

14. CONCLUSIONS

14.1.1 This EIA Report has provided an assessment of the potential environmental impacts associated with the construction and operation of the Project, based on the engineering design information available at this stage.

14.1.2 The assessment has been conducted, in accordance with the EIA Study Brief (No. ESB–220/2011) under the EIAO for the Project, covering the following environmental issues:

- Air Quality Impact
- Noise Impact
- Water Quality Impact
- Waste Management
- Terrestrial Ecological Impact
- Landscape and Visual Impacts
- Cultural Heritage Impact
- Land Contamination
- Hazard to Life

14.1.3 The findings of this EIA study have determined the likely nature and extent of environmental impacts predicted to arise from the construction and operation of the Project. During the EIA process, environmental control measures have been identified and incorporated into the planning and design of the Project, to achieve compliance with environmental legislation and standards during both the construction and operation phases. The Implementation Schedules listing the recommended mitigation measures are presented in **Section 13**.

14.1.4 Overall, the EIA study for the In-situ Re-provisioning of Sha Tin WTW (South Works) has predicted that the Project, with the implementation of the mitigation measures, would be environmentally acceptable with no adverse residual impacts on the population and environmentally sensitive resources. **Table 14.1** summarises the environmental outcomes/benefits that have accrued from the environmental considerations and analysis during the EIA process and the implementation of environmental control measures of the Project.

Table 14.1 Summary of Key Environmental Outcomes and Benefits

The Project Need	<ul style="list-style-type: none"> • aging of plant and equipment after more than 40 years of service requiring major renovation or replacement; and • re-provision of the South Works of the existing Sha Tin WTW with a treatment process that can continue to meet the latest treated water quality standards.
Environmental/Social Benefits of the Project	<ul style="list-style-type: none"> • provision of a safe and reliable water supply; • Improvement in water supply reliability to the territory; • development of environmentally sustainable design by applying low-carbon concept; • Provision of education facilities to the general public.
Environmentally Friendly Design and Benefit	<ul style="list-style-type: none"> • In-situ re-provisioning of the WTW promotes re-use of land, thereby minimising the environmental impacts and costs of developing a new site; • About 90% of the works area is situated within the existing Sha

	<p>Tin WTW is of low ecological value. The impact to natural habitat is minimized.</p> <ul style="list-style-type: none"> • Impacts to ecological sensitive areas have been minimized through the design process (e.g. use of retaining wall instead of soil nails); • The adoption of new treatment processes will reduce the use of chlorine, which presents a significant health risk to adjacent communities; • Engineering design for fixed plant complies with the day-time, evening time and night time noise criteria; • Lighting/glare • Green roof, sensitive landscaping, other sustainability features. • Due to the introduction of the new treatment technologies, the reprovisioning works will lead to a permanent reduction in chlorine storage and usage at the WTW. As a result, the chlorine-related risks for the surrounding population will be reduced in comparison with current levels.
Air Quality	<p>Potential air quality impacts from the construction works of the Project would mainly be related to construction dust from excavation, materials handling, spoil removal, demolition and wind erosion. In view of the nature of works, adverse dust impact at the ASRs would not be expected from the Project. Nevertheless, appropriate dust suppression measures as stipulated in the Air Pollution Control (Construction Dust) Regulation should be implemented to minimize any potential dust impact.</p>
Noise Impact	<p><u>Construction Noise</u> This assessment has presented the construction noise impacts of the Project during normal daytime working hours. The predicted unmitigated noise levels at representative NSRs would range from 46 to 78 dB(A). With the adoption of quiet PME and use of movable noise barrier, the noise levels due to the Project itself at all representative NSRs would comply with the EIAO-TM criteria.</p> <p>When considering the cumulative construction noise impacts, exceedance of 1 dB(A) during examination periods would be predicted at C.U.H.K.F.A.A. Thomas Cheung School; however, the exceedances are only contributed by the concurrent construction works of SCL(TAW-HUH) as the Project does not induce any impact during that period. All practicable direct mitigation measures have been exhaustively investigated and residual impact is minimised. The residual impacts are considered to be temporary, reversible and unlikely to induce public health concern and as such, are considered to be minor and acceptable.</p> <p><u>Fixed Plant Noise</u> The noise impact associated with the operation of the Project has been assessed. The predicted fixed plant noise levels at the representative NSRs would be expected to comply with the day-time, evening time and night time criteria based on the assessment using a set of specified maximum SWLs for the newly proposed fixed plant. If there is any change in engineering design information during detailed design stage or fitting-out stage, the fixed source noise design should be reviewed by the Engineer/Contractor to ensure that both the NCO and EIAO-TM criteria at NSR can be met in the future.</p>
Water Quality	<p>Potential water quality impact associated with land-based construction works for the Project would be generated from site</p>

	<p>run-off, wastewater from construction activities, and sewage from workforce. Provided that all the recommended mitigation measures are properly implemented, no adverse water quality impacts would be expected during the construction phase of the Project. Water quality monitoring of the two water courses along the Project boundary is recommended during site clearance and foundation works to ensure no adverse water quality impacts to these water courses. Regular site inspection is also recommended to ensure the recommended mitigation measures are properly implemented.</p> <p>During operation phase of the Project, major sources of water quality impact would be washwater effluent and overflow from treatment works components. Proper mitigation measures will be implemented to avoid discharge of washwater effluent and overflow into the nearby water environment and hence no adverse water quality would be expected.</p>
<p>Waste Management</p>	<p>Waste types generated by the construction activities are likely to include inert and non-inert C&D materials from demolition works of existing facilities of the South Works, construction works of new facilities for the North and the South Works, slope excavation works and construction works of new access roads, general refuse from the workforce and chemical wastes from the maintenance of construction vehicles and equipment. Provided that these identified wastes would be handled, transported and disposed of using the recommended methods and that good site practices would be strictly followed, adverse environmental impacts are not expected.</p> <p>The waste management assessment has recommended good waste management practices to ensure that adverse environmental impacts are prevented. The assessment concluded that no unacceptable environmental impacts would result from the storage, handling, collection, transport and disposal of wastes arising from the construction and operation of the project.</p>
<p>Terrestrial Ecology</p>	<p>A literature review and ecological field surveys have been conducted. Four habitat types were identified within the study area including secondary woodland, plantation, watercourse and developed area. The secondary woodland habitat is considered to have high ecological value. The other habitat was regarded as of low value. Six flora and 26 fauna species of conservation importance were recorded from the study area during surveys.</p> <p>Major ecological impacts would include direct impact on the secondary woodland habitat and the floral species of conservation importance. The impacts to about 0.69 ha of secondary woodland habitat would be compensated by the creation of about 0.23 ha on-site of woodland habitat within the Sha Tin WTW and about 0.29 ha off-site of woodland habitat at Sha Tin South Freshwater Service Reservoir nearby and northwest of Sha Tin West Service Reservoir (a total of about 0.52 ha). The area of secondary woodland habitat would be reduced by about 0.17ha. Feasible woodland compensation locations have been exhaustively investigated and residual impact is minimised as far as practicable. Considering the size and value of the habitat affected, the residual impact is considered to be insignificant, with the implementation of the recommended habitat compensation.</p> <p>Four flora species of conservation importance (Incense Tree, Ailanthus, Lamb of Tartary, and Hong Kong Eagle's Claw) would be</p>

	<p>directly affected by the Project. Detailed vegetation surveys should be conducted to identify the affected individuals within the proposed works area. Transplantation is recommended as far as possible to minimize the direct impact to these important species.</p> <p>The implementation of a mitigation strategy for Short-nosed Fruit Bat will avoid impacts to this species, thereby resulting in no adverse impact. Indirect impacts during the construction phase would comprise noise and human disturbance, construction dust, and construction site runoff. With proper implementation of good site practices and noise mitigation measures, no significant adverse ecological impact is anticipated.</p> <p>The level of disturbance during the operation phase would be comparable to the existing condition. No significant adverse impact is therefore expected.</p> <p>With the implementation of the recommended mitigation measures, no unacceptable residual indirect impact due to the construction and operation of the proposed Project would be expected. The implementation of mitigation measures would be subject to regular audit as part of the EM&A programme.</p>
<p>Landscape and Visual</p>	<p>The proposed works of the Project at Sha Tin WTW would inevitably result in some landscape and visual impacts during the construction and operation phases. These impacts have been minimized through careful consideration of alternatives, minimization of works areas, incorporation of aesthetic external designs and landscape treatments of proposed structures.</p> <p>The proposed works will be mainly located within the existing Sha Tin WTW Compound under the Other Specified Uses (OU) of the Approved Sha Tin Outline Zoning Plan No. S/ST/30. It is considered that the proposed Project is permitted development under the OZP and would fit in with the current and future planning settings and would not be in conflict with the statutory town plan.</p> <p>Based on a preliminary tree survey, approximately 800 existing trees will be affected by the proposed works. Among these 800 trees, approximately 652 trees will be felled due to the Project. None of these are Registered Old and Valuable Trees. There are approximately 21 nos. of <i>Aquilaria sinensis</i> which is protected under Cap. 586 in Hong Kong and 1 no. of <i>Ailanthus fordii</i> under the Forest and Countryside Ordinance (Cap. 96). Any affected <i>Aquilaria sinensis</i> and <i>Ailanthus fordii</i> including other trees of conservation importance are proposed to be transplanted where possible. Detailed tree survey and removal application will be submitted in accordance with DEVB TCW No. 10/2013 - Tree Preservation separately. Under the proposed scheme for the Project, opportunities for tree compensation within the project boundary have been fully explored and incorporated in the proposed mitigation measures as much as practicable. Due to limited available space for tree planting within the project boundary, approximately 200 nos. of heavy standard trees and 460 nos. of light standard trees are proposed on-site and off-site at Sha Tin South Freshwater Service Reservoir and Sha Tin West Service Reservoir at Po Fook Shan to compensate for the tree to be felled. It offers a compensation ratio greater than 1:1 (i.e. approximately 660 newly planted trees v.s. approximately 652 felled trees). Approximately 2,300m² of woodland mix planting are proposed on-site whereas about 2,900m² off-site to compensate for the impact to</p>

	<p>the woodland habitat.</p> <p>There would be substantial residual landscape impact on LR1 and moderate residual landscape impact on LR2, LR3, LR4 and LCA2 with the implementation of proposed mitigation measures during construction phase. The residual impact of LR1 would be moderate and LR2, LR3, LR4 and LCA2 would be slight in Day 1 operation phase and reduced to slight and insubstantial in Year 10 of operation phase when the proposed compensatory planting including woodland mix planting becomes mature. Because not all woodland/tree compensation will be provided on-site, some of the woodland/tree planting will be compensated off-site. There would still be some slight residual impact on LR1.</p> <p>There would be moderate residual visual impact on VSRs R1, R2, R3, R4, GIC1, O1 and O2 and slight residual impact on VSRs T1 and T2 during the construction phase. The residual impact would be slight in Day 1 of Operation Phase and reduced to insubstantial in Year 10 of Operation Phase.</p> <p>Although there is slight residual impact on LR1, as a whole, it is considered that the residual landscape and visual impacts of the proposed project is considered acceptable with mitigation measures implemented during construction and operation phases.</p>
<p>Cultural Heritage</p>	<p>Cultural heritage resources within the study area have been identified and reviewed through site surveys and literature review. No archaeological potential is present within the study area. Therefore no impact to archaeology is anticipated.</p> <p>Direct impact on three existing graded historic buildings at Hin Tin village and the Ex KCR Beacon Hill Tunnel during construction phase is not anticipated. Considering sufficient buffer distances between the built heritages at Hin Tin village (approximately 270 m) and the proposed works areas, there would be insignificant visual and vibration impact during construction and operation phases.</p> <p>Four existing staff quarters would be refurbished to be used as construction site office located in close proximity to the west of Ex KCR Beacon Hill Tunnel portal (Refer to Figure 2.1), and the proposed Administration Building cum Mainland East Laboratory would also be built at about 120 m to the northwest of the portal (Refer to Figure 10.1). Due to the proposed work design and distance between these buildings and the tunnel portal, vibration impact on the facade wall of portal is considered to be insignificant. As precautionary measure, ppv limit of 7.5mm/s is recommended, including measuring at the facade wall of tunnel portal and inside the tunnel where it is nearest to any construction works within the Works Area.</p> <p>In conclusion, the construction and operation of the Project would not cause unacceptable impacts on cultural heritage resources, with implementation of the recommended mitigation measures.</p>
<p>Land Contamination</p>	<p>This assessment has examined the potential contaminating land uses within the Project site. It also covers potential impacts of the contamination on future use. The assessment involved site appraisal and preparation of CAP.</p> <p>Site investigation will be carried out at the decommission stage of</p>

	<p>the Project site due to site access and sensitive nature of the water works. Based on the findings in the site investigation, if any contamination is found, appropriate remediation measures shall be identified and carried out before construction commences, so as to clean up the Project site to the relevant RBRGs. With the remediation and mitigation measures in place, the potential land contamination impacts to the sensitive receptors and future use as water treatment facilities are thus not considered to be insurmountable. As a precaution, mitigation measures are proposed for the excavation of soil, treatment of soil and general environmental, health and safety on site during the construction stage.</p>
<p>Hazard to Life</p>	<p>A Hazard Assessment of the risks associated with the transport, storage and use of chlorine at Sha Tin WTW and off-site transport of chlorine within the Consultation Zone has been conducted for the Construction and Operational Phases of the Project. To obtain the total chlorine risks, risks from the on-site Sha Tin WTW chlorine transport, storage and use were combined with the off-site chlorine transport risks.</p> <p>The Sha Tin WTW Re-provisioning is an improvement project. Due to the introduction of the new treatment technologies, the re-provisioning works will lead to a permanent reduction in chlorine storage and usage at the WTW. As a result, the chlorine-related risks for the surrounding population will be reduced in comparison with current levels.</p> <p>The assessment results show that for both Construction and Operational Phases, the Individual Risk complies with the Hong Kong Risk Guidelines.</p> <p>The Societal Risk lies within the As Low As Reasonably Practicable (ALARP) region of the Hong Kong Risk Guideline (HKRG). An ALARP assessment has been carried out to identify feasible mitigation measures and assess the cost effectiveness of each measure in terms of risk reduction achieved and the cost of implementing the measures, a number of recommendations have been made. The residual risks remain in the ALARP region.</p> <p>Cumulative Individual Risks within the Consultation zone were also presented by combining risks from the on-site transport, storage and use of chlorine, off-site chlorine transport, Beacon Hill North Offtake Station, the 750mm and 500mm gas pipelines that run through the Old Beacon Hill Tunnel, and the explosives transport and use for SCL construction. The cumulative Individual Risk values are low and in the maximum order of 10^{-6} per year which complies with the Hong Kong Risk Guidelines.</p> <p>The Cumulative Societal Risk lies within the “ALARP” region of the Hong Kong Risk Guidelines.</p>

- 14.1.5 The various sections of this EIA Report have presented the measures to minimise the potential environmental impacts associated the Project in the planning, design, construction and operation stages. The key measures to minimise the environmental impacts are summarised in **Section 13**.
- 14.1.6 Environmental monitoring and audit requirements have been recommended, where necessary, to check on project compliance of environmental legislation and standards. These are presented in a separate, stand-alone EM&A report.

~ End of Section 14 ~