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## 14. Summary of Environmental Outcomes

### 14.1 General

14.1.1.1 This section summarises the overall environmental outcomes due to the construction and operation of the Project in accordance with Section 3.6.1 of the ESB-348/2021. With reference to **Section 1** and **Section 2**, environmental considerations have been the key considerations throughout the Project. Alternative options for designs and construction methodologies have been duly considered in response to the public aspirations collated during the public engagement process in an appropriate manner. Besides, all the options considered have ensured that environmental impacts could be avoided or minimized where practicable and mitigated by implementation of suitable mitigation measures to fulfil all the statutory requirements. The technical assessments conducted (see **Section 3** to **Section 12**) have demonstrated that all the statutory requirements in ESB-348/2021 and EIAO-TM have been complied with.

14.1.1.2 The following sections summarise the approaches that have been adopted to either avoid or minimize various environmental impacts throughout the design process, and the associated environmental enhancements.

### 14.2 Environmentally Friendly Options Considered and Incorporated to Avoid and Minimise Environmental Impact

14.2.1.1 As described in **Section 2.7** avoidance and minimisation of environmental impacts have been adopted as one of the key considerations throughout the entire project development and design. For those impacts that could not be avoided, due considerations have been given to minimize those impacts as much as practicable so that all the residual impacts would comply with the statutory requirements. Given the views and opinions collated from the public engagement process, much emphasis has been given to address issues such as habitat disturbance at Tai Lam Country Park, potential hydrological impacts, environmental impacts on marine / reclamation works, air, noise waste, etc. A summary of these avoidance and minimisation approaches is given in **Table 14.1**.

**Table 14.1 Key Design Considerations and the Associated Environmental Benefits**

Design Approach	Key Design Considerations	Associated Environmental Benefits
Avoidance of Works within Tai Lam Country Park	<ul style="list-style-type: none"><li>No aboveground works within Tai Lam Country Park. Only tunnelling works and part of temporary underground adit at the Wah Fat Works Area would be carried out underneath Tai Lam Country Park. No aboveground works within the Tai Lam Country Park boundary.</li><li>After considering the latest geological information at Tai Lam Country Park, it has been determined that the most suitable construction method for these tunnel sections is drill-and-blast. Alternative tunnelling methods, including the use of TBM in Tai Lam</li></ul>	<ul style="list-style-type: none"><li>No direct loss of aboveground natural habitat and resources within Tai Lam Country Park boundary.</li></ul>

Design Approach	Key Design Considerations	Associated Environmental Benefits
	<p>Country Park were duly explored but considered not suitable from the engineering perspective.</p>	
Avoidance of Marine Works	<ul style="list-style-type: none"> <li>• Avoid reclamation and the associated dredging works within Tuen Mun Typhoon Shelter have been totally avoided.</li> </ul>	<ul style="list-style-type: none"> <li>• Avoid the disturbance of seabed, marine habitat loss and generation and disposal of marine sediment.</li> </ul>
Minimisation of Potential Water Drawdown in Tai Lam Country Park	<ul style="list-style-type: none"> <li>• Good practices and water control strategies such as including probing ahead, pre-grouting and posting grouting will be implemented to minimize adverse impact. As a precautionary measures, monitoring programme will be implemented to monitor the mitigation measures on groundwater infiltration within Tai Lam Country Park.</li> <li>• Drill-and-blast/drill-and-break tunnel section would be in granite and with sufficient depth below ground, together with the good practices and mitigation measures, adverse impact on the change in groundwater table would be insignificant.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimised impacts on water drawdown in Tai Lam Country Park.</li> </ul>
Minimisation of Air Quality Impact	<ul style="list-style-type: none"> <li>• Adopt mitigation measures for fugitive dust such as regular spray, exposed earth surface covered by tarpaulins, standard wheel washing facilities at the construction site exits, vehicle washing at the exit of the barging facility with the provision of vehicle washing facilities.</li> <li>• Provision of 3-side with top cover and spraying system at unloading points at the barging facility.</li> <li>• Blasting to be carried out in a fully enclosed environment.</li> <li>• Avoid using exempted Non-Road Mobile Machinery (NRMM) where practicable.</li> <li>• Site hoardings of not less than 2.4m high should be provided as far as practicable along the site boundary with provision for public crossing. Taller site hoarding may be considered for ASRs in close vicinity to the site boundary, subject to actual site constrains and detailed design. Good site practice shall also be adopted by the Contractor to ensure the</li> </ul>	<ul style="list-style-type: none"> <li>• Minimised fugitive dust generation and emissions; and</li> <li>• Ensure compliance with the requirements in Annex 4 of the EIAO-TM at the ASRs.</li> </ul>

Design Approach	Key Design Considerations	Associated Environmental Benefits
	<p>conditions of the hoardings are properly maintained throughout the construction period.</p> <ul style="list-style-type: none"> <li>• Connect construction plant and equipment to mains electricity supply and avoid use of diesel generators and diesel-powered equipment as far as practicable to minimize air quality impact arising from construction machinery.</li> <li>• Close the impermeable blast covers at tunnel portals prior to blasting works in order to ensure blasting works in a fully enclosed environment.</li> <li>• The engine of the barge shall be switched-off during berthing as far as practicable. Provision of on-shore power supply shall also be considered wherever possible to minimize air quality impact from the marine vessels, with consideration of actual site constraints or circumstances to be further reviewed during detail design stage.</li> <li>• Close liaison between the contractors of other concurrent projects and the Project would be maintained to minimise dusty activities to be conducted concurrently as far as practicable.</li> <li>• During the subsequent design stage and the operational stage, the ventilation engineer should conduct reviews on the ventilation scheme covering different periods of a day, taking into account the contemporary circumstance such as latest traffic forecast, traffic composition, update on the ambient air quality, etc., and then review and update the air quality assessment as necessary to demonstrate full compliance of the AQO. These reviews would allow the designer and operator to optimize the operation of the ventilation system without compromising the compliance of AQO.</li> <li>• Proper design of any planned air sensitive uses within the satellite control building and operation area in Lam Tei, and maintenance compound and training ground and supporting area in Pillar Point such that any openings, openable</li> </ul>	

Design Approach	Key Design Considerations	Associated Environmental Benefits
	<p>windows, and/or FAIs will be located and avoided from the predicted exceedance zone at 1.5mAG. (e.g., by provision of fixed glazed window or blank facades, and FAIs to be located away or proposed air sensitive uses outside the exceedance zone). Further review of the layout and design of these TMB highway / tunnel operation and maintenance facilities in Detailed Design Stage to ensure compliance of the AQOs. For the proposed satellite control building and FAIs for maintenance compound located within the exceedance zone at 1.5mAG, installation of air filtering system is recommended. Further review of the air filtering system and NO<sub>2</sub> removal efficiency to ensure compliance of the AQOs in Detailed Design Stage.</p>	
<p>Minimisation of Noise Impact</p>	<ul style="list-style-type: none"> <li>• Adopt noise mitigation measures such as of use of Quality Powered Mechanical Equipment (QPME) and/or quieter mechanical equipment, quieter construction method, temporary/moveable noise enclosure will be considered during construction.</li> <li>• Installation of temporary full enclosure is recommended at the bulk excavation area, temporary adit portal and spoil storage area of MVB at Wah Fat Playground to minimise construction noise impacts on the NSRs.</li> <li>• Install suitable noise control measures such as silencers and sound attenuators will also be used to reduce the noise generated by noisy machines and plants in operation stage</li> </ul>	<ul style="list-style-type: none"> <li>• Minimised construction, road traffic noise and fixed noise impacts.</li> </ul>
<p>Minimisation of the C&amp;D Material &amp; Risk if Unauthorised Filling Activities</p>	<ul style="list-style-type: none"> <li>• During design phase, a Construction and Demolition (C&amp;D) Material Management Plan (C&amp;DMMP) will be prepared in accordance with Section 4.1.3 “Construction and Demolition Materials” of the Project Administration Handbook for Civil Engineering Works and will be submitted together with the EIA Report to the department Vetting Committee for endorsement and then to Public Fill Committee (PFC) for approval.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimisation of the C&amp;D Material &amp; Risk if Unauthorised Filling Activities.</li> </ul>

Design Approach	Key Design Considerations	Associated Environmental Benefits
	<ul style="list-style-type: none"> <li>• Segregate C&amp;D materials will be segregated from other wastes to avoid contamination. Ensure acceptability at PFRFs or reclamation sites.</li> <li>• Carry out on-site sorting.</li> <li>• Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate.</li> <li>• Implement a trip-ticket system for each works contract in accordance with DEVB TC(W) No. 6/2010 to ensure that the disposal / handling of C&amp;D materials is properly documented and verified, so as to avoid the illegal dumping and landfilling of C&amp;D materials.</li> <li>• All dump trucks and vessels engaged on site should be equipped with Global Positioning System (GPS) or equivalent automatic system for real time tracking and monitoring of their travel routings and parking locations to prohibit illegal dumping and landfilling of C&amp;D materials.</li> </ul>	
<p>Minimisation of Cultural Heritage Impact</p>	<ul style="list-style-type: none"> <li>• Avoid-the three SAIs, namely Shek Kok Tsui, Fu Tei Ha and So Kwu Wat and will not be impacted.</li> <li>• Any vibration and building movement induced from the proposed works will be strictly monitored to ensure no disturbance and physical damages made to the heritage sites during the course of works.</li> <li>• Avoided direct impact on the Built Heritage at the former Girl Guide Associate Campsite, no excavation works will be carried out and existing building structures will not be demolished or removed but only require some necessary restoration/ refurbishment/ repair.</li> </ul>	<ul style="list-style-type: none"> <li>• Avoided direct impact on SAIs and minimise impacts on the heritage site and historical building/ structure/ feature/ site.</li> </ul>

### 14.3 Environmental Benefits of Environmental Protection Measures Recommended

14.3.1.1 Mitigation measures/ good site practices/ enhancement measures have been recommended to further reduce the environmental impacts due to the construction and operation of the

Project. Key recommended mitigation measures/ good site practices/ enhancement measures and their associated benefits are summarised in **Table 14.2** below. Details have been mentioned in technical assessment sections (**Section 3** to **Section 12**).

**Table 14.2 Key Recommended Mitigation Measures/ Good Site Practices/ Enhancement Measures and their Associated Benefits**

Aspect	Key Recommended Mitigation Measures/ Good Site Practices/ Enhancement Measures	Associated Environmental Benefits
Air Quality Impact	<ul style="list-style-type: none"> <li>• Adopt dedicated spoil transportation routes away from the identified Air Sensitive Receivers (ASRs) as practicable.</li> <li>• Install 3-sided screen with top cover and provide water sprays at the unloading point to barges at the barging facility.</li> <li>• Avoid using exempted NRMM as much as practicable and when alternatives are available from the local market at the time of construction.</li> <li>• Site hoardings of not less than 2.4m high should be provided as far as practicable along the site boundary with provision for public crossing. Taller site hoardings may be considered for ASRs in close vicinity to the site boundary, subject to actual site constrains and detailed design. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period.</li> <li>• Adopt water spraying system for areas with heavy construction activities.</li> <li>• Connect construction plant and equipment to mains electricity supply, and avoid use of diesel generators and diesel-powered equipment as far as practicable to minimize air quality impact arising from construction machinery.</li> <li>• Close the impermeable blast covers at tunnel portals prior to blasting works in order to ensure blasting works in a fully enclosed environment.</li> <li>• Water spray before open blasting and on blasted material prior to transportation</li> <li>• Provide vehicle washing facilities at the exit of the barging facility and exit of works sites.</li> <li>• The engine of the barge shall be switched-off during berthing as far as practicable. Provision of on-shore power supply shall also be considered wherever possible to minimize air quality impact from the marine vessels, with consideration of actual site constraints or circumstances to be further reviewed during detail design stage</li> </ul>	<ul style="list-style-type: none"> <li>• Protect Air Sensitive Receivers (ASRs) by reducing fugitive dust generation and emissions.</li> <li>• Ensure compliance with the requirements in Annex 4 of the EIAO-TM at the ASRs.</li> </ul>

Aspect	Key Recommended Mitigation Measures/ Good Site Practices/ Enhancement Measures	Associated Environmental Benefits
	<ul style="list-style-type: none"> <li>• Close liaison between the contractors of other concurrent projects and the Project would be maintained to minimise dusty activities to be conducted concurrently as far as practicable.</li> <li>• During the subsequent design stage and the operational stage, the ventilation engineer should conduct reviews on the ventilation scheme covering different periods of a day, taking into account the contemporary circumstance such as latest traffic forecast, traffic composition, update on the ambient air quality, etc., and then review and update the air quality assessment as necessary to demonstrate full compliance of the AQO. These reviews would allow the designer and operator to optimize the operation of the ventilation system without compromising the compliance of AQO.</li> <li>• The planned air sensitive uses within the highway / tunnel operation and maintenance facilities of the TMB shall be properly designed such that any openings, openable windows, and/or fresh air intakes will be located and avoided from the predicted exceedance zone at 1.5mAG. Further review of the layout and design of operation area will be conducted in Detailed Design Stage to ensure compliance of the AQOs.</li> </ul>	
Noise Impact	<ul style="list-style-type: none"> <li>• Follow good site practices to limit construction noise emissions at the sources.</li> <li>• Use of quality powered mechanical equipment and quieter construction methods.</li> <li>• Use of temporary noise barriers and noise enclosures to screen noise from relatively static PME's.</li> <li>• Install acoustic tunnel door or enclosure at the tunnel portal opening for tunnelling activities.</li> <li>• Install temporary noise enclosures for the construction sites near Wah Fat Playground.</li> <li>• Provide mitigation measures for fixed noise sources (e.g., quieter equipment, silencer, barrier and enclosure) with reference to EPD's "Good Practices on Ventilation System Noise Control".</li> <li>• Orientate louvres away from adjacent NSRs, preferably onto main roads which are less noise sensitive.</li> <li>• Select façade for ventilation shafts with adequate sound insulation properties.</li> </ul>	<ul style="list-style-type: none"> <li>• Protect Noise Sensitive Receivers (NSRs) by reducing construction, road traffic and fixed noise impacts.</li> <li>• Ensure compliance with the respective road traffic noise requirements at neighbouring NSRs.</li> <li>• Ensure compliance with the respective fixed noise requirements at neighbouring NSRs.</li> </ul>



Aspect	Key Recommended Mitigation Measures/ Good Site Practices/ Enhancement Measures	Associated Environmental Benefits
Water Quality Impact	<ul style="list-style-type: none"> <li>• Follow Best Management Practices (BMPs) of mitigation measures in controlling water pollution and good site management as specified in the ProPECC PN 1/94 “Construction Site Drainage” and Environment, Transport and Works Bureau (ETWB) Technical Circular (Works) (TC(W)) No. 5/2005.</li> <li>• Adopt suitable water control strategies as far as practicable, including probing ahead, pre-grouting and post-grouting, during tunnelling works.</li> <li>• Control impact on groundwater through adopting toe grouting and installation of recharge well during temporary dewatering for excavation works.</li> <li>• Provide adequate and sufficient portable chemical toilets for construction workforce and temporary storage tank for collection of wastewater.</li> <li>• Comply with the Conditions for Working within Water Gathering Grounds</li> <li>• Carry out construction works close to inland waters in dry season as far as practicable.</li> <li>• Conduct watercourse removal and flow diversion in dry season as far as practicable.</li> <li>• Size all vessels to maintain adequate clearance between vessels and the seabed in all tide levels.</li> <li>• Control loading of barges and hoppers to prevent splashing of materials into the surrounding water.</li> <li>• Install and maintain roadside gullies and oil / grease interceptors for removal of pollutants from storm water as necessary.</li> <li>• Collect and treat wastewater generated by washing and maintenance activities, and discharge to public sewerage system properly.</li> </ul>	<ul style="list-style-type: none"> <li>• Protect the neighbouring WSRs during construction and operational phases.</li> </ul>
Waste Management Implications	<ul style="list-style-type: none"> <li>• During design phase, a Construction and Demolition (C&amp;D) Material Management Plan (C&amp;DMMP) will be prepared in accordance with Section 4.1.3 “Construction and Demolition Materials” of the Project Administration Handbook for Civil Engineering Works and will be submitted together with the EIA Report to the department Vetting</li> </ul>	<ul style="list-style-type: none"> <li>• Minimize waste generation.</li> <li>• Ensure proper handling of chemical waste.</li> <li>• Ensure the C&amp;D materials are disposed and delivery to designated sites.</li> </ul>

Aspect	Key Recommended Mitigation Measures/ Good Site Practices/ Enhancement Measures	Associated Environmental Benefits
	<p>Committee for endorsement and then to Public Fill Committee (PFC) for approval.</p> <ul style="list-style-type: none"> <li>• Carry out on-site sorting, re-use and recycled C&amp;D materials, implement a trip-ticket system for each works contract to in accordance with Development Bureau TC(W) No. 6/2010 ensure that the disposal / handling of C&amp;D materials is properly documented and verified so as to avoid the illegal dumping and landfilling of C&amp;D materials.</li> <li>• All dump trucks and vessels engaged on site should be equipped with Global Positioning System (GPS) or equivalent automatic system for real time tracking and monitoring of their travel routings and parking locations</li> <li>• Chemical wastes (e.g., spent lubricant oil) should be recycled at an appropriate facility as far as possible, while the chemical waste that cannot be recycled should be disposed of at either the CWTC, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.</li> <li>• Standard formwork should also be used as far as practicable in order to minimise the arising of non-inert C&amp;D materials. The use of more durable formwork (e.g., metal hoarding) or plastic facing should be encouraged in order to enhance the possibility of recycling. The purchasing of construction materials should be carefully planned in order to avoid over ordering and wastage.</li> <li>• Implement an education programme for workforce relating to avoiding, reducing, reusing and recycling general waste. Participation in a local collection scheme should be considered by the Contractor to facilitate waste reduction.</li> <li>• Measures and good site practices to be implemented at the works area during construction (Details to refer to <b>Section 6</b>)</li> </ul>	
Land Contamination	<ul style="list-style-type: none"> <li>• Prior to the commencement of the site investigation (SI) works, review the Contamination Assessment Plan (CAP) provided in <b>Appendix 7.1</b> and conduct site re-appraisal to confirm whether the proposed SI works (e.g., sampling locations, testing parameters etc.) are still valid, and to confirm the</li> </ul>	<ul style="list-style-type: none"> <li>• Land contamination issues could be resolved before commencement of construction works.</li> </ul>

Aspect	Key Recommended Mitigation Measures/ Good Site Practices/ Enhancement Measures	Associated Environmental Benefits
	<p>appropriate RBRGs land use scenario for the development.</p> <ul style="list-style-type: none"> <li>• Should any changes in operation which lead to any new or the relocation of contamination hotspots or occurrence of spillage or accident be found in the review, supplementary CAP(s), presenting the findings of the review, the latest site conditions and updated sampling strategy and testing protocol, should be submitted to EPD for approval.</li> <li>• The SI works should be carried out according to EPD's approved CAP(s).</li> <li>• 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 in the CAR(s), Remediation Action Plan(s) (RAP(s)) which provides details of the remedial actions for the identified contaminated soil and/or groundwater should be developed prior to construction works at the concerned areas. Submission to EPD for approval of the supplementary CAP(s), CAR(s) and, if required, RAP would be carried out in stages according to the programme of TMB.</li> <li>• If required, carry out soil/groundwater remediation works according to EPD approved RAP(s) and submit Remediation Report(s) (RR(s)) afterwards for EPD approval prior to the commencement of construction works at the contaminated areas.</li> </ul>	
Hazard to Life	<ul style="list-style-type: none"> <li>• Reduce the amount of combustibles in the cabin of truck. The fuel carried in the fuel tank should also be minimized to reduce the duration of any fire.</li> <li>• Implement defensive driving attitude and dedicate training programme for both driver and his attendants.</li> <li>• Transport the required quantity of explosive for a particular blast.</li> <li>• Combine explosive deliveries for a given work area as far as practicable.</li> <li>• Maintain a minimum headway between two consecutive truck convoys of 10 minutes whenever practicable.</li> <li>• Implement a better emergency response and training to ensure adequate fire extinguishers are</li> </ul>	<ul style="list-style-type: none"> <li>• Protect nearby sensitive receivers from adverse impacts due to transportation, overnight storage and use of explosive for blasting.</li> </ul>

Aspect	Key Recommended Mitigation Measures/ Good Site Practices/ Enhancement Measures	Associated Environmental Benefits
	<p>used and attempt is made to evacuate the area of the incident or securing the explosive load if possible.</p> <ul style="list-style-type: none"> <li>• Equip bigger capacity AFFF-type extinguishers on all explosive vehicles.</li> <li>• Implement good practices as per Practice Note for Authorized Persons and Registered Structural Engineers – Control of Blasting (APP-72), and Mines Division Guidance Note Nos. GN 8 How to Apply for a Mode A Licence for Storage of Schedule 1 Dangerous Goods (Blasting Explosives) and GN 3 Application and Handling of a Conveyance Permit.</li> <li>• Formulate a Hazard Management Plan with a view to aligning the understanding of the risk of the three projects (i.e. Route 11, Tuen Mun Bypass (TMB) and Lam Tei Underground Quarrying (LTUQ)) so that all the working populations at Lam Tei Quarry area, which includes the workforce induced under the construction and operational stage of three projects, could be considered as on-site populations in the QRA for all the three projects. The measures stipulated in the Hazard Management Plan may include, but not limited to, the adjustment of the blasting schedules of the three projects to minimize the potential cumulative impact, provision of common trainings and drills to the workforce of all the three projects, etc. The Hazard Management Plan, which would be agreed among the three projects, would be submitted to EPD for agreement prior to the tender invitation of construction phases of Route 11, TMB and LTUQ, whichever is earlier.</li> </ul>	
Landfill Gas Hazard	<ul style="list-style-type: none"> <li>• Implementation of appropriate safety measures during construction works to minimise the risk of fire and explosions and asphyxiation of works, especially in confined space.</li> <li>• Periodically during ground-works construction, the works area should be monitored for methane, carbon dioxide and oxygen using appropriately calibrated portable gas detection equipment.</li> <li>• All access to confined spaces should be restricted only to authorized personnel and should be informed of the landfill gas hazard. No general public should be permitted or allowed to access the service voids, manholes, chambers or wells.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimise the risk of fire and explosions and asphyxiation of works.</li> </ul>

Aspect	Key Recommended Mitigation Measures/ Good Site Practices/ Enhancement Measures	Associated Environmental Benefits
	<ul style="list-style-type: none"> <li>During operation, regular monitoring of landfill gas should be conducted at buildings and enclosures (e.g. proposed Administration Building, Maintenance Compound, temporary re-provisioning of EMSD Servicing Centre, service manholes, etc.) within the Consultation Zone to verify the effectiveness and to ensure the continued performance of the implemented protection measures.</li> </ul>	
Ecology Impact (Terrestrial)	<ul style="list-style-type: none"> <li>No aboveground works at the recognized sites of conservation importance (including Lam Tei and Yick Yuen Conservation Area and Tai Lam Country Park). All aboveground works including site formation works at the northern portal will be located away from the Tai Lam Country Park as far as further reduce disturbance impacts. Provision of screening (e.g., hoarding) during construction phase is recommended to confine the proposed works within Project footprint and hence outside Tai Lam Country Park to avoid disturbance to adjacent habitats from the construction phase activities.</li> <li>Shifting the portal and the mainline eastward away from the Lam Tei Irrigation Reservoir so as to allow integrated site formation for tunnel portals of TMB and which can also reduce environmental impact associated with site formation.</li> <li>Shifting the works area at Wah Fat Playground away from the perennial stream where two freshwater crab species of conservation importance were recorded.</li> <li>Upon the completion of construction works, the proposed works area and magazine sites would be decommissioned and reinstated to its original condition in principle.</li> <li>Detailed vegetation survey should be conducted within mixed woodland and shrubland/grassland at Pillar Point and near Wah Fat Playground prior to the commencement of construction activities to confirm the presence of flora species of conservation interest. Transplantation and/or mitigation measures would be recommended as far as possible (Details to refer to <b>Section 10</b>).</li> <li>Prior to commencement of the stream diversion and construction works near Wah Fat Playground, an update Freshwater Crab survey should be conducted and cover the stretch of the watercourse S2 and S2A. Should species of conservation importance be found within the</li> </ul>	<ul style="list-style-type: none"> <li>Minimize the direct and indirect impacts to the habitat and species of conservation importance during construction phase.</li> <li>Minimise physical disturbance to the surrounding habitats.</li> </ul>

Aspect	Key Recommended Mitigation Measures/ Good Site Practices/ Enhancement Measures	Associated Environmental Benefits
	<p>affected watercourse sections, a Freshwater Crab Translocation Plan should be prepared. Freshwater crab translocation should be conducted to move the affected individuals from the Project area to suitable recipient site(s). (Details to refer to <b>Section 10</b>).</p> <ul style="list-style-type: none"> <li>• Measure and good site practices to be implemented at the works area during construction (Details to refer to <b>Section 10</b>).</li> <li>• Stream diversion works with green channel design elements incorporated will be carried out to divert any water flow from the upper sections of the watercourses within Project Area (i.e. S1, S2 and S3) to the lower sections of the watercourses with similar ecological features and/or hydrology setting outside the Project Area so as to maintain the flow between unaffected sections of the stream and to avoid excessive water flow entering the construction area. Detailed design of any stream diversion should follow the guidelines in ETWB Technical Circular (Works) No. 5/2005 (Protection of natural streams/rivers from adverse impacts arising from construction works) and appropriate construction methods should be used.</li> <li>• Adopt suitable water control strategies, which are applicable to both TBM tunnelling and drill-and-blast / drill-and-break tunnelling, as far as practicable (Refer to <b>Section 5</b> for details).</li> <li>• Compensatory woodland planting is suggested to mitigate the loss of approximately ~2.2ha of mixed woodland. (Details to refer to <b>Section 10</b>).</li> </ul>	
Landscape and Visual Impacts	<ul style="list-style-type: none"> <li>• Tree protection works and tree transplantation to be undertaken in accordance with DEVB TC(W) 4/2020 on “Tree Preservation”. In accordance with DEVB TC(W) No. 4/2020, the compensatory planting proposal should have the basic primary objective of planting compensatory trees in a ratio not less than 1:1 in terms of quantity as far as practicable.</li> <li>• Construction area control, where possible, to ensure that the landscape and visual impacts arising from the construction activities are minimized.</li> <li>• Advance Implementation of Mitigation Planting.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimize landscape and visual impacts during construction and operational phases.</li> </ul>

Aspect	Key Recommended Mitigation Measures/ Good Site Practices/ Enhancement Measures	Associated Environmental Benefits
	<ul style="list-style-type: none"> <li>• Decorative screen hoarding will be erected along areas of the construction works site boundary where the works site borders publicly accessible routes and/or is close to visually sensitive receivers (VSRs) to screen undesirable views of the works site.</li> <li>• Control of night-time lighting and Construction traffic (land and sea) reduced to practical minimum.</li> <li>• The alignment and structures associated with the new road should be integrated, as far as technically feasible, with existing roadside structures and the landscape context to reduce the potential cumulative impact of the proposed works.</li> <li>• Aesthetic treatment and Design of the building and tunnel ventilation shaft should be vetted and advised upon by ArchSD in accordance with ETWB TCW No. 8/2005 – Aesthetic Design of Ancillary Buildings in Engineering Projects.</li> <li>• Greening Provision in the early project planning stage and shall be in accordance with DEVB TCW No. 2/2012- allocation of space for quality greening on Roads.</li> <li>• Post-planting monitoring of the compensatory trees shall be undertaken (namely, duration of the post-planting monitoring and monitoring methodology). The monitoring will be aimed to assess the success and performance of the compensatory planting trees, monitor the growth performance of the planted seedlings and whips, and identify any need of vegetation and site maintenance work.</li> <li>• The design and implementation of the aesthetic appearance of the retaining wall and slopes will be undertaken in accordance with GEO Publication No. 1/2011 – Technical Guidelines on Landscape Treatment for Slopes (2011), and WBTC No. 17/2000 on Improvement to the Appearance of Slopes.</li> <li>• Wah Fat Playground will be impacted during construction stage. Areas temporarily disturbed will be reinstated after completion of construction of TMB. All hard and soft landscape areas disturbed temporarily during construction due to temporary excavations, temporary works sites shall be reinstated to equal or better quality, to the</li> </ul>	

Aspect	Key Recommended Mitigation Measures/ Good Site Practices/ Enhancement Measures	Associated Environmental Benefits
	satisfaction of the relevant Government Departments.	
Cultural Heritage Impact	<ul style="list-style-type: none"> <li>• Three sites of Archaeological Interest, namely Shek Kok Tsui, Fu Tei Ha and So Kwu Wat, will not be impacted.</li> <li>• Avoid direct impact on the Built Heritage BH-03 at the GGA campsite, no excavation works will be carried out and existing building structures will not be demolished or removed but only require some necessary restoration/ refurbishment/ repair. Appropriate protective and mitigation measures are to be recommended during detail design stage of the Project when the structural condition and assessment of the Site and the historical buildings/ structures/ features are verified during detailed design stage of the Project. The protective and mitigation measures should be agreed by AMO, and to be implemented to the satisfaction of AMO to safeguard against any potential adverse impact.</li> <li>• Any vibration and building movement induced from the proposed works should be strictly monitored to ensure no disturbance and physical damages made to the heritage sites during the course of works.</li> <li>• Special attention should be paid to avoid adverse physical impact arising from the construction works to the heritage site. Design proposal, method of works and choice of machinery should be targeted to minimize adverse impacts to the heritage site. Any vibration and building movement induced from the construction works should be strictly monitored to ensure no disturbance and physical damages made to the heritage site during the course of works.</li> <li>• Excavation works in close vicinity to the heritage site should not jeopardize stability of the historic structures. It should not undermine or cause damage to foundation of the historic structures. Foundation information of the historic structures shall be verified on site if needed, sufficient lateral support should be provided and de-watering (if required) should be carried out with great cautions to control ground movement and change of ground water regime at the heritage site.</li> <li>• Installation of monitoring checkpoints shall be carried out in great care and adequate protection shall be provided so as to avoid unnecessary disturbance / damage to the historic fabrics.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimise adverse impact on any Sites of Archaeological Interest and historical building building/ structure/ feature/ site.</li> <li>• Ensure compliance with all statutory requirements and those recommendations in the EIA report.</li> </ul>



Aspect	Key Recommended Mitigation Measures/ Good Site Practices/ Enhancement Measures	Associated Environmental Benefits
	<p>Photo records of monitoring checkpoints shall be submitted upon installation for AMO's records. Monitoring records should be submitted to AMO on regular basis and please alert AMO should the monitoring reach Alert/ Alarm/ Action levels.</p> <ul style="list-style-type: none"> <li>As a precautionary measure, the project proponent and his/her contractor are required to inform AMO immediately when any antiquities or supposed antiquities under the Antiquities and Monuments Ordinance (Cap. 53) are discovered during the course of works.</li> </ul>	
General	<ul style="list-style-type: none"> <li>Implement a comprehensive Environmental Monitoring System throughout the entire construction period.</li> <li>Employ an Environmental Team (ET) and Independent Environmental Checker (IEC)</li> </ul>	<ul style="list-style-type: none"> <li>Ensure compliance with all statutory requirements and those recommendations in the EIA report</li> </ul>

## 14.4 Estimated Population Protected from Various Environmental Impacts

14.4.1.1 Population and environmental sensitive areas in the vicinity of the Project site have been protected through the avoidance and/or minimisation of environmental impacts from the construction and operation of the Project. Population protected from air quality impacts include air sensitive receivers within 500m from the Project Boundary including residential buildings, commercial buildings, industrial buildings, educational uses, recreational uses, places of public worship, and government/institutional or community uses. Population protected from noise impacts include noise sensitive receivers within 300m from the Project Boundary including residential buildings, educational uses, places of public worship, and government/institutional or community uses. Population protected from water quality impacts include water sensitive receivers within 500m from the Project Boundary. Direct impacts on habitat at Tai Lam Country Park, Lam Tei and Yick Yuen Conservation Area and Freshwater Crab species, *Somanniathelphusa zanklon*, *Cryptopotamon anacoluthon*, and *Nanhaipotamon hongkongense* at stream near Wah Fat Playground have been avoided.

## 14.5 Overall Conclusion

14.5.1.1 The findings of this EIA have provided information on the nature and extent of environmental impacts arising from the construction and operation of the Project. The EIA has, where appropriate, identified mitigation measures to ensure compliance with environmental legislation and standards.

14.5.1.2 Overall, the EIA Report has predicted that the Project would be environmentally acceptable with the implementation of the proposed mitigation measures for construction and operation phases. An environmental monitoring and audit programme has been recommended to ensure the effectiveness of recommended mitigation measures.