

5. NOISE

5.1 Introduction

5.1.1 Assessment on the potential noise impacts associated with the construction and operation of the Project and the demolition of the existing South Works of Sha Tin WTW are presented in this section. Representative Noise Sensitive Receivers (NSRs) in the vicinity of the study area are identified. The potential noise impacts on these NSRs arising from the construction activities and operation of fixed plant have been assessed and appropriate mitigation measures are proposed to alleviate the potential noise impacts.

5.2 Description of the Environment

Environs

5.2.1 The Project site is located within the existing Sha Tin WTW. It is surrounded by the slope of Kam Shan and Lion Rock from north to south, and immediately to the east of the Project site is the existing MTR East Rail Line. Further to the northeast and east of the Project site is a mixture of residential uses, commercial uses, recreational area and educational institutes. The existing noise climate of the study area is dominated by the railway noise from the existing East Rail Line. Traffic noise arising from Che Kung Miu Road and Hin Keng Street are another major noise sources in the vicinity.

5.2.2 To investigate the prevailing noise levels of the study area, noise measurements were taken on 26 to 27 September 2011. The measurements were conducted in accordance with the calibration and measurement procedures stated in the IND-TM. The measured prevailing background noise levels are presented in **Appendix 5.1**.

Noise Sensitive Receivers

5.2.3 In accordance with Annex 13 of the EIAO-TM, all domestic premises including temporary housing, education institutions including kindergarten and nurseries, hospital, medical clinics, home for aged, convalescent homes, places of public worship, libraries, courts of law, performing arts centres, auditoria, amphitheatres, hostels and country parks are considered as NSRs. As stated in the EIA Study Brief, the boundary of the assessment area for noise impact assessment should be 300 m from the Project boundary. A total of 8 representative NSRs, which are considered to be most likely to be affected by the construction of the Project, have been identified for this assessment. Details of the representative NSRs are shown in **Table 5.1** and their locations are illustrated in **Figure 5.1**.

Table 5.1 Details of Representative Noise Sensitive Receivers (NSRs)

NSRs	Description	Land Use	Distance from the nearest Project Boundary (m)	No. of Storey
HK1	The L Louey (East)	Residential	25	2
HK2	The L Louey (South)	Residential	25	2
HK3	Hin Keng Estate - Hin Yau House (North)	Residential	95	35
HK4	Hin Keng Estate - Hin Yau House (South)	Residential	95	35
HK5	Hin Keng Estate - Hin Wan House	Residential	115	35
HK6	Hin Keng Estate - Hin Kwai House	Residential	145	35
HK7	C.U.H.K.F.A.A. Thomas Cheung School	Educational Institutions	215	6
HK8*	Sha Tin WTW Staff Quarters ^[1]	Residential	- ^[2]	1-3

Note:

[1]All the Sha Tin WTW Staff Quarters would be used as site office during the construction of the project. It is only considered as representative noise sensitive receivers during operational phase.

[2]Located within the Project area

5.3 Environmental Legislation, Plans, Standards, and Guidelines

5.3.1 The criteria and guidelines for noise impact assessment are laid down in Annex 5 and Annex 13 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM). In addition,

specific requirements on noise impact assessment for this Project are stipulated in Clause 3.4.7 of the EIA Study Brief (No. ESB-220/2011).

5.3.2 The Noise Control Ordinance, Cap. 400 (NCO) and Environmental Impact Assessment Ordinance, Cap. 499 (EIAO) provide the statutory framework for noise control. Assessment procedures and standards are set out in the following Technical Memoranda (TMs):

- Technical Memorandum on Noise from Places other than Domestic Premises, Public Places or Construction Sites (IND-TM);
- Technical Memorandum on Noise from Construction Work in Designated Areas (DA-TM);
- Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM); and
- Technical Memorandum on Noise from Percussive Piling (PP-TM).

5.3.3 The NCO and the accompanying Technical Memoranda provide a mechanism for assessing noise levels and provides the statutory power to control noise.

5.3.4 With regard to the assessments of the operation noise impact, the NCO designates acceptable noise levels for NSRs on the basis of an Area Sensitivity Rating (ASR), based on the characteristics of the area where they are located such as rural, village, low-density residential, or urban (see **Table 5.2**). Within these areas, the presence of “influencing factors” (such as the presence of industrial activities or major roads) can further affect the ASR and hence the acceptable noise level.

Table 5.2 Area Sensitivity Ratings (ASRs)

Type of Area Containing NSR	Degree to which NSR is affected by IF		
	Not Affected	Indirectly Affected	Directly Affected
Urban Area	B	C	C
Low density residential area consisting of low-rise or isolated high-rise developments	A	B	C
Rural Area	A	B	B
Area other than those above	B	B	C

Construction Noise

5.3.5 Referring to the indicative construction programme (**Appendix 2.1**), the construction works would be conducted between 0800 and 1800. Under the GW-TM, noise from construction activity is not restricted between 0700 and 1900 hours on weekdays, except Public Holidays. However, the EIAO-TM identifies a daytime general construction noise limit of 75 dB(A) for domestic premises and 70 dB(A) for educational institutions during normal teaching periods, whereas 65 dB(A) during examination periods. These noise standards were used as the assessment criteria in the construction noise assessment.

Operation Noise

5.3.6 Fixed noise sources associated with the Project would be controlled by the NCO and IND-TM. The Acceptable Noise Levels (ANL) is a function of the type of area within which the NSRs are located, and the degree of the effect on the NSRs of influencing factors such as major roads and industrial areas. According to the IND-TM, the ANLs for different ASRs are given in **Table 5.3**.

Table 5.3 Acceptable Noise Levels for Fixed Noise Sources

Time Period	Acceptable Noise Level, dB(A)		
	ASR A	ASR B	ASR C
Daytime and Evening (0700 to 2300 hours)	60	65	70
Night (2300 to 0700 hours)	50	55	60

5.3.7 All identified representative NSRs are located in areas other than rural areas, low density residential area and urban area, and they are not affected by influencing factors. With reference to **Table 5.2** above, ASR of “B” has been assumed for the NSRs in the vicinity of the proposed Project site. As Sha Tin WTW is operating 24-hour a day, ANL for night time with lower acceptable noise levels is adopted as the noise criteria for fixed noise sources for residential NSRs. Whereas for school, the

ANL for daytime and evening period is adopted in view of the normal opening hours of school. The EIAO-TM recommends that the level of the intruding noise at the façade of the nearest sensitive use should be at least 5 dB(A) below the appropriate ANL or, in the case of background noise being 5 dB(A) lower than the ANL, the predicted noise level arising from the operation of the proposed Project at the façade of the nearest sensitive use should not exceed the background noise level. In this regard, noise measurement was undertaken in the vicinity of the representative NSRs to study the prevailing noise level (see **Appendix 5.1**). The assessment criteria for the proposed fixed noise sources, as adopted in this EIA Study are presented in **Table 5.4**. However, the noise criteria for cumulative noise impacts arising from all items of equipment including new equipment and existing equipment would follow the relevant ANL criteria.

Table 5.4 Noise Criteria for Fixed Noise Sources

NSR	Description	ANL ⁽¹⁾ , dB(A)	Planning Criteria (ANL-5dB(A))	Minimum Measured Noise Level, dB(A)	Criteria for Proposed Fixed Plant, dB(A)	Criteria for Cumulative Impact, dB(A)
HK1	The L Louey (East)	55	50	52	50	55
HK2	The L Louey (South)	55	50	52	50	55
HK3	Hin Keng Estate - Hin Yau House (North)	55	50	58	50	55
HK4	Hin Keng Estate - Hin Yau House (South)	55	50	58	50	55
HK5	Hin Keng Estate Hin Wan House	55	50	58	50	55
HK6	Hin Keng Estate Hin Kwai House	55	50	57	50	55
HK7	C.U.H.K.F.A.A. Thomas Cheung School	65	60 ⁽²⁾	59	59 ⁽²⁾	65
HK8	Sha Tin WTW Staff Quarters	55	50	57	50	55

Notes:

1. ASR of "B" has been assumed for the NSRs;
2. The criteria is recommended for the time period of daytime and evening time, as school is not considered as a night-time NSR.

5.3.8 In any event, the Area Sensitivity Rating assumed in the EIA Report is for indicative assessment only. It should be noted that the fixed noise sources are controlled under Section 13 of the NCO. At the time of investigation, the Noise Control Authority shall determine noise impact from concerned fixed noise sources on the basis of prevailing legislation and practices being in force and taking account of contemporary conditions/situations of adjoining land uses. Nothing in the EIA Report shall bind the Noise Control Authority in the context of law enforcement against all the fixed noise sources being assessed.

5.4 Identification of Environmental Impacts

Construction Phase

- 5.4.1 Potential source of noise impact during the demolition/construction of the Project would be the use of Powered Mechanical Equipment (PME) for various demolition/construction activities. Major construction works would include cut-back of the existing engineered slope, site clearance, bore-piling works, demolition of the existing South Works of the Sha Tin WTW, construction of superstructures and truck haulage. Details of the proposed construction methods and sequence of works are described in Section 3 of this EIA Report. The construction programme which commences in 2015 for completion in early 2021 is shown in **Appendix 2.1**.
- 5.4.2 Generally, the construction activities of the Project would be carried out in non-restricted hours (0700-1900 hours) during normal working days. For any construction activities that need to be carried out during restricted hours, it is the Contractor's responsibility to ensure compliance with the NCO and the relevant TMs. The Contractor will be required to submit construction noise permit (CNP) application to the Noise Control Authority and abide by any conditions stated in the CNP, should one be issued.

Operation Phase

- 5.4.3 According to the design information, the major fixed plant noise sources are identified as the new mixers, ventilation fans, blowers, cooling tower and pump gallery.

Cumulative Noise Impact from the Other Concurrent Project

- 5.4.4 Based on the current programme, the Project would likely to have interactions with Shatin to Central Link – Tai Wai to Hung Hom Section [SCL(TAW-HUH)]. SCL(TAW-HUH) is an extension of Ma On Shan Line from Tai Wai Station via Hin Keng passing through Lion Rock to the east Kowloon. The construction works of SCL(TAW-HUH) at Hin Keng are located just next to the Project site. The fixed plant proposed by SCL(TAW-HUH) are also located within 300 m from the Project. Potential cumulative noise impacts would be expected from the construction and operation of SCL(TAW-HUH) in Tai Wai area.

5.5 Assessment Methodologies*Construction Phase*

- 5.5.1 According to the current construction programme for the Project, the demolition and construction works are scheduled to be conducted in sequence. Some of the construction tasks would be carried out concurrently. Construction noise level was calculated for each month during the construction phase. All of the construction tasks within the Project area are taken into consideration for the calculation, construction activities from concurrent project within 300 m of a given NSR are also considered in the cumulative construction noise calculation.
- 5.5.2 In accordance with the EIAO-TM, the methodology outlined in the GW-TM was used for the demolition/construction noise assessment. The general approach is summarized below:
- Locate the NSRs which would most likely be affected by noise from the demolition/construction works;
 - Determine the items of PME for each discrete construction activity, based on available information or agreed plant inventories;
 - Assign sound power levels (SWLs) to the proposed PME according to the GW-TM or other sources;
 - Calculate distance attenuation and screening effects to NSRs from notional noise source;
 - Predicted construction noise levels at NSRs in the absence of any mitigation measures;
 - Include a 3 dB(A) façade correction to the predicted noise levels in order to account for the façade effect at each NSR.
- 5.5.3 Sound power levels of the equipment were taken from Table 3 of GW-TM. Where no sound power level was given in the GW-TM, reference was made to British Standard 5228: Part 1:2009 Noise Control on Construction and Open Sites or previous similar studies. Groups of PME were assigned for various construction activities of the Project. The proposed plant inventory for the demolition/construction works of the Project is presented in **Appendix 5.2**. Appropriate on-time percentage for all items of PME was reasonably assumed as presented in **Appendix 5.2**. The Project Proponent has confirmed the proposed plant inventories as being practical and adequate for completing the works within the scheduled timeframe.
- 5.5.4 The assessment was undertaken based on the assumption that all items of construction equipment are located at a notional noise source point for each phase of works and that all items of equipment are operating simultaneously.

Operation Phase

- 5.5.5 For the assessment of noise from fixed plant, the maximum permissible sound power levels (Max. SWLs) of the identified fixed noise sources have been determined by adopting standard acoustic principles. The following formula has been used for calculating the maximum SWLs of the fixed plant.

$$\text{SPL} = \text{Max SWL} - \text{DC} + \text{FC} - \text{BC}$$

Where,

SPL Sound Pressure Level, in dB(A)

Max. SWL Maximum Permissible Sound Power Level, in dB(A)

DC	Distance Attenuation, in dB(A) (i.e. $20\log D + 8$ [where D is the distance in metres])
FC	Façade Correction, in dB(A) (i.e. 3 dB(A))
BC	Barrier Correction, in dB(A)

- 5.5.6 It was assumed that all the fixed plant within the same location would be operated simultaneously for the worst-case scenario. Screening correction offered by buildings or other structures such as office and residential buildings has been taken into account in calculating the predicted noise levels. According to the GW-TM, effective barriers can result in noise reduction of 5 to 10 dB(A) for the fixed plant depending on the line of sight of the representative NSRs. A positive 3 dB(A) has been added to the predicted noise levels at the NSRs due to the façade effect.
- 5.5.7 Corrections of tonality, intermittency or impulsiveness have not been included owing to the lack of design/supplier information at this stage. If the noise exhibits any of these characteristics during detailed design or operation of the plant, the noise limit of the plant should be reduced in accordance with the recommendation given in IND-TM.
- 5.5.8 In addition to the newly proposed equipment, the existing equipment for the North Works of Sha Tin WTW will be retained and continue to operate. The sound power level of the existing equipment for the North Works of Sha Tin WTW was estimated based on on-site free-field measurement. The details of the on-site noise measurement are given in **Appendix 5.3**. The noise measurement results and estimated sound power level are presented in **Appendix 5.4**.

5.6 Prediction and Evaluation of Environmental Impacts

Construction Noise

Unmitigated Construction Noise Impacts

- 5.6.1 For normal daytime working hours, exceedances of the construction noise criteria would be predicted at representative NSRs in the absence of mitigation measures. Details of construction noise calculations and results are presented in **Appendix 5.5**. A summary of the calculated noise results is shown in **Table 5.5**.

Table 5.5 Unmitigated Construction Noise Levels due to the Project at Representative NSRs During Normal Daytime Working Hours

NSRs	Description	Predicted Unmitigated Construction Noise Level, dB(A)
HK1	The L Louey (East)	55- 76
HK2	The L Louey (South)	56- 77
HK3	Hin Keng Estate - Hin Yau House (North)	51-74
HK4	Hin Keng Estate - Hin Yau House (South)	51- 77
HK5	Hin Keng Estate - Hin Wan House	51- 78
HK6	Hin Keng Estate - Hin Kwai House	49- 77
HK7*	C.U.H.K.F.A.A. Thomas Cheung School	46- 72

Notes:

- (a) EIAO-TM noise limits of $L_{eq(30\text{ minutes})}$ 75 dB(A) for domestic premises, and $L_{eq(30\text{ minutes})}$ 70 dB(A) for educational institutions during normal teaching periods and 65 dB(A) during examination periods.
- (b) Boldfaced value indicates the predicted noise level exceeds the relevant noise limit.
- (c) NSR with asterisk means education institution.
- (d) Public examination is assumed to be held in March, April and May, while school examination is assumed to be held in December and June of each year.

- 5.6.2 The above results showed that the predicted noise levels at the representative NSRs are in the range of 46 to 78 dB(A). Exceedances in the range of 1 to 3 dB(A) were predicted at some NSRs. Noise mitigation measures would therefore be required to reduce noise levels to the stipulated noise standards.

Recommended Mitigation Measures for Construction Noise

5.6.3 In order to reduce the excessive noise impacts at the affected NSRs, the following mitigation measures have been considered:

- Good site practice;
- Use of quiet PME; and
- Adoption of movable noise barriers.

Good Site Practice

5.6.4 Although the noise mitigation effects are not easily quantifiable and the benefits may vary with site conditions and operating conditions, good site practices are easy to implement and do not impact upon the works schedule. The site practices listed below should be followed during each phase of construction:

- Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program;
- Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction phase;
- Mobile plant, if any, should be sited as far from NSRs as possible;
- Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;
- 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;
- Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities.

Adoption of Quiet PME

5.6.5 In order to reduce the excessive noise impacts at the affected NSRs during normal daytime working hours, quieter PME are recommended. The Contractor may use other types of quiet plant instead of specific items of quiet plant adopted in this assessment, which have the same total SWL, to meet their needs. Quiet PME adopted in the assessment were taken from the BS5228: Part 1:2009 or the noise specification of the plant provided from the supplier, and the PME are known to be available in Hong Kong. Quiet PME that have been adopted in the assessment are summarised in **Table 5.6** and the proposed mitigated plant inventory for the demolition/construction works of the Project is detailed in **Appendix 5.6**.

Table 5.6 Quiet PME Recommended for Adoption during Construction Phase

PME	Reference	SWL, dB(A)
Bulldozer	BS C5/14	114
Diesel Generator	BS C4/85	94
Dump Truck	BS C2/30	107
Excavator	BS C1/12	110
Excavator	BS C2/14	107
Excavator	BS C4/17	99
Excavator	BS C1/4	104
Mobile Crane	BS C4/43	98
Piling Machine	BS C3/14	111
Poker Vibrator	BS C4/33	106
Road Roller	BS C2/37	107
Silent Piler	Giken-001 ⁽¹⁾	86
Water Pump	BS C4/88	96

Note:

- (1) The noise specification of the Silent Piler is provided by the supplier, Giken Seisakusho Asia PTE., LTD.

Use of Movable Noise Barrier

- 5.6.6 The use of movable noise barrier for certain PME could further alleviate the construction noise impacts. In general, 5 dB(A) reduction for movable PME and 10 dB(A) for stationary PME can be achieved depending on the actual design of movable noise barrier. The Contractor shall be responsible for design of the movable noise barrier with due consideration given to the size of the PME and the requirement of intercepting the line of sight between the NSRs and PME. Barrier material of surface mass in excess of 14 kg/m² is recommended to achieve the predicted screening effect.

Mitigated Construction Noise Impacts

- 5.6.7 The predicted mitigated construction noise levels are detailed in **Appendix 5.7** and summarized in **Table 5.7** below. As shown in **Appendix 5.7**, with the implementation of all the above-mentioned mitigation measures, the predicted construction noise levels due to the Project itself at representative NSRs would be reduced by up to 10 dB(A). The predicted construction noise levels due to the Project itself at all representative NSRs, ranging from 46-72 dB(A), would comply with the EIAO-TM noise criteria.
- 5.6.8 In terms of the cumulative impacts with SCL(TAW-HUH), exceedance of 1 dB(A) during examination periods would be predicted at C.U.H.K.F.A.A. Thomas Cheung School (HK7). The exceedance is solely due to the concurrent construction works of SCL(TAW-HUH), as no overall increase in cumulative noise level due to the Project is predicted at the NSR. Further discussion on residual impacts is presented in Section 5.7 below.

Table 5.7 Cumulative Mitigated Construction Noise Levels at Representative NSRs During Normal Daytime Working Hours

NSRs	Description	Predicted Noise Level, dB(A)		
		The Project	SCL(TAW-HUH)	Cumulative
HK1	The L Louey (East)	54-72	51-64	54-72
HK2	The L Louey (South)	56-71	51-64	57-71
HK3	Hin Keng Estate - Hin Yau House (North)	51-68	53-66	53-68
HK4	Hin Keng Estate - Hin Yau House (South)	51-68	53-66	57-68
HK5	Hin Keng Estate - Hin Wan House	51-68	68-75	57-75
HK6	Hin Keng Estate - Hin Kwai House	49-67	64-75	55-75
HK7*	C.U.H.K.F.A.A. Thomas Cheung School	46-64	54-66	54-66

Notes:

- (a) EIAO-TM noise limits of $L_{eq(30 \text{ minutes})}$ 75 dB(A) for domestic premises, and $L_{eq(30 \text{ minutes})}$ 70 dB(A) for education institutions during normal teaching periods and 65 dB(A) during examination periods.
- (b) Boldfaced value indicates the predicted noise level exceeds the relevant noise limit.
- (c) NSR with asterisk means education institution.
- (d) Public examination is assumed to be held in March, April and May, while school examination is assumed to be held in December and June of each year.

Fixed Plant Noise

- 5.6.9 Based on the calculated maximum allowable sound power levels for the new equipments and the estimated sound power levels for the existing equipment, the predicted fixed plant noise levels at the representative NSRs are summarised in **Table 5.8**. Details of the calculations are presented in **Appendix 5.8**. If there is any change in engineering design information during detailed design stage or fitting-out stage, the fixed source noise design should be reviewed by the Engineer/Contractor to ensure that both the NCO and EIAO-TM criteria at the NSRs can be met in the future.

Table 5.8 Predicted Fixed Plant Noise Levels at Representative NSRs

NSRs	Description	Predicted Noise Level, dB(A)			
		Existing Equipment	New Equipment	SCL(TAW-HUH)	Cumulative
HK1	The L Louey (East)	40	36	38	43
HK2	The L Louey (South)	49	45	37	51
HK3	Hin Keng Estate - Hin Yau House (North)	45	35	48	50
HK4	Hin Keng Estate - Hin Yau House (South)	47	46	39	50

NSRs	Description	Predicted Noise Level, dB(A)			
		Existing Equipment	New Equipment	SCL(TAW-HUH)	Cumulative
HK5	Hin Keng Estate - Hin Wan House	47	47	35	50
HK6	Hin Keng Estate - Hin Kwai House	45	46	27	48
HK7*	C.U.H.K.F.A.A. Thomas Cheung School	42	43	33	46
HK8	Sha Tin WTW Staff Quarters	46	50	30	52

Notes:

- (a) Noise Criteria for domestic premises: 50 dB(A) for new equipment and 55 dB(A) for cumulative noise impact; whereas noise criteria for educational institutes: 60 dB(A) for new equipment and 65 dB(A) for cumulative noise impact.
- (b) NSR with asterisk means education institution.

5.6.10 It should be noted that the fixed plant noise assessment is based on the worst-case scenario in which all items of equipment were assumed to operate simultaneously during operation period.

Recommended Mitigation Measures for Fixed Plant Noise

5.6.11 Provided that the fixed plant is properly designed to meet the maximum allowable SWLs, therefore, no adverse residual impacts would be predicted. However, it is still recommended that the following noise reduction measures be considered as far as practicable during the processes of detailed design and procurement:

- Choose quieter plant such as those which have been effectively silenced;
- Include noise levels specification when ordering new plant (including chillier and E/M equipment);
- Locate fixed plant/louver away from any NSRs as far as practicable;
- Locate fixed plant in walled plant rooms or in specially designed enclosures;
- Locate noisy machines in a basement or a completely separate building;
- Install direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosure where necessary; and
- Develop and implement a regularly scheduled plant maintenance programme so that equipment is properly operated and serviced in order to maintain a controlled level of noise. The programme should be implemented by properly trained personnel.

5.7 Evaluation of Residual Environmental Impacts

Construction Noise

5.7.1 With the implementation of the recommended noise mitigation measures, the predicted noise levels due to the construction of the Project itself would comply with the EIAO-TM normal daytime criteria. Residual construction noise impact of 1 dB(A) for only 1 month during the examination period would be expected at C.U.H.K.F.A.A. Thomas Cheung School. The exceedance is solely due to the concurrent construction works of SCL(TAW-HUH), while no overall increase of cumulative noise level due to the Project is predicted at the NSR. MTR would be liaised during construction stage to reduce cumulative impact with the construction of SCL – Tai Wai to Hung Hom Section.

Fixed Plant Noise

5.7.2 No adverse impact on residual fixed plant noise impacts due to the operation of the Project is expected.

5.8 EM&A Requirements

- 5.8.1 An Environmental Monitoring and Audit programme is recommended to be established according to the predicted occurrence of noisy activities. The recommended mitigation measures should be implemented during construction stage. Details of the programme are provided in a stand-alone EM&A Manual.
- 5.8.2 With the implementation of the recommended noise mitigation measures, no adverse impact is expected due to the operation of the fixed plant equipments based on a set of specified maximum SWLs for newly proposed fixed plant as shown in **Appendix 5.8**. Operation noise monitoring is therefore considered not necessary.

5.9 Conclusion

Construction Noise

- 5.9.1 This assessment has presented the construction noise impacts of the Project during normal daytime working hours. The predicted unmitigated noise levels at representative NSRs would range from 46 to 78 dB(A). With the adoption of quiet PME and use of movable noise barrier, the noise levels due to the Project itself at all representative NSRs would comply with the EIAO-TM criteria.
- 5.9.2 When considering the cumulative construction noise impacts, exceedance of 1 dB(A) during examination periods would be predicted at C.U.H.K.F.A.A. Thomas Cheung School; however, the exceedances are only contributed by the concurrent construction works of SCL(TAW-HUH) as the Project does not induce any impact during that period. All practicable direct mitigation measures have been exhaustively investigated and residual impact is minimised. The residual impacts are considered to be temporary, reversible and unlikely to induce public health concern and as such, are considered to be minor and acceptable.

Fixed Plant Noise

- 5.9.3 The noise impact associated with the operation of the Project has been assessed. The predicted fixed plant noise levels at the representative NSRs would be expected to comply with the day-time, evening time and night time criteria based on the assessment using a set of specified maximum SWLs for the newly proposed fixed plant. If there is any change in engineering design information during detailed design stage or fitting-out stage, the fixed source noise design should be reviewed by the Engineer/Contractor to ensure that both the NCO and EIAO-TM criteria at NSR can be met in the future.

~End of Section 5 ~