																				
S608	Install decking	14/12/18	28/01/19																																				
S610, S611, S612	ELS work	21/01/20	30/05/20																																				
S620	C&C Tunnel Structure	01/06/20	08/10/20																																				
S623	Backfill	09/10/20	11/11/20																																				
Depressed Road & Underpass at Kai Tak (Part of Portion 3A4 & Portion 3A5)																																							
S340, S345	Pipepiles & Kingposts & Sheetpiles	13/11/18	08/10/19																																				
S350, S351	ELS work	09/10/19	30/07/20																																				
S360	Depressed Rd, underpass, adit structure and backfill	30/07/20	07/05/21																																				
U Trough Structures and At-grade Road at Kai Tak (Portion 3D)																																							
S745	Sheetpiling	05/10/21	23/12/21																																				
S750	ELS work	24/12/21	23/06/22																																				
S760	Construct Trough Structure	24/06/22	15/11/22																																				
S770	Backfill & remove sheetpiles	03/09/22	31/01/23																																				
S775	Roadwork for At-grade road	01/02/23	06/05/23																																				

ID	Construction Activities	Start	Finish	2020												2021												2022												2023					
				J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Kowloon City Vehicular Ferry Pier (Portion 1B)																																												
S135, S136	Demolition of carpark building and ramp structure	02/06/18	18/07/18																																										
S150	Reprovision of new parking facilities	19/07/18	03/09/18																																									
Ma Tau Kok C&C tunnel & Access Shaft (Portion 1A)																																											
S380, S420	Piling and kingposts	17/09/18	23/03/19																																									
S426	Install decking	01/04/19	31/05/19																																										
S390, S391, S392, S393, S430, S431, S432	ELS work	01/04/19	11/05/22																																										
S400	Construction of RC wall and temporary noise enclosure	02/07/20	20/08/20																																									
S440	C&C Tunnel Structure	12/05/22	17/09/22																																									
S910	Backfill	19/09/22	14/01/23																																									
Landing Steps and Covered Walkway (Portion 1E & Portion 2B)																																												
S470	Removal of existing seawall	04/01/19	31/10/19																																									
S480, S490	Construction of landing steps and covered walkway	12/07/19	11/09/20																																									
Marine Tunnel Stage1 (tunnel footprint of Portion 2A1)																																											
S540	Construction of temp working platforms	01/11/18	21/02/19																																									
S545, S550	Cofferdam construction of sheetpiles and pipepiles	28/01/19	31/07/19																																									
S555	Temporary reclamation between pipepiles and sheetpiles	26/10/19	19/12/19																																									
S560, S561, S562	ELS work	21/01/20	13/05/20																																									
S570	Marine Tunnel Structure	09/05/20	29/10/20																																									
S575, S576	Backfill	22/10/20	05/11/20																																									
S580	Removal of reclamation/ temp platforms	06/11/20	08/01/21																																									
S585	Dredging for Stage 2 diversion	24/12/20	19/01/21																																									
Marine Tunnel Stage2 (tunnel footprint of Portion 2A3)																																											
S640	Construction of temp working platforms	20/01/21	04/03/21																																									
S645, S650	Cofferdam construction of sheetpiles and pipepiles	10/02/21	23/09/21																																									
S655	Temporary reclamation between pipepiles and sheetpiles	24/09/21	08/11/21																																									
S660, S661, S662	ELS work	07/12/21	07/06/22																																									
S670	Marine Tunnel Structure	19/05/22	11/10/22																																									
S675, S676	Backfill	12/10/22	09/12/22																																									
S677	Reprovision of MTK Public Pier	12/10/22	09/12/22																																									
S680	Removal of reclamation/ temp platforms	10/12/22	04/02/23																																									
Vertical Wall along depressed road at Portion 3B																																												
S200, S222	Pipepiles and sheetpiles	23/04/18	07/01/19																																									
Ventilation Adit at Eastern Interface(Portion 3A6)																																												
S300	Piling and pumping test	28/04/18	07/11/18																																									
S310	ELS work	08/11/18	31/01/19																																									
S320	Ventilation Adit Structure	01/02/19	07/08/19																																									
S325	Backfill	08/08/19	27/08/19																																									
Kai Tak C&C Tunnel (Portion 3A2 & Part of Portion 3A4)																																											
S605	Piling and kingposts	05/04/18	13/12/18																																									
S608	Install decking	14/12/18	28/01/19																																									
S610, S611, S612	ELS work	21/01/20	30/05/20																																									
S620	C&C Tunnel Structure	01/06/20	08/10/20																																									
S623	Backfill	09/10/20	11/11/20																																									
Depressed Road & Underpass at Kai Tak (Part of Portion 3A4 & Portion 3A5)																																											
S340, S345	Pipepiles & Kingposts & Sheetpiles	13/11/18	08/10/19																																									
S350, S351	ELS work	09/10/19	30/07/20																																									
S360	Depressed Rd, underpass, adit structure and backfill	30/07/20	07/05/21																																									
U Trough Structures and At-grade Road at Kai Tak (Portion 3D)																																											
S745	Sheetpiling	05/10/21	23/12/21																																									
S750	ELS work	24/12/21	23/06/22																																									
S760	Construct Trough Structure	24/06/22	15/11/22																																									
S770	Backfill & remove sheetpiles	03/09/22	31/01/23																																								
S775	Roadwork for At-grade road	01/02/23	06/05/23																																								

Appendix 2.2

Construction Plant Inventory

Appendix 2.2 Construction Plant Inventory

ID	Construction Activities	Group [1]	PME	Ref.[2]	No of items	SWL / Item dB(A)	On-time %	Barrier Correction, dB(A)	SPL, dB(A)	Max SPL, dB(A)[1]
Kowloon City Vehicular Ferry Pier (Portion 1B)										
S135, S136	Demolition of carpark building and ramp structure	1	Breaker, excavator mounted, hydraulic	BS D8-13	1	110	10%	-5	95	
			Crusher, excavator mounted, hydraulic	OCNP	1	103	30%	-5	93	
								Total	**97**	
		2	Breaker, excavator mounted, hydraulic	BS D8-13	1	110	15%	-5	97	
								Total	**97**	
		3	Crusher, excavator mounted, hydraulic	OCNP	2	103	40%	-5	97	
								Total	**97**	
		4	Hand Held Breaker	BS D8-12	1	106	20%	-5	94	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	1	100	45%	-5	92	
			Saw, wire	OCNP	1	101	20%	-5	89	
								Total	**97**	
		5	Hand Held Breaker	BS D8-12	1	106	40%	-5	97	
								Total	**97**	
		6	Dump truck with grab	OCNP	1	105	50%	-5	97	
								Total	**97**	
		7	Dump truck with grab	OCNP	2	105	20%	-5	96	
								Total	**96**	
		8	Dump truck with grab	OCNP	1	105	20%	-5	93	
			Crusher, excavator mounted, hydraulic	OCNP	1	103	50%	-5	95	
								Total	**97**	**97**
S150	Reprovision of new parking facilities	1	Asphalt paver	BS D8-24	1	101	15%	-5	88	
			Road roller	BS D8-30	1	101	20%	-5	89	
			Roller, vibratory	BS D3-116	1	106	20%	-5	94	
			Dump truck	BS D9-39	1	103	15%	-5	90	
								Total	**97**	
		2	Asphalt paver	BS D8-24	1	101	30%	-5	91	
			Roller, vibratory	BS D3-116	1	106	30%	-5	96	
								Total	**97**	
		3	Asphalt paver	BS D8-24	1	101	30%	-5	91	
			Road roller	BS D8-30	1	101	30%	-5	91	
								Total	**94**	
		4	Dump truck with grab	OCNP	1	105	20%	-5	93	
								Total	**93**	**97**
Ma Tau Kok C&C tunnel & Access Shaft (Portion 1A)										
S380, S420	Piling and kingposts	1	Pipe Pile Rig	CNP 167	4	114	30%	-5	110	
			Air compressor, air flow > 30m3/min	CNP 003	12	104	30%	-5	105	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	100%	-5	98	
			Water pump, diesel	CNP 282	2	103	30%	-5	96	
								Total	**111**	
		2	Pipe Pile Rig	CNP 167	4	114	20%	-5	108	
			Air compressor, air flow > 10m3/min and <= 30m3/min	CNP 002	14	102	25%	-5	102	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	9	100	50%	-5	102	
			Water pump, diesel	CNP 282	4	103	20%	-5	97	
			Crawler crane	BS D7-114	5	101	45%	-5	100	
			Air Blower (electric)	OCNP	10	95	50%	-5	97	
			Desander	CNP162	2	105	20%	-5	96	
			Grout mixer	OCNP	2	90	15%	-5	80	
			Grout pump	OCNP	2	105	10%	0	98	
			Vibratory hammer, hydraulic	OCNP	1	115	5%	-5	97	
			Power pack	OCNP	1	100	5%	0	87	
			Mini Excavator / Backhoe	OCNP	5	94	20%	0	94	
			HD90	OCNP	2	109	10%	-5	97	
			Welding Machine (electric)	Ref 1	12	95	20%	-5	94	
			Water pump, submersible	CNP 283	15	85	20%	0	90	
								Total	**111**	
		3	Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	100%	-5	98	
			Grout mixer	OCNP	1	90	50%	-5	82	
			Grout pump	OCNP	1	105	50%	-5	97	
			Air Blower (electric)	OCNP	2	95	100%	-5	93	
			Water pump, submersible	CNP 283	4	85	100%	0	91	
								Total	**102**	
		4	Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	100%	-5	98	
			Mini Backhoe (3 tonnes)	OCNP	1	94	70%	-5	87	
			Dump truck, with or without grab	OCNP	2	105	50%	-5	100	
			Water pump, submersible	CNP 283	4	85	100%	0	91	
								Total	**103**	
		5	Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	100%	-5	98	
			Mini Excavator / Backhoe	OCNP	1	94	70%	-5	87	
			Dump truck, with or without grab	OCNP	2	105	20%	-5	96	
			Water pump, submersible	CNP 283	4	85	100%	0	91	
								Total	**101**	**111**
S426	Install decking	1	Crawler crane	BS D7-114	1	101	70%	-5	94	
			Tractor with trailer	CNP 222	1	118	30%	-5	108	
			Generator, standard	CNP 101	1	108	100%	-5	103	
								Total	**109**	
		2	Crawler crane	BS D7-114	1	101	70%	-5	94	
			Flat-top Lorry	OCNP	1	105	30%	0	100	
			Generator, standard	CNP 101	1	108	100%	-5	103	
								Total	**105**	
		3	Lorry with crane	OCNP	1	105	60%	0	103	
			Tractor with trailer	CNP 222	1	118	20%	-5	106	
			Generator, standard	CNP 101	1	108	100%	-5	103	
								Total	**109**	
		4	Flat-top Lorry	OCNP	1	105	30%	0	100	
			Lorry with crane	OCNP	1	105	60%	0	103	
			Generator, standard	CNP 101	1	108	100%	-5	103	
								Total	**107**	
		5	Crawler crane	BS D7-114	1	101	70%	-5	94	
			Drill, hand-held (electric)	CNP 065	2	98	70%	0	99	
			Welding Machine (electric)	Ref 1	2	95	70%	0	96	
			Water pump, submersible	CNP 283	4	85	70%	0	89	
			Generator, standard	CNP 101	1	108	100%	-5	103	
								Total	**106**	
		6	Drill, hand-held (electric)	CNP 065	2	98	70%	0	99	
			Welding Machine (electric)	Ref 1	2	95	70%	0	96	
			Water pump, submersible	CNP 283	4	85	70%	0	89	
			Lorry with crane	OCNP	1	105	60%	0	103	
			Generator, standard	CNP 101	1	108	100%	-5	103	
								Total	**107**	
		7	Drill, hand-held (electric)	CNP 065	2	98	70%	0	99	
			Welding Machine (electric)	Ref 1	2	95	70%	0	96	
			Air Blower (electric)	OCNP	2	95	80%	0	97	
			Water pump, submersible	CNP 283	4	85	80%	0	90	
			Lorry with crane	OCNP	4	105	30%	0	106	

Appendix 2.2 Construction Plant Inventory

ID	Construction Activities	Group [1]	PME	Ref.[2]	No of items	SWL / Item dB(A)	On-time %	Barrier Correction, dB(A)	SPL, dB(A)	Max SPL, dB(A)[1]
			Generator, standard	CNP 101	1	108	100%	-5	103	
								Total	**109**	**109**
S390, S391, S392, S393, S430, S431, S432	ELS work	1	Excavator / Backhoe	BS C6-10	2	107	70%	-5	103	
			Breaker, excavator mounted, hydraulic	BS D8-13	2	110	30%	-5	103	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	100%	-5	98	
			Air Blower (electric)	OCNP	2	95	100%	0	98	
			Water pump, submersible	CNP 283	2	85	80%	0	87	
								Total	**107**	
		2	Breaker, excavator mounted, hydraulic	BS D8-13	2	110	40%	-5	104	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	100%	-5	98	
			Air Blower (electric)	OCNP	2	95	100%	-5	93	
			Water pump, submersible	CNP 283	2	85	100%	0	88	
								Total	**105**	
		3	Excavator / Backhoe	BS C6-10	2	107	80%	-5	104	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	100%	-5	98	
			Dump truck, with or without grab	OCNP	2	105	20%	-5	96	
			Air Blower (electric)	OCNP	2	95	100%	-5	93	
			Water pump, submersible	CNP 283	2	85	100%	0	88	
								Total	**106**	
		4	Drill, percussive, hand-held (electric)	CNP 064	2	103	30%	0	101	
			Drill/ grinder, hand-held (electric)	CNP 065	1	98	30%	0	93	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	100%	-5	98	
			Welding Set	Ref 2	2	78	70%	0	79	
			Air Blower (electric)	OCNP	2	95	100%	-5	93	
			Water pump, submersible	CNP 283	2	85	70%	0	86	
								Total	**104**	
		5	Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	100%	-5	98	
			Lorry with crane	OCNP	1	105	60%	-5	98	
			Air Blower (electric)	OCNP	2	95	100%	-5	93	
			Water pump, submersible	CNP 283	2	85	100%	0	88	
								Total	**102**	
		6	Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	100%	-5	98	
			Crawler crane	BS D7-114	1	101	60%	-5	94	
			Air Blower (electric)	OCNP	2	95	100%	-5	93	
			Water pump, submersible	CNP 283	2	85	100%	0	88	
								Total	**101**	
		7	Generator, silenced, 75 dB(A) at 7 m	CNP 102	3	100	100%	-5	100	
			Lorry with crane	OCNP	2	105	30%	-5	98	
			Crawler crane	BS D7-114	2	101	40%	-5	95	
			Welding Set	Ref 2	5	78	70%	0	83	
			Air Blower (electric)	OCNP	5	95	90%	-5	97	
			Water pump, submersible	CNP 283	10	85	100%	0	95	
								Total	**104**	
		8	Excavator / Backhoe	BS C6-10	5	107	50%	-5	106	
			Crawler crane	BS D7-114	3	101	50%	-5	98	
			Dump truck	BS D9-39	4	103	30%	-5	99	
			Concrete pump truck	CNP 047	1	109	40%	-5	100	
			Concrete truck	CNP 044	1	109	40%	-5	100	
			Poker, vibratory, hand-held	OCNP	3	102	50%	-5	99	
			Lorry with crane	OCNP	1	105	50%	-5	97	
			Air compressor, air flow > 30m3/min	CNP 003	2	104	70%	-5	100	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	70%	-5	96	
								Total	**110**	
		9	Breaker, excavator mounted, hydraulic	BS D8-13	5	110	20%	-5	105	
			Rock drill, crawler mounted (hydraulic)	CNP 182	1	123	10%	-5	108	
			Spliter	BS D8-2	1	118	10%	-5	103	
								Total	**111**	
		10	Excavator / Backhoe	BS C6-10	5	107	30%	-5	104	
			Crawler crane	BS D7-114	3	101	30%	-5	96	
			Dump truck	BS D9-39	4	103	25%	-5	98	
			Concrete pump truck	CNP 047	1	109	20%	-5	97	
			Concrete truck	CNP 044	1	109	15%	-5	96	
			Poker, vibratory, hand-held	OCNP	3	102	20%	-5	95	
			Lorry with crane	OCNP	1	105	20%	-5	93	
			Breaker, excavator mounted, hydraulic	BS D8-13	8	110	10%	-5	104	
			Rock drill, crawler mounted (hydraulic)	CNP 182	1	123	8%	-5	107	
			Spliter	BS D8-2	1	118	8%	-5	102	
			Air compressor, air flow > 30m3/min	CNP 003	2	104	30%	-5	97	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	25%	-5	92	
								Total	**112**	
		11	Excavator / Backhoe	BS C6-10	5	107	30%	-5	104	
			Crawler crane	BS D7-114	3	101	30%	-5	96	
			Dump truck	BS D9-39	4	103	25%	-5	98	
			Concrete pump truck	CNP 047	1	109	20%	-5	97	
			Concrete truck	CNP 044	1	109	15%	-5	96	
			Poker, vibratory, hand-held	OCNP	3	102	20%	-5	95	
			Lorry with crane	OCNP	1	105	20%	-5	93	
			Breaker, excavator mounted, hydraulic	BS D8-13	10	110	8%	-5	104	
			Rock drill, crawler mounted (hydraulic)	CNP 182	1	123	8%	-5	107	
			Spliter	BS D8-2	1	118	8%	-5	102	
			Air compressor, air flow > 30m3/min	CNP 003	2	104	30%	-5	97	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	25%	-5	92	
								Total	**112**	
		12	Excavator / Backhoe	BS C6-10	5	107	15%	-5	101	
			Crawler crane	BS D7-114	3	101	30%	-5	96	
			Dump truck	BS D9-39	4	103	15%	-5	96	
			Concrete pump truck	CNP 047	1	109	30%	-5	99	
			Concrete truck	CNP 044	1	109	30%	-5	99	
			Poker, vibratory, hand-held	OCNP	3	102	30%	-5	97	
			Lorry with crane	OCNP	1	105	30%	-5	95	
			Breaker, excavator mounted, hydraulic	BS D8-13	4	110	15%	-5	103	
			Rock drill, crawler mounted (hydraulic)	CNP 182	1	123	8%	-5	107	
			Spliter	BS D8-2	1	118	8%	-5	102	
			Air compressor, air flow > 30m3/min	CNP 003	2	104	30%	-5	97	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	30%	-5	93	
								Total	**111**	
		13	Breaker, excavator mounted, hydraulic	BS D8-13	2	110	20%	-5	101	
			Concrete pump truck	CNP 047	2	109	25%	-5	101	
			Concrete truck	CNP 044	2	109	30%	-5	102	
			Poker, vibratory, hand-held	OCNP	3	102	30%	-5	97	
			Air compressor, air flow > 30m3/min	CNP 003	2	104	60%	-5	100	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	50%	-5	95	
			Rock drill, crawler mounted (hydraulic)	CNP 182	1	123	8%	-5	107	
			Spliter	BS D8-2	1	118	8%	-5	102	
								Total	**111**	

Appendix 2.2 Construction Plant Inventory

ID	Construction Activities	Group [1]	PME	Ref.[2]	No of items	SWL / Item dB(A)	On-time %	Barrier Correction, dB(A)	SPL, dB(A)	Max SPL, dB(A)[1]
		14	Breaker, excavator mounted, hydraulic	BS D8-13	8	110	8%	-5	103	
			Excavator / Backhoe	BS C6-10	5	107	15%	-5	101	
			Crawler crane	BS D7-114	3	101	45%	-5	97	
			Dump truck	BS D9-39	4	103	30%	-5	99	
			Air compressor, air flow > 30m3/min	CNP 003	2	104	60%	-5	100	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	40%	-5	94	
			Rock drill, crawler mounted (hydraulic)	CNP 182	1	123	8%	-5	107	
			Spliter	BS D8-2	1	118	8%	-5	102	
								Total	**111**	**112**
S400	Construction of RC wall and temporary noise enclosure	1	Mini Excavator / Backhoe	OCNP	1	94	80%	-5	88	
			Water pump, submersible	CNP 283	2	85	100%	0	88	
			Generator, standard	CNP 101	2	108	100%	-5	106	
								Total	**106**	
		2	Mini Excavator / Backhoe	OCNP	1	94	80%	-5	88	
			Dump truck, with or without grab	OCNP	1	105	20%	0	98	
			Generator, standard	CNP 101	2	108	100%	-5	106	
								Total	**107**	
		3	Crawler crane	BS D7-114	1	101	60%	0	99	
			Tractor with trailer	CNP 222	1	118	20%	-5	106	
			Generator, standard	CNP 101	2	108	100%	-5	106	
								Total	**109**	
		4	Lorry with crane	OCNP	1	105	60%	0	103	
			Tractor with trailer	CNP 222	1	118	20%	-5	106	
			Generator, standard	CNP 101	2	108	100%	-5	106	
								Total	**110**	
		5	Crawler crane	BS D7-114	1	101	60%	0	99	
			Lorry with crane	OCNP	1	105	60%	0	103	
			Generator, standard	CNP 101	2	108	100%	-5	106	
								Total	**108**	
		6	Concrete Lorry Mixer	CNP 044	1	109	50%	-5	101	
			Poker, vibratory, hand-held	OCNP	1	102	50%	-5	94	
			Generator, standard	CNP 101	2	108	100%	-5	106	
								Total	**107**	
		7	Lorry with crane	OCNP	1	105	60%	0	103	
			Welding Set	Ref 2	2	78	50%	-5	73	
			Cherry picker / Scissor platform	Ref 3	2	105	50%	0	105	
			Generator, standard	CNP 101	2	108	100%	-5	106	
								Total	**110**	
		8	Crawler crane	BS D7-114	1	101	60%	0	99	
			Welding Set	Ref 2	2	78	50%	-5	73	
			Cherry picker / Scissor platform	Ref 3	2	105	50%	0	105	
			Generator, standard	CNP 101	2	108	100%	-5	106	
								Total	**109**	
		9	Mini Backhoe (3 tonnes)	OCNP	1	94	60%	-5	87	
			Welding Set	Ref 2	2	78	50%	-5	73	
			Air Blower (electric)	OCNP	2	95	100%	-5	93	
			Cherry picker / Scissor platform	Ref 3	2	105	50%	0	105	
			Generator, standard	CNP 101	2	108	100%	-5	106	
								Total	**109**	
		10	Winch	CNP 262	1	95	100%	0	95	
			Concrete pump truck	CNP 047	1	109	50%	-5	101	
			Concrete truck	CNP 044	2	109	50%	-5	104	
			Poker, vibratory, hand-held	OCNP	3	102	50%	-5	99	
			Lorry with crane	OCNP	1	105	100%	-5	100	
								Total	**108**	
		11	Mobile crane	CNP 048	2	112	30%	0	110	
			Lorry with crane	OCNP	1	105	80%	-5	99	
			Scissor platform	Ref 3	2	105	50%	0	105	
								Total	**111**	**111**
S440	C&C Tunnel Structure	1	Bar bender and cutter	CNP 021	2	90	70%	0	91	
			Saw, circular wood	BS D7-79	2	103	50%	-5	98	
			Air Blower (electric)	OCNP	2	95	80%	-5	92	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	100%	-5	98	
			Water pump, submersible	CNP 283	8	85	80%	0	93	
								Total	**102**	
		2	Concrete Lorry Mixer	CNP 044	2	109	80%	-5	106	
			Concrete pump	CNP 047	2	109	80%	-5	106	
			Poker, vibratory, hand-held	OCNP	3	102	50%	-5	99	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	100%	-5	98	
			Water pump, submersible	CNP 283	4	85	80%	0	90	
								Total	**110**	
		3	Crawler crane	BS D7-114	2	101	50%	-5	96	
			Air Blower (electric)	OCNP	2	95	100%	-5	93	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	100%	-5	98	
			Water pump, submersible	CNP 283	8	85	80%	0	93	
								Total	**102**	
		4	Lorry with crane	OCNP	1	105	60%	-5	98	
			Air Blower (electric)	OCNP	2	95	80%	-5	92	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	100%	-5	98	
			Water pump, submersible	CNP 283	8	85	80%	0	93	
								Total	**102**	
		5	Bar bender and cutter	CNP 021	2	90	50%	0	90	
			Drill/ grinder, hand-held (electric)	CNP 065	1	98	30%	0	93	
			Saw, circular wood	BS D7-79	4	103	50%	-5	101	
			Air Blower (electric)	OCNP	2	95	80%	-5	92	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	100%	-5	98	
			Water pump, submersible	CNP 283	8	85	80%	0	93	
								Total	**104**	
		6	Crawler Crane	BS D7-114	2	101	100%	-5	99	
			Lorry with crane	OCNP	1	105	100%	-5	100	
			Generator, silenced, 75 dB(A) at 7 m	CNP 102	2	100	100%	-5	98	
			Air Blower (electric)	OCNP	2	95	80%	-5	92	
			Poker, vibratory, hand-held	OCNP	3	102	50%	-5	99	
			Concrete pump truck	CNP 047	1	109	100%	-5	104	
			Concrete truck	CNP 044	2	109	80%	-5	106	
								Total	**110**	
		7	Crawler Crane	BS D7-114	5	101	100%	-5	103	
								Total	**103**	**110**
S910	Backfill	1	Dump truck, with or without grab	OCNP	2	105	50%	-5	100	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Mini Excavator / Backhoe	OCNP	2	94	80%	-5	91	
			Water pump, submersible	CNP 283	4	85	100%	0	91	
								Total	**107**	
		2	Bulldozer	Ref 4	1	102	80%	-5	96	
			Dump truck, with or without grab	OCNP	1	105	20%	-5	93	

Appendix 2.2 Construction Plant Inventory

ID	Construction Activities	Group [1]	PME	Ref.[2]	No of items	SWL / Item dB(A)	On-time %	Barrier Correction, dB(A)	SPL, dB(A)	Max SPL, dB(A)[1]
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Mini Excavator / Backhoe	OCNP	1	94	80%	-5	88	
			Road roller	BS D8-30	1	101	60%	0	99	
			Water pump, submersible	CNP 283	4	85	100%	0	91	
								Total	**107**	
		3	Bulldozer	Ref 4	1	102	80%	-5	96	
			Compactor, vibratory	CNP 050	1	105	60%	-5	98	
			Dump truck, with or without grab	OCNP	1	105	20%	-5	93	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Mini Excavator / Backhoe	OCNP	1	94	80%	-5	88	
			Water pump, submersible	CNP 283	4	85	100%	0	91	
								Total	**107**	
		4	Bulldozer	Ref 4	2	102	80%	-5	99	
			Compactor, vibratory	CNP 050	3	105	60%	-5	103	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, submersible	CNP 283	4	85	100%	0	91	
								Total	**108**	
		5	Compactor, vibratory	CNP 050	3	105	60%	-5	103	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Road roller	BS D8-30	4	101	60%	-5	100	
			Water pump, submersible	CNP 283	4	85	100%	0	91	
								Total	**108**	
		6	Bulldozer	Ref 4	2	102	80%	-5	99	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Road roller	BS D8-30	4	101	60%	-5	100	
			Water pump, submersible	CNP 283	4	85	100%	0	91	
								Total	**108**	
		7	Mini Excavator / Backhoe	OCNP	1	94	80%	-5	88	
			Compactor, vibratory	CNP 050	3	105	60%	-5	103	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, submersible	CNP 283	4	85	100%	0	91	
								Total	**108**	
		8	Mini Excavator / Backhoe	OCNP	1	94	80%	-5	88	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Road roller	BS D8-30	4	101	60%	-5	100	
			Water pump, submersible	CNP 283	4	85	100%	0	91	
								Total	**107**	
		9	Bulldozer	Ref 4	2	102	80%	-5	99	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Mini Excavator / Backhoe	OCNP	1	94	80%	-5	88	
			Water pump, submersible	CNP 283	4	85	100%	0	91	
								Total	**107**	**108**
Landing Steps and Covered Walkway (Portion 1E & Portion 2B)										
S470	Removal of existing seawall	1	Breaker, excavator mounted, hydraulic	BS D8-13	1	110	70%	-5	103	
			Dump truck with grab	OCNP	1	105	20%	0	98	
			Derrick lighter	CNP 061	1	104	80%	0	103	
			Tug boat	CNP 221	1	110	80%	0	109	
								Total	**111**	**111**
S480, S490	Construction of landing steps and covered walkway	1	Bar bender and cutter	CNP 021	1	90	20%	0	83	
			Concrete Lorry Mixer	CNP 044	1	109	70%	-5	102	
			Concrete pump	CNP 047	1	109	70%	-5	102	
			Poker, vibratory, hand-held	OCNP	1	102	50%	-5	94	
			Saw, circular wood	BS D7-79	1	103	20%	0	96	
								Total	**106**	**106**
Marine Tunnel Stage1 (tunnel footprint of Portion 2A1)										
S540	Construction of temp working platforms	1	Crawler crane on flat-top barge	BS D7-114	2	101	70%	0	102	
			Derrick lighter	CNP 061	2	104	70%	0	105	
			Tug boat	CNP 221	1	110	20%	0	103	
								Total	**109**	
		2	Crawler crane on flat-top barge	BS D7-114	1	101	50%	0	98	
			Derrick lighter	CNP 061	1	104	50%	0	101	
			Tug boat	CNP 221	1	110	5%	0	97	
			Vibratory hammer, hydraulic	OCNP	2	115	30%	0	113	
			Power pack	OCNP	2	100	30%	0	98	
			Welding Machine (electric)	Ref 1	2	95	50%	0	95	
			Water pump, submersible	CNP 283	4	85	80%	0	90	
								Total	**113**	**113**
S545, S550	Cofferdam construction of sheetpiles and pipepiles	1	Crawler crane on flat-top barge	BS D7-114	1	101	30%	0	96	
			Derrick lighter	CNP 061	1	104	80%	0	103	
			Tug boat	CNP 221	1	110	20%	0	103	
								Total	**106**	
		2	Pipe Pile Rig	CNP 167	5	114	50%	0	118	
			Air compressor, air flow > 30m3/min	CNP 003	12	104	50%	-5	107	
			Generator, standard	CNP 101	8	108	80%	-5	111	
			Crawler crane	BS D7-114	8	101	60%	0	108	
			Water pump, diesel	CNP 282	5	103	50%	0	107	
			Vibratory hammer, hydraulic	OCNP	2	115	30%	0	113	
			Mini Excavator / Backhoe	OCNP	5	94	80%	0	100	
			Welding Machine (electric)	Ref 1	10	95	55%	0	102	
			Power pack	OCNP	2	100	30%	0	98	
			Water pump, submersible	CNP 283	15	85	80%	0	96	
								Total	**121**	
		3	Pipe Pile Rig	CNP 167	1	114	70%	0	112	
			Air compressor, air flow > 30m3/min	CNP 003	1	104	70%	-5	97	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, diesel	CNP 282	1	103	70%	0	101	
			Crawler crane on flat-top barge	BS D7-114	1	101	30%	0	96	
			Welder / Generator	Ref 1	2	100	50%	0	100	
			Water pump, submersible	CNP 283	10	85	80%	0	94	
								Total	**114**	
		4	Generator, standard	CNP 101	2	108	100%	-5	106	
			Vibratory hammer, hydraulic	OCNP	2	115	70%	0	116	
			Power pack	OCNP	2	100	70%	0	101	
			Crawler crane on flat-top barge	BS D7-114	1	101	30%	0	96	
			Welder / Generator	Ref 1	2	100	30%	0	98	
			Water pump, submersible	CNP 283	10	85	80%	0	94	
								Total	**117**	**121**
S555	Temporary reclamation between pipepiles and sheetpiles	1	Crawler crane	BS D7-114	2	101	50%	0	101	
			Tug boat	CNP 221	1	110	20%	0	103	
			Derrick lighter	CNP 061	2	104	50%	0	104	
			Bulldozer	Ref 4	2	102	50%	0	102	
			Compactor, vibratory	CNP 050	2	105	80%	0	107	
								Total	**111**	**111**
S560, S561,	ELS work	1	Excavator / Backhoe	CNP 081	1	112	80%	0	111	
			Drill, hand-held (electric)	CNP 065	1	98	20%	0	91	

Appendix 2.2 Construction Plant Inventory

ID	Construction Activities	Group [1]	PME	Ref.[2]	No of items	SWL / Item dB(A)	On-time %	Barrier Correction, dB(A)	SPL, dB(A)	Max SPL, dB(A)[1]
S562			Welder / Generator	Ref 1	1	100	100%	0	100	
			Dump truck with Grab	OCNP	1	105	100%	0	105	
			Welding Set	Ref 2	1	78	60%	0	76	
			Lorry with crane	OCNP	1	105	30%	0	100	
			Crawler crane	BS D7-114	1	101	30%	0	96	
			Air Blower (electric)	OCNP	2	95	100%	0	98	
			Dump truck	BS D9-39	1	103	20%	0	96	
			Derrick lighter	CNP 061	1	104	50%	0	101	
			Bulldozer	Ref 4	1	102	20%	0	95	
			Water pump, submersible	CNP 283	12	85	100%	0	96	
								Total	**113**	
		2	Derrick lighter	CNP 061	1	104	40%	0	100	
			Tug boat	CNP 221	1	110	40%	0	106	
								Total	**107**	**113**
S570	Marine Tunnel Structure	1	Bar bender and cutter	CNP 021	2	90	50%	0	90	
			Saw, circular wood	BS D7-79	2	103	20%	0	99	
			Crawler crane	BS D7-114	2	101	20%	0	97	
			Air Blower (electric)	OCNP	2	95	100%	0	98	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, submersible	CNP 283	12	85	100%	0	96	
								Total	**108**	
		2	Concrete Lorry Mixer	CNP 044	8	109	70%	0	116	
			Concrete pump	CNP 047	3	109	70%	0	112	
			Poker, vibratory, hand-held	OCNP	3	102	50%	0	104	
			Air Blower (electric)	OCNP	2	95	100%	0	98	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, submersible	CNP 283	12	85	100%	0	96	
								Total	**118**	
		3	Tug boat	CNP 221	1	110	40%	0	106	
								Total	**106**	
		4	Concrete Lorry Mixer	CNP 044	1	109	70%	0	107	
			Concrete pump	CNP 047	1	109	70%	0	107	
			Poker, vibratory, hand-held	OCNP	1	102	50%	0	99	
			Crawler crane	BS D7-114	2	101	20%	0	97	
			Air Blower (electric)	OCNP	2	95	100%	0	98	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, submersible	CNP 283	12	85	100%	0	96	
								Total	**112**	
		5	Bar bender and cutter	CNP 021	1	90	50%	0	87	
			Concrete Lorry Mixer	CNP 044	1	109	30%	0	104	
			Concrete pump	CNP 047	1	109	30%	0	104	
			Poker, vibratory, hand-held	OCNP	1	102	20%	0	95	
			Saw, circular wood	BS D7-79	1	103	20%	0	96	
			Crawler crane	BS D7-114	1	101	20%	0	94	
			Air Blower (electric)	OCNP	2	95	100%	0	98	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, submersible	CNP 283	12	85	100%	0	96	
								Total	**110**	
		6	Bar bender and cutter	CNP 021	1	90	50%	0	87	
			Concrete Lorry Mixer	CNP 044	1	109	30%	0	104	
			Concrete pump	CNP 047	1	109	30%	0	104	
			Poker, vibratory, hand-held	OCNP	1	102	20%	0	95	
			Saw, circular wood	BS D7-79	1	103	20%	0	96	
			Lorry with crane	OCNP	1	105	20%	0	98	
			Air Blower (electric)	OCNP	2	95	100%	0	98	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, submersible	CNP 283	12	85	100%	0	96	
								Total	**110**	**118**
S575, S576	Backfill	1	Bulldozer	Ref 4	2	102	50%	0	102	
			Compactor, vibratory	CNP 050	3	105	50%	0	107	
			Dump truck, with or without grab	OCNP	4	105	80%	0	110	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Road roller	CNP 185	2	108	100%	0	111	
			Water pump, submersible	CNP 283	12	85	100%	0	96	
								Total	**115**	
		2	Derrick lighter	CNP 061	1	104	40%	0	100	
			Tug boat	CNP 221	1	110	40%	0	106	
								Total	**107**	**115**
S580	Removal of reclamation/ temp platforms	1	Excavator / Backhoe	CNP 081	1	112	80%	0	111	
			Dump truck, with or without grab	OCNP	1	105	30%	0	100	
			Crawler crane on flat-top barge	BS D7-114	1	101	30%	0	96	
			Derrick lighter	CNP 061	1	104	30%	0	99	
			Welder / Generator	Ref 1	1	100	60%	0	98	
								Total	**112**	
		2	Crawler crane on flat-top barge	BS D7-114	1	101	20%	0	94	
			Derrick lighter	CNP 061	1	104	20%	0	97	
			Tug boat	CNP 221	1	110	20%	0	103	
								Total	**104**	
		3	Excavator / Backhoe	CNP 081	2	112	70%	0	113	
			Dump truck, with or without grab	OCNP	2	105	60%	0	106	
			Generator, standard	CNP 101	2	108	100%	-5	106	
								Total	**115**	
		4	Excavator / Backhoe	CNP 081	1	112	70%	0	110	
			Crawler crane on flat-top barge	BS D7-114	1	101	50%	0	98	
			Derrick lighter	CNP 061	1	104	60%	0	102	
			Generator, standard	CNP 101	2	108	100%	-5	106	
								Total	**112**	**115**
S585	Dredging for Stage 2 diversion	1	Derrick lighter	CNP 061	1	104	20%	0	97	
			Grab dredger	CNP 063	1	112	20%	0	105	
			Tug boat	CNP 221	1	110	20%	0	103	
								Total	**108**	**108**
Marine Tunnel Stage2 (tunnel footprint of Portion 2A3)										
S640	Construction of temp working platforms	1	Crawler crane on flat-top barge	BS D7-114	2	101	70%	0	102	
			Derrick lighter	CNP 061	2	104	70%	0	105	
			Tug boat	CNP 221	1	110	20%	0	103	
								Total	**109**	
		2	Crawler crane on flat-top barge	BS D7-114	2	101	70%	0	102	
			Vibratory hammer, hydraulic	OCNP	2	115	70%	0	116	
			Power pack	OCNP	2	100	70%	0	101	
			Welding Machine (electric)	Ref 1	2	95	70%	0	96	
			Water pump, submersible	CNP 283	4	85	80%	0	90	
								Total	**117**	**117**
S645, S650	Cofferdam construction of sheetpiles and	1	Crawler crane on flat-top barge	BS D7-114	1	101	30%	0	96	
			Derrick lighter	CNP 061	1	104	80%	0	103	
			Tug boat	CNP 221	1	110	20%	0	103	

Appendix 2.2 Construction Plant Inventory

ID	Construction Activities	Group [1]	PME	Ref.[2]	No of items	SWL / Item dB(A)	On-time %	Barrier Correction, dB(A)	SPL, dB(A)	Max SPL, dB(A)[1]
	pipepiles							**Total**	**106**	
		2	Pipe Pile Rig	CNP 167	2	114	70%	0	115	
			Air compressor, air flow > 30m3/min	CNP 003	2	104	70%	-5	100	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, diesel	CNP 282	2	103	70%	0	104	
			Welder / Generator	Ref 1	2	100	50%	0	100	
			Water pump, submersible	CNP 283	10	85	80%	0	94	
								Total	**116**	
		3	Pipe Pile Rig	CNP 167	1	114	70%	0	112	
			Air compressor, air flow > 30m3/min	CNP 003	1	104	70%	-5	97	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, diesel	CNP 282	1	103	70%	0	101	
			Crawler crane on flat-top barge	BS D7-114	1	101	30%	0	96	
			Welder / Generator	Ref 1	2	100	50%	0	100	
			Water pump, submersible	CNP 283	10	85	80%	0	94	
								Total	**114**	
		4	Generator, standard	CNP 101	2	108	100%	-5	106	
			Vibratory hammer, hydraulic	OCNP	2	115	70%	0	116	
			Power pack	OCNP	2	100	70%	0	101	
			Crawler crane on flat-top barge	BS D7-114	1	101	30%	0	96	
			Welder / Generator	Ref 1	2	100	30%	0	98	
			Water pump, submersible	CNP 283	10	85	80%	0	94	
								Total	**117**	**117**
S655	Temporary reclamation between pipepiles and sheetpiles	1	Crawler crane	BS D7-114	2	101	50%	0	101	
			Tug boat	CNP 221	1	110	20%	0	103	
			Derrick lighter	CNP 061	2	104	50%	0	104	
			Bulldozer	Ref 4	2	102	50%	0	102	
			Compactor, vibratory	CNP 050	2	105	80%	0	107	
								Total	**111**	**111**
S660, S661, S662	ELS work	1	Excavator / Backhoe	CNP 081	1	112	80%	0	111	
			Drill, hand-held (electric)	CNP 065	1	98	20%	0	91	
			Welder / Generator	Ref 1	1	100	100%	0	100	
			Dump truck with Grab	OCNP	1	105	100%	0	105	
			Welding Set	Ref 2	1	78	60%	0	76	
			Lorry with crane	OCNP	1	105	30%	0	100	
			Crawler crane	BS D7-114	1	101	30%	0	96	
			Air Blower (electric)	OCNP	2	95	100%	0	98	
			Dump truck	BS D9-39	1	103	20%	0	96	
			Derrick lighter	CNP 061	1	104	50%	0	101	
			Bulldozer	Ref 4	1	102	20%	0	95	
			Water pump, submersible	CNP 283	12	85	100%	0	96	
								Total	**113**	
		2	Derrick lighter	CNP 061	1	104	50%	0	101	
			Tug boat	CNP 221	1	110	20%	0	103	
								Total	**105**	**113**
S670	Marine Tunnel Structure	1	Bar bender and cutter	CNP 021	2	90	50%	0	90	
			Saw, circular wood	BS D7-79	2	103	20%	0	99	
			Crawler crane	BS D7-114	2	101	20%	0	97	
			Air Blower (electric)	OCNP	2	95	100%	0	98	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, submersible	CNP 283	12	85	100%	0	96	
								Total	**108**	
		2	Concrete Lorry Mixer	CNP 044	8	109	70%	0	116	
			Concrete pump	CNP 047	3	109	70%	0	112	
			Poker, vibratory, hand-held	OCNP	3	102	50%	0	104	
			Air Blower (electric)	OCNP	2	95	100%	0	98	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, submersible	CNP 283	12	85	100%	0	96	
								Total	**118**	
		3	Tug boat	CNP 221	1	110	40%	0	106	
								Total	**106**	
		4	Concrete Lorry Mixer	CNP 044	1	109	70%	0	107	
			Concrete pump	CNP 047	1	109	70%	0	107	
			Poker, vibratory, hand-held	OCNP	1	102	50%	0	99	
			Crawler crane	BS D7-114	2	101	20%	0	97	
			Air Blower (electric)	OCNP	2	95	100%	0	98	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, submersible	CNP 283	12	85	100%	0	96	
								Total	**112**	
		5	Bar bender and cutter	CNP 021	1	90	50%	0	87	
			Concrete Lorry Mixer	CNP 044	1	109	30%	0	104	
			Concrete pump	CNP 047	1	109	30%	0	104	
			Poker, vibratory, hand-held	OCNP	1	102	20%	0	95	
			Saw, circular wood	BS D7-79	1	103	20%	0	96	
			Crawler crane	BS D7-114	1	101	20%	0	94	
			Air Blower (electric)	OCNP	2	95	100%	0	98	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, submersible	CNP 283	12	85	100%	0	96	
								Total	**110**	
		6	Bar bender and cutter	CNP 021	1	90	50%	0	87	
			Concrete Lorry Mixer	CNP 044	1	109	30%	0	104	
			Concrete pump	CNP 047	1	109	30%	0	104	
			Poker, vibratory, hand-held	OCNP	1	102	20%	0	95	
			Saw, circular wood	BS D7-79	1	103	20%	0	96	
			Lorry with crane	OCNP	1	105	20%	0	98	
			Air Blower (electric)	OCNP	2	95	100%	0	98	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, submersible	CNP 283	12	85	100%	0	96	
								Total	**110**	**118**
S675, S676	Backfill	1	Bulldozer	Ref 4	2	102	50%	0	102	
			Compactor, vibratory	CNP 050	3	105	50%	0	107	
			Dump truck, with or without grab	OCNP	4	105	80%	0	110	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Road roller	CNP 185	2	108	100%	0	111	
			Water pump, submersible	CNP 283	12	85	100%	0	96	
								Total	**115**	
		2	Derrick lighter	CNP 061	1	104	40%	0	100	
			Tug boat	CNP 221	1	110	40%	0	106	
								Total	**107**	**115**
S677	Reprovision of MTK Public Pier	1	Breaker, excavator mounted, hydraulic	BS D8-13	1	110	50%	0	107	
			Concrete crusher, excavator mounted	OCNP	1	103	70%	0	101	
			Water pump, submersible	CNP 283	1	85	100%	0	85	
			Generator, standard	CNP 101	1	108	100%	-5	103	
								Total	**109**	
		2	Concrete crusher, excavator mounted	OCNP	1	103	20%	0	96	
			Lorry with crane	OCNP	1	105	80%	0	104	

Appendix 2.2 Construction Plant Inventory

ID	Construction Activities	Group [1]	PME	Ref.[2]	No of items	SWL / Item dB(A)	On-time %	Barrier Correction, dB(A)	SPL, dB(A)	Max SPL, dB(A)[1]
			Water pump, submersible	CNP 283	1	85	100%	0	85	
			Generator, standard	CNP 101	1	108	100%	-5	103	
			Saw, wire	OCNP	1	101	80%	0	100	
								Total	**108**	
		3	Breaker, excavator mounted, hydraulic	BS D8-13	1	110	50%	0	107	
			Lorry with crane	OCNP	1	105	80%	0	104	
			Water pump, submersible	CNP 283	1	85	100%	0	85	
			Generator, standard	CNP 101	1	108	100%	-5	103	
			Saw, wire	OCNP	1	101	80%	0	100	
								Total	**110**	
		4	Concrete crusher, excavator mounted	OCNP	1	103	20%	0	96	
			Crawler crane	BS D7-114	1	101	50%	0	98	
			Water pump, submersible	CNP 283	1	85	100%	0	85	
			Generator, standard	CNP 101	1	108	100%	-5	103	
			Saw, wire	OCNP	1	101	80%	0	100	
								Total	**106**	
		5	Breaker, excavator mounted, hydraulic	BS D8-13	1	110	50%	0	107	
			Crawler crane	BS D7-114	1	101	50%	0	98	
			Water pump, submersible	CNP 283	1	85	100%	0	85	
			Generator, standard	CNP 101	1	108	100%	-5	103	
			Saw, wire	OCNP	1	101	80%	0	100	
								Total	**109**	
		6	Dump truck, with or without grab	OCNP	1	105	30%	0	100	
			Mini Excavator / Backhoe	OCNP	1	94	30%	0	89	
			Water pump, submersible	CNP 283	1	85	100%	0	85	
			Generator, standard	CNP 101	1	108	100%	-5	103	
								Total	**105**	
		7	Lorry with crane	OCNP	1	105	80%	0	104	
			Bar Bender	CNP 021	1	90	40%	0	86	
			Generator, standard	CNP 101	1	108	100%	-5	103	
			Welding Set	Ref 2	2	78	50%	0	78	
			Water pump, submersible	CNP 283	1	85	100%	0	85	
								Total	**107**	
		8	Concrete Lorry Mixer	CNP 044	1	109	50%	0	106	
			Lorry mounted concrete pump	CNP 047	1	109	50%	0	106	
			Concrete Poker Vibrator	CNP 170	1	113	50%	0	110	
			Generator, standard	CNP 101	1	108	100%	-5	103	
								Total	**113**	**115**
S680	Removal of reclamation/ temp platforms	1	Excavator / Backhoe	CNP 081	2	112	70%	0	113	
			Dump truck with Grab	OCNP	2	105	20%	0	101	
			Dump Truck	BS D9-39	2	103	30%	0	101	
			Crawler crane on flat-top barge	BS D7-114	1	101	50%	0	98	
			Derrick lighter	CNP 061	1	104	50%	0	101	
			Generator, standard	CNP 101	1	108	100%	-5	103	
			Welding Set	Ref 2	4	78	50%	0	81	
								Total	**115**	
		2	Crawler crane on flat-top barge	BS D7-114	1	101	20%	0	94	
			Derrick lighter	CNP 061	1	104	20%	0	97	
			Tug boat	CNP 221	1	110	20%	0	103	
								Total	**104**	**115**
Vertical Wall along depressed road at Portion 3B										
S200, S222	Pipepiles and sheetpiles	1	Pipe Pile Rig	CNP 167	1	114	80%	0	113	
			Air compressor, air flow > 30m3/min	CNP 003	1	104	80%	-5	98	
			Generator, standard	CNP 101	1	108	100%	-5	103	
			Water pump, diesel	CNP 282	1	103	80%	0	102	
			Mini Backhoe (3 tonnes)	OCNP	1	94	50%	0	91	
			Dump truck, with or without grab	OCNP	1	105	30%	0	100	
			Grout mixer	OCNP	1	90	30%	0	85	
			Grout pump	OCNP	1	105	30%	0	100	
			Water pump, submersible	CNP 283	4	85	100%	0	91	
			Vibratory hammer, hydraulic	OCNP	1	115	30%	0	110	
			Power pack	OCNP	1	100	30%	0	95	
								Total	**116**	**116**
Ventilation Adit at Eastern Interface(Portion 3A6)										
S300	Piling and pumping test	1	Pipe Pile Rig	CNP 167	1	114	80%	0	113	
			Air compressor, air flow > 30m3/min	CNP 003	2	104	80%	-5	101	
			Generator, standard	CNP 101	1	108	100%	-5	103	
			Water pump, diesel	CNP 282	1	103	80%	0	102	
			Mini Backhoe (3 tonnes)	OCNP	1	94	60%	0	92	
			Dump truck, with or without grab	OCNP	1	105	30%	0	100	
			Grout mixer	OCNP	1	90	80%	0	89	
			Grout pump	OCNP	1	105	100%	0	105	
			Water pump, submersible	CNP 283	8	85	100%	0	94	
								Total	**115**	**115**
S310	ELS work	1	Excavator / Backhoe	CNP 081	1	112	80%	0	111	
			Breaker, excavator mounted, hydraulic	BS D8-13	1	110	30%	0	105	
			Drill, hand-held (electric)	CNP 065	1	98	20%	0	91	
			Welder / Generator	Ref 1	1	100	100%	0	100	
			Dump truck with Grab	OCNP	1	105	30%	0	100	
			Welding Set	Ref 2	1	78	30%	0	73	
			Lorry with crane	OCNP	1	105	30%	0	100	
			Crawler crane	BS D7-114	1	101	30%	0	96	
			Ventilation fan	CNP 241	1	108	80%	0	107	
			Dump truck	BS D9-39	1	103	30%	0	98	
			Water pump, submersible	CNP 283	8	85	80%	0	93	
								Total	**114**	**114**
S320	Ventilation Adit Structure	1	Bar bender and cutter	CNP 021	2	90	50%	0	90	
			Concrete Lorry Mixer	CNP 044	2	109	70%	0	110	
			Concrete pump	CNP 047	2	109	70%	0	110	
			Poker, vibratory, hand-held	OCNP	2	102	60%	0	103	
			Saw, circular wood	BS D7-79	2	103	20%	0	99	
			Crawler crane	BS D7-114	1	101	20%	0	94	
			Ventilation fan	CNP 241	1	108	80%	0	107	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, submersible	CNP 283	8	85	80%	0	93	
								Total	**115**	**115**
S325	Backfill	1	Bulldozer	Ref 4	1	102	60%	0	100	
			Compactor, vibratory	CNP 050	1	105	60%	0	103	
			Dump truck with Grab	OCNP	1	105	80%	0	104	
			Generator, standard	CNP 101	1	108	100%	-5	103	
			Road roller	CNP 185	1	108	60%	0	106	
			Water pump, submersible	CNP 283	2	85	80%	0	87	
								Total	**110**	**110**
Kai Tak C&C Tunnel (Portion 3A2 & Part of Portion 3A4)										
S605	Piling and kingposts	1	Pipe Pile Rig	CNP 167	2	114	80%	0	116	

Appendix 2.2 Construction Plant Inventory

ID	Construction Activities	Group [1]	PME	Ref.[2]	No of items	SWL / Item dB(A)	On-time %	Barrier Correction, dB(A)	SPL, dB(A)	Max SPL, dB(A)[1]
			Air compressor, air flow > 30m3/min	CNP 003	4	104	80%	-5	104	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, diesel	CNP 282	2	103	80%	0	105	
			Mini Backhoe (3 tonnes)	OCNP	1	94	80%	0	93	
			Dump truck, with or without grab	OCNP	2	105	70%	0	106	
			Grout mixer	OCNP	1	90	60%	0	88	
			Grout pump	OCNP	1	105	60%	0	103	
			Water pump, submersible	CNP 283	4	85	100%	0	91	
								Total	**118**	**118**
S608	Install decking	1	Crawler crane	BS D7-114	1	101	80%	0	100	
			Tractor with trailer	CNP 222	1	118	20%	0	111	
			Flat-top Lorry	OCNP	1	105	70%	0	103	
			Drill, hand-held (electric)	CNP 065	2	98	80%	0	100	
			Welder / Generator	Ref 1	2	100	80%	0	102	
			Generator, standard	CNP 101	1	108	100%	-5	103	
								Total	**113**	**113**
S610, S611, S612	ELS work	1	Excavator / Backhoe	CNP 081	2	112	80%	0	114	
			Breaker, excavator mounted, hydraulic	BS D8-13	1	110	30%	0	105	
			Drill, hand-held (electric)	CNP 065	1	98	20%	0	91	
			Welder / Generator	Ref 1	2	100	80%	0	102	
			Dump truck with Grab	OCNP	2	105	30%	0	103	
			Welding Set	Ref 2	2	78	30%	0	76	
			Lorry with crane	OCNP	1	105	30%	0	100	
			Crawler crane	BS D7-114	1	101	30%	0	96	
			Ventilation fan	CNP 241	2	108	80%	0	110	
			Dump truck	BS D9-39	1	103	30%	0	98	
			Water pump, submersible	CNP 283	8	85	80%	0	93	
								Total	**116**	**116**
S620	C&C Tunnel Structure	1	Bar bender and cutter	CNP 021	2	90	50%	0	90	
			Concrete Lorry Mixer	CNP 044	2	109	80%	0	111	
			Concrete pump	CNP 047	2	109	80%	0	111	
			Poker, vibratory, hand-held	OCNP	3	102	50%	0	104	
			Saw, circular wood	BS D7-79	4	103	50%	0	106	
			Crawler crane	BS D7-114	2	101	50%	0	101	
			Ventilation fan	CNP 241	2	108	50%	0	108	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, submersible	CNP 283	8	85	80%	0	93	
								Total	**116**	**116**
S623	Backfill	1	Bulldozer	Ref 4	2	102	50%	0	102	
			Compactor, vibratory	CNP 050	2	105	50%	0	105	
			Dump truck with Grab	OCNP	2	105	50%	0	105	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Road roller	CNP 185	2	108	50%	0	108	
			Water pump, submersible	CNP 283	4	85	100%	0	91	
								Total	**113**	**113**
Depressed Road & Underpass at Kai Tak (Part of Portion 3A4 & Portion 3A5)										
S340, S345	Pipepiles & Kingposts, sheetpiles	1	Pipe Pile Rig	CNP 167	2	114	80%	0	116	
			Air compressor, air flow > 30m3/min	CNP 003	4	104	80%	-5	104	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, diesel	CNP 282	2	103	80%	0	105	
			Mini Backhoe (3 tonnes)	OCNP	1	94	60%	0	92	
			Dump truck, with or without grab	OCNP	2	105	30%	0	103	
			Grout mixer	OCNP	1	90	60%	0	88	
			Grout pump	OCNP	1	105	60%	0	103	
			Vibratory hammer, hydraulic	OCNP	1	115	60%	0	113	
			Power pack	OCNP	1	100	60%	0	98	
			Water pump, submersible	CNP 283	4	85	80%	0	90	
								Total	**119**	**119**
S350, S351	ELS work	1	Excavator / Backhoe	CNP 081	2	112	80%	0	114	
			Breaker, excavator mounted, hydraulic	BS D8-13	1	110	30%	0	105	
			Drill, hand-held (electric)	CNP 065	1	98	30%	0	93	
			Welder / Generator	Ref 1	2	100	80%	0	102	
			Dump truck with Grab	OCNP	2	105	20%	0	101	
			Welding Set	Ref 2	2	78	30%	0	76	
			Lorry with crane	OCNP	1	105	20%	0	98	
			Crawler crane	BS D7-114	1	101	20%	0	94	
			Ventilation fan	CNP 241	2	108	80%	0	110	
			Dump truck	BS D9-39	1	103	30%	0	98	
			Water pump, submersible	CNP 283	8	85	80%	0	93	
								Total	**116**	**116**
S360	Depressed Rd, underpass, adit structure and backfill	1	Bar bender and cutter	CNP 021	2	90	30%	0	88	
			Concrete Lorry Mixer	CNP 044	2	109	80%	0	111	
			Concrete pump	CNP 047	2	109	80%	0	111	
			Poker, vibratory, hand-held	OCNP	3	102	80%	0	106	
			Saw, circular wood	BS D7-79	4	103	20%	0	102	
			Crawler crane	BS D7-114	2	101	20%	0	97	
			Ventilation fan	CNP 241	2	108	80%	0	110	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, submersible	CNP 283	8	85	80%	0	93	
			Bulldozer	Ref 4	2	102	50%	0	102	
			Compactor, vibratory	CNP 050	2	105	50%	0	105	
			Dump truck with Grab	OCNP	2	105	20%	0	101	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Road roller	CNP 185	2	108	30%	0	106	
			Water pump, submersible	CNP 283	4	85	80%	0	90	
								Total	**118**	**118**
U Trough Structures and At-grade Road at Kai Tak (Portion 3D)										
S745	Sheetpiling	1	Vibratory hammer, hydraulic	OCNP	2	115	80%	0	117	
			Power pack	OCNP	2	100	80%	0	102	
			Flat-top Lorry	OCNP	2	105	80%	0	107	
								Total	**118**	**118**
S750	ELS work	1	Excavator / Backhoe	CNP 081	2	112	80%	0	114	
			Breaker, excavator mounted, hydraulic	BS D8-13	1	110	30%	0	105	
			Drill, hand-held (electric)	CNP 065	1	98	20%	0	91	
			Welder / Generator	Ref 1	2	100	80%	0	102	
			Dump truck with Grab	OCNP	2	105	30%	0	103	
			Welding Set	Ref 2	2	78	30%	0	76	
			Lorry with crane	OCNP	1	105	20%	0	98	
			Crawler crane	BS D7-114	1	101	20%	0	94	
			Ventilation fan	CNP 241	2	108	80%	0	110	
			Dump truck	BS D9-39	1	103	30%	0	98	
			Water pump, submersible	CNP 283	8	85	80%	0	93	
								Total	**116**	**116**
S760	Construct Trough Structure	1	Bar bender and cutter	CNP 021	2	90	30%	0	88	
			Concrete Lorry Mixer	CNP 044	2	109	70%	0	110	
			Concrete pump	CNP 047	2	109	70%	0	110	

Appendix 2.2 Construction Plant Inventory

ID	Construction Activities	Group [1]	PME	Ref.[2]	No of items	SWL / Item dB(A)	On-time %	Barrier Correction, dB(A)	SPL, dB(A)	Max SPL, dB(A)[1]
			Poker, vibratory, hand-held	OCNP	3	102	60%	0	105	
			Saw, circular wood	BS D7-79	4	103	20%	0	102	
			Crawler crane	BS D7-114	2	101	30%	0	99	
			Ventilation fan	CNP 241	2	108	80%	0	110	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Water pump, submersible	CNP 283	8	85	80%	0	93	
								Total	**116**	**116**
S770	Backfill & remove sheetpiles	1	Bulldozer	Ref 4	2	102	60%	0	103	
			Compactor, vibratory	CNP 050	2	105	60%	0	106	
			Dump truck with Grab	OCNP	2	105	80%	0	107	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Road roller	CNP 185	2	108	80%	0	110	
			Water pump, submersible	CNP 283	4	85	100%	0	91	
			Vibratory hammer, hydraulic	OCNP	2	115	80%	0	117	
			Power pack	OCNP	2	100	80%	0	102	
			Flat-top Lorry	OCNP	2	105	50%	0	105	
			Welder / Generator	Ref 1	2	100	30%	0	98	
								Total	**119**	**119**
S775	Roadwork for At-grade road	1	Asphalt paver	CNP 004	1	109	80%	0	108	
			Bar bender and cutter	CNP 021	1	90	30%	0	85	
			Bulldozer	Ref 4	1	102	30%	0	97	
			Concrete Lorry Mixer	CNP 044	1	109	80%	0	108	
			Generator, standard	CNP 101	2	108	100%	-5	106	
			Dump truck	BS D9-39	4	103	20%	0	102	
			Poker, vibratory, hand-held	OCNP	1	102	80%	0	101	
			Road roller	CNP 185	1	108	80%	0	107	
			Roller, vibratory	BS D3-116	1	106	80%	0	105	
			Crawler crane	BS D7-114	1	101	20%	0	94	
								Total	**115**	**115**

Notes:
[1] PME in separate groups will not be operated at the same time. The group with the highest SWL is adopted in this assessment as the worst-case scenario.
[2] The SWLs are referred to the following references:
CNP - Table 3 - Sound Power Levels for Items of Powered Mechanical Equipment (PME) of Technical Memorandum on Noise from Construction Work Other Than Percussive Piling (GW-TM) issued by Noise Control Authority, Environmental Protection Department
OCNP - Sound power levels of other commonly used PME obtained from http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf
Ref 1 - Appendix 8.4 of the approved EIA Report for Shatin to Central Link - Stabling Sidings at Hung Hom Freight Yard (Register No.: AEIAR-164/2012)
Ref 2 - Appendix 5.1 of the approved EIA Report for Hong Kong Section of Guangzhou - Shenzhen - Hong Kong Express Rail Link (Register No.: AEIAR-143/2009)
Ref 3 - Appendix 8.3 of the approved EIA Report for Tai Wai to Hung Hom Section (Register No.: AEIAR-167/2012)
Ref 4 - Table 4-14 of the approved EIA Report for Proposed Comprehensive Development at Wo Shang Wai, Yuen Long (Register No.: AEIAR-120/2008)
BS - British Standard 5228: Part 1:2009 Noise Control on Construction and Open Sites

Appendix 3.1

Notional Distance of Works Area to NSR

Appendix 3.1 Notional Distance of Works Area to NSRs

Portion	Distance to Notional Source Position, m	
	E-N12 Grand Waterfront Tower 3	E-N21 Hang Chien Court Block J
1A	37	58
1B	110	7
1E	187	63
2A1	221	293
2A3	165	133
2B	239	104
3A2	>300	>300
3A4	>300	>300
3A5	>300	>300
3A6	>300	>300
3B	>300	>300
3D	>300	>300

Appendix 3.2

Detailed Noise Calculation

Appendix 3.2 Detailed Noise Calculation

NSR: E-N12 Grand Waterfront Tower 3

ID	Construction Activities	Portion [1][2]	SWL	Dist.	SPL [3]	Start	Finish	2018 A M J J A S O N D	2019 J F M A M J J A S O N D	2020 J F M A M J J A S O N D	2021 J F M A M J J A S O N D	2022 J F M A M J J A S O N D	2023 J F M A M J J A S O N D
Kowloon City Vehicular Ferry Pier (Portion 1B)													
S135, S136	Demolition of carpark building and ramp structure	1B	97	110	51	02/06/18	18/07/18	51 51					
S150	Reprovision of new parking facilities	1B	97	110	51	19/07/18	03/09/18	51 51 51					
Ma Tau Kok C&C tunnel & Access Shaft (Portion 1A)													
S380, S420	Piling and kingposts	1A	111	37	75	17/09/18	23/03/19	75 75 75 75	75 75 75				
S426	Install decking	1A	109	37	73	01/04/19	31/05/19		73 73				
S390, S391, S392, S393, S430, S431, S432	ELS work	1A	112	37	75	01/04/19	11/05/22		75 75 75 75 75 75 75 75 75	75 75 75 75 75 75 75 75 75 75 75 75	75 75 75 75 75 75 75 75 75 75 75 75	75 75 75 75 75	
S400	Construction of RC wall and temporary noise enclosure	1A	111	37	75	02/07/20	20/08/20			75 75			
S440	C&C Tunnel Structure	1A	110	37	74	12/05/22	17/09/22					74 74 74 74 74	
S910	Backfill	1A	108	37	72	19/09/22	14/01/23					72 72 72 72 72	
Landing Steps and Covered Walkway (Portion 1E & Portion 2B)													
S470	Removal of existing seawall	1E & 2B	111	187	61	04/01/19	31/10/19		61 61 61 61 61 61 61				
S480, S490	Construction of landing steps and covered walkway	1E & 2B	106	187	56	12/07/19	11/09/20		56 56 56 56 56 56 56	56 56 56 56 56 56 56 56 56 56			
Marine Tunnel Stage1 (tunnel footprint of Portion 2A1)													
S540	Construction of temp working platforms	2A1	113	221	62	01/11/18	21/02/19	62 62	62 62				
S545, S550	Cofferdam construction of sheetpiles and pipepiles	2A1	121	221	69	28/01/19	31/07/19		69 69 69 69 69 69 69				
S555	Temporary reclamation between pipepiles and sheetpiles	2A1	111	221	59	26/10/19	19/12/19			59 59 59			
S560, S561, S562	ELS work	2A1	113	221	61	21/01/20	13/05/20			61 61 61 61 61			
S570	Marine Tunnel Structure	2A1	118	221	66	09/05/20	29/10/20			66 66 66 66 66 66			
S575, S576	Backfill	2A1	115	221	63	22/10/20	05/11/20			63 63			
S580	Removal of reclamation/ temp platforms	2A1	115	221	63	06/11/20	08/01/21			63 63 63			
S585	Dredging for Stage 2 diversion	2A1	108	221	56	24/12/20	19/01/21			56 56			
Marine Tunnel Stage2 (tunnel footprint of Portion 2A3)													
S640	Construction of temp working platforms	2A3	117	165	67	20/01/21	04/03/21				67 67 67		
S645, S650	Cofferdam construction of sheetpiles and pipepiles	2A3	117	165	68	10/02/21	23/09/21				68 68 68 68 68 68 68 68		
S655	Temporary reclamation between pipepiles and sheetpiles	2A3	111	165	62	24/09/21	08/11/21				62 62 62		
S660, S661, S662	ELS work	2A3	113	165	64	07/12/21	07/06/22				64	64 64 64 64 64 64	
S670	Marine Tunnel Structure	2A3	118	165	69	19/05/22	11/10/22					69 69 69 69 69 69	
S675, S676	Backfill	2A3	115	165	66	12/10/22	09/12/22						66 66 66
S677	Reprovision of MTK Public Pier	2A3	115	165	66	12/10/22	09/12/22						66 66 66
S680	Removal of reclamation/ temp platforms	2A3	115	165	65	10/12/22	04/02/23						65 65 65
Vertical Wall along depressed road at Portion 3B													
S200, S222	Pipepiles and sheetpiles	3B	116	>300	-	23/04/18	07/01/19	- - - - - - - - - -	-				
Ventilation Adit at Eastern Interface(Portion 3A6)													
S300	Piling and pumping test	3A6	115	>300	-	28/04/18	07/11/18	- - - - - - - - -					
S310	ELS work	3A6	114	>300	-	08/11/18	31/01/19		-				
S320	Ventilation Adit Structure	3A6	115	>300	-	01/02/19	07/08/19		- - - - - - -				
S325	Backfill	3A6	110	>300	-	08/08/19	27/08/19		-				
Kai Tak C&C Tunnel (Portion 3A2 & Part of Portion 3A4)													
S605	Piling and kingposts	3A2 & 3A4	118	>300	-	05/04/18	13/12/18	- - - - - - - - -					
S608	Install decking	3A2 & 3A4	113	>300	-	14/12/18	28/01/19		- -				
S610, S611, S612	ELS work	3A2 & 3A4	116	>300	-	21/01/20	30/05/20			- - - - -			
S620	C&C Tunnel Structure	3A2 & 3A4	116	>300	-	01/06/20	08/10/20			- - - - -			
S623	Backfill	3A2 & 3A4	113	>300	-	09/10/20	11/11/20			- -			
Depressed Road & Underpass at Kai Tak (Part of Portion 3A4 & Portion 3A5)													
S340, S345	Pipepiles & Kingposts & Sheetpiles	3A4 & 3A5	119	>300	-	13/11/18	08/10/19		- - - - - - - - - -				
S350, S351	ELS work	3A4 & 3A5	116	>300	-	09/10/19	30/07/20			- - - - - - - -			
S360	Depressed Rd, underpass, adit structure and backfill	3A4 & 3A5	118	>300	-	30/07/20	07/05/21			- - - - - -	- - - - -		
U Trough Structures and At-grade Road at Kai Tak (Portion 3D)													
S745	Sheetpiling	3D	118	>300	-	05/10/21	23/12/21				- - -		
S750	ELS work	3D	116	>300	-	24/12/21	23/06/22					- - - - - -	
S760	Construct Trough Structure	3D	116	>300	-	24/06/22	15/11/22						- - - - -
S770	Backfill & remove sheetpiles	3D	119	>300	-	03/09/22	31/01/23						- - - - -
S775	Roadwork for At-grade road	3D	115	>300	-	01/02/23	06/05/23						- - - -
							Total SPL (CKR only), dB(A)[4]:	- - 51 54 51 75 75 75 75 76 76 76 78 78 76 76 76 76 76 75 75	76 76 76 76 76 76 78 78 76 76 76 76 76 77 77 76 76 76 76 76 76 76 76 76 76 76 78 75 75 75 77 75 74 74 73 65	- - - - - - - - - - - -
							Corrected SPL (CKR only), dB(A)[4][5]:	- - 51 51 51 75 75 75 75 75 75 75 75 75 75 75 75 75 75 75	75 75 75 75 75 75 75 75 75 75 75 75 75 75 75 75 75 75 75	75 75 75 75 75 75 75 75 75 75 75 75 75 75 75 75 75 74 74 73 65	- - - - - - - - - - - -
							Exceedance (CKR only), dB(A):	- -	- - - - - - - - - - - - - - - - - - -

NSR: E-N21 Hang Chien Court Block J

ID	Construction Activities	Portion [1][2]	SWL	Dist.	SPL [3]	Start	Finish
Kowloon City Vehicular Ferry Pier (Portion 1B)							
S135, S136	Demolition of carpark building and ramp structure	1B	97	7	75	02/06/18	18/07/18
S150	Reprovision of new parking facilities	1B	97	7	75	19/07/18	03/09/18
Ma Tau Kok C&C tunnel & Access Shaft (Portion 1A)							
S380, S420	Piling and kingposts	1A	111	58	71	17/09/18	23/03/19
S426	Install decking	1A	109	58	69	01/04/19	31/05/19
S390, S391, S392, S393, S430, S431, S432	ELS work	1A	112	58	71	01/04/19	11/05/22
S400	Construction of RC wall and temporary noise enclosure	1A	111	58	71	02/07/20	20/08/20
S440	C&C Tunnel Structure	1A	110	58	70	12/05/22	17/09/22
S910	Backfill	1A	108	58	68	19/09/22	14/01/23
Landing Steps and Covered Walkway (Portion 1E & Portion 2B)							
S470	Removal of existing seawall	1E & 2B	111	63	70	04/01/19	31/10/19
S480, S490	Construction of landing steps and covered walkway	1E & 2B	106	63	65	12/07/19	11/09/20
Marine Tunnel Stage1 (tunnel footprint of Portion 2A1)							
S540	Construction of temp working platforms	2A1	113	293	59	01/11/18	21/02/19
S545, S550	Cofferdam construction of sheetpiles and pipepiles	2A1	121	293	66	28/01/19	31/07/19
S555	Temporary reclamation between pipepiles and sheetpiles	2A1	111	293	57	26/10/19	19/12/19
S560, S561, S562	ELS work	2A1	113	293	59	21/01/20	13/05/20
S570	Marine Tunnel Structure	2A1	118	293	64	09/05/20	29/10/20
S575, S576	Backfill	2A1	115	293	61	22/10/20	05/11/20
S580	Removal of reclamation/ temp platforms	2A1	115	293	60	06/11/20	08/01/21
S585	Dredging for Stage 2 diversion	2A1	108	293	53	24/12/20	19/01/21
Marine Tunnel Stage2 (tunnel footprint of Portion 2A3)							
S640	Construction of temp working platforms	2A3	117	133	69	20/01/21	04/03/21
S645, S650	Cofferdam construction of sheetpiles and pipepiles	2A3	117	133	70	10/02/21	23/09/21
S655	Temporary reclamation between pipepiles and sheetpiles	2A3	111	133	63	24/09/21	08/11/21
S660, S661, S662	ELS work	2A3	113	133	66	07/12/21	07/06/22
S670	Marine Tunnel Structure	2A3	118	133	71	19/05/22	11/10/22
S675, S676	Backfill	2A3	115	133	68	12/10/22	09/12/22
S677	Reprovision of MTK Public Pier	2A3	115	133	68	12/10/22	09/12/22
S680	Removal of reclamation/ temp platforms	2A3	115	133	67	10/12/22	04/02/23
Vertical Wall along depressed road at Portion 3B							
S200, S222	Pipepiles and sheetpiles	3B	116	>300	-	23/04/18	07/01/19
Ventilation Adit at Eastern Interface(Portion 3A6)							
S300	Piling and pumping test	3A6	115	>300	-	28/04/18	07/11/18
S310	ELS work	3A6	114	>300	-	08/11/18	31/01/19
S320	Ventilation Adit Structure	3A6	115	>300	-	01/02/19	07/08/19
S325	Backfill	3A6	110	>300	-	08/08/19	27/08/19
Kai Tak C&C Tunnel (Portion 3A2 & Part of Portion 3A4)							
S605	Piling and kingposts	3A2 & 3A4	118	>300	-	05/04/18	13/12/18
S608	Install decking	3A2 & 3A4	113	>300	-	14/12/18	28/01/19
S610, S611, S612	ELS work	3A2 & 3A4	116	>300	-	21/01/20	30/05/20
S620	C&C Tunnel Structure	3A2 & 3A4	116	>300	-	01/06/20	08/10/20
S623	Backfill	3A2 & 3A4	113	>300	-	09/10/20	11/11/20
Depressed Road & Underpass at Kai Tak (Part of Portion 3A4 & Portion 3A5)							
S340, S345	Pipepiles & Kingposts & Sheetpiles	3A4 & 3A5	119	>300	-	13/11/18	08/10/19
S350, S351	ELS work	3A4 & 3A5	116	>300	-	09/10/19	30/07/20
S360	Depressed Rd, underpass, adit structure and backfill	3A4 & 3A5	118	>300	-	30/07/20	07/05/21
U Trough Structures and At-grade Road at Kai Tak (Portion 3D)							
S745	Sheetpiling	3D	118	>300	-	05/10/21	23/12/21
S750	ELS work	3D	116	>300	-	24/12/21	23/06/22
S760	Construct Trough Structure	3D	116	>300	-	24/06/22	15/11/22
S770	Backfill & remove sheetpiles	3D	119	>300	-	03/09/22	31/01/23
S775	Roadwork for At-grade road	3D	115	>300	-	01/02/23	06/05/23

2018

ID	A	M	J	J	A	S	O	N	D
S135, S136			75	75					
S150				75	75	75			
S380, S420						71	71	71	71
S540								59	59
S200, S222	-	-	-	-	-	-	-	-	-
S300	-	-	-	-	-	-	-	-	
S310								-	-
S605	-	-	-	-	-	-	-	-	-
S608									-
S340, S345								-	-
Total SPL (CKR only), dB(A)[4]:	-	-	75	78	75	77	71	71	71
Corrected SPL (CKR only), dB(A)[4][5]:	-	-	75	75	75	75	71	71	71
Exceedance (CKR only), dB(A):	-	-	-	-	-	-	-	-	-
Range (CKR only), dB(A):	67 - 75								
SPL from Kai Tai Development (KTD)[5][6], dB(A):	78	78	78	-	-	-	-	-	-
Cumlative SPL (CKR + KTD)[6], dB(A):	78	78	80	75	75	75	71	71	71
Cumulative Exceedance (CKR + KTD)[6], dB(A):	3	3	5	-	-	-	-	-	-

2019

ID	J	F	M	A	M	J	J	A	S	O	N	D
S380, S420	71	71	71									
S426				69	69							
S390, S391, S392, S393, S430, S431, S432				71	71	71	71	71	71	71	71	71
S470				70	70	70	70	70	70	70		
S480, S490							65	65	65	65	65	65
S540	59	59										
S545, S550	66	66	66	66	66	66	66					
S555										57	57	57
S200, S222	-											
S310	-											
S320		-	-	-	-	-	-	-				
S325								-				
S608	-											
S340, S345	-	-	-	-	-	-	-	-	-	-		
S350, S351											-	-
Total SPL (CKR only), dB(A)[4]:	73	73	72	76	76	74	75	74	74	74	72	72
Corrected SPL (CKR only), dB(A)[4][5]:	71	71	71	71	71	71	71	71	71	71	71	71
Exceedance (CKR only), dB(A):	-	-	-	-	-	-	-	-	-	-	-	-
SPL from Kai Tai Development (KTD)[5][6], dB(A):	-	-	-	-	-	-	-	-	-	-	-	-
Cumlative SPL (CKR + KTD)[6], dB(A):	71	71	71	71	71	71	71	71	71	71	71	71
Cumulative Exceedance (CKR + KTD)[6], dB(A):	-	-	-	-	-	-	-	-	-	-	-	-

2020

ID	J	F	M	A	M	J	J	A	S	O	N	D
S390, S391, S392, S393, S430, S431, S432	71	71	71	71	71	71	71	71	71	71	71	71
S400							71	71				
S480, S490	65	65	65	65	65	65	65	65	65			
S560, S561, S562	59	59	59	59	59							
S570					64	64	64	64	64	64		
S575, S576										61	61	
S580											60	60
S585												53
S610, S611, S612	-	-	-	-	-							
S620						-	-	-	-	-		
S623										-	-	
S350, S351	-	-	-	-	-	-	-					
S360							-	-	-	-	-	-
Total SPL (CKR only), dB(A)[4]:	72	72	72	72	73	73	75	75	73	72	72	72
Corrected SPL (CKR only), dB(A)[4][5]:	71	71	71	71	71	71	71	71	71	71	71	71
Exceedance (CKR only), dB(A):	-	-	-	-	-	-	-	-	-	-	-	-
SPL from Kai Tai Development (KTD)[5][6], dB(A):	-	-	-	-	-	-	-	-	-	-	-	-
Cumlative SPL (CKR + KTD)[6], dB(A):	71	71	71	71	71	71	71	71	71	71	71	71
Cumulative Exceedance (CKR + KTD)[6], dB(A):	-	-	-	-	-	-	-	-	-	-	-	-

2021

ID	J	F	M	A	M	J	J	A	S	O	N	D
S390, S391, S392, S393, S430, S431, S432	71	71	71	71	71	71	71	71	71	71	71	71
S580	60											
S585	53											
S640	69	69	69									
S645, S650		70	70	70	70	70	70	70	70			
S655									63	63	63	
S660, S661, S662												66
S360	-	-	-	-	-							
S745										-	-	-
S750												-
Total SPL (CKR only), dB(A)[4]:	74	75	75	74	74	74	74	74	74	72	72	72
Corrected SPL (CKR only), dB(A)[4][5]:	71	71	71	71	71	71	71	71	71	71	71	71
Exceedance (CKR only), dB(A):	-	-	-	-	-	-	-	-	-	-	-	-
SPL from Kai Tai Development (KTD)[5][6], dB(A):	-	-	-	-	-	-	-	-	-	-	-	-
Cumlative SPL (CKR + KTD)[6], dB(A):	71	71	71	71	71	71	71	71	71	71	71	71
Cumulative Exceedance (CKR + KTD)[6], dB(A):	-	-	-	-	-	-	-	-	-	-	-	-

2022

ID	J	F	M	A	M	J	J	A	S	O	N	D
S390, S391, S392, S393, S430, S431, S432	71	71	71	71	71							
S440					70	70	70	70	70			
S910									68	68	68	68
S660, S661, S662	66	66	66	66	66	66						
S670					71	71	71	71	71	71		
S675, S676										68	68	68
S677										68	68	68
S680												67
S750	-	-	-	-	-	-						
S760						-	-	-	-	-	-	
S770									-	-	-	-
Total SPL (CKR only), dB(A)[4]:	72	72	72	72	76	74	73	73	74	75	73	74
Corrected SPL (CKR only), dB(A)[4][5]:	71	71	71	71	71	74	73	73	73	75	73	74
Exceedance (CKR only), dB(A):	-	-	-	-	-	-	-	-	-	-	-	-
SPL from Kai Tai Development (KTD)[5][6], dB(A):	-	-	-	-	-	-	-	-	-	-	-	-
Cumlative SPL (CKR + KTD)[6], dB(A):	71	71	71	71	71	74	73	73	73	75	73	74
Cumulative Exceedance (CKR + KTD)[6], dB(A):	-	-	-	-	-	-	-	-	-	-	-	-

2023

ID	J	F	M	A	M	J	J	A	S	O	N	D
S910	68											
S680	67	67										
S770	-											
S775		-	-	-	-							
Total SPL (CKR only), dB(A)[4]:	71	67	-	-	-	-	-	-	-	-	-	-
Corrected SPL (CKR only), dB(A)[4][5]:	71	67	-	-	-	-	-	-	-	-	-	-
Exceedance (CKR only), dB(A):	-	-	-	-	-	-	-	-	-	-	-	-
SPL from Kai Tai Development (KTD)[5][6], dB(A):	-	-	-	-	-	-	-	-	-	-	-	-
Cumlative SPL (CKR + KTD)[6], dB(A):	71	67	-	-	-	-	-	-	-	-	-	-
Cumulative Exceedance (CKR + KTD)[6], dB(A):	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

[1] For works that would be conducted in more than one works sites, the distance of the works site closer to the NSR is adopted in the assessment as the worst-case scenario.

[2] Works located outside 300m boundary of the NSR are not assessed.

[3] For the calculation of sound pressure levels (SPL), the PMEs are assumed to be placed at the notional source position according to the "Technical Memorandum on Noise from Construction Work other than Percussive Piling" by EPD.

[4] Bold values denote exceedanc of the EIAO-TM criteria of 75 dB(A) for residential dwellings.

[5] The following construction activities are scheduled to be conducted in the same month but will not be conducted on the same days, thus should not be added up. The the activities with the lower SPL (underlined) are omitted in the "corrected SPL".

- S135, S136 and S150 - S390, S391, S392, S393, S430, S431, S432 and any other activities
- S380, S420 and S545, S550 - S400 and any other activities
- S440 and S910 - S150 and S380, S420

[6] The concurrent work that is within 300m of the NSR, Contract No. KL/2012/03 - Stage 4 infrastructure works at north apron area of Kai Tak Airport under KTD, is estimated to complete before mid-2018. Following the Approved CKR EIA Report, the noise level from KTD is assumed to be 78 dB(A) for this assessment.