

4 Noise Impact

4.1 Overview

This section presents the assessment of potential noise impacts which may arise during the construction and operation phases. Construction noise associated with the use of Powered Mechanical Equipment (PME) has been conducted. With the implementation of practical mitigation measures including good site management practices, use of site hoarding, use of movable noise barrier, full enclosure, use of “quiet” plant and working method and separation of approximate 25m away from concrete lorry mixer at certain locations, construction noise impacts at all of the neighbouring noise sensitive uses would be controlled to within the noise criterion of 75dB(A).

Construction noise associated with construction vehicle accessing LMC Loop through LMC Road and Ha Wan Tsuen Road for advance works in Year 2016 and through Sai Kwo Road, Ha Wan Tsuen Road and LMC Road for site formation in Year 2020 has been assessed. Construction access vehicle noise impact on the sensitive receivers will be mitigated by provision of 0.8m to 5m temporary noise barriers and controlled to acceptable levels.

Operational noise impacts associated with fixed noise sources and road traffic noise which are based on the worst case scenario of the traffic impact assessment have also been investigated. Fixed noise source sound power level limits are specified for sewage treatment works and district cooling system (provisional) with necessary noise control measures to comply with the statutory criteria. Operational traffic noise impact on the sensitive receivers outside the LMC Loop will be mitigated by provision of 0.8m to 5m noise barriers and controlled to acceptable levels. Provision of central air conditioning system for the first layer of noise sensitive receivers facing Road M1 has been allowed to mitigate the noise impact from road traffic.

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 Ordinance (TM-EIAO) as well as the requirements set out under clause 3.4.5 of the EIA Study Brief.

4.2 Environmental Legislation, Standards and Guidelines

The relevant legislation and associated guidance applicable to the present study for the assessment of noise impacts include:

- Noise Control Ordinance (NCO) (Cap.400);
- Environmental Impact Assessment Ordinance (EIAO) (Cap. 499);
- Technical Memoranda (TM) on Noise from Construction Work other than Percussive Piling (TM-GW);
- TM on Noise from Percussive Piling (TM-PP); and
- TM on Noise on Construction Work in Designated Areas (TM-DA).

4.2.1 Construction Noise

The NCO provides the statutory framework for noise control in Hong Kong. Assessment procedures and standards are set out in the respective TM promulgated under the NCO.

To ensure a better environment, the TM-EIAO promulgated under the EIAO has imposed more stringent criteria. For construction, there is no statutory limit on daytime construction noise under the NCO and related TMs. Nevertheless, the TM-EIAO stipulates criteria of 65 - 75dB(A) for daytime construction activities, as shown in the following **Table 4.1**.

Table 4.1 Noise standards for construction activities

Uses	Noise Standards ^[1] , L _{eq} (30 mins) dB(A)
	0700 to 1900 hours on any day not being a Sunday or general holiday
All domestic premises including temporary housing accommodation	75
Hotels and hostels	75
Education - Educational institutions of kindergartens, nurseries and all others where unaided voice communication is required	70 65 (During examinations)
Education - Educational institutions of student hostels and staff quarters	75

Notes:

[1] The above standards apply to uses that rely on opened windows for ventilation.

4.2.1.1 Construction Noise During Restricted Hours

The NCO also provides statutory control on general construction works during restricted hours (ie 1900 to 0700 hours (of the next day) from Monday to Saturday and at any time on Sundays or public holidays). The use of Powered Mechanical Equipment (PME) for construction works during restricted hours would require a Construction Noise Permit (CNP). The TM-GW details the procedures adopted by EPD for assessing such application. The granting of a CNP is subject to conditions stated in the CNP and it may be revoked at any time for failure to comply with the permit conditions.

In addition to the general controls on the use of PME during restricted hours, the use of Specified Powered Mechanical Equipment (SPME) and the undertaking of Prescribed Construction Work (PCW) during the restricted hours in a designated area are controlled by the TM-DA. Construction plant or equipment classified as SPME under the TM-DA includes hand-held breakers, bulldozers, concrete lorry mixer, dump trucks and poker vibrators. The PCW includes the erection or dismantling of formwork or scaffolding, hammering, handling of rubble, wooden boards, steel bars, or scaffolding material, and the disposal of rubble through plastic chutes.

The TM-DA details the procedures that should generally be adopted by the Authority for assessing the use of SPME during restricted hours and for determining whether a CNP would be issued.

Maximum noise levels from construction activities during restricted hours at affected NSRs are controlled under the TMs and shall not exceed the specified Acceptable Noise Levels (ANLs). These ANLs are stipulated in accordance with the Area Sensitivity Ratings (ASR) established for the NSRs. The ANLs for construction works in Designated Areas are more stringent than those given in the Technical Memorandum on Noise from Construction Work Other Than Percussive Piling (TM-GW) and are summarised in **Table 4.2**.

Table 4.2 ANLs for construction during restricted hours

Time Period	Acceptable Noise Levels for Area Sensitivity Ratings, dB(A)		
	A	B	C
All weekdays during the evening (1900 to 2300 hours), and general holidays (including Sundays) during the day and evening (0700 to 2300 hours)	60 (45)	65 (50)	70 (55)
All days during the night-time (2300 to 0700 hours)	45 (30)	50 (35)	55 (40)

Note:

Figures in brackets are ANLs for SPME construction work in designated areas.

As defined in the Noise Control Designated Area Plan No. EPD/AN/NT-01, Chau Tau Tsuen, Pun Uk Tsuen, LMC Tsuen, and Ho Sheung Heung are within the Designated Area.

Construction works during restricted hours might be required for the construction crossing over San Tin Highway and San Sham Road. It is a must as required by Transport Department and the Police Force that no live traffic should be underneath the launching operation for public safety reasons. Hence, these activities might only be carried out when the roads are closed to public traffic. These two construction works are

- The elevated structure of Western Connection Road (i.e. the portion of Lok Ma Chau Road / San Tin Highway Connection) across San Tin Highway (expressway); and
- The elevated structure of Direct Link to LMC Spurline Station across San Sham Road.

In general, the construction works which need to be conducted during restricted hours include lanes closure beneath the road, falsework and formwork erection, formwork launching and concrete casting. The works contract will require contractor to devise their construction method and apply for a CNP prior to commencement of construction. Mitigation measures as required for compliance with the NCO requirement (e.g. implementation of work sequencing, assignation of reasonable PME and application of suitable mitigation measures at the fixed construction plant) shall be implemented by the contractor to minimise any adverse impact.

Despite any description made in the report, there is no guarantee that a CNP will be issued for the project construction. The Noise Control Authority will consider a well-justified CNP application, once filed, for construction works within restricted hours as guided by the relevant TMs issued under the NCO. The Noise Control Authority will take into account contemporary conditions / situations of adjoining land uses and any previous complaints against construction activities at the site before making a decision in granting a CNP. Nothing in the report shall bind the

Noise Control Authority in making a decision. If a CNP is to be issued, the Noise Control Authority shall include in it any conditions demand. Failure to comply with any such conditions will lead to cancellation of the CNP and prosecution under the NCO.

4.2.1.2 Percussive Piling

Under the TM-PP, CNPs are also required for percussive piling involving the use of diesel, pneumatic and / or steam hammer. This TM specifies the permitted hours and other conditions for percussive piling. **Table 4.3** lists the acceptable percussive piling noise levels for various types of NSR.

Table 4.3 ANLs for percussive piling

NSR Window Type or Means of Ventilation	ANL, dB(A)
(i) NSR (or part of NSR) with no window or other opening	100
(ii) NSR with central air conditioning system.	90
(iii) NSR with windows or other openings but without central air conditioning system	85

Depending on the numbers and types of piling machines and the separation from NSRs, percussive piling may be restricted to 12, 5 or 3 hours per day. For NSRs that are particularly sensitive to noise, such as hospitals, medical clinics, educational institutions and courts of law, a further reduction of 10 dB(A) shall be applied to the above ANLs. Nevertheless, no percussive piling is required for the construction of LMC Loop.

4.2.1.3 Blasting

The administrative and procedural control of all blasting operations in Hong Kong is vested with the Mines Division of the Civil Engineering and Development Department (CEDD). The Dangerous Goods (General) Regulations, Chapter 295 also stipulates that no person shall carry out any blasting works unless he possesses a valid mine blasting certificate issued by the Mines Division of CEDD. The Superintendent of Mines will review the application on a case-by-case basis before issuing the Mine Blasting Certificate. Although there is no statutory noise level for blasting, the noise associated with the removal of debris and rocks are controlled under the TM-EIAO. Nevertheless, no blasting is required for the construction of LMC Loop.

4.2.2 Operational Noise

The TM-EIAO has stipulated the noise standards for various noise sources as shown in **Table 4.4**. It should, however, be noted that the following noise criteria are only applicable to uses that rely on opened windows for ventilation.

Table 4.4 Noise standards for operational phase

Common Uses	Noise Standards ^[1]				
	Aircraft Noise (Noise Exposure Forecast: NEF)	Helicopter Noise L _{max} , dB(A)	Road Traffic Noise L _{10 (1hour)} , dB(A)	Rail Noise	Fixed Noise Sources
All domestic premises including temporary housing accommodation	25	85	70	(see Note 3) (a) The appropriate Acceptable Noise Levels shown in Table 2 of the Technical Memorandum for the Assessment of Noise from Places Other than Domestic Premises, Public Places or Construction Sites and (b) L _{max} (2300-0700 hours) = 85dB(A)	(a) 5dB(A) below the appropriate Acceptable Noise Levels (ANL) shown in Table 2 of the Technical Memorandum for the Assessment of Noise from Places Other than Domestic Premises, Public Places or Construction Sites, or (b) the prevailing background noise levels (For quiet areas with level 5 dB(A) below the ANL)
Hotels and hostels	25	85	70		
Offices	30	90	70		
Education - Educational institutions of kindergartens, nurseries and all others where unaided voice communication is required	25	85	65		
Education - Educational institutions of student hostels and staff quarters	25	85	70		
Places of public worship and courts of law	25	85	65		
Hospitals, clinics, convalescences and homes for the aged, diagnostic rooms, wards	25	85	55		

Notes:

- [1] The above standards apply to uses that rely on opened windows for ventilation. When assessment of rail noise impact at an internal location inside the building is required, the appropriate ANL should be 10 dB(A) less than the relevant ANL as shown in **Table 4.4** above.
- [2] The above standards should be viewed as the maximum permissible noise levels assessed at 1m from the external facade.
- [3] Rail noise is under the control of the Noise Control Ordinance and shall comply with the Acceptable Noise Levels laid down in the Technical Memorandum for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites.

4.2.2.1 Fixed Noise Sources

Operational noise from fixed noise sources is controlled under the NCO's Technical Memorandum on Noise from Places other than Domestic Premises, Public Places or Construction Sites (TM-Places). To plan for a better environment, the TM-EIAO has specified the following requirements, whichever is more stringent.

- 5 dB(A) below the appropriate ANLs in the Technical Memorandum on Noise from Places other than Domestic Premises, Public Places or Construction Sites; or
- the prevailing background noise levels.

The ANLs for different Area Sensitivity Ratings during different periods are summarised in **Table 4.5**.

Table 4.5 ANLs for fixed noise sources

Time Period	ANL, dB(A)			ANL-5, dB(A)		
	ASR A	ASR B	ASR C	ASR A	ASR B	ASR C
Day (0700 to 1900 hours)	60	65	70	55	60	65
Evening (1900 to 2300 hours)	60	65	70	55	60	65
Night (2300 to 0700 hours)	50	55	60	45	50	55

Note:

ASR – Area Sensitivity Rating.

4.2.2.2 Road Traffic Noise Sources

The criteria for assessing road traffic noise is given in the TM-EIAO and tabulated in **Table 4.4**. Noise criterion for domestic premises, hotels, hostels and offices is 70dB(A). The same for educational institutes and places of worship is 65dB(A). It should be noted that all these criteria only apply to NSRs that rely on opened windows for ventilation. In addition, reference has been made to EIAO Guidance Note No. 12/2010 on “Road Traffic Noise Impact Under the Environmental Impact Assessment Ordinance”.

4.2.2.3 Aircraft & Helicopter Noise Sources

The noise criteria for aircraft and helicopter noise are given in **Table 4.4**. NSRs should be planned beyond the NEF25 contour of aircraft noise.

For helicopter noise, NSRs should be planned beyond to have the noise impacts less than 85dB(A) L_{max} .

Similar to road traffic noise assessment, all these criteria only apply to NSRs relying on opened windows for ventilation.

4.2.2.4 Railway Airborne Noise Sources

The noise criterion for assessing railway noise is given in **Table 4.4**. In addition, noise level during the period between 11:00pm and 7:00am of the following day should not exceed 85 dB(A) L_{max} . Similar to road traffic noise assessment, all these criteria only apply to NSRs relying on opened windows for ventilation.

4.2.2.5 Railway Structureborne or Groundborne Noise

With reference to the Technical Memorandum for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites (TM-Places) under the NCO, the criteria for railway noise transmitted primarily through the structural elements of the building or buildings should be 10dB(A) less than the relevant ANL.

4.3 Description of the Environment

4.3.1 Existing Environment

The LMC Loop was used as a disposal site for mud extracted from the training works for the Shenzhen River. It has been left vacant since its formation. The noise climate is dominated by road traffic in the vicinity.

The adjacent area in Hong Kong outside LMC Loop is currently a tranquil rural area and is intended to be used to service the development of the LMC Loop. A large part of the adjacent area in Hong Kong outside LMC Loop falls within the Frontier Closed Area (FCA) and is therefore characterised by essentially rural land uses including arable farming and fish ponds. Active land uses are largely found in the part of the adjacent area in Hong Kong outside LMC Loop outside the FCA. A few village settlements, including LMC Tsuen, Pun Uk Tsuen, Chau Tau Tsuen, and Ha Wan Fisherman San Tsuen, lie within or on the fringe of the adjacent area in Hong Kong outside LMC Loop and are mainly surrounded by arable lands and fish ponds.

The area around the San Tin Interchange has been occupied for uses closely related to the cross-boundary activities. These include open car parks and open storage compounds for the cross-boundary commuters and goods, as well as a public transport interchange for cross-boundary shuttle bus services. The noise climate is mainly dominated by nearby road traffic in the vicinity.

The southern portion of the adjacent area in Hong Kong outside LMC Loop includes expressway of Fanling Highway and San Tin Highway with some scattered temporary houses. Further away from the highways, the adjacent area in Hong Kong outside LMC Loop is characterised by rural land uses with arable farming and land covered by trees. The noise climate is mainly dominated by the road traffic from Fanling Highway and San Tin Highway in the vicinity. The eastern portion of the adjacent area in Hong Kong outside LMC Loop includes scattered village houses in Tse Koo Hang and Ma Tso Lung and land covered by trees. The noise climate is mainly dominated by the minor road traffic along Border Road in the vicinity.

4.3.2 Baseline Condition

4.3.2.1 Existing Noise Sources

The area for noise impact assessment shall generally include all areas within 300 metres from the boundary of the Project and the associated works. Major land uses in the vicinity of the Project area are villages and agricultural areas. **Figure 4.1** shows an overlay of landuse proposals, locations of existing noise sources

within 300m from the boundary of the Project and potential noise sources impacts to the planned NSRs. **Table 4.5a** gives the shortest separation distance of the planned NSR to these existing noise sources.

Table 4.5a Major existing noise sources and its potential impacts

Noise Source	Shortest Separation Distance to Planned NSR, (m)	Potential Noise Impacts	Affected NSRs
LMC Station and Public Transport Interchange	965	N	-
LMC Railway	415	N	-
LMC BCP	740	N	-
LMC Helipad	630	N	-
LMC Operational Base	615	N	-
Lo Wu Range (Helipad)	1740	N	-
Lo Wu Classification Range	1740	N	-
LMC Public Transport Interchange	1540	N	-

The nature and operation of these noise sources are described as follows.

LMC Station and Public Transport Interchange

LMC Station is the terminus of LMC Spur Line, and it is located at 965m west of LMC Loop. Major fixed noise sources from the operation of LMC Station include public address system (PA system), intake and exhaust louvers, etc. In addition, LMC Station Public Transport Interchange provides a road-based transport to the control point. However, as LMC station is located at more than 300m away from LMC Loop, potential fixed noise impact is therefore not anticipated.

LMC Railway

LMC Railway is a spur from the East Rail Line, and it is located at 415m south-west of LMC Loop. Major noise sources come from the railway airborne noise including rolling noise and air-conditioning noise from trains running between LMC station and Sheung Shui Station. However, as LMC Railway is located at more than 300m away from LMC Loop, potential railway airborne noise impact is therefore not anticipated.

LMC BCP

The LMC BCP operates for 24 hours daily for passenger clearance, and it is located at 740m south-west of LMC Loop. Major fixed noise sources from the operation of LMC BCP include PA system and vehicle idling noise. However, as LMC BCP is located at more than 300m away from LMC Loop, potential fixed noise impact is therefore not anticipated.

LMC Helipad

LMC Helipad is located inside LMC BCP both for emergency and pre-planned tasks by the government department, at 630m south-west of LMC Loop. As LMC Helipad is located at more than 300m away from LMC Loop, potential helicopter noise impact is therefore not anticipated.

LMC Operational Base

LMC Operational Base is for both emergency and pre-planned tasks by the government department, and it is located at 615m east of LMC Loop. According to Agreement No. CE 60/2005 (TP) Land Use Planning for the Closed Area, the helipad is already closed for operation. As LMC Operational Base is located at more than 300m away from LMC Loop and the helipad is already closed for operation, potential helicopter noise impact is therefore not anticipated.

Lo Wu Range (Helipad)

Lo Wu Range (Helipad) at Tai Shek Mo is used for fire-fighting and police training, and it is located at 1740m south-east of LMC Loop. As Lo Wu Range (Helipad) is located at more than 300m away from LMC Loop, potential helicopter noise impact is therefore not anticipated.

Lo Wu Classification Range

Lo Wu Classification Range is a shooting range for discipline services including the Hong Kong Police Force, and it is located in a valley between Tai Sek Mo and Fung Kong Shan at 1740m south-east of LMC Loop. As Lo Wu Classification Range is located at more than 300m away from LMC Loop, potential fixed noise impact is therefore not anticipated.

LMC Public Transport Interchange

LMC Public Transport Interchange is to provide commuters a choice of road-based public transport to the control point, and it is located at 1540m south-west of LMC Loop. As LMC Public Transport Interchange is located at more than 300m away from LMC Loop, potential fixed noise impact is therefore not anticipated.

4.3.2.2 Planned Noise Sources

Other than the major existing noise sources within 300 metres from the boundary of the Project and associated works, there are planned noise sources which may give rise to potential impacts on the existing and future NSRs within 300 metres from the boundary of the Project and associated works. They are listed in **Table 4.5b** and their associated locations are shown in **Figure 4.1**.

Table 4.5b Planned noise sources and its potential impacts

Noise Source	Shortest Separation Distance (m)		Potential Noise Impacts	Affected NSRs ^[1]
	Planned NSR	Existing NSR		
STW within LMC Loop	195 ^[2] /70 ^[3]	450	Y	P
Mechanical Plant and Equipment inside LMC Loop	10 ^[4]	80 ^[5]	Y	P/E
ESS	10 ^[4]	165	Y	P/E
Fire Station cum Ambulance Depot	175 ^[2] /100 ^[3]	700	Y	P
District Cooling System (provisional) – South	70	95	Y	P/E

Noise Source	Shortest Separation Distance (m)		Potential Noise Impacts	Affected NSRs ^[1]
	Planned NSR	Existing NSR		
District Cooling System (provisional) – North	70	700	Y	P
Transport Interchange (TI) at north side within LMC Loop	160 ^[2] /100 ^[3]	965	Y	P
Transport Interchange (TI) at west side within LMC Loop	155	150	Y	P/E
Transport Interchange (TI) above LMC Station Public Transport Interchange	965	500	Y	P/E
Area in Shenzhen	300	-	N	-
Northern Link	-	-	N	-
Express Rail Link	-	-	N	-

Note:

- [1] P and E represent planned NSRs and existing NSRs respectively.
- [2] Distance from noise source to the nearest NSR within LMC Loop.
- [3] Distance from noise source to the nearest NSR in the “Unspecified Use” (UNSP) area in Hoo Hok Wai (HHW) area.
- [4] Plantroom exhaust is assumed at least 10m separation distance from the planned NSRs.
- [5] Separation distance is measured from the site boundary of LMC Loop to the nearest existing NSRs.

The nature and operation of these noise sources are described as follows.

Sewage Treatment Work (STW)

The proposed STW within LMC Loop is to serve the sewage generation requirement of the development and it is located at 195m south-east of the planned NSRs within LMC Loop and 70m west of the Hoo Hok Wai (HHW) area, which is currently within an “Unspecified Use” (UNSP) area on the approved Ma Tso Lung and Hoo Hok Wai DPA Plan (No. DPA/NE-MTL/2). The planning intention of the HHW area is to conserve and enhance the ecological value and functions of the existing fish ponds or wetland of the area. Subject to the “no-net-loss in wetland” principle, limited low-density private residential or passive recreational development may be allowed within this “UNSP” area in future in exchange for committed long-term conservation and management of the remaining ponds or wetland within a development site in this “UNSP” area. The proposed STW consists of inlet pump station, blower house (Sludge), blower house (MBR), water storage tank, transformer bays, membrane bioreactor, etc. Potential fixed noise impact due to operation of STW will be addressed in this noise assessment.

Mechanical Plant and Equipment inside LMC Loop

Mechanical plant and equipment inside LMC Loop usually consists of chillers, pumps, air-handling units, etc. The majority of these mechanical plant would be enclosed in a plantroom and therefore their noise emission will be adequately controlled. External ventilation openings can be equipped with sound attenuators or acoustic louvers for proper noise control design and outdoor chiller plant with noise screens or acoustic enclosure to ensure compliance with the noise criteria. Hence, potential fixed noise impact is not anticipated.

Electricity Sub-Station (ESS)

Noise sources from ESS consist of transformer (132/11kV) and ventilation system. The technology today can provide low noise transformer that can be used for open installation. Such installations are evident in many districts of Hong Kong and they are proven to be suitable for open installation from noise emission perspective. Ventilation system can be equipped with sound attenuators or acoustic louvers for proper noise control design. Hence, the potential fixed noise impact is not anticipated.

Fire Station cum Ambulance Depot

Fire Station cum Ambulance Depot is proposed in the eastern part of LMC Loop to provide emergency service for the public. Noise sources from depot operations include loudspeakers, siren, fire engine sirens, etc. Though of short durations, these noises may be potential nuisance to the nearby NSRs, despite, their occurrences are infrequent and on a need basis. As the depot is located at 700m and 100m from existing and planned NSRs respectively, potential nuisance is also not anticipated.

District Cooling System (DCS) (provisional)

Two DCSs (provisional) are proposed in the northern and southern part in the LMC Loop respectively. The proposed DCS (provisional) is to provide a central cooling system to serve the air conditioning system of LMC Loop, and it is located at 70m south-west of the planned NSRs and 95m north-east of existing NSRs at Ha Wan Tsuen. Potential fixed noise impact due to operation of DCS (provisional) will be addressed in this noise assessment.

Transport Interchange (TI)

Two new transport interchanges (TIs) are proposed with ancillary park-and-ride facilities inside the LMC Loop development. The shortest distances from the nearest existing and planned NSRs from the two proposed TIs are 150m and 100m respectively. Noisy equipment inside TI usually consists of ventilation fans, idling engine and manoeuvring vehicles, etc. However, the TI would be enclosed and therefore their noise emissions are adequately controlled. External ventilation openings can be equipped with sound attenuators or acoustic louvers for proper noise control design. Hence, potential fixed noise impact is therefore not anticipated.

In addition, another TI is proposed above the existing LMC Station Public Transport Interchange. It would be an open TI with passengers taking and dropping operations. Provision for mechanical ventilation is not required for this TI and the existing LMC Station Public Transport Interchange. Fixed noise impact is therefore not anticipated. Road traffic noise impact from the proposed TI is addressed under road traffic noise assessment.

Area in Shenzhen

The Area in Shenzhen will be implemented in accordance with the planning intention to promote cooperation between Hong Kong and Shenzhen as shown in **Figure 4.2**. The proposed developments will mainly be concentrated at the current Huanggang BCP, which may have opportunity to be released for development after Liantang/Heung Yeung Wai BCP commences operation. According to the current development proposal as shown in **Figure 4.2**, the Area in Shenzhen will

accommodate high-tech R&D, residential, commercial, open space and other related uses. Though the planning assumption for the Area in Shenzhen is not yet confirmed, there would be provision of central air conditioning system for the first layer of buildings facing Road M1 within LMC Loop as discussed in **Section 4.8.2.1**. More importantly, these buildings in the Area in Shenzhen will be located at more than 300m away from LMC Loop. Hence, potential noise impact from the Area in Shenzhen is therefore not anticipated.

Northern Link

The proposed Northern Link (NOL) will connect the existing West Rail and LMC Spur Line. However, the NOL alignment has not yet been finalised and is still under investigation. No updated information is available at the time of preparing this report. Nevertheless, the environmental impacts of NOL are subject to the statutory approval under the EIAO process and environmental impacts from NOL will comply with TM-EIAO. Adverse noise impacts from NOL are therefore not expected by provision of appropriate mitigation measures identified in the corresponding study if necessary.

Express Rail Link

With reference to the approved EIA Study “Hong Kong Section of Guangzhou – Shenzhen – Hong Kong Express Rail Link” (EIA-169/2009), there will be no railway stations along the alignment except at the West Kowloon Terminus. The proposed railway runs across the Mai Po Area through tunnels to minimise environmental impacts during operation. As the proposed alignment is located at more than 3000m west of LMC Loop, potential groundborne noise and airborne noise impacts are therefore not anticipated.

4.3.2.3 Prevailing Noise Level

Prevailing noise levels have been measured in the vicinity of the project boundary. **Figure 4.3** shows the locations of prevailing background noise measurements. A summary of the results is given in **Table 4.6**.

Table 4.6 Prevailing noise measurements

Monitoring Location ^[3]	Prevailing Noise Levels ^[1] , dB(A) L _{eq}	
	Day & Evening ^[2]	Night ^[2]
Fishponds on the northeast of the LMC Loop (PNM-1)	41-53	50-54
Fishponds in Tai Law Hau (PNM-2)	40-55	46-57
Lok Ma Chau Tsuen (PNM-3)	42-46	39-45
Ha Wan Tsuen (PNM-4)	56-60	43-59
The LMC Loop Location 1 (PNM-5)	47-61	42-50
The LMC Loop Location 2 (PNM-6)	45-54	41-49
The LMC Loop Location 3 (PNM-7)	46-52	41-47
The LMC Loop Location 4 (PNM-8)	43-48	40-46

Note:

- [1] Measurements conducted in July 2009 and July 2010
- [2] Day: 0700 to 1900 hours, Evening: 1900 to 2300 hours, Night: 2300 to 0700 hours
- [3] PNM represents prevailing noise measurement location

The higher noise levels at PNM-1 and PNM-2 during nighttime are mainly due to aerators in operation at night and occasionally during daytime. Ambient noise at PNM-4 during daytime and evening is resulted from local minibus movements. Noise levels at PNM-5 to PNM-8 during nighttime are generally low but during daytime and evening at PNM-5 is mainly resulted from trucks passing by Huanggang port.

4.4 Noise Sensitive Receivers

With reference to Annex 13 of the TM-EIAO, NSRs include residential uses (all domestic premises including temporary housing), institutional uses (educational institutions including kindergarten and nurseries), hospitals, medical clinics, homes for the aged, convalescent homes, places of worship, libraries, court of law, performing arts centres, auditoria and amphitheatres, country park and others.

Representative NSRs within 300 metres from the boundary of the Project and associated works have been identified with the first layer of NSRs selected for assessment. These NSRs cover all existing sensitive developments and planned NSRs within LMC Loop during construction period for construction noise assessment, and both the existing and planned developments for operational noise assessment.

The existing NSRs are identified by means of topographic maps, aerial photos, land status plans and several site surveys. Planned / committed NSRs are identified by making reference to relevant Outline Zoning Plans (OZP), Outline Development Plans, Development Permission Area Plans, Layout Plans and other relevant published landuse plans, including any alternative development proposal(s) identified or recommended in the course of the EIA study.

The existing and planned NSRs in the vicinity, which may be affected by LMC Loop are shown in **Tables 4.7** and **4.8** and illustrated in **Figures 4.4 – 4.7**. Photos of the NSRs are shown in **Appendix 4-1**. The ground levels are included in **Appendix 4-1A**.

Table 4.7 Existing NSRs identified within 300 metres from the boundary of the Project and associated works

Location of NSRs	Assessment Points (AP)	No. of Storey	Uses ^[1]
Border Road	BR-1	1	R
	BR-2	2	R
	BR-3	1	R
	BR-4	2	R
	BR-5	1	R
Chau Tau Tsuen	CTT-1	3	R
	CTT-2	2	R
	CTT-3	3	R
Ha Wan Fisherman San Tsuen	HWFST-2	1	R
Ha Wan Tsuen	HWT-3	1	R
	HWT-4	1	R
	HWT-5 to HWT-6	1	R

Location of NSRs	Assessment Points (AP)	No. of Storey	Uses ^[1]
	HWT-7 to HWT-8 ^[2]	2	R
Ha Wan Tsuen Road	HWTR-1 to HWTR-18	1	R
	HWTR-20 to HWTR-22	1	R
	HTWR-23	2	R
Kwu Tung North	KTN-50	2	R
	KTN-51	2	R
LMC Road	LMCR-1	4	R
	LMCR-2	2	R
	LMCR-3	3	R
	LMCR-4	3	R
	LMCR-5 to LMCR-7	2	R
	LMCR-8	2	R
	LMCR-9	2	R
	LMCR-10	2	R
	LMCR-11	1	R
	LMCR-12 ^[2]	1	R ^[3]
	LMCR-14	3	R
	LMCR-15	3	R
	LMCR-16	1	R
LMCR-17	2	R	
LMC San Tsuen	LMCST-1 to LMCST-2	1	R
LMC Tsuen	LMCT-1	3	R
Ma Tso Lung	MTL-2	1	R
	MTL-3	2	R
	MTL-4 to MTL-6	1	R
	MTL-7	2	R
	MTL-20	1	R
	MTL-21	1	R
Ma Tso Lung Road	MTLR-1	1	R
	MTLR-2	2	R
	MTLR-3	1	R
	MTLR-4	2	R
	MTLR-5 to MTLR-6	2	R
	MTLR-7	2	R
Ma Tso Lung San Tsuen	MTLST-1	1	R
Ma Tso Lung Shun Yee San Tsuen	MTLSYST-1	2	R
	MTLSYST-2	1	R
Pun Uk Tsuen	PUT-1 to PUT-2	3	R
San Sham Road	SSR-1 to SSR-2	2	R
Tung Chan Wai	TCW-1	3	R
Tung Wing On Road	TWOR-1	3	R

Notes:

[1] R – Residential

- [2] HWT-8 and LMCR-12 will be resumed in mid 2016, therefore only construction access road traffic noise assessment during advance works has been conducted.
- [3] The landuse of LMCR-12 was found different from that stated in the LMC Access Road EA Report.

Site observation has found that LMCR-12 is currently a temple of a temporary structure and appears to be recently constructed, which is different from the landuse previously stated in the LMC Access Road EA Report. Land search conducted by surveyors indicated that the lots are old scheduled agricultural lots. It is therefore proposed that the noise criteria applicable to LMCR-12 will remain the same as the assumed village house landuse as stated in the LMC Access Road EA Report.

Table 4.8 Planned NSRs identified within 300 metres from the boundary of the Project and associated works

Location of NSRs	Assessment Points	No. of Storey	Uses ^[1]
Other Specified Uses (Comprehensive Development and Wetland Enhancement Area) [OU(CDWEA)] near San Tin	CDWEA-P1 to CDWEA-P4	3 ^[2]	[3]
“Unspecified Use” area in Hoo Hok Wai	HHW-P1 to HHW-P4	3 ^[2]	[6]
“Village Type Development” (“V”) zone near Chau Tau Tsuen	CTT-P1 to CTT-P3	3 ^[2]	R
Eco-Lodge	EL-P1 to EL-P5	1 ^[2]	[3]
Ex-Lung Kai Public School	ELKPS-P1	1 ^[2]	G
LMC Loop	LMCL-P1 to LMCL-P3	8 ^[4]	E ^[5]
	LMCL-P4	10 ^[4]	E ^[5]
	LMCL-P5 to LMCL-P7	9 ^[4]	E ^[5]
	LMCL-P8 to LMCL-P11	6 ^[4]	E ^[5]
	LMCL-P12 to LMCL-P15	8 ^[4]	E ^[5]
	LMCL-P16 to LMCL-P17	10 ^[4]	E ^[5]
	LMCL-P18 to LMCL-P23	9 ^[4]	E ^[5]
	LMCL-P24 to LMCL-P25	10 ^[4]	E ^[5]
LMCL-P26 to LMCL-P28	6 ^[4]	E ^[5]	
LMC Tsuen	LMCTE-P1 to LMCTE-P18	3 ^[2]	R
R&D near Lo Wu Classification Range	KTN F1-3	10	OU

Notes:

- [1] R – residential, OU – Other specified uses, G - Government
- [2] One storey for Ex-Lung Kai Public school and Eco-lodge. Three storeys for residential premises in the CDWEA in San Tin and Unspecified Use in Hoo Hok Wai, village zone near Chau Tau Tsuen, and LMC Tsuen are assumed.
- [3] Residential uses are assumed and the uses will be updated when more information is available.
- [4] No. of storeys according to the latest planning information from the Study.
- [5] Educational institutions refer to student hostels, staff quarters, academic and administration buildings. However, central air conditioning is assumed to be provided for academic and administration buildings. Thus, only student hostels and staff quarters are considered as NSRs.
- [6] Residential uses are assumed in light of the planning intention for the “UNSP” area for HHW under the current Approved Ma Tso Lung and Hoo Hok Wai DPA Plan No. DPA/NE-MTL/2.

The relevant plans have been reviewed to identify the planned / committed NSRs. The nature and location of these planned NSRs are described as follows.

Other Specified Uses (Comprehensive Development and Wetland Enhancement Area) [OU(CDWEA)] near San Tin

The “OU(CDWEA)” zone near San Tin is located at the south of the MTR LMC Station and west of the LMC BCP. According to the Approved San Tin OZP No. S/YL-ST/8, the zoning designation is intended for conservation and enhancement of ecological value and functions of the existing fish ponds or wetland through consideration of application for development or redevelopment under a “private-public partnership approach”. Limited low-density private residential or passive recreational development within the “OU(CDWEA)” zone in exchange for committed long-term conservation and management of the remaining fish ponds or wetland within the development site may be permitted subject to the “no-net-loss in wetland” principle and planning permission from the Town Planning Board. Any new building should be located farthest away from Deep Bay.

“Unspecified Use” area in Hoo Hok Wai

According to DPA Plan No. DPA/NE-MTL/2, the Hoo Hok Wai Area stretching from the east of Lok Ma Chau Loop in Liu Pok is designated as “unspecified use”. The planning intention for this “UNSP” area for HHW is similar to the planning intention designated for the “OU(CDWEA)” zone in San Tin under the current Approved San Tin OZP No. S/YL-ST/8, which is to conserve and enhance the ecological value and functions of the existing fish ponds or wetland of the area. Subject to the “no-net-loss in wetland” principle, limited low-density private residential or passive recreational development may be allowed within this “UNSP” area in future in exchange for committed long-term conservation and management of the remaining ponds or wetland within a development site in this “UNSP” area. In addition, planning permission from the TPB is required for any development proposal in this “UNSP” area.

“Village Type Development” zone near Chau Tau Tsuen

The village settlement near Chau Tau Tsuen located to the south of LMC Loop is under the “Village Type Development”(“V”) zoning according to the current Approved San Tin OZP S/YL-ST/8 which is intended for development of Small Houses by indigenous villagers.

Eco-Lodge

According to the Approved Ma Tso Lung and Hoo Hok Wai DPA Plan No. EPA/NE-MTL/2, the small knoll to the west of Tse Koo Hang is zoned “OU(Eco-lodge)” and it possesses expansive views over the environmentally sensitive fishponds/ wetlands of Hoo Hok Wai which serve as a valuable natural setting, but relatively untouched due to restricted public access and physical separation. The site is accessible to high value ecological areas (including Ramsar Site) and can be linked with recreational uses as well as historical and cultural interest in the Closed Area. The eco-lodge should preferably be constructed on stilts to minimize site formation on the natural landscape of the site. To tie in with the surrounding rural environment, no new development, or addition, alteration and/or modification to or redevelopment of an existing building within this zone shall result in a total development and/or redevelopment in excess of a maximum plot

ratio of 0.2 and a maximum building height of 1 storey. Location of the Eco-lodge is shown as “OU” near Eastern Connection Road in **Figures 4.4 to 4.6**.

Ex-Lung Kai Public School

According to the latest RODP for North East New Territories New Development Areas (Application No. ESB-176/2007), the ex-Lung Kai Public School within KTN, with site area estimated to be around 0.26ha, is scheduled for development as either potential eco-tourism education centre, holiday camp or other recreation uses.

Research & Development (R&D) near Lo Wu Classification Range

According to the latest RODP for North East New Territories New Development Areas (Application No. ESB-176/2007), R&D is reserved for KTN F1-3 with site area estimated to be around 8.18ha.

LMC Loop

A RODP for LMC Loop has been formulated with internal development to be constructed and operated in phases. The first phase of development (including educational institutions, student hostels and staff quarters which is noise sensitive) is anticipated to put into operation in Year 2020 and thus they have been considered as planned NSRs in this noise assessment. However, as the educational institutions will be equipped with central air conditioning system, adverse noise impacts are not anticipated.

LMC Tsuen

The village settlement near LMC Tsuen is located to the south of the LMC Loop and is under the “Village Type Development” (“V”) according to the current Approved San Tin OZP No. S/YL-ST/8 which is intended for development of Small Houses by indigenous villagers.

4.5 Assessment Methodology

4.5.1 Construction Phase

4.5.1.1 General Assessment Procedures

Construction noise assessment will be conducted based on the following procedures:

- Determine 300 metres from the boundary of the Project and associated works;
- Identify and locate representative NSRs that may be affected by the works;
- Obtain the construction method and work sequence for the construction period;
- Obtain the construction plant inventory for each corresponding construction work sequence;

- Determine the sound power levels of the plant items according to the information stated in the TM-GW or other recognised sources of reference, where appropriate;
- Calculate the correction factors based on the distance between the NSRs and the notional noise source positions of the work sites;
- Apply corrections for façade, distance, barrier attenuation, acoustic reflection where applicable;
- Predict construction noise levels at the NSRs;
- Quantify the level of impact at the NSRs, in accordance with TM-GW; and
- Predict the cumulative noise impacts for any concurrent construction works in the vicinity of the proposed work.

4.5.1.2 Locations of Representative NSRs

For construction noise assessment, representative NSRs locations that would be affected by the construction activities have been selected from **Table 4.7** and are summarised in **Table 4.9** below.

Table 4.9 Representative NSRs for construction noise assessment

Location of NSRs	Assessment Points	No. of Storeys	Uses ^[1]
Border Road	BR3	1	R
	BR4	2	R
	BR5	1	R
Chau Tau Tsuen	CTT-3	3	R
Ha Wan Tsuen Road	HWTR-1	1	R
	HWTR-6	1	R
	HWTR-11	1	R
	HWTR-20	1	R
LMC Road	LMCR-14	3	R
	LMCR-15	3	R
LMC San Tsuen	LMCST-2	1	R
Ma Tso Lung	MTL-20	1	R
Ma Tso Lung Road	MTLR-1	1	R
San Sham Road	SSR-2	2	R
Ha Wan Tsuen	HWT-8	2	R
LMC Loop	LMCL-P4	10 ^[2]	E ^[3]
Tung Wing On Road	TWOR-1	3	R
Eco-Lodge	EL-P3	1	R

Notes:

[1] R – residential

[2] No. of storeys according to the latest planning information from the Study.

[3] Educational institutions refer to student hostels, staff quarters, academic and administration buildings. However, central air conditioning is assumed to be provided for academic and administration buildings. Thus, only student hostels and staff quarters are considered as NSRs.

Construction noise impacts of both existing and planned NSRs have been assessed with the locations of planned receivers within the loop established in accordance with the implementation phasing of the development. According to the tentative construction programme (as refer to **Appendix 2-6**), the anticipated population intake for most of the planned NSRs is scheduled to commence beyond 2020 while the major construction activities including earthwork, building etc. will be completed at the same time. Thus, only the remaining minor internal road and utilities construction works will impose construction noise impact on the planned NSRs.

OU (CDWEA) zone in San Tin, “Unspecified Use” area in HHW, Ex-Lung Kai Public School and LMC Tsuen, Chau Tau Tsuen and Eco-Lodge

The implementation of the “OU (CDWEA)” zone in San Tin will depend on private initiatives and market condition. Its implementation programme is subject to the decision of the Town Planning Board on the planning applications for development proposals submitted for their consideration under the statutory planning application system.

Similarly, development in the HHW which is currently within an “Unspecified Use” area in the current Approved Ma Tso Lung and Hoo Hok Wai DPA Plan No. D/NE-MTL/2, will also be subject to private initiatives and decision of the (TPB) on the planning applications submitted for their consideration under their planning application system.

The re-use of Ex-Lung Kai Public School will be financed and implemented by non-governmental organisation or other interested private sectors. Currently, there is no implementation programme.

There are areas zoned “Village Type Development” at LMC Tsuen and Chau Tau Tsuen. The small houses will be constructed by indigenous villagers in accordance with the approval from Lands Department. The development of Small Houses is subject to compliance with the statutory planning requirements and prevailing land policy.

Though the implementation programme for development of Eco-lodge is yet to be confirmed, one planned receiver with the nearest separation distance from the construction workfront has been chosen for construction noise assessment as worst scenario.

4.5.1.3 Implementation Programme

An implementation programme showing the construction period for advance works (Establishment of ecological area), phase 1 infrastructure (Site formation works, LMC Road improvement works, etc), phase 1 buildings, phase 2 infrastructure (Construction of Eastern Connection Road, DCS (provisional), etc) and phase 2 buildings within LMC Loop is shown in **Appendix 2-6**.

4.5.1.4 Construction Noise Assessment Tool

An in-house program has been used for construction noise calculations. Initially, program runs were conducted without any mitigation measures (ie the “Unmitigated Scenario”). Where noise level exceedance was identified, further

runs would be made assuming different combinations of mitigation measures to be incorporated (ie the “Mitigated Scenario”).

4.5.1.5 Construction Access Road Traffic Noise

Construction access road traffic noise calculation is based on the method of UK Department of Transport “Calculation of Road Traffic Noise (CRTN)”. The predicted noise levels at the sensitive receivers include 2.5dB(A) facade reflection and correction factors of effects due to gradient, distance, view angle, road surface and barriers. The standard 0.8m solid parapet along viaduct has also been included in the assessment.

The computer programme, RoadNoise 2000, has been used to model traffic noise from road networks. It complies with the *Calculation of Road Traffic Noise (CRTN)* developed by the UK Department of Transport. The road traffic noise will be presented in terms of noise levels exceeded for 10% of the one-hour period during peak traffic flow [ie $L_{10(1hr)}$ dB(A)].

The construction work for LMC Loop is tentatively scheduled from 2014 to 2020. LMC Road and Ha Wan Tsuen Road will be used as construction access road during advance works in 2016, while Sai Kwo Road, LMC Road and Ha Wan Tsuen Road will be used as construction access roads during site formation works. The construction period in Year 2016 for advance works and Year 2020 for site formation are chosen for construction access road traffic noise assessment. Representative NSRs for construction access road traffic noise is shown in **Table 4.10** below.

Table 4.10 Representative NSRs for construction access road traffic noise

Location of NSRs	Assessment Points	No. of Storey	Uses ^[1]
Chau Tau Tsuen	CTT-1	3	R
	CTT-2	2	R
	CTT-3	3	R
Ha Wan Fisherman San Tsuen	HWFST-2	1	R
Ha Wan Tsuen	HWT-3	1	R
	HWT-4	1	R
	HWT-5 to HWT-6	1	R
	HWT-7 to HWT-8 ^[2]	2	R
Ha Wan Tsuen Road	HWTR-1 to HWTR-18, HWTR-20 to HWTR-22	1	R
	HTWR-23	2	R
LMC Road	LMCR-1	4	R
	LMCR-2	2	R
	LMCR-3	3	R
	LMCR-4	3	R
	LMCR-5 to LMCR-7	2	R
	LMCR-8	2	R
	LMCR-9	2	R
	LMCR-10	2	R
	LMCR-11	1	R
LMCR-12 ^[3]	1	R	

Location of NSRs	Assessment Points	No. of Storey	Uses ^[1]
	LMCR-14	3	R
	LMCR-15	3	R
	LMCR-16	1	R
	LMCR-17	2	R
LMC San Tsuen	LMCST-1 to LMCST-2	1	R
LMC Tsuen	LMCT-1	3	R
San Sham Road	SSR-1 to SSR-2	2	R
Tung Chan Wai	TCW-1	3	R
Tung Wing On Road	TWOR-1	3	R

Notes:

- [1] R – Residential
- [2] HTW-8 will be resumed in mid 2016, therefore only construction access road traffic noise assessment during advance works has been conducted.
- [3] LMCR-12 will be resumed in mid 2016, therefore only construction access road traffic noise assessment during advance works has been conducted. Site observation has found that LMCR-12 is currently a temple of a temporary structure and appears to be recently constructed, which is different from the landuse previously stated in the LMC Access Road EA Report. Land search conducted by surveyors indicated that the lots are old scheduled agricultural lots. It is therefore proposed that the noise criteria applicable to LMCR-12 will remain the same as the assumed village house landuse as stated in the LMC Access Road EA Report.

According to the conditions in the current Environmental Permit (No. FEP-05/129/2002/F), Clause 2.7 requires that “The Permit Holder shall, if required by the Director, carry out further assessments and implement further noise mitigation measures if the traffic volume using the LMC Access Road exceeds that assumed in s.2.1.2 and Table B5 of the Environmental Assessment Report attached to the Application VEP-126/2003.” Further road traffic noise assessment is required to assess the impact and further noise mitigation measures shall be implemented as necessary. Mitigation measures in terms of temporary noise barrier are proposed in this noise assessment.

4.5.2 Operational Phase

4.5.2.1 Location of Representative NSRs

For operational noise assessment, representative NSRs locations have been selected from **Tables 4.7** and **4.8** and are summarised in **Table 4.11**.

Table 4.11 Representative NSRs for operational noise assessment

Location of NSRs	Assessment Points	No. of Storey	Uses ^[1]
Border Road	BR-1	1	R
	BR-2	2	R
	BR-3	1	R
	BR-4	2	R
	BR-5	1	R
CDWEA in San Tin	CDWEA-P1 to CDWEA-P4	3	[2]
“Unspecified Use” area in Hoo Hok Wai	HHW-P1 to HHW-P4	3	[6]
Chau Tau Tsuen	CTT-1	3	R

Location of NSRs	Assessment Points	No. of Storey	Uses ^[1]
	CTT-2	2	R
	CTT-3	3	R
	CTT-P1 to CTT-P3	3 ^[3]	R
Eco-Lodge	EL-P1 to EL-P5	1	^[2]
Ex-Lung Kai Public School	ELKPS-P1	1	G
Ha Wan Fisherman San Tsuen	HWFST-2	1	R
Ha Wan Tsuen	HWT-3	1	R
	HWT-4	1	R
	HWT-5 to HWT-6	1	R
	HWT-7 to HWT-8 ^[5]	2	R
Ha Wan Tsuen Road	HWTR-1 to HWTR-18	1	R
	HWTR-20 to HWTR-22	1	R
	HTWR-23	2	R
Kwu Tung North	KTN-50	2	R
	KTN-51	2	R
LMC Loop	LMCL-P1 to LMCL-P3	8	E ^[4]
	LMCL-P4	10	E ^[4]
	LMCL-P5 to LMCL-P7	9	E ^[4]
	LMCL-P8 to LMCL-P11	6	E ^[4]
	LMCL-P12 to LMCL-P15	8	E ^[4]
	LMCL-P16 to LMCL-P17	10	E ^[4]
	LMCL-P18 to LMCL-P23	9	E ^[4]
	LMCL-P24 to LMCL-P25	10	E ^[4]
LMCL-P26 to LMCL-P28	6	E ^[4]	
LMC Road	LMCR-1	4	R
	LMCR-2	2	R
	LMCR-3	3	R
	LMCR-4	3	R
	LMCR-5 to LMCR-7	2	R
	LMCR-8	2	R
	LMCR-9	2	R
	LMCR-10	2	R
	LMCR-11	1	R
	LMCR-12 ^[5]	1	R
	LMCR-14	3	R
	LMCR-15	3	R
	LMCR-16	1	R
LMCR-17	2	R	
LMC San Tsuen	LMCST-1 to LMCST-2	1	R
LMC Tsuen	LMCT-1	3	R
LMC Tsuen	LMCTE-P1 to LMCTE-P18	3	R
Ma Tso Lung	MTL-2	1	R
	MTL-3	2	
	MTL-4 to MTL-6	1	

Location of NSRs	Assessment Points	No. of Storey	Uses ^[1]
	MTL-7	2	
	MTL-20	1	
	MTL-21	1	
Ma Tso Lung Road	MTLR-1	1	R
	MTLR-2	2	
	MTLR-3	1	
	MTLR-4	2	
	MTLR-5 to MTLR-6	2	
	MTLR-7	2	
Ma Tso Lung San Tsuen	MTLST-1	1	R
Ma Tso Lung Shun Yee San Tsuen	MTLSYST-1	2	R
	MTLSYST-2	1	
Pun Uk Tsuen	PUT-1 to PUT-2	3	R
San Sham Road	SSR-1 to SSR-2	2	R
Tung Chan Wai	TCW-1	3	R
Tung Wing On Road	TWOR-1	3	R
R&D near Lo Wu Classification Range	KTN F1-3	10	OU

Notes:

- [1] R – Residential, OU – Other specified uses, G - Government
- [2] Residential uses are assumed and the uses will be updated when more information is available.
- [3] Three storeys for residential premises are assumed.
- [4] Educational institutions refer to student hostels, staff quarters, academic and administration buildings. However, central air conditioning is assumed to be provided for academic and administration buildings. Thus, only student hostels and staff quarters are considered as NSRs.
- [5] HWT-8 and LMCR-12 will be resumed in mid 2016, therefore only construction access road traffic noise assessment during advance works has been conducted.
- [6] Residential uses are assumed in light of the planning intention for the “UNSP” area for HHW under the current Approved Ma Tso Lung and Hoo Hok Wai DPA Plan No. DPA/NE-MTL/2.

4.5.2.2 Operational Road Traffic Noise

Road traffic noise calculation is based on CRTN which is stated in **Section 4.5.1.5**. According to the EIA Study Brief, calculations of future road traffic noise will be based on the peak hourly flow for the maximum traffic projected within a 15 years period upon commencement of operation. The traffic projection will take into account the induced traffic due to the operation of other planned roads and committed projects. Since the full operation for LMC Loop will be in Year 2027, the assessment year for road traffic noise is taken as Year 2042 (15 years after full operation for LMC Loop). **Figure 4.1** shows the 300 metres from the boundary of the Project and associated works which would be modeled by CRTN.

4.5.2.3 Assessment of Other Noise Sources

For assessing fixed noise sources, the Area Sensitivity Ratings at the NSRs are defined in accordance with the relevant TMs. Since the LMC Loop and its surrounding land uses are rural in nature, an ASR of “A” is therefore assigned for the NSRs.

Assessment of fixed noise from STW, and district cooling system (DCS) (provisional) will be conducted according to standard acoustic principles.

4.6 Identification of Impacts

4.6.1 Construction Phase

Construction activities of the Loop development and its associated infrastructure have been identified for noise assessment and inclusive of the following Designated Project (DP):

- Ecological Area (DP1);
- Western Connection Road (DP2);
- Direct Link to LMC Station (DP3);
- Drainage System under Internal Transport Networks (DP4);
- Sewage Treatment Works (DP5);
- Eastern Connection Road (DP6); and
- Flushing Water Service Reservoir (DP7)

The major construction works would include the following activities:

- Site clearance and formation activities;
- LMC Road improvement works (Western Connection Road);
- Construction of Eastern Connection Road; and
- Construction of buildings and Infrastructures within Loop

These construction activities will involve the use of Powered Mechanical Equipment (PME) including air compressor, excavators, lorries, mobile cranes, concrete lorry mixers, pokers, rollers, etc. However, percussive piling and blasting works will not be involved for the construction of LMC Loop and the associated works.

In addition, tunnel boring machine will not be used. Instead, cut-and-cover method has been recommended for the construction of underpass. Therefore, the associated groundborne noise impacts are not anticipated and thus, the associated construction noise impact has been assessed in the construction airborne noise assessment.

The adopted utilisation rates and the associated PME are summarised in **Table 4.12**.

Table 4.12 Utilisation rates of PME

PME	Typical Utilisation Rate (%)
Air Compressor	100
Asphalt Paver	100
Bar Bender and Cutter (Electric)	100
Hand Held Breaker	100
Bulldozer	100
Concrete Lorry Mixer	100
Concrete Pump	100

PME	Typical Utilisation Rate (%)
Mobile Crane	100
Compactor, vibratory	100
Dump Truck	100
Backhoe	100
Excavator	100
Motor Grader	100
Generator	100
Grout Mixer	100
Grout Pump	100
Hoist , Petrol	100
Lorry, Crane/Grab	100
Piling, Large Diameter Bored, rcd	100
Vibratory Poker	100
Rock Drill (pneumatic)	100
Roller	100
Electric Saw	100
Water Pump	100
Vertical band drain installation rig	100

The adopted utilisation rates, Sound Power Levels (SWLs) and the associated PME are presented in **Appendix 4-2**. Construction plant inventory has been confirmed with the project proponent.

Sai Kwo Road, Lok Ma Chau Road and Ha Wan Tsuen Road will be utilised for construction access. Road traffic noise impact will be assessed for the peak hour daily traffic of the worst case scenario during advance works at Year 2016 and site formation at Year 2020 of the construction period.

4.6.2 Operational Phase

Operational activities of the Loop development and its associated infrastructure have been identified for noise assessment and inclusive of the following Designated Project (DP):

- Ecological Area (DP1);
- Western Connection Road (DP2);
- Direct Link to LMC Station (DP3);
- Drainage System under Internal Transport Networks (DP4);
- Sewage Treatment Works (DP5);
- Eastern Connection Road (DP6); and
- Flushing Water Service Reservoir (DP7).

The major operational activities would include the following noise sources:

- Fixed noise; and
- Road traffic noise

4.6.2.1 Fixed Noise Sources

Fixed noise sources at the two new TIs within LMC Loop are primarily the idling engine and manoeuvring vehicles, etc. Currently there are no layouts indicating the detailed design of the TIs, therefore quantitative assessment is not possible. As the two TIs will be enclosed and therefore their noise emissions are adequately controlled. External ventilation openings can be equipped with sound attenuators or acoustic louvers for proper noise control design.

In addition, another TI is proposed above the existing LMC Station Public Transport Interchange. It would be an open TI with passengers taking and dropping operations. Provision for mechanical ventilation is not required for this TI and the existing LMC Station Public Transport Interchange.

There would not be any potential noise sources at the proposed flushing water service reservoir. Therefore, fixed noise impacts are not expected from the TIs and proposed flushing water service reservoir during operational phase.

Other existing fixed noise sources around LMC Loop as shown in **Table 4.5a** include the LMC Station, LMC Spur Line, LMC BCP, LMC Helipad, LMC Operational Base, Lo Wu Range (Helipad), Lo Wu Classification Range and a Public Transport Interchange. They are located at 965m, 415m, 740m, 630m, 615m, 1740m, 1740m and 1540m respectively. Given the large separation distances, noise impacts are not anticipated.

4.6.2.2 Road Traffic Noise

Major roads in the vicinity of the project boundary and the associated road networks include Eastern Connection Road, Western Connection Road, and the new roads within LMC Loop. In addition, local roads with lighter traffic volume including Lung Hau Road, Border Road, Ma Tso Lung Road and other local village roads are also presented. Hence, road traffic noise impact on both existing and planned NSRs will be assessed accordingly.

4.7 Evaluation of Impacts

4.7.1 Construction Phase

4.7.1.1 Assessment Results of Construction Airborne Noise under Unmitigated Scenario

According to the latest engineering design, construction would mainly comprise of the activities as described in **Section 4.6.1**. The corresponding Sound Power Levels (SWLs) of these activities have been estimated according to the PME's SWLs and the assessment methodology in the GW-TM. **Appendix 4-2** presents the SWLs for each PME and **Appendix 4-3** shows the phasing of construction. **Appendix 4-4** gives the plant inventory adopted for each workfront and **Appendix 4-5** provides the distance between the notional sources and the NSRs.

Assessment is conducted in accordance with the work programme given in **Appendix 4-6**. **Appendix 4-7** presents the calculated construction noise impacts

at selected representative NSRs. The predicted construction noise impacts at the NSRs under unmitigated scenario are summarised in **Table 4.13** below.

Table 4.13 Predicted construction noise impact at NSRs under unmitigated scenario

Location of NSRs	AP	Uses ^[1]	L _{eq} (30mins), dB(A)			Duration of Exceedance Months
			Criterion ^[2]	Unmitigated Noise Level	Exceedance	
Border Road	BR3	R	75	75	-	-
	BR4	R	75	76	1	11
	BR5	R	75	82	6	48
Chau Tau Tsuen	CTT-3	R	75	63	-	-
Ha Wan Tsuen Road	HWTR-1	R	75	79	4	22
	HWTR-6	R	75	90	15	4
	HWTR-11	R	75	90	15	4
	HWTR-20	R	75	74	-	-
LMC Road	LMCR-14	R	75	79	4	4
	LMCR-15	R	75	66	-	-
LMC San Tsuen	LMCST-2	R	75	77	2	4
Ma Tso Lung	MTL-20	R	75	86	11	6
Ma Tso Lung Road	MTLR-1	R	75	73	-	-
San Sham Road	SSR-2	R	75	76	1	4
Ha Wan Tsuen	HWT-8	R	75	84	9	31
LMC Loop	LMCL-P4	E ^[3]	75	74	-	-
Tung Wing On Road	TWOR-1	R	75	64	-	-
Eco-Lodge	EL-P3	R	75	88	13	6

Note:

[1] R – residential

[2] Relevant environmental standards/ criteria: TM-EIAO noise standards for construction activities

[3] Educational institutions refer to student hostels, staff quarters, academic and administration buildings. However, central air conditioning is assumed to be provided for academic and administration buildings. Thus, only student hostels and staff quarters are considered as NSRs.

It can be seen from the above table that exceedances of noise level from 1 to 15 dB(A) are predicted at some NSRs during construction phase under unmitigated scenario. Mitigation measures are therefore required.

4.7.1.2 Assessment Results of Construction Access Road Traffic Noise under Unmitigated Scenario

Construction access road traffic noise impacts to NSRs along Sai Kwo Road, LMC Road and Ha Wan Tsuen Road have been conducted for the peak hourly traffic flow in Year 2016 and 2020. While 2020 represents the worst case scenario, the need for erection of roadside barrier of 5m high has imposed a requirement for land resumption. As the required land could not be resumed prior to 2016, requirements for noise barrier with lower heights to cater for future use of the access road were assessed at 2016 to reflect the less construction traffic conditions without land resumption. Computer plot of the road scheme in 2016 and 2020 is shown in **Appendix 4-8**. Location of existing low noise surfacing have been extracted from Lok Ma Chau Station Access Road Noise Assessment Study – Noise Assessment Report and is shown in **Appendix 4-8A**. The extent of

low noise surfacing is along a section of Lok Ma Chau Road between Lung Hau Road and Chau Tau Road. **Tables 4.14a** to **4.14b** summarises the traffic data for the key roads assumed in the noise assessment. The traffic data used in the noise assessment has been endorsed by Transport Department as given in **Appendix 4-10A**. Details are given in **Appendices 4-9** and **4-10**.

Table 4.14a Summary of peak hour traffic flow data in 2016

ID	Road Section	Projected Peak Hour Flow in 2016, veh/h	% Heavy Vehicle	Design Speed, km/h
1201	Ha Wan Tsuen Road, from LMC Loop internal road to village road near Ha Wan Tsuen	14	7.1	50
1202	Ha Wan Tsuen Road, from Lung Hau Road to village road near Ha Wan Tsuen	26	11.5	50
1204	LMC Road (2 way), from Lung Hau Road to LMC Road	990	15.6	50
1205	LMC Road (2 way), from LMC Road to village road near Pun Uk Tsuen	1018	19.9	50
1206	LMC Road (2 way), from village road near Pun Uk Tsuen to Chau Tau West Road	1050	19.9	50

Notes:

- [1] There will be no construction traffic flow at Sai Kwo Road and temporary road connecting local road near San Sham Road and Border Road.

During the advance works in 2016, there will be an additional 20 construction vehicles per hour travelling along LMC Road and Ha Wan Tsuen Road (Two ways).

Table 4.14b Summary of peak hour traffic flow data in 2020

ID	Road Section	Projected Peak Hour Flow in 2020, veh/h	% Heavy Vehicle	Design Speed, km/h
1202	Ha Wan Tsuen Road, from Lung Hau Road to village road near Ha Wan Tsuen	27	11.1	50
1204	LMC Road (2 way), from Lung Hau Road to LMC Road	1026	15.3	50
1205	LMC Road (2 way), from LMC Road to village road near Pun Uk Tsuen	1101	19.5	50
1206	LMC Road (2 way), from village road near Pun Uk Tsuen to Chau Tau West Road	1129	19.1	50
1002	Ha Wan Tsuen Road, from LMC Loop internal road to temporary connection road	14	7.1	50
1003	Ha Wan Tsuen Road, from temporary connection road to village road near Ha Wan Tsuen	14	7.1	50
1004	Sai Kwo Road (NB), from Tun Yu Road to the temporary road	0	0	50

ID	Road Section	Projected Peak Hour Flow in 2020, veh/h	% Heavy Vehicle	Design Speed, km/h
	beneath San Sham Road			
1005	Temporary Road (EB), from local road near San Sham Road to Border Road	0	0	50

During the site formation for LMC Loop in 2020, there will be an additional 60 construction vehicles per hour travelling along Sai Kwo Road, LMC Road and Ha Wan Tsuen Road (One way).

Predicted construction access road traffic noise impacts in Year 2016 and Year 2020 are summarised in **Tables 4.15a to 4.15b**.

Table 4.15a Predicted construction access road traffic noise impacts for NSRs along LMC Road and Ha Wan Tsuen Road under unmitigated scenario in 2016

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Total Noise Impacts	Criterion ^[2]		
Chau Tau Tsuen	CTT-1	63	70	Y	R
	CTT-2	63	70	Y	R
	CTT-3	65	70	Y	R
Ha Wan Fisherman San Tsuen	HWFST-2	69	70	Y	R
Ha Wan Tsuen	HWT-3	68	70	Y	R
	HWT-4	68	70	Y	R
	HWT-5	60	70	Y	R
	HWT-6	65	70	Y	R
	HWT-7	64	70	Y	R
	HWT-8 ^[3]	64	70	Y	R
Ha Wan Tsuen Road	HWTR-1	65	70	Y	R
	HWTR-2	64	70	Y	R
	HWTR-3	43	70	Y	R
	HWTR-4	61	70	Y	R
	HWTR-5	60	70	Y	R
	HWTR-6	71	70	N	R
	HWTR-7	72	70	N	R
	HWTR-8	71	70	N	R
	HWTR-9	71	70	N	R
	HWTR-10	72	70	N	R
	HWTR-11	70	70	Y	R
	HWTR-12	61	70	Y	R
	HWTR-13	62	70	Y	R
	HWTR-14	62	70	Y	R
	HWTR-15	62	70	Y	R

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Total Noise Impacts	Criterion ^[2]		
	HWTR-16	62	70	Y	R
	HWTR-17	64	70	Y	R
	HWTR-18	64	70	Y	R
	HWTR-20	63	70	Y	R
	HWTR-21	65	70	Y	R
	HWTR-22	63	70	Y	R
	HWTR-23	75	70	N	R
LMC Road	LMCR-1	72	70	N	R
	LMCR-2	71	70	N	R
	LMCR-3	71	70	N	R
	LMCR-4	72	70	N	R
	LMCR-5	71	70	N	R
	LMCR-6	70	70	Y	R
	LMCR-7	65	70	Y	R
	LMCR-8	71	70	N	R
	LMCR-9	70	70	Y	R
	LMCR-10	69	70	Y	R
	LMCR-11	68	70	Y	R
	LMCR-12 ^[4]	73	70	N	R
	LMCR-14	70	70	Y	R
	LMCR-15	69	70	Y	R
	LMCR-16	74	70	N	R
	LMCR-17	69	70	Y	R
	LMC San Tsuen	LMCST-1	64	70	Y
LMCST-2		66	70	Y	R
LMC Tsuen	LMCT-1	58	70	Y	R
San Sham Road	SSR-1	71	70	N	R
	SSR-2	70	70	Y	R
Tung Chan Wai	TCW-1	61	70	Y	R
Tung Wing On Road	TWOR-1	75	70	N	R

Notes:

- [1] R – residential
- [2] Relevant environmental standards/ criteria: TM-EIAO noise standards for road traffic noise
- [3] HWT-8 will be resumed in mid 2016, therefore only construction access road traffic noise assessment during advance works has been conducted.
- [4] LMCR-12 will be resumed in mid 2016, therefore only construction access road traffic noise assessment during advance works has been conducted. Site observation has found that LMCR-12 is currently a temple of a temporary structure and appears to be recently constructed, which is different from the landuse previously stated in the LMC Access Road EA Report. Land search conducted by surveyors indicated that the lots are old scheduled agricultural lots. It is therefore proposed that the

noise criteria applicable to LMCR-12 will remain the same as the assumed village house landuse as stated in the LMC Access Road EA Report.

Table 4.15b Predicted construction access road traffic noise impacts for NSRs along Sai Kwo Road, LMC Road and Ha Wan Tsuen Road under unmitigated scenario in 2020

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Total Noise Impacts	Criterion ^[2]		
Chau Tau Tsuen	CTT-1	63	70	Y	R
	CTT-2	63	70	Y	R
	CTT-3	66	70	Y	R
Ha Wan Fisherman San Tsuen	HWFST-2	70	70	Y	R
Ha Wan Tsuen	HWT-3	67	70	Y	R
	HWT-4	68	70	Y	R
	HWT-5	64	70	Y	R
	HWT-6	64	70	Y	R
	HWT-7	68	70	Y	R
	HWT-8 ^[3]	-	-	-	-
Ha Wan Tsuen Road	HWTR-1	70	70	Y	R
	HWTR-2	66	70	Y	R
	HWTR-3	50	70	Y	R
	HWTR-4	64	70	Y	R
	HWTR-5	62	70	Y	R
	HWTR-6	71	70	N	R
	HWTR-7	72	70	N	R
	HWTR-8	72	70	N	R
	HWTR-9	72	70	N	R
	HWTR-10	73	70	N	R
	HWTR-11	71	70	N	R
	HWTR-12	65	70	Y	R
	HWTR-13	66	70	Y	R
	HWTR-14	66	70	Y	R
	HWTR-15	66	70	Y	R
	HWTR-16	66	70	Y	R
	HWTR-17	69	70	Y	R
	HWTR-18	67	70	Y	R
	HWTR-20	66	70	Y	R
	HWTR-21	68	70	Y	R
	HWTR-22	68	70	Y	R
	HWTR-23	76	70	N	R
	LMC Road	LMCR-1	73	70	N
LMCR-2		72	70	N	R

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Total Noise Impacts	Criterion ^[2]		
	LMCR-3	71	70	N	R
	LMCR-4	72	70	N	R
	LMCR-5	72	70	N	R
	LMCR-6	71	70	N	R
	LMCR-7	66	70	Y	R
	LMCR-8	72	70	N	R
	LMCR-9	71	70	N	R
	LMCR-10	70	70	Y	R
	LMCR-11	68	70	Y	R
	LMCR-12 ^[3]	-	-	-	-
	LMCR-14	71	70	N	R
	LMCR-15	69	70	Y	R
	LMCR-16	75	70	N	R
	LMCR-17	70	70	Y	R
LMC San Tsuen	LMCST-1	64	70	Y	R
	LMCST-2	67	70	Y	R
LMC Tsuen	LMCT-1	59	70	Y	R
San Sham Road	SSR-1	72	70	N	R
	SSR-2	71	70	N	R
Tung Chan Wai	TCW-1	61	70	Y	R
Tung Wing On Road	TWOR-1	75	70	N	R

Notes:

[1] R – residential

[2] Relevant environmental standards/ criteria: TM-EIAO noise standards for road traffic noise

[3] HWT-8 and LMCR-12 will be resumed in mid 2016, therefore only construction access road traffic noise assessment during advance works has been conducted.

The predicted road traffic noise level at the residential NSRs along Sai Kwo Road, LMC Road and Ha Wan Tsuen Road are between 43 – 75dB(A) in 2016 and 50 – 76dB(A) in 2020. Hence, mitigation measures are required.

4.7.2 Operational Phase

4.7.2.1 Assessment Results of Road Traffic Noise under Unmitigated Scenario

A computer plot of the road scheme in 2042 is shown in **Appendix 4-11**. **Table 4.16** summarises the traffic data in 2042 for the key roads assumed in the noise assessments. Details of traffic data in 2042 are given in **Appendix 4-13**.

Table 4.16 Summary of peak hour traffic flow data in 2042

ID	Road Section	Projected Peak Hour Flow in 2042, veh/h	% Heavy Vehicle	Design Speed (km/h)
1201	Ha Wan Tsuen Road (2 way), from LMC Loop internal road to village road near Ha Wan Tsuen	668	7.2	50
1202	Ha Wan Tsuen Road (2 way), from Lung Hau Road to village road near Ha Wan Tsuen	697	7.3	50
1204	LMC Road (2 way), from Lung Hau Road to LMC Road	1496	14.8	50
1205	LMC Road (2 way), from LMC Road to village road near Pun Uk Tsuen	1639	14.8	50
1206	LMC Road (2 way), from village road near Pun Uk Tsuen to Chau Tau West Road	1667	14.8	50
77	Eastern Connection Road (SB)	637	2.8	50
78	Eastern Connection Road (NB)	448	4.7	50

The predicted road traffic noise levels at each representative NSRs are presented in **Tables 4.17** and **4.18**. **Appendix 4-14** shows the noise impacts at different levels of the NSRs. 10 sample calculations of road traffic noise are shown in **Appendix 4-14A**.

Table 4.17 Predicted road traffic noise impact at existing NSRs under unmitigated scenario (Year 2042)

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Total Noise Impacts	Criterion ^[2]		
Border Road	BR-1	63	70	Y	R
	BR-2	49	70	Y	R
	BR-3	39	70	Y	R
	BR-4	38	70	Y	R
	BR-5	67	70	Y	R
Chau Tau Tsuen	CTT-1	64	70	Y	R
	CTT-2	66	70	Y	R
	CTT-3	67	70	Y	R
Ha Wan Fisherman San Tsuen	HWFST-2	70	70	Y	R
Ha Wan Tsuen	HWT-3	67	70	Y	R
	HWT-4	68	70	Y	R
	HWT-5	68	70	Y	R
	HWT-6	67	70	Y	R
	HWT-7	69	70	Y	R
	HWT-8 ^[3]	-	-	-	-
Ha Wan Tsuen Road	HWTR-1	72	70	N	R
	HWTR-2	68	70	Y	R
	HWTR-3	57	70	Y	R

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]	
		Total Noise Impacts	Criterion ^[2]			
	HWTR-4	65	70	Y	R	
	HWTR-5	64	70	Y	R	
	HWTR-6	74	70	N	R	
	HWTR-7	72	70	N	R	
	HWTR-8	76	70	N	R	
	HWTR-9	76	70	N	R	
	HWTR-10	75	70	N	R	
	HWTR-11	76	70	N	R	
	HWTR-12	71	70	N	R	
	HWTR-13	72	70	N	R	
	HWTR-14	72	70	N	R	
	HWTR-15	73	70	N	R	
	HWTR-16	73	70	N	R	
	HWTR-17	72	70	N	R	
	HWTR-18	68	70	Y	R	
	HWTR-20	68	70	Y	R	
	HWTR-21	70	70	Y	R	
	HWTR-22	70	70	Y	R	
	HWTR-23	76	70	N	R	
	Kwu Tung North	KTN-50	74	70	N	R
		KTN-51	74	70	N	R
	LMC Road	LMCR-1	73	70	N	R
		LMCR-2	72	70	N	R
LMCR-3		72	70	N	R	
LMCR-4		73	70	N	R	
LMCR-5		73	70	N	R	
LMCR-6		71	70	N	R	
LMCR-7		67	70	Y	R	
LMCR-8		72	70	N	R	
LMCR-9		71	70	N	R	
LMCR-10		70	70	Y	R	
LMCR-11		69	70	Y	R	
LMCR-12 ^[3]		-	-	-	-	
LMCR-14		71	70	N	R	
LMCR-15		70	70	Y	R	
LMCR-16		77	70	N	R	
LMCR-17	71	70	N	R		
LMC San Tsuen	LMCST-1	66	70	Y	R	
	LMCST-2	68	70	Y	R	
LMC Tsuen	LMCT-1	60	70	Y	R	
Ma Tso Lung	MTL-2	64	70	Y	R	
	MTL-3	66	70	Y	R	

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Total Noise Impacts	Criterion ^[2]		
	MTL-4	65	70	Y	R
	MTL-5	66	70	Y	R
	MTL-6	65	70	Y	R
	MTL-7	65	70	Y	R
	MTL-20	70	70	Y	R
	MTL-21	70	70	Y	R
Ma Tso Lung Road	MTLR-1	64	70	Y	R
	MTLR-2	66	70	Y	R
	MTLR-3	64	70	Y	R
	MTLR-4	44	70	Y	R
	MTLR-5	59	70	Y	R
	MTLR-6	62	70	Y	R
	MTLR-7	64	70	Y	R
Ma Tso Lung San Tsuen	MTLST-1	64	70	Y	R
Ma Tso Lung Shun Yee San Tsuen	MTLSYST-1	60	70	Y	R
	MTLSYST-2	58	70	Y	R
Pun Uk Tsuen	PUT-1	63	70	Y	R
	PUT-2	66	70	Y	R
San Sham Road	SSR-1	72	70	N	R
	SSR-2	71	70	N	R
Tung Chan Wai	TCW-1	61	70	Y	R
Tung Wing On Road	TWOR-1	76	70	N	R

Notes:

[1] R – Residential

[2] Relevant environmental standards/ criteria: TM-EIAO noise standards for road traffic noise

[3] HWT-8 and LMCR-12 will be resumed in mid 2016, therefore only construction access road traffic noise assessment during advance works has been conducted.

Table 4.18 Predicted road traffic noise impact at planned NSRs under unmitigated scenario (Year 2042)

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Total Noise Impacts	Criterion ^[3]		
OU (CDWEA)	CDWEA-P1	66	70	Y	[2]
	CDWEA-P2	65	70	Y	
	CDWEA-P3	64	70	Y	
	CDWEA-P4	63	70	Y	
Village zone near Chau Tau Tsuen	CTT-P1	70	70	Y	R
	CTT-P2	70	70	Y	R
	CTT-P3	73	70	N	R
Eco-Lodge	EL-P1	71	70	N	[2]
	EL-P2	67	70	Y	

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Total Noise Impacts	Criterion ^[3]		
	EL-P3	72	70	N	
	EL-P4	71	70	N	
	EL-P5	69	70	Y	
Ex-Lung Kai Public School	ELKPS-P1	58	70	Y	G
Unspecified Use area in Hoo Hok Wai	HHW-P1	63	70	Y	[5]
	HHW-P2	62	70	Y	
	HHW-P3	61	70	Y	
R&D near Lo Wu Classification Range	KTN F1-3	67	70	Y	OU
LMC Tsuen	LMCTE-P1	65	70	Y	R
	LMCTE-P2	64	70	Y	R
	LMCTE-P3	63	70	Y	R
	LMCTE-P4	65	70	Y	R
	LMCTE-P5	65	70	Y	R
	LMCTE-P6	58	70	Y	R
	LMCTE-P7	61	70	Y	R
	LMCTE-P8	61	70	Y	R
	LMCTE-P9	59	70	Y	R
	LMCTE-P10	58	70	Y	R
	LMCTE-P11	60	70	Y	R
	LMCTE-P12	57	70	Y	R
	LMCTE-P13	59	70	Y	R
	LMCTE-P14	60	70	Y	R
	LMCTE-P15	61	70	Y	R
	LMCTE-P16	58	70	Y	R
	LMCTE-P17	57	70	Y	R
	LMCTE-P18	57	70	Y	R
LMC Loop	LMCL-P1	76	70	N	E ^[4]
	LMCL-P2	76	70	N	E ^[4]
	LMCL-P3	72	70	N	E ^[4]
	LMCL-P4	59	70	Y	E ^[4]
	LMCL-P5	54	70	Y	E ^[4]
	LMCL-P6	55	70	Y	E ^[4]
	LMCL-P7	56	70	Y	E ^[4]
	LMCL-P8	58	70	Y	E ^[4]
	LMCL-P9	56	70	Y	E ^[4]
	LMCL-P10	56	70	Y	E ^[4]
	LMCL-P11	55	70	Y	E ^[4]
	LMCL-P12	72	70	N	E ^[4]
	LMCL-P13	76	70	N	E ^[4]
	LMCL-P14	75	70	N	E ^[4]
	LMCL-P15	71	70	N	E ^[4]

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Total Noise Impacts	Criterion ^[3]		
	LMCL-P16	61	70	Y	E ^[4]
	LMCL-P17	50	70	Y	E ^[4]
	LMCL-P18	54	70	Y	E ^[4]
	LMCL-P19	55	70	Y	E ^[4]
	LMCL-P20	56	70	Y	E ^[4]
	LMCL-P21	54	70	Y	E ^[4]
	LMCL-P22	54	70	Y	E ^[4]
	LMCL-P23	57	70	Y	E ^[4]
	LMCL-P24	61	70	Y	E ^[4]
	LMCL-P25	68	70	Y	E ^[4]
	LMCL-P26	54	70	Y	E ^[4]
	LMCL-P27	55	70	Y	E ^[4]
	LMCL-P28	56	70	Y	E ^[4]

Notes:

- [1] R – Residential, OU – Other specified uses, G - Government
- [2] Residential uses are assumed and the uses will be updated when more information is available.
- [3] Relevant environmental standards/ criteria: TM-EIAO noise standards for road traffic noise
- [4] Educational institutions refer to student hostels, staff quarters, academic and administration buildings. However, central air conditioning is assumed to be provided for academic and administration buildings. Thus, only student hostels and staff quarters are considered as NSRs.
- [5] Residential uses are assumed in light of the planning intention for the “UNSP” area for HHW under the current Approved Ma Tso Lung and Hoo Hok Wai DPA Plan No. DPA/NE-MTL/2.

In unmitigated scenario, among the existing NSRs about 36 dwellings and noise sensitive receivers will be exposed to noise levels exceeding the criteria. A summary of assessment results at the representative NSRs planned within LMC Loop; and currently existing in the adjacent area in Hong Kong outside LMC Loop, and along Western Connection Road and Eastern Connection Road is given in **Table 4.19**.

Table 4.19 Summary of assessment results at representative existing and planned NSRs under unmitigated scenario (Year 2042)

NSR Location	Assessment Results	Achieved Compliance
Border Road	Predicted cumulative road traffic noise level for all residential NSRs is 38 – 67 dB(A)	Full
Chau Tau Tsuen	Predicted cumulative road traffic noise level for all residential NSRs is 64 – 67 dB(A)	Full
Ha Wan Fisherman San Tsuen	Predicted cumulative road traffic noise level for residential NSR (HWFST-2) is 70 dB(A)	Full
Ha Wan Tsuen	Predicted cumulative road traffic noise level for all residential NSRs is 67 – 69dB(A).	Full
Ha Wan Tsuen Road	Predicted cumulative road traffic noise level for residential NSRs (HWTR-2 to HWTR-5, HWTR-18 to HWTR-22) is 57 – 70 dB(A). For other residential NSRs (HTWR-1, HWTR-6 to HWTR-17 and HWTR-23), the predicted noise level is 71 – 76 dB(A).	HTWR-1, HWTR-6 to HWTR-17 and HWTR-23 exceed the stipulated noise criterion of 70 dB(A) by 1 to 6 dB(A)
Kwu Tung North	Predicted cumulative road traffic noise level for residential NSRs (KTN-50 and KTN-51) is 74 dB(A)	KTN-50 and KTN-51 exceed the stipulated noise criterion of 70dB(A) by 4 dB(A)
LMC Road	Predicted cumulative road traffic noise level for residential NSRs (LMCR-7, LMCR-10, LMCR-11 and LMCR-15) is 67-70dB(A). For other residential NSRs (LMCR-1 to LMCR-6, LMCR-8 to LMCR-9, LMCR-14, LMCR-16 and LMCR-17), the predicted noise level is 71 – 77 dB(A).	LMCR-1 to LMCR-6, LMCR-8 to LMCR-9, LMCR-14, LMCR-16 and LMCR-17 exceed the stipulated noise criterion of 70 dB(A) by 1 to 7 dB(A).
LMC San Tsuen	Predicted cumulative road traffic noise level for all residential NSRs is 66 – 68 dB(A)	Full
LMC Tsuen	Predicted cumulative road traffic noise level for the residential NSR is 60 dB(A)	Full

NSR Location	Assessment Results	Achieved Compliance
Ma Tso Lung	Predicted cumulative road traffic noise level for the residential NSRs is 64 – 70 dB(A).	Full
Ma Tso Lung Road	Predicted cumulative road traffic noise level for all residential NSRs is 44 – 66dB(A).	Full
Ma Tso Lung San Tsuen	Predicted cumulative road traffic noise level for the residential NSR (MTLST-1) is 64dB(A)	Full
Ma Tso Lung Shun Yee San Tsuen	Predicted cumulative road traffic noise level for all residential NSRs is 58 – 60dB(A)	Full
Pun Uk Tsuen	Predicted cumulative road traffic noise level for all residential NSRs is 63 – 66 dB(A)	Full
San Sham Road	Predicted cumulative road traffic noise level for residential NSR (SSR1 and SSR-2) is 71 - 72 dB(A).	SSR-1 and SSR-2 exceed the stipulated noise criterion of 70 dB(A) by 1 - 2 dB(A)
Tung Chan Wai	Predicted cumulative road traffic noise level for the residential NSR (TCW-1) is 61dB(A)	Full
Tung Wing On Road	Predicted cumulative road traffic noise level for the residential NSR (TWOR-1) is 76dB(A)	TWOR-1 exceeds the stipulated noise criterion of 70 dB(A) by 6 dB(A)
Comprehensive Development and Wetland and Enhancement Area	Predicted cumulative road traffic noise level for the NSRs (CDWEA-P1 to CDWEA-P4) is 63 – 66 dB(A).	Full
Village zone near Chau Tau Tsuen	Predicted cumulative road traffic noise level for the NSRs (CTT-P1 and CTT-P2) is 70 dB(A). Predicted cumulative road traffic noise level for other NSR (CTT-P3) is 73 dB(A)	CTT-P3 exceeds the stipulated noise criterion of 70 dB(A) by 3 dB(A)
Eco-lodge	Predicted cumulative road traffic noise level for the NSRs (EL-P2, and EL-P5) is 67 – 69 dB(A). Predicted cumulative road traffic noise level for other residential NSRs (EL-P1, EL-P3 and EL-P4) is 71 - 72 dB(A)	EL-P1, EL-P3 and EL-P4 exceeds the stipulated noise criterion of 1 – 2 dB(A)
Ex-Lung Kai Public School	Predicted cumulative road traffic noise level for the NSR is 58 dB(A)	Full

NSR Location	Assessment Results	Achieved Compliance
Unspecified Use area in Hoo Hok Wai	Predicted cumulative road traffic noise level for the NSRs (HHW-P1 to HHW-P3) is 61 – 63 dB(A).	Full
R&D near Lo Wu Classification Range	Predicted cumulative road traffic noise level for the NSRs (KTN F1-3) is 67 dB(A).	Full
LMC Loop	Predicted cumulative road traffic noise level for the NSRs (LMCL-P4 to LMCL-P11 and LMCL-P16 to LMCL-P28) is 50 – 68 dB(A). Predicted cumulative road traffic noise level for other NSRs (LMCL-P1 to LMCL-P3 and LMCL-P12 to LMCL-P15) is 71 – 76 dB(A)	LMCL-P1 to LMCL-P3 and LMCL-P12 to LMCL-P15 exceed the stipulated noise criterion of 70 dB(A) by 1 to 6 dB(A)
LMC Tsuen	Predicted cumulative road traffic noise level for the NSRs is 57 – 65 dB(A)	Full

4.7.2.2 Assessment Results of other Fixed Noise Sources under Unmitigated Scenario

A summary of the noise criteria at NSRs applicable to fixed plant noise source is given in **Table 4.20**.

Table 4.20 Summary of noise criteria at NSRs for fixed noise sources

Area	Time Period	Prevailing Noise Levels ^[1] , dB(A) L _{eq}	ASR	ANL-5, dB(A) L _{eq} ^[2]	Criteria, dB(A) ^[#] ^[3]
LMC Loop	Day & Evening	40	A	55	40
	Night	39	A	45	39

Note : [#] = lower of [1] & [2]

[3] Relevant environmental standards/ criteria: TM-EIAO noise standards for fixed noise sources

The fixed noise source inside LMC Loop consists of the proposed STW, the plantroom exhaust, DCS (provisional) and ESS. Noise source of plantroom exhaust is generated by intake and exhaust fans. Proper selection of quiet fan and provision of silencer will ensure the noise criteria can be achieved such that adverse cumulative noise impacts from plantroom exhaust on other fixed sources are not anticipated. In addition, the separation distance from Lok Ma Chau Station and Lok Ma Chau Control Point to Ha Wan Tsuen is about 700m and 650m respectively. Given the large separation distance, cumulative impacts from Lok Ma Chau Station and Lok Ma Chau Control Point on other fixed sources are not anticipated.

The major noise source of DCS (provisional) comes from the pump system inside and enclosed in the district cooling system building structure (Reference: EIA-157/2008 Kai Tai Development Engineering Study cum Design and Construction of Advance Works – Investigation, Design, and Construction); other noise sources in DCS (provisional) include condensers, chillers and air blowers.

The major noise source of STW comes from the inlet pump of the influent pumping station, the air blowers of the blower house, and returned activated sludge (RAS) pump of the RAS pumping station (Reference: EIA-097/2004 Tai Po Sewage Treatment Works Stage V).

The HHW area is within the “Unspecified Use” area in the current Approved Ma Tso Lung and Hoo Hok Wai DPA Plan No. D/NE-MTL/2. Development proposal is subject to approval by the TPB under the planning application system. As the exact locations of the planned NSRs in the HHW area are not yet confirmed, the nearest separation from STW to Hoo Hok Wai (HHW-P4) will be adopted as worst case scenario assessment. The nearest NSR from STW is HHW-P4 which is assumed to be located at 100m from STW. The second nearest NSR LMCL-P18 is located at 195m from STW within LMCL. The nearest NSR LMCL-P8 from DCS (provisional) is located at about 70m away. Analysis has been conducted to quantify the preliminary SWL criteria. **Table 4.21** shows the maximum SWL criteria. Detailed calculation is shown in **Appendix 4-15**. Calculations of fixed noise levels at various representative floors of the NSRs are shown in **Appendix 4-15A**.

Table 4.21 Summary of SWLs criteria for major fixed noise sources

Plant Item	Maximum Allowable SWL, dB(A) ^[2]
Sewage Treatment Works	75 ^[1] / 84
District Cooling System (provisional) – South	78
District Cooling System (provisional) – North	75 ^[1] /84

Note:

- [1] The maximum allowable sound power level of 78 dB(A) is specified to control impact on any noise sensitive use at the “Unspecified Use” area in Hoo Hok Wai to acceptable level, while 84 dB(A) is specified for the scenario with no sensitive use at the HHW area.
- [2] Relevant environmental standards/ criteria: TM-EIAO noise standards for fixed noise sources

3dB(A) of facade effect and 3dB(A) of tonality have been applied in noise analysis. With referenced to “Tuen Mun Area 54 Sewage Pumping Station EIA-150/2008” and “Yuen Long and Kam Tin Sewerage and Sewage Disposal Stage 2 EIA-094/2004” , a noise reduction of 10dB(A) and 20dB(A) is possible with the application of silencer installation and special acoustic enclosure at various units.

Special acoustic enclosures can be applied at inlet pump of the influent pumping station, air blowers of the blower house, RAS pump of the RAS pumping station, thickened primary sludge pumps of the primary sludge thickeners, effluent pump of the effluent pumping station, thickened primary sludge pumps of the sludge pumping station, condensers and chillers for a noise reduction of 20dB(A); while silencers can be applied at exhaust fan of the sludge pumping station for a noise reduction of 10dB(A).

The Contractor shall install acoustic silencers, noise barriers or acoustic enclosures as appropriate to ensure that the specified maximum SWLs shown in **Table 4.21** will not be exceeded. The future design and selection of the equipment shall also aim to reduce the effect of tonality at the NSRs.

4.8 Mitigation Measures

4.8.1 Construction Phase

The predicted noise levels show that the unmitigated construction noise impacts would exceed the daytime noise criteria. Mitigation measures are therefore required. The following mitigation measures have been considered:

- Good site practices to limit noise emissions at the source;
- Use of quiet plant and working methods;
- Use of site hoarding as noise barrier to screen noise at ground level of NSRs;
- Use of temporary noise barriers to screen noise from relatively static PMEs;
- Scheduling of construction works outside school examination periods in critical area; and
- Alternative use of plant items within one worksite, wherever practicable.

The above mitigation measures would need to be implemented in work sites as good practices where appropriate. Detailed descriptions of these mitigation measures are given in the following sections.

4.8.1.1 Good Site Management Practices

Good site practice and noise management techniques could considerably reduce the noise impact from construction site activities on nearby NSRs. The following measures should be practised during each phase of construction:

- only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme;
- machines and plant (such as trucks, cranes) 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, where possible, be orientated so that the noise is directed away from nearby NSRs;
- silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works;
- mobile plant should be sited as far away from NSRs as possible and practicable; and
- material stockpiles, site office and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities.

The benefits of these techniques can vary according to specific site conditions and operations. The environmental noise climate would certainly be improved with these control practices, although the improvement can only be quantified during implementation when specific site parameters are known.

4.8.1.2 Use of Site Hoarding

Purpose built temporary noise barriers (approx 2.4m high) located on the site boundaries between noisy construction activities and NSRs could generally reduce noise levels at low-level zone of NSRs through partial screening. It would be possible for the Contractor to provide these in the form of site hoardings to achieve this attenuation effect, provided that they have no openings or gaps and have a superficial surface density of at least 14kg/m². Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period. For conservative assessments, however, the site hoarding has not been taken into consideration in the construction noise assessments.

4.8.1.3 Use of Movable Noise Barrier & Full Enclosure for Relatively Fixed Plant Source

Movable temporary noise barriers that can be located close to noisy plant and be moved concurrently with the plant along a worksite can be very effective for screening noise from NSRs. A typical design which has been used locally is a wooden framed barrier with a small-cantilevered upper portion of superficial

density no less than 14kg/m² on a skid footing with 25mm thick internal sound absorptive lining. This measure is particularly effective for low level zone of NSRs. A cantilevered top cover would be required to achieve screening benefits at upper floors of NSRs.

Movable barriers will be used for some PME (e.g. pipe pile rigs, auger). It is anticipated that suitably designed barriers could achieve at least 5dB(A) reduction for movable plant and 10 dB(A) for stationary plant.

The use of standard enclosure has been considered in this assessment to shelter relatively fixed plant including air compressor, generator. These standard enclosures can provide at least 15dB(A) noise reduction. For electric saw, movable noise barriers of 5dB(A) attenuation have been assumed.

To ensure the design and logistics of movable barrier can be effectively manoeuvred with the PME, a noise mitigation plan shall be prepared to provide construction details, manoeuvring mechanism and trailing routes for the respective PME as part of the detailed implementation requirements.

A summary of the barrier and standard enclosure adopted for various PMEs and indicative drawing for barrier and standard enclosure are shown in **Appendix 4-16**, and the associated noise reduction is given in **Appendix 4-2** and summarised in **Table 4.22** below:

Table 4.22 Summary of barrier and standard enclosure adopted for PMEs

PME	Enclosure / Barriers	Attenuation, dB(A)
Air Compressor	Enclosure	-15dB(A)
Asphalt Paver	Movable Barrier	-5dB(A)
Hand Held Breaker	Movable Barrier	-10dB(A)
Bulldozer	Movable Barrier	-5dB(A)
Concrete Lorry Mixer	Movable Barrier	-5dB(A)
Mobile Crane	Movable Barrier	-5dB(A)
Compactor, vibratory	Movable Barrier	-10dB(A)
Dump Truck with Grab	Movable Barrier	-5dB(A)
Excavator	Movable Barrier	-5dB(A)
Generator	Enclosure	-15dB(A)
Lorry, Crane/Grab	Movable Barrier	-5dB(A)
Vibrating Poker	Movable Barrier	-10dB(A)
Vertical band drain installation rig	Movable Barrier	-5dB(A)

4.8.1.4 Use of “Quiet” Plant and Working Methods

The use of quiet plant is a feasible solution to tackle adverse noise impacts associated with construction works. It is generally known (supported by field measurement) that particular models of construction equipment are quieter than standard types given in the TM-GW. Whilst it is generally considered too restrictive to specify that the Contractor has to use specific models or items of plant, it is reasonable and practicable to set plant noise performance specifications for specific PME so that some flexibility in selection of plant is allowed. A pragmatic approach would be to request that the Contractor independently verifies the noise level of the plant proposed to be used and demonstrates through

furnishing of these results, that the plant proposed to be used on the site meets the requirements. **Section 4.2.1.1** gives more details on the CNP/NCO requirements.

The use of quiet plant associated with the construction works is made reference to the PME listed in the TM or the QPME/ other commonly used PME listed in EPD web pages as far as possible which includes the SWLs for specific quiet PME. CNP applications which contain sufficient details of any particularly quiet items of PME or any special noise control measures which the CNP applicant proposes to employ on the site may be given special consideration by the Noise Control Authority. It should be noted that EPD may apply the noise levels specified in the TM-GW and TM-DA when processing a CNP application for evening or night time works.

4.8.1.5 Assessment Results of Construction Airborne Noise under Mitigated Scenario

With the adoption of the above mitigation measures, **Appendix 4-17** presents the mitigated work programme adopted and corresponding SWLs.

Appendix 4-18 also presents the calculated construction noise impacts at selected representative NSRs. The predicted construction noise impacts at the NSRs are summarised in the **Table 4.23**.

Table 4.23 Construction noise impact at NSRs under mitigated scenario

Location of NSRs	AP	Uses ^[1]	L _{eq} (30mins), dB(A)			Duration of Exceedance Months
			Criterion ^[2]	Mitigated Noise Level	Exceedance	
Border Road	BR3	R	75	69	-	-
	BR4	R	75	71	-	-
	BR5	R	75	72	-	-
Chau Tau Tsuen	CTT-3	R	75	54	-	-
Ha Wan Tsuen Road	HWTR-1	R	75	70	-	-
	HWTR-6	R	75	80	5	4
	HWTR-11	R	75	80	5	4
	HWTR-20	R	75	64	-	-
LMC Road	LMCR-14	R	75	69	-	-
	LMCR-15	R	75	57	-	-
LMC San Tsuen	LMCST-2	R	75	68	-	-
Ma Tso Lung	MTL-20	R	75	75	-	-
Ma Tso Lung Road	MTLR-1	R	75	62	-	-
San Sham Road	SSR-2	R	75	65	-	-
Ha Wan Tsuen	HWT-8	R	75	73	-	-
LMC Loop	LMCL-P4	E ^[3]	75	64	-	-
Tung Wing On Road	TWOR-1	R	75	54	-	-

Location of NSRs	AP	Uses ^[1]	L _{eq} (30mins), dB(A)			Duration of Exceedance Months
			Criterion ^[2]	Mitigated Noise Level	Exceedance	
Eco-Lodge	EL-P3	R	75	78	3	6

Notes:

- [1] R – residential
 [2] Relevant environmental standards/ criteria: TM-EIAO noise standards for construction activities
 [3] Educational institutions refer to student hostels, staff quarters, academic and administration buildings. However, central air conditioning is assumed to be provided for academic and administration buildings. Thus, only student hostels and staff quarters are considered as NSRs.

It can be seen from the above **Table 4.23**, most of the NSRs have been mitigated to within the criterion after implementation of the noise control measures except HWTR-6, HWTR-11 and EL-P3 due to close notional distance (~10m) from the workfront. The major contribution for the exceedance at these 3 NSRs was resulted from the operation of concrete lorry mixer. To achieve the noise criterion, it is advisable to locate the concrete lorry mixer at around 25m away from the existing NSRs along Ha Wan Tsuen Road, Lok Ma Chau Road and planned NSRs at eco-lodge along Border Road. Results indicate that HWTR-6 and HWTR-11 with the highest noise levels at 80 dB(A) will be mitigated to 75 dB(A), within the noise criterion. **Table 4.23a** summarises the results of the assessment.

Table 4.23a Mitigated construction noise impact at HWTR-6, HWTR-11 and EL-P3 by moving the concrete lorry mixer approximately 25m further away

Location of NSRs	AP	Uses ^[1]	L _{eq} (30mins), dB(A)			Duration of Exceedance Months
			Criterion ^[2]	Mitigated Noise Level	Exceedance	
Ha Wan Tsuen Road	HWTR-6	R	75	75	-	-
	HWTR-11	R	75	75	-	-
Eco-Lodge	EL-P3	R	75	75	-	-

Notes:

- [1] R – residential
 [2] Relevant environmental standards/ criteria: TM-EIAO noise standards for construction activities

4.8.1.6 Assessment Results of Construction Access Road Traffic Noise under Mitigated Scenario

Representative NSRs where exceedances were predicted in **Section 4.7.1.2** have been extracted. Noise impacts on the NSRs after mitigation provisions of temporary noise barriers along Sai Kwo Road, Lok Ma Chau Road and Ha Wan Tsuen Road at year 2016 and 2020 are tabulated in **Tables 4.24a** and **4.24b** respectively. **Appendix 4-19** shows the sectional drawings of the noise barriers. **Appendix 4-20** and **4-20a** include the noise impacts at various levels at Year 2016 and Year 2020 respectively. Locations of temporary noise barriers are shown in **Figures 4.8a** to **4.8f**.

Table 4.24a Predicted road traffic noise impacts at NSRs along Sai Kwo Road, LMC Road and Ha Wan Tsuen Road under mitigated scenario at 2016

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Total Noise Impacts	Criterion ^[2]		
Ha Wan Tsuen Road	HWTR-6	70	70	Y	R
	HWTR-7	70	70	Y	R
	HWTR-8	70	70	Y	R
	HWTR-9	66	70	Y	R
	HWTR-10	70	70	Y	R
	HWTR-23	70	70	Y	R
LMC Road	LMCR-1	70	70	Y	R
	LMCR-2	70	70	Y	R
	LMCR-4	70	70	Y	R
	LMCR-5	69	70	Y	R
	LMCR-8	70	70	Y	R
	LMCR-12 ^[3]	70	70	Y	R
	LMCR-16	70	70	Y	R
San Sham Road	SSR-1	69	70	Y	R
Tung Wing On Road	TWOR-1	75	70	N	R

Notes:

[1] R – residential

[2] Relevant environmental standards/ criteria: TM-EIAO noise standards for road traffic noise

[3] LMCR-12 will be resumed in mid 2016, therefore only construction access road traffic noise assessment during advance works has been conducted. Site observation has found that LMCR-12 is currently a temple of a temporary structure and appears to be recently constructed, which is different from the landuse previously stated in the LMC Access Road EA Report. Land search conducted by surveyors indicated that the lots are old scheduled agricultural lots. It is therefore proposed that the noise criteria applicable to LMCR-12 will remain the same as the assumed village house landuse as stated in the LMC Access Road EA Report.

Table 4.24b Predicted road traffic noise impacts at NSRs along Sai Kwo Road, LMC Road and Ha Wan Tsuen Road under mitigated scenario at 2020

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Total Noise Impacts	Criterion ^[2]		
Ha Wan Tsuen Road	HWTR-6	70	70	Y	R
	HWTR-7	70	70	Y	R
	HWTR-8	70	70	Y	R
	HWTR-9	66	70	Y	R
	HWTR-10	70	70	Y	R
	HWTR-11	66	70	Y	R
	HWTR-23	70	70	Y	R
LMC Road	LMCR-1	70	70	Y	R
	LMCR-2	70	70	Y	R
	LMCR-4	69	70	Y	R
	LMCR-5	69	70	Y	R
	LMCR-6	69	70	Y	R

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Total Noise Impacts	Criterion ^[2]		
	LMCR-8	70	70	Y	R
	LMCR-9	69	70	Y	R
	LMCR-14	70	70	Y	R
	LMCR-16	70	70	Y	R
San Sham Road	SSR-1	70	70	Y	R
	SSR-2	70	70	Y	R
Tung Wing On Road	TWOR-1	75	70	N	R

Notes:

[1] R – residential

[2] Relevant environmental standards/ criteria: TM-EIAO noise standards for road traffic noise

With the proposed mitigation measures, most NSRs will comply with the noise criterion of 70dB(A) for residential uses except at Tung Wing On Road (TWOR-1). Further analysis as summarised in **Table 4.25** below has however revealed that the contribution due to the access road is less than 1dB(A) (i.e. 0.0dB(A)) in comparison with the prevailing noise level (i.e. 74.6dB(A) in Year 2016 and 74.8dB(A) in Year 2020) after implementation of temporary noise barrier. Besides, the noise level from access road (i.e. 48dB(A) in Year 2016 and 56dB(A) in Year 2020) is also within the noise criterion of 70 dB(A) despite the cumulative noise level is 74.6dB(A) in Year 2016 and 74.8dB(A) in Year 2020. Hence the traffic noise impact from the construction access vehicle is insignificant.

Table 4.25a Traffic noise contribution under mitigated scenario at 2016

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Contribution, dB(A)	Uses ^[1]
		Total Noise Impacts	Prevailing Noise Impacts		
Tung Wing On Road	TWOR-1	74.6	74.6	0.0	R

Notes:

[1] R – Residential

Table 4.25b Traffic noise contribution under mitigated scenario at 2020

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Contribution, dB(A)	Uses ^[1]
		Total Noise Impacts	Prevailing Noise Impacts		
Tung Wing On Road	TWOR-1	74.8	74.8	0.0	R

Notes:

[1] R – Residential

Table 4.25c Traffic noise contribution due to project road only under mitigated scenario at 2016

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Noise Impacts from Project Road	Criterion		
Tung Wing On Road	TWOR-1	48	70	Y	R

Notes:

[1] R – Residential

Table 4.25d Traffic noise contribution due to project road only under mitigated scenario at 2020

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Noise Impacts from Project Road	Criterion		
Tung Wing On Road	TWOR-1	56	70	Y	R

Notes:

[1] R – Residential

4.8.2 Operational Phase

4.8.2.1 Assessment Results of Road Traffic Noise under Mitigated Scenario

Existing and planned NSRs where exceedances were predicted in **Section 4.7.2.1** have been extracted. Based on the worst case scenario for traffic impact assessment, noise impacts on the NSRs after mitigation provisions of 0.8m noise barrier, 3m noise barrier, 5m noise barrier and provision of central air conditioning system for the first layer of noise sensitive receivers facing internal Road M1 in LMC Loop are tabulated in **Tables 4.26** and **4.27**. Provision of central air conditioning system for the first layer of noise sensitive receivers facing Road M1 in LMC Loop will be recommended as a detailed design measures for buildings within the “Education” (“E”) and “OU (R&D/C&C)” zone facing the internal main road/Road M1. The provision of central air conditioning has been reviewed and will be stated in the lease conditions. It should also be noted that under the RODP/preliminary layout plan in **Figure 4.1**, it is intended that hostel facilities will be located away from the internal main road/Road M1. **Appendix 4-19** shows the sectional drawings the noise barriers. **Appendix 4-21** includes the noise impacts at various levels. Locations and extent of the 0.8m noise barrier, 3m noise barriers and 5m noise barrier are shown in **Figures 4.9 to 4.9d**. Locations of the NSRs in LMC Loop which shall not rely on opened window for ventilation are shown in **Figures 4.10 to 4.10a**.

Table 4.26 Predicted road traffic noise impact at existing NSRs (Year 2042) under mitigated scenario

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Total Noise Impacts	Criterion ^[2]		
Ha Wan Tsuen Road	HWTR-1	70	70	Y	R
	HWTR-6	67	70	Y	R
	HWTR-7	70	70	Y	R
	HWTR-8	70	70	Y	R
	HWTR-9	66	70	Y	R
	HWTR-10	70	70	Y	R
	HWTR-11	67	70	Y	R
	HWTR-12	69	70	Y	R
	HWTR-13	67	70	Y	R
	HWTR-14	68	70	Y	R
	HWTR-15	68	70	Y	R
	HWTR-16	67	70	Y	R
	HWTR-17	69	70	Y	R
	HWTR-23	70	70	Y	R
Kwu Tung North	KTN-50	74	70	N	R
	KTN-51	74	70	N	R
LMC Road	LMCR-1	69	70	Y	R
	LMCR-2	69	70	Y	R
	LMCR-3	68	70	Y	R
	LMCR-4	69	70	Y	R
	LMCR-5	69	70	Y	R
	LMCR-6	69	70	Y	R
	LMCR-8	70	70	Y	R
	LMCR-9	69	70	Y	R
	LMCR-14	70	70	Y	R
	LMCR-16	68	70	Y	R
	LMCR-17	70	70	Y	R
San Sham Road	SSR-1	70	70	Y	R
	SSR-2	70	70	Y	R
Tung Wing On Road	TWOR-1	76	70	N	R

Notes:

[1] R – Residential

[2] Relevant environmental standards/ criteria: TM-EIAO noise standards for road traffic noise

Table 4.27 Predicted road traffic noise impact at planned NSRs (Year 2042) under mitigated scenario

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Total Noise Impacts	Criterion ^[3]		
Village zone near Chau Tau Tsuen	CTT-P3	73	70	N	R
Eco-Lodge	EL-P1	70	70	Y	[2]

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Total Noise Impacts	Criterion ^[3]		
	EL-P3	70	70	Y	[2]
	EL-P4	66	70	Y	[2]
LMC Loop	LMCL-P1	69	70	Y	E ^[4]
	LMCL-P2	70	70	Y	E ^[4]
	LMCL-P3	70	70	Y	E ^[4]
	LMCL-P12	70	70	Y	E ^[4]
	LMCL-P13	70	70	Y	E ^[4]
	LMCL-P14	68	70	Y	E ^[4]
	LMCL-P15	63	70	Y	E ^[4]

Notes:

- [1] R – Residential
 [2] Residential uses are assumed and the uses will be updated when more information is available.
 [3] Relevant environmental standards/ criteria: TM-EIAO noise standards for road traffic noise
 [4] Educational institutions refer to student hostels, staff quarters, academic and administration buildings. However, central air conditioning is assumed to be provided for academic and administration buildings. Thus, only student hostels and staff quarters are considered as NSRs.

With the proposed mitigation measures, all NSRs will comply with the noise criterion of 70dB(A) for residential uses except at KTN-50, KTN-51, TWOR-1 and CTT-P3. **Table 4.30** below shows the contribution due to the project road in comparison with the year 2042 prevailing noise level after implementation of the mitigation measures. The contribution of Project to NSRs KTN-50, KTN-51, TWOR-1 and CTT-P3 are less than 1 dB(A) (i.e. 0.0dB(A) to 0.2dB(A)). The noise level from project road (i.e. 59.2 dB(A) to 63.7 dB(A)) is also within the noise criterion of 70 dB(A) despite the cumulative noise levels range between 72.6 and 75.6dB(A). Hence, the road traffic noise impact from project road is insignificant.

Table 4.30 Traffic noise contribution under mitigated scenario

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Contribution, dB(A)	Uses ^[2]
		Total Noise Impacts	Prevailing Noise Impacts ^[1]		
Kwu Tung North	KTN-50	74.2	74.2	0.0	R
	KTN-51	74.3	74.3	0.0	R
Tung Wing On Road	TWOR-1	75.6	75.6	0.0	R
Village zone near Chau Tau Tsuen	CTT-P3	72.6	72.4	0.2	R

Notes:

- [1] Prevailing noise impacts at year 2042.
 [2] R – Residential

Table 4.30a below shows the contribution due to the project road only after implementation of the mitigation measures.

Table 4.30a Traffic noise contribution due to project road only under mitigated scenario

NSR Location	AP	L ₁₀ (1 hr), dB(A)		Compliance (Y/N)	Uses ^[1]
		Noise Impacts from Project Road	Criterion		
Kwu Tung North	KTN-50	59.5	70	Y	R
	KTN-51	63.7	70	Y	R
Tung Wing On Road	TWOR-1	59.2	70	Y	R
Village zone near Chau Tau Tsuen	CTT-P3	63.1	70	Y	R

Notes:

[1] R – Residential

4.8.3 Assessment of Side Effects and Constraints

The adopted mitigation measures has been designed to balance between feasibility and effectiveness. The scheme has avoided blockage to the entrance way of premises along Lok Ma Chau Road as far as possible. The induced impacts from noise barrier will be separately discussed in Air Quality, Ecology and LVIA chapters.

4.8.4 Evaluation of Constraints on planned Noise Sensitive Developments / Landuses

The first layer of NSRs facing Road M1 of LMC Loop will be provided with central air conditioning. As central air conditioning is a standard provision for the proposed educational institutions in LMC Loop, adverse constraints are not anticipated.

4.8.5 Summary of Noise Mitigation Measures

A summary of noise mitigation measures during construction and operational phases for DPs is shown in **Table 4.31** below.

Table 4.31 Summary of noise mitigation measures for DPs

DP	Phases	Mitigation Measures
Ecological Area (DP1)	Construction	<ul style="list-style-type: none"> • Use of movable barrier, enclosure and QPME; - Wooden framed barrier with a small-cantilevered upper portion of superficial density not less than 14kg/m² on a skid footing with 25mm thick internal sound absorptive lining
	Operation (Road Traffic)	<ul style="list-style-type: none"> • Mitigation measures are not required.
Western Connection Road (DP2)	Construction	<ul style="list-style-type: none"> • Use of movable barrier, enclosure and QPME; - Wooden framed barrier with a small-cantilevered upper portion of superficial density not less than 14kg/m² on a skid footing with 25mm thick internal sound absorptive lining • Operation of concrete lorry mixer approximately

DP	Phases	Mitigation Measures
		<p>25m away from the NSRs</p> <ul style="list-style-type: none"> ● Provision of temporary noise barrier along construction access through WCR at 2016 (Figure 4.8b and 4.8c). <ul style="list-style-type: none"> - TNB 1: Approx. 46m long, 0.8m high noise barrier; - TNB 2: Approx. 8m long, 1.5m high noise barrier; - TNB 3: Approx. 5m long, 1.5m high noise barrier; - TNB 4: Approx. 9m long, 1.5m high noise barrier; - TNB 5: Approx. 16m long, 3m high noise barrier; - TNB 6: Approx. 15m long, 1.5m high noise barrier; - TNB 7: Approx. 12m long, 1.5m high noise barrier; - TNB 8: Approx. 28m long, 1.5m high noise barrier; - TNB 9: Approx. 22m long, 1.5m high noise barrier; - TNB 10: Approx. 17m long, 1.5m high noise barrier; - TNB 11: Approx. 23m long, 1.5m high noise barrier; - TNB 12: Approx. 18m long, 3m high noise barrier; - TNB 13: Approx. 28m long, 1.5m high noise barrier; - TNB 14: Approx. 27m long, 1.5m high noise barrier; - TNB 15: Approx. 47m long, 0.8m high noise barrier; - TNB 16: Approx. 2m long, 3m high noise barrier. ● Provision of temporary noise barrier along construction access through WCR at 2020 (Figure 4.8e and 4.8f). <ul style="list-style-type: none"> - TNB 1: Approx. 46m long, 0.8m high noise barrier; - TNB 2: Approx. 8m long, 3m high noise barrier; - TNB 3: Approx. 5m long, 3m high noise barrier; - TNB 4: Approx. 9m long, 3m high noise barrier; - TNB 5: Approx. 16m long, 5m high noise barrier; - TNB 6: Approx. 15m long, 3m high noise barrier; - TNB 7: Approx. 13m long, 3m high noise barrier; - TNB 8: Approx. 24m long, 3m high noise barrier; - TNB 9: Approx. 20m long, 0.8m high noise barrier; - TNB 10: Approx. 11m long, 3m high noise barrier; - TNB 11: Approx. 42m long, 1.5m high noise barrier; - TNB 12: Approx. 19m long, 3m high noise barrier; - TNB 13: Approx. 28m long, 3m high noise barrier; - TNB 14: Approx. 27m long, 3m high noise barrier; - TNB 15: Approx. 47m long, 0.8m high noise barrier; - TNB 17: Approx. 37m long, 1m high noise barrier.

DP	Phases	Mitigation Measures
	Operation (Road Traffic)	<ul style="list-style-type: none"> • Provision of noise barrier before operation of the proposed project (Figure 4.9a, 4.9b and 4.9d); - NB 1: Approx. 16m long, 0.8m high noise barrier; - NB 2: Approx. 42m long, 0.8m high noise barrier; - NB 3: Approx. 27m long, 0.8m high noise barrier; - NB 4: Approx. 14m long, 0.8m high noise barrier; - NB 6: Approx. 50m long, 0.8m high noise barrier; - NB 7: Approx. 8m long, 0.8m high noise barrier; - NB 8: Approx. 10m long, 3m high noise barrier; - NB 9: Approx. 33m long, 5m high noise barrier; - NB 10: Approx. 12m long, 3m high noise barrier; - NB 11: Approx. 12m long, 5m high noise barrier; - NB 12: Approx. 36m long, 3m high noise barrier; - NB 13: Approx. 12m long, 3m high noise barrier; - NB 14: Approx. 32m long, 0.8m high noise barrier; - NB 15: Approx. 27m long, 3m high noise barrier; - NB 16: Approx. 57m long, 3m high noise barrier; - NB 21: Approx. 47m long, 0.8m high noise barrier; - NB 22: Approx. 46m long, 0.8m high noise barrier; - NB 23: Approx. 16m long, 3m high noise barrier; - NB 24: Approx. 80m long, 0.8m high noise barrier
Direct Link to LMC Station (DP3)	Construction	<ul style="list-style-type: none"> • Use of movable barrier, enclosure and QPME; - Wooden framed barrier with a small-cantilevered upper portion of superficial density not less than 14kg/m² on a skid footing with 25mm thick internal sound absorptive lining
	Operation (Road Traffic)	<ul style="list-style-type: none"> • Provision of noise barrier before operation of the proposed project (Figure 4.9d); - NB 19: Approx. 730m long, 0.8m high parapet at both sides of the road.
Drainage System under Internal Transport Networks (DP4)	Construction	<ul style="list-style-type: none"> • Use of movable barrier, enclosure and QPME; - Wooden framed barrier with a small-cantilevered upper portion of superficial density not less than 14kg/m² on a skid footing with 25mm thick internal sound absorptive lining
	Operation (Road Traffic)	<ul style="list-style-type: none"> • Mitigation measures are not required.
Sewage Treatment Works (DP5)	Construction	<ul style="list-style-type: none"> • Use of movable barrier, enclosure and QPME; - Wooden framed barrier with a small-cantilevered upper portion of superficial density not less than 14kg/m² on a skid footing with 25mm thick internal sound absorptive lining
	Operation (Fixed Plant)	<ul style="list-style-type: none"> • Noise mitigation measures including silencers, acoustic louvers and acoustic enclosures should be allowed; • The maximum allowable sound power level of 75 dB(A) is specified to control impact on noise sensitive uses at Hoo Hok Wai to acceptable level, while 84 dB(A) is specified for the scenario with no sensitive uses at HHW.
Eastern Connection Road (DP6)	Construction	<ul style="list-style-type: none"> • Use of movable barrier, enclosure and QPME; - Wooden framed barrier with a small-cantilevered upper portion of superficial density not less than

DP	Phases	Mitigation Measures
		<p>14kg/m² on a skid footing with 25mm thick internal sound absorptive lining</p> <ul style="list-style-type: none"> • Operation of concrete lorry mixer approximately 25m away from the NSRs
	Operation (Road Traffic)	<ul style="list-style-type: none"> • Provision of noise barrier before operation of the proposed project (Figure 4.9c); - NB 18^[2]: Approx. 190m long, 0.8m high noise barrier; - NB 20^[2]: Approx. 81m long, 0.8m high noise barrier. • Minimum 13m setback from Eco-lodge to ECR^[3]
Flushing Water Service Reservoir (DP7)	Construction	<ul style="list-style-type: none"> • Use of movable barrier, enclosure and QPME; - Wooden framed barrier with a small-cantilevered upper portion of superficial density not less than 14kg/m² on a skid footing with 25mm thick internal sound absorptive lining
	Operation (Fixed Plant)	<ul style="list-style-type: none"> • Mitigation measures are not required.
Non DP	Construction	<ul style="list-style-type: none"> • Use of movable barrier, enclosure and QPME; Wooden framed barrier with a small-cantilevered upper portion of superficial density not less than 14kg/m² on a skid footing with 25mm thick internal sound absorptive lining
	Operation (Road Traffic)	<ul style="list-style-type: none"> • Provision of central air conditioning for the first layer of noise sensitive receivers facing Road M1 • Minimum 5m setback from planned sensitive uses inside LMC Loop.
	Operation (Fixed plant)	<p><u>DCS (provisional) – North</u></p> <ul style="list-style-type: none"> • The maximum allowable sound power level of 75 dB(A) is specified to control impact on noise sensitive uses at Hoo Hok Wai to acceptable noise level, while 84 dB(A) is specified for the scenario with no sensitive uses at HHW. <p><u>DCS (provisional) – South</u></p> <ul style="list-style-type: none"> • The maximum allowable sound power level of 78 dB(A) is specified to control impact on noise sensitive uses at Ha Wan Tsuen to acceptable noise level

Notes:

- [1] TNB – Temporary noise barrier, NB – Noise barrier. All the proposed noise barriers are reflective in terms of acoustic characteristic.
- [2] Noise barriers NB18 and NB20 are designed for protection of the planned NSRs while the other noise barriers are designed for protection of the existing NSRs
- [3] The setback distance of Eco-lodge has been made reference to the "Land Use Planning for the Closed Area - Feasibility Study Agreement No. CE 60/2005".

4.9 Residual Environmental Impacts

Construction and operational noise impact arising from the Project can be properly mitigated by implementing the proposed noise control measures. Adverse residual noise impacts are not anticipated. In order to ensure compliance

of the operational noise level with the stipulated noise standards in TM, noise commissioning tests for all major fixed noise sources should be included in the Contract Document.

4.10 Level of Uncertainty

4.10.1 Construction Airborne Noise

The prediction of construction noise level is based on the method described in the TM-GW under the NCO. The SWL of PME used in the assessment was based in Table 3 of TM-GW and QPME system adopted by EPD. All PME with items required for a particular construction activity is assumed to be located at the notional source position of the work areas, with 100% on-time operation. The sound pressure level (SPL) of receivers has been calculated according to point source correction.

4.10.2 Construction Access Road Traffic Noise

The prediction of construction access road traffic noise level is based on the method of UK Department of Transport "Calculation of Road Traffic Noise (CRTN)". The maximum traffic flow at Year 2016 and Year 2020 which has been approved by Transport Department, was formulated based on the planning parameters of the development. The SPL of receivers has been calculated according to line source correction.

4.10.3 Road Traffic Noise

Similar to the construction access road traffic noise assessment, the maximum traffic flow at Year 2042 which has been approved by Transport Department, was formulated based on the planning parameters of the development.

4.10.4 Fixed Noise

Maximum SWL as the compliance criteria for fixed noise sources has been determined by backward calculation (point source correction). The plant inventory inside DSC (provisional) and STW will be formulated during details design stage, which should comply the determined fixed noise criteria.

4.11 Conclusion

Construction noise assessment has been conducted. Results indicate that the noise impacts on all of the NSRs after the implementation of good site practices, temporary noise barriers and use of site hoarding, quiet plants and practical mitigation measures including the setting of the concrete lorry mixer at around 25m away from the existing NSRs along Ha Wan Tsuen Road and Lok Ma Chau Road and planned NSRs at eco-lodge along Border Road. By implementing the aforesaid feasible mitigation measure, typical NSRs including HWTR-6, HWTR-11 and EL-P3 would be within the stipulated noise criterion.

Construction access road traffic noise assessment on the access route along LMC Road and Ha Wan Tsuen Road for advance works at Year 2016 and along Sai

Kwo Road, Lok Ma Chau Road and Ha Wan Tsuen Road for site formation at Year 2020 has been conducted. With the implementation of temporary noise barrier, most NSRs along Lok Ma Chau Road, Sai Kwo Road and Ha Wan Tsuen Road would be within their respective noise criteria and where exceedances were predicted, those contribution due to access road is less than 1dB(A) (i.e. 0.0dB(A)) and within the noise criterion of 70 dB(A). Hence the traffic noise impact from the construction access vehicle is insignificant.

In operational phase, road traffic noise impacts which are based on the worst case scenario of the traffic impact assessment have been investigated. Traffic noise impact on the most of the noise sensitive receivers outside the LMC Loop will be mitigated by 0.8m to 5m noise barriers to within their respective noise criteria and where exceedances are predicted, those contribution due to project road is less than 1dB(A) (i.e. 0.0dB(A) to 0.2dB(A)) and within the noise criterion of 70 dB(A). Hence road traffic noise impact from the project road is insignificant. In addition, provision of central air conditioning for the first layer of noise sensitive receivers facing Road M1 has been allowed to mitigate the noise impact from road traffic noise. Fixed noise source sound power level limits are specified for sewage treatment works and DCS (provisional) with necessary noise control measures to satisfy the noise criterion.