



**THE GOVERNMENT OF THE HONG KONG  
SPECIAL ADMINISTRATIVE REGION  
DRAINAGE SERVICES DEPARTMENT**

**Tolo Harbour Sewerage of Unsewered Areas, Stage II -  
Investigation, Design and Construction**

**Sai O Trunk Sewer Sewage Pumping Station**

**Environmental Impact Assessment  
Executive Summary**

**AECOM Asia Co. Ltd.**

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## 1 INTRODUCTION

### 1.1 Project Background

- 1.1.1 The Environmental Protection Department (EPD) commissioned a study entitled “Tolo Harbour Catchment Study on Unsewered Developments” (SMP) in 1989. The purposes of conducting the study were to establish an inventory of all unsewered areas within the Tolo Harbour Catchment, to identify specific solutions to alleviate the pollution problems caused by these unsewered areas, and to recommend short- and long-term measures to reduce pollution entering the Tolo Harbour.
- 1.1.2 The short-term measures were implemented under the project entitled “Tolo Harbour Catchment – first-aid measures” and comprised the interception and diversion of pollution flows into the existing sewerage system at seven locations in Sha Tin and Tai Po. These measures are completed and in operation. The long-term measures include the provision of sewerage facilities to collect pollution discharges from 165 unsewered areas within the Tolo Harbour Catchment.
- 1.1.3 Since the completion of the SMP, the projected populations in the region have increased significantly. To assess whether the existing sewerage system has the capacity for the future need, EPD completed another study, the Review of North District and Tolo Harbour Sewerage Master Plans (the Review) in November 2002. The Review recommended, amongst others, construction of sewers and pumping stations with associated rising mains for provision of sewerage to the unsewered areas in Sha Tin and Tai Po and also the extension of existing trunk sewer in Ma On Shan along Sai Sha Road with construction of a pumping station at the downstream of this trunk main. Based on the findings and recommendations of the Review, the scope of works under Stage II has been repackaged. To tackle the local pollution issues at Shing Mun River and the proposed Lung Mei Artificial Beach, the proposed village sewerage works under Stage I Phase IIC and Stage II have also been re-prioritised.
- 1.1.4 A Preliminary Environmental Review (PER), undertaken for the proposed sewerage works under the “Tolo Harbour Sewerage of Unsewered Areas, Stage II – Investigation, Design and Construction”, identified the proposed Sai O Trunk Sewer sewage pumping station (SPS) located at the north of Sai O near Nai Chung, as a Designated Project (DP) that requires an environmental permit under the Environmental Impact Assessment Ordinance (EIAO) EIAO for its construction and operation by virtue of Item F.3(b) in Part I, Schedule 2 of the EIAO – a sewage pumping station with an installed capacity of more than 2 000 m<sup>3</sup> per day and a boundary of which is less than 150 m from an existing or planned (i) residential area; (ii) place of worship; and (iii) educational institution.
- 1.1.5 In accordance with the requirements of Section 5(1)(a) of the *EIAO*, an application for an Environmental Impact Assessment (EIA) Study Brief for the proposed sewage pumping station was submitted on 30 October 2014 under *EIAO* with a Project Profile (PP) (No. PP-517/2014). An *EIA Study Brief* No.ESB-281/2014 for “Sai O Trunk Sewer Sewage Pumping Station” (hereafter referred to as “the Project”) was issued on 10 December 2014.

### 1.2 Purpose of this Executive Summary

- 1.2.1 This Executive Summary (ES) summarizes the key findings, recommendations and conclusions of the EIA Report for the Project. The ES contains the following information:
- Section 2 presents purpose and nature of the Project, consideration of

alternative options and construction methods for the Project;

- Section 3 presents the key findings of the environmental impact assessment;
- Section 4 describes the proposed environmental monitoring and audit for the Project; and
- Section 5 presents the conclusions.

## **2 PROJECT DESCRIPTION**

### **2.1 Purpose and Scope of Project**

2.1.1 The proposed Sai O Trunk Sewer SPS, as part of “Public Works Programme Item 4125DS - Tolo Harbour Sewerage of Unsewered Areas, Stage II” that originated from the findings of the Study “Review of North District and Tolo Harbour Sewerage Master Plans” completed by Environmental Protection Department (EPD) in 2002, is a core component of the proposed trunk sewerage system in Ma On Shan along Sai Sha Road. It is required to receive all sewage flows along Sai Sha Road from Kei Ling Ha Lo Wai to Cheung Muk Tau and the adjacent residential development, health care and education institutions, and then convey the sewage to Ma On Shan Sewage Pumping Station and ultimately to Sha Tin Sewage Treatment Works. Location of the proposed Sai O Trunk Sewer SPS is shown in **Figure 2.1**.

2.1.2 Based on the latest design, the installed capacity per day of the proposed Sai O Trunk Sewer SPS is about 20,600m<sup>3</sup> for coping with the sewerage needs of both existing and future developments, with the following main components:

- Loading/unloading bay
- Inlet chamber
- Coarse screen channel
- Distribution chamber
- Wet wells
- Valve chamber
- Emergency storage tank
- Deodorizing unit
- Switch room
- Transformer room

2.1.3 Same as other existing unmanned sewage pumping stations in Hong Kong (e.g. Ma On Shan and Ma On Shan 108 SPSs in Ma On Shan / Wu Kai Sha areas), the operation of the proposed SPS would be monitored by Sha Tin Sewage Treatment Works (Sha Tin STW) and communication channels for public enquiries / contact on the operation of the unmanned SPS would be displayed at a conspicuous place outside the SPS.

### **2.2 Need and Benefits of the Project**

2.2.1 At present, the sewage from the existing village houses at Sai Sha is preliminarily treated by private treatment facilities, i.e. septic tanks / and soakaway systems, the performance of which could be affected by high development density, poor design and inadequate maintenance and could cause pollution of the environment and poor hygiene. While the sewage from existing residential developments is treated by local private treatment plants, the nearby residents are suffering from the nuisance from the aging treatment plants.

- 2.2.2 The Sai Sha trunk sewerage system together with the proposed Sai O Trunk Sewer SPS is designed to serve the existing and planned developments in the Sai Sha area, by collecting and conveying the sewage generated from these developments to Shatin Sewage Treatment Works for proper treatment. The proposed trunk sewerage system is generally supported by the local communities. As an essential component for the operation of the proposed trunk sewerage system, the Project plays an important role to improve the environment and hygiene conditions of the area.
- 2.2.3 Without the Project, the whole sewerage system along Sai Sha Road could not be functioned. Without proper collection of sewage generated from the existing developments to Shatin Sewage Treatment Works for treatment, the environmental and hygiene nuisance resulting from the potential inadequate performance of the private treatment facilities / plants due to aging, increasing village density, poor maintenance etc. could not be rectified or improved. Moreover, the planned developments cannot be implemented and potential supply of housing units within the catchment, e.g. the "Comprehensive Development Area" ("CDA") zone on the approved Shap Sz Heung Outline Zoning Plan No. S/NE-SSH/11, will be seriously affected, which will aggravate the shortage of housing supply in Hong Kong.

### 2.3 Consideration of Alternative Options

- 2.3.1 Alternative options of location and design of the Project were considered in detail in the EIA Report. Highlights of the considerations given to alternatives and options are presented below.

#### Site Selection and Optimisation

- 2.3.2 Eight possible locations were identified and considered in the site selection process. The possible locations are listed below and their indicative positions are shown in **Appendix 2.1**.

- Location 1: On footpath next to existing public toilet and Nai Chung Bus Terminus
- Location 2: Vacant land in between Nai Chung Bus Terminus and Nai Chung Village
- Location 3: Vacant land at the east of Hong Kong Baptist Theological Seminary (HKBTS)
- Location 4: Vacant land at the east of Nai Chung Village and opposite to Nai Chung Barbecue Site
- Location 5: Open area at Lok Wo Sha Lane and on the west of The Entrance
- Location 6: Nai Chung Barbecue Site
- Location 7: Chek Kok
- Location 8: Vacant land next to Sai O Offtake and Piggling Station

- 2.3.3 A comparison of the environmental benefits and dis-benefits of the locations with respect to following environmental considerations of the selection of the preferable location for the proposed SPSs is summarised in **Table 2.1**.

- Conservation and Ecology: Avoidance of recognised sites of conservation importance and natural habitats with higher ecological values in order to avoid any irreversible adverse impact on ecology and conservation;
- Air Quality and Noise: Minimisation of air and / or noise sensitive receivers to be affected;
- Visual: Lower Visibility to Public;

- Better Environmental Performance: higher energy efficiency, less waste generation, impact on less sensitive receivers); and
- Minimisation of septic sewage and the associated odour issue due to long retention time.

**Table 2.1 Comparison of Alternative Location Options**

| Environmental Consideration | Alternative Location Options   |  |  |   |   |  |  |  |
|-----------------------------|--|--|--|---|---|--|--|--|
|                             | 1  | 2  | 3  | 4   | 5   | 6  | 7  | 8  |
| Conservation & Ecology      | <b>Preferable</b><br>No encroachment on or in close proximity to any recognized sites of conservation importance and habitats with high ecological value.  | <b>Not Preferable</b><br>Encroachment on and in close proximity to natural habitats of higher ecological value, including woodland, mudflat and mangrove.  | <b>Less Preferable</b><br>While no encroachment on any recognized sites of conservation importance and habitats with high ecological value, it is located close to habitats of higher ecological value, including mangrove, mudflat and woodland.  | <b>Not Preferable</b><br>Encroachment on woodland of higher ecological value.   | <b>Preferable</b><br>No encroachment on or in close proximity to any recognized sites of conservation importance and habitats with high ecological value.   | <b>Not Preferable</b><br>Encroachment on Ma On Shan Country Park and woodland.   | <b>Not Preferable</b><br>Encroachment on Tseng Tau Coast SSSI.   | <b>Preferable</b><br>No encroachment on or in close proximity to any recognized sites of conservation importance and habitats with high ecological value.  |
| Air Quality & Noise         | <b>Less Preferable</b><br>Affects more nearby existing or planned air / noise sensitive receivers within 150 m* of the location including HKBTS, Sai O Village, Nai Chung Village, Sai Sha Villa, planned sitting out area and playground, and Zessa Vista.  | <b>Less Preferable</b><br>Affects more existing or planned air / noise sensitive receivers within 150 m* of the location, including Sai O Village, Nai Chung Village, Zessa Vista, HKBTS and Sai Sha Villa   | <b>Preferable</b><br>Affects not as many nearby air / noise sensitive receivers within 150 m* of the location, including the planned sitting out area and playground, HKBTS, Zessa Vista and Nai Chung Village.  | <b>Preferable</b><br>Affects not as many nearby existing or planned air / noise sensitive receivers within 150 m* of the location, including Nai Chung Village, Kwun Hang Village, Nai Chung barbecue area and the "CDA" zone on the approved Shap Sz Heung OZP No. S/NE-SSH/11.  | <b>Less Preferable</b><br>Affects more nearby existing or planned air / noise sensitive receivers within 150 m* of the location, including the Entrance, Double Cove, Li Po Chun United World College, Lake Silver and "Residential (Group A)" zone on the draft Ma On Shan OZP No. S/MOS/23.   | <b>Preferable</b><br>Affects not as many existing or planned nearby air / noise sensitive receivers within 150 m* of the location, including Nai Chung barbecue area, Kwun Hang Village, Nai Chung Village and "CDA" zone on the approved Shap Sz Heung OZP No. S/NE-SSH/11.   | <b>More Preferable</b><br>Far away from air and noise sensitive receivers (over 500m).   | <b>Preferable</b><br>Affects not as many nearby existing or planned air / noise sensitive receivers within 150 m* of the location, including HKBTS, the planned school with recreational area under approved planning application no. A/MOS/125 and planned sitting out area and playground.   |
| Visual                      | <b>Less Preferable</b><br>High visibility to public  | <b>Less Preferable</b><br>Medium to high visibility to public  | <b>Preferable</b><br>Medium visibility to public   | <b>Preferable</b><br>Medium visibility to public  | <b>Less Preferable</b><br>High visibility to public   | <b>More Preferable</b><br>Low to medium visibility to public   | <b>More Preferable</b><br>Low visibility to public   | <b>Preferable</b><br>Medium visibility to public   |
| Environmental Performance   | <b>Preferable</b><br>Since the site is located at low point of the catchment, no additional pumping facilities or deep excavation for the SPS to facilitate connection with deeper gravity sewerage pipe is required, better performance could be achieved with less C&D materials generation, higher energy efficiency in operation, and avoidance of impact on additional sensitive receivers near the extra pumping facilities. | <b>Preferable</b><br>Since the site is located at low point of the catchment, no additional pumping facilities or deep excavation for the SPS to facilitate connection with deeper gravity sewerage pipe is required, better environmental performance could be achieved with less C&D materials generation, higher energy efficiency in operation, and avoidance of impact on additional sensitive receivers near the extra pumping facilities. | <b>Preferable</b><br>Since the site is located at low point of the catchment, no additional pumping facilities or deep excavation for the SPS to facilitate connection with deeper gravity sewerage pipe is required, better environmental performance could be achieved with less C&D materials generation, higher energy efficiency in operation, and avoidance of impact on additional sensitive receivers near the extra pumping facilities. | <b>Less Preferable</b><br>Since the site is located at high point of the catchment, additional pumping facilities or deep sewer/SPS would be required, poorer environmental performance would be anticipated with more C&D materials generation, lower energy efficiency in operation and impact on additional sensitive receivers near the extra pumping facilities. | <b>Less Preferable</b><br>Since the site is located at high point of the catchment, additional pumping facilities or deep sewer/SPS would be required, poorer environmental performance would be anticipated with more C&D materials generation, lower energy efficiency in operation and impact on additional sensitive receivers near the extra pumping facilities. | <b>Less Preferable</b><br>Since the site is located at high point of the catchment, additional pumping facilities or deep sewer/SPS would be required, poorer environmental performance with more C&D materials generation, lower energy efficiency in operation and impact on additional sensitive receivers near the extra pumping facilities. | <b>Preferable</b><br>Since the site is located at low point of the catchment, no additional pumping facilities or deep excavation for the SPS to facilitate connection with deeper gravity sewerage pipe is required, better environmental performance could be achieved with less C&D materials generation, higher energy efficiency in operation, and avoidance of impact on additional sensitive receivers near the extra pumping facilities. | <b>Preferable</b><br>Since the site is located at low point of the catchment, no additional pumping facilities or deep excavation for the SPS to facilitate connection with deeper gravity sewerage pipe is required, better environmental performance could be achieved with less C&D materials generation, higher energy efficiency in operation, and avoidance of impact on additional sensitive receivers near the extra pumping facilities. |
| Septic Sewage & Odour       | <b>Preferable</b><br>Medium pumping distance that decrease the likeliness of septic sewage and hence causing odour problems  | <b>Preferable</b><br>Medium pumping distance that decrease the likeliness of septic sewage and hence causing odour problems  | <b>Preferable</b><br>Medium pumping distance that decrease the likeliness of septic sewage and hence causing odour problems  | <b>Preferable</b><br>Medium pumping distance that decrease the likeliness of septic sewage and hence causing odour problems   | <b>More Preferable</b><br>Short pumping distance that decrease the likeliness of septic sewage and hence causing odour problems   | <b>Preferable</b><br>Medium pumping distance that decrease the likeliness of septic sewage and hence causing odour problems  | <b>Less Preferable</b><br>Long pumping distance that increase the likeliness of septic sewage and hence causing odour problems   | <b>Preferable</b><br>Medium pumping distance that decrease the likeliness of septic sewage and hence causing odour problems  |

Note:  
\* – As described in **Section 1.1.4**, the proposed SPS is considered as a DP by virtue of Item F.3(b) of Part I, Schedule 2 of EIAO as it has an installed capacity of more than 2 000 m<sup>3</sup> per day and a boundary of which is less than 150 m from existing or planned uses that would be potentially affected by development of SPS (including residential area, place of worship, and educational institution).

- 2.3.4 As shown in the **Table 2.1**, Locations 2, 4, 6 and 7 are not recommended for the proposed SPS as all of them would encroach on recognised sites of conservation importance and / or natural habitats with higher ecological values that irreversible adverse impact on ecology and conservation could not be avoided. While Location 3 would not encroach on these valuable sites/habitats, it is less preferable due to its relatively close proximity to habitats with higher ecological values (including woodland, mudflats and mangrove). For the remaining 3 locations (Locations 1, 5 and 8), they are all considered preferable with respect to conservation and ecology aspects as they would not encroach on or in the close proximity to any recognised sites of conservation importance and/or natural habitats with higher ecological values.
- 2.3.5 In regard to air quality and noise aspects, amongst the remaining 3 locations (Locations 1, 5 and 8), Location 8 is considered more preferable as the proposed SPS at this location would affect relatively less nearby air and noise sensitive receivers.
- 2.3.6 In regard to visual aspect, Location 8 is also comparatively less visible to public than Locations 1 and 5.
- 2.3.7 In regard to environmental performance and septic sewage and odour aspect, Location 8 is also considered preferable. Extra pumping facilities or deep gravity sewer/SPS would not be required and hence would result in less C&D materials generation, higher energy efficiency in operation, and avoidance of impact on additional sensitive receivers near the extra pumping facilities. In addition, the likeliness of septic sewage that cause odour problem would be reduced.
- 2.3.8 Based on the above comparison of the eight locations, the vacant land next to Sai O Offtake and Pigging Station is considered the most preferred site for the Sai O Trunk Sewer SPS given the environmental benefits and comparatively less environmental dis-benefits.
- 2.3.9 In the process of developing the preferred design option for the SPS (**Section 2.3.10** refers), the site footprint and location of the proposed SPS building have been modified from Location 8 into Location 8A as indicated in **Appendix 2.1**. In order to optimise the preferred location, the SPS building has been moved further away from Nin Ming Road and sit alongside the aboveground structures of Sai O Offtake and Pigging Station at the corner of the preferred vacant land. Location 8A allows the SPS building to be positioned in such a way that is most compatible with the surrounding landscape and visual context and greater room for landscape planting to enhance the landscape quality and block the view from the main road as detailed in **Section 2.3.11**, which could in turn minimise the landscape and visual impact to the maximum practicable extent. Location 8A has therefore been selected as the preferred location for the Sai O Trunk Sewer SPS that could best avoid impacts on area of conservation importance and natural habitats of higher ecological value, and avoid / minimise the potential adverse environmental impacts associated with the SPS (e.g. noise, odour, visual) while achieving a comparatively better environmental performance.

#### Design Options

- 2.3.10 The major environmental impacts associated with the Sai O Trunk Sewer SPS would be odour and fixed plant noise impacts from its operation and visual impact from the aboveground structures. Different design features (e.g. underground plant facilities, minimising the building bulk, appropriate façade and boundary treatments, etc.) were considered in the process of developing the preferred design option for the SPS from the original design option presented in the Project Profile submitted for the Application for EIA Study Brief (Application No. ESB-281/2014)



(**Appendix 2.2**), with an aim to avoid / minimise the potential impacts on the nearby sensitive receivers to the maximum practicable extent without compromising operational requirements of the proposed SPS. The preferred design option adopted was optimised from the original design that it has retained beneficial features of the original design that could improve the overall environmental performance of the SPS and also incorporated other advantageous features in order to minimise the potential environmental impacts on the nearby sensitive receivers to the maximum practicable extent.

2.3.11 Similar to the original design option, the preferred design option has adopted the typical design of submersible type pumping station to reduce the scale and size of above-ground structure of the SPS. To avoid adverse odour and fixed plant noise impacts, all the underground and aboveground equipment / components of the SPS will be enclosed within reinforced concrete structure with soundproof door and ventilated via deodorization unit and equipped with silencers or other acoustic treatment equipment at ventilation openings. Similar to landscape and aesthetic design of the original design option, the preferred design option has been designed to blend into the existing environment of the Project site and screen the view of the proposed SPS from the public path with aesthetically designed fence wall treated with planters and vegetation. Building façades, roof slab and fence walls would be treated with planters and vegetation while the surface of the SPS would be covered with wall tiles to harmonize with the earthy landscape to echo with the surrounding natural environment.

2.3.12 In addition to the beneficial features of the original design as described above, the preferred design option also includes the following advantageous features to further avoid/minimise the potential environmental impacts on the nearby sensitive receivers to the maximum practicable extent:

- Apart from the enclosed design of SPS, the loading/unloading area in the alternative scheme has been enclosed to confine any potential environmental nuisances from the loading and unloading activities during the SPS operation.
- Building bulk of the SPS has been reduced by about 16% with the adoption of submersible type pumping station together with the compacted design and thereby minimising the potential visual impact from the new superstructure.
- Site footprint has been modified and compacted design of SPS has been adopted to allow the SPS building to be moved further away from Nin Ming Road and sited alongside the aboveground structures of Sai O Offtake and Pigging Station at the corner of the vacant land, and be positioned in such a way that is most compatible with the surrounding landscape and visual context, hence minimising the potential landscape and visual impact from the new superstructure.
- The area of excavation works required for the underground wells/chambers would be reduced as compared to the original design since deeper underground structures with smaller plan area would be adopted in the design, hence minimising the potential visual impact from the excavation works.
- With the whole SPS building being moved to the northern part of the site (alongside to the northern boundary wall of the existing Sai O Offtake and Pigging Station), the southern part of the site (next to Nin Ming Road) could therefore be preserved for landscape planting to improve the existing landscape quality and provide screen planting to block the view of the SPS from the main road.

## **2.4 Construction Method and Sequence**

2.4.1 The proposed Sai O Trunk Sewer SPS is a single storey building with basement. It would be constructed using shallow foundation (e.g. footing foundation) and cast in-situ construction method. The major construction works would involve site clearance, soil excavation, steel fixing and concreting, backfilling, E&M installations and pipework, finishing and landscape works. The construction activities would be carried out in phased sequence in conjunction with the overlapping of some activities such that the construction duration could be shortened and potential adverse cumulative impacts from concurrent construction activities would be avoided.

## **2.5 Construction Programme**

2.5.1 The construction of the Project is planned to commence in year 2021 Q4 for completion, commissioning, and operation in year 2024 Q2.

## **2.6 Concurrent Project**

2.6.1 Based on the available information at the time of this EIA preparation, "Sai Sha Road Widening" would be carried out adjacent to the Project site from Q1 of 2018 to Q4 of 2023, as such cumulative construction phase environmental impacts are expected.

2.6.2 A school with recreational area is proposed at various lots in D.D.167 and adjoining government land, Nai Chung to the north of Nin Ming Road under the approved planning application no. A/MOS/125. Since no confirmed construction programme of the planned educational development is available at time of the preparation of this EIA, potential cumulative environmental impacts associated with this planned development have not been taken into account.

2.6.3 Comprehensive Residential and Commercial Development with Government, Institution or Community Facilities is proposed along Sai Sha Road at Tai Po Town Lot 157 and Various Lots in D.D. 165, D.D. 207 and D.D. 218 and Adjoining Government Land, Sai Sha, Shap Sz Heung under the approved planning application nos. A/NE-SSH/120 and A/NE-SSH/120-1. Since no confirmed construction programme of the planned comprehensive development is available at time of the preparation of this EIA, potential cumulative environmental impacts associated with this planned development have not been taken into account.

## **3 KEY FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT**

### **3.1 Air Quality Impact**

3.1.1 Potential air quality impacts associated with the construction and operational phases of the project have been assessed in accordance with the criteria and guidelines as stated in the requirements given in Section 3.4.1 and Appendix B of the *EIA Study Brief*, as well as Annexes 4 and 12 of *EIAO-TM*. The assessment area for air quality impact assessment covers the area within 500m from the boundary of the Project site.

3.1.2 Potential air quality impacts from the construction works of the Project would mainly be related to fugitive dust generated from wind erosion of the excavated areas and stockpiles as well as construction activities such as site clearance, excavation, backfilling. Given the small scale of the construction works, with the implementation

of sufficient dust suppression measures as stipulated under the *Air Pollution Control (Construction Dust) Regulation (Cap. 311R)* and good site practices, construction dust impacts are not expected to be significant on the surrounding air sensitive receivers. Requirements of *Air Pollution Control (Construction Dust) Regulation* and *EPD's Recommended Pollution Control Clauses for Construction Contracts* are proposed to be incorporated into the contract.

- 3.1.3 Odour emission from the proposed pumping station would be the main concern during the operational phase. Air ventilated from the enclosed structure of the proposed SPS should be treated by deodorising unit with odour removal efficiency of at least 99.5% in terms of target odour species, i.e. H<sub>2</sub>S, before discharging to the atmosphere. The exhaust outlet of the deodorising unit would be located away from the nearby air sensitive receivers as far as practicable, i.e. facing east of the Sai O Trunk Sewer SPS. With incorporation of the proposed odour control measures in the design of the SPS, no adverse odour impact would be anticipated during operation of the proposed SPS.

## 3.2 Noise Impact

- 3.2.1 Potential noise impacts associated with the construction and operational phases of the project have been assessed in accordance with the criteria and guidelines as stated in the requirements given in Section 3.4.2 and Appendix C of the *EIA Study Brief*, as well as Annexes 5 and 13 of the *EIAO-TM*. The assessment area for noise impact assessment covers the area within 300m from the boundary of the Project site.
- 3.2.2 Construction noise is expected from the use of Powered Mechanical Equipment (PME) during various construction activities, such as site clearance, excavation, substructure works, superstructure works, fitting out works and landscape works for the proposed Sai O Trunk Sewer SPS. Noise impact arising from construction activities of the Project was assessed. With proper implementation of the proposed mitigation measures, including adoption of good site practices, use of quiet PME, movable noise barriers/acoustic mats and proper scheduling of noisy construction activities, the mitigated cumulative construction noise levels from the Project and nearby concurrent project at all representative noise sensitive receivers (NSRs) in the vicinity of the Project work site would range from 59 to 74 dB(A), complying with the noise criteria set out in the *EIAO-TM*.
- 3.2.3 The noise impact associated with the operation of the Project was assessed. Based on the plant design information, the predicted fixed plant noise levels at all the representative NSRs would be comply with the criteria with the implementation of mitigation measures including provision of silencers or other acoustic treatment equipment at the outlet of the ventilation fans and exhaust fan of the deodorising unit.

## 3.3 Water Quality Impact

- 3.3.1 The water quality impact assessment has been conducted in accordance with the requirements in Annexes 6 and 14 of the *EIAO-TM* and the requirements in Section 3.4.3 and Appendix D of the *EIA Study Brief*. The Study area for water quality impact assessment covered the Tolo Harbour and Channel Water Control Zone (WCZ) as designated under Water Pollution Control Ordinance (*WPCO*), including inland water bodies in the area within 500m from the Project site and downstream of the emergency discharge.

- 3.3.2 Minor water quality impact would be associated with land-based construction. Impacts may result from uncontrolled discharge of wastewater from general construction activities, construction site runoff, accidental spillage, and sewage from on-site construction workers. Impacts could be controlled to comply with the WPCO standards by implementing the recommended mitigation measures. No unacceptable water quality impact would be expected during the construction phase of the Project with the proper implementation of the recommended mitigation measures.
- 3.3.3 Potential water quality impacts during the operational phase would be mainly associated with emergency discharge from the proposed Sai O Trunk Sewer SPS due to pumps/parts failure and interruption of the electrical power supply. Precautionary measures and designs to safeguard the normal operation of the SPS, facilitate immediate actions to recover normal operation of the SPS in case of irregularities, and temporarily store sewage in case of complete power outage / plant failure, including provision of dual power supply, standby pumps, twin rising mains system, mechanically raked bar screen (which safeguards the equipment downstream from being damaged by large objects), remote monitoring system, regular maintenance and inspections, and 2-hour emergency storage, would be provided to avoid the occurrence of any emergency discharge. Sewage will be tanked away as necessary as a last resort to maximise buffer for emergency storage as far as practicable in case the power outage / plant failure cannot be recovered in time. Any incident of emergency bypass from the SPS would follow EPD's "A Guide on Reporting Sewage Bypass Incidents in Sewage Pumping Stations and Sewers" and DSD's "Contingency Plan for Incidents Possibly Encountered in Sewage Treatment Facilities having a Potential of Generating an Environmental Nuisance" ("Contingency Plan"). The Contingency Plan details the procedures to promptly notify relevant Government Departments (e.g. EPD) in the event of emergency overflow that may pollute water sensitive receivers close to the proposed SPS or cause other environmental nuisance as soon as possible within 24 hours of the incident and to conduct joint investigation with EPD to assess the impacts as well as to work out mitigation measures to reduce impact to the environment and public health and to interact with the community if necessary. With the incorporation of the recommended precautionary measures, emergency discharge of sewage would be prevented to the maximum practicable extent and the potential impact would be short-term in the unlikely event that an emergency discharge does occur. No unacceptable water quality impact would be expected during the operational phase of the Project.

### **3.4 Waste Management Implication**

- 3.4.1 The wastes impact assessment has been conducted in accordance with the criteria and guidelines as stated in the requirements given in Section 3.4.4 and Appendix E of the *EIA Study Brief*, as well as Annexes 7 and 15 of the *EIAO-TM* and relevant waste legislation and guidelines.
- 3.4.2 Construction and Demolition (C&D) materials will be generated from excavation and demolition activities during construction phase. A total volume of C&D materials to be generated from the Project was estimated to be approximately 7,350 m<sup>3</sup>, with approximately 6,390 m<sup>3</sup> of inert C&D materials and 960 m<sup>3</sup> of non-inert C&D materials.
- 3.4.3 Inert C&D materials from the above construction works would be sorted and reused as filling material as much as possible. It is expected that approximately 1,500 m<sup>3</sup> of inert C&D materials would be reused on-site as backfill materials and approximately 4,890 m<sup>3</sup> of surplus inert C&D materials would require to be

disposed of. The surplus would be transported and disposed of at public filling area for use as filling material by other projects. Non-inert C&D materials would be recycled as far as possible before disposed to strategic landfill. Opportunities to minimise the generation and maximise the reuse of C&D materials would be continually investigated during the detailed design and construction phases. With the implementation of the recommended good site practices and mitigation measures for the handling, transportation and disposal of the identified waste arising, no adverse environmental impacts would be anticipated.

3.4.4 Small quantities of other waste materials, including general refuse and chemical waste would also be generated throughout construction. 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.

3.4.5 The main waste types to be generated during the operational phase would be screenings, which would be similar in nature to general refuse, and the collected screenings be disposed of at strategic landfill. Provided that proper handling procedures and disposal method are adopted, adverse environmental impacts are not expected during the operational phase.

### **3.5 Land Contamination**

3.5.1 The land contamination assessment has been conducted in accordance with the criteria and guidelines as stated in the requirements given in Section 3.4.4 and Appendix F of the *EIA Study Brief*, as well as Section 3.1 of Annex 19 of the *EIAO-TM*.

3.5.2 Based on the site appraisal, no current or historical potentially contaminating land uses / activities were identified within the Project site and therefore adverse land contamination impact arising from Project is not anticipated. No further land contamination assessment (including SI works and submission of CAP, CAR and RAP) as well as EM&A requirements are considered necessary for the Project.

### **3.6 Ecological Impact (Terrestrial and Aquatic)**

3.6.1 The Ecological Impact Assessment has been conducted in accordance with the relevant requirements as specified in Section 3.4.6 and Appendix H of the *EIA Study Brief*, as well as Annexes 8 and 16 of the *EIAO-TM*. The assessment area for the purpose of ecological impact assessment shall include areas within 500 m distance from the boundary of the Project and areas likely to be impacted by the Project.

3.6.2 A total of 12 habitat types were identified within the assessment area, including woodland, mixed woodland, plantation, shrubland, grassland, developed area / wasteland, natural watercourse, modified watercourse, mangrove, rocky shore, sandy shore and intertidal mudflat. The woodland, mixed woodland and the intertidal habitats within the assessment area are considered to have moderate ecological value while the other habitats are of low or low to moderate ecological value. 6 flora and 19 fauna species of conservation importance were recorded in the assessment area. The Project site is a shrubland of low ecological as it is derived by recolonisation of an abandoned land by weedy vegetation and under frequent disturbance. A mammal species of conservation importance, Japanese Pipistrelle (*Pipistrellus abramus*), was identified within the Project site in the previous surveys conducted in 2015-2016, no species of conservation importance was recorded in the recent surveys conducted in 2018-2019.

- 3.6.3 A total of approximately 0.35 ha shrubland within the Project site would be permanently lost. Given the small size and low ecological value of the affected habitat, the direct impact is considered minor. Construction site runoff, deterioration of water quality and other disturbance impacts resulting from the construction works would have potential indirect impact on nearby natural habitats (e.g. intertidal, mangrove, shrubland, etc.). With the implementation of good site practice and control / mitigation measures for water quality impacts and other construction disturbance (e.g. dust, noise), no adverse residual ecological impact would be anticipated from the Project.

### 3.7 Hazard to Life

- 3.7.1 A Quantitative Risk Assessment (QRA) has been carried out to assess the risk to life associated with the nearby town gas installations (i.e. Sai O Offtake and Pigging Station and two high pressure town gas pipelines) during the construction stage and operation stage of the Project. The results showed that both the individual risks and societal risks from Sai O Offtake and Pigging Station to the Project comply with the *Risk Guidelines* given in Annex 4 of the *EIAO-TM*.
- 3.7.2 A review has been conducted to assess the risk to life associated with the Ma On Shan Water Treatment Work during the construction stage and operation stage of the Project. The review showed that the risk to life from the Ma On Shan Water Treatment Work to the Project was insignificant and therefore not a key issue with respect to the *Risk Guidelines* given in Annex 4 of the *EIAO-TM*.

### 3.8 Landscape and Visual Impact

- 3.8.1 A landscape and visual impact assessment has been carried out in accordance with Section 3.4.8 and Appendix I of the *EIA Study Brief*, Annexes 10 and 18 of the *EIAO-TM*, and *EIAO Guidance Note No.8/2010*.
- 3.8.2 During the construction phase, the key sources of landscape and visual impacts would mainly due to the construction of the proposed Sai O Trunk Sewer SPS including associated temporary works and removal of existing vegetation. During construction, 21 nos. of existing trees would be retained in-situ. Nevertheless, 65 nos. of existing trees within the proposed works boundary would be felled. To compensate the loss of greenery, 65 nos. of new trees are proposed on-site for compensation. To replenish the loss of greenery, vertical green wall and green roof are also proposed. The scale of development is considered medium as the works are localized and at low level. Generally, there would not be any potential blockage of view during construction. With the implementation of mitigation measures including preservation of trees, compensatory tree planting, control of night-time lighting glare, erection of decorative screening hoarding, careful management of construction activities and facilities, as well as reinstatement of temporarily disturbed landscape areas, no unacceptable residual landscape and visual impacts from the construction of the Project would be anticipated.
- 3.8.3 During the operational phase, the operation of the proposed Sai O Trunk Sewer SPS would be the key sources of landscape and visual impacts. With the recommended mitigation measures including proposed tree and shrub planting to soften the proposed SPS, aesthetically pleasing design of the proposed SPS, as well as provision of green roof and vertical greening, no unacceptable residual landscape and visual impacts from the operation of the Project would be anticipated. While some adverse effects were predicted, these can be eliminated, reduced or offset to a large extent by specific measures. It is therefore concluded

that the landscape and visual impacts are acceptable with the implementation of the recommended mitigation measures.

### **3.9 Cultural Heritage**

- 3.9.1 A cultural heritage impact assessment has been carried out in accordance with Section 3.4.9 of the *EIA Study Brief* and Annexes 10 and 19 of the *EIAO-TM*.
- 3.9.2 No archaeological potential or built heritage resources were identified within 300m from the site boundary of the Project. No cultural heritage impact is anticipated from the construction or operation of the Project.

## **4 ENVIRONMENTAL MONITORING AND AUDIT (EM&A)**

- 4.1.1 Environmental Monitoring and Audit (EM&A) requirements and regular site inspection and audits for air quality, noise, water quality, waste management, ecological (terrestrial and aquatic), and landscape and visual impacts have been recommended during construction phase whilst commissioning tests and / or EM&A requirements for air quality and noise impacts have been recommended during operation phase to ensure that the recommended mitigation measures are properly implemented. The EM&A requirements under construction and operation phases are specified and detailed in the EM&A Manual.

## **5 CONCLUSION**

- 5.1.1 The findings of the EIA provided information on the nature and extent of the environmental impacts likely to arise from the construction and operation of the proposed Sai O Trunk Sewer SPS. The EIA has, where appropriate, identified mitigation measures to ensure compliance with environmental legislation and standards.
- 5.1.2 Overall, the EIA concluded that the Project would comply with the requirements of the *EIA Study Brief* and *EIAO-TM* with the implementation of the proposed mitigation measures during the construction and operational phases of the Sai O Trunk Sewer SPS. The schedule of implementation of the proposed mitigation measures has been provided in the EIA Report. An EM&A programme has also been recommended to check the effectiveness of the proposed mitigation measures.