PROPOSED COMPREHENSIVE RESIDENTIAL AND COMMERCIAL DEVELOPMENT ATOP SIU HO WAN DEPOT

Executive Summary

July 2017

MTR ARUP

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1 INTRODUCTION

1.1 Background

1.1.1.1 Siu Ho Wan Depot (SHD, the Subject Site) has been highlighted in both 2015 and 2016 Policy Address as a potential railway site being explored by MTR Corporation Limited (MTRCL) (the Project Proponent) in collaboration with the Government to provide housing supply (the Proposed Development). In the 2017 Policy Address, the Chief Executive announced the initiative to commence the statutory planning procedures this year, with the aim to provide not less than 14,000 residential units in the medium to long term.

1.1.1.2 The Proposed Development is in line with the planning theme of "Strategic Economic and Housing Development" for the North Lantau Corridor recommended by the Lantau Development Advisory Committee (LanDAC), which has been earmarked as one of the medium-term projects in their *First-term Work Report* published in January 2016.

1.1.1.3 In support of the Government's policy initiative, the Project Proponent has commissioned a consultancy study (the Project) to formulate scheme options for comprehensive residential and commercial development (the Proposed Development Scheme) to optimise the development potential of SHD. The Proposed 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 scheme details and implementation programme may be subject to change. The arrangements for implementation of the proposed development will be separately considered by the Government in due course.

1.2 Site Location and History

1.2.1.1 The Subject Site, with an area of about 30 hectares, is located on reclaimed land in Northshore Lantau formed over 20 years ago at approximately 5 km east of Tung Chung New Town and Hong Kong International Airport (HKIA). It is bounded by an existing seawall

maintenance access road to its north, with the Lantau Airport Railway (LAR) and the North Lantau Highway (NLH) to its south (**Figure 1.1**).

1.2.1.2 SHD currently serves the TCL, Airport Express Line (AEL) and Disney Resort Line (DRL). It provides maintenance service for the TCL, AEL and DRL trains, engineering train, railway infrastructure and stabling tracks.

1.2.1.3 Surrounding environment of the Subject Site is characterised by a combination of transport infrastructure, Government facilities and natural landscape. Major land uses within 500m including Siu Ho Wan Government Maintenance Depot, Discovery Bay Tunnel Administration Building and New Lantao Bus Company Siu Ho Wan Depot, Lantau North (Extension) Country Park, and Siu Ho Wan Sewage Treatment Works (SHWSTW). The closest residents of Pak Mong Village are located at some 1.2km away.

1.2.1.4 From ecological perspective, the Subject Site is highly disturbed with low percentage of vegetation coverage limited to planted trees of common species and exotic shrub. No species of conservation importance has been recorded within the Project Area. Major sites of conservation importance within 500m include Coastal Protection Area (CPA), Lantau North (Extension) Country Park and Tai Ho Priority Site located at south of NLH, and The Brothers Marine Park (BMP).

1.3 Scope of the Project

1.3.1.1 The Proposed Development comprises residential towers situated on a podium deck over the entire SHD, along with commercial/retail facilities, schools and kindergartens, private recreational facilities and open space, car parking and loading/unloading facilities, public transport interchange (PTI), utility plant rooms and other supporting facilities.

1.3.1.2 To facilitate construction of the Proposed Development, SHD will undergo replanning to reprovision the existing facilities within the site boundary by 4 major stages to make room for construction of the concrete slab deck and property enabling works (including piling). Depot operation will be maintained at all times during the replanning works and migration process.

1.3.1.3 The proposed SHO will be located at the western position of the Proposed Development along the existing railway tracks outside the

SHD, with the station concourse integrated with the property development podium for convenient accessibility.

1.3.1.4 Major works outside the site boundary to support the Proposed Development including western access (vehicular bridge) connection to Tai Ho Interchange, eastern access connection to the future Road P1 (Siu Ho Wan Section) or existing Sham Shui Kok Drive with local road improvement during interim period, and a new sewerage connection to the SHWSTW.

1.3.1.5 The Project is classified as a Designated Project (DP) under Schedule 3 (Item 1) of the EIA Ordinance, Cap.499 (EIAO) for an engineering feasibility study of urban development covering more than 20 hectares. The following project components have been identified as DPs under Schedule 2 of the EIAO:

- An ultimate sewage pumping station (SPS) within the Subject Site to cater for sewage generated from the Proposed Development, that with an installed capacity more than 2,000m^3 per day and a boundary of which is less than 150m from an existing or planned residential area or educational institution (Item F.3(b));
- SHO and associated trackworks on AEL/TCL (Item A.2); and
- Operation of the SHD (Item A.4).

1.4 Scope of this EIA Report

1.4.1.1 An EIA Study Brief No. ESB-294/2016 has been issued by Environmental Protection Department (EPD) for the Project under the EIAO (the Study Brief). Further design details on the SHO and SHD Replanning Works have been developed after the Study Brief is issued. To streamline the project implementation and for ease of reference by the public, a separate EIA Study has been undertaken concurrently for the railway related works, i.e. SHO and SHD Replanning Works including construction of the concrete slab deck and property enabling works, under the EIA Study Brief No. ESB-296/2016 (the Railway EIA). Both EIA Reports will be reviewed together for approval under the EIAO process.

1.4.1.2 Accordingly this EIA has been focused on potential impacts associated with construction and operation of the topside development including the access roads, SPS and the sewerage connection to SHWSTW (the SHD Topside Development EIA). Potential environmental interface issues as well as cumulative impacts of railway related works and the

Proposed Development have been suitably addressed in this EIA in accordance with the Study Brief requirements.

1.5 Purpose of this Executive Summary

1.5.1.1 This Executive Summary (ES) highlights the key information and findings of the SHD Topside Development EIA Study.

2 PROJECT DESCRIPTION

2.1 Purposes and Objectives of the Project

2.1.1.1 The Project is aimed to achieve the following objectives:

- **Housing Supply by Land Use Optimisation:** The Project supports Government's housing initiative by optimising utilisation of 30ha valuable land resources for flat supply.
- **Strategic and Local Planning Frameworks:** Aligned with the planning theme of "Strategic Economic and Housing Development" recommended by LanDAC, the Project supports key strategic directions of underscoring transit-oriented, compact development, optimising land uses by exploring more topside development, and reshaping travel pattern by promoting smart urban growth with jobs closer to home, as promulgated in *Hong Kong 2030+: Towards a Planning Vision and Strategy Transcending 2030*.
- **Quality Built Environment for a New Community:** With reference to the Sustainable Building Design and Urban Design Guidelines, the Project creates a self-contained community with supporting commercial/retail, recreational, and Government, Institution and Community facilities of quality and sustainable built environment served by environmentally friendly rail transport.

"With" and "Without" the Project

2.1.1.2 With the Project, the existing SHD operation will be covered by a landscaped deck after replanning works to contain potential environmental impact and allow flexibility for future planning of sensitive uses in the area. The Proposed Development will act as a focal point of Siu Ho Wan area by providing new commercial/retail, educational, and public transport facilities to serve the local community.

2.1.1.3 Without the Project, Siu Ho Wan will remain as a low-rise industrial area with an open air depot on-site. The proposed new community and public transport facilities will not be materialised and the development potential of Siu Ho Wan area will be significantly deprived. The outcome will be wasting of valuable land resources proven to be technically feasible and suitable for housing development.

2.2 Consideration of Development Options

2.2.1 Development Scheme Design

2.2.1.1 The Proposed Development Scheme has taken into account a number of planning and design considerations in the scheme design process as follows:

- ***SHD Replanning Works and Migration Sequence*** which pose restrictions on the development phasing, structural arrangement and building dispositions. Specifically, Stage 1 of the replanning works is located within the strip of land of about 70m-wide along the southern site boundary to maintain depot operation;
- ***Sustainable Building Design Guidelines*** with respect to building separation, building setback and site coverage of greenery;
- ***Urban Design Guidelines*** with respect to building height profile and disposition, podium design, and enhancement of air circulation and visual permeability. Specifically, breezeways and visual corridors have been introduced at strategic locations across the Proposed Development. Innovative and interesting façade design will be deployed to the towers along the southern site boundary by optimising the provision of fixed window/curtain wall in the detailed design;
- ***Chlorine Hazard Associated with Siu Ho Wan Water Treatment Works*** by planning amenity area and plant room within the consultation zone of about 8,600m^2 at eastern end of the Proposed Development;
- ***Provision of Schools*** in tandem with population build-up by reserving suitable spaces on the podium deck at Phases 2 to 4 of the Proposed Development; and
- ***Public Views*** collected during the EIA study in relation to design, environmental impacts and interfaces have been duly considered.

2.2.2 Environmental Design

2.2.2.1 The Proposed Development is subject to significant traffic and rail noise impacts from NLH and LAR abutting its southern site boundary. The hierarchy of "Avoid, Minimise and Mitigate" principle has been adopted in the scheme design process to resolve environmental issues.

2.2.2.2 The Study indicates that the options of at-source noise barrier/enclosure along the NLH and building setback are considered not practicable, due to the reasons: 1) unacceptable disturbance on strategic road network, 2) space limitation, and 3) unacceptable impacts and risk on depot and train services. Low noise road surface has already been provided at NLH and Tuen Mun - Chek Lap Kok (TM-CLK) Link.

2.2.2.3 Practical and effective mitigation measures have been incorporated in the Proposed Development Scheme for noise control within acceptable levels as below:

- ***Noise Canopy*** of up to 15m-wide protruding from the southern podium façade will be installed at strategic locations to substantially shield the rail noise from the LAR.
- ***Self-protecting Building Design*** will be adopted by facing the prescribed windows of habitable rooms along the southern site boundary to the open spaces to the north. Building features such as balcony/utility platform will be deployed to further limit the angle-of-view to the noise sources where necessary. Curvilinear arrangement will be applied to the clusters of maximum 4 towers with innovative façade design to add visual interest and improve permeability.
- ***Acoustic Window and Balcony*** will be applied in the detailed design for habitable rooms subject to significant traffic noise impact to provide noise mitigation of up to 8 and 10 dB(A) respectively, based on precedent cases presented in EPD's website and the approved *Hung Shui Kiu New Development Area EIA (AEIAR-203/2016)*.

2.3 Proposed Development Scheme

2.3.1.1 The Proposed Development Scheme comprises about 108 residential towers and 3 schools situated on a podium deck (**Figure 1.2**). A building podium has been incorporated for neighbourhood shopping facilities, kindergartens, PTI, SHO concourse, internal transport facilities, private recreational facilities, utility plant room and supporting facilities etc.. The proposed development schedule summarising key development parameters is provided in **Table 1.1**.

Table 1.1 Proposed Development Schedule

Parameter	Proposed Schedule
Development Site Area	About 30ha
Number of Flats	About 14,000
Number of Blocks	108
Building Height (approx.)	+86 to +106 mPD
Podium Height (approx.)	+20.1 and +26.5 mPD
Design Population	37,800
Open Space	About 75,600 m^2
Commercial/Retail Facilities	30,000 m^2 Gross Floor Area
Educational Uses	3 x 30-Classroom Schools 4 x 6-Classroom Kindergartens
Transportation Facilities	Integrated SHO Concourse Public Transport Interchange

2.3.1.2 An ultimate SPS with underground storage tanks, with a design capacity of about 12,100m^3/day will be located at the eastern end of the Subject Site, which is identified as the only Schedule 2 DP within the Proposed Development. A new sewer comprises 450mm diameter twin rising mains of about 900m long will be constructed for connection to the SHWSTW under this Project to serve the Proposed Development.

2.3.1.3 The Project will be implemented by phase based on SHD Replanning Works progress and market conditions. As an indicative reference for this EIA, SHO and SHD Replanning Works are tentatively scheduled to take place from 2019 to 2036. Construction works for the topside development is tentatively targeted to commence in 2023 for earliest population intake in 2026, with project completion in 2038.

2.3.1.4 The Proposed Development Scheme, including but not limited to development schedule, building disposition, floor layout and implementation programme, is indicative to provide guiding principles on the design for future reference. In the project implementation stage, alternative measures/ approaches may be explored to achieve comparable environmental performance. Any changes to the project components that are not Schedule 2 DP after the approval of this EIA report, supplementary environmental assessments would be carried out as required by relevant authorities to satisfy the latest planning mechanism and other statutory requirements at that time, without the need for a new EIA.

3 SUMMARY OF ENVIRONMENTAL IMPACT ASSESSMENT

3.1 Approach to Environmental Impact Assessment

3.1.1.1 The EIA process provides a means of scoping, assessing and reporting the environmental impacts and benefits of the Project. 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 Proposed Development. Public concerns have also been duly considered and incorporated into the scheme design and EIA process where appropriate. Mitigation measures have been proposed to avoid some potential environmental impacts, or to minimise or mitigate to acceptable levels.

3.2 Air Quality

3.2.1.1 Potential air quality impacts associated with the Project have been assessed in accordance with Clause 3.4.4 and Appendix B of the Study Brief and Section 1 of Annex 4 and Annex 12 of the *Technical Memorandum on EIA Process (EIAO-TM)* to ensure compliance of the *Hong Kong Air Quality Objectives (HKAQOs)* and relevant criteria and guidelines.

3.2.2 Construction Phase

3.2.2.1 Fugitive dust generated from construction of the Project will be mainly attributed to the foundation and excavation works for the SPS, road improvement works at Sham Shui Kok Drive for the temporary eastern access connection, and wind erosion of open sites. Cumulative construction dust impacts with concurrent projects, in particular the railway related works, in form of Total Suspended Particulates (TSP), Respirable Suspended Particulates (RSP) and Fine Suspended Particulates (FSP) have been quantitatively assessed.

3.2.2.2 Air sensitive receivers (ASRs) that may be affected by construction of the Proposed Development including the future residents, namely Internal (Planned) ASRs, and the offices/industrial undertakings in the vicinity, namely External (Existing) ASRs, have been considered.

3.2.2.3 Results of the assessment have indicated that with the implementation of suitable dust mitigation measures as stipulated in the *Air Pollution Control (Construction Dust) Regulation* and good site practices, the predicted dust levels at representative ASRs would comply with

relevant HKAQOs and EIAO-TM criteria under conservative assumptions as presented in **Table 3.1**. Adverse air quality impact due to construction of the Project is therefore not anticipated.

Table 3.1: Summary of Predicted Cumulative Construction Dust Levels with Mitigation Measures (in $\mu g/m^3$)

	TSP	RSP		FSP		Compliance
	Highest 1-hr	10th highest 24-hr	Annual	10th highest 24-hr	Annual	
External (Existing) ASRs	220 - 454	78 - 96	34 - 36	58 - 62	24 - 25	Yes
Internal (Planned) ASRs	219 - 268	78 - 80	34 - 35	58 - 60	23 - 24	Yes
HKAQOs/ EIAO-TM Criteria	500	100	50	75	35	---

3.2.3 Operational Phase

3.2.3.1 Major emission sources that may affect future occupants of the topside development including vehicular emission from the surrounding road network, HKIA emission under the 3-Runway System, industrial emission from the Organic Waste Treatment Facilities (OWTF), marine emission from North Lantau Refuse Transfer Station (NLRTS), as well as fugitive dust emission from construction of the Project have been considered.

3.2.3.2 Background air quality has been extracted from EPD's regional scale model *Pollutant in the Atmosphere and the Transport over Hong Kong (PATH)* which has covered all major emission sources within Hong Kong and the Pearl River Delta Economic Zone. Nitrogen Dioxide (NO_2), RSP and FSP have been chosen as representative criteria air pollutants for the assessment.

3.2.3.3 Horizontal separation of minimum 20m has been allowed between NLH/TM-CLK Link and the residential dwellings of the Proposed Development in accordance with the *Hong Kong Planning Standards and Guidelines (HKPSG)*. Internal traffic has been largely confined within the podium to minimise potential impacts.

3.2.3.4 Results of the assessment have indicated that the predicted concentrations of key representative pollutants at representative ASRs would comply with HKAQOs under conservative assumptions as presented in **Table 3.2**. Contour maps at worst-affected levels have been prepared to demonstrate full compliance of HKAQOs within the Subject Site.

Table 3.2: Summary of Predicted Concentrations of Representative Air Pollutants during Operational Phase (in $\mu g/m^3$)

	NO_2		RSP		FSP		Compliance
	19th highest 1-hr	**Annual**	**10th highest 24-hr**	**Annual**	**10th highest 24-hr**	**Annual**	
External (Existing) ASRs	128 - 185	24 - 37	77 - 94	33 - 35	58 - 61	24 - 25	Yes
Internal (Planned) ASRs	129 - 146	23 - 26	78 - 80	33 - 33	58 - 60	23 - 24	Yes
HKAQOs/ EIAO-TM Criteria	200	40	100	50	75	35	---

3.2.3.5 Potential odour impact arising from the operation of SHWSTW, OWTF and NLRTS has been quantitatively assessed. As the SPS within the Project will be enclosed and equipped with odour control equipment, potential odour contribution to the ASRs is predicted to be negligible (less than 0.1 odour unit). Results of the assessment have indicated that the predicted odour concentrations at representative ASRs would comply with the odour criterion under conservative assumptions as presented in **Table 3.3**.

Table 3.3: Summary of Predicted Odour Concentrations (in odour units based on an averaging time of 5 seconds)

	Odour Concentration		Compliance
	With SPS	**Without SPS**	
External (Existing) ASRs	0.9 – 3.7	0.9 – 3.7	Yes
Internal (Planned) ASRs	0.5 - 1.7	0.5 – 1.7	Yes
EIAO-TM Criterion	5	5	---

3.3 Noise Impact

3.3.1.1 Potential noise impacts associated with the Project have been assessed in accordance Clause 3.4.5 and Appendix C of the Study Brief and Annexes 5 and 13 of the EIAO-TM to ensure compliance of relevant standards and guidelines.

3.3.2 Construction Noise

3.3.2.1 Noise sensitive receivers (NSRs) at initial phases of the future residents that may be affected by construction of the Proposed Development have been considered. With the closest residents at Pak Mong Village located at some 1.2km away, no external (existing) NSR will be affected.

3.3.2.2 Cumulative noise impact arising from construction of the Project, including railway related works, has been quantitatively assessed based on tentative implementation programme and Powered Mechanical Equipment inventories. Noise control measures including good site practices, barriers, quiet plants etc. would be adopted, while percussive piling would be avoided. Results of the assessment have indicated that with the recommended noise control measures in place, all NSRs within the Project would comply with relevant noise standards.

3.3.3 Road Traffic Noise

3.3.3.1 Traffic noise impact on the Proposed Development has been quantitatively assessed based on peak-hour traffic forecasts of Year 2053 (i.e. 15 years upon project completion). Internal road traffic will be largely confined within the podium.

3.3.3.2 Due consideration has been taken in the development scheme design to minimise and mitigate significant traffic noise impact from NLH. Self-protecting building design has been adopted in the Proposed Development Scheme. Acoustic window and balcony will be incorporated in the detailed scheme design, where appropriate, for traffic noise mitigation. With the noise sensitive uses at the 3 schools being effectively shielded and arrangement of noise tolerant use at some facades, compliance of relevant noise criteria as stipulated in the HKPSG can be achieved.

3.3.4 Fixed Noise

3.3.4.1 The Railway EIA has recommended proper selection of plant and adoption of acoustic treatment to ameliorate the noise generated from depot operation during interim stages of replanning works to expedite housing supply at initial phases of the Project. As the entire SHD will be decked upon completion of the replanning works, noise impact to the future residents due to depot operation will be insignificant.

3.3.4.2 Major utilities and fixed plant items, including SPS and PTI, will be suitably located with no direct line-of-sight from the future residents. Noise control measures including sound attenuators will be equipped at the ventilation louvers (including those along the SHD boundary) and fixed plant items where necessary to ensure compliance of relevant noise criteria.

3.3.5 Aircraft Noise

3.3.5.1 The Subject Site is located at over 1km from the Noise Exposure Forecast 25 (NEF25) contour under full operation of the Three-Runway

System of the HKIA, which satisfies the criterion for planning of domestic premises and educational uses as stipulated in the HKPSG.

3.3.6 Rail Noise

3.3.6.1 Rail noise impact on the Project has been quantitatively assessed, taking into account the TCL and AEL operation after track modification works for the proposed SHO and shunting noise entering/departing and within SHD.

3.3.6.2 A temporary cantilever noise barrier and canopy will be installed at the podium edge to mitigate the rail noise during interim stages of the SHD replanning works. Sections of noise canopy of up to 15m-wide protruding from the southern podium will be installed at strategic locations to substantially shield the rail noise from TCL / AEL. Coupled with the self-protecting building design adopted in the Proposed Development Scheme, compliance of relevant noise criteria can be achieved.

3.3.6.3 Cumulative fixed and rail noise assessment has been conducted. With the implementation of the recommended mitigation measures, cumulative fixed and rail noise impacts on NSRs would comply with the relevant noise criteria.

3.3.7 Helicopter Noise

3.3.7.1 According to Government Flying Services, the emergency helicopter flight path along the Siu Ho Wan section is mainly used during adverse weather conditions. Civil Aviation Department has advised that no helicopter shall fly closer than 500 feet (about 150m) to any person or structure, etc.. Based on helicopter noise source data from the operators, the predicted maximum façade noise level at the Proposed Development will be within relevant noise criterion as stipulated in the HKPSG.

3.3.8 Marine Traffic Noise

3.3.8.1 The Project does not involve any marine works and will not generate any marine traffic. As no existing or planned marine route is located within 300m, adverse marine traffic noise impact is not anticipated.

3.4 Water Quality

3.4.1.1 Potential water quality impacts associated with the Project have been assessed in accordance with Clause 3.4.6 and Appendix D of the Study Brief and Annexes 6 and 14 of the EIAO-TM to ensure compliance of relevant standards and guidelines. No dredging or marine works is required under the Proposed Development.

3.4.1.2 Major water sensitive receivers (WSRs) located in the vicinity including the BMP at about 200m to the north and Tai Ho Bay at about 270m across NLH have been considered.

3.4.2 Construction Phase

3.4.2.1 With the implementation of good site practices and mitigation measures to control construction surface runoff, adverse water quality impact on the WSRs is not anticipated.

3.4.3 Operational Phase

3.4.3.1 Sewage/effluent generated from the Project will be conveyed to SHWSTW for treatment. The proposed SPS will be designed (see below **Section 3.5**) to minimise the chance of emergency discharge. Appropriate measures such as silt traps will be incorporated in detailed design of the drainage system and road gullies. Residual water quality impact is not anticipated from operation of the Project.

3.5 Sewerage and Sewage Treatment Implications

3.5.1.1 Potential sewerage and sewage treatment implications of the Project have been assessed in accordance with Clause 3.4.7 and Appendix E of the Study Brief and the criteria and guidelines stipulated in Section 6.5 in Annex 14 of the EIAO-TM.

3.5.1.2 Sewage generated by the Proposed Development and the railway related operations (SHO and the reprovisioned SHD) is estimated to be about 12,100m^3/day and 1,229m^3/day Average Dry Weather Flow (ADWF), respectively. The Government has identified sufficient sewage treatment capacity at the SHWSTW to cater for the predicted flow.

3.5.1.3 A new sewerage system will be provided to serve the Project (see **Section 2.3.1.2**). Due consideration has been given on its design to minimise the chance of discharging untreated sewage due to failure of rising main, pump and power by adopting the following measures. No adverse impacts on water quality or ecology is anticipated from the Proposed Development.

- Twin rising mains with concrete encasing;
- 100% standby pumping capacity with spare pump stockpiled up to 50% pumping capacity;
- Dual-feed power supply;
- Emergency storage tank of up to 3-hours ADWF capacity at the ultimate SPS;
- Real-time monitoring and control system;
- Term contractor to provide 24-hour emergency repair service in case of emergency situation; and
- Qualified personnel to carry out regular inspection and routine maintenance.

3.6 Waste Management Implications

3.6.1.1 Waste management implications associated with the Project have been assessed in accordance with Clause 3.4.8 and Appendix F of the Study Brief and the criteria and guidelines stipulated in Annexes 7 and 15 respectively of the EIAO-TM.

3.6.2 Construction Phase

3.6.2.1 Waste minimisation measures such as pre-cast construction method, on-site sorting and reuse of Construction and Demolition (C&D) materials will be adopted where practicable. About 100,860m^3 and 25,240m^3 of inert and non-inert C&D materials, respectively, 1,372 tonnes of general refuse, and a few hundred litres/month of chemical wastes will be generated from construction activities.

3.6.2.2 Construction waste materials will be properly collected and stored prior to transportation, with good site practices to minimise environmental impacts. Trip-ticket system and dump trucks equipped with GPS or equivalent system will be adopted as appropriate to prevent illegal dumping. No adverse environmental implication is anticipated from construction waste generated from the Project.

3.6.3 Operational Phase

3.6.3.1 About 81 tonnes/day of Municipal Solid Waste (MSW) will be generated from upon full completion of the Proposed Development, of which about 28 tonnes will be recycled through the provision of waste separation and recycling facilities. Proper measures will be deployed to minimise environmental impacts due to treatment, handling and disposal of MSW. Chemical wastes from the SPS and school operations will be collected by licensed waste collectors. No adverse environmental implication is anticipated from wastes generated from operation of the Proposed Development.

3.7 Land Contamination

3.7.1.1 Potential land contamination impacts associated with the Project have been assessed in accordance with Clause 3.4.10 of the Study Brief and Appendix H and the guidelines as stipulated in Sections 3.1 and 3.2 of Annex 19 of the EIAO-TM.

3.7.1.2 Potential land contamination impact within the SHO and SHD Replanning Works area has been assessed under the Railway EIA. All necessary site investigation, land contamination assessment and remediation works will be carried out under the SHO and SHD Replanning Works and will be completed prior the commencement of construction works at concerned area(s) of SHO and SHD Replanning Works.

3.7.1.3 The existing and historical land uses within the proposed ultimate SPS located at eastern end of the SHD and works areas outside the site boundary (i.e. access roads and sewerage connection) have been reviewed, based on historical aerial photo, topographic map, relevant information from EPD and FSD, and site reconnaissance. No potential contaminative activities were identified and therefore potential land contamination is not anticipated.

3.8 Ecology

3.8.1.1 Potential ecological impacts associated with the Project have been assessed in accordance with Clause 3.4.11 and Appendix I of the Study Brief, and Annexes 8 and 16 of the EIAO-TM.

3.8.2 Construction Phase

3.8.2.1 The Project will not encroach into recognised sites of conservation importance in the area. Construction of the Proposed Development will only have direct impacts on urbanised/disturbed habitat of very low ecological value and plantation of low ecological value of very small extent. Percussive piling, marine works and marine traffic will be avoided to protect the BMP and Chinese White Dolphin habitat. Indirect impacts on the natural habitats due to construction activities are considered insignificant, and will be further minimised through adoption of good site practices. No adverse ecological impact is anticipated from construction of the Project.

3.8.3 Operational Phase

3.8.3.1 Potential indirect ecological impacts due to operation of the Proposed Development are considered insignificant, given the large separation distance from the natural habitats.

3.8.3.2 For marine ecological impact, given that the chances of emergency discharge of untreated sewage are minimised, no adverse impact is anticipated from operation of the Proposed Development.

3.9 Fisheries

3.9.1.1 Potential fisheries impacts associated with the Project have been assessed in accordance with Clause 3.4.12 and Appendix J of the Study Brief and the criteria and guidelines stipulated in Annexes 9 and 17 of EIAO-TM.

3.9.1.2 Results of the comprehensive study on capture fisheries, culture fisheries and sites of fisheries importance, including spawning and nursery grounds and artificial reefs, have revealed that fisheries production in the North Lantau Waters near SHD is ranked low, with the nearest spawning and nursery ground located at over 2 km away.

3.9.2 Construction Phase

3.9.2.1 There will be no loss of fishing ground or change in fishing operation location due to the Project hence adverse fisheries impact is not anticipated. Construction site runoff will be properly controlled hence impact on marine waters is anticipated to be insignificant.

3.9.3 Operational Phase

3.9.3.1 There will be no wastewater discharge during operation of the Project hence no adverse impact on the fisheries resources and fishing ground is anticipated. No fisheries-specific mitigation measure is therefore required.

3.10 Landscape and Visual

3.10.1.1 Potential landscape and visual impacts from the Project have been assessed in accordance with Clause 3.4.13 and Appendix K of the Study Brief, EIAO Guidance Note No. 8/2010, and Annexes 10 and 18 of the EIAO-TM.

3.10.1.2 The Subject Site is located within an area of low/moderate landscape value and sensitivity. Major landscape resources in the vicinity including the water body at Tai Ho Bay and woodland on slopes between NLH and Lantau North (Extension) Country Park will not be affected by the Proposed Development. Some 5 trees of common species will be affected by the road improvement works at Sham Shui Kok Drive. Potential impact on the existing tree plantations due to the proposed new sewer and access roads will be avoided as far as practicable.

3.10.1.3 Major visual corridor from Tai Ho to the sea channel between the Hong Kong Boundary Crossing Facilities Island and the BMP will not be affected by the Project. The proposed 30m-wide diagonal and 15m-wide perpendicular corridors, coupled with curvilinear building alignment, will maintain visual permeability across the Proposed Development; while the terraced-design podium enhanced with greening will marginally soften the podium edge.

3.10.1.4 Views of the Project from key visually sensitive receivers nearby are generally obstructed by existing vegetation, topography and road infrastructure. The residual impact at visually sensitive receivers, taking into account their respective sensitivities, are expect to experience insignificant to moderate visual impact during operation, with the implementation of proposed mitigation measures.

3.10.1.5 Overall, the residual landscape and visual impacts of the Project are considered acceptable with the implementation of the proposed mitigation measures and scheme design enhancement. Landscape and visual character of the Subject Site will be gradually transformed from low-rise industrial to an urban development node with greening.

3.11 Hazard to Life

3.11.1.1 A hazard-to-life assessment has been conducted in accordance with Clause 3.4.9 and Appendix G of the Study Brief and the criteria stipulated in Section 2 of Annex 4 of the EIAO-TM.

3.11.1.2 Siu Ho Wan Water Treatment Works (SHWWTW) is a potentially hazardous installation due to its chlorine storage, with a consultation zone (CZ) of about 1km-radius. About 8,600m^2 of the eastern end of the Subject Site is situated within the CZ where only amenity area and plant room will be located.

3.11.1.3 Potential risk associated with the chlorine transhipment dock at Sham Shui Kok considered insignificant as the temporary eastern access road connection is located outside the 10^{-6}/yr individual risk contour.

3.11.1.4 Results of the quantitative assessment for SHWWTW have indicated that the Project is located outside the risk 10^{-5}/yr individual risk contour which satisfies the relevant risk criterion. The societal risk curve falls within "As Low As Reasonably Practicable (ALARP)" region. No specific mitigation measure is required for the Project based on cost-benefit analysis. However, adequate emergency training and drills for construction workers within the consultation zone shall be provided as precautionary measures.

4 Environmental Monitoring and Audit

4.1.1.1 An Environmental Monitoring and Audit (EM&A) programme has been formulated for the ultimate SPS which is a DP listed under Schedule 2 of the EIAO, with details presented in the separate EM&A Manual.

4.1.1.2 The EM&A programme will provide management actions 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

5.1.1.1 This EIA Study has demonstrated overall environmental acceptability of the proposed comprehensive residential and commercial development atop Siu Ho Wan Depot, in accordance with the Study Brief (ESB-294/2016) and the EIAO-TM. The Project is expected to meet all relevant environmental standards with the implementation of suitable mitigation measures during both construction and operational stages.

5.1.1.2 The Project supports Government's policy initiatives by optimising the utilisation of existing railway land for housing supply. With reference to the Sustainable Building Design Guidelines, a technically feasible development scheme has been formulated for a self-contained community of about 14,000 residential units, supported by a new station along the Tung Chung Line for environmentally friendly transport.

5.1.1.3 By providing a landscaped deck over the entire depot site, the Project will bring environmental benefits to the community by containing the existing industrial operation, while acting as a focal point with new commercial/retail, educational and public transport facilities to allow flexibility for future land use planning of the Siu Ho Wan area which supports the Government's strategic planning direction for North Lantau.