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1. INTRODUCTION

1.1 Background

1.1.1 The Government is committed to increase the supply of land for housing development in a persistent manner to meet the keen housing demands of the public. To meet this policy objective, the sites at San Hing Road (SHR) and Hong Po Road (HPR) have been identified for potential public housing development.

1.1.2 The Proposed Development Area (PDA) mainly comprises of the SHR Site, SHR Site Extension, HPR Site, the proposed Road L7 and the realigned Hong Po Road. The PDA covers an area of about 29.7 hectares to provide about 21,600 public housing units for a total population of about 61,000.

1.1.3 The PDA falls within an area zoned "Residential (Group E)" ("R(E)") and "Green Belt" ("GB") on the approved Lam Tei and Yick Yuen Outline Zoning Plan (OZP) No. S/TM-LTYY/10 and "Residential (Group E) 1" ("R(E)1"), "GB" and "Village Type Development" ("V") and an area shown as 'Road' on the approved Tuen Mun OZP No. S/TM/35.

1.1.4 In February 2018, the Civil Engineering Development Department, commissioned Black & Veatch Hong Kong Limited (B&V) to carry out an engineering feasibility study to ascertain the engineering feasibility and environmental acceptability of the public housing developments at the identified sites (the Study).

1.1.5 The Study is a Designated Project (DP) under Schedule 3 Item 1 of the Environmental Impact Assessment Ordinance (EIAO), i.e. an engineering feasibility study of urban development projects with a study area covering more than 20 ha or involving a total population of more than 100,000. The proposed sewage pumping station (SPS) at the SHR Site is a DP under Item F.3(b), Part I, Schedule 2 of the EIAO.

1.1.6 A Project Profile (No. PP-551/2017) was submitted to the Environmental Protection Department (EPD) on 21 June 2017 for application for an EIA Study Brief in accordance with Section 5(1)(a) of the EIAO. An EIA Study Brief (EIA Study Brief No: ESB-299/2017) was issued by EPD on 4 August 2017 in accordance with Section 5(7)(a) of the EIAO.

1.1.7 The PDA is situated in Tuen Mun between Lam Tei Light Rail Transit (LRT) Station and Siu Hong LRT/ West Rail Line (WRL) Interchange Station. On the southern side of the PDA is Po Tong Ha and Tsz Tin Tsuen, while the western side is the Tsing Shan Firing Range (TSFR). The private housing site, Villa Pinada, which is a low density private residential development, is located to the north of the PDA and is situated between HPR Site and SHR Site Extension.

1.1.8 SHR Site, SHR Site Extension and HPR Site are currently used mainly for brownfield operations such as open storages, workshops, ice-making and dyeing factories, warehouses and temporary structures, etc. There are also low-rise village houses settlements, agricultural lands, graves, urns and permitted burial grounds, slopes, etc., scattering throughout the PDA. In addition, there are CLP pylons and 400kV overhead powerlines (OHL) spanning across SHR Site, SHR Site Extension and HPR Site on the southern side. SHR Site, SHR Site Extension and HPR Site are connected by Hong Po Road which is a single two-way road of about 6m wide.

1.1.9 Under the Study, the views and opinions from stakeholders and green groups had been collected. All comments collected had been compiled and analysed, which had been taken into account for the preparation of the layout for the proposed developments.

1.2 Purpose of this Executive Summary

1.2.1 The Executive Summary (ES) illustrates the key information and findings of the EIA study for the proposed developments at San Hing Road and Hong Po Road, Tuen Mun.

2. PROJECT DESCRIPTION

2.1 Objectives and Scope of Project

2.1.1 The Project aims to provide approximately 21,600 new public housing units to accommodate a total population of approximately 61,000 with associated supporting infrastructure. The Project comprises the PDA and the associated infrastructure works (collectively referred to as the "Project Site"). The location and extent of the PDA and the associated infrastructure works required to support the Project are illustrated in **Figure 2.1**.

2.1.2 The proposed site formation and infrastructure works to support the public housing developments comprise the followings:

a) Site formation works;
b) Slope works and other geotechnical works;
c) Land decontamination works;
d) Roadworks (e.g. Proposed Road L7 and the realigned Hong Po Road);
e) Waterworks (including service reservoirs);
f) Sewerage works (including a SPS);
g) Drainage works;
h) Landscaping works;
i) Public Transport Interchanges (PTIs); and
j) Other infrastructure works including utilities and road junction improvement works etc.

2.2 Need of Project

2.2.1 Housing is one of the most important livelihood issues in Hong Kong to be addressed by the Government. Hence, increasing housing supply has been one of the major focuses in the Policy Addresses for last few years. The 2011-2014 Policy Addresses had identified that increasing production of Public Rental Housing (PRH) / Subsidised Sale Flats (SSF) as well as land supply for private housing development would be a key to tackle issues arising from the raising housing demand. Various measures had been recommended with an aim to expanding the land resources, which include exploring the possibility of converting agricultural land in some parts of the New Territories, currently used for industrial purposes or temporary storage into land for housing development. In the 2018 Policy Address, the Government shared the community's aspiration about the development of brownfield sites to increase housing supply. Under the Long Term Housing Strategy 2019, the split ratio of public / private housing of 70:30 is adopted continuously, and supply target for public housing is 301,000 for ten year from 2020/21 to 2029/30.

2.2.2 To align with the Government Policy on Housing, this Project was putting forward to provide approximately 21,600 public housing units, accommodating a total population of approximately 61,000. The proposed developments would also include supporting social welfare and other facilities to serve the proposed developments. These facilities include primary schools, secondary school, kindergartens, community centre, child care centre, residential care home for the elderly, children and youth services centre, and retail, etc.

2.2.3 Of the approximately 29.7 ha of land proposed for development of public housings, schools, the proposed Road L7 and the realigned Hong Po Road etc., approximately 10.3 ha of land is currently used for various types of brownfield operations. The transition of this land being mainly used for brownfield operations into housing developments proposed under this Project could optimise the land use as well as addressing the public housing needs.

2.2.4 The PDA is currently rural area with a mixture of land uses, with brownfield operations as the predominant uses. These brownfield operations are intermingled with rural settlements and residential developments, agricultural land and vacant land, etc. The expansion in brownfield site has resulted in deterioration of the rural environmental due to the increasing

noise nuisances to the surrounding residents. In addition, the possibility of improper discharge of industrial waste water and contaminants without proper treatment into the nearby watercourses could deteriorate the water quality in the vicinity.

2.2.5 With the implementation of the proposed public housing developments, proper sewerage facilities will be provided to convey the sewage collected within the PDA to the downstream public sewerage system, thereby alleviating the impact caused by the existing brownfield operations.

2.2.6 By transforming the brownfield sites for housing developments and other associated ancillary facilities, e.g. provision of PTIs, Government, Institution or Community (GI/C) facilities and social welfare facilities and public sewerage system etc., not only the living condition at the study area would be improved, the public's expectation on provision of more traffic and transport infrastructure and G/IC facilities at the area could also be met and therefore, improving the overall living environment for the existing residents in the vicinity and future residents.

2.2.7 The proposed Road L7 and the realigned Hong Po Road will provide an alternative route for the PDA and adjacent areas, e.g. San Hing Tsuen and Tsz Tin Tsuen, to the nearby road networks, which could release the burden of the existing road linkages within the area.

2.3 Appreciation of Existing Environment

2.3.1 The PDA mainly comprises of the SHR Site, SHR Site Extension and HPR Site, the proposed Road L7 and the realigned Hong Po Road. To facilitate the developments, a number of infrastructure works including site formation, construction of public housing and schools, provision of social welfare facilities, construction of roads, drainage and sewerage, waterworks and landscaping works, etc., will be implemented.

<u>SHR Site</u>

2.3.2 The SHR Site is located to the south of San Hing Tsuen and bounded north by San Hing Road, east by Ng Lau Road and south by Hong Po Road. The site currently comprises of low-rise village houses settlements, warehouses and temporary structures. The eastern part of the SHR site falls within the Railway Protection Zone of Mass Transit Railway Corporation Limited (MTRCL).

2.3.3 The existing low-rise village houses are located very close to the brownfield sites and hence are affected by the brownfield operations to a certain extent. Other than brownfield operations and low-density residential developments, there are several drainage channels located within the SHR Site. About half of the SHR Site falls within the San Hing Tsuen Site of Archaeological Interest (SAI). CLP's 400kV OHL and the pylons and the Kei Lun Wai SAI are located to the south of SHR Site. The Tuen Mun Nullah is located on the eastern side of SHR Site.

2.3.4 The watercourses in SHR Site are now channelized with little vegetation along the banks. They act as continuations of the natural/semi-natural streams that drain water from the hillside woodland/shrubland areas and collect storm water from the nearby villages.

2.3.5 No declared monuments, proposed monuments, graded historic sites/buildings, or any Government historic sites is present within SHR Site.

<u>SHR Site Extension</u>

2.3.6 The SHR Site Extension is located between Villa Pinada and northwest boundary of SHR Site. It is currently occupied by a marble factory and squatter structures. Immediately north of SHR Site Extension is the Permitted Burial Ground No. 6 (BURGD6). The eastern edge of SHR Site Extension falls within the San Hing Tsuen SAI. No declared monuments, proposed

monuments, graded historic sites/buildings or any Government historic sites is identified within SHR Site Extension.

2.3.7 Patches of agricultural land are scattered throughout the village and open storage /workshop areas. The central bulk of SHR Site Extension comprises agricultural land/orchard.

2.3.8 There is an existing open channel running from the northwest to the south within the SHR Site Extension. A drainage channel is located to the south of the SHR Site Extension. These existing drainage channels would require proper diversion during the proposed site formation works. 400kV OHL and the pylons and the Kei Lun Wai SAI are located to the south of the SHR Site Extension, where the San Hing Tsuen SAI is located on the eastern side of the SHR Site Extension.

HPR Site

2.3.9 The HPR Site is located to the west of Villa Pinada and to the east of TSFR. To the north and west of the HPR Site are the BURGD7 and BURGD8 respectively. The HPR Site is currently occupied by open storage and orchard. A DSD adit shaft building is located to the northwest of the site.

2.3.10 There are currently two semi-natural streams running across the HPR Site, in which one is running from the north to the south and another one is running from the west to the south. The Siu Hang Tsuen SAI is located to the south of the HPR Site. No declared monuments, proposed monuments, graded historic sites/buildings or any Government historic sites is identified within HPR Site.

Other Infrastructure Works

2.3.11 The existing infrastructure and roads would need to be upgraded in order to support the proposed public housing developments. The proposed supporting infrastructure includes the construction of the proposed Road L7 and the realigned Hong Po Road which link Lam Tei Interchange and Ming Kum Road. The proposed Road L7 will provide an alternative route to the proposed development sites to diversify the traffic to different location so as to minimise the traffic impact to the surrounding road network. A small patch of woodland would unavoidably be affected by the construction of proposed Road L7.

2.3.12 Besides roadworks, a new SPS is proposed at the SHR site to collect sewage from the SHR Site, SHR Site Extension and HPR Site to the downstream sewerage system. Rising mains are proposed along Hong Po Road and Tsing Lun Road to convey sewage from the SHR SPS to the downstream sewage pumping station in Area 54, Tuen Mun (TM54 SPS).

2.3.13 The construction of the associated rising mains falls within the Kei Lun Wai SAI, while southern end of the proposed Road L7 falls within the Siu Hang Tsuen SAI.

2.3.14 The proposed fresh water service reservoir (FWSR) and salt water service reservoir (SWSR) at the HPR site would be located at the village/orchard area and adjacent to the TSFR Boundary. The proposed FWSR and SWSR will provide fresh water supply and salt water supply for the proposed public housing developments, respectively together with the existing fresh water supply infrastructure. The proposed watermains will be constructed along the existing Ming Kum Road, the proposed Road L7 and the realigned Hong Po Road, which mainly fall within the open area/village area.

2.3.15 No declared monuments, proposed monuments, graded historic sites/buildings or any Government historic sites is identified within the associated infrastructure works area.

2.4 Designated Projects

2.4.1 The Study is a DP under Schedule 3 Item 1 of EIAO, i.e. an Engineering feasibility study of urban development projects with a study area covering more than 20 ha or involving a total

population of more than 100,000. Location of DP under Schedule 2 of the EIAO and details are shown in **Figure 2.2** and **Table 2.1** respectively.

Table 2.1 Summary of Designated Project

Item Ref. No.	Ref. Category No.	Descriptions of DP under EIAO	Works Descriptions
DP1	F.3 (b) of Part 1 Schedule 2	A SPS with an installed capacity of more than 2,000 m^3 per day and a boundary of which is less than 150m from an existing or planned residential area	Construction of a SPS with a design capacity of 14,629m^3/day at SHR Site and is less than 150m from an existing / planned residential area

2.5 Project Benefits and Environmental Initiatives

Project Benefits

2.5.1 The Project aspires to turn the existing vast extent of brownfield sites including container yard, vehicle repair workshop, ice-making factory, motor services yards, workshop for woodworking and sawmill and warehouse as well as sporadic low density residential development, agricultural land and vacant land into potential land for public housing developments. These brownfield sites have created considerable environmental, traffic, visual impacts to the neighbouring communities. One of the overarching objectives of the Project is to transform these brownfield sites to more optimal uses and better land utilisation for future development of Hong Kong. The benefits of the Project are described below:

- **Alleviating scarcity of housing supply** – The Project will provide approx. 21,600 public housing units, comprising PRH and SSF, responding to the needs of community and improving the quality of life.
- **Serving a Wider Community** – Commercial and retail facilities would be provided within the proposed development sites to serve the planned population as well as the nearby community. Two PTIs would be provided, one at the SHR Site and the other at the HPR Site. These two PTIs are located near the existing villages and hence, would not only serve the proposed developments but also the nearby villagers and residents.
- **Providing "Government, Institution or Community" (G/IC) facilities** – The Project has proposed various welfare facilities and educational facilities including Child Care Centre (CCC), Special Child Care Centre (SCCC), On-site Pre-school Rehabilitation Service (OPRS) Office Base , Residential Care Home for the Elderly (RCHE), Day Care Unit (DCU), Integrated Children and Youth Services Centre (ICYSC) and Neighbourhood Elderly Centre (NEC), kindergartens, primary school and secondary school, etc (details subject to further review at detailed design stage). These facilities could help to relieve the increasing welfare and educational needs at the Tuen Mun North area as well as the needs arising from the proposed developments.

Environmental Initiatives and Benefits

2.5.2 The environmental consideration has been the key factors in the planning of the Project. Throughout the planning process, environmental impacts as well as benefits are both identified and critically considered. The Project offers potential environmental initiatives both to conserve existing environmental resources and, where opportunities exist, to enhance and upgrade the environment on various fronts. The environmental initiatives and benefits that the Project offers are summarised below:

- Improving the existing interface issues of industrial/residential uses;
- Providing proper sewerage system within the PDA;
- Encouraging green commuting within and beyond the PDA;
- Providing opportunity to clean-up the existing potentially contaminated land;

- Providing sustainable development and greening opportunities;
- Enhancing the ecological value of the retained semi-natural streams for identified species of conservation interest; and
- Providing opportunity to enhance the ecological performance of nearby area.

Improving the Existing Interface Issues of Industrial/Residential Uses

2.5.3 As present, the proliferation of brownfield operations within the PDA has created considerable environmental, traffic and visual problems. To maximize the land use for housing supply and improve the overall environment of the area, the existing brownfield operations such as workshops, warehouses and temporary structures within the PDA will be converted into housing developments. This will help alleviate the existing industrial/ residential interface issues resulting from existing brownfield operations.

Providing Proper Sewerage System within the PDA

2.5.4 Currently, there is no public sewers within the PDA, and the watercourses are still subject to discharges from scattered houses not served by public sewers. With the proposed SHR SPS and associated sewage pipes to be constructed under the Project, all the areas within the PDA will be provided with public sewers that convey the sewage to the downstream public sewage collection and treatment system. Hence, the watercourses in the vicinity are anticipated to have potential benefits from the improvement in water quality.

Encouraging Green Commuting within and beyond the PDA

2.5.5 Pedestrian walkways and cycle tracks will be constructed along the proposed Road L7 and the re-aligned Hong Po Road to promote green commuting. The proposed cycle tracks will be connected to the nearby residential areas (e.g. Tuen Mun New Town) and public transport facilities (e.g. Lam Tei LRT Station and Siu Hong LRT/WRL Interchange Station) where practicable. Upgrading/modification works to existing footbridge at Ng Lau Road and associated covered walkway are proposed to improve the walking environment and promote green commuting. All these measures are proposed to facilitate walking and cycling across the PDA and in the wider community. This would also in turn help to reduce road-based traffic and hence their associated vehicular noise and pollutants emission.

Providing Opportunity to Clean-up the Existing Potentially Contaminated Land

2.5.6 The PDA currently comprises brownfield operations including container yard, vehicle repair workshop, ice-making factory, motor services yards and warehouse, etc, which are identified as the land uses that have the potential to cause or have caused land contamination.

2.5.7 Proposed mitigation measures to clean-up the potentially contaminated land, will be carried out prior to the implementation of the proposed public housing developments. This act is to minimise the health risk to the future occupants arising from the exposure of the contaminated soil and/or groundwater. It would also provide the opportunity to reuse the treated contaminated materials into useful materials for backfilling, which results in minimising the amount of waste disposing into the depleting landfill in Hong Kong and achieving a more sustainable development.

2.5.8 Upon remediation of the contaminated land, if any, the Project will have converted previously contaminated soil and groundwater into safe and usable land fit for development, thus bringing benefits to the community at large and helping to address Hong Kong's long-term housing demand and other land use needs.

Providing Sustainable Development and Greening Opportunities

2.5.9 The woodland area along the proposed Road L7 will be preserved under the Project as far as practicable to maintain the local character, green landscape and linkage between urban and

rural areas. Besides that, green planting/greening space would be provided in the open spaces within SHR Site, SHR Site Extension and HPR Site. Screen planting would also be provided along the proposed Road L7 and the realigned Hong Po Road. Green roof and corresponding landscape work such as planting of climbers, shrubs and bamboo, etc. would be carried out for the proposed SPS, service reservoirs and proposed PTIs areas.

Enhancing the Ecological Value of the Retained Semi-natural Stream for identified Species of Conservation Interests

2.5.10 Two crab species of conservation interest, i.e. *Cryptopotamon anacoluthon* and *Somanniathelphusa zanklon* were identified at a section of semi-natural stream adjacent to HPR Site during the ecological baseline survey conducted under this Project. Apart from setting a 6m buffer zone alongside the southern bank of the retained stream section to minimize the disturbance to the two crab species due to the construction and operation of the proposed development, ecological enhancement for the retained stream section by removing existing artificial bank structures and planting of native/ self-sustaining vegetation to reinstate its natural riparian habitat is also recommended. This aims to improve the carrying capability of the semi-natural stream for the two crab species of conservation interest.

Providing Opportunity to Enhance the Ecological Performance of Nearby Area

2.5.11 Ecological enhancement by provision of not less than 1.2ha of enhancement planting has been recommended under the Project. This measure takes the opportunity to enhance the ecological performance of the off-site village/orchard habitat adjacent to the northeastern side of the HPR Site, which is currently by planting native species and turn it into a woodland habitat. It could reduce the human disturbance to the nearby ecologically sensitive semi-natural stream section, provide additional ecological buffer and increase the ecological linkage with the nearby shrubland/grassland.

2.6 Development Programme for the Project

2.6.1 In order to ensure a balanced and programmed development with orderly rehousing/relocation of qualified clearees, the implementation of the developments is proposed to be divided into 4 main stages as illustrated in **Figures 2.3a** and **2.3b**. The target for first phase of population intake of the developments is in Year 2030.

Key Developments in Stage 1

2.6.2 Stage 1 involves delivery of the proposed public housing development at SHR Site Extension with a target population intake scheduled for 2030. The construction of the realigned Hong Po Road, junction improvement works, the SPS at SHR site and other associated works are targeted to commence in 2025 for completion in 2030. Details of the proposed works to be implemented in the first stage include the following:

- Site formation and construction of public housing at SHR Site Extension;
- Construction of SPS at SHR Site and the associated rising mains;
- Upgrading of existing sewers and modification of the existing TM54 SPS;
- Construction of the realigned Hong Po Road;
- Carrying out of junction improvement works;
- Construction of the footbridge to connect SHR Site and Siu Hong LRT/WRL Interchange Station; and
- Carrying out of associated drainage works, sewerage works, and waterworks etc.

Key Developments in Stage 2

2.6.3 In Stage 2, the development would focus on the construction of the proposed Road L7 and the associated infrastructure works. It is targeted to commence the construction works in 2026

for completion by 2029. The proposed works to be implemented in the second stage include the following:

- Construction of the proposed Road L7;
- Carrying out of junction improvement works; and
- Laying of watermains along the proposed Road L7.

Key Developments in Stage 3

2.6.4 In Stage 3, site formation works for the public housing development at SHR Site is targeted to commence in 2025 for population intake planned in 2031. Besides that, the site formation and construction of schools at SHR Site are targeted to commence in 2026 for completion by 2031 to match with the population intake at SHR Site. The major site formation and associated infrastructure works in this development stage will include:

- Site formation and construction of public housing and PTI at SHR Site;
- Site formation and construction of schools at SHR Site; and
- Carrying out of associated drainage works, sewerage works, and waterworks etc.

Key Developments in Stage 4

2.6.5 In Stage 4, the public housing development at HPR Site is targeted to commence in 2026 for population intake planned in 2033. Besides that, the site formation and construction of schools at SHR Site Extension are targeted to commence in 2026 for completion by 2033 to match with the population intake at HPR Site. The major site formation and associated infrastructure works in this development stage will include:

- Site formation and construction of public housing and PTI at HPR Site;
- Site formation and construction of schools at SHR Site Extension;
- Construction of natural terrain mitigation measures at HPR Site;
- Construction of fresh/ salt water service reservoirs at HPR Site;
- Carrying out of associated drainage works, sewerage works, and waterworks etc.

3. SUMMARY OF KEY FINDINGS IN ENVIRONMENTAL IMPACT ASSESSMENT (EIA) STUDY

3.1 Approach to Environmental Impact Assessment

3.1.1 The EIA process provides a means of identifying, assessing and reporting the environmental impacts and benefits of the Project. It is an iterative process that has been undertaken 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. The views obtained from the public inspection period of the Project Profile and the consultation with the green groups have been considered and incorporated into the EIA report, where appropriate. Mitigation measures have been proposed, where required, to avoid potential environmental impacts, or to minimise impacts to acceptable levels. In addition, environmental benefits have been incorporated into the Project, where possible.

3.2 Air Quality Impact

Key Assessment Scope and Key Criteria

3.2.1 The air quality impact assessment was conducted in accordance with the requirements in Annexes 4 and 12 of the Technical Memorandum on EIA Process (EIAO-TM) and the requirements in Section 3.4.3 and Appendix B of the EIA Study Brief. The assessment area for the air quality impact is defined by a distance of 500m from the boundary of the Project Site during construction phase and 500m from the boundary of the PDA and road junction improvement works during operation phase.

3.2.2 Quantitative assessments using the relevant air models approved by EPD have been conducted for both construction and operation phases. Cumulative air quality impact has also been determined in the impact assessments.

Construction Phase

3.2.3 Potential construction dust impact would be generated from site clearance, land decontamination, site formation works and roadworks. Quantitative fugitive dust assessments have been conducted. The major concurrent projects include Site 4A (South), Site 4A (East) and Site 5 of the Tuen Mun Area 54 Development and Tuen Mun Area 29 West Development. With the implementation of mitigation measures specified in the Air Pollution Control (Construction Dust) Regulation together with the recommended dust suppression measures including watering once per hour on active works areas, exposed areas and haul roads and other site management measures such as, good site practices, and environmental monitoring and audit (EM&A) programme, the predicted Total Suspended Solid (TSP), Respiratory Suspended Solid (RSP) and Fine Suspended Solid (FSP) at representative air sensitive receivers (ASRs) would comply with the criteria stipulated in the Air Quality Objectives (AQOs) and EIAO-TM. The predicted concentrations for key representative pollutants after implementation of mitigation measures are summarised in **Table 3.1**.

Table 3.1 Summary of predicted cumulative construction dust impact (after implementation of mitigation measures)

	Pollutant Concentration (μg/m³)					Compliance
	TSP	RSP		FSP		
	1-hr	24-hr (10th highest)	Annual	24-hr (10th highest)	Annual	
Existing ASRs	202 - 434	83 - 98	36 - 46	62 - 68	25 - 27	Yes
AQOs/ EIAO-TM Criteria	500	100	50	75	35	--

Operation Phase

3.2.4 Key existing, planned and committed air pollution sources during operation phase are the vehicular emission from open sections of existing roads, proposed roads and proposed junction improvement works within the assessment area. Cumulative air quality impact at the representative ASRs would also be expected due to the background pollutant concentrations, portal emissions from the noise enclosure at Tsing Lun Road and industrial emissions from the identified chimneys within the assessment area. Key representative air pollutants include Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), RSP and FSP.

3.2.5 Quantitative assessment has been conducted and the assessment results concluded that the predicted cumulative air quality impacts in Year 2029 and Year 2033 on all ASRs would comply with the AQOs. Results in Year 2029 and Year 2033 are summarised in **Table 3.2** and **Table 3.3** respectively. Therefore, no adverse air quality impact during operation phase is anticipated.

Table 3.2 Summary of predicted concentrations of representative air pollutants during Operation phase in Year 2029

	Pollutant Concentration (μg/m³)								Compliance
	NO_2		RSP		FSP		SO_2		
	1-hr (19th highest)	Annual	24-hr (10th highest)	Annual	24-hr (10th highest)	Annual	10-min (4th highest)	24-hr (4th highest)	
Existing ASRs	104 - 139	23.7 – 37.4	82 - 89	35.6 - 37.6	62 - 67	25.3 – 26.7	n/a	n/a	Yes
Planned ASRs	104 - 128	24.3 – 36.9	83 - 86	36.0 – 36.8	62 - 64	25.6 – 26.3	122 - 145	28 - 31	Yes
AQOs/ EIAO-TM Criteria	200	40	100	50	75	35	500	125	--

Table 3.3 Summary of predicted concentrations of representative air pollutants during Operation phase in Year 2033

	Pollutant Concentration (μg/m³)								Compliance
	NO_2		RSP		FSP		SO_2		
	1-hr (19th highest)	Annual	24-hr (10th highest)	Annual	24-hr (10th highest)	Annual	10-min (4th highest)	24-hr (4th highest)	
Existing ASRs	104 - 128	23.6 – 32.6	82 - 89	35.6 - 37.6	62 - 67	25.3 – 26.7	n/a	n/a	Yes
Planned ASRs	105 - 125	24.6 – 33.2	83 - 85	36.0 – 36.5	62 - 64	25.6 – 26.1	122 - 145	28 - 31	Yes
AQOs/ EIAO-TM Criteria	200	40	100	50	75	35	500	125	--

3.2.6 Potential odour impact arising from the operation of the proposed SHR SPS and future refuse collection points (RCPs) has been assessed in this EIA. With the installation of deodourising units with 99.5% odour removal efficiency and incorporation of appropriate design measures at the proposed SHR SPS, and proper ventilation and deodorizing design system installed at the future RCPs together with implementation of good housekeeping, it is anticipated that there would be no adverse odour impact from the proposed SHR SPS and future RCPs at the nearby ASRs.

3.3 Noise Impact

Key Assessment Scope and Key Criteria

3.3.1 The noise impact assessment was conducted in accordance with the requirements set out under Annexes 5 and 13 of the EIAO-TM, and Section 3.4.4 and Appendix C of the EIA Study Brief. The assessment area for noise impact is generally defined by a distance of 300m from the Project Site (i.e. the PDA boundary and the associated infrastructure works).

Construction Phase

Construction Noise

3.3.2 Construction noise associated with the use of powered mechanical equipment (PME) for various stages of construction has been assessed. With the implementation of practical mitigation measures including good site management practices, use of Quality Powered Mechanical Equipment (QPME), use of movable noise barrier, noise enclosure and noise insulating fabric and provision of minimum separations from the affected educational institutions or avoidance of any noisy construction activities during the school examination period, the predicted construction noise impact would be 58-75 dB(A) for residential noise sensitive receivers (NSRs), 50-70 dB(A) for education institutions and 50-65 dB(A) for education institutions during school examination period. Hence, no unacceptable impact arising from the construction of the Project would be anticipated.

3.3.3 For conducting construction works close to education institution, it is recommended that the Contractor shall liaise with the school representative(s) to obtain the examination schedule so as to avoid noisy construction activities during school examination period.

Operation Phase

Road Traffic Noise

3.3.4 Operation road traffic noise impact on the representative existing and planned noise sensitive uses within and near the PDA and the junction improvement works have been predicted. To mitigate the road traffic noise impact on the existing and planned NSRs within and near the PDA and one of the junctions, a combination of noise mitigation measures has been recommended, including i) application of low noise road surfacing material along some sections of Project roads and other roads ii) construction of roadside noise barriers along some sections of project roads, iii) provision of acoustic windows for the proposed public housing buildings, iv) construction of boundary wall for the proposed welfare facilities and v) implementation of on-site noise mitigation measures at Site 5 of Tuen Mun Area 54 by Hong Kong Housing Authority. Restriction on locating the more noise sensitive welfare uses at façade facing the realigned Hong Po Road and access road in HPR Site has also been recommended. With all the proposed mitigation measures in place, the façade noise levels at all the planned NSRs would comply with the respective noise criteria. A summary of the predicted road traffic noise levels with mitigation measures in place is given in **Table 3.4**.

Table 3.4 Summary of Mitigated Road Traffic Noise Levels

Use	Predicted Mitigated Overall Noise Levels, $L_{10(1hr)}$ dB(A)	Criteria, $L10_{(1hr)}$ dB(A)
Residential	41 - 70	70
Educational Institutions	57 - 65	65

3.3.5 With the implementation of the proposed mitigation measures, the traffic noise level from Project roads would comply with the respective noise criteria and the Project road contribution to overall noise level of existing residential and educational NSRs outside PDA would be negligible.

Fixed Noise Source

3.3.6 A number of facilities have been recommended to support the operation of the proposed developments. Some of these facilities, which include the proposed SHR SPS and the two PTIs are fixed noise sources that would have potential noise impacts on NSRs. Other than these proposed fixed noise sources, there are existing fixed noise sources including rural workshops and storage sites.

3.3.7 Fixed noise source impact assessment has been conducted for all existing and planned NSRs. Noise impact from proposed fixed plant could be effectively mitigated by implementing noise mitigation measure at source. With the adoption of the proposed maximum permissible Sound Power Levels (SWLs) for the ventilation fans of proposed PTIs, the impact noise levels at the representative NSRs would comply with the relevant noise criteria. Therefore, adverse impact on the NSRs due to fixed noise sources is not anticipated.

Rail Noise

3.3.8 Rail noise impact assessment has been conducted for the planned NSRs at the SHR Site which are potentially affected by the WRL and LRT operation. With the implementation of mitigation measure in the form of provision of acoustic windows for the proposed public housing, the impact noise levels at all representative NSRs would comply with the relevant rail noise criteria. Therefore, adverse rail noise impact on the planned NSRs is not anticipated.

3.4 Water Quality Impact

Key Assessment Scope and Key Criteria

3.4.1 The water quality impact assessment was conducted in accordance with the requirements set out under Annexes 6 and 14 of the EIAO-TM, and Section 3.4.5 and Appendix D of the EIA Study Brief. The assessment area of the water quality impact includes the area within 500 m from the boundary of the Project Site.

Construction Phase

3.4.2 Water quality impacts from the construction works are associated with the general construction activities, construction site run-off, accidental spillage, and sewage effluent from construction workforce. The site practices as outlined in the ProPECCPN 1/94 "Construction Site Drainage" and the ETWB TC (W) No. 5/2005 "Protection of natural streams/rivers from adverse impacts arising from construction works" are recommended to minimise the potential water quality impacts from the construction activities. Proper site management and good site practices are also recommended to ensure that construction wastes and other construction-related materials would not enter the nearby streams. Temporary sanitary facilities would be provided on construction sites to properly collect the on-site sewage generated from the construction workers. Water quality monitoring will be implemented and regular site inspection will be conducted during construction stage to ensure that the recommended mitigation measures are properly implemented.

3.4.3 With the implementation of the recommended mitigation measures, the construction works for the Project would not result in unacceptable impacts on water quality.

Operation Phase

3.4.4 During the operation phase, all the sewage and wastewater generated from the PDA will be properly collected and discharged to the public sewerage system and conveyed to the Pillar Point Sewage Treatment Works (PPSTW) for chemically enhanced primary treatment (CEPT) prior to discharge into Urmston Road. Discharge from the PPSTW after CEPT and UV disinfection would not cause adverse water quality impact in North Western and Western Buffer waters.

3.4.5 In view of the potential emergency discharge from the proposed SHR SPS, contingency measures such as a storage tank, twin rising mains, standby pumps and dual electricity supply or backup power supply facilities would be provided at the proposed SHR SPS to minimize the risk of failure of the SPS leading to emergency discharge of untreated sewage. An emergency response plan will be formulated to minimize the impact of emergency discharges and facilitate subsequent management of the emergency. With proper implementation of the recommended mitigation measures, no unacceptable water quality impact would be expected during the operation phase of the Project. No adverse residual water quality impact is anticipated during operation phase of the Project.

3.5 Sewerage and Sewage Treatment Implications

Key Assessment Scope and Key Criteria

3.5.1 Sewerage and sewage treatment implications of the Project were evaluated and assessed in accordance with Section 3.4.6 and Appendix E of the EIA Study Brief and the criteria as stated in Annex 14 of the EIAO-TM.

Operation Phase

3.5.2 The proposed development in the PDA will generate large amount of sewage flow. New public sewerage system and the proposed SHR SPS will be constructed to collect sewage generated from the PDA and convey the collected sewage to the downstream sewerage system. According to the assessment, the PPSTW would have adequate treatment capacity to cater for the sewage flow generated from the PDA.

3.5.3 Based on the findings of this sewerage and sewage treatment impact assessment, the Project is sustainable from sewage collection, treatment and disposal perspective.

3.6 Ecological Impact

Key Assessment Scope and Key Criteria

3.6.1 The ecological impact assessment was conducted in accordance with the requirements set out under Annexes 8 and 16 of the EIAO-TM, Section 3.4.9 and Appendix H of the EIA Study Brief, EIAO Guidance Notes (6/2010, 7/2010 and 10/2010) and other relevant legislations and guidelines. The assessment area of the ecological impact includes the area within 500 m from the boundary of the Project Site.

Potential Impacts and Mitigation Measures

3.6.2 Ecological baseline was established by both literature review and 8 months programme of field surveys covering both dry and wet seasons. A total of 11 types of habitat were identified within the ecological assessment area, of which 8 types of habitats, including woodland, agricultural land, natural stream, semi-natural stream, drainage channel, village/orchard, village area and urban area were located within the Project Site where the development area and associated infrastructure works are proposed.

3.6.3 Avoidance measures were considered and incorporated during early stages of the Project. Direct encroachment onto the two identified sites of conservation interest within the assessment area, namely a mature secondary woodland (W2) near Tong Hang Road and the Conservation Area (CA) zone near Chung Shan has been avoided by the Project. An upstream section of the semi-natural stream (R1f) at HPR Site is proposed to be retained by adjusting the proposed development boundary for preservation of the localities of two crab species of conservation interest (*Cryptopotamon anacoluthon* and *Somanniathelphusa zanklon*) (See Section 8.7.7 of EIA Report).

3.6.4 Most habitats to be lost, such as agricultural land, drainage channel, village area, village/orchard and urban area are of low ecological value. Although the whole of the

woodland (W3) is rated as of medium ecological value, the affected portion is a low-quality habitat patch, and regularly disturbed by grave-sweeping activities. Hence, the potential impact due to loss of woodland is minor. The potential impacts due to loss of habitats are all anticipated to be minor (See Section 8.7.39 of EIA Report). A summary of the estimated habitat loss is given in **Table 3.5**.

Table 3.5 Summary of the Habitat Loss

Habitat	Ecological Value	Permanent Loss (ha)
Woodland (W3) *	Medium	1.2
Agricultural Land	Low	1.1
Natural Stream (of Water Network N2) ^	Low	0.0 (193m^2; 104m in total length)
Semi-natural Stream (of Water Network N1)	Medium-low to Low	0.1 (356m in total length)
Drainage Channel	Low	0.4 (1,160m in total length)
Village / Orchard	Low	8.0
Village Area	Negligible	17.4
Urban Area	Negligible	0.4

Note:
* Seven woodlands were identified in the ecological baseline, viz, W1-W7. Only a small part of W3 will be in unavoidable conflict with the development. All others W1-2, W4-7 will not be affected.
^ Natural streams of higher ecological value were all located in water network N1 which will not be affected by the proposed development.

3.6.5 Consideration of avoiding the impacts on floral species of conservation interest, viz. *Aquilaria sinensis* and *Pyrenaria spectabilis* has been taken into account during the selection of the alignment and construction method of the proposed Road L7 at Po Tong Ha. With careful designation of the alignment and the adoption of suitable construction method for the retaining structures along the proposed Road L7, all the *Pyrenaria spectabilis* and majority of *Aquilaria sinensis* can be preserved in-situ. Only three individuals of *Aquilaria sinensis* were found falling within the footprint of the proposed Road L7. To minimize the impact on the three individuals of *Aquilaria sinensis*, two of them will be preserved by transplanting while the remaining one will be felled down due to its poor health condition. With implementation of proposed mitigation measure, the impact on *Aquilaria sinensis* is insubstantial.

3.6.6 Majority of the recorded localities of the two crab species of conservation interest (viz. *Cryptopotamon anacoluthon* and *Somanniathelphusa zanklon*) are identified at the upper section of the semi-natural stream R1f, marginally located along the boundary of HPR Site. To avoid direct impact on these two crab species, the ecologically sensitive upper section of the semi-natural stream R1f located in HPR Site is proposed to be retained by excluding it from the project site area. After this active avoidance measure, only one locality of *Cryptopotamon anacoluthon* will be unavoidably affected. Translocation of these crabs at suitable undisturbed stream habitat before construction is recommended. With the implementation of the recommended translocation measure and recommended good site practices (e.g. Use of quiet mechanical plant and regular dust suppression measures, etc.), no significant overall ecological impact on the crab species is anticipated. To further improve the carrying capability of the semi-natural stream for the two crab species of conservation interest, ecological enhancement for the retained section of the semi-natural stream by provision of 6m buffer zone along its southern bank, removing existing artificial bank structures and planting of native/self-sustaining vegetation to reinstate its natural riparian habitat is proposed.

3.6.7 Though the impact of woodland loss at W3 is anticipated to be minor due to limited size and low-quality of the affected woodland patch, provision of woodland enhancement planting is

recommended to enhance ecological performance of the area. According to the current proposal, enhancement planting of not less than 1.2ha will be provided.

3.6.8 With the implementation of the recommended mitigation measures, no adverse residual ecological impacts arising from the implementation of the proposed Project are anticipated.

3.7 Impact from Electric and Magnetic Fields

Key Assessment Scope and Key Criteria

3.7.1 The assessment for the electric and magnetic fields was conducted in accordance with the requirements set out under Section 3.4.12 of the EIA Study Brief and the guidelines issued by the International Commission on Non-ionizing Radiation Protection (ICNRIP).

Impact Assessment

3.7.2 Some sections of the existing 400kV overhead cables run across the Hong Po Road and San Hing Tsuen areas. On-site measurement of overhead cables has been conducted at representative locations of the proposed PTIs, public housing development areas, school sites and the proposed SPS to investigate the potential health hazard to humans due to exposure to electric field (ELF) and magnetic field (EMF) generated by the overhead lines.

3.7.3 The assessment results confirmed that the strength of the ELF and EMF generated from the 400kV overhead cables are well below the stipulated guideline limits issued by the ICNIRP in 1998. Thus. the ELF and EMF generated by overhead cables will not pose a hazard to human health.

3.8 Landscape and Visual Impact

Key Assessment Scope and Key Criteria

3.8.1 The landscape and visual impact assessment was conducted based on the criteria and guidelines in Annexes 10 and 18 of the EIAO-TM, the EIAO Guidance Note No. 8/2010 and Section 3.4.10 and Appendix I of the EIA Study Brief. According to the EIA Study Brief, the study area for the landscape impact assessment included areas within 500m from the boundary of the Project Site, while the assessment area for the visual impact assessment shall be defined by the visual envelope of the Project.

Landscape Impacts

3.8.2 Within the assessment area, 8 Landscape Resources (LRs) and three (3) Landscape Character Areas (LCAs) are identified. Given the rural nature of the Project area, the proposed developments of the Project will inevitably result in some landscape and visual impacts on the LRs and LCAs during construction and operation phases. It is not possible to fully mitigate all landscape impacts in relation to loss of natural/semi-natural stream, hillside woodland, agricultural land or orchard during the construction period and early operation stage, mainly as long periods of time are required to sufficiently compensate for the associated impacts. A broad-brush tree survey has been carried out, it is found that four (4) numbers of tree of particular interest (including 2 nos. of *Ficus microcarpa*, 1 no. of *Melaleuca cajuputi subsp. cumingiana* and 1 no. of *Litchi chinensis*) are located within the footprint of the Project Site. No Old and Valuable Tree was found within the project site boundary or assessment area.

3.8.3 The main impact for most of the affected LRs and LCAs would be the loss of greenery and existing trees. Approximately 1,300 nos. of existing trees will be affected due to the Project. To compensate the loss of greenery, not less than 1,300 nos. of new trees in different sizes is proposed to be planted as far as practicable. Existing trees will be preserved as far as practicable. If retaining trees are not practicable, transplant the affected trees to other suitable locations within the Project Site or the adjacent areas will be considered. Tree removal will only be considered when tree preservation or transplanting is found unsuitable

or impracticable. Tree Preservation and Removal Proposal will be prepared during detailed design stage, to finalise tree treatment and allocate compensatory planting areas including open space, sitting out areas and streetscape. With the implementation of the proposed mitigation measures, such as compensatory planting, tree protection and preservation, tree transplantation, roadside greening, screen planting and enhancement of semi-natural stream etc, the residual impacts to LRs and LCAs can be reduced to an acceptable level.

Visual Impacts

Construction Phase

3.8.4 Visual impacts are primarily due to the high-rise buildings development but also due to the construction of proposed road system, proposed SPS, water services reservoirs and natural terrain mitigation measures. In addition, visual impact will also involve the impacts from excavation works, site formation works, as well as the loss of greenery due to the removal of trees and vegetation. All Visual Sensitive Receivers (VSRs) are affected by the Project in different levels. Visual blockage would be gradually built-up by phase as a continuous process. Impact arising from the construction works are limited at lower level due to the existing views are partially screened by adjacent architectures, vegetation and level difference of landforms. With the implementation of proposed mitigation measures such as site hoarding and control of night-time glare, the visual impact during construction phase will be mitigated.

Operation Phase

3.8.5 From a visual perspective, given the nature and scale of the proposed development with high-rise buildings development, the Project will likely alter the visual context of the area. The carpark users in Tuen Tsz Wai and the residents in Po Tong Ha are anticipated to experience substantial visual impacts. On the other hand, a number of VSRs are anticipated to experience moderate visual impacts, including: the passengers on the train heading towards Siu Hong MTR Station of the West Rail Line, road users at Hong Po Road roundabout, the hikers walking along the trails between Castle Peak and Por Lo Shan, the visitors of Miu Fat monastery and the visitors for tomb-sweeping around Chung Shan hillsides. The remaining VSRs would experience slight visual impacts.

3.8.6 Based on the impact assessment findings, a number of mitigation measures have been proposed. These include adopting alternative designs to prevent and/or minimise adverse impacts; remedial measures such as colour and textural treatment of building features; and compensatory measures such as the implementation of landscape design elements (e.g. tree planting and creation of new open space, etc.) to compensate for unavoidable adverse impacts and attempt to generate potentially beneficial long-term impacts.

3.8.7 For the DP1, which is the proposed SPS at SHR Site, in view of the small scale of development, no significant landscape impacts on LRs and LCAs, as well as visual impacts on VSRs are anticipated.

3.8.8 Overall, there will be some adverse effects brought up by the Project. Mitigation measures have been proposed and the project design has endeavoured every effort to minimise potential impacts to practical minimum. Assuming that full and appropriate mitigation measures are to be implemented during construction and operation phases, the residual landscape and visual impacts are perceived to be acceptable, as stated in EIAO-TMs and EIAO Guidance Note No. 8/2010.

3.9 Waste Management Implications

Key Assessment Scope and Key Criteria

3.9.1 The types of waste that would be generated during the construction and operation phases of the Project have been identified. The potential environmental impacts that may result from these waste materials have been assessed in accordance with the criteria and guidelines outlined in Annex 7 and Annex 15 of the EIAO-TM, and Section 3.4.7 and Appendix F of the EIA Study Brief.

Construction Phase

3.9.2 The main waste types to be generated during the construction phase of the Project would include construction and demolition (C&D) materials, chemical waste, general refuse and asbestos containing material (ACM). It is estimated that there will be a total of around 99,000 m^3 of non-inert C&D materials, about 633,000 m^3 of inert C&D materials, a few hundred litres per month of chemical waste, less than 650 kg per day of general refuse and some ACM to be generated during the construction phase of the Project. Reduction measures have been recommended to minimise the amount of materials generated by the Project by reusing C&D materials as far as practicable before off-site disposal.

3.9.3 The inert C&D materials generated from the Project will be reused within the Project or other concurrent projects as far as practical. For instance, during site clearance, site formation and infrastructure works, it is estimated that around 58% of the inert C&D materials will be suitable for reuse on-site as backfilling materials under this Project and the rest of inert C&D materials (about 233,000 m^3) will be transported to other concurrent projects and/or public fill area (Tuen Mun Area 38 Fill Bank) for reuse. Temporary stockpiling areas are also identified to store the C&D materials for reuse under this Project. Provided that the waste is handled, transported and disposed of using approved methods, adverse environmental impacts would not be expected.

Operation Phase

3.9.4 The main types of waste to be generated during the operation phase of the Project would consist of municipal solid waste (MSW), screenings and chemical waste. It is expected that the Project would generate around 150 tonnes of MSW per day in total, about 3.5 m^3 of screenings per week, and a minimal amount of chemical waste, mainly from maintenance activities on the road networks and the SPS within the PDA. The MSW generated would be conveyed to refuse collection points before being transported to the existing West New Territories (WENT) Landfill outside the PDA. Initiatives such as promoting recycling and providing recycling bins would be employed in order to minimise the amount of MSW to be disposed of at landfill. Provided that the waste generated in the operation phase is handled, transported and disposed of properly, no adverse environmental impacts are anticipated.

3.10 Land Contamination Impact

Key Assessment Scope and Key Criteria

3.10.1 The land contamination assessment is conducted in accordance with the criteria and guidelines as stated in the requirements given in Section 3.4.8 and Appendix G of the EIA Study Brief, as well as Annex 19 of the EIAO-TM.

3.10.2 The land contamination assessment examined the potential contaminative land uses within the Project Site and their potential impacts to future land use. The majority of the potentially contaminated sites could not be accessed for inspection of the site conditions during site walkover and permission could not be obtained from the land site owners/operators to carry out site investigation (SI) works at the time of preparation of the EIA report. As such, the assessment on the potential land contamination was conducted based on the findings from

site appraisal comprises site walkover and review of historical aerial photographs and maps, historical spillage and leakage records and previous site investigations undertaken at the Project Site.

3.10.3 Based on the available information, 57 potentially contaminated sites have been identified within the Project Site. Based on the site survey and desktop review, the majority of the potentially contaminated sites have been identified as open storage, container yards, workshops and service yards. The source of potential land contaminating activities at the identified sites mainly relates to the spillage and accidents associated with the storage and use of chemicals. As such, it is considered that the potential land contamination at these sites would be localised.

3.10.4 The chemicals of concern (COCs) identified with the potential to be present at the potentially contaminated sites include: metals, Volatile Organic Compounds, Semi Volatile Organic Compounds, Petroleum Carbon Ranges and Polychlorinated Biphenyls. These COCs are readily treatable with proven remediation techniques in local remediation experience. By implementing the recommended remediation works, any contaminated site(s) identified within the Project Site could be cleaned up prior to construction/development.

3.10.5 The recommended remediation works would not only minimise the health risk to the future occupants arising from the exposure of the contaminated soil and/or groundwater, it would also provide the opportunity to reuse the treated contaminated materials into useful materials for backfilling, which results in minimising the amount of waste disposing into the depleting landfill in Hong Kong and achieving a more sustainable development.

3.10.6 Since the identified potentially contaminated sites are still in operation, SI is unlikely to be carried out at this stage. There may also be change in land use prior to development within both the potentially contaminated sites and other surveyed sites. In view of this, it is recommended to conduct further works including site re-appraisal. Findings from the re-appraisal will be presented in the supplementary Contamination Assessment Plan(s) (CAP(s)). Upon approval of the supplementary CAP and completion of the SI works, a Contamination Assessment Report(s) will be prepared to present the findings of the SI works. If contaminated soil and/or groundwater were identified, remediation should be carried out according to EPD's approved Remediation Action Plan(s) and Remediation Report(s) (RR(s)) should be submitted to EPD for agreement after completion of the remediation works. No development works of the contaminated portions shall be commenced prior to EPD's agreement of the RR(s).

3.11 Impact on Cultural Heritage

Key Assessment Scope and Key Criteria

3.11.1 A cultural heritage impact assessment has been conducted, including a built heritage impact assessment and an archaeological impact assessment, to evaluate the impacts on known or potential cultural heritage resources. The cultural heritage impact assessment followed the requirements of Annexes 10 and 19 of the EIAO-TM as well as those set out in Section 3.4.11 and Appendix J of the EIA Study Brief. The assessment area includes areas within a distance of 50m from the boundary of the Project Site.

Terrestrial Archaeology

3.11.2 The proposed developments are located within or in very close proximity to San Hing Tsuen, Siu Hang Tsuen, and Kei Lun Wai Sites of Archaeological Interest (SAI). Based on the evaluation of the literatures, geology and topography at the PDA, San Hing Tsuen SAI may be affected. Field evaluation of identified area of archaeological potential (i.e. northern part of SHR Site) cannot be conducted at this stage as the area is currently in use by light industrial activities and occupied by structures. It is required to carry out an archaeological field survey

at the northern part of SHR Site (Area 2 – See Section 13.6 of EIA Report) upon land resumption and prior to any construction works. This will identify if significant deposits or features are present and follow up action can be recommended. The scope and programme of the proposed archaeological work shall be agreed with AMO. Subject to the findings of the archaeological work, appropriate mitigation measures would be proposed by the project proponent in prior agreement with AMO.

3.11.3 For the areas with low or no archaeological potential, works should be ceased and AMO should be informed immediately in case of discovery of antiquities or supposed antiquities in the course of the construction works. Agreement from AMO would be sought on the follow-up actions if required.

Built Heritage

3.11.4 Literature review is conducted to collate relevant information on Declared Monuments and Graded Historical Buildings. Previous investigations within the current study area and surrounding area carried out under other projects (See Section 13.4 of EIA report) indicate little potential for built heritage or heritage as identified in Guidelines for Cultural Heritage Impact Assessment. As such, no further built heritage survey was deemed necessary. There are no proposed or declared monuments, graded or proposed to be graded historic buildings, Government historic sites or new items proposed for grading by the Antiquities Advisory Board within the boundary of the Project Site. In summary, it can be stated that no built heritage will be affected during construction and operation phases of the Project.

3.12 Environmental Monitoring and Audit Requirements

3.12.1 An Environmental Monitoring and Audit (EM&A) programme will be implemented during the construction and operation phases to regularly monitor the environmental impacts on the neighbouring sensitive receivers. Any action required during the construction and/or operation phases are also recommended for implementation. EM&A requirements for air quality, construction noise, road traffic noise, water quality, waste management, land contamination, terrestrial ecology, landscape and visual impacts and cultural heritage have been recommended. Regular site inspection and audits will be conducted during construction phase to ensure that the recommended mitigation measures are properly implemented. The EM&A requirements are specified and detailed in the EM&A Manual. A summary of the EM&A requirements by each of the environmental parameters is presented in **Table 3.6** below.

Table 3.6 Summary of EM&A Requirements

	EM&A Ref.	Construction Phase	Operation Phase
Air Quality Impact	S.5	✓	✓
Noise Impact	S.6	✓	✓
Water Quality	S.7	✓	×
Sewerage and Sewage Treatment	S.8	×	×
Ecological Impact	S.9	✓	×
Impacts from Electric and Magnetic Fields	S.10	×	×
Landscape and Visual Impacts	S.11	✓	✓
Waste Implication	S.12	✓	×
Land Contamination	S.13	✓	×
Cultural Heritage Impact	S.14	✓	×

4. SUMMARY OF ENVIRONMENTAL OUTCOMES

4.1 General

4.1.1 The Project will provide public housing developments and other uses including supporting infrastructure and community facilities, and to improve the existing environment. The Project aspires to transform the existing brownfield sites consisting of workshops, warehouses and vehicle repair workshops, etc. which have created considerable environmental, traffic and visual problems into a new housing area with landscaping and greening works.

4.1.2 This EIA Study has provided an assessment of the potential environmental impacts associated with the construction and operation of the Project, based on the engineering design information available at this stage. This has also included specific assessments for a Schedule 3 DP and a Schedule 2 DP under the EIAO.

4.1.3 The technical assessments conducted (see EIA Report Chapter 4 to Chapter 13) have demonstrated that the following environmental impacts due to the Project have complied with all the statutory requirements in EIA Study Brief (EIA SB No.: ESB-299/2017) and EIAO-TM.

- Air Quality Impact;
- Noise Impact;
- Water Quality Impact;
- Sewerage and Sewage Treatment Implications;
- Ecological Impact;
- Impact from Electric and Magnetic Fields;
- Landscape and Visual Impacts;
- Waste Management Implications;
- Land Contamination Impact; and
- Cultural Heritage Impact.

4.1.4 The findings of this EIA Study have predicted the likely nature and extent of environmental impacts arisen from the construction and operation of the Project. During the EIA process, environmental mitigation measures have been identified for incorporation into the planning and design of the Project, to achieve full compliance with environmental legislation and standards during the construction and operation phases.

4.1.5 Avoidance of environmental impacts is one of the key considerations throughout the entire project development and design.

<u>Avoidance of Encroachment onto Recognised Sites of Conservation Interest</u>

4.1.6 All the recognised sites of conservation interest, including the Conservation Area near Chung Shan and a mature woodland near Tong Hang Road have been avoided and will not be encroached by any developments under this Project.

<u>Avoidance of Direct Impact on Crab Species and Plants of Conservation Interest</u>

4.1.7 Most of the species of conservation interest as well as their habitats with ecological value have been excluded from the Project Site during this engineering feasibility stage. To avoid the direct loss of the semi-natural stream and minimising impact on identified crab species of conservation interest (*Cryptopotamon anacoluthon* and *Somanniathelphusa zanklon*), an upstream section of the semi-natural stream R1f located within the HPR Site is excluded from the PDA. This can also help to avoid direct impacts on the crab species of conservation interest.

4.1.8 With careful designation of the alignment of the proposed Road L7 and construction method for the retaining structures along the proposed Road L7, the loss of woodland area can be minimised and most of the floral species of conservation interest, including a large specimen of *Aquilaria sinensis* and all the *Pyrenaria spectabilis* in the woodland can be preserved in-situ.

Avoidance of Direct Impact on Natural and Semi-natural Stream of Higher Ecological Value

4.1.9 The proposed development has totally avoided direct encroachment onto natural and semi-natural streams of higher ecological value. In addition, refinement of PDA boundary and drainage alignment have been adopted in order to preserve the upper section of semi-natural stream R1f with higher ecological value during the planning of the development.

4.1.10 Overall, the EIA Study has predicted that the Project, with the implementation of avoidance/mitigation measures, would be environmentally acceptable with no adverse residual impacts on the population and environmental sensitive resources. The environmental benefits (including improving the existing interface issues of industrial/residential uses, improving the water quality by providing new sewerage system for the existing unsewered areas within the PDA, enhancing the ecological value of the retained semi-natural stream to preserve crab species of conservation interest, etc) are also likely to be resulted from the Project.

END OF TEXT

FIGURES