

12 CONCLUSIONS AND RECOMMENDATIONS

12.1 Air Quality Impact Assessment

The construction of the Project may lead to dust generation. It is predicted that various construction activities associated with the earthworks, material handling and tunnel construction would cause temporary minor impacts. “Best practice measures” are recommended to suppress dust emissions from construction activities through good site practice.

12.2 Noise Impact Assessment

The construction of the Project may lead to noise generation if noise mitigation measures are not undertaken. It is predicted that various construction activities associated with the earthworks, excavation and construction may cause temporary impacts without mitigation. “Best practice measures”, quiet plant and mobile noise barriers are recommended to suppress noise emissions from construction activities where noise exceedance is anticipated.

12.3 Water Quality Impact Assessment

With appropriate mitigation and precautions measures in place during construction there should be relatively minor impacts associated with this project during or following construction. In the operational phase, the impacts from stormwater discharge are anticipated to be negligible.

12.4 Waste Impact Assessment

The potential environmental impacts with the handling and disposal of waste arising from the construction the Tsuen Wan Drainage Tunnel have been assessed. Operational impacts on the proposed route are not expected to be a key concern and no detailed assessment will be required. Key issues include the need for effective waste management planning during the construction phase. The assessment has concluded that the potential environmental impacts associated with the handling, storage, treatment and disposal of waste arising for the construction of the Tsuen Wan Drainage Tunnel meet the requirements of the EIAO-TM.

12.5 Ecological Impact Assessment

The ecological resources recorded within the Study Area included woodland, plantation, grassland, village-orchard, stream channel, intertidal habitat (artificial/disturbed seashore) and disturbed/urbanized, as well as the associated wildlife. Of these habitats, woodland and stream habitat (Sam Dip Tam Stream and Tso Kung Tam Stream) have moderate ecological value. The remaining habitats are of low to moderate ecological value. With the exception of low to moderate impact to the middle course of Sam Dip Tam Stream (location of Intake I-2) and Tso Kung Tam Stream (location of Intake I-3), the direct ecological impact due to the construction and operation of the drainage channel is expected to be low. No rare or protected species near the works areas are affected by the proposed works. The loss of stream sections of natural bottom and bank and hydrological disruption to the natural stream

habitats downstream to the intake structures, particularly Intakes I-2 and I-3, have been minimised and properly mitigated. No adverse residual impact is expected after the implementation of the recommended mitigation measures. Since the affected sections of Sam Dip Tam Stream and Tso Kung Tam Stream (location of Intakes I-2 and I-3) are partially disturbed (with relatively less aquatic faunal diversity) due to the residential sewage and the intake structures have been appropriately designed to minimise habitat loss, the impacts due to the land take for the surface structures and hydrological disruption are considered acceptable. Adverse ecological impacts on the proposed Ecological Park are also unlikely.

12.6 Cultural Heritage Impact Assessment

A literature review supplemented by an archaeological investigation identified no sites of archaeological significance in the Study Area. No mitigation measures for archaeological resources are considered necessary.

One Grade III building (Po Kwong Yuen Monastery at Lo Wai) and 86 historical buildings and structures were identified within the Study Area during the built heritage survey. Most of the identified sites except a few sites at Lo Wai, Sam Dip Tam and Yau Kom Tau settlement areas are located over 70 m from the Preferred Option of the drainage tunnel alignment and the associated Intakes/Outfall construction activities.

Potential vibration impact on a number of historical buildings and structures at Lo Wai, Sam Dip Tam and Yau Kom Tau has been identified in *Section 8.5.2* and appropriate mitigation measures have been recommended including the adoption of construction methods that minimises generation of excessive vibration, a pre-construction survey to establish the existing condition of the potentially affected buildings and vibration monitoring as part of the EM&A programme.

12.7 Hazard to Life

According to the EIA Study Brief, evaluation of Hazard to Life as the criteria specified is considered not necessary since no overnight storage of explosives is anticipated for this project. In addition, with the stringent control and monitoring procedures in place, adverse impact on populated area or on PHI nearby due to the blasting operation is unlikely.

12.8 Fisheries Impact Assessment

Reviews of existing information on commercial fisheries resources and fishing operations located within the Study Area have been undertaken. Information from a study on fishing operations in Hong Kong and the AFCD Port Surveys indicate that fisheries production values in the vicinity of the Study Area vary but are medium to low.

The construction and operation of the Project will not give rise to impacts to fisheries, as there is no predicted adverse impact to water quality or habitat loss.

No special mitigation measures are required for fisheries resources, mitigation measures recommended to reduce impacts to water quality are also expected to mitigate any impacts to fisheries resources. The availability of literature on the fisheries resources of the Study Area comes mainly from the AFCD.

12.9 Environmental Outcomes

12.9.1 Population and Environmental Sensitive Areas Protected

During construction stage, the dwellings exposed to the project boundary are approximately 667 dwellings together with 1 school and 2 temples. 239 out of the 667 dwellings, 1 school and 2 temples would be affected by cumulative construction noise (except the Kwai Shue House at Intake 1, Route Twisk Villa at Intake 3). After implementing mitigation measures such as the use of quiet plant, application of noise barrier and the adoption of regular noise monitoring during construction phase, a substantial number of the population (approximately 239 dwellings, 1 school and two temples) are protected.

Furthermore, it is estimated that Hong Hoi Chee Hong Temple and Squatter at Intake 2 and Intake 3 respectively would be subject to exceedances of the groundborne noise during the period 2300 to 0700. However, it has been demonstrated that after restricting the TBM operation in non-restricted period (i.e. 0700 to 1900) for tunnel section near the temple and squatters, all the dwellings at Squatter and Hong Hoi Chee Hong Temple are protected.

With appropriate mitigation measures and precautions in place, the adjacent sensitive receivers, water bodies, habitats and historical buildings/structures will be protected during both construction and operation of the project.

12.9.2 Environmental Friendly Designs and Problems Avoided

The proposed works are essentially based on the principle of avoiding environmental impacts as far as practical where avoidance is not possible, then minimisation is the key principle. Based on this principle, the shortest tunnel option (Option 3) was proposed. This option is the most favoured and involves least waste/spoil arisings from construction as it is the shortest. This will also be of benefit following construction since there will be less operation and maintenance requirements for the whole life of the tunnel which can be translated into an environmental advantage. Regarding the intake and outfall structures, their locations are optimized to be situated in some already disturbed areas or the areas with lower ecological value such that less habitats and vegetation will be affected and hence least environmental impacts will be generated.

Some environmental friendly designs have been incorporated into the drainage system to mitigate potential impacts to the surrounding environment. These includes the provision of cascade and rip rap at outfall to attenuate velocity of discharge and to prevent scouring and erosion of seabed and principally to minimize impacts in terms of turbulence and energy propulsion (i.e. waves and disturbance to marine vessels) on the receiving water. The drainage tunnel will also be lined to avoid drawdown of groundwater, so the water levels in the stream courses will not be affected and thus impacts on the surrounding habitats are not anticipated.

12.9.3 Environmental Benefits of the Project

The primary objective of the proposed drainage tunnel is to improve the flood protection level in Tsuen Wan and Kwai Chung areas without any significant additional improvement works required in the downstream urban drainage system. The drainage tunnel will divert the surplus stormwater into Ramble Channel to alleviate the flooding problems in Tsuen Wan

and Kwai Chung. With the proposed system, the flood protection level of trunk drains will be improved to a 200-year return period. It entirely avoids works in the trunk drains in the developed urban areas with heavy traffic and congested underground utilities, and hence prevents associated environmental impacts arisen from those works. Moreover, the project will protect the downstream areas not only urban areas but also agricultural lands from washout/erosion of crops during heavy rainstorm events.