

4 NOISE

4.1 INTRODUCTION

4.1.1 This section evaluates the potential noise impacts associated with the construction and operation of the Project. The noise impact assessment has been conducted in accordance with the requirements of Annex 5 and Annex 13 of the *Technical Memorandum on Environmental Impact Assessment Process* (EIAO-TM) as well as the requirements set out under Clause 3.4.5 and Appendix C of the EIA Study Brief (No. ESB-339/2021) (hereinafter “the Study Brief”).

4.2 LEGISLATIONS, STANDARDS AND GUIDELINES

Construction Phase

- 4.2.1 The principal legislation relating to the control of construction noise due to the Project is the EIAO. The EIAO-TM, issued under the EIAO, provides guidelines and noise criteria for evaluating noise impacts. The assessment criteria are defined in Annex 5 of the EIAO-TM with reference made to Annex 13 of the EIAO-TM for the guidelines of noise assessment.
- 4.2.2 The *Noise Control Ordinance* (NCO) also provides statutory controls on general construction works during restricted hours (i.e. between 1900 and 0700 hours or at any time on a general holiday (including Sunday)). A number of Technical Memoranda have been issued under the NCO to stipulate control approaches and criteria with respect to construction activities:
- *Technical Memorandum on Noise from Construction Work other than Percussive Piling* (GW-TM);
 - *Technical Memorandum on Noise from Percussive Piling* (PP-TM); and
 - *Technical Memorandum on Noise from Construction Work in Designated Areas* (DA-TM).
- 4.2.3 The GW-TM, which provides the guidelines for controlling the construction noise from the use of Powered Mechanical Equipment (PME) at the construction work sites, details the procedures that should be adopted for the assessment of noise from construction work other than percussive piling during restricted hours and for the issuing of Construction Noise Permits (CNP) by the Noise Control Authority.
- 4.2.4 In addition to the general controls on the use of PME during restricted hours, the use of Specified Powered Mechanical Equipment (SPME) and/or undertaking of Prescribed Construction Work (PCW) within designated areas are controlled under DA-TM. The DA-TM details the procedures for the assessment of the use of SPME and/or undertaking of PCW during restricted hours for issuing of CNP adopted by the Noise Control Authority.
- (a) General Construction Works during Non-Restricted Hours**
- 4.2.5 Under the EIAO, potential noise impact arising from general construction works during non-restricted hours (i.e. 0700 to 1900 hours on any day not being a Sunday or general holiday) at noise sensitive uses that rely on opened windows for ventilation, should be assessed in accordance with the noise criteria specified in the EIAO-TM. The EIAO-TM noise standards are presented in **Table 4.1**.

Table 4.1 - EIAO-TM Daytime Construction Noise Standards ($L_{eq(30min)}$ dB(A))

Uses	Noise Standards
Domestic premises, hotel, hostel	75
Educational Institutions	70
Educational Institution (during examination periods)	65
Notes:	
(a) The above standards apply to uses which rely on opened windows for ventilation.	
(b) The above standards shall be viewed as the maximum permissible noise levels assessed at 1m from the external façade.	

(b) General Construction Works during Restricted Hours

- 4.2.6 When assessing a CNP application for the use of PME during the restricted hours (i.e. 1900 to 0700 hours of the next day or any time on Sundays or general holidays), the Noise Control Authority will compare the Acceptable Noise Levels (ANLs), as promulgated in GW-TM, and the Corrected Noise Levels (CNLs) (i.e. after accounting for factors such as barrier effects and reflections) associated with the proposed PME operations. The ANLs are obtained with corrections for the duration of the CNP and multiple permit situations, if applicable to the Basic Noise Levels (BNLs). The BNLs are related to the noise sensitivity of the area in question and different Area Sensitivity Ratings (ASRs) have been established to reflect the background characteristics of different areas. The appropriate ASR for the Noise Sensitive Receiver (NSR) is determined with reference to **Table 4.2**. The relevant BNLs are shown in **Table 4.3**.

Table 4.2 - Area Sensitivity Ratings (ASRs)

Types of Area Containing NSR	Degree to which NSR is affected by Influencing Factor (IF)		
	Not Affected	Indirectly Affected	Directly Affected
Rural area, including Country Parks or village type developments	A	B	B
Low density residential area consisting of low-rise or isolated high-rise developments	A	B	C
Urban area	B	C	C
Area other than those above	B	B	C
Notes:			
The following definitions apply:			
(a) "Country Park" means an area that is designated as a country park pursuant to section 14 of the <i>Country Parks Ordinance</i> ;			
(b) "Directly affected" means that the NSR is at such a location that noise generated by the IF is readily noticeable at the NSR and is a dominant feature of the noise climate of the NSR;			
(c) "Indirectly affected" means that the NSR is at such a location that noise generated by the IF, whilst noticeable at the NSR, is not a dominant feature of the noise climate of the NSR;			
(d) "Not affected" means that the NSR is at such a location that noise generated by the IF is not noticeable at the NSR; and			
(e) "Urban area" means an area of high density, diverse development including a mixture of such elements as industrial activities, major trade or commercial activities and residential premises.			

Table 4.3 – Basic Noise Levels of General Construction Works

Time Period	L _{Aeq, 5min} (dB(A))		
	ASR 'A'	ASR 'B'	ASR 'C'
All days during the evening (1900 to 2300 hours), and general holidays (including Sundays) during the daytime and evening (0700 to 2300 hours)	60	65	70
All days during the night-time (2300 to 0700 hours)	45	50	55

- 4.2.7 The Noise Control Authority will consider a well-justified CNP application, for the construction works within restricted hours as guided by the relevant TMs issued under the NCO. The Noise Control Authority will take into account the adjoining land uses, contemporary conditions/situation, and any complaints against construction activities at the site before making a decision. Nothing in this EIA Report shall bind the Noise Control Authority in making its decision. The Noise Control Authority may include any conditions in a CNP that it considers appropriate. Failure to comply with any such conditions may lead to cancellation of the CNP and prosecution action under the NCO.
- 4.2.8 Under the DA-TM, the use of five types of Specified Powered Mechanical Equipment (SPME) and three types of Prescribed Construction Work (PCW) within a designated area during restricted hours would require a valid CNP. The SPME includes hand-held breaker, bulldozer, concrete lorry mixer, dump truck and hand-held vibratory poker: The PCW are erecting or dismantling of formwork or scaffolding, loading, unloading or handling of rubble, wooden boards, steel bars, wood or scaffolding materials and hammering.
- 4.2.9 In general, it should not be presumed that a CNP would be granted for carrying out PCW within a designated area during restricted hours. The CNP may be granted for the execution of construction works during restricted hours involving the use of PME and/or SPME if the relevant ANLs and criteria stipulated in the GW-TM and DA-TM can be met.
- 4.2.10 Percussive piling is prohibited between 1900 and 0700 hours on any weekday not being a general holiday and at any time on Sunday or general holiday. A CNP is required for the carrying out of percussive piling between 0700 and 1900 hours on any day not being a general holiday. PP-TM sets out the requirements for working and determination of the permitted hours of operations. Referring to the construction method for the Project, percussive piling is not required.

Operation Phase

- 4.2.11 Road traffic noise is controlled under EIAO-TM, with relevant noise standards and guidelines stipulated in Annexes 5 and 13.
- 4.2.12 The road traffic noise is presented in terms of noise levels exceeded for 10% of the one-hour period for the hour having the peak traffic flow [L_{10(1 hour)} dB(A)]. The noise standards of Road Traffic Noise for planning purpose as stipulated in Annex 5 of EIAO-TM are presented in **Table 4.4**.

Table 4.4 - Noise standards for Road Traffic Noise

Common Uses	Road Traffic Noise Peak Hour Traffic L _{10 1 hour} (dB(A))
All domestic premises including temporary housing accommodation	70
Hotel and hostels	70
Offices	70
Educational institutions including kindergartens, nurseries and all others where unaided voice communication is required	65
Places of public Worship and courts of law	65
Hospitals, clinics, convalescences and homes for the aged, diagnostic rooms, wards	55
Notes:	
(a) The above standards apply to uses which rely on opened windows for ventilation	
(b) The above standards should be viewed as the maximum permissible noise levels assessed at 1m from the external facade	

4.3 DESCRIPTION OF ENVIRONMENT

- 4.3.1 The site location is within an urban area which is mainly bounded by high-rise residential buildings, low rise village houses and educational institutions. The noise source at the Project site is dominated by existing roads.

4.4 ASSESSMENT AREA AND NOISE SENSITIVE RECEIVERS

- 4.4.1 The assessment area for noise impact assessment is defined by a distance of 300m from the boundary of the Project site and the works of the Project, in accordance with Appendix C of the EIA Study Brief. Existing, committed and planned NSRs earmarked on the relevant Outline Zoning Plans (OZP), Development Permission Area Plans, Outline Development Plans, Layout Plans and other relevant published land use plans, including plans and drawings published by the Lands Department and any land use and development applications approved by the Town Planning Board, in the vicinity of the Study have been identified.
- 4.4.2 The first layer of the NSRs have been selected as representative NSRs and included in the noise impact assessments as the NSRs behind are located further away from the Project and/or are screened by existing structures. Representative NSRs for construction noise assessment are selected with direct views to the construction works sites, while that for road noise assessment are selected with direct views to the new road segments.
- 4.4.3 All existing and planned NSRs identified are listed in **Table 4.5** and shown in **Figure 4.1**. The identified representative NSRs and the selected Noise Assessment Points (NAP) are listed in **Table 4.6** and **Appendix 4.1.2** with their locations shown in **Figures 4.1.1 to 4.1.4**. Map showing the locations and details of the NAPs is provided in **Appendix 4.17**.
- 4.4.4 With reference to the latest Tuen Mun OZP No. S/TM/36, some areas zoned as GIC are identified as NSR within the assessment area. During the course of the EIA study, there were no available information on planned usage and building layout plans of some of the potential GIC developments (PN4 to PN9). Therefore, some assessment points have been

conservatively selected at the boundary of potential GIC development area or referring to the recommended buffer distances between the road type and the land uses according to the HKPSG for the operation phase traffic noise impact assessment. In the absence of information on the potential future development at these area, assessment has been conducted based on the proposed storey nos as per the OZP if available. PN4 adjoins Tuen Mun Road which is an Urban Trunk Road, the minimum buffer distance should not be less than 20m for active and passive recreation uses as per Table 3.1 of the HKPSG. PN5 faces Lung Mun Road which is a District Distributor, the minimum buffer distance should not be less than 10m for active and passive recreation uses. Since there is LRT track between Lung Mun Road and the PN5 site, and the site is located on top level of an existing retaining wall, the assessment points for PN5 are assumed to be at the edge of the retaining wall. PN6/PN9 and PN7 faces Tsing Wun Road and Hoi Wing Road respectively. Both roads are District Distributor, the minimum buffer distance is also 10m for active and passive recreation uses. The assessment points for PN8 faces Yip Wong Road are assumed to be on top of the existing slope.

Table 4.5 - Identified Noise Sensitive Receivers (NSRs)

NSR ID	Description
Existing NSRs	
H1	Sam Shing Hui
H2	Palm Cove
H3	Dragon Inn Court
H4	Tsing Yung Terrace
H5	Kam Fai Garden
H6	Harvest Garden
H7	TWGHs Tai Tung Pui Social Services Building
H8	Chung Sing Benevolent Society Mrs. Aw Boon Haw Secondary School
H9	Semple Memorial Secondary School
H10	Hanford Garden
H11	Sam Shing Estate
H12	Siu Lun Court
H13	Pok Oi Hospital Tuen Mun Nursing Home
H16	Lui Cheung Kwong Lutheran Primary School
H22	Hong King Garden
H24	JC Place
H25	Rainbow Garden
H26	Po Leung Kuk Hong Kong Taoist Association Yuen Yuen Primary School
H34	Alpine Garden
H35	Hoi Tak Garden
H37	Castle Peak Bay Garden
H38	Tuen Mun Cornwall Elderly's Home
H39	Verdant Villa
H40	Pine Villas
H41	Faraday House
H42	Scenic Villa
H43	Sam Chau Ma Temple
H44	Dragon Villa
H45	South Crest

NSR ID	Description
H46	Crown by the Sea
H49	Seaview Garden
H50	Elegant Villa
H51	Tuen Mun Court
H52	Bayview Terrace
H53	Caritas Li Ka Shing Care and Attention Home
H54	Village House near Dragon Inn Court and Scenic Villa
H57	Village House between Palm Cove and Dragon Inn
H58	Tsui Ning Garden
H59	Boulder Lodge Staff Quarter
H60	Tuen Mun Siu Lun Government Complex
L27	Tsing Shan Tsuen
L28	Yuan Ming Monastery
L29	Yan Chi Monastery
L30	Yan Chai Hospital No.2 Secondary School
L31	Ju Ching Chu Secondary School (Tuen Mun)
L32	Independent Commission Against Corruption (ICAC) Training Camp
L33	Hong Chi Morninghill School / Hong Chi Morninglight School
L34	Tin Tak Shing Kau to Tong - Tuen Mun
L35	Glorious Garden
L36	Lung Mun Oasis
L37	The Church of Christ in China Hoh Fuk Tong Primary School
L38	Lung Yat Estate
L39	Hong Kong Christian Service Jockey Club Lodge of Rising Sun
L40	SKH St. Peter's Church (Castle Peak)
L41	Hong Kong Institute of Vocational Education (Tuen Mun)
L42	SKH St. Peter's Church Kindergarten & Child Care Centre
L44	Hung To Garden
L45	Kok Chan Sim Chi
L46	Richie House
L47	Felicity Garden
L48	Ling Yim Buddhism Institute
L49	Wai Lin Ching She
L75	The Esplanade
L76	Sze Lo Temple
L77	Village House opposite to Felicity Garden (L47_1)
L78	Cannan Garden
L79	Miu Chong Temple
L80	Yuen Yung Ching She
L81	Tin Hau Temple at Tin Hau Road
L87	Tuen Mun Children and Juvenile Home
L88	Village houses near Yip Wong Road
L94	Sun Tuen Mun Centre
Planned NSRs	
PN1	Public Housing Development at Yip Wong Road

NSR ID	Description
PN3	Planned Residential Development at Ex-salvation Army Sam Shing Chuen Lau Ng Ying School / The Salvation Army 'To Gather' @ Sam Shing Transitional Housing
PN4	Proposed G/IC Facilities near Siu Lun Complex
PN5	Proposed G/IC Facilities near Tuen Mun Children and Juvenile Home
PN6	Proposed G/IC Facilities at Former St. Simon's Primary School
PN7	Proposed G/IC Facilities at Car Park near Sam Shing Hui
PN8	Proposed G/IC Facilities at Tuen Mun Kau Hui
PN9	Proposed G/IC Facilities at Tsing Shan Tsuen
PN10	Proposed Residential Development at 8 Tsing Ha Lane
PN11	Proposed G/IC Facilities at Hong Kong Girl Guide Tuen Mun Campsite

Table 4.6 - Representative Noise Assessment Points (NAPs)

NSR ID	NAP ID	Description	Type of Use ^(a)
Existing NSRs			
H1	H1_1	Sam Shing Temple Office	Office
	H1_2	Sam Shing Temple	Place of Worship
	H1_3	Sam Shing Hui Office	Office
	H1_4	Fuk Tak Shrine	Place of Worship
H2	H2_1	Palm Cove (Tower 6)	Residential
	H2_2	Palm Cove (Tower 5)	Residential
H3	H3_1	Dragon Inn Court (Block 4)	Residential
	H3_2	Dragon Inn Court (Block 3)	Residential
H4	H4_1	Tsing Yung Terrace Block 1	Residential
H5	H5_1	Kam Fai Garden (Block 3)	Residential
	H5_2	Kam Fai Garden (Block 3)	Residential
	H5_3	Kam Fai Garden (Block 2)	Residential
	H5_4	Kam Fai Garden (Block 2)	Residential
	H5_5	Kam Fai Garden (Block 1)	Residential
	H5_6	Kam Fai Garden (Block 1)	Residential
	H5_7	Kam Fai Garden (Block 3)	Residential
	H5_8	Kam Fai Garden (Block 3)	Residential
	H5_9	Kam Fai Garden (Block 2)	Residential
	H5_10	Kam Fai Garden (Block 2)	Residential
	H5_11	Kam Fai Garden (Block 1)	Residential
	H5_12	Kam Fai Garden (Block 1)	Residential
H6	H6_1	Harvest Garden (Block 1)	Residential
	H6_2	Harvest Garden (Block 1)	Residential
H7	H7_1	Day Care Centre (G/F) Care & Attention Home (1/F-4/F) Activity Centre (5/F-8/F) Physiotherapy Room (9/F)	G/F to 8/F: Homes for the Aged (Residential) 9/F: Clinic
	H7_2	Day Care Centre (G/F) Care & Attention Home (1/F-4/F) Activity Centre (5/F-8/F)	G/F to 8/F: Homes for the Aged (Residential) 9/F: Clinic

NSR ID	NAP ID	Description	Type of Use ^(a)
		Physiotherapy Room (9/F)	
	H7_3	Day Care Centre (G/F) Care & Attention Home (1/F-4/F) Activity Centre (5/F-8/F) Physiotherapy Room (9/F)	G/F to 8/F: Homes for the Aged (Residential) 9/F: Clinic
	H7_4	Day Care Centre (G/F) Care & Attention Home (1/F-4/F) Activity Centre (5/F-8/F) Physiotherapy Room (9/F)	G/F to 8/F: Homes for the Aged (Residential) 9/F: Clinic
H8	H8_1	Chung Sing Benevolent Society Mrs. Aw Boon Haw Secondary School	Educational Institution
	H8_2	Chung Sing Benevolent Society Mrs. Aw Boon Haw Secondary School	Educational Institution
H9	H9_1	Semple Memorial Secondary School	Educational Institution
	H9_2	Four Gospel Church	Place of Worship
H10	H10_1	Hanford Garden (Block 2)	Residential
	H10_2	Hanford Garden (Block 2)	Residential
	H10_3	Hanford Garden (Block 1)	Residential
	H10_4	Hanford Garden (Block 1)	Residential
	H10_5	Hanford Garden (Block 1)	Residential
	H10_6	Hanford Garden (Block 3)	Residential
	H10_7	Hanford Garden (Block 4)	Residential
H11	H11_1	Sam Shing Estate (Chun Yu House)	Residential
	H11_2	The Salvation Army Sam Shing Nursery School	Educational
H12	H12_1	Siu Lun Court (Sui Lun House)	Residential
	H12_2	Siu Lun Court (Sui Lun House)	Residential
	H12_3	Siu Lun Court (Sui Lun House)	Residential
	H12_4	Siu Lun Court (Ka Lun House)	Residential
	H12_5	Siu Lun Court (Fu Lun House)	Residential
	H12_6	Siu Lun Court (Fu Lun House)	Residential
H22	H22_1	Hong King Garden (Block B)	Residential
	H22_2	Hong King Garden (Block B)	Residential
H24	H24_1	JC Place (Tower 1)	Residential
	H24_2	JC Place (Tower 1)	Residential
H53	H53_1	Caritas Li Ka Shing Care and Attention Home (1/F)	Clinics
H54	H54_1	Village House near Dragon Inn Court and Scenic Villa	Residential

NSR ID	NAP ID	Description	Type of Use ^(a)
L27	L27_1	Tsing Shan Tsuen No. 83	Residential
	L27_2	Tsing Shan Tsuen No. 82	Residential
	L27_3	Tsing Shan Tsuen No. 98	Residential
	L27_4	Tsing Shan Tsuen No. 113	Residential
	L27_5	Tsing Shan Tsuen No. 114	Residential
	L27_6	Tsing Shan Tsuen No. 111A	Residential
L28	L28_1	Yuan Ming Monastery	Place of Worship
L30	L30_1	Yan Chai Hospital No.2 Secondary School	Educational Institution
	L30_2	Yan Chai Hospital No. 2 Secondary School	Educational Institution
L31	L31_3	Ju Ching Chu Secondary School (Tuen Mun)	Educational Institution
	L31_4	Ju Ching Chu Secondary School (Tuen Mun)	Educational Institution
	L31_5	Ju Ching Chu Secondary School (Tuen Mun)	Educational Institution
L32	L32_1	ICAC Training Camp	Educational Institution
	L32_2	ICAC Training Camp	Educational Institution
	L32_3	ICAC Training Camp	Educational Institution
	L32_4	ICAC Training Camp	Educational Institution
	L32_5	ICAC Training Camp	Educational Institution
	L32_6	ICAC Training Camp	Educational Institution
	L32_7	ICAC Training Camp	Educational Institution
	L32_8	ICAC Training Camp	Educational Institution
	L32_9	ICAC Training Camp	Educational Institution
L33	L33_1	Hong Chi Morninghill School / Hong Chi Morninglight School	Educational Institution
	L33_2	Hong Chi Morninghill School / Hong Chi Morninglight School	Educational Institution
	L33_3	Hong Chi Morninghill School / Hong Chi Morninglight School	Educational Institution
L34	L34_1	Tin Tak Shing Kau to Tong - Tuen Mun	Place of Worship
L35	L35_1	Glorious Garden Block 2	Residential
L36	L36_2	Lung Mun Oasis Block 2	Residential
	L36_3	Lung Mun Oasis Block 2	Residential
	L36_4	Lung Mun Oasis Block 3	Residential
	L36_5	Lung Mun Oasis Block 3	Residential
	L36_6	Lung Mun Oasis Block 4	Residential
	L36_7	Lung Mun Oasis Block 4	Residential
	L36_8	Lung Mun Oasis Block 5	Residential
	L36_10	W.F.B. Avalokitesvara Nursery School	Educational Institution

NSR ID	NAP ID	Description	Type of Use ^(a)
L37	L37_1	The Church of Christ in China Hoh Fuk Tong Primary School	Educational Institution
	L37_2	The Church of Christ in China Hoh Fuk Tong Primary School	Educational Institution
	L37_3	The Church of Christ in China Hoh Fuk Tong Primary School	Educational Institution
L38	L38_1	Lung Yat Estate Kin Lung House	Residential
	L38_2	Lung Yat Estate Kin Lung House	Residential
	L38_3	Lung Yat Estate Hong Lung House	Residential
L39	L39_1	Hong Kong Christian Service Jockey Club Lodge of Rising Sun	Residential
L40	L40_1	SKH St. Peter's Church (Castle Peak)	Place of Worship
	L40_2	SKH St. Peter's Church (Castle Peak)	Place of Worship
L42	L42_1	S.K.H. St. Peter's Church Castle Peak Kindergarten & Child Care Centre	Educational Institution
	L42_2	S.K.H. St. Peter's Church Castle Peak Kindergarten & Child Care Centre	Educational Institution
L49	L49_1	Wai Lin Ching She	Place of Worship
L78	L78_1	Cannan Garden	Residential
L88	L88_1	Village houses near Yip Wong Road	Residential
Planned NSRs			
PN1	PN1_1	Public Housing Development at Yip Wong Road (Block 4)	Residential
	PN1_2	Public Housing Development at Yip Wong Road (Block 4)	Residential
	PN1_3	Public Housing Development at Yip Wong Road (Block 3)	Residential
	PN1_4	Public Housing Development at Yip Wong Road (Block 4 - Kindergarten at 1/F Lower Floor)	Educational Institution
PN3	PN3_1	Transitional Housing Development at Ex-Salvation Army Sam Shing Chuen Lau Ng Ying School	Residential

NSR ID	NAP ID	Description	Type of Use ^(a)
PN4	PN4_1	Proposed G/IC Facilities near Siu Lun Complex	G/IC
	PN4_2	Proposed G/IC Facilities near Siu Lun Complex	G/IC
PN5	PN5_1	Proposed G/IC Facilities near Tuen Mun Children and Juvenile Home	G/IC
	PN5_2	Proposed G/IC Facilities near Tuen Mun Children and Juvenile Home	G/IC
	PN5_3	Proposed G/IC Facilities near Tuen Mun Children and Juvenile Home	G/IC
PN6	PN6_1	Proposed G/IC Facilities at Former St. Simon's Primary School	G/IC
PN7	PN7_1	Proposed G/IC Facilities at Car Park near Sam Shing Hui	G/IC
	PN7_2	Proposed G/IC Facilities at Car Park near Sam Shing Hui	G/IC
PN8	PN8_1	Proposed G/IC Facilities at Tuen Mun Kau Hui	G/IC
	PN8_2	Proposed G/IC Facilities at Tuen Mun Kau Hui	G/IC
	PN8_3	Proposed G/IC Facilities at Tuen Mun Kau Hui	G/IC
	PN8_4	Proposed G/IC Facilities at Tuen Mun Kau Hui	G/IC
PN9	PN9_1	Proposed G/IC Facilities at Tsing Shan Tsuen	G/IC
	PN9_2	Proposed G/IC Facilities at Tsing Shan Tsuen	G/IC
	PN9_3	Proposed G/IC Facilities at Tsing Shan Tsuen	G/IC
	PN9_4	Proposed G/IC Facilities at Tsing Shan Tsuen	G/IC
	PN9_5	Proposed G/IC Facilities at Tsing Shan Tsuen	G/IC
Note:			
(a) G/IC - Government, Institution or Community.			

4.5 IDENTIFICATION OF ENVIRONMENTAL IMPACTS

Construction Phase

4.5.1 Potential source of noise impact during construction phase of the Project would be due to the use of PME from different construction activities. The construction of the Project will be commenced from 2024 to 2031 tentatively. Tentative construction programme of the Project is presented in **Appendix 4.2.1**. Based on the current construction plan, no construction works are planned during restricted hours. Details of the proposed construction methods are described in **Chapter 2** of this EIA Report, with major construction activities listed in **Table 4.7**.

Table 4.7 - Construction Activities

Location	Activity
All Works Areas	(i) Tree Felling & Site Clearance
Lung Fu Road Slip Road	<u>LFR Viaduct (North Section) (including road improvement (realignment) works at Lung Mun Road and Slip Road of WCR to TWR)</u>
	(i) Predrilling
	(ii) UU (Underground Utility) Diversion
	(iii) Piling (reverse circulation drill)
	(iv) Excavation and Lateral Support (ELS) System including slope works (sheet piling)
	(v) Pile Caps
	(vi) Abutment & Piers, and Reinstatement of Slope
	(vii) Bridge Deck
	(viii) Noise Barriers (including erection/removal of existing noise barriers), Street Furniture, Road Surfacing & Road Marking
(ix) Landscape and Establishment Works	
	<u>LFR Viaduct (South Section) (including road improvement works at Lung Chak Road and Slip Road of WCR to TWR)</u>
	(i) Predrilling
	(ii) UU (Underground Utility) Diversion
	(iii) Piling (reverse circulation drill)
	(iv) Excavation and Lateral Support (ELS) System including slope works (sheet piling)
	(v) Pile Caps
	(vi) Abutment & Piers, and Reinstatement of Slope
	(vii) Bridge Deck
	(viii) Noise Barriers (including erection/removal of existing noise barriers), Street Furniture, Road Surfacing & Road Marking
(ix) Landscape and Establishment Works	
	<u>Slip Road between TWR & WCR</u>
	(i) Predrilling
	(ii) ELS
	(iii) Piling (Stage 1 - At Ex. Slopes)

Location	Activity
	(iv) Retaining Walls and U-troughs (Stage 1) (v) Formation of Temp. Road for Traffic Diversion (vi) Piling (Stage 2 - At Ex. Slip Road) (vii) Retaining Walls and U-troughs (Stage 2) (viii) Street Lighting, Street Furniture, Road Surfacing & Road Marking (ix) Landscape and Establishment Works
	<u>TWR adjacent to Tsing Shan Tsuen LRT Station</u> (i) Street Lighting, Street Furniture, Road Surfacing & Road Marking (ii) Landscape and Establishment Works
	<u>Road Intersection of Lung Mun Road near Glorious Garden</u> (i) Street Lighting, Street Furniture, Road Surfacing & Road Marking (ii) Landscape and Establishment Works
Hoi Wing Road Slip Road	(i) Predrilling (ii) UU Diversion, Removal and Re-provision of Staircase (iii) ELS Works including slope works (sheet piling) (Stage 1 - For Piling Works) (iv) Piling (Bored Piles) (v) Piling (Socketed H-piles) (vi) ELS Works (Stage 2 - For U-trough Construction) (vii) U-trough Structure (viii) Street Lighting, Street Furniture, Road Surfacing & Road Marking (ix) Landscape and Establishment Works
Junction Improvement of Castle Peak Road	(i) UU Diversion (ii) Junction Improvement Works
Junction Improvement Works between Sam Shing Street and Castle Peak Road	(i) Junction Improvement Works
Note: No percussive piling is anticipated for the Project. Notwithstanding, should percussive piling be required, the requirement in PP-TM shall be followed.	

4.5.2 During the construction, some existing noise barriers on the existing roads will be required to be temporary removed. These noise barriers will be re-provided. The indicative locations of the re-provision or temporary removal of the noise barriers are shown in **Appendix 4.5.2**.

- 4.5.3 As shown in **Appendix 4.5.2**, two portions of existing noise barriers at Lung Fu Road will be removed after the construction of the proposed LFRSR NB and SB, including the erection of reprovisioned noise barriers at the proposed LFRSR. Based on this, adverse traffic noise impact during construction phase is not anticipated. The extent and height of the reprovisioned noise barriers have been proposed and shown in **Figure 4.3**. The barriers will follow the design of the “Guidelines on Designing Noise Barrier” and its preliminary design is shown in **Appendix 4.12**. The lower portions of the barriers will be provided with absorptive panels, which are the same as the existing ones. The proposed reprovisioning works at Lung Fu Road has been taken into account in the traffic noise impact assessment. Results indicated that the proposed reprovisioning works at Lung Fu Road will not cause adverse noise impact at the nearby NSRs with the implementation of proposed noise mitigation measures (see **Section 4.8**).
- 4.5.4 Based on the construction activities presented in **Table 4.7**, piling works would be carried out. No percussive piling works will be anticipated for the Project. Alternative piling method has been considered and adopted in lieu of percussive piling method.
- 4.5.5 The extent and significance of construction noise impact will depend on the types and numbers of PME in operation. Construction works will be carried out during non-restricted hours as far as practicable. Noise impact of construction works outside restricted hours will be identified and evaluated in this EIA study. In case construction work is required to carry out during restricted hours, a Construction Noise Permit (CNP) is required. The Contractor will be required to submit CNP application(s) to the Noise Control Authority and abide by any conditions stated in the CNP, should one be issued. It is the Contractor’s responsibility to ensure compliance with the NCO and the relevant TMs. The conditions stipulated in the CNP and the mitigation measures should be implemented for the construction works conducted during the restricted hours.
- 4.5.6 The construction of the Project is anticipated to commence in 2024 Q3 and for completion by 2031 Q4. As mentioned in **Chapter 1**, potential concurrent projects have been identified in the vicinity of the Study Area during construction phase of the Project (refer to **Figure 1.2**):
- Site Formation and Infrastructure Works for Public Housing Developments at Tuen Mun Central – Phase 1
 - Cycle track between Tsuen Wan and Tuen Mun (Tuen Mun to So Kwun Wat Section)
 - Tuen Mun South Extension
 - Tuen Mun Bypass
 - Reprovision of Tuen Mun Swimming Pool, Tuen Mun Golf Centre Practice Green and Community Green Station
- 4.5.7 Construction of Public Housing Development (PHD) at Yip Wong Road is the potential concurrent project under Site Formation and Infrastructure Works for Public Housing Developments at Tuen Mun Central – Phase 1. Based on the information in *Final Preliminary Environmental Review Report for Site Formation and Infrastructure Works for Public Housing Developments at Tuen Mun Central – Investigation, Design and Construction*, it is expected that the construction of Public Housing Development at Yip Wong Road would be completed in December 2024. Considering the construction of the Project will be commenced in 2024 Q3, (refer to the construction programme presented in **Appendix 4.2.1**), the construction of Public Housing Development at Yip Wong Road would pose cumulative construction noise impact to the NSRs in the vicinity of the works sites of the Project. The predicted cumulative construction noise levels are summarised in **Table 4.11** and the detailed calculation of cumulative construction noise impact are shown in **Appendix 4.11.2**.
- 4.5.8 Based on the latest available information, the tentative construction work for the entire cycle tracks will commence in 2023 for completion by 2026. It is anticipated that the cycle tracks would pose cumulative construction noise impact to the NSRs in the vicinity of the works sites

of the Project. The predicted cumulative construction noise levels are summarised in **Table 4.11** below and the detailed calculation of cumulative construction noise impact are shown in **Appendix 4.11.2**.

- 4.5.9 The construction of Tuen Mun South Extension will be under progress tentatively from 2023 to 2030. Based on the EIA report for Tuen Mun South Extension (AEIAR-236/2022), part of the Tuen Mun South Extension project would be located within 300 m assessment area of the work site for the proposed Lung Fu Road Slip Road. Most of residential buildings and school facing the proposed Lung Fu Road Slip Road would not have direct line of sight to the work sites of the Tuen Mun South Extension project. Considering that the project proponent of Tuen Mun South Extension would implement sufficient noise mitigation measures, such as quiet plant and noise barriers, to ensure the compliance of the construction noise criteria at the nearby NSRs, no significant cumulative construction noise impact will be anticipated. Nonetheless, cumulative noise impact will be expected at those NSRs, i.e., L38 and PN1 are located closest to the Tuen Mun South Extension. The cumulative construction noise levels for these NSRs have been assessed and are summarized in **Table 4.11** below and the detailed calculation of cumulative construction noise impact are shown in **Appendix 4.11.2**.
- 4.5.10 According to the latest available information, the construction works of Tuen Mun Bypass are tentatively scheduled to be completed by 2036 or earlier by 2033 Q4. Solid information on the construction programme of the Tuen Mun Bypass Project was not available at this stage. In view that the construction activities of the Tuen Mun Bypass project that overlapping with the Project is the construction of tunnel. Therefore, airborne noise during construction phase of Tuen Mun Bypass in the vicinity of Hoi Wing Road is not anticipated.
- 4.5.11 According to the latest available information, the re-provisioning of Community Green Station are tentatively scheduled to be completed by 2024. However, solid information on the construction programme and plant inventory is not available at the time of this EIA study. The re-provisioning site is located under Lung Fu Road flyover. Considering sufficient noise mitigation measures, such as quiet plant and noise barriers, will be implemented by the project proponent of the re-provisioning of Tuen Mun Community Green Station for achievement of noise compliance, no significant cumulative construction noise impact is anticipated.
- 4.5.12 According to the latest available information, the re-provisioning of Tuen Mun Swimming Pool and Tuen Mun Golf Centre Practice Green are tentatively scheduled to be completed by 2026. However, solid information on the construction programme and plant inventory is not available at the time of this EIA study. The re-provisioning site is located under Lung Fu Road flyover and in a considerable separation distance between the Project and this concurrent project. Considering sufficient noise mitigation measures, such as quiet plant and noise barriers, will be implemented by the project proponent of the re-provisioning of Tuen Mun Swimming Pool and Tuen Mun Golf Centre Practice Green for achievement of noise compliance, no significant cumulative construction noise impact is anticipated.
- 4.5.13 For the abovementioned concurrent projects that may pose cumulative noise impact but the construction programme and/or the plant inventory are not yet available for assessment at this stage, further review(s) on the cumulative construction noise impact shall be carried out in the later Construction Noise Management Plan (CNMP) stage when the relevant information is available.

Operation Phase Road Traffic Noise

- 4.5.14 No fixed plant noise sources are proposed for the Project.
- 4.5.15 The operation phase noise impacts arising from the Project mainly come from road traffic noise as vehicular movement on the proposed Project roads. "Project roads" refers to the roads that are newly developed or substantially changed due to the Project. The cumulative noise impact of neighbouring roads such as the Tuen Mun Road, Wong Chu Road, Hoi Wing Road, Tsing Wun Road, Lung Mun Road and Lung Fu Road upon the surrounding NSRs have also been

considered. All road sections other than the “Project roads” as defined above are regarded as “Existing roads” in this assessment. The road sections of the “Existing roads” and the “Project roads” have been identified and presented in **Figure 4.2**. In this assessment, LFRSR SB, LFRSR NB and HWRSR are identified as “Project roads”. Other junction and road modification works and road improvement works are regarded as “Existing roads”.

4.6 ASSESSMENT METHODOLOGY

Construction Noise

- 4.6.1 The construction noise impact assessment was undertaken in accordance with the procedures outlined in the GW-TM, which is issued under the NCO. The assessment methodology is summarised as follows:
- Locate representative NSRs that may be affected by the Project;
 - Determine the PME used for corresponding activities, based on the agreed plant inventory provided by Project Engineer;
 - Assign sound power levels (SWLs) to the PME proposed based on the GW-TM and other recognized sources ⁽¹⁾⁽²⁾;
 - Calculate the correction factors based on the distance between the NSRs and the notional noise source position of the work sites;
 - Apply corrections in the calculations, such as potential screening effects and acoustic reflection, if any; and
 - Predict the construction noise levels at representative NSRs in the absence of any mitigation measures.
- 4.6.2 The construction programme and zoning arrangement of construction activities are presented in **Appendix 4.2.1** and **Appendix 4.2.2**. The plant inventory (including type and quantity of the PME used as well as percentage on time utilization), which has been confirmed by the Project Engineer to be practical and suitable for the proposed works, is presented in **Appendix 4.3**. The sound power level (SWL) of plant in Table 3 of GW-TM or “Sound power levels of other commonly used PME” (Other PME) published by EPD have been referred to. The SWL of each construction activity has been calculated based on types and quantity of the plant, SWL of plant and percentage on-time utilization.
- 4.6.3 Where predicted noise level exceeds the noise criteria, appropriate noise mitigation measures, including quieter construction methods, quality PME and use of insulation fabric/noise barriers/enclosures, will be proposed and investigated. The mitigated scenario at different construction phases of the Project will be assessed, if applicable. The residual construction noise impact will be evaluated if the mitigated noise levels still exceed the relevant noise criteria upon exhaust of direct mitigation measures.

¹ “Sound power levels of other commonly used PME” prepared by the Noise Control Authority

² The following SWL of the PMEs has made reference to previous EIA projects:

- Electric Chain Saw refers to the approved EIA Report of Tuen Mun South Extension (AEIAR-236/2022)
- Cherry Picker refers to the approved EIA Report of TRUNK ROAD T4 (AEIAR-231/2021)
- Hydraulic crusher refers to the approved EIA Report of TRUNK ROAD T4 (AEIAR-231/2021)
- Welding set refers to the approved EIA Report of TRUNK ROAD T4 (AEIAR-231/2021)

- 4.6.4 The potential concurrent projects in the vicinity of the Project have been identified. Cumulative construction noise impacts from the potential concurrent projects are assessed based on the latest public available information and information from the relevant authorities.

Operation Phase Road Traffic Noise

- 4.6.5 Road traffic noise prediction is carried out, following strictly the procedures stipulated in the “Calculation of Road Traffic Noise (CRTN)” (1988) published by Department of Transport, UK. Road traffic noise was presented in terms of noise levels exceeded for 10% of the one-hour period having the peak traffic flow (i.e. $L_{10(1\text{hour})}$ dB(A)). A 2.5 dB(A) façade reflection and correction factors for effects due to gradient, distance, view angle, road surface and barriers have been included in the assessment.
- 4.6.6 Traffic noise is predicted based on the maximum traffic flow within 15 years upon commencement of operation of the Project according to Appendix C of the EIA Study Brief and Section 5.1 in Annex 13 of the EIAO-TM.
- 4.6.7 All major road segments within 300m from the boundary of the Project site area and all relevant structures and features that could have noise screening or reflective effects have been taken into consideration in the road traffic noise impact assessment. The characteristics of the road segments including the road width, surface type and traffic flow have been considered in the assessment. The surface type of the concerned road segments has been confirmed with HyD.
- 4.6.8 As confirmed by the Traffic Consultant, Year 2036 has the maximum traffic projection within 15 years (from Year 2031 to 2046) upon commencement of operation of the Project. While it is anticipated that the traffic loading of some roads in Tuen Mun area will be relieved due to the commencement of the planned Tuen Mun Bypass (TMBP) in Year 2033 under the latest policy initiatives, the other possible critical traffic condition would occur in Year 2036 with the proposed new road links and without TMBP following the original time-table of TMBP. Review of the traffic forecast in Years 2033 and 2036 both without TMBP indicates that the % of increase from Year 2033 to 2036 is very minimal and the difference in noise levels between these 2 years is expected to be less than 0.1 dB(A) in general. Therefore, the scenario of Year 2036 with the proposed new road links and without TMBP was adopted as the maximum traffic forecast scenario within 15 years for assessment.
- 4.6.9 The traffic flow adopted for noise assessment has been endorsed by the related authority, i.e. Transport Department. The peak hour traffic flow of “With Project” and “Without Project” scenarios in Year 2036 is given in **Appendix 4.4.1**, the endorsement from Transport Department is given in **Appendix 4.4.2**, written correspondence from the Traffic Consultant confirming the methodology of the traffic forecast endorsed by TD has been strictly adopted in preparing the traffic data for the road traffic noise assessment of this EIA, and the predicted peak hour traffic flow in Year 2036 is the maximum traffic projection within 15 years upon operation of the project is given in **Appendix 4.4.3**.
- 4.6.10 The following scenarios are considered for traffic noise impact assessment in accordance with EIA Study Brief and the EIAO Guidance Note No. 12/2012 (GN 12/2012):
- Unmitigated scenario in Year 2036 and without the operation of TMBP;
 - Mitigated scenario in Year 2036 and without the operation of TMBP; and
 - Prevailing scenario in Year 2023 for indirect mitigation measures eligibility assessment.
- 4.6.11 With consideration of the scope of this Project, road sections were classified as the following categories for the purpose of the road traffic noise assessment:
- “Project roads” which in the context of this report describe all roads that are completely new or are substantially altered by the proposed project. In this Project, proposed

widening and addition of slip roads at Lung Fu Road and Hoi Wing Road are identified as new roads. All road sections defined in the scope of designated project defined in EIAO are considered as “Project roads”. Spot Heights of the “Project roads” are illustrated in **Appendix 4.16**.

- “Existing roads” which are unchanged or without significant traffic noise impact (i.e. the traffic noise level with the road project would not be greater than that without the road project at the design year by 1.0 dB(A). In this assessment, junction modification works at Castle Peak Road – Castle Peak Bay/ Hoi Wing Road, Castle Peak Road – Castle Peak Bay/ Sham Shing Street, and road improvement works at LFR/ Lung Chak Road, Lung Mun Road and Slip Roads between Wong Chu Road and Lung Mun Road/Tsing Wun Road are regarded as “Existing roads”. Spot heights of the realigned slip road between Wong Chu Road and Tsing Wun Road are also illustrated in **Appendix 4.16**.
- 4.6.12 The extent of “Project roads” and “Existing roads” has been defined and presented in **Figure 4.2**. Low noise road surfacing (LNRS) and existing noise mitigation measures within the Assessment Area has been considered in the assessment. Locations of existing noise barriers and enclosures within the Assessment Area are shown in **Appendix 4.5.1**. The extent of LNRS on existing roads within the Assessment Area has been confirmed with HyD and is shown in **Appendix 4.6**.
- 4.6.13 In accordance with the GN 12/2012, direct mitigation measures should be proposed for “Project roads” if adverse environmental impact is predicted. If the NSRs are affected by noise from other existing roads, direct mitigation measures are required to reduce the noise from the “Project roads” to a level that it:
- is not higher than the noise standard; and
 - has no significant contribution (less than 1.0 dB(A)) to the overall noise level, if the cumulative noise level (i.e. noise from the Project roads together with other existing roads) exceeds the noise standard.
- 4.6.14 Indirect mitigation measures should be considered upon exhaust of direct mitigation measures to abate the residual impact from noise sources under the EIAO-TM and the GN 12/2010. The eligibility testing criteria for indirect mitigation measures are listed as follows:
- The predicted overall noise level from the Project roads, together with other traffic noise in the vicinity must be above a specified noise level (e.g. 70 dB(A) for domestic premises and 65 dB(A) for educational institutions. All are in $L_{10}(1\text{hour})$);
 - The predicted overall noise level is at least 1.0 dB(A) more than the prevailing traffic noise level, i.e. the total traffic noise level existing before the works to construct Project roads were commenced; and
 - The contribution to the increase in the predicted overall noise level from the Project roads must be at least 1.0 dB(A).

4.7 PREDICTION AND EVALUATION OF ENVIRONMENTAL IMPACTS

Construction Noise

- 4.7.1 Potential construction noise impacts of the Project during normal daytime working hours have been assessed at the representative NSRs according to the construction programme and construction plant inventory presented in **Appendix 4.2.1** and **Appendix 4.3** respectively. The unmitigated noise assessment results are summarized in **Table 4.8**. Details of the unmitigated construction noise assessment are presented in **Appendices 4.7.1** and **4.7.2**.

Table 4.8 - Summary of Construction Noise Assessment Results - Unmitigated

NAP ID	NSR Description	Type of Use	Noise Criteria L_{eq} (30 min), dB(A)	Predicted Unmitigated Maximum Construction Noise Level L_{eq} (30 min), dB(A)
H1_1	Sham Shing Temple Office	Office	75	83
H1_2	Sam Shing Temple	Place of Worship	70	81
H1_3	Sam Shing Hui Office	Office	75	83
H1_4	Fuk Tak Shrine	Place of Worship	70	84
H2_1	Palm Cove (Tower 6)	Residential	75	74
H2_2	Palm Cove (Tower 5)	Residential	75	74
H3_1	Dragon Inn Court (Block 4)	Residential	75	75
H3_2	Dragon Inn Court (Block 3)	Residential	75	77
H4_1	Tsing Yung Terrace Block 1	Residential	75	80
H5_1	Kam Fai Garden (Block 3)	Residential	75	79
H5_2	Kam Fai Garden (Block 3)	Residential	75	78
H5_3	Kam Fai Garden (Block 2)	Residential	75	78
H5_4	Kam Fai Garden (Block 2)	Residential	75	78
H5_5	Kam Fai Garden (Block 1)	Residential	75	78
H5_6	Kam Fai Garden (Block 1)	Residential	75	79
H5_7	Kam Fai Garden (Block 3)	Residential	75	78
H5_8	Kam Fai Garden (Block 3)	Residential	75	78
H5_9	Kam Fai Garden (Block 2)	Residential	75	78
H5_10	Kam Fai Garden (Block 2)	Residential	75	78
H5_11	Kam Fai Garden (Block 1)	Residential	75	78
H5_12	Kam Fai Garden (Block 1)	Residential	75	78
H6_1	Harvest Garden (Block 1)	Residential	75	76
H6_2	Harvest Garden (Block 1)	Residential	75	76
H7_1	Day Care Centre (G/F)	Homes for the Aged (Residential)	75	72
H7_2	Care & Attention Home (1/F-4/F)	Homes for the Aged (Residential)	75	72
H7_3	Activity Centre (5/F-8/F)	Residential	75	72
H8_1	Chung Sing Benevolent Society Mrs. Aw Boon Haw Secondary School	Educational	70	81
H8_2	Chung Sing Benevolent Society Mrs. Aw Boon Haw Secondary School	Educational	70	81
H9_1	Seiple Memorial Secondary School	Educational	70	79
H9_2	Four Gospel Church	Place of Worship	70	90
H10_1	Hanford Garden (Block 2)	Residential	75	91
H10_2	Hanford Garden (Block 2)	Residential	75	87

NAP ID	NSR Description	Type of Use	Noise Criteria Leq (30 min), dB(A)	Predicted Unmitigated Maximum Construction Noise Level Leq (30 min), dB(A)
H10_3	Hanford Garden (Block 1)	Residential	75	<u>81</u>
H10_4	Hanford Garden (Block 1)	Residential	75	<u>82</u>
H10_5	Hanford Garden (Block 1)	Residential	75	<u>83</u>
H10_6	Hanford Garden (Block 3)	Residential	75	<u>79</u>
H10_7	Hanford Garden (Block 4)	Residential	75	<u>78</u>
H11_1	Sam Shing Estate	Residential	75	<u>83</u>
H11_2	The Salvation Army Sam Shing Nursery School	Educational	70	<u>72</u>
H12_1	Siu Lun Court (Sui Lun House)	Residential	75	<u>83</u>
H12_2	Siu Lun Court (Sui Lun House)	Residential	75	<u>84</u>
H12_3	Siu Lun Court (Sui Lun House)	Residential	75	<u>80</u>
H12_4	Siu Lun Court (Ka Lun House)	Residential	75	<u>79</u>
H12_5	Siu Lun Court (Fu Lun House)	Residential	75	<u>77</u>
H12_6	Siu Lun Court (Fu Lun House)	Residential	75	75
H24_1	JC Place (Tower 1)	Residential	75	72
H24_2	JC Place (Tower 1)	Residential	75	71
H54_1	Village House near Dragon Inn Court and Scenic Villa	Residential	75	<u>76</u>
L27_1	Tsing Shan Tsuen No. 83	Residential	75	<u>82</u>
L27_2	Tsing Shan Tsuen No. 82	Residential	75	<u>83</u>
L27_3	Tsing Shan Tsuen No. 98	Residential	75	<u>83</u>
L27_4	Tsing Shan Tsuen No. 113	Residential	75	<u>83</u>
L27_5	Tsing Shan Tsuen No. 114	Residential	75	<u>84</u>
L27_6	Tsing Shan Tsuen No. 111A	Residential	75	<u>85</u>
L30_1	Yan Chai Hospital No. 2 Secondary School	Educational	70	<u>82</u>
L30_2	Yan Chai Hospital No. 2 Secondary School	Educational	70	<u>80</u>
L31_3	Ju Ching Chu Secondary School (Tuen Mun)	Educational	70	<u>80</u>
L31_4	Ju Ching Chu Secondary School (Tuen Mun)	Educational	70	<u>86</u>
L31_5	Ju Ching Chu Secondary School (Tuen Mun)	Educational	70	<u>83</u>
L32_1	ICAC Training Camp	Educational	70	<u>87</u>
L32_2	ICAC Training Camp	Educational	70	<u>87</u>
L32_3	ICAC Training Camp	Educational	70	<u>86</u>
L32_4	ICAC Training Camp	Educational	70	<u>86</u>
L32_5	ICAC Training Camp	Educational	70	<u>86</u>
L32_6	ICAC Training Camp	Educational	70	<u>85</u>
L32_7	ICAC Training Camp	Educational	70	<u>85</u>

NAP ID	NSR Description	Type of Use	Noise Criteria Leq (30 min), dB(A)	Predicted Unmitigated Maximum Construction Noise Level Leq (30 min), dB(A)
L32_8	ICAC Training Camp	Educational	70	<u>85</u>
L32_9	ICAC Training Camp	Educational	70	<u>84</u>
L33_1	Hong Chi Morninglight School	Educational	70	<u>83</u>
L33_2	Hong Chi Morninglight School	Educational	70	<u>84</u>
L33_3	Hong Chi Morninglight School	Educational	70	<u>85</u>
L35_1	Glorious Garden Block 2	Residential	75	<u>84</u>
L36_2	Lung Mun Oasis Block 2	Residential	75	<u>81</u>
L36_3	Lung Mun Oasis Block 2	Residential	75	<u>83</u>
L36_4	Lung Mun Oasis Block 3	Residential	75	<u>83</u>
L36_5	Lung Mun Oasis Block 3	Residential	75	<u>83</u>
L36_6	Lung Mun Oasis Block 4	Residential	75	<u>83</u>
L36_7	Lung Mun Oasis Block 4	Residential	75	<u>84</u>
L36_8	Lung Mun Oasis Block 5	Residential	75	<u>83</u>
L36_10	W.F.B. Avalokitesvara Nursery School	Educational	70	<u>87</u>
L37_1	The Church of Christ in China Hoh Fuk Tong Primary School	Educational	70	<u>83</u>
L37_2	The Church of Christ in China Hoh Fuk Tong Primary School	Educational	70	<u>85</u>
L37_3	The Church of Christ in China Hoh Fuk Tong Primary School	Educational	70	<u>80</u>
L38_1	Lung Yat Estate Kin Lung House	Residential	75	<u>82</u>
L38_2	Lung Yat Estate Kin Lung House	Residential	75	<u>79</u>
L38_3	Lung Yat Estate Hong Lung House	Residential	75	<u>76</u>
L39_1	Hong Kong Christian Service Jockey Club Lodge of Rising Sun	Residential	75	<u>79</u>
L40_1	SKH St. Peter's Church (Castle Peak)	Place of Worship	70	<u>74</u>
L40_2	SKH St. Peter's Church (Castle Peak)	Place of Worship	70	<u>74</u>
L42_1	S.K.H St. Peter's Church Castle Peak Kindergarten & Child Care Centre	Educational	70	<u>76</u>
L42_2	S.K.H St. Peter's Church Castle Peak Kindergarten & Child Care Centre	Educational	70	<u>78</u>
L78_1	Cannan Garden	Residential	75	<u>86</u>
L88_1	Village houses near Yip Wong Road	Residential	75	<u>82</u>
PN1_1	Public Housing Development at Yip Wong Road (Block 4)	Residential	75	<u>81</u>
PN1_2	Public Housing Development at Yip Wong Road (Block 4)	Residential	75	<u>81</u>
PN1_4	Public Housing Development at Yip Wong Road (Block 4 - Kindergarten at 1/F Lower Floor)	Educational	70	<u>81</u>

NAP ID	NSR Description	Type of Use	Noise Criteria $L_{eq}(30\text{ min}),$ dB(A)	Predicted Unmitigated Maximum Construction Noise Level $L_{eq}(30\text{ min}),$ dB(A)
<p>Notes: [1] Bold and underlined values denote exceedance over the corresponding noise criteria. [2] Noise criteria of 75 dB(A) for all domestic premises (including temporary housing accommodation) hotels and hostels, 70 dB(A) for educational institution and places for public worship for conservatism, whereas 65 dB(A) for examination period.</p>				

4.7.2 The predicted noise levels are in the range of 71 dB(A) to 91 dB(A). Predicted noise levels at some of the representative NSRs exceed over the corresponding construction noise criteria. Based on this, direct mitigation measures are required to mitigate the potential noise impact on the affected NSRs during construction phase.

4.7.3 The total number of dwellings, classrooms and other noise sensitive receivers that will be exposed to noise impact exceeding the criteria set in Annex 5 in the EIAO-TM were evaluated and it is estimated that a total of about 3,777 dwellings, 550 classrooms and 17 other NSRs will be exposed to construction noise impact under unmitigated scenario.

Operation Phase Road Traffic Noise

4.7.4 Road traffic noise prediction has been carried out at representative NSRs for LFR Portion and HWR Portion. The affected NSRs requiring direct noise mitigation measures are summarized in **Table 4.9** with details presented in **Appendices 4.8.1** and **4.8.2** for LFR Portion and HWR Portion, respectively.

Table 4.9 - Summary of affected NSRs requiring Direct Noise Mitigation Measures

NSR	Description	NAP	Assessment Point Elevation (mPD)	Type of Use	Noise Criteria, L10(1-hr), dB(A)	AM							PM						
						Predicted Noise Level in 2036, L10(1-hr),			Criteria for Direct Noise Mitigation				Predicted Noise Level in 2036, L10(1-hr),			Criteria for Direct Noise Mitigation			
						Overall	Project Roads	All Other Roads	Project Roads Exceed	Overall Exceed	Project Road Contribution	Direct Mitigation Measures Required	Overall	Project Roads	All Other Roads	Project Roads Exceed	Overall Exceed	Project Road Contribution	Direct Mitigation Measures Required
L27	Tsing Shan Tsuen No. 111A	L27_6_1	16.1	Residential	70	<u>74</u>	67	<u>73</u>	No	Yes	1.0	Yes	<u>74</u>	66	<u>73</u>	No	Yes	0.8	No
L27	Tsing Shan Tsuen No. 111A	L27_6_2	18.9	Residential	70	<u>74</u>	68	<u>73</u>	No	Yes	1.1	Yes	<u>74</u>	67	<u>73</u>	No	Yes	0.9	No
L30	Yan Chai Hospital No. 2 Secondary School	L30_1_4	22.5	Educational	65	<u>73</u>	<u>66</u>	<u>72</u>	Yes	Yes	1.0	Yes	<u>73</u>	65	<u>72</u>	No	Yes	0.9	No
L30	Yan Chai Hospital No. 2 Secondary School	L30_1_5	26.0	Educational	65	<u>73</u>	<u>66</u>	<u>72</u>	Yes	Yes	0.9	Yes	<u>73</u>	<u>66</u>	<u>72</u>	Yes	Yes	1.0	Yes
L30	Yan Chai Hospital No. 2 Secondary School	L30_1_6	29.5	Educational	65	<u>74</u>	<u>67</u>	<u>73</u>	Yes	Yes	1.0	Yes	<u>73</u>	<u>67</u>	<u>72</u>	Yes	Yes	1.0	Yes
L30	Yan Chai Hospital No. 2 Secondary School	L30_1_7	33.0	Educational	65	<u>74</u>	<u>67</u>	<u>73</u>	Yes	Yes	1.0	Yes	<u>74</u>	<u>67</u>	<u>73</u>	Yes	Yes	1.0	Yes
L30	Yan Chai Hospital No. 2 Secondary School	L30_2_4	22.5	Educational	65	<u>68</u>	60	<u>67</u>	No	Yes	0.8	No	<u>67</u>	60	<u>66</u>	No	Yes	1.0	Yes
L30	Yan Chai Hospital No. 2 Secondary School	L30_2_5	26.0	Educational	65	<u>69</u>	62	<u>68</u>	No	Yes	1.0	Yes	<u>69</u>	62	<u>67</u>	No	Yes	1.2	Yes
L30	Yan Chai Hospital No. 2 Secondary School	L30_2_6	29.5	Educational	65	<u>71</u>	64	<u>70</u>	No	Yes	1.0	Yes	<u>70</u>	64	<u>69</u>	No	Yes	1.2	Yes
L30	Yan Chai Hospital No. 2 Secondary School	L30_2_7	33.0	Educational	65	<u>72</u>	64	<u>71</u>	No	Yes	0.9	No	<u>71</u>	65	<u>70</u>	No	Yes	1.1	Yes
L31	Ju Ching Chu Secondary School (Tuen Mun)	L31_4_6	29.3	Educational	65	<u>72</u>	62	<u>72</u>	No	Yes	0.5	No	<u>72</u>	<u>66</u>	<u>71</u>	Yes	Yes	1.1	Yes
L31	Ju Ching Chu Secondary School (Tuen Mun)	L31_5_5	25.8	Educational	65	<u>69</u>	60	<u>68</u>	No	Yes	0.7	No	<u>68</u>	62	<u>67</u>	No	Yes	1.2	Yes
L31	Ju Ching Chu Secondary School (Tuen Mun)	L31_5_6	29.3	Educational	65	<u>69</u>	62	<u>69</u>	No	Yes	0.9	No	<u>69</u>	63	<u>68</u>	No	Yes	1.3	Yes
L36	Lung Mun Oasis Block 2	L36_3_26	80.5	Residential	70	70	62	69	No	No	0.8	No	<u>71</u>	64	70	No	Yes	1.0	Yes
L37	The Church of Christ in China Hoh Fuk Tong Primary School	L37_2_6	23.6	Educational	65	<u>72</u>	64	<u>71</u>	No	Yes	0.8	No	<u>73</u>	<u>66</u>	<u>72</u>	Yes	Yes	1.0	Yes
L37	The Church of Christ in China Hoh Fuk Tong Primary School	L37_3_5	20.1	Educational	65	<u>68</u>	60	<u>67</u>	No	Yes	0.6	No	<u>68</u>	61	<u>67</u>	No	Yes	1.0	Yes
L37	The Church of Christ in China Hoh Fuk Tong Primary School	L37_3_6	23.6	Educational	65	<u>69</u>	61	<u>68</u>	No	Yes	0.7	No	<u>69</u>	63	<u>68</u>	No	Yes	1.1	Yes
L37	The Church of Christ in China Hoh Fuk Tong Primary School	L37_3_7	27.1	Educational	65	<u>70</u>	62	<u>69</u>	No	Yes	0.8	No	<u>71</u>	64	<u>69</u>	No	Yes	1.1	Yes
L37	The Church of Christ in China Hoh Fuk Tong Primary School	L37_3_8	30.6	Educational	65	<u>71</u>	63	<u>70</u>	No	Yes	0.7	No	<u>71</u>	65	<u>70</u>	No	Yes	1.0	Yes
PN9	Proposed G/IC Facilities at Tsing Shan Tsuen	PN9_3_1	16.9	G/IC	65	<u>77</u>	<u>67</u>	<u>76</u>	Yes	Yes	0.5	Yes	<u>77</u>	<u>66</u>	<u>76</u>	Yes	Yes	0.4	Yes
PN9	Proposed G/IC Facilities at Tsing Shan Tsuen	PN9_3_2	20.4	G/IC	65	<u>77</u>	<u>67</u>	<u>76</u>	Yes	Yes	0.5	Yes	<u>77</u>	<u>66</u>	<u>76</u>	Yes	Yes	0.4	Yes
PN9	Proposed G/IC Facilities at Tsing Shan Tsuen	PN9_3_3	23.9	G/IC	65	<u>77</u>	<u>67</u>	<u>76</u>	Yes	Yes	0.6	Yes	<u>77</u>	<u>66</u>	<u>76</u>	Yes	Yes	0.4	Yes
PN9	Proposed G/IC Facilities at Tsing Shan Tsuen	PN9_3_4	27.4	G/IC	65	<u>77</u>	<u>67</u>	<u>76</u>	Yes	Yes	0.5	Yes	<u>77</u>	<u>66</u>	<u>76</u>	Yes	Yes	0.4	Yes
PN9	Proposed G/IC Facilities at Tsing Shan Tsuen	PN9_4_2	14.5	G/IC	65	<u>77</u>	<u>68</u>	<u>76</u>	Yes	Yes	0.7	Yes	<u>77</u>	<u>67</u>	<u>76</u>	Yes	Yes	0.4	Yes
PN9	Proposed G/IC Facilities at Tsing Shan Tsuen	PN9_4_3	18.0	G/IC	65	<u>77</u>	<u>69</u>	<u>76</u>	Yes	Yes	0.8	Yes	<u>77</u>	<u>68</u>	<u>76</u>	Yes	Yes	0.6	Yes
PN9	Proposed G/IC Facilities at Tsing Shan Tsuen	PN9_4_4	21.5	G/IC	65	<u>77</u>	<u>70</u>	<u>76</u>	Yes	Yes	0.9	Yes	<u>77</u>	<u>68</u>	<u>76</u>	Yes	Yes	0.7	Yes
PN9	Proposed G/IC Facilities at Tsing Shan Tsuen	PN9_5_2	14.5	G/IC	65	<u>76</u>	<u>68</u>	<u>75</u>	Yes	Yes	0.7	Yes	<u>76</u>	<u>67</u>	<u>75</u>	Yes	Yes	0.5	Yes
PN9	Proposed G/IC Facilities at Tsing Shan Tsuen	PN9_5_3	18.0	G/IC	65	<u>77</u>	<u>70</u>	<u>76</u>	Yes	Yes	0.9	Yes	<u>77</u>	<u>69</u>	<u>76</u>	Yes	Yes	0.8	Yes
PN9	Proposed G/IC Facilities at Tsing Shan Tsuen	PN9_5_4	21.5	G/IC	65	<u>77</u>	<u>70</u>	<u>76</u>	Yes	Yes	1.0	Yes	<u>77</u>	<u>69</u>	<u>76</u>	Yes	Yes	0.7	Yes

[1] Bold and underlined values denote exceedance over the corresponding noise criteria.
 [2] Detail of Road Traffic Noise Assessment for un-mitigated scenario shall refer to **Appendix 4.8.1** and **Appendix 4.8.2**.

- 4.7.5 The maximum predicted noise levels from “Project roads” during AM and PM peak in the unmitigated scenario are 68dB(A), 67dB(A) and 70dB(A) for residential premises, schools and G/IC respectively. The overall predicted noise levels at some of the representative NSRs would exceed the corresponding road traffic noise criteria of 70dB(A), 65dB(A) and 65dB(A) for residential premises, schools and G/IC, respectively. Based on this, direct mitigation on “Project roads” measures are required to mitigate the potential noise impact on the affected NSRs during operation phase.

4.8 MITIGATION OF ENVIRONMENTAL IMPACTS

Construction Noise

- 4.8.1 Since exceedance of relevant noise standards is predicted, practicable direct noise mitigation measures including the use of quality PME, noise barriers, noise enclosures, noise insulation fabric and quieter alternative construction methods are recommended to minimize the noise impact at the affected NSRs during non-restricted hours.

Use of Noise Barrier, Noise Insulation Fabric and Noise Enclosure

- 4.8.2 To alleviate the construction noise impact on the affected NSRs, noise barriers or enclosures would be erected to provide screening from the construction plant. Noise barriers will become more effective when located immediately adjacent to the PME and be moved concurrently with the PME along the work site. The Contractor should be responsible for design of the noise barrier/enclosure with due consideration given to the size of the PME and the requirement of intercepting the line of sight between the NSRs and PME. A typical design which has been used locally is a wooden framed barrier of superficial density no less than 14kg/m² on a skid footing with 25mm thick internal sound absorptive lining. A typical configuration of noise barrier and portable noise enclosure is shown in **Appendix 4.9**. Noise barriers should be erected/built in such a way with no openings or gaps on the joints, and should be long enough (e.g. at least five times greater than its height) or be bent around the noise sources to ensure the effectiveness. A cantilevered top cover would be required for the noise barriers to achieve screening benefits at the upper floors of NSRs. It is anticipated that suitably designed noise barriers/enclosures could achieve at least 5 to 10 dB(A) reduction for movable and stationary plants, respectively.
- 4.8.3 In addition, noise insulation fabric (the Fabric) would be installed for PME such as piling rigs and drilling rigs and the Fabric should be lapped such that there would be no opening or gaps on the joints. With reference to MTRC Contract C4420 Tsim Sha Tsui Modification Noise Assessment Report for Variation of Environmental Permit (July 2003) and the technical data from manufacturer, a noise reduction of over 10 dB(A) could be achieved with the use of the Fabric. As a conservative approach, a noise reduction of 10 dB(A) for the PME lapped with the Fabric was assumed in this assessment.

Quiet Construction Method / Quality Powered Mechanical Equipment

- 4.8.4 For sheet piles installation, “Press-in” method is more preferable than the use of traditional vibratory hammer due to lesser noise and vibration impact generated. According to the EPD web page, the noise emission of “Press-in” method is 69 dB(A) at 7 m from the silent piler, which is more than 20 dB(A) quieter than the vibratory hammer. The Contractor should prioritise the use of “Press-in” method over the traditional method if site conditions allowed. However, “Press-in” method would also have its own limitations and thus it should not restrict Contractor to fully adopt the “Press-in” as long as the Contractor can demonstrate the full

compliance of daytime noise criteria by using vibratory hammer with proper mitigation measures.

- 4.8.5 Traditional demolition method relies on excavator mounted hydraulic breaker to break concrete structures, however, operating hydraulic breaker would inevitably generate significant noise impact to the NSRs nearby. As confirmed by Project Engineer, it is feasible to adopt quieter demolition equipment (e.g. hydraulic crusher) in some activities as a mitigation measure. Using hydraulic crusher would create lesser noise impact to the NSRs. The Contractor should, subject to the actual site condition, proactively adopt quieter demolition equipment to carry out the demolition works, where practicable.
- 4.8.6 Apart from the above, the Contractor will be required to review and adopt quieter construction methods or technologies to further reduce the noise at its source as far as they are technically feasible and applicable for the proposed construction works. These include non-explosive chemical expansion agent, high pressure water jetting, hand-held concrete crusher, quieter type blade saw, and quieter type wire saw / diamond wire saw. These quieter equipment / construction methods, while not adopted in the assessment, shall be considered during the design, tendering and implementation stage of the construction works as appropriate.
- 4.8.7 The use of Quality PME (QPME) is considered a practical way to mitigate construction noise impact. QPME is defined as a PME having actual SWL lower than the value specified in the GW-TM. Sound power levels of different QPME are listed in **Table 4.10**. The type of QPME adopted in this assessment is for reference only. The contractors may adopt alternative QPME as long as it can demonstrate that they would not result in construction noise impacts worse than those predicted in this assessment.

Table 4.10 SWL of QPME adopted for Construction Noise Mitigation

QPME / Quiet PME	Reference Number	Brand	Model Number	SWL, dB(A)
Excavator, wheeled/tracked	EPD-10780	KOMATSU	PC138US-8	97
Asphalt Paver	EPD-01226R	VOLVO	ABG5770	104
Air Compressor	EPD-07503	AIRMAN	PDS55S-5C1	92
Crane, mobile	EPD-05797	Maeda	CC985S-1	91
Roller, vibratory	EPD-09720	SAKAI	SW502S-1	94
Generator, Silenced	EPD-08951	DENYO	DCA-25USI3	80
Crane, mobile	EPD-12289	SUMITOMO	SCX1500A-3	103
Breaker, electric hand-held, 10kg < mass < 18kg	OCUPME-004	/	/	103
Drill, hand-held (battery)	OCUPME-014	/	/	89
Drill rig, rotary type (diesel)	OCUPME-015	/	/	110
Forklift, LPG, output power ≤	OCUPME-018	/	/	104

QPME / Quiet PME	Reference Number	Brand	Model Number	SWL, dB(A)
32kW, speed ≤ 10km/hr				
Grout mixer	OCUPME-021	/	/	90
Grout pump	OCUPME-022	/	/	105
Jig-saw, hand-held, wood (electric)	OCUPME-024	/	/	99
Poker, vibratory, hand-held (electric)	OCUPME-027	/	/	102
Paint line marker (low pressure)	OCUPME-030	/	/	87
Dump truck, 5.5 tonne < gross vehicle weight ≤ 38 tonne	OCUPME-046	/	/	105
Note: Another QPME of equivalent SWL will be adopted when more than one item needed.				

4.8.8 The plant inventory with incorporation of the above recommendation on the use of QPME is provided in **Appendix 4.10**.

Good Site Practices

4.8.9 It is also recommended to implement good site practices as far as practicable so as to further reduce the noise impact at NSRs. The following good site practices should be followed during the construction phase.

- Only well-maintained plant should be operated on-site and should be served regularly during construction period;
- Mobile plant, if any, should be sited as far from NSRs as possible;
- Use of site hoarding as a noise barrier to screen noise at low level NSRs;
- Machines and plant that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum.
- Silencers or mufflers on construction equipment should be utilized and be properly maintained during construction;
- Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and
- Material stockpiles should be effectively utilized, wherever practicable, in screening noise from on-site construction activities.

4.8.10 Since NSRs H1 and H9 are located in close vicinity to the works area of the Project and Cycle Track between Tsuen Wan and Tuen Mun (Tuen Mun to So Kwun Wat), the contractor of the Project will continuously liaise with the Contractor of Cycle Track to avoid concurrent operation of PMEs. In view of the above measures, cumulative construction noise impacts on the NSR



H1 and H9 with the Cycle Track Project will not be anticipated and thus not considered in the construction noise assessment.

4.8.11 Noise reduction from the use of mitigation measures such as quiet plant, temporary noise barrier and enclosure for construction plant as described above have been applied in the assessment. The mitigation measures have been confirmed with the Project Engineer to be practicable and suitable for the construction programme. The construction plant inventory adopted is presented in **Appendix 4.10** while detailed construction noise calculations and results for the mitigated scenario are presented in **Appendices 4.11.1** and **4.11.2**. A summary of the predicted cumulative noise levels at the representative floor of representative NSRs is presented in **Table 4.11**. The predicted cumulative noise levels of the Project are in the range of 57dB(A) to 75dB(A). Predicted noise levels at representative floor levels of selected NAPs are shown in **Appendix 4.18**.

Table 4.11 - Summary of Cumulative Construction Noise Assessment Results - Mitigated

NAP ID	NSR Description	Type of Use	Noise Criteria L _{eq} (30 min), dB(A)	Predicted Mitigated Maximum Construction Noise Level L _{eq} (30 min), dB(A)
H1_1	Sham Shing Temple Office	Office	75	69
H1_2	Sam Shing Temple	Place of Worship	70	67
H1_3	Sam Shing Hui Office	Office	75	67
H1_4	Fuk Tak Shrine	Place of Worship	70	70
H2_1	Palm Cove (Tower 6)	Residential	75	61
H2_2	Palm Cove (Tower 5)	Residential	75	61
H3_1	Dragon Inn Court (Block 4)	Residential	75	64
H3_2	Dragon Inn Court (Block 3)	Residential	75	65
H4_1	Tsing Yung Terrace Block 1	Residential	75	66
H5_1	Kam Fai Garden (Block 3)	Residential	75	67
H5_2	Kam Fai Garden (Block 3)	Residential	75	67
H5_3	Kam Fai Garden (Block 2)	Residential	75	67
H5_4	Kam Fai Garden (Block 2)	Residential	75	67
H5_5	Kam Fai Garden (Block 1)	Residential	75	67
H5_6	Kam Fai Garden (Block 1)	Residential	75	67
H5_7	Kam Fai Garden (Block 3)	Residential	75	66
H5_8	Kam Fai Garden (Block 3)	Residential	75	66
H5_9	Kam Fai Garden (Block 2)	Residential	75	66
H5_10	Kam Fai Garden (Block 2)	Residential	75	66
H5_11	Kam Fai Garden (Block 1)	Residential	75	66
H5_12	Kam Fai Garden (Block 1)	Residential	75	66
H6_1	Harvest Garden (Block 1)	Residential	75	67
H6_2	Harvest Garden (Block 1)	Residential	75	63
H7_1	Day Care Centre (G/F)	Homes for the Aged (Residential)	75	61
H7_2	Care & Attention Home (1/F-4/F)	Homes for the Aged (Residential)	75	61

NAP ID	NSR Description	Type of Use	Noise Criteria Leq (30 min), dB(A)	Predicted Mitigated Maximum Construction Noise Level Leq (30 min), dB(A)
H7_3	Activity Centre (5/F-8/F)	Residential	75	61
H8_1	Chung Sing Benevolent Society Mrs. Aw Boon Haw Secondary School	Educational	70	66
H8_2	Chung Sing Benevolent Society Mrs. Aw Boon Haw Secondary School	Educational	70	66
H9_1	Semple Memorial Secondary School	Educational	70	62
H9_2	Four Gospel Church	Place of Worship	70	69
H10_1	Hanford Garden (Block 2)	Residential	75	75
H10_2	Hanford Garden (Block 2)	Residential	75	70
H10_3	Hanford Garden (Block 1)	Residential	75	65
H10_4	Hanford Garden (Block 1)	Residential	75	66
H10_5	Hanford Garden (Block 1)	Residential	75	66
H10_6	Hanford Garden (Block 3)	Residential	75	62
H10_7	Hanford Garden (Block 4)	Residential	75	71
H11_1	Sam Shing Estate	Residential	75	69
H11_2	The Salvation Army Sam Shing Nursery School	Educational	70	57
H12_1	Siu Lun Court (Sui Lun House)	Residential	75	67
H12_2	Siu Lun Court (Sui Lun House)	Residential	75	68
H12_3	Siu Lun Court (Sui Lun House)	Residential	75	64
H12_4	Siu Lun Court (Ka Lun House)	Residential	75	62
H12_5	Siu Lun Court (Fu Lun House)	Residential	75	60
H12_6	Siu Lun Court (Fu Lun House)	Residential	75	59
H24_1	JC Place (Tower 1)	Residential	75	59
H24_2	JC Place (Tower 1)	Residential	75	58
H54_1	Village House near Dragon Inn Court and Scenic Villa	Residential	75	64
L27_1	Tsing Shan Tsuen No. 83	Residential	75	65
L27_2	Tsing Shan Tsuen No. 82	Residential	75	67
L27_3	Tsing Shan Tsuen No. 98	Residential	75	67
L27_4	Tsing Shan Tsuen No. 113	Residential	75	68
L27_5	Tsing Shan Tsuen No. 114	Residential	75	68
L27_6	Tsing Shan Tsuen No. 111A	Residential	75	69
L30_1	Yan Chai Hospital No. 2 Secondary School	Educational	70	67
L30_2	Yan Chai Hospital No. 2 Secondary School	Educational	70	66
L31_3	Ju Ching Chu Secondary School (Tuen Mun)	Educational	70	65

NAP ID	NSR Description	Type of Use	Noise Criteria Leq (30 min), dB(A)	Predicted Mitigated Maximum Construction Noise Level Leq (30 min), dB(A)
L31_4	Ju Ching Chu Secondary School (Tuen Mun)	Educational	70	69
L31_5	Ju Ching Chu Secondary School (Tuen Mun)	Educational	70	67
L32_1	ICAC Training Camp	Educational	70	70
L32_2	ICAC Training Camp	Educational	70	70
L32_3	ICAC Training Camp	Educational	70	70
L32_4	ICAC Training Camp	Educational	70	70
L32_5	ICAC Training Camp	Educational	70	70
L32_6	ICAC Training Camp	Educational	70	70
L32_7	ICAC Training Camp	Educational	70	70
L32_8	ICAC Training Camp	Educational	70	69
L32_9	ICAC Training Camp	Educational	70	68
L33_1	Hong Chi Morninglight School	Educational	70	67
L33_2	Hong Chi Morninglight School	Educational	70	68
L33_3	Hong Chi Morninglight School	Educational	70	68
L35_1	Glorious Garden Block 2	Residential	75	67
L36_2	Lung Mun Oasis Block 2	Residential	75	64
L36_3	Lung Mun Oasis Block 2	Residential	75	66
L36_4	Lung Mun Oasis Block 3	Residential	75	66
L36_5	Lung Mun Oasis Block 3	Residential	75	68
L36_6	Lung Mun Oasis Block 4	Residential	75	67
L36_7	Lung Mun Oasis Block 4	Residential	75	68
L36_8	Lung Mun Oasis Block 5	Residential	75	68
L36_10	W.F.B. Avalokitesvara Nursery School	Educational	70	70
L37_1	The Church of Christ in China Hoh Fuk Tong Primary School	Educational	70	67
L37_2	The Church of Christ in China Hoh Fuk Tong Primary School	Educational	70	69
L37_3	The Church of Christ in China Hoh Fuk Tong Primary School	Educational	70	64
L38_1	Lung Yat Estate Kin Lung House	Residential	75	71
L38_2	Lung Yat Estate Kin Lung House	Residential	75	70
L38_3	Lung Yat Estate Hong Lung House	Residential	75	70
L39_1	Hong Kong Christian Service Jockey Club Lodge of Rising Sun	Residential	75	63
L40_1	SKH St. Peter's Church (Castle Peak)	Place of Worship	70	58
L40_2	SKH St. Peter's Church (Castle Peak)	Place of Worship	70	58

NAP ID	NSR Description	Type of Use	Noise Criteria Leq (30 min), dB(A)	Predicted Mitigated Maximum Construction Noise Level Leq (30 min), dB(A)
L42_1	S.K.H St. Peter's Church Castle Peak Kindergarten & Child Care Centre	Educational	70	60
L42_2	S.K.H St. Peter's Church Castle Peak Kindergarten & Child Care Centre	Educational	70	61
L78_1	Cannan Garden	Residential	75	70
L88_1	Village houses near Yip Wong Road	Residential	75	65
PN1_1	Public Housing Development at Yip Wong Road (Block 4)	Residential	75	70
PN1_2	Public Housing Development at Yip Wong Road (Block 4)	Residential	75	70
PN1_4	Public Housing Development at Yip Wong Road (Block 4 – Kindergarten at 1/F Lower Floor)	Educational	70	70
Notes: [1] Bold and underlined values denote exceedance over the corresponding noise criteria. [2] Noise criteria of 75 dB(A) for all domestic premises (including temporary housing accommodation) hotels and hostels, 70 dB(A) for educational institution and places for public worship for conservatism, whereas 65 dB(A) for examination period.				

4.8.12 The mitigated construction noise levels arising from the Project at all the identified NSRs comply with the EIAO-TM construction noise criteria, except during examination period of Chung Sing Benevolent Society Mrs. Aw Boon Haw Secondary School (H8), Yan Chai Hospital No.2 Secondary School (L30), Ju Ching Chu Secondary School (Tuen Mun) (L31), Independent Commission Against Corruption (ICAC) Training Camp (L32), Hong Chi Morninglight School (L33), WFB Avalokitesvara Nursery School (L36_10) and Church of Christ in China (CCC) Hoh Fuk Tong Primary School (L37) and Planned Kindergarten of the Public Housing Development at Yip Wong Road (PN1_4).

4.8.13 For the above-mentioned schools, the prediction result indicated that no exceedance is anticipated during non-examination period, while up to 5 dB(A) noise exceedance is expected to occur if works are to be conducted during the examination period. Due to the close proximity to the works sites, it is not feasible to adopt minimum separation distance. As precautionary measures, terms will be specified in the contractual documents requiring Contractor to liaise with the school's management for the schedule of construction works, to avoid carrying out noisy construction activities during examination period. Noisy construction activities, such as those to be carried out in work zone 3a, 3b, 3c, 3d and 4b would be scheduled to avoid examination periods of the nearby schools/education institutions when necessary. With the particularly noisy construction activities not to be carried out during the examination periods, the mitigated construction noise impact would comply with the noise criterion, 65 dB(A).

4.8.14 With the implementation of the aforementioned mitigation measures, no adverse construction noise impact is anticipated at the NSRs due to the Project.

Operation Phase Road Traffic Noise

4.8.15 The predicted overall noise levels at the planned NSRs are found to exceed their relevant noise criteria under the with-Project unmitigated scenario. The noise exceedance at most of the

planned NSRs would be mainly contributed by existing roads, e.g., Lung Mun Road, Lung Fu Road, Tsing Wun Road, Castle Peak Road / Castle Peak Bay, Tuen Mun Road, etc. Since there is no planning information related to these planned NSRs at the time of this study, relevant authorities including LandsD and PlanD are recommended to impose lease requirement or planning requirement on the future developers to incorporate noise mitigation measures for compliance of the relevant road traffic noise criteria/standard, with due consideration to uses with even more stringent criteria (e.g., 55 dB(A) for the use of diagnostic room/ward). Hence, provisions of direct mitigation measures at the “Project roads” for the planned NSRs, e.g., PN9, would not be further considered.

- 4.8.16 The alignment options for LFRSR NB and SB has been discussed in Chapter 2. Environmental factors have been considered and the proposed alignment option is generally preferred from environmental perspective. With reference to Annex 13 of the EIAO-TM, where the predicted noise impacts exceed the applicable noise criteria, direct mitigation measures shall be considered and evaluated.
- 4.8.17 Direct noise mitigation measures would be provided as far as practicable until the mitigated overall noise levels comply with the relevant standards or the mitigated noise levels from the Project roads does not exceed the relevant standards and does not contribute to the overall noise levels by 1.0 dB(A) or more. Direct noise mitigation measures, including LNRS are proposed to mitigate adverse traffic noise impact on the affected NSRs.
- 4.8.18 Direct mitigation measure of LNRS proposed for the Project are summarized in **Table 4.12**. The locations and extent of LNRS are shown in **Figure 4.3**. In addition to the LNRS, 1.8m parapet wall would be provided along the western side of LFRSR NB and 0.5m parapet wall would be provided along remaining sides of LFRSR NB and SB as standard provisions.

Table 4.12 - Proposed Noise Mitigation Measures

Proposed Noise Mitigation Measure	Location	Approximate Length, m (rounded off to the nearest 10m)	Concerned NSRs
LFRSR			
LNRS	Proposed slip road LFRSR NB	470m	L27, L30, L31
LNRS	Proposed slip road LFRSR SB	670m	L36, L37

- 4.8.19 With the implementation of the recommended noise mitigation measures, predicted noise levels at some of the representative NSRs would comply with the traffic noise criteria. However, exceedance of the traffic noise would still be predicted at some of the representative NSRs due to existing roads. The predicted noise levels at the affected NSRs with the proposed noise mitigation measures are summarized in **Table 4.13**, with details given in **Appendices 4.13.1**, for LFR Portion.

Table 4.13 - Summary of Predicted Road Traffic Noise Assessment Results at the Affected NSRs – With Mitigation Measures

NSR	Description	NAP	Assessment Point Elevation (mPD)	Type of Use	Noise Criteria, L10(1-hr), dB(A)	AM							PM						
						Predicted Noise Level in 2036, L10(1-hr),			Criteria for Direct Noise Mitigation				Predicted Noise Level in 2036, L10(1-hr),			Criteria for Direct Noise Mitigation			
						Overall	Project Roads	All Other Roads	Project Roads Exceed	Overall Exceed	Project Road Contribution	Direct Mitigation Measures Required	Overall	Project Roads	All Other Roads	Project Roads Exceed	Overall Exceed	Project Road Contribution	Direct Mitigation Measures Required
L27	Tsing Shan Tsuen No. 111A	L27_6_1	16.1	Residential	70	<u>73</u>	64	<u>73</u>	No	Yes	0.6	No	<u>73</u>	63	<u>73</u>	No	Yes	0.4	No
L27	Tsing Shan Tsuen No. 111A	L27_6_2	18.9	Residential	70	<u>74</u>	65	<u>73</u>	No	Yes	0.7	No	<u>74</u>	64	<u>73</u>	No	Yes	0.6	No
L30	Yan Chai Hospital No. 2 Secondary School	L30_1_4	22.5	Educational	65	<u>73</u>	63	<u>72</u>	No	Yes	0.6	No	<u>72</u>	63	<u>72</u>	No	Yes	0.5	No
L30	Yan Chai Hospital No. 2 Secondary School	L30_1_5	26.0	Educational	65	<u>73</u>	64	<u>72</u>	No	Yes	0.5	No	<u>73</u>	63	<u>72</u>	No	Yes	0.6	No
L30	Yan Chai Hospital No. 2 Secondary School	L30_1_6	29.5	Educational	65	<u>73</u>	64	<u>73</u>	No	Yes	0.6	No	<u>73</u>	64	<u>72</u>	No	Yes	0.6	No
L30	Yan Chai Hospital No. 2 Secondary School	L30_1_7	33.0	Educational	65	<u>74</u>	64	<u>73</u>	No	Yes	0.6	No	<u>73</u>	64	<u>72</u>	No	Yes	0.7	No
L30	Yan Chai Hospital No. 2 Secondary School	L30_2_4	22.5	Educational	65	<u>68</u>	58	<u>67</u>	No	Yes	0.4	No	<u>67</u>	58	<u>66</u>	No	Yes	0.6	No
L30	Yan Chai Hospital No. 2 Secondary School	L30_2_5	26.0	Educational	65	<u>69</u>	60	<u>68</u>	No	Yes	0.6	No	<u>68</u>	60	<u>67</u>	No	Yes	0.7	No
L30	Yan Chai Hospital No. 2 Secondary School	L30_2_6	29.5	Educational	65	<u>70</u>	61	<u>70</u>	No	Yes	0.5	No	<u>70</u>	61	<u>69</u>	No	Yes	0.7	No
L30	Yan Chai Hospital No. 2 Secondary School	L30_2_7	33.0	Educational	65	<u>71</u>	62	<u>71</u>	No	Yes	0.5	No	<u>71</u>	62	<u>70</u>	No	Yes	0.7	No
L31	Ju Ching Chu Secondary School (Tuen Mun)	L31_4_6	29.3	Educational	65	<u>72</u>	60	<u>72</u>	No	Yes	0.3	No	<u>72</u>	63	<u>71</u>	No	Yes	0.7	No
L31	Ju Ching Chu Secondary School (Tuen Mun)	L31_5_5	25.8	Educational	65	<u>68</u>	58	<u>68</u>	No	Yes	0.4	No	<u>68</u>	59	<u>67</u>	No	Yes	0.7	No
L31	Ju Ching Chu Secondary School (Tuen Mun)	L31_5_6	29.3	Educational	65	<u>69</u>	59	<u>69</u>	No	Yes	0.5	No	<u>68</u>	61	<u>68</u>	No	Yes	0.7	No
L36	Lung Mun Oasis Block 2	L36_3_26	80.5	Residential	70	70	59	69	No	No	0.4	No	70	61	70	No	No	0.6	No
L37	The Church of Christ in China Hoh Fuk Tong Primary School	L37_2_6	23.6	Educational	65	<u>72</u>	62	<u>71</u>	No	Yes	0.4	No	<u>72</u>	63	<u>72</u>	No	Yes	0.6	No
L37	The Church of Christ in China Hoh Fuk Tong Primary School	L37_3_5	20.1	Educational	65	<u>68</u>	57	<u>67</u>	No	Yes	0.3	No	<u>68</u>	59	<u>67</u>	No	Yes	0.6	No
L37	The Church of Christ in China Hoh Fuk Tong Primary School	L37_3_6	23.6	Educational	65	<u>69</u>	58	<u>68</u>	No	Yes	0.4	No	<u>69</u>	60	<u>68</u>	No	Yes	0.7	No
L37	The Church of Christ in China Hoh Fuk Tong Primary School	L37_3_7	27.1	Educational	65	<u>70</u>	60	<u>69</u>	No	Yes	0.5	No	<u>70</u>	62	<u>69</u>	No	Yes	0.6	No
L37	The Church of Christ in China Hoh Fuk Tong Primary School	L37_3_8	30.6	Educational	65	<u>70</u>	60	<u>70</u>	No	Yes	0.4	No	<u>71</u>	62	<u>70</u>	No	Yes	0.6	No

Notes:

- [1] Bold and underlined values denote exceedance over the corresponding noise criteria.
- [2] Details of Road Traffic Noise Assessment for mitigated scenario shall refer to **Appendix 4.13.1**.

- 4.8.20 Based on the traffic noise impact assessment results, the traffic noise impact prior to and after the commencement of the Project will be dominated by traffic noise generated by existing roads. It is estimated that there will be 8 existing residential dwellings and 10 existing classrooms will be protected by the proposed direct noise mitigation measures, i.e. their overall noise level will be reduced from exceedance to comply with respective criterion. Prior to the commencement of the Project, it is estimated that 1146 existing residential dwellings, 496 classrooms and 14 others NSRs already been subject to traffic noise impact due to the existing roads. The number of existing residential dwellings and classrooms subject to traffic noise impact will be increase to 1166 and 506 without noise mitigation measures. Upon exhausting all practicable direct noise mitigation measures, it is estimated that the number of existing residential dwellings and classrooms will be decreased to 1158 and 496 respectively. The numbers of other NSRs subject to traffic noise impact will remain the same before and after the provision of noise mitigation measures as the traffic noise are dominated by existing roads.

4.9 EVALUATION OF RESIDUAL IMPACTS

Construction Noise

- 4.9.1 The predicted mitigated construction noise levels at all NSRs would comply with the relevant noise standards stipulated in EIAO-TM with the implementation of the mitigation measures as mentioned in Section 4.8. The predicted construction noise levels at some of the schools would exceed the noise criterion of 65 dB(A) during their respective examination period.
- 4.9.2 Scheduling of noisy construction works outside school examination period would reduce the overall construction noise impacts at the NSRs and ensure compliance with the construction noise criterion. The Contractor shall liaise with the school representative(s) to obtain the examination schedule in order to avoid noisy construction activities during school examination period and to schedule the construction activities in the vicinity of schools and kindergartens during summer recess as much as possible. A construction noise management plan shall be prepared during the design / tendering and implementation stage of the construction works to verify the inventory of noise sources, assess the effectiveness and practicality of all identified measures and update the construction noise impact assessment and proposed noise mitigation measures as necessary.
- 4.9.3 With the implementation of the proposed mitigation measures, the predicted noise levels at the representative NSRs during construction phase would comply with the construction noise criteria. No residual noise impact is expected.

Operation Phase Road Traffic Noise

- 4.9.4 With the implementation of all the proposed direct noise mitigation measures, the noise contributions from Project roads to the overall noise levels at all NSRs would be less than 1.0 dB(A) and the predicted noise levels due to Project roads at all NRSs would comply with the relevant noise criteria except for the Planned NSRs PN9. Information would be given to the relevant departments including PlanD and LandsD. Detail traffic noise impact assessment based on the planned land use and building design should be included in lease requirement or planning requirement, where appropriate, to ensure noise mitigation measures, such as self-protecting building design, will be incorporated by the future developers for compliance of the road traffic noise standards and requirements of the EIAO/HKPSG, with due consideration to uses with more stringent criteria (e.g., 55 dB(A) for the use of diagnostic room/ward).
- 4.9.5 Results of the eligibility assessment for indirect technical remedies is presented in **Appendix 4.14**. Due to high prevailing noise levels and/or dominant noise contribution from existing roads,



none of the NSRs are eligible for consideration for indirect technical remedies under the EIAO-TM.

4.10 ENVIRONMENTAL MONITORING AND AUDIT

Construction Phase

- 4.10.1 Based on the results of construction noise impact assessment given in **Appendix 4.7**, noise exceedances at some of the representative NSRs are predicted during construction of the Project under unmitigated scenario. Noise monitoring is therefore recommended to be carried out during construction phase. Regular environmental site audit is also recommended to be carried out during construction phase to ensure proper implementation of mitigation measures and good site practices. Details of the EM&A programme are provided in a stand-alone EM&A Manual.

Operation Phase

- 4.10.2 Based on the results of the road traffic noise impact assessment given in **Appendix 4.8.2** and **Appendix 4.13.1**, there is no adverse traffic noise impact anticipated from the Project with the implementation of the proposed mitigation measures. To verify the effectiveness of the proposed noise mitigation measures, road traffic noise levels should be monitored at representative NSRs during the first year after completion of road works. Details of the EM&A programme are provided in a stand-alone EM&A Manual.

4.11 CONCLUSION

Construction Phase

- 4.11.1 Construction noise impact assessment has been conducted for the representative NSRs identified within the Assessment Area. Assessment results indicated that the mitigated noise levels at all NSRs would comply with the noise criteria set out in the EIAO-TM with the implementation of the proposed noise mitigation measures, including use of Quieter Construction Methods, QPME, provision of temporary movable noise barriers / enclosures and noise insulating fabric, avoiding concurrent uses of PME with other project and restriction of noisy construction activity during examination period.
- 4.11.2 A construction noise management plan shall be prepared during the design / tendering and implementation stage of the construction works, to verify the inventory of noise sources, assess the effectiveness and practicality of all identified measures and update the construction noise impact assessment and proposed noise mitigation measures as necessary. Noise monitoring has been recommended to be carried out during construction phase. Regular environmental site audit has also been recommended to be carried out during construction phase to ensure proper implementation of mitigation measures and good site practices.



Operation Phase

- 4.11.3 Road traffic noise impact assessment has been conducted for the representative NSRs identified within the Assessment Area. Assessment results indicate that the predicted road traffic noise levels at some of the representative NSRs would exceed the noise criteria under unmitigated scenario.
- 4.11.4 With the implementation of noise mitigation measures including LNRS on some Project roads, the predicted noise levels at some of the NSRs would still exceed the relevant noise criteria. However, the exceedances were contributed by the Existing roads. The contributions from the Project roads to the overall noise levels at all NSRs are all less than 1.0 dB(A) and all the predicted noise levels of the Project roads would comply with the noise criteria. Based on this, no adverse road traffic noise impact arising from the Project is anticipated.