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MTR Corporation Limited

Consultancy Agreement NEX/1062

# Siu Ho Wan Station and Siu Ho Wan Depot Replanning Works

## Executive Summary

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and Commercial Development Atop SHD

# 1 INTRODUCTION

## 1.1 Background

1.1.1 The 30-hectare Siu Ho Wan Depot (SHD) has been highlighted in both 2015 and 2016 Policy Address as a potential railway site which is being explored by MTR Corporation Limited (MTRCL) in collaboration with the Government to provide housing supply.

1.1.2 In the 2017 Policy Address, the Chief Executive announced the initiative to commence the statutory planning procedures for SHD this year, with the aim to provide not less than 14,000 residential units in the medium to long term.

1.1.3 The Lantau Development Advisory Committee (LanDAC) has also recommended "Strategic Economic and Housing Development" as the planning theme for the North Lantau Corridor. The proposed comprehensive development atop SHD is in line with the planning theme, which has been earmarked as one of the medium-term projects in the First-term Working Report published by LanDAC in January 2016.

1.1.4 In support of the Government's policy initiative to make better use of railway land to provide housing supply, MTRCL has commissioned a consultancy study to formulate scheme options for comprehensive residential and commercial development (hereinafter referred to as the "SHD Topside Development") to optimise the development potential of SHD. The SHD Topside Development, with a new Siu Ho Wan Station (SHO) proposed along the Tung Chung Line (TCL) to meet the transportation needs of the development and enable building of a sustainable community, is based on an indicative scheme and indicative development/implementation programme formulated for providing the reference parameters for this Environmental Impact Assessment (EIA). The arrangements for implementation will be separately considered by the Government in due course.

1.1.5 Under the indicative scheme, to facilitate the construction of the SHD Topside Development, the existing SHD will undergo replanning works to make room for the phased construction of the SHD Topside Development, while maintenance and supporting services to the existing Tung Chung Line (TCL), Airport Express Line (AEL) and Disneyland Resort Line (DRL) should be maintained without causing disruption to the normal operation. A new Siu Ho Wan Station (SHO) has been proposed along the Tung Chung Line (TCL) tracks to meet the transportation needs of the development and enable building of a sustainable community. The environmental impacts associated with the construction and operation of the proposed SHO and SHD Replanning Works (hereafter referred to as the "Project") has been assessed in this Environmental Impact Assessment (EIA) study.

## 1.2 Scope of Project

1.2.1 The Project as presented in **Figure No. NEX1062/S/SHD/ACM/Z10/101** comprises the following key elements:

- SHD Replanning Works within the existing SHD boundary;
- Construction of concrete slab which would also provide support for construction of SHD Topside Development podium decking, as well as property enabling works for SHD Topside Development;
- New SHO station and associated trackworks at existing AEL/TCL, as well as western access and local accesses; and
- Sewerage network provision outside existing SHD boundary to cater for sewage generated by the Project for treatment at the Siu Ho Wan Sewage Treatment Works.

1.2.2 The project elements, the SHO and SHD Replanning Works, are classified as the following Designated Projects (DPs) under Part I, Schedule 2 of the EIA Ordinance (EIAO):

- Item A.2 – A railway and its associated station (i.e. SHO and associated trackworks on AEL/TCL).
- Item A.4 – A railway siding, depot, maintenance workshop, marshalling yard or goods yard (i.e. the operation of SHD).

## 1.3 Environmental Impact Assessment Studies

1.3.1 This EIA study was conducted for SHO and SHD Replanning Works in accordance with the EIA Study Brief No. ESB-296/2016 issued in November 2016, and the Technical Memorandum on Environmental Impact Assessment Process (TM-EIAO).

1.3.2 The purpose of this EIA study is to provide information on the nature and extent of environmental impacts arising from the construction and operation of the Project and associated works that will take place concurrently. The information in this EIA study will contribute to decisions by the Director of Environmental Protection on:

i. the overall acceptability of any adverse environmental consequences that are likely to arise as a result of the Project;

ii. the conditions and requirements for the detailed design, construction and operation of the Project to mitigate against adverse environmental consequences wherever practicable; and

iii. the acceptability of residual impacts after the proposed mitigation measures are implemented.

Interface with SHD Topside Development EIA

1.3.3 As discussed in **Section 1.1.5**, SHD Replanning Works is proposed to facilitate the construction of SHD Topside Development and to make room for the phased construction of the SHD Topside Development, while the proposed SHO is proposed to meet the transportation needs of the SHD Topside Development and enable building of a sustainable community.

1.3.4 An EIA Study Brief (ESB-294/2016) was issued for SHD Topside Development, SHO and associated trackworks, SHD Replanning Works and associated facilities in September 2016. After the issue of the EIA Study Brief (ESB-294/2016), more design details on the SHO and SHD Replanning Works were developed. It was therefore proposed to prepare a separate EIA study for railway related works (i.e. the Project) (Railway EIA). The arrangement of this separate EIA study is to streamline the project implementation and for ease of reference of the public. Potential environmental interface issues as well as cumulative impacts have been addressed in detail collaboratively in the course of the Railway EIA and the SHD Topside Development EIA studies, and findings presented to address the requirements of corresponding EIA study briefs, i.e. ESB-296/2016 for the Project and ESB-294/2016 for SHD Topside Development.

## 1.4 Purpose of this Executive Summary

1.4.1 This Executive Summary (ES) highlights the key information and findings of this EIA study.

# 2 PROJECT DESCRIPTION

## 2.1 Site Location and History

2.1.1 The 30-hectares SHD is sited on reclaimed land in Northshore Lantau. It is delineated as "railway area" under the Railway Area Plan (RAP) which also covers AEL and TCL. The SHD has operated since 1998 for supporting the operation of the existing TCL, AEL and DRL. The existing SHD comprises stabling sidings and main depot building located in the centre of the site, permanent way facilities at the north eastern side, test track at the southern area, and other supporting facilities including maintenance workshops, utilities and drainage, ancillary buildings and facilities, traction substation and sewage pumping station, etc.

## 2.2 Purpose and Objective of the Project

2.2.1 The purpose, objective and benefits of the Project have been considered in detail in the EIA Study and are summarised as follows:

- *Supporting Government's Strategic Planning Objective:* the Project, which includes railway replanning works at the existing SHD to allow for topside development and provides a new railway station at Siu Ho Wan, is compatible with the key strategic direction of "Underscoring Compact Development" and "Optimising Land Uses" as indicated in the public engagement document (October 2016) of "Hong Kong 2030+: Towards a Planning Vision and Strategy Transcending 2030" (Hong Kong 2030+), in which it proposes to underscore transit-oriented, compact development with railway as the backbone of the public transport system and to explore more topside development respectively.
- *Supporting Government's Policy Address in Housing Supply:* The Project will optimize utilization of an existing 30-ha railway depot site for creation of land resources suitable for property development to provide as much housing as practicable for addressing issues on housing supply in phases, while the normal operation of the depot, TCL, AEL and DRL could be maintained.
- *Enhancing the Environment in Siu Ho Wan:* With isolation of industrial interface by confining the future depot operation within a concrete slab/podium deck, the surrounding local environment in the Siu Ho Wan area will be improved and more flexibility for future land use planning of the Siu Ho Wan area is anticipated. The provision of SHO along the existing TCL serving the local community in Siu Ho Wan is also in line with the transport policy of having more environmentally friendly railway as the backbone of transport network

<u>Scenario "With" and "Without" Project</u>

2.2.2 Upon completion of each stage of the SHD Replanning Works and respective phase of the SHD Topside Development, the existing land use of the Project site which is solely for industrial operation will be changed to diverse development with a mix of industrial activities, major trade or commercial activities and residential premises. The provision of SHO on TCL would also in future alleviate the traffic burden on the surrounding road network and the associated vehicular emissions and traffic noise in Siu Ho Wan area.

2.2.3 Without the Project, the existing SHD remains an open air design with some of maintenance activities within isolated buildings and most of stabling tracks as well as train washing facilities located outdoor without cover, would induce potential indirect impacts to the local environment, even though there are currently no sensitive receivers in the vicinity of existing SHD. Furthermore, without the Project would constrain the flexibility of future development planning of land uses in the Siu Ho Wan area that are sensitive to industrial land use. The provision of housing

supply through the utilization of the railway depot site could also not be achieved.

## 2.3 Consideration of Alternatives/Options

2.3.1 During the course of the EIA study, the public concern on direct impact on ecological resources, such as the Tai Ho Priority Site and the Brothers Marine Park has been taken into account during the selection of alternatives/options in the planning and conceptual design stage of the Project, such that neither temporary works area nor elements of the Project will encroach into any recognised sites of conservation importance.

2.3.2 The considerations of alternatives/options of the Project are considered in detail in the EIA Study and are summarised as follows.

Siting of Replanning Works and Replanning Sequences

2.3.3 Considering that the existing location of SHD is currently being occupied for depot operation without any natural habitats of flora and fauna on site, and any air quality and noise sensitive receiver in the immediate proximity, the SHD site is justifiable from land use suitability and technical sustainability perspectives to optimize utilization of railway land for comprehensive development purpose. Also, having the construction works on a developed area which is currently used as a railway depot will avoid potential impacts on ecological and landscape resources. In addition to significant buffer distance from ecological sensitive area such as the Tai Ho Priority Site, potential environmental impacts on existing sensitive receivers are minimal and no environmental dis-benefit is anticipated with respect to the development siting.

2.3.4 During the development of a feasible depot replanning sequences, engineering and environmental factors have been considered. Among all considerations, maintaining a safe depot operation condition without any disturbance to the operating railway is an overriding consideration. Also, it would be necessary to sequence the works such that prolonged decommissioning and reprovisioning of depot facilities could be avoided in each stage in order to achieve the short term goal for housing supply and more importantly, the planning vision in Hong Kong 2030+. Having regard to these constraints and considerations, options available for the depot replanning works would be limited. After considering all the key engineering factors including environmental factors in the option selection, the proposed 4-stage replanning option is selected as this option can minimize industrial interface issue to the largest practicable extent and also can be well respond to the constraints presented in construction planning and address the overriding needs of the depot operation.

Station Options

2.3.5 Options and alternatives of project design, as well as construction methods were reviewed and considered during selection of the preferred option of SHO along TCL, taking account of engineering feasibility, operational safety, site constraints, programme and environmental aspects. Considering the currently proposed location of SHO would have minimal impacts on the environment and public, it is selected as the preferred station option. The associated trackworks is therefore proposed according to the selected station location to allow for safe operation of the operating railway during construction.

Construction Method, Sequences and Programme

2.3.6 Similar to the development of the depot replanning schemes, maintaining a safe depot operation condition without any disturbance to the operating railway is an overriding consideration factor in the determination and selection of construction sequences and methods.

2.3.7 Apart from quieter construction method (e.g. bored piling method) will be adopted for the foundation of the SHD Topside Development, the construction of the concrete slab would also be completed as soon as possible in respective staging area such that remaining works would be conducted under the concrete slab to minimize the potential construction noise impact. The option of completing the whole concrete slab within the SHD boundary (i.e. Year 2034) before population intake at the SHD Topside Development was reviewed but considered to contradict with the prime objective of the SHD Topside Development in providing as much housing as practicable for addressing the need of housing supply. Although there would be potential impacts on earlier phases of the SHD Topside Development due to construction noise from remaining stages of the SHD Replanning Works and operational noise impacts from the existing SHD, comprehensive mitigation measure packages could be adopted to control the noise impacts to meet established noise standards. Key summary of noise assessment findings is provided in **Section 3.3**.

2.3.8 Marine transportation for construction materials and spoil during the construction phase of the Project would also be avoided as far as possible to minimize marine traffic and associated potential impacts on marine environment.

## 2.4 Details of the Project

SHO and SHD Replanning Works

2.4.1 The proposed depot replanning sequences will be carried out in stages to allow continuous and safe operation of existing TCL, AEL, DRL as well as the existing SHD. Details of the tentative depot replanning scheme is presented in **Appendix 2.1**, with the tentative layout of Reprovisioned SHD presented in **Figure No. NEX1062/S/SHD/ACM/Z10/102**. The function and area of the Reprovisioned SHD will be the same as the existing SHD. Construction of SHO will be conducted during Stage 1 SHD Replanning Works.

2.4.2 The existing sewerage system serving the SHD is required to be upgraded and reprovided for the future Reprovisioned SHD and SHO. Provision of sewerage system would include installation of new sewage pumping station and additional rising mains (change from rising main to twin rising mains). The installation of new rising mains outside the existing SHD boundary would follow same alignment of existing rising main without encroachment on any sites of conservation importance in order to minimize impacts on the environment.

2.4.3 A western access road bridge connecting to the proposed Tai Ho Interchange bridge link would be required to serve SHO, Reprovisioned SHD and SHD Topside Development. Local accesses including vehicular access ramp and staircase as mean of escape (MoE) would also be provided to enhance the connectivity to SHO and SHD Topside Development.

Construction Works Areas

2.4.4 Major works areas during the construction phase of the Project include the areas of SHD Replanning Works, SHO and associated trackworks, as well as provision of sewerage system, western access and local accesses outside the existing SHD boundary. Temporary works area within the Scheme Boundary may be required for the provision of site office, temporary storage of construction materials, utility or temporary access, subject to actual site conditions and constraints, to support the construction of the Project. Locations of major works areas are indicated in **Figure No. NEX1062/S/SHD/ACM/Z10/105**.

Construction Programme

2.4.5 As an indicative reference for this EIA, the tentative construction programme of the

Project and SHD Topside Development, as well as the population intake of SHD Topside Development, is summarised in **Table 2.1**. The construction interface between the Project and SHD Topside Development is provided in **Appendix 2.2**.

### Table 2.1 Tentative Construction Programme

| SHD Replanning Works | | | | SHO and Associated Trackworks | Planned SHD Topside Development (1) | | |
|---|---|---|---|---|---|---|---|
| Stage | Works Programme(1) | | Completion of works & Operation | Works programme | Phase | Commencement of Superstructure Works | Population Intake(4) |
| | Start | Slab Completion(2) | | | | | |
| 1 | 2019 | 2023 | 2024 | 2019 – 2026(3) | 1 | 2023 | 2026-2027 |
| 2 | 2024 | 2026 | 2028 | - | 2 | 2027 | 2030 |
| 3 | 2028 | 2030 | 2032 | - | 3 | 2031 | 2034 |
| 4 | 2032 | 2034 | 2036 | - | 4 | 2032 for Phase 4a(5)<br>2035 for Phase 4b & 4c | 2035 - 2038 |

Notes:
(1) The foundation of SHD Topside Development including piling and excavation works will be conducted in parallel with replanning works in respective phasing.
(2) Upon completion of concrete slab in respective phasing area, the contractor(s) of SHD Topside Development would be on board to commence the superstructure works.
(3) Civil construction works for SHO will be completed in 2023 while building services (BS) and electrical and mechanical (E&M) works will be conducted in 2024-2026. Operation of SHO would commence in 2026.
(4) Population intake year of different phases of SHD Topside Development is shown in **Appendix 2.3**.
(5) Phase 4a SHD Topside Development is located above Stage 3 SHD Replanning Works.

# 3 KEY FINDINGS OF ENVIRONMENTAL IMPACT ASSESSMENT

## 3.1 Approach to the EIA

3.1.1 The EIA process provides a means of identifying, assessing and reporting the environmental impacts associated with the construction and operation of the Project based on the engineering design information available at this stage. It is an iterative process that has been followed in parallel with the design process to identify the potential environmental effects of various design options, and develop alternatives as well as mitigation measures to be incorporated into the design, construction and operation of the Project. Public concerns have also been considered and incorporated into the design and EIA process where appropriate. Mitigation measures have been recommended to avoid some potential environmental impacts, while others are minimized or mitigated to acceptable levels.

3.1.2 The findings of this EIA study have determined the likely nature and extent of the following environmental impacts predicted to arise from the construction and operation of the Project:

- Air Quality;
- Noise;
- Water Quality;
- Sewerage and sewage treatment;
- Waste Management;
- Land Contamination;
- Landscape and Visual; and
- Hazard to Life.

## 3.2 Air Quality

Assessment Scope and Key Criteria

3.2.1 Assessment of potential air quality impacts on air sensitive receivers (ASRs) arising from the construction and operation of the Project has been conducted in accordance with the criteria and guidelines as stated in Annexes 4 and 12 of the TM-EIAO as well as the requirements given in Clause 3.4.4 of the ESB-296/2016. The assessment for construction dust impact is within 500m study area from the Scheme Boundary and adopts quantitative assessment approach, while the assessment for air quality during operational phase of the Project adopts qualitative assessment approach in view of the nature of the Project remains unchanged.

Construction Phase

3.2.2 Potential air quality impacts from the construction works for the Project would mainly be related to construction dust from excavation, materials handling, spoil removal and wind erosion. Background concentrations from pollutants and the pollutant-emitting activities in immediate neighbourhood of the Project Site including open road traffic, construction works of SHD Topside Development, Organic waste treatment facilities (OWTF), Hong Kong International Airport (HKIA) and marine vessels have been included to evaluate the cumulative dust impact. With the implementation of mitigation measures in the Air Pollution Control (Construction Dust) Regulation such as proposed dust suppression measures, regular watering once per hour on areas with dusty surface and good site practices, the predicted dust impact at ASRs would comply with the hourly, daily and annual particulate criteria stipulated in the Air Quality Objectives (AQOs) and TM-EIAO. No adverse dust impact on the ASRs is anticipated in each stage of SHD Replanning Works. A summary of the predictions for representative air pollutants related to construction dust impact after implementation of mitigation measures is given **Table 3.1**.

**Table 3.1 Summary of Construction Dust Impact after Implementation of Mitigation Measures**

| Stage | TSP Conc. (μg/m$^3$) | RSP Conc. (μg/m$^3$) | | FSP Conc. (μg/m$^3$) | | AQO / EIAO-TM Compliance |
|---|---|---|---|---|---|---|
| | Max. 1-hour (500) | 10$^{th}$ highest 24-hour (100) | Annual (50) | 10$^{th}$ highest 24-hour (75) | Annual (35) | |
| 1 | 219 – 445 | 78 – 84 | 33 – 35 | 59 – 61 | 24 – 25 | Yes |
| 2 | 219 – 355 | 77 – 81 | 32 – 34 | 58 – 60 | 23 – 25 | Yes |
| 3 | 219 – 424 | 77 – 90 | 32 – 35 | 58 – 61 | 23 – 25 | Yes |
| 4 | 219 – 452 | 77 – 96 | 32 – 35 | 58 – 61 | 23 – 25 | Yes |

Note: Respective criterion is given in bracket.

Operation Phase

3.2.3 With the operation activities at Reprovisioned SHD same as those at existing SHD, it is anticipated that there would be no additional air quality impact arising from the operation of Reprovisioned SHD. Besides, the operation of SHO associated with emission free electric-powered rail system would result in minimal exhaust air from railway operations, and thus the air quality impact during operation phase of SHO is considered insignificant. The odour impact arising from the reprovisioned Sewage Pumping Station (SPS) would also be insignificant with proper implementation of mitigation measures. No adverse residual impact is expected during operation phase of the Project.

## 3.3 Noise

Assessment Scope and Key Criteria

3.3.1 Assessment of potential noise impacts on noise sensitive receivers (NSRs) arising from the construction and operation of the Project has been conducted in accordance with the criteria and guidelines as stated in Annexes 5 and 13 of the TM-EIAO and the Noise Control Ordinance (NCO), as well as the requirements given in Clause 3.4.5 of the ESB-296/2016. The assessment covers the NSRs within 300m study area from the Scheme Boundary.

Construction Phase

3.3.2 Construction noise associated with the use of powered mechanical equipment (PME) for different construction phases has been assessed. With the implementation of practical mitigation measures including good site management practices, use of movable noise barrier, full enclosure and use of quiet plant, the maximum predicted construction noise impact would be 75 dB(A) for noise sensitive receivers (NSRs). Hence, no unacceptable impact arising from the construction of the Project is anticipated.

Operation Phase

3.3.3 The noise impact associated with the operation of the fixed plant noise sources has been assessed. The predicted fixed plant noise levels at the representative NSRs would comply with the stipulated noise criteria based on the calculated maximum allowable SWLs for the planned equipment and the estimated sound power levels for the existing equipment. There would be no residual fixed plant noise impact with the adoption of the proposed maximum permissible sound power levels for the planned fixed plant.

3.3.4 The potential rail noise impacts associated with the operation of existing SHD and TCL/AEL will be alleviated by the provision of the mitigation measures including self-protecting building design, noise canopies and cantilever noise barrier for protecting the affected NSRs to acceptable noise levels. Alternative approaches in noise

mitigation package could be further explored by the future developers of SHD Topside Development in the detailed design stage. With the implementation of the recommended noise mitigation measures, the predicted railway noise levels at all NSRs would comply with the noise criteria, and no residual impact is anticipated. A summary of the predicted mitigated rail noise levels and summary of cumulative operational noise impact are given **Tables 3.2** and **3.3** respectively.

**Table 3.2 Summary of Mitigated Rail Noise Levels at Representative Planned NSRs**

| Assessment Scenario | Mitigated Overall Noise Levels, $L_{eq\ 30min}$ dB(A) Daytime /Evening (Night-time) | Criteria, $L_{eq\ 30min}$ dB(A) Daytime /Evening (Night-time) |
|---|---|---|
| Scenario 1A,1B & 1C | <40 - 61 (<40 – 58) for NSR with ASR C<br><40 - 46 (<40 – 44) for NSR with ASR B | 70 (60) for ASR C<br>65 (55) for ASR B |
| Scenario 2 | <40 - 57 (<40 - 57) for NSR with ASR C<br><40 - 42 (<40 - 42) for NSR with ASR B | 70 (60) for ASR C<br>65 (55) for ASR B |
| Scenario 3 | <40 - 57 (<40 - 57) for NSR with ASR C<br><40 - 49 (<40 - 49) for NSR with ASR B | 70 (60) for ASR C<br>65 (55) for ASR B |
| Scenario 4 | <40 - 60 (<40 - 60) for NSR with ASR C<br><40 - 49 (<40 - 49) for NSR with ASR B | 70 (60) for ASR C<br>65 (55) for ASR B |

**Table 3.3 Summary of Cumulative Operational Noise Levels at Representative Planned NSRs**

| Assessment Scenario | Predicted Cumulative Operational Overall Noise Levels, $L_{eq\ 30min}$ dB(A) Daytime /Evening (Night-time) | Criteria, $L_{eq\ 30min}$ dB(A) Daytime /Evening (Night-time) |
|---|---|---|
| Scenario 1A,1B & 1C | 56-65 (48-58) for NSR with ASR C<br>57 (<48 - 50) for NSR with ASR B | 70 (60) for ASR C<br>65 (55) for ASR B |
| Scenario 2 | 57-63 (49-55) for NSR with ASR C<br>56-59 (46-50) for NSR with ASR B | 70 (60) for ASR C<br>65 (55) for ASR B |
| Scenario 3 | 57-61 (51-55) for NSR with ASR C<br>54-59 (45-50) for NSR with ASR B | 70 (60) for ASR C<br>65 (55) for ASR B |
| Scenario 4 | 57-61 (51-58) for NSR with ASR C<br>53-59 (43-50) for NSR with ASR B | 70 (60) for ASR C<br>65 (55) for ASR B |

3.3.5 Based on the findings of cumulative operational noise impact assessment, the mitigated noise levels at all representative NSRs would comply with the noise criteria as stipulated in the TM-IND. It is therefore concluded that, with implementation of the recommended noise mitigation measures for fixed plant, mainline operation and train operation within SHD, there would be no adverse cumulative operational noise impacts to the NSRs.

## 3.4 Water Quality

Assessment Scope and Key Criteria

3.4.1 The potential water quality impacts have been identified and analysed for compliance with the prevailing Water Quality Objectives (WQOs) stipulated under the Water Pollution Control Ordinance (WPCO), the criteria and guidelines stated in Annexes 6 and 14 of the TM-EIAO.

3.4.2 The assessment area basically covers 500m from the Scheme boundary, and are further extended to include inland watercourses and associated water systems in the vicinity, existing and planned drainage system which potentially affected by the

Project and relevant Water Sensitive Receivers (WSRs) within the North Western WCZ.

Construction Phase

3.4.3 No marine works will be conducted during the construction of the Project, and the main source of potential water quality impact is from the land-based construction activities. Minimization of water quality impact could be achieved through implementing adequate mitigation measures and good site practices. Regular site inspections should be undertaken routinely to inspect the construction activities and works areas in order to ensure the recommended mitigation measures are properly implemented. Therefore, no adverse residual water quality impact is anticipated.

Operation Phase

3.4.4 The key source of potential impact on water quality during the operational phase will be the sewage effluent, emergency discharge from sewage pumping station, surface and road runoff from the SHO and Reprovisioned SHD, as well as accidental spillage of chemicals. With the incorporation of the precautionary measures, no emergency sewage discharge during the operation of SHO and Reprovisioned SHD is anticipated. Besides, water quality impacts associated with the non-point source discharge from the partial SHO would be minimized with proper implementation of the recommended mitigation measures. Implementation of the project would not result in adverse water quality impact.

## 3.5 Sewerage and Sewage Treatment

Assessment Scope and Key Criteria

3.5.1 The impact assessment has been carried out in accordance with the criteria and guidelines outlined in Annex 14 of the TM-EIAO, other relevant guidance note and practice guide, and the requirements given in Clause 3.4.7 of the ESB-296/2016.

Operation Phase

3.5.2 No unacceptable impact due to the cumulative sewerage generation from the Project and the SHD Topside Development on the sewerage system is anticipated. With the implementation of mitigation measures including the provision of twin rising mains, dual feed power supply, spare pumps, emergency storage and control system etc, no emergency sewage discharge during the operation of SHO and Reprovisioned SHD is anticipated.

## 3.6 Waste Management

Assessment Scope and Key Criteria

3.6.1 The potential wastes management implications have been assessed in accordance with the criteria and guidelines stated in Annexes 7 and 15 of the EIAO-TM, and the requirements given in Clause 3.4.8 of the ESB-296/2016.

Construction Phase

3.6.2 Different types of waste generated from the Project during construction phase would include Construction and Demolition (C&D) materials (from demolition works, excavation and piling works, site formation and construction of facilities and station), land-based sediments, general refuse from workforce, and chemical wastes from the maintenance of construction plant and equipment.

3.6.3 The C&D materials comprise both inert (e.g. rocks, soil, broken concrete, building debris) and non-inert components (e.g. vegetation and wood). Based on preliminary

design information, it was estimated that the total volume of C&D materials to be approximately 1,319,370 $m^3$ of inert materials and approximately 18,200$m^3$ of non-inert materials. It is also expected that there would be approximately 228 kg of general refuse generated daily and small to a few hundred litres of chemical wastes generated monthly during the construction period. With the implementation of the mitigation measures recommended, no unacceptable environmental impacts arising from storage, handling, collection, transport and disposal of wastes are expected.

3.6.4 The total volume of land-based sediment to be excavated from the Project is estimated to be approximately 21,826 $m^3$, including approximately 18,764 $m^3$ for Type 1 – Open Sea Disposal, 2,198 $m^3$ for Type 1 – Open Sea (Dedicated Sites) Disposal and 864 $m^3$ for Type 2 – Confined Marine Disposal in accordance with PNAP No. 252 (ADV-21). With the implementation of the recommended mitigation measures and the requirements of PNAP No. 252 (ADV-21), no unacceptable environment impacts would be expected from excavation, transportation and disposal of land-based sediment.

Operation Phase

3.6.5 The main waste types generated during the operation of the SHO and Reprovisioned SHD would be municipal solid waste and chemical waste from the staff, commercial operators and maintenance activities. The handling, collection, transportation and disposal practices of the identified waste generated would follow the current practices at other operating railway lines. It is anticipated that no unacceptable impacts would arise if the mitigation measures are strictly followed.

## 3.7 Land Contamination

Assessment Scope and Key Criteria

3.7.1 Potential of land contamination within the Scheme Boundary has been examined. A land contamination assessment was completed in accordance with the guidelines stated in the Annex 19 of the TM-EIAO, other relevant guidance note and practice guide, and the requirements given in Clause 3.4.10 of the ESB-296/2016.

Potential Land Contamination Issues

3.7.2 Potentially contaminated land within the Scheme Boundary has been identified in the Contamination Assessment Plan (CAP) through the site appraisal exercise. Based on the site appraisal results, 9 facilities / areas (i.e. AB2, AB3, AB6, AB8, AB9, Transformers located outside AB11, AB16, AB22 and MDB) within existing SHD have been identified as potentially contaminated and require further site investigation. Since the concerned areas are still in operation and undertaking the SI works at this stage is not feasible due to significant impact to the existing SHD operations, therefore, the SI works are recommended to be carried out after decommissioning of concerned facilities but prior to construction works at the concerned areas to confirm any contaminated area. The remediation works, if required, should be completed and RR(s) demonstrating the completion of remediation works at the area(s) (if any) confirmed with contamination will be prepared and submitted to EPD for approval prior to the commencement of construction works at the contaminated areas. After completion of remediation for any identified contaminated areas, no residual impact in respect of land contamination on the future users is anticipated.

## 3.8 Landscape and Visual

Assessment Scope and Key Criteria

3.8.1 The assessment evaluated the impacts to landscape resources and visual sensitive receivers according to EIAO GN 8/2010 and the criteria and guidelines stated in the Annexes 10 and 18 of TM-EIAO respectively, and the requirements given in Clause

3.4.11 of the ESB-296/2016.

Construction Phase

3.8.2 There is no old and valuable trees (OVT) and tree of specific conservation interest identified within the Scheme Boundary. Based on a broad brush tree survey, approximately 510 nos. existing trees, which are all common species, would be affected by the Project. Compensatory tree planting would be provided in accordance with relevant Technical Circulars where applicable to compensate for felled trees.

3.8.3 During construction phase, there would be negligible residual impact on Visual Sensitive Receivers (VSR) at Tung Chung New Town Extension Tung Chung East Development, and moderate magnitude of visual impact for VSR at North Lantau Highway, Cheung Tung Road and Vehicular Access Bridge to North Lantau Highway who view the Project at a closer distance. It is predicted that the magnitude of visual change for remaining identified VSRs is considered as small due to the longer distance from the project site.

Operation Phase

3.8.4 With the implementation of proposed mitigation measures, there would be insubstantial to moderate residual impact on Landscape Resources (LRs) and Landscape Character Areas (LCAs) in day 1 of operation and Year 10 upon reinstatement of the affected area.

3.8.5 The residual impact at VSRs during operation phase would be reduced to insubstantial to slight with the aesthetic design of aboveground structures in both Day 1 and Year 10 of operation with the implementation of proposed mitigation measures.

3.8.6 As a whole, the residual landscape and visual impacts of the Project is considered acceptable with the implementation of the recommended mitigation measures during construction and operation phases.

## 3.9 Hazard to Life

Assessment Scope and Key Criteria

3.9.1 The hazard to life assessment is conducted in accordance with the criteria and guidelines as stated in the requirements given in the Clause 3.4.9 of the EIA Study Brief, as well as Annex 4 of the TM-EIAO.

Potential Hazard to Life Issues

3.9.2 Siu Ho Wan Water Treatment Works (SHWWTW) and Sham Shui Kok Chlorine Transhipment Dock (SSK Dock) were identified as potential hazardous facilities. The SHWWTW is the Potentially Hazardous Installation (PHI) with its consultation zone (CZ) encroached into the Scheme Boundary, while the potential risk due to the operation of SSK Dock is negligible. For the SHWWTW, Quantitative Risk Assessment (QRA) has been conducted for the SHWWTW to account for the cumulative risk posed to the Project and SHD Topside Development.

**3.9.3** The criterion of Annex 4 of the TM-EIAO for Individual Risk is met with regards to the hazards to life posed by SHWWTW. The assessment results show that the cumulative societal risk for the impact from SHWWTW fall into the “As Low As Reasonably Practicable (ALARP)” region. No specific mitigation measure is required for the Project based on cost-benefit analysis. Nevertheless, precautionary measures for chlorine released from SHWWTW such as provision of emergency plan for efficient evacuation including good practice (i.e. adequate training and drills for

construction workers) during construction phase shall be implemented to further reduce the risk level.

# 4 ENVIRONMENTAL MONITORING AND AUDIT

4.1.1 The EIA Study of the Project has demonstrated its compliance with the TM-EIAO requirements. Actual impacts during the construction works will be monitored through a detailed EM&A programme. Full details of the programme are presented in a separate EM&A Manual associated with the EIA Report. The EM&A programme will provide management actions and detail the recommended mitigation measures to check the effectiveness of the recommended mitigation measures and compliance with relevant statutory criteria, thereby ensuring the environmental acceptability of the construction and operation of the Project.

# 5 CONCLUSION

5.1.1 The implementation of this Project is in line with the Government's strategic planning objective by utilizing land resources above existing depot and is compatible with 2017 Policy Address by providing as much housing as practicable to address issues on housing supply in phases. The Project would also enhance the local environment in Siu Ho Wan and allow flexibility for future land use planning of the Siu Ho Wan area.

5.1.2 This EIA Study has assessed the overall acceptability of the environmental impacts likely to arise as a result of the construction and operation of the Project, in accordance with the ESB-296/2016, TM-EIAO and other relevant guidelines and criteria. It has demonstrated the protection of the population and environmentally sensitive resources and the acceptability of any environmental impacts from this Project. The findings of EIA Study indicated that, with the implementation of the recommended mitigation measures, the Project would be environmentally acceptable and in compliance with the relevant assessment standards/criteria of the TM-EIAO. Where appropriate, EM&A mechanisms have been recommended to verify the environmental acceptability of the Project and to check the effectiveness of the recommended mitigation measures.