APPENDIX B IMPLEMENTATION SCHEDULE OF RECOMMENDED MITIGATION MEASURES

Implementation Schedule of Recommended Mitigation Measures

This section presents the implementation schedule of mitigation measures for the Project. Table B.1 summarises the details of the recommended mitigation measures for all works areas. For each recommended mitigation measures, both the location and timing for the measure have clearly been identified as well as the parties responsible for implementing the measure and for maintenance (where applicable).

Table B.1 Implementation Schedule of Recommended Mitigation Measures

EIA Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage*			Relevant Legislation & Guidelines
				Des	C	O	
Air Quality Impact							
Construction Phase							
3.5.12	<u>Emission Standards and Requirements for PMEs</u> • Legal control on the types of fuel allowed for use and their sulphur contents in commercial and industrial processes should be observed. • Only approved or exempted non-road mobile machinery should be allowed to be used in construction sites.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		Air Pollution Control (Fuel Restriction) Regulation, Air Pollution control (Non-road Mobile Machinery) (Emission) Regulation; ETWB-TC(W) No. 19/2005
3.5.12	<u>Control on fuel for PMEs</u> • All construction plants are required to use ultra-low-sulphur diesel (ULSD) (defined as diesel fuel containing not more than 0.005% sulphur by weight).	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		Air Pollution Control (Fuel Restriction) Regulation
3.8.1, 3.9.1	Watering once every 2 hours on active works areas to reduce dust emission.	All active works areas, exposed surface and unpaved road during construction phase/ upon completion of all construction activities	Contractor		√		Air Pollution Control Ordinance (APCO); Air Pollution Control (Construction Dust) Regulation; HKAQO; Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM)
3.8.1, 3.9.1	A sealed door should be installed at the opening of tunnel mined by drill and break, and a dust collector with dust removal efficiency of at least 80% should be installed at the ventilation exhaust to treat the dust-laden exhaust before release to the ambient.	Tunneling mined by drill and break	Contractor		√		

3.8.4	Dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices listed below shall be carried out to further minimize construction dust impact: • Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather. • Use of frequent watering for particularly dusty construction areas and areas close to ASRs. • Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering shall be applied to aggregate fines. • Open stockpiles shall be avoided or covered. Where possible, prevent placing dusty material storage piles near ASRs. • Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations. • Establishment and use of vehicle wheel and body washing facilities at the exit points of the site. • Provision of not less than 2.4m high hoarding from ground level along site boundary where adjoins a road, streets or other accessible to the public except for a site entrance or exit. • Imposition of speed controls for vehicles on site haul roads. • Where possible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs. • Instigation of an environmental monitoring and auditing program to monitor the construction process in order to enforce controls and modify method of work if dusty conditions arise.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		
3.8.5	To minimize the exhaust emission from NRMMs during the construction phase, below measures shall be applied as far as practicable: • Connect construction plant and equipment to main electricity supply and avoid use of diesel generators and diesel-powered equipment; • Exempted NRMMs shall be avoided; • Deploy electrified NRMMS as far as practicable.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		
Noise Impact							
Construction Phase							

4.6.30, 4.6.31	Good site practices listed below and the noise control requirements stated in EPD's *"Recommended Pollution Control Clauses for Construction Contracts"* should be included in the Contract Specification for the Contractors to follow and should be implemented to further minimize the potential noise impacts during the construction phase of the Project. • Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme. • Silencers or mufflers on construction equipment should be utilised and should be properly maintained during the construction programme. • Mobile plant, if any, should be sited as far away from noise sensitive receivers (NSRs) as possible. • Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum. • Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs.	All construction sites / construction phase / upon completion of all construction activities	Project Proponent and Contractor	√	√		EIAO-TM; Noise Control Ordinance (NCO)
4.6.32, 4.6.33	Adopting quiet PME is recommended. The type of quiet PME adopted in this assessment is for reference only. The contractors may adopt alternative quiet PME as long as it can be demonstrated that they would not result in construction noise impacts worse than those predicted in this assessment.	All active construction sites / construction phase / upon completion of all construction activities	Contractor		√		EIAO-TM; NCO
4.6.34	The use of non-percussive equipment and method, such as hydraulic crusher and chemical expansion agent, to carry out demolition / excavation works as far as practicable according to Section 4.6.34.	Active construction sites which require rock breaking / construction phase / upon completion of all construction activities	Project Proponent and Contractor	√	√		EIAO-TM; NCO
4.6.35, Appendix 4.8	The contractor shall adopt non-percussive equipment and method, such as silent piling by "Press-in" Method, to carry out sheet piling works as far as practicable.	All Active construction sites / construction phase / upon completion of all construction activities	Contractor		√		
4.6.36, Appendi	The contractor shall implement movable noise barrier and purpose-built barrier for the following PMEs, such that the line of sight between the NSRs	All Active construction sites / construction phase / upon	Contractor		√		

x 4.8	and the PME is blocked. Or otherwise, equivalent noise mitigation measures should be implemented. • Bulldozer, tracked • Excavator, wheeled/tracked • Dump truck , 5.5 tonne < gross vehicle weight ≦ 38 tonne • Lorry, with crane/grab, 5.5 tonne < gross vehicle weight ≦ 38 tonne • Loader, wheeled • Breaker, mini-robot mounted • Hand-held Percussive Breaker • Air compressor • Grout Mixer • Grout Pump • Generator • Concrete lorry mixer • Poker, vibratory, hand-held (electric) • Compactor, vibratory • Concrete pump, stationary mounted • Roller, vibratory • Crane, mobile • Aerial work platform, working height ≤ 13m • Breaker, hand-held, mass > 10kg and < 20kg • Asphalt Paver • Paint line marker • Hydraulic splitter • Bar bender and cutter (electric) • Concrete crusher, excavator mounted • Welder/Generator, portable	completion of all construction activities					

	• Power pack (diesel) • Rock drill, crawler mounted (hydraulic) / Breaker, excavator mounted (hydraulic) • Water jetting unit (diesel), standard • Saw, wire • Drill, percussive, hand-held (electric) • Breaker, excavator mounted (hydraulic)						
4.6.37, Appendix 4.8	The contractor shall implement noise insulating fabric for the following PMEs such that the line of sight between the NSRs and the PME is blocked. Or otherwise, equivalent noise mitigation measures should be implemented. • Drill rig, rotary type (diesel) • Vibratory hammer • Piling, large diameter bored, reverse circulation drill • Piling, large diameter bored, oscillator • Piling, large diameter bored, grab and chisel • Crawler Crane with Grab and Chisel for Large Diameter Bored Pile	All Active construction sites / construction phase / upon completion of all construction activities	Contractor		√		
4.6.38, Appendix 4.8	The contractor shall implement noise enclosure for conveyor belt such that the line of sight between the NSRs and the PME is blocked. Or otherwise, equivalent noise mitigation measures should be implemented.	All Active construction sites / construction phase / upon completion of all construction activities	Contractor		√		
4.5.2, 4.6.33, Appendix 4.8	The contractor shall limit the operation of PMEs for not more than or equal to utilization rate stated in Appendix 4.8. Or otherwise, equivalent noise mitigation measures should be implemented.	All Active construction sites / construction phase / upon completion of all construction activities	Contractor		√		
4.6.46	<u>Sequencing Operation of Construction Activities and Reduction of number of PME</u> • To minimise the construction noise impact at WWG8, KTV5, STTNV5 and STTNV2, limit of one type of construction activity to be conducted within the buffer zones determined in Section 4.6 of the EIA report; and	Buffer zones for WWG8, KTV5 and, STTNV5 and STTNV2 / construction phase / upon completion of relevant construction activities	Project Proponent and Contractor	√	√		EIAO-TM

	• Reduction of number of vibratory compactor for "Road Surfacing" works from 6 nos. to 4 nos. within the buffer zones for WWG8 & KTV5.						
4.6.47	<u>Scheduling of Noisy Construction Activities during Examination Period of STGPS2</u> • To minimise the construction noise impact on STGPS2 during examination period, noisy activities including "Pile Cap, L-retaining Wall and Formation of new road", "Pile Cap and Formation of new road", "Foundation of Noise Barrier", "Slope Formation / Upgrading Works" and "Road Surfacing" in work zones 1 & 2 during examination period should be avoided as far as practicable. • Contractor should keep close communication with the school representative(s) to obtain the updated schedule of examination at the time conducting of the relevant construction works.	Work Zone 1 / 2 examination period in November 2030, November to December 2032, May to June 2033 / upon completion of relevant construction activities	Contractor		√		EIAO-TM
Operation Phase							
4.7.10	In accordance with HyD *Guidance Notes on Road Surface Requirements for Expressways and High Speed Road* (RD/GN/032), polymer modified friction course (PMFC) is proposed as the standard surfacing material on the road sections with design speed of 70km/h or above without traffic lights and classified as trunk road/high speed road.	Along the Project road/ Permanent/ Prior to first operation of the Project road	Project Proponent and Contractor	√	√	√	HyD *Guidance Notes on Road Surface Requirements for Expressways and High Speed Road* (RD/GN/032)
4.7.27	At-source mitigation measures, including the provision of vertical barriers, cantilever barriers and semi-enclosures have been proposed at appropriate locations along the Project road. Extents and locations of proposed direct mitigation measures are presented in Table 4.22 and 60604728/R42b/Figure 4.4, 60604728/R42b/Figure 4.4.1 to 60604728/R42b/Figure 4.4.4 of the EIA Report.	Along the Project road/ Permanent/ Prior to first operation of the Project road	Project Proponent and Contractor	√	√	√	EIAO-TM
Water Quality Impact							
Construction Phase							
5.7.2 – 5.7.3	The site practices outlined in ProPECC PN 1/94 "Construction Site Drainage" should be followed where applicable to minimise surface run-off and the chance of erosion. Surface run-off from construction sites should be discharged into storm drains via adequately designed sand / silt removal facilities such as sand traps, silt traps and sedimentation basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ProPECC PN 1/94

	stormwater to such silt removal facilities. Perimeter channels at site boundaries should be provided as necessary to intercept storm run-off from outside the site so that it will not wash across the site. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks.						
5.7.4	Silt removal facilities, channels and manholes should be maintained and the deposited silt and grit should be removed regularly (as well as at the onset of and after each rainstorm) to prevent overflows and localised flooding.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ProPECC PN 1/94
5.7.5	Construction works should be programmed to minimise soil excavation in the wet season (i.e. April to September). If soil excavation cannot be avoided in these months or at any time of year when rainstorms are likely, temporarily exposed slope surfaces should be covered e.g. by tarpaulin, and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Intercepting channels should be provided (e.g. along the crest / edge of excavation) to prevent storm run-off from washing across exposed soil surfaces.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ProPECC PN 1/94
5.7.6	Earthworks final surfaces should be well compacted and the subsequent permanent work or surface protection should be carried out immediately after the final surfaces are formed to prevent erosion caused by rainstorms. Appropriate drainage like intercepting channels should be provided where necessary.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ProPECC PN 1/94
5.7.7	Measures should be taken to minimise the ingress of rainwater into trenches. If excavation of trenches in the wet season is necessary, they should be dug and backfilled in short sections. Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ProPECC PN 1/94
5.7.8	Open stockpiles of construction materials (e.g. aggregates, sand and fill material) on sites should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ProPECC PN 1/94
5.7.9	Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers. Discharge of surface run-off into foul sewers	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ProPECC PN 1/94

	must always be prevented in order not to unduly overload the foul sewerage system.						
5.7.10	If bentonite slurries are required for any construction works, they should be reconditioned and reused wherever practicable to minimise the disposal volume of used bentonite slurries. Temporary enclosed storage locations should be provided on-site for any unused bentonite that needs to be transported away after the related construction activities are completed. Requirements as stipulated in ProPECC Note PN 1/94 should be closely followed when handling and disposing bentonite slurries.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ProPECC PN 1/94
5.7.11	Water used in ground boring and drilling for site investigation or rock / soil anchoring should as far as practicable be re-circulated after sedimentation. When there is a need for final disposal, the wastewater should be discharged into storm drains via silt removal facilities.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ProPECC PN 1/94
5.7.12	All vehicles and plant should be cleaned before they leave a construction site to minimise the deposition of earth, mud, debris on roads. A wheel washing bay should be provided at every site exit if practicable and wash-water should have sand and silt settled out or removed before discharging into storm drains. The section of construction road between the wheel washing bay and the public road should be paved with backfall to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ProPECC PN 1/94
5.7.13	Good site practices should be adopted to remove rubbish and litter from construction sites so as to prevent the rubbish and litter from spreading from the site area. It is recommended to clean the construction sites on a regular basis.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM
5.7.14	Apply to EPD for a discharge licence for discharge of effluent from the construction site under the WPCO. The discharge quality must meet the requirements specified in the discharge licence. All the runoff and wastewater generated from the works areas should be treated so that it satisfies all the standards listed in the TM-DSS. The beneficial uses of the treated effluent for other on-site activities such as dust suppression, wheel washing and general cleaning etc., can minimise water consumption and reduce the effluent discharge volume. If monitoring of the treated effluent quality from the works areas is required during the construction phase of the	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; TM-DSS

	Project, the monitoring should be carried out in accordance with the relevant WPCO licence.						
5.7.15	Acidic wastewater generated from acid cleaning, etching, pickling and similar activities should be neutralised to within the pH range of 6 to 10 before discharging into foul sewers. If there is no public foul sewer in the vicinity, the neutralized wastewater should be tankered off site for disposal into foul sewers or treated to a standard acceptable to storm drains and the receiving waters.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ProPECC PN 1/94
5.7.16	Sufficient chemical toilets should be provided in the works areas. A licensed waste collector should be deployed to clean the chemical toilets on a regular basis.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ProPECC PN 1/94
5.7.17	Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the surrounding environment. Regular environmental audit of the construction site should be conducted to provide an effective control of any malpractices and achieve continual improvement of environmental performance on site.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ProPECC PN 1/94
5.7.18	Contractor must register as a chemical waste producer if chemical wastes would be produced from the construction activities. The WDO (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation, should be observed and complied with for control of chemical wastes.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; Waste Disposal Ordinance (WDO)
5.7.19	Any service shop and maintenance facilities should be located on hard standings within a bunded area, and sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM
5.7.20	Disposal of chemical wastes should be carried out in compliance with the WDO. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the WDO should be followed to avoid leakage or spillage of chemicals.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; WDO
5.7.21	Appropriate measures should be implemented to minimize the groundwater	All construction sites /	Contractor		√		WPCO; EIAO-TM;

	infiltration during the tunnel construction.	construction phase / upon completion of all construction activities					ProPECC PN 1/94
5.7.22	In the event of excessive infiltration being observed as a result of the tunnelling or excavation works even after incorporation of the water control strategies, post-grouting should be applied as far as practicable before the lining is casted.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ProPECC PN 1/94
5.7.23	Above measures or other similar methods, as approved by the Engineer to suit the works condition shall be applied to minimize the groundwater infiltration.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ProPECC PN 1/94
5.7.24	In case seepage of groundwater occurs, groundwater should be pumped out from works areas and discharged to the drainage system via silt trap. Groundwater from dewatering process should also be discharged to the storm system via silt removal facilities.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ProPECC PN 1/94
5.7.25 - 5.7.26	The practices outlined in Environment, Transport and Works Bureau (ETWB) TC (Works) No. 5/2005 Protection of natural streams/rivers from adverse impacts arising from construction works" should also be adopted where applicable to minimise the water quality impacts upon any natural streams or surface water systems.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; ETWB TC (Works) No. 5/2005
5.7.27	Any excavated contaminated material and exposed contaminated surface should be properly housed and covered to avoid generation of contaminated runoff. Open stockpiling of contaminated materials should not be allowed. Any contaminated runoff generated under the construction process should be properly collected and diverted to wastewater treatment facilities (WTF) as necessary. The WTF shall deploy suitable treatment processes (e.g. oil interceptor/ activated carbon) to reduce the pollution level to an acceptable standard and remove any prohibited substances (such as total petroleum hydrocarbon) to an undetectable range. All treated effluent from the wastewater treatment system shall meet the requirements as stated in TM-DSS and should be either discharged into the foul sewers or tankered away for proper disposal	Tunnel Portal Areas / construction phase/ upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; TM-DSS
5.7.28	No direct discharge of groundwater from contaminated areas should be	Tunnel Portal Areas /	Contractor		√		WPCO; EIAO-TM; TM-

	adopted. Prior to any excavation works within the potentially contaminated areas, the baseline groundwater quality in these areas should be reviewed based on the past relevant site investigation data and any additional groundwater quality measurements to be performed with reference to Guidance Note for Contaminated Land Assessment and Remediation and the review results should be submitted to EPD for examination. If the review results indicated that the groundwater to be generated from the excavation works would be contaminated, this contaminated groundwater should be either properly treated or properly recharged into the ground in compliance with the requirements of the TM-DSS. If wastewater treatment is to be deployed for treating the contaminated groundwater, the wastewater treatment unit shall deploy suitable treatment process (e.g. oil interceptor/ activated carbon) to reduce the pollution level to an acceptable standard and remove any prohibited substances (such as total petroleum hydrocarbon) to an undetectable range. All treated effluent from the wastewater treatment plant shall meet the requirements as stated in the TM-DSS and should be either discharged into the foul sewers or tankered away for proper disposal.	construction phase/ upon completion of all construction activities					DSS; Guidance Note for Contaminated Land Assessment and Remediation
5.7.29	If deployment of wastewater treatment is not feasible for handling the contaminated groundwater, groundwater recharging wells should be installed as appropriate for recharging the contaminated groundwater back into the ground. The recharging wells should be selected at places where the groundwater quality will not be affected by the recharge operation as indicated in Section 2.3 of TM-DSS. The baseline groundwater quality should be determined prior to the selection of the recharge wells, and submit a working plan to EPD for agreement. Pollution levels of groundwater to be recharged shall not be higher than pollutant levels of ambient groundwater at the recharge well. Groundwater monitoring wells should be installed near the recharge points to monitor the effectiveness of the recharge wells and to ensure that no likelihood of increase of groundwater level and transfer of pollutants beyond the site boundary. Prior to recharge, free products should be removed as necessary by installing the petrol interceptor. The Contractor should apply for a discharge licence under the WPCO through the Regional Office of EPD for groundwater recharge operation or discharge of treated groundwater.	Tunnel Portal Areas / construction phase/ upon completion of all construction activities	Contractor		√		WPCO; EIAO-TM; TM-DSS; Guidance Note for Contaminated Land Assessment and Remediation
Design and Operation Phases							
5.7.30 -	Best Management Practices (BMPs) to reduce storm water and non-point	Project Site / Design and	Project	√		√	WPCO; ProPECC PN 5/93

5.7.36	source pollution are also proposed as follows: <u>Design Measures</u> • Exposed surface shall be avoided within the proposed development to minimise soil erosion. The Project Site shall be either hard paved or covered by landscaping area and plantation where appropriate. • The drainage system within the Project Site should be designed to cater for the runoff from 50 year-return-period rainstorm. <u>Devices/ Facilities to Control Pollution</u> • Screening facilities such as standard gully grating and trash grille, with spacing which is capable of screening off large substances such as fallen leaves and rubbish should be provided at the inlet of drainage system. • Road gullies with standard design and silt traps and oil interceptors should be incorporated during the detailed design to remove particles present in stormwater runoff. <u>Administrative Measures</u> • Good management measures such as regular cleaning and sweeping of road surface/ open areas is suggested. The road surface/ open area cleaning should also be carried out prior to occurrence of rainstorm. • Manholes, as well as storm water gullies, ditches provided at the Project site should be regularly inspected and cleaned (e.g. monthly). Additional inspection and cleansing should be carried out before forecast heavy rainfall.	Operation Phases	Proponent				
5.7.37	All sewage generated from the administration building would be treated by the on-site STP before discharging to the nearby road drainage system outside Lion Rock Country Park. The on-site sewage treatment facility will be designed generally with reference to EPD's "*Guidelines for the Design of Small Sewage Treatment Plant*". The on-site STP will adopt MBR with UV disinfection technology and installed within the footprint area of the administration building. There is a need to apply to EPD for a discharge licence for effluent discharge from the on-site STP under the WPCO. The treated effluent of the MBR plant will meet the effluent standards of Group D inland water as specified in TM-DSS.	Project Site / Design and Operation Phases	Project Proponent	√		√	WPCO; ProPECC PN 5/93, EPD's Guidelines for the Design of Small Sewage Treatment Plant

5.7.38	An emergency storage tank with 2 hours of ADWF capacity will be provided for temporary storage of sewage and the stored sewage will be tankered away, to avoid emergency discharge to drainage system. To further minimize the potential emergency discharge from the on-site STP, dual or standby power supply, standby sewage treatment units, flow sensors and alarm systems should be provided. Level sensors connected with alarm signalizing system will also be installed, to monitor the storage volume to avoid overflow of untreated wastewater/raw sewage. Some spare parts such as electrical and mechanical components of the proposed STP will also be provided in case of facilities break down / emergency. Regular test, maintenances and replacement of membranes or equipment are necessary to maintain a good operation condition.	Project Site / Design and Operation Phases	Project Proponent	√		√	WPCO; ProPECC PN 5/93, EPD's Guidelines for the Design of Small Sewage Treatment Plant
5.7.39	Wastewater generated from canteen within the new administration building will be collected and treated by grease trap before being treated at the on-site STP.	Project Site / Design and Operation Phases	Project Proponent	√		√	WPCO; ProPECC PN 5/93, EPD's Guidelines for the Design of Small Sewage Treatment Plant
5.7.40	All sewage generated from the new ventilation buildings at Kowloon and Shatin portals would be treated by a septic tank with soakaway system each. The design of septic tank with soakaway system shall follow the relevant guidelines and practices as given in the ProPECC PN 5/93 "*Drainage Plans subject to Comment by the EPD*". Regular maintenance shall be provided to all components of the wastewater treatment system, including the on-site STP, septic tank with soakaway system, grease traps, etc. No direct discharge of sewage effluent into the inland water will be allowed.	Project Site / Design and Operation Phases	Project Proponent	√		√	WPCO; ProPECC PN 5/93, EPD's Guidelines for the Design of Small Sewage Treatment Plant
5.7.41	Wastewater from washing and maintenance activities of ventilation system will be collected and treated with active carbon filter before discharge to the septic tank. All wastewater generated from washing and maintenance activities of work vehicles at car parking area will be collected and treated by petrol interceptor following by sedimentation tank before discharge to the on-site STP. Regular maintenance shall be provided to all components of the wastewater treatment system, including the on-site STP, petrol interceptor, sedimentation tank, active carbon filter system, etc.. A Licensed Chemical Waster Collector Contractor should be employed to collect and dispose of spent lubrication oil generated from vehicle maintenance activities in compliance with the Waste Disposal Ordinance. No direct discharge of these wastewaters into the inland water will be allowed.	Project Site / Design and Operation Phases	Project Proponent	√		√	WPCO; ProPECC PN 5/93, WDO

5.7.42	Mitigation measures are required to mitigate tunnel run-off during the operation phase as illustrated in follow: • Road drainage channels discharge should pass through oil/grit interceptors/chambers to remove oil, grease and sediment before discharging into the public storm drainage system; • The silt traps and oil interceptors should be cleaned and maintained regularly; and • Oily contents of the oil interceptors should be transferred to an appropriate disposal facility, or to be collected for reuse, if possible.	Project Site / Design and Operation Phases	Project Proponent	√		√	WPCO; ProPECC PN 5/93
Waste Management Implication							
Construction Phase							
6.7.3	<u>Good Site Practices</u> Recommendations for good site practices during the construction phase include: • Nomination of an approved personnel, such as a site manager, to be responsible for good site practices, and making arrangements for collection of all wastes generated at the site and effective disposal to an appropriate facility; • Training of site personnel in proper waste management and chemical waste handling procedures; • Provision of sufficient waste reception/ disposal points; • Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; and • Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		Waste Disposal Ordinance (WDO)
6.7.4	<u>Waste Reduction Measures</u> Recommendations to achieve waste reduction include: • Use of steel formwork instead of timber formwork to reduce the generation of timber waste;	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		WDO

	• Segregate and store different types of construction related waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; • Encourage collection of wastepaper, plastic bottles and aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the workforce; • Any used chemicals or those with remaining functional capacity shall be recycled. • Proper storage and site practices to minimize the potential for damage or contamination of construction materials; and • Plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste.						
6.7.5	The Contractor shall prepare and implement a WMP as part of the EMP in accordance with ETWB TCW No. 19/2005 which describes the arrangements for avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal of different categories of waste to be generated from the construction activities. Such a management plan should incorporate site specific factors, such as the designation of areas for segregation and temporary storage of reusable and recyclable materials. The EMP should be submitted to the Engineer for approval. The Contractor should implement the waste management practices in the EMP throughout the construction stage of the Project. The EMP should be reviewed regularly and updated by the Contractor.	All construction sites / construction phase / upon completion of all construction activities	Contractor	√	√		ETWB TC(W) No. 19/2005
6.7.6	<u>Storage of Waste</u> Recommendations to minimise the impacts include: • Waste should be handled and stored well to ensure secure containment, thus minimising the potential of pollution; • Maintain and clean storage areas routinely; • Stockpiling area should be provided with covers and water spraying system to prevent materials from wind-blown or being washed away; • Conveyor belt systems should be fully enclosed and dust proof; and • Different locations should be designated to stockpile each material to enhance reuse.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		-
6.7.7	<u>Collection of Waste</u>	All construction sites /	Contractor		√		WDO; Waste Disposal

	Waste haulers should be employed for the collection and transportation of waste generated. The following measures should be enforced to minimise the potential adverse impacts: • Remove waste in timely manner; • Waste collectors should only collect wastes prescribed by their permits; • Impacts during transportation, such as dust and odour, should be mitigated by the use of covered trucks or in enclosed containers; • Obtain relevant waste disposal permits from the appropriate authorities, in accordance with the WDO (Cap. 354), Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 345) and the Land (Miscellaneous Provisions) Ordinance (Cap. 28); • Waste should be disposed of at licensed waste disposal facilities; and • Maintain records of quantities of waste generated, recycled and disposed.	construction phase / upon completion of all construction activities					(Charges for Disposal of Construction Waste) Regulation; Land (Miscellaneous Provisions) Ordinance
6.7.9	<u>Transportation of Waste</u> Implementation of trip ticket system with reference to DEVB TC(W) No. 6/2010, Trip Ticket System for Disposal of Construction & Demolition Materials, to monitor disposal of waste and to control fly-tipping outside PFRFs or landfills. Additionally, all dump trucks should be equipped with GPS or equivalent system for the monitoring of their travel routings and parking locations to prohibit illegal dumping and landfilling of C&D materials. A recording system for the amount of waste generated, recycled and disposed (including disposal sites) as well as travel routings and parking locations should be proposed.	Transportation Route of Waste / Construction Phase	Contractor		√		DEVB TC(W) No. 6/2010
6.7.11	<u>Sorting of C&D Materials</u> Concerning the necessity of maximising reuse for the Project, it is paramount for sorting to be performed to recover the inert materials, reusable and recyclable materials before disposal off-site. All surplus C&D materials arising from or in connection with the works shall become the property of the Contractor when it is removed unless otherwise stated. The Contractor will be responsible for devising a system to work for sorting of C&D materials and promptly removing all sorted and processed materials arising from the construction activities. The system should be included in the EMP, identifying the source of generation, estimated quantity, arrangement for sorting, collection, temporary storage areas (if any) and frequency of	All construction sites / construction phase / upon completion of all construction activities	Contractor	√	√		ETWB TC(W) No. 19/2005 Project Administration Handbook (PAH)

	collection by recycling Contractors or frequency of off-site removal. A Construction and Demolition Material Management Plan (C&DMMP) should be prepared and submitted together with EIA Report for PFC's approval as required under Section 4.1.3 of the PAH.						
6.7.12	It is recommended that specific areas should be provided by the Contractors for sorting and to provide temporary storage areas (if required) for the sorted materials. The materials could be segregated according to the categories as shown below: • Excavated materials suitable for reuse on site; • Excavated materials for delivery to PFRFs for beneficial reuse in other projects; • Surplus rock to be recycled into aggregates and other rock products in the Lam Tei Quarry; and • Non-inert C&D materials for delivery to landfills.	All construction sites / construction phase / upon completion of all construction activities	Contractor	√	√		ETWB TC(W) No. 19/2005
6.7.13	The C&D materials should at least be segregated into inert and non-inert materials, in which the inert portion could be reused and recycled as far as practicable before delivery to PFRFs for beneficial reuse in other projects. While opportunities for reusing the non-inert portion should be investigated before disposal of at designated landfills.	All construction sites / construction phase / upon completion of all construction activities	Contractor	√	√		ETWB TC(W) No. 19/2005
6.7.14	<u>Chemical Wastes</u> If chemical wastes are produced at the construction site, the Contractor would be required to register with the EPD as a Chemical Waste Producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport and dispose of the chemical wastes, to either the Chemical Waste Treatment Centre at Tsing Yi, or other licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√		Waste Disposal (Chemical Waste) (General) Regulation, Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes
6.7.15	<u>General Refuse</u> General refuse should be stored in enclosed bins or compaction units	All construction sites / construction phase / upon	Contractor		√		Public Health and Municipal Services Ordinance

	separate from C&D material. A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D material. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' light material. Clearly labelled recycling bins should be provided on site in order to encourage segregation and recycling of aluminium and plastic wastes, and wastepaper in order to reduce general refuse generation. The contractor should carry out an education programme for workers in avoiding, reducing, reusing and recycling of materials generation. Posters and leaflets advising on the use of the bins should also be provided in the site as reminders. The recyclable waste materials should then be collected by reliable waste recycling agents on a regular basis.	completion of all construction activities					(Cap.132)
Operation Phase							
6.7.18	<u>Screening, Grits and Sludge</u> The below good housekeeping practices should be followed to further ameliorate any odour impact from handling, collection, transportation and disposal of screenings, grits and sludge: • Screens should be cleaned regularly to remove any accumulated organic debris; • Screening and grit transfer systems should be flushed regularly with water to remove organic debris and grit; • Grit and screened materials should be transferred to closed containers; • Scum and grease collection wells and troughs should be emptied and flushed regularly to prevent putrefaction of accumulated organics; • Skim and remove floating solids and grease from primary clarifiers regularly; • Frequent sludge withdrawal from tanks is necessary to prevent the production of gases; • Sludge trucks and containers should be washed thoroughly before leaving the new administration building to avoid any odour nuisance during transportation; and • The screenings & grits would be collected and disposed of at NENT Landfill by a reputable waste collector, while sludge would be trucked away to the designated Drainage Services Department (DSD) sewage treatment works (STW) (e.g. Sha Tin STW) for collaborate treatment by	Operation Phase	Operator			√	WDO

	a reputable licensed waste collector. The disposal of screening & grits as well as sludge would be carried out on a regular basis to reduce the potential pest, odour and litter impacts.						
6.7.19	Chemical Waste The requirements given in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes would be followed in handling of chemical waste as in construction phase. A trip-ticket system would be adopted by the operator to monitor disposal of chemical waste. The Contractor shall register with EPD as a chemical waste producer. The licensed collector shall deliver the waste to the Chemical Waste Treatment Centre (CWTC) at Tsing Yi, or other licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	Operation Phase	Operator			√	Waste Disposal (Chemical Waste) (General) Regulation, Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes
6.7.20 - 6.7.21	General Refuse Recycling of wastepaper, aluminium cans and plastic bottles should be encouraged, it is recommended to place clearly labelled recycling bins at designated locations which could be accessed conveniently. Other general refuse should be separated from chemical waste by providing separated bins for storage to maximize the recyclable volume. A reputable waste collector should be employed to remove general refuse on a daily basis to minimize odour, pest and litter impacts.	Operation Phase	Operator			√	Public Health and Municipal Services Ordinance (Cap.132)
Land Contamination							
7.8.1 - 7.8.3	Site re-appraisal should be carried out for the whole Project Area at a later stage of the Project in order to address any new contamination issues caused by the (i) changes in operation of the identified potentially contaminated site and (ii) changes in land use within the Project Area. The submission of supplementary Contamination Assessment Plan(s) (CAP(s)), associated site investigation (SI) works and any necessary remediation should be carried out at the concerned facilities and any new contaminated area identified in the site re-appraisal, prior to the commencement of construction at the potentially contaminated area(s). Supplementary CAP(s), presenting findings of the review, the latest site conditions of the concerned facilities / new contaminated area and updated sampling strategy and testing protocol, should be submitted to EPD for endorsement. The SI	Project Area / Construction Phase (after decommissioning of the concerned facilities / areas but prior to the construction works at the concerned facilities / areas)	Project Proponent / Contractor		√		Guidance Note for Contaminated Land Assessment and Remediation; Practice Guide for Investigation and Remediation of Contaminated Land; Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management

	works should be carried out according to EPD's agreed supplementary CAP(s). Following completion of SI works and receipt of laboratory test results, Contamination Assessment Report(s) ((CAR)(s)) should be prepared to present the findings of the SI works and to discuss the presence, nature and extent of contamination. If contamination is identified, Remediation Action Plan(s) ((RAP)(s)) which provides details of the remedial actions for the identified contaminated soil and / or groundwater should be endorsed by EPD. The possible remediation methods are detailed in Section 5.2 of the CAP provided in Appendix 7.1 of the EIA Report. Remediation action, if necessary, will be carried out according to EPD endorsed RAP(s) and Remediation Report(s) (RR(s)) will be submitted after completion of the remediation action. The RR(s) should be endorsed by EPD prior to the commencement of construction works at the respective identified contaminated areas (if any).						
7.8.5	The mitigation measures will be recommended in the RAP and would typically include the following: • Excavation profiles must be properly designed and executed with attention to the relevant requirements for environment, health and safety; • Excavation shall be carried out during dry season as far as possible to minimise contaminated runoff from contaminated soils; • Supply of suitable clean backfill material (or treated soil) after excavation; • Stockpiling site(s) shall be lined with impermeable sheeting and bunded. Stockpiles shall be fully covered by impermeable sheeting to reduce dust emission. If this is not practicable due to frequent usage, regular watering shall be applied. However, watering shall be avoided on stockpiles of contaminated soil to minimise contaminated runoff. • Vehicles containing any excavated materials shall be suitably covered to limit potential dust emissions or contaminated wastewater run-off, and truck bodies and tailgates shall be sealed to prevent any discharge during transport or during wet conditions;	Project Area / Construction Phase	Contractor		√		Guidance Note for Contaminated Land Assessment and Remediation; Practice Guide for Investigation and Remediation of Contaminated Land; Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management

	• Speed control for the trucks carrying contaminated materials shall be enforced; • Vehicle wheel and body washing facilities at the site's exist points shall be established and used; and • Pollution control measures for air emissions (e.g. from biopile blower and handling of cement), noise emissions (e.g. from blower or earthmoving equipment), and water discharges (e.g. runoff control from treatment facility) shall be implemented and complied with relevant regulations and guidelines.						
Ecological Impact (Terrestrial)							
8.10.2 – 8.10.11	<u>Avoidance of Adverse Impacts to Recognized Sites of Conservation Importance and Natural Habitats</u> Extensive environmental considerations have been taken into account during the evaluation of design and construction options in order to avoid and minimize environmental impacts and maximize environmental benefits as far as possible. There would be no aboveground works within the Beacon Hill SSSI and direct impacts on Lion Rock Country Park (LRCP) and the natural habitats there are largely avoided. The associated facilities such as the workshops, depots and car parks will make use of the existing tunnel support areas as far as possible to avoid/minimize additional space needed and any further encroachment into LRCP. To combine the ventilation buildings at each portal to allow better tunnel operation and reduce the required footprint, which in turn reduces the extent of woodland and plantation loss. To avoid direct encroachment upon natural habitats within LRCP, the proposed area for temporary stockpiling is now located at the north of the existing toll plaza near downhill side within the footprint of the permanent works (i.e. no additional ecological impacts) and away from the LRCP. Extensive environmental considerations have been taken into account during the evaluation of design and construction options in order to avoid and minimize environmental impacts and maximize environmental benefits	Project sites / Design, Pre-construction and Construction phases	Project Proponent / Contractor	√	√		EIAO-TM

	as far as possible. The uphill option would encroach within the LRCP as compared to the downhill option and would also lead to the direct loss of wooded areas, watercourses and impact to wildlife. As such, it is recommended to avoid uphill option as far as practicable. Road widening works along LRTR would mainly comprise construction of slopes and retaining walls. The construction of the road widening roads mainly in the downhill area significantly replaced the need for massive equipment for bored piling works uphill to relatively much smaller filling and retaining structures downhill that require simpler and more environmentally friendly equipment. Adoption of the middle alignment option for new tunnel to avoid direct impact to the hillside vegetation at the LRCP and Tei Lung Hau. To avoid/minimize the potential impacts to LRCP, the footprint of NTHMMs (rigid barriers and flexible barriers) are located at developed / paved areas at the margin of LRCP and outside LRCP as far as practicable.						
8.10.12-8.10.18	Provision of screening (e.g. by erection of hoarding) during construction phase is recommended to confine the proposed Project footprint to avoid any unnecessary encroachment of construction works into the adjacent sensitive natural habitats. Precautionary measure (erection of hoarding at Project footprint near natural watercourse) should be implemented to prevent unintended access or use of natural watercourses within or in the vicinity of Project footprint (i.e. S2 to S8) by workers to avoid or minimize potential disturbance impacts to natural watercourses. The design of proposed rigid barriers and flexible barriers (e.g. extent, dimension, construction method) would be carefully designed and adjusted on site to avoid/minimize tree felling and vegetation trimming to the maximum practicable extent. Landscape works such as planting of native shrubs in pits of rigid barriers and flexible barriers and provision of subdued colour paint would be undertaken to reinstate the affected area upon the completion of works.	Project sites / Design, Pre-construction and Construction phases	Project Proponent / Contractor	√	√	√	EIAO-TM, *Guidelines on Tree Preservation during Development* and *TC(W) No. 4/2020 Tree Preservation*, Guiding Principles on Use of Native Plant Species in Public Works Projects

	Protection measures, as referenced to *Guidelines on Tree Preservation during Development* and *TC(W) No. 4/2020 Tree Preservation* should be implemented. All temporarily affected areas should be reinstated by woodland mix planting after completion of the works. Vegetation surveys should be conducted at the temporarily affected area, to review the Preliminary Reinstatement Plan (Appendix 8.8 refers) and to submit a Final Reinstatement Plan to relevant government authorities (e.g. AFCD, EPD) for approval before commencement of any construction activities.						
8.10.19-8.10.21	To mitigate the potential adverse impacts to flora species of conservation importance, mitigation measures (e.g. preserve in-situ, transplant, mitigation planting to be provided at recipient site) are recommended. To minimize impacts, a detailed vegetation survey should be conducted within the concerned areas prior to the commencement of construction activities by a qualified ecologist / botanist with at least 10 years relevant experience to ascertain the presence, update the conditions and determine the abundance and locations of the flora species of conservation importance. All identified species of conservation importance should be labelled and fenced off on site for preservation, or in case of unavoidable loss, for transplantation as far as possible. In case plant preservation or transplantation is not practical as recommended by the qualified ecologist (e.g. due to poor health and low survive rate of the plant), other mitigation measures (e.g. compensation by seedling planting) should be implemented. A Final PPTP should be prepared by a qualified ecologist / botanist with at least 10 years relevant experience to recommend the suitable mitigation measures (e.g. preservation, transplantation or seedling compensation) to mitigate the potential adverse impacts to the identified flora species of conservation importance.	Project sites / Design and Pre-construction phases	Contractor	√	√	√	EIAO-TM
8-10-22 – 8.10.23	Protection of Fauna Species of Conservation Importance In order to avoid any potential direct injury to fauna species of conservation importance recorded within the Project footprint, A pre-construction survey in natural habitats within and in the surrounding of the Project footprint is recommended (e.g. natural watercourse S7 and woodland near the Project footprint) to ascertain the presence and abundance of the fauna species of conservation importance prior to the commencement of construction works. A Pre-construction Fauna Survey Report prepared by a qualified ecologist	Project sites / Design and Pre-construction phases	Project Proponent and Contractor	√	√		EIAO-TM

	with at least 10 years relevant experience would be submitted to relevant government authorities (e.g. AFCD and EPD). In case any fauna species of conservation importance recorded would be directly impacted, translocation should be carried out to avoid potential direct impact. A Translocation Proposal (PTP) should be prepared by a qualified ecologist with at least 10 years relevant experience, where appropriate, to present detailed findings of potentially affected fauna within the impacted habitats (e.g. species and number of affected individuals), propose protection and translocation methodology (e.g. protection measure, timing of the translocation, implementation programme) and maintenance programme. The PTP should be submitted to and approved by relevant government authorities (e.g. AFCD and EPD) prior to commencement of construction works.						
8.10.24- 8.10.25	<u>Minimizing Disturbance Impacts on Natural Habitats and Fauna</u> To avoid excessive cumulative environmental impacts, the proposed widening works along LRTR are divided into four work zones, and with major site formation and foundations works of adjacent work zones sequenced to be constructed at different phases under the construction programme. Provision of screening (e.g. site hoardings, noise barriers) during construction phase is recommended. The following standard good site practices should also be implemented throughout the construction phase: • Placement of equipment or stockpile in designated works areas and access routes selected on existing disturbed land to minimize disturbance to natural habitats; • Construction activities should be restricted to clearly demarcated works areas; and • Collect general refuse and construction wastes properly and dispose in a timely manner.	Project sites / Construction phase	Contractor		√		EIAO-TM, *Guidelines on Tree Preservation during Development* and *TC(W) No. 4/2020 Tree Preservation*
8.10.26 – 8.10.32	Minimising Glare, Air Quality, Noise, Water Quality and Disturbance Impacts Proper implementation of mitigation measures (such as good site practices, restriction of construction hours from 07:00 to 19:00 outside country park area, night-time lighting control and lining hoarding at the Project boundary), should minimize any potential impacts. Construction works between the hours of 18:00 to 08:00 and on Sundays and Public Holidays within country park area should be avoided. The intensity of light should also be controlled to the lowest possible level. Unnecessary lighting should be turned off	Project sites / Construction and Operation phase	Contractor		√	√	EIAO-TM, *Air Pollution Control (Construction Dust) Regulation (Cap. 311R), Recommended Pollution Control Clauses for Construction Contracts, ETWB Technical Circular (Works) No. 5/2005 Protection of natural*

	outside working hours of the construction sites. A balance between lighting for safety and avoiding excessive lighting can be achieved through the use of directional lighting. The intensity of light during the operation stage (e.g. at LRT administration building) should also be controlled to the lowest possible level. A balance between lighting for safety and avoiding excessive lighting can be achieved through the use of directional lighting (i.e. direct lighting away from the natural habitats and LRCP during operation phases. Dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation (Cap. 311R) would avoid and minimize impacts to the surrounding habitats and the associated wildlife arising from the construction activities. Good site practices should be adopted, such as: • Regular spraying of haul roads; • Proper storage of construction materials; and • Covering trucks or transporting wastes in enclosed containers. Provision of movable noise barriers or enclosures to provide screening from the construction plant and implementation of noise control requirements stated in "*Recommended Pollution Control Clauses for Construction Contracts*" is also recommended. Use of Quality Powered Mechanical Equipment (QPME) and orientate noisy machines / plant away from these habitats. Good site practices as described in ETWB Technical Circular (Works) No. 5/2005 Protection of natural streams/rivers from adverse impacts arising from construction works and ProPECC PN 1/94 Construction Site Drainage should also be adopted to avoid any adverse water quality impacts where applicable.						*streams/rivers from adverse impacts arising from construction works*, *ProPECC PN 1/94 Construction Site Drainage* and *ProPECC PN 5/93 Drainage Plans subject to Comment*
8.10.33	<u>Minimising Groundwater Infiltration</u> Please refer to the minimization measures of groundwater infiltration as stated in the Water Quality Section above and Section 5 of the EIA Report.	All construction sites / construction phase / upon completion of all construction activities	Contractor		√	√	WPCO; EIAO-TM; ProPECC PN 1/94
8.10.34	<u>Minimising Impacts from Noise Barriers</u> The installation of noise barrier would be carefully designed. Usage of tinted materials and superimposing dark patterns or strips on the barrier, as per *Guidelines on Design of Noise Barriers* and *Practice Notes No.*	Project Sites /Design and Operation phase	Contractor	√		√	*Guidelines on Design of Noise Barriers, Practice Notes No. BSTR/PN/003 (Revision E) Noise Barriers with Transparent Panels*

	BSTR/PN/003 (Revision E) Noise Barriers with Transparent Panels, would be employed to minimize bird mortality from collision.						
8.10.35 – 8.10.40	Compensatory Planting for Unavoidable Woodland Loss The unavoidable permanent loss of woodland within LRCP (about 0.25 ha) will be mitigated by provision of woodland compensatory planting at a ratio of not less than 1:1 in terms of area. A Preliminary Woodland Compensation Plan (WCP) is presented in Appendix 8.10 to form the basis to guide the implementation of the proposed compensatory planting, and should be reviewed and updated in Final WCP by a qualified ecologist / arborist with at least 10 years relevant experience to be prepared appointed by the Project Proponent during the detailed design phase of the Project. The Final WCP should include the survey findings of detailed vegetation and tree survey, implementation details and schedule, management requirement, as well as monitoring requirements of the compensatory planting area (e.g. monitoring frequency, parameters including health condition and survival rate of planted species, presence of weedy plant). The Final WCP should be submitted to and approved by relevant government authorities (e.g. AFCD and EPD) prior to the commencement of construction activities.	Within assessment area / Design, Construction phases	Project Proponent/ Contractor	√	√	√	EIAO-TM
Cultural Heritage Impact							
9.7.1	Pre and post condition survey Pre and post condition survey of Ex Kowloon Canton Railway Beacon Hill Tunnel (Government Historic Site) should be conducted by professional qualified building surveyor or engineer before and after the construction works respectively. The survey results shall be submitted to AMO for record.	Ex Beacon Hill Tunnel / before and after construction phase	Contractor		√		EIAO-TM Annexes 10 and 19; Guidelines for Cultural Heritage Impact Assessment
9.7.2	Monitoring of vibration, settlement and tilting for Ex Beacon Hill Tunnel Monitoring of vibration, settlement and tilting incorporated with a set of Alert, Alarm and Action (AAA) system shall be employed for Ex Kowloon Canton Railway Beacon Hill Tunnel (Government Historic Site) during the construction phase, measuring inside the tunnel tube at locations closest to the proposed construction works. The proposed AAA limiting criteria are presented in Table 9.3 of EIA Report. The actual limiting criteria should be further agreed with the AMO. A monitoring proposal, including type and frequency of monitoring, distribution of monitoring points and proposed	Ex Beacon Hill Tunnel and work site close to Ex Beacon Hill Tunnel / Construction Phase/ upon completion of all construction activities in the vicinity of Ex Beacon Hill Tunnel	Contractor		√		EIAO-TM Annexes 10 and 19; Guidelines for Cultural Heritage Impact Assessment

	actions to be taken when reaching respective monitoring limits, should be submitted to AMO for agreement before commencement of works. Record of monitoring should be submitted regularly to AMO during the construction. AMO should be alerted in case any irregularities are observed.						
9.7.4 - 9.7.5	<u>Adopt similar fonts of the name of the tunnel and colour scheme of associated buildings</u> It is suggested that fonts on both sides of the portals of the two tunnels, namely "Lion Rock Tunnel 獅子山隧道" and "Second Lion Rock Tunnel 第二獅子山隧道", should be kept or replicated and placed on similar position as the current setting. The colour scheme of associated buildings is suggested to be adopted to the new administrative buildings in order to maintain the original sentiment.	Construction sites / Construction phase	Contractor		√		EIAO-TM Annexes 10 and 19; Guidelines for Cultural Heritage Impact Assessment
9.7.5	<u>Retain the commemorative plaques of the tunnel</u> The two commemorative plaques marking the opening ceremony of the tunnel should be kept at prominent position at the new administrative buildings visible to all guests.	Construction sites / Construction phase	Contractor		√		EIAO-TM Annexes 10 and 19; Guidelines for Cultural Heritage Impact Assessment
9.7.5	<u>Conduct detailed photographic recording</u> Detailed photographic recording on the Lion Rock Tunnel and its associated buildings (both exterior and interior) should be conducted before any works to commence. A copy of the photographic documentation should be provided to AMO for record.	Construction sites / Construction phase	Contractor		√		EIAO-TM Annexes 10 and 19; Guidelines for Cultural Heritage Impact Assessment
9.7.6 and 9.7.7	Monitoring of vibration, settlement and tilting for NB17 to NB20 Monitoring of vibration, settlement and tilting incorporated with a set of Alert, Alarm and Action (AAA) system shall be employed for NB17 to NB20 in the same fashion as the Ex Beacon Hill Tunnel.	NB17 to NB20	Contractor		√		EIAO-TM Annexes 10 and 19; Guidelines for Cultural Heritage Impact Assessment
9.7.8	<u>Inform AMO immediately in case of discovery of antiquities or supposed antiquities</u> As a precautionary measure, AMO should be informed immediately in case of discovery of antiquities or supposed antiquities in the course of works, so that appropriate mitigation measures, if needed, can be timely formulated and implemented in agreement with AMO.	Construction sites / Construction phase	Contractor		√		EIAO-TM Annexes 10 and 19; Guidelines for Cultural Heritage Impact Assessment; Antiquities and Monuments Ordinance (A&MO) (Cap.53)

Landscape and Visual Impact							
Table 10.10	Preservation of Existing Vegetation (CM1) All the existing Trees to be retained and not to be affected by the Project shall be carefully protected during construction accordance with DEVB TCW No. 4/2020 - Tree Preservation and the latest Guidelines on Tree Preservation during Development issued by GLTM Section of DevB. Any existing vegetation in landscaped areas and natural terrain not to be affected by the Project shall be carefully preserved. In particular for trees with conservation importance fall within the temporary works area, the works shall be carefully arranged to preserve the trees where technically feasible. Preservation of trees of particular interest will be favourably considered with reference to DEVB TC(W) No. 4/2020. Any unavoidably removal or transplanting of trees of particular interest shall be fully justified in accordance with DEVB TC(W) No. 4/2020 and Guidelines for Tree Risk Assessment and Management Arrangement issued by DEVB.	Construction sites / Design and Construction phase	Project Proponent / Contractor	√	√		DEVB TC(W) No. 4/2020 - Tree Preservation and the latest Guidelines on Tree Preservation during Development issued by GLTMS of DEVB
Table 10.10	Control of Night-time Lighting Glare (CM2) Any lighting provision of the construction works at night shall be carefully controlled to prevent light overspill to the nearby VSRs and into the sky. Relevant best practices as suggested in the "Guidelines on Industry Best Practices for External Lighting Installations" promulgated by ENB shall be adopted.	Construction sites / Construction phase	Project Proponent / Contractor		√		"Guidelines on Industry Best Practices for External Lighting Installations" promulgated by ENB
Table 10.10	Erection of Decorative Screen Hoarding (CM3) Decorative Hoarding, which is compatible with the surrounding natural settings, shall be erected during construction to minimise the potential landscape and visual impacts due to the construction works and activities. For visually sensitive locations such as works area closed to Hung Mui Kuk Nature Trail and works area adjoining residential developments, appropriate greening design in the form of vertical greening or portable planter along the hoarding shall be applied to blend in with the natural surroundings during construction phase.	Construction sites / Construction phase	Project Proponent / Contractor		√		-
Table 10.10	Management of Construction Activities and Facilities (CM4)	Construction sites / Construction phase	Contractor		√		-

	The facilities and activities at works sites and areas, which include site office, temporary storage areas, temporary works etc., shall be carefully managed and controlled on the height, deposition and arrangement to minimise any potential adverse landscape and visual impacts.						
Table 10.10	Reinstatement of Temporarily Disturbed Landscape Areas (CM5) All hard and soft landscape areas disturbed temporarily during construction due to temporary excavations, temporary works sites and works areas shall be reinstated to equal or better quality, to the satisfaction of the relevant Government Departments. The reinstatement planting will be subject to 3-year establishment period for areas within Lion Rock Country Park.	Construction sites / Construction phase	Contractor		√		-
Table 10.10	Minimize the Direct Conflict with Lion Rock Country Park (CM6) The optimum alignment of proposed road improvement works is carefully designed to minimize direct conflict with the Lion Rock Country Park. The works area of road widening and associated slope works shall be minimized and confined to avoid any unnecessary vegetation loss in the adjacent Country Park.	Construction sites / Design and Construction phase	Project Proponent / Contractor	√	√		-
Table 10.10	Minimize Disturbance on Watercourses (CM7) The design shall minimize disturbance on watercourses, particularly for natural watercourse. Good site practices as described in ETWB TCW No. 5/2005 "Protection of natural streams/rivers from adverse impacts arising from construction works" shall also be adopted to avoid any pollution entering the watercourses nearby where applicable. Should temporarily or indirect disturbance on watercourse is unavoidable, it shall be reinstated to the satisfaction of relevant Government Departments.	Construction sites / Design and Construction phase	Project Proponent / Contractor	√	√		ETWB TCW No. 5/2005 "Protection of natural streams/rivers from adverse impacts arising from construction works"
Table 10.11	Compensatory Tree Planting for Loss of Existing Trees (OM1) Any Trees to be felled under the Project shall be compensated in accordance with DevB TCW No. 4/2020 - Tree Preservation. The size of compensatory trees at their maturity should be appropriate to the location and function in reference to Appendix C of DevB TCW No. 4/2020. For trees to be compensated on slopes, the guidelines for tree planting stipulated in GEO Publication No. 1/2011 will be followed. Approximately 145 heavy standard trees are proposed within site under OM1, the exact number and location	Construction sites / Design, Construction and Operational phase	Project Proponent / Contractor / Operator	√	√	√	DEVB TC(W) No. 4/2020 - Tree Preservation, GEO Publication No. 1/2011, the Greening Master Plan issued by CEDD, the Street Tree Selection Guide issued by DEVB and DEVB TC(W) No. 6/2015 - Maintenance of Vegetation

	subject to the detailed design at design and construction stage of this Project.						and Hard Landscape Features
Table 10.11	Compensatory Woodland Mix Planting on Soil Slopes (OM2) Woodland Mix Planting with tree whips shall be applied on slope as compensatory planting in accordance with Appendix C of DevB TCW No. 4/2020. The appropriate new or reinstated soil cut and fill slopes shall be at a gradient of 35 degree or below following the technical guidelines set out in GEO Publication No. 1/2011 at the tunnel portals and the affected slopes along the road improvement works. The quality aspects such as improving the vegetation diversity of native species mix, enhancing ecological value and improving overall value of landscape setting etc. of the compensatory planting proposal shall be fully considered. Use of native species shall be maximized as far as possible in accordance with the Guiding Principles on Use of Native Plant Species in Public Works Projects issued by DEVB to improve the habitat complexity and quality, particularly for the affected areas / engineered slopes at the margins of Lion Rock Country Park. Approximately 2,070 whip trees and 1,200 native seedlings/whip trees are proposed within site and off-site respectively under OM2, the exact number and location subject to the detailed design at design and construction stage of this Project.	Construction sites / Design, Construction and Operational phase	Project Proponent / Contractor / Operator	√	√	√	DEVB TC(W) No. 4/2020 - Tree Preservation, GEO Publication No. 1/2011, the Guiding Principles on Use of Native Plant Species in Public Works Projects issued by DEVB and DEVB TC(W) No. 6/2015 - Maintenance of Vegetation and Hard Landscape Features
Table 10.11	Aesthetically pleasing design of Aboveground Structures (OM3) The Aboveground Structures of the Project including Tunnel Portals, Ventilation Buildings, Tunnel Administration Building etc. in the regard of layouts, forms, materials and finishes shall be sensitively designed so as to blend in the structures to the adjacent landscape and visual context. Design concepts like matching colour schemes among the existing building façade and the new administration building shall be fully explored in the design stage in order to maintain the original sentiment.	Construction sites / Design, Construction and Operational phase	Project Proponent / Contractor / Operator	√	√	√	-
Table 10.11	Aesthetically pleasing design of Highways Structures and Slope Associated Structures (OM4) Highways Structures proposed shall be sensitively designed in the regard of form, tonal colour and texture so as to minimise any potential adverse	Construction sites / Design, Construction and Operational phase	Project Proponent / Contractor / Operator	√	√	√	-

	landscape and visual impact. The slope associated structures including proposed retaining structures and the natural terrain hazards mitigation works (i.e. rigid barrier/ flexible barrier) shall be sensitively designed to minimize the extend of structure and to break down the monotonous façade with natural material, colour or texture to blend in the retaining structures to the adjacent landscape and visual context. The flexible barrier shall avoid placing in front of the vegetated area so that visual screening can be provided by the vegetation as per the GEO Publication No. 1/2011. Greening measures such as climbers along viaduct piers and shrubs along footbridges shall be fully explored in design stage. Early advice from ACABAS shall be sought.						
Table 10.11	<u>Aesthetically pleasing design of footbridges, noise barriers and noise enclosures (OM5)</u> Sensitive design of footbridges with greening, noise barriers and noise enclosures with chromatic measures. A combination of tinted or transparent panels at top and solid panels at the bottom could allow the daylight to pass through and lighten the visual impact. The detail design of noise barriers and noise enclosures shall make reference to "Guidelines on Greening of Noise Barriers" promulgated by DEVB in appropriate locations, subject to the agreement of future maintenance departments. Greening measures such as screen planting and/or climbers along the barriers shall be fully explored in design stage. Early advice from ACABAS shall be sought.	Construction sites / Design, Construction and Operational phase	Project Proponent / Contractor / Operator	√	√	√	"Guidelines on Greening of Noise Barriers" promulgated by DEVB
Table 10.11	<u>Provision of Green Roof (OM6)</u> Green Roof shall be proposed to enhance the landscape quality of the Aboveground Structures including Tunnel Administration Building and Ventilation Buildings and mitigate any potential adverse visual impact on adjacent VSRs. The extent of roof greening shall be in accordance with DEVB TC(W) No. 3/2012 – Site Coverage of Greenery for Government Building Projects.	Construction sites / Design, Construction and Operational phase	Project Proponent / Contractor / Operator	√	√	√	DEVB TC(W) No. 3/2012 – Site Coverage of Greenery for Government Building Projects
Table 10.11	<u>Provision of Buffer Planting / Roadside Planting (OM7)</u> Buffer Planting shall be provided at the perimeter of the Portal Areas to screen and soften the proposed Aboveground Structures. Roadside Planting	Construction sites / Design, Construction and Operational phase	Project Proponent / Contractor /	√	√	√	The Greening Master Plan issued by CEDD and the Street Tree Selection Guide

	shall be provided along the road improvement works as a green buffer to the adjacent VSRs. In addition to tree planting, combination of shrub and groundcover will be planted to enhance the buffer and screening effect.		Operator				issued by DEVB and DEVB TC(W) No. 6/2015 - Maintenance of Vegetation and Hard Landscape Features
Table 10.11	<u>Greening Works on Slopes and associated structures (OM8)</u> Woodland Mix Planting with tree whips shall be proposed as far as practicable. On slope with gradient not suitable for whip tree planting, combination of shrub/groundcover mix shall be applied to new soil cut and fill slopes in accordance with technical guidelines set out in GEO Publication No. 1/2011 at the tunnel portals and the affected slopes along the road improvement works. Other greening measures e.g. planting of toe planters, berm planters, climbers along retaining structures, check dams, rigid barrier and flexible barriers etc. will be proposed to maximize the greenery. The use of unobtrusive colours and tones for all hard elements on slopes.	Construction sites / Design, Construction and Operational phase	Project Proponent / Contractor / Operator	√	√	√	GEO Publication No. 1/2011 and the Guiding Principles on Use of Native Plant Species in Public Works Projects issued by DEVB and DEVB TC(W) No. 6/2015 - Maintenance of Vegetation and Hard Landscape Features
Hazard to Life							
Construction Phase							
11.1.3 – 11.1.5	Construction works would commence after the removal of all chlorine drums at Sha Tin Water Treatment Works.	Proposed Works Area	Contractor		√		EIAO-TM
11.12.3	Although the proposed mitigation measure was considered economically unviable for PLL reduction during construction phase, the following "Good Practices" are proposed to limit the number of causalities and/ or fatalities: • Establishment of emergency response plans; • Safety/ emergency response training and drills for all personnel; and • Maintain the number of construction workers onsite to a minimum	Proposed Works Area within 200 m radius from the LPG Compound/ Construction Phase	Contractor		√		EIAO-TM

*Des = Design; C = Construction; O = Operation