

**11. SUMMARY OF ENVIRONMENTAL OUTCOMES**

**11.1 Introduction**

11.1.1 This section summarizes the key environmental outcomes arises from the assessments completed in this EIA Report for the proposed Project in Sha Tau Kok. For each of the environmental components assessed, a summary of key environmental sensitive receivers is completed, together with an overview of the key potential environmental impacts and key mitigation measures, highlighting their benefits where necessary.

11.1.2 The summary of each of the components will be structured as follows:

- a) List of sensitive receivers;
- b) Protection of Environmental Sensitive Areas;
- c) Key Environmental Problems Avoided / Environmental Outcomes;
- d) Assessment Methodology and Criteria;
- e) Key Construction Impacts
- f) Key Operation Impacts
- g) Key Mitigation Measures
- h) Residual Impacts; and
- i) Compliance with the guidelines and criteria of the Environmental Impact Assessment Ordinance – Technical Memorandum (EIAO-TM)

**11.2 Air Quality Impact**

11.2.1 **Table 11.1** presents a summary of findings of the assessment of impacts to air quality as a result of the construction and operation of this Project. Full details of the assessment and mitigation measures are presented in Section 3 of the EIA Report.

**Table 11.1 – Summary of Environmental Assessment & Outcomes - Air Quality**

Items	Description
Air Sensitive Receivers (ASRs)	In accordance with the requirements stated in Clause 3.4.2.2 of the EIA Study Brief, the Study Area for the air quality impact assessment covered an area of 500 m from the boundary of the Project Site.  Eight (8) representative ASRs were identified and illustrated in <a href="#">Figure 3.1</a> of the EIA Report.
Protection of Environmentally Sensitive Areas	With the implementation of the recommended dust control measures and adoption of good construction site practices during construction phase and odour mitigation measures during operation phase, no adverse fugitive dust impact or odour impact is anticipated within the Study Area and associated ASRs.
Key Environmental Issues Avoided/ Environmental Outcomes	Potential impacts to the identified ASRs during construction phase are not anticipated by strictly following the dust control measures stipulated in the <i>Air Pollution Control (Construction Dust) Regulations</i> and good site practices.  Potential odour impacts on the identified ASRs during operation phase are not anticipated provided that odour mitigation measures and recommendations are followed and implemented.
Assessment Methodology and Criteria	<ul style="list-style-type: none"> <li>• The principal legislation for the management of air quality in Hong Kong is the <i>Air Pollution Control Ordinance (APCO)</i> (Cap 311). The APCO Amendment was passed in July 2013 and a set of new Air Quality Objectives (AQOs) has been effective from 1 January 2014. The new AQOs were used as the evaluation criteria for this assessment.</li> <li>• A maximum hourly TSP level of 500 µg m<sup>-3</sup> at ASRs is also stipulated in Annex 4 of the EIAO-TM to assess potential construction dust impacts. The measures stipulated in the <i>Air Pollution Control</i></li> </ul>

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	<p><i>(Construction Dust) Regulation</i> should also be followed to ensure that any dust impacts are minimised.</p> <ul style="list-style-type: none"><li>Annex 4 of the EIAO-TM also stipulates that any predictive assessment of odour impact should meet 5 odour units based on an averaging time of 5 seconds.</li></ul>
Key Construction Impacts	Soil excavation, material handling, truck movements on unpaved roads and wind erosion from open stockpiling of dusty materials within the Project Site are identified to be the potential dust generating activities.
Key Operation Impacts	Potential odour emission is expected from the exhaust pipe of the TSTP and the STKSTW during operation. Potential odour nuisance may also result from the transportation, storage and handling of sludge produced during the sewage treatment process.
Key Mitigation Measures	<p>Construction Phase</p> <p>Dust control measures stipulated in the <i>Air Pollution Control (Construction Dust) Regulation</i> will be implemented during the construction of the Project to reduce the potential fugitive dust emissions and also gaseous emission from construction plant.</p> <p>Operation Phase</p> <p>Deodourizing facility using activated carbon filters and/or bio-trickling filters will be equipped for both TSTP and STKSTW to attain the required odour removal efficiency at exhaust. The deodorization system would undergo maintenance annually or when the average odour removal efficiency of deodorization facility is smaller than the required odour removal efficiency. Ventilation system will also be provided inside the TSTP and STKSTW to ensure adequate air exchange within the plants. Dewater sludge will be disposed of at the landfill regularly using fully enclosed trucks to minimise potential odour impact.</p>
Residual Impacts	<p>Construction Phase:</p> <p>No adverse residual air quality impact is anticipated with the implementation of the mitigation measures and good construction site practices.</p> <p>Operation Phase:</p> <p>No adverse residual air quality impact is envisaged at all identified ASRs with the implementation of the recommended odour control measures and proper site management practices.</p>
Compliance with EIAO-TM	The assessment and the impacts are acceptable and in compliance with the EIAO-TM Annexes 4 & 12 and applicable assessment standards/ criteria.

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**11.3 Noise Impact**

11.3.1 **Table 11.2** presents a summary of findings of the assessment of impacts to noise as a result of the construction and operation of this Project. Full details of the assessment and mitigation measures are presented in Section 4 of the EIA Report.

**Table 11.2 – Summary of Environmental Assessment & Outcomes - Noise**

Items	Description
Noise Sensitive Receivers (NSRs)	In accordance with the requirements stated in Clause 3.4.3.2 of the EIA Study Brief, the Study Area for the noise impact assessment shall cover an area of 300 m from the boundary of the Project Site. 8 representative NSRs were identified and illustrated in <a href="#">Figure 4.1</a> of the EIA Report.
Protection of Environmentally Sensitive Areas	The environmentally sensitive areas are protected as a result of adoption of the environmentally friendly options and designs. Adverse noise impacts on noise sensitive receivers within the assessment areas have been minimized with the practicable mitigation measures implemented.
Key Environmental Issues Avoided/ Environmental Outcomes	The maximum number of work fronts, length of open cut and working duration has been optimized to minimize the exceedances of daytime construction noise criteria.
Assessment Methodology and Criteria	<ul style="list-style-type: none"> <li>• The methodology for the noise impact assessment is in accordance with the procedures outlined in the GW-TM, which is issued under the NCO and the EIAO-TM.</li> <li>• Using a conservative approach, each work activity has been assumed to operate simultaneously. Based on the construction programme, cumulative noise impact throughout the construction phase has been assessed.</li> </ul>
Key Construction Impacts	Potential sources of noise impacts during the construction phase of the Project will mainly arise from powered mechanical equipment (PME) operating at the land-based construction work sites. No NSR was identified within 300 m from the marine-based works area, hence the potential construction noise impacts are expected to be minimal.
Key Operation Impacts	Potential sources of noise impacts during the operation phase of the Project will mainly arise from fixed plant items operating in the Project site. However, no unacceptable noise impact is expected due to the operation of fixed plant items.
Key Mitigation Measures	<p>Construction Phase:</p> <p>In view of the predicted noise exceedances at some of the NSRs during the construction of the Project, the following mitigation measures have been considered:</p> <ul style="list-style-type: none"> <li>• Good construction site practice;</li> <li>• Use of quiet PME;</li> <li>• Adoption of temporary noise barriers and movable noise barriers; and</li> <li>• Scheduling of PME / construction activities.</li> </ul> <p>Operation Phase:</p> <p>While no noise impact is expected due to operation of fixed plant items, the following measures will be implemented:</p> <ul style="list-style-type: none"> <li>• All the equipment will be fully totally enclosed inside building structure;</li> <li>• Quieter equipment should be chosen;</li> <li>• Include noise levels specification when ordering new equipment items;</li> </ul>

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Items	Description
Residual Impacts	<ul style="list-style-type: none"><li>• All openings, including louvres for ventilation fan and machine room doors should be oriented away from NSRs;</li><li>• Silencers, acoustic louvres or acoustic doors should be used; and</li><li>• Develop and implement a regularly scheduled equipment maintenance programme so that equipment items are properly operated and serviced. The programme should be implemented by properly trained personnel.</li></ul> <p>Construction Phase:</p> <ul style="list-style-type: none"><li>• With the implementation of all practical mitigation measures and works scheduling , no residual impacts are anticipated and predicted noise levels at all NSRs are predicted to comply with the EIAO requirement.</li></ul> <p>Operational Phase:</p> <ul style="list-style-type: none"><li>• No residual operational noise impact is anticipated.</li></ul> <p>The assessment and the impacts are acceptable and in compliance with the EIAO-TM Annexes 5 &amp; 13 and applicable assessment standards/ criteria.</p>
Compliance with EIAO-TM	

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**11.4 Water Quality Impact**

11.4.1 **Table 11.3** presents a summary of findings of the assessment of impacts to water quality as a result of the construction and operation of this Project. Full details of the assessment and mitigation measures are presented in Section 5 of the EIA Report.

**Table 11.3 – Summary of Environmental Assessment & Outcomes – Water Quality**

Items	Description
Sensitive Receivers (SRs)	<p>The following SRs have been identified:</p> <ul style="list-style-type: none"> <li>• Fisheries Sensitive Receivers Fish Culture Zones at Sha Tau Kok and two of its potential relocation sites, Ap Chau, Kat O, O Pui Tong, Sai Lau Kong and Wong Wan</li> <li>• Ecological Sensitive Receivers Seagrass bed Horseshoe crab at coastline off STKSTW, off Pak Hok Lam, off Nga Yiu Tau, A Chau and off Luk Keng Mangrove stand at coastline off Nga Yiu Tau, off Wu Shek Kok, off Tai Wan, off Luk Keng, off Kuk Po, Kei Shan Tsui, Tai Sham Chung, So Lo Pun, Pak Kok Wan, Yan Chau Tong Marine Park and Ngau Shi Wu Wan Marine Park at Yan Chau Tong</li> </ul>
Protection of Environmentally Sensitive Areas	<p>Design measures have been included to minimize the potential water quality impact from outfall and diffuser construction. Selection of outfall location and improvement on effluent quality are taken into account in the design to minimize the potential water quality impact from the operation of the expanded STKSTW. With the implementation of the suggested mitigation measures, full WQO compliance is predicted at identified WSRs. Changes in DO level due to Project operation are limited though. Modelling results also indicates TIN level is predicted to improve significantly near the existing outfall</p>
Key Environmental Issues Avoided/ Environmental Outcomes	<ul style="list-style-type: none"> <li>• Non-dredge trenchless method would be adopted for outfall construction such that potential water quality impact and waste generation from marine dredging of outfall alignment can be avoided.</li> <li>• Removal of sediment at outfall diffuser would be conducted within fully drained water-tight cofferdam. Potential water quality impact from conventional marine dredging for outfall diffuser construction would be avoided.</li> <li>• Expansion of treatment capacity and improvement in effluent quality allows more population be served within the sewage catchment and reduce untreated sewage from entering local rivers or marine waters.</li> </ul>
Assessment Methodology and Criteria	<ul style="list-style-type: none"> <li>• The potential impacts due to the construction and operation of the Project and associated developments were assessed following the EIAO-TM Annex 6 guidelines and the impacts evaluated based on the criteria in EIAO-TM Annex 14.</li> </ul>

- Impacts due to the dispersion of fine sediment in suspension during the construction of the submarine pipelines have been assessed using computational modelling (Delft3D PART).
- The simulation of operation impacts on water quality has also been studied by means of computational modelling (Delft3D WAQ and CORMIX). The models have been used to simulate the effects of the physical presence of hydrodynamic regime, flushing and sedimentation patterns, and water quality changes.

Key Construction Impacts

Non-dredge trenchless construction method has been adopted for outfall alignment. Removal of sediment at outfall diffuser would be conducted within fully drained water-tight cofferdam as well. Potential disturbance from installation and removal would be the major source of water quality impact from marine construction. The water quality modelling works have indicated that the installation and removal of sheetpiles can proceed at the recommended working rates without causing unacceptable impacts to water quality sensitive receivers.

- *Suspended Solids (SS)*: The majority of SS elevations in water have been predicted to remain within relatively close proximity to the dredging works and, as such, the majority of sediment has been predicted to settle within relatively close proximity to the works areas. Thus, no unacceptable impacts are expected to be posed by the works.
- *Water Quality (Dissolved Oxygen, Nutrients, and Heavy Metals)*: The dispersion of sediment due to dredging is not expected to impact the general water quality of the receiving waters. Effects will be transient, localised in extent, of small magnitude and compliant with applicable standards. Thus, no unacceptable impacts are expected to be posed by the works.
- *Other Discharges*: Land based construction activities, vessel discharges and contaminants are not predicted to cause unacceptable impacts to the water quality sensitive receivers.

Key Operation Impacts

The discharge of treated effluent from the expanded STKSTW is the main environmental concern for the Project operation. Results of water quality modelling indicate that there will be a general improvement in water quality at the currently stressed inner Starling Inlet during the operation of the expanded STKSTW as a result of improvement in effluent quality and relocation of discharge outfall. Most of the WSRs within the Starling Inlet are predicted to benefit from the operation the expanded STKSTW. Significant improvement of TIN level is predicted at WSRs near the existing outfall. On the other hand, some WSRs located on the southern coast of the Starling Inlet as well as WSRs which are close to the new discharge outfall are predicted to be affected by the expanded STKSTW. Yet the predicted changes are expected to be limited and within the relevant criteria of WQO. No non-compliance to WQO criteria is predicted.

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### Key Mitigation Measures

Appropriate preventive and mitigation measures are recommended. Construction methods that cause fewer disturbances to marine sediment are adopted, such as non-dredge trenchless construction of outfall alignment and cofferdam construction of outfall diffuser structure. Environmental monitoring and audit is recommended to ensure the proper implementation of these measures.

### Residual Impacts

#### Construction Phase:

- No adverse residual construction impact on water quality is anticipated.
- No additional non-compliance to WQO from the discharge of treated effluent from the TSTP is anticipated as the total pollution loading of TSTP would remain the same as the baseline scenario

#### Operational Phase:

- Modelling assessment for operation phase effluent discharge indicated that no non-compliance to WQO from the discharge of treated effluent from the expanded STKSTW.

### Compliance with EIAO-TM

The assessment and the impacts are acceptable and in compliance with the EIAO-TM Annexes 6 & 14 and applicable assessment standards/ criteria.

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**11.5 Waste Management Implication and Land Contamination**

11.5.1 **Table 11.4** presents a summary of findings of the waste management implications and land contamination as a result of the construction and operation of this Project. Full details of the assessment and mitigation measures are presented in Section 6 of the EIA Report.

**Table 11.4 – Summary of Environmental Assessment & Outcomes – Waste Management Implication and Land Contamination**

Items	Description
Key Environmental Issues Avoided/ Environmental Outcomes	<p>Potential project layouts, construction design and methods and reuse of excavated materials, were examined on the basis of their potential environmental impacts. The preferred alternatives have led to the reduction in the amount of waste expected to be produced and, therefore, have brought about an overall reduction in waste management impacts.</p> <p>The proposed works areas were examined for potential contaminated land issue from past and present land uses and activities.</p>
Assessment Methodology and Criteria	<p>The potential environmental impacts associated with the handling and disposal of waste arising from the construction and operation of this Project are assessed in accordance with the criteria presented in Annexes 7 and 15 of the EIAO-TM:</p> <ul style="list-style-type: none"> <li>• Estimation of the types and quantities of the wastes to be generated;</li> <li>• Assessment of the secondary environmental impacts due to the management of waste with respect to potential hazards, air and odour emissions, noise, wastewater discharges and traffic; and</li> <li>• Assessment of the potential impacts on the capacity of waste collection, transfer and disposal facilities.</li> </ul> <p>Land contamination is assessed in accordance with Annex 19 of the EIAO-TM and the relevant EPD’s Practice Guide, Guidance Note and Guidance Manual, consisting of:</p> <ul style="list-style-type: none"> <li>• Desk-top review of existing and historical information;</li> <li>• Interpretation of existing and historical aerial photographs;</li> <li>• Review of Government records; and</li> <li>• Site walkover to verify collected information.</li> </ul>
Key Construction Impacts	<p>The key potential impacts during the construction phase are related to wastes generated from construction of submarine outfall and land-based construction works. All the wastes produced during the construction phase will be disposed of accordingly to their nature and relevant regulations, avoiding any potential adverse impact.</p> <p>The review and site walkover indicated no contaminated land in the proposed works area.</p>
Key Operation Impacts	<p>Dewatered sludge, screenings, general refuse and chemical waste will be produced during the operation phase. The potential environmental impacts associated with waste storage, handling, collection, transport and disposal will meet the criteria specified in the EIAO-TM, thus no unacceptable operational waste management impact is anticipated.</p> <p>The operation of the TSTP will not require use of large amount of chemicals or fuels that may potentially cause land contamination. No contaminated land is expected for the demolition of the TSTP after the expanded STKSTW comes into operation.</p>
Key Mitigation Measures	<p>A Environmental Management Plan (EMP) will be devised which incorporates mitigation measures that have been</p>



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	proposed to avoid or reduce potential adverse environmental impacts associated with handling, collection and disposal of waste arising from the construction and operation of this Project.
Residual Impacts	With the implementation of the recommended mitigation measures, in particular the establishment and implementation of the EMP, no residual impacts are anticipated from the construction and operation of this Project.
Compliance with EIAO-TM	The assessment and the impacts are acceptable and in compliance with the EIAO-TM Annexes 7 & 15 and applicable assessment standards/ criteria.

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**11.6 Ecological Impact (Terrestrial And Marine)**

11.6.1 **Table 11.5** presents a summary of findings of the assessment of impacts to ecological resources as a result of the construction and operation of this Project. Full details of the assessment and mitigation measures are presented in Section 7 of the EIA Report.

**Table 11.5 – Summary of Environmental Assessment & Outcomes – Ecological Impact**

Items	Description
Protection of Environmentally Sensitive Areas	The A Chau Site of Special Scientific Interest (SSSI) and coastal habitats including mangrove stands, sandflats and mudflats at Sha Tau Kok Hoi are the recognized ecologically important / sensitive sites located within the Study Area. These ecological sensitive habitats are located outside of the project site.
Key Environmental Issues Avoided/ Environmental Outcomes	<ul style="list-style-type: none"> <li>• Disturbance to the key ecological sensitive receivers such as the A Chau SSSI and coastal habitats including mangrove stands, sandflats and mudflats at Sha Tau Kok Hoi has been avoided by locating the project site away from these areas.</li> <li>• Potential impacts on the construction noise have been avoided for Night Roosting Site for Great Egrets.</li> <li>• Potential impacts on waterbirds and ardeids (i.e. on the mudflats or in the open waters, as well as the Night Roosting Site for Great Egrets) on the existing outfall are not expected, due to the grouting or foam concreting works being confined within the STKSTW.</li> <li>• Potential project layouts, construction design and methods were examined on the basis of their potential environmental impacts. The adopted layout has avoided construction impacts to marine ecological resources.</li> <li>• Impacts to marine ecology have been reduced through the adoption of trenchless installation technique for the submarine outfall. The outfall is also proposed to be located in more offshore, open waters to enhance dilution and dispersion of effluent. This results in less adverse effect on water quality of surrounding areas and thus to the marine ecological resources.</li> </ul>
Assessment Methodology and Criteria	<ul style="list-style-type: none"> <li>• A literature review was supplemented by a programme of field surveys that covered terrestrial and marine assemblages and habitats.</li> <li>• The potential impacts due to the construction and operation of the proposed Project were assessed following the EIAO-TM Annex 16 guidelines and the impacts evaluated based on criteria in EIAO-TM Annex 8 and Guidance Notes.</li> </ul>
Key Construction Impacts	<ul style="list-style-type: none"> <li>• Direct loss of habitats and vegetation removal within the footprint of the land-based works area, including potential reduction of species abundance/diversity, loss of feeding grounds, reduction of ecological carrying capacity.</li> <li>• Direct disturbances to benthic habitat within the marine works area.</li> <li>• Potential disturbance to the recognized site of conservation importance at the A Chau SSSI.</li> <li>• Potential disturbance to species of conservation interest.</li> <li>• Habitat fragmentation and isolation, including potential restriction of wildlife utilisation of the area (i.e. transit, feeding and roosting) especially for those inactive/ less mobile/ habitat-specific wildlife nesting/inhabiting the habitats, and degradation of habitat quality/ ecological function.</li> <li>• Physical disturbance to the surrounding habitats and associated wildlife due to noise and increased human</li> </ul>

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	<p>activities, especially in terms of the Night Roosting Site for the Great Egrets.</p> <ul style="list-style-type: none"><li>• Potential indirect impact, potential changes in the water quality, hydrodynamics properties, sedimentation hydrology.</li></ul>
Key Operation Impacts	<ul style="list-style-type: none"><li>• Perturbations to key water quality parameters from the effluent discharge at the diffuser of the proposed submarine outfall at the mouth of Starling Inlet.</li></ul>
Key Mitigation Measures	<ul style="list-style-type: none"><li>• Avoid direct and indirect impacts to ecologically sensitive habitats.</li><li>• To avoid/minimize the potential disturbance on the Night Roosting Site for Egret. If the presences of Egrets are confirmed to be continuing their usage before the construction activities, no work shall be undertaken within an area of 100 m from the Night Roosting Site from 16:00 to 07:00 of the following day (as illustrated in <i>Section 2.3.2 of Annex 7A</i>). In addition, strong artificial lighting should not be used in the area at night to avoid disturbance to the roosting ardeids. Clear signs should be erected on site to alert all site staff and workers about the requirement.</li><li>• The alignment chosen for the submarine outfall is away from key ecological sensitive habitats.</li><li>• The use of trenchless techniques during the installation of the submarine outfall will reduce the severity of perturbations to water quality and hence allow compliance with the impact assessment criteria at sensitive receivers.</li><li>• The mitigation measures designed to mitigate impacts to water quality to acceptable levels (compliance with assessment criteria) are also expected to mitigate impacts to marine ecological resources.</li></ul>
Residual Impacts	No adverse residual construction and operational ecological impact is anticipated.
Compliance with EIAO-TM	The assessment and the residual impacts are acceptable and in compliance with the EIAO-TM Annexes 8 & 16 and applicable assessment standards/criteria.

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**11.7 Fisheries Impact**

11.7.1 **Table 11.6** presents a summary of findings of the assessment of impacts to fisheries resources as a result of the construction and operation of this Project. Full details of the assessment and mitigation measures are presented in Section 8 of the EIA Report.

**Table 11.6 – Summary of Environmental Assessment & Outcomes – Fisheries Impact**

Items	Description
Protection of Environmentally Sensitive Areas	Fisheries sensitive receivers including fish culture zones at Sha Tau Kok, Ap Chau, Kat O, O Pui Tong, Sai Lau Kong and Wong Wan, recognized spawning and nursery ground of commercial fisheries resources at northeast water and artificial reefs at Yan Chau Tong Marine Park and O Pui Tong have been identified; however, the assessment of water quality impacts demonstrated that these areas will not be significantly affected.
Key Environmental Issues Avoided/ Environmental Outcomes	<ul style="list-style-type: none"> <li>• Potential project layouts, construction and operation design and methods were examined on the basis of their potential impacts to fisheries.</li> <li>• Impacts to fisheries have been reduced through the adoption of trenchless installation technique for the submarine outfall. The outfall is also proposed to be located in more offshore, open waters to enhance dilution and dispersion of effluent. This results in less adverse effect on water quality of surrounding areas and thus to the fisheries resources.</li> </ul>
Assessment Methodology and Criteria	<ul style="list-style-type: none"> <li>• A literature review was conducted to establish the fisheries importance of the area surrounding the proposed Project.</li> <li>• The potential impacts due to the construction and operation of the Project were assessed following the EIAO-TM Annex 17 guidelines and the impacts evaluated based on the criteria in EIAO-TM Annex 9.</li> </ul>
Key Construction Impacts	<ul style="list-style-type: none"> <li>• Direct disturbances of fisheries habitat and fishing ground; and,</li> <li>• Perturbations to key water quality parameters.</li> </ul>
Key Operation Impacts	The change in the hydrodynamic regime and water quality due to the expanded STKSTW (operation scenario).
Key Mitigation Measures	<ul style="list-style-type: none"> <li>• The mitigation measures designed to mitigate impacts to water quality to acceptable levels (compliance with assessment criteria) are expected to mitigate impacts to fisheries resources.</li> <li>• Construction impacts to fisheries resources and fishing operations have largely been avoided through the planning and design of the marine works (e.g. adoption of trenchless method, location of the outfall diffuser to allow better mixing, and optimisation of project construction schedule). No fisheries-specific mitigation measures are required during construction.</li> <li>• Unacceptable operation phase impacts are not expected. No additional fisheries-specific mitigation measures or compensation are required during operation.</li> </ul>

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Residual Impacts

Impacts to fisheries resources, habitats and fishing operations during construction and operation phase are considered to be within acceptable level. Given the compliance of water quality standard prior to the discharge at the submarine outfall, the magnitude of residual impact is considered to be within acceptable levels given the small size and low fisheries importance of the area being disturbed.

Compliance with EIAO-TM

The assessment and the impacts are acceptable and in compliance with the EIAO-TM Annexes 9 & 17 and applicable assessment standards/ criteria.

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**11.8 Landscape and Visual Impacts**

11.8.1 **Table 11.7** presents a summary of findings of the assessment of impacts to landscape and visual as a result of the construction and operation of this Project. Full details of the assessment and mitigation measures are presented in Section 9 of the EIA Report.

**Table 11.7 – Summary of Environmental Assessment & Outcomes – Landscape and Visual**

Items	Description
Visually Sensitive Receivers (VSRs), Landscape Resources (LRs) and Landscape Character Areas (LCAs)	A total of 16 VSRs, 55 LRs and 7 LCAs were identified.
Key Environmental Issues Avoided/ Environmental Outcomes	The layout as shown in <a href="#">Figure 2.1</a> is a reduced footprint which keeps the proposed STKSTW within the existing STKSTW site area to avoid encroachment into the adjacent vegetated areas.
Protection of Environmentally Sensitive Areas	The project is proposed and will be restricted on existing urban developed areas. Impacts on landscape and visually sensitive areas will be avoided.
Assessment Methodology and Criteria	<p>The methodology of the LVIA was based on Annexes 10 and 18 in the EIAO-TM under the EIA Ordinance and associated Guidance Notes.</p> <ul style="list-style-type: none"> <li>• The landscape assessment considered the impact of the proposed development on the existing landscape resources and landscape characters within 500 m of the development site.</li> <li>• The visual assessment examined the impact of the proposed development on the existing views and the visual amenity, from representative VSRs within the ZVI.</li> <li>• In order to illustrate the visual impacts of the proposed project, photomontages were prepared from representative viewpoints compare the existing conditions with the view after construction. The residual impacts are evaluated qualitatively, in accordance with the requirements of Annex 10 of the EIAO-TM.</li> </ul>
Key Construction Impacts	<p>Sources of construction impacts will be:</p> <p><u>Major Works Items:</u></p> <ul style="list-style-type: none"> <li>• Site clearance works;</li> <li>• Removal of existing trees on site;</li> <li>• Demolishment of existing STKSTW;</li> <li>• Construction works for a TSTP /a new STKSTW;</li> <li>• Presence of incomplete structures;</li> <li>• Importation and storage of construction equipment and plant;</li> <li>• Indirect dust and water quality disturbance from construction activities</li> </ul> <p><u>Minor Works Items:</u></p> <ul style="list-style-type: none"> <li>• Demolishment of existing STKSPS;</li> <li>• Decommissioning of the existing rising mains</li> <li>• Construction of a new gravity sewer</li> <li>• Indirect dust and water quality disturbance from construction activities</li> </ul>
Key Operation Impacts	<p>Sources of operational phase landscape impact will be:</p> <ul style="list-style-type: none"> <li>• Presence of a new STKSTW in the landscape.</li> </ul>
Key Mitigation Measures	<p><u>Construction Phase Mitigation Measures:</u></p> <ul style="list-style-type: none"> <li>• CM1 – Preservation of Existing Trees (A total of 108 existing trees are proposed to be retained)</li> </ul>

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- CM2 -Proper Control of Site Construction Activities

### Operation Phase Mitigation Measures:

- OM1 – Suitable design of the proposed STKSTW
- OM2 - Amenity / Compensatory Planting  
(31 trees are proposed to compensate the loss of 18 trees)
- OM3 - Amenity enhancement  
(amenity enhancement includes roof greening and vertical greening)

Residual Impacts

No significant adverse residual impacts have been identified. The Landscape and Visual Mitigation Measures proposed will help to mitigate the impacts on the LCAs, LRs and VSRs. The overall landscape and visual impacts are considered acceptable with mitigation measures.

Compliance with EIAO-TM

The assessment and the impacts are acceptable and in compliance with the EIAO-TM Annexes 10 & 18 and applicable assessment standards/ criteria.

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**11.9 Cultural Heritage**

11.9.1 **Table 11.8** presents a summary of findings of the assessment of impacts to cultural heritage as a result of the construction and operation of this Project. Full details of the assessment and mitigation measures are presented in Section 10 of the EIA Report.

**Table 11.8 – Summary of Environmental Assessment & Outcomes – Cultural Heritage**

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Items	Description
Built Heritage Items	A total number of 11 and 27 historic buildings were identified in Ha Tam Shui Hang and Sha Tau Kok respectively. No declared monuments identified.
Protection of Environmentally Sensitive Areas	The Cultural Heritage Impact Assessment (CHIA) confirmed that the Project will not cause impact of any kind to the identified historic buildings. Alternative construction method recommended to minimize impact to nearby Tin Hau Temple.
Assessment Methodology and Criteria	The methodology of the CHIA was based on Annexes 19 in the EIAO-TM under the EIA Ordinance, Appendix I-1 of the EIA Study Brief and associated Guidance Notes.
Key Construction Impacts	Because of the distance between the identified historic buildings and the Project sites, it is believed that the proposed Project will not cause any impact from any perspective. Alternative construction method recommended to minimize impact to nearby Tin Hau Temple.
Key Operation Impacts	No operation impact is anticipated.
Key Mitigation Measures	<ul style="list-style-type: none"><li>• Trenchless excavation in the vicinity of the Tin Hau Temple with buffer of 10m between works area for open cut section and the Temple.</li><li>• Condition survey and vibration impact assessment during construction.</li><li>• Precautionary and protective measures during construction.</li></ul>
Residual Impacts	The proposed Project will not cause any impact from any perspective.
Compliance with EIAO-TM	The assessment and the impacts are acceptable and in compliance with the EIAO-TM Annexes 19 and applicable assessment standards/ criteria.

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**11.10 Environmental Benefits of the Project**

- 11.10.1 The environmental impact assessment (covering air quality, noise, water quality, waste management, ecology, fisheries, landscape and visual and cultural heritage) has concluded that no unacceptable environmental impacts are envisaged due to the construction and operation of the Project. No long-term unacceptable impact on the environment is anticipated.
- 11.10.2 The environmental benefits of the Project include the following:
- a) Improve treatment to produce effluent with better quality
  - b) Provide more treatment capacity within the existing plant site
  - c) Cover the treatment facilities and provide odour treatment to improve air quality
  - d) Incorporate environmental enhancements in the new treatment facilities, including renewable energy, energy-efficient electrical and mechanical equipment, greening, water saving measures, etc.
  - e) Locate the discharge point of the new submarine away from sensitive receivers, including the fish culture zones and the identified species of conservation importance
  - f) Demolish STKSPS to make the land available for other beneficial purposes
- 11.10.3 With the proposed Project, STKSTW will have sufficient capacity to cope with the increased sewage flow in the future for the existing catchment and sewage collected from the extensions of different villages sewerage projects. As such, the Project is essential to secure sewage treatment services for the Sha Tau Kok Area.

**11.11 Environmentally Friendly Design Recommended**

- 11.11.1 The following is the environmentally friendly design recommended for the Project:
- Membrane Bioreactor Process as Treatment Process
- 11.11.2 MBR requires the smallest footprint to provide the best effluent quality within the 3 processes considered and hence limits the extent for creating environmental impacts.
- Demolition of STKSPS
- 11.11.3 It limits the footprint for the construction works to the existing STKSTW site. This is far from residential area and comparatively less environmental impacts will be created. Moreover, odour, noise and visual impacts to surrounding sensitive receivers can be removed.
- Lay the new sewer along Shun Hing Street
- 11.11.4 It is recommended to lay the sewer along Shun Hing Street because fewer sensitive receivers are immediately affected (Sha Tau Kok Chuen and Sha Tau Kok Recreation Ground) during construction and maintenance.
- Discharge effluent at Ah Kung Au
- 11.11.5 The new outfall will extend from Starling Inlet to Ah Kung Au to locate the discharge point away from the sensitive receivers, such as the Sha Tau Kok Fish Culture Zone, as far as practicable and to achieve compliance with the Water Quality Objectives for Mirs Bay Water Control Zone.
- Trenchless technique by HDD for construction of submarine outfall
- 11.11.6 For the submarine outfall, the trenchless technique by HDD is recommended because it creates the least environmental impact to the marine ecosystem. In consideration to the length of the submarine outfall and the placement of the whole section of the pipe under the sea, HDD seems to be the most suitable trenchless method. The other trenchless methods are greatly constrained by the length and site condition.
- Precautionary measures for minimizing emergency discharge

11.11.7 It is recommended to provide precautionary measures such as provision of dual power supply, installation of standby equipment for sewage treatment and construction of emergency storage tank to minimize emergency discharge. With the implementation of above preventive measures, the possibility of sewage overflow from STKSTW will be extreme low. However, safety outlets will be provided to the emergency storage tanks to prevent flooding of the STKSTW.

**11.12 Key Environmental Problems Avoided, Population and Environmentally Sensitive Areas Protected**

11.12.1 The major sensitive areas within the study area include residential area in Sha Tau Kok Chuen, waters in Starling Inlet and nearby natural habitats. With the implementation of the proposed control and mitigation measures, the sensitive receivers for different environmental aspects would be protected from environmental impacts arising from the Project during both construction and operation phases. The environmental protection measures recommended, population and environmentally sensitive areas protected and key environmental problems avoided are summarized in **Table 11.1 – 11.8** above.