



Proposed Interim Sewage Treatment Plant and Effluent Reuse Facility at Wo Shang Wai, Yuen Long

Executive Summary

June 2018

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1 Introduction

In March 2005, the Project Proponent, Profit Point Enterprises Limited, acquired a development site in Yuen Long at Wo Shang Wai. A comprehensive residential development was proposed at the site, of which the Environmental Impact Assessment (EIA) report was approved on 31 July 2008 (AEIAR-120/2008). An environmental permit (EP) was granted on 9 September 2008 (EP-311/2008) for the construction and operation of the development.

Under the approved EIA report, it is understood that a number of sewage projects have been proposed to upgrade the existing system in North West New Territories. As such, it was anticipated that domestic effluent generated from the development would be discharged via public sewer and a dedicated sewage treatment plant (STP) on-site was considered not necessary. However, the implementation programme of the government sewerage system is currently uncertain.

Therefore, an interim STP on-site is proposed as a temporary measure to handle the sewage generated from the development before the availability of public sewerage connection, which is considered to be the long term measure for the residential development. The reclaimed water is expected to be fully reused on-site for toilet flushing and irrigation. The Project will be decommissioned after the development is connected to the planned public sewerage system.

2 Project Description

2.1 Location of the Project

The proposed STP is located within the Comprehensive Development at Wo Shang Wai, Yuen Long (hereafter referred as WSW development), and the effluent reuse system will be located on the basement level within the STP. The WSW development is bounded by Castle Peak Road – Mai Po and San Tin Highway to the east, with fish ponds to the north, Wo Shang Wai Village to the south-west, and residential developments (i.e., Royal Palms and Palms Spring) to the south. The location of the Project is shown in **Figure 2.1**.

2.1.1 Project Layout and Components

The STP is a 1-storey high building structure with effluent reuse facility located in the basement of the building, the footprint of the STP building is about 225 m². The height of the building structure is anticipated to be approximately 11.40mPD with formation level to be approximately -4.9mPD. The basement level of the proposed interim STP is expected to connect with the basement level of the WSW Development. The effluent reuse facility will comprise of the following:

- Equalization tank;
- Reclaimed water storage tank
- Anoxic tank;
- Aerobic / membrane tank;
- An ultraviolet (UV) steriliser;
- Sludge tank;
- Treated effluent collection tank;
- Emergency storage tank; and
- Associated pumping facilities and piping network.

The STP will be designed generally in accordance with EPD's Guidelines for the Design of Small Sewage Treatment Plant.

All pipes and fittings used for reclaimed water supply and associated distribution system will be in a specific colour (to be determined during detailed design stage) for distinguishing from the ones used for fresh water supply.

2.1.2 Effluent Process Technology and Standard

Membrane Bioreactor (MBR) technology has been proposed for sewage treatment, with a capacity of 1,446m³/d. MBR is a combined system of biological treatment and microfiltration process, which is capable of generating high quality effluent. The treated effluent from MBR process will undergo ultraviolet (UV) disinfection, which will serve as second disinfection barrier to ensure *E.coli* level in the effluent be reduced to non-detectable level. Subsequently, sodium hypochlorite solution will be added to the UV-disinfected effluent to maintain the total residual chlorine level. The STP will be designed to meet the reuse water quality standards recommended in the "Water Supplies Department Inter-departmental Working Group on the Implementation of Reclaimed Water Supply in Sheung Shui and Fanling" for non-potable uses. Sludge generated from the treatment process will be transported for offsite disposal every day.

2.2 Measures for Effluent Reuse to avoid Potential Health Impacts

As mentioned in **Section 1**, reclaimed water will only be used for toilet flushing and landscape irrigation. Pipes for reclaimed water will be easily differential from potable water pipes to avoid incorrect connections and contamination of potable water pipes. The EIA study has identified a range of engineering and management measures to prevent cross contamination, as summarized below:

- Each type of water (i.e., potable, toilet flushing and irrigation) will be stored in clearly labelled storage tanks and pipes with different colour;
- Non-return valves will be installed on pipes;
- Inspection and water sampling will be conducted regularly to identify any possible cross connection and non-compliance of reuse criteria;
- An Operation and Maintenance Manual clearly stating all precaution measures, of which operators must strictly follow, will also be included in the WSW Development Management Manual;
- Provide training to future land owners, management and operation staff; and
- Operators of landscape irrigation will be required to wear protective gears.

With the implementation of the aforementioned measures, potential health impacts are not anticipated.

2.3 Consideration of Alternative and Selection of Preferred Options

In order to minimise construction footprint and potential environmental impacts on nearby sensitive uses, the interim STP is proposed to be located within the WSW Development. Potential locations for the Project within the WSW Development were primarily identified with the aim of minimising disruption to the development's master layout plan (MLP). Four options were identified and the environmental benefits and dis-benefits of each were compared, as summarised in **Table 2.1** below. With due consideration to the associated environmental impacts and impact on the WSW Development's MLP, Option 4 was selected as the preferred option.

Table 2.1: Summary of Alternative Siting and Layout of the Project

Options	Environmental Benefits	Environmental Dis-benefits
Option 1 <i>Open space south-west of the WSW Development</i>	<ul style="list-style-type: none"> • Minimal disturbance to the MLP. 	<ul style="list-style-type: none"> • Close proximity to sensitive receivers situated in between WSW housing blocks and is anticipated to cause disturbances to nearby residents. • Obstruction of committed visual and ventilation corridor under the WSW Development.
Option 2 <i>Next to WSW site entrance</i>	<ul style="list-style-type: none"> • Integration with original E&M buildings and minimise visual impacts. • Located further away from majority of the sensitive receivers, minimising air and noise impacts. 	<ul style="list-style-type: none"> • Located far away from sewage collection and reclaimed water distribution, which will require additional pumping facilities and associated infrastructure. Thus, not energy efficient. • Cumulative noise impacts with XRL's ventilation building.
Option 3 <i>Near or integrate with WSW Clubhouses</i>	<ul style="list-style-type: none"> • Avoid potential additional visual impact from a new superstructure. • Relatively farther away from sensitive receivers. 	<ul style="list-style-type: none"> • Potential need for expansion of clubhouse footprint to accommodate the STP, potentially affecting the form and height of the clubhouse, which has been designed to be compatible with the character of the area.
Option 4 <i>E&M building of WSW Development across the clubhouses next to the boundary fencing</i>	<ul style="list-style-type: none"> • Some distance from sensitive receivers, but located centrally enough for effective sewage collection and reclaimed water distribution. 	<ul style="list-style-type: none"> • Additional superstructure with potential visual impacts.
Preferred Option: Option 4		

2.4 Construction and Decommissioning Methods

As the Project falls within the WSW Development, which has already completed site clearance and is in the process of site formation as part of the development's construction, these works will not be required in this Project. Other major construction elements will broadly include basement excavation, foundation works, superstructure construction and laying of associated piping network. Well established conventional construction methods will be adopted for these works.

Decommissioning of the STP would only involve isolation of the sewerage connections and retirement of the treatment units after the connection to the Government sewer has satisfactorily completed. No demolition works will be required.

2.5 Implementation Programme

Construction of the Project is targeted to commence in Q3 2018 and complete by 2021 in time for occupation of the WSW Development. The Project will be decommissioned once the planned public sewer on Castle Peak Road is available. However, it is to be noted that the structure of the STP and its associated infrastructure will only cease operation and will not be demolished.

3 Summary of Environmental Impacts Assessment

3.1 Air Quality

Potential air quality impacts associated with the construction and operational phase of the proposed Project have been assessed in the EIA report. Representative Air Sensitive Receivers (ASRs) within a study area of 500 m from the site boundary have been identified and assessed in accordance with Annex 4 and 12 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) as well as the requirements stipulated in Clause 3.4.3 and Appendix B of the EIA Study Brief (ESB-289/2015). Suitable mitigation measures, where necessary, are recommended to protect the nearby ASRs and to ensure that the legislative criteria and guidelines can be satisfied.

3.1.1 Construction Phase

Dust generated from construction activities is the major source of air pollution during the construction phase. Activities anticipated during the construction phase that could potentially give rise to fugitive dust emissions include earth moving, transfer of dusty material and construction of the superstructure of the STP building. Other potential sources of air quality impacts may include exhaust emissions from construction vehicles and potential odour generated from the excavation of sediment.

Given the small scale and localized nature of the STP building construction works, the potential construction phase dust emission is anticipated to be short-term and not significant; and the potential odour impact is also considered to be short-term and controllable. While the associated works of the Project which will mainly involve laying of piping for the effluent reuse facility will spread over the entire WSW Development site, the required earthworks will be minor with insignificant dust emissions. With the implementation of the recommended mitigation measures for construction dust and odour control, no adverse air quality impacts on the surrounding ASRs are anticipated during the construction phase of the Project.

3.1.2 Operation Phase

During operation phase, ASRs may be subject to potential odour impacts due to the proposed STP and sludge generated on-site. However, the proposed effluent reuse facility will be entirely underground, enclosed within the STP building and equipped with a high efficiency deodorizer. With proper operation of the STP and proposed effluent reuse facility as well as the recommended odour containment and control measures in place to confine and reduce potential odour emissions at sources, adverse odour impacts on the surrounding ASRs are not anticipated.

3.1.3 Decommissioning Phase

Upon the implementation of the public trunk sewer, the proposed STP will be decommissioned, but the structures will be retained in-situ and will not be demolished. Hence no adverse air quality impacts on the surrounding ASRs are anticipated during the decommissioning phase of the Project.

3.2 Noise Impact

3.2.1 Construction Phase

During construction phase, the potential source of noise impact is the use of Powered Mechanical Equipment (PME) for basement excavation, foundation works, superstructure construction and laying of associated piping network of the proposed STP. Potential cumulative construction noise impacts from Wo Shang Wai (WSW) development are also expected. With the vertical noise barriers along the perimeter of the WSW development site during the whole construction period of the proposed interim STP, no adverse construction noise impact is anticipated during construction phase.

Underground construction work is required for the basement level of the proposed STP. Given that the extent of the underground work is small and use of drill and blast method are not expected, no ground-borne noise impact is anticipated during construction phase.

3.2.2 Operation Phase

During operation phase, potential fixed noise impacts are expected from the operation of STP and other existing noise sources in the vicinity, including the WSW development on-site electrical and mechanical (E&M) building, Mai Po Ventilation Building (MPVB) under the XRL project and the existing STP at Royal Palm. Fixed noise sources have been assessed individually and cumulatively. With the adoption of the maximum allowable sound power levels (Max SWLs) by incorporating appropriate noise reduction design (such as acoustic louver blade or ventilation silencer, to be determined during detailed design stage), potential cumulative fixed noise impact is expected to comply with statutory requirements during operation phase. Noise commissioning test should be carried out prior to the operation of the proposed STP to ensure the compliance of the noise levels from the operation of the STP with the stipulated noise criteria.

3.2.3 Decommissioning Phase

The interim STP will be decommissioned when the WSW development is connected to the committed public sewer. The STP will only cease operation and the structure of the STP and its associated infrastructure will not be demolished. Therefore, no noise impact is anticipated during decommissioning phase.

3.3 Water Quality Impact

3.3.1 Construction Phase

For construction phase, potential water quality impacts are mainly land-based, which include construction site runoff, accidental spillage of chemicals, sewage from the construction workforce and general construction activities. With implementation of environmental best practices for construction site management as well as water pollution preventive and mitigation measures, no adverse water quality impacts are anticipated during construction phase.

3.3.2 Operation Phase

For operation phase, potential water quality impacts identified include discharge of treated sewage, emergency discharge of untreated sewage, and use of reclaimed water onsite. The interim sewage treatment plant will employ Membrane Bioreactor technology to treat the sewage generated from the WSW development and the treated effluent will be further polished by disinfection to meet the WSD water reuse standards. With treatment to the required WSD reuse standards and full use of the reclaimed water at the WSW Development, alongside preventive and contingency measures for avoidance and minimisation of treated or untreated effluent discharge to Deep Bay, no adverse water quality impacts are anticipated during operation phase. Contingency measures shall be documented in a contingency plan to be prepared by the operator of the STP. The contingency plan shall cover situations when the reclaimed water cannot meet the

proposed criteria as well as situations when the STP is out of service, and shall be implemented throughout operation of the onsite STP.

3.3.3 Decommission Phase

The decommissioning would involve only isolation of the sewerage connections to the onsite STP and retirement of the treatment units after the connection to the Government sewer has been established, while the STP building and other structural components would be retained in place. With these proposed arrangements, no adverse water quality impacts are expected during decommissioning phase.

3.4 Waste Management Implications

3.4.1 Construction Phase

The major waste types generated by the construction activities will include C&D materials from excavation works, foundation works, STP construction works; sediment from excavation works; chemical waste from maintenance and servicing of construction plant and equipment and general refuse from the workforce. Provided that all these identified wastes are handled, transported and disposed of in accordance with the relevant legislative and recommended requirements and the recommended good site practices and mitigation measures are properly implemented, no adverse environmental impact is expected during the construction phase.

3.4.2 Operation Phase

During the operation phase, the waste types generated will be screening and grits, sludge from the operation of the on-site STP, general refuse from staff, and chemical waste from regular maintenance activities. Provided that all these wastes are handled, transported and disposed of in accordance with the relevant legislative requirements and the recommended mitigation measures are properly implemented, no adverse environmental impact is expected during the operation phase.

3.4.3 Decommission Phase

The on-site STP is proposed to temporary handle the sewage generated by the WSW Development before the government sewerage network is available. Once all the sewage is connected to the permanent government sewer, the on-site STP would be decommissioned but will not be demolished. Therefore, it is anticipated that no waste will be generated during decommissioning phase.

3.5 Ecological (Terrestrial and Aquatic)

The Project site is currently a construction site dominated by developed area forming part of the WSW development. The Project site is generally not ecologically significant owing to the relatively low ecological value of the developed area, which is the dominant habitat at the Project site. Ecological impact to adjacent habitat due to air quality, noise and groundwater impact is minor owing to the minor scale of works involved. Although the fishponds within the Inner Deep Bay and WRA are important for wildlife, with the implementation of good site practices outlined in ProPECC Note PN1/94 to minimise site surface runoff from construction works areas and to control the dispersion of sediments and contaminants to inland, disturbance to offsite wetland habitats is considered negligible.

No significant ecological impact will be resulted from the operation of the Project as all potential air quality, noise and water quality impacts will be controlled to environmentally acceptable levels. No specific ecological mitigation is considered necessary for the proposed Project.

3.6 Landscape and Visual

Given that the existing site is bare land with no landscape resources and the scale of the Project is small and will be integrated into and compatible with the comprehensive development at Wo Shang Wai, the landscape

impact due to the Project is considered insubstantial for construction, operation and decommissioning phases.

No construction phase visual impact is anticipated as no visually sensitive receivers are identified during construction due to the enclosure of the site by noise barriers and screen hoardings. Planned visually sensitive receivers during operation and decommissioning phases will experience a slight adverse visual impact due to unavoidable partial views of the above-ground structure of the proposed STP.

3.7 Impact Summary

A summary of the environmental impacts for individual aspects in the EIA report is presented in **Table 3.1**.

Table 3.1: Summary of Environmental Impacts

Assessment Points	Results of Impact Prediction	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impact for Mitigation
Air Quality Impact						
Air Sensitive Receivers within 500m assessment area	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> Insignificant fugitive dust emission and construction vehicle and machine emission are anticipated. Potential odour impact from excavation of sediment is considered to be short-term and controllable with proper control measures. <p><u>Operation Phase</u></p> <ul style="list-style-type: none"> Insignificant odour impact due to the proposed STP and sludge generated on the nearby ASRs is anticipated. <p><u>Decommissioning Phase</u></p> <ul style="list-style-type: none"> No adverse air quality impacts on the surrounding ASRs are anticipated. 	<ul style="list-style-type: none"> Annex 4 and 12 of Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) Air Pollution Control Ordinance Air Pollution Control (Construction Dust) Regulation Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation 	<p><u>Construction Phase</u></p> <p>N/A</p> <p><u>Operation Phase</u></p> <p>N/A</p> <p><u>Decommissioning Phase</u></p> <p>N/A</p>	<p><u>Construction Phase</u></p> <p>N/A</p> <p><u>Operation Phase</u></p> <p>N/A</p> <p><u>Decommissioning Phase</u></p> <p>N/A</p>	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> General practices for dust control. Relevant measures stipulated in Air Pollution Control (Construction Dust) Regulation. Complete covering using plastic tarpaulin sheets of all stockpiled malodour excavated material. <p><u>Operation Phase</u></p> <p>For potential odour impact due to the proposed STP:</p> <ul style="list-style-type: none"> The STP will be totally enclosed. Negative pressure ventilation will be provided within the enclosure to avoid any fugitive odorous emission from the STP. Further odour containment will be achieved by covering or confining the sewage channels, sewage tanks, and equipment with potential odour emission. Proper mixing will be provided at the equalization and sludge holding tanks to prevent sewage septicity. Chemical or biological deodorization facilities 	<p><u>Construction Phase</u></p> <p>No adverse residual air quality impacts are anticipated.</p> <p><u>Operation Phase</u></p> <p>No adverse residual air quality impacts are anticipated.</p> <p><u>Decommissioning Phase</u></p> <p>N/A</p>

Assessment Points	Results of Impact Prediction	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impact for Mitigation
					with 99.5% odour removal efficiency will be provided to treat potential odorous emissions from the STP including sewage channels / tanks, filter press and screening facilities so as to minimize any potential odour impact to the nearby ASRs. <ul style="list-style-type: none"> The deodorization facilities should be regularly maintained so as to ensure at least 99.5% odour removal efficiency. The deodorization facilities should be designed such that the discharge point is directed away from nearby ASRs. 	
					<u>Decommissioning Phase</u> N/A	
Noise Impact						
The first layer of NSRs (nearest to the noise sources in various directions) has been selected as the assessment points within 300m assessment area.	<u>Construction Phase</u> <ul style="list-style-type: none"> Under the prevailing site condition with existing vertical noise barriers, no significant noise impact is anticipated. <u>Operation Phase</u> <p>With the adoption of the maximum allowable sound power levels for the proposed STP, no exceedances in relevant noise criteria is expected.</p>	<ul style="list-style-type: none"> Environmental Impact Assessment Ordinance (Cap. 499); Noise Control Ordinance (Cap. 400); EIAO-TM: relevant Guidance Notes under EIAO; TM on Noise from Construction Work other than Percussive Piling (GW-TM); and TM on Places other than 	<u>Construction Phase</u> N/A <u>Operation Phase</u> N/A	<u>Design Phase</u> <p>Appropriate noise reduction measures will be adopted (such as acoustic louver blade or ventilation silencers) at the noise source to ensure the required maximum allowable SWLs is achieved.</p> <u>Construction Phase</u> N/A <u>Operation Phase</u>	<u>Construction Phase</u> <ul style="list-style-type: none"> Adoption of good site practice to limit noise emission at source; Adoption of QPME; Use of Noise Enclosure/Acoustic Shed; Use of Noise Insulating Fabric; and Schedule construction works carefully to avoid overlapping of works 	<u>Construction Phase</u> <p>No adverse residual noise impacts are anticipated.</p> <u>Operation Phase</u> <p>No adverse residual noise impacts are anticipated.</p> <u>Decommissioning Phase</u> <p>No adverse residual noise impacts are anticipated.</p>

Assessment Points	Results of Impact Prediction	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impact for Mitigation
	<p><u>Decommissioning Phase</u></p> <ul style="list-style-type: none"> No adverse noise impact is anticipated. 	Domestic Premises, Public Places or Construction Sites (IND-TM).		N/A	<p>involving PME that emit loud noises.</p> <p><u>Operation Phase</u></p> <p>Noise commissioning test prior to the operation of the STP.</p> <p><u>Decommissioning Phase</u></p> <p>N/A</p>	
Water Quality Impact						
Water Sensitive Receivers within 500m assessment area	<p><u>Construction Phase</u></p> <p>With implementation of good site management practices and recommended mitigation measures, there will be:</p> <ul style="list-style-type: none"> No adverse water quality impacts due to construction site runoff No adverse water quality impacts due to accidental spillage of chemicals No adverse water quality impacts due to sewage from construction workforce No adverse water quality impacts due to general construction activities <p><u>Operation Phase</u></p> <ul style="list-style-type: none"> No adverse water quality impacts due to use of reclaimed water onsite No discharge of reclaimed water to Deep Bay Risk of untreated sewage effluent discharge to Deep Bay 	<ul style="list-style-type: none"> Environmental Impact Assessment Ordinance (Cap. 499) Water Pollution Control Ordinance (Cap. 358) Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters “No Net Increase in Pollution Load” Requirement in Deep Bay Practice Note for Professional Persons on Construction Site Drainage (ProPECC Note PN1/94) Guidelines for the Design of Small Sewage Treatment Plant. 	<p><u>Construction Phase</u></p> <p>N/A</p> <p><u>Operation Phase</u></p> <p>N/A</p> <p><u>Decommissioning Phase</u></p> <p>N/A</p>	<p><u>Construction Phase</u></p> <p>N/A</p> <p><u>Operation Phase</u></p> <p>Full onsite use of reclaimed water to avoid discharge to Deep Bay</p> <p><u>Decommissioning Phase</u></p> <p>The onsite STP would not be decommissioned until the sewerage connection to the Government sewer has been commissioned</p>	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> Adoption of good site practices and precautionary measures for inclement weather as outlined in ProPECC Note PN1/94 Proper storage of chemicals Provision of portable toilets onsite Implementation of general good site management <p><u>Operation Phase</u></p> <ul style="list-style-type: none"> Use of Membrane Bioreactor technology with ultraviolet disinfection and chlorine dosing to treat the sewage generated by the WSW Development Implementation of preventive measures for cross-contamination and mis-use of reclaimed water Contingency measures including standby power supply, alarms and 	<p><u>Construction Phase</u></p> <p>No adverse residual water quality impacts are anticipated.</p> <p><u>Operation Phase</u></p> <p>No adverse residual water quality impacts are anticipated.</p> <p><u>Decommissioning Phase</u></p> <p>No adverse residual water quality impacts are anticipated.</p>

Assessment Points	Results of Impact Prediction	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impact for Mitigation
	<p>due to emergency event is negligible</p> <p><u>Decommissioning Phase</u></p> <ul style="list-style-type: none"> No adverse water quality impacts due to decommissioning of the onsite STP 				<p>storage tank to prevent discharge of treated or untreated sewage effluent to Deep Bay</p> <p><u>Decommissioning Phase</u></p> <ul style="list-style-type: none"> Any wastewaters generated from the decommissioning process and any residual untreated sewage or reclaimed water would be pumped out and tanked away to the public sewage treatment work for offsite treatment and disposal. 	
Waste Management Implication						
Study Area	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> Inert construction and demolition (C&D) materials of about 14,000m³ will be generated from excavation; foundation; sewage treatment plant (STP) construction works; Very minor amount of non-inert C&D materials generated from excavation; foundation; STP construction works; Sediment of 800m³ will be generated from excavation works; General refuse of maximum daily arising of up to 20kg from 	<ul style="list-style-type: none"> Annexes 7 and 15 of EIAO-TM Waste Disposal Ordinance (Cap. 354); Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C); Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N); Dumping at Sea Ordinance (Cap. 466); Public Cleansing and Prevention of Nuisances Regulation (Cap. 132BK); and Land (Miscellaneous Provisions) Ordinance 	<p><u>Construction Phase</u></p> <p>N/A</p> <p><u>Operation Phase</u></p> <p>N/A</p> <p><u>Decommissioning Phase</u></p> <p>N/A</p>	<p><u>Construction Phase</u></p> <p>N/A</p> <p><u>Operation Phase</u></p> <p>N/A</p> <p><u>Decommissioning Phase</u></p> <p>N/A</p>	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> Good site practices and waste reduction measures for C&D materials The inert C&D materials should be reused on-site as fill material as far as practicable The loading, unloading, handling, transfer or storage of treated and untreated sediment should be carried out in such a manner to prevent or minimise dust emissions Handling of chemical wastes in accordance with the Code of Practice on the Packaging, 	<p><u>Construction Phase</u></p> <p>No residual impacts would be anticipated.</p> <p><u>Operation Phase</u></p> <p>No residual impacts would be anticipated.</p> <p><u>Decommissioning Phase</u></p> <p>N/A</p>

Assessment Points	Results of Impact Prediction	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impact for Mitigation
	<p>construction workforce;</p> <ul style="list-style-type: none"> Small quantity of chemical waste from maintenance and servicing of construction plant and equipment. <p><u>Operation Phase</u></p> <ul style="list-style-type: none"> The total quantity of screening and grits generated in the proposed STP is expected to be 0.075 m³/day; About 13m³/day of sewage sludge will be generated from sewage treatment plant; About 3.5 kg/day of general refuse will be generated from operation activities; Chemical waste refuse will be generated from maintenance activities. <p><u>Decommissioning Phase</u></p> <ul style="list-style-type: none"> No adverse waste impact is anticipated. 	(Cap. 28).			<p>Labelling and Storage of Chemical Wastes, and disposal of chemical wastes at licensed chemical waste recycling/ treatment facilities</p> <ul style="list-style-type: none"> Employ a reputable licensed waste collector for disposal of general refuse at designated landfill sites <p><u>Operation Phase</u></p> <ul style="list-style-type: none"> Screening and grits generated will be transferred to closed containers before transportation and disposal at designated landfill sites The collected sludge will be transported to the designated landfill site or public sewage treatment works by designated sewage tankers for disposal Employ a reputable licensed waste collector to collect general refuse on a daily basis and dispose of the general refuse at designated landfill sites Handling of chemical wastes in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes, and 	

Assessment Points	Results of Impact Prediction	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impact for Mitigation
					disposal of chemical wastes at licensed chemical waste recycling/ treatment facilities	
					<u>Decommissioning Phase</u> N/A	
Ecological Impact						
Ecological sensitive receivers, habitats and species potentially affected by the proposed works within 500m assessment area	<p><u>Construction & Decommissioning Phase</u></p> <ul style="list-style-type: none"> No direct impact on species and habitats loss is anticipated. Minor indirect impact to wetland restoration area, offsite habitats. Minor ecological impacts on the faunal species of conservation interest recorded within the Wetland Restoration Area and other offsite habitats are anticipated. <p><u>Operation Phase</u></p> <ul style="list-style-type: none"> Indirect ecological impact due to noise and odour emission is anticipated to be negligible. Indirect impact on treatment of sewage effluent to aquatic habitat is anticipated to be negligible. 	<ul style="list-style-type: none"> Forests and Countryside Ordinance (Cap. 96) Forestry Regulations (Cap. 96 sub. leg.) Wild Animals Protection Ordinance (Cap. 170) Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586) EIAO-GN No. 6/2010, 7/2010 and 10/2010 Annexes 8 and 16 of the EIAO-TM Town Planning Ordinance (Cap. 131) Town Planning Board Guideline no. 12C Hong Kong Planning Standards and Guidelines Chapter 10 	<p><u>Construction Phase</u> N/A</p> <p><u>Operation Phase</u> N/A</p> <p><u>Decommissioning Phase</u> N/A</p>	<p><u>Construction Phase</u> N/A</p> <p><u>Operation Phase</u> N/A</p> <p><u>Decommissioning Phase</u> N/A</p>	<ul style="list-style-type: none"> Given that the mitigation measures for air, noise, water, waste and landscape aspects proposed in respective sections which are indirectly beneficial to the local ecology shall be checked as part of the environmental monitoring and audit procedures during construction period as presented in the standalone EM&A Manual, no specific ecological monitoring and audit programme is considered required. 	<p><u>Construction, Operation and Decommissioning Phase</u></p> <p>Residual loss of habitat with low ecological value in the Project Area would be anticipated.</p> <p>Minor / negligible impacts on nearby wetland habitats and associated fauna would be anticipated.</p>
Landscape and Visual Impacts						
Landscape Resources (LRs) and Landscape Character Areas (LCAs) within 100 m Study Area	<p><u>Construction Phase</u></p> <p>Landscape impact is anticipated to be insubstantial and no VSRs</p>	<ul style="list-style-type: none"> Annexes 10, 11, 18, 20 and 21 EIAO-TM EIAO GN No. 8/2010 	<p><u>Construction Phase</u> N/A</p> <p><u>Operation Phase</u></p>	<p><u>Construction Phase</u> N/A</p> <p><u>Operation Phase</u></p>	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> Integration of Construction Programme with that of the WSW 	<p><u>Construction Phase</u></p> <p>Landscape impact remains insubstantial and no visual impact.</p>

Assessment Points	Results of Impact Prediction	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impact for Mitigation
and Visually Sensitive Receivers (VSRs) within the Zone of Visual Influence (ZVI)	<p>have been identified.</p> <p><u>Operation Phase</u> Landscape impact is anticipated to be insubstantial and visual impact is anticipated to be slight adverse to a small number of VSRs.</p> <p><u>Decommissioning Phase</u> Landscape impact is anticipated to be insubstantial and visual impact is anticipated to be slight adverse to a small number of VSRs.</p>		<p>N/A</p> <p><u>Decommissioning Phase</u></p> <p>N/A</p>	<p>N/A</p> <p><u>Decommissioning Phase</u></p> <p>N/A</p>	<p>Development</p> <ul style="list-style-type: none"> • Advance Planting • Dust and Erosion Control for Exposed Soil <p><u>Operation Phase</u></p> <ul style="list-style-type: none"> • Sensitive Design and Disposition • Visual Screening • Screen Planting • Enhancement Planting • Green Roofs and Vertical Greening <p><u>Decommissioning Phase</u> Same as operation phase</p>	<p><u>Operation Phase</u> Landscape impact remains insubstantial and visual impact remains slight adverse.</p> <p><u>Decommissioning Phase</u> Landscape impact remains insubstantial and visual impact remains slight adverse.</p>

4 Environmental Monitoring and Audit

An environmental monitoring and audit (EM&A) programme to check the effectiveness of the recommended mitigation measures and compliance with relevant statutory requirements should be implemented. Details of the EM&A works are given in the separately prepared EM&A Manual for the Project, with the specific EM&A requirements highlighted as follows:

Air

During construction phase, the on-going EM&A programme for the proposed WSW Development would overlap with any monitoring proposed for this Project. No monitoring during operational and decommissioning phase is required.

Noise

The extent of the STP construction works represent only a small part of the proposed WSW Development. As regular noise monitoring of the on-going EM&A programme for the proposed WSW Development would be carried out during the whole construction period of the Project, no noise monitoring is proposed under this project during the construction phase of the proposed STP.

Prior to the operation of the proposed STP, a noise commissioning test should be conducted by the Contractor to check for the compliance of the noise levels from the operation of the fixed plant with the stipulated noise criteria. No monitoring during operation and decommissioning phase is required.

Water Quality

During construction phase, regular site audits should be conducted to check the implementation of the recommended mitigation measures.

During operation phase, reclaimed water quality sampling and testing and reclaimed water supply and use monitoring should be conducted to ensure the reclaimed water quality meet the Water Supplies Department's reclaimed water standards and can be fully reused.

Waste

Throughout the construction phase of the Project, regular site inspections as part of the EM&A procedures should be carried out to determine if wastes are being managed in accordance with the Waste Management Plan (WMP). No other specific waste monitoring during operation and decommissioning phase is required.

Ecology

Given that the mitigation measures for air, noise, water, waste and landscape aspects proposed in respective sections which are indirectly beneficial to the local ecology shall be checked as part of the environmental monitoring and audit procedures during construction period as presented in the standalone EM&A Manual, no specific ecological monitoring and audit programme is considered required.

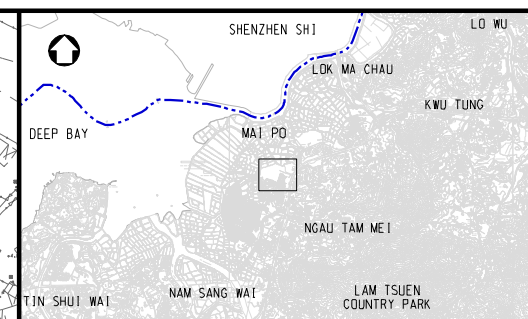
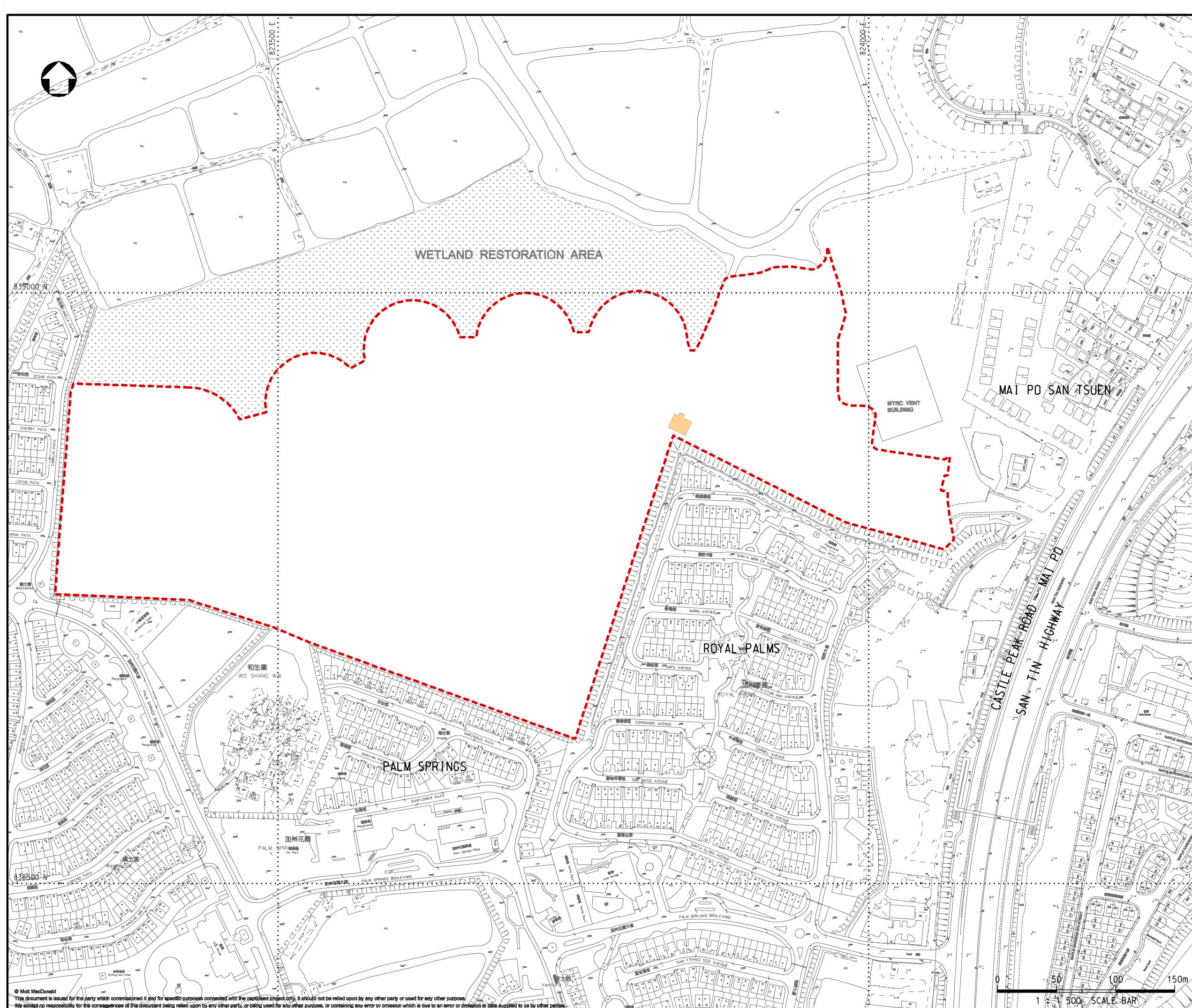
Landscape and Visual

The implementation of the proposed landscape and visual precautionary / enhancement / mitigation measures should be checked as part of the EM&A procedures during the construction phase and the first year of operation phase during the establishment period of the proposed planting.

5 Conclusion

The EIA study has identified and assessed the potential environmental impacts that may arise from the construction, operation and decommission of the Project in accordance with the guidelines of the EIAO-TM and the EIA Study Brief. Based on the results of the assessments, the EIA study concludes that the Project would be environmentally acceptable and in compliance with the environmental legislation and standards. With the implementation of the recommended environmental mitigation measures, no significant adverse residual impacts from the Project are anticipated. A comprehensive environmental monitoring and audit programme should be implemented to check the implementation of mitigation measures and environmental compliance.

Figures



LEGEND

- PROJECT BOUNDARY (COVERING THE ASSOCIATED WORKS)
- PROPOSED SEWAGE TREATMENT PLANT (ABOVE-GROUND STRUCTURE)

Rev	Date	Drawn	Description	Ch'k'd	App'd
P3	APR 17	MING	GENERAL REVISION	EY	EC
P2	JAN 17	MING	GENERAL REVISION	EY	JFP
P1	SEP 16	MING	FIRST ISSUE	EY	JFP

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Project
PROPOSED INTERIM SEWAGE TREATMENT PLANT AND EFFLUENT REUSE FACILITY AT WO SHANG WAI, YUEN LONG

Title
PROJECT LOCATION

Designed	EY	Eng check	JC
Drawn	MING	Coordination	JC
Dwg check	EY	Approved	EC
Scale at A1	1:1500	Status	PRE
Drawing Number		Rev	P3

FIGURE 2.1